Technical Memorandum for Additional Radiological Sediment Sampling at the Middle River Complex 2323 Eastern Boulevard Middle River, Maryland

Prepared for:

Lockheed Martin Corporation

Prepared by:

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March 2015



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TABLE OF CONTENTS

Section **Page**

ACRONYMS AND ABBREVIATIONS iii

1 INTRODUCTION 1-1

2 SITE BACKGROUND 2-1

2.1 SITE DESCRIPTION 2-1

2.2 BACKGROUND 2-1

3 INVESTIGATION APPROACH AND METHODOLOGY 3-1

4 RESULTS 4-1

5 REFERENCES 5-1

APPENDIX A—DATA-VALIDATION REPORTS

APPENDIX B—CHEMICAL DATA TABLE

APPENDIX C—LABORATORY SAMPLE REPORTS

APPENDIX D—REGULATORY AGENCY CORRESPONDANCE

LIST OF FIGURES

Page

Figure 1-1 Middle River Complex Location Map 1-3

Figure 2-1 Middle River Complex Facility Map 2-3

Figure 3-1 Proposed Dark Head Cove Radiological Analysis Sediment Sampling Locations, 2014 3-6

Figure 3-2 Background Locations, Spring 2014 3-7

LIST OF TABLES

Page

Table 3-1 Summary of Sediment Sampling and Radiological Analysis — Dark Head Cove, 2014 3-4

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ACRONYMS AND ABBREVIATIONS

α	alpha (denotes alpha contamination/radiation)
β	beta (denotes beta contamination/radiation)
γ	gamma (denotes gamma radiation)
ANS	Applied NanoStructured Solutions, LLC
FS	feasibility study
HASL	Health and Safety Laboratory
HCl	hydrochloric acid
HF	hydrofluoric acid
HNO_3	nitric acid
ICP-MS	inductively coupled plasma mass spectrometry
LMCPI	LMC Properties, Inc.
Lockheed Martin	Lockheed Martin Corporation
mg/kg	milligram(s) per kilogram
MRAS	MRA Systems, Inc.
MRC	Middle River Complex
MSA	Martin State Airport
MST	Mission Systems & Training
NaI	sodium iodide
PAH	polycyclic aromatic hydrocarbon
PCBs	polychlorinated biphenyls
pCi/g	picocuries per gram
PRGs	preliminary remediation goals
SRA	sediment removal action
Tc-99	technetium 99
Tetra Tech	Tetra Tech, Inc.
Th	thorium
Th-228	thorium 228
Th-230	thorium 230
Th-232	thorium 232
U	uranium
U-233	uranium 233
U-234	uranium 234

U-235	uranium 235
U-236	uranium 236
U-238	uranium 238
USEPA	United States Environmental Protection Agency

Section 1
Introduction

Tetra Tech, Inc. (Tetra Tech) has prepared this technical memorandum on behalf of Lockheed Martin Corporation (Lockheed Martin) to document the additional radiological sediment sampling and results at the Middle River Complex (MRC) at 2323 Eastern Boulevard in Middle River, Maryland (see Figure 1-1). This sampling was completed to determine if any radioactively contaminated material is present above background and/or above risk-based preliminary remedial goals (PRGs). The information and data herein will also be used to evaluate disposal options for sediment removed from Dark Head Cove during future operations. A 2012 feasibility study (FS) of possible environmental remedies for the Middle River Complex led the Maryland Department of the Environment and the United States Environmental Protection Agency (USEPA) to approve the proposed sediment remedies for Dark Head Cove and Cow Pen Creek. Sediment in the creek and cove is impacted by polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), and metals. Since radiological operations had occurred in former Building D at the Middle River Complex, radiological characterization of the sediment was performed. Sediment was sampled for isotopic thorium (Th-228, Th-230, and Th-232) and isotopic uranium (U-233/234, U-235/236, and U-238) in September 2013 to support the remedial design. The 2013 sampling effort revealed a single sediment sample (SD-142-02) with a uranium-235 concentration (0.427 pCi/g) slightly above background; sample SD-142-02 was collected in shallow sediment near Outfall 005.

This single positive radiological result and concern that enriched uranium might be present onsite (due to possible migration from Block E), prompted Lockheed Martin Corporation to perform additional sediment sampling in 2014. The specifics of the sampling program are detailed in the *Additional Radiological Analysis Sediment Sampling Work Plan, Middle River Complex, 2323 Eastern Boulevard, Middle River, Maryland* (Tetra Tech 2014b).

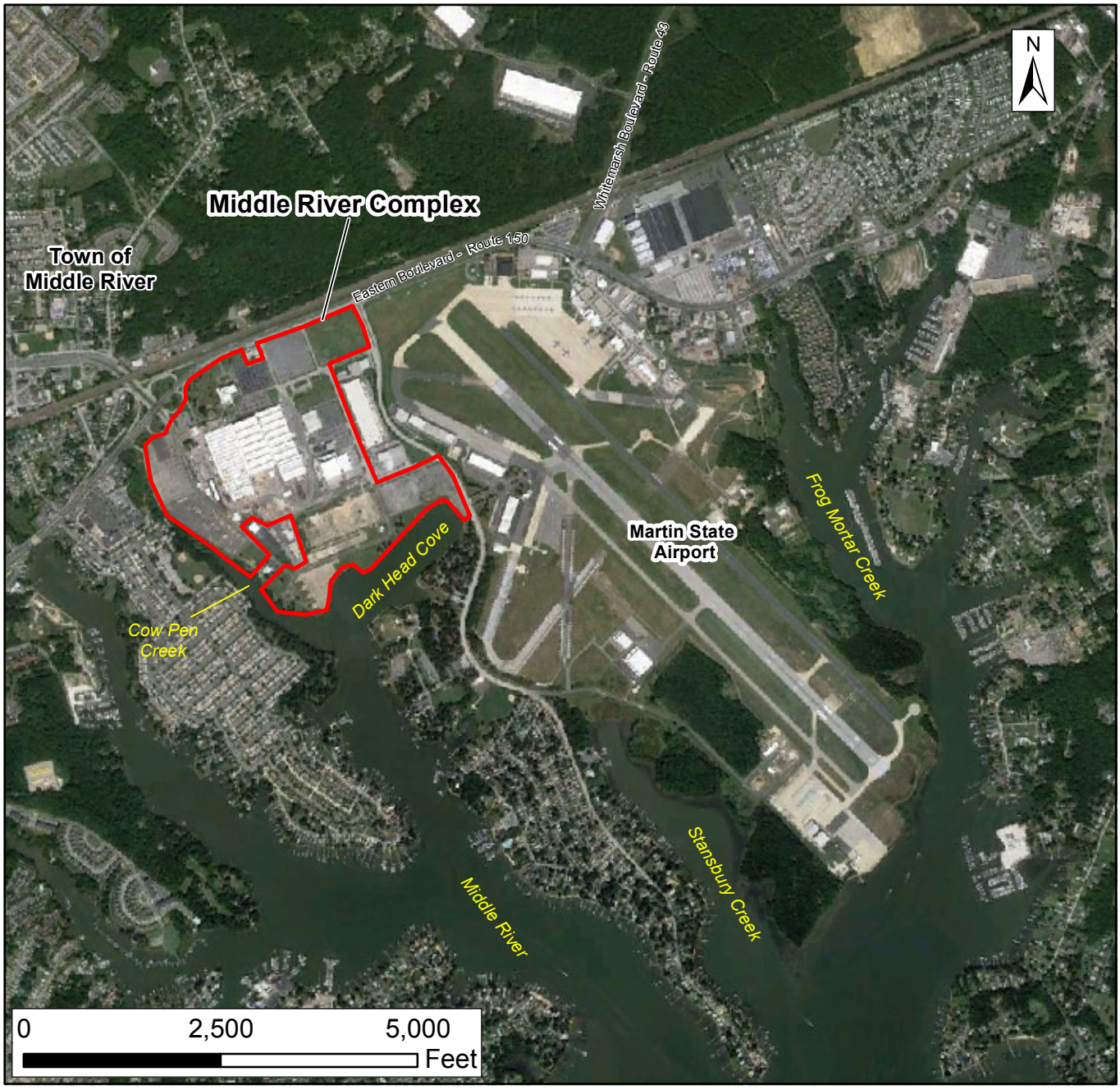
This technical memorandum is organized as follows:

Section 2 – Site Background: Briefly describes the site history and previous investigations.

Section 3 – Investigation Approach and Methodology: Presents the technical approach to the investigation and describes the field methodology for sampling and radiological analyses.

Section 4 - Results: Presents the results of the investigation program.

Section 5 – References: Cites references used in compiling this technical memorandum.



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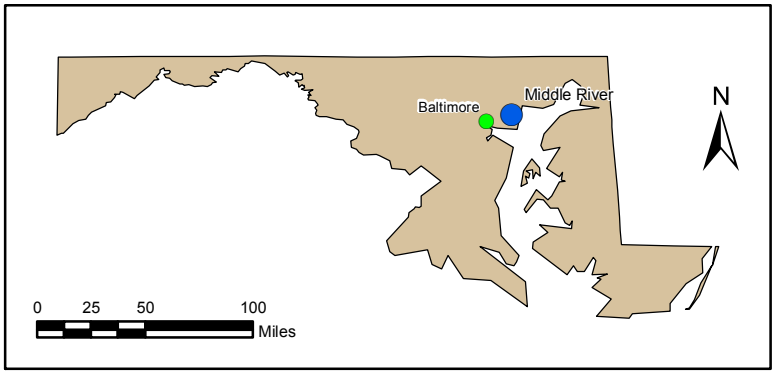

FIGURE 1-1

MIDDLE RIVER COMPLEX LOCATION MAP

Lockheed Martin Middle River Complex
Middle River, Maryland

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Section 2
Site Background

2.1 SITE DESCRIPTION

The Lockheed Martin Corporation (Lockheed Martin) Middle River Complex (MRC) is at 2323 Eastern Boulevard in Middle River, Maryland (Figure 2-1). The site is comprised of approximately 163 acres with 12 main buildings. The property includes an active industrial area and yard, perimeter parking lots, an athletic field, a vacant concrete-covered lot, a trailer and parts storage lot, and numerous grassy areas along the facility perimeter. Locked chain-link fences surround all exterior lots and the main industrial area. The site is bounded by Eastern Boulevard (Route 150) to the north, Dark Head Cove to the south, Cow Pen Creek to the west, and Martin State Airport (MSA) to the east.

The MRC is owned by LMC Properties, Inc. (LMCPI) (a Lockheed Martin subsidiary). LMCPI activities at the site are limited to facility and building management and maintenance. Two main tenants occupy the site: MRA Systems, Inc. (MRAS) (a subsidiary of General Electric Company) and the Mission Systems & Training (MST) business area of Lockheed Martin. MRAS designs, manufactures, fabricates, tests, overhauls, repairs, and maintains aeronautical structures, parts, and components for military and commercial applications. MST fabricates, assembles, tests, and otherwise supports vertical-launch systems. Historically, the property has been used for aircraft and missile-launching-systems design, development, and sales. Applied NanoStructured Solutions, LLC (ANS) (another Lockheed Martin company) also occupies a small portion of the site. ANS develops and commercializes nanotechnology.

2.2 BACKGROUND

Various MRC site investigations have identified sediment contamination resulting from historical facility activities and historical filling used to create the existing surface grade. Sediment impacts include elevated concentrations of polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), and metals. Investigations performed between 2005 and 2013 are

summarized in the feasibility study (FS) (Tetra Tech, 2012) and *Sediment Remedy Design Investigation Report* (Tetra Tech, 2014a).

Historical radiological research activities were conducted in the western portion of former Building D basement during the 1950s and 1960s. These activities included the use of uranium-235 (U-235) and magnesium-thorium alloy (4% thorium as thorium-232 [Th-232]). A 2012 radiological survey of concrete and soil at former Building D indicates that thorium and uranium isotope concentrations in these media were less than United States Environmental Protection Agency (USEPA) preliminary remediation goals (PRGs)[1]. Sample results were compared to USEPA PRGs based on residential exposure. The calculated PRGs were 3.07 pCi/g (Th-228), 24.3 pCi/g (Th-230), 3.46 pCi/g (Th-232), 4.02 pCi/g (U-233/234), 0.192 pCi/g (U-235/236), and 4.48 pCi/g (U-238). No concrete samples had activity above these values.

Stormwater runoff and sediment from former Building D and its vicinity discharges to Dark Head Cove via MRC storm drain Outfall 005 -West, Outfall 005-East, and Outfall 008. Six sediment cores were advanced in the creek bed of Dark Head Cove in 2013 to evaluate possible impacts from former Building D runoff to cove sediment; these samples were advanced approximately 5-, 25-, and 50-feet from Outfalls 005-West and 005-East (Tetra Tech, 2014b). Sediment samples collected from these cores were analyzed for thorium (Th) isotopes (Th-228, Th-230, and Th-232) and uranium (U) isotopes (U-233/234, U-235 and U-238). For comparison, background radiological samples were also collected nearby, offshore of the Hawthorne community.

With the exception of sample SD-142-02 (collected at a depth of 18-30 inches near Outfall 005-East), all isotope results for samples collected in 2013 were indistinguishable from background concentrations. Uranium-235 activity for SD-142-02 was 0.427 picocuries per gram (pCi/g), which was above the outdoor worker value for soil (0.35 pCi/g). Results for adjacent core samples (i.e., SD-141-01, SD-141-02, SD-143-01, and SD-143-02) and for the shallower sediment sample from the same location (SD-142-01) were all indistinguishable from background concentrations.

[1] USEPA preliminary remediation goals for radionuclides – PRG calculator
http://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search



FIGURE 2-1

MIDDLE RIVER COMPLEX FACILITY MAP

LEGEND

OUTFALL 004 NPDES PERMITTED OUTFALL

STORMWATER AND FLOW DIRECTION

EXISTING STRUCTURE

FORMER STRUCTURE

AST - aboveground storage tank
GAL - gallon
NPDES - National Pollutant Discharge Elimination System
UST - underground storage tank

Lockheed Martin Middle River Complex
Middle River, Maryland

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Section 3
Investigation Approach and Methodology

Sediment samples were collected from the bottom of Dark Head Cove at nearby (non-study area) locations to assess background radiological concentrations. Cove-bottom sediment samples were then collected in Dark Head Cove from June 9-20, 2014 near three Block F outfall locations (Outfalls 005 West, 005 East, and 008) to:

- characterize the extent of radiological contamination, if present
- delineate the vertical and horizontal extent of radiological contamination (if present)
- evaluate waste disposal options for dredged sediment

Sampling was conducted in accordance with the approved work plan (Tetra Tech, 2014b). Eleven reference-background samples were collected from three locations at distances ranging from two to six miles from the study area, and 131 sediment samples were collected in the study area; all samples were submitted for radiological analysis. Samples were collected from three sampling intervals: 0-6 inches, 6-18 inches, and 18-30 inches. Composite sediment samples were also collected from Outfalls 005East, 005West, and 008; these samples were analyzed for waste characterization. In addition, the two (2) samples with the highest concentration of U-235 were analyzed for technicium-99 (Tc-99). All samples were analyzed by the laboratory on a standard 30-calendar-day turnaround time.

To determine radiological distributions near and beyond the outfalls, a phased or tiered approach (i.e., Tiers 1, 2, and 3) was employed for the laboratory analyses. As shown on Figure 3-1, Tier 1 samples are located nearest the outfalls/bulkhead, and Tier 2 and 3 samples extend outward in three directions from the Tier 1 locations. Laboratory analyses for thorium and uranium (Table 3-1) were performed for the first three sample depths in all Tier 1 and Tier 2 samples (red dots SD-195 through SD-222, and green dots on Figure 3-1), and in all reference samples (SD-277 through

SD-279; see Figure 3-2). Gamma (γ) spectroscopy analyses of five composite samples and the background samples was also performed. Analytical results for cove sediments were screened against background reference area concentrations and against site-specific preliminary remediation goals (PRGs), as specified in the work plan (Tetra Tech. 2014b). Per the work plan, Tier 3 samples were to be analyzed only if Tier 2 sample concentrations were above screening levels. Since all initial sample data were consistent with background and well below site-specific PRG values (listed below), Tier 3 analysis was not performed.

Preliminary Remediation Goals for Target Radiological Isotopes

Radiological isotope	Preliminary remediation goal for recreational exposure to Dark Head Cove sediments (in picocuries per gram [pCi/g)	
	1×10^{-6} cancer risk level[1]	1×10^{-5} cancer risk level[2]
Ra-226[3]	1.41E+01	1.41E+02
Ra-226+D[3, 4]	2.67E-01	2.67E+00
Ra-228[3]	2.64E+01	2.64E+02
Ra-228+D[3]	6.33E-01	6.33E+00
Tc-99[3]	3.24E+03	3.24E+04
Tc-99m[3]	1.75E+05	1.75E+05
Th-228	5.11E+02	5.11E+03
Th-229	6.30E+00	6.30E+01
Th-229+D	1.02E+00	1.02E+01
Th-230	5.64E+01	5.64E+02
Th-231	5.03E+05	5.03E+06
Th-232	5.16E+01	5.16E+02
U-233	8.32E+01	8.32E+02
U-234	8.88E+01	8.88E+02
U-235	3.67E+00	3.67E+01
U-235+D	3.67E+00	3.67E+01
U-236	9.43E+01	9.43E+02
U-237	6.65E+03	6.65E+04
U-238	9.89+01	9.89+02
U-238+D	1.28E+01	1.28E+02

Source: USEPA preliminary remediation goals for radionuclides – PRG calculator
http://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search

1) Screening levels for radiological isotopes are typically set at the 1E-06 cancer risk level (i.e., a one-in-one million probability of developing cancer).
2) The State of Maryland's *cumulative* cancer risk benchmark is 1E-05 (i.e., a one-in-one hundred thousand probability of developing cancer).
3) These isotopes analyzed using gamma spec analysis) are included in this table for waste-profiling purposes only.
4) The +D designation indicates that the PRG assumes secular equilibrium of the isotope and all of its daughter (decay) products. These values are included in this table to be complete; secular equilibrium is not assumed for the isotopes in this study.
5) Results reported as U-233/234.
6) Results reported as U-235/236.

Sediment from all cores was screened in the field for radiological parameters in accordance with Sections 3.2 and 3.3 and Appendix C of the approved *Sediment Remedy Design Investigation Work Plan* (Tetra Tech, 2013). The following radiological screening methods were used:

- Once the core was removed from the core sleeve, each core interval was scanned for gamma (γ) radiation using a Ludlum™ Model 2241 scaler/ratemeter with a Ludlum™ Model 44-10 sodium iodide (NaI) scintillation detector.
- The core was also scanned for alpha (α) and beta (β) radiation using a Ludlum™ Model 2360 scaler/ratemeter with a Ludlum™ Model 43-93 phoswhich probe.
- After the core sample was collected, an additional gamma (γ) scan was performed on the remaining core material to determine if there had been a decrease in gamma (γ) activity (i.e., after removal of the sample, the initial gamma (γ) reading decreased).

Radiological results from all core samples were indistinguishable from background. There was no decrease in gamma activity after core sampling was completed.

Table 3-1

Summary of Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, Maryland
Page 1 of 2

Sediment sample number	Location	Sample depth	Sample analyses and methods*	Rationale/purpose
Tier 1: SD-195 through SD-203, SD-218, SD-219, SD-220 12 cores; 48 samples Tier 2: 6 cores (24 samples) Tier 3: 10 cores (44 samples)	Dark Head Cove-Outfall 005 West	Four samples (depending on site conditions) at each core location; For all but SD-219, sediment samples were collected from depth intervals of 0-6 inches, 6-18 inches, 18-30 inches, and 30-52 inches. For the sample 10 feet off the outfall, samples were collected from depth intervals of 0-6 inches, 6-12 inches, 12-18 inches, and 18-24 inches. Duplicate samples were collected at a rate of 5%.	**Laboratory analyses**: Isotopic thorium by HASL 300 method A-01-R(1) Isotopic uranium by SW846 6020A(1)Total uranium mass concentration (calculation) Percent uranium-235 (calculation) Gamma spectroscopy HASL method GA-01-R with 21 day ingrowth(2) Technetium-99 (Tc-99) by SW846 6020A(1,3) *Above thorium and uranium analyses/calculations were requested for the first three Tier 1-2 sample depths. Tetra Tech requested lab to HOLD analyses for the fourth Tiers 1-2 sample depth, for all Tier 3 samples, and the Tc-99 analysis. See notes at bottom of table for gamma and Tc-99 analyses.*	Recent sediment sampling conducted near Outfall 005 West indicated radiological parameters below preliminary remediation goals (PRGs). However, samples were collected from only three cores near this outfall, and one sample collected at a nearby outfall (i.e., Outfall 005 East) slightly exceeded the uranium soil PRG. Therefore, additional sediment samples and analyses were required to more fully assess radiological activities and concentrations in sediment near this outfall.
Tier 1: SD-204 through SD-210, and SD-221 (8cores; 32 samples Tier 2: 4 cores (16 samples) Tier 3: 4 cores (16 samples)	Dark Head Cove-Outfall 005 East	Four samples (depending on site conditions) at each core location; For all but SD-221, sediment samples were collected from depth intervals of 0-6 inches, 6-18 inches, 18-30 inches, and 30-52 inches. For SD-221, samples were collected from depth intervals of 0-6 inches, 6-12 inches, 12-18 inches, and 18-24 inches. Duplicate samples were collected at a rate of 5%.	**Laboratory analyses**: Isotopic thorium by HASL method A-01-R(1) Isotopic uranium by SW846 6020A(1) Total uranium mass concentration (calculation) Percent uranium-235 (calculation) Gamma spectroscopy HASL method GA-01-R with 21 day ingrowth(2) Tc-99 by SW846 6020A(1,3) *Above thorium and uranium analyses/calculations were requested for the first three Tiers 1-2 sample depths. Tetra Tech requested lab to HOLD analyses for the fourth Tiers 1-2 sample depth, for all Tier 3 samples, and the Tc-99 analysis. See notes at bottom of table regarding gamma and Tc-99 analyses.*	Recent sediment sampling conducted near Outfall 005 East indicated radiological parameters below PRGs except for one sample (SD-142-02 18-30 inch depth), which slightly exceeded the soil uranium PRG. Samples were collected from only three cores near this outfall; therefore, additional sediment samples and analyses were required to evaluate the area of the PRG exceedance at SD-142-02 and to more fully assess radiological activities and concentrations in sediment near this outfall.

Table 3-1

Summary of Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, Maryland
Page 2 of 2

Sediment sample number	Location	Sample depth	Sample analyses and methods*	Rationale/purpose
Tier 1: SD-211 through SD-217, and SD-222 (8 cores; 32 samples Tier 2: five cores,(20 samples No Tier 3 sampling planned	Dark Head Cove-Outfall 008	Four samples (depending on site conditions) at each core location For all but SD-222, sediment samples were collected from depth intervals of 0-6 inches, 6-18 inches, 18-30 inches, and 30-52 inches. For SD-222, samples were collected from depth intervals of 0-6 inches, 6-12 inches, 12-18 inches, and 18-24 inches. Duplicate samples were collected at a rate of five percent.	**Laboratory analyses**: Isotopic thorium by HASL method A-01-R(1) Isotopic uranium by SW846 6020A(1) Total uranium mass concentration (calculation) Percent uranium-235 (calculation) Gamma spectroscopy HASL method GA-01-R with 21 day ingrowth(2) Tc-99 by SW846 6020A(1,3) *Above thorium and uranium analyses/calculations were requested for the first three Tier 1-2 sample depths. Tetra Tech HELD analyses for the fourth Tiers 1-2 sample depth, for all Tier 3 samples, and the Tc-99 analysis. See notes at bottom of table for gamma and Tc-99 analyses.*	Recent sediment sampling conducted near Outfall 008 indicated radiological parameters below PRGs. However, samples were collected from only three cores near this outfall, and one sample collected at a nearby outfall (i.e., Outfall 005 East) that is cross-connected slightly exceeded the soil uranium PRG. Therefore, additional sediment samples and analyses were required to more fully assess radiological activities and concentrations in sediment near this outfall.
Tier 1: SD-277 through SD-279 Background 3 cores; 12 samples No Tier 2 or 3 sampling planned	Background locations beyond Dark Head Cove	Four samples (depending on site conditions) at each core location; Sediment samples were collected from depth intervals of 0-6 inches, 6-18 inches, 18-30 inches, and 30-52 inches. Duplicate samples were collected at a rate of 5%.	**Laboratory analyses**: Isotopic thorium by HASL method A-01-R(1) Isotopic uranium by SW846 6020A(1) Total uranium mass concentration (calculation) Percent uranium-235 (calculation)	Sediment samples were required to compare local background activities and concentrations to sample results.

(1) For isotopic thorium, isotopic uranium, and technetium-99 (Tc-99), samples were prepared in the laboratory using the total dissolution method using nitric acid (HNO_3), hydrochloric acid (HCl), and hydrofluoric acid (HF).

(2) Five composite samples were analyzed as part of Tiers 1-2 analyses for gamma spectroscopy using HASL method GA-01-R with 21-day ingrowth. Composite samples for gamma spectroscopy were collected from each group of approximately five to eight core locations and submitted for Tier 1-2 analyses. Material was collected from each core to the maximum analysis depth (e.g., top three sample intervals to 2.5 feet), then composited with material from adjacent cores and analyzed.

(3) The two (2) samples with the highest concentration of uranium were analyzed for technetium-99 using SW846 Method 6020A.

HASL – Health and Safety Laboratory (United States Department of Energy Environmental Measurements Laboratory)

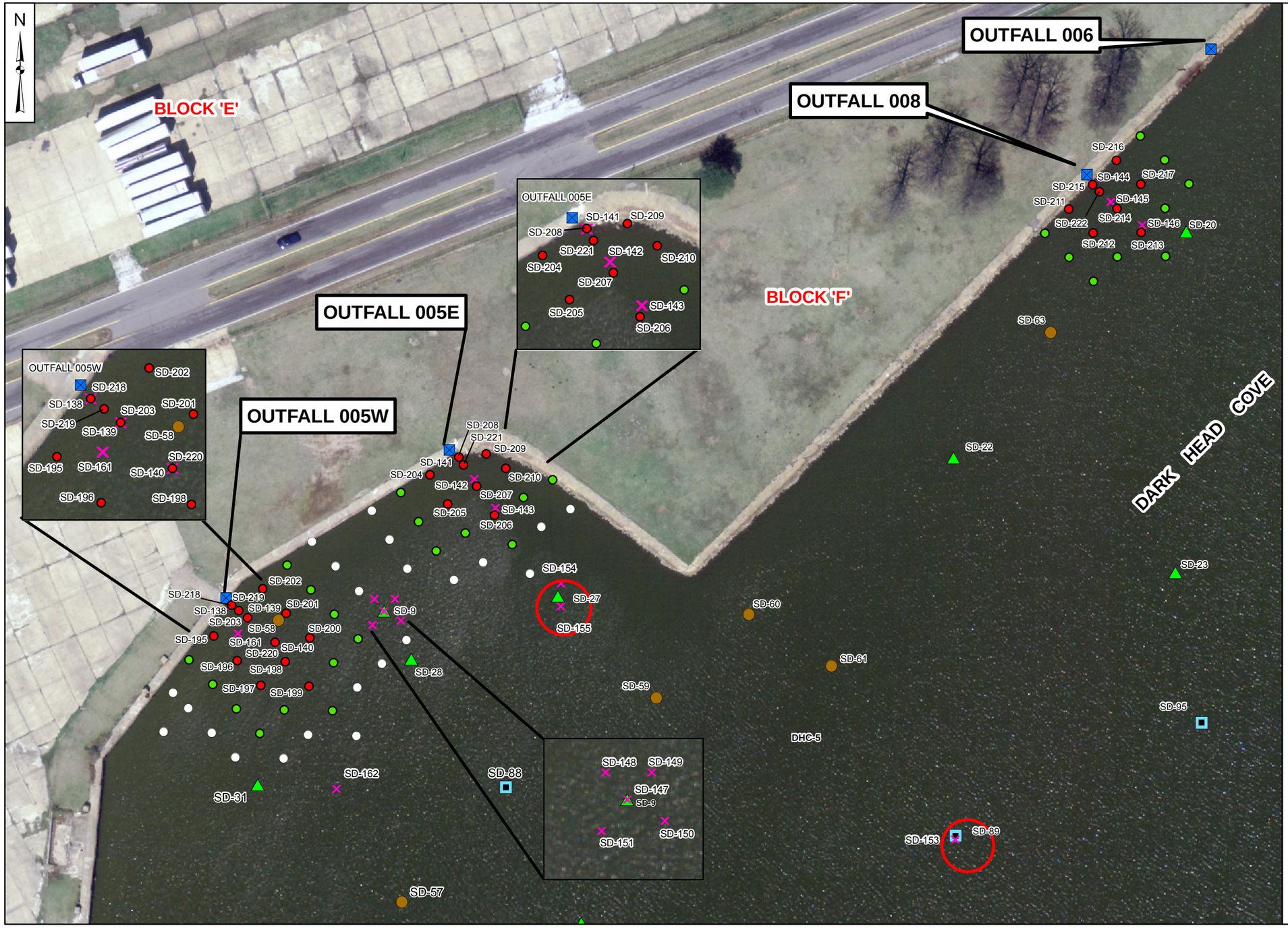

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Figure 3-1
Proposed Dark Head Cove
Radiological Analysis
Sediment Sample Locations, 2014
Lockheed Martin Middle River Complex
Middle River, Maryland

Legend

- Tier 1 Sample Location 2014
- Tier 2 Sample Location 2014
- Tier 3 Sample Location 2014
- Sediment Core/Sample Location - 2013
- Delineation Sample Location - 2010
- Sediment Sample Locations- Nov 2008
- Storm Drain Outfall
- Sediment Sample Location- 2005
- Treatability Testing Sample Location- 2013

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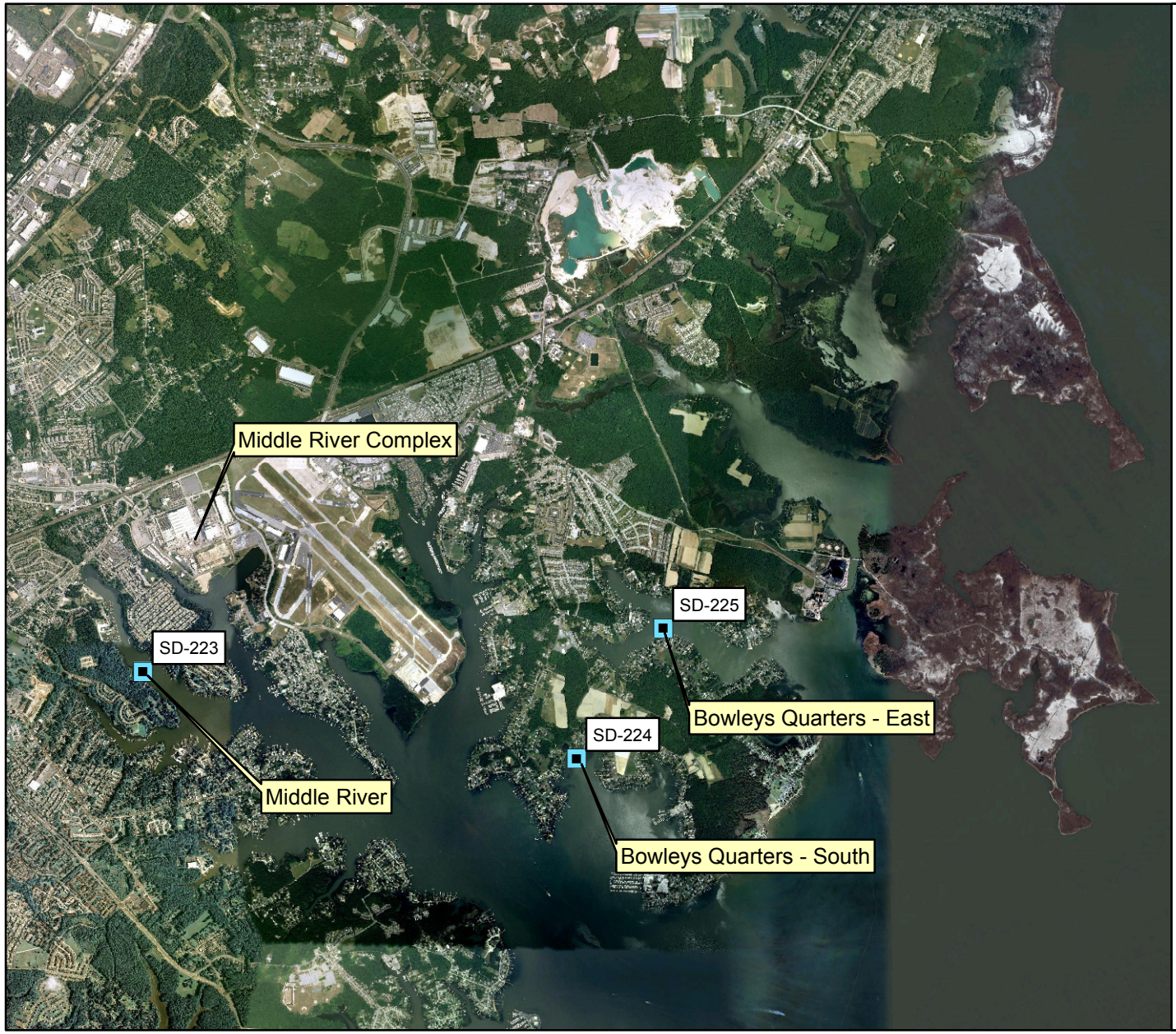

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Figure 3-2
Background Locations
Spring 2014
Lockheed Martin
Middle River Complex
Middle River, Maryland

Legend

Proposed Background Samples

0 2,000 4,000 6,000
Feet

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Section 4
Results

This 2014 investigation supplements existing sediment data collected during previous sediment investigations of Dark Head Cove. An elevated concentration of U-235 was detected during a previous investigation. This memorandum was developed to document the additional radiological sediment sampling and results, and to determine if any radioactively contaminated material is present above background and/or preliminary remediation goals (PRGs) in the study area. In addition, this data was used to evaluate disposal options for sediment removed from Dark Head Cove during subsequent field operations.

Eleven reference-background samples were collected from three locations at distances ranging from two to six miles from the study area. All background sample results were consistent with a normal background distribution.

One-hundred thirty-one sediment samples from the study area were analyzed for radiological constituents. Samples were collected from three sampling intervals: 0-6 inches, 6-18 inches, and 18-30 inches. Composite sediment samples were also collected from Outfalls 005E, 005W, and 008; these samples were analyzed for waste characterization. Duplicate samples were collected at a rate of five percent.

Data was evaluated using United States Environmental Protection Agency (USEPA) Pro UCL software. Pro UCL calculates the 95% upper confidence limit (UCL) on the arithmetic mean. This value is typically used in human health risk assessment as a reasonable upper bound for the average concentration. The 95% upper confidence limit is considered the exposure point concentration (EPC) (i.e., the concentration to which our receptor is exposed). Risk estimates are calculated based on the exposure point concentration.

All study area concentrations are indistinguishable from background concentrations and well below the site-specific preliminary remediation goals. Data Validation reports are in Appendix A.

Data and statistics for background, study area, and composite samples are in Appendix B. Laboratory sample reports are in Appendix C.

The sample data laboratory reports were forwarded to the Maryland Department of the Environment for review. The Department concurred with Tetra Tech's conclusion that radioisotopic activity found in the sediment samples was consistent with naturally occurring background levels (Appendix D). The data was also submitted to the New York State Department of Environmental Conservation (DEC) for evaluation against the waste acceptance criteria established for disposal at the Waste Management, Inc. Model City Disposal Facility in Model City, New York. New York State Department of Environmental Conservation concluded that there are no radiological impacts in the sediment from the Lockheed Martin Middle River site (Appendix D).

Section 5
References

1. Tetra Tech, Inc. (Tetra Tech), 2012. *Feasibility Study for the Remediation of Sediments in Cow Pen Creek and Dark Head Cove, Middle River Complex, 2323 Eastern Boulevard, Middle River, Maryland*. Report prepared for Lockheed Martin Corporation, Bethesda, Maryland by Tetra Tech, Inc., Germantown, Maryland. October.

2. Tetra Tech, Inc. (Tetra Tech), 2013. *Sediment Remedy Design Investigation Work Plan, Middle River Complex, 2323 Eastern Boulevard, Middle River, Maryland.* Report prepared for Lockheed Martin Corporation, Bethesda, Maryland by Tetra Tech, Inc., Germantown, Maryland. July.

3. Tetra Tech, Inc. (Tetra Tech), 2014a. *Sediment-Remedy-Design Investigation Report, Middle River Complex, 2323 Eastern Boulevard, Middle River, Maryland*. Report prepared for Lockheed Martin Corporation, Bethesda, Maryland by Tetra Tech, Inc., Germantown, Maryland. April.

4. Tetra Tech, Inc. (Tetra Tech), 2014b. *Additional Radiological Analysis Sediment-Sampling Work Plan, Middle River Complex, 2323 Eastern Boulevard, Middle River, Maryland*. Report prepared for Lockheed Martin Corporation, Bethesda, Maryland by Tetra Tech, Inc., Germantown, Maryland. June.

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APPENDIX A—DATA VALIDATION REPORTS

TETRATECH **INTERNAL CORRESPONDENCE**

TO: **M. MARTIN** **DATE: OCTOBER 14, 2014**

FROM: **A. COGNETTI** **COPIES: DV FILE**

SUBJECT: **DATA VALIDATION: RADIOLOGICAL ANALYSES/METALS URANIUM**
MRC SEDIMENT INVESTIGATION
SAMPLE DELIVERY GROUPS (SDGs) – 680-102577-1 and 680-102577-2

SAMPLE: 2/Sediment/Rad

SD-005E-02 SD-005W-02

Overview

The sample set for MRC Sediment Investigation, SDG 680-102577-1 and 680-102577-2 consists of two (2) sediment environmental samples analyzed for gamma emitters and isotopic uranium. There is no field duplicate pair associated with this SDG.

The samples were collected by Tetra Tech on June 1, 2014 and were analyzed by Test America. All analyses were conducted using Method GA-01-R and SW-846 Method 6020A.

The data contained in this SDG was validated with regard to the following parameters: data completeness, holding times, initial/continuing calibration, laboratory method blank, blank spike recoveries and detection limits.

Notes

Contamination was detected in the initial calibration and continuing calibrations analyzed on September 2, 2014.

Contaminant	Maximum Concentration (ug/L)	Action Level (mg/kg)
Uranium-233	0.0345	0.00292
Uranium-238	0.00507	0.00043

An action level of 5X the maximum concentration was established in order to evaluate samples for blank contamination. Sample aliquot, percent solids and dilution factors were taken into account when applying the action level. No action was taken on the detected results greater than the action level.

The uncertainty for the sample results are reported at 2 standard deviations (95% confidence level). The EDD does not contain the uncertainty result.

Uranium isotopes were determined via method 6020A. Isotopic uranium results reported via method 6020A and expressed in mg/kg units were converted to activity units, pCi/g, by the laboratory using isotope specific theoretical activities.

Nondetected results reported for uranium isotopes determined via method 6020A were reported at limits below the Minimum Detectable Concentration (MDC) by the laboratory. The manner in which the nondetected radioisotopes were reported was based upon the common practice of reporting radiological parameters at the concentration determined by the instrument. Therefore, metals raw instrument results expressed in ug/L were then converted to pCi/g and reported as nondetects below the MDC.

EXECUTIVE SUMMARY

Laboratory Performance Issues: None.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the Methods A-01-R, SW-846 6020A and EPA Functional Guidelines for Inorganic Data Validation (January 2010). The text of this report has been formulated to address only those problem areas affecting data quality.

Tetra Tech
Ann Cognetti
Chemist/Data Validator

Tetra Tech
Joseph A. Samchuck
Data Validation Manager

Attachments:
1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as Reported by the Laboratory
3. Appendix C - Support Documentation

APPENDIX A

QUALIFIED LABORATORY RESULTS

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = ICP PDS Recovery Noncompliance; MSA's $r < 0.995$
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = RPD between columns/detectors >40% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient $r < 0.995$
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 standard deviations is greater than sample activity
Z1 = Tentatively Identified Compound considered presumptively present
Z2 = Tentatively Identified Compound column bleed
Z3 = Tentatively Identified Compound aldol condensate

PROJ_NO: 05220	NSAMPLE	SD-005E-02						SD-005W-02					
SDG: 680-102577-1	LAB_ID	680-102577-2						680-102577-1					
FRACTION: RADG	SAMP_DATE	6/13/2014						6/13/2014					
MEDIA: SEDIMENT	QC_TYPE	NM			TIC			NM			TIC		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS												
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ACTINIUM-228					1.38						1.08		
BISMUTH-214					0.902						0.953		
LEAD-212					1.41						1.04		
LEAD-214					0.849						0.956		
POTASSIUM-40					14.4						13.7		
RADIUM-226		0.902						0.953					
RADIUM-228		1.38						1.08					
THALLIUM-208					0.461						0.225		
THORIUM-232		1.38						1.08					
URANIUM-235		-0.147	U					-0.0826	U				
URANIUM-238		1.64	U					0.641	U				

PROJ_NO: 05220	NSAMPLE	SD-005E-02						SD-005W-02					
SDG: 680-102577-2	LAB_ID	680-102577-2						680-102577-1					
FRACTION: M	SAMP_DATE	6/13/2014						6/13/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS												
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					2.6						1.4		
URANIUM-233					0.0033	U					0.0034	U	
URANIUM-234					0.00067	U					0.00068	U	
URANIUM-235					0.019						0.012		
URANIUM-235 (PERCENT)		0.725						0.85					
URANIUM-236					0.00089	U					0.0009	U	
URANIUM-238					2.6						1.4		

PROJ_NO: 05220	NSAMPLE	SD-005E-02			SD-005W-02		
SDG: 680-102577-2	LAB_ID	680-102577-2			680-102577-1		
FRACTION: RAD	SAMP_DATE	6/13/2014			6/13/2014		
MEDIA: SOIL	QC_TYPE	NM			NM		
	UNITS	PCI/G			PCI/G		
	PCT_SOLIDS						
	DUP_OF						
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
URANIUM-233		-20.8	U		-21.1	U	
URANIUM-234		0.971	U		0.642	U	
URANIUM-235		0.0412			0.0255		
URANIUM-236		-0.00118	U		-0.00011	U	
URANIUM-238		0.863			0.467		

APPENDIX B

RESULTS AS REPORTED BY THE LABORATORY

Client Sample ID: SD-005W-02

Lab Sample ID: 680-102577-1
Matrix: Solid

Date Collected: 06/13/14 12:00
Date Received: 06/20/14 09:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.953		0.246	0.265	1.00	0.201	pCi/g	07/03/14 14:41	07/24/14 02:06	1
Radium-228	1.08		0.349	0.366		0.209	pCi/g	07/03/14 14:41	07/24/14 02:06	1
Thorium-232	1.08		0.349	0.366		0.209	pCi/g	07/03/14 14:41	07/24/14 02:06	1
Uranium-235	-0.0826	U	0.379	0.379		0.660	pCi/g	07/03/14 14:41	07/24/14 02:06	1
Uranium-238	0.641	U	1.73	1.74		3.09	pCi/g	07/03/14 14:41	07/24/14 02:06	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Ac-228	*1.08*		*0.349*	*0.366*		*0.209*	*pCi/g*	*07/03/14 14:41*	*07/24/14 02:06*	*1*
Bi-214	*0.953*		*0.246*	*0.265*		*0.201*	*pCi/g*	*07/03/14 14:41*	*07/24/14 02:06*	*1*
K-40	*13.7*		*2.53*	*2.89*		*0.857*	*pCi/g*	*07/03/14 14:41*	*07/24/14 02:06*	*1*
Pb-212	*1.04*		*0.229*	*0.266*		*0.225*	*pCi/g*	*07/03/14 14:41*	*07/24/14 02:06*	*1*
Pb-214	*0.956*		*0.250*	*0.269*		*0.217*	*pCi/g*	*07/03/14 14:41*	*07/24/14 02:06*	*1*
Tl-208	*0.225*		*0.114*	*0.116*		*0.134*	*pCi/g*	*07/03/14 14:41*	*07/24/14 02:06*	*1*

Client Sample ID: SD-005E-02

Lab Sample ID: 680-102577-2
Matrix: Solid

Date Collected: 06/13/14 12:05
Date Received: 06/20/14 09:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.902		0.234	0.252	1.00	0.190	pCi/g	07/03/14 14:41	07/24/14 02:40	1
Radium-228	1.38		0.304	0.335		0.276	pCi/g	07/03/14 14:41	07/24/14 02:40	1
Thorium-232	1.38		0.304	0.335		0.276	pCi/g	07/03/14 14:41	07/24/14 02:40	1
Uranium-235	-0.147	U	2.58	2.58		0.843	pCi/g	07/03/14 14:41	07/24/14 02:40	1
Uranium-238	1.64	U	0.998	1.01		3.14	pCi/g	07/03/14 14:41	07/24/14 02:40	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Ac-228	*1.38*		*0.304*	*0.335*		*0.276*	*pCi/g*	*07/03/14 14:41*	*07/24/14 02:40*	*1*
Bi-214	*0.902*		*0.234*	*0.252*		*0.190*	*pCi/g*	*07/03/14 14:41*	*07/24/14 02:40*	*1*
K-40	*14.4*		*2.39*	*2.81*		*1.04*	*pCi/g*	*07/03/14 14:41*	*07/24/14 02:40*	*1*
Pb-212	*1.41*		*0.250*	*0.309*		*0.224*	*pCi/g*	*07/03/14 14:41*	*07/24/14 02:40*	*1*
Pb-214	*0.849*		*0.204*	*0.222*		*0.187*	*pCi/g*	*07/03/14 14:41*	*07/24/14 02:40*	*1*
Tl-208	*0.461*		*0.124*	*0.133*		*0.0893*	*pCi/g*	*07/03/14 14:41*	*07/24/14 02:40*	*1*

Client Sample ID: SD-005W-02

Lab Sample ID: 680-102577-1
Matrix: Solid

Date Collected: 06/13/14 12:00
Date Received: 06/20/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0034	mg/Kg		08/21/14 10:35	09/02/14 22:53	5
U-234	ND		0.011	0.00068	mg/Kg		08/21/14 10:35	09/02/14 22:53	5
U-235	0.012		0.011	0.0046	mg/Kg		08/21/14 10:35	09/02/14 22:53	5
U-236	ND		0.011	0.00090	mg/Kg		08/21/14 10:35	09/02/14 22:53	5
U-238	1.4		0.011	0.00068	mg/Kg		08/21/14 10:35	09/02/14 22:53	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.4		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-21.1	U	0.453	1.99	108	32.5	pCi/g	08/21/14 10:35	09/02/14 22:53	5
U-234	0.642	U F	0.402	0.407	70.0	4.20	pCi/g	08/21/14 10:35	09/02/14 22:53	5
U-235	0.0255	F	0.000829	0.00249	0.0243	0.00991	pCi/g	08/21/14 10:35	09/02/14 22:53	5
U-236	-0.000116	U	0.000630	0.000631	0.728	0.0583	pCi/g	08/21/14 10:35	09/02/14 22:53	5
U-238	0.467	F	0.0152	0.0455	0.00378	0.000227	pCi/g	08/21/14 10:35	09/02/14 22:53	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.850						%		09/04/14 13:23	1

Client Sample ID: SD-005E-02

Lab Sample ID: 680-102577-2
Matrix: Solid

Date Collected: 06/13/14 12:05
Date Received: 06/20/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0033	mg/Kg		08/21/14 10:35	09/02/14 22:58	5
U-234	ND		0.011	0.00067	mg/Kg		08/21/14 10:35	09/02/14 22:58	5
U-235	0.019		0.011	0.0045	mg/Kg		08/21/14 10:35	09/02/14 22:58	5
U-236	ND		0.011	0.00089	mg/Kg		08/21/14 10:35	09/02/14 22:58	5
U-238	2.6		0.011	0.00067	mg/Kg		08/21/14 10:35	09/02/14 22:58	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.6		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-20.8	U	0.160	1.92	107	32.2	pCi/g	08/21/14 10:35	09/02/14 22:58	5
U-234	0.971	U F	0.873	0.877	69.3	4.16	pCi/g	08/21/14 10:35	09/02/14 22:58	5
U-235	0.0412	F	0.00167	0.00415	0.0241	0.00981	pCi/g	08/21/14 10:35	09/02/14 22:58	5
U-236	-0.00118	U	0.00200	0.00200	0.721	0.0577	pCi/g	08/21/14 10:35	09/02/14 22:58	5
U-238	0.863	F	0.0195	0.0818	0.00375	0.000225	pCi/g	08/21/14 10:35	09/02/14 22:58	5

Client Sample ID: SD-005E-02

Date Collected: 06/13/14 12:05
Date Received: 06/20/14 09:30

Lab Sample ID: 680-102577-2

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.725						%		09/04/14 13:23	1

APPENDIX C

SUPPORT DOCUMENTATION

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Sediments

Report Number: 680-102577-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 06/20/2014; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 1.2 C.

RADIUM-226 AND OTHER GAMMA EMITTERS (GS)

Samples SD-005W-02 (680-102577-1) and SD-005E-02 (680-102577-2) were analyzed for Radium-226 and other gamma emitters (GS) in accordance with approved methodologies. The samples were leached on 06/25/2014, prepared on 07/03/2014 and analyzed on 07/24/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.43
Client Contact: Mike Martin	Phone: (703) 342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page 1 of 1
Company: Tetra Tech, Inc.		Analysis Requested		Job #: 680-102577
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes:
City: Germantown	TAT Requested (days): Standard			A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; G - Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA; M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2SO3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - ph 4-5; Z - other (specify)
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			Other:
Email: Michael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6010 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:									
SD-005W-02	6/13/14	1200	C	Solid						X		
SD-005E-02	6/13/14	1205	C	Solid						X		
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:
Relinquished by:	Date/Time: 6/19/14 - 1600	Company: TT	Received by:	Date/Time: 6/19/14 1620	Company: TestAmerica
Relinquished by:	Date/Time: 6/19/14 1720	Company: TT	Received by:	Date/Time: 6/20/14 0930	Company: TT
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-102577-1
SDG Number: 680102577-1

Login Number: 102577
List Number: 1
Creator: Daughtry, Beth A

List Source: TestAmerica Savannah

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-102577-1
SDG Number: 680102577-1

Login Number: 102577
List Number: 2
Creator: Daniels, Brian J

List Source: TestAmerica St. Louis
List Creation: 06/25/14 12:42 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	Thermal preservation not required.
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	True	

HOLD TIME

SDG 680-102577-1

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
RAD	PCI/G	SD-005W-02	680-102577-1	NM	06/13/2014	07/03/2014	07/24/2014	20	21	41
RAD	PCI/G	SD-005E-02	680-102577-2	NM	06/13/2014	07/03/2014	07/24/2014	20	21	41

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102577-1
SDG: 680102577-1

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102577-1
SDG: 680102577-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-102577-1	SD-005W-02	Solid	06/13/14 12:00	06/20/14 09:30
680-102577-2	SD-005E-02	Solid	06/13/14 12:05	06/20/14 09:30

Gamma Spectroscopy Run Log

Detector: GV4

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/30/12 13:58		IC 160-11761/1		11761			JLW
04/02/12 16:50		ICV 160-11761/2		11761			JLW
02/27/13 16:17		ACVTOP 160-38300/1		38300			JLW
07/11/14 15:24		ICB 160-130904/1		130904			JLW
07/24/14 00:00		CCB 160-133792/1		133792			SMP
07/24/14 00:41		CCV 160-133792/2		133792			
07/24/14 01:02		CCV 160-133792/3		133792			SMP
07/24/14 01:31	180	ZZZZZ		133792			
07/24/14 08:13	30	LCS 160-129597/2-A		133792	129597	GA-01-R	SMP
07/24/14 09:27	30	ZZZZZ		133792			
07/24/14 10:09	30	ZZZZZ		133792			
07/24/14 10:49	30	ZZZZZ		133792			
07/24/14 14:27	30	ZZZZZ		133792			
07/24/14 15:09	30	ZZZZZ		133792			
07/24/14 15:50	30	ZZZZZ		133792			
07/24/14 17:58	30	ZZZZZ		133792			
07/24/14 18:43	30	ZZZZZ		133792			
07/24/14 19:20	30	ZZZZZ		133792			
07/24/14 19:54	30	ZZZZZ		133792			
07/24/14 20:26	30	ZZZZZ		133792			
07/24/14 20:59	30	ZZZZZ		133792			
07/24/14 21:32	30	ZZZZZ		133792			
07/24/14 22:04	30	ZZZZZ		133792			

Detector: GV7

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/27/12 08:10		IC 160-12302/1		12302			JLW
03/27/12 15:25		ICV 160-12302/2		12302			JLW
01/28/14 18:43		ACVTOP 160-101797/1		101797			JLW
07/11/14 15:25		ICB 160-130901/1		130901			JLW
07/24/14 00:00		CCV 160-133793/1		133793			
07/24/14 00:21		CCV 160-133793/2		133793			SMP
07/24/14 00:41		CCB 160-133793/3		133793			SMP
07/24/14 01:31	60	ZZZZZ		133793			
07/24/14 02:40	30	680-102577-1 DU	SD-005W-02 DU	133793	129597	GA-01-R	SMP
07/24/14 08:13	30	ZZZZZ		133793			
07/24/14 09:28	30	ZZZZZ		133793			
07/24/14 10:10	30	ZZZZZ		133793			
07/24/14 10:50	30	ZZZZZ		133793			
07/24/14 13:56	30	ZZZZZ		133793			
07/24/14 14:33	30	ZZZZZ		133793			
07/24/14 15:11	30	ZZZZZ		133793			
07/24/14 15:52	30	ZZZZZ		133793			
07/24/14 17:49		ZZZZZ		133793			
07/24/14 18:02	60	ZZZZZ		133793			
07/24/14 19:20	30	ZZZZZ		133793			
07/24/14 19:54	30	ZZZZZ		133793			
07/24/14 20:26	30	ZZZZZ		133793			
07/24/14 20:59	30	ZZZZZ		133793			
07/24/14 21:32	60	ZZZZZ		133793			

Gamma Spectroscopy Run Log

Detector: GV8

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/27/12 10:58		IC 160-12311/1		12311			JLW
03/29/12 01:58		ICV 160-12311/2		12311			JLW
06/10/14 05:54		ACVTOP 160-126217/1		126217			JLW
07/11/14 15:25		ICB 160-130902/1		130902			JLW
07/24/14 00:01		CCV 160-133794/1		133794			
07/24/14 00:22		CCV 160-133794/2		133794			SMP
07/24/14 00:41		CCB 160-133794/3		133794			SMP
07/24/14 01:32	60	ZZZZZ		133794			
07/24/14 02:40	30	680-102577-2	SD-005E-02	133794	129597	GA-01-R	SMP
07/24/14 08:14	30	ZZZZZ		133794			
07/24/14 09:29	30	ZZZZZ		133794			
07/24/14 10:11	30	ZZZZZ		133794			
07/24/14 10:52	30	ZZZZZ		133794			
07/24/14 13:57	30	ZZZZZ		133794			
07/24/14 14:34	30	ZZZZZ		133794			
07/24/14 15:12	30	ZZZZZ		133794			
07/24/14 15:53	30	ZZZZZ		133794			
07/24/14 17:50		ZZZZZ		133794			
07/24/14 18:02	120	ZZZZZ		133794			
07/24/14 20:27	30	ZZZZZ		133794			
07/24/14 20:59	30	ZZZZZ		133794			
07/24/14 21:32	30	ZZZZZ		133794			
07/24/14 22:05	30	ZZZZZ		133794			

Detector: GV14

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
04/23/12 09:56		IC 160-12359/1		12359			JLW
04/24/12 08:12		ICV 160-12359/2		12359			JLW
01/24/14 08:37		ACVTOP 160-101066/1		101066			JLW
07/11/14 15:06		ICB 160-130894/1		130894			JLW
07/24/14 00:01		CCB 160-133788/1		133788			SMP
07/24/14 00:43		CCV 160-133788/2		133788			
07/24/14 01:03		CCV 160-133788/3		133788			SMP
07/24/14 01:28	30	ZZZZZ		133788			
07/24/14 02:06	30	MB 160-129597/1-A		133788	129597	GA-01-R	SMP
07/24/14 02:37	60	ZZZZZ		133788			
07/24/14 08:11	30	ZZZZZ		133788			
07/24/14 09:25	30	ZZZZZ		133788			
07/24/14 10:07		ZZZZZ		133788			
07/24/14 10:07	30	ZZZZZ		133788			
07/24/14 10:42	30	ZZZZZ		133788			
07/24/14 14:38	30	ZZZZZ		133788			
07/24/14 15:34	30	ZZZZZ		133788			
07/24/14 17:53	60	ZZZZZ		133788			
07/24/14 19:16	30	ZZZZZ		133788			
07/24/14 19:52	30	ZZZZZ		133788			
07/24/14 20:24	30	ZZZZZ		133788			
07/24/14 20:56	30	ZZZZZ		133788			
07/24/14 21:29	30	ZZZZZ		133788			
07/24/14 22:03	30	ZZZZZ		133788			
07/24/14 22:34	30	ZZZZZ		133788			

Gamma Spectroscopy Run Log

Detector: GV15

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/22/12 11:06		IC 160-12362/1		12362			JLW
03/23/12 06:10		ICV 160-12362/2		12362			JLW
01/24/14 15:13		ACVTOP 160-101162/1		101162			JLW
07/11/14 15:07		ICB 160-130897/1		130897			JLW
07/24/14 00:02		CCB 160-133787/1		133787			SMP
07/24/14 00:43		CCV 160-133787/2		133787			
07/24/14 01:03		CCV 160-133787/3		133787			SMP
07/24/14 01:28	30	ZZZZZ		133787			
07/24/14 02:06	30	680-102577-1	SD-005W-02	133787	129597	GA-01-R	SMP
07/24/14 02:38	30	ZZZZZ		133787			
07/24/14 08:12	30	ZZZZZ		133787			
07/24/14 09:26	30	ZZZZZ		133787			
07/24/14 10:08	30	ZZZZZ		133787			
07/24/14 10:45	60	ZZZZZ		133787			
07/24/14 13:59	60	ZZZZZ		133787			
07/24/14 16:23	60	ZZZZZ		133787			
07/24/14 19:17	30	ZZZZZ		133787			
07/24/14 19:53	30	ZZZZZ		133787			
07/24/14 20:25	30	ZZZZZ		133787			
07/24/14 20:57	30	ZZZZZ		133787			
07/24/14 21:29	30	ZZZZZ		133787			
07/24/14 22:03	30	ZZZZZ		133787			
07/24/14 22:35	30	ZZZZZ		133787			

Gamma Verification per Geometry

Detector: Ge4

Geometry: Tunacan

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 317.8

lab ID# of cal standard 6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14534	97.4
Am-241	2037	418	0.3590	1163	1211.4	104.1
Cd-109	2881	591	0.0361	16363	16123	98.5
Co-57	1511	310	0.8560	362	353.51	97.7
Ce-139	2139	439	0.7990	549	541.9	98.7
Hg-203	4651	954	0.8146	1171	1197.5	102.3
Sn-113	3015	618	0.6400	966	965.83	100.0
Cs-137	1938	397	0.8510	467	464.8	99.5
Y-88	7264	1489	0.9370	1589	1568.4	98.7
Co-60	3580	734	0.9997	734	732.09	99.7
Co-60	3581	734	0.9999	734	730.52	99.5
Y-88	7690	1577	0.9920	1589	1608.9	101.2

Reviewed By: Jody Watson

Date: 4/2/2012

Gamma Verification per Geometry

Detector: Ge7
Geometry: Tunacan
Reference date 1/1/2012
Calibration Standard: 90099
Standard volume g / vial 1550
Standard volume transferred in g / geometry 317.8
lab ID# of cal standard 6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14726	98.7
Am-241	2037	418	0.3590	1163	1241.6	106.7
Cd-109	2881	591	0.0361	16363	15976	97.6
Co-57	1511	310	0.8560	362	346.77	95.8
Ce-139	2139	439	0.7990	549	539.48	98.3
Hg-203	4651	954	0.8146	1171	1199.2	102.4
Sn-113	3015	618	0.6400	966	976.76	101.1
Cs-137	1938	397	0.8510	467	467.66	100.2
Y-88	7264	1489	0.9370	1589	1567.3	98.6
Co-60	3580	734	0.9997	734	726.23	98.9
Co-60	3581	734	0.9999	734	719.64	98.0
Y-88	7690	1577	0.9920	1589	1635.7	102.9

Reviewed By: Jody Watson

Date: 3/16/2012

Gamma Verification per Geometry

Detector: Ge8

Geometry: Tunacan

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 317.8

lab ID# of cal standard 6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14960	100.2
Am-241	2037	418	0.3590	1163	1240.5	106.6
Cd-109	2881	591	0.0361	16363	16066	98.2
Co-57	1511	310	0.8560	362	345.12	95.4
Ce-139	2139	439	0.7990	549	536.34	97.7
Hg-203	4651	954	0.8146	1171	1218.2	104.1
Sn-113	3015	618	0.6400	966	967.15	100.1
Cs-137	1938	397	0.8510	467	465.86	99.8
Y-88	7264	1489	0.9370	1589	1552.1	97.6
Co-60	3580	734	0.9997	734	724.48	98.7
Co-60	3581	734	0.9999	734	729.98	99.4
Y-88	7690	1577	0.9920	1589	1627.2	102.4

Reviewed By: Jody Watson

Date: 3/28/2012

Gamma Verification per Geometry

Detector: Ge14

Geometry: Tunacan

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 317.8

lab ID# of cal standard 6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14422	96.6
Am-241	2037	418	0.3590	1163	1222.5	105.1
Cd-109	2881	591	0.0361	16363	16145	98.7
Co-57	1511	310	0.8560	362	349.28	96.5
Ce-139	2139	439	0.7990	549	538.52	98.1
Hg-203	4651	954	0.8146	1171	1205.9	103.0
Sn-113	3015	618	0.6400	966	971.36	100.6
Cs-137	1938	397	0.8510	467	465.65	99.7
Y-88	7264	1489	0.9370	1589	1570	98.8
Co-60	3580	734	0.9997	734	724.16	98.6
Co-60	3581	734	0.9999	734	720.6	98.1
Y-88	7690	1577	0.9920	1589	1634	102.8

Reviewed By: Jody Watson

Date: 4/23/2012

Gamma Verification per Geometry

Detector: Ge15

Geometry: Tunacan

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 317.8

lab ID# of cal standard 6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14410	96.5
Am-241	2037	418	0.3590	1163	1206.9	103.7
Cd-109	2881	591	0.0361	16363	16069	98.2
Co-57	1511	310	0.8560	362	356.06	98.4
Ce-139	2139	439	0.7990	549	538.81	98.2
Hg-203	4651	954	0.8146	1171	1202.4	102.7
Sn-113	3015	618	0.6400	966	974.62	100.9
Cs-137	1938	397	0.8510	467	465.43	99.7
Y-88	7264	1489	0.9370	1589	1573.7	99.0
Co-60	3580	734	0.9997	734	716.44	97.6
Co-60	3581	734	0.9999	734	726.55	98.9
Y-88	7690	1577	0.9920	1589	1633.2	102.8

Reviewed By: Jody Watson

Date: 3/22/2012

2nd Source Verification

Detector: Ge4

Geometry: Tunacan

Reference date 1/1/2010

Source: 81427-334

Standard volume g / vial 1550

Standard volume transferred in g / geometry 318.5

lab ID# of cal standard Tuna Can_00002

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1179.4	101.3
Cs-137	1926	396	0.851	465	435.81	93.7
Co-60	3611	742	0.99974	742	706.01	95.1
Co-60	3612	742	0.999856	742	707.18	95.3

Reviewed By: Megan McAfee

Date: 4/5/2012

2nd Source Verification

Detector: Ge7

Geometry: Tunacan

Reference date 1/1/2010

Source: 81427-334

Standard volume g / vial 1550

Standard volume transferred in g / geometry 318.5

lab ID# of cal standard 6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1150.4	98.8
Cs-137	1926	396	0.851	465	440.47	94.7
Co-60	3611	742	0.99974	742	681.72	91.9
Co-60	3612	742	0.999856	742	692.1	93.2

Reviewed By: Jody Watson

Date: 3/27/2012

2nd Source Verification

Detector: Ge8

Geometry: Tunacan

Reference date 1/1/2010

Source: 81427-334

Standard volume g / vial 1550

Standard volume transferred in g / geometry 318.5

lab ID# of cal standard 6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1175.4	101.0
Cs-137	1926	396	0.851	465	446.61	96.0
Co-60	3611	742	0.99974	742	697.22	93.9
Co-60	3612	742	0.999856	742	691.92	93.2

Reviewed By: Jody Watson

Date: 3/29/2012

2nd Source Verification

Detector: Ge14

Geometry: Tunacan

Reference date 1/1/2010

Source: 81427-334

Standard volume g / vial 1550

Standard volume transferred in g / geometry 318.5

lab ID# of cal standard 6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1140.8	98.0
Cs-137	1926	396	0.851	465	447.55	96.2
Co-60	3611	742	0.99974	742	690.01	93.0
Co-60	3612	742	0.999856	742	699.61	94.2

Reviewed By: Jody Watson

Date: 4/24/2012

2nd Source Verification

Detector: Ge 15

Geometry: Tunacan

Reference date 1/1/2010

Source: 81427-334

Standard volume g / vial 1550

Standard volume transferred in g / geometry 318.5

lab ID# of cal standard 6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1151	98.9
Cs-137	1926	396	0.851	465	435.18	93.6
Co-60	3611	742	0.99974	742	687.16	92.6
Co-60	3612	742	0.999856	742	696.46	93.8

Reviewed By: Jody Watson

Date: 3/23/2012

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: Detector # 7
SpectrumID: 7_20140128004_EffVerif
Analysis Description: ACVTOP-259586;TunaCan2006
Calibration: 7_TunaCan_90099_032712
Detector: Ge 7 SN/154

Verification Date: 2014-01-28 18:43
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.25E+02	5.2%
Cs-137	661.66	400	3.78E+02	5.6%
Co-1332	1332.5	777	7.28E+02	6.2%

Comments:

Perform Jody Watson Reviev 1/28/2014

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TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: Detector # 8
SpectrumID: 8_20140610003_EffVerif
Analysis Description: ACVTop-259586;TunaCan2006
Calibration: 8_Soil_TunaCan_90099_032712
Detector: Ge 8 SN/174

Verification Date: 2014-06-10 05:54
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.70E+02	-4.7%
Cs-137	661.66	400	3.95E+02	1.3%
Co-1332	1332.5	777	7.55E+02	2.8%

Comments:

Perform __Jody Watson 6/10/14_____ Reviev _Elizabeth Hoerchler 06/10/14_____

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TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: Detector #14
SpectrumID: 14_20140124005_EffVerif
Analysis Description: ACVTop-259586;TunaCan2006
Calibration: 14_TunaCan_90099_042312
Detector: Ge14 SN/11080670

Verification Date: 2014-01-24 08:37
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.50E+02	-0.3%
Cs-137	661.66	400	3.96E+02	1.0%
Co-1332	1332.5	777	7.52E+02	3.3%

Comments:

Perform Jody Watson Revie 1/24/2014

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TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: Detector #15
SpectrumID: 15_20140124007_EffVerif
Analysis Description: ACVTop-259586;TunaCan2006
Calibration: 15_TunaCan_90099_032212
Detector: Ge15 SN/11012216

Verification Date: 2014-01-24 15:13
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.42E+02	1.5%
Cs-137	661.66	400	3.86E+02	3.5%
Co-1332	1332.5	777	7.51E+02	3.3%

Comments:

Perform ____Jody Watson_____ Revie 1/24/2014

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Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-129597/1-A
Matrix: Solid
Analysis Batch: 133788

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 129597

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.03143	U	0.0391	0.0392	1.00	0.186	pCi/g	07/03/14 14:41	07/24/14 02:06	1
Radium-228	0.06282	U	0.0909	0.0911		0.201	pCi/g	07/03/14 14:41	07/24/14 02:06	1
Thorium-232	0.06282	U	0.0909	0.0911		0.201	pCi/g	07/03/14 14:41	07/24/14 02:06	1
Uranium-235	0.02916	U	0.117	0.117		0.235	pCi/g	07/03/14 14:41	07/24/14 02:06	1
Uranium-238	0.05176	U	0.178	0.178		1.20	pCi/g	07/03/14 14:41	07/24/14 02:06	1

Other Detected Radionuclides	*MB Result*	*MB Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*07/03/14 14:41*	*07/24/14 02:06*	*1*

Lab Sample ID: LCS 160-129597/2-A
Matrix: Solid
Analysis Batch: 133792

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 129597

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.4	100.0		10.6		1.70	pCi/g	103	87 - 116
Cesium-137	31.0	29.85		3.27		0.381	pCi/g	96	87 - 120
Cobalt-60	21.9	21.05		2.23		0.163	pCi/g	96	87 - 115

Lab Sample ID: 680-102577-1 DU
Matrix: Solid
Analysis Batch: 133793

Client Sample ID: SD-005W-02
Prep Type: Total/NA
Prep Batch: 129597

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Radium-226	0.953		0.7903		0.212	1.00	0.121	pCi/g	0.34	1
Radium-228	1.08		1.282		0.300		0.267	pCi/g	0.31	1
Thorium-232	1.08		1.282		0.300		0.267	pCi/g	0.31	1
Uranium-235	-0.0826	U	0.07357	U	0.260		0.495	pCi/g	0.24	1
Uranium-238	0.641	U	1.192	U	0.749		2.13	pCi/g	0.22	1

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 129597

Lab ID: MB 160-129597/1-A | Analyzed: 07/24/14 02:06 | Ts: 30 | Sigma: 2
Client ID: | Detector: GV14 | Decay Corrected: No

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.03143	0.0391	0.0392	U	pCi/g	1.00	0.186	133788
Radium-228	0.06282	0.0909	0.0911	U	pCi/g		0.201	133788
Thorium-232	0.06282	0.0909	0.0911	U	pCi/g		0.201	133788
Uranium-235	0.02916	0.117	0.117	U	pCi/g		0.235	133788
Uranium-238	0.05176	0.178	0.178	U	pCi/g		1.20	133788

Other Detected Radionuclides	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Other Detected Radionuclide	None				pCi/g	

Lab ID: LCS 160-129597/2-A | Analyzed: 07/24/14 08:13 | Ts: 30 | Sigma: 2
Client ID: | Detector: GV4 | Decay Corrected: No

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Americium-241	100.0	2.24	10.6		pCi/g		1.70	133792
Cesium-137	29.85	1.02	3.27		pCi/g		0.381	133792
Cobalt-60	21.05	0.705	2.23		pCi/g		0.163	133792

Lab ID: 680-102577-1 | Analyzed: 07/24/14 02:06 | Ts: 30 | Sigma: 2
Client ID: SD-005W-02 | Detector: GV15 | Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.953	0.246	0.265		pCi/g	1.00	0.201	133787
Radium-228	1.08	0.349	0.366		pCi/g		0.209	133787
Thorium-232	1.08	0.349	0.366		pCi/g		0.209	133787
Uranium-235	-0.0826	0.379	0.379	U	pCi/g		0.660	133787
Uranium-238	0.641	1.73	1.74	U	pCi/g		3.09	133787

Other Detected Radionuclides	Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Ac-228	1.08	0.349	0.366		pCi/g	0.209
Bi-214	0.953	0.246	0.265		pCi/g	0.201
K-40	13.7	2.53	2.89		pCi/g	0.857
Pb-212	1.04	0.229	0.266		pCi/g	0.225
Pb-214	0.956	0.250	0.269		pCi/g	0.217
Tl-208	0.225	0.114	0.116		pCi/g	0.134

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 129597

Lab ID: 680-102577-1 DU | Analyzed: 07/24/14 02:40 | Ts: 30 | Sigma: 2
Client ID: SD-005W-02 | Detector: GV7 | Decay Corrected: No

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.7903	0.195	0.212		pCi/g	1.00	0.121	133793
Radium-228	1.282	0.270	0.300		pCi/g		0.267	133793
Thorium-232	1.282	0.270	0.300		pCi/g		0.267	133793
Uranium-235	0.07357	0.260	0.260	U	pCi/g		0.495	133793
Uranium-238	1.192	0.738	0.749	U	pCi/g		2.13	133793

Other Detected Radionuclides	DU Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Ac-228	1.282	0.270	0.300		pCi/g	0.267
Bi-214	0.7903	0.195	0.212		pCi/g	0.121
K-40	8.414	1.91	2.10		pCi/g	1.60
Pb-212	0.9880	0.168	0.211		pCi/g	0.142
Pb-214	1.035	0.199	0.226		pCi/g	0.158
Tl-208	0.3179	0.0807	0.0872		pCi/g	0.0378

Lab ID: 680-102577-2 | Analyzed: 07/24/14 02:40 | Ts: 30 | Sigma: 2
Client ID: SD-005E-02 | Detector: GV8 | Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.902	0.234	0.252		pCi/g	1.00	0.190	133794
Radium-228	1.38	0.304	0.335		pCi/g		0.276	133794
Thorium-232	1.38	0.304	0.335		pCi/g		0.276	133794
Uranium-235	-0.147	2.58	2.58	U	pCi/g		0.843	133794
Uranium-238	1.64	0.998	1.01	U	pCi/g		3.14	133794

Other Detected Radionuclides	Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Ac-228	1.38	0.304	0.335		pCi/g	0.276
Bi-214	0.902	0.234	0.252		pCi/g	0.190
K-40	14.4	2.39	2.81		pCi/g	1.04
Pb-212	1.41	0.250	0.309		pCi/g	0.224
Pb-214	0.849	0.204	0.222		pCi/g	0.187
Tl-208	0.461	0.124	0.133		pCi/g	0.0893

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 129597

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-129597/1-A	Radium-226			0.03143	U	pCi/g							
MB 160-129597/1-A	Radium-228			0.06282	U	pCi/g							
MB 160-129597/1-A	Thorium-232			0.06282	U	pCi/g							
MB 160-129597/1-A	Uranium-235			0.02916	U	pCi/g							
MB 160-129597/1-A	Uranium-238			0.05176	U	pCi/g							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-129597/2-A	Americium-241		97.4	100.0		pCi/g	103	87 - 116					
LCS 160-129597/2-A	Cesium-137		31.0	29.85		pCi/g	96	87 - 120					
LCS 160-129597/2-A	Cobalt-60		21.9	21.05		pCi/g	96	87 - 115					

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
680-102577-1	Radium-226	0.953		0.7903		pCi/g			19	0.34	0.96	1	
680-102577-1	Radium-228	1.08		1.282		pCi/g			18	0.31	0.88	1	
680-102577-1	Thorium-232	1.08		1.282		pCi/g			18	0.31	0.88	1	
680-102577-1	Uranium-235	-0.0826		0.07357	U	pCi/g			3465	0.24	0.68	1	
680-102577-1	Uranium-238	0.641		1.192	U	pCi/g			60	0.22	0.58	1	

Glossary:

Ts = Count Duration, Sample

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Sediments

Report Number: 680-102577-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT
The samples were received on 06/20/2014; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 1.2 C.

TOTAL URANIUM
Samples SD-005W-02 (680-102577-1) and SD-005E-02 (680-102577-2) were analyzed for Total Uranium in accordance with EPA SW-846 6020A. The samples were analyzed on 09/04/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM
Samples SD-005W-02 (680-102577-1) and SD-005E-02 (680-102577-2) were analyzed for Isotopic Uranium in accordance with EPA SW-846 6020A. The samples were prepared on 08/21/2014 and analyzed on 09/02/2014.

The instrument blank (ICB) contained uranium 233 greater than the reporting limit (RL). All associated samples were non-detect, showing there was no high bias. The data have been qualified and reported. (ICB 160-141597/10)

Refer to the QC report for details.

Samples SD-005W-02 (680-102577-1)[5X] and SD-005E-02 (680-102577-2)[5X] required dilution prior to analysis. Samples were high in salts. . The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM PERCENTAGE
Samples SD-005W-02 (680-102577-1) and SD-005E-02 (680-102577-2) were analyzed for Isotopic Uranium Percentage in accordance with EPA SW-846 6020A. The samples were analyzed on 09/04/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM ACTIVITY
Samples SD-005W-02 (680-102577-1) and SD-005E-02 (680-102577-2) were analyzed for Isotopic Uranium Activity in accordance with EPA SW-846 6020A. The samples were prepared on 08/21/2014 and analyzed on 09/02/2014.

Samples SD-005W-02 (680-102577-1)[5X] and SD-005E-02 (680-102577-2)[5X] required dilution prior to analysis. Samples were high in salts. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24908.43
Client Contact: Mike Martin	Phone: (703) 347-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page [redacted] 1 of 1
Company: Tetra Tech, Inc.		Analysis Requested		Job #: 680-102577
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes:
City: Germantown	TAT Requested (days): Standard			A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; G - Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA; M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2SO3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - ph 4-5; Z - other (specify)
State, Zip: MD, 20874	PO #: Purchase Order not required			Other:
Phone:	WO #:			
Email: Michael.Martin@tetratech.com	Project #: 68012942			
Project Name: Sediments	SSOW#:			
Site:				

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	9020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
SD-005W-02	6/13/14	1200	C	Solid						X		
SD-005E-02	6/13/14	1205	C	Solid						X		
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6/19/14 1600	TT		6/19/14 1620	TestAmerica
2		6/19/14 1720	TT		6/20/14 0930	TA
3						

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-102577-2
SDG Number: 680102577-1

Login Number: 102577
List Number: 1
Creator: Daughtry, Beth A

List Source: TestAmerica Savannah

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-102577-2
SDG Number: 680102577-1

Login Number: 102577
List Number: 2
Creator: Daniels, Brian J

List Source: TestAmerica St. Louis
List Creation: 06/25/14 12:42 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	Thermal preservation not required.
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	True	

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102577-2
SDG: 680102577-1

Method	Method Description	Protocol	Laboratory
6020A	Metals (ICP/MS), Isotopic Uranium	SW846	TAL SL
6020A	Metals (ICP/MS), Total Uranium	SW846	TAL SL
6020A	Metals (ICP/MS), Isotopic Uranium Percentage	SW846	TAL SL
6020A Activity	Metals (ICP/MS), Isotopic Uranium (Activity)	SW846	TAL SL

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Default Detection Limits

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102577-2
SDG: 680102577-1

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	RL	MDL	Units	Method
U-233	0.0050	0.0015	mg/Kg	6020A
U-234	0.0050	0.00030	mg/Kg	6020A
U-235	0.0050	0.0020	mg/Kg	6020A
U-236	0.0050	0.00040	mg/Kg	6020A
U-238	0.0050	0.00030	mg/Kg	6020A

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	RL	MDL	Units	Method
Total Uranium	0.0050	0.00030	mg/Kg	6020A

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102577-2
SDG: 680102577-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-102577-1	SD-005W-02	Solid	06/13/14 12:00	06/20/14 09:30
680-102577-2	SD-005E-02	Solid	06/13/14 12:05	06/20/14 09:30

12-IN
PREPARATION LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

Prep Method: 3050B

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight (g)	Initial Volume	Final Volume (mL)
MB 160-139348/1-A	08/21/2014 10:35	139348	0.5931		50
LCS 160-139348/2-A	08/21/2014 10:35	139348	0.5263		50
680-102577-1	08/21/2014 10:35	139348	0.5552		50
680-102577-2	08/21/2014 10:35	139348	0.5608		50

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/02/2014 18:15 End Date: 09/03/2014 00:54

Lab Sample Id	D/F	Type	Time	Analytes																												
				U-233	U-234	U-235	U-236	U-238																								
ICIS 160-141597/1			18:15	X	X	X	X	X																								
IC 160-141597/2	1		18:22	X	X	X	X	X																								
IC 160-141597/3	1		18:27	X	X	X	X	X																								
IC 160-141597/4	1		18:31	X	X	X	X	X																								
IC 160-141597/5	1		18:36	X	X	X	X	X																								
IC 160-141597/6	1		18:41	X	X	X	X	X																								
ICV 160-141597/7	1		18:45	X																												
ICV 160-141597/8	1		18:50		X			X																								
ICV 160-141597/9	1		18:55			X	X																									
ICB 160-141597/10	1		18:59	X	X	X	X	X																								
CRI 160-141597/11	1		19:04			X		X																								
CRI 160-141597/12	1		19:09	X	X		X																									
ICSA 160-141597/13	1		19:13	X	X	X	X	X																								
ICSAB 160-141597/14	1		19:18	X	X	X	X	X																								
CCV 160-141597/15			19:23																													
CCB 160-141597/16			19:27																													
ZZZZZZ			19:32																													
ZZZZZZ			19:37																													
ZZZZZZ			19:41																													
ZZZZZZ			19:46																													
ZZZZZZ			19:51																													
ZZZZZZ			19:55																													
ZZZZZZ			20:00																													
ZZZZZZ			20:05																													
ZZZZZZ			20:09																													
ZZZZZZ			20:14																													
CCV 160-141597/27			20:19																													
CCB 160-141597/28			20:23																													
ZZZZZZ			20:28																													
ZZZZZZ			20:33																													
ZZZZZZ			20:37																													
ZZZZZZ			20:42																													
ZZZZZZ			20:47																													
ZZZZZZ			20:51																													
ZZZZZZ			20:56																													
ZZZZZZ			21:01																													
ZZZZZZ			21:05																													
ZZZZZZ			21:10																													
CCV 160-141597/39			21:15																													

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/02/2014 18:15 End Date: 09/03/2014 00:54

Lab Sample Id	D/F	Type	Time	Analytes																												
				U-233	U-234	U-235	U-236	U-238																									
CCB 160-141597/40			21:19																													
ZZZZZZ			21:24																													
ZZZZZZ			21:29																													
ZZZZZZ			21:33																													
ZZZZZZ			21:38																													
ZZZZZZ			21:43																													
ZZZZZZ			21:48																													
ZZZZZZ			21:52																													
ZZZZZZ			21:57																													
ZZZZZZ			22:01																													
ZZZZZZ			22:06																													
CCV 160-141597/51	1		22:11	X	X	X	X	X																								
CCB 160-141597/52	1		22:16	X	X	X	X	X																								
ZZZZZZ			22:20																													
ZZZZZZ			22:25																													
ZZZZZZ			22:30																													
ZZZZZZ			22:34																													
ZZZZZZ			22:39																													
MB 160-139348/1-A	2	T	22:44	X	X	X	X	X																								
LCS 160-139348/2-A	2	T	22:48		X	X		X																								
680-102577-1	5	T	22:53	X	X	X	X	X																								
680-102577-2	5	T	22:58	X	X	X	X	X																								
ZZZZZZ			23:02																													
CCV 160-141597/63	1		23:07	X	X	X	X	X																								
CCB 160-141597/64	1		23:12	X	X	X	X	X																								
ZZZZZZ			23:16																													
ZZZZZZ			23:21																													
ZZZZZZ			23:26																													
ZZZZZZ			23:30																													
ZZZZZZ			23:35																													
ZZZZZZ			23:40																													
ZZZZZZ			23:44																													
ZZZZZZ			23:49																													
ZZZZZZ			23:54																													
ZZZZZZ			23:58																													
CCV 160-141597/75	1		00:03	X	X	X	X	X																								
CCB 160-141597/76	1		00:08	X	X	X	X	X																								
ZZZZZZ			00:12																													
ZZZZZZ			00:17																													

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/02/2014 18:15 End Date: 09/03/2014 00:54

Lab Sample Id	D/F	Type	Time	Analytes																												
				U-233	U-234	U-235	U-236	U-238																									
ZZZZZZ			00:22																													
ZZZZZZ			00:26																													
ZZZZZZ			00:31																													
ZZZZZZ			00:36																													
ZZZZZZ			00:40																													
ZZZZZZ			00:45																													
CCV 160-141597/85			00:50																													
CCB 160-141597/86			00:54																													

Prep Types:
T = Total/NA

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

Instrument ID: NOEQUIP Analysis Method: 6020A

Start Date: 09/04/2014 13:20 End Date: 09/04/2014 13:20

Lab Sample Id	D/F	Type	Time	Analytes																										
				U																										
680-102577-1	1	T	13:20	X																										
680-102577-2	1	T	13:20	X																										
ZZZZZZ			13:20																											
ZZZZZZ			13:20																											
ZZZZZZ			13:20																											
ZZZZZZ			13:20																											
ZZZZZZ			13:20																											
ZZZZZZ			13:20																											
ZZZZZZ			13:20																											
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ZZZZZZ			13:20																											
ZZZZZZ			13:20																											
ZZZZZZ			13:20																											
ZZZZZZ			13:20																											
ZZZZZZ			13:20																											

Prep Types:
T = Total/NA

FORM XIII-IN

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

ICV Source: ISOU ICV(3)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00021

Analyte	ICV 160-141597/7 09/02/2014 18:45				CCV 160-141597/51 09/02/2014 22:11				CCV 160-141597/63 09/02/2014 23:07			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.226		0.223	101	0.0493	J	0.0515	96	0.0508		0.0515	99

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

ICV Source: ISOU ICV(3)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00021

Analyte	CCV 160-141597/75 09/03/2014 00:03											
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.0510		0.0515	99								

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

ICV Source: ISOU ICV(4,8)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00021

Analyte	ICV 160-141597/8 09/02/2014 18:50				CCV 160-141597/51 09/02/2014 22:11				CCV 160-141597/63 09/02/2014 23:07			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0892		0.0835	107	0.0871		0.0827	105	0.0874		0.0827	106
U-238	10.1		9.78	103	5.50		5.03	109	5.49		5.03	109

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

ICV Source: ISOU ICV(4,8)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00021

Analyte	CCV 160-141597/75 09/03/2014 00:03											
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0885		0.0827	107								
U-238	5.53		5.03	110								

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

ICV Source: ISOU ICV(5,6)_00022 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00021

Analyte	ICV 160-141597/9 09/02/2014 18:55				CCV 160-141597/51 09/02/2014 22:11				CCV 160-141597/63 09/02/2014 23:07			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	1.16		1.06	109	5.27		4.85	109	5.25		4.85	108
U-236	0.0702		0.0746	94	0.0933		0.0890	105	0.0945		0.0890	106

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

ICV Source: ISOU ICV(5,6)_00022 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00021

Analyte	CCV 160-141597/75 09/03/2014 00:03											
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	5.32		4.85	110								
U-236	0.0946		0.0890	106								

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2B-IN
CRQL CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

Method: 6020A Instrument ID: ICPMS6100

Lab Sample ID: CRI 160-141597/11 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 1_00021

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-235	0.0485	0.0499	J	103	70-130
U-238	0.0503	0.0496	J	99	70-130

Lab Sample ID: CRI 160-141597/12 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 2_00022

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-233	0.0309	0.0363	J	117	70-130
U-234	0.0496	0.0495	J	100	70-130
U-236	0.0534	0.0529		99	70-130

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IIB-IN

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

Concentration Units: ug/L

Analyte	RL	ICB 160-141597/10 09/02/2014 18:59		CCB 160-141597/52 09/02/2014 22:16		CCB 160-141597/64 09/02/2014 23:12		CCB 160-141597/76 09/03/2014 00:08	
		Found	C	Found	C	Found	C	Found	C
U-233	0.025	0.0345		0.0146	J	0.0150	J	0.0141	J
U-234	0.025	ND		ND		ND		ND	
U-235	0.025	ND		ND		ND		ND	
U-236	0.025	ND		ND		ND		ND	
U-238	0.025	0.00507	J	ND		ND		ND	

Italicized analytes were not requested for this sequence.

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-139348/1-A

Instrument Code: ICPMS6100 Batch No.: 141597

CAS No.	Analyte	Concentration	C	Q	Method
13968-55-3	U-233	ND			6020A_U
13966-29-5	U-234	ND			6020A_U
15117-96-1	U-235	ND			6020A_U
13982-70-2	U-236	ND			6020A_U
7440-61-1	U-238	ND			6020A_U

FORM III-IN

4A-IN
INTERFERENCE CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

Lab Sample ID: ICSAB 160-141597/14 Instrument ID: ICPMS6100

Lab File ID: 090214M2.rep ICS Source: ISOU ICSAB_00022

Concentration Units: ug/L

Analyte	True Solution AB	Found Solution AB	Percent Recovery
U-233	**0.0515**	**0.0537**	**104**
U-234	**0.0827**	**0.0910**	**110**
U-235	**4.85**	**5.47**	**113**
U-236	**0.0890**	**0.0975**	**110**
U-238	**5.03**	**5.69**	**113**

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IVA-IN

7A-IN
LAB CONTROL SAMPLE
METALS

Lab ID: LCS 160-139348/2-A

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

Sample Matrix: Solid LCS Source: ISOU Prep Spk_00002

Analyte	Solid(mg/Kg)							
	True	Found	C	%R	Limits		Q	Method
U-234	0.00785	0.00845		108	80	120		6020A
U-235	0.461	0.508		110	80	120		6020A
U-238	0.477	0.525		110	80	120		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

9-IN
DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102577-2

SDG Number: 680102577-1

Matrix: Solid Instrument ID: ICPMS6100

Method: 6020A MDL Date: 08/05/2013 10:01

Prep Method: 3050B

Analyte	Wavelength/ Mass	RL (mg/Kg)	MDL (mg/Kg)
U-233	233	0.005	0.0015
U-234	234	0.005	0.0003
U-235	235	0.005	0.00203
U-236	236	0.005	0.0004
U-238	238	0.005	0.0003

9-IN
CALIBRATION BLANK DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102577-2

SDG Number: 680102577-1

Matrix: Solid Instrument ID: ICPMS6100

Method: 6020A XMDL Date: 07/18/2014 15:08

Analyte	Wavelength/ Mass	XRL (ug/L)	XMDL (ug/L)
U-233	233	0.05	0.0066
U-234	234	0.05	0.0021
U-235	235	0.05	0.0034
U-236	236	0.05	0.0015
U-238	238	0.05	0.0082

9-IN
DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102577-2

SDG Number: 680102577-1

Matrix: Solid Instrument ID: NOEQUIP

Method: 6020A MDL Date: 06/12/2013 14:02

Analyte	Wavelength/ Mass	RL (mg/Kg)	MDL (mg/Kg)
Total Uranium		0.005	0.0003

11-IN
LINEAR RANGES
METALS

Lab Name: TestAmerica St. Louis Job No: 680-102577-2

SDG No.: 680102577-1

Instrument ID: ICPMS6100 Date: 02/14/2012 11:04

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	Method
U-233		2000	6020A
U-234		2000	6020A
U-235		2000	6020A
U-236		2000	6020A
U-238		2000	6020A

15-IN
ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

ICP-MS Instrument ID: ICPMS6100 Start Date: 09/02/2014 End Date: 09/03/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
IC 160-141597/2	18:22										
IC 160-141597/3	18:27										
IC 160-141597/4	18:31										
IC 160-141597/5	18:36										
IC 160-141597/6	18:41										
ICV 160-141597/7	18:45	101									
ICV 160-141597/8	18:50	101									
ICV 160-141597/9	18:55	99									
ICB 160-141597/10	18:59	98									
CRI 160-141597/11	19:04	100									
CRI 160-141597/12	19:09	100									
ICSA 160-141597/13	19:13	90									
ICSAB 160-141597/14	19:18	89									
CCV 160-141597/51	22:11	94									
CCB 160-141597/52	22:16	92									
MB 160-139348/1-A	22:44	96									
LCS 160-139348/2-A	22:48	95									
680-102577-1	22:53	94									
680-102577-2	22:58	93									
CCV 160-141597/63	23:07	92									
CCB 160-141597/64	23:12	90									
CCV 160-141597/75	00:03	93									
CCB 160-141597/76	00:08	93									

TETRA TECH

INTERNAL CORRESPONDENCE

TO: M. MARTIN **DATE:** OCTOBER 13, 2014

FROM: MICHELLE L. ALLEN **COPIES:** DV FILE

SUBJECT: RADIOLOGICAL DATA VALIDATION – ISOTOPIC THORIUM
LOCKHEED MARTIN CORPORATION (LMC) – MIDDLE RIVER COMPLEX (MRC)
SEDIMENT INVESTIGATION
SAMPLE DELIVERY GROUP (SDG) 680-102199-1

SAMPLES: 34/Sediment/Isotopic Thorium

SD-195-SS	SD-196-01	SD-196-02
SD-196-SS	SD-200-01	SD-200-02
SD-200-03	SD-200-SS	SD-201-01
SD-201-02	SD-201-SS	SD-202-01
SD-202-02	SD-202-SS	SD-203-01
SD-203-02	SD-203-SS	SD-218-01
SD-218-02	SD-218-SS	SD-219-01
SD-219-02	SD-219-03	SD-219-SS
SD-220-01	SD-220-02	SD-220-SS
SD-277-01	SD-277-02	SD-277-SS
SD-279-01	SD-279-02	SD-279-SS
SD-DUP-01		

Overview

The sample set for LMC-MRC, SDG 680-102199-1 consisted of thirty-four (34) sediment environmental samples. All thirty-four (34) sediment samples were analyzed for isotopic thorium (thorium-228, thorium-230, and thorium-232). One field duplicate sample pair was included in this SDG: SD-DUP 01/SD-196-01.

The samples were collected by Tetra Tech, Inc. on June 9-10, 2014 and analyzed by TestAmerica, Inc. All analyses were conducted in accordance with Method A-01-R analytical and reporting protocols.

The findings offered in this report are based upon a general review of all available data. The data contained in this SDG were validated with regard to the following parameters: data completeness, holding times, instrument daily calibration and blank checks, laboratory blank results, laboratory control sample recoveries, laboratory duplicate results, yield recoveries, field duplicate results, detection limits and analyte quantitation. Areas of concern are listed below.

Major

No major issues were identified.

Minor

- Thorium-230 was detected in the method blank, MB 160-126996/1-A associated with preparation batch #126996 at a concentration of 0.1486 ± 0.0822 pCi/g. The mean difference of the blank activity and detected sample activity was calculated and used for the evaluation of blank contamination for samples associated with this preparation batch. The mean difference for sample SD-202-01 was less than 2. The result for thorium-230 in this sample was qualified as estimated, non-detected, (UJ), because the sample is not statistically distinguishable from the blank. The remaining calculated mean differences were greater than 3 and the sample and blank activities

differed by less than a factor of 10, therefore, the sample results were qualified as estimated, (J), as the blank activity may have an impact on the sample activities.

- Thorium-230 was detected in the method blank, MB 160-126998/1-A associated with preparation batch #126998 at a concentration of 0.1451 ± 0.0901 pCi/g. The mean difference of the blank activity and detected sample activity was calculated and used for the evaluation of blank contamination for samples associated with this preparation batch. The calculated mean differences were greater than 3 and the sample and blank activities differed by less than a factor of 10, therefore, the sample results were qualified as estimated, (J), as the blank activity may have an impact on the sample activities.

Notes

All sample results are reported on a dry weight basis.

The uncertainty for the sample results are reported at 2σ (standard deviations, 95% confidence level). The EDD does not contain the uncertainty result.

The mean differences were calculated for thorium-228, thorium-230, thorium-232 for the original and laboratory duplicate analyses for samples SD-279-SS and SD-196-01. The mean differences were < 3 for all thorium isotopes. No validation action was required.

The field duplicate sample pair had mean differences for thorium-228, thorium-230 and thorium-232 < 2 (95% confidence level). No validation action was required.

Executive Summary

Laboratory Performance: Thorium-230 was detected in the laboratory method blanks.

Other Factors Affecting Data Quality: None.

The text of this report has been formulated to address only those areas affecting data quality.

Tetra Tech, Inc.
Michelle L. Allen
Chemist/Data Validator

Tetra Tech, Inc.
Joseph A. Samchuck
Data Validation Manager

Attachments:
Appendix A – Qualified Analytical Results
Appendix B – Results as Reported by the Laboratory
Appendix C – Support Documentation

Appendix A

Qualified Analytical Results

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = ICP PDS Recovery Noncompliance; MSA's $r < 0.995$
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = RPD between columns/detectors >40% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient $r < 0.995$
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 standard deviations is greater than sample activity
Z1 = Tentatively Identified Compound considered presumptively present
Z2 = Tentatively Identified Compound column bleed
Z3 = Tentatively Identified Compound aldol condensate

PROJ_NO: 05220	NSAMPLE	SD-195-SS			SD-196-01			SD-196-02			SD-196-SS		
SDG: 680-102199-1	LAB_ID	680-102199-25			680-102199-27			680-102199-28			680-102199-26		
FRACTION: RAD	SAMP_DATE	6/10/2014			6/10/2014			6/10/2014			6/10/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
THORIUM-228		1.07			1.31			0.905			1.3		
THORIUM-230		0.676	J	A	1.08	J	A	0.876	J	A	1.2	J	A
THORIUM-232		0.936			1.06			0.808			1.26		

PROJ_NO: 05220	NSAMPLE	SD-200-01			SD-200-02			SD-200-03			SD-200-SS		
SDG: 680-102199-1	LAB_ID	680-102199-40			680-102199-41			680-102199-42			680-102199-39		
FRACTION: RAD	SAMP_DATE	6/10/2014			6/10/2014			6/10/2014			6/10/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
THORIUM-228		1.39			1.07			1.42			1.05		
THORIUM-230		1.28	J	A	0.785	J	A	0.84	J	A	1.15	J	A
THORIUM-232		1.14			1.35			1.22			1.42		

PROJ_NO: 05220	NSAMPLE	SD-201-01			SD-201-02			SD-201-SS			SD-202-01		
SDG: 680-102199-1	LAB_ID	680-102199-36			680-102199-37			680-102199-35			680-102199-23		
FRACTION: RAD	SAMP_DATE	6/10/2014			6/10/2014			6/10/2014			6/10/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
THORIUM-228		1.22			0.69			1.12			0.455		
THORIUM-230		1.03	J	A	0.614	J	A	1.23	J	A	0.28	UJ	A
THORIUM-232		1.2			0.663			0.959			0.378		

PROJ_NO: 05220	NSAMPLE	SD-202-02			SD-202-SS			SD-203-01			SD-203-02		
SDG: 680-102199-1	LAB_ID	680-102199-24			680-102199-22			680-102199-19			680-102199-20		
FRACTION: RAD	SAMP_DATE	6/10/2014			6/10/2014			6/10/2014			6/10/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
THORIUM-228		1.12			0.652			1.33			0.621		
THORIUM-230		0.66	J	A	0.558	J	A	0.937	J	A	0.684	J	A
THORIUM-232		1.33			0.717			1.24			0.615		

PROJ_NO: 05220	NSAMPLE	SD-203-SS			SD-218-01			SD-218-02			SD-218-SS		
SDG: 680-102199-1	LAB_ID	680-102199-18			680-102199-16			680-102199-17			680-102199-15		
FRACTION: RAD	SAMP_DATE	6/10/2014			6/10/2014			6/10/2014			6/10/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
THORIUM-228		1.09			1.2			1.53			0.925		
THORIUM-230		1.27	J	A	0.865	J	A	0.746	J	A	0.755	J	A
THORIUM-232		1.47			1.53			1.18			0.928		

PROJ_NO: 05220	NSAMPLE	SD-219-01			SD-219-02			SD-219-03			SD-219-SS		
SDG: 680-102199-1	LAB_ID	680-102199-12			680-102199-13			680-102199-14			680-102199-11		
FRACTION: RAD	SAMP_DATE	6/10/2014			6/10/2014			6/10/2014			6/10/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
THORIUM-228		1.09			1.04			1.15			0.799		
THORIUM-230		0.781	J	A	0.608	J	A	1.17	J	A	0.862	J	A
THORIUM-232		0.886			0.926			1.05			0.719		

PROJ_NO: 05220	NSAMPLE	SD-220-01			SD-220-02			SD-220-SS			SD-277-01		
SDG: 680-102199-1	LAB_ID	680-102199-31			680-102199-32			680-102199-30			680-102199-8		
FRACTION: RAD	SAMP_DATE	6/10/2014			6/10/2014			6/10/2014			6/9/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
THORIUM-228		1.03			0.986			1.05			1.45		
THORIUM-230		0.914	J	A	0.94	J	A	1.13	J	A	1.17	J	A
THORIUM-232		1.3			0.944			1.14			1.24		

PROJ_NO: 05220	NSAMPLE	SD-277-02			SD-277-SS			SD-279-01			SD-279-02		
SDG: 680-102199-1	LAB_ID	680-102199-9			680-102199-7			680-102199-2			680-102199-3		
FRACTION: RAD	SAMP_DATE	6/9/2014			6/9/2014			6/9/2014			6/9/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
THORIUM-228		1.38			1.11			1.05			0.607		
THORIUM-230		1.12	J	A	1.04	J	A	0.839	J	A	0.508	J	A
THORIUM-232		1.17			1.07			1.01			0.539		

PROJ_NO: 05220	NSAMPLE	SD-279-SS			SD-DUP-01		
SDG: 680-102199-1	LAB_ID	680-102199-1			680-102199-33		
FRACTION: RAD	SAMP_DATE	6/9/2014			6/10/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM		
	UNITS	PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0		
	DUP_OF				SD-196-01		
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
THORIUM-228		1.56			1.17		
THORIUM-230		1.22	J	A	0.851	J	A
THORIUM-232		1.29			1.3		

Appendix B

Results as Reported by the Laboratory

Client Sample ID: SD-279-SS

Lab Sample ID: 680-102199-1
Matrix: Solid

Date Collected: 06/09/14 15:40
Date Received: 06/11/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.56		0.270	0.300	1.00	0.105	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	1.22		0.237	0.258	1.00	0.0699	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	1.29		0.243	0.266	1.00	0.0342	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*85.2*		*30 - 110*	*06/16/14 12:49*	*06/30/14 01:40*	*1*

Client Sample ID: SD-279-01

Lab Sample ID: 680-102199-2
Matrix: Solid

Date Collected: 06/09/14 15:45
Date Received: 06/11/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.05		0.218	0.235	1.00	0.0926	pCi/g	06/16/14 12:49	06/30/14 18:11	1
Thorium-230	0.839		0.194	0.207	1.00	0.0753	pCi/g	06/16/14 12:49	06/30/14 18:11	1
Thorium-232	1.01		0.211	0.227	1.00	0.0501	pCi/g	06/16/14 12:49	06/30/14 18:11	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*87.5*		*30 - 110*	*06/16/14 12:49*	*06/30/14 18:11*	*1*

Client Sample ID: SD-279-02

Lab Sample ID: 680-102199-3
Matrix: Solid

Date Collected: 06/09/14 15:50
Date Received: 06/11/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.607		0.167	0.175	1.00	0.0872	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	0.508		0.150	0.156	1.00	0.0331	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	0.539		0.157	0.164	1.00	0.0881	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*87.7*		*30 - 110*	*06/16/14 12:49*	*06/30/14 01:40*	*1*

Client Sample ID: SD-277-SS

Lab Sample ID: 680-102199-7
Matrix: Solid

Date Collected: 06/09/14 18:10
Date Received: 06/11/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.11		0.215	0.235	1.00	0.0629	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	1.04		0.208	0.225	1.00	0.0535	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	1.07		0.210	0.229	1.00	0.0467	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Client Sample ID: SD-277-SS

Lab Sample ID: 680-102199-7

Date Collected: 06/09/14 18:10
Date Received: 06/11/14 09:30

Matrix: Solid

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	92.1		30 - 110	06/16/14 12:49	06/30/14 01:40	1

Client Sample ID: SD-277-01

Lab Sample ID: 680-102199-8

Date Collected: 06/09/14 18:15
Date Received: 06/11/14 09:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.45		0.260	0.287	1.00	0.104	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	1.17		0.232	0.252	1.00	0.0772	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	1.24		0.237	0.259	1.00	0.0514	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	86.3		30 - 110	06/16/14 12:49	06/30/14 01:40	1

Client Sample ID: SD-277-02

Lab Sample ID: 680-102199-9

Date Collected: 06/09/14 18:20
Date Received: 06/11/14 09:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.38		0.246	0.272	1.00	0.0829	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	1.12		0.221	0.240	1.00	0.0674	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	1.17		0.225	0.246	1.00	0.0491	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	85.2		30 - 110	06/16/14 12:49	06/30/14 01:40	1

Client Sample ID: SD-219-SS

Lab Sample ID: 680-102199-11

Date Collected: 06/10/14 09:20
Date Received: 06/11/14 09:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.799		0.199	0.210	1.00	0.117	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	0.862		0.201	0.213	1.00	0.0659	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	0.719		0.183	0.193	1.00	0.0656	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	83.1		30 - 110	06/16/14 12:49	06/30/14 01:40	1

Client Sample ID: SD-219-01

Lab Sample ID: 680-102199-12

Date Collected: 06/10/14 09:22
Date Received: 06/11/14 09:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.09		0.223	0.242	1.00	0.0797	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	0.781		0.188	0.199	1.00	0.0583	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	0.886		0.199	0.213	1.00	0.0580	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*88.0*		*30 - 110*	*06/16/14 12:49*	*06/30/14 01:40*	*1*

Client Sample ID: SD-219-02

Lab Sample ID: 680-102199-13

Date Collected: 06/10/14 09:25
Date Received: 06/11/14 09:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.04		0.220	0.237	1.00	0.0712	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	0.608		0.171	0.179	1.00	0.0889	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	0.926		0.207	0.222	1.00	0.0600	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*85.4*		*30 - 110*	*06/16/14 12:49*	*06/30/14 01:40*	*1*

Client Sample ID: SD-219-03

Lab Sample ID: 680-102199-14

Date Collected: 06/10/14 09:28
Date Received: 06/11/14 09:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.15		0.239	0.258	1.00	0.110	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	1.17		0.238	0.258	1.00	0.0882	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	1.05		0.225	0.242	1.00	0.0875	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*82.2*		*30 - 110*	*06/16/14 12:49*	*06/30/14 01:40*	*1*

Client Sample ID: SD-218-SS

Lab Sample ID: 680-102199-15

Date Collected: 06/10/14 10:10
Date Received: 06/11/14 09:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.925		0.204	0.218	1.00	0.0887	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	0.755		0.183	0.193	1.00	0.0665	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	0.928		0.201	0.216	1.00	0.0563	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Client Sample ID: SD-218-SS

Lab Sample ID: 680-102199-15

Date Collected: 06/10/14 10:10
Date Received: 06/11/14 09:30

Matrix: Solid

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*90.8*		*30 - 110*	*06/16/14 12:49*	*06/30/14 01:40*	*1*

Client Sample ID: SD-218-01

Lab Sample ID: 680-102199-16

Date Collected: 06/10/14 10:12
Date Received: 06/11/14 09:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.20		0.252	0.271	1.00	0.102	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	0.865		0.213	0.225	1.00	0.0835	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	1.53		0.281	0.309	1.00	0.0667	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*75.2*		*30 - 110*	*06/16/14 12:49*	*06/30/14 01:40*	*1*

Client Sample ID: SD-218-02

Lab Sample ID: 680-102199-17

Date Collected: 06/10/14 10:14
Date Received: 06/11/14 09:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.53		0.275	0.304	1.00	0.128	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	0.746		0.190	0.200	1.00	0.0767	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	1.18		0.237	0.257	1.00	0.0720	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*79.8*		*30 - 110*	*06/16/14 12:49*	*06/30/14 01:40*	*1*

Client Sample ID: SD-203-SS

Lab Sample ID: 680-102199-18

Date Collected: 06/10/14 11:40
Date Received: 06/11/14 09:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.09		0.222	0.241	1.00	0.0850	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	1.27		0.238	0.261	1.00	0.0647	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	1.47		0.255	0.283	1.00	0.0574	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*87.9*		*30 - 110*	*06/16/14 12:49*	*06/30/14 01:40*	*1*

Client Sample ID: SD-203-01

Lab Sample ID: 680-102199-19

Date Collected: 06/10/14 11:45
Date Received: 06/11/14 09:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.33		0.248	0.272	1.00	0.103	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	0.937		0.205	0.220	1.00	0.0509	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	1.24		0.234	0.256	1.00	0.0334	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*85.0*		*30 - 110*	*06/16/14 12:49*	*06/30/14 01:40*	*1*

Client Sample ID: SD-203-02

Lab Sample ID: 680-102199-20

Date Collected: 06/10/14 11:50
Date Received: 06/11/14 09:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.621		0.164	0.172	1.00	0.0868	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	0.684		0.169	0.178	1.00	0.0473	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	0.615		0.160	0.168	1.00	0.0588	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*92.9*		*30 - 110*	*06/16/14 12:49*	*06/30/14 01:40*	*1*

Client Sample ID: SD-202-SS

Lab Sample ID: 680-102199-22

Date Collected: 06/10/14 12:20
Date Received: 06/11/14 09:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.652		0.164	0.173	1.00	0.0661	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	0.558		0.151	0.158	1.00	0.0463	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	0.717		0.171	0.181	1.00	0.0461	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*91.6*		*30 - 110*	*06/16/14 12:49*	*06/30/14 01:40*	*1*

Client Sample ID: SD-202-01

Lab Sample ID: 680-102199-23

Date Collected: 06/10/14 12:25
Date Received: 06/11/14 09:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.455		0.145	0.150	1.00	0.0885	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	0.280		0.111	0.113	1.00	0.0494	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	0.378		0.128	0.132	1.00	0.0324	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Client Sample ID: SD-202-01

Lab Sample ID: 680-102199-23

Date Collected: 06/10/14 12:25
Date Received: 06/11/14 09:30

Matrix: Solid

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.7*		*30 - 110*	*06/16/14 12:49*	*06/30/14 01:40*	*1*

Client Sample ID: SD-202-02

Lab Sample ID: 680-102199-24

Date Collected: 06/10/14 12:30
Date Received: 06/11/14 09:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.12		0.236	0.254	1.00	0.112	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	0.660		0.181	0.189	1.00	0.0914	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	1.33		0.253	0.276	1.00	0.0769	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*79.0*		*30 - 110*	*06/16/14 12:49*	*06/30/14 01:40*	*1*

Client Sample ID: SD-195-SS

Lab Sample ID: 680-102199-25

Date Collected: 06/10/14 13:30
Date Received: 06/11/14 09:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.07		0.211	0.229	1.00	0.0756	pCi/g	06/17/14 07:50	06/30/14 01:43	1
Thorium-230	0.676		0.167	0.177	1.00	0.0582	pCi/g	06/17/14 07:50	06/30/14 01:43	1
Thorium-232	0.936		0.195	0.210	1.00	0.0305	pCi/g	06/17/14 07:50	06/30/14 01:43	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*92.2*		*30 - 110*	*06/17/14 07:50*	*06/30/14 01:43*	*1*

Client Sample ID: SD-196-SS

Lab Sample ID: 680-102199-26

Date Collected: 06/10/14 14:00
Date Received: 06/11/14 09:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.30		0.242	0.265	1.00	0.0818	pCi/g	06/16/14 13:16	06/30/14 01:42	1
Thorium-230	1.20		0.233	0.254	1.00	0.0788	pCi/g	06/16/14 13:16	06/30/14 01:42	1
Thorium-232	1.26		0.237	0.259	1.00	0.0627	pCi/g	06/16/14 13:16	06/30/14 01:42	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*86.3*		*30 - 110*	*06/16/14 13:16*	*06/30/14 01:42*	*1*

Client Sample ID: SD-196-01

Lab Sample ID: 680-102199-27

Date Collected: 06/10/14 14:05
Date Received: 06/11/14 09:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.31		0.239	0.263	1.00	0.0765	pCi/g	06/16/14 13:16	06/30/14 01:42	1
Thorium-230	1.08		0.217	0.235	1.00	0.0697	pCi/g	06/16/14 13:16	06/30/14 01:42	1
Thorium-232	1.06		0.214	0.232	1.00	0.0694	pCi/g	06/16/14 13:16	06/30/14 01:42	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*86.7*		*30 - 110*	*06/16/14 13:16*	*06/30/14 01:42*	*1*

Client Sample ID: SD-196-02

Lab Sample ID: 680-102199-28

Date Collected: 06/10/14 14:10
Date Received: 06/11/14 09:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.905		0.195	0.209	1.00	0.0733	pCi/g	06/16/14 13:16	06/30/14 01:42	1
Thorium-230	0.876		0.190	0.204	1.00	0.0470	pCi/g	06/16/14 13:16	06/30/14 01:42	1
Thorium-232	0.808		0.183	0.195	1.00	0.0534	pCi/g	06/16/14 13:16	06/30/14 01:42	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*93.1*		*30 - 110*	*06/16/14 13:16*	*06/30/14 01:42*	*1*

Client Sample ID: SD-220-SS

Lab Sample ID: 680-102199-30

Date Collected: 06/10/14 14:40
Date Received: 06/11/14 09:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.05		0.217	0.234	1.00	0.0974	pCi/g	06/16/14 13:16	06/30/14 01:42	1
Thorium-230	1.13		0.222	0.241	1.00	0.0616	pCi/g	06/16/14 13:16	06/30/14 01:42	1
Thorium-232	1.14		0.223	0.243	1.00	0.0658	pCi/g	06/16/14 13:16	06/30/14 01:42	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*86.5*		*30 - 110*	*06/16/14 13:16*	*06/30/14 01:42*	*1*

Client Sample ID: SD-220-01

Lab Sample ID: 680-102199-31

Date Collected: 06/10/14 14:42
Date Received: 06/11/14 09:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.03		0.211	0.228	1.00	0.0729	pCi/g	06/16/14 13:16	06/30/14 01:42	1
Thorium-230	0.914		0.200	0.215	1.00	0.0822	pCi/g	06/16/14 13:16	06/30/14 01:42	1
Thorium-232	1.30		0.236	0.260	1.00	0.0520	pCi/g	06/16/14 13:16	06/30/14 01:42	1

Client Sample ID: SD-220-01

Lab Sample ID: 680-102199-31

Date Collected: 06/10/14 14:42
Date Received: 06/11/14 09:30

Matrix: Solid

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*87.9*		*30 - 110*	*06/16/14 13:16*	*06/30/14 01:42*	*1*

Client Sample ID: SD-220-02

Lab Sample ID: 680-102199-32

Date Collected: 06/10/14 14:44
Date Received: 06/11/14 09:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.986		0.210	0.226	1.00	0.0717	pCi/g	06/16/14 13:16	06/30/14 01:43	1
Thorium-230	0.940		0.204	0.219	1.00	0.0505	pCi/g	06/16/14 13:16	06/30/14 01:43	1
Thorium-232	0.944		0.204	0.219	1.00	0.0331	pCi/g	06/16/14 13:16	06/30/14 01:43	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*82.3*		*30 - 110*	*06/16/14 13:16*	*06/30/14 01:43*	*1*

Client Sample ID: SD-DUP-01

Lab Sample ID: 680-102199-33

Date Collected: 06/10/14 00:00
Date Received: 06/11/14 09:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.17		0.226	0.246	1.00	0.100	pCi/g	06/16/14 13:16	06/30/14 01:43	1
Thorium-230	0.851		0.190	0.203	1.00	0.0679	pCi/g	06/16/14 13:16	06/30/14 01:43	1
Thorium-232	1.30		0.234	0.258	1.00	0.0594	pCi/g	06/16/14 13:16	06/30/14 01:43	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*90.6*		*30 - 110*	*06/16/14 13:16*	*06/30/14 01:43*	*1*

Client Sample ID: SD-201-SS

Lab Sample ID: 680-102199-35

Date Collected: 06/10/14 15:10
Date Received: 06/11/14 09:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.12		0.214	0.234	1.00	0.0872	pCi/g	06/16/14 13:16	06/30/14 01:43	1
Thorium-230	1.23		0.222	0.245	1.00	0.0605	pCi/g	06/16/14 13:16	06/30/14 01:43	1
Thorium-232	0.959		0.195	0.211	1.00	0.0449	pCi/g	06/16/14 13:16	06/30/14 01:43	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*95.9*		*30 - 110*	*06/16/14 13:16*	*06/30/14 01:43*	*1*

Client Sample ID: SD-201-01

Lab Sample ID: 680-102199-36

Date Collected: 06/10/14 15:15
Date Received: 06/11/14 09:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.22		0.225	0.248	1.00	0.0727	pCi/g	06/16/14 13:16	06/30/14 01:43	1
Thorium-230	1.03		0.206	0.223	1.00	0.0532	pCi/g	06/16/14 13:16	06/30/14 01:43	1
Thorium-232	1.20		0.221	0.243	1.00	0.0306	pCi/g	06/16/14 13:16	06/30/14 01:43	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*93.3*		*30 - 110*	*06/16/14 13:16*	*06/30/14 01:43*	*1*

Client Sample ID: SD-201-02

Lab Sample ID: 680-102199-37

Date Collected: 06/10/14 15:20
Date Received: 06/11/14 09:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.690		0.177	0.186	1.00	0.105	pCi/g	06/16/14 13:16	06/30/14 01:43	1
Thorium-230	0.614		0.163	0.171	1.00	0.0719	pCi/g	06/16/14 13:16	06/30/14 01:43	1
Thorium-232	0.663		0.167	0.176	1.00	0.0427	pCi/g	06/16/14 13:16	06/30/14 01:43	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*93.3*		*30 - 110*	*06/16/14 13:16*	*06/30/14 01:43*	*1*

Client Sample ID: SD-200-SS

Lab Sample ID: 680-102199-39

Date Collected: 06/10/14 15:50
Date Received: 06/11/14 09:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.05		0.207	0.225	1.00	0.0787	pCi/g	06/16/14 13:16	06/30/14 01:43	1
Thorium-230	1.15		0.214	0.235	1.00	0.0566	pCi/g	06/16/14 13:16	06/30/14 01:43	1
Thorium-232	1.42		0.237	0.266	1.00	0.0450	pCi/g	06/16/14 13:16	06/30/14 01:43	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*90.9*		*30 - 110*	*06/16/14 13:16*	*06/30/14 01:43*	*1*

Client Sample ID: SD-200-01

Lab Sample ID: 680-102199-40

Date Collected: 06/10/14 15:55
Date Received: 06/11/14 09:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.39		0.244	0.270	1.00	0.106	pCi/g	06/16/14 13:16	06/30/14 01:43	1
Thorium-230	1.28		0.231	0.255	1.00	0.0538	pCi/g	06/16/14 13:16	06/30/14 01:43	1
Thorium-232	1.14		0.217	0.238	1.00	0.0536	pCi/g	06/16/14 13:16	06/30/14 01:43	1

Client Sample ID: SD-200-01

Lab Sample ID: 680-102199-40

Date Collected: 06/10/14 15:55
Date Received: 06/11/14 09:30

Matrix: Solid

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.0*		*30 - 110*	*06/16/14 13:16*	*06/30/14 01:43*	*1*

Client Sample ID: SD-200-02

Lab Sample ID: 680-102199-41

Date Collected: 06/10/14 16:00
Date Received: 06/11/14 09:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.07		0.227	0.244	1.00	0.107	pCi/g	06/16/14 13:16	06/30/14 01:43	1
Thorium-230	0.785		0.193	0.204	1.00	0.0792	pCi/g	06/16/14 13:16	06/30/14 01:43	1
Thorium-232	1.35		0.250	0.275	1.00	0.0601	pCi/g	06/16/14 13:16	06/30/14 01:43	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*83.5*		*30 - 110*	*06/16/14 13:16*	*06/30/14 01:43*	*1*

Client Sample ID: SD-200-03

Lab Sample ID: 680-102199-42

Date Collected: 06/10/14 16:05
Date Received: 06/11/14 09:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.42		0.243	0.271	1.00	0.0789	pCi/g	06/16/14 13:16	06/30/14 01:43	1
Thorium-230	0.840		0.187	0.200	1.00	0.0587	pCi/g	06/16/14 13:16	06/30/14 01:43	1
Thorium-232	1.22		0.225	0.247	1.00	0.0603	pCi/g	06/16/14 13:16	06/30/14 01:43	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*88.6*		*30 - 110*	*06/16/14 13:16*	*06/30/14 01:43*	*1*

Appendix C

Support Documentation

LMC-MRC
SEDIMENT INVESTIGATION
SDG 680-102199-1

LABORATORY DUPLICATE EVALUATION

MEAN DIFFERENCE:

$$\frac{|\text{SAMPLE ACTIVITY} - \text{BLANK ACTIVITY}|}{\sqrt{((\text{SAMPLE UNCERTAINTY}/2)^2 + (\text{BLANK UNCERTAINTY}/2)^2)}}$$

PREPARATION BATCH #126996

SAMPLE ID:	**SD-279-SS**	**Th-228**
SAMPLE RESULTS		1.56 ± 0.3 pCi/g
DUPLICATE RESULTS		1.089 ± 0.236 pCi/g
MEAN DIFFERENCE =	2.467897332	

		Th-230
SAMPLE RESULTS		1.22 ± 0.258 pCi/g
DUPLICATE RESULTS		1.257 ± 0.254 pCi/g
MEAN DIFFERENCE =	0.204391816	

		Th-232
SAMPLE RESULTS		1.29 ± 0.266 pCi/g
DUPLICATE RESULTS		1.22 ± 0.249 pCi/g
MEAN DIFFERENCE =	0.384237122	

LMC-MRC
SEDIMENT INVESTIGATION
SDG 680-102199-1

LABORATORY DUPLICATE EVALUATION

MEAN DIFFERENCE:

$$\frac{|\text{SAMPLE ACTIVITY} - \text{BLANK ACTIVITY}|}{\sqrt{((\text{SAMPLE UNCERTAINTY}/2)^2 + (\text{BLANK UNCERTAINTY}/2)^2)}}$$

PREPARATION BATCH #126998

SAMPLE ID:	**SD-196-SS**	**Th-228**
SAMPLE RESULTS		1.3 ± 0.265 pCi/g
DUPLICATE RESULTS		1.034 ± 0.224 pCi/g
MEAN DIFFERENCE =	1.533192144	

		Th-230
SAMPLE RESULTS		1.2 ± 0.254 pCi/g
DUPLICATE RESULTS		0.954 ± 0.212 pCi/g
MEAN DIFFERENCE =	1.487090437	

		Th-232
SAMPLE RESULTS		1.26 ± 0.265 pCi/g
DUPLICATE RESULTS		1.116 ± 0.23 pCi/g
MEAN DIFFERENCE =	0.820766016	

LMC-MRC
SEDIMENT INVESTIGATION
SDG 680-102199-1

FIELD DUPLICATE EVALUATION

MEAN DIFFERENCE:

$$\frac{|\text{SAMPLE ACTIVITY} - \text{BLANK ACTIVITY}|}{\sqrt{((\text{SAMPLE UNCERTAINTY}/2)^2 + (\text{BLANK UNCERTAINTY}/2)^2)}}$$

SAMPLE IDs:	**SD-196-01/SD-DUP-01**	**Th-228**
SAMPLE RESULTS		1.31 ± 0.263 pCi/g
DUPLICATE RESULTS		1.17 ± 0.246 pCi/g
MEAN DIFFERENCE =	0.777522845	
		Th-230
SAMPLE RESULTS		1.08 ± 0.235 pCi/g
DUPLICATE RESULTS		0.851 ± 0.203 pCi/g
MEAN DIFFERENCE =	1.474858608	
		Th-232
SAMPLE RESULTS		1.06 ± 0.232 pCi/g
DUPLICATE RESULTS		1.3 ± 0.258 pCi/g
MEAN DIFFERENCE =	1.383405945	

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:42:40PM 6/30/2014

Sample

Sample Name: 680-102199-A-1-B SD-279-SS
SampleType: Sample
: 680-102199-A-1-B
Sample Collection Date: 6/9/2014 3:40:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9958g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126996
AnalysisID: 613465

Analyst: 60040

Tracer

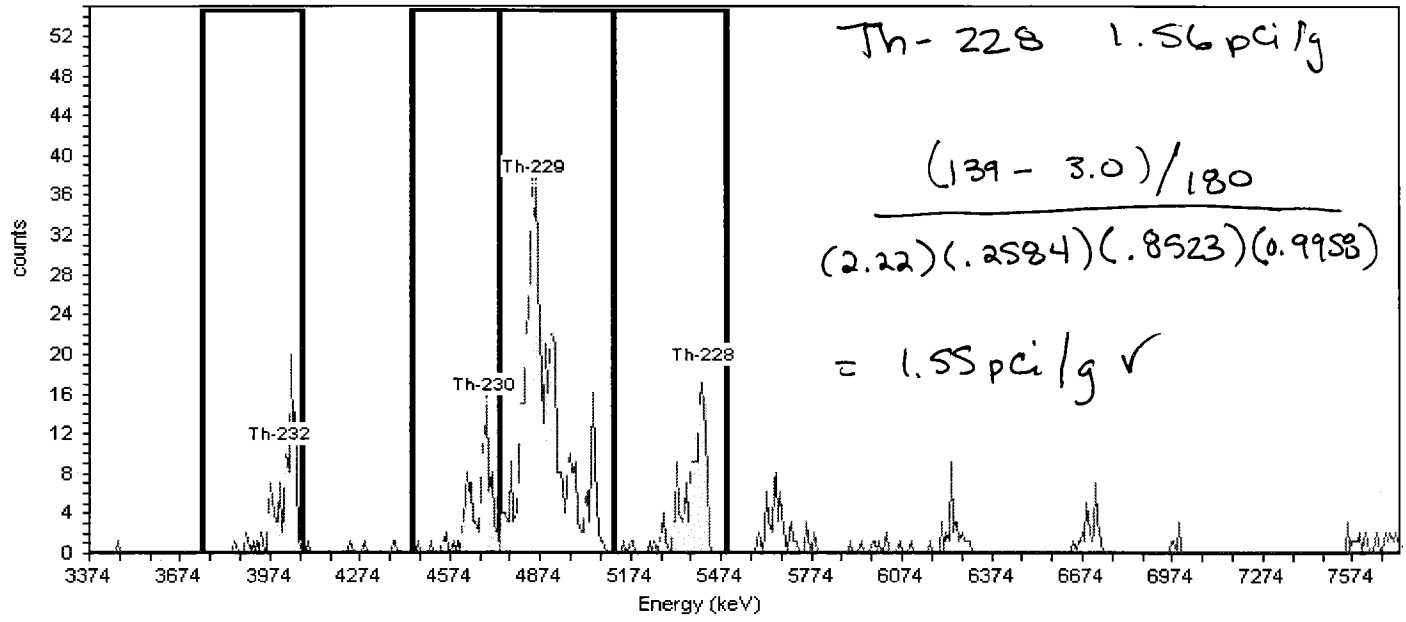
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 85.23%

Acquisition

Detector: AV10
Serial Number: 49-155N2
Acquisition Start Date: 6/30/2014 1:40:09AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:26PM
Background Info: Sample: ICB;AV10; Det: AV10; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9794;AV10-20140505
Calibration Date: 5/6/2014 5:39:10PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.84% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:38:13AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 6/30/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	30.9	100.2	113	0.0000	113.46	1.292	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4739.1	37.5	99.7	107	0.7500	106.25	1.216	pCi/g
Th-229	4848.0	4,845.3	2.7	4739.1	5119.5	99.2	99.6	538	1.5000	536.50	5.238	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	54.1	99.8	139	3.0000	136.00	1.556	pCi/g

LMC-MRC
SEDIMENT INVESTIGATION
SDG 680-102199-1

BLANK CONTAMINATION EVALUATION

MEAN DIFFERENCE:

$$\frac{|\text{SAMPLE ACTIVITY} - \text{BLANK ACTIVITY}|}{\sqrt{((\text{SAMPLE UNCERTAINTY}/2)^2 + (\text{BLANK UNCERTAINTY}/2)^2)}}$$

PREPARATION BATCH #126996

BLANK ID:	**MB 160-126996/1-A**	**Th-230** **0.1486 ± 0.0822 pCi/g**

AFFECTED SAMPLES:

SAMPLE ID:	SD-279-SS	**Th-230** 1.22 ± 0.258 pCi/g
MEAN DIFFERENCE =	7.91348752	
SAMPLE ID:	SD-279-01	**Th-230** 0.839 ± 0.207 pCi/g
MEAN DIFFERENCE =	6.19961006	
SAMPLE ID:	SD-279-02	**Th-230** 0.508 ± 0.156 pCi/g
MEAN DIFFERENCE =	4.076410133	
SAMPLE ID:	SD-277-SS	**Th-230** 1.04 ± 0.225 pCi/g
MEAN DIFFERENCE =	7.442440826	

LMC-MRC
SEDIMENT INVESTIGATION
SDG 680-102199-1

BLANK CONTAMINATION EVALUATION

MEAN DIFFERENCE:

$$\frac{|\text{SAMPLE ACTIVITY} - \text{BLANK ACTIVITY}|}{\sqrt{((\text{SAMPLE UNCERTAINTY}/2)^2 + (\text{BLANK UNCERTAINTY}/2)^2)}}$$

PREPARATION BATCH #126996

BLANK ID:	**MB 160-126996/1-A**	**Th-230** **0.1486 ± 0.0822 pCi/g**

AFFECTED SAMPLES:

SAMPLE ID:	SD-277-01	**Th-230** 1.17 ± 0.232 pCi/g
MEAN DIFFERENCE =	8.299619908	
SAMPLE ID:	SD-277-02	**Th-230** 1.12 ± 0.24 pCi/g
MEAN DIFFERENCE =	7.658271151	
SAMPLE ID:	SD-219-SS	**Th-230** 0.862 ± 0.213 pCi/g
MEAN DIFFERENCE =	6.249374736	
SAMPLE ID:	SD-219-01	**Th-230** 0.781 ± 0.199 pCi/g
MEAN DIFFERENCE =	5.87435598	
SAMPLE ID:	SD-219-02	**Th-230** 0.608 ± 0.179 pCi/g
MEAN DIFFERENCE =	4.664630125	

LMC-MRC
SEDIMENT INVESTIGATION
SDG 680-102199-1

BLANK CONTAMINATION EVALUATION

MEAN DIFFERENCE:

$$\frac{|\text{SAMPLE ACTIVITY} - \text{BLANK ACTIVITY}|}{\sqrt{((\text{SAMPLE UNCERTAINTY}/2)^2 + (\text{BLANK UNCERTAINTY}/2)^2)}}$$

PREPARATION BATCH #126996

BLANK ID:	**MB 160-126996/1-A**	**Th-230** **0.1486 ± 0.0822 pCi/g**

AFFECTED SAMPLES:

SAMPLE ID:	SD-219-03	**Th-230** 1.17 ± 0.258 pCi/g
MEAN DIFFERENCE =	7.544181588	
SAMPLE ID:	SD-218-SS	**Th-230** 0.755 ± 0.193 pCi/g
MEAN DIFFERENCE =	5.781413478	
SAMPLE ID:	SD-218-01	**Th-230** 0.865 ± 0.225 pCi/g
MEAN DIFFERENCE =	5.981337904	
SAMPLE ID:	SD-218-02	**Th-230** 0.746 ± 0.2 pCi/g
MEAN DIFFERENCE =	5.525513417	
SAMPLE ID:	SD-203-SS	**Th-230** 1.27 ± 0.261 pCi/g
MEAN DIFFERENCE =	8.196225406	

LMC-MRC
SEDIMENT INVESTIGATION
SDG 680-102199-1

BLANK CONTAMINATION EVALUATION

MEAN DIFFERENCE:

$$\frac{|\text{SAMPLE ACTIVITY} - \text{BLANK ACTIVITY}|}{\sqrt{((\text{SAMPLE UNCERTAINTY}/2)^2 + (\text{BLANK UNCERTAINTY}/2)^2)}}$$

PREPARATION BATCH #126996

BLANK ID:	**MB 160-126996/1-A**	**Th-230** **0.1486 ± 0.0822 pCi/g**
AFFECTED SAMPLES:		
SAMPLE ID:	SD-203-01	**Th-230** 0.937 ± 0.22 pCi/g
MEAN DIFFERENCE =	6.71393176	
SAMPLE ID:	SD-203-02	**Th-230** 0.684 ± 0.178 pCi/g
MEAN DIFFERENCE =	5.461499873	
SAMPLE ID:	SD-202-SS	**Th-230** 0.558 ± 0.158 pCi/g
MEAN DIFFERENCE =	4.597328046	
SAMPLE ID:	SD-202-01	**Th-230** 0.28 ± 0.113 pCi/g
MEAN DIFFERENCE =	1.880704214	
SAMPLE ID:	SD-202-02	**Th-230** 0.66 ± 0.189 pCi/g
MEAN DIFFERENCE =	4.962602694	

LMC-MRC
SEDIMENT INVESTIGATION
SDG 680-102199-1

BLANK CONTAMINATION EVALUATION

MEAN DIFFERENCE:

$$\frac{|\text{SAMPLE ACTIVITY} - \text{BLANK ACTIVITY}|}{\sqrt{((\text{SAMPLE UNCERTAINTY}/2)^2 + (\text{BLANK UNCERTAINTY}/2)^2)}}$$

PREPARATION BATCH #126998

BLANK ID:	**MB 160-126998/1-A**	**Th-230** **0.1451 ± 0.0901 pCi/g**

AFFECTED SAMPLES:

SAMPLE ID:	SD-195-SS	**Th-230** 0.676 ± 0.177 pCi/g
MEAN DIFFERENCE =	5.34608274	
SAMPLE ID:	SD-196-SS	**Th-230** 1.2 ± 0.254 pCi/g
MEAN DIFFERENCE =	7.828368798	
SAMPLE ID:	SD-196-01	**Th-230** 1.08 ± 0.235 pCi/g
MEAN DIFFERENCE =	7.429264269	
SAMPLE ID:	SD-196-02	**Th-230** 0.876 ± 0.204 pCi/g
MEAN DIFFERENCE =	6.554826773	

LMC-MRC
SEDIMENT INVESTIGATION
SDG 680-102199-1

BLANK CONTAMINATION EVALUATION

MEAN DIFFERENCE:

$$\frac{|\text{SAMPLE ACTIVITY} - \text{BLANK ACTIVITY}|}{\sqrt{((\text{SAMPLE UNCERTAINTY}/2)^2 + (\text{BLANK UNCERTAINTY}/2)^2)}}$$

PREPARATION BATCH #126998

BLANK ID:	**MB 160-126998/1-A**	**Th-230** **0.1451 ± 0.0901 pCi/g**
AFFECTED SAMPLES:		
SAMPLE ID:	SD-220-SS	**Th-230** 1.13 ± 0.241 pCi/g
MEAN DIFFERENCE =	7.655902356	
SAMPLE ID:	SD-220-01	**Th-230** 0.914 ± 0.215 pCi/g
MEAN DIFFERENCE =	6.596719407	
SAMPLE ID:	SD-220-02	**Th-230** 0.94 ± 0.204 pCi/g
MEAN DIFFERENCE =	7.128788892	
SAMPLE ID:	SD-DUP-01	**Th-230** 0.851 ± 0.203 pCi/g
MEAN DIFFERENCE =	6.356686334	
SAMPLE ID:	SD-201-SS	**Th-230** 1.23 ± 0.245 pCi/g
MEAN DIFFERENCE =	8.312067249	

LMC-MRC
SEDIMENT INVESTIGATION
SDG 680-102199-1

BLANK CONTAMINATION EVALUATION

MEAN DIFFERENCE:

$$\frac{|\text{SAMPLE ACTIVITY} - \text{BLANK ACTIVITY}|}{\sqrt{((\text{SAMPLE UNCERTAINTY}/2)^2 + (\text{BLANK UNCERTAINTY}/2)^2)}}$$

PREPARATION BATCH #126998

BLANK ID:	**MB 160-126998/1-A**	**Th-230** **0.1451 ± 0.0901 pCi/g**
AFFECTED SAMPLES:		
SAMPLE ID:	SD-201-01	**Th-230** 1.03 ± 0.223 pCi/g
MEAN DIFFERENCE =	7.35840577	
SAMPLE ID:	SD-201-02	**Th-230** 0.614 ± 0.171 pCi/g
MEAN DIFFERENCE =	4.851907905	
SAMPLE ID:	SD-200-SS	**Th-230** 1.15 ± 0.235 pCi/g
MEAN DIFFERENCE =	7.985525365	
SAMPLE ID:	SD-200-01	**Th-230** 1.28 ± 0.255 pCi/g
MEAN DIFFERENCE =	8.392689913	
SAMPLE ID:	SD-200-02	**Th-230** 0.785 ± 0.204 pCi/g
MEAN DIFFERENCE =	5.738724383	

LMC-MRC
SEDIMENT INVESTIGATION
SDG 680-102199-1

BLANK CONTAMINATION EVALUATION

MEAN DIFFERENCE:

$$\frac{|\text{SAMPLE ACTIVITY} - \text{BLANK ACTIVITY}|}{\sqrt{((\text{SAMPLE UNCERTAINTY}/2)^2 + (\text{BLANK UNCERTAINTY}/2)^2)}}$$

PREPARATION BATCH #126998

BLANK ID:	**MB 160-126998/1-A**	**Th-230**
		0.1451 ± 0.0901 pCi/g

AFFECTED SAMPLES:

SAMPLE ID:	SD-200-03	**Th-230**
		0.84 ± 0.187 pCi/g

MEAN DIFFERENCE = 6.695440093

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: S. Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.46
Client Contact: Mike Martin	Phone: (703)342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~46 of 46~~ 1 of 4
Company: Tetra Tech, Inc.				Job #: 680-102199
Address: 20251 Century Blvd Suite 200	Due Date Requested:			
City: Germantown	TAT Requested (days): Standard			
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			
Email: Michael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2SO3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=wasteoil, BT=Tissue, A=Air)	Field Filtered Sample (Perform Matrix Spike)	Perform Matrix Spike Dup	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of Containers	Special Instructions/Note:
SD-279-SS	6/9/14	1540	C	Solid				X				
SD-279-01		1545	C	Solid				X				
SD-279-02		1550	C	Solid				X				
SD-279-03		1555	C	Solid				X				Hold Pending analysis SS to 02
SD-278-SS		1740	C	Solid				X				
SD-278-01		1745	C	Solid				X				
SD-277-SS		1810	C	Solid				X				
SD-277-01		1815	C	Solid				X				
SD-277-02		1820	C	Solid				X				
SD-277-03		1825	C	Solid				X				Hold Pending analysis SS to 02
SD-219-SS	6/10/14	0920	C	Solid				X				

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
[signature]	6-10-14 / 1625	Tt	[signature]	6/10/14 / 1645	TestAmerica
[signature]	6/10/14 / 1735	TestAmerica	[signature]	6-11-14 0930	TA STL

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

7/23/2014

12

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: S. Gmeron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-58831-24906.1
Client Contact: Mike Martin	Phone:	E-Mail: jerry.lanier@testamericainc.com		Page: Page 2 of 4
Company: Tetra Tech, Inc.		Analysis Requested		Job #: 680-102199
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes:
City: Germantown	TAT Requested (days): Standard			A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; G - Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA; M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2SO3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - ph 4-5; Z - other (specify)
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			Other:
Email: Michael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Special Instructions/Note:
SD-219-01	6/10/14	0922	C	Solid		X			
SD-219-02	6/10/14	0925	C	Solid		X			
SD-219-03	6/10/14	0928	C	Solid		X			[redacted]
SD-218-55		1010	C	Solid		X			
SD-218-01		1012	C	Solid		X			
SD-218-02		1014	C	Solid		X			
SD-203-55		1140	C	Solid		X			
SD-203-01		1145	C	Solid		X			
SD-203-02		1150	C	Solid		X			
SD-203-03		1155	C	Solid		X			Hold pending analysis SS still
SD-202-55		1220	C	Solid		X			

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6-10-14 / 1625	TT		6/10/14 / 1645	TestAmerica
2		6/10/14 / 1735	TestAmerica		6-11-14 0930	TA STL
3		Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: S. Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.5
Client Contact: Mike Martin	Phone:	E-Mail: jerry.lanier@testamericainc.com		Page: Page 3 of 4
Company: Tetra Tech, Inc.		Analysis Requested		Job #: 680-102199
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes:
City: Germantown	TAT Requested (days):			A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; G - Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA; M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2SO3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - ph 4-5; Z - other (specify)
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			
Email: Michael.Martin@tetratech.com	WO #:			Other:
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Special Instructions/Note:
SD-202-01	6/10/14	1225	C	Solid		X			
SD-202-02		1230	C	Solid		X			
SD-195-55		1330	C	Solid		X			
SD-196-55		1400	C	Solid					
SD-196-01		1405	C	Solid					
SD-196-02		1410	C	Solid					
SD-196-03		1415	C	Solid					Hold pending analysis SS to 02
SD-220-55		1440		Solid					
SD-220-01		1442		Solid					
SD-220-02		1444		Solid					
SD-DUP-01		0000	C	Solid		X			

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	6-10-14 / 1625	TT		6/10/14 / 1645	TestAmerica
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	6/10/14 / 1735	TestAmerica		6-11-14 0930	YA STL
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.2
Client Contact: Mike Martin	Phone:	E-Mail: jerry.lanier@testamericainc.com		Page: Page Page 4 of 4
Company: Tetra Tech, Inc.		Analysis Requested		Job #: 680-102199
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes:
City: Germantown	TAT Requested (days):			A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; G - Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA; M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2SO3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - ph 4-6; Z - other (specify)
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			Other:
Email: Michael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	680 - Local Method	A01R_Th - Standard Target List	9020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Special Instructions/Note:
SD-220-03	6/10/14	1446	C	Solid		X			Hold pending analysis SS to 02
SD-201-SS		1510	C	Solid		X			
SD-201-01		1515	C	Solid		X			
SD-201-02		1520	C	Solid		X			
SD-201-03		1525	C	Solid		X			Hold pending analysis SS to 02
SD-200-SS		1550	C	Solid		X			
SD-200-01		1555	C	Solid		X			
SD-200-02		1600	C	Solid		X			
SD-200-03	↓	1605	C	Solid		X			
				Solid					
				Solid					

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	6-10-14 / 1625			6/10/14 / 1645	TestAmerica
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	6/10/14 / 1735	TestAmerica		6-11-14 0930	TA STL
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-102199-1
SDG Number: 680102199-1

Login Number: 102199
List Number: 1
Creator: Daughtry, Beth A

List Source: TestAmerica Savannah

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.		
The cooler's custody seal, if present, is intact.		
Sample custody seals, if present, are intact.		
The cooler or samples do not appear to have been compromised or tampered with.		
Samples were received on ice.		
Cooler Temperature is acceptable.		
Cooler Temperature is recorded.		
COC is present.		
COC is filled out in ink and legible.		
COC is filled out with all pertinent information.		
Is the Field Sampler's name present on COC?		
There are no discrepancies between the containers received and the COC.		
Samples are received within Holding Time.		
Sample containers have legible labels.		
Containers are not broken or leaking.		
Sample collection date/times are provided.		
Appropriate sample containers are used.		
Sample bottles are completely filled.		
Sample Preservation Verified.		
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs		
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").		
Multiphasic samples are not present.		
Samples do not require splitting or compositing.		
Residual Chlorine Checked.		

Job ID: 680-102199-1

Laboratory: TestAmerica Savannah

Narrative

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Sediments

Report Number: 680-102199-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 06/11/2014; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 1.1 C.

ISOTOPIC THORIUM

Samples SD-279-SS (680-102199-1), SD-279-01 (680-102199-2), SD-279-02 (680-102199-3), SD-277-SS (680-102199-7), SD-277-01 (680-102199-8), SD-277-02 (680-102199-9), SD-219-SS (680-102199-11), SD-219-01 (680-102199-12), SD-219-02 (680-102199-13), SD-219-03 (680-102199-14), SD-218-SS (680-102199-15), SD-218-01 (680-102199-16), SD-218-02 (680-102199-17), SD-203-SS (680-102199-18), SD-203-01 (680-102199-19), SD-203-02 (680-102199-20), SD-202-SS (680-102199-22), SD-202-01 (680-102199-23), SD-202-02 (680-102199-24), SD-195-SS (680-102199-25), SD-196-SS (680-102199-26), SD-196-01 (680-102199-27), SD-196-02 (680-102199-28), SD-220-SS (680-102199-30), SD-220-01 (680-102199-31), SD-220-02 (680-102199-32), SD-DUP-01 (680-102199-33), SD-201-SS (680-102199-35), SD-201-01 (680-102199-36), SD-201-02 (680-102199-37), SD-200-SS (680-102199-39), SD-200-01 (680-102199-40), SD-200-02 (680-102199-41) and SD-200-03 (680-102199-42) were analyzed for Isotopic Thorium in accordance with A01R_Th. The samples were leached on 06/12/2014, prepared on 06/16/2014 and 06/17/2014 and analyzed on 06/30/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-1
SDG: 680102199-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-102199-1	SD-279-SS	Solid	06/09/14 15:40	06/11/14 09:30
680-102199-2	SD-279-01	Solid	06/09/14 15:45	06/11/14 09:30
680-102199-3	SD-279-02	Solid	06/09/14 15:50	06/11/14 09:30
680-102199-7	SD-277-SS	Solid	06/09/14 18:10	06/11/14 09:30
680-102199-8	SD-277-01	Solid	06/09/14 18:15	06/11/14 09:30
680-102199-9	SD-277-02	Solid	06/09/14 18:20	06/11/14 09:30
680-102199-11	SD-219-SS	Solid	06/10/14 09:20	06/11/14 09:30
680-102199-12	SD-219-01	Solid	06/10/14 09:22	06/11/14 09:30
680-102199-13	SD-219-02	Solid	06/10/14 09:25	06/11/14 09:30
680-102199-14	SD-219-03	Solid	06/10/14 09:28	06/11/14 09:30
680-102199-15	SD-218-SS	Solid	06/10/14 10:10	06/11/14 09:30
680-102199-16	SD-218-01	Solid	06/10/14 10:12	06/11/14 09:30
680-102199-17	SD-218-02	Solid	06/10/14 10:14	06/11/14 09:30
680-102199-18	SD-203-SS	Solid	06/10/14 11:40	06/11/14 09:30
680-102199-19	SD-203-01	Solid	06/10/14 11:45	06/11/14 09:30
680-102199-20	SD-203-02	Solid	06/10/14 11:50	06/11/14 09:30
680-102199-22	SD-202-SS	Solid	06/10/14 12:20	06/11/14 09:30
680-102199-23	SD-202-01	Solid	06/10/14 12:25	06/11/14 09:30
680-102199-24	SD-202-02	Solid	06/10/14 12:30	06/11/14 09:30
680-102199-25	SD-195-SS	Solid	06/10/14 13:30	06/11/14 09:30
680-102199-26	SD-196-SS	Solid	06/10/14 14:00	06/11/14 09:30
680-102199-27	SD-196-01	Solid	06/10/14 14:05	06/11/14 09:30
680-102199-28	SD-196-02	Solid	06/10/14 14:10	06/11/14 09:30
680-102199-30	SD-220-SS	Solid	06/10/14 14:40	06/11/14 09:30
680-102199-31	SD-220-01	Solid	06/10/14 14:42	06/11/14 09:30
680-102199-32	SD-220-02	Solid	06/10/14 14:44	06/11/14 09:30
680-102199-33	SD-DUP-01	Solid	06/10/14 00:00	06/11/14 09:30
680-102199-35	SD-201-SS	Solid	06/10/14 15:10	06/11/14 09:30
680-102199-36	SD-201-01	Solid	06/10/14 15:15	06/11/14 09:30
680-102199-37	SD-201-02	Solid	06/10/14 15:20	06/11/14 09:30
680-102199-39	SD-200-SS	Solid	06/10/14 15:50	06/11/14 09:30
680-102199-40	SD-200-01	Solid	06/10/14 15:55	06/11/14 09:30
680-102199-41	SD-200-02	Solid	06/10/14 16:00	06/11/14 09:30
680-102199-42	SD-200-03	Solid	06/10/14 16:05	06/11/14 09:30

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-1
SDG: 680102199-1

Method	Method Description	Protocol	Laboratory
A-01-R	Isotopic Thorium (Alpha Spectrometry)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

5

Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Rad

Leach Batch: 126552

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102199-1	SD-279-SS	Total/NA	Solid	Dry and Grind	
680-102199-1 DU	SD-279-SS	Total/NA	Solid	Dry and Grind	
680-102199-2	SD-279-01	Total/NA	Solid	Dry and Grind	
680-102199-3	SD-279-02	Total/NA	Solid	Dry and Grind	
680-102199-7	SD-277-SS	Total/NA	Solid	Dry and Grind	
680-102199-8	SD-277-01	Total/NA	Solid	Dry and Grind	
680-102199-9	SD-277-02	Total/NA	Solid	Dry and Grind	
680-102199-11	SD-219-SS	Total/NA	Solid	Dry and Grind	
680-102199-12	SD-219-01	Total/NA	Solid	Dry and Grind	
680-102199-13	SD-219-02	Total/NA	Solid	Dry and Grind	
680-102199-14	SD-219-03	Total/NA	Solid	Dry and Grind	
680-102199-15	SD-218-SS	Total/NA	Solid	Dry and Grind	
680-102199-16	SD-218-01	Total/NA	Solid	Dry and Grind	
680-102199-17	SD-218-02	Total/NA	Solid	Dry and Grind	
680-102199-18	SD-203-SS	Total/NA	Solid	Dry and Grind	
680-102199-19	SD-203-01	Total/NA	Solid	Dry and Grind	
680-102199-20	SD-203-02	Total/NA	Solid	Dry and Grind	
680-102199-22	SD-202-SS	Total/NA	Solid	Dry and Grind	
680-102199-23	SD-202-01	Total/NA	Solid	Dry and Grind	
680-102199-24	SD-202-02	Total/NA	Solid	Dry and Grind	
680-102199-25	SD-195-SS	Total/NA	Solid	Dry and Grind	
680-102199-26	SD-196-SS	Total/NA	Solid	Dry and Grind	
680-102199-26 DU	SD-196-SS	Total/NA	Solid	Dry and Grind	
680-102199-27	SD-196-01	Total/NA	Solid	Dry and Grind	
680-102199-28	SD-196-02	Total/NA	Solid	Dry and Grind	
680-102199-30	SD-220-SS	Total/NA	Solid	Dry and Grind	
680-102199-31	SD-220-01	Total/NA	Solid	Dry and Grind	
680-102199-32	SD-220-02	Total/NA	Solid	Dry and Grind	
680-102199-33	SD-DUP-01	Total/NA	Solid	Dry and Grind	
680-102199-35	SD-201-SS	Total/NA	Solid	Dry and Grind	
680-102199-36	SD-201-01	Total/NA	Solid	Dry and Grind	
680-102199-37	SD-201-02	Total/NA	Solid	Dry and Grind	
680-102199-39	SD-200-SS	Total/NA	Solid	Dry and Grind	
680-102199-40	SD-200-01	Total/NA	Solid	Dry and Grind	
680-102199-41	SD-200-02	Total/NA	Solid	Dry and Grind	
680-102199-42	SD-200-03	Total/NA	Solid	Dry and Grind	

Prep Batch: 126996

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102199-1	SD-279-SS	Total/NA	Solid	ExtChrom	126552
680-102199-1 DU	SD-279-SS	Total/NA	Solid	ExtChrom	126552
680-102199-2	SD-279-01	Total/NA	Solid	ExtChrom	126552
680-102199-3	SD-279-02	Total/NA	Solid	ExtChrom	126552
680-102199-7	SD-277-SS	Total/NA	Solid	ExtChrom	126552
680-102199-8	SD-277-01	Total/NA	Solid	ExtChrom	126552
680-102199-9	SD-277-02	Total/NA	Solid	ExtChrom	126552
680-102199-11	SD-219-SS	Total/NA	Solid	ExtChrom	126552
680-102199-12	SD-219-01	Total/NA	Solid	ExtChrom	126552
680-102199-13	SD-219-02	Total/NA	Solid	ExtChrom	126552
680-102199-14	SD-219-03	Total/NA	Solid	ExtChrom	126552
680-102199-15	SD-218-SS	Total/NA	Solid	ExtChrom	126552

Rad (Continued)

Prep Batch: 126996 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102199-16	SD-218-01	Total/NA	Solid	ExtChrom	126552
680-102199-17	SD-218-02	Total/NA	Solid	ExtChrom	126552
680-102199-18	SD-203-SS	Total/NA	Solid	ExtChrom	126552
680-102199-19	SD-203-01	Total/NA	Solid	ExtChrom	126552
680-102199-20	SD-203-02	Total/NA	Solid	ExtChrom	126552
680-102199-22	SD-202-SS	Total/NA	Solid	ExtChrom	126552
680-102199-23	SD-202-01	Total/NA	Solid	ExtChrom	126552
680-102199-24	SD-202-02	Total/NA	Solid	ExtChrom	126552
LCS 160-126996/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-126996/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Prep Batch: 126998

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102199-25	SD-195-SS	Total/NA	Solid	ExtChrom	126552
680-102199-26	SD-196-SS	Total/NA	Solid	ExtChrom	126552
680-102199-26 DU	SD-196-SS	Total/NA	Solid	ExtChrom	126552
680-102199-27	SD-196-01	Total/NA	Solid	ExtChrom	126552
680-102199-28	SD-196-02	Total/NA	Solid	ExtChrom	126552
680-102199-30	SD-220-SS	Total/NA	Solid	ExtChrom	126552
680-102199-31	SD-220-01	Total/NA	Solid	ExtChrom	126552
680-102199-32	SD-220-02	Total/NA	Solid	ExtChrom	126552
680-102199-33	SD-DUP-01	Total/NA	Solid	ExtChrom	126552
680-102199-35	SD-201-SS	Total/NA	Solid	ExtChrom	126552
680-102199-36	SD-201-01	Total/NA	Solid	ExtChrom	126552
680-102199-37	SD-201-02	Total/NA	Solid	ExtChrom	126552
680-102199-39	SD-200-SS	Total/NA	Solid	ExtChrom	126552
680-102199-40	SD-200-01	Total/NA	Solid	ExtChrom	126552
680-102199-41	SD-200-02	Total/NA	Solid	ExtChrom	126552
680-102199-42	SD-200-03	Total/NA	Solid	ExtChrom	126552
LCS 160-126998/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-126998/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry) (Continued)

Lab Sample ID: LCS 160-126998/2-A
Matrix: Solid
Analysis Batch: 128973

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 126998

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Thorium-230	24.5	25.53		2.63	1.00	0.149	pCi/g	104	81 - 118

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*85.8*		*30 - 110*

Lab Sample ID: 680-102199-26 DU
Matrix: Solid
Analysis Batch: 128957

Client Sample ID: SD-196-SS
Prep Type: Total/NA
Prep Batch: 126998

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Thorium-228	1.30		1.034		0.224	1.00	0.0914	pCi/g	0.55	1
Thorium-230	1.20		0.9540		0.212	1.00	0.0677	pCi/g	0.54	1
Thorium-232	1.26		1.116		0.230	1.00	0.0481	pCi/g	0.30	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Thorium-229	*97.0*		*30 - 110*

Tracer/Carrier Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-1
SDG: 680102199-1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Matrix: Solid

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)
		Th-229
Lab Sample ID	**Client Sample ID**	**(30-110)**
680-102199-1	SD-279-SS	85.2
680-102199-1 DU	SD-279-SS	89.4
680-102199-2	SD-279-01	87.5
680-102199-3	SD-279-02	87.7
680-102199-7	SD-277-SS	92.1
680-102199-8	SD-277-01	86.3
680-102199-9	SD-277-02	85.2
680-102199-11	SD-219-SS	83.1
680-102199-12	SD-219-01	88.0
680-102199-13	SD-219-02	85.4
680-102199-14	SD-219-03	82.2
680-102199-15	SD-218-SS	90.8
680-102199-16	SD-218-01	75.2
680-102199-17	SD-218-02	79.8
680-102199-18	SD-203-SS	87.9
680-102199-19	SD-203-01	85.0
680-102199-20	SD-203-02	92.9
680-102199-22	SD-202-SS	91.6
680-102199-23	SD-202-01	89.7
680-102199-24	SD-202-02	79.0
680-102199-25	SD-195-SS	92.2
680-102199-26	SD-196-SS	86.3
680-102199-26 DU	SD-196-SS	97.0
680-102199-27	SD-196-01	86.7
680-102199-28	SD-196-02	93.1
680-102199-30	SD-220-SS	86.5
680-102199-31	SD-220-01	87.9
680-102199-32	SD-220-02	82.3
680-102199-33	SD-DUP-01	90.6
680-102199-35	SD-201-SS	95.9
680-102199-36	SD-201-01	93.3
680-102199-37	SD-201-02	93.3
680-102199-39	SD-200-SS	90.9
680-102199-40	SD-200-01	89.0
680-102199-41	SD-200-02	83.5
680-102199-42	SD-200-03	88.6
LCS 160-126996/2-A	Lab Control Sample	92.0
LCS 160-126998/2-A	Lab Control Sample	85.8
MB 160-126996/1-A	Method Blank	85.3
MB 160-126998/1-A	Method Blank	85.4

Tracer/Carrier Legend

Th-229 = Thorium-229

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Lab Sample ID: MB 160-126996/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 128984 — **Prep Batch: 126996**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.004757	U	0.0470	0.0470	1.00	0.106	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	0.1486		0.0813	0.0822	1.00	0.0520	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	-0.005412	U	0.0245	0.0245	1.00	0.0800	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*85.3*		*30 - 110*	*06/16/14 12:49*	*06/30/14 01:40*	*1*

Lab Sample ID: LCS 160-126996/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 128945 — **Prep Batch: 126996**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Thorium-230	24.5	23.38		2.41	1.00	0.216	pCi/g	95	81 - 118

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*92.0*		*30 - 110*

Lab Sample ID: 680-102199-1 DU — **Client Sample ID: SD-279-SS**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 128912 — **Prep Batch: 126996**

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Thorium-228	1.56		1.089		0.236	1.00	0.0962	pCi/g	0.87	1
Thorium-230	1.22		1.257		0.254	1.00	0.0678	pCi/g	0.08	1
Thorium-232	1.29		1.220		0.249	1.00	0.0743	pCi/g	0.14	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Thorium-229	*89.4*		*30 - 110*

Lab Sample ID: MB 160-126998/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 128962 — **Prep Batch: 126998**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.04749	U	0.0667	0.0668	1.00	0.113	pCi/g	06/16/14 13:16	06/30/14 18:12	1
Thorium-230	0.1451		0.0892	0.0901	1.00	0.0951	pCi/g	06/16/14 13:16	06/30/14 18:12	1
Thorium-232	-0.007527	U	0.0185	0.0185	1.00	0.0768	pCi/g	06/16/14 13:16	06/30/14 18:12	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*85.4*		*30 - 110*	*06/16/14 13:16*	*06/30/14 18:12*	*1*

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-1
SDG: 680102199-1

Client Sample ID: SD-279-SS

Lab Sample ID: 680-102199-1

Date Collected: 06/09/14 15:40
Date Received: 06/11/14 09:30

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128901	06/30/14 01:40	MLK	TAL SL

Client Sample ID: SD-279-01

Lab Sample ID: 680-102199-2

Date Collected: 06/09/14 15:45
Date Received: 06/11/14 09:30

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128946	06/30/14 18:11	MLK	TAL SL

Client Sample ID: SD-279-02

Lab Sample ID: 680-102199-3

Date Collected: 06/09/14 15:50
Date Received: 06/11/14 09:30

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128933	06/30/14 01:40	MLK	TAL SL

Client Sample ID: SD-277-SS

Lab Sample ID: 680-102199-7

Date Collected: 06/09/14 18:10
Date Received: 06/11/14 09:30

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128935	06/30/14 01:40	MLK	TAL SL

Client Sample ID: SD-277-01

Lab Sample ID: 680-102199-8

Date Collected: 06/09/14 18:15
Date Received: 06/11/14 09:30

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128936	06/30/14 01:40	MLK	TAL SL

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-1
SDG: 680102199-1

Client Sample ID: SD-277-02

Lab Sample ID: 680-102199-9

Date Collected: 06/09/14 18:20
Matrix: Solid
Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128937	06/30/14 01:40	MLK	TAL SL

Client Sample ID: SD-219-SS

Lab Sample ID: 680-102199-11

Date Collected: 06/10/14 09:20
Matrix: Solid
Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128938	06/30/14 01:40	MLK	TAL SL

Client Sample ID: SD-219-01

Lab Sample ID: 680-102199-12

Date Collected: 06/10/14 09:22
Matrix: Solid
Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128939	06/30/14 01:40	MLK	TAL SL

Client Sample ID: SD-219-02

Lab Sample ID: 680-102199-13

Date Collected: 06/10/14 09:25
Matrix: Solid
Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128940	06/30/14 01:40	MLK	TAL SL

Client Sample ID: SD-219-03

Lab Sample ID: 680-102199-14

Date Collected: 06/10/14 09:28
Matrix: Solid
Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128941	06/30/14 01:40	MLK	TAL SL

Client Sample ID: SD-218-SS

Lab Sample ID: 680-102199-15

Date Collected: 06/10/14 10:10

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128942	06/30/14 01:40	MLK	TAL SL

Client Sample ID: SD-218-01

Lab Sample ID: 680-102199-16

Date Collected: 06/10/14 10:12

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128943	06/30/14 01:40	MLK	TAL SL

Client Sample ID: SD-218-02

Lab Sample ID: 680-102199-17

Date Collected: 06/10/14 10:14

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128944	06/30/14 01:40	MLK	TAL SL

Client Sample ID: SD-203-SS

Lab Sample ID: 680-102199-18

Date Collected: 06/10/14 11:40

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128947	06/30/14 01:40	MLK	TAL SL

Client Sample ID: SD-203-01

Lab Sample ID: 680-102199-19

Date Collected: 06/10/14 11:45

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128948	06/30/14 01:40	MLK	TAL SL

Client Sample ID: SD-203-02

Lab Sample ID: 680-102199-20

Date Collected: 06/10/14 11:50
Date Received: 06/11/14 09:30

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128949	06/30/14 01:40	MLK	TAL SL

Client Sample ID: SD-202-SS

Lab Sample ID: 680-102199-22

Date Collected: 06/10/14 12:20
Date Received: 06/11/14 09:30

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128950	06/30/14 01:40	MLK	TAL SL

Client Sample ID: SD-202-01

Lab Sample ID: 680-102199-23

Date Collected: 06/10/14 12:25
Date Received: 06/11/14 09:30

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128952	06/30/14 01:40	MLK	TAL SL

Client Sample ID: SD-202-02

Lab Sample ID: 680-102199-24

Date Collected: 06/10/14 12:30
Date Received: 06/11/14 09:30

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128953	06/30/14 01:40	MLK	TAL SL

Client Sample ID: SD-195-SS

Lab Sample ID: 680-102199-25

Date Collected: 06/10/14 13:30
Date Received: 06/11/14 09:30

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126998	06/17/14 07:50	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128971	06/30/14 01:43	MLK	TAL SL

Client Sample ID: SD-196-SS

Lab Sample ID: 680-102199-26

Date Collected: 06/10/14 14:00
Matrix: Solid
Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126998	06/16/14 13:16	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128956	06/30/14 01:42	MLK	TAL SL

Client Sample ID: SD-196-01

Lab Sample ID: 680-102199-27

Date Collected: 06/10/14 14:05
Matrix: Solid
Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126998	06/16/14 13:16	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128958	06/30/14 01:42	MLK	TAL SL

Client Sample ID: SD-196-02

Lab Sample ID: 680-102199-28

Date Collected: 06/10/14 14:10
Matrix: Solid
Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126998	06/16/14 13:16	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129083	06/30/14 01:42	MLK	TAL SL

Client Sample ID: SD-220-SS

Lab Sample ID: 680-102199-30

Date Collected: 06/10/14 14:40
Matrix: Solid
Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126998	06/16/14 13:16	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128959	06/30/14 01:42	MLK	TAL SL

Client Sample ID: SD-220-01

Lab Sample ID: 680-102199-31

Date Collected: 06/10/14 14:42
Matrix: Solid
Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126998	06/16/14 13:16	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128960	06/30/14 01:42	MLK	TAL SL

Client Sample ID: SD-220-02

Lab Sample ID: 680-102199-32

Date Collected: 06/10/14 14:44
Matrix: Solid
Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126998	06/16/14 13:16	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128961	06/30/14 01:43	MLK	TAL SL

Client Sample ID: SD-DUP-01

Lab Sample ID: 680-102199-33

Date Collected: 06/10/14 00:00
Matrix: Solid
Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126998	06/16/14 13:16	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128963	06/30/14 01:43	MLK	TAL SL

Client Sample ID: SD-201-SS

Lab Sample ID: 680-102199-35

Date Collected: 06/10/14 15:10
Matrix: Solid
Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126998	06/16/14 13:16	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128964	06/30/14 01:43	MLK	TAL SL

Client Sample ID: SD-201-01

Lab Sample ID: 680-102199-36

Date Collected: 06/10/14 15:15
Matrix: Solid
Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126998	06/16/14 13:16	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128965	06/30/14 01:43	MLK	TAL SL

Client Sample ID: SD-201-02

Lab Sample ID: 680-102199-37

Date Collected: 06/10/14 15:20
Matrix: Solid
Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126998	06/16/14 13:16	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128966	06/30/14 01:43	MLK	TAL SL

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-1
SDG: 680102199-1

Client Sample ID: SD-200-SS

Lab Sample ID: 680-102199-39

Date Collected: 06/10/14 15:50
Matrix: Solid
Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126998	06/16/14 13:16	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128967	06/30/14 01:43	MLK	TAL SL

Client Sample ID: SD-200-01

Lab Sample ID: 680-102199-40

Date Collected: 06/10/14 15:55
Matrix: Solid
Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126998	06/16/14 13:16	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128968	06/30/14 01:43	MLK	TAL SL

Client Sample ID: SD-200-02

Lab Sample ID: 680-102199-41

Date Collected: 06/10/14 16:00
Matrix: Solid
Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126998	06/16/14 13:16	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128969	06/30/14 01:43	MLK	TAL SL

Client Sample ID: SD-200-03

Lab Sample ID: 680-102199-42

Date Collected: 06/10/14 16:05
Matrix: Solid
Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126998	06/16/14 13:16	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128970	06/30/14 01:43	MLK	TAL SL

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Alpha Spectroscopy Run Log

Detector: AV3

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:26	140	IC 160-120519/1		120519			PS
05/07/14 23:02	60	ICV 160-120855/1		120855			PS
06/18/14 19:10	960	ICB 160-127828/1		127828			PS
06/19/14 16:44	60	CCV 160-127913/1		127913			PS
06/30/14 00:01	1	PULSER 160-128945/1		128945			
06/30/14 01:38	180	ZZZZZ		128945			
06/30/14 01:40	180	ZZZZZ		128945			
06/30/14 18:11	180	LCS 160-126996/2-A		128945	126996	A-01-R	MLK

Detector: AV4

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:26	140	IC 160-120520/1		120520			PS
05/07/14 23:03	60	ICV 160-120856/1		120856			PS
06/18/14 19:10	960	ICB 160-127829/1		127829			PS
06/19/14 16:44	60	CCV 160-127914/1		127914			PS
06/30/14 00:01	1	PULSER 160-128946/1		128946			
06/30/14 01:38	180	ZZZZZ		128946			
06/30/14 01:40	180	ZZZZZ		128946			
06/30/14 18:11	180	680-102199-2	SD-279-01	128946	126996	A-01-R	MLK

Detector: AV6

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:26	140	IC 160-120521/1		120521			PS
05/07/14 23:03	60	ICV 160-120857/1		120857			PS
06/18/14 19:08	960	ICB 160-127830/1		127830			PS
06/19/14 18:06	60	CCV 160-127932/1		127932			PS
06/30/14 00:01	1	PULSER 160-128962/1		128962			
06/30/14 01:38	180	ZZZZZ		128962			
06/30/14 01:42	180	ZZZZZ		128962			
06/30/14 18:12	180	MB 160-126998/1-A		128962	126998	A-01-R	MLK

Detector: AV7

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/07/14 19:51	140	IC 160-120843/1		120843			PS
05/07/14 23:03	60	ICV 160-120858/1		120858			PS
06/18/14 19:08	960	ICB 160-127831/1		127831			PS
06/19/14 16:44	60	CCV 160-127943/1		127943			PS
06/30/14 00:01	1	PULSER 160-128973/1		128973			
06/30/14 01:38	180	ZZZZZ		128973			
06/30/14 01:42	180	ZZZZZ		128973			
06/30/14 18:12	180	LCS 160-126998/2-A		128973	126998	A-01-R	MLK

Detector: AV8

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:27	140	IC 160-120523/1		120523			PS
05/08/14 00:14	60	ICV 160-121084/1		121084			PS
06/18/14 19:08	960	ICB 160-127837/1		127837			PS
06/19/14 18:06	60	CCV 160-127954/1		127954			PS
06/30/14 00:01	1	PULSER 160-128984/1		128984			

Alpha Spectroscopy Run Log

Detector: AV8 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
06/30/14 01:40	180	MB 160-126996/1-A		128984	126996	A-01-R	MLK

Detector: AV10

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:27	140	IC 160-120512/1		120512			PS
05/07/14 23:03	60	ICV 160-120847/1		120847			PS
06/18/14 19:08	960	ICB 160-127776/1		127776			PS
06/19/14 18:06	60	CCV 160-127860/1		127860			PS
06/30/14 00:02	1	PULSER 160-128901/1		128901			MLK
06/30/14 01:40	180	680-102199-1	SD-279-SS	128901	126996	A-01-R	MLK

Detector: AV11

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:27	140	IC 160-120513/1		120513			PS
05/07/14 23:04	60	ICV 160-120848/1		120848			PS
06/18/14 19:08	960	ICB 160-127786/1		127786			PS
06/19/14 18:07	60	CCV 160-127871/1		127871			PS
06/30/14 00:02	1	PULSER 160-128912/1		128912			MLK
06/30/14 01:40	180	680-102199-1 DU	SD-279-SS DU	128912	126996	A-01-R	MLK

Detector: AV13

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:28	140	IC 160-120515/1		120515			PS
05/07/14 23:04	60	ICV 160-120850/1		120850			PS
06/18/14 19:08	960	ICB 160-127807/1		127807			PS
06/19/14 19:45	60	CCV 160-127892/1		127892			PS
06/30/14 00:01	1	PULSER 160-128933/1		128933			MLK
06/30/14 01:40	180	680-102199-3	SD-279-02	128933	126996	A-01-R	MLK

Detector: AV14

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:28	140	IC 160-120516/1		120516			PS
05/07/14 23:04	60	ICV 160-120851/1		120851			PS
06/18/14 19:08	960	ICB 160-127817/1		127817			PS
06/19/14 18:08	60	CCV 160-127902/1		127902			PS
06/30/14 00:01	1	PULSER 160-128935/1		128935			MLK
06/30/14 01:40	180	680-102199-7	SD-277-SS	128935	126996	A-01-R	MLK

Detector: AV15

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:28	140	IC 160-120517/1		120517			PS
05/07/14 23:04	60	ICV 160-120852/1		120852			PS
06/18/14 19:08	960	ICB 160-127818/1		127818			PS
06/19/14 19:45	60	CCV 160-127903/1		127903			PS
06/30/14 00:01	1	PULSER 160-128936/1		128936			MLK
06/30/14 01:40	180	680-102199-8	SD-277-01	128936	126996	A-01-R	MLK

Alpha Spectroscopy Run Log

Detector: AV16

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:27	140	IC 160-120398/1		120398			PS
05/08/14 00:14	60	ICV 160-121072/1		121072			PS
06/18/14 19:08	960	ICB 160-127819/1		127819			PS
06/19/14 18:08	60	CCV 160-127904/1		127904			PS
06/30/14 00:01	1	PULSER 160-128937/1		128937			MLK
06/30/14 01:40	180	680-102199-9	SD-277-02	128937	126996	A-01-R	MLK

Detector: AV17

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:28	140	IC 160-120399/1		120399			PS
05/08/14 00:14	60	ICV 160-121073/1		121073			PS
06/18/14 19:08	960	ICB 160-127820/1		127820			PS
06/19/14 18:08	60	CCV 160-127905/1		127905			PS
06/30/14 00:02	1	PULSER 160-128938/1		128938			MLK
06/30/14 01:40	180	680-102199-11	SD-219-SS	128938	126996	A-01-R	MLK

Detector: AV18

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:28	140	IC 160-120400/1		120400			PS
05/08/14 00:14	60	ICV 160-121074/1		121074			PS
06/18/14 19:08	960	ICB 160-127821/1		127821			PS
06/19/14 18:08	60	CCV 160-127906/1		127906			PS
06/30/14 00:02	1	PULSER 160-128939/1		128939			MLK
06/30/14 01:40	180	680-102199-12	SD-219-01	128939	126996	A-01-R	MLK

Detector: AV19

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:28	140	IC 160-120401/1		120401			PS
05/08/14 14:33	60	ICV 160-121361/1		121361			PS
06/18/14 19:08	960	ICB 160-127822/1		127822			PS
06/19/14 18:08	60	CCV 160-127907/1		127907			PS
06/30/14 00:02	1	PULSER 160-128940/1		128940			MLK
06/30/14 01:40	180	680-102199-13	SD-219-02	128940	126996	A-01-R	MLK

Detector: AV20

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:28	140	IC 160-120402/1		120402			PS
05/07/14 23:05	60	ICV 160-120854/1		120854			PS
06/18/14 19:08	960	ICB 160-127824/1		127824			PS
06/19/14 18:08	60	CCV 160-127909/1		127909			PS
06/30/14 00:02	1	PULSER 160-128941/1		128941			MLK
06/30/14 01:40	180	680-102199-14	SD-219-03	128941	126996	A-01-R	MLK

Detector: AV21

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:28	140	IC 160-120403/1		120403			PS
05/08/14 00:16	60	ICV 160-121075/1		121075			PS

Alpha Spectroscopy Run Log

Detector: AV21 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
06/18/14 19:08	960	ICB 160-127825/1		127825			PS
06/19/14 19:45	60	CCV 160-127910/1		127910			PS
06/30/14 00:02	1	PULSER 160-128942/1		128942			MLK
06/30/14 01:40	180	680-102199-15	SD-218-SS	128942	126996	A-01-R	MLK

Detector: AV23

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:29	140	IC 160-120404/1		120404			PS
05/08/14 14:33	60	ICV 160-121362/1		121362			PS
06/18/14 19:08	960	ICB 160-127826/1		127826			PS
06/19/14 19:45	60	CCV 160-127911/1		127911			PS
06/30/14 00:02	1	PULSER 160-128943/1		128943			MLK
06/30/14 01:40	180	680-102199-16	SD-218-01	128943	126996	A-01-R	MLK

Detector: AV24

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:29	140	IC 160-120405/1		120405			PS
05/08/14 00:16	60	ICV 160-121076/1		121076			PS
06/18/14 19:08	960	ICB 160-127827/1		127827			PS
06/19/14 19:45	60	CCV 160-127912/1		127912			PS
06/30/14 00:02	1	PULSER 160-128944/1		128944			MLK
06/30/14 01:40	180	680-102199-17	SD-218-02	128944	126996	A-01-R	MLK

Detector: AV43

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:30	140	IC 160-120406/1		120406			PS
05/08/14 00:16	60	ICV 160-121077/1		121077			PS
06/19/14 00:17	960	ICB 160-127915/1		127915			PS
06/22/14 17:38	60	CCV 160-127969/1		127969			PS
06/30/14 01:04	1	PULSER 160-128947/1		128947			
06/30/14 01:04	1	PULSER 160-128947/2		128947			MLK
06/30/14 01:40	180	680-102199-18	SD-203-SS	128947	126996	A-01-R	MLK
06/30/14 18:10	960	ZZZZZ		128947			

Detector: AV44

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:30	140	IC 160-120407/1		120407			PS
05/08/14 00:17	60	ICV 160-121078/1		121078			PS
06/19/14 00:17	960	ICB 160-127916/1		127916			PS
06/22/14 17:38	60	CCV 160-127970/1		127970			PS
06/30/14 00:18	1	PULSER 160-128948/1		128948			MLK
06/30/14 01:40	180	680-102199-19	SD-203-01	128948	126996	A-01-R	MLK
06/30/14 18:10	960	ZZZZZ		128948			

Detector: AV45

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:30	140	IC 160-120408/1		120408			PS

Alpha Spectroscopy Run Log

Detector: AV45 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/08/14 14:32	60	ICV 160-121363/1		121363			PS
06/19/14 00:17	960	ICB 160-127917/1		127917			PS
06/22/14 20:07	60	CCV 160-127985/1		127985			PS
06/30/14 00:18	1	PULSER 160-128949/1		128949			MLK
06/30/14 01:40	180	680-102199-20	SD-203-02	128949	126996	A-01-R	MLK
06/30/14 18:10	960	ZZZZZ		128949			

Detector: AV46

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:30	140	IC 160-120409/1		120409			PS
05/08/14 00:18	60	ICV 160-121079/1		121079			PS
06/19/14 00:17	960	ICB 160-127918/1		127918			PS
06/22/14 21:17	60	CCV 160-127986/1		127986			PS
06/30/14 00:18	1	PULSER 160-128950/1		128950			MLK
06/30/14 01:40	180	680-102199-22	SD-202-SS	128950	126996	A-01-R	MLK
06/30/14 18:10	960	ZZZZZ		128950			

Detector: AV48

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:32	140	IC 160-120411/1		120411			PS
05/08/14 00:18	60	ICV 160-121081/1		121081			PS
06/19/14 00:17	960	ICB 160-127920/1		127920			PS
06/22/14 20:07	60	CCV 160-127988/1		127988			PS
06/30/14 00:18	1	PULSER 160-128952/1		128952			MLK
06/30/14 01:40	180	680-102199-23	SD-202-01	128952	126996	A-01-R	MLK
06/30/14 18:10	960	ZZZZZ		128952			

Detector: AV49

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:03	140	IC 160-120271/1		120271			PS
05/08/14 14:34	60	ICV 160-121364/1		121364			PS
06/19/14 00:17	960	ICB 160-127921/1		127921			PS
06/22/14 18:52	60	CCV 160-127989/1		127989			PS
06/30/14 00:18	1	PULSER 160-128953/1		128953			MLK
06/30/14 01:40	180	680-102199-24	SD-202-02	128953	126996	A-01-R	MLK

Detector: AV53

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:04	140	IC 160-120275/1		120275			PS
05/08/14 00:18	60	ICV 160-121082/1		121082			PS
06/19/14 00:17	960	ICB 160-127925/1		127925			PS
06/22/14 18:53	60	CCV 160-127992/1		127992			PS
06/30/14 00:18	1	PULSER 160-128956/1		128956			MLK
06/30/14 01:42	180	680-102199-26	SD-196-SS	128956	126998	A-01-R	MLK

Alpha Spectroscopy Run Log

Detector: AV54

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:04	140	IC 160-120276/1		120276			PS
05/08/14 14:34	60	ICV 160-121368/1		121368			PS
06/19/14 00:18	960	ICB 160-127926/1		127926			PS
06/22/14 18:53	60	CCV 160-127993/1		127993			PS
06/30/14 00:18	1	PULSER 160-128957/1		128957			MLK
06/30/14 01:42	180	680-102199-26 DU	SD-196-SS DU	128957	126998	A-01-R	MLK

Detector: AV55

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/07/14 19:51	140	IC 160-120842/1		120842			PS
05/08/14 00:19	60	ICV 160-121083/1		121083			PS
06/19/14 00:18	960	ICB 160-127927/1		127927			PS
06/22/14 20:08	60	CCV 160-127994/1		127994			PS
06/30/14 00:18	1	PULSER 160-128958/1		128958			MLK
06/30/14 01:42	180	680-102199-27	SD-196-01	128958	126998	A-01-R	MLK

Detector: AV56

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:04	140	IC 160-120278/1		120278			PS
05/08/14 17:18	60	ICV 160-121369/1		121369			PS
06/19/14 00:18	960	ICB 160-127928/1		127928			PS
06/22/14 18:53	60	CCV 160-127995/1		127995			PS
06/30/14 00:19	1	PULSER 160-129083/1		129083			MLK
06/30/14 01:42	180	680-102199-28	SD-196-02	129083	126998	A-01-R	MLK

Detector: AV57

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:05	140	IC 160-120279/1		120279			PS
05/08/14 14:35	60	ICV 160-121370/1		121370			PS
06/19/14 00:18	960	ICB 160-127929/1		127929			PS
06/22/14 18:53	60	CCV 160-127996/1		127996			PS
06/30/14 00:19	1	PULSER 160-128959/1		128959			MLK
06/30/14 01:42	180	680-102199-30	SD-220-SS	128959	126998	A-01-R	MLK

Detector: AV58

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:05	140	IC 160-120280/1		120280			PS
05/08/14 14:35	60	ICV 160-121371/1		121371			PS
06/19/14 00:18	960	ICB 160-127930/1		127930			PS
06/22/14 18:53	60	CCV 160-127997/1		127997			PS
06/30/14 00:19	1	PULSER 160-128960/1		128960			MLK
06/30/14 01:42	180	680-102199-31	SD-220-01	128960	126998	A-01-R	MLK

Detector: AV59

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:05	140	IC 160-120281/1		120281			PS
05/08/14 14:36	60	ICV 160-121372/1		121372			PS

Alpha Spectroscopy Run Log

Detector: AV59 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
06/19/14 00:18	960	ICB 160-127931/1		127931			PS
06/22/14 20:09	60	CCV 160-127998/1		127998			PS
06/30/14 00:19	1	PULSER 160-128961/1		128961			MLK
06/30/14 01:43	180	680-102199-32	SD-220-02	128961	126998	A-01-R	MLK

Detector: AV60

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:06	140	IC 160-120282/1		120282			PS
05/08/14 17:21	60	ICV 160-121373/1		121373			PS
06/19/14 00:18	960	ICB 160-127933/1		127933			PS
06/22/14 21:17	60	CCV 160-127999/1		127999			PS
06/30/14 00:19	1	PULSER 160-128963/1		128963			MLK
06/30/14 01:43	180	680-102199-33	SD-DUP-01	128963	126998	A-01-R	MLK

Detector: AV61

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:06	140	IC 160-120283/1		120283			PS
05/08/14 14:36	60	ICV 160-121374/1		121374			PS
06/19/14 00:18	960	ICB 160-127934/1		127934			PS
06/22/14 22:21	60	CCV 160-128018/1		128018			PS
06/30/14 00:19	1	PULSER 160-128964/1		128964			MLK
06/30/14 01:43	180	680-102199-35	SD-201-SS	128964	126998	A-01-R	MLK

Detector: AV62

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:06	140	IC 160-120284/1		120284			PS
05/08/14 14:36	60	ICV 160-121375/1		121375			PS
06/19/14 00:18	960	ICB 160-127935/1		127935			PS
06/22/14 20:09	60	CCV 160-128000/1		128000			PS
06/30/14 00:19	1	PULSER 160-128965/1		128965			MLK
06/30/14 01:43	180	680-102199-36	SD-201-01	128965	126998	A-01-R	MLK

Detector: AV63

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:06	140	IC 160-120285/1		120285			PS
05/08/14 14:36	60	ICV 160-121376/1		121376			PS
06/19/14 00:18	960	ICB 160-127936/1		127936			PS
06/22/14 21:18	60	CCV 160-128001/1		128001			PS
06/30/14 00:19	1	PULSER 160-128966/1		128966			MLK
06/30/14 01:43	180	680-102199-37	SD-201-02	128966	126998	A-01-R	MLK

Detector: AV64

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 17:47	140	IC 160-120041/1		120041			PS
05/11/14 19:31	60	ICV 160-121389/1		121389			PS
06/19/14 00:18	960	ICB 160-127937/1		127937			PS
06/22/14 21:18	60	CCV 160-128002/1		128002			PS

Alpha Spectroscopy Run Log

Detector: AV64 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
06/30/14 00:19	1	PULSER 160-128967/1		128967			MLK
06/30/14 01:43	180	680-102199-39	SD-200-SS	128967	126998	A-01-R	MLK

Detector: AV65

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 17:47	140	IC 160-120042/1		120042			PS
05/08/14 17:18	60	ICV 160-121377/1		121377			PS
06/19/14 00:18	960	ICB 160-127938/1		127938			
06/19/14 19:57	960	ICB 160-127938/2		127938			PS
06/22/14 20:09	60	CCV 160-128003/1		128003			PS
06/30/14 00:19	1	PULSER 160-128968/1		128968			MLK
06/30/14 01:43	180	680-102199-40	SD-200-01	128968	126998	A-01-R	MLK

Detector: AV66

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 17:47	140	IC 160-120043/1		120043			PS
05/11/14 19:32	60	ICV 160-121390/1		121390			PS
06/19/14 00:18	960	ICB 160-127939/1		127939			PS
06/22/14 21:18	60	CCV 160-128004/1		128004			PS
06/30/14 00:19	1	PULSER 160-128969/1		128969			MLK
06/30/14 01:43	180	680-102199-41	SD-200-02	128969	126998	A-01-R	MLK

Detector: AV67

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 17:48	140	IC 160-120044/1		120044			PS
05/11/14 19:32	60	ICV 160-121391/1		121391			PS
06/19/14 00:18	960	ICB 160-127940/1		127940			PS
06/22/14 18:54	60	CCV 160-128005/1		128005			PS
06/30/14 00:19	1	PULSER 160-128970/1		128970			MLK
06/30/14 01:43	180	680-102199-42	SD-200-03	128970	126998	A-01-R	MLK

Detector: AV68

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 17:48	140	IC 160-120045/1		120045			PS
05/08/14 14:36	60	ICV 160-121378/1		121378			PS
06/19/14 00:18	960	ICB 160-127941/1		127941			PS
06/22/14 20:09	60	CCV 160-128006/1		128006			PS
06/30/14 00:19	1	PULSER 160-128971/1		128971			MLK
06/30/14 01:43	180	680-102199-25	SD-195-SS	128971	126998	A-01-R	MLK

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: S. Gmoron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.46
Client Contact: Mike Martin	Phone: (703)34-8384	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~10 of 10~~ 1 of 4
Company: Tetra Tech, Inc.		Analysis Requested		Job #: 680-102199
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes:
City: Germantown	TAT Requested (days): Standard			A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			Other:
Email: Michael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	880 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
SD-279-55	6/9/14	1540	C	Solid				X				
SD-279-01		1545	C	Solid				X				
SD-279-02		1550	C	Solid				X				
SD-279-03		1555	C	Solid				X				Hold Pending analysis SS to 02
SD-278-55		1740	C	Solid				X				
SD-278-01		1745	C	Solid				X				
SD-277-55		1810	C	Solid				X				
SD-277-01		1815	C	Solid				X				
SD-277-02		1820	C	Solid				X				
SD-277-03	↓	1825	C	Solid				X				Hold Pending analysis SS to 02
SD-219-55	6/10/14	0920	C	Solid				X				

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
A	6-10-14 / 1625	TT		6/10/14 1645	TestAmerica
Relinquished by:	Date/Time: 6/10/14 1735	Company TestAmerica	Received by: Clark	Date/Time: 6-11-14 0930	Company TA STL
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Alpha Spectroscopy Daily Pulser Check

Analysis Date: 06/30/14

		Gross Counts			FWHM (keV)			Pulser Center			Energy (keV)		
Detector	**Analysis Date**	**Result**	**Criteria**	**P/F**	**Result**	**Criteria**	**P/F**	**Result**	**Criteria**	**P/F**	**Result**	**Criteria**	**P/F**
AV3	06/30/14 00:01	7353	6995.6 - 7732.0	Pass	12.1	10 - 20	Pass	227.0	221.0 - 231.0	Pass	5060	5012.2 - 5092.2	Pass
AV4	06/30/14 00:01	7438	7058.9 - 7801.9	Pass	14.3	10 - 20	Pass	226.0	220.0 - 230.0	Pass	5053	5004.6 - 5084.6	Pass
AV6	06/30/14 00:01	7437	7050.8 - 7793.0	Pass	14.0	10 - 20	Pass	217.0	212.0 - 222.0	Pass	4985	4944.9 - 5024.9	Pass
AV7	06/30/14 00:01	7435	7003.5 - 7740.8	Pass	17.8	10 - 20	Pass	226.9	222.0 - 232.0	Pass	5059	5020.1 - 5100.1	Pass
AV8	06/30/14 00:01	7430	7052.4 - 7794.7	Pass	13.9	10 - 20	Pass	220.9	216.0 - 226.0	Pass	5015	4975.1 - 5055.1	Pass
AV10	06/30/14 00:02	7460	7323.5 - 8094.4	Pass	12.4	10 - 20	Pass	224.1	216.0 - 226.0	Pass	5038	4974.9 - 5054.9	Pass
AV11	06/30/14 00:02	7707	7322.5 - 8093.3	Pass	13.7	10 - 20	Pass	226.0	221.1 - 231.1	Pass	5053	5012.8 - 5092.8	Pass
AV13	06/30/14 00:01	7627	7244.9 - 8007.5	Pass	18.9	10 - 20	Pass	223.0	219.1 - 229.1	Pass	5030	4998.3 - 5078.3	Pass
AV14	06/30/14 00:01	7471	7236.1 - 7997.8	Pass	12.0	10 - 20	Pass	224.0	219.0 - 229.0	Pass	5037	4997.5 - 5077.5	Pass
AV15	06/30/14 00:01	7622	7313.8 - 8083.7	Pass	14.6	10 - 20	Pass	223.9	219.2 - 229.2	Pass	5037	4998.9 - 5078.9	Pass
AV16	06/30/14 00:01	7477	7055.7 - 7798.4	Pass	12.3	10 - 20	Pass	218.0	215.9 - 225.9	Pass	4993	4974.6 - 5054.6	Pass
AV17	06/30/14 00:02	7570	7224.6 - 7985.1	Pass	11.5	10 - 20	Pass	226.0	221.0 - 231.0	Pass	5052	5012.5 - 5092.5	Pass
AV18	06/30/14 00:02	7577	7204.8 - 7963.1	Pass	11.9	10 - 20	Pass	225.0	220.0 - 230.0	Pass	5045	5004.9 - 5084.9	Pass
AV19	06/30/14 00:02	7593	7231.9 - 7993.2	Pass	11.4	10 - 20	Pass	225.0	221.0 - 231.0	Pass	5045	5012.3 - 5092.3	Pass
AV20	06/30/14 00:02	7668	7255.1 - 8018.8	Pass	14.8	10 - 20	Pass	221.9	217.9 - 227.9	Pass	5022	4989.0 - 5069.0	Pass
AV21	06/30/14 00:02	7665	7278.7 - 8044.9	Pass	14.3	10 - 20	Pass	222.9	219.0 - 229.0	Pass	5030	4997.5 - 5077.5	Pass
AV23	06/30/14 00:02	7628	7259.0 - 8023.1	Pass	16.0	10 - 20	Pass	224.1	219.0 - 229.0	Pass	5038	4997.4 - 5077.4	Pass
AV24	06/30/14 00:02	7652	7259.6 - 8023.8	Pass	15.3	10 - 20	Pass	216.9	212.9 - 222.9	Pass	4985	4952.1 - 5032.1	Pass
AV43	06/30/14 01:04	7455	7041.9 - 7783.1	Pass	11.4	10 - 20	Pass	221.0	216.9 - 226.9	Pass	5015	4982.0 - 5062.0	Pass
AV44	06/30/14 00:18	7610	7220.7 - 7980.8	Pass	11.5	10 - 20	Pass	221.0	216.0 - 226.0	Pass	5015	4975.1 - 5055.1	Pass
AV45	06/30/14 00:18	7617	7219.6 - 7979.6	Pass	16.0	10 - 20	Pass	225.2	219.7 - 229.7	Pass	5046	5003.0 - 5083.0	Pass
AV46	06/30/14 00:18	7371	7134.7 - 7885.7	Pass	12.9	10 - 20	Pass	225.0	220.0 - 230.0	Pass	5045	5004.8 - 5084.8	Pass
AV48	06/30/14 00:18	7653	7068.1 - 7812.1	Pass	13.7	10 - 20	Pass	218.9	218.0 - 228.0	Pass	4999	4989.8 - 5069.8	Pass
AV49	06/30/14 00:18	7632	7226.6 - 7987.3	Pass	15.4	10 - 20	Pass	221.1	215.0 - 225.0	Pass	5016	4967.4 - 5047.4	Pass
AV53	06/30/14 00:18	7255	6906.6 - 7633.6	Pass	11.0	10 - 20	Pass	222.0	217.0 - 227.0	Pass	5023	4982.6 - 5062.6	Pass
AV54	06/30/14 00:18	7261	6918.5 - 7646.8	Pass	16.0	10 - 20	Pass	225.9	222.1 - 232.1	Pass	5052	5020.5 - 5100.5	Pass
AV55	06/30/14 00:18	7254	6899.4 - 7625.7	Pass	11.4	10 - 20	Pass	225.0	220.0 - 230.0	Pass	5045	5004.9 - 5084.9	Pass
AV56	06/30/14 00:19	6917	6868.1 - 7591.0	Pass	13.4	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	5004.9 - 5069.9	Pass
AV57	06/30/14 00:19	7288	6901.7 - 7628.2	Pass	18.9	10 - 20	Pass	229.0	224.0 - 234.0	Pass	5075	5034.9 - 5114.9	Pass
AV58	06/30/14 00:19	7032	6766.5 - 7478.7	Pass	12.6	10 - 20	Pass	223.9	219.0 - 229.0	Pass	5037	4997.2 - 5077.2	Pass
AV59	06/30/14 00:19	7253	6885.8 - 7610.6	Pass	18.2	10 - 20	Pass	222.9	217.9 - 227.9	Pass	5029	4989.1 - 5069.1	Pass
AV60	06/30/14 00:19	7227	6867.8 - 7590.7	Pass	17.5	10 - 20	Pass	220.9	216.2 - 226.2	Pass	5015	4976.7 - 5056.7	Pass
AV61	06/30/14 00:19	7209	6682.3 - 7385.7	Pass	16.5	10 - 20	Pass	223.0	219.0 - 229.0	Pass	5030	4997.8 - 5077.8	Pass
AV62	06/30/14 00:19	7247	6875.3 - 7599.0	Pass	18.7	10 - 20	Pass	221.9	217.1 - 227.1	Pass	5022	4983.0 - 5063.0	Pass
AV63	06/30/14 00:19	7243	6829.2 - 7548.0	Pass	13.8	10 - 20	Pass	223.0	217.9 - 227.9	Pass	5030	4989.3 - 5069.3	Pass
AV64	06/30/14 00:19	7241	6847.3 - 7568.1	Pass	13.8	10 - 20	Pass	225.0	219.4 - 229.4	Pass	5045	5000.4 - 5080.4	Pass
AV65	06/30/14 00:19	7226	6864.5 - 7587.1	Pass	15.3	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	4989.7 - 5069.7	Pass
AV66	06/30/14 00:19	7232	6865.2 - 7587.8	Pass	15.2	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	4989.9 - 5069.9	Pass
AV67	06/30/14 00:19	7122	6893.5 - 7619.1	Pass	13.3	10 - 20	Pass	228.1	221.9 - 231.9	Pass	5068	5019.4 - 5099.4	Pass

Alpha Spectroscopy Daily Pulser Check

Analysis Date: 06/30/14

		Gross Counts			FWHM (keV)			Pulser Center			Energy (keV)		
Detector	Analysis Date	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F
AV68	06/30/14 00:19	7451	7080.3 - 7825.6	Pass	19.1	10 - 20	Pass	223.9	219.0 - 229.0	Pass	5037	4997.3 - 5077.3	Pass

Alpha Spectroscopy Calibration Summary

Detector: AV3

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120519/1	05/05/14 22:26	82234-334_00001	0.2609	0.20-0.32		
ICV 160-120855/1	05/07/14 23:02	82233-334_00001	0.2696	0.20-0.32	103.3	95-105
CCV 160-127913/1	06/19/14 16:44	82234-334_00001	0.2566	0.20-0.32	98.3	95-105

Detector: AV4

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120520/1	05/05/14 22:26	82235-334_00001	0.2582	0.20-0.32		
ICV 160-120856/1	05/07/14 23:03	82234-334_00001	0.2599	0.20-0.32	100.6	95-105
CCV 160-127914/1	06/19/14 16:44	82235-334_00001	0.2590	0.20-0.32	100.3	95-105

Detector: AV6

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120521/1	05/05/14 22:26	82237-334_00003	0.2589	0.20-0.32		
ICV 160-120857/1	05/07/14 23:03	82236-334_00001	0.2622	0.20-0.32	101.3	95-105
CCV 160-127932/1	06/19/14 18:06	82237-334_00003	0.2606	0.20-0.32	100.7	95-105

Detector: AV7

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120843/1	05/07/14 19:51	82236-334_00001	0.2580	0.20-0.32		
ICV 160-120858/1	05/07/14 23:03	82237-334_00003	0.2546	0.20-0.32	98.6	95-105
CCV 160-127943/1	06/19/14 16:44	82236-334_00001	0.2549	0.20-0.32	98.8	95-105

Detector: AV8

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120523/1	05/05/14 22:27	82240-334_00001	0.2705	0.20-0.32		
ICV 160-121084/1	05/08/14 00:14	82234-334_00001	0.2639	0.20-0.32	97.6	95-105
CCV 160-127954/1	06/19/14 18:06	82240-334_00001	0.2668	0.20-0.32	98.6	95-105

Detector: AV10

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120512/1	05/05/14 22:27	82242-334_00001	0.2584	0.20-0.32		
ICV 160-120847/1	05/07/14 23:03	82241-334_00001	0.2593	0.20-0.32	100.3	95-105
CCV 160-127860/1	06/19/14 18:06	82242-334_00001	0.2552	0.20-0.32	98.7	95-105

Detector: AV11

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120513/1	05/05/14 22:27	82243-334_00001	0.2688	0.20-0.32		
ICV 160-120848/1	05/07/14 23:04	82242-334_00001	0.2598	0.20-0.32	96.6	95-105
CCV 160-127871/1	06/19/14 18:07	82243-334_00001	0.2647	0.20-0.32	98.5	95-105

Detector: AV13

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120515/1	05/05/14 22:28	82245-334_00001	0.2599	0.20-0.32		
ICV 160-120850/1	05/07/14 23:04	82244-334_00001	0.2556	0.20-0.32	98.4	95-105
CCV 160-127892/1	06/19/14 19:45	82245-334_00001	0.2566	0.20-0.32	98.7	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV14

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120516/1	05/05/14 22:28	82246-334_00001	0.2634	0.20-0.32		
ICV 160-120851/1	05/07/14 23:04	82245-334_00001	0.2665	0.20-0.32	101.2	95-105
CCV 160-127902/1	06/19/14 18:08	82246-334_00001	0.2615	0.20-0.32	99.3	95-105

Detector: AV15

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120517/1	05/05/14 22:28	82247-334_00001	0.2562	0.20-0.32		
ICV 160-120852/1	05/07/14 23:04	82246-334_00001	0.2590	0.20-0.32	101.1	95-105
CCV 160-127903/1	06/19/14 19:45	82247-334_00001	0.2528	0.20-0.32	98.7	95-105

Detector: AV16

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120398/1	05/05/14 19:27	82232-334_00001	0.2711	0.20-0.32		
ICV 160-121072/1	05/08/14 00:14	82247-334_00001	0.2609	0.20-0.32	96.2	95-105
CCV 160-127904/1	06/19/14 18:08	82232-334_00001	0.2712	0.20-0.32	100.1	95-105

Detector: AV17

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120399/1	05/05/14 19:28	82233-334_00001	0.2607	0.20-0.32		
ICV 160-121073/1	05/08/14 00:14	82232-334_00001	0.2633	0.20-0.32	101.0	95-105
CCV 160-127905/1	06/19/14 18:08	82233-334_00001	0.2613	0.20-0.32	100.2	95-105

Detector: AV18

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120400/1	05/05/14 19:28	82234-334_00001	0.2546	0.20-0.32		
ICV 160-121074/1	05/08/14 00:14	82233-334_00001	0.2618	0.20-0.32	102.8	95-105
CCV 160-127906/1	06/19/14 18:08	82234-334_00001	0.2539	0.20-0.32	99.7	95-105

Detector: AV19

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120401/1	05/05/14 19:28	82235-334_00001	0.2534	0.20-0.32		
ICV 160-121361/1	05/08/14 14:33	82235-334_00001	0.2496	0.20-0.32	98.5	95-105
CCV 160-127907/1	06/19/14 18:08	82235-334_00001	0.2536	0.20-0.32	100.1	95-105

Detector: AV20

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120402/1	05/05/14 19:28	82236-334_00001	0.2556	0.20-0.32		
ICV 160-120854/1	05/07/14 23:05	82235-334_00001	0.2551	0.20-0.32	99.8	95-105
CCV 160-127909/1	06/19/14 18:08	82236-334_00001	0.2577	0.20-0.32	100.8	95-105

Detector: AV21

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120403/1	05/05/14 19:28	82237-334_00003	0.2545	0.20-0.32		
ICV 160-121075/1	05/08/14 00:16	82236-334_00001	0.2553	0.20-0.32	100.3	95-105
CCV 160-127910/1	06/19/14 19:45	82237-334_00003	0.2545	0.20-0.32	100.0	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV23

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120404/1	05/05/14 19:29	82240-334_00001	0.2591	0.20-0.32		
ICV 160-121362/1	05/08/14 14:33	82233-334_00001	0.2592	0.20-0.32	100.0	95-105
CCV 160-127911/1	06/19/14 19:45	82240-334_00001	0.2586	0.20-0.32	99.8	95-105

Detector: AV24

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120405/1	05/05/14 19:29	82241-334_00001	0.2642	0.20-0.32		
ICV 160-121076/1	05/08/14 00:16	82240-334_00001	0.2662	0.20-0.32	100.8	95-105
CCV 160-127912/1	06/19/14 19:45	82241-334_00001	0.2644	0.20-0.32	100.1	95-105

Detector: AV43

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120406/1	05/05/14 19:30	82242-334_00001	0.2574	0.20-0.32		
ICV 160-121077/1	05/08/14 00:16	82241-334_00001	0.2568	0.20-0.32	99.8	95-105
CCV 160-127969/1	06/22/14 17:38	82242-334_00001	0.2558	0.20-0.32	99.4	95-105

Detector: AV44

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120407/1	05/05/14 19:30	82243-334_00001	0.2632	0.20-0.32		
ICV 160-121078/1	05/08/14 00:17	82242-334_00001	0.2594	0.20-0.32	98.6	95-105
CCV 160-127970/1	06/22/14 17:38	82243-334_00001	0.2633	0.20-0.32	100.0	95-105

Detector: AV45

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120408/1	05/05/14 19:30	82244-334_00001	0.2606	0.20-0.32		
ICV 160-121363/1	05/08/14 14:32	82243-334_00001	0.2658	0.20-0.32	102.0	95-105
CCV 160-127985/1	06/22/14 20:07	82244-334_00001	0.2609	0.20-0.32	100.1	95-105

Detector: AV46

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120409/1	05/05/14 19:30	82245-334_00001	0.2680	0.20-0.32		
ICV 160-121079/1	05/08/14 00:18	82244-334_00001	0.2610	0.20-0.32	97.4	95-105
CCV 160-127986/1	06/22/14 21:17	82245-334_00001	0.2669	0.20-0.32	99.6	95-105

Detector: AV48

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120411/1	05/05/14 19:32	82247-334_00001	0.2578	0.20-0.32		
ICV 160-121081/1	05/08/14 00:18	82246-334_00001	0.2600	0.20-0.32	100.9	95-105
CCV 160-127988/1	06/22/14 20:07	82247-334_00001	0.2577	0.20-0.32	99.9	95-105

Detector: AV49

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120271/1	05/04/14 21:03	82232-334_00001	0.2653	0.20-0.32		
ICV 160-121364/1	05/08/14 14:34	82247-334_00001	0.2545	0.20-0.32	95.9	95-105
CCV 160-127989/1	06/22/14 18:52	82232-334_00001	0.2674	0.20-0.32	100.8	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV53

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120275/1	05/04/14 21:04	82236-334_00001	0.2632	0.20-0.32		
ICV 160-121082/1	05/08/14 00:18	82235-334_00001	0.2648	0.20-0.32	100.6	95-105
CCV 160-127992/1	06/22/14 18:53	82236-334_00001	0.2651	0.20-0.32	100.7	95-105

Detector: AV54

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120276/1	05/04/14 21:04	82237-334_00003	0.2602	0.20-0.32		
ICV 160-121368/1	05/08/14 14:34	82236-334_00001	0.2609	0.20-0.32	100.3	95-105
CCV 160-127993/1	06/22/14 18:53	82237-334_00003	0.2628	0.20-0.32	101.0	95-105

Detector: AV55

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120842/1	05/07/14 19:51	82232-334_00001	0.2679	0.20-0.32		
ICV 160-121083/1	05/08/14 00:19	82237-334_00003	0.2569	0.20-0.32	95.9	95-105
CCV 160-127994/1	06/22/14 20:08	82232-334_00001	0.2683	0.20-0.32	100.2	95-105

Detector: AV56

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120278/1	05/04/14 21:04	82240-334_00001	0.2609	0.20-0.32		
ICV 160-121369/1	05/08/14 17:18	82247-334_00001	0.2519	0.20-0.32	96.5	95-105
CCV 160-127995/1	06/22/14 18:53	82240-334_00001	0.2626	0.20-0.32	100.7	95-105

Detector: AV57

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120279/1	05/04/14 21:05	82241-334_00001	0.2674	0.20-0.32		
ICV 160-121370/1	05/08/14 14:35	82240-334_00001	0.2676	0.20-0.32	100.1	95-105
CCV 160-127996/1	06/22/14 18:53	82241-334_00001	0.2692	0.20-0.32	100.7	95-105

Detector: AV58

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120280/1	05/04/14 21:05	82242-334_00001	0.2656	0.20-0.32		
ICV 160-121371/1	05/08/14 14:35	82241-334_00001	0.2710	0.20-0.32	102.0	95-105
CCV 160-127997/1	06/22/14 18:53	82242-334_00001	0.2631	0.20-0.32	99.1	95-105

Detector: AV59

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120281/1	05/04/14 21:05	82243-334_00001	0.2744	0.20-0.32		
ICV 160-121372/1	05/08/14 14:36	82242-334_00001	0.2677	0.20-0.32	97.5	95-105
CCV 160-127998/1	06/22/14 20:09	82243-334_00001	0.2720	0.20-0.32	99.1	95-105

Detector: AV60

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120282/1	05/04/14 21:06	82244-334_00001	0.2633	0.20-0.32		
ICV 160-121373/1	05/08/14 17:21	82243-334_00001	0.2725	0.20-0.32	103.5	95-105
CCV 160-127999/1	06/22/14 21:17	82244-334_00001	0.2629	0.20-0.32	99.8	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV61

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120283/1	05/04/14 21:06	82245-334_00001	0.2646	0.20-0.32		
ICV 160-121374/1	05/08/14 14:36	82244-334_00001	0.2581	0.20-0.32	97.5	95-105
CCV 160-128018/1	06/22/14 22:21	82245-334_00001	0.2622	0.20-0.32	99.1	95-105

Detector: AV62

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120284/1	05/04/14 21:06	82246-334_00001	0.2634	0.20-0.32		
ICV 160-121375/1	05/08/14 14:36	82245-334_00001	0.2622	0.20-0.32	99.6	95-105
CCV 160-128000/1	06/22/14 20:09	82246-334_00001	0.2650	0.20-0.32	100.6	95-105

Detector: AV63

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120285/1	05/04/14 21:06	82247-334_00001	0.2548	0.20-0.32		
ICV 160-121376/1	05/08/14 14:36	82246-334_00001	0.2601	0.20-0.32	102.1	95-105
CCV 160-128001/1	06/22/14 21:18	82247-334_00001	0.2557	0.20-0.32	100.3	95-105

Detector: AV64

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120041/1	05/04/14 17:47	82232-334_00001	0.2775	0.20-0.32		
ICV 160-121389/1	05/11/14 19:31	82247-334_00001	0.2666	0.20-0.32	96.1	95-105
CCV 160-128002/1	06/22/14 21:18	82232-334_00001	0.2776	0.20-0.32	100.0	95-105

Detector: AV65

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120042/1	05/04/14 17:47	82233-334_00001	0.2713	0.20-0.32		
ICV 160-121377/1	05/08/14 17:18	82232-334_00001	0.2712	0.20-0.32	99.9	95-105
CCV 160-128003/1	06/22/14 20:09	82233-334_00001	0.2695	0.20-0.32	99.3	95-105

Detector: AV66

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120043/1	05/04/14 17:47	82234-334_00001	0.2593	0.20-0.32		
ICV 160-121390/1	05/11/14 19:32	82233-334_00001	0.2667	0.20-0.32	102.9	95-105
CCV 160-128004/1	06/22/14 21:18	82234-334_00001	0.2570	0.20-0.32	99.1	95-105

Detector: AV67

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120044/1	05/04/14 17:48	82235-334_00001	0.2732	0.20-0.32		
ICV 160-121391/1	05/11/14 19:32	82234-334_00001	0.2702	0.20-0.32	98.9	95-105
CCV 160-128005/1	06/22/14 18:54	82235-334_00001	0.2782	0.20-0.32	101.8	95-105

Detector: AV68

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120045/1	05/04/14 17:48	82236-334_00001	0.2649	0.20-0.32		
ICV 160-121378/1	05/08/14 14:36	82235-334_00001	0.2630	0.20-0.32	99.3	95-105
CCV 160-128006/1	06/22/14 20:09	82236-334_00001	0.2631	0.20-0.32	99.3	95-105

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:13:14AM 6/19/2014

Sample

Sample Name: ICB;AV3
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

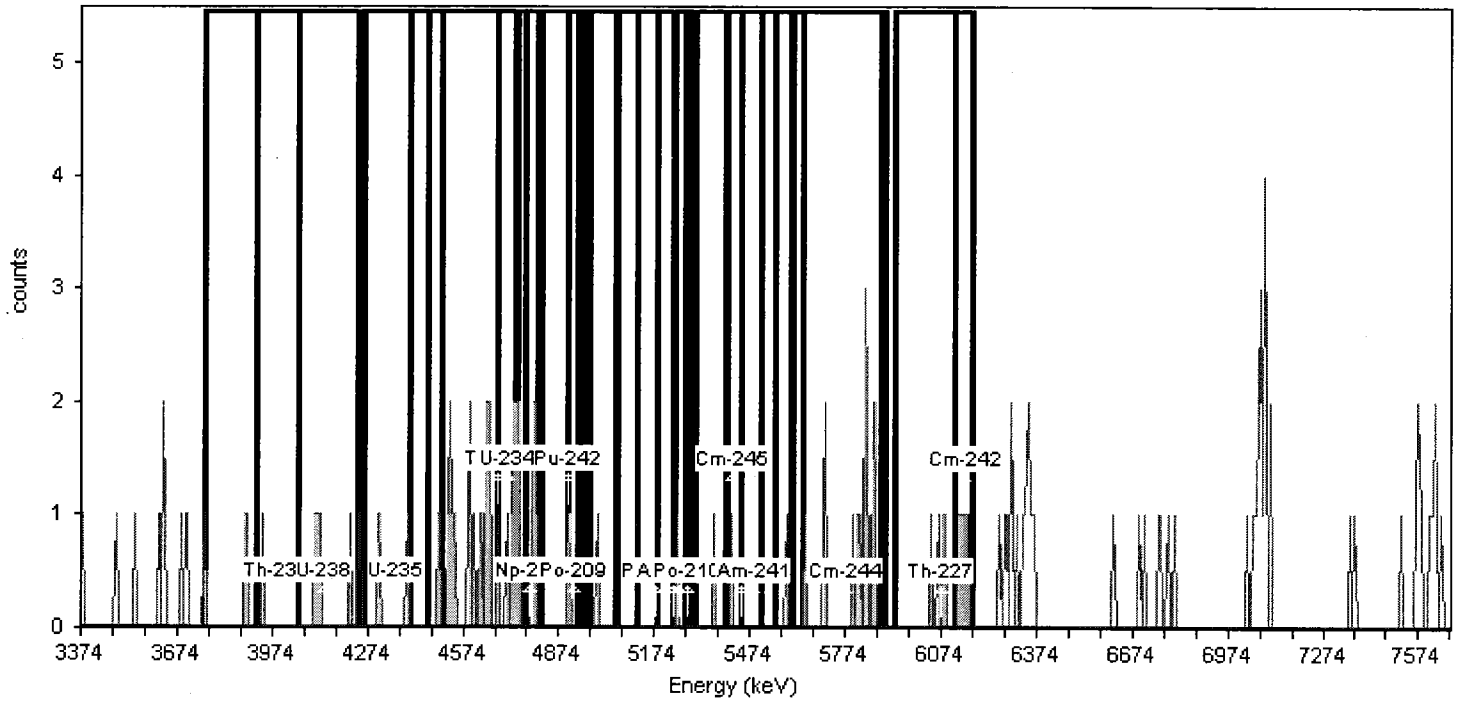
Analyst: 60040

Acquisition

Detector: AV3 , SN: 49-202 FF7
Acquisition Start Date: 6/18/2014 7:10:38PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-8875;AV3-20140505
Calibration Date: 5/6/2014 5:38:33PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.09% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 127.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	4.00	4.167E-003	2.329E-003
U-238	4.14	3.92	4.24	6.00	6.250E-003	2.756E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	26.00	2.708E-002	5.413E-003
U-234	4.71	4.51	4.82	28.00	2.917E-002	5.610E-003
Pu-242	4.90	4.68	4.95	14.00	1.458E-002	4.034E-003
Th-229	4.86	4.74	5.12	10.00	1.042E-002	3.455E-003
Np-237	4.78	4.77	4.81	4.00	4.167E-003	2.329E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	1.00	1.042E-003	1.473E-003
U-232	5.25	5.06	5.40	2.00	2.083E-003	1.804E-003
Th-228	5.45	5.19	5.51	3.00	3.125E-003	2.083E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	2.00	2.083E-003	1.804E-003
Am-241	5.48	5.30	5.60	3.00	3.125E-003	2.083E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	13.00	1.354E-002	3.898E-003
Cm-244	5.78	5.64	5.90	13.00	1.354E-002	3.898E-003
Th-227	6.07	5.93	6.18	9.00	9.375E-003	3.294E-003
Cm-242	6.15	6.12	6.18	5.00	5.208E-003	2.552E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:13:20AM 6/19/2014

Sample

Sample Name: ICB;AV4
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

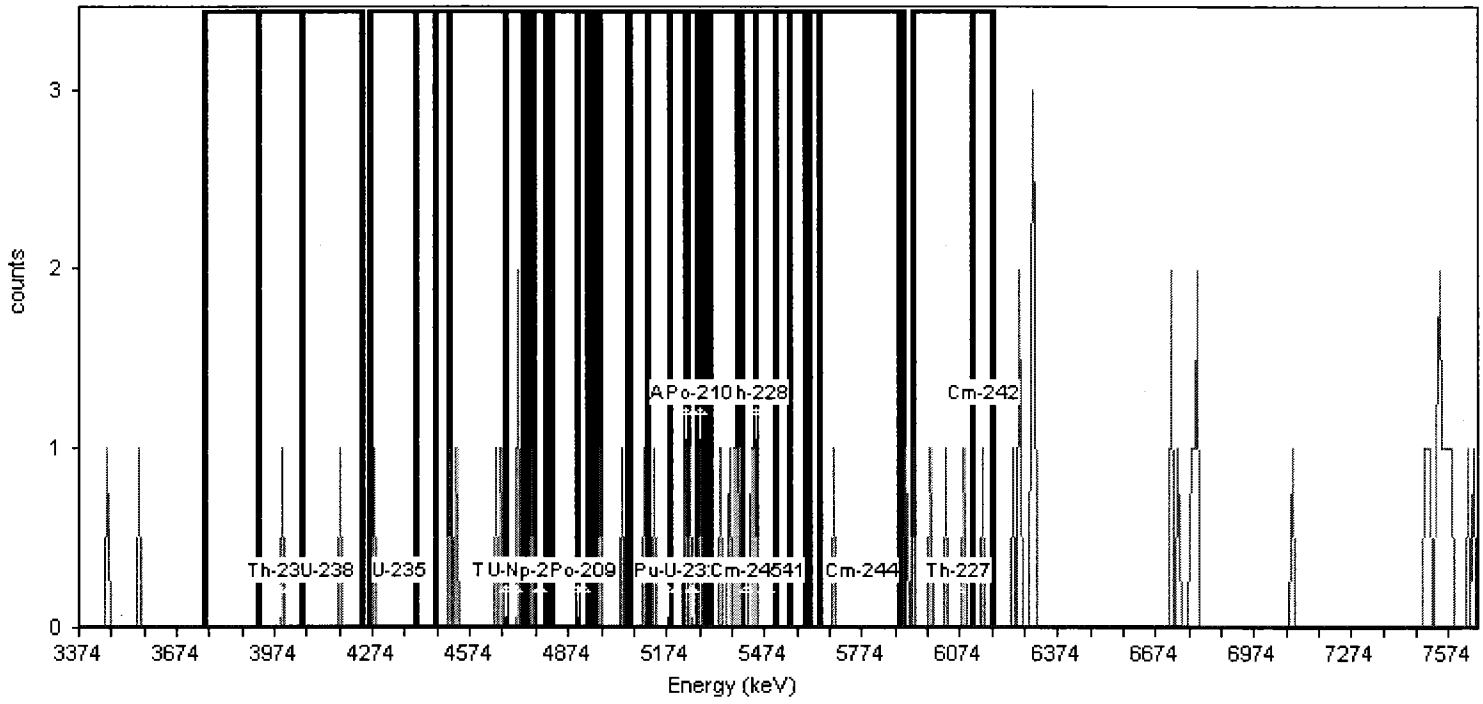
Analyst: 60040

Acquisition

Detector: AV4 , SN: 46-033Q4
Acquisition Start Date: 6/18/2014 7:10:40PM
Live Time: 960.00 min.
Real Time: 960.03 min.
Calibration Name: IC-8876;AV4-20140505
Calibration Date: 5/6/2014 5:38:40PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.82% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 64.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	7.00	7.292E-003	2.946E-003
Pu-242	4.90	4.68	4.95	3.00	3.125E-003	2.083E-003
Th-229	4.86	4.74	5.12	4.00	4.167E-003	2.329E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	5.00	5.208E-003	2.552E-003
Am-243	5.23	5.05	5.31	5.00	5.208E-003	2.552E-003
U-232	5.25	5.06	5.40	10.00	1.042E-002	3.455E-003
Th-228	5.45	5.19	5.51	11.00	1.146E-002	3.608E-003
Po-210	5.28	5.23	5.29	3.00	3.125E-003	2.083E-003
Pu-238	5.47	5.27	5.55	9.00	9.375E-003	3.294E-003
Am-241	5.48	5.30	5.60	8.00	8.333E-003	3.125E-003
Cm-245	5.42	5.40	5.45	4.00	4.167E-003	2.329E-003
Pu-236	5.76	5.61	5.89	1.00	1.042E-003	1.473E-003
Cm-244	5.78	5.64	5.90	1.00	1.042E-003	1.473E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:13:25AM 6/19/2014

Sample

Sample Name: ICB;AV6
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

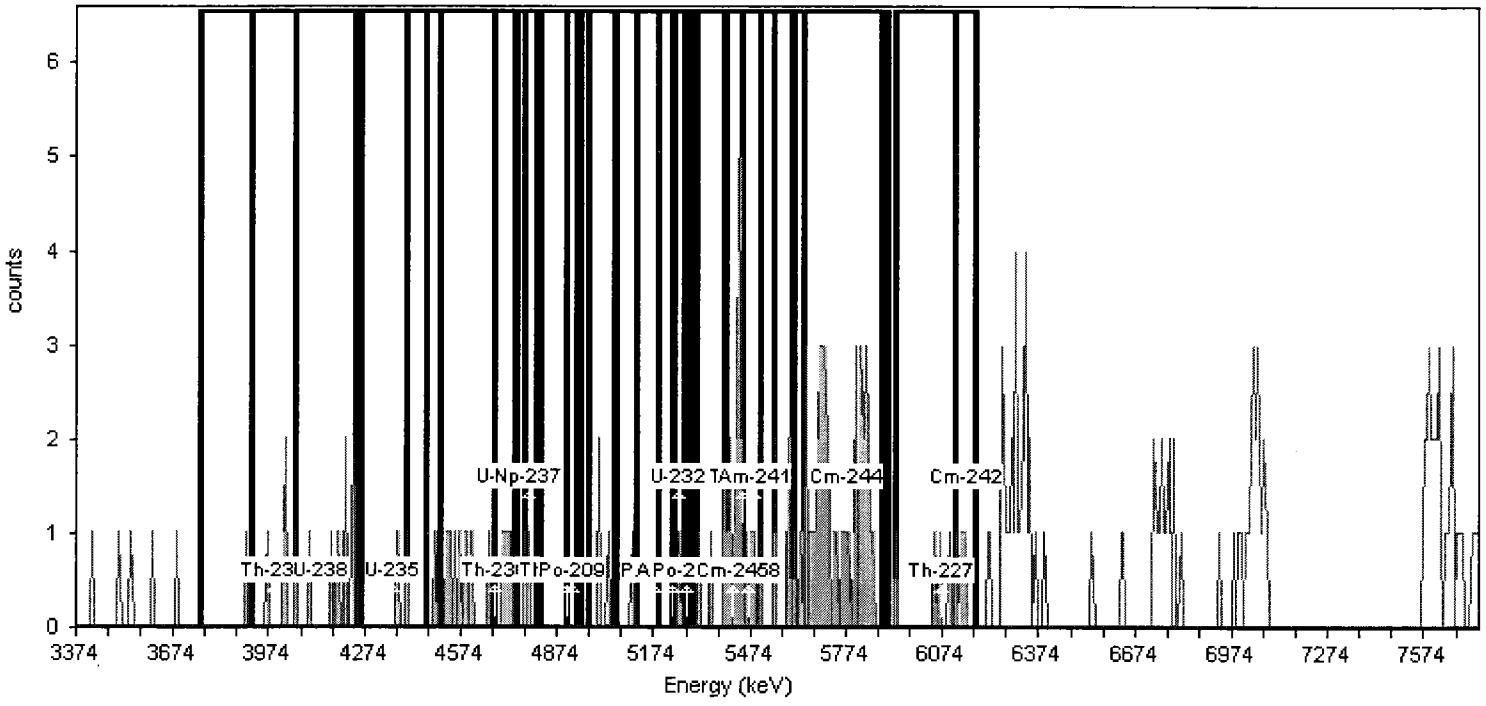
Analyst: 60040

Acquisition

Detector: AV6 , SN: 47-27FF2
Acquisition Start Date: 6/18/2014 7:08:18PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9520;AV6-20140505
Calibration Date: 5/6/2014 5:38:46PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.89% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 213.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	6.00	6.250E-003	2.756E-003
U-238	4.14	3.92	4.24	13.00	1.354E-002	3.898E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	14.00	1.458E-002	4.034E-003
U-234	4.71	4.51	4.82	14.00	1.458E-002	4.034E-003
Pu-242	4.90	4.68	4.95	6.00	6.250E-003	2.756E-003
Th-229	4.86	4.74	5.12	6.00	6.250E-003	2.756E-003
Np-237	4.78	4.77	4.81	2.00	2.083E-003	1.804E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	7.00	7.292E-003	2.946E-003
Th-228	5.45	5.19	5.51	21.00	2.187E-002	4.886E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	22.00	2.292E-002	4.996E-003
Am-241	5.48	5.30	5.60	24.00	2.500E-002	5.208E-003
Cm-245	5.42	5.40	5.45	14.00	1.458E-002	4.034E-003
Pu-236	5.76	5.61	5.89	44.00	4.583E-002	6.988E-003
Cm-244	5.78	5.64	5.90	42.00	4.375E-002	6.831E-003
Th-227	6.07	5.93	6.18	8.00	8.333E-003	3.125E-003
Cm-242	6.15	6.12	6.18	4.00	4.167E-003	2.329E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:13:31AM 6/19/2014

Sample

Sample Name: ICB;AV7
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

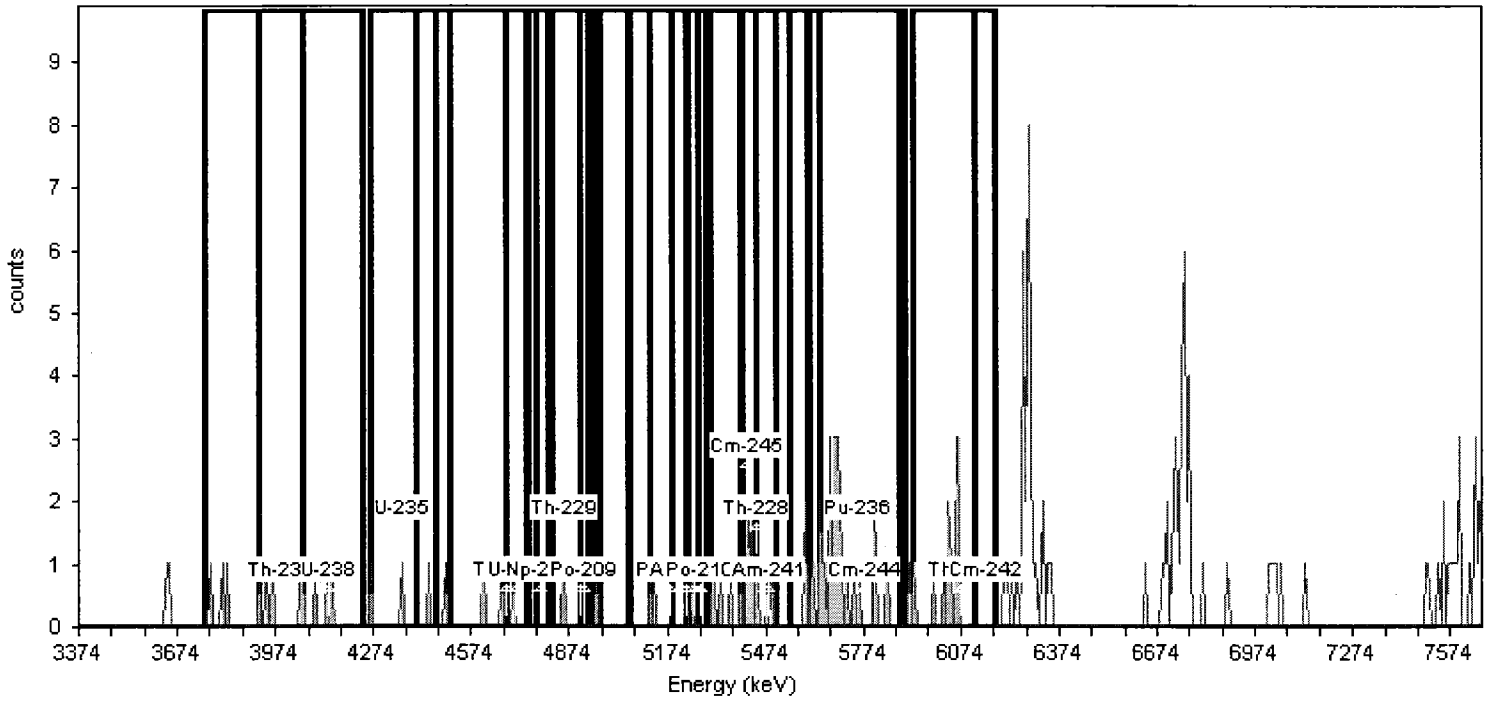
Analyst: 60040

Acquisition

Detector: AV7 , SN: 48-158EE5
Acquisition Start Date: 6/18/2014 7:08:20PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-8877;AV7-20140507
Calibration Date: 5/7/2014 10:48:48PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.80% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 167.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	9.00	9.375E-003	3.294E-003
U-238	4.14	3.92	4.24	9.00	9.375E-003	3.294E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	4.00	4.167E-003	2.329E-003
Pu-242	4.90	4.68	4.95	3.00	3.125E-003	2.083E-003
Th-229	4.86	4.74	5.12	4.00	4.167E-003	2.329E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	7.00	7.292E-003	2.946E-003
Th-228	5.45	5.19	5.51	13.00	1.354E-002	3.898E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	12.00	1.250E-002	3.756E-003
Am-241	5.48	5.30	5.60	14.00	1.458E-002	4.034E-003
Cm-245	5.42	5.40	5.45	7.00	7.292E-003	2.946E-003
Pu-236	5.76	5.61	5.89	26.00	2.708E-002	5.413E-003
Cm-244	5.78	5.64	5.90	25.00	2.604E-002	5.311E-003
Th-227	6.07	5.93	6.18	10.00	1.042E-002	3.455E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:13:36AM 6/19/2014

Sample

Sample Name: ICB;AV8
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

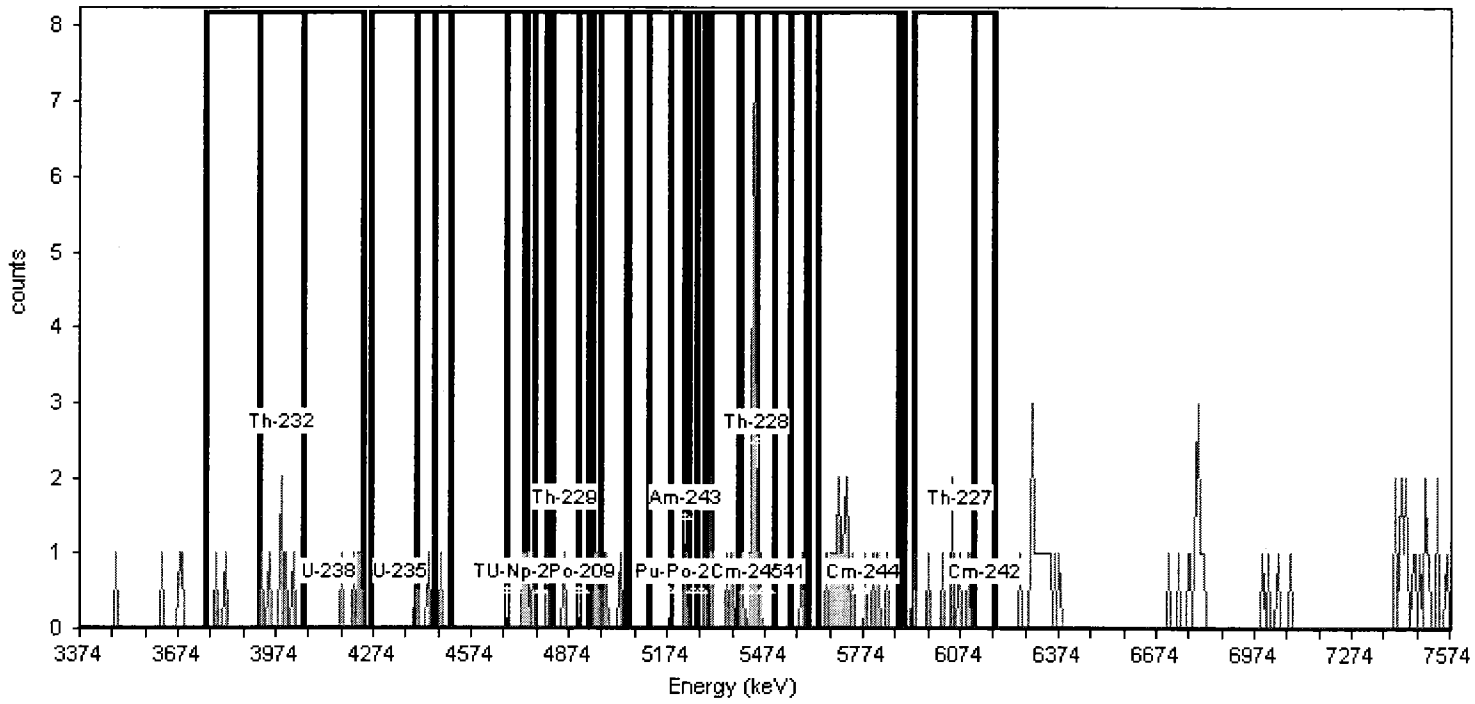
Analyst: 60040

Acquisition

Detector: AV8 , SN: 41-137Q6
Acquisition Start Date: 6/18/2014 7:08:22PM
Live Time: 960.01 min.
Real Time: 960.03 min.
Calibration Name: IC-9792;AV8-20140505
Calibration Date: 5/6/2014 5:38:58PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.05% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 119.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	8.00	8.333E-003	3.125E-003
U-238	4.14	3.92	4.24	10.00	1.042E-002	3.455E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	5.00	5.208E-003	2.552E-003
Pu-242	4.90	4.68	4.95	6.00	6.250E-003	2.756E-003
Th-229	4.86	4.74	5.12	9.00	9.375E-003	3.294E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	7.00	7.292E-003	2.946E-003
Th-228	5.45	5.19	5.51	19.00	1.979E-002	4.658E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	18.00	1.875E-002	4.540E-003
Am-241	5.48	5.30	5.60	18.00	1.875E-002	4.540E-003
Cm-245	5.42	5.40	5.45	12.00	1.250E-002	3.756E-003
Pu-236	5.76	5.61	5.89	16.00	1.667E-002	4.295E-003
Cm-244	5.78	5.64	5.90	16.00	1.667E-002	4.295E-003
Th-227	6.07	5.93	6.18	7.00	7.292E-003	2.946E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:26:33AM 6/19/2014

Sample

Sample Name: ICB;AV10
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

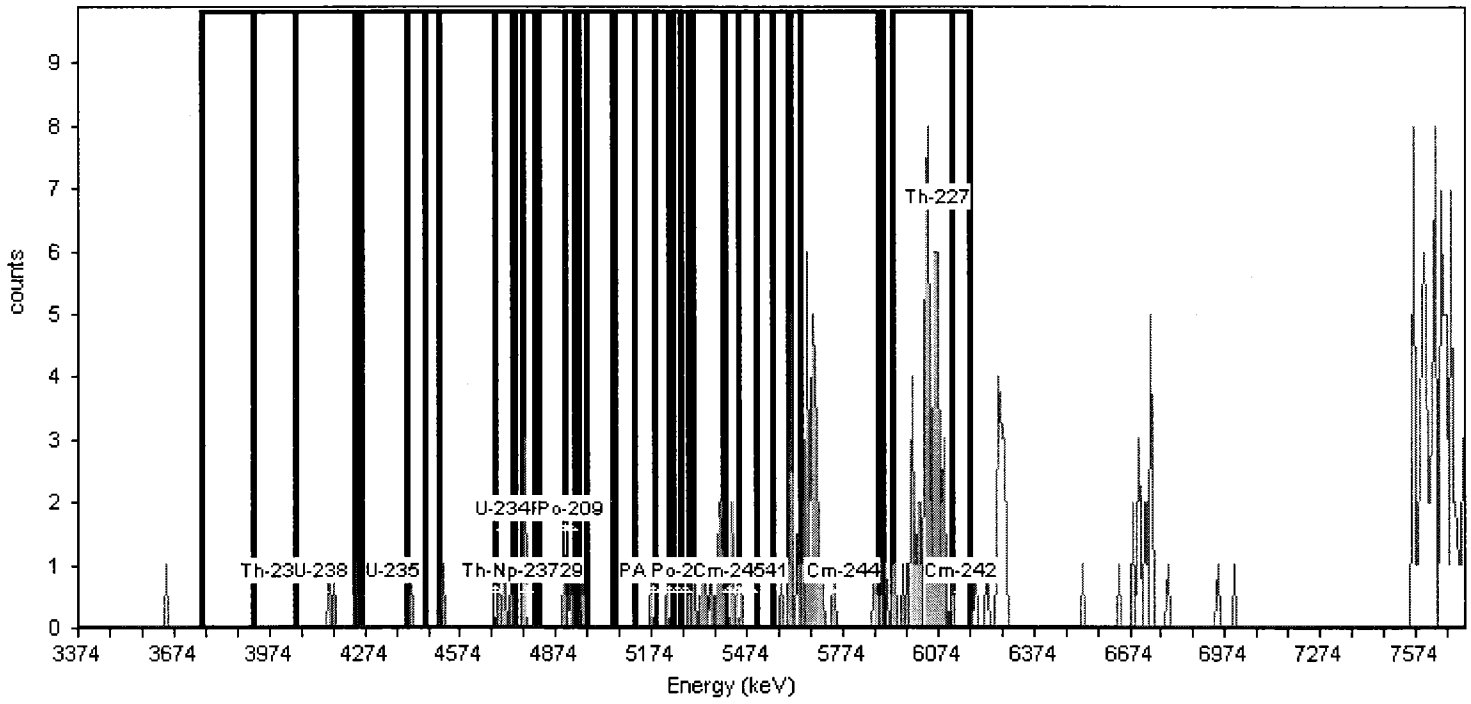
Analyst: 60040

Acquisition

Detector: AV10 , SN: 49-155N2
Acquisition Start Date: 6/18/2014 7:08:26PM
Live Time: 960.00 min.
Real Time: 970.50 min.
Calibration Name: IC-9794;AV10-20140505
Calibration Date: 5/6/2014 5:39:10PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.84% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 237.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	5.00	5.208E-003	2.552E-003
U-234	4.71	4.51	4.82	8.00	8.333E-003	3.125E-003
Pu-242	4.90	4.68	4.95	10.00	1.042E-002	3.455E-003
Th-229	4.86	4.74	5.12	8.00	8.333E-003	3.125E-003
Np-237	4.78	4.77	4.81	4.00	4.167E-003	2.329E-003
Po-209	4.92	4.90	4.93	2.00	2.083E-003	1.804E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	12.00	1.250E-002	3.756E-003
Th-228	5.45	5.19	5.51	15.00	1.563E-002	4.167E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	14.00	1.458E-002	4.034E-003
Am-241	5.48	5.30	5.60	15.00	1.563E-002	4.167E-003
Cm-245	5.42	5.40	5.45	4.00	4.167E-003	2.329E-003
Pu-236	5.76	5.61	5.89	33.00	3.437E-002	6.074E-003
Cm-244	5.78	5.64	5.90	27.00	2.813E-002	5.512E-003
Th-227	6.07	5.93	6.18	52.00	5.417E-002	7.583E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:26:39AM 6/19/2014

Sample

Sample Name: ICB;AV11
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

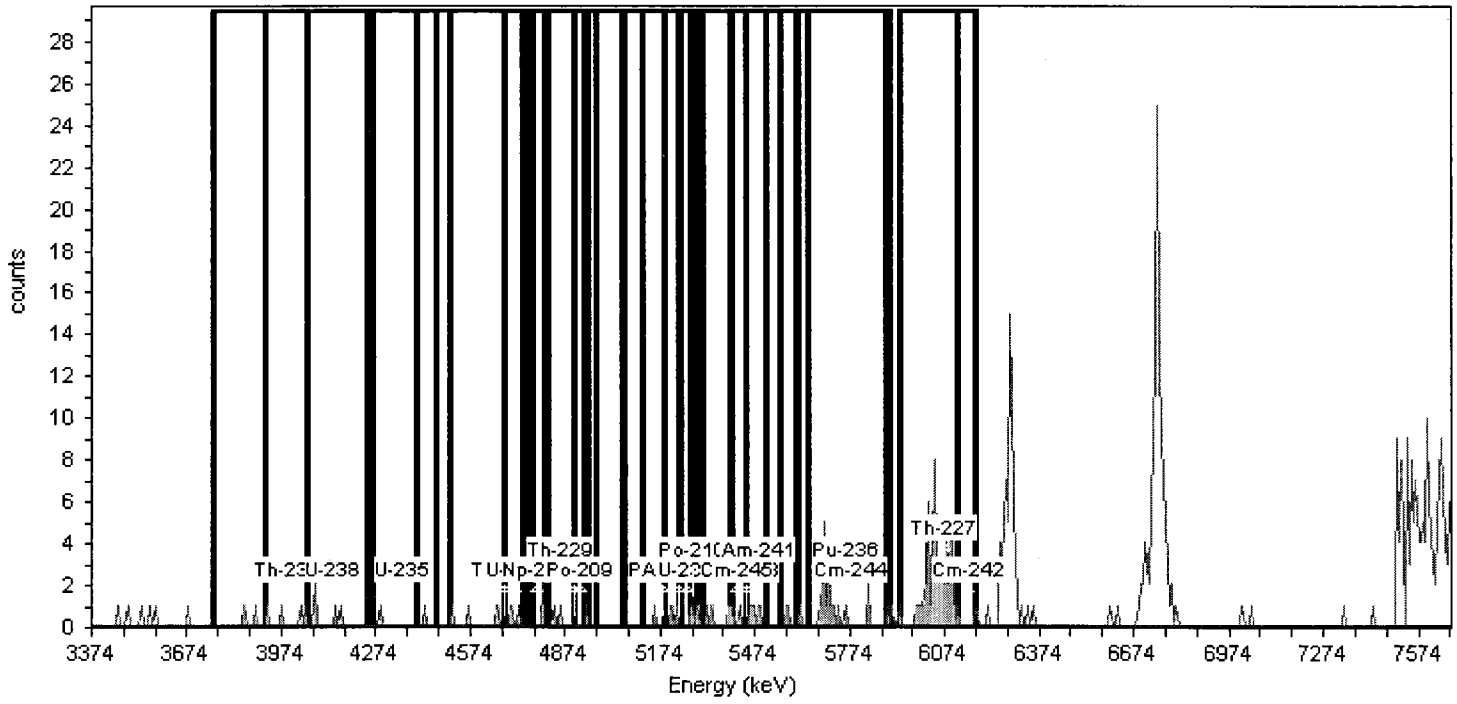
Analyst: 60040

Acquisition

Detector: AV11 , SN: 49-155dd2
Acquisition Start Date: 6/18/2014 7:08:27PM
Live Time: 960.00 min.
Real Time: 970.50 min.
Calibration Name: IC-9795;AV11-20140505
Calibration Date: 5/6/2014 5:39:16PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.88% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 403.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	6.00	6.250E-003	2.756E-003
U-238	4.14	3.92	4.24	8.00	8.333E-003	3.125E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	7.00	7.292E-003	2.946E-003
Pu-242	4.90	4.68	4.95	7.00	7.292E-003	2.946E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	2.00	2.083E-003	1.804E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	6.00	6.250E-003	2.756E-003
U-232	5.25	5.06	5.40	11.00	1.146E-002	3.608E-003
Th-228	5.45	5.19	5.51	15.00	1.563E-002	4.167E-003
Po-210	5.28	5.23	5.29	3.00	3.125E-003	2.083E-003
Pu-238	5.47	5.27	5.55	13.00	1.354E-002	3.898E-003
Am-241	5.48	5.30	5.60	12.00	1.250E-002	3.756E-003
Cm-245	5.42	5.40	5.45	3.00	3.125E-003	2.083E-003
Pu-236	5.76	5.61	5.89	19.00	1.979E-002	4.658E-003
Cm-244	5.78	5.64	5.90	19.00	1.979E-002	4.658E-003
Th-227	6.07	5.93	6.18	52.00	5.417E-002	7.583E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:26:50AM 6/19/2014

Sample

Sample Name: ICB;AV13
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

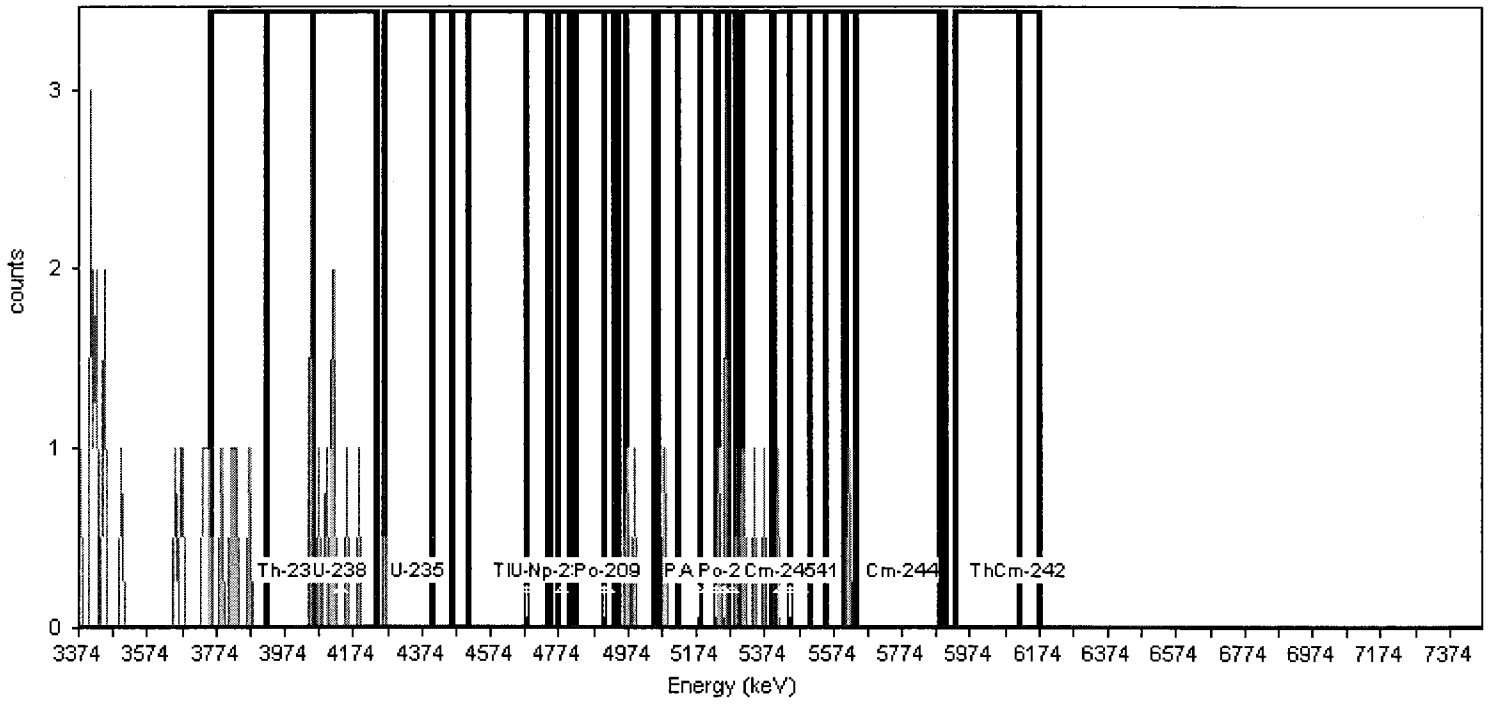
Analyst: 60040

Acquisition

Detector: AV13 , SN: 49-155M7
Acquisition Start Date: 6/18/2014 7:08:30PM
Live Time: 960.00 min.
Real Time: 970.52 min.
Calibration Name: IC-9884;AV13-20140505
Calibration Date: 5/6/2014 5:39:28PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.99% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 47.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	9.00	9.375E-003	3.294E-003
U-238	4.14	3.92	4.24	10.00	1.042E-002	3.455E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	0.00	0.000E+000	1.473E-003
U-234	4.71	4.51	4.82	0.00	0.000E+000	1.473E-003
Pu-242	4.90	4.68	4.95	0.00	0.000E+000	1.473E-003
Th-229	4.86	4.74	5.12	3.00	3.125E-003	2.083E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	7.00	7.292E-003	2.946E-003
U-232	5.25	5.06	5.40	10.00	1.042E-002	3.455E-003
Th-228	5.45	5.19	5.51	10.00	1.042E-002	3.455E-003
Po-210	5.28	5.23	5.29	5.00	5.208E-003	2.552E-003
Pu-238	5.47	5.27	5.55	6.00	6.250E-003	2.756E-003
Am-241	5.48	5.30	5.60	5.00	5.208E-003	2.552E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	1.00	1.042E-003	1.473E-003
Cm-244	5.78	5.64	5.90	0.00	0.000E+000	1.473E-003
Th-227	6.07	5.93	6.18	0.00	0.000E+000	1.473E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:26:57AM 6/19/2014

Sample

Sample Name: ICB;AV14
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

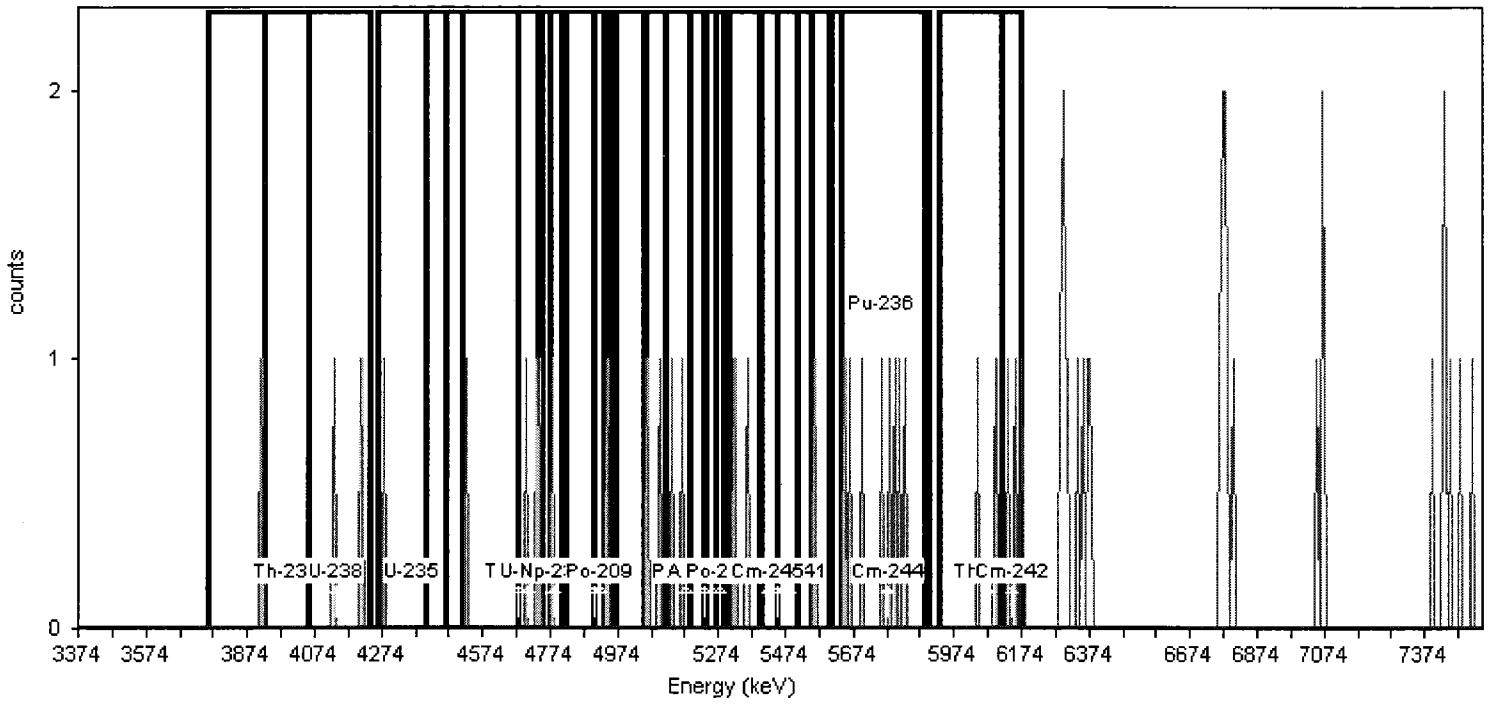
Analyst: 60040

Acquisition

Detector: AV14 , SN: 50-060W4
Acquisition Start Date: 6/18/2014 7:08:33PM
Live Time: 960.00 min.
Real Time: 970.48 min.
Calibration Name: IC-9885;AV14-20140505
Calibration Date: 5/6/2014 5:39:36PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.34% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 57.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	4.00	4.167E-003	2.329E-003
U-234	4.71	4.51	4.82	5.00	5.208E-003	2.552E-003
Pu-242	4.90	4.68	4.95	5.00	5.208E-003	2.552E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	6.00	6.250E-003	2.756E-003
Th-228	5.45	5.19	5.51	2.00	2.083E-003	1.804E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	2.00	2.083E-003	1.804E-003
Am-241	5.48	5.30	5.60	3.00	3.125E-003	2.083E-003
Cm-245	5.42	5.40	5.45	0.00	0.000E+000	1.473E-003
Pu-236	5.76	5.61	5.89	8.00	8.333E-003	3.125E-003
Cm-244	5.78	5.64	5.90	8.00	8.333E-003	3.125E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:27:02AM 6/19/2014

Sample

Sample Name: ICB;AV15
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

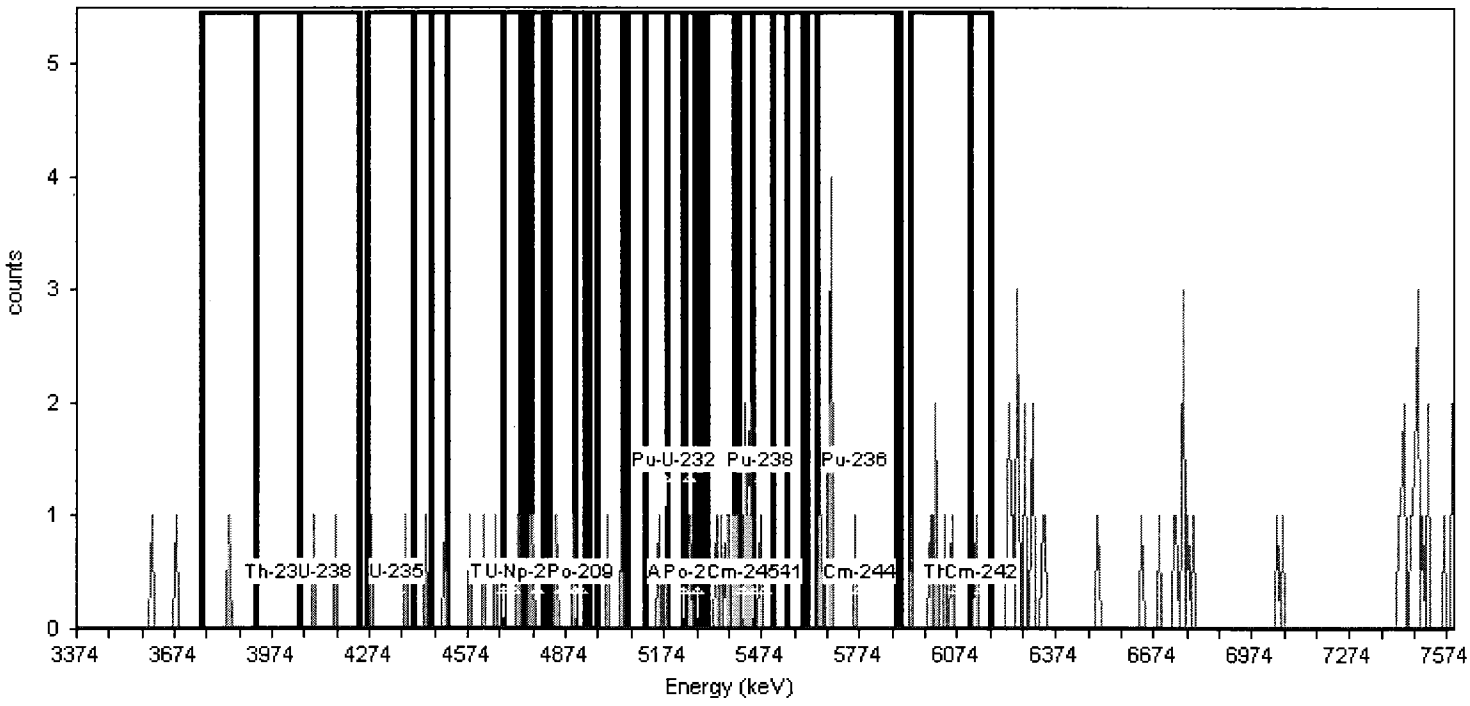
Analyst: 60040

Acquisition

Detector: AV15 , SN: 41-172C5
Acquisition Start Date: 6/18/2014 7:08:35PM
Live Time: 960.00 min.
Real Time: 970.52 min.
Calibration Name: IC-9886;AV15-20140505
Calibration Date: 5/6/2014 5:39:42PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.62% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 96.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.68	4.40	4.75	7.00	7.292E-003	2.946E-003
U-234	4.71	4.51	4.82	7.00	7.292E-003	2.946E-003
Pu-242	4.90	4.68	4.95	6.00	6.250E-003	2.756E-003
Th-229	4.86	4.74	5.12	6.00	6.250E-003	2.756E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	10.00	1.042E-002	3.455E-003
Th-228	5.45	5.19	5.51	14.00	1.458E-002	4.034E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	13.00	1.354E-002	3.898E-003
Am-241	5.48	5.30	5.60	13.00	1.354E-002	3.898E-003
Cm-245	5.42	5.40	5.45	7.00	7.292E-003	2.946E-003
Pu-236	5.76	5.61	5.89	9.00	9.375E-003	3.294E-003
Cm-244	5.78	5.64	5.90	9.00	9.375E-003	3.294E-003
Th-227	6.07	5.93	6.18	8.00	8.333E-003	3.125E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:27:08AM 6/19/2014

Sample

Sample Name: ICB;AV16
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

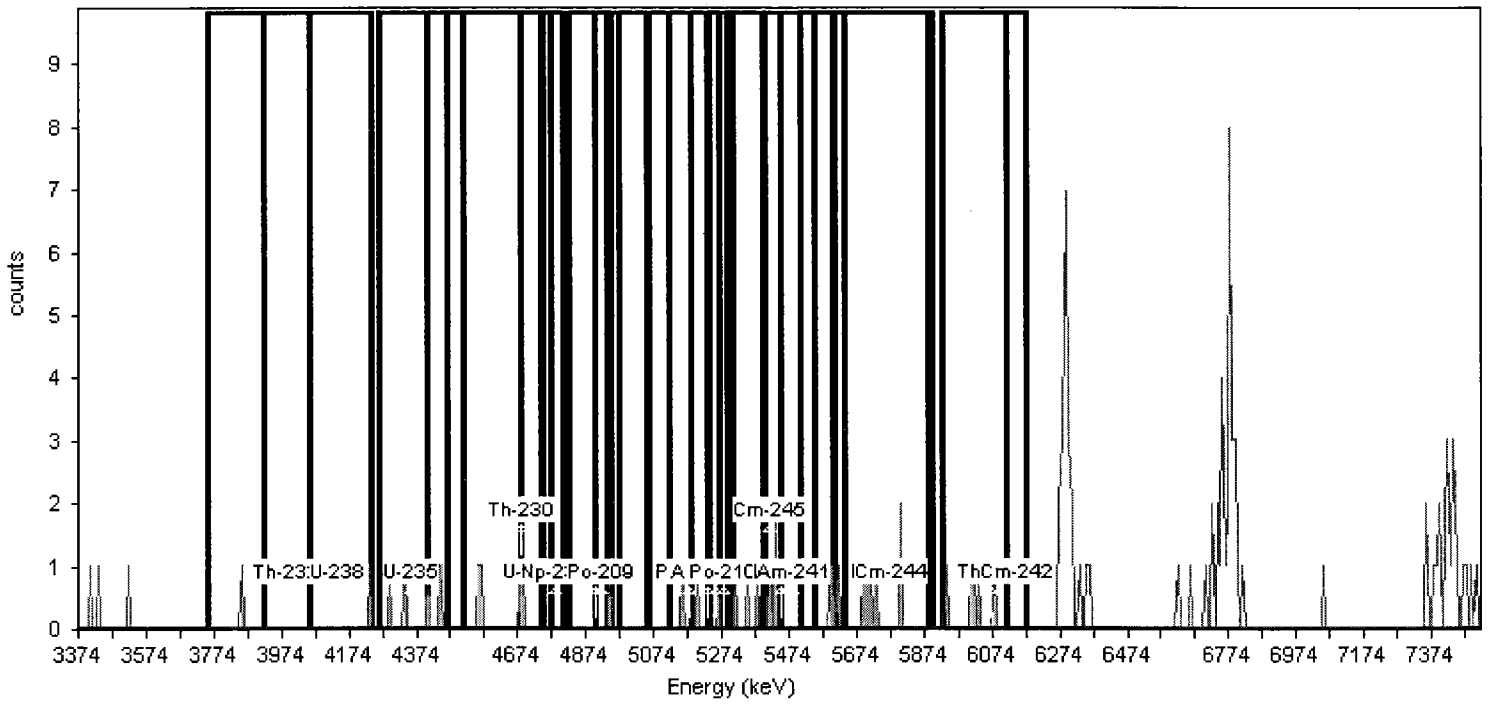
Analyst: 60040

Acquisition

Detector: AV16 , SN: 51-082B6
Acquisition Start Date: 6/18/2014 7:08:37PM
Live Time: 960.00 min.
Real Time: 970.48 min.
Calibration Name: IC-7107;AV16-20140505
Calibration Date: 5/5/2014 10:08:41PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.11% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 116.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	4.00	4.167E-003	2.329E-003
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	4.00	4.167E-003	2.329E-003
Pu-242	4.90	4.68	4.95	3.00	3.125E-003	2.083E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	6.00	6.250E-003	2.756E-003
Th-228	5.45	5.19	5.51	8.00	8.333E-003	3.125E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	6.00	6.250E-003	2.756E-003
Am-241	5.48	5.30	5.60	8.00	8.333E-003	3.125E-003
Cm-245	5.42	5.40	5.45	3.00	3.125E-003	2.083E-003
Pu-236	5.76	5.61	5.89	8.00	8.333E-003	3.125E-003
Cm-244	5.78	5.64	5.90	7.00	7.292E-003	2.946E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:13:46AM 6/19/2014

Sample

Sample Name: ICB;AV17
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

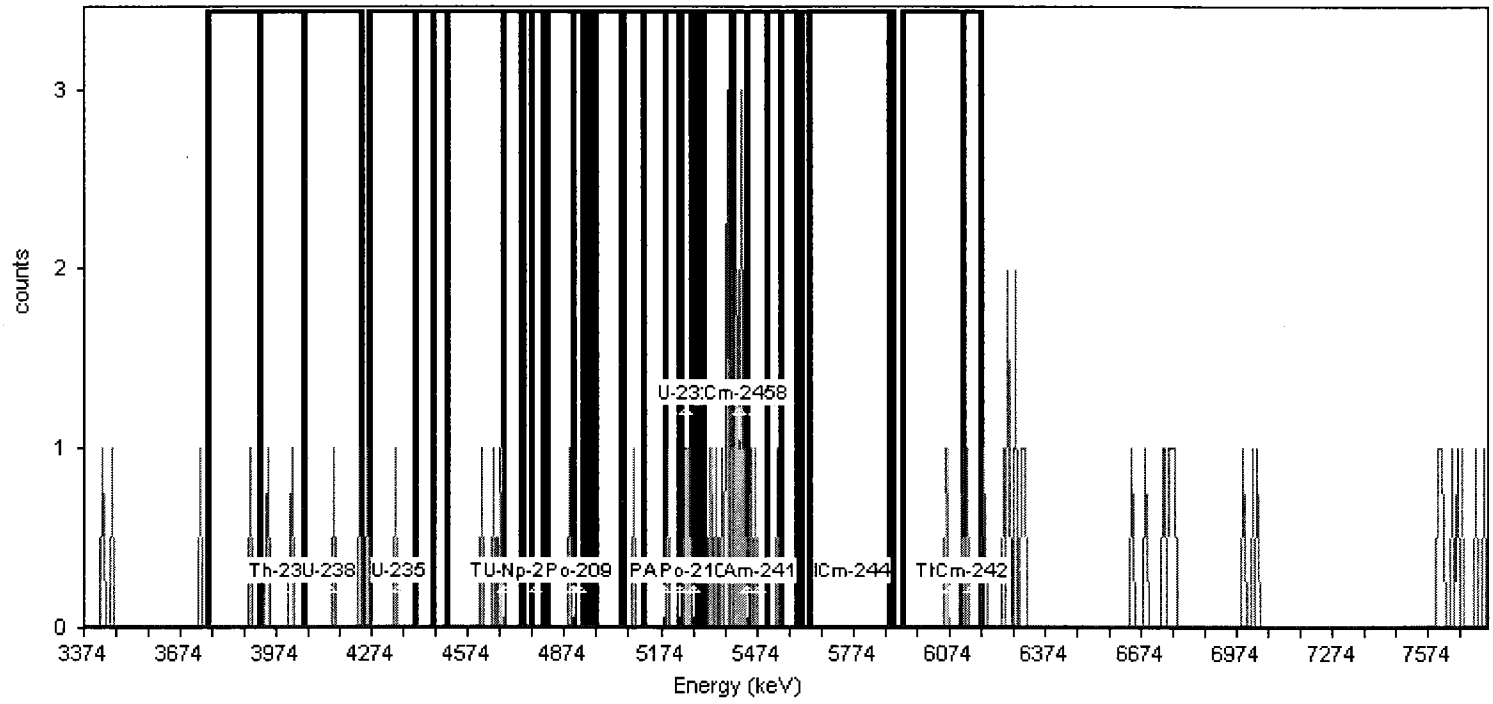
Analyst: 60040

Acquisition

Detector: AV17 , SN: 50-051C4
Acquisition Start Date: 6/18/2014 7:08:39PM
Live Time: 960.00 min.
Real Time: 960.05 min.
Calibration Name: IC-8874;AV17-20140505
Calibration Date: 5/5/2014 10:08:49PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.07% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 66.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	3.00	3.125E-003	2.083E-003
U-238	4.14	3.92	4.24	4.00	4.167E-003	2.329E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	3.00	3.125E-003	2.083E-003
U-234	4.71	4.51	4.82	3.00	3.125E-003	2.083E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	12.00	1.250E-002	3.756E-003
Th-228	5.45	5.19	5.51	21.00	2.187E-002	4.886E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	19.00	1.979E-002	4.658E-003
Am-241	5.48	5.30	5.60	19.00	1.979E-002	4.658E-003
Cm-245	5.42	5.40	5.45	10.00	1.042E-002	3.455E-003
Pu-236	5.76	5.61	5.89	0.00	0.000E+000	1.473E-003
Cm-244	5.78	5.64	5.90	0.00	0.000E+000	1.473E-003
Th-227	6.07	5.93	6.18	3.00	3.125E-003	2.083E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:13:52AM 6/19/2014

Sample

Sample Name: ICB;AV18
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

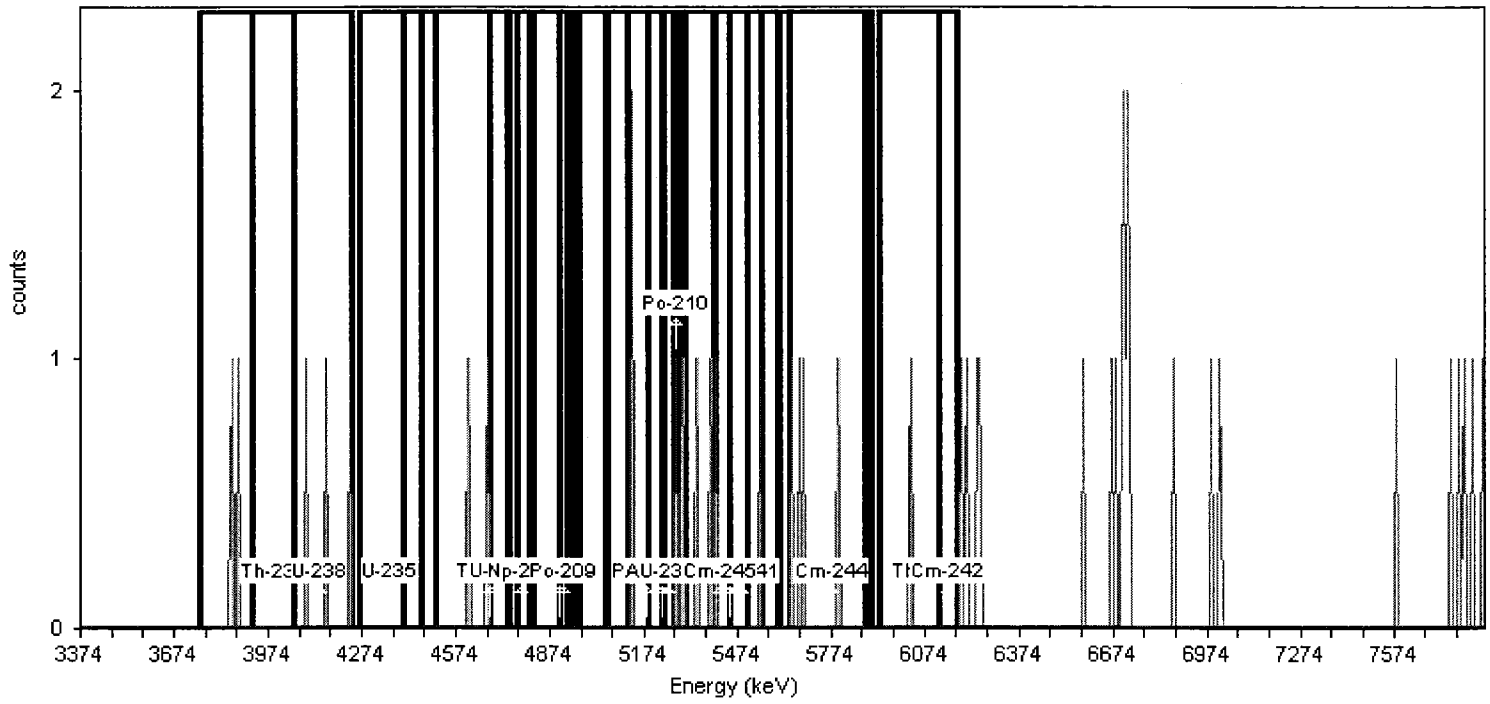
Analyst: 60040

Acquisition

Detector: AV18 , SN: 51-082C5
Acquisition Start Date: 6/18/2014 7:08:41PM
Live Time: 960.00 min.
Real Time: 960.05 min.
Calibration Name: IC-8875;AV18-20140505
Calibration Date: 5/5/2014 10:09:08PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.46% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 42.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	2.00	2.083E-003	1.804E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	0.00	0.000E+000	1.473E-003
Th-229	4.86	4.74	5.12	0.00	0.000E+000	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	7.00	7.292E-003	2.946E-003
Th-228	5.45	5.19	5.51	5.00	5.208E-003	2.552E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	6.00	6.250E-003	2.756E-003
Am-241	5.48	5.30	5.60	5.00	5.208E-003	2.552E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	4.00	4.167E-003	2.329E-003
Cm-244	5.78	5.64	5.90	4.00	4.167E-003	2.329E-003
Th-227	6.07	5.93	6.18	1.00	1.042E-003	1.473E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:13:58AM 6/19/2014

Sample

Sample Name: ICB;AV19
Spectrum #1 Analysis #1
Comment:

Batch

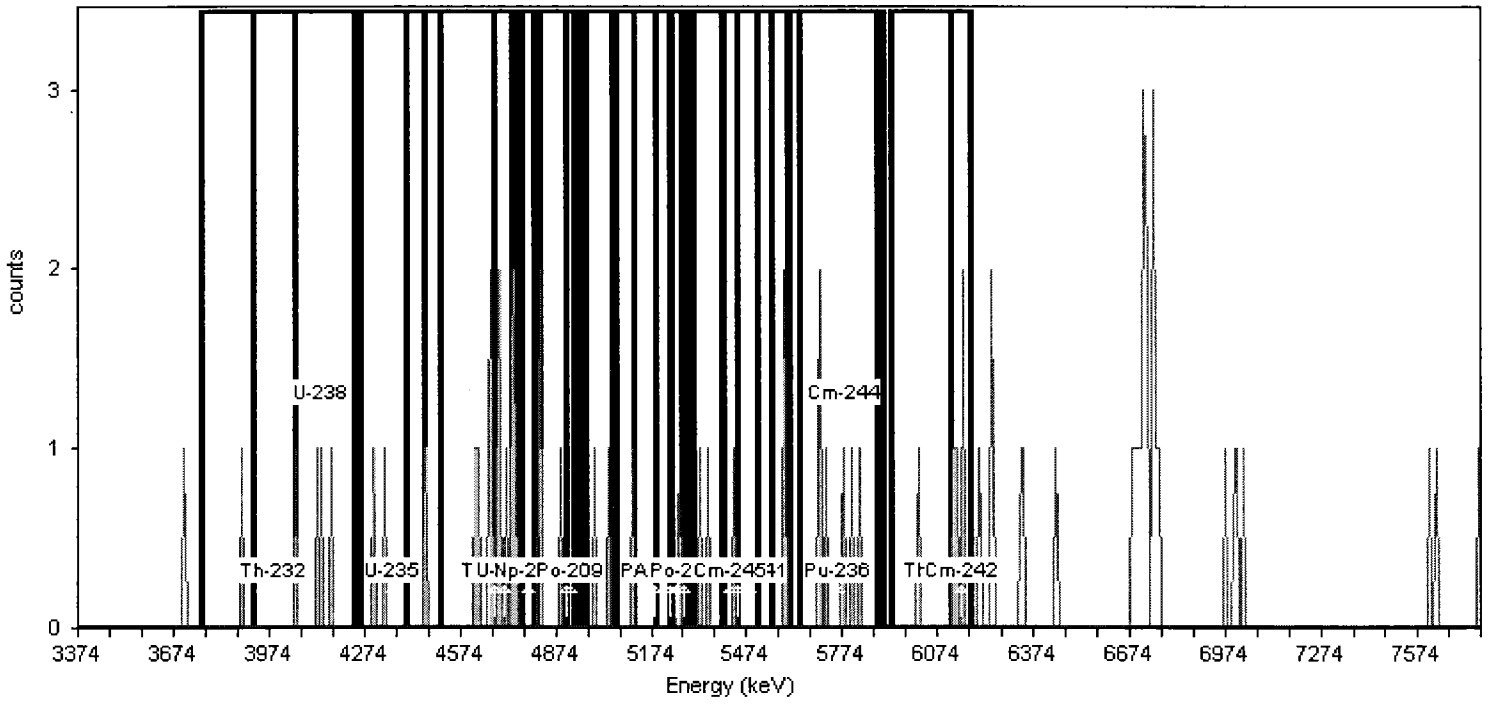
Batch Name: June2014
Analyst: 60040
Description:

Acquisition

Detector: AV19 , SN: 50-025FF5
Acquisition Start Date: 6/18/2014 7:08:42PM
Live Time: 960.00 min.
Real Time: 960.05 min.
Calibration Name: IC-8876;AV19-20140505
Calibration Date: 5/5/2014 10:09:02PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.34% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 73.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	4.00	4.167E-003	2.329E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.68	4.40	4.75	12.00	1.250E-002	3.756E-003
U-234	4.71	4.51	4.82	13.00	1.354E-002	3.898E-003
Pu-242	4.90	4.68	4.95	9.00	9.375E-003	3.294E-003
Th-229	4.86	4.74	5.12	9.00	9.375E-003	3.294E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	4.00	4.167E-003	2.329E-003
Th-228	5.45	5.19	5.51	4.00	4.167E-003	2.329E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	3.00	3.125E-003	2.083E-003
Am-241	5.48	5.30	5.60	6.00	6.250E-003	2.756E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	6.00	6.250E-003	2.756E-003
Cm-244	5.78	5.64	5.90	6.00	6.250E-003	2.756E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	4.00	4.167E-003	2.329E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:14:04AM 6/19/2014

Sample

Sample Name: ICB;AV20
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

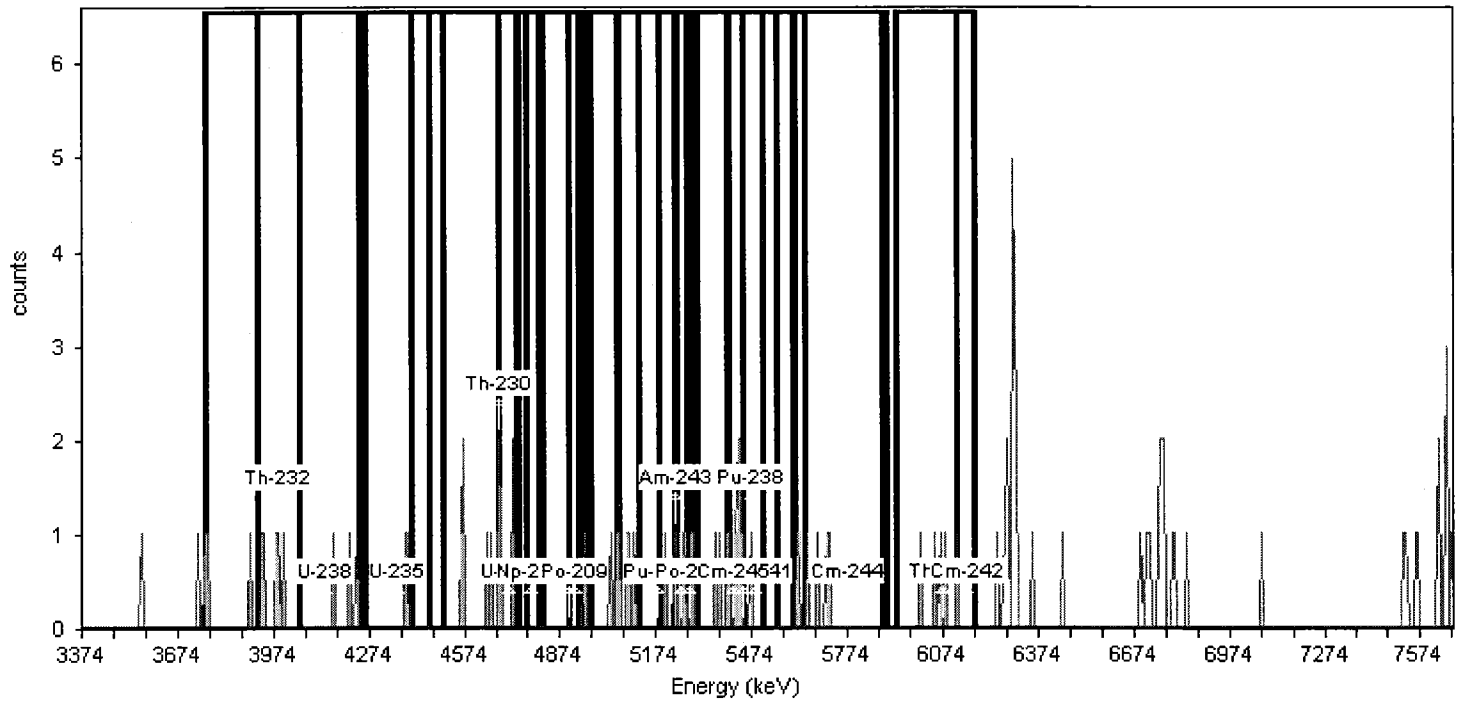
Analyst: 60040

Acquisition

Detector: AV20 , SN: 48-121A7
Acquisition Start Date: 6/18/2014 7:08:45PM
Live Time: 960.00 min.
Real Time: 960.05 min.
Calibration Name: IC-8877;AV20-20140505
Calibration Date: 5/5/2014 10:09:21PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.56% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 97.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	8.00	8.333E-003	3.125E-003
U-238	4.14	3.92	4.24	8.00	8.333E-003	3.125E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	10.00	1.042E-002	3.455E-003
U-234	4.71	4.51	4.82	10.00	1.042E-002	3.455E-003
Pu-242	4.90	4.68	4.95	6.00	6.250E-003	2.756E-003
Th-229	4.86	4.74	5.12	7.00	7.292E-003	2.946E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	8.00	8.333E-003	3.125E-003
Am-243	5.23	5.05	5.31	11.00	1.146E-002	3.608E-003
U-232	5.25	5.06	5.40	14.00	1.458E-002	4.034E-003
Th-228	5.45	5.19	5.51	16.00	1.667E-002	4.295E-003
Po-210	5.28	5.23	5.29	5.00	5.208E-003	2.552E-003
Pu-238	5.47	5.27	5.55	12.00	1.250E-002	3.756E-003
Am-241	5.48	5.30	5.60	10.00	1.042E-002	3.455E-003
Cm-245	5.42	5.40	5.45	7.00	7.292E-003	2.946E-003
Pu-236	5.76	5.61	5.89	5.00	5.208E-003	2.552E-003
Cm-244	5.78	5.64	5.90	4.00	4.167E-003	2.329E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:14:16AM 6/19/2014

Sample

Sample Name: ICB;AV21
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

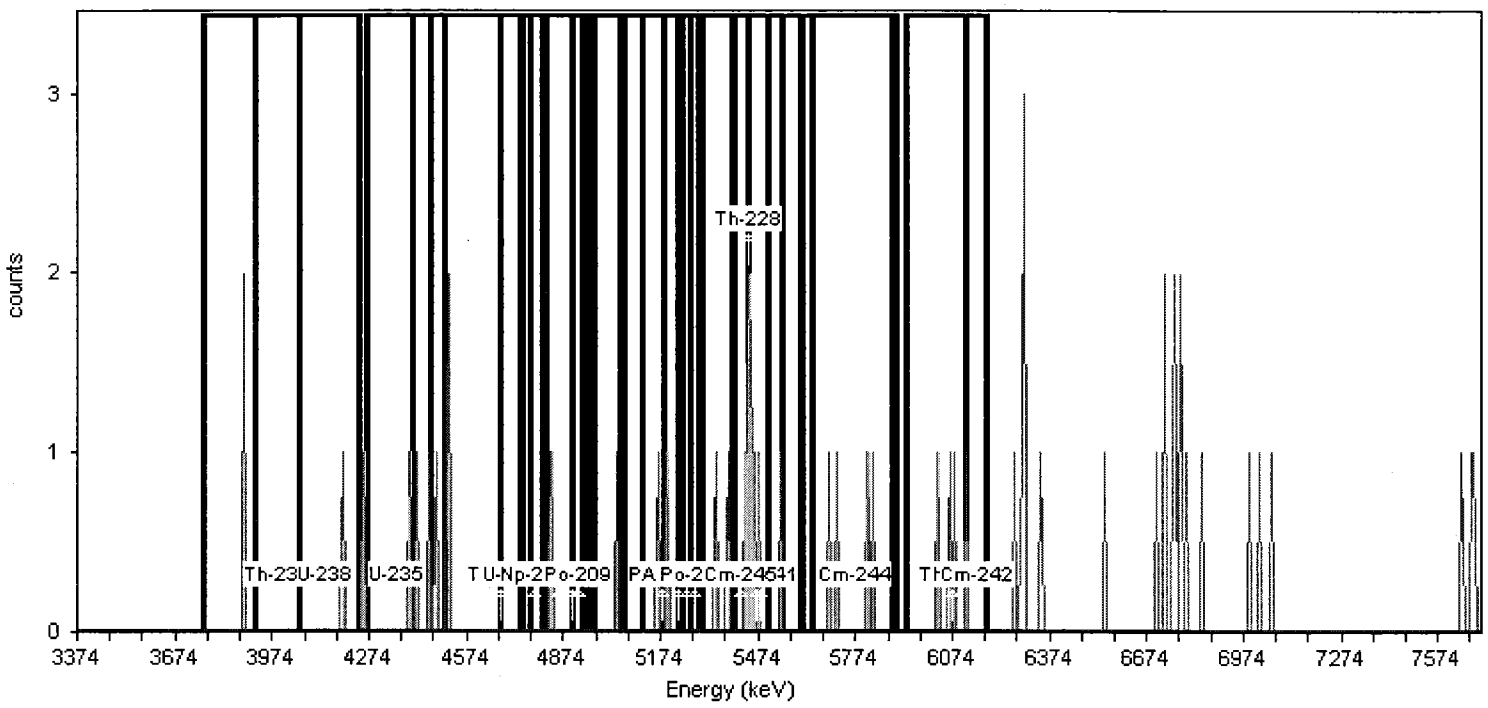
Analyst: 60040

Acquisition

Detector: AV21 , SN: 48-102BB6
Acquisition Start Date: 6/18/2014 7:08:46PM
Live Time: 960.00 min.
Real Time: 960.05 min.
Calibration Name: IC-9520;AV21-20140505
Calibration Date: 5/5/2014 10:09:29PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.45% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 55.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.68	4.40	4.75	5.00	5.208E-003	2.552E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	4.00	4.167E-003	2.329E-003
Th-228	5.45	5.19	5.51	10.00	1.042E-002	3.455E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	10.00	1.042E-002	3.455E-003
Am-241	5.48	5.30	5.60	10.00	1.042E-002	3.455E-003
Cm-245	5.42	5.40	5.45	4.00	4.167E-003	2.329E-003
Pu-236	5.76	5.61	5.89	4.00	4.167E-003	2.329E-003
Cm-244	5.78	5.64	5.90	4.00	4.167E-003	2.329E-003
Th-227	6.07	5.93	6.18	4.00	4.167E-003	2.329E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:14:22AM 6/19/2014

Sample

Sample Name: ICB;AV23
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

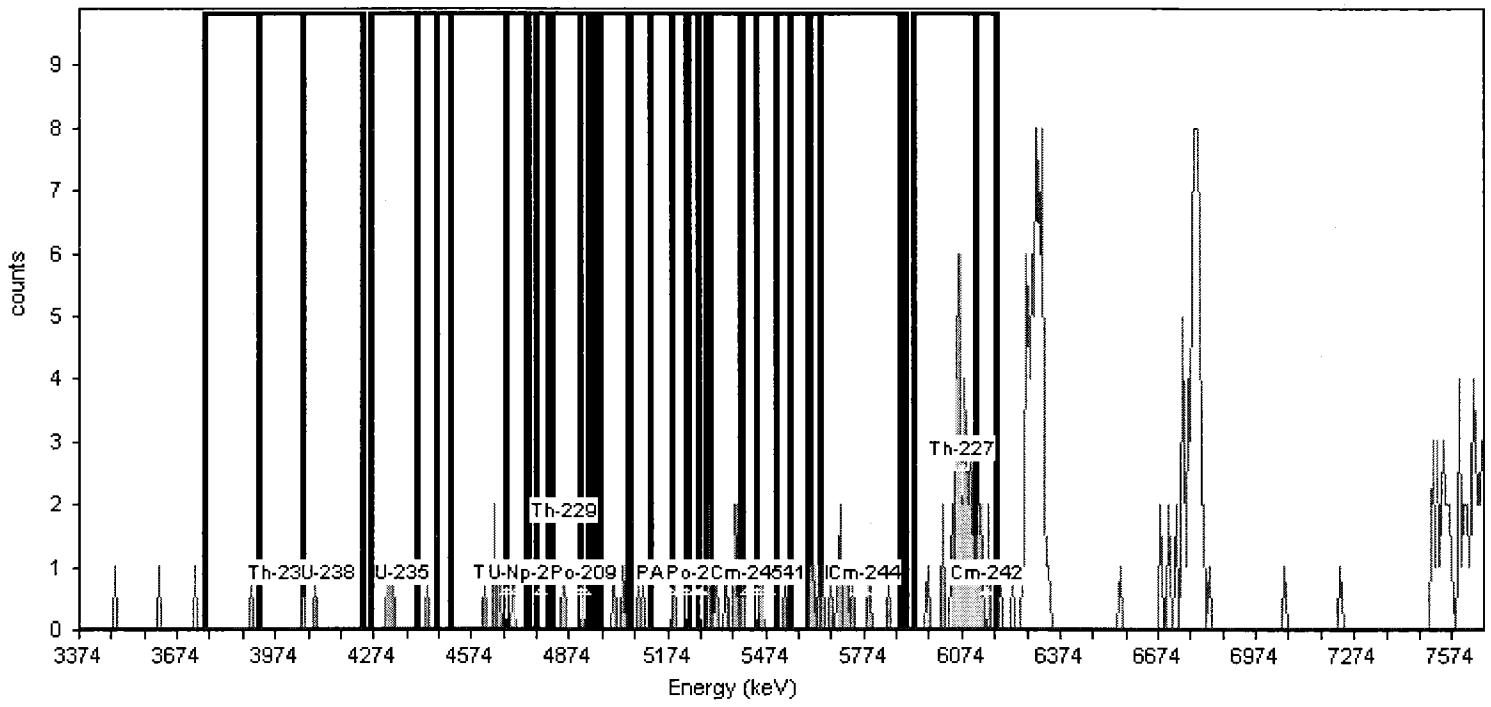
Analyst: 60040

Acquisition

Detector: AV23 , SN: 48-158FF3
Acquisition Start Date: 6/18/2014 7:08:49PM
Live Time: 960.00 min.
Real Time: 960.05 min.
Calibration Name: IC-9792;AV23-20140505
Calibration Date: 5/5/2014 10:09:35PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.91% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 234.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	4.00	4.167E-003	2.329E-003
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	5.00	5.208E-003	2.552E-003
Pu-242	4.90	4.68	4.95	4.00	4.167E-003	2.329E-003
Th-229	4.86	4.74	5.12	7.00	7.292E-003	2.946E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	5.00	5.208E-003	2.552E-003
Am-243	5.23	5.05	5.31	5.00	5.208E-003	2.552E-003
U-232	5.25	5.06	5.40	10.00	1.042E-002	3.455E-003
Th-228	5.45	5.19	5.51	10.00	1.042E-002	3.455E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	10.00	1.042E-002	3.455E-003
Am-241	5.48	5.30	5.60	10.00	1.042E-002	3.455E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	13.00	1.354E-002	3.898E-003
Cm-244	5.78	5.64	5.90	10.00	1.042E-002	3.455E-003
Th-227	6.07	5.93	6.18	38.00	3.958E-002	6.505E-003
Cm-242	6.15	6.12	6.18	7.00	7.292E-003	2.946E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:14:27AM 6/19/2014

Sample

Sample Name: ICB;AV24
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

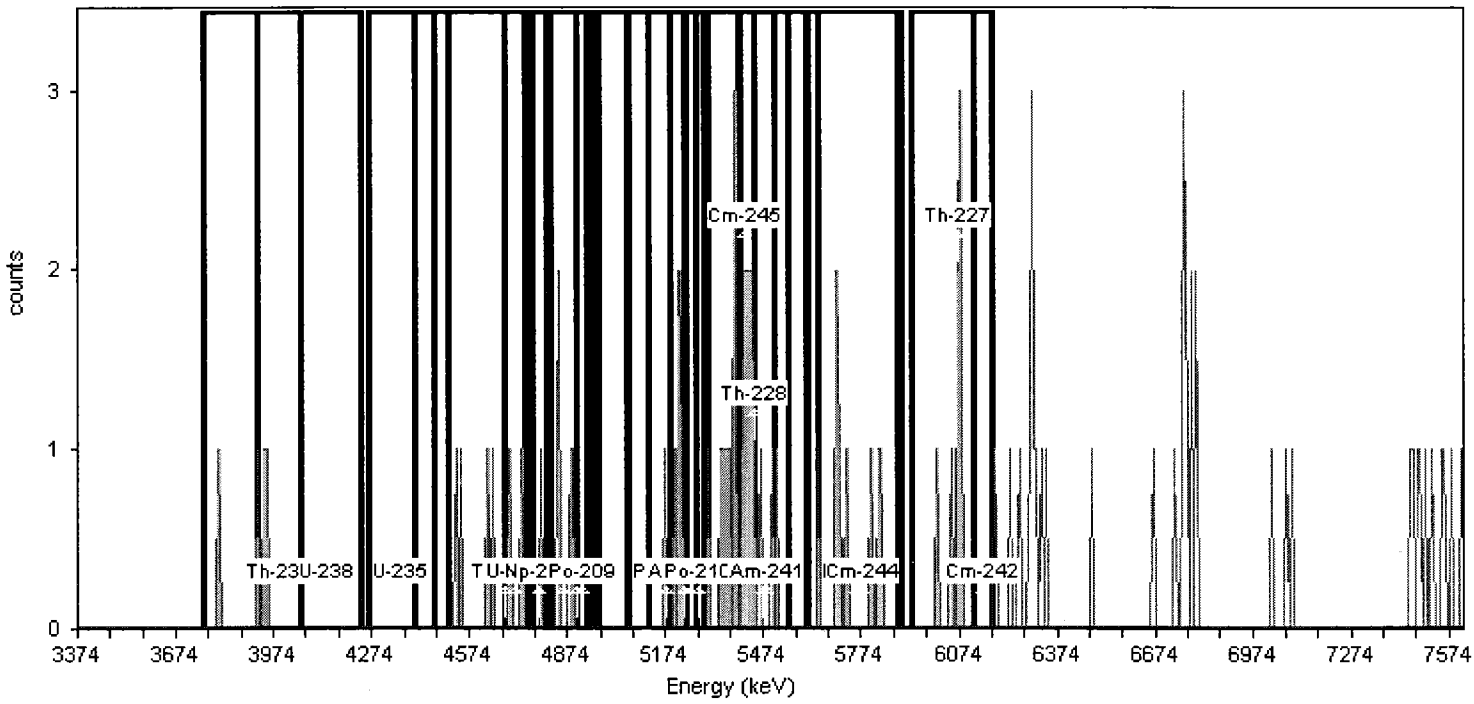
Analyst: 60040

Acquisition

Detector: AV24 , SN: 47-137Q4
Acquisition Start Date: 6/18/2014 7:08:51PM
Live Time: 960.00 min.
Real Time: 960.05 min.
Calibration Name: IC-9793;AV24-20140505
Calibration Date: 5/5/2014 10:09:41PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.42% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 93.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	4.00	4.167E-003	2.329E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	7.00	7.292E-003	2.946E-003
Pu-242	4.90	4.68	4.95	7.00	7.292E-003	2.946E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	5.00	5.208E-003	2.552E-003
Am-243	5.23	5.05	5.31	6.00	6.250E-003	2.756E-003
U-232	5.25	5.06	5.40	14.00	1.458E-002	4.034E-003
Th-228	5.45	5.19	5.51	25.00	2.604E-002	5.311E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	22.00	2.292E-002	4.996E-003
Am-241	5.48	5.30	5.60	22.00	2.292E-002	4.996E-003
Cm-245	5.42	5.40	5.45	10.00	1.042E-002	3.455E-003
Pu-236	5.76	5.61	5.89	8.00	8.333E-003	3.125E-003
Cm-244	5.78	5.64	5.90	8.00	8.333E-003	3.125E-003
Th-227	6.07	5.93	6.18	7.00	7.292E-003	2.946E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:35:57PM 6/19/2014

Sample

Sample Name: ICB;AV43
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

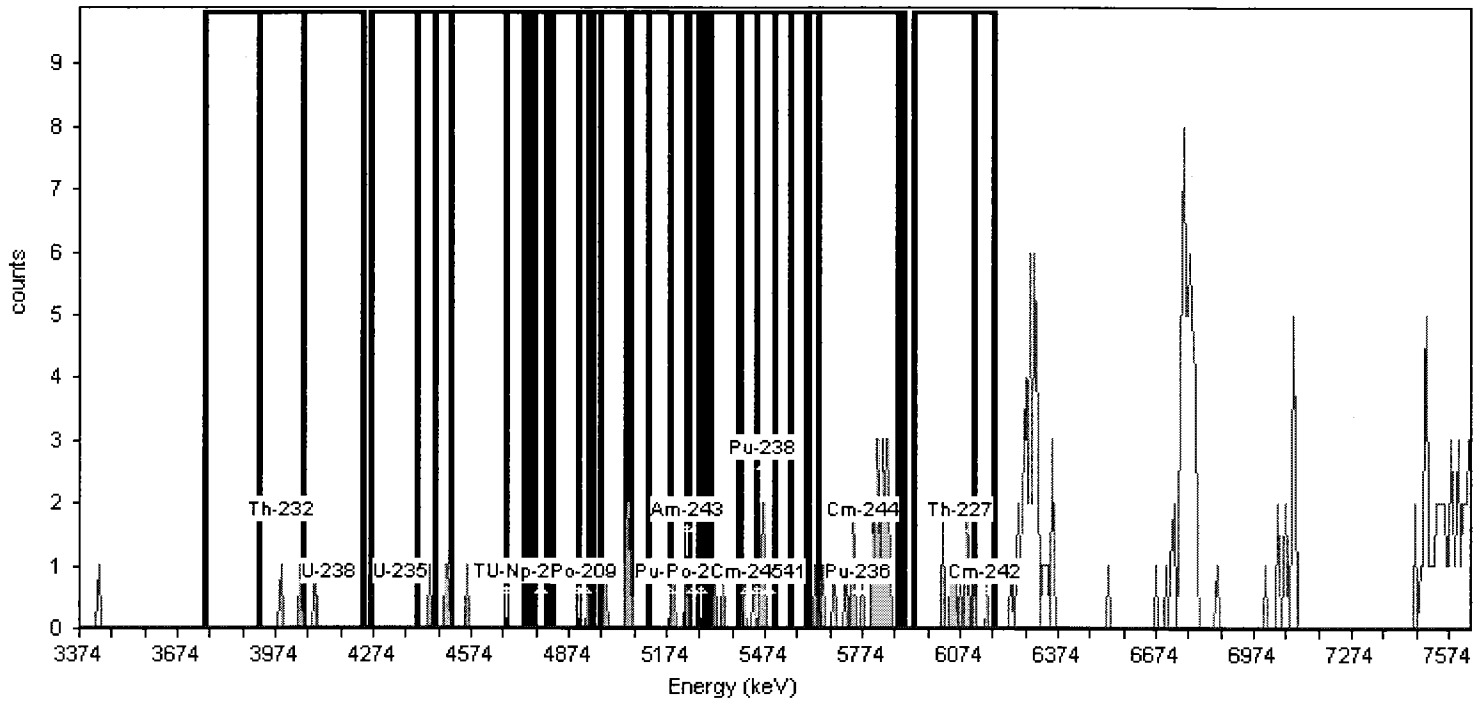
Analyst: 60040

Acquisition

Detector: AV43 , SN: 49-190X4
Acquisition Start Date: 6/19/2014 12:17:24AM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9794;AV43-20140505
Calibration Date: 5/5/2014 10:09:47PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.74% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 195.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	4.00	4.167E-003	2.329E-003
U-234	4.71	4.51	4.82	1.00	1.042E-003	1.473E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	6.00	6.250E-003	2.756E-003
Am-243	5.23	5.05	5.31	5.00	5.208E-003	2.552E-003
U-232	5.25	5.06	5.40	5.00	5.208E-003	2.552E-003
Th-228	5.45	5.19	5.51	9.00	9.375E-003	3.294E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	7.00	7.292E-003	2.946E-003
Am-241	5.48	5.30	5.60	7.00	7.292E-003	2.946E-003
Cm-245	5.42	5.40	5.45	2.00	2.083E-003	1.804E-003
Pu-236	5.76	5.61	5.89	23.00	2.396E-002	5.103E-003
Cm-244	5.78	5.64	5.90	22.00	2.292E-002	4.996E-003
Th-227	6.07	5.93	6.18	10.00	1.042E-002	3.455E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:36:08PM 6/19/2014

Sample

Sample Name: ICB;AV44
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

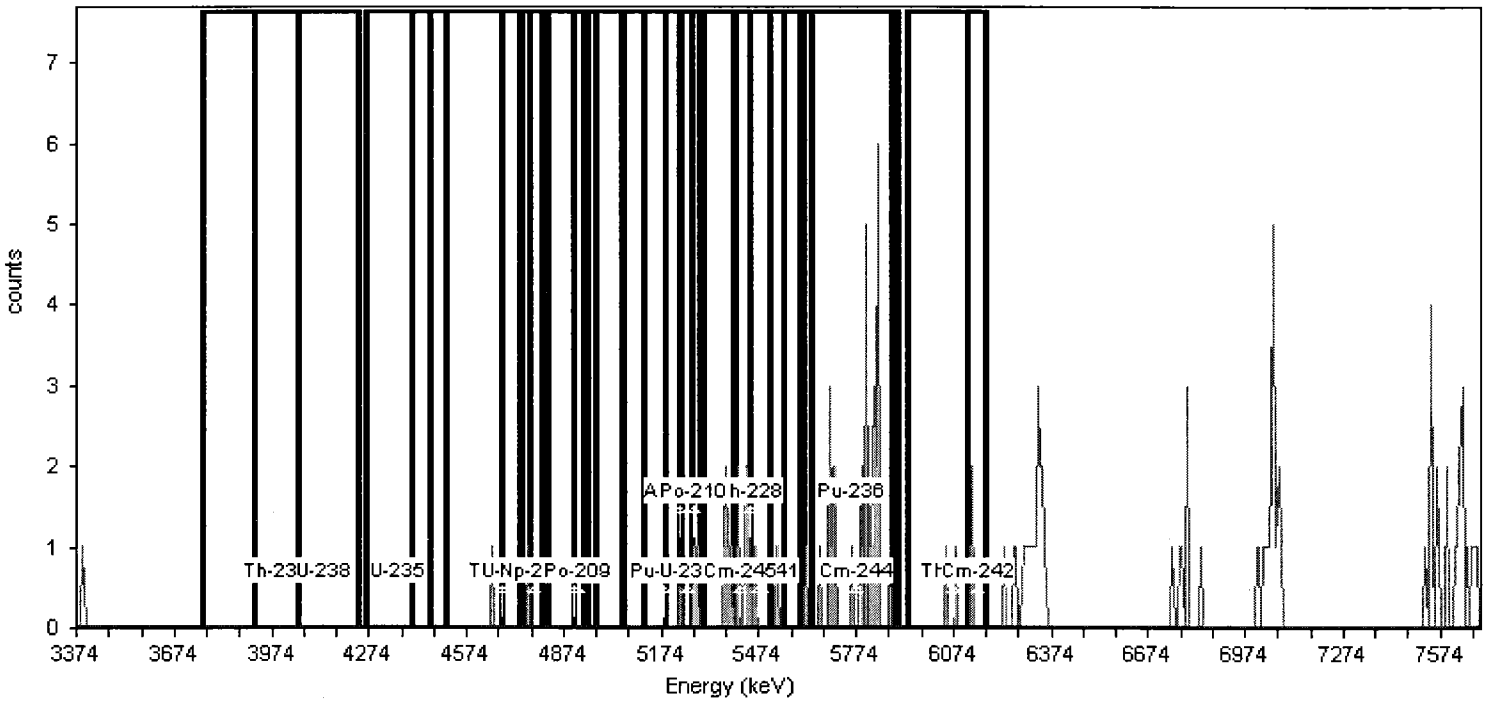
Analyst: 60040

Acquisition

Detector: AV44 , SN: 50-051JJ1
Acquisition Start Date: 6/19/2014 12:17:25AM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9795;AV44-20140505
Calibration Date: 5/5/2014 10:09:57PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.32% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 114.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	0.00	0.000E+000	1.473E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	1.00	1.042E-003	1.473E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	8.00	8.333E-003	3.125E-003
Th-228	5.45	5.19	5.51	16.00	1.667E-002	4.295E-003
Po-210	5.28	5.23	5.29	3.00	3.125E-003	2.083E-003
Pu-238	5.47	5.27	5.55	16.00	1.667E-002	4.295E-003
Am-241	5.48	5.30	5.60	14.00	1.458E-002	4.034E-003
Cm-245	5.42	5.40	5.45	7.00	7.292E-003	2.946E-003
Pu-236	5.76	5.61	5.89	29.00	3.021E-002	5.705E-003
Cm-244	5.78	5.64	5.90	28.00	2.917E-002	5.610E-003
Th-227	6.07	5.93	6.18	4.00	4.167E-003	2.329E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:36:14PM 6/19/2014

Sample

Sample Name: ICB;AV45
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

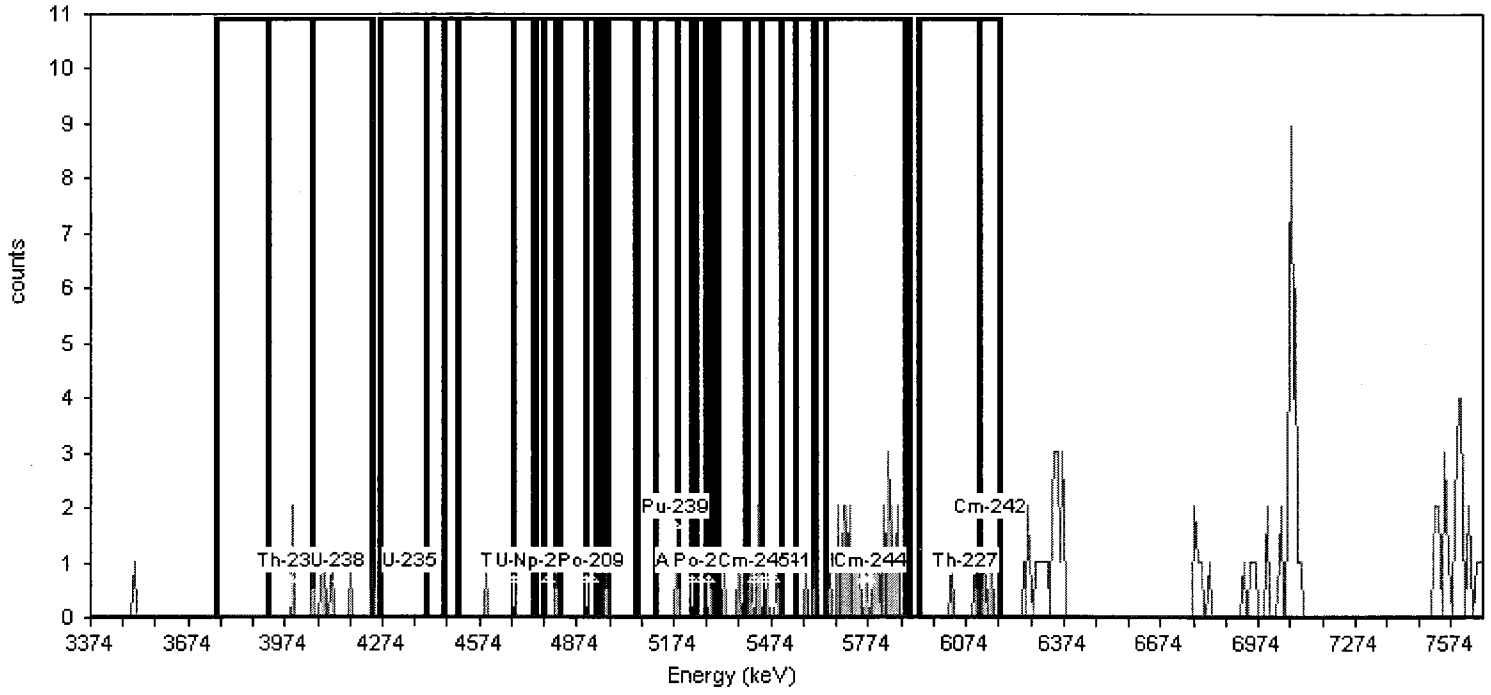
Analyst: 60040

Acquisition

Detector: AV45 , SN: 48-158FF2
Acquisition Start Date: 6/19/2014 12:17:28AM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9817;AV45-20140505
Calibration Date: 5/5/2014 10:10:03PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.06% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 153.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	3.00	3.125E-003	2.083E-003
U-238	4.14	3.92	4.24	8.00	8.333E-003	3.125E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	1.00	1.042E-003	1.473E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	5.00	5.208E-003	2.552E-003
Th-228	5.45	5.19	5.51	11.00	1.146E-002	3.608E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	10.00	1.042E-002	3.455E-003
Am-241	5.48	5.30	5.60	11.00	1.146E-002	3.608E-003
Cm-245	5.42	5.40	5.45	5.00	5.208E-003	2.552E-003
Pu-236	5.76	5.61	5.89	27.00	2.813E-002	5.512E-003
Cm-244	5.78	5.64	5.90	27.00	2.813E-002	5.512E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:36:19PM 6/19/2014

Sample

Sample Name: ICB;AV46
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

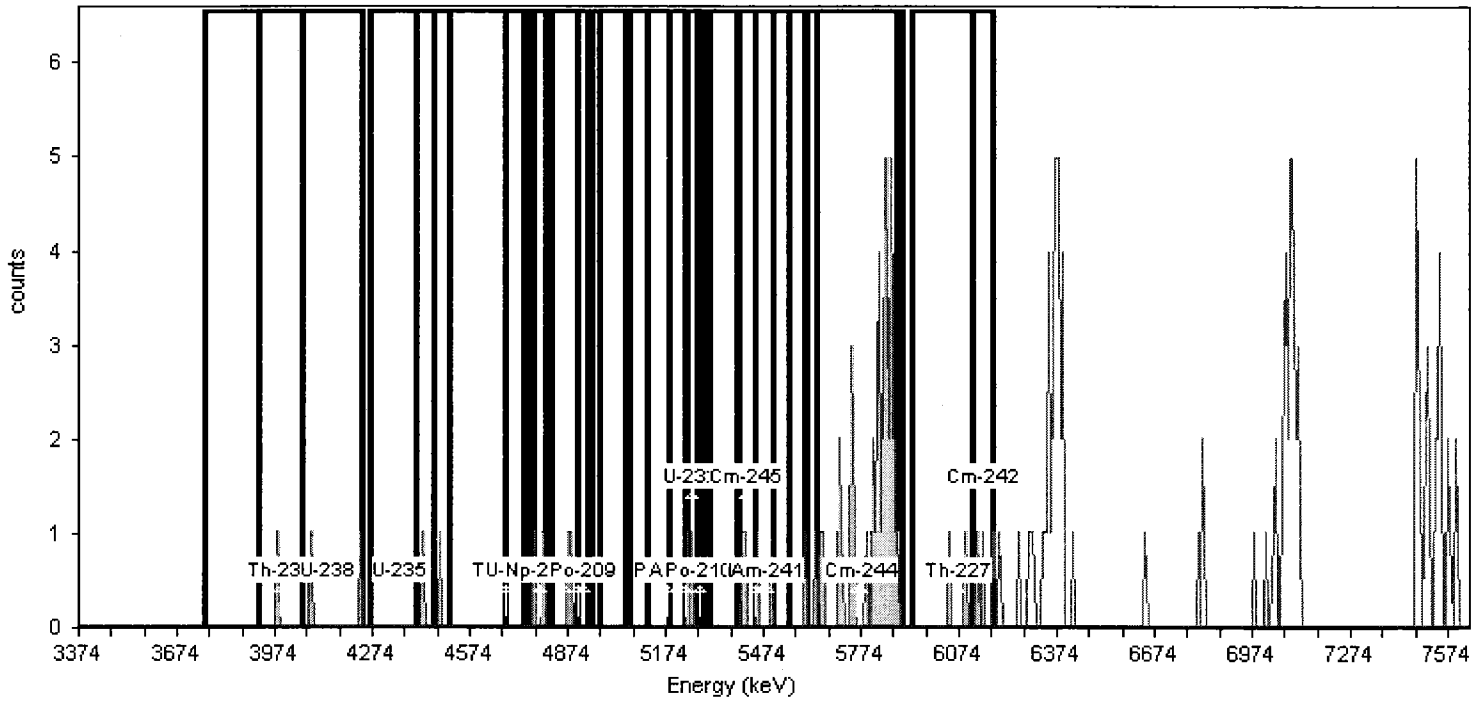
Analyst: 60040

Acquisition

Detector: AV46 , SN: 49-202GG2
Acquisition Start Date: 6/19/2014 12:17:29AM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9884;AV46-20140505
Calibration Date: 5/5/2014 10:10:09PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.80% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 154.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	2.00	2.083E-003	1.804E-003
U-234	4.71	4.51	4.82	3.00	3.125E-003	2.083E-003
Pu-242	4.90	4.68	4.95	5.00	5.208E-003	2.552E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	3.00	3.125E-003	2.083E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	2.00	2.083E-003	1.804E-003
Th-228	5.45	5.19	5.51	6.00	6.250E-003	2.756E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	4.00	4.167E-003	2.329E-003
Am-241	5.48	5.30	5.60	5.00	5.208E-003	2.552E-003
Cm-245	5.42	5.40	5.45	2.00	2.083E-003	1.804E-003
Pu-236	5.76	5.61	5.89	38.00	3.958E-002	6.505E-003
Cm-244	5.78	5.64	5.90	37.00	3.854E-002	6.421E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:33:32PM 6/19/2014

Sample

Sample Name: ICB;AV48
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

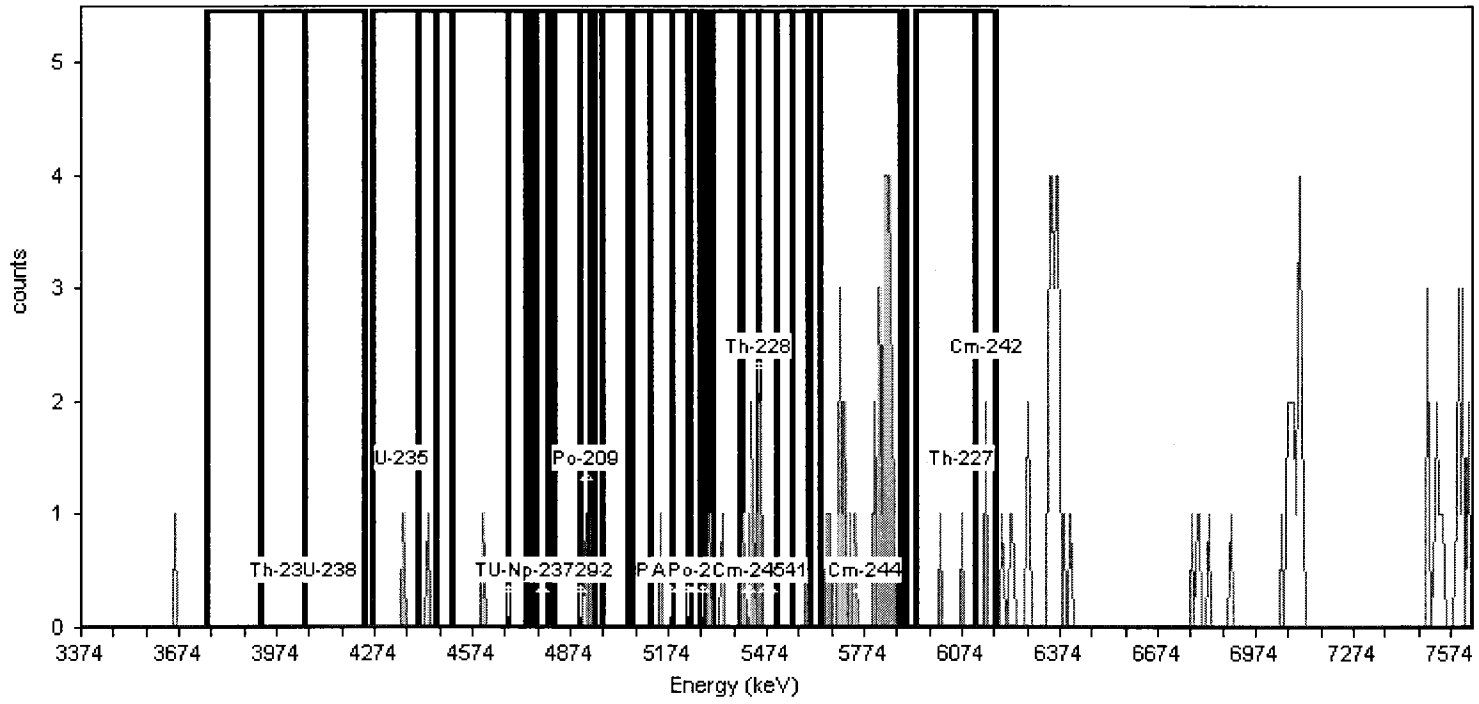
Analyst: 60040

Acquisition

Detector: AV48 , SN: 50-051JJ4
Acquisition Start Date: 6/19/2014 12:17:33AM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9886;AV48-20140505
Calibration Date: 5/5/2014 10:10:22PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.78% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 124.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	0.00	0.000E+000	1.473E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	2.00	2.083E-003	1.804E-003
U-234	4.71	4.51	4.82	1.00	1.042E-003	1.473E-003
Pu-242	4.90	4.68	4.95	2.00	2.083E-003	1.804E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	2.00	2.083E-003	1.804E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	4.00	4.167E-003	2.329E-003
Th-228	5.45	5.19	5.51	10.00	1.042E-002	3.455E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	10.00	1.042E-002	3.455E-003
Am-241	5.48	5.30	5.60	11.00	1.146E-002	3.608E-003
Cm-245	5.42	5.40	5.45	6.00	6.250E-003	2.756E-003
Pu-236	5.76	5.61	5.89	33.00	3.437E-002	6.074E-003
Cm-244	5.78	5.64	5.90	33.00	3.437E-002	6.074E-003
Th-227	6.07	5.93	6.18	4.00	4.167E-003	2.329E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:33:37PM 6/19/2014

Sample

Sample Name: ICB;AV49
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

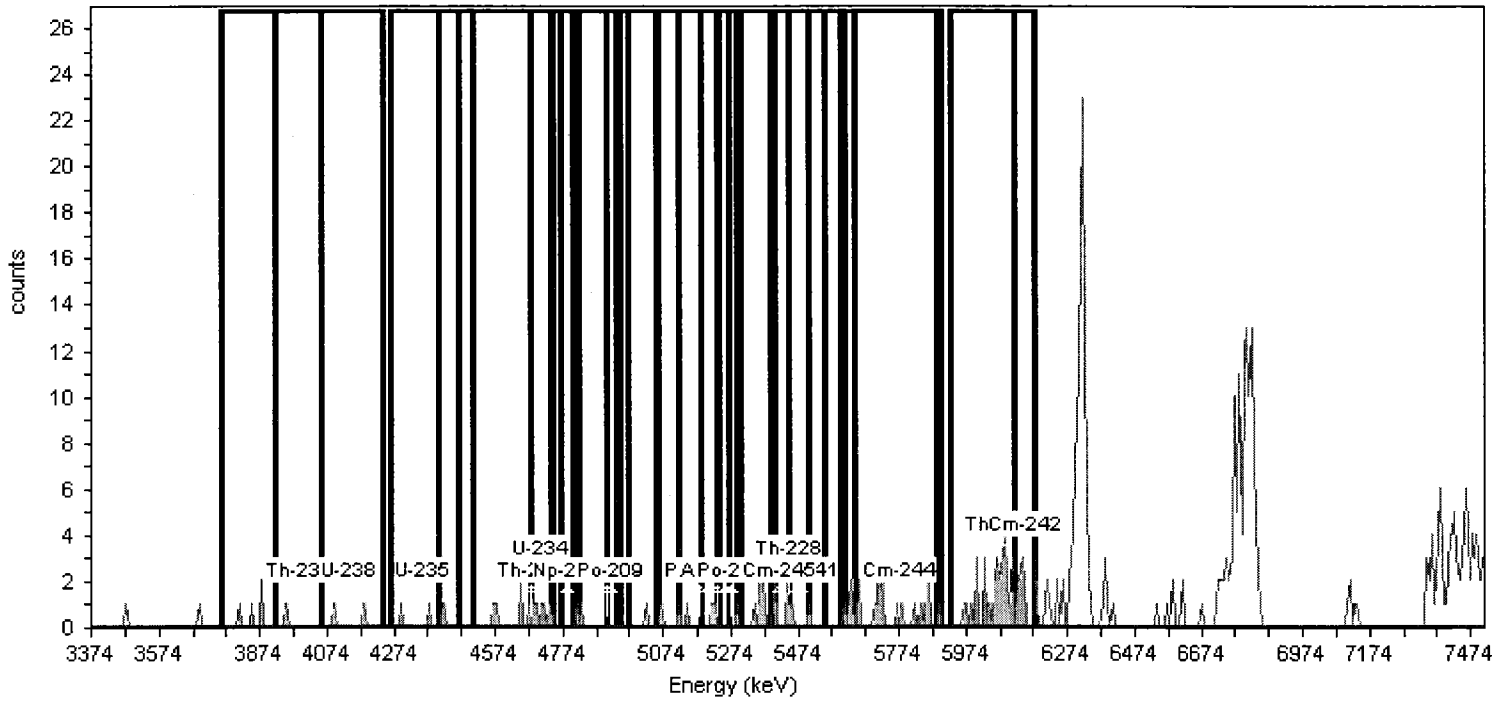
Analyst: 60040

Acquisition

Detector: AV49 , SN: 47-043hh4
Acquisition Start Date: 6/19/2014 12:17:35AM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-7107;AV49-20140504
Calibration Date: 5/5/2014 6:52:38PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.53% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 390.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	5.00	5.208E-003	2.552E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.68	4.40	4.75	12.00	1.250E-002	3.756E-003
U-234	4.71	4.51	4.82	12.00	1.250E-002	3.756E-003
Pu-242	4.90	4.68	4.95	8.00	8.333E-003	3.125E-003
Th-229	4.86	4.74	5.12	6.00	6.250E-003	2.756E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	6.00	6.250E-003	2.756E-003
Am-243	5.23	5.05	5.31	6.00	6.250E-003	2.756E-003
U-232	5.25	5.06	5.40	14.00	1.458E-002	4.034E-003
Th-228	5.45	5.19	5.51	16.00	1.667E-002	4.295E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	14.00	1.458E-002	4.034E-003
Am-241	5.48	5.30	5.60	13.00	1.354E-002	3.898E-003
Cm-245	5.42	5.40	5.45	5.00	5.208E-003	2.552E-003
Pu-236	5.76	5.61	5.89	21.00	2.187E-002	4.886E-003
Cm-244	5.78	5.64	5.90	18.00	1.875E-002	4.541E-003
Th-227	6.07	5.93	6.18	41.00	4.271E-002	6.751E-003
Cm-242	6.15	6.12	6.18	11.00	1.146E-002	3.608E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:33:59PM 6/19/2014

Sample

Sample Name: ICB;AV53
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

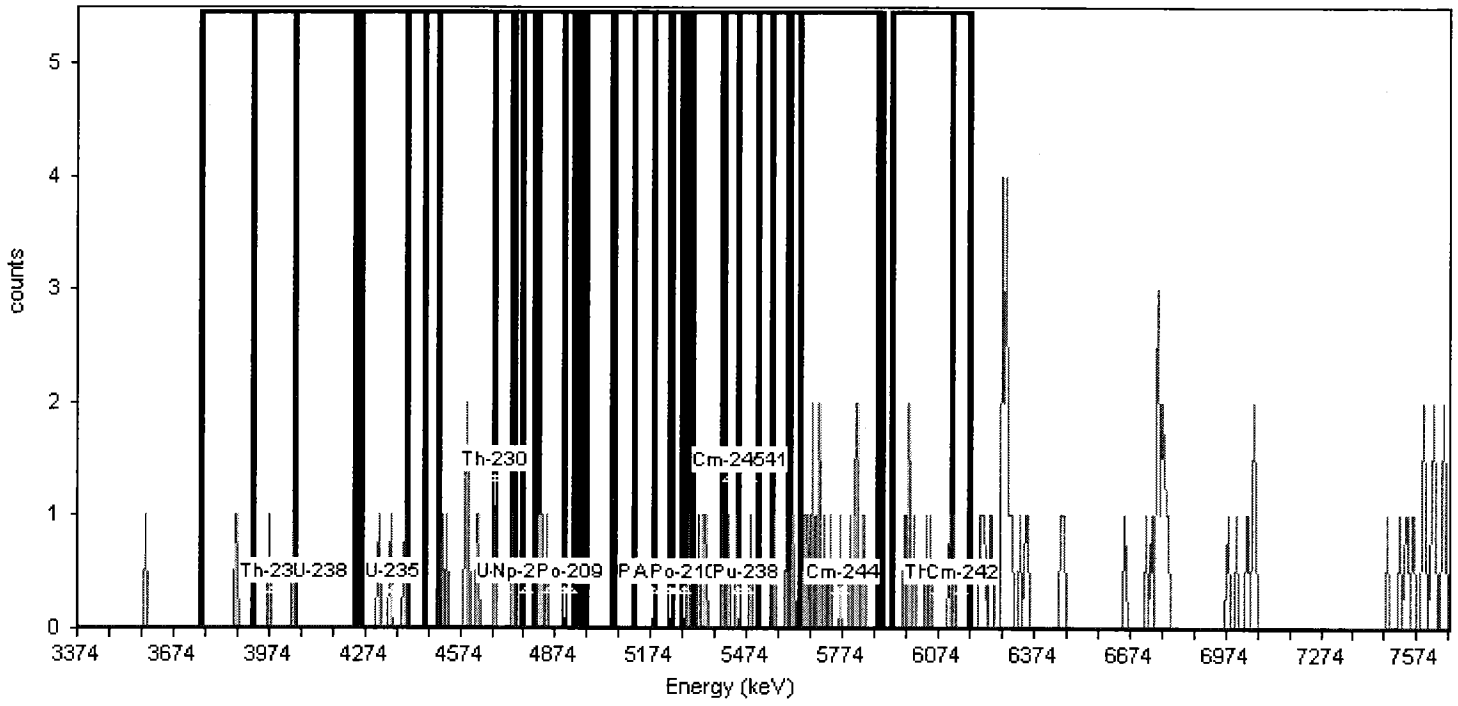
Analyst: 60040

Acquisition

Detector: AV53 , SN: 50-051A6
Acquisition Start Date: 6/19/2014 12:17:59AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-8877;AV53-20140504
Calibration Date: 5/5/2014 6:53:06PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.32% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 111.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	3.00	3.125E-003	2.083E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.68	4.40	4.75	8.00	8.333E-003	3.125E-003
U-234	4.71	4.51	4.82	9.00	9.375E-003	3.294E-003
Pu-242	4.90	4.68	4.95	5.00	5.208E-003	2.552E-003
Th-229	4.86	4.74	5.12	4.00	4.167E-003	2.329E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	0.00	0.000E+000	1.473E-003
Am-243	5.23	5.05	5.31	1.00	1.042E-003	1.473E-003
U-232	5.25	5.06	5.40	5.00	5.208E-003	2.552E-003
Th-228	5.45	5.19	5.51	8.00	8.333E-003	3.125E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	8.00	8.333E-003	3.125E-003
Am-241	5.48	5.30	5.60	9.00	9.375E-003	3.294E-003
Cm-245	5.42	5.40	5.45	3.00	3.125E-003	2.083E-003
Pu-236	5.76	5.61	5.89	16.00	1.667E-002	4.295E-003
Cm-244	5.78	5.64	5.90	15.00	1.563E-002	4.167E-003
Th-227	6.07	5.93	6.18	8.00	8.333E-003	3.125E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:05PM 6/19/2014

Sample

Sample Name: ICB;AV54
Spectrum #1 Analysis #1
Comment:

Batch

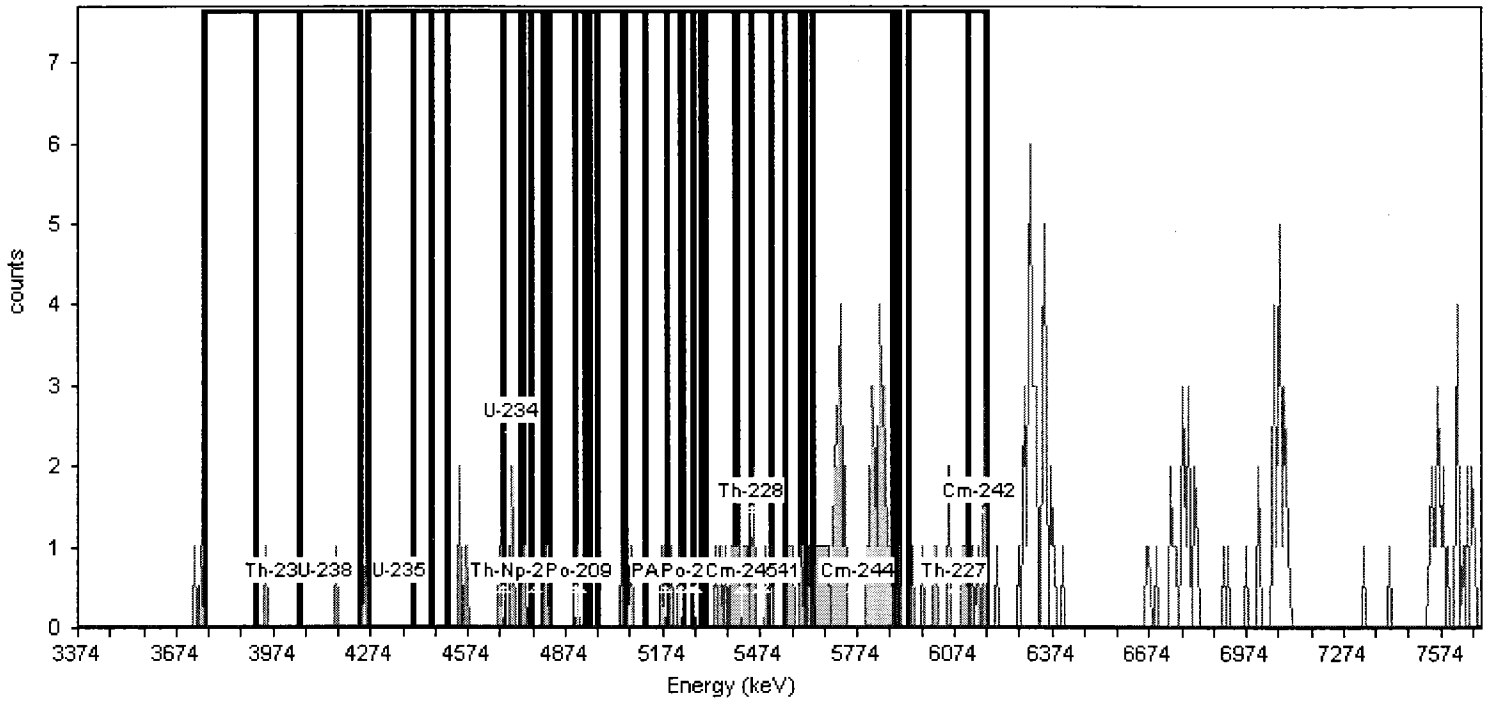
Batch Name: June2014
Analyst: 60040
Description:

Acquisition

Detector: AV54 , SN: 48-046II6
Acquisition Start Date: 6/19/2014 12:18:06AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9520;AV54-20140504
Calibration Date: 5/5/2014 6:53:13PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.02% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 195.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	7.00	7.292E-003	2.946E-003
U-234	4.71	4.51	4.82	8.00	8.333E-003	3.125E-003
Pu-242	4.90	4.68	4.95	5.00	5.208E-003	2.552E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	5.00	5.208E-003	2.552E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	10.00	1.042E-002	3.455E-003
Th-228	5.45	5.19	5.51	16.00	1.667E-002	4.295E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	14.00	1.458E-002	4.034E-003
Am-241	5.48	5.30	5.60	17.00	1.771E-002	4.419E-003
Cm-245	5.42	5.40	5.45	6.00	6.250E-003	2.756E-003
Pu-236	5.76	5.61	5.89	41.00	4.271E-002	6.751E-003
Cm-244	5.78	5.64	5.90	41.00	4.271E-002	6.751E-003
Th-227	6.07	5.93	6.18	13.00	1.354E-002	3.898E-003
Cm-242	6.15	6.12	6.18	5.00	5.208E-003	2.552E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:10PM 6/19/2014

Sample

Sample Name: ICB;AV55
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

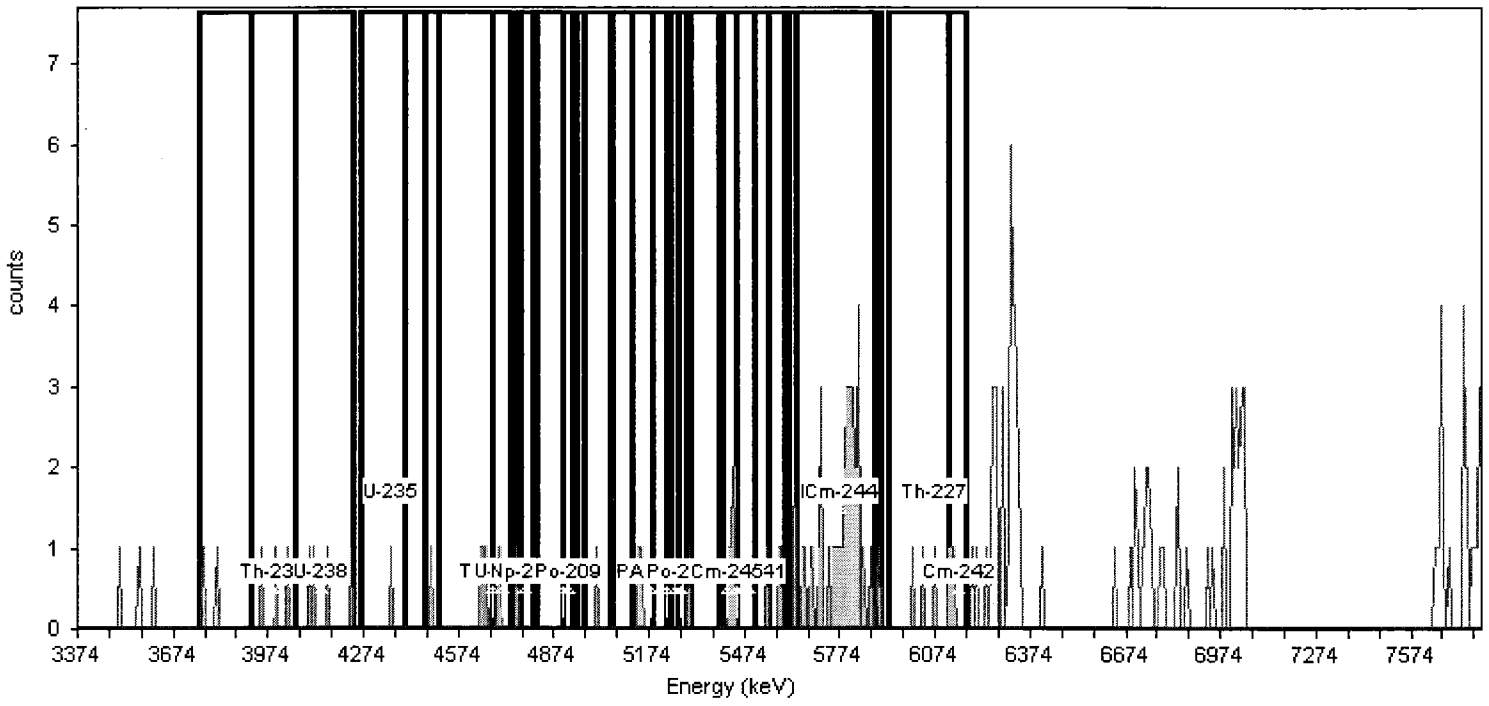
Analyst: 60040

Acquisition

Detector: AV55 , SN: 50-051C2
Acquisition Start Date: 6/19/2014 12:18:11AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-7107;AV55-20140507
Calibration Date: 5/7/2014 10:48:56PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.79% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 168.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	5.00	5.208E-003	2.552E-003
U-238	4.14	3.92	4.24	7.00	7.292E-003	2.946E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	5.00	5.208E-003	2.552E-003
U-234	4.71	4.51	4.82	5.00	5.208E-003	2.552E-003
Pu-242	4.90	4.68	4.95	2.00	2.083E-003	1.804E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	3.00	3.125E-003	2.083E-003
Th-228	5.45	5.19	5.51	5.00	5.208E-003	2.552E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	6.00	6.250E-003	2.756E-003
Am-241	5.48	5.30	5.60	8.00	8.333E-003	3.125E-003
Cm-245	5.42	5.40	5.45	4.00	4.167E-003	2.329E-003
Pu-236	5.76	5.61	5.89	37.00	3.854E-002	6.421E-003
Cm-244	5.78	5.64	5.90	35.00	3.646E-002	6.250E-003
Th-227	6.07	5.93	6.18	6.00	6.250E-003	2.756E-003
Cm-242	6.15	6.12	6.18	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:16PM 6/19/2014

Sample

Sample Name: ICB;AV56
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

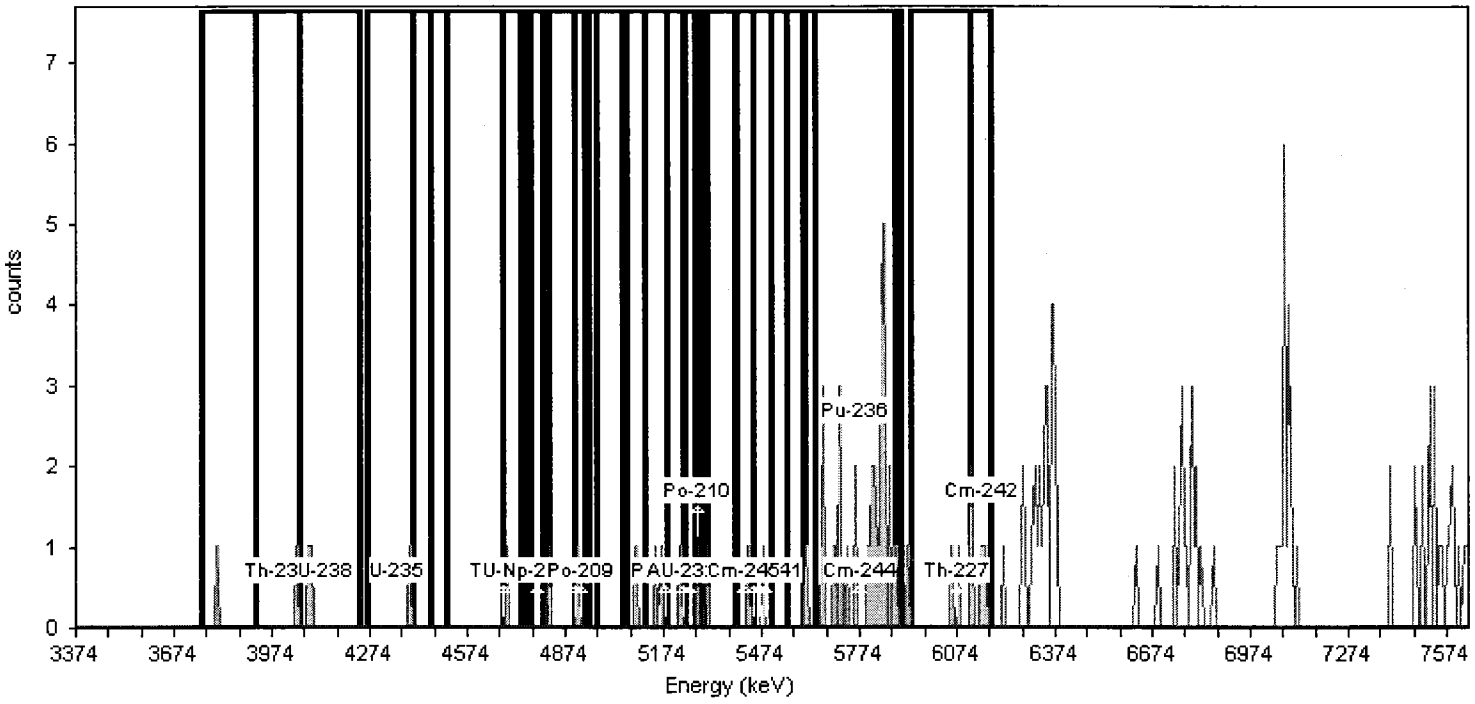
Analyst: 60040

Acquisition

Detector: AV56 , SN: 52-059EE5
Acquisition Start Date: 6/19/2014 12:18:17AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9792;AV56-20140504
Calibration Date: 5/5/2014 6:53:34PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.09% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 143.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	1.00	1.042E-003	1.473E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	3.00	3.125E-003	2.083E-003
Th-229	4.86	4.74	5.12	3.00	3.125E-003	2.083E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	6.00	6.250E-003	2.756E-003
U-232	5.25	5.06	5.40	6.00	6.250E-003	2.756E-003
Th-228	5.45	5.19	5.51	5.00	5.208E-003	2.552E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	4.00	4.167E-003	2.329E-003
Am-241	5.48	5.30	5.60	3.00	3.125E-003	2.083E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	34.00	3.542E-002	6.163E-003
Cm-244	5.78	5.64	5.90	33.00	3.437E-002	6.074E-003
Th-227	6.07	5.93	6.18	8.00	8.333E-003	3.125E-003
Cm-242	6.15	6.12	6.18	6.00	6.250E-003	2.756E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:21PM 6/19/2014

Sample

Sample Name: ICB;AV57
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

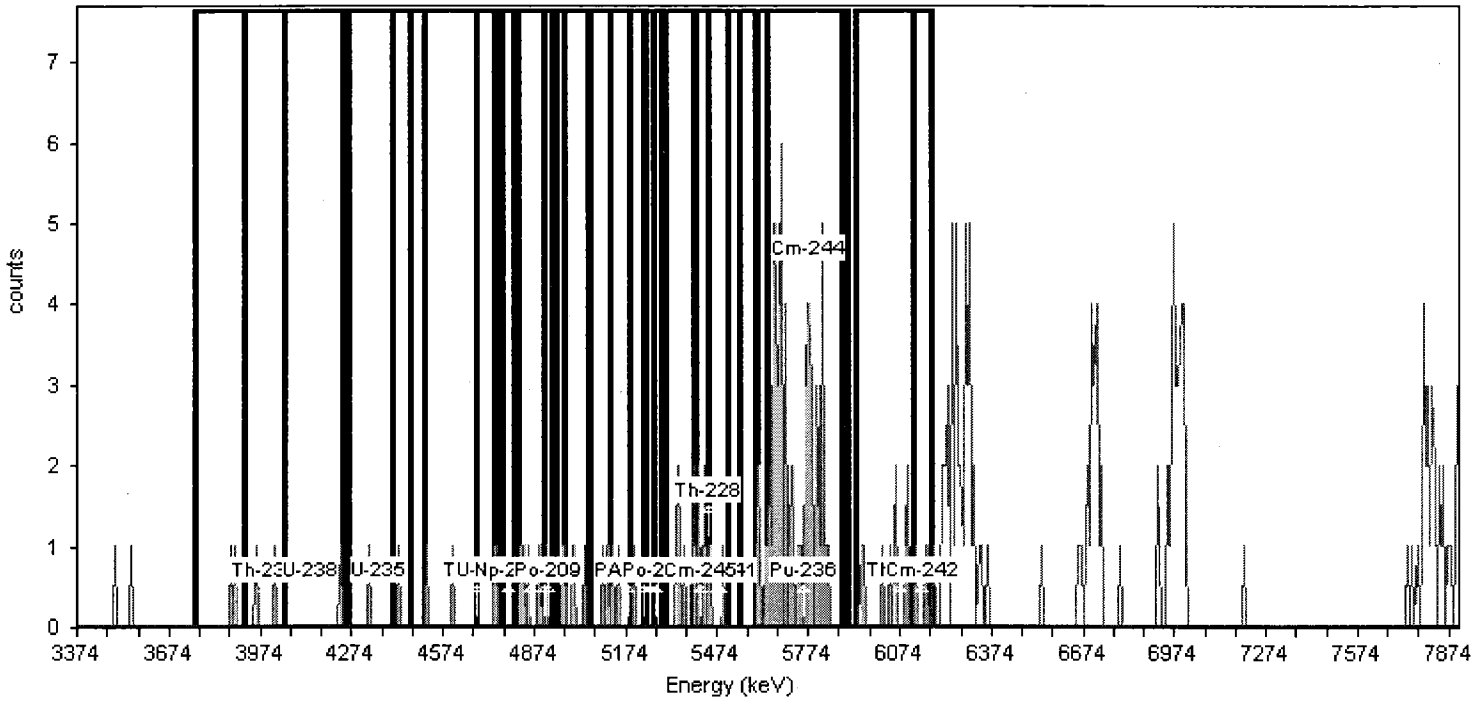
Analyst: 60040

Acquisition

Detector: AV57 , SN: 48-158EE3
Acquisition Start Date: 6/19/2014 12:18:24AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9793;AV57-20140504
Calibration Date: 5/5/2014 6:53:40PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.74% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 233.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	4.00	4.167E-003	2.329E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	5.00	5.208E-003	2.552E-003
U-234	4.71	4.51	4.82	4.00	4.167E-003	2.329E-003
Pu-242	4.90	4.68	4.95	7.00	7.292E-003	2.946E-003
Th-229	4.86	4.74	5.12	13.00	1.354E-002	3.898E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	8.00	8.333E-003	3.125E-003
Am-243	5.23	5.05	5.31	5.00	5.208E-003	2.552E-003
U-232	5.25	5.06	5.40	11.00	1.146E-002	3.608E-003
Th-228	5.45	5.19	5.51	13.00	1.354E-002	3.898E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	12.00	1.250E-002	3.756E-003
Am-241	5.48	5.30	5.60	12.00	1.250E-002	3.756E-003
Cm-245	5.42	5.40	5.45	7.00	7.292E-003	2.946E-003
Pu-236	5.76	5.61	5.89	58.00	6.042E-002	8.001E-003
Cm-244	5.78	5.64	5.90	55.00	5.729E-002	7.795E-003
Th-227	6.07	5.93	6.18	11.00	1.146E-002	3.608E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:28PM 6/19/2014

Sample

Sample Name: ICB;AV58
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

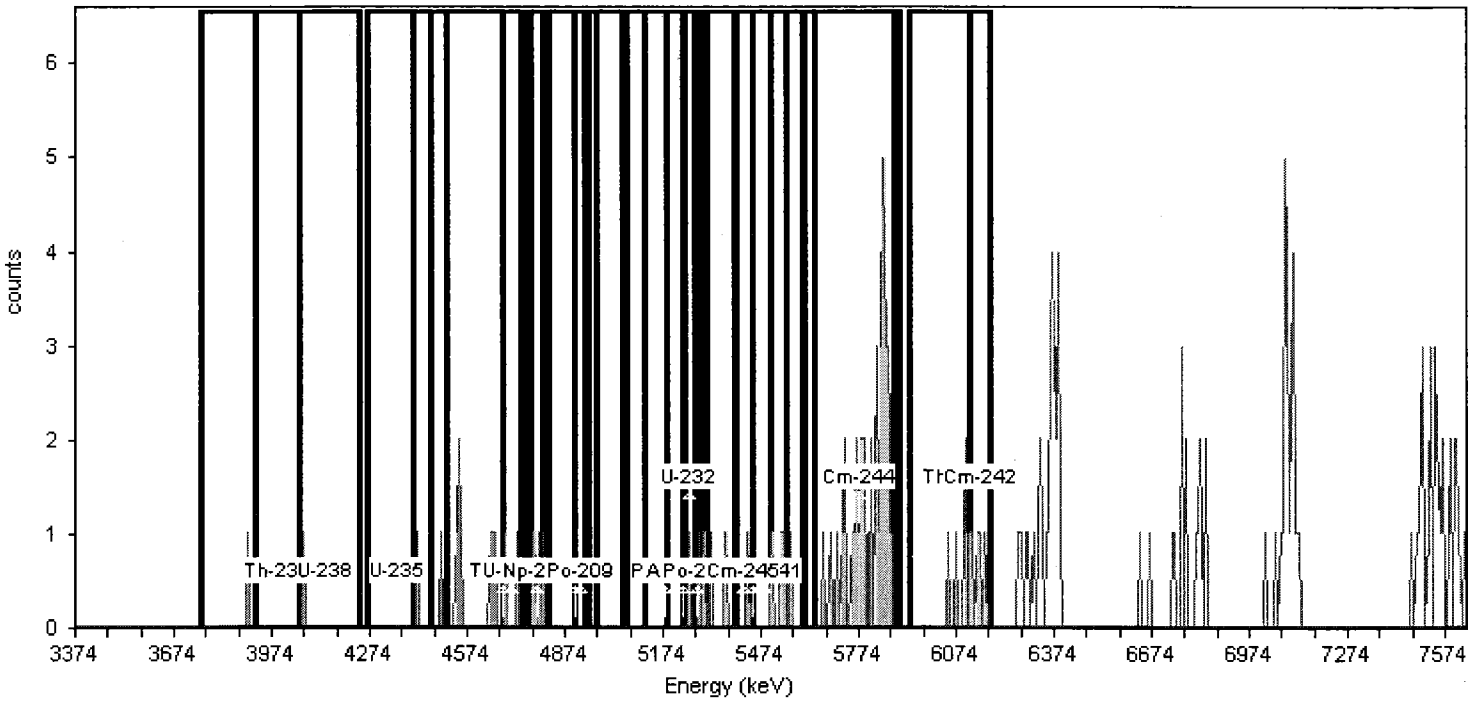
Analyst: 60040

Acquisition

Detector: AV58 , SN: 52-102 C5
Acquisition Start Date: 6/19/2014 12:18:31AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9794;AV58-20140504
Calibration Date: 5/5/2014 6:53:46PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.56% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 160.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	11.00	1.146E-002	3.608E-003
U-234	4.71	4.51	4.82	12.00	1.250E-002	3.756E-003
Pu-242	4.90	4.68	4.95	5.00	5.208E-003	2.552E-003
Th-229	4.86	4.74	5.12	3.00	3.125E-003	2.083E-003
Np-237	4.78	4.77	4.81	3.00	3.125E-003	2.083E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	0.00	0.000E+000	1.473E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	5.00	5.208E-003	2.552E-003
Th-228	5.45	5.19	5.51	7.00	7.292E-003	2.946E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	8.00	8.333E-003	3.125E-003
Am-241	5.48	5.30	5.60	8.00	8.333E-003	3.125E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	37.00	3.854E-002	6.421E-003
Cm-244	5.78	5.64	5.90	37.00	3.854E-002	6.421E-003
Th-227	6.07	5.93	6.18	9.00	9.375E-003	3.294E-003
Cm-242	6.15	6.12	6.18	5.00	5.208E-003	2.552E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:33PM 6/19/2014

Sample

Sample Name: ICB;AV59
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

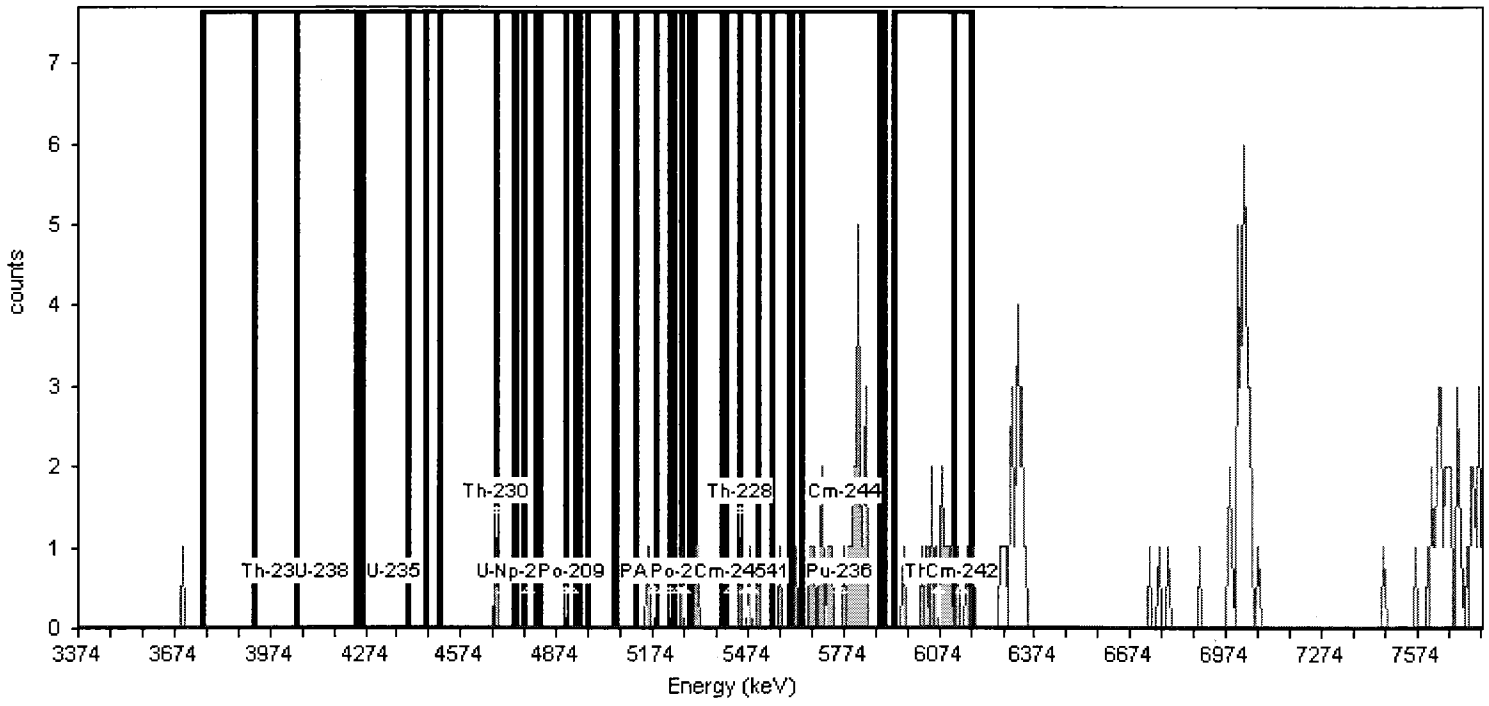
Analyst: 60040

Acquisition

Detector: AV59 , SN: 49-155M7
Acquisition Start Date: 6/19/2014 12:18:32AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9795;AV59-20140504
Calibration Date: 5/5/2014 6:53:53PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.44% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 141.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	0.00	0.000E+000	1.473E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	1.00	1.042E-003	1.473E-003
U-234	4.71	4.51	4.82	1.00	1.042E-003	1.473E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	0.00	0.000E+000	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	3.00	3.125E-003	2.083E-003
Th-228	5.45	5.19	5.51	5.00	5.208E-003	2.552E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	5.00	5.208E-003	2.552E-003
Am-241	5.48	5.30	5.60	5.00	5.208E-003	2.552E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	27.00	2.813E-002	5.512E-003
Cm-244	5.78	5.64	5.90	26.00	2.708E-002	5.413E-003
Th-227	6.07	5.93	6.18	14.00	1.458E-002	4.034E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:39PM 6/19/2014

Sample

Sample Name: ICB;AV60
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

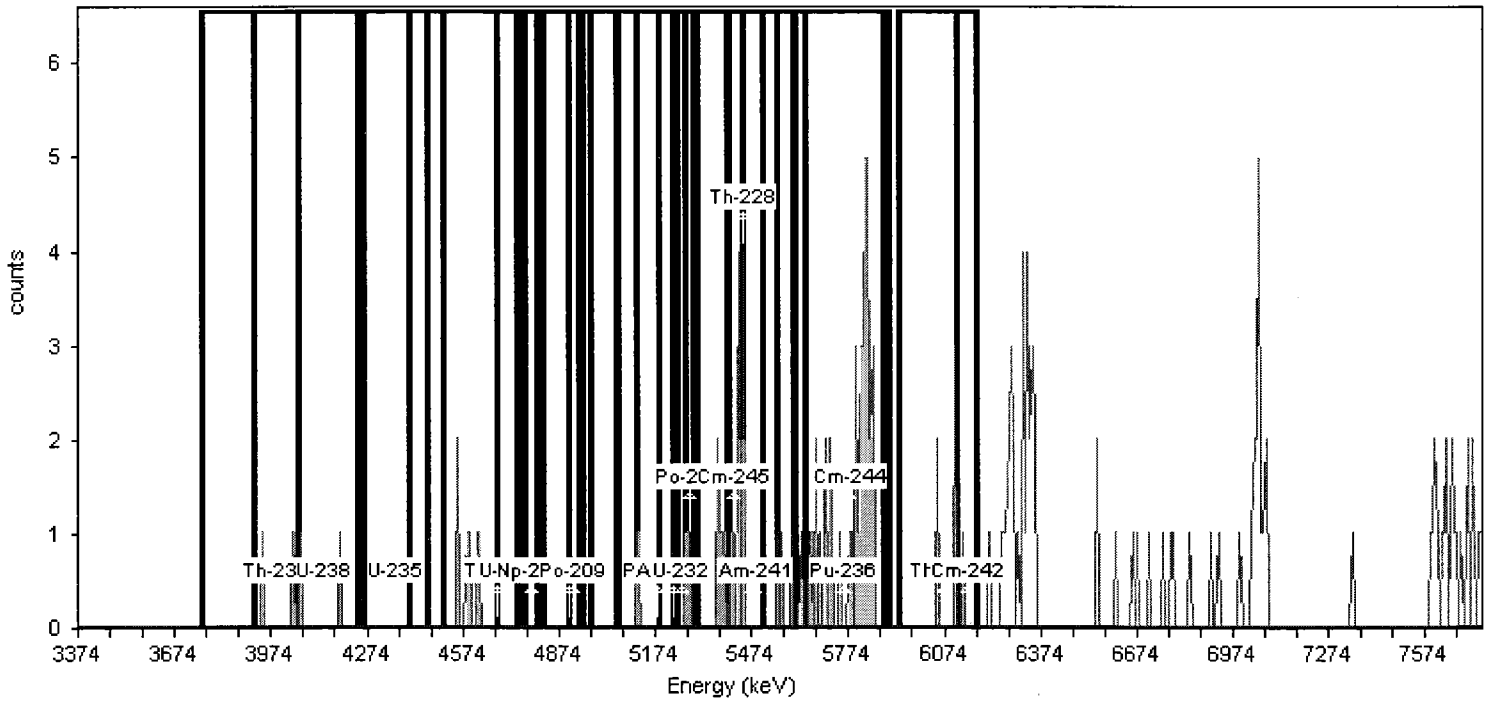
Analyst: 60040

Acquisition

Detector: AV60 , SN: 49-027117
Acquisition Start Date: 6/19/2014 12:18:33AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9817;AV60-20140504
Calibration Date: 5/5/2014 6:53:59PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.33% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 151.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	4.00	4.167E-003	2.329E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	5.00	5.208E-003	2.552E-003
U-234	4.71	4.51	4.82	5.00	5.208E-003	2.552E-003
Pu-242	4.90	4.68	4.95	0.00	0.000E+000	1.473E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	8.00	8.333E-003	3.125E-003
Th-228	5.45	5.19	5.51	17.00	1.771E-002	4.419E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	18.00	1.875E-002	4.541E-003
Am-241	5.48	5.30	5.60	18.00	1.875E-002	4.541E-003
Cm-245	5.42	5.40	5.45	10.00	1.042E-002	3.455E-003
Pu-236	5.76	5.61	5.89	38.00	3.958E-002	6.505E-003
Cm-244	5.78	5.64	5.90	37.00	3.854E-002	6.421E-003
Th-227	6.07	5.93	6.18	6.00	6.250E-003	2.756E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:44PM 6/19/2014

Sample

Sample Name: ICB;AV61
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

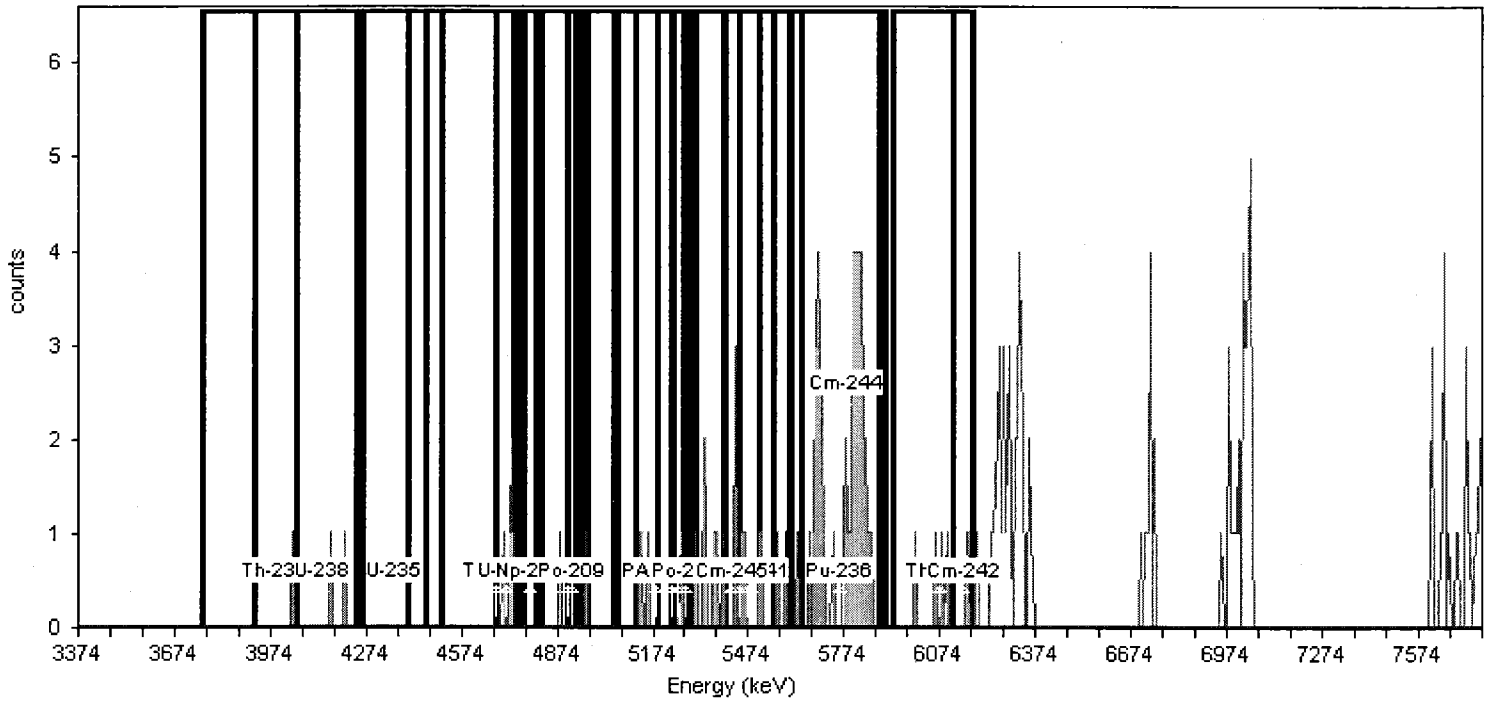
Analyst: 60040

Acquisition

Detector: AV61 , SN: 5-051JJ3
Acquisition Start Date: 6/19/2014 12:18:33AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9884;AV61-20140504
Calibration Date: 5/5/2014 6:54:06PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.46% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 159.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	4.00	4.167E-003	2.329E-003
U-234	4.71	4.51	4.82	4.00	4.167E-003	2.329E-003
Pu-242	4.90	4.68	4.95	5.00	5.208E-003	2.552E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	9.00	9.375E-003	3.294E-003
Th-228	5.45	5.19	5.51	13.00	1.354E-002	3.898E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	13.00	1.354E-002	3.898E-003
Am-241	5.48	5.30	5.60	15.00	1.563E-002	4.167E-003
Cm-245	5.42	5.40	5.45	4.00	4.167E-003	2.329E-003
Pu-236	5.76	5.61	5.89	41.00	4.271E-002	6.751E-003
Cm-244	5.78	5.64	5.90	40.00	4.167E-002	6.670E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:50PM 6/19/2014

Sample

Sample Name: ICB;AV62
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

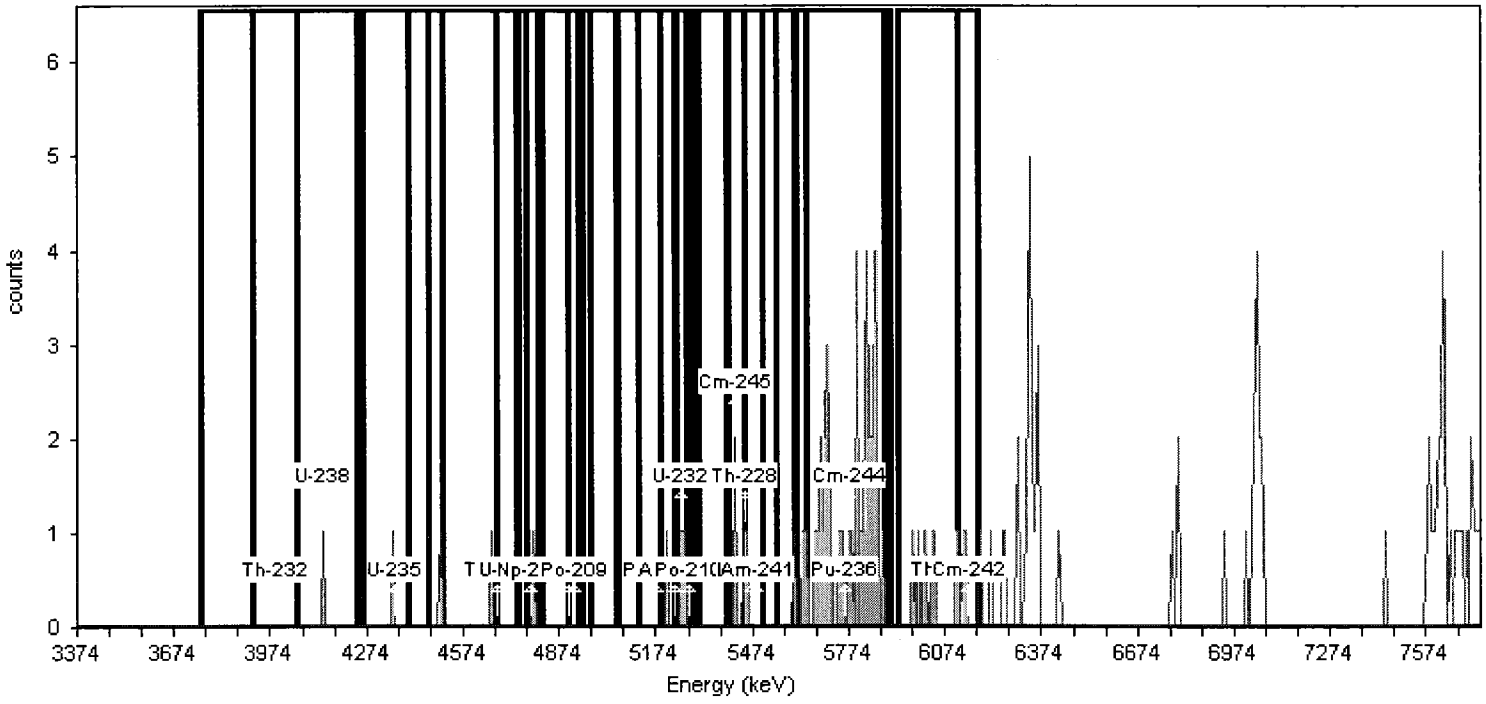
Analyst: 60040

Acquisition

Detector: AV62 , SN: 52-060FF2
Acquisition Start Date: 6/19/2014 12:18:34AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9885;AV62-20140504
Calibration Date: 5/5/2014 6:54:13PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.34% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 132.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	2.00	2.083E-003	1.804E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	3.00	3.125E-003	2.083E-003
Th-228	5.45	5.19	5.51	7.00	7.292E-003	2.946E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	4.00	4.167E-003	2.329E-003
Am-241	5.48	5.30	5.60	5.00	5.208E-003	2.552E-003
Cm-245	5.42	5.40	5.45	3.00	3.125E-003	2.083E-003
Pu-236	5.76	5.61	5.89	39.00	4.062E-002	6.588E-003
Cm-244	5.78	5.64	5.90	38.00	3.958E-002	6.505E-003
Th-227	6.07	5.93	6.18	9.00	9.375E-003	3.294E-003
Cm-242	6.15	6.12	6.18	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:56PM 6/19/2014

Sample

Sample Name: ICB;AV63
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

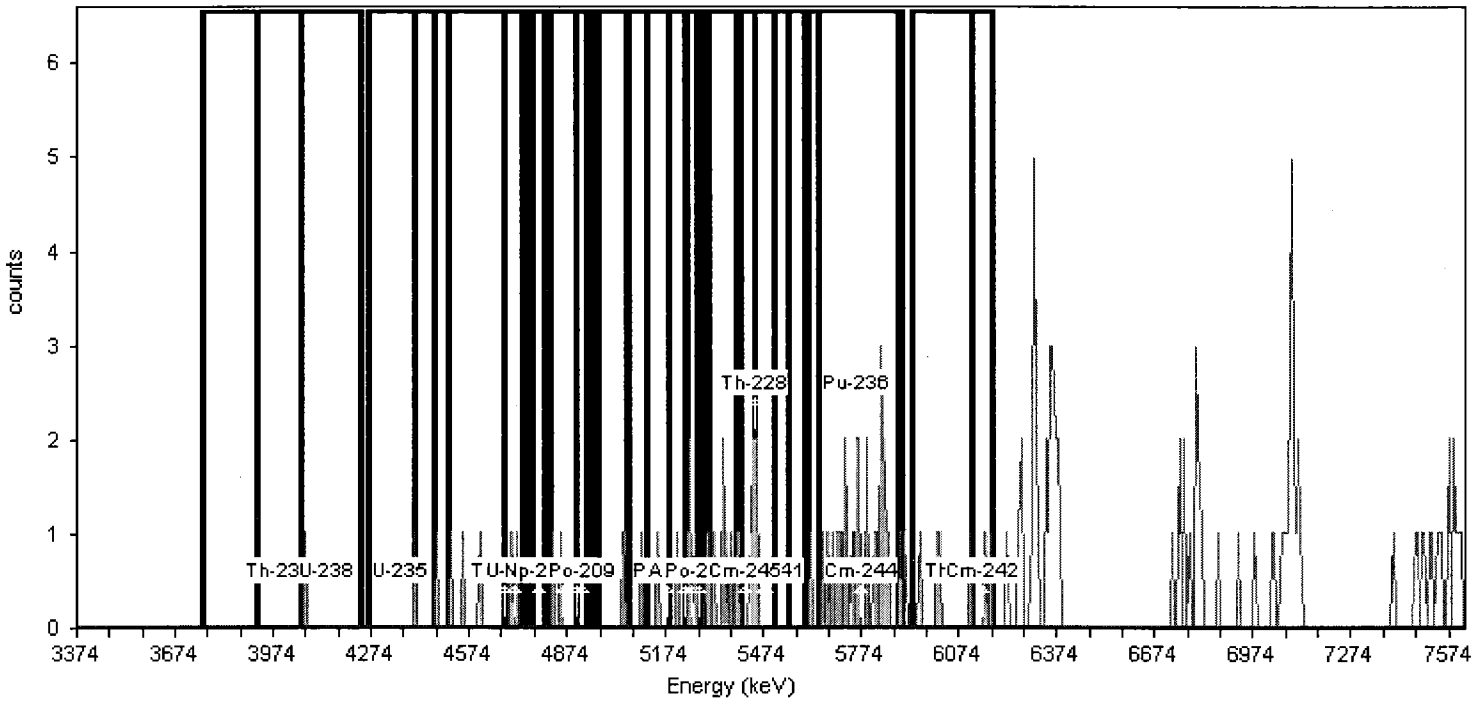
Analyst: 60040

Acquisition

Detector: AV63 , SN: 47-029ff2
Acquisition Start Date: 6/19/2014 12:18:35AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9886;AV63-20140504
Calibration Date: 5/5/2014 6:54:19PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.48% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 141.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	7.00	7.292E-003	2.946E-003
U-234	4.71	4.51	4.82	5.00	5.208E-003	2.552E-003
Pu-242	4.90	4.68	4.95	4.00	4.167E-003	2.329E-003
Th-229	4.86	4.74	5.12	4.00	4.167E-003	2.329E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	8.00	8.333E-003	3.125E-003
U-232	5.25	5.06	5.40	14.00	1.458E-002	4.034E-003
Th-228	5.45	5.19	5.51	19.00	1.979E-002	4.658E-003
Po-210	5.28	5.23	5.29	3.00	3.125E-003	2.083E-003
Pu-238	5.47	5.27	5.55	15.00	1.563E-002	4.167E-003
Am-241	5.48	5.30	5.60	15.00	1.563E-002	4.167E-003
Cm-245	5.42	5.40	5.45	6.00	6.250E-003	2.756E-003
Pu-236	5.76	5.61	5.89	25.00	2.604E-002	5.311E-003
Cm-244	5.78	5.64	5.90	25.00	2.604E-002	5.311E-003
Th-227	6.07	5.93	6.18	6.00	6.250E-003	2.756E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:35:01PM 6/19/2014

Sample

Sample Name: ICB;AV64
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

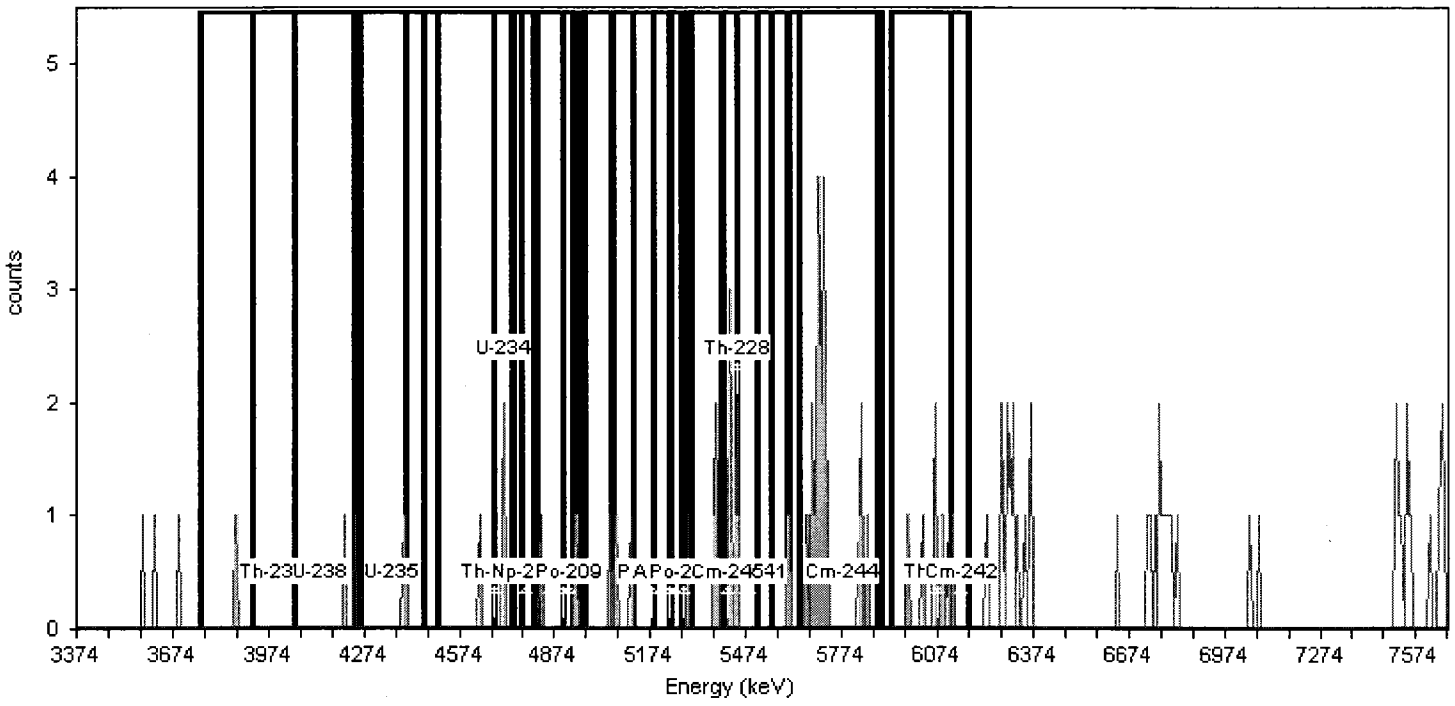
Analyst: 60040

Acquisition

Detector: AV64 , SN: 47-029ee4
Acquisition Start Date: 6/19/2014 12:18:36AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-7107;AV64-20140504a
Calibration Date: 5/4/2014 8:44:03PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.75% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 100.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	4.00	4.167E-003	2.329E-003
U-234	4.71	4.51	4.82	3.00	3.125E-003	2.083E-003
Pu-242	4.90	4.68	4.95	4.00	4.167E-003	2.329E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	6.00	6.250E-003	2.756E-003
Th-228	5.45	5.19	5.51	10.00	1.042E-002	3.455E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	10.00	1.042E-002	3.455E-003
Am-241	5.48	5.30	5.60	10.00	1.042E-002	3.455E-003
Cm-245	5.42	5.40	5.45	6.00	6.250E-003	2.756E-003
Pu-236	5.76	5.61	5.89	23.00	2.396E-002	5.103E-003
Cm-244	5.78	5.64	5.90	22.00	2.292E-002	4.996E-003
Th-227	6.07	5.93	6.18	8.00	8.333E-003	3.125E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:22:41PM 6/22/2014

Sample

Sample Name: ICB;AV65
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014c
Description:

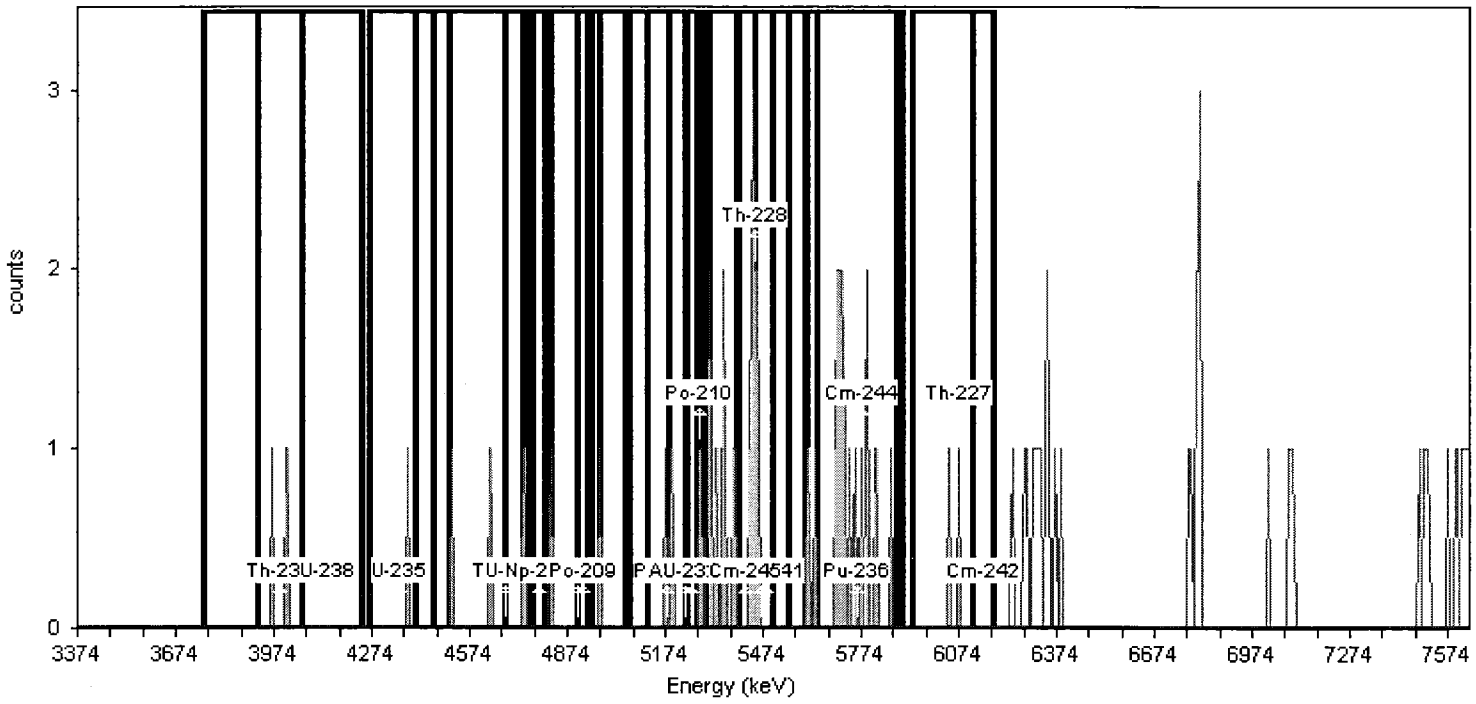
Analyst: 60040

Acquisition

Detector: AV65 , SN: 44-049JJ1
Acquisition Start Date: 6/19/2014 7:57:24PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8874;AV65-20140504
Calibration Date: 5/4/2014 8:43:55PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.13% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 84.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	3.00	3.125E-003	2.083E-003
U-234	4.71	4.51	4.82	4.00	4.167E-003	2.329E-003
Pu-242	4.90	4.68	4.95	2.00	2.083E-003	1.804E-003
Th-229	4.86	4.74	5.12	3.00	3.125E-003	2.083E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	6.00	6.250E-003	2.756E-003
U-232	5.25	5.06	5.40	13.00	1.354E-002	3.898E-003
Th-228	5.45	5.19	5.51	21.00	2.187E-002	4.886E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	20.00	2.083E-002	4.774E-003
Am-241	5.48	5.30	5.60	18.00	1.875E-002	4.541E-003
Cm-245	5.42	5.40	5.45	6.00	6.250E-003	2.756E-003
Pu-236	5.76	5.61	5.89	17.00	1.771E-002	4.419E-003
Cm-244	5.78	5.64	5.90	15.00	1.563E-002	4.167E-003
Th-227	6.07	5.93	6.18	2.00	2.083E-003	1.804E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:35:12PM 6/19/2014

Sample

Sample Name: ICB;AV66
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

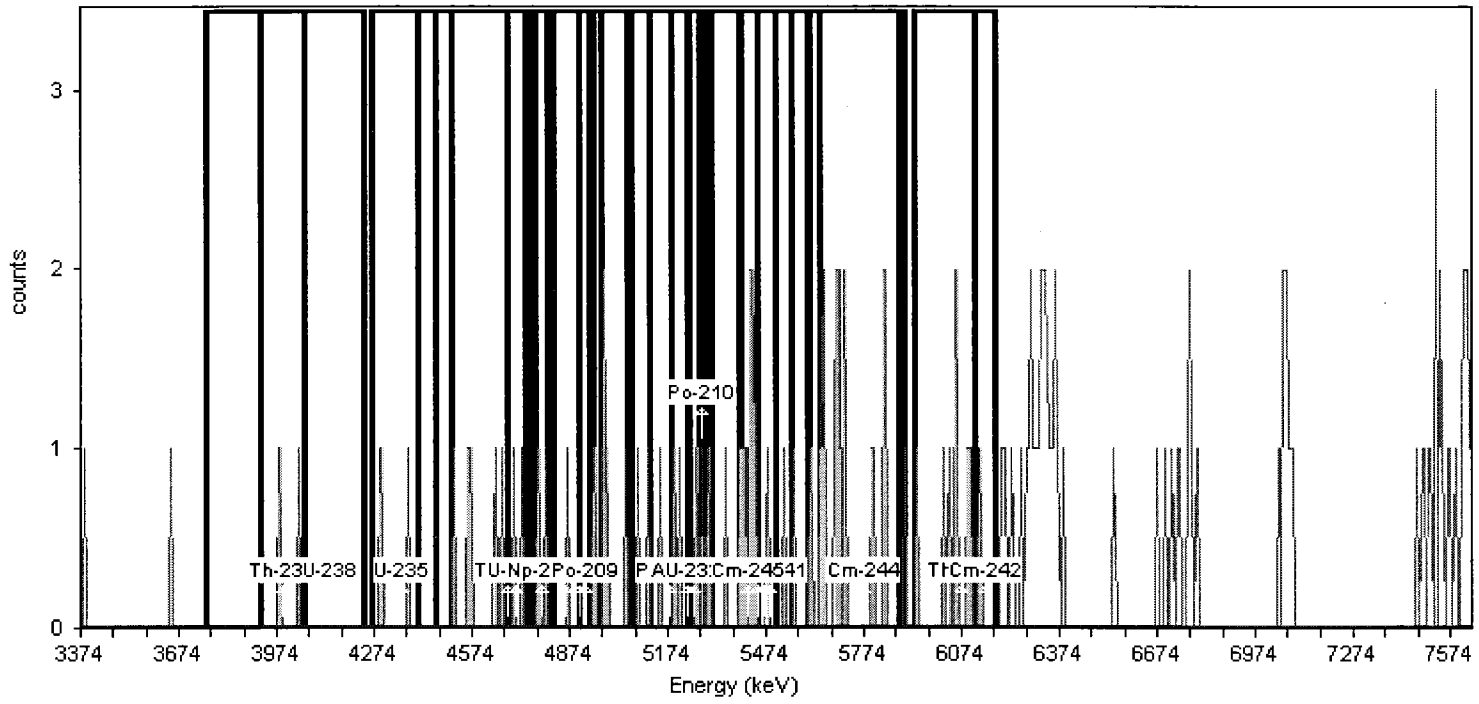
Analyst: 60040

Acquisition

Detector: AV66 , SN: 48-158EE2
Acquisition Start Date: 6/19/2014 12:18:38AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-8875;AV66-20140504
Calibration Date: 5/4/2014 8:44:10PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.93% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 131.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	7.00	7.292E-003	2.946E-003
U-234	4.71	4.51	4.82	9.00	9.375E-003	3.294E-003
Pu-242	4.90	4.68	4.95	6.00	6.250E-003	2.756E-003
Th-229	4.86	4.74	5.12	10.00	1.042E-002	3.455E-003
Np-237	4.78	4.77	4.81	2.00	2.083E-003	1.804E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	9.00	9.375E-003	3.294E-003
Am-243	5.23	5.05	5.31	8.00	8.333E-003	3.125E-003
U-232	5.25	5.06	5.40	11.00	1.146E-002	3.608E-003
Th-228	5.45	5.19	5.51	15.00	1.563E-002	4.167E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	13.00	1.354E-002	3.898E-003
Am-241	5.48	5.30	5.60	13.00	1.354E-002	3.898E-003
Cm-245	5.42	5.40	5.45	8.00	8.333E-003	3.125E-003
Pu-236	5.76	5.61	5.89	18.00	1.875E-002	4.541E-003
Cm-244	5.78	5.64	5.90	18.00	1.875E-002	4.541E-003
Th-227	6.07	5.93	6.18	8.00	8.333E-003	3.125E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:35:18PM 6/19/2014

Sample

Sample Name: ICB;AV67
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

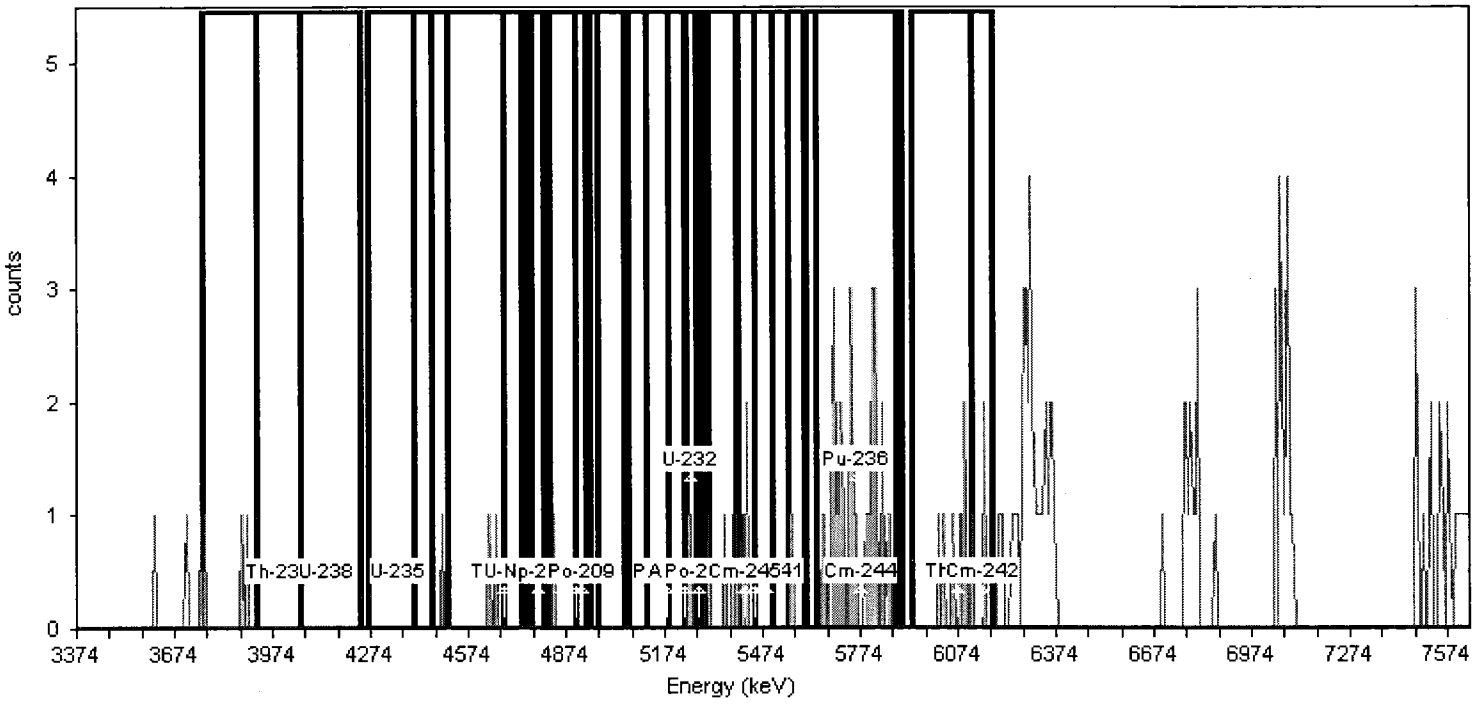
Analyst: 60040

Acquisition

Detector: AV67 , SN: 52-102 D7
Acquisition Start Date: 6/19/2014 12:18:39AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-8876;AV67-20140504
Calibration Date: 5/4/2014 8:44:15PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.32% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 140.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	3.00	3.125E-003	2.083E-003
U-238	4.14	3.92	4.24	0.00	0.000E+000	1.473E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	3.00	3.125E-003	2.083E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	0.00	0.000E+000	1.473E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	6.00	6.250E-003	2.756E-003
Th-228	5.45	5.19	5.51	9.00	9.375E-003	3.294E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	7.00	7.292E-003	2.946E-003
Am-241	5.48	5.30	5.60	9.00	9.375E-003	3.294E-003
Cm-245	5.42	5.40	5.45	4.00	4.167E-003	2.329E-003
Pu-236	5.76	5.61	5.89	30.00	3.125E-002	5.800E-003
Cm-244	5.78	5.64	5.90	30.00	3.125E-002	5.800E-003
Th-227	6.07	5.93	6.18	9.00	9.375E-003	3.294E-003
Cm-242	6.15	6.12	6.18	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:35:24PM 6/19/2014

Sample

Sample Name: ICB;AV68
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

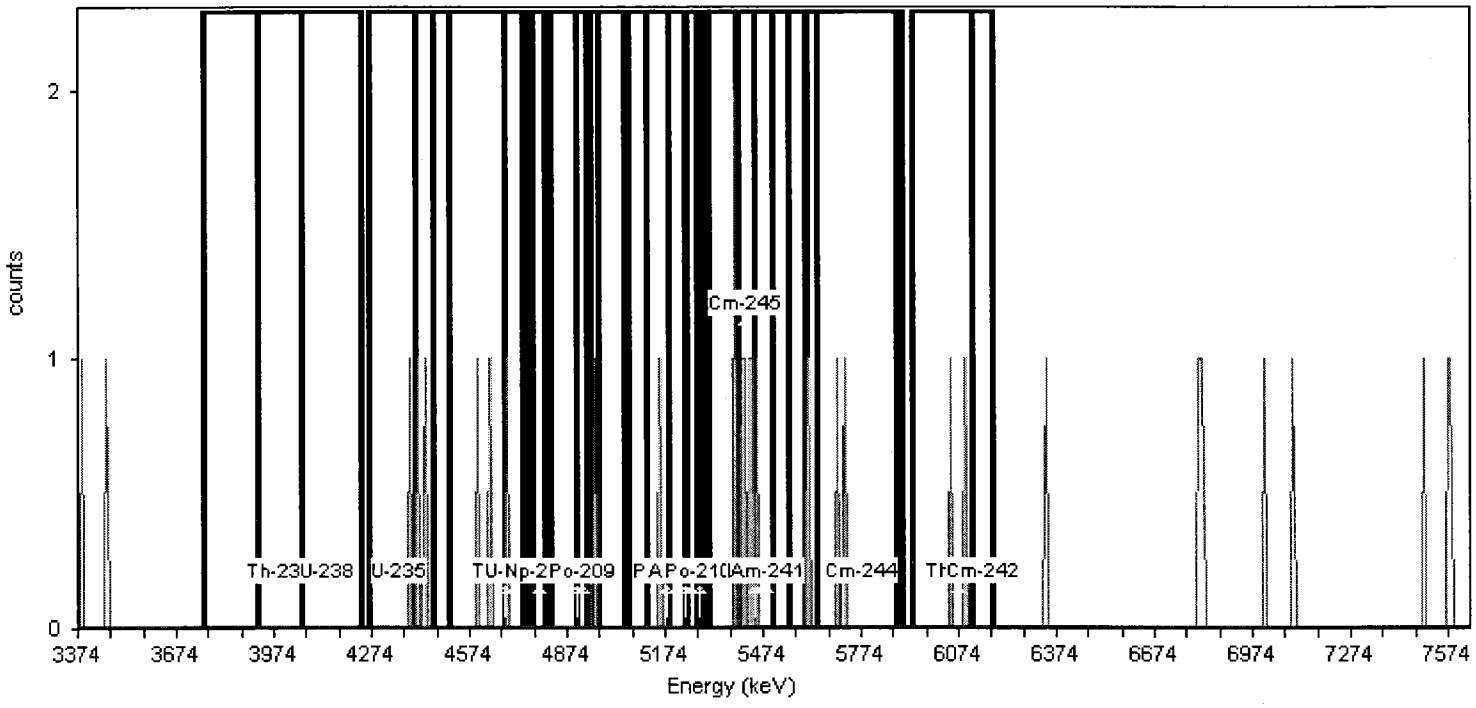
Analyst: 60040

Acquisition

Detector: AV68 , SN: 48-45884
Acquisition Start Date: 6/19/2014 12:18:40AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-8877;AV68-20140504
Calibration Date: 5/4/2014 8:44:22PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.49% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 31.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	0.00	0.000E+000	1.473E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.68	4.40	4.75	5.00	5.208E-003	2.552E-003
U-234	4.71	4.51	4.82	3.00	3.125E-003	2.083E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	1.00	1.042E-003	1.473E-003
U-232	5.25	5.06	5.40	3.00	3.125E-003	2.083E-003
Th-228	5.45	5.19	5.51	7.00	7.292E-003	2.946E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	7.00	7.292E-003	2.946E-003
Am-241	5.48	5.30	5.60	7.00	7.292E-003	2.946E-003
Cm-245	5.42	5.40	5.45	4.00	4.167E-003	2.329E-003
Pu-236	5.76	5.61	5.89	3.00	3.125E-003	2.083E-003
Cm-244	5.78	5.64	5.90	2.00	2.083E-003	1.804E-003
Th-227	6.07	5.93	6.18	2.00	2.083E-003	1.804E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TETRA TECH

INTERNAL CORRESPONDENCE

TO: M. MARTIN **DATE:** OCTOBER 14, 2014

FROM: MICHELLE L. ALLEN **COPIES:** DV FILE

SUBJECT: **RADIOLOGICAL DATA VALIDATION – TOTAL URANIUM/ISOTOPIC THORIUM LOCKHEED MARTIN CORPORATION (LMC) – MIDDLE RIVER COMPLEX (MRC) SEDIMENT INVESTIGATION SAMPLE DELIVERY GROUP (SDG) 680-102199-3**

SAMPLES: 33/Sediment/Total Uranium/Isotopic Uranium

SD-195-SS	SD-196-01	SD-196-02
SD-196-SS	SD-200-01	SD-200-02
SD-200-SS	SD-201-01	SD-201-02
SD-201-SS	SD-202-01	SD-202-02
SD-202-SS	SD-203-01	SD-203-02
SD-203-SS	SD-218-01	SD-218-02
SD-218-SS	SD-219-01	SD-219-02
SD-219-03	SD-219-SS	SD-220-01
SD-220-02	SD-220-SS	SD-277-01
SD-277-02	SD-277-SS	SD-279-01
SD-279-02	SD-279-SS	SD-DUP-01

Overview

The sample set for LMC-MRC, SDG 680-102199-3 consisted of thirty-three (33) sediment environmental samples. All thirty-three (33) sediment samples were analyzed for total uranium and isotopic uranium (uranium-233, uranium-234, uranium-235, uranium-236, and uranium-238). One field duplicate sample pair was included in this SDG: SD-DUP 01/SD-196-01.

The samples were collected by Tetra Tech, Inc. on June 9-10, 2014 and analyzed by TestAmerica, Inc. All analyses were conducted in accordance with EPA SW846 Method 6020A analytical and reporting protocols.

The findings offered in this report are based upon a general review of all available data. The data contained in this SDG were validated with regard to the following parameters: data completeness, holding times, ICP/MS tuning, initial and continuing calibrations, laboratory method and preparation blank results, Interference Check Sample (ICS), laboratory control sample recoveries, matrix spike/matrix spike duplicate results, internal standard recoveries, ICP serial dilution results, field duplicate precision, detection limits and analyte quantitation. Areas of concern are listed below.

Major

No major issues were identified.

Minor

- Detected results reported below the Reporting Limit (RL) limit but above the Method Detection Limit (MDL) were qualified as estimated, (J).

Notes

The following uranium isotopes were detected in the laboratory method and preparation blanks at the following maximum concentrations:

Analyte	Maximum Concentration (mg/Kg)	Action Level (mg/Kg)
Uranium-238 (1)	0.00212	0.0106
Uranium-238 (2)	0.0114	0.057
Uranium-233 (3)	0.0503 µg/L	0.02515
Uranium-233 (4)	0.0973 µg/L	0.04865

(1) - Maximum concentration detected in the laboratory preparation blank from preparation batch #137278 affecting all 6020A samples associated with this preparation batch.
(2) - Maximum concentration detected in the laboratory preparation blank from preparation batch #137385 affecting all 6020A samples associated with this preparation batch.
(3) - Maximum concentration detected in the initial and continuing calibration blanks from 6020A analysis affecting samples analyzed on 08/14/14.
(4) - Maximum concentration detected in the initial and continuing calibration blanks from 6020A analysis affecting samples analyzed on 08/18/14.

Action levels of 5X the maximum concentration were established to evaluate for laboratory blank contamination. Dilution factor and sample aliquot, if necessary, were taken into consideration during the application of the action level. No action was taken because uranium-233 was not detected and the detected results for uranium-238 were above the established action level.

All sample results are reported on a wet weight basis.

All samples were analyzed at a 5X dilution. The RLs of the non-detected results are elevated.

Uranium isotopes were determined via method 6020A. Isotopic uranium results reported via method 6020A and expressed in mg/kg units were converted to activity units, pCi/g, by the laboratory using isotope specific theoretical activities.

Non-detected results reported for uranium isotopes determined via method 6020A were reported at limits below the Minimum Detectable Concentration (MDC) by the laboratory. The manner in which the non-detected radioisotopes were reported was based upon the common practice of reporting radiological parameters at the concentration determined by the instrument. Therefore, metals raw instrument results expressed in µg/L were then converted to pCi/g and reported as non-detects below the MDC.

Executive Summary

Laboratory Performance: Uranium-233 and uranium-238 were detected in the laboratory method/preparation blanks.

Other Factors Affecting Data Quality: Results below the RL were estimated.
The text of this report has been formulated to address only those areas affecting data quality.

The text of this report has been formulated to address only those areas affecting data quality.

Tetra Tech, Inc.
Michelle L. Allen
Chemist/Data Validator

Tetra Tech, Inc.
Joseph A. Samchuck
Data Validation Manager

Attachments:
Appendix A – Qualified Analytical Results
Appendix B – Results as Reported by the Laboratory
Appendix C – Support Documentation

Appendix A

Qualified Analytical Results

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = ICP PDS Recovery Noncompliance; MSA's $r < 0.995$
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = RPD between columns/detectors >40% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient $r < 0.995$
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 standard deviations is greater than sample activity
Z1 = Tentatively Identified Compound considered presumptively present
Z2 = Tentatively Identified Compound column bleed
Z3 = Tentatively Identified Compound aldol condensate

PROJ_NO: 05220	NSAMPLE	SD-195-SS						SD-196-01					
SDG: 680-102199-3	LAB_ID	680-102199-25						680-102199-27					
FRACTION: M	SAMP_DATE	6/10/2014						6/10/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					0.94						2.6		
URANIUM-233					0.0037	U					0.0037	U	
URANIUM-234					0.00074	U					0.00074	U	
URANIUM-235					0.0068	J	P				0.019		
URANIUM-235 (PERCENT)		0.726						0.725					
URANIUM-236					0.00099	U					0.00099	U	
URANIUM-238					0.93						2.6		

PROJ_NO: 05220	NSAMPLE	SD-196-02						SD-196-SS					
SDG: 680-102199-3	LAB_ID	680-102199-28						680-102199-26					
FRACTION: M	SAMP_DATE	6/10/2014						6/10/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					1.8						2.5		
URANIUM-233					0.0036	U					0.0037	U	
URANIUM-234					0.00073	U					0.00074	U	
URANIUM-235					0.013						0.018		
URANIUM-235 (PERCENT)		0.717						0.715					
URANIUM-236					0.00097	U					0.00098	U	
URANIUM-238					1.8						2.5		

PROJ_NO: 05220	NSAMPLE	SD-200-01						SD-200-02					
SDG: 680-102199-3	LAB_ID	680-102199-40						680-102199-41					
FRACTION: M	SAMP_DATE	6/10/2014						6/10/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					3.3						3.7		
URANIUM-233					0.0035	U					0.0034	U	
URANIUM-234					0.00069	U					0.00067	U	
URANIUM-235					0.027						0.028		
URANIUM-235 (PERCENT)		0.812						0.751					
URANIUM-236					0.00092	U					0.0009	U	
URANIUM-238					3.3						3.7		

PROJ_NO: 05220	NSAMPLE	SD-200-SS						SD-201-01					
SDG: 680-102199-3	LAB_ID	680-102199-39						680-102199-36					
FRACTION: M	SAMP_DATE	6/10/2014						6/10/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					3.4						3.8		
URANIUM-233					0.0035	U					0.0033	U	
URANIUM-234					0.0007	U					0.00067	U	
URANIUM-235					0.026						0.03		
URANIUM-235 (PERCENT)		0.759						0.783					
URANIUM-236					0.00093	U					0.00089	U	
URANIUM-238					3.4						3.8		

PROJ_NO: 05220	NSAMPLE	SD-201-02						SD-201-SS					
SDG: 680-102199-3	LAB_ID	680-102199-37						680-102199-35					
FRACTION: M	SAMP_DATE	6/10/2014						6/10/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					2.5						4.6		
URANIUM-233					0.0033	U					0.0034	U	
URANIUM-234					0.00065	U					0.00069	U	
URANIUM-235					0.019						0.035		
URANIUM-235 (PERCENT)		0.754						0.755					
URANIUM-236					0.00087	U					0.00092	U	
URANIUM-238					2.5						4.6		

PROJ_NO: 05220	NSAMPLE	SD-202-01						SD-202-02					
SDG: 680-102199-3	LAB_ID	680-102199-23						680-102199-24					
FRACTION: M	SAMP_DATE	6/10/2014						6/10/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					2						0.84		
URANIUM-233					0.0032	U					0.0034	U	
URANIUM-234					0.00063	U					0.00068	U	
URANIUM-235					0.015						0.0063	J	P
URANIUM-235 (PERCENT)		0.744						0.753					
URANIUM-236					0.00084	U					0.0009	U	
URANIUM-238					2						0.83		

PROJ_NO: 05220	NSAMPLE	SD-202-SS						SD-203-01					
SDG: 680-102199-3	LAB_ID	680-102199-22						680-102199-19					
FRACTION: M	SAMP_DATE	6/10/2014						6/10/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					2.9						2.6		
URANIUM-233					0.0034	U					0.0033	U	
URANIUM-234					0.00068	U					0.00066	U	
URANIUM-235					0.022						0.019		
URANIUM-235 (PERCENT)		0.753						0.725					
URANIUM-236					0.00091	U					0.00088	U	
URANIUM-238					2.9						2.6		

PROJ_NO: 05220	NSAMPLE	SD-203-02						SD-203-SS					
SDG: 680-102199-3	LAB_ID	680-102199-20						680-102199-18					
FRACTION: M	SAMP_DATE	6/10/2014						6/10/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					3.3						3.9		
URANIUM-233					0.0035	U					0.0032	U	
URANIUM-234					0.0007	U					0.00064	U	
URANIUM-235					0.031						0.029		
URANIUM-235 (PERCENT)		0.931						0.738					
URANIUM-236					0.00093	U					0.00085	U	
URANIUM-238					3.3						3.9		

PROJ_NO: 05220	NSAMPLE	SD-218-01						SD-218-02					
SDG: 680-102199-3	LAB_ID	680-102199-16						680-102199-17					
FRACTION: M	SAMP_DATE	6/10/2014						6/10/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					1						0.69		
URANIUM-233					0.0037	U					0.0035	U	
URANIUM-234					0.00074	U					0.00069	U	
URANIUM-235					0.0076	J	P				0.005	J	P
URANIUM-235 (PERCENT)		0.754						0.73					
URANIUM-236					0.00099	U					0.00092	U	
URANIUM-238					1						0.68		

PROJ_NO: 05220	NSAMPLE	SD-218-SS						SD-219-01					
SDG: 680-102199-3	LAB_ID	680-102199-15						680-102199-12					
FRACTION: M	SAMP_DATE	6/10/2014						6/10/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					0.84						3.2		
URANIUM-233					0.0033	U					0.0035	U	
URANIUM-234					0.00066	U					0.0007	U	
URANIUM-235					0.0062	J	P				0.024		
URANIUM-235 (PERCENT)		0.741						0.744					
URANIUM-236					0.00088	U					0.00094	U	
URANIUM-238					0.83						3.2		

PROJ_NO: 05220	NSAMPLE	SD-219-02						SD-219-03					
SDG: 680-102199-3	LAB_ID	680-102199-13						680-102199-14					
FRACTION: M	SAMP_DATE	6/10/2014						6/10/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					1.1						3.6		
URANIUM-233					0.0036	U					0.0033	U	
URANIUM-234					0.00072	U					0.00065	U	
URANIUM-235					0.0084	J	P				0.027		
URANIUM-235 (PERCENT)		0.758						0.744					
URANIUM-236					0.00096	U					0.00087	U	
URANIUM-238					1.1						3.6		

PROJ_NO: 05220	NSAMPLE	SD-219-SS						SD-220-01					
SDG: 680-102199-3	LAB_ID	680-102199-11						680-102199-31					
FRACTION: M	SAMP_DATE	6/10/2014						6/10/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					2.4						3.1		
URANIUM-233					0.0031	U					0.0035	U	
URANIUM-234					0.00063	U					0.00071	U	
URANIUM-235					0.018						0.025		
URANIUM-235 (PERCENT)		0.744						0.8					
URANIUM-236					0.00084	U					0.00095	U	
URANIUM-238					2.4						3.1		

PROJ_NO: 05220	NSAMPLE	SD-220-02						SD-220-SS					
SDG: 680-102199-3	LAB_ID	680-102199-32						680-102199-30					
FRACTION: M	SAMP_DATE	6/10/2014						6/10/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					2						2.8		
URANIUM-233					0.0032	U					0.0036	U	
URANIUM-234					0.00064	U					0.00072	U	
URANIUM-235					0.02						0.022		
URANIUM-235 (PERCENT)		0.99						0.78					
URANIUM-236					0.00086	U					0.00096	U	
URANIUM-238					2						2.8		

PROJ_NO: 05220	NSAMPLE	SD-277-01						SD-277-02					
SDG: 680-102199-3	LAB_ID	680-102199-8						680-102199-9					
FRACTION: M	SAMP_DATE	6/9/2014						6/9/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					3.1						5.4		
URANIUM-233					0.0032	U					0.0035	U	
URANIUM-234					0.00064	U					0.00069	U	
URANIUM-235					0.023						0.041		
URANIUM-235 (PERCENT)		0.736						0.754					
URANIUM-236					0.00086	U					0.00092	U	
URANIUM-238					3.1						5.4		

PROJ_NO: 05220	NSAMPLE	SD-277-SS						SD-279-01					
SDG: 680-102199-3	LAB_ID	680-102199-7						680-102199-2					
FRACTION: M	SAMP_DATE	6/9/2014						6/9/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					3.2						3		
URANIUM-233					0.0034	U					0.0033	U	
URANIUM-234					0.00068	U					0.00067	U	
URANIUM-235					0.024						0.023		
URANIUM-235 (PERCENT)		0.744						0.761					
URANIUM-236					0.00091	U					0.00089	U	
URANIUM-238					3.2						3		

PROJ_NO: 05220	NSAMPLE	SD-279-02						SD-279-SS					
SDG: 680-102199-3	LAB_ID	680-102199-3						680-102199-1					
FRACTION: M	SAMP_DATE	6/9/2014						6/9/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					1.6						2.6		
URANIUM-233					0.0033	U					0.0036	U	
URANIUM-234					0.00066	U					0.00072	U	
URANIUM-235					0.012						0.019		
URANIUM-235 (PERCENT)		0.744						0.725					
URANIUM-236					0.00088	U					0.00096	U	
URANIUM-238					1.6						2.6		

PROJ_NO: 05220	NSAMPLE	SD-DUP-01					
SDG: 680-102199-3	LAB_ID	680-102199-33					
FRACTION: M	SAMP_DATE	6/10/2014					
MEDIA: SOIL	QC_TYPE	NM					
	UNITS	%			MG/KG		
	PCT_SOLIDS	100.0			100.0		
	DUP_OF						
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					3		
URANIUM-233					0.0036	U	
URANIUM-234					0.00071	U	
URANIUM-235					0.023		
URANIUM-235 (PERCENT)		0.761					
URANIUM-236					0.00095	U	
URANIUM-238					3		

PROJ_NO: 05220	NSAMPLE	SD-195-SS			SD-196-01			SD-196-02			SD-196-SS		
SDG: 680-102199-3	LAB_ID	680-102199-25			680-102199-27			680-102199-28			680-102199-26		
FRACTION: RAD	SAMP_DATE	6/10/2014			6/10/2014			6/10/2014			6/10/2014		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
URANIUM-233		1.25	U		0.472	U		0.131	U		1.08	U	
URANIUM-234		0.415	U		0.883	U		0.493	U		0.535	U	
URANIUM-235		0.0148			0.042			0.0283			0.0394		
URANIUM-236		0.00189	U		-0.00524	U		-0.00452	U		-0.00419	U	
URANIUM-238		0.312			0.862			0.59			0.826		

PROJ_NO: 05220	NSAMPLE	SD-200-01			SD-200-02			SD-200-SS			SD-201-01		
SDG: 680-102199-3	LAB_ID	680-102199-40			680-102199-41			680-102199-39			680-102199-36		
FRACTION: RAD	SAMP_DATE	6/10/2014			6/10/2014			6/10/2014			6/10/2014		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
URANIUM-233		0.772	U		0.855	U		0.567	U		0.911	U	
URANIUM-234		1.35	U		1.55	U		1.55	U		1.82	U	
URANIUM-235		0.0576			0.0602			0.0558			0.0654		
URANIUM-236		0.00211	U		0.00122	U		0.0006	U		0.00224	U	
URANIUM-238		1.12			1.24			1.15			1.29		

PROJ_NO: 05220	NSAMPLE	SD-201-02			SD-201-SS			SD-202-01			SD-202-02		
SDG: 680-102199-3	LAB_ID	680-102199-37			680-102199-35			680-102199-23			680-102199-24		
FRACTION: RAD	SAMP_DATE	6/10/2014			6/10/2014			6/10/2014			6/10/2014		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
URANIUM-233		0.987	U		0.992	U		0.515	U		1.02	U	
URANIUM-234		1.17	U		1.93	U		0.869	U		0.479	U	
URANIUM-235		0.0408			0.0746			0.0317			0.0136		
URANIUM-236		0.00347	U		0.0037	U		0.00177	U		0.00178	U	
URANIUM-238		0.849			1.56			0.666			0.28		

PROJ_NO: 05220	NSAMPLE	SD-202-SS			SD-203-01			SD-203-02			SD-203-SS		
SDG: 680-102199-3	LAB_ID	680-102199-22			680-102199-19			680-102199-20			680-102199-18		
FRACTION: RAD	SAMP_DATE	6/10/2014			6/10/2014			6/10/2014			6/10/2014		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
URANIUM-233		0.503	U		1.03	U		1.04	U		1.18	U	
URANIUM-234		1.33	U		1.28	U		1.69	U		1.61	U	
URANIUM-235		0.0467			0.0415			0.0675			0.0629		
URANIUM-236		0.00291	U		0.00325	U		0.00247	U		0.00258	U	
URANIUM-238		0.959			0.865			1.09			1.31		

PROJ_NO: 05220	NSAMPLE	SD-218-01			SD-218-02			SD-218-SS			SD-219-01		
SDG: 680-102199-3	LAB_ID	680-102199-16			680-102199-17			680-102199-15			680-102199-12		
FRACTION: RAD	SAMP_DATE	6/10/2014			6/10/2014			6/10/2014			6/10/2014		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
URANIUM-233		1.08	U		1.17	U		1.48	U		0.659	U	
URANIUM-234		0.728	U		0.37	U		0.583	U		1.44	U	
URANIUM-235		0.0165			0.0109			0.0134			0.0515		
URANIUM-236		0.00255	U		0.00068	U		0.00396	U		0.00139	U	
URANIUM-238		0.353			0.228			0.278			1.07		

PROJ_NO: 05220	NSAMPLE	SD-219-02			SD-219-03			SD-219-SS			SD-220-01		
SDG: 680-102199-3	LAB_ID	680-102199-13			680-102199-14			680-102199-11			680-102199-31		
FRACTION: RAD	SAMP_DATE	6/10/2014			6/10/2014			6/10/2014			6/10/2014		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
URANIUM-233		0.848	U		0.898	U		0.948	U		0.939	U	
URANIUM-234		0.604	U		1.19	U		1.31	U		1.53	U	
URANIUM-235		0.0182			0.0574			0.039			0.054		
URANIUM-236		0.00095	U		0.00121	U		0.00349	U		0.00187	U	
URANIUM-238		0.384			1.2			0.817			1.03		

PROJ_NO: 05220	NSAMPLE	SD-220-02			SD-220-SS			SD-277-01			SD-277-02		
SDG: 680-102199-3	LAB_ID	680-102199-32			680-102199-30			680-102199-8			680-102199-9		
FRACTION: RAD	SAMP_DATE	6/10/2014			6/10/2014			6/9/2014			6/9/2014		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
URANIUM-233		0.758	U		0.863	U		0.813	U		1.25	U	
URANIUM-234		1.22	U		1.21	U		1.11	U		2.09	U	
URANIUM-235		0.0429			0.0468			0.0498			0.0878		
URANIUM-236		0.00361	U		0.00211	U		0.00024	U		0.00146	U	
URANIUM-238		0.672			0.948			1.03			1.83		

PROJ_NO: 05220	NSAMPLE	SD-277-SS			SD-279-01			SD-279-02			SD-279-SS		
SDG: 680-102199-3	LAB_ID	680-102199-7			680-102199-2			680-102199-3			680-102199-1		
FRACTION: RAD	SAMP_DATE	6/9/2014			6/9/2014			6/9/2014			6/9/2014		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
URANIUM-233		1.06	U		1	U		0.462	U		0.56	U	
URANIUM-234		1.3	U		1.31	U		0.794	U		1.33	U	
URANIUM-235		0.0514			0.0486			0.0257			0.042		
URANIUM-236		0.00067	U		0.00078	U		0.00028	U		0.00124	U	
URANIUM-238		1.07			1.02			0.539			0.868		

PROJ_NO: 05220	NSAMPLE	SD-DUP-01		
SDG: 680-102199-3	LAB_ID	680-102199-33		
FRACTION: RAD	SAMP_DATE	6/10/2014		
MEDIA: SOIL	QC_TYPE	NM		
	UNITS	PCI/G		
	PCT_SOLIDS	100.0		
	DUP_OF			
PARAMETER		RESULT	VQL	QLCD
URANIUM-233		0.643	U	
URANIUM-234		1.29	U	
URANIUM-235		0.0496		
URANIUM-236		0.00148	U	
URANIUM-238		1.02		

Appendix B

Results as Reported by the Laboratory

Client Sample ID: SD-196-02

Lab Sample ID: 680-102199-28

Date Collected: 06/10/14 14:10
Date Received: 06/11/14 09:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/12/14 11:13	08/18/14 16:05	5
U-234	ND		0.012	0.00073	mg/Kg		08/12/14 11:13	08/18/14 16:05	5
U-235	0.013		0.012	0.0049	mg/Kg		08/12/14 11:13	08/18/14 16:05	5
U-236	ND		0.012	0.00097	mg/Kg		08/12/14 11:13	08/18/14 16:05	5
U-238	1.8	B	0.012	0.00073	mg/Kg		08/12/14 11:13	08/18/14 16:05	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.8		0.0050	0.00030	mg/Kg			08/19/14 12:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
U-233	0.131	U	117	35.1	pCi/g		08/12/14 11:13	08/18/14 16:05	5
U-234	0.493	U	75.6	4.53	pCi/g		08/12/14 11:13	08/18/14 16:05	5
U-235	0.0283		0.0262	0.0107	pCi/g		08/12/14 11:13	08/18/14 16:05	5
U-236	-0.00452	U	0.785	0.0629	pCi/g		08/12/14 11:13	08/18/14 16:05	5
U-238	0.590		0.00408	0.000245	pCi/g		08/12/14 11:13	08/18/14 16:05	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Percent U-235	0.717				%			08/19/14 12:17	1

Client Sample ID: SD-220-SS

Lab Sample ID: 680-102199-30

Date Collected: 06/10/14 14:40
Date Received: 06/11/14 09:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/12/14 10:57	08/14/14 16:05	5
U-234	ND		0.012	0.00072	mg/Kg		08/12/14 10:57	08/14/14 16:05	5
U-235	0.022		0.012	0.0049	mg/Kg		08/12/14 10:57	08/14/14 16:05	5
U-236	ND		0.012	0.00096	mg/Kg		08/12/14 10:57	08/14/14 16:05	5
U-238	2.8	B	0.012	0.00072	mg/Kg		08/12/14 10:57	08/14/14 16:05	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.8		0.0050	0.00030	mg/Kg			08/19/14 12:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
U-233	0.863	U	115	34.6	pCi/g		08/12/14 10:57	08/14/14 16:05	5
U-234	1.21	U	74.5	4.47	pCi/g		08/12/14 10:57	08/14/14 16:05	5
U-235	0.0468		0.0259	0.0105	pCi/g		08/12/14 10:57	08/14/14 16:05	5
U-236	0.00211	U	0.775	0.0620	pCi/g		08/12/14 10:57	08/14/14 16:05	5
U-238	0.948		0.00403	0.000242	pCi/g		08/12/14 10:57	08/14/14 16:05	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Percent U-235	0.780				%			08/19/14 12:16	1

Client Sample ID: SD-279-SS

Date Collected: 06/09/14 15:40
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-1
Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/12/14 10:34	08/14/14 13:50	5
U-234	ND		0.012	0.00072	mg/Kg		08/12/14 10:34	08/14/14 13:50	5
U-235	0.019		0.012	0.0049	mg/Kg		08/12/14 10:34	08/14/14 13:50	5
U-236	ND		0.012	0.00096	mg/Kg		08/12/14 10:34	08/14/14 13:50	5
U-238	2.6	B	0.012	0.00072	mg/Kg		08/12/14 10:34	08/14/14 13:50	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.6		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
U-233	0.560	U	116	34.7	pCi/g		08/12/14 10:34	08/14/14 13:50	5
U-234	1.33	U	74.8	4.49	pCi/g		08/12/14 10:34	08/14/14 13:50	5
U-235	0.0420		0.0260	0.0106	pCi/g		08/12/14 10:34	08/14/14 13:50	5
U-236	0.00124	U	0.777	0.0622	pCi/g		08/12/14 10:34	08/14/14 13:50	5
U-238	0.868		0.00404	0.000243	pCi/g		08/12/14 10:34	08/14/14 13:50	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Percent U-235	0.725				%			08/19/14 12:11	1

Client Sample ID: SD-279-01

Date Collected: 06/09/14 15:45
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-2
Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0033	mg/Kg		08/12/14 10:34	08/14/14 14:08	5
U-234	ND		0.011	0.00067	mg/Kg		08/12/14 10:34	08/14/14 14:08	5
U-235	0.023		0.011	0.0045	mg/Kg		08/12/14 10:34	08/14/14 14:08	5
U-236	ND		0.011	0.00089	mg/Kg		08/12/14 10:34	08/14/14 14:08	5
U-238	3.0	B	0.011	0.00067	mg/Kg		08/12/14 10:34	08/14/14 14:08	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.0		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
U-233	1.00	U	108	32.3	pCi/g		08/12/14 10:34	08/14/14 14:08	5
U-234	1.31	U	69.5	4.17	pCi/g		08/12/14 10:34	08/14/14 14:08	5
U-235	0.0486		0.0241	0.00982	pCi/g		08/12/14 10:34	08/14/14 14:08	5
U-236	0.000780	U	0.722	0.0578	pCi/g		08/12/14 10:34	08/14/14 14:08	5
U-238	1.02		0.00375	0.000226	pCi/g		08/12/14 10:34	08/14/14 14:08	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Percent U-235	0.761				%			08/19/14 12:11	1

Client Sample ID: SD-279-02

Date Collected: 06/09/14 15:50
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-3
Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0033	mg/Kg		08/12/14 10:34	08/14/14 14:13	5
U-234	ND		0.011	0.00066	mg/Kg		08/12/14 10:34	08/14/14 14:13	5
U-235	0.012		0.011	0.0045	mg/Kg		08/12/14 10:34	08/14/14 14:13	5
U-236	ND		0.011	0.00088	mg/Kg		08/12/14 10:34	08/14/14 14:13	5
U-238	1.6	B	0.011	0.00066	mg/Kg		08/12/14 10:34	08/14/14 14:13	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.6		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
U-233	0.462	U	106	31.8	pCi/g		08/12/14 10:34	08/14/14 14:13	5
U-234	0.794	U	68.5	4.11	pCi/g		08/12/14 10:34	08/14/14 14:13	5
U-235	0.0257		0.0238	0.00968	pCi/g		08/12/14 10:34	08/14/14 14:13	5
U-236	0.000285	U	0.712	0.0570	pCi/g		08/12/14 10:34	08/14/14 14:13	5
U-238	0.539		0.00370	0.000222	pCi/g		08/12/14 10:34	08/14/14 14:13	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Percent U-235	0.744				%			08/19/14 12:11	1

Client Sample ID: SD-277-SS

Date Collected: 06/09/14 18:10
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-7
Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0034	mg/Kg		08/12/14 10:34	08/14/14 14:18	5
U-234	ND		0.011	0.00068	mg/Kg		08/12/14 10:34	08/14/14 14:18	5
U-235	0.024		0.011	0.0046	mg/Kg		08/12/14 10:34	08/14/14 14:18	5
U-236	ND		0.011	0.00091	mg/Kg		08/12/14 10:34	08/14/14 14:18	5
U-238	3.2	B	0.011	0.00068	mg/Kg		08/12/14 10:34	08/14/14 14:18	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.2		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
U-233	1.06	U	110	32.9	pCi/g		08/12/14 10:34	08/14/14 14:18	5
U-234	1.30	U	70.8	4.25	pCi/g		08/12/14 10:34	08/14/14 14:18	5
U-235	0.0514		0.0246	0.0100	pCi/g		08/12/14 10:34	08/14/14 14:18	5
U-236	0.000677	U	0.736	0.0590	pCi/g		08/12/14 10:34	08/14/14 14:18	5
U-238	1.07		0.00383	0.000230	pCi/g		08/12/14 10:34	08/14/14 14:18	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Percent U-235	0.744				%			08/19/14 12:11	1

Client Sample ID: SD-277-01

Date Collected: 06/09/14 18:15
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-8
Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0032	mg/Kg		08/12/14 10:34	08/14/14 14:22	5
U-234	ND		0.011	0.00064	mg/Kg		08/12/14 10:34	08/14/14 14:22	5
U-235	0.023		0.011	0.0043	mg/Kg		08/12/14 10:34	08/14/14 14:22	5
U-236	ND		0.011	0.00086	mg/Kg		08/12/14 10:34	08/14/14 14:22	5
U-238	3.1	B	0.011	0.00064	mg/Kg		08/12/14 10:34	08/14/14 14:22	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.1		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
U-233	0.813	U	103	31.0	pCi/g		08/12/14 10:34	08/14/14 14:22	5
U-234	1.11	U	66.6	4.00	pCi/g		08/12/14 10:34	08/14/14 14:22	5
U-235	0.0498		0.0231	0.00943	pCi/g		08/12/14 10:34	08/14/14 14:22	5
U-236	0.000249	U	0.693	0.0555	pCi/g		08/12/14 10:34	08/14/14 14:22	5
U-238	1.03		0.00360	0.000216	pCi/g		08/12/14 10:34	08/14/14 14:22	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Percent U-235	0.736				%			08/19/14 12:11	1

Client Sample ID: SD-277-02

Date Collected: 06/09/14 18:20
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-9
Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0035	mg/Kg		08/12/14 10:34	08/14/14 14:27	5
U-234	ND		0.012	0.00069	mg/Kg		08/12/14 10:34	08/14/14 14:27	5
U-235	0.041		0.012	0.0047	mg/Kg		08/12/14 10:34	08/14/14 14:27	5
U-236	ND		0.012	0.00092	mg/Kg		08/12/14 10:34	08/14/14 14:27	5
U-238	5.4	B	0.012	0.00069	mg/Kg		08/12/14 10:34	08/14/14 14:27	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	5.4		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
U-233	1.25	U	111	33.3	pCi/g		08/12/14 10:34	08/14/14 14:27	5
U-234	2.09	U	71.6	4.30	pCi/g		08/12/14 10:34	08/14/14 14:27	5
U-235	0.0878		0.0249	0.0101	pCi/g		08/12/14 10:34	08/14/14 14:27	5
U-236	0.00146	U	0.745	0.0596	pCi/g		08/12/14 10:34	08/14/14 14:27	5
U-238	1.83		0.00387	0.000233	pCi/g		08/12/14 10:34	08/14/14 14:27	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Percent U-235	0.754				%			08/19/14 12:11	1

Client Sample ID: SD-219-SS

Lab Sample ID: 680-102199-11

Date Collected: 06/10/14 09:20
Date Received: 06/11/14 09:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.010	0.0031	mg/Kg		08/12/14 10:34	08/14/14 14:41	5
U-234	ND		0.010	0.00063	mg/Kg		08/12/14 10:34	08/14/14 14:41	5
U-235	0.018		0.010	0.0042	mg/Kg		08/12/14 10:34	08/14/14 14:41	5
U-236	ND		0.010	0.00084	mg/Kg		08/12/14 10:34	08/14/14 14:41	5
U-238	2.4	B	0.010	0.00063	mg/Kg		08/12/14 10:34	08/14/14 14:41	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.4		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
U-233	0.948	U	101	30.3	pCi/g		08/12/14 10:34	08/14/14 14:41	5
U-234	1.31	U	65.1	3.91	pCi/g		08/12/14 10:34	08/14/14 14:41	5
U-235	0.0390		0.0226	0.00921	pCi/g		08/12/14 10:34	08/14/14 14:41	5
U-236	0.00349	U	0.677	0.0542	pCi/g		08/12/14 10:34	08/14/14 14:41	5
U-238	0.817		0.00352	0.000211	pCi/g		08/12/14 10:34	08/14/14 14:41	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Percent U-235	0.744				%			08/19/14 12:11	1

Client Sample ID: SD-219-01

Lab Sample ID: 680-102199-12

Date Collected: 06/10/14 09:22
Date Received: 06/11/14 09:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0035	mg/Kg		08/12/14 10:34	08/14/14 14:46	5
U-234	ND		0.012	0.00070	mg/Kg		08/12/14 10:34	08/14/14 14:46	5
U-235	0.024		0.012	0.0048	mg/Kg		08/12/14 10:34	08/14/14 14:46	5
U-236	ND		0.012	0.00094	mg/Kg		08/12/14 10:34	08/14/14 14:46	5
U-238	3.2	B	0.012	0.00070	mg/Kg		08/12/14 10:34	08/14/14 14:46	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.2		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
U-233	0.659	U	113	33.9	pCi/g		08/12/14 10:34	08/14/14 14:46	5
U-234	1.44	U	72.9	4.38	pCi/g		08/12/14 10:34	08/14/14 14:46	5
U-235	0.0515		0.0253	0.0103	pCi/g		08/12/14 10:34	08/14/14 14:46	5
U-236	0.00139	U	0.758	0.0607	pCi/g		08/12/14 10:34	08/14/14 14:46	5
U-238	1.07		0.00394	0.000237	pCi/g		08/12/14 10:34	08/14/14 14:46	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Percent U-235	0.744				%			08/19/14 12:11	1

Client Sample ID: SD-219-02

Lab Sample ID: 680-102199-13

Date Collected: 06/10/14 09:25
Date Received: 06/11/14 09:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/12/14 10:34	08/14/14 14:50	5
U-234	ND		0.012	0.00072	mg/Kg		08/12/14 10:34	08/14/14 14:50	5
U-235	0.0084	J	0.012	0.0049	mg/Kg		08/12/14 10:34	08/14/14 14:50	5
U-236	ND		0.012	0.00096	mg/Kg		08/12/14 10:34	08/14/14 14:50	5
U-238	1.1	B	0.012	0.00072	mg/Kg		08/12/14 10:34	08/14/14 14:50	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.1		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
U-233	0.848	U	115	34.6	pCi/g		08/12/14 10:34	08/14/14 14:50	5
U-234	0.604	U	74.4	4.47	pCi/g		08/12/14 10:34	08/14/14 14:50	5
U-235	0.0182		0.0259	0.0105	pCi/g		08/12/14 10:34	08/14/14 14:50	5
U-236	0.000959	U	0.774	0.0620	pCi/g		08/12/14 10:34	08/14/14 14:50	5
U-238	0.384		0.00402	0.000242	pCi/g		08/12/14 10:34	08/14/14 14:50	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Percent U-235	0.758				%			08/19/14 12:11	1

Client Sample ID: SD-219-03

Lab Sample ID: 680-102199-14

Date Collected: 06/10/14 09:28
Date Received: 06/11/14 09:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0033	mg/Kg		08/12/14 10:34	08/14/14 14:55	5
U-234	ND		0.011	0.00065	mg/Kg		08/12/14 10:34	08/14/14 14:55	5
U-235	0.027		0.011	0.0044	mg/Kg		08/12/14 10:34	08/14/14 14:55	5
U-236	ND		0.011	0.00087	mg/Kg		08/12/14 10:34	08/14/14 14:55	5
U-238	3.6	B	0.011	0.00065	mg/Kg		08/12/14 10:34	08/14/14 14:55	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.6		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
U-233	0.898	U	104	31.3	pCi/g		08/12/14 10:34	08/14/14 14:55	5
U-234	1.19	U	67.5	4.05	pCi/g		08/12/14 10:34	08/14/14 14:55	5
U-235	0.0574		0.0234	0.00954	pCi/g		08/12/14 10:34	08/14/14 14:55	5
U-236	0.00121	U	0.701	0.0562	pCi/g		08/12/14 10:34	08/14/14 14:55	5
U-238	1.20		0.00364	0.000219	pCi/g		08/12/14 10:34	08/14/14 14:55	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Percent U-235	0.744				%			08/19/14 12:11	1

Client Sample ID: SD-218-SS

Lab Sample ID: 680-102199-15

Date Collected: 06/10/14 10:10
Date Received: 06/11/14 09:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0033	mg/Kg		08/12/14 10:34	08/14/14 15:00	5
U-234	ND		0.011	0.00066	mg/Kg		08/12/14 10:34	08/14/14 15:00	5
U-235	0.0062	J	0.011	0.0044	mg/Kg		08/12/14 10:34	08/14/14 15:00	5
U-236	ND		0.011	0.00088	mg/Kg		08/12/14 10:34	08/14/14 15:00	5
U-238	0.83	B	0.011	0.00066	mg/Kg		08/12/14 10:34	08/14/14 15:00	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.84		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
U-233	1.48	U	105	31.6	pCi/g		08/12/14 10:34	08/14/14 15:00	5
U-234	0.583	U	68.1	4.09	pCi/g		08/12/14 10:34	08/14/14 15:00	5
U-235	0.0134		0.0237	0.00963	pCi/g		08/12/14 10:34	08/14/14 15:00	5
U-236	0.00396	U	0.708	0.0567	pCi/g		08/12/14 10:34	08/14/14 15:00	5
U-238	0.278		0.00368	0.000221	pCi/g		08/12/14 10:34	08/14/14 15:00	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Percent U-235	0.741				%			08/19/14 12:11	1

Client Sample ID: SD-218-01

Lab Sample ID: 680-102199-16

Date Collected: 06/10/14 10:12
Date Received: 06/11/14 09:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0037	mg/Kg		08/12/14 10:34	08/14/14 15:04	5
U-234	ND		0.012	0.00074	mg/Kg		08/12/14 10:34	08/14/14 15:04	5
U-235	0.0076	J	0.012	0.0050	mg/Kg		08/12/14 10:34	08/14/14 15:04	5
U-236	ND		0.012	0.00099	mg/Kg		08/12/14 10:34	08/14/14 15:04	5
U-238	1.0	B	0.012	0.00074	mg/Kg		08/12/14 10:34	08/14/14 15:04	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.0		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
U-233	1.08	U	119	35.7	pCi/g		08/12/14 10:34	08/14/14 15:04	5
U-234	0.728	U	76.8	4.61	pCi/g		08/12/14 10:34	08/14/14 15:04	5
U-235	0.0165		0.0267	0.0109	pCi/g		08/12/14 10:34	08/14/14 15:04	5
U-236	0.00255	U	0.798	0.0639	pCi/g		08/12/14 10:34	08/14/14 15:04	5
U-238	0.353		0.00415	0.000249	pCi/g		08/12/14 10:34	08/14/14 15:04	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Percent U-235	0.754				%			08/19/14 12:11	1

Client Sample ID: SD-218-02

Lab Sample ID: 680-102199-17

Date Collected: 06/10/14 10:14
Date Received: 06/11/14 09:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0035	mg/Kg		08/12/14 10:34	08/14/14 15:09	5
U-234	ND		0.012	0.00069	mg/Kg		08/12/14 10:34	08/14/14 15:09	5
U-235	0.0050	J	0.012	0.0047	mg/Kg		08/12/14 10:34	08/14/14 15:09	5
U-236	ND		0.012	0.00092	mg/Kg		08/12/14 10:34	08/14/14 15:09	5
U-238	0.68	B	0.012	0.00069	mg/Kg		08/12/14 10:34	08/14/14 15:09	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.69		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
U-233	1.17	U	111	33.3	pCi/g		08/12/14 10:34	08/14/14 15:09	5
U-234	0.370	U	71.7	4.30	pCi/g		08/12/14 10:34	08/14/14 15:09	5
U-235	0.0109		0.0249	0.0101	pCi/g		08/12/14 10:34	08/14/14 15:09	5
U-236	0.000686	U	0.745	0.0597	pCi/g		08/12/14 10:34	08/14/14 15:09	5
U-238	0.228		0.00387	0.000233	pCi/g		08/12/14 10:34	08/14/14 15:09	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Percent U-235	0.730				%			08/19/14 12:11	1

Client Sample ID: SD-203-SS

Lab Sample ID: 680-102199-18

Date Collected: 06/10/14 11:40
Date Received: 06/11/14 09:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0032	mg/Kg		08/12/14 10:34	08/14/14 15:14	5
U-234	ND		0.011	0.00064	mg/Kg		08/12/14 10:34	08/14/14 15:14	5
U-235	0.029		0.011	0.0043	mg/Kg		08/12/14 10:34	08/14/14 15:14	5
U-236	ND		0.011	0.00085	mg/Kg		08/12/14 10:34	08/14/14 15:14	5
U-238	3.9	B	0.011	0.00064	mg/Kg		08/12/14 10:34	08/14/14 15:14	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.9		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
U-233	1.18	U	102	30.6	pCi/g		08/12/14 10:34	08/14/14 15:14	5
U-234	1.61	U	65.9	3.95	pCi/g		08/12/14 10:34	08/14/14 15:14	5
U-235	0.0629		0.0229	0.00932	pCi/g		08/12/14 10:34	08/14/14 15:14	5
U-236	0.00258	U	0.685	0.0549	pCi/g		08/12/14 10:34	08/14/14 15:14	5
U-238	1.31		0.00356	0.000214	pCi/g		08/12/14 10:34	08/14/14 15:14	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Percent U-235	0.738				%			08/19/14 12:11	1

Client Sample ID: SD-203-01

Lab Sample ID: 680-102199-19

Date Collected: 06/10/14 11:45
Date Received: 06/11/14 09:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0033	mg/Kg		08/12/14 10:34	08/14/14 15:18	5
U-234	ND		0.011	0.00066	mg/Kg		08/12/14 10:34	08/14/14 15:18	5
U-235	0.019		0.011	0.0045	mg/Kg		08/12/14 10:34	08/14/14 15:18	5
U-236	ND		0.011	0.00088	mg/Kg		08/12/14 10:34	08/14/14 15:18	5
U-238	2.6	B	0.011	0.00066	mg/Kg		08/12/14 10:34	08/14/14 15:18	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.6		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
U-233	1.03	U	106	31.8	pCi/g		08/12/14 10:34	08/14/14 15:18	5
U-234	1.28	U	68.5	4.11	pCi/g		08/12/14 10:34	08/14/14 15:18	5
U-235	0.0415		0.0238	0.00969	pCi/g		08/12/14 10:34	08/14/14 15:18	5
U-236	0.00325	U	0.712	0.0570	pCi/g		08/12/14 10:34	08/14/14 15:18	5
U-238	0.865		0.00370	0.000222	pCi/g		08/12/14 10:34	08/14/14 15:18	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Percent U-235	0.725				%			08/19/14 12:11	1

Client Sample ID: SD-203-02

Lab Sample ID: 680-102199-20

Date Collected: 06/10/14 11:50
Date Received: 06/11/14 09:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0035	mg/Kg		08/12/14 10:34	08/14/14 15:23	5
U-234	ND		0.012	0.00070	mg/Kg		08/12/14 10:34	08/14/14 15:23	5
U-235	0.031		0.012	0.0047	mg/Kg		08/12/14 10:34	08/14/14 15:23	5
U-236	ND		0.012	0.00093	mg/Kg		08/12/14 10:34	08/14/14 15:23	5
U-238	3.3	B	0.012	0.00070	mg/Kg		08/12/14 10:34	08/14/14 15:23	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.3		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
U-233	1.04	U	112	33.6	pCi/g		08/12/14 10:34	08/14/14 15:23	5
U-234	1.69	U	72.4	4.34	pCi/g		08/12/14 10:34	08/14/14 15:23	5
U-235	0.0675		0.0251	0.0102	pCi/g		08/12/14 10:34	08/14/14 15:23	5
U-236	0.00247	U	0.752	0.0603	pCi/g		08/12/14 10:34	08/14/14 15:23	5
U-238	1.09		0.00391	0.000235	pCi/g		08/12/14 10:34	08/14/14 15:23	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Percent U-235	0.931				%			08/19/14 12:11	1

Client Sample ID: SD-202-SS

Date Collected: 06/10/14 12:20
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-22
Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0034	mg/Kg		08/12/14 10:34	08/14/14 15:37	5
U-234	ND		0.011	0.00068	mg/Kg		08/12/14 10:34	08/14/14 15:37	5
U-235	0.022		0.011	0.0046	mg/Kg		08/12/14 10:34	08/14/14 15:37	5
U-236	ND		0.011	0.00091	mg/Kg		08/12/14 10:34	08/14/14 15:37	5
U-238	2.9	B	0.011	0.00068	mg/Kg		08/12/14 10:34	08/14/14 15:37	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.9		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
U-233	0.503	U	109	32.8	pCi/g		08/12/14 10:34	08/14/14 15:37	5
U-234	1.33	U	70.6	4.24	pCi/g		08/12/14 10:34	08/14/14 15:37	5
U-235	0.0467		0.0245	0.00999	pCi/g		08/12/14 10:34	08/14/14 15:37	5
U-236	0.00291	U	0.734	0.0588	pCi/g		08/12/14 10:34	08/14/14 15:37	5
U-238	0.959		0.00381	0.000229	pCi/g		08/12/14 10:34	08/14/14 15:37	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Percent U-235	0.753				%			08/19/14 12:11	1

Client Sample ID: SD-202-01

Date Collected: 06/10/14 12:25
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-23
Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0032	mg/Kg		08/12/14 10:34	08/14/14 15:42	5
U-234	ND		0.011	0.00063	mg/Kg		08/12/14 10:34	08/14/14 15:42	5
U-235	0.015		0.011	0.0043	mg/Kg		08/12/14 10:34	08/14/14 15:42	5
U-236	ND		0.011	0.00084	mg/Kg		08/12/14 10:34	08/14/14 15:42	5
U-238	2.0	B	0.011	0.00063	mg/Kg		08/12/14 10:34	08/14/14 15:42	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.0		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
U-233	0.515	U	101	30.4	pCi/g		08/12/14 10:34	08/14/14 15:42	5
U-234	0.869	U	65.4	3.93	pCi/g		08/12/14 10:34	08/14/14 15:42	5
U-235	0.0317		0.0227	0.00925	pCi/g		08/12/14 10:34	08/14/14 15:42	5
U-236	0.00177	U	0.680	0.0545	pCi/g		08/12/14 10:34	08/14/14 15:42	5
U-238	0.666		0.00353	0.000212	pCi/g		08/12/14 10:34	08/14/14 15:42	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Percent U-235	0.744				%			08/19/14 12:11	1

Client Sample ID: SD-202-02

Lab Sample ID: 680-102199-24

Date Collected: 06/10/14 12:30
Date Received: 06/11/14 09:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^ *	0.011	0.0034	mg/Kg		08/12/14 10:34	08/14/14 15:46	5
U-234	ND	^	0.011	0.00068	mg/Kg		08/12/14 10:34	08/14/14 15:46	5
U-235	0.0063	J ^	0.011	0.0046	mg/Kg		08/12/14 10:34	08/14/14 15:46	5
U-236	ND	^	0.011	0.00090	mg/Kg		08/12/14 10:34	08/14/14 15:46	5
U-238	0.83	B	0.011	0.00068	mg/Kg		08/12/14 10:34	08/14/14 15:46	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.84		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
U-233	1.02	U	109	32.6	pCi/g		08/12/14 10:34	08/14/14 15:46	5
U-234	0.479	U	70.1	4.20	pCi/g		08/12/14 10:34	08/14/14 15:46	5
U-235	0.0136		0.0243	0.00991	pCi/g		08/12/14 10:34	08/14/14 15:46	5
U-236	0.00178	U	0.728	0.0583	pCi/g		08/12/14 10:34	08/14/14 15:46	5
U-238	0.280		0.00378	0.000227	pCi/g		08/12/14 10:34	08/14/14 15:46	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Percent U-235	0.753				%			08/19/14 12:11	1

Client Sample ID: SD-195-SS

Lab Sample ID: 680-102199-25

Date Collected: 06/10/14 13:30
Date Received: 06/11/14 09:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0037	mg/Kg		08/12/14 10:34	08/14/14 15:51	5
U-234	ND		0.012	0.00074	mg/Kg		08/12/14 10:34	08/14/14 15:51	5
U-235	0.0068	J	0.012	0.0050	mg/Kg		08/12/14 10:34	08/14/14 15:51	5
U-236	ND		0.012	0.00099	mg/Kg		08/12/14 10:34	08/14/14 15:51	5
U-238	0.93	B	0.012	0.00074	mg/Kg		08/12/14 10:34	08/14/14 15:51	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.94		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
U-233	1.25	U	119	35.7	pCi/g		08/12/14 10:34	08/14/14 15:51	5
U-234	0.415	U	76.9	4.61	pCi/g		08/12/14 10:34	08/14/14 15:51	5
U-235	0.0148		0.0267	0.0109	pCi/g		08/12/14 10:34	08/14/14 15:51	5
U-236	0.00189	U	0.799	0.0640	pCi/g		08/12/14 10:34	08/14/14 15:51	5
U-238	0.312		0.00415	0.000250	pCi/g		08/12/14 10:34	08/14/14 15:51	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Percent U-235	0.726				%			08/19/14 12:11	1

Client Sample ID: SD-196-SS

Lab Sample ID: 680-102199-26

Date Collected: 06/10/14 14:00
Date Received: 06/11/14 09:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0037	mg/Kg		08/12/14 10:57	08/18/14 15:56	5
U-234	ND		0.012	0.00074	mg/Kg		08/12/14 10:57	08/18/14 15:56	5
U-235	0.018		0.012	0.0050	mg/Kg		08/12/14 10:57	08/18/14 15:56	5
U-236	ND		0.012	0.00098	mg/Kg		08/12/14 10:57	08/18/14 15:56	5
U-238	2.5	B	0.012	0.00074	mg/Kg		08/12/14 10:57	08/18/14 15:56	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.5		0.0050	0.00030	mg/Kg			08/19/14 12:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
U-233	1.08	U	118	35.5	pCi/g		08/12/14 10:57	08/18/14 15:56	5
U-234	0.535	U	76.4	4.59	pCi/g		08/12/14 10:57	08/18/14 15:56	5
U-235	0.0394		0.0265	0.0108	pCi/g		08/12/14 10:57	08/18/14 15:56	5
U-236	-0.00419	U	0.794	0.0636	pCi/g		08/12/14 10:57	08/18/14 15:56	5
U-238	0.826		0.00413	0.000248	pCi/g		08/12/14 10:57	08/18/14 15:56	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Percent U-235	0.715				%			08/19/14 12:17	1

Client Sample ID: SD-196-01

Lab Sample ID: 680-102199-27

Date Collected: 06/10/14 14:05
Date Received: 06/11/14 09:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0037	mg/Kg		08/12/14 11:13	08/18/14 16:01	5
U-234	ND		0.012	0.00074	mg/Kg		08/12/14 11:13	08/18/14 16:01	5
U-235	0.019		0.012	0.0050	mg/Kg		08/12/14 11:13	08/18/14 16:01	5
U-236	ND		0.012	0.00099	mg/Kg		08/12/14 11:13	08/18/14 16:01	5
U-238	2.6	B	0.012	0.00074	mg/Kg		08/12/14 11:13	08/18/14 16:01	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.6		0.0050	0.00030	mg/Kg			08/19/14 12:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
U-233	0.472	U	119	35.7	pCi/g		08/12/14 11:13	08/18/14 16:01	5
U-234	0.883	U	76.9	4.61	pCi/g		08/12/14 11:13	08/18/14 16:01	5
U-235	0.0420		0.0267	0.0109	pCi/g		08/12/14 11:13	08/18/14 16:01	5
U-236	-0.00524	U	0.799	0.0640	pCi/g		08/12/14 11:13	08/18/14 16:01	5
U-238	0.862		0.00415	0.000250	pCi/g		08/12/14 11:13	08/18/14 16:01	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Percent U-235	0.725				%			08/19/14 12:17	1

Client Sample ID: SD-220-01

Lab Sample ID: 680-102199-31

Date Collected: 06/10/14 14:42
Date Received: 06/11/14 09:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0035	mg/Kg		08/12/14 10:57	08/14/14 17:00	5
U-234	ND		0.012	0.00071	mg/Kg		08/12/14 10:57	08/14/14 17:00	5
U-235	0.025		0.012	0.0048	mg/Kg		08/12/14 10:57	08/14/14 17:00	5
U-236	ND		0.012	0.00095	mg/Kg		08/12/14 10:57	08/14/14 17:00	5
U-238	3.1	B	0.012	0.00071	mg/Kg		08/12/14 10:57	08/14/14 17:00	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.1		0.0050	0.00030	mg/Kg			08/19/14 12:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
U-233	0.939	U	114	34.2	pCi/g		08/12/14 10:57	08/14/14 17:00	5
U-234	1.53	U	73.6	4.41	pCi/g		08/12/14 10:57	08/14/14 17:00	5
U-235	0.0540		0.0255	0.0104	pCi/g		08/12/14 10:57	08/14/14 17:00	5
U-236	0.00187	U	0.764	0.0612	pCi/g		08/12/14 10:57	08/14/14 17:00	5
U-238	1.03		0.00397	0.000239	pCi/g		08/12/14 10:57	08/14/14 17:00	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Percent U-235	0.800				%			08/19/14 12:16	1

Client Sample ID: SD-220-02

Lab Sample ID: 680-102199-32

Date Collected: 06/10/14 14:44
Date Received: 06/11/14 09:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0032	mg/Kg		08/12/14 10:57	08/14/14 17:05	5
U-234	ND		0.011	0.00064	mg/Kg		08/12/14 10:57	08/14/14 17:05	5
U-235	0.020		0.011	0.0044	mg/Kg		08/12/14 10:57	08/14/14 17:05	5
U-236	ND		0.011	0.00086	mg/Kg		08/12/14 10:57	08/14/14 17:05	5
U-238	2.0	B	0.011	0.00064	mg/Kg		08/12/14 10:57	08/14/14 17:05	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.0		0.0050	0.00030	mg/Kg			08/19/14 12:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
U-233	0.758	U	104	31.1	pCi/g		08/12/14 10:57	08/14/14 17:05	5
U-234	1.22	U	66.9	4.01	pCi/g		08/12/14 10:57	08/14/14 17:05	5
U-235	0.0429		0.0232	0.00946	pCi/g		08/12/14 10:57	08/14/14 17:05	5
U-236	0.00361	U	0.695	0.0557	pCi/g		08/12/14 10:57	08/14/14 17:05	5
U-238	0.672		0.00361	0.000217	pCi/g		08/12/14 10:57	08/14/14 17:05	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Percent U-235	0.990				%			08/19/14 12:16	1

Client Sample ID: SD-DUP-01

Lab Sample ID: 680-102199-33

Date Collected: 06/10/14 00:00
Date Received: 06/11/14 09:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/12/14 10:57	08/14/14 17:10	5
U-234	ND		0.012	0.00071	mg/Kg		08/12/14 10:57	08/14/14 17:10	5
U-235	0.023		0.012	0.0048	mg/Kg		08/12/14 10:57	08/14/14 17:10	5
U-236	ND		0.012	0.00095	mg/Kg		08/12/14 10:57	08/14/14 17:10	5
U-238	3.0	B	0.012	0.00071	mg/Kg		08/12/14 10:57	08/14/14 17:10	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.0		0.0050	0.00030	mg/Kg			08/19/14 12:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
U-233	0.643	U	115	34.4	pCi/g		08/12/14 10:57	08/14/14 17:10	5
U-234	1.29	U	74.1	4.45	pCi/g		08/12/14 10:57	08/14/14 17:10	5
U-235	0.0496		0.0257	0.0105	pCi/g		08/12/14 10:57	08/14/14 17:10	5
U-236	0.00148	U	0.770	0.0617	pCi/g		08/12/14 10:57	08/14/14 17:10	5
U-238	1.02		0.00400	0.000241	pCi/g		08/12/14 10:57	08/14/14 17:10	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Percent U-235	0.761				%			08/19/14 12:17	1

Client Sample ID: SD-201-SS

Lab Sample ID: 680-102199-35

Date Collected: 06/10/14 15:10
Date Received: 06/11/14 09:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0034	mg/Kg		08/12/14 10:57	08/14/14 17:14	5
U-234	ND		0.011	0.00069	mg/Kg		08/12/14 10:57	08/14/14 17:14	5
U-235	0.035		0.011	0.0046	mg/Kg		08/12/14 10:57	08/14/14 17:14	5
U-236	ND		0.011	0.00092	mg/Kg		08/12/14 10:57	08/14/14 17:14	5
U-238	4.6	B	0.011	0.00069	mg/Kg		08/12/14 10:57	08/14/14 17:14	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	4.6		0.0050	0.00030	mg/Kg			08/19/14 12:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
U-233	0.992	U	110	33.1	pCi/g		08/12/14 10:57	08/14/14 17:14	5
U-234	1.93	U	71.2	4.27	pCi/g		08/12/14 10:57	08/14/14 17:14	5
U-235	0.0746		0.0247	0.0101	pCi/g		08/12/14 10:57	08/14/14 17:14	5
U-236	0.00370	U	0.740	0.0593	pCi/g		08/12/14 10:57	08/14/14 17:14	5
U-238	1.56		0.00384	0.000231	pCi/g		08/12/14 10:57	08/14/14 17:14	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Percent U-235	0.755				%			08/19/14 12:17	1

Client Sample ID: SD-201-01

Date Collected: 06/10/14 15:15
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-36
Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0033	mg/Kg		08/12/14 10:57	08/14/14 17:19	5
U-234	ND		0.011	0.00067	mg/Kg		08/12/14 10:57	08/14/14 17:19	5
U-235	0.030		0.011	0.0045	mg/Kg		08/12/14 10:57	08/14/14 17:19	5
U-236	ND		0.011	0.00089	mg/Kg		08/12/14 10:57	08/14/14 17:19	5
U-238	3.8	B	0.011	0.00067	mg/Kg		08/12/14 10:57	08/14/14 17:19	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.8		0.0050	0.00030	mg/Kg			08/19/14 12:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
U-233	0.911	U	107	32.1	pCi/g		08/12/14 10:57	08/14/14 17:19	5
U-234	1.82	U	69.1	4.15	pCi/g		08/12/14 10:57	08/14/14 17:19	5
U-235	0.0654		0.0240	0.00977	pCi/g		08/12/14 10:57	08/14/14 17:19	5
U-236	0.00224	U	0.718	0.0575	pCi/g		08/12/14 10:57	08/14/14 17:19	5
U-238	1.29		0.00373	0.000224	pCi/g		08/12/14 10:57	08/14/14 17:19	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Percent U-235	0.783				%			08/19/14 12:17	1

Client Sample ID: SD-201-02

Date Collected: 06/10/14 15:20
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-37
Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0033	mg/Kg		08/12/14 10:57	08/14/14 17:24	5
U-234	ND		0.011	0.00065	mg/Kg		08/12/14 10:57	08/14/14 17:24	5
U-235	0.019		0.011	0.0044	mg/Kg		08/12/14 10:57	08/14/14 17:24	5
U-236	ND		0.011	0.00087	mg/Kg		08/12/14 10:57	08/14/14 17:24	5
U-238	2.5	B	0.011	0.00065	mg/Kg		08/12/14 10:57	08/14/14 17:24	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.5		0.0050	0.00030	mg/Kg			08/19/14 12:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
U-233	0.987	U	105	31.5	pCi/g		08/12/14 10:57	08/14/14 17:24	5
U-234	1.17	U	67.8	4.07	pCi/g		08/12/14 10:57	08/14/14 17:24	5
U-235	0.0408		0.0235	0.00959	pCi/g		08/12/14 10:57	08/14/14 17:24	5
U-236	0.00347	U	0.704	0.0564	pCi/g		08/12/14 10:57	08/14/14 17:24	5
U-238	0.849		0.00366	0.000220	pCi/g		08/12/14 10:57	08/14/14 17:24	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Percent U-235	0.754				%			08/19/14 12:17	1

Client Sample ID: SD-200-SS

Lab Sample ID: 680-102199-39

Date Collected: 06/10/14 15:50
Date Received: 06/11/14 09:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0035	mg/Kg		08/12/14 10:57	08/14/14 17:29	5
U-234	ND		0.012	0.00070	mg/Kg		08/12/14 10:57	08/14/14 17:29	5
U-235	0.026		0.012	0.0047	mg/Kg		08/12/14 10:57	08/14/14 17:29	5
U-236	ND		0.012	0.00093	mg/Kg		08/12/14 10:57	08/14/14 17:29	5
U-238	3.4	B	0.012	0.00070	mg/Kg		08/12/14 10:57	08/14/14 17:29	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.4		0.0050	0.00030	mg/Kg			08/19/14 12:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
U-233	0.567	U	113	33.8	pCi/g		08/12/14 10:57	08/14/14 17:29	5
U-234	1.55	U	72.7	4.36	pCi/g		08/12/14 10:57	08/14/14 17:29	5
U-235	0.0558		0.0253	0.0103	pCi/g		08/12/14 10:57	08/14/14 17:29	5
U-236	0.000605	U	0.756	0.0605	pCi/g		08/12/14 10:57	08/14/14 17:29	5
U-238	1.15		0.00393	0.000236	pCi/g		08/12/14 10:57	08/14/14 17:29	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Percent U-235	0.759				%			08/19/14 12:17	1

Client Sample ID: SD-200-01

Lab Sample ID: 680-102199-40

Date Collected: 06/10/14 15:55
Date Received: 06/11/14 09:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0035	mg/Kg		08/12/14 10:57	08/14/14 17:33	5
U-234	ND		0.012	0.00069	mg/Kg		08/12/14 10:57	08/14/14 17:33	5
U-235	0.027		0.012	0.0047	mg/Kg		08/12/14 10:57	08/14/14 17:33	5
U-236	ND		0.012	0.00092	mg/Kg		08/12/14 10:57	08/14/14 17:33	5
U-238	3.3	B	0.012	0.00069	mg/Kg		08/12/14 10:57	08/14/14 17:33	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.3		0.0050	0.00030	mg/Kg			08/19/14 12:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
U-233	0.772	U	111	33.3	pCi/g		08/12/14 10:57	08/14/14 17:33	5
U-234	1.35	U	71.6	4.30	pCi/g		08/12/14 10:57	08/14/14 17:33	5
U-235	0.0576		0.0249	0.0101	pCi/g		08/12/14 10:57	08/14/14 17:33	5
U-236	0.00211	U	0.744	0.0596	pCi/g		08/12/14 10:57	08/14/14 17:33	5
U-238	1.12		0.00387	0.000233	pCi/g		08/12/14 10:57	08/14/14 17:33	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Percent U-235	0.812				%			08/19/14 12:17	1

Client Sample ID: SD-200-02
Date Collected: 06/10/14 16:00
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-41
Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0034	mg/Kg		08/12/14 10:57	08/14/14 17:38	5
U-234	ND		0.011	0.00067	mg/Kg		08/12/14 10:57	08/14/14 17:38	5
U-235	0.028		0.011	0.0046	mg/Kg		08/12/14 10:57	08/14/14 17:38	5
U-236	ND		0.011	0.00090	mg/Kg		08/12/14 10:57	08/14/14 17:38	5
U-238	3.7	B	0.011	0.00067	mg/Kg		08/12/14 10:57	08/14/14 17:38	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.7		0.0050	0.00030	mg/Kg			08/19/14 12:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
U-233	0.855	U	108	32.4	pCi/g		08/12/14 10:57	08/14/14 17:38	5
U-234	1.55	U	69.7	4.19	pCi/g		08/12/14 10:57	08/14/14 17:38	5
U-235	0.0602		0.0242	0.00986	pCi/g		08/12/14 10:57	08/14/14 17:38	5
U-236	0.00122	U	0.725	0.0581	pCi/g		08/12/14 10:57	08/14/14 17:38	5
U-238	1.24		0.00377	0.000226	pCi/g		08/12/14 10:57	08/14/14 17:38	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
Percent U-235	0.751				%			08/19/14 12:17	1

Appendix C

Support Documentation

MRC SEDIMENT INVESTIGATION

SOIL DATA

680-102199-3

FRACTION	CHEMICAL	SD-196-01	UNITS	SD-DUP-01	RPD	D
M	TOTAL URANIUM	2.6	MG/KG	3	14.29	0.40
M	URANIUM-235	0.019	MG/KG	0.023	19.05	0.00
M	URANIUM-235 (PERCENT)	0.725	%	0.761	4.85	0.04
M	URANIUM-238	2.6	MG/KG	3	14.29	0.40
RAD	URANIUM-235	0.042	PCI/G	0.0496	16.59	0.01
RAD	URANIUM-238	0.862	PCI/G	1.02	16.79	0.16

Current RPD Quality Control Limit: 50 %.
Shaded cells indicate RPDs that exceed the applicable quality control limit.

LMC-MRC
SDG 680-102199-3

U-238 CONVERSION (mg/Kg to pCi/g)

SAMPLE ID	SD-279-SS
U-238 (mg/Kg)	2.6
SOIL CONVERSION	2.80E-12
ATOMIC WEIGHT (g/mole)	238.03
U-238 HALF LIFE (y)	4.51E+09

= 8.65E-01 pCi/g

2.6 mg/Kg/(2.8E-12 * 238.03 g/mole * 4.51E9 y)

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-9-F SD-277-02

0.8428g / 50ml

Sample Date/Time: Thursday, August 14, 2014 14:27:29

Autosampler Position: 30

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-9-F.038

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			819174.096	ug/L	884012.991
	233	**U**	**0.000281**	8.601	16.267	ug/L	5.867
	234	**U**	**0.000728**	18.593	25.933	ug/L	5.000
	235	**U**	**0.088208**	5.251	2433.941	ug/L	5.600
	236	**U**	**0.000049**	47.859	6.067	ug/L	4.400
→	238	**U**	**11.826652**	4.835	295848.474	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.665**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

$$\frac{11.826652\ \mu g}{1L} \times \frac{0.05L}{0.5428g} \times 5$$

$$= 5.447\ \mu g/g$$

$$= mg/Kg$$

QUANTITATIVE ANALYSIS REPORT

SD-200-01

Sample ID: 680-102199-A-40-C

Sample Date/Time: Thursday, August 14, 2014 17:33:41

Autosampler Position: 58

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-40-C.072

0.5430g | 50ml

DF = 5X

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
[>	165	**Ho (IS)**			801819.296	ug/L	884012.991
|	233	**U**	**0.000174**	20.657	11.867	ug/L	5.867
|	234	**U**	**0.000471**	20.237	18.000	ug/L	5.000
|	235	**U**	**0.057899**	4.780	1565.086	ug/L	5.600
|	236	**U**	**0.000071**	13.913	6.867	ug/L	4.400
→ [	238	**U**	**7.226504**	5.082	176928.925	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
[>	Ho (IS)	165	90.702	
|	U	233		
|	U	234		
|	U	235		
|	U	236		
[	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

$$\frac{7.226504\ \mu g}{1L} \times \frac{0.05L}{0.5430g} \times 5$$

$$= 3.327\ \mu g/g$$

or mg/kg

MRC SEDIMENT INVESTIGATION
SEDIMENT DATA
680-102199-3

FRACTION	CHEMICAL	SD-196-01	UNITS	SD-DUP-01	RPD	D
M	TOTAL URANIUM	2.6	MG/KG	3	14.29	0.40
M	URANIUM-238	2.6	MG/KG	3	14.29	0.40
RAD	THORIUM-228	1.31	PCI/G	1.17	11.29	0.14
RAD	THORIUM-230	1.08 J	PCI/G	0.851 J	23.72	0.23
RAD	THORIUM-232	1.06	PCI/G	1.3	20.34	0.24
RAD	URANIUM-235	0.042	PCI/G	0.0496	16.59	0.01
RAD	URANIUM-238	0.862	PCI/G	1.02	16.79	0.16

Current RPD Quality Control Limit: 50 %.
Shaded cells indicate RPDs that exceed the applicable quality control limit.

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: S. Gamon	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.46
Client Contact: Mike Martin	Phone: (703)84[illegible]-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~10 of 10~~ 1 of 4
Company: Tetra Tech, Inc.		Analysis Requested		Job #: 680-102199
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
City: Germantown	TAT Requested (days): Standard			
State, Zip: MD, 20874	PO #: Purchase Order not required			
Phone:	WO #:			Other:
Email: Michael.Martin@tetratech.com	Project #: 68012942			
Project Name: Sediments	SSOW#:			
Site:				

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	680 - Local Method	A01R_Tl - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Perform MS/MSD (Yes or No)	Special Instructions/Note:
SD-279-SS	6/9/14	1540	C	Solid			X				
SD-279-01		1545	C	Solid			X				
SD-279-02		1550	C	Solid			X				
SD-279-03		1555	C	Solid			X				Hold Pending analysis SS to 02
SD-278-SS		1740	C	Solid			X				
SD-278-01		1745	C	Solid			X				
SD-277-SS		1810	C	Solid			X				
SD-277-01		1815	C	Solid			X				
SD-277-02		1820	C	Solid			X				
SD-277-03	↓	1825	C	Solid			X				Hold Pending analysis SS to 02
SD-219-SS	6/10/14	0920	C	Solid			X				

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:
Relinquished by:	Date/Time: 6-10-14 / 1625	Company: Tt	Received by:	Date/Time: 6/11/14 1645	Company: TestAmerica
Relinquished by:	Date/Time: 6/10/14 1735	Company: TestAmerica	Received by: Clark	Date/Time: 6-11-14 0930	Company: TA STL
Relinquished by:	Date/Time:	Company:	Received by:	Date/Time:	Company:

Custody Seals Intact: △ Yes △ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: S. Gmeron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.1
Client Contact: Mike Martin	Phone:	E-Mail: jerry.lanier@testamericainc.com		Page: Page 2 of 4
Company: Tetra Tech, Inc.		Analysis Requested		Job #: 680-102199
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes:
City: Germantown	TAT Requested (days): Standard			A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; G - Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA; M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2SO3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - ph 4-5; Z - other (specify)
State, Zip: MD, 20874	PO #: Purchase Order not required			
Phone:	WO #:			Other:
Email: Michael.Martin@tetratech.com				
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	680 - Local Method	Ad1R_Th - Standard Target List	6020_7470A	GA_01_R_Ra - (HOD) Radium-226/228	Special Instructions/Note:
SD-219-01	6/10/14	0922	C	Solid		X			
SD-219-02	6/10/14	0925	C	Solid		X			
SD-219-03	6/10/14	0928	C	Solid		X			[redacted]
SD-218-55		1010	C	Solid		X			
SD-218-01		1012	C	Solid		X			
SD-218-02		1014	C	Solid		X			
SD-203-55		1140	C	Solid		X			
SD-203-01		1145	C	Solid		X			
SD-203-02		1150	C	Solid		X			
SD-203-03		1155	C	Solid		X			Hold for any analysis SS should
SD-202-55		1220	C	Solid		X			

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	6-10-14 / 1625	TT		6/10/14 / 1645	TestAmerica
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	6/10/14 / 1755	TT		6-11-14 0930	TA STL
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: S. Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.5
Client Contact: Mike Martin	Phone:	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~5 of 5~~ 3 of 4
Company: Tetra Tech, Inc.		Analysis Requested		Job #: 680-102199
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes:
City: Germantown	TAT Requested (days):			A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			
Email: Michael.Martin@tetratech.com	WO #:			Other:
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	680 - Local Method	A01R_Th - Standard Target List	9020, 7470A	GA_01_R_Ra - (NOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
SD-202-01	6/10/14	1225	C	Solid		X				
SD-202-02		1230	C	Solid		X				
SD-195-55		1330	C	Solid		X				
SD-196-55		1400	C	Solid						
SD-196-01		1405	C	Solid						
SD-196-02		1410	C	Solid						
SD-196-03		1415	C	Solid						Hold pending analysis 55 to 02
SD-220-55		1440		Solid						
SD-220-01		1442		Solid						
SD-220-02		1444		Solid						
SD-DUP-01		0000	C	Solid		X				

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	6-10-14 / 1625	TT		6/10/14 / 1645	TestAmerica
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	6/10/14 / 1735	TestAmerica		6-11-14 0930	TA STL
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.2
Client Contact: Mike Martin	Phone:	E-Mail: jerry.lanier@testamericainc.com		Page: Page Blank 4 of 4
Company: Tetra Tech, Inc.		Analysis Requested		Job #: 680-102199
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes:
City: Germantown	TAT Requested (days):			A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; G - Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA; M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2SO3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - ph 4-5; Z - other (specify)
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			Other:
Email: Michael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	680 - Local Method	A01R_Th - Standard Target List	9020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Special Instructions/Note:
SD-220-03	6/10/14	1496	C	Solid		X			Hold pending analysis SS to 02
SD-201-SS		1510	C	Solid		X			
SD-201-01		1515	C	Solid		X			
SD-201-02		1520	C	Solid		X			
SD-201-03		1525	C	Solid		X			Hold pending analysis SS to 02
SD-200-SS		1550	C	Solid		X			
SD-200-01		1555	C	Solid		X			
SD-200-02		1600	C	Solid		X			
SD-200-03		1605	C	Solid		X			
				Solid					
				Solid					

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	6-10-14 / 1625			6/10/14 / 1645	TestAmerica
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	6/10/14 / 1735	TestAmerica		6-11-14 0930	TA SR
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-102199-3
SDG Number: 680102199-3

Login Number: 102199
List Number: 1
Creator: Daughtry, Beth A

List Source: TestAmerica Savannah

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.		
The cooler's custody seal, if present, is intact.		
Sample custody seals, if present, are intact.		
The cooler or samples do not appear to have been compromised or tampered with.		
Samples were received on ice.		
Cooler Temperature is acceptable.		
Cooler Temperature is recorded.		
COC is present.		
COC is filled out in ink and legible.		
COC is filled out with all pertinent information.		
Is the Field Sampler's name present on COC?		
There are no discrepancies between the containers received and the COC.		
Samples are received within Holding Time.		
Sample containers have legible labels.		
Containers are not broken or leaking.		
Sample collection date/times are provided.		
Appropriate sample containers are used.		
Sample bottles are completely filled.		
Sample Preservation Verified.		
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs		
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").		
Multiphasic samples are not present.		
Samples do not require splitting or compositing.		
Residual Chlorine Checked.		

Job ID: 680-102199-3

Laboratory: TestAmerica Savannah

Narrative

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Sediments

Report Number: 680-102199-3

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 06/11/2014; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 1.1 C.

A revised report was necessary to correct the dilution factors for samples SD-196-SS (680-102199-26), SD-196-01 (680-102199-27), SD-196-02 (680-102199-28) for isotopic uranium activity and also the final volume that was used.

TOTAL URANIUM

Samples SD-279-SS (680-102199-1), SD-279-01 (680-102199-2), SD-279-02 (680-102199-3), SD-277-SS (680-102199-7), SD-277-01 (680-102199-8), SD-277-02 (680-102199-9), SD-219-SS (680-102199-11), SD-219-01 (680-102199-12), SD-219-02 (680-102199-13), SD-219-03 (680-102199-14), SD-218-SS (680-102199-15), SD-218-01 (680-102199-16), SD-218-02 (680-102199-17), SD-203-SS (680-102199-18), SD-203-01 (680-102199-19), SD-203-02 (680-102199-20), SD-202-SS (680-102199-22), SD-202-01 (680-102199-23), SD-202-02 (680-102199-24), SD-195-SS (680-102199-25), SD-196-SS (680-102199-26), SD-196-01 (680-102199-27), SD-196-02 (680-102199-28), SD-220-SS (680-102199-30), SD-220-01 (680-102199-31), SD-220-02 (680-102199-32), SD-DUP-01 (680-102199-33), SD-201-SS (680-102199-35), SD-201-01 (680-102199-36), SD-201-02 (680-102199-37), SD-200-SS (680-102199-39), SD-200-01 (680-102199-40) and SD-200-02 (680-102199-41) were analyzed for Total Uranium in accordance with EPA SW-846 6020A. The samples were analyzed on 08/19/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM

Samples SD-279-SS (680-102199-1), SD-279-01 (680-102199-2), SD-279-02 (680-102199-3), SD-277-SS (680-102199-7), SD-277-01 (680-102199-8), SD-277-02 (680-102199-9), SD-219-SS (680-102199-11), SD-219-01 (680-102199-12), SD-219-02 (680-102199-13), SD-219-03 (680-102199-14), SD-218-SS (680-102199-15), SD-218-01 (680-102199-16), SD-218-02 (680-102199-17), SD-203-SS (680-102199-18), SD-203-01 (680-102199-19), SD-203-02 (680-102199-20), SD-202-SS (680-102199-22), SD-202-01 (680-102199-23), SD-202-02 (680-102199-24), SD-195-SS (680-102199-25), SD-196-SS (680-102199-26), SD-196-01 (680-102199-27), SD-196-02 (680-102199-28), SD-220-SS (680-102199-30), SD-220-01 (680-102199-31), SD-220-02 (680-102199-32), SD-DUP-01 (680-102199-33), SD-201-SS (680-102199-35), SD-201-01 (680-102199-36), SD-201-02 (680-102199-37), SD-200-SS (680-102199-39), SD-200-01 (680-102199-40) and SD-200-02 (680-102199-41) were analyzed for Isotopic Uranium in accordance with EPA SW-846 6020A. The samples were prepared on 08/12/2014 and analyzed on 08/14/2014 and 08/18/2014.

The instrument blank contained uranium 233 greater than the reporting limit (RL), and were not reanalyzed because the associated samples were non-detect for uranium 233 . The data have been qualified and reported. (ICB 160-138778/13)

The ICB was outside upper QC limits for uranium 233. All of the samples were bracketed by CCB's that were withing limits. (ICB 160-138156/10)

Job ID: 680-102199-3 (Continued)

Laboratory: TestAmerica Savannah (Continued)

Due to the high concentration of uranium 238, the matrix spike / matrix spike duplicate (MS/MSD) for could not be evaluated for accuracy and precision. The associated laboratory control sample (LCS) met acceptance criteria. (680-102199-1 MS), (680-102199-1 MSD)

The presence of the '4' qualifier indicates analytes where the concentration in the unspiked sample exceeded four times the spiking amount.

Refer to the QC report for details.

Samples SD-279-SS (680-102199-1)[5X], SD-279-01 (680-102199-2)[5X], SD-279-02 (680-102199-3)[5X], SD-277-SS (680-102199-7)[5X], SD-277-01 (680-102199-8)[5X], SD-277-02 (680-102199-9)[5X], SD-219-SS (680-102199-11)[5X], SD-219-01 (680-102199-12)[5X], SD-219-02 (680-102199-13)[5X], SD-219-03 (680-102199-14)[5X], SD-218-SS (680-102199-15)[5X], SD-218-01 (680-102199-16)[5X], SD-218-02 (680-102199-17)[5X], SD-203-SS (680-102199-18)[5X], SD-203-01 (680-102199-19)[5X], SD-203-02 (680-102199-20)[5X], SD-202-SS (680-102199-22)[5X], SD-202-01 (680-102199-23)[5X], SD-202-02 (680-102199-24)[5X], SD-195-SS (680-102199-25)[5X], SD-196-SS (680-102199-26)[5X], SD-196-01 (680-102199-27)[5X], SD-196-02 (680-102199-28)[5X], SD-220-SS (680-102199-30)[5X], SD-220-01 (680-102199-31)[5X], SD-220-02 (680-102199-32)[5X], SD-DUP-01 (680-102199-33)[5X], SD-201-SS (680-102199-35)[5X], SD-201-01 (680-102199-36)[5X], SD-201-02 (680-102199-37)[5X], SD-200-SS (680-102199-39)[5X], SD-200-01 (680-102199-40)[5X] and SD-200-02 (680-102199-41)[5X] required dilution prior to analysis due to high salt content. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM PERCENTAGE

Samples SD-279-SS (680-102199-1), SD-279-01 (680-102199-2), SD-279-02 (680-102199-3), SD-277-SS (680-102199-7), SD-277-01 (680-102199-8), SD-277-02 (680-102199-9), SD-219-SS (680-102199-11), SD-219-01 (680-102199-12), SD-219-02 (680-102199-13), SD-219-03 (680-102199-14), SD-218-SS (680-102199-15), SD-218-01 (680-102199-16), SD-218-02 (680-102199-17), SD-203-SS (680-102199-18), SD-203-01 (680-102199-19), SD-203-02 (680-102199-20), SD-202-SS (680-102199-22), SD-202-01 (680-102199-23), SD-202-02 (680-102199-24), SD-195-SS (680-102199-25), SD-196-SS (680-102199-26), SD-196-01 (680-102199-27), SD-196-02 (680-102199-28), SD-220-SS (680-102199-30), SD-220-01 (680-102199-31), SD-220-02 (680-102199-32), SD-DUP-01 (680-102199-33), SD-201-SS (680-102199-35), SD-201-01 (680-102199-36), SD-201-02 (680-102199-37), SD-200-SS (680-102199-39), SD-200-01 (680-102199-40) and SD-200-02 (680-102199-41) were analyzed for Isotopic Uranium Percentage in accordance with EPA SW-846 6020A. The samples were analyzed on 08/19/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM ACTIVITY

Samples SD-279-SS (680-102199-1), SD-279-01 (680-102199-2), SD-279-02 (680-102199-3), SD-277-SS (680-102199-7), SD-277-01 (680-102199-8), SD-277-02 (680-102199-9), SD-219-SS (680-102199-11), SD-219-01 (680-102199-12), SD-219-02 (680-102199-13), SD-219-03 (680-102199-14), SD-218-SS (680-102199-15), SD-218-01 (680-102199-16), SD-218-02 (680-102199-17), SD-203-SS (680-102199-18), SD-203-01 (680-102199-19), SD-203-02 (680-102199-20), SD-202-SS (680-102199-22), SD-202-01 (680-102199-23), SD-202-02 (680-102199-24), SD-195-SS (680-102199-25), SD-196-SS (680-102199-26), SD-196-01 (680-102199-27), SD-196-02 (680-102199-28), SD-220-SS (680-102199-30), SD-220-01 (680-102199-31), SD-220-02 (680-102199-32), SD-DUP-01 (680-102199-33), SD-201-SS (680-102199-35), SD-201-01 (680-102199-36), SD-201-02 (680-102199-37), SD-200-SS (680-102199-39), SD-200-01 (680-102199-40) and SD-200-02 (680-102199-41) were analyzed for Isotopic Uranium Activity in accordance with EPA SW-846 6020A. The samples were prepared on 08/12/2014 and analyzed on 08/14/2014 and 08/18/2014.

U-238 was detected in method blanks MB 160-137278/1-A, and MB 160-137385/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged. Refer to the QC report for details.

Samples SD-279-SS (680-102199-1)[5X], SD-279-01 (680-102199-2)[5X], SD-279-02 (680-102199-3)[5X], SD-277-SS (680-102199-7)[5X], SD-277-01 (680-102199-8)[5X], SD-277-02 (680-102199-9)[5X], SD-219-SS (680-102199-11)[5X], SD-219-01 (680-102199-12)[5X], SD-219-02 (680-102199-13)[5X], SD-219-03 (680-102199-14)[5X], SD-218-SS (680-102199-15)[5X], SD-218-01 (680-102199-16)[5X], SD-218-02 (680-102199-17)[5X], SD-203-SS (680-102199-18)[5X], SD-203-01 (680-102199-19)[5X], SD-203-02 (680-102199-20)[5X], SD-202-SS (680-102199-22)[5X], SD-202-01 (680-102199-23)[5X], SD-202-02 (680-102199-24)[5X], SD-195-SS (680-102199-25)[5X], SD-220-SS (680-102199-30)[5X], SD-220-01 (680-102199-31)[5X], SD-220-02 (680-102199-32)[5X], SD-DUP-01 (680-102199-33)[5X],

Job ID: 680-102199-3 (Continued)

Laboratory: TestAmerica Savannah (Continued)

SD-201-SS (680-102199-35)[5X], SD-201-01 (680-102199-36)[5X], SD-201-02 (680-102199-37)[5X], SD-200-SS (680-102199-39)[5X], SD-200-01 (680-102199-40)[5X] and SD-200-02 (680-102199-41)[5X] required dilution prior to analysis due to high salt content. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-3
SDG: 680102199-3

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-102199-1	SD-279-SS	Solid	06/09/14 15:40	06/11/14 09:30
680-102199-2	SD-279-01	Solid	06/09/14 15:45	06/11/14 09:30
680-102199-3	SD-279-02	Solid	06/09/14 15:50	06/11/14 09:30
680-102199-7	SD-277-SS	Solid	06/09/14 18:10	06/11/14 09:30
680-102199-8	SD-277-01	Solid	06/09/14 18:15	06/11/14 09:30
680-102199-9	SD-277-02	Solid	06/09/14 18:20	06/11/14 09:30
680-102199-11	SD-219-SS	Solid	06/10/14 09:20	06/11/14 09:30
680-102199-12	SD-219-01	Solid	06/10/14 09:22	06/11/14 09:30
680-102199-13	SD-219-02	Solid	06/10/14 09:25	06/11/14 09:30
680-102199-14	SD-219-03	Solid	06/10/14 09:28	06/11/14 09:30
680-102199-15	SD-218-SS	Solid	06/10/14 10:10	06/11/14 09:30
680-102199-16	SD-218-01	Solid	06/10/14 10:12	06/11/14 09:30
680-102199-17	SD-218-02	Solid	06/10/14 10:14	06/11/14 09:30
680-102199-18	SD-203-SS	Solid	06/10/14 11:40	06/11/14 09:30
680-102199-19	SD-203-01	Solid	06/10/14 11:45	06/11/14 09:30
680-102199-20	SD-203-02	Solid	06/10/14 11:50	06/11/14 09:30
680-102199-22	SD-202-SS	Solid	06/10/14 12:20	06/11/14 09:30
680-102199-23	SD-202-01	Solid	06/10/14 12:25	06/11/14 09:30
680-102199-24	SD-202-02	Solid	06/10/14 12:30	06/11/14 09:30
680-102199-25	SD-195-SS	Solid	06/10/14 13:30	06/11/14 09:30
680-102199-26	SD-196-SS	Solid	06/10/14 14:00	06/11/14 09:30
680-102199-27	SD-196-01	Solid	06/10/14 14:05	06/11/14 09:30
680-102199-28	SD-196-02	Solid	06/10/14 14:10	06/11/14 09:30
680-102199-30	SD-220-SS	Solid	06/10/14 14:40	06/11/14 09:30
680-102199-31	SD-220-01	Solid	06/10/14 14:42	06/11/14 09:30
680-102199-32	SD-220-02	Solid	06/10/14 14:44	06/11/14 09:30
680-102199-33	SD-DUP-01	Solid	06/10/14 00:00	06/11/14 09:30
680-102199-35	SD-201-SS	Solid	06/10/14 15:10	06/11/14 09:30
680-102199-36	SD-201-01	Solid	06/10/14 15:15	06/11/14 09:30
680-102199-37	SD-201-02	Solid	06/10/14 15:20	06/11/14 09:30
680-102199-39	SD-200-SS	Solid	06/10/14 15:50	06/11/14 09:30
680-102199-40	SD-200-01	Solid	06/10/14 15:55	06/11/14 09:30
680-102199-41	SD-200-02	Solid	06/10/14 16:00	06/11/14 09:30

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-3
SDG: 680102199-3

Method	Method Description	Protocol	Laboratory
6020A	Metals (ICP/MS), Isotopic Uranium	SW846	TAL SL
6020A	Metals (ICP/MS), Total Uranium	SW846	TAL SL
6020A	Metals (ICP/MS), Isotopic Uranium Percentage	SW846	TAL SL
6020A Activity	Metals (ICP/MS), Isotopic Uranium (Activity)	SW846	TAL SL

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Qualifiers

Metals

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
*	LCS or LCSD exceeds the control limits
^	ICV,CCV,ICB,CCB, ISA, ISB, CRI, CRA, DLCK or MRL standard: Instrument related QC exceeds the control limits.

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Default Detection Limits

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-3
SDG: 680102199-3

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	RL	MDL	Units	Method
U-233	0.0050	0.0015	mg/Kg	6020A
U-234	0.0050	0.00030	mg/Kg	6020A
U-235	0.0050	0.0020	mg/Kg	6020A
U-236	0.0050	0.00040	mg/Kg	6020A
U-238	0.0050	0.00030	mg/Kg	6020A

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	RL	MDL	Units	Method
Total Uranium	0.0050	0.00030	mg/Kg	6020A

COVER PAGE
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102199-3

SDG No.: 680102199-3

Project: Sediments

Client Sample ID	Lab Sample ID
SD-279-SS	680-102199-1
SD-279-01	680-102199-2
SD-279-02	680-102199-3
SD-277-SS	680-102199-7
SD-277-01	680-102199-8
SD-277-02	680-102199-9
SD-219-SS	680-102199-11
SD-219-01	680-102199-12
SD-219-02	680-102199-13
SD-219-03	680-102199-14
SD-218-SS	680-102199-15
SD-218-01	680-102199-16
SD-218-02	680-102199-17
SD-203-SS	680-102199-18
SD-203-01	680-102199-19
SD-203-02	680-102199-20
SD-202-SS	680-102199-22
SD-202-01	680-102199-23
SD-202-02	680-102199-24
SD-195-SS	680-102199-25
SD-196-SS	680-102199-26
SD-196-01	680-102199-27
SD-196-02	680-102199-28
SD-220-SS	680-102199-30
SD-220-01	680-102199-31
SD-220-02	680-102199-32
SD-DUP-01	680-102199-33
SD-201-SS	680-102199-35
SD-201-01	680-102199-36
SD-201-02	680-102199-37
SD-200-SS	680-102199-39
SD-200-01	680-102199-40
SD-200-02	680-102199-41

Comments:

9-IN
DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102199-3

SDG Number: 680102199-3

Matrix: Solid Instrument ID: ICPMS6100

Method: 6020A MDL Date: 08/05/2013 10:01

Prep Method: 3050B

Analyte	Wavelength/ Mass	RL (mg/Kg)	MDL (mg/Kg)
U-233	233	0.005	0.0015
U-234	234	0.005	0.0003
U-235	235	0.005	0.00203
U-236	236	0.005	0.0004
U-238	238	0.005	0.0003

9-IN
CALIBRATION BLANK DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102199-3

SDG Number: 680102199-3

Matrix: Solid Instrument ID: ICPMS6100

Method: 6020A XMDL Date: 07/18/2014 15:08

Analyte	Wavelength/ Mass	XRL (ug/L)	XMDL (ug/L)
U-233	233	0.05	0.0066
U-234	234	0.05	0.0021
U-235	235	0.05	0.0034
U-236	236	0.05	0.0015
U-238	238	0.05	0.0082

9-IN
DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102199-3

SDG Number: 680102199-3

Matrix: Solid Instrument ID: NOEQUIP

Method: 6020A MDL Date: 06/12/2013 14:02

Analyte	Wavelength/ Mass	RL (mg/Kg)	MDL (mg/Kg)
Total Uranium		0.005	0.0003

11-IN
LINEAR RANGES
METALS

Lab Name: TestAmerica St. Louis Job No: 680-102199-3

SDG No.: 680102199-3

Instrument ID: ICPMS6100 Date: 02/14/2012 11:04

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	Method
U-233		2000	6020A
U-234		2000	6020A
U-235		2000	6020A
U-236		2000	6020A
U-238		2000	6020A

12-IN
PREPARATION LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Prep Method: 3050B

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight (g)	Initial Volume	Final Volume (mL)
MB 160-137278/1-A	08/12/2014 10:34	137278	0.5086		50
LCS 160-137278/2-A	08/12/2014 10:34	137278	0.5770		50
680-102199-1	08/12/2014 10:34	137278	0.5201		50
680-102199-1 MS	08/12/2014 10:34	137278	0.5785		50
680-102199-1 MSD	08/12/2014 10:34	137278	0.5179		50
680-102199-2	08/12/2014 10:34	137278	0.5598		50
680-102199-3	08/12/2014 10:34	137278	0.5679		50
680-102199-7	08/12/2014 10:34	137278	0.5491		50
680-102199-8	08/12/2014 10:34	137278	0.5835		50
680-102199-9	08/12/2014 10:34	137278	0.5428		50
680-102199-11	08/12/2014 10:34	137278	0.5971		50
680-102199-12	08/12/2014 10:34	137278	0.5334		50
680-102199-13	08/12/2014 10:34	137278	0.5224		50
680-102199-14	08/12/2014 10:34	137278	0.5765		50
680-102199-15	08/12/2014 10:34	137278	0.5709		50
680-102199-16	08/12/2014 10:34	137278	0.5066		50
680-102199-17	08/12/2014 10:34	137278	0.5424		50
680-102199-18	08/12/2014 10:34	137278	0.5901		50
680-102199-19	08/12/2014 10:34	137278	0.5677		50
680-102199-20	08/12/2014 10:34	137278	0.5373		50
680-102199-22	08/12/2014 10:34	137278	0.5508		50
680-102199-23	08/12/2014 10:34	137278	0.5945		50
680-102199-24	08/12/2014 10:34	137278	0.5550		50
680-102199-25	08/12/2014 10:34	137278	0.5058		50

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Concentration Units: mg/Kg Lab Sample ID: MB 160-137278/1-A

Instrument Code: ICPMS6100 Batch No.: 138156

CAS No.	Analyte	Concentration	C	Q	Method
13968-55-3	U-233	ND			6020A_U
13966-29-5	U-234	ND			6020A_U
15117-96-1	U-235	ND			6020A_U
13982-70-2	U-236	ND			6020A_U
7440-61-1	U-238	0.00212	J		6020A_U

FORM III-IN

7A-IN
LAB CONTROL SAMPLE
METALS

Lab ID: LCS 160-137278/2-A

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

Sample Matrix: Solid LCS Source: ISOU Prep Spk_00002

Analyte	Solid(mg/Kg)							
	True	Found	C	%R	Limits		Q	Method
U-234	0.00716	0.00705		98	80	120		6020A
U-235	0.420	0.416		99	80	120		6020A
U-238	0.436	0.432		99	80	120		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

5A-IN
MATRIX SPIKE SAMPLE RECOVERY
METALS

Client ID: SD-279-SS MS | Lab ID: 680-102199-1 MS

Lab Name: TestAmerica St. Louis | Job No.: 680-102199-3

SDG No.: 680102199-3

Matrix: Solid | Concentration Units: mg/Kg

% Solids:

Analyte	SSR	C	Sample Result (SR)	C	Spike Added (SA)	%R	Control Limit %R	Q	Method
U-234	0.00698	J	ND		0.00715	98	75-125		6020A
U-235	0.437		0.019		0.419	100	75-125		6020A
U-238	3.54		2.6		0.434	222	75-125	4 ✓	6020A

SSR = Spiked Sample Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VA - IN

5A-IN
MATRIX SPIKE DUPLICATE SAMPLE RECOVERY
METALS

Client ID: SD-279-SS MSD | Lab ID: 680-102199-1 MSD

Lab Name: TestAmerica St. Louis | Job No.: 680-102199-3

SDG No.: 680102199-3

Matrix: Solid | Concentration Units: mg/Kg

% Solids:

Analyte	(SDR)	C	Spike Added (SA)	%R	Control Limit %R	RPD	RPD Limit	Q	Method
U-234	0.00717	J	0.00798	90	75-125	3	20		6020A
U-235	0.438		0.468	89	75-125	0	20		6020A
U-238	3.25		0.485	138	75-125	9	20	4 ✓	6020A

SDR = Sample Duplicate Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VD - IN

8-IN
ICP-AES AND ICP-MS SERIAL DILUTIONS
METALS

Lab ID: 680-102199-1

SDG No: 680102199-3

Lab Name: TestAmerica St. Louis Job No: 680-102199-3

Matrix: Solid Concentration Units: mg/Kg

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Method
U-233	ND		ND		NC		6020A
U-234	ND		ND		NC		6020A
U-235	0.019		ND		NC		6020A
U-236	ND		ND		NC		6020A
U-238	2.6		2.66		3.1		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIII-IN

12-IN
PREPARATION LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Prep Method: 3050B

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight (g)	Initial Volume	Final Volume (mL)
MB 160-137385/1-A	08/12/2014 10:57	137385	0.5983		50
LCS 160-137385/2-A	08/12/2014 10:57	137385	0.5239		50
680-102199-30	08/12/2014 10:57	137385	0.5218		50
680-102199-30 MS	08/12/2014 10:57	137385	0.5818		50
680-102199-30 MSD	08/12/2014 10:57	137385	0.5170		50
680-102199-31	08/12/2014 10:57	137385	0.5287		50
680-102199-32	08/12/2014 10:57	137385	0.5815		50
680-102199-33	08/12/2014 10:57	137385	0.5246		50
680-102199-35	08/12/2014 10:57	137385	0.5464		50
680-102199-36	08/12/2014 10:57	137385	0.5630		50
680-102199-37	08/12/2014 10:57	137385	0.5738		50
680-102199-39	08/12/2014 10:57	137385	0.5349		50
680-102199-40	08/12/2014 10:57	137385	0.5430		50
680-102199-41	08/12/2014 10:57	137385	0.5576		50
680-102199-26	08/12/2014 10:57	137385	0.5088		50
680-102199-27	08/12/2014 11:13	137385	0.5057		50
680-102199-28	08/12/2014 11:13	137385	0.5147		50

FORM XII-IN

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Concentration Units: mg/Kg Lab Sample ID: MB 160-137385/1-A

Instrument Code: ICPMS6100 Batch No.: 138156

CAS No.	Analyte	Concentration	C	Q	Method
13968-55-3	U-233	ND			6020A_U
13966-29-5	U-234	ND			6020A_U
15117-96-1	U-235	ND			6020A_U
13982-70-2	U-236	ND			6020A_U
7440-61-1	U-238	0.0114			6020A_U

FORM III-IN

7A-IN
LAB CONTROL SAMPLE
METALS

Lab ID: LCS 160-137385/2-A

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

Sample Matrix: Solid LCS Source: ISOU Prep Spk_00002

Analyte	Solid(mg/Kg)							
	True	Found	C	%R	Limits		Q	Method
U-234	0.00789	0.00850		108	80	120		6020A
U-235	0.463	0.505		109	80	120		6020A
U-238	0.480	0.527		110	80	120		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

5A-IN
MATRIX SPIKE SAMPLE RECOVERY
METALS

Client ID: SD-220-SS MS | Lab ID: 680-102199-30 MS

Lab Name: TestAmerica St. Louis | Job No.: 680-102199-3

SDG No.: 680102199-3

Matrix: Solid | Concentration Units: mg/Kg

% Solids:

Analyte	SSR	C	Sample Result (SR)	C	Spike Added (SA)	%R	Control Limit %R	Q	Method
U-234	0.00765	J	ND		0.00710	108	75-125		6020A
U-235	0.467		0.022		0.417	107	75-125		6020A
U-238	3.31		2.8		0.432	114	75-125	4	6020A

SSR = Spiked Sample Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VA - IN

5A-IN
MATRIX SPIKE DUPLICATE SAMPLE RECOVERY
METALS

Client ID: SD-220-SS MSD | Lab ID: 680-102199-30 MSD

Lab Name: TestAmerica St. Louis | Job No.: 680-102199-3

SDG No.: 680102199-3

Matrix: Solid | Concentration Units: mg/Kg

% Solids:

Analyte	(SDR)	C	Spike Added (SA)	%R	Control Limit %R	RPD	RPD Limit	Q	Method
U-234	0.00859	J	0.00800	107	75-125	12	20		6020A
U-235	0.523		0.469	107	75-125	11	20		6020A
U-238	3.38		0.486	116	75-125	2	20	4	6020A

SDR = Sample Duplicate Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VD - IN

8-IN
ICP-AES AND ICP-MS SERIAL DILUTIONS
METALS

Lab ID: 680-102199-30

SDG No: 680102199-3

Lab Name: TestAmerica St. Louis Job No: 680-102199-3

Matrix: Solid Concentration Units: mg/Kg

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Method
U-233	ND		ND		NC		6020A
U-234	ND		ND		NC		6020A
U-235	0.022		ND		NC		6020A
U-236	ND		ND		NC		6020A
U-238	2.8		2.88		2.0		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/14/2014 11:32 End Date: 08/15/2014 00:12

Lab Sample Id	D/F	Type	Time	Analytes				
				U-233	U-234	U-235	U-236	U-238
ICIS 160-138156/1	1		11:32	X	X	X	X	X
IC 160-138156/2	1		11:39	X	X	X	X	X
IC 160-138156/3	1		11:43	X	X	X	X	X
IC 160-138156/4	1		11:48	X	X	X	X	X
IC 160-138156/5	1		11:53	X	X	X	X	X
IC 160-138156/6	1		11:58	X	X	X	X	X
ICV 160-138156/7	1		12:02	X				
ICV 160-138156/8	1		12:07		X			X
ICV 160-138156/9	1		12:12			X	X	
ICB 160-138156/10	1		12:16	X	X	X	X	X
CRI 160-138156/11	1		12:21			X		X
CRI 160-138156/12	1		12:26	X	X		X	
ICSA 160-138156/13	1		12:30	X	X	X	X	X
ICSAB 160-138156/14	1		12:35	X	X	X	X	X
CCV 160-138156/15	1		12:40	X	X	X	X	X
CCB 160-138156/16	1		12:44	X	X	X	X	X
ZZZZZZ			12:49					
ZZZZZZ			12:54					
ZZZZZZ			12:58					
ZZZZZZ			13:03					
ZZZZZZ			13:08					
ZZZZZZ			13:12					
ZZZZZZ			13:17					
ZZZZZZ			13:22					
ZZZZZZ			13:26					
MB 160-137278/1-A	2	T	13:31	X	X	X	X	X
CCV 160-138156/27	1		13:36	X	X	X	X	X
CCB 160-138156/28	1		13:40	X	X	X	X	X
LCS 160-137278/2-A	2	T	13:45		X	X		X
680-102199-1	5	T	13:50	X	X	X	X	X
680-102199-1 SD	25	T	13:54	X	X	X	X	X
680-102199-1 MS	5	T	13:59		X	X		X
680-102199-1 MSD	5	T	14:04		X	X		X
680-102199-2	5	T	14:08	X	X	X	X	X
680-102199-3	5	T	14:13	X	X	X	X	X
680-102199-7	5	T	14:18	X	X	X	X	X
680-102199-8	5	T	14:22	X	X	X	X	X
680-102199-9	5	T	14:27	X	X	X	X	X
CCV 160-138156/39	1		14:32	X	X	X	X	X

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/14/2014 11:32 End Date: 08/15/2014 00:12

| Lab Sample Id | D/F | Type | Time | Analytes | | |

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/14/2014 11:32 End Date: 08/15/2014 00:12

| Lab Sample Id | D/F | Type | Time | Analytes | | |

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/14/2014 11:32 End Date: 08/15/2014 00:12

Lab Sample Id	D/F	Type	Time	Analytes																												
				U-233	U-234	U-235	U-236	U-238																								
ZZZZZZ			21:10																													
ZZZZZZ			21:15																													
ZZZZZZ			21:19																													
ZZZZZZ			21:24																													
ZZZZZZ			21:29																													
ZZZZZZ			21:33																													
ZZZZZZ			21:38																													
ZZZZZZ			21:43																													
ZZZZZZ			21:48																													
CCV 160-138156/127			21:52																													
CCB 160-138156/128			21:57																													
ZZZZZZ			22:02																													
ZZZZZZ			22:06																													
ZZZZZZ			22:11																													
ZZZZZZ			22:16																													
ZZZZZZ			22:20																													
ZZZZZZ			22:25																													
ZZZZZZ			22:30																													
ZZZZZZ			22:34																													
ZZZZZZ			22:39																													
ZZZZZZ			22:44																													
CCV 160-138156/139			22:48																													
CCB 160-138156/140			22:53																													
ZZZZZZ			22:58																													
ZZZZZZ			23:02																													
ZZZZZZ			23:07																													
ZZZZZZ			23:12																													
ZZZZZZ			23:16																													
ZZZZZZ			23:21																													
ZZZZZZ			23:26																													
ZZZZZZ			23:30																													
ZZZZZZ			23:35																													
ZZZZZZ			23:40																													
CCV 160-138156/151			23:44																													
CCB 160-138156/152			23:49																													
ZZZZZZ			23:54																													
ZZZZZZ			23:58																													
ZZZZZZ			00:03																													
CCV 160-138156/156			00:08																													

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/14/2014 11:32 End Date: 08/15/2014 00:12

Lab Sample Id	D/F	Type	Time	Analytes																														
				U-233	U-234	U-235	U-236	U-238																												
CCB 160-138156/157			00:12																																

Prep Types:
T = Total/NA

FORM XIII-IN

15-IN

ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY

METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

ICP-MS Instrument ID: ICPMS6100 Start Date: 08/14/2014 End Date: 08/14/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
ICIS 160-138156/1	11:32										
IC 160-138156/2	11:39										
IC 160-138156/3	11:43										
IC 160-138156/4	11:48										
IC 160-138156/5	11:53										
IC 160-138156/6	11:58										
ICV 160-138156/7	12:02	100									
ICV 160-138156/8	12:07	101									
ICV 160-138156/9	12:12	98									
ICB 160-138156/10	12:16	99									
CRI 160-138156/11	12:21	100									
CRI 160-138156/12	12:26	100									
ICSA 160-138156/13	12:30	91									
ICSAB 160-138156/14	12:35	91									
CCV 160-138156/15	12:40	98									
CCB 160-138156/16	12:44	99									
MB 160-137278/1-A	13:31	102									
CCV 160-138156/27	13:36	99									
CCB 160-138156/28	13:40	100									
LCS 160-137278/2-A	13:45	104									
680-102199-1	13:50	96									
680-102199-1 SD	13:54	97									
680-102199-1 MS	13:59	95									
680-102199-1 MSD	14:04	96									
680-102199-2	14:08	94									
680-102199-3	14:13	96									
680-102199-7	14:18	95									
680-102199-8	14:22	95									
680-102199-9	14:27	93									
CCV 160-138156/39	14:32	95									
CCB 160-138156/40	14:36	95									
680-102199-11	14:41	90									
680-102199-12	14:46	93									
680-102199-13	14:50	101									
680-102199-14	14:55	101									
680-102199-15	15:00	93									
680-102199-16	15:04	100									
680-102199-17	15:09	101									
680-102199-18	15:14	90									
680-102199-19	15:18	86									
680-102199-20	15:23	89									
CCV 160-138156/51	15:28	94									

FORM XV - IN

15-IN
ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

ICP-MS Instrument ID: ICPMS6100 Start Date: 08/14/2014 End Date: 08/14/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
CCB 160-138156/52	15:32	94									
680-102199-22	15:37	89									
680-102199-23	15:42	92									
680-102199-24	15:46	97									
680-102199-25	15:51	96									
MB 160-137385/1-A	15:56	94									
LCS 160-137385/2-A	16:00	95									
680-102199-30	16:05	90									
680-102199-30 SD	16:10	93									
680-102199-30 MS	16:14	90									
680-102199-30 MSD	16:19	90									
CCV 160-138156/63	16:26	92									
CCB 160-138156/64	16:32	92									
680-102199-31	17:00	90									
680-102199-32	17:05	86									
680-102199-33	17:10	91									
680-102199-35	17:14	90									
680-102199-36	17:19	92									
680-102199-37	17:24	84									
680-102199-39	17:29	89									
680-102199-40	17:33	91									
680-102199-41	17:38	89									
CCV 160-138156/75	17:47	90									
CCB 160-138156/76	17:52	90									

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

ICV Source: ISOU ICV(3)_00017 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00018

Analyte	ICV 160-138156/7 08/14/2014 12:02				CCV 160-138156/15 08/14/2014 12:40				CCV 160-138156/27 08/14/2014 13:36			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.229		0.223	102	0.0524		0.0515	102	0.0520		0.0515	101

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

ICV Source: ISOU ICV(3)_00017 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00018

Analyte	CCV 160-138156/39 08/14/2014 14:32				CCV 160-138156/51 08/14/2014 15:28				CCV 160-138156/63 08/14/2014 16:26			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.0533		0.0515	103	0.0532		0.0515	103	0.0540		0.0515	105

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

ICV Source: ISOU ICV(3)_00017 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00018

Analyte	CCV 160-138156/75 08/14/2014 17:47											
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.0554		0.0515	108								

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

ICV Source: ISOU ICV(4,8)_00017 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00018

Analyte	ICV 160-138156/8 08/14/2014 12:07				CCV 160-138156/15 08/14/2014 12:40				CCV 160-138156/27 08/14/2014 13:36			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0867		0.0835	104	0.0831		0.0827	101	0.0831		0.0827	101
U-238	9.82		9.78	100	5.14		5.03	102	5.13		5.03	102

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

ICV Source: ISOU ICV(4,8)_00017 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00018

Analyte	CCV 160-138156/39 08/14/2014 14:32				CCV 160-138156/51 08/14/2014 15:28				CCV 160-138156/63 08/14/2014 16:26			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0859		0.0827	104	0.0872		0.0827	105	0.0867		0.0827	105
U-238	5.34		5.03	106	5.41		5.03	108	5.41		5.03	108

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

ICV Source: ISOU ICV(4,8)_00017 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00018

Analyte	CCV 160-138156/75 08/14/2014 17:47											
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0893		0.0827	108								
U-238	5.50		5.03	109								

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

ICV Source: ISOU ICV(5,6)_00019 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00018

Analyte	ICV 160-138156/9 08/14/2014 12:12				CCV 160-138156/15 08/14/2014 12:40				CCV 160-138156/27 08/14/2014 13:36			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	1.14		1.06	108	4.97		4.85	102	4.95		4.85	102
U-236	0.0692		0.0746	93	0.0895		0.0890	101	0.0892		0.0890	100

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

ICV Source: ISOU ICV(5,6)_00019 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00018

Analyte	CCV 160-138156/39 08/14/2014 14:32				CCV 160-138156/51 08/14/2014 15:28				CCV 160-138156/63 08/14/2014 16:26			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	5.13		4.85	106	5.20		4.85	107	5.20		4.85	107
U-236	0.0923		0.0890	104	0.0937		0.0890	105	0.0949		0.0890	107

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

ICV Source: ISOU ICV(5,6)_00019 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00018

Analyte	CCV 160-138156/75 08/14/2014 17:47											
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	5.33		4.85	110								
U-236	0.0966		0.0890	109								

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2B-IN
CRQL CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Method: 6020A Instrument ID: ICPMS6100

Lab Sample ID: CRI 160-138156/11 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 1_00018

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-235	0.0485	0.0493	J	102	70-130
U-238	0.0503	0.0489	J	97	70-130

Lab Sample ID: CRI 160-138156/12 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 2_00019

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-233	0.0309	0.0355	J	115	70-130
U-234	0.0496	0.0501		101	70-130
U-236	0.0534	0.0533		100	70-130

Lab Sample ID: CRI 160-138778/14 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 1_00019

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-235	0.0485	0.0496	J	102	70-130
U-238	0.0503	0.0541		108	70-130

Lab Sample ID: CRI 160-138778/15 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 2_00020

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-233	0.0309	0.0353	J	114	70-130
U-234	0.0496	0.0496	J	100	70-130
U-236	0.0534	0.0537		101	70-130

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IIB-IN

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Concentration Units: ug/L

Analyte	RL	ICB 160-138156/10 08/14/2014 12:16		CCB 160-138156/16 08/14/2014 12:44		CCB 160-138156/28 08/14/2014 13:40		CCB 160-138156/40 08/14/2014 14:36	
		Found	C	Found	C	Found	C	Found	C
U-233	0.050	0.0503		0.0146	J	0.0129	J	0.0134	J
U-234	0.050	ND		ND		ND		ND	
U-235	0.050	ND		ND		ND		ND	
U-236	0.050	ND		ND		ND		ND	
U-238	0.050	ND		ND		ND		ND	

Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Concentration Units: ug/L

Analyte	RL	CCB 160-138156/52 08/14/2014 15:32		CCB 160-138156/64 08/14/2014 16:32		CCB 160-138156/76 08/14/2014 17:52			
		Found	C	Found	C	Found	C	Found	C
U-233	0.050	0.0137	J	0.0139	J	0.0139	J		
U-234	0.050	ND		ND		ND			
U-235	0.050	ND		ND		ND			
U-236	0.050	ND		ND		ND			
U-238	0.050	ND		ND		ND			

Italicized analytes were not requested for this sequence.

4A-IN
INTERFERENCE CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Lab Sample ID: ICSAB 160-138156/14 Instrument ID: ICPMS6100

Lab File ID: 081414m1.rep ICS Source: ISOU_ICSAB_00019

Concentration Units: ug/L

Analyte	True Solution AB	Found Solution AB	Found Percent Recovery
U-233	**0.0515**	**0.0550**	**107**
U-234	**0.0827**	**0.0863**	**104**
U-235	**4.85**	**5.18**	**107**
U-236	**0.0890**	**0.0927**	**104**
U-238	**5.03**	**5.41**	**108**

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IVA-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/18/2014 14:28 End Date: 08/18/2014 23:43

| Lab Sample Id | D/F | Type | Time | Analytes | | |

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/18/2014 14:28 End Date: 08/18/2014 23:43

| Lab Sample Id | D/F | Type | Time | Analytes | | |

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/18/2014 14:28 End Date: 08/18/2014 23:43

Lab Sample Id	D/F	Type	Time	Analytes																														
				U-233	U-234	U-235	U-236	U-238																											
ZZZZZZ			20:46																															
ZZZZZZ			20:50																															
ZZZZZZ			20:55																															
ZZZZZZ			21:00																															
ZZZZZZ			21:04																															
ZZZZZZ			21:09																															
ZZZZZZ			21:14																															
ZZZZZZ			21:18																															
CCV 160-138778/87			21:23																															
CCB 160-138778/88			21:28																															
ZZZZZZ			21:32																															
ZZZZZZ			21:37																															
ZZZZZZ			21:42																															
ZZZZZZ			21:46																															
ZZZZZZ			21:51																															
ZZZZZZ			21:56																															
ZZZZZZ			22:00																															
ZZZZZZ			22:05																															
ZZZZZZ			22:10																															
ZZZZZZ			22:14																															
CCV 160-138778/99			22:19																															
CCB 160-138778/100			22:24																															
ZZZZZZ			22:28																															
ZZZZZZ			22:33																															
ZZZZZZ			22:38																															
ZZZZZZ			22:42																															
ZZZZZZ			22:47																															
ZZZZZZ			22:52																															
ZZZZZZ			22:56																															
ZZZZZZ			23:01																															
ZZZZZZ			23:06																															
ZZZZZZ			23:10																															
CCV 160-138778/111			23:15																															
CCB 160-138778/112			23:20																															
ZZZZZZ			23:24																															
ZZZZZZ			23:29																															
ZZZZZZ			23:34																															
CCV 160-138778/116			23:38																															
CCB 160-138778/117			23:43																															

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/18/2014 14:28 End Date: 08/18/2014 23:43

| Lab Sample Id | D/F | Type | Time | Analytes | | |

15-IN

ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY

METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

ICP-MS Instrument ID: ICPMS6100 Start Date: 08/18/2014 End Date: 08/18/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
IC 160-138778/5	14:35										
IC 160-138778/6	14:40										
IC 160-138778/7	14:44										
IC 160-138778/8	14:49										
IC 160-138778/9	14:54										
ICV 160-138778/10	14:58	100									
ICV 160-138778/11	15:03	100									
ICV 160-138778/12	15:08	100									
ICB 160-138778/13	15:12	99									
CRI 160-138778/14	15:17	100									
CRI 160-138778/15	15:22	99									
ICSA 160-138778/16	15:26	95									
ICSAB 160-138778/1	15:31	94									
CCV 160-138778/2	15:36	100									
CCB 160-138778/3	15:40	100									
680-102199-26	15:56	96									
680-102199-27	16:01	98									
680-102199-28	16:05	97									
CCV 160-138778/27	16:43	96									
CCB 160-138778/28	16:47	98									

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

ICV Source: ISOU ICV(3)_00018 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	ICV 160-138778/10 08/18/2014 14:58				CCV 160-138778/2 08/18/2014 15:36				CCV 160-138778/27 08/18/2014 16:43			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.231		0.223	103	0.0536		0.0515	104	0.0540		0.0515	105

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

ICV Source: ISOU ICV(4,8)_00018 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	ICV 160-138778/11 08/18/2014 15:03				CCV 160-138778/2 08/18/2014 15:36				CCV 160-138778/27 08/18/2014 16:43			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0880		0.0835	105	0.0841		0.0827	102	0.0878		0.0827	106
U-238	9.96		9.78	102	5.22		5.03	104	5.45		5.03	109

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

ICV Source: ISOU ICV(5,6)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	ICV 160-138778/12 08/18/2014 15:08				CCV 160-138778/2 08/18/2014 15:36				CCV 160-138778/27 08/18/2014 16:43			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	1.11		1.06	105	5.02		4.85	104	5.26		4.85	109
U-236	0.0671		0.0746	90	0.0904		0.0890	102	0.0936		0.0890	105

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Concentration Units: ug/L

Analyte	RL	ICB 160-138778/13 08/18/2014 15:12		CCB 160-138778/3 08/18/2014 15:40		CCB 160-138778/28 08/18/2014 16:47			
		Found	C	Found	C	Found	C	Found	C
U-233	0.050	* 0.0973		0.0113	J	0.0109	J		
U-234	0.050	ND		ND		ND			
U-235	0.050	ND		ND		ND			
U-236	0.050	ND		ND		ND			
U-238	0.050	0.0211	J	ND		ND			

Italicized analytes were not requested for this sequence.

4A-IN
INTERFERENCE CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Lab Sample ID: ICSAB 160-138778/1 Instrument ID: ICPMS6100

Lab File ID: 081814M3.rep ICS Source: ISOU ICSAB 00020

Concentration Units: ug/L

Analyte	True Solution AB	Found Solution AB	Percent Recovery
U-233	**0.0515**	**0.0543**	**105**
U-234	**0.0827**	**0.0844**	**102**
U-235	**4.85**	**5.06**	**104**
U-236	**0.0890**	**0.0901**	**101**
U-238	**5.03**	**5.27**	**105**

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IVA-IN

TETRA TECH **INTERNAL CORRESPONDENCE**

TO: **M. MARTIN** **DATE:** **OCTOBER 14, 2014**

FROM: **MICHELLE L. ALLEN** **COPIES:** **DV FILE**

SUBJECT: **RADIOLOGICAL DATA VALIDATION – GAMMA SPECTROSCOPY**
LOCKHEED MARTIN CORPORATION (LMC) – MIDDLE RIVER COMPLEX (MRC)
SEDIMENT INVESTIGATION
SAMPLE DELIVERY GROUP (SDG) 680-102199-4

SAMPLES: 6/Sediment/Gamma Spectroscopy

SD-277-01	SD-277-02	SD-277-SS
SD-279-01	SD-279-02	SD-279-SS

Overview

The sample set for LMC-MRC, SDG 680-102199-4 consisted of six (6) sediment environmental samples. All six (6) sediment samples were analyzed for gamma spectroscopy. No field duplicate sample pair was included in this SDG.

The samples were collected by Tetra Tech, Inc. on June 9, 2014 and analyzed by TestAmerica, Inc. All analyses were conducted in accordance with Method GA-01-R analytical and reporting protocols.

The findings offered in this report are based upon a general review of all available data. The data contained in this SDG were validated with regard to the following parameters: data completeness, holding times, initial calibrations and initial calibration verifications, instrument daily calibration and blank checks, laboratory blank results, laboratory control sample recoveries, laboratory duplicate results, detection limits and analyte quantitation. Areas of concern are listed below.

Major

No major issues were identified.

Minor

No minor issues were identified.

Notes

All sample results are reported on a wet weight basis.

The uncertainty for the sample results are reported at 2σ (standard deviations, 95% confidence level). The EDD does not contain the uncertainty result.

The mean differences were calculated for the gamma emitters for the original and laboratory duplicate analyses for sample SD-279-SS. The mean differences were < 3 for most of the gamma emitters evaluated which indicates the activities agree at the 3σ (99%) confidence level with the following exceptions:

Isotope	Mean Difference
Preparation Batch # 137115	
Radium-226	1.701
Radium-228/Thorium-232	1.470

Isotope	Mean Difference
Preparation Batch # 137389	
Bismuth-212	2.32
Protactinium-231	1.383
Radium-226	1.70

In addition, the mean difference for actinium-227 exceeded 3. No action was taken because the activities reported for the original and duplicate reported less than the Minimum Detectable Concentration (MDC).

Executive Summary

Laboratory Performance: None.

Other Factors Affecting Data Quality: None.

The text of this report has been formulated to address only those areas affecting data quality.

Tetra Tech, Inc.
Michelle L. Allen
Chemist/Data Validator

Tetra Tech, Inc.
Joseph A. Samchuck
Data Validation Manager

Attachments:
Appendix A – Qualified Analytical Results
Appendix B – Results as Reported by the Laboratory
Appendix C – Support Documentation

Appendix A

Qualified Analytical Results

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = ICP PDS Recovery Noncompliance; MSA's $r < 0.995$
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = RPD between columns/detectors >40% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient $r < 0.995$
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 standard deviations is greater than sample activity
Z1 = Tentatively Identified Compound considered presumptively present
Z2 = Tentatively Identified Compound column bleed
Z3 = Tentatively Identified Compound aldol condensate

PROJ_NO: 05220	NSAMPLE	SD-277-01			SD-277-01A						SD-277-02		
SDG: 680-102199-4	LAB_ID	680-102199-8			680-102199-8						680-102199-9		
FRACTION: RADG	SAMP_DATE	6/9/2014			6/9/2014						6/9/2014		
MEDIA: SOIL	QC_TYPE	NM			NM			TIC			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ACTINIUM-227		0.0953	U								0.169	U	
ACTINIUM-228		1.82									1.82		
BISMUTH-212		0.836	U								1.93	U	
BISMUTH-214		0.901						1.57			1.05		
LEAD-210		3.39									1.84	U	
LEAD-212		1.06						1.48			1.37		
LEAD-214		1.1						1.33			0.573		
POTASSIUM-40		17.3						13			14.9		
PROTACTINIUM-231		-0.00075	U								-0.571	U	
RADIUM-226		5.27			1.57						3.97	U	
RADIUM-228		1.82			1.3						1.82		
THALLIUM-208		0.468						0.67			0.418		
THORIUM-232		1.82			1.3						1.82		
THORIUM-234		2.45									2.14	U	
URANIUM-235		0.105	U		0.244	U					0.6	U	
URANIUM-238		2.45			1.83	U					2.14	U	

PROJ_NO: 05220	NSAMPLE	SD-277-02A						SD-277-SS			SD-277-SSA		
SDG: 680-102199-4	LAB_ID	680-102199-9						680-102199-7			680-102199-7		
FRACTION: RADG	SAMP_DATE	6/9/2014						6/9/2014			6/9/2014		
MEDIA: SOIL	QC_TYPE	NM			TIC			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ACTINIUM-227								0.431	U				
ACTINIUM-228					1.86			1.24	U				
BISMUTH-212								1.32	U				
BISMUTH-214					0.938			1.18					
LEAD-210								-0.881	U				
LEAD-212					1.23			1.37					
LEAD-214					1.11			0.29	U				
POTASSIUM-40					20			13.2					
PROTACTINIUM-231								0.509	U				
RADIUM-226		0.938						3.09	U		0.339	U	
RADIUM-228		1.86						1.24	U		1.13		
THALLIUM-208					0.429			0.501					
THORIUM-232		1.86						1.24	U		1.13		
THORIUM-234								2.22	U				
URANIUM-235		0.17	U					0.323	U		0.468	U	
URANIUM-238		1.97						2.22	U		3.34	U	

PROJ_NO: 05220	NSAMPLE	SD-277-SSA			SD-279-01			SD-279-01A					
SDG: 680-102199-4	LAB_ID	680-102199-7			680-102199-2			680-102199-2					
FRACTION: RADG	SAMP_DATE	6/9/2014			6/9/2014			6/9/2014					
MEDIA: SOIL	QC_TYPE	TIC			NM			NM			TIC		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ACTINIUM-227					0.322	U							
ACTINIUM-228					1.9								
BISMUTH-212					0.806	U							
BISMUTH-214					1.29								
LEAD-210					2.22	U							
LEAD-212		1.57			1.2						1.4		
LEAD-214					1.26								
POTASSIUM-40		13.3			10								
PROTACTINIUM-231					-0.159	U							
RADIUM-226					3.6	U		0.279	U				
RADIUM-228					1.9			1.48					
THALLIUM-208		0.751			0.719						0.845		
THORIUM-232					1.9			1.48					
THORIUM-234					2.51	U							
URANIUM-235					0.388	U		0.434	U				
URANIUM-238					2.51	U		3.99	U				

PROJ_NO: 05220	NSAMPLE	SD-279-02			SD-279-02A			SD-279-SS			SD-279-SSA		
SDG: 680-102199-4	LAB_ID	680-102199-3			680-102199-3			680-102199-1			680-102199-1		
FRACTION: RADG	SAMP_DATE	6/9/2014			6/9/2014			6/9/2014			6/9/2014		
MEDIA: SOIL	QC_TYPE	NM			TIC			NM			TIC		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ACTINIUM-227		-0.0502	U					0.616	U				
ACTINIUM-228		0.771			0.931			2.33			2.36		
BISMUTH-212		1.3						3.1					
BISMUTH-214		0.516			0.6			1.19			1.54		
LEAD-210		0.418	U					2.59	U				
LEAD-212		0.472			0.477			1.31			1.41		
LEAD-214		0.552			0.565			1.05			1.47		
POTASSIUM-40		7.51			6.96			17.2			14		
PROTACTINIUM-231		-0.73	U					0.405	U				
RADIUM-226		1.45			0.6			7.19			1.54		
RADIUM-228		0.771			0.931			2.33			2.36		
THALLIUM-208		0.282			0.245			0.503			0.748		
THORIUM-232		0.771			0.931			2.33			2.36		
THORIUM-234		0.678	U					2.48	U				
URANIUM-235		0.121	U		0.166	U		-0.427	U		0.0442	U	
URANIUM-238		0.678	U		1.13	U		2.48	U		1.51	U	

Appendix B

Results as Reported by the Laboratory

Client Sample Results

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-4
SDG: 680102199-1

Client Sample ID: SD-279-SS

Date Collected: 06/09/14 15:40
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-1
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.616	U	0.422	0.427		0.649	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Radium-226	1.54		0.559	0.579	1.00	0.657	pCi/g	08/11/14 14:47	09/02/14 12:02	1
Actinium 228	2.33		0.457	0.509		0.315	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Radium-228	2.36		0.716	0.751		0.446	pCi/g	08/11/14 14:47	09/02/14 12:02	1
Bismuth-212	3.10		1.58	1.60		1.66	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Bismuth-214	1.19		0.413	0.429		0.483	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Lead-210	2.59	U	1.85	1.90		2.78	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Lead-212	1.31		0.234	0.274		0.312	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Thorium-232	2.36		0.716	0.751		0.446	pCi/g	08/11/14 14:47	09/02/14 12:02	1
Lead-214	1.05		0.305	0.322		0.393	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Uranium-235	0.0442	U	0.821	0.821		1.43	pCi/g	08/11/14 14:47	09/02/14 12:02	1
Potassium-40	17.2		2.96	3.39		2.67	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Uranium-238	1.51	U	1.46	1.47		3.54	pCi/g	08/11/14 14:47	09/02/14 12:02	1
Protactinium-231	0.405	U	0.483	0.485		5.01	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Radium-226	7.19		3.01	3.16	1.00	3.28	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Radium-228	2.33		0.457	0.509		0.315	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Thorium-232	2.33		0.457	0.509		0.315	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Thorium-234	2.48	U	2.13	2.15		2.85	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Thallium-208	0.503		0.179	0.186		0.209	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Uranium-235	-0.427	U	17.1	17.1		0.979	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Uranium-238	2.48	U	2.13	2.15		2.85	pCi/g	08/11/14 14:47	09/08/14 18:04	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Ac-228	*2.36*		*0.716*	*0.751*		*0.446*	*pCi/g*	*08/11/14 14:47*	*09/02/14 12:02*	*1*
Bi-214	*1.54*		*0.559*	*0.579*		*0.657*	*pCi/g*	*08/11/14 14:47*	*09/02/14 12:02*	*1*
K-40	*14.0*		*5.03*	*5.21*		*6.93*	*pCi/g*	*08/11/14 14:47*	*09/02/14 12:02*	*1*
Pb-212	*1.41*		*0.422*	*0.448*		*0.521*	*pCi/g*	*08/11/14 14:47*	*09/02/14 12:02*	*1*
Pb-214	*1.47*		*0.623*	*0.639*		*0.682*	*pCi/g*	*08/11/14 14:47*	*09/02/14 12:02*	*1*
Tl-208	*0.748*		*0.325*	*0.333*		*0.287*	*pCi/g*	*08/11/14 14:47*	*09/02/14 12:02*	*1*

Client Sample ID: SD-279-01

Date Collected: 06/09/14 15:45
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-2
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.322	U	0.881	0.882		1.51	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Radium-226	0.279	U	0.460	0.461	1.00	0.826	pCi/g	08/11/14 14:47	09/02/14 14:33	1
Actinium 228	1.90		0.599	0.627		1.17	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Radium-228	1.48		0.559	0.577		1.15	pCi/g	08/11/14 14:47	09/02/14 14:33	1
Bismuth-212	0.806	U	2.42	2.43		4.27	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Bismuth-214	1.29		0.630	0.642		0.724	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Lead-210	2.22	U	2.48	2.50		3.65	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Lead-212	1.20		0.357	0.380		0.456	pCi/g	08/11/14 14:47	08/14/14 13:35	1

Client Sample ID: SD-279-01

Date Collected: 06/09/14 15:45
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-2
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-232	1.48		0.559	0.577		1.15	pCi/g	08/11/14 14:47	09/02/14 14:33	1
Lead-214	1.26		0.467	0.483		0.585	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Uranium-235	0.434	U	0.664	0.666		1.16	pCi/g	08/11/14 14:47	09/02/14 14:33	1
Potassium-40	10.0		4.10	4.21		5.91	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Uranium-238	3.99	U	3.03	3.06		4.03	pCi/g	08/11/14 14:47	09/02/14 14:33	1
Protactinium-231	-0.159	U	0.523	0.523		6.02	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Radium-226	3.60	U	4.03	4.06	1.00	5.64	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Radium-228	1.90		0.599	0.627		1.17	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Thorium-232	1.90		0.599	0.627		1.17	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Thorium-234	2.51	U	2.63	2.65		3.78	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Thallium-208	0.719		0.280	0.289		0.244	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Uranium-235	0.388	U	0.441	0.442		1.17	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Uranium-238	2.51	U	2.63	2.65		3.78	pCi/g	08/11/14 14:47	08/14/14 13:35	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Pb-212	*1.40*		*0.445*	*0.470*		*0.497*	*pCi/g*	*08/11/14 14:47*	*09/02/14 14:33*	*1*
Tl-208	*0.845*		*0.245*	*0.259*		*0.163*	*pCi/g*	*08/11/14 14:47*	*09/02/14 14:33*	*1*

Client Sample ID: SD-279-02

Date Collected: 06/09/14 15:50
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-3
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.0502	U	0.350	0.350		0.595	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Radium-226	0.600		0.197	0.206	1.00	0.213	pCi/g	08/11/14 14:47	09/02/14 15:06	1
Actinium 228	0.771		0.224	0.237		0.200	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Radium-228	0.931		0.357	0.369		0.318	pCi/g	08/11/14 14:47	09/02/14 15:06	1
Bismuth-212	1.30		0.565	0.581		0.521	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Bismuth-214	0.516		0.153	0.162		0.160	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Lead-210	0.418	U	0.688	0.690		1.05	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Lead-212	0.472		0.102	0.119		0.133	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Thorium-232	0.931		0.357	0.369		0.318	pCi/g	08/11/14 14:47	09/02/14 15:06	1
Lead-214	0.552		0.120	0.133		0.137	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Uranium-235	0.166	U	0.318	0.318		0.509	pCi/g	08/11/14 14:47	09/02/14 15:06	1
Potassium-40	7.51		1.37	1.57		1.22	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Uranium-238	1.13	U	1.29	1.30		1.85	pCi/g	08/11/14 14:47	09/02/14 15:06	1
Protactinium-231	-0.730	U	1.23	1.23		2.06	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Radium-226	1.45		1.04	1.07	1.00	1.40	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Radium-228	0.771		0.224	0.237		0.200	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Thorium-232	0.771		0.224	0.237		0.200	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Thorium-234	0.678	U	0.662	0.666		1.04	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Thallium-208	0.282		0.0780	0.0833		0.0671	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Uranium-235	0.121	U	0.146	0.147		0.240	pCi/g	08/11/14 14:47	09/10/14 20:45	1

Client Sample ID: SD-279-02

Lab Sample ID: 680-102199-3

Date Collected: 06/09/14 15:50
Date Received: 06/11/14 09:30

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-238	0.678	U	0.662	0.666		1.04	pCi/g	08/11/14 14:47	09/10/14 20:45	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Ac-228	*0.931*		*0.357*	*0.369*		*0.318*	*pCi/g*	*08/11/14 14:47*	*09/02/14 15:06*	*1*
Bi-214	*0.600*		*0.197*	*0.206*		*0.213*	*pCi/g*	*08/11/14 14:47*	*09/02/14 15:06*	*1*
K-40	*6.96*		*1.33*	*1.50*		*1.36*	*pCi/g*	*08/11/14 14:47*	*09/02/14 15:06*	*1*
Pb-212	*0.477*		*0.137*	*0.151*		*0.178*	*pCi/g*	*08/11/14 14:47*	*09/02/14 15:06*	*1*
Pb-214	*0.565*		*0.203*	*0.211*		*0.236*	*pCi/g*	*08/11/14 14:47*	*09/02/14 15:06*	*1*
Tl-208	*0.245*		*0.0914*	*0.0949*		*0.105*	*pCi/g*	*08/11/14 14:47*	*09/02/14 15:06*	*1*

Client Sample ID: SD-277-SS

Lab Sample ID: 680-102199-7

Date Collected: 06/09/14 18:10
Date Received: 06/11/14 09:30

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.431	U	0.429	0.432		0.679	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Radium-226	0.339	U	0.403	0.404	1.00	0.789	pCi/g	08/11/14 14:47	09/02/14 17:48	1
Actinium 228	1.24	U	0.664	0.675		1.36	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Radium-228	1.13		0.567	0.577		1.11	pCi/g	08/11/14 14:47	09/02/14 17:48	1
Bismuth-212	1.32	U	2.07	2.07		3.49	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Bismuth-214	1.18		0.645	0.655		0.721	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Lead-210	-0.881	U	3.04	3.04		4.06	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Lead-212	1.37		0.416	0.442		0.497	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Thorium-232	1.13		0.567	0.577		1.11	pCi/g	08/11/14 14:47	09/02/14 17:48	1
Lead-214	0.290	U	0.444	0.445		0.787	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Uranium-235	0.468	U	0.431	0.433		1.45	pCi/g	08/11/14 14:47	09/02/14 17:48	1
Potassium-40	13.2		4.53	4.70		6.09	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Uranium-238	3.34	U	2.61	2.63		3.70	pCi/g	08/11/14 14:47	09/02/14 17:48	1
Protactinium-231	0.509	U	0.723	0.725		6.97	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Radium-226	3.09	U	4.49	4.51	1.00	6.23	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Radium-228	1.24	U	0.664	0.675		1.36	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Thorium-232	1.24	U	0.664	0.675		1.36	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Thorium-234	2.22	U	2.52	2.53		3.77	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Thallium-208	0.501		0.208	0.214		0.209	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Uranium-235	0.323	U	0.743	0.743		1.08	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Uranium-238	2.22	U	2.52	2.53		3.77	pCi/g	08/11/14 14:47	08/27/14 10:16	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
K-40	*13.3*		*4.56*	*4.74*		*6.14*	*pCi/g*	*08/11/14 14:47*	*09/02/14 17:48*	*1*
Pb-212	*1.57*		*0.433*	*0.465*		*0.491*	*pCi/g*	*08/11/14 14:47*	*09/02/14 17:48*	*1*
Tl-208	*0.751*		*0.234*	*0.245*		*0.184*	*pCi/g*	*08/11/14 14:47*	*09/02/14 17:48*	*1*

Client Sample Results

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-4
SDG: 680102199-1

Client Sample ID: SD-277-01

Date Collected: 06/09/14 18:15
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-8
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0953	U	0.448	0.448		1.87	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Radium-226	1.57		0.536	0.557	1.00	0.597	pCi/g	08/11/14 14:47	09/03/14 09:10	1
Actinium 228	1.82		0.320	0.365		0.366	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Radium-228	1.30		0.590	0.603		1.30	pCi/g	08/11/14 14:47	09/03/14 09:10	1
Bismuth-212	0.836	U	1.07	1.08		1.77	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Bismuth-214	0.901		0.327	0.338		0.308	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Lead-210	3.39		1.27	1.34		1.65	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Lead-212	1.06		0.192	0.223		0.219	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Thorium-232	1.30		0.590	0.603		1.30	pCi/g	08/11/14 14:47	09/03/14 09:10	1
Lead-214	1.10		0.201	0.228		0.208	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Uranium-235	0.244	U	0.237	0.238		1.19	pCi/g	08/11/14 14:47	09/03/14 09:10	1
Potassium-40	17.3		2.58	3.08		0.706	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Uranium-238	1.83	U	1.41	1.42		3.52	pCi/g	08/11/14 14:47	09/03/14 09:10	1
Protactinium-231	-0.000753	U	0.00178	0.00179		2.99	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Radium-226	5.27		1.97	2.10	1.00	2.04	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Radium-228	1.82		0.320	0.365		0.366	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Thorium-232	1.82		0.320	0.365		0.366	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Thorium-234	2.45		1.07	1.10		1.52	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Thallium-208	0.468		0.121	0.130		0.0959	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Uranium-235	0.105	U	0.228	0.229		0.561	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Uranium-238	2.45		1.07	1.10		1.52	pCi/g	08/11/14 14:47	08/14/14 16:25	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Bi-214	*1.57*		*0.536*	*0.557*		*0.597*	*pCi/g*	*08/11/14 14:47*	*09/03/14 09:10*	*1*
K-40	*13.0*		*4.11*	*4.30*		*5.28*	*pCi/g*	*08/11/14 14:47*	*09/03/14 09:10*	*1*
Pb-212	*1.48*		*0.354*	*0.388*		*0.405*	*pCi/g*	*08/11/14 14:47*	*09/03/14 09:10*	*1*
Pb-214	*1.33*		*0.450*	*0.468*		*0.531*	*pCi/g*	*08/11/14 14:47*	*09/03/14 09:10*	*1*
Tl-208	*0.670*		*0.215*	*0.224*		*0.169*	*pCi/g*	*08/11/14 14:47*	*09/03/14 09:10*	*1*

Client Sample ID: SD-277-02

Date Collected: 06/09/14 18:20
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-9
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.169	U	0.685	0.685		1.19	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Radium-226	0.938		0.197	0.217	1.00	0.201	pCi/g	08/11/14 14:47	09/03/14 09:11	1
Actinium 228	1.82		0.745	0.766		0.904	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Radium-228	1.86		0.427	0.463		0.246	pCi/g	08/11/14 14:47	09/03/14 09:11	1
Bismuth-212	1.93	U	2.29	2.30		3.74	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Bismuth-214	1.05		0.460	0.472		0.489	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Lead-210	1.84	U	2.39	2.40		3.31	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Lead-212	1.37		0.288	0.324		0.324	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Thorium-232	1.86		0.427	0.463		0.246	pCi/g	08/11/14 14:47	09/03/14 09:11	1

Client Sample Results

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-4
SDG: 680102199-1

Client Sample ID: SD-277-02
Date Collected: 06/09/14 18:20
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-9
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Lead-214	0.573		0.322	0.327		0.531	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Uranium-235	0.170	U	0.307	0.307		0.514	pCi/g	08/11/14 14:47	09/03/14 09:11	1
Potassium-40	14.9		3.99	4.24		4.68	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Uranium-238	1.97		1.00	1.02		1.47	pCi/g	08/11/14 14:47	09/03/14 09:11	1
Protactinium-231	-0.571	U	3.67	3.67		6.42	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Radium-226	3.97	U	3.25	3.29	1.00	4.53	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Radium-228	1.82		0.745	0.766		0.904	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Thorium-232	1.82		0.745	0.766		0.904	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Thorium-234	2.14	U	1.21	1.23		3.35	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Thallium-208	0.418		0.212	0.216		0.295	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Uranium-235	0.600	U	0.597	0.599		0.973	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Uranium-238	2.14	U	1.21	1.23		3.35	pCi/g	08/11/14 14:47	08/14/14 16:25	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Ac-228	*1.86*		*0.427*	*0.463*		*0.246*	*pCi/g*	*08/11/14 14:47*	*09/03/14 09:11*	*1*
Bi-214	*0.938*		*0.197*	*0.217*		*0.201*	*pCi/g*	*08/11/14 14:47*	*09/03/14 09:11*	*1*
K-40	*20.0*		*2.62*	*3.25*		*0.631*	*pCi/g*	*08/11/14 14:47*	*09/03/14 09:11*	*1*
Pb-212	*1.23*		*0.193*	*0.234*		*0.202*	*pCi/g*	*08/11/14 14:47*	*09/03/14 09:11*	*1*
Pb-214	*1.11*		*0.201*	*0.228*		*0.192*	*pCi/g*	*08/11/14 14:47*	*09/03/14 09:11*	*1*
Tl-208	*0.429*		*0.0995*	*0.108*		*0.0695*	*pCi/g*	*08/11/14 14:47*	*09/03/14 09:11*	*1*

Appendix C

Support Documentation

Client Sample Results

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-4
SDG: 680102199-1

Client Sample ID: SD-279-SS

Date Collected: 06/09/14 15:40
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-1
Matrix: Solid

Amy switch
-55 9/8/14
-55A 9/2/14

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.616	U	0.422	0.427		0.649	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Radium-226	**1.54**		0.559	0.579	1.00	0.657	pCi/g	08/11/14 14:47	09/02/14 12:02	1
Actinium 228	2.33		0.457	0.509		0.315	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Radium-228	**2.36**		0.716	0.751		0.446	pCi/g	08/11/14 14:47	09/02/14 12:02	1
Bismuth-212	3.10		1.58	1.60		1.66	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Bismuth-214	1.19		0.413	0.429		0.483	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Lead-210	2.59	U	1.85	1.90		2.78	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Lead-212	1.31		0.234	0.274		0.312	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Thorium-232	**2.36**		0.716	0.751		0.446	pCi/g	08/11/14 14:47	09/02/14 12:02	1
Lead-214	1.05		0.305	0.322		0.393	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Uranium-235	**0.0442**	U	0.821	0.821		1.43	pCi/g	08/11/14 14:47	09/02/14 12:02	1
Potassium-40	17.2		2.96	3.39		2.67	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Uranium-238	**1.51**	U	1.46	1.47		3.54	pCi/g	08/11/14 14:47	09/02/14 12:02	1
Protactinium-231	0.405	U	0.483	0.485		5.01	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Radium-226	7.19		3.01	3.16	1.00	3.28	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Radium-228	2.33		0.457	0.509		0.315	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Thorium-232	2.33		0.457	0.509		0.315	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Thorium-234	2.48	U	2.13	2.15		2.85	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Thallium-208	0.503		0.179	0.186		0.209	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Uranium-235	-0.427	U	17.1	17.1		0.979	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Uranium-238	2.48	U	2.13	2.15		2.85	pCi/g	08/11/14 14:47	09/08/14 18:04	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Ac-228	***2.36***		*0.716*	*0.751*		*0.446*	*pCi/g*	*08/11/14 14:47*	*09/02/14 12:02*	*1*
Bi-214	***1.54***		*0.559*	*0.579*		*0.657*	*pCi/g*	*08/11/14 14:47*	*09/02/14 12:02*	*1*
K-40	***14.0***		*5.03*	*5.21*		*6.93*	*pCi/g*	*08/11/14 14:47*	*09/02/14 12:02*	*1*
Pb-212	***1.41***		*0.422*	*0.448*		*0.521*	*pCi/g*	*08/11/14 14:47*	*09/02/14 12:02*	*1*
Pb-214	***1.47***		*0.623*	*0.639*		*0.682*	*pCi/g*	*08/11/14 14:47*	*09/02/14 12:02*	*1*
Tl-208	***0.748***		*0.325*	*0.333*		*0.287*	*pCi/g*	*08/11/14 14:47*	*09/02/14 12:02*	*1*

Client Sample ID: SD-279-01

Date Collected: 06/09/14 15:45
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-2
Matrix: Solid

-01 8/14/14
-01 9/2/14

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.322	U	0.881	0.882		1.51	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Radium-226	**0.279**	U	0.460	0.461	1.00	0.826	pCi/g	08/11/14 14:47	09/02/14 14:33	1
Actinium 228	1.90		0.599	0.627		1.17	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Radium-228	**1.48**		0.559	0.577		1.15	pCi/g	08/11/14 14:47	09/02/14 14:33	1
Bismuth-212	0.806	U	2.42	2.43		4.27	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Bismuth-214	1.29		0.630	0.642		0.724	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Lead-210	2.22	U	2.48	2.50		3.65	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Lead-212	1.20		0.357	0.380		0.456	pCi/g	08/11/14 14:47	08/14/14 13:35	1

Client Sample ID: SD-279-01

Date Collected: 06/09/14 15:45
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-2
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-232	1.48		0.559	0.577		1.15	pCi/g	08/11/14 14:47	09/02/14 14:33	1
Lead-214	1.26		0.467	0.483		0.585	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Uranium-235	0.434	U	0.664	0.666		1.16	pCi/g	08/11/14 14:47	09/02/14 14:33	1
Potassium-40	10.0		4.10	4.21		5.91	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Uranium-238	3.99	U	3.03	3.06		4.03	pCi/g	08/11/14 14:47	09/02/14 14:33	1
Protactinium-231	-0.159	U	0.523	0.523		6.02	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Radium-226	3.60	U	4.03	4.06	1.00	5.64	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Radium-228	1.90		0.599	0.627		1.17	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Thorium-232	1.90		0.599	0.627		1.17	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Thorium-234	2.51	U	2.63	2.65		3.78	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Thallium-208	0.719		0.280	0.289		0.244	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Uranium-235	0.388	U	0.441	0.442		1.17	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Uranium-238	2.51	U	2.63	2.65		3.78	pCi/g	08/11/14 14:47	08/14/14 13:35	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Pb-212	*1.40*		*0.445*	*0.470*		*0.497*	*pCi/g*	*08/11/14 14:47*	*09/02/14 14:33*	*1*
Tl-208	*0.845*		*0.245*	*0.259*		*0.163*	*pCi/g*	*08/11/14 14:47*	*09/02/14 14:33*	*1*

Client Sample ID: SD-279-02

Date Collected: 06/09/14 15:50
Date Received: 06/11/14 09:30

02 - 9/10/14
- 02A 9/2/14

Lab Sample ID: 680-102199-3
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.0502	U	0.350	0.350		0.595	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Radium-226	0.600		0.197	0.206	1.00	0.213	pCi/g	08/11/14 14:47	09/02/14 15:06	1
Actinium 228	0.771		0.224	0.237		0.200	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Radium-228	0.931		0.357	0.369		0.318	pCi/g	08/11/14 14:47	09/02/14 15:06	1
Bismuth-212	1.30		0.565	0.581		0.521	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Bismuth-214	0.516		0.153	0.162		0.160	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Lead-210	0.418	U	0.688	0.690		1.05	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Lead-212	0.472		0.102	0.119		0.133	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Thorium-232	0.931		0.357	0.369		0.318	pCi/g	08/11/14 14:47	09/02/14 15:06	1
Lead-214	0.552		0.120	0.133		0.137	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Uranium-235	0.166	U	0.318	0.318		0.509	pCi/g	08/11/14 14:47	09/02/14 15:06	1
Potassium-40	7.51		1.37	1.57		1.22	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Uranium-238	1.13	U	1.29	1.30		1.85	pCi/g	08/11/14 14:47	09/02/14 15:06	1
Protactinium-231	-0.730	U	1.23	1.23		2.06	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Radium-226	1.45		1.04	1.07	1.00	1.40	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Radium-228	0.771		0.224	0.237		0.200	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Thorium-232	0.771		0.224	0.237		0.200	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Thorium-234	0.678	U	0.662	0.666		1.04	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Thallium-208	0.282		0.0780	0.0833		0.0671	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Uranium-235	0.121	U	0.146	0.147		0.240	pCi/g	08/11/14 14:47	09/10/14 20:45	1

Client Sample Results

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-4
SDG: 680102199-1

Client Sample ID: SD-279-02

Lab Sample ID: 680-102199-3

Date Collected: 06/09/14 15:50
Date Received: 06/11/14 09:30

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-238	0.678	U	0.662	0.666		1.04	pCi/g	08/11/14 14:47	09/10/14 20:45	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Ac-228	**0.931**		*0.357*	*0.369*		*0.318*	*pCi/g*	*08/11/14 14:47*	*09/02/14 15:06*	*1*
Bi-214	**0.609**		*0.197*	*0.206*		*0.213*	*pCi/g*	*08/11/14 14:47*	*09/02/14 15:06*	*1*
K-40	**6.96**		*1.33*	*1.50*		*1.36*	*pCi/g*	*08/11/14 14:47*	*09/02/14 15:06*	*1*
Pb-212	**0.477**		*0.137*	*0.151*		*0.178*	*pCi/g*	*08/11/14 14:47*	*09/02/14 15:06*	*1*
Pb-214	**0.565**		*0.203*	*0.211*		*0.236*	*pCi/g*	*08/11/14 14:47*	*09/02/14 15:06*	*1*
Tl-208	**0.245**		*0.0914*	*0.0949*		*0.105*	*pCi/g*	*08/11/14 14:47*	*09/02/14 15:06*	*1*

Client Sample ID: SD-277-SS

-SS 8/27 Lab Sample ID: 680-102199-7

Date Collected: 06/09/14 18:10
Date Received: 06/11/14 09:30

-SSA 9/2

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.431	U	0.429	0.432		0.679	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Radium-226	**0.339**	**U**	0.403	0.404	1.00	0.789	pCi/g	08/11/14 14:47	09/02/14 17:48	1
Actinium 228	1.24	U	0.664	0.675		1.36	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Radium-228	**1.13**		0.567	0.577		1.11	pCi/g	08/11/14 14:47	09/02/14 17:48	1
Bismuth-212	1.32	U	2.07	2.07		3.49	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Bismuth-214	1.18		0.645	0.655		0.721	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Lead-210	-0.881	U	3.04	3.04		4.06	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Lead-212	1.37		0.416	0.442		0.497	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Thorium-232	**1.13**		0.567	0.577		1.11	pCi/g	08/11/14 14:47	09/02/14 17:48	1
Lead-214	0.290	U	0.444	0.445		0.787	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Uranium-235	**0.466**	**U**	0.431	0.433		1.45	pCi/g	08/11/14 14:47	09/02/14 17:48	1
Potassium-40	13.2		4.53	4.70		6.09	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Uranium-238	**3.34**	**U**	2.61	2.63		3.70	pCi/g	08/11/14 14:47	09/02/14 17:48	1
Protactinium-231	0.509	U	0.723	0.725		6.97	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Radium-226	3.09	U	4.49	4.51	1.00	6.23	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Radium-228	1.24	U	0.664	0.675		1.36	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Thorium-232	1.24	U	0.664	0.675		1.36	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Thorium-234	2.22	U	2.52	2.53		3.77	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Thallium-208	0.501		0.208	0.214		0.209	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Uranium-235	0.323	U	0.743	0.743		1.08	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Uranium-238	2.22	U	2.52	2.53		3.77	pCi/g	08/11/14 14:47	08/27/14 10:16	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
K-40	**13.3**		*4.56*	*4.74*		*6.14*	*pCi/g*	*08/11/14 14:47*	*09/02/14 17:48*	*1*
Pb-212	**1.57**		*0.433*	*0.465*		*0.491*	*pCi/g*	*08/11/14 14:47*	*09/02/14 17:48*	*1*
Tl-208	**0.751**		*0.234*	*0.245*		*0.184*	*pCi/g*	*08/11/14 14:47*	*09/02/14 17:48*	*1*

Client Sample Results

Client: Tetra Tech, Inc.
Project/Site: Sediments

-01 8/14

TestAmerica Job ID: 680-102199-4
SDG: 680102199-1

Client Sample ID: SD-277-01

-01A 9/3

Lab Sample ID: 680-102199-8

Date Collected: 06/09/14 18:15
Date Received: 06/11/14 09:30

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0953	U	0.448	0.448		1.87	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Radium-226	[redacted]		0.536	0.557	1.00	0.597	pCi/g	08/11/14 14:47	09/03/14 09:10	1
Actinium 228	1.82		0.320	0.365		0.366	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Radium-228	[redacted]		0.590	0.603		1.30	pCi/g	08/11/14 14:47	09/03/14 09:10	1
Bismuth-212	0.836	U	1.07	1.08		1.77	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Bismuth-214	0.901		0.327	0.338		0.308	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Lead-210	3.39		1.27	1.34		1.65	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Lead-212	1.06		0.192	0.223		0.219	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Thorium-232	[redacted]		0.590	0.603		1.30	pCi/g	08/11/14 14:47	09/03/14 09:10	1
Lead-214	1.10		0.201	0.228		0.208	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Uranium-235	[redacted]	U	0.237	0.238		1.19	pCi/g	08/11/14 14:47	09/03/14 09:10	1
Potassium-40	17.3		2.58	3.08		0.706	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Uranium-238	[redacted]	U	1.41	1.42		3.52	pCi/g	08/11/14 14:47	09/03/14 09:10	1
Protactinium-231	-0.000753	U	0.00178	0.00179		2.99	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Radium-226	5.27		1.97	2.10	1.00	2.04	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Radium-228	1.82		0.320	0.365		0.366	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Thorium-232	1.82		0.320	0.365		0.366	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Thorium-234	2.45		1.07	1.10		1.52	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Thallium-208	0.468		0.121	0.130		0.0959	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Uranium-235	0.105	U	0.228	0.229		0.561	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Uranium-238	2.45		1.07	1.10		1.52	pCi/g	08/11/14 14:47	08/14/14 16:25	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Bi-214	[redacted]		*0.536*	*0.557*		*0.597*	*pCi/g*	*08/11/14 14:47*	*09/03/14 09:10*	*1*
K-40	[redacted]		*4.11*	*4.30*		*5.28*	*pCi/g*	*08/11/14 14:47*	*09/03/14 09:10*	*1*
Pb-212	[redacted]		*0.354*	*0.388*		*0.405*	*pCi/g*	*08/11/14 14:47*	*09/03/14 09:10*	*1*
Pb-214	[redacted]		*0.450*	*0.468*		*0.531*	*pCi/g*	*08/11/14 14:47*	*09/03/14 09:10*	*1*
Tl-208	[redacted]		*0.215*	*0.224*		*0.169*	*pCi/g*	*08/11/14 14:47*	*09/03/14 09:10*	*1*

Client Sample ID: SD-277-02

-02 8/14

Lab Sample ID: 680-102199-9

Date Collected: 06/09/14 18:20
Date Received: 06/11/14 09:30

-02A 9/3

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.169	U	0.685	0.685		1.19	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Radium-226	[redacted]		0.197	0.217	1.00	0.201	pCi/g	08/11/14 14:47	09/03/14 09:11	1
Actinium 228	1.82		0.745	0.766		0.904	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Radium-228	[redacted]		0.427	0.463		0.246	pCi/g	08/11/14 14:47	09/03/14 09:11	1
Bismuth-212	1.93	U	2.29	2.30		3.74	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Bismuth-214	1.05		0.460	0.472		0.489	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Lead-210	1.84	U	2.39	2.40		3.31	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Lead-212	1.37		0.288	0.324		0.324	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Thorium-232	[redacted]		0.427	0.463		0.246	pCi/g	08/11/14 14:47	09/03/14 09:11	1

Client Sample ID: SD-277-02
Date Collected: 06/09/14 18:20
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-9
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Lead-214	0.573		0.322	0.327		0.531	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Uranium-235	0.170	U	0.307	0.307		0.514	pCi/g	08/11/14 14:47	09/03/14 09:11	1
Potassium-40	14.9		3.99	4.24		4.68	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Uranium-238	1.97		1.00	1.02		1.47	pCi/g	08/11/14 14:47	09/03/14 09:11	1
Protactinium-231	-0.571	U	3.67	3.67		6.42	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Radium-226	3.97	U	3.25	3.29	1.00	4.53	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Radium-228	1.82		0.745	0.766		0.904	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Thorium-232	1.82		0.745	0.766		0.904	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Thorium-234	2.14	U	1.21	1.23		3.35	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Thallium-208	0.418		0.212	0.216		0.295	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Uranium-235	0.600	U	0.597	0.599		0.973	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Uranium-238	2.14	U	1.21	1.23		3.35	pCi/g	08/11/14 14:47	08/14/14 16:25	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Ac-228	*1.86*		*0.427*	*0.463*		*0.246*	*pCi/g*	*08/11/14 14:47*	*09/03/14 09:11*	*1*
Bi-214	*0.938*		*0.197*	*0.217*		*0.201*	*pCi/g*	*08/11/14 14:47*	*09/03/14 09:11*	*1*
K-40	*20.0*		*2.62*	*3.25*		*0.631*	*pCi/g*	*08/11/14 14:47*	*09/03/14 09:11*	*1*
Pb-212	*1.23*		*0.193*	*0.234*		*0.202*	*pCi/g*	*08/11/14 14:47*	*09/03/14 09:11*	*1*
Pb-214	*1.11*		*0.201*	*0.228*		*0.192*	*pCi/g*	*08/11/14 14:47*	*09/03/14 09:11*	*1*
Tl-208	*0.429*		*0.0995*	*0.108*		*0.0695*	*pCi/g*	*08/11/14 14:47*	*09/03/14 09:11*	*1*

LMC-MRC
SEDIMENT INVESTIGATION
SDG 680-102199-4

LABORATORY DUPLICATE EVALUATION

MEAN DIFFERENCE:

$$\frac{|\text{SAMPLE ACTIVITY} - \text{BLANK ACTIVITY}|}{\sqrt{((\text{SAMPLE UNCERTAINTY}/2)^2 + (\text{BLANK UNCERTAINTY}/2)^2)}}$$

PREPARATION BATCH #137115

SAMPLE ID:	**SD-279-SS**	**Ra-226**
SAMPLE RESULTS		1.54 ± 0.579 pCi/g
DUPLICATE RESULTS		0.962 ± 0.356 pCi/g
MEAN DIFFERENCE =	1.700778107	

		Ra-228/Th-232
SAMPLE RESULTS		2.36 ± 0.751 pCi/g
DUPLICATE RESULTS		1.725 ± 0.428 pCi/g
MEAN DIFFERENCE =	1.46922953	

		U-235
SAMPLE RESULTS		0.0442 ± 0.821 pCi/g
DUPLICATE RESULTS		0.2379 ± 0.34 pCi/g
MEAN DIFFERENCE =	0.43595812	

		U-238
SAMPLE RESULTS		1.51 ± 1.47 pCi/g
DUPLICATE RESULTS		2.152 ± 1.43 pCi/g
MEAN DIFFERENCE =	0.626095692	

LMC-MRC
SEDIMENT INVESTIGATION
SDG 680-102199-4

LABORATORY DUPLICATE EVALUATION

MEAN DIFFERENCE:

$$\frac{|\text{SAMPLE ACTIVITY} - \text{BLANK ACTIVITY}|}{\sqrt{((\text{SAMPLE UNCERTAINTY}/2)^2 + (\text{BLANK UNCERTAINTY}/2)^2)}}$$

PREPARATION BATCH #137389

SAMPLE ID:	**SD-279-SS**	**Actinium-227**
SAMPLE RESULTS		0.616 ± 0.427 pCi/g
DUPLICATE RESULTS		-1.058 ± 0.864 pCi/g
MEAN DIFFERENCE =	3.473909507	

		Actinium-228
SAMPLE RESULTS		2.33 ± 0.509 pCi/g
DUPLICATE RESULTS		2.13 ± 0.447 pCi/g
MEAN DIFFERENCE =	0.590480683	

		Bismuth-212
SAMPLE RESULTS		3.1 ± 1.6 pCi/g
DUPLICATE RESULTS		0.5711 ± 1.48 pCi/g
MEAN DIFFERENCE =	2.320580091	

		Bismuth-214
SAMPLE RESULTS		1.19 ± 0.429 pCi/g
DUPLICATE RESULTS		1.081 ± 0.35 pCi/g
MEAN DIFFERENCE =	0.393742422	

LMC-MRC
SEDIMENT INVESTIGATION
SDG 680-102199-4

LABORATORY DUPLICATE EVALUATION

MEAN DIFFERENCE:

$$\frac{|\text{SAMPLE ACTIVITY} - \text{BLANK ACTIVITY}|}{\sqrt{((\text{SAMPLE UNCERTAINTY}/2)^2 + (\text{BLANK UNCERTAINTY}/2)^2)}}$$

		Lead-210
SAMPLE RESULTS		2.59 ± 1.9 pCi/g
DUPLICATE RESULTS		2.573 ± 0.283 pCi/g
MEAN DIFFERENCE =	0.01769948	

		Lead-212
SAMPLE RESULTS		1.31 ± 0.274 pCi/g
DUPLICATE RESULTS		1.318 ± 0.283 pCi/g
MEAN DIFFERENCE =	0.040618427	

		Lead-214
SAMPLE RESULTS		1.05 ± 0.322 pCi/g
DUPLICATE RESULTS		1.199 ± 0.28 pCi/g
MEAN DIFFERENCE =	0.698361632	

		Potassium-40
SAMPLE RESULTS		17.2 ± 3.39 pCi/g
DUPLICATE RESULTS		18.06 ± 3.49 pCi/g
MEAN DIFFERENCE =	0.35351605	

		Protactinium-231
SAMPLE RESULTS		0.405 ± 1.47 pCi/g
DUPLICATE RESULTS		-1.685 ± 2.64 pCi/g
MEAN DIFFERENCE =	1.383340211	

LMC-MRC
SEDIMENT INVESTIGATION
SDG 680-102199-4

LABORATORY DUPLICATE EVALUATION

MEAN DIFFERENCE:

$$\frac{|\text{SAMPLE ACTIVITY} - \text{BLANK ACTIVITY}|}{\sqrt{((\text{SAMPLE UNCERTAINTY}/2)^2 + (\text{BLANK UNCERTAINTY}/2)^2)}}$$

		Radium-226	
SAMPLE RESULTS		7.19 ±	3.16 pCi/g
DUPLICATE RESULTS		3.829 ±	2.38 pCi/g
MEAN DIFFERENCE =	1.699187628		
		Radium-228/Thorium-232	
SAMPLE RESULTS		2.33 ±	0.509 pCi/g
DUPLICATE RESULTS		2.13 ±	0.447 pCi/g
MEAN DIFFERENCE =	0.590480683		
		Thorium-234	
SAMPLE RESULTS		2.48 ±	2.15 pCi/g
DUPLICATE RESULTS		1.594 ±	1.66 pCi/g
MEAN DIFFERENCE =	0.652366196		
		Thallium-208	
SAMPLE RESULTS		0.503 ±	0.186 pCi/g
DUPLICATE RESULTS		0.5512 ±	0.155 pCi/g
MEAN DIFFERENCE =	0.398153394		
		Uranium-235	
SAMPLE RESULTS		-0.427 ±	17.1 pCi/g
DUPLICATE RESULTS		0.2206 ±	0.394 pCi/g
MEAN DIFFERENCE =	0.075722593		
		Uranium-238	
SAMPLE RESULTS		2.48 ±	2.15 pCi/g
DUPLICATE RESULTS		1.594 ±	1.66 pCi/g
MEAN DIFFERENCE =	0.652366196		

5b

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: S. Gamon	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.46
Client Contact: Mike Martin	Phone: (703)84[illegible]-8384	E-Mail: jerry.lanier@testamericainc.com		Page: ~~Page 10 of 10~~ 1 of 4

Company: Tetra Tech, Inc.	Analysis Requested	Job #: 680-102199
Address: 20251 Century Blvd Suite 200	Due Date Requested:	
City: Germantown	TAT Requested (days): Standard	
State, Zip: MD, 20874	PO #: Purchase Order not required	
Phone:	WO #:	
Email: Michael.Martin@tetratech.com	Project #: 68012942	
Project Name: Sediments	SSOW#:	
Site:		

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Perform MS/MSD (Yes or No)	Total Number of containers	Special Instructions/Note:
SD-279-55	6/9/14	1540	C	Solid			X					
SD-279-01		1545	C	Solid			X					
SD-279-02		1550	C	Solid			X					
SD-279-03		1555	C	Solid			X					Hold Pending analysis SS to 02
SD-278-55		1740	C	Solid			X					
SD-278-01		1745	C	Solid			X					
SD-277-55		1810	C	Solid			X					
SD-277-01		1815	C	Solid			X					
SD-277-02		1820	C	Solid			X					
SD-277-03	↓	1825	C	Solid			X					Hold pending analysis SS to 02
SD-219-55	6/10/14	0920	C	Solid			X					

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
[signature]	6-10-14 / 1625	TT	[signature]	6/10/14 1645	~~TestAmerica~~
Relinquished by: [signature]	Date/Time: 6/10/14 1735	Company TestAmerica	Received by: [signature]	Date/Time: 6-11-14 0830	Company TA STL
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ∆ Yes ∆ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Sediments

Report Number: 680-102199-4

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 06/11/2014; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 1.1 C.

RADIUM-226 AND OTHER GAMMA EMITTERS (GS)

Samples SD-279-SS (680-102199-1), SD-279-01 (680-102199-2), SD-279-02 (680-102199-3), SD-277-SS (680-102199-7), SD-277-01 (680-102199-8) and SD-277-02 (680-102199-9) were analyzed for Radium-226 and other gamma emitters (GS) in accordance with The Department of Energy. The samples were leached on 08/12/2014, prepared on 08/11/2014 and analyzed on 08/14/2014, 08/27/2014, 09/08/2014 and 09/10/2014.

Method(s) GA-01-R: Prep Batch #137389: Ra-226 by gamma spectroscopy is typically determined by inference from daughters (e.g. Bi-214) after sealing the sample in an appropriate counting geometry/container and waiting 21 days to allow the Ra-226 decay chain through Rn-222 to reach secular equilibrium. Such an approach is considered to be the most reliable and representative means for establishing the true Ra-226 concentration in the sample. The method requested by the client to report Ra-226, using its own 186 keV gamma-ray emission, is subject to interference and potential bias due to the 185.7 keV U-235 gamma ray. Experience also indicates gamma spectroscopy software does not consistently assign accurate peak areas to Ra-226 (186 keV), with the problem compounded by slight drift of the instrumentation. The laboratory considers Ra-226 reported based upon the 186 keV gamma-ray emission to be best used by the client in a qualitative fashion.
The following samples were affected: (680-102199-1), (680-102199-1 DU), (680-102199-2), (680-102199-7), (680-102199-8), (680-102199-9), (MB 160-137389/1-A), SD-277-01 (680-102199-8), SD-277-02 (680-102199-9), SD-277-SS (680-102199-7), SD-279-01 (680-102199-2), SD-279-SS (680-102199-1).
Prep Batch #137389: The reporting limit for radium-226 analyzed by gamma spectroscopy was not met. The data is reported with the MDC achieved.
Prep Batch #137389: The RER was outside of the acceptance limits of 1 for actinium-227. Both the sample and duplicate activity were less than the MDC.

Several analytes exceeded the RPD limit for the duplicate of sample SD-279-SSDU (680-102199-1). Refer to the QC report for details.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

RADIUM-226 AND OTHER GAMMA EMITTERS (GS)

Samples SD-279-SS (680-102199-1), SD-279-01 (680-102199-2), SD-279-02 (680-102199-3), SD-277-SS (680-102199-7), SD-277-01 (680-102199-8) and SD-277-02 (680-102199-9) were analyzed for Radium-226 and other gamma emitters (GS) in accordance with approved methodologies. The samples were leached on 08/07/2014, prepared on 08/11/2014 and analyzed on 09/02/2014 and 09/03/2014.

Method(s) Fill_Geo-21: Insufficient sample was provided for the following sample(s) to fill a geometry (e.g. tuna can) calibrated for Ra-226 analysis by gamma spectroscopy: (680-102199-1), (680-102199-1 DU), (680-102199-2), (680-102199-3), (680-102199-7), (680-102199-8), (680-102199-9), SD-277-01 (680-102199-8), SD-277-02 (680-102199-9), SD-277-SS (680-102199-7), SD-279-01 (680-102199-2), SD-279-02 (680-102199-3), SD-279-SS (680-102199-1) a 25mL geometry was used instead.
Gamma (batch:137115)

Americium-241, Cesium-137, Cobalt-60 and Uranium-235 exceeded the RPD limit for the duplicate of sample SD-279-SSDU (680-102199-1). Refer to the QC report for details.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.
F	Duplicate RPD exceeds the control limit

Rad TICs

Qualifier	Qualifier Description
F	Duplicate RPD exceeds the control limit

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-4
SDG: 680102199-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-102199-1	SD-279-SS	Solid	06/09/14 15:40	06/11/14 09:30
680-102199-2	SD-279-01	Solid	06/09/14 15:45	06/11/14 09:30
680-102199-3	SD-279-02	Solid	06/09/14 15:50	06/11/14 09:30
680-102199-7	SD-277-SS	Solid	06/09/14 18:10	06/11/14 09:30
680-102199-8	SD-277-01	Solid	06/09/14 18:15	06/11/14 09:30
680-102199-9	SD-277-02	Solid	06/09/14 18:20	06/11/14 09:30

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-4
SDG: 680102199-1

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-137115/1-A
Matrix: Solid
Analysis Batch: 141130

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 137115

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.2749	U	11.0	11.0	1.00	0.757	pCi/g	08/11/14 14:47	09/02/14 09:53	1
Radium-228	0.07116	U	0.205	0.206		1.23	pCi/g	08/11/14 14:47	09/02/14 09:53	1
Thorium-232	0.07116	U	0.205	0.206		1.23	pCi/g	08/11/14 14:47	09/02/14 09:53	1
Uranium-235	0.01779	U	0.422	0.422		0.767	pCi/g	08/11/14 14:47	09/02/14 09:53	1
Uranium-238	0.8991	U	1.29	1.30		3.01	pCi/g	08/11/14 14:47	09/02/14 09:53	1

Other Detected Radionuclides	*MB Result*	*MB Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*08/11/14 14:47*	*09/02/14 09:53*	*1*

Lab Sample ID: LCS 160-137115/2-A
Matrix: Solid
Analysis Batch: 141135

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 137115

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	981	1011		100		1.95	pCi/g	103	87 - 116
Cesium-137	362	383.2		37.5		1.36	pCi/g	106	87 - 120
Cobalt-60	383	416.2		40.0		1.03	pCi/g	109	87 - 115

Lab Sample ID: 680-102199-1 DU
Matrix: Solid
Analysis Batch: 141135

Client Sample ID: SD-279-SS
Prep Type: Total/NA
Prep Batch: 137115

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Radium-226	1.54		0.9620		0.356	1.00	0.360	pCi/g	0.62	1
Radium-228	2.36		1.725		0.428		0.324	pCi/g	0.54	1
Thorium-232	2.36		1.725		0.428		0.324	pCi/g	0.54	1
Uranium-235	0.0442	U	0.2379	U	0.340		0.626	pCi/g	0.17	1
Uranium-238	1.51	U	2.152		1.43		1.94	pCi/g	0.22	1

Lab Sample ID: MB 160-137389/1-A
Matrix: Solid
Analysis Batch: 137825

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 137389

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.01251	U	0.821	0.821		1.45	pCi/g	08/11/14 14:47	08/13/14 18:36	1
Actinium 228	0.1554	U	0.266	0.267		1.08	pCi/g	08/11/14 14:47	08/13/14 18:36	1
Bismuth-212	0.6622	U	1.78	1.78		3.18	pCi/g	08/11/14 14:47	08/13/14 18:36	1
Bismuth-214	-0.03500	U	0.410	0.410		0.657	pCi/g	08/11/14 14:47	08/13/14 18:36	1
Lead-210	0.3779	U	2.00	2.00		3.36	pCi/g	08/11/14 14:47	08/13/14 18:36	1
Lead-212	0.03745	U	0.237	0.237		0.454	pCi/g	08/11/14 14:47	08/13/14 18:36	1
Lead-214	-0.1398	U	0.751	0.751		0.614	pCi/g	08/11/14 14:47	08/13/14 18:36	1
Potassium-40	-1.543	U	6.48	6.48		5.49	pCi/g	08/11/14 14:47	08/13/14 18:36	1
Protactinium-231	-0.2578	U	0.833	0.833		7.22	pCi/g	08/11/14 14:47	08/13/14 18:36	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: MB 160-137389/1-A
Matrix: Solid
Analysis Batch: 137825

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 137389

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.9022	U	4.12	4.13	1.00	5.40	pCi/g	08/11/14 14:47	08/13/14 18:36	1
Radium-228	0.1554	U	0.266	0.267		1.08	pCi/g	08/11/14 14:47	08/13/14 18:36	1
Thorium-232	0.1554	U	0.266	0.267		1.08	pCi/g	08/11/14 14:47	08/13/14 18:36	1
Thorium-234	1.124	U	1.11	1.12		2.97	pCi/g	08/11/14 14:47	08/13/14 18:36	1
Thallium-208	0.03963	U	0.176	0.176		0.256	pCi/g	08/11/14 14:47	08/13/14 18:36	1
Uranium-235	0.2933	U	0.661	0.662		1.11	pCi/g	08/11/14 14:47	08/13/14 18:36	1
Uranium-238	1.124	U	1.11	1.12		2.97	pCi/g	08/11/14 14:47	08/13/14 18:36	1

Lab Sample ID: LCS 160-137389/2-A
Matrix: Solid
Analysis Batch: 137825

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 137389

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	981	1059		105		3.49	pCi/g	108	87 - 116
Cesium-137	363	377.5		37.1		2.26	pCi/g	104	87 - 120
Cobalt-60	386	427.7		41.2		1.15	pCi/g	111	87 - 115

Lab Sample ID: 680-102199-1 DU
Matrix: Solid
Analysis Batch: 142798

Client Sample ID: SD-279-SS
Prep Type: Total/NA
Prep Batch: 137389

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Actinium-227	0.616	U	-1.058	U F	0.864		1.39	pCi/g	1.30	1
Actinium 228	2.33		2.130		0.447		0.295	pCi/g	0.20	1
Bismuth-212	3.10		0.5711	U	1.48		2.54	pCi/g	0.82	1
Bismuth-214	1.19		1.081		0.350		0.333	pCi/g	0.14	1
Lead-210	2.59	U	2.573		1.35		1.80	pCi/g	0.01	1
Lead-212	1.31		1.318		0.283		0.240	pCi/g	0.01	1
Lead-214	1.05		1.199		0.280		0.235	pCi/g	0.25	1
Potassium-40	17.2		18.06		3.49		2.51	pCi/g	0.13	1
Protactinium-231	0.405	U	-1.685	U	2.64		4.39	pCi/g	0.67	1
Radium-226	7.19		3.829		2.38	1.00	2.93	pCi/g	0.61	1
Radium-228	2.33		2.130		0.447		0.295	pCi/g	0.20	1
Thorium-232	2.33		2.130		0.447		0.295	pCi/g	0.20	1
Thorium-234	2.48	U	1.594	U	1.66		2.22	pCi/g	0.23	1
Thallium-208	0.503		0.5512		0.155		0.125	pCi/g	0.14	1
Uranium-235	-0.427	U	0.2206	U	0.394		0.615	pCi/g	0.04	1
Uranium-238	2.48	U	1.594	U	1.66		2.22	pCi/g	0.23	1

QC Association Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-4
SDG: 680102199-1

Rad

Leach Batch: 136662

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102199-1	SD-279-SS	Total/NA	Solid	Dry and Grind	
680-102199-1 DU	SD-279-SS	Total/NA	Solid	Dry and Grind	
680-102199-2	SD-279-01	Total/NA	Solid	Dry and Grind	
680-102199-3	SD-279-02	Total/NA	Solid	Dry and Grind	
680-102199-7	SD-277-SS	Total/NA	Solid	Dry and Grind	
680-102199-8	SD-277-01	Total/NA	Solid	Dry and Grind	
680-102199-9	SD-277-02	Total/NA	Solid	Dry and Grind	

Prep Batch: 137115

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102199-1	SD-279-SS	Total/NA	Solid	Fill_Geo-21	136662
680-102199-1 DU	SD-279-SS	Total/NA	Solid	Fill_Geo-21	136662
680-102199-2	SD-279-01	Total/NA	Solid	Fill_Geo-21	136662
680-102199-3	SD-279-02	Total/NA	Solid	Fill_Geo-21	136662
680-102199-7	SD-277-SS	Total/NA	Solid	Fill_Geo-21	136662
680-102199-8	SD-277-01	Total/NA	Solid	Fill_Geo-21	136662
680-102199-9	SD-277-02	Total/NA	Solid	Fill_Geo-21	136662
LCS 160-137115/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-137115/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

Leach Batch: 137168

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102199-1	SD-279-SS	Total/NA	Solid	Dry and Grind	
680-102199-1 DU	SD-279-SS	Total/NA	Solid	Dry and Grind	
680-102199-2	SD-279-01	Total/NA	Solid	Dry and Grind	
680-102199-3	SD-279-02	Total/NA	Solid	Dry and Grind	
680-102199-7	SD-277-SS	Total/NA	Solid	Dry and Grind	
680-102199-8	SD-277-01	Total/NA	Solid	Dry and Grind	
680-102199-9	SD-277-02	Total/NA	Solid	Dry and Grind	

Prep Batch: 137389

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102199-1	SD-279-SS	Total/NA	Solid	Fill_Geo-0	137168
680-102199-1 DU	SD-279-SS	Total/NA	Solid	Fill_Geo-0	137168
680-102199-2	SD-279-01	Total/NA	Solid	Fill_Geo-0	137168
680-102199-3	SD-279-02	Total/NA	Solid	Fill_Geo-0	137168
680-102199-7	SD-277-SS	Total/NA	Solid	Fill_Geo-0	137168
680-102199-8	SD-277-01	Total/NA	Solid	Fill_Geo-0	137168
680-102199-9	SD-277-02	Total/NA	Solid	Fill_Geo-0	137168
LCS 160-137389/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-0	
MB 160-137389/1-A	Method Blank	Total/NA	Solid	Fill_Geo-0	

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 137115

Lab ID: MB 160-137115/1-A | Analyzed: 09/02/14 09:53 | Ts: 120 | Sigma: 2
Client ID: | Detector: GV4 | Decay Corrected: No

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	-0.2749	11.0	11.0	U	pCi/g	1.00	0.757	141130
Radium-228	0.07116	0.205	0.206	U	pCi/g		1.23	141130
Thorium-232	0.07116	0.205	0.206	U	pCi/g		1.23	141130
Uranium-235	0.01779	0.422	0.422	U	pCi/g		0.767	141130
Uranium-238	0.8991	1.29	1.30	U	pCi/g		3.01	141130

Other Detected Radionuclides	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Other Detected Radionuclide	None				pCi/g	

Lab ID: LCS 160-137115/2-A | Analyzed: 09/02/14 12:02 | Ts: 120 | Sigma: 2
Client ID: | Detector: GV7 | Decay Corrected: No

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Americium-241	1011	3.76	100		pCi/g		1.95	141135
Cesium-137	383.2	3.25	37.5		pCi/g		1.36	141135
Cobalt-60	416.2	3.01	40.0		pCi/g		1.03	141135

Lab ID: 680-102199-1 | Analyzed: 09/02/14 12:02 | Ts: 120 | Sigma: 2
Client ID: SD-279-SS | Detector: GV4 | Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	1.54	0.559	0.579		pCi/g	1.00	0.657	141130
Radium-228	2.36	0.716	0.751		pCi/g		0.446	141130
Thorium-232	2.36	0.716	0.751		pCi/g		0.446	141130
Uranium-235	0.0442	0.821	0.821	U	pCi/g		1.43	141130
Uranium-238	1.51	1.46	1.47	U	pCi/g		3.54	141130

Other Detected Radionuclides	Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Ac-228	2.36	0.716	0.751		pCi/g	0.446
Bi-214	1.54	0.559	0.579		pCi/g	0.657
K-40	14.0	5.03	5.21		pCi/g	6.93
Pb-212	1.41	0.422	0.448		pCi/g	0.521
Pb-214	1.47	0.623	0.639		pCi/g	0.682
Tl-208	0.748	0.325	0.333		pCi/g	0.287

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 137115

Lab ID: 680-102199-1 DU Analyzed: 09/02/14 14:34 Ts: 120 Sigma: 2
Client ID: SD-279-SS Detector: GV7 Decay Corrected: No

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.9620	0.343	0.356		pCi/g	1.00	0.360	141135
Radium-228	1.725	0.394	0.428		pCi/g		0.324	141135
Thorium-232	1.725	0.394	0.428		pCi/g		0.324	141135
Uranium-235	0.2379	0.339	0.340	U	pCi/g		0.626	141135
Uranium-238	2.152	1.41	1.43		pCi/g		1.94	141135

Other Detected Radionuclides	DU Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Ac-228	1.725	0.394	0.428		pCi/g	0.324
Bi-214	0.9620	0.343	0.356		pCi/g	0.360
K-40	23.21	3.26	3.96		pCi/g	0.843
Pb-212	1.279	0.223	0.262		pCi/g	0.243
Pb-214	0.9692	0.235	0.253		pCi/g	0.257
Tl-208	0.2731	0.113	0.116	F	pCi/g	0.150

Lab ID: 680-102199-2 Analyzed: 09/02/14 14:33 Ts: 120 Sigma: 2
Client ID: SD-279-01 Detector: GV4 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.279	0.460	0.461	U	pCi/g	1.00	0.826	141130
Radium-228	1.48	0.559	0.577		pCi/g		1.15	141130
Thorium-232	1.48	0.559	0.577		pCi/g		1.15	141130
Uranium-235	0.434	0.664	0.666	U	pCi/g		1.16	141130
Uranium-238	3.99	3.03	3.06	U	pCi/g		4.03	141130

Other Detected Radionuclides	Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Pb-212	1.40	0.445	0.470		pCi/g	0.497
Tl-208	0.845	0.245	0.259		pCi/g	0.163

Lab ID: 680-102199-3 Analyzed: 09/02/14 15:06 Ts: 120 Sigma: 2
Client ID: SD-279-02 Detector: GV17 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.600	0.197	0.206		pCi/g	1.00	0.213	141148
Radium-228	0.931	0.357	0.369		pCi/g		0.318	141148
Thorium-232	0.931	0.357	0.369		pCi/g		0.318	141148
Uranium-235	0.166	0.318	0.318	U	pCi/g		0.509	141148
Uranium-238	1.13	1.29	1.30	U	pCi/g		1.85	141148

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 137115

Lab ID: 680-102199-3 Analyzed: 09/02/14 15:06 Ts: 120 Sigma: 2
Client ID: SD-279-02 Detector: GV17 Decay Corrected: No

Other Detected Radionuclides	Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Ac-228	0.931	0.357	0.369		pCi/g	0.318
Bi-214	0.600	0.197	0.206		pCi/g	0.213
K-40	6.96	1.33	1.50		pCi/g	1.36
Pb-212	0.477	0.137	0.151		pCi/g	0.178
Pb-214	0.565	0.203	0.211		pCi/g	0.236
Tl-208	0.245	0.0914	0.0949		pCi/g	0.105

Lab ID: 680-102199-7 Analyzed: 09/02/14 17:48 Ts: 120 Sigma: 2
Client ID: SD-277-SS Detector: GV4 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.339	0.403	0.404	U	pCi/g	1.00	0.789	141130
Radium-228	1.13	0.567	0.577		pCi/g		1.11	141130
Thorium-232	1.13	0.567	0.577		pCi/g		1.11	141130
Uranium-235	0.468	0.431	0.433	U	pCi/g		1.45	141130
Uranium-238	3.34	2.61	2.63	U	pCi/g		3.70	141130

Other Detected Radionuclides	Result	Count Unc	Total Unc	Qualifier	Unit	MDC
K-40	13.3	4.56	4.74		pCi/g	6.14
Pb-212	1.57	0.433	0.465		pCi/g	0.491
Tl-208	0.751	0.234	0.245		pCi/g	0.184

Lab ID: 680-102199-8 Analyzed: 09/03/14 09:10 Ts: 120 Sigma: 2
Client ID: SD-277-01 Detector: GV4 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	1.57	0.536	0.557		pCi/g	1.00	0.597	141691
Radium-228	1.30	0.590	0.603		pCi/g		1.30	141691
Thorium-232	1.30	0.590	0.603		pCi/g		1.30	141691
Uranium-235	0.244	0.237	0.238	U	pCi/g		1.19	141691
Uranium-238	1.83	1.41	1.42	U	pCi/g		3.52	141691

Other Detected Radionuclides	Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Bi-214	1.57	0.536	0.557		pCi/g	0.597
K-40	13.0	4.11	4.30		pCi/g	5.28
Pb-212	1.48	0.354	0.388		pCi/g	0.405
Pb-214	1.33	0.450	0.468		pCi/g	0.531
Tl-208	0.670	0.215	0.224		pCi/g	0.169

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 137115

Lab ID: 680-102199-9 Analyzed: 09/03/14 09:11 Ts: 120 Sigma: 2
Client ID: SD-277-02 Detector: GV7 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.938	0.197	0.217		pCi/g	1.00	0.201	141692
Radium-228	1.86	0.427	0.463		pCi/g		0.246	141692
Thorium-232	1.86	0.427	0.463		pCi/g		0.246	141692
Uranium-235	0.170	0.307	0.307	U	pCi/g		0.514	141692
Uranium-238	1.97	1.00	1.02		pCi/g		1.47	141692

Other Detected Radionuclides	Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Ac-228	1.86	0.427	0.463		pCi/g	0.246
Bi-214	0.938	0.197	0.217		pCi/g	0.201
K-40	20.0	2.62	3.25		pCi/g	0.631
Pb-212	1.23	0.193	0.234		pCi/g	0.202
Pb-214	1.11	0.201	0.228		pCi/g	0.192
Tl-208	0.429	0.0995	0.108		pCi/g	0.0695

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-137115/1-A	Radium-226			-0.2749	U	pCi/g							
MB 160-137115/1-A	Radium-228			0.07116	U	pCi/g							
MB 160-137115/1-A	Thorium-232			0.07116	U	pCi/g							
MB 160-137115/1-A	Uranium-235			0.01779	U	pCi/g							
MB 160-137115/1-A	Uranium-238			0.8991	U	pCi/g							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-137115/2-A	Americium-241		981	1011		pCi/g	103	87 - 116					
LCS 160-137115/2-A	Cesium-137		362	383.2		pCi/g	106	87 - 120					
LCS 160-137115/2-A	Cobalt-60		383	416.2		pCi/g	109	87 - 115					

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
680-102199-1	Radium-226	1.54		0.9620		pCi/g			46	0.62	1.70	1	
680-102199-1	Radium-228	2.36		1.725		pCi/g			31	0.54	1.47	1	
680-102199-1	Thorium-232	2.36		1.725		pCi/g			31	0.54	1.47	1	
680-102199-1	Uranium-235	0.0442		0.2379	U	pCi/g			137	0.17	0.44	1	
680-102199-1	Uranium-238	1.51		2.152		pCi/g			35	0.22	0.63	1	

Glossary:
Ts = Count Duration, Sample

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102199-4

SDG No.: 680102199-1

Batch Number: 137115 Batch Start Date: 08/11/14 14:47 Batch Analyst: Lockhart, Justin D

Batch Method: Fill_Geo-21 Batch End Date: 08/11/14 16:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	TareWeight	GrossWeight	InitialAmount	IngDecDate1	IngDecDate3	Geometry
MB 160-137115/1		Fill_Geo-21, GA-01-R				25 g	08/11/2014	09/01/2014	25mL d=1
LCS 160-137115/2		Fill_Geo-21, GA-01-R				25 g	08/11/2014	09/01/2014	25mL d=1
680-102199-A-1-D	SD-279-SS	Fill_Geo-21, GA-01-R	T	37.1 g	59.4 g	22.3 g	08/11/2014	09/01/2014	25mL d=1
680-102199-A-1-D DU	SD-279-SS	Fill_Geo-21, GA-01-R	T	37.1 g	59.4 g	22.3 g	08/11/2014	09/01/2014	25mL d=1
680-102199-A-2-C	SD-279-01	Fill_Geo-21, GA-01-R	T	36.9 g	60.9 g	24 g	08/11/2014	09/01/2014	25mL d=1
680-102199-A-3-C	SD-279-02	Fill_Geo-21, GA-01-R	T	37.1 g	88.0 g	50.9 g	08/11/2014	09/01/2014	25mL solid
680-102199-A-7-C	SD-277-SS	Fill_Geo-21, GA-01-R	T	37.0 g	61.0 g	24 g	08/11/2014	09/01/2014	25mL d=1
680-102199-A-8-C	SD-277-01	Fill_Geo-21, GA-01-R	T	37.5 g	64.1 g	26.6 g	08/11/2014	09/01/2014	25mL d=1
680-102199-A-9-C	SD-277-02	Fill_Geo-21, GA-01-R	T	37.6 g	67.4 g	29.8 g	08/11/2014	09/01/2014	25mL d=1

Lab Sample ID	Client Sample ID	Method Chain	Basis	25mLD=1 00006
MB 160-137115/1		Fill_Geo-21, GA-01-R		
LCS 160-137115/2		Fill_Geo-21, GA-01-R		# mL
680-102199-A-1-D	SD-279-SS	Fill_Geo-21, GA-01-R	T	
680-102199-A-1-D DU	SD-279-SS	Fill_Geo-21, GA-01-R	T	
680-102199-A-2-C	SD-279-01	Fill_Geo-21, GA-01-R	T	
680-102199-A-3-C	SD-279-02	Fill_Geo-21, GA-01-R	T	
680-102199-A-7-C	SD-277-SS	Fill_Geo-21, GA-01-R	T	
680-102199-A-8-C	SD-277-01	Fill_Geo-21, GA-01-R	T	
680-102199-A-9-C	SD-277-02	Fill_Geo-21, GA-01-R	T	

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102199-4

SDG No.: 680102199-1

Batch Number: 137115 Batch Start Date: 08/11/14 14:47 Batch Analyst: Lockhart, Justin D

Batch Method: Fill_Geo-21 Batch End Date: 08/11/14 16:00

Batch Notes	
Balance ID	1121432711
SOP Number	ST-RC-0003 ST-RC-0025

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102199-4

SDG No.: 680102199-1

Batch Number: 137389 Batch Start Date: 08/12/14 11:54 Batch Analyst: Lockhart, Justin D

Batch Method: Fill_Geo-0 Batch End Date:

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	TareWeight	GrossWeight	Geometry	25mLD=1 00006
MB 160-137389/1		Fill_Geo-0, GA-01-R		25 g			25mL d=1	
LCS 160-137389/2		Fill_Geo-0, GA-01-R		25 g			25mL d=1	# mL
680-102199-A-1-G	SD-279-SS	Fill_Geo-0, GA-01-R	T	22.3 g	37.1 g	59.4 g	25mL d=1	
680-102199-A-1-G DU	SD-279-SS	Fill_Geo-0, GA-01-R	T	22.3 g	37.1 g	59.4 g	25mL d=1	
680-102199-A-2-E	SD-279-01	Fill_Geo-0, GA-01-R	T	24 g	36.9 g	60.9 g	25mL d=1	
680-102199-A-3-E	SD-279-02	Fill_Geo-0, GA-01-R	T	50.9 g	37.1 g	88.0 g	25mL solid	
680-102199-A-7-E	SD-277-SS	Fill_Geo-0, GA-01-R	T	24 g	37.0 g	61.0 g	25mL d=1	
680-102199-A-8-E	SD-277-01	Fill_Geo-0, GA-01-R	T	26.6 g	37.5 g	64.1 g	25mL d=1	
680-102199-A-9-E	SD-277-02	Fill_Geo-0, GA-01-R	T	29.8 g	37.6 g	67.4 g	25mL d=1	

Batch Notes

Balance ID	1121432711
SOP Number	ST-RC-0003 ST-RC-0025

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 137389

Lab ID: MB 160-137389/1-A | Analyzed: 08/13/14 18:36 | Ts: 120 | Sigma: 2
Client ID: | Detector: GV4 | Decay Corrected: No

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.01251	0.821	0.821	U	pCi/g		1.45	137825
Radium-226	-0.9022	4.12	4.13	U	pCi/g	1.00	5.40	137825
Radium-228	0.1554	0.266	0.267	U	pCi/g		1.08	137825
Thorium-232	0.1554	0.266	0.267	U	pCi/g		1.08	137825
Thorium-234	1.124	1.11	1.12	U	pCi/g		2.97	137825
Thallium-208	0.03963	0.176	0.176	U	pCi/g		0.256	137825
Uranium-235	0.2933	0.661	0.662	U	pCi/g		1.11	137825
Uranium-238	1.124	1.11	1.12	U	pCi/g		2.97	137825
Actinium 228	0.1554	0.266	0.267	U	pCi/g		1.08	137825
Bismuth-212	0.6622	1.78	1.78	U	pCi/g		3.18	137825
Bismuth-214	-0.03500	0.410	0.410	U	pCi/g		0.657	137825
Lead-210	0.3779	2.00	2.00	U	pCi/g		3.36	137825
Lead-212	0.03745	0.237	0.237	U	pCi/g		0.454	137825
Lead-214	-0.1398	0.751	0.751	U	pCi/g		0.614	137825
Potassium-40	-1.543	6.48	6.48	U	pCi/g		5.49	137825
Protactinium-231	-0.2578	0.833	0.833	U	pCi/g		7.22	137825

Lab ID: LCS 160-137389/2-A | Analyzed: 08/13/14 20:43 | Ts: 120 | Sigma: 2
Client ID: | Detector: GV4 | Decay Corrected: No

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Americium-241	1059	6.18	105		pCi/g		3.49	137825
Cesium-137	377.5	5.07	37.1		pCi/g		2.26	137825
Cobalt-60	427.7	4.52	41.2		pCi/g		1.15	137825

Lab ID: 680-102199-1 | Analyzed: 09/08/14 18:04 | Ts: 120 | Sigma: 2
Client ID: SD-279-SS | Detector: GV12 | Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.616	0.422	0.427	U	pCi/g		0.649	142436
Radium-226	7.19	3.01	3.16		pCi/g	1.00	3.28	142436
Radium-228	2.33	0.457	0.509		pCi/g		0.315	142436
Thorium-232	2.33	0.457	0.509		pCi/g		0.315	142436
Thorium-234	2.48	2.13	2.15	U	pCi/g		2.85	142436
Thallium-208	0.503	0.179	0.186		pCi/g		0.209	142436
Uranium-235	-0.427	17.1	17.1	U	pCi/g		0.979	142436

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 137389

Lab ID: 680-102199-1 Analyzed: 09/08/14 18:04 Ts: 120 Sigma: 2
Client ID: SD-279-SS Detector: GV12 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-238	2.48	2.13	2.15	U	pCi/g		2.85	142436
Actinium 228	2.33	0.457	0.509		pCi/g		0.315	142436
Bismuth-212	3.10	1.58	1.60		pCi/g		1.66	142436
Bismuth-214	1.19	0.413	0.429		pCi/g		0.483	142436
Lead-210	2.59	1.85	1.90	U	pCi/g		2.78	142436
Lead-212	1.31	0.234	0.274		pCi/g		0.312	142436
Lead-214	1.05	0.305	0.322		pCi/g		0.393	142436
Potassium-40	17.2	2.96	3.39		pCi/g		2.67	142436
Protactinium-231	0.405	0.483	0.485	U	pCi/g		5.01	142436

Lab ID: 680-102199-1 DU Analyzed: 09/09/14 11:54 Ts: 120 Sigma: 2
Client ID: SD-279-SS Detector: GV7 Decay Corrected: No

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	-1.058	0.857	0.864	U F	pCi/g		1.39	142798
Radium-226	3.829	2.32	2.38		pCi/g	1.00	2.93	142798
Radium-228	2.130	0.397	0.447		pCi/g		0.295	142798
Thorium-232	2.130	0.397	0.447		pCi/g		0.295	142798
Thorium-234	1.594	1.65	1.66	U	pCi/g		2.22	142798
Thallium-208	0.5512	0.146	0.155		pCi/g		0.125	142798
Uranium-235	0.2206	0.393	0.394	U	pCi/g		0.615	142798
Uranium-238	1.594	1.65	1.66	U	pCi/g		2.22	142798
Actinium 228	2.130	0.397	0.447		pCi/g		0.295	142798
Bismuth-212	0.5711	1.47	1.48	U	pCi/g		2.54	142798
Bismuth-214	1.081	0.334	0.350		pCi/g		0.333	142798
Lead-210	2.573	1.31	1.35		pCi/g		1.80	142798
Lead-212	1.318	0.245	0.283		pCi/g		0.240	142798
Lead-214	1.199	0.254	0.280		pCi/g		0.235	142798
Potassium-40	18.06	3.02	3.49		pCi/g		2.51	142798
Protactinium-231	-1.685	2.63	2.64	U	pCi/g		4.39	142798

Lab ID: 680-102199-2 Analyzed: 08/14/14 13:35 Ts: 120 Sigma: 2
Client ID: SD-279-01 Detector: GV4 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.322	0.881	0.882	U	pCi/g		1.51	138111

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 137389

Lab ID: 680-102199-2 Analyzed: 08/14/14 13:35 Ts: 120 Sigma: 2
Client ID: SD-279-01 Detector: GV4 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	3.60	4.03	4.06	U	pCi/g	1.00	5.64	138111
Radium-228	1.90	0.599	0.627		pCi/g		1.17	138111
Thorium-232	1.90	0.599	0.627		pCi/g		1.17	138111
Thorium-234	2.51	2.63	2.65	U	pCi/g		3.78	138111
Thallium-208	0.719	0.280	0.289		pCi/g		0.244	138111
Uranium-235	0.388	0.441	0.442	U	pCi/g		1.17	138111
Uranium-238	2.51	2.63	2.65	U	pCi/g		3.78	138111
Actinium 228	1.90	0.599	0.627		pCi/g		1.17	138111
Bismuth-212	0.806	2.42	2.43	U	pCi/g		4.27	138111
Bismuth-214	1.29	0.630	0.642		pCi/g		0.724	138111
Lead-210	2.22	2.48	2.50	U	pCi/g		3.65	138111
Lead-212	1.20	0.357	0.380		pCi/g		0.456	138111
Lead-214	1.26	0.467	0.483		pCi/g		0.585	138111
Potassium-40	10.0	4.10	4.21		pCi/g		5.91	138111
Protactinium-231	-0.159	0.523	0.523	U	pCi/g		6.02	138111

Lab ID: 680-102199-3 Analyzed: 09/10/14 20:45 Ts: 120 Sigma: 2
Client ID: SD-279-02 Detector: GV7 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	-0.0502	0.350	0.350	U	pCi/g		0.595	143246
Radium-226	1.45	1.04	1.07		pCi/g	1.00	1.40	143246
Radium-228	0.771	0.224	0.237		pCi/g		0.200	143246
Thorium-232	0.771	0.224	0.237		pCi/g		0.200	143246
Thorium-234	0.678	0.662	0.666	U	pCi/g		1.04	143246
Thallium-208	0.282	0.0780	0.0833		pCi/g		0.0671	143246
Uranium-235	0.121	0.146	0.147	U	pCi/g		0.240	143246
Uranium-238	0.678	0.662	0.666	U	pCi/g		1.04	143246
Actinium 228	0.771	0.224	0.237		pCi/g		0.200	143246
Bismuth-212	1.30	0.565	0.581		pCi/g		0.521	143246
Bismuth-214	0.516	0.153	0.162		pCi/g		0.160	143246
Lead-210	0.418	0.688	0.690	U	pCi/g		1.05	143246
Lead-212	0.472	0.102	0.119		pCi/g		0.133	143246
Lead-214	0.552	0.120	0.133		pCi/g		0.137	143246
Potassium-40	7.51	1.37	1.57		pCi/g		1.22	143246
Protactinium-231	-0.730	1.23	1.23	U	pCi/g		2.06	143246

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 137389

Lab ID: 680-102199-7 Analyzed: 08/27/14 10:16 Ts: 120 Sigma: 2
Client ID: SD-277-SS Detector: GV4 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.431	0.429	0.432	U	pCi/g		0.679	140477
Radium-226	3.09	4.49	4.51	U	pCi/g	1.00	6.23	140477
Radium-228	1.24	0.664	0.675	U	pCi/g		1.36	140477
Thorium-232	1.24	0.664	0.675	U	pCi/g		1.36	140477
Thorium-234	2.22	2.52	2.53	U	pCi/g		3.77	140477
Thallium-208	0.501	0.208	0.214		pCi/g		0.209	140477
Uranium-235	0.323	0.743	0.743	U	pCi/g		1.08	140477
Uranium-238	2.22	2.52	2.53	U	pCi/g		3.77	140477
Actinium 228	1.24	0.664	0.675	U	pCi/g		1.36	140477
Bismuth-212	1.32	2.07	2.07	U	pCi/g		3.49	140477
Bismuth-214	1.18	0.645	0.655		pCi/g		0.721	140477
Lead-210	-0.881	3.04	3.04	U	pCi/g		4.06	140477
Lead-212	1.37	0.416	0.442		pCi/g		0.497	140477
Lead-214	0.290	0.444	0.445	U	pCi/g		0.787	140477
Potassium-40	13.2	4.53	4.70		pCi/g		6.09	140477
Protactinium-231	0.509	0.723	0.725	U	pCi/g		6.97	140477

Lab ID: 680-102199-8 Analyzed: 08/14/14 16:25 Ts: 120 Sigma: 2
Client ID: SD-277-01 Detector: GV7 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.0953	0.448	0.448	U	pCi/g		1.87	138050
Radium-226	5.27	1.97	2.10		pCi/g	1.00	2.04	138050
Radium-228	1.82	0.320	0.365		pCi/g		0.366	138050
Thorium-232	1.82	0.320	0.365		pCi/g		0.366	138050
Thorium-234	2.45	1.07	1.10		pCi/g		1.52	138050
Thallium-208	0.468	0.121	0.130		pCi/g		0.0959	138050
Uranium-235	0.105	0.228	0.229	U	pCi/g		0.561	138050
Uranium-238	2.45	1.07	1.10		pCi/g		1.52	138050
Actinium 228	1.82	0.320	0.365		pCi/g		0.366	138050
Bismuth-212	0.836	1.07	1.08	U	pCi/g		1.77	138050
Bismuth-214	0.901	0.327	0.338		pCi/g		0.308	138050
Lead-210	3.39	1.27	1.34		pCi/g		1.65	138050
Lead-212	1.06	0.192	0.223		pCi/g		0.219	138050
Lead-214	1.10	0.201	0.228		pCi/g		0.208	138050
Potassium-40	17.3	2.58	3.08		pCi/g		0.706	138050

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 137389

Lab ID: 680-102199-8 Analyzed: 08/14/14 16:25 Ts: 120 Sigma: 2
Client ID: SD-277-01 Detector: GV7 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Protactinium-231	-0.000753	0.00178	0.00179	U	pCi/g		2.99	138050

Lab ID: 680-102199-9 Analyzed: 08/14/14 16:25 Ts: 120 Sigma: 2
Client ID: SD-277-02 Detector: GV4 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.169	0.685	0.685	U	pCi/g		1.19	138111
Radium-226	3.97	3.25	3.29	U	pCi/g	1.00	4.53	138111
Radium-228	1.82	0.745	0.766		pCi/g		0.904	138111
Thorium-232	1.82	0.745	0.766		pCi/g		0.904	138111
Thorium-234	2.14	1.21	1.23	U	pCi/g		3.35	138111
Thallium-208	0.418	0.212	0.216		pCi/g		0.296	138111
Uranium-235	0.600	0.597	0.599	U	pCi/g		0.973	138111
Uranium-238	2.14	1.21	1.23	U	pCi/g		3.35	138111
Actinium 228	1.82	0.745	0.766		pCi/g		0.904	138111
Bismuth-212	1.93	2.29	2.30	U	pCi/g		3.74	138111
Bismuth-214	1.05	0.460	0.472		pCi/g		0.489	138111
Lead-210	1.84	2.39	2.40	U	pCi/g		3.31	138111
Lead-212	1.37	0.288	0.324		pCi/g		0.324	138111
Lead-214	0.573	0.322	0.327		pCi/g		0.531	138111
Potassium-40	14.9	3.99	4.24		pCi/g		4.68	138111
Protactinium-231	-0.571	3.67	3.67	U	pCi/g		6.42	138111

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 137389

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-137389/1-A	Actinium-227			0.01251	U	pCi/g							
MB 160-137389/1-A	Radium-226			-0.9022	U	pCi/g							
MB 160-137389/1-A	Radium-228			0.1554	U	pCi/g							
MB 160-137389/1-A	Thorium-232			0.1554	U	pCi/g							
MB 160-137389/1-A	Thorium-234			1.124	U	pCi/g							
MB 160-137389/1-A	Thallium-208			0.03963	U	pCi/g							
MB 160-137389/1-A	Uranium-235			0.2933	U	pCi/g							
MB 160-137389/1-A	Uranium-238			1.124	U	pCi/g							
MB 160-137389/1-A	Actinium 228			0.1554	U	pCi/g							
MB 160-137389/1-A	Bismuth-212			0.6622	U	pCi/g							
MB 160-137389/1-A	Bismuth-214			-0.03500	U	pCi/g							
MB 160-137389/1-A	Lead-210			0.3779	U	pCi/g							
MB 160-137389/1-A	Lead-212			0.03745	U	pCi/g							
MB 160-137389/1-A	Lead-214			-0.1398	U	pCi/g							
MB 160-137389/1-A	Potassium-40			-1.543	U	pCi/g							
MB 160-137389/1-A	Protactinium-231			-0.2578	U	pCi/g							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-137389/2-A	Americium-241		981	1059		pCi/g	108	87 - 116					
LCS 160-137389/2-A	Cesium-137		363	377.5		pCi/g	104	87 - 120					
LCS 160-137389/2-A	Cobalt-60		386	427.7		pCi/g	111	87 - 115					

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
680-102199-1	Actinium-227	0.616		-1.058	U F	pCi/g			756	1.30	3.47	1	
680-102199-1	Radium-226	7.19		3.829		pCi/g			61	0.61	1.70	1	
680-102199-1	Radium-228	2.33		2.130		pCi/g			9	0.20	0.58	1	
680-102199-1	Thorium-232	2.33		2.130		pCi/g			9	0.20	0.58	1	
680-102199-1	Thorium-234	2.48		1.594	U	pCi/g			44	0.23	0.66	1	
680-102199-1	Thallium-208	0.503		0.5512		pCi/g			9	0.14	0.40	1	
680-102199-1	Uranium-235	-0.427		0.2206	U	pCi/g			628	0.04	0.08	1	
680-102199-1	Uranium-238	2.48		1.594	U	pCi/g			44	0.23	0.66	1	
680-102199-1	Actinium 228	2.33		2.130		pCi/g			9	0.20	0.58	1	
680-102199-1	Bismuth-212	3.10		0.5711	U	pCi/g			138	0.82	2.32	1	
680-102199-1	Bismuth-214	1.19		1.081		pCi/g			9	0.14	0.38	1	
680-102199-1	Lead-210	2.59		2.573		pCi/g			0.8	0.01	0.02	1	
680-102199-1	Lead-212	1.31		1.318		pCi/g			0.3	0.01	0.02	1	
680-102199-1	Lead-214	1.05		1.199		pCi/g			14	0.25	0.72	1	
680-102199-1	Potassium-40	17.2		18.06		pCi/g			5	0.13	0.36	1	

Gamma Spectroscopy Analysis Detail Report

Prep Batch: 137389

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
680-102199-1	Protactinium-231	0.405		-1.685	U	pCi/g			327	0.67	1.56	1	

Glossary:

Ts = Count Duration, Sample

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102199-4

SDG No.: 680102199-1

Batch Number: 137115 Batch Start Date: 08/11/14 14:47 Batch Analyst: Lockhart, Justin D

Batch Method: Fill_Geo-21 Batch End Date: 08/11/14 16:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	TareWeight	GrossWeight	InitialAmount	IngDecDate1	IngDecDate3	Geometry
MB 160-137115/1		Fill_Geo-21, GA-01-R				25 g	08/11/2014	09/01/2014	25mL d=1
LCS 160-137115/2		Fill_Geo-21, GA-01-R				25 g	08/11/2014	09/01/2014	25mL d=1
680-102199-A-1-D	SD-279-SS	Fill_Geo-21, GA-01-R	T	37.1 g	59.4 g	22.3 g	08/11/2014	09/01/2014	25mL d=1
680-102199-A-1-D DU	SD-279-SS	Fill_Geo-21, GA-01-R	T	37.1 g	59.4 g	22.3 g	08/11/2014	09/01/2014	25mL d=1
680-102199-A-2-C	SD-279-01	Fill_Geo-21, GA-01-R	T	36.9 g	60.9 g	24 g	08/11/2014	09/01/2014	25mL d=1
680-102199-A-3-C	SD-279-02	Fill_Geo-21, GA-01-R	T	37.1 g	88.0 g	50.9 g	08/11/2014	09/01/2014	25mL solid
680-102199-A-7-C	SD-277-SS	Fill_Geo-21, GA-01-R	T	37.0 g	61.0 g	24 g	08/11/2014	09/01/2014	25mL d=1
680-102199-A-8-C	SD-277-01	Fill_Geo-21, GA-01-R	T	37.5 g	64.1 g	26.6 g	08/11/2014	09/01/2014	25mL d=1
680-102199-A-9-C	SD-277-02	Fill_Geo-21, GA-01-R	T	37.6 g	67.4 g	29.8 g	08/11/2014	09/01/2014	25mL d=1

Lab Sample ID	Client Sample ID	Method Chain	Basis	25mLD=1 00006
MB 160-137115/1		Fill_Geo-21, GA-01-R		
LCS 160-137115/2		Fill_Geo-21, GA-01-R		# mL
680-102199-A-1-D	SD-279-SS	Fill_Geo-21, GA-01-R	T	
680-102199-A-1-D DU	SD-279-SS	Fill_Geo-21, GA-01-R	T	
680-102199-A-2-C	SD-279-01	Fill_Geo-21, GA-01-R	T	
680-102199-A-3-C	SD-279-02	Fill_Geo-21, GA-01-R	T	
680-102199-A-7-C	SD-277-SS	Fill_Geo-21, GA-01-R	T	
680-102199-A-8-C	SD-277-01	Fill_Geo-21, GA-01-R	T	
680-102199-A-9-C	SD-277-02	Fill_Geo-21, GA-01-R	T	

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102199-4

SDG No.: 680102199-1

Batch Number: 137115 Batch Start Date: 08/11/14 14:47 Batch Analyst: Lockhart, Justin D

Batch Method: Fill_Geo-21 Batch End Date: 08/11/14 16:00

Batch Notes	
Balance ID	1121432711
SOP Number	ST-RC-0003 ST-RC-0025

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102199-4

SDG No.: 680102199-1

Batch Number: 137389 Batch Start Date: 08/12/14 11:54 Batch Analyst: Lockhart, Justin D

Batch Method: Fill_Geo-0 Batch End Date:

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	TareWeight	GrossWeight	Geometry	25mLD=1 00006
MB 160-137389/1		Fill_Geo-0, GA-01-R		25 g			25mL d=1	
LCS 160-137389/2		Fill_Geo-0, GA-01-R		25 g			25mL d=1	# mL
680-102199-A-1-G	SD-279-SS	Fill_Geo-0, GA-01-R	T	22.3 g	37.1 g	59.4 g	25mL d=1	
680-102199-A-1-G DU	SD-279-SS	Fill_Geo-0, GA-01-R	T	22.3 g	37.1 g	59.4 g	25mL d=1	
680-102199-A-2-E	SD-279-01	Fill_Geo-0, GA-01-R	T	24 g	36.9 g	60.9 g	25mL d=1	
680-102199-A-3-E	SD-279-02	Fill_Geo-0, GA-01-R	T	50.9 g	37.1 g	88.0 g	25mL solid	
680-102199-A-7-E	SD-277-SS	Fill_Geo-0, GA-01-R	T	24 g	37.0 g	61.0 g	25mL d=1	
680-102199-A-8-E	SD-277-01	Fill_Geo-0, GA-01-R	T	26.6 g	37.5 g	64.1 g	25mL d=1	
680-102199-A-9-E	SD-277-02	Fill_Geo-0, GA-01-R	T	29.8 g	37.6 g	67.4 g	25mL d=1	

Batch Notes

Balance ID	1121432711
SOP Number	ST-RC-0003 ST-RC-0025

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

Gamma Spectroscopy Run Log

Detector: GV4

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/05/12 21:42		IC 160-12292/1		12292			JLW
03/08/12 03:13		ICV 160-12292/2		12292			JLW
02/27/13 16:17		ACVTOP 160-38300/1		38300			JLW
08/09/14 09:24		ICB 160-136893/1		136893			RTM
08/13/14 00:02		CCV 160-137825/1		137825			
08/13/14 00:22		CCV 160-137825/2		137825			
08/13/14 00:43		CCB 160-137825/3		137825			RTM
08/13/14 01:34		CCV 160-137825/4		137825			
08/13/14 01:54		CCV 160-137825/5		137825			RTM
08/13/14 08:59	60	ZZZZZ		137825			
08/13/14 11:15	30	ZZZZZ		137825			
08/13/14 14:47	30	ZZZZZ		137825			
08/13/14 18:36	120	MB 160-137389/1-A		137825	137389	GA-01-R	RTM
08/13/14 20:43	120	LCS 160-137389/2-A		137825	137389	GA-01-R	RTM
08/14/14 00:01		CCB 160-138111/1		138111			RTM
08/14/14 00:43		CCV 160-138111/2		138111			
08/14/14 01:04		CCV 160-138111/3		138111			RTM
08/14/14 01:40	120	ZZZZZ		138111			
08/14/14 09:26	30	ZZZZZ		138111			
08/14/14 10:12	30	ZZZZZ		138111			
08/14/14 10:56	30	ZZZZZ		138111			
08/14/14 11:41	30	ZZZZZ		138111			
08/14/14 12:52	30	ZZZZZ		138111			
08/14/14 13:35	120	680-102199-2	SD-279-01	138111	137389	GA-01-R	RTM
08/14/14 16:25	120	680-102199-9	SD-277-02	138111	137389	GA-01-R	RTM
08/14/14 18:45	30	ZZZZZ		138111			
08/14/14 19:22	30	ZZZZZ		138111			
08/14/14 20:14	30	ZZZZZ		138111			
08/14/14 20:52	30	ZZZZZ		138111			
08/14/14 21:33	30	ZZZZZ		138111			
08/27/14 00:01		CCB 160-140477/1		140477			SMP
08/27/14 00:49		CCV 160-140477/2		140477			
08/27/14 01:10		CCV 160-140477/3		140477			SMP
08/27/14 10:16	120	680-102199-7	SD-277-SS	140477	137389	GA-01-R	SMP
08/27/14 13:30	60	ZZZZZ		140477			
08/27/14 21:00	60	ZZZZZ		140477			
09/02/14 00:02		CCB 160-141130/1		141130			EMN
09/02/14 00:47		CCV 160-141130/2		141130			
09/02/14 01:08		CCV 160-141130/3		141130			EMN
09/02/14 02:04	30	ZZZZZ		141130			
09/02/14 02:56	30	ZZZZZ		141130			
09/02/14 09:53	120	MB 160-137115/1-A		141130	137115	GA-01-R	EMN
09/02/14 12:02	120	680-102199-1	SD-279-SS	141130	137115	GA-01-R	EMN
09/02/14 14:33	120	680-102199-2	SD-279-01	141130	137115	GA-01-R	EMN
09/02/14 17:48	120	680-102199-7	SD-277-SS	141130	137115	GA-01-R	EMN
09/02/14 19:51	30	ZZZZZ		141130			
09/02/14 20:27	30	ZZZZZ		141130			
09/02/14 21:00	30	ZZZZZ		141130			
09/02/14 21:42	30	ZZZZZ		141130			
09/03/14 00:01		CCB 160-141691/1		141691			SMP
09/03/14 01:29		CCV 160-141691/2		141691			
09/03/14 01:50		CCV 160-141691/3		141691			SMP
09/03/14 02:21	45	ZZZZZ		141691			
09/03/14 09:10	120	680-102199-8	SD-277-01	141691	137115	GA-01-R	SMP

Gamma Spectroscopy Run Log

Detector: GV4 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
09/03/14 12:51	30	ZZZZZ		141691			
09/03/14 13:53	30	ZZZZZ		141691			
09/03/14 14:42	30	ZZZZZ		141691			
09/03/14 15:27	45	ZZZZZ		141691			
09/03/14 16:55	45	ZZZZZ		141691			
09/03/14 18:44	30	ZZZZZ		141691			
09/03/14 19:42	30	ZZZZZ		141691			
09/03/14 20:41	30	ZZZZZ		141691			
09/03/14 21:21	30	ZZZZZ		141691			
09/03/14 22:00	30	ZZZZZ		141691			

Detector: GV7

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/07/12 11:02		IC 160-12300/1		12300			JLW
03/07/12 20:19		ICV 160-12300/2		12300			JLW
03/26/12 11:32		IC 160-12301/1		12301			JLW
04/12/12 19:52		ICV 160-12301/2		12301			JLW
01/28/14 18:43		ACVTOP 160-101797/1		101797			JLW
08/09/14 09:24		ICB 160-136895/1		136895			RTM
08/14/14 00:01		CCV 160-138050/1		138050			
08/14/14 00:43		CCV 160-138050/2		138050			
08/14/14 01:04		CCV 160-138050/3		138050			RTM
08/14/14 01:28		CCB 160-138050/4		138050			RTM
08/14/14 08:49		ZZZZZ		138050			
08/14/14 09:07	120	ZZZZZ		138050			
08/14/14 11:18	60	ZZZZZ		138050			
08/14/14 12:55	30	ZZZZZ		138050			
08/14/14 13:36	120	ZZZZZ		138050			
08/14/14 16:25	120	680-102199-8	SD-277-01	138050	137389	GA-01-R	RTM
08/14/14 18:46	30	ZZZZZ		138050			
08/14/14 19:23	30	ZZZZZ		138050			
08/14/14 20:12	30	ZZZZZ		138050			
08/14/14 20:52	30	ZZZZZ		138050			
08/14/14 21:34	30	ZZZZZ		138050			
09/02/14 00:02		CCV 160-141135/1		141135			
09/02/14 00:24		CCV 160-141135/2		141135			EMN
09/02/14 00:49		CCB 160-141135/3		141135			EMN
09/02/14 02:05	30	ZZZZZ		141135			
09/02/14 02:55	120	ZZZZZ		141135			
09/02/14 09:38	120	ZZZZZ		141135			
09/02/14 12:02	120	LCS 160-137115/2-A		141135	137115	GA-01-R	EMN
09/02/14 14:34	120	680-102199-1 DU	SD-279-SS DU	141135	137115	GA-01-R	EMN
09/02/14 17:11	120	ZZZZZ		141135			
09/02/14 19:24	30	ZZZZZ		141135			
09/02/14 20:27	30	ZZZZZ		141135			
09/02/14 21:00	30	ZZZZZ		141135			
09/02/14 21:43	30	ZZZZZ		141135			
09/02/14 22:28	60	ZZZZZ		141135			
09/03/14 00:02		CCV 160-141692/1		141692			
09/03/14 00:23		CCV 160-141692/2		141692			SMP
09/03/14 00:47		CCB 160-141692/3		141692			SMP
09/03/14 02:15	60	ZZZZZ		141692			

Gamma Spectroscopy Run Log

Detector: GV7 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
09/03/14 08:13		ZZZZZ		141692			
09/03/14 09:11	120	680-102199-9	SD-277-02	141692	137115	GA-01-R	SMP
09/03/14 13:06	30	ZZZZZ		141692			
09/03/14 13:56	30	ZZZZZ		141692			
09/03/14 15:28	45	ZZZZZ		141692			
09/03/14 16:56	45	ZZZZZ		141692			
09/03/14 18:48	45	ZZZZZ		141692			
09/03/14 19:43	45	ZZZZZ		141692			
09/03/14 20:41	30	ZZZZZ		141692			
09/03/14 21:21	30	ZZZZZ		141692			
09/03/14 22:00	45	ZZZZZ		141692			
09/05/14 17:58		ICB 160-142451/1		142451			JLW
09/09/14 06:50		CCB 160-142798/1		142798			SMP
09/09/14 08:45		CCV 160-142798/2		142798			
09/09/14 09:07		CCV 160-142798/3		142798			SMP
09/09/14 10:56	30	ZZZZZ		142798			
09/09/14 11:54	120	680-102199-1 DU	SD-279-SS DU	142798	137389	GA-01-R	SMP
09/09/14 14:21	30	ZZZZZ		142798			
09/09/14 15:13	30	ZZZZZ		142798			
09/09/14 15:54	30	ZZZZZ		142798			
09/09/14 17:04	30	ZZZZZ		142798			
09/09/14 17:46	30	ZZZZZ		142798			
09/09/14 19:05	60	ZZZZZ		142798			
09/09/14 21:09	60	ZZZZZ		142798			
09/09/14 22:14	30	ZZZZZ		142798			
09/10/14 00:01		CCV 160-143246/1		143246			
09/10/14 00:23		CCV 160-143246/2		143246			SMP
09/10/14 00:43		CCB 160-143246/3		143246			SMP
09/10/14 02:06	120	ZZZZZ		143246			
09/10/14 06:18	30	ZZZZZ		143246			
09/10/14 07:01	30	ZZZZZ		143246			
09/10/14 08:13		ZZZZZ		143246			
09/10/14 08:40	30	ZZZZZ		143246			
09/10/14 09:42	30	ZZZZZ		143246			
09/10/14 10:29	30	ZZZZZ		143246			
09/10/14 11:12	30	ZZZZZ		143246			
09/10/14 11:54	30	ZZZZZ		143246			
09/10/14 14:15		ZZZZZ		143246			
09/10/14 16:14	90	ZZZZZ		143246			
09/10/14 19:03	30	ZZZZZ		143246			
09/10/14 19:41	60	ZZZZZ		143246			
09/10/14 20:45	120	680-102199-3	SD-279-02	143246	137389	GA-01-R	SMP
09/10/14 22:49	60	ZZZZZ		143246			

Detector: GV12

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
09/01/11 19:20		IC 160-45527/1		45527			JLW
09/06/11 07:27		ICV 160-45527/2		45527			JLW
01/28/14 14:18		ACVTOP 160-101795/1		101795			JLW
09/05/14 17:50		ICB 160-142440/1		142440			JLW
09/08/14 07:37		CCB 160-142436/1		142436			EMN
09/08/14 08:15		CCV 160-142436/2		142436			

Gamma Spectroscopy Run Log

Detector: GV12 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
09/08/14 08:36		CCV 160-142436/3		142436			EMN
09/08/14 10:42	60	ZZZZZ		142436			
09/08/14 12:05	120	ZZZZZ		142436			
09/08/14 14:16	30	ZZZZZ		142436			
09/08/14 14:48	30	ZZZZZ		142436			
09/08/14 15:29		ZZZZZ		142436			
09/08/14 16:07		ZZZZZ		142436			
09/08/14 17:17	30	ZZZZZ		142436			
09/08/14 18:04	120	680-102199-1	SD-279-SS	142436	137389	GA-01-R	EMN

Detector: GV17

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/27/12 15:45		IC 160-12388/1		12388			JLW
04/12/12 19:55		ICV 160-12388/2		12388			JLW
01/23/14 11:17		ACVTOP 160-100896/1		100896			JLW
08/09/14 09:24		ICB 160-136901/1		136901			RTM
09/02/14 00:05		CCV 160-141148/1		141148			
09/02/14 00:26		CCV 160-141148/2		141148			EMN
09/02/14 00:46		CCB 160-141148/3		141148			EMN
09/02/14 02:16	120	ZZZZZ		141148			
09/02/14 11:53	120	ZZZZZ		141148			
09/02/14 15:06	120	680-102199-3	SD-279-02	141148	137115	GA-01-R	EMN
09/02/14 17:41	60	ZZZZZ		141148			
09/02/14 19:36	30	ZZZZZ		141148			
09/02/14 20:24	30	ZZZZZ		141148			
09/02/14 20:56	30	ZZZZZ		141148			
09/02/14 21:40	60	ZZZZZ		141148			

Test America
St. Louis
Background Check

Spectrum: 4_20140813002_BG
Acquired: 8/13/2014 12:43:53 AM
Detector: Ge 4 SN/181
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.32	1.20	1.24	1.30	1.39	1.43	PASS

Analyst: Rachel Mueller Reviewer: ashley silas

Test America
St. Louis
Quality Control Check

Spectrum: 4_20140813003_QCAsLeft
Acquired: 8/13/2014 1:54:50 AM
Detector: Ge 4 SN/181
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.00	239.00	240.00	PASS
Energy	59.54	59.22	59.29	59.64	59.79	59.86	PASS
FWHM	0.77	0.00	0.00	0.77	1.87	1.97	PASS
ActivityDiff	650.60	-5.00	-4.00	0.66	4.00	5.00	PASS
QA-662							
FWHM	1.34	0.00	0.00	1.33	3.04	3.14	PASS
ActivityDiff	609.90	-5.00	-4.00	-3.33	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.80	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.52	1333.01	1333.26	PASS
FWHM	1.84	0.00	0.00	1.80	4.04	4.14	PASS
ActivityDiff	1189.70	-5.00	-4.00	-2.29	4.00	5.00	PASS

Analyst: Rachel Mueller Reviewer: ashley silas

Test America
St. Louis
Background Check

Spectrum: 4_20140814001_BG
Acquired: 8/14/2014 12:01:07 AM
Detector: Ge 4 SN/181
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.32	1.20	1.24	1.26	1.39	1.43	PASS

Analyst: Rachel Mueller Reviewer: Rachel Mueller

Test America
St. Louis
Quality Control Check

Spectrum: 4_20140814002_QCAsLeft
Acquired: 8/14/2014 1:04:27 AM
Detector: Ge 4 SN/181
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.54	59.22	59.29	59.60	59.79	59.86	PASS
FWHM	0.77	0.00	0.00	0.76	1.87	1.97	PASS
ActivityDiff	650.60	-5.00	-4.00	-3.19	4.00	5.00	PASS
QA-662							
FWHM	1.34	0.00	0.00	1.30	3.04	3.14	PASS
ActivityDiff	609.90	-5.00	-4.00	-3.32	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.60	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.49	1333.01	1333.26	PASS
FWHM	1.84	0.00	0.00	1.87	4.04	4.14	PASS
ActivityDiff	1189.70	-5.00	-4.00	0.92	4.00	5.00	PASS

Analyst: Rachel Mueller Reviewer: Rachel Mueller

Test America
St. Louis
Background Check

Spectrum: 4_20140827001_BG
Acquired: 8/27/2014 12:01:12 AM
Detector: Ge 4 SN/181
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.32	1.20	1.24	1.28	1.39	1.43	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

Test America
St. Louis
Quality Control Check

Spectrum: 4_20140827002_QCAsLeft
Acquired: 8/27/2014 1:10:40 AM
Detector: Ge 4 SN/181
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.00	239.00	240.00	PASS
Energy	59.54	59.22	59.29	59.63	59.79	59.86	PASS
FWHM	0.77	0.00	0.00	0.80	1.87	1.97	PASS
ActivityDiff	650.60	-5.00	-4.00	-1.71	4.00	5.00	PASS
QA-662							
FWHM	1.34	0.00	0.00	1.32	3.04	3.14	PASS
ActivityDiff	609.90	-5.00	-4.00	-0.90	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.30	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.65	1333.01	1333.26	PASS
FWHM	1.84	0.00	0.00	1.73	4.04	4.14	PASS
ActivityDiff	1189.70	-5.00	-4.00	-1.28	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

Test America
St. Louis
Background Check

Spectrum: 4_20140902001_BG
Acquired: 9/2/2014 12:02:10 AM
Detector: Ge 4 SN/181
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.32	1.20	1.24	1.30	1.39	1.43	PASS

Analyst: Rachel Mueller Reviewer: Rachel Mueller

Test America
St. Louis
Quality Control Check

Spectrum: 4_20140902002_QCAsLeft
Acquired: 9/2/2014 1:08:34 AM
Detector: Ge 4 SN/181
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.10	239.00	240.00	PASS
Energy	59.54	59.22	59.29	59.66	59.79	59.86	PASS
FWHM	0.77	0.00	0.00	0.77	1.87	1.97	PASS
ActivityDiff	650.60	-5.00	-4.00	-0.83	4.00	5.00	PASS
QA-662							
FWHM	1.34	0.00	0.00	1.33	3.04	3.14	PASS
ActivityDiff	609.90	-5.00	-4.00	-2.50	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.00	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.59	1333.01	1333.26	PASS
FWHM	1.84	0.00	0.00	1.83	4.04	4.14	PASS
ActivityDiff	1189.70	-5.00	-4.00	-1.55	4.00	5.00	PASS

Analyst: Rachel Mueller Reviewer: Rachel Mueller

Test America
St. Louis
Background Check

Spectrum: 4_20140903001_BG
Acquired: 9/3/2014 12:01:51 AM
Detector: Ge 4 SN/181
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.32	1.20	1.24	1.32	1.39	1.43	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

Test America
St. Louis
Quality Control Check

Spectrum: 4_20140903002_QCAsLeft
Acquired: 9/3/2014 1:50:18 AM
Detector: Ge 4 SN/181
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.80	239.00	240.00	PASS
Energy	59.54	59.22	59.29	59.59	59.79	59.86	PASS
FWHM	0.77	0.00	0.00	0.77	1.87	1.97	PASS
ActivityDiff	650.60	-5.00	-4.00	0.30	4.00	5.00	PASS
QA-662							
FWHM	1.34	0.00	0.00	1.33	3.04	3.14	PASS
ActivityDiff	609.90	-5.00	-4.00	-0.55	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.80	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.52	1333.01	1333.26	PASS
FWHM	1.84	0.00	0.00	1.85	4.04	4.14	PASS
ActivityDiff	1189.70	-5.00	-4.00	-1.95	4.00	5.00	PASS

Analyst: Rachel Mueller Reviewer: Rachel Mueller

Test America
St. Louis
Quality Control Check

Spectrum: 7_20140814002_QCAsLeft
Acquired: 8/14/2014 1:04:43 AM
Detector: Ge 7 SN/154
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.80	239.00	240.00	PASS
Energy	59.58	59.04	59.29	59.57	59.79	60.04	PASS
FWHM	0.84	0.00	0.00	0.84	1.94	2.04	PASS
ActivityDiff	647.00	-5.00	-4.00	-0.92	4.00	5.00	PASS
QA-662							
FWHM	1.45	0.00	0.00	1.43	3.15	3.25	PASS
ActivityDiff	606.50	-5.00	-4.00	0.50	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.50	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.71	1333.01	1333.26	PASS
FWHM	1.98	0.00	0.00	1.99	4.18	4.28	PASS
ActivityDiff	1183.00	-5.00	-4.00	0.50	4.00	5.00	PASS

Analyst: Rachel Mueller Reviewer: Jody Watson

Test America
St. Louis
Background Check

Spectrum: 7_20140814003_BG
Acquired: 8/14/2014 1:28:03 AM
Detector: Ge 7 SN/154
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.34	1.40	1.45	PASS

Analyst: Rachel Mueller Reviewer: Jody Watson

Test America
St. Louis
Quality Control Check

Spectrum: 7_20140902001_QCAsLeft
Acquired: 9/2/2014 12:24:13 AM
Detector: Ge 7 SN/154
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.58	59.04	59.29	59.59	59.79	60.04	PASS
FWHM	0.84	0.00	0.00	0.90	1.94	2.04	PASS
ActivityDiff	647.00	-5.00	-4.00	0.08	4.00	5.00	PASS
QA-662							
FWHM	1.45	0.00	0.00	1.49	3.15	3.25	PASS
ActivityDiff	606.50	-5.00	-4.00	0.13	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.10	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.60	1333.01	1333.26	PASS
FWHM	1.98	0.00	0.00	1.97	4.18	4.28	PASS
ActivityDiff	1183.00	-5.00	-4.00	-0.45	4.00	5.00	PASS

Analyst: Rachel Mueller Reviewer: Rachel Mueller

Test America
St. Louis
Background Check

Spectrum: 7_20140902002_BG
Acquired: 9/2/2014 12:49:35 AM
Detector: Ge 7 SN/154
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.29	1.40	1.45	PASS

Analyst: Rachel Mueller Reviewer: Rachel Mueller

Test America
St. Louis
Quality Control Check

Spectrum: 7_20140903001_QCAsLeft
Acquired: 9/3/2014 12:23:57 AM
Detector: Ge 7 SN/154
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.58	59.04	59.29	59.59	59.79	60.04	PASS
FWHM	0.84	0.00	0.00	0.84	1.94	2.04	PASS
ActivityDiff	647.00	-5.00	-4.00	2.34	4.00	5.00	PASS
QA-662							
FWHM	1.45	0.00	0.00	1.44	3.15	3.25	PASS
ActivityDiff	606.50	-5.00	-4.00	-0.06	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.40	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.69	1333.01	1333.26	PASS
FWHM	1.98	0.00	0.00	2.01	4.18	4.28	PASS
ActivityDiff	1183.00	-5.00	-4.00	0.19	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

Test America
St. Louis
Background Check

Spectrum: 7_20140903002_BG
Acquired: 9/3/2014 12:47:47 AM
Detector: Ge 7 SN/154
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.28	1.40	1.45	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

Test America
St. Louis
Background Check

Spectrum: 7_20140909001_BG
Acquired: 9/9/2014 6:50:34 AM
Detector: Ge 7 SN/154
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.25	1.40	1.45	PASS

Analyst: Jody Watson Reviewer: Jody Watson

Test America
St. Louis
Background Check

Spectrum: 7_20140910002_BG
Acquired: 9/10/2014 12:43:33 AM
Detector: Ge 7 SN/154
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.31	1.40	1.45	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

Test America
St. Louis
Quality Control Check

Spectrum: 7_20140909003_QCAsLeft
Acquired: 9/9/2014 9:07:07 AM
Detector: Ge 7 SN/154
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.00	239.00	240.00	PASS
Energy	59.58	59.04	59.29	59.62	59.79	60.04	PASS
FWHM	0.84	0.00	0.00	1.23	1.94	2.04	PASS
ActivityDiff	647.00	-5.00	-4.00	0.37	4.00	5.00	PASS
QA-662							
FWHM	1.45	0.00	0.00	1.71	3.15	3.25	PASS
ActivityDiff	606.50	-5.00	-4.00	0.05	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.10	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.62	1333.01	1333.26	PASS
FWHM	1.98	0.00	0.00	2.21	4.18	4.28	PASS
ActivityDiff	1183.00	-5.00	-4.00	-1.38	4.00	5.00	PASS

Analyst: Jody Watson Reviewer: Jody Watson

Test America
St. Louis
Quality Control Check

Spectrum: 7_20140910001_QCAsLeft
Acquired: 9/10/2014 12:23:22 AM
Detector: Ge 7 SN/154
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.58	59.04	59.29	59.60	59.79	60.04	PASS
FWHM	0.84	0.00	0.00	1.00	1.94	2.04	PASS
ActivityDiff	647.00	-5.00	-4.00	0.84	4.00	5.00	PASS
QA-662							
FWHM	1.45	0.00	0.00	1.55	3.15	3.25	PASS
ActivityDiff	606.50	-5.00	-4.00	0.16	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.50	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.71	1333.01	1333.26	PASS
FWHM	1.98	0.00	0.00	2.08	4.18	4.28	PASS
ActivityDiff	1183.00	-5.00	-4.00	-1.19	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

Test America
St. Louis
Quality Control Check

Spectrum: 7_20140910001_QCAsLeft
Acquired: 9/10/2014 12:23:22 AM
Detector: Ge 7 SN/154
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.58	59.04	59.29	59.60	59.79	60.04	PASS
FWHM	0.84	0.00	0.00	1.00	1.94	2.04	PASS
ActivityDiff	647.00	-5.00	-4.00	0.84	4.00	5.00	PASS
QA-662							
FWHM	1.45	0.00	0.00	1.55	3.15	3.25	PASS
ActivityDiff	606.50	-5.00	-4.00	0.16	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.50	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.71	1333.01	1333.26	PASS
FWHM	1.98	0.00	0.00	2.08	4.18	4.28	PASS
ActivityDiff	1183.00	-5.00	-4.00	-1.19	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

Test America
St. Louis
Quality Control Check

Spectrum: 7_20140910001_QCAsLeft
Acquired: 9/10/2014 12:23:22 AM
Detector: Ge 7 SN/154
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.58	59.04	59.29	59.60	59.79	60.04	PASS
FWHM	0.84	0.00	0.00	1.00	1.94	2.04	PASS
ActivityDiff	647.00	-5.00	-4.00	0.84	4.00	5.00	PASS
QA-662							
FWHM	1.45	0.00	0.00	1.55	3.15	3.25	PASS
ActivityDiff	606.50	-5.00	-4.00	0.16	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.50	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.71	1333.01	1333.26	PASS
FWHM	1.98	0.00	0.00	2.08	4.18	4.28	PASS
ActivityDiff	1183.00	-5.00	-4.00	-1.19	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

Test America
St. Louis
Background Check

Spectrum: 7_20140910002_BG
Acquired: 9/10/2014 12:43:33 AM
Detector: Ge 7 SN/154
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.31	1.40	1.45	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

Test America
St. Louis
Background Check

Spectrum: 7_20140910002_BG
Acquired: 9/10/2014 12:43:33 AM
Detector: Ge 7 SN/154
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.31	1.40	1.45	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

Test America
St. Louis
Background Check

Spectrum: 12_20140908001_BG
Acquired: 9/8/2014 7:37:57 AM
Detector: Ge12 S/N10034336
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.16	1.95	2.02	2.19	2.29	2.36	PASS

Analyst: Jody Watson Reviewer: Jody Watson

Test America
St. Louis
Quality Control Check

Spectrum: 12_20140908002_QCAsLeft
Acquired: 9/8/2014 8:36:05 AM
Detector: Ge12 S/N10034336
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.80	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.57	59.79	60.04	PASS
FWHM	0.90	0.00	0.00	1.08	2.00	2.10	PASS
ActivityDiff	691.00	-5.00	-4.00	0.33	4.00	5.00	PASS
QA-662							
FWHM	1.48	0.00	0.00	1.57	3.18	3.28	PASS
ActivityDiff	659.00	-5.00	-4.00	0.71	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.20	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.47	1333.01	1333.26	PASS
FWHM	2.00	0.00	0.00	2.08	4.20	4.30	PASS
ActivityDiff	1274.00	-5.00	-4.00	0.83	4.00	5.00	PASS

Analyst: Jody Watson Reviewer: Jody Watson

Test America
St. Louis
Quality Control Check

Spectrum: 17_20140902001_QCAsLeft
Acquired: 9/2/2014 12:26:30 AM
Detector: Ge17 SN/11080671
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.63	59.79	60.04	PASS
FWHM	0.77	0.00	0.00	0.77	1.87	1.97	PASS
ActivityDiff	691.00	-5.00	-4.00	0.09	4.00	5.00	PASS
QA-662							
FWHM	1.37	0.00	0.00	1.32	3.07	3.17	PASS
ActivityDiff	659.00	-5.00	-4.00	2.15	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.70	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.54	1333.01	1333.26	PASS
FWHM	1.88	0.00	0.00	1.83	4.08	4.18	PASS
ActivityDiff	1274.00	-5.00	-4.00	-0.75	4.00	5.00	PASS

Analyst: Rachel Mueller Reviewer: Rachel Mueller

Test America
St. Louis
Quality Control Check

Spectrum: 17_20140902001_QCAsLeft
Acquired: 9/2/2014 12:26:30 AM
Detector: Ge17 SN/11080671
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.63	59.79	60.04	PASS
FWHM	0.77	0.00	0.00	0.77	1.87	1.97	PASS
ActivityDiff	691.00	-5.00	-4.00	0.09	4.00	5.00	PASS
QA-662							
FWHM	1.37	0.00	0.00	1.32	3.07	3.17	PASS
ActivityDiff	659.00	-5.00	-4.00	2.15	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.70	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.54	1333.01	1333.26	PASS
FWHM	1.88	0.00	0.00	1.83	4.08	4.18	PASS
ActivityDiff	1274.00	-5.00	-4.00	-0.75	4.00	5.00	PASS

Analyst: Rachel Mueller Reviewer: Rachel Mueller

Test America
St. Louis
Background Check

Spectrum: 17_20140902002_BG
Acquired: 9/2/2014 12:46:44 AM
Detector: Ge17 SN/11080671
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.36	2.23	2.27	2.38	2.45	2.50	PASS

Analyst: Rachel Mueller Reviewer: Rachel Mueller

Test America
St. Louis
Background Check

Spectrum: 17_20140902002_BG
Acquired: 9/2/2014 12:46:44 AM
Detector: Ge17 SN/11080671
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.36	2.23	2.27	2.38	2.45	2.50	PASS

Analyst: Rachel Mueller Reviewer: Rachel Mueller

Gamma Verification per Geometry

Detector: Ge 04
Geometry: 25 mL D=1
Reference date 1/1/2012
Calibration Standard: 90101
Standard volume g / vial 5.31144
Standard volume transferred in g / geometry 0.5067
lab ID# of cal standard 6706

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	abundance	activity Bq/sample	Count Results	%recovery
Am-241	3253	310	0.359	**864.4**	870.13	100.7
Cd-109	4733	452	0.0361	**12507.4**	12351	98.7
Co-57	2482	237	0.856	**276.6**	282	101.9
Ce-139	3514	335	0.799	**419.6**	409.08	97.5
Hg-203	7639	729	0.8155	**893.6**	934.77	104.6
Sn-113	4952	472	0.64	**738.1**	740.3	100.3
Cs-137	3184	304	0.851	**356.9**	350.56	98.2
Y-88	11930	1138	0.937	**1214.6**	1183.9	97.5
Co-60	5881	561	0.99974	**561.2**	558.63	99.5
Co-60	5882	561	0.99986	**561.2**	561.14	100.0
Y-88	12630	1205	0.992	**1214.6**	1239.2	102.0

Reviewed By: Jody watson

Date: 3/5/2012

Gamma Verification per Geometry

Detector: Ge7

Geometry: 25mL solid

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 56

lab ID# of cal standard Rad12-0010

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	112	0.0425	2630	2647.2	100.6
Am-241	2037	74	0.359	205	205.94	100.5
Cd-109	2881	104	0.0361	2883	2885.4	100.1
Co-57	1511	55	0.856	64	64.298	100.8
Ce-139	2139	77	0.799	97	93.788	97.0
Hg-203	4651	168	0.8146	206	213.53	103.5
Sn-113	3015	109	0.64	170	172.61	101.4
Cs-137	1938	70	0.851	82	84.005	102.1
Y-88	7264	262	0.937	280	264.1	94.3
Co-60	3580	129	0.99974	129	126.18	97.5
Co-60	3581	129	0.999856	129	129.57	100.1
Y-88	7690	278	0.992	280	288.85	103.1

Reviewed By: Jody Watson

Date: 3/7/2012

Gamma Verification per Geometry

Detector: Ge 07

Geometry: 25 mL D=1

Reference date 1/1/2012

Calibration Standard: 90101

Standard volume g / vial 5.31144

Standard volume transferred in g / geometry 0.5067

lab ID# of cal standard 6706

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	abundance	activity Bq/sample	Count Results	%recovery
Am-241	3253	310	0.359	**864.4**	869.15	100.5
Cd-109	4733	452	0.0361	**12507.4**	12148	97.1
Co-57	2482	237	0.856	**276.6**	279.17	100.9
Ce-139	3514	335	0.799	**419.6**	404.29	96.4
Hg-203	7639	729	0.8155	**893.6**	945.2	105.8
Sn-113	4952	472	0.64	**738.1**	747.38	101.3
Cs-137	3184	304	0.851	**356.9**	362.35	101.5
Y-88	11930	1138	0.937	**1214.6**	1152.4	94.9
Co-60	5881	561	0.99974	**561.2**	549.99	98.0
Co-60	5882	561	0.99986	**561.2**	546.72	97.4
Y-88	12630	1205	0.992	**1214.6**	1282.9	105.6

Reviewed By: Megan McAfee

Date: 4/9/2012

Gamma Verification per Geometry

Detector: Ge 12

Geometry: 25 mL D=1

Reference date 7/1/2011

Calibration Standard: 85520-334

Standard volume g / vial 5.32298

Standard volume transferred in g / geometry 0.5177

lab ID# of cal standard Rad11-0100

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	abundance	activity Bq/sample	Count Results	%recovery
Am-241	3368	328	0.359	**912.4**	920.15	100.8
Cd-109	4780	465	0.0361	**12877.9**	12656	98.3
Co-57	2554	248	0.856	**290.2**	291.13	100.3
Ce-139	3552	345	0.799	**432.4**	418.17	96.7
Hg-203	7851	764	0.8155	**936.3**	987.93	105.5
Sn-113	4932	480	0.64	**749.5**	754.46	100.7
Cs-137	3188	310	0.851	**364.3**	370.02	101.6
Y-88	11970	1164	0.937	**1242.4**	1170.6	94.2
Co-60	5897	574	0.99974	**573.7**	565.76	98.6
Co-60	5897	574	0.99986	**573.6**	571.12	99.6
Y-88	12680	1233	0.992	**1243.2**	1279.6	102.9

Reviewed By: Jody Watson

Date: 9/2/2011

Gamma Verification per Geometry

Detector: Ge17

Geometry: 25mL solid

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 56

lab ID# of cal standard 6701

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	112	0.0425	2630	2656.9	101.0
Am-241	2037	74	0.359	205	205.05	100.0
Cd-109	2881	104	0.0361	2883	2896.9	100.5
Co-57	1511	55	0.856	64	64.687	101.4
Ce-139	2139	77	0.799	97	94.403	97.6
Hg-203	4651	168	0.8146	206	213.24	103.4
Sn-113	3015	109	0.64	170	169.12	99.4
Cs-137	1938	70	0.851	82	84.917	103.2
Y-88	7264	262	0.937	280	266.71	95.2
Co-60	3580	129	0.99974	129	126.25	97.6
Co-60	3581	129	0.999856	129	129.91	100.4
Y-88	7690	278	0.992	280	286.49	102.3

Reviewed By: Megan McAfee

Date: 4/9/2012

2nd Source Verification

Detector: Ge 4

Geometry: 25 mL D=1

Reference date 1/1/2011

Source: 85520-334

Standard volume g / vial 5.32298

Standard volume transferred in g / geometry 0.5177

lab ID# of cal standard 6673

Isotope	Certified Activity gammas/sec	Geometry Activity	Abundance	Activity Bq/sample	Count Results	%recovery
Am-241	3368	328	0.359	**912.4**	960.81	105.3
Cs-137	3188	310	0.851	**364.3**	371.48	102.0
Co-60	5897	574	0.99974	**573.7**	614.66	107.1
Co-60	5897	574	0.99986	**573.6**	619.49	108.0

Reviewed By: Jody Watson

Date: 3/8/2012

2nd Source Verification

Detector:	Ge7
Geometry:	25mL solid
Reference date	1/1/2011
Source:	83814-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	56.25
lab ID# of cal standard	6669

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2090	76	0.359	211	217.55	103.0
Cs-137	1877	68	0.851	80	80.272	100.3
Co-60	3626	132	0.99974	132	130.26	99.0
Co-60	3627	132	0.999856	132	130.19	98.9

Reviewed By: Jody Watson

Date: 3/7/2012

2nd Source Verification

Detector: Ge 7

Geometry: 25 mL D=1

Reference date 1/1/2011

Source: 83925-334

Standard volume g / vial 5.29152

Standard volume transferred in g / geometry 0.5067

lab ID# of cal standard 6673

Isotope	Certified Activity gammas/sec	Geometry Activity	Abundance	Activity Bq/sample	Count Results	%recovery
Am-241	3254	312	0.359	**867.9**	929.11	107.0
Cs-137	3106	297	0.851	**349.5**	373.86	107.0
Co-60	6000	575	0.99974	**574.7**	607.64	105.7
Co-60	6003	575	0.99986	**574.9**	612.65	106.6

Reviewed By: Jody Watson

Date: 4/12/2012

2nd Source Verification

Detector: Ge 12

Geometry: 25mL D=1

Reference date 1/1/2010

Source: 81593-334

Standard volume g / vial 5.31128

Standard volume transferred in g / geometry 0.5096

lab ID# of cal standard Rad10-0042

Isotope	Certified Activity gammas/sec	Geometry Activity	Abundance	Activity Bq/sample	Count Results	%recovery
Am-241	3474	333	0.359	**928.5**	968.4	104.3
Cs-137	3289	316	0.851	**370.8**	384.55	103.7
Co-60	6166	592	0.99974	**591.8**	588.21	99.4
Co-60	6169	592	0.99986	**592.0**	601.63	101.6

Reviewed By: Jody Watson

Date: 9/6/2011

2nd Source Verification

Detector: Ge17
Geometry: 25mL solid
Reference date 1/1/2011
Source: 83814-334
Standard volume g / vial 1550
Standard volume transferred in g / geometry 56.25
lab ID# of cal standard 6669

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2090	76	0.359	211	219.29	103.8
Cs-137	1877	68	0.851	80	81.57	101.9
Co-60	3626	132	0.99974	132	130.2	98.9
Co-60	3627	132	0.999856	132	132.43	100.6

Reviewed By: Megan McAfee

Date: 4/17/2012

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: Detector # 4
SpectrumID: 4_20130227011_EffVerif
Analysis Description: ACVTop-91774;Tuna Can 2006
Calibration: 4_Soil_TunaCan_90099_033012
Detector: Ge 4 SN/181

Verification Date: 2013-02-27 16:17
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.48E+02	0.3%
Cs-137	661.66	400	3.83E+02	4.3%
Co-1332	1332.5	777	7.45E+02	4.1%

Comments:

Perform ____KM 2/27/13_____ Reviev ___RM 2/27/13_____

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TestAmerica

ANNUAL CALIBRATION VERIFICATION

Detector ID: Detector # 7
SpectrumID: 7_20140128004_EffVerif
Analysis Description: ACVTOP-259586;TunaCan2006
Calibration: 7_TunaCan_90099_032712
Detector: Ge 7 SN/154

Verification Date: 2014-01-28 18:43
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.25E+02	5.2%
Cs-137	661.66	400	3.78E+02	5.6%
Co-1332	1332.5	777	7.28E+02	6.2%

Comments:

Perform Jody Watson Reviev 1/28/2014

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TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: Detector #12
SpectrumID: 12_20140128004_EffVerif
Analysis Description: ACVTop-259586;TunaCan2006
Calibration: 12_TunaCanCal_90099_100212
Detector: Ge12 S/N10034336

Verification Date: 2014-01-28 14:18
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.47E+02	0.4%
Cs-137	661.66	400	3.94E+02	1.6%
Co-1332	1332.5	777	7.55E+02	2.8%

Comments:

Perform Jody Watson Revie 1/28/2014

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector #17**

SpectrumID: 17_20140123005_EffVerif

Analysis Description: ACVTop-259586;TunaCan2006

Calibration: 17_TunaCan_90099_032612

Detector: Ge17 SN/11080671

Verification Date: 2014-01-23 11:17

Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.37E+02	2.6%
Cs-137	661.66	400	3.87E+02	3.3%
Co-1332	1332.5	777	7.33E+02	5.6%

Comments:

Perform Jody Watson

Revie

1/23/2014

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TETRA TECH INTERNAL CORRESPONDENCE

TO: M. MARTIN **DATE:** OCTOBER 10, 2014

FROM: A. COGNETTI **COPIES:** DV FILE

SUBJECT: **INORGANIC DATA VALIDATION- TCLP METALS**
MRC SEDIMENT INVESTIGATION
SAMPLE DELIVERY GROUP (SDG) 680-102252-2

SAMPLES: 5/Composite/TCLP Metals

Composite Sample (SD-207-SS & SD-207-01) Composite Sample (SD-246-SS & SD-246-01)
SD-202-SS SD-235-SS SD-241-SS

Overview

The sample set for MRC Sediment Investigation, SDG 680-102252-2 consists of five (5) composite samples analyzed for toxicity characteristic leaching procedure metals. There is no field duplicate pair included in this SDG.

The samples were collected on June 10, 11, 13, and 17 2014 and analyzed by Test America Laboratories, Inc. Analyses were conducted in accordance to SW-846 Methods 6020 and 7470A analytical and reporting protocol.

Summary

A cursory review was performed on the TCLP metal analysis with regard to the following parameters: data completeness, holding times and laboratory method blank results.

Areas of concern with respect to data quality are listed below.

Major Problems

- No major issues were identified.

Minor Problems

- No minor issues were identified.

Notes

Nondetected results were reported to the MDL.

EXECUTIVE SUMMARY

Laboratory Performance Issues: None.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the USEPA National Functional Guidelines for Inorganic Data Validation (January 2010). The text of this report has been formulated to address only those problem areas affecting data quality.

Tetra Tech
Ann Cognetti
Chemist/Data Validator

Tetra Tech
Joseph A. Samchuck
Data Validation Manager

Attachments:
Appendix A – Qualified Analytical Results
Appendix B – Results as Reported by the Laboratory
Appendix C – Support Documentation

Appendix A

Qualified Analytical Results

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = ICP PDS Recovery Noncompliance; MSA's $r < 0.995$
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = RPD between columns/detectors >40% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient $r < 0.995$
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 standard deviations is greater than sample activity
Z1 = Tentatively Identified Compound considered presumptively present
Z2 = Tentatively Identified Compound column bleed
Z3 = Tentatively Identified Compound aldol condensate

PROJ_NO: 05220	NSAMPLE	CompSampleSD-207-SS&SD-20			CompSampleSD-246-SS&SD-24			SD-202-SS			SD-235-SS		
SDG: 680-102252-2	LAB_ID	680-102252-28			680-102468-50			680-102252-1			680-102359-22		
FRACTION: TCLPM	SAMP_DATE	6/11/2014			6/17/2014			6/10/2014			6/13/2014		
MEDIA: WATER	QC_TYPE	NM			NM			NM			NM		
	UNITS	MG/L			MG/L			MG/L			MG/L		
	PCT_SOLIDS	0.0			0.0			0.0			0.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ARSENIC		0.025	U		0.025	U		0.025	U		0.025	U	
BARIUM		0.11			0.13			0.33			0.22		
CADMIUM		0.11			0.18			0.023			0.1		
CHROMIUM		0.075			0.13			0.11			0.14		
LEAD		0.16			0.24			0.2			0.33		
MERCURY		0.02	U		0.02	U		0.02	U		0.02	U	
SELENIUM		0.025	U		0.025	U		0.025	U		0.025	U	
SILVER		0.01	U		0.01	U		0.01	U		0.01	U	

PROJ_NO: 05220	NSAMPLE	SD-241-01		
SDG: 680-102252-2	LAB_ID	680-102468-14		
FRACTION: TCLPM	SAMP_DATE	6/17/2014		
MEDIA: WATER	QC_TYPE	NM		
	UNITS	MG/L		
	PCT_SOLIDS	0.0		
	DUP_OF			
PARAMETER		RESULT	VQL	QLCD
ARSENIC		0.025	U	
BARIUM		0.16		
CADMIUM		0.11		
CHROMIUM		0.092		
LEAD		0.2		
MERCURY		0.02	U	
SELENIUM		0.025	U	
SILVER		0.01	U	

Appendix B

Results as Reported by the Laboratory

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS - TCLP

Client Sample ID: Composite Sample (SD-207-SS & SD-207 | Lab Sample ID: 680-102252-28

Lab Name: TestAmerica Savannah | Job No.: 680-102252-2

SDG ID.: 680102252-2

Matrix: Solid | Date Sampled: 06/11/2014 00:00

Reporting Basis: WET | Date Received: 06/12/2014 09:33

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7439-92-1	Lead	0.16	0.015	0.015	mg/L			1	6020
7440-22-4	Silver	0.010	0.010	0.010	mg/L	U		1	6020
7440-38-2	Arsenic	0.025	0.025	0.025	mg/L	U		1	6020
7440-39-3	Barium	0.11	0.050	0.050	mg/L			1	6020
7440-43-9	Cadmium	0.11	0.0050	0.0050	mg/L			1	6020
7440-47-3	Chromium	0.075	0.050	0.050	mg/L			1	6020
7782-49-2	Selenium	0.025	0.025	0.025	mg/L	U		1	6020
7439-97-6	Mercury	0.020	0.020	0.020	mg/L	U		1	7470A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS - TCLP

Client Sample ID: Composite Sample (SD-246-SS & SD-246 | Lab Sample ID: 680-102468-50

Lab Name: TestAmerica Savannah | Job No.: 680-102252-2

SDG ID.: 680102252-2

Matrix: Solid | Date Sampled: 06/17/2014 00:00

Reporting Basis: WET | Date Received: 06/18/2014 09:21

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7439-92-1	Lead	0.24	0.015	0.015	mg/L			1	6020
7440-22-4	Silver	0.010	0.010	0.010	mg/L	U		1	6020
7440-38-2	Arsenic	0.025	0.025	0.025	mg/L	U		1	6020
7440-39-3	Barium	0.13	0.050	0.050	mg/L			1	6020
7440-43-9	Cadmium	0.18	0.0050	0.0050	mg/L			1	6020
7440-47-3	Chromium	0.13	0.050	0.050	mg/L			1	6020
7782-49-2	Selenium	0.025	0.025	0.025	mg/L	U		1	6020
7439-97-6	Mercury	0.020	0.020	0.020	mg/L	U		1	7470A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS - TCLP

Client Sample ID: SD-202-SS
Lab Sample ID: 680-102252-1
Lab Name: TestAmerica Savannah
Job No.: 680-102252-2
SDG ID.: 680102252-2
Matrix: Solid
Date Sampled: 06/10/2014 12:20
Reporting Basis: WET
Date Received: 06/12/2014 09:33

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7439-92-1	Lead	0.20	0.015	0.015	mg/L			1	6020
7440-22-4	Silver	0.010	0.010	0.010	mg/L	U		1	6020
7440-38-2	Arsenic	0.025	0.025	0.025	mg/L	U		1	6020
7440-39-3	Barium	0.33	0.050	0.050	mg/L			1	6020
7440-43-9	Cadmium	0.023	0.0050	0.0050	mg/L			1	6020
7440-47-3	Chromium	0.11	0.050	0.050	mg/L			1	6020
7782-49-2	Selenium	0.025	0.025	0.025	mg/L	U		1	6020
7439-97-6	Mercury	0.020	0.020	0.020	mg/L	U		1	7470A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS - TCLP

Client Sample ID: SD-235-SS
Lab Sample ID: 680-102359-22
Lab Name: TestAmerica Savannah
Job No.: 680-102252-2
SDG ID.: 680102252-2
Matrix: Solid
Date Sampled: 06/13/2014 11:00
Reporting Basis: WET
Date Received: 06/14/2014 08:39

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7439-92-1	Lead	0.33	0.015	0.015	mg/L			1	6020
7440-22-4	Silver	0.010	0.010	0.010	mg/L	U		1	6020
7440-38-2	Arsenic	0.025	0.025	0.025	mg/L	U		1	6020
7440-39-3	Barium	0.22	0.050	0.050	mg/L			1	6020
7440-43-9	Cadmium	0.10	0.0050	0.0050	mg/L			1	6020
7440-47-3	Chromium	0.14	0.050	0.050	mg/L			1	6020
7782-49-2	Selenium	0.025	0.025	0.025	mg/L	U		1	6020
7439-97-6	Mercury	0.020	0.020	0.020	mg/L	U		1	7470A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS - TCLP

Client Sample ID: SD-241-01 Lab Sample ID: 680-102468-14

Lab Name: TestAmerica Savannah Job No.: 680-102252-2

SDG ID.: 680102252-2

Matrix: Solid Date Sampled: 06/17/2014 09:15

Reporting Basis: WET Date Received: 06/18/2014 09:21

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
7439-92-1	Lead	0.20	0.015	0.015	mg/L			1	6020
7440-22-4	Silver	0.010	0.010	0.010	mg/L	U		1	6020
7440-38-2	Arsenic	0.025	0.025	0.025	mg/L	U		1	6020
7440-39-3	Barium	0.16	0.050	0.050	mg/L			1	6020
7440-43-9	Cadmium	0.11	0.0050	0.0050	mg/L			1	6020
7440-47-3	Chromium	0.092	0.050	0.050	mg/L			1	6020
7782-49-2	Selenium	0.025	0.025	0.025	mg/L	U		1	6020
7439-97-6	Mercury	0.020	0.020	0.020	mg/L	U		1	7470A

Appendix C

Support Documentation

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Sediments

Report Number: 680-102252-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT
The samples were received on 06/12/2014, 06/14/2014 and 06/18/2014; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 0.8, 2.4 and 3.2 C.

METALS (ICPMS) - TCLP
Samples SD-202-SS (680-102252-1), SD-241-01 (680-102468-14), SD-235-SS (680-102359-22), Composite Sample (SD-207-SS & SD-207-01) (680-102252-28) and Composite Sample (SD-246-SS & SD-246-01) (680-102468-50) were analyzed for metals (ICPMS) - TCLP in accordance with EPA SW-846 Methods 1311/6020. The samples were leached on 08/13/2014 and 08/14/2014, prepared on 08/15/2014 and 08/18/2014 and analyzed on 08/17/2014 and 08/18/2014.

Silver exceeded the recovery criteria low for the MS/MSD of sample Composite Sample (SD-207-SS & SD-207-01) (680-102252-28) in batch 680-344834.

Refer to the QC report for details.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

MERCURY - TCLP
Samples SD-202-SS (680-102252-1), SD-241-01 (680-102468-14), SD-235-SS (680-102359-22), Composite Sample (SD-207-SS & SD-207-01) (680-102252-28) and Composite Sample (SD-246-SS & SD-246-01) (680-102468-50) were analyzed for mercury - TCLP in accordance with EPA SW-846 Methods 1311/7470A. The samples were leached on 08/13/2014 and 08/14/2014, prepared on 08/15/2014 and 08/18/2014 and analyzed on 08/18/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

SAMPLE SUMMARY

Client: Tetra Tech, Inc.

Job Number: 680-102252-2
Sdg Number: 680102252-2

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
680-102252-1	SD-202-SS	Solid	06/10/2014 1220	06/12/2014 0933
680-102252-28	Composite Sample (SD-207-SS & SD-207-01)	Solid	06/11/2014 0000	06/12/2014 0933
680-102359-22	SD-235-SS	Solid	06/13/2014 1100	06/14/2014 0839
680-102468-14	SD-241-01	Solid	06/17/2014 0915	06/18/2014 0921
680-102468-50	Composite Sample (SD-246-SS & SD-246-01)	Solid	06/17/2014 0000	06/18/2014 0921

PCB

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: S. Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.6
Client Contact: Mike Martin	Phone: (703) 342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~6 of 6~~ 1 of 3
Company: Tetra Tech, Inc.		Analysis Requested		Job #:
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes:
City: Germantown	TAT Requested (days):			A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA; M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			Other:
Email: MIchael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site: Dark Head Cove	SSOW#:			

680-102252 Chain of Custody

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-202-SS	6/10/14	1220	C	Solid			X					
SD-202-01		1225	C	Solid			X					
SD-202-02		1230	C	Solid			X					
SD-195-SS		1330	C	Solid			X					
TCLP 195 SS				Solid					X			* Following PCB Analysis, submit sample with highest Concentration for TCLP Analysis.
SD-200-SS		1550	C	Solid			X					
SD-200-01		1555	C	Solid			X					
SD-200-02		1600	C	Solid			X					
SD-200-03		1605	C	Solid			X					
SD-197-SS	6/11/14	1030	C	Solid			X					
SD-197-01	6/11/14	1035	C	Solid			X					

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:
Relinquished by:	Date/Time: 6-11-14 / 1600	Company: Tt	Received by:	Date/Time: 6/11/14 1600	Company: TestAmerica
Relinquished by:	Date/Time: 6/11/14 1715	Company: TestAmerica	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 06/12/14 0933	Company TA SV

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 2.4°C 680-102252

PCB

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.8
Client Contact: Mike Martin	Phone: (703)742-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~8 of 46~~ 2 of 3
Company: Tetra Tech, Inc.				Job #:

Address: 20251 Century Blvd Suite 200	Due Date Requested:	Analysis Requested	Preservation Codes:
City: Germantown	TAT Requested (days):		A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; G - Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA; M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2SO3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - ph 4-5; Z - other (specify)
State, Zip: MD, 20874	PO #: Purchase Order not required		
Phone:	WO #:		Other:
Email: MIchael.Martin@tetratech.com	Project #: 68012942		
Project Name: Sediments	SSOW#:		
Site:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-197-02	6/11/14	1040	C	Solid			X					
SD-197-03		1045	C	Solid			X					
SD-199-55		1110	C	Solid			X					
SD-199-01		1115	C	Solid			X					
SD-199-02		1120	C	Solid			X					
SD-199-03		1125	C	Solid			X					
SD-DUP 01		0000	C	Solid			X					
SD-209-01		1400	C	Solid			X					
SD-209-02		1405	C	Solid			X					
SD-209-03		1410	C	Solid			X					
SD-204-55		1220	C	Solid			X					

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	6-11-14 / 1600	TT		6/11/14 / 1600	TestAmerica
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	6/11/14 / 1715	TestAmerica			
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
				06/12/14 0933	TA W

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:
		680-102252

PCB

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Gnepun	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.9
Client Contact: Mike Martin	Phone: (703)342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: ~~Page 9 of 46~~ 3 of 3
Company: Tetra Tech, Inc.				Job #:
Address: 20251 Century Blvd Suite 200	Due Date Requested:			
City: Germantown	TAT Requested (days):			
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			
Email: MIchael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitnc Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2SO3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code				N	N	N	N		
SD-204-01	6/11/14	1225	C	Solid			X					
SD-204-02		1230	C	Solid			X					
SD-207-SS		1448	C	Solid			X					
SD-207-01		1450	C	Solid			X					
SD-207-02		1455	C	Solid			X					
SD-207-03		1500	C	Solid			X					
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6-11-14/1600	Tt		6/11/14/1600	TestAmerica
2		6/11/14/1715	TestAmerica		Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 06/12/14 0933	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 680-102252

PCB

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.20
Client Contact: Mike Martin	Phone: (703)342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~20 of 46~~ 1 of 4
Company: Tetra Tech, Inc.				Job #:
Address: 20251 Century Blvd Suite 200	Due Date Requested:			
City: Germantown	TAT Requested (days):			
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			
Email: MIchael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
		Preservation Code:					N	N	N	N		
SD-224-55	6/13/14	0820	C	Solid			X					
SD-224-01		0825	C	Solid			X					
SD-224-02		0830	C	Solid			X					
SD-224-03		0835	C	Solid			X					
SD-223-55		0840	C	Solid			X					
SD-223-01		0845	C	Solid			X					
SD-223-02		0850	C	Solid			X					
SD-226-55		0855	C	Solid			X					
SD-226-01		0900	C	Solid			X					
SD-226-02		0905	C	Solid			X					
SD-226-03		0910	C	Solid			X					

680-102359 Chain of Custody

Possible Hazard Identification

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements: 680-102359

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Date/Time:	Company		Date/Time:	Company
Relinquished by:	6/13/14 -		Received by:	6/13/14 1430	TestAmerica
Relinquished by:	6/13/14 1740	TT	Received by:	6/14/14 08:39	TA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 0.8 C

PCBs

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.21
Client Contact: Mike Martin	Phone:	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~21 of 46~~ 2 of 4
Company: Tetra Tech, Inc.		Analysis Requested		Job #:
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes:
City: Germantown	TAT Requested (days):			A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
State, Zip: MD, 20874	PO #: Purchase Order not required			
Phone:	WO #:			Other:
Email: MIchael.Martin@tetratech.com	Project #: 68012942			
Project Name: Sediments	SSOW#:			
Site:				

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-225-SS	6/3/14	0915	C	Solid			X					
SD-225-01		0920	C	Solid			X					
SD-225-02		0925	C	Solid			X					
SD-225-03		0930	C	Solid			X					
SD-228-SS		1005	C	Solid			X					
SD-228-01		1010	C	Solid			X					
SD-228-02		1015	C	Solid			X					
SD-228-03		1020	C	Solid			X					
SD-234-SS		1030	C	Solid			X					
SD-234-01		1035	C	Solid			X					
SD-235-~~02~~ SS		1100	C	Solid			X					

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements: 680-102359

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	[signature]	6/13/14	TT	[signature]	6/13/14 1430	TT
2	[signature]	6/13/14 1740	TT	[signature]	6/14/14 0839	TT
3						

Custody Seals Intact: △ Yes △ No

Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 0.8 °C

PCB

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.23
Client Contact: Mike Martin	Phone: (703) 342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: ~~Page 23 of 46~~ 3 of 4
Company: Tetra Tech, Inc.				Job #:
Address: 20251 Century Blvd Suite 200	Due Date Requested:			
City: Germantown	TAT Requested (days): Standard			
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			
Email: MIchael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2SO3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-235-01	6/13/14	1105	C	Solid			X					
SD-235-02		1110	C	Solid			X					
SD-235-03		1115	C	Solid			X					
SD-236-SS		1205	C	Solid			X					
SD-236-01		1210	C	Solid			X					
SD-236-02		1215	C	Solid			X					
SD-237-SS		1230	C	Solid			X					
SD-237-01		1235	C	Solid			X					
SD-237-02		1240	C	Solid			X					
SD-237-03		1245	C	Solid			X					
SD-DUP 03	↓	0000	C	Solid			X					

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements: 680-102359

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6/13/14 -	TT		6/13/14 1470	TT
2		6/13/14 1700			6/14/14 08:39	TA
3						

Custody Seals Intact:	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:
Δ Yes Δ No		0.8 C

PCBs

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.25
Client Contact: Mike Martin	Phone: (703)342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~25 of 46~~ 4 of 4
Company: Tetra Tech, Inc.				Job #:

Address: 20251 Century Blvd Suite 200	Due Date Requested:	Analysis Requested
City: Germantown	TAT Requested (days): Standard	
State, Zip: MD, 20874	PO #: Purchase Order not required	
Phone:	WO #:	
Email: MIchael.Martin@tetratech.com	Project #: 68012942	
Project Name: Sediments	SSOW#:	
Site:		

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2SO3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-227-SS	6/13/14	1310	C	Solid			X					
SD-227-01	↓	1315	C	Solid			X					
SD-227-02	↓	1320	C	Solid			X					
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements: 680-102359

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	6/13/14 -	TT		6/13/14 1420	TA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	6/13/14 1740	TT		6/14/14 08:39	TT
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:
		0.8 a c

PCB

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Sts Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.32
Client Contact: Mike Martin	Phone: (703) 342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~32 of 46~~ 1 of 5
Company: Tetra Tech, Inc.				Job #:
Address: 20251 Century Blvd Suite 200	Due Date Requested:			
City: Germantown	TAT Requested (days): Standard			
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			
Email: MIchael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2SO3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-239-SS	6/17/14	0735	C	Solid			X					
SD-239-01		0740	C	Solid			X					
SD-239-02		0745	C	Solid			X					
SD-239-03		0750	C	Solid			X					~~Hold pending analysis of SS to 02~~
SD-238-SS		0820	C	Solid			X					
SD-238-01		0825	C	Solid			X					
SD-238-02		0830	C	Solid			X					
SD-238-03		0835	C	Solid			X					~~SS to 02~~
SD-240-SS		0845	C	Solid			X					
SD-240-01		0850	C	Solid			X					
SD-240-02		0855	C	Solid			X					

680-102468 Chain of Custody

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements: 680-102468

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
[signature]	6-17-14 / 1600	T+	[signature]	6/17/14 1600	TestAmerica
[signature]	6/17/14 1720	TestAmerica	[signature]	6/18/14 09:21	T+

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 3.2 °C

PCBs

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Sto Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.33
Client Contact: Mike Martin	Phone: (703) 342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~33 of 46~~ 2 of 5
Company: Tetra Tech, Inc.				Job #:
Address: 20251 Century Blvd Suite 200	Due Date Requested:			
City: Germantown	TAT Requested (days): Standard			
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			
Email: MIchael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2SO3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-240-03	6/17/14	0900	C	Solid			X					~~Hold pending analysis of SS-01~~
SD-241-SS		0910	C	Solid			X					
SD-241-01		0915	C	Solid			X					
SD-241-02		0920	C	Solid			X					
SD-241-03		0925	C	Solid			X					
SD-DUP04		0000	C	Solid			X					
SD-242-SS		0940	C	Solid			X					
SD-242-01		0945	C	Solid			X					
SD-242-02		0950	C	Solid			X					
SD-242-03		0955	C	Solid			X					
SD-243-SS		1010	C	Solid			X					

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements: 680-102468

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
[signature]	6/17/14 - 1600	TT	[signature]	6/17/14/1600	TA
[signature]	6/17/14/1720	TA	M. [signature]	6/18/14 09:21	TA

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 3.2 °C

PCBs

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.35
Client Contact: Mike Martin	Phone: (703)347-8389	E-Mail: jerry.lanier@testamericainc.com		Page: ~~Page 35 of 40~~ 3 of 5
Company: Tetra Tech, Inc.				Job #:
Address: 20251 Century Blvd Suite 200	Due Date Requested:			
City: Germantown	TAT Requested (days): Standard			
State, Zip: MD, 20874	PO #: Purchase Order not required			
Phone:	WO #:			
Email: MIchael.Martin@tetratech.com	Project #: 68012942			
Project Name: Sediments	SSOW#:			
Site:				

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
		Preservation Code:					N	N	N	N		
SD-243-01	6/17/14	1015	C	Solid			X					
SD-243-02		1020	C	Solid			X					
SD-243-03		1025	C	Solid			X					
SD-244-55		1045	C	Solid			X					
SD-244-01		1050	C	Solid			X					
SD-244-02		1055	C	Solid			X					
SD-244-03		1100	C	Solid			X					
SD-245-55		1135	C	Solid			X					
SD-245-01		1140	C	Solid			X					
SD-245-02		1145	C	Solid			X					
SD-245-03		1150	C	Solid			X					

Possible Hazard Identification

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements: 680-102468

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6/17/14 1600	TT		6/17/14 1600	TT
2		6/17/14 1720	TT		6/18/14 09:21	TT
3						

Custody Seals Intact: △ Yes △ No

Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 3.2 °C

PCBs

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.37
Client Contact: Mike Martin	Phone: (705) 341-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~37 of 46~~ 4 of 5
Company: Tetra Tech, Inc.				Job #:
Address: 20251 Century Blvd Suite 200	Due Date Requested:			
City: Germantown	TAT Requested (days): Standard			
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			
Email: MIchael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-246-SS	6/17/14	1205	C	Solid			X					
SD-246-01		1210	C	Solid			X					
SD-246-02		1215	C	Solid			X					
SD-246-03		1220	C	Solid			X					
SD-247-SS		1305	C	Solid			X					
SD-247-01		1310	C	Solid			X					
SD-247-02		1315	C	Solid			X					
SD-247-03		1320	C	Solid			X					
SD-248-SS		1400	C	Solid			X					
SD-248-01		1405	C	Solid			X					MS/MSD
SD-248-02		1410	C	Solid			X					

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements: 680-102468

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	[signature]	6/17/14 - 1600	TT	[signature]	6/17/14 1600	TT
2	[signature]	6/17/14 1720	TT	[signature]	6/18/14 09:21	TA
3						

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 32.1

PCBs

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.39
Client Contact: Mike Martin	Phone: (703)342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~2 of 6~~ 5 of 5
Company: Tetra Tech, Inc.				Job #:
Address: 20251 Century Blvd Suite 200	Due Date Requested:			
City: Germantown	TAT Requested (days): Standard			
State, Zip: MD, 20874	PO #: Purchase Order not required			
Phone:	WO #:			
Email: MIchael.Martin@tetratech.com	Project #: 68012942			
Project Name: Sediments	SSOW#:			
Site:				

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2SO3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-248-03	6/17/14	1415	C	Solid			X					
SD-249-55		1425	C	Solid			X					
SD-249-01		1430	C	Solid			X					~~MS/MSD~~
SD-249-02		1435	C	Solid			X					
SD-249-03		1440	C	Solid			X					
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements: 680-102468

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6/17/14 1100	TT		6/17/14 1600	TT
2		6/17/14 1720	TT		6/18/14 0921	TT
3		Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: △ Yes △ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 3.2 0.0

METHOD SUMMARY

Client: Tetra Tech, Inc.

Job Number: 680-102252-2
Sdg Number: 680102252-2

Description	Lab Location	Method	Preparation Method
Matrix: Solid			
Metals (ICP/MS)	TAL SAV	SW846 6020	
TCLP Extraction	TAL SAV		SW846 1311
Preparation, Total Metals	TAL SAV		SW846 3010A
Mercury (CVAA)	TAL SAV	SW846 7470A	
TCLP Extraction	TAL SAV		SW846 1311
Preparation, Mercury	TAL SAV		SW846 7470A

Lab References:

TAL SAV = TestAmerica Savannah

Method References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

HOLDTIME

SDG 680102252-2

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
	MG/L	SD-241-01	680-102468-14	NM	06/17/2014	08/15/2014	08/17/2014	59	2	61
	MG/L	SD-235-SS	680-102359-22	NM	06/13/2014	08/15/2014	08/17/2014	63	2	65
	MG/L	SD-202-SS	680-102252-1	NM	06/10/2014	08/15/2014	08/17/2014	66	2	68
	MG/L	CompSampleSD-246-SS&	680-102468-50	NM	06/17/2014	08/15/2014	08/17/2014	59	2	61
	MG/L	CompSampleSD-207-SS&	680-102252-28	NM	06/11/2014	08/18/2014	08/18/2014	68	0	68
TCLPM	MG/L	SD-241-01	680-102468-14	NM	06/17/2014	08/15/2014	08/18/2014	59	3	62
TCLPM	MG/L	SD-235-SS	680-102359-22	NM	06/13/2014	08/15/2014	08/18/2014	63	3	66
TCLPM	MG/L	SD-202-SS	680-102252-1	NM	06/10/2014	08/15/2014	08/18/2014	66	3	69
TCLPM	MG/L	CompSampleSD-246-SS&	680-102468-50	NM	06/17/2014	08/15/2014	08/18/2014	59	3	62
TCLPM	MG/L	CompSampleSD-207-SS&	680-102252-28	NM	06/11/2014	08/18/2014	08/18/2014	68	0	68

COVER PAGE
METALS

Lab Name: TestAmerica Savannah Job Number: 680-102252-2

SDG No.: 680102252-2

Project: Sediments

Client Sample ID	Lab Sample ID
SD-202-SS	680-102252-1
Composite Sample (SD-207-SS & SD-207-01)	680-102252-28
SD-235-SS	680-102359-22
SD-241-01	680-102468-14
Composite Sample (SD-246-SS & SD-246-01)	680-102468-50

Comments:

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica Savannah Job No.: 680-102252-2

SDG No.: 680102252-2

Instrument ID: ICPMSB Method: 6020

Start Date: 08/17/2014 10:47 End Date: 08/18/2014 08:34

Lab Sample ID	D/F	Type	Time	Analytes																					
				Ag	As	Ba	Cd	Cr	Pb	Se															
ITUNE 680-344610/1			10:47																						
CALIBSTD 680-344610/2 IC	1		11:22	X	X	X	X	X	X	X															
IC 680-344610/3	1		11:29	X	X	X	X	X	X	X															
IC 680-344610/4	1		11:37	X	X	X	X	X	X	X															
IC 680-344610/5	1		11:44	X	X	X	X	X	X	X															
IC 680-344610/6	1		11:51	X	X	X	X	X	X	X															
IC 680-344610/7	1		11:58	X	X	X	X	X	X	X															
RINSE 680-344610/8			12:05																						
ICV 680-344610/9	1		12:12	X	X	X	X	X	X	X															
ICB 680-344610/10	1		12:20	X	X	X	X	X	X	X															
CRI 680-344610/11	1		12:27	X	X	X	X	X	X	X															
CCV 680-344610/12	1		12:34	X	X	X	X	X	X	X															
CCB 680-344610/13	1		12:41	X	X	X	X	X	X	X															
ICSA 680-344610/14	1		12:48	X	X	X	X	X	X	X															
ICSAB 680-344610/15	1		12:56	X	X	X	X	X	X	X															
ZZZZZZ			13:03																						
ZZZZZZ			13:10																						
ZZZZZZ			13:17																						
ZZZZZZ			13:24																						
CCV 680-344610/20	1		13:31	X	X	X	X	X	X	X															
CCB 680-344610/21	1		13:39	X	X	X	X	X	X	X															
ZZZZZZ			13:46																						
ZZZZZZ			13:53																						
ZZZZZZ			14:00																						
ZZZZZZ			14:07																						
ZZZZZZ			14:15																						
ZZZZZZ			14:22																						
ZZZZZZ			14:29																						
ZZZZZZ			14:36																						
ZZZZZZ			14:43																						
ZZZZZZ			14:50																						
CCV 680-344610/32			14:58																						
CCB 680-344610/33			15:05																						
ZZZZZZ			15:12																						
ZZZZZZ			15:19																						
ZZZZZZ			15:26																						
ZZZZZZ			15:34																						
ZZZZZZ			15:41																						
ZZZZZZ			15:48																						
CRI 680-344610/40			15:55																						
CCV 680-344610/41	1		16:03	X	X	X	X	X	X	X															

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica Savannah Job No.: 680-102252-2

SDG No.: 680102252-2

Instrument ID: ICPMSB Method: 6020

Start Date: 08/17/2014 10:47 End Date: 08/18/2014 08:34

Lab Sample ID	D/F	Type	Time	Analytes																				
				Ag	As	Ba	Cd	Cr	Pb	Se														
CCB 680-344610/42	1		16:10	X	X	X	X	X	X	X														
MB 680-344245/1-A	1	T	16:17	X	X	X	X	X	X	X														
LCS 680-344245/2-A	1	T	16:24	X	X	X	X	X	X	X														
ZZZZZZ			16:31																					
680-104168-A-1-G SD	5		16:38	X	X	X	X	X	X	X														
680-104168-A-1-G PDS	1		16:46	X	X	X	X	X	X	X														
680-104168-A-1-H MS	1		16:53	X	X	X	X	X	X	X														
680-104168-A-1-I MSD	1		17:00	X	X	X	X	X	X	X														
680-102252-1	1	P	17:07	X	X	X	X	X	X	X														
680-102359-22	1	P	17:14	X	X	X	X	X	X	X														
680-102468-14	1	P	17:21	X	X	X	X	X	X	X														
CCV 680-344610/53	1		17:28	X	X	X	X	X	X	X														
CCB 680-344610/54	1		17:35	X	X	X	X	X	X	X														
680-102468-50	1	P	17:43	X	X	X	X	X	X	X														
LB 680-343974/1-D	1	P	17:50	X	X	X	X	X	X	X														
CRI 680-344610/57	1		17:57	X	X	X	X	X	X	X														
CCV 680-344610/58	1		18:04	X	X	X	X	X	X	X														
CCB 680-344610/59	1		18:11	X	X	X	X	X	X	X														
ZZZZZZ			18:19																					
ZZZZZZ			18:26																					
ZZZZZZ			18:33																					
ZZZZZZ			18:40																					
ZZZZZZ			18:47																					
ZZZZZZ			18:54																					
ZZZZZZ			19:02																					
ZZZZZZ			19:09																					
ZZZZZZ			19:16																					
ZZZZZZ			19:23																					
CCV 680-344610/70			19:30																					
CCB 680-344610/71			19:37																					
ZZZZZZ			19:44																					
ZZZZZZ			19:52																					
ZZZZZZ			19:59																					
ZZZZZZ			20:06																					
ZZZZZZ			20:13																					
ZZZZZZ			20:20																					
ZZZZZZ			20:27																					
ZZZZZZ			20:35																					
ZZZZZZ			20:42																					
ZZZZZZ			20:49																					
CCV 680-344610/82			20:56																					
CCB 680-344610/83			21:03																					

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica Savannah Job No.: 680-102252-2

SDG No.: 680102252-2

Instrument ID: ICPMSB Method: 6020

Start Date: 08/17/2014 10:47 End Date: 08/18/2014 08:34

Lab Sample ID	D / F	Type	Time	Analytes																				
				Ag	As	Ba	Cd	Cr	Pb	Se														
ZZZZZZ			21:10																					
ZZZZZZ			21:17																					
ZZZZZZ			21:25																					
ZZZZZZ			21:32																					
ZZZZZZ			21:39																					
ZZZZZZ			21:46																					
CRI 680-344610/90			21:53																					
CCV 680-344610/91			22:00																					
CCB 680-344610/92			22:08																					
ZZZZZZ			22:15																					
ZZZZZZ			22:22																					
ZZZZZZ			22:29																					
ZZZZZZ			22:36																					
ZZZZZZ			22:44																					
ZZZZZZ			22:51																					
ZZZZZZ			22:58																					
ZZZZZZ			23:05																					
ZZZZZZ			23:12																					
ZZZZZZ			23:19																					
CCV 680-344610/103			23:27																					
CCB 680-344610/104			23:34																					
ZZZZZZ			23:41																					
ZZZZZZ			23:48																					
ZZZZZZ			23:55																					
ZZZZZZ			00:02																					
ZZZZZZ			00:10																					
ZZZZZZ			00:17																					
ZZZZZZ			00:24																					
ZZZZZZ			00:31																					
ZZZZZZ			00:38																					
ZZZZZZ			00:45																					
CCV 680-344610/115			00:53																					
CCB 680-344610/116			01:00																					
ZZZZZZ			01:07																					
ZZZZZZ			01:14																					
ZZZZZZ			01:21																					
ZZZZZZ			01:28																					
ZZZZZZ			01:36																					
ZZZZZZ			01:43																					
CRI 680-344610/123			01:50																					
CCV 680-344610/124			01:57																					
CCB 680-344610/125			02:04																					

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica Savannah Job No.: 680-102252-2

SDG No.: 680102252-2

Instrument ID: ICPMSB Method: 6020

Start Date: 08/17/2014 10:47 End Date: 08/18/2014 08:34

Lab Sample ID	D / F	Type	Time	Analytes																				
				Ag	As	Ba	Cd	Cr	Pb	Se														
ICSA 680-344610/126			02:12																					
ICSAB 680-344610/127			02:19																					
RINSE 680-344610/128			02:26																					
RINSE 680-344610/129			02:34																					
RINSE 680-344610/130			02:41																					
CCV 680-344610/131			02:48																					
CCB 680-344610/132			02:55																					
ZZZZZZ			03:02																					
ZZZZZZ			03:10																					
ZZZZZZ			03:17																					
ZZZZZZ			03:24																					
ZZZZZZ			03:31																					
ZZZZZZ			03:38																					
ZZZZZZ			03:46																					
ZZZZZZ			03:53																					
ZZZZZZ			04:00																					
ZZZZZZ			04:07																					
CCV 680-344610/143			04:14																					
CCB 680-344610/144			04:22																					
ZZZZZZ			04:29																					
ZZZZZZ			04:36																					
ZZZZZZ			04:43																					
ZZZZZZ			04:50																					
ZZZZZZ			04:58																					
ZZZZZZ			05:05																					
ZZZZZZ			05:12																					
ZZZZZZ			05:19																					
ZZZZZZ			05:26																					
ZZZZZZ			05:34																					
CCV 680-344610/155			05:41																					
CCB 680-344610/156			05:48																					
ZZZZZZ			05:55																					
ZZZZZZ			06:03																					
ZZZZZZ			06:10																					
ZZZZZZ			06:17																					
CRI 680-344610/161			06:24																					
CCV 680-344610/162			06:32																					
CCB 680-344610/163			06:39																					
ZZZZZZ			06:46																					
ZZZZZZ			06:53																					
ZZZZZZ			07:00																					
ZZZZZZ			07:07																					

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica Savannah Job No.: 680-102252-2

SDG No.: 680102252-2

Instrument ID: ICPMSB Method: 6020

Start Date: 08/17/2014 10:47 End Date: 08/18/2014 08:34

Lab Sample ID	D / F	Type	Time	Analytes																			
				Ag	As	Ba	Cd	Cr	Pb	Se													
ZZZZZZ			07:15																				
ZZZZZZ			07:22																				
ZZZZZZ			07:29																				
ZZZZZZ			07:36																				
ZZZZZZ			07:43																				
ZZZZZZ			07:51																				
CCV 680-344610/174			07:58																				
CCB 680-344610/175			08:05																				
ZZZZZZ			08:12																				
CRI 680-344610/177			08:19																				
CCV 680-344610/178			08:27																				
CCB 680-344610/179			08:34																				

Prep Types

= TCLP

P = TCLP

T = Total/NA

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica Savannah Job No.: 680-102252-2

SDG No.: 680102252-2

Concentration Units: ug/L

Analyte	RL	ICB 680-344610/10 08/17/2014 12:20		CCB 680-344610/13 08/17/2014 12:41		CCB 680-344610/21 08/17/2014 13:39		CCB 680-344610/42 08/17/2014 16:10	
		Found	C	Found	C	Found	C	Found	C
Arsenic	0.50	0.26	U	0.26	U	0.26	U	0.26	U
Barium	1.0	0.28	U	0.28	U	0.28	U	0.28	U
Cadmium	0.10	0.026	U	0.026	U	0.026	U	0.026	U
Chromium	1.0	0.50	U	0.50	U	0.50	U	0.50	U
Lead	2.0	0.10	U	0.10	U	0.10	U	0.10	U
Selenium	0.50	0.22	U	0.22	U	0.22	U	0.22	U
Silver	0.20	0.036	U	0.036	U	0.036	U	0.036	U
Copper	1.0	0.22	U	0.22	U	0.22	U	0.22	U
Thallium	0.20	0.050	U	0.050	U	0.050	U	0.050	U
Zinc	4.0	1.7	U	1.7	U	1.7	U	1.7	U

Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica Savannah Job No.: 680-102252-2

SDG No.: 680102252-2

Concentration Units: ug/L

Analyte	RL	CCB 680-344610/54 08/17/2014 17:35		CCB 680-344610/59 08/17/2014 18:11					
		Found	C	Found	C	Found	C	Found	C
Arsenic	0.50	0.26	U	0.26	U				
Barium	1.0	0.28	U	0.28	U				
Cadmium	0.10	0.026	U	0.026	U				
Chromium	1.0	0.50	U	0.50	U				
Lead	2.0	0.10	U	0.10	U				
Selenium	0.50	0.22	U	0.22	U				
Silver	0.20	0.036	U	0.036	U				
Copper	1.0	0.22	U	0.22	U				
Thallium	0.20	0.050	U	0.050	U				
Zinc	4.0	1.7	U	1.7	U				

Italicized analytes were not requested for this sequence.

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica Savannah Job No.: 680-102252-2

SDG No.: 680102252-2

Instrument ID: ICPMSB Method: 6020

Start Date: 08/18/2014 11:31 End Date: 08/19/2014 14:06

Lab Sample ID	D/F	Type	Time	Analytes																					
				Ag	As	Ba	Cd	Cr	Pb	Se															
ITUNE 680-344834/1			11:31																						
CALIBSTD 680-344834/2 IC	1		12:06	X	X	X	X	X	X	X															
IC 680-344834/3	1		12:14	X	X	X	X	X	X	X															
IC 680-344834/4	1		12:21	X	X	X	X	X	X	X															
IC 680-344834/5	1		12:28	X	X	X	X	X	X	X															
IC 680-344834/6	1		12:35	X	X	X	X	X	X	X															
IC 680-344834/7	1		12:42	X	X	X	X	X	X	X															
RINSE 680-344834/8			12:49																						
ICV 680-344834/9	1		12:57	X	X	X	X	X	X	X															
ICB 680-344834/10	1		13:04	X	X	X	X	X	X	X															
CRI 680-344834/11	1		13:11	X	X	X	X	X	X	X															
CCV 680-344834/12	1		13:18	X	X	X	X	X	X	X															
CCB 680-344834/13	1		13:25	X	X	X	X	X	X	X															
ICSA 680-344834/14	1		13:33	X	X	X	X	X	X	X															
ICSAB 680-344834/15	1		13:40	X	X	X	X	X	X	X															
ZZZZZZ			13:47																						
ZZZZZZ			13:54																						
ZZZZZZ			14:01																						
ZZZZZZ			14:09																						
CCV 680-344834/20	1		14:16	X	X	X	X	X	X	X															
CCB 680-344834/21	1		14:23	X	X	X	X	X	X	X															
CCV 680-344834/22	1		20:51	X	X	X	X	X	X	X															
CCB 680-344834/23	1		20:58	X	X	X	X	X	X	X															
MB 680-344563/1-A	1	T	21:06	X	X	X	X	X	X	X															
LCS 680-344563/2-A	1	T	21:13	X	X	X	X		X	X															
ZZZZZZ			21:20																						
ZZZZZZ			21:27																						
490-59396-A-1-E SD	5		21:34	X	X	X	X	X	X	X															
490-59396-A-1-E PDS	1		21:42	X	X	X	X	X	X	X															
490-59396-A-1-F MS	1		21:49	X	X	X	X	X	X	X															
490-59396-A-1-G MSD	1		21:56	X	X	X	X	X	X	X															
ZZZZZZ			22:03																						
LB 680-344563/10-A	1	T	22:10	X	X	X	X	X	X	X															
CCV 680-344834/34	1		22:17	X	X	X	X	X	X	X															
CCB 680-344834/35	1		22:24	X	X	X	X	X	X	X															
680-102252-28	1	P	22:32	X	X	X	X	X	X	X															
680-102252-28 MS	1	P	22:39	X	X	X	X	X	X	X															
680-102252-28 MSD	1	P	22:46	X	X	X	X	X	X	X															
ZZZZZZ			22:53																						
ZZZZZZ			23:00																						
ZZZZZZ			23:07																						

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica Savannah Job No.: 680-102252-2

SDG No.: 680102252-2

Instrument ID: ICPMSB Method: 6020

Start Date: 08/18/2014 11:31 End Date: 08/19/2014 14:06

Lab Sample ID	D/F	Type	Time	Analytes																				
				Ag	As	Ba	Cd	Cr	Pb	Se														
CRI 680-344834/42	1		23:15	X	X	X	X	X	X	X														
CCV 680-344834/43	1		23:22	X	X	X	X	X	X	X														
CCB 680-344834/44	1		23:29	X	X	X	X	X	X	X														
CCV 680-344834/45			01:09																					
CCB 680-344834/46			01:16																					
ZZZZZZ			01:24																					
ZZZZZZ			01:31																					
ZZZZZZ			01:38																					
ZZZZZZ			01:45																					
ZZZZZZ			01:52																					
ZZZZZZ			02:00																					
ZZZZZZ			02:07																					
ZZZZZZ			02:14																					
ZZZZZZ			02:21																					
ZZZZZZ			02:28																					
CCV 680-344834/57			02:35																					
CCB 680-344834/58			02:42																					
ZZZZZZ			02:50																					
ZZZZZZ			02:57																					
ZZZZZZ			03:04																					
ZZZZZZ			03:11																					
ZZZZZZ			03:18																					
ZZZZZZ			03:26																					
ZZZZZZ			03:33																					
CCV 680-344834/66			03:40																					
CCB 680-344834/67			03:47																					
ZZZZZZ			03:54																					
ZZZZZZ			04:02																					
ZZZZZZ			04:09																					
ZZZZZZ			04:16																					
ZZZZZZ			04:23																					
ZZZZZZ			04:30																					
ZZZZZZ			04:38																					
ZZZZZZ			04:45																					
ZZZZZZ			04:52																					
ZZZZZZ			04:59																					
CCV 680-344834/78			05:06																					
CCB 680-344834/79			05:13																					
ZZZZZZ			05:21																					
ZZZZZZ			05:28																					
ZZZZZZ			05:35																					
ZZZZZZ			05:42																					

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica Savannah Job No.: 680-102252-2

SDG No.: 680102252-2

Instrument ID: ICPMSB Method: 6020

Start Date: 08/18/2014 11:31 End Date: 08/19/2014 14:06

Lab Sample ID	D/F	Type	Time	Analytes																				
				Ag	As	Ba	Cd	Cr	Pb	Se														
CCV 680-344834/84			05:50																					
CCB 680-344834/85			05:57																					
ZZZZZZ			06:04																					
ZZZZZZ			06:11																					
ZZZZZZ			06:18																					
ZZZZZZ			06:26																					
ZZZZZZ			06:33																					
ZZZZZZ			06:40																					
ZZZZZZ			06:47																					
ZZZZZZ			06:54																					
ZZZZZZ			07:02																					
ZZZZZZ			07:09																					
CCV 680-344834/96			07:16																					
CCB 680-344834/97			07:23																					
ZZZZZZ			07:30																					
ZZZZZZ			07:37																					
ZZZZZZ			07:45																					
ZZZZZZ			07:52																					
ZZZZZZ			07:59																					
ZZZZZZ			08:06																					
ZZZZZZ			08:13																					
ZZZZZZ			08:21																					
ZZZZZZ			08:28																					
ZZZZZZ			08:35																					
CCV 680-344834/108			08:42																					
CCB 680-344834/109			08:49																					
ZZZZZZ			08:57																					
ZZZZZZ			09:04																					
ZZZZZZ			09:11																					
ZZZZZZ			09:18																					
ZZZZZZ			09:25																					
ZZZZZZ			09:33																					
ZZZZZZ			09:40																					
ZZZZZZ			09:47																					
ZZZZZZ			09:54																					
ZZZZZZ			10:01																					
CCV 680-344834/120			10:09																					
CCB 680-344834/121			10:16																					
ZZZZZZ			10:23																					
ZZZZZZ			10:30																					
ZZZZZZ			10:37																					
ZZZZZZ			10:44																					

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica Savannah Job No.: 680-102252-2

SDG No.: 680102252-2

Instrument ID: ICPMSB Method: 6020

Start Date: 08/18/2014 11:31 End Date: 08/19/2014 14:06

Lab Sample ID	D/F	Type	Time	Analytes																			
				Ag	As	Ba	Cd	Cr	Pb	Se													
CCV 680-344834/126			10:52																				
CCB 680-344834/127			10:59																				
ZZZZZZ			11:06																				
ZZZZZZ			11:13																				
ZZZZZZ			11:20																				
ZZZZZZ			11:28																				
ZZZZZZ			11:35																				
ZZZZZZ			11:42																				
ZZZZZZ			11:49																				
ZZZZZZ			11:56																				
ZZZZZZ			12:03																				
ZZZZZZ			12:11																				
CCV 680-344834/138			12:18																				
CCB 680-344834/139			12:25																				
CCV 680-344834/140	1		12:32					X															
CCB 680-344834/141	1		12:39					X															
ZZZZZZ			12:47																				
ICSA 680-344834/143	1		12:54	X	X	X	X	X	X	X													
ICSAB 680-344834/144	1		13:01	X	X	X	X	X	X	X													
ZZZZZZ			13:09																				
ZZZZZZ			13:16																				
ZZZZZZ			13:23																				
CCV 680-344834/148	1		13:30					X															
CCB 680-344834/149	1		13:37					X															
LCS 680-344563/2-A	1	T	13:45					X															
CRI 680-344834/151	1		13:52					X															
CCV 680-344834/152	1		13:59					X															
CCB 680-344834/153	1		14:06					X															

Prep Types

= TCLP

P = TCLP

T = Total/NA

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica Savannah Job No.: 680-102252-2

SDG No.: 680102252-2

Concentration Units: ug/L

Analyte	RL	ICB 680-344834/10 08/18/2014 13:04		CCB 680-344834/13 08/18/2014 13:25		CCB 680-344834/21 08/18/2014 14:23		CCB 680-344834/23 08/18/2014 20:58	
		Found	C	Found	C	Found	C	Found	C
Arsenic	0.50	0.26	U	0.26	U	0.26	U	0.26	U
Barium	1.0	0.28	U	0.28	U	0.28	U	0.28	U
Cadmium	0.10	0.026	U	0.026	U	0.026	U	0.026	U
Chromium	1.0	0.50	U	0.50	U	0.50	U	0.50	U
Lead	2.0	0.10	U	0.10	U	0.10	U	0.10	U
Selenium	0.50	0.22	U	0.22	U	0.22	U	0.22	U
Silver	0.20	0.036	U	0.036	U	0.036	U	0.036	U
Copper	1.0	0.22	U	0.22	U	0.22	U	0.22	U
Thallium	0.20	0.050	U	0.050	U	0.050	U	0.050	U
Zinc	4.0	1.7	U	1.7	U	1.7	U	1.7	U

Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica Savannah Job No.: 680-102252-2

SDG No.: 680102252-2

Concentration Units: ug/L

Analyte	RL	CCB 680-344834/35 08/18/2014 22:24		CCB 680-344834/44 08/18/2014 23:29		CCB 680-344834/141 08/19/2014 12:39		CCB 680-344834/149 08/19/2014 13:37	
		Found	C	Found	C	Found	C	Found	C
Arsenic	0.50	0.26	U	0.26	U				
Barium	1.0	0.28	U	0.28	U				
Cadmium	0.10	0.026	U	0.026	U				
Chromium	1.0	0.50	U	0.50	U	0.50	U	0.50	U
Lead	2.0	0.10	U	0.10	U				
Selenium	0.50	0.22	U	0.22	U				
Silver	0.20	0.036	U	0.036	U				
Copper	1.0	0.22	U	0.22	U	0.22	U	0.22	U
Thallium	0.20	0.050	U	0.050	U	0.050	U	0.050	U
Zinc	4.0	1.7	U	1.7	U	1.7	U	1.7	U

Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica Savannah Job No.: 680-102252-2

SDG No.: 680102252-2

Concentration Units: ug/L

Analyte	RL	CCB 680-344834/153 08/19/2014 14:06							
		Found	C	Found	C	Found	C	Found	C
Arsenic	0.50								
Barium	1.0								
Cadmium	0.10								
Chromium	1.0	0.50	U						
Lead	2.0								
Selenium	0.50								
Silver	0.20								
Copper	1.0	0.22	U						
Thallium	0.20	0.050	U						
Zinc	4.0	1.7	U						

Italicized analytes were not requested for this sequence.

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica Savannah Job No.: 680-102252-2

SDG No.: 680102252-2

Concentration Units: mg/L Lab Sample ID: MB 680-344245/1-A

Instrument Code: ICPMSB Batch No.: 344610

CAS No.	Analyte	Concentration	C	Q	Method
7439-92-1	Lead	0.0015	U		6020
7440-22-4	Silver	0.0010	U		6020
7440-38-2	Arsenic	0.0025	U		6020
7440-39-3	Barium	0.0050	U		6020
7440-43-9	Cadmium	0.00050	U		6020
7440-47-3	Chromium	0.0050	U		6020
7782-49-2	Selenium	0.0025	U		6020

3-IN
METHOD BLANK
METALS - TCLP

Lab Name: TestAmerica Savannah Job No.: 680-102252-2

SDG No.: 680102252-2

Concentration Units: mg/L Lab Sample ID: LB 680-343974/1-D

Instrument Code: ICPMSB Batch No.: 344610

CAS No.	Analyte	Concentration	C	Q	Method
7439-92-1	Lead	0.015	U		6020
7440-22-4	Silver	0.010	U		6020
7440-38-2	Arsenic	0.025	U		6020
7440-39-3	Barium	0.050	U		6020
7440-43-9	Cadmium	0.0050	U		6020
7440-47-3	Chromium	0.050	U		6020
7782-49-2	Selenium	0.025	U		6020

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica Savannah Job No.: 680-102252-2

SDG No.: 680102252-2

Concentration Units: mg/L Lab Sample ID: MB 680-344563/1-A

Instrument Code: ICPMSB Batch No.: 344834

CAS No.	Analyte	Concentration	C	Q	Method
7439-92-1	Lead	0.0015	U		6020
7440-22-4	Silver	0.0010	U		6020
7440-38-2	Arsenic	0.0025	U		6020
7440-39-3	Barium	0.0050	U		6020
7440-43-9	Cadmium	0.00050	U		6020
7440-47-3	Chromium	0.0050	U		6020
7782-49-2	Selenium	0.0025	U		6020

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica Savannah Job No.: 680-102252-2

SDG No.: 680102252-2

Concentration Units: mg/L Lab Sample ID: LB 680-344563/10-A

Instrument Code: ICPMSB Batch No.: 344834

CAS No.	Analyte	Concentration	C	Q	Method
7439-92-1	Lead	0.015	U		6020
7440-22-4	Silver	0.010	U		6020
7440-38-2	Arsenic	0.025	U		6020
7440-39-3	Barium	0.050	U		6020
7440-43-9	Cadmium	0.0050	U		6020
7440-47-3	Chromium	0.050	U		6020
7782-49-2	Selenium	0.025	U		6020

9-IN
DETECTION LIMITS
METALS - TCLP

Lab Name: TestAmerica Savannah Job Number: 680-102252-2

SDG Number: 680102252-2

Matrix: Solid Instrument ID: ICPMSB

Method: 6020 MDL Date: 05/01/2010 16:21

Prep Method: 3010A

Leach Method: 1311

Analyte	Wavelength/ Mass	RL (mg/L)	MDL (mg/L)
Arsenic		0.025	0.025
Barium		0.05	0.05
Cadmium		0.005	0.005
Chromium		0.05	0.05
Lead		0.015	0.015
Selenium		0.025	0.025
Silver		0.01	0.01

9-IN
CALIBRATION BLANK DETECTION LIMITS
METALS - TCLP

Lab Name: TestAmerica Savannah Job Number: 680-102252-2

SDG Number: 680102252-2

Matrix: Solid Instrument ID: ICPMSB

Method: 6020 XMDL Date: 08/01/2010 15:59

Analyte	Wavelength/ Mass	XRL (ug/L)	XMDL (ug/L)
Arsenic		0.5	0.26
Barium		1	0.28
Cadmium		0.1	0.026
Chromium		1	0.5
Lead		2	0.1
Selenium		0.5	0.22
Silver		0.2	0.036

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica Savannah Job No.: 680-102252-2

SDG No.: 680102252-2

Instrument ID: LEEMAN2 Method: 7470A

Start Date: 08/18/2014 09:17 End Date: 08/18/2014 11:44

Lab Sample ID	D/F	Type	Time	Analytes																				
				Hg																				
IC 680-344298/1-B			09:17	X																				
IC 680-344298/2-B			09:20	X																				
IC 680-344298/3-B			09:23	X																				
IC 680-344298/4-B			09:26	X																				
IC 680-344298/5-B			09:29	X																				
IC 680-344298/6-B			09:32	X																				
ICV 680-344298/10-A	1		09:35	X																				
ICB 680-344298/11-A	1		09:38	X																				
CRA 680-344298/12-A	1		09:41	X																				
CCV 680-344298/8-A	1		09:43	X																				
CCB 680-344298/9-A	1		09:46	X																				
MB 680-344298/13-A	1	T	09:49	X																				
LCS 680-344298/14-A	1	T	09:52	X																				
ZZZZZZ			09:55																					
ZZZZZZ			09:58																					
ZZZZZZ			10:01																					
ZZZZZZ			10:04																					
ZZZZZZ			10:07																					
LB 680-343974/1-C	1	P	10:10	X																				
ZZZZZZ			10:13																					
680-104168-A-1-N MS	1	P	10:16	X																				
CCV 680-344298/8-A	1		10:19	X																				
CCB 680-344298/9-A	1		10:22	X																				
680-104168-A-1-O MSD	1	P	10:25	X																				
680-102252-1	1	P	10:28	X																				
680-102359-22	1	P	10:30	X																				
680-102468-14	1	P	10:33	X																				
680-102468-50	1	P	10:36	X																				
ZZZZZZ			10:39																					
ZZZZZZ			10:42																					
ZZZZZZ			10:45																					
ZZZZZZ			10:48																					
ZZZZZZ			10:51																					
CCV 680-344298/8-A	1		10:54	X																				
CCB 680-344298/9-A	1		10:57	X																				
ZZZZZZ			11:00																					
ZZZZZZ			11:03																					
ZZZZZZ			11:06																					
ZZZZZZ			11:09																					
ZZZZZZ			11:11																					
ZZZZZZ			11:14																					
ZZZZZZ			11:17																					

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica Savannah Job No.: 680-102252-2

SDG No.: 680102252-2

Instrument ID: LEEMAN2 Method: 7470A

Start Date: 08/18/2014 09:17 End Date: 08/18/2014 11:44

Lab Sample ID	D / F	Type	Time	Analytes																		
				Hg																		
ZZZZZZ			11:20																			
ZZZZZZ			11:23																			
ZZZZZZ			11:26																			
CCV 680-344298/8-A			11:29																			
CCB 680-344298/9-A			11:32																			
ZZZZZZ			11:35																			
ZZZZZZ			11:38																			
CCV 680-344298/8-A			11:41																			
CCB 680-344298/9-A			11:44																			

Prep Types

P = TCLP

T = Total/NA

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica Savannah Job No.: 680-102252-2

SDG No.: 680102252-2

Instrument ID: LEEMAN2 Method: 7470A

Start Date: 08/18/2014 15:53 End Date: 08/18/2014 17:09

Lab Sample ID	D / F	Type	Time	Analytes																			
				Hg																			
IC 680-344599/1-A			15:53	X																			
IC 680-344599/2-A			15:56	X																			
IC 680-344599/3-A			15:59	X																			
IC 680-344599/4-A			16:02	X																			
IC 680-344599/5-A			16:05	X																			
IC 680-344599/6-A			16:08	X																			
ICV 680-344599/10-A	1		16:11	X																			
ICB 680-344599/11-A	1		16:14	X																			
CRA 680-344599/12-A	1		16:17	X																			
CCV 680-344599/8-A	1		16:20	X																			
CCB 680-344599/9-A	1		16:22	X																			
MB 680-344599/13-A	1	T	16:25	X																			
LCS 680-344599/14-A	1	T	16:28	X																			
ZZZZZZ			16:31																				
ZZZZZZ			16:34																				
ZZZZZZ			16:37																				
ZZZZZZ			16:40																				
ZZZZZZ			16:43																				
ZZZZZZ			16:46																				
LB 680-344213/1-C	1	P	16:49	X																			
680-102252-28	1	P	16:52	X																			
CCV 680-344599/8-A	1		16:55	X																			
CCB 680-344599/9-A	1		16:58	X																			
680-102252-28 MS	1	P	17:01	X																			
680-102252-28 MSD	1	P	17:03	X																			
CCV 680-344599/8-A	1		17:06	X																			
CCB 680-344599/9-A	1		17:09	X																			

Prep Types

P = TCLP

T = Total/NA

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica Savannah Job No.: 680-102252-2

SDG No.: 680102252-2

Concentration Units: ug/L

Analyte	RL	ICB 680-344298/11-A 08/18/2014 09:38		CCB 680-344298/9-A 08/18/2014 09:46		CCB 680-344298/9-A 08/18/2014 10:22		CCB 680-344298/9-A 08/18/2014 10:57	
		Found	C	Found	C	Found	C	Found	C
Mercury	0.20	0.20	U	0.20	U	0.20	U	0.20	U

Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica Savannah Job No.: 680-102252-2

SDG No.: 680102252-2

Concentration Units: ug/L

Analyte	RL	ICB 680-344599/11-A 08/18/2014 16:14		CCB 680-344599/9-A 08/18/2014 16:22		CCB 680-344599/9-A 08/18/2014 16:58		CCB 680-344599/9-A 08/18/2014 17:09	
		Found	C	Found	C	Found	C	Found	C
Mercury	0.20	0.20	U	0.20	U	0.20	U	0.20	U

Italicized analytes were not requested for this sequence.

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica Savannah Job No.: 680-102252-2

SDG No.: 680102252-2

Concentration Units: mg/L Lab Sample ID: MB 680-344298/13-A

Instrument Code: LEEMAN2 Batch No.: 344669

CAS No.	Analyte	Concentration	C	Q	Method
7439-97-6	Mercury	0.00020	U		7470A

3-IN
METHOD BLANK
METALS - TCLP

Lab Name: TestAmerica Savannah Job No.: 680-102252-2

SDG No.: 680102252-2

Concentration Units: mg/L Lab Sample ID: LB 680-343974/1-C

Instrument Code: LEEMAN2 Batch No.: 344669

CAS No.	Analyte	Concentration	C	Q	Method
7439-97-6	Mercury	0.020	U		7470A

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica Savannah Job No.: 680-102252-2

SDG No.: 680102252-2

Concentration Units: mg/L Lab Sample ID: MB 680-344599/13-A

Instrument Code: LEEMAN2 Batch No.: 344741

CAS No.	Analyte	Concentration	C	Q	Method
7439-97-6	Mercury	0.00020	U		7470A

3-IN
METHOD BLANK
METALS - TCLP

Lab Name: TestAmerica Savannah Job No.: 680-102252-2

SDG No.: 680102252-2

Concentration Units: mg/L Lab Sample ID: LB 680-344213/1-C

Instrument Code: LEEMAN2 Batch No.: 344741

CAS No.	Analyte	Concentration	C	Q	Method
7439-97-6	Mercury	0.020	U		7470A

FORM III-IN

9-IN
DETECTION LIMITS
METALS - TCLP

Lab Name: TestAmerica Savannah Job Number: 680-102252-2

SDG Number: 680102252-2

Matrix: Solid Instrument ID: LEEMAN2

Method: 7470A MDL Date: 06/02/2009 00:00

Prep Method: 7470A

Leach Method: 1311

Analyte	Wavelength/ Mass	RL (mg/L)	MDL (mg/L)
Mercury		0.02	0.02

9-IN
CALIBRATION BLANK DETECTION LIMITS
METALS - TCLP

Lab Name: TestAmerica Savannah Job Number: 680-102252-2

SDG Number: 680102252-2

Matrix: Solid Instrument ID: LEEMAN2

Method: 7470A XMDL Date: 06/02/2009 00:00

Analyte	Wavelength/ Mass	XRL (ug/L)	XMDL (ug/L)
Mercury		0.2	0.2

TETRA TECH **INTERNAL CORRESPONDENCE**

TO: **M. MARTIN** **DATE:** **OCTOBER 14, 2014**

FROM: **MICHELLE L. ALLEN** **COPIES:** **DV FILE**

SUBJECT: **RADIOLOGICAL DATA VALIDATION – ISOTOPIC THORIUM/ GAMMA SPECTROSCOPY**
LOCKHEED MARTIN CORPORATION (LMC) – MIDDLE RIVER COMPLEX (MRC) SEDIMENT INVESTIGATION
SAMPLE DELIVERY GROUP (SDG) 680-102327-1

SAMPLES: 32/Sediment/Isotopic Thorium

SD-197-01	SD-197-02	SD-197-SS
SD-198-01	SD-198-02	SD-198-SS
SD-199-01	SD-199-02	SD-199-SS
SD-204-01	SD-204-02	SD-204-SS
SD-205-01	SD-205-02	SD-205-03
SD-205-SS	SD-207-01	SD-207-02
SD-207-SS	SD-208-01	SD-208-02
SD-208-SS	SD-209-01	SD-209-02
SD-209-03	SD-210-01	SD-210-02
SD-210-SS	SD-221-01	SD-221-02
SD-221-SS	SD-DUP-02	

1/Sediment/Gamma Spectrometry

SD-005W-01

Overview

The sample set for LMC-MRC, SDG 680-102327-1 consisted of thirty-three (33) sediment environmental samples. Thirty-two (32) sediment samples were analyzed for isotopic thorium (thorium-228, thorium-230, and thorium-232). One sample was analyzed for gamma spectroscopy (radium-226, radium-228, thorium-232, uranium-235, uranium-238, actinium-228, bismuth-214, lead-212, lead-214, potassium-40, and thallium-208). One field duplicate sample pair was included in this SDG: SD-DUP 02/SD-199-02.

The samples were collected by Tetra Tech, Inc. on June 11, 2014 and analyzed by TestAmerica, Inc. All analyses were conducted in accordance with Method A-01-R and GA-01-R analytical and reporting protocols.

The findings offered in this report are based upon a general review of all available data. The data contained in this SDG were validated with regard to the following parameters: data completeness, holding times, instrument daily calibration and blank checks, laboratory blank results, laboratory control sample recoveries, laboratory duplicate results, yield recoveries, field duplicate results, detection limits and analyte quantitation. Areas of concern are listed below.

Major

No major issues were identified.

Minor

- Thorium-230 was detected in the method blank, MB 160-127449/1-A associated with preparation batch #127449 at a concentration of 0.1804 ± 0.0880 pCi/g. The mean difference of the blank

activity and detected sample activity was calculated and used for the evaluation of blank contamination for samples associated with this preparation batch. The mean differences for samples SD-205-SS and SD-210-SS were between 2 and 3. The results for thorium-230 in these samples were qualified as estimated, (J), because the samples statistically overlap at the 2σ and 3σ confidence interval. The remaining calculated mean differences were greater than 3 and the sample and blank activities differed by less than a factor of 10, therefore, the sample results were qualified as estimated, (J), as the blank activity may have an impact on the sample activities.

- Thorium-230 was detected in the method blank, MB 160-129166/1-A associated with preparation batch #129166 at a concentration of 0.1247 ± 0.0751 pCi/g. The mean difference of the blank activity and detected sample activity was calculated and used for the evaluation of blank contamination for samples associated with this preparation batch. The calculated mean differences for the affected samples were greater than 3 and the sample and blank activities differed by less than a factor of 10, therefore, the sample results were qualified as estimated, (J), as the blank activity may have an impact on the sample activities.

Notes

All sample results are reported on a wet weight basis.

The mean differences were calculated for thorium-228, thorium-230, and thorium-232 for the original and laboratory duplicate analyses for sample SD-198-SS. The mean difference was < 2 for thorium-228, thorium-230, and thorium-232 which indicates the activities agree, or overlap, at the 2σ (95%) confidence level. No validation action was required.

The mean differences were calculated for thorium-228, thorium-230, and thorium-232 for the original and laboratory duplicate analyses for sample SD-221-01. The mean differences were < 2 for thorium-228, thorium-230, and thorium-232 which indicates the activities agree, or overlap, at the 2σ (95%) confidence level. No validation action was required.

The mean differences were calculated for thorium-228, thorium-230, and thorium-232 for the original and laboratory duplicate analyses for sample SD-208-SS. The mean difference was < 3 for thorium-228, thorium-232, and thorium-230 which indicates the activities agree, or overlap, at the 3σ (99%) confidence level. No validation action was required.

The field duplicate sample pair had a mean difference for thorium-228, thorium-230, and thorium-232 < 3 (99% confidence level). No validation action was required.

The uncertainty for the sample results are reported at 2σ (standard deviations, 95% confidence level). The EDD does not contain the uncertainty result.

Executive Summary

Laboratory Performance: Thorium-230 was detected in the laboratory method blanks.

Other Factors Affecting Data Quality: None.

The text of this report has been formulated to address only those areas affecting data quality.

Tetra Tech, Inc.
Michelle L. Allen
Chemist/Data Validator

Tetra Tech, Inc.
Joseph A. Samchuck
Data Validation Manager

Attachments:
Appendix A – Qualified Analytical Results
Appendix B – Results as Reported by the Laboratory
Appendix C – Support Documentation

Appendix A

Qualified Analytical Results

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = ICP PDS Recovery Noncompliance; MSA's $r < 0.995$
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = RPD between columns/detectors >40% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient $r < 0.995$
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 standard deviations is greater than sample activity
Z1 = Tentatively Identified Compound considered presumptively present
Z2 = Tentatively Identified Compound column bleed
Z3 = Tentatively Identified Compound aldol condensate

PROJ_NO: 05220	NSAMPLE	SD-197-01			SD-197-02			SD-197-SS			SD-198-01		
SDG: 680-102327-1	LAB_ID	680-102327-6			680-102327-7			680-102327-5			680-102327-2		
FRACTION: RAD	SAMP_DATE	6/11/2014			6/11/2014			6/11/2014			6/11/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
THORIUM-228		1.2			0.834			1.15			1.19		
THORIUM-230		0.997			0.75			1.09			1.01		
THORIUM-232		1.41			1.03			1.07			1.16		

PROJ_NO: 05220	NSAMPLE	SD-198-02			SD-198-SS			SD-199-01			SD-199-02		
SDG: 680-102327-1	LAB_ID	680-102327-3			680-102327-1			680-102327-10			680-102327-11		
FRACTION: RAD	SAMP_DATE	6/11/2014			6/11/2014			6/11/2014			6/11/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
THORIUM-228		1.13			1.3			1.27			1.08		
THORIUM-230		1.01			1.45			1.05			0.66		
THORIUM-232		0.999			1.45			1.39			0.965		

PROJ_NO: 05220	NSAMPLE	SD-199-SS			SD-204-01			SD-204-02			SD-204-SS		
SDG: 680-102327-1	LAB_ID	680-102327-9			680-102327-22			680-102327-23			680-102327-21		
FRACTION: RAD	SAMP_DATE	6/11/2014			6/11/2014			6/11/2014			6/11/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
THORIUM-228		1.08			1.22			0.92			0.356		
THORIUM-230		1.35			0.885			0.755			0.412		
THORIUM-232		1.19			1.03			0.655			0.377		

PROJ_NO: 05220	NSAMPLE	SD-205-01			SD-205-02			SD-205-03			SD-205-SS		
SDG: 680-102327-1	LAB_ID	680-102327-35			680-102327-36			680-102327-37			680-102327-34		
FRACTION: RAD	SAMP_DATE	6/11/2014			6/11/2014			6/11/2014			6/11/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
THORIUM-228		0.929			1.17			0.616			0.641		
THORIUM-230		0.977	J	A	0.931	J	A	0.57	J	A	0.505	J	A
THORIUM-232		1.03			1.23			0.644			0.484		

PROJ_NO: 05220	NSAMPLE	SD-207-01			SD-207-02			SD-207-SS			SD-208-01		
SDG: 680-102327-1	LAB_ID	680-102327-31			680-102327-32			680-102327-30			680-102327-16		
FRACTION: RAD	SAMP_DATE	6/11/2014			6/11/2014			6/11/2014			6/11/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
THORIUM-228		1.18			1.14			0.753			0.692		
THORIUM-230		0.796	J	A	0.999	J	A	0.633	J	A	0.719		
THORIUM-232		1.16			1.22			0.629			0.762		

PROJ_NO: 05220	NSAMPLE	SD-208-02			SD-208-SS			SD-209-01			SD-209-02		
SDG: 680-102327-1	LAB_ID	680-102327-17			680-102327-15			680-102327-18			680-102327-19		
FRACTION: RAD	SAMP_DATE	6/11/2014			6/11/2014			6/11/2014			6/11/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
THORIUM-228		0.834			0.188			0.73			0.378		
THORIUM-230		0.717			0.349	J	A	0.424			0.365		
THORIUM-232		1.02			0.257			0.399			0.493		

PROJ_NO: 05220	NSAMPLE	SD-209-03			SD-210-01			SD-210-02			SD-210-SS		
SDG: 680-102327-1	LAB_ID	680-102327-20			680-102327-28			680-102327-29			680-102327-27		
FRACTION: RAD	SAMP_DATE	6/11/2014			6/11/2014			6/11/2014			6/11/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
THORIUM-228		0.425			0.551			0.579			0.274		
THORIUM-230		0.499			0.563	J	A	0.506	J	A	0.406	J	A
THORIUM-232		0.508			0.605			0.571			0.219		

PROJ_NO: 05220	NSAMPLE	SD-221-01			SD-221-02			SD-221-SS			SD-DUP-02		
SDG: 680-102327-1	LAB_ID	680-102327-25			680-102327-26			680-102327-24			680-102327-13		
FRACTION: RAD	SAMP_DATE	6/11/2014			6/11/2014			6/11/2014			6/11/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF										SD-199-02		
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
THORIUM-228		0.458			0.697			0.446			0.695		
THORIUM-230		0.556	J	A	0.687	J	A	0.434	J	A	0.775		
THORIUM-232		0.559			0.677			0.407			1.08		

Appendix B

Results as Reported by the Laboratory

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = ICP PDS Recovery Noncompliance; MSA's $r < 0.995$
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = RPD between columns/detectors >40% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient $r < 0.995$
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 standard deviations is greater than sample activity
Z1 = Tentatively Identified Compound considered presumptively present
Z2 = Tentatively Identified Compound column bleed
Z3 = Tentatively Identified Compound aldol condensate

Client Sample ID: SD-198-SS

Lab Sample ID: 680-102327-1
Matrix: Solid

Date Collected: 06/11/14 07:55
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.30		0.302	0.321	1.00	0.152	pCi/g	06/18/14 13:57	07/01/14 12:21	1
Thorium-230	1.45		0.314	0.337	1.00	0.0957	pCi/g	06/18/14 13:57	07/01/14 12:21	1
Thorium-232	1.45		0.312	0.335	1.00	0.0762	pCi/g	06/18/14 13:57	07/01/14 12:21	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*53.4*		*30 - 110*	*06/18/14 13:57*	*07/01/14 12:21*	*1*

Client Sample ID: SD-198-01

Lab Sample ID: 680-102327-2
Matrix: Solid

Date Collected: 06/11/14 08:00
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.19		0.307	0.323	1.00	0.160	pCi/g	06/18/14 13:57	07/01/14 12:21	1
Thorium-230	1.01		0.280	0.292	1.00	0.123	pCi/g	06/18/14 13:57	07/01/14 12:21	1
Thorium-232	1.16		0.298	0.314	1.00	0.116	pCi/g	06/18/14 13:57	07/01/14 12:21	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*49.1*		*30 - 110*	*06/18/14 13:57*	*07/01/14 12:21*	*1*

Client Sample ID: SD-198-02

Lab Sample ID: 680-102327-3
Matrix: Solid

Date Collected: 06/11/14 08:05
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.13		0.270	0.286	1.00	0.153	pCi/g	06/18/14 13:57	07/01/14 12:21	1
Thorium-230	1.01		0.249	0.263	1.00	0.103	pCi/g	06/18/14 13:57	07/01/14 12:21	1
Thorium-232	0.999		0.246	0.260	1.00	0.0855	pCi/g	06/18/14 13:57	07/01/14 12:21	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*64.8*		*30 - 110*	*06/18/14 13:57*	*07/01/14 12:21*	*1*

Client Sample ID: SD-197-SS

Lab Sample ID: 680-102327-5
Matrix: Solid

Date Collected: 06/11/14 10:30
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.15		0.270	0.287	1.00	0.140	pCi/g	06/18/14 13:57	07/01/14 12:21	1
Thorium-230	1.09		0.259	0.275	1.00	0.103	pCi/g	06/18/14 13:57	07/01/14 12:21	1
Thorium-232	1.07		0.254	0.270	1.00	0.0687	pCi/g	06/18/14 13:57	07/01/14 12:21	1

Client Sample ID: SD-197-SS

Lab Sample ID: 680-102327-5
Matrix: Solid

Date Collected: 06/11/14 10:30
Date Received: 06/12/14 09:40

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	64.1		30 - 110	06/18/14 13:57	07/01/14 12:21	1

Client Sample ID: SD-197-01

Lab Sample ID: 680-102327-6
Matrix: Solid

Date Collected: 06/11/14 10:35
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.20		0.315	0.331	1.00	0.191	pCi/g	06/18/14 13:57	07/01/14 12:21	1
Thorium-230	0.997		0.279	0.291	1.00	0.110	pCi/g	06/18/14 13:57	07/01/14 12:21	1
Thorium-232	1.41		0.330	0.351	1.00	0.0997	pCi/g	06/18/14 13:57	07/01/14 12:21	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	49.9		30 - 110	06/18/14 13:57	07/01/14 12:21	1

Client Sample ID: SD-197-02

Lab Sample ID: 680-102327-7
Matrix: Solid

Date Collected: 06/11/14 10:40
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.834		0.227	0.238	1.00	0.127	pCi/g	06/18/14 13:57	07/01/14 12:21	1
Thorium-230	0.750		0.211	0.220	1.00	0.0672	pCi/g	06/18/14 13:57	07/01/14 12:21	1
Thorium-232	1.03		0.248	0.262	1.00	0.0835	pCi/g	06/18/14 13:57	07/01/14 12:21	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	65.8		30 - 110	06/18/14 13:57	07/01/14 12:21	1

Client Sample ID: SD-199-SS

Lab Sample ID: 680-102327-9
Matrix: Solid

Date Collected: 06/11/14 11:10
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.08		0.264	0.279	1.00	0.146	pCi/g	06/18/14 13:57	07/01/14 12:21	1
Thorium-230	1.35		0.288	0.310	1.00	0.0869	pCi/g	06/18/14 13:57	07/01/14 12:21	1
Thorium-232	1.19		0.271	0.288	1.00	0.0928	pCi/g	06/18/14 13:57	07/01/14 12:21	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	60.7		30 - 110	06/18/14 13:57	07/01/14 12:21	1

Client Sample ID: SD-199-01

Lab Sample ID: 680-102327-10
Matrix: Solid
Date Collected: 06/11/14 11:15
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.27		0.293	0.312	1.00	0.137	pCi/g	06/18/14 13:57	07/01/14 12:21	1
Thorium-230	1.05		0.263	0.277	1.00	0.0929	pCi/g	06/18/14 13:57	07/01/14 12:21	1
Thorium-232	1.39		0.302	0.323	1.00	0.0925	pCi/g	06/18/14 13:57	07/01/14 12:21	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*58.8*		*30 - 110*	*06/18/14 13:57*	*07/01/14 12:21*	*1*

Client Sample ID: SD-199-02

Lab Sample ID: 680-102327-11
Matrix: Solid
Date Collected: 06/11/14 11:20
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.08		0.273	0.288	1.00	0.104	pCi/g	06/18/14 13:57	07/01/14 12:21	1
Thorium-230	0.660		0.213	0.221	1.00	0.0887	pCi/g	06/18/14 13:57	07/01/14 12:21	1
Thorium-232	0.965		0.257	0.269	1.00	0.0773	pCi/g	06/18/14 13:57	07/01/14 12:21	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*57.2*		*30 - 110*	*06/18/14 13:57*	*07/01/14 12:21*	*1*

Client Sample ID: SD-DUP-02

Lab Sample ID: 680-102327-13
Matrix: Solid
Date Collected: 06/11/14 00:00
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.695		0.210	0.218	1.00	0.140	pCi/g	06/18/14 13:57	07/01/14 12:21	1
Thorium-230	0.775		0.214	0.224	1.00	0.0831	pCi/g	06/18/14 13:57	07/01/14 12:21	1
Thorium-232	1.08		0.252	0.268	1.00	0.0827	pCi/g	06/18/14 13:57	07/01/14 12:21	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*66.8*		*30 - 110*	*06/18/14 13:57*	*07/01/14 12:21*	*1*

Client Sample ID: SD-005W-01

Lab Sample ID: 680-102327-14
Matrix: Solid
Date Collected: 06/11/14 12:00
Date Received: 06/12/14 09:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.921		0.225	0.242	1.00	0.225	pCi/g	06/25/14 12:41	07/16/14 01:35	1
Radium-228	1.43		0.321	0.350		0.237	pCi/g	06/25/14 12:41	07/16/14 01:35	1
Thorium-232	1.43		0.321	0.350		0.237	pCi/g	06/25/14 12:41	07/16/14 01:35	1
Uranium-235	0.0963	U	0.233	0.233		0.630	pCi/g	06/25/14 12:41	07/16/14 01:35	1

Client Sample ID: SD-005W-01

Lab Sample ID: 680-102327-14
Matrix: Solid

Date Collected: 06/11/14 12:00
Date Received: 06/12/14 09:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-238	1.69	U	1.29	1.30		1.76	pCi/g	06/25/14 12:41	07/16/14 01:35	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Ac-228	*1.43*		*0.321*	*0.350*		*0.237*	*pCi/g*	*06/25/14 12:41*	*07/16/14 01:35*	*1*
Bi-214	*0.921*		*0.225*	*0.242*		*0.225*	*pCi/g*	*06/25/14 12:41*	*07/16/14 01:35*	*1*
K-40	*12.9*		*1.84*	*2.22*		*1.19*	*pCi/g*	*06/25/14 12:41*	*07/16/14 01:35*	*1*
Pb-212	*1.25*		*0.204*	*0.244*		*0.206*	*pCi/g*	*06/25/14 12:41*	*07/16/14 01:35*	*1*
Pb-214	*0.836*		*0.207*	*0.222*		*0.218*	*pCi/g*	*06/25/14 12:41*	*07/16/14 01:35*	*1*
Tl-208	*0.370*		*0.109*	*0.115*		*0.109*	*pCi/g*	*06/25/14 12:41*	*07/16/14 01:35*	*1*

Client Sample ID: SD-208-SS

Lab Sample ID: 680-102327-15
Matrix: Solid

Date Collected: 06/11/14 12:00
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.188		0.0954	0.0967	1.00	0.0831	pCi/g	07/01/14 13:01	07/07/14 18:12	1
Thorium-230	0.349		0.125	0.128	1.00	0.0675	pCi/g	07/01/14 13:01	07/07/14 18:12	1
Thorium-232	0.257		0.106	0.108	1.00	0.0492	pCi/g	07/01/14 13:01	07/07/14 18:12	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*85.1*		*30 - 110*	*07/01/14 13:01*	*07/07/14 18:12*	*1*

Client Sample ID: SD-208-01

Lab Sample ID: 680-102327-16
Matrix: Solid

Date Collected: 06/11/14 12:05
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.692		0.179	0.188	1.00	0.0834	pCi/g	06/18/14 13:57	07/01/14 12:22	1
Thorium-230	0.719		0.180	0.190	1.00	0.0513	pCi/g	06/18/14 13:57	07/01/14 12:22	1
Thorium-232	0.762		0.185	0.196	1.00	0.0336	pCi/g	06/18/14 13:57	07/01/14 12:22	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*84.0*		*30 - 110*	*06/18/14 13:57*	*07/01/14 12:22*	*1*

Client Sample ID: SD-208-02

Lab Sample ID: 680-102327-17
Matrix: Solid
Date Collected: 06/11/14 12:10
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.834		0.201	0.213	1.00	0.107	pCi/g	06/18/14 13:57	07/01/14 12:22	1
Thorium-230	0.717		0.183	0.192	1.00	0.0528	pCi/g	06/18/14 13:57	07/01/14 12:22	1
Thorium-232	1.02		0.216	0.233	1.00	0.0346	pCi/g	06/18/14 13:57	07/01/14 12:22	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*81.7*		*30 - 110*	*06/18/14 13:57*	*07/01/14 12:22*	*1*

Client Sample ID: SD-209-01

Lab Sample ID: 680-102327-18
Matrix: Solid
Date Collected: 06/11/14 14:00
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.730		0.184	0.193	1.00	0.0856	pCi/g	06/18/14 13:57	07/01/14 12:22	1
Thorium-230	0.424		0.138	0.143	1.00	0.0480	pCi/g	06/18/14 13:57	07/01/14 12:22	1
Thorium-232	0.399		0.134	0.138	1.00	0.0507	pCi/g	06/18/14 13:57	07/01/14 12:22	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*84.0*		*30 - 110*	*06/18/14 13:57*	*07/01/14 12:22*	*1*

Client Sample ID: SD-209-02

Lab Sample ID: 680-102327-19
Matrix: Solid
Date Collected: 06/11/14 14:05
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.378		0.134	0.138	1.00	0.0995	pCi/g	06/18/14 13:57	07/01/14 12:22	1
Thorium-230	0.365		0.127	0.130	1.00	0.0601	pCi/g	06/18/14 13:57	07/01/14 12:22	1
Thorium-232	0.493		0.146	0.152	1.00	0.0490	pCi/g	06/18/14 13:57	07/01/14 12:22	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*82.0*		*30 - 110*	*06/18/14 13:57*	*07/01/14 12:22*	*1*

Client Sample ID: SD-209-03

Lab Sample ID: 680-102327-20
Matrix: Solid
Date Collected: 06/11/14 14:10
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.425		0.157	0.161	1.00	0.119	pCi/g	06/18/14 13:57	07/01/14 12:22	1
Thorium-230	0.499		0.163	0.168	1.00	0.0601	pCi/g	06/18/14 13:57	07/01/14 12:22	1
Thorium-232	0.508		0.164	0.170	1.00	0.0683	pCi/g	06/18/14 13:57	07/01/14 12:22	1

Client Sample ID: SD-209-03

Lab Sample ID: 680-102327-20
Matrix: Solid
Date Collected: 06/11/14 14:10
Date Received: 06/12/14 09:40

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	72.6		30 - 110	06/18/14 13:57	07/01/14 12:22	1

Client Sample ID: SD-204-SS

Lab Sample ID: 680-102327-21
Matrix: Solid
Date Collected: 06/11/14 12:20
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.356		0.149	0.152	1.00	0.126	pCi/g	06/18/14 13:57	07/01/14 12:22	1
Thorium-230	0.412		0.150	0.154	1.00	0.0411	pCi/g	06/18/14 13:57	07/01/14 12:22	1
Thorium-232	0.377		0.145	0.148	1.00	0.0709	pCi/g	06/18/14 13:57	07/01/14 12:22	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	69.5		30 - 110	06/18/14 13:57	07/01/14 12:22	1

Client Sample ID: SD-204-01

Lab Sample ID: 680-102327-22
Matrix: Solid
Date Collected: 06/11/14 12:25
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.22		0.274	0.292	1.00	0.0870	pCi/g	06/18/14 13:57	07/01/14 12:22	1
Thorium-230	0.885		0.233	0.245	1.00	0.0697	pCi/g	06/18/14 13:57	07/01/14 12:22	1
Thorium-232	1.03		0.251	0.266	1.00	0.0791	pCi/g	06/18/14 13:57	07/01/14 12:22	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	62.3		30 - 110	06/18/14 13:57	07/01/14 12:22	1

Client Sample ID: SD-204-02

Lab Sample ID: 680-102327-23
Matrix: Solid
Date Collected: 06/11/14 12:30
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.920		0.208	0.222	1.00	0.0354	pCi/g	06/18/14 13:57	07/01/14 12:22	1
Thorium-230	0.755		0.189	0.199	1.00	0.0354	pCi/g	06/18/14 13:57	07/01/14 12:22	1
Thorium-232	0.655		0.176	0.184	1.00	0.0534	pCi/g	06/18/14 13:57	07/01/14 12:22	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	80.3		30 - 110	06/18/14 13:57	07/01/14 12:22	1

Client Sample ID: SD-221-SS

Lab Sample ID: 680-102327-24
Matrix: Solid

Date Collected: 06/11/14 13:20
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.446		0.146	0.151	1.00	0.0819	pCi/g	07/02/14 15:22	07/07/14 18:12	1
Thorium-230	0.434		0.142	0.147	1.00	0.0599	pCi/g	07/02/14 15:22	07/07/14 18:12	1
Thorium-232	0.407		0.138	0.142	1.00	0.0596	pCi/g	07/02/14 15:22	07/07/14 18:12	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*85.0*		*30 - 110*	*07/02/14 15:22*	*07/07/14 18:12*	*1*

Client Sample ID: SD-221-01

Lab Sample ID: 680-102327-25
Matrix: Solid

Date Collected: 06/11/14 13:25
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.458		0.150	0.155	1.00	0.105	pCi/g	06/18/14 13:59	07/01/14 12:28	1
Thorium-230	0.556		0.161	0.167	1.00	0.0830	pCi/g	06/18/14 13:59	07/01/14 12:28	1
Thorium-232	0.559		0.160	0.167	1.00	0.0723	pCi/g	06/18/14 13:59	07/01/14 12:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*87.9*		*30 - 110*	*06/18/14 13:59*	*07/01/14 12:28*	*1*

Client Sample ID: SD-221-02

Lab Sample ID: 680-102327-26
Matrix: Solid

Date Collected: 06/11/14 13:30
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.697		0.172	0.182	1.00	0.0482	pCi/g	06/18/14 13:59	07/01/14 12:28	1
Thorium-230	0.687		0.171	0.180	1.00	0.0482	pCi/g	06/18/14 13:59	07/01/14 12:28	1
Thorium-232	0.677		0.170	0.179	1.00	0.0644	pCi/g	06/18/14 13:59	07/01/14 12:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*88.2*		*30 - 110*	*06/18/14 13:59*	*07/01/14 12:28*	*1*

Client Sample ID: SD-210-SS

Lab Sample ID: 680-102327-27
Matrix: Solid

Date Collected: 06/11/14 14:35
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.274		0.114	0.116	1.00	0.0942	pCi/g	06/18/14 13:59	07/01/14 12:28	1
Thorium-230	0.406		0.131	0.135	1.00	0.0476	pCi/g	06/18/14 13:59	07/01/14 12:28	1
Thorium-232	0.219		0.0980	0.0997	1.00	0.0673	pCi/g	06/18/14 13:59	07/01/14 12:28	1

Client Sample ID: SD-210-SS

Lab Sample ID: 680-102327-27
Matrix: Solid

Date Collected: 06/11/14 14:35
Date Received: 06/12/14 09:40

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*91.8*		*30 - 110*	*06/18/14 13:59*	*07/01/14 12:28*	*1*

Client Sample ID: SD-210-01

Lab Sample ID: 680-102327-28
Matrix: Solid

Date Collected: 06/11/14 14:40
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.551		0.160	0.167	1.00	0.0930	pCi/g	06/18/14 13:59	07/01/14 12:28	1
Thorium-230	0.563		0.158	0.165	1.00	0.0505	pCi/g	06/18/14 13:59	07/01/14 12:28	1
Thorium-232	0.605		0.164	0.171	1.00	0.0502	pCi/g	06/18/14 13:59	07/01/14 12:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*86.0*		*30 - 110*	*06/18/14 13:59*	*07/01/14 12:28*	*1*

Client Sample ID: SD-210-02

Lab Sample ID: 680-102327-29
Matrix: Solid

Date Collected: 06/11/14 14:45
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.579		0.165	0.172	1.00	0.103	pCi/g	06/18/14 13:59	07/01/14 12:28	1
Thorium-230	0.506		0.151	0.156	1.00	0.0682	pCi/g	06/18/14 13:59	07/01/14 12:28	1
Thorium-232	0.571		0.161	0.168	1.00	0.0835	pCi/g	06/18/14 13:59	07/01/14 12:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*85.4*		*30 - 110*	*06/18/14 13:59*	*07/01/14 12:28*	*1*

207

Client Sample ID: SD-~~027~~-SS

MWA 6/12/14

Lab Sample ID: 680-102327-30
Matrix: Solid

Date Collected: 06/11/14 14:48
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.753		0.169	0.180	1.00	0.0429	pCi/g	06/18/14 13:59	07/01/14 12:28	1
Thorium-230	0.633		0.155	0.163	1.00	0.0283	pCi/g	06/18/14 13:59	07/01/14 12:28	1
Thorium-232	0.629		0.154	0.163	1.00	0.0282	pCi/g	06/18/14 13:59	07/01/14 12:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*105*		*30 - 110*	*06/18/14 13:59*	*07/01/14 12:28*	*1*

207

Client Sample ID: SD-~~027~~-01 MLA 9/12/14
Date Collected: 06/11/14 14:50
Date Received: 06/12/14 09:40

Lab Sample ID: 680-102327-31
Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.18		0.223	0.244	1.00	0.0545	pCi/g	06/18/14 13:59	07/01/14 12:28	1
Thorium-230	0.796		0.183	0.195	1.00	0.0478	pCi/g	06/18/14 13:59	07/01/14 12:28	1
Thorium-232	1.16		0.220	0.241	1.00	0.0476	pCi/g	06/18/14 13:59	07/01/14 12:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.1*		*30 - 110*	*06/18/14 13:59*	*07/01/14 12:28*	*1*

207

Client Sample ID: SD-~~027~~-02 MLA 9/12/14
Date Collected: 06/11/14 14:55
Date Received: 06/12/14 09:40

Lab Sample ID: 680-102327-32
Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.14		0.229	0.248	1.00	0.0768	pCi/g	06/18/14 13:59	07/01/14 12:28	1
Thorium-230	0.999		0.214	0.229	1.00	0.0645	pCi/g	06/18/14 13:59	07/01/14 12:28	1
Thorium-232	1.22		0.234	0.256	1.00	0.0513	pCi/g	06/18/14 13:59	07/01/14 12:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*83.8*		*30 - 110*	*06/18/14 13:59*	*07/01/14 12:28*	*1*

Client Sample ID: SD-205-SS
Date Collected: 06/11/14 15:25
Date Received: 06/12/14 09:40

Lab Sample ID: 680-102327-34
Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.641		0.238	0.244	1.00	0.0663	pCi/g	06/18/14 13:59	07/01/14 12:28	1
Thorium-230	0.505		0.212	0.217	1.00	0.101	pCi/g	06/18/14 13:59	07/01/14 12:28	1
Thorium-232	0.484		0.206	0.210	1.00	0.0660	pCi/g	06/18/14 13:59	07/01/14 12:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*41.4*		*30 - 110*	*06/18/14 13:59*	*07/01/14 12:28*	*1*

Client Sample ID: SD-205-01
Date Collected: 06/11/14 15:30
Date Received: 06/12/14 09:40

Lab Sample ID: 680-102327-35
Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.929		0.196	0.211	1.00	0.0471	pCi/g	06/18/14 13:59	07/01/14 12:28	1
Thorium-230	0.977		0.202	0.218	1.00	0.0632	pCi/g	06/18/14 13:59	07/01/14 12:28	1
Thorium-232	1.03		0.206	0.223	1.00	0.0469	pCi/g	06/18/14 13:59	07/01/14 12:28	1

Client Sample ID: SD-205-01

Lab Sample ID: 680-102327-35

Date Collected: 06/11/14 15:30
Date Received: 06/12/14 09:40

Matrix: Solid

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*93.2*		*30 - 110*	*06/18/14 13:59*	*07/01/14 12:28*	*1*

Client Sample ID: SD-205-02

Lab Sample ID: 680-102327-36

Date Collected: 06/11/14 15:35
Date Received: 06/12/14 09:40

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.17		0.228	0.248	1.00	0.0575	pCi/g	06/18/14 13:59	07/01/14 12:28	1
Thorium-230	0.931		0.203	0.218	1.00	0.0572	pCi/g	06/18/14 13:59	07/01/14 12:28	1
Thorium-232	1.23		0.233	0.255	1.00	0.0730	pCi/g	06/18/14 13:59	07/01/14 12:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*87.8*		*30 - 110*	*06/18/14 13:59*	*07/01/14 12:28*	*1*

Client Sample ID: SD-205-03

Lab Sample ID: 680-102327-37

Date Collected: 06/11/14 15:40
Date Received: 06/12/14 09:40

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.616		0.173	0.180	1.00	0.0766	pCi/g	06/18/14 13:59	07/01/14 12:28	1
Thorium-230	0.570		0.165	0.171	1.00	0.0539	pCi/g	06/18/14 13:59	07/01/14 12:28	1
Thorium-232	0.644		0.175	0.183	1.00	0.0612	pCi/g	06/18/14 13:59	07/01/14 12:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*88.1*		*30 - 110*	*06/18/14 13:59*	*07/01/14 12:28*	*1*

Appendix C

Support Documentation

LMC-MRC
SEDIMENT INVESTIGATION
SDG 680-102327-1

FIELD DUPLICATE EVALUATION

MEAN DIFFERENCE:

$$\frac{|\text{SAMPLE ACTIVITY} - \text{BLANK ACTIVITY}|}{\sqrt{((\text{SAMPLE UNCERTAINTY}/2)^2 + (\text{BLANK UNCERTAINTY}/2)^2)}}$$

SAMPLE IDs:	**SD-199-02/SD-DUP-02**	**Th-228**
SAMPLE RESULTS		1.08 ± 0.288 pCi/g
DUPLICATE RESULTS		0.695 ± 0.218 pCi/g
MEAN DIFFERENCE =	2.131762031	
		Th-230
SAMPLE RESULTS		0.66 ± 0.221 pCi/g
DUPLICATE RESULTS		0.775 ± 0.224 pCi/g
MEAN DIFFERENCE =	0.730925232	
		Th-232
SAMPLE RESULTS		0.965 ± 0.269 pCi/g
DUPLICATE RESULTS		1.08 ± 0.268 pCi/g
MEAN DIFFERENCE =	0.605714256	

LMC-MRC
SEDIMENT INVESTIGATION
SDG 680-102327-1

LABORATORY DUPLICATE EVALUATION

MEAN DIFFERENCE:

$$\frac{|\text{SAMPLE ACTIVITY} - \text{BLANK ACTIVITY}|}{\sqrt{((\text{SAMPLE UNCERTAINTY}/2)^2 + (\text{BLANK UNCERTAINTY}/2)^2)}}$$

PREPARATION BATCH #127446

SAMPLE ID:	**SD-198-SS**	
		Th-228
SAMPLE RESULTS		1.3 ± 0.321 pCi/g
DUPLICATE RESULTS		1.45 ± 0.336 pCi/g
MEAN DIFFERENCE =	0.64559138	
		Th-230
SAMPLE RESULTS		1.45 ± 0.337 pCi/g
DUPLICATE RESULTS		1.296 ± 0.315 pCi/g
MEAN DIFFERENCE =	0.667684089	
		Th-232
SAMPLE RESULTS		1.45 ± 0.335 pCi/g
DUPLICATE RESULTS		1.132 ± 0.289 pCi/g
MEAN DIFFERENCE =	1.437509315	

LMC-MRC
SEDIMENT INVESTIGATION
SDG 680-102327-1

LABORATORY DUPLICATE EVALUATION

MEAN DIFFERENCE:

$$\frac{|\text{SAMPLE ACTIVITY - BLANK ACTIVITY}|}{\sqrt{((\text{SAMPLE UNCERTAINTY}/2)^2 + (\text{BLANK UNCERTAINTY}/2)^2)}}$$

PREPARATION BATCH #127449

SAMPLE ID:	**SD-221-01**	**Th-228**
SAMPLE RESULTS		0.458 ± 0.155 pCi/g
DUPLICATE RESULTS		0.3048 ± 0.116 pCi/g
MEAN DIFFERENCE =	1.582643784	

		Th-230
SAMPLE RESULTS		0.556 ± 0.167 pCi/g
DUPLICATE RESULTS		0.4511 ± 0.142 pCi/g
MEAN DIFFERENCE =	0.957073366	

		Th-232
SAMPLE RESULTS		0.559 ± 0.167 pCi/g
DUPLICATE RESULTS		0.4162 ± 0.136 pCi/g
MEAN DIFFERENCE =	1.326079077	

LMC-MRC
SEDIMENT INVESTIGATION
SDG 680-102327-1

LABORATORY DUPLICATE EVALUATION

MEAN DIFFERENCE:

$$\frac{|\text{SAMPLE ACTIVITY} - \text{BLANK ACTIVITY}|}{\sqrt{((\text{SAMPLE UNCERTAINTY}/2)^2 + (\text{BLANK UNCERTAINTY}/2)^2)}}$$

PREPARATION BATCH #129166

SAMPLE ID:	**SD-208-SS**	**Th-228**
SAMPLE RESULTS		0.188 ± 0.0967 pCi/g
DUPLICATE RESULTS		0.4124 ± 0.148 pCi/g
MEAN DIFFERENCE =	2.538597575	

		Th-230
SAMPLE RESULTS		0.349 ± 0.128 pCi/g
DUPLICATE RESULTS		0.4287 ± 0.144 pCi/g
MEAN DIFFERENCE =	0.827340593	

		Th-232
SAMPLE RESULTS		0.257 ± 0.108 pCi/g
DUPLICATE RESULTS		0.3474 ± 0.129 pCi/g
MEAN DIFFERENCE =	1.074649514	

LMC-MRC
SEDIMENT INVESTIGATION
SDG 680-102327-1

BLANK CONTAMINATION EVALUATION

MEAN DIFFERENCE:

$$\frac{|\text{SAMPLE ACTIVITY} - \text{BLANK ACTIVITY}|}{\sqrt{((\text{SAMPLE UNCERTAINTY}/2)^2 + (\text{BLANK UNCERTAINTY}/2)^2)}}$$

PREPARATION BATCH #129166

BLANK ID: **MB 160-129166/1-A** **Th-230**
0.1247 ± 0.0751 pCi/g

AFFECTED SAMPLES:

SAMPLE ID: SD-208-SS **Th-230**
0.349 ± 0.128 pCi/g

MEAN DIFFERENCE = 3.02281154

SAMPLE ID: SD-221-SS **Th-230**
0.434 ± 0.147 pCi/g

MEAN DIFFERENCE = 3.747438821

LMC-MRC
SEDIMENT INVESTIGATION
SDG 680-102327-1

BLANK CONTAMINATION EVALUATION

MEAN DIFFERENCE:

$$\frac{|\text{SAMPLE ACTIVITY} - \text{BLANK ACTIVITY}|}{\sqrt{((\text{SAMPLE UNCERTAINTY}/2)^2 + (\text{BLANK UNCERTAINTY}/2)^2)}}$$

PREPARATION BATCH #127449

BLANK ID: **MB 160-127449/1-A** **Th-230** **0.1804 ± 0.088 pCi/g**

AFFECTED SAMPLES:

SAMPLE ID: SD-221-01 ✓ **Th-230** 0.556 ± 0.167 pCi/g

MEAN DIFFERENCE = 3.97950803

SAMPLE ID: SD-221-02 ✓ **Th-230** 0.687 ± 0.18 pCi/g

MEAN DIFFERENCE = 5.056905747

SAMPLE ID: SD-210-SS **Th-230** 0.406 ± 0.135 pCi/g

MEAN DIFFERENCE = 2.799893277

SAMPLE ID: SD-210-01 ✓ **Th-230** 0.563 ± 0.165 pCi/g

MEAN DIFFERENCE = 4.09197861

LMC-MRC
SEDIMENT INVESTIGATION
SDG 680-102327-1

BLANK CONTAMINATION EVALUATION

MEAN DIFFERENCE:

$$\frac{|\text{SAMPLE ACTIVITY} - \text{BLANK ACTIVITY}|}{\sqrt{((\text{SAMPLE UNCERTAINTY}/2)^2 + (\text{BLANK UNCERTAINTY}/2)^2)}}$$

PREPARATION BATCH #127449

BLANK ID:	**MB 160-127449/1-A**	**Th-230** **0.1804 ± 0.088 pCi/g**
AFFECTED SAMPLES:		
SAMPLE ID:	SD-210-02 ✓	**Th-230** 0.506 ± 0.156 pCi/g
MEAN DIFFERENCE =	3.635776783	
SAMPLE ID:	SD-207-SS ✓	**Th-230** 0.633 ± 0.163 pCi/g
MEAN DIFFERENCE =	4.886694623	
SAMPLE ID:	SD-207-01 ✓	**Th-230** 0.796 ± 0.195 pCi/g
MEAN DIFFERENCE =	5.75496776	
SAMPLE ID:	SD-207-02	**Th-230** 0.999 ± 0.229 pCi/g
MEAN DIFFERENCE =	6.673560524	

LMC-MRC
SEDIMENT INVESTIGATION
SDG 680-102327-1

BLANK CONTAMINATION EVALUATION

MEAN DIFFERENCE:

$$\frac{|\text{SAMPLE ACTIVITY} - \text{BLANK ACTIVITY}|}{\sqrt{((\text{SAMPLE UNCERTAINTY}/2)^2 + (\text{BLANK UNCERTAINTY}/2)^2)}}$$

PREPARATION BATCH #127449

BLANK ID: **MB 160-127449/1-A** **Th-230** **0.1804 ± 0.088 pCi/g**

AFFECTED SAMPLES:

SAMPLE ID: SD-205-SS **Th-230** 0.505 ± 0.217 pCi/g

MEAN DIFFERENCE = 2.772410324

SAMPLE ID: SD-205-01 **Th-230** 0.977 ± 0.218 pCi/g

MEAN DIFFERENCE = 6.776936609

SAMPLE ID: SD-205-02 **Th-230** 0.931 ± 0.218 pCi/g

MEAN DIFFERENCE = 6.385599571

SAMPLE ID: SD-205-03 **Th-230** 0.57 ± 0.171 pCi/g

MEAN DIFFERENCE = 4.05168928

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:23:19PM 7/1/2014

Sample

Sample Name: 680-102327-A-1-C
SampleType: Sample
: 680-102327-A-1-C
Sample Collection Date: 6/11/2014 7:55:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0021g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 127446
AnalysisID: 613609

Analyst: 60040

Tracer

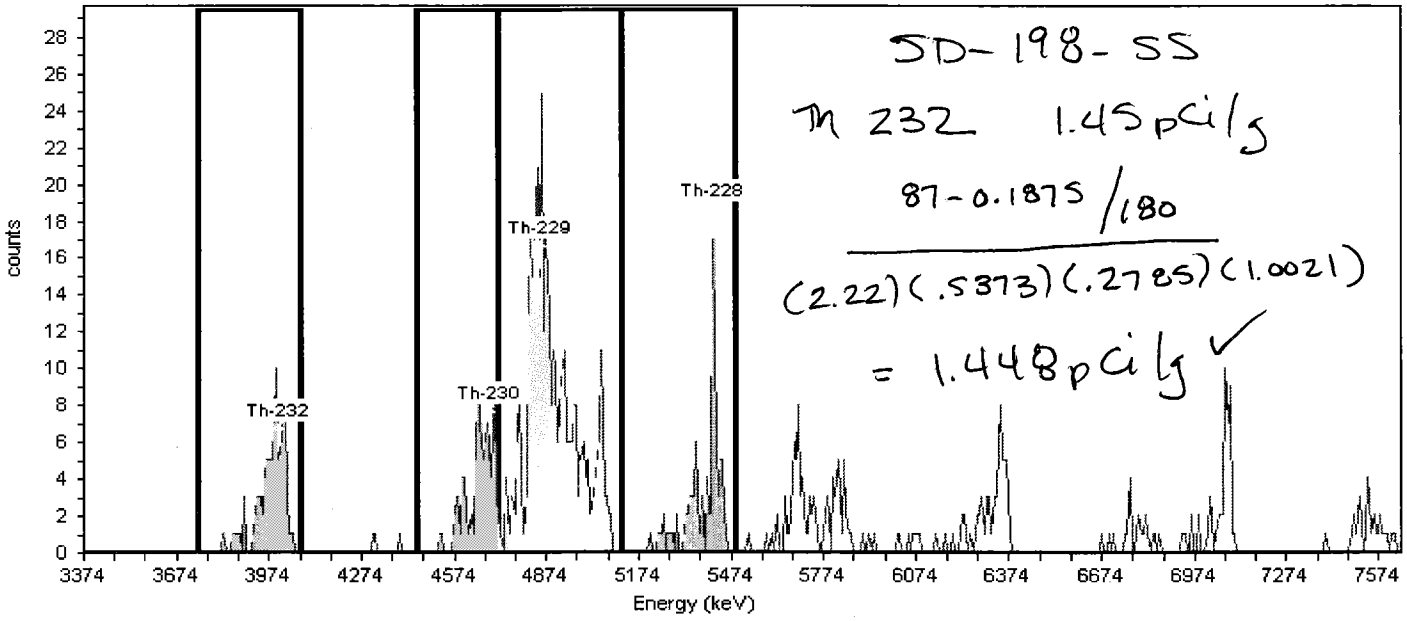
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 53.73%

Acquisition

Detector: AV72
Serial Number: 48-05a21
Acquisition Start Date: 7/1/2014 12:21:43PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/19/2014 12:18:47AM
Background Info: Sample: ICB;AV72; Det: AV72; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-9793;AV72-20140504
Calibration Date: 5/4/2014 8:44:56PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 27.85% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:17:07PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	79.5	100.2	87	0.1875	86.81	1.446	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	43.0	99.7	86	0.5625	85.41	1.429	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	80.8	99.6	365	0.3750	364.59	3.281	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	52.9	99.8	80	2.8125	77.19	1.291	pCi/g

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: S. Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.7
Client Contact: Mike Martin	Phone: (703) 342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~1 of 6~~ 1 of 4
Company: Tetra Tech, Inc.		Analysis Requested		Job #: 680-102327
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes:
City: Germantown	TAT Requested (days):			A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; G - Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA; M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2SO3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - ph-4-5; Z - other (specify)
State, Zip: MD, 20874	PO #: Purchase Order not required			
Phone:	WO #:			
Email: Michael.Martin@tetratech.com	Project #: 68012942			Other:
Project Name: Sediments	SSOW#:			
Site:				

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=wastestoil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Perform MS/MSD (Yes or No)	Special Instructions/Note:
SD-198-SS	6/11/14	0755	C	Solid			X				
SD-198-01		0800	C	Solid			X				
SD-198-02		0805	C	Solid			X				
SD-198-03		0810	C	Solid			X				Hold Pending analysis of SS to 02
SD-197-SS		1030	C	Solid			X				
SD-197-01		1035	C	Solid			X				
SD-197-02		1040	C	Solid			X				
SD-197-03		1045	C	Solid			X				Hold Pending analysis of SS to 02
SD-199-SS		1110	C	Solid			X				
SD-199-01		1115	C	Solid			X				
SD-199-02		1120	C	Solid			X				

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	[signature]	6/11/14 - 1600	TT	[signature]	6/11/14 1600	TestAmerica
2	[signature]	6/11/14 1730	TestAmerica	[signature]	6-12-14 0840	TA SR
3						

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.3
Client Contact: Mike Martin	Phone:	E-Mail: jerry.lanier@testamericainc.com		Page: Page 2 of 4
Company: Tetra Tech, Inc.		Analysis Requested		Job #: 680-102327
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes:
City: Germantown	TAT Requested (days):			A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; G - Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA; M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2SO3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - ph 4-5; Z - other (specify)
State, Zip: MD, 20874	PO #: Purchase Order not required			
Phone:	WO #:			Other:
Email: Michael.Martin@tetratech.com				
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Special Instructions/Note:
SD-199-03	6/11/14	1125	C	Solid			X			Hold pending analysis of SS in 02
SD-DUP02		0000		Solid			X			
SD-005W-01		1200	C	Solid					X	
SD-208-SS		1206	C	Solid			X			
SD-208-01		1205	C	Solid			X			
SD-208-02		1210	C	Solid			X			
SD-209-01		1400	C	Solid			X			
SD-209-02		1405	C	Solid			X			
SD-209-03		1410	C	Solid			X			
SD-204-SS		1220	C	Solid			X			
SD-204-01		1225	C	Solid			X			

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month): ☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	6-11-14 / 1600	TL		6/11/14 / 1600	TestAmerica
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	6/11/14 / 1630	TestAmerica		6-12-14 0440	TASL
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Gorman	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.4
Client Contact: Mike Martin	Phone: (703)342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~4 of 4~~ 3 of 4
Company: Tetra Tech, Inc.		Analysis Requested		Job #: 680-102307
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes:
City: Germantown	TAT Requested (days):			A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
State, Zip: MD, 20874	PO #: Purchase Order not required			
Phone:	WO #:			Other:
Email: Michael.Martin@tetratech.com	Project #: 68012942			
Project Name: Sediments	SSOW#:			
Site:				

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	8020, 7470A	GA_01_R_Ra - (MOD)-Radium-226/228	Special Instructions/Note:
	Preservation Code:						N	N	N		
SD-204-02	6/11/14	1220	C	Solid				X			
SD-221-55		1320	C	Solid				X			
SD-221-01		1325	C	Solid				X			
SD-221-02		1330	C	Solid				X			
SD-210-55		1435	C	Solid				X			
SD-210-01		1440	C	Solid				X			
SD-210-02		1445	C	Solid				X			
SD-207-55		1448	C	Solid				X			
SD-207-01		1450	C	Solid				X			
SD-207-02		1455	C	Solid				X			
SD-217-03	↓	1500	C	Solid				X			Hold Pending Analysis of SS to 02

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	[signature]	6-11-14 / 1600	TT	[signature]	6/11/14 / 1668	TestAmerica
	[signature]	6/11/14 / 1630 / 1730	TestAmerica	[signature]	6-12-14 0940	TASR
	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.12
Client Contact: Mike Martin	Phone: (703) 342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page 12 of 16 4 of 4
Company: Tetra Tech, Inc.		Analysis Requested		Job #: 680-102327
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes:
City: Germantown	TAT Requested (days):			A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; G - Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA; M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2SO3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - ph 4-5; Z - other (specify)
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			Other:
Email: Michael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Special Instructions/Note:
SD-205-SS	6/11/14	1525	C	Solid				X			
SD-205-01		1530	C	Solid				X			
SD-205-02		1535	C	Solid				X			
SD-205-03		1540	C	Solid				X			
				Solid							
				Solid							
				Solid							
				Solid							
				Solid							
				Solid							
				Solid							

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	6-11-14 / 1640	TT		6/11/14 / 1600	TestAmerica
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	6/11/14 / 1730	TestAmerica		6-12-14 0940	TASTE
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-102327-1
SDG Number: 680102327-1

Login Number: 102327
List Number: 1
Creator: Daughtry, Beth A

List Source: TestAmerica Savannah

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-102327-1
SDG Number: 680102327-1

Login Number: 102327
List Number: 2
Creator: Daniels, Brian J

List Source: TestAmerica St. Louis
List Creation: 06/13/14 03:50 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	True	

Tracer/Carrier Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-1
SDG: 680102327-1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Matrix: Solid

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	Th-229 (30-110)
680-102327-1	SD-198-SS	53.4
680-102327-1 DU	SD-198-SS	58.7
680-102327-2	SD-198-01	49.1
680-102327-3	SD-198-02	64.8
680-102327-5	SD-197-SS	64.1
680-102327-6	SD-197-01	49.9
680-102327-7	SD-197-02	65.8
680-102327-9	SD-199-SS	60.7
680-102327-10	SD-199-01	58.8
680-102327-11	SD-199-02	57.2
680-102327-13	SD-DUP-02	66.8
680-102327-15	SD-208-SS	85.1
680-102327-15 DU	SD-208-SS	86.4
680-102327-16	SD-208-01	84.0
680-102327-17	SD-208-02	81.7
680-102327-18	SD-209-01	84.0
680-102327-19	SD-209-02	82.0
680-102327-20	SD-209-03	72.6
680-102327-21	SD-204-SS	69.5
680-102327-22	SD-204-01	62.3
680-102327-23	SD-204-02	80.3
680-102327-24	SD-221-SS	85.0
680-102327-25	SD-221-01	87.9
680-102327-25 DU	SD-221-01	89.1
680-102327-26	SD-221-02	88.2
680-102327-27	SD-210-SS	91.8
680-102327-28	SD-210-01	86.0
680-102327-29	SD-210-02	85.4
680-102327-30	SD-027-SS	105
680-102327-31	SD-027-01	89.1
680-102327-32	SD-027-02	83.8
680-102327-34	SD-205-SS	41.4
680-102327-35	SD-205-01	93.2
680-102327-36	SD-205-02	87.8
680-102327-37	SD-205-03	88.1
LCS 160-127446/2-A	Lab Control Sample	69.9
LCS 160-127449/2-A	Lab Control Sample	88.4
LCS 160-129166/2-A	Lab Control Sample	94.2
MB 160-127446/1-A	Method Blank	75.7
MB 160-127449/1-A	Method Blank	90.9
MB 160-129166/1-A	Method Blank	89.3

Tracer/Carrier Legend

Th-229 = Thorium-229

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Lab Sample ID: MB 160-127446/1-A
Matrix: Solid
Analysis Batch: 129245

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 127446

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.003137	U	0.0268	0.0268	1.00	0.0766	pCi/g	06/18/14 13:57	07/01/14 12:22	1
Thorium-230	0.05768	U	0.0564	0.0566	1.00	0.0652	pCi/g	06/18/14 13:57	07/01/14 12:22	1
Thorium-232	0.005310	U	0.0163	0.0163	1.00	0.0375	pCi/g	06/18/14 13:57	07/01/14 12:22	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*75.7*		*30 - 110*	*06/18/14 13:57*	*07/01/14 12:22*	*1*

Lab Sample ID: LCS 160-127446/2-A
Matrix: Solid
Analysis Batch: 129247

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 127446

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Thorium-230			24.5	23.69		2.56	1.00	0.126	pCi/g	97	81 - 118

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*69.9*		*30 - 110*

Lab Sample ID: 680-102327-1 DU
Matrix: Solid
Analysis Batch: 129302

Client Sample ID: SD-198-SS
Prep Type: Total/NA
Prep Batch: 127446

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Thorium-228	1.30			1.450		0.336	1.00	0.141	pCi/g			0.23	1
Thorium-230	1.45			1.296		0.315	1.00	0.130	pCi/g			0.24	1
Thorium-232	1.45			1.132		0.289	1.00	0.0927	pCi/g			0.51	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Thorium-229	*58.7*		*30 - 110*

Lab Sample ID: MB 160-127449/1-A
Matrix: Solid
Analysis Batch: 129248

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 127449

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	-0.005780	U	0.00667	0.00669	1.00	0.0585	pCi/g	06/18/14 13:59	07/01/14 12:29	1
Thorium-230	0.1804		0.0867	0.0880	1.00	0.0466	pCi/g	06/18/14 13:59	07/01/14 12:29	1
Thorium-232	0.01023	U	0.0205	0.0205	1.00	0.0307	pCi/g	06/18/14 13:59	07/01/14 12:29	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*90.9*		*30 - 110*	*06/18/14 13:59*	*07/01/14 12:29*	*1*

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry) (Continued)

Lab Sample ID: LCS 160-127449/2-A
Matrix: Solid
Analysis Batch: 129249

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 127449

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Thorium-230	24.5	25.70		2.62	1.00	0.0645	pCi/g	105	81 - 118

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*88.4*		*30 - 110*

Lab Sample ID: 680-102327-25 DU
Matrix: Solid
Analysis Batch: 129325

Client Sample ID: SD-221-01
Prep Type: Total/NA
Prep Batch: 127449

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Thorium-228	0.458		0.3048		0.116	1.00	0.0535	pCi/g	0.57	1
Thorium-230	0.556		0.4511		0.142	1.00	0.0469	pCi/g	0.34	1
Thorium-232	0.559		0.4162		0.136	1.00	0.0532	pCi/g	0.47	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Thorium-229	*89.1*		*30 - 110*

Lab Sample ID: MB 160-129166/1-A
Matrix: Solid
Analysis Batch: 129973

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 129166

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.02400	U	0.0378	0.0379	1.00	0.0651	pCi/g	07/01/14 13:01	07/07/14 18:12	1
Thorium-230	0.1247		0.0743	0.0751	1.00	0.0554	pCi/g	07/01/14 13:01	07/07/14 18:12	1
Thorium-232	0.008627	U	0.0216	0.0216	1.00	0.0483	pCi/g	07/01/14 13:01	07/07/14 18:12	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.3*		*30 - 110*	*07/01/14 13:01*	*07/07/14 18:12*	*1*

Lab Sample ID: LCS 160-129166/2-A
Matrix: Solid
Analysis Batch: 129974

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 129166

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Thorium-230	24.5	24.17		2.48	1.00	0.130	pCi/g	99	81 - 118

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*94.2*		*30 - 110*

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry) (Continued)

Lab Sample ID: 680-102327-15 DU
Matrix: Solid
Analysis Batch: 129976

Client Sample ID: SD-208-SS
Prep Type: Total/NA
Prep Batch: 129166

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Thorium-228	0.188		0.4124		0.148	1.00	0.113	pCi/g	0.92	1
Thorium-230	0.349		0.4287		0.144	1.00	0.0633	pCi/g	0.29	1
Thorium-232	0.257		0.3474		0.129	1.00	0.0630	pCi/g	0.38	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Thorium-229	*86.4*		*30 - 110*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-128622/1-A
Matrix: Solid
Analysis Batch: 131682

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 128622

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.03852	U	0.0771	0.0773	1.00	0.129	pCi/g	06/25/14 12:41	07/16/14 02:12	1
Radium-228	-0.008469	U	0.0505	0.0505		0.224	pCi/g	06/25/14 12:41	07/16/14 02:12	1
Thorium-232	-0.008469	U	0.0505	0.0505		0.224	pCi/g	06/25/14 12:41	07/16/14 02:12	1
Uranium-235	0.0000	U	0.0699	0.0699		0.320	pCi/g	06/25/14 12:41	07/16/14 02:12	1
Uranium-238	-0.2907	U	0.636	0.636		1.09	pCi/g	06/25/14 12:41	07/16/14 02:12	1

Other Detected Radionuclides	*MB Result*	*MB Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*06/25/14 12:41*	*07/16/14 02:12*	*1*

Lab Sample ID: LCS 160-128622/2-A
Matrix: Solid
Analysis Batch: 131933

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 128622

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.4	101.0		10.7		1.50	pCi/g	104	87 - 116
Cesium-137	31.0	30.57		3.34		0.389	pCi/g	99	87 - 120
Cobalt-60	22.0	22.05		2.33		0.0869	pCi/g	100	87 - 115

Rad

Leach Batch: 127010

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102327-1	SD-198-SS	Total/NA	Solid	Dry and Grind	
680-102327-1 DU	SD-198-SS	Total/NA	Solid	Dry and Grind	
680-102327-2	SD-198-01	Total/NA	Solid	Dry and Grind	
680-102327-3	SD-198-02	Total/NA	Solid	Dry and Grind	
680-102327-5	SD-197-SS	Total/NA	Solid	Dry and Grind	
680-102327-6	SD-197-01	Total/NA	Solid	Dry and Grind	
680-102327-7	SD-197-02	Total/NA	Solid	Dry and Grind	
680-102327-9	SD-199-SS	Total/NA	Solid	Dry and Grind	
680-102327-10	SD-199-01	Total/NA	Solid	Dry and Grind	
680-102327-11	SD-199-02	Total/NA	Solid	Dry and Grind	
680-102327-13	SD-DUP-02	Total/NA	Solid	Dry and Grind	
680-102327-14	SD-005W-01	Total/NA	Solid	Dry and Grind	
680-102327-15	SD-208-SS	Total/NA	Solid	Dry and Grind	
680-102327-15 DU	SD-208-SS	Total/NA	Solid	Dry and Grind	
680-102327-16	SD-208-01	Total/NA	Solid	Dry and Grind	
680-102327-17	SD-208-02	Total/NA	Solid	Dry and Grind	
680-102327-18	SD-209-01	Total/NA	Solid	Dry and Grind	
680-102327-19	SD-209-02	Total/NA	Solid	Dry and Grind	
680-102327-20	SD-209-03	Total/NA	Solid	Dry and Grind	
680-102327-21	SD-204-SS	Total/NA	Solid	Dry and Grind	
680-102327-22	SD-204-01	Total/NA	Solid	Dry and Grind	
680-102327-23	SD-204-02	Total/NA	Solid	Dry and Grind	
680-102327-24	SD-221-SS	Total/NA	Solid	Dry and Grind	
680-102327-25	SD-221-01	Total/NA	Solid	Dry and Grind	
680-102327-25 DU	SD-221-01	Total/NA	Solid	Dry and Grind	
680-102327-26	SD-221-02	Total/NA	Solid	Dry and Grind	
680-102327-27	SD-210-SS	Total/NA	Solid	Dry and Grind	
680-102327-28	SD-210-01	Total/NA	Solid	Dry and Grind	
680-102327-29	SD-210-02	Total/NA	Solid	Dry and Grind	
680-102327-30	SD-027-SS	Total/NA	Solid	Dry and Grind	
680-102327-31	SD-027-01	Total/NA	Solid	Dry and Grind	
680-102327-32	SD-027-02	Total/NA	Solid	Dry and Grind	
680-102327-34	SD-205-SS	Total/NA	Solid	Dry and Grind	
680-102327-35	SD-205-01	Total/NA	Solid	Dry and Grind	
680-102327-36	SD-205-02	Total/NA	Solid	Dry and Grind	
680-102327-37	SD-205-03	Total/NA	Solid	Dry and Grind	

Prep Batch: 127446

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102327-1	SD-198-SS	Total/NA	Solid	ExtChrom	127010
680-102327-1 DU	SD-198-SS	Total/NA	Solid	ExtChrom	127010
680-102327-2	SD-198-01	Total/NA	Solid	ExtChrom	127010
680-102327-3	SD-198-02	Total/NA	Solid	ExtChrom	127010
680-102327-5	SD-197-SS	Total/NA	Solid	ExtChrom	127010
680-102327-6	SD-197-01	Total/NA	Solid	ExtChrom	127010
680-102327-7	SD-197-02	Total/NA	Solid	ExtChrom	127010
680-102327-9	SD-199-SS	Total/NA	Solid	ExtChrom	127010
680-102327-10	SD-199-01	Total/NA	Solid	ExtChrom	127010
680-102327-11	SD-199-02	Total/NA	Solid	ExtChrom	127010
680-102327-13	SD-DUP-02	Total/NA	Solid	ExtChrom	127010
680-102327-16	SD-208-01	Total/NA	Solid	ExtChrom	127010

Rad (Continued)

Prep Batch: 127446 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102327-17	SD-208-02	Total/NA	Solid	ExtChrom	127010
680-102327-18	SD-209-01	Total/NA	Solid	ExtChrom	127010
680-102327-19	SD-209-02	Total/NA	Solid	ExtChrom	127010
680-102327-20	SD-209-03	Total/NA	Solid	ExtChrom	127010
680-102327-21	SD-204-SS	Total/NA	Solid	ExtChrom	127010
680-102327-22	SD-204-01	Total/NA	Solid	ExtChrom	127010
680-102327-23	SD-204-02	Total/NA	Solid	ExtChrom	127010
LCS 160-127446/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-127446/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Prep Batch: 127449

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102327-25	SD-221-01	Total/NA	Solid	ExtChrom	127010
680-102327-25 DU	SD-221-01	Total/NA	Solid	ExtChrom	127010
680-102327-26	SD-221-02	Total/NA	Solid	ExtChrom	127010
680-102327-27	SD-210-SS	Total/NA	Solid	ExtChrom	127010
680-102327-28	SD-210-01	Total/NA	Solid	ExtChrom	127010
680-102327-29	SD-210-02	Total/NA	Solid	ExtChrom	127010
680-102327-30	SD-227-SS 207	Total/NA	Solid	ExtChrom	127010
680-102327-31	SD-227-01 ↓ MA 9/12/14	Total/NA	Solid	ExtChrom	127010
680-102327-32	SD-227-02	Total/NA	Solid	ExtChrom	127010
680-102327-34	SD-205-SS	Total/NA	Solid	ExtChrom	127010
680-102327-35	SD-205-01	Total/NA	Solid	ExtChrom	127010
680-102327-36	SD-205-02	Total/NA	Solid	ExtChrom	127010
680-102327-37	SD-205-03	Total/NA	Solid	ExtChrom	127010
LCS 160-127449/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-127449/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Prep Batch: 128622

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102327-14	SD-005W-01	Total/NA	Solid	Fill_Geo-21	127010
LCS 160-128622/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-128622/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

Prep Batch: 129166

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102327-15	SD-208-SS	Total/NA	Solid	ExtChrom	127010
680-102327-15 DU	SD-208-SS	Total/NA	Solid	ExtChrom	127010
680-102327-24	SD-221-SS	Total/NA	Solid	ExtChrom	127010
LCS 160-129166/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-129166/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Analysis Batch: 126217

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
ACVTOP 160-126217/1	ACV			GAMMA_SUM	

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-1
SDG: 680102327-1

Client Sample ID: SD-198-SS

Lab Sample ID: 680-102327-1
Matrix: Solid

Date Collected: 06/11/14 07:55
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			127446	06/18/14 13:57	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129301	07/01/14 12:21	MLK	TAL SL

Client Sample ID: SD-198-01

Lab Sample ID: 680-102327-2
Matrix: Solid

Date Collected: 06/11/14 08:00
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			127446	06/18/14 13:57	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129303	07/01/14 12:21	MLK	TAL SL

Client Sample ID: SD-198-02

Lab Sample ID: 680-102327-3
Matrix: Solid

Date Collected: 06/11/14 08:05
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			127446	06/18/14 13:57	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129304	07/01/14 12:21	MLK	TAL SL

Client Sample ID: SD-197-SS

Lab Sample ID: 680-102327-5
Matrix: Solid

Date Collected: 06/11/14 10:30
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			127446	06/18/14 13:57	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129305	07/01/14 12:21	MLK	TAL SL

Client Sample ID: SD-197-01

Lab Sample ID: 680-102327-6
Matrix: Solid

Date Collected: 06/11/14 10:35
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			127446	06/18/14 13:57	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129306	07/01/14 12:21	MLK	TAL SL

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-1
SDG: 680102327-1

Client Sample ID: SD-197-02

Lab Sample ID: 680-102327-7
Matrix: Solid

Date Collected: 06/11/14 10:40
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			127446	06/18/14 13:57	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129307	07/01/14 12:21	MLK	TAL SL

Client Sample ID: SD-199-SS

Lab Sample ID: 680-102327-9
Matrix: Solid

Date Collected: 06/11/14 11:10
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			127446	06/18/14 13:57	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129308	07/01/14 12:21	MLK	TAL SL

Client Sample ID: SD-199-01

Lab Sample ID: 680-102327-10
Matrix: Solid

Date Collected: 06/11/14 11:15
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			127446	06/18/14 13:57	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129310	07/01/14 12:21	MLK	TAL SL

Client Sample ID: SD-199-02

Lab Sample ID: 680-102327-11
Matrix: Solid

Date Collected: 06/11/14 11:20
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			127446	06/18/14 13:57	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129311	07/01/14 12:21	MLK	TAL SL

Client Sample ID: SD-DUP-02

Lab Sample ID: 680-102327-13
Matrix: Solid

Date Collected: 06/11/14 00:00
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			127446	06/18/14 13:57	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129312	07/01/14 12:21	MLK	TAL SL

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-1
SDG: 680102327-1

Client Sample ID: SD-005W-01

Lab Sample ID: 680-102327-14
Matrix: Solid

Date Collected: 06/11/14 12:00
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	Fill_Geo-21			128622	06/25/14 12:41	JDP	TAL SL
Total/NA	Analysis	GA-01-R		1	131681	07/16/14 01:35	JLW	TAL SL

Client Sample ID: SD-208-SS

Lab Sample ID: 680-102327-15
Matrix: Solid

Date Collected: 06/11/14 12:00
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			129166	07/01/14 13:01	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129975	07/07/14 18:12	MLK	TAL SL

Client Sample ID: SD-208-01

Lab Sample ID: 680-102327-16
Matrix: Solid

Date Collected: 06/11/14 12:05
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			127446	06/18/14 13:57	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129314	07/01/14 12:22	MLK	TAL SL

Client Sample ID: SD-208-02

Lab Sample ID: 680-102327-17
Matrix: Solid

Date Collected: 06/11/14 12:10
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			127446	06/18/14 13:57	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129315	07/01/14 12:22	MLK	TAL SL

Client Sample ID: SD-209-01

Lab Sample ID: 680-102327-18
Matrix: Solid

Date Collected: 06/11/14 14:00
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			127446	06/18/14 13:57	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129316	07/01/14 12:22	MLK	TAL SL

Client Sample ID: SD-209-02

Lab Sample ID: 680-102327-19

Date Collected: 06/11/14 14:05
Matrix: Solid
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			127446	06/18/14 13:57	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129317	07/01/14 12:22	MLK	TAL SL

Client Sample ID: SD-209-03

Lab Sample ID: 680-102327-20

Date Collected: 06/11/14 14:10
Matrix: Solid
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			127446	06/18/14 13:57	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129318	07/01/14 12:22	MLK	TAL SL

Client Sample ID: SD-204-SS

Lab Sample ID: 680-102327-21

Date Collected: 06/11/14 12:20
Matrix: Solid
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			127446	06/18/14 13:57	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129319	07/01/14 12:22	MLK	TAL SL

Client Sample ID: SD-204-01

Lab Sample ID: 680-102327-22

Date Collected: 06/11/14 12:25
Matrix: Solid
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			127446	06/18/14 13:57	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129321	07/01/14 12:22	MLK	TAL SL

Client Sample ID: SD-204-02

Lab Sample ID: 680-102327-23

Date Collected: 06/11/14 12:30
Matrix: Solid
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			127446	06/18/14 13:57	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129322	07/01/14 12:22	MLK	TAL SL

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-1
SDG: 680102327-1

Client Sample ID: SD-221-SS

Lab Sample ID: 680-102327-24
Matrix: Solid

Date Collected: 06/11/14 13:20
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			129166	07/02/14 15:22	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129977	07/07/14 18:12	MLK	TAL SL

Client Sample ID: SD-221-01

Lab Sample ID: 680-102327-25
Matrix: Solid

Date Collected: 06/11/14 13:25
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			127449	06/18/14 13:59	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129324	07/01/14 12:28	MLK	TAL SL

Client Sample ID: SD-221-02

Lab Sample ID: 680-102327-26
Matrix: Solid

Date Collected: 06/11/14 13:30
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			127449	06/18/14 13:59	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129326	07/01/14 12:28	MLK	TAL SL

Client Sample ID: SD-210-SS

Lab Sample ID: 680-102327-27
Matrix: Solid

Date Collected: 06/11/14 14:35
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			127449	06/18/14 13:59	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129327	07/01/14 12:28	MLK	TAL SL

Client Sample ID: SD-210-01

Lab Sample ID: 680-102327-28
Matrix: Solid

Date Collected: 06/11/14 14:40
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			127449	06/18/14 13:59	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129328	07/01/14 12:28	MLK	TAL SL

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-1
SDG: 680102327-1

Client Sample ID: SD-210-02

Lab Sample ID: 680-102327-29
Matrix: Solid

Date Collected: 06/11/14 14:45
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			127449	06/18/14 13:59	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129329	07/01/14 12:28	MLK	TAL SL

Client Sample ID: SD-027-SS

Lab Sample ID: 680-102327-30
Matrix: Solid

Date Collected: 06/11/14 14:48
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			127449	06/18/14 13:59	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129330	07/01/14 12:28	MLK	TAL SL

Client Sample ID: SD-027-01

Lab Sample ID: 680-102327-31
Matrix: Solid

Date Collected: 06/11/14 14:50
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			127449	06/18/14 13:59	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129226	07/01/14 12:28	MLK	TAL SL

Client Sample ID: SD-027-02

Lab Sample ID: 680-102327-32
Matrix: Solid

Date Collected: 06/11/14 14:55
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			127449	06/18/14 13:59	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129227	07/01/14 12:28	MLK	TAL SL

Client Sample ID: SD-205-SS

Lab Sample ID: 680-102327-34
Matrix: Solid

Date Collected: 06/11/14 15:25
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			127449	06/18/14 13:59	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129228	07/01/14 12:28	MLK	TAL SL

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-1
SDG: 680102327-1

Client Sample ID: SD-205-01

Lab Sample ID: 680-102327-35

Date Collected: 06/11/14 15:30
Date Received: 06/12/14 09:40

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			127449	06/18/14 13:59	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129229	07/01/14 12:28	MLK	TAL SL

Client Sample ID: SD-205-02

Lab Sample ID: 680-102327-36

Date Collected: 06/11/14 15:35
Date Received: 06/12/14 09:40

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			127449	06/18/14 13:59	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129230	07/01/14 12:28	MLK	TAL SL

Client Sample ID: SD-205-03

Lab Sample ID: 680-102327-37

Date Collected: 06/11/14 15:40
Date Received: 06/12/14 09:40

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			127449	06/18/14 13:59	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129231	07/01/14 12:28	MLK	TAL SL

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-1
SDG: 680102327-1

Method	Method Description	Protocol	Laboratory
A-01-R	Isotopic Thorium (Alpha Spectrometry)	DOE	TAL SL
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL
GAMMA_SUM			TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-1
SDG: 680102327-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-102327-1	SD-198-SS	Solid	06/11/14 07:55	06/12/14 09:40
680-102327-2	SD-198-01	Solid	06/11/14 08:00	06/12/14 09:40
680-102327-3	SD-198-02	Solid	06/11/14 08:05	06/12/14 09:40
680-102327-5	SD-197-SS	Solid	06/11/14 10:30	06/12/14 09:40
680-102327-6	SD-197-01	Solid	06/11/14 10:35	06/12/14 09:40
680-102327-7	SD-197-02	Solid	06/11/14 10:40	06/12/14 09:40
680-102327-9	SD-199-SS	Solid	06/11/14 11:10	06/12/14 09:40
680-102327-10	SD-199-01	Solid	06/11/14 11:15	06/12/14 09:40
680-102327-11	SD-199-02	Solid	06/11/14 11:20	06/12/14 09:40
680-102327-13	SD-DUP-02	Solid	06/11/14 00:00	06/12/14 09:40
680-102327-14	SD-005W-01	Solid	06/11/14 12:00	06/12/14 09:40
680-102327-15	SD-208-SS	Solid	06/11/14 12:00	06/12/14 09:40
680-102327-16	SD-208-01	Solid	06/11/14 12:05	06/12/14 09:40
680-102327-17	SD-208-02	Solid	06/11/14 12:10	06/12/14 09:40
680-102327-18	SD-209-01	Solid	06/11/14 14:00	06/12/14 09:40
680-102327-19	SD-209-02	Solid	06/11/14 14:05	06/12/14 09:40
680-102327-20	SD-209-03	Solid	06/11/14 14:10	06/12/14 09:40
680-102327-21	SD-204-SS	Solid	06/11/14 12:20	06/12/14 09:40
680-102327-22	SD-204-01	Solid	06/11/14 12:25	06/12/14 09:40
680-102327-23	SD-204-02	Solid	06/11/14 12:30	06/12/14 09:40
680-102327-24	SD-221-SS	Solid	06/11/14 13:20	06/12/14 09:40
680-102327-25	SD-221-01	Solid	06/11/14 13:25	06/12/14 09:40
680-102327-26	SD-221-02	Solid	06/11/14 13:30	06/12/14 09:40
680-102327-27	SD-210-SS	Solid	06/11/14 14:35	06/12/14 09:40
680-102327-28	SD-210-01	Solid	06/11/14 14:40	06/12/14 09:40
680-102327-29	SD-210-02	Solid	06/11/14 14:45	06/12/14 09:40
680-102327-30	SD-027-SS	Solid	06/11/14 14:48	06/12/14 09:40
680-102327-31	SD-027-01	Solid	06/11/14 14:50	06/12/14 09:40
680-102327-32	SD-027-02	Solid	06/11/14 14:55	06/12/14 09:40
680-102327-34	SD-205-SS	Solid	06/11/14 15:25	06/12/14 09:40
680-102327-35	SD-205-01	Solid	06/11/14 15:30	06/12/14 09:40
680-102327-36	SD-205-02	Solid	06/11/14 15:35	06/12/14 09:40
680-102327-37	SD-205-03	Solid	06/11/14 15:40	06/12/14 09:40

Alpha Spectroscopy Daily Pulser Check

Analysis Date: 07/01/14

		Gross Counts			FWHM (keV)			Pulser Center			Energy (keV)		
Detector	**Analysis Date**	**Result**	**Criteria**	**P/F**	**Result**	**Criteria**	**P/F**	**Result**	**Criteria**	**P/F**	**Result**	**Criteria**	**P/F**
AV72	07/01/14 01:10	7448	6924.7 - 7653.6	Pass	13.4	10 - 20	Pass	221.0	217.1 - 227.1	Pass	5015	4983.0 - 5063.0	Pass
AV73	07/01/14 01:10	7307	6916.6 - 7644.7	Pass	12.5	10 - 20	Pass	225.0	220.0 - 230.0	Pass	5045	5005.1 - 5085.1	Pass
AV74	07/01/14 01:10	7315	6930.9 - 7660.5	Pass	12.4	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	4990.2 - 5070.2	Pass
AV75	07/01/14 01:22	7557	6938.4 - 7668.8	Pass	13.7	10 - 20	Pass	221.9	217.0 - 227.0	Pass	5022	4982.2 - 5062.2	Pass
AV76	07/01/14 01:22	7556	7010.1 - 7748.0	Pass	13.5	10 - 20	Pass	233.0	228.0 - 238.0	Pass	5105	5064.7 - 5144.7	Pass
AV77	07/01/14 01:22	7545	7172.4 - 7927.4	Pass	15.1	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	4990.0 - 5070.0	Pass
AV78	07/01/14 01:22	7550	7170.6 - 7925.4	Pass	13.8	10 - 20	Pass	224.1	219.0 - 229.0	Pass	5038	4997.5 - 5077.5	Pass
AV79	07/01/14 01:22	7548	7146.3 - 7898.6	Pass	13.6	10 - 20	Pass	222.0	217.0 - 227.0	Pass	5022	4982.6 - 5062.6	Pass
AV80	07/01/14 01:22	7543	7165.0 - 7919.2	Pass	14.0	10 - 20	Pass	224.0	219.0 - 229.0	Pass	5037	4997.6 - 5077.6	Pass
AV81	07/01/14 01:22	7301	7058.0 - 7800.9	Pass	12.4	10 - 20	Pass	218.1	212.0 - 222.0	Pass	4993	4945.1 - 5025.1	Pass
AV82	07/01/14 01:22	7541	7160.6 - 7914.3	Pass	13.6	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	4990.4 - 5070.4	Pass
AV84	07/01/14 01:22	7528	7145.0 - 7897.1	Pass	12.7	10 - 20	Pass	226.0	221.0 - 231.0	Pass	5052	5012.6 - 5092.6	Pass
AV85	07/01/14 01:22	7497	7133.6 - 7884.6	Pass	12.9	10 - 20	Pass	216.0	211.0 - 221.0	Pass	4978	4937.8 - 5017.8	Pass
AV86	07/01/14 01:22	7689	7289.4 - 8056.7	Pass	13.5	10 - 20	Pass	225.0	220.0 - 230.0	Pass	5045	5005.1 - 5085.1	Pass
AV87	07/01/14 01:22	7558	7237.2 - 7999.0	Pass	11.7	10 - 20	Pass	222.1	217.0 - 227.0	Pass	5023	4982.7 - 5062.7	Pass
AV88	07/01/14 01:22	7683	7299.1 - 8067.5	Pass	13.9	10 - 20	Pass	225.0	220.1 - 230.1	Pass	5045	5005.3 - 5085.3	Pass
AV89	07/01/14 01:22	7532	7180.9 - 7936.8	Pass	13.2	10 - 20	Pass	222.0	217.0 - 227.0	Pass	5022	4982.6 - 5062.6	Pass
AV90	07/01/14 01:22	7643	7246.3 - 8009.1	Pass	10.9	10 - 20	Pass	226.0	221.0 - 231.0	Pass	5052	5012.4 - 5092.4	Pass
AV91	07/01/14 01:22	7542	7095.7 - 7842.6	Pass	11.9	10 - 20	Pass	219.0	215.1 - 225.1	Pass	5000	4968.0 - 5048.0	Pass
AV93	07/01/14 01:23	7637	7205.1 - 7963.6	Pass	13.7	10 - 20	Pass	221.9	218.0 - 228.0	Pass	5022	4990.3 - 5070.3	Pass
AV94	07/01/14 01:23	7389	7068.2 - 7812.2	Pass	12.4	10 - 20	Pass	220.9	215.9 - 225.9	Pass	5014	4974.7 - 5054.7	Pass
AV95	07/01/14 01:32	7563	7152.6 - 7905.5	Pass	13.6	10 - 20	Pass	225.0	220.0 - 230.0	Pass	5045	5005.0 - 5085.0	Pass
AV96	07/01/14 01:32	7557	7234.1 - 7995.6	Pass	14.6	10 - 20	Pass	223.9	220.1 - 230.1	Pass	5037	5005.3 - 5085.3	Pass
AV97	07/01/14 01:33	7557	7235.7 - 7997.4	Pass	13.9	10 - 20	Pass	224.0	219.0 - 229.0	Pass	5038	4997.6 - 5077.6	Pass
AV98	07/01/14 01:33	7555	7218.4 - 7978.3	Pass	13.8	10 - 20	Pass	225.1	218.9 - 228.9	Pass	5045	4996.9 - 5076.9	Pass
AV99	07/01/14 01:37	7601	6927.3 - 7656.5	Pass	13.6	10 - 20	Pass	223.1	218.1 - 228.1	Pass	5030	4990.4 - 5070.4	Pass
AV100	07/01/14 01:52	7469	7216.0 - 7975.6	Pass	14.1	10 - 20	Pass	221.0	216.0 - 226.0	Pass	5015	4975.2 - 5055.2	Pass
AV101	07/01/14 01:37	7595	7212.7 - 7971.9	Pass	13.8	10 - 20	Pass	219.9	214.9 - 224.9	Pass	5007	4967.1 - 5047.1	Pass
AV102	07/01/14 01:37	7591	7208.5 - 7967.3	Pass	14.4	10 - 20	Pass	226.9	222.0 - 232.0	Pass	5059	5019.5 - 5099.5	Pass
AV103	07/01/14 01:37	7583	7167.3 - 7921.7	Pass	15.0	10 - 20	Pass	221.9	216.9 - 226.9	Pass	5022	4982.0 - 5062.0	Pass
AV104	07/01/14 01:37	7346	7203.0 - 7961.2	Pass	12.8	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	4989.9 - 5069.9	Pass
AV105	07/01/14 01:37	7584	7201.2 - 7959.3	Pass	13.9	10 - 20	Pass	220.1	215.1 - 225.1	Pass	5008	4968.3 - 5048.3	Pass
AV119	07/01/14 01:38	7680	7286.5 - 8053.5	Pass	14.0	10 - 20	Pass	217.0	212.1 - 222.1	Pass	4985	4945.7 - 5025.7	Pass
AV120	07/01/14 01:38	7670	7283.9 - 8050.6	Pass	15.5	10 - 20	Pass	219.9	215.1 - 225.1	Pass	5007	4968.1 - 5048.1	Pass
AV121	07/01/14 01:38	7673	7281.1 - 8047.6	Pass	14.3	10 - 20	Pass	220.9	217.1 - 227.1	Pass	5015	4983.1 - 5063.1	Pass
AV122	07/01/14 01:38	7671	7278.5 - 8044.6	Pass	14.4	10 - 20	Pass	220.1	214.1 - 224.1	Pass	5008	4961.2 - 5041.2	Pass

Alpha Spectroscopy Daily Pulser Check

Analysis Date: 07/07/14

		Gross Counts			FWHM (keV)			Pulser Center			Energy (keV)		
Detector	Analysis Date	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F
AV14	07/07/14 00:37	7597	7236.1 - 7997.8	Pass	11.7	10 - 20	Pass	224.0	219.0 - 229.0	Pass	5037	4997.5 - 5077.5	Pass
AV15	07/07/14 00:37	7703	7313.8 - 8083.7	Pass	13.6	10 - 20	Pass	223.9	219.2 - 229.2	Pass	5037	4998.9 - 5078.9	Pass
AV16	07/07/14 00:37	7436	7055.7 - 7798.4	Pass	12.6	10 - 20	Pass	218.1	215.9 - 225.9	Pass	4993	4974.6 - 5054.6	Pass
AV17	07/07/14 00:37	7623	7224.6 - 7985.1	Pass	11.3	10 - 20	Pass	227.0	221.0 - 231.0	Pass	5060	5012.5 - 5092.5	Pass
AV18	07/07/14 00:37	7602	7204.8 - 7963.1	Pass	11.8	10 - 20	Pass	225.0	220.0 - 230.0	Pass	5045	5004.9 - 5084.9	Pass

Alpha Spectroscopy Daily Pulser Check

Analysis Date: 07/01/14

		Gross Counts			FWHM (keV)			Pulser Center			Energy (keV)		
Detector	**Analysis Date**	**Result**	**Criteria**	**P/F**	**Result**	**Criteria**	**P/F**	**Result**	**Criteria**	**P/F**	**Result**	**Criteria**	**P/F**
AV72	07/01/14 01:10	7448	6924.7 - 7653.6	Pass	13.4	10 - 20	Pass	221.0	217.1 - 227.1	Pass	5015	4983.0 - 5063.0	Pass
AV73	07/01/14 01:10	7307	6916.6 - 7644.7	Pass	12.5	10 - 20	Pass	225.0	220.0 - 230.0	Pass	5045	5005.1 - 5085.1	Pass
AV74	07/01/14 01:10	7315	6930.9 - 7660.5	Pass	12.4	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	4990.2 - 5070.2	Pass
AV75	07/01/14 01:22	7557	6938.4 - 7668.8	Pass	13.7	10 - 20	Pass	221.9	217.0 - 227.0	Pass	5022	4982.2 - 5062.2	Pass
AV76	07/01/14 01:22	7556	7010.1 - 7748.0	Pass	13.5	10 - 20	Pass	233.0	228.0 - 238.0	Pass	5105	5064.7 - 5144.7	Pass
AV77	07/01/14 01:22	7545	7172.4 - 7927.4	Pass	15.1	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	4990.0 - 5070.0	Pass
AV78	07/01/14 01:22	7550	7170.6 - 7925.4	Pass	13.8	10 - 20	Pass	224.1	219.0 - 229.0	Pass	5038	4997.5 - 5077.5	Pass
AV79	07/01/14 01:22	7548	7146.3 - 7898.6	Pass	13.6	10 - 20	Pass	222.0	217.0 - 227.0	Pass	5022	4982.6 - 5062.6	Pass
AV80	07/01/14 01:22	7543	7165.0 - 7919.2	Pass	14.0	10 - 20	Pass	224.0	219.0 - 229.0	Pass	5037	4997.6 - 5077.6	Pass
AV81	07/01/14 01:22	7301	7058.0 - 7800.9	Pass	12.4	10 - 20	Pass	218.1	212.0 - 222.0	Pass	4993	4945.1 - 5025.1	Pass
AV82	07/01/14 01:22	7541	7160.6 - 7914.3	Pass	13.6	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	4990.4 - 5070.4	Pass
AV84	07/01/14 01:22	7528	7145.0 - 7897.1	Pass	12.7	10 - 20	Pass	226.0	221.0 - 231.0	Pass	5052	5012.6 - 5092.6	Pass
AV85	07/01/14 01:22	7497	7133.6 - 7884.6	Pass	12.9	10 - 20	Pass	216.0	211.0 - 221.0	Pass	4978	4937.8 - 5017.8	Pass
AV86	07/01/14 01:22	7689	7289.4 - 8056.7	Pass	13.5	10 - 20	Pass	225.0	220.0 - 230.0	Pass	5045	5005.1 - 5085.1	Pass
AV87	07/01/14 01:22	7558	7237.2 - 7999.0	Pass	11.7	10 - 20	Pass	222.1	217.0 - 227.0	Pass	5023	4982.7 - 5062.7	Pass
AV88	07/01/14 01:22	7683	7299.1 - 8067.5	Pass	13.9	10 - 20	Pass	225.0	220.1 - 230.1	Pass	5045	5005.3 - 5085.3	Pass
AV89	07/01/14 01:22	7532	7180.9 - 7936.8	Pass	13.2	10 - 20	Pass	222.0	217.0 - 227.0	Pass	5022	4982.6 - 5062.6	Pass
AV90	07/01/14 01:22	7643	7246.3 - 8009.1	Pass	10.9	10 - 20	Pass	226.0	221.0 - 231.0	Pass	5052	5012.4 - 5092.4	Pass
AV91	07/01/14 01:22	7542	7095.7 - 7842.6	Pass	11.9	10 - 20	Pass	219.0	215.1 - 225.1	Pass	5000	4968.0 - 5048.0	Pass
AV93	07/01/14 01:23	7637	7205.1 - 7963.6	Pass	13.7	10 - 20	Pass	221.9	218.0 - 228.0	Pass	5022	4990.3 - 5070.3	Pass
AV94	07/01/14 01:23	7389	7068.2 - 7812.2	Pass	12.4	10 - 20	Pass	220.9	215.9 - 225.9	Pass	5014	4974.7 - 5054.7	Pass
AV95	07/01/14 01:32	7563	7152.6 - 7905.5	Pass	13.6	10 - 20	Pass	225.0	220.0 - 230.0	Pass	5045	5005.0 - 5085.0	Pass
AV96	07/01/14 01:32	7557	7234.1 - 7995.6	Pass	14.6	10 - 20	Pass	223.9	220.1 - 230.1	Pass	5037	5005.3 - 5085.3	Pass
AV97	07/01/14 01:33	7557	7235.7 - 7997.4	Pass	13.9	10 - 20	Pass	224.0	219.0 - 229.0	Pass	5038	4997.6 - 5077.6	Pass
AV98	07/01/14 01:33	7555	7218.4 - 7978.3	Pass	13.8	10 - 20	Pass	225.1	218.9 - 228.9	Pass	5045	4996.9 - 5076.9	Pass
AV99	07/01/14 01:37	7601	6927.3 - 7656.5	Pass	13.6	10 - 20	Pass	223.1	218.1 - 228.1	Pass	5030	4990.4 - 5070.4	Pass
AV100	07/01/14 01:52	7469	7216.0 - 7975.6	Pass	14.1	10 - 20	Pass	221.0	216.0 - 226.0	Pass	5015	4975.2 - 5055.2	Pass
AV101	07/01/14 01:37	7595	7212.7 - 7971.9	Pass	13.8	10 - 20	Pass	219.9	214.9 - 224.9	Pass	5007	4967.1 - 5047.1	Pass
AV102	07/01/14 01:37	7591	7208.5 - 7967.3	Pass	14.4	10 - 20	Pass	226.9	222.0 - 232.0	Pass	5059	5019.5 - 5099.5	Pass
AV103	07/01/14 01:37	7583	7167.3 - 7921.7	Pass	15.0	10 - 20	Pass	221.9	216.9 - 226.9	Pass	5022	4982.0 - 5062.0	Pass
AV104	07/01/14 01:37	7346	7203.0 - 7961.2	Pass	12.8	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	4989.9 - 5069.9	Pass
AV105	07/01/14 01:37	7584	7201.2 - 7959.3	Pass	13.9	10 - 20	Pass	220.1	215.1 - 225.1	Pass	5008	4968.3 - 5048.3	Pass
AV119	07/01/14 01:38	7680	7286.5 - 8053.5	Pass	14.0	10 - 20	Pass	217.0	212.1 - 222.1	Pass	4985	4945.7 - 5025.7	Pass
AV120	07/01/14 01:38	7670	7283.9 - 8050.6	Pass	15.5	10 - 20	Pass	219.9	215.1 - 225.1	Pass	5007	4968.1 - 5048.1	Pass
AV121	07/01/14 01:38	7673	7281.1 - 8047.6	Pass	14.3	10 - 20	Pass	220.9	217.1 - 227.1	Pass	5015	4983.1 - 5063.1	Pass
AV122	07/01/14 01:38	7671	7278.5 - 8044.6	Pass	14.4	10 - 20	Pass	220.1	214.1 - 224.1	Pass	5008	4961.2 - 5041.2	Pass

Alpha Spectroscopy Daily Pulser Check

Analysis Date: 07/07/14

		Gross Counts			FWHM (keV)			Pulser Center			Energy (keV)		
Detector	**Analysis Date**	**Result**	**Criteria**	**P/F**	**Result**	**Criteria**	**P/F**	**Result**	**Criteria**	**P/F**	**Result**	**Criteria**	**P/F**
AV14	07/07/14 00:37	7597	7236.1 - 7997.8	Pass	11.7	10 - 20	Pass	224.0	219.0 - 229.0	Pass	5037	4997.5 - 5077.5	Pass
AV15	07/07/14 00:37	7703	7313.8 - 8083.7	Pass	13.6	10 - 20	Pass	223.9	219.2 - 229.2	Pass	5037	4998.9 - 5078.9	Pass
AV16	07/07/14 00:37	7436	7055.7 - 7798.4	Pass	12.6	10 - 20	Pass	218.1	215.9 - 225.9	Pass	4993	4974.6 - 5054.6	Pass
AV17	07/07/14 00:37	7623	7224.6 - 7985.1	Pass	11.3	10 - 20	Pass	227.0	221.0 - 231.0	Pass	5060	5012.5 - 5092.5	Pass
AV18	07/07/14 00:37	7602	7204.8 - 7963.1	Pass	11.8	10 - 20	Pass	225.0	220.0 - 230.0	Pass	5045	5004.9 - 5084.9	Pass

Alpha Spectroscopy Calibration Summary

Detector: AV14

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120516/1	05/05/14 22:28	82246-334_00001	0.2634	0.20-0.32		
ICV 160-120851/1	05/07/14 23:04	82245-334_00001	0.2665	0.20-0.32	101.2	95-105
CCV 160-127902/1	06/19/14 18:08	82246-334_00001	0.2615	0.20-0.32	99.3	95-105

Detector: AV15

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120517/1	05/05/14 22:28	82247-334_00001	0.2562	0.20-0.32		
ICV 160-120852/1	05/07/14 23:04	82246-334_00001	0.2590	0.20-0.32	101.1	95-105
CCV 160-127903/1	06/19/14 19:45	82247-334_00001	0.2528	0.20-0.32	98.7	95-105

Detector: AV16

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120398/1	05/05/14 19:27	82232-334_00001	0.2711	0.20-0.32		
ICV 160-121072/1	05/08/14 00:14	82247-334_00001	0.2609	0.20-0.32	96.2	95-105
CCV 160-127904/1	06/19/14 18:08	82232-334_00001	0.2712	0.20-0.32	100.1	95-105

Detector: AV17

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120399/1	05/05/14 19:28	82233-334_00001	0.2607	0.20-0.32		
ICV 160-121073/1	05/08/14 00:14	82232-334_00001	0.2633	0.20-0.32	101.0	95-105
CCV 160-127905/1	06/19/14 18:08	82233-334_00001	0.2613	0.20-0.32	100.2	95-105

Detector: AV18

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120400/1	05/05/14 19:28	82234-334_00001	0.2546	0.20-0.32		
ICV 160-121074/1	05/08/14 00:14	82233-334_00001	0.2618	0.20-0.32	102.8	95-105
CCV 160-127906/1	06/19/14 18:08	82234-334_00001	0.2539	0.20-0.32	99.7	95-105

Detector: AV72

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120049/1	05/04/14 17:49	82241-334_00001	0.2785	0.20-0.32		
ICV 160-121382/1	05/08/14 17:19	82240-334_00001	0.2790	0.20-0.32	100.2	95-105
CCV 160-128010/1	06/22/14 20:10	82241-334_00001	0.2819	0.20-0.32	101.2	95-105

Detector: AV73

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120050/1	05/04/14 17:49	82242-334_00001	0.2608	0.20-0.32		
ICV 160-121392/1	05/11/14 19:32	82241-334_00001	0.2656	0.20-0.32	101.8	95-105
CCV 160-128011/1	06/22/14 20:10	82242-334_00001	0.2635	0.20-0.32	101.1	95-105

Detector: AV74

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120051/1	05/04/14 17:49	82243-334_00001	0.2680	0.20-0.32		
ICV 160-121383/1	05/08/14 17:20	82242-334_00001	0.2603	0.20-0.32	97.1	95-105
CCV 160-128012/1	06/22/14 21:18	82243-334_00001	0.2667	0.20-0.32	99.5	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV75

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120052/1	05/04/14 17:50	82244-334_00001	0.2571	0.20-0.32		
ICV 160-121393/1	05/11/14 19:33	82243-334_00001	0.2675	0.20-0.32	104.0	95-105
CCV 160-127949/1	06/19/14 19:46	82244-334_00001	0.2620	0.20-0.32	101.9	95-105

Detector: AV76

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120053/1	05/04/14 17:51	82245-334_00001	0.2586	0.20-0.32		
ICV 160-121394/1	05/11/14 19:33	82244-334_00001	0.2582	0.20-0.32	99.8	95-105
CCV 160-128013/1	06/22/14 18:55	82245-334_00001	0.2572	0.20-0.32	99.5	95-105

Detector: AV77

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120054/1	05/04/14 17:51	82246-334_00001	0.2615	0.20-0.32		
ICV 160-121384/1	05/08/14 17:20	82245-334_00001	0.2575	0.20-0.32	98.5	95-105
CCV 160-127951/1	06/19/14 19:46	82246-334_00001	0.2594	0.20-0.32	99.2	95-105

Detector: AV78

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120055/1	05/04/14 17:51	82247-334_00001	0.2571	0.20-0.32		
ICV 160-121385/1	05/08/14 17:20	82246-334_00001	0.2600	0.20-0.32	101.1	95-105
CCV 160-127971/1	06/22/14 17:35	82247-334_00001	0.2561	0.20-0.32	99.6	95-105

Detector: AV79

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-119923/1	05/01/14 19:15	82232-334_00001	0.2705	0.20-0.32		
ICV 160-121432/1	05/11/14 20:47	82247-334_00001	0.2634	0.20-0.32	97.4	95-105
CCV 160-127953/1	06/19/14 19:46	82232-334_00001	0.2735	0.20-0.32	101.1	95-105

Detector: AV80

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-119924/1	05/01/14 19:15	82233-334_00001	0.2609	0.20-0.32		
ICV 160-121395/1	05/11/14 19:33	82232-334_00001	0.2651	0.20-0.32	101.6	95-105
CCV 160-127955/1	06/19/14 19:46	82233-334_00001	0.2660	0.20-0.32	101.9	95-105

Detector: AV81

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-119925/1	05/01/14 19:15	82234-334_00001	0.2563	0.20-0.32		
ICV 160-121433/1	05/11/14 20:47	82233-334_00001	0.2687	0.20-0.32	104.8	95-105
CCV 160-127956/1	06/19/14 19:46	82234-334_00001	0.2599	0.20-0.32	101.4	95-105

Detector: AV82

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-119926/1	05/01/14 19:15	82235-334_00001	0.2576	0.20-0.32		
ICV 160-121434/1	05/11/14 20:48	82234-334_00001	0.2576	0.20-0.32	100.0	95-105
CCV 160-127957/1	06/19/14 19:47	82235-334_00001	0.2592	0.20-0.32	100.6	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV84

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-119928/1	05/01/14 19:16	82237-334_00003	0.2640	0.20-0.32		
ICV 160-121396/1	05/11/14 19:34	82236-334_00001	0.2641	0.20-0.32	100.1	95-105
CCV 160-127972/1	06/22/14 17:36	82237-334_00003	0.2587	0.20-0.32	98.0	95-105

Detector: AV85

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120845/1	05/07/14 19:52	82234-334_00001	0.2637	0.20-0.32		
ICV 160-121387/1	05/08/14 17:21	82237-334_00003	0.2638	0.20-0.32	100.0	95-105
CCV 160-127973/1	06/22/14 17:36	82234-334_00001	0.2614	0.20-0.32	99.1	95-105

Detector: AV86

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-119930/1	05/01/14 19:16	82240-334_00001	0.2672	0.20-0.32		
ICV 160-121435/1	05/11/14 20:48	82243-334_00001	0.2654	0.20-0.32	99.3	95-105
CCV 160-127974/1	06/22/14 17:36	82240-334_00001	0.2647	0.20-0.32	99.1	95-105

Detector: AV87

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-119931/1	05/01/14 19:16	82241-334_00001	0.2836	0.20-0.32		
ICV 160-121397/1	05/11/14 19:34	82240-334_00001	0.2824	0.20-0.32	99.5	95-105
CCV 160-127975/1	06/22/14 17:36	82241-334_00001	0.2855	0.20-0.32	100.7	95-105

Detector: AV88

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-119932/1	05/01/14 19:16	82242-334_00001	0.2624	0.20-0.32		
ICV 160-121436/1	05/11/14 20:49	82241-334_00001	0.2649	0.20-0.32	100.9	95-105
CCV 160-127960/1	06/19/14 19:48	82242-334_00001	0.2570	0.20-0.32	97.9	95-105

Detector: AV89

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-119933/1	05/01/14 19:17	82243-334_00001	0.2635	0.20-0.32		
ICV 160-121398/1	05/11/14 19:35	82242-334_00001	0.2615	0.20-0.32	99.2	95-105
CCV 160-127961/1	06/19/14 19:49	82243-334_00001	0.2639	0.20-0.32	100.1	95-105

Detector: AV90

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-119934/1	05/01/14 19:17	82244-334_00001	0.2634	0.20-0.32		
ICV 160-121437/1	05/11/14 22:02	82243-334_00001	0.2651	0.20-0.32	100.6	95-105
CCV 160-128014/1	06/22/14 18:55	82244-334_00001	0.2571	0.20-0.32	97.6	95-105

Detector: AV91

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-119935/1	05/01/14 19:17	82245-334_00001	0.2657	0.20-0.32		
ICV 160-121438/1	05/11/14 20:51	82244-334_00001	0.2614	0.20-0.32	98.4	95-105
CCV 160-128015/1	06/22/14 20:07	82245-334_00001	0.2642	0.20-0.32	99.4	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV93

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-119937/1	05/01/14 19:18	82247-334_00001	0.2542	0.20-0.32		
ICV 160-121400/1	05/11/14 19:35	82246-334_00001	0.2613	0.20-0.32	102.8	95-105
CCV 160-128016/1	06/22/14 18:55	82247-334_00001	0.2542	0.20-0.32	100.0	95-105

Detector: AV94

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-119692/1	05/01/14 13:48	82232-334_00001	0.2727	0.20-0.32		
ICV 160-121439/1	05/11/14 23:17	82247-334_00001	0.2605	0.20-0.32	95.5	95-105
CCV 160-127977/1	06/22/14 17:37	82232-334_00001	0.2703	0.20-0.32	99.1	95-105

Detector: AV95

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-119693/1	05/01/14 13:49	82233-334_00001	0.2686	0.20-0.32		
ICV 160-121440/1	05/11/14 22:03	82232-334_00001	0.2688	0.20-0.32	100.1	95-105
CCV 160-127978/1	06/22/14 17:38	82233-334_00001	0.2662	0.20-0.32	99.1	95-105

Detector: AV96

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-119694/1	05/01/14 13:49	82234-334_00001	0.2613	0.20-0.32		
ICV 160-121441/1	05/11/14 22:04	82233-334_00001	0.2698	0.20-0.32	103.3	95-105
CCV 160-128017/1	06/22/14 18:55	82234-334_00001	0.2564	0.20-0.32	98.1	95-105

Detector: AV97

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-119695/1	05/01/14 13:49	82235-334_00001	0.2630	0.20-0.32		
ICV 160-121442/1	05/11/14 22:04	82234-334_00001	0.2569	0.20-0.32	97.7	95-105
CCV 160-127979/1	06/22/14 17:38	82235-334_00001	0.2604	0.20-0.32	99.0	95-105

Detector: AV98

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-119696/1	05/01/14 13:49	82236-334_00001	0.2676	0.20-0.32		
ICV 160-121401/1	05/11/14 19:36	82235-334_00001	0.2682	0.20-0.32	100.2	95-105
CCV 160-127980/1	06/22/14 17:38	82236-334_00001	0.2705	0.20-0.32	101.1	95-105

Detector: AV99

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-119697/1	05/01/14 13:50	82237-334_00003	0.2529	0.20-0.32		
ICV 160-121443/1	05/11/14 20:51	82236-334_00001	0.2551	0.20-0.32	100.9	95-105
CCV 160-127964/1	06/19/14 13:55	82237-334_00003	0.2508	0.20-0.32	99.1	95-105

Detector: AV100

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120839/1	05/07/14 19:52	82233-334_00001	0.2677	0.20-0.32		
ICV 160-121388/1	05/11/14 19:36	82237-334_00003	0.2555	0.20-0.32	95.4	95-105
CCV 160-127861/1	06/19/14 15:09	82233-334_00001	0.2656	0.20-0.32	99.2	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV101

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-119684/1	05/01/14 13:50	82240-334_00001	0.2653	0.20-0.32		
ICV 160-121407/1	05/11/14 23:18	82232-334_00001	0.2702	0.20-0.32	101.8	95-105
CCV 160-127862/1	06/19/14 13:55	82240-334_00001	0.2678	0.20-0.32	100.9	95-105

Detector: AV102

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-119685/1	05/01/14 13:50	82241-334_00001	0.2747	0.20-0.32		
ICV 160-121408/1	05/11/14 20:52	82240-334_00001	0.2718	0.20-0.32	99.0	95-105
CCV 160-127863/1	06/19/14 13:55	82241-334_00001	0.2720	0.20-0.32	99.0	95-105

Detector: AV103

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-119686/1	05/01/14 13:51	82242-334_00001	0.2603	0.20-0.32		
ICV 160-121409/1	05/11/14 22:04	82241-334_00001	0.2640	0.20-0.32	101.4	95-105
CCV 160-127864/1	06/19/14 13:56	82242-334_00001	0.2618	0.20-0.32	100.6	95-105

Detector: AV104

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-119687/1	05/01/14 13:51	82243-334_00001	0.2599	0.20-0.32		
ICV 160-121410/1	05/11/14 20:52	82242-334_00001	0.2519	0.20-0.32	96.9	95-105
CCV 160-127865/1	06/19/14 13:56	82243-334_00001	0.2635	0.20-0.32	101.4	95-105

Detector: AV105

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-119688/1	05/01/14 13:51	82244-334_00001	0.2405	0.20-0.32		
ICV 160-121411/1	05/11/14 23:18	82243-334_00001	0.2457	0.20-0.32	102.2	95-105
CCV 160-127866/1	06/19/14 13:58	82244-334_00001	0.2420	0.20-0.32	100.6	95-105

Detector: AV119

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-119678/1	04/30/14 22:55	82243-334_00001	0.2642	0.20-0.32		
ICV 160-121422/1	05/11/14 22:06	82242-334_00001	0.2603	0.20-0.32	98.5	95-105
CCV 160-127880/1	06/19/14 15:11	82243-334_00001	0.2702	0.20-0.32	102.3	95-105

Detector: AV120

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-119679/1	04/30/14 22:56	82244-334_00001	0.2632	0.20-0.32		
ICV 160-121604/1	05/12/14 00:59	82243-334_00001	0.2642	0.20-0.32	100.4	95-105
CCV 160-127882/1	06/19/14 16:40	82244-334_00001	0.2633	0.20-0.32	100.0	95-105

Detector: AV121

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-119680/1	04/30/14 22:56	82245-334_00001	0.2686	0.20-0.32		
ICV 160-121423/1	05/11/14 23:20	82244-334_00001	0.2609	0.20-0.32	97.2	95-105
CCV 160-127883/1	06/19/14 14:00	82245-334_00001	0.2664	0.20-0.32	99.2	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV122

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-119681/1	04/30/14 22:56	82246-334_00001	0.2660	0.20-0.32		
ICV 160-121424/1	05/11/14 23:20	82245-334_00001	0.2590	0.20-0.32	97.4	95-105
CCV 160-127884/1	06/19/14 15:11	82246-334_00001	0.2617	0.20-0.32	98.4	95-105

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:26:57AM 6/19/2014

Sample

Sample Name: ICB;AV14
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

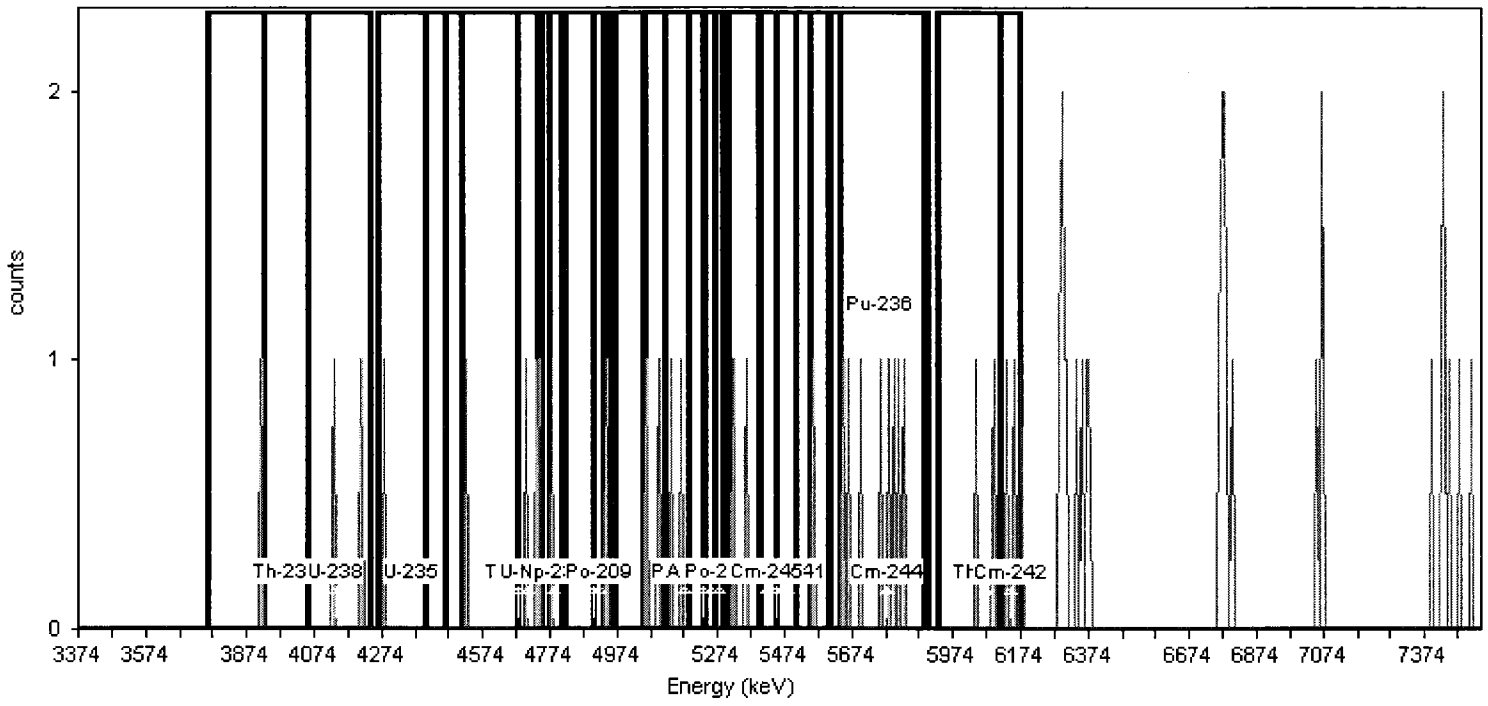
Analyst: 60040

Acquisition

Detector: AV14 , SN: 50-060W4
Acquisition Start Date: 6/18/2014 7:08:33PM
Live Time: 960.00 min.
Real Time: 970.48 min.
Calibration Name: IC-9885;AV14-20140505
Calibration Date: 5/6/2014 5:39:36PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.34% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 57.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	4.00	4.167E-003	2.329E-003
U-234	4.71	4.51	4.82	5.00	5.208E-003	2.552E-003
Pu-242	4.90	4.68	4.95	5.00	5.208E-003	2.552E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	6.00	6.250E-003	2.756E-003
Th-228	5.45	5.19	5.51	2.00	2.083E-003	1.804E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	2.00	2.083E-003	1.804E-003
Am-241	5.48	5.30	5.60	3.00	3.125E-003	2.083E-003
Cm-245	5.42	5.40	5.45	0.00	0.000E+000	1.473E-003
Pu-236	5.76	5.61	5.89	8.00	8.333E-003	3.125E-003
Cm-244	5.78	5.64	5.90	8.00	8.333E-003	3.125E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:27:02AM 6/19/2014

Sample

Sample Name: ICB;AV15
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

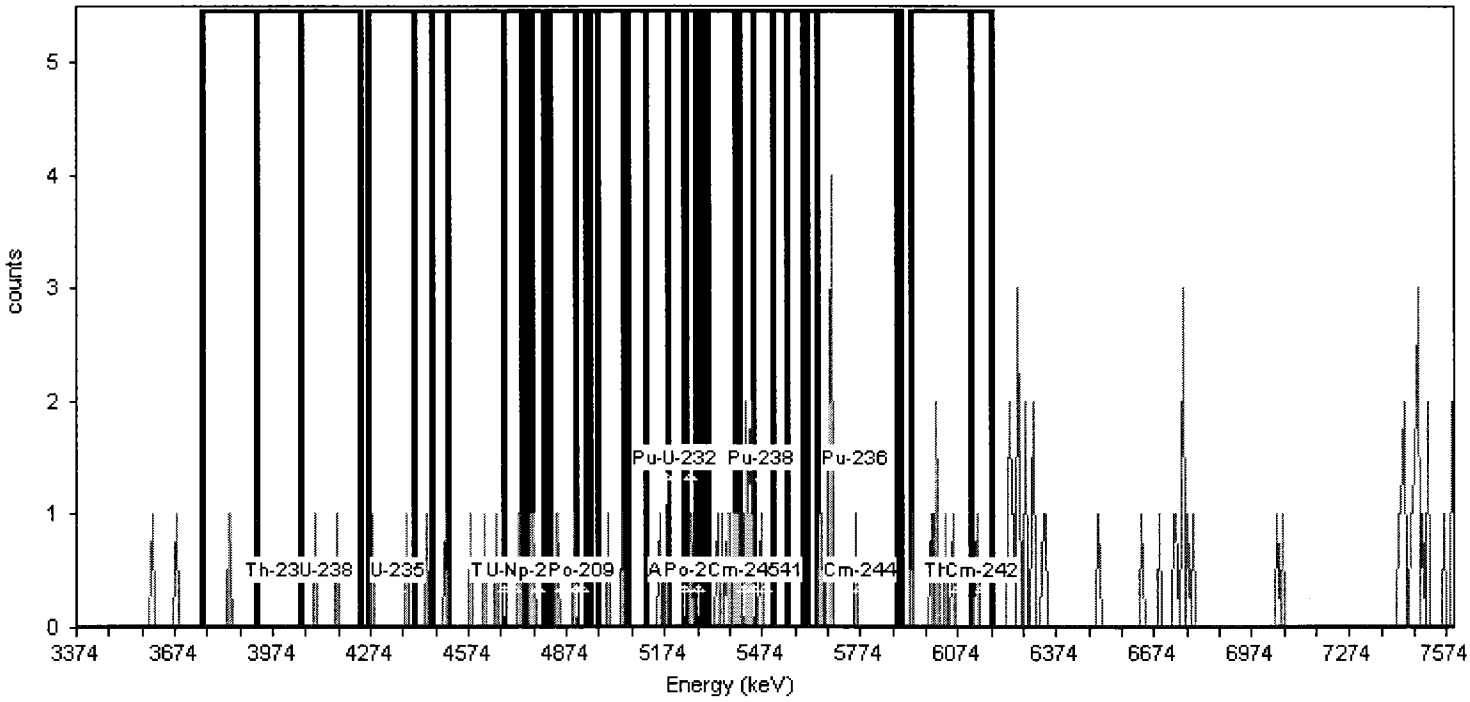
Analyst: 60040

Acquisition

Detector: AV15 , SN: 41-172C5
Acquisition Start Date: 6/18/2014 7:08:35PM
Live Time: 960.00 min.
Real Time: 970.52 min.
Calibration Name: IC-9886;AV15-20140505
Calibration Date: 5/6/2014 5:39:42PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.62% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 96.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.68	4.40	4.75	7.00	7.292E-003	2.946E-003
U-234	4.71	4.51	4.82	7.00	7.292E-003	2.946E-003
Pu-242	4.90	4.68	4.95	6.00	6.250E-003	2.756E-003
Th-229	4.86	4.74	5.12	6.00	6.250E-003	2.756E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	10.00	1.042E-002	3.455E-003
Th-228	5.45	5.19	5.51	14.00	1.458E-002	4.034E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	13.00	1.354E-002	3.898E-003
Am-241	5.48	5.30	5.60	13.00	1.354E-002	3.898E-003
Cm-245	5.42	5.40	5.45	7.00	7.292E-003	2.946E-003
Pu-236	5.76	5.61	5.89	9.00	9.375E-003	3.294E-003
Cm-244	5.78	5.64	5.90	9.00	9.375E-003	3.294E-003
Th-227	6.07	5.93	6.18	8.00	8.333E-003	3.125E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:27:08AM 6/19/2014

Sample

Sample Name: ICB;AV16
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

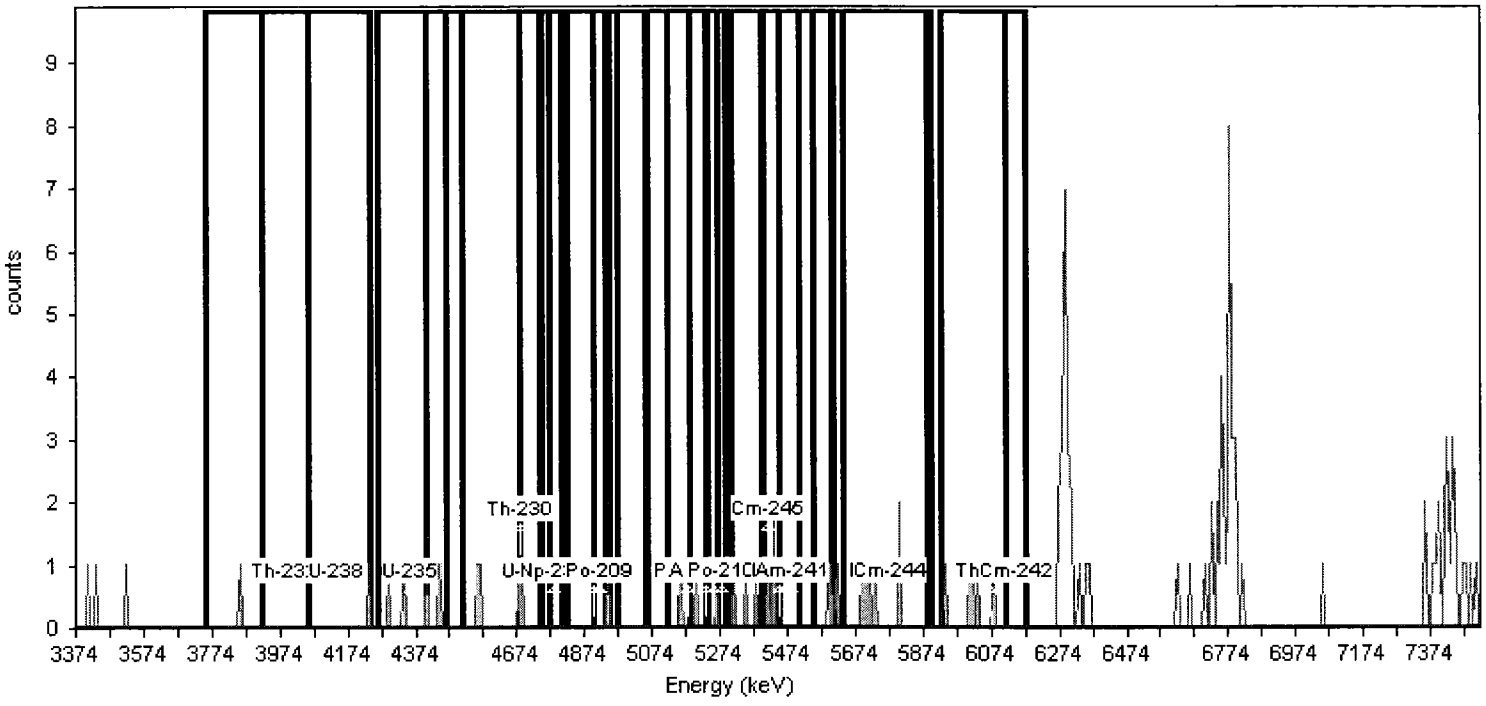
Analyst: 60040

Acquisition

Detector: AV16 , SN: 51-082B6
Acquisition Start Date: 6/18/2014 7:08:37PM
Live Time: 960.00 min.
Real Time: 970.48 min.
Calibration Name: IC-7107;AV16-20140505
Calibration Date: 5/5/2014 10:08:41PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.11% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 116.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	4.00	4.167E-003	2.329E-003
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	4.00	4.167E-003	2.329E-003
Pu-242	4.90	4.68	4.95	3.00	3.125E-003	2.083E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	6.00	6.250E-003	2.756E-003
Th-228	5.45	5.19	5.51	8.00	8.333E-003	3.125E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	6.00	6.250E-003	2.756E-003
Am-241	5.48	5.30	5.60	8.00	8.333E-003	3.125E-003
Cm-245	5.42	5.40	5.45	3.00	3.125E-003	2.083E-003
Pu-236	5.76	5.61	5.89	8.00	8.333E-003	3.125E-003
Cm-244	5.78	5.64	5.90	7.00	7.292E-003	2.946E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:13:46AM 6/19/2014

Sample

Sample Name: ICB;AV17
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

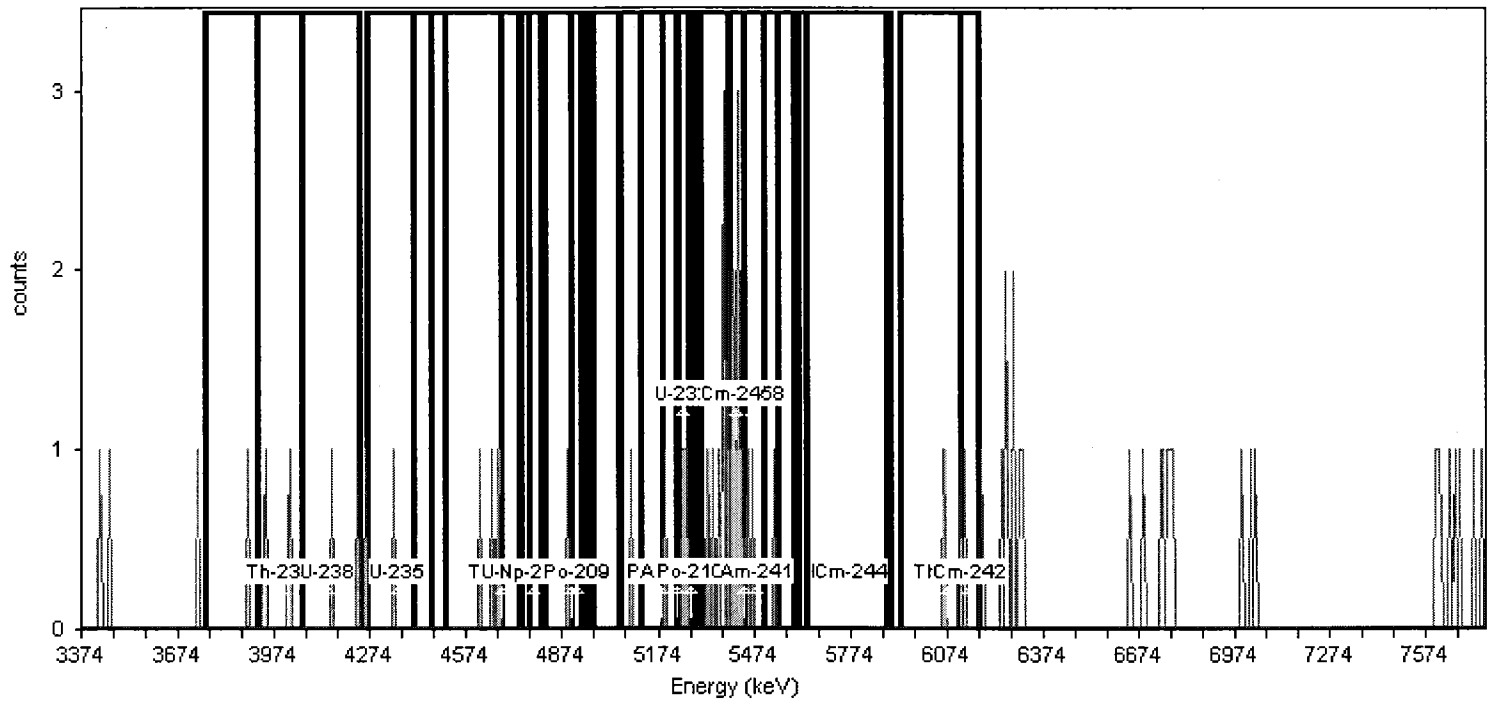
Analyst: 60040

Acquisition

Detector: AV17 , SN: 50-051C4
Acquisition Start Date: 6/18/2014 7:08:39PM
Live Time: 960.00 min.
Real Time: 960.05 min.
Calibration Name: IC-8874;AV17-20140505
Calibration Date: 5/5/2014 10:08:49PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.07% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 66.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	3.00	3.125E-003	2.083E-003
U-238	4.14	3.92	4.24	4.00	4.167E-003	2.329E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	3.00	3.125E-003	2.083E-003
U-234	4.71	4.51	4.82	3.00	3.125E-003	2.083E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	12.00	1.250E-002	3.756E-003
Th-228	5.45	5.19	5.51	21.00	2.187E-002	4.886E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	19.00	1.979E-002	4.658E-003
Am-241	5.48	5.30	5.60	19.00	1.979E-002	4.658E-003
Cm-245	5.42	5.40	5.45	10.00	1.042E-002	3.455E-003
Pu-236	5.76	5.61	5.89	0.00	0.000E+000	1.473E-003
Cm-244	5.78	5.64	5.90	0.00	0.000E+000	1.473E-003
Th-227	6.07	5.93	6.18	3.00	3.125E-003	2.083E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:13:52AM 6/19/2014

Sample

Sample Name: ICB;AV18
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

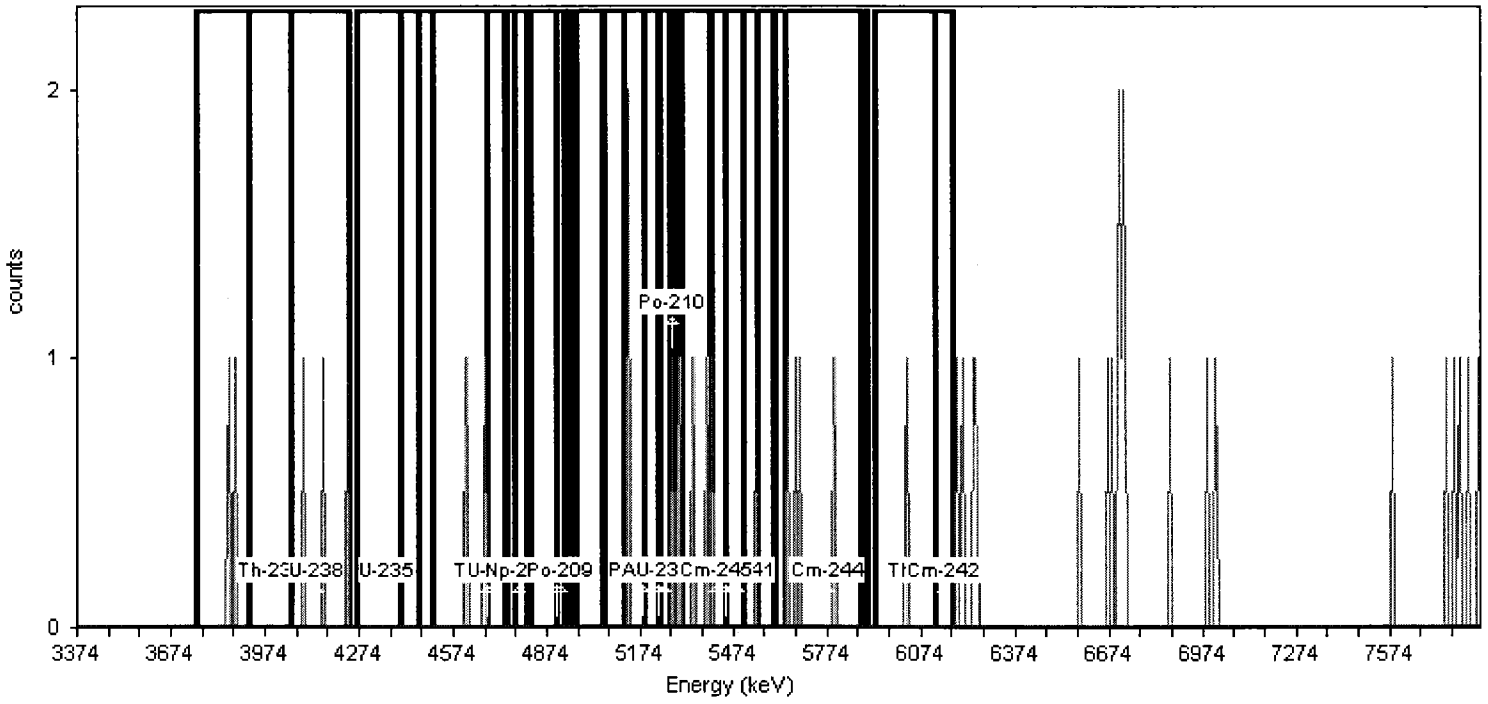
Analyst: 60040

Acquisition

Detector: AV18 , SN: 51-082C5
Acquisition Start Date: 6/18/2014 7:08:41PM
Live Time: 960.00 min.
Real Time: 960.05 min.
Calibration Name: IC-8875;AV18-20140505
Calibration Date: 5/5/2014 10:09:08PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.46% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 42.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	2.00	2.083E-003	1.804E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	0.00	0.000E+000	1.473E-003
Th-229	4.86	4.74	5.12	0.00	0.000E+000	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	7.00	7.292E-003	2.946E-003
Th-228	5.45	5.19	5.51	5.00	5.208E-003	2.552E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	6.00	6.250E-003	2.756E-003
Am-241	5.48	5.30	5.60	5.00	5.208E-003	2.552E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	4.00	4.167E-003	2.329E-003
Cm-244	5.78	5.64	5.90	4.00	4.167E-003	2.329E-003
Th-227	6.07	5.93	6.18	1.00	1.042E-003	1.473E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:35:46PM 6/19/2014

Sample

Sample Name: ICB;AV72
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

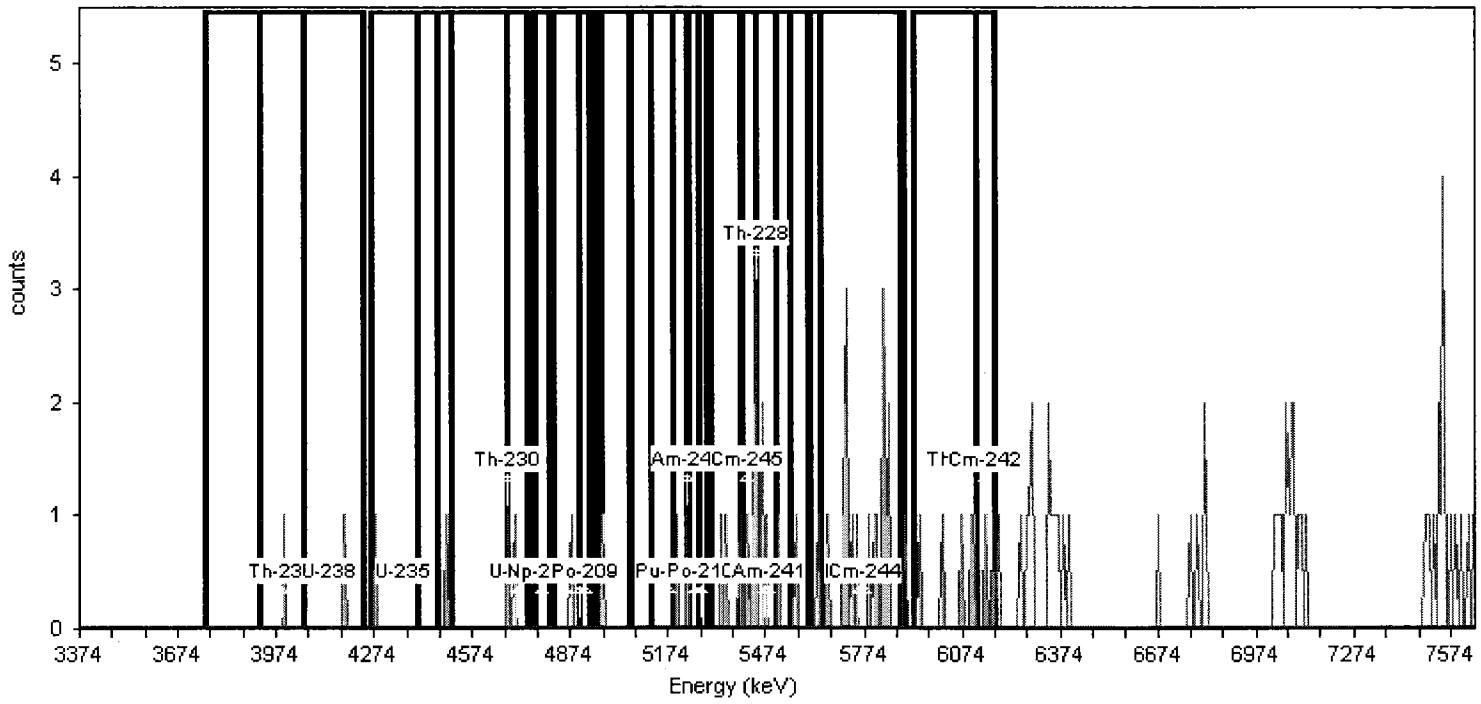
Analyst: 60040

Acquisition

Detector: AV72 , SN: 48-05a21
Acquisition Start Date: 6/19/2014 12:18:47AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9793;AV72-20140504
Calibration Date: 5/4/2014 8:44:56PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.85% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 102.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	3.00	3.125E-003	2.083E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	3.00	3.125E-003	2.083E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	5.00	5.208E-003	2.552E-003
Th-228	5.45	5.19	5.51	15.00	1.563E-002	4.167E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	14.00	1.458E-002	4.034E-003
Am-241	5.48	5.30	5.60	15.00	1.563E-002	4.167E-003
Cm-245	5.42	5.40	5.45	8.00	8.333E-003	3.125E-003
Pu-236	5.76	5.61	5.89	19.00	1.979E-002	4.658E-003
Cm-244	5.78	5.64	5.90	19.00	1.979E-002	4.658E-003
Th-227	6.07	5.93	6.18	7.00	7.292E-003	2.946E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:35:52PM 6/19/2014

Sample

Sample Name: ICB;AV73
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

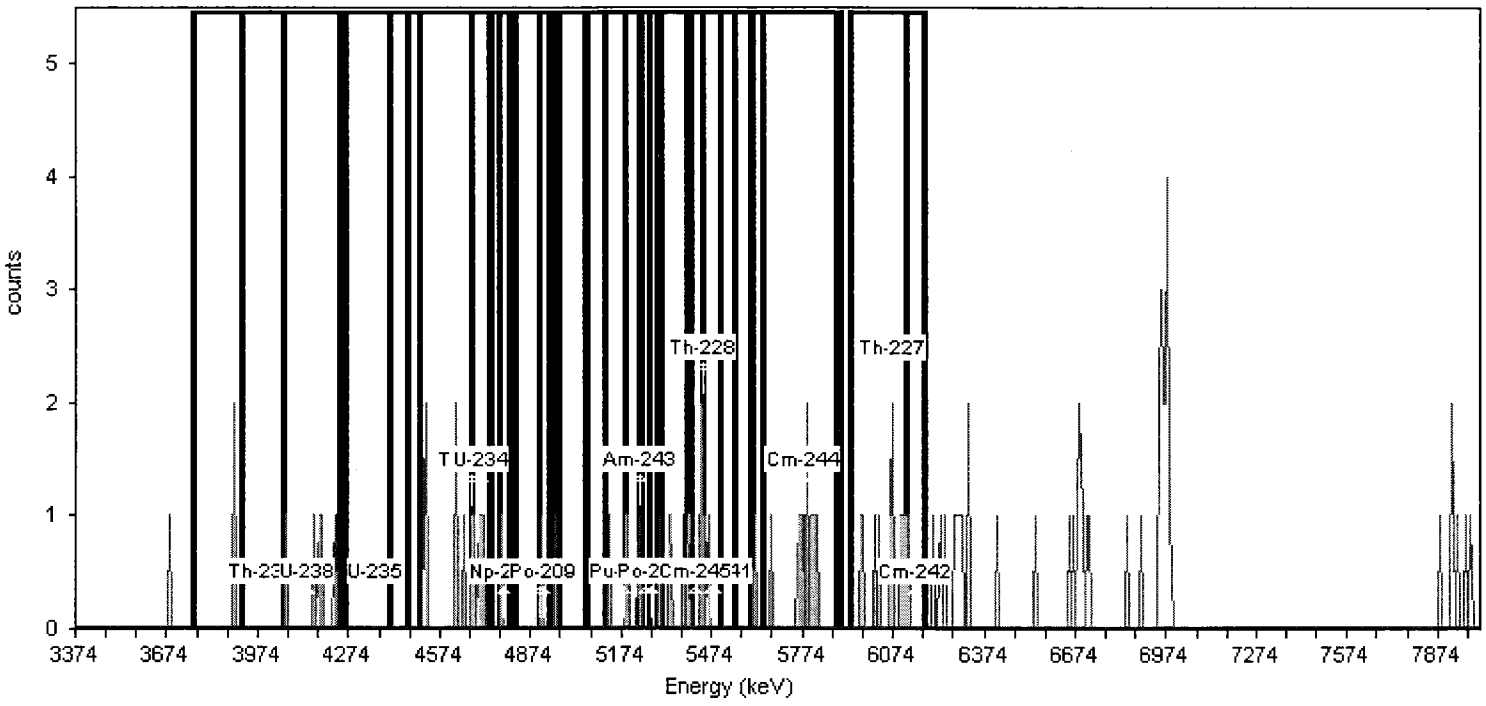
Analyst: 60040

Acquisition

Detector: AV73 , SN: 49-155N4
Acquisition Start Date: 6/19/2014 12:18:49AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9794;AV73-20140504
Calibration Date: 5/4/2014 8:45:02PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.08% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 96.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	5.00	5.208E-003	2.552E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	10.00	1.042E-002	3.455E-003
U-234	4.71	4.51	4.82	11.00	1.146E-002	3.608E-003
Pu-242	4.90	4.68	4.95	7.00	7.292E-003	2.946E-003
Th-229	4.86	4.74	5.12	3.00	3.125E-003	2.083E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	5.00	5.208E-003	2.552E-003
U-232	5.25	5.06	5.40	8.00	8.333E-003	3.125E-003
Th-228	5.45	5.19	5.51	12.00	1.250E-002	3.756E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	9.00	9.375E-003	3.294E-003
Am-241	5.48	5.30	5.60	9.00	9.375E-003	3.294E-003
Cm-245	5.42	5.40	5.45	5.00	5.208E-003	2.552E-003
Pu-236	5.76	5.61	5.89	10.00	1.042E-002	3.455E-003
Cm-244	5.78	5.64	5.90	9.00	9.375E-003	3.294E-003
Th-227	6.07	5.93	6.18	11.00	1.146E-002	3.608E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:36:03PM 6/19/2014

Sample

Sample Name: ICB;AV74
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

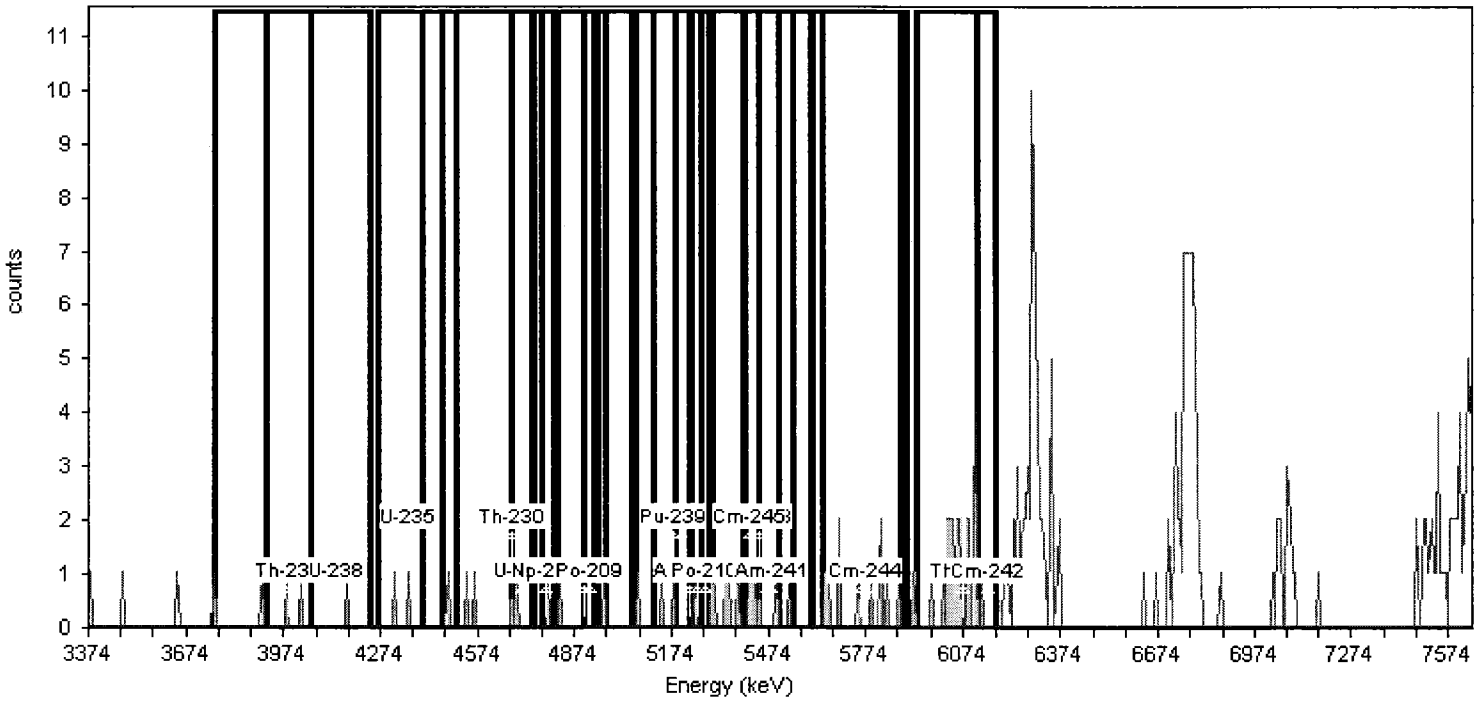
Analyst: 60040

Acquisition

Detector: AV74 , SN: 50-051C6
Acquisition Start Date: 6/19/2014 12:18:50AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9795;AV74-20140504
Calibration Date: 5/4/2014 8:45:10PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.80% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 236.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	4.00	4.167E-003	2.329E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	5.00	5.208E-003	2.552E-003
U-234	4.71	4.51	4.82	5.00	5.208E-003	2.552E-003
Pu-242	4.90	4.68	4.95	4.00	4.167E-003	2.329E-003
Th-229	4.86	4.74	5.12	4.00	4.167E-003	2.329E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	6.00	6.250E-003	2.756E-003
U-232	5.25	5.06	5.40	9.00	9.375E-003	3.294E-003
Th-228	5.45	5.19	5.51	11.00	1.146E-002	3.608E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	11.00	1.146E-002	3.608E-003
Am-241	5.48	5.30	5.60	11.00	1.146E-002	3.608E-003
Cm-245	5.42	5.40	5.45	4.00	4.167E-003	2.329E-003
Pu-236	5.76	5.61	5.89	11.00	1.146E-002	3.608E-003
Cm-244	5.78	5.64	5.90	11.00	1.146E-002	3.608E-003
Th-227	6.07	5.93	6.18	23.00	2.396E-002	5.103E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:26:22AM 6/19/2014

Sample

Sample Name: ICB;AV75
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

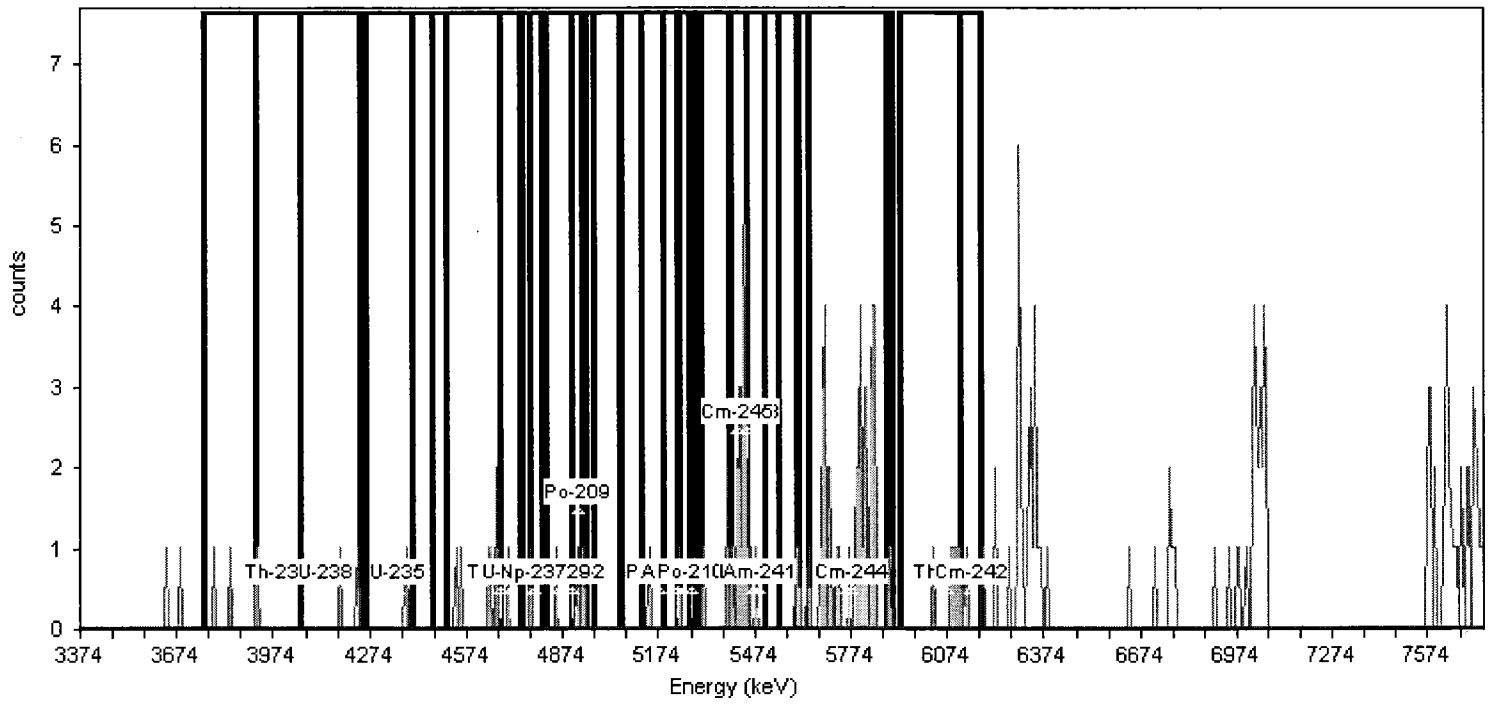
Analyst: 60040

Acquisition

Detector: AV75 , SN: 46-033P6
Acquisition Start Date: 6/18/2014 7:08:54PM
Live Time: 960.00 min.
Real Time: 960.03 min.
Calibration Name: IC-9817;AV75-20140504
Calibration Date: 5/4/2014 8:45:16PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.71% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 178.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	3.00	3.125E-003	2.083E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	7.00	7.292E-003	2.946E-003
Pu-242	4.90	4.68	4.95	6.00	6.250E-003	2.756E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	2.00	2.083E-003	1.804E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	6.00	6.250E-003	2.756E-003
Th-228	5.45	5.19	5.51	20.00	2.083E-002	4.774E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	19.00	1.979E-002	4.658E-003
Am-241	5.48	5.30	5.60	20.00	2.083E-002	4.774E-003
Cm-245	5.42	5.40	5.45	14.00	1.458E-002	4.034E-003
Pu-236	5.76	5.61	5.89	38.00	3.958E-002	6.505E-003
Cm-244	5.78	5.64	5.90	38.00	3.958E-002	6.505E-003
Th-227	6.07	5.93	6.18	7.00	7.292E-003	2.946E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:22:29PM 6/22/2014

Sample

Sample Name: ICB;AV76
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014c
Description:

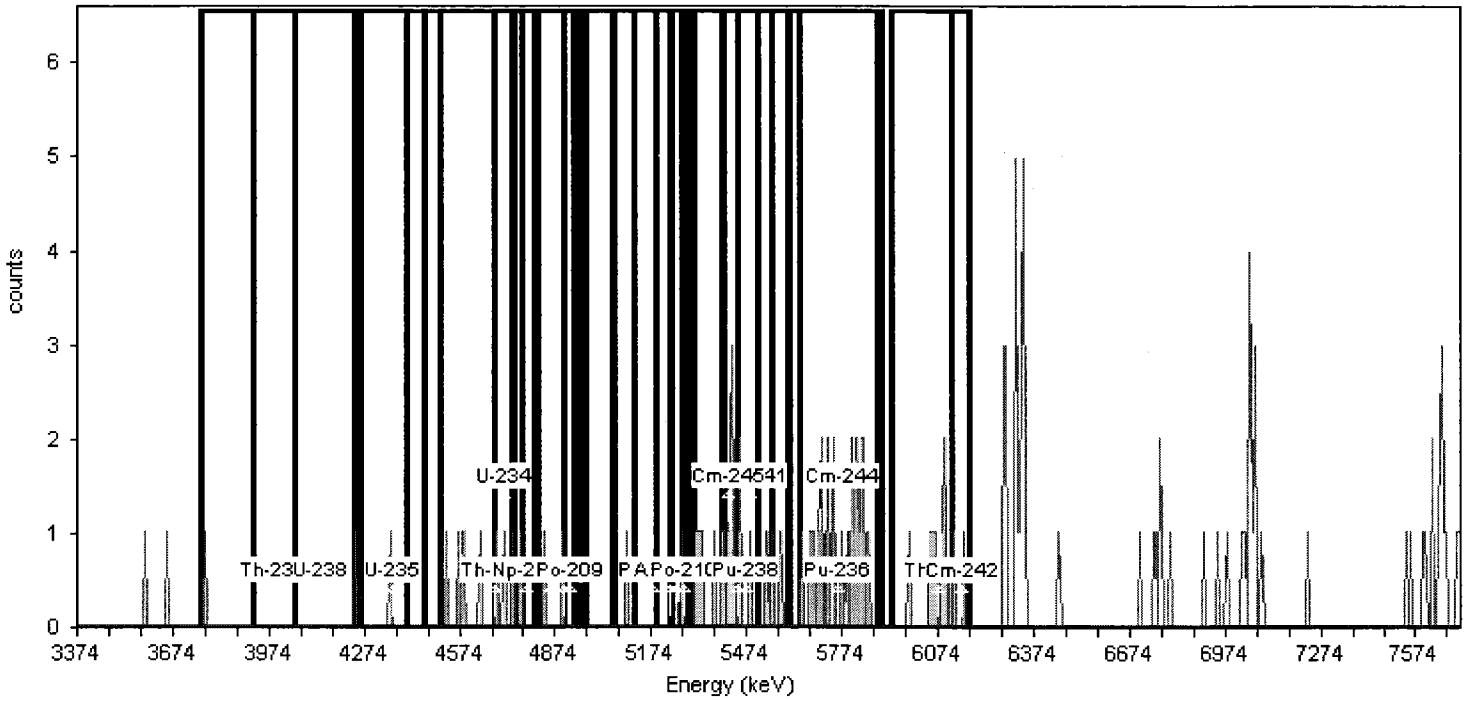
Analyst: 60040

Acquisition

Detector: AV76 , SN: 49-155N6
Acquisition Start Date: 6/19/2014 7:56:59PM
Live Time: 960.00 min.
Real Time: 960.04 min.
Calibration Name: IC-9884;AV76-20140504
Calibration Date: 5/4/2014 8:45:22PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.86% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 125.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	7.00	7.292E-003	2.946E-003
U-234	4.71	4.51	4.82	8.00	8.333E-003	3.125E-003
Pu-242	4.90	4.68	4.95	6.00	6.250E-003	2.756E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	9.00	9.375E-003	3.294E-003
Th-228	5.45	5.19	5.51	16.00	1.667E-002	4.295E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	18.00	1.875E-002	4.541E-003
Am-241	5.48	5.30	5.60	18.00	1.875E-002	4.541E-003
Cm-245	5.42	5.40	5.45	7.00	7.292E-003	2.946E-003
Pu-236	5.76	5.61	5.89	24.00	2.500E-002	5.208E-003
Cm-244	5.78	5.64	5.90	24.00	2.500E-002	5.208E-003
Th-227	6.07	5.93	6.18	10.00	1.042E-002	3.455E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:20:50AM 6/19/2014

Sample

Sample Name: ICB;AV77
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

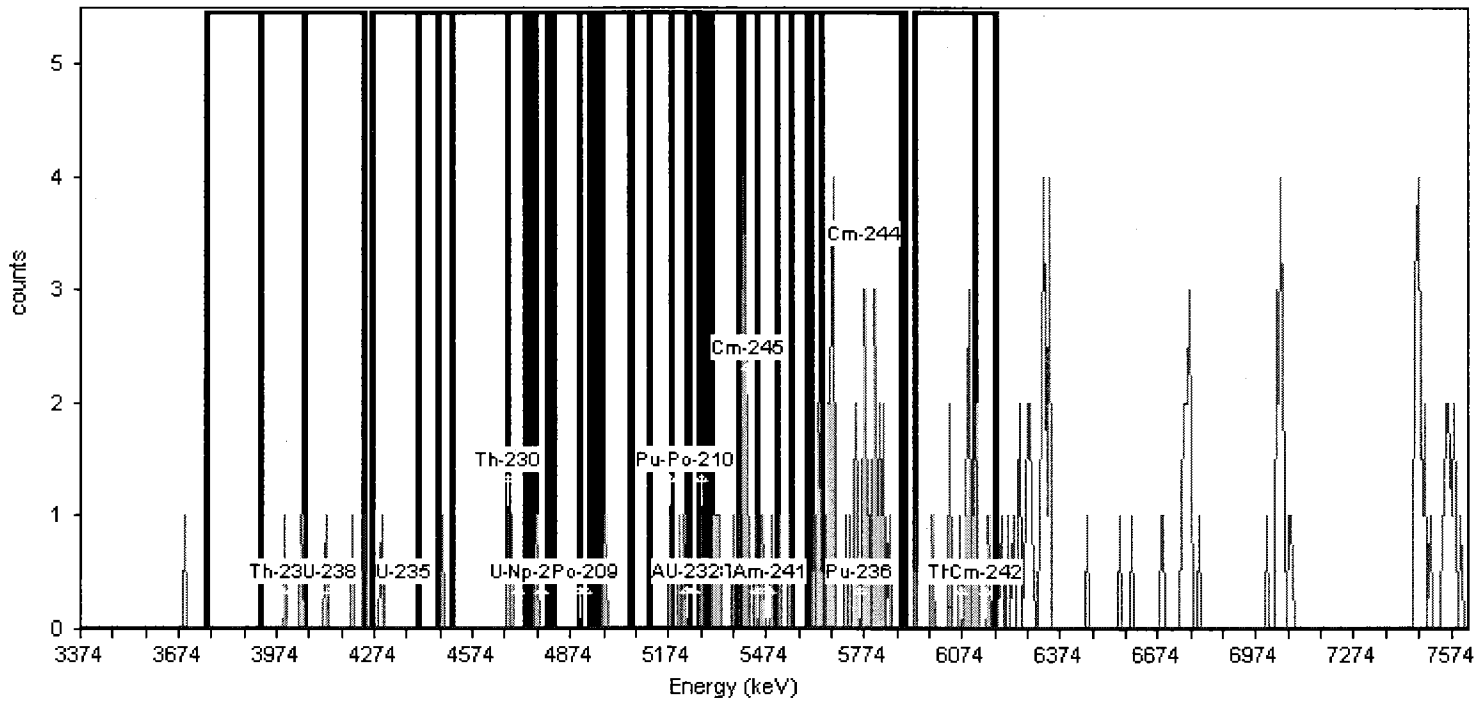
Analyst: 60040

Acquisition

Detector: AV77 , SN: 49-155N7
Acquisition Start Date: 6/18/2014 7:08:56PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9885;AV77-20140504
Calibration Date: 5/4/2014 8:45:28PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.15% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 155.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	5.00	5.208E-003	2.552E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	3.00	3.125E-003	2.083E-003
U-234	4.71	4.51	4.82	3.00	3.125E-003	2.083E-003
Pu-242	4.90	4.68	4.95	3.00	3.125E-003	2.083E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	12.00	1.250E-002	3.756E-003
Th-228	5.45	5.19	5.51	19.00	1.979E-002	4.658E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	19.00	1.979E-002	4.658E-003
Am-241	5.48	5.30	5.60	18.00	1.875E-002	4.541E-003
Cm-245	5.42	5.40	5.45	10.00	1.042E-002	3.455E-003
Pu-236	5.76	5.61	5.89	32.00	3.333E-002	5.984E-003
Cm-244	5.78	5.64	5.90	29.00	3.021E-002	5.705E-003
Th-227	6.07	5.93	6.18	13.00	1.354E-002	3.898E-003
Cm-242	6.15	6.12	6.18	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:21:55PM 6/22/2014

Sample

Sample Name: ICB;AV78
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014c
Description:

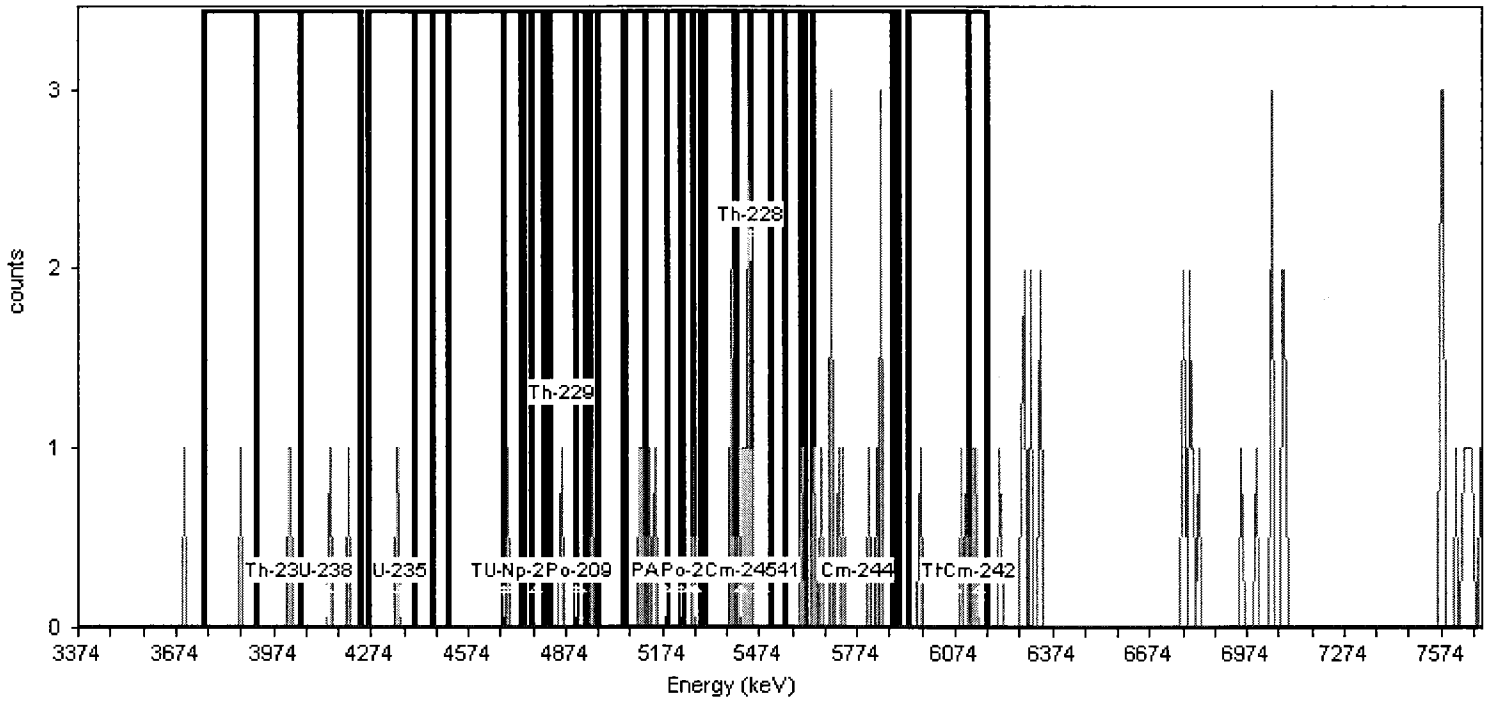
Analyst: 60040

Acquisition

Detector: AV78 , SN: 46-033FF4
Acquisition Start Date: 6/19/2014 7:57:03PM
Live Time: 960.00 min.
Real Time: 960.04 min.
Calibration Name: IC-9886;AV78-20140504
Calibration Date: 5/4/2014 8:45:34PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.71% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 84.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	3.00	3.125E-003	2.083E-003
U-238	4.14	3.92	4.24	4.00	4.167E-003	2.329E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	1.00	1.042E-003	1.473E-003
U-234	4.71	4.51	4.82	1.00	1.042E-003	1.473E-003
Pu-242	4.90	4.68	4.95	2.00	2.083E-003	1.804E-003
Th-229	4.86	4.74	5.12	4.00	4.167E-003	2.329E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	5.00	5.208E-003	2.552E-003
U-232	5.25	5.06	5.40	7.00	7.292E-003	2.946E-003
Th-228	5.45	5.19	5.51	11.00	1.146E-002	3.608E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	11.00	1.146E-002	3.608E-003
Am-241	5.48	5.30	5.60	11.00	1.146E-002	3.608E-003
Cm-245	5.42	5.40	5.45	8.00	8.333E-003	3.125E-003
Pu-236	5.76	5.61	5.89	12.00	1.250E-002	3.756E-003
Cm-244	5.78	5.64	5.90	12.00	1.250E-002	3.756E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:21:01AM 6/19/2014

Sample

Sample Name: ICB;AV79
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

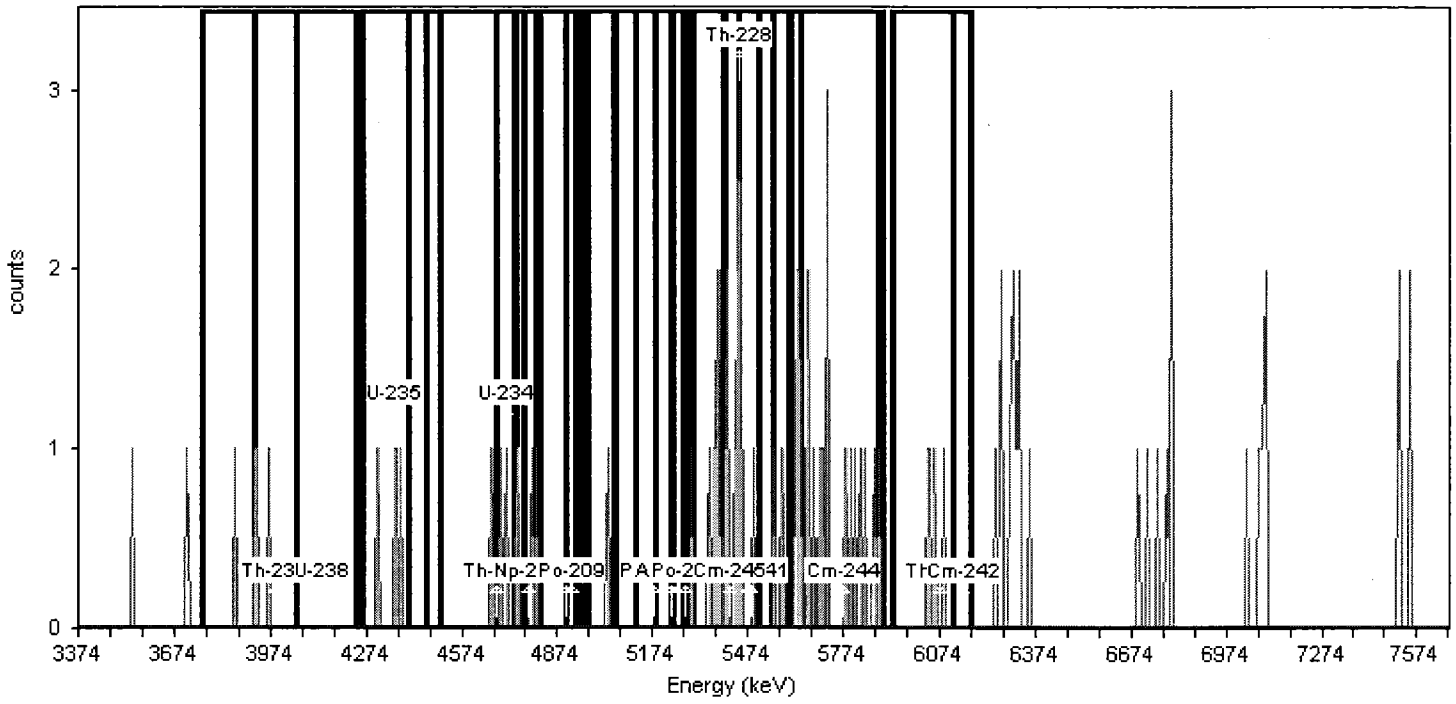
Analyst: 60040

Acquisition

Detector: AV79 , SN: 46-033Q5
Acquisition Start Date: 6/18/2014 7:08:58PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-7107;AV79-20140501
Calibration Date: 5/4/2014 5:31:27PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.05% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 90.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	4.00	4.167E-003	2.329E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	4.00	4.167E-003	2.329E-003
Th-230	4.68	4.40	4.75	4.00	4.167E-003	2.329E-003
U-234	4.71	4.51	4.82	6.00	6.250E-003	2.756E-003
Pu-242	4.90	4.68	4.95	5.00	5.208E-003	2.552E-003
Th-229	4.86	4.74	5.12	4.00	4.167E-003	2.329E-003
Np-237	4.78	4.77	4.81	2.00	2.083E-003	1.804E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	1.00	1.042E-003	1.473E-003
U-232	5.25	5.06	5.40	7.00	7.292E-003	2.946E-003
Th-228	5.45	5.19	5.51	18.00	1.875E-002	4.541E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	19.00	1.979E-002	4.658E-003
Am-241	5.48	5.30	5.60	20.00	2.083E-002	4.774E-003
Cm-245	5.42	5.40	5.45	9.00	9.375E-003	3.294E-003
Pu-236	5.76	5.61	5.89	20.00	2.083E-002	4.774E-003
Cm-244	5.78	5.64	5.90	16.00	1.667E-002	4.295E-003
Th-227	6.07	5.93	6.18	4.00	4.167E-003	2.329E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:21:07AM 6/19/2014

Sample

Sample Name: ICB;AV80
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

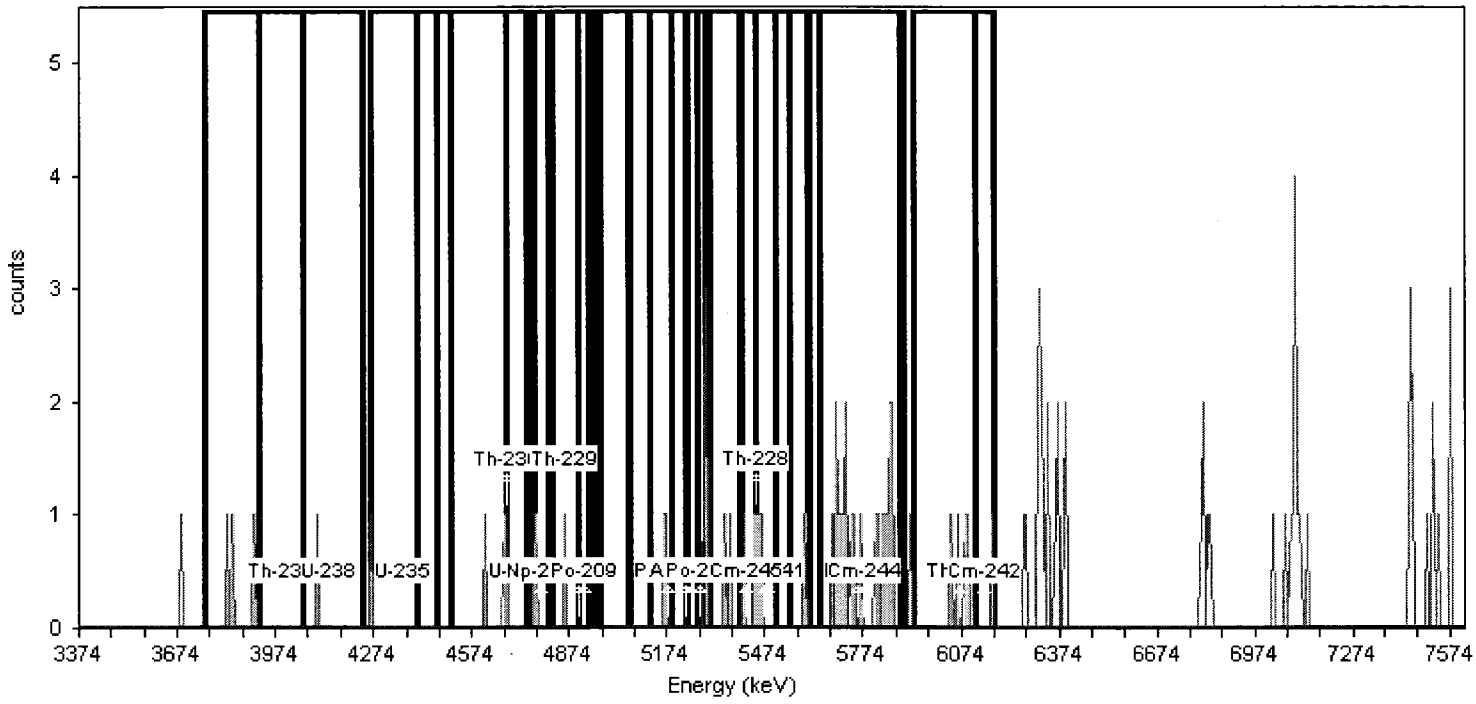
Analyst: 60040

Acquisition

Detector: AV80 , SN: 46-03305
Acquisition Start Date: 6/18/2014 7:08:59PM
Live Time: 960.00 min.
Real Time: 960.03 min.
Calibration Name: IC-8874;AV80-20140501
Calibration Date: 5/4/2014 5:31:37PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.09% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 92.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	3.00	3.125E-003	2.083E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	3.00	3.125E-003	2.083E-003
U-234	4.71	4.51	4.82	4.00	4.167E-003	2.329E-003
Pu-242	4.90	4.68	4.95	3.00	3.125E-003	2.083E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	5.00	5.208E-003	2.552E-003
U-232	5.25	5.06	5.40	7.00	7.292E-003	2.946E-003
Th-228	5.45	5.19	5.51	10.00	1.042E-002	3.455E-003
Po-210	5.28	5.23	5.29	3.00	3.125E-003	2.083E-003
Pu-238	5.47	5.27	5.55	10.00	1.042E-002	3.455E-003
Am-241	5.48	5.30	5.60	8.00	8.333E-003	3.125E-003
Cm-245	5.42	5.40	5.45	3.00	3.125E-003	2.083E-003
Pu-236	5.76	5.61	5.89	20.00	2.083E-002	4.774E-003
Cm-244	5.78	5.64	5.90	20.00	2.083E-002	4.774E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:21:12AM 6/19/2014

Sample

Sample Name: ICB;AV81
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

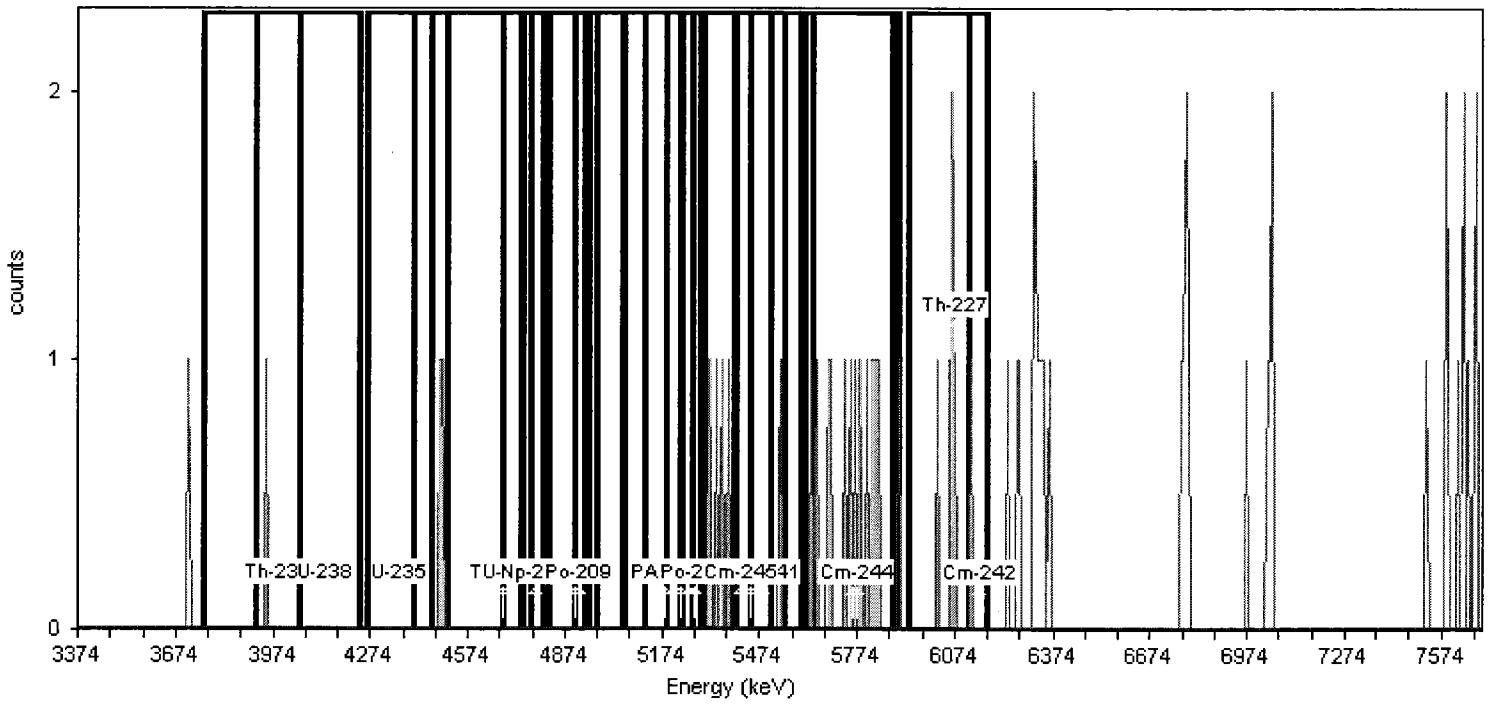
Analyst: 60040

Acquisition

Detector: AV81 , SN: 52-104X5
Acquisition Start Date: 6/18/2014 7:09:00PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-8875;AV81-20140501
Calibration Date: 5/4/2014 5:31:43PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.63% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 58.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	2.00	2.083E-003	1.804E-003
U-234	4.71	4.51	4.82	0.00	0.000E+000	1.473E-003
Pu-242	4.90	4.68	4.95	0.00	0.000E+000	1.473E-003
Th-229	4.86	4.74	5.12	0.00	0.000E+000	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	0.00	0.000E+000	1.473E-003
Am-243	5.23	5.05	5.31	0.00	0.000E+000	1.473E-003
U-232	5.25	5.06	5.40	4.00	4.167E-003	2.329E-003
Th-228	5.45	5.19	5.51	4.00	4.167E-003	2.329E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	5.00	5.208E-003	2.552E-003
Am-241	5.48	5.30	5.60	5.00	5.208E-003	2.552E-003
Cm-245	5.42	5.40	5.45	0.00	0.000E+000	1.473E-003
Pu-236	5.76	5.61	5.89	13.00	1.354E-002	3.898E-003
Cm-244	5.78	5.64	5.90	13.00	1.354E-002	3.898E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:21:18AM 6/19/2014

Sample

Sample Name: ICB;AV82
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

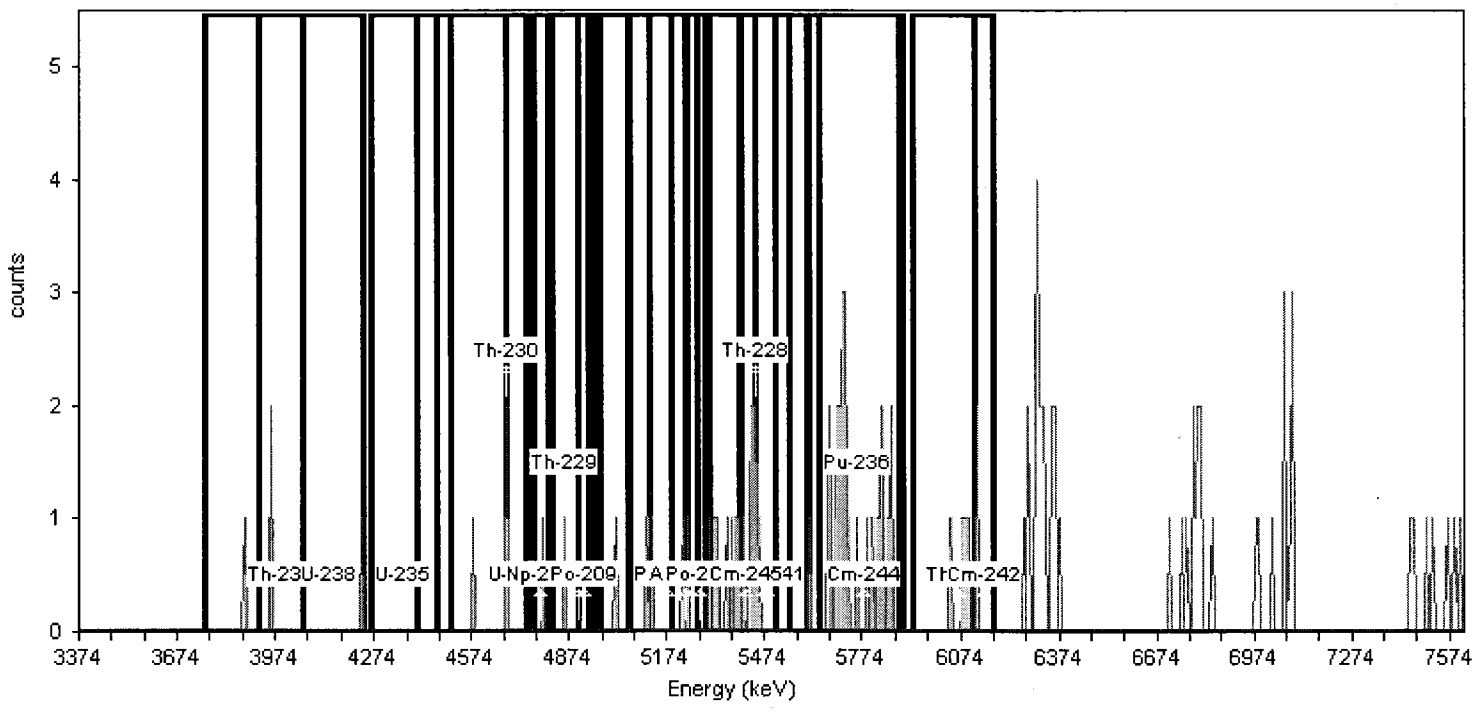
Analyst: 60040

Acquisition

Detector: AV82 , SN: 46-032EE5
Acquisition Start Date: 6/18/2014 7:09:00PM
Live Time: 960.01 min.
Real Time: 960.03 min.
Calibration Name: IC-8876;AV82-20140501
Calibration Date: 5/4/2014 5:31:49PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.76% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 110.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	3.00	3.125E-003	2.083E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	3.00	3.125E-003	2.083E-003
U-234	4.71	4.51	4.82	4.00	4.167E-003	2.329E-003
Pu-242	4.90	4.68	4.95	4.00	4.167E-003	2.329E-003
Th-229	4.86	4.74	5.12	4.00	4.167E-003	2.329E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	5.00	5.208E-003	2.552E-003
Am-243	5.23	5.05	5.31	5.00	5.208E-003	2.552E-003
U-232	5.25	5.06	5.40	11.00	1.146E-002	3.608E-003
Th-228	5.45	5.19	5.51	17.00	1.771E-002	4.419E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	15.00	1.562E-002	4.167E-003
Am-241	5.48	5.30	5.60	15.00	1.562E-002	4.167E-003
Cm-245	5.42	5.40	5.45	8.00	8.333E-003	3.125E-003
Pu-236	5.76	5.61	5.89	27.00	2.812E-002	5.512E-003
Cm-244	5.78	5.64	5.90	26.00	2.708E-002	5.413E-003
Th-227	6.07	5.93	6.18	7.00	7.292E-003	2.946E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:21:29AM 6/19/2014

Sample

Sample Name: ICB;AV84 Spectrum #1 Analysis #1
Comment:

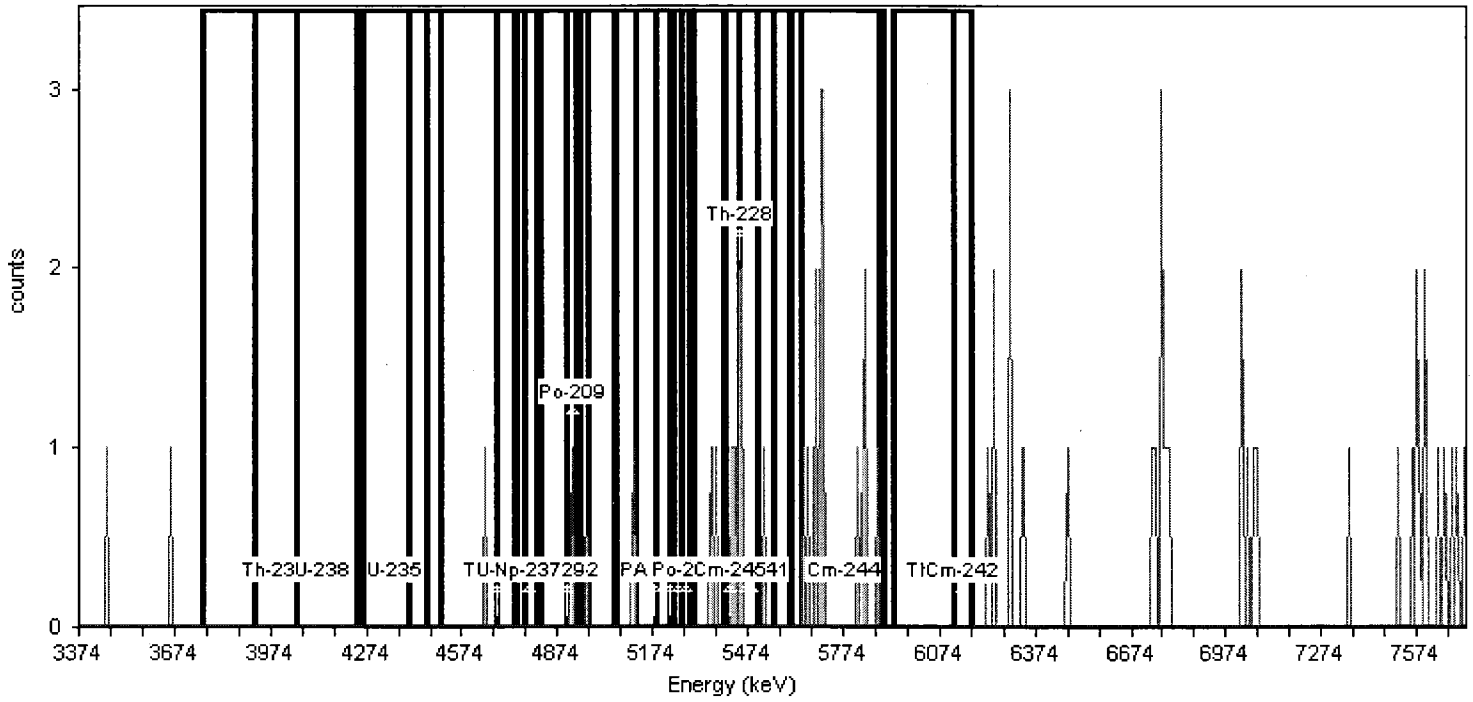
Batch

Batch Name: June2014 Analyst: 60040
Description:

Acquisition

Detector: AV84 , SN: 46-033FF3
Acquisition Start Date: 6/18/2014 7:09:02PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9520;AV84-20140501
Calibration Date: 5/4/2014 5:32:01PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.40% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 64.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	0.00	0.000E+000	1.473E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	1.00	1.042E-003	1.473E-003
U-234	4.71	4.51	4.82	1.00	1.042E-003	1.473E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	3.00	3.125E-003	2.083E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	1.00	1.042E-003	1.473E-003
U-232	5.25	5.06	5.40	3.00	3.125E-003	2.083E-003
Th-228	5.45	5.19	5.51	8.00	8.333E-003	3.125E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	9.00	9.375E-003	3.294E-003
Am-241	5.48	5.30	5.60	9.00	9.375E-003	3.294E-003
Cm-245	5.42	5.40	5.45	4.00	4.167E-003	2.329E-003
Pu-236	5.76	5.61	5.89	13.00	1.354E-002	3.898E-003
Cm-244	5.78	5.64	5.90	13.00	1.354E-002	3.898E-003
Th-227	6.07	5.93	6.18	0.00	0.000E+000	1.473E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:21:34AM 6/19/2014

Sample

Sample Name: ICB;AV85
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

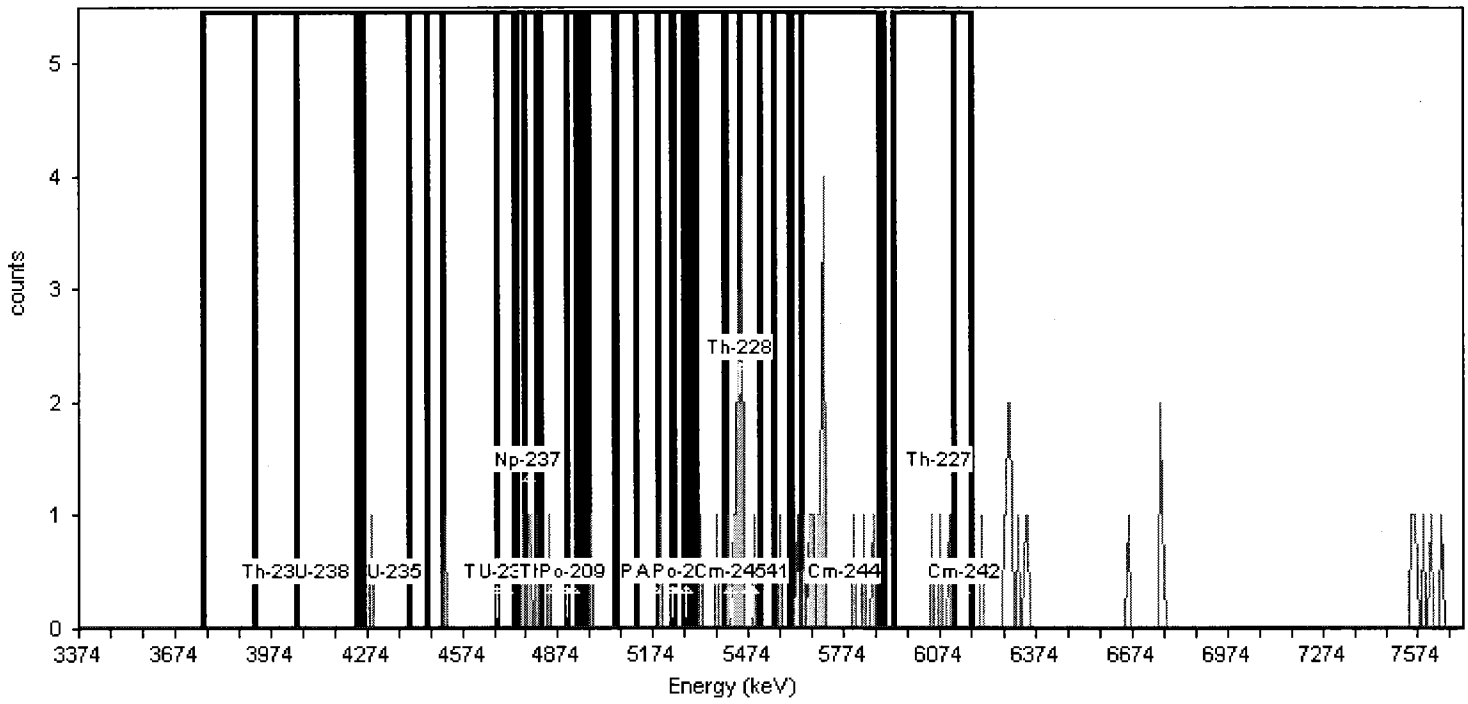
Analyst: 60040

Acquisition

Detector: AV85 , SN: 46-032EE7
Acquisition Start Date: 6/18/2014 7:09:03PM
Live Time: 960.00 min.
Real Time: 960.03 min.
Calibration Name: IC-8875;AV85-20140507
Calibration Date: 5/7/2014 10:49:08PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.37% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 61.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	0.00	0.000E+000	1.473E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	1.00	1.042E-003	1.473E-003
U-234	4.71	4.51	4.82	4.00	4.167E-003	2.329E-003
Pu-242	4.90	4.68	4.95	4.00	4.167E-003	2.329E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	2.00	2.083E-003	1.804E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	1.00	1.042E-003	1.473E-003
U-232	5.25	5.06	5.40	3.00	3.125E-003	2.083E-003
Th-228	5.45	5.19	5.51	16.00	1.667E-002	4.295E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	15.00	1.563E-002	4.167E-003
Am-241	5.48	5.30	5.60	16.00	1.667E-002	4.295E-003
Cm-245	5.42	5.40	5.45	8.00	8.333E-003	3.125E-003
Pu-236	5.76	5.61	5.89	14.00	1.458E-002	4.034E-003
Cm-244	5.78	5.64	5.90	13.00	1.354E-002	3.898E-003
Th-227	6.07	5.93	6.18	3.00	3.125E-003	2.083E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:22:00PM 6/22/2014

Sample

Sample Name: ICB;AV86
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014c
Description:

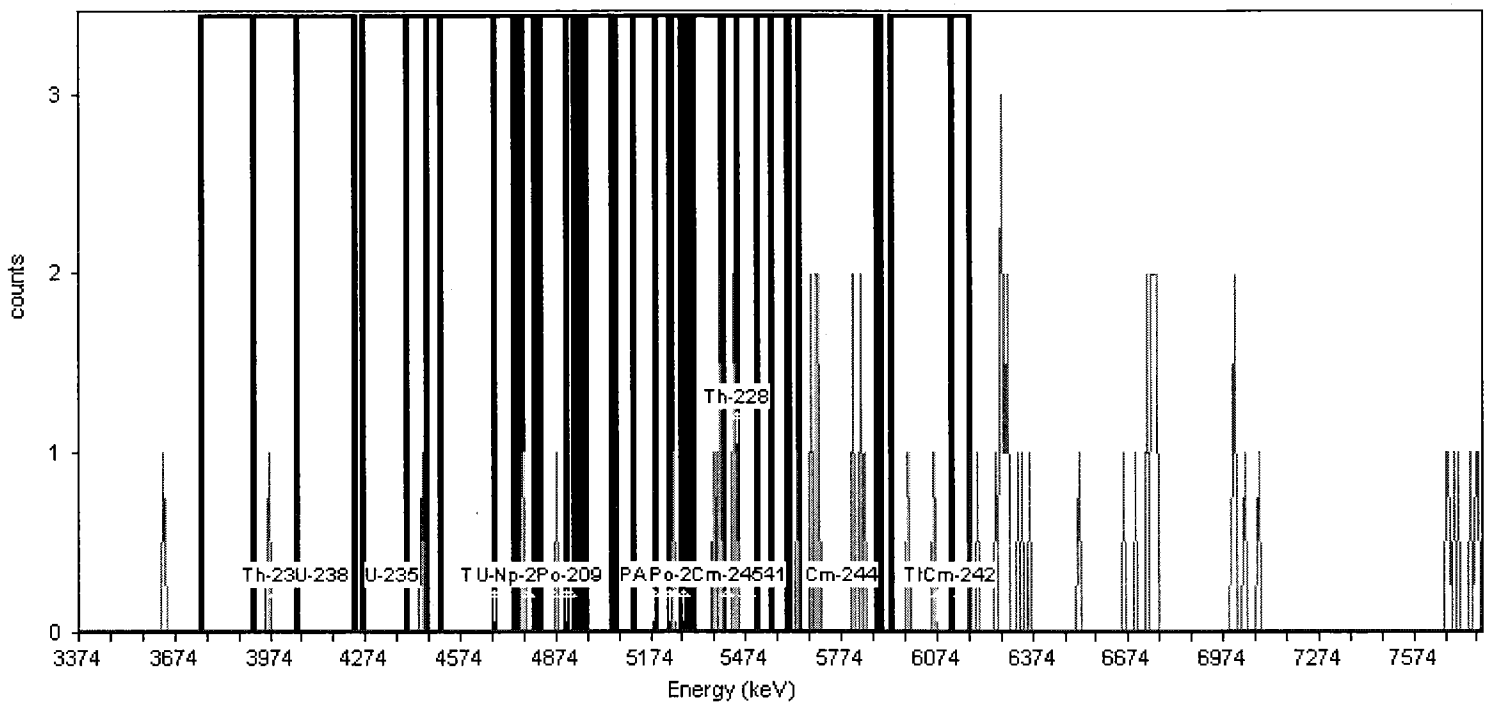
Analyst: 60040

Acquisition

Detector: AV86 , SN: 46-033Q6
Acquisition Start Date: 6/19/2014 7:57:02PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9792;AV86-20140501
Calibration Date: 5/4/2014 5:32:16PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.72% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 64.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	1.00	1.042E-003	1.473E-003
U-234	4.71	4.51	4.82	1.00	1.042E-003	1.473E-003
Pu-242	4.90	4.68	4.95	2.00	2.083E-003	1.804E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	0.00	0.000E+000	1.473E-003
Am-243	5.23	5.05	5.31	1.00	1.042E-003	1.473E-003
U-232	5.25	5.06	5.40	5.00	5.208E-003	2.552E-003
Th-228	5.45	5.19	5.51	9.00	9.375E-003	3.294E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	8.00	8.333E-003	3.125E-003
Am-241	5.48	5.30	5.60	8.00	8.333E-003	3.125E-003
Cm-245	5.42	5.40	5.45	5.00	5.208E-003	2.552E-003
Pu-236	5.76	5.61	5.89	12.00	1.250E-002	3.756E-003
Cm-244	5.78	5.64	5.90	11.00	1.146E-002	3.608E-003
Th-227	6.07	5.93	6.18	3.00	3.125E-003	2.083E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:21:46AM 6/19/2014

Sample

Sample Name: ICB;AV87 Spectrum #1 Analysis #1
Comment:

Batch

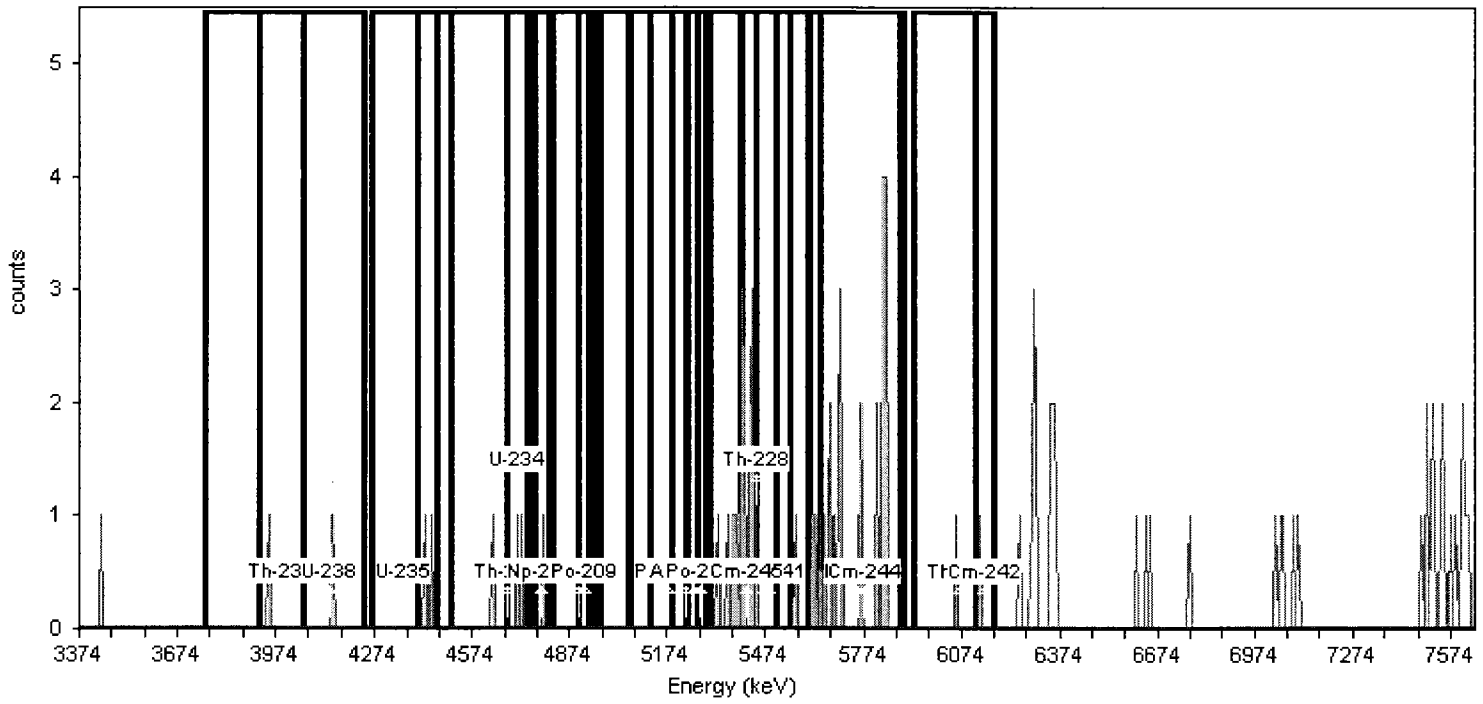
Batch Name: June2014 Analyst: 60040
Description:

Acquisition

Detector: AV87 , SN: 50-051C3
Acquisition Start Date: 6/18/2014 7:09:05PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9793;AV87-20140501
Calibration Date: 5/4/2014 5:32:22PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 28.36% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI; Nuclide Library: Background ROI Library
Total Background Counts: 88.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	5.00	5.208E-003	2.552E-003
U-234	4.71	4.51	4.82	4.00	4.167E-003	2.329E-003
Pu-242	4.90	4.68	4.95	3.00	3.125E-003	2.083E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	0.00	0.000E+000	1.473E-003
Am-243	5.23	5.05	5.31	0.00	0.000E+000	1.473E-003
U-232	5.25	5.06	5.40	8.00	8.333E-003	3.125E-003
Th-228	5.45	5.19	5.51	16.00	1.667E-002	4.295E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	16.00	1.667E-002	4.295E-003
Am-241	5.48	5.30	5.60	17.00	1.771E-002	4.419E-003
Cm-245	5.42	5.40	5.45	11.00	1.146E-002	3.608E-003
Pu-236	5.76	5.61	5.89	23.00	2.396E-002	5.103E-003
Cm-244	5.78	5.64	5.90	21.00	2.187E-002	4.886E-003
Th-227	6.07	5.93	6.18	2.00	2.083E-003	1.804E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:21:51AM 6/19/2014

Sample

Sample Name: ICB;AV88
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

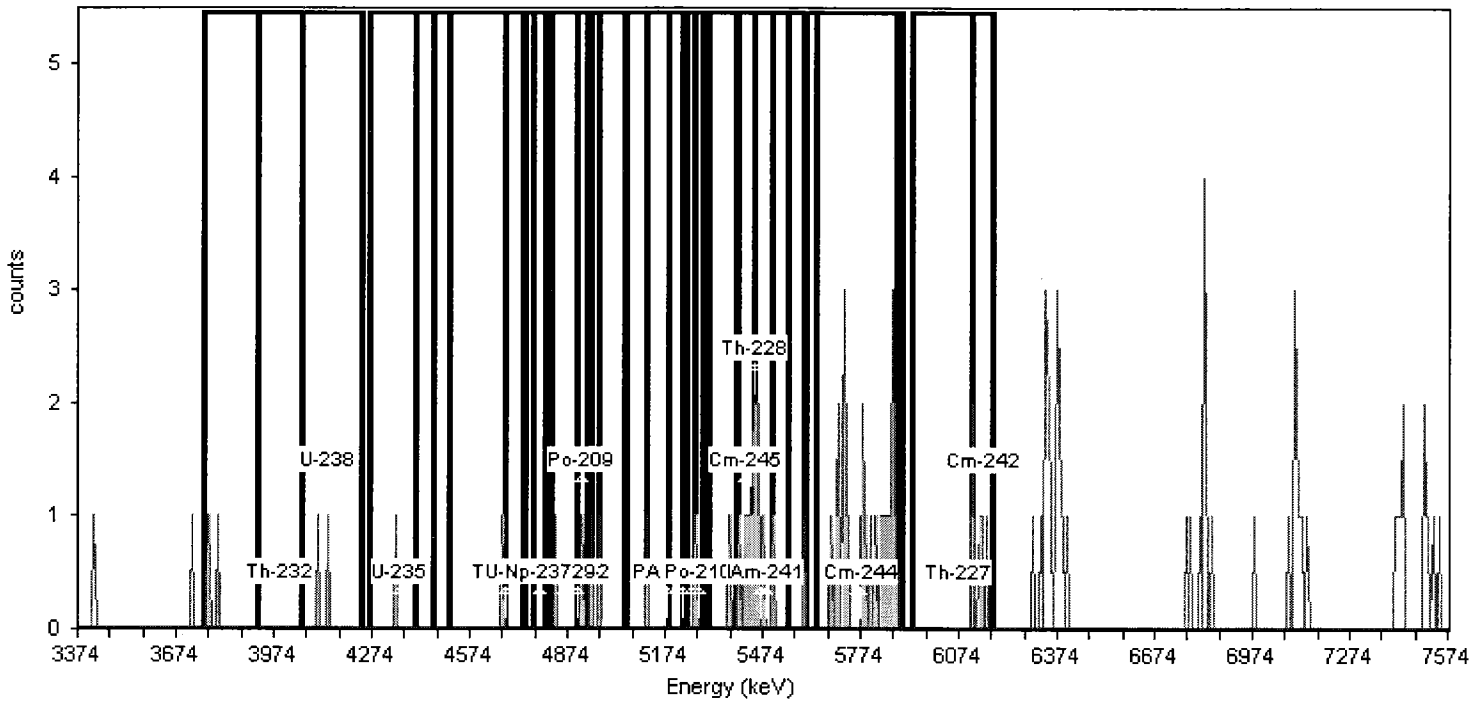
Analyst: 60040

Acquisition

Detector: AV88 , SN: 76-033FF1
Acquisition Start Date: 6/18/2014 7:09:06PM
Live Time: 960.00 min.
Real Time: 960.03 min.
Calibration Name: IC-9794;AV88-20140501
Calibration Date: 5/4/2014 5:32:29PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.24% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 101.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	1.00	1.042E-003	1.473E-003
U-234	4.71	4.51	4.82	1.00	1.042E-003	1.473E-003
Pu-242	4.90	4.68	4.95	3.00	3.125E-003	2.083E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	4.00	4.167E-003	2.329E-003
Th-228	5.45	5.19	5.51	15.00	1.563E-002	4.167E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	15.00	1.563E-002	4.167E-003
Am-241	5.48	5.30	5.60	15.00	1.563E-002	4.167E-003
Cm-245	5.42	5.40	5.45	7.00	7.292E-003	2.946E-003
Pu-236	5.76	5.61	5.89	24.00	2.500E-002	5.208E-003
Cm-244	5.78	5.64	5.90	24.00	2.500E-002	5.208E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	5.00	5.208E-003	2.552E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:22:38AM 6/19/2014

Sample

Sample Name: ICB;AV89
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

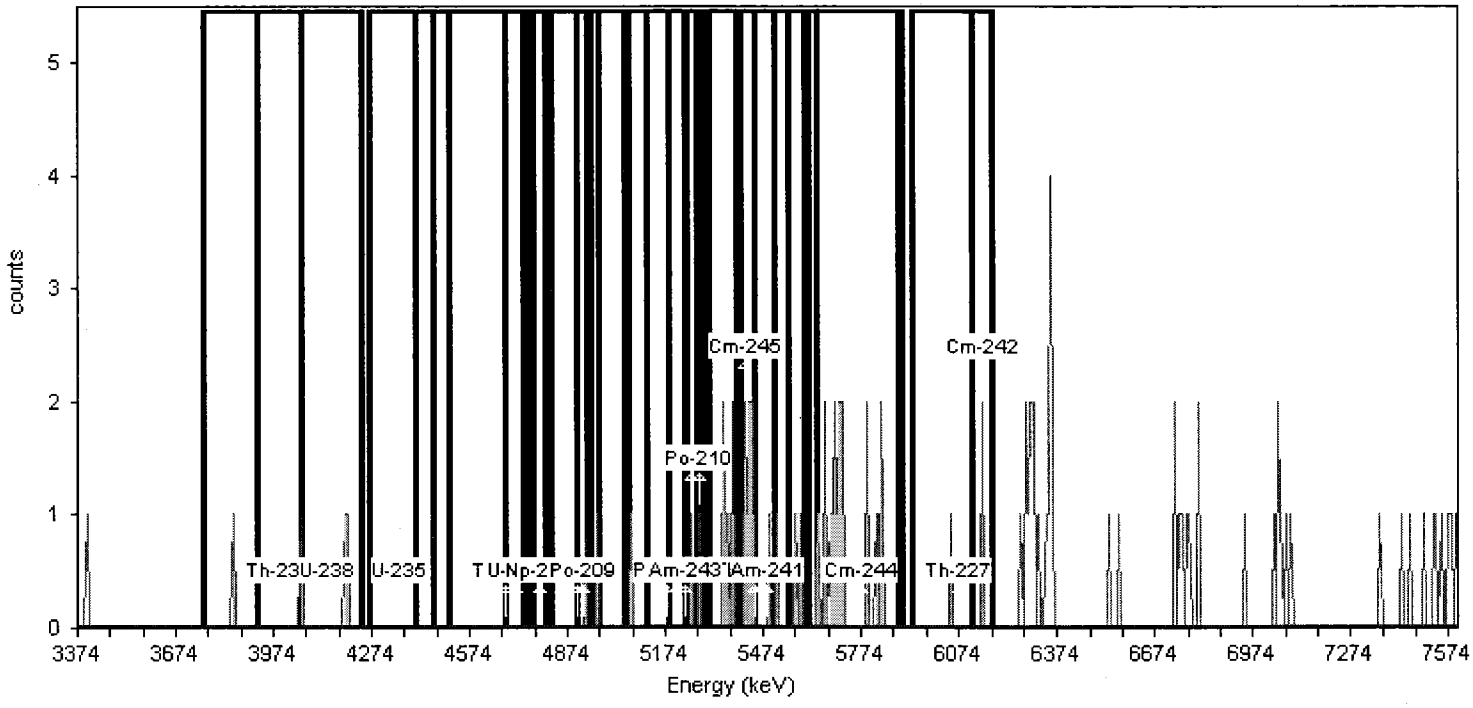
Analyst: 60040

Acquisition

Detector: AV89 , SN: 46-033P5
Acquisition Start Date: 6/18/2014 7:09:08PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9795;AV89-20140501
Calibration Date: 5/4/2014 5:32:37PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.35% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 91.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	0.00	0.000E+000	1.473E-003
U-234	4.71	4.51	4.82	0.00	0.000E+000	1.473E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	3.00	3.125E-003	2.083E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	9.00	9.375E-003	3.294E-003
Th-228	5.45	5.19	5.51	16.00	1.667E-002	4.295E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	16.00	1.667E-002	4.295E-003
Am-241	5.48	5.30	5.60	17.00	1.771E-002	4.419E-003
Cm-245	5.42	5.40	5.45	7.00	7.292E-003	2.946E-003
Pu-236	5.76	5.61	5.89	18.00	1.875E-002	4.541E-003
Cm-244	5.78	5.64	5.90	18.00	1.875E-002	4.541E-003
Th-227	6.07	5.93	6.18	3.00	3.125E-003	2.083E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:22:44AM 6/19/2014

Sample

Sample Name: ICB;AV90
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

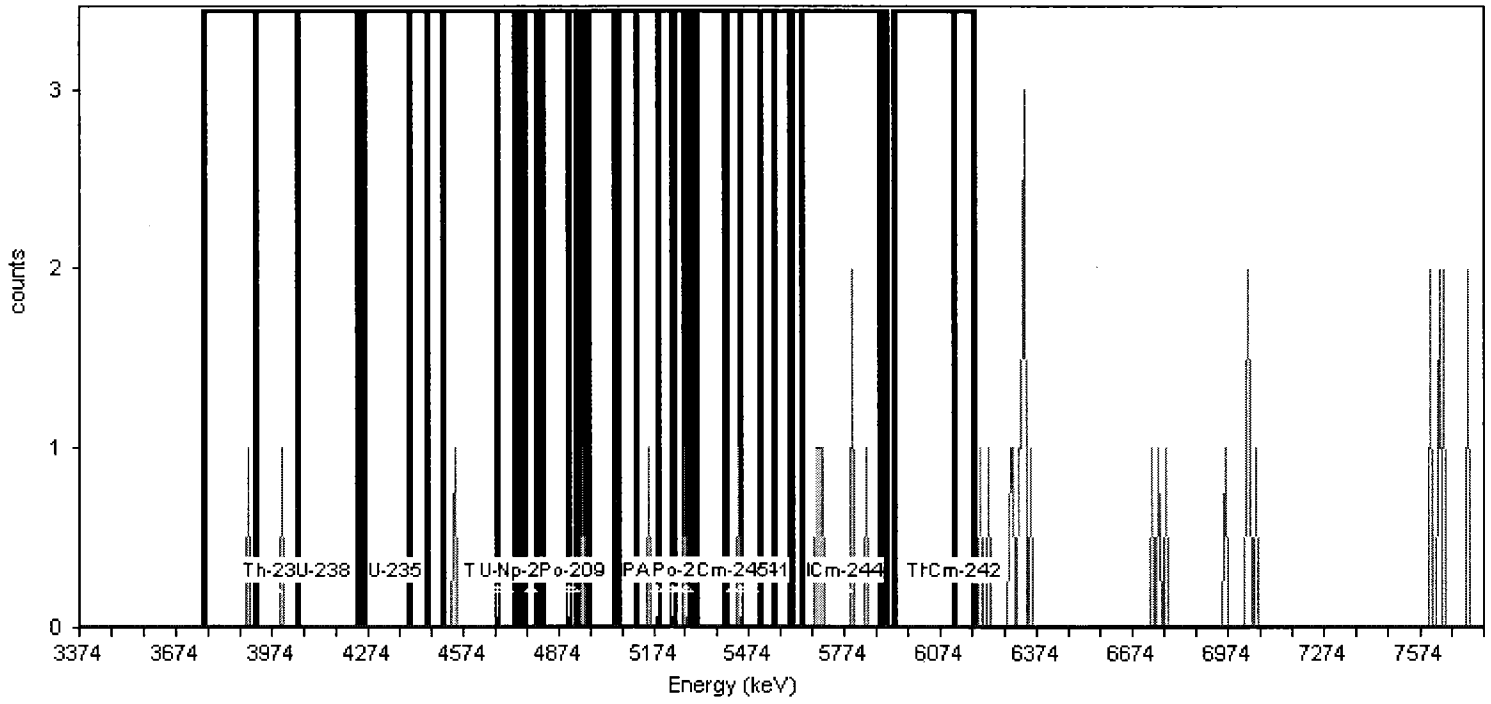
Analyst: 60040

Acquisition

Detector: AV90 , SN: 49-188R2
Acquisition Start Date: 6/18/2014 7:09:09PM
Live Time: 960.01 min.
Real Time: 960.04 min.
Calibration Name: IC-9817;AV90-20140501
Calibration Date: 5/4/2014 5:32:43PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.34% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 39.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	1.00	1.042E-003	1.473E-003
U-234	4.71	4.51	4.82	1.00	1.042E-003	1.473E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	2.00	2.083E-003	1.804E-003
Th-228	5.45	5.19	5.51	2.00	2.083E-003	1.804E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	2.00	2.083E-003	1.804E-003
Am-241	5.48	5.30	5.60	1.00	1.042E-003	1.473E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	6.00	6.250E-003	2.756E-003
Cm-244	5.78	5.64	5.90	6.00	6.250E-003	2.756E-003
Th-227	6.07	5.93	6.18	0.00	0.000E+000	1.473E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:40:10AM 6/19/2014

Sample

Sample Name: ICB;AV91
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

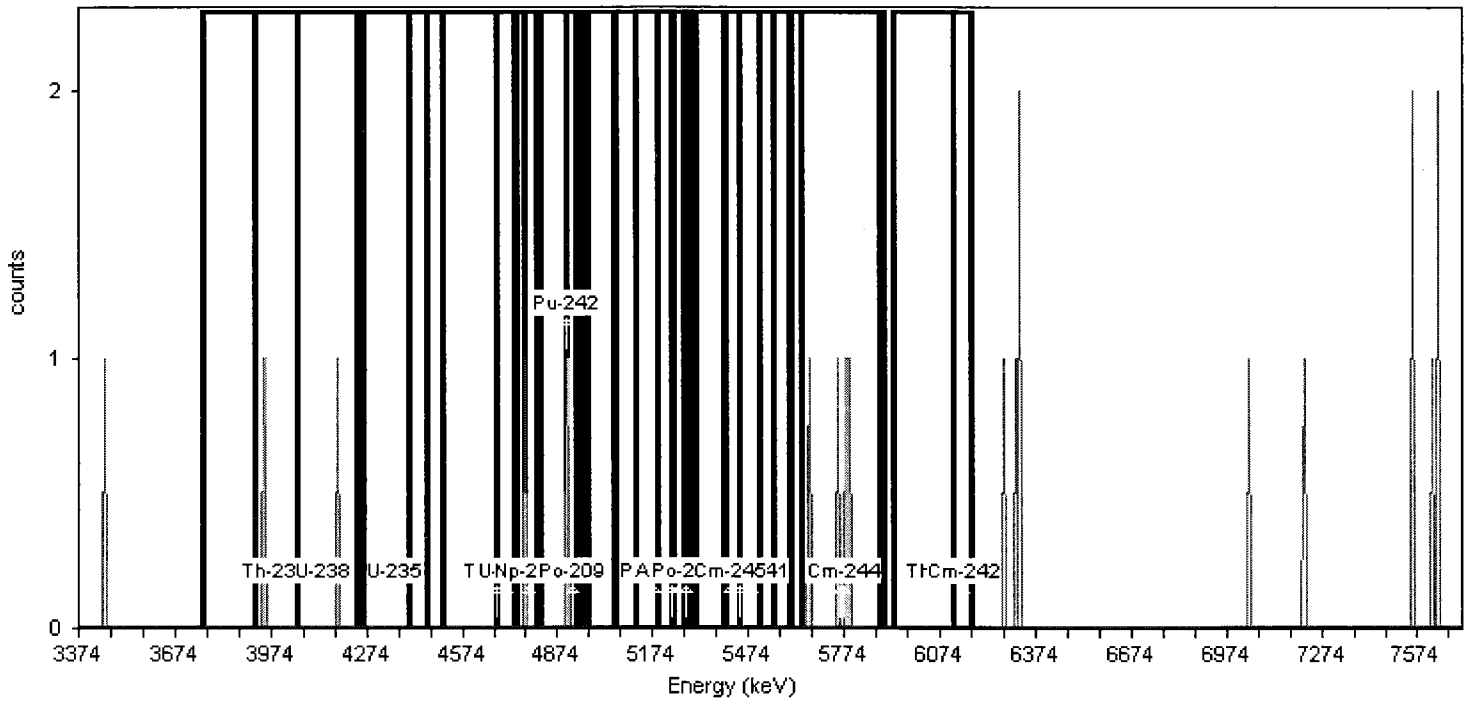
Analyst: 60040

Acquisition

Detector: AV91 , SN: 52-063gg5
Acquisition Start Date: 6/18/2014 7:09:11PM
Live Time: 960.00 min.
Real Time: 982.40 min.
Calibration Name: IC-9884;AV91-20140501
Calibration Date: 5/4/2014 5:32:49PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.57% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 20.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	0.00	0.000E+000	1.473E-003
U-234	4.71	4.51	4.82	1.00	1.042E-003	1.473E-003
Pu-242	4.90	4.68	4.95	2.00	2.083E-003	1.804E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	0.00	0.000E+000	1.473E-003
Am-243	5.23	5.05	5.31	0.00	0.000E+000	1.473E-003
U-232	5.25	5.06	5.40	0.00	0.000E+000	1.473E-003
Th-228	5.45	5.19	5.51	0.00	0.000E+000	1.473E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	0.00	0.000E+000	1.473E-003
Am-241	5.48	5.30	5.60	0.00	0.000E+000	1.473E-003
Cm-245	5.42	5.40	5.45	0.00	0.000E+000	1.473E-003
Pu-236	5.76	5.61	5.89	4.00	4.167E-003	2.329E-003
Cm-244	5.78	5.64	5.90	4.00	4.167E-003	2.329E-003
Th-227	6.07	5.93	6.18	0.00	0.000E+000	1.473E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:40:45AM 6/19/2014

Sample

Sample Name: ICB;AV93
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

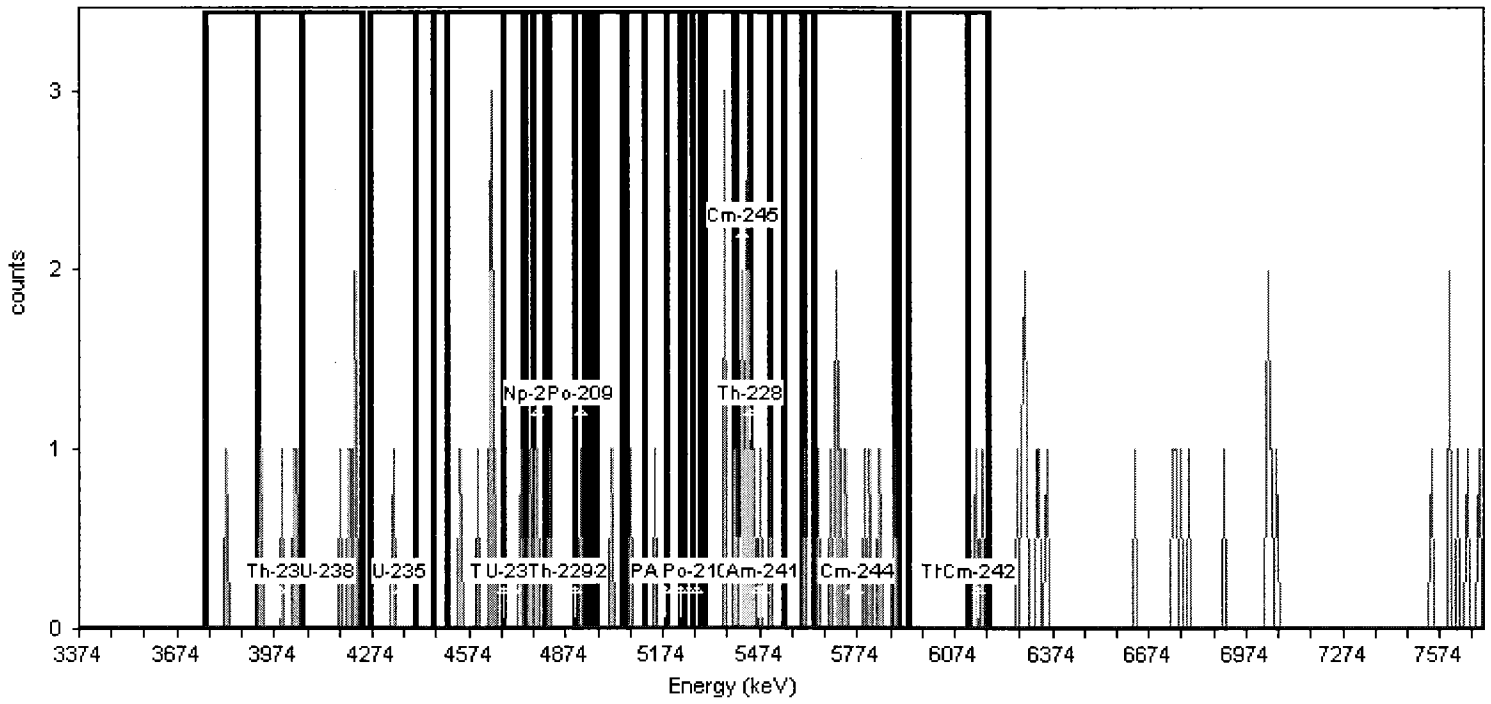
Analyst: 60040

Acquisition

Detector: AV93 , SN: 46-033Q2
Acquisition Start Date: 6/18/2014 7:09:14PM
Live Time: 960.00 min.
Real Time: 982.40 min.
Calibration Name: IC-9886;AV93-20140501
Calibration Date: 5/4/2014 5:33:02PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.42% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 84.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	5.00	5.208E-003	2.552E-003
U-238	4.14	3.92	4.24	9.00	9.375E-003	3.294E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	9.00	9.375E-003	3.294E-003
U-234	4.71	4.51	4.82	13.00	1.354E-002	3.898E-003
Pu-242	4.90	4.68	4.95	6.00	6.250E-003	2.756E-003
Th-229	4.86	4.74	5.12	7.00	7.292E-003	2.946E-003
Np-237	4.78	4.77	4.81	2.00	2.083E-003	1.804E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	7.00	7.292E-003	2.946E-003
Th-228	5.45	5.19	5.51	17.00	1.771E-002	4.419E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	17.00	1.771E-002	4.419E-003
Am-241	5.48	5.30	5.60	17.00	1.771E-002	4.419E-003
Cm-245	5.42	5.40	5.45	11.00	1.146E-002	3.608E-003
Pu-236	5.76	5.61	5.89	12.00	1.250E-002	3.756E-003
Cm-244	5.78	5.64	5.90	11.00	1.146E-002	3.608E-003
Th-227	6.07	5.93	6.18	2.00	2.083E-003	1.804E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:40:51AM 6/19/2014

Sample

Sample Name: ICB;AV94
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

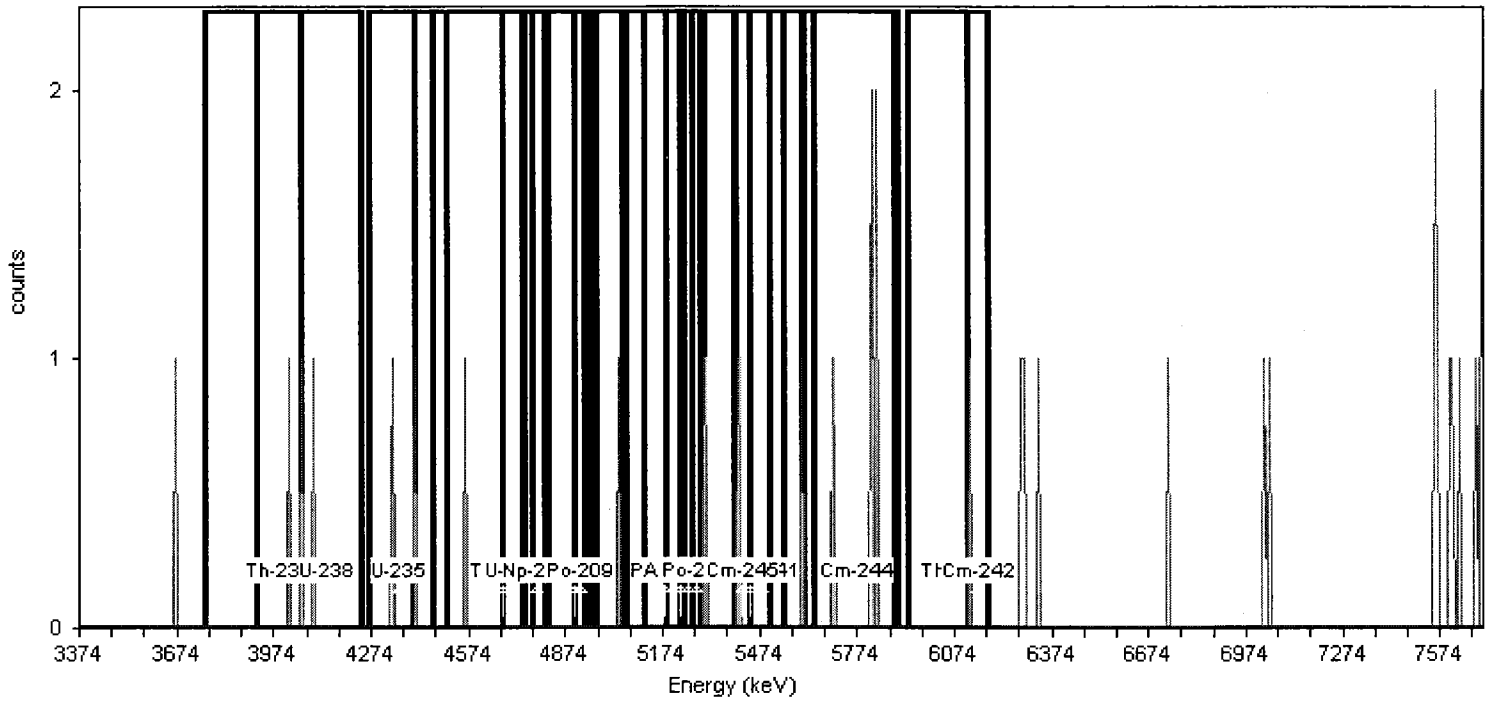
Analyst: 60040

Acquisition

Detector: AV94 , SN: 49-203ff5
Acquisition Start Date: 6/18/2014 7:09:15PM
Live Time: 960.00 min.
Real Time: 982.40 min.
Calibration Name: IC-7107;AV94-20140501a
Calibration Date: 5/1/2014 5:52:31PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.27% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 33.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	2.00	2.083E-003	1.804E-003
U-234	4.71	4.51	4.82	1.00	1.042E-003	1.473E-003
Pu-242	4.90	4.68	4.95	0.00	0.000E+000	1.473E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	1.00	1.042E-003	1.473E-003
U-232	5.25	5.06	5.40	1.00	1.042E-003	1.473E-003
Th-228	5.45	5.19	5.51	2.00	2.083E-003	1.804E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	2.00	2.083E-003	1.804E-003
Am-241	5.48	5.30	5.60	3.00	3.125E-003	2.083E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	5.00	5.208E-003	2.552E-003
Cm-244	5.78	5.64	5.90	5.00	5.208E-003	2.552E-003
Th-227	6.07	5.93	6.18	1.00	1.042E-003	1.473E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:22:06PM 6/22/2014

Sample

Sample Name: ICB;AV95
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014c
Description:

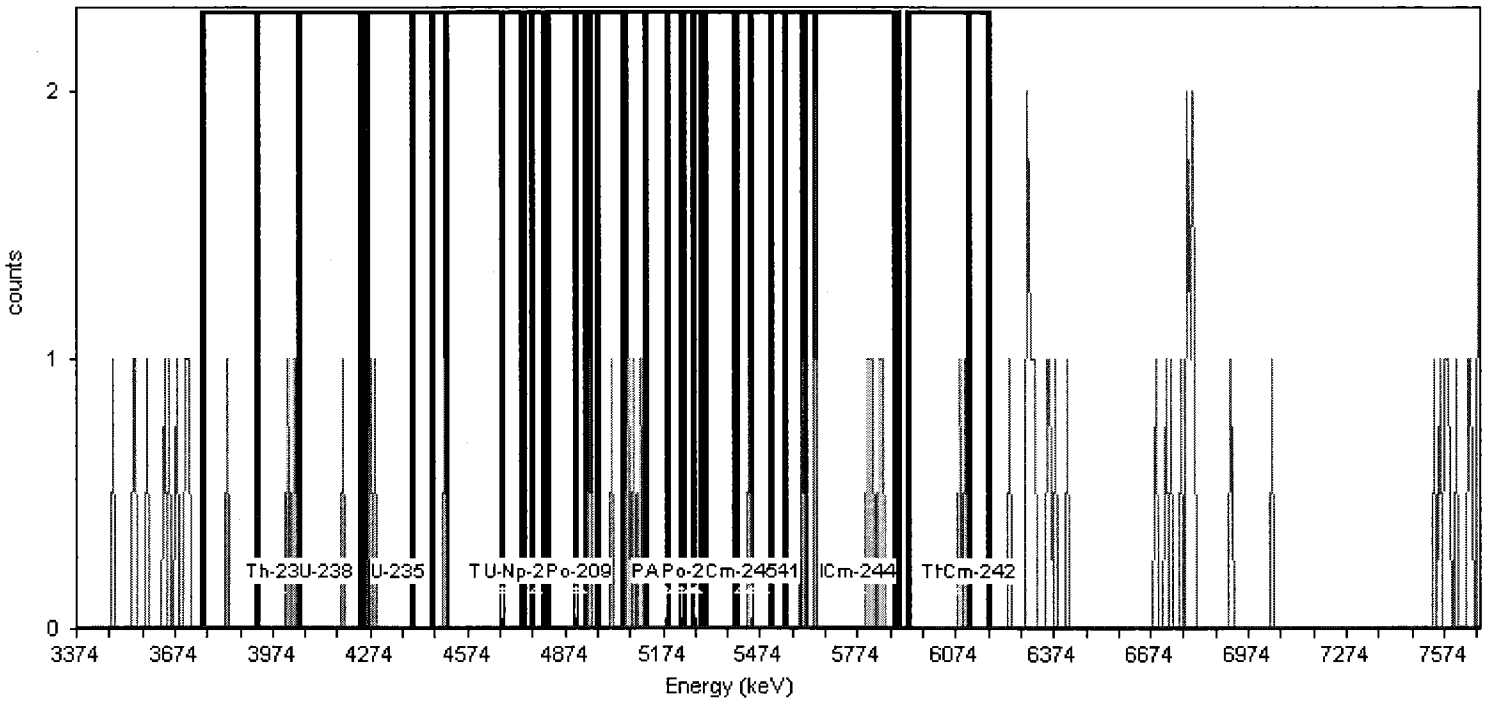
Analyst: 60040

Acquisition

Detector: AV95 , SN: 49-155n3
Acquisition Start Date: 6/19/2014 7:57:07PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8874;AV95-20140501a
Calibration Date: 5/1/2014 5:52:40PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.86% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 65.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	4.00	4.167E-003	2.329E-003
U-238	4.14	3.92	4.24	4.00	4.167E-003	2.329E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	1.00	1.042E-003	1.473E-003
U-234	4.71	4.51	4.82	0.00	0.000E+000	1.473E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	3.00	3.125E-003	2.083E-003
Th-228	5.45	5.19	5.51	1.00	1.042E-003	1.473E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	1.00	1.042E-003	1.473E-003
Am-241	5.48	5.30	5.60	2.00	2.083E-003	1.804E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	7.00	7.292E-003	2.946E-003
Cm-244	5.78	5.64	5.90	7.00	7.292E-003	2.946E-003
Th-227	6.07	5.93	6.18	2.00	2.083E-003	1.804E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:41:02AM 6/19/2014

Sample

Sample Name: ICB;AV96
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

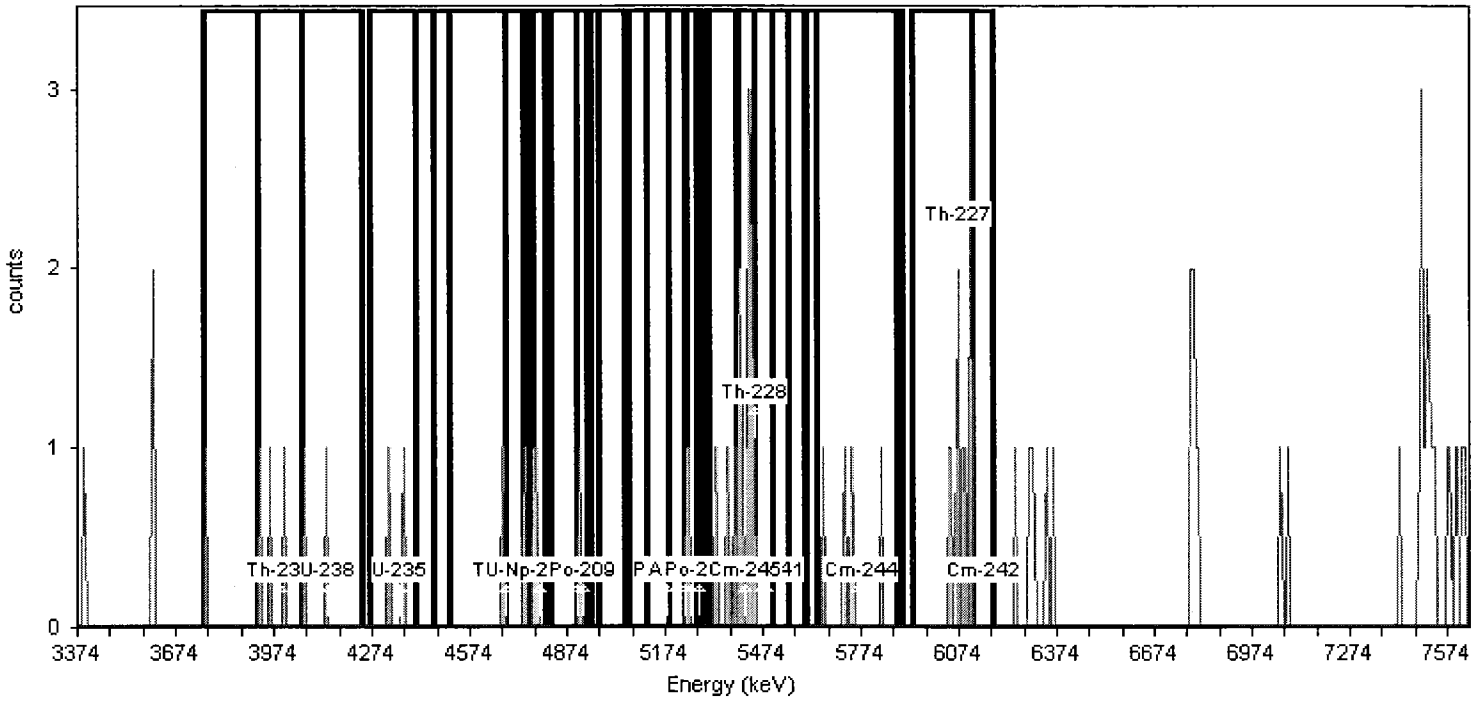
Analyst: 60040

Acquisition

Detector: AV96 , SN: 46-033P1
Acquisition Start Date: 6/18/2014 7:09:19PM
Live Time: 960.00 min.
Real Time: 982.40 min.
Calibration Name: IC-8875;AV96-20140501
Calibration Date: 5/1/2014 5:52:48PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.13% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 77.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	4.00	4.167E-003	2.329E-003
U-238	4.14	3.92	4.24	5.00	5.208E-003	2.552E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	2.00	2.083E-003	1.804E-003
U-234	4.71	4.51	4.82	4.00	4.167E-003	2.329E-003
Pu-242	4.90	4.68	4.95	4.00	4.167E-003	2.329E-003
Th-229	4.86	4.74	5.12	4.00	4.167E-003	2.329E-003
Np-237	4.78	4.77	4.81	2.00	2.083E-003	1.804E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	7.00	7.292E-003	2.946E-003
Th-228	5.45	5.19	5.51	15.00	1.563E-002	4.167E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	13.00	1.354E-002	3.898E-003
Am-241	5.48	5.30	5.60	13.00	1.354E-002	3.898E-003
Cm-245	5.42	5.40	5.45	10.00	1.042E-002	3.455E-003
Pu-236	5.76	5.61	5.89	4.00	4.167E-003	2.329E-003
Cm-244	5.78	5.64	5.90	4.00	4.167E-003	2.329E-003
Th-227	6.07	5.93	6.18	10.00	1.042E-002	3.455E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:41:07AM 6/19/2014

Sample

Sample Name: ICB;AV97
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

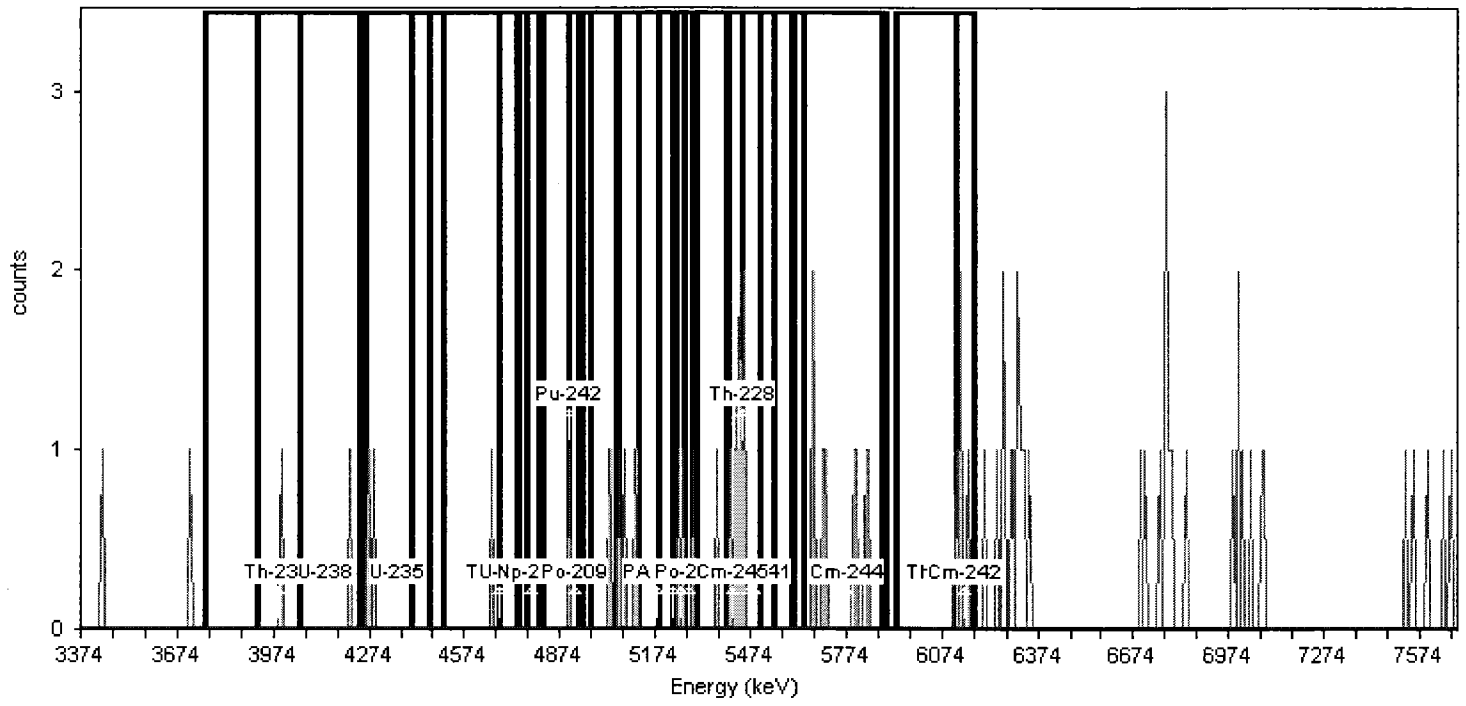
Analyst: 60040

Acquisition

Detector: AV97 , SN: 76-03393
Acquisition Start Date: 6/18/2014 7:09:21PM
Live Time: 960.00 min.
Real Time: 982.38 min.
Calibration Name: IC-8876;AV97-20140501
Calibration Date: 5/1/2014 5:52:54PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.30% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 70.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	1.00	1.042E-003	1.473E-003
U-234	4.71	4.51	4.82	1.00	1.042E-003	1.473E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	6.00	6.250E-003	2.756E-003
U-232	5.25	5.06	5.40	7.00	7.292E-003	2.946E-003
Th-228	5.45	5.19	5.51	12.00	1.250E-002	3.756E-003
Po-210	5.28	5.23	5.29	3.00	3.125E-003	2.083E-003
Pu-238	5.47	5.27	5.55	10.00	1.042E-002	3.455E-003
Am-241	5.48	5.30	5.60	9.00	9.375E-003	3.294E-003
Cm-245	5.42	5.40	5.45	6.00	6.250E-003	2.756E-003
Pu-236	5.76	5.61	5.89	8.00	8.333E-003	3.125E-003
Cm-244	5.78	5.64	5.90	8.00	8.333E-003	3.125E-003
Th-227	6.07	5.93	6.18	4.00	4.167E-003	2.329E-003
Cm-242	6.15	6.12	6.18	4.00	4.167E-003	2.329E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:41:13AM 6/19/2014

Sample

Sample Name: ICB;AV98
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014b
Description:

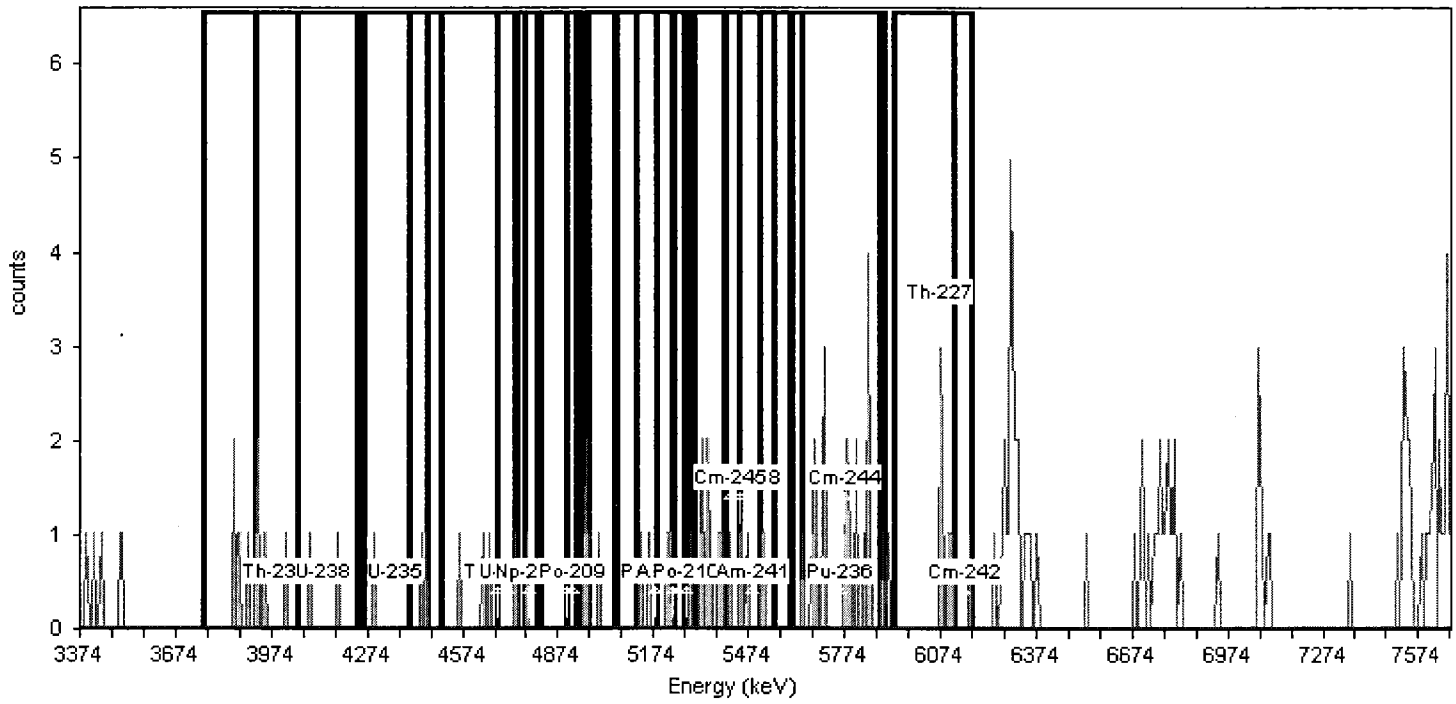
Analyst: 60040

Acquisition

Detector: AV98 , SN: 46-033Q3
Acquisition Start Date: 6/18/2014 7:09:23PM
Live Time: 960.01 min.
Real Time: 982.40 min.
Calibration Name: IC-8877;AV98-20140501
Calibration Date: 5/1/2014 5:53:01PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.76% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 156.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	9.00	9.375E-003	3.294E-003
U-238	4.14	3.92	4.24	7.00	7.292E-003	2.946E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	5.00	5.208E-003	2.552E-003
Pu-242	4.90	4.68	4.95	2.00	2.083E-003	1.804E-003
Th-229	4.86	4.74	5.12	6.00	6.250E-003	2.756E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	5.00	5.208E-003	2.552E-003
Am-243	5.23	5.05	5.31	5.00	5.208E-003	2.552E-003
U-232	5.25	5.06	5.40	13.00	1.354E-002	3.898E-003
Th-228	5.45	5.19	5.51	15.00	1.562E-002	4.167E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	15.00	1.562E-002	4.167E-003
Am-241	5.48	5.30	5.60	14.00	1.458E-002	4.034E-003
Cm-245	5.42	5.40	5.45	2.00	2.083E-003	1.804E-003
Pu-236	5.76	5.61	5.89	20.00	2.083E-002	4.773E-003
Cm-244	5.78	5.64	5.90	21.00	2.187E-002	4.886E-003
Th-227	6.07	5.93	6.18	8.00	8.333E-003	3.125E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:22:50AM 6/19/2014

Sample

Sample Name: ICB;AV99
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

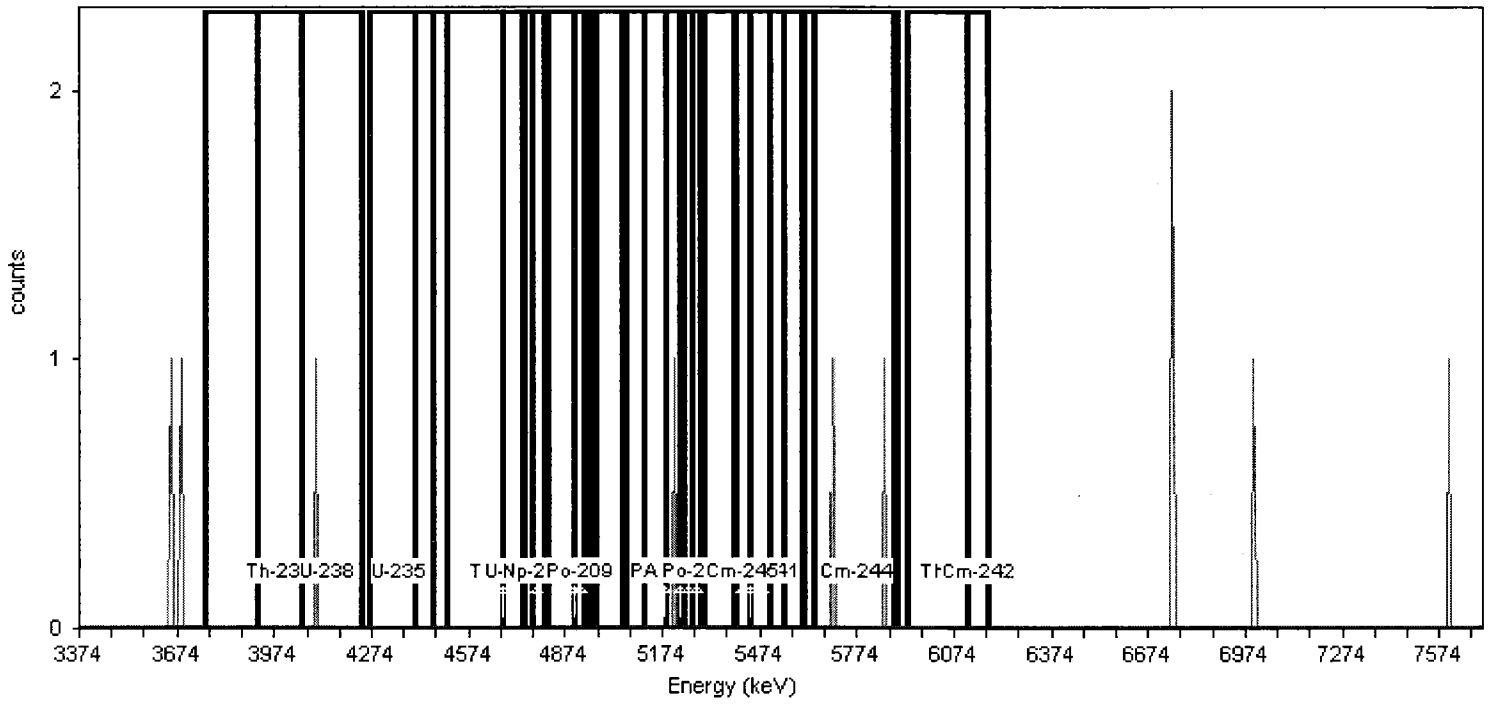
Analyst: 60040

Acquisition

Detector: AV99 , SN: 52-059DD3
Acquisition Start Date: 6/18/2014 7:09:23PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9520;AV99-20140501
Calibration Date: 5/1/2014 5:53:07PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.29% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 10.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	0.00	0.000E+000	1.473E-003
U-234	4.71	4.51	4.82	0.00	0.000E+000	1.473E-003
Pu-242	4.90	4.68	4.95	0.00	0.000E+000	1.473E-003
Th-229	4.86	4.74	5.12	0.00	0.000E+000	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	1.00	1.042E-003	1.473E-003
U-232	5.25	5.06	5.40	1.00	1.042E-003	1.473E-003
Th-228	5.45	5.19	5.51	1.00	1.042E-003	1.473E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	0.00	0.000E+000	1.473E-003
Am-241	5.48	5.30	5.60	0.00	0.000E+000	1.473E-003
Cm-245	5.42	5.40	5.45	0.00	0.000E+000	1.473E-003
Pu-236	5.76	5.61	5.89	2.00	2.083E-003	1.804E-003
Cm-244	5.78	5.64	5.90	2.00	2.083E-003	1.804E-003
Th-227	6.07	5.93	6.18	0.00	0.000E+000	1.473E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:22:55AM 6/19/2014

Sample

Sample Name: ICB;AV100
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

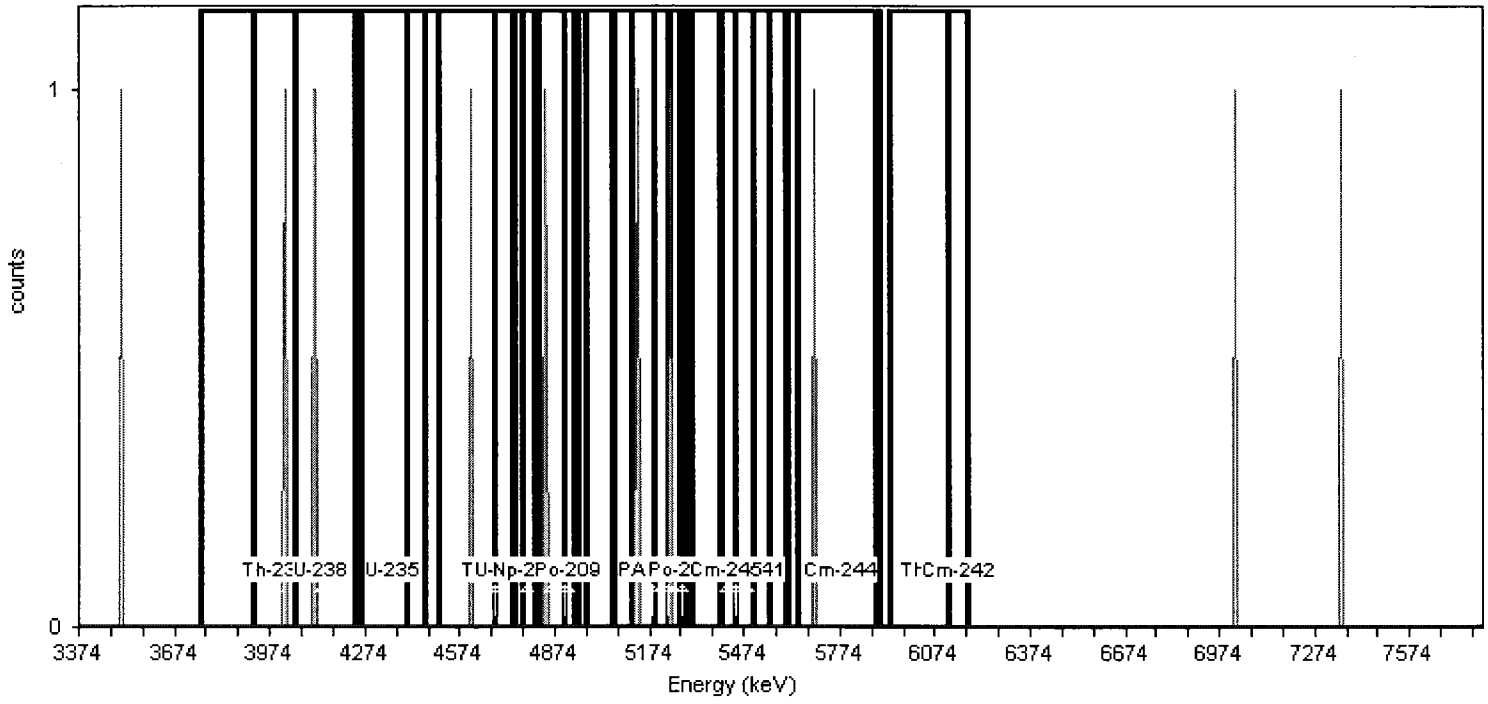
Analyst: 60040

Acquisition

Detector: AV100 , SN: 49-037W4
Acquisition Start Date: 6/18/2014 7:09:25PM
Live Time: 960.00 min.
Real Time: 960.03 min.
Calibration Name: IC-8874;AV100-20140507
Calibration Date: 5/7/2014 10:49:22PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.77% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 11.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	1.00	1.042E-003	1.473E-003
U-234	4.71	4.51	4.82	1.00	1.042E-003	1.473E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	2.00	2.083E-003	1.804E-003
Th-228	5.45	5.19	5.51	1.00	1.042E-003	1.473E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	0.00	0.000E+000	1.473E-003
Am-241	5.48	5.30	5.60	0.00	0.000E+000	1.473E-003
Cm-245	5.42	5.40	5.45	0.00	0.000E+000	1.473E-003
Pu-236	5.76	5.61	5.89	1.00	1.042E-003	1.473E-003
Cm-244	5.78	5.64	5.90	1.00	1.042E-003	1.473E-003
Th-227	6.07	5.93	6.18	0.00	0.000E+000	1.473E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:23:00AM 6/19/2014

Sample

Sample Name: ICB;AV101
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

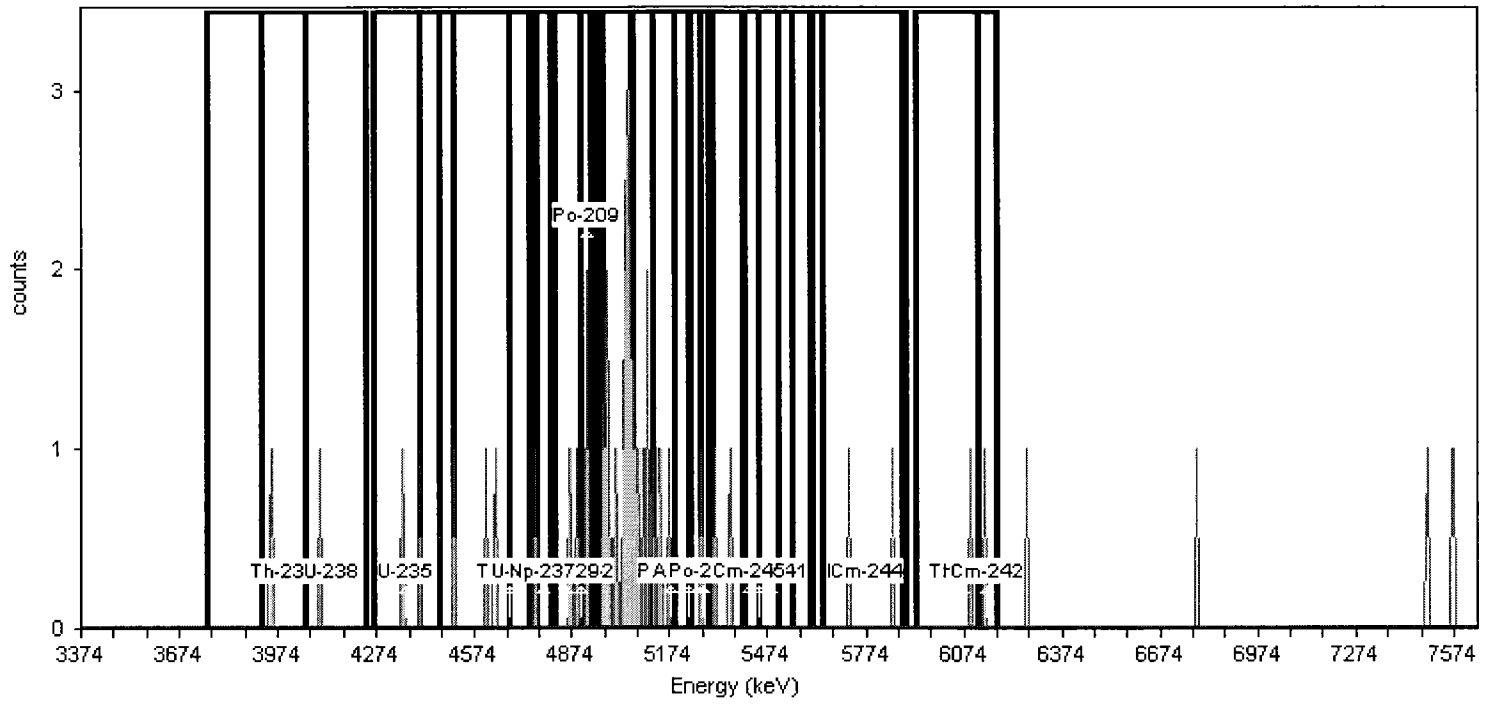
Analyst: 60040

Acquisition

Detector: AV101 , SN: 49-037X6
Acquisition Start Date: 6/18/2014 7:09:27PM
Live Time: 960.00 min.
Real Time: 960.03 min.
Calibration Name: IC-9792;AV101-20140501
Calibration Date: 5/1/2014 5:53:24PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.53% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 46.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	4.00	4.167E-003	2.329E-003
U-234	4.71	4.51	4.82	4.00	4.167E-003	2.329E-003
Pu-242	4.90	4.68	4.95	5.00	5.208E-003	2.552E-003
Th-229	4.86	4.74	5.12	25.00	2.604E-002	5.311E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	2.00	2.083E-003	1.804E-003
Pu-239	5.18	4.97	5.24	22.00	2.292E-002	4.996E-003
Am-243	5.23	5.05	5.31	12.00	1.250E-002	3.756E-003
U-232	5.25	5.06	5.40	12.00	1.250E-002	3.756E-003
Th-228	5.45	5.19	5.51	3.00	3.125E-003	2.083E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	3.00	3.125E-003	2.083E-003
Am-241	5.48	5.30	5.60	2.00	2.083E-003	1.804E-003
Cm-245	5.42	5.40	5.45	0.00	0.000E+000	1.473E-003
Pu-236	5.76	5.61	5.89	2.00	2.083E-003	1.804E-003
Cm-244	5.78	5.64	5.90	2.00	2.083E-003	1.804E-003
Th-227	6.07	5.93	6.18	2.00	2.083E-003	1.804E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:23:06AM 6/19/2014

Sample

Sample Name: ICB;AV102
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

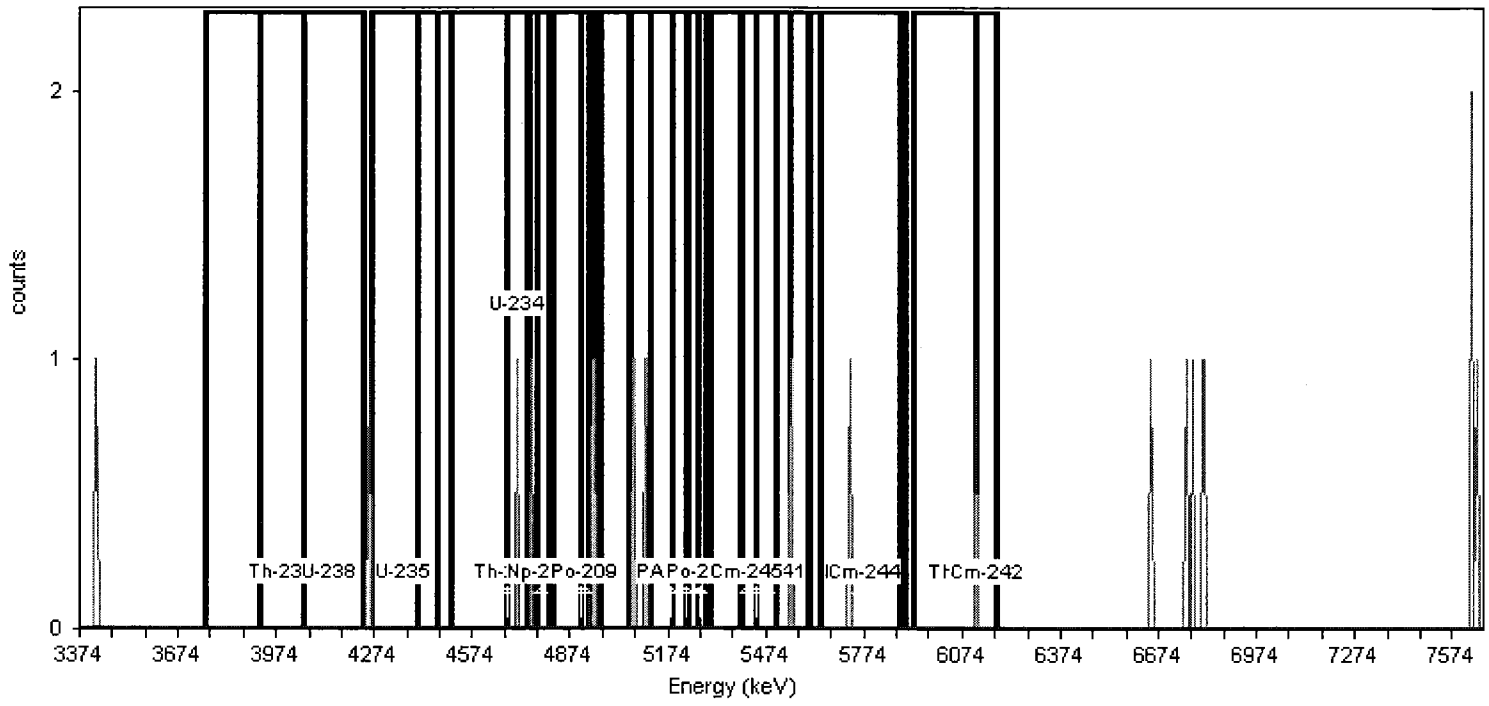
Analyst: 60040

Acquisition

Detector: AV102 , SN: 49-037X1
Acquisition Start Date: 6/18/2014 7:09:29PM
Live Time: 960.00 min.
Real Time: 960.03 min.
Calibration Name: IC-9793;AV102-20140501
Calibration Date: 5/1/2014 5:53:30PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.47% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 19.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	0.00	0.000E+000	1.473E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	1.00	1.042E-003	1.473E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	4.00	4.167E-003	2.329E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	2.00	2.083E-003	1.804E-003
Th-228	5.45	5.19	5.51	0.00	0.000E+000	1.473E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	1.00	1.042E-003	1.473E-003
Am-241	5.48	5.30	5.60	1.00	1.042E-003	1.473E-003
Cm-245	5.42	5.40	5.45	0.00	0.000E+000	1.473E-003
Pu-236	5.76	5.61	5.89	1.00	1.042E-003	1.473E-003
Cm-244	5.78	5.64	5.90	1.00	1.042E-003	1.473E-003
Th-227	6.07	5.93	6.18	1.00	1.042E-003	1.473E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:23:12AM 6/19/2014

Sample

Sample Name: ICB;AV103
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

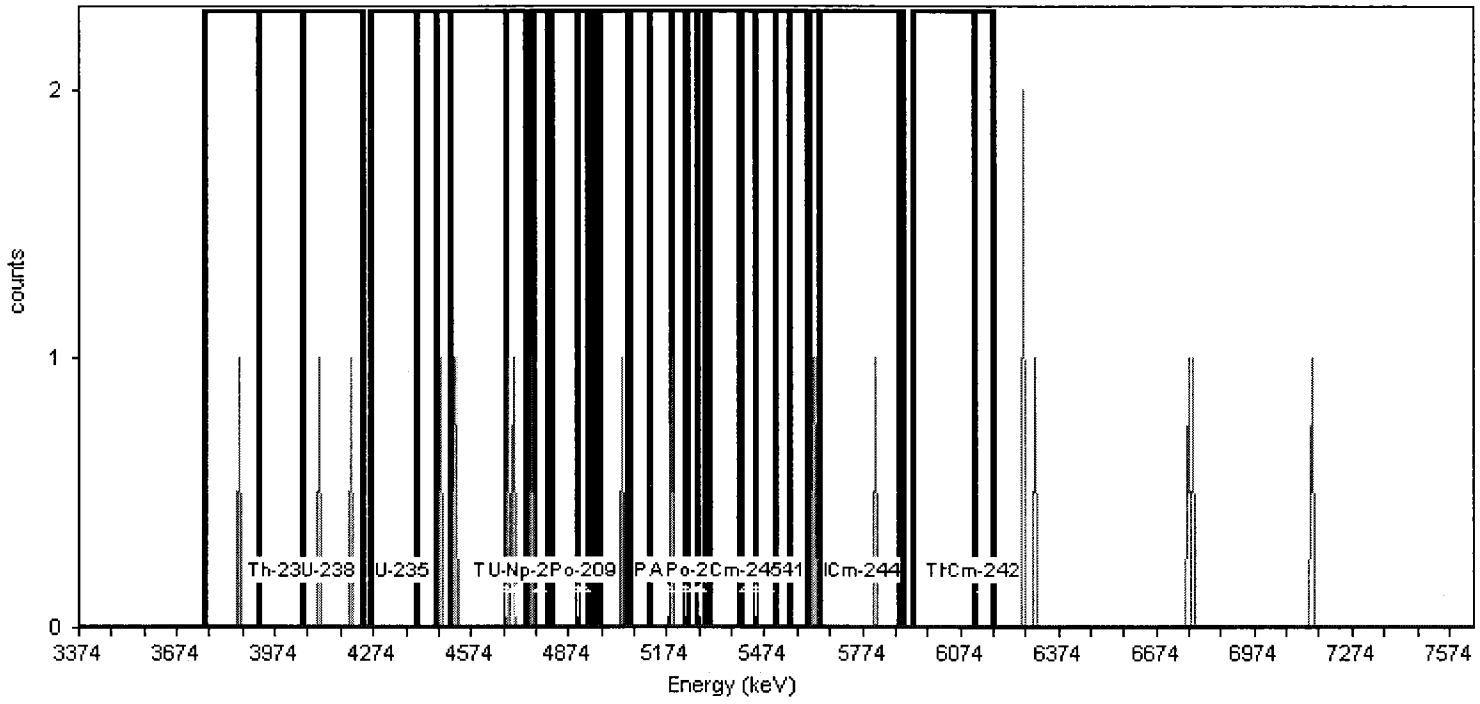
Analyst: 60040

Acquisition

Detector: AV103 , SN: 49-037F3
Acquisition Start Date: 6/18/2014 7:09:30PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9794;AV103-20140501
Calibration Date: 5/1/2014 5:53:36PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.03% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 18.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	4.00	4.167E-003	2.329E-003
U-234	4.71	4.51	4.82	4.00	4.167E-003	2.329E-003
Pu-242	4.90	4.68	4.95	3.00	3.125E-003	2.083E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	1.00	1.042E-003	1.473E-003
U-232	5.25	5.06	5.40	1.00	1.042E-003	1.473E-003
Th-228	5.45	5.19	5.51	1.00	1.042E-003	1.473E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	0.00	0.000E+000	1.473E-003
Am-241	5.48	5.30	5.60	0.00	0.000E+000	1.473E-003
Cm-245	5.42	5.40	5.45	0.00	0.000E+000	1.473E-003
Pu-236	5.76	5.61	5.89	2.00	2.083E-003	1.804E-003
Cm-244	5.78	5.64	5.90	1.00	1.042E-003	1.473E-003
Th-227	6.07	5.93	6.18	0.00	0.000E+000	1.473E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:23:18AM 6/19/2014

Sample

Sample Name: ICB;AV104
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

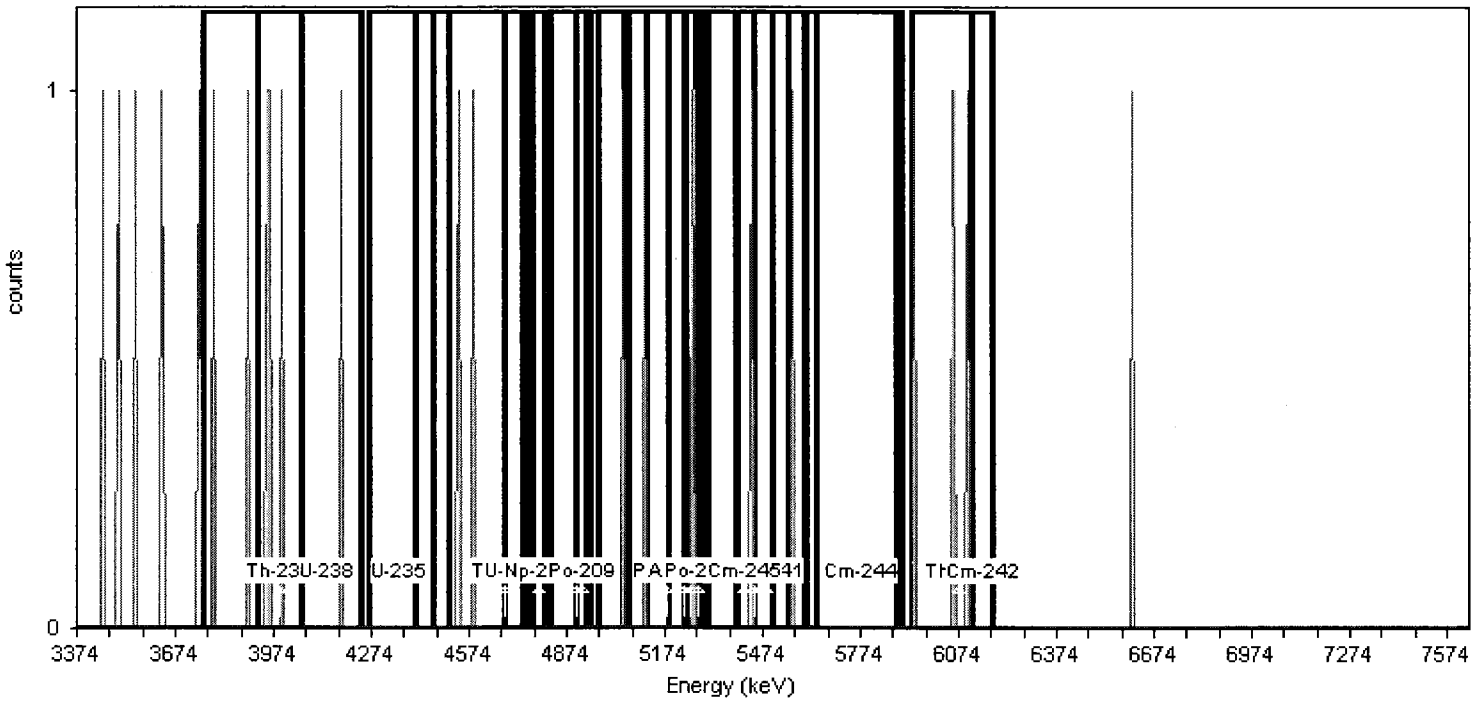
Analyst: 60040

Acquisition

Detector: AV104 , SN: 49-037E5
Acquisition Start Date: 6/18/2014 7:09:32PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9795;AV104-20140501
Calibration Date: 5/1/2014 5:53:43PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.99% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 22.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	5.00	5.208E-003	2.552E-003
U-238	4.14	3.92	4.24	4.00	4.167E-003	2.329E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	2.00	2.083E-003	1.804E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	0.00	0.000E+000	1.473E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	2.00	2.083E-003	1.804E-003
Th-228	5.45	5.19	5.51	2.00	2.083E-003	1.804E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	1.00	1.042E-003	1.473E-003
Am-241	5.48	5.30	5.60	2.00	2.083E-003	1.804E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	0.00	0.000E+000	1.473E-003
Cm-244	5.78	5.64	5.90	0.00	0.000E+000	1.473E-003
Th-227	6.07	5.93	6.18	3.00	3.125E-003	2.083E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:23:23AM 6/19/2014

Sample

Sample Name: ICB;AV105
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

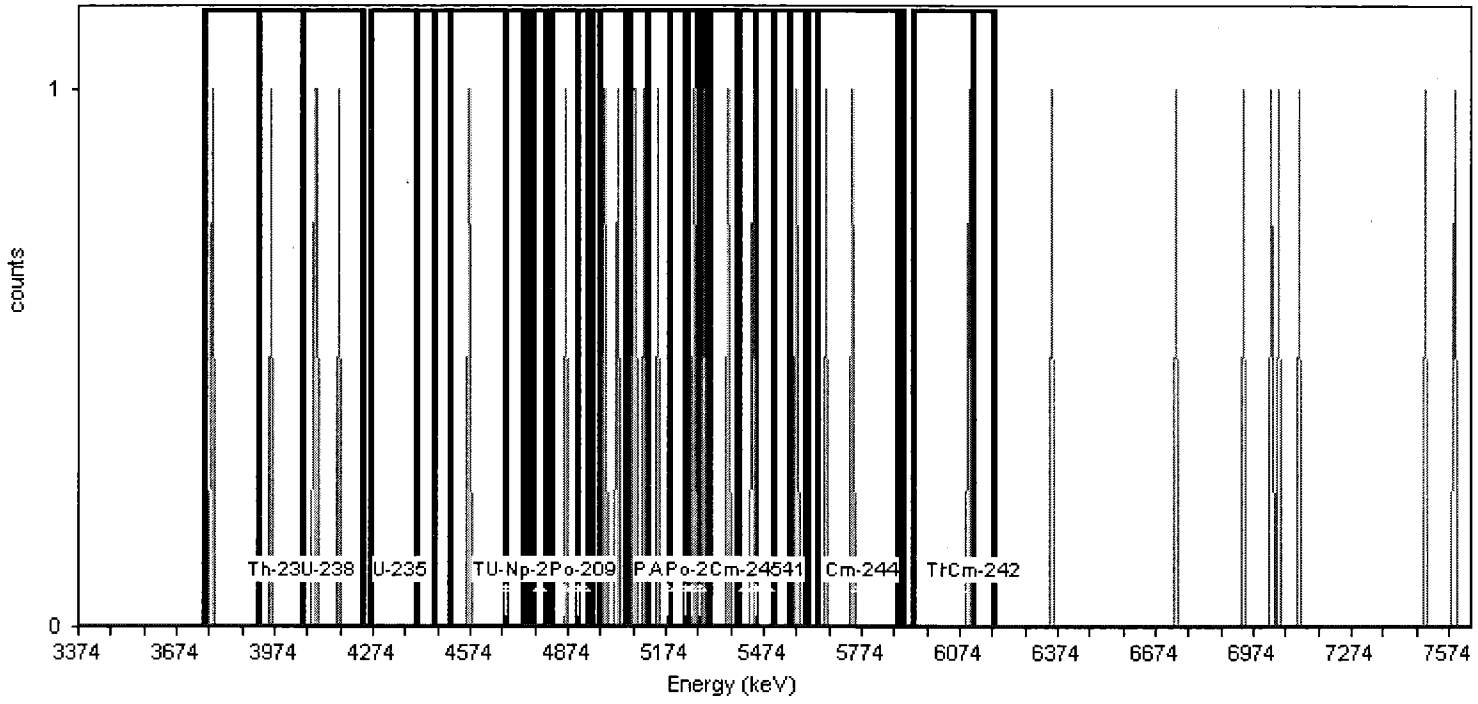
Analyst: 60040

Acquisition

Detector: AV105 , SN: 49-037F1
Acquisition Start Date: 6/18/2014 7:09:34PM
Live Time: 960.00 min.
Real Time: 960.03 min.
Calibration Name: IC-9817;AV105-20140501
Calibration Date: 5/1/2014 5:53:50PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.05% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 29.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	4.00	4.167E-003	2.329E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	1.00	1.042E-003	1.473E-003
U-234	4.71	4.51	4.82	1.00	1.042E-003	1.473E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	6.00	6.250E-003	2.756E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	6.00	6.250E-003	2.756E-003
Am-243	5.23	5.05	5.31	6.00	6.250E-003	2.756E-003
U-232	5.25	5.06	5.40	7.00	7.292E-003	2.946E-003
Th-228	5.45	5.19	5.51	4.00	4.167E-003	2.329E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	3.00	3.125E-003	2.083E-003
Am-241	5.48	5.30	5.60	3.00	3.125E-003	2.083E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	2.00	2.083E-003	1.804E-003
Cm-244	5.78	5.64	5.90	2.00	2.083E-003	1.804E-003
Th-227	6.07	5.93	6.18	1.00	1.042E-003	1.473E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:24:31AM 6/19/2014

Sample

Sample Name: ICB;AV119
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

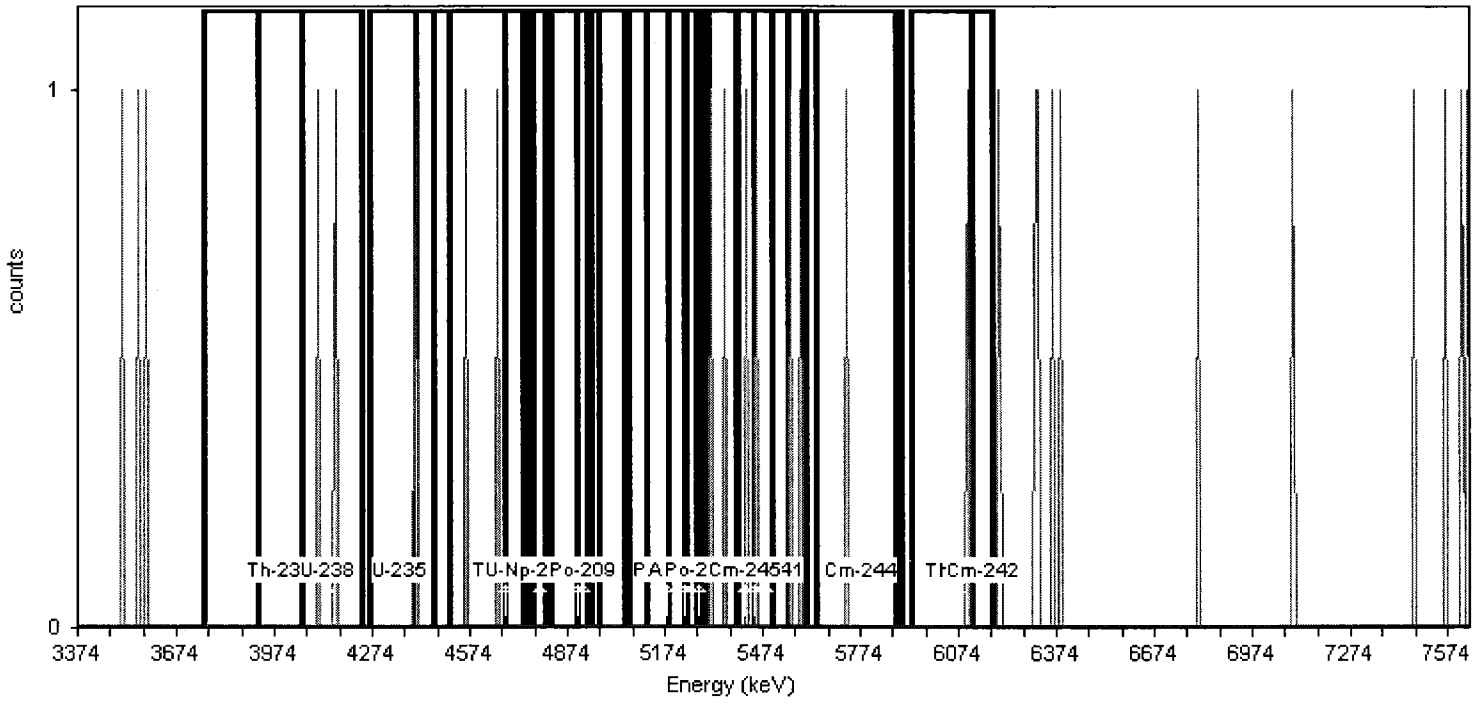
Analyst: 60040

Acquisition

Detector: AV119 , SN: 49-037G6
Acquisition Start Date: 6/18/2014 7:09:58PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9795;AV119-20140430
Calibration Date: 5/1/2014 1:17:18PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.42% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 27.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	3.00	3.125E-003	2.083E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	0.00	0.000E+000	1.473E-003
Th-229	4.86	4.74	5.12	0.00	0.000E+000	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	0.00	0.000E+000	1.473E-003
Am-243	5.23	5.05	5.31	0.00	0.000E+000	1.473E-003
U-232	5.25	5.06	5.40	2.00	2.083E-003	1.804E-003
Th-228	5.45	5.19	5.51	4.00	4.167E-003	2.329E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	4.00	4.167E-003	2.329E-003
Am-241	5.48	5.30	5.60	6.00	6.250E-003	2.756E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	1.00	1.042E-003	1.473E-003
Cm-244	5.78	5.64	5.90	1.00	1.042E-003	1.473E-003
Th-227	6.07	5.93	6.18	1.00	1.042E-003	1.473E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:24:36AM 6/19/2014

Sample

Sample Name: ICB;AV120
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

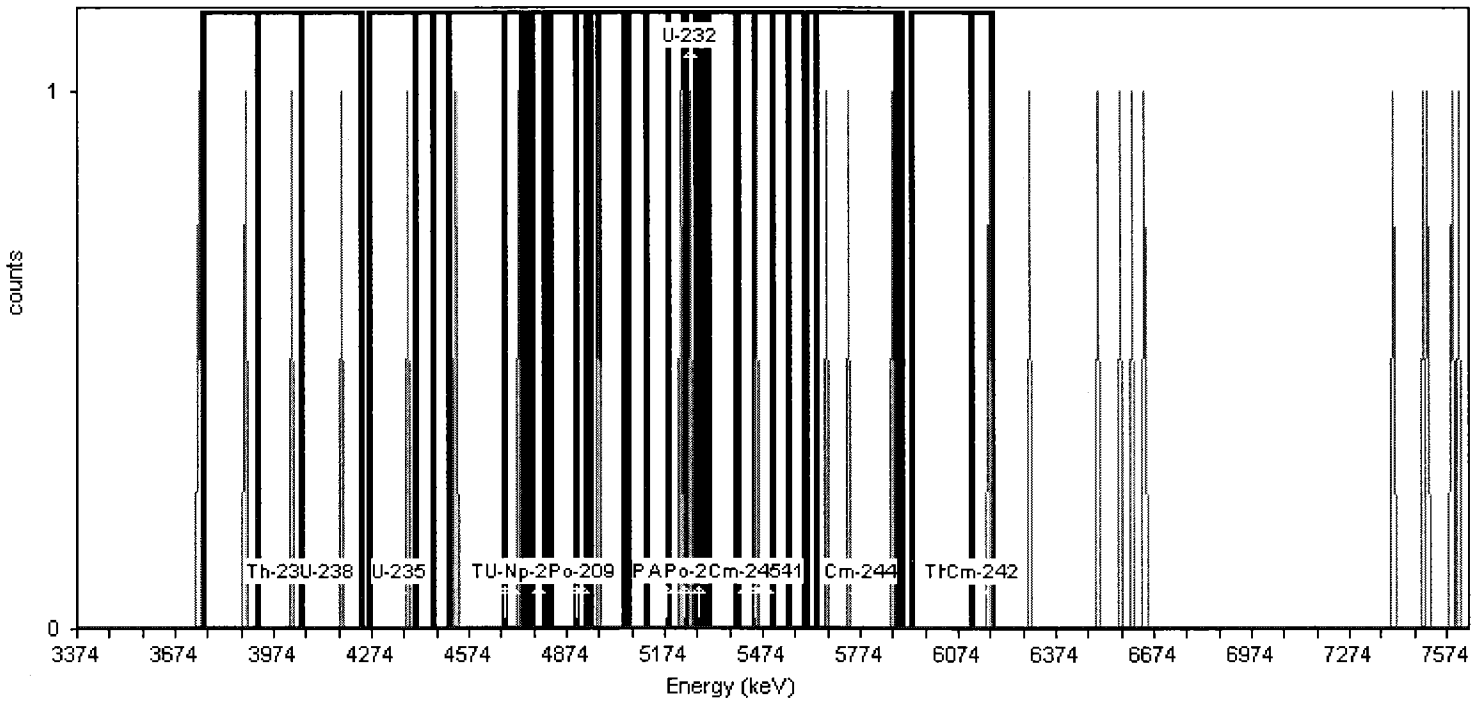
Analyst: 60040

Acquisition

Detector: AV120 , SN: 49-037W3
Acquisition Start Date: 6/18/2014 7:10:00PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9817;AV120-20140430
Calibration Date: 5/1/2014 1:17:24PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.32% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 25.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	2.00	2.083E-003	1.804E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	2.00	2.083E-003	1.804E-003
Th-228	5.45	5.19	5.51	3.00	3.125E-003	2.083E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	1.00	1.042E-003	1.473E-003
Am-241	5.48	5.30	5.60	1.00	1.042E-003	1.473E-003
Cm-245	5.42	5.40	5.45	0.00	0.000E+000	1.473E-003
Pu-236	5.76	5.61	5.89	3.00	3.125E-003	2.083E-003
Cm-244	5.78	5.64	5.90	3.00	3.125E-003	2.083E-003
Th-227	6.07	5.93	6.18	1.00	1.042E-003	1.473E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:24:42AM 6/19/2014

Sample

Sample Name: ICB;AV121
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

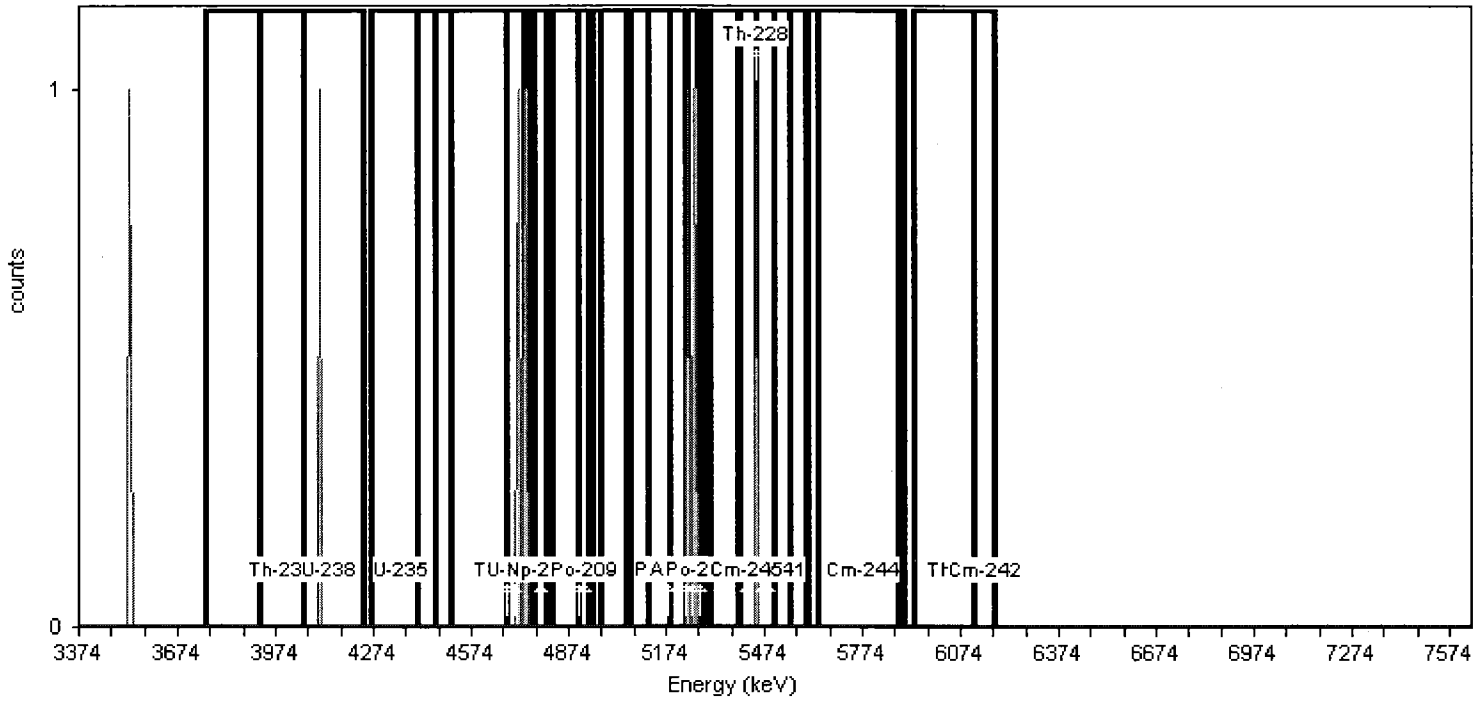
Analyst: 60040

Acquisition

Detector: AV121 , SN: 49-037W2
Acquisition Start Date: 6/18/2014 7:10:02PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9884;AV121-20140430
Calibration Date: 5/1/2014 1:17:30PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.86% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 7.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	2.00	2.083E-003	1.804E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	2.00	2.083E-003	1.804E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	2.00	2.083E-003	1.804E-003
Th-228	5.45	5.19	5.51	3.00	3.125E-003	2.083E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	1.00	1.042E-003	1.473E-003
Am-241	5.48	5.30	5.60	1.00	1.042E-003	1.473E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	0.00	0.000E+000	1.473E-003
Cm-244	5.78	5.64	5.90	0.00	0.000E+000	1.473E-003
Th-227	6.07	5.93	6.18	0.00	0.000E+000	1.473E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:04:33AM 6/25/2014

Sample

Sample Name: ICB;AV122
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

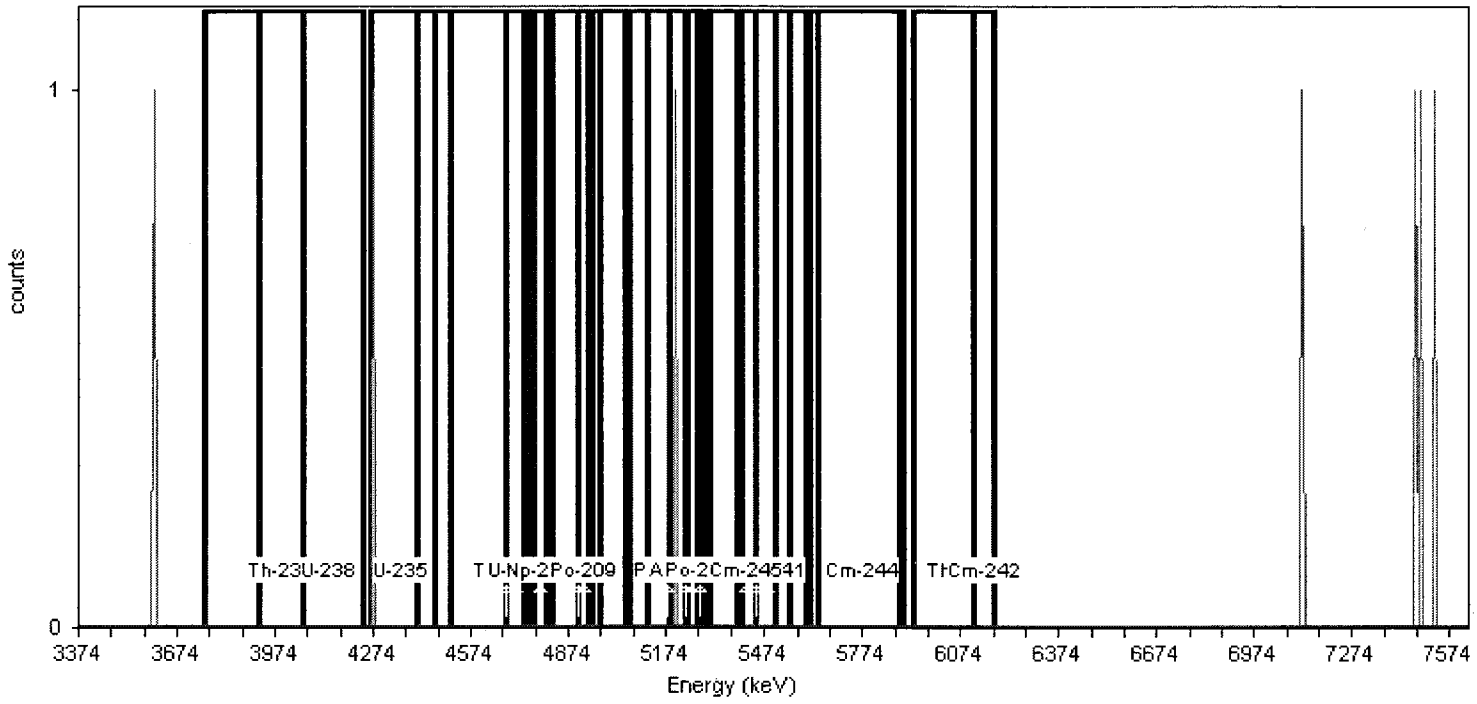
Analyst: 60040

Acquisition

Detector: AV122 , SN: 49-037G4
Acquisition Start Date: 6/18/2014 7:10:03PM
Live Time: 960.01 min.
Real Time: 960.02 min.
Calibration Name: IC-9885;AV122-20140430
Calibration Date: 5/1/2014 1:18:17PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.60% +/- 0.39% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 7.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	0.00	0.000E+000	1.473E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	0.00	0.000E+000	1.473E-003
U-234	4.71	4.51	4.82	0.00	0.000E+000	1.473E-003
Pu-242	4.90	4.68	4.95	0.00	0.000E+000	1.473E-003
Th-229	4.86	4.74	5.12	0.00	0.000E+000	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	1.00	1.042E-003	1.473E-003
U-232	5.25	5.06	5.40	1.00	1.042E-003	1.473E-003
Th-228	5.45	5.19	5.51	1.00	1.042E-003	1.473E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	0.00	0.000E+000	1.473E-003
Am-241	5.48	5.30	5.60	0.00	0.000E+000	1.473E-003
Cm-245	5.42	5.40	5.45	0.00	0.000E+000	1.473E-003
Pu-236	5.76	5.61	5.89	0.00	0.000E+000	1.473E-003
Cm-244	5.78	5.64	5.90	0.00	0.000E+000	1.473E-003
Th-227	6.07	5.93	6.18	0.00	0.000E+000	1.473E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

Run Logs

Alpha Spectroscopy Run Log

Detector: AV14

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:28	140	IC 160-120516/1		120516			PS
05/07/14 23:04	60	ICV 160-120851/1		120851			PS
06/18/14 19:08	960	ICB 160-127817/1		127817			PS
06/19/14 18:08	60	CCV 160-127902/1		127902			PS
07/07/14 00:37	1	PULSER 160-129973/1		129973			MLK
07/07/14 16:36	30	ZZZZZ		129973			
07/07/14 18:12	180	MB 160-129166/1-A		129973	129166	A-01-R	MLK

Detector: AV15

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:28	140	IC 160-120517/1		120517			PS
05/07/14 23:04	60	ICV 160-120852/1		120852			PS
06/18/14 19:08	960	ICB 160-127818/1		127818			PS
06/19/14 19:45	60	CCV 160-127903/1		127903			PS
07/07/14 00:37	1	PULSER 160-129974/1		129974			MLK
07/07/14 16:36	30	ZZZZZ		129974			
07/07/14 18:12	180	LCS 160-129166/2-A		129974	129166	A-01-R	MLK

Detector: AV16

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:27	140	IC 160-120398/1		120398			PS
05/08/14 00:14	60	ICV 160-121072/1		121072			PS
06/18/14 19:08	960	ICB 160-127819/1		127819			PS
06/19/14 18:08	60	CCV 160-127904/1		127904			PS
07/07/14 00:37	1	PULSER 160-129975/1		129975			MLK
07/07/14 16:36	30	ZZZZZ		129975			
07/07/14 18:12	180	680-102327-15	SD-208-SS	129975	129166	A-01-R	MLK

Detector: AV17

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:28	140	IC 160-120399/1		120399			PS
05/08/14 00:14	60	ICV 160-121073/1		121073			PS
06/18/14 19:08	960	ICB 160-127820/1		127820			PS
06/19/14 18:08	60	CCV 160-127905/1		127905			PS
07/07/14 00:37	1	PULSER 160-129976/1		129976			MLK
07/07/14 16:36	30	ZZZZZ		129976			
07/07/14 18:12	180	680-102327-15 DU	SD-208-SS DU	129976	129166	A-01-R	MLK

Detector: AV18

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:28	140	IC 160-120400/1		120400			PS
05/08/14 00:14	60	ICV 160-121074/1		121074			PS
06/18/14 19:08	960	ICB 160-127821/1		127821			PS
06/19/14 18:08	60	CCV 160-127906/1		127906			PS
07/07/14 00:37	1	PULSER 160-129977/1		129977			MLK
07/07/14 16:36	30	ZZZZZ		129977			
07/07/14 18:12	180	680-102327-24	SD-221-SS	129977	129166	A-01-R	MLK

Alpha Spectroscopy Run Log

Detector: AV72

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 17:49	140	IC 160-120049/1		120049			PS
05/08/14 17:19	60	ICV 160-121382/1		121382			PS
06/19/14 00:18	960	ICB 160-127946/1		127946			PS
06/22/14 20:10	60	CCV 160-128010/1		128010			PS
07/01/14 01:10	1	PULSER 160-129301/1		129301			MLK
07/01/14 12:21	180	680-102327-1	SD-198-SS	129301	127446	A-01-R	MLK
07/01/14 17:49	600	ZZZZZ		129301			

Detector: AV73

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 17:49	140	IC 160-120050/1		120050			PS
05/11/14 19:32	60	ICV 160-121392/1		121392			PS
06/19/14 00:18	960	ICB 160-127947/1		127947			PS
06/22/14 20:10	60	CCV 160-128011/1		128011			PS
07/01/14 01:10	1	PULSER 160-129302/1		129302			MLK
07/01/14 12:21	180	680-102327-1 DU	SD-198-SS DU	129302	127446	A-01-R	MLK
07/01/14 17:49	600	ZZZZZ		129302			

Detector: AV74

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 17:49	140	IC 160-120051/1		120051			PS
05/08/14 17:20	60	ICV 160-121383/1		121383			PS
06/19/14 00:18	960	ICB 160-127948/1		127948			PS
06/22/14 21:18	60	CCV 160-128012/1		128012			PS
07/01/14 01:10	1	PULSER 160-129303/1		129303			MLK
07/01/14 12:21	180	680-102327-2	SD-198-01	129303	127446	A-01-R	MLK
07/01/14 17:49	600	ZZZZZ		129303			

Detector: AV75

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 17:50	140	IC 160-120052/1		120052			PS
05/11/14 19:33	60	ICV 160-121393/1		121393			PS
06/18/14 19:08	960	ICB 160-127832/1		127832			PS
06/19/14 19:46	60	CCV 160-127949/1		127949			PS
07/01/14 01:22	1	PULSER 160-129304/1		129304			MLK
07/01/14 12:21	180	680-102327-3	SD-198-02	129304	127446	A-01-R	MLK
07/01/14 17:49	600	ZZZZZ		129304			

Detector: AV76

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 17:51	140	IC 160-120053/1		120053			PS
05/11/14 19:33	60	ICV 160-121394/1		121394			PS
06/19/14 19:56	960	ICB 160-127950/1		127950			PS
06/22/14 18:55	60	CCV 160-128013/1		128013			PS
07/01/14 01:22	1	PULSER 160-129305/1		129305			MLK
07/01/14 12:21	180	680-102327-5	SD-197-SS	129305	127446	A-01-R	MLK
07/01/14 17:49	600	ZZZZZ		129305			

Alpha Spectroscopy Run Log

Detector: AV77

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 17:51	140	IC 160-120054/1		120054			PS
05/08/14 17:20	60	ICV 160-121384/1		121384			PS
06/18/14 19:08	960	ICB 160-127834/1		127834			PS
06/19/14 19:46	60	CCV 160-127951/1		127951			PS
07/01/14 01:22	1	PULSER 160-129306/1		129306			MLK
07/01/14 12:21	180	680-102327-6	SD-197-01	129306	127446	A-01-R	MLK
07/01/14 17:51	600	ZZZZZ		129306			

Detector: AV78

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 17:51	140	IC 160-120055/1		120055			PS
05/08/14 17:20	60	ICV 160-121385/1		121385			PS
06/19/14 19:57	960	ICB 160-127952/1		127952			PS
06/22/14 17:35	60	CCV 160-127971/1		127971			PS
07/01/14 01:22	1	PULSER 160-129307/1		129307			MLK
07/01/14 12:21	180	680-102327-7	SD-197-02	129307	127446	A-01-R	MLK
07/01/14 17:51	600	ZZZZZ		129307			

Detector: AV79

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/01/14 19:15	140	IC 160-119923/1		119923			PS
05/11/14 20:47	60	ICV 160-121432/1		121432			PS
06/18/14 19:08	960	ICB 160-127836/1		127836			PS
06/19/14 19:46	60	CCV 160-127953/1		127953			PS
07/01/14 01:22	1	PULSER 160-129308/1		129308			MLK
07/01/14 12:21	180	680-102327-9	SD-199-SS	129308	127446	A-01-R	MLK
07/01/14 17:51	600	ZZZZZ		129308			

Detector: AV80

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/01/14 19:15	140	IC 160-119924/1		119924			PS
05/11/14 19:33	60	ICV 160-121395/1		121395			PS
06/18/14 19:08	960	ICB 160-127838/1		127838			PS
06/19/14 19:46	60	CCV 160-127955/1		127955			PS
07/01/14 01:22	1	PULSER 160-129310/1		129310			MLK
07/01/14 12:21	180	680-102327-10	SD-199-01	129310	127446	A-01-R	MLK
07/01/14 17:51	600	ZZZZZ		129310			

Detector: AV81

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/01/14 19:15	140	IC 160-119925/1		119925			PS
05/11/14 20:47	60	ICV 160-121433/1		121433			PS
06/18/14 19:09	960	ICB 160-127839/1		127839			PS
06/19/14 19:46	60	CCV 160-127956/1		127956			PS
07/01/14 01:22	1	PULSER 160-129311/1		129311			MLK
07/01/14 12:21	180	680-102327-11	SD-199-02	129311	127446	A-01-R	MLK
07/01/14 17:51	600	ZZZZZ		129311			

Alpha Spectroscopy Run Log

Detector: AV82

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/01/14 19:15	140	IC 160-119926/1		119926			PS
05/11/14 20:48	60	ICV 160-121434/1		121434			PS
06/18/14 19:09	960	ICB 160-127840/1		127840			PS
06/19/14 19:47	60	CCV 160-127957/1		127957			PS
07/01/14 01:22	1	PULSER 160-129312/1		129312			MLK
07/01/14 12:21	180	680-102327-13	SD-DUP-02	129312	127446	A-01-R	MLK
07/01/14 17:51	600	ZZZZZ		129312			

Detector: AV84

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/01/14 19:16	140	IC 160-119928/1		119928			PS
05/11/14 19:34	60	ICV 160-121396/1		121396			PS
06/18/14 19:09	960	ICB 160-127842/1		127842			PS
06/22/14 17:36	60	CCV 160-127972/1		127972			PS
07/01/14 01:22	1	PULSER 160-129314/1		129314			MLK
07/01/14 12:22	180	680-102327-16	SD-208-01	129314	127446	A-01-R	MLK
07/01/14 17:51	600	ZZZZZ		129314			

Detector: AV85

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/07/14 19:52	140	IC 160-120845/1		120845			PS
05/08/14 17:21	60	ICV 160-121387/1		121387			PS
06/18/14 19:09	960	ICB 160-127843/1		127843			PS
06/22/14 17:36	60	CCV 160-127973/1		127973			PS
07/01/14 01:22	1	PULSER 160-129315/1		129315			MLK
07/01/14 12:22	180	680-102327-17	SD-208-02	129315	127446	A-01-R	MLK
07/01/14 17:51	600	ZZZZZ		129315			

Detector: AV86

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/01/14 19:16	140	IC 160-119930/1		119930			PS
05/11/14 20:48	60	ICV 160-121435/1		121435			PS
06/19/14 19:57	960	ICB 160-127959/1		127959			PS
06/22/14 17:36	60	CCV 160-127974/1		127974			PS
07/01/14 01:22	1	PULSER 160-129316/1		129316			MLK
07/01/14 12:22	180	680-102327-18	SD-209-01	129316	127446	A-01-R	MLK
07/01/14 17:51	600	ZZZZZ		129316			

Detector: AV87

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/01/14 19:16	140	IC 160-119931/1		119931			PS
05/11/14 19:34	60	ICV 160-121397/1		121397			PS
06/18/14 19:09	960	ICB 160-127845/1		127845			PS
06/22/14 17:36	60	CCV 160-127975/1		127975			PS
07/01/14 01:22	1	PULSER 160-129317/1		129317			MLK
07/01/14 12:22	180	680-102327-19	SD-209-02	129317	127446	A-01-R	MLK
07/01/14 17:51	600	ZZZZZ		129317			

Alpha Spectroscopy Run Log

Detector: AV88

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/01/14 19:16	140	IC 160-119932/1		119932			PS
05/11/14 20:49	60	ICV 160-121436/1		121436			PS
06/18/14 19:09	960	ICB 160-127846/1		127846			PS
06/19/14 19:48	60	CCV 160-127960/1		127960			PS
07/01/14 01:22	1	PULSER 160-129318/1		129318			MLK
07/01/14 12:22	180	680-102327-20	SD-209-03	129318	127446	A-01-R	MLK
07/01/14 17:51	600	ZZZZZ		129318			

Detector: AV89

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/01/14 19:17	140	IC 160-119933/1		119933			PS
05/11/14 19:35	60	ICV 160-121398/1		121398			PS
06/18/14 19:09	960	ICB 160-127847/1		127847			PS
06/19/14 19:49	60	CCV 160-127961/1		127961			PS
07/01/14 01:22	1	PULSER 160-129319/1		129319			MLK
07/01/14 12:22	180	680-102327-21	SD-204-SS	129319	127446	A-01-R	MLK
07/01/14 17:51	600	ZZZZZ		129319			

Detector: AV90

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/01/14 19:17	140	IC 160-119934/1		119934			PS
05/11/14 22:02	60	ICV 160-121437/1		121437			PS
06/18/14 19:09	960	ICB 160-127849/1		127849			PS
06/22/14 18:55	60	CCV 160-128014/1		128014			PS
07/01/14 01:22	1	PULSER 160-129321/1		129321			MLK
07/01/14 12:22	180	680-102327-22	SD-204-01	129321	127446	A-01-R	MLK
07/01/14 17:51	600	ZZZZZ		129321			

Detector: AV91

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/01/14 19:17	140	IC 160-119935/1		119935			PS
05/11/14 20:51	60	ICV 160-121438/1		121438			PS
06/18/14 19:09	960	ICB 160-127850/1		127850			PS
06/22/14 20:07	60	CCV 160-128015/1		128015			PS
07/01/14 01:22	1	PULSER 160-129322/1		129322			MLK
07/01/14 12:22	180	680-102327-23	SD-204-02	129322	127446	A-01-R	MLK
07/01/14 17:51	600	ZZZZZ		129322			

Detector: AV93

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/01/14 19:18	140	IC 160-119937/1		119937			PS
05/11/14 19:35	60	ICV 160-121400/1		121400			PS
06/18/14 19:09	960	ICB 160-127852/1		127852			PS
06/22/14 18:55	60	CCV 160-128016/1		128016			PS
07/01/14 01:23	1	PULSER 160-129324/1		129324			MLK
07/01/14 12:28	180	680-102327-25	SD-221-01	129324	127449	A-01-R	MLK
07/01/14 17:51	600	ZZZZZ		129324			

Alpha Spectroscopy Run Log

Detector: AV94

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/01/14 13:48	140	IC 160-119692/1		119692			PS
05/11/14 23:17	60	ICV 160-121439/1		121439			PS
06/18/14 19:09	960	ICB 160-127853/1		127853			PS
06/22/14 17:37	60	CCV 160-127977/1		127977			PS
07/01/14 01:23	1	PULSER 160-129325/1		129325			MLK
07/01/14 12:28	180	680-102327-25 DU	SD-221-01 DU	129325	127449	A-01-R	MLK
07/01/14 17:51	600	ZZZZZ		129325			

Detector: AV95

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/01/14 13:49	140	IC 160-119693/1		119693			PS
05/11/14 22:03	60	ICV 160-121440/1		121440			PS
06/19/14 19:57	960	ICB 160-127963/1		127963			PS
06/22/14 17:38	60	CCV 160-127978/1		127978			PS
07/01/14 01:23	1	PULSER 160-129326/1		129326			
07/01/14 01:32	1	PULSER 160-129326/2		129326			MLK
07/01/14 12:28	180	680-102327-26	SD-221-02	129326	127449	A-01-R	MLK
07/01/14 17:51	600	ZZZZZ		129326			

Detector: AV96

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/01/14 13:49	140	IC 160-119694/1		119694			PS
05/11/14 22:04	60	ICV 160-121441/1		121441			PS
06/18/14 19:09	960	ICB 160-127855/1		127855			PS
06/22/14 18:55	60	CCV 160-128017/1		128017			PS
07/01/14 01:32	1	PULSER 160-129327/1		129327			MLK
07/01/14 12:28	180	680-102327-27	SD-210-SS	129327	127449	A-01-R	MLK
07/01/14 17:52	600	ZZZZZ		129327			

Detector: AV97

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/01/14 13:49	140	IC 160-119695/1		119695			PS
05/11/14 22:04	60	ICV 160-121442/1		121442			PS
06/18/14 19:09	960	ICB 160-127856/1		127856			PS
06/22/14 17:38	60	CCV 160-127979/1		127979			PS
07/01/14 01:33	1	PULSER 160-129328/1		129328			MLK
07/01/14 12:28	180	680-102327-28	SD-210-01	129328	127449	A-01-R	MLK
07/01/14 17:52	600	ZZZZZ		129328			

Detector: AV98

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/01/14 13:49	140	IC 160-119696/1		119696			PS
05/11/14 19:36	60	ICV 160-121401/1		121401			PS
06/18/14 19:09	960	ICB 160-127857/1		127857			PS
06/22/14 17:38	60	CCV 160-127980/1		127980			PS
07/01/14 01:33	1	PULSER 160-129329/1		129329			MLK
07/01/14 12:28	180	680-102327-29	SD-210-02	129329	127449	A-01-R	MLK
07/01/14 17:52	600	ZZZZZ		129329			

Alpha Spectroscopy Run Log

Detector: AV99

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/01/14 13:50	140	IC 160-119697/1		119697			PS
05/11/14 20:51	60	ICV 160-121443/1		121443			PS
06/18/14 19:09	960	ICB 160-127858/1		127858			PS
06/19/14 13:55	60	CCV 160-127964/1		127964			PS
07/01/14 01:37	1	PULSER 160-129330/1		129330			MLK
07/01/14 12:28	180	680-102327-30	SD-027-SS	129330	127449	A-01-R	MLK
07/01/14 17:51	600	ZZZZZ		129330			

Detector: AV100

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/07/14 19:52	140	IC 160-120839/1		120839			PS
05/11/14 19:36	60	ICV 160-121388/1		121388			PS
06/18/14 19:09	960	ICB 160-127777/1		127777			PS
06/19/14 15:09	60	CCV 160-127861/1		127861			PS
07/01/14 01:37	1	PULSER 160-129226/1		129226			
07/01/14 01:52	1	PULSER 160-129226/2		129226			MLK
07/01/14 12:28	180	680-102327-31	SD-027-01	129226	127449	A-01-R	MLK
07/01/14 17:51	600	ZZZZZ		129226			

Detector: AV101

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/01/14 13:50	140	IC 160-119684/1		119684			PS
05/11/14 23:18	60	ICV 160-121407/1		121407			PS
06/18/14 19:09	960	ICB 160-127778/1		127778			PS
06/19/14 13:55	60	CCV 160-127862/1		127862			PS
07/01/14 01:37	1	PULSER 160-129227/1		129227			MLK
07/01/14 12:28	180	680-102327-32	SD-027-02	129227	127449	A-01-R	MLK
07/01/14 17:51	600	ZZZZZ		129227			

Detector: AV102

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/01/14 13:50	140	IC 160-119685/1		119685			PS
05/11/14 20:52	60	ICV 160-121408/1		121408			PS
06/18/14 19:09	960	ICB 160-127779/1		127779			PS
06/19/14 13:55	60	CCV 160-127863/1		127863			PS
07/01/14 01:37	1	PULSER 160-129228/1		129228			MLK
07/01/14 12:28	180	680-102327-34	SD-205-SS	129228	127449	A-01-R	MLK
07/01/14 17:51	600	ZZZZZ		129228			

Detector: AV103

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/01/14 13:51	140	IC 160-119686/1		119686			PS
05/11/14 22:04	60	ICV 160-121409/1		121409			PS
06/18/14 19:09	960	ICB 160-127780/1		127780			PS
06/19/14 13:56	60	CCV 160-127864/1		127864			PS
07/01/14 01:37	1	PULSER 160-129229/1		129229			MLK
07/01/14 12:28	180	680-102327-35	SD-205-01	129229	127449	A-01-R	MLK
07/01/14 17:51	600	ZZZZZ		129229			

Alpha Spectroscopy Run Log

Detector: AV104

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/01/14 13:51	140	IC 160-119687/1		119687			PS
05/11/14 20:52	60	ICV 160-121410/1		121410			PS
06/18/14 19:09	960	ICB 160-127781/1		127781			PS
06/19/14 13:56	60	CCV 160-127865/1		127865			PS
07/01/14 01:37	1	PULSER 160-129230/1		129230			MLK
07/01/14 12:28	180	680-102327-36	SD-205-02	129230	127449	A-01-R	MLK
07/01/14 17:51	600	ZZZZZ		129230			

Detector: AV105

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/01/14 13:51	140	IC 160-119688/1		119688			PS
05/11/14 23:18	60	ICV 160-121411/1		121411			PS
06/18/14 19:09	960	ICB 160-127782/1		127782			PS
06/19/14 13:58	60	CCV 160-127866/1		127866			PS
07/01/14 01:37	1	PULSER 160-129231/1		129231			MLK
07/01/14 12:28	180	680-102327-37	SD-205-03	129231	127449	A-01-R	MLK
07/01/14 17:51	600	ZZZZZ		129231			

Detector: AV119

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
04/30/14 22:55	140	IC 160-119678/1		119678			PS
05/11/14 22:06	60	ICV 160-121422/1		121422			PS
06/18/14 19:09	960	ICB 160-127795/1		127795			PS
06/19/14 15:11	60	CCV 160-127880/1		127880			PS
07/01/14 01:38	1	PULSER 160-129245/1		129245			MLK
07/01/14 12:22	180	MB 160-127446/1-A		129245	127446	A-01-R	MLK

Detector: AV120

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
04/30/14 22:56	140	IC 160-119679/1		119679			PS
05/12/14 00:59	60	ICV 160-121604/1		121604			PS
06/18/14 19:10	960	ICB 160-127797/1		127797			PS
06/19/14 16:40	60	CCV 160-127882/1		127882			PS
07/01/14 01:38	1	PULSER 160-129247/1		129247			MLK
07/01/14 12:22	180	LCS 160-127446/2-A		129247	127446	A-01-R	MLK

Detector: AV121

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
04/30/14 22:56	140	IC 160-119680/1		119680			PS
05/11/14 23:20	60	ICV 160-121423/1		121423			PS
06/18/14 19:10	960	ICB 160-127798/1		127798			PS
06/19/14 14:00	60	CCV 160-127883/1		127883			PS
07/01/14 01:38	1	PULSER 160-129248/1		129248			MLK
07/01/14 12:29	180	MB 160-127449/1-A		129248	127449	A-01-R	MLK

Alpha Spectroscopy Run Log

Detector: AV122

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
04/30/14 22:56	140	IC 160-119681/1		119681			PS
05/11/14 23:20	60	ICV 160-121424/1		121424			PS
06/18/14 19:10	960	ICB 160-127799/1		127799			PS
06/19/14 15:11	60	CCV 160-127884/1		127884			PS
07/01/14 01:38	1	PULSER 160-129249/1		129249			MLK
07/01/14 12:29	180	LCS 160-127449/2-A		129249	127449	A-01-R	MLK

Spectrum: 4_20140716001_BG
Acquired: 7/16/2014 12:01:00 AM
Detector: Ge 4 SN/181
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.32	1.20	1.24	1.29	1.39	1.43	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

Spectrum: 4_20140716002_QCAsLeft
Acquired: 7/16/2014 1:04:38 AM
Detector: Ge 4 SN/181
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.54	59.22	59.29	59.62	59.79	59.86	PASS
FWHM	0.77	0.00	0.00	0.78	1.87	1.97	PASS
ActivityDiff	650.60	-5.00	-4.00	-1.07	4.00	5.00	PASS
QA-662							
FWHM	1.34	0.00	0.00	1.24	3.04	3.14	PASS
ActivityDiff	609.90	-5.00	-4.00	-3.07	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.30	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.40	1333.01	1333.26	PASS
FWHM	1.84	0.00	0.00	1.89	4.04	4.14	PASS
ActivityDiff	1189.70	-5.00	-4.00	-2.84	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

Spectrum: 8_20140716001_QCASLeft
Acquired: 7/16/2014 12:22:49 AM
Detector: Ge 8 SN/174
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.00	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.55	59.79	60.04	PASS
FWHM	1.10	0.00	0.00	0.85	2.20	2.30	PASS
ActivityDiff	650.60	-5.00	-4.00	-3.14	4.00	5.00	PASS
QA-662							
FWHM	1.53	0.00	0.00	1.34	3.23	3.33	PASS
ActivityDiff	609.90	-5.00	-4.00	-1.70	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.60	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.39	1333.01	1333.26	PASS
FWHM	1.90	0.00	0.00	1.70	4.10	4.20	PASS
ActivityDiff	1189.70	-5.00	-4.00	-2.24	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

Test America
St. Louis
Quality Control Check

Spectrum: 9_20140716001_QCAsLeft
Acquired: 7/16/2014 12:23:04 AM
Detector: Ge9 S/N100228730
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.80	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.57	59.79	60.04	PASS
FWHM	1.08	0.00	0.00	0.96	2.18	2.28	PASS
ActivityDiff	649.44	-5.00	-4.00	-1.36	4.00	5.00	PASS
QA-662							
FWHM	1.62	0.00	0.00	1.55	3.32	3.42	PASS
ActivityDiff	607.56	-5.00	-4.00	0.73	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.80	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.36	1333.01	1333.26	PASS
FWHM	2.12	0.00	0.00	2.01	4.32	4.42	PASS
ActivityDiff	1191.31	-5.00	-4.00	-1.76	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

Test America
St. Louis
Background Check

Spectrum: 9_20140716002_BG
Acquired: 7/16/2014 12:45:20 AM
Detector: Ge9 S/N100228730
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.89	1.53	1.65	1.82	2.14	2.26	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

Test America
St. Louis
Quality Control Check

Spectrum: 12_20140716001_QCAsLeft
Acquired: 7/16/2014 12:23:28 AM
Detector: Ge12 S/N10034336
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.80	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.56	59.79	60.04	PASS
FWHM	0.90	0.00	0.00	1.09	2.00	2.10	PASS
ActivityDiff	691.00	-5.00	-4.00	-0.19	4.00	5.00	PASS
QA-662							
FWHM	1.48	0.00	0.00	1.59	3.18	3.28	PASS
ActivityDiff	659.00	-5.00	-4.00	-0.95	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.20	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.46	1333.01	1333.26	PASS
FWHM	2.00	0.00	0.00	2.12	4.20	4.30	PASS
ActivityDiff	1274.00	-5.00	-4.00	-1.86	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

Test America
St. Louis
Background Check

Spectrum: 12_20140716002_BG
Acquired: 7/16/2014 12:45:54 AM
Detector: Ge12 S/N10034336
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.16	1.95	2.02	2.11	2.29	2.36	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

Gamma Verification per Geometry

Detector: Ge4

Geometry: Tunacan

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 317.8

lab ID# of cal standard 6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14534	97.4
Am-241	2037	418	0.3590	1163	1211.4	104.1
Cd-109	2881	591	0.0361	16363	16123	98.5
Co-57	1511	310	0.8560	362	353.51	97.7
Ce-139	2139	439	0.7990	549	541.9	98.7
Hg-203	4651	954	0.8146	1171	1197.5	102.3
Sn-113	3015	618	0.6400	966	965.83	100.0
Cs-137	1938	397	0.8510	467	464.8	99.5
Y-88	7264	1489	0.9370	1589	1568.4	98.7
Co-60	3580	734	0.9997	734	732.09	99.7
Co-60	3581	734	0.9999	734	730.52	99.5
Y-88	7690	1577	0.9920	1589	1608.9	101.2

Reviewed By: Jody Watson

Date: 4/2/2012

Gamma Verification per Geometry

Detector: Ge9

Geometry: Tunacan

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 317.8

lab ID# of cal standard 6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14240	95.4
Am-241	2037	418	0.3590	1163	1244.5	107.0
Cd-109	2881	591	0.0361	16363	15902	97.2
Co-57	1511	310	0.8560	362	347.48	96.0
Ce-139	2139	439	0.7990	549	535.87	97.6
Hg-203	4651	954	0.8146	1171	1216.7	103.9
Sn-113	3015	618	0.6400	966	970.65	100.5
Cs-137	1938	397	0.8510	467	466.58	99.9
Y-88	7264	1489	0.9370	1589	1552.5	97.7
Co-60	3580	734	0.9997	734	727.12	99.0
Co-60	3581	734	0.9999	734	719.75	98.0
Y-88	7690	1577	0.9920	1589	1638.8	103.1

Reviewed By: Jody Watson

Date: 6/14/2012

Gamma Verification per Geometry

Detector: Ge 12

Geometry: 100 mL D=1

Reference date 7/1/2011

Calibration Standard: 85520-334

Standard volume g / vial 5.32298

Standard volume transferred in g / geometry 0.7524

lab ID# of cal standard Rad11-0101

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	abundance	Activity Bq/sample	Count results	%recovery
Am-241	3368	476	0.359	**1326.1**	1333.5	100.6
Cd-109	4780	676	0.0361	**18716.1**	18345	98.0
Co-57	2554	361	0.856	**421.7**	427.69	101.4
Ce-139	3552	502	0.799	**628.4**	610.05	97.1
Hg-203	7851	1110	0.8155	**1360.8**	1426.6	104.8
Sn-113	4932	697	0.64	**1089.3**	1093.4	100.4
Cs-137	3188	451	0.851	**529.5**	530.57	100.2
Y-88	11970	1692	0.937	**1805.7**	1721.6	95.3
Co-60	5897	834	0.99974	**833.8**	837.98	100.5
Co-60	5897	834	0.99986	**833.7**	829.16	99.5
Y-88	12680	1792	0.992	**1806.8**	1846	102.2

Reviewed By: Jody Watson

Date: 9/1/2011

***** SUMMARY OF LIBRARY PEAK USAGE *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
Pb-210	N	1.3971E+04				8.15E+03		
			46.54	1.397E+04	(	1.478E+02	6.46E-01	4.25E+00 G
AM-241		1.1694E+03				1.58E+05		
			59.54	1.169E+03	(	1.086E+01	6.16E-01	3.57E+01 G
CD-109		1.5657E+04				4.63E+02		
			88.03	1.566E+04	(	2.117E+02	8.71E-01	3.61E+00 G
CO-57		3.3118E+02				2.72E+02		
			122.06	3.312E+02	(	1.731E+01	2.86E+00	8.56E+01 G
Ce-139		5.4173E+02				1.38E+02		
			165.85	5.417E+02	(	1.357E+02	1.07E+01	7.99E+01 G
Hg-203		-5.2429E-01				4.66E+01		
			279.17	-5.243E-01	?(	2.327E+00	1.34E+02	8.15E+01 G
SN-113		9.5260E+02				1.15E+02		
			391.69	9.526E+02	?(	7.503E+02	2.44E+01	6.40E+01 G
CS-137		4.4452E+02				1.10E+04		
			661.66	4.445E+02	(	3.202E+00	7.63E-01	8.52E+01 G
Y-898		2.4057E+03				1.07E+02		
			898.02	2.406E+03	@(	1.118E+03	2.36E+01	9.37E+01 G
Co-1173		6.8772E+02				1.93E+03		
			1173.24	6.877E+02	(	4.547E+00	8.09E-01	9.99E+01 G
Co-1332		6.9256E+02				1.93E+03		
			1332.50	6.926E+02	(	2.044E+00	7.49E-01	1.00E+02 G
Y-1836		1.7452E+03				1.07E+02		
			1836.01	1.745E+03	(	2.388E+02	1.02E+01	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the

2nd Source Verification

Detector: Ge9

Geometry: Tunacan

Reference date 1/1/2010

Source: 81427-334

Standard volume g / vial 1550

Standard volume transferred in g / geometry 318.5

lab ID# of cal standard 6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1169.4	100.4
Cs-137	1926	396	0.851	465	444.52	95.6
Co-60	3611	742	0.99974	742	687.72	92.7
Co-60	3612	742	0.999856	742	692.56	93.3

Reviewed By: Jody Watson

Date: 6/14/2012

2nd Source Verification

Detector: Ge 12

Geometry: 100mL D=1

Reference date 1/1/2010

Source: 81593-334

Standard volume g / vial 5.31128

Standard volume transferred in g / geometry 0.7524

lab ID# of cal standard Rad10-0044

Isotope	Certified Activity gammas/sec	Geometry Activity	abundance	Activity Bq/sample	Count Results	%recovery
Am-241	3474	492	0.359	**1370.8**	1363.4	99.5
Cs-137	3289	466	0.851	**547.5**	549.43	100.4
Co-60	6166	873	0.99974	**873.7**	856.8	98.1
Co-60	6166	873	0.99986	**873.6**	869.91	99.6

Reviewed By: Jody Watson

Date: 9/7/2011

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ANNUAL CALIBRATION VERIFICATION

Detector ID: Detector # 4
SpectrumID: 4_20130227011_EffVerif
Analysis Description: ACVTop-91774;Tuna Can 2006
Calibration: 4_Soil_TunaCan_90099_033012
Detector: Ge 4 SN/181

Verification Date: 2013-02-27 16:17
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.48E+02	0.3%
Cs-137	661.66	400	3.83E+02	4.3%
Co-1332	1332.5	777	7.45E+02	4.1%

Comments:

Perform ____KM 2/27/13_____ Reviev ___RM 2/27/13_____

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TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: Detector # 9
SpectrumID: 9_20140127006_EffVerif
Analysis Description: ACVTop-259586;TunaCan2006
Calibration: 9_Soil_TunaCan_90099_050312
Detector: Ge9 S/N100228730

Verification Date: 2014-01-27 09:57
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.36E+02	2.9%
Cs-137	661.66	400	3.87E+02	3.2%
Co-1332	1332.5	777	7.44E+02	4.3%

Comments:

Perform Justin D Lockhart / Jody Watson Revie 1/27/2014

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TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: Detector #12
SpectrumID: 12_20140128004_EffVerif
Analysis Description: ACVTop-259586;TunaCan2006
Calibration: 12_TunaCanCal_90099_100212
Detector: Ge12 S/N10034336

Verification Date: 2014-01-28 14:18
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.47E+02	0.4%
Cs-137	661.66	400	3.94E+02	1.6%
Co-1332	1332.5	777	7.55E+02	2.8%

Comments:

Perform Jody Watson Revie 1/28/2014

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Spectrum: 4_20140711008_BGLong
Acquired: 7/11/2014 3:24:18 PM
Detector: Ge 4 SN/181
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.32	1.20	1.24	1.27	1.39	1.43	PASS

Analyst: Micha Korrinhizer Reviewer:

Spectrum: 8_20140711008_BGLong
Acquired: 7/11/2014 3:25:42 PM
Detector: Ge 8 SN/174
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.56	1.39	1.45	1.59	1.68	1.74	PASS

Analyst: Micha Korrinhizer Reviewer: Siobhan Perry

Test America
St. Louis
Background Check

Spectrum: 9_20140711008_BGLong
Acquired: 7/11/2014 3:06:40 PM
Detector: Ge9 S/N100228730
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.89	1.53	1.65	1.78	2.14	2.26	PASS

Analyst: Micha Korrinhizer Reviewer:

Test America
St. Louis
Background Check

Spectrum: 12_20140713001_BGLong
Acquired: 7/13/2014 4:15:39 PM
Detector: Ge12 S/N10034336
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.16	1.95	2.02	2.11	2.29	2.36	PASS

Analyst: Siobhan Perry Reviewer:

Gamma Spectroscopy Run Log

Detector: GV4

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/30/12 13:58		IC 160-11761/1		11761			JLW
04/02/12 16:50		ICV 160-11761/2		11761			JLW
02/27/13 16:17		ACVTOP 160-38300/1		38300			JLW
07/11/14 15:24		ICB 160-130904/1		130904			JLW
07/16/14 00:01		CCB 160-131933/1		131933			JLW
07/16/14 00:43		CCV 160-131933/2		131933			
07/16/14 01:04		CCV 160-131933/3		131933			JLW
07/16/14 01:37	30	ZZZZZ		131933			
07/16/14 02:10	30	LCS 160-128622/2-A		131933	128622	GA-01-R	JLW
07/16/14 07:34	30	ZZZZZ		131933			
07/16/14 08:18	30	ZZZZZ		131933			
07/16/14 09:29	30	ZZZZZ		131933			
07/16/14 10:18	30	ZZZZZ		131933			
07/16/14 12:14		ZZZZZ		131933			
07/16/14 17:30	60	ZZZZZ		131933			
07/16/14 18:47	60	ZZZZZ		131933			
07/16/14 20:05		ZZZZZ		131933			
07/16/14 21:02		ZZZZZ		131933			
07/16/14 21:57		ZZZZZ		131933			
07/16/14 22:47		ZZZZZ		131933			
07/16/14 23:18		ZZZZZ		131933			

Detector: GV8

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/27/12 10:58		IC 160-12311/1		12311			JLW
03/29/12 01:58		ICV 160-12311/2		12311			JLW
06/10/14 05:54		ACVTOP 160-126217/1		126217			JLW
07/11/14 15:25		ICB 160-130902/1		130902			JLW
07/16/14 00:01		CCV 160-131938/1		131938			
07/16/14 00:22		CCV 160-131938/2		131938			JLW
07/16/14 00:44		CCB 160-131938/3		131938			
07/16/14 01:38	30	ZZZZZ		131938			
07/16/14 02:11	30	ZZZZZ		131938			
07/16/14 07:35	30	ZZZZZ		131938			
07/16/14 08:19	30	ZZZZZ		131938			
07/16/14 09:30	30	ZZZZZ		131938			
07/16/14 10:21	30	ZZZZZ		131938			
07/16/14 11:21		ZZZZZ		131938			
07/16/14 17:32	60	ZZZZZ		131938			
07/16/14 18:50		ZZZZZ		131938			
07/16/14 19:30		ZZZZZ		131938			
07/16/14 20:14		ZZZZZ		131938			
07/16/14 21:04		ZZZZZ		131938			
07/16/14 21:59		ZZZZZ		131938			
07/16/14 22:48		ZZZZZ		131938			

Detector: GV9

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/03/12 13:37		IC 160-12326/1		12326			JLW
06/14/12 10:54		ICV 160-12326/2		12326			JLW
01/27/14 09:57		ACVTOP 160-101591/1		101591			JLW

Gamma Spectroscopy Run Log

Detector: GV9 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
07/11/14 15:06		ICB 160-130891/1		130891			JLW
07/16/14 00:02		CCV 160-131682/1		131682			
07/16/14 00:23		CCV 160-131682/2		131682			JLW
07/16/14 00:45		CCB 160-131682/3		131682			JLW
07/16/14 01:34	30	ZZZZZ		131682			
07/16/14 02:12	30	MB 160-128622/1-A		131682	128622	GA-01-R	JLW
07/16/14 07:32	30	ZZZZZ		131682			
07/16/14 08:15	30	ZZZZZ		131682			
07/16/14 09:30	30	ZZZZZ		131682			
07/16/14 10:15	30	ZZZZZ		131682			
07/16/14 11:10	30	ZZZZZ		131682			
07/16/14 12:09		ZZZZZ		131682			
07/16/14 17:35	60	ZZZZZ		131682			
07/16/14 18:45	60	ZZZZZ		131682			
07/16/14 20:06		ZZZZZ		131682			
07/16/14 21:54		ZZZZZ		131682			
07/16/14 22:49		ZZZZZ		131682			

Detector: GV12

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
09/01/11 22:13		IC 160-45545/1		45545			JLW
09/07/11 12:09		ICV 160-45545/2		45545			JLW
01/28/14 14:18		ACVTOP 160-101795/1		101795			JLW
07/13/14 16:15		ICB 160-131111/1		131111			JLW
07/16/14 00:02		CCV 160-131681/1		131681			
07/16/14 00:23		CCV 160-131681/2		131681			JLW
07/16/14 00:45		CCB 160-131681/3		131681			JLW
07/16/14 01:35	60	680-102327-14	SD-005W-01	131681	128622	GA-01-R	JLW
07/16/14 07:33	30	ZZZZZ		131681			
07/16/14 08:16	30	ZZZZZ		131681			
07/16/14 09:32	30	ZZZZZ		131681			
07/16/14 10:14	30	ZZZZZ		131681			
07/16/14 11:11	30	ZZZZZ		131681			
07/16/14 12:13	30	ZZZZZ		131681			
07/16/14 17:36	60	ZZZZZ		131681			
07/16/14 18:51		ZZZZZ		131681			
07/16/14 19:31		ZZZZZ		131681			
07/16/14 20:15		ZZZZZ		131681			

TETRA TECH

INTERNAL CORRESPONDENCE

TO: M. MARTIN **DATE:** OCTOBER 14, 2014

FROM: MICHELLE L. ALLEN **COPIES:** DV FILE

SUBJECT: **RADIOLOGICAL DATA VALIDATION – TOTAL URANIUM/ISOTOPIC THORIUM LOCKHEED MARTIN CORPORATION (LMC) – MIDDLE RIVER COMPLEX (MRC) SEDIMENT INVESTIGATION SAMPLE DELIVERY GROUP (SDG) 680-102327-3**

SAMPLES: 35/Sediment/Total Uranium/Isotopic Uranium

SD-005E-01	SD-005W-01	SD-197-01
SD-197-02	SD-197-SS	SD-198-01
SD-198-02	SD-198-SS	SD-199-01
SD-199-02	SD-199-SS	SD-204-01
SD-204-02	SD-204-SS	SD-205-01
SD-205-02	SD-205-SS	SD-206-01
SD-206-02	SD-206-SS	SD-207-01
SD-207-02	SD-207-SS	SD-208-01
SD-208-02	SD-208-SS	SD-209-01
SD-209-02	SD-210-01	SD-210-02
SD-210-SS	SD-221-01	SD-221-02
SD-221-SS	SD-DUP-02	

Overview

The sample set for LMC-MRC, SDG 680-102327-3 consisted of thirty-five (35) sediment environmental samples. All thirty-five (35) sediment samples were analyzed for total uranium and isotopic uranium (uranium-233, uranium-234, uranium-235, uranium-236, and uranium-238). One field duplicate sample pair was included in this SDG: SD-DUP-02/SD-199-02.

The samples were collected by Tetra Tech, Inc. on June 11-12, 2014 and analyzed by TestAmerica, Inc. All analyses were conducted in accordance with EPA SW846 Method 6020A analytical and reporting protocols.

The findings offered in this report are based upon a general review of all available data. The data contained in this SDG were validated with regard to the following parameters: data completeness, holding times, ICP/MS tuning, initial and continuing calibrations, laboratory method and preparation blank results, Interference Check Sample (ICS), laboratory control sample recoveries, matrix spike/matrix spike duplicate results, internal standard recoveries, ICP serial dilution results, field duplicate precision, detection limits and analyte quantitation. Areas of concern are listed below.

Major

No major issues were identified.

Minor

- The Continuing Calibration Verification (CCV) performed on 08/26/14 @ 15:09 had a Percent Recovery (%R) for uranium-235 above the 110% quality control limit. The detected result reported for uranium-235 in the affected sample, SD-221-SS was qualified as estimated, (J).

- The following uranium isotopes were detected in the laboratory method and preparation blanks at the following maximum concentrations:

Analyte	Maximum Concentration (mg/Kg)	Action Level (mg/Kg)
Uranium-238 [1]	0.00308	0.0154
Uranium-238 [2]	0.000968	0.00484
Uranium-235 [3]	0.0207 µg/L	0.007
Uranium-238 [3]	0.0207 µg/L	0.01035
Uranium-233 [4]	0.153 µg/L	0.0765
Uranium-238 [5]	0.0246 µg/L	0.0123
Uranium-233 [6]	0.118 µg/L	0.059
Uranium-238 [6]	0.0240 µg/L	0.012

[1] - Maximum concentration detected in the laboratory preparation blank from preparation batch #137845 affecting all 6020A samples associated with this preparation batch.
[1] - Maximum concentration detected in the laboratory preparation blank from preparation batch #139821 affecting all 6020A sample associated with this preparation batch.
[3] - Maximum concentration detected in the initial and continuing calibration blanks from 6020A analysis affecting samples analyzed on 08/21-22/14.
[4] - Maximum concentration detected in the initial and continuing calibration blanks from 6020A analysis affecting samples analyzed on 08/22/14.
[5] - Maximum concentration detected in the initial and continuing calibration blanks from 6020A analysis affecting samples analyzed on 08/25/14.
[6] - Maximum concentration detected in the initial and continuing calibration blanks from 6020A analysis affecting samples analyzed on 08/26/14.

Action levels of 5X the maximum concentration were established to evaluate for laboratory blank contamination. Dilution factor and sample aliquot, if necessary, were taken into consideration during the application of the action level. The detected results for uranium-235 in the affected samples were qualified as non-detected, (U). No action was taken for uranium-233 because this isotope was not detected in the affected samples. No action was taken for uranium-238 because the detected results reported for uranium-238 were above the established action level.

- Detected results reported below the Reporting Limit (RL) limit but above the Method Detection Limit (MDL) were qualified as estimated, (J).

Notes

The blind duplicate sample, SD-DUP-03, was inadvertently analyzed by the laboratory. This sample should have been marked as HOLD on the sample Chain of Custody (COC) because the associated environmental sample was marked as HOLD. The results for this sample were removed from the database.

Samples SD-005W-01 and SD-005E-01 were not marked for total uranium/isotopic uranium on the sample COCs, however, these samples were included in the in the uranium analysis list provided to the laboratory by the client.

The CCVs performed on 08/22/14 @ 20:00, 20:56, and 21:10 had %Rs for uranium-233 above the 110% quality control limit. No action was necessary because uranium-233 was not detected in the affected samples.

The Contract Required Quantitation Limit (CRQL) samples analyzed for uranium-233 on 08/22/14 and 08/26/14 were greater than the 130% quality control limit. No action was necessary because this isotope was not detected in the associated samples.

All sample results are reported on a wet weight basis.

All samples were analyzed at a 5X dilution. The RLs of the non-detected results are elevated.

Uranium isotopes were determined via method 6020A. Isotopic uranium results reported via method 6020A and expressed in mg/kg units were converted to activity units, pCi/g, by the laboratory using isotope specific theoretical activities.

Non-detected results reported for uranium isotopes determined via method 6020A were reported at limits below the Minimum Detectable Concentration (MDC) by the laboratory. The manner in which the non-detected radioisotopes were reported was based upon the common practice of reporting radiological parameters at the concentration determined by the instrument. Therefore, metals raw instrument results expressed in µg/L were then converted to pCi/g and reported as non-detects below the MDC.

Executive Summary

Laboratory Performance: CCV %Rs exceeded 110% in some analytical batches. Uranium-233, uranium-235, and uranium-238 were detected in the laboratory method/preparation blanks.

Other Factors Affecting Data Quality: Results below the RL were estimated.

The text of this report has been formulated to address only those areas affecting data quality.

Tetra Tech, Inc.
Michelle L. Allen
Chemist/Data Validator

Tetra Tech, Inc.
Joseph A. Samchuck
Data Validation Manager

Attachments:
Appendix A – Qualified Analytical Results
Appendix B – Results as Reported by the Laboratory
Appendix C – Support Documentation

Appendix A

Qualified Analytical Results

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = ICP PDS Recovery Noncompliance; MSA's $r < 0.995$
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = RPD between columns/detectors >40% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient $r < 0.995$
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 standard deviations is greater than sample activity
Z1 = Tentatively Identified Compound considered presumptively present
Z2 = Tentatively Identified Compound column bleed
Z3 = Tentatively Identified Compound aldol condensate

PROJ_NO: 05220	NSAMPLE	SD-005E-01						SD-005W-01					
SDG: 680-102327-3	LAB_ID	680-102370-6						680-102327-14					
FRACTION: M	SAMP_DATE	6/12/2014						6/11/2014					
MEDIA: SEDIMENT	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					0.91						2.6		
URANIUM-233					0.0035	U					0.0036	U	
URANIUM-234					0.00069	U					0.00072	U	
URANIUM-235					0.0067	U	A				0.018		
URANIUM-235 (PERCENT)		0.739						0.688					
URANIUM-236					0.00092	U					0.00096	U	
URANIUM-238					0.9						2.6		

PROJ_NO: 05220	NSAMPLE	SD-197-01						SD-197-02					
SDG: 680-102327-3	LAB_ID	680-102327-6						680-102327-7					
FRACTION: M	SAMP_DATE	6/11/2014						6/11/2014					
MEDIA: SEDIMENT	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					2.9						1.4		
URANIUM-233					0.0034	U					0.0032	U	
URANIUM-234					0.00067	U					0.00064	U	
URANIUM-235					0.022						0.012		
URANIUM-235 (PERCENT)		0.753						0.85					
URANIUM-236					0.0009	U					0.00085	U	
URANIUM-238					2.9						1.4		

PROJ_NO: 05220	NSAMPLE	SD-197-SS						SD-198-01					
SDG: 680-102327-3	LAB_ID	680-102327-5						680-102327-2					
FRACTION: M	SAMP_DATE	6/11/2014						6/11/2014					
MEDIA: SEDIMENT	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					2.8						2.4		
URANIUM-233					0.0036	U					0.0033	U	
URANIUM-234					0.00072	U					0.00065	U	
URANIUM-235					0.02						0.021		
URANIUM-235 (PERCENT)		0.709						0.867					
URANIUM-236					0.00096	U					0.00087	U	
URANIUM-238					2.8						2.4		

PROJ_NO: 05220	NSAMPLE	SD-198-02						SD-198-SS					
SDG: 680-102327-3	LAB_ID	680-102327-3						680-102327-1					
FRACTION: M	SAMP_DATE	6/11/2014						6/11/2014					
MEDIA: SEDIMENT	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					1.9						3.1		
URANIUM-233					0.0034	U					0.0033	U	
URANIUM-234					0.00068	U					0.00066	U	
URANIUM-235					0.016						0.022		
URANIUM-235 (PERCENT)		0.835						0.705					
URANIUM-236					0.0009	U					0.00088	U	
URANIUM-238					1.9						3.1		

PROJ_NO: 05220	NSAMPLE	SD-199-01						SD-199-02					
SDG: 680-102327-3	LAB_ID	680-102327-10						680-102327-11					
FRACTION: M	SAMP_DATE	6/11/2014						6/11/2014					
MEDIA: SEDIMENT	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					2.5						2.7		
URANIUM-233					0.0032	U					0.0034	U	
URANIUM-234					0.00063	U					0.00069	U	
URANIUM-235					0.027						0.023		
URANIUM-235 (PERCENT)		1.07						0.845					
URANIUM-236					0.00084	U					0.00092	U	
URANIUM-238					2.5						2.7		

PROJ_NO: 05220	NSAMPLE	SD-199-SS						SD-204-01					
SDG: 680-102327-3	LAB_ID	680-102327-9						680-102327-22					
FRACTION: M	SAMP_DATE	6/11/2014						6/11/2014					
MEDIA: SEDIMENT	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					2.8						1.3		
URANIUM-233					0.0033	U					0.0033	U	
URANIUM-234					0.00067	U					0.00067	U	
URANIUM-235					0.022						0.0085	J	P
URANIUM-235 (PERCENT)		0.78						0.65					
URANIUM-236					0.00089	U					0.00089	U	
URANIUM-238					2.8						1.3		

PROJ_NO: 05220	NSAMPLE	SD-204-02						SD-204-SS					
SDG: 680-102327-3	LAB_ID	680-102327-23						680-102327-21					
FRACTION: M	SAMP_DATE	6/11/2014						6/11/2014					
MEDIA: SEDIMENT	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					0.59						0.86		
URANIUM-233					0.0035	U					0.0037	U	
URANIUM-234					0.00069	U					0.00074	U	
URANIUM-235					0.0047	U					0.0063	U	A
URANIUM-235 (PERCENT)		0						0.736					
URANIUM-236					0.00092	U					0.00098	U	
URANIUM-238					0.59						0.85		

PROJ_NO: 05220	NSAMPLE	SD-205-01						SD-205-02					
SDG: 680-102327-3	LAB_ID	680-102327-35						680-102327-36					
FRACTION: M	SAMP_DATE	6/11/2014						6/11/2014					
MEDIA: SEDIMENT	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					2.8						1.4		
URANIUM-233					0.0034	U					0.0035	U	
URANIUM-234					0.00068	U					0.0007	U	
URANIUM-235					0.041						0.01	J	P
URANIUM-235 (PERCENT)		1.44						0.709					
URANIUM-236					0.00091	U					0.00094	U	
URANIUM-238					2.8						1.4		

PROJ_NO: 05220	NSAMPLE	SD-205-SS						SD-206-01					
SDG: 680-102327-3	LAB_ID	680-102327-34						680-102370-3					
FRACTION: M	SAMP_DATE	6/11/2014						6/12/2014					
MEDIA: SEDIMENT	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					1.4						2.4		
URANIUM-233					0.0035	U					0.0033	U	
URANIUM-234					0.0007	U					0.00065	U	
URANIUM-235					0.01	J	P				0.02		
URANIUM-235 (PERCENT)		0.709						0.826					
URANIUM-236					0.00093	U					0.00087	U	
URANIUM-238					1.4						2.4		

PROJ_NO: 05220	NSAMPLE	SD-206-02						SD-206-SS					
SDG: 680-102327-3	LAB_ID	680-102370-4						680-102370-2					
FRACTION: M	SAMP_DATE	6/12/2014						6/12/2014					
MEDIA: SEDIMENT	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					3.1						3.1		
URANIUM-233					0.0035	U					0.0032	U	
URANIUM-234					0.00091	J	P				0.00064	U	
URANIUM-235					0.087						0.025		
URANIUM-235 (PERCENT)		2.82						0.8					
URANIUM-236					0.00092	U					0.00085	U	
URANIUM-238					3						3.1		

PROJ_NO: 05220	NSAMPLE	SD-207-01						SD-207-02					
SDG: 680-102327-3	LAB_ID	680-102327-31						680-102327-32					
FRACTION: M	SAMP_DATE	6/11/2014						6/11/2014					
MEDIA: SEDIMENT	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					2.5						1.9		
URANIUM-233					0.0031	U					0.0032	U	
URANIUM-234					0.00063	U					0.00064	U	
URANIUM-235					0.052						0.014		
URANIUM-235 (PERCENT)		2.12						0.731					
URANIUM-236					0.00084	U					0.00085	U	
URANIUM-238					2.4						1.9		

PROJ_NO: 05220	NSAMPLE	SD-207-SS						SD-208-01					
SDG: 680-102327-3	LAB_ID	680-102327-30						680-102327-16					
FRACTION: M	SAMP_DATE	6/11/2014						6/11/2014					
MEDIA: SEDIMENT	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					2.9						0.77		
URANIUM-233					0.0033	U					0.0032	U	
URANIUM-234					0.00065	U					0.00063	U	
URANIUM-235					0.023						0.0054	U	A
URANIUM-235 (PERCENT)		0.787						0.706					
URANIUM-236					0.00087	U					0.00085	U	
URANIUM-238					2.9						0.76		

PROJ_NO: 05220	NSAMPLE	SD-208-02						SD-208-SS					
SDG: 680-102327-3	LAB_ID	680-102327-17						680-102327-15					
FRACTION: M	SAMP_DATE	6/11/2014						6/11/2014					
MEDIA: SEDIMENT	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					0.56						1.3		
URANIUM-233					0.0032	U					0.0033	U	
URANIUM-234					0.00064	U					0.00066	U	
URANIUM-235					0.0043	U					0.0094	J	P
URANIUM-235 (PERCENT)		0						0.718					
URANIUM-236					0.00085	U					0.00088	U	
URANIUM-238					0.56						1.3		

PROJ_NO: 05220	NSAMPLE	SD-209-01						SD-209-02					
SDG: 680-102327-3	LAB_ID	680-102327-18						680-102327-19					
FRACTION: M	SAMP_DATE	6/11/2014						6/11/2014					
MEDIA: SEDIMENT	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					0.46						0.38		
URANIUM-233					0.0035	U					0.0033	U	
URANIUM-234					0.0007	U					0.00065	U	
URANIUM-235					0.0047	U					0.0044	U	
URANIUM-235 (PERCENT)		0						0					
URANIUM-236					0.00093	U					0.00087	U	
URANIUM-238					0.46						0.38		

PROJ_NO: 05220	NSAMPLE	SD-210-01						SD-210-02					
SDG: 680-102327-3	LAB_ID	680-102327-28						680-102327-29					
FRACTION: M	SAMP_DATE	6/11/2014						6/11/2014					
MEDIA: SEDIMENT	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					0.6						0.58		
URANIUM-233					0.0035	U					0.0032	U	
URANIUM-234					0.0007	U					0.00065	U	
URANIUM-235					0.0048	U					0.0044	U	
URANIUM-235 (PERCENT)		0						0					
URANIUM-236					0.00094	U					0.00086	U	
URANIUM-238					0.6						0.58		

PROJ_NO: 05220	NSAMPLE	SD-210-SS						SD-221-01					
SDG: 680-102327-3	LAB_ID	680-102327-27						680-102327-25					
FRACTION: M	SAMP_DATE	6/11/2014						6/11/2014					
MEDIA: SEDIMENT	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					2						0.48		
URANIUM-233					0.0037	U					0.0033	U	
URANIUM-234					0.00073	U					0.00066	U	
URANIUM-235					0.018						0.0056	U	A
URANIUM-235 (PERCENT)		0.892						1.18					
URANIUM-236					0.00098	U					0.00088	U	
URANIUM-238					2						0.47		

PROJ_NO: 05220	NSAMPLE	SD-221-02						SD-221-SS					
SDG: 680-102327-3	LAB_ID	680-102327-26						680-102327-24					
FRACTION: M	SAMP_DATE	6/11/2014						6/11/2014					
MEDIA: SEDIMENT	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					0.56						0.69		
URANIUM-233					0.0033	U					0.0037	U	
URANIUM-234					0.00067	U					0.00075	U	
URANIUM-235					0.0045	U					0.0076	J	CP
URANIUM-235 (PERCENT)		0						1.11					
URANIUM-236					0.00089	U					0.00099	U	
URANIUM-238					0.56						0.68		

PROJ_NO: 05220	NSAMPLE	SD-DUP-02					
SDG: 680-102327-3	LAB_ID	680-102327-13					
FRACTION: M	SAMP_DATE	6/11/2014					
MEDIA: SEDIMENT	QC_TYPE	NM					
	UNITS	%			MG/KG		
	PCT_SOLIDS	100.0			100.0		
	DUP_OF	SD-199-02			SD-199-02		
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					2.5		
URANIUM-233					0.0034	U	
URANIUM-234					0.00067	U	
URANIUM-235					0.019		
URANIUM-235 (PERCENT)		0.754					
URANIUM-236					0.0009	U	
URANIUM-238					2.5		

PROJ_NO: 05220	NSAMPLE	SD-005E-01			SD-005W-01			SD-197-01			SD-197-02		
SDG: 680-102327-3	LAB_ID	680-102370-6			680-102327-14			680-102327-6			680-102327-7		
FRACTION: RAD	SAMP_DATE	6/12/2014			6/11/2014			6/11/2014			6/11/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
URANIUM-233		-8	U		-8.88	U		-8.23	U		-7.5	U	
URANIUM-234		0.51	U		1.03	U		1.17	U		0.461	U	
URANIUM-235		0.0146	U	A	0.0399			0.0483			0.0251		
URANIUM-236		-0.00023	U		-0.00149	U		-0.00069	U		0.0003	U	
URANIUM-238		0.302			0.87			0.986			0.472		

PROJ_NO: 05220	NSAMPLE	SD-197-SS			SD-198-01			SD-198-02			SD-198-SS		
SDG: 680-102327-3	LAB_ID	680-102327-5			680-102327-2			680-102327-3			680-102327-1		
FRACTION: RAD	SAMP_DATE	6/11/2014			6/11/2014			6/11/2014			6/11/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
URANIUM-233		-8.59	U		-7.89	U		-8.26	U		-7.63	U	
URANIUM-234		0.987	U		0.901	U		0.956	U		1.35	U	
URANIUM-235		0.0431			0.0443			0.0339			0.0468		
URANIUM-236		3E-05	U		0.00053	U		-0.00158	U		0.00045	U	
URANIUM-238		0.949			0.816			0.64			1.03		

PROJ_NO: 05220	NSAMPLE	SD-199-01			SD-199-02			SD-199-SS			SD-204-01		
SDG: 680-102327-3	LAB_ID	680-102327-10			680-102327-11			680-102327-9			680-102327-22		
FRACTION: RAD	SAMP_DATE	6/11/2014			6/11/2014			6/11/2014			6/11/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
URANIUM-233		-7.54	U		-8.58	U		-7.87	U		-8.11	U	
URANIUM-234		1.46	U		1.22	U		0.953	U		0.224	U	
URANIUM-235		0.0583			0.0489			0.048			0.0184		
URANIUM-236		0.00057	U		-0.00104	U		-0.00054	U		-0.00066	U	
URANIUM-238		0.856			0.908			0.928			0.423		

PROJ_NO: 05220	NSAMPLE	SD-204-02			SD-204-SS			SD-205-01			SD-205-02		
SDG: 680-102327-3	LAB_ID	680-102327-23			680-102327-21			680-102327-35			680-102327-36		
FRACTION: RAD	SAMP_DATE	6/11/2014			6/11/2014			6/11/2014			6/11/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
URANIUM-233		-8.27	U		-9.06	U		-8.52	U		-8.47	U	
URANIUM-234		0.212	U		0.128	U		2.69	U		0.434	U	
URANIUM-235		0.00882	U		0.0136	U	A	0.0884			0.0219		
URANIUM-236		0.00035	U		-0.00066	U		0.0022	U		-0.00087	U	
URANIUM-238		0.199			0.287			0.934			0.484		

PROJ_NO: 05220	NSAMPLE	SD-205-SS			SD-206-01			SD-206-02			SD-206-SS		
SDG: 680-102327-3	LAB_ID	680-102327-34			680-102370-3			680-102370-4			680-102370-2		
FRACTION: RAD	SAMP_DATE	6/11/2014			6/12/2014			6/12/2014			6/12/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
URANIUM-233		-8.8	U		-7.01	U		-7.06	U		10.3	U	
URANIUM-234		0.275	U		1.06	U		5.69			1.49	U	
URANIUM-235		0.0224			0.0438			0.187			0.055		
URANIUM-236		-0.00099	U		0.00076	U		0.0097	U		0.00074	U	
URANIUM-238		0.46			0.792			0.994			1.05		

PROJ_NO: 05220	NSAMPLE	SD-207-01			SD-207-02			SD-207-SS			SD-208-01		
SDG: 680-102327-3	LAB_ID	680-102327-31			680-102327-32			680-102327-30			680-102327-16		
FRACTION: RAD	SAMP_DATE	6/11/2014			6/11/2014			6/11/2014			6/11/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
URANIUM-233		-7.67	U		-7.82	U		-7.82	U		-7.83	U	
URANIUM-234		3.35	U		0.774	U		0.899	U		0.221	U	
URANIUM-235		0.112			0.031			0.0487			0.0118	U	A
URANIUM-236		0.00737	U		-0.00098	U		-0.00056	U		0.00021	U	
URANIUM-238		0.804			0.645			0.96			0.256		

PROJ_NO: 05220	NSAMPLE	SD-208-02			SD-208-SS			SD-209-01			SD-209-02		
SDG: 680-102327-3	LAB_ID	680-102327-17			680-102327-15			680-102327-18			680-102327-19		
FRACTION: RAD	SAMP_DATE	6/11/2014			6/11/2014			6/11/2014			6/11/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
URANIUM-233		-7.66	U		-8.12	U		-8.74	U		-8.17	U	
URANIUM-234		0.151	U		0.444	U		-0.026	U		0.0244	U	
URANIUM-235		0.00775	U		0.0202			0.00567	U		0.00498	U	
URANIUM-236		-0.00124	U		-0.00105	U		-0.00117	U		-0.0005	U	
URANIUM-238		0.19			0.432			0.155			0.127		

PROJ_NO: 05220	NSAMPLE	SD-210-01			SD-210-02			SD-210-SS			SD-221-01		
SDG: 680-102327-3	LAB_ID	680-102327-28			680-102327-29			680-102327-27			680-102327-25		
FRACTION: RAD	SAMP_DATE	6/11/2014			6/11/2014			6/11/2014			6/11/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
URANIUM-233		-8.86	U		-7.94	U		-9.32	U		-7.92	U	
URANIUM-234		0.0672	U		0.107	U		0.845	U		0.303	U	
URANIUM-235		0.00793	U		0.00811	U		0.0379			0.0122	U	A
URANIUM-236		-0.00118	U		-0.00044	U		0.00022	U		0.00218	U	
URANIUM-238		0.201			0.194			0.686			0.157		

PROJ_NO: 05220	NSAMPLE	SD-221-02			SD-221-SS			SD-DUP-02		
SDG: 680-102327-3	LAB_ID	680-102327-26			680-102327-24			680-102327-13		
FRACTION: RAD	SAMP_DATE	6/11/2014			6/11/2014			6/11/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0		
	DUP_OF							SD-199-02		
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
URANIUM-233		-8.54	U		-36.6	U		-8.23	U	
URANIUM-234		-0.0443	U		0.591	U		0.914	U	
URANIUM-235		0.00777	U		0.0165	J	C	0.0411		
URANIUM-236		-0.00097	U		0.00135	U		-0.00156	U	
URANIUM-238		0.188			0.228			0.847		

Appendix B

Results as Reported by the Laboratory

Client Sample ID: SD-198-SS

Date Collected: 06/11/14 07:55
Date Received: 06/12/14 09:40

Lab Sample ID: 680-102327-1
Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0033	mg/Kg		08/20/14 09:25	08/22/14 17:03	5
U-234	ND		0.011	0.00066	mg/Kg		08/20/14 09:25	08/21/14 22:16	5
U-235	0.022		0.011	0.0045	mg/Kg		08/20/14 09:25	08/21/14 22:16	5
U-236	ND		0.011	0.00088	mg/Kg		08/20/14 09:25	08/21/14 22:16	5
U-238	3.1		0.011	0.00066	mg/Kg		08/20/14 09:25	08/25/14 17:59	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.1		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-7.63	U	0.440	0.829	106	31.9	pCi/g	08/20/14 09:25	08/22/14 17:03	5
U-234	1.35	U	0.278	0.304	68.7	4.12	pCi/g	08/20/14 09:25	08/21/14 22:16	5
U-235	0.0468		0.00223	0.00485	0.0238	0.00971	pCi/g	08/20/14 09:25	08/21/14 22:16	5
U-236	0.000457	U	0.000238	0.000242	0.714	0.0572	pCi/g	08/20/14 09:25	08/21/14 22:16	5
U-238	1.03		0.00227	0.0951	0.00371	0.000223	pCi/g	08/20/14 09:25	08/25/14 17:59	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.705						%		08/20/14 09:25	1

Client Sample ID: SD-198-01

Date Collected: 06/11/14 08:00
Date Received: 06/12/14 09:40

Lab Sample ID: 680-102327-2
Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0033	mg/Kg		08/20/14 09:25	08/22/14 17:31	5
U-234	ND		0.011	0.00065	mg/Kg		08/20/14 09:25	08/21/14 22:44	5
U-235	0.021		0.011	0.0044	mg/Kg		08/20/14 09:25	08/21/14 22:44	5
U-236	ND		0.011	0.00087	mg/Kg		08/20/14 09:25	08/21/14 22:44	5
U-238	2.4		0.011	0.00065	mg/Kg		08/20/14 09:25	08/25/14 18:27	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.4		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-7.89	U	0.399	0.828	105	31.4	pCi/g	08/20/14 09:25	08/22/14 17:31	5
U-234	0.901	U	0.194	0.211	67.6	4.06	pCi/g	08/20/14 09:25	08/21/14 22:44	5
U-235	0.0443		0.00410	0.00578	0.0235	0.00956	pCi/g	08/20/14 09:25	08/21/14 22:44	5
U-236	0.000534	U	0.000700	0.000702	0.703	0.0563	pCi/g	08/20/14 09:25	08/21/14 22:44	5
U-238	0.816		0.0147	0.0765	0.00365	0.000220	pCi/g	08/20/14 09:25	08/25/14 18:27	5

Client Sample ID: SD-198-01

Lab Sample ID: 680-102327-2
Matrix: Solid

Date Collected: 06/11/14 08:00
Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.867						%		08/20/14 09:25	1

Client Sample ID: SD-198-02

Lab Sample ID: 680-102327-3
Matrix: Solid

Date Collected: 06/11/14 08:05
Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0034	mg/Kg		08/20/14 09:25	08/22/14 17:35	5
U-234	ND		0.011	0.00068	mg/Kg		08/20/14 09:25	08/21/14 22:49	5
U-235	0.016		0.011	0.0046	mg/Kg		08/20/14 09:25	08/21/14 22:49	5
U-236	ND		0.011	0.00090	mg/Kg		08/20/14 09:25	08/21/14 22:49	5
U-238	1.9		0.011	0.00068	mg/Kg		08/20/14 09:25	08/25/14 18:32	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.9		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-8.26	U	0.236	0.796	109	32.7	pCi/g	08/20/14 09:25	08/22/14 17:35	5
U-234	0.956	U	0.579	0.586	70.3	4.22	pCi/g	08/20/14 09:25	08/21/14 22:49	5
U-235	0.0339		0.00421	0.00524	0.0244	0.00994	pCi/g	08/20/14 09:25	08/21/14 22:49	5
U-236	-0.00158	U	0.00156	0.00157	0.731	0.0585	pCi/g	08/20/14 09:25	08/21/14 22:49	5
U-238	0.640		0.0114	0.0599	0.00380	0.000228	pCi/g	08/20/14 09:25	08/25/14 18:32	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.835						%		08/20/14 09:25	1

Client Sample ID: SD-197-SS

Lab Sample ID: 680-102327-5
Matrix: Solid

Date Collected: 06/11/14 10:30
Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0036	mg/Kg		08/20/14 09:25	08/22/14 17:40	5
U-234	ND		0.012	0.00072	mg/Kg		08/20/14 09:25	08/21/14 22:54	5
U-235	0.020		0.012	0.0049	mg/Kg		08/20/14 09:25	08/21/14 22:54	5
U-236	ND		0.012	0.00096	mg/Kg		08/20/14 09:25	08/21/14 22:54	5
U-238	2.8		0.012	0.00072	mg/Kg		08/20/14 09:25	08/25/14 18:37	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.8		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Client Sample ID: SD-197-SS

Lab Sample ID: 680-102327-5

Date Collected: 06/11/14 10:30
Date Received: 06/12/14 09:40

Matrix: Solid

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-8.59	U	0.353	0.865	116	34.7	pCi/g	08/20/14 09:25	08/22/14 17:40	5
U-234	0.987	U	0.323	0.335	74.6	4.48	pCi/g	08/20/14 09:25	08/21/14 22:54	5
U-235	0.0431		0.00290	0.00492	0.0259	0.0105	pCi/g	08/20/14 09:25	08/21/14 22:54	5
U-236	0.0000310	U	0.000503	0.000503	0.775	0.0621	pCi/g	08/20/14 09:25	08/21/14 22:54	5
U-238	0.949		0.0149	0.0886	0.00403	0.000242	pCi/g	08/20/14 09:25	08/25/14 18:37	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.709						%		08/20/14 09:25	1

Client Sample ID: SD-197-01

Lab Sample ID: 680-102327-6

Date Collected: 06/11/14 10:35
Date Received: 06/12/14 09:40

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0034	mg/Kg		08/20/14 09:25	08/22/14 17:45	5
U-234	ND		0.011	0.00067	mg/Kg		08/20/14 09:25	08/21/14 22:58	5
U-235	0.022		0.011	0.0046	mg/Kg		08/20/14 09:25	08/21/14 22:58	5
U-236	ND		0.011	0.00090	mg/Kg		08/20/14 09:25	08/21/14 22:58	5
U-238	2.9		0.011	0.00067	mg/Kg		08/20/14 09:25	08/25/14 18:41	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.9		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-8.23	U	0.336	0.829	108	32.4	pCi/g	08/20/14 09:25	08/22/14 17:45	5
U-234	1.17	U	0.166	0.198	69.8	4.19	pCi/g	08/20/14 09:25	08/21/14 22:58	5
U-235	0.0483		0.00226	0.00498	0.0242	0.00987	pCi/g	08/20/14 09:25	08/21/14 22:58	5
U-236	-0.000696	U	0.00141	0.00141	0.725	0.0581	pCi/g	08/20/14 09:25	08/21/14 22:58	5
U-238	0.986		0.0139	0.0918	0.00377	0.000226	pCi/g	08/20/14 09:25	08/25/14 18:41	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.753						%		08/20/14 09:25	1

Client Sample ID: SD-197-02

Date Collected: 06/11/14 10:40
Date Received: 06/12/14 09:40

Lab Sample ID: 680-102327-7

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0032	mg/Kg		08/20/14 09:25	08/22/14 17:49	5
U-234	ND		0.011	0.00064	mg/Kg		08/20/14 09:25	08/21/14 23:03	5
U-235	0.012		0.011	0.0043	mg/Kg		08/20/14 09:25	08/21/14 23:03	5
U-236	ND		0.011	0.00085	mg/Kg		08/20/14 09:25	08/21/14 23:03	5
U-238	1.4		0.011	0.00064	mg/Kg		08/20/14 09:25	08/25/14 18:46	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.4		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-7.50	U	0.673	0.964	102	30.6	pCi/g	08/20/14 09:25	08/22/14 17:49	5
U-234	0.461	U	0.482	0.484	65.9	3.96	pCi/g	08/20/14 09:25	08/21/14 23:03	5
U-235	0.0251		0.00151	0.00276	0.0229	0.00932	pCi/g	08/20/14 09:25	08/21/14 23:03	5
U-236	0.000301	U	0.00159	0.00159	0.685	0.0549	pCi/g	08/20/14 09:25	08/21/14 23:03	5
U-238	0.472		0.0195	0.0476	0.00356	0.000214	pCi/g	08/20/14 09:25	08/25/14 18:46	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.850						%		08/20/14 09:25	1

Client Sample ID: SD-199-SS

Date Collected: 06/11/14 11:10
Date Received: 06/12/14 09:40

Lab Sample ID: 680-102327-9

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0033	mg/Kg		08/20/14 09:25	08/22/14 17:54	5
U-234	ND		0.011	0.00067	mg/Kg		08/20/14 09:25	08/21/14 23:08	5
U-235	0.022		0.011	0.0045	mg/Kg		08/20/14 09:25	08/21/14 23:08	5
U-236	ND		0.011	0.00089	mg/Kg		08/20/14 09:25	08/21/14 23:08	5
U-238	2.8		0.011	0.00067	mg/Kg		08/20/14 09:25	08/25/14 18:51	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.8		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-7.87	U	0.200	0.751	107	32.1	pCi/g	08/20/14 09:25	08/22/14 17:54	5
U-234	0.953	U	0.544	0.551	69.1	4.14	pCi/g	08/20/14 09:25	08/21/14 23:08	5
U-235	0.0480		0.00364	0.00572	0.0240	0.00977	pCi/g	08/20/14 09:25	08/21/14 23:08	5
U-236	-0.000546	U	0.00135	0.00135	0.718	0.0575	pCi/g	08/20/14 09:25	08/21/14 23:08	5
U-238	0.928		0.0184	0.0874	0.00373	0.000224	pCi/g	08/20/14 09:25	08/25/14 18:51	5

Client Sample ID: SD-199-SS

Lab Sample ID: 680-102327-9

Date Collected: 06/11/14 11:10
Date Received: 06/12/14 09:40

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.780						%		08/20/14 09:25	1

Client Sample ID: SD-199-01

Lab Sample ID: 680-102327-10

Date Collected: 06/11/14 11:15
Date Received: 06/12/14 09:40

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0032	mg/Kg		08/20/14 09:25	08/22/14 17:59	5
U-234	ND		0.011	0.00063	mg/Kg		08/20/14 09:25	08/21/14 23:12	5
U-235	0.027		0.011	0.0043	mg/Kg		08/20/14 09:25	08/21/14 23:12	5
U-236	ND		0.011	0.00084	mg/Kg		08/20/14 09:25	08/21/14 23:12	5
U-238	2.5		0.011	0.00063	mg/Kg		08/20/14 09:25	08/25/14 18:55	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.5		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-7.54	U	0.388	0.794	102	30.5	pCi/g	08/20/14 09:25	08/22/14 17:59	5
U-234	1.46	U	0.582	0.597	65.7	3.94	pCi/g	08/20/14 09:25	08/21/14 23:12	5
U-235	0.0583		0.00555	0.00772	0.0228	0.00929	pCi/g	08/20/14 09:25	08/21/14 23:12	5
U-236	0.000573	U	0.000778	0.000780	0.682	0.0547	pCi/g	08/20/14 09:25	08/21/14 23:12	5
U-238	0.856		0.0242	0.0824	0.00355	0.000213	pCi/g	08/20/14 09:25	08/25/14 18:55	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	1.07						%		08/20/14 09:25	1

Client Sample ID: SD-199-02

Lab Sample ID: 680-102327-11

Date Collected: 06/11/14 11:20
Date Received: 06/12/14 09:40

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0034	mg/Kg		08/20/14 09:25	08/22/14 18:03	5
U-234	ND		0.011	0.00069	mg/Kg		08/20/14 09:25	08/21/14 23:26	5
U-235	0.023		0.011	0.0047	mg/Kg		08/20/14 09:25	08/21/14 23:26	5
U-236	ND		0.011	0.00092	mg/Kg		08/20/14 09:25	08/21/14 23:26	5
U-238	2.7		0.011	0.00069	mg/Kg		08/20/14 09:25	08/25/14 19:00	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.7		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Client Sample ID: SD-199-02

Lab Sample ID: 680-102327-11

Date Collected: 06/11/14 11:20
Date Received: 06/12/14 09:40

Matrix: Solid

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-8.58	U	0.183	0.810	110	33.1	pCi/g	08/20/14 09:25	08/22/14 18:03	5
U-234	1.22	U	0.108	0.156	71.3	4.28	pCi/g	08/20/14 09:25	08/21/14 23:26	5
U-235	0.0489		0.00583	0.00736	0.0248	0.0101	pCi/g	08/20/14 09:25	08/21/14 23:26	5
U-236	-0.00104	U	0.000605	0.000612	0.741	0.0594	pCi/g	08/20/14 09:25	08/21/14 23:26	5
U-238	0.908		0.0325	0.0896	0.00385	0.000232	pCi/g	08/20/14 09:25	08/25/14 19:00	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.845						%		08/20/14 09:25	1

Client Sample ID: SD-DUP-02

Lab Sample ID: 680-102327-13

Date Collected: 06/11/14 00:00
Date Received: 06/12/14 09:40

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0034	mg/Kg		08/20/14 09:25	08/22/14 18:17	5
U-234	ND		0.011	0.00067	mg/Kg		08/20/14 09:25	08/21/14 23:31	5
U-235	0.019		0.011	0.0045	mg/Kg		08/20/14 09:25	08/21/14 23:31	5
U-236	ND		0.011	0.00090	mg/Kg		08/20/14 09:25	08/21/14 23:31	5
U-238	2.5		0.011	0.00067	mg/Kg		08/20/14 09:25	08/25/14 19:14	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.5		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-8.23	U	0.321	0.822	108	32.4	pCi/g	08/20/14 09:25	08/22/14 18:17	5
U-234	0.914	U	0.526	0.533	69.7	4.18	pCi/g	08/20/14 09:25	08/21/14 23:31	5
U-235	0.0411		0.00378	0.00535	0.0242	0.00986	pCi/g	08/20/14 09:25	08/21/14 23:31	5
U-236	-0.00156	U	0.00146	0.00147	0.724	0.0580	pCi/g	08/20/14 09:25	08/21/14 23:31	5
U-238	0.847		0.0184	0.0801	0.00376	0.000226	pCi/g	08/20/14 09:25	08/25/14 19:14	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.754						%		08/20/14 09:25	1

Client Sample ID: SD-005W-01

Lab Sample ID: 680-102327-14

Date Collected: 06/11/14 12:00
Date Received: 06/12/14 09:40

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0036	mg/Kg		08/20/14 09:25	08/22/14 18:22	5
U-234	ND		0.012	0.00072	mg/Kg		08/20/14 09:25	08/21/14 23:36	5
U-235	0.018		0.012	0.0049	mg/Kg		08/20/14 09:25	08/21/14 23:36	5
U-236	ND		0.012	0.00096	mg/Kg		08/20/14 09:25	08/21/14 23:36	5
U-238	2.6		0.012	0.00072	mg/Kg		08/20/14 09:25	08/25/14 19:19	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.6		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-8.88	U	0.376	0.899	116	34.7	pCi/g	08/20/14 09:25	08/22/14 18:22	5
U-234	1.03	U	0.324	0.338	74.7	4.48	pCi/g	08/20/14 09:25	08/21/14 23:36	5
U-235	0.0399		0.00205	0.00420	0.0259	0.0106	pCi/g	08/20/14 09:25	08/21/14 23:36	5
U-236	-0.00149	U	0.00225	0.00225	0.777	0.0622	pCi/g	08/20/14 09:25	08/21/14 23:36	5
U-238	0.870		0.0101	0.0806	0.00404	0.000243	pCi/g	08/20/14 09:25	08/25/14 19:19	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.688						%		08/20/14 09:25	1

Client Sample ID: SD-208-SS

Lab Sample ID: 680-102327-15

Date Collected: 06/11/14 12:00
Date Received: 06/12/14 09:40

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0033	mg/Kg		08/20/14 09:25	08/22/14 18:27	5
U-234	ND		0.011	0.00066	mg/Kg		08/20/14 09:25	08/21/14 23:40	5
U-235	0.0094	J	0.011	0.0045	mg/Kg		08/20/14 09:25	08/21/14 23:40	5
U-236	ND		0.011	0.00088	mg/Kg		08/20/14 09:25	08/21/14 23:40	5
U-238	1.3		0.011	0.00066	mg/Kg		08/20/14 09:25	08/25/14 19:23	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.3		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-8.12	U	0.372	0.835	106	31.8	pCi/g	08/20/14 09:25	08/22/14 18:27	5
U-234	0.444	U	0.136	0.142	68.5	4.11	pCi/g	08/20/14 09:25	08/21/14 23:40	5
U-235	0.0202		0.0000425	0.00186	0.0238	0.00970	pCi/g	08/20/14 09:25	08/21/14 23:40	5
U-236	-0.00105	U	0.000213	0.000234	0.712	0.0571	pCi/g	08/20/14 09:25	08/21/14 23:40	5
U-238	0.432		0.00312	0.0399	0.00370	0.000223	pCi/g	08/20/14 09:25	08/25/14 19:23	5

Client Sample ID: SD-208-SS

Date Collected: 06/11/14 12:00
Date Received: 06/12/14 09:40

Lab Sample ID: 680-102327-15
Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.718						%		08/20/14 09:25	1

Client Sample ID: SD-208-01

Date Collected: 06/11/14 12:05
Date Received: 06/12/14 09:40

Lab Sample ID: 680-102327-16
Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0032	mg/Kg		08/20/14 09:25	08/22/14 18:31	5
U-234	ND		0.011	0.00063	mg/Kg		08/20/14 09:25	08/21/14 23:45	5
U-235	0.0054	J	0.011	0.0043	mg/Kg		08/20/14 09:25	08/21/14 23:45	5
U-236	ND		0.011	0.00085	mg/Kg		08/20/14 09:25	08/21/14 23:45	5
U-238	0.76		0.011	0.00063	mg/Kg		08/20/14 09:25	08/25/14 19:28	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.77		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-7.83	U	0.510	0.882	102	30.6	pCi/g	08/20/14 09:25	08/22/14 18:31	5
U-234	0.221	U	0.142	0.143	65.8	3.95	pCi/g	08/20/14 09:25	08/21/14 23:45	5
U-235	0.0118		0.000336	0.00113	0.0228	0.00930	pCi/g	08/20/14 09:25	08/21/14 23:45	5
U-236	0.000219	U	0.00162	0.00162	0.684	0.0548	pCi/g	08/20/14 09:25	08/21/14 23:45	5
U-238	0.256		0.00726	0.0247	0.00355	0.000214	pCi/g	08/20/14 09:25	08/25/14 19:28	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.706						%		08/20/14 09:25	1

Client Sample ID: SD-208-02

Date Collected: 06/11/14 12:10
Date Received: 06/12/14 09:40

Lab Sample ID: 680-102327-17
Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0032	mg/Kg		08/20/14 09:25	08/22/14 18:36	5
U-234	ND		0.011	0.00064	mg/Kg		08/20/14 09:25	08/21/14 23:50	5
U-235	ND		0.011	0.0043	mg/Kg		08/20/14 09:25	08/21/14 23:50	5
U-236	ND		0.011	0.00085	mg/Kg		08/20/14 09:25	08/21/14 23:50	5
U-238	0.56		0.011	0.00064	mg/Kg		08/20/14 09:25	08/25/14 19:33	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.56		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Client Sample ID: SD-208-02

Lab Sample ID: 680-102327-17

Date Collected: 06/11/14 12:10
Date Received: 06/12/14 09:40

Matrix: Solid

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-7.66	U	0.616	0.936	102	30.7	pCi/g	08/20/14 09:25	08/22/14 18:36	5
U-234	0.151	U	0.138	0.139	66.1	3.96	pCi/g	08/20/14 09:25	08/21/14 23:50	5
U-235	0.00775	U	0.000778	0.00106	0.0229	0.00934	pCi/g	08/20/14 09:25	08/21/14 23:50	5
U-236	-0.00124	U	0.00148	0.00148	0.687	0.0550	pCi/g	08/20/14 09:25	08/21/14 23:50	5
U-238	0.190		0.00279	0.0177	0.00357	0.000214	pCi/g	08/20/14 09:25	08/25/14 19:33	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.000						%		08/20/14 09:25	1

Client Sample ID: SD-209-01

Lab Sample ID: 680-102327-18

Date Collected: 06/11/14 14:00
Date Received: 06/12/14 09:40

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0035	mg/Kg		08/20/14 09:25	08/22/14 18:41	5
U-234	ND		0.012	0.00070	mg/Kg		08/20/14 09:25	08/21/14 23:54	5
U-235	ND		0.012	0.0047	mg/Kg		08/20/14 09:25	08/21/14 23:54	5
U-236	ND		0.012	0.00093	mg/Kg		08/20/14 09:25	08/21/14 23:54	5
U-238	0.46		0.012	0.00070	mg/Kg		08/20/14 09:25	08/25/14 19:37	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.46		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-8.74	U	0.778	1.12	112	33.6	pCi/g	08/20/14 09:25	08/22/14 18:41	5
U-234	-0.0260	U	0.0794	0.0794	72.2	4.34	pCi/g	08/20/14 09:25	08/21/14 23:54	5
U-235	0.00567	U	0.000466	0.000699	0.0251	0.0102	pCi/g	08/20/14 09:25	08/21/14 23:54	5
U-236	-0.00117	U	0.00157	0.00157	0.751	0.0601	pCi/g	08/20/14 09:25	08/21/14 23:54	5
U-238	0.155		0.0107	0.0178	0.00390	0.000235	pCi/g	08/20/14 09:25	08/25/14 19:37	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.000						%		08/20/14 09:25	1

Client Sample ID: SD-209-02

Lab Sample ID: 680-102327-19

Date Collected: 06/11/14 14:05
Date Received: 06/12/14 09:40

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0033	mg/Kg		08/20/14 09:25	08/22/14 18:45	5
U-234	ND		0.011	0.00065	mg/Kg		08/20/14 09:25	08/21/14 23:59	5
U-235	ND		0.011	0.0044	mg/Kg		08/20/14 09:25	08/21/14 23:59	5
U-236	ND		0.011	0.00087	mg/Kg		08/20/14 09:25	08/21/14 23:59	5
U-238	0.38		0.011	0.00065	mg/Kg		08/20/14 09:25	08/25/14 19:42	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.38		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-8.17	U	0.282	0.803	105	31.5	pCi/g	08/20/14 09:25	08/22/14 18:45	5
U-234	0.0244	U	0.201	0.201	67.8	4.07	pCi/g	08/20/14 09:25	08/21/14 23:59	5
U-235	0.00498	U	0.000259	0.000526	0.0235	0.00959	pCi/g	08/20/14 09:25	08/21/14 23:59	5
U-236	-0.000507	U	0.000736	0.000738	0.704	0.0564	pCi/g	08/20/14 09:25	08/21/14 23:59	5
U-238	0.127		0.00534	0.0128	0.00366	0.000220	pCi/g	08/20/14 09:25	08/25/14 19:42	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.000						%		08/20/14 09:25	1

Client Sample ID: SD-204-SS

Lab Sample ID: 680-102327-21

Date Collected: 06/11/14 12:20
Date Received: 06/12/14 09:40

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0037	mg/Kg		08/20/14 09:25	08/22/14 18:50	5
U-234	ND		0.012	0.00074	mg/Kg		08/20/14 09:25	08/22/14 00:04	5
U-235	0.0063	J	0.012	0.0050	mg/Kg		08/20/14 09:25	08/22/14 00:04	5
U-236	ND		0.012	0.00098	mg/Kg		08/20/14 09:25	08/22/14 00:04	5
U-238	0.85		0.012	0.00074	mg/Kg		08/20/14 09:25	08/25/14 19:47	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.86		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-9.06	U	0.192	0.855	118	35.5	pCi/g	08/20/14 09:25	08/22/14 18:50	5
U-234	0.128	U	0.206	0.206	76.4	4.58	pCi/g	08/20/14 09:25	08/22/14 00:04	5
U-235	0.0136		0.00127	0.00178	0.0265	0.0108	pCi/g	08/20/14 09:25	08/22/14 00:04	5
U-236	-0.000667	U	0.00253	0.00253	0.794	0.0636	pCi/g	08/20/14 09:25	08/22/14 00:04	5
U-238	0.287		0.0135	0.0296	0.00413	0.000248	pCi/g	08/20/14 09:25	08/25/14 19:47	5

Client Sample ID: SD-204-SS

Lab Sample ID: 680-102327-21
Matrix: Solid

Date Collected: 06/11/14 12:20
Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.736						%		08/20/14 09:25	1

Client Sample ID: SD-204-01

Lab Sample ID: 680-102327-22
Matrix: Solid

Date Collected: 06/11/14 12:25
Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0033	mg/Kg		08/20/14 09:25	08/22/14 18:55	5
U-234	ND		0.011	0.00067	mg/Kg		08/20/14 09:25	08/22/14 00:08	5
U-235	0.0085	J	0.011	0.0045	mg/Kg		08/20/14 09:25	08/22/14 00:08	5
U-236	ND		0.011	0.00089	mg/Kg		08/20/14 09:25	08/22/14 00:08	5
U-238	1.3		0.011	0.00067	mg/Kg		08/20/14 09:25	08/25/14 19:51	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.3		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-8.11	U	0.250	0.787	107	32.2	pCi/g	08/20/14 09:25	08/22/14 18:55	5
U-234	0.224	U	0.382	0.382	69.2	4.15	pCi/g	08/20/14 09:25	08/22/14 00:08	5
U-235	0.0184		0.000680	0.00183	0.0240	0.00979	pCi/g	08/20/14 09:25	08/22/14 00:08	5
U-236	-0.000662	U	0.00122	0.00122	0.720	0.0576	pCi/g	08/20/14 09:25	08/22/14 00:08	5
U-238	0.423		0.0134	0.0411	0.00374	0.000225	pCi/g	08/20/14 09:25	08/25/14 19:51	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.650						%		08/20/14 09:25	1

Client Sample ID: SD-204-02

Lab Sample ID: 680-102327-23
Matrix: Solid

Date Collected: 06/11/14 12:30
Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0035	mg/Kg		08/20/14 09:25	08/22/14 18:59	5
U-234	ND		0.012	0.00069	mg/Kg		08/20/14 09:25	08/22/14 00:22	5
U-235	ND		0.012	0.0047	mg/Kg		08/20/14 09:25	08/22/14 00:22	5
U-236	ND		0.012	0.00092	mg/Kg		08/20/14 09:25	08/22/14 00:22	5
U-238	0.59		0.012	0.00069	mg/Kg		08/20/14 09:25	08/25/14 19:56	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.59		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Client Sample ID: SD-204-02

Lab Sample ID: 680-102327-23

Date Collected: 06/11/14 12:30
Date Received: 06/12/14 09:40

Matrix: Solid

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-8.27	U	0.495	0.907	111	33.3	pCi/g	08/20/14 09:25	08/22/14 18:59	5
U-234	0.212	U	0.269	0.269	71.7	4.30	pCi/g	08/20/14 09:25	08/22/14 00:22	5
U-235	0.00882	U	0.000255	0.000851	0.0249	0.0101	pCi/g	08/20/14 09:25	08/22/14 00:22	5
U-236	0.000358	U	0.00147	0.00147	0.745	0.0597	pCi/g	08/20/14 09:25	08/22/14 00:22	5
U-238	0.199		0.00540	0.0191	0.00387	0.000233	pCi/g	08/20/14 09:25	08/25/14 19:56	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.000						%		08/20/14 09:25	1

Client Sample ID: SD-221-SS

Lab Sample ID: 680-102327-24

Date Collected: 06/11/14 13:20
Date Received: 06/12/14 09:40

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0037	mg/Kg		08/25/14 07:53	08/26/14 15:56	5
U-234	ND		0.012	0.00075	mg/Kg		08/25/14 07:53	08/26/14 15:56	5
U-235	0.0076	J ^	0.012	0.0050	mg/Kg		08/25/14 07:53	08/26/14 15:56	5
U-236	ND		0.012	0.00099	mg/Kg		08/25/14 07:53	08/26/14 15:56	5
U-238	0.68	B	0.012	0.00075	mg/Kg		08/25/14 07:53	08/26/14 15:56	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.69		0.0050	0.00030	mg/Kg			08/25/14 07:53	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-36.6	U	0.282	3.38	120	35.9	pCi/g	08/25/14 07:53	08/26/14 15:56	5
U-234	0.591	U F	0.247	0.253	77.3	4.64	pCi/g	08/25/14 07:53	08/26/14 15:56	5
U-235	0.0165	F	0.00215	0.00264	0.0268	0.0109	pCi/g	08/25/14 07:53	08/26/14 15:56	5
U-236	0.00135	U	0.00103	0.00103	0.803	0.0644	pCi/g	08/25/14 07:53	08/26/14 15:56	5
U-238	0.228	F	0.0149	0.0257	0.00418	0.000251	pCi/g	08/25/14 07:53	08/26/14 15:56	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	1.11						%		08/25/14 07:53	1

Client Sample ID: SD-221-01

Date Collected: 06/11/14 13:25
Date Received: 06/12/14 09:40

Lab Sample ID: 680-102327-25

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0033	mg/Kg		08/13/14 10:17	08/22/14 19:23	5
U-234	ND		0.011	0.00066	mg/Kg		08/13/14 10:17	08/22/14 00:36	5
U-235	0.0056	J	0.011	0.0044	mg/Kg		08/13/14 10:17	08/22/14 00:36	5
U-236	ND		0.011	0.00088	mg/Kg		08/13/14 10:17	08/22/14 00:36	5
U-238	0.47		0.011	0.00066	mg/Kg		08/13/14 10:17	08/22/14 00:36	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.48		0.0050	0.00030	mg/Kg			08/13/14 10:17	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-7.92	U	0.481	0.873	106	31.7	pCi/g	08/13/14 10:17	08/22/14 19:23	5
U-234	0.303	U	0.558	0.559	68.1	4.09	pCi/g	08/13/14 10:17	08/22/14 00:36	5
U-235	0.0122		0.00294	0.00315	0.0237	0.00964	pCi/g	08/13/14 10:17	08/22/14 00:36	5
U-236	0.00218	U	0.000891	0.000913	0.708	0.0567	pCi/g	08/13/14 10:17	08/22/14 00:36	5
U-238	0.157		0.00405	0.0150	0.00368	0.000221	pCi/g	08/13/14 10:17	08/22/14 00:36	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	1.18						%		08/13/14 10:17	1

Client Sample ID: SD-221-02

Date Collected: 06/11/14 13:30
Date Received: 06/12/14 09:40

Lab Sample ID: 680-102327-26

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0033	mg/Kg		08/13/14 10:17	08/22/14 19:41	5
U-234	ND		0.011	0.00067	mg/Kg		08/13/14 10:17	08/22/14 00:55	5
U-235	ND		0.011	0.0045	mg/Kg		08/13/14 10:17	08/22/14 00:55	5
U-236	ND		0.011	0.00089	mg/Kg		08/13/14 10:17	08/22/14 00:55	5
U-238	0.56		0.011	0.00067	mg/Kg		08/13/14 10:17	08/22/14 00:55	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.56		0.0050	0.00030	mg/Kg			08/13/14 10:17	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-8.54	U	0.399	0.881	107	32.2	pCi/g	08/13/14 10:17	08/22/14 19:41	5
U-234	-0.0443	U	0.324	0.324	69.3	4.16	pCi/g	08/13/14 10:17	08/22/14 00:55	5
U-235	0.00777	U	0.000293	0.000773	0.0241	0.00980	pCi/g	08/13/14 10:17	08/22/14 00:55	5
U-236	-0.000979	U	0.00197	0.00197	0.720	0.0577	pCi/g	08/13/14 10:17	08/22/14 00:55	5
U-238	0.188		0.0179	0.0249	0.00374	0.000225	pCi/g	08/13/14 10:17	08/22/14 00:55	5

Client Sample ID: SD-221-02

Lab Sample ID: 680-102327-26

Date Collected: 06/11/14 13:30
Date Received: 06/12/14 09:40

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.000						%		08/13/14 10:17	1

Client Sample ID: SD-210-SS

Lab Sample ID: 680-102327-27

Date Collected: 06/11/14 14:35
Date Received: 06/12/14 09:40

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0037	mg/Kg		08/13/14 10:17	08/22/14 19:46	5
U-234	ND		0.012	0.00073	mg/Kg		08/13/14 10:17	08/22/14 01:00	5
U-235	0.018		0.012	0.0050	mg/Kg		08/13/14 10:17	08/22/14 01:00	5
U-236	ND		0.012	0.00098	mg/Kg		08/13/14 10:17	08/22/14 01:00	5
U-238	2.0		0.012	0.00073	mg/Kg		08/13/14 10:17	08/22/14 01:00	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.0		0.0050	0.00030	mg/Kg			08/13/14 10:17	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-9.32	U	0.324	0.916	118	35.3	pCi/g	08/13/14 10:17	08/22/14 19:46	5
U-234	0.845	U	0.0229	0.0810	76.0	4.56	pCi/g	08/13/14 10:17	08/22/14 01:00	5
U-235	0.0379		0.00197	0.00401	0.0264	0.0107	pCi/g	08/13/14 10:17	08/22/14 01:00	5
U-236	0.000221	U	0.000912	0.000912	0.790	0.0633	pCi/g	08/13/14 10:17	08/22/14 01:00	5
U-238	0.686		0.0174	0.0654	0.00410	0.000247	pCi/g	08/13/14 10:17	08/22/14 01:00	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.892						%		08/13/14 10:17	1

Client Sample ID: SD-210-01

Lab Sample ID: 680-102327-28

Date Collected: 06/11/14 14:40
Date Received: 06/12/14 09:40

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0035	mg/Kg		08/13/14 10:17	08/22/14 19:51	5
U-234	ND		0.012	0.00070	mg/Kg		08/13/14 10:17	08/22/14 01:04	5
U-235	ND		0.012	0.0048	mg/Kg		08/13/14 10:17	08/22/14 01:04	5
U-236	ND		0.012	0.00094	mg/Kg		08/13/14 10:17	08/22/14 01:04	5
U-238	0.60		0.012	0.00070	mg/Kg		08/13/14 10:17	08/22/14 01:04	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.60		0.0050	0.00030	mg/Kg			08/13/14 10:17	1

Client Sample ID: SD-210-01

Lab Sample ID: 680-102327-28

Date Collected: 06/11/14 14:40
Date Received: 06/12/14 09:40

Matrix: Solid

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-8.86	U	0.198	0.839	113	33.9	pCi/g	08/13/14 10:17	08/22/14 19:51	5
U-234	0.0672	U	0.0977	0.0979	73.1	4.38	pCi/g	08/13/14 10:17	08/22/14 01:04	5
U-235	0.00793	U	0.000591	0.000939	0.0254	0.0103	pCi/g	08/13/14 10:17	08/22/14 01:04	5
U-236	-0.00118	U	0.000781	0.000789	0.759	0.0608	pCi/g	08/13/14 10:17	08/22/14 01:04	5
U-238	0.201		0.0146	0.0235	0.00395	0.000237	pCi/g	08/13/14 10:17	08/22/14 01:04	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.000						%		08/13/14 10:17	1

Client Sample ID: SD-210-02

Lab Sample ID: 680-102327-29

Date Collected: 06/11/14 14:45
Date Received: 06/12/14 09:40

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0032	mg/Kg		08/13/14 10:17	08/22/14 19:55	5
U-234	ND		0.011	0.00065	mg/Kg		08/13/14 10:17	08/22/14 01:18	5
U-235	ND		0.011	0.0044	mg/Kg		08/13/14 10:17	08/22/14 01:18	5
U-236	ND		0.011	0.00086	mg/Kg		08/13/14 10:17	08/22/14 01:18	5
U-238	0.58		0.011	0.00065	mg/Kg		08/13/14 10:17	08/22/14 01:18	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.58		0.0050	0.00030	mg/Kg			08/13/14 10:17	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-7.94	U	0.463	0.865	104	31.1	pCi/g	08/13/14 10:17	08/22/14 19:55	5
U-234	0.107	U	0.168	0.169	67.0	4.02	pCi/g	08/13/14 10:17	08/22/14 01:18	5
U-235	0.00811	U	0.000628	0.000975	0.0233	0.00947	pCi/g	08/13/14 10:17	08/22/14 01:18	5
U-236	-0.000445	U	0.00162	0.00162	0.696	0.0557	pCi/g	08/13/14 10:17	08/22/14 01:18	5
U-238	0.194		0.00729	0.0193	0.00362	0.000217	pCi/g	08/13/14 10:17	08/22/14 01:18	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.000						%		08/13/14 10:17	1

Client Sample ID: SD-207-SS

Lab Sample ID: 680-102327-30

Date Collected: 06/11/14 14:48
Date Received: 06/12/14 09:40

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0033	mg/Kg		08/13/14 10:17	08/22/14 20:09	5
U-234	ND		0.011	0.00065	mg/Kg		08/13/14 10:17	08/22/14 01:23	5
U-235	0.023		0.011	0.0044	mg/Kg		08/13/14 10:17	08/22/14 01:23	5
U-236	ND		0.011	0.00087	mg/Kg		08/13/14 10:17	08/22/14 01:23	5
U-238	2.9		0.011	0.00065	mg/Kg		08/13/14 10:17	08/22/14 01:23	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.9		0.0050	0.00030	mg/Kg			08/13/14 10:17	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-7.82	U	0.475	0.862	105	31.5	pCi/g	08/13/14 10:17	08/22/14 20:09	5
U-234	0.899	U	0.702	0.707	67.9	4.07	pCi/g	08/13/14 10:17	08/22/14 01:23	5
U-235	0.0487		0.00138	0.00469	0.0236	0.00960	pCi/g	08/13/14 10:17	08/22/14 01:23	5
U-236	-0.000564	U	0.00163	0.00163	0.705	0.0565	pCi/g	08/13/14 10:17	08/22/14 01:23	5
U-238	0.960		0.0139	0.0894	0.00367	0.000220	pCi/g	08/13/14 10:17	08/22/14 01:23	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.787						%		08/13/14 10:17	1

Client Sample ID: SD-207-01

Lab Sample ID: 680-102327-31

Date Collected: 06/11/14 14:50
Date Received: 06/12/14 09:40

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.010	0.0031	mg/Kg		08/20/14 10:02	08/22/14 20:33	5
U-234	ND		0.010	0.00063	mg/Kg		08/20/14 10:02	08/22/14 01:46	5
U-235	0.052		0.010	0.0043	mg/Kg		08/20/14 10:02	08/22/14 01:46	5
U-236	ND		0.010	0.00084	mg/Kg		08/20/14 10:02	08/22/14 01:46	5
U-238	2.4		0.010	0.00063	mg/Kg		08/20/14 10:02	08/22/14 01:46	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.5		0.0050	0.00030	mg/Kg			08/20/14 10:02	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-7.67	U	0.294	0.765	101	30.3	pCi/g	08/20/14 10:02	08/22/14 20:33	5
U-234	3.35	U	0.441	0.538	65.2	3.91	pCi/g	08/20/14 10:02	08/22/14 01:46	5
U-235	0.112		0.00195	0.0105	0.0227	0.00922	pCi/g	08/20/14 10:02	08/22/14 01:46	5
U-236	0.00737	U	0.00423	0.00429	0.678	0.0543	pCi/g	08/20/14 10:02	08/22/14 01:46	5
U-238	0.804		0.0339	0.0814	0.00352	0.000212	pCi/g	08/20/14 10:02	08/22/14 01:46	5

Client Sample ID: SD-207-01

Lab Sample ID: 680-102327-31

Date Collected: 06/11/14 14:50
Date Received: 06/12/14 09:40

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	2.12						%		08/20/14 10:02	1

Client Sample ID: SD-207-02

Lab Sample ID: 680-102327-32

Date Collected: 06/11/14 14:55
Date Received: 06/12/14 09:40

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0032	mg/Kg		08/20/14 10:02	08/22/14 20:51	5
U-234	ND		0.011	0.00064	mg/Kg		08/20/14 10:02	08/22/14 02:14	5
U-235	0.014		0.011	0.0043	mg/Kg		08/20/14 10:02	08/22/14 02:14	5
U-236	ND		0.011	0.00085	mg/Kg		08/20/14 10:02	08/22/14 02:14	5
U-238	1.9		0.011	0.00064	mg/Kg		08/20/14 10:02	08/22/14 02:14	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.9		0.0050	0.00030	mg/Kg			08/20/14 10:02	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-7.82	U	0.205	0.748	102	30.6	pCi/g	08/20/14 10:02	08/22/14 20:51	5
U-234	0.774	U	0.248	0.258	65.9	3.95	pCi/g	08/20/14 10:02	08/22/14 02:14	5
U-235	0.0310		0.000428	0.00289	0.0229	0.00931	pCi/g	08/20/14 10:02	08/22/14 02:14	5
U-236	-0.000986	U	0.000438	0.000447	0.684	0.0548	pCi/g	08/20/14 10:02	08/22/14 02:14	5
U-238	0.645		0.0169	0.0617	0.00356	0.000214	pCi/g	08/20/14 10:02	08/22/14 02:14	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.731						%		08/20/14 10:02	1

Client Sample ID: SD-205-SS

Lab Sample ID: 680-102327-34

Date Collected: 06/11/14 15:25
Date Received: 06/12/14 09:40

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0035	mg/Kg		08/13/14 10:18	08/22/14 20:14	5
U-234	ND		0.012	0.00070	mg/Kg		08/13/14 10:18	08/22/14 01:28	5
U-235	0.010	J	0.012	0.0047	mg/Kg		08/13/14 10:18	08/22/14 01:28	5
U-236	ND		0.012	0.00093	mg/Kg		08/13/14 10:18	08/22/14 01:28	5
U-238	1.4		0.012	0.00070	mg/Kg		08/13/14 10:18	08/22/14 01:28	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.4		0.0050	0.00030	mg/Kg			08/13/14 10:18	1

Client Sample ID: SD-205-SS

Lab Sample ID: 680-102327-34

Date Collected: 06/11/14 15:25
Date Received: 06/12/14 09:40

Matrix: Solid

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-8.80	U	0.311	0.867	112	33.7	pCi/g	08/13/14 10:18	08/22/14 20:14	5
U-234	0.275	U	0.137	0.139	72.5	4.35	pCi/g	08/13/14 10:18	08/22/14 01:28	5
U-235	0.0224		0.00100	0.00229	0.0252	0.0103	pCi/g	08/13/14 10:18	08/22/14 01:28	5
U-236	-0.000995	U	0.000222	0.000240	0.754	0.0604	pCi/g	08/13/14 10:18	08/22/14 01:28	5
U-238	0.460		0.0125	0.0441	0.00392	0.000235	pCi/g	08/13/14 10:18	08/22/14 01:28	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.709						%		08/13/14 10:18	1

Client Sample ID: SD-205-01

Lab Sample ID: 680-102327-35

Date Collected: 06/11/14 15:30
Date Received: 06/12/14 09:40

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0034	mg/Kg		08/20/14 10:02	08/22/14 21:05	5
U-234	ND		0.011	0.00068	mg/Kg		08/20/14 10:02	08/22/14 02:19	5
U-235	0.041		0.011	0.0046	mg/Kg		08/20/14 10:02	08/22/14 02:19	5
U-236	ND		0.011	0.00091	mg/Kg		08/20/14 10:02	08/22/14 02:19	5
U-238	2.8		0.011	0.00068	mg/Kg		08/20/14 10:02	08/22/14 02:19	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.8		0.0050	0.00030	mg/Kg			08/20/14 10:02	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-8.52	U	0.456	0.907	110	32.9	pCi/g	08/20/14 10:02	08/22/14 21:05	5
U-234	2.69	U	0.584	0.634	70.7	4.24	pCi/g	08/20/14 10:02	08/22/14 02:19	5
U-235	0.0884		0.00767	0.0112	0.0246	0.0100	pCi/g	08/20/14 10:02	08/22/14 02:19	5
U-236	0.00220	U	0.00411	0.00411	0.735	0.0589	pCi/g	08/20/14 10:02	08/22/14 02:19	5
U-238	0.934		0.0787	0.117	0.00382	0.000230	pCi/g	08/20/14 10:02	08/22/14 02:19	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	1.44						%		08/20/14 10:02	1

Client Sample ID: SD-205-02

Lab Sample ID: 680-102327-36

Date Collected: 06/11/14 15:35
Date Received: 06/12/14 09:40

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0035	mg/Kg		08/13/14 10:18	08/22/14 20:19	5
U-234	ND		0.012	0.00070	mg/Kg		08/13/14 10:18	08/22/14 01:32	5
U-235	0.010	J	0.012	0.0047	mg/Kg		08/13/14 10:18	08/22/14 01:32	5
U-236	ND		0.012	0.00094	mg/Kg		08/13/14 10:18	08/22/14 01:32	5
U-238	1.4		0.012	0.00070	mg/Kg		08/13/14 10:18	08/22/14 01:32	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.4		0.0050	0.00030	mg/Kg			08/13/14 10:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-8.47	U	0.773	1.10	113	33.8	pCi/g	08/13/14 10:18	08/22/14 20:19	5
U-234	0.434	U	0.184	0.188	72.8	4.37	pCi/g	08/13/14 10:18	08/22/14 01:32	5
U-235	0.0219		0.000615	0.00210	0.0253	0.0103	pCi/g	08/13/14 10:18	08/22/14 01:32	5
U-236	-0.000877	U	0.00326	0.00326	0.756	0.0606	pCi/g	08/13/14 10:18	08/22/14 01:32	5
U-238	0.484		0.00480	0.0448	0.00393	0.000236	pCi/g	08/13/14 10:18	08/22/14 01:32	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.709						%		08/13/14 10:18	1

Client Sample ID: SD-DUP-03

Lab Sample ID: 680-102370-1

Date Collected: 06/12/14 00:00
Date Received: 06/13/14 09:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0035	mg/Kg		08/14/14 09:01	08/22/14 15:34	5
U-234	ND		0.012	0.00071	mg/Kg		08/14/14 09:01	08/21/14 19:21	5
U-235	ND		0.012	0.0048	mg/Kg		08/14/14 09:01	08/21/14 19:21	5
U-236	ND		0.012	0.00094	mg/Kg		08/14/14 09:01	08/21/14 19:21	5
U-238	0.52	B	0.012	0.00071	mg/Kg		08/14/14 09:01	08/21/14 19:21	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.52		0.0050	0.00030	mg/Kg			08/14/14 09:01	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-7.98	U	0.427	0.849	113	34.0	pCi/g	08/14/14 09:01	08/22/14 15:34	5
U-234	0.451	U	0.190	0.194	73.2	4.39	pCi/g	08/14/14 09:01	08/21/14 19:21	5
U-235	0.00776	U	0.000480	0.000861	0.0254	0.0103	pCi/g	08/14/14 09:01	08/21/14 19:21	5
U-236	0.000456	U	0.00189	0.00189	0.760	0.0609	pCi/g	08/14/14 09:01	08/21/14 19:21	5
U-238	0.174	F	0.0147	0.0217	0.00395	0.000237	pCi/g	08/14/14 09:01	08/21/14 19:21	5

Client Sample ID: SD-DUP-03

Lab Sample ID: 680-102370-1

Date Collected: 06/12/14 00:00
Date Received: 06/13/14 09:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.000						%		08/14/14 09:01	1

Client Sample ID: SD-206-SS

Lab Sample ID: 680-102370-2

Date Collected: 06/12/14 08:10
Date Received: 06/13/14 09:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0032	mg/Kg		08/14/14 09:01	08/22/14 15:38	5
U-234	ND		0.011	0.00064	mg/Kg		08/14/14 09:01	08/21/14 19:26	5
U-235	0.025		0.011	0.0043	mg/Kg		08/14/14 09:01	08/21/14 19:26	5
U-236	ND		0.011	0.00085	mg/Kg		08/14/14 09:01	08/21/14 19:26	5
U-238	3.1	B	0.011	0.00064	mg/Kg		08/14/14 09:01	08/21/14 19:26	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.1		0.0050	0.00030	mg/Kg			08/14/14 09:01	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	10.3	U	54.8	54.8	103	30.9	pCi/g	08/14/14 09:01	08/22/14 15:38	5
U-234	1.49	U	0.177	0.224	66.5	3.99	pCi/g	08/14/14 09:01	08/21/14 19:26	5
U-235	0.0550		0.00208	0.00547	0.0231	0.00940	pCi/g	08/14/14 09:01	08/21/14 19:26	5
U-236	0.000746	U	0.00156	0.00156	0.691	0.0553	pCi/g	08/14/14 09:01	08/21/14 19:26	5
U-238	1.05	F	0.0339	0.102	0.00359	0.000216	pCi/g	08/14/14 09:01	08/21/14 19:26	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.800						%		08/14/14 09:01	1

Client Sample ID: SD-206-01

Lab Sample ID: 680-102370-3

Date Collected: 06/12/14 08:15
Date Received: 06/13/14 09:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0033	mg/Kg		08/14/14 09:01	08/22/14 15:43	5
U-234	ND		0.011	0.00065	mg/Kg		08/14/14 09:01	08/21/14 19:31	5
U-235	0.020		0.011	0.0044	mg/Kg		08/14/14 09:01	08/21/14 19:31	5
U-236	ND		0.011	0.00087	mg/Kg		08/14/14 09:01	08/21/14 19:31	5
U-238	2.4	B	0.011	0.00065	mg/Kg		08/14/14 09:01	08/21/14 19:31	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.4		0.0050	0.00030	mg/Kg			08/14/14 09:01	1

Client Sample ID: SD-206-01

Date Collected: 06/12/14 08:15
Date Received: 06/13/14 09:30

Lab Sample ID: 680-102370-3
Matrix: Solid

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-7.01	U	0.313	0.717	105	31.5	pCi/g	08/14/14 09:01	08/22/14 15:43	5
U-234	1.06	U	0.235	0.255	67.8	4.07	pCi/g	08/14/14 09:01	08/21/14 19:31	5
U-235	0.0438		0.000854	0.00412	0.0235	0.00958	pCi/g	08/14/14 09:01	08/21/14 19:31	5
U-236	0.000761	U	0.00222	0.00222	0.704	0.0564	pCi/g	08/14/14 09:01	08/21/14 19:31	5
U-238	0.792	F	0.00686	0.0732	0.00366	0.000220	pCi/g	08/14/14 09:01	08/21/14 19:31	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.826						%		08/14/14 09:01	1

Client Sample ID: SD-206-02

Date Collected: 06/12/14 08:20
Date Received: 06/13/14 09:30

Lab Sample ID: 680-102370-4
Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0035	mg/Kg		08/14/14 09:01	08/22/14 15:48	5
U-234	0.00091	J	0.012	0.00069	mg/Kg		08/14/14 09:01	08/21/14 19:35	5
U-235	0.087		0.012	0.0047	mg/Kg		08/14/14 09:01	08/21/14 19:35	5
U-236	ND		0.012	0.00092	mg/Kg		08/14/14 09:01	08/21/14 19:35	5
U-238	3.0	B	0.012	0.00069	mg/Kg		08/14/14 09:01	08/21/14 19:35	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.1		0.0050	0.00030	mg/Kg			08/14/14 09:01	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-7.06	U	0.557	0.856	111	33.4	pCi/g	08/14/14 09:01	08/22/14 15:48	5
U-234	5.69		0.529	0.744	71.8	4.31	pCi/g	08/14/14 09:01	08/21/14 19:35	5
U-235	0.187		0.00922	0.0195	0.0249	0.0102	pCi/g	08/14/14 09:01	08/21/14 19:35	5
U-236	0.00970	U	0.00611	0.00618	0.746	0.0598	pCi/g	08/14/14 09:01	08/21/14 19:35	5
U-238	0.994	F	0.0648	0.112	0.00388	0.000233	pCi/g	08/14/14 09:01	08/21/14 19:35	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	2.82						%		08/14/14 09:01	1

Client Sample ID: SD-005E-01

Date Collected: 06/12/14 08:30
Date Received: 06/13/14 09:30

Lab Sample ID: 680-102370-6

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0035	mg/Kg		08/14/14 09:01	08/22/14 15:52	5
U-234	ND		0.012	0.00069	mg/Kg		08/14/14 09:01	08/21/14 19:40	5
U-235	0.0067	J	0.012	0.0047	mg/Kg		08/14/14 09:01	08/21/14 19:40	5
U-236	ND		0.012	0.00092	mg/Kg		08/14/14 09:01	08/21/14 19:40	5
U-238	0.90	B	0.012	0.00069	mg/Kg		08/14/14 09:01	08/21/14 19:40	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.91		0.0050	0.00030	mg/Kg			08/14/14 09:01	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-8.00	U	0.261	0.781	111	33.3	pCi/g	08/14/14 09:01	08/22/14 15:52	5
U-234	0.510	U	0.430	0.432	71.7	4.30	pCi/g	08/14/14 09:01	08/21/14 19:40	5
U-235	0.0146		0.00210	0.00249	0.0249	0.0101	pCi/g	08/14/14 09:01	08/21/14 19:40	5
U-236	-0.000238	U	0.00191	0.00191	0.745	0.0597	pCi/g	08/14/14 09:01	08/21/14 19:40	5
U-238	0.302	F	0.0264	0.0383	0.00387	0.000233	pCi/g	08/14/14 09:01	08/21/14 19:40	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.739						%		08/14/14 09:01	1

Appendix C

Support Documentation

QUANTITATIVE ANALYSIS REPORT SD-198-55

Sample ID: 680-102327-A-1-H

Sample Date/Time: Monday, August 25, 2014 17:59:44

Autosampler Position: 19

Dataset File: D:\Elandata\Dataset\082514M3\680-102327-A-1-H.035

0.5664 g / 50ml

DF = 5X

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			740547.015	ug/L	790430.887
	233	**U**	**-0.037260**	0.107	15.400	ug/L	1319.194
	234	**U**	**0.000341**	14.826	16.933	ug/L	7.867
	235	**U**	**0.050972**	0.700	1382.667	ug/L	70.000
	236	**U**	**-0.000039**	26.897	6.067	ug/L	8.200
→	238	**U**	**6.962361**	0.110	159666.181	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.689**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

$$\frac{6.962361\ \mu g}{1L} \times \frac{0.05L}{0.5664g} \times 5 = 3.07\ \mu g/g$$

LMC-MRC
SDG 680-102327-3

U-238 CONVERSION (mg/Kg to pCi/g)

SAMPLE ID	SD-198-SS
U-238 (mg/Kg)	3.1
SOIL CONVERSION	2.80E-12
ATOMIC WEIGHT (g/mole)	238.03
U-238 HALF LIFE (y)	4.51E+09

= 1.03E+00 pCi/g

3.1 mg/Kg/(2.8E-12 * 238.03 g/mole * 4.51E9 y)

MRC SEDIMENT INVESTIGATION

SEDIMENT DATA

680-102327-3

FRACTION	CHEMICAL	SD-199-02	UNITS	SD-DUP-02	RPD	D
M	TOTAL URANIUM	2.7	MG/KG	2.5	7.69	0.20
M	URANIUM-235	0.023	MG/KG	0.019	19.05	0.00
M	URANIUM-235 (PERCENT)	0.845	%	0.754	11.38	0.09
M	URANIUM-238	2.7	MG/KG	2.5	7.69	0.20
RAD	THORIUM-228	1.08	PCI/G	0.695	43.38	0.39
RAD	THORIUM-230	0.66	PCI/G	0.775	16.03	0.12
RAD	THORIUM-232	0.965	PCI/G	1.08	11.25	0.12
RAD	URANIUM-235	0.0489	PCI/G	0.0411	17.33	0.01
RAD	URANIUM-238	0.908	PCI/G	0.847	6.95	0.06

Current RPD Quality Control Limit: 50 %.
Shaded cells indicate RPDs that exceed the applicable quality control limit.

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: S. Camera	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.7
Client Contact: Mike Martin	Phone: (703) 342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~Page~~ 1 of 4
Company: Tetra Tech, Inc.		Analysis Requested		Job #: 680-102327
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes:
City: Germantown	TAT Requested (days):			A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; G - Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA; M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2SO3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - ph 4-5; Z - other (specify)
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			Other:
Email: Michael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	9320, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
		Preservation Code:										
SD-198-SS	6/11/14	0755	C	Solid				X				
SD-198-01		0800	C	Solid				X				
SD-198-02		0805	C	Solid				X				
SD-198-03		0810	C	Solid				X				Hold Pending analysis of SS to 02
SD-197-SS		1030	C	Solid				X				
SD-197-01		1035	C	Solid				X				
SD-197-02		1040	C	Solid				X				
SD-197-03		1045	C	Solid				X				Hold Pending analysis of SS to 02
SD-199-SS		1110	C	Solid				X				
SD-199-01		1115	C	Solid				X				
SD-199-02		1120	C	Solid				X				

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	6/11/14 1603	TT		6/11/14 1600	TestAmerica
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	6/11/14 1730	TestAmerica		6-12-14 0940	TA SR
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.3
Client Contact: Mike Martin	Phone:	E-Mail: jerry.lanier@testamericainc.com		Page: Page 2 of 4
Company: Tetra Tech, Inc.		Analysis Requested		Job #: 680-102327
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes:
City: Germantown	TAT Requested (days):			A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; G - Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA; M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2SO3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - ph 4-5; Z - other (specify)
State, Zip: MD, 20874	PO #: Purchase Order not required			Other:
Phone:	WO #:			
Email: Michael.Martin@tetratech.com	Project #: 68012942			
Project Name: Sediments	SSOW#:			
Site:				

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of Containers	Special Instructions/Note:
				Preservation Code:			N	N	N	N		
SD-149-03	6/11/14	1125	C	Solid				X				Hold pending analysis of SS to 02
SD-DUP02		0000		Solid				X				
SD-005W-01		1200	C	Solid				X		X		
SD-208-55		1206	C	Solid				X				
SD-208-01		1205	C	Solid				X				
SD-208-02		1210	C	Solid				X				
SD-209-01		1400	C	Solid				X				
SD-209-02		1405	C	Solid				X				
SD-209-03		1410	C	Solid				X				
SD-209-55		1220	C	Solid				X				
SD-204-01		1025	C	Solid				X				

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	[signature]	6-11-14 / 1600	TT	[signature]	6/11/14 / 1600	TestAmerica
2	[signature]	6/11/14 / 1630 1730	TestAmerica	[signature]	6-12-14 0440	TA STL
3						

Custody Seals Intact: △ Yes △ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.4
Client Contact: Mike Martin	Phone: (703)342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~4 of 46~~ 3 of 4
Company: Tetra Tech, Inc.		Analysis Requested		Job #: 680-102327
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes:
City: Germantown	TAT Requested (days):			A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			Other:
Email: Michael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (w=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	880 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD)-Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-204-02	6/11/14	1320	C	Solid				X				
SD-221-55		1320	C	Solid				X				
SD-221-01		1325	C	Solid				X				
SD-221-02		1330	C	Solid				X				
SD-210-55		1435	C	Solid				X				
SD-210-01		1440	C	Solid				X				
SD-210-02		1445	C	Solid				X				
SD-207-55		1448	C	Solid				X				
SD-207-01		1450	C	Solid				X				
SD-207-02		1455	C	Solid				X				
SD-207-03	↓	1500	C	Solid				X				Hold Pending Analysis of SS to 02

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:				
Relinquished by:	Date/Time: 6-11-14 1600	Company: TT	Received by:	Date/Time: 6/11/14 1668	Company: TestAmerica
Relinquished by:	Date/Time: 6/11/14 1630 1730	Company: TestAmerica	Received by:	Date/Time: 6-12-14 0940	Company: TASR
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

R&D

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.12
Client Contact: Mike Martin	Phone: (703) 342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page 12 of 26 4 of 4
Company: Tetra Tech, Inc.				Job #: 680-102327
Address: 20251 Century Blvd Suite 200	Due Date Requested:			
City: Germantown	TAT Requested (days):			
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			
Email: Michael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2SO3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=wasteoil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
SD-205-SS	6/11/14	1525	C	Solid				X				
SD-205-01		1530	C	Solid				X				
SD-205-02		1535	C	Solid				X				
SD-205-03		1540	C	Solid				X				HOLD as per table
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Date/Time	Company	Received by	Date/Time	Company
Relinquished by:	6-11-14 / 1640	TT		6/11/14 / 1600	BV America
Relinquished by:	6/11/14 / 1730	BV America		6-12-14 0940	TA STL
Relinquished by:			Received by:	Date/Time:	Company

Custody Seals Intact: ∆ Yes ∆ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

02 RAD

Cur165

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: S. Green	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.13
Client Contact: Mike Martin	Phone: (703)342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~13 of 13~~ 1 of 4
Company: Tetra Tech, Inc.				Job #: 680-102370
Address: 20251 Century Blvd Suite 200	Due Date Requested:	Analysis Requested		
City: Germantown	TAT Requested (days): Standard			Preservation Codes:
State, Zip: MD, 20874	PO #: Purchase Order not required			A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
Phone:	WO #:			Other:
Email: Michael.Martin@tetratech.com	Project #: 68012942			
Project Name: Sediments	SSOW#:			
Site: Dark Head Cove				

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=wastoil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of Containers	Special Instructions/Note:
SD-DUP03	6/12/14	0000	C	Solid				X				
SD-206-SS		0810	C	Solid				X				
SD-206-01		0815	C	Solid				X				
SD-206-02		0820	C	Solid				X				
SD-206-03		0825	C	Solid				X				
SD-005E-01		0830	C	Solid				X		X		Hold pending analysis of SS to 02
~~SD-222-SS~~ SD-215-SS		0850	C	Solid				X				
SD-222-SS		0905	C	Solid				X				
SD-222-01		0910	C	Solid				X				
SD-222-02		0915	C	Solid				X				
SD-222-03		1920	C	Solid				X				

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For ____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:
Relinquished by:	Date/Time: 6-12-14 / 1600	Company: TE	Received by:	Date/Time: 6/12/14 / 1600	Company: TestAmerica
Relinquished by:	Date/Time: 6/12/14 / 1735	Company: TestAmerica	Received by:	Date/Time: 6-13-14 / 0930	Company: TASTcore
Relinquished by:	Date/Time:	Company:	Received by:	Date/Time:	Company:

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-102327-3
SDG Number: 680102327-1

Login Number: 102327
List Number: 1
Creator: Daughtry, Beth A

List Source: TestAmerica Savannah

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-102327-3
SDG Number: 680102327-1

Login Number: 102327
List Number: 2
Creator: Daniels, Brian J

List Source: TestAmerica St. Louis
List Creation: 06/13/14 03:50 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	True	

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-102327-3
SDG Number: 680102327-1

Login Number: 102370
List Number: 1
Creator: Daughtry, Beth A

List Source: TestAmerica Savannah

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-102327-3
SDG Number: 680102327-1

Login Number: 102370
List Number: 2
Creator: Daniels, Brian J

List Source: TestAmerica St. Louis
List Creation: 06/16/14 12:53 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	3.1
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Sediments

Report Number: 680-102327-3

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 06/12/2014 and 06/13/2014; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 2.6 and 3.1 C.

A revised report was necessary to correct the final volume that was used to calculate the Uranium data.

TOTAL URANIUM

Samples SD-198-SS (680-102327-1), SD-DUP-03 (680-102370-1), SD-198-01 (680-102327-2), SD-206-SS (680-102370-2), SD-198-02 (680-102327-3), SD-206-01 (680-102370-3), SD-206-02 (680-102370-4), SD-197-SS (680-102327-5), SD-197-01 (680-102327-6), SD-005E-01 (680-102370-6), SD-197-02 (680-102327-7), SD-199-SS (680-102327-9), SD-199-01 (680-102327-10), SD-199-02 (680-102327-11), SD-DUP-02 (680-102327-13), SD-005W-01 (680-102327-14), SD-208-SS (680-102327-15), SD-208-01 (680-102327-16), SD-208-02 (680-102327-17), SD-209-01 (680-102327-18), SD-209-02 (680-102327-19), SD-204-SS (680-102327-21), SD-204-01 (680-102327-22), SD-204-02 (680-102327-23), SD-221-SS (680-102327-24), SD-221-01 (680-102327-25), SD-221-02 (680-102327-26), SD-210-SS (680-102327-27), SD-210-01 (680-102327-28), SD-210-02 (680-102327-29), SD-207-SS (680-102327-30), SD-207-01 (680-102327-31), SD-207-02 (680-102327-32), SD-205-SS (680-102327-34), SD-205-01 (680-102327-35) and SD-205-02 (680-102327-36) were analyzed for Total Uranium in accordance with EPA SW-846 6020A. The samples were analyzed on 08/13/2014, 08/14/2014, 08/20/2014 and 08/25/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM

Samples SD-198-SS (680-102327-1), SD-DUP-03 (680-102370-1), SD-198-01 (680-102327-2), SD-206-SS (680-102370-2), SD-198-02 (680-102327-3), SD-206-01 (680-102370-3), SD-206-02 (680-102370-4), SD-197-SS (680-102327-5), SD-197-01 (680-102327-6), SD-005E-01 (680-102370-6), SD-197-02 (680-102327-7), SD-199-SS (680-102327-9), SD-199-01 (680-102327-10), SD-199-02 (680-102327-11), SD-DUP-02 (680-102327-13), SD-005W-01 (680-102327-14), SD-208-SS (680-102327-15), SD-208-01 (680-102327-16), SD-208-02 (680-102327-17), SD-209-01 (680-102327-18), SD-209-02 (680-102327-19), SD-204-SS (680-102327-21), SD-204-01 (680-102327-22), SD-204-02 (680-102327-23), SD-221-SS (680-102327-24), SD-221-01 (680-102327-25), SD-221-02 (680-102327-26), SD-210-SS (680-102327-27), SD-210-01 (680-102327-28), SD-210-02 (680-102327-29), SD-207-SS (680-102327-30), SD-207-01 (680-102327-31), SD-207-02 (680-102327-32), SD-205-SS (680-102327-34), SD-205-01 (680-102327-35) and SD-205-02 (680-102327-36) were analyzed for Isotopic Uranium in accordance with EPA SW-846 6020A. The samples were prepared on 08/13/2014, 08/14/2014, 08/20/2014 and 08/25/2014 and analyzed on 08/21/2014, 08/22/2014, 08/25/2014 and 08/26/2014.

The ICB and CCB contained uranium 233 above the reporting limit (RL). All reported samples associated with these QC were ND for this analyte; therefore, re-analysis of samples was not performed. (CCB 160-139817/100), (CCB 160-139817/103), (CCB 160-139817/16), (CCB 160-139817/28), (CCB 160-139817/40), (CCB 160-139817/52), (CCB 160-139817/64), (CCB 160-139817/76), (CCB 160-139817/88), (ICB 160-139817/10)

The initial calibration verification (ICV) result was above the upper control limit for uranium 235. Sample results were below the reporting limit, and have been reported as qualified data. (ICV 160-140258/9)

The continuing calibration verification (CCV) recovered above the upper control limit for uranium 233. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The following samples are impacted: (CCV 160-139817/102), (CCV 160-139817/87), (CCV 160-139817/99).

The LLC was above upper QC limits for uranium 233. Associated samples which are below the reporting limit for the contaminant do not require re-analysis. Original results are reported. (CRI 160-139817/12), (CRI 160-140258/12)

The serial dilution performed for the following sample(s) was outside control limits for uranium 238, indicating a matrix interference: (680-102327-24 SD)

Due to the high concentration of uranium 238, the matrix spike / matrix spike duplicate (MS/MSD) could not be evaluated for accuracy and

precision. The associated laboratory control sample (LCS) met acceptance criteria. (680-102327-1 MS), (680-102327-1 MSD)

U-235 exceeded the recovery criteria low for the MS of sample SD-221-SSMS (680-102327-24) in batch 160-140258.

For the MSD of sample SD-221-SSMSD (680-102327-24) in batch 160-140258, U-235 exceeded the recovery criteria low. U-238 exceeded the recovery criteria high. Also, U-238 exceeded the RPD limit.

Refer to the QC report for details.

The presence of the '4' qualifier indicates analytes where the concentration in the unspiked sample exceeded four times the spiking amount.

Refer to the QC report for details.

Samples SD-198-SS (680-102327-1)[5X], SD-DUP-03 (680-102327-1)[5X], SD-198-01 (680-102327-2)[5X], SD-206-SS (680-102327-2)[5X], SD-198-02 (680-102327-3)[5X], SD-206-01 (680-102327-3)[5X], SD-206-02 (680-102327-4)[5X], SD-197-SS (680-102327-5)[5X], SD-197-01 (680-102327-6)[5X], SD-005E-01 (680-102327-6)[5X], SD-197-02 (680-102327-7)[5X], SD-199-SS (680-102327-9)[5X], SD-199-01 (680-102327-10)[5X], SD-199-02 (680-102327-11)[5X], SD-DUP-02 (680-102327-13)[5X], SD-005W-01 (680-102327-14)[5X], SD-208-SS (680-102327-15)[5X], SD-208-01 (680-102327-16)[5X], SD-208-02 (680-102327-17)[5X], SD-209-01 (680-102327-18)[5X], SD-209-02 (680-102327-19)[5X], SD-204-SS (680-102327-21)[5X], SD-204-01 (680-102327-22)[5X], SD-204-02 (680-102327-23)[5X], SD-221-SS (680-102327-24)[5X], SD-221-01 (680-102327-25)[5X], SD-221-02 (680-102327-26)[5X], SD-210-SS (680-102327-27)[5X], SD-210-01 (680-102327-28)[5X], SD-210-02 (680-102327-29)[5X], SD-207-SS (680-102327-30)[5X], SD-207-01 (680-102327-31)[5X], SD-207-02 (680-102327-32)[5X], SD-205-SS (680-102327-34)[5X], SD-205-01 (680-102327-35)[5X] and SD-205-02 (680-102327-36)[5X] required dilution prior to analysis. The samples were high in salts. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM PERCENTAGE

Samples SD-198-SS (680-102327-1), SD-DUP-03 (680-102370-1), SD-198-01 (680-102327-2), SD-206-SS (680-102370-2), SD-198-02 (680-102327-3), SD-206-01 (680-102370-3), SD-206-02 (680-102370-4), SD-197-SS (680-102327-5), SD-197-01 (680-102327-6), SD-005E-01 (680-102370-6), SD-197-02 (680-102327-7), SD-199-SS (680-102327-9), SD-199-01 (680-102327-10), SD-199-02 (680-102327-11), SD-DUP-02 (680-102327-13), SD-005W-01 (680-102327-14), SD-208-SS (680-102327-15), SD-208-01 (680-102327-16), SD-208-02 (680-102327-17), SD-209-01 (680-102327-18), SD-209-02 (680-102327-19), SD-204-SS (680-102327-21), SD-204-01 (680-102327-22), SD-204-02 (680-102327-23), SD-221-SS (680-102327-24), SD-221-01 (680-102327-25), SD-221-02 (680-102327-26), SD-210-SS (680-102327-27), SD-210-01 (680-102327-28), SD-210-02 (680-102327-29), SD-207-SS (680-102327-30), SD-207-01 (680-102327-31), SD-207-02 (680-102327-32), SD-205-SS (680-102327-34), SD-205-01 (680-102327-35) and SD-205-02 (680-102327-36) were analyzed for Isotopic Uranium Percentage in accordance with EPA SW-846 6020A. The samples were analyzed on 08/13/2014, 08/14/2014, 08/20/2014 and 08/25/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM ACTIVITY

Samples SD-198-SS (680-102327-1), SD-DUP-03 (680-102370-1), SD-198-01 (680-102327-2), SD-206-SS (680-102370-2), SD-198-02 (680-102327-3), SD-206-01 (680-102370-3), SD-206-02 (680-102370-4), SD-197-SS (680-102327-5), SD-197-01 (680-102327-6), SD-005E-01 (680-102370-6), SD-197-02 (680-102327-7), SD-199-SS (680-102327-9), SD-199-01 (680-102327-10), SD-199-02 (680-102327-11), SD-DUP-02 (680-102327-13), SD-005W-01 (680-102327-14), SD-208-SS (680-102327-15), SD-208-01 (680-102327-16), SD-208-02 (680-102327-17), SD-209-01 (680-102327-18), SD-209-02 (680-102327-19), SD-204-SS (680-102327-21), SD-204-01 (680-102327-22), SD-204-02 (680-102327-23), SD-221-SS (680-102327-24), SD-221-01 (680-102327-25), SD-221-02 (680-102327-26), SD-210-SS (680-102327-27), SD-210-01 (680-102327-28), SD-210-02 (680-102327-29), SD-207-SS (680-102327-30), SD-207-01 (680-102327-31), SD-207-02 (680-102327-32), SD-205-SS (680-102327-34), SD-205-01 (680-102327-35) and SD-205-02 (680-102327-36) were analyzed for Isotopic Uranium Activity in accordance with EPA SW-846 6020A. The samples were prepared on 08/13/2014, 08/14/2014, 08/20/2014 and 08/25/2014 and analyzed on 08/21/2014, 08/22/2014, 08/25/2014 and 08/26/2014.

U-238 was detected in method blank MB 160-137845/1-A, and method blank MB 160-139821/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged.

The Relative Error Ration (RER) and Duplicate Error Ration (DER) recoveries were outside control limits for uranium 234, 235 and 238. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

The Duplicate Error Ration (DER) was outside control limits for uranium 234 and 235. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits. (680-102327-1 MSD)

U-238 exceeded the recovery criteria high for the MSD of sample SD-221-SSMSD (680-102327-24) in batch 160-140259.

Refer to the QC report for details.

Samples SD-198-SS (680-102327-1)[5X], SD-DUP-03 (680-102327-1)[5X], SD-198-01 (680-102327-2)[5X], SD-206-SS (680-102327-2)[5X], SD-198-02 (680-102327-3)[5X], SD-206-01 (680-102327-3)[5X], SD-206-02 (680-102327-4)[5X], SD-197-SS (680-102327-5)[5X], SD-197-01 (680-102327-6)[5X], SD-005E-01 (680-102327-6)[5X], SD-197-02 (680-102327-7)[5X], SD-199-SS (680-102327-9)[5X], SD-199-01 (680-102327-10)[5X], SD-199-02 (680-102327-11)[5X], SD-DUP-02 (680-102327-13)[5X], SD-005W-01 (680-102327-14)[5X], SD-208-SS (680-102327-15)[5X], SD-208-01 (680-102327-16)[5X], SD-208-02 (680-102327-17)[5X], SD-209-01 (680-102327-18)[5X], SD-209-02 (680-102327-19)[5X], SD-204-SS (680-102327-21)[5X], SD-204-01 (680-102327-22)[5X], SD-204-02 (680-102327-23)[5X], SD-221-SS (680-102327-24)[5X], SD-221-01 (680-102327-25)[5X], SD-221-02 (680-102327-26)[5X], SD-210-SS (680-102327-27)[5X], SD-210-01 (680-102327-28)[5X], SD-210-02 (680-102327-29)[5X], SD-207-SS (680-102327-30)[5X], SD-207-01 (680-102327-31)[5X], SD-207-02 (680-102327-32)[5X], SD-205-SS (680-102327-34)[5X], SD-205-01 (680-102327-35)[5X] and SD-205-02 (680-102327-36)[5X] required dilution prior to analysis. The samples were high in salts. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Qualifiers

Metals

Qualifier	Qualifier Description
^	ICV,CCV,ICB,CCB, ISA, ISB, CRI, CRA, DLCK or MRL standard: Instrument related QC exceeds the control limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
B	Compound was found in the blank and sample.
F2	MS/MSD RPD exceeds control limits
F1	MS and/or MSD Recovery exceeds the control limits
V	Serial Dilution exceeds the control limits

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.
F	MS/MSD Recovery and/or RPD exceeds the control limits
F1	MS and/or MSD Recovery exceeds the control limits

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-3
SDG: 680102327-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-102327-1	SD-198-SS	Solid	06/11/14 07:55	06/12/14 09:40
680-102327-2	SD-198-01	Solid	06/11/14 08:00	06/12/14 09:40
680-102327-3	SD-198-02	Solid	06/11/14 08:05	06/12/14 09:40
680-102327-5	SD-197-SS	Solid	06/11/14 10:30	06/12/14 09:40
680-102327-6	SD-197-01	Solid	06/11/14 10:35	06/12/14 09:40
680-102327-7	SD-197-02	Solid	06/11/14 10:40	06/12/14 09:40
680-102327-9	SD-199-SS	Solid	06/11/14 11:10	06/12/14 09:40
680-102327-10	SD-199-01	Solid	06/11/14 11:15	06/12/14 09:40
680-102327-11	SD-199-02	Solid	06/11/14 11:20	06/12/14 09:40
680-102327-13	SD-DUP-02	Solid	06/11/14 00:00	06/12/14 09:40
680-102327-14	SD-005W-01	Solid	06/11/14 12:00	06/12/14 09:40
680-102327-15	SD-208-SS	Solid	06/11/14 12:00	06/12/14 09:40
680-102327-16	SD-208-01	Solid	06/11/14 12:05	06/12/14 09:40
680-102327-17	SD-208-02	Solid	06/11/14 12:10	06/12/14 09:40
680-102327-18	SD-209-01	Solid	06/11/14 14:00	06/12/14 09:40
680-102327-19	SD-209-02	Solid	06/11/14 14:05	06/12/14 09:40
680-102327-21	SD-204-SS	Solid	06/11/14 12:20	06/12/14 09:40
680-102327-22	SD-204-01	Solid	06/11/14 12:25	06/12/14 09:40
680-102327-23	SD-204-02	Solid	06/11/14 12:30	06/12/14 09:40
680-102327-24	SD-221-SS	Solid	06/11/14 13:20	06/12/14 09:40
680-102327-25	SD-221-01	Solid	06/11/14 13:25	06/12/14 09:40
680-102327-26	SD-221-02	Solid	06/11/14 13:30	06/12/14 09:40
680-102327-27	SD-210-SS	Solid	06/11/14 14:35	06/12/14 09:40
680-102327-28	SD-210-01	Solid	06/11/14 14:40	06/12/14 09:40
680-102327-29	SD-210-02	Solid	06/11/14 14:45	06/12/14 09:40
680-102327-30	SD-207-SS	Solid	06/11/14 14:48	06/12/14 09:40
680-102327-31	SD-207-01	Solid	06/11/14 14:50	06/12/14 09:40
680-102327-32	SD-207-02	Solid	06/11/14 14:55	06/12/14 09:40
680-102327-34	SD-205-SS	Solid	06/11/14 15:25	06/12/14 09:40
680-102327-35	SD-205-01	Solid	06/11/14 15:30	06/12/14 09:40
680-102327-36	SD-205-02	Solid	06/11/14 15:35	06/12/14 09:40
680-102370-1	SD-DUP-03	Solid	06/12/14 00:00	06/13/14 09:30
680-102370-2	SD-206-SS	Solid	06/12/14 08:10	06/13/14 09:30
680-102370-3	SD-206-01	Solid	06/12/14 08:15	06/13/14 09:30
680-102370-4	SD-206-02	Solid	06/12/14 08:20	06/13/14 09:30
680-102370-6	SD-005E-01	Solid	06/12/14 08:30	06/13/14 09:30

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-3
SDG: 680102327-1

Method	Method Description	Protocol	Laboratory
6020A	Metals (ICP/MS), Isotopic Uranium	SW846	TAL SL
6020A	Metals (ICP/MS), Total Uranium	SW846	TAL SL
6020A	Metals (ICP/MS), Isotopic Uranium Percentage	SW846	TAL SL
6020A Activity	Metals (ICP/MS), Isotopic Uranium (Activity)	SW846	TAL SL

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Default Detection Limits

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-3
SDG: 680102327-1

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	RL	MDL	Units	Method
U-233	0.0050	0.0015	mg/Kg	6020A
U-234	0.0050	0.00030	mg/Kg	6020A
U-235	0.0050	0.0020	mg/Kg	6020A
U-236	0.0050	0.00040	mg/Kg	6020A
U-238	0.0050	0.00030	mg/Kg	6020A

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	RL	MDL	Units	Method
Total Uranium	0.0050	0.00030	mg/Kg	6020A

COVER PAGE
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102327-3

SDG No.: 680102327-1

Project: Sediments

Client Sample ID	Lab Sample ID
SD-198-SS	680-102327-1
SD-198-01	680-102327-2
SD-198-02	680-102327-3
SD-197-SS	680-102327-5
SD-197-01	680-102327-6
SD-197-02	680-102327-7
SD-199-SS	680-102327-9
SD-199-01	680-102327-10
SD-199-02	680-102327-11
SD-DUP-02	680-102327-13
SD-005W-01	680-102327-14
SD-208-SS	680-102327-15
SD-208-01	680-102327-16
SD-208-02	680-102327-17
SD-209-01	680-102327-18
SD-209-02	680-102327-19
SD-204-SS	680-102327-21
SD-204-01	680-102327-22
SD-204-02	680-102327-23
SD-221-SS	680-102327-24
SD-221-01	680-102327-25
SD-221-02	680-102327-26
SD-210-SS	680-102327-27
SD-210-01	680-102327-28
SD-210-02	680-102327-29
SD-207-SS	680-102327-30
SD-207-01	680-102327-31
SD-207-02	680-102327-32
SD-205-SS	680-102327-34
SD-205-01	680-102327-35
SD-205-02	680-102327-36
SD-DUP-03	680-102370-1
SD-206-SS	680-102370-2
SD-206-01	680-102370-3
SD-206-02	680-102370-4
SD-005E-01	680-102370-6

Comments:

9-IN
DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102327-3

SDG Number: 680102327-1

Matrix: Solid Instrument ID: ICPMS6100

Method: 6020A MDL Date: 08/05/2013 10:01

Prep Method: 3050B

Analyte	Wavelength/ Mass	RL (mg/Kg)	MDL (mg/Kg)
U-233	233	0.005	0.0015
U-234	234	0.005	0.0003
U-235	235	0.005	0.00203
U-236	236	0.005	0.0004
U-238	238	0.005	0.0003

9-IN
CALIBRATION BLANK DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102327-3

SDG Number: 680102327-1

Matrix: Solid Instrument ID: ICPMS6100

Method: 6020A XMDL Date: 07/18/2014 15:08

Analyte	Wavelength/ Mass	XRL (ug/L)	XMDL (ug/L)
U-233	233	0.05	0.0066
U-234	234	0.05	0.0021
U-235	235	0.05	0.0034
U-236	236	0.05	0.0015
U-238	238	0.05	0.0082

9-IN
DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102327-3

SDG Number: 680102327-1

Matrix: Solid Instrument ID: NOEQUIP

Method: 6020A MDL Date: 06/12/2013 14:02

Analyte	Wavelength/ Mass	RL (mg/Kg)	MDL (mg/Kg)
Total Uranium		0.005	0.0003

11-IN
LINEAR RANGES
METALS

Lab Name: TestAmerica St. Louis Job No: 680-102327-3

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Date: 02/14/2012 11:04

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	Method
U-233		2000	6020A
U-234		2000	6020A
U-235		2000	6020A
U-236		2000	6020A
U-238		2000	6020A

12-IN
PREPARATION LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Prep Method: 3050B

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight (g)	Initial Volume	Final Volume (mL)
MB 160-137774/1-A	08/13/2014 10:17	137774	0.5188		50
LCS 160-137774/2-A	08/13/2014 10:17	137774	0.5556		50
680-102327-25	08/13/2014 10:17	137774	0.5707		50
680-102327-25 MS	08/13/2014 10:17	137774	0.5856		50
680-102327-25 MSD	08/13/2014 10:17	137774	0.5123		50
680-102327-26	08/13/2014 10:17	137774	0.5613		50
680-102327-27	08/13/2014 10:17	137774	0.5118		50
680-102327-28	08/13/2014 10:17	137774	0.5323		50
680-102327-29	08/13/2014 10:17	137774	0.5808		50
680-102327-30	08/13/2014 10:17	137774	0.5730		50
680-102327-34	08/13/2014 10:18	137774	0.5364		50
680-102327-36	08/13/2014 10:18	137774	0.5345		50

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-137774/1-A

Instrument Code: ICPMS6100 Batch No.: 139525

CAS No.	Analyte	Concentration	C	Q	Method
13966-29-5	U-234	ND			6020A_U
15117-96-1	U-235	ND			6020A_U
13982-70-2	U-236	ND			6020A_U
7440-61-1	U-238	ND			6020A_U

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-137774/1-A

Instrument Code: ICPMS6100 Batch No.: 139817

CAS No.	Analyte	Concentration	C	Q	Method
13968-55-3	U-233	ND		^	6020A_U

7A-IN
LAB CONTROL SAMPLE
METALS

Lab ID: LCS 160-137774/2-A

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

Sample Matrix: Solid LCS Source: ISOU Prep Spk_00002

Analyte	Solid(mg/Kg)							
	True	Found	C	%R	Limits		Q	Method
U-234	0.00744	0.00791		106	80	120		6020A
U-235	0.436	0.469		107	80	120		6020A
U-238	0.452	0.485		107	80	120		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

5A-IN
MATRIX SPIKE SAMPLE RECOVERY
METALS

Client ID: SD-221-01 MS
Lab ID: 680-102327-25 MS
Lab Name: TestAmerica St. Louis
Job No.: 680-102327-3
SDG No.: 680102327-1
Matrix: Solid
Concentration Units: mg/Kg
% Solids:

Analyte	SSR	C	Sample Result (SR)	C	Spike Added (SA)	%R	Control Limit %R	Q	Method
U-234	0.00678	J	ND		0.00706	96	75-125		6020A
U-235	0.411		0.0056	J	0.414	98	75-125		6020A
U-238	0.888		0.47		0.429	98	75-125		6020A

SSR = Spiked Sample Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VA - IN

5A-IN
MATRIX SPIKE DUPLICATE SAMPLE RECOVERY
METALS

Client ID: SD-221-01 MSD Lab ID: 680-102327-25 MSD

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Matrix: Solid Concentration Units: mg/Kg

% Solids:

Analyte	(SDR)	C	Spike Added (SA)	%R	Control Limit %R	RPD	RPD Limit	Q	Method
U-234	0.00812	J	0.00807	101	75-125	18	20		6020A
U-235	0.485		0.473	101	75-125	17	20		6020A
U-238	0.948		0.491	98	75-125	6	20		6020A

SDR = Sample Duplicate Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VD - IN

8-IN
ICP-AES AND ICP-MS SERIAL DILUTIONS
METALS

Lab ID: 680-102327-25

SDG No: 680102327-1

Lab Name: TestAmerica St. Louis Job No: 680-102327-3

Matrix: Solid Concentration Units: mg/Kg

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Method
U-233	ND		ND		NC	^	6020A
U-234	ND		ND		NC		6020A
U-235	0.0056	J	ND		NC		6020A
U-236	ND		ND		NC		6020A
U-238	0.47		0.475		1.5		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIII-IN

12-IN
PREPARATION LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Prep Method: 3050B

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight (g)	Initial Volume	Final Volume (mL)
MB 160-137845/1-A	08/14/2014 09:01	137845	0.5136		50
LCS 160-137845/2-A	08/14/2014 09:01	137845	0.5956		50
680-102370-1	08/14/2014 09:01	137845	0.5316		50
680-102370-2	08/14/2014 09:01	137845	0.5852		50
680-102370-3	08/14/2014 09:01	137845	0.5739		50
680-102370-4	08/14/2014 09:01	137845	0.5417		50
680-102370-6	08/14/2014 09:01	137845	0.5426		50

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-137845/1-A

Instrument Code: ICPMS6100 Batch No.: 139525

CAS No.	Analyte	Concentration	C	Q	Method
13966-29-5	U-234	ND			6020A_U
15117-96-1	U-235	ND			6020A_U
13982-70-2	U-236	ND			6020A_U
7440-61-1	U-238	0.00308	J		6020A_U

FORM III-IN

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-137845/1-A

Instrument Code: ICPMS6100 Batch No.: 139817

CAS No.	Analyte	Concentration	C	Q	Method
13968-55-3	U-233	ND		^	6020A_U

7A-IN
LAB CONTROL SAMPLE
METALS

Lab ID: LCS 160-137845/2-A

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

Sample Matrix: Solid LCS Source: ISOU Prep Spk_00002

Analyte	Solid(mg/Kg)							
	True	Found	C	%R	Limits		Q	Method
U-234	0.00694	0.00733		106	80	120		6020A
U-235	0.407	0.439		108	80	120		6020A
U-238	0.422	0.449		106	80	120		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

12-IN
PREPARATION LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Prep Method: 3050B

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight (g)	Initial Volume	Final Volume (mL)
MB 160-139022/1-A	08/20/2014 09:25	139022	0.5910		50
LCS 160-139022/2-A	08/20/2014 09:25	139022	0.5236		50
680-102327-1	08/20/2014 09:25	139022	0.5664		50
680-102327-1 MS	08/20/2014 09:25	139022	0.5647		50
680-102327-1 MSD	08/20/2014 09:25	139022	0.5220		50
680-102327-2	08/20/2014 09:25	139022	0.5751		50
680-102327-3	08/20/2014 09:25	139022	0.5531		50
680-102327-5	08/20/2014 09:25	139022	0.5214		50
680-102327-6	08/20/2014 09:25	139022	0.5574		50
680-102327-7	08/20/2014 09:25	139022	0.5900		50
680-102327-9	08/20/2014 09:25	139022	0.5631		50
680-102327-10	08/20/2014 09:25	139022	0.5923		50
680-102327-11	08/20/2014 09:25	139022	0.5453		50
680-102327-13	08/20/2014 09:25	139022	0.5580		50
680-102327-14	08/20/2014 09:25	139022	0.5205		50
680-102327-15	08/20/2014 09:25	139022	0.5673		50
680-102327-16	08/20/2014 09:25	139022	0.5912		50
680-102327-17	08/20/2014 09:25	139022	0.5887		50
680-102327-18	08/20/2014 09:25	139022	0.5383		50
680-102327-19	08/20/2014 09:25	139022	0.5738		50
680-102327-21	08/20/2014 09:25	139022	0.5092		50
680-102327-22	08/20/2014 09:25	139022	0.5617		50
680-102327-23	08/20/2014 09:25	139022	0.5424		50

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-139022/1-A

Instrument Code: ICPMS6100 Batch No.: 139525

CAS No.	Analyte	Concentration	C	Q	Method
13966-29-5	U-234	ND			6020A_U
15117-96-1	U-235	ND			6020A_U
13982-70-2	U-236	ND			6020A_U

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-139022/1-A

Instrument Code: ICPMS6100 Batch No.: 140203

CAS No.	Analyte	Concentration	C	Q	Method
7440-61-1	U-238	ND			6020A_U

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-139022/1-A

Instrument Code: ICPMS6100 Batch No.: 139817

CAS No.	Analyte	Concentration	C	Q	Method
13968-55-3	U-233	ND		^	6020A_U

7A-IN
LAB CONTROL SAMPLE
METALS

Lab ID: LCS 160-139022/2-A

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

Sample Matrix: Solid LCS Source: ISOU Prep Spk_00002

Analyte	Solid(mg/Kg)							
	True	Found	C	%R	Limits		Q	Method
U-234	0.00789	0.00796		101	80	120		6020A
U-235	0.463	0.477		103	80	120		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

7A-IN
LAB CONTROL SAMPLE
METALS

Lab ID: LCS 160-139022/2-A

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

Sample Matrix: Solid LCS Source: ISOU Prep Spk_00002

Analyte	Solid(mg/Kg)							
	True	Found	C	%R	Limits		Q	Method
U-238	0.480	0.548		114	80	120		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

5A-IN
MATRIX SPIKE SAMPLE RECOVERY
METALS

Client ID: SD-198-SS MS | Lab ID: 680-102327-1 MS

Lab Name: TestAmerica St. Louis | Job No.: 680-102327-3

SDG No.: 680102327-1

Matrix: Solid | Concentration Units: mg/Kg

% Solids:

Analyte	SSR	C	Sample Result (SR)	C	Spike Added (SA)	%R	Control Limit %R	Q	Method
U-234	0.00716	J	ND		0.00732	98	75-125		6020A
U-235	0.438		0.022		0.429	97	75-125		6020A
U-238	3.51		3.1		0.445	98	75-125	4	6020A

SSR = Spiked Sample Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VA - IN

5A-IN
MATRIX SPIKE DUPLICATE SAMPLE RECOVERY
METALS

Client ID: SD-198-SS MSD | Lab ID: 680-102327-1 MSD

Lab Name: TestAmerica St. Louis | Job No.: 680-102327-3

SDG No.: 680102327-1

Matrix: Solid | Concentration Units: mg/Kg

% Solids:

Analyte	(SDR)	C	Spike Added (SA)	%R	Control Limit %R	RPD	RPD Limit	Q	Method
U-234	0.00845	J	0.00792	107	75-125	17	20		6020A
U-235	0.517		0.464	107	75-125	17	20		6020A
U-238	3.71		0.481	133	75-125	6	20	4 ✓	6020A

SDR = Sample Duplicate Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VD - IN

8-IN
ICP-AES AND ICP-MS SERIAL DILUTIONS
METALS

Lab ID: 680-102327-1

SDG No: 680102327-1

Lab Name: TestAmerica St. Louis Job No: 680-102327-3

Matrix: Solid Concentration Units: mg/Kg

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Method
U-233	ND		ND		NC	^	6020A
U-234	ND		ND		NC		6020A
U-235	0.022		ND		NC		6020A
U-236	ND		ND		NC		6020A
U-238	3.1		3.02		1.8		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIII-IN

12-IN
PREPARATION LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Prep Method: 3050B

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight (g)	Initial Volume	Final Volume (mL)
MB 160-139028/1-A	08/20/2014 10:02	139028	0.5740		50
LCS 160-139028/2-A	08/20/2014 10:02	139028	0.5597		50
680-102327-31	08/20/2014 10:02	139028	0.5963		50
680-102327-31 MS	08/20/2014 10:02	139028	0.5730		50
680-102327-31 MSD	08/20/2014 10:02	139028	0.5427		50
680-102327-32	08/20/2014 10:02	139028	0.5905		50
680-102327-35	08/20/2014 10:02	139028	.5500		50

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-139028/1-A

Instrument Code: ICPMS6100 Batch No.: 139525

CAS No.	Analyte	Concentration	C	Q	Method
13966-29-5	U-234	ND			6020A_U
15117-96-1	U-235	ND			6020A_U
13982-70-2	U-236	ND			6020A_U
7440-61-1	U-238	ND			6020A_U

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-139028/1-A

Instrument Code: ICPMS6100 Batch No.: 139817

CAS No.	Analyte	Concentration	C	Q	Method
13968-55-3	U-233	ND		^	6020A_U

FORM III-IN

7A-IN
LAB CONTROL SAMPLE
METALS

Lab ID: LCS 160-139028/2-A

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

Sample Matrix: Solid LCS Source: ISOU Prep Spk_00002

Analyte	Solid(mg/Kg)							
	True	Found	C	%R	Limits		Q	Method
U-234	0.00739	0.00752		102	80	120		6020A
U-235	0.433	0.442		102	80	120		6020A
U-238	0.449	0.451		101	80	120		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

5A-IN
MATRIX SPIKE SAMPLE RECOVERY
METALS

Client ID: SD-207-01 MS | Lab ID: 680-102327-31 MS

Lab Name: TestAmerica St. Louis | Job No.: 680-102327-3

SDG No.: 680102327-1

Matrix: Solid | Concentration Units: mg/Kg

% Solids:

Analyte	SSR	C	Sample Result (SR)	C	Spike Added (SA)	%R	Control Limit %R	Q	Method
U-234	0.00790	J	ND		0.00721	110	75-125		6020A
U-235	0.489		0.052		0.423	103	75-125		6020A
U-238	2.90		2.4		0.439	114	75-125	4	6020A

SSR = Spiked Sample Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VA - IN

5A-IN
MATRIX SPIKE DUPLICATE SAMPLE RECOVERY
METALS

Client ID: SD-207-01 MSD Lab ID: 680-102327-31 MSD

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Matrix: Solid Concentration Units: mg/Kg

% Solids:

Analyte	(SDR)	C	Spike Added (SA)	%R	Control Limit %R	RPD	RPD Limit	Q	Method
U-234	0.00824	J	0.00762	108	75-125	4	20		6020A
U-235	0.509		0.447	102	75-125	4	20		6020A
U-238	2.96		0.463	123	75-125	2	20	4	6020A

SDR = Sample Duplicate Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VD - IN

8-IN
ICP-AES AND ICP-MS SERIAL DILUTIONS
METALS

Lab ID: 680-102327-31

SDG No: 680102327-1

Lab Name: TestAmerica St. Louis Job No: 680-102327-3

Matrix: Solid Concentration Units: mg/Kg

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Method
U-233	ND		ND		NC	^	6020A
U-234	ND		ND		NC		6020A
U-235	0.052		0.0496	J	NC		6020A
U-236	ND		ND		NC		6020A
U-238	2.4		2.43		1.3		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIII-IN

12-IN
PREPARATION LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Prep Method: 3050B

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight (g)	Initial Volume	Final Volume (mL)
MB 160-139821/1-A	08/25/2014 07:53	139821	0.5700		50
LCS 160-139821/2-A	08/25/2014 07:53	139821	0.5096		50
680-102327-24	08/25/2014 07:53	139821	0.5031		50
680-102327-24 MS	08/25/2014 07:53	139821	0.5624		50
680-102327-24 MSD	08/25/2014 07:53	139821	0.5022		50

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-139821/1-A

Instrument Code: ICPMS6100 Batch No.: 140258

CAS No.	Analyte	Concentration	C	Q	Method
13968-55-3	U-233	ND		^	6020A_U
13966-29-5	U-234	ND			6020A_U
15117-96-1	U-235	ND		^	6020A_U
13982-70-2	U-236	ND			6020A_U
7440-61-1	U-238	0.000968	J		6020A_U

FORM III-IN

7A-IN
LAB CONTROL SAMPLE
METALS

Lab ID: LCS 160-139821/2-A

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

Sample Matrix: Solid LCS Source: ISOU Prep Spk_00002

Analyte	Solid(mg/Kg)							
	True	Found	C	%R	Limits		Q	Method
U-234	0.00811	0.00835		103	80	120		6020A
U-235	0.476	0.506		106	80	120	^	6020A
U-238	0.493	0.526		107	80	120		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

5A-IN
MATRIX SPIKE SAMPLE RECOVERY
METALS

Client ID: SD-221-SS MS | Lab ID: 680-102327-24 MS

Lab Name: TestAmerica St. Louis | Job No.: 680-102327-3

SDG No.: 680102327-1

Matrix: Solid | Concentration Units: mg/Kg

% Solids:

Analyte	SSR	C	Sample Result (SR)	C	Spike Added (SA)	%R	Control Limit %R	Q	Method
U-234	0.00703	J	ND		0.00735	96	75-125		6020A
U-235	0.423		0.0076	J	0.431	96	75-125	^	6020A
U-238	1.04		0.68		0.447	80	75-125		6020A

SSR = Spiked Sample Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VA - IN

5A-IN
MATRIX SPIKE DUPLICATE SAMPLE RECOVERY
METALS

Client ID: SD-221-SS MSD | Lab ID: 680-102327-24 MSD

Lab Name: TestAmerica St. Louis | Job No.: 680-102327-3

SDG No.: 680102327-1

Matrix: Solid | Concentration Units: mg/Kg

% Solids:

Analyte	(SDR)	C	Spike Added (SA)	%R	Control Limit %R	RPD	RPD Limit	Q	Method
U-234	0.00908	J	0.00823	110	75-125	25	20	F2	6020A
U-235	0.557		0.483	114	75-125	27	20	^ F2	6020A
U-238	1.39		0.500	143	75-125	29	20	F1 F2	6020A

SDR = Sample Duplicate Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VD - IN

8-IN
ICP-AES AND ICP-MS SERIAL DILUTIONS
METALS

Lab ID: 680-102327-24

SDG No: 680102327-1

Lab Name: TestAmerica St. Louis Job No: 680-102327-3

Matrix: Solid Concentration Units: mg/Kg

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Method
U-233	ND		ND		NC	^	6020A
U-234	ND		ND		NC		6020A
U-235	0.0076	J	ND		NC	^	6020A
U-236	ND		ND		NC		6020A
U-238	0.68		0.604		11	V	6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/21/2014 16:12 End Date: 08/22/2014 02:28

| Lab Sample Id | D/F | Type | Time | Analytes | | |

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/21/2014 16:12 End Date: 08/22/2014 02:28

Lab Sample Id	D/F	Type	Time	Analytes			
				U-234	U-235	U-236	U-238
CCB 160-139525/40	1		19:17	X	X	X	X
680-102370-1	5	T	19:21	X	X	X	X
680-102370-2	5	T	19:26	X	X	X	X
680-102370-3	5	T	19:31	X	X	X	X
680-102370-4	5	T	19:35	X	X	X	X
680-102370-6	5	T	19:40	X	X	X	X
ZZZZZZ			19:45				
ZZZZZZ			19:49				
ZZZZZZ			19:54				
ZZZZZZ			19:59				
ZZZZZZ			20:03				
CCV 160-139525/51	1		20:08	X	X	X	X
CCB 160-139525/52	1		20:13	X	X	X	X
ZZZZZZ			20:17				
ZZZZZZ			20:22				
ZZZZZZ			20:27				
ZZZZZZ			20:31				
ZZZZZZ			20:36				
CCV 160-139525/58			20:41				
CCB 160-139525/59			20:45				
ICIS 160-139525/60			20:50	X	X	X	X
IC 160-139525/61	1		20:57	X	X	X	X
IC 160-139525/62	1		21:01	X	X	X	X
IC 160-139525/63	1		21:06	X	X	X	X
IC 160-139525/64	1		21:11	X	X	X	X
IC 160-139525/65	1		21:15	X	X	X	X
ICV 160-139525/66			21:20				
ICV 160-139525/67	1		21:25	X			X
ICV 160-139525/68	1		21:29		X	X	
ICB 160-139525/69	1		21:34	X	X	X	X
CRI 160-139525/70	1		21:39		X		X
CRI 160-139525/71	1		21:43	X		X	
ICSA 160-139525/72	1		21:48	X	X	X	X
ICSAB 160-139525/73	1		21:53	X	X	X	X
CCV 160-139525/74	1		21:58	X	X	X	X
CCB 160-139525/75	1		22:02	X	X	X	X
MB 160-139022/1-A	2	T	22:07	X	X	X	
LCS 160-139022/2-A	2	T	22:12	X	X		
680-102327-1	5	T	22:16	X	X	X	

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/21/2014 16:12 End Date: 08/22/2014 02:28

| Lab Sample Id | D/F | Type | Time | Analytes | | |

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/21/2014 16:12 End Date: 08/22/2014 02:28

| Lab Sample Id | D/F | Type | Time | Analytes | | |

15-IN
ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICP-MS Instrument ID: ICPMS6100 Start Date: 08/21/2014 End Date: 08/22/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
IC 160-139525/2	16:19										
IC 160-139525/3	16:24										
IC 160-139525/4	16:28										
IC 160-139525/5	16:33										
IC 160-139525/6	16:38										
ICV 160-139525/8	16:47	96									
ICV 160-139525/9	16:52	94									
ICB 160-139525/10	16:56	96									
CRI 160-139525/11	17:01	96									
CRI 160-139525/12	17:06	96									
ICSA 160-139525/13	17:10	87									
ICSAB 160-139525/14	17:15	87									
CCV 160-139525/15	17:20	96									
CCB 160-139525/16	17:25	95									
MB 160-137845/1-A	18:11	96									
CCV 160-139525/27	18:16	92									
CCB 160-139525/28	18:21	91									
LCS 160-137845/2-A	18:25	94									
CCV 160-139525/39	19:12	92									
CCB 160-139525/40	19:17	91									
680-102370-1	19:21	92									
680-102370-2	19:26	86									
680-102370-3	19:31	86									
680-102370-4	19:35	87									
680-102370-6	19:40	91									
CCV 160-139525/51	20:08	87									
CCB 160-139525/52	20:13	89									
IC 160-139525/61	20:57										
IC 160-139525/62	21:01										
IC 160-139525/63	21:06										
IC 160-139525/64	21:11										
IC 160-139525/65	21:15										
ICV 160-139525/67	21:25	99									
ICV 160-139525/68	21:29	99									
ICB 160-139525/69	21:34	100									
CRI 160-139525/70	21:39	99									
CRI 160-139525/71	21:43	98									
ICSA 160-139525/72	21:48	97									
ICSAB 160-139525/73	21:53	97									
CCV 160-139525/74	21:58	104									
CCB 160-139525/75	22:02	101									
MB 160-139022/1-A	22:07	108									

FORM XV - IN

15-IN
ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICP-MS Instrument ID: ICPMS6100 Start Date: 08/21/2014 End Date: 08/22/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
LCS 160-139022/2-A	22:12	107									
680-102327-1	22:16	97									
CCV 160-139525/79	22:21	100									
CCB 160-139525/80	22:26	100									
680-102327-1 SD	22:30	101									
680-102327-1 MS	22:35	95									
680-102327-1 MSD	22:40	96									
680-102327-2	22:44	95									
680-102327-3	22:49	100									
680-102327-5	22:54	97									
680-102327-6	22:58	96									
680-102327-7	23:03	100									
680-102327-9	23:08	93									
680-102327-10	23:12	99									
CCV 160-139525/91	23:17	97									
CCB 160-139525/92	23:22	96									
680-102327-11	23:26	96									
680-102327-13	23:31	95									
680-102327-14	23:36	95									
680-102327-15	23:40	90									
680-102327-16	23:45	100									
680-102327-17	23:50	100									
680-102327-18	23:54	105									
680-102327-19	23:59	100									
680-102327-21	00:04	96									
680-102327-22	00:08	101									
CCV 160-139525/103	00:13	97									
CCB 160-139525/104	00:18	94									
680-102327-23	00:22	96									
MB 160-137774/1-A	00:27	98									
LCS 160-137774/2-A	00:32	99									
680-102327-25	00:36	105									
680-102327-25 SD	00:41	100									
680-102327-25 MS	00:46	106									
680-102327-25 MSD	00:50	107									
680-102327-26	00:55	105									
680-102327-27	01:00	91									
680-102327-28	01:04	100									
CCV 160-139525/115	01:09	98									
CCB 160-139525/116	01:14	99									
680-102327-29	01:18	101									
680-102327-30	01:23	98									

FORM XV - IN

15-IN
ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICP-MS Instrument ID: ICPMS6100 Start Date: 08/21/2014 End Date: 08/22/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
680-102327-34	01:28	98									
680-102327-36	01:32	100									
MB 160-139028/1-A	01:37	105									
LCS 160-139028/2-A	01:42	105									
680-102327-31	01:46	96									
680-102327-31 SD	01:51	99									
680-102327-31 MS	01:56	97									
680-102327-31 MSD	02:00	97									
CCV 160-139525/127	02:05	99									
CCB 160-139525/128	02:10	97									
680-102327-32	02:14	96									
680-102327-35	02:19	96									
CCV 160-139525/131	02:24	97									
CCB 160-139525/132	02:28	97									

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(4,8)_00018 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	ICV 160-139525/8 08/21/2014 16:47				CCV 160-139525/15 08/21/2014 17:20				CCV 160-139525/27 08/21/2014 18:16			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0900		0.0835	108	0.0852		0.0827	103	0.0873		0.0827	106
U-238	10.1		9.78	104	5.30		5.03	105	5.41		5.03	108

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(4,8)_00018 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	CCV 160-139525/39 08/21/2014 19:12				CCV 160-139525/51 08/21/2014 20:08				ICV 160-139525/67 08/21/2014 21:25			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0792		0.0827	96	0.0839		0.0827	102	0.0906		0.0835	108
U-238	4.96		5.03	99	5.23		5.03	104	10.1		9.78	103

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(4,8)_00018 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	CCV 160-139525/74 08/21/2014 21:58				CCV 160-139525/79 08/21/2014 22:21				CCV 160-139525/91 08/21/2014 23:17			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0829		0.0827	100	0.0867		0.0827	105	0.0910		0.0827	110
U-238	5.07		5.03	101	5.27		5.03	105				

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(4,8)_00018 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	CCV 160-139525/103 08/22/2014 00:13				CCV 160-139525/115 08/22/2014 01:09				CCV 160-139525/127 08/22/2014 02:05			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0884		0.0827	107	0.0866		0.0827	105	0.0870		0.0827	105
U-238	5.43		5.03	108	5.37		5.03	107	5.32		5.03	106

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(4,8)_00018 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	CCV 160-139525/131 08/22/2014 02:24											
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0896		0.0827	108								
U-238	5.46		5.03	109								

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(5,6)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	ICV 160-139525/9 08/21/2014 16:52				CCV 160-139525/15 08/21/2014 17:20				CCV 160-139525/27 08/21/2014 18:16			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	1.16		1.06	109	5.11		4.85	105	5.19		4.85	107
U-236	0.0704		0.0746	94	0.0909		0.0890	102	0.0933		0.0890	105

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(5,6)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	CCV 160-139525/39 08/21/2014 19:12				CCV 160-139525/51 08/21/2014 20:08				ICV 160-139525/68 08/21/2014 21:29			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	4.75		4.85	98	5.05		4.85	104	1.13		1.06	107
U-236	0.0855		0.0890	96	0.0906		0.0890	102	0.0691		0.0746	93

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(5,6)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	CCV 160-139525/74 08/21/2014 21:58				CCV 160-139525/79 08/21/2014 22:21				CCV 160-139525/91 08/21/2014 23:17			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	4.90		4.85	101	5.08		4.85	105	5.33		4.85	110
U-236	0.0875		0.0890	98	0.0913		0.0890	103	0.0961		0.0890	108

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(5,6)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	CCV 160-139525/103 08/22/2014 00:13				CCV 160-139525/115 08/22/2014 01:09				CCV 160-139525/127 08/22/2014 02:05			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	5.24		4.85	108	5.17		4.85	107	5.12		4.85	106
U-236	0.0943		0.0890	106	0.0939		0.0890	105	0.0927		0.0890	104

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(5,6)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	CCV 160-139525/131 08/22/2014 02:24											
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	5.32		4.85	110								
U-236	0.0961		0.0890	108								

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2B-IN
CRQL CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Method: 6020A Instrument ID: ICPMS6100

Lab Sample ID: CRI 160-139525/11 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 1_00019

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-235	0.0485	0.0508		105	70-130
U-238	0.0503	0.0541		108	70-130

Lab Sample ID: CRI 160-139525/12 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 2_00020

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-234	0.0496	0.0520		105	70-130
U-236	0.0534	0.0553		104	70-130

Lab Sample ID: CRI 160-139525/70 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 1_00019

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-235	0.0485	0.0488	J	101	70-130
U-238	0.0503	0.0519		103	70-130

Lab Sample ID: CRI 160-139525/71 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 2_00020

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-234	0.0496	0.0506		102	70-130
U-236	0.0534	0.0540		101	70-130

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IIB-IN

2B-IN
CRQL CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Method: 6020A Instrument ID: ICPMS6100

Lab Sample ID: CRI 160-139817/12 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 2_00020

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-233	0.0309	0.0517	^	167	70-130

Lab Sample ID: CRI 160-140203/21 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 1_00020

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-238	0.0503	0.0477	J	95	70-130

Lab Sample ID: CRI 160-140258/11 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 1_00020

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-235	0.0485	0.0475	J	98	70-130
U-238	0.0503	0.0541		108	70-130

Lab Sample ID: CRI 160-140258/12 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 2_00021

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-233	0.0309	0.0421	J ^	136	70-130
U-234	0.0496	0.0499	J	101	70-130
U-236	0.0534	0.0541		101	70-130

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IIB-IN

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: ug/L

Analyte	RL	ICB 160-139525/10 08/21/2014 16:56		CCB 160-139525/16 08/21/2014 17:25		CCB 160-139525/28 08/21/2014 18:21		CCB 160-139525/40 08/21/2014 19:17	
		Found	C	Found	C	Found	C	Found	C
U-234	0.050	ND		ND		ND		ND	
U-235	0.050	ND		ND		ND		ND	
U-236	0.050	ND		ND		ND		ND	
U-238	0.050	0.0166	J	ND		ND		ND	

Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: ug/L

Analyte	RL	CCB 160-139525/52 08/21/2014 20:13		ICB 160-139525/69 08/21/2014 21:34		CCB 160-139525/75 08/21/2014 22:02		CCB 160-139525/80 08/21/2014 22:26	
		Found	C	Found	C	Found	C	Found	C
U-234	0.050	ND		ND		ND		ND	
U-235	0.050	ND		ND		ND		ND	
U-236	0.050	ND		ND		ND		ND	
U-238	0.050	ND		* 0.0207	J	ND		ND	

Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: ug/L

Analyte	RL	CCB 160-139525/92 08/21/2014 23:22		CCB 160-139525/104 08/22/2014 00:18		CCB 160-139525/116 08/22/2014 01:14		CCB 160-139525/128 08/22/2014 02:10	
		Found	C	Found	C	Found	C	Found	C
U-234	0.050	ND		ND		ND		ND	
U-235	0.050	ND		0.00475	J	0.0140	J	0.00781	J
U-236	0.050	ND		ND		ND		ND	
U-238	0.050			ND		0.0164	J	0.0115	J

Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: ug/L

Analyte	RL	CCB 160-139525/132 08/22/2014 02:28							
		Found	C	Found	C	Found	C	Found	C
U-234	0.050	ND							
U-235	0.050	0.00568	J						
U-236	0.050	ND							
U-238	0.050	0.00821	J						

Italicized analytes were not requested for this sequence.

4A-IN
INTERFERENCE CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Lab Sample ID: ICSAB 160-139525/14 Instrument ID: ICPMS6100

Lab File ID: 082114m2.rep ICS Source: ISOU ICSAB_00020

Concentration Units: ug/L

Analyte	True Solution AB	Found Solution AB	Percent Recovery
U-234	**0.0827**	**0.0890**	**108**
U-235	**4.85**	**5.32**	**110**
U-236	**0.0890**	**0.0952**	**107**
U-238	**5.03**	**5.51**	**110**

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IVA-IN

4A-IN
INTERFERENCE CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Lab Sample ID: ICSAB 160-139525/73 Instrument ID: ICPMS6100

Lab File ID: 082114m2.rep ICS Source: ISOU ICSAB_00020

Concentration Units: ug/L

Analyte	True Solution AB	Found Solution AB	Percent Recovery
U-234	**0.0827**	**0.0871**	**105**
U-235	**4.85**	**5.15**	**106**
U-236	**0.0890**	**0.0934**	**105**
U-238	**5.03**	**5.32**	**106**

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IVA-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/22/2014 13:16 End Date: 08/22/2014 21:15

Lab Sample Id	D/F	Type	Time	Analytes
				U-233
ICIS 160-139817/1			13:16	X
IC 160-139817/2	1		13:23	X
IC 160-139817/3	1		13:28	X
IC 160-139817/4	1		13:32	X
IC 160-139817/5	1		13:37	X
IC 160-139817/6	1		13:42	X
ICV 160-139817/7	1		13:46	X
ICV 160-139817/8			13:51	
ICV 160-139817/9			13:56	
ICB 160-139817/10	1		14:00	X
CRI 160-139817/11			14:05	
CRI 160-139817/12	1		14:10	X
ICSA 160-139817/13	1		14:14	X
ICSAB 160-139817/14	1		14:19	X
CCV 160-139817/15	1		14:24	X
CCB 160-139817/16	1		14:28	X
MB 160-137845/1-A	2	T	14:33	X
ZZZZZZ			14:38	
ZZZZZZ			14:42	
ZZZZZZ			14:47	
ZZZZZZ			14:52	
ZZZZZZ			14:56	
ZZZZZZ			15:01	
ZZZZZZ			15:06	
ZZZZZZ			15:10	
ZZZZZZ			15:15	
CCV 160-139817/27	1		15:20	X
CCB 160-139817/28	1		15:24	X
ZZZZZZ			15:29	
680-102370-1	5	T	15:34	X
680-102370-2	5	T	15:38	X
680-102370-3	5	T	15:43	X
680-102370-4	5	T	15:48	X
680-102370-6	5	T	15:52	X
ZZZZZZ			15:57	
ZZZZZZ			16:02	
ZZZZZZ			16:06	
ZZZZZZ			16:11	
CCV 160-139817/39	1		16:16	X

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/22/2014 13:16 End Date: 08/22/2014 21:15

Lab Sample Id	D/F	Type	Time	Analytes
				U-233
CCB 160-139817/40	1		16:20	X
ZZZZZZ			16:25	
ZZZZZZ			16:30	
ZZZZZZ			16:34	
ZZZZZZ			16:39	
ZZZZZZ			16:44	
ZZZZZZ			16:49	
MB 160-139022/1-A	2	T	16:53	X
ZZZZZZ			16:58	
680-102327-1	5	T	17:03	X
680-102327-1 SD	25	T	17:07	X
CCV 160-139817/51	1		17:12	X
CCB 160-139817/52	1		17:17	X
ZZZZZZ			17:21	
ZZZZZZ			17:26	
680-102327-2	5	T	17:31	X
680-102327-3	5	T	17:35	X
680-102327-5	5	T	17:40	X
680-102327-6	5	T	17:45	X
680-102327-7	5	T	17:49	X
680-102327-9	5	T	17:54	X
680-102327-10	5	T	17:59	X
680-102327-11	5	T	18:03	X
CCV 160-139817/63	1		18:08	X
CCB 160-139817/64	1		18:13	X
680-102327-13	5	T	18:17	X
680-102327-14	5	T	18:22	X
680-102327-15	5	T	18:27	X
680-102327-16	5	T	18:31	X
680-102327-17	5	T	18:36	X
680-102327-18	5	T	18:41	X
680-102327-19	5	T	18:45	X
680-102327-21	5	T	18:50	X
680-102327-22	5	T	18:55	X
680-102327-23	5	T	18:59	X
CCV 160-139817/75	1		19:04	X
CCB 160-139817/76	1		19:09	X
MB 160-137774/1-A	2	T	19:13	X
ZZZZZZ			19:18	

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/22/2014 13:16 End Date: 08/22/2014 21:15

Lab Sample Id	D/F	Type	Time	Analytes
				U-233
680-102327-25	5	T	19:23	X
680-102327-25 SD	25	T	19:27	X
ZZZZZZ			19:32	
ZZZZZZ			19:37	
680-102327-26	5	T	19:41	X
680-102327-27	5	T	19:46	X
680-102327-28	5	T	19:51	X
680-102327-29	5	T	19:55	X
CCV 160-139817/87	1		20:00	X
CCB 160-139817/88	1		20:05	X
680-102327-30	5	T	20:09	X
680-102327-34	5	T	20:14	X
680-102327-36	5	T	20:19	X
MB 160-139028/1-A	2	T	20:23	X
ZZZZZZ			20:28	
680-102327-31	5	T	20:33	X
680-102327-31 SD	25	T	20:37	X
ZZZZZZ			20:42	
ZZZZZZ			20:47	
680-102327-32	5	T	20:51	X
CCV 160-139817/99	1		20:56	X
CCB 160-139817/100	1		21:01	X
680-102327-35	5	T	21:05	X
CCV 160-139817/102	1		21:10	X
CCB 160-139817/103	1		21:15	X

Prep Types:
T = Total/NA

FORM XIII-IN

15-IN
ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICP-MS Instrument ID: ICPMS6100 Start Date: 08/22/2014 End Date: 08/22/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
IC 160-139817/2	13:23										
IC 160-139817/3	13:28										
IC 160-139817/4	13:32										
IC 160-139817/5	13:37										
IC 160-139817/6	13:42										
ICV 160-139817/7	13:46	98									
ICB 160-139817/10	14:00	99									
CRI 160-139817/12	14:10	99									
ICSA 160-139817/13	14:14	96									
ICSAB 160-139817/14	14:19	96									
CCV 160-139817/15	14:24	104									
CCB 160-139817/16	14:28	104									
MB 160-137845/1-A	14:33	107									
CCV 160-139817/27	15:20	102									
CCB 160-139817/28	15:24	101									
680-102370-1	15:34	103									
680-102370-2	15:38	95									
680-102370-3	15:43	94									
680-102370-4	15:48	96									
680-102370-6	15:52	102									
CCV 160-139817/39	16:16	98									
CCB 160-139817/40	16:20	98									
MB 160-139022/1-A	16:53	101									
680-102327-1	17:03	95									
680-102327-1 SD	17:07	97									
CCV 160-139817/51	17:12	96									
CCB 160-139817/52	17:17	97									
680-102327-2	17:31	93									
680-102327-3	17:35	96									
680-102327-5	17:40	93									
680-102327-6	17:45	94									
680-102327-7	17:49	97									
680-102327-9	17:54	92									
680-102327-10	17:59	95									
680-102327-11	18:03	93									
CCV 160-139817/63	18:08	95									
CCB 160-139817/64	18:13	95									
680-102327-13	18:17	93									
680-102327-14	18:22	93									
680-102327-15	18:27	89									
680-102327-16	18:31	98									
680-102327-17	18:36	97									

FORM XV - IN

15-IN

ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY

METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICP-MS Instrument ID: ICPMS6100 Start Date: 08/22/2014 End Date: 08/22/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
680-102327-18	18:41	101									
680-102327-19	18:45	96									
680-102327-21	18:50	93									
680-102327-22	18:55	96									
680-102327-23	18:59	94									
CCV 160-139817/75	19:04	93									
CCB 160-139817/76	19:09	91									
MB 160-137774/1-A	19:13	95									
680-102327-25	19:23	98									
680-102327-25 SD	19:27	94									
680-102327-26	19:41	96									
680-102327-27	19:46	87									
680-102327-28	19:51	97									
680-102327-29	19:55	96									
CCV 160-139817/87	20:00	93									
CCB 160-139817/88	20:05	93									
680-102327-30	20:09	93									
680-102327-34	20:14	91									
680-102327-36	20:19	92									
MB 160-139028/1-A	20:23	97									
680-102327-31	20:33	92									
680-102327-31 SD	20:37	94									
680-102327-32	20:51	90									
CCV 160-139817/99	20:56	91									
CCB 160-139817/100	21:01	91									
680-102327-35	21:05	91									
CCV 160-139817/102	21:10	90									
CCB 160-139817/103	21:15	90									

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(3)_00018 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	ICV 160-139817/7 08/22/2014 13:46				CCV 160-139817/15 08/22/2014 14:24				CCV 160-139817/27 08/22/2014 15:20			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.229		0.223	102	0.0552		0.0515	107	0.0533		0.0515	103

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(3)_00018 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	CCV 160-139817/39 08/22/2014 16:16				CCV 160-139817/51 08/22/2014 17:12				CCV 160-139817/63 08/22/2014 18:08			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.0535		0.0515	104	0.0550		0.0515	107	0.0567		0.0515	110

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(3)_00018 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	CCV 160-139817/75 08/22/2014 19:04				CCV 160-139817/87 08/22/2014 20:00				CCV 160-139817/99 08/22/2014 20:56			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.0562		0.0515	109	0.0570		0.0515	111	0.0576		0.0515	112

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(3)_00018 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	CCV 160-139817/102 08/22/2014 21:10											
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.0584		0.0515	113								

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: ug/L

Analyte	RL	ICB 160-139817/10 08/22/2014 14:00		CCB 160-139817/16 08/22/2014 14:28		CCB 160-139817/28 08/22/2014 15:24		CCB 160-139817/40 08/22/2014 16:20	
		Found	C	Found	C	Found	C	Found	C
U-233	0.050	0.153		0.104		0.0881		0.0883	

Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: ug/L

Analyte	RL	CCB 160-139817/52 08/22/2014 17:17		CCB 160-139817/64 08/22/2014 18:13		CCB 160-139817/76 08/22/2014 19:09		CCB 160-139817/88 08/22/2014 20:05	
		Found	C	Found	C	Found	C	Found	C
U-233	0.050	0.0897		0.0928		0.0928		0.0922	

Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: ug/L

Analyte	RL	CCB 160-139817/100 08/22/2014 21:01		CCB 160-139817/103 08/22/2014 21:15					
		Found	C	Found	C	Found	C	Found	C
U-233	0.050	0.0933		0.0936					

Italicized analytes were not requested for this sequence.

4A-IN
INTERFERENCE CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Lab Sample ID: ICSAB 160-139817/14 Instrument ID: ICPMS6100

Lab File ID: 082214m2.rep ICS Source: ISOU ICSAB_00020

Concentration Units: ug/L

Analyte	True Solution AB	Found Solution AB	Found Percent Recovery
U-233	**0.0515**	**0.0587**	**114**

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IVA-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/25/2014 15:14 End Date: 08/26/2014 01:32

Lab Sample Id	D/F	Type	Time	Analytes
				U-238
ZZZZZZ			15:14	
ZZZZZZ			15:20	
ZZZZZZ			15:25	
ZZZZZZ			15:30	
ZZZZZZ			15:34	
ZZZZZZ			15:39	
ZZZZZZ			15:44	
ZZZZZZ			15:48	
ZZZZZZ			15:53	
ZZZZZZ			16:00	
ICIS 160-140203/11			16:05	X
IC 160-140203/12	1		16:12	X
IC 160-140203/13	1		16:16	X
IC 160-140203/14	1		16:21	X
IC 160-140203/15	1		16:26	X
IC 160-140203/16	1		16:30	X
ICV 160-140203/17			16:35	
ICV 160-140203/18	1		16:40	X
ICV 160-140203/19			16:44	
ICB 160-140203/20	1		16:49	X
CRI 160-140203/21	1		16:54	X
CRI 160-140203/22			16:59	
ICSA 160-140203/23	1		17:03	X
ICSAB 160-140203/24	1		17:08	X
CCV 160-140203/25	1		17:13	X
CCB 160-140203/26	1		17:17	X
ZZZZZZ			17:22	
ZZZZZZ			17:27	
ZZZZZZ			17:31	
ZZZZZZ			17:36	
ZZZZZZ			17:41	
ZZZZZZ			17:45	
MB 160-139022/1-A	2	T	17:50	X
LCS 160-139022/2-A	2	T	17:55	X
680-102327-1	5	T	17:59	X
680-102327-1 SD	25	T	18:04	X
CCV 160-140203/37	1		18:09	X
CCB 160-140203/38	1		18:13	X
680-102327-1 MS	5	T	18:18	X

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/25/2014 15:14 End Date: 08/26/2014 01:32

Lab Sample Id	D/F	Type	Time	Analytes
				U-238
680-102327-1 MSD	5	T	18:23	X
680-102327-2	5	T	18:27	X
680-102327-3	5	T	18:32	X
680-102327-5	5	T	18:37	X
680-102327-6	5	T	18:41	X
680-102327-7	5	T	18:46	X
680-102327-9	5	T	18:51	X
680-102327-10	5	T	18:55	X
680-102327-11	5	T	19:00	X
CCV 160-140203/49	1		19:05	X
CCB 160-140203/50	1		19:09	X
680-102327-13	5	T	19:14	X
680-102327-14	5	T	19:19	X
680-102327-15	5	T	19:23	X
680-102327-16	5	T	19:28	X
680-102327-17	5	T	19:33	X
680-102327-18	5	T	19:37	X
680-102327-19	5	T	19:42	X
680-102327-21	5	T	19:47	X
680-102327-22	5	T	19:51	X
680-102327-23	5	T	19:56	X
CCV 160-140203/61	1		20:01	X
CCB 160-140203/62	1		20:05	X
ZZZZZZ			20:10	
ZZZZZZ			20:15	
ZZZZZZ			20:19	
ZZZZZZ			20:24	
ZZZZZZ			20:29	
ZZZZZZ			20:33	
ZZZZZZ			20:38	
ZZZZZZ			20:43	
ZZZZZZ			20:47	
ZZZZZZ			20:52	
CCV 160-140203/73			20:57	
CCB 160-140203/74			21:01	
ZZZZZZ			21:06	
ZZZZZZ			21:11	
ZZZZZZ			21:15	
ZZZZZZ			21:20	

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/25/2014 15:14 End Date: 08/26/2014 01:32

Lab Sample Id	D/F	Type	Time	Analytes
				U-238
ZZZZZZ			21:25	
ZZZZZZ			21:29	
ZZZZZZ			21:34	
ZZZZZZ			21:39	
ZZZZZZ			21:43	
ZZZZZZ			21:48	
CCV 160-140203/85			21:53	
CCB 160-140203/86			21:57	
ZZZZZZ			22:02	
ZZZZZZ			22:07	
ZZZZZZ			22:11	
ZZZZZZ			22:16	
ZZZZZZ			22:21	
ZZZZZZ			22:25	
ZZZZZZ			22:30	
ZZZZZZ			22:35	
ZZZZZZ			22:39	
ZZZZZZ			22:44	
CCV 160-140203/97			22:49	
CCB 160-140203/98			22:53	
ZZZZZZ			22:58	
ZZZZZZ			23:03	
ZZZZZZ			23:07	
ZZZZZZ			23:12	
ZZZZZZ			23:17	
ZZZZZZ			23:21	
ZZZZZZ			23:26	
ZZZZZZ			23:31	
ZZZZZZ			23:35	
ZZZZZZ			23:40	
CCV 160-140203/109			23:45	
CCB 160-140203/110			23:50	
ZZZZZZ			23:54	
ZZZZZZ			23:59	
ZZZZZZ			00:04	
ZZZZZZ			00:08	
ZZZZZZ			00:13	
ZZZZZZ			00:18	
ZZZZZZ			00:22	

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/25/2014 15:14 End Date: 08/26/2014 01:32

Lab Sample Id	D/F	Type	Time	Analytes
				U-238
ZZZZZZ			00:27	
ZZZZZZ			00:32	
ZZZZZZ			00:36	
CCV 160-140203/121			00:41	
CCB 160-140203/122			00:46	
ZZZZZZ			00:50	
ZZZZZZ			00:55	
ZZZZZZ			01:00	
ZZZZZZ			01:04	
ZZZZZZ			01:09	
ZZZZZZ			01:14	
ZZZZZZ			01:18	
ZZZZZZ			01:23	
CCV 160-140203/131			01:28	
CCB 160-140203/132			01:32	

Prep Types:
T = Total/NA

15-IN
ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICP-MS Instrument ID: ICPMS6100 Start Date: 08/25/2014 End Date: 08/25/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
IC 160-140203/12	16:12										
IC 160-140203/13	16:16										
IC 160-140203/14	16:21										
IC 160-140203/15	16:26										
IC 160-140203/16	16:30										
ICV 160-140203/18	16:40	99									
ICB 160-140203/20	16:49	100									
CRI 160-140203/21	16:54	99									
ICSA 160-140203/23	17:03	94									
ICSAB 160-140203/24	17:08	92									
CCV 160-140203/25	17:13	101									
CCB 160-140203/26	17:17	102									
MB 160-139022/1-A	17:50	106									
LCS 160-139022/2-A	17:55	105									
680-102327-1	17:59	94									
680-102327-1 SD	18:04	97									
CCV 160-140203/37	18:09	99									
CCB 160-140203/38	18:13	96									
680-102327-1 MS	18:18	92									
680-102327-1 MSD	18:23	93									
680-102327-2	18:27	90									
680-102327-3	18:32	95									
680-102327-5	18:37	91									
680-102327-6	18:41	92									
680-102327-7	18:46	96									
680-102327-9	18:51	88									
680-102327-10	18:55	91									
680-102327-11	19:00	91									
CCV 160-140203/49	19:05	95									
CCB 160-140203/50	19:09	94									
680-102327-13	19:14	90									
680-102327-14	19:19	91									
680-102327-15	19:23	87									
680-102327-16	19:28	96									
680-102327-17	19:33	97									
680-102327-18	19:37	101									
680-102327-19	19:42	98									
680-102327-21	19:47	94									
680-102327-22	19:51	96									
680-102327-23	19:56	96									
CCV 160-140203/61	20:01	95									
CCB 160-140203/62	20:05	95									

FORM XV - IN

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(4,8)_00019 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00020

Analyte	ICV 160-140203/18 08/25/2014 16:40				CCV 160-140203/25 08/25/2014 17:13				CCV 160-140203/37 08/25/2014 18:09			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-238	10.1		9.78	103	5.44		5.03	108	5.32		5.03	106

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(4,8)_00019 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00020

Analyte	CCV 160-140203/49 08/25/2014 19:05				CCV 160-140203/61 08/25/2014 20:01							
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-238	5.41		5.03	108	5.48		5.03	109				

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: ug/L

Analyte	RL	ICB 160-140203/20 08/25/2014 16:49		CCB 160-140203/26 08/25/2014 17:17		CCB 160-140203/38 08/25/2014 18:13		CCB 160-140203/50 08/25/2014 19:09	
		Found	C	Found	C	Found	C	Found	C
U-238	0.050	0.0246	J	ND		ND		ND	

Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: ug/L

Analyte	RL	CCB 160-140203/62 08/25/2014 20:05							
		Found	C	Found	C	Found	C	Found	C
U-238	0.050	ND							

Italicized analytes were not requested for this sequence.

4A-IN
INTERFERENCE CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Lab Sample ID: ICSAB 160-140203/24 Instrument ID: ICPMS6100

Lab File ID: 082514m3.rep ICS Source: ISOU ICSAB_00021

Concentration Units: ug/L

Analyte	True	Found	
	Solution AB	Solution AB	Percent Recovery
U-238	**5.03**	**5.47**	**109**

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IVA-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/26/2014 14:30 End Date: 08/26/2014 16:19

Lab Sample Id	D/F	Type	Time	Analytes				
				U-233	U-234	U-235	U-236	U-238
ICIS 160-140258/1			14:30	X	X	X	X	X
IC 160-140258/2	1		14:36	X	X	X	X	X
IC 160-140258/3	1		14:41	X	X	X	X	X
IC 160-140258/4	1		14:46	X	X	X	X	X
IC 160-140258/5	1		14:50	X	X	X	X	X
IC 160-140258/6	1		14:55	X	X	X	X	X
ICV 160-140258/7	1		15:00	X				
ICV 160-140258/8	1		15:04		X			X
ICV 160-140258/9	1		15:09			X	X	
ICB 160-140258/10	1		15:14	X	X	X	X	X
CRI 160-140258/11	1		15:18			X		X
CRI 160-140258/12	1		15:23	X	X		X	
ICSA 160-140258/13	1		15:28	X	X	X	X	X
ICSAB 160-140258/14	1		15:32	X	X	X	X	X
CCV 160-140258/15	1		15:37	X	X	X	X	X
CCB 160-140258/16	1		15:42	X	X	X	X	X
MB 160-139821/1-A	2	T	15:46	X	X	X	X	X
LCS 160-139821/2-A	2	T	15:51		X	X		X
680-102327-24	5	T	15:56	X	X	X	X	X
680-102327-24 SD	25	T	16:00	X	X	X	X	X
680-102327-24 MS	5	T	16:05		X	X		X
680-102327-24 MSD	5	T	16:10		X	X		X
CCV 160-140258/23	1		16:14	X	X	X	X	X
CCB 160-140258/24	1		16:19	X	X	X	X	X

Prep Types:
T = Total/NA

FORM XIII-IN

15-IN

ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY

METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICP-MS Instrument ID: ICPMS6100 Start Date: 08/26/2014 End Date: 08/26/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
IC 160-140258/2	14:36										
IC 160-140258/3	14:41										
IC 160-140258/4	14:46										
IC 160-140258/5	14:50										
IC 160-140258/6	14:55										
ICV 160-140258/7	15:00	100									
ICV 160-140258/8	15:04	99									
ICV 160-140258/9	15:09	96									
ICB 160-140258/10	15:14	98									
CRI 160-140258/11	15:18	99									
CRI 160-140258/12	15:23	98									
ICSA 160-140258/13	15:28	91									
ICSAB 160-140258/14	15:32	90									
CCV 160-140258/15	15:37	97									
CCB 160-140258/16	15:42	97									
MB 160-139821/1-A	15:46	102									
LCS 160-139821/2-A	15:51	102									
680-102327-24	15:56	87									
680-102327-24 SD	16:00	96									
680-102327-24 MS	16:05	86									
680-102327-24 MSD	16:10	84									
CCV 160-140258/23	16:14	96									
CCB 160-140258/24	16:19	96									

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(3)_00019 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00020

Analyte	ICV 160-140258/7 08/26/2014 15:00				CCV 160-140258/15 08/26/2014 15:37				CCV 160-140258/23 08/26/2014 16:14			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.227		0.223	102	0.0485	J	0.0515	94	0.0483	J	0.0515	94

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(4,8)_00019 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00020

Analyte	ICV 160-140258/8 08/26/2014 15:04				CCV 160-140258/15 08/26/2014 15:37				CCV 160-140258/23 08/26/2014 16:14			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0887		0.0835	106	0.0855		0.0827	103	0.0880		0.0827	106
U-238	9.99		9.78	102	5.33		5.03	106	5.53		5.03	110

Note: Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(5,6)_00021 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00020

Analyte	ICV 160-140258/9 08/26/2014 15:09				CCV 160-140258/15 08/26/2014 15:37				CCV 160-140258/23 08/26/2014 16:14			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	1.17		1.06	111	5.13		4.85	106	5.28		4.85	109
U-236	0.0716		0.0746	96	0.0910		0.0890	102	0.0948		0.0890	107

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: ug/L

Analyte	RL	ICB 160-140258/10 08/26/2014 15:14		CCB 160-140258/16 08/26/2014 15:42		CCB 160-140258/24 08/26/2014 16:19			
		Found	C	Found	C	Found	C	Found	C
U-233	0.050	0.118		0.0183	J	0.0176	J		
U-234	0.050	ND		ND		ND			
U-235	0.050	ND		ND		ND			
U-236	0.050	ND		ND		ND			
U-238	0.050	0.0240	J	ND		ND			

Italicized analytes were not requested for this sequence.

4A-IN
INTERFERENCE CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Lab Sample ID: ICSAB 160-140258/14 Instrument ID: ICPMS6100

Lab File ID: 082614M1.rep ICS Source: ISOU ICSAB_00021

Concentration Units: ug/L

Analyte	True Solution AB	Found Solution AB	Found Percent Recovery
U-233	**0.0515**	**0.0488**	**95**
U-234	**0.0827**	**0.0854**	**103**
U-235	**4.85**	**5.08**	**105**
U-236	**0.0890**	**0.0916**	**103**
U-238	**5.03**	**5.29**	**105**

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IVA-IN

TETRA TECH **INTERNAL CORRESPONDENCE**

TO:	**M. MARTIN**	**DATE:**	**OCTOBER 14, 2014**
FROM:	**MICHELLE L. ALLEN**	**COPIES:**	**DV FILE**

SUBJECT: **RADIOLOGICAL DATA VALIDATION – TECHNETIUM-99**
LOCKHEED MARTIN CORPORATION (LMC) – MIDDLE RIVER COMPLEX (MRC)
SEDIMENT INVESTIGATION
SAMPLE DELIVERY GROUPS (SDG) 680-102327-4

SAMPLES: 1/Sediment/Technetium-99

SD-207-01

Overview

The sample set for LMC-MRC, SDGs 680-102327-4 consisted of one (1) sediment environmental sample. The one (1) sediment sample was analyzed for technetium-99. No field duplicate sample pair was included in this SDG.

The sample was collected by Tetra Tech, Inc. on June 11, 2014 and analyzed by TestAmerica, Inc. All analyses were conducted in accordance with EPA SW846 Method 6020A analytical and reporting protocols.

The findings offered in this report are based upon a general review of all available data. The data contained in this SDG were validated with regard to the following parameters: data completeness, holding times, ICP/MS tuning, initial and continuing calibrations, laboratory method and preparation blank results, laboratory control sample recoveries, matrix spike/matrix spike duplicate results, internal standard recoveries, tracer/carrier results, detection limits and analyte quantitation. Areas of concern are listed below.

Major

No major issues were identified.

Minor

No minor issues were identified.

Notes

All sample results are reported on a wet weight basis.

Non-detected results were reported to the MDL.

Executive Summary

Laboratory Performance: None.

Other Factors Affecting Data Quality: None.

The text of this report has been formulated to address only those areas affecting data quality.

Tetra Tech, Inc.
Michelle L. Allen
Chemist/Data Validator

Tetra Tech, Inc.
Joseph A. Samchuck
Data Validation Manager

Attachments:
Appendix A – Qualified Analytical Results
Appendix B – Results as Reported by the Laboratory
Appendix C – Support Documentation

Appendix A

Qualified Analytical Results

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = ICP PDS Recovery Noncompliance; MSA's $r < 0.995$
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = RPD between columns/detectors >40% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient $r < 0.995$
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 standard deviations is greater than sample activity
Z1 = Tentatively Identified Compound considered presumptively present
Z2 = Tentatively Identified Compound column bleed
Z3 = Tentatively Identified Compound aldol condensate

PROJ_NO: 05220	NSAMPLE	SD-207-01		
SDG: 680-102327-4	LAB_ID	680-102327-31		
FRACTION: M	SAMP_DATE	6/11/2014		
MEDIA: SOIL	QC_TYPE	NM		
	UNITS	MG/KG		
	PCT_SOLIDS	100.0		
	DUP_OF			
PARAMETER		RESULT	VQL	QLCD
TECHNETIUM-99		1.6E-05	U	

Appendix B

Results as Reported by the Laboratory

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-4
SDG: 680102327-1

Client Sample ID: SD-207-01
Date Collected: 06/11/14 14:50
Date Received: 06/12/14 09:40

Lab Sample ID: 680-102327-31
Matrix: Solid

Method: 6020A - Metals (ICP/MS), Tc-99

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tc-99	ND		0.000055	0.000016	mg/Kg		09/12/14 13:53	09/17/14 15:24	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Re	*91*		*30 - 110*	*09/12/14 13:53*	*09/17/14 15:24*	*1*

7

Appendix C

Support Documentation

QUANTITATIVE ANALYSIS REPORT

SD-207 -01

Sample ID: 680-102327-A-31-J

Sample Date/Time: Wednesday, September 17, 2014 15:24:21

Autosampler Position: 118

Dataset File: D:\Elandata\Dataset\091714M1\680-102327-A-31-J.137

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
	99	**Tc**	**0.000195**	107.067	5.984	ug/L	1.920
>	115	**In-115 (IS)**			459634.883	ug/L	426757.728
→	187	**Re**	**454.431017**	2.414	5061622.537	ug/L	388.864

5.0147 g / 50ml

DF = 1 X

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
	Tc	99		
>	**In-115 (IS**	115	**107.704**	
	Re	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

Re $\frac{454.431017\ \text{ug}}{1\text{L}} \times \frac{0.05\text{L}}{5.0147\text{g}} \times 1$

$= 4.54\ \text{mg/g}$

4.54 mg/kg ✓

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-207-01 Lab Sample ID: 680-102327-31

Lab Name: TestAmerica St. Louis Job No.: 680-102327-4

SDG ID.: 680102327-1

Matrix: Solid Date Sampled: 06/11/2014 14:50

Reporting Basis: WET Date Received: 06/12/2014 09:40

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
14133-76-7	Tc-99	ND	0.000055	0.000016	mg/Kg			1	6020A
7440-15-5	Re	4.5			mg/Kg			1	6020A

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Gerean	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.4
Client Contact: Mike Martin	Phone: (703)342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~4 of 45~~ 3 of 4
Company: Tetra Tech, Inc.		Analysis Requested		Job #: 680-102327
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes:
City: Germantown	TAT Requested (days):			A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; G - Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA; M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2SO3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - ph 4-5; Z - other (specify)
State, Zip: MD, 20874	PO #: Purchase Order not required			
Phone:	WO #:			Other:
Email: Michael.Martin@tetratech.com				
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Perform MS/MSD (Yes or No)	Special Instructions/Note:
			Preservation Code:		X	N	N	N	N	X	
SD-204-02	6/11/14	1230	C	Solid			X				
SD-221-SS		1320	C	Solid			X				
SD-221-01		1325	C	Solid			X				
SD-221-02		1330	C	Solid			X				
SD-210-SS		1435	C	Solid			X				
SD-210-01		1440	C	Solid			X				
SD-210-02		1445	C	Solid			X				
SD-207-SS		1448	C	Solid			X				
SD-207-01		1450	C	Solid			X				
SD-207-02		1455	C	Solid			X				
SD-207-03	↓	1500	C	Solid			X				Hold Pending Analysis of SS to 02

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month): ☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	6-11-14 / 1600	TT		6/11/14 / 1605	TestAmerica
Relinquished by:	Date/Time: 6/11/14 / 1630 1730	Company TestAmerica	Received by:	Date/Time: 6-12-14 0940	Company TASR
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Page 14 of 18

9/19/2014

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-102327-4
SDG Number: 680102327-1

Login Number: 102327
List Number: 2
Creator: Daniels, Brian J

List Source: TestAmerica St. Louis
List Creation: 06/13/14 03:50 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	True	

Job ID: 680-102327-4

Laboratory: TestAmerica Savannah

Narrative

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Sediments

Report Number: 680-102327-4

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 06/12/2014; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 2.6 C.

METALS BY ICPMS

Sample SD-207-01 (680-102327-31) was analyzed for Metals by ICPMS in accordance with EPA SW-846 6020A. The samples were prepared on 09/12/2014 and analyzed on 09/17/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-4
SDG: 680102327-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-102327-31	SD-207-01	Solid	06/11/14 14:50	06/12/14 09:40

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-4
SDG: 680102327-1

Method	Method Description	Protocol	Laboratory
6020A	Metals (ICP/MS), Tc-99	SW846	TAL SL

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Tracer/Carrier Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-4
SDG: 680102327-1

Method: 6020A - Metals (ICP/MS), Tc-99

Matrix: Solid

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)
		Re
Lab Sample ID	Client Sample ID	(30-110)
680-102327-31	SD-207-01	91
680-102327-31 MS	SD-207-01	87
680-102327-31 MSD	SD-207-01	88
LCS 160-143794/2-A	Lab Control Sample	101
MB 160-143794/1-A	Method Blank	100

Tracer/Carrier Legend

Re = Re

8

Method: 6020A - Metals (ICP/MS), Tc-99

Lab Sample ID: MB 160-143794/1-A
Matrix: Solid
Analysis Batch: 144626

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 143794

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tc-99	ND		0.000049	0.000015	mg/Kg		09/12/14 13:53	09/17/14 15:16	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Re	*100*		*30 - 110*	*09/12/14 13:53*	*09/17/14 15:16*	*1*

Lab Sample ID: LCS 160-143794/2-A
Matrix: Solid
Analysis Batch: 144626

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 143794

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Tc-99	0.00238	0.00240		mg/Kg		101	80 - 120

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Re	*101*		*30 - 110*

Lab Sample ID: 680-102327-31 MS
Matrix: Solid
Analysis Batch: 144626

Client Sample ID: SD-207-01
Prep Type: Total/NA
Prep Batch: 143794

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Tc-99	ND		0.00235	0.00185		mg/Kg		79	75 - 125

Carrier	*MS %Yield*	*MS Qualifier*	*Limits*
Re	*87*		*30 - 110*

Lab Sample ID: 680-102327-31 MSD
Matrix: Solid
Analysis Batch: 144626

Client Sample ID: SD-207-01
Prep Type: Total/NA
Prep Batch: 143794

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Tc-99	ND		0.00237	0.00190		mg/Kg		80	75 - 125	3	30

Carrier	*MSD %Yield*	*MSD Qualifier*	*Limits*
Re	*88*		*30 - 110*

QC Association Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-4
SDG: 680102327-1

Metals

Prep Batch: 143794

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102327-31	SD-207-01	Total/NA	Solid	None	
680-102327-31 MS	SD-207-01	Total/NA	Solid	None	
680-102327-31 MSD	SD-207-01	Total/NA	Solid	None	
LCS 160-143794/2-A	Lab Control Sample	Total/NA	Solid	None	
MB 160-143794/1-A	Method Blank	Total/NA	Solid	None	

Analysis Batch: 144626

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102327-31	SD-207-01	Total/NA	Solid	6020A	143794
680-102327-31 MS	SD-207-01	Total/NA	Solid	6020A	143794
680-102327-31 MSD	SD-207-01	Total/NA	Solid	6020A	143794
LCS 160-143794/2-A	Lab Control Sample	Total/NA	Solid	6020A	143794
MB 160-143794/1-A	Method Blank	Total/NA	Solid	6020A	143794

10

COVER PAGE
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102327-4

SDG No.: 680102327-1

Project: Sediments

Client Sample ID	Lab Sample ID
SD-207-01	680-102327-31

Comments:

9-IN
DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102327-4

SDG Number: 680102327-1

Matrix: Solid Instrument ID: ICPMS6100

Method: 6020A MDL Date: 08/07/2012 16:02

Prep Method: None

Analyte	Wavelength/ Mass	RL (mg/Kg)	MDL (mg/Kg)
Re			
Tc-99	99	0.00005	0.000015

9-IN
CALIBRATION BLANK DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102327-4

SDG Number: 680102327-1

Matrix: Solid Instrument ID: ICPMS6100

Method: 6020A XMDL Date: 08/24/2012 17:05

Analyte	Wavelength/ Mass	XRL (ug/L)	XMDL (ug/L)
Re			
Tc-99	99	0.005	0.001

11-IN
LINEAR RANGES
METALS

Lab Name: TestAmerica St. Louis Job No: 680-102327-4

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Date: 02/14/2012 11:04

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	Method
Tc-99		2000	6020A
Re		2000	6020A

12-IN
PREPARATION LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-4

SDG No.: 680102327-1

Prep Method: None

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight (g)	Initial Volume	Final Volume (mL)
MB 160-143794/1-A	09/12/2014 13:53	143794	5.1140		50
LCS 160-143794/2-A	09/12/2014 13:53	143794	5.0344		50
680-102327-31	09/12/2014 13:53	143794	5.0147		50
680-102327-31 MS	09/12/2014 13:53	143794	5.1144		50
680-102327-31 MSD	09/12/2014 13:53	143794	5.0674		50

FORM XII-IN

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-4

SDG No.: 680102327-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-143794/1-A

Instrument Code: ICPMS6100 Batch No.: 144626

CAS No.	Analyte	Concentration	C	Q	Method
14133-76-7	Tc-99	ND			6020A_TC99
7440-15-5	Re	4.89			6020A_TC99

FORM III-IN

7A-IN
LAB CONTROL SAMPLE
METALS

Lab ID: LCS 160-143794/2-A

Lab Name: TestAmerica St. Louis Job No.: 680-102327-4

Sample Matrix: Solid LCS Source: TC99-PREP_00004

Analyte	Solid(mg/Kg)							
	True	Found	C	%R	Limits		Q	Method
Tc-99	0.00238	0.00240		101	80	120		6020A
Re	4.97	5.00		101	30	110		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

5A-IN
MATRIX SPIKE SAMPLE RECOVERY
METALS

Client ID: SD-207-01 MS | Lab ID: 680-102327-31 MS

Lab Name: TestAmerica St. Louis | Job No.: 680-102327-4

SDG No.: 680102327-1

Matrix: Solid | Concentration Units: mg/Kg

% Solids:

Analyte	SSR C	Sample Result (SR) C	Spike Added (SA)	%R	Control Limit %R	Q	Method
Tc-99	0.00185	ND	0.00235	79	75-125		6020A
Re	4.26	4.5	4.89	87	30-110		6020A

SSR = Spiked Sample Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VA - IN

5A-IN
MATRIX SPIKE DUPLICATE SAMPLE RECOVERY
METALS

Client ID: SD-207-01 MSD | Lab ID: 680-102327-31 MSD

Lab Name: TestAmerica St. Louis | Job No.: 680-102327-4

SDG No.: 680102327-1

Matrix: Solid | Concentration Units: mg/Kg

% Solids:

Analyte	(SDR) C	Spike Added (SA)	%R	Control Limit %R	RPD	RPD Limit	Q	Method
Tc-99	0.00190	0.00237	80	75-125	3	30		6020A
Re	4.36	4.93	88	30-110				6020A

SDR = Sample Duplicate Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VD - IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-4

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/17/2014 06:36 End Date: 09/17/2014 17:40

Lab Sample Id	D/F	Type	Time	Analytes		
				Re	Tc-99	
ICIS 160-144626/1	1		06:36	X	X	
IC 160-144626/2	1		06:40	X	X	
IC 160-144626/3	1		06:44	X	X	
IC 160-144626/4	1		06:48	X	X	
ICV 160-144626/5	1		06:52	X	X	
ICB 160-144626/6	1		06:55	X	X	
CRI 160-144626/7	1		06:59	X	X	
CCV 160-144626/8			07:03			
CCB 160-144626/9			07:07			
ZZZZZZ			07:11			
ZZZZZZ			07:15			
ZZZZZZ			07:19			
ZZZZZZ			07:23			
ZZZZZZ			07:27			
ZZZZZZ			07:30			
ZZZZZZ			07:34			
ZZZZZZ			07:38			
ZZZZZZ			07:42			
ZZZZZZ			07:46			
CCV 160-144626/20			07:50			
CCB 160-144626/21			07:54			
ZZZZZZ			07:57			
ZZZZZZ			08:01			
ZZZZZZ			08:05			
ZZZZZZ			08:09			
ZZZZZZ			08:13			
ZZZZZZ			08:17			
ZZZZZZ			08:21			
ZZZZZZ			08:25			
ZZZZZZ			08:28			
ZZZZZZ			08:32			
CCV 160-144626/32			08:36			
CCB 160-144626/33			08:40			
ZZZZZZ			08:44			
ZZZZZZ			08:48			
ZZZZZZ			08:52			
ZZZZZZ			08:56			
ZZZZZZ			08:59			
ZZZZZZ			09:03			

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-4

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/17/2014 06:36 End Date: 09/17/2014 17:40

| Lab Sample Id | D/F | Type | Time | Analytes | | |

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-4

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/17/2014 06:36 End Date: 09/17/2014 17:40

Lab Sample Id	D/F	Type	Time	Analytes	
				Re	Tc-99
ZZZZZZ			11:38		
CCV 160-144626/80			11:42		
CCB 160-144626/81			11:46		
ZZZZZZ			11:50		
ZZZZZZ			11:54		
ZZZZZZ			11:58		
ZZZZZZ			12:01		
ZZZZZZ			12:05		
ZZZZZZ			12:09		
ZZZZZZ			12:13		
ZZZZZZ			12:17		
ZZZZZZ			12:21		
ZZZZZZ			12:25		
CCV 160-144626/92			12:29		
CCB 160-144626/93			12:32		
ZZZZZZ			12:36		
ZZZZZZ			12:40		
ZZZZZZ			12:45		
ZZZZZZ			12:49		
ZZZZZZ			12:53		
ZZZZZZ			12:57		
ZZZZZZ			13:01		
ZZZZZZ			13:04		
ZZZZZZ			13:08		
ZZZZZZ			13:12		
CCV 160-144626/104			13:16		
CCB 160-144626/105			13:20		
ZZZZZZ			13:24		
ZZZZZZ			13:28		
ZZZZZZ			13:32		
ZZZZZZ			13:35		
ZZZZZZ			13:39		
ZZZZZZ			13:43		
ZZZZZZ			13:47		
ZZZZZZ			13:51		
ZZZZZZ			13:55		
ZZZZZZ			13:59		
CCV 160-144626/116			14:02		
CCB 160-144626/117			14:06		

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-4

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/17/2014 06:36 End Date: 09/17/2014 17:40

Lab Sample Id	D/F	Type	Time	Analytes	
				Re	Tc-99
ZZZZZZ			14:10		
ZZZZZZ			14:14		
ZZZZZZ			14:18		
ZZZZZZ			14:22		
ZZZZZZ			14:26		
ZZZZZZ			14:30		
ZZZZZZ			14:33		
ZZZZZZ			14:37		
ZZZZZZ			14:41		
ZZZZZZ			14:45		
CCV 160-144626/128	1		14:49	X	X
CCB 160-144626/129	1		14:53	X	X
ZZZZZZ			14:57		
ZZZZZZ			15:01		
ZZZZZZ			15:04		
ZZZZZZ			15:08		
ZZZZZZ			15:12		
MB 160-143794/1-A	1	T	15:16	X	X
LCS 160-143794/2-A	1	T	15:20	X	X
680-102327-31	1	T	15:24	X	X
680-102327-31 MS	1	T	15:28	X	X
680-102327-31 MSD	1	T	15:32	X	X
CCV 160-144626/140	1		15:35	X	X
CCB 160-144626/141	1		15:39	X	X
ZZZZZZ			15:43		
ZZZZZZ			15:47		
ZZZZZZ			15:51		
ZZZZZZ			15:55		
ZZZZZZ			15:59		
ZZZZZZ			16:03		
ZZZZZZ			16:06		
ZZZZZZ			16:10		
ZZZZZZ			16:14		
ZZZZZZ			16:18		
CCV 160-144626/152	1		16:22	X	X
CCB 160-144626/153	1		16:26	X	X
ZZZZZZ			16:30		
ZZZZZZ			16:34		
ZZZZZZ			16:37		

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-4

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/17/2014 06:36 End Date: 09/17/2014 17:40

| Lab Sample Id | D/F | Type | Time | Analytes | | |

15-IN
ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-4

SDG No.: 680102327-1

ICP-MS Instrument ID: ICPMS6100 Start Date: 09/17/2014 End Date: 09/17/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element In-115	Q	Element	Q	Element	Q	Element	Q	Element	Q
ICIS 160-144626/1	06:36										
IC 160-144626/2	06:40										
IC 160-144626/3	06:44										
IC 160-144626/4	06:48										
ICV 160-144626/5	06:52	102									
ICB 160-144626/6	06:55	102									
CRI 160-144626/7	06:59	102									
CCV 160-144626/128	14:49	96									
CCB 160-144626/129	14:53	95									
MB 160-143794/1-A	15:16	111									
LCS 160-143794/2-A	15:20	108									
680-102327-31	15:24	108									
680-102327-31 MS	15:28	109									
680-102327-31 MSD	15:32	108									
CCV 160-144626/140	15:35	92									
CCB 160-144626/141	15:39	91									
CCV 160-144626/152	16:22	92									
CCB 160-144626/153	16:26	92									

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-4

SDG No.: 680102327-1

ICV Source: TC99 ICV_00082 Concentration Units: ug/L

CCV Source: TC99 CAL2/CCV_00040

Analyte	ICV 160-144626/5 09/17/2014 06:52				CCV 160-144626/128 09/17/2014 14:49				CCV 160-144626/140 09/17/2014 15:35			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
Re	500		500	100	536		500	107	534		500	107
Tc-99	0.283		0.292	97	0.280		0.307	91	0.283		0.307	92

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-4

SDG No.: 680102327-1

ICV Source: TC99 ICV_00082 Concentration Units: ug/L

CCV Source: TC99 CAL2/CCV_00040

Analyte	CCV 160-144626/152 09/17/2014 16:22											
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
Re	516		500	103								
Tc-99	0.284		0.307	92								

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2B-IN
CRQL CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-4

SDG No.: 680102327-1

Method: 6020A Instrument ID: ICPMS6100

Lab Sample ID: CRI 160-144626/7 Concentration Units: ug/L

CRQL Check Standard Source: TC99 CAL1/LLC_00043

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
Tc-99	0.00492	0.00424	J	86	70-130
Re	100	112		112	30-110

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IIB-IN

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-4

SDG No.: 680102327-1

Concentration Units: ug/L

Analyte	RL	ICB 160-144626/6 09/17/2014 06:55		CCB 160-144626/129 09/17/2014 14:53		CCB 160-144626/141 09/17/2014 15:39		CCB 160-144626/153 09/17/2014 16:26	
		Found	C	Found	C	Found	C	Found	C
Re		0.142		0.788		0.809		0.555	
Tc-99	0.0050	ND		ND		ND		ND	

Italicized analytes were not requested for this sequence.

TETRATECH **INTERNAL CORRESPONDENCE**

TO: **M. MARTIN** **DATE: OCTOBER 14, 2014**

FROM: **A. COGNETTI** **COPIES: DV FILE**

SUBJECT: **DATA VALIDATION: RADIOLOGICAL ANALYSES ISOTOPIC THORIUM / URANIUM/ GAMMA EMITTERS**
MRC SEDIMENT INVESTIGATION
SAMPLE DELIVERY GROUPS (SDGs) – 680-102370-1 and 680-102370-4

SAMPLE: 29/Sediment/Isotopic Thorium/Uranium

SD-206-01	SD-206-02	SD-206-SS	SD-211-01*	SD-211-02*	SD-211-SS*
SD-212-01*	SD-212-02*	SD-212-SS*	SD-213-01*	SD-213-02*	SD-213-SS*
SD-214-01*	SD-214-02*	SD-214-03	SD-214-SS*	SD-215-SS*	SD-216-01*
SD-216-02*	SD-216-SS*	SD-217-01*	SD-217-02*	SD-217-SS*	SD-222-01*
SD-222-02*	SD-222-03*	SD-222-SS*	SD-DUP-04*		

2/Sediment/ Gamma Emitters

SD-005E-01 SD-008-01*

Overview

The sample set for MRC Sediment Investigation, SDG 680-102370-1 and 680-102370-4 consists of twenty-nine (29) sediment environmental samples analyzed for isotopic thorium. Twenty-five (25) sediment environmental samples were analyzed for isotopic uranium as denoted above (*). Two (2) sediment samples were analyzed for gamma emitters: radium-226, radium-228, thorium-232, uranium-235 and uranium-238. There is one (1) field duplicate pair associated with this SDG: SD-DUP-04/ SD-213-02.

The samples were collected by Tetra Tech on June 12, 2014 and were analyzed by Test America. All analyses were conducted using Methods A-01-R, GA-01-R and SW-846 6020A.

The data contained in this SDG was validated with regard to the following parameters: data completeness, holding times, initial/continuing calibration, laboratory method blank, blank spike recoveries, matrix spike/ matrix spike duplicate recoveries, tracer yield, field duplicate precision and detection limits.

Minor Problems

- Thorium-230 was detected in the method blank associated with batch 160-128227/1-A at a concentration of 0.1034 +/- 0.0660 pCi/g. A mean difference of the blank activity and positive sample activity was calculated and used for evaluation of blank contamination for samples SD-206-01, SD-206-02, SD-206-SS, SD-211-01, SD-211-02, SD-211-SS, SD-214-SS, SD-215-SS, SD-216-01, SD-216-02, SD-216-SS, SD-217-01, SD-217-02, SD-217-SS, SD-222-01, SD-222-01, SD-222-02, SD-222-03, and SD-222-SS. The mean differences were greater than 3 and the sample and blank results differed by a factor less than 10 in samples SD-206-02, SD-206-SS, SD-211-01, SD-211-02, SD-214-SS, SD-215-SS, SD-216-01, SD-216-02, SD-216-SS, SD-217-01, SD-217-02, SD-217-SS, SD-222-01, SD-222-02, SD-222-03, and SD-222-SS. Therefore, the sample results were qualified as estimated (J) as the contaminant may have an impact on the sample results. The mean difference was greater than 3 and the sample and blank results were greater than a factor of 10 in samples SD-206-01 and SD-211-SS;

therefore, the sample results were not qualified.

- Thorium-230 was detected in the method blank associated with batch 160-128228/1-A at a concentration of 0.1211 +/- 0.0731 pCi/g. A mean difference of the blank activity and positive sample activity was calculated and used for evaluation of blank contamination for samples SD-212-01, SD-212-02, SD-212-SS, SD-213-01, SD-213-02, SD-213-SS, SD-214-01, SD-214-02, SD-214-03, and SD-DUP-04. The mean differences were greater than 3 and the sample and blank results differed by a factor of less than 10 in samples SD-212-01, SD-212-02, SD-212-SS, SD-213-01, SD-213-02, SD-214-01, SD-214-03 and SD-DUP-04. Therefore, the sample results were qualified as estimated (J) as the contaminant may have an impact on the sample results. The mean difference was greater than 3 and the sample and blank results were greater than a factor of 10 in samples SD-213-SS and SD-214-02; therefore, the sample results were not qualified.

Notes

Uranium-233 was detected in the initial calibration blank analyzed on September 2, 2014 at a concentration of 0.0345 ug/L. No action was taken on the nondetected results in the sediment samples.

The matrix spike/ matrix spike duplicate (MS/MSD) percent recoveries (%Rs) of Uranium-238 exceeded quality control limits in spiked sample SD-214-01. The sample concentration was greater than 4X the spike concentration. No action was taken.

Uranium isotopes were determined via method 6020A. Isotopic uranium results reported via method 6020A and expressed in mg/kg units were converted to activity units, pCi/g, by the laboratory using isotope specific theoretical activities.

Nondetected results reported for uranium isotopes determined via method 6020A were reported at limits below the Minimum Detectable Concentration (MDC) by the laboratory. The manner in which the nondetected radioisotopes were reported was based upon the common practice of reporting radiological parameters at the concentration determined by the instrument. Therefore, metals raw instrument results expressed in ug/L were then converted to pCi/g and reported as nondetects below the MDC.

The uncertainty for the sample results are reported at 2 standard deviations (95% confidence level). The EDD does not contain the uncertainty result.

EXECUTIVE SUMMARY

Laboratory Performance Issues: Contamination was detected in a method blank for Thorium-230.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the Methods A-01-R, GA-0-R, SW-846 6020A and EPA Functional Guidelines for Inorganic Data Validation (January 2010). The text of this report has been formulated to address only those problem areas affecting data quality.

Ann Cognetti

Tetra Tech
Ann Cognetti
Chemist/Data Validator

Tetra Tech
Joseph A. Samchuck
Data Validation Manager

Attachments:
1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as Reported by the Laboratory
3. Appendix C - Support Documentation

APPENDIX A

QUALIFIED LABORATORY RESULTS

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = ICP PDS Recovery Noncompliance; MSA's $r < 0.995$
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = RPD between columns/detectors >40% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient $r < 0.995$
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 standard deviations is greater than sample activity
Z1 = Tentatively Identified Compound considered presumptively present
Z2 = Tentatively Identified Compound column bleed
Z3 = Tentatively Identified Compound aldol condensate

PROJ_NO: 05220	NSAMPLE	SD-005E-01						SD-008-01					
SDG: 680-102370-1	LAB_ID	680-102370-6						680-102370-33					
FRACTION: RADG	SAMP_DATE	6/12/2014						6/12/2014					
MEDIA: SEDIMENT	QC_TYPE	NM			TIC			NM			TIC		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ACTINIUM-228					0.507						0.895		
BISMUTH-214					0.465						0.732		
LEAD-212					0.48						0.92		
LEAD-214					0.543						0.82		
POTASSIUM-40					4.89						6.71		
RADIUM-226		0.465						0.732					
RADIUM-228		0.507						0.895					
THALLIUM-208					0.189						0.26		
THORIUM-232		0.507						0.895					
URANIUM-235		0.149	U					0.209	U				
URANIUM-238		0.845	U					0.592	U				

PROJ_NO: 05220	NSAMPLE	SD-206-01			SD-206-02			SD-206-SS			SD-211-01		
SDG: 680-102370-1	LAB_ID	680-102370-3			680-102370-4			680-102370-2			680-102370-13		
FRACTION: RAD	SAMP_DATE	6/12/2014			6/12/2014			6/12/2014			6/12/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
THORIUM-228		1.27			1.09			1.03			1.31		
THORIUM-230		1.04			0.809	J	A	0.873	J	A	0.882	J	A
THORIUM-232		1.24			1.14			0.993			1.18		

PROJ_NO: 05220	NSAMPLE	SD-211-02			SD-211-SS			SD-212-01			SD-212-02		
SDG: 680-102370-1	LAB_ID	680-102370-14			680-102370-12			680-102370-25			680-102370-26		
FRACTION: RAD	SAMP_DATE	6/12/2014			6/12/2014			6/12/2014			6/12/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
THORIUM-228		1.08			1.2			1.24			1.1		
THORIUM-230		0.928	J	A	1.21			1	J	A	1.17	J	A
THORIUM-232		0.984			1.41			1.12			1.01		

PROJ_NO: 05220	NSAMPLE	SD-212-SS			SD-213-01			SD-213-02			SD-213-SS		
SDG: 680-102370-1	LAB_ID	680-102370-24			680-102370-30			680-102370-31			680-102370-29		
FRACTION: RAD	SAMP_DATE	6/12/2014			6/12/2014			6/12/2014			6/12/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
THORIUM-228		0.964			0.998			1.14			1.1		
THORIUM-230		0.923	J	A	0.979	J	A	1.15	J	A	1.26		
THORIUM-232		1.03			1.17			1.18			1.23		

PROJ_NO: 05220	NSAMPLE	SD-214-01			SD-214-02			SD-214-03			SD-214-SS		
SDG: 680-102370-1	LAB_ID	680-102370-23			680-102370-34			680-102370-35			680-102370-22		
FRACTION: RAD	SAMP_DATE	6/12/2014			6/12/2014			6/12/2014			6/12/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
THORIUM-228		0.986			1.22			0.865			0.855		
THORIUM-230		0.865	J	A	1.24			0.433	J	A	0.948	J	A
THORIUM-232		1.09			1.15			0.856			1.04		

PROJ_NO: 05220	NSAMPLE	SD-215-SS			SD-216-01			SD-216-02			SD-216-SS		
SDG: 680-102370-1	LAB_ID	680-102370-7			680-102370-16			680-102370-17			680-102370-15		
FRACTION: RAD	SAMP_DATE	6/12/2014			6/12/2014			6/12/2014			6/12/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
THORIUM-228		0.898			0.946			0.69			1.01		
THORIUM-230		0.499	J	A	0.895	J	A	0.583	J	A	0.82	J	A
THORIUM-232		1.01			0.956			0.688			0.903		

PROJ_NO: 05220	NSAMPLE	SD-217-01			SD-217-02			SD-217-SS			SD-222-01		
SDG: 680-102370-1	LAB_ID	680-102370-19			680-102370-20			680-102370-18			680-102370-9		
FRACTION: RAD	SAMP_DATE	6/12/2014			6/12/2014			6/12/2014			6/12/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
THORIUM-228		0.431			0.767			0.437			0.639		
THORIUM-230		0.36	J	A	0.551	J	A	0.657	J	A	0.689	J	A
THORIUM-232		0.37			0.665			0.371			0.487		

PROJ_NO: 05220	NSAMPLE	SD-222-02			SD-222-03			SD-222-SS			SD-DUP-04		
SDG: 680-102370-1	LAB_ID	680-102370-10			680-102370-11			680-102370-8			680-102370-28		
FRACTION: RAD	SAMP_DATE	6/12/2014			6/12/2014			6/12/2014			6/12/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF										SD-213-02		
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
THORIUM-228		0.421			0.767			0.297			1.06		
THORIUM-230		0.436	J	A	0.495	J	A	0.429	J	A	1.04	J	A
THORIUM-232		0.338			0.647			0.363			1.26		

PROJ_NO: 05220	NSAMPLE	SD-008-01						SD-211-01					
SDG: 680-102370-4	LAB_ID	680-102370-33						680-102370-13					
FRACTION: M	SAMP_DATE	6/12/2014						6/12/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					1						0.88		
URANIUM-233					0.0033	U					0.0034	U	
URANIUM-234					0.00066	U					0.00068	U	
URANIUM-235					0.0075	J	P				0.0062	J	P
URANIUM-235 (PERCENT)		0.744						0.708					
URANIUM-236					0.00088	U					0.00091	U	
URANIUM-238					1						0.87		

PROJ_NO: 05220	NSAMPLE	SD-211-02						SD-211-SS					
SDG: 680-102370-4	LAB_ID	680-102370-14						680-102370-12					
FRACTION: M	SAMP_DATE	6/12/2014						6/12/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					0.78						0.91		
URANIUM-233					0.0036	U					0.0036	U	
URANIUM-234					0.00071	U					0.00072	U	
URANIUM-235					0.0055	J	P				0.0062	J	P
URANIUM-235 (PERCENT)		0.709						0.684					
URANIUM-236					0.00095	U					0.00096	U	
URANIUM-238					0.77						0.9		

PROJ_NO: 05220	NSAMPLE	SD-212-01						SD-212-02					
SDG: 680-102370-4	LAB_ID	680-102370-25						680-102370-26					
FRACTION: M	SAMP_DATE	6/12/2014						6/12/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					2						2		
URANIUM-233					0.0033	U					0.0035	U	
URANIUM-234					0.00066	U					0.0007	U	
URANIUM-235					0.014						0.015		
URANIUM-235 (PERCENT)		0.695						0.744					
URANIUM-236					0.00088	U					0.00093	U	
URANIUM-238					2						2		

PROJ_NO: 05220	NSAMPLE	SD-212-SS						SD-213-01					
SDG: 680-102370-4	LAB_ID	680-102370-24						680-102370-30					
FRACTION: M	SAMP_DATE	6/12/2014						6/12/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					2.3						2.1		
URANIUM-233					0.0033	U					0.0032	U	
URANIUM-234					0.00065	U					0.00063	U	
URANIUM-235					0.018						0.016		
URANIUM-235 (PERCENT)		0.777						0.756					
URANIUM-236					0.00087	U					0.00084	U	
URANIUM-238					2.3						2.1		

PROJ_NO: 05220	NSAMPLE	SD-213-02						SD-213-SS					
SDG: 680-102370-4	LAB_ID	680-102370-31						680-102370-29					
FRACTION: M	SAMP_DATE	6/12/2014						6/12/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					1.8						2.3		
URANIUM-233					0.0036	U					0.0036	U	
URANIUM-234					0.00071	U					0.00071	U	
URANIUM-235					0.013						0.017		
URANIUM-235 (PERCENT)		0.717						0.734					
URANIUM-236					0.00095	U					0.00095	U	
URANIUM-238					1.8						2.3		

PROJ_NO: 05220	NSAMPLE	SD-214-01						SD-214-02					
SDG: 680-102370-4	LAB_ID	680-102370-23						680-102370-34					
FRACTION: M	SAMP_DATE	6/12/2014						6/12/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					2.4						1.8		
URANIUM-233					0.0035	U					0.0033	U	
URANIUM-234					0.00069	U					0.00065	U	
URANIUM-235					0.018						0.013		
URANIUM-235 (PERCENT)		0.744						0.717					
URANIUM-236					0.00092	U					0.00087	U	
URANIUM-238					2.4						1.8		

PROJ_NO: 05220	NSAMPLE	SD-214-SS						SD-215-SS					
SDG: 680-102370-4	LAB_ID	680-102370-22						680-102370-7					
FRACTION: M	SAMP_DATE	6/12/2014						6/12/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					2.1						0.35		
URANIUM-233					0.0037	U					0.0036	U	
URANIUM-234					0.00074	U					0.00072	U	
URANIUM-235					0.015						0.0049	U	
URANIUM-235 (PERCENT)		0.709						0					
URANIUM-236					0.00099	U					0.00096	U	
URANIUM-238					2.1						0.35		

PROJ_NO: 05220	NSAMPLE	SD-216-01						SD-216-02					
SDG: 680-102370-4	LAB_ID	680-102370-16						680-102370-17					
FRACTION: M	SAMP_DATE	6/12/2014						6/12/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					0.73						0.35		
URANIUM-233					0.0034	U					0.0034	U	
URANIUM-234					0.00068	U					0.00068	U	
URANIUM-235					0.0052	J	P				0.0046	U	
URANIUM-235 (PERCENT)		0.717						0					
URANIUM-236					0.0009	U					0.00091	U	
URANIUM-238					0.72						0.35		

PROJ_NO: 05220	NSAMPLE	SD-216-SS						SD-217-01					
SDG: 680-102370-4	LAB_ID	680-102370-15						680-102370-19					
FRACTION: M	SAMP_DATE	6/12/2014						6/12/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					1						0.95		
URANIUM-233					0.0036	U					0.0033	U	
URANIUM-234					0.00071	U					0.00065	U	
URANIUM-235					0.0072	J	P				0.0074	J	P
URANIUM-235 (PERCENT)		0.722						0.781					
URANIUM-236					0.00095	U					0.00087	U	
URANIUM-238					0.99						0.94		

PROJ_NO: 05220	NSAMPLE	SD-217-02						SD-217-SS					
SDG: 680-102370-4	LAB_ID	680-102370-20						680-102370-18					
FRACTION: M	SAMP_DATE	6/12/2014						6/12/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					0.93						1.3		
URANIUM-233					0.0036	U					0.0034	U	
URANIUM-234					0.00071	U					0.00068	U	
URANIUM-235					0.0067	J	P				0.0097	J	P
URANIUM-235 (PERCENT)		0.723						0.741					
URANIUM-236					0.00095	U					0.0009	U	
URANIUM-238					0.92						1.3		

PROJ_NO: 05220	NSAMPLE	SD-222-01						SD-222-02					
SDG: 680-102370-4	LAB_ID	680-102370-9						680-102370-10					
FRACTION: M	SAMP_DATE	6/12/2014						6/12/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					0.97						0.61		
URANIUM-233					0.0036	U					0.0033	U	
URANIUM-234					0.00072	U					0.00066	U	
URANIUM-235					0.0068	J	P				0.0045	U	
URANIUM-235 (PERCENT)		0.703						0					
URANIUM-236					0.00097	U					0.00088	U	
URANIUM-238					0.96						0.61		

PROJ_NO: 05220	NSAMPLE	SD-222-03						SD-222-SS					
SDG: 680-102370-4	LAB_ID	680-102370-11						680-102370-8					
FRACTION: M	SAMP_DATE	6/12/2014						6/12/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					0.52						0.47		
URANIUM-233					0.0037	U					0.0036	U	
URANIUM-234					0.00074	U					0.00072	U	
URANIUM-235					0.005	U					0.0049	U	
URANIUM-235 (PERCENT)		0						0					
URANIUM-236					0.00099	U					0.00096	U	
URANIUM-238					0.52						0.47		

PROJ_NO: 05220	NSAMPLE	SD-DUP-04					
SDG: 680-102370-4	LAB_ID	680-102370-28					
FRACTION: M	SAMP_DATE	6/12/2014					
MEDIA: SOIL	QC_TYPE	NM					
	UNITS	%			MG/KG		
	PCT_SOLIDS	100.0			100.0		
	DUP_OF	SD-213-02			SD-213-02		
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					1.8		
URANIUM-233					0.0033	U	
URANIUM-234					0.00067	U	
URANIUM-235					0.013		
URANIUM-235 (PERCENT)		0.717					
URANIUM-236					0.00089	U	
URANIUM-238					1.8		

PROJ_NO: 05220	NSAMPLE	SD-008-01			SD-211-01			SD-211-02			SD-211-SS		
SDG: 680-102370-4	LAB_ID	680-102370-33			680-102370-13			680-102370-14			680-102370-12		
FRACTION: RAD	SAMP_DATE	6/12/2014			6/12/2014			6/12/2014			6/12/2014		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
URANIUM-233		-20.7	U		-20.9	U		-22	U		-22.2	U	
URANIUM-234		0.27	U		0.306	U		0.53	U		0.287	U	
URANIUM-235		0.0162			0.0134			0.0118			0.0135		
URANIUM-236		-0.00025	U		-0.00112	U		-0.00126	U		-0.00202	U	
URANIUM-238		0.343			0.292			0.258			0.301		

PROJ_NO: 05220	NSAMPLE	SD-212-01			SD-212-02			SD-212-SS			SD-213-01		
SDG: 680-102370-4	LAB_ID	680-102370-25			680-102370-26			680-102370-24			680-102370-30		
FRACTION: RAD	SAMP_DATE	6/12/2014			6/12/2014			6/12/2014			6/12/2014		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
URANIUM-233		-20.8	U		-21.7	U		-20.3	U		-19.6	U	
URANIUM-234		0.94	U		0.919	U		0.964	U		0.867	U	
URANIUM-235		0.0312			0.0327			0.039			0.0352		
URANIUM-236		-0.00091	U		-9E-05	U		-0.0005	U		-0.00117	U	
URANIUM-238		0.657			0.679			0.757			0.72		

PROJ_NO: 05220	NSAMPLE	SD-213-02			SD-213-SS			SD-214-01			SD-214-02		
SDG: 680-102370-4	LAB_ID	680-102370-31			680-102370-29			680-102370-23			680-102370-34		
FRACTION: RAD	SAMP_DATE	6/12/2014			6/12/2014			6/12/2014			6/12/2014		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
URANIUM-233		-22.1	U		-22.2	U		-21.5	U		-20.4	U	
URANIUM-234		0.717	U		0.952	U		1.02	U		0.737	U	
URANIUM-235		0.0283			0.0359			0.0389			0.0291		
URANIUM-236		-0.00036	U		-0.00142	U		-0.00176	U		-0.00095	U	
URANIUM-238		0.615			0.758			0.801			0.601		

PROJ_NO: 05220	NSAMPLE	SD-214-SS			SD-215-SS			SD-216-01			SD-216-02		
SDG: 680-102370-4	LAB_ID	680-102370-22			680-102370-7			680-102370-16			680-102370-17		
FRACTION: RAD	SAMP_DATE	6/12/2014			6/12/2014			6/12/2014			6/12/2014		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
URANIUM-233		-23	U		-21.7	U		-21	U		-21.1	U	
URANIUM-234		0.943	U		0.242	U		0.32	U		0.158	U	
URANIUM-235		0.0328			0.00525	U		0.0112			0.00498	U	
URANIUM-236		-0.00112	U		-0.0008	U		-0.00125	U		-0.00064	U	
URANIUM-238		0.695			0.117			0.242			0.118		

PROJ_NO: 05220	NSAMPLE	SD-216-SS			SD-217-01			SD-217-02			SD-217-SS		
SDG: 680-102370-4	LAB_ID	680-102370-15			680-102370-19			680-102370-20			680-102370-18		
FRACTION: RAD	SAMP_DATE	6/12/2014			6/12/2014			6/12/2014			6/12/2014		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
URANIUM-233		-22.1	U		-20.6	U		-22.1	U		-21.1	U	
URANIUM-234		0.514	U		0.388	U		0.466	U		0.662	U	
URANIUM-235		0.0157			0.016			0.0144			0.0209		
URANIUM-236		-0.00058	U		-0.00098	U		-0.00061	U		-0.00081	U	
URANIUM-238		0.333			0.315			0.31			0.441		

PROJ_NO: 05220	NSAMPLE	SD-222-01			SD-222-02			SD-222-03			SD-222-SS		
SDG: 680-102370-4	LAB_ID	680-102370-9			680-102370-10			680-102370-11			680-102370-8		
FRACTION: RAD	SAMP_DATE	6/12/2014			6/12/2014			6/12/2014			6/12/2014		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
URANIUM-233		-21.9	U		-20.3	U		-22.8	U		-22	U	
URANIUM-234		0.631	U		0.39	U		0.206	U		0.348	U	
URANIUM-235		0.0147			0.00933	U		0.00749	U		0.0068	U	
URANIUM-236		0.00037	U		-0.00051	U		-0.00156	U		-0.00043	U	
URANIUM-238		0.324			0.206			0.174			0.156		

PROJ_NO: 05220	NSAMPLE	SD-DUP-04		
SDG: 680-102370-4	LAB_ID	680-102370-28		
FRACTION: RAD	SAMP_DATE	6/12/2014		
MEDIA: SOIL	QC_TYPE	NM		
	UNITS	PCI/G		
	PCT_SOLIDS	100.0		
	DUP_OF	SD-213-02		
PARAMETER		RESULT	VQL	QLCD
URANIUM-233		-20.7	U	
URANIUM-234		0.788	U	
URANIUM-235		0.0291		
URANIUM-236		-0.00162	U	
URANIUM-238		0.615		

APPENDIX B

RESULTS AS REPORTED BY THE LABORATORY

Client Sample ID: SD-DUP-03

Lab Sample ID: 680-102370-1
Matrix: Solid

Date Collected: 06/12/14 00:00
Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.613		0.180	0.187	1.00	0.129	pCi/g	06/23/14 15:01	07/01/14 12:32	1
Thorium-230	0.682		0.182	0.191	1.00	0.0773	pCi/g	06/23/14 15:01	07/01/14 12:32	1
Thorium-232	0.657		0.178	0.187	1.00	0.0726	pCi/g	06/23/14 15:01	07/01/14 12:32	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*79.6*		*30 - 110*	*06/23/14 15:01*	*07/01/14 12:32*	*1*

Client Sample ID: SD-206-SS

Lab Sample ID: 680-102370-2
Matrix: Solid

Date Collected: 06/12/14 08:10
Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.03		0.219	0.236	1.00	0.0843	pCi/g	06/23/14 15:01	07/01/14 12:32	1
Thorium-230	0.873		0.202	0.215	1.00	0.0811	pCi/g	06/23/14 15:01	07/01/14 12:32	1
Thorium-232	0.993		0.213	0.229	1.00	0.0646	pCi/g	06/23/14 15:01	07/01/14 12:32	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*83.2*		*30 - 110*	*06/23/14 15:01*	*07/01/14 12:32*	*1*

Client Sample ID: SD-206-01

Lab Sample ID: 680-102370-3
Matrix: Solid

Date Collected: 06/12/14 08:15
Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.27		0.245	0.267	1.00	0.105	pCi/g	06/23/14 15:01	07/01/14 12:32	1
Thorium-230	1.04		0.220	0.237	1.00	0.0779	pCi/g	06/23/14 15:01	07/01/14 12:32	1
Thorium-232	1.24		0.238	0.260	1.00	0.0553	pCi/g	06/23/14 15:01	07/01/14 12:32	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*84.2*		*30 - 110*	*06/23/14 15:01*	*07/01/14 12:32*	*1*

Client Sample ID: SD-206-02

Lab Sample ID: 680-102370-4
Matrix: Solid

Date Collected: 06/12/14 08:20
Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.09		0.229	0.247	1.00	0.0845	pCi/g	06/23/14 15:01	07/01/14 12:32	1
Thorium-230	0.809		0.198	0.209	1.00	0.0769	pCi/g	06/23/14 15:01	07/01/14 12:32	1
Thorium-232	1.14		0.234	0.253	1.00	0.0766	pCi/g	06/23/14 15:01	07/01/14 12:32	1

Client Sample ID: SD-206-02

Lab Sample ID: 680-102370-4
Matrix: Solid

Date Collected: 06/12/14 08:20
Date Received: 06/13/14 09:30

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*78.9*		*30 - 110*	*06/23/14 15:01*	*07/01/14 12:32*	*1*

Client Sample ID: SD-005E-01

Lab Sample ID: 680-102370-6
Matrix: Solid

Date Collected: 06/12/14 08:30
Date Received: 06/13/14 09:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.465		0.114	0.123	1.00	0.0938	pCi/g	06/25/14 12:41	07/16/14 01:34	1
Radium-228	0.507		0.162	0.170		0.123	pCi/g	06/25/14 12:41	07/16/14 01:34	1
Thorium-232	0.507		0.162	0.170		0.123	pCi/g	06/25/14 12:41	07/16/14 01:34	1
Uranium-235	0.149	U	0.186	0.187		0.303	pCi/g	06/25/14 12:41	07/16/14 01:34	1
Uranium-238	0.845	U	0.895	0.899		1.46	pCi/g	06/25/14 12:41	07/16/14 01:34	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Ac-228	*0.507*		*0.162*	*0.170*		*0.123*	*pCi/g*	*06/25/14 12:41*	*07/16/14 01:34*	*1*
Bi-214	*0.465*		*0.114*	*0.123*		*0.0938*	*pCi/g*	*06/25/14 12:41*	*07/16/14 01:34*	*1*
K-40	*4.89*		*0.912*	*1.04*		*0.660*	*pCi/g*	*06/25/14 12:41*	*07/16/14 01:34*	*1*
Pb-212	*0.480*		*0.117*	*0.132*		*0.111*	*pCi/g*	*06/25/14 12:41*	*07/16/14 01:34*	*1*
Pb-214	*0.543*		*0.102*	*0.116*		*0.0981*	*pCi/g*	*06/25/14 12:41*	*07/16/14 01:34*	*1*
Tl-208	*0.189*		*0.0557*	*0.0590*		*0.0446*	*pCi/g*	*06/25/14 12:41*	*07/16/14 01:34*	*1*

Client Sample ID: SD-215-SS

Lab Sample ID: 680-102370-7
Matrix: Solid

Date Collected: 06/12/14 08:50
Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.898		0.214	0.227	1.00	0.0890	pCi/g	06/23/14 15:01	07/01/14 12:32	1
Thorium-230	0.499		0.159	0.164	1.00	0.0570	pCi/g	06/23/14 15:01	07/01/14 12:32	1
Thorium-232	1.01		0.225	0.240	1.00	0.0648	pCi/g	06/23/14 15:01	07/01/14 12:32	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*76.6*		*30 - 110*	*06/23/14 15:01*	*07/01/14 12:32*	*1*

Client Sample ID: SD-222-SS

Lab Sample ID: 680-102370-8
Matrix: Solid

Date Collected: 06/12/14 09:05
Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.297		0.120	0.122	1.00	0.0782	pCi/g	06/23/14 15:01	07/01/14 12:32	1
Thorium-230	0.429		0.144	0.149	1.00	0.0881	pCi/g	06/23/14 15:01	07/01/14 12:32	1
Thorium-232	0.363		0.130	0.133	1.00	0.0558	pCi/g	06/23/14 15:01	07/01/14 12:32	1

Client Sample ID: SD-222-SS

Lab Sample ID: 680-102370-8
Matrix: Solid

Date Collected: 06/12/14 09:05
Date Received: 06/13/14 09:30

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	82.5		30 - 110	06/23/14 15:01	07/01/14 12:32	1

Client Sample ID: SD-222-01

Lab Sample ID: 680-102370-9
Matrix: Solid

Date Collected: 06/12/14 09:10
Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.639		0.164	0.172	1.00	0.0667	pCi/g	06/23/14 15:01	07/01/14 12:32	1
Thorium-230	0.689		0.169	0.178	1.00	0.0469	pCi/g	06/23/14 15:01	07/01/14 12:32	1
Thorium-232	0.487		0.141	0.147	1.00	0.0308	pCi/g	06/23/14 15:01	07/01/14 12:32	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	89.0		30 - 110	06/23/14 15:01	07/01/14 12:32	1

Client Sample ID: SD-222-02

Lab Sample ID: 680-102370-10
Matrix: Solid

Date Collected: 06/12/14 09:15
Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.421		0.140	0.145	1.00	0.102	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-230	0.436		0.138	0.143	1.00	0.0687	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-232	0.338		0.121	0.124	1.00	0.0601	pCi/g	06/23/14 15:01	07/01/14 12:33	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	89.3		30 - 110	06/23/14 15:01	07/01/14 12:33	1

Client Sample ID: SD-222-03

Lab Sample ID: 680-102370-11
Matrix: Solid

Date Collected: 06/12/14 19:20
Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.767		0.193	0.203	1.00	0.102	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-230	0.495		0.152	0.157	1.00	0.0529	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-232	0.647		0.173	0.181	1.00	0.0524	pCi/g	06/23/14 15:01	07/01/14 12:33	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	81.8		30 - 110	06/23/14 15:01	07/01/14 12:33	1

Client Sample ID: SD-211-SS

Lab Sample ID: 680-102370-12
Matrix: Solid

Date Collected: 06/12/14 10:00
Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.20		0.262	0.281	1.00	0.100	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-230	1.21		0.262	0.281	1.00	0.0734	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-232	1.41		0.282	0.306	1.00	0.0422	pCi/g	06/23/14 15:01	07/01/14 12:33	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*67.3*		*30 - 110*	*06/23/14 15:01*	*07/01/14 12:33*	*1*

Client Sample ID: SD-211-01

Lab Sample ID: 680-102370-13
Matrix: Solid

Date Collected: 06/12/14 10:05
Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.31		0.266	0.288	1.00	0.129	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-230	0.882		0.216	0.228	1.00	0.0879	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-232	1.18		0.247	0.266	1.00	0.0522	pCi/g	06/23/14 15:01	07/01/14 12:33	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*76.4*		*30 - 110*	*06/23/14 15:01*	*07/01/14 12:33*	*1*

Client Sample ID: SD-211-02

Lab Sample ID: 680-102370-14
Matrix: Solid

Date Collected: 06/12/14 10:10
Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.08		0.223	0.241	1.00	0.0892	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-230	0.928		0.205	0.220	1.00	0.0641	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-232	0.984		0.210	0.226	1.00	0.0510	pCi/g	06/23/14 15:01	07/01/14 12:33	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*80.3*		*30 - 110*	*06/23/14 15:01*	*07/01/14 12:33*	*1*

Client Sample ID: SD-216-SS

Lab Sample ID: 680-102370-15
Matrix: Solid

Date Collected: 06/12/14 10:20
Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.01		0.253	0.267	1.00	0.151	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-230	0.820		0.221	0.231	1.00	0.0765	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-232	0.903		0.231	0.243	1.00	0.0762	pCi/g	06/23/14 15:01	07/01/14 12:33	1

Client Sample ID: SD-216-SS

Lab Sample ID: 680-102370-15
Matrix: Solid

Date Collected: 06/12/14 10:20
Date Received: 06/13/14 09:30

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*62.6*		*30 - 110*	*06/23/14 15:01*	*07/01/14 12:33*	*1*

Client Sample ID: SD-216-01

Lab Sample ID: 680-102370-16
Matrix: Solid

Date Collected: 06/12/14 10:25
Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.946		0.218	0.232	1.00	0.110	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-230	0.895		0.209	0.222	1.00	0.0852	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-232	0.956		0.214	0.229	1.00	0.0619	pCi/g	06/23/14 15:01	07/01/14 12:33	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*80.6*		*30 - 110*	*06/23/14 15:01*	*07/01/14 12:33*	*1*

Client Sample ID: SD-216-02

Lab Sample ID: 680-102370-17
Matrix: Solid

Date Collected: 06/12/14 10:30
Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.690		0.176	0.185	1.00	0.0835	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-230	0.583		0.160	0.168	1.00	0.0620	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-232	0.688		0.174	0.183	1.00	0.0637	pCi/g	06/23/14 15:01	07/01/14 12:33	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*84.1*		*30 - 110*	*06/23/14 15:01*	*07/01/14 12:33*	*1*

Client Sample ID: SD-217-SS

Lab Sample ID: 680-102370-18
Matrix: Solid

Date Collected: 06/12/14 12:20
Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.437		0.219	0.222	1.00	0.184	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-230	0.657		0.259	0.265	1.00	0.141	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-232	0.371		0.192	0.194	1.00	0.0742	pCi/g	06/23/14 15:01	07/01/14 12:33	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*38.1*		*30 - 110*	*06/23/14 15:01*	*07/01/14 12:33*	*1*

Client Sample ID: SD-217-01

Lab Sample ID: 680-102370-19

Date Collected: 06/12/14 12:25
Date Received: 06/13/14 09:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.431		0.138	0.143	1.00	0.0787	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-230	0.360		0.124	0.128	1.00	0.0485	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-232	0.370		0.125	0.129	1.00	0.0318	pCi/g	06/23/14 15:01	07/01/14 12:33	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*92.6*		*30 - 110*	*06/23/14 15:01*	*07/01/14 12:33*	*1*

Client Sample ID: SD-217-02

Lab Sample ID: 680-102370-20

Date Collected: 06/12/14 12:30
Date Received: 06/13/14 09:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.767		0.190	0.201	1.00	0.0903	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-230	0.551		0.160	0.167	1.00	0.0697	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-232	0.665		0.175	0.183	1.00	0.0622	pCi/g	06/23/14 15:01	07/01/14 12:33	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*83.1*		*30 - 110*	*06/23/14 15:01*	*07/01/14 12:33*	*1*

Client Sample ID: SD-214-SS

Lab Sample ID: 680-102370-22

Date Collected: 06/12/14 13:10
Date Received: 06/13/14 09:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.855		0.221	0.233	1.00	0.112	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-230	0.948		0.230	0.243	1.00	0.0715	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-232	1.04		0.240	0.255	1.00	0.0626	pCi/g	06/23/14 15:01	07/01/14 12:33	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*67.9*		*30 - 110*	*06/23/14 15:01*	*07/01/14 12:33*	*1*

Client Sample ID: SD-214-01

Lab Sample ID: 680-102370-23

Date Collected: 06/12/14 13:15
Date Received: 06/13/14 09:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.986		0.218	0.233	1.00	0.0975	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-230	0.865		0.205	0.218	1.00	0.104	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-232	1.09		0.228	0.246	1.00	0.102	pCi/g	06/23/14 15:05	07/01/14 12:26	1

Client Sample ID: SD-214-01

Lab Sample ID: 680-102370-23
Matrix: Solid

Date Collected: 06/12/14 13:15
Date Received: 06/13/14 09:30

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	82.1		30 - 110	06/23/14 15:05	07/01/14 12:26	1

Client Sample ID: SD-212-SS

Lab Sample ID: 680-102370-24
Matrix: Solid

Date Collected: 06/12/14 14:10
Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.964		0.214	0.229	1.00	0.112	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-230	0.923		0.208	0.222	1.00	0.0973	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-232	1.03		0.217	0.234	1.00	0.0766	pCi/g	06/23/14 15:05	07/01/14 12:26	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	86.1		30 - 110	06/23/14 15:05	07/01/14 12:26	1

Client Sample ID: SD-212-01

Lab Sample ID: 680-102370-25
Matrix: Solid

Date Collected: 06/12/14 14:15
Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.24		0.260	0.280	1.00	0.118	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-230	1.00		0.231	0.246	1.00	0.0866	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-232	1.12		0.246	0.263	1.00	0.100	pCi/g	06/23/14 15:05	07/01/14 12:26	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	74.2		30 - 110	06/23/14 15:05	07/01/14 12:26	1

Client Sample ID: SD-212-02

Lab Sample ID: 680-102370-26
Matrix: Solid

Date Collected: 06/12/14 14:20
Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.10		0.220	0.239	1.00	0.103	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-230	1.17		0.222	0.243	1.00	0.0504	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-232	1.01		0.208	0.225	1.00	0.0776	pCi/g	06/23/14 15:05	07/01/14 12:26	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	87.9		30 - 110	06/23/14 15:05	07/01/14 12:26	1

Client Sample ID: SD-DUP-04

Lab Sample ID: 680-102370-28
Matrix: Solid

Date Collected: 06/12/14 00:00
Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.06		0.218	0.235	1.00	0.0678	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-230	1.04		0.216	0.233	1.00	0.0715	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-232	1.26		0.236	0.258	1.00	0.0571	pCi/g	06/23/14 15:05	07/01/14 12:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*83.9*		*30 - 110*	*06/23/14 15:05*	*07/01/14 12:26*	*1*

Client Sample ID: SD-213-SS

Lab Sample ID: 680-102370-29
Matrix: Solid

Date Collected: 06/12/14 14:30
Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.10		0.235	0.253	1.00	0.111	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-230	1.26		0.248	0.270	1.00	0.0688	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-232	1.23		0.244	0.265	1.00	0.0361	pCi/g	06/23/14 15:05	07/01/14 12:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*80.3*		*30 - 110*	*06/23/14 15:05*	*07/01/14 12:26*	*1*

Client Sample ID: SD-213-01

Lab Sample ID: 680-102370-30
Matrix: Solid

Date Collected: 06/12/14 14:35
Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.998		0.208	0.224	1.00	0.0956	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-230	0.979		0.203	0.219	1.00	0.0673	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-232	1.17		0.222	0.243	1.00	0.0738	pCi/g	06/23/14 15:05	07/01/14 12:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.7*		*30 - 110*	*06/23/14 15:05*	*07/01/14 12:26*	*1*

Client Sample ID: SD-213-02

Lab Sample ID: 680-102370-31
Matrix: Solid

Date Collected: 06/12/14 14:40
Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.14		0.239	0.257	1.00	0.0938	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-230	1.15		0.237	0.256	1.00	0.0557	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-232	1.18		0.241	0.261	1.00	0.0899	pCi/g	06/23/14 15:05	07/01/14 12:26	1

Client Sample ID: SD-213-02

Lab Sample ID: 680-102370-31
Matrix: Solid

Date Collected: 06/12/14 14:40
Date Received: 06/13/14 09:30

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*78.8*		*30 - 110*	*06/23/14 15:05*	*07/01/14 12:26*	*1*

Client Sample ID: SD-008-01

Lab Sample ID: 680-102370-33
Matrix: Solid

Date Collected: 06/12/14 14:50
Date Received: 06/13/14 09:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.732		0.209	0.222	1.00	0.202	pCi/g	06/25/14 12:41	07/16/14 01:35	1
Radium-228	0.895		0.210	0.229		0.152	pCi/g	06/25/14 12:41	07/16/14 01:35	1
Thorium-232	0.895		0.210	0.229		0.152	pCi/g	06/25/14 12:41	07/16/14 01:35	1
Uranium-235	0.209	U	0.270	0.271		0.474	pCi/g	06/25/14 12:41	07/16/14 01:35	1
Uranium-238	0.592	U	0.739	0.741		2.17	pCi/g	06/25/14 12:41	07/16/14 01:35	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Ac-228	*0.895*		*0.210*	*0.229*		*0.152*	*pCi/g*	*06/25/14 12:41*	*07/16/14 01:35*	*1*
Bi-214	*0.732*		*0.209*	*0.222*		*0.202*	*pCi/g*	*06/25/14 12:41*	*07/16/14 01:35*	*1*
K-40	*6.71*		*1.63*	*1.77*		*1.45*	*pCi/g*	*06/25/14 12:41*	*07/16/14 01:35*	*1*
Pb-212	*0.920*		*0.153*	*0.194*		*0.127*	*pCi/g*	*06/25/14 12:41*	*07/16/14 01:35*	*1*
Pb-214	*0.820*		*0.172*	*0.192*		*0.182*	*pCi/g*	*06/25/14 12:41*	*07/16/14 01:35*	*1*
Tl-208	*0.260*		*0.0823*	*0.0866*		*0.0788*	*pCi/g*	*06/25/14 12:41*	*07/16/14 01:35*	*1*

Client Sample ID: SD-214-02

Lab Sample ID: 680-102370-34
Matrix: Solid

Date Collected: 06/12/14 13:20
Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.22		0.231	0.253	1.00	0.0851	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-230	1.24		0.231	0.253	1.00	0.0323	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-232	1.15		0.224	0.244	1.00	0.0859	pCi/g	06/23/14 15:05	07/01/14 12:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.8*		*30 - 110*	*06/23/14 15:05*	*07/01/14 12:26*	*1*

Client Sample ID: SD-214-03

Lab Sample ID: 680-102370-35
Matrix: Solid

Date Collected: 06/12/14 13:25
Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.865		0.198	0.211	1.00	0.0684	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-230	0.433		0.140	0.145	1.00	0.0582	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-232	0.856		0.196	0.209	1.00	0.0508	pCi/g	06/23/14 15:05	07/01/14 12:26	1

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102370-1
SDG: 680-102370-1

Client Sample ID: SD-214-03
Date Collected: 06/12/14 13:25
Date Received: 06/13/14 09:30

Lab Sample ID: 680-102370-35
Matrix: Solid

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	84.8		30 - 110	06/23/14 15:05	07/01/14 12:26	1

Client Sample ID: SD-215-SS

Lab Sample ID: 680-102370-7
Matrix: Solid

Date Collected: 06/12/14 08:50
Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/20/14 11:20	09/02/14 19:41	5
U-234	ND		0.012	0.00072	mg/Kg		08/20/14 11:20	09/02/14 19:41	5
U-235	ND		0.012	0.0049	mg/Kg		08/20/14 11:20	09/02/14 19:41	5
U-236	ND		0.012	0.00096	mg/Kg		08/20/14 11:20	09/02/14 19:41	5
U-238	0.35		0.012	0.00072	mg/Kg		08/20/14 11:20	09/02/14 19:41	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.35		0.0050	0.00030	mg/Kg			09/04/14 13:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-21.7	U	0.870	2.18	116	34.7	pCi/g	08/20/14 11:20	09/02/14 19:41	5
U-234	0.242	U	0.260	0.261	74.6	4.48	pCi/g	08/20/14 11:20	09/02/14 19:41	5
U-235	0.00525	U	0.000559	0.000738	0.0259	0.0106	pCi/g	08/20/14 11:20	09/02/14 19:41	5
U-236	-0.000807	U	0.000644	0.000649	0.776	0.0621	pCi/g	08/20/14 11:20	09/02/14 19:41	5
U-238	0.117		0.00519	0.0120	0.00403	0.000242	pCi/g	08/20/14 11:20	09/02/14 19:41	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.000						%		09/04/14 13:21	1

Client Sample ID: SD-222-SS

Lab Sample ID: 680-102370-8
Matrix: Solid

Date Collected: 06/12/14 09:05
Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/20/14 11:20	09/02/14 19:46	5
U-234	ND		0.012	0.00072	mg/Kg		08/20/14 11:20	09/02/14 19:46	5
U-235	ND		0.012	0.0049	mg/Kg		08/20/14 11:20	09/02/14 19:46	5
U-236	ND		0.012	0.00096	mg/Kg		08/20/14 11:20	09/02/14 19:46	5
U-238	0.47		0.012	0.00072	mg/Kg		08/20/14 11:20	09/02/14 19:46	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.47		0.0050	0.00030	mg/Kg			09/04/14 13:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-22.0	U	0.209	2.03	116	34.8	pCi/g	08/20/14 11:20	09/02/14 19:46	5
U-234	0.348	U	0.0366	0.0486	75.0	4.50	pCi/g	08/20/14 11:20	09/02/14 19:46	5
U-235	0.00680	U	0.000536	0.000823	0.0260	0.0106	pCi/g	08/20/14 11:20	09/02/14 19:46	5
U-236	-0.000437	U	0.00239	0.00239	0.780	0.0624	pCi/g	08/20/14 11:20	09/02/14 19:46	5
U-238	0.156		0.00703	0.0160	0.00405	0.000243	pCi/g	08/20/14 11:20	09/02/14 19:46	5

Client Sample ID: SD-222-SS

Lab Sample ID: 680-102370-8
Matrix: Solid

Date Collected: 06/12/14 09:05
Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.000						%		09/04/14 13:21	1

Client Sample ID: SD-222-01

Lab Sample ID: 680-102370-9
Matrix: Solid

Date Collected: 06/12/14 09:10
Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/20/14 11:20	09/02/14 19:51	5
U-234	ND		0.012	0.00072	mg/Kg		08/20/14 11:20	09/02/14 19:51	5
U-235	0.0068	J	0.012	0.0049	mg/Kg		08/20/14 11:20	09/02/14 19:51	5
U-236	ND		0.012	0.00097	mg/Kg		08/20/14 11:20	09/02/14 19:51	5
U-238	0.96		0.012	0.00072	mg/Kg		08/20/14 11:20	09/02/14 19:51	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.97		0.0050	0.00030	mg/Kg			09/04/14 13:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-21.9	U	0.538	2.09	116	34.9	pCi/g	08/20/14 11:20	09/02/14 19:51	5
U-234	0.631	U	0.196	0.204	75.1	4.51	pCi/g	08/20/14 11:20	09/02/14 19:51	5
U-235	0.0147		0.000881	0.00161	0.0261	0.0106	pCi/g	08/20/14 11:20	09/02/14 19:51	5
U-236	0.000375	U	0.000760	0.000761	0.781	0.0625	pCi/g	08/20/14 11:20	09/02/14 19:51	5
U-238	0.324		0.0261	0.0396	0.00406	0.000244	pCi/g	08/20/14 11:20	09/02/14 19:51	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.703						%		09/04/14 13:21	1

Client Sample ID: SD-222-02

Lab Sample ID: 680-102370-10
Matrix: Solid

Date Collected: 06/12/14 09:15
Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0033	mg/Kg		08/20/14 11:20	09/02/14 19:55	5
U-234	ND		0.011	0.00066	mg/Kg		08/20/14 11:20	09/02/14 19:55	5
U-235	ND		0.011	0.0045	mg/Kg		08/20/14 11:20	09/02/14 19:55	5
U-236	ND		0.011	0.00088	mg/Kg		08/20/14 11:20	09/02/14 19:55	5
U-238	0.61		0.011	0.00066	mg/Kg		08/20/14 11:20	09/02/14 19:55	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.61		0.0050	0.00030	mg/Kg			09/04/14 13:19	1

Client Sample ID: SD-222-02

Lab Sample ID: 680-102370-10
Matrix: Solid

Date Collected: 06/12/14 09:15
Date Received: 06/13/14 09:30

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-20.3	U	0.367	1.91	106	31.9	pCi/g	08/20/14 11:20	09/02/14 19:55	5
U-234	0.390	U	0.401	0.403	68.6	4.12	pCi/g	08/20/14 11:20	09/02/14 19:55	5
U-235	0.00933	U	0.000696	0.00110	0.0238	0.00971	pCi/g	08/20/14 11:20	09/02/14 19:55	5
U-236	-0.000514	U	0.00152	0.00152	0.713	0.0571	pCi/g	08/20/14 11:20	09/02/14 19:55	5
U-238	0.206		0.00279	0.0191	0.00371	0.000223	pCi/g	08/20/14 11:20	09/02/14 19:55	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.000						%		09/04/14 13:21	1

Client Sample ID: SD-222-03

Lab Sample ID: 680-102370-11
Matrix: Solid

Date Collected: 06/12/14 19:20
Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0037	mg/Kg		08/20/14 11:20	09/02/14 20:00	5
U-234	ND		0.012	0.00074	mg/Kg		08/20/14 11:20	09/02/14 20:00	5
U-235	ND		0.012	0.0050	mg/Kg		08/20/14 11:20	09/02/14 20:00	5
U-236	ND		0.012	0.00099	mg/Kg		08/20/14 11:20	09/02/14 20:00	5
U-238	0.52		0.012	0.00074	mg/Kg		08/20/14 11:20	09/02/14 20:00	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.52		0.0050	0.00030	mg/Kg			09/04/14 13:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-22.8	U	0.223	2.11	119	35.7	pCi/g	08/20/14 11:20	09/02/14 20:00	5
U-234	0.206	U	0.162	0.163	76.8	4.61	pCi/g	08/20/14 11:20	09/02/14 20:00	5
U-235	0.00749	U	0.000422	0.000808	0.0267	0.0109	pCi/g	08/20/14 11:20	09/02/14 20:00	5
U-236	-0.00156	U	0.000913	0.000924	0.798	0.0639	pCi/g	08/20/14 11:20	09/02/14 20:00	5
U-238	0.174		0.00898	0.0183	0.00415	0.000249	pCi/g	08/20/14 11:20	09/02/14 20:00	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.000						%		09/04/14 13:21	1

Client Sample ID: SD-211-SS

Lab Sample ID: 680-102370-12
Matrix: Solid

Date Collected: 06/12/14 10:00
Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/20/14 11:20	09/02/14 20:05	5
U-234	ND		0.012	0.00072	mg/Kg		08/20/14 11:20	09/02/14 20:05	5
U-235	0.0062	J	0.012	0.0049	mg/Kg		08/20/14 11:20	09/02/14 20:05	5
U-236	ND		0.012	0.00096	mg/Kg		08/20/14 11:20	09/02/14 20:05	5
U-238	0.90		0.012	0.00072	mg/Kg		08/20/14 11:20	09/02/14 20:05	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.91		0.0050	0.00030	mg/Kg			09/04/14 13:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-22.2	U	0.248	2.05	116	34.8	pCi/g	08/20/14 11:20	09/02/14 20:05	5
U-234	0.287	U	0.0484	0.0551	74.8	4.49	pCi/g	08/20/14 11:20	09/02/14 20:05	5
U-235	0.0135		0.000580	0.00137	0.0260	0.0106	pCi/g	08/20/14 11:20	09/02/14 20:05	5
U-236	-0.00202	U	0.00216	0.00216	0.778	0.0623	pCi/g	08/20/14 11:20	09/02/14 20:05	5
U-238	0.301		0.0116	0.0300	0.00404	0.000243	pCi/g	08/20/14 11:20	09/02/14 20:05	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.684						%		09/04/14 13:21	1

Client Sample ID: SD-211-01

Lab Sample ID: 680-102370-13
Matrix: Solid

Date Collected: 06/12/14 10:05
Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0034	mg/Kg		08/20/14 11:20	09/02/14 20:09	5
U-234	ND		0.011	0.00068	mg/Kg		08/20/14 11:20	09/02/14 20:09	5
U-235	0.0062	J	0.011	0.0046	mg/Kg		08/20/14 11:20	09/02/14 20:09	5
U-236	ND		0.011	0.00091	mg/Kg		08/20/14 11:20	09/02/14 20:09	5
U-238	0.87		0.011	0.00068	mg/Kg		08/20/14 11:20	09/02/14 20:09	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.88		0.0050	0.00030	mg/Kg			09/04/14 13:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-20.9	U	0.360	1.95	110	32.9	pCi/g	08/20/14 11:20	09/02/14 20:09	5
U-234	0.306	U	0.297	0.299	70.7	4.25	pCi/g	08/20/14 11:20	09/02/14 20:09	5
U-235	0.0134		0.000289	0.00126	0.0246	0.0100	pCi/g	08/20/14 11:20	09/02/14 20:09	5
U-236	-0.00112	U	0.000577	0.000586	0.735	0.0589	pCi/g	08/20/14 11:20	09/02/14 20:09	5
U-238	0.292		0.0127	0.0297	0.00382	0.000230	pCi/g	08/20/14 11:20	09/02/14 20:09	5

Client Sample ID: SD-211-01

Lab Sample ID: 680-102370-13
Matrix: Solid

Date Collected: 06/12/14 10:05
Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.708						%		09/04/14 13:21	1

Client Sample ID: SD-211-02

Lab Sample ID: 680-102370-14
Matrix: Solid

Date Collected: 06/12/14 10:10
Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/20/14 11:20	09/02/14 20:14	5
U-234	ND		0.012	0.00071	mg/Kg		08/20/14 11:20	09/02/14 20:14	5
U-235	0.0055	J	0.012	0.0048	mg/Kg		08/20/14 11:20	09/02/14 20:14	5
U-236	ND		0.012	0.00095	mg/Kg		08/20/14 11:20	09/02/14 20:14	5
U-238	0.77		0.012	0.00071	mg/Kg		08/20/14 11:20	09/02/14 20:14	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.78		0.0050	0.00030	mg/Kg			09/04/14 13:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-22.0	U	0.769	2.17	115	34.4	pCi/g	08/20/14 11:20	09/02/14 20:14	5
U-234	0.530	U	0.400	0.403	74.0	4.44	pCi/g	08/20/14 11:20	09/02/14 20:14	5
U-235	0.0118		0.00129	0.00169	0.0257	0.0105	pCi/g	08/20/14 11:20	09/02/14 20:14	5
U-236	-0.00126	U	0.000963	0.000970	0.770	0.0616	pCi/g	08/20/14 11:20	09/02/14 20:14	5
U-238	0.258		0.0173	0.0294	0.00400	0.000240	pCi/g	08/20/14 11:20	09/02/14 20:14	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.709						%		09/04/14 13:21	1

Client Sample ID: SD-216-SS

Lab Sample ID: 680-102370-15
Matrix: Solid

Date Collected: 06/12/14 10:20
Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/20/14 11:20	09/02/14 20:28	5
U-234	ND		0.012	0.00071	mg/Kg		08/20/14 11:20	09/02/14 20:28	5
U-235	0.0072	J	0.012	0.0048	mg/Kg		08/20/14 11:20	09/02/14 20:28	5
U-236	ND		0.012	0.00095	mg/Kg		08/20/14 11:20	09/02/14 20:28	5
U-238	0.99		0.012	0.00071	mg/Kg		08/20/14 11:20	09/02/14 20:28	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.0		0.0050	0.00030	mg/Kg			09/04/14 13:19	1

Client Sample ID: SD-216-SS

Lab Sample ID: 680-102370-15
Matrix: Solid

Date Collected: 06/12/14 10:20
Date Received: 06/13/14 09:30

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-22.1	U	0.508	2.09	114	34.3	pCi/g	08/20/14 11:20	09/02/14 20:28	5
U-234	0.514	U	0.405	0.408	73.8	4.43	pCi/g	08/20/14 11:20	09/02/14 20:28	5
U-235	0.0157		0.000689	0.00160	0.0256	0.0104	pCi/g	08/20/14 11:20	09/02/14 20:28	5
U-236	-0.000583	U	0.00144	0.00144	0.767	0.0615	pCi/g	08/20/14 11:20	09/02/14 20:28	5
U-238	0.333		0.0101	0.0323	0.00399	0.000240	pCi/g	08/20/14 11:20	09/02/14 20:28	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.722						%		09/04/14 13:21	1

Client Sample ID: SD-216-01

Lab Sample ID: 680-102370-16
Matrix: Solid

Date Collected: 06/12/14 10:25
Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0034	mg/Kg		08/20/14 11:20	09/02/14 20:33	5
U-234	ND		0.011	0.00068	mg/Kg		08/20/14 11:20	09/02/14 20:33	5
U-235	0.0052	J	0.011	0.0046	mg/Kg		08/20/14 11:20	09/02/14 20:33	5
U-236	ND		0.011	0.00090	mg/Kg		08/20/14 11:20	09/02/14 20:33	5
U-238	0.72		0.011	0.00068	mg/Kg		08/20/14 11:20	09/02/14 20:33	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.73		0.0050	0.00030	mg/Kg			09/04/14 13:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-21.0	U	0.182	1.94	109	32.6	pCi/g	08/20/14 11:20	09/02/14 20:33	5
U-234	0.320	U	0.175	0.178	70.1	4.21	pCi/g	08/20/14 11:20	09/02/14 20:33	5
U-235	0.0112		0.000722	0.00126	0.0243	0.00991	pCi/g	08/20/14 11:20	09/02/14 20:33	5
U-236	-0.00125	U	0.000416	0.000432	0.728	0.0583	pCi/g	08/20/14 11:20	09/02/14 20:33	5
U-238	0.242		0.0114	0.0250	0.00379	0.000228	pCi/g	08/20/14 11:20	09/02/14 20:33	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.717						%		09/04/14 13:21	1

Client Sample ID: SD-216-02

Lab Sample ID: 680-102370-17

Date Collected: 06/12/14 10:30
Date Received: 06/13/14 09:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0034	mg/Kg		08/20/14 11:20	09/02/14 20:37	5
U-234	ND		0.011	0.00068	mg/Kg		08/20/14 11:20	09/02/14 20:37	5
U-235	ND		0.011	0.0046	mg/Kg		08/20/14 11:20	09/02/14 20:37	5
U-236	ND		0.011	0.00091	mg/Kg		08/20/14 11:20	09/02/14 20:37	5
U-238	0.35		0.011	0.00068	mg/Kg		08/20/14 11:20	09/02/14 20:37	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.35		0.0050	0.00030	mg/Kg			09/04/14 13:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-21.1	U	0.321	1.96	109	32.8	pCi/g	08/20/14 11:20	09/02/14 20:37	5
U-234	0.158	U	0.173	0.174	70.6	4.24	pCi/g	08/20/14 11:20	09/02/14 20:37	5
U-235	0.00498	U	0.000394	0.000605	0.0245	0.00999	pCi/g	08/20/14 11:20	09/02/14 20:37	5
U-236	-0.000646	U	0.00136	0.00136	0.734	0.0588	pCi/g	08/20/14 11:20	09/02/14 20:37	5
U-238	0.118		0.00246	0.0111	0.00382	0.000229	pCi/g	08/20/14 11:20	09/02/14 20:37	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.000						%		09/04/14 13:21	1

Client Sample ID: SD-217-SS

Lab Sample ID: 680-102370-18

Date Collected: 06/12/14 12:20
Date Received: 06/13/14 09:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0034	mg/Kg		08/20/14 11:20	09/02/14 20:42	5
U-234	ND		0.011	0.00068	mg/Kg		08/20/14 11:20	09/02/14 20:42	5
U-235	0.0097	J	0.011	0.0046	mg/Kg		08/20/14 11:20	09/02/14 20:42	5
U-236	ND		0.011	0.00090	mg/Kg		08/20/14 11:20	09/02/14 20:42	5
U-238	1.3		0.011	0.00068	mg/Kg		08/20/14 11:20	09/02/14 20:42	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.3		0.0050	0.00030	mg/Kg			09/04/14 13:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-21.1	U	0.108	1.95	109	32.6	pCi/g	08/20/14 11:20	09/02/14 20:42	5
U-234	0.662	U	0.266	0.273	70.1	4.21	pCi/g	08/20/14 11:20	09/02/14 20:42	5
U-235	0.0209		0.000505	0.00199	0.0243	0.00992	pCi/g	08/20/14 11:20	09/02/14 20:42	5
U-236	-0.000816	U	0.00145	0.00145	0.729	0.0584	pCi/g	08/20/14 11:20	09/02/14 20:42	5
U-238	0.441		0.0131	0.0426	0.00379	0.000228	pCi/g	08/20/14 11:20	09/02/14 20:42	5

Client Sample ID: SD-217-SS

Lab Sample ID: 680-102370-18
Matrix: Solid

Date Collected: 06/12/14 12:20
Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.741						%		09/04/14 13:21	1

Client Sample ID: SD-217-01

Lab Sample ID: 680-102370-19
Matrix: Solid

Date Collected: 06/12/14 12:25
Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0033	mg/Kg		08/20/14 11:20	09/02/14 20:47	5
U-234	ND		0.011	0.00065	mg/Kg		08/20/14 11:20	09/02/14 20:47	5
U-235	0.0074	J	0.011	0.0044	mg/Kg		08/20/14 11:20	09/02/14 20:47	5
U-236	ND		0.011	0.00087	mg/Kg		08/20/14 11:20	09/02/14 20:47	5
U-238	0.94		0.011	0.00065	mg/Kg		08/20/14 11:20	09/02/14 20:47	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.95		0.0050	0.00030	mg/Kg			09/04/14 13:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-20.6	U	0.175	1.90	105	31.5	pCi/g	08/20/14 11:20	09/02/14 20:47	5
U-234	0.388	U	0.207	0.210	67.9	4.07	pCi/g	08/20/14 11:20	09/02/14 20:47	5
U-235	0.0160		0.000265	0.00150	0.0236	0.00960	pCi/g	08/20/14 11:20	09/02/14 20:47	5
U-236	-0.000987	U	0.000902	0.000906	0.705	0.0565	pCi/g	08/20/14 11:20	09/02/14 20:47	5
U-238	0.315		0.00311	0.0292	0.00367	0.000220	pCi/g	08/20/14 11:20	09/02/14 20:47	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.781						%		09/04/14 13:21	1

Client Sample ID: SD-217-02

Lab Sample ID: 680-102370-20
Matrix: Solid

Date Collected: 06/12/14 12:30
Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/20/14 11:20	09/02/14 20:51	5
U-234	ND		0.012	0.00071	mg/Kg		08/20/14 11:20	09/02/14 20:51	5
U-235	0.0067	J	0.012	0.0048	mg/Kg		08/20/14 11:20	09/02/14 20:51	5
U-236	ND		0.012	0.00095	mg/Kg		08/20/14 11:20	09/02/14 20:51	5
U-238	0.92		0.012	0.00071	mg/Kg		08/20/14 11:20	09/02/14 20:51	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.93		0.0050	0.00030	mg/Kg			09/04/14 13:19	1

Client Sample ID: SD-217-02

Lab Sample ID: 680-102370-20

Date Collected: 06/12/14 12:30
Date Received: 06/13/14 09:30

Matrix: Solid

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-22.1	U	0.193	2.04	114	34.3	pCi/g	08/20/14 11:20	09/02/14 20:51	5
U-234	0.466	U	0.184	0.189	73.8	4.43	pCi/g	08/20/14 11:20	09/02/14 20:51	5
U-235	0.0144		0.000512	0.00142	0.0256	0.0104	pCi/g	08/20/14 11:20	09/02/14 20:51	5
U-236	-0.000613	U	0.00189	0.00189	0.767	0.0614	pCi/g	08/20/14 11:20	09/02/14 20:51	5
U-238	0.310		0.00700	0.0293	0.00399	0.000240	pCi/g	08/20/14 11:20	09/02/14 20:51	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.723						%		09/04/14 13:21	1

Client Sample ID: SD-214-SS

Lab Sample ID: 680-102370-22

Date Collected: 06/12/14 13:10
Date Received: 06/13/14 09:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0037	mg/Kg		08/20/14 11:20	09/02/14 20:56	5
U-234	ND		0.012	0.00074	mg/Kg		08/20/14 11:20	09/02/14 20:56	5
U-235	0.015		0.012	0.0050	mg/Kg		08/20/14 11:20	09/02/14 20:56	5
U-236	ND		0.012	0.00099	mg/Kg		08/20/14 11:20	09/02/14 20:56	5
U-238	2.1		0.012	0.00074	mg/Kg		08/20/14 11:20	09/02/14 20:56	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.1		0.0050	0.00030	mg/Kg			09/04/14 13:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-23.0	U	0.0864	2.12	119	35.8	pCi/g	08/20/14 11:20	09/02/14 20:56	5
U-234	0.943	U	0.0937	0.128	77.0	4.62	pCi/g	08/20/14 11:20	09/02/14 20:56	5
U-235	0.0328		0.000777	0.00311	0.0268	0.0109	pCi/g	08/20/14 11:20	09/02/14 20:56	5
U-236	-0.00112	U	0.00155	0.00155	0.801	0.0641	pCi/g	08/20/14 11:20	09/02/14 20:56	5
U-238	0.695		0.00998	0.0647	0.00416	0.000250	pCi/g	08/20/14 11:20	09/02/14 20:56	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.709						%		09/04/14 13:21	1

Client Sample ID: SD-214-01

Lab Sample ID: 680-102370-23

Date Collected: 06/12/14 13:15
Date Received: 06/13/14 09:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0035	mg/Kg		08/20/14 11:20	09/02/14 21:01	5
U-234	ND		0.012	0.00069	mg/Kg		08/20/14 11:20	09/02/14 21:01	5
U-235	0.018		0.012	0.0047	mg/Kg		08/20/14 11:20	09/02/14 21:01	5
U-236	ND		0.012	0.00092	mg/Kg		08/20/14 11:20	09/02/14 21:01	5
U-238	2.4		0.012	0.00069	mg/Kg		08/20/14 11:20	09/02/14 21:01	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.4		0.0050	0.00030	mg/Kg			09/04/14 13:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-21.5	U	0.321	2.00	111	33.3	pCi/g	08/20/14 11:20	09/02/14 21:01	5
U-234	1.02	U	0.268	0.284	71.6	4.30	pCi/g	08/20/14 11:20	09/02/14 21:01	5
U-235	0.0389		0.00201	0.00411	0.0249	0.0101	pCi/g	08/20/14 11:20	09/02/14 21:01	5
U-236	-0.00176	U	0.00162	0.00163	0.744	0.0596	pCi/g	08/20/14 11:20	09/02/14 21:01	5
U-238	0.801		0.0162	0.0755	0.00387	0.000232	pCi/g	08/20/14 11:20	09/02/14 21:01	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.744						%		09/04/14 13:21	1

Client Sample ID: SD-212-SS

Lab Sample ID: 680-102370-24

Date Collected: 06/12/14 14:10
Date Received: 06/13/14 09:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0033	mg/Kg		08/20/14 11:20	09/02/14 21:29	5
U-234	ND		0.011	0.00065	mg/Kg		08/20/14 11:20	09/02/14 21:29	5
U-235	0.018		0.011	0.0044	mg/Kg		08/20/14 11:20	09/02/14 21:29	5
U-236	ND		0.011	0.00087	mg/Kg		08/20/14 11:20	09/02/14 21:29	5
U-238	2.3		0.011	0.00065	mg/Kg		08/20/14 11:20	09/02/14 21:29	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.3		0.0050	0.00030	mg/Kg			09/04/14 13:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-20.3	U	0.119	1.87	105	31.5	pCi/g	08/20/14 11:20	09/02/14 21:29	5
U-234	0.964	U	0.241	0.257	67.7	4.06	pCi/g	08/20/14 11:20	09/02/14 21:29	5
U-235	0.0390		0.000826	0.00368	0.0235	0.00958	pCi/g	08/20/14 11:20	09/02/14 21:29	5
U-236	-0.000507	U	0.00114	0.00114	0.704	0.0564	pCi/g	08/20/14 11:20	09/02/14 21:29	5
U-238	0.757		0.0213	0.0728	0.00366	0.000220	pCi/g	08/20/14 11:20	09/02/14 21:29	5

Client Sample ID: SD-212-SS

Lab Sample ID: 680-102370-24
Matrix: Solid

Date Collected: 06/12/14 14:10
Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.777						%		09/04/14 13:21	1

Client Sample ID: SD-212-01

Lab Sample ID: 680-102370-25
Matrix: Solid

Date Collected: 06/12/14 14:15
Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0033	mg/Kg		08/20/14 11:20	09/02/14 21:33	5
U-234	ND		0.011	0.00066	mg/Kg		08/20/14 11:20	09/02/14 21:33	5
U-235	0.014		0.011	0.0045	mg/Kg		08/20/14 11:20	09/02/14 21:33	5
U-236	ND		0.011	0.00088	mg/Kg		08/20/14 11:20	09/02/14 21:33	5
U-238	2.0		0.011	0.00066	mg/Kg		08/20/14 11:20	09/02/14 21:33	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.0		0.0050	0.00030	mg/Kg			09/04/14 13:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-20.8	U	0.514	1.98	106	31.8	pCi/g	08/20/14 11:20	09/02/14 21:33	5
U-234	0.940	U	0.229	0.245	68.5	4.11	pCi/g	08/20/14 11:20	09/02/14 21:33	5
U-235	0.0312		0.000446	0.00291	0.0238	0.00970	pCi/g	08/20/14 11:20	09/02/14 21:33	5
U-236	-0.000912	U	0.000152	0.000174	0.712	0.0571	pCi/g	08/20/14 11:20	09/02/14 21:33	5
U-238	0.657		0.0117	0.0616	0.00370	0.000223	pCi/g	08/20/14 11:20	09/02/14 21:33	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.695						%		09/04/14 13:21	1

Client Sample ID: SD-212-02

Lab Sample ID: 680-102370-26
Matrix: Solid

Date Collected: 06/12/14 14:20
Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0035	mg/Kg		08/20/14 12:10	09/02/14 21:48	5
U-234	ND		0.012	0.00070	mg/Kg		08/20/14 12:10	09/02/14 21:48	5
U-235	0.015		0.012	0.0047	mg/Kg		08/20/14 12:10	09/02/14 21:48	5
U-236	ND		0.012	0.00093	mg/Kg		08/20/14 12:10	09/02/14 21:48	5
U-238	2.0		0.012	0.00070	mg/Kg		08/20/14 12:10	09/02/14 21:48	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.0		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Client Sample ID: SD-212-02

Lab Sample ID: 680-102370-26
Matrix: Solid

Date Collected: 06/12/14 14:20
Date Received: 06/13/14 09:30

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-21.7	U	0.175	2.00	112	33.6	pCi/g	08/20/14 12:10	09/02/14 21:48	5
U-234	0.919	U	0.255	0.268	72.2	4.33	pCi/g	08/20/14 12:10	09/02/14 21:48	5
U-235	0.0327		0.000542	0.00306	0.0251	0.0102	pCi/g	08/20/14 12:10	09/02/14 21:48	5
U-236	-0.0000901	U	0.000350	0.000350	0.751	0.0601	pCi/g	08/20/14 12:10	09/02/14 21:48	5
U-238	0.679		0.0236	0.0668	0.00390	0.000234	pCi/g	08/20/14 12:10	09/02/14 21:48	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.744						%		09/04/14 13:22	1

Client Sample ID: SD-DUP-04

Lab Sample ID: 680-102370-28
Matrix: Solid

Date Collected: 06/12/14 00:00
Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0033	mg/Kg		08/20/14 12:10	09/02/14 22:06	5
U-234	ND		0.011	0.00067	mg/Kg		08/20/14 12:10	09/02/14 22:06	5
U-235	0.013		0.011	0.0045	mg/Kg		08/20/14 12:10	09/02/14 22:06	5
U-236	ND		0.011	0.00089	mg/Kg		08/20/14 12:10	09/02/14 22:06	5
U-238	1.8		0.011	0.00067	mg/Kg		08/20/14 12:10	09/02/14 22:06	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.8		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-20.7	U	0.626	2.01	107	32.2	pCi/g	08/20/14 12:10	09/02/14 22:06	5
U-234	0.788	U	0.342	0.350	69.4	4.16	pCi/g	08/20/14 12:10	09/02/14 22:06	5
U-235	0.0291		0.00165	0.00314	0.0241	0.00981	pCi/g	08/20/14 12:10	09/02/14 22:06	5
U-236	-0.00162	U	0.00106	0.00107	0.721	0.0578	pCi/g	08/20/14 12:10	09/02/14 22:06	5
U-238	0.615		0.0177	0.0593	0.00375	0.000225	pCi/g	08/20/14 12:10	09/02/14 22:06	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.717						%		09/04/14 13:22	1

Client Sample ID: SD-213-SS

Lab Sample ID: 680-102370-29

Date Collected: 06/12/14 14:30
Date Received: 06/13/14 09:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/20/14 12:10	09/02/14 22:20	5
U-234	ND		0.012	0.00071	mg/Kg		08/20/14 12:10	09/02/14 22:20	5
U-235	0.017		0.012	0.0048	mg/Kg		08/20/14 12:10	09/02/14 22:20	5
U-236	ND		0.012	0.00095	mg/Kg		08/20/14 12:10	09/02/14 22:20	5
U-238	2.3		0.012	0.00071	mg/Kg		08/20/14 12:10	09/02/14 22:20	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.3		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-22.2	U	0.291	2.07	115	34.4	pCi/g	08/20/14 12:10	09/02/14 22:20	5
U-234	0.952	U	0.242	0.257	74.1	4.45	pCi/g	08/20/14 12:10	09/02/14 22:20	5
U-235	0.0359		0.00100	0.00345	0.0257	0.0105	pCi/g	08/20/14 12:10	09/02/14 22:20	5
U-236	-0.00142	U	0.000104	0.000167	0.770	0.0617	pCi/g	08/20/14 12:10	09/02/14 22:20	5
U-238	0.758		0.0106	0.0705	0.00400	0.000241	pCi/g	08/20/14 12:10	09/02/14 22:20	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.734						%		09/04/14 13:22	1

Client Sample ID: SD-213-01

Lab Sample ID: 680-102370-30

Date Collected: 06/12/14 14:35
Date Received: 06/13/14 09:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0032	mg/Kg		08/20/14 12:10	09/02/14 22:25	5
U-234	ND		0.011	0.00063	mg/Kg		08/20/14 12:10	09/02/14 22:25	5
U-235	0.016		0.011	0.0043	mg/Kg		08/20/14 12:10	09/02/14 22:25	5
U-236	ND		0.011	0.00084	mg/Kg		08/20/14 12:10	09/02/14 22:25	5
U-238	2.1		0.011	0.00063	mg/Kg		08/20/14 12:10	09/02/14 22:25	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.1		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-19.6	U	0.276	1.83	102	30.5	pCi/g	08/20/14 12:10	09/02/14 22:25	5
U-234	0.867	U	0.100	0.128	65.7	3.94	pCi/g	08/20/14 12:10	09/02/14 22:25	5
U-235	0.0352		0.000778	0.00333	0.0228	0.00929	pCi/g	08/20/14 12:10	09/02/14 22:25	5
U-236	-0.00117	U	0.000427	0.000440	0.683	0.0547	pCi/g	08/20/14 12:10	09/02/14 22:25	5
U-238	0.720		0.0168	0.0684	0.00355	0.000213	pCi/g	08/20/14 12:10	09/02/14 22:25	5

Client Sample ID: SD-213-01

Lab Sample ID: 680-102370-30
Matrix: Solid

Date Collected: 06/12/14 14:35
Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.756						%		09/04/14 13:22	1

Client Sample ID: SD-213-02

Lab Sample ID: 680-102370-31
Matrix: Solid

Date Collected: 06/12/14 14:40
Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/20/14 12:10	09/02/14 22:30	5
U-234	ND		0.012	0.00071	mg/Kg		08/20/14 12:10	09/02/14 22:30	5
U-235	0.013		0.012	0.0048	mg/Kg		08/20/14 12:10	09/02/14 22:30	5
U-236	ND		0.012	0.00095	mg/Kg		08/20/14 12:10	09/02/14 22:30	5
U-238	1.8		0.012	0.00071	mg/Kg		08/20/14 12:10	09/02/14 22:30	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.8		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-22.1	U	0.178	2.04	114	34.3	pCi/g	08/20/14 12:10	09/02/14 22:30	5
U-234	0.717	U	0.223	0.232	73.8	4.43	pCi/g	08/20/14 12:10	09/02/14 22:30	5
U-235	0.0283		0.0000356	0.00260	0.0256	0.0104	pCi/g	08/20/14 12:10	09/02/14 22:30	5
U-236	-0.000368	U	0.00393	0.00393	0.767	0.0614	pCi/g	08/20/14 12:10	09/02/14 22:30	5
U-238	0.615		0.00167	0.0566	0.00399	0.000240	pCi/g	08/20/14 12:10	09/02/14 22:30	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.717						%		09/04/14 13:22	1

Client Sample ID: SD-008-01

Lab Sample ID: 680-102370-33
Matrix: Solid

Date Collected: 06/12/14 14:50
Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0033	mg/Kg		08/20/14 12:10	09/02/14 22:34	5
U-234	ND		0.011	0.00066	mg/Kg		08/20/14 12:10	09/02/14 22:34	5
U-235	0.0075	J	0.011	0.0044	mg/Kg		08/20/14 12:10	09/02/14 22:34	5
U-236	ND		0.011	0.00088	mg/Kg		08/20/14 12:10	09/02/14 22:34	5
U-238	1.0		0.011	0.00066	mg/Kg		08/20/14 12:10	09/02/14 22:34	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.0		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Client Sample ID: SD-008-01

Lab Sample ID: 680-102370-33

Date Collected: 06/12/14 14:50
Date Received: 06/13/14 09:30

Matrix: Solid

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-20.7	U	0.344	1.94	105	31.6	pCi/g	08/20/14 12:10	09/02/14 22:34	5
U-234	0.270	U	0.131	0.133	68.1	4.09	pCi/g	08/20/14 12:10	09/02/14 22:34	5
U-235	0.0162		0.000872	0.00173	0.0237	0.00963	pCi/g	08/20/14 12:10	09/02/14 22:34	5
U-236	-0.000255	U	0.00130	0.00130	0.708	0.0567	pCi/g	08/20/14 12:10	09/02/14 22:34	5
U-238	0.343		0.00954	0.0329	0.00368	0.000221	pCi/g	08/20/14 12:10	09/02/14 22:34	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.744						%		09/04/14 13:22	1

Client Sample ID: SD-214-02

Lab Sample ID: 680-102370-34

Date Collected: 06/12/14 13:20
Date Received: 06/13/14 09:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0033	mg/Kg		08/20/14 12:10	09/02/14 22:39	5
U-234	ND		0.011	0.00065	mg/Kg		08/20/14 12:10	09/02/14 22:39	5
U-235	0.013		0.011	0.0044	mg/Kg		08/20/14 12:10	09/02/14 22:39	5
U-236	ND		0.011	0.00087	mg/Kg		08/20/14 12:10	09/02/14 22:39	5
U-238	1.8		0.011	0.00065	mg/Kg		08/20/14 12:10	09/02/14 22:39	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.8		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-20.4	U	0.334	1.90	105	31.4	pCi/g	08/20/14 12:10	09/02/14 22:39	5
U-234	0.737	U	0.383	0.389	67.5	4.05	pCi/g	08/20/14 12:10	09/02/14 22:39	5
U-235	0.0291		0.000886	0.00282	0.0234	0.00955	pCi/g	08/20/14 12:10	09/02/14 22:39	5
U-236	-0.000954	U	0.00180	0.00180	0.702	0.0562	pCi/g	08/20/14 12:10	09/02/14 22:39	5
U-238	0.601		0.00522	0.0555	0.00365	0.000219	pCi/g	08/20/14 12:10	09/02/14 22:39	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.717						%		09/04/14 13:22	1

APPENDIX C

SUPPORT DOCUMENTATION

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Sediments

Report Number: 680-102370-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 06/13/2014; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 3.1 C.

ISOTOPIC THORIUM

Samples SD-DUP-03 (680-102370-1), SD-206-SS (680-102370-2), SD-206-01 (680-102370-3), SD-206-02 (680-102370-4), SD-215-SS (680-102370-7), SD-222-SS (680-102370-8), SD-222-01 (680-102370-9), SD-222-02 (680-102370-10), SD-222-03 (680-102370-11), SD-211-SS (680-102370-12), SD-211-01 (680-102370-13), SD-211-02 (680-102370-14), SD-216-SS (680-102370-15), SD-216-01 (680-102370-16), SD-216-02 (680-102370-17), SD-217-SS (680-102370-18), SD-217-01 (680-102370-19), SD-217-02 (680-102370-20), SD-214-SS (680-102370-22), SD-214-01 (680-102370-23), SD-212-SS (680-102370-24), SD-212-01 (680-102370-25), SD-212-02 (680-102370-26), SD-DUP-04 (680-102370-28), SD-213-SS (680-102370-29), SD-213-01 (680-102370-30), SD-213-02 (680-102370-31), SD-214-02 (680-102370-34) and SD-214-03 (680-102370-35) were analyzed for Isotopic Thorium in accordance with A01R_Th. The samples were leached on 06/17/2014, prepared on 06/23/2014 and analyzed on 07/01/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

RADIUM-226 AND OTHER GAMMA EMITTERS (GS)

Samples SD-005E-01 (680-102370-6) and SD-008-01 (680-102370-33) were analyzed for Radium-226 and other gamma emitters (GS) in accordance with approved methodologies. The samples were leached on 06/17/2014, prepared on 06/25/2014 and analyzed on 07/16/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

02 RAD

Cur165

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: S. Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.13
Client Contact: Mike Martin	Phone: (703)342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~13 of 16~~ 1 of 4
Company: Tetra Tech, Inc.			Analysis Requested	Job #: 680-102370
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes:
City: Germantown	TAT Requested (days): Standard			A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
State, Zip: MD, 20874	PO #: Purchase Order not required			
Phone:	WO #:			Other:
Email: Michael.Martin@tetratech.com				
Project Name: Sediments	Project #: 68012942			
Site: Dark Head Cove	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=wastoil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	8020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Perform MS/MSD (Yes or No)	Special Instructions/Note:
		Preservation Code:				N	N	N	N	N	
SD-DUP03	6/12/14	0000	C	Solid			X				
SD-206-S5		0810	C	Solid			X				
SD-206-01		0815	C	Solid			X				
SD-206-02		0820	C	Solid			X				
SD-206-03		0825	C	Solid			X				Add pu-239 analysis of S5 to 02
SD-005E-01		0830	C	Solid			[redacted]		X		
~~SD-222-S5~~ SD-215-S5		0850	C	Solid			X				
SD-222-S5		0905	C	Solid			X				
SD-222-01		0910	C	Solid			X				
SD-222-02		0915	C	Solid			X				
SD-222-03		1920	C	Solid			X				[redacted]

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time: 6-12-14 / 1600	Company: T+	Received by:	Date/Time: 6/12/14 / 1600	Company: TestAmerica
Relinquished by:	Date/Time: 6/12/14 / 1735	Company: TestAmerica	Received by:	Date/Time: 6-13-14 / 0930	Company: TestAmerica
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.10
Client Contact: Mike Martin	Phone: (703) 341-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~19 of 46~~ 2 of 4
Company: Tetra Tech, Inc.			Analysis Requested	Job #: 680-102370
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes:
City: Germantown	TAT Requested (days): Standard			A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			Other:
Email: Michael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	8020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
		Preservation Code:										
SD-211-55	6/12/14	1000	C	Solid				X				
SD-211-01		1005	C	Solid				X				
SD-211-02		1010	C	Solid				X				
SD-216-55		~~1020~~ 1020	C	Solid				X				
SD-216-01		~~1025~~ 1025	C	Solid				X				
SD-216-02		1030	C	Solid				X				
SD-217-55		1220	C	Solid				X				
SD-217-01		1225	C	Solid				X				
SD-217-02		1230	C	Solid				X				
SD-217-03		1235	C	Solid				X				Hold pending analysis of 55 to 02
SD-214-55		1310	C	Solid				X				

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:
Relinquished by:	Date/Time: 6-12-14 / 1600	Company: TT	Received by:	Date/Time: 6/12/14 1600	Company: TA
Relinquished by:	Date/Time: 6/12/14 1735	Company: TA	Received by:	Date/Time: 6/13/14 0930	Company: TA/Buffalo
Relinquished by:	Date/Time:	Company:	Received by:	Date/Time:	Company:

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.15
Client Contact: Mike Martin	Phone: (703)542-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~45 of 46~~ 3 of 4
Company: Tetra Tech, Inc.		Analysis Requested		Job #: 680-102370
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes:
City: Germantown	TAT Requested (days): Standard			A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			Other:
Email: Michael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	880 - Local Method	A01R_Th - Standard Target List	8020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N					
SD-214-01	6/12/14	1315	C	Solid				X				MS/MSD
SD-212-55		1410	C	Solid				X				
SD-212-01		1415	C	Solid				X				
SD-212-02		1420	C	Solid				X				
SD-212-03		1425	C	Solid				(X)				Hold pending analysis of 55 to 02
SD-DUP04		0000	C	Solid				X				
SD-213-55		1430	C	Solid				X				
SD-213-01		1435	C	Solid				X				
SD-213-02		1440	C	Solid				X				
SD-213-03		1445	C	Solid				(X)				Hold pending analysis of 55 to 02
SD-008-01	↓	1450	C	Solid						X		

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
[signature]	6-12-14 / 1600	TT	[signature]	6/12/14 / 1600	TA
Relinquished by: [signature]	Date/Time: 6/12/14 / 1735	Company TT	Received by: [signature]	Date/Time: 6/13/14 / 0930	Company TA/Shelli
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: △ Yes △ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Green	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.18
Client Contact: Mike Martin	Phone: (703)742-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~18 of 18~~ 4 of 4
Company: Tetra Tech, Inc.				Job #: 680-102370
Address: 20251 Century Blvd Suite 200	Due Date Requested:			
City: Germantown	TAT Requested (days):			
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			
Email: Michael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
SD-214-02	6/12/14	1320		Solid				X				
SD-214-03	6/12/14	1325		Solid				X				
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
					6/12/14 1600	TT
	Relinquished by:	6/12/14 1735	TT		6/13/14 0930	TAS Knoxville
	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No
Custody Seal No.:
Cooler Temperature(s) °C and Other Remarks:

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102370-1
SDG: 680-102370-1

Method	Method Description	Protocol	Laboratory
A-01-R	Isotopic Thorium (Alpha Spectrometry)	DOE	TAL SL
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102370-1
SDG: 680-102370-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-102370-1	SD-DUP-03	Solid	06/12/14 00:00	06/13/14 09:30
680-102370-2	SD-206-SS	Solid	06/12/14 08:10	06/13/14 09:30
680-102370-3	SD-206-01	Solid	06/12/14 08:15	06/13/14 09:30
680-102370-4	SD-206-02	Solid	06/12/14 08:20	06/13/14 09:30
680-102370-6	SD-005E-01	Solid	06/12/14 08:30	06/13/14 09:30
680-102370-7	SD-215-SS	Solid	06/12/14 08:50	06/13/14 09:30
680-102370-8	SD-222-SS	Solid	06/12/14 09:05	06/13/14 09:30
680-102370-9	SD-222-01	Solid	06/12/14 09:10	06/13/14 09:30
680-102370-10	SD-222-02	Solid	06/12/14 09:15	06/13/14 09:30
680-102370-11	SD-222-03	Solid	06/12/14 19:20	06/13/14 09:30
680-102370-12	SD-211-SS	Solid	06/12/14 10:00	06/13/14 09:30
680-102370-13	SD-211-01	Solid	06/12/14 10:05	06/13/14 09:30
680-102370-14	SD-211-02	Solid	06/12/14 10:10	06/13/14 09:30
680-102370-15	SD-216-SS	Solid	06/12/14 10:20	06/13/14 09:30
680-102370-16	SD-216-01	Solid	06/12/14 10:25	06/13/14 09:30
680-102370-17	SD-216-02	Solid	06/12/14 10:30	06/13/14 09:30
680-102370-18	SD-217-SS	Solid	06/12/14 12:20	06/13/14 09:30
680-102370-19	SD-217-01	Solid	06/12/14 12:25	06/13/14 09:30
680-102370-20	SD-217-02	Solid	06/12/14 12:30	06/13/14 09:30
680-102370-22	SD-214-SS	Solid	06/12/14 13:10	06/13/14 09:30
680-102370-23	SD-214-01	Solid	06/12/14 13:15	06/13/14 09:30
680-102370-24	SD-212-SS	Solid	06/12/14 14:10	06/13/14 09:30
680-102370-25	SD-212-01	Solid	06/12/14 14:15	06/13/14 09:30
680-102370-26	SD-212-02	Solid	06/12/14 14:20	06/13/14 09:30
680-102370-28	SD-DUP-04	Solid	06/12/14 00:00	06/13/14 09:30
680-102370-29	SD-213-SS	Solid	06/12/14 14:30	06/13/14 09:30
680-102370-30	SD-213-01	Solid	06/12/14 14:35	06/13/14 09:30
680-102370-31	SD-213-02	Solid	06/12/14 14:40	06/13/14 09:30
680-102370-33	SD-008-01	Solid	06/12/14 14:50	06/13/14 09:30
680-102370-34	SD-214-02	Solid	06/12/14 13:20	06/13/14 09:30
680-102370-35	SD-214-03	Solid	06/12/14 13:25	06/13/14 09:30

HOLDTIME

SDG 680-102370-1

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
	PCI/G	SD-008-01	680-102370-33	NM	06/12/2014	06/25/2014	07/16/2014	13	21	34
	PCI/G	SD-005E-01	680-102370-6	NM	06/12/2014	06/25/2014	07/16/2014	13	21	34
RAD	PCI/G	SD-214-03	680-102370-35	NM	06/12/2014	06/23/2014	07/01/2014	11	8	19
RAD	PCI/G	SD-206-01	680-102370-3	NM	06/12/2014	06/23/2014	07/01/2014	11	8	19
RAD	PCI/G	SD-206-02	680-102370-4	NM	06/12/2014	06/23/2014	07/01/2014	11	8	19
RAD	PCI/G	SD-206-SS	680-102370-2	NM	06/12/2014	06/23/2014	07/01/2014	11	8	19
RAD	PCI/G	SD-211-01	680-102370-13	NM	06/12/2014	06/23/2014	07/01/2014	11	8	19
RAD	PCI/G	SD-211-02	680-102370-14	NM	06/12/2014	06/23/2014	07/01/2014	11	8	19
RAD	PCI/G	SD-211-SS	680-102370-12	NM	06/12/2014	06/23/2014	07/01/2014	11	8	19
RAD	PCI/G	SD-212-01	680-102370-25	NM	06/12/2014	06/23/2014	07/01/2014	11	8	19
RAD	PCI/G	SD-212-02	680-102370-26	NM	06/12/2014	06/23/2014	07/01/2014	11	8	19
RAD	PCI/G	SD-212-SS	680-102370-24	NM	06/12/2014	06/23/2014	07/01/2014	11	8	19
RAD	PCI/G	SD-213-01	680-102370-30	NM	06/12/2014	06/23/2014	07/01/2014	11	8	19
RAD	PCI/G	SD-213-02	680-102370-31	NM	06/12/2014	06/23/2014	07/01/2014	11	8	19
RAD	PCI/G	SD-213-SS	680-102370-29	NM	06/12/2014	06/23/2014	07/01/2014	11	8	19

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
RAD	PCI/G	SD-217-01	680-102370-19	NM	06/12/2014	06/23/2014	07/01/2014	11	8	19
RAD	PCI/G	SD-DUP-03	680-102370-1	NM	06/12/2014	06/23/2014	07/01/2014	11	8	19
RAD	PCI/G	SD-222-SS	680-102370-8	NM	06/12/2014	06/23/2014	07/01/2014	11	8	19
RAD	PCI/G	SD-222-03	680-102370-11	NM	06/12/2014	06/23/2014	07/01/2014	11	8	19
RAD	PCI/G	SD-222-02	680-102370-10	NM	06/12/2014	06/23/2014	07/01/2014	11	8	19
RAD	PCI/G	SD-222-01	680-102370-9	NM	06/12/2014	06/23/2014	07/01/2014	11	8	19
RAD	PCI/G	SD-214-01	680-102370-23	NM	06/12/2014	06/23/2014	07/01/2014	11	8	19
RAD	PCI/G	SD-217-02	680-102370-20	NM	06/12/2014	06/23/2014	07/01/2014	11	8	19
RAD	PCI/G	SD-214-02	680-102370-34	NM	06/12/2014	06/23/2014	07/01/2014	11	8	19
RAD	PCI/G	SD-216-SS	680-102370-15	NM	06/12/2014	06/23/2014	07/01/2014	11	8	19
RAD	PCI/G	SD-216-02	680-102370-17	NM	06/12/2014	06/23/2014	07/01/2014	11	8	19
RAD	PCI/G	SD-216-01	680-102370-16	NM	06/12/2014	06/23/2014	07/01/2014	11	8	19
RAD	PCI/G	SD-215-SS	680-102370-7	NM	06/12/2014	06/23/2014	07/01/2014	11	8	19
RAD	PCI/G	SD-214-SS	680-102370-22	NM	06/12/2014	06/23/2014	07/01/2014	11	8	19
RAD	PCI/G	SD-DUP-04	680-102370-28	NM	06/12/2014	06/23/2014	07/01/2014	11	8	19
RAD	PCI/G	SD-217-SS	680-102370-18	NM	06/12/2014	06/23/2014	07/01/2014	11	8	19

Field Duplicate Precision

ANALYTE	SD-DUP-04	SD-213-02	RPD	DIFFERENCE
THORIUM-228	1.06	1.14	7.27	0.08
THORIUM-232	1.26	1.18	6.56	0.08
THORIUM-230	ND	1.15	200.00	0.11

Field Duplicate Precision

ANALYTE	SD-DUP-04	SD-213-02	RPD	DIFFERENCE
URANIUM-235	0.013	0.013	0.00	0
URANIUM-238	1.8	1.8	0.00	0

Alpha Spectroscopy Run Log

Detector: AV1

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:25	140	IC 160-120511/1		120511			PS
05/07/14 23:01	60	ICV 160-120846/1		120846			PS
06/18/14 19:10	960	ICB 160-127775/1		127775			PS
06/19/14 16:43	60	CCV 160-127859/1		127859			PS
07/01/14 01:00	1	PULSER 160-129224/1		129224			MLK
07/01/14 12:26	180	680-102370-23	SD-214-01	129224	128228	A-01-R	MLK

Detector: AV3

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:26	140	IC 160-120519/1		120519			PS
05/07/14 23:02	60	ICV 160-120855/1		120855			PS
06/18/14 19:10	960	ICB 160-127828/1		127828			PS
06/19/14 16:44	60	CCV 160-127913/1		127913			PS
07/01/14 01:00	1	PULSER 160-129269/1		129269			MLK
07/01/14 12:26	180	680-102370-23 MS	SD-214-01 MS	129269	128228	A-01-R	MLK
07/03/14 15:56	1	PULSER 160-129774/1		129774			MLK
07/03/14 17:15	180	680-102370-23MSD	SD-214-01 MSD	129774	128228	A-01-R	MLK

Detector: AV6

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:26	140	IC 160-120521/1		120521			PS
05/07/14 23:03	60	ICV 160-120857/1		120857			PS
06/18/14 19:08	960	ICB 160-127830/1		127830			PS
06/19/14 18:06	60	CCV 160-127932/1		127932			PS
07/01/14 01:00	1	PULSER 160-129287/1		129287			MLK
07/01/14 12:26	180	680-102370-24	SD-212-SS	129287	128228	A-01-R	MLK

Detector: AV7

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/07/14 19:51	140	IC 160-120843/1		120843			PS
05/07/14 23:03	60	ICV 160-120858/1		120858			PS
06/18/14 19:08	960	ICB 160-127831/1		127831			PS
06/19/14 16:44	60	CCV 160-127943/1		127943			PS
07/01/14 01:00	1	PULSER 160-129298/1		129298			MLK
07/01/14 12:26	180	680-102370-25	SD-212-01	129298	128228	A-01-R	MLK

Detector: AV8

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:27	140	IC 160-120523/1		120523			PS
05/08/14 00:14	60	ICV 160-121084/1		121084			PS
06/18/14 19:08	960	ICB 160-127837/1		127837			PS
06/19/14 18:06	60	CCV 160-127954/1		127954			PS
07/01/14 01:00	1	PULSER 160-129309/1		129309			MLK
07/01/14 12:26	180	680-102370-26	SD-212-02	129309	128228	A-01-R	MLK

Alpha Spectroscopy Run Log

Detector: AV9

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:27	140	IC 160-120524/1		120524			PS
05/07/14 23:03	60	ICV 160-120859/1		120859			PS
06/18/14 19:08	960	ICB 160-127848/1		127848			PS
06/19/14 18:06	60	CCV 160-127962/1		127962			PS
07/01/14 01:00	1	PULSER 160-129320/1		129320			MLK
07/01/14 12:26	180	680-102370-28	SD-DUP-04	129320	128228	A-01-R	MLK

Detector: AV10

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:27	140	IC 160-120512/1		120512			PS
05/07/14 23:03	60	ICV 160-120847/1		120847			PS
06/18/14 19:08	960	ICB 160-127776/1		127776			PS
06/19/14 18:06	60	CCV 160-127860/1		127860			PS
07/01/14 01:00	1	PULSER 160-129225/1		129225			MLK
07/01/14 12:26	180	680-102370-29	SD-213-SS	129225	128228	A-01-R	MLK

Detector: AV11

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:27	140	IC 160-120513/1		120513			PS
05/07/14 23:04	60	ICV 160-120848/1		120848			PS
06/18/14 19:08	960	ICB 160-127786/1		127786			PS
06/19/14 18:07	60	CCV 160-127871/1		127871			PS
07/01/14 01:00	1	PULSER 160-129236/1		129236			MLK
07/01/14 12:26	180	680-102370-30	SD-213-01	129236	128228	A-01-R	MLK

Detector: AV12

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:28	140	IC 160-120514/1		120514			PS
05/07/14 23:04	60	ICV 160-120849/1		120849			PS
06/18/14 19:08	960	ICB 160-127796/1		127796			PS
06/19/14 18:07	60	CCV 160-127881/1		127881			PS
07/01/14 01:00	1	PULSER 160-129246/1		129246			MLK
07/01/14 12:26	180	680-102370-31	SD-213-02	129246	128228	A-01-R	MLK

Detector: AV13

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:28	140	IC 160-120515/1		120515			PS
05/07/14 23:04	60	ICV 160-120850/1		120850			PS
06/18/14 19:08	960	ICB 160-127807/1		127807			PS
06/19/14 19:45	60	CCV 160-127892/1		127892			PS
07/01/14 01:00	1	PULSER 160-129257/1		129257			
07/01/14 01:52	1	PULSER 160-129257/2		129257			MLK
07/01/14 12:26	180	680-102370-34	SD-214-02	129257	128228	A-01-R	MLK

Detector: AV14

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:28	140	IC 160-120516/1		120516			PS

Alpha Spectroscopy Run Log

Detector: AV14 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/07/14 23:04	60	ICV 160-120851/1		120851			PS
06/18/14 19:08	960	ICB 160-127817/1		127817			PS
06/19/14 18:08	60	CCV 160-127902/1		127902			PS
07/01/14 01:00	1	PULSER 160-129259/1		129259			MLK
07/01/14 12:26	180	680-102370-35	SD-214-03	129259	128228	A-01-R	MLK

Detector: AV24

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:29	140	IC 160-120405/1		120405			PS
05/08/14 00:16	60	ICV 160-121076/1		121076			PS
06/18/14 19:08	960	ICB 160-127827/1		127827			PS
06/19/14 19:45	60	CCV 160-127912/1		127912			PS
07/01/14 01:00	1	PULSER 160-129268/1		129268			MLK
07/01/14 12:32	180	680-102370-1	SD-DUP-03	129268	128227	A-01-R	MLK

Detector: AV51

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:03	140	IC 160-120273/1		120273			PS
05/08/14 17:17	60	ICV 160-121366/1		121366			PS
06/19/14 00:17	960	ICB 160-127923/1		127923			PS
06/22/14 20:07	60	CCV 160-127991/1		127991			PS
07/01/14 01:09	1	PULSER 160-129279/1		129279			MLK
07/01/14 12:32	180	680-102370-1 DU	SD-DUP-03 DU	129279	128227	A-01-R	MLK
07/01/14 17:47	600	ZZZZZ		129279			

Detector: AV53

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:04	140	IC 160-120275/1		120275			PS
05/08/14 00:18	60	ICV 160-121082/1		121082			PS
06/19/14 00:17	960	ICB 160-127925/1		127925			PS
06/22/14 18:53	60	CCV 160-127992/1		127992			PS
07/01/14 01:09	1	PULSER 160-129280/1		129280			MLK
07/01/14 12:32	180	680-102370-2	SD-206-SS	129280	128227	A-01-R	MLK
07/01/14 17:47	600	ZZZZZ		129280			

Detector: AV54

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:04	140	IC 160-120276/1		120276			PS
05/08/14 14:34	60	ICV 160-121368/1		121368			PS
06/19/14 00:18	960	ICB 160-127926/1		127926			PS
06/22/14 18:53	60	CCV 160-127993/1		127993			PS
07/01/14 01:09	1	PULSER 160-129281/1		129281			MLK
07/01/14 12:32	180	680-102370-3	SD-206-01	129281	128227	A-01-R	MLK
07/01/14 17:47	600	ZZZZZ		129281			

Alpha Spectroscopy Run Log

Detector: AV55

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/07/14 19:51	140	IC 160-120842/1		120842			PS
05/08/14 00:19	60	ICV 160-121083/1		121083			PS
06/19/14 00:18	960	ICB 160-127927/1		127927			PS
06/22/14 20:08	60	CCV 160-127994/1		127994			PS
07/01/14 01:09	1	PULSER 160-129282/1		129282			MLK
07/01/14 12:32	180	680-102370-4	SD-206-02	129282	128227	A-01-R	MLK
07/01/14 17:47	600	ZZZZZ		129282			

Detector: AV56

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:04	140	IC 160-120278/1		120278			PS
05/08/14 17:18	60	ICV 160-121369/1		121369			PS
06/19/14 00:18	960	ICB 160-127928/1		127928			PS
06/22/14 18:53	60	CCV 160-127995/1		127995			PS
07/01/14 01:09	1	PULSER 160-129283/1		129283			MLK
07/01/14 12:32	180	680-102370-7	SD-215-SS	129283	128227	A-01-R	MLK
07/01/14 17:47	600	ZZZZZ		129283			

Detector: AV58

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:05	140	IC 160-120280/1		120280			PS
05/08/14 14:35	60	ICV 160-121371/1		121371			PS
06/19/14 00:18	960	ICB 160-127930/1		127930			PS
06/22/14 18:53	60	CCV 160-127997/1		127997			PS
07/01/14 01:09	1	PULSER 160-129285/1		129285			MLK
07/01/14 12:32	180	680-102370-8	SD-222-SS	129285	128227	A-01-R	MLK
07/01/14 17:47	600	ZZZZZ		129285			

Detector: AV59

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:05	140	IC 160-120281/1		120281			PS
05/08/14 14:36	60	ICV 160-121372/1		121372			PS
06/19/14 00:18	960	ICB 160-127931/1		127931			PS
06/22/14 20:09	60	CCV 160-127998/1		127998			PS
07/01/14 01:09	1	PULSER 160-129286/1		129286			MLK
07/01/14 12:32	180	680-102370-9	SD-222-01	129286	128227	A-01-R	MLK
07/01/14 17:47	600	ZZZZZ		129286			

Detector: AV60

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:06	140	IC 160-120282/1		120282			PS
05/08/14 17:21	60	ICV 160-121373/1		121373			PS
06/19/14 00:18	960	ICB 160-127933/1		127933			PS
06/22/14 21:17	60	CCV 160-127999/1		127999			PS
07/01/14 01:09	1	PULSER 160-129288/1		129288			MLK
07/01/14 12:33	180	680-102370-10	SD-222-02	129288	128227	A-01-R	MLK
07/01/14 17:47	600	ZZZZZ		129288			

Alpha Spectroscopy Run Log

Detector: AV61

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:06	140	IC 160-120283/1		120283			PS
05/08/14 14:36	60	ICV 160-121374/1		121374			PS
06/19/14 00:18	960	ICB 160-127934/1		127934			PS
06/22/14 22:21	60	CCV 160-128018/1		128018			PS
07/01/14 01:09	1	PULSER 160-129289/1		129289			MLK
07/01/14 12:33	180	680-102370-11	SD-222-03	129289	128227	A-01-R	MLK
07/01/14 17:47	600	ZZZZZ		129289			

Detector: AV62

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:06	140	IC 160-120284/1		120284			PS
05/08/14 14:36	60	ICV 160-121375/1		121375			PS
06/19/14 00:18	960	ICB 160-127935/1		127935			PS
06/22/14 20:09	60	CCV 160-128000/1		128000			PS
07/01/14 01:09	1	PULSER 160-129290/1		129290			MLK
07/01/14 12:33	180	680-102370-12	SD-211-SS	129290	128227	A-01-R	MLK
07/01/14 17:47	600	ZZZZZ		129290			

Detector: AV63

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:06	140	IC 160-120285/1		120285			PS
05/08/14 14:36	60	ICV 160-121376/1		121376			PS
06/19/14 00:18	960	ICB 160-127936/1		127936			PS
06/22/14 21:18	60	CCV 160-128001/1		128001			PS
07/01/14 01:09	1	PULSER 160-129291/1		129291			MLK
07/01/14 12:33	180	680-102370-13	SD-211-01	129291	128227	A-01-R	MLK
07/01/14 17:47	600	ZZZZZ		129291			

Detector: AV64

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 17:47	140	IC 160-120041/1		120041			PS
05/11/14 19:31	60	ICV 160-121389/1		121389			PS
06/19/14 00:18	960	ICB 160-127937/1		127937			PS
06/22/14 21:18	60	CCV 160-128002/1		128002			PS
07/01/14 01:09	1	PULSER 160-129292/1		129292			MLK
07/01/14 12:33	180	680-102370-14	SD-211-02	129292	128227	A-01-R	MLK
07/01/14 17:48	600	ZZZZZ		129292			

Detector: AV65

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 17:47	140	IC 160-120042/1		120042			PS
05/08/14 17:18	60	ICV 160-121377/1		121377			PS
06/19/14 00:18	960	ICB 160-127938/1		127938			
06/19/14 19:57	960	ICB 160-127938/2		127938			PS
06/22/14 20:09	60	CCV 160-128003/1		128003			PS
07/01/14 01:09	1	PULSER 160-129293/1		129293			MLK
07/01/14 12:33	180	680-102370-15	SD-216-SS	129293	128227	A-01-R	MLK
07/01/14 17:49	600	ZZZZZ		129293			

Alpha Spectroscopy Run Log

Detector: AV66

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 17:47	140	IC 160-120043/1		120043			PS
05/11/14 19:32	60	ICV 160-121390/1		121390			PS
06/19/14 00:18	960	ICB 160-127939/1		127939			PS
06/22/14 21:18	60	CCV 160-128004/1		128004			PS
07/01/14 01:09	1	PULSER 160-129294/1		129294			MLK
07/01/14 12:33	180	680-102370-16	SD-216-01	129294	128227	A-01-R	MLK
07/01/14 17:49	600	ZZZZZ		129294			

Detector: AV67

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 17:48	140	IC 160-120044/1		120044			PS
05/11/14 19:32	60	ICV 160-121391/1		121391			PS
06/19/14 00:18	960	ICB 160-127940/1		127940			PS
06/22/14 18:54	60	CCV 160-128005/1		128005			PS
07/01/14 01:09	1	PULSER 160-129295/1		129295			MLK
07/01/14 12:33	180	680-102370-17	SD-216-02	129295	128227	A-01-R	MLK
07/01/14 17:49	600	ZZZZZ		129295			

Detector: AV68

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 17:48	140	IC 160-120045/1		120045			PS
05/08/14 14:36	60	ICV 160-121378/1		121378			PS
06/19/14 00:18	960	ICB 160-127941/1		127941			PS
06/22/14 20:09	60	CCV 160-128006/1		128006			PS
07/01/14 01:09	1	PULSER 160-129296/1		129296			MLK
07/01/14 12:33	180	680-102370-18	SD-217-SS	129296	128227	A-01-R	MLK
07/01/14 17:49	600	ZZZZZ		129296			

Detector: AV69

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 17:48	140	IC 160-120046/1		120046			PS
05/08/14 17:19	60	ICV 160-121379/1		121379			PS
06/19/14 00:18	960	ICB 160-127942/1		127942			PS
06/22/14 20:09	60	CCV 160-128007/1		128007			PS
07/01/14 01:09	1	PULSER 160-129297/1		129297			MLK
07/01/14 12:33	180	680-102370-19	SD-217-01	129297	128227	A-01-R	MLK
07/01/14 17:49	600	ZZZZZ		129297			

Detector: AV70

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/07/14 19:51	140	IC 160-120844/1		120844			PS
05/08/14 14:36	60	ICV 160-121380/1		121380			PS
06/19/14 00:18	960	ICB 160-127944/1		127944			PS
06/22/14 20:10	60	CCV 160-128008/1		128008			PS
07/01/14 01:10	1	PULSER 160-129299/1		129299			MLK
07/01/14 12:33	180	680-102370-20	SD-217-02	129299	128227	A-01-R	MLK
07/01/14 17:49	600	ZZZZZ		129299			

Alpha Spectroscopy Run Log

Detector: AV71

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 17:49	140	IC 160-120048/1		120048			PS
05/08/14 17:19	60	ICV 160-121381/1		121381			PS
06/19/14 00:18	960	ICB 160-127945/1		127945			PS
06/22/14 20:10	60	CCV 160-128009/1		128009			PS
07/01/14 01:10	1	PULSER 160-129300/1		129300			MLK
07/01/14 12:33	180	680-102370-22	SD-214-SS	129300	128227	A-01-R	MLK
07/01/14 17:49	600	ZZZZZ		129300			

Detector: AV115

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/07/14 19:52	140	IC 160-120840/1		120840			PS
05/11/14 20:54	60	ICV 160-121418/1		121418			PS
06/18/14 19:09	960	ICB 160-127791/1		127791			PS
06/19/14 15:10	60	CCV 160-127876/1		127876			PS
07/01/14 01:38	1	PULSER 160-129241/1		129241			MLK
07/01/14 12:25	180	MB 160-128228/1-A		129241	128228	A-01-R	MLK

Detector: AV116

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
04/30/14 22:55	140	IC 160-119675/1		119675			PS
05/11/14 22:06	60	ICV 160-121419/1		121419			PS
06/18/14 19:09	960	ICB 160-127792/1		127792			PS
06/19/14 15:10	60	CCV 160-127877/1		127877			PS
07/01/14 01:38	1	PULSER 160-129242/1		129242			MLK
07/01/14 12:25	180	LCS 160-128228/2-A		129242	128228	A-01-R	MLK

Detector: AV117

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
04/30/14 22:55	140	IC 160-119676/1		119676			PS
05/11/14 22:06	60	ICV 160-121420/1		121420			PS
06/18/14 19:09	960	ICB 160-127793/1		127793			PS
06/19/14 15:10	60	CCV 160-127878/1		127878			PS
07/01/14 01:38	1	PULSER 160-129243/1		129243			MLK
07/01/14 12:32	180	MB 160-128227/1-A		129243	128227	A-01-R	MLK

Detector: AV118

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
04/30/14 22:55	140	IC 160-119677/1		119677			PS
05/11/14 23:19	60	ICV 160-121421/1		121421			PS
06/18/14 19:09	960	ICB 160-127794/1		127794			PS
06/19/14 15:10	60	CCV 160-127879/1		127879			PS
07/01/14 01:38	1	PULSER 160-129244/1		129244			MLK
07/01/14 12:32	180	LCS 160-128227/2-A		129244	128227	A-01-R	MLK

Alpha Spectroscopy Calibration Summary

Detector: AV1

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120511/1	05/05/14 22:25	82232-334_00001	0.2630	0.20-0.32		
ICV 160-120846/1	05/07/14 23:01	82247-334_00001	0.2524	0.20-0.32	96.0	95-105
CCV 160-127859/1	06/19/14 16:43	82232-334_00001	0.2642	0.20-0.32	100.4	95-105

Detector: AV3

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120519/1	05/05/14 22:26	82234-334_00001	0.2609	0.20-0.32		
ICV 160-120855/1	05/07/14 23:02	82233-334_00001	0.2696	0.20-0.32	103.3	95-105
CCV 160-127913/1	06/19/14 16:44	82234-334_00001	0.2566	0.20-0.32	98.3	95-105

Detector: AV6

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120521/1	05/05/14 22:26	82237-334_00003	0.2589	0.20-0.32		
ICV 160-120857/1	05/07/14 23:03	82236-334_00001	0.2622	0.20-0.32	101.3	95-105
CCV 160-127932/1	06/19/14 18:06	82237-334_00003	0.2606	0.20-0.32	100.7	95-105

Detector: AV7

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120843/1	05/07/14 19:51	82236-334_00001	0.2580	0.20-0.32		
ICV 160-120858/1	05/07/14 23:03	82237-334_00003	0.2546	0.20-0.32	98.6	95-105
CCV 160-127943/1	06/19/14 16:44	82236-334_00001	0.2549	0.20-0.32	98.8	95-105

Detector: AV8

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120523/1	05/05/14 22:27	82240-334_00001	0.2705	0.20-0.32		
ICV 160-121084/1	05/08/14 00:14	82234-334_00001	0.2639	0.20-0.32	97.6	95-105
CCV 160-127954/1	06/19/14 18:06	82240-334_00001	0.2668	0.20-0.32	98.6	95-105

Detector: AV9

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120524/1	05/05/14 22:27	82241-334_00001	0.2704	0.20-0.32		
ICV 160-120859/1	05/07/14 23:03	82240-334_00001	0.2666	0.20-0.32	98.6	95-105
CCV 160-127962/1	06/19/14 18:06	82241-334_00001	0.2701	0.20-0.32	99.9	95-105

Detector: AV10

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120512/1	05/05/14 22:27	82242-334_00001	0.2584	0.20-0.32		
ICV 160-120847/1	05/07/14 23:03	82241-334_00001	0.2593	0.20-0.32	100.3	95-105
CCV 160-127860/1	06/19/14 18:06	82242-334_00001	0.2552	0.20-0.32	98.7	95-105

Detector: AV11

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120513/1	05/05/14 22:27	82243-334_00001	0.2688	0.20-0.32		
ICV 160-120848/1	05/07/14 23:04	82242-334_00001	0.2598	0.20-0.32	96.6	95-105
CCV 160-127871/1	06/19/14 18:07	82243-334_00001	0.2647	0.20-0.32	98.5	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV12

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120514/1	05/05/14 22:28	82244-334_00001	0.2597	0.20-0.32		
ICV 160-120849/1	05/07/14 23:04	82243-334_00001	0.2688	0.20-0.32	103.5	95-105
CCV 160-127881/1	06/19/14 18:07	82244-334_00001	0.2583	0.20-0.32	99.5	95-105

Detector: AV13

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120515/1	05/05/14 22:28	82245-334_00001	0.2599	0.20-0.32		
ICV 160-120850/1	05/07/14 23:04	82244-334_00001	0.2556	0.20-0.32	98.4	95-105
CCV 160-127892/1	06/19/14 19:45	82245-334_00001	0.2566	0.20-0.32	98.7	95-105

Detector: AV14

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120516/1	05/05/14 22:28	82246-334_00001	0.2634	0.20-0.32		
ICV 160-120851/1	05/07/14 23:04	82245-334_00001	0.2665	0.20-0.32	101.2	95-105
CCV 160-127902/1	06/19/14 18:08	82246-334_00001	0.2615	0.20-0.32	99.3	95-105

Detector: AV24

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120405/1	05/05/14 19:29	82241-334_00001	0.2642	0.20-0.32		
ICV 160-121076/1	05/08/14 00:16	82240-334_00001	0.2662	0.20-0.32	100.8	95-105
CCV 160-127912/1	06/19/14 19:45	82241-334_00001	0.2644	0.20-0.32	100.1	95-105

Detector: AV51

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120273/1	05/04/14 21:03	82234-334_00001	0.2624	0.20-0.32		
ICV 160-121366/1	05/08/14 17:17	82233-334_00001	0.2693	0.20-0.32	102.6	95-105
CCV 160-127991/1	06/22/14 20:07	82234-334_00001	0.2581	0.20-0.32	98.4	95-105

Detector: AV53

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120275/1	05/04/14 21:04	82236-334_00001	0.2632	0.20-0.32		
ICV 160-121082/1	05/08/14 00:18	82235-334_00001	0.2648	0.20-0.32	100.6	95-105
CCV 160-127992/1	06/22/14 18:53	82236-334_00001	0.2651	0.20-0.32	100.7	95-105

Detector: AV54

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120276/1	05/04/14 21:04	82237-334_00003	0.2602	0.20-0.32		
ICV 160-121368/1	05/08/14 14:34	82236-334_00001	0.2609	0.20-0.32	100.3	95-105
CCV 160-127993/1	06/22/14 18:53	82237-334_00003	0.2628	0.20-0.32	101.0	95-105

Detector: AV55

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120842/1	05/07/14 19:51	82232-334_00001	0.2679	0.20-0.32		
ICV 160-121083/1	05/08/14 00:19	82237-334_00003	0.2569	0.20-0.32	95.9	95-105
CCV 160-127994/1	06/22/14 20:08	82232-334_00001	0.2683	0.20-0.32	100.2	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV56

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120278/1	05/04/14 21:04	82240-334_00001	0.2609	0.20-0.32		
ICV 160-121369/1	05/08/14 17:18	82247-334_00001	0.2519	0.20-0.32	96.5	95-105
CCV 160-127995/1	06/22/14 18:53	82240-334_00001	0.2626	0.20-0.32	100.7	95-105

Detector: AV58

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120280/1	05/04/14 21:05	82242-334_00001	0.2656	0.20-0.32		
ICV 160-121371/1	05/08/14 14:35	82241-334_00001	0.2710	0.20-0.32	102.0	95-105
CCV 160-127997/1	06/22/14 18:53	82242-334_00001	0.2631	0.20-0.32	99.1	95-105

Detector: AV59

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120281/1	05/04/14 21:05	82243-334_00001	0.2744	0.20-0.32		
ICV 160-121372/1	05/08/14 14:36	82242-334_00001	0.2677	0.20-0.32	97.5	95-105
CCV 160-127998/1	06/22/14 20:09	82243-334_00001	0.2720	0.20-0.32	99.1	95-105

Detector: AV60

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120282/1	05/04/14 21:06	82244-334_00001	0.2633	0.20-0.32		
ICV 160-121373/1	05/08/14 17:21	82243-334_00001	0.2725	0.20-0.32	103.5	95-105
CCV 160-127999/1	06/22/14 21:17	82244-334_00001	0.2629	0.20-0.32	99.8	95-105

Detector: AV61

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120283/1	05/04/14 21:06	82245-334_00001	0.2646	0.20-0.32		
ICV 160-121374/1	05/08/14 14:36	82244-334_00001	0.2581	0.20-0.32	97.5	95-105
CCV 160-128018/1	06/22/14 22:21	82245-334_00001	0.2622	0.20-0.32	99.1	95-105

Detector: AV62

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120284/1	05/04/14 21:06	82246-334_00001	0.2634	0.20-0.32		
ICV 160-121375/1	05/08/14 14:36	82245-334_00001	0.2622	0.20-0.32	99.6	95-105
CCV 160-128000/1	06/22/14 20:09	82246-334_00001	0.2650	0.20-0.32	100.6	95-105

Detector: AV63

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120285/1	05/04/14 21:06	82247-334_00001	0.2548	0.20-0.32		
ICV 160-121376/1	05/08/14 14:36	82246-334_00001	0.2601	0.20-0.32	102.1	95-105
CCV 160-128001/1	06/22/14 21:18	82247-334_00001	0.2557	0.20-0.32	100.3	95-105

Detector: AV64

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120041/1	05/04/14 17:47	82232-334_00001	0.2775	0.20-0.32		
ICV 160-121389/1	05/11/14 19:31	82247-334_00001	0.2666	0.20-0.32	96.1	95-105
CCV 160-128002/1	06/22/14 21:18	82232-334_00001	0.2776	0.20-0.32	100.0	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV65

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120042/1	05/04/14 17:47	82233-334_00001	0.2713	0.20-0.32		
ICV 160-121377/1	05/08/14 17:18	82232-334_00001	0.2712	0.20-0.32	99.9	95-105
CCV 160-128003/1	06/22/14 20:09	82233-334_00001	0.2695	0.20-0.32	99.3	95-105

Detector: AV66

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120043/1	05/04/14 17:47	82234-334_00001	0.2593	0.20-0.32		
ICV 160-121390/1	05/11/14 19:32	82233-334_00001	0.2667	0.20-0.32	102.9	95-105
CCV 160-128004/1	06/22/14 21:18	82234-334_00001	0.2570	0.20-0.32	99.1	95-105

Detector: AV67

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120044/1	05/04/14 17:48	82235-334_00001	0.2732	0.20-0.32		
ICV 160-121391/1	05/11/14 19:32	82234-334_00001	0.2702	0.20-0.32	98.9	95-105
CCV 160-128005/1	06/22/14 18:54	82235-334_00001	0.2782	0.20-0.32	101.8	95-105

Detector: AV68

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120045/1	05/04/14 17:48	82236-334_00001	0.2649	0.20-0.32		
ICV 160-121378/1	05/08/14 14:36	82235-334_00001	0.2630	0.20-0.32	99.3	95-105
CCV 160-128006/1	06/22/14 20:09	82236-334_00001	0.2631	0.20-0.32	99.3	95-105

Detector: AV69

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120046/1	05/04/14 17:48	82237-334_00003	0.2557	0.20-0.32		
ICV 160-121379/1	05/08/14 17:19	82236-334_00001	0.2646	0.20-0.32	103.5	95-105
CCV 160-128007/1	06/22/14 20:09	82237-334_00003	0.2594	0.20-0.32	101.5	95-105

Detector: AV70

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120844/1	05/07/14 19:51	82235-334_00001	0.2652	0.20-0.32		
ICV 160-121380/1	05/08/14 14:36	82237-334_00003	0.2579	0.20-0.32	97.2	95-105
CCV 160-128008/1	06/22/14 20:10	82235-334_00001	0.2569	0.20-0.32	96.9	95-105

Detector: AV71

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120048/1	05/04/14 17:49	82240-334_00001	0.2679	0.20-0.32		
ICV 160-121381/1	05/08/14 17:19	82244-334_00001	0.2589	0.20-0.32	96.6	95-105
CCV 160-128009/1	06/22/14 20:10	82240-334_00001	0.2683	0.20-0.32	100.1	95-105

Detector: AV115

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120840/1	05/07/14 19:52	82244-334_00001	0.2626	0.20-0.32		
ICV 160-121418/1	05/11/14 20:54	82237-334_00003	0.2672	0.20-0.32	101.8	95-105
CCV 160-127876/1	06/19/14 15:10	82244-334_00001	0.2651	0.20-0.32	100.9	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV116

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-119675/1	04/30/14 22:55	82240-334_00001	0.2704	0.20-0.32		
ICV 160-121419/1	05/11/14 22:06	82245-334_00001	0.2603	0.20-0.32	96.2	95-105
CCV 160-127877/1	06/19/14 15:10	82240-334_00001	0.2694	0.20-0.32	99.6	95-105

Detector: AV117

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-119676/1	04/30/14 22:55	82241-334_00001	0.2586	0.20-0.32		
ICV 160-121420/1	05/11/14 22:06	82240-334_00001	0.2603	0.20-0.32	100.7	95-105
CCV 160-127878/1	06/19/14 15:10	82241-334_00001	0.2593	0.20-0.32	100.3	95-105

Detector: AV118

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-119677/1	04/30/14 22:55	82242-334_00001	0.2584	0.20-0.32		
ICV 160-121421/1	05/11/14 23:19	82241-334_00001	0.2655	0.20-0.32	102.8	95-105
CCV 160-127879/1	06/19/14 15:10	82242-334_00001	0.2593	0.20-0.32	100.3	95-105

Tracer/Carrier Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102370-1
SDG: 680-102370-1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Matrix: Solid

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	Th-229 (30-110)
680-102370-1	SD-DUP-03	79.6
680-102370-1 DU	SD-DUP-03	83.8
680-102370-2	SD-206-SS	83.2
680-102370-3	SD-206-01	84.2
680-102370-4	SD-206-02	78.9
680-102370-7	SD-215-SS	76.6
680-102370-8	SD-222-SS	82.5
680-102370-9	SD-222-01	89.0
680-102370-10	SD-222-02	89.3
680-102370-11	SD-222-03	81.8
680-102370-12	SD-211-SS	67.3
680-102370-13	SD-211-01	76.4
680-102370-14	SD-211-02	80.3
680-102370-15	SD-216-SS	62.6
680-102370-16	SD-216-01	80.6
680-102370-17	SD-216-02	84.1
680-102370-18	SD-217-SS	38.1
680-102370-19	SD-217-01	92.6
680-102370-20	SD-217-02	83.1
680-102370-22	SD-214-SS	67.9
680-102370-23	SD-214-01	82.1
680-102370-23 MS	SD-214-01	84.0
680-102370-23MSD	SD-214-01	88.5
680-102370-24	SD-212-SS	86.1
680-102370-25	SD-212-01	74.2
680-102370-26	SD-212-02	87.9
680-102370-28	SD-DUP-04	83.9
680-102370-29	SD-213-SS	80.3
680-102370-30	SD-213-01	89.7
680-102370-31	SD-213-02	78.8
680-102370-34	SD-214-02	89.8
680-102370-35	SD-214-03	84.8
LCS 160-128227/2-A	Lab Control Sample	71.2
LCS 160-128228/2-A	Lab Control Sample	94.3
MB 160-128227/1-A	Method Blank	93.9
MB 160-128228/1-A	Method Blank	91.7

Tracer/Carrier Legend

Th-229 = Thorium-229

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Lab Sample ID: MB 160-128227/1-A
Matrix: Solid
Analysis Batch: 129243

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 128227

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.0006459	U	0.0224	0.0224	1.00	0.0669	pCi/g	06/23/14 15:01	07/01/14 12:32	1
Thorium-230	0.1034		0.0654	0.0660	1.00	0.0310	pCi/g	06/23/14 15:01	07/01/14 12:32	1
Thorium-232	0.0000	U	0.00386	0.00386	1.00	0.0309	pCi/g	06/23/14 15:01	07/01/14 12:32	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*93.9*		*30 - 110*	*06/23/14 15:01*	*07/01/14 12:32*	*1*

Lab Sample ID: LCS 160-128227/2-A
Matrix: Solid
Analysis Batch: 129244

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 128227

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Thorium-230	24.5	24.83		2.66	1.00	0.156	pCi/g	101	81 - 118

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*71.2*		*30 - 110*

Lab Sample ID: 680-102370-1 DU
Matrix: Solid
Analysis Batch: 129279

Client Sample ID: SD-DUP-03
Prep Type: Total/NA
Prep Batch: 128227

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Thorium-228	0.613		0.7360		0.198	1.00	0.101	pCi/g	0.32	1
Thorium-230	0.682		0.6714		0.185	1.00	0.0594	pCi/g	0.03	1
Thorium-232	0.657		0.6923		0.187	1.00	0.0518	pCi/g	0.09	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Thorium-229	*83.8*		*30 - 110*

Lab Sample ID: MB 160-128228/1-A
Matrix: Solid
Analysis Batch: 129241

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 128228

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.006508	U	0.0215	0.0216	1.00	0.0541	pCi/g	06/23/14 15:05	07/01/14 12:25	1
Thorium-230	0.1211		0.0724	0.0731	1.00	0.0541	pCi/g	06/23/14 15:05	07/01/14 12:25	1
Thorium-232	0.0000	U	0.00389	0.00389	1.00	0.0311	pCi/g	06/23/14 15:05	07/01/14 12:25	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*91.7*		*30 - 110*	*06/23/14 15:05*	*07/01/14 12:25*	*1*

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry) (Continued)

Lab Sample ID: LCS 160-128228/2-A
Matrix: Solid
Analysis Batch: 129242

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 128228

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Thorium-230			24.5	20.69		2.16	1.00	0.0591	pCi/g	84	81 - 118		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*94.3*		*30 - 110*

Lab Sample ID: 680-102370-23 MS
Matrix: Solid
Analysis Batch: 129269

Client Sample ID: SD-214-01
Prep Type: Total/NA
Prep Batch: 128228

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Thorium-230	0.865		4.33	5.842		0.716	1.00	0.125	pCi/g	115	76 - 115		

Tracer	*MS %Yield*	*MS Qualifier*	*Limits*
Thorium-229	*84.0*		*30 - 110*

Lab Sample ID: 680-102370-23MSD
Matrix: Solid
Analysis Batch: 129774

Client Sample ID: SD-214-01
Prep Type: Total/NA
Prep Batch: 128228

Analyte	Sample Result	Sample Qual	Spike Added	MSD Result	MSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Thorium-230	5.89		4.31	5.550		0.679	1.00	0.106	pCi/g	109	76 - 115	0.21	1

Tracer	*MSD %Yield*	*MSD Qualifier*	*Limits*
Thorium-229	*88.5*		*30 - 110*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-128622/1-A
Matrix: Solid
Analysis Batch: 131682

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 128622

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.03852	U	0.0771	0.0773	1.00	0.129	pCi/g	06/25/14 12:41	07/16/14 02:12	1
Radium-228	-0.008469	U	0.0505	0.0505		0.224	pCi/g	06/25/14 12:41	07/16/14 02:12	1
Thorium-232	-0.008469	U	0.0505	0.0505		0.224	pCi/g	06/25/14 12:41	07/16/14 02:12	1
Uranium-235	0.0000	U	0.0699	0.0699		0.320	pCi/g	06/25/14 12:41	07/16/14 02:12	1
Uranium-238	-0.2907	U	0.636	0.636		1.09	pCi/g	06/25/14 12:41	07/16/14 02:12	1

Other Detected Radionuclides	*MB Result*	*MB Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*06/25/14 12:41*	*07/16/14 02:12*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: LCS 160-128622/2-A
Matrix: Solid
Analysis Batch: 131933

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 128622

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	97.4	101.0		10.7		1.50	pCi/g	104	87 - 116
Cesium-137	31.0	30.57		3.34		0.389	pCi/g	99	87 - 120
Cobalt-60	22.0	22.05		2.33		0.0869	pCi/g	100	87 - 115

Lab Sample ID: 680-102370-6 DU
Matrix: Solid
Analysis Batch: 131938

Client Sample ID: SD-005E-01
Prep Type: Total/NA
Prep Batch: 128622

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Radium-226	0.465		0.5591		0.162	1.00	0.118	pCi/g	0.33	1
Radium-228	0.507		0.4101		0.151		0.276	pCi/g	0.30	1
Thorium-232	0.507		0.4101		0.151		0.276	pCi/g	0.30	1
Uranium-235	0.149	U	0.06926	U	0.209		0.400	pCi/g	0.20	1
Uranium-238	0.845	U	1.230	U	0.590		1.51	pCi/g	0.26	1

Rad

Leach Batch: 127216

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102370-1	SD-DUP-03	Total/NA	Solid	Dry and Grind	
680-102370-1 DU	SD-DUP-03	Total/NA	Solid	Dry and Grind	
680-102370-2	SD-206-SS	Total/NA	Solid	Dry and Grind	
680-102370-3	SD-206-01	Total/NA	Solid	Dry and Grind	
680-102370-4	SD-206-02	Total/NA	Solid	Dry and Grind	
680-102370-6	SD-005E-01	Total/NA	Solid	Dry and Grind	
680-102370-6 DU	SD-005E-01	Total/NA	Solid	Dry and Grind	
680-102370-7	SD-215-SS	Total/NA	Solid	Dry and Grind	
680-102370-8	SD-222-SS	Total/NA	Solid	Dry and Grind	
680-102370-9	SD-222-01	Total/NA	Solid	Dry and Grind	
680-102370-10	SD-222-02	Total/NA	Solid	Dry and Grind	
680-102370-11	SD-222-03	Total/NA	Solid	Dry and Grind	
680-102370-12	SD-211-SS	Total/NA	Solid	Dry and Grind	
680-102370-13	SD-211-01	Total/NA	Solid	Dry and Grind	
680-102370-14	SD-211-02	Total/NA	Solid	Dry and Grind	
680-102370-15	SD-216-SS	Total/NA	Solid	Dry and Grind	
680-102370-16	SD-216-01	Total/NA	Solid	Dry and Grind	
680-102370-17	SD-216-02	Total/NA	Solid	Dry and Grind	
680-102370-18	SD-217-SS	Total/NA	Solid	Dry and Grind	
680-102370-19	SD-217-01	Total/NA	Solid	Dry and Grind	
680-102370-20	SD-217-02	Total/NA	Solid	Dry and Grind	
680-102370-22	SD-214-SS	Total/NA	Solid	Dry and Grind	
680-102370-23	SD-214-01	Total/NA	Solid	Dry and Grind	
680-102370-23 MS	SD-214-01	Total/NA	Solid	Dry and Grind	
680-102370-23MSD	SD-214-01	Total/NA	Solid	Dry and Grind	
680-102370-24	SD-212-SS	Total/NA	Solid	Dry and Grind	
680-102370-25	SD-212-01	Total/NA	Solid	Dry and Grind	
680-102370-26	SD-212-02	Total/NA	Solid	Dry and Grind	
680-102370-28	SD-DUP-04	Total/NA	Solid	Dry and Grind	
680-102370-29	SD-213-SS	Total/NA	Solid	Dry and Grind	
680-102370-30	SD-213-01	Total/NA	Solid	Dry and Grind	
680-102370-31	SD-213-02	Total/NA	Solid	Dry and Grind	
680-102370-33	SD-008-01	Total/NA	Solid	Dry and Grind	
680-102370-34	SD-214-02	Total/NA	Solid	Dry and Grind	
680-102370-35	SD-214-03	Total/NA	Solid	Dry and Grind	

Prep Batch: 128227

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102370-1	SD-DUP-03	Total/NA	Solid	ExtChrom	127216
680-102370-1 DU	SD-DUP-03	Total/NA	Solid	ExtChrom	127216
680-102370-2	SD-206-SS	Total/NA	Solid	ExtChrom	127216
680-102370-3	SD-206-01	Total/NA	Solid	ExtChrom	127216
680-102370-4	SD-206-02	Total/NA	Solid	ExtChrom	127216
680-102370-7	SD-215-SS	Total/NA	Solid	ExtChrom	127216
680-102370-8	SD-222-SS	Total/NA	Solid	ExtChrom	127216
680-102370-9	SD-222-01	Total/NA	Solid	ExtChrom	127216
680-102370-10	SD-222-02	Total/NA	Solid	ExtChrom	127216
680-102370-11	SD-222-03	Total/NA	Solid	ExtChrom	127216
680-102370-12	SD-211-SS	Total/NA	Solid	ExtChrom	127216
680-102370-13	SD-211-01	Total/NA	Solid	ExtChrom	127216
680-102370-14	SD-211-02	Total/NA	Solid	ExtChrom	127216

Rad (Continued)

Prep Batch: 128227 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102370-15	SD-216-SS	Total/NA	Solid	ExtChrom	127216
680-102370-16	SD-216-01	Total/NA	Solid	ExtChrom	127216
680-102370-17	SD-216-02	Total/NA	Solid	ExtChrom	127216
680-102370-18	SD-217-SS	Total/NA	Solid	ExtChrom	127216
680-102370-19	SD-217-01	Total/NA	Solid	ExtChrom	127216
680-102370-20	SD-217-02	Total/NA	Solid	ExtChrom	127216
680-102370-22	SD-214-SS	Total/NA	Solid	ExtChrom	127216
LCS 160-128227/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-128227/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Prep Batch: 128228

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102370-23	SD-214-01	Total/NA	Solid	ExtChrom	127216
680-102370-23 MS	SD-214-01	Total/NA	Solid	ExtChrom	127216
680-102370-23MSD	SD-214-01	Total/NA	Solid	ExtChrom	127216
680-102370-24	SD-212-SS	Total/NA	Solid	ExtChrom	127216
680-102370-25	SD-212-01	Total/NA	Solid	ExtChrom	127216
680-102370-26	SD-212-02	Total/NA	Solid	ExtChrom	127216
680-102370-28	SD-DUP-04	Total/NA	Solid	ExtChrom	127216
680-102370-29	SD-213-SS	Total/NA	Solid	ExtChrom	127216
680-102370-30	SD-213-01	Total/NA	Solid	ExtChrom	127216
680-102370-31	SD-213-02	Total/NA	Solid	ExtChrom	127216
680-102370-34	SD-214-02	Total/NA	Solid	ExtChrom	127216
680-102370-35	SD-214-03	Total/NA	Solid	ExtChrom	127216
LCS 160-128228/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-128228/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Prep Batch: 128622

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102370-6	SD-005E-01	Total/NA	Solid	Fill_Geo-21	127216
680-102370-6 DU	SD-005E-01	Total/NA	Solid	Fill_Geo-21	127216
680-102370-33	SD-008-01	Total/NA	Solid	Fill_Geo-21	127216
LCS 160-128622/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-128622/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

Alpha Spectroscopy Analysis Detail Report

Prep Batch: 128227

Lab ID: MB 160-128227/1-A
Client ID.
Sigma: 2

Analyzed: 07/01/14 12:32
Detector: AV117
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.0006459	0.0224	0.0224	U	pCi/g	1.00	0.0669	129243
Thorium-230	0.1034	0.0654	0.0660		pCi/g	1.00	0.0310	129243
Thorium-232	0.0000	0.00386	0.00386	U	pCi/g	1.00	0.0309	129243

Tracer	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.743	0.473	0.675		pCi/g	0.0593	6.12	93.9	30 - 110

Lab ID: LCS 160-128227/2-A
Client ID:
Sigma: 2

Analyzed: 07/01/14 12:32
Detector: AV118
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	24.83	1.65	2.66		pCi/g	1.00	0.156	129244

Tracer	LCS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	8.765	0.828	1.11		pCi/g	0.0587	12.3	71.2	30 - 110

Lab ID: 680-102370-1
Client ID: SD-DUP-03
Sigma: 2

Analyzed: 07/01/14 12:32
Detector: AV24
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.613	0.180	0.187		pCi/g	1.00	0.129	129268
Thorium-230	0.682	0.182	0.191		pCi/g	1.00	0.0773	129268
Thorium-232	0.657	0.178	0.187		pCi/g	1.00	0.0726	129268

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.87	0.431	0.594		pCi/g	0.0647	6.12	79.6	30 - 110

Lab ID: 680-102370-1 DU
Client ID: SD-DUP-03
Sigma: 2

Analyzed: 07/01/14 12:32
Detector: AV51
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.7360	0.188	0.198		pCi/g	1.00	0.101	129279
Thorium-230	0.6714	0.176	0.185		pCi/g	1.00	0.0594	129279
Thorium-232	0.6923	0.178	0.187		pCi/g	1.00	0.0518	129279

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128227

Lab ID: 680-102370-1 DU
Client ID: SD-DUP-03
Sigma: 2
Analyzed: 07/01/14 12:32
Detector: AV51
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Tracer	DU Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.135	0.444	0.619		pCi/g	0.0545	6.13	83.8	30 - 110

Lab ID: 680-102370-2
Client ID: SD-206-SS
Sigma: 2
Analyzed: 07/01/14 12:32
Detector: AV53
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.03	0.219	0.236		pCi/g	1.00	0.0843	129280
Thorium-230	0.873	0.202	0.215		pCi/g	1.00	0.0811	129280
Thorium-232	0.993	0.213	0.229		pCi/g	1.00	0.0646	129280

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.07	0.439	0.611		pCi/g	0.0580	6.09	83.2	30 - 110

Lab ID: 680-102370-3
Client ID: SD-206-01
Sigma: 2
Analyzed: 07/01/14 12:32
Detector: AV54
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.27	0.245	0.267		pCi/g	1.00	0.105	129281
Thorium-230	1.04	0.220	0.237		pCi/g	1.00	0.0779	129281
Thorium-232	1.24	0.238	0.260		pCi/g	1.00	0.0553	129281

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.16	0.447	0.622		pCi/g	0.0625	6.12	84.2	30 - 110

Lab ID: 680-102370-4
Client ID: SD-206-02
Sigma: 2
Analyzed: 07/01/14 12:32
Detector: AV55
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.09	0.229	0.247		pCi/g	1.00	0.0845	129282
Thorium-230	0.809	0.198	0.209		pCi/g	1.00	0.0769	129282
Thorium-232	1.14	0.234	0.253		pCi/g	1.00	0.0766	129282

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.83	0.426	0.588		pCi/g	0.0487	6.12	78.9	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128227

Lab ID: 680-102370-7
Client ID: SD-215-SS
Sigma: 2

Analyzed: 07/01/14 12:32
Detector: AV56
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.898	0.214	0.227		pCi/g	1.00	0.0890	129283
Thorium-230	0.499	0.159	0.164		pCi/g	1.00	0.0570	129283
Thorium-232	1.01	0.225	0.240		pCi/g	1.00	0.0648	129283

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.67	0.424	0.577		pCi/g	0.0546	6.10	76.6	30 - 110

Lab ID: 680-102370-8
Client ID: SD-222-SS
Sigma: 2

Analyzed: 07/01/14 12:32
Detector: AV58
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.297	0.120	0.122		pCi/g	1.00	0.0782	129285
Thorium-230	0.429	0.144	0.149		pCi/g	1.00	0.0881	129285
Thorium-232	0.363	0.130	0.133		pCi/g	1.00	0.0558	129285

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.06	0.438	0.611		pCi/g	0.0541	6.14	82.5	30 - 110

Lab ID: 680-102370-9
Client ID: SD-222-01
Sigma: 2

Analyzed: 07/01/14 12:32
Detector: AV59
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.639	0.164	0.172		pCi/g	1.00	0.0667	129286
Thorium-230	0.689	0.169	0.178		pCi/g	1.00	0.0469	129286
Thorium-232	0.487	0.141	0.147		pCi/g	1.00	0.0308	129286

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.46	0.448	0.641		pCi/g	0.0275	6.14	89.0	30 - 110

Lab ID: 680-102370-10
Client ID: SD-222-02
Sigma: 2

Analyzed: 07/01/14 12:33
Detector: AV60
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.421	0.140	0.145		pCi/g	1.00	0.102	129288
Thorium-230	0.436	0.138	0.143		pCi/g	1.00	0.0687	129288

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128227

Lab ID: 680-102370-10
Client ID: SD-222-02
Sigma: 2

Analyzed: 07/01/14 12:33
Detector: AV60
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-232	0.338	0.121	0.124		pCi/g	1.00	0.0601	129288

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.44	0.454	0.644		pCi/g	0.0432	6.09	89.3	30 - 110

Lab ID: 680-102370-11
Client ID: SD-222-03
Sigma: 2

Analyzed: 07/01/14 12:33
Detector: AV61
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.767	0.193	0.203		pCi/g	1.00	0.102	129289
Thorium-230	0.495	0.152	0.157		pCi/g	1.00	0.0529	129289
Thorium-232	0.647	0.173	0.181		pCi/g	1.00	0.0524	129289

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.99	0.435	0.604		pCi/g	0.0579	6.10	81.8	30 - 110

Lab ID: 680-102370-12
Client ID: SD-211-SS
Sigma: 2

Analyzed: 07/01/14 12:33
Detector: AV62
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.20	0.262	0.281		pCi/g	1.00	0.100	129290
Thorium-230	1.21	0.262	0.281		pCi/g	1.00	0.0734	129290
Thorium-232	1.41	0.282	0.306		pCi/g	1.00	0.0422	129290

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.11	0.397	0.526		pCi/g	0.0436	6.11	67.3	30 - 110

Lab ID: 680-102370-13
Client ID: SD-211-01
Sigma: 2

Analyzed: 07/01/14 12:33
Detector: AV63
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.31	0.266	0.288		pCi/g	1.00	0.129	129291
Thorium-230	0.882	0.216	0.228		pCi/g	1.00	0.0879	129291
Thorium-232	1.18	0.247	0.266		pCi/g	1.00	0.0522	129291

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128227

Lab ID: 680-102370-13
Client ID: SD-211-01
Sigma: 2
Analyzed: 07/01/14 12:33
Detector: AV63
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.69	0.431	0.584		pCi/g	0.0639	6.14	76.4	30 - 110

Lab ID: 680-102370-14
Client ID: SD-211-02
Sigma: 2
Analyzed: 07/01/14 12:33
Detector: AV64
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.08	0.223	0.241		pCi/g	1.00	0.0892	129292
Thorium-230	0.928	0.205	0.220		pCi/g	1.00	0.0641	129292
Thorium-232	0.984	0.210	0.226		pCi/g	1.00	0.0510	129292

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.92	0.422	0.591		pCi/g	0.0586	6.12	80.3	30 - 110

Lab ID: 680-102370-15
Client ID: SD-216-SS
Sigma: 2
Analyzed: 07/01/14 12:33
Detector: AV65
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.01	0.253	0.267		pCi/g	1.00	0.151	129293
Thorium-230	0.820	0.221	0.231		pCi/g	1.00	0.0765	129293
Thorium-232	0.903	0.231	0.243		pCi/g	1.00	0.0762	129293

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	3.81	0.375	0.493		pCi/g	0.0525	6.10	62.6	30 - 110

Lab ID: 680-102370-16
Client ID: SD-216-01
Sigma: 2
Analyzed: 07/01/14 12:33
Detector: AV66
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.946	0.218	0.232		pCi/g	1.00	0.110	129294
Thorium-230	0.895	0.209	0.222		pCi/g	1.00	0.0852	129294
Thorium-232	0.956	0.214	0.229		pCi/g	1.00	0.0619	129294

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.92	0.437	0.602		pCi/g	0.0764	6.11	80.6	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128227

Lab ID: 680-102370-17
Client ID: SD-216-02
Sigma: 2

Analyzed: 07/01/14 12:33
Detector: AV67
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.690	0.176	0.185		pCi/g	1.00	0.0835	129295
Thorium-230	0.583	0.160	0.168		pCi/g	1.00	0.0620	129295
Thorium-232	0.688	0.174	0.183		pCi/g	1.00	0.0637	129295

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.14	0.434	0.612		pCi/g	0.0418	6.11	84.1	30 - 110

Lab ID: 680-102370-18
Client ID: SD-217-SS
Sigma: 2

Analyzed: 07/01/14 12:33
Detector: AV68
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.437	0.219	0.222		pCi/g	1.00	0.184	129296
Thorium-230	0.657	0.259	0.265		pCi/g	1.00	0.141	129296
Thorium-232	0.371	0.192	0.194		pCi/g	1.00	0.0742	129296

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.33	0.297	0.356		pCi/g	0.0431	6.12	38.1	30 - 110

Lab ID: 680-102370-19
Client ID: SD-217-01
Sigma: 2

Analyzed: 07/01/14 12:33
Detector: AV69
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.431	0.138	0.143		pCi/g	1.00	0.0787	129297
Thorium-230	0.360	0.124	0.128		pCi/g	1.00	0.0485	129297
Thorium-232	0.370	0.125	0.129		pCi/g	1.00	0.0318	129297

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.69	0.474	0.673		pCi/g	0.0513	6.15	92.6	30 - 110

Lab ID: 680-102370-20
Client ID: SD-217-02
Sigma: 2

Analyzed: 07/01/14 12:33
Detector: AV70
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.767	0.190	0.201		pCi/g	1.00	0.0903	129299
Thorium-230	0.551	0.160	0.167		pCi/g	1.00	0.0697	129299

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128227

Lab ID: 680-102370-20
Client ID: SD-217-02
Sigma: 2

Analyzed: 07/01/14 12:33
Detector: AV70
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-232	0.665	0.175	0.183		pCi/g	1.00	0.0622	129299

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.10	0.440	0.614		pCi/g	0.0432	6.14	83.1	30 - 110

Lab ID: 680-102370-22
Client ID: SD-214-SS
Sigma: 2

Analyzed: 07/01/14 12:33
Detector: AV71
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.855	0.221	0.233		pCi/g	1.00	0.112	129300
Thorium-230	0.948	0.230	0.243		pCi/g	1.00	0.0715	129300
Thorium-232	1.04	0.240	0.255		pCi/g	1.00	0.0626	129300

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.15	0.395	0.527		pCi/g	0.0637	6.12	67.9	30 - 110

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-128227/1-A	Thorium-228			0.0006459	U	pCi/g							
MB 160-128227/1-A	Thorium-230			0.1034		pCi/g							
MB 160-128227/1-A	Thorium-232			0.0000	U	pCi/g							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-128227/2-A	Thorium-230		24.5	24.83		pCi/g	101	81 - 118					

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
680-102370-1	Thorium-228	0.613		0.7360		pCi/g			18	0.32	0.91	1	
680-102370-1	Thorium-230	0.682		0.6714		pCi/g			2	0.03	0.08	1	
680-102370-1	Thorium-232	0.657		0.6923		pCi/g			5	0.09	0.27	1	

Glossary:
Ts = Count Duration, Sample

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102370-1

SDG No.: 680-102370-1

Batch Number: 128227 Batch Start Date: 06/23/14 15:01 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/01/14 09:26

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-128227/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-128227/2		ExtChrom, A-01-R		0.4968 g	0.2 mL	0.4968 g			
680-102370-A-1-A	SD-DUP-03	ExtChrom, A-01-R	T	0.9994 g	0.2 mL				
680-102370-A-1-A DU	SD-DUP-03	ExtChrom, A-01-R	T	0.9980 g	0.2 mL				
680-102370-A-2-A	SD-206-SS	ExtChrom, A-01-R	T	1.0045 g	0.2 mL				
680-102370-A-3-A	SD-206-01	ExtChrom, A-01-R	T	0.9994 g	0.2 mL				
680-102370-A-4-A	SD-206-02	ExtChrom, A-01-R	T	0.9992 g	0.2 mL				
680-102370-A-7-A	SD-215-SS	ExtChrom, A-01-R	T	1.0030 g	0.2 mL				
680-102370-A-8-A	SD-222-SS	ExtChrom, A-01-R	T	.9970 g	0.2 mL				
680-102370-A-9-A	SD-222-01	ExtChrom, A-01-R	T	.9969 g	0.2 mL				
680-102370-A-10-A	SD-222-02	ExtChrom, A-01-R	T	1.0048 g	0.2 mL				
680-102370-A-11-A	SD-222-03	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				
680-102370-A-12-A	SD-211-SS	ExtChrom, A-01-R	T	1.0023 g	0.2 mL				
680-102370-A-13-A	SD-211-01	ExtChrom, A-01-R	T	0.9969 g	0.2 mL				
680-102370-A-14-A	SD-211-02	ExtChrom, A-01-R	T	0.9997 g	0.2 mL				
680-102370-A-15-A	SD-216-SS	ExtChrom, A-01-R	T	1.0038 g	0.2 mL				
680-102370-A-16-A	SD-216-01	ExtChrom, A-01-R	T	1.0023 g	0.2 mL				
680-102370-A-17-A	SD-216-02	ExtChrom, A-01-R	T	1.0015 g	0.2 mL				
680-102370-A-18-A	SD-217-SS	ExtChrom, A-01-R	T	1.0005 g	0.2 mL				
680-102370-A-19-A	SD-217-01	ExtChrom, A-01-R	T	0.9956 g	0.2 mL				
680-102370-A-20-A	SD-217-02	ExtChrom, A-01-R	T	0.9975 g	0.2 mL				

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

A-01-R

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102370-1

SDG No.: 680-102370-1

Batch Number: 128227 Batch Start Date: 06/23/14 15:01 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/01/14 09:26

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
680-102370-A-22 -A	SD-214-SS	ExtChrom, A-01-R	T	0.9997 g	0.2 mL				

Batch Notes	
Balance ID	27050421
Column Analyst	scb
Column Date	6/27/14
CoPrecipitation Analyst	scb
CoPrecipitation Date	7/1/14
Person's name who witnessed reagent drop	nmn per scb
Analyst who added reagent	scb
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102370-1

SDG No.: 680-102370-1

Batch Number: 128228 Batch Start Date: 06/23/14 15:05 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/01/14 09:24

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	Th-230 00023	TRM-2 00001		
MB 160-128228/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-128228/2		ExtChrom, A-01-R		0.4997 g	0.2 mL		0.4997 g		
680-102370-A-23 -A	SD-214-01	ExtChrom, A-01-R	T	0.9992 g	0.2 mL				
680-102370-A-23 -B MS	SD-214-01	ExtChrom, A-01-R	T	0.9980 g	0.2 mL	0.2 mL			
680-102370-A-23 -C MSD	SD-214-01	ExtChrom, A-01-R	T	1.0011 g	0.2 mL	0.2 mL			
680-102370-A-24 -A	SD-212-SS	ExtChrom, A-01-R	T	0.9960 g	0.2 mL				
680-102370-A-25 -A	SD-212-01	ExtChrom, A-01-R	T	0.9964 g	0.2 mL				
680-102370-A-26 -A	SD-212-02	ExtChrom, A-01-R	T	1.0000 g	0.2 mL				
680-102370-A-28 -A	SD-DUP-04	ExtChrom, A-01-R	T	1.0015 g	0.2 mL				
680-102370-A-29 -A	SD-213-SS	ExtChrom, A-01-R	T	1.0000 g	0.2 mL				
680-102370-A-30 -A	SD-213-01	ExtChrom, A-01-R	T	1.0010 g	0.2 mL				
680-102370-A-31 -A	SD-213-02	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				
680-102370-A-34 -A	SD-214-02	ExtChrom, A-01-R	T	0.9996 g	0.2 mL				
680-102370-A-35 -A	SD-214-03	ExtChrom, A-01-R	T	1.0033 g	0.2 mL				

Batch Notes	
Balance ID	27050421
Column Analyst	scb
Column Date	6/27/14
CoPrecipitation Analyst	scb
CoPrecipitation Date	7/1/14
Person's name who witnessed reagent drop	nmn per scb
Analyst who added reagent	scb
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102370-1

SDG No.: 680-102370-1

Batch Number: 128228 Batch Start Date: 06/23/14 15:05 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/01/14 09:24

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128228

Lab ID: MB 160-128228/1-A
Client ID:
Sigma: 2
Analyzed: 07/01/14 12:25
Detector: AV115
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.006508	0.0215	0.0216	U	pCi/g	1.00	0.0541	129241
Thorium-230	0.1211	0.0724	0.0731		pCi/g	1.00	0.0541	129241
Thorium-232	0.0000	0.00389	0.00389	U	pCi/g	1.00	0.0311	129241

Tracer	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.611	0.463	0.661		pCi/g	0.0435	6.12	91.7	30 - 110

Lab ID: LCS 160-128228/2-A
Client ID:
Sigma: 2
Analyzed: 07/01/14 12:25
Detector: AV116
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	20.69	1.28	2.16		pCi/g	1.00	0.0591	129242

Tracer	LCS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	11.54	0.926	1.34		pCi/g	0.0557	12.2	94.3	30 - 110

Lab ID: 680-102370-23
Client ID: SD-214-01
Sigma: 2
Analyzed: 07/01/14 12:26
Detector: AV1
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.986	0.218	0.233		pCi/g	1.00	0.0975	129224
Thorium-230	0.865	0.205	0.218		pCi/g	1.00	0.104	129224
Thorium-232	1.09	0.228	0.246		pCi/g	1.00	0.102	129224

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.02	0.438	0.609		pCi/g	0.0497	6.12	82.1	30 - 110

Lab ID: 680-102370-23 MS
Client ID: SD-214-01
Sigma: 2
Analyzed: 07/01/14 12:26
Detector: AV3
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	MS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	5.842	0.521	0.716		pCi/g	1.00	0.125	129269

Tracer	MS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.148	0.446	0.621		pCi/g	0.0656	6.13	84.0	30 - 110

Alpha Spectroscopy Analysis Detail Report

Prep Batch: 128228

Lab ID: 680-102370-23MSD
Client ID: SD-214-01
Sigma: 2

Analyzed: 07/03/14 17:15
Detector: AV3
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	MSD Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	5.550	0.493	0.679		pCi/g	1.00	0.106	129774

Tracer	MSD Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.408	0.457	0.644		pCi/g	0.0806	6.11	88.5	30 - 110

Lab ID: 680-102370-24
Client ID: SD-212-SS
Sigma: 2

Analyzed: 07/01/14 12:26
Detector: AV6
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.964	0.214	0.229		pCi/g	1.00	0.112	129287
Thorium-230	0.923	0.208	0.222		pCi/g	1.00	0.0973	129287
Thorium-232	1.03	0.217	0.234		pCi/g	1.00	0.0766	129287

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.29	0.454	0.635		pCi/g	0.0692	6.14	86.1	30 - 110

Lab ID: 680-102370-25
Client ID: SD-212-01
Sigma: 2

Analyzed: 07/01/14 12:26
Detector: AV7
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.24	0.260	0.280		pCi/g	1.00	0.118	129298
Thorium-230	1.00	0.231	0.246		pCi/g	1.00	0.0866	129298
Thorium-232	1.12	0.246	0.263		pCi/g	1.00	0.100	129298

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.55	0.422	0.570		pCi/g	0.0594	6.14	74.2	30 - 110

Lab ID: 680-102370-26
Client ID: SD-212-02
Sigma: 2

Analyzed: 07/01/14 12:26
Detector: AV8
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.10	0.220	0.239		pCi/g	1.00	0.103	129309
Thorium-230	1.17	0.222	0.243		pCi/g	1.00	0.0504	129309
Thorium-232	1.01	0.208	0.225		pCi/g	1.00	0.0776	129309

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128228

Lab ID: 680-102370-26 | Analyzed: 07/01/14 12:26 | Decay Corrected: No
Client ID: SD-212-02 | Detector: AV8 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.38	0.448	0.636		pCi/g	0.0734	6.12	87.9	30 - 110

Lab ID: 680-102370-28 | Analyzed: 07/01/14 12:26 | Decay Corrected: No
Client ID: SD-DUP-04 | Detector: AV9 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.06	0.218	0.235		pCi/g	1.00	0.0678	129320
Thorium-230	1.04	0.216	0.233		pCi/g	1.00	0.0715	129320
Thorium-232	1.26	0.236	0.258		pCi/g	1.00	0.0571	129320

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.12	0.436	0.613		pCi/g	0.0482	6.11	83.9	30 - 110

Lab ID: 680-102370-29 | Analyzed: 07/01/14 12:26 | Decay Corrected: No
Client ID: SD-213-SS | Detector: AV10 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.10	0.235	0.253		pCi/g	1.00	0.111	129225
Thorium-230	1.26	0.248	0.270		pCi/g	1.00	0.0688	129225
Thorium-232	1.23	0.244	0.265		pCi/g	1.00	0.0361	129225

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.91	0.438	0.602		pCi/g	0.0744	6.12	80.3	30 - 110

Lab ID: 680-102370-30 | Analyzed: 07/01/14 12:26 | Decay Corrected: No
Client ID: SD-213-01 | Detector: AV11 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.998	0.208	0.224		pCi/g	1.00	0.0956	129236
Thorium-230	0.979	0.203	0.219		pCi/g	1.00	0.0673	129236
Thorium-232	1.17	0.222	0.243		pCi/g	1.00	0.0738	129236

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.48	0.453	0.646		pCi/g	0.0604	6.11	89.7	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128228

Lab ID: 680-102370-31
Client ID: SD-213-02
Sigma: 2
Analyzed: 07/01/14 12:26
Detector: AV12
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.14	0.239	0.257		pCi/g	1.00	0.0938	129246
Thorium-230	1.15	0.237	0.256		pCi/g	1.00	0.0557	129246
Thorium-232	1.18	0.241	0.261		pCi/g	1.00	0.0899	129246

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.81	0.431	0.591		pCi/g	0.0504	6.10	78.8	30 - 110

Lab ID: 680-102370-34
Client ID: SD-214-02
Sigma: 2
Analyzed: 07/01/14 12:26
Detector: AV13
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.22	0.231	0.253		pCi/g	1.00	0.0851	129257
Thorium-230	1.24	0.231	0.253		pCi/g	1.00	0.0323	129257
Thorium-232	1.15	0.224	0.244		pCi/g	1.00	0.0859	129257

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.50	0.461	0.653		pCi/g	0.0550	6.12	89.8	30 - 110

Lab ID: 680-102370-35
Client ID: SD-214-03
Sigma: 2
Analyzed: 07/01/14 12:26
Detector: AV14
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.865	0.198	0.211		pCi/g	1.00	0.0684	129259
Thorium-230	0.433	0.140	0.145		pCi/g	1.00	0.0582	129259
Thorium-232	0.856	0.196	0.209		pCi/g	1.00	0.0508	129259

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.17	0.444	0.621		pCi/g	0.0646	6.10	84.8	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128228

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-128228/1-A	Thorium-228			0.006508	U	pCi/g							
MB 160-128228/1-A	Thorium-230			0.1211		pCi/g							
MB 160-128228/1-A	Thorium-232			0.0000	U	pCi/g							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-128228/2-A	Thorium-230		24.5	20.69		pCi/g	84	81 - 118					

Matrix Spike ID:	Analyte	Parent Result	Spike Added	MS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
680-102370-23	Thorium-230	0.865	4.33	5.842		pCi/g	115	76 - 115	5				

Matrix Spike Duplicate ID:	Analyte	Parent Result	Spike Added	MSD Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
680-102370-23MSD	Thorium-230	5.89	4.31	5.550		pCi/g	109	76 - 115	5	0.21	0.59	1	

Glossary:

Ts = Count Duration, Sample

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102370-1

SDG No.: 680-102370-1

Batch Number: 128227 Batch Start Date: 06/23/14 15:01 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/01/14 09:26

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-128227/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-128227/2		ExtChrom, A-01-R		0.4968 g	0.2 mL	0.4968 g			
680-102370-A-1-A	SD-DUP-03	ExtChrom, A-01-R	T	0.9994 g	0.2 mL				
680-102370-A-1-A DU	SD-DUP-03	ExtChrom, A-01-R	T	0.9980 g	0.2 mL				
680-102370-A-2-A	SD-206-SS	ExtChrom, A-01-R	T	1.0045 g	0.2 mL				
680-102370-A-3-A	SD-206-01	ExtChrom, A-01-R	T	0.9994 g	0.2 mL				
680-102370-A-4-A	SD-206-02	ExtChrom, A-01-R	T	0.9992 g	0.2 mL				
680-102370-A-7-A	SD-215-SS	ExtChrom, A-01-R	T	1.0030 g	0.2 mL				
680-102370-A-8-A	SD-222-SS	ExtChrom, A-01-R	T	.9970 g	0.2 mL				
680-102370-A-9-A	SD-222-01	ExtChrom, A-01-R	T	.9969 g	0.2 mL				
680-102370-A-10-A	SD-222-02	ExtChrom, A-01-R	T	1.0048 g	0.2 mL				
680-102370-A-11-A	SD-222-03	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				
680-102370-A-12-A	SD-211-SS	ExtChrom, A-01-R	T	1.0023 g	0.2 mL				
680-102370-A-13-A	SD-211-01	ExtChrom, A-01-R	T	0.9969 g	0.2 mL				
680-102370-A-14-A	SD-211-02	ExtChrom, A-01-R	T	0.9997 g	0.2 mL				
680-102370-A-15-A	SD-216-SS	ExtChrom, A-01-R	T	1.0038 g	0.2 mL				
680-102370-A-16-A	SD-216-01	ExtChrom, A-01-R	T	1.0023 g	0.2 mL				
680-102370-A-17-A	SD-216-02	ExtChrom, A-01-R	T	1.0015 g	0.2 mL				
680-102370-A-18-A	SD-217-SS	ExtChrom, A-01-R	T	1.0005 g	0.2 mL				
680-102370-A-19-A	SD-217-01	ExtChrom, A-01-R	T	0.9956 g	0.2 mL				
680-102370-A-20-A	SD-217-02	ExtChrom, A-01-R	T	0.9975 g	0.2 mL				

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102370-1

SDG No.: 680-102370-1

Batch Number: 128227 Batch Start Date: 06/23/14 15:01 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/01/14 09:26

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
680-102370-A-22 -A	SD-214-SS	ExtChrom, A-01-R	T	0.9997 g	0.2 mL				

Batch Notes	
Balance ID	27050421
Column Analyst	scb
Column Date	6/27/14
CoPrecipitation Analyst	scb
CoPrecipitation Date	7/1/14
Person's name who witnessed reagent drop	nmn per scb
Analyst who added reagent	scb
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102370-1

SDG No.: 680-102370-1

Batch Number: 128228 Batch Start Date: 06/23/14 15:05 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/01/14 09:24

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	Th-230 00023	TRM-2 00001		
MB 160-128228/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-128228/2		ExtChrom, A-01-R		0.4997 g	0.2 mL		0.4997 g		
680-102370-A-23 -A	SD-214-01	ExtChrom, A-01-R	T	0.9992 g	0.2 mL				
680-102370-A-23 -B MS	SD-214-01	ExtChrom, A-01-R	T	0.9980 g	0.2 mL	0.2 mL			
680-102370-A-23 -C MSD	SD-214-01	ExtChrom, A-01-R	T	1.0011 g	0.2 mL	0.2 mL			
680-102370-A-24 -A	SD-212-SS	ExtChrom, A-01-R	T	0.9960 g	0.2 mL				
680-102370-A-25 -A	SD-212-01	ExtChrom, A-01-R	T	0.9964 g	0.2 mL				
680-102370-A-26 -A	SD-212-02	ExtChrom, A-01-R	T	1.0000 g	0.2 mL				
680-102370-A-28 -A	SD-DUP-04	ExtChrom, A-01-R	T	1.0015 g	0.2 mL				
680-102370-A-29 -A	SD-213-SS	ExtChrom, A-01-R	T	1.0000 g	0.2 mL				
680-102370-A-30 -A	SD-213-01	ExtChrom, A-01-R	T	1.0010 g	0.2 mL				
680-102370-A-31 -A	SD-213-02	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				
680-102370-A-34 -A	SD-214-02	ExtChrom, A-01-R	T	0.9996 g	0.2 mL				
680-102370-A-35 -A	SD-214-03	ExtChrom, A-01-R	T	1.0033 g	0.2 mL				

Batch Notes	
Balance ID	27050421
Column Analyst	scb
Column Date	6/27/14
CoPrecipitation Analyst	scb
CoPrecipitation Date	7/1/14
Person's name who witnessed reagent drop	nmn per scb
Analyst who added reagent	scb
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102370-1

SDG No.: 680-102370-1

Batch Number: 128228 Batch Start Date: 06/23/14 15:05 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/01/14 09:24

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

Alpha Spectroscopy Daily Pulser Check

Analysis Date: 07/01/14

		Gross Counts			FWHM (keV)			Pulser Center			Energy (keV)		
Detector	Analysis Date	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F
AV1	07/01/14 01:00	7273	6814.5 - 7531.8	Pass	12.7	10 - 20	Pass	223.0	216.9 - 226.9	Pass	5030	4982.0 - 5062.0	Pass
AV3	07/01/14 01:00	7370	6995.6 - 7732.0	Pass	11.9	10 - 20	Pass	227.0	221.0 - 231.0	Pass	5060	5012.2 - 5092.2	Pass
AV6	07/01/14 01:00	7444	7050.8 - 7793.0	Pass	14.2	10 - 20	Pass	217.0	212.0 - 222.0	Pass	4985	4944.9 - 5024.9	Pass
AV7	07/01/14 01:00	7348	7003.5 - 7740.8	Pass	17.3	10 - 20	Pass	228.2	222.0 - 232.0	Pass	5068	5020.1 - 5100.1	Pass
AV8	07/01/14 01:00	7433	7052.4 - 7794.7	Pass	15.1	10 - 20	Pass	220.9	216.0 - 226.0	Pass	5014	4975.1 - 5055.1	Pass
AV9	07/01/14 01:00	7541	7187.8 - 7944.4	Pass	12.8	10 - 20	Pass	221.0	216.0 - 226.0	Pass	5015	4975.3 - 5055.3	Pass
AV10	07/01/14 01:00	7523	7323.5 - 8094.4	Pass	12.3	10 - 20	Pass	224.0	216.0 - 226.0	Pass	5038	4974.9 - 5054.9	Pass
AV11	07/01/14 01:00	7716	7322.5 - 8093.3	Pass	13.3	10 - 20	Pass	226.0	221.1 - 231.1	Pass	5052	5012.8 - 5092.8	Pass
AV12	07/01/14 01:00	7595	7265.8 - 8030.6	Pass	11.6	10 - 20	Pass	221.0	214.9 - 224.9	Pass	5015	4967.1 - 5047.1	Pass
AV13	07/01/14 01:52	7507	7244.9 - 8007.5	Pass	17.0	10 - 20	Pass	222.9	219.1 - 229.1	Pass	5029	4998.3 - 5078.3	Pass
AV14	07/01/14 01:00	7585	7236.1 - 7997.8	Pass	11.9	10 - 20	Pass	224.0	219.0 - 229.0	Pass	5037	4997.5 - 5077.5	Pass
AV24	07/01/14 01:00	7657	7259.6 - 8023.8	Pass	15.6	10 - 20	Pass	218.1	212.9 - 222.9	Pass	4994	4952.1 - 5032.1	Pass
AV51	07/01/14 01:09	7281	6922.8 - 7651.5	Pass	16.5	10 - 20	Pass	222.1	217.1 - 227.1	Pass	5023	4983.5 - 5063.5	Pass
AV53	07/01/14 01:09	7263	6906.6 - 7633.6	Pass	11.1	10 - 20	Pass	222.0	217.0 - 227.0	Pass	5023	4982.6 - 5062.6	Pass
AV54	07/01/14 01:09	7274	6918.5 - 7646.8	Pass	15.6	10 - 20	Pass	225.8	222.1 - 232.1	Pass	5051	5020.5 - 5100.5	Pass
AV55	07/01/14 01:09	7263	6899.4 - 7625.7	Pass	11.5	10 - 20	Pass	225.0	220.0 - 230.0	Pass	5045	5004.9 - 5084.9	Pass
AV56	07/01/14 01:09	7008	6868.1 - 7591.0	Pass	13.1	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	5004.9 - 5069.9	Pass
AV58	07/01/14 01:09	6979	6766.5 - 7478.7	Pass	13.0	10 - 20	Pass	225.9	219.0 - 229.0	Pass	5052	4997.2 - 5077.2	Pass
AV59	07/01/14 01:09	7256	6885.8 - 7610.6	Pass	18.3	10 - 20	Pass	222.9	217.9 - 227.9	Pass	5029	4989.1 - 5069.1	Pass
AV60	07/01/14 01:09	7230	6867.8 - 7590.7	Pass	15.8	10 - 20	Pass	220.9	216.2 - 226.2	Pass	5014	4976.7 - 5056.7	Pass
AV61	07/01/14 01:09	7197	6682.3 - 7385.7	Pass	17.1	10 - 20	Pass	222.9	219.0 - 229.0	Pass	5030	4997.8 - 5077.8	Pass
AV62	07/01/14 01:09	7250	6875.3 - 7599.0	Pass	18.7	10 - 20	Pass	221.9	217.1 - 227.1	Pass	5022	4983.0 - 5063.0	Pass
AV63	07/01/14 01:09	7247	6829.2 - 7548.0	Pass	13.4	10 - 20	Pass	223.0	217.9 - 227.9	Pass	5030	4989.3 - 5069.3	Pass
AV64	07/01/14 01:09	7242	6847.3 - 7568.1	Pass	14.0	10 - 20	Pass	225.0	219.4 - 229.4	Pass	5045	5000.4 - 5080.4	Pass
AV65	07/01/14 01:09	7230	6864.5 - 7587.1	Pass	15.8	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	4989.7 - 5069.7	Pass
AV66	07/01/14 01:09	7230	6865.2 - 7587.8	Pass	15.4	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	4989.9 - 5069.9	Pass
AV67	07/01/14 01:09	7250	6893.5 - 7619.1	Pass	13.0	10 - 20	Pass	228.0	221.9 - 231.9	Pass	5067	5019.4 - 5099.4	Pass
AV68	07/01/14 01:09	7455	7080.3 - 7825.6	Pass	19.2	10 - 20	Pass	223.9	219.0 - 229.0	Pass	5036	4997.3 - 5077.3	Pass
AV69	07/01/14 01:09	7219	6915.8 - 7643.8	Pass	12.5	10 - 20	Pass	221.0	216.0 - 226.0	Pass	5015	4975.3 - 5055.3	Pass
AV70	07/01/14 01:10	7452	7073.8 - 7818.4	Pass	14.4	10 - 20	Pass	220.1	214.1 - 224.1	Pass	5008	4960.7 - 5040.7	Pass
AV71	07/01/14 01:10	7449	7076.2 - 7821.0	Pass	13.7	10 - 20	Pass	219.0	214.0 - 224.0	Pass	5000	4960.3 - 5040.3	Pass
AV115	07/01/14 01:38	7691	7254.6 - 8018.2	Pass	13.4	10 - 20	Pass	222.0	216.9 - 226.9	Pass	5022	4982.2 - 5062.2	Pass
AV116	07/01/14 01:38	7688	7295.5 - 8063.4	Pass	13.9	10 - 20	Pass	221.0	216.0 - 226.0	Pass	5015	4975.1 - 5055.1	Pass
AV117	07/01/14 01:38	7682	7268.9 - 8034.0	Pass	14.2	10 - 20	Pass	223.1	217.1 - 227.1	Pass	5031	4983.2 - 5063.2	Pass
AV118	07/01/14 01:38	7682	7290.8 - 8058.2	Pass	13.8	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	4990.2 - 5070.2	Pass

Alpha Spectroscopy Daily Pulser Check

Analysis Date: 07/03/14

		Gross Counts			FWHM (keV)			Pulser Center			Energy (keV)		
Detector	Analysis Date	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F
AV3	07/03/14 15:56	7349	6995.6 - 7732.0	Pass	12.1	10 - 20	Pass	227.0	221.0 - 231.0	Pass	5060	5012.2 - 5092.2	Pass

Gamma Spectroscopy Run Log

Detector: GV4

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/30/12 13:58		IC 160-11761/1		11761			JLW
04/02/12 16:50		ICV 160-11761/2		11761			JLW
02/27/13 16:17		ACVTOP 160-38300/1		38300			JLW
07/11/14 15:24		ICB 160-130904/1		130904			JLW
07/16/14 00:01		CCB 160-131933/1		131933			JLW
07/16/14 00:43		CCV 160-131933/2		131933			
07/16/14 01:04		CCV 160-131933/3		131933			JLW
07/16/14 01:37	30	ZZZZZ		131933			
07/16/14 02:10	30	LCS 160-128622/2-A		131933	128622	GA-01-R	JLW
07/16/14 07:34	30	ZZZZZ		131933			
07/16/14 08:18	30	ZZZZZ		131933			
07/16/14 09:29	30	ZZZZZ		131933			
07/16/14 10:18	30	ZZZZZ		131933			
07/16/14 12:14	30	ZZZZZ		131933			
07/16/14 17:30	60	ZZZZZ		131933			
07/16/14 18:47	60	ZZZZZ		131933			
07/16/14 20:05	30	ZZZZZ		131933			
07/16/14 21:02	30	ZZZZZ		131933			
07/16/14 21:57	30	ZZZZZ		131933			
07/16/14 22:47	30	ZZZZZ		131933			
07/16/14 23:18	30	ZZZZZ		131933			

Detector: GV8

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/27/12 10:58		IC 160-12311/1		12311			JLW
03/29/12 01:58		ICV 160-12311/2		12311			JLW
06/10/14 05:54		ACVTOP 160-126217/1		126217			JLW
07/11/14 15:25		ICB 160-130902/1		130902			JLW
07/16/14 00:01		CCV 160-131938/1		131938			
07/16/14 00:22		CCV 160-131938/2		131938			JLW
07/16/14 00:44		CCB 160-131938/3		131938			JLW
07/16/14 01:38	30	ZZZZZ		131938			
07/16/14 02:11	30	680-102370-6 DU	SD-005E-01 DU	131938	128622	GA-01-R	JLW
07/16/14 07:35	30	ZZZZZ		131938			
07/16/14 08:19	30	ZZZZZ		131938			
07/16/14 09:30	30	ZZZZZ		131938			
07/16/14 10:21	30	ZZZZZ		131938			
07/16/14 11:21	120	ZZZZZ		131938			
07/16/14 17:32	60	ZZZZZ		131938			
07/16/14 18:50	30	ZZZZZ		131938			
07/16/14 19:30	30	ZZZZZ		131938			
07/16/14 20:14	30	ZZZZZ		131938			
07/16/14 21:04	30	ZZZZZ		131938			
07/16/14 21:59	30	ZZZZZ		131938			
07/16/14 22:48	30	ZZZZZ		131938			

Detector: GV9

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/03/12 13:37		IC 160-12326/1		12326			JLW
06/14/12 10:54		ICV 160-12326/2		12326			JLW
01/27/14 09:57		ACVTOP 160-101591/1		101591			JLW

Gamma Spectroscopy Run Log

Detector: GV9 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
07/11/14 15:06		ICB 160-130891/1		130891			JLW
07/16/14 00:02		CCV 160-131682/1		131682			
07/16/14 00:23		CCV 160-131682/2		131682			JLW
07/16/14 00:45		CCB 160-131682/3		131682			JLW
07/16/14 01:34	30	680-102370-6	SD-005E-01	131682	128622	GA-01-R	JLW
07/16/14 02:12	30	MB 160-128622/1-A		131682	128622	GA-01-R	JLW
07/16/14 07:32	30	ZZZZZ		131682			
07/16/14 08:15	30	ZZZZZ		131682			
07/16/14 09:30	30	ZZZZZ		131682			
07/16/14 10:15	30	ZZZZZ		131682			
07/16/14 11:10	30	ZZZZZ		131682			
07/16/14 12:09	30	ZZZZZ		131682			
07/16/14 17:35	60	ZZZZZ		131682			
07/16/14 18:45	60	ZZZZZ		131682			
07/16/14 20:06	30	ZZZZZ		131682			
07/16/14 21:54	30	ZZZZZ		131682			
07/16/14 22:49	30	ZZZZZ		131682			

Detector: GV14

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
04/23/12 09:56		IC 160-12359/1		12359			JLW
04/24/12 08:12		ICV 160-12359/2		12359			JLW
01/24/14 08:37		ACVTOP 160-101066/1		101066			JLW
07/11/14 15:06		ICB 160-130894/1		130894			JLW
07/16/14 00:02		CCB 160-131968/1		131968			JLW
07/16/14 00:45		CCV 160-131968/2		131968			
07/16/14 01:06		CCV 160-131968/3		131968			JLW
07/16/14 01:35	30	680-102370-33	SD-008-01	131968	128622	GA-01-R	JLW
07/16/14 02:12	30	ZZZZZ		131968			
07/16/14 07:33	30	ZZZZZ		131968			
07/16/14 08:15	30	ZZZZZ		131968			
07/16/14 09:31	30	ZZZZZ		131968			
07/16/14 10:16	30	ZZZZZ		131968			
07/16/14 11:12	30	ZZZZZ		131968			
07/16/14 12:10	30	ZZZZZ		131968			
07/16/14 17:37	60	ZZZZZ		131968			
07/16/14 18:52	30	ZZZZZ		131968			
07/16/14 19:32	30	ZZZZZ		131968			
07/16/14 20:08	60	ZZZZZ		131968			
07/16/14 22:00	30	ZZZZZ		131968			
07/16/14 22:50	30	ZZZZZ		131968			

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 128622

Lab ID: MB 160-128622/1-A | Analyzed: 07/16/14 02:12 | Ts: 30 | Sigma: 2
Client ID: | Detector: GV9 | Decay Corrected: No

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.03852	0.0771	0.0773	U	pCi/g	1.00	0.129	131682
Radium-228	-0.008469	0.0505	0.0505	U	pCi/g		0.224	131682
Thorium-232	-0.008469	0.0505	0.0505	U	pCi/g		0.224	131682
Uranium-235	0.0000	0.0699	0.0699	U	pCi/g		0.320	131682
Uranium-238	-0.2907	0.636	0.636	U	pCi/g		1.09	131682

Other Detected Radionuclides	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Other Detected Radionuclide	None				pCi/g	

Lab ID: LCS 160-128622/2-A | Analyzed: 07/16/14 02:10 | Ts: 30 | Sigma: 2
Client ID: | Detector: GV4 | Decay Corrected: No

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Americium-241	101.0	2.07	10.7		pCi/g		1.50	131933
Cesium-137	30.57	1.03	3.34		pCi/g		0.389	131933
Cobalt-60	22.05	0.727	2.33		pCi/g		0.0869	131933

Lab ID: 680-102370-6 | Analyzed: 07/16/14 01:34 | Ts: 30 | Sigma: 2
Client ID: SD-005E-01 | Detector: GV9 | Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.465	0.114	0.123		pCi/g	1.00	0.0938	131682
Radium-228	0.507	0.162	0.170		pCi/g		0.123	131682
Thorium-232	0.507	0.162	0.170		pCi/g		0.123	131682
Uranium-235	0.149	0.186	0.187	U	pCi/g		0.303	131682
Uranium-238	0.845	0.895	0.899	U	pCi/g		1.46	131682

Other Detected Radionuclides	Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Ac-228	0.507	0.162	0.170		pCi/g	0.123
Bi-214	0.465	0.114	0.123		pCi/g	0.0938
K-40	4.89	0.912	1.04		pCi/g	0.660
Pb-212	0.480	0.117	0.132		pCi/g	0.111
Pb-214	0.543	0.102	0.116		pCi/g	0.0981
Tl-208	0.189	0.0557	0.0590		pCi/g	0.0446

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 128622

Lab ID: 680-102370-6 DU | Analyzed: 07/16/14 02:11 | Ts: 30 | Sigma: 2
Client ID: SD-005E-01 | Detector: GV8 | Decay Corrected: No

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.5591	0.152	0.162		pCi/g	1.00	0.118	131938
Radium-228	0.4101	0.145	0.151		pCi/g		0.276	131938
Thorium-232	0.4101	0.145	0.151		pCi/g		0.276	131938
Uranium-235	0.06926	0.209	0.209	U	pCi/g		0.400	131938
Uranium-238	1.230	0.576	0.590	U	pCi/g		1.51	131938

Other Detected Radionuclides	DU Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Ac-228	0.4101	0.145	0.151		pCi/g	0.276
Bi-214	0.5591	0.152	0.162		pCi/g	0.118
K-40	3.142	0.914	0.969		pCi/g	0.671
Pb-212	0.5481	0.120	0.139		pCi/g	0.112
Pb-214	0.4858	0.123	0.133		pCi/g	0.115
Tl-208	0.2092	0.0610	0.0648		pCi/g	0.0376

Lab ID: 680-102370-33 | Analyzed: 07/16/14 01:35 | Ts: 30 | Sigma: 2
Client ID: SD-008-01 | Detector: GV14 | Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.732	0.209	0.222		pCi/g	1.00	0.202	131968
Radium-228	0.895	0.210	0.229		pCi/g		0.152	131968
Thorium-232	0.895	0.210	0.229		pCi/g		0.152	131968
Uranium-235	0.209	0.270	0.271	U	pCi/g		0.474	131968
Uranium-238	0.592	0.739	0.741	U	pCi/g		2.17	131968

Other Detected Radionuclides	Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Ac-228	0.895	0.210	0.229		pCi/g	0.152
Bi-214	0.732	0.209	0.222		pCi/g	0.202
K-40	6.71	1.63	1.77		pCi/g	1.45
Pb-212	0.920	0.153	0.194		pCi/g	0.127
Pb-214	0.820	0.172	0.192		pCi/g	0.182
Tl-208	0.260	0.0823	0.0866		pCi/g	0.0788

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 128622

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-128622/1-A	Radium-226			0.03852	U	pCi/g							
MB 160-128622/1-A	Radium-228			-0.008469	U	pCi/g							
MB 160-128622/1-A	Thorium-232			-0.008469	U	pCi/g							
MB 160-128622/1-A	Uranium-235			0.0000	U	pCi/g							
MB 160-128622/1-A	Uranium-238			-0.2907	U	pCi/g							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-128622/2-A	Americium-241		97.4	101.0		pCi/g	104	87 - 116					
LCS 160-128622/2-A	Cesium-137		31.0	30.57		pCi/g	99	87 - 120					
LCS 160-128622/2-A	Cobalt-60		22.0	22.05		pCi/g	100	87 - 115					

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
680-102370-6	Radium-226	0.465		0.5591		pCi/g			18	0.33	0.92	1	
680-102370-6	Radium-228	0.507		0.4101		pCi/g			21	0.30	0.86	1	
680-102370-6	Thorium-232	0.507		0.4101		pCi/g			21	0.30	0.86	1	
680-102370-6	Uranium-235	0.149		0.06926	U	pCi/g			73	0.20	0.57	1	
680-102370-6	Uranium-238	0.845		1.230	U	pCi/g			37	0.26	0.71	1	

Glossary:

Ts = Count Duration, Sample

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102370-1

SDG No.: 680-102370-1

Batch Number: 128622 Batch Start Date: 06/25/14 12:41 Batch Analyst: Price, Justin D

Batch Method: Fill_Geo-21 Batch End Date: 06/25/14 13:10

Lab Sample ID	Client Sample ID	Method Chain	Basis	TareWeight	GrossWeight	InitialAmount	IngDecDate1	IngDecDate3	Geometry
MB 160-128622/1		Fill_Geo-21, GA-01-R				291.18 g	6/25/14	7/16/14	Tuna Can
LCS 160-128622/2		Fill_Geo-21, GA-01-R				341.9 g	6/25/14	7/16/14	Tuna Can
680-102370-A-6-A	SD-005E-01	Fill_Geo-21, GA-01-R	T	46.8 g	410.5 g	363.7 g	6/25/14	7/16/14	Tuna Can
680-102370-A-6-A DU	SD-005E-01	Fill_Geo-21, GA-01-R	T	46.8 g	410.5 g	363.7 g	6/25/14	7/16/14	Tuna Can
680-102370-A-33-A	SD-008-01	Fill_Geo-21, GA-01-R	T	46.1 g	293.0 g	246.9 g	6/25/14	7/16/14	Tuna Can

Lab Sample ID	Client Sample ID	Method Chain	Basis	Tuna Can LCS 00003					
MB 160-128622/1		Fill_Geo-21, GA-01-R							
LCS 160-128622/2		Fill_Geo-21, GA-01-R		# g					
680-102370-A-6-A	SD-005E-01	Fill_Geo-21, GA-01-R	T						
680-102370-A-6-A DU	SD-005E-01	Fill_Geo-21, GA-01-R	T						
680-102370-A-33-A	SD-008-01	Fill_Geo-21, GA-01-R	T						

Batch Notes	
Balance ID	1121432711
SOP Number	ST-RC-0003; ST-RC-0025

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

Gamma Verification per Geometry

Detector: Ge4

Geometry: Tunacan

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 317.8

lab ID# of cal standard 6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14534	97.4
Am-241	2037	418	0.3590	1163	1211.4	104.1
Cd-109	2881	591	0.0361	16363	16123	98.5
Co-57	1511	310	0.8560	362	353.51	97.7
Ce-139	2139	439	0.7990	549	541.9	98.7
Hg-203	4651	954	0.8146	1171	1197.5	102.3
Sn-113	3015	618	0.6400	966	965.83	100.0
Cs-137	1938	397	0.8510	467	464.8	99.5
Y-88	7264	1489	0.9370	1589	1568.4	98.7
Co-60	3580	734	0.9997	734	732.09	99.7
Co-60	3581	734	0.9999	734	730.52	99.5
Y-88	7690	1577	0.9920	1589	1608.9	101.2

Reviewed By: Jody Watson

Date: 4/2/2012

Gamma Verification per Geometry

Detector: Ge8

Geometry: Tunacan

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 317.8

lab ID# of cal standard 6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14960	100.2
Am-241	2037	418	0.3590	1163	1240.5	106.6
Cd-109	2881	591	0.0361	16363	16066	98.2
Co-57	1511	310	0.8560	362	345.12	95.4
Ce-139	2139	439	0.7990	549	536.34	97.7
Hg-203	4651	954	0.8146	1171	1218.2	104.1
Sn-113	3015	618	0.6400	966	967.15	100.1
Cs-137	1938	397	0.8510	467	465.86	99.8
Y-88	7264	1489	0.9370	1589	1552.1	97.6
Co-60	3580	734	0.9997	734	724.48	98.7
Co-60	3581	734	0.9999	734	729.98	99.4
Y-88	7690	1577	0.9920	1589	1627.2	102.4

Reviewed By: Jody Watson

Date: 3/28/2012

Gamma Verification per Geometry

Detector: Ge9

Geometry: Tunacan

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 317.8

lab ID# of cal standard 6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14240	95.4
Am-241	2037	418	0.3590	1163	1244.5	107.0
Cd-109	2881	591	0.0361	16363	15902	97.2
Co-57	1511	310	0.8560	362	347.48	96.0
Ce-139	2139	439	0.7990	549	535.87	97.6
Hg-203	4651	954	0.8146	1171	1216.7	103.9
Sn-113	3015	618	0.6400	966	970.65	100.5
Cs-137	1938	397	0.8510	467	466.58	99.9
Y-88	7264	1489	0.9370	1589	1552.5	97.7
Co-60	3580	734	0.9997	734	727.12	99.0
Co-60	3581	734	0.9999	734	719.75	98.0
Y-88	7690	1577	0.9920	1589	1638.8	103.1

Reviewed By: Jody Watson

Date: 6/14/2012

Gamma Verification per Geometry

Detector: Ge14

Geometry: Tunacan

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 317.8

lab ID# of cal standard 6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14422	96.6
Am-241	2037	418	0.3590	1163	1222.5	105.1
Cd-109	2881	591	0.0361	16363	16145	98.7
Co-57	1511	310	0.8560	362	349.28	96.5
Ce-139	2139	439	0.7990	549	538.52	98.1
Hg-203	4651	954	0.8146	1171	1205.9	103.0
Sn-113	3015	618	0.6400	966	971.36	100.6
Cs-137	1938	397	0.8510	467	465.65	99.7
Y-88	7264	1489	0.9370	1589	1570	98.8
Co-60	3580	734	0.9997	734	724.16	98.6
Co-60	3581	734	0.9999	734	720.6	98.1
Y-88	7690	1577	0.9920	1589	1634	102.8

Reviewed By: Jody Watson

Date: 4/23/2012

2nd Source Verification

Detector: Ge4

Geometry: Tunacan

Reference date 1/1/2010

Source: 81427-334

Standard volume g / vial 1550

Standard volume transferred in g / geometry 318.5

lab ID# of cal standard Tuna Can_00002

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1179.4	101.3
Cs-137	1926	396	0.851	465	435.81	93.7
Co-60	3611	742	0.99974	742	706.01	95.1
Co-60	3612	742	0.999856	742	707.18	95.3

Reviewed By: Megan McAfee

Date: 4/5/2012

2nd Source Verification

Detector: Ge8

Geometry: Tunacan

Reference date 1/1/2010

Source: 81427-334

Standard volume g / vial 1550

Standard volume transferred in g / geometry 318.5

lab ID# of cal standard 6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1175.4	101.0
Cs-137	1926	396	0.851	465	446.61	96.0
Co-60	3611	742	0.99974	742	697.22	93.9
Co-60	3612	742	0.999856	742	691.92	93.2

Reviewed By: Jody Watson

Date: 3/29/2012

2nd Source Verification

Detector: Ge9

Geometry: Tunacan

Reference date 1/1/2010

Source: 81427-334

Standard volume g / vial 1550

Standard volume transferred in g / geometry 318.5

lab ID# of cal standard 6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1169.4	100.4
Cs-137	1926	396	0.851	465	444.52	95.6
Co-60	3611	742	0.99974	742	687.72	92.7
Co-60	3612	742	0.999856	742	692.56	93.3

Reviewed By: Jody Watson

Date: 6/14/2012

2nd Source Verification

Detector: Ge14

Geometry: Tunacan

Reference date 1/1/2010

Source: 81427-334

Standard volume g / vial 1550

Standard volume transferred in g / geometry 318.5

lab ID# of cal standard 6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1140.8	98.0
Cs-137	1926	396	0.851	465	447.55	96.2
Co-60	3611	742	0.99974	742	690.01	93.0
Co-60	3612	742	0.999856	742	699.61	94.2

Reviewed By: Jody Watson

Date: 4/24/2012

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Sediments

Report Number: 680-102370-4

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 06/13/2014; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 3.1 C.

A revised report was necessary to correct the final volume that was used to calculate the Uranium data.

TOTAL URANIUM

Samples SD-215-SS (680-102370-7), SD-222-SS (680-102370-8), SD-222-01 (680-102370-9), SD-222-02 (680-102370-10), SD-222-03 (680-102370-11), SD-211-SS (680-102370-12), SD-211-01 (680-102370-13), SD-211-02 (680-102370-14), SD-216-SS (680-102370-15), SD-216-01 (680-102370-16), SD-216-02 (680-102370-17), SD-217-SS (680-102370-18), SD-217-01 (680-102370-19), SD-217-02 (680-102370-20), SD-214-SS (680-102370-22), SD-214-01 (680-102370-23), SD-212-SS (680-102370-24), SD-212-01 (680-102370-25), SD-212-02 (680-102370-26), SD-DUP-04 (680-102370-28), SD-213-SS (680-102370-29), SD-213-01 (680-102370-30), SD-213-02 (680-102370-31), SD-008-01 (680-102370-33) and SD-214-02 (680-102370-34) were analyzed for Total Uranium in accordance with EPA SW-846 6020A. The samples were analyzed on 09/04/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM

Samples SD-215-SS (680-102370-7), SD-222-SS (680-102370-8), SD-222-01 (680-102370-9), SD-222-02 (680-102370-10), SD-222-03 (680-102370-11), SD-211-SS (680-102370-12), SD-211-01 (680-102370-13), SD-211-02 (680-102370-14), SD-216-SS (680-102370-15), SD-216-01 (680-102370-16), SD-216-02 (680-102370-17), SD-217-SS (680-102370-18), SD-217-01 (680-102370-19), SD-217-02 (680-102370-20), SD-214-SS (680-102370-22), SD-214-01 (680-102370-23), SD-212-SS (680-102370-24), SD-212-01 (680-102370-25), SD-212-02 (680-102370-26), SD-DUP-04 (680-102370-28), SD-213-SS (680-102370-29), SD-213-01 (680-102370-30), SD-213-02 (680-102370-31), SD-008-01 (680-102370-33) and SD-214-02 (680-102370-34) were analyzed for Isotopic Uranium in accordance with EPA SW-846 6020A. The samples were prepared on 08/20/2014 and analyzed on 09/02/2014.

The instrument blank (ICB) contained uranium 233 greater than the reporting limit (RL). All associated samples were non-detect, showing there was no high bias. The data have been qualified and reported. (ICB 160-141597/10)

U-238 exceeded the recovery criteria high for the MS/MSD of sample SD-214-01 (680-102370-23) in batch 160-141597.

Refer to the QC report for details.

The presence of the '4' qualifier indicates analytes where the concentration in the unspiked sample exceeded four times the spiking amount.

Refer to the QC report for details.

Samples SD-215-SS (680-102370-7)[5X], SD-222-SS (680-102370-8)[5X], SD-222-01 (680-102370-9)[5X], SD-222-02 (680-102370-10)[5X], SD-222-03 (680-102370-11)[5X], SD-211-SS (680-102370-12)[5X], SD-211-01 (680-102370-13)[5X], SD-211-02 (680-102370-14)[5X], SD-216-SS (680-102370-15)[5X], SD-216-01 (680-102370-16)[5X], SD-216-02 (680-102370-17)[5X], SD-217-SS (680-102370-18)[5X], SD-217-01 (680-102370-19)[5X], SD-217-02 (680-102370-20)[5X], SD-214-SS (680-102370-22)[5X], SD-214-01 (680-102370-23)[5X], SD-212-SS (680-102370-24)[5X], SD-212-01 (680-102370-25)[5X], SD-212-02 (680-102370-26)[5X], SD-DUP-04 (680-102370-28)[5X], SD-213-SS (680-102370-29)[5X], SD-213-01 (680-102370-30)[5X], SD-213-02 (680-102370-31)[5X], SD-008-01 (680-102370-33)[5X] and SD-214-02 (680-102370-34)[5X] required dilution prior to analysis. Samples were high in salts. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM PERCENTAGE

Samples SD-215-SS (680-102370-7), SD-222-SS (680-102370-8), SD-222-01 (680-102370-9), SD-222-02 (680-102370-10), SD-222-03

(680-102370-11), SD-211-SS (680-102370-12), SD-211-01 (680-102370-13), SD-211-02 (680-102370-14), SD-216-SS (680-102370-15), SD-216-01 (680-102370-16), SD-216-02 (680-102370-17), SD-217-SS (680-102370-18), SD-217-01 (680-102370-19), SD-217-02 (680-102370-20), SD-214-SS (680-102370-22), SD-214-01 (680-102370-23), SD-212-SS (680-102370-24), SD-212-01 (680-102370-25), SD-212-02 (680-102370-26), SD-DUP-04 (680-102370-28), SD-213-SS (680-102370-29), SD-213-01 (680-102370-30), SD-213-02 (680-102370-31), SD-008-01 (680-102370-33) and SD-214-02 (680-102370-34) were analyzed for Isotopic Uranium Percentage in accordance with EPA SW-846 6020A. The samples were analyzed on 09/04/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM ACTIVITY

Samples SD-215-SS (680-102370-7), SD-222-SS (680-102370-8), SD-222-01 (680-102370-9), SD-222-02 (680-102370-10), SD-222-03 (680-102370-11), SD-211-SS (680-102370-12), SD-211-01 (680-102370-13), SD-211-02 (680-102370-14), SD-216-SS (680-102370-15), SD-216-01 (680-102370-16), SD-216-02 (680-102370-17), SD-217-SS (680-102370-18), SD-217-01 (680-102370-19), SD-217-02 (680-102370-20), SD-214-SS (680-102370-22), SD-214-01 (680-102370-23), SD-212-SS (680-102370-24), SD-212-01 (680-102370-25), SD-212-02 (680-102370-26), SD-DUP-04 (680-102370-28), SD-213-SS (680-102370-29), SD-213-01 (680-102370-30), SD-213-02 (680-102370-31), SD-008-01 (680-102370-33) and SD-214-02 (680-102370-34) were analyzed for Isotopic Uranium Activity in accordance with EPA SW-846 6020A. The samples were prepared on 08/20/2014 and analyzed on 09/02/2014.

Samples SD-215-SS (680-102370-7)[5X], SD-222-SS (680-102370-8)[5X], SD-222-01 (680-102370-9)[5X], SD-222-02 (680-102370-10)[5X], SD-222-03 (680-102370-11)[5X], SD-211-SS (680-102370-12)[5X], SD-211-01 (680-102370-13)[5X], SD-211-02 (680-102370-14)[5X], SD-216-SS (680-102370-15)[5X], SD-216-01 (680-102370-16)[5X], SD-216-02 (680-102370-17)[5X], SD-217-SS (680-102370-18)[5X], SD-217-01 (680-102370-19)[5X], SD-217-02 (680-102370-20)[5X], SD-214-SS (680-102370-22)[5X], SD-214-01 (680-102370-23)[5X], SD-212-SS (680-102370-24)[5X], SD-212-01 (680-102370-25)[5X], SD-212-02 (680-102370-26)[5X], SD-DUP-04 (680-102370-28)[5X], SD-213-SS (680-102370-29)[5X], SD-213-01 (680-102370-30)[5X], SD-213-02 (680-102370-31)[5X], SD-008-01 (680-102370-33)[5X] and SD-214-02 (680-102370-34)[5X] required dilution prior to analysis. Samples were high in salts. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102370-4
SDG: 680-102370-4

Method	Method Description	Protocol	Laboratory
6020A	Metals (ICP/MS), Isotopic Uranium	SW846	TAL SL
6020A	Metals (ICP/MS), Total Uranium	SW846	TAL SL
6020A	Metals (ICP/MS), Isotopic Uranium Percentage	SW846	TAL SL
6020A Activity	Metals (ICP/MS), Isotopic Uranium (Activity)	SW846	TAL SL

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102370-4
SDG: 680-102370-4

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-102370-7	SD-215-SS	Solid	06/12/14 08:50	06/13/14 09:30
680-102370-8	SD-222-SS	Solid	06/12/14 09:05	06/13/14 09:30
680-102370-9	SD-222-01	Solid	06/12/14 09:10	06/13/14 09:30
680-102370-10	SD-222-02	Solid	06/12/14 09:15	06/13/14 09:30
680-102370-11	SD-222-03	Solid	06/12/14 19:20	06/13/14 09:30
680-102370-12	SD-211-SS	Solid	06/12/14 10:00	06/13/14 09:30
680-102370-13	SD-211-01	Solid	06/12/14 10:05	06/13/14 09:30
680-102370-14	SD-211-02	Solid	06/12/14 10:10	06/13/14 09:30
680-102370-15	SD-216-SS	Solid	06/12/14 10:20	06/13/14 09:30
680-102370-16	SD-216-01	Solid	06/12/14 10:25	06/13/14 09:30
680-102370-17	SD-216-02	Solid	06/12/14 10:30	06/13/14 09:30
680-102370-18	SD-217-SS	Solid	06/12/14 12:20	06/13/14 09:30
680-102370-19	SD-217-01	Solid	06/12/14 12:25	06/13/14 09:30
680-102370-20	SD-217-02	Solid	06/12/14 12:30	06/13/14 09:30
680-102370-22	SD-214-SS	Solid	06/12/14 13:10	06/13/14 09:30
680-102370-23	SD-214-01	Solid	06/12/14 13:15	06/13/14 09:30
680-102370-24	SD-212-SS	Solid	06/12/14 14:10	06/13/14 09:30
680-102370-25	SD-212-01	Solid	06/12/14 14:15	06/13/14 09:30
680-102370-26	SD-212-02	Solid	06/12/14 14:20	06/13/14 09:30
680-102370-28	SD-DUP-04	Solid	06/12/14 00:00	06/13/14 09:30
680-102370-29	SD-213-SS	Solid	06/12/14 14:30	06/13/14 09:30
680-102370-30	SD-213-01	Solid	06/12/14 14:35	06/13/14 09:30
680-102370-31	SD-213-02	Solid	06/12/14 14:40	06/13/14 09:30
680-102370-33	SD-008-01	Solid	06/12/14 14:50	06/13/14 09:30
680-102370-34	SD-214-02	Solid	06/12/14 13:20	06/13/14 09:30

12-IN
PREPARATION LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

Prep Method: 3050B

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight (g)	Initial Volume	Final Volume (mL)
MB 160-139040/1-A	08/20/2014 11:20	139040	0.5541		50
LCS 160-139040/2-A	08/20/2014 11:20	139040	0.5465		50
680-102370-7	08/20/2014 11:20	139040	0.5210		50
680-102370-8	08/20/2014 11:20	139040	0.5185		50
680-102370-9	08/20/2014 11:20	139040	0.5177		50
680-102370-10	08/20/2014 11:20	139040	0.5667		50
680-102370-11	08/20/2014 11:20	139040	0.5064		50
680-102370-12	08/20/2014 11:20	139040	0.5197		50
680-102370-13	08/20/2014 11:20	139040	0.5497		50
680-102370-14	08/20/2014 11:20	139040	0.5252		50
680-102370-15	08/20/2014 11:20	139040	0.5268		50
680-102370-16	08/20/2014 11:20	139040	0.5549		50
680-102370-17	08/20/2014 11:20	139040	0.5505		50
680-102370-18	08/20/2014 11:20	139040	0.5547		50
680-102370-19	08/20/2014 11:20	139040	0.5731		50
680-102370-20	08/20/2014 11:20	139040	0.5271		50
680-102370-22	08/20/2014 11:20	139040	0.5049		50
680-102370-23	08/20/2014 11:20	139040	0.5432		50
680-102370-23 MS	08/20/2014 11:20	139040	0.5919		50
680-102370-23 MSD	08/20/2014 11:20	139040	0.5553		50
680-102370-24	08/20/2014 11:20	139040	0.5744		50
680-102370-25	08/20/2014 11:20	139040	0.5673		50

FORM XII-IN

12-IN
PREPARATION LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

Prep Method: 3050B

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight (g)	Initial Volume	Final Volume (mL)
MB 160-139047/1-A	08/20/2014 12:10	139047	0.5651		50
LCS 160-139047/2-A	08/20/2014 12:10	139047	0.5283		50
680-102370-26	08/20/2014 12:10	139047	0.5385		50
680-102370-26 MS	08/20/2014 12:10	139047	0.5889		50
680-102370-26 MSD	08/20/2014 12:10	139047	0.5099		50
680-102370-28	08/20/2014 12:10	139047	0.5605		50
680-102370-29	08/20/2014 12:10	139047	0.5246		50
680-102370-30	08/20/2014 12:10	139047	0.5922		50
680-102370-31	08/20/2014 12:10	139047	0.5270		50
680-102370-33	08/20/2014 12:10	139047	0.5710		50
680-102370-34	08/20/2014 12:10	139047	0.5760		50

COVER PAGE
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102370-4

SDG No.: 680-102370-4

Project: Sediments

Client Sample ID	Lab Sample ID
SD-215-SS	680-102370-7
SD-222-SS	680-102370-8
SD-222-01	680-102370-9
SD-222-02	680-102370-10
SD-222-03	680-102370-11
SD-211-SS	680-102370-12
SD-211-01	680-102370-13
SD-211-02	680-102370-14
SD-216-SS	680-102370-15
SD-216-01	680-102370-16
SD-216-02	680-102370-17
SD-217-SS	680-102370-18
SD-217-01	680-102370-19
SD-217-02	680-102370-20
SD-214-SS	680-102370-22
SD-214-01	680-102370-23
SD-212-SS	680-102370-24
SD-212-01	680-102370-25
SD-212-02	680-102370-26
SD-DUP-04	680-102370-28
SD-213-SS	680-102370-29
SD-213-01	680-102370-30
SD-213-02	680-102370-31
SD-008-01	680-102370-33
SD-214-02	680-102370-34

Comments:

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/02/2014 18:15 End Date: 09/03/2014 00:54

Lab Sample Id	D/F	Type	Time	Analytes				
				U-233	U-234	U-235	U-236	U-238
ICIS 160-141597/1			18:15	X	X	X	X	X
IC 160-141597/2	1		18:22	X	X	X	X	X
IC 160-141597/3	1		18:27	X	X	X	X	X
IC 160-141597/4	1		18:31	X	X	X	X	X
IC 160-141597/5	1		18:36	X	X	X	X	X
IC 160-141597/6	1		18:41	X	X	X	X	X
ICV 160-141597/7	1		18:45	X				
ICV 160-141597/8	1		18:50		X			X
ICV 160-141597/9	1		18:55			X	X	
ICB 160-141597/10	1		18:59	X	X	X	X	X
CRI 160-141597/11	1		19:04			X		X
CRI 160-141597/12	1		19:09	X	X		X	
ICSA 160-141597/13	1		19:13	X	X	X	X	X
ICSAB 160-141597/14	1		19:18	X	X	X	X	X
CCV 160-141597/15	1		19:23	X	X	X	X	X
CCB 160-141597/16	1		19:27	X	X	X	X	X
MB 160-139040/1-A	2	T	19:32	X	X	X	X	X
LCS 160-139040/2-A	2	T	19:37		X	X		X
680-102370-7	5	T	19:41	X	X	X	X	X
680-102370-8	5	T	19:46	X	X	X	X	X
680-102370-9	5	T	19:51	X	X	X	X	X
680-102370-10	5	T	19:55	X	X	X	X	X
680-102370-11	5	T	20:00	X	X	X	X	X
680-102370-12	5	T	20:05	X	X	X	X	X
680-102370-13	5	T	20:09	X	X	X	X	X
680-102370-14	5	T	20:14	X	X	X	X	X
CCV 160-141597/27	1		20:19	X	X	X	X	X
CCB 160-141597/28	1		20:23	X	X	X	X	X
680-102370-15	5	T	20:28	X	X	X	X	X
680-102370-16	5	T	20:33	X	X	X	X	X
680-102370-17	5	T	20:37	X	X	X	X	X
680-102370-18	5	T	20:42	X	X	X	X	X
680-102370-19	5	T	20:47	X	X	X	X	X
680-102370-20	5	T	20:51	X	X	X	X	X
680-102370-22	5	T	20:56	X	X	X	X	X
680-102370-23	5	T	21:01	X	X	X	X	X
680-102370-23 SD	25	T	21:05	X	X	X	X	X
680-102370-23 MS	5	T	21:10		X	X		X
CCV 160-141597/39	1		21:15	X	X	X	X	X

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/02/2014 18:15 End Date: 09/03/2014 00:54

| Lab Sample Id | D/F | Type | Time | Analytes | | |

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/02/2014 18:15 End Date: 09/03/2014 00:54

Lab Sample Id	D/F	Type	Time	Analytes																														
				U-233	U-234	U-235	U-236	U-238																												
ZZZZZZ			00:22																																
ZZZZZZ			00:26																																
ZZZZZZ			00:31																																
ZZZZZZ			00:36																																
ZZZZZZ			00:40																																
ZZZZZZ			00:45																																
CCV 160-141597/85			00:50																																
CCB 160-141597/86			00:54																																

Prep Types:
T = Total/NA

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

Instrument ID: NOEQUIP Analysis Method: 6020A

Start Date: 09/04/2014 13:19 End Date: 09/04/2014 13:19

Lab Sample Id	D/F	Type	Time	Analytes
				U
680-102370-7	1	T	13:19	X
ZZZZZZ			13:19	
ZZZZZZ			13:19	
680-102370-8	1	T	13:19	X
680-102370-9	1	T	13:19	X
680-102370-10	1	T	13:19	X
680-102370-11	1	T	13:19	X
680-102370-12	1	T	13:19	X
680-102370-13	1	T	13:19	X
680-102370-14	1	T	13:19	X
680-102370-15	1	T	13:19	X
680-102370-16	1	T	13:19	X
680-102370-17	1	T	13:19	X
680-102370-18	1	T	13:19	X
680-102370-19	1	T	13:19	X
680-102370-20	1	T	13:19	X
680-102370-22	1	T	13:19	X
680-102370-23	1	T	13:19	X
680-102370-24	1	T	13:19	X
680-102370-25	1	T	13:19	X

Prep Types:
T = Total/NA

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

Instrument ID: NOEQUIP Analysis Method: 6020A

Start Date: 09/04/2014 13:20 End Date: 09/04/2014 13:20

Lab Sample Id	D/F	Type	Time	Analytes																											
				U																											
680-102370-26	1	T	13:20	X																											
680-102370-28	1	T	13:20	X																											
680-102370-29	1	T	13:20	X																											
680-102370-30	1	T	13:20	X																											
680-102370-31	1	T	13:20	X																											
680-102370-33	1	T	13:20	X																											
680-102370-34	1	T	13:20	X																											

Prep Types:
T = Total/NA

FORM XIII-IN

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

ICV Source: ISOU ICV(3)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00021

Analyte	ICV 160-141597/7 09/02/2014 18:45				CCV 160-141597/15 09/02/2014 19:23				CCV 160-141597/27 09/02/2014 20:19			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.226		0.223	101	0.0511		0.0515	99	0.0507		0.0515	98

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

ICV Source: ISOU ICV(3)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00021

Analyte	CCV 160-141597/39 09/02/2014 21:15				CCV 160-141597/51 09/02/2014 22:11				CCV 160-141597/63 09/02/2014 23:07			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.0492	J	0.0515	95	0.0493	J	0.0515	96	0.0508		0.0515	99

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

ICV Source: ISOU ICV(4,8)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00021

Analyte	ICV 160-141597/8 09/02/2014 18:50				CCV 160-141597/15 09/02/2014 19:23				CCV 160-141597/27 09/02/2014 20:19			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0892		0.0835	107	0.0867		0.0827	105	0.0876		0.0827	106
U-238	10.1		9.78	103	5.40		5.03	107	5.51		5.03	110

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

ICV Source: ISOU ICV(4,8)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00021

Analyte	CCV 160-141597/39 09/02/2014 21:15				CCV 160-141597/51 09/02/2014 22:11				CCV 160-141597/63 09/02/2014 23:07			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0847		0.0827	102	0.0871		0.0827	105	0.0874		0.0827	106
U-238	5.32		5.03	106	5.50		5.03	109	5.49		5.03	109

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

ICV Source: ISOU ICV(5,6)_00022 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00021

Analyte	ICV 160-141597/9 09/02/2014 18:55				CCV 160-141597/15 09/02/2014 19:23				CCV 160-141597/27 09/02/2014 20:19			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	1.16		1.06	109	5.23		4.85	108	5.28		4.85	109
U-236	0.0702		0.0746	94	0.0931		0.0890	105	0.0948		0.0890	107

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

ICV Source: ISOU ICV(5,6)_00022 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00021

Analyte	CCV 160-141597/39 09/02/2014 21:15				CCV 160-141597/51 09/02/2014 22:11				CCV 160-141597/63 09/02/2014 23:07			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	5.08		4.85	105	5.27		4.85	109	5.25		4.85	108
U-236	0.0910		0.0890	102	0.0933		0.0890	105	0.0945		0.0890	106

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2B-IN
CRQL CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

Method: 6020A Instrument ID: ICPMS6100

Lab Sample ID: CRI 160-141597/11 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 1_00021

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-235	0.0485	0.0499	J	103	70-130
U-238	0.0503	0.0496	J	99	70-130

Lab Sample ID: CRI 160-141597/12 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 2_00022

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-233	0.0309	0.0363	J	117	70-130
U-234	0.0496	0.0495	J	100	70-130
U-236	0.0534	0.0529		99	70-130

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IIB-IN

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

Concentration Units: ug/L

Analyte	RL	ICB 160-141597/10 09/02/2014 18:59		CCB 160-141597/16 09/02/2014 19:27		CCB 160-141597/28 09/02/2014 20:23		CCB 160-141597/40 09/02/2014 21:19	
		Found	C	Found	C	Found	C	Found	C
U-233	0.050	0.0345	J	0.0140	J	0.0142	J	0.0139	J
U-234	0.050	ND		ND		ND		ND	
U-235	0.050	ND		ND		ND		ND	
U-236	0.050	ND		ND		ND		ND	
U-238	0.050	ND		ND		ND		ND	

Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

Concentration Units: ug/L

Analyte	RL	CCB 160-141597/52 09/02/2014 22:16		CCB 160-141597/64 09/02/2014 23:12					
		Found	C	Found	C	Found	C	Found	C
U-233	0.050	0.0146	J	0.0150	J				
U-234	0.050	ND		ND					
U-235	0.050	ND		ND					
U-236	0.050	ND		ND					
U-238	0.050	ND		ND					

Italicized analytes were not requested for this sequence.

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

Concentration Units: mg/Kg Lab Sample ID: MB 160-139040/1-A

Instrument Code: ICPMS6100 Batch No.: 141597

CAS No.	Analyte	Concentration	C	Q	Method
13968-55-3	U-233	ND			6020A_U
13966-29-5	U-234	ND			6020A_U
15117-96-1	U-235	ND			6020A_U
13982-70-2	U-236	ND			6020A_U
7440-61-1	U-238	ND			6020A_U

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

Concentration Units: mg/Kg Lab Sample ID: MB 160-139047/1-A

Instrument Code: ICPMS6100 Batch No.: 141597

CAS No.	Analyte	Concentration	C	Q	Method
13968-55-3	U-233	ND			6020A_U
13966-29-5	U-234	ND			6020A_U
15117-96-1	U-235	ND			6020A_U
13982-70-2	U-236	ND			6020A_U
7440-61-1	U-238	ND			6020A_U

4A-IN
INTERFERENCE CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

Lab Sample ID: ICSAB 160-141597/14 Instrument ID: ICPMS6100

Lab File ID: 090214M2.rep ICS Source: ISOU ICSAB_00022

Concentration Units: ug/L

Analyte	True Solution AB	Found Solution AB	Percent Recovery
U-233	**0.0515**	**0.0537**	**104**
U-234	**0.0827**	**0.0910**	**110**
U-235	**4.85**	**5.47**	**113**
U-236	**0.0890**	**0.0975**	**110**
U-238	**5.03**	**5.69**	**113**

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IVA-IN

5A-IN
MATRIX SPIKE SAMPLE RECOVERY
METALS

Client ID: SD-214-01 MS
Lab ID: 680-102370-23 MS
Lab Name: TestAmerica St. Louis
Job No.: 680-102370-4
SDG No.: 680-102370-4
Matrix: Solid
Concentration Units: mg/Kg
% Solids:

Analyte	SSR	C	Sample Result (SR)	C	Spike Added (SA)	%R	Control Limit %R	Q	Method
U-234	0.00767	J	ND		0.00698	110	75-125		6020A
U-235	0.480		0.018		0.409	113	75-125		6020A
U-238	2.95		2.4		0.425	132	75-125	4	6020A

SSR = Spiked Sample Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VA - IN

5A-IN
MATRIX SPIKE DUPLICATE SAMPLE RECOVERY
METALS

Client ID: SD-214-01 MSD
Lab ID: 680-102370-23 MSD
Lab Name: TestAmerica St. Louis
Job No.: 680-102370-4
SDG No.: 680-102370-4
Matrix: Solid
Concentration Units: mg/Kg
% Solids:

Analyte	(SDR)	C	Spike Added (SA)	%R	Control Limit %R	RPD	RPD Limit	Q	Method
U-234	0.00876	J	0.00744	118	75-125	13	20		6020A
U-235	0.525		0.436	116	75-125	9	20		6020A
U-238	2.97		0.453	130	75-125	1	20	4	6020A

SDR = Sample Duplicate Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VD - IN

5A-IN
MATRIX SPIKE SAMPLE RECOVERY
METALS

Client ID: SD-212-02 MS
Lab ID: 680-102370-26 MS
Lab Name: TestAmerica St. Louis
Job No.: 680-102370-4
SDG No.: 680-102370-4
Matrix: Solid
Concentration Units: mg/Kg
% Solids:

Analyte	SSR	C	Sample Result (SR)	C	Spike Added (SA)	%R	Control Limit %R	Q	Method
U-234	0.00792	J	ND		0.00702	113	75-125		6020A
U-235	0.483		0.015		0.412	114	75-125		6020A
U-238	2.48		2.0		0.427	109	75-125	4	6020A

SSR = Spiked Sample Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VA - IN

5A-IN
MATRIX SPIKE DUPLICATE SAMPLE RECOVERY
METALS

Client ID: SD-212-02 MSD
Lab ID: 680-102370-26 MSD
Lab Name: TestAmerica St. Louis
Job No.: 680-102370-4
SDG No.: 680-102370-4
Matrix: Solid
Concentration Units: mg/Kg
% Solids:

Analyte	(SDR)	C	Spike Added (SA)	%R	Control Limit %R	RPD	RPD Limit	Q	Method
U-234	0.00832	J	0.00811	103	75-125	5	20		6020A
U-235	0.514		0.475	105	75-125	6	20		6020A
U-238	2.58		0.493	113	75-125	4	20	4	6020A

SDR = Sample Duplicate Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VD - IN

7A-IN
LAB CONTROL SAMPLE
METALS

Lab ID: LCS 160-139040/2-A

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

Sample Matrix: Solid LCS Source: ISOU Prep Spk_00002

Analyte	Solid(mg/Kg)							
	True	Found	C	%R	Limits		Q	Method
U-234	0.00756	0.00824		109	80	120		6020A
U-235	0.444	0.496		112	80	120		6020A
U-238	0.460	0.511		111	80	120		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

7A-IN
LAB CONTROL SAMPLE
METALS

Lab ID: LCS 160-139047/2-A

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

Sample Matrix: Solid LCS Source: ISOU Prep Spk_00002

Analyte	Solid(mg/Kg)							
	True	Found	C	%R	Limits		Q	Method
U-234	0.00782	0.00830		106	80	120		6020A
U-235	0.459	0.500		109	80	120		6020A
U-238	0.476	0.519		109	80	120		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

8-IN
ICP-AES AND ICP-MS SERIAL DILUTIONS
METALS

Lab ID: 680-102370-23

SDG No: 680-102370-4

Lab Name: TestAmerica St. Louis Job No: 680-102370-4

Matrix: Solid Concentration Units: mg/Kg

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Method
U-233	ND		ND		NC		6020A
U-234	ND		ND		NC		6020A
U-235	0.018		ND		NC		6020A
U-236	ND		ND		NC		6020A
U-238	2.4		2.34		1.9		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIII-IN

8-IN
ICP-AES AND ICP-MS SERIAL DILUTIONS
METALS

Lab ID: 680-102370-26

SDG No: 680-102370-4

Lab Name: TestAmerica St. Louis Job No: 680-102370-4

Matrix: Solid Concentration Units: mg/Kg

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Method
U-233	ND		ND		NC		6020A
U-234	ND		ND		NC		6020A
U-235	0.015		ND		NC		6020A
U-236	ND		ND		NC		6020A
U-238	2.0		1.97		2.6		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIII-IN

9-IN
DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102370-4

SDG Number: 680-102370-4

Matrix: Solid Instrument ID: ICPMS6100

Method: 6020A MDL Date: 08/05/2013 10:01

Prep Method: 3050B

Analyte	Wavelength/ Mass	RL (mg/Kg)	MDL (mg/Kg)
U-233	233	0.005	0.0015
U-234	234	0.005	0.0003
U-235	235	0.005	0.00203
U-236	236	0.005	0.0004
U-238	238	0.005	0.0003

9-IN
CALIBRATION BLANK DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102370-4

SDG Number: 680-102370-4

Matrix: Solid Instrument ID: ICPMS6100

Method: 6020A XMDL Date: 07/18/2014 15:08

Analyte	Wavelength/ Mass	XRL (ug/L)	XMDL (ug/L)
U-233	233	0.05	0.0066
U-234	234	0.05	0.0021
U-235	235	0.05	0.0034
U-236	236	0.05	0.0015
U-238	238	0.05	0.0082

9-IN
DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102370-4

SDG Number: 680-102370-4

Matrix: Solid Instrument ID: NOEQUIP

Method: 6020A MDL Date: 06/12/2013 14:02

Analyte	Wavelength/ Mass	RL (mg/Kg)	MDL (mg/Kg)
Total Uranium		0.005	0.0003

11-IN
LINEAR RANGES
METALS

Lab Name: TestAmerica St. Louis Job No: 680-102370-4

SDG No.: 680-102370-4

Instrument ID: ICPMS6100 Date: 02/14/2012 11:04

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	Method
U-233		2000	6020A
U-234		2000	6020A
U-235		2000	6020A
U-236		2000	6020A
U-238		2000	6020A

15-IN
ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

ICP-MS Instrument ID: ICPMS6100 Start Date: 09/02/2014 End Date: 09/02/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
IC 160-141597/2	18:22										
IC 160-141597/3	18:27										
IC 160-141597/4	18:31										
IC 160-141597/5	18:36										
IC 160-141597/6	18:41										
ICV 160-141597/7	18:45	101									
ICV 160-141597/8	18:50	101									
ICV 160-141597/9	18:55	99									
ICB 160-141597/10	18:59	98									
CRI 160-141597/11	19:04	100									
CRI 160-141597/12	19:09	100									
ICSA 160-141597/13	19:13	90									
ICSAB 160-141597/14	19:18	89									
CCV 160-141597/15	19:23	99									
CCB 160-141597/16	19:27	100									
MB 160-139040/1-A	19:32	102									
LCS 160-139040/2-A	19:37	102									
680-102370-7	19:41	100									
680-102370-8	19:46	90									
680-102370-9	19:51	79									
680-102370-10	19:55	95									
680-102370-11	20:00	99									
680-102370-12	20:05	101									
680-102370-13	20:09	101									
680-102370-14	20:14	99									
CCV 160-141597/27	20:19	96									
CCB 160-141597/28	20:23	95									
680-102370-15	20:28	98									
680-102370-16	20:33	98									
680-102370-17	20:37	97									
680-102370-18	20:42	91									
680-102370-19	20:47	92									
680-102370-20	20:51	90									
680-102370-22	20:56	90									
680-102370-23	21:01	92									
680-102370-23 SD	21:05	96									
680-102370-23 MS	21:10	90									
CCV 160-141597/39	21:15	97									
CCB 160-141597/40	21:19	96									
680-102370-23 MSD	21:24	89									
680-102370-24	21:29	89									
680-102370-25	21:33	91									

FORM XV - IN

15-IN

ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY

METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

ICP-MS Instrument ID: ICPMS6100 Start Date: 09/02/2014 End Date: 09/02/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
MB 160-139047/1-A	21:38	98									
LCS 160-139047/2-A	21:43	98									
680-102370-26	21:48	90									
680-102370-26 SD	21:52	94									
680-102370-26 MS	21:57	88									
680-102370-26 MSD	22:01	88									
680-102370-28	22:06	87									
CCV 160-141597/51	22:11	94									
CCB 160-141597/52	22:16	92									
680-102370-29	22:20	90									
680-102370-30	22:25	87									
680-102370-31	22:30	87									
680-102370-33	22:34	93									
680-102370-34	22:39	88									
CCV 160-141597/63	23:07	92									
CCB 160-141597/64	23:12	90									

BLANK CONTAMINATION EVALUATION

SDG 680-102370-1

MEAN DIFFERENCE (MD):

$$MD = \frac{|\text{SAMPLE ACTIVITY} - \text{BLANK ACTIVITY}|}{\sqrt{((\text{SAMPLE UNCERTAINTY}/2)^2 + (\text{BLANK UNCERTAINTY}/2)^2)}}$$

BLANK ID: MB 160-128227/1-A THORIUM-230 0.1034 ± 0.0660 pCi/g

AFFECTED SAMPLES:

SAMPLE ID: SD-206-01

THORIUM-230 1.04 ± 0.237 pCi/g

MD = 7.614

SAMPLE ID: SD-206-02

THORIUM-230 0.809 ± 0.209 pCi/g

MD = 6.439

SAMPLE ID: SD-206-SS

THORIUM-230 0.873 ± 0.215 pCi/g

MD = 6.844

SAMPLE ID: SD-211-01

THORIUM-230 0.882 ± 0.228 pCi/g

MD = 6.560

MB 160-128227

SAMPLE ID: SD-211-02

THORIUM-230

0.928 ± 0.22 pCi/g

MD = 7.180

SAMPLE ID: SD-211-SS

THORIUM-230

1.21 ± 0.281 pCi/g

MD = 7.668

SAMPLE ID: SD-214-SS

THORIUM-230

0.948 ± 0.243 pCi/g

MD = 6.708

SAMPLE ID: SD-215-SS

THORIUM-230

0.499 ± 0.164 pCi/g

MD = 4.476

SAMPLE ID: SD-216-01

THORIUM-230

0.895 ± 0.222 pCi/g

MD = 6.836

SAMPLE ID: SD-216-02

THORIUM-230

0.583 ± 0.168 pCi/g

MD = 5.314

MB 160-128227

SAMPLE ID: SD-216-SS

THORIUM-230

0.82 ± 0.231 pCi/g

MD = 5.966

SAMPLE ID: SD-217-01

THORIUM-230

0.36 ± 0.128 pCi/g

MD = 3.564

SAMPLE ID: SD-217-02

THORIUM-230

0.551 ± 0.167 pCi/g

MD = 4.985

SAMPLE ID: SD-217-SS

THORIUM-230

0.657 ± 0.265 pCi/g

MD = 4.054

SAMPLE ID: SD-222-01

THORIUM-230

0.689 ± 0.178 pCi/g

MD = 6.169

MB 160-128227

SAMPLE ID: SD-222-02

THORIUM-230

0.436 ± 0.143 pCi/g

MD = 4.224

SAMPLE ID: SD-222-03

THORIUM-230

0.495 ± 0.157 pCi/g

MD = 4.599

SAMPLE ID: SD-222-SS

THORIUM-230

0.429 ± 0.149 pCi/g

MD = 3.996

SAMPLE ID: SD-DUP-03

THORIUM-230

0.682 ± 0.191 pCi/g

MD = 5.726

BLANK CONTAMINATION EVALUATION

SDG 680-102370-1

MEAN DIFFERENCE (MD):

$$\frac{|\text{SAMPLE ACTIVITY} - \text{BLANK ACTIVITY}|}{((\text{SAMPLE UNCERTAINTY}/2)^2 + (\text{BLANK UNCERTAINTY}/2))}$$

BLANK ID: MB 160-128228/1-A THORIUM-230

0.1211 ± 0.0731 pCi/g

AFFECTED SAMPLES:

SAMPLE ID: SD-212-01

THORIUM-230

1 ± 0.246 pCi/g

MD = 6.850

SAMPLE ID: SD-212-02

THORIUM-230

1.17 ± 0.243 pCi/g

MD = 8.267

SAMPLE ID: SD-212-SS

THORIUM-230

0.923 ± 0.222 pCi/g

MD = 6.862

SAMPLE ID: SD-213-01

THORIUM-230

0.979 ± 0.219 pCi/g

MD = 7.432

MB 160-128228

SAMPLE ID: SD-213-02

THORIUM-230

1.15 ± 0.256 pCi/g

MD = 7.729

SAMPLE ID: SD-213-SS

THORIUM-230

1.26 ± 0.27 pCi/g

MD = 8.143

SAMPLE ID: SD-214-01

THORIUM-230

0.865 ± 0.218 pCi/g

MD = 6.471

SAMPLE ID: SD-214-02

THORIUM-230

1.24 ± 0.253 pCi/g

MD = 8.497

SAMPLE ID: SD-214-03

THORIUM-230

0.433 ± 0.145 pCi/g

MD = 3.842

SAMPLE ID: SD-DUP-04

THORIUM-230

1.04 ± 0.233 pCi/g

MD = 7.526

TETRATECH INTERNAL CORRESPONDENCE

TO: **M. MARTIN** **DATE: OCTOBER 14, 2014**

FROM: **A. COGNETTI** **COPIES: DV FILE**

SUBJECT: **DATA VALIDATION: RADIOLOGICAL ANALYSES ISOTOPIC THORIUM/ URANIUM/TECHNETIUM**
MRC SEDIMENT INVESTIGATION
SAMPLE DELIVERY GROUPS (SDGs) – 680-102380-1, 680-102380-3, and 680-102380-4

SAMPLE: 30/Sediment/Rad

SD-223-01	SD-223-02	SD-223-SS	SD-224-01	SD-224-02	SD-224-SS
SD-225-01	SD-225-02	SD-225-SS	SD-226-01	SD-226-02	SD-226-SS
SD-227-01	SD-227-02	SD-227-SS	SD-228-01	SD-228-02	SD-228-SS
SD-234-01	SD-234-SS	SD-235-01	SD-235-02	SD-235-SS	SD-236-01
SD-236-02	SD-236-SS	SD-237-01	SD-237-02	SD-237-SS	SD-DUP05

1/Sediment/Technetium-99

SD-228-01

Overview

The sample set for MRC Sediment Investigation, SDG 680-102380-1, 680-102380-3 and 680-102380-4 consists of thirty (30) sediment environmental samples analyzed for isotopic thorium and uranium. Sample SD-228-01 was also analyzed for technetium-99. There is one (1) field duplicate pair associated with this SDG: SD-DUP05 and SD-237-02.

The samples were collected by Tetra Tech on June 13, 2014 and were analyzed by Test America. All analyses were conducted using Methods A-01-R and SW-846 6020A analysis and reporting protocol.

The data contained in this SDG was validated with regard to the following parameters: data completeness, holding times, initial/continuing calibration, laboratory method blank, blank spike recoveries, matrix spike/ matrix spike duplicate recoveries, field duplicate recoveries and detection limits.

Minor Problems

- Thorium-230 was detected in the method blank associated with batch 160-128228/1-A at a concentration of 0.122 +/- 0.0731 pCi/g. A mean difference of the blank activity and positive sample activity was calculated and used for evaluation of blank contamination for samples SD-223-01, SD-223-02, SD-223-SS, SD-224-01, SD-224-02, SD-224-SS, SD-226-01 and SD-226-SS. The mean differences were greater than 3 and the sample and blank results differed by a factor less than 10 in samples SD-223-01, SD-223-02, SD-224-01, SD-224-02, SD-224-SS, SD-226-01, and SD-226-SS. Therefore, the sample results were qualified as estimated (J) as the contaminant may have an impact on the sample results. The mean difference was greater than 3 and the sample and blank results were greater than a factor of 10 in sample SD-223-SS; therefore, the sample result was not qualified.

Notes

The uncertainty for the sample results are reported at 2 standard deviations (95% confidence level). The EDD does not contain the uncertainty result.

Contamination was detected in the initial calibration blank, continuing calibration blank and method blank at the following maximum concentrations:

Contaminant	Maximum Concentration	Action Level (mg/kg)
Uranium-238(1)	0.0133 ug/L	0.0060
Uranium-233(2)	0.0114 ug/L	0.0052
Uranium-238(3)	0.00135 mg/kg	0.00675
Uranium-238(4)	0.00048 mg/kg	0.0024

(1) Maximum concentration detected in the initial calibration blank analyzed on August 14, 2014.
(2) Maximum concentration detected in the continuing calibration blank analyzed on August 18, 2014.
(3) Maximum concentration detected in the method blank associated with batch 160-137068.
(4) Maximum concentration detected in the method blank associated with batch 160-137069.

An action level of 5X the maximum concentration was established in order to evaluate samples for blank contamination. Sample aliquot and dilution factors were taken in to account when applying the action level. No action was taken on the detected results greater than the action level.

The continuing calibration verification (CCV) percent difference (%D) for Uranium-233 was greater than the 110% quality control limit on August 18, 2014 @ 21:23 and 23:38. No action was taken on the high %D because all results were nondetects.

The matrix spike duplicate (MSD) percent recovery (%R) of Uranium-238 was less than the lower quality control limit in spiked sample SD-224-SS. The sample concentration was greater than 4X the spike concentration. No action was taken.

Uranium isotopes were determined via method 6020A. Isotopic uranium results reported via method 6020A and expressed in mg/kg units were converted to activity units, pCi/g, by the laboratory using isotope specific theoretical activities.

Nondetected results reported for uranium isotopes determined via method 6020A were reported at limits below the Minimum Detectable Concentration (MDC) by the laboratory. The manner in which the nondetected radioisotopes were reported was based upon the common practice of reporting radiological parameters at the concentration determined by the instrument. Therefore, metals raw instrument results expressed in ug/L were then converted to pCi/g and reported as nondetects below the MDC.

EXECUTIVE SUMMARY

Laboratory Performance Issues: Contamination was detected in a method blank for Thorium-230. The CCV %D for Uranium-233 exceeded the 110% quality control limit.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the Methods A-01-R, SW-6020A and EPA National Functional Guidelines for Inorganic Data Validation (2010). The text of this report has been formulated to address only those problem areas affecting data quality.

Tetra Tech
Ann Cognetti
Chemist/Data Validator

Tetra Tech
Joseph A. Samchuck
Data Validation Manager

Attachments:
1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as Reported by the Laboratory
3. Appendix C - Support Documentation

APPENDIX A

QUALIFIED LABORATORY RESULTS

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = ICP PDS Recovery Noncompliance; MSA's $r < 0.995$
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = RPD between columns/detectors >40% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient $r < 0.995$
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 standard deviations is greater than sample activity
Z1 = Tentatively Identified Compound considered presumptively present
Z2 = Tentatively Identified Compound column bleed
Z3 = Tentatively Identified Compound aldol condensate

PROJ_NO: 05220	NSAMPLE	SD-223-01			SD-223-02			SD-223-SS			SD-224-01		
SDG: 680-102380-1	LAB_ID	680-102380-6			680-102380-7			680-102380-5			680-102380-2		
FRACTION: RAD	SAMP_DATE	6/13/2014			6/13/2014			6/13/2014			6/13/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
THORIUM-228		1.17			1.54			1.27			1.22		
THORIUM-230		0.744	J	A	1.04	J	A	1.28			1	J	A
THORIUM-232		1.24			1.36			1.14			1.43		

PROJ_NO: 05220	NSAMPLE	SD-224-02			SD-224-SS			SD-225-01			SD-225-02		
SDG: 680-102380-1	LAB_ID	680-102380-3			680-102380-1			680-102380-13			680-102380-14		
FRACTION: RAD	SAMP_DATE	6/13/2014			6/13/2014			6/13/2014			6/13/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
THORIUM-228		0.8			1.01			1.32			0.904		
THORIUM-230		0.817	J	A	1	J	A	1.35			0.952		
THORIUM-232		0.777			1.35			1.33			0.906		

PROJ_NO: 05220	NSAMPLE	SD-225-SS			SD-226-01			SD-226-02			SD-226-SS		
SDG: 680-102380-1	LAB_ID	680-102380-12			680-102380-9			680-102380-10			680-102380-8		
FRACTION: RAD	SAMP_DATE	6/13/2014			6/13/2014			6/13/2014			6/13/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
THORIUM-228		1.34			1.21			1.23			1.01		
THORIUM-230		1.45			0.979	J	A	1.03			1.15	J	A
THORIUM-232		1.39			1.36			1.05			1.28		

PROJ_NO: 05220	NSAMPLE	SD-227-01			SD-227-02			SD-227-SS			SD-228-01		
SDG: 680-102380-1	LAB_ID	680-102380-35			680-102380-36			680-102380-34			680-102380-17		
FRACTION: RAD	SAMP_DATE	6/13/2014			6/13/2014			6/13/2014			6/13/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
THORIUM-228		1.54			0.895			1.31			1.29		
THORIUM-230		1.35			0.753			0.978			1.4		
THORIUM-232		1.27			0.963			1.39			1.36		

PROJ_NO: 05220	NSAMPLE	SD-228-02			SD-228-SS			SD-234-01			SD-234-SS		
SDG: 680-102380-1	LAB_ID	680-102380-18			680-102380-16			680-102380-21			680-102380-20		
FRACTION: RAD	SAMP_DATE	6/13/2014			6/13/2014			6/13/2014			6/13/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
THORIUM-228		1.06			1.32			1.05			0.765		
THORIUM-230		0.797			1.08			0.685			0.835		
THORIUM-232		1.12			1.4			0.928			0.778		

PROJ_NO: 05220	NSAMPLE	SD-235-01			SD-235-02			SD-235-SS			SD-236-01		
SDG: 680-102380-1	LAB_ID	680-102380-23			680-102380-24			680-102380-22			680-102380-27		
FRACTION: RAD	SAMP_DATE	6/13/2014			6/13/2014			6/13/2014			6/13/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
THORIUM-228		1.16			1.08			0.913			0.562		
THORIUM-230		0.894			1.04			0.729			0.447		
THORIUM-232		1.32			1.12			0.904			0.389		

PROJ_NO: 05220	NSAMPLE	SD-236-02			SD-236-SS			SD-237-01			SD-237-02		
SDG: 680-102380-1	LAB_ID	680-102380-28			680-102380-26			680-102380-30			680-102380-31		
FRACTION: RAD	SAMP_DATE	6/13/2014			6/13/2014			6/13/2014			6/13/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
THORIUM-228		0.555			0.335			1.55			1.27		
THORIUM-230		0.582			0.271			1.11			0.986		
THORIUM-232		0.658			0.208			1.51			1.39		

PROJ_NO: 05220	NSAMPLE	SD-237-SS			SD-DUP05		
SDG: 680-102380-1	LAB_ID	680-102380-29			680-102380-33		
FRACTION: RAD	SAMP_DATE	6/13/2014			6/13/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM		
	UNITS	PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0		
	DUP_OF				SD-237-02		
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
THORIUM-228		1.09			1.14		
THORIUM-230		1.04			1.11		
THORIUM-232		0.944			1.14		

PROJ_NO: 05220	NSAMPLE	SD-223-01						SD-223-02					
SDG: 680-102380-3	LAB_ID	680-102380-6						680-102380-7					
FRACTION: M	SAMP_DATE	6/13/2014						6/13/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					3.6						1		
URANIUM-233					0.0035	U					0.0033	U	
URANIUM-234					0.0007	U					0.00066	U	
URANIUM-235					0.026						0.0068	J	P
URANIUM-235 (PERCENT)		0.717						0.682					
URANIUM-236					0.00094	U					0.00088	U	
URANIUM-238					3.6						0.99		

PROJ_NO: 05220	NSAMPLE	SD-223-SS						SD-224-01					
SDG: 680-102380-3	LAB_ID	680-102380-5						680-102380-2					
FRACTION: M	SAMP_DATE	6/13/2014						6/13/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					3.2						3.6		
URANIUM-233					0.0034	U					0.0035	U	
URANIUM-234					0.00068	U					0.0007	U	
URANIUM-235					0.024						0.026		
URANIUM-235 (PERCENT)		0.744						0.717					
URANIUM-236					0.00091	U					0.00093	U	
URANIUM-238					3.2						3.6		

PROJ_NO: 05220	NSAMPLE	SD-224-02						SD-224-SS					
SDG: 680-102380-3	LAB_ID	680-102380-3						680-102380-1					
FRACTION: M	SAMP_DATE	6/13/2014						6/13/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					2.7						2.3		
URANIUM-233					0.0033	U					0.0036	U	
URANIUM-234					0.00066	U					0.00071	U	
URANIUM-235					0.019						0.016		
URANIUM-235 (PERCENT)		0.699						0.691					
URANIUM-236					0.00088	U					0.00095	U	
URANIUM-238					2.7						2.3		

PROJ_NO: 05220	NSAMPLE	SD-225-01						SD-225-02					
SDG: 680-102380-3	LAB_ID	680-102380-13						680-102380-14					
FRACTION: M	SAMP_DATE	6/13/2014						6/13/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					3.3						2.6		
URANIUM-233					0.0033	U					0.0033	U	
URANIUM-234					0.00066	U					0.00065	U	
URANIUM-235					0.024						0.018		
URANIUM-235 (PERCENT)		0.722						0.688					
URANIUM-236					0.00088	U					0.00087	U	
URANIUM-238					3.3						2.6		

PROJ_NO: 05220	NSAMPLE	SD-225-SS						SD-226-01					
SDG: 680-102380-3	LAB_ID	680-102380-12						680-102380-9					
FRACTION: M	SAMP_DATE	6/13/2014						6/13/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					3.6						3.7		
URANIUM-233					0.0036	U					0.0036	U	
URANIUM-234					0.00073	U					0.00072	U	
URANIUM-235					0.027						0.028		
URANIUM-235 (PERCENT)		0.744						0.751					
URANIUM-236					0.00097	U					0.00096	U	
URANIUM-238					3.6						3.7		

PROJ_NO: 05220	NSAMPLE	SD-226-02						SD-226-SS					
SDG: 680-102380-3	LAB_ID	680-102380-10						680-102380-8					
FRACTION: M	SAMP_DATE	6/13/2014						6/13/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					2.2						4		
URANIUM-233					0.0034	U					0.0036	U	
URANIUM-234					0.00067	U					0.00072	U	
URANIUM-235					0.016						0.029		
URANIUM-235 (PERCENT)		0.722						0.72					
URANIUM-236					0.0009	U					0.00096	U	
URANIUM-238					2.2						4		

PROJ_NO: 05220	NSAMPLE	SD-227-01						SD-227-02					
SDG: 680-102380-3	LAB_ID	680-102380-35						680-102380-36					
FRACTION: M	SAMP_DATE	6/13/2014						6/13/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					3.3						3.4		
URANIUM-233					0.0032	U					0.0033	U	
URANIUM-234					0.00065	U					0.00066	U	
URANIUM-235					0.025						0.025		
URANIUM-235 (PERCENT)		0.752						0.73					
URANIUM-236					0.00086	U					0.00088	U	
URANIUM-238					3.3						3.4		

PROJ_NO: 05220	NSAMPLE	SD-227-SS						SD-228-01					
SDG: 680-102380-3	LAB_ID	680-102380-34						680-102380-17					
FRACTION: M	SAMP_DATE	6/13/2014						6/13/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					4.1						4.5		
URANIUM-233					0.0036	U					0.0035	U	
URANIUM-234					0.00073	U					0.001	J	
URANIUM-235					0.03						0.095		
URANIUM-235 (PERCENT)		0.726						2.11					
URANIUM-236					0.00097	U					0.00093	U	
URANIUM-238					4.1						4.4		

PROJ_NO: 05220	NSAMPLE	SD-228-02						SD-228-SS					
SDG: 680-102380-3	LAB_ID	680-102380-18						680-102380-16					
FRACTION: M	SAMP_DATE	6/13/2014						6/13/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					2.5						3.9		
URANIUM-233					0.0035	U					0.0033	U	
URANIUM-234					0.0007	U					0.00065	U	
URANIUM-235					0.019						0.029		
URANIUM-235 (PERCENT)		0.754						0.738					
URANIUM-236					0.00093	U					0.00087	U	
URANIUM-238					2.5						3.9		

PROJ_NO: 05220	NSAMPLE	SD-234-01						SD-234-SS					
SDG: 680-102380-3	LAB_ID	680-102380-21						680-102380-20					
FRACTION: M	SAMP_DATE	6/13/2014						6/13/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					0.89						2.3		
URANIUM-233					0.0035	U					0.0036	U	
URANIUM-234					0.0007	U					0.00073	U	
URANIUM-235					0.0059	J	P				0.018		
URANIUM-235 (PERCENT)		0.666						0.777					
URANIUM-236					0.00093	U					0.00097	U	
URANIUM-238					0.88						2.3		

PROJ_NO: 05220	NSAMPLE	SD-235-01						SD-235-02					
SDG: 680-102380-3	LAB_ID	680-102380-23						680-102380-24					
FRACTION: M	SAMP_DATE	6/13/2014						6/13/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					3.3						3.8		
URANIUM-233					0.0035	U					0.0036	U	
URANIUM-234					0.0007	U					0.00072	U	
URANIUM-235					0.028						0.04		
URANIUM-235 (PERCENT)		0.841						1.04					
URANIUM-236					0.00093	U					0.00095	U	
URANIUM-238					3.3						3.8		

PROJ_NO: 05220	NSAMPLE	SD-235-SS						SD-236-01					
SDG: 680-102380-3	LAB_ID	680-102380-22						680-102380-27					
FRACTION: M	SAMP_DATE	6/13/2014						6/13/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					2.4						0.62		
URANIUM-233					0.0032	U					0.0033	U	
URANIUM-234					0.00064	U					0.00065	U	
URANIUM-235					0.021						0.0044	U	
URANIUM-235 (PERCENT)		0.867						0					
URANIUM-236					0.00086	U					0.00087	U	
URANIUM-238					2.4						0.62		

PROJ_NO: 05220	NSAMPLE	SD-236-02						SD-236-SS					
SDG: 680-102380-3	LAB_ID	680-102380-28						680-102380-26					
FRACTION: M	SAMP_DATE	6/13/2014						6/13/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					0.85						0.28		
URANIUM-233					0.0036	U					0.0035	U	
URANIUM-234					0.00072	U					0.0007	U	
URANIUM-235					0.0054	J	P				0.0047	U	
URANIUM-235 (PERCENT)		0.639						0					
URANIUM-236					0.00095	U					0.00093	U	
URANIUM-238					0.84						0.28		

PROJ_NO: 05220	NSAMPLE	SD-237-01						SD-237-02					
SDG: 680-102380-3	LAB_ID	680-102380-30						680-102380-31					
FRACTION: M	SAMP_DATE	6/13/2014						6/13/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					3.1						3.9		
URANIUM-233					0.0037	U					0.0034	U	
URANIUM-234					0.00075	U					0.00068	U	
URANIUM-235					0.025						0.057		
URANIUM-235 (PERCENT)		0.8						1.48					
URANIUM-236					0.001	U					0.0009	U	
URANIUM-238					3.1						3.8		

PROJ_NO: 05220	NSAMPLE	SD-237-SS						SD-DUP05					
SDG: 680-102380-3	LAB_ID	680-102380-29						680-102380-33					
FRACTION: M	SAMP_DATE	6/13/2014						6/13/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF							SD-237-02			SD-237-02		
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					2.6						4.1		
URANIUM-233					0.0033	U					0.0036	U	
URANIUM-234					0.00066	U					0.00073	U	
URANIUM-235					0.032						0.044		
URANIUM-235 (PERCENT)		1.22						1.06					
URANIUM-236					0.00088	U					0.00097	U	
URANIUM-238					2.6						4.1		

PROJ_NO: 05220	NSAMPLE	SD-223-01			SD-223-02			SD-223-SS			SD-224-01		
SDG: 680-102380-3	LAB_ID	680-102380-6			680-102380-7			680-102380-5			680-102380-2		
FRACTION: RAD	SAMP_DATE	6/13/2014			6/13/2014			6/13/2014			6/13/2014		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
URANIUM-233		-0.528	U		-0.468	U		-0.462	U		-0.396	U	
URANIUM-234		1.33	U		0.443	U		1.57	U		1.33	U	
URANIUM-235		0.0567			0.0148			0.0526			0.056		
URANIUM-236		-0.00209	U		-0.0026	U		-0.00152	U		-0.00148	U	
URANIUM-238		1.21			0.334			1.07			1.2		

PROJ_NO: 05220	NSAMPLE	SD-224-02			SD-224-SS			SD-225-01			SD-225-02		
SDG: 680-102380-3	LAB_ID	680-102380-3			680-102380-1			680-102380-13			680-102380-14		
FRACTION: RAD	SAMP_DATE	6/13/2014			6/13/2014			6/13/2014			6/13/2014		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
URANIUM-233		-0.482	U		-0.562	U		-0.686	U		-0.71	U	
URANIUM-234		1.12	U		1.05	U		1.34	U		1.1	U	
URANIUM-235		0.0419			0.0356			0.0529			0.0397		
URANIUM-236		-0.00197	U		-0.00172	U		-0.00212	U		-0.00179	U	
URANIUM-238		0.898			0.78			1.11			0.86		

PROJ_NO: 05220	NSAMPLE	SD-225-SS			SD-226-01			SD-226-02			SD-226-SS		
SDG: 680-102380-3	LAB_ID	680-102380-12			680-102380-9			680-102380-10			680-102380-8		
FRACTION: RAD	SAMP_DATE	6/13/2014			6/13/2014			6/13/2014			6/13/2014		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
URANIUM-233		-0.821	U		-0.885	U		-0.494	U		-0.697	U	
URANIUM-234		1.45	U		1.67	U		0.853	U		1.51	U	
URANIUM-235		0.0577			0.0597			0.0342			0.0631		
URANIUM-236		-0.00144	U		-0.00218	U		-0.0016	U		-0.00224	U	
URANIUM-238		1.21			1.25			0.725			1.34		

PROJ_NO: 05220	NSAMPLE	SD-227-01			SD-227-02			SD-227-SS			SD-228-01		
SDG: 680-102380-3	LAB_ID	680-102380-35			680-102380-36			680-102380-34			680-102380-17		
FRACTION: RAD	SAMP_DATE	6/13/2014			6/13/2014			6/13/2014			6/13/2014		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
URANIUM-233		-0.623	U		-0.834	U		-0.677	U		-0.591	U	
URANIUM-234		1.21	U		1.33	U		1.55	U		6.47		
URANIUM-235		0.053			0.0543			0.0649			0.206		
URANIUM-236		-0.00212	U		-0.00236	U		-0.00191	U		0.00787	U	
URANIUM-238		1.11			1.15			1.37			1.47		

PROJ_NO: 05220	NSAMPLE	SD-228-02			SD-228-SS			SD-234-01			SD-234-SS		
SDG: 680-102380-3	LAB_ID	680-102380-18			680-102380-16			680-102380-21			680-102380-20		
FRACTION: RAD	SAMP_DATE	6/13/2014			6/13/2014			6/13/2014			6/13/2014		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
URANIUM-233		-0.781	U		-0.406	U		-0.865	U		-1.09	U	
URANIUM-234		0.82	U		1.64	U		0.379	U		0.862	U	
URANIUM-235		0.0407			0.0623			0.0127			0.04		
URANIUM-236		-0.0019	U		-0.00267	U		-0.00216	U		-0.00197	U	
URANIUM-238		0.829			1.32			0.295			0.772		

PROJ_NO: 05220	NSAMPLE	SD-235-01			SD-235-02			SD-235-SS			SD-236-01		
SDG: 680-102380-3	LAB_ID	680-102380-23			680-102380-24			680-102380-22			680-102380-27		
FRACTION: RAD	SAMP_DATE	6/13/2014			6/13/2014			6/13/2014			6/13/2014		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
URANIUM-233		-0.797	U		-0.758	U		-0.853	U		-1.17	U	
URANIUM-234		1.61	U		2.45	U		1.2	U		0.276	U	
URANIUM-235		0.0602			0.0873			0.0457			0.00893	U	
URANIUM-236		-0.00178	U		0.00074	U		-0.00108	U		-0.00206	U	
URANIUM-238		1.12			1.27			0.818			0.208		

PROJ_NO: 05220	NSAMPLE	SD-236-02			SD-236-SS			SD-237-01			SD-237-02		
SDG: 680-102380-3	LAB_ID	680-102380-28			680-102380-26			680-102380-30			680-102380-31		
FRACTION: RAD	SAMP_DATE	6/13/2014			6/13/2014			6/13/2014			6/13/2014		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
URANIUM-233		-1.02	U		-1.2	U		-0.856	U		-0.649	U	
URANIUM-234		0.353	U		0.168	U		1.36	U		3.47	U	
URANIUM-235		0.0116			0.003	U		0.054			0.123		
URANIUM-236		-0.00228	U		-0.00165	U		-0.00145	U		0.00252	U	
URANIUM-238		0.281			0.0929			1.05			1.29		

PROJ_NO: 05220	NSAMPLE	SD-237-SS			SD-DUP05		
SDG: 680-102380-3	LAB_ID	680-102380-29			680-102380-33		
FRACTION: RAD	SAMP_DATE	6/13/2014			6/13/2014		
MEDIA: SOIL	QC_TYPE	NM			NM		
	UNITS	PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0		
	DUP_OF				SD-237-02		
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
URANIUM-233		-0.871	U		-0.741	U	
URANIUM-234		1.67	U		2.44	U	
URANIUM-235		0.0684			0.0956		
URANIUM-236		0.00031	U		-9E-05	U	
URANIUM-238		0.872			1.37		

PROJ_NO: 05220	NSAMPLE	SD-228-01		
SDG: 680-102380-4	LAB_ID	680-102380-17		
FRACTION: M	SAMP_DATE	6/13/2014		
MEDIA: SOIL	QC_TYPE	NM		
	UNITS	MG/KG		
	PCT_SOLIDS	100.0		
	DUP_OF			
PARAMETER		RESULT	VQL	QLCD
TECHNETIUM-99		1.7E-05	U	

APPENDIX B

RESULTS AS REPORTED BY THE LABORATORY

Client Sample ID: SD-224-SS

Lab Sample ID: 680-102380-1
Matrix: Solid

Date Collected: 06/13/14 08:20
Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.01		0.220	0.235	1.00	0.106	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-230	1.00		0.216	0.232	1.00	0.0716	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-232	1.35		0.248	0.273	1.00	0.0520	pCi/g	06/23/14 15:05	07/01/14 12:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*85.0*		*30 - 110*	*06/23/14 15:05*	*07/01/14 12:26*	*1*

Client Sample ID: SD-224-01

Lab Sample ID: 680-102380-2
Matrix: Solid

Date Collected: 06/13/14 08:25
Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.22		0.239	0.260	1.00	0.0881	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-230	1.00		0.216	0.232	1.00	0.0716	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-232	1.43		0.256	0.283	1.00	0.0521	pCi/g	06/23/14 15:05	07/01/14 12:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*80.5*		*30 - 110*	*06/23/14 15:05*	*07/01/14 12:26*	*1*

Client Sample ID: SD-224-02

Lab Sample ID: 680-102380-3
Matrix: Solid

Date Collected: 06/13/14 08:30
Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.800		0.202	0.213	1.00	0.121	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-230	0.817		0.198	0.210	1.00	0.0679	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-232	0.777		0.193	0.204	1.00	0.0676	pCi/g	06/23/14 15:05	07/01/14 12:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*80.9*		*30 - 110*	*06/23/14 15:05*	*07/01/14 12:26*	*1*

Client Sample ID: SD-223-SS

Lab Sample ID: 680-102380-5
Matrix: Solid

Date Collected: 06/13/14 08:40
Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.27		0.254	0.275	1.00	0.0887	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-230	1.28		0.254	0.275	1.00	0.0649	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-232	1.14		0.238	0.257	1.00	0.0707	pCi/g	06/23/14 15:05	07/01/14 12:26	1

Client Sample ID: SD-223-SS

Lab Sample ID: 680-102380-5
Matrix: Solid

Date Collected: 06/13/14 08:40
Date Received: 06/14/14 08:30

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	79.0		30 - 110	06/23/14 15:05	07/01/14 12:26	1

Client Sample ID: SD-223-01

Lab Sample ID: 680-102380-6
Matrix: Solid

Date Collected: 06/13/14 08:45
Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.17		0.246	0.265	1.00	0.0786	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-230	0.744		0.199	0.209	1.00	0.105	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-232	1.24		0.252	0.273	1.00	0.0664	pCi/g	06/23/14 15:05	07/01/14 12:26	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	77.3		30 - 110	06/23/14 15:05	07/01/14 12:26	1

Client Sample ID: SD-223-02

Lab Sample ID: 680-102380-7
Matrix: Solid

Date Collected: 06/13/14 08:50
Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.54		0.291	0.319	1.00	0.123	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-230	1.04		0.238	0.254	1.00	0.0991	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-232	1.36		0.272	0.295	1.00	0.0984	pCi/g	06/23/14 15:05	07/01/14 12:26	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	73.5		30 - 110	06/23/14 15:05	07/01/14 12:26	1

Client Sample ID: SD-226-SS

Lab Sample ID: 680-102380-8
Matrix: Solid

Date Collected: 06/13/14 08:55
Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.01		0.218	0.234	1.00	0.0929	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-230	1.15		0.231	0.250	1.00	0.0697	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-232	1.28		0.241	0.264	1.00	0.0590	pCi/g	06/23/14 15:05	07/01/14 12:26	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	86.7		30 - 110	06/23/14 15:05	07/01/14 12:26	1

Client Sample ID: SD-226-01

Lab Sample ID: 680-102380-9
Matrix: Solid

Date Collected: 06/13/14 09:00
Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.21		0.238	0.259	1.00	0.0909	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-230	0.979		0.214	0.229	1.00	0.0745	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-232	1.36		0.250	0.275	1.00	0.0595	pCi/g	06/23/14 15:05	07/01/14 12:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*83.9*		*30 - 110*	*06/23/14 15:05*	*07/01/14 12:26*	*1*

Client Sample ID: SD-226-02

Lab Sample ID: 680-102380-10
Matrix: Solid

Date Collected: 06/13/14 09:05
Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.23		0.232	0.254	1.00	0.105	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	1.03		0.212	0.229	1.00	0.0910	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	1.05		0.212	0.230	1.00	0.0717	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*91.2*		*30 - 110*	*06/24/14 14:58*	*07/02/14 18:02*	*1*

Client Sample ID: SD-225-SS

Lab Sample ID: 680-102380-12
Matrix: Solid

Date Collected: 06/13/14 09:15
Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.34		0.266	0.289	1.00	0.124	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	1.45		0.272	0.298	1.00	0.0607	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	1.39		0.267	0.291	1.00	0.0935	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*73.0*		*30 - 110*	*06/24/14 14:58*	*07/02/14 18:02*	*1*

Client Sample ID: SD-225-01

Lab Sample ID: 680-102380-13
Matrix: Solid

Date Collected: 06/13/14 09:20
Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.32		0.246	0.270	1.00	0.0702	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	1.35		0.250	0.274	1.00	0.0740	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	1.33		0.246	0.270	1.00	0.0591	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Client Sample ID: SD-225-01

Lab Sample ID: 680-102380-13
Matrix: Solid

Date Collected: 06/13/14 09:20
Date Received: 06/14/14 08:30

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	81.5		30 - 110	06/24/14 14:58	07/02/14 18:02	1

Client Sample ID: SD-225-02

Lab Sample ID: 680-102380-14
Matrix: Solid

Date Collected: 06/13/14 09:25
Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.904		0.204	0.218	1.00	0.102	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	0.952		0.206	0.221	1.00	0.0674	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	0.906		0.199	0.213	1.00	0.0329	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	88.1		30 - 110	06/24/14 14:58	07/02/14 18:02	1

Client Sample ID: SD-228-SS

Lab Sample ID: 680-102380-16
Matrix: Solid

Date Collected: 06/13/14 10:05
Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.32		0.249	0.273	1.00	0.105	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	1.08		0.223	0.241	1.00	0.0741	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	1.40		0.254	0.280	1.00	0.0813	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	81.7		30 - 110	06/24/14 14:58	07/02/14 18:02	1

Client Sample ID: SD-228-01

Lab Sample ID: 680-102380-17
Matrix: Solid

Date Collected: 06/13/14 10:10
Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.29		0.244	0.267	1.00	0.0873	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	1.40		0.252	0.278	1.00	0.0518	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	1.36		0.250	0.275	1.00	0.0837	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	84.5		30 - 110	06/24/14 14:58	07/02/14 18:02	1

Client Sample ID: SD-228-02

Lab Sample ID: 680-102380-18
Matrix: Solid

Date Collected: 06/13/14 10:15
Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.06		0.229	0.246	1.00	0.0955	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	0.797		0.196	0.207	1.00	0.0362	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	1.12		0.235	0.253	1.00	0.0964	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*80.3*		*30 - 110*	*06/24/14 14:58*	*07/02/14 18:02*	*1*

Client Sample ID: SD-234-SS

Lab Sample ID: 680-102380-20
Matrix: Solid

Date Collected: 06/13/14 10:30
Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.765		0.184	0.195	1.00	0.0665	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	0.835		0.191	0.204	1.00	0.0566	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	0.778		0.184	0.195	1.00	0.0493	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*87.1*		*30 - 110*	*06/24/14 14:58*	*07/02/14 18:02*	*1*

Client Sample ID: SD-234-01

Lab Sample ID: 680-102380-21
Matrix: Solid

Date Collected: 06/13/14 10:35
Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.05		0.221	0.238	1.00	0.103	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	0.685		0.176	0.186	1.00	0.0698	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	0.928		0.204	0.218	1.00	0.0507	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*87.8*		*30 - 110*	*06/24/14 14:58*	*07/02/14 18:02*	*1*

Client Sample ID: SD-235-SS

Lab Sample ID: 680-102380-22
Matrix: Solid

Date Collected: 06/13/14 11:00
Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.913		0.208	0.221	1.00	0.0882	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	0.729		0.185	0.195	1.00	0.0704	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	0.904		0.204	0.218	1.00	0.0522	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Client Sample ID: SD-235-SS

Lab Sample ID: 680-102380-22

Date Collected: 06/13/14 11:00
Date Received: 06/14/14 08:30

Matrix: Solid

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	80.4		30 - 110	06/24/14 14:58	07/02/14 18:02	1

Client Sample ID: SD-23501

Lab Sample ID: 680-102380-23

Date Collected: 06/13/14 11:05
Date Received: 06/14/14 08:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.16		0.231	0.251	1.00	0.111	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	0.894		0.199	0.213	1.00	0.0624	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	1.32		0.240	0.264	1.00	0.0621	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	87.8		30 - 110	06/24/14 14:58	07/02/14 18:02	1

Client Sample ID: SD-235-02

Lab Sample ID: 680-102380-24

Date Collected: 06/13/14 11:10
Date Received: 06/14/14 08:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.08		0.213	0.231	1.00	0.0733	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	1.04		0.208	0.225	1.00	0.0536	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	1.12		0.215	0.235	1.00	0.0534	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	95.6		30 - 110	06/24/14 14:58	07/02/14 18:02	1

Client Sample ID: SD-236-SS

Lab Sample ID: 680-102380-26

Date Collected: 06/13/14 12:05
Date Received: 06/14/14 08:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.335		0.113	0.116	1.00	0.0567	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	0.271		0.104	0.106	1.00	0.0708	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	0.208		0.0883	0.0900	1.00	0.0479	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	107		30 - 110	06/24/14 14:58	07/02/14 18:02	1

Client Sample ID: SD-236-01

Lab Sample ID: 680-102380-27
Matrix: Solid

Date Collected: 06/13/14 12:10
Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.562		0.163	0.170	1.00	0.101	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	0.447		0.143	0.148	1.00	0.0817	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	0.389		0.134	0.138	1.00	0.0811	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.3*		*30 - 110*	*06/24/14 14:58*	*07/02/14 18:02*	*1*

Client Sample ID: SD-236-02

Lab Sample ID: 680-102380-28
Matrix: Solid

Date Collected: 06/13/14 12:15
Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.555		0.159	0.166	1.00	0.0888	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	0.582		0.161	0.168	1.00	0.0666	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	0.658		0.170	0.178	1.00	0.0564	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*90.4*		*30 - 110*	*06/24/14 14:58*	*07/02/14 18:02*	*1*

Client Sample ID: SD-237-SS

Lab Sample ID: 680-102380-29
Matrix: Solid

Date Collected: 06/13/14 12:30
Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.09		0.251	0.268	1.00	0.111	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	1.04		0.243	0.258	1.00	0.0908	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	0.944		0.230	0.244	1.00	0.0725	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*69.0*		*30 - 110*	*06/24/14 14:58*	*07/02/14 18:02*	*1*

Client Sample ID: SD-237-01

Lab Sample ID: 680-102380-30
Matrix: Solid

Date Collected: 06/13/14 12:35
Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.55		0.281	0.310	1.00	0.131	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	1.11		0.234	0.252	1.00	0.0790	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	1.51		0.272	0.300	1.00	0.0741	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Client Sample ID: SD-237-01

Lab Sample ID: 680-102380-30
Matrix: Solid

Date Collected: 06/13/14 12:35
Date Received: 06/14/14 08:30

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	78.1		30 - 110	06/24/14 14:58	07/02/14 18:02	1

Client Sample ID: SD-237-02

Lab Sample ID: 680-102380-31
Matrix: Solid

Date Collected: 06/13/14 12:40
Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.27		0.226	0.250	1.00	0.0759	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	0.986		0.198	0.215	1.00	0.0577	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	1.39		0.234	0.262	1.00	0.0512	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	98.1		30 - 110	06/24/14 14:58	07/02/14 18:02	1

Client Sample ID: SD-DUP05

Lab Sample ID: 680-102380-33
Matrix: Solid

Date Collected: 06/13/14 00:00
Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.14		0.220	0.240	1.00	0.0947	pCi/g	06/24/14 14:58	07/02/14 18:03	1
Thorium-230	1.11		0.214	0.233	1.00	0.0468	pCi/g	06/24/14 14:58	07/02/14 18:03	1
Thorium-232	1.14		0.216	0.237	1.00	0.0307	pCi/g	06/24/14 14:58	07/02/14 18:03	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	92.5		30 - 110	06/24/14 14:58	07/02/14 18:03	1

Client Sample ID: SD-227-SS

Lab Sample ID: 680-102380-34
Matrix: Solid

Date Collected: 06/13/14 13:10
Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.31		0.251	0.274	1.00	0.0986	pCi/g	06/24/14 14:58	07/02/14 18:03	1
Thorium-230	0.978		0.215	0.230	1.00	0.0537	pCi/g	06/24/14 14:58	07/02/14 18:03	1
Thorium-232	1.39		0.256	0.282	1.00	0.0668	pCi/g	06/24/14 14:58	07/02/14 18:03	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	81.5		30 - 110	06/24/14 14:58	07/02/14 18:03	1

Client Sample ID: SD-227-01

Lab Sample ID: 680-102380-35

Date Collected: 06/13/14 13:15
Date Received: 06/14/14 08:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.54		0.281	0.309	1.00	0.102	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-230	1.35		0.264	0.287	1.00	0.111	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-232	1.27		0.252	0.274	1.00	0.0710	pCi/g	06/24/14 15:13	07/02/14 18:11	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*74.3*		*30 - 110*	*06/24/14 15:13*	*07/02/14 18:11*	*1*

Client Sample ID: SD-227-02

Lab Sample ID: 680-102380-36

Date Collected: 06/13/14 13:20
Date Received: 06/14/14 08:30

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.895		0.204	0.217	1.00	0.0981	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-230	0.753		0.184	0.194	1.00	0.0579	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-232	0.963		0.207	0.222	1.00	0.0505	pCi/g	06/24/14 15:13	07/02/14 18:11	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*86.1*		*30 - 110*	*06/24/14 15:13*	*07/02/14 18:11*	*1*

Client Sample ID: SD-228-01
Date Collected: 06/13/14 10:10
Date Received: 06/14/14 08:30

Lab Sample ID: 680-102380-17
Matrix: Solid

Method: 6020A - Metals (ICP/MS), Tc-99

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tc-99	ND		0.000056	0.000017	mg/Kg		09/12/14 13:53	09/17/14 15:43	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Re	*88*		*30 - 110*	*09/12/14 13:53*	*09/17/14 15:43*	*1*

Client Sample ID: SD-224-SS

Lab Sample ID: 680-102380-1
Matrix: Solid

Date Collected: 06/13/14 08:20
Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/11/14 11:25	08/18/14 20:04	5
U-234	ND		0.012	0.00071	mg/Kg		08/11/14 11:25	08/14/14 19:55	5
U-235	0.016		0.012	0.0048	mg/Kg		08/11/14 11:25	08/14/14 19:55	5
U-236	ND		0.012	0.00095	mg/Kg		08/11/14 11:25	08/14/14 19:55	5
U-238	2.3	B	0.012	0.00071	mg/Kg		08/11/14 11:25	08/14/14 19:55	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.3		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.562	U	0.745	0.747	114	34.2	pCi/g	08/11/14 11:25	08/18/14 20:04	5
U-234	1.05	U	0.145	0.174	73.7	4.42	pCi/g	08/11/14 11:25	08/14/14 19:55	5
U-235	0.0356		0.00108	0.00345	0.0256	0.0104	pCi/g	08/11/14 11:25	08/14/14 19:55	5
U-236	-0.00172	U	0.00107	0.00108	0.766	0.0614	pCi/g	08/11/14 11:25	08/14/14 19:55	5
U-238	0.780		0.0192	0.0743	0.00398	0.000239	pCi/g	08/11/14 11:25	08/14/14 19:55	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.691						%		08/19/14 13:49	1

Client Sample ID: SD-224-01

Lab Sample ID: 680-102380-2
Matrix: Solid

Date Collected: 06/13/14 08:25
Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0035	mg/Kg		08/11/14 11:25	08/18/14 20:22	5
U-234	ND		0.012	0.00070	mg/Kg		08/11/14 11:25	08/14/14 20:23	5
U-235	0.026		0.012	0.0047	mg/Kg		08/11/14 11:25	08/14/14 20:23	5
U-236	ND		0.012	0.00093	mg/Kg		08/11/14 11:25	08/14/14 20:23	5
U-238	3.6	B	0.012	0.00070	mg/Kg		08/11/14 11:25	08/14/14 20:23	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.6		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.396	U	0.0408	0.0547	112	33.7	pCi/g	08/11/14 11:25	08/18/14 20:22	5
U-234	1.33	U	0.627	0.638	72.6	4.36	pCi/g	08/11/14 11:25	08/14/14 20:23	5
U-235	0.0560		0.00443	0.00680	0.0252	0.0103	pCi/g	08/11/14 11:25	08/14/14 20:23	5
U-236	-0.00148	U	0.000778	0.000790	0.755	0.0604	pCi/g	08/11/14 11:25	08/14/14 20:23	5
U-238	1.20		0.0731	0.132	0.00392	0.000236	pCi/g	08/11/14 11:25	08/14/14 20:23	5

Client Sample ID: SD-224-01

Lab Sample ID: 680-102380-2
Matrix: Solid

Date Collected: 06/13/14 08:25
Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.717						%		08/19/14 13:49	1

Client Sample ID: SD-224-02

Lab Sample ID: 680-102380-3
Matrix: Solid

Date Collected: 06/13/14 08:30
Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0033	mg/Kg		08/11/14 11:25	08/18/14 20:36	5
U-234	ND		0.011	0.00066	mg/Kg		08/11/14 11:25	08/14/14 20:28	5
U-235	0.019		0.011	0.0045	mg/Kg		08/11/14 11:25	08/14/14 20:28	5
U-236	ND		0.011	0.00088	mg/Kg		08/11/14 11:25	08/14/14 20:28	5
U-238	2.7	B	0.011	0.00066	mg/Kg		08/11/14 11:25	08/14/14 20:28	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.7		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.482	U	0.304	0.308	107	32.0	pCi/g	08/11/14 11:25	08/18/14 20:36	5
U-234	1.12	U	0.135	0.170	68.8	4.13	pCi/g	08/11/14 11:25	08/14/14 20:28	5
U-235	0.0419		0.00376	0.00538	0.0239	0.00973	pCi/g	08/11/14 11:25	08/14/14 20:28	5
U-236	-0.00197	U	0.00282	0.00283	0.715	0.0573	pCi/g	08/11/14 11:25	08/14/14 20:28	5
U-238	0.898		0.0511	0.0972	0.00372	0.000223	pCi/g	08/11/14 11:25	08/14/14 20:28	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.699						%		08/19/14 13:49	1

Client Sample ID: SD-223-SS

Lab Sample ID: 680-102380-5
Matrix: Solid

Date Collected: 06/13/14 08:40
Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0034	mg/Kg		08/11/14 11:25	08/18/14 20:41	5
U-234	ND		0.011	0.00068	mg/Kg		08/11/14 11:25	08/14/14 20:33	5
U-235	0.024		0.011	0.0046	mg/Kg		08/11/14 11:25	08/14/14 20:33	5
U-236	ND		0.011	0.00091	mg/Kg		08/11/14 11:25	08/14/14 20:33	5
U-238	3.2	B	0.011	0.00068	mg/Kg		08/11/14 11:25	08/14/14 20:33	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.2		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Client Sample ID: SD-223-SS

Lab Sample ID: 680-102380-5
Matrix: Solid

Date Collected: 06/13/14 08:40
Date Received: 06/14/14 08:30

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.462	U	0.565	0.567	109	32.7	pCi/g	08/11/14 11:25	08/18/14 20:41	5
U-234	1.57	U	0.355	0.383	70.4	4.23	pCi/g	08/11/14 11:25	08/14/14 20:33	5
U-235	0.0526		0.00451	0.00662	0.0245	0.00996	pCi/g	08/11/14 11:25	08/14/14 20:33	5
U-236	-0.00152	U	0.00231	0.00232	0.732	0.0586	pCi/g	08/11/14 11:25	08/14/14 20:33	5
U-238	1.07		0.0681	0.120	0.00380	0.000229	pCi/g	08/11/14 11:25	08/14/14 20:33	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.744						%		08/19/14 13:49	1

Client Sample ID: SD-223-01

Lab Sample ID: 680-102380-6
Matrix: Solid

Date Collected: 06/13/14 08:45
Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0035	mg/Kg		08/11/14 11:25	08/18/14 20:46	5
U-234	ND		0.012	0.00070	mg/Kg		08/11/14 11:25	08/14/14 20:37	5
U-235	0.026		0.012	0.0048	mg/Kg		08/11/14 11:25	08/14/14 20:37	5
U-236	ND		0.012	0.00094	mg/Kg		08/11/14 11:25	08/14/14 20:37	5
U-238	3.6	B	0.012	0.00070	mg/Kg		08/11/14 11:25	08/14/14 20:37	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.6		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.528	U	0.599	0.601	113	33.8	pCi/g	08/11/14 11:25	08/18/14 20:46	5
U-234	1.33	U	0.229	0.259	72.8	4.37	pCi/g	08/11/14 11:25	08/14/14 20:37	5
U-235	0.0567		0.00528	0.00742	0.0253	0.0103	pCi/g	08/11/14 11:25	08/14/14 20:37	5
U-236	-0.00209	U	0.00265	0.00266	0.757	0.0606	pCi/g	08/11/14 11:25	08/14/14 20:37	5
U-238	1.21		0.0908	0.143	0.00393	0.000236	pCi/g	08/11/14 11:25	08/14/14 20:37	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.717						%		08/19/14 13:49	1

Client Sample ID: SD-223-02

Date Collected: 06/13/14 08:50
Date Received: 06/14/14 08:30

Lab Sample ID: 680-102380-7
Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0033	mg/Kg		08/11/14 11:25	08/18/14 20:50	5
U-234	ND		0.011	0.00066	mg/Kg		08/11/14 11:25	08/14/14 20:42	5
U-235	0.0068	J	0.011	0.0045	mg/Kg		08/11/14 11:25	08/14/14 20:42	5
U-236	ND		0.011	0.00088	mg/Kg		08/11/14 11:25	08/14/14 20:42	5
U-238	0.99	B	0.011	0.00066	mg/Kg		08/11/14 11:25	08/14/14 20:42	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.0		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.468	U	0.323	0.326	106	31.9	pCi/g	08/11/14 11:25	08/18/14 20:50	5
U-234	0.443	U	0.336	0.338	68.7	4.13	pCi/g	08/11/14 11:25	08/14/14 20:42	5
U-235	0.0148		0.00186	0.00230	0.0239	0.00972	pCi/g	08/11/14 11:25	08/14/14 20:42	5
U-236	-0.00260	U	0.00112	0.00115	0.714	0.0572	pCi/g	08/11/14 11:25	08/14/14 20:42	5
U-238	0.334		0.0229	0.0384	0.00371	0.000223	pCi/g	08/11/14 11:25	08/14/14 20:42	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.682						%		08/19/14 13:49	1

Client Sample ID: SD-226-SS

Date Collected: 06/13/14 08:55
Date Received: 06/14/14 08:30

Lab Sample ID: 680-102380-8
Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0036	mg/Kg		08/11/14 11:25	08/18/14 20:55	5
U-234	ND		0.012	0.00072	mg/Kg		08/11/14 11:25	08/14/14 20:47	5
U-235	0.029		0.012	0.0049	mg/Kg		08/11/14 11:25	08/14/14 20:47	5
U-236	ND		0.012	0.00096	mg/Kg		08/11/14 11:25	08/14/14 20:47	5
U-238	4.0	B	0.012	0.00072	mg/Kg		08/11/14 11:25	08/14/14 20:47	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	4.0		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.697	U	0.361	0.367	116	34.8	pCi/g	08/11/14 11:25	08/18/14 20:55	5
U-234	1.51	U	0.517	0.535	75.0	4.50	pCi/g	08/11/14 11:25	08/14/14 20:47	5
U-235	0.0631		0.00391	0.00700	0.0260	0.0106	pCi/g	08/11/14 11:25	08/14/14 20:47	5
U-236	-0.00224	U	0.00227	0.00228	0.779	0.0624	pCi/g	08/11/14 11:25	08/14/14 20:47	5
U-238	1.34		0.108	0.164	0.00405	0.000243	pCi/g	08/11/14 11:25	08/14/14 20:47	5

Client Sample ID: SD-226-SS

Lab Sample ID: 680-102380-8
Matrix: Solid

Date Collected: 06/13/14 08:55
Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.720						%		08/19/14 13:49	1

Client Sample ID: SD-226-01

Lab Sample ID: 680-102380-9
Matrix: Solid

Date Collected: 06/13/14 09:00
Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0036	mg/Kg		08/11/14 11:25	08/18/14 21:00	5
U-234	ND		0.012	0.00072	mg/Kg		08/11/14 11:25	08/14/14 20:51	5
U-235	0.028		0.012	0.0049	mg/Kg		08/11/14 11:25	08/14/14 20:51	5
U-236	ND		0.012	0.00096	mg/Kg		08/11/14 11:25	08/14/14 20:51	5
U-238	3.7	B	0.012	0.00072	mg/Kg		08/11/14 11:25	08/14/14 20:51	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.7		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.885	U	0.395	0.403	116	34.7	pCi/g	08/11/14 11:25	08/18/14 21:00	5
U-234	1.67	U	0.293	0.331	74.8	4.49	pCi/g	08/11/14 11:25	08/14/14 20:51	5
U-235	0.0597		0.00711	0.00898	0.0260	0.0106	pCi/g	08/11/14 11:25	08/14/14 20:51	5
U-236	-0.00218	U	0.00184	0.00185	0.777	0.0622	pCi/g	08/11/14 11:25	08/14/14 20:51	5
U-238	1.25		0.125	0.170	0.00404	0.000243	pCi/g	08/11/14 11:25	08/14/14 20:51	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.751						%		08/19/14 13:49	1

Client Sample ID: SD-226-02

Lab Sample ID: 680-102380-10
Matrix: Solid

Date Collected: 06/13/14 09:05
Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0034	mg/Kg		08/11/14 11:25	08/18/14 21:04	5
U-234	ND		0.011	0.00067	mg/Kg		08/11/14 11:25	08/14/14 21:05	5
U-235	0.016		0.011	0.0046	mg/Kg		08/11/14 11:25	08/14/14 21:05	5
U-236	ND		0.011	0.00090	mg/Kg		08/11/14 11:25	08/14/14 21:05	5
U-238	2.2	B	0.011	0.00067	mg/Kg		08/11/14 11:25	08/14/14 21:05	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.2		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Client Sample ID: SD-226-02

Lab Sample ID: 680-102380-10
Matrix: Solid

Date Collected: 06/13/14 09:05
Date Received: 06/14/14 08:30

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.494	U	0.394	0.397	108	32.5	pCi/g	08/11/14 11:25	08/18/14 21:04	5
U-234	0.853	U	0.161	0.179	69.9	4.20	pCi/g	08/11/14 11:25	08/14/14 21:05	5
U-235	0.0342		0.00219	0.00383	0.0243	0.00989	pCi/g	08/11/14 11:25	08/14/14 21:05	5
U-236	-0.00160	U	0.00250	0.00251	0.727	0.0582	pCi/g	08/11/14 11:25	08/14/14 21:05	5
U-238	0.725		0.0380	0.0768	0.00378	0.000227	pCi/g	08/11/14 11:25	08/14/14 21:05	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.722						%		08/19/14 13:49	1

Client Sample ID: SD-225-SS

Lab Sample ID: 680-102380-12
Matrix: Solid

Date Collected: 06/13/14 09:15
Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0036	mg/Kg		08/11/14 11:25	08/18/14 21:09	5
U-234	ND		0.012	0.00073	mg/Kg		08/11/14 11:25	08/14/14 21:10	5
U-235	0.027		0.012	0.0049	mg/Kg		08/11/14 11:25	08/14/14 21:10	5
U-236	ND		0.012	0.00097	mg/Kg		08/11/14 11:25	08/14/14 21:10	5
U-238	3.6	B	0.012	0.00073	mg/Kg		08/11/14 11:25	08/14/14 21:10	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.6		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.821	U	0.390	0.397	117	35.0	pCi/g	08/11/14 11:25	08/18/14 21:09	5
U-234	1.45	U	0.757	0.768	75.3	4.52	pCi/g	08/11/14 11:25	08/14/14 21:10	5
U-235	0.0577		0.00614	0.00812	0.0262	0.0107	pCi/g	08/11/14 11:25	08/14/14 21:10	5
U-236	-0.00144	U	0.00110	0.00111	0.783	0.0627	pCi/g	08/11/14 11:25	08/14/14 21:10	5
U-238	1.21		0.109	0.156	0.00407	0.000245	pCi/g	08/11/14 11:25	08/14/14 21:10	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.744						%		08/19/14 13:49	1

Client Sample ID: SD-225-01

Lab Sample ID: 680-102380-13

Date Collected: 06/13/14 09:20
Date Received: 06/14/14 08:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0033	mg/Kg		08/11/14 11:25	08/18/14 21:14	5
U-234	ND		0.011	0.00066	mg/Kg		08/11/14 11:25	08/14/14 21:15	5
U-235	0.024		0.011	0.0045	mg/Kg		08/11/14 11:25	08/14/14 21:15	5
U-236	ND		0.011	0.00088	mg/Kg		08/11/14 11:25	08/14/14 21:15	5
U-238	3.3	B	0.011	0.00066	mg/Kg		08/11/14 11:25	08/14/14 21:15	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.3		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.686	U	0.180	0.191	107	32.0	pCi/g	08/11/14 11:25	08/18/14 21:14	5
U-234	1.34	U	0.651	0.662	68.8	4.13	pCi/g	08/11/14 11:25	08/14/14 21:15	5
U-235	0.0529		0.00558	0.00740	0.0239	0.00973	pCi/g	08/11/14 11:25	08/14/14 21:15	5
U-236	-0.00212	U	0.00147	0.00148	0.715	0.0573	pCi/g	08/11/14 11:25	08/14/14 21:15	5
U-238	1.11		0.0831	0.132	0.00372	0.000223	pCi/g	08/11/14 11:25	08/14/14 21:15	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.722						%		08/19/14 13:49	1

Client Sample ID: SD-225-02

Lab Sample ID: 680-102380-14

Date Collected: 06/13/14 09:25
Date Received: 06/14/14 08:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0033	mg/Kg		08/11/14 11:25	08/18/14 21:18	5
U-234	ND		0.011	0.00065	mg/Kg		08/11/14 11:25	08/14/14 21:19	5
U-235	0.018		0.011	0.0044	mg/Kg		08/11/14 11:25	08/14/14 21:19	5
U-236	ND		0.011	0.00087	mg/Kg		08/11/14 11:25	08/14/14 21:19	5
U-238	2.6	B	0.011	0.00065	mg/Kg		08/11/14 11:25	08/14/14 21:19	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.6		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.710	U	0.213	0.222	104	31.3	pCi/g	08/11/14 11:25	08/18/14 21:18	5
U-234	1.10	U	0.187	0.213	67.4	4.05	pCi/g	08/11/14 11:25	08/14/14 21:19	5
U-235	0.0397		0.00101	0.00379	0.0234	0.00954	pCi/g	08/11/14 11:25	08/14/14 21:19	5
U-236	-0.00179	U	0.000868	0.000884	0.701	0.0561	pCi/g	08/11/14 11:25	08/14/14 21:19	5
U-238	0.860		0.0429	0.0900	0.00364	0.000219	pCi/g	08/11/14 11:25	08/14/14 21:19	5

Client Sample ID: SD-225-02

Lab Sample ID: 680-102380-14
Matrix: Solid

Date Collected: 06/13/14 09:25
Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.688						%		08/19/14 13:49	1

Client Sample ID: SD-228-SS

Lab Sample ID: 680-102380-16
Matrix: Solid

Date Collected: 06/13/14 10:05
Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0033	mg/Kg		08/11/14 11:25	08/18/14 21:32	5
U-234	ND		0.011	0.00065	mg/Kg		08/11/14 11:25	08/14/14 21:24	5
U-235	0.029		0.011	0.0044	mg/Kg		08/11/14 11:25	08/14/14 21:24	5
U-236	ND		0.011	0.00087	mg/Kg		08/11/14 11:25	08/14/14 21:24	5
U-238	3.9	B	0.011	0.00065	mg/Kg		08/11/14 11:25	08/14/14 21:24	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.9		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.406	U	0.0937	0.101	105	31.4	pCi/g	08/11/14 11:25	08/18/14 21:32	5
U-234	1.64	U	0.239	0.282	67.6	4.06	pCi/g	08/11/14 11:25	08/14/14 21:24	5
U-235	0.0623		0.00588	0.00821	0.0235	0.00956	pCi/g	08/11/14 11:25	08/14/14 21:24	5
U-236	-0.00267	U	0.00152	0.00154	0.703	0.0563	pCi/g	08/11/14 11:25	08/14/14 21:24	5
U-238	1.32		0.110	0.164	0.00365	0.000220	pCi/g	08/11/14 11:25	08/14/14 21:24	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.738						%		08/19/14 13:49	1

Client Sample ID: SD-228-01

Lab Sample ID: 680-102380-17
Matrix: Solid

Date Collected: 06/13/14 10:10
Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0035	mg/Kg		08/11/14 11:25	08/18/14 21:37	5
U-234	0.0010	J	0.012	0.00070	mg/Kg		08/11/14 11:25	08/14/14 21:29	5
U-235	0.095		0.012	0.0047	mg/Kg		08/11/14 11:25	08/14/14 21:29	5
U-236	ND		0.012	0.00093	mg/Kg		08/11/14 11:25	08/14/14 21:29	5
U-238	4.4	B	0.012	0.00070	mg/Kg		08/11/14 11:25	08/14/14 21:29	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	4.5		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Client Sample ID: SD-228-01

Lab Sample ID: 680-102380-17

Date Collected: 06/13/14 10:10
Date Received: 06/14/14 08:30

Matrix: Solid

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.591	U	0.392	0.395	112	33.6	pCi/g	08/11/14 11:25	08/18/14 21:37	5
U-234	6.47		0.421	0.730	72.3	4.34	pCi/g	08/11/14 11:25	08/14/14 21:29	5
U-235	0.206		0.0255	0.0317	0.0251	0.0102	pCi/g	08/11/14 11:25	08/14/14 21:29	5
U-236	0.00787	U	0.00299	0.00307	0.751	0.0602	pCi/g	08/11/14 11:25	08/14/14 21:29	5
U-238	1.47		0.153	0.204	0.00390	0.000235	pCi/g	08/11/14 11:25	08/14/14 21:29	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	2.11						%		08/19/14 13:49	1

Client Sample ID: SD-228-02

Lab Sample ID: 680-102380-18

Date Collected: 06/13/14 10:15
Date Received: 06/14/14 08:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0035	mg/Kg		08/11/14 11:25	08/18/14 21:42	5
U-234	ND		0.012	0.00070	mg/Kg		08/11/14 11:25	08/14/14 21:33	5
U-235	0.019		0.012	0.0047	mg/Kg		08/11/14 11:25	08/14/14 21:33	5
U-236	ND		0.012	0.00093	mg/Kg		08/11/14 11:25	08/14/14 21:33	5
U-238	2.5	B	0.012	0.00070	mg/Kg		08/11/14 11:25	08/14/14 21:33	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.5		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.781	U	0.213	0.224	112	33.7	pCi/g	08/11/14 11:25	08/18/14 21:42	5
U-234	0.820	U	0.278	0.288	72.4	4.35	pCi/g	08/11/14 11:25	08/14/14 21:33	5
U-235	0.0407		0.00453	0.00588	0.0252	0.0102	pCi/g	08/11/14 11:25	08/14/14 21:33	5
U-236	-0.00190	U	0.000327	0.000371	0.753	0.0603	pCi/g	08/11/14 11:25	08/14/14 21:33	5
U-238	0.829		0.0905	0.118	0.00391	0.000235	pCi/g	08/11/14 11:25	08/14/14 21:33	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.754						%		08/19/14 13:49	1

Client Sample ID: SD-234-SS

Lab Sample ID: 680-102380-20
Matrix: Solid

Date Collected: 06/13/14 10:30
Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0036	mg/Kg		08/11/14 11:25	08/18/14 21:46	5
U-234	ND		0.012	0.00073	mg/Kg		08/11/14 11:25	08/14/14 21:38	5
U-235	0.018		0.012	0.0049	mg/Kg		08/11/14 11:25	08/14/14 21:38	5
U-236	ND		0.012	0.00097	mg/Kg		08/11/14 11:25	08/14/14 21:38	5
U-238	2.3	B	0.012	0.00073	mg/Kg		08/11/14 11:25	08/14/14 21:38	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.3		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-1.09	U	0.369	0.383	117	35.0	pCi/g	08/11/14 11:25	08/18/14 21:46	5
U-234	0.862	U	0.367	0.376	75.4	4.52	pCi/g	08/11/14 11:25	08/14/14 21:38	5
U-235	0.0400		0.00392	0.00537	0.0262	0.0107	pCi/g	08/11/14 11:25	08/14/14 21:38	5
U-236	-0.00197	U	0.000512	0.000543	0.783	0.0628	pCi/g	08/11/14 11:25	08/14/14 21:38	5
U-238	0.772		0.0860	0.111	0.00407	0.000245	pCi/g	08/11/14 11:25	08/14/14 21:38	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.777						%		08/19/14 13:49	1

Client Sample ID: SD-234-01

Lab Sample ID: 680-102380-21
Matrix: Solid

Date Collected: 06/13/14 10:35
Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0035	mg/Kg		08/11/14 11:25	08/18/14 21:51	5
U-234	ND		0.012	0.00070	mg/Kg		08/11/14 11:25	08/14/14 21:43	5
U-235	0.0059	J	0.012	0.0047	mg/Kg		08/11/14 11:25	08/14/14 21:43	5
U-236	ND		0.012	0.00093	mg/Kg		08/11/14 11:25	08/14/14 21:43	5
U-238	0.88	B	0.012	0.00070	mg/Kg		08/11/14 11:25	08/14/14 21:43	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.89		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.865	U	0.465	0.472	112	33.6	pCi/g	08/11/14 11:25	08/18/14 21:51	5
U-234	0.379	U	0.217	0.220	72.3	4.34	pCi/g	08/11/14 11:25	08/14/14 21:43	5
U-235	0.0127		0.00245	0.00272	0.0251	0.0102	pCi/g	08/11/14 11:25	08/14/14 21:43	5
U-236	-0.00216	U	0.000838	0.000861	0.752	0.0602	pCi/g	08/11/14 11:25	08/14/14 21:43	5
U-238	0.295		0.0324	0.0423	0.00391	0.000235	pCi/g	08/11/14 11:25	08/14/14 21:43	5

Client Sample ID: SD-234-01

Lab Sample ID: 680-102380-21
Matrix: Solid

Date Collected: 06/13/14 10:35
Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.666						%		08/19/14 13:49	1

Client Sample ID: SD-235-SS

Lab Sample ID: 680-102380-22
Matrix: Solid

Date Collected: 06/13/14 11:00
Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0032	mg/Kg		08/11/14 11:25	08/18/14 21:56	5
U-234	ND		0.011	0.00064	mg/Kg		08/11/14 11:25	08/14/14 21:48	5
U-235	0.021		0.011	0.0044	mg/Kg		08/11/14 11:25	08/14/14 21:48	5
U-236	ND		0.011	0.00086	mg/Kg		08/11/14 11:25	08/14/14 21:48	5
U-238	2.4	B	0.011	0.00064	mg/Kg		08/11/14 11:25	08/14/14 21:48	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.4		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.853	U	0.351	0.360	104	31.1	pCi/g	08/11/14 11:25	08/18/14 21:56	5
U-234	1.20	U	0.335	0.353	66.9	4.01	pCi/g	08/11/14 11:25	08/14/14 21:48	5
U-235	0.0457		0.00346	0.00544	0.0232	0.00946	pCi/g	08/11/14 11:25	08/14/14 21:48	5
U-236	-0.00108	U	0.00166	0.00167	0.695	0.0557	pCi/g	08/11/14 11:25	08/14/14 21:48	5
U-238	0.818		0.0692	0.102	0.00361	0.000217	pCi/g	08/11/14 11:25	08/14/14 21:48	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.867						%		08/19/14 13:49	1

Client Sample ID: SD-235-01

Lab Sample ID: 680-102380-23
Matrix: Solid

Date Collected: 06/13/14 11:05
Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0035	mg/Kg		08/11/14 11:25	08/18/14 22:00	5
U-234	ND		0.012	0.00070	mg/Kg		08/11/14 11:25	08/14/14 22:02	5
U-235	0.028		0.012	0.0047	mg/Kg		08/11/14 11:25	08/14/14 22:02	5
U-236	ND		0.012	0.00093	mg/Kg		08/11/14 11:25	08/14/14 22:02	5
U-238	3.3	B	0.012	0.00070	mg/Kg		08/11/14 11:25	08/14/14 22:02	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.3		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Client Sample ID: SD-235-01

Lab Sample ID: 680-102380-23

Date Collected: 06/13/14 11:05
Date Received: 06/14/14 08:30

Matrix: Solid

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.797	U	0.640	0.644	113	33.8	pCi/g	08/11/14 11:25	08/18/14 22:00	5
U-234	1.61	U	0.446	0.470	72.7	4.36	pCi/g	08/11/14 11:25	08/14/14 22:02	5
U-235	0.0602		0.00602	0.00818	0.0253	0.0103	pCi/g	08/11/14 11:25	08/14/14 22:02	5
U-236	-0.00178	U	0.000826	0.000842	0.756	0.0605	pCi/g	08/11/14 11:25	08/14/14 22:02	5
U-238	1.12		0.0730	0.126	0.00393	0.000236	pCi/g	08/11/14 11:25	08/14/14 22:02	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.841						%		08/19/14 13:49	1

Client Sample ID: SD-235-02

Lab Sample ID: 680-102380-24

Date Collected: 06/13/14 11:10
Date Received: 06/14/14 08:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0036	mg/Kg		08/11/14 11:25	08/18/14 22:05	5
U-234	ND		0.012	0.00072	mg/Kg		08/11/14 11:25	08/14/14 22:06	5
U-235	0.040		0.012	0.0048	mg/Kg		08/11/14 11:25	08/14/14 22:06	5
U-236	ND		0.012	0.00095	mg/Kg		08/11/14 11:25	08/14/14 22:06	5
U-238	3.8	B	0.012	0.00072	mg/Kg		08/11/14 11:25	08/14/14 22:06	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.8		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.758	U	0.680	0.683	115	34.5	pCi/g	08/11/14 11:25	08/18/14 22:05	5
U-234	2.45	U	0.449	0.503	74.2	4.45	pCi/g	08/11/14 11:25	08/14/14 22:06	5
U-235	0.0873		0.00545	0.00971	0.0258	0.0105	pCi/g	08/11/14 11:25	08/14/14 22:06	5
U-236	0.000740	U	0.00192	0.00192	0.771	0.0617	pCi/g	08/11/14 11:25	08/14/14 22:06	5
U-238	1.27		0.0804	0.142	0.00401	0.000241	pCi/g	08/11/14 11:25	08/14/14 22:06	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	1.04						%		08/19/14 13:49	1

Client Sample ID: SD-236-SS

Lab Sample ID: 680-102380-26
Matrix: Solid

Date Collected: 06/13/14 12:05
Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0035	mg/Kg		08/11/14 11:35	08/18/14 22:28	5
U-234	ND		0.012	0.00070	mg/Kg		08/11/14 11:35	08/14/14 22:20	5
U-235	ND		0.012	0.0047	mg/Kg		08/11/14 11:35	08/14/14 22:20	5
U-236	ND		0.012	0.00093	mg/Kg		08/11/14 11:35	08/14/14 22:20	5
U-238	0.28	B	0.012	0.00070	mg/Kg		08/11/14 11:35	08/14/14 22:20	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.28		0.0050	0.00030	mg/Kg			08/19/14 13:51	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-1.20	U	0.328	0.346	112	33.6	pCi/g	08/11/14 11:35	08/18/14 22:28	5
U-234	0.168	U	0.281	0.282	72.3	4.34	pCi/g	08/11/14 11:35	08/14/14 22:20	5
U-235	0.00300	U	0.000961	0.00100	0.0251	0.0102	pCi/g	08/11/14 11:35	08/14/14 22:20	5
U-236	-0.00165	U	0.00186	0.00186	0.751	0.0602	pCi/g	08/11/14 11:35	08/14/14 22:20	5
U-238	0.0929		0.00264	0.00895	0.00390	0.000235	pCi/g	08/11/14 11:35	08/14/14 22:20	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.000						%		08/19/14 13:50	1

Client Sample ID: SD-236-01

Lab Sample ID: 680-102380-27
Matrix: Solid

Date Collected: 06/13/14 12:10
Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0033	mg/Kg		08/11/14 11:35	08/18/14 22:47	5
U-234	ND		0.011	0.00065	mg/Kg		08/11/14 11:35	08/14/14 22:39	5
U-235	ND		0.011	0.0044	mg/Kg		08/11/14 11:35	08/14/14 22:39	5
U-236	ND		0.011	0.00087	mg/Kg		08/11/14 11:35	08/14/14 22:39	5
U-238	0.62	B	0.011	0.00065	mg/Kg		08/11/14 11:35	08/14/14 22:39	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.62		0.0050	0.00030	mg/Kg			08/19/14 13:51	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-1.17	U	0.191	0.219	105	31.5	pCi/g	08/11/14 11:35	08/18/14 22:47	5
U-234	0.276	U	0.161	0.163	67.7	4.07	pCi/g	08/11/14 11:35	08/14/14 22:39	5
U-235	0.00893	U	0.00132	0.00155	0.0235	0.00958	pCi/g	08/11/14 11:35	08/14/14 22:39	5
U-236	-0.00206	U	0.000914	0.000934	0.704	0.0564	pCi/g	08/11/14 11:35	08/14/14 22:39	5
U-238	0.208		0.0229	0.0298	0.00366	0.000220	pCi/g	08/11/14 11:35	08/14/14 22:39	5

Client Sample ID: SD-236-01

Lab Sample ID: 680-102380-27

Date Collected: 06/13/14 12:10
Date Received: 06/14/14 08:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.000						%		08/19/14 13:50	1

Client Sample ID: SD-236-02

Lab Sample ID: 680-102380-28

Date Collected: 06/13/14 12:15
Date Received: 06/14/14 08:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/11/14 11:35	08/18/14 22:52	5
U-234	ND		0.012	0.00072	mg/Kg		08/11/14 11:35	08/14/14 22:44	5
U-235	0.0054	J	0.012	0.0048	mg/Kg		08/11/14 11:35	08/14/14 22:44	5
U-236	ND		0.012	0.00095	mg/Kg		08/11/14 11:35	08/14/14 22:44	5
U-238	0.84	B	0.012	0.00072	mg/Kg		08/11/14 11:35	08/14/14 22:44	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.85		0.0050	0.00030	mg/Kg			08/19/14 13:51	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-1.02	U	0.363	0.375	115	34.5	pCi/g	08/11/14 11:35	08/18/14 22:52	5
U-234	0.353	U	0.393	0.395	74.2	4.45	pCi/g	08/11/14 11:35	08/14/14 22:44	5
U-235	0.0116		0.00174	0.00205	0.0258	0.0105	pCi/g	08/11/14 11:35	08/14/14 22:44	5
U-236	-0.00228	U	0.000533	0.000573	0.771	0.0617	pCi/g	08/11/14 11:35	08/14/14 22:44	5
U-238	0.281		0.0250	0.0359	0.00401	0.000241	pCi/g	08/11/14 11:35	08/14/14 22:44	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.639						%		08/19/14 13:50	1

Client Sample ID: SD-237-SS

Lab Sample ID: 680-102380-29

Date Collected: 06/13/14 12:30
Date Received: 06/14/14 08:30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0033	mg/Kg		08/11/14 11:35	08/18/14 22:56	5
U-234	ND		0.011	0.00066	mg/Kg		08/11/14 11:35	08/14/14 22:58	5
U-235	0.032		0.011	0.0045	mg/Kg		08/11/14 11:35	08/14/14 22:58	5
U-236	ND		0.011	0.00088	mg/Kg		08/11/14 11:35	08/14/14 22:58	5
U-238	2.6	B	0.011	0.00066	mg/Kg		08/11/14 11:35	08/14/14 22:58	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.6		0.0050	0.00030	mg/Kg			08/19/14 13:51	1

Client Sample ID: SD-237-SS

Lab Sample ID: 680-102380-29
Matrix: Solid

Date Collected: 06/13/14 12:30
Date Received: 06/14/14 08:30

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.871	U	0.471	0.478	106	31.9	pCi/g	08/11/14 11:35	08/18/14 22:56	5
U-234	1.67	U	0.583	0.603	68.6	4.12	pCi/g	08/11/14 11:35	08/14/14 22:58	5
U-235	0.0684		0.00424	0.00759	0.0238	0.00970	pCi/g	08/11/14 11:35	08/14/14 22:58	5
U-236	0.000314	U	0.00121	0.00121	0.713	0.0571	pCi/g	08/11/14 11:35	08/14/14 22:58	5
U-238	0.872		0.0541	0.0968	0.00370	0.000223	pCi/g	08/11/14 11:35	08/14/14 22:58	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	1.22						%		08/19/14 13:50	1

Client Sample ID: SD-237-01

Lab Sample ID: 680-102380-30
Matrix: Solid

Date Collected: 06/13/14 12:35
Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0037	mg/Kg		08/11/14 11:35	08/18/14 23:01	5
U-234	ND		0.012	0.00075	mg/Kg		08/11/14 11:35	08/14/14 23:02	5
U-235	0.025		0.012	0.0051	mg/Kg		08/11/14 11:35	08/14/14 23:02	5
U-236	ND		0.012	0.0010	mg/Kg		08/11/14 11:35	08/14/14 23:02	5
U-238	3.1	B	0.012	0.00075	mg/Kg		08/11/14 11:35	08/14/14 23:02	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.1		0.0050	0.00030	mg/Kg			08/19/14 13:51	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.856	U	0.249	0.261	120	36.0	pCi/g	08/11/14 11:35	08/18/14 23:01	5
U-234	1.36	U	0.148	0.194	77.6	4.66	pCi/g	08/11/14 11:35	08/14/14 23:02	5
U-235	0.0540		0.00224	0.00545	0.0269	0.0110	pCi/g	08/11/14 11:35	08/14/14 23:02	5
U-236	-0.00145	U	0.00191	0.00191	0.806	0.0646	pCi/g	08/11/14 11:35	08/14/14 23:02	5
U-238	1.05		0.0521	0.109	0.00419	0.000252	pCi/g	08/11/14 11:35	08/14/14 23:02	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.800						%		08/19/14 13:50	1

Client Sample ID: SD-237-02

Lab Sample ID: 680-102380-31
Matrix: Solid

Date Collected: 06/13/14 12:40
Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0034	mg/Kg		08/11/14 11:35	08/18/14 23:06	5
U-234	ND		0.011	0.00068	mg/Kg		08/11/14 11:35	08/14/14 23:07	5
U-235	0.057		0.011	0.0046	mg/Kg		08/11/14 11:35	08/14/14 23:07	5
U-236	ND		0.011	0.00090	mg/Kg		08/11/14 11:35	08/14/14 23:07	5
U-238	3.8	B	0.011	0.00068	mg/Kg		08/11/14 11:35	08/14/14 23:07	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.9		0.0050	0.00030	mg/Kg			08/19/14 13:51	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.649	U	0.376	0.381	109	32.7	pCi/g	08/11/14 11:35	08/18/14 23:06	5
U-234	3.47	U	0.692	0.762	70.3	4.22	pCi/g	08/11/14 11:35	08/14/14 23:07	5
U-235	0.123		0.0110	0.0158	0.0244	0.00995	pCi/g	08/11/14 11:35	08/14/14 23:07	5
U-236	0.00252	U	0.00199	0.00201	0.731	0.0586	pCi/g	08/11/14 11:35	08/14/14 23:07	5
U-238	1.29		0.0797	0.143	0.00380	0.000228	pCi/g	08/11/14 11:35	08/14/14 23:07	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	1.48						%		08/19/14 13:50	1

Client Sample ID: SD-DUP05

Lab Sample ID: 680-102380-33
Matrix: Solid

Date Collected: 06/13/14 00:00
Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/11/14 11:35	08/18/14 23:10	5
U-234	ND		0.012	0.00073	mg/Kg		08/11/14 11:35	08/14/14 23:12	5
U-235	0.044		0.012	0.0049	mg/Kg		08/11/14 11:35	08/14/14 23:12	5
U-236	ND		0.012	0.00097	mg/Kg		08/11/14 11:35	08/14/14 23:12	5
U-238	4.1	B	0.012	0.00073	mg/Kg		08/11/14 11:35	08/14/14 23:12	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	4.1		0.0050	0.00030	mg/Kg			08/19/14 13:51	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.741	U	0.452	0.457	116	34.9	pCi/g	08/11/14 11:35	08/18/14 23:10	5
U-234	2.44	U	0.300	0.375	75.2	4.51	pCi/g	08/11/14 11:35	08/14/14 23:12	5
U-235	0.0956		0.00723	0.0114	0.0261	0.0106	pCi/g	08/11/14 11:35	08/14/14 23:12	5
U-236	-0.0000938	U	0.00155	0.00155	0.782	0.0626	pCi/g	08/11/14 11:35	08/14/14 23:12	5
U-238	1.37		0.0979	0.159	0.00406	0.000244	pCi/g	08/11/14 11:35	08/14/14 23:12	5

Client Sample ID: SD-DUP05

Lab Sample ID: 680-102380-33
Matrix: Solid

Date Collected: 06/13/14 00:00
Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	1.06						%		08/19/14 13:50	1

Client Sample ID: SD-227-SS

Lab Sample ID: 680-102380-34
Matrix: Solid

Date Collected: 06/13/14 13:10
Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0036	mg/Kg		08/11/14 11:35	08/18/14 23:24	5
U-234	ND		0.012	0.00073	mg/Kg		08/11/14 11:35	08/14/14 23:16	5
U-235	0.030		0.012	0.0049	mg/Kg		08/11/14 11:35	08/14/14 23:16	5
U-236	ND		0.012	0.00097	mg/Kg		08/11/14 11:35	08/14/14 23:16	5
U-238	4.1	B	0.012	0.00073	mg/Kg		08/11/14 11:35	08/14/14 23:16	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	4.1		0.0050	0.00030	mg/Kg			08/19/14 13:51	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.677	U	0.466	0.470	117	35.0	pCi/g	08/11/14 11:35	08/18/14 23:24	5
U-234	1.55	U	1.05	1.06	75.4	4.52	pCi/g	08/11/14 11:35	08/14/14 23:16	5
U-235	0.0649		0.00616	0.00857	0.0262	0.0107	pCi/g	08/11/14 11:35	08/14/14 23:16	5
U-236	-0.00191	U	0.00166	0.00167	0.784	0.0628	pCi/g	08/11/14 11:35	08/14/14 23:16	5
U-238	1.37		0.133	0.184	0.00407	0.000245	pCi/g	08/11/14 11:35	08/14/14 23:16	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.726						%		08/19/14 13:50	1

Client Sample ID: SD-227-01

Lab Sample ID: 680-102380-35
Matrix: Solid

Date Collected: 06/13/14 13:15
Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0032	mg/Kg		08/11/14 11:35	08/18/14 23:29	5
U-234	ND		0.011	0.00065	mg/Kg		08/11/14 11:35	08/14/14 23:21	5
U-235	0.025		0.011	0.0044	mg/Kg		08/11/14 11:35	08/14/14 23:21	5
U-236	ND		0.011	0.00086	mg/Kg		08/11/14 11:35	08/14/14 23:21	5
U-238	3.3	B	0.011	0.00065	mg/Kg		08/11/14 11:35	08/14/14 23:21	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.3		0.0050	0.00030	mg/Kg			08/19/14 13:51	1

Client Sample ID: SD-227-01

Lab Sample ID: 680-102380-35
Matrix: Solid

Date Collected: 06/13/14 13:15
Date Received: 06/14/14 08:30

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.623	U	0.414	0.418	104	31.2	pCi/g	08/11/14 11:35	08/18/14 23:29	5
U-234	1.21	U	0.290	0.310	67.0	4.02	pCi/g	08/11/14 11:35	08/14/14 23:21	5
U-235	0.0530		0.00185	0.00522	0.0233	0.00948	pCi/g	08/11/14 11:35	08/14/14 23:21	5
U-236	-0.00212	U	0.00188	0.00189	0.697	0.0558	pCi/g	08/11/14 11:35	08/14/14 23:21	5
U-238	1.11		0.0563	0.116	0.00362	0.000218	pCi/g	08/11/14 11:35	08/14/14 23:21	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.752						%		08/19/14 13:50	1

Client Sample ID: SD-227-02

Lab Sample ID: 680-102380-36
Matrix: Solid

Date Collected: 06/13/14 13:20
Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0033	mg/Kg		08/11/14 11:35	08/18/14 23:34	5
U-234	ND		0.011	0.00066	mg/Kg		08/11/14 11:35	08/14/14 23:26	5
U-235	0.025		0.011	0.0045	mg/Kg		08/11/14 11:35	08/14/14 23:26	5
U-236	ND		0.011	0.00088	mg/Kg		08/11/14 11:35	08/14/14 23:26	5
U-238	3.4	B	0.011	0.00066	mg/Kg		08/11/14 11:35	08/14/14 23:26	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.4		0.0050	0.00030	mg/Kg			08/19/14 13:51	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.834	U	0.346	0.355	106	31.8	pCi/g	08/11/14 11:35	08/18/14 23:34	5
U-234	1.33	U	0.528	0.542	68.4	4.10	pCi/g	08/11/14 11:35	08/14/14 23:26	5
U-235	0.0543		0.00593	0.00775	0.0237	0.00967	pCi/g	08/11/14 11:35	08/14/14 23:26	5
U-236	-0.00236	U	0.00140	0.00142	0.710	0.0569	pCi/g	08/11/14 11:35	08/14/14 23:26	5
U-238	1.15		0.114	0.155	0.00369	0.000222	pCi/g	08/11/14 11:35	08/14/14 23:26	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.730						%		08/19/14 13:50	1

APPENDIX C

SUPPORT DOCUMENTATION

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Sediments

Report Number: 680-102380-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 06/14/2014; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 1.8 C.

ISOTOPIC THORIUM

Samples SD-224-SS (680-102380-1), SD-224-01 (680-102380-2), SD-224-02 (680-102380-3), SD-223-SS (680-102380-5), SD-223-01 (680-102380-6), SD-223-02 (680-102380-7), SD-226-SS (680-102380-8), SD-226-01 (680-102380-9), SD-226-02 (680-102380-10), SD-225-SS (680-102380-12), SD-225-01 (680-102380-13), SD-225-02 (680-102380-14), SD-228-SS (680-102380-16), SD-228-01 (680-102380-17), SD-228-02 (680-102380-18), SD-234-SS (680-102380-20), SD-234-01 (680-102380-21), SD-235-SS (680-102380-22), SD-23501 (680-102380-23), SD-235-02 (680-102380-24), SD-236-SS (680-102380-26), SD-236-01 (680-102380-27), SD-236-02 (680-102380-28), SD-237-SS (680-102380-29), SD-237-01 (680-102380-30), SD-237-02 (680-102380-31), SD-DUP05 (680-102380-33), SD-227-SS (680-102380-34), SD-227-01 (680-102380-35) and SD-227-02 (680-102380-36) were analyzed for Isotopic Thorium in accordance with A01R_Th. The samples were leached on 06/18/2014, prepared on 06/23/2014 and 06/24/2014 and analyzed on 07/01/2014 and 07/02/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.19
Client Contact: Mike Martin	Phone: (703)342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: ~~Page 19 of 46~~ 1 of 4
Company: Tetra Tech, Inc.			Analysis Requested	Job #: 680-102380
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes:
City: Germantown	TAT Requested (days):			A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; G - Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA; M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2SO3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - ph 4-5; Z - other (specify)
State, Zip: MD, 20874	PO #: Purchase Order not required			Other:
Phone:	WO #:			
Email: Michael.Martin@tetratech.com	Project #: 68012942			
Project Name: Sediments	SSOW#:			
Site:				

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	6010 - Local Method	A01R_Th - Standard Target List	9020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Special Instructions/Note:
SD-224-SS	6/13/14	0820	C	Solid		X			
SD-224-01		0825	C	Solid		X			
SD-224-02		0830	C	Solid		X			
SD-224-03		0835	C	Solid		(X)			Hold Pending Analysis of SS to 02
SD-223-SS		0840	C	Solid		X			
SD-223-01		0845	C	Solid		X			
SD-223-02		0850	C	Solid		X			
SD-226-SS		0855	C	Solid		X			
SD-226-01		0900	C	Solid		X			
SD-226-02		0905	C	Solid		X			
SD-226-03		0910	C	Solid		(X)			Hold Pending Analysis of SS to 02

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6/13/14 -			6/13/14 1430	TestAmerica
2		6/13/14 1800	TestAmerica		6/14/14 0830	TA
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.22
Client Contact: Mike Martin	Phone: (703)342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~22 of 40~~ 2 of 4
Company: Tetra Tech, Inc.				Job #: 680-102380
Address: 20251 Century Blvd Suite 200	Due Date Requested:	Analysis Requested		Preservation Codes:
City: Germantown	TAT Requested (days):			A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; G - Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA; M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2SO3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - ph 4-5; Z - other (specify)
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			Other:
Email: Michael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-228/226	Special Instructions/Note:
SD-225-SS	6/13/14	0915	C	Solid		X			
SD-225-01		0928	C	Solid		X			
SD-225-02		0925	C	Solid		X			
SD-225-03		0930	C	Solid		(X)			Hold Pending Analysis of SS to 03
SD-228-SS		1005	C	Solid		X			
SD-228-01		1010	C	Solid		X			
SD-228-02		1015	C	Solid		X			
SD-228-03		1020	C	Solid		(X)			Hold Pending Analysis of SS to 03
SD-234-SS		1030	C	Solid		X			
SD-234-01		1035	C	Solid		X			
SD-235-SS		1100	C	Solid		X			

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:
Relinquished by:	Date/Time: 6/13/14	Company TT	Received by:	Date/Time: 6/13/14 1430	Company TT
Relinquished by: Paul Hyland	Date/Time: 6/13/14 1800	Company Test America	Received by:	Date/Time: 6/14/14 0830	Company TT
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

RID

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.24
Client Contact: Mike Martin	Phone: (703)342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~24 of 46~~ 3 of 4
Company: Tetra Tech, Inc.				Job #: 680-102380
Address: 20251 Century Blvd Suite 200	Due Date Requested:	Analysis Requested		Preservation Codes:
City: Germantown	TAT Requested (days): Standard			A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; G - Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA; M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2SO3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - ph 4-5; Z - other (specify)
State, Zip: MD, 20874	PO #: Purchase Order not required			Other:
Phone:	WO #:			
Email: Michael.Martin@tetratech.com	Project #: 68012942			
Project Name: Sediments	SSOW#:			
Site:				

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-228/228	Special Instructions/Note:
SD-235-01	6/8/14	1105	C	Solid				X			
SD-235-02		1110	C	Solid				X			
SD-235-03		1115	C	Solid				(X)			Hold Pending Analysis of SS to 02
SD-236-SS		1205	C	Solid				X			
SD-236-01		1210	C	Solid				X			
SD-236-02		1215	C	Solid				X			
SD-237-SS		1230	C	Solid				X			
SD-237-01		1235	C	Solid				X			
SD-237-02		1240	C	Solid				X			
SD-237-03		1245	C	Solid				(X)			Hold pending Analysis of SS to 02
SD-DUP05	↓	0000	C	Solid				X			

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6/13/14	TT		6/13/14 1430	TT
2		6/15/14 1800	TT		6/14/14 0830	TT
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

RAO

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Grierson	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.26
Client Contact: Mike Martin	Phone: (703) 342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~26 of 46~~ 4 of 4
Company: Tetra Tech, Inc.				Job #: 680-102380
Address: 20251 Century Blvd Suite 200	Due Date Requested:			
City: Germantown	TAT Requested (days): Standard			
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			
Email: Michael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2SO3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	9020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
SD-227-55	6/13/14	1310	C	Solid				X				
SD-227-01	↓	1315	C	Solid				X				
SD-227-02	↓	1320	C	Solid				X				
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:
Relinquished by:	Date/Time: 6/13/14 -	Company: TT	Received by:	Date/Time: 6/13/14 1430	Company: TT
Relinquished by:	Date/Time: 6/13/14 1800	Company: TT	Received by:	Date/Time: 6/14/14 0830	Company: TT
Relinquished by:	Date/Time:	Company:	Received by:	Date/Time:	Company:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102380-1
SDG: 680102380-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-102380-1	SD-224-SS	Solid	06/13/14 08:20	06/14/14 08:30
680-102380-2	SD-224-01	Solid	06/13/14 08:25	06/14/14 08:30
680-102380-3	SD-224-02	Solid	06/13/14 08:30	06/14/14 08:30
680-102380-5	SD-223-SS	Solid	06/13/14 08:40	06/14/14 08:30
680-102380-6	SD-223-01	Solid	06/13/14 08:45	06/14/14 08:30
680-102380-7	SD-223-02	Solid	06/13/14 08:50	06/14/14 08:30
680-102380-8	SD-226-SS	Solid	06/13/14 08:55	06/14/14 08:30
680-102380-9	SD-226-01	Solid	06/13/14 09:00	06/14/14 08:30
680-102380-10	SD-226-02	Solid	06/13/14 09:05	06/14/14 08:30
680-102380-12	SD-225-SS	Solid	06/13/14 09:15	06/14/14 08:30
680-102380-13	SD-225-01	Solid	06/13/14 09:20	06/14/14 08:30
680-102380-14	SD-225-02	Solid	06/13/14 09:25	06/14/14 08:30
680-102380-16	SD-228-SS	Solid	06/13/14 10:05	06/14/14 08:30
680-102380-17	SD-228-01	Solid	06/13/14 10:10	06/14/14 08:30
680-102380-18	SD-228-02	Solid	06/13/14 10:15	06/14/14 08:30
680-102380-20	SD-234-SS	Solid	06/13/14 10:30	06/14/14 08:30
680-102380-21	SD-234-01	Solid	06/13/14 10:35	06/14/14 08:30
680-102380-22	SD-235-SS	Solid	06/13/14 11:00	06/14/14 08:30
680-102380-23	SD-23501	Solid	06/13/14 11:05	06/14/14 08:30
680-102380-24	SD-235-02	Solid	06/13/14 11:10	06/14/14 08:30
680-102380-26	SD-236-SS	Solid	06/13/14 12:05	06/14/14 08:30
680-102380-27	SD-236-01	Solid	06/13/14 12:10	06/14/14 08:30
680-102380-28	SD-236-02	Solid	06/13/14 12:15	06/14/14 08:30
680-102380-29	SD-237-SS	Solid	06/13/14 12:30	06/14/14 08:30
680-102380-30	SD-237-01	Solid	06/13/14 12:35	06/14/14 08:30
680-102380-31	SD-237-02	Solid	06/13/14 12:40	06/14/14 08:30
680-102380-33	SD-DUP05	Solid	06/13/14 00:00	06/14/14 08:30
680-102380-34	SD-227-SS	Solid	06/13/14 13:10	06/14/14 08:30
680-102380-35	SD-227-01	Solid	06/13/14 13:15	06/14/14 08:30
680-102380-36	SD-227-02	Solid	06/13/14 13:20	06/14/14 08:30

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102380-1
SDG: 680102380-1

Method	Method Description	Protocol	Laboratory
A-01-R	Isotopic Thorium (Alpha Spectrometry)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

HOLDTIME

SDG 680102380-1

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
RAD	PCI/G	SD-228-01	680-102380-17	NM	06/13/2014	06/24/2014	07/02/2014	11	8	19
RAD	PCI/G	SD-223-02	680-102380-7	NM	06/13/2014	06/23/2014	07/01/2014	10	8	18
RAD	PCI/G	SD-223-SS	680-102380-5	NM	06/13/2014	06/23/2014	07/01/2014	10	8	18
RAD	PCI/G	SD-224-01	680-102380-2	NM	06/13/2014	06/23/2014	07/01/2014	10	8	18
RAD	PCI/G	SD-224-02	680-102380-3	NM	06/13/2014	06/23/2014	07/01/2014	10	8	18
RAD	PCI/G	SD-224-SS	680-102380-1	NM	06/13/2014	06/23/2014	07/01/2014	10	8	18
RAD	PCI/G	SD-225-01	680-102380-13	NM	06/13/2014	06/24/2014	07/02/2014	11	8	19
RAD	PCI/G	SD-225-02	680-102380-14	NM	06/13/2014	06/24/2014	07/02/2014	11	8	19
RAD	PCI/G	SD-225-SS	680-102380-12	NM	06/13/2014	06/24/2014	07/02/2014	11	8	19
RAD	PCI/G	SD-226-01	680-102380-9	NM	06/13/2014	06/23/2014	07/01/2014	10	8	18
RAD	PCI/G	SD-226-02	680-102380-10	NM	06/13/2014	06/24/2014	07/02/2014	11	8	19
RAD	PCI/G	SD-226-SS	680-102380-8	NM	06/13/2014	06/23/2014	07/01/2014	10	8	18
RAD	PCI/G	SD-227-01	680-102380-35	NM	06/13/2014	06/24/2014	07/02/2014	11	8	19
RAD	PCI/G	SD-223-01	680-102380-6	NM	06/13/2014	06/23/2014	07/01/2014	10	8	18
RAD	PCI/G	SD-227-SS	680-102380-34	NM	06/13/2014	06/24/2014	07/02/2014	11	8	19

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
RAD	PCI/G	SD-DUP05	680-102380-33	NM	06/13/2014	06/24/2014	07/02/2014	11	8	19
RAD	PCI/G	SD-228-02	680-102380-18	NM	06/13/2014	06/24/2014	07/02/2014	11	8	19
RAD	PCI/G	SD-228-SS	680-102380-16	NM	06/13/2014	06/24/2014	07/02/2014	11	8	19
RAD	PCI/G	SD-234-01	680-102380-21	NM	06/13/2014	06/24/2014	07/02/2014	11	8	19
RAD	PCI/G	SD-234-SS	680-102380-20	NM	06/13/2014	06/24/2014	07/02/2014	11	8	19
RAD	PCI/G	SD-23501	680-102380-23	NM	06/13/2014	06/24/2014	07/02/2014	11	8	19
RAD	PCI/G	SD-235-02	680-102380-24	NM	06/13/2014	06/24/2014	07/02/2014	11	8	19
RAD	PCI/G	SD-235-SS	680-102380-22	NM	06/13/2014	06/24/2014	07/02/2014	11	8	19
RAD	PCI/G	SD-236-01	680-102380-27	NM	06/13/2014	06/24/2014	07/02/2014	11	8	19
RAD	PCI/G	SD-236-02	680-102380-28	NM	06/13/2014	06/24/2014	07/02/2014	11	8	19
RAD	PCI/G	SD-236-SS	680-102380-26	NM	06/13/2014	06/24/2014	07/02/2014	11	8	19
RAD	PCI/G	SD-237-01	680-102380-30	NM	06/13/2014	06/24/2014	07/02/2014	11	8	19
RAD	PCI/G	SD-237-02	680-102380-31	NM	06/13/2014	06/24/2014	07/02/2014	11	8	19
RAD	PCI/G	SD-237-SS	680-102380-29	NM	06/13/2014	06/24/2014	07/02/2014	11	8	19
RAD	PCI/G	SD-227-02	680-102380-36	NM	06/13/2014	06/24/2014	07/02/2014	11	8	19

Field Duplicate Precision

ANALYTE	SD-DUP-05	SD-237-02	RPD	DIFFERENCE
THORIUM-228	1.14	1.27	10.79	0.13
THORIUM-230	1.11	0.986	11.83	0.124
THORIUM-232	1.14	1.39	19.76	0.25
URANIUM-235	0.044	0.057	25.74	0.013
URANIUM-238	4.1	3.8	7.59	0.3

BLANK CONTAMINATION EVALUATION

SDG 680-102380-1

MEAN DIFFERENCE (MD):

$$\frac{|\text{SAMPLE ACTIVITY} - \text{BLANK ACTIVITY}|}{\sqrt{((\text{SAMPLE UNCERTAINTY}/2)^2 + (\text{BLANK UNCERTAINTY}/2)^2)}}$$

BLANK ID: MB 160-128228/1-A THORIUM-230

0.1211 ± 0.0731 pCi/g

AFFECTED SAMPLES:

SAMPLE ID: SD-223-01

THORIUM-230

0.744 ± 0.209 pCi/g

MD = 5.627

SAMPLE ID: SD-223-02

THORIUM-230

1.04 ± 0.254 pCi/g

MD = 6.953

SAMPLE ID: SD-223-SS

THORIUM-230

1.28 ± 0.275 pCi/g

MD = 8.145

SAMPLE ID: SD-224-01

THORIUM-230

1 ± 0.232 pCi/g

MD = 7.226

SAMPLE ID: SD-224-02

THORIUM-230

0.817 ± 0.21 pCi/g

MD = 6.259

SAMPLE ID: SD-224-SS

THORIUM-230

1 ± 0.232 pCi/g

MD = 7.226

SAMPLE ID: SD-226-01

THORIUM-230

0.979 ± 0.229 pCi/g

MD = 7.138

SAMPLE ID: SD-226-SS

THORIUM-230

1.15 ± 0.25 pCi/g

MD = 7.900

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Lab Sample ID: MB 160-128228/1-A
Matrix: Solid
Analysis Batch: 129241

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 128228

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.006508	U	0.0215	0.0216	1.00	0.0541	pCi/g	06/23/14 15:05	07/01/14 12:25	1
Thorium-230	0.1211		0.0724	0.0731	1.00	0.0541	pCi/g	06/23/14 15:05	07/01/14 12:25	1
Thorium-232	0.0000	U	0.00389	0.00389	1.00	0.0311	pCi/g	06/23/14 15:05	07/01/14 12:25	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*91.7*		*30 - 110*	*06/23/14 15:05*	*07/01/14 12:25*	*1*

Lab Sample ID: LCS 160-128228/2-A
Matrix: Solid
Analysis Batch: 129242

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 128228

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Thorium-230	24.5	20.69		2.16	1.00	0.0591	pCi/g	84	81 - 118

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*94.3*		*30 - 110*

Lab Sample ID: MB 160-128412/1-A
Matrix: Solid
Analysis Batch: 129494

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 128412

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	-0.005722	U	0.00661	0.00662	1.00	0.0579	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	0.07533	U	0.0694	0.0697	1.00	0.0995	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	0.002532	U	0.0216	0.0216	1.00	0.0618	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*94.5*		*30 - 110*	*06/24/14 14:58*	*07/02/14 18:02*	*1*

Lab Sample ID: LCS 160-128412/2-A
Matrix: Solid
Analysis Batch: 129495

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 128412

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Thorium-230	24.5	22.92		2.33	1.00	0.129	pCi/g	94	81 - 118

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*102*		*30 - 110*

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry) (Continued)

Lab Sample ID: 680-102380-10 DU
Matrix: Solid
Analysis Batch: 129523

Client Sample ID: SD-226-02
Prep Type: Total/NA
Prep Batch: 128412

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Thorium-228	1.23		1.054		0.242	1.00	0.104	pCi/g	0.35	1
Thorium-230	1.03		1.025		0.235	1.00	0.0761	pCi/g	0.02	1
Thorium-232	1.05		1.541		0.298	1.00	0.0881	pCi/g	0.93	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Thorium-229	*84.0*		*30 - 110*

Lab Sample ID: MB 160-128417/1-A
Matrix: Solid
Analysis Batch: 129499

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 128417

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	-0.009679	U	0.00858	0.00862	1.00	0.0660	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-230	0.03903	U	0.0410	0.0411	1.00	0.0462	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-232	0.008210	U	0.0206	0.0206	1.00	0.0460	pCi/g	06/24/14 15:13	07/02/14 18:11	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*92.2*		*30 - 110*	*06/24/14 15:13*	*07/02/14 18:11*	*1*

Lab Sample ID: LCS 160-128417/2-A
Matrix: Solid
Analysis Batch: 129502

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 128417

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Thorium-230	24.5	25.66		2.63	1.00	0.170	pCi/g	105	81 - 118

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*85.3*		*30 - 110*

Rad

Leach Batch: 127441

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102380-1	SD-224-SS	Total/NA	Solid	Dry and Grind	
680-102380-2	SD-224-01	Total/NA	Solid	Dry and Grind	
680-102380-3	SD-224-02	Total/NA	Solid	Dry and Grind	
680-102380-5	SD-223-SS	Total/NA	Solid	Dry and Grind	
680-102380-6	SD-223-01	Total/NA	Solid	Dry and Grind	
680-102380-7	SD-223-02	Total/NA	Solid	Dry and Grind	
680-102380-8	SD-226-SS	Total/NA	Solid	Dry and Grind	
680-102380-9	SD-226-01	Total/NA	Solid	Dry and Grind	
680-102380-10	SD-226-02	Total/NA	Solid	Dry and Grind	
680-102380-10 DU	SD-226-02	Total/NA	Solid	Dry and Grind	
680-102380-12	SD-225-SS	Total/NA	Solid	Dry and Grind	
680-102380-13	SD-225-01	Total/NA	Solid	Dry and Grind	
680-102380-14	SD-225-02	Total/NA	Solid	Dry and Grind	
680-102380-16	SD-228-SS	Total/NA	Solid	Dry and Grind	
680-102380-17	SD-228-01	Total/NA	Solid	Dry and Grind	
680-102380-18	SD-228-02	Total/NA	Solid	Dry and Grind	
680-102380-20	SD-234-SS	Total/NA	Solid	Dry and Grind	
680-102380-21	SD-234-01	Total/NA	Solid	Dry and Grind	
680-102380-22	SD-235-SS	Total/NA	Solid	Dry and Grind	
680-102380-23	SD-23501	Total/NA	Solid	Dry and Grind	
680-102380-24	SD-235-02	Total/NA	Solid	Dry and Grind	
680-102380-26	SD-236-SS	Total/NA	Solid	Dry and Grind	
680-102380-27	SD-236-01	Total/NA	Solid	Dry and Grind	
680-102380-28	SD-236-02	Total/NA	Solid	Dry and Grind	
680-102380-29	SD-237-SS	Total/NA	Solid	Dry and Grind	
680-102380-30	SD-237-01	Total/NA	Solid	Dry and Grind	
680-102380-31	SD-237-02	Total/NA	Solid	Dry and Grind	
680-102380-33	SD-DUP05	Total/NA	Solid	Dry and Grind	
680-102380-34	SD-227-SS	Total/NA	Solid	Dry and Grind	
680-102380-35	SD-227-01	Total/NA	Solid	Dry and Grind	
680-102380-36	SD-227-02	Total/NA	Solid	Dry and Grind	

Prep Batch: 128228

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102380-1	SD-224-SS	Total/NA	Solid	ExtChrom	127441
680-102380-2	SD-224-01	Total/NA	Solid	ExtChrom	127441
680-102380-3	SD-224-02	Total/NA	Solid	ExtChrom	127441
680-102380-5	SD-223-SS	Total/NA	Solid	ExtChrom	127441
680-102380-6	SD-223-01	Total/NA	Solid	ExtChrom	127441
680-102380-7	SD-223-02	Total/NA	Solid	ExtChrom	127441
680-102380-8	SD-226-SS	Total/NA	Solid	ExtChrom	127441
680-102380-9	SD-226-01	Total/NA	Solid	ExtChrom	127441
LCS 160-128228/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-128228/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Prep Batch: 128412

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102380-10	SD-226-02	Total/NA	Solid	ExtChrom	127441
680-102380-10 DU	SD-226-02	Total/NA	Solid	ExtChrom	127441
680-102380-12	SD-225-SS	Total/NA	Solid	ExtChrom	127441
680-102380-13	SD-225-01	Total/NA	Solid	ExtChrom	127441

Rad (Continued)

Prep Batch: 128412 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102380-14	SD-225-02	Total/NA	Solid	ExtChrom	127441
680-102380-16	SD-228-SS	Total/NA	Solid	ExtChrom	127441
680-102380-17	SD-228-01	Total/NA	Solid	ExtChrom	127441
680-102380-18	SD-228-02	Total/NA	Solid	ExtChrom	127441
680-102380-20	SD-234-SS	Total/NA	Solid	ExtChrom	127441
680-102380-21	SD-234-01	Total/NA	Solid	ExtChrom	127441
680-102380-22	SD-235-SS	Total/NA	Solid	ExtChrom	127441
680-102380-23	SD-23501	Total/NA	Solid	ExtChrom	127441
680-102380-24	SD-235-02	Total/NA	Solid	ExtChrom	127441
680-102380-26	SD-236-SS	Total/NA	Solid	ExtChrom	127441
680-102380-27	SD-236-01	Total/NA	Solid	ExtChrom	127441
680-102380-28	SD-236-02	Total/NA	Solid	ExtChrom	127441
680-102380-29	SD-237-SS	Total/NA	Solid	ExtChrom	127441
680-102380-30	SD-237-01	Total/NA	Solid	ExtChrom	127441
680-102380-31	SD-237-02	Total/NA	Solid	ExtChrom	127441
680-102380-33	SD-DUP05	Total/NA	Solid	ExtChrom	127441
680-102380-34	SD-227-SS	Total/NA	Solid	ExtChrom	127441
LCS 160-128412/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-128412/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Prep Batch: 128417

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102380-35	SD-227-01	Total/NA	Solid	ExtChrom	127441
680-102380-36	SD-227-02	Total/NA	Solid	ExtChrom	127441
LCS 160-128417/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-128417/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Alpha Spectroscopy Run Log

Detector: AV3

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:26	140	IC 160-120519/1		120519			PS
05/07/14 23:02	60	ICV 160-120855/1		120855			PS
06/18/14 19:10	960	ICB 160-127828/1		127828			PS
06/19/14 16:44	60	CCV 160-127913/1		127913			PS
07/01/14 01:00	1	PULSER 160-129269/1		129269			MLK
07/01/14 12:26	180	ZZZZZ		129269			
07/02/14 10:53	1	PULSER 160-129494/2		129494			MLK
07/02/14 18:02	180	MB 160-128412/1-A		129494	128412	A-01-R	MLK
07/03/14 15:56	1	PULSER 160-129774/1		129774			MLK
07/03/14 17:15	180	ZZZZZ		129774			

Detector: AV4

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:26	140	IC 160-120520/1		120520			PS
05/07/14 23:03	60	ICV 160-120856/1		120856			PS
06/18/14 19:10	960	ICB 160-127829/1		127829			PS
06/19/14 16:44	60	CCV 160-127914/1		127914			PS
07/02/14 10:53	1	PULSER 160-129495/2		129495			MLK
07/02/14 18:02	180	LCS 160-128412/2-A		129495	128412	A-01-R	MLK

Detector: AV6

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:26	140	IC 160-120521/1		120521			PS
05/07/14 23:03	60	ICV 160-120857/1		120857			PS
06/18/14 19:08	960	ICB 160-127830/1		127830			PS
06/19/14 18:06	60	CCV 160-127932/1		127932			PS
07/02/14 10:53	1	PULSER 160-129512/2		129512			MLK
07/02/14 18:02	180	680-102380-10	SD-226-02	129512	128412	A-01-R	MLK

Detector: AV7

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/07/14 19:51	140	IC 160-120843/1		120843			PS
05/07/14 23:03	60	ICV 160-120858/1		120858			PS
06/18/14 19:08	960	ICB 160-127831/1		127831			PS
06/19/14 16:44	60	CCV 160-127943/1		127943			PS
07/02/14 10:53	1	PULSER 160-129523/2		129523			MLK
07/02/14 18:02	180	680-102380-10 DU	SD-226-02 DU	129523	128412	A-01-R	MLK

Detector: AV8

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:27	140	IC 160-120523/1		120523			PS
05/08/14 00:14	60	ICV 160-121084/1		121084			PS
06/18/14 19:08	960	ICB 160-127837/1		127837			PS
06/19/14 18:06	60	CCV 160-127954/1		127954			PS
07/02/14 10:53	1	PULSER 160-129534/2		129534			MLK
07/02/14 18:02	180	680-102380-12	SD-225-SS	129534	128412	A-01-R	MLK

Alpha Spectroscopy Run Log

Detector: AV9

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:27	140	IC 160-120524/1		120524			PS
05/07/14 23:03	60	ICV 160-120859/1		120859			PS
06/18/14 19:08	960	ICB 160-127848/1		127848			PS
06/19/14 18:06	60	CCV 160-127962/1		127962			PS
07/02/14 10:53	1	PULSER 160-129545/2		129545			MLK
07/02/14 18:02	180	680-102380-13	SD-225-01	129545	128412	A-01-R	MLK

Detector: AV10

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:27	140	IC 160-120512/1		120512			PS
05/07/14 23:03	60	ICV 160-120847/1		120847			PS
06/18/14 19:08	960	ICB 160-127776/1		127776			PS
06/19/14 18:06	60	CCV 160-127860/1		127860			PS
07/02/14 10:53	1	PULSER 160-129466/2		129466			MLK
07/02/14 18:02	180	680-102380-14	SD-225-02	129466	128412	A-01-R	MLK

Detector: AV11

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:27	140	IC 160-120513/1		120513			PS
05/07/14 23:04	60	ICV 160-120848/1		120848			PS
06/18/14 19:08	960	ICB 160-127786/1		127786			PS
06/19/14 18:07	60	CCV 160-127871/1		127871			PS
07/02/14 10:53	1	PULSER 160-129477/2		129477			MLK
07/02/14 18:02	180	680-102380-16	SD-228-SS	129477	128412	A-01-R	MLK

Detector: AV12

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:28	140	IC 160-120514/1		120514			PS
05/07/14 23:04	60	ICV 160-120849/1		120849			PS
06/18/14 19:08	960	ICB 160-127796/1		127796			PS
06/19/14 18:07	60	CCV 160-127881/1		127881			PS
07/02/14 10:53	1	PULSER 160-129482/2		129482			MLK
07/02/14 18:02	180	680-102380-17	SD-228-01	129482	128412	A-01-R	MLK

Detector: AV13

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:28	140	IC 160-120515/1		120515			PS
05/07/14 23:04	60	ICV 160-120850/1		120850			PS
06/18/14 19:08	960	ICB 160-127807/1		127807			PS
06/19/14 19:45	60	CCV 160-127892/1		127892			PS
07/02/14 10:53	1	PULSER 160-129483/2		129483			MLK
07/02/14 18:02	180	680-102380-18	SD-228-02	129483	128412	A-01-R	MLK

Detector: AV14

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:28	140	IC 160-120516/1		120516			PS
05/07/14 23:04	60	ICV 160-120851/1		120851			PS

Alpha Spectroscopy Run Log

Detector: AV14 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
06/18/14 19:08	960	ICB 160-127817/1		127817			PS
06/19/14 18:08	60	CCV 160-127902/1		127902			PS
07/02/14 10:53	1	PULSER 160-129484/2		129484			MLK
07/02/14 18:02	180	680-102380-20	SD-234-SS	129484	128412	A-01-R	MLK

Detector: AV15

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:28	140	IC 160-120517/1		120517			PS
05/07/14 23:04	60	ICV 160-120852/1		120852			PS
06/18/14 19:08	960	ICB 160-127818/1		127818			PS
06/19/14 19:45	60	CCV 160-127903/1		127903			PS
07/01/14 01:00	1	PULSER 160-129260/1		129260			MLK
07/01/14 12:26	180	680-102380-1	SD-224-SS	129260	128228	A-01-R	MLK
07/02/14 10:53	1	PULSER 160-129485/2		129485			MLK
07/02/14 18:02	180	680-102380-21	SD-234-01	129485	128412	A-01-R	MLK

Detector: AV16

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:27	140	IC 160-120398/1		120398			PS
05/08/14 00:14	60	ICV 160-121072/1		121072			PS
06/18/14 19:08	960	ICB 160-127819/1		127819			PS
06/19/14 18:08	60	CCV 160-127904/1		127904			PS
07/01/14 01:00	1	PULSER 160-129261/1		129261			MLK
07/01/14 12:26	180	680-102380-2	SD-224-01	129261	128228	A-01-R	MLK
07/02/14 10:53	1	PULSER 160-129486/2		129486			MLK
07/02/14 18:02	180	680-102380-22	SD-235-SS	129486	128412	A-01-R	MLK

Detector: AV17

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:28	140	IC 160-120399/1		120399			PS
05/08/14 00:14	60	ICV 160-121073/1		121073			PS
06/18/14 19:08	960	ICB 160-127820/1		127820			PS
06/19/14 18:08	60	CCV 160-127905/1		127905			PS
07/01/14 01:00	1	PULSER 160-129262/1		129262			MLK
07/01/14 12:26	180	680-102380-3	SD-224-02	129262	128228	A-01-R	MLK
07/02/14 10:53	1	PULSER 160-129487/2		129487			MLK
07/02/14 18:02	180	680-102380-23	SD-23501	129487	128412	A-01-R	MLK

Detector: AV18

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:28	140	IC 160-120400/1		120400			PS
05/08/14 00:14	60	ICV 160-121074/1		121074			PS
06/18/14 19:08	960	ICB 160-127821/1		127821			PS
06/19/14 18:08	60	CCV 160-127906/1		127906			PS
07/01/14 01:00	1	PULSER 160-129263/1		129263			MLK
07/01/14 12:26	180	680-102380-5	SD-223-SS	129263	128228	A-01-R	MLK
07/02/14 10:53	1	PULSER 160-129488/2		129488			MLK
07/02/14 18:02	180	680-102380-24	SD-235-02	129488	128412	A-01-R	MLK

Alpha Spectroscopy Run Log

Detector: AV19

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:28	140	IC 160-120401/1		120401			PS
05/08/14 14:33	60	ICV 160-121361/1		121361			PS
06/18/14 19:08	960	ICB 160-127822/1		127822			PS
06/19/14 18:08	60	CCV 160-127907/1		127907			PS
07/01/14 01:00	1	PULSER 160-129264/1		129264			MLK
07/01/14 12:26	180	680-102380-6	SD-223-01	129264	128228	A-01-R	MLK
07/02/14 10:53	1	PULSER 160-129489/2		129489			MLK
07/02/14 18:02	180	680-102380-26	SD-236-SS	129489	128412	A-01-R	MLK

Detector: AV20

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:28	140	IC 160-120402/1		120402			PS
05/07/14 23:05	60	ICV 160-120854/1		120854			PS
06/18/14 19:08	960	ICB 160-127824/1		127824			PS
06/19/14 18:08	60	CCV 160-127909/1		127909			PS
07/01/14 01:00	1	PULSER 160-129265/1		129265			MLK
07/01/14 12:26	180	680-102380-7	SD-223-02	129265	128228	A-01-R	MLK
07/02/14 10:53	1	PULSER 160-129490/2		129490			MLK
07/02/14 18:02	180	680-102380-27	SD-236-01	129490	128412	A-01-R	MLK

Detector: AV21

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:28	140	IC 160-120403/1		120403			PS
05/08/14 00:16	60	ICV 160-121075/1		121075			PS
06/18/14 19:08	960	ICB 160-127825/1		127825			PS
06/19/14 19:45	60	CCV 160-127910/1		127910			PS
07/01/14 01:00	1	PULSER 160-129266/1		129266			MLK
07/01/14 12:26	180	680-102380-8	SD-226-SS	129266	128228	A-01-R	MLK
07/02/14 10:53	1	PULSER 160-129491/2		129491			MLK
07/02/14 18:02	180	680-102380-28	SD-236-02	129491	128412	A-01-R	MLK

Detector: AV23

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:29	140	IC 160-120404/1		120404			PS
05/08/14 14:33	60	ICV 160-121362/1		121362			PS
06/18/14 19:08	960	ICB 160-127826/1		127826			PS
06/19/14 19:45	60	CCV 160-127911/1		127911			PS
07/01/14 01:00	1	PULSER 160-129267/1		129267			MLK
07/01/14 12:26	180	680-102380-9	SD-226-01	129267	128228	A-01-R	MLK
07/02/14 10:53	1	PULSER 160-129492/2		129492			MLK
07/02/14 18:02	180	680-102380-29	SD-237-SS	129492	128412	A-01-R	MLK

Detector: AV24

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:29	140	IC 160-120405/1		120405			PS
05/08/14 00:16	60	ICV 160-121076/1		121076			PS
06/18/14 19:08	960	ICB 160-127827/1		127827			PS
06/19/14 19:45	60	CCV 160-127912/1		127912			PS
07/02/14 10:54	1	PULSER 160-129493/2		129493			MLK

Alpha Spectroscopy Run Log

Detector: AV24 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
07/02/14 18:02	180	680-102380-30	SD-237-01	129493	128412	A-01-R	MLK

Detector: AV43

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:30	140	IC 160-120406/1		120406			PS
05/08/14 00:16	60	ICV 160-121077/1		121077			PS
06/19/14 00:17	960	ICB 160-127915/1		127915			PS
06/22/14 17:38	60	CCV 160-127969/1		127969			PS
07/02/14 15:55	1	PULSER 160-129496/2		129496			MLK
07/02/14 18:02	180	680-102380-31	SD-237-02	129496	128412	A-01-R	MLK

Detector: AV44

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:30	140	IC 160-120407/1		120407			PS
05/08/14 00:17	60	ICV 160-121078/1		121078			PS
06/19/14 00:17	960	ICB 160-127916/1		127916			PS
06/22/14 17:38	60	CCV 160-127970/1		127970			PS
07/02/14 15:55	1	PULSER 160-129497/2		129497			MLK
07/02/14 18:03	180	680-102380-33	SD-DUP05	129497	128412	A-01-R	MLK

Detector: AV45

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:30	140	IC 160-120408/1		120408			PS
05/08/14 14:32	60	ICV 160-121363/1		121363			PS
06/19/14 00:17	960	ICB 160-127917/1		127917			PS
06/22/14 20:07	60	CCV 160-127985/1		127985			PS
07/02/14 15:55	1	PULSER 160-129498/2		129498			MLK
07/02/14 18:03	180	680-102380-34	SD-227-SS	129498	128412	A-01-R	MLK

Detector: AV46

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:30	140	IC 160-120409/1		120409			PS
05/08/14 00:18	60	ICV 160-121079/1		121079			PS
06/19/14 00:17	960	ICB 160-127918/1		127918			PS
06/22/14 21:17	60	CCV 160-127986/1		127986			PS
07/02/14 15:55	1	PULSER 160-129499/2		129499			MLK
07/02/14 18:11	180	MB 160-128417/1-A		129499	128417	A-01-R	MLK

Detector: AV49

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:03	140	IC 160-120271/1		120271			PS
05/08/14 14:34	60	ICV 160-121364/1		121364			PS
06/19/14 00:17	960	ICB 160-127921/1		127921			PS
06/22/14 18:52	60	CCV 160-127989/1		127989			PS
07/02/14 15:55	1	PULSER 160-129502/2		129502			MLK
07/02/14 18:11	180	LCS 160-128417/2-A		129502	128417	A-01-R	MLK

Alpha Spectroscopy Run Log

Detector: AV50

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:03	140	IC 160-120272/1		120272			PS
05/08/14 14:34	60	ICV 160-121365/1		121365			PS
06/19/14 00:17	960	ICB 160-127922/1		127922			PS
06/22/14 18:52	60	CCV 160-127990/1		127990			PS
07/02/14 15:54	1	PULSER 160-129503/2		129503			MLK
07/02/14 18:11	180	680-102380-35	SD-227-01	129503	128417	A-01-R	MLK

Detector: AV51

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:03	140	IC 160-120273/1		120273			PS
05/08/14 17:17	60	ICV 160-121366/1		121366			PS
06/19/14 00:17	960	ICB 160-127923/1		127923			PS
06/22/14 20:07	60	CCV 160-127991/1		127991			PS
07/02/14 15:54	1	PULSER 160-129504/2		129504			MLK
07/02/14 18:11	180	680-102380-36	SD-227-02	129504	128417	A-01-R	MLK

Detector: AV58

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:05	140	IC 160-120280/1		120280			PS
05/08/14 14:35	60	ICV 160-121371/1		121371			PS
06/19/14 00:18	960	ICB 160-127930/1		127930			PS
06/22/14 18:53	60	CCV 160-127997/1		127997			PS
07/02/14 15:54	1	PULSER 160-129510/2		129510			MLK
07/02/14 18:11	180	ZZZZZ		129510			

Detector: AV60

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:06	140	IC 160-120282/1		120282			PS
05/08/14 17:21	60	ICV 160-121373/1		121373			PS
06/19/14 00:18	960	ICB 160-127933/1		127933			PS
06/22/14 21:17	60	CCV 160-127999/1		127999			PS
07/02/14 15:54	1	PULSER 160-129513/2		129513			MLK
07/02/14 18:11	180	ZZZZZ		129513			

Detector: AV115

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/07/14 19:52	140	IC 160-120840/1		120840			PS
05/11/14 20:54	60	ICV 160-121418/1		121418			PS
06/18/14 19:09	960	ICB 160-127791/1		127791			PS
06/19/14 15:10	60	CCV 160-127876/1		127876			PS
07/01/14 01:38	1	PULSER 160-129241/1		129241			MLK
07/01/14 12:25	180	MB 160-128228/1-A		129241	128228	A-01-R	MLK

Detector: AV116

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
04/30/14 22:55	140	IC 160-119675/1		119675			PS
05/11/14 22:06	60	ICV 160-121419/1		121419			PS

Alpha Spectroscopy Run Log

Detector: AV116 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
06/18/14 19:09	960	ICB 160-127792/1		127792			PS
06/19/14 15:10	60	CCV 160-127877/1		127877			PS
07/01/14 01:38	1	PULSER 160-129242/1		129242			MLK
07/01/14 12:25	180	LCS 160-128228/2-A		129242	128228	A-01-R	MLK

Tracer/Carrier Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102380-1
SDG: 680102380-1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Matrix: Solid

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	Th-229 (30-110)
680-102380-1	SD-224-SS	85.0
680-102380-2	SD-224-01	80.5
680-102380-3	SD-224-02	80.9
680-102380-5	SD-223-SS	79.0
680-102380-6	SD-223-01	77.3
680-102380-7	SD-223-02	73.5
680-102380-8	SD-226-SS	86.7
680-102380-9	SD-226-01	83.9
680-102380-10	SD-226-02	91.2
680-102380-10 DU	SD-226-02	84.0
680-102380-12	SD-225-SS	73.0
680-102380-13	SD-225-01	81.5
680-102380-14	SD-225-02	88.1
680-102380-16	SD-228-SS	81.7
680-102380-17	SD-228-01	84.5
680-102380-18	SD-228-02	80.3
680-102380-20	SD-234-SS	87.1
680-102380-21	SD-234-01	87.8
680-102380-22	SD-235-SS	80.4
680-102380-23	SD-23501	87.8
680-102380-24	SD-235-02	95.6
680-102380-26	SD-236-SS	107
680-102380-27	SD-236-01	89.3
680-102380-28	SD-236-02	90.4
680-102380-29	SD-237-SS	69.0
680-102380-30	SD-237-01	78.1
680-102380-31	SD-237-02	98.1
680-102380-33	SD-DUP05	92.5
680-102380-34	SD-227-SS	81.5
680-102380-35	SD-227-01	74.3
680-102380-36	SD-227-02	86.1
LCS 160-128228/2-A	Lab Control Sample	94.3
LCS 160-128412/2-A	Lab Control Sample	102
LCS 160-128417/2-A	Lab Control Sample	85.3
MB 160-128228/1-A	Method Blank	91.7
MB 160-128412/1-A	Method Blank	94.5
MB 160-128417/1-A	Method Blank	92.2

Tracer/Carrier Legend

Th-229 = Thorium-229

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128228

Lab ID: MB 160-128228/1-A
Client ID:
Sigma: 2

Analyzed: 07/01/14 12:25
Detector: AV115
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.006508	0.0215	0.0216	U	pCi/g	1.00	0.0541	129241
Thorium-230	0.1211	0.0724	0.0731		pCi/g	1.00	0.0541	129241
Thorium-232	0.0000	0.00389	0.00389	U	pCi/g	1.00	0.0311	129241

Tracer	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.611	0.463	0.661		pCi/g	0.0435	6.12	91.7	30 - 110

Lab ID: LCS 160-128228/2-A
Client ID:
Sigma: 2

Analyzed: 07/01/14 12:25
Detector: AV116
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	20.69	1.28	2.16		pCi/g	1.00	0.0591	129242

Tracer	LCS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	11.54	0.926	1.34		pCi/g	0.0557	12.2	94.3	30 - 110

Lab ID: 680-102380-1
Client ID: SD-224-SS
Sigma: 2

Analyzed: 07/01/14 12:26
Detector: AV15
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.01	0.220	0.235		pCi/g	1.00	0.106	129260
Thorium-230	1.00	0.216	0.232		pCi/g	1.00	0.0716	129260
Thorium-232	1.35	0.248	0.273		pCi/g	1.00	0.0520	129260

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.19	0.451	0.627		pCi/g	0.0695	6.10	85.0	30 - 110

Lab ID: 680-102380-2
Client ID: SD-224-01
Sigma: 2

Analyzed: 07/01/14 12:26
Detector: AV16
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.22	0.239	0.260		pCi/g	1.00	0.0881	129261
Thorium-230	1.00	0.216	0.232		pCi/g	1.00	0.0716	129261
Thorium-232	1.43	0.256	0.283		pCi/g	1.00	0.0521	129261

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128228

Lab ID: 680-102380-2
Client ID: SD-224-01
Sigma: 2

Analyzed: 07/01/14 12:26
Detector: AV16
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.93	0.428	0.596		pCi/g	0.0422	6.13	80.5	30 - 110

Lab ID: 680-102380-3
Client ID: SD-224-02
Sigma: 2

Analyzed: 07/01/14 12:26
Detector: AV17
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.800	0.202	0.213		pCi/g	1.00	0.121	129262
Thorium-230	0.817	0.198	0.210		pCi/g	1.00	0.0679	129262
Thorium-232	0.777	0.193	0.204		pCi/g	1.00	0.0676	129262

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.96	0.438	0.605		pCi/g	0.0502	6.14	80.9	30 - 110

Lab ID: 680-102380-5
Client ID: SD-223-SS
Sigma: 2

Analyzed: 07/01/14 12:26
Detector: AV18
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.27	0.254	0.275		pCi/g	1.00	0.0887	129263
Thorium-230	1.28	0.254	0.275		pCi/g	1.00	0.0649	129263
Thorium-232	1.14	0.238	0.257		pCi/g	1.00	0.0707	129263

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.84	0.437	0.597		pCi/g	0.0296	6.12	79.0	30 - 110

Lab ID: 680-102380-6
Client ID: SD-223-01
Sigma: 2

Analyzed: 07/01/14 12:26
Detector: AV19
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.17	0.246	0.265		pCi/g	1.00	0.0786	129264
Thorium-230	0.744	0.199	0.209		pCi/g	1.00	0.105	129264
Thorium-232	1.24	0.252	0.273		pCi/g	1.00	0.0664	129264

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.74	0.435	0.590		pCi/g	0.0760	6.13	77.3	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128228

Lab ID: 680-102380-7
Client ID: SD-223-02
Sigma: 2

Analyzed: 07/01/14 12:26
Detector: AV20
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.54	0.291	0.319		pCi/g	1.00	0.123	129265
Thorium-230	1.04	0.238	0.254		pCi/g	1.00	0.0991	129265
Thorium-232	1.36	0.272	0.295		pCi/g	1.00	0.0984	129265

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.50	0.422	0.567		pCi/g	0.0701	6.13	73.5	30 - 110

Lab ID: 680-102380-8
Client ID: SD-226-SS
Sigma: 2

Analyzed: 07/01/14 12:26
Detector: AV21
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.01	0.218	0.234		pCi/g	1.00	0.0929	129266
Thorium-230	1.15	0.231	0.250		pCi/g	1.00	0.0697	129266
Thorium-232	1.28	0.241	0.264		pCi/g	1.00	0.0590	129266

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.32	0.459	0.641		pCi/g	0.0514	6.14	86.7	30 - 110

Lab ID: 680-102380-9
Client ID: SD-226-01
Sigma: 2

Analyzed: 07/01/14 12:26
Detector: AV23
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.21	0.238	0.259		pCi/g	1.00	0.0909	129267
Thorium-230	0.979	0.214	0.229		pCi/g	1.00	0.0745	129267
Thorium-232	1.36	0.250	0.275		pCi/g	1.00	0.0595	129267

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.12	0.445	0.619		pCi/g	0.0687	6.10	83.9	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128228

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-128228/1-A	Thorium-228			0.006508	U	pCi/g							
MB 160-128228/1-A	Thorium-230			0.1211		pCi/g							
MB 160-128228/1-A	Thorium-232			0.0000	U	pCi/g							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-128228/2-A	Thorium-230		24.5	20.69		pCi/g	84	81 - 118					

Glossary:

Ts = Count Duration, Sample

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102380-1

SDG No.: 680102380-1

Batch Number: 128228 Batch Start Date: 06/23/14 15:05 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/01/14 09:24

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-128228/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-128228/2		ExtChrom, A-01-R		0.4997 g	0.2 mL	0.4997 g			
680-102380-A-1-A	SD-224-SS	ExtChrom, A-01-R	T	1.0032 g	0.2 mL				
680-102380-A-2-A	SD-224-01	ExtChrom, A-01-R	T	0.9990 g	0.2 mL				
680-102380-A-3-A	SD-224-02	ExtChrom, A-01-R	T	0.9975 g	0.2 mL				
680-102380-A-5-A	SD-223-SS	ExtChrom, A-01-R	T	0.9993 g	0.2 mL				
680-102380-A-6-A	SD-223-01	ExtChrom, A-01-R	T	0.9980 g	0.2 mL				
680-102380-A-7-A	SD-223-02	ExtChrom, A-01-R	T	0.9983 g	0.2 mL				
680-102380-A-8-A	SD-226-SS	ExtChrom, A-01-R	T	0.9969 g	0.2 mL				
680-102380-A-9-A	SD-226-01	ExtChrom, A-01-R	T	1.0033 g	0.2 mL				

Batch Notes	
Balance ID	27050421
Column Analyst	scb
Column Date	6/27/14
CoPrecipitation Analyst	scb
CoPrecipitation Date	7/1/14
Person's name who witnessed reagent drop	nmn per scb
Analyst who added reagent	scb
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

A-01-R

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102380-1

SDG No.: 680102380-1

Batch Number: 128412 Batch Start Date: 06/24/14 14:58 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/02/14 14:52

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-128412/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-128412/2		ExtChrom, A-01-R		0.5018 g	0.2 mL	0.5018 g			
680-102380-A-10 -A	SD-226-02	ExtChrom, A-01-R	T	1.0046 g	0.2 mL				
680-102380-A-10 -A DU	SD-226-02	ExtChrom, A-01-R	T	1.0010 g	0.2 mL				
680-102380-A-12 -A	SD-225-SS	ExtChrom, A-01-R	T	0.9992 g	0.2 mL				
680-102380-A-13 -A	SD-225-01	ExtChrom, A-01-R	T	0.9962 g	0.2 mL				
680-102380-A-14 -A	SD-225-02	ExtChrom, A-01-R	T	0.9993 g	0.2 mL				
680-102380-A-16 -A	SD-228-SS	ExtChrom, A-01-R	T	0.9982 g	0.2 mL				
680-102380-A-17 -A	SD-228-01	ExtChrom, A-01-R	T	1.0048 g	0.2 mL				
680-102380-A-18 -A	SD-228-02	ExtChrom, A-01-R	T	0.9957 g	0.2 mL				
680-102380-A-20 -A	SD-234-SS	ExtChrom, A-01-R	T	1.0043 g	0.2 mL				
680-102380-A-21 -A	SD-234-01	ExtChrom, A-01-R	T	0.9975 g	0.2 mL				
680-102380-A-22 -A	SD-235-SS	ExtChrom, A-01-R	T	.9991 g	0.2 mL				
680-102380-A-23 -A	SD-23501	ExtChrom, A-01-R	T	0.9992 g	0.2 mL				
680-102380-A-24 -A	SD-235-02	ExtChrom, A-01-R	T	0.9987 g	0.2 mL				
680-102380-A-26 -A	SD-236-SS	ExtChrom, A-01-R	T	0.9988 g	0.2 mL				
680-102380-A-27 -A	SD-236-01	ExtChrom, A-01-R	T	0.9978 g	0.2 mL				
680-102380-A-28 -A	SD-236-02	ExtChrom, A-01-R	T	1.0000 g	0.2 mL				
680-102380-A-29 -A	SD-237-SS	ExtChrom, A-01-R	T	1.0007 g	0.2 mL				
680-102380-A-30 -A	SD-237-01	ExtChrom, A-01-R	T	0.9969 g	0.2 mL				
680-102380-A-31 -A	SD-237-02	ExtChrom, A-01-R	T	1.0027 g	0.2 mL				

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102380-1

SDG No.: 680102380-1

Batch Number: 128412 Batch Start Date: 06/24/14 14:58 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/02/14 14:52

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
680-102380-A-33-A	SD-DUP05	ExtChrom, A-01-R	T	1.0026 g	0.2 mL				
680-102380-A-34-A	SD-227-SS	ExtChrom, A-01-R	T	1.0005 g	0.2 mL				

Batch Notes	
Balance ID	27050421
Column Analyst	nmn per scb
Column Date	7/2/14
CoPrecipitation Analyst	scb
CoPrecipitation Date	7/2/14
Person's name who witnessed reagent drop	nmn per scb
Analyst who added reagent	scb
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

A-01-R

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102380-1

SDG No.: 680102380-1

Batch Number: 128417 Batch Start Date: 06/24/14 15:13 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/02/14 14:51

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-128417/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-128417/2		ExtChrom, A-01-R		0.4999 g	0.2 mL	0.4999 g			
680-102380-A-35 -A	SD-227-01	ExtChrom, A-01-R	T	1.0005 g	0.2 mL				
680-102380-A-36 -A	SD-227-02	ExtChrom, A-01-R	T	0.9967 g	0.2 mL				

Batch Notes	
Balance ID	27050421
Column Analyst	nmn per scb
Column Date	7/2/14
CoPrecipitation Analyst	scb
CoPrecipitation Date	7/2/14
Person's name who witnessed reagent drop	nmn per scb
Analyst who added reagent	scb
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

A-01-R

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128412

Lab ID: MB 160-128412/1-A
Client ID:
Sigma: 2

Analyzed: 07/02/14 18:02
Detector: AV3
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	-0.005722	0.00661	0.00662	U	pCi/g	1.00	0.0579	129494
Thorium-230	0.07533	0.0694	0.0697	U	pCi/g	1.00	0.0995	129494
Thorium-232	0.002532	0.0216	0.0216	U	pCi/g	1.00	0.0618	129494

Tracer	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.781	0.473	0.678		pCi/g	0.0807	6.12	94.5	30 - 110

Lab ID: LCS 160-128412/2-A
Client ID:
Sigma: 2

Analyzed: 07/02/14 18:02
Detector: AV4
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	22.92	1.32	2.33		pCi/g	1.00	0.129	129495

Tracer	LCS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	12.49	0.985	1.44		pCi/g	0.118	12.2	102	30 - 110

Lab ID: 680-102380-10
Client ID: SD-226-02
Sigma: 2

Analyzed: 07/02/14 18:02
Detector: AV6
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.23	0.232	0.254		pCi/g	1.00	0.105	129512
Thorium-230	1.03	0.212	0.229		pCi/g	1.00	0.0910	129512
Thorium-232	1.05	0.212	0.230		pCi/g	1.00	0.0717	129512

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.55	0.464	0.658		pCi/g	0.0657	6.09	91.2	30 - 110

Lab ID: 680-102380-10 DU
Client ID: SD-226-02
Sigma: 2

Analyzed: 07/02/14 18:02
Detector: AV7
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.054	0.225	0.242		pCi/g	1.00	0.104	129523
Thorium-230	1.025	0.219	0.235		pCi/g	1.00	0.0761	129523
Thorium-232	1.541	0.268	0.298		pCi/g	1.00	0.0881	129523

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128412

Lab ID: 680-102380-10 DU
Client ID: SD-226-02
Sigma: 2

Analyzed: 07/02/14 18:02
Detector: AV7
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Tracer	DU Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.135	0.447	0.621		pCi/g	0.0591	6.11	84.0	30 - 110

Lab ID: 680-102380-12
Client ID: SD-225-SS
Sigma: 2

Analyzed: 07/02/14 18:02
Detector: AV8
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.34	0.266	0.289		pCi/g	1.00	0.124	129534
Thorium-230	1.45	0.272	0.298		pCi/g	1.00	0.0607	129534
Thorium-232	1.39	0.267	0.291		pCi/g	1.00	0.0935	129534

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.47	0.409	0.555		pCi/g	0.0735	6.12	73.0	30 - 110

Lab ID: 680-102380-13
Client ID: SD-225-01
Sigma: 2

Analyzed: 07/02/14 18:02
Detector: AV9
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.32	0.246	0.270		pCi/g	1.00	0.0702	129545
Thorium-230	1.35	0.250	0.274		pCi/g	1.00	0.0740	129545
Thorium-232	1.33	0.246	0.270		pCi/g	1.00	0.0591	129545

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.00	0.432	0.603		pCi/g	0.0484	6.14	81.5	30 - 110

Lab ID: 680-102380-14
Client ID: SD-225-02
Sigma: 2

Analyzed: 07/02/14 18:02
Detector: AV10
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.904	0.204	0.218		pCi/g	1.00	0.102	129466
Thorium-230	0.952	0.206	0.221		pCi/g	1.00	0.0674	129466
Thorium-232	0.906	0.199	0.213		pCi/g	1.00	0.0329	129466

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.39	0.459	0.645		pCi/g	0.0745	6.12	88.1	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128412

Lab ID: 680-102380-16 | Analyzed: 07/02/14 18:02 | Decay Corrected: No
Client ID: SD-228-SS | Detector: AV11 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.32	0.249	0.273		pCi/g	1.00	0.105	129477
Thorium-230	1.08	0.223	0.241		pCi/g	1.00	0.0741	129477
Thorium-232	1.40	0.254	0.280		pCi/g	1.00	0.0813	129477

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.01	0.433	0.604		pCi/g	0.0637	6.13	81.7	30 - 110

Lab ID: 680-102380-17 | Analyzed: 07/02/14 18:02 | Decay Corrected: No
Client ID: SD-228-01 | Detector: AV12 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.29	0.244	0.267		pCi/g	1.00	0.0873	129482
Thorium-230	1.40	0.252	0.278		pCi/g	1.00	0.0518	129482
Thorium-232	1.36	0.250	0.275		pCi/g	1.00	0.0837	129482

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.15	0.445	0.621		pCi/g	0.0503	6.09	84.5	30 - 110

Lab ID: 680-102380-18 | Analyzed: 07/02/14 18:02 | Decay Corrected: No
Client ID: SD-228-02 | Detector: AV13 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.06	0.229	0.246		pCi/g	1.00	0.0955	129483
Thorium-230	0.797	0.196	0.207		pCi/g	1.00	0.0362	129483
Thorium-232	1.12	0.235	0.253		pCi/g	1.00	0.0964	129483

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.93	0.438	0.603		pCi/g	0.0552	6.15	80.3	30 - 110

Lab ID: 680-102380-20 | Analyzed: 07/02/14 18:02 | Decay Corrected: No
Client ID: SD-234-SS | Detector: AV14 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.765	0.184	0.195		pCi/g	1.00	0.0665	129484
Thorium-230	0.835	0.191	0.204		pCi/g	1.00	0.0566	129484

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128412

Lab ID: 680-102380-20
Client ID: SD-234-SS
Sigma: 2

Analyzed: 07/02/14 18:02
Detector: AV14
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-232	0.778	0.184	0.195		pCi/g	1.00	0.0493	129484

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.31	0.449	0.633		pCi/g	0.0646	6.09	87.1	30 - 110

Lab ID: 680-102380-21
Client ID: SD-234-01
Sigma: 2

Analyzed: 07/02/14 18:02
Detector: AV15
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.05	0.221	0.238		pCi/g	1.00	0.103	129485
Thorium-230	0.685	0.176	0.186		pCi/g	1.00	0.0698	129485
Thorium-232	0.928	0.204	0.218		pCi/g	1.00	0.0507	129485

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.38	0.461	0.645		pCi/g	0.0699	6.14	87.8	30 - 110

Lab ID: 680-102380-22
Client ID: SD-235-SS
Sigma: 2

Analyzed: 07/02/14 18:02
Detector: AV16
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.913	0.208	0.221		pCi/g	1.00	0.0882	129486
Thorium-230	0.729	0.185	0.195		pCi/g	1.00	0.0704	129486
Thorium-232	0.904	0.204	0.218		pCi/g	1.00	0.0522	129486

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.92	0.427	0.595		pCi/g	0.0422	6.13	80.4	30 - 110

Lab ID: 680-102380-23
Client ID: SD-23501
Sigma: 2

Analyzed: 07/02/14 18:02
Detector: AV17
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.16	0.231	0.251		pCi/g	1.00	0.111	129487
Thorium-230	0.894	0.199	0.213		pCi/g	1.00	0.0624	129487
Thorium-232	1.32	0.240	0.264		pCi/g	1.00	0.0621	129487

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128412

Lab ID: 680-102380-23
Client ID: SD-23501
Sigma: 2

Analyzed: 07/02/14 18:02
Detector: AV17
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.38	0.456	0.642		pCi/g	0.0501	6.12	87.8	30 - 110

Lab ID: 680-102380-24
Client ID: SD-235-02
Sigma: 2

Analyzed: 07/02/14 18:02
Detector: AV18
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.08	0.213	0.231		pCi/g	1.00	0.0733	129488
Thorium-230	1.04	0.208	0.225		pCi/g	1.00	0.0536	129488
Thorium-232	1.12	0.215	0.235		pCi/g	1.00	0.0534	129488

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.86	0.481	0.688		pCi/g	0.0296	6.13	95.6	30 - 110

Lab ID: 680-102380-26
Client ID: SD-236-SS
Sigma: 2

Analyzed: 07/02/14 18:02
Detector: AV19
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.335	0.113	0.116		pCi/g	1.00	0.0567	129489
Thorium-230	0.271	0.104	0.106		pCi/g	1.00	0.0708	129489
Thorium-232	0.208	0.0883	0.0900		pCi/g	1.00	0.0479	129489

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	6.56	0.511	0.752		pCi/g	0.0761	6.13	107	30 - 110

Lab ID: 680-102380-27
Client ID: SD-236-01
Sigma: 2

Analyzed: 07/02/14 18:02
Detector: AV20
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.562	0.163	0.170		pCi/g	1.00	0.101	129490
Thorium-230	0.447	0.143	0.148		pCi/g	1.00	0.0817	129490
Thorium-232	0.389	0.134	0.138		pCi/g	1.00	0.0811	129490

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.47	0.465	0.654		pCi/g	0.0702	6.13	89.3	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128412

Lab ID: 680-102380-28
Client ID: SD-236-02
Sigma: 2

Analyzed: 07/02/14 18:02
Detector: AV21
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.555	0.159	0.166		pCi/g	1.00	0.0888	129491
Thorium-230	0.582	0.161	0.168		pCi/g	1.00	0.0666	129491
Thorium-232	0.658	0.170	0.178		pCi/g	1.00	0.0564	129491

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.53	0.468	0.659		pCi/g	0.0513	6.12	90.4	30 - 110

Lab ID: 680-102380-29
Client ID: SD-237-SS
Sigma: 2

Analyzed: 07/02/14 18:02
Detector: AV23
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.09	0.251	0.268		pCi/g	1.00	0.111	129492
Thorium-230	1.04	0.243	0.258		pCi/g	1.00	0.0908	129492
Thorium-232	0.944	0.230	0.244		pCi/g	1.00	0.0725	129492

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.22	0.405	0.538		pCi/g	0.0688	6.12	69.0	30 - 110

Lab ID: 680-102380-30
Client ID: SD-237-01
Sigma: 2

Analyzed: 07/02/14 18:02
Detector: AV24
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.55	0.281	0.310		pCi/g	1.00	0.131	129493
Thorium-230	1.11	0.234	0.252		pCi/g	1.00	0.0790	129493
Thorium-232	1.51	0.272	0.300		pCi/g	1.00	0.0741	129493

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.79	0.428	0.588		pCi/g	0.0678	6.14	78.1	30 - 110

Lab ID: 680-102380-31
Client ID: SD-237-02
Sigma: 2

Analyzed: 07/02/14 18:02
Detector: AV43
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.27	0.226	0.250		pCi/g	1.00	0.0759	129496
Thorium-230	0.986	0.198	0.215		pCi/g	1.00	0.0577	129496

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128412

Lab ID: 680-102380-31
Client ID: SD-237-02
Sigma: 2

Analyzed: 07/02/14 18:02
Detector: AV43
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-232	1.39	0.234	0.262		pCi/g	1.00	0.0512	129496

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.99	0.483	0.697		pCi/g	0.0630	6.10	98.1	30 - 110

Lab ID: 680-102380-33
Client ID: SD-DUP05
Sigma: 2

Analyzed: 07/02/14 18:03
Detector: AV44
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.14	0.220	0.240		pCi/g	1.00	0.0947	129497
Thorium-230	1.11	0.214	0.233		pCi/g	1.00	0.0468	129497
Thorium-232	1.14	0.216	0.237		pCi/g	1.00	0.0307	129497

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.64	0.464	0.663		pCi/g	0.0433	6.10	92.5	30 - 110

Lab ID: 680-102380-34
Client ID: SD-227-SS
Sigma: 2

Analyzed: 07/02/14 18:03
Detector: AV45
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.31	0.251	0.274		pCi/g	1.00	0.0986	129498
Thorium-230	0.978	0.215	0.230		pCi/g	1.00	0.0537	129498
Thorium-232	1.39	0.256	0.282		pCi/g	1.00	0.0668	129498

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.99	0.438	0.606		pCi/g	0.0500	6.12	81.5	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128412

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-128412/1-A	Thorium-228			-0.005722	U	pCi/g							
MB 160-128412/1-A	Thorium-230			0.07533	U	pCi/g							
MB 160-128412/1-A	Thorium-232			0.002532	U	pCi/g							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-128412/2-A	Thorium-230		24.5	22.92		pCi/g	94	81 - 118					

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
680-102380-10	Thorium-228	1.23		1.054		pCi/g			15	0.35	1.00	1	
680-102380-10	Thorium-230	1.03		1.025		pCi/g			0.8	0.02	0.05	1	
680-102380-10	Thorium-232	1.05		1.541		pCi/g			38	0.93	2.60	1	

Glossary:

Ts = Count Duration, Sample

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102380-1

SDG No.: 680102380-1

Batch Number: 128228 Batch Start Date: 06/23/14 15:05 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/01/14 09:24

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-128228/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-128228/2		ExtChrom, A-01-R		0.4997 g	0.2 mL	0.4997 g			
680-102380-A-1-A	SD-224-SS	ExtChrom, A-01-R	T	1.0032 g	0.2 mL				
680-102380-A-2-A	SD-224-01	ExtChrom, A-01-R	T	0.9990 g	0.2 mL				
680-102380-A-3-A	SD-224-02	ExtChrom, A-01-R	T	0.9975 g	0.2 mL				
680-102380-A-5-A	SD-223-SS	ExtChrom, A-01-R	T	0.9993 g	0.2 mL				
680-102380-A-6-A	SD-223-01	ExtChrom, A-01-R	T	0.9980 g	0.2 mL				
680-102380-A-7-A	SD-223-02	ExtChrom, A-01-R	T	0.9983 g	0.2 mL				
680-102380-A-8-A	SD-226-SS	ExtChrom, A-01-R	T	0.9969 g	0.2 mL				
680-102380-A-9-A	SD-226-01	ExtChrom, A-01-R	T	1.0033 g	0.2 mL				

Batch Notes	
Balance ID	27050421
Column Analyst	scb
Column Date	6/27/14
CoPrecipitation Analyst	scb
CoPrecipitation Date	7/1/14
Person's name who witnessed reagent drop	nmn per scb
Analyst who added reagent	scb
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

A-01-R

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102380-1

SDG No.: 680102380-1

Batch Number: 128412 Batch Start Date: 06/24/14 14:58 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/02/14 14:52

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-128412/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-128412/2		ExtChrom, A-01-R		0.5018 g	0.2 mL	0.5018 g			
680-102380-A-10 -A	SD-226-02	ExtChrom, A-01-R	T	1.0046 g	0.2 mL				
680-102380-A-10 -A DU	SD-226-02	ExtChrom, A-01-R	T	1.0010 g	0.2 mL				
680-102380-A-12 -A	SD-225-SS	ExtChrom, A-01-R	T	0.9992 g	0.2 mL				
680-102380-A-13 -A	SD-225-01	ExtChrom, A-01-R	T	0.9962 g	0.2 mL				
680-102380-A-14 -A	SD-225-02	ExtChrom, A-01-R	T	0.9993 g	0.2 mL				
680-102380-A-16 -A	SD-228-SS	ExtChrom, A-01-R	T	0.9982 g	0.2 mL				
680-102380-A-17 -A	SD-228-01	ExtChrom, A-01-R	T	1.0048 g	0.2 mL				
680-102380-A-18 -A	SD-228-02	ExtChrom, A-01-R	T	0.9957 g	0.2 mL				
680-102380-A-20 -A	SD-234-SS	ExtChrom, A-01-R	T	1.0043 g	0.2 mL				
680-102380-A-21 -A	SD-234-01	ExtChrom, A-01-R	T	0.9975 g	0.2 mL				
680-102380-A-22 -A	SD-235-SS	ExtChrom, A-01-R	T	.9991 g	0.2 mL				
680-102380-A-23 -A	SD-23501	ExtChrom, A-01-R	T	0.9992 g	0.2 mL				
680-102380-A-24 -A	SD-235-02	ExtChrom, A-01-R	T	0.9987 g	0.2 mL				
680-102380-A-26 -A	SD-236-SS	ExtChrom, A-01-R	T	0.9988 g	0.2 mL				
680-102380-A-27 -A	SD-236-01	ExtChrom, A-01-R	T	0.9978 g	0.2 mL				
680-102380-A-28 -A	SD-236-02	ExtChrom, A-01-R	T	1.0000 g	0.2 mL				
680-102380-A-29 -A	SD-237-SS	ExtChrom, A-01-R	T	1.0007 g	0.2 mL				
680-102380-A-30 -A	SD-237-01	ExtChrom, A-01-R	T	0.9969 g	0.2 mL				
680-102380-A-31 -A	SD-237-02	ExtChrom, A-01-R	T	1.0027 g	0.2 mL				

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102380-1

SDG No.: 680102380-1

Batch Number: 128412 Batch Start Date: 06/24/14 14:58 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/02/14 14:52

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
680-102380-A-33 -A	SD-DUP05	ExtChrom, A-01-R	T	1.0026 g	0.2 mL				
680-102380-A-34 -A	SD-227-SS	ExtChrom, A-01-R	T	1.0005 g	0.2 mL				

Batch Notes	
Balance ID	27050421
Column Analyst	nmn per scb
Column Date	7/2/14
CoPrecipitation Analyst	scb
CoPrecipitation Date	7/2/14
Person's name who witnessed reagent drop	nmn per scb
Analyst who added reagent	scb
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102380-1

SDG No.: 680102380-1

Batch Number: 128417 Batch Start Date: 06/24/14 15:13 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/02/14 14:51

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-128417/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-128417/2		ExtChrom, A-01-R		0.4999 g	0.2 mL	0.4999 g			
680-102380-A-35 -A	SD-227-01	ExtChrom, A-01-R	T	1.0005 g	0.2 mL				
680-102380-A-36 -A	SD-227-02	ExtChrom, A-01-R	T	0.9967 g	0.2 mL				

Batch Notes	
Balance ID	27050421
Column Analyst	nmn per scb
Column Date	7/2/14
CoPrecipitation Analyst	scb
CoPrecipitation Date	7/2/14
Person's name who witnessed reagent drop	nmn per scb
Analyst who added reagent	scb
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128417

Lab ID: MB 160-128417/1-A
Client ID:
Sigma: 2
Analyzed: 07/02/14 18:11
Detector: AV46
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	-0.009679	0.00858	0.00862	U	pCi/g	1.00	0.0660	129499
Thorium-230	0.03903	0.0410	0.0411	U	pCi/g	1.00	0.0462	129499
Thorium-232	0.008210	0.0206	0.0206	U	pCi/g	1.00	0.0460	129499

Tracer	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.642	0.460	0.661		pCi/g	0.0606	6.12	92.2	30 - 110

Lab ID: LCS 160-128417/2-A
Client ID:
Sigma: 2
Analyzed: 07/02/14 18:11
Detector: AV49
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	25.66	1.51	2.63		pCi/g	1.00	0.170	129502

Tracer	LCS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	10.44	0.891	1.25		pCi/g	0.139	12.2	85.3	30 - 110

Lab ID: 680-102380-35
Client ID: SD-227-01
Sigma: 2
Analyzed: 07/02/14 18:11
Detector: AV50
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.54	0.281	0.309		pCi/g	1.00	0.102	129503
Thorium-230	1.35	0.264	0.287		pCi/g	1.00	0.111	129503
Thorium-232	1.27	0.252	0.274		pCi/g	1.00	0.0710	129503

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.54	0.413	0.562		pCi/g	0.0840	6.12	74.3	30 - 110

Lab ID: 680-102380-36
Client ID: SD-227-02
Sigma: 2
Analyzed: 07/02/14 18:11
Detector: AV51
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.895	0.204	0.217		pCi/g	1.00	0.0981	129504
Thorium-230	0.753	0.184	0.194		pCi/g	1.00	0.0579	129504
Thorium-232	0.963	0.207	0.222		pCi/g	1.00	0.0505	129504

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128417

Lab ID:	680-102380-36	Analyzed:	07/02/14 18:11	Decay Corrected:	No
Client ID:	SD-227-02	Detector:	AV51	Yield Truncated:	No
Sigma:	2	Dil Fac:	1	Ts:	180

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.28	0.451	0.633		pCi/g	0.0546	6.14	86.1	30 - 110

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-128417/1-A	Thorium-228			-0.009679	U	pCi/g							
MB 160-128417/1-A	Thorium-230			0.03903	U	pCi/g							
MB 160-128417/1-A	Thorium-232			0.008210	U	pCi/g							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-128417/2-A	Thorium-230		24.5	25.66		pCi/g	105	81 - 118					

Glossary:

Ts = Count Duration, Sample

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102380-1

SDG No.: 680102380-1

Batch Number: 128228 Batch Start Date: 06/23/14 15:05 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/01/14 09:24

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-128228/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-128228/2		ExtChrom, A-01-R		0.4997 g	0.2 mL	0.4997 g			
680-102380-A-1-A	SD-224-SS	ExtChrom, A-01-R	T	1.0032 g	0.2 mL				
680-102380-A-2-A	SD-224-01	ExtChrom, A-01-R	T	0.9990 g	0.2 mL				
680-102380-A-3-A	SD-224-02	ExtChrom, A-01-R	T	0.9975 g	0.2 mL				
680-102380-A-5-A	SD-223-SS	ExtChrom, A-01-R	T	0.9993 g	0.2 mL				
680-102380-A-6-A	SD-223-01	ExtChrom, A-01-R	T	0.9980 g	0.2 mL				
680-102380-A-7-A	SD-223-02	ExtChrom, A-01-R	T	0.9983 g	0.2 mL				
680-102380-A-8-A	SD-226-SS	ExtChrom, A-01-R	T	0.9969 g	0.2 mL				
680-102380-A-9-A	SD-226-01	ExtChrom, A-01-R	T	1.0033 g	0.2 mL				

Batch Notes	
Balance ID	27050421
Column Analyst	scb
Column Date	6/27/14
CoPrecipitation Analyst	scb
CoPrecipitation Date	7/1/14
Person's name who witnessed reagent drop	nmn per scb
Analyst who added reagent	scb
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102380-1

SDG No.: 680102380-1

Batch Number: 128412 Batch Start Date: 06/24/14 14:58 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/02/14 14:52

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-128412/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-128412/2		ExtChrom, A-01-R		0.5018 g	0.2 mL	0.5018 g			
680-102380-A-10 -A	SD-226-02	ExtChrom, A-01-R	T	1.0046 g	0.2 mL				
680-102380-A-10 -A DU	SD-226-02	ExtChrom, A-01-R	T	1.0010 g	0.2 mL				
680-102380-A-12 -A	SD-225-SS	ExtChrom, A-01-R	T	0.9992 g	0.2 mL				
680-102380-A-13 -A	SD-225-01	ExtChrom, A-01-R	T	0.9962 g	0.2 mL				
680-102380-A-14 -A	SD-225-02	ExtChrom, A-01-R	T	0.9993 g	0.2 mL				
680-102380-A-16 -A	SD-228-SS	ExtChrom, A-01-R	T	0.9982 g	0.2 mL				
680-102380-A-17 -A	SD-228-01	ExtChrom, A-01-R	T	1.0048 g	0.2 mL				
680-102380-A-18 -A	SD-228-02	ExtChrom, A-01-R	T	0.9957 g	0.2 mL				
680-102380-A-20 -A	SD-234-SS	ExtChrom, A-01-R	T	1.0043 g	0.2 mL				
680-102380-A-21 -A	SD-234-01	ExtChrom, A-01-R	T	0.9975 g	0.2 mL				
680-102380-A-22 -A	SD-235-SS	ExtChrom, A-01-R	T	.9991 g	0.2 mL				
680-102380-A-23 -A	SD-23501	ExtChrom, A-01-R	T	0.9992 g	0.2 mL				
680-102380-A-24 -A	SD-235-02	ExtChrom, A-01-R	T	0.9987 g	0.2 mL				
680-102380-A-26 -A	SD-236-SS	ExtChrom, A-01-R	T	0.9988 g	0.2 mL				
680-102380-A-27 -A	SD-236-01	ExtChrom, A-01-R	T	0.9978 g	0.2 mL				
680-102380-A-28 -A	SD-236-02	ExtChrom, A-01-R	T	1.0000 g	0.2 mL				
680-102380-A-29 -A	SD-237-SS	ExtChrom, A-01-R	T	1.0007 g	0.2 mL				
680-102380-A-30 -A	SD-237-01	ExtChrom, A-01-R	T	0.9969 g	0.2 mL				
680-102380-A-31 -A	SD-237-02	ExtChrom, A-01-R	T	1.0027 g	0.2 mL				

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102380-1

SDG No.: 680102380-1

Batch Number: 128412 Batch Start Date: 06/24/14 14:58 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/02/14 14:52

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
680-102380-A-33-A	SD-DUP05	ExtChrom, A-01-R	T	1.0026 g	0.2 mL				
680-102380-A-34-A	SD-227-SS	ExtChrom, A-01-R	T	1.0005 g	0.2 mL				

Batch Notes	
Balance ID	27050421
Column Analyst	nmn per scb
Column Date	7/2/14
CoPrecipitation Analyst	scb
CoPrecipitation Date	7/2/14
Person's name who witnessed reagent drop	nmn per scb
Analyst who added reagent	scb
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102380-1

SDG No.: 680102380-1

Batch Number: 128417 Batch Start Date: 06/24/14 15:13 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/02/14 14:51

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-128417/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-128417/2		ExtChrom, A-01-R		0.4999 g	0.2 mL	0.4999 g			
680-102380-A-35 -A	SD-227-01	ExtChrom, A-01-R	T	1.0005 g	0.2 mL				
680-102380-A-36 -A	SD-227-02	ExtChrom, A-01-R	T	0.9967 g	0.2 mL				

Batch Notes	
Balance ID	27050421
Column Analyst	nmn per scb
Column Date	7/2/14
CoPrecipitation Analyst	scb
CoPrecipitation Date	7/2/14
Person's name who witnessed reagent drop	nmn per scb
Analyst who added reagent	scb
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

Alpha Spectroscopy Daily Pulser Check

Analysis Date: 07/01/14

		Gross Counts			FWHM (keV)			Pulser Center			Energy (keV)		
Detector	Analysis Date	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F
AV3	07/01/14 01:00	7370	6995.6 - 7732.0	Pass	11.9	10 - 20	Pass	227.0	221.0 - 231.0	Pass	5060	5012.2 - 5092.2	Pass
AV15	07/01/14 01:00	7702	7313.8 - 8083.7	Pass	14.4	10 - 20	Pass	223.9	219.2 - 229.2	Pass	5036	4998.9 - 5078.9	Pass
AV16	07/01/14 01:00	7542	7055.7 - 7798.4	Pass	12.6	10 - 20	Pass	218.0	215.9 - 225.9	Pass	4993	4974.6 - 5054.6	Pass
AV17	07/01/14 01:00	7574	7224.6 - 7985.1	Pass	11.6	10 - 20	Pass	227.0	221.0 - 231.0	Pass	5060	5012.5 - 5092.5	Pass
AV18	07/01/14 01:00	7589	7204.8 - 7963.1	Pass	12.0	10 - 20	Pass	225.0	220.0 - 230.0	Pass	5045	5004.9 - 5084.9	Pass
AV19	07/01/14 01:00	7583	7231.9 - 7993.2	Pass	11.5	10 - 20	Pass	225.0	221.0 - 231.0	Pass	5045	5012.3 - 5092.3	Pass
AV20	07/01/14 01:00	7671	7255.1 - 8018.8	Pass	14.8	10 - 20	Pass	221.9	217.9 - 227.9	Pass	5022	4989.0 - 5069.0	Pass
AV21	07/01/14 01:00	7671	7278.7 - 8044.9	Pass	14.2	10 - 20	Pass	223.0	219.0 - 229.0	Pass	5030	4997.5 - 5077.5	Pass
AV23	07/01/14 01:00	7635	7259.0 - 8023.1	Pass	16.1	10 - 20	Pass	224.1	219.0 - 229.0	Pass	5038	4997.4 - 5077.4	Pass
AV115	07/01/14 01:38	7691	7254.6 - 8018.2	Pass	13.4	10 - 20	Pass	222.0	216.9 - 226.9	Pass	5022	4982.2 - 5062.2	Pass
AV116	07/01/14 01:38	7688	7295.5 - 8063.4	Pass	13.9	10 - 20	Pass	221.0	216.0 - 226.0	Pass	5015	4975.1 - 5055.1	Pass

Analysis Date: 07/02/14

		Gross Counts			FWHM (keV)			Pulser Center			Energy (keV)		
Detector	Analysis Date	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F
AV3	07/02/14 10:53	7326	6995.6 - 7732.0	Pass	12.3	10 - 20	Pass	227.0	221.0 - 231.0	Pass	5060	5012.2 - 5092.2	Pass
AV4	07/02/14 10:53	7440	7058.9 - 7801.9	Pass	14.1	10 - 20	Pass	226.0	220.0 - 230.0	Pass	5053	5004.6 - 5084.6	Pass
AV6	07/02/14 10:53	7440	7050.8 - 7793.0	Pass	13.7	10 - 20	Pass	217.0	212.0 - 222.0	Pass	4985	4944.9 - 5024.9	Pass
AV7	07/02/14 10:53	7325	7003.5 - 7740.8	Pass	17.8	10 - 20	Pass	226.9	222.0 - 232.0	Pass	5059	5020.1 - 5100.1	Pass
AV8	07/02/14 10:53	7429	7052.4 - 7794.7	Pass	14.6	10 - 20	Pass	220.9	216.0 - 226.0	Pass	5014	4975.1 - 5055.1	Pass
AV9	07/02/14 10:53	7511	7187.8 - 7944.4	Pass	12.9	10 - 20	Pass	221.0	216.0 - 226.0	Pass	5015	4975.3 - 5055.3	Pass
AV10	07/02/14 10:53	7430	7323.5 - 8094.4	Pass	12.6	10 - 20	Pass	224.1	216.0 - 226.0	Pass	5038	4974.9 - 5054.9	Pass
AV11	07/02/14 10:53	7711	7322.5 - 8093.3	Pass	13.5	10 - 20	Pass	226.0	221.1 - 231.1	Pass	5053	5012.8 - 5092.8	Pass
AV12	07/02/14 10:53	7629	7265.8 - 8030.6	Pass	11.5	10 - 20	Pass	221.0	214.9 - 224.9	Pass	5015	4967.1 - 5047.1	Pass
AV13	07/02/14 10:53	7642	7244.9 - 8007.5	Pass	16.6	10 - 20	Pass	222.8	219.1 - 229.1	Pass	5029	4998.3 - 5078.3	Pass
AV14	07/02/14 10:53	7611	7236.1 - 7997.8	Pass	12.0	10 - 20	Pass	224.0	219.0 - 229.0	Pass	5037	4997.5 - 5077.5	Pass
AV15	07/02/14 10:53	7699	7313.8 - 8083.7	Pass	14.4	10 - 20	Pass	223.9	219.2 - 229.2	Pass	5037	4998.9 - 5078.9	Pass
AV16	07/02/14 10:53	7556	7055.7 - 7798.4	Pass	12.5	10 - 20	Pass	218.0	215.9 - 225.9	Pass	4992	4974.6 - 5054.6	Pass
AV17	07/02/14 10:53	7552	7224.6 - 7985.1	Pass	11.8	10 - 20	Pass	227.0	221.0 - 231.0	Pass	5060	5012.5 - 5092.5	Pass
AV18	07/02/14 10:53	7582	7204.8 - 7963.1	Pass	12.0	10 - 20	Pass	225.0	220.0 - 230.0	Pass	5045	5004.9 - 5084.9	Pass
AV19	07/02/14 10:53	7594	7231.9 - 7993.2	Pass	11.3	10 - 20	Pass	225.0	221.0 - 231.0	Pass	5045	5012.3 - 5092.3	Pass
AV20	07/02/14 10:53	7669	7255.1 - 8018.8	Pass	15.0	10 - 20	Pass	221.9	217.9 - 227.9	Pass	5022	4989.0 - 5069.0	Pass
AV21	07/02/14 10:53	7668	7278.7 - 8044.9	Pass	14.1	10 - 20	Pass	223.0	219.0 - 229.0	Pass	5030	4997.5 - 5077.5	Pass
AV23	07/02/14 10:53	7630	7259.0 - 8023.1	Pass	16.0	10 - 20	Pass	224.1	219.0 - 229.0	Pass	5038	4997.4 - 5077.4	Pass
AV24	07/02/14 10:54	7663	7259.6 - 8023.8	Pass	14.5	10 - 20	Pass	218.0	212.9 - 222.9	Pass	4993	4952.1 - 5032.1	Pass
AV43	07/02/14 15:55	7449	7041.9 - 7783.1	Pass	12.1	10 - 20	Pass	220.9	216.9 - 226.9	Pass	5014	4982.0 - 5062.0	Pass
AV44	07/02/14 15:55	7610	7220.7 - 7980.8	Pass	11.7	10 - 20	Pass	221.0	216.0 - 226.0	Pass	5015	4975.1 - 5055.1	Pass
AV45	07/02/14 15:55	7639	7219.6 - 7979.6	Pass	16.3	10 - 20	Pass	224.0	219.7 - 229.7	Pass	5037	5003.0 - 5083.0	Pass

Alpha Spectroscopy Daily Pulser Check

Analysis Date: 07/02/14

		Gross Counts			FWHM (keV)			Pulser Center			Energy (keV)		
Detector	Analysis Date	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F
AV46	07/02/14 15:55	7661	7134.7 - 7885.7	Pass	13.6	10 - 20	Pass	225.0	220.0 - 230.0	Pass	5045	5004.8 - 5084.8	Pass
AV49	07/02/14 15:55	7628	7226.6 - 7987.3	Pass	15.7	10 - 20	Pass	221.1	215.0 - 225.0	Pass	5016	4967.4 - 5047.4	Pass
AV50	07/02/14 15:54	7651	7169.4 - 7924.1	Pass	13.5	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	4990.3 - 5070.3	Pass
AV51	07/02/14 15:54	7284	6922.8 - 7651.5	Pass	15.7	10 - 20	Pass	222.1	217.1 - 227.1	Pass	5023	4983.5 - 5063.5	Pass
AV58	07/02/14 15:54	7112	6766.5 - 7478.7	Pass	12.3	10 - 20	Pass	227.0	219.0 - 229.0	Pass	5060	4997.2 - 5077.2	Pass
AV60	07/02/14 15:54	7215	6867.8 - 7590.7	Pass	16.4	10 - 20	Pass	220.9	216.2 - 226.2	Pass	5014	4976.7 - 5056.7	Pass

Analysis Date: 07/03/14

		Gross Counts			FWHM (keV)			Pulser Center			Energy (keV)		
Detector	Analysis Date	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F
AV3	07/03/14 15:56	7349	6995.6 - 7732.0	Pass	12.1	10 - 20	Pass	227.0	221.0 - 231.0	Pass	5060	5012.2 - 5092.2	Pass

Alpha Spectroscopy Calibration Summary

Detector: AV3

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120519/1	05/05/14 22:26	82234-334_00001	0.2609	0.20-0.32		
ICV 160-120855/1	05/07/14 23:02	82233-334_00001	0.2696	0.20-0.32	103.3	95-105
CCV 160-127913/1	06/19/14 16:44	82234-334_00001	0.2566	0.20-0.32	98.3	95-105

Detector: AV4

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120520/1	05/05/14 22:26	82235-334_00001	0.2582	0.20-0.32		
ICV 160-120856/1	05/07/14 23:03	82234-334_00001	0.2599	0.20-0.32	100.6	95-105
CCV 160-127914/1	06/19/14 16:44	82235-334_00001	0.2590	0.20-0.32	100.3	95-105

Detector: AV6

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120521/1	05/05/14 22:26	82237-334_00003	0.2589	0.20-0.32		
ICV 160-120857/1	05/07/14 23:03	82236-334_00001	0.2622	0.20-0.32	101.3	95-105
CCV 160-127932/1	06/19/14 18:06	82237-334_00003	0.2606	0.20-0.32	100.7	95-105

Detector: AV7

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120843/1	05/07/14 19:51	82236-334_00001	0.2580	0.20-0.32		
ICV 160-120858/1	05/07/14 23:03	82237-334_00003	0.2546	0.20-0.32	98.6	95-105
CCV 160-127943/1	06/19/14 16:44	82236-334_00001	0.2549	0.20-0.32	98.8	95-105

Detector: AV8

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120523/1	05/05/14 22:27	82240-334_00001	0.2705	0.20-0.32		
ICV 160-121084/1	05/08/14 00:14	82234-334_00001	0.2639	0.20-0.32	97.6	95-105
CCV 160-127954/1	06/19/14 18:06	82240-334_00001	0.2668	0.20-0.32	98.6	95-105

Detector: AV9

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120524/1	05/05/14 22:27	82241-334_00001	0.2704	0.20-0.32		
ICV 160-120859/1	05/07/14 23:03	82240-334_00001	0.2666	0.20-0.32	98.6	95-105
CCV 160-127962/1	06/19/14 18:06	82241-334_00001	0.2701	0.20-0.32	99.9	95-105

Detector: AV10

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120512/1	05/05/14 22:27	82242-334_00001	0.2584	0.20-0.32		
ICV 160-120847/1	05/07/14 23:03	82241-334_00001	0.2593	0.20-0.32	100.3	95-105
CCV 160-127860/1	06/19/14 18:06	82242-334_00001	0.2552	0.20-0.32	98.7	95-105

Detector: AV11

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120513/1	05/05/14 22:27	82243-334_00001	0.2688	0.20-0.32		
ICV 160-120848/1	05/07/14 23:04	82242-334_00001	0.2598	0.20-0.32	96.6	95-105
CCV 160-127871/1	06/19/14 18:07	82243-334_00001	0.2647	0.20-0.32	98.5	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV12

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120514/1	05/05/14 22:28	82244-334_00001	0.2597	0.20-0.32		
ICV 160-120849/1	05/07/14 23:04	82243-334_00001	0.2688	0.20-0.32	103.5	95-105
CCV 160-127881/1	06/19/14 18:07	82244-334_00001	0.2583	0.20-0.32	99.5	95-105

Detector: AV13

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120515/1	05/05/14 22:28	82245-334_00001	0.2599	0.20-0.32		
ICV 160-120850/1	05/07/14 23:04	82244-334_00001	0.2556	0.20-0.32	98.4	95-105
CCV 160-127892/1	06/19/14 19:45	82245-334_00001	0.2566	0.20-0.32	98.7	95-105

Detector: AV14

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120516/1	05/05/14 22:28	82246-334_00001	0.2634	0.20-0.32		
ICV 160-120851/1	05/07/14 23:04	82245-334_00001	0.2665	0.20-0.32	101.2	95-105
CCV 160-127902/1	06/19/14 18:08	82246-334_00001	0.2615	0.20-0.32	99.3	95-105

Detector: AV15

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120517/1	05/05/14 22:28	82247-334_00001	0.2562	0.20-0.32		
ICV 160-120852/1	05/07/14 23:04	82246-334_00001	0.2590	0.20-0.32	101.1	95-105
CCV 160-127903/1	06/19/14 19:45	82247-334_00001	0.2528	0.20-0.32	98.7	95-105

Detector: AV16

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120398/1	05/05/14 19:27	82232-334_00001	0.2711	0.20-0.32		
ICV 160-121072/1	05/08/14 00:14	82247-334_00001	0.2609	0.20-0.32	96.2	95-105
CCV 160-127904/1	06/19/14 18:08	82232-334_00001	0.2712	0.20-0.32	100.1	95-105

Detector: AV17

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120399/1	05/05/14 19:28	82233-334_00001	0.2607	0.20-0.32		
ICV 160-121073/1	05/08/14 00:14	82232-334_00001	0.2633	0.20-0.32	101.0	95-105
CCV 160-127905/1	06/19/14 18:08	82233-334_00001	0.2613	0.20-0.32	100.2	95-105

Detector: AV18

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120400/1	05/05/14 19:28	82234-334_00001	0.2546	0.20-0.32		
ICV 160-121074/1	05/08/14 00:14	82233-334_00001	0.2618	0.20-0.32	102.8	95-105
CCV 160-127906/1	06/19/14 18:08	82234-334_00001	0.2539	0.20-0.32	99.7	95-105

Detector: AV19

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120401/1	05/05/14 19:28	82235-334_00001	0.2534	0.20-0.32		
ICV 160-121361/1	05/08/14 14:33	82235-334_00001	0.2496	0.20-0.32	98.5	95-105
CCV 160-127907/1	06/19/14 18:08	82235-334_00001	0.2536	0.20-0.32	100.1	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV20

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120402/1	05/05/14 19:28	82236-334_00001	0.2556	0.20-0.32		
ICV 160-120854/1	05/07/14 23:05	82235-334_00001	0.2551	0.20-0.32	99.8	95-105
CCV 160-127909/1	06/19/14 18:08	82236-334_00001	0.2577	0.20-0.32	100.8	95-105

Detector: AV21

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120403/1	05/05/14 19:28	82237-334_00003	0.2545	0.20-0.32		
ICV 160-121075/1	05/08/14 00:16	82236-334_00001	0.2553	0.20-0.32	100.3	95-105
CCV 160-127910/1	06/19/14 19:45	82237-334_00003	0.2545	0.20-0.32	100.0	95-105

Detector: AV23

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120404/1	05/05/14 19:29	82240-334_00001	0.2591	0.20-0.32		
ICV 160-121362/1	05/08/14 14:33	82233-334_00001	0.2592	0.20-0.32	100.0	95-105
CCV 160-127911/1	06/19/14 19:45	82240-334_00001	0.2586	0.20-0.32	99.8	95-105

Detector: AV24

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120405/1	05/05/14 19:29	82241-334_00001	0.2642	0.20-0.32		
ICV 160-121076/1	05/08/14 00:16	82240-334_00001	0.2662	0.20-0.32	100.8	95-105
CCV 160-127912/1	06/19/14 19:45	82241-334_00001	0.2644	0.20-0.32	100.1	95-105

Detector: AV43

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120406/1	05/05/14 19:30	82242-334_00001	0.2574	0.20-0.32		
ICV 160-121077/1	05/08/14 00:16	82241-334_00001	0.2568	0.20-0.32	99.8	95-105
CCV 160-127969/1	06/22/14 17:38	82242-334_00001	0.2558	0.20-0.32	99.4	95-105

Detector: AV44

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120407/1	05/05/14 19:30	82243-334_00001	0.2632	0.20-0.32		
ICV 160-121078/1	05/08/14 00:17	82242-334_00001	0.2594	0.20-0.32	98.6	95-105
CCV 160-127970/1	06/22/14 17:38	82243-334_00001	0.2633	0.20-0.32	100.0	95-105

Detector: AV45

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120408/1	05/05/14 19:30	82244-334_00001	0.2606	0.20-0.32		
ICV 160-121363/1	05/08/14 14:32	82243-334_00001	0.2658	0.20-0.32	102.0	95-105
CCV 160-127985/1	06/22/14 20:07	82244-334_00001	0.2609	0.20-0.32	100.1	95-105

Detector: AV46

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120409/1	05/05/14 19:30	82245-334_00001	0.2680	0.20-0.32		
ICV 160-121079/1	05/08/14 00:18	82244-334_00001	0.2610	0.20-0.32	97.4	95-105
CCV 160-127986/1	06/22/14 21:17	82245-334_00001	0.2669	0.20-0.32	99.6	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV49

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120271/1	05/04/14 21:03	82232-334_00001	0.2653	0.20-0.32		
ICV 160-121364/1	05/08/14 14:34	82247-334_00001	0.2545	0.20-0.32	95.9	95-105
CCV 160-127989/1	06/22/14 18:52	82232-334_00001	0.2674	0.20-0.32	100.8	95-105

Detector: AV50

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120272/1	05/04/14 21:03	82233-334_00001	0.2693	0.20-0.32		
ICV 160-121365/1	05/08/14 14:34	82232-334_00001	0.2692	0.20-0.32	100.0	95-105
CCV 160-127990/1	06/22/14 18:52	82233-334_00001	0.2708	0.20-0.32	100.5	95-105

Detector: AV51

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120273/1	05/04/14 21:03	82234-334_00001	0.2624	0.20-0.32		
ICV 160-121366/1	05/08/14 17:17	82233-334_00001	0.2693	0.20-0.32	102.6	95-105
CCV 160-127991/1	06/22/14 20:07	82234-334_00001	0.2581	0.20-0.32	98.4	95-105

Detector: AV115

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120840/1	05/07/14 19:52	82244-334_00001	0.2626	0.20-0.32		
ICV 160-121418/1	05/11/14 20:54	82237-334_00003	0.2672	0.20-0.32	101.8	95-105
CCV 160-127876/1	06/19/14 15:10	82244-334_00001	0.2651	0.20-0.32	100.9	95-105

Detector: AV116

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-119675/1	04/30/14 22:55	82240-334_00001	0.2704	0.20-0.32		
ICV 160-121419/1	05/11/14 22:06	82245-334_00001	0.2603	0.20-0.32	96.2	95-105
CCV 160-127877/1	06/19/14 15:10	82240-334_00001	0.2694	0.20-0.32	99.6	95-105

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Sediments

Report Number: 680-102380-3

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT
The samples were received on 06/14/2014; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 1.8 C.

A revised report was necessary to correct the final volume that was used to calculate the Uranium data.

TOTAL URANIUM
Samples SD-224-SS (680-102380-1), SD-224-01 (680-102380-2), SD-224-02 (680-102380-3), SD-223-SS (680-102380-5), SD-223-01 (680-102380-6), SD-223-02 (680-102380-7), SD-226-SS (680-102380-8), SD-226-01 (680-102380-9), SD-226-02 (680-102380-10), SD-225-SS (680-102380-12), SD-225-01 (680-102380-13), SD-225-02 (680-102380-14), SD-228-SS (680-102380-16), SD-228-01 (680-102380-17), SD-228-02 (680-102380-18), SD-234-SS (680-102380-20), SD-234-01 (680-102380-21), SD-235-SS (680-102380-22), SD-235-01 (680-102380-23), SD-235-02 (680-102380-24), SD-236-SS (680-102380-26), SD-236-01 (680-102380-27), SD-236-02 (680-102380-28), SD-237-SS (680-102380-29), SD-237-01 (680-102380-30), SD-237-02 (680-102380-31), SD-DUP05 (680-102380-33), SD-227-SS (680-102380-34), SD-227-01 (680-102380-35) and SD-227-02 (680-102380-36) were analyzed for Total Uranium in accordance with EPA SW-846 6020A. The samples were analyzed on 08/11/2014 and 08/19/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM
Samples SD-224-SS (680-102380-1), SD-224-01 (680-102380-2), SD-224-02 (680-102380-3), SD-223-SS (680-102380-5), SD-223-01 (680-102380-6), SD-223-02 (680-102380-7), SD-226-SS (680-102380-8), SD-226-01 (680-102380-9), SD-226-02 (680-102380-10), SD-225-SS (680-102380-12), SD-225-01 (680-102380-13), SD-225-02 (680-102380-14), SD-228-SS (680-102380-16), SD-228-01 (680-102380-17), SD-228-02 (680-102380-18), SD-234-SS (680-102380-20), SD-234-01 (680-102380-21), SD-235-SS (680-102380-22), SD-235-01 (680-102380-23), SD-235-02 (680-102380-24), SD-236-SS (680-102380-26), SD-236-01 (680-102380-27), SD-236-02 (680-102380-28), SD-237-SS (680-102380-29), SD-237-01 (680-102380-30), SD-237-02 (680-102380-31), SD-DUP05 (680-102380-33), SD-227-SS (680-102380-34), SD-227-01 (680-102380-35) and SD-227-02 (680-102380-36) were analyzed for Isotopic Uranium in accordance with EPA SW-846 6020A. The samples were prepared on 08/11/2014 and analyzed on 08/14/2014 and 08/18/2014.

Due to the high concentration of uranium 238, the matrix spike / matrix spike duplicate (MS/MSD) could not be evaluated for accuracy and precision. The associated laboratory control sample (LCS) met acceptance criteria. (680-102380-1 MSD)

The presence of the '4' qualifier indicates analytes where the concentration in the unspiked sample exceeded four times the spiking amount.

Refer to the QC report for details.

Samples SD-224-SS (680-102380-1)[5X], SD-224-01 (680-102380-2)[5X], SD-224-02 (680-102380-3)[5X], SD-223-SS (680-102380-5)[5X], SD-223-01 (680-102380-6)[5X], SD-223-02 (680-102380-7)[5X], SD-226-SS (680-102380-8)[5X], SD-226-01 (680-102380-9)[5X], SD-226-02 (680-102380-10)[5X], SD-225-SS (680-102380-12)[5X], SD-225-01 (680-102380-13)[5X], SD-225-02 (680-102380-14)[5X], SD-228-SS (680-102380-16)[5X], SD-228-01 (680-102380-17)[5X], SD-228-02 (680-102380-18)[5X], SD-234-SS (680-102380-20)[5X], SD-234-01 (680-102380-21)[5X], SD-235-SS (680-102380-22)[5X], SD-235-01 (680-102380-23)[5X], SD-235-02 (680-102380-24)[5X], SD-236-SS (680-102380-26)[5X], SD-236-01 (680-102380-27)[5X], SD-236-02 (680-102380-28)[5X], SD-237-SS (680-102380-29)[5X], SD-237-01 (680-102380-30)[5X], SD-237-02 (680-102380-31)[5X], SD-DUP05 (680-102380-33)[5X], SD-227-SS (680-102380-34)[5X], SD-227-01 (680-102380-35)[5X] and SD-227-02 (680-102380-36)[5X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM PERCENTAGE
Samples SD-224-SS (680-102380-1), SD-224-01 (680-102380-2), SD-224-02 (680-102380-3), SD-223-SS (680-102380-5), SD-223-01 (680-102380-6), SD-223-02 (680-102380-7), SD-226-SS (680-102380-8), SD-226-01 (680-102380-9), SD-226-02 (680-102380-10),

SD-225-SS (680-102380-12), SD-225-01 (680-102380-13), SD-225-02 (680-102380-14), SD-228-SS (680-102380-16), SD-228-01 (680-102380-17), SD-228-02 (680-102380-18), SD-234-SS (680-102380-20), SD-234-01 (680-102380-21), SD-235-SS (680-102380-22), SD-235-01 (680-102380-23), SD-235-02 (680-102380-24), SD-236-SS (680-102380-26), SD-236-01 (680-102380-27), SD-236-02 (680-102380-28), SD-237-SS (680-102380-29), SD-237-01 (680-102380-30), SD-237-02 (680-102380-31), SD-DUP05 (680-102380-33), SD-227-SS (680-102380-34), SD-227-01 (680-102380-35) and SD-227-02 (680-102380-36) were analyzed for Isotopic Uranium Percentage in accordance with EPA SW-846 6020A. The samples were analyzed on 08/19/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM ACTIVITY

Samples SD-224-SS (680-102380-1), SD-224-01 (680-102380-2), SD-224-02 (680-102380-3), SD-223-SS (680-102380-5), SD-223-01 (680-102380-6), SD-223-02 (680-102380-7), SD-226-SS (680-102380-8), SD-226-01 (680-102380-9), SD-226-02 (680-102380-10), SD-225-SS (680-102380-12), SD-225-01 (680-102380-13), SD-225-02 (680-102380-14), SD-228-SS (680-102380-16), SD-228-01 (680-102380-17), SD-228-02 (680-102380-18), SD-234-SS (680-102380-20), SD-234-01 (680-102380-21), SD-235-SS (680-102380-22), SD-235-01 (680-102380-23), SD-235-02 (680-102380-24), SD-236-SS (680-102380-26), SD-236-01 (680-102380-27), SD-236-02 (680-102380-28), SD-237-SS (680-102380-29), SD-237-01 (680-102380-30), SD-237-02 (680-102380-31), SD-DUP05 (680-102380-33), SD-227-SS (680-102380-34), SD-227-01 (680-102380-35) and SD-227-02 (680-102380-36) were analyzed for Isotopic Uranium Activity in accordance with EPA SW-846 6020A. The samples were prepared on 08/11/2014 and analyzed on 08/14/2014 and 08/18/2014.

The continuing calibration verification (CCV) recovered above the upper control limit for uranium 233. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The following samples are impacted: (CCV 160-138778/116), (CCV 160-138778/87).

U-238 was detected in method blank MB 160-137068/1-A, and MB 160-137069/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged.

Samples SD-224-SS (680-102380-1)[5X], SD-224-01 (680-102380-2)[5X], SD-224-02 (680-102380-3)[5X], SD-223-SS (680-102380-5)[5X], SD-223-01 (680-102380-6)[5X], SD-223-02 (680-102380-7)[5X], SD-226-SS (680-102380-8)[5X], SD-226-01 (680-102380-9)[5X], SD-226-02 (680-102380-10)[5X], SD-225-SS (680-102380-12)[5X], SD-225-01 (680-102380-13)[5X], SD-225-02 (680-102380-14)[5X], SD-228-SS (680-102380-16)[5X], SD-228-01 (680-102380-17)[5X], SD-228-02 (680-102380-18)[5X], SD-234-SS (680-102380-20)[5X], SD-234-01 (680-102380-21)[5X], SD-235-SS (680-102380-22)[5X], SD-235-01 (680-102380-23)[5X], SD-235-02 (680-102380-24)[5X], SD-236-SS (680-102380-26)[5X], SD-236-01 (680-102380-27)[5X], SD-236-02 (680-102380-28)[5X], SD-237-SS (680-102380-29)[5X], SD-237-01 (680-102380-30)[5X], SD-237-02 (680-102380-31)[5X], SD-DUP05 (680-102380-33)[5X], SD-227-SS (680-102380-34)[5X], SD-227-01 (680-102380-35)[5X] and SD-227-02 (680-102380-36)[5X] required dilution prior to analysis due to high salt content in the samples. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102380-3
SDG: 680102380-1

Method	Method Description	Protocol	Laboratory
6020A	Metals (ICP/MS), Isotopic Uranium	SW846	TAL SL
6020A	Metals (ICP/MS), Total Uranium	SW846	TAL SL
6020A	Metals (ICP/MS), Isotopic Uranium Percentage	SW846	TAL SL
6020A Activity	Metals (ICP/MS), Isotopic Uranium (Activity)	SW846	TAL SL

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102380-3
SDG: 680102380-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-102380-1	SD-224-SS	Solid	06/13/14 08:20	06/14/14 08:30
680-102380-2	SD-224-01	Solid	06/13/14 08:25	06/14/14 08:30
680-102380-3	SD-224-02	Solid	06/13/14 08:30	06/14/14 08:30
680-102380-5	SD-223-SS	Solid	06/13/14 08:40	06/14/14 08:30
680-102380-6	SD-223-01	Solid	06/13/14 08:45	06/14/14 08:30
680-102380-7	SD-223-02	Solid	06/13/14 08:50	06/14/14 08:30
680-102380-8	SD-226-SS	Solid	06/13/14 08:55	06/14/14 08:30
680-102380-9	SD-226-01	Solid	06/13/14 09:00	06/14/14 08:30
680-102380-10	SD-226-02	Solid	06/13/14 09:05	06/14/14 08:30
680-102380-12	SD-225-SS	Solid	06/13/14 09:15	06/14/14 08:30
680-102380-13	SD-225-01	Solid	06/13/14 09:20	06/14/14 08:30
680-102380-14	SD-225-02	Solid	06/13/14 09:25	06/14/14 08:30
680-102380-16	SD-228-SS	Solid	06/13/14 10:05	06/14/14 08:30
680-102380-17	SD-228-01	Solid	06/13/14 10:10	06/14/14 08:30
680-102380-18	SD-228-02	Solid	06/13/14 10:15	06/14/14 08:30
680-102380-20	SD-234-SS	Solid	06/13/14 10:30	06/14/14 08:30
680-102380-21	SD-234-01	Solid	06/13/14 10:35	06/14/14 08:30
680-102380-22	SD-235-SS	Solid	06/13/14 11:00	06/14/14 08:30
680-102380-23	SD-235-01	Solid	06/13/14 11:05	06/14/14 08:30
680-102380-24	SD-235-02	Solid	06/13/14 11:10	06/14/14 08:30
680-102380-26	SD-236-SS	Solid	06/13/14 12:05	06/14/14 08:30
680-102380-27	SD-236-01	Solid	06/13/14 12:10	06/14/14 08:30
680-102380-28	SD-236-02	Solid	06/13/14 12:15	06/14/14 08:30
680-102380-29	SD-237-SS	Solid	06/13/14 12:30	06/14/14 08:30
680-102380-30	SD-237-01	Solid	06/13/14 12:35	06/14/14 08:30
680-102380-31	SD-237-02	Solid	06/13/14 12:40	06/14/14 08:30
680-102380-33	SD-DUP05	Solid	06/13/14 00:00	06/14/14 08:30
680-102380-34	SD-227-SS	Solid	06/13/14 13:10	06/14/14 08:30
680-102380-35	SD-227-01	Solid	06/13/14 13:15	06/14/14 08:30
680-102380-36	SD-227-02	Solid	06/13/14 13:20	06/14/14 08:30

12-IN
PREPARATION LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Prep Method: 3050B

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight (g)	Initial Volume	Final Volume (mL)
MB 160-137068/1-A	08/11/2014 11:25	137068	0.5663		50
LCS 160-137068/2-A	08/11/2014 11:25	137068	0.5550		50
680-102380-1	08/11/2014 11:25	137068	0.5277		50
680-102380-1 MS	08/11/2014 11:25	137068	0.5100		50
680-102380-1 MSD	08/11/2014 11:25	137068	0.5536		50
680-102380-2	08/11/2014 11:25	137068	0.5356		50
680-102380-3	08/11/2014 11:25	137068	0.5650		50
680-102380-5	08/11/2014 11:25	137068	0.5522		50
680-102380-6	08/11/2014 11:25	137068	0.5342		50
680-102380-7	08/11/2014 11:25	137068	0.5657		50
680-102380-8	08/11/2014 11:25	137068	0.5188		50
680-102380-9	08/11/2014 11:25	137068	0.5201		50
680-102380-10	08/11/2014 11:25	137068	0.5563		50
680-102380-12	08/11/2014 11:25	137068	0.5163		50
680-102380-13	08/11/2014 11:25	137068	0.5653		50
680-102380-14	08/11/2014 11:25	137068	0.5766		50
680-102380-16	08/11/2014 11:25	137068	0.5751		50
680-102380-17	08/11/2014 11:25	137068	0.5382		50
680-102380-18	08/11/2014 11:25	137068	0.5369		50
680-102380-20	08/11/2014 11:25	137068	0.5159		50
680-102380-21	08/11/2014 11:25	137068	0.5378		50
680-102380-22	08/11/2014 11:25	137068	0.5815		50
680-102380-23	08/11/2014 11:25	137068	0.5348		50
680-102380-24	08/11/2014 11:25	137068	0.5243		50

12-IN
PREPARATION LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Prep Method: 3050B

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight (g)	Initial Volume	Final Volume (mL)
MB 160-137069/1-A	08/11/2014 11:35	137069	0.5450		50
LCS 160-137069/2-A	08/11/2014 11:35	137069	0.5066		50
680-102380-26	08/11/2014 11:35	137069	0.5380		50
680-102380-26 MS	08/11/2014 11:35	137069	0.5695		50
680-102380-26 MSD	08/11/2014 11:35	137069	0.5343		50
680-102380-27	08/11/2014 11:35	137069	0.5740		50
680-102380-28	08/11/2014 11:35	137069	0.5244		50
680-102380-29	08/11/2014 11:35	137069	0.5671		50
680-102380-30	08/11/2014 11:35	137069	0.5012		50
680-102380-31	08/11/2014 11:35	137069	0.5528		50
680-102380-33	08/11/2014 11:35	137069	0.5170		50
680-102380-34	08/11/2014 11:35	137069	0.5158		50
680-102380-35	08/11/2014 11:35	137069	0.5800		50
680-102380-36	08/11/2014 11:35	137069	0.5689		50

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/14/2014 11:32 End Date: 08/15/2014 00:12

| Lab Sample Id | D/F | Type | Time | Analytes | | |

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/14/2014 11:32 End Date: 08/15/2014 00:12

| Lab Sample Id | D/F | Type | Time | Analytes | | |

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/14/2014 11:32 End Date: 08/15/2014 00:12

Lab Sample Id	D/F	Type	Time	Analytes			
				U-234	U-235	U-236	U-238
ZZZZZZ			18:06				
CCV 160-138156/80			18:11				
CCB 160-138156/81			18:15				
ICIS 160-138156/82			18:20	X	X	X	X
IC 160-138156/83	1		18:27	X	X	X	X
IC 160-138156/84	1		18:31	X	X	X	X
IC 160-138156/85	1		18:36	X	X	X	X
IC 160-138156/86	1		18:41	X	X	X	X
IC 160-138156/87	1		18:45	X	X	X	X
ICV 160-138156/88			18:50				
ICV 160-138156/89	1		18:55	X			X
ICV 160-138156/90	1		18:59		X	X	
ICB 160-138156/91	1		19:04	X	X	X	X
CRI 160-138156/92	1		19:09		X		X
CRI 160-138156/93	1		19:13	X		X	
ICSA 160-138156/94	1		19:18	X	X	X	X
ICSAB 160-138156/95	1		19:23	X	X	X	X
CCV 160-138156/96	1		19:27	X	X	X	X
CCB 160-138156/97	1		19:32	X	X	X	X
ZZZZZZ			19:37				
ZZZZZZ			19:41				
MB 160-137068/1-A	2	T	19:46	X	X	X	X
LCS 160-137068/2-A	2	T	19:51	X	X		X
680-102380-1	5	T	19:55	X	X	X	X
CCV 160-138156/103	1		20:00	X	X	X	X
CCB 160-138156/104	1		20:05	X	X	X	X
680-102380-1 SD	25	T	20:09	X	X	X	X
680-102380-1 MS	5	T	20:14	X	X		X
680-102380-1 MSD	5	T	20:19	X	X		X
680-102380-2	5	T	20:23	X	X	X	X
680-102380-3	5	T	20:28	X	X	X	X
680-102380-5	5	T	20:33	X	X	X	X
680-102380-6	5	T	20:37	X	X	X	X
680-102380-7	5	T	20:42	X	X	X	X
680-102380-8	5	T	20:47	X	X	X	X
680-102380-9	5	T	20:51	X	X	X	X
CCV 160-138156/115	1		20:56	X	X	X	X
CCB 160-138156/116	1		21:01	X	X	X	X
680-102380-10	5	T	21:05	X	X	X	X

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/14/2014 11:32 End Date: 08/15/2014 00:12

| Lab Sample Id | D/F | Type | Time | Analytes | | |

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/14/2014 11:32 End Date: 08/15/2014 00:12

Lab Sample Id	D/F	Type	Time	Analytes																													
				U-234	U-235	U-236	U-238																											
CCB 160-138156/157			00:12																														

Prep Types:
T = Total/NA

FORM XIII-IN

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

ICV Source: ISOU ICV(4,8)_00017 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00018

Analyte	ICV 160-138156/89 08/14/2014 18:55				CCV 160-138156/96 08/14/2014 19:27				CCV 160-138156/103 08/14/2014 20:00			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0872		0.0835	104	0.0789		0.0827	95	0.0781		0.0827	95
U-238	10.0		9.78	102	4.92		5.03	98	4.86		5.03	97

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

ICV Source: ISOU ICV(4,8)_00017 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00018

Analyte	CCV 160-138156/115 08/14/2014 20:56				CCV 160-138156/127 08/14/2014 21:52				CCV 160-138156/139 08/14/2014 22:48			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0839		0.0827	101	0.0817		0.0827	99	0.0841		0.0827	102
U-238	5.19		5.03	103	5.12		5.03	102	5.23		5.03	104

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

ICV Source: ISOU ICV(4,8)_00017 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00018

Analyte	CCV 160-138156/151 08/14/2014 23:44											
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0840		0.0827	102								
U-238	5.27		5.03	105								

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

ICV Source: ISOU ICV(5,6)_00019 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00018

Analyte	ICV 160-138156/90 08/14/2014 18:59				CCV 160-138156/96 08/14/2014 19:27				CCV 160-138156/103 08/14/2014 20:00			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	1.11		1.06	105	4.75		4.85	98	4.67		4.85	96
U-236	0.0677		0.0746	91	0.0857		0.0890	96	0.0838		0.0890	94

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

ICV Source: ISOU ICV(5,6)_00019 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00018

Analyte	CCV 160-138156/115 08/14/2014 20:56				CCV 160-138156/127 08/14/2014 21:52				CCV 160-138156/139 08/14/2014 22:48			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	4.99		4.85	103	4.92		4.85	102	5.04		4.85	104
U-236	0.0899		0.0890	101	0.0882		0.0890	99	0.0907		0.0890	102

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

ICV Source: ISOU ICV(5,6)_00019 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00018

Analyte	CCV 160-138156/151 08/14/2014 23:44											
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	5.05		4.85	104								
U-236	0.0912		0.0890	103								

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/18/2014 14:28 End Date: 08/18/2014 23:43

Lab Sample Id	D/F	Type	Time	Analytes
				U-233
ICSAB 160-138778/1	1		15:31	X
CCV 160-138778/2			15:36	
CCB 160-138778/3			15:40	
ICIS 160-138778/4			14:28	X
IC 160-138778/5	1		14:35	X
IC 160-138778/6	1		14:40	X
IC 160-138778/7	1		14:44	X
IC 160-138778/8	1		14:49	X
IC 160-138778/9	1		14:54	X
ICV 160-138778/10	1		14:58	X
ICV 160-138778/11			15:03	
ICV 160-138778/12			15:08	
ICB 160-138778/13	1		15:12	X
CRI 160-138778/14			15:17	
CRI 160-138778/15	1		15:22	X
ICSA 160-138778/16	1		15:26	X
ZZZZZZ			15:56	
ZZZZZZ			16:01	
ZZZZZZ			16:05	
ZZZZZZ			16:10	
ZZZZZZ			16:15	
ZZZZZZ			16:19	
ZZZZZZ			16:24	
ZZZZZZ			16:29	
ZZZZZZ			16:33	
ZZZZZZ			16:38	
CCV 160-138778/27			16:43	
CCB 160-138778/28			16:47	
ZZZZZZ			16:52	
ZZZZZZ			16:57	
ZZZZZZ			17:02	
ZZZZZZ			17:06	
ZZZZZZ			17:11	
ZZZZZZ			17:15	
ZZZZZZ			17:20	
ZZZZZZ			17:25	
ZZZZZZ			17:29	
ZZZZZZ			17:34	
CCV 160-138778/39			17:39	

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/18/2014 14:28 End Date: 08/18/2014 23:43

Lab Sample Id	D/F	Type	Time	Analytes
				U-233
CCB 160-138778/40			17:44	
ZZZZZZ			17:48	
ZZZZZZ			17:53	
ZZZZZZ			17:58	
ZZZZZZ			18:02	
ZZZZZZ			18:07	
ZZZZZZ			18:12	
ZZZZZZ			18:16	
ZZZZZZ			18:21	
ZZZZZZ			18:26	
ZZZZZZ			18:30	
CCV 160-138778/51			18:35	
CCB 160-138778/52			18:40	
ZZZZZZ			18:44	
ZZZZZZ			18:49	
ZZZZZZ			18:54	
ZZZZZZ			18:58	
ZZZZZZ			19:03	
ZZZZZZ			19:08	
ZZZZZZ			19:12	
ZZZZZZ			19:17	
ZZZZZZ			19:22	
ZZZZZZ			19:26	
CCV 160-138778/63	1		19:31	X
CCB 160-138778/64	1		19:36	X
ZZZZZZ			19:40	
ZZZZZZ			19:45	
ZZZZZZ			19:50	
MB 160-137068/1-A	2	T	19:54	X
ZZZZZZ			19:59	
680-102380-1	5	T	20:04	X
680-102380-1 SD	25	T	20:08	X
ZZZZZZ			20:13	
ZZZZZZ			20:18	
680-102380-2	5	T	20:22	X
CCV 160-138778/75	1		20:27	X
CCB 160-138778/76	1		20:32	X
680-102380-3	5	T	20:36	X
680-102380-5	5	T	20:41	X

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/18/2014 14:28 End Date: 08/18/2014 23:43

Lab Sample Id	D/F	Type	Time	Analytes
				U-233
680-102380-6	5	T	20:46	X
680-102380-7	5	T	20:50	X
680-102380-8	5	T	20:55	X
680-102380-9	5	T	21:00	X
680-102380-10	5	T	21:04	X
680-102380-12	5	T	21:09	X
680-102380-13	5	T	21:14	X
680-102380-14	5	T	21:18	X
CCV 160-138778/87	1		21:23	X
CCB 160-138778/88	1		21:28	X
680-102380-16	5	T	21:32	X
680-102380-17	5	T	21:37	X
680-102380-18	5	T	21:42	X
680-102380-20	5	T	21:46	X
680-102380-21	5	T	21:51	X
680-102380-22	5	T	21:56	X
680-102380-23	5	T	22:00	X
680-102380-24	5	T	22:05	X
MB 160-137069/1-A	2	T	22:10	X
ZZZZZZ			22:14	
CCV 160-138778/99	1		22:19	X
CCB 160-138778/100	1		22:24	X
680-102380-26	5	T	22:28	X
680-102380-26 SD	25	T	22:33	X
ZZZZZZ			22:38	
ZZZZZZ			22:42	
680-102380-27	5	T	22:47	X
680-102380-28	5	T	22:52	X
680-102380-29	5	T	22:56	X
680-102380-30	5	T	23:01	X
680-102380-31	5	T	23:06	X
680-102380-33	5	T	23:10	X
CCV 160-138778/111	1		23:15	X
CCB 160-138778/112	1		23:20	X
680-102380-34	5	T	23:24	X
680-102380-35	5	T	23:29	X
680-102380-36	5	T	23:34	X
CCV 160-138778/116	1		23:38	X
CCB 160-138778/117	1		23:43	X

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/18/2014 14:28 End Date: 08/18/2014 23:43

Lab Sample Id	D/F	Type	Time	Analytes
				U-233

Prep Types:
T = Total/NA

FORM XIII-IN

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

ICV Source: ISOU ICV(3)_00018 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	ICV 160-138778/10 08/18/2014 14:58				CCV 160-138778/63 08/18/2014 19:31				CCV 160-138778/75 08/18/2014 20:27			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.231		0.223	103	0.0537		0.0515	104	0.0543		0.0515	105

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

ICV Source: ISOU ICV(3)_00018 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	CCV 160-138778/87 08/18/2014 21:23				CCV 160-138778/99 08/18/2014 22:19				CCV 160-138778/111 08/18/2014 23:15			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.0575		0.0515	112	0.0555		0.0515	108	0.0563		0.0515	109

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

ICV Source: ISOU ICV(3)_00018 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	CCV 160-138778/116 08/18/2014 23:38											
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.0574		0.0515	111								

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2B-IN
CRQL CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Method: 6020A Instrument ID: ICPMS6100

Lab Sample ID: CRI 160-138156/92 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 1_00018

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-235	0.0485	0.0476	J	98	70-130
U-238	0.0503	0.0515		102	70-130

Lab Sample ID: CRI 160-138156/93 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 2_00019

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-234	0.0496	0.0498	J	100	70-130
U-236	0.0534	0.0536		100	70-130

Lab Sample ID: CRI 160-138778/15 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 2_00020

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-233	0.0309	0.0353	J	114	70-130

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IIB-IN

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Concentration Units: ug/L

Analyte	RL	ICB 160-138156/91 08/14/2014 19:04		CCB 160-138156/97 08/14/2014 19:32		CCB 160-138156/104 08/14/2014 20:05		CCB 160-138156/116 08/14/2014 21:01	
		Found	C	Found	C	Found	C	Found	C
U-234	0.050	ND		ND		ND		ND	
U-235	0.050	ND		ND		ND		ND	
U-236	0.050	ND		ND		ND		ND	
U-238	0.050	0.0133	J	ND		ND		ND	

Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Concentration Units: ug/L

Analyte	RL	CCB 160-138156/128 08/14/2014 21:57		CCB 160-138156/140 08/14/2014 22:53		CCB 160-138156/152 08/14/2014 23:49			
		Found	C	Found	C	Found	C	Found	C
U-234	0.050	ND		ND		ND			
U-235	0.050	ND		ND		ND			
U-236	0.050	ND		ND		ND			
U-238	0.050	ND		ND		ND			

Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Concentration Units: ug/L

Analyte	RL	ICB 160-138778/13 08/18/2014 15:12		CCB 160-138778/64 08/18/2014 19:36		CCB 160-138778/76 08/18/2014 20:32		CCB 160-138778/88 08/18/2014 21:28	
		Found	C	Found	C	Found	C	Found	C
U-233	0.050	0.0973		0.0113	J	0.0112	J	0.0111	J

Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Concentration Units: ug/L

Analyte	RL	CCB 160-138778/100 08/18/2014 22:24		CCB 160-138778/112 08/18/2014 23:20		CCB 160-138778/117 08/18/2014 23:43			
		Found	C	Found	C	Found	C	Found	C
U-233	0.050	0.0111	J	0.0113	J	0.0114	J		

Italicized analytes were not requested for this sequence.

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-137068/1-A

Instrument Code: ICPMS6100 Batch No.: 138156

CAS No.	Analyte	Concentration	C	Q	Method
13966-29-5	U-234	ND			6020A_U
15117-96-1	U-235	ND			6020A_U
13982-70-2	U-236	ND			6020A_U
7440-61-1	U-238	0.00135	J		6020A_U

FORM III-IN

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-137069/1-A

Instrument Code: ICPMS6100 Batch No.: 138156

CAS No.	Analyte	Concentration	C	Q	Method
13966-29-5	U-234	ND			6020A_U
15117-96-1	U-235	ND			6020A_U
13982-70-2	U-236	ND			6020A_U
7440-61-1	U-238	0.000480	J		6020A_U

FORM III-IN

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-137068/1-A

Instrument Code: ICPMS6100 Batch No.: 138778

CAS No.	Analyte	Concentration	C	Q	Method
13968-55-3	U-233	ND			6020A_U

FORM III-IN

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-137069/1-A

Instrument Code: ICPMS6100 Batch No.: 138778

CAS No.	Analyte	Concentration	C	Q	Method
13968-55-3	U-233	ND		^	6020A_U

FORM III-IN

4A-IN
INTERFERENCE CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Lab Sample ID: ICSAB 160-138156/95 Instrument ID: ICPMS6100

Lab File ID: 081414m1.rep ICS Source: ISOU ICSAB_00019

Concentration Units: ug/L

Analyte	True Solution AB	Found Solution AB	Percent Recovery
U-234	**0.0827**	**0.0813**	**98**
U-235	**4.85**	**4.87**	**100**
U-236	**0.0890**	**0.0867**	**97**
U-238	**5.03**	**5.05**	**100**

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IVA-IN

4A-IN
INTERFERENCE CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Lab Sample ID: ICSAB 160-138778/1 Instrument ID: ICPMS6100

Lab File ID: 081814M3.rep ICS Source: ISOU_ICSAB_00020

Concentration Units: ug/L

Analyte	True Solution AB	Found Solution AB	Percent Recovery
U-233	**0.0515**	**0.0543**	**105**

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IVA-IN

5A-IN
MATRIX SPIKE SAMPLE RECOVERY
METALS

Client ID: SD-224-SS MS
Lab ID: 680-102380-1 MS
Lab Name: TestAmerica St. Louis
Job No.: 680-102380-3
SDG No.: 680102380-1
Matrix: Solid
Concentration Units: mg/Kg
% Solids:

Analyte	SSR	C	Sample Result (SR)	C	Spike Added (SA)	%R	Control Limit %R	Q	Method
U-234	0.00769	J	ND		0.00811	95	75-125		6020A
U-235	0.467		0.016		0.475	95	75-125		6020A
U-238	2.84		2.3		0.493	106	75-125	4	6020A

SSR = Spiked Sample Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VA - IN

5A-IN
MATRIX SPIKE DUPLICATE SAMPLE RECOVERY
METALS

Client ID: SD-224-SS MSD | Lab ID: 680-102380-1 MSD

Lab Name: TestAmerica St. Louis | Job No.: 680-102380-3

SDG No.: 680102380-1

Matrix: Solid | Concentration Units: mg/Kg

% Solids:

Analyte	(SDR)	C	Spike Added (SA)	%R	Control Limit %R	RPD	RPD Limit	Q	Method
U-234	0.00703	J	0.00747	94	75-125	9	20		6020A
U-235	0.431		0.438	95	75-125	8	20		6020A
U-238	2.52		0.454	44	75-125	12	20	4	6020A

SDR = Sample Duplicate Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VD - IN

5A-IN
MATRIX SPIKE SAMPLE RECOVERY
METALS

Client ID: SD-236-SS MS
Lab ID: 680-102380-26 MS
Lab Name: TestAmerica St. Louis
Job No.: 680-102380-3
SDG No.: 680102380-1
Matrix: Solid
Concentration Units: mg/Kg
% Solids:

Analyte	SSR C		Sample Result (SR) C		Spike Added (SA)	%R	Control Limit %R	Q	Method
U-234	0.00701	J	ND		0.00726	97	75-125		6020A
U-235	0.425		ND		0.426	100	75-125		6020A
U-238	0.727		0.28		0.441	102	75-125		6020A

SSR = Spiked Sample Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VA - IN

5A-IN
MATRIX SPIKE DUPLICATE SAMPLE RECOVERY
METALS

Client ID: SD-236-SS MSD
Lab ID: 680-102380-26 MSD
Lab Name: TestAmerica St. Louis
Job No.: 680-102380-3
SDG No.: 680102380-1
Matrix: Solid
Concentration Units: mg/Kg
% Solids:

Analyte	(SDR)	C	Spike Added (SA)	%R	Control Limit %R	RPD	RPD Limit	Q	Method
U-234	0.00700	J	0.00774	90	75-125	0	20		6020A
U-235	0.426		0.454	94	75-125	0	20		6020A
U-238	0.722		0.470	95	75-125	1	20		6020A

SDR = Sample Duplicate Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VD - IN

7A-IN
LAB CONTROL SAMPLE
METALS

Lab ID: LCS 160-137068/2-A

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

Sample Matrix: Solid LCS Source: ISOU Prep Spk_00002

Analyte	Solid(mg/Kg)							
	True	Found	C	%R	Limits		Q	Method
U-234	0.00745	0.00711		95	80	120		6020A
U-235	0.437	0.427		98	80	120		6020A
U-238	0.453	0.438		97	80	120		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

7A-IN
LAB CONTROL SAMPLE
METALS

Lab ID: LCS 160-137069/2-A

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

Sample Matrix: Solid LCS Source: ISOU Prep Spk_00002

Analyte	Solid(mg/Kg)							
	True	Found	C	%R	Limits		Q	Method
U-234	0.00816	0.00857		105	80	120		6020A
U-235	0.478	0.518		108	80	120		6020A
U-238	0.496	0.534		108	80	120		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

8-IN
ICP-AES AND ICP-MS SERIAL DILUTIONS
METALS

Lab ID: 680-102380-1

SDG No: 680102380-1

Lab Name: TestAmerica St. Louis Job No: 680-102380-3

Matrix: Solid Concentration Units: mg/Kg

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Method
U-233	ND		ND		NC		6020A
U-234	ND		ND		NC		6020A
U-235	0.016		ND		NC		6020A
U-236	ND		ND		NC		6020A
U-238	2.3		2.26		2.5		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIII-IN

8-IN
ICP-AES AND ICP-MS SERIAL DILUTIONS
METALS

Lab ID: 680-102380-26

SDG No: 680102380-1

Lab Name: TestAmerica St. Louis Job No: 680-102380-3

Matrix: Solid Concentration Units: mg/Kg

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Method
U-233	ND		ND		NC		6020A
U-234	ND		ND		NC		6020A
U-235	ND		ND		NC		6020A
U-236	ND		ND		NC		6020A
U-238	0.28		0.274		0.82		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIII-IN

9-IN
DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102380-3

SDG Number: 680102380-1

Matrix: Solid Instrument ID: ICPMS6100

Method: 6020A MDL Date: 08/05/2013 10:01

Prep Method: 3050B

Analyte	Wavelength/ Mass	RL (mg/Kg)	MDL (mg/Kg)
U-233	233	0.005	0.0015
U-234	234	0.005	0.0003
U-235	235	0.005	0.00203
U-236	236	0.005	0.0004
U-238	238	0.005	0.0003

9-IN
CALIBRATION BLANK DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102380-3

SDG Number: 680102380-1

Matrix: Solid Instrument ID: ICPMS6100

Method: 6020A XMDL Date: 07/18/2014 15:08

Analyte	Wavelength/ Mass	XRL (ug/L)	XMDL (ug/L)
U-233	233	0.05	0.0066
U-234	234	0.05	0.0021
U-235	235	0.05	0.0034
U-236	236	0.05	0.0015
U-238	238	0.05	0.0082

9-IN
DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102380-3

SDG Number: 680102380-1

Matrix: Solid Instrument ID: NOEQUIP

Method: 6020A MDL Date: 06/12/2013 14:02

Analyte	Wavelength/ Mass	RL (mg/Kg)	MDL (mg/Kg)
Total Uranium		0.005	0.0003

11-IN
LINEAR RANGES
METALS

Lab Name: TestAmerica St. Louis Job No: 680-102380-3

SDG No.: 680102380-1

Instrument ID: ICPMS6100 Date: 02/14/2012 11:04

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	Method
U-233		2000	6020A
U-234		2000	6020A
U-235		2000	6020A
U-236		2000	6020A
U-238		2000	6020A

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Instrument ID: NOEQUIP Analysis Method: 6020A

Start Date: 08/11/2014 11:25 End Date: 08/11/2014 11:25

Lab Sample Id	D/F	Type	Time	Analytes
				U
ZZZZZZ			11:25	
ZZZZZZ			11:25	
680-102380-1	1	T	11:25	X
ZZZZZZ			11:25	
ZZZZZZ			11:25	
680-102380-2	1	T	11:25	X
680-102380-3	1	T	11:25	X
680-102380-5	1	T	11:25	X
680-102380-6	1	T	11:25	X
680-102380-7	1	T	11:25	X
680-102380-8	1	T	11:25	X
680-102380-9	1	T	11:25	X
680-102380-10	1	T	11:25	X
680-102380-12	1	T	11:25	X
680-102380-13	1	T	11:25	X
680-102380-14	1	T	11:25	X
680-102380-16	1	T	11:25	X
680-102380-17	1	T	11:25	X
680-102380-18	1	T	11:25	X
680-102380-20	1	T	11:25	X
680-102380-21	1	T	11:25	X
680-102380-22	1	T	11:25	X
680-102380-23	1	T	11:25	X
680-102380-24	1	T	11:25	X

Prep Types:
T = Total/NA

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Instrument ID: NOEQUIP Analysis Method: 6020A

Start Date: 08/19/2014 13:51 End Date: 08/19/2014 13:51

Lab Sample Id	D/F	Type	Time	Analytes																										
				U																										
680-102380-26	1	T	13:51	X																										
680-102380-27	1	T	13:51	X																										
680-102380-28	1	T	13:51	X																										
680-102380-29	1	T	13:51	X																										
680-102380-30	1	T	13:51	X																										
680-102380-31	1	T	13:51	X																										
680-102380-33	1	T	13:51	X																										
680-102380-34	1	T	13:51	X																										
680-102380-35	1	T	13:51	X																										
680-102380-36	1	T	13:51	X																										

Prep Types:
T = Total/NA

FORM XIII-IN

15-IN
ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

ICP-MS Instrument ID: ICPMS6100 Start Date: 08/14/2014 End Date: 08/14/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
IC 160-138156/83	18:27										
IC 160-138156/84	18:31										
IC 160-138156/85	18:36										
IC 160-138156/86	18:41										
IC 160-138156/87	18:45										
ICV 160-138156/89	18:55	101									
ICV 160-138156/90	18:59	102									
ICB 160-138156/91	19:04	101									
CRI 160-138156/92	19:09	102									
CRI 160-138156/93	19:13	102									
ICSA 160-138156/94	19:18	98									
ICSAB 160-138156/95	19:23	98									
CCV 160-138156/96	19:27	106									
CCB 160-138156/97	19:32	106									
MB 160-137068/1-A	19:46	109									
LCS 160-137068/2-A	19:51	108									
680-102380-1	19:55	98									
CCV 160-138156/103	20:00	106									
CCB 160-138156/104	20:05	106									
680-102380-1 SD	20:09	103									
680-102380-1 MS	20:14	98									
680-102380-1 MSD	20:19	98									
680-102380-2	20:23	99									
680-102380-3	20:28	93									
680-102380-5	20:33	96									
680-102380-6	20:37	99									
680-102380-7	20:42	114									
680-102380-8	20:47	97									
680-102380-9	20:51	99									
CCV 160-138156/115	20:56	100									
CCB 160-138156/116	21:01	100									
680-102380-10	21:05	99									
680-102380-12	21:10	98									
680-102380-13	21:15	95									
680-102380-14	21:19	93									
680-102380-16	21:24	96									
680-102380-17	21:29	98									
680-102380-18	21:33	93									
680-102380-20	21:38	95									
680-102380-21	21:43	103									
680-102380-22	21:48	93									
CCV 160-138156/127	21:52	101									

15-IN
ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

ICP-MS Instrument ID: ICPMS6100 Start Date: 08/14/2014 End Date: 08/14/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
CCB 160-138156/128	21:57	99									
680-102380-23	22:02	96									
680-102380-24	22:06	96									
MB 160-137069/1-A	22:11	103									
LCS 160-137069/2-A	22:16	101									
680-102380-26	22:20	100									
680-102380-26 SD	22:25	98									
680-102380-26 MS	22:30	98									
680-102380-26 MSD	22:34	101									
680-102380-27	22:39	101									
680-102380-28	22:44	106									
CCV 160-138156/139	22:48	100									
CCB 160-138156/140	22:53	99									
680-102380-29	22:58	95									
680-102380-30	23:02	97									
680-102380-31	23:07	96									
680-102380-33	23:12	94									
680-102380-34	23:16	94									
680-102380-35	23:21	96									
680-102380-36	23:26	98									
CCV 160-138156/151	23:44	99									
CCB 160-138156/152	23:49	111									

15-IN
ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

ICP-MS Instrument ID: ICPMS6100 Start Date: 08/18/2014 End Date: 08/18/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
IC 160-138778/5	14:35										
IC 160-138778/6	14:40										
IC 160-138778/7	14:44										
IC 160-138778/8	14:49										
IC 160-138778/9	14:54										
ICV 160-138778/10	14:58	100									
ICB 160-138778/13	15:12	99									
CRI 160-138778/15	15:22	99									
ICSA 160-138778/16	15:26	95									
ICSAB 160-138778/1	15:31	94									
CCV 160-138778/63	19:31	96									
CCB 160-138778/64	19:36	92									
MB 160-137068/1-A	19:54	95									
680-102380-1	20:04	91									
680-102380-1 SD	20:08	93									
680-102380-2	20:22	90									
CCV 160-138778/75	20:27	94									
CCB 160-138778/76	20:32	93									
680-102380-3	20:36	89									
680-102380-5	20:41	89									
680-102380-6	20:46	91									
680-102380-7	20:50	102									
680-102380-8	20:55	89									
680-102380-9	21:00	91									
680-102380-10	21:04	92									
680-102380-12	21:09	91									
680-102380-13	21:14	90									
680-102380-14	21:18	90									
CCV 160-138778/87	21:23	92									
CCB 160-138778/88	21:28	93									
680-102380-16	21:32	90									
680-102380-17	21:37	90									
680-102380-18	21:42	89									
680-102380-20	21:46	89									
680-102380-21	21:51	96									
680-102380-22	21:56	88									
680-102380-23	22:00	91									
680-102380-24	22:05	91									
MB 160-137069/1-A	22:10	93									
CCV 160-138778/99	22:19	94									
CCB 160-138778/100	22:24	94									
680-102380-26	22:28	94									

FORM XV - IN

15-IN
ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

ICP-MS Instrument ID: ICPMS6100 Start Date: 08/18/2014 End Date: 08/18/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
680-102380-26 SD	22:33	93									
680-102380-27	22:47	98									
680-102380-28	22:52	99									
680-102380-29	22:56	91									
680-102380-30	23:01	94									
680-102380-31	23:06	92									
680-102380-33	23:10	90									
CCV 160-138778/111	23:15	94									
CCB 160-138778/112	23:20	94									
680-102380-34	23:24	89									
680-102380-35	23:29	90									
680-102380-36	23:34	93									
CCV 160-138778/116	23:38	94									
CCB 160-138778/117	23:43	95									

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Sediments

Report Number: 680-102380-4

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 06/14/2014; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 1.8 C.

METALS BY ICPMS

Sample SD-228-01 (680-102380-17) was analyzed for Metals by ICPMS in accordance with EPA SW-846 6020A. The samples were prepared on 09/12/2014 and analyzed on 09/17/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102380-4
SDG: 680102380-1

Method	Method Description	Protocol	Laboratory
6020A	Metals (ICP/MS), Tc-99	SW846	TAL SL

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

12-IN
PREPARATION LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-4

SDG No.: 680102380-1

Prep Method: None

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight (g)	Initial Volume	Final Volume (mL)
MB 160-143794/1-A	09/12/2014 13:53	143794	5.1140		50
LCS 160-143794/2-A	09/12/2014 13:53	143794	5.0344		50
680-102380-17	09/12/2014 13:53	143794	5.0278		50

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-4

SDG No.: 680102380-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/17/2014 06:36 End Date: 09/17/2014 17:40

| Lab Sample Id | D/F | Type | Time | Analytes | | |

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-4

SDG No.: 680102380-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/17/2014 06:36 End Date: 09/17/2014 17:40

Lab Sample Id	D/F	Type	Time	Analytes																												
				Re	Tc-99																											
ZZZZZZ			09:07																													
ZZZZZZ			09:11																													
ZZZZZZ			09:15																													
ZZZZZZ			09:19																													
CCV 160-144626/44			09:23																													
CCB 160-144626/45			09:27																													
ZZZZZZ			09:30																													
ZZZZZZ			09:34																													
ZZZZZZ			09:38																													
ZZZZZZ			09:42																													
ZZZZZZ			09:46																													
ZZZZZZ			09:50																													
ZZZZZZ			09:54																													
ZZZZZZ			09:58																													
ZZZZZZ			10:01																													
ZZZZZZ			10:05																													
CCV 160-144626/56			10:09																													
CCB 160-144626/57			10:13																													
ZZZZZZ			10:17																													
ZZZZZZ			10:21																													
ZZZZZZ			10:25																													
ZZZZZZ			10:28																													
ZZZZZZ			10:32																													
ZZZZZZ			10:36																													
ZZZZZZ			10:40																													
ZZZZZZ			10:44																													
ZZZZZZ			10:48																													
ZZZZZZ			10:52																													
CCV 160-144626/68			10:56																													
CCB 160-144626/69			10:59																													
ZZZZZZ			11:03																													
ZZZZZZ			11:07																													
ZZZZZZ			11:11																													
ZZZZZZ			11:15																													
ZZZZZZ			11:19																													
ZZZZZZ			11:23																													
ZZZZZZ			11:27																													
ZZZZZZ			11:30																													
ZZZZZZ			11:34																													

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-4

SDG No.: 680102380-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/17/2014 06:36 End Date: 09/17/2014 17:40

| Lab Sample Id | D/F | Type | Time | Analytes | | |

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-4

SDG No.: 680102380-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/17/2014 06:36 End Date: 09/17/2014 17:40

Lab Sample Id	D/F	Type	Time	Analytes																													
				Re	Tc-99																												
ZZZZZZ			14:10																														
ZZZZZZ			14:14																														
ZZZZZZ			14:18																														
ZZZZZZ			14:22																														
ZZZZZZ			14:26																														
ZZZZZZ			14:30																														
ZZZZZZ			14:33																														
ZZZZZZ			14:37																														
ZZZZZZ			14:41																														
ZZZZZZ			14:45																														
CCV 160-144626/128	1		14:49	X	X																												
CCB 160-144626/129	1		14:53	X	X																												
ZZZZZZ			14:57																														
ZZZZZZ			15:01																														
ZZZZZZ			15:04																														
ZZZZZZ			15:08																														
ZZZZZZ			15:12																														
MB 160-143794/1-A	1	T	15:16	X	X																												
LCS 160-143794/2-A	1	T	15:20	X	X																												
ZZZZZZ			15:24																														
ZZZZZZ			15:28																														
ZZZZZZ			15:32																														
CCV 160-144626/140	1		15:35	X	X																												
CCB 160-144626/141	1		15:39	X	X																												
680-102380-17	1	T	15:43	X	X																												
ZZZZZZ			15:47																														
ZZZZZZ			15:51																														
ZZZZZZ			15:55																														
ZZZZZZ			15:59																														
ZZZZZZ			16:03																														
ZZZZZZ			16:06																														
ZZZZZZ			16:10																														
ZZZZZZ			16:14																														
ZZZZZZ			16:18																														
CCV 160-144626/152	1		16:22	X	X																												
CCB 160-144626/153	1		16:26	X	X																												
ZZZZZZ			16:30																														
ZZZZZZ			16:34																														
ZZZZZZ			16:37																														

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-4

SDG No.: 680102380-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/17/2014 06:36 End Date: 09/17/2014 17:40

Lab Sample Id	D/F	Type	Time	Analytes																																
				Re	Tc-99																																	
ZZZZZZ			16:41																																			
ZZZZZZ			16:45																																			
ZZZZZZ			16:49																																			
ZZZZZZ			16:53																																			
ZZZZZZ			16:57																																			
ZZZZZZ			17:01																																			
ZZZZZZ			17:05																																			
CCV 160-144626/164			17:08																																			
CCB 160-144626/165			17:12																																			
ZZZZZZ			17:16																																			
ZZZZZZ			17:20																																			
ZZZZZZ			17:24																																			
ZZZZZZ			17:28																																			
ZZZZZZ			17:32																																			
CCV 160-144626/171			17:36																																			
CCB 160-144626/172			17:40																																			

Prep Types:
T = Total/NA

FORM XIII-IN

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-4

SDG No.: 680102380-1

ICV Source: TC99 ICV_00082 Concentration Units: ug/L

CCV Source: TC99 CAL2/CCV_00040

Analyte	ICV 160-144626/5 09/17/2014 06:52				CCV 160-144626/128 09/17/2014 14:49				CCV 160-144626/140 09/17/2014 15:35			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
Re	500		500	100	536		500	107	534		500	107
Tc-99	0.283		0.292	97	0.280		0.307	91	0.283		0.307	92

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-4

SDG No.: 680102380-1

ICV Source: TC99 ICV_00082 Concentration Units: ug/L

CCV Source: TC99 CAL2/CCV_00040

Analyte	CCV 160-144626/152 09/17/2014 16:22											
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
Re	516		500	103								
Tc-99	0.284		0.307	92								

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2B-IN
CRQL CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-4

SDG No.: 680102380-1

Method: 6020A Instrument ID: ICPMS6100

Lab Sample ID: CRI 160-144626/7 Concentration Units: ug/L

CRQL Check Standard Source: TC99 CAL1/LLC_00043

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
Tc-99	0.00492	0.00424	J	86	70-130
Re	100	112		112	30-110

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IIB-IN

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-4

SDG No.: 680102380-1

Concentration Units: ug/L

Analyte	RL	ICB 160-144626/6 09/17/2014 06:55		CCB 160-144626/129 09/17/2014 14:53		CCB 160-144626/141 09/17/2014 15:39		CCB 160-144626/153 09/17/2014 16:26	
		Found	C	Found	C	Found	C	Found	C
Re		0.142		0.788		0.809		0.555	
Tc-99	0.0050	ND		ND		ND		ND	

Italicized analytes were not requested for this sequence.

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-4

SDG No.: 680102380-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-143794/1-A

Instrument Code: ICPMS6100 Batch No.: 144626

CAS No.	Analyte	Concentration	C	Q	Method
14133-76-7	Tc-99	ND			6020A_TC99
7440-15-5	Re	4.89			6020A_TC99

FORM III-IN

7A-IN
LAB CONTROL SAMPLE
METALS

Lab ID: LCS 160-143794/2-A

Lab Name: TestAmerica St. Louis Job No.: 680-102380-4

Sample Matrix: Solid LCS Source: TC99-PREP_00004

Analyte	Solid(mg/Kg)							
	True	Found	C	%R	Limits		Q	Method
Tc-99	0.00238	0.00240		101	80	120		6020A
Re	4.97	5.00		101	30	110		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

15-IN

ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY

METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-4

SDG No.: 680102380-1

ICP-MS Instrument ID: ICPMS6100 Start Date: 09/17/2014 End Date: 09/17/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element In-115	Q	Element	Q	Element	Q	Element	Q	Element	Q
ICIS 160-144626/1	06:36										
IC 160-144626/2	06:40										
IC 160-144626/3	06:44										
IC 160-144626/4	06:48										
ICV 160-144626/5	06:52	102									
ICB 160-144626/6	06:55	102									
CRI 160-144626/7	06:59	102									
CCV 160-144626/128	14:49	96									
CCB 160-144626/129	14:53	95									
MB 160-143794/1-A	15:16	111									
LCS 160-143794/2-A	15:20	108									
CCV 160-144626/140	15:35	92									
CCB 160-144626/141	15:39	91									
680-102380-17	15:43	109									
CCV 160-144626/152	16:22	92									
CCB 160-144626/153	16:26	92									

9-IN
DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102380-4

SDG Number: 680102380-1

Matrix: Solid Instrument ID: ICPMS6100

Method: 6020A MDL Date: 08/07/2012 16:02

Prep Method: None

Analyte	Wavelength/ Mass	RL (mg/Kg)	MDL (mg/Kg)
Re			
Tc-99	99	0.00005	0.000015

9-IN
CALIBRATION BLANK DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102380-4

SDG Number: 680102380-1

Matrix: Solid Instrument ID: ICPMS6100

Method: 6020A XMDL Date: 08/24/2012 17:05

Analyte	Wavelength/ Mass	XRL (ug/L)	XMDL (ug/L)
Re			
Tc-99	99	0.005	0.001

FORM IX - IN

11-IN
LINEAR RANGES
METALS

Lab Name: TestAmerica St. Louis Job No: 680-102380-4

SDG No.: 680102380-1

Instrument ID: ICPMS6100 Date: 02/14/2012 11:04

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	Method
Tc-99		2000	6020A
Re		2000	6020A

TETRATECH INTERNAL CORRESPONDENCE

TO: **M. MARTIN** **DATE: OCTOBER 14, 2014**

FROM: **A. COGNETTI** **COPIES: DV FILE**

SUBJECT: **DATA VALIDATION: RADIOLOGICAL ANALYSES ISOTOPIC THORIUM/METALS-URANIUM**
MRC SEDIMENT INVESTIGATION
SAMPLE DELIVERY GROUPS (SDGs) – 680-102431-1 and 680-102431-3

SAMPLE: 14/Sediment/Rad

SD-229-01	SD-229-SS	SD-230-01	SD-230-02	SD-230-SS	SD-231-01
SD-231-02	SD-231-SS	SD-232-01	SD-232-02	SD-232-SS	SD-233-01
SD-233-02	SD-233-SS				

Overview

The sample set for MRC Sediment Investigation, SDG 680-102431-1 consists of fourteen (14) sediment environmental samples analyzed for isotopic thorium and uranium. There is no field duplicate pair associated with this SDG.

The samples were collected by Tetra Tech on June 16, 2014 and were analyzed by Test America. All analyses were conducted using Method A-01-R and SW-846 Method 6020A.

The data contained in this SDG was validated with regard to the following parameters: data completeness, holding times, initial/continuing calibration, laboratory method blanks, blank spike recoveries, matrix spike/ matrix spike duplicate recoveries, tracer yield and detection limits.

Notes

Samples SD-230-03, SD-231-03, SD-232-03 and SD-233-03 are listed on the chain of custody for analyses. The sample results are not included in this SDG.

The matrix spike duplicate (MSD) percent recovery (%R) of thorium-230 (116%) was marginally greater than the 115% quality control limit in spiked sample SD-230-02.The MS %R was within quality control limits. No action was taken.

Contamination was detected in the initial calibration and continuing calibrations analyzed on September 2, 2014.

Contaminant	Maximum Concentration (ug/L)	Action Level (mg/kg)
Uranium-233	0.0345	0.00292
Uranium-238	0.00507	0.00043

An action level of 5X the maximum concentration was established in order to evaluate samples for blank contamination. Sample aliquot, percent solids and dilution factors were taken into account when applying the action level.

The MSD %R of Uranium-238 was less than the lower quality control limit and the relative percent difference (RPD) exceeded quality control limits in spiked sample SD-230-02. No action was taken on the Uranium-238 result. The RPDs for Uranium-234 and Uranium-235 also exceeded quality control limits. The MS/MSD %Rs of Uranium-234 and Uranium-235 were within quality control limits. No action was taken. The laboratory control sample (LCS) %Rs of these analytes were within quality control limits.

Uranium isotopes were determined via method 6020A. Isotopic uranium results reported via method 6020A and expressed in mg/kg units were converted to activity units, pCi/g, by the laboratory using isotope specific theoretical activities.

Nondetected results reported for uranium isotopes determined via method 6020A were reported at limits below the Minimum Detectable Concentration (MDC) by the laboratory. The manner in which the nondetected radioisotopes were reported was based upon the common practice of reporting radiological parameters at the concentration determined by the instrument. Therefore, metals raw instrument results expressed in ug/L were then converted to pCi/g and reported as nondetects below the MDC.

The uncertainty for the sample results are reported at 2 standard deviations (95% confidence level). The EDD does not contain the uncertainty result.

EXECUTIVE SUMMARY

Laboratory Performance Issues: None.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the Methods A-01-R, SW-846 6020A and EPA Functional Guidelines for Inorganic Data Validation (January 2010). The text of this report has been formulated to address only those problem areas affecting data quality.

Ann Cognetti

Tetra Tech
Ann Cognetti
Chemist/Data Validator

Tetra Tech
Joseph A. Samchuck
Data Validation Manager

Attachments:
1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as Reported by the Laboratory
3. Appendix C - Support Documentation

APPENDIX A

QUALIFIED LABORATORY RESULTS

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = ICP PDS Recovery Noncompliance; MSA's $r < 0.995$
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = RPD between columns/detectors >40% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient $r < 0.995$
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 standard deviations is greater than sample activity
Z1 = Tentatively Identified Compound considered presumptively present
Z2 = Tentatively Identified Compound column bleed
Z3 = Tentatively Identified Compound aldol condensate

PROJ_NO: 05220	NSAMPLE	SD-229-01			SD-229-SS			SD-230-01			SD-230-02		
SDG: 680-102431-1	LAB_ID	680-102431-2			680-102431-1			680-102431-4			680-102431-5		
FRACTION: RAD	SAMP_DATE	6/16/2014			6/16/2014			6/16/2014			6/16/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
THORIUM-228		0.964			0.842			0.535			0.733		
THORIUM-230		0.683			1.02			0.706			0.673		
THORIUM-232		1.04			0.837			0.522			0.583		

PROJ_NO: 05220	NSAMPLE	SD-230-SS			SD-231-01			SD-231-02			SD-231-SS		
SDG: 680-102431-1	LAB_ID	680-102431-3			680-102431-8			680-102431-9			680-102431-7		
FRACTION: RAD	SAMP_DATE	6/16/2014			6/16/2014			6/16/2014			6/16/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
THORIUM-228		0.547			0.931			0.878			0.639		
THORIUM-230		0.638			1.23			0.889			0.857		
THORIUM-232		0.57			1.19			1.06			0.774		

PROJ_NO: 05220	NSAMPLE	SD-232-01			SD-232-02			SD-232-SS			SD-233-01		
SDG: 680-102431-1	LAB_ID	680-102431-12			680-102431-13			680-102431-11			680-102431-16		
FRACTION: RAD	SAMP_DATE	6/16/2014			6/16/2014			6/16/2014			6/16/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
THORIUM-228		1.38			1.2			1.21			0.967		
THORIUM-230		1.22			1.21			1.3			0.971		
THORIUM-232		1.37			1.11			1.21			1.38		

PROJ_NO: 05220	NSAMPLE	SD-233-02			SD-233-SS		
SDG: 680-102431-1	LAB_ID	680-102431-17			680-102431-15		
FRACTION: RAD	SAMP_DATE	6/16/2014			6/16/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM		
	UNITS	PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0		
	DUP_OF						
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
THORIUM-228		1.19			1.06		
THORIUM-230		1.11			1.06		
THORIUM-232		1.25			1.24		

PROJ_NO: 05220	NSAMPLE	SD-229-01						SD-229-SS					
SDG: 680-102431-3	LAB_ID	680-102431-2						680-102431-1					
FRACTION: M	SAMP_DATE	6/16/2014						6/16/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					0.89						0.72		
URANIUM-233					0.0035	U					0.0032	U	
URANIUM-234					0.00069	U					0.00063	U	
URANIUM-235					0.0063	J	P				0.005	J	P
URANIUM-235 (PERCENT)		0.711						0.699					
URANIUM-236					0.00093	U					0.00084	U	
URANIUM-238					0.88						0.71		

PROJ_NO: 05220	NSAMPLE	SD-230-01						SD-230-02					
SDG: 680-102431-3	LAB_ID	680-102431-4						680-102431-5					
FRACTION: M	SAMP_DATE	6/16/2014						6/16/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					0.74						1		
URANIUM-233					0.0037	U					0.0037	U	
URANIUM-234					0.00074	U					0.00074	U	
URANIUM-235					0.0053	J	P				0.0074	J	P
URANIUM-235 (PERCENT)		0.721						0.735					
URANIUM-236					0.00099	U					0.00098	U	
URANIUM-238					0.73						1		

PROJ_NO: 05220	NSAMPLE	SD-230-SS						SD-231-01					
SDG: 680-102431-3	LAB_ID	680-102431-3						680-102431-8					
FRACTION: M	SAMP_DATE	6/16/2014						6/16/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					0.77						1.8		
URANIUM-233					0.0036	U					0.0033	U	
URANIUM-234					0.00072	U					0.00065	U	
URANIUM-235					0.0054	J	P				0.014		
URANIUM-235 (PERCENT)		0.706						0.772					
URANIUM-236					0.00096	U					0.00087	U	
URANIUM-238					0.76						1.8		

PROJ_NO: 05220	NSAMPLE	SD-231-02						SD-231-SS					
SDG: 680-102431-3	LAB_ID	680-102431-9						680-102431-7					
FRACTION: M	SAMP_DATE	6/16/2014						6/16/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					1.6						1.5		
URANIUM-233					0.0036	U					0.0034	U	
URANIUM-234					0.00073	U					0.00068	U	
URANIUM-235					0.013						0.011		
URANIUM-235 (PERCENT)		0.806						0.728					
URANIUM-236					0.00097	U					0.00091	U	
URANIUM-238					1.6						1.5		

PROJ_NO: 05220	NSAMPLE	SD-232-01						SD-232-02					
SDG: 680-102431-3	LAB_ID	680-102431-12						680-102431-13					
FRACTION: M	SAMP_DATE	6/16/2014						6/16/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					2.1						1.4		
URANIUM-233					0.0036	U					0.0037	U	
URANIUM-234					0.00072	U					0.00073	U	
URANIUM-235					0.015						0.01	J	P
URANIUM-235 (PERCENT)		0.709						0.709					
URANIUM-236					0.00095	U					0.00098	U	
URANIUM-238					2.1						1.4		

PROJ_NO: 05220	NSAMPLE	SD-232-SS						SD-233-01					
SDG: 680-102431-3	LAB_ID	680-102431-11						680-102431-16					
FRACTION: M	SAMP_DATE	6/16/2014						6/16/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					1.9						2		
URANIUM-233					0.0034	U					0.0035	U	
URANIUM-234					0.00067	U					0.00071	U	
URANIUM-235					0.014						0.015		
URANIUM-235 (PERCENT)		0.731						0.744					
URANIUM-236					0.0009	U					0.00094	U	
URANIUM-238					1.9						2		

PROJ_NO: 05220	NSAMPLE	SD-233-02						SD-233-SS					
SDG: 680-102431-3	LAB_ID	680-102431-17						680-102431-15					
FRACTION: M	SAMP_DATE	6/16/2014						6/16/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					1.6						2		
URANIUM-233					0.0034	U					0.0034	U	
URANIUM-234					0.00069	U					0.00069	U	
URANIUM-235					0.013						0.015		
URANIUM-235 (PERCENT)		0.806						0.744					
URANIUM-236					0.00092	U					0.00092	U	
URANIUM-238					1.6						2		

PROJ_NO: 05220	NSAMPLE	SD-229-01			SD-229-SS			SD-230-01			SD-230-02		
SDG: 680-102431-3	LAB_ID	680-102431-2			680-102431-1			680-102431-4			680-102431-5		
FRACTION: RAD	SAMP_DATE	6/16/2014			6/16/2014			6/16/2014			6/16/2014		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
URANIUM-233		-21.7	U		-19.7	U		-23.3	U		-23.3	U	
URANIUM-234		0.435	U		0.179	U		0.37	U		0.473	U	
URANIUM-235		0.0137			0.0107			0.0114			0.016		
URANIUM-236		-0.00123	U		-0.00142	U		-0.0007	U		-0.00165	U	
URANIUM-238		0.296			0.237			0.246			0.336		

PROJ_NO: 05220	NSAMPLE	SD-230-SS			SD-231-01			SD-231-02			SD-231-SS		
SDG: 680-102431-3	LAB_ID	680-102431-3			680-102431-8			680-102431-9			680-102431-7		
FRACTION: RAD	SAMP_DATE	6/16/2014			6/16/2014			6/16/2014			6/16/2014		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
URANIUM-233		-22.8	U		-20.4	U		-22.7	U		-21.5	U	
URANIUM-234		0.261	U		0.702	U		0.878	U		0.69	U	
URANIUM-235		0.0116			0.0296			0.0284			0.0238		
URANIUM-236		-0.00125	U		-0.00121	U		-0.00065	U		-0.00076	U	
URANIUM-238		0.255			0.595			0.55			0.512		

PROJ_NO: 05220	NSAMPLE	SD-232-01			SD-232-02			SD-232-SS			SD-233-01		
SDG: 680-102431-3	LAB_ID	680-102431-12			680-102431-13			680-102431-11			680-102431-16		
FRACTION: RAD	SAMP_DATE	6/16/2014			6/16/2014			6/16/2014			6/16/2014		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
URANIUM-233		-22.1	U		-22.6	U		-21.2	U		-21.9	U	
URANIUM-234		0.938	U		0.629	U		0.833	U		0.917	U	
URANIUM-235		0.0331			0.0217			0.0293			0.0319		
URANIUM-236		-0.0016	U		-0.00101	U		-0.0011	U		-0.00054	U	
URANIUM-238		0.696			0.456			0.624			0.67		

PROJ_NO: 05220	NSAMPLE	SD-233-02			SD-233-SS		
SDG: 680-102431-3	LAB_ID	680-102431-17			680-102431-15		
FRACTION: RAD	SAMP_DATE	6/16/2014			6/16/2014		
MEDIA: SOIL	QC_TYPE	NM			NM		
	UNITS	PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0		
	DUP_OF						
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
URANIUM-233		-21.3	U		-21.4	U	
URANIUM-234		0.671	U		0.918	U	
URANIUM-235		0.0283			0.0319		
URANIUM-236		-0.00068	U		-0.00133	U	
URANIUM-238		0.538			0.671		

APPENDIX B

RESULTS AS REPORTED BY THE LABORATORY

Client Sample ID: SD-229-SS

Lab Sample ID: 680-102431-1
Matrix: Solid

Date Collected: 06/16/14 12:05
Date Received: 06/17/14 09:20

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.842		0.204	0.216	1.00	0.0895	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-230	1.02		0.225	0.241	1.00	0.0896	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-232	0.837		0.202	0.214	1.00	0.0686	pCi/g	06/24/14 15:13	07/02/14 18:11	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*78.3*		*30 - 110*	*06/24/14 15:13*	*07/02/14 18:11*	*1*

Client Sample ID: SD-229-01

Lab Sample ID: 680-102431-2
Matrix: Solid

Date Collected: 06/16/14 12:10
Date Received: 06/17/14 09:20

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.964		0.212	0.227	1.00	0.103	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-230	0.683		0.177	0.186	1.00	0.0763	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-232	1.04		0.215	0.232	1.00	0.0542	pCi/g	06/24/14 15:13	07/02/14 18:11	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*86.1*		*30 - 110*	*06/24/14 15:13*	*07/02/14 18:11*	*1*

Client Sample ID: SD-230-SS

Lab Sample ID: 680-102431-3
Matrix: Solid

Date Collected: 06/16/14 13:40
Date Received: 06/17/14 09:20

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.547		0.156	0.163	1.00	0.0766	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-230	0.638		0.167	0.176	1.00	0.0698	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-232	0.570		0.158	0.165	1.00	0.0695	pCi/g	06/24/14 15:13	07/02/14 18:11	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*86.5*		*30 - 110*	*06/24/14 15:13*	*07/02/14 18:11*	*1*

Client Sample ID: SD-230-01

Lab Sample ID: 680-102431-4
Matrix: Solid

Date Collected: 06/16/14 13:45
Date Received: 06/17/14 09:20

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.535		0.153	0.159	1.00	0.0751	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-230	0.706		0.173	0.183	1.00	0.0481	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-232	0.522		0.149	0.155	1.00	0.0546	pCi/g	06/24/14 15:13	07/02/14 18:11	1

Client Sample ID: SD-230-01

Lab Sample ID: 680-102431-4
Matrix: Solid

Date Collected: 06/16/14 13:45
Date Received: 06/17/14 09:20

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	90.7		30 - 110	06/24/14 15:13	07/02/14 18:11	1

Client Sample ID: SD-230-02

Lab Sample ID: 680-102431-5
Matrix: Solid

Date Collected: 06/16/14 13:50
Date Received: 06/17/14 09:20

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.733		0.183	0.193	1.00	0.0983	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-230	0.673		0.172	0.181	1.00	0.0567	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-232	0.583		0.160	0.168	1.00	0.0663	pCi/g	06/24/14 15:13	07/02/14 18:11	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	85.9		30 - 110	06/24/14 15:13	07/02/14 18:11	1

Client Sample ID: SD-231-SS

Lab Sample ID: 680-102431-7
Matrix: Solid

Date Collected: 06/16/14 14:10
Date Received: 06/17/14 09:20

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.639		0.166	0.174	1.00	0.0903	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-230	0.857		0.188	0.201	1.00	0.0470	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-232	0.774		0.178	0.190	1.00	0.0465	pCi/g	06/24/14 15:13	07/02/14 18:11	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	92.5		30 - 110	06/24/14 15:13	07/02/14 18:11	1

Client Sample ID: SD-231-01

Lab Sample ID: 680-102431-8
Matrix: Solid

Date Collected: 06/16/14 14:15
Date Received: 06/17/14 09:20

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.931		0.211	0.225	1.00	0.0830	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-230	1.23		0.241	0.262	1.00	0.0607	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-232	1.19		0.235	0.255	1.00	0.0349	pCi/g	06/24/14 15:13	07/02/14 18:11	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	81.6		30 - 110	06/24/14 15:13	07/02/14 18:11	1

Client Sample ID: SD-231-02

Lab Sample ID: 680-102431-9

Date Collected: 06/16/14 14:20
Date Received: 06/17/14 09:20

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.878		0.199	0.212	1.00	0.106	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-230	0.889		0.196	0.210	1.00	0.0725	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-232	1.06		0.212	0.230	1.00	0.0430	pCi/g	06/24/14 15:13	07/02/14 18:11	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*92.5*		*30 - 110*	*06/24/14 15:13*	*07/02/14 18:11*	*1*

Client Sample ID: SD-232-SS

Lab Sample ID: 680-102431-11

Date Collected: 06/16/14 15:20
Date Received: 06/17/14 09:20

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.21		0.238	0.258	1.00	0.0904	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-230	1.30		0.244	0.267	1.00	0.0650	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-232	1.21		0.235	0.256	1.00	0.0517	pCi/g	06/24/14 15:13	07/02/14 18:11	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*79.3*		*30 - 110*	*06/24/14 15:13*	*07/02/14 18:11*	*1*

Client Sample ID: SD-232-01

Lab Sample ID: 680-102431-12

Date Collected: 06/16/14 15:25
Date Received: 06/17/14 09:20

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.38		0.260	0.284	1.00	0.121	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-230	1.22		0.240	0.261	1.00	0.0612	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-232	1.37		0.253	0.278	1.00	0.0609	pCi/g	06/24/14 15:13	07/02/14 18:11	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*78.9*		*30 - 110*	*06/24/14 15:13*	*07/02/14 18:11*	*1*

Client Sample ID: SD-232-02

Lab Sample ID: 680-102431-13

Date Collected: 06/16/14 15:30
Date Received: 06/17/14 09:20

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.20		0.245	0.265	1.00	0.111	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-230	1.21		0.243	0.263	1.00	0.0859	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-232	1.11		0.232	0.250	1.00	0.0625	pCi/g	06/24/14 15:13	07/02/14 18:11	1

Client Sample ID: SD-232-02

Lab Sample ID: 680-102431-13
Matrix: Solid

Date Collected: 06/16/14 15:30
Date Received: 06/17/14 09:20

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	80.3		30 - 110	06/24/14 15:13	07/02/14 18:11	1

Client Sample ID: SD-233-SS

Lab Sample ID: 680-102431-15
Matrix: Solid

Date Collected: 06/16/14 15:40
Date Received: 06/17/14 09:20

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.06		0.223	0.240	1.00	0.0873	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-230	1.06		0.220	0.237	1.00	0.0649	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-232	1.24		0.238	0.260	1.00	0.0666	pCi/g	06/24/14 15:13	07/02/14 18:11	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	80.4		30 - 110	06/24/14 15:13	07/02/14 18:11	1

Client Sample ID: SD-233-01

Lab Sample ID: 680-102431-16
Matrix: Solid

Date Collected: 06/16/14 15:45
Date Received: 06/17/14 09:20

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.967		0.213	0.228	1.00	0.0846	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-230	0.971		0.211	0.226	1.00	0.0521	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-232	1.38		0.251	0.276	1.00	0.0519	pCi/g	06/24/14 15:13	07/02/14 18:11	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	85.8		30 - 110	06/24/14 15:13	07/02/14 18:11	1

Client Sample ID: SD-233-02

Lab Sample ID: 680-102431-17
Matrix: Solid

Date Collected: 06/16/14 15:50
Date Received: 06/17/14 09:20

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.19		0.238	0.258	1.00	0.0921	pCi/g	06/24/14 15:13	07/02/14 18:12	1
Thorium-230	1.11		0.228	0.247	1.00	0.0711	pCi/g	06/24/14 15:13	07/02/14 18:12	1
Thorium-232	1.25		0.241	0.263	1.00	0.0634	pCi/g	06/24/14 15:13	07/02/14 18:12	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	81.4		30 - 110	06/24/14 15:13	07/02/14 18:12	1

Client Sample ID: SD-229-SS

Lab Sample ID: 680-102431-1
Matrix: Solid

Date Collected: 06/16/14 12:05
Date Received: 06/17/14 09:20

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0032	mg/Kg		08/21/14 10:35	09/02/14 23:02	5
U-234	ND		0.011	0.00063	mg/Kg		08/21/14 10:35	09/02/14 23:02	5
U-235	0.0050	J	0.011	0.0043	mg/Kg		08/21/14 10:35	09/02/14 23:02	5
U-236	ND		0.011	0.00084	mg/Kg		08/21/14 10:35	09/02/14 23:02	5
U-238	0.71		0.011	0.00063	mg/Kg		08/21/14 10:35	09/02/14 23:02	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.72		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-19.7	U	0.169	1.82	102	30.5	pCi/g	08/21/14 10:35	09/02/14 23:02	5
U-234	0.179	U F	0.254	0.254	65.7	3.94	pCi/g	08/21/14 10:35	09/02/14 23:02	5
U-235	0.0107	F	0.000763	0.00125	0.0228	0.00929	pCi/g	08/21/14 10:35	09/02/14 23:02	5
U-236	-0.00142	U	0.000417	0.000437	0.683	0.0547	pCi/g	08/21/14 10:35	09/02/14 23:02	5
U-238	0.237	F	0.00464	0.0223	0.00355	0.000213	pCi/g	08/21/14 10:35	09/02/14 23:02	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.699						%		09/04/14 13:23	1

Client Sample ID: SD-229-01

Lab Sample ID: 680-102431-2
Matrix: Solid

Date Collected: 06/16/14 12:10
Date Received: 06/17/14 09:20

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0035	mg/Kg		08/21/14 10:35	09/02/14 23:16	5
U-234	ND		0.012	0.00069	mg/Kg		08/21/14 10:35	09/02/14 23:16	5
U-235	0.0063	J	0.012	0.0047	mg/Kg		08/21/14 10:35	09/02/14 23:16	5
U-236	ND		0.012	0.00093	mg/Kg		08/21/14 10:35	09/02/14 23:16	5
U-238	0.88		0.012	0.00069	mg/Kg		08/21/14 10:35	09/02/14 23:16	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.89		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-21.7	U	0.225	2.01	112	33.5	pCi/g	08/21/14 10:35	09/02/14 23:16	5
U-234	0.435	U F	0.335	0.338	72.1	4.32	pCi/g	08/21/14 10:35	09/02/14 23:16	5
U-235	0.0137	F	0.00138	0.00187	0.0250	0.0102	pCi/g	08/21/14 10:35	09/02/14 23:16	5
U-236	-0.00123	U	0.00165	0.00166	0.749	0.0600	pCi/g	08/21/14 10:35	09/02/14 23:16	5
U-238	0.296	F	0.0198	0.0336	0.00389	0.000234	pCi/g	08/21/14 10:35	09/02/14 23:16	5

Client Sample ID: SD-229-01

Lab Sample ID: 680-102431-2
Matrix: Solid

Date Collected: 06/16/14 12:10
Date Received: 06/17/14 09:20

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.711						%		09/04/14 13:23	1

Client Sample ID: SD-230-SS

Lab Sample ID: 680-102431-3
Matrix: Solid

Date Collected: 06/16/14 13:40
Date Received: 06/17/14 09:20

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/21/14 10:35	09/02/14 23:21	5
U-234	ND		0.012	0.00072	mg/Kg		08/21/14 10:35	09/02/14 23:21	5
U-235	0.0054	J	0.012	0.0049	mg/Kg		08/21/14 10:35	09/02/14 23:21	5
U-236	ND		0.012	0.00096	mg/Kg		08/21/14 10:35	09/02/14 23:21	5
U-238	0.76		0.012	0.00072	mg/Kg		08/21/14 10:35	09/02/14 23:21	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.77		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-22.8	U	0.597	2.18	116	34.8	pCi/g	08/21/14 10:35	09/02/14 23:21	5
U-234	0.261	U F	0.372	0.373	75.0	4.50	pCi/g	08/21/14 10:35	09/02/14 23:21	5
U-235	0.0116	F	0.000167	0.00108	0.0260	0.0106	pCi/g	08/21/14 10:35	09/02/14 23:21	5
U-236	-0.00125	U	0.000514	0.000526	0.779	0.0624	pCi/g	08/21/14 10:35	09/02/14 23:21	5
U-238	0.255	F	0.00735	0.0246	0.00405	0.000243	pCi/g	08/21/14 10:35	09/02/14 23:21	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.706						%		09/04/14 13:23	1

Client Sample ID: SD-230-01

Lab Sample ID: 680-102431-4
Matrix: Solid

Date Collected: 06/16/14 13:45
Date Received: 06/17/14 09:20

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0037	mg/Kg		08/21/14 10:35	09/02/14 23:26	5
U-234	ND		0.012	0.00074	mg/Kg		08/21/14 10:35	09/02/14 23:26	5
U-235	0.0053	J	0.012	0.0050	mg/Kg		08/21/14 10:35	09/02/14 23:26	5
U-236	ND		0.012	0.00099	mg/Kg		08/21/14 10:35	09/02/14 23:26	5
U-238	0.73		0.012	0.00074	mg/Kg		08/21/14 10:35	09/02/14 23:26	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.74		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Client Sample ID: SD-230-01

Lab Sample ID: 680-102431-4

Date Collected: 06/16/14 13:45
Date Received: 06/17/14 09:20

Matrix: Solid

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-23.3	U	0.237	2.16	119	35.8	pCi/g	08/21/14 10:35	09/02/14 23:26	5
U-234	0.370	U F	0.110	0.116	77.1	4.63	pCi/g	08/21/14 10:35	09/02/14 23:26	5
U-235	0.0114	F	0.000773	0.00130	0.0268	0.0109	pCi/g	08/21/14 10:35	09/02/14 23:26	5
U-236	-0.000705	U	0.00253	0.00253	0.801	0.0642	pCi/g	08/21/14 10:35	09/02/14 23:26	5
U-238	0.246	F	0.00340	0.0229	0.00416	0.000250	pCi/g	08/21/14 10:35	09/02/14 23:26	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.721						%		09/04/14 13:23	1

Client Sample ID: SD-230-02

Lab Sample ID: 680-102431-5

Date Collected: 06/16/14 13:50
Date Received: 06/17/14 09:20

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0037	mg/Kg		08/21/14 10:35	09/02/14 23:30	5
U-234	ND		0.012	0.00074	mg/Kg		08/21/14 10:35	09/02/14 23:30	5
U-235	0.0074	J	0.012	0.0050	mg/Kg		08/21/14 10:35	09/02/14 23:30	5
U-236	ND		0.012	0.00098	mg/Kg		08/21/14 10:35	09/02/14 23:30	5
U-238	1.0		0.012	0.00074	mg/Kg		08/21/14 10:35	09/02/14 23:30	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.0		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-23.3	U	0.282	2.16	118	35.5	pCi/g	08/21/14 10:35	09/02/14 23:30	5
U-234	0.473	U F	0.253	0.256	76.3	4.58	pCi/g	08/21/14 10:35	09/02/14 23:30	5
U-235	0.0160	F	0.000628	0.00160	0.0265	0.0108	pCi/g	08/21/14 10:35	09/02/14 23:30	5
U-236	-0.00165	U	0.00195	0.00195	0.793	0.0636	pCi/g	08/21/14 10:35	09/02/14 23:30	5
U-238	0.336	F	0.0190	0.0362	0.00412	0.000248	pCi/g	08/21/14 10:35	09/02/14 23:30	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.735						%		09/04/14 13:23	1

Client Sample ID: SD-231-SS

Lab Sample ID: 680-102431-7
Matrix: Solid

Date Collected: 06/16/14 14:10
Date Received: 06/17/14 09:20

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0034	mg/Kg		08/21/14 10:35	09/02/14 23:49	5
U-234	ND		0.011	0.00068	mg/Kg		08/21/14 10:35	09/02/14 23:49	5
U-235	0.011		0.011	0.0046	mg/Kg		08/21/14 10:35	09/02/14 23:49	5
U-236	ND		0.011	0.00091	mg/Kg		08/21/14 10:35	09/02/14 23:49	5
U-238	1.5		0.011	0.00068	mg/Kg		08/21/14 10:35	09/02/14 23:49	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.5		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-21.5	U	0.110	1.98	110	33.0	pCi/g	08/21/14 10:35	09/02/14 23:49	5
U-234	0.690	U F	0.260	0.268	71.0	4.26	pCi/g	08/21/14 10:35	09/02/14 23:49	5
U-235	0.0238	F	0.00232	0.00319	0.0247	0.0100	pCi/g	08/21/14 10:35	09/02/14 23:49	5
U-236	-0.000767	U	0.00181	0.00181	0.738	0.0591	pCi/g	08/21/14 10:35	09/02/14 23:49	5
U-238	0.512	F	0.0257	0.0536	0.00384	0.000231	pCi/g	08/21/14 10:35	09/02/14 23:49	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.728						%		09/04/14 13:23	1

Client Sample ID: SD-231-01

Lab Sample ID: 680-102431-8
Matrix: Solid

Date Collected: 06/16/14 14:15
Date Received: 06/17/14 09:20

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0033	mg/Kg		08/21/14 10:35	09/02/14 23:54	5
U-234	ND		0.011	0.00065	mg/Kg		08/21/14 10:35	09/02/14 23:54	5
U-235	0.014		0.011	0.0044	mg/Kg		08/21/14 10:35	09/02/14 23:54	5
U-236	ND		0.011	0.00087	mg/Kg		08/21/14 10:35	09/02/14 23:54	5
U-238	1.8		0.011	0.00065	mg/Kg		08/21/14 10:35	09/02/14 23:54	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.8		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-20.4	U	0.509	1.95	105	31.5	pCi/g	08/21/14 10:35	09/02/14 23:54	5
U-234	0.702	U	0.221	0.230	67.7	4.06	pCi/g	08/21/14 10:35	09/02/14 23:54	5
U-235	0.0296		0.00138	0.00306	0.0235	0.00958	pCi/g	08/21/14 10:35	09/02/14 23:54	5
U-236	-0.00121	U	0.00215	0.00215	0.704	0.0564	pCi/g	08/21/14 10:35	09/02/14 23:54	5
U-238	0.595		0.00768	0.0552	0.00366	0.000220	pCi/g	08/21/14 10:35	09/02/14 23:54	5

Client Sample ID: SD-231-01

Lab Sample ID: 680-102431-8
Matrix: Solid

Date Collected: 06/16/14 14:15
Date Received: 06/17/14 09:20

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.772						%		09/04/14 13:23	1

Client Sample ID: SD-231-02

Lab Sample ID: 680-102431-9
Matrix: Solid

Date Collected: 06/16/14 14:20
Date Received: 06/17/14 09:20

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/21/14 10:35	09/03/14 00:17	5
U-234	ND		0.012	0.00073	mg/Kg		08/21/14 10:35	09/03/14 00:17	5
U-235	0.013		0.012	0.0049	mg/Kg		08/21/14 10:35	09/03/14 00:17	5
U-236	ND		0.012	0.00097	mg/Kg		08/21/14 10:35	09/03/14 00:17	5
U-238	1.6		0.012	0.00073	mg/Kg		08/21/14 10:35	09/03/14 00:17	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.6		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-22.7	U	0.494	2.15	117	35.0	pCi/g	08/21/14 10:35	09/03/14 00:17	5
U-234	0.878	U	0.130	0.153	75.4	4.52	pCi/g	08/21/14 10:35	09/03/14 00:17	5
U-235	0.0284		0.00117	0.00286	0.0262	0.0107	pCi/g	08/21/14 10:35	09/03/14 00:17	5
U-236	-0.000658	U	0.00210	0.00210	0.784	0.0628	pCi/g	08/21/14 10:35	09/03/14 00:17	5
U-238	0.550		0.0107	0.0517	0.00407	0.000245	pCi/g	08/21/14 10:35	09/03/14 00:17	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.806						%		09/04/14 13:23	1

Client Sample ID: SD-232-SS

Lab Sample ID: 680-102431-11
Matrix: Solid

Date Collected: 06/16/14 15:20
Date Received: 06/17/14 09:20

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0034	mg/Kg		08/21/14 10:35	09/03/14 00:22	5
U-234	ND		0.011	0.00067	mg/Kg		08/21/14 10:35	09/03/14 00:22	5
U-235	0.014		0.011	0.0046	mg/Kg		08/21/14 10:35	09/03/14 00:22	5
U-236	ND		0.011	0.00090	mg/Kg		08/21/14 10:35	09/03/14 00:22	5
U-238	1.9		0.011	0.00067	mg/Kg		08/21/14 10:35	09/03/14 00:22	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.9		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Client Sample ID: SD-232-SS

Lab Sample ID: 680-102431-11
Matrix: Solid

Date Collected: 06/16/14 15:20
Date Received: 06/17/14 09:20

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-21.2	U	0.451	2.00	108	32.5	pCi/g	08/21/14 10:35	09/03/14 00:22	5
U-234	0.833	U	0.0664	0.101	69.9	4.19	pCi/g	08/21/14 10:35	09/03/14 00:22	5
U-235	0.0293		0.00136	0.00302	0.0243	0.00988	pCi/g	08/21/14 10:35	09/03/14 00:22	5
U-236	-0.00110	U	0.000740	0.000747	0.726	0.0582	pCi/g	08/21/14 10:35	09/03/14 00:22	5
U-238	0.624		0.00964	0.0582	0.00377	0.000227	pCi/g	08/21/14 10:35	09/03/14 00:22	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.731						%		09/04/14 13:23	1

Client Sample ID: SD-232-01

Lab Sample ID: 680-102431-12
Matrix: Solid

Date Collected: 06/16/14 15:25
Date Received: 06/17/14 09:20

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/21/14 10:35	09/03/14 00:26	5
U-234	ND		0.012	0.00072	mg/Kg		08/21/14 10:35	09/03/14 00:26	5
U-235	0.015		0.012	0.0048	mg/Kg		08/21/14 10:35	09/03/14 00:26	5
U-236	ND		0.012	0.00095	mg/Kg		08/21/14 10:35	09/03/14 00:26	5
U-238	2.1		0.012	0.00072	mg/Kg		08/21/14 10:35	09/03/14 00:26	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.1		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-22.1	U	0.142	2.04	115	34.5	pCi/g	08/21/14 10:35	09/03/14 00:26	5
U-234	0.938	U	0.203	0.221	74.2	4.45	pCi/g	08/21/14 10:35	09/03/14 00:26	5
U-235	0.0331		0.00135	0.00333	0.0258	0.0105	pCi/g	08/21/14 10:35	09/03/14 00:26	5
U-236	-0.00160	U	0.00164	0.00165	0.771	0.0618	pCi/g	08/21/14 10:35	09/03/14 00:26	5
U-238	0.696		0.0125	0.0652	0.00401	0.000241	pCi/g	08/21/14 10:35	09/03/14 00:26	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.709						%		09/04/14 13:23	1

Client Sample ID: SD-232-02

Lab Sample ID: 680-102431-13
Matrix: Solid

Date Collected: 06/16/14 15:30
Date Received: 06/17/14 09:20

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0037	mg/Kg		08/21/14 10:35	09/03/14 00:31	5
U-234	ND		0.012	0.00073	mg/Kg		08/21/14 10:35	09/03/14 00:31	5
U-235	0.010	J	0.012	0.0050	mg/Kg		08/21/14 10:35	09/03/14 00:31	5
U-236	ND		0.012	0.00098	mg/Kg		08/21/14 10:35	09/03/14 00:31	5
U-238	1.4		0.012	0.00073	mg/Kg		08/21/14 10:35	09/03/14 00:31	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.4		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-22.6	U	0.256	2.10	118	35.3	pCi/g	08/21/14 10:35	09/03/14 00:31	5
U-234	0.629	U	0.595	0.598	76.0	4.56	pCi/g	08/21/14 10:35	09/03/14 00:31	5
U-235	0.0217		0.00189	0.00275	0.0264	0.0108	pCi/g	08/21/14 10:35	09/03/14 00:31	5
U-236	-0.00101	U	0.00105	0.00105	0.790	0.0633	pCi/g	08/21/14 10:35	09/03/14 00:31	5
U-238	0.456		0.0167	0.0452	0.00411	0.000247	pCi/g	08/21/14 10:35	09/03/14 00:31	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.709						%		09/04/14 13:23	1

Client Sample ID: SD-233-SS

Lab Sample ID: 680-102431-15
Matrix: Solid

Date Collected: 06/16/14 15:40
Date Received: 06/17/14 09:20

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0034	mg/Kg		08/21/14 10:35	09/03/14 00:36	5
U-234	ND		0.011	0.00069	mg/Kg		08/21/14 10:35	09/03/14 00:36	5
U-235	0.015		0.011	0.0047	mg/Kg		08/21/14 10:35	09/03/14 00:36	5
U-236	ND		0.011	0.00092	mg/Kg		08/21/14 10:35	09/03/14 00:36	5
U-238	2.0		0.011	0.00069	mg/Kg		08/21/14 10:35	09/03/14 00:36	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.0		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-21.4	U	0.217	1.98	110	33.1	pCi/g	08/21/14 10:35	09/03/14 00:36	5
U-234	0.918	U	0.298	0.310	71.3	4.28	pCi/g	08/21/14 10:35	09/03/14 00:36	5
U-235	0.0319		0.000204	0.00294	0.0248	0.0101	pCi/g	08/21/14 10:35	09/03/14 00:36	5
U-236	-0.00133	U	0.00146	0.00147	0.741	0.0593	pCi/g	08/21/14 10:35	09/03/14 00:36	5
U-238	0.671		0.0131	0.0631	0.00385	0.000231	pCi/g	08/21/14 10:35	09/03/14 00:36	5

Client Sample ID: SD-233-SS

Lab Sample ID: 680-102431-15

Date Collected: 06/16/14 15:40
Date Received: 06/17/14 09:20

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.744						%		09/04/14 13:23	1

Client Sample ID: SD-233-01

Lab Sample ID: 680-102431-16

Date Collected: 06/16/14 15:45
Date Received: 06/17/14 09:20

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0035	mg/Kg		08/21/14 10:35	09/03/14 00:40	5
U-234	ND		0.012	0.00071	mg/Kg		08/21/14 10:35	09/03/14 00:40	5
U-235	0.015		0.012	0.0048	mg/Kg		08/21/14 10:35	09/03/14 00:40	5
U-236	ND		0.012	0.00094	mg/Kg		08/21/14 10:35	09/03/14 00:40	5
U-238	2.0		0.012	0.00071	mg/Kg		08/21/14 10:35	09/03/14 00:40	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.0		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-21.9	U	0.124	2.02	113	34.0	pCi/g	08/21/14 10:35	09/03/14 00:40	5
U-234	0.917	U	0.172	0.191	73.3	4.40	pCi/g	08/21/14 10:35	09/03/14 00:40	5
U-235	0.0319		0.000725	0.00302	0.0254	0.0104	pCi/g	08/21/14 10:35	09/03/14 00:40	5
U-236	-0.000548	U	0.00204	0.00204	0.762	0.0610	pCi/g	08/21/14 10:35	09/03/14 00:40	5
U-238	0.670		0.0170	0.0639	0.00396	0.000238	pCi/g	08/21/14 10:35	09/03/14 00:40	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.744						%		09/04/14 13:23	1

Client Sample ID: SD-233-02

Lab Sample ID: 680-102431-17

Date Collected: 06/16/14 15:50
Date Received: 06/17/14 09:20

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0034	mg/Kg		08/21/14 10:35	09/03/14 00:45	5
U-234	ND		0.011	0.00069	mg/Kg		08/21/14 10:35	09/03/14 00:45	5
U-235	0.013		0.011	0.0047	mg/Kg		08/21/14 10:35	09/03/14 00:45	5
U-236	ND		0.011	0.00092	mg/Kg		08/21/14 10:35	09/03/14 00:45	5
U-238	1.6		0.011	0.00069	mg/Kg		08/21/14 10:35	09/03/14 00:45	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.6		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Client Sample ID: SD-233-02
Date Collected: 06/16/14 15:50
Date Received: 06/17/14 09:20

Lab Sample ID: 680-102431-17
Matrix: Solid

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-21.3	U	0.154	1.97	111	33.2	pCi/g	08/21/14 10:35	09/03/14 00:45	5
U-234	0.671	U	0.227	0.235	71.4	4.28	pCi/g	08/21/14 10:35	09/03/14 00:45	5
U-235	0.0283		0.000406	0.00264	0.0248	0.0101	pCi/g	08/21/14 10:35	09/03/14 00:45	5
U-236	-0.000683	U	0.00317	0.00317	0.742	0.0594	pCi/g	08/21/14 10:35	09/03/14 00:45	5
U-238	0.538		0.0156	0.0519	0.00386	0.000232	pCi/g	08/21/14 10:35	09/03/14 00:45	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.806						%		09/04/14 13:23	1

APPENDIX C

SUPPORT DOCUMENTATION

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Sediments

Report Number: 680-102431-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 06/17/2014; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 2.6 C.

ISOTOPIC THORIUM

Samples SD-229-SS (680-102431-1), SD-229-01 (680-102431-2), SD-230-SS (680-102431-3), SD-230-01 (680-102431-4), SD-230-02 (680-102431-5), SD-231-SS (680-102431-7), SD-231-01 (680-102431-8), SD-231-02 (680-102431-9), SD-232-SS (680-102431-11), SD-232-01 (680-102431-12), SD-232-02 (680-102431-13), SD-233-SS (680-102431-15), SD-233-01 (680-102431-16) and SD-233-02 (680-102431-17) were analyzed for Isotopic Thorium in accordance with A01R_Th. The samples were leached on 06/19/2014, prepared on 06/24/2014 and analyzed on 07/02/2014.

The matrix spike duplicate (MSD) recovery associated with the following samples was just outside the upper control limit of 115% (116%): SD-231-01 (680-102431-8). Sample matrix interference is suspected because the associated matrix spike (MS) and laboratory control sample (LCS) spike recoveries were within acceptance limits.

Refer to the QC report for details.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Sediments

Report Number: 680-102431-3

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT
The samples were received on 06/17/2014; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 2.6 C.

TOTAL URANIUM
Samples SD-229-SS (680-102431-1), SD-229-01 (680-102431-2), SD-230-SS (680-102431-3), SD-230-01 (680-102431-4), SD-230-02 (680-102431-5), SD-231-SS (680-102431-7), SD-231-01 (680-102431-8), SD-231-02 (680-102431-9), SD-232-SS (680-102431-11), SD-232-01 (680-102431-12), SD-232-02 (680-102431-13), SD-233-SS (680-102431-15), SD-233-01 (680-102431-16) and SD-233-02 (680-102431-17) were analyzed for Total Uranium in accordance with EPA SW-846 6020A. The samples were analyzed on 09/04/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM
Samples SD-229-SS (680-102431-1), SD-229-01 (680-102431-2), SD-230-SS (680-102431-3), SD-230-01 (680-102431-4), SD-230-02 (680-102431-5), SD-231-SS (680-102431-7), SD-231-01 (680-102431-8), SD-231-02 (680-102431-9), SD-232-SS (680-102431-11), SD-232-01 (680-102431-12), SD-232-02 (680-102431-13), SD-233-SS (680-102431-15), SD-233-01 (680-102431-16) and SD-233-02 (680-102431-17) were analyzed for Isotopic Uranium in accordance with EPA SW-846 6020A. The samples were prepared on 08/21/2014 and analyzed on 09/02/2014 and 09/03/2014.

The instrument blank (ICB) contained uranium 233 greater than the reporting limit (RL). All associated samples were non-detect, showing there was no high bias. The data have been qualified and reported. (ICB 160-141597/10)

U-238 exceeded the recovery criteria low for the MSD of sample SD-230-02MSD (680-102431-5) in batch 160-141597. U-234, U-235 and U-238 exceeded the RPD limit.

Refer to the QC report for details.

The presence of the '4' qualifier indicates analytes where the concentration in the unspiked sample exceeded four times the spiking amount.

Samples SD-229-SS (680-102431-1)[5X], SD-229-01 (680-102431-2)[5X], SD-230-SS (680-102431-3)[5X], SD-230-01 (680-102431-4)[5X], SD-230-02 (680-102431-5)[5X], SD-231-SS (680-102431-7)[5X], SD-231-01 (680-102431-8)[5X], SD-231-02 (680-102431-9)[5X], SD-232-SS (680-102431-11)[5X], SD-232-01 (680-102431-12)[5X], SD-232-02 (680-102431-13)[5X], SD-233-SS (680-102431-15)[5X], SD-233-01 (680-102431-16)[5X] and SD-233-02 (680-102431-17)[5X] required dilution prior to analysis. Samples were high in salts. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM PERCENTAGE
Samples SD-229-SS (680-102431-1), SD-229-01 (680-102431-2), SD-230-SS (680-102431-3), SD-230-01 (680-102431-4), SD-230-02 (680-102431-5), SD-231-SS (680-102431-7), SD-231-01 (680-102431-8), SD-231-02 (680-102431-9), SD-232-SS (680-102431-11), SD-232-01 (680-102431-12), SD-232-02 (680-102431-13), SD-233-SS (680-102431-15), SD-233-01 (680-102431-16) and SD-233-02 (680-102431-17) were analyzed for Isotopic Uranium Percentage in accordance with EPA SW-846 6020A. The samples were analyzed on 09/04/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM ACTIVITY
Samples SD-229-SS (680-102431-1), SD-229-01 (680-102431-2), SD-230-SS (680-102431-3), SD-230-01 (680-102431-4), SD-230-02 (680-102431-5), SD-231-SS (680-102431-7), SD-231-01 (680-102431-8), SD-231-02 (680-102431-9), SD-232-SS (680-102431-11),

SD-232-01 (680-102431-12), SD-232-02 (680-102431-13), SD-233-SS (680-102431-15), SD-233-01 (680-102431-16) and SD-233-02 (680-102431-17) were analyzed for Isotopic Uranium Activity in accordance with EPA SW-846 6020A. The samples were prepared on 08/21/2014 and analyzed on 09/02/2014 and 09/03/2014.

U-238 exceeded the recovery criteria low for the MSD of sample SD-230-02MSD (680-102431-5) in batch 160-141598.

The Relative Error Ratio (RER) and Duplicate Error Ratio (DER) were outside control limits for uranium 234, 235 and 238. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample was within acceptance limits. (680-102431-5 MS), (680-102431-5 MSD), SD-230-02 (680-102431-5 MS), SD-230-02 (680-102431-5 MSD)

Refer to the QC report for details.

Samples SD-229-SS (680-102431-1)[5X], SD-229-01 (680-102431-2)[5X], SD-230-SS (680-102431-3)[5X], SD-230-01 (680-102431-4)[5X], SD-230-02 (680-102431-5)[5X], SD-231-SS (680-102431-7)[5X], SD-231-01 (680-102431-8)[5X], SD-231-02 (680-102431-9)[5X], SD-232-SS (680-102431-11)[5X], SD-232-01 (680-102431-12)[5X], SD-232-02 (680-102431-13)[5X], SD-233-SS (680-102431-15)[5X], SD-233-01 (680-102431-16)[5X] and SD-233-02 (680-102431-17)[5X] required dilution prior to analysis. Samples were high in salts. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.28
Client Contact: Mike Martin	Phone: (703) 342-8589	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~28 of 28~~ 1 of 2
Company: Tetra Tech, Inc.				Job #: 680-102431-1
Address: 20251 Century Blvd Suite 200	Due Date Requested:	Analysis Requested		
City: Germantown	TAT Requested (days): Standard			
State, Zip: MD, 20874				Preservation Codes:
Phone:	PO #: Purchase Order not required			A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
Email: Michael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			Other:
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=soil, O=waste/oil, BT=Tissue, A=Air)	680 - Local Method	A01R_Th - Standard Target List	9320, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Special Instructions/Note:
SD-229-SS	6/16/14	1205	C	Solid		X			
SD-229-01		1210	C	Solid		X			
SD-230-SS		1340	C	Solid		X			
SD-230-01		1345	C	Solid		X			
SD-230-01		1350	C	Solid		X			MS/MSD
SD-230-03		1355	C	Solid		(X)			
SD-231-SS		1410	C	Solid		X			
SD-231-01		1415	C	Solid		X			
SD-231-02		1420	C	Solid		X			
SD-231-03		1425	C	Solid		(X)			
SD-232-SS		1520	C	Solid		X			

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	6-16-14 / 1600	TT		6/16/14 1600	TA
Relinquished by:	6/16/14 1710	TA		6.17.14 0820	TA STL
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.30
Client Contact: Mike Martin	Phone: (703) 342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~30 of 46~~ 2 of 2
Company: Tetra Tech, Inc.				Job #: 680-102431-1
Address: 20251 Century Blvd Suite 200	Due Date Requested:	Analysis Requested		Preservation Codes:
City: Germantown	TAT Requested (days): Standard			A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; G - Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA; M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2SO3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - ph 4-5; Z - other (specify)
State, Zip: MD, 20874	PO #: Purchase Order not required			Other:
Phone:	WO #:			
Email: Michael.Martin@tetratech.com	Project #: 68012942			
Project Name: Sediments	SSOW#:			
Site:				

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (w=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-228/226	Total Number of containers	Special Instructions/Note:
SD-232-01	6/16/14	1525		Solid				X				
SD-232-02		1530		Solid				X				
SD-232-03		1535		Solid				(X)				
SD-233-55		1540		Solid				X				
SD-233-01		1545		Solid				X				
SD-233-02		1550		Solid				X				
SD-233-03		1555		Solid				(X)				
				Solid								
				Solid								
				Solid								
				Solid								

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6-16-14 / 1600	T+		6/16/14 1616	TestAmerica
2		6/16/14 1910	TestAmerica	Clark	6-17-14 0920	TA STL
3		Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102431-1
SDG: 680-102431-1

Method	Method Description	Protocol	Laboratory
A-01-R	Isotopic Thorium (Alpha Spectrometry)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102431-3
SDG: 680-102431-1

Method	Method Description	Protocol	Laboratory
6020A	Metals (ICP/MS), Isotopic Uranium	SW846	TAL SL
6020A	Metals (ICP/MS), Total Uranium	SW846	TAL SL
6020A	Metals (ICP/MS), Isotopic Uranium Percentage	SW846	TAL SL
6020A Activity	Metals (ICP/MS), Isotopic Uranium (Activity)	SW846	TAL SL

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102431-1
SDG: 680-102431-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-102431-1	SD-229-SS	Solid	06/16/14 12:05	06/17/14 09:20
680-102431-2	SD-229-01	Solid	06/16/14 12:10	06/17/14 09:20
680-102431-3	SD-230-SS	Solid	06/16/14 13:40	06/17/14 09:20
680-102431-4	SD-230-01	Solid	06/16/14 13:45	06/17/14 09:20
680-102431-5	SD-230-02	Solid	06/16/14 13:50	06/17/14 09:20
680-102431-7	SD-231-SS	Solid	06/16/14 14:10	06/17/14 09:20
680-102431-8	SD-231-01	Solid	06/16/14 14:15	06/17/14 09:20
680-102431-9	SD-231-02	Solid	06/16/14 14:20	06/17/14 09:20
680-102431-11	SD-232-SS	Solid	06/16/14 15:20	06/17/14 09:20
680-102431-12	SD-232-01	Solid	06/16/14 15:25	06/17/14 09:20
680-102431-13	SD-232-02	Solid	06/16/14 15:30	06/17/14 09:20
680-102431-15	SD-233-SS	Solid	06/16/14 15:40	06/17/14 09:20
680-102431-16	SD-233-01	Solid	06/16/14 15:45	06/17/14 09:20
680-102431-17	SD-233-02	Solid	06/16/14 15:50	06/17/14 09:20

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102431-3
SDG: 680-102431-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-102431-1	SD-229-SS	Solid	06/16/14 12:05	06/17/14 09:20
680-102431-2	SD-229-01	Solid	06/16/14 12:10	06/17/14 09:20
680-102431-3	SD-230-SS	Solid	06/16/14 13:40	06/17/14 09:20
680-102431-4	SD-230-01	Solid	06/16/14 13:45	06/17/14 09:20
680-102431-5	SD-230-02	Solid	06/16/14 13:50	06/17/14 09:20
680-102431-7	SD-231-SS	Solid	06/16/14 14:10	06/17/14 09:20
680-102431-8	SD-231-01	Solid	06/16/14 14:15	06/17/14 09:20
680-102431-9	SD-231-02	Solid	06/16/14 14:20	06/17/14 09:20
680-102431-11	SD-232-SS	Solid	06/16/14 15:20	06/17/14 09:20
680-102431-12	SD-232-01	Solid	06/16/14 15:25	06/17/14 09:20
680-102431-13	SD-232-02	Solid	06/16/14 15:30	06/17/14 09:20
680-102431-15	SD-233-SS	Solid	06/16/14 15:40	06/17/14 09:20
680-102431-16	SD-233-01	Solid	06/16/14 15:45	06/17/14 09:20
680-102431-17	SD-233-02	Solid	06/16/14 15:50	06/17/14 09:20

HOLDTIME

SDG 680-102431-1

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
RAD	PCI/G	SD-233-SS	680-102431-15	NM	06/16/2014	06/24/2014	07/02/2014	8	8	16
RAD	PCI/G	SD-233-02	680-102431-17	NM	06/16/2014	06/24/2014	07/02/2014	8	8	16
RAD	PCI/G	SD-233-01	680-102431-16	NM	06/16/2014	06/24/2014	07/02/2014	8	8	16
RAD	PCI/G	SD-232-SS	680-102431-11	NM	06/16/2014	06/24/2014	07/02/2014	8	8	16
RAD	PCI/G	SD-232-02	680-102431-13	NM	06/16/2014	06/24/2014	07/02/2014	8	8	16
RAD	PCI/G	SD-232-01	680-102431-12	NM	06/16/2014	06/24/2014	07/02/2014	8	8	16
RAD	PCI/G	SD-231-SS	680-102431-7	NM	06/16/2014	06/24/2014	07/02/2014	8	8	16
RAD	PCI/G	SD-231-02	680-102431-9	NM	06/16/2014	06/24/2014	07/02/2014	8	8	16
RAD	PCI/G	SD-231-01	680-102431-8	NM	06/16/2014	06/24/2014	07/02/2014	8	8	16
RAD	PCI/G	SD-230-SS	680-102431-3	NM	06/16/2014	06/24/2014	07/02/2014	8	8	16
RAD	PCI/G	SD-230-02	680-102431-5	NM	06/16/2014	06/24/2014	07/02/2014	8	8	16
RAD	PCI/G	SD-230-01	680-102431-4	NM	06/16/2014	06/24/2014	07/02/2014	8	8	16
RAD	PCI/G	SD-229-SS	680-102431-1	NM	06/16/2014	06/24/2014	07/02/2014	8	8	16
RAD	PCI/G	SD-229-01	680-102431-2	NM	06/16/2014	06/24/2014	07/02/2014	8	8	16

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Lab Sample ID: MB 160-128417/1-A
Matrix: Solid
Analysis Batch: 129499

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 128417

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	-0.009679	U	0.00858	0.00862	1.00	0.0660	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-230	0.03903	U	0.0410	0.0411	1.00	0.0462	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-232	0.008210	U	0.0206	0.0206	1.00	0.0460	pCi/g	06/24/14 15:13	07/02/14 18:11	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*92.2*		*30 - 110*	*06/24/14 15:13*	*07/02/14 18:11*	*1*

Lab Sample ID: LCS 160-128417/2-A
Matrix: Solid
Analysis Batch: 129502

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 128417

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Thorium-230	24.5	25.66		2.63	1.00	0.170	pCi/g	105	81 - 118

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*85.3*		*30 - 110*

Lab Sample ID: 680-102431-5 MS
Matrix: Solid
Analysis Batch: 129510

Client Sample ID: SD-230-02
Prep Type: Total/NA
Prep Batch: 128417

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Thorium-230	0.673		4.33	5.500		0.676	1.00	0.0873	pCi/g	111	76 - 115

Tracer	*MS %Yield*	*MS Qualifier*	*Limits*
Thorium-229	*85.9*		*30 - 110*

Lab Sample ID: 680-102431-5 MSD
Matrix: Solid
Analysis Batch: 129513

Client Sample ID: SD-230-02
Prep Type: Total/NA
Prep Batch: 128417

Analyte	Sample Result	Sample Qual	Spike Added	MSD Result	MSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Thorium-230	0.673		4.31	5.655	F1	0.676	1.00	0.0662	pCi/g	116	76 - 115	0.11	1

Tracer	*MSD %Yield*	*MSD Qualifier*	*Limits*
Thorium-229	*93.0*		*30 - 110*

Rad

Leach Batch: 127643

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102431-1	SD-229-SS	Total/NA	Solid	Dry and Grind	
680-102431-2	SD-229-01	Total/NA	Solid	Dry and Grind	
680-102431-3	SD-230-SS	Total/NA	Solid	Dry and Grind	
680-102431-4	SD-230-01	Total/NA	Solid	Dry and Grind	
680-102431-5	SD-230-02	Total/NA	Solid	Dry and Grind	
680-102431-5 MS	SD-230-02	Total/NA	Solid	Dry and Grind	
680-102431-5 MSD	SD-230-02	Total/NA	Solid	Dry and Grind	
680-102431-7	SD-231-SS	Total/NA	Solid	Dry and Grind	
680-102431-8	SD-231-01	Total/NA	Solid	Dry and Grind	
680-102431-9	SD-231-02	Total/NA	Solid	Dry and Grind	
680-102431-11	SD-232-SS	Total/NA	Solid	Dry and Grind	
680-102431-12	SD-232-01	Total/NA	Solid	Dry and Grind	
680-102431-13	SD-232-02	Total/NA	Solid	Dry and Grind	
680-102431-15	SD-233-SS	Total/NA	Solid	Dry and Grind	
680-102431-16	SD-233-01	Total/NA	Solid	Dry and Grind	
680-102431-17	SD-233-02	Total/NA	Solid	Dry and Grind	

Prep Batch: 128417

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102431-1	SD-229-SS	Total/NA	Solid	ExtChrom	127643
680-102431-2	SD-229-01	Total/NA	Solid	ExtChrom	127643
680-102431-3	SD-230-SS	Total/NA	Solid	ExtChrom	127643
680-102431-4	SD-230-01	Total/NA	Solid	ExtChrom	127643
680-102431-5	SD-230-02	Total/NA	Solid	ExtChrom	127643
680-102431-5 MS	SD-230-02	Total/NA	Solid	ExtChrom	127643
680-102431-5 MSD	SD-230-02	Total/NA	Solid	ExtChrom	127643
680-102431-7	SD-231-SS	Total/NA	Solid	ExtChrom	127643
680-102431-8	SD-231-01	Total/NA	Solid	ExtChrom	127643
680-102431-9	SD-231-02	Total/NA	Solid	ExtChrom	127643
680-102431-11	SD-232-SS	Total/NA	Solid	ExtChrom	127643
680-102431-12	SD-232-01	Total/NA	Solid	ExtChrom	127643
680-102431-13	SD-232-02	Total/NA	Solid	ExtChrom	127643
680-102431-15	SD-233-SS	Total/NA	Solid	ExtChrom	127643
680-102431-16	SD-233-01	Total/NA	Solid	ExtChrom	127643
680-102431-17	SD-233-02	Total/NA	Solid	ExtChrom	127643
LCS 160-128417/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-128417/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128417

Lab ID: MB 160-128417/1-A
Client ID:
Sigma: 2
Analyzed: 07/02/14 18:11
Detector: AV46
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	-0.009679	0.00858	0.00862	U	pCi/g	1.00	0.0660	129499
Thorium-230	0.03903	0.0410	0.0411	U	pCi/g	1.00	0.0462	129499
Thorium-232	0.008210	0.0206	0.0206	U	pCi/g	1.00	0.0460	129499

Tracer	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.642	0.460	0.661		pCi/g	0.0606	6.12	92.2	30 - 110

Lab ID: LCS 160-128417/2-A
Client ID:
Sigma: 2
Analyzed: 07/02/14 18:11
Detector: AV49
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	25.66	1.51	2.63		pCi/g	1.00	0.170	129502

Tracer	LCS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	10.44	0.891	1.25		pCi/g	0.139	12.2	85.3	30 - 110

Lab ID: 680-102431-1
Client ID: SD-229-SS
Sigma: 2
Analyzed: 07/02/14 18:11
Detector: AV53
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.842	0.204	0.216		pCi/g	1.00	0.0895	129505
Thorium-230	1.02	0.225	0.241		pCi/g	1.00	0.0896	129505
Thorium-232	0.837	0.202	0.214		pCi/g	1.00	0.0686	129505

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.77	0.426	0.585		pCi/g	0.0580	6.09	78.3	30 - 110

Lab ID: 680-102431-2
Client ID: SD-229-01
Sigma: 2
Analyzed: 07/02/14 18:11
Detector: AV54
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.964	0.212	0.227		pCi/g	1.00	0.103	129506
Thorium-230	0.683	0.177	0.186		pCi/g	1.00	0.0763	129506
Thorium-232	1.04	0.215	0.232		pCi/g	1.00	0.0542	129506

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128417

Lab ID: 680-102431-2 | Analyzed: 07/02/14 18:11 | Decay Corrected: No
Client ID: SD-229-01 | Detector: AV54 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.28	0.453	0.634		pCi/g	0.0626	6.13	86.1	30 - 110

Lab ID: 680-102431-3 | Analyzed: 07/02/14 18:11 | Decay Corrected: No
Client ID: SD-230-SS | Detector: AV55 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.547	0.156	0.163		pCi/g	1.00	0.0766	129507
Thorium-230	0.638	0.167	0.176		pCi/g	1.00	0.0698	129507
Thorium-232	0.570	0.158	0.165		pCi/g	1.00	0.0695	129507

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.27	0.444	0.627		pCi/g	0.0485	6.10	86.5	30 - 110

Lab ID: 680-102431-4 | Analyzed: 07/02/14 18:11 | Decay Corrected: No
Client ID: SD-230-01 | Detector: AV56 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.535	0.153	0.159		pCi/g	1.00	0.0751	129508
Thorium-230	0.706	0.173	0.183		pCi/g	1.00	0.0481	129508
Thorium-232	0.522	0.149	0.155		pCi/g	1.00	0.0546	129508

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.53	0.461	0.654		pCi/g	0.0546	6.10	90.7	30 - 110

Lab ID: 680-102431-5 | Analyzed: 07/02/14 18:11 | Decay Corrected: No
Client ID: SD-230-02 | Detector: AV57 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.733	0.183	0.193		pCi/g	1.00	0.0983	129509
Thorium-230	0.673	0.172	0.181		pCi/g	1.00	0.0567	129509
Thorium-232	0.583	0.160	0.168		pCi/g	1.00	0.0663	129509

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.25	0.445	0.627		pCi/g	0.0788	6.12	85.9	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128417

Lab ID: 680-102431-5 MS
Client ID: SD-230-02
Sigma: 2
Analyzed: 07/02/14 18:11
Detector: AV58
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	MS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	5.500	0.494	0.676		pCi/g	1.00	0.0873	129510

Tracer	MS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.269	0.447	0.629		pCi/g	0.0540	6.14	85.9	30 - 110

Lab ID: 680-102431-5 MSD
Client ID: SD-230-02
Sigma: 2
Analyzed: 07/02/14 18:11
Detector: AV60
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	MSD Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	5.655	0.481	0.676	F1	pCi/g	1.00	0.0662	129513

Tracer	MSD Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.681	0.465	0.666		pCi/g	0.0433	6.11	93.0	30 - 110

Lab ID: 680-102431-7
Client ID: SD-231-SS
Sigma: 2
Analyzed: 07/02/14 18:11
Detector: AV61
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.639	0.166	0.174		pCi/g	1.00	0.0903	129514
Thorium-230	0.857	0.188	0.201		pCi/g	1.00	0.0470	129514
Thorium-232	0.774	0.178	0.190		pCi/g	1.00	0.0465	129514

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.66	0.464	0.664		pCi/g	0.0581	6.12	92.5	30 - 110

Lab ID: 680-102431-8
Client ID: SD-231-01
Sigma: 2
Analyzed: 07/02/14 18:11
Detector: AV62
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.931	0.211	0.225		pCi/g	1.00	0.0830	133832
Thorium-230	1.23	0.241	0.262		pCi/g	1.00	0.0607	133832
Thorium-232	1.19	0.235	0.255		pCi/g	1.00	0.0349	133832

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.00	0.437	0.606		pCi/g	0.0435	6.13	81.6	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128417

Lab ID: 680-102431-9 | Analyzed: 07/02/14 18:11 | Decay Corrected: No
Client ID: SD-231-02 | Detector: AV63 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.878	0.199	0.212		pCi/g	1.00	0.106	129516
Thorium-230	0.889	0.196	0.210		pCi/g	1.00	0.0725	129516
Thorium-232	1.06	0.212	0.230		pCi/g	1.00	0.0430	129516

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.67	0.474	0.672		pCi/g	0.0638	6.14	92.5	30 - 110

Lab ID: 680-102431-11 | Analyzed: 07/02/14 18:11 | Decay Corrected: No
Client ID: SD-232-SS | Detector: AV64 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.21	0.238	0.258		pCi/g	1.00	0.0904	129517
Thorium-230	1.30	0.244	0.267		pCi/g	1.00	0.0650	129517
Thorium-232	1.21	0.235	0.256		pCi/g	1.00	0.0517	129517

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.86	0.420	0.586		pCi/g	0.0586	6.13	79.3	30 - 110

Lab ID: 680-102431-12 | Analyzed: 07/02/14 18:11 | Decay Corrected: No
Client ID: SD-232-01 | Detector: AV65 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.38	0.260	0.284		pCi/g	1.00	0.121	129518
Thorium-230	1.22	0.240	0.261		pCi/g	1.00	0.0612	129518
Thorium-232	1.37	0.253	0.278		pCi/g	1.00	0.0609	129518

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.85	0.425	0.588		pCi/g	0.0529	6.14	78.9	30 - 110

Lab ID: 680-102431-13 | Analyzed: 07/02/14 18:11 | Decay Corrected: No
Client ID: SD-232-02 | Detector: AV66 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.20	0.245	0.265		pCi/g	1.00	0.111	129519
Thorium-230	1.21	0.243	0.263		pCi/g	1.00	0.0859	129519

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128417

Lab ID: 680-102431-13 | Analyzed: 07/02/14 18:11 | Decay Corrected: No
Client ID: SD-232-02 | Detector: AV66 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-232	1.11	0.232	0.250		pCi/g	1.00	0.0625	129519

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.92	0.438	0.603		pCi/g	0.0768	6.14	80.3	30 - 110

Lab ID: 680-102431-15 | Analyzed: 07/02/14 18:11 | Decay Corrected: No
Client ID: SD-233-SS | Detector: AV67 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.06	0.223	0.240		pCi/g	1.00	0.0873	129520
Thorium-230	1.06	0.220	0.237		pCi/g	1.00	0.0649	129520
Thorium-232	1.24	0.238	0.260		pCi/g	1.00	0.0666	129520

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.90	0.424	0.591		pCi/g	0.0417	6.11	80.4	30 - 110

Lab ID: 680-102431-16 | Analyzed: 07/02/14 18:11 | Decay Corrected: No
Client ID: SD-233-01 | Detector: AV69 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.967	0.213	0.228		pCi/g	1.00	0.0846	129522
Thorium-230	0.971	0.211	0.226		pCi/g	1.00	0.0521	129522
Thorium-232	1.38	0.251	0.276		pCi/g	1.00	0.0519	129522

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.26	0.455	0.634		pCi/g	0.0511	6.13	85.8	30 - 110

Lab ID: 680-102431-17 | Analyzed: 07/02/14 18:12 | Decay Corrected: No
Client ID: SD-233-02 | Detector: AV70 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.19	0.238	0.258		pCi/g	1.00	0.0921	129524
Thorium-230	1.11	0.228	0.247		pCi/g	1.00	0.0711	129524
Thorium-232	1.25	0.241	0.263		pCi/g	1.00	0.0634	129524

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128417

Lab ID:	680-102431-17	Analyzed:	07/02/14 18:12	Decay Corrected:	No
Client ID:	SD-233-02	Detector:	AV70	Yield Truncated:	No
Sigma:	2	Dil Fac:	1	Ts:	180

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.99	0.435	0.604		pCi/g	0.0432	6.13	81.4	30 - 110

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-128417/1-A	Thorium-228			-0.009679	U	pCi/g							
MB 160-128417/1-A	Thorium-230			0.03903	U	pCi/g							
MB 160-128417/1-A	Thorium-232			0.008210	U	pCi/g							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-128417/2-A	Thorium-230		24.5	25.66		pCi/g	105	81 - 118					

Matrix Spike ID:	Analyte	Parent Result	Spike Added	MS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
680-102431-5	Thorium-230	0.673	4.33	5.500		pCi/g	111	76 - 115	3				

Matrix Spike Duplicate ID:	Analyte	Parent Result	Spike Added	MSD Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
680-102431-5	Thorium-230	0.673	4.31	5.655	F1	pCi/g	116	76 - 115	3	0.11	0.32	1	

Glossary:

Ts = Count Duration, Sample

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102431-1

SDG No.: 680-102431-1

Batch Number: 128417 Batch Start Date: 06/24/14 15:13 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/02/14 14:51

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	Th-230 00023	TRM-2 00001		
MB 160-128417/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-128417/2		ExtChrom, A-01-R		0.4999 g	0.2 mL		0.4999 g		
680-102431-A-1-A	SD-229-SS	ExtChrom, A-01-R	T	1.0046 g	0.2 mL				
680-102431-A-2-A	SD-229-01	ExtChrom, A-01-R	T	0.9977 g	0.2 mL				
680-102431-A-3-A	SD-230-SS	ExtChrom, A-01-R	T	1.0035 g	0.2 mL				
680-102431-A-4-A	SD-230-01	ExtChrom, A-01-R	T	1.0038 g	0.2 mL				
680-102431-A-5-A	SD-230-02	ExtChrom, A-01-R	T	1.0006 g	0.2 mL				
680-102431-A-5-B MS	SD-230-02	ExtChrom, A-01-R	T	0.9969 g	0.2 mL	0.2 mL			
680-102431-A-5-C MSD	SD-230-02	ExtChrom, A-01-R	T	1.0020 g	0.2 mL	0.2 mL			
680-102431-A-7-A	SD-231-SS	ExtChrom, A-01-R	T	0.9995 g	0.2 mL				
680-102431-A-8-A	SD-231-01	ExtChrom, A-01-R	T	0.9985 g	0.2 mL				
680-102431-A-9-A	SD-231-02	ExtChrom, A-01-R	T	0.9974 g	0.2 mL				
680-102431-A-11-A	SD-232-SS	ExtChrom, A-01-R	T	0.9990 g	0.2 mL				
680-102431-A-12-A	SD-232-01	ExtChrom, A-01-R	T	0.9960 g	0.2 mL				
680-102431-A-13-A	SD-232-02	ExtChrom, A-01-R	T	0.9974 g	0.2 mL				
680-102431-A-15-A	SD-233-SS	ExtChrom, A-01-R	T	1.0024 g	0.2 mL				
680-102431-A-16-A	SD-233-01	ExtChrom, A-01-R	T	0.9990 g	0.2 mL				
680-102431-A-17-A	SD-233-02	ExtChrom, A-01-R	T	0.9984 g	0.2 mL				

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

Alpha Spectroscopy Daily Pulser Check

Analysis Date: 07/02/14

		Gross Counts			FWHM (keV)			Pulser Center			Energy (keV)		
Detector	Analysis Date	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F
AV46	07/02/14 15:55	7661	7134.7 - 7885.7	Pass	13.6	10 - 20	Pass	225.0	220.0 - 230.0	Pass	5045	5004.8 - 5084.8	Pass
AV49	07/02/14 15:55	7628	7226.6 - 7987.3	Pass	15.7	10 - 20	Pass	221.1	215.0 - 225.0	Pass	5016	4967.4 - 5047.4	Pass
AV53	07/02/14 15:54	7240	6906.6 - 7633.6	Pass	11.2	10 - 20	Pass	222.0	217.0 - 227.0	Pass	5023	4982.6 - 5062.6	Pass
AV54	07/02/14 15:54	7269	6918.5 - 7646.8	Pass	15.7	10 - 20	Pass	227.2	222.1 - 232.1	Pass	5061	5020.5 - 5100.5	Pass
AV55	07/02/14 15:54	7233	6899.4 - 7625.7	Pass	11.7	10 - 20	Pass	225.0	220.0 - 230.0	Pass	5045	5004.9 - 5084.9	Pass
AV56	07/02/14 15:54	6982	6868.1 - 7591.0	Pass	13.1	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	5004.9 - 5069.9	Pass
AV57	07/02/14 15:54	7289	6901.7 - 7628.2	Pass	18.9	10 - 20	Pass	229.0	224.0 - 234.0	Pass	5075	5034.9 - 5114.9	Pass
AV58	07/02/14 15:54	7112	6766.5 - 7478.7	Pass	12.3	10 - 20	Pass	227.0	219.0 - 229.0	Pass	5060	4997.2 - 5077.2	Pass
AV60	07/02/14 15:54	7215	6867.8 - 7590.7	Pass	16.4	10 - 20	Pass	220.9	216.2 - 226.2	Pass	5014	4976.7 - 5056.7	Pass
AV61	07/02/14 15:55	7207	6682.3 - 7385.7	Pass	17.1	10 - 20	Pass	223.0	219.0 - 229.0	Pass	5030	4997.8 - 5077.8	Pass
AV62	07/02/14 15:55	7249	6875.3 - 7599.0	Pass	19.6	10 - 20	Pass	221.9	217.1 - 227.1	Pass	5022	4983.0 - 5063.0	Pass
AV63	07/02/14 15:55	7245	6829.2 - 7548.0	Pass	14.1	10 - 20	Pass	223.0	217.9 - 227.9	Pass	5030	4989.3 - 5069.3	Pass
AV64	07/02/14 15:55	7245	6847.3 - 7568.1	Pass	14.3	10 - 20	Pass	225.0	219.4 - 229.4	Pass	5045	5000.4 - 5080.4	Pass
AV65	07/02/14 15:55	7226	6864.5 - 7587.1	Pass	15.8	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	4989.7 - 5069.7	Pass
AV66	07/02/14 15:55	7231	6865.2 - 7587.8	Pass	15.3	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	4989.9 - 5069.9	Pass
AV67	07/02/14 15:55	7271	6893.5 - 7619.1	Pass	12.9	10 - 20	Pass	228.0	221.9 - 231.9	Pass	5067	5019.4 - 5099.4	Pass
AV69	07/02/14 15:55	7283	6915.8 - 7643.8	Pass	12.7	10 - 20	Pass	221.0	216.0 - 226.0	Pass	5015	4975.3 - 5055.3	Pass
AV70	07/02/14 15:55	7447	7073.8 - 7818.4	Pass	14.2	10 - 20	Pass	220.1	214.1 - 224.1	Pass	5008	4960.7 - 5040.7	Pass

Alpha Spectroscopy Calibration Summary

Detector: AV46

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120409/1	05/05/14 19:30	82245-334_00001	0.2680	0.20-0.32		
ICV 160-121079/1	05/08/14 00:18	82244-334_00001	0.2610	0.20-0.32	97.4	95-105
CCV 160-127986/1	06/22/14 21:17	82245-334_00001	0.2669	0.20-0.32	99.6	95-105

Detector: AV49

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120271/1	05/04/14 21:03	82232-334_00001	0.2653	0.20-0.32		
ICV 160-121364/1	05/08/14 14:34	82247-334_00001	0.2545	0.20-0.32	95.9	95-105
CCV 160-127989/1	06/22/14 18:52	82232-334_00001	0.2674	0.20-0.32	100.8	95-105

Detector: AV53

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120275/1	05/04/14 21:04	82236-334_00001	0.2632	0.20-0.32		
ICV 160-121082/1	05/08/14 00:18	82235-334_00001	0.2648	0.20-0.32	100.6	95-105
CCV 160-127992/1	06/22/14 18:53	82236-334_00001	0.2651	0.20-0.32	100.7	95-105

Detector: AV54

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120276/1	05/04/14 21:04	82237-334_00003	0.2602	0.20-0.32		
ICV 160-121368/1	05/08/14 14:34	82236-334_00001	0.2609	0.20-0.32	100.3	95-105
CCV 160-127993/1	06/22/14 18:53	82237-334_00003	0.2628	0.20-0.32	101.0	95-105

Detector: AV55

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120842/1	05/07/14 19:51	82232-334_00001	0.2679	0.20-0.32		
ICV 160-121083/1	05/08/14 00:19	82237-334_00003	0.2569	0.20-0.32	95.9	95-105
CCV 160-127994/1	06/22/14 20:08	82232-334_00001	0.2683	0.20-0.32	100.2	95-105

Detector: AV56

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120278/1	05/04/14 21:04	82240-334_00001	0.2609	0.20-0.32		
ICV 160-121369/1	05/08/14 17:18	82247-334_00001	0.2519	0.20-0.32	96.5	95-105
CCV 160-127995/1	06/22/14 18:53	82240-334_00001	0.2626	0.20-0.32	100.7	95-105

Detector: AV57

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120279/1	05/04/14 21:05	82241-334_00001	0.2674	0.20-0.32		
ICV 160-121370/1	05/08/14 14:35	82240-334_00001	0.2676	0.20-0.32	100.1	95-105
CCV 160-127996/1	06/22/14 18:53	82241-334_00001	0.2692	0.20-0.32	100.7	95-105

Detector: AV58

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120280/1	05/04/14 21:05	82242-334_00001	0.2656	0.20-0.32		
ICV 160-121371/1	05/08/14 14:35	82241-334_00001	0.2710	0.20-0.32	102.0	95-105
CCV 160-127997/1	06/22/14 18:53	82242-334_00001	0.2631	0.20-0.32	99.1	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV60

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120282/1	05/04/14 21:06	82244-334_00001	0.2633	0.20-0.32		
ICV 160-121373/1	05/08/14 17:21	82243-334_00001	0.2725	0.20-0.32	103.5	95-105
CCV 160-127999/1	06/22/14 21:17	82244-334_00001	0.2629	0.20-0.32	99.8	95-105

Detector: AV61

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120283/1	05/04/14 21:06	82245-334_00001	0.2646	0.20-0.32		
ICV 160-121374/1	05/08/14 14:36	82244-334_00001	0.2581	0.20-0.32	97.5	95-105
CCV 160-128018/1	06/22/14 22:21	82245-334_00001	0.2622	0.20-0.32	99.1	95-105

Detector: AV62

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120284/1	05/04/14 21:06	82246-334_00001	0.2634	0.20-0.32		
ICV 160-121375/1	05/08/14 14:36	82245-334_00001	0.2622	0.20-0.32	99.6	95-105
CCV 160-128000/1	06/22/14 20:09	82246-334_00001	0.2650	0.20-0.32	100.6	95-105

Detector: AV63

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120285/1	05/04/14 21:06	82247-334_00001	0.2548	0.20-0.32		
ICV 160-121376/1	05/08/14 14:36	82246-334_00001	0.2601	0.20-0.32	102.1	95-105
CCV 160-128001/1	06/22/14 21:18	82247-334_00001	0.2557	0.20-0.32	100.3	95-105

Detector: AV64

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120041/1	05/04/14 17:47	82232-334_00001	0.2775	0.20-0.32		
ICV 160-121389/1	05/11/14 19:31	82247-334_00001	0.2666	0.20-0.32	96.1	95-105
CCV 160-128002/1	06/22/14 21:18	82232-334_00001	0.2776	0.20-0.32	100.0	95-105

Detector: AV65

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120042/1	05/04/14 17:47	82233-334_00001	0.2713	0.20-0.32		
ICV 160-121377/1	05/08/14 17:18	82232-334_00001	0.2712	0.20-0.32	99.9	95-105
CCV 160-128003/1	06/22/14 20:09	82233-334_00001	0.2695	0.20-0.32	99.3	95-105

Detector: AV66

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120043/1	05/04/14 17:47	82234-334_00001	0.2593	0.20-0.32		
ICV 160-121390/1	05/11/14 19:32	82233-334_00001	0.2667	0.20-0.32	102.9	95-105
CCV 160-128004/1	06/22/14 21:18	82234-334_00001	0.2570	0.20-0.32	99.1	95-105

Detector: AV67

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120044/1	05/04/14 17:48	82235-334_00001	0.2732	0.20-0.32		
ICV 160-121391/1	05/11/14 19:32	82234-334_00001	0.2702	0.20-0.32	98.9	95-105
CCV 160-128005/1	06/22/14 18:54	82235-334_00001	0.2782	0.20-0.32	101.8	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV69

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120046/1	05/04/14 17:48	82237-334_00003	0.2557	0.20-0.32		
ICV 160-121379/1	05/08/14 17:19	82236-334_00001	0.2646	0.20-0.32	103.5	95-105
CCV 160-128007/1	06/22/14 20:09	82237-334_00003	0.2594	0.20-0.32	101.5	95-105

Detector: AV70

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120844/1	05/07/14 19:51	82235-334_00001	0.2652	0.20-0.32		
ICV 160-121380/1	05/08/14 14:36	82237-334_00003	0.2579	0.20-0.32	97.2	95-105
CCV 160-128008/1	06/22/14 20:10	82235-334_00001	0.2569	0.20-0.32	96.9	95-105

COVER PAGE
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102431-3

SDG No.: 680-102431-1

Project: Sediments

Client Sample ID	Lab Sample ID
SD-229-SS	680-102431-1
SD-229-01	680-102431-2
SD-230-SS	680-102431-3
SD-230-01	680-102431-4
SD-230-02	680-102431-5
SD-231-SS	680-102431-7
SD-231-01	680-102431-8
SD-231-02	680-102431-9
SD-232-SS	680-102431-11
SD-232-01	680-102431-12
SD-232-02	680-102431-13
SD-233-SS	680-102431-15
SD-233-01	680-102431-16
SD-233-02	680-102431-17

Comments:

12-IN
PREPARATION LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

Prep Method: 3050B

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight (g)	Initial Volume	Final Volume (mL)
MB 160-139348/1-A	08/21/2014 10:35	139348	0.5931		50
LCS 160-139348/2-A	08/21/2014 10:35	139348	0.5263		50
680-102431-1	08/21/2014 10:35	139348	0.5918		50
680-102431-2	08/21/2014 10:35	139348	0.5397		50
680-102431-3	08/21/2014 10:35	139348	0.5187		50
680-102431-4	08/21/2014 10:35	139348	0.5044		50
680-102431-5	08/21/2014 10:35	139348	0.5094		50
680-102431-5 MS	08/21/2014 10:35	139348	0.5208		50
680-102431-5 MSD	08/21/2014 10:35	139348	0.5496		50
680-102431-7	08/21/2014 10:35	139348	0.5477		50
680-102431-8	08/21/2014 10:35	139348	0.5742		50
680-102431-8 MS	08/21/2014 10:35	139348	0.5989		50
680-102431-8 MSD	08/21/2014 10:35	139348	0.5915		50
680-102431-9	08/21/2014 10:35	139348	0.5158		50
680-102431-11	08/21/2014 10:35	139348	0.5565		50
680-102431-12	08/21/2014 10:35	139348	0.5239		50
680-102431-13	08/21/2014 10:35	139348	0.5116		50
680-102431-15	08/21/2014 10:35	139348	0.5456		50
680-102431-16	08/21/2014 10:35	139348	0.5307		50
680-102431-17	08/21/2014 10:35	139348	0.5447		50

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/02/2014 18:15 End Date: 09/03/2014 00:54

Lab Sample Id	D/F	Type	Time	Analytes																												
				U-233	U-234	U-235	U-236	U-238																								
ICIS 160-141597/1			18:15	X	X	X	X	X																								
IC 160-141597/2	1		18:22	X	X	X	X	X																								
IC 160-141597/3	1		18:27	X	X	X	X	X																								
IC 160-141597/4	1		18:31	X	X	X	X	X																								
IC 160-141597/5	1		18:36	X	X	X	X	X																								
IC 160-141597/6	1		18:41	X	X	X	X	X																								
ICV 160-141597/7	1		18:45	X																												
ICV 160-141597/8	1		18:50		X			X																								
ICV 160-141597/9	1		18:55			X	X																									
ICB 160-141597/10	1		18:59	X	X	X	X	X																								
CRI 160-141597/11	1		19:04			X		X																								
CRI 160-141597/12	1		19:09	X	X		X																									
ICSA 160-141597/13	1		19:13	X	X	X	X	X																								
ICSAB 160-141597/14	1		19:18	X	X	X	X	X																								
CCV 160-141597/15			19:23																													
CCB 160-141597/16			19:27																													
ZZZZZZ			19:32																													
ZZZZZZ			19:37																													
ZZZZZZ			19:41																													
ZZZZZZ			19:46																													
ZZZZZZ			19:51																													
ZZZZZZ			19:55																													
ZZZZZZ			20:00																													
ZZZZZZ			20:05																													
ZZZZZZ			20:09																													
ZZZZZZ			20:14																													
CCV 160-141597/27			20:19																													
CCB 160-141597/28			20:23																													
ZZZZZZ			20:28																													
ZZZZZZ			20:33																													
ZZZZZZ			20:37																													
ZZZZZZ			20:42																													
ZZZZZZ			20:47																													
ZZZZZZ			20:51																													
ZZZZZZ			20:56																													
ZZZZZZ			21:01																													
ZZZZZZ			21:05																													
ZZZZZZ			21:10																													
CCV 160-141597/39			21:15																													

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/02/2014 18:15 End Date: 09/03/2014 00:54

Lab Sample Id	D/F	Type	Time	Analytes																												
				U-233	U-234	U-235	U-236	U-238																									
CCB 160-141597/40			21:19																													
ZZZZZZ			21:24																													
ZZZZZZ			21:29																													
ZZZZZZ			21:33																													
ZZZZZZ			21:38																													
ZZZZZZ			21:43																													
ZZZZZZ			21:48																													
ZZZZZZ			21:52																													
ZZZZZZ			21:57																													
ZZZZZZ			22:01																													
ZZZZZZ			22:06																													
CCV 160-141597/51	1		22:11	X	X	X	X	X																								
CCB 160-141597/52	1		22:16	X	X	X	X	X																								
ZZZZZZ			22:20																													
ZZZZZZ			22:25																													
ZZZZZZ			22:30																													
ZZZZZZ			22:34																													
ZZZZZZ			22:39																													
MB 160-139348/1-A	2	T	22:44	X	X	X	X	X																								
LCS 160-139348/2-A	2	T	22:48		X	X		X																								
ZZZZZZ			22:53																													
ZZZZZZ			22:58																													
680-102431-1	5	T	23:02	X	X	X	X	X																								
CCV 160-141597/63	1		23:07	X	X	X	X	X																								
CCB 160-141597/64	1		23:12	X	X	X	X	X																								
680-102431-2	5	T	23:16	X	X	X	X	X																								
680-102431-3	5	T	23:21	X	X	X	X	X																								
680-102431-4	5	T	23:26	X	X	X	X	X																								
680-102431-5	5	T	23:30	X	X	X	X	X																								
680-102431-5 SD	25	T	23:35	X	X	X	X	X																								
680-102431-5 MS	5	T	23:40		X	X		X																								
680-102431-5 MSD	5	T	23:44		X	X		X																								
680-102431-7	5	T	23:49	X	X	X	X	X																								
680-102431-8	5	T	23:54	X	X	X	X	X																								
680-102431-8 MS	5	T	23:58		X	X		X																								
CCV 160-141597/75	1		00:03	X	X	X	X	X																								
CCB 160-141597/76	1		00:08	X	X	X	X	X																								
680-102431-8 MSD	5	T	00:12		X	X		X																								
680-102431-9	5	T	00:17	X	X	X	X	X																								

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/02/2014 18:15 End Date: 09/03/2014 00:54

Lab Sample Id	D/F	Type	Time	Analytes																												
				U-233	U-234	U-235	U-236	U-238																									
680-102431-11	5	T	00:22	X	X	X	X	X																								
680-102431-12	5	T	00:26	X	X	X	X	X																								
680-102431-13	5	T	00:31	X	X	X	X	X																								
680-102431-15	5	T	00:36	X	X	X	X	X																								
680-102431-16	5	T	00:40	X	X	X	X	X																								
680-102431-17	5	T	00:45	X	X	X	X	X																								
CCV 160-141597/85	1		00:50	X	X	X	X	X																								
CCB 160-141597/86	1		00:54	X	X	X	X	X																								

Prep Types:
T = Total/NA

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

Instrument ID: NOEQUIP Analysis Method: 6020A

Start Date: 09/04/2014 13:20 End Date: 09/04/2014 13:20

Lab Sample Id	D/F	Type	Time	Analytes
				U
ZZZZZZ			13:20	
ZZZZZZ			13:20	
680-102431-1	1	T	13:20	X
680-102431-2	1	T	13:20	X
680-102431-3	1	T	13:20	X
680-102431-4	1	T	13:20	X
680-102431-5	1	T	13:20	X
680-102431-7	1	T	13:20	X
680-102431-8	1	T	13:20	X
680-102431-9	1	T	13:20	X
680-102431-11	1	T	13:20	X
680-102431-12	1	T	13:20	X
680-102431-13	1	T	13:20	X
680-102431-15	1	T	13:20	X
680-102431-16	1	T	13:20	X
680-102431-17	1	T	13:20	X

Prep Types:
T = Total/NA

FORM XIII-IN

15-IN
ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

ICP-MS Instrument ID: ICPMS6100 Start Date: 09/02/2014 End Date: 09/03/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
IC 160-141597/2	18:22										
IC 160-141597/3	18:27										
IC 160-141597/4	18:31										
IC 160-141597/5	18:36										
IC 160-141597/6	18:41										
ICV 160-141597/7	18:45	101									
ICV 160-141597/8	18:50	101									
ICV 160-141597/9	18:55	99									
ICB 160-141597/10	18:59	98									
CRI 160-141597/11	19:04	100									
CRI 160-141597/12	19:09	100									
ICSA 160-141597/13	19:13	90									
ICSAB 160-141597/14	19:18	89									
CCV 160-141597/51	22:11	94									
CCB 160-141597/52	22:16	92									
MB 160-139348/1-A	22:44	96									
LCS 160-139348/2-A	22:48	95									
680-102431-1	23:02	98									
CCV 160-141597/63	23:07	92									
CCB 160-141597/64	23:12	90									
680-102431-2	23:16	92									
680-102431-3	23:21	85									
680-102431-4	23:26	87									
680-102431-5	23:30	90									
680-102431-5 SD	23:35	95									
680-102431-5 MS	23:40	89									
680-102431-5 MSD	23:44	87									
680-102431-7	23:49	86									
680-102431-8	23:54	91									
680-102431-8 MS	23:58	89									
CCV 160-141597/75	00:03	93									
CCB 160-141597/76	00:08	93									
680-102431-8 MSD	00:12	89									
680-102431-9	00:17	87									
680-102431-11	00:22	89									
680-102431-12	00:26	89									
680-102431-13	00:31	88									
680-102431-15	00:36	88									
680-102431-16	00:40	89									
680-102431-17	00:45	89									
CCV 160-141597/85	00:50	93									
CCB 160-141597/86	00:54	92									

FORM XV - IN

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

ICV Source: ISOU ICV(3)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00021

Analyte	ICV 160-141597/7 09/02/2014 18:45				CCV 160-141597/51 09/02/2014 22:11				CCV 160-141597/63 09/02/2014 23:07			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.226		0.223	101	0.0493	J	0.0515	96	0.0508		0.0515	99

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

ICV Source: ISOU ICV(3)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00021

Analyte	CCV 160-141597/75 09/03/2014 00:03				CCV 160-141597/85 09/03/2014 00:50							
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.0510		0.0515	99	0.0506		0.0515	98				

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

ICV Source: ISOU ICV(4,8)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00021

Analyte	ICV 160-141597/8 09/02/2014 18:50				CCV 160-141597/51 09/02/2014 22:11				CCV 160-141597/63 09/02/2014 23:07			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0892		0.0835	107	0.0871		0.0827	105	0.0874		0.0827	106
U-238	10.1		9.78	103	5.50		5.03	109	5.49		5.03	109

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

ICV Source: ISOU ICV(4,8)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00021

Analyte	CCV 160-141597/75 09/03/2014 00:03				CCV 160-141597/85 09/03/2014 00:50							
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0885		0.0827	107	0.0884		0.0827	107				
U-238	5.53		5.03	110	5.47		5.03	109				

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

ICV Source: ISOU ICV(5,6)_00022 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00021

Analyte	ICV 160-141597/9 09/02/2014 18:55				CCV 160-141597/51 09/02/2014 22:11				CCV 160-141597/63 09/02/2014 23:07			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	1.16		1.06	109	5.27		4.85	109	5.25		4.85	108
U-236	0.0702		0.0746	94	0.0933		0.0890	105	0.0945		0.0890	106

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

ICV Source: ISOU ICV(5,6)_00022 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00021

Analyte	CCV 160-141597/75 09/03/2014 00:03				CCV 160-141597/85 09/03/2014 00:50							
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	5.32		4.85	110	5.26		4.85	109				
U-236	0.0946		0.0890	106	0.0942		0.0890	106				

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2B-IN
CRQL CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

Method: 6020A Instrument ID: ICPMS6100

Lab Sample ID: CRI 160-141597/11 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 1_00021

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-235	0.0485	0.0499	J	103	70-130
U-238	0.0503	0.0496	J	99	70-130

Lab Sample ID: CRI 160-141597/12 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 2_00022

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-233	0.0309	0.0363	J	117	70-130
U-234	0.0496	0.0495	J	100	70-130
U-236	0.0534	0.0529		99	70-130

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IIB-IN

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

Concentration Units: ug/L

Analyte	RL	ICB 160-141597/10 09/02/2014 18:59		CCB 160-141597/52 09/02/2014 22:16		CCB 160-141597/64 09/02/2014 23:12		CCB 160-141597/76 09/03/2014 00:08	
		Found	C	Found	C	Found	C	Found	C
U-233	0.025	0.0345		0.0146	J	0.0150	J	0.0141	J
U-234	0.025	ND		ND		ND		ND	
U-235	0.025	ND		ND		ND		ND	
U-236	0.025	ND		ND		ND		ND	
U-238	0.025	0.00507	J	ND		ND		ND	

Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

Concentration Units: ug/L

Analyte	RL	CCB 160-141597/86 09/03/2014 00:54							
		Found	C	Found	C	Found	C	Found	C
U-233	0.025	0.0139	J						
U-234	0.025	ND							
U-235	0.025	ND							
U-236	0.025	ND							
U-238	0.025	ND							

Italicized analytes were not requested for this sequence.

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-139348/1-A

Instrument Code: ICPMS6100 Batch No.: 141597

CAS No.	Analyte	Concentration	C	Q	Method
13968-55-3	U-233	ND			6020A_U
13966-29-5	U-234	ND			6020A_U
15117-96-1	U-235	ND			6020A_U
13982-70-2	U-236	ND			6020A_U
7440-61-1	U-238	ND			6020A_U

4A-IN
INTERFERENCE CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

Lab Sample ID: ICSAB 160-141597/14 Instrument ID: ICPMS6100

Lab File ID: 090214M2.rep ICS Source: ISOU ICSAB_00022

Concentration Units: ug/L

Analyte	True Solution AB	Found Solution AB	Found Percent Recovery
U-233	**0.0515**	**0.0537**	**104**
U-234	**0.0827**	**0.0910**	**110**
U-235	**4.85**	**5.47**	**113**
U-236	**0.0890**	**0.0975**	**110**
U-238	**5.03**	**5.69**	**113**

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IVA-IN

5A-IN
MATRIX SPIKE SAMPLE RECOVERY
METALS

Client ID: SD-230-02 MS | Lab ID: 680-102431-5 MS

Lab Name: TestAmerica St. Louis | Job No.: 680-102431-3

SDG No.: 680-102431-1

Matrix: Solid | Concentration Units: mg/Kg

% Solids:

Analyte	SSR	C	Sample Result (SR)	C	Spike Added (SA)	%R	Control Limit %R	Q	Method
U-234	0.00899	J	ND		0.00794	113	75-125		6020A
U-235	0.543		0.0074	J	0.465	115	75-125		6020A
U-238	1.54		1.0		0.483	112	75-125		6020A

SSR = Spiked Sample Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VA - IN

5A-IN
MATRIX SPIKE DUPLICATE SAMPLE RECOVERY
METALS

Client ID: SD-230-02 MSD | Lab ID: 680-102431-5 MSD

Lab Name: TestAmerica St. Louis | Job No.: 680-102431-3

SDG No.: 680-102431-1

Matrix: Solid | Concentration Units: mg/Kg

% Solids:

Analyte	(SDR)	C	Spike Added (SA)	%R	Control Limit %R	RPD	RPD Limit	Q	Method
U-234	0.00689	J	0.00752	92	75-125	26	20	F2	6020A
U-235	0.408		0.441	91	75-125	28	20	F2	6020A
U-238	1.16		0.457	36	75-125	28	20	F1 F2	6020A

SDR = Sample Duplicate Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VD - IN

5A-IN
MATRIX SPIKE SAMPLE RECOVERY
METALS

Client ID: SD-231-01 MS Lab ID: 680-102431-8 MS

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

Matrix: Solid Concentration Units: mg/Kg

% Solids:

Analyte	SSR	C	Sample Result (SR)	C	Spike Added (SA)	%R	Control Limit %R	Q	Method
U-234	0.00608	J	ND		0.00690	88	75-125		6020A
U-235	0.369		0.014		0.405	88	75-125		6020A
U-238	2.20		1.8		0.420	102	75-125	4	6020A

SSR = Spiked Sample Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VA - IN

5A-IN
MATRIX SPIKE DUPLICATE SAMPLE RECOVERY
METALS

Client ID: SD-231-01 MSD Lab ID: 680-102431-8 MSD

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

Matrix: Solid Concentration Units: mg/Kg

% Solids:

Analyte	(SDR)	C	Spike Added (SA)	%R	Control Limit %R	RPD	RPD Limit	Q	Method
U-234	0.00591	J	0.00699	85	75-125	3	20		6020A
U-235	0.354		0.410	83	75-125	4	20		6020A
U-238	2.11		0.425	81	75-125	4	20	4	6020A

SDR = Sample Duplicate Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VD - IN

7A-IN
LAB CONTROL SAMPLE
METALS

Lab ID: LCS 160-139348/2-A

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

Sample Matrix: Solid LCS Source: ISOU Prep Spk_00002

Analyte	Solid(mg/Kg)							
	True	Found	C	%R	Limits		Q	Method
U-234	0.00785	0.00845		108	80	120		6020A
U-235	0.461	0.508		110	80	120		6020A
U-238	0.477	0.525		110	80	120		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

8-IN
ICP-AES AND ICP-MS SERIAL DILUTIONS
METALS

Lab ID: 680-102431-5

SDG No: 680-102431-1

Lab Name: TestAmerica St. Louis Job No: 680-102431-3

Matrix: Solid Concentration Units: mg/Kg

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Method
U-233	ND		ND		NC		6020A
U-234	ND		ND		NC		6020A
U-235	0.0074	J	ND		NC		6020A
U-236	ND		ND		NC		6020A
U-238	1.0		0.963		3.5		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIII-IN

9-IN
DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102431-3

SDG Number: 680-102431-1

Matrix: Solid Instrument ID: ICPMS6100

Method: 6020A MDL Date: 08/05/2013 10:01

Prep Method: 3050B

Analyte	Wavelength/ Mass	RL (mg/Kg)	MDL (mg/Kg)
U-233	233	0.005	0.0015
U-234	234	0.005	0.0003
U-235	235	0.005	0.00203
U-236	236	0.005	0.0004
U-238	238	0.005	0.0003

9-IN
CALIBRATION BLANK DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102431-3

SDG Number: 680-102431-1

Matrix: Solid Instrument ID: ICPMS6100

Method: 6020A XMDL Date: 07/18/2014 15:08

Analyte	Wavelength/ Mass	XRL (ug/L)	XMDL (ug/L)
U-233	233	0.05	0.0066
U-234	234	0.05	0.0021
U-235	235	0.05	0.0034
U-236	236	0.05	0.0015
U-238	238	0.05	0.0082

9-IN
DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102431-3

SDG Number: 680-102431-1

Matrix: Solid Instrument ID: NOEQUIP

Method: 6020A MDL Date: 06/12/2013 14:02

Analyte	Wavelength/ Mass	RL (mg/Kg)	MDL (mg/Kg)
Total Uranium		0.005	0.0003

11-IN
LINEAR RANGES
METALS

Lab Name: TestAmerica St. Louis Job No: 680-102431-3

SDG No.: 680-102431-1

Instrument ID: ICPMS6100 Date: 02/14/2012 11:04

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	Method
U-233		2000	6020A
U-234		2000	6020A
U-235		2000	6020A
U-236		2000	6020A
U-238		2000	6020A

TETRATECH INTERNAL CORRESPONDENCE

TO: **M. MARTIN** **DATE: OCTOBER 14, 2014**

FROM: **A. COGNETTI** **COPIES: DV FILE**

SUBJECT: **DATA VALIDATION: RADIOLOGICAL ANALYSES ISOTOPIC THORIUM**
MRC SEDIMENT INVESTIGATION
SAMPLE DELIVERY GROUP (SDG) – 680-102600-2

SAMPLE: 4/Sediment/Rad

SD-278-01 SD-278-02 SD-278-03 SD-278-SS

Overview

The sample set for MRC Sediment Investigation, SDG 680-102600-2 consists of four (4) sediment environmental samples analyzed for isotopic thorium. There is no field duplicate pair associated with this SDG.

The samples were collected by Tetra Tech on June 20, 2014 and were analyzed by Test America. All analyses were conducted using Method A-01-R analysis and reporting protocol.

The data contained in this SDG was validated with regard to the following parameters: data completeness, holding time, initial/continuing calibration, laboratory method blank, blank spike recoveries, matrix spike/ matrix spike duplicate recoveries, tracer yield and detection limits.

Minor Problems

- Thorium-230 was detected in the method blank associated with batch 160-128863/1-A at a concentration of 0.3143 +/- 0.126 pCi/g. A mean difference of the blank activity and positive sample activity was calculated and used for evaluation of blank contamination for samples SD-228-01, SD-228-02, SD-228-SS, and SD-228-03. The mean difference was greater than 3 and the sample and blank results differed by a factor less than 10 in all samples. Therefore, the sample results were qualified as estimated (J) as the contaminant may have an impact on the sample results.

Notes

The uncertainty for the sample results are reported at 2 standard deviations (95% confidence level). The EDD does not contain the uncertainty result.

EXECUTIVE SUMMARY

Laboratory Performance Issues: Contamination was detected in a method blank for Thorium-230.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the Methods A-01-R. The text of this report has been formulated to address only those problem areas affecting data quality.

Tetra Tech
Ann Cognetti
Chemist/Data Validator

Tetra Tech
Joseph A. Samchuck
Data Validation Manager

Attachments:
1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as Reported by the Laboratory
3. Appendix C - Support Documentation

APPENDIX A

QUALIFIED LABORATORY RESULTS

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = ICP PDS Recovery Noncompliance; MSA's $r < 0.995$
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = RPD between columns/detectors >40% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient $r < 0.995$
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 standard deviations is greater than sample activity
Z1 = Tentatively Identified Compound considered presumptively present
Z2 = Tentatively Identified Compound column bleed
Z3 = Tentatively Identified Compound aldol condensate

PROJ_NO: 05220	NSAMPLE	SD-278-01			SD-278-02			SD-278-03			SD-278-SS		
SDG: 680-102600-2	LAB_ID	680-102600-7			680-102600-8			680-102600-9			680-102600-6		
FRACTION: RAD	SAMP_DATE	6/20/2014			6/20/2014			6/20/2014			6/20/2014		
MEDIA: SEDIMENT	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
THORIUM-228		1.45			1.29			1.69			0.996		
THORIUM-230		1.38	J	A	0.905	J	A	1.23	J	A	1.27	J	A
THORIUM-232		1.38			1.15			1.42			1.31		

APPENDIX B

RESULTS AS REPORTED BY THE LABORATORY

Client Sample ID: SD-278-SS

Lab Sample ID: 680-102600-6
Matrix: Solid

Date Collected: 06/20/14 10:00
Date Received: 06/23/14 09:00

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.996		0.210	0.226	1.00	0.0670	pCi/g	06/27/14 17:25	07/07/14 18:11	1
Thorium-230	1.27		0.236	0.259	1.00	0.0707	pCi/g	06/27/14 17:25	07/07/14 18:11	1
Thorium-232	1.31		0.239	0.263	1.00	0.0564	pCi/g	06/27/14 17:25	07/07/14 18:11	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*85.1*		*30 - 110*	*06/27/14 17:25*	*07/07/14 18:11*	*1*

Client Sample ID: SD-278-01

Lab Sample ID: 680-102600-7
Matrix: Solid

Date Collected: 06/20/14 10:05
Date Received: 06/23/14 09:00

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.45		0.266	0.292	1.00	0.109	pCi/g	06/27/14 17:25	07/07/14 18:11	1
Thorium-230	1.38		0.257	0.282	1.00	0.0768	pCi/g	06/27/14 17:25	07/07/14 18:11	1
Thorium-232	1.38		0.257	0.282	1.00	0.0842	pCi/g	06/27/14 17:25	07/07/14 18:11	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*79.0*		*30 - 110*	*06/27/14 17:25*	*07/07/14 18:11*	*1*

Client Sample ID: SD-278-02

Lab Sample ID: 680-102600-8
Matrix: Solid

Date Collected: 06/20/14 10:10
Date Received: 06/23/14 09:00

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.29		0.235	0.259	1.00	0.0809	pCi/g	06/27/14 17:25	07/07/14 18:11	1
Thorium-230	0.905		0.196	0.210	1.00	0.0480	pCi/g	06/27/14 17:25	07/07/14 18:11	1
Thorium-232	1.15		0.221	0.242	1.00	0.0776	pCi/g	06/27/14 17:25	07/07/14 18:11	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*91.3*		*30 - 110*	*06/27/14 17:25*	*07/07/14 18:11*	*1*

Client Sample ID: SD-278-03

Lab Sample ID: 680-102600-9
Matrix: Solid

Date Collected: 06/20/14 10:15
Date Received: 06/23/14 09:00

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.69		0.294	0.326	1.00	0.0991	pCi/g	06/27/14 17:25	07/07/14 18:11	1
Thorium-230	1.23		0.248	0.269	1.00	0.0376	pCi/g	06/27/14 17:25	07/07/14 18:11	1
Thorium-232	1.42		0.269	0.294	1.00	0.100	pCi/g	06/27/14 17:25	07/07/14 18:11	1

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102600-2
SDG: 680102600-2

Client Sample ID: SD-278-03
Date Collected: 06/20/14 10:15
Date Received: 06/23/14 09:00

Lab Sample ID: 680-102600-9
Matrix: Solid

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	77.0		30 - 110	06/27/14 17:25	07/07/14 18:11	1

APPENDIX C

SUPPORT DOCUMENTATION

BLANK CONTAMINATION EVALUATION

SDG 680-102600-2

MEAN DIFFERENCE (MD):

$$\frac{|\text{SAMPLE ACTIVITY} - \text{BLANK ACTIVITY}|}{\sqrt{((\text{SAMPLE UNCERTAINTY}/2)^2 + (\text{BLANK UNCERTAINTY}/2)^2)}}$$

BLANK ID: MB 160-128863/1-A THORIUM-230

0.3143 ± 0.1260 pCi/L

AFFECTED SAMPLES:

SAMPLE ID: SD-278-01

THORIUM-230

1.38 ± 0.282 pCi/L

MD = 6.901

SAMPLE ID: SD-278-02

THORIUM-230

0.905 ± 0.21 pCi/L

MD = 4.824

SAMPLE ID: SD-278-03

THORIUM-230

1.23 ± 0.269 pCi/L

MD = 6.165

SAMPLE ID: SD-278-SS

THORIUM-230

1.27 ± 0.259 pCi/L

MD = 6.636

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Sediments

Report Number: 680-102600-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 06/23/2014; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the coolers at receipt was 24.2 C.

ISOTOPIC THORIUM

Samples SD-278-SS (680-102600-6), SD-278-01 (680-102600-7), SD-278-02 (680-102600-8) and SD-278-03 (680-102600-9) were analyzed for Isotopic Thorium in accordance with A01R_Th. The samples were leached on 06/24/2014, prepared on 06/27/2014 and analyzed on 07/07/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.43
Client Contact: Mike Martin	Phone: (703) 342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page [redacted] 1 of 1
Company: Tetra Tech, Inc.		Analysis Requested		Job #:
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes:
City: Germantown	TAT Requested (days): Standard			A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			Other:
Email: Michael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:		X	X	N	N	N	N	X	
SD-278-SS	6/20/14	1000	C	Solid				X				
SD-278-01	↓	1005	C	Solid				X				
SD-278-02		1010	C	Solid				X				
SD-278-03		1015	C	Solid				X				
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements: 680 - 102600

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	[signature]	6/20/14 - 1100	TT	[signature]	6/23/14 09:00	TA
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 2 + 2° C

HOLDTIME

SDG 680102600-2

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
RAD	PCI/G	SD-278-SS	680-102600-6	NM	06/20/2014	06/27/2014	07/07/2014	7	10	17
RAD	PCI/G	SD-278-03	680-102600-9	NM	06/20/2014	06/27/2014	07/07/2014	7	10	17
RAD	PCI/G	SD-278-02	680-102600-8	NM	06/20/2014	06/27/2014	07/07/2014	7	10	17
RAD	PCI/G	SD-278-01	680-102600-7	NM	06/20/2014	06/27/2014	07/07/2014	7	10	17

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102600-2
SDG: 680102600-2

Method	Method Description	Protocol	Laboratory
A-01-R	Isotopic Thorium (Alpha Spectrometry)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102600-2
SDG: 680102600-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-102600-6	SD-278-SS	Solid	06/20/14 10:00	06/23/14 09:00
680-102600-7	SD-278-01	Solid	06/20/14 10:05	06/23/14 09:00
680-102600-8	SD-278-02	Solid	06/20/14 10:10	06/23/14 09:00
680-102600-9	SD-278-03	Solid	06/20/14 10:15	06/23/14 09:00

Tracer/Carrier Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102600-2
SDG: 680102600-2

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Matrix: Solid

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	Th-229 (30-110)
680-102600-6	SD-278-SS	85.1
680-102600-6 DU	SD-278-SS	78.2
680-102600-7	SD-278-01	79.0
680-102600-8	SD-278-02	91.3
680-102600-9	SD-278-03	77.0
LCS 160-128863/2-A	Lab Control Sample	93.7
MB 160-128863/1-A	Method Blank	84.4

Tracer/Carrier Legend

Th-229 = Thorium-229

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Lab Sample ID: MB 160-128863/1-A
Matrix: Solid
Analysis Batch: 130012

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 128863

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	-0.02056	U	0.0284	0.0285	1.00	0.104	pCi/g	06/27/14 17:25	07/07/14 18:10	1
Thorium-230	0.3143		0.123	0.126	1.00	0.0758	pCi/g	06/27/14 17:25	07/07/14 18:10	1
Thorium-232	0.003586	U	0.0349	0.0349	1.00	0.0879	pCi/g	06/27/14 17:25	07/07/14 18:10	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*84.4*		*30 - 110*	*06/27/14 17:25*	*07/07/14 18:10*	*1*

Lab Sample ID: LCS 160-128863/2-A
Matrix: Solid
Analysis Batch: 130023

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 128863

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Thorium-230			24.5	23.67		2.42	1.00	0.0950	pCi/g	97	81 - 118		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*93.7*		*30 - 110*

Lab Sample ID: 680-102600-6 DU
Matrix: Solid
Analysis Batch: 129939

Client Sample ID: SD-278-SS
Prep Type: Total/NA
Prep Batch: 128863

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Thorium-228	0.996			1.417		0.295	1.00	0.115	pCi/g			0.81	1
Thorium-230	1.27			1.486		0.300	1.00	0.0708	pCi/g			0.39	1
Thorium-232	1.31			1.596		0.311	1.00	0.0371	pCi/g			0.50	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Thorium-229	*78.2*		*30 - 110*

Alpha Spectroscopy Run Log

Detector: AV7

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/07/14 19:51	140	IC 160-120843/1		120843			PS
05/07/14 23:03	60	ICV 160-120858/1		120858			PS
06/18/14 19:08	960	ICB 160-127831/1		127831			PS
06/19/14 16:44	60	CCV 160-127943/1		127943			PS
07/07/14 00:37	1	PULSER 160-130012/1		130012			MLK
07/07/14 16:35	30	ZZZZZ		130012			
07/07/14 18:10	180	MB 160-128863/1-A		130012	128863	A-01-R	MLK

Detector: AV8

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:27	140	IC 160-120523/1		120523			PS
05/08/14 00:14	60	ICV 160-121084/1		121084			PS
06/18/14 19:08	960	ICB 160-127837/1		127837			PS
06/19/14 18:06	60	CCV 160-127954/1		127954			PS
07/07/14 00:37	1	PULSER 160-130023/1		130023			MLK
07/07/14 16:35	30	ZZZZZ		130023			
07/07/14 18:11	180	LCS 160-128863/2-A		130023	128863	A-01-R	MLK

Detector: AV9

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:27	140	IC 160-120524/1		120524			PS
05/07/14 23:03	60	ICV 160-120859/1		120859			PS
06/18/14 19:08	960	ICB 160-127848/1		127848			PS
06/19/14 18:06	60	CCV 160-127962/1		127962			PS
07/07/14 00:37	1	PULSER 160-130034/1		130034			MLK
07/07/14 16:35	30	ZZZZZ		130034			
07/07/14 18:11	180	680-102600-6	SD-278-SS	130034	128863	A-01-R	MLK

Detector: AV10

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:27	140	IC 160-120512/1		120512			PS
05/07/14 23:03	60	ICV 160-120847/1		120847			PS
06/18/14 19:08	960	ICB 160-127776/1		127776			PS
06/19/14 18:06	60	CCV 160-127860/1		127860			PS
07/07/14 00:37	1	PULSER 160-129939/1		129939			MLK
07/07/14 16:36	30	ZZZZZ		129939			
07/07/14 18:11	180	680-102600-6 DU	SD-278-SS DU	129939	128863	A-01-R	MLK

Detector: AV11

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:27	140	IC 160-120513/1		120513			PS
05/07/14 23:04	60	ICV 160-120848/1		120848			PS
06/18/14 19:08	960	ICB 160-127786/1		127786			PS
06/19/14 18:07	60	CCV 160-127871/1		127871			PS
07/07/14 00:37	1	PULSER 160-129950/1		129950			MLK
07/07/14 16:36	30	ZZZZZ		129950			
07/07/14 18:11	180	680-102600-7	SD-278-01	129950	128863	A-01-R	MLK

Alpha Spectroscopy Run Log

Detector: AV12

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:28	140	IC 160-120514/1		120514			PS
05/07/14 23:04	60	ICV 160-120849/1		120849			PS
06/18/14 19:08	960	ICB 160-127796/1		127796			PS
06/19/14 18:07	60	CCV 160-127881/1		127881			PS
07/07/14 00:37	1	PULSER 160-129960/1		129960			MLK
07/07/14 16:36	30	ZZZZZ		129960			
07/07/14 18:11	180	680-102600-8	SD-278-02	129960	128863	A-01-R	MLK

Detector: AV13

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:28	140	IC 160-120515/1		120515			PS
05/07/14 23:04	60	ICV 160-120850/1		120850			PS
06/18/14 19:08	960	ICB 160-127807/1		127807			PS
06/19/14 19:45	60	CCV 160-127892/1		127892			PS
07/07/14 00:37	1	PULSER 160-129971/1		129971			MLK
07/07/14 16:36	30	ZZZZZ		129971			
07/07/14 18:11	180	680-102600-9	SD-278-03	129971	128863	A-01-R	MLK

Alpha Spectroscopy Daily Pulser Check

Analysis Date: 07/07/14

		Gross Counts			FWHM (keV)			Pulser Center			Energy (keV)		
Detector	**Analysis Date**	**Result**	**Criteria**	**P/F**	**Result**	**Criteria**	**P/F**	**Result**	**Criteria**	**P/F**	**Result**	**Criteria**	**P/F**
AV7	07/07/14 00:37	7343	7003.5 - 7740.8	Pass	17.6	10 - 20	Pass	226.9	222.0 - 232.0	Pass	5059	5020.1 - 5100.1	Pass
AV8	07/07/14 00:37	7432	7052.4 - 7794.7	Pass	15.0	10 - 20	Pass	220.9	216.0 - 226.0	Pass	5014	4975.1 - 5055.1	Pass
AV9	07/07/14 00:37	7525	7187.8 - 7944.4	Pass	12.9	10 - 20	Pass	221.0	216.0 - 226.0	Pass	5015	4975.3 - 5055.3	Pass
AV10	07/07/14 00:37	7454	7323.5 - 8094.4	Pass	12.6	10 - 20	Pass	224.1	216.0 - 226.0	Pass	5038	4974.9 - 5054.9	Pass
AV11	07/07/14 00:37	7714	7322.5 - 8093.3	Pass	13.4	10 - 20	Pass	226.0	221.1 - 231.1	Pass	5053	5012.8 - 5092.8	Pass
AV12	07/07/14 00:37	7629	7265.8 - 8030.6	Pass	11.6	10 - 20	Pass	221.0	214.9 - 224.9	Pass	5015	4967.1 - 5047.1	Pass
AV13	07/07/14 00:37	7659	7244.9 - 8007.5	Pass	16.1	10 - 20	Pass	224.2	219.1 - 229.1	Pass	5039	4998.3 - 5078.3	Pass

Alpha Spectroscopy Calibration Summary

Detector: AV7

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120843/1	05/07/14 19:51	82236-334_00001	0.2580	0.20-0.32		
ICV 160-120858/1	05/07/14 23:03	82237-334_00003	0.2546	0.20-0.32	98.6	95-105
CCV 160-127943/1	06/19/14 16:44	82236-334_00001	0.2549	0.20-0.32	98.8	95-105

Detector: AV8

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120523/1	05/05/14 22:27	82240-334_00001	0.2705	0.20-0.32		
ICV 160-121084/1	05/08/14 00:14	82234-334_00001	0.2639	0.20-0.32	97.6	95-105
CCV 160-127954/1	06/19/14 18:06	82240-334_00001	0.2668	0.20-0.32	98.6	95-105

Detector: AV9

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120524/1	05/05/14 22:27	82241-334_00001	0.2704	0.20-0.32		
ICV 160-120859/1	05/07/14 23:03	82240-334_00001	0.2666	0.20-0.32	98.6	95-105
CCV 160-127962/1	06/19/14 18:06	82241-334_00001	0.2701	0.20-0.32	99.9	95-105

Detector: AV10

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120512/1	05/05/14 22:27	82242-334_00001	0.2584	0.20-0.32		
ICV 160-120847/1	05/07/14 23:03	82241-334_00001	0.2593	0.20-0.32	100.3	95-105
CCV 160-127860/1	06/19/14 18:06	82242-334_00001	0.2552	0.20-0.32	98.7	95-105

Detector: AV11

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120513/1	05/05/14 22:27	82243-334_00001	0.2688	0.20-0.32		
ICV 160-120848/1	05/07/14 23:04	82242-334_00001	0.2598	0.20-0.32	96.6	95-105
CCV 160-127871/1	06/19/14 18:07	82243-334_00001	0.2647	0.20-0.32	98.5	95-105

Detector: AV12

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120514/1	05/05/14 22:28	82244-334_00001	0.2597	0.20-0.32		
ICV 160-120849/1	05/07/14 23:04	82243-334_00001	0.2688	0.20-0.32	103.5	95-105
CCV 160-127881/1	06/19/14 18:07	82244-334_00001	0.2583	0.20-0.32	99.5	95-105

Detector: AV13

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120515/1	05/05/14 22:28	82245-334_00001	0.2599	0.20-0.32		
ICV 160-120850/1	05/07/14 23:04	82244-334_00001	0.2556	0.20-0.32	98.4	95-105
CCV 160-127892/1	06/19/14 19:45	82245-334_00001	0.2566	0.20-0.32	98.7	95-105

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128863

Lab ID: MB 160-128863/1-A
Client ID:
Sigma: 2
Analyzed: 07/07/14 18:10
Detector: AV7
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	-0.02056	0.0284	0.0285	U	pCi/g	1.00	0.104	130012
Thorium-230	0.3143	0.123	0.126		pCi/g	1.00	0.0758	130012
Thorium-232	0.003586	0.0349	0.0349	U	pCi/g	1.00	0.0879	130012

Tracer	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.160	0.449	0.624		pCi/g	0.0592	6.12	84.4	30 - 110

Lab ID: LCS 160-128863/2-A
Client ID:
Sigma: 2
Analyzed: 07/07/14 18:11
Detector: AV8
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	23.67	1.37	2.42		pCi/g	1.00	0.0950	130023

Tracer	LCS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	11.51	0.928	1.34		pCi/g	0.147	12.3	93.7	30 - 110

Lab ID: 680-102600-6
Client ID: SD-278-SS
Sigma: 2
Analyzed: 07/07/14 18:11
Detector: AV9
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.996	0.210	0.226		pCi/g	1.00	0.0670	130034
Thorium-230	1.27	0.236	0.259		pCi/g	1.00	0.0707	130034
Thorium-232	1.31	0.239	0.263		pCi/g	1.00	0.0564	130034

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.21	0.441	0.621		pCi/g	0.0483	6.13	85.1	30 - 110

Lab ID: 680-102600-6 DU
Client ID: SD-278-SS
Sigma: 2
Analyzed: 07/07/14 18:11
Detector: AV10
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.417	0.270	0.295		pCi/g	1.00	0.115	129939
Thorium-230	1.486	0.273	0.300		pCi/g	1.00	0.0708	129939
Thorium-232	1.596	0.281	0.311		pCi/g	1.00	0.0371	129939

Alpha Spectroscopy Analysis Detail Report

Prep Batch: 128863

Lab ID: 680-102600-6 DU
Client ID: SD-278-SS
Sigma: 2

Analyzed: 07/07/14 18:11
Detector: AV10
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Tracer	DU Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.793	0.433	0.591		pCi/g	0.0745	6.13	78.2	30 - 110

Lab ID: 680-102600-7
Client ID: SD-278-01
Sigma: 2

Analyzed: 07/07/14 18:11
Detector: AV11
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.45	0.266	0.292		pCi/g	1.00	0.109	129950
Thorium-230	1.38	0.257	0.282		pCi/g	1.00	0.0768	129950
Thorium-232	1.38	0.257	0.282		pCi/g	1.00	0.0842	129950

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.85	0.427	0.590		pCi/g	0.0607	6.14	79.0	30 - 110

Lab ID: 680-102600-8
Client ID: SD-278-02
Sigma: 2

Analyzed: 07/07/14 18:11
Detector: AV12
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.29	0.235	0.259		pCi/g	1.00	0.0809	129960
Thorium-230	0.905	0.196	0.210		pCi/g	1.00	0.0480	129960
Thorium-232	1.15	0.221	0.242		pCi/g	1.00	0.0776	129960

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.57	0.463	0.658		pCi/g	0.0504	6.10	91.3	30 - 110

Lab ID: 680-102600-9
Client ID: SD-278-03
Sigma: 2

Analyzed: 07/07/14 18:11
Detector: AV13
Dil Fac: 1

Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.69	0.294	0.326		pCi/g	1.00	0.0991	129971
Thorium-230	1.23	0.248	0.269		pCi/g	1.00	0.0376	129971
Thorium-232	1.42	0.269	0.294		pCi/g	1.00	0.100	129971

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.71	0.427	0.582		pCi/g	0.0549	6.12	77.0	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128863

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-128863/1-A	Thorium-228			-0.02056	U	pCi/g							
MB 160-128863/1-A	Thorium-230			0.3143		pCi/g							
MB 160-128863/1-A	Thorium-232			0.003586	U	pCi/g							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-128863/2-A	Thorium-230		24.5	23.67		pCi/g	97	81 - 118					

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
680-102600-6	Thorium-228	0.996		1.417		pCi/g			35	0.81	2.27	1	
680-102600-6	Thorium-230	1.27		1.486		pCi/g			16	0.39	1.10	1	
680-102600-6	Thorium-232	1.31		1.596		pCi/g			20	0.50	1.40	1	

Glossary:

Ts = Count Duration, Sample

TETRA TECH

INTERNAL CORRESPONDENCE

TO: M. MARTIN **DATE:** OCTOBER 15, 2014

FROM: MICHELLE L. ALLEN **COPIES:** DV FILE

SUBJECT: RADIOLOGICAL DATA VALIDATION – GAMMA SPECTROSCOPY
LOCKHEED MARTIN CORPORATION (LMC) – MIDDLE RIVER COMPLEX (MRC)
SEDIMENT INVESTIGATION
SAMPLE DELIVERY GROUP (SDG) 680-102600-3

SAMPLES: 3/Sediment/Gamma Spectroscopy

SD-278-01 SD-278-02 SD-278-SS

Overview

The sample set for LMC-MRC, SDG 680-102600-3 consisted of three (3) sediment environmental samples. All three (3) sediment samples were analyzed for gamma spectroscopy. No field duplicate sample pair was included in this SDG.

The samples were collected by Tetra Tech, Inc. on June 20, 2014 and analyzed by TestAmerica, Inc. All analyses were conducted in accordance with Method GA-01-R analytical and reporting protocols.

The findings offered in this report are based upon a general review of all available data. The data contained in this SDG were validated with regard to the following parameters: data completeness, holding times, initial calibrations and initial calibration verifications, instrument daily calibration and blank checks, laboratory blank results, laboratory control sample recoveries, laboratory duplicate results, detection limits and analyte quantitation. Areas of concern are listed below.

Major

No major issues were identified.

Minor

- Pb-212 was detected in the method blank, MB 160-140177/1-A associated with preparation batch #140177 at a concentration of 0.2592 ± 0.185 pCi/g. The mean difference of the blank activity and detected sample activity was calculated and used for the evaluation of blank contamination for samples associated with this preparation batch. The mean difference for sample SD-278-SS was between 2 and 3. The result for Pb-212 in this sample was qualified as estimated, non-detected, (J), because contaminant had an effect on the sample result (the blank and sample result can statistically overlap between 2 and 3). The remaining calculated mean differences were greater than 3 and the sample and blank activities differed by less than a factor of 10, therefore, the sample results were qualified as estimated, (J), as the blank activity may have an impact on the sample activities.

Notes

All sample results are reported on a dry weight basis.

The uncertainty for the sample results are reported at 2σ (standard deviations, 95% confidence level). The EDD does not contain the uncertainty result.

The mean differences were calculated for the gamma emitters for the original and laboratory duplicate analyses for sample SD-278-SS. The mean differences were < 3 for most of the gamma emitters

evaluated which indicates the activities agree at the 3σ (99%) confidence level with the following exceptions:

Isotope	Mean Difference
Preparation Batch # 138233	
Radium-226	1.24
Uranium-238	1.68

Isotope	Mean Difference
Preparation Batch # 140177	
Actinium-227	1.35
Bismuth-214	1.31
Lead-212	1.06
Thorium-234	1.89
Uranium-238	1.89

In addition, the mean difference for actinium-227 exceeded 3. No action was taken because the activities reported for the original and duplicate reported less than the Minimum Detectable Concentration (MDC).

Executive Summary

Laboratory Performance: Pb-212 was detected in the laboratory method blank.

Other Factors Affecting Data Quality: None.

The text of this report has been formulated to address only those areas affecting data quality.

Tetra Tech, Inc.
Michelle L. Allen
Chemist/Data Validator

Tetra Tech, Inc.
Joseph A. Samchuck
Data Validation Manager

Attachments:
Appendix A – Qualified Analytical Results
Appendix B – Results as Reported by the Laboratory
Appendix C – Support Documentation

Appendix A

Qualified Analytical Results

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = ICP PDS Recovery Noncompliance; MSA's $r < 0.995$
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = RPD between columns/detectors >40% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient $r < 0.995$
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 standard deviations is greater than sample activity
Z1 = Tentatively Identified Compound considered presumptively present
Z2 = Tentatively Identified Compound column bleed
Z3 = Tentatively Identified Compound aldol condensate

PROJ_NO: 05220	NSAMPLE	SD-278-01			SD-278-01A						SD-278-02		
SDG: 680-102600-3	LAB_ID	680-102600-7			680-102600-7						680-102600-8		
FRACTION: RADG	SAMP_DATE	6/20/2014			6/20/2014						6/20/2014		
MEDIA: SOIL	QC_TYPE	NM			NM			TIC			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ACTINIUM-227		0.177	U								0.586		
ACTINIUM-228		1.79						1.38			1.75		
BISMUTH-212		0.799	U								3.45		
BISMUTH-214		1.05						0.773			0.747		
LEAD-210		1.33	U								0.773	U	
LEAD-212		1.39	J	A				1.23			1.24	J	A
LEAD-214		1.18						0.926			0.82		
POTASSIUM-40		18.4						18.2			16.1		
PROTACTINIUM-231		0.69	U								1.81	U	
RADIUM-226		7.55			0.773						-0.382	U	
RADIUM-228		1.79			1.38						1.75		
THALLIUM-208		0.475						0.545			0.56		
THORIUM-232		1.79			1.38						1.75		
THORIUM-234		1.4	U								1.59	U	
URANIUM-235		0.15	U		0.275	U					0.41	U	
URANIUM-238		1.4	U		1.92	U					1.59	U	

PROJ_NO: 05220	NSAMPLE	SD-278-02A						SD-278-SS			SD-278-SSA		
SDG: 680-102600-3	LAB_ID	680-102600-8						680-102600-6			680-102600-6		
FRACTION: RADG	SAMP_DATE	6/20/2014						6/20/2014			6/20/2014		
MEDIA: SOIL	QC_TYPE	NM			TIC			NM			TIC		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ACTINIUM-227								0.743	U				
ACTINIUM-228					1.21			1.15			1.83		
BISMUTH-212								0	U				
BISMUTH-214					0.769			0.567	U		0.948		
LEAD-210								3.22	U				
LEAD-212					1.6			0.773	J	A	1		
LEAD-214					0.977			0.626	U		0.532		
POTASSIUM-40					17.8			14.7			18.2		
PROTACTINIUM-231								-0.126	U				
RADIUM-226		0.769						5.35			0.948		
RADIUM-228		1.21						1.15			1.83		
THALLIUM-208					0.62			0.371			0.428		
THORIUM-232		1.21						1.15			1.83		
THORIUM-234								3.3	U				
URANIUM-235		0.235	U					0.614	U		0.188	U	
URANIUM-238		1.68	U					3.3	U		1.9	U	

Appendix B

Results as Reported by the Laboratory

Client Sample ID: SD-278-SS

Date Collected: 06/20/14 10:00
Date Received: 06/23/14 09:00

Lab Sample ID: 680-102600-6
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.743	U	0.496	0.502		0.788	pCi/g	08/15/14 18:30	08/26/14 11:33	1
Radium-226	0.948		0.347	0.359	1.00	0.409	pCi/g	08/15/14 18:30	09/08/14 12:05	1
Actinium 228	1.15		0.612	0.622		1.08	pCi/g	08/15/14 18:30	08/26/14 11:33	1
Radium-228	1.83		0.473	0.506		0.346	pCi/g	08/15/14 18:30	09/08/14 12:05	1
Bismuth-212	0.000	U	2.96	2.96		3.30	pCi/g	08/15/14 18:30	08/26/14 11:33	1
Bismuth-214	0.567	U	0.487	0.490		0.745	pCi/g	08/15/14 18:30	08/26/14 11:33	1
Lead-210	3.22	U	2.16	2.20		3.33	pCi/g	08/15/14 18:30	08/26/14 11:33	1
Lead-212	0.773		0.339	0.349		0.464	pCi/g	08/15/14 18:30	08/26/14 11:33	1
Thorium-232	1.83		0.473	0.506		0.346	pCi/g	08/15/14 18:30	09/08/14 12:05	1
Lead-214	0.626	U	0.363	0.368		0.638	pCi/g	08/15/14 18:30	08/26/14 11:33	1
Uranium-235	0.188	U	0.420	0.421		0.855	pCi/g	08/15/14 18:30	09/08/14 12:05	1
Potassium-40	14.7		4.27	4.50		5.23	pCi/g	08/15/14 18:30	08/26/14 11:33	1
Uranium-238	1.90	U	1.80	1.81		2.44	pCi/g	08/15/14 18:30	09/08/14 12:05	1
Protactinium-231	-0.126	U	0.357	0.357		7.46	pCi/g	08/15/14 18:30	08/26/14 11:33	1
Radium-226	5.35		3.72	3.79	1.00	5.19	pCi/g	08/15/14 18:30	08/26/14 11:33	1
Radium-228	1.15		0.612	0.622		1.08	pCi/g	08/15/14 18:30	08/26/14 11:33	1
Thorium-232	1.15		0.612	0.622		1.08	pCi/g	08/15/14 18:30	08/26/14 11:33	1
Thorium-234	3.30	U	2.26	2.29		3.37	pCi/g	08/15/14 18:30	08/26/14 11:33	1
Thallium-208	0.371		0.227	0.230		0.336	pCi/g	08/15/14 18:30	08/26/14 11:33	1
Uranium-235	0.614	U	0.668	0.671		1.09	pCi/g	08/15/14 18:30	08/26/14 11:33	1
Uranium-238	3.30	U	2.26	2.29		3.37	pCi/g	08/15/14 18:30	08/26/14 11:33	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Ac-228	*1.83*		*0.473*	*0.506*		*0.346*	*pCi/g*	*08/15/14 18:30*	*09/08/14 12:05*	*1*
Bi-214	*0.948*		*0.347*	*0.359*		*0.409*	*pCi/g*	*08/15/14 18:30*	*09/08/14 12:05*	*1*
K-40	*18.2*		*2.58*	*3.12*		*2.07*	*pCi/g*	*08/15/14 18:30*	*09/08/14 12:05*	*1*
Pb-212	*1.00*		*0.213*	*0.239*		*0.262*	*pCi/g*	*08/15/14 18:30*	*09/08/14 12:05*	*1*
Pb-214	*0.532*		*0.234*	*0.239*		*0.381*	*pCi/g*	*08/15/14 18:30*	*09/08/14 12:05*	*1*
Tl-208	*0.428*		*0.155*	*0.160*		*0.181*	*pCi/g*	*08/15/14 18:30*	*09/08/14 12:05*	*1*

Client Sample ID: SD-278-01

Date Collected: 06/20/14 10:05
Date Received: 06/23/14 09:00

Lab Sample ID: 680-102600-7
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.177	U	0.312	0.313		2.42	pCi/g	08/15/14 18:30	08/26/14 11:28	1
Radium-226	0.773		0.287	0.298	1.00	0.389	pCi/g	08/15/14 18:30	09/10/14 01:56	1
Actinium 228	1.79		0.440	0.476		0.573	pCi/g	08/15/14 18:30	08/26/14 11:28	1
Radium-228	1.38		0.390	0.414		0.528	pCi/g	08/15/14 18:30	09/10/14 01:56	1
Bismuth-212	0.799	U	1.25	1.25		2.09	pCi/g	08/15/14 18:30	08/26/14 11:28	1
Bismuth-214	1.05		0.293	0.313		0.335	pCi/g	08/15/14 18:30	08/26/14 11:28	1
Lead-210	1.33	U	1.90	1.91		2.98	pCi/g	08/15/14 18:30	08/26/14 11:28	1
Lead-212	1.39		0.225	0.288		0.288	pCi/g	08/15/14 18:30	08/26/14 11:28	1

Client Sample ID: SD-278-01

Date Collected: 06/20/14 10:05
Date Received: 06/23/14 09:00

Lab Sample ID: 680-102600-7
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-232	1.38		0.390	0.414		0.528	pCi/g	08/15/14 18:30	09/10/14 01:56	1
Lead-214	1.18		0.289	0.313		0.341	pCi/g	08/15/14 18:30	08/26/14 11:28	1
Uranium-235	0.275	U	0.457	0.458		0.678	pCi/g	08/15/14 18:30	09/10/14 01:56	1
Potassium-40	18.4		2.70	3.29		2.25	pCi/g	08/15/14 18:30	08/26/14 11:28	1
Uranium-238	1.92	U	0.872	0.895		2.12	pCi/g	08/15/14 18:30	09/10/14 01:56	1
Protactinium-231	0.690	U	0.624	0.628		4.85	pCi/g	08/15/14 18:30	08/26/14 11:28	1
Radium-226	7.55		2.53	2.85	1.00	2.90	pCi/g	08/15/14 18:30	08/26/14 11:28	1
Radium-228	1.79		0.440	0.476		0.573	pCi/g	08/15/14 18:30	08/26/14 11:28	1
Thorium-232	1.79		0.440	0.476		0.573	pCi/g	08/15/14 18:30	08/26/14 11:28	1
Thorium-234	1.40	U	1.96	1.96		3.01	pCi/g	08/15/14 18:30	08/26/14 11:28	1
Thallium-208	0.475		0.147	0.155		0.166	pCi/g	08/15/14 18:30	08/26/14 11:28	1
Uranium-235	0.150	U	0.515	0.515		0.944	pCi/g	08/15/14 18:30	08/26/14 11:28	1
Uranium-238	1.40	U	1.96	1.96		3.01	pCi/g	08/15/14 18:30	08/26/14 11:28	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Ac-228	*1.38*		*0.390*	*0.414*		*0.528*	*pCi/g*	*08/15/14 18:30*	*09/10/14 01:56*	*1*
Bi-214	*0.773*		*0.287*	*0.298*		*0.389*	*pCi/g*	*08/15/14 18:30*	*09/10/14 01:56*	*1*
K-40	*18.2*		*2.79*	*3.35*		*2.06*	*pCi/g*	*08/15/14 18:30*	*09/10/14 01:56*	*1*
Pb-212	*1.23*		*0.258*	*0.303*		*0.291*	*pCi/g*	*08/15/14 18:30*	*09/10/14 01:56*	*1*
Pb-214	*0.926*		*0.327*	*0.341*		*0.382*	*pCi/g*	*08/15/14 18:30*	*09/10/14 01:56*	*1*
Tl-208	*0.545*		*0.158*	*0.167*		*0.174*	*pCi/g*	*08/15/14 18:30*	*09/10/14 01:56*	*1*

Client Sample ID: SD-278-02

Date Collected: 06/20/14 10:10
Date Received: 06/23/14 09:00

Lab Sample ID: 680-102600-8
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.586		0.293	0.303		0.405	pCi/g	08/15/14 18:30	08/26/14 11:29	1
Radium-226	0.769		0.255	0.267	1.00	0.298	pCi/g	08/15/14 18:30	09/08/14 17:33	1
Actinium 228	1.75		0.518	0.548		0.431	pCi/g	08/15/14 18:30	08/26/14 11:29	1
Radium-228	1.21		0.321	0.344		0.457	pCi/g	08/15/14 18:30	09/08/14 17:33	1
Bismuth-212	3.45		1.37	1.41		1.30	pCi/g	08/15/14 18:30	08/26/14 11:29	1
Bismuth-214	0.747		0.258	0.270		0.350	pCi/g	08/15/14 18:30	08/26/14 11:29	1
Lead-210	0.773	U	1.37	1.38		2.18	pCi/g	08/15/14 18:30	08/26/14 11:29	1
Lead-212	1.24		0.232	0.282		0.267	pCi/g	08/15/14 18:30	08/26/14 11:29	1
Thorium-232	1.21		0.321	0.344		0.457	pCi/g	08/15/14 18:30	09/08/14 17:33	1
Lead-214	0.820		0.220	0.235		0.326	pCi/g	08/15/14 18:30	08/26/14 11:29	1
Uranium-235	0.235	U	0.273	0.274		0.409	pCi/g	08/15/14 18:30	09/08/14 17:33	1
Potassium-40	16.1		2.71	3.17		2.64	pCi/g	08/15/14 18:30	08/26/14 11:29	1
Uranium-238	1.68	U	0.827	0.845		1.77	pCi/g	08/15/14 18:30	09/08/14 17:33	1
Protactinium-231	1.81	U	1.59	1.61		3.58	pCi/g	08/15/14 18:30	08/26/14 11:29	1
Radium-226	-0.382	U	2.39	2.39	1.00	3.37	pCi/g	08/15/14 18:30	08/26/14 11:29	1
Radium-228	1.75		0.518	0.548		0.431	pCi/g	08/15/14 18:30	08/26/14 11:29	1

Client Sample Results

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102600-3
SDG: 680102600-1

Client Sample ID: SD-278-02
Date Collected: 06/20/14 10:10
Date Received: 06/23/14 09:00

Lab Sample ID: 680-102600-8
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-232	1.75		0.518	0.548		0.431	pCi/g	08/15/14 18:30	08/26/14 11:29	1
Thorium-234	1.59	U	1.29	1.31		2.04	pCi/g	08/15/14 18:30	08/26/14 11:29	1
Thallium-208	0.560		0.170	0.179		0.179	pCi/g	08/15/14 18:30	08/26/14 11:29	1
Uranium-235	0.410	U	0.458	0.460		0.714	pCi/g	08/15/14 18:30	08/26/14 11:29	1
Uranium-238	1.59	U	1.29	1.31		2.04	pCi/g	08/15/14 18:30	08/26/14 11:29	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Ac-228	*1.21*		*0.321*	*0.344*		*0.457*	*pCi/g*	*08/15/14 18:30*	*09/08/14 17:33*	*1*
Bi-214	*0.769*		*0.255*	*0.267*		*0.298*	*pCi/g*	*08/15/14 18:30*	*09/08/14 17:33*	*1*
K-40	*17.8*		*2.80*	*3.34*		*2.64*	*pCi/g*	*08/15/14 18:30*	*09/08/14 17:33*	*1*
Pb-212	*1.60*		*0.210*	*0.295*		*0.187*	*pCi/g*	*08/15/14 18:30*	*09/08/14 17:33*	*1*
Pb-214	*0.977*		*0.243*	*0.263*		*0.225*	*pCi/g*	*08/15/14 18:30*	*09/08/14 17:33*	*1*
Tl-208	*0.620*		*0.146*	*0.160*		*0.116*	*pCi/g*	*08/15/14 18:30*	*09/08/14 17:33*	*1*

Appendix C

Support Documentation

LMC-MRC
SEDIMENT INVESTIGATION
SDG 680-102600-3

BLANK CONTAMINATION EVALUATION

MEAN DIFFERENCE:

$$\frac{|\text{SAMPLE ACTIVITY} - \text{BLANK ACTIVITY}|}{\sqrt{((\text{SAMPLE UNCERTAINTY}/2)^2 + (\text{BLANK UNCERTAINTY}/2)^2)}}$$

PREPARATION BATCH #140177

BLANK ID:	**MB 160-140177/1-A**	**Pb-212**
		0.2592 ± 0.187 pCi/g

AFFECTED SAMPLES:

SAMPLE ID:	SD-278-SS	**Pb-212**
		0.773 ± 0.339 pCi/g
MEAN DIFFERENCE =	2.654225185	
SAMPLE ID:	SD-278-01	**Pb-212**
		1.39 ± 0.288 pCi/g
MEAN DIFFERENCE =	6.586200552	
SAMPLE ID:	SD-278-02	**Pb-212**
		1.24 ± 0.282 pCi/g
MEAN DIFFERENCE =	5.797236065	

LMC-MRC
SEDIMENT INVESTIGATION
SDG 680-102600-3

LABORATORY DUPLICATE EVALUATION

MEAN DIFFERENCE:

$$\frac{|\text{SAMPLE ACTIVITY} - \text{BLANK ACTIVITY}|}{\sqrt{((\text{SAMPLE UNCERTAINTY}/2)^2 + (\text{BLANK UNCERTAINTY}/2)^2)}}$$

PREPARATION BATCH #138233

SAMPLE ID:	**SD-278-SS**	**Ra-226**
SAMPLE RESULTS		0.948 ± 0.359 pCi/g
DUPLICATE RESULTS		0.6753 ± 0.254 pCi/g
MEAN DIFFERENCE =	1.240195831	

		Ra-228/Th-232
SAMPLE RESULTS		1.83 ± 0.506 pCi/g
DUPLICATE RESULTS		1.609 ± 0.437 pCi/g
MEAN DIFFERENCE =	0.661098359	

		U-235
SAMPLE RESULTS		0.188 ± 0.421 pCi/g
DUPLICATE RESULTS		0.193 ± 0.318 pCi/g
MEAN DIFFERENCE =	0.018953643	

		U-238
SAMPLE RESULTS		1.9 ± 1.81 pCi/g
DUPLICATE RESULTS		0.3359 ± 0.414 pCi/g
MEAN DIFFERENCE =	1.68477778	

LMC-MRC
SEDIMENT INVESTIGATION
SDG 680-102600-3

LABORATORY DUPLICATE EVALUATION

MEAN DIFFERENCE:

$$\frac{|\text{SAMPLE ACTIVITY} - \text{BLANK ACTIVITY}|}{\sqrt{((\text{SAMPLE UNCERTAINTY}/2)^2 + (\text{BLANK UNCERTAINTY}/2)^2)}}$$

PREPARATION BATCH #140177

SAMPLE ID:	**SD-278-SS**	**Actinium-227**
SAMPLE RESULTS		0.743 ± 0.502 pCi/g
DUPLICATE RESULTS		0.2976 ± 0.429 pCi/g
MEAN DIFFERENCE =	1.349008086	

		Actinium-228
SAMPLE RESULTS		1.15 ± 0.359 pCi/g
DUPLICATE RESULTS		1.141 ± 0.459 pCi/g
MEAN DIFFERENCE =	0.030889648	

		Bismuth-212
SAMPLE RESULTS		0 ± 2.96 pCi/g
DUPLICATE RESULTS		1.491 ± 1.23 pCi/g
MEAN DIFFERENCE =	0.930309147	

		Bismuth-214
SAMPLE RESULTS		0.567 ± 0.49 pCi/g
DUPLICATE RESULTS		0.9441 ± 0.3 pCi/g
MEAN DIFFERENCE =	1.312694803	

LMC-MRC
SEDIMENT INVESTIGATION
SDG 680-102600-3

LABORATORY DUPLICATE EVALUATION

MEAN DIFFERENCE:

$$\frac{|\text{SAMPLE ACTIVITY} - \text{BLANK ACTIVITY}|}{\sqrt{((\text{SAMPLE UNCERTAINTY}/2)^2 + (\text{BLANK UNCERTAINTY}/2)^2)}}$$

		Lead-210
SAMPLE RESULTS		3.22 ± 2.2 pCi/g
DUPLICATE RESULTS		3.103 ± 1.97 pCi/g
MEAN DIFFERENCE =	0.07923831	

		Lead-212
SAMPLE RESULTS		0.773 ± 0.349 pCi/g
DUPLICATE RESULTS		0.9958 ± 0.234 pCi/g
MEAN DIFFERENCE =	1.06048056	

		Lead-214
SAMPLE RESULTS		0.626 ± 0.368 pCi/g
DUPLICATE RESULTS		0.7779 ± 0.279 pCi/g
MEAN DIFFERENCE =	0.657851662	

		Potassium-40
SAMPLE RESULTS		14.7 ± 4.5 pCi/g
DUPLICATE RESULTS		15.59 ± 3.09 pCi/g
MEAN DIFFERENCE =	0.326081166	

		Protactinium-231
SAMPLE RESULTS		-0.126 ± 0.357 pCi/g
DUPLICATE RESULTS		-0.0334 ± 0.0765 pCi/g
MEAN DIFFERENCE =	0.507142563	

LMC-MRC
SEDIMENT INVESTIGATION
SDG 680-102600-3

LABORATORY DUPLICATE EVALUATION

MEAN DIFFERENCE:

$$\frac{|\text{SAMPLE ACTIVITY} - \text{BLANK ACTIVITY}|}{\sqrt{((\text{SAMPLE UNCERTAINTY}/2)^2 + (\text{BLANK UNCERTAINTY}/2)^2)}}$$

		Radium-226	
SAMPLE RESULTS		5.35 ±	3.79 pCi/g
DUPLICATE RESULTS		3.887 ±	2.98 pCi/g
MEAN DIFFERENCE =	0.606895919		

		Radium-228/Thorium-232	
SAMPLE RESULTS		1.15 ±	0.622 pCi/g
DUPLICATE RESULTS		1.141 ±	0.459 pCi/g
MEAN DIFFERENCE =	0.023285198		

		Thorium-234	
SAMPLE RESULTS		3.3 ±	2.29 pCi/g
DUPLICATE RESULTS		0.9843 ±	0.858 pCi/g
MEAN DIFFERENCE =	1.893878497		

		Thallium-208	
SAMPLE RESULTS		0.371 ±	0.23 pCi/g
DUPLICATE RESULTS		0.3704 ±	0.16 pCi/g
MEAN DIFFERENCE =	0.004282984		

		Uranium-235	
SAMPLE RESULTS		0.614 ±	0.671 pCi/g
DUPLICATE RESULTS		0.4186 ±	0.481 pCi/g
MEAN DIFFERENCE =	0.473357352		

		Uranium-238	
SAMPLE RESULTS		3.3 ±	2.29 pCi/g
DUPLICATE RESULTS		0.9843 ±	0.858 pCi/g
MEAN DIFFERENCE =	1.893878497		

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.43
Client Contact: Mike Martin	Phone: (703) 342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page [redacted] 1 of 1
Company: Tetra Tech, Inc.				Job #:

Address: 20251 Century Blvd Suite 200	Due Date Requested:	Analysis Requested
City: Germantown	TAT Requested (days): Standard	
State, Zip: MD, 20874	PO #: Purchase Order not required	
Phone:	WO #:	
Email: MIchael.Martin@tetratech.com	Project #: 68012942	
Project Name: Sediments	SSOW#:	
Site:		

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2SO3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-278-SS	6/20/14	1000	C	Solid				X				
SD-278-01	↓	1005	C	Solid				X				
SD-278-02		1010	C	Solid				X				
SD-278-03	↓	1015	C	Solid				X				
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements: 680 - 102600

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:		
Relinquished by:	Date/Time: 6/20/14 - 1100	Company TT	Received by:	Date/Time: 6/23/14 09:00	Company TA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ∆ Yes ∆ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 2.4, 2.0 C

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Sediments

Report Number: 680-102600-3

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 06/23/2014; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 24.2 C.

RADIUM-226 AND OTHER GAMMA EMITTERS (GS)

Samples SD-278-SS (680-102600-6), SD-278-01 (680-102600-7) and SD-278-02 (680-102600-8) were analyzed for Radium-226 and other gamma emitters (GS) in accordance with The Department of Energy. The samples were leached on 08/12/2014, prepared on 08/15/2014 and analyzed on 08/26/2014.

Method(s) GA-01-R: Prep Batch #140177: Ra-226 by gamma spectroscopy is typically determined by inference from daughters (e.g. Bi-214) after sealing the sample in an appropriate counting geometry/container and waiting 21 days to allow the Ra-226 decay chain through Rn-222 to reach secular equilibrium. Such an approach is considered to be the most reliable and representative means for establishing the true Ra-226 concentration in the sample. The method requested by the client to report Ra-226, using its own 186 keV gamma-ray emission, is subject to interference and potential bias due to the 185.7 keV U-235 gamma ray. Experience also indicates gamma spectroscopy software does not consistently assign accurate peak areas to Ra-226 (186 keV), with the problem compounded by slight drift of the instrumentation. The laboratory considers Ra-226 reported based upon the 186 keV gamma-ray emission to be best used by the client in a qualitative fashion.
The following samples were affected: (680-102600-6), (680-102600-6 DU), (680-102600-7), (680-102600-8), (LCS 160-140177/2-A), (MB 160-140177/1-A), SD-278-01 (680-102600-7), SD-278-02 (680-102600-8), SD-278-SS (680-102600-6).
Prep Batch #140177: The MDC was greater than the requested limit of 1 pCi/g for Radium-226. Radium-226 was requested to be reported with no ingrowth for this batch; therefore, samples were reported from the only usable gamma energy line, 185.99 KeV. This energy line has a low efficiency which causes an elevated MDC. . . (680-102600-6), (680-102600-6 DU), (680-102600-7), (680-102600-8), (LCS 160-140177/2-A), (MB 160-140177/1-A), SD-278-01 (680-102600-7), SD-278-02 (680-102600-8), SD-278-SS (680-102600-6)
Prep Batch #140177: Lead-212 analyzed by gamma spectroscopy was detected above the MDC in the blank. Variations in Compton backgrounds and statistical analyses allowed for small area counts in the ROIs of this nuclide. Other thorium decay chain products are not present in the blank to support lead-212 identification. The data is reported. (680-102600-6), (680-102600-6 DU), (680-102600-7), (680-102600-8), (LCS 160-140177/2-A), (MB 160-140177/1-A), SD-278-01 (680-102600-7), SD-278-02 (680-102600-8), SD-278-SS (680-102600-6)

Actinium-227, Americium-241, Bismuth-212, Cobalt-60, Protactinium-231, Thorium-234 and Uranium-238 exceeded the RPD limit for the duplicate of sample SD-278-SSDU (680-102600-6). Refer to the QC report for details.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

RADIUM-226 AND OTHER GAMMA EMITTERS (GS)

Samples SD-278-SS (680-102600-6), SD-278-01 (680-102600-7) and SD-278-02 (680-102600-8) were analyzed for Radium-226 and other gamma emitters (GS) in accordance with approved methodologies. The samples were leached on 08/08/2014, prepared on 08/15/2014 and analyzed on 09/08/2014 and 09/10/2014.

Method(s) Fill_Geo-21: Insufficient sample was provided for the following sample(s) to fill a geometry (e.g. tuna can) calibrated for Ra-226 analysis by gamma spectroscopy: (680-102600-6), (680-102600-6 DU), (680-102600-7), (680-102600-8), SD-278-01 (680-102600-7), SD-278-02 (680-102600-8), SD-278-SS (680-102600-6) a 25mL geometry was used instead.
Gamma (batch:138233) Gamma (batch:140177)

Americium-241, Cobalt-60 and Uranium-238 exceeded the RPD limit for the duplicate of sample SD-278-SSDU (680-102600-6). Refer to the QC report for details.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Definitions/Glossary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102600-3
SDG: 680102600-1

Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

Rad TICs

Qualifier	Qualifier Description
F	Duplicate RPD exceeds the control limit

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102600-3
SDG: 680102600-1

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102600-3
SDG: 680102600-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-102600-6	SD-278-SS	Solid	06/20/14 10:00	06/23/14 09:00
680-102600-7	SD-278-01	Solid	06/20/14 10:05	06/23/14 09:00
680-102600-8	SD-278-02	Solid	06/20/14 10:10	06/23/14 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-138233/1-A
Matrix: Solid
Analysis Batch: 142442

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 138233

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.4531	U	0.380	0.382	1.00	0.589	pCi/g	08/15/14 18:30	09/08/14 10:44	1
Radium-228	0.2550	U	0.581	0.581		1.13	pCi/g	08/15/14 18:30	09/08/14 10:44	1
Thorium-232	0.2550	U	0.581	0.581		1.13	pCi/g	08/15/14 18:30	09/08/14 10:44	1
Uranium-235	0.1111	U	0.644	0.644		1.12	pCi/g	08/15/14 18:30	09/08/14 10:44	1
Uranium-238	-1.928	U	6.55	6.55		3.56	pCi/g	08/15/14 18:30	09/08/14 10:44	1

Other Detected Radionuclides	*MB Result*	*MB Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*08/15/14 18:30*	*09/08/14 10:44*	*1*

Lab Sample ID: LCS 160-138233/2-A
Matrix: Solid
Analysis Batch: 142447

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 138233

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	981	1013		100		2.01	pCi/g	103	87 - 116
Cesium-137	362	381.8		37.3		1.38	pCi/g	105	87 - 120
Cobalt-60	382	416.1		40.0		0.955	pCi/g	109	87 - 115

Lab Sample ID: 680-102600-6 DU
Matrix: Solid
Analysis Batch: 142447

Client Sample ID: SD-278-SS
Prep Type: Total/NA
Prep Batch: 138233

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Radium-226	0.948		0.6753		0.254	1.00	0.271	pCi/g	0.45	1
Radium-228	1.83		1.609		0.437		0.259	pCi/g	0.24	1
Thorium-232	1.83		1.609		0.437		0.259	pCi/g	0.24	1
Uranium-235	0.188	U	0.1930	U	0.318		0.531	pCi/g	0.01	1
Uranium-238	1.90	U	0.3359	U	0.414		1.90	pCi/g	0.70	1

Lab Sample ID: MB 160-140177/1-A
Matrix: Solid
Analysis Batch: 140267

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 140177

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.4512	U	0.668	0.669		1.11	pCi/g	08/15/14 18:30	08/26/14 11:36	1
Actinium 228	0.1887	U	0.267	0.268		0.539	pCi/g	08/15/14 18:30	08/26/14 11:36	1
Bismuth-212	0.1466	U	1.01	1.01		1.80	pCi/g	08/15/14 18:30	08/26/14 11:36	1
Bismuth-214	-0.07571	U	0.332	0.332		0.422	pCi/g	08/15/14 18:30	08/26/14 11:36	1
Lead-210	-0.07242	U	1.64	1.64		2.46	pCi/g	08/15/14 18:30	08/26/14 11:36	1
Lead-212	0.2592		0.185	0.187		0.256	pCi/g	08/15/14 18:30	08/26/14 11:36	1
Lead-214	0.1092	U	0.195	0.195		0.318	pCi/g	08/15/14 18:30	08/26/14 11:36	1
Potassium-40	-2.315	U	92.6	92.6		2.63	pCi/g	08/15/14 18:30	08/26/14 11:36	1
Protactinium-231	1.014	U	2.07	2.07		3.50	pCi/g	08/15/14 18:30	08/26/14 11:36	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: MB 160-140177/1-A
Matrix: Solid
Analysis Batch: 140267

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 140177

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.9427	U	2.13	2.14	1.00	3.10	pCi/g	08/15/14 18:30	08/26/14 11:36	1
Radium-228	0.1887	U	0.267	0.268		0.539	pCi/g	08/15/14 18:30	08/26/14 11:36	1
Thorium-232	0.1887	U	0.267	0.268		0.539	pCi/g	08/15/14 18:30	08/26/14 11:36	1
Thorium-234	-0.9281	U	2.43	2.43		2.36	pCi/g	08/15/14 18:30	08/26/14 11:36	1
Thallium-208	-0.07418	U	0.218	0.218		0.205	pCi/g	08/15/14 18:30	08/26/14 11:36	1
Uranium-235	0.1587	U	0.280	0.281		0.679	pCi/g	08/15/14 18:30	08/26/14 11:36	1
Uranium-238	-0.9281	U	2.43	2.43		2.36	pCi/g	08/15/14 18:30	08/26/14 11:36	1

Lab Sample ID: LCS 160-140177/2-A
Matrix: Solid
Analysis Batch: 140271

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 140177

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	981	995.9		98.7		1.98	pCi/g	101	87 - 116
Cesium-137	362	369.5		36.1		1.33	pCi/g	102	87 - 120
Cobalt-60	384	412.8		39.6		0.977	pCi/g	108	87 - 115

Lab Sample ID: 680-102600-6 DU
Matrix: Solid
Analysis Batch: 140267

Client Sample ID: SD-278-SS
Prep Type: Total/NA
Prep Batch: 140177

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Actinium-227	0.743	U	0.2976	U	0.429		0.710	pCi/g	0.48	1
Actinium 228	1.15		1.141		0.459		0.595	pCi/g	0	1
Bismuth-212	0.000	U	1.491	U	1.23		1.91	pCi/g	0.36	1
Bismuth-214	0.567	U	0.9441		0.300		0.345	pCi/g	0.48	1
Lead-210	3.22	U	3.103		1.97		2.60	pCi/g	0.03	1
Lead-212	0.773		0.9958		0.234		0.296	pCi/g	0.38	1
Lead-214	0.626	U	0.7779		0.297		0.366	pCi/g	0.23	1
Potassium-40	14.7		15.59		3.09		2.53	pCi/g	0.12	1
Protactinium-231	-0.126	U	-0.03342	U	0.0765		4.10	pCi/g	0.21	1
Radium-226	5.35		3.887		2.98	1.00	3.52	pCi/g	0.22	1
Radium-228	1.15		1.141		0.459		0.595	pCi/g	0	1
Thorium-232	1.15		1.141		0.459		0.595	pCi/g	0	1
Thorium-234	3.30	U	0.9843	U	0.858		2.26	pCi/g	0.74	1
Thallium-208	0.371		0.3704		0.160		0.192	pCi/g	0	1
Uranium-235	0.614	U	0.4186	U	0.481		0.774	pCi/g	0.17	1
Uranium-238	3.30	U	0.9843	U	0.858		2.26	pCi/g	0.74	1

QC Association Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102600-3
SDG: 680102600-1

Rad

Leach Batch: 136843

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102600-6	SD-278-SS	Total/NA	Solid	Dry and Grind	
680-102600-6 DU	SD-278-SS	Total/NA	Solid	Dry and Grind	
680-102600-7	SD-278-01	Total/NA	Solid	Dry and Grind	
680-102600-8	SD-278-02	Total/NA	Solid	Dry and Grind	

Leach Batch: 137170

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102600-6	SD-278-SS	Total/NA	Solid	Dry and Grind	
680-102600-6 DU	SD-278-SS	Total/NA	Solid	Dry and Grind	
680-102600-7	SD-278-01	Total/NA	Solid	Dry and Grind	
680-102600-8	SD-278-02	Total/NA	Solid	Dry and Grind	

Prep Batch: 138233

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102600-6	SD-278-SS	Total/NA	Solid	Fill_Geo-21	136843
680-102600-6 DU	SD-278-SS	Total/NA	Solid	Fill_Geo-21	136843
680-102600-7	SD-278-01	Total/NA	Solid	Fill_Geo-21	136843
680-102600-8	SD-278-02	Total/NA	Solid	Fill_Geo-21	136843
LCS 160-138233/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-138233/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

Prep Batch: 140177

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102600-6	SD-278-SS	Total/NA	Solid	Fill_Geo-0	137170
680-102600-6 DU	SD-278-SS	Total/NA	Solid	Fill_Geo-0	137170
680-102600-7	SD-278-01	Total/NA	Solid	Fill_Geo-0	137170
680-102600-8	SD-278-02	Total/NA	Solid	Fill_Geo-0	137170
LCS 160-140177/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-0	
MB 160-140177/1-A	Method Blank	Total/NA	Solid	Fill_Geo-0	

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 138233

Lab ID: MB 160-138233/1-A | Analyzed: 09/08/14 10:44 | Ts: 120 | Sigma: 2
Client ID: | Detector: GV4 | Decay Corrected: No

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.4531	0.380	0.382	U	pCi/g	1.00	0.589	142442
Radium-228	0.2550	0.581	0.581	U	pCi/g		1.13	142442
Thorium-232	0.2550	0.581	0.581	U	pCi/g		1.13	142442
Uranium-235	0.1111	0.644	0.644	U	pCi/g		1.12	142442
Uranium-238	-1.928	6.55	6.55	U	pCi/g		3.56	142442

Other Detected Radionuclides	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Other Detected Radionuclide	None				pCi/g	

Lab ID: LCS 160-138233/2-A | Analyzed: 09/08/14 12:28 | Ts: 120 | Sigma: 2
Client ID: | Detector: GV7 | Decay Corrected: No

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Americium-241	1013	3.80	100		pCi/g		2.01	142447
Cesium-137	381.8	3.25	37.3		pCi/g		1.38	142447
Cobalt-60	416.1	2.98	40.0		pCi/g		0.955	142447

Lab ID: 680-102600-6 | Analyzed: 09/08/14 12:05 | Ts: 120 | Sigma: 2
Client ID: SD-278-SS | Detector: GV12 | Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.948	0.347	0.359		pCi/g	1.00	0.409	142436
Radium-228	1.83	0.473	0.506		pCi/g		0.346	142436
Thorium-232	1.83	0.473	0.506		pCi/g		0.346	142436
Uranium-235	0.188	0.420	0.421	U	pCi/g		0.855	142436
Uranium-238	1.90	1.80	1.81	U	pCi/g		2.44	142436

Other Detected Radionuclides	Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Ac-228	1.83	0.473	0.506		pCi/g	0.346
Bi-214	0.948	0.347	0.359		pCi/g	0.409
K-40	18.2	2.58	3.12		pCi/g	2.07
Pb-212	1.00	0.213	0.239		pCi/g	0.262
Pb-214	0.532	0.234	0.239		pCi/g	0.381
Tl-208	0.428	0.155	0.160		pCi/g	0.181

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 138233

Lab ID: 680-102600-6 DU | Analyzed: 09/08/14 14:34 | Ts: 120 | Sigma: 2
Client ID: SD-278-SS | Detector: GV7 | Decay Corrected: No

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.6753	0.245	0.254		pCi/g	1.00	0.271	142447
Radium-228	1.609	0.408	0.437		pCi/g		0.259	142447
Thorium-232	1.609	0.408	0.437		pCi/g		0.259	142447
Uranium-235	0.1930	0.318	0.318	U	pCi/g		0.531	142447
Uranium-238	0.3359	0.412	0.414	U	pCi/g		1.90	142447

Other Detected Radionuclides	DU Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Ac-228	1.609	0.408	0.437		pCi/g	0.259
Bi-214	0.6753	0.245	0.254		pCi/g	0.271
K-40	11.99	2.60	2.85	F	pCi/g	3.00
Pb-212	1.280	0.212	0.253		pCi/g	0.207
Pb-214	0.9133	0.236	0.252		pCi/g	0.243
Tl-208	0.5887	0.130	0.142		pCi/g	0.0835

Lab ID: 680-102600-7 | Analyzed: 09/10/14 01:56 | Ts: 120 | Sigma: 2
Client ID: SD-278-01 | Detector: GV14 | Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.773	0.287	0.298		pCi/g	1.00	0.389	143250
Radium-228	1.38	0.390	0.414		pCi/g		0.528	143250
Thorium-232	1.38	0.390	0.414		pCi/g		0.528	143250
Uranium-235	0.275	0.457	0.458	U	pCi/g		0.678	143250
Uranium-238	1.92	0.872	0.895	U	pCi/g		2.12	143250

Other Detected Radionuclides	Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Ac-228	1.38	0.390	0.414		pCi/g	0.528
Bi-214	0.773	0.287	0.298		pCi/g	0.389
K-40	18.2	2.79	3.35		pCi/g	2.06
Pb-212	1.23	0.258	0.303		pCi/g	0.291
Pb-214	0.926	0.327	0.341		pCi/g	0.382
Tl-208	0.545	0.158	0.167		pCi/g	0.174

Lab ID: 680-102600-8 | Analyzed: 09/08/14 17:33 | Ts: 120 | Sigma: 2
Client ID: SD-278-02 | Detector: GV7 | Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.769	0.255	0.267		pCi/g	1.00	0.298	142447
Radium-228	1.21	0.321	0.344		pCi/g		0.457	142447

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 138233

Lab ID: 680-102600-8 Analyzed: 09/08/14 17:33 Ts: 120 Sigma: 2
Client ID: SD-278-02 Detector: GV7 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-232	1.21	0.321	0.344		pCi/g		0.457	142447
Uranium-235	0.235	0.273	0.274	U	pCi/g		0.409	142447
Uranium-238	1.68	0.827	0.845	U	pCi/g		1.77	142447

Other Detected Radionuclides	Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Ac-228	1.21	0.321	0.344		pCi/g	0.457
Bi-214	0.769	0.255	0.267		pCi/g	0.298
K-40	17.8	2.80	3.34		pCi/g	2.64
Pb-212	1.60	0.210	0.295		pCi/g	0.187
Pb-214	0.977	0.243	0.263		pCi/g	0.225
Tl-208	0.620	0.146	0.160		pCi/g	0.116

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-138233/1-A	Radium-226			0.4531	U	pCi/g							
MB 160-138233/1-A	Radium-228			0.2550	U	pCi/g							
MB 160-138233/1-A	Thorium-232			0.2550	U	pCi/g							
MB 160-138233/1-A	Uranium-235			0.1111	U	pCi/g							
MB 160-138233/1-A	Uranium-238			-1.928	U	pCi/g							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-138233/2-A	Americium-241		981	1013		pCi/g	103	87 - 116					
LCS 160-138233/2-A	Cesium-137		362	381.8		pCi/g	105	87 - 120					
LCS 160-138233/2-A	Cobalt-60		382	416.1		pCi/g	109	87 - 115					

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
680-102600-6	Radium-226	0.948		0.6753		pCi/g			34	0.45	1.24	1	
680-102600-6	Radium-228	1.83		1.609		pCi/g			13	0.24	0.67	1	
680-102600-6	Thorium-232	1.83		1.609		pCi/g			13	0.24	0.67	1	
680-102600-6	Uranium-235	0.188		0.1930	U	pCi/g			3	0.01	0.02	1	
680-102600-6	Uranium-238	1.90		0.3359	U	pCi/g			140	0.70	1.69	1	

Glossary:
Ts = Count Duration, Sample

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102600-3

SDG No.: 680102600-1

Batch Number: 138233 Batch Start Date: 08/15/14 18:30 Batch Analyst: Santos, Mario J

Batch Method: Fill_Geo-21 Batch End Date:

Lab Sample ID	Client Sample ID	Method Chain	Basis	TareWeight	GrossWeight	InitialAmount	IngDecDate1	IngDecDate3	Geometry
MB 160-138233/1		Fill_Geo-21, GA-01-R				25 g	8/15/14	9/5/14	25mL d=1
LCS 160-138233/2		Fill_Geo-21, GA-01-R				25 g	8/15/14	9/5/14	25mL d=1
680-102600-A-6-D	SD-278-SS	Fill_Geo-21, GA-01-R	T	37.0 g	63.3 g	26.3 g	8/15/14	9/5/14	25mL d=1
680-102600-A-6-D DU	SD-278-SS	Fill_Geo-21, GA-01-R	T	37.0 g	63.3 g	26.3 g	8/15/14	9/5/14	25mL d=1
680-102600-A-7-C	SD-278-01	Fill_Geo-21, GA-01-R	T	36.7 g	67.4 g	30.7 g	8/15/14	9/5/14	25mL Solid
680-102600-A-8-C	SD-278-02	Fill_Geo-21, GA-01-R	T	36.8 g	69.3 g	32.5 g	8/15/14	9/5/14	25mL Solid

Lab Sample ID	Client Sample ID	Method Chain	Basis	25mLD=1 00006
MB 160-138233/1		Fill_Geo-21, GA-01-R		
LCS 160-138233/2		Fill_Geo-21, GA-01-R		# mL
680-102600-A-6-D	SD-278-SS	Fill_Geo-21, GA-01-R	T	
680-102600-A-6-D DU	SD-278-SS	Fill_Geo-21, GA-01-R	T	
680-102600-A-7-C	SD-278-01	Fill_Geo-21, GA-01-R	T	
680-102600-A-8-C	SD-278-02	Fill_Geo-21, GA-01-R	T	

Batch Notes

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102600-3

SDG No.: 680102600-1

Batch Number: 140177 Batch Start Date: 08/26/14 09:42 Batch Analyst: Lockhart, Justin D

Batch Method: Fill_Geo-0 Batch End Date:

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	TareWeight	GrossWeight	Geometry	25mLD=1 00006
MB 160-140177/1		Fill_Geo-0, GA-01-R		25 g			25mL d=1	
LCS 160-140177/2		Fill_Geo-0, GA-01-R		25 g			25mL d=1	# mL
680-102600-A-6-E	SD-278-SS	Fill_Geo-0, GA-01-R	T	26.3 g	37.0 g	63.3 g	25mL d=1	
680-102600-A-6-E DU	SD-278-SS	Fill_Geo-0, GA-01-R	T	26.3 g	37.0 g	63.3 g	25mL d=1	
680-102600-A-7-D	SD-278-01	Fill_Geo-0, GA-01-R	T	30.7 g	36.7 g	67.4 g	25mL Solid	
680-102600-A-8-D	SD-278-02	Fill_Geo-0, GA-01-R	T	32.5 g	36.8 g	69.3 g	25mL Solid	

Batch Notes

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 140177

Lab ID: MB 160-140177/1-A | Analyzed: 08/26/14 11:36 | Ts: 120 | Sigma: 2
Client ID: | Detector: GV12 | Decay Corrected: No

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	-0.4512	0.668	0.669	U	pCi/g		1.11	140267
Radium-226	0.9427	2.13	2.14	U	pCi/g	1.00	3.10	140267
Radium-228	0.1887	0.267	0.268	U	pCi/g		0.539	140267
Thorium-232	0.1887	0.267	0.268	U	pCi/g		0.539	140267
Thorium-234	-0.9281	2.43	2.43	U	pCi/g		2.36	140267
Thallium-208	-0.07418	0.218	0.218	U	pCi/g		0.205	140267
Uranium-235	0.1587	0.280	0.281	U	pCi/g		0.679	140267
Uranium-238	-0.9281	2.43	2.43	U	pCi/g		2.36	140267
Actinium 228	0.1887	0.267	0.268	U	pCi/g		0.539	140267
Bismuth-212	0.1466	1.01	1.01	U	pCi/g		1.80	140267
Bismuth-214	-0.07571	0.332	0.332	U	pCi/g		0.422	140267
Lead-210	-0.07242	1.64	1.64	U	pCi/g		2.46	140267
Lead-212	0.2592	0.185	0.187		pCi/g		0.256	140267
Lead-214	0.1092	0.195	0.195	U	pCi/g		0.318	140267
Potassium-40	-2.315	92.6	92.6	U	pCi/g		2.63	140267
Protactinium-231	1.014	2.07	2.07	U	pCi/g		3.50	140267

Lab ID: LCS 160-140177/2-A | Analyzed: 08/26/14 11:39 | Ts: 120 | Sigma: 2
Client ID: | Detector: GV7 | Decay Corrected: No

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Americium-241	995.9	3.76	98.7		pCi/g		1.98	140271
Cesium-137	369.5	3.19	36.1		pCi/g		1.33	140271
Cobalt-60	412.8	3.01	39.6		pCi/g		0.977	140271

Lab ID: 680-102600-6 | Analyzed: 08/26/14 11:33 | Ts: 120 | Sigma: 2
Client ID: SD-278-SS | Detector: GV4 | Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.743	0.496	0.502	U	pCi/g		0.788	140269
Radium-226	5.35	3.72	3.79		pCi/g	1.00	5.19	140269
Radium-228	1.15	0.612	0.622		pCi/g		1.08	140269
Thorium-232	1.15	0.612	0.622		pCi/g		1.08	140269
Thorium-234	3.30	2.26	2.29	U	pCi/g		3.37	140269
Thallium-208	0.371	0.227	0.230		pCi/g		0.336	140269
Uranium-235	0.614	0.668	0.671	U	pCi/g		1.09	140269

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 140177

Lab ID: 680-102600-6 Analyzed: 08/26/14 11:33 Ts: 120 Sigma: 2
Client ID: SD-278-SS Detector: GV4 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-238	3.30	2.26	2.29	U	pCi/g		3.37	140269
Actinium 228	1.15	0.612	0.622		pCi/g		1.08	140269
Bismuth-212	0.000	2.96	2.96	U	pCi/g		3.30	140269
Bismuth-214	0.567	0.487	0.490	U	pCi/g		0.745	140269
Lead-210	3.22	2.16	2.20	U	pCi/g		3.33	140269
Lead-212	0.773	0.339	0.349		pCi/g		0.464	140269
Lead-214	0.626	0.363	0.368	U	pCi/g		0.638	140269
Potassium-40	14.7	4.27	4.50		pCi/g		5.23	140269
Protactinium-231	-0.126	0.357	0.357	U	pCi/g		7.46	140269

Lab ID: 680-102600-6 DU Analyzed: 08/26/14 13:40 Ts: 120 Sigma: 2
Client ID: SD-278-SS Detector: GV12 Decay Corrected: No

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.2976	0.427	0.429	U	pCi/g		0.710	140267
Radium-226	3.887	2.93	2.98		pCi/g	1.00	3.52	140267
Radium-228	1.141	0.446	0.459		pCi/g		0.595	140267
Thorium-232	1.141	0.446	0.459		pCi/g		0.595	140267
Thorium-234	0.9843	0.851	0.858	U	pCi/g		2.26	140267
Thallium-208	0.3704	0.156	0.160		pCi/g		0.192	140267
Uranium-235	0.4186	0.480	0.481	U	pCi/g		0.774	140267
Uranium-238	0.9843	0.851	0.858	U	pCi/g		2.26	140267
Actinium 228	1.141	0.446	0.459		pCi/g		0.595	140267
Bismuth-212	1.491	1.22	1.23	U	pCi/g		1.91	140267
Bismuth-214	0.9441	0.286	0.300		pCi/g		0.345	140267
Lead-210	3.103	1.91	1.97		pCi/g		2.60	140267
Lead-212	0.9958	0.208	0.234		pCi/g		0.296	140267
Lead-214	0.7779	0.287	0.297		pCi/g		0.366	140267
Potassium-40	15.59	2.70	3.09		pCi/g		2.53	140267
Protactinium-231	-0.03342	0.0765	0.0765	U	pCi/g		4.10	140267

Lab ID: 680-102600-7 Analyzed: 08/26/14 11:28 Ts: 120 Sigma: 2
Client ID: SD-278-01 Detector: GV17 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.177	0.312	0.313	U	pCi/g		2.42	140266

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 140177

Lab ID: 680-102600-7 Analyzed: 08/26/14 11:28 Ts: 120 Sigma: 2
Client ID: SD-278-01 Detector: GV17 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	7.55	2.53	2.85		pCi/g	1.00	2.90	140266
Radium-228	1.79	0.440	0.476		pCi/g		0.573	140266
Thorium-232	1.79	0.440	0.476		pCi/g		0.573	140266
Thorium-234	1.40	1.96	1.96	U	pCi/g		3.01	140266
Thallium-208	0.475	0.147	0.155		pCi/g		0.166	140266
Uranium-235	0.150	0.515	0.515	U	pCi/g		0.944	140266
Uranium-238	1.40	1.96	1.96	U	pCi/g		3.01	140266
Actinium 228	1.79	0.440	0.476		pCi/g		0.573	140266
Bismuth-212	0.799	1.25	1.25	U	pCi/g		2.09	140266
Bismuth-214	1.05	0.293	0.313		pCi/g		0.335	140266
Lead-210	1.33	1.90	1.91	U	pCi/g		2.98	140266
Lead-212	1.39	0.225	0.288		pCi/g		0.288	140266
Lead-214	1.18	0.289	0.313		pCi/g		0.341	140266
Potassium-40	18.4	2.70	3.29		pCi/g		2.25	140266
Protactinium-231	0.690	0.624	0.628	U	pCi/g		4.85	140266

Lab ID: 680-102600-8 Analyzed: 08/26/14 11:29 Ts: 120 Sigma: 2
Client ID: SD-278-02 Detector: GV14 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.586	0.293	0.303		pCi/g		0.405	140264
Radium-226	-0.382	2.39	2.39	U	pCi/g	1.00	3.37	140264
Radium-228	1.75	0.518	0.548		pCi/g		0.431	140264
Thorium-232	1.75	0.518	0.548		pCi/g		0.431	140264
Thorium-234	1.59	1.29	1.31	U	pCi/g		2.04	140264
Thallium-208	0.560	0.170	0.179		pCi/g		0.179	140264
Uranium-235	0.410	0.458	0.460	U	pCi/g		0.714	140264
Uranium-238	1.59	1.29	1.31	U	pCi/g		2.04	140264
Actinium 228	1.75	0.518	0.548		pCi/g		0.431	140264
Bismuth-212	3.45	1.37	1.41		pCi/g		1.30	140264
Bismuth-214	0.747	0.258	0.270		pCi/g		0.350	140264
Lead-210	0.773	1.37	1.38	U	pCi/g		2.18	140264
Lead-212	1.24	0.232	0.282		pCi/g		0.267	140264
Lead-214	0.820	0.220	0.235		pCi/g		0.326	140264
Potassium-40	16.1	2.71	3.17		pCi/g		2.64	140264
Protactinium-231	1.81	1.59	1.61	U	pCi/g		3.58	140264

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 140177

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-140177/1-A	Actinium-227			-0.4512	U	pCi/g							
MB 160-140177/1-A	Radium-226			0.9427	U	pCi/g							
MB 160-140177/1-A	Radium-228			0.1887	U	pCi/g							
MB 160-140177/1-A	Thorium-232			0.1887	U	pCi/g							
MB 160-140177/1-A	Thorium-234			-0.9281	U	pCi/g							
MB 160-140177/1-A	Thallium-208			-0.07418	U	pCi/g							
MB 160-140177/1-A	Uranium-235			0.1587	U	pCi/g							
MB 160-140177/1-A	Uranium-238			-0.9281	U	pCi/g							
MB 160-140177/1-A	Actinium 228			0.1887	U	pCi/g							
MB 160-140177/1-A	Bismuth-212			0.1466	U	pCi/g							
MB 160-140177/1-A	Bismuth-214			-0.07571	U	pCi/g							
MB 160-140177/1-A	Lead-210			-0.07242	U	pCi/g							
MB 160-140177/1-A	Lead-212			0.2592		pCi/g							
MB 160-140177/1-A	Lead-214			0.1092	U	pCi/g							
MB 160-140177/1-A	Potassium-40			-2.315	U	pCi/g							
MB 160-140177/1-A	Protactinium-231			1.014	U	pCi/g							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-140177/2-A	Americium-241		981	995.9		pCi/g	101	87 - 116					
LCS 160-140177/2-A	Cesium-137		362	369.5		pCi/g	102	87 - 120					
LCS 160-140177/2-A	Cobalt-60		384	412.8		pCi/g	108	87 - 115					

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
680-102600-6	Actinium-227	0.743		0.2976	U	pCi/g			86	0.48	1.35	1	
680-102600-6	Radium-226	5.35		3.887		pCi/g			32	0.22	0.61	1	
680-102600-6	Radium-228	1.15		1.141		pCi/g			0.4	0	0.01	1	
680-102600-6	Thorium-232	1.15		1.141		pCi/g			0.4	0	0.01	1	
680-102600-6	Thorium-234	3.30		0.9843	U	pCi/g			108	0.74	1.89	1	
680-102600-6	Thallium-208	0.371		0.3704		pCi/g			0.1	0	0	1	
680-102600-6	Uranium-235	0.614		0.4186	U	pCi/g			38	0.17	0.47	1	
680-102600-6	Uranium-238	3.30		0.9843	U	pCi/g			108	0.74	1.89	1	
680-102600-6	Actinium 228	1.15		1.141		pCi/g			0.4	0	0.01	1	
680-102600-6	Bismuth-212	0.000		1.491	U	pCi/g			200	0.36	0.93	1	
680-102600-6	Bismuth-214	0.567		0.9441		pCi/g			50	0.48	1.31	1	
680-102600-6	Lead-210	3.22		3.103		pCi/g			4	0.03	0.08	1	
680-102600-6	Lead-212	0.773		0.9958		pCi/g			25	0.38	1.06	1	
680-102600-6	Lead-214	0.626		0.7779		pCi/g			22	0.23	0.64	1	
680-102600-6	Potassium-40	14.7		15.59		pCi/g			6	0.12	0.33	1	

Gamma Spectroscopy Analysis Detail Report

Prep Batch: 140177

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
680-102600-6	Protactinium-231	-0.126		-0.03342	U	pCi/g			116	0.21	0.51	1	

Glossary:

Ts = Count Duration, Sample

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102600-3

SDG No.: 680102600-1

Batch Number: 138233 Batch Start Date: 08/15/14 18:30 Batch Analyst: Santos, Mario J

Batch Method: Fill_Geo-21 Batch End Date:

Lab Sample ID	Client Sample ID	Method Chain	Basis	TareWeight	GrossWeight	InitialAmount	IngDecDate1	IngDecDate3	Geometry
MB 160-138233/1		Fill_Geo-21, GA-01-R				25 g	8/15/14	9/5/14	25mL d=1
LCS 160-138233/2		Fill_Geo-21, GA-01-R				25 g	8/15/14	9/5/14	25mL d=1
680-102600-A-6-D	SD-278-SS	Fill_Geo-21, GA-01-R	T	37.0 g	63.3 g	26.3 g	8/15/14	9/5/14	25mL d=1
680-102600-A-6-D DU	SD-278-SS	Fill_Geo-21, GA-01-R	T	37.0 g	63.3 g	26.3 g	8/15/14	9/5/14	25mL d=1
680-102600-A-7-C	SD-278-01	Fill_Geo-21, GA-01-R	T	36.7 g	67.4 g	30.7 g	8/15/14	9/5/14	25mL Solid
680-102600-A-8-C	SD-278-02	Fill_Geo-21, GA-01-R	T	36.8 g	69.3 g	32.5 g	8/15/14	9/5/14	25mL Solid

Lab Sample ID	Client Sample ID	Method Chain	Basis	25mLD=1 00006
MB 160-138233/1		Fill_Geo-21, GA-01-R		
LCS 160-138233/2		Fill_Geo-21, GA-01-R		# mL
680-102600-A-6-D	SD-278-SS	Fill_Geo-21, GA-01-R	T	
680-102600-A-6-D DU	SD-278-SS	Fill_Geo-21, GA-01-R	T	
680-102600-A-7-C	SD-278-01	Fill_Geo-21, GA-01-R	T	
680-102600-A-8-C	SD-278-02	Fill_Geo-21, GA-01-R	T	

Batch Notes

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102600-3

SDG No.: 680102600-1

Batch Number: 140177 Batch Start Date: 08/26/14 09:42 Batch Analyst: Lockhart, Justin D

Batch Method: Fill_Geo-0 Batch End Date:

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	TareWeight	GrossWeight	Geometry	25mLD=1_00006
MB 160-140177/1		Fill_Geo-0, GA-01-R		25 g			25mL d=1	
LCS 160-140177/2		Fill_Geo-0, GA-01-R		25 g			25mL d=1	# mL
680-102600-A-6-E	SD-278-SS	Fill_Geo-0, GA-01-R	T	26.3 g	37.0 g	63.3 g	25mL d=1	
680-102600-A-6-E DU	SD-278-SS	Fill_Geo-0, GA-01-R	T	26.3 g	37.0 g	63.3 g	25mL d=1	
680-102600-A-7-D	SD-278-01	Fill_Geo-0, GA-01-R	T	30.7 g	36.7 g	67.4 g	25mL Solid	
680-102600-A-8-D	SD-278-02	Fill_Geo-0, GA-01-R	T	32.5 g	36.8 g	69.3 g	25mL Solid	

Batch Notes

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

Gamma Spectroscopy Run Log

Detector: GV4

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/05/12 21:42		IC 160-12292/1		12292			JLW
03/08/12 03:13		ICV 160-12292/2		12292			JLW
02/27/13 16:17		ACVTOP 160-38300/1		38300			JLW
08/09/14 09:24		ICB 160-136893/1		136893			RTM
08/26/14 00:01		CCB 160-140269/1		140269			SMP
08/26/14 01:05		CCV 160-140269/2		140269			
08/26/14 01:27		CCV 160-140269/3		140269			SMP
08/26/14 09:39	30	ZZZZZ		140269			
08/26/14 10:24	30	ZZZZZ		140269			
08/26/14 11:33	120	680-102600-6	SD-278-SS	140269	140177	GA-01-R	SMP
08/26/14 14:21	30	ZZZZZ		140269			
08/26/14 15:09	30	ZZZZZ		140269			
08/26/14 16:13	30	ZZZZZ		140269			
08/26/14 17:00	30	ZZZZZ		140269			
08/26/14 19:06	30	ZZZZZ		140269			
08/26/14 19:48	30	ZZZZZ		140269			
08/26/14 20:32	30	ZZZZZ		140269			
08/26/14 21:10	30	ZZZZZ		140269			
09/05/14 17:56		ICB 160-142444/1		142444			JLW
09/08/14 06:50		CCV 160-142442/1		142442			
09/08/14 07:10		CCV 160-142442/2		142442			SMP
09/08/14 07:32		CCB 160-142442/3		142442			SMP
09/08/14 10:44	120	MB 160-138233/1-A		142442	138233	GA-01-R	SMP
09/08/14 13:04	30	ZZZZZ		142442			
09/08/14 13:40	30	ZZZZZ		142442			
09/08/14 14:22	30	ZZZZZ		142442			
09/08/14 15:01		ZZZZZ		142442			
09/08/14 17:41	30	ZZZZZ		142442			
09/08/14 18:15	30	ZZZZZ		142442			
09/08/14 19:11	30	ZZZZZ		142442			

Detector: GV7

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/07/12 11:02		IC 160-12300/1		12300			JLW
03/07/12 20:19		ICV 160-12300/2		12300			JLW
03/26/12 11:32		IC 160-12301/1		12301			JLW
04/12/12 19:52		ICV 160-12301/2		12301			JLW
01/28/14 18:43		ACVTOP 160-101797/1		101797			JLW
08/09/14 09:24		ICB 160-136895/1		136895			RTM
08/26/14 00:01		CCV 160-140271/1		140271			
08/26/14 00:23		CCV 160-140271/2		140271			SMP
08/26/14 01:06		CCB 160-140271/3		140271			SMP
08/26/14 09:34	60	ZZZZZ		140271			
08/26/14 10:49	30	ZZZZZ		140271			
08/26/14 11:39	120	LCS 160-140177/2-A		140271	140177	GA-01-R	SMP
08/26/14 14:15	30	ZZZZZ		140271			
08/26/14 15:01	30	ZZZZZ		140271			
08/26/14 15:54	30	ZZZZZ		140271			
08/26/14 19:06	30	ZZZZZ		140271			
08/26/14 19:49	90	ZZZZZ		140271			
08/26/14 21:52	30	ZZZZZ		140271			
09/05/14 17:58		ICB 160-142451/1		142451			JLW

Gamma Spectroscopy Run Log

Detector: GV7 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
09/08/14 06:49		CCB 160-142447/1		142447			EMN
09/08/14 07:33		CCV 160-142447/2		142447			
09/08/14 07:55		CCV 160-142447/3		142447			EMN
09/08/14 10:51	60	ZZZZZ		142447			
09/08/14 12:28	120	LCS 160-138233/2-A		142447	138233	GA-01-R	EMN
09/08/14 14:34	120	680-102600-6 DU	SD-278-SS DU	142447	138233	GA-01-R	EMN
09/08/14 17:33	120	680-102600-8	SD-278-02	142447	138233	GA-01-R	EMN

Detector: GV12

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
09/01/11 19:20		IC 160-45527/1		45527			JLW
09/06/11 07:27		ICV 160-45527/2		45527			JLW
01/28/14 14:18		ACVTOP 160-101795/1		101795			JLW
08/09/14 09:27		ICB 160-136897/1		136897			RTM
08/26/14 00:03		CCB 160-140267/1		140267			SMP
08/26/14 01:08		CCV 160-140267/2		140267			
08/26/14 01:28		CCV 160-140267/3		140267			SMP
08/26/14 09:30	60	ZZZZZ		140267			
08/26/14 10:41	30	ZZZZZ		140267			
08/26/14 11:36	120	MB 160-140177/1-A		140267	140177	GA-01-R	SMP
08/26/14 13:40	120	680-102600-6 DU	SD-278-SS DU	140267	140177	GA-01-R	SMP
08/26/14 15:52	30	ZZZZZ		140267			
08/26/14 19:04	30	ZZZZZ		140267			
08/26/14 19:46	30	ZZZZZ		140267			
08/26/14 20:30	30	ZZZZZ		140267			
08/26/14 21:09	30	ZZZZZ		140267			
08/26/14 21:51	120	ZZZZZ		140267			
09/05/14 17:50		ICB 160-142440/1		142440			JLW
09/08/14 07:37		CCB 160-142436/1		142436			EMN
09/08/14 08:15		CCV 160-142436/2		142436			
09/08/14 08:36		CCV 160-142436/3		142436			EMN
09/08/14 10:42	60	ZZZZZ		142436			
09/08/14 12:05	120	680-102600-6	SD-278-SS	142436	138233	GA-01-R	EMN
09/08/14 14:16	30	ZZZZZ		142436			
09/08/14 14:48	30	ZZZZZ		142436			
09/08/14 15:29		ZZZZZ		142436			
09/08/14 16:07		ZZZZZ		142436			
09/08/14 17:17	30	ZZZZZ		142436			
09/08/14 18:04	120	ZZZZZ		142436			

Detector: GV14

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/13/12 11:03		IC 160-12356/1		12356			JLW
03/16/12 10:15		ICV 160-12356/2		12356			JLW
01/24/14 08:37		ACVTOP 160-101066/1		101066			JLW
08/09/14 09:22		ICB 160-136899/1		136899			RTM
08/26/14 00:02		CCV 160-140264/1		140264			
08/26/14 00:23		CCV 160-140264/2		140264			SMP
08/26/14 01:07		CCB 160-140264/3		140264			SMP
08/26/14 09:30	60	ZZZZZ		140264			
08/26/14 10:43	30	ZZZZZ		140264			

Gamma Spectroscopy Run Log

Detector: GV14 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
08/26/14 11:29	120	680-102600-8	SD-278-02	140264	140177	GA-01-R	SMP
08/26/14 14:09	30	ZZZZZ		140264			
08/26/14 14:59	30	ZZZZZ		140264			
08/26/14 15:51	30	ZZZZZ		140264			
08/26/14 19:03	30	ZZZZZ		140264			
08/26/14 19:45	30	ZZZZZ		140264			
08/26/14 20:29	30	ZZZZZ		140264			
08/26/14 21:07	30	ZZZZZ		140264			
08/26/14 21:50	30	ZZZZZ		140264			
08/26/14 23:00	30	ZZZZZ		140264			
09/05/14 17:49		ICB 160-142433/1		142433			JLW
09/10/14 00:03		CCV 160-143250/1		143250			
09/10/14 00:24		CCV 160-143250/2		143250			SMP
09/10/14 00:45		CCB 160-143250/3		143250			SMP
09/10/14 01:56	120	680-102600-7	SD-278-01	143250	138233	GA-01-R	SMP
09/10/14 07:02	30	ZZZZZ		143250			
09/10/14 08:33	120	ZZZZZ		143250			
09/10/14 10:53	60	ZZZZZ		143250			
09/10/14 12:19	60	ZZZZZ		143250			
09/10/14 14:04	30	ZZZZZ		143250			
09/10/14 16:25	45	ZZZZZ		143250			
09/10/14 19:00	30	ZZZZZ		143250			
09/10/14 19:38		ZZZZZ		143250			
09/10/14 21:46	30	ZZZZZ		143250			
09/10/14 22:19	60	ZZZZZ		143250			

Detector: GV17

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/27/12 15:45		IC 160-12388/1		12388			JLW
04/12/12 19:55		ICV 160-12388/2		12388			JLW
01/23/14 11:17		ACVTOP 160-100896/1		100896			JLW
08/09/14 09:24		ICB 160-136901/1		136901			RTM
08/26/14 00:03		CCV 160-140266/1		140266			
08/26/14 00:23		CCV 160-140266/2		140266			
08/26/14 00:44		CCV 160-140266/3		140266			SMP
08/26/14 01:08		CCB 160-140266/4		140266			SMP
08/26/14 09:32	60	ZZZZZ		140266			
08/26/14 10:42	30	ZZZZZ		140266			
08/26/14 11:28	120	680-102600-7	SD-278-01	140266	140177	GA-01-R	SMP
08/26/14 14:06	30	ZZZZZ		140266			
08/26/14 15:00	30	ZZZZZ		140266			
08/26/14 15:49	30	ZZZZZ		140266			
08/26/14 16:28	30	ZZZZZ		140266			
08/26/14 19:04	30	ZZZZZ		140266			
08/26/14 19:47	30	ZZZZZ		140266			
08/26/14 20:31	30	ZZZZZ		140266			
08/26/14 21:09	30	ZZZZZ		140266			
08/26/14 21:52	30	ZZZZZ		140266			

Test America
St. Louis
Background Check

Spectrum: 4_20140826001_BG
Acquired: 8/26/2014 12:01:17 AM
Detector: Ge 4 SN/181
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.32	1.20	1.24	1.29	1.39	1.43	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

Test America
St. Louis
Quality Control Check

Spectrum: 4_20140826002_QCAsLeft
Acquired: 8/26/2014 1:27:22 AM
Detector: Ge 4 SN/181
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.00	239.00	240.00	PASS
Energy	59.54	59.22	59.29	59.64	59.79	59.86	PASS
FWHM	0.77	0.00	0.00	1.19	1.87	1.97	PASS
ActivityDiff	650.60	-5.00	-4.00	-1.62	4.00	5.00	PASS
QA-662							
FWHM	1.34	0.00	0.00	1.62	3.04	3.14	PASS
ActivityDiff	609.90	-5.00	-4.00	-3.65	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.40	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.69	1333.01	1333.26	PASS
FWHM	1.84	0.00	0.00	1.99	4.04	4.14	PASS
ActivityDiff	1189.70	-5.00	-4.00	-3.07	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

Test America
St. Louis
Quality Control Check

Spectrum: 4_20140908001_QCAsLeft
Acquired: 9/8/2014 7:10:57 AM
Detector: Ge 4 SN/181
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.54	59.22	59.29	59.61	59.79	59.86	PASS
FWHM	0.77	0.00	0.00	1.33	1.87	1.97	PASS
ActivityDiff	650.60	-5.00	-4.00	-1.52	4.00	5.00	PASS
QA-662							
FWHM	1.34	0.00	0.00	1.73	3.04	3.14	PASS
ActivityDiff	609.90	-5.00	-4.00	-0.94	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.90	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.55	1333.01	1333.26	PASS
FWHM	1.84	0.00	0.00	2.08	4.04	4.14	PASS
ActivityDiff	1189.70	-5.00	-4.00	-1.48	4.00	5.00	PASS

Analyst: Jody Watson Reviewer: Jody Watson

Test America
St. Louis
Background Check

Spectrum: 4_20140908002_BG
Acquired: 9/8/2014 7:32:37 AM
Detector: Ge 4 SN/181
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.32	1.20	1.24	1.28	1.39	1.43	PASS

Analyst: Jody Watson Reviewer: Jody Watson

Test America
St. Louis
Quality Control Check

Spectrum: 7_20140826001_QCAsLeft
Acquired: 8/26/2014 12:23:12 AM
Detector: Ge 7 SN/154
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.80	239.00	240.00	PASS
Energy	59.58	59.04	59.29	59.57	59.79	60.04	PASS
FWHM	0.84	0.00	0.00	1.22	1.94	2.04	PASS
ActivityDiff	647.00	-5.00	-4.00	2.55	4.00	5.00	PASS
QA-662							
FWHM	1.45	0.00	0.00	1.70	3.15	3.25	PASS
ActivityDiff	606.50	-5.00	-4.00	0.40	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.40	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.67	1333.01	1333.26	PASS
FWHM	1.98	0.00	0.00	2.16	4.18	4.28	PASS
ActivityDiff	1183.00	-5.00	-4.00	0.23	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

Test America
St. Louis
Background Check

Spectrum: 7_20140826002_BG
Acquired: 8/26/2014 1:06:00 AM
Detector: Ge 7 SN/154
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.29	1.40	1.45	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

SB-124	<	7.7339E-02
SB-125	<	1.8482E-01
I-131	<	5.5504E-02
BA-133	<	1.1488E-01
CS-134	<	1.4985E-01
CS-137	<	1.0264E-01
CE-139	<	6.7696E-02
Ba-140	<	2.7196E-01
La-140	<	2.3065E-01
CE-141	<	1.0009E-01
CE-144	<	3.1762E-01
PM-144	<	1.1715E-01
EU-152	<	1.5679E-01
EU-154	<	1.0091E+00
EU-155	<	1.2796E-01
HF-181	<	1.4261E-01
Ta-182	<	4.6290E-01
Hg-203	<	5.0691E-02
TL-208	<	1.7581E-01
pm-146	<	2.9187E-01
y-88	<	1.3891E-01
PB-210	<	4.3386E+00
PB-212	<	1.5112E-01
PB-214	<	1.4401E-01
BI-207	<	9.1397E-02
BI-212	<	1.6080E+00
BI-214	<	3.2069E-01
BI-210M	<	1.2796E-01
RA-224	<	1.3599E+00
AC-228	<	4.5399E-01
TH-227	<	2.3314E-01
TH-229	<	9.4858E-01
TH-234	<	3.2484E+00
PA-231	<	3.2574E+00
PA-233	<	1.2846E-01
PA-234	<	2.2823E-01
PA-234M	<	1.7081E+01
Ra-226	<	1.1189E+00
U-235	<	3.6185E-01
AM-241	<	2.2755E-01
Np-237	<	2.1831E-01

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

TestAmerica Spectrum name: 7_20140826002_BG.An1

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.1 keV) 0.000E+00 DPS

Test America
St. Louis
Background Check

Spectrum: 7_20140908001_BG
Acquired: 9/8/2014 6:49:10 AM
Detector: Ge 7 SN/154
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.25	1.40	1.45	PASS

Analyst: Jody Watson Reviewer: Jody Watson

Test America
St. Louis
Quality Control Check

Spectrum: 7_20140908002_QCAsLeft
Acquired: 9/8/2014 7:55:41 AM
Detector: Ge 7 SN/154
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.58	59.04	59.29	59.60	59.79	60.04	PASS
FWHM	0.84	0.00	0.00	1.30	1.94	2.04	PASS
ActivityDiff	647.00	-5.00	-4.00	0.25	4.00	5.00	PASS
QA-662							
FWHM	1.45	0.00	0.00	1.73	3.15	3.25	PASS
ActivityDiff	606.50	-5.00	-4.00	-1.11	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.50	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.71	1333.01	1333.26	PASS
FWHM	1.98	0.00	0.00	2.22	4.18	4.28	PASS
ActivityDiff	1183.00	-5.00	-4.00	-0.46	4.00	5.00	PASS

Analyst: Jody Watson Reviewer: Jody Watson

Test America
St. Louis
Background Check

Spectrum: 12_20140826001_BG
Acquired: 8/26/2014 12:03:50 AM
Detector: Ge12 S/N10034336
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.16	1.95	2.02	2.13	2.29	2.36	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

Test America
St. Louis
Quality Control Check

Spectrum: 12_20140826002_QCAsLeft
Acquired: 8/26/2014 1:28:57 AM
Detector: Ge12 S/N10034336
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.10	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.63	59.79	60.04	PASS
FWHM	0.90	0.00	0.00	1.17	2.00	2.10	PASS
ActivityDiff	691.00	-5.00	-4.00	-0.90	4.00	5.00	PASS
QA-662							
FWHM	1.48	0.00	0.00	1.68	3.18	3.28	PASS
ActivityDiff	659.00	-5.00	-4.00	1.93	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.60	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.57	1333.01	1333.26	PASS
FWHM	2.00	0.00	0.00	2.07	4.20	4.30	PASS
ActivityDiff	1274.00	-5.00	-4.00	-2.79	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

Test America
St. Louis
Background Check

Spectrum: 12_20140908001_BG
Acquired: 9/8/2014 7:37:57 AM
Detector: Ge12 S/N10034336
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.16	1.95	2.02	2.19	2.29	2.36	PASS

Analyst: Jody Watson Reviewer: Jody Watson

Test America
St. Louis
Quality Control Check

Spectrum: 12_20140908002_QCAsLeft
Acquired: 9/8/2014 8:36:05 AM
Detector: Ge12 S/N10034336
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.80	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.57	59.79	60.04	PASS
FWHM	0.90	0.00	0.00	1.08	2.00	2.10	PASS
ActivityDiff	691.00	-5.00	-4.00	0.33	4.00	5.00	PASS
QA-662							
FWHM	1.48	0.00	0.00	1.57	3.18	3.28	PASS
ActivityDiff	659.00	-5.00	-4.00	0.71	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.20	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.47	1333.01	1333.26	PASS
FWHM	2.00	0.00	0.00	2.08	4.20	4.30	PASS
ActivityDiff	1274.00	-5.00	-4.00	0.83	4.00	5.00	PASS

Analyst: Jody Watson Reviewer: Jody Watson

Test America
St. Louis
Quality Control Check

Spectrum: 14_20140826001_QCAsLeft
Acquired: 8/26/2014 12:23:48 AM
Detector: Ge14 SN/11080670
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.00	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.66	59.79	60.04	PASS
FWHM	0.76	0.00	0.00	0.82	1.86	1.96	PASS
ActivityDiff	671.90	-5.00	-4.00	-0.39	4.00	5.00	PASS
QA-662							
FWHM	1.35	0.00	0.00	1.41	3.05	3.15	PASS
ActivityDiff	628.85	-5.00	-4.00	-0.91	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.00	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.52	1333.01	1333.26	PASS
FWHM	1.91	0.00	0.00	1.98	4.11	4.21	PASS
ActivityDiff	1224.59	-5.00	-4.00	-4.52	4.00	5.00	Low OOT

Analyst: Siobhan Perry Reviewer: Rachel Mueller

Test America
St. Louis
Background Check

Spectrum: 14_20140826002_BG
Acquired: 8/26/2014 1:07:47 AM
Detector: Ge14 SN/11080670
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.91	1.75	1.80	1.93	2.01	2.06	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

Test America
St. Louis
Quality Control Check

Spectrum: 14_20140910001_QCAsLeft
Acquired: 9/10/2014 12:24:12 AM
Detector: Ge14 SN/11080670
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.00	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.66	59.79	60.04	PASS
FWHM	0.76	0.00	0.00	0.79	1.86	1.96	PASS
ActivityDiff	671.90	-5.00	-4.00	-0.79	4.00	5.00	PASS
QA-662							
FWHM	1.35	0.00	0.00	1.39	3.05	3.15	PASS
ActivityDiff	628.85	-5.00	-4.00	-0.58	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.50	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.64	1333.01	1333.26	PASS
FWHM	1.91	0.00	0.00	1.84	4.11	4.21	PASS
ActivityDiff	1224.59	-5.00	-4.00	0.98	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

Test America
St. Louis
Quality Control Check

Spectrum: 14_20140910001_QCAsLeft
Acquired: 9/10/2014 12:24:12 AM
Detector: Ge14 SN/11080670
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.00	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.66	59.79	60.04	PASS
FWHM	0.76	0.00	0.00	0.79	1.86	1.96	PASS
ActivityDiff	671.90	-5.00	-4.00	-0.79	4.00	5.00	PASS
QA-662							
FWHM	1.35	0.00	0.00	1.39	3.05	3.15	PASS
ActivityDiff	628.85	-5.00	-4.00	-0.58	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.50	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.64	1333.01	1333.26	PASS
FWHM	1.91	0.00	0.00	1.84	4.11	4.21	PASS
ActivityDiff	1224.59	-5.00	-4.00	0.98	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

Test America
St. Louis
Background Check

Spectrum: 14_20140910002_BG
Acquired: 9/10/2014 12:45:25 AM
Detector: Ge14 SN/11080670
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.91	1.75	1.80	1.83	2.01	2.06	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

Test America
St. Louis
Background Check

Spectrum: 14_20140910002_BG
Acquired: 9/10/2014 12:45:25 AM
Detector: Ge14 SN/11080670
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.91	1.75	1.80	1.83	2.01	2.06	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

Test America
St. Louis
Quality Control Check

Spectrum: 17_20140826002_QCAsLeft
Acquired: 8/26/2014 12:44:06 AM
Detector: Ge17 SN/11080671
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.10	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.67	59.79	60.04	PASS
FWHM	0.77	0.00	0.00	0.78	1.87	1.97	PASS
ActivityDiff	691.00	-5.00	-4.00	-0.94	4.00	5.00	PASS
QA-662							
FWHM	1.37	0.00	0.00	1.33	3.07	3.17	PASS
ActivityDiff	659.00	-5.00	-4.00	1.45	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.00	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.61	1333.01	1333.26	PASS
FWHM	1.88	0.00	0.00	1.86	4.08	4.18	PASS
ActivityDiff	1274.00	-5.00	-4.00	-0.86	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

Test America
St. Louis
Background Check

Spectrum: 17_20140826003_BG
Acquired: 8/26/2014 1:08:40 AM
Detector: Ge17 SN/11080671
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.36	2.23	2.27	2.40	2.45	2.50	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

Gamma Verification per Geometry

Detector: Ge 04
Geometry: 25 mL D=1
Reference date 1/1/2012
Calibration Standard: 90101
Standard volume g / vial 5.31144
Standard volume transferred in g / geometry 0.5067
lab ID# of cal standard 6706

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	abundance	activity Bq/sample	Count Results	%recovery
Am-241	3253	310	0.359	**864.4**	870.13	100.7
Cd-109	4733	452	0.0361	**12507.4**	12351	98.7
Co-57	2482	237	0.856	**276.6**	282	101.9
Ce-139	3514	335	0.799	**419.6**	409.08	97.5
Hg-203	7639	729	0.8155	**893.6**	934.77	104.6
Sn-113	4952	472	0.64	**738.1**	740.3	100.3
Cs-137	3184	304	0.851	**356.9**	350.56	98.2
Y-88	11930	1138	0.937	**1214.6**	1183.9	97.5
Co-60	5881	561	0.99974	**561.2**	558.63	99.5
Co-60	5882	561	0.99986	**561.2**	561.14	100.0
Y-88	12630	1205	0.992	**1214.6**	1239.2	102.0

Reviewed By: Jody watson

Date: 3/5/2012

Gamma Verification per Geometry

Detector: Ge7

Geometry: 25mL solid

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 56

lab ID# of cal standard Rad12-0010

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	112	0.0425	2630	2647.2	100.6
Am-241	2037	74	0.359	205	205.94	100.5
Cd-109	2881	104	0.0361	2883	2885.4	100.1
Co-57	1511	55	0.856	64	64.298	100.8
Ce-139	2139	77	0.799	97	93.788	97.0
Hg-203	4651	168	0.8146	206	213.53	103.5
Sn-113	3015	109	0.64	170	172.61	101.4
Cs-137	1938	70	0.851	82	84.005	102.1
Y-88	7264	262	0.937	280	264.1	94.3
Co-60	3580	129	0.99974	129	126.18	97.5
Co-60	3581	129	0.999856	129	129.57	100.1
Y-88	7690	278	0.992	280	288.85	103.1

Reviewed By: Jody Watson

Date: 3/7/2012

Gamma Verification per Geometry

Detector: Ge 07
Geometry: 25 mL D=1
Reference date 1/1/2012
Calibration Standard: 90101
Standard volume g / vial 5.31144
Standard volume transferred in g / geometry 0.5067
lab ID# of cal standard 6706

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	abundance	activity Bq/sample	Count Results	%recovery
Am-241	3253	310	0.359	**864.4**	869.15	100.5
Cd-109	4733	452	0.0361	**12507.4**	12148	97.1
Co-57	2482	237	0.856	**276.6**	279.17	100.9
Ce-139	3514	335	0.799	**419.6**	404.29	96.4
Hg-203	7639	729	0.8155	**893.6**	945.2	105.8
Sn-113	4952	472	0.64	**738.1**	747.38	101.3
Cs-137	3184	304	0.851	**356.9**	362.35	101.5
Y-88	11930	1138	0.937	**1214.6**	1152.4	94.9
Co-60	5881	561	0.99974	**561.2**	549.99	98.0
Co-60	5882	561	0.99986	**561.2**	546.72	97.4
Y-88	12630	1205	0.992	**1214.6**	1282.9	105.6

Reviewed By: Megan McAfee

Date: 4/9/2012

Gamma Verification per Geometry

Detector: Ge 12

Geometry: 25 mL D=1

Reference date 7/1/2011

Calibration Standard: 85520-334

Standard volume g / vial 5.32298

Standard volume transferred in g / geometry 0.5177

lab ID# of cal standard Rad11-0100

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	abundance	activity Bq/sample	Count Results	%recovery
Am-241	3368	328	0.359	**912.4**	920.15	100.8
Cd-109	4780	465	0.0361	**12877.9**	12656	98.3
Co-57	2554	248	0.856	**290.2**	291.13	100.3
Ce-139	3552	345	0.799	**432.4**	418.17	96.7
Hg-203	7851	764	0.8155	**936.3**	987.93	105.5
Sn-113	4932	480	0.64	**749.5**	754.46	100.7
Cs-137	3188	310	0.851	**364.3**	370.02	101.6
Y-88	11970	1164	0.937	**1242.4**	1170.6	94.2
Co-60	5897	574	0.99974	**573.7**	565.76	98.6
Co-60	5897	574	0.99986	**573.6**	571.12	99.6
Y-88	12680	1233	0.992	**1243.2**	1279.6	102.9

Reviewed By: Jody Watson

Date: 9/2/2011

Gamma Verification per Geometry

Detector: Ge14

Geometry: 25mL solid

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 56

lab ID# of cal standard 6701

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	112	0.0425	2630	2640.5	100.4
Am-241	2037	74	0.359	205	206.84	100.9
Cd-109	2881	104	0.0361	2883	2875.8	99.7
Co-57	1511	55	0.856	64	64.519	101.2
Ce-139	2139	77	0.799	97	94.344	97.5
Hg-203	4651	168	0.8146	206	212.13	102.8
Sn-113	3015	109	0.64	170	171.77	100.9
Cs-137	1938	70	0.851	82	83.192	101.1
Y-88	7264	262	0.937	280	269.81	96.3
Co-60	3580	129	0.99974	129	127.55	98.6
Co-60	3581	129	0.999856	129	127.85	98.8
Y-88	7690	278	0.992	280	287.7	102.7

Reviewed By: Rachael Schneider

Date: 3/15/2012

Gamma Verification per Geometry

Detector: Ge17

Geometry: 25mL solid

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 56

lab ID# of cal standard 6701

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	112	0.0425	2630	2656.9	101.0
Am-241	2037	74	0.359	205	205.05	100.0
Cd-109	2881	104	0.0361	2883	2896.9	100.5
Co-57	1511	55	0.856	64	64.687	101.4
Ce-139	2139	77	0.799	97	94.403	97.6
Hg-203	4651	168	0.8146	206	213.24	103.4
Sn-113	3015	109	0.64	170	169.12	99.4
Cs-137	1938	70	0.851	82	84.917	103.2
Y-88	7264	262	0.937	280	266.71	95.2
Co-60	3580	129	0.99974	129	126.25	97.6
Co-60	3581	129	0.999856	129	129.91	100.4
Y-88	7690	278	0.992	280	286.49	102.3

Reviewed By: Megan McAfee

Date: 4/9/2012

2nd Source Verification

Detector: Ge 4

Geometry: 25 mL D=1

Reference date 1/1/2011

Source: 85520-334

Standard volume g / vial 5.32298

Standard volume transferred in g / geometry 0.5177

lab ID# of cal standard 6673

Isotope	Certified Activity gammas/sec	Geometry Activity	Abundance	Activity Bq/sample	Count Results	%recovery
Am-241	3368	328	0.359	**912.4**	960.81	105.3
Cs-137	3188	310	0.851	**364.3**	371.48	102.0
Co-60	5897	574	0.99974	**573.7**	614.66	107.1
Co-60	5897	574	0.99986	**573.6**	619.49	108.0

Reviewed By: Jody Watson

Date: 3/8/2012

2nd Source Verification

Detector: Ge 7

Geometry: 25 mL D=1

Reference date 1/1/2011

Source: 83925-334

Standard volume g / vial 5.29152

Standard volume transferred in g / geometry 0.5067

lab ID# of cal standard 6673

Isotope	Certified Activity gammas/sec	Geometry Activity	Abundance	Activity Bq/sample	Count Results	%recovery
Am-241	3254	312	0.359	**867.9**	929.11	107.0
Cs-137	3106	297	0.851	**349.5**	373.86	107.0
Co-60	6000	575	0.99974	**574.7**	607.64	105.7
Co-60	6003	575	0.99986	**574.9**	612.65	106.6

Reviewed By: Jody Watson

Date: 4/12/2012

2nd Source Verification

Detector: Ge 12

Geometry: 25mL D=1

Reference date 1/1/2010

Source: 81593-334

Standard volume g / vial 5.31128

Standard volume transferred in g / geometry 0.5096

lab ID# of cal standard Rad10-0042

Isotope	Certified Activity gammas/sec	Geometry Activity	Abundance	Activity Bq/sample	Count Results	%recovery
Am-241	3474	333	0.359	**928.5**	968.4	104.3
Cs-137	3289	316	0.851	**370.8**	384.55	103.7
Co-60	6166	592	0.99974	**591.8**	588.21	99.4
Co-60	6169	592	0.99986	**592.0**	601.63	101.6

Reviewed By: Jody Watson

Date: 9/6/2011

2nd Source Verification

Detector:	Ge7
Geometry:	25mL solid
Reference date	1/1/2011
Source:	83814-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	56.25
lab ID# of cal standard	6669

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2090	76	0.359	211	217.55	103.0
Cs-137	1877	68	0.851	80	80.272	100.3
Co-60	3626	132	0.99974	132	130.26	99.0
Co-60	3627	132	0.999856	132	130.19	98.9

Reviewed By: Jody Watson

Date: 3/7/2012

2nd Source Verification

Detector:	Ge14
Geometry:	25mL solid
Reference date	1/1/2011
Source:	83814-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	56.25
lab ID# of cal standard	6669

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2090	76	0.359	211	216.99	102.7
Cs-137	1877	68	0.851	80	81.969	102.4
Co-60	3626	132	0.99974	132	131.68	100.0
Co-60	3627	132	0.999856	132	132.29	100.5

Reviewed By: Megan McAfee

Date: 4/5/2012

2nd Source Verification

Detector: Ge17

Geometry: 25mL solid

Reference date 1/1/2011

Source: 83814-334

Standard volume g / vial 1550

Standard volume transferred in g / geometry 56.25

lab ID# of cal standard 6669

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2090	76	0.359	211	219.29	103.8
Cs-137	1877	68	0.851	80	81.57	101.9
Co-60	3626	132	0.99974	132	130.2	98.9
Co-60	3627	132	0.999856	132	132.43	100.6

Reviewed By: Megan McAfee

Date: 4/17/2012

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: Detector # 4
SpectrumID: 4_20130227011_EffVerif
Analysis Description: ACVTop-91774;Tuna Can 2006
Calibration: 4_Soil_TunaCan_90099_033012
Detector: Ge 4 SN/181

Verification Date: 2013-02-27 16:17
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) (Assay-Actual)/Assay
Am-241	59.54	449	4.48E+02	0.3%
Cs-137	661.66	400	3.83E+02	4.3%
Co-1332	1332.5	777	7.45E+02	4.1%

Comments:

Perform ____KM 2/27/13_____ Reviev ___RM 2/27/13_____

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: Detector # 7

SpectrumID: 7_20140128004_EffVerif

Analysis Description: ACVTOP-259586;TunaCan2006

Calibration: 7_TunaCan_90099_032712

Detector: Ge 7 SN/154

Verification Date: 2014-01-28 18:43

Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.25E+02	5.2%
Cs-137	661.66	400	3.78E+02	5.6%
Co-1332	1332.5	777	7.28E+02	6.2%

Comments:

Perform Jody Watson Reviev 1/28/2014

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TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector #12**
SpectrumID: 12_20140128004_EffVerif
Analysis Description: ACVTop-259586;TunaCan2006
Calibration: 12_TunaCanCal_90099_100212
Detector: Ge12 S/N10034336

Verification Date: 2014-01-28 14:18
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.47E+02	0.4%
Cs-137	661.66	400	3.94E+02	1.6%
Co-1332	1332.5	777	7.55E+02	2.8%

Comments:

Perform Jody Watson Revie 1/28/2014

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: Detector #14

SpectrumID: 14_20140124005_EffVerif

Analysis Description: ACVTop-259586;TunaCan2006

Calibration: 14_TunaCan_90099_042312

Detector: Ge14 SN/11080670

Verification Date: 2014-01-24 08:37

Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.50E+02	-0.3%
Cs-137	661.66	400	3.96E+02	1.0%
Co-1332	1332.5	777	7.52E+02	3.3%

Comments:

Perform Jody Watson

Revie

1/24/2014

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TestAmerica

ANNUAL CALIBRATION VERIFICATION

Detector ID: Detector #17

SpectrumID: 17_20140123005_EffVerif

Analysis Description: ACVTop-259586;TunaCan2006

Calibration: 17_TunaCan_90099_032612

Detector: Ge17 SN/11080671

Verification Date: 2014-01-23 11:17

Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.37E+02	2.6%
Cs-137	661.66	400	3.87E+02	3.3%
Co-1332	1332.5	777	7.33E+02	5.6%

Comments:

Perform Jody Watson Revie 1/23/2014

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TETRA TECH **INTERNAL CORRESPONDENCE**

TO: **M. MARTIN** **DATE:** **OCTOBER 14, 2014**

FROM: **MICHELLE L. ALLEN** **COPIES:** **DV FILE**

SUBJECT: **RADIOLOGICAL DATA VALIDATION – TOTAL URANIUM/ISOTOPIC THORIUM**
LOCKHEED MARTIN CORPORATION (LMC) – MIDDLE RIVER COMPLEX (MRC)
SEDIMENT INVESTIGATION
SAMPLE DELIVERY GROUP (SDG) 680-102600-4

SAMPLES: 4/Sediment/Total Uranium/Isotopic Uranium

SD-278-01 SD-278-02 SD-278-03
SD-278-SS

Overview

The sample set for LMC-MRC, SDG 680-102600-4 consisted of four (4) sediment environmental samples. All four (4) sediment samples were analyzed for total uranium and isotopic uranium (uranium-233, uranium-234, uranium-235, uranium-236, and uranium-238). No field duplicate sample pair was included in this SDG.

The samples were collected by Tetra Tech, Inc. on June 20, 2014 and analyzed by TestAmerica, Inc. All analyses were conducted in accordance with EPA SW846 Method 6020A analytical and reporting protocols.

The findings offered in this report are based upon a general review of all available data. The data contained in this SDG were validated with regard to the following parameters: data completeness, holding times, ICP/MS tuning, initial and continuing calibrations, laboratory method and preparation blank results, Interference Check Sample (ICS), laboratory control sample recoveries, matrix spike/matrix spike duplicate results, internal standard recoveries, ICP serial dilution results, detection limits and analyte quantitation. Areas of concern are listed below.

Major

No major issues were identified.

Minor

- The detected uranium-238 result reported below the Reporting Limit (RL) limit but above the Method Detection Limit (MDL) was qualified as estimated, (J).

Notes

The following uranium isotope was detected in the laboratory method blanks at the following maximum concentration:

Analyte	Maximum Concentration (µg/L)	Action Level (mg/Kg)
Uranium-233 [(1)]	0.00988	0.00494

[(1)] - Maximum concentration detected in the initial and continuing calibration blanks from 6020A analysis affecting samples analyzed on 08/21-22/14.

An action level of 5X the maximum concentration was established to evaluate for laboratory blank contamination. Dilution factor and sample

aliquot, if necessary, were taken into consideration during the application of the action level. No action was taken for uranium-233 because this isotope was not detected in the affected samples.

Samples SD-278-02 was marked as HOLD for total uranium/isotopic uranium on the in the "uranium analysis list" provided to the laboratory by the client. This sample was logged in and analyzed for isotopic thorium as indicated on the sample Chain of Custody (COC). The laboratory inadvertently analyzed this sample for total uranium/isotopic uranium because, typically, for this specific project, the laboratory analyzed the samples for uranium if the samples were previously analyzed for thorium.

All sample results are reported on a wet weight basis.

All samples were analyzed at a 5X dilution. The RLs of the non-detected results are elevated.

Uranium isotopes were determined via method 6020A. Isotopic uranium results reported via method 6020A and expressed in mg/kg units were converted to activity units, pCi/g, by the laboratory using isotope specific theoretical activities.

Non-detected results reported for uranium isotopes determined via method 6020A were reported at limits below the Minimum Detectable Concentration (MDC) by the laboratory. The manner in which the non-detected radioisotopes were reported was based upon the common practice of reporting radiological parameters at the concentration determined by the instrument. Therefore, metals raw instrument results expressed in µg/L were then converted to pCi/g and reported as non-detects below the MDC.

Executive Summary

Laboratory Performance: Uranium-233 was detected in the laboratory method blanks.

Other Factors Affecting Data Quality: A result below the RL was estimated.

The text of this report has been formulated to address only those areas affecting data quality.

Tetra Tech, Inc.
Michelle L. Allen
Chemist/Data Validator

Tetra Tech, Inc.
Joseph A. Samchuck
Data Validation Manager

Attachments:
Appendix A – Qualified Analytical Results
Appendix B – Results as Reported by the Laboratory
Appendix C – Support Documentation

Appendix A

Qualified Analytical Results

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = ICP PDS Recovery Noncompliance; MSA's $r < 0.995$
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = RPD between columns/detectors >40% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient $r < 0.995$
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 standard deviations is greater than sample activity
Z1 = Tentatively Identified Compound considered presumptively present
Z2 = Tentatively Identified Compound column bleed
Z3 = Tentatively Identified Compound aldol condensate

PROJ_NO: 05220	NSAMPLE	SD-278-01						SD-278-02					
SDG: 680-102600-4	LAB_ID	680-102600-7						680-102600-8					
FRACTION: M	SAMP_DATE	6/20/2014						6/20/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					2.1						2.6		
URANIUM-233					0.69	U					0.69	U	
URANIUM-234					0.14	U					0.14	U	
URANIUM-235					0.93	U					0.93	U	
URANIUM-235 (PERCENT)		0						0					
URANIUM-236					0.18	U					0.18	U	
URANIUM-238					2.1	J	P				2.6		

PROJ_NO: 05220	NSAMPLE	SD-278-03						SD-278-SS					
SDG: 680-102600-4	LAB_ID	680-102600-9						680-102600-6					
FRACTION: M	SAMP_DATE	6/20/2014						6/20/2014					
MEDIA: SOIL	QC_TYPE	NM						NM					
	UNITS	%			MG/KG			%			MG/KG		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL URANIUM					3						2.5		
URANIUM-233					0.64	U					0.73	U	
URANIUM-234					0.13	U					0.15	U	
URANIUM-235					0.86	U					0.99	U	
URANIUM-235 (PERCENT)		0						0					
URANIUM-236					0.17	U					0.19	U	
URANIUM-238					3						2.5		

PROJ_NO: 05220	NSAMPLE	SD-278-01			SD-278-02			SD-278-03			SD-278-SS		
SDG: 680-102600-4	LAB_ID	680-102600-7			680-102600-8			680-102600-9			680-102600-6		
FRACTION: RAD	SAMP_DATE	6/20/2014			6/20/2014			6/20/2014			6/20/2014		
MEDIA: SOIL	QC_TYPE	NM			NM			NM			NM		
	UNITS	PCI/G			PCI/G			PCI/G			PCI/G		
	PCT_SOLIDS	100.0			100.0			100.0			100.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
URANIUM-233		-27.9	U		-28	U		-26.2	U		-29.3	U	
URANIUM-234		1.03	U		1.08	U		1.32	U		1.33	U	
URANIUM-235		0.0331			0.0416			0.049			0.0411		
URANIUM-236		-2E-05	U		-0.00017	U		0.00052	U		0.00065	U	
URANIUM-238		0.716			0.86			1.02			0.857		

Appendix B

Results as Reported by the Laboratory

Client Sample ID: SD-278-SS

Lab Sample ID: 680-102600-6

Date Collected: 06/20/14 10:00
Date Received: 06/23/14 09:00

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	0.0036	U	0.012	0.0036	mg/Kg		08/19/14 10:40	08/21/14 17:38	5
U-234	0.00073	U	0.012	0.00073	mg/Kg		08/19/14 10:40	08/21/14 17:38	5
U-235	0.019		0.012	0.0049	mg/Kg		08/19/14 10:40	08/21/14 17:38	5
U-236	0.00097	U	0.012	0.00097	mg/Kg		08/19/14 10:40	08/21/14 17:38	5
U-238	2.5		0.012	0.00073	mg/Kg		08/19/14 10:40	08/21/14 17:38	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.5		0.0050	0.00030	mg/Kg			08/22/14 14:31	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-29.3	U	0.294	2.71	117	35.1	pCi/g	08/19/14 10:40	08/21/14 17:38	5
U-234	1.33	U	0.629	0.641	75.5	4.53	pCi/g	08/19/14 10:40	08/21/14 17:38	5
U-235	0.0411		0.00158	0.00410	0.0262	0.0107	pCi/g	08/19/14 10:40	08/21/14 17:38	5
U-236	0.000659	U	0.00211	0.00211	0.785	0.0629	pCi/g	08/19/14 10:40	08/21/14 17:38	5
U-238	0.857		0.00821	0.0792	0.00408	0.000245	pCi/g	08/19/14 10:40	08/21/14 17:38	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.754						%		08/22/14 14:30	1

Client Sample ID: SD-278-01

Lab Sample ID: 680-102600-7

Date Collected: 06/20/14 10:05
Date Received: 06/23/14 09:00

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	0.0034	U	0.011	0.0034	mg/Kg		08/19/14 10:40	08/21/14 17:57	5
U-234	0.00069	U	0.011	0.00069	mg/Kg		08/19/14 10:40	08/21/14 17:57	5
U-235	0.015		0.011	0.0046	mg/Kg		08/19/14 10:40	08/21/14 17:57	5
U-236	0.00091	U	0.011	0.00091	mg/Kg		08/19/14 10:40	08/21/14 17:57	5
U-238	2.1		0.011	0.00069	mg/Kg		08/19/14 10:40	08/21/14 17:57	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.1		0.0050	0.00030	mg/Kg			08/22/14 14:31	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-27.9	U	0.482	2.61	110	33.0	pCi/g	08/19/14 10:40	08/21/14 17:57	5
U-234	1.03	U	0.483	0.493	71.0	4.26	pCi/g	08/19/14 10:40	08/21/14 17:57	5
U-235	0.0331		0.00414	0.00514	0.0247	0.0100	pCi/g	08/19/14 10:40	08/21/14 17:57	5
U-236	-0.0000295	U	0.00111	0.00111	0.738	0.0591	pCi/g	08/19/14 10:40	08/21/14 17:57	5
U-238	0.716		0.0892	0.111	0.00384	0.000231	pCi/g	08/19/14 10:40	08/21/14 17:57	5

Client Sample ID: SD-278-01

Date Collected: 06/20/14 10:05
Date Received: 06/23/14 09:00

Lab Sample ID: 680-102600-7
Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.709						%		08/22/14 14:30	1

Client Sample ID: SD-278-02

Date Collected: 06/20/14 10:10
Date Received: 06/23/14 09:00

Lab Sample ID: 680-102600-8
Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	0.0034	U	0.011	0.0034	mg/Kg		08/19/14 10:40	08/21/14 18:02	5
U-234	0.00069	U	0.011	0.00069	mg/Kg		08/19/14 10:40	08/21/14 18:02	5
U-235	0.019		0.011	0.0046	mg/Kg		08/19/14 10:40	08/21/14 18:02	5
U-236	0.00091	U	0.011	0.00091	mg/Kg		08/19/14 10:40	08/21/14 18:02	5
U-238	2.6		0.011	0.00069	mg/Kg		08/19/14 10:40	08/21/14 18:02	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.6		0.0050	0.00030	mg/Kg			08/22/14 14:31	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-28.0	U	0.859	2.72	110	33.0	pCi/g	08/19/14 10:40	08/21/14 18:02	5
U-234	1.08	U	0.414	0.426	71.1	4.27	pCi/g	08/19/14 10:40	08/21/14 18:02	5
U-235	0.0416		0.00323	0.00501	0.0247	0.0101	pCi/g	08/19/14 10:40	08/21/14 18:02	5
U-236	-0.000177	U	0.00140	0.00140	0.739	0.0592	pCi/g	08/19/14 10:40	08/21/14 18:02	5
U-238	0.860		0.0517	0.0945	0.00384	0.000231	pCi/g	08/19/14 10:40	08/21/14 18:02	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.725						%		08/22/14 14:30	1

Client Sample ID: SD-278-03

Date Collected: 06/20/14 10:15
Date Received: 06/23/14 09:00

Lab Sample ID: 680-102600-9
Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	0.0032	U	0.011	0.0032	mg/Kg		08/19/14 10:40	08/21/14 18:07	5
U-234	0.00064	U	0.011	0.00064	mg/Kg		08/19/14 10:40	08/21/14 18:07	5
U-235	0.023		0.011	0.0043	mg/Kg		08/19/14 10:40	08/21/14 18:07	5
U-236	0.00085	U	0.011	0.00085	mg/Kg		08/19/14 10:40	08/21/14 18:07	5
U-238	3.0		0.011	0.00064	mg/Kg		08/19/14 10:40	08/21/14 18:07	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.0		0.0050	0.00030	mg/Kg			08/22/14 14:31	1

Client Sample ID: SD-278-03
Date Collected: 06/20/14 10:15
Date Received: 06/23/14 09:00

Lab Sample ID: 680-102600-9
Matrix: Solid

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-26.2	U	0.0424	2.41	103	30.8	pCi/g	08/19/14 10:40	08/21/14 18:07	5
U-234	1.32	U	0.549	0.562	66.2	3.97	pCi/g	08/19/14 10:40	08/21/14 18:07	5
U-235	0.0490		0.000949	0.00461	0.0230	0.00937	pCi/g	08/19/14 10:40	08/21/14 18:07	5
U-236	0.000523	U	0.00103	0.00103	0.688	0.0551	pCi/g	08/19/14 10:40	08/21/14 18:07	5
U-238	1.02		0.0305	0.0987	0.00358	0.000215	pCi/g	08/19/14 10:40	08/21/14 18:07	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.761						%		08/22/14 14:30	1

Appendix C

Support Documentation

LMC-MRC
SDG 680-102600-4

U-238 CONVERSION (mg/Kg to pCi/g)

SAMPLE ID	SD-278-02
U-238 (mg/Kg)	2.6
SOIL CONVERSION	2.80E-12
ATOMIC WEIGHT (g/mole)	238.03
U-238 HALF LIFE (y)	4.51E+09

= 8.65E-01 pCi/g

2.6 mg/Kg/(2.8E-12 * 238.03 g/mole * 4.51E9 y)

QUANTITATIVE ANALYSIS REPORT

SD-278-02

Sample ID: 680-102600-A-8-G
Sample Date/Time: Thursday, August 21, 2014 18:02:19
Autosampler Position: 18
Dataset File: D:\Elandata\Dataset\082114M2\680-102600-A-8-G.024

Sample Result Summary

0.547g/50ml

DF = 5X

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	Ho (IS)			740467.709	ug/L	805590.911
	233	U	-0.006368	1.532	13.400	ug/L	264.336
	234	U	0.000381	19.121	14.733	ug/L	4.533
	235	U	0.042143	3.883	1107.176	ug/L	19.067
	236	U	-0.000006	393.809	4.733	ug/L	5.400
→	238	U	5.595425	3.007	129304.718	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	Ho (IS)	165	91.916	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

$$\frac{5.59\ \text{mg}}{1\text{L}} \times \frac{0.05\text{L}}{0.547\text{g}} \times 5$$

$$= 2.55\ \text{mg/g}\ \checkmark$$

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.43
Client Contact: Mike Martin	Phone: (703) 342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page [redacted] 1 of 1
Company: Tetra Tech, Inc.		Analysis Requested		Job #:
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
City: Germantown	TAT Requested (days): Standard			
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			Other:
Email: MIchael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-278-SS	6/20/14	1000	C	Solid				X				
SD-278-01	↓	1005	C	Solid				X				
SD-278-02		1010	C	Solid				X				
SD-278-03	↓	1015	C	Solid				X				
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements: 680 - 102600

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
[signature]	6/20/14 - 1100	TT	[signature]	6/23/14 09:00	TA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 2.4, 2.0 C

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-102600-4
SDG Number: 680102600-1

Login Number: 102600
List Number: 1
Creator: Kicklighter, Marilyn D

List Source: TestAmerica Savannah

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	melted
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-102600-4
SDG Number: 680102600-1

Login Number: 102600
List Number: 2
Creator: Clarke, Jill C

List Source: TestAmerica St. Louis
List Creation: 06/24/14 02:13 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	4.8
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Sediments

Report Number: 680-102600-4

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT
The samples were received on 06/23/2014. The temperature of the coolers at receipt was 24.2 C.

A revised report was necessary to correct the final volume that was used to calculate the Uranium data.

TOTAL URANIUM
Samples SD-278-SS (680-102600-6), SD-278-01 (680-102600-7), SD-278-02 (680-102600-8) and SD-278-03 (680-102600-9) were analyzed for Total Uranium in accordance with EPA SW-846 6020A. The samples were analyzed on 08/22/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM
Samples SD-278-SS (680-102600-6), SD-278-01 (680-102600-7), SD-278-02 (680-102600-8) and SD-278-03 (680-102600-9) were analyzed for Isotopic Uranium in accordance with EPA SW-846 6020A. The samples were prepared on 08/19/2014 and analyzed on 08/21/2014.

The instrument blank contained uranium 233 greater than the reporting limit (RL), and were not reanalyzed because the samples were all non detect for the analyte. The data have been qualified and reported. (ICB 160-139525/10)

The presence of the '4' qualifier indicates analytes where the concentration in the unspiked sample exceeded four times the spiking amount.

Refer to the QC report for details.

Samples SD-278-SS (680-102600-6)[5X], SD-278-01 (680-102600-7)[5X], SD-278-02 (680-102600-8)[5X] and SD-278-03 (680-102600-9)[5X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM PERCENTAGE
Samples SD-278-SS (680-102600-6), SD-278-01 (680-102600-7), SD-278-02 (680-102600-8) and SD-278-03 (680-102600-9) were analyzed for Isotopic Uranium Percentage in accordance with EPA SW-846 6020A. The samples were analyzed on 08/22/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM ACTIVITY
Samples SD-278-SS (680-102600-6), SD-278-01 (680-102600-7), SD-278-02 (680-102600-8) and SD-278-03 (680-102600-9) were analyzed for Isotopic Uranium Activity in accordance with EPA SW-846 6020A. The samples were prepared on 08/19/2014 and analyzed on 08/21/2014.

Samples SD-278-SS (680-102600-6)[5X], SD-278-01 (680-102600-7)[5X], SD-278-02 (680-102600-8)[5X] and SD-278-03 (680-102600-9)[5X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Definitions/Glossary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102600-4
SDG: 680102600-1

Qualifiers

Metals

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Default Detection Limits

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102600-4
SDG: 680102600-1

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	RL	MDL	Units	Method
U-233	0.0050	0.0015	mg/Kg	6020A
U-234	0.0050	0.00030	mg/Kg	6020A
U-235	0.0050	0.0020	mg/Kg	6020A
U-236	0.0050	0.00040	mg/Kg	6020A
U-238	0.0050	0.00030	mg/Kg	6020A

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	RL	MDL	Units	Method
Total Uranium	0.0050	0.00030	mg/Kg	6020A

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102600-4
SDG: 680102600-1

Method	Method Description	Protocol	Laboratory
6020A	Metals (ICP/MS), Isotopic Uranium	SW846	TAL SL
6020A	Metals (ICP/MS), Total Uranium	SW846	TAL SL
6020A	Metals (ICP/MS), Isotopic Uranium Percentage	SW846	TAL SL
6020A Activity	Metals (ICP/MS), Isotopic Uranium (Activity)	SW846	TAL SL

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102600-4
SDG: 680102600-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-102600-6	SD-278-SS	Solid	06/20/14 10:00	06/23/14 09:00
680-102600-7	SD-278-01	Solid	06/20/14 10:05	06/23/14 09:00
680-102600-8	SD-278-02	Solid	06/20/14 10:10	06/23/14 09:00
680-102600-9	SD-278-03	Solid	06/20/14 10:15	06/23/14 09:00

COVER PAGE
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102600-4

SDG No.: 680102600-1

Project: Sediments

Client Sample ID	Lab Sample ID
SD-278-SS	680-102600-6
SD-278-01	680-102600-7
SD-278-02	680-102600-8
SD-278-03	680-102600-9

Comments:

9-IN
DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102600-4

SDG Number: 680102600-1

Matrix: Solid Instrument ID: ICPMS6100

Method: 6020A MDL Date: 08/05/2013 10:01

Prep Method: 3050B

Analyte	Wavelength/ Mass	RL (mg/Kg)	MDL (mg/Kg)
U-233	233	0.005	0.0015
U-234	234	0.005	0.0003
U-235	235	0.005	0.00203
U-236	236	0.005	0.0004
U-238	238	0.005	0.0003

9-IN
CALIBRATION BLANK DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102600-4

SDG Number: 680102600-1

Matrix: Solid Instrument ID: ICPMS6100

Method: 6020A XMDL Date: 07/18/2014 15:08

Analyte	Wavelength/ Mass	XRL (ug/L)	XMDL (ug/L)
U-233	233	0.05	0.0066
U-234	234	0.05	0.0021
U-235	235	0.05	0.0034
U-236	236	0.05	0.0015
U-238	238	0.05	0.0082

9-IN
DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102600-4

SDG Number: 680102600-1

Matrix: Solid Instrument ID: NOEQUIP

Method: 6020A MDL Date: 06/12/2013 14:02

Analyte	Wavelength/ Mass	RL (mg/Kg)	MDL (mg/Kg)
Total Uranium		0.005	0.0003

11-IN
LINEAR RANGES
METALS

Lab Name: TestAmerica St. Louis Job No: 680-102600-4

SDG No.: 680102600-1

Instrument ID: ICPMS6100 Date: 02/14/2012 11:04

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	Method
U-233		2000	6020A
U-234		2000	6020A
U-235		2000	6020A
U-236		2000	6020A
U-238		2000	6020A

12-IN
PREPARATION LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG No.: 680102600-1

Prep Method: 3050B

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight (g)	Initial Volume	Final Volume (mL)
MB 160-138784/1-A	08/19/2014 10:40	138784	0.5107		50
LCS 160-138784/2-A	08/19/2014 10:40	138784	0.5581		50
680-102600-6	08/19/2014 10:40	138784	0.5150		50
680-102600-6 MS	08/19/2014 10:40	138784	0.5071		50
680-102600-6 MSD	08/19/2014 10:40	138784	0.5208		50
680-102600-7	08/19/2014 10:40	138784	0.5474		50
680-102600-8	08/19/2014 10:40	138784	0.5470		50
680-102600-9	08/19/2014 10:40	138784	0.5872		50

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG No.: 680102600-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-138784/1-A

Instrument Code: ICPMS6100 Batch No.: 139525

CAS No.	Analyte	Concentration	C	Q	Method
13968-55-3	U-233	0.0015	U		6020A_U
13966-29-5	U-234	0.00029	U		6020A_U
15117-96-1	U-235	0.0020	U		6020A_U
13982-70-2	U-236	0.00039	U		6020A_U
7440-61-1	U-238	0.00029	U		6020A_U

7A-IN
LAB CONTROL SAMPLE
METALS

Lab ID: LCS 160-138784/2-A

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

Sample Matrix: Solid LCS Source: ISOU Prep Spk_00002

Analyte	Solid(mg/Kg)							
	True	Found	C	%R	Limits		Q	Method
U-234	0.00741	0.00723		98	80	120		6020A
U-235	0.434	0.439		101	80	120		6020A
U-238	0.450	0.452		100	80	120		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

5A-IN
MATRIX SPIKE SAMPLE RECOVERY
METALS

Client ID: SD-278-SS MS | Lab ID: 680-102600-6 MS

Lab Name: TestAmerica St. Louis | Job No.: 680-102600-4

SDG No.: 680102600-1

Matrix: Solid | Concentration Units: mg/Kg

% Solids:

Analyte	SSR	C	Sample Result (SR)	C	Spike Added (SA)	%R	Control Limit %R	Q	Method
U-234	0.00740	J	0.00073	U	0.00815	91	75-125		6020A
U-235	0.456		0.019		0.478	91	75-125		6020A
U-238	3.03		2.5		0.496	97	75-125	4	6020A

SSR = Spiked Sample Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VA - IN

5A-IN
MATRIX SPIKE DUPLICATE SAMPLE RECOVERY
METALS

Client ID: SD-278-SS MSD | Lab ID: 680-102600-6 MSD

Lab Name: TestAmerica St. Louis | Job No.: 680-102600-4

SDG No.: 680102600-1

Matrix: Solid | Concentration Units: mg/Kg

% Solids:

Analyte	(SDR) C		Spike Added (SA)	%R	Control Limit %R	RPD	RPD Limit	Q	Method
U-234	0.00746	J	0.00794	94	75-125	1	20		6020A
U-235	0.459		0.465	95	75-125	1	20		6020A
U-238	3.13		0.483	120	75-125	3	20	4	6020A

SDR = Sample Duplicate Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VD - IN

8-IN
ICP-AES AND ICP-MS SERIAL DILUTIONS
METALS

Lab ID: 680-102600-6

SDG No: 680102600-1

Lab Name: TestAmerica St. Louis Job No: 680-102600-4

Matrix: Solid Concentration Units: mg/Kg

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Method
U-233	0.0036	U	0.018	U	NC		6020A
U-234	0.00073	U	0.0036	U	NC		6020A
U-235	0.019		0.025	U	NC		6020A
U-236	0.00097	U	0.0049	U	NC		6020A
U-238	2.5		2.40		5.9		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG No.: 680102600-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/21/2014 16:12 End Date: 08/22/2014 02:28

Lab Sample Id	D/F	Type	Time	Analytes				
				U-233	U-234	U-235	U-236	U-238
ICIS 160-139525/1			16:12	X	X	X	X	X
IC 160-139525/2	1		16:19	X	X	X	X	X
IC 160-139525/3	1		16:24	X	X	X	X	X
IC 160-139525/4	1		16:28	X	X	X	X	X
IC 160-139525/5	1		16:33	X	X	X	X	X
IC 160-139525/6	1		16:38	X	X	X	X	X
ICV 160-139525/7	1		16:42	X				
ICV 160-139525/8	1		16:47		X			X
ICV 160-139525/9	1		16:52			X	X	
ICB 160-139525/10	1		16:56	X	X	X	X	X
CRI 160-139525/11	1		17:01			X		X
CRI 160-139525/12	1		17:06	X	X		X	
ICSA 160-139525/13	1		17:10	X	X	X	X	X
ICSAB 160-139525/14	1		17:15	X	X	X	X	X
CCV 160-139525/15	1		17:20	X	X	X	X	X
CCB 160-139525/16	1		17:25	X	X	X	X	X
MB 160-138784/1-A	2	T	17:29	X	X	X	X	X
LCS 160-138784/2-A	2	T	17:34		X	X		X
680-102600-6	5	T	17:38	X	X	X	X	X
680-102600-6 SD	25	T	17:43	X	X	X	X	X
680-102600-6 MS	5	T	17:48		X	X		X
680-102600-6 MSD	5	T	17:52		X	X		X
680-102600-7	5	T	17:57	X	X	X	X	X
680-102600-8	5	T	18:02	X	X	X	X	X
680-102600-9	5	T	18:07	X	X	X	X	X
ZZZZZZ			18:11					
CCV 160-139525/27	1		18:16	X	X	X	X	X
CCB 160-139525/28	1		18:21	X	X	X	X	X
ZZZZZZ			18:25					
ZZZZZZ			18:30					
ZZZZZZ			18:35					
ZZZZZZ			18:39					
ZZZZZZ			18:44					
ZZZZZZ			18:49					
ZZZZZZ			18:53					
ZZZZZZ			18:58					
ZZZZZZ			19:03					
ZZZZZZ			19:07					
CCV 160-139525/39			19:12					

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG No.: 680102600-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/21/2014 16:12 End Date: 08/22/2014 02:28

Lab Sample Id	D/F	Type	Time	Analytes				
				U-233	U-234	U-235	U-236	U-238
CCB 160-139525/40			19:17					
ZZZZZZ			19:21					
ZZZZZZ			19:26					
ZZZZZZ			19:31					
ZZZZZZ			19:35					
ZZZZZZ			19:40					
ZZZZZZ			19:45					
ZZZZZZ			19:49					
ZZZZZZ			19:54					
ZZZZZZ			19:59					
ZZZZZZ			20:03					
CCV 160-139525/51			20:08					
CCB 160-139525/52			20:13					
ZZZZZZ			20:17					
ZZZZZZ			20:22					
ZZZZZZ			20:27					
ZZZZZZ			20:31					
ZZZZZZ			20:36					
CCV 160-139525/58			20:41					
CCB 160-139525/59			20:45					
ICIS 160-139525/60			20:50	X	X	X	X	X
IC 160-139525/61			20:57	X	X	X	X	X
IC 160-139525/62			21:01	X	X	X	X	X
IC 160-139525/63			21:06	X	X	X	X	X
IC 160-139525/64			21:11	X	X	X	X	X
IC 160-139525/65			21:15	X	X	X	X	X
ICV 160-139525/66			21:20					
ICV 160-139525/67			21:25					
ICV 160-139525/68			21:29					
ICB 160-139525/69			21:34					
CRI 160-139525/70			21:39					
CRI 160-139525/71			21:43					
ICSA 160-139525/72			21:48					
ICSAB 160-139525/73			21:53					
CCV 160-139525/74			21:58					
CCB 160-139525/75			22:02					
ZZZZZZ			22:07					
ZZZZZZ			22:12					
ZZZZZZ			22:16					

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG No.: 680102600-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/21/2014 16:12 End Date: 08/22/2014 02:28

Lab Sample Id	D/F	Type	Time	Analytes				
				U-233	U-234	U-235	U-236	U-238
CCV 160-139525/79			22:21					
CCB 160-139525/80			22:26					
ZZZZZZ			22:30					
ZZZZZZ			22:35					
ZZZZZZ			22:40					
ZZZZZZ			22:44					
ZZZZZZ			22:49					
ZZZZZZ			22:54					
ZZZZZZ			22:58					
ZZZZZZ			23:03					
ZZZZZZ			23:08					
ZZZZZZ			23:12					
CCV 160-139525/91			23:17					
CCB 160-139525/92			23:22					
ZZZZZZ			23:26					
ZZZZZZ			23:31					
ZZZZZZ			23:36					
ZZZZZZ			23:40					
ZZZZZZ			23:45					
ZZZZZZ			23:50					
ZZZZZZ			23:54					
ZZZZZZ			23:59					
ZZZZZZ			00:04					
ZZZZZZ			00:08					
CCV 160-139525/103			00:13					
CCB 160-139525/104			00:18					
ZZZZZZ			00:22					
ZZZZZZ			00:27					
ZZZZZZ			00:32					
ZZZZZZ			00:36					
ZZZZZZ			00:41					
ZZZZZZ			00:46					
ZZZZZZ			00:50					
ZZZZZZ			00:55					
ZZZZZZ			01:00					
ZZZZZZ			01:04					
CCV 160-139525/115			01:09					
CCB 160-139525/116			01:14					
ZZZZZZ			01:18					

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG No.: 680102600-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/21/2014 16:12 End Date: 08/22/2014 02:28

Lab Sample Id	D/F	Type	Time	Analytes				
				U-233	U-234	U-235	U-236	U-238
ZZZZZZ			01:23					
ZZZZZZ			01:28					
ZZZZZZ			01:32					
ZZZZZZ			01:37					
ZZZZZZ			01:42					
ZZZZZZ			01:46					
ZZZZZZ			01:51					
ZZZZZZ			01:56					
ZZZZZZ			02:00					
CCV 160-139525/127			02:05					
CCB 160-139525/128			02:10					
ZZZZZZ			02:14					
ZZZZZZ			02:19					
CCV 160-139525/131			02:24					
CCB 160-139525/132			02:28					

Prep Types:
T = Total/NA

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG No.: 680102600-1

Instrument ID: NOEQUIP Analysis Method: 6020A

Start Date: 08/22/2014 14:31 End Date: 08/22/2014 14:31

Lab Sample Id	D/F	Type	Time	Analytes U
680-102600-6	1	T	14:31	X
680-102600-7	1	T	14:31	X
680-102600-8	1	T	14:31	X
680-102600-9	1	T	14:31	X

Prep Types:
T = Total/NA

FORM XIII-IN

15-IN

ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY

METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG No.: 680102600-1

ICP-MS Instrument ID: ICPMS6100 Start Date: 08/21/2014 End Date: 08/21/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
IC 160-139525/2	16:19										
IC 160-139525/3	16:24										
IC 160-139525/4	16:28										
IC 160-139525/5	16:33										
IC 160-139525/6	16:38										
ICV 160-139525/7	16:42	96									
ICV 160-139525/8	16:47	96									
ICV 160-139525/9	16:52	94									
ICB 160-139525/10	16:56	96									
CRI 160-139525/11	17:01	96									
CRI 160-139525/12	17:06	96									
ICSA 160-139525/13	17:10	87									
ICSAB 160-139525/14	17:15	87									
CCV 160-139525/15	17:20	96									
CCB 160-139525/16	17:25	95									
MB 160-138784/1-A	17:29	97									
LCS 160-138784/2-A	17:34	101									
680-102600-6	17:38	92									
680-102600-6 SD	17:43	98									
680-102600-6 MS	17:48	93									
680-102600-6 MSD	17:52	92									
680-102600-7	17:57	92									
680-102600-8	18:02	92									
680-102600-9	18:07	91									
CCV 160-139525/27	18:16	92									
CCB 160-139525/28	18:21	91									

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG No.: 680102600-1

ICV Source: ISOU ICV(3)_00018 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	ICV 160-139525/7 08/21/2014 16:42				CCV 160-139525/15 08/21/2014 17:20				CCV 160-139525/27 08/21/2014 18:16			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.232		0.223	104	0.0481	J	0.0515	93	0.0492	J	0.0515	95

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG No.: 680102600-1

ICV Source: ISOU ICV(4,8)_00018 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

	ICV 160-139525/8 08/21/2014 16:47				CCV 160-139525/15 08/21/2014 17:20				CCV 160-139525/27 08/21/2014 18:16			
Analyte	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0900		0.0835	108	0.0852		0.0827	103	0.0873		0.0827	106
U-238	10.1		9.78	104	5.30		5.03	105	5.41		5.03	108

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG No.: 680102600-1

ICV Source: ISOU ICV(5,6)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	ICV 160-139525/9 08/21/2014 16:52				CCV 160-139525/15 08/21/2014 17:20				CCV 160-139525/27 08/21/2014 18:16			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	1.16		1.06	109	5.11		4.85	105	5.19		4.85	107
U-236	0.0704		0.0746	94	0.0909		0.0890	102	0.0933		0.0890	105

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2B-IN
CRQL CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG No.: 680102600-1

Method: 6020A Instrument ID: ICPMS6100

Lab Sample ID: CRI 160-139525/11 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 1_00019

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-235	0.0485	0.0508		105	70-130
U-238	0.0503	0.0541		108	70-130

Lab Sample ID: CRI 160-139525/12 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 2_00020

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-233	0.0309	0.0310	J	100	70-130
U-234	0.0496	0.0520		105	70-130
U-236	0.0534	0.0553		104	70-130

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IIB-IN

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG No.: 680102600-1

Concentration Units: ug/L

Analyte	RL	ICB 160-139525/10 08/21/2014 16:56 Found	C	CCB 160-139525/16 08/21/2014 17:25 Found	C	CCB 160-139525/28 08/21/2014 18:21 Found	C	Found	C
U-233	0.050	0.0829		0.00703	J	0.00988	J		
U-234	0.050	0.0021	U	0.0021	U	0.0021	U		
U-235	0.050	0.0034	U	0.0034	U	0.0034	U		
U-236	0.050	0.0015	U	0.0015	U	0.0015	U		
U-238	0.050	0.0166	J	0.0082	U	0.0082	U		

Italicized analytes were not requested for this sequence.

4A-IN
INTERFERENCE CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG No.: 680102600-1

Lab Sample ID: ICSAB 160-139525/14 Instrument ID: ICPMS6100

Lab File ID: 082114m2.rep ICS Source: ISOU ICSAB_00020

Concentration Units: ug/L

Analyte	True Solution AB	Found Solution AB	Percent Recovery
U-233	**0.0515**	**0.0516**	**100**
U-234	**0.0827**	**0.0890**	**108**
U-235	**4.85**	**5.32**	**110**
U-236	**0.0890**	**0.0952**	**107**
U-238	**5.03**	**5.51**	**110**

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IVA-IN

APPENDIX B—CHEMICAL DATA TABLE

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	SD-195	SD-196	SD-196	SD-196	SD-
SAMPLE ID	SD-195-SS	SD-196-01	SD-196-01-AVG	SD-196-01-D	SD-19
SAMPLE DATE	20140610	20140610	20140610	20140610	2014
SAMPLE CODE	Normal	ORIG	Avg	DUP	Nor
RADIONUCLIDES (pCi/g) [1]					
THORIUM-228	1.07	1.31	1.24	1.17	0.905
THORIUM-230	0.676 J	1.08 J	0.9655	0.851 J	0.876
THORIUM-232	0.936	1.06	1.18	1.3	0.808
URANIUM-233	1.25 U	0.472 U	0.5575 U	0.643 U	0.131
URANIUM-234	0.415 U	0.883 U	1.0865 U	1.29 U	0.493
URANIUM-235	0.0148	0.042	0.0458	0.0496	0.0283
URANIUM-236	0.00189 U	0.064 U	0.03274 U	0.00148 U	0.0629
URANIUM-238	0.312	0.862	0.941	1.02	0.59
RAD GAMMA (pCi/g) [2]					
ACTINIUM-227	NA	NA	NA	NA	NA
ACTINIUM-228	NA	NA	NA	NA	NA
BISMUTH-212	NA	NA	NA	NA	NA
BISMUTH-214	NA	NA	NA	NA	NA
LEAD-210	NA	NA	NA	NA	NA
LEAD-212	NA	NA	NA	NA	NA
LEAD-214	NA	NA	NA	NA	NA
POTASSIUM-40	NA	NA	NA	NA	NA
PROTACTINIUM-231	NA	NA	NA	NA	NA
RADIUM-226	NA	NA	NA	NA	NA
RADIUM-228	NA	NA	NA	NA	NA
THALLIUM-208	NA	NA	NA	NA	NA
THORIUM-232	NA	NA	NA	NA	NA
THORIUM-234	NA	NA	NA	NA	NA
URANIUM-235	NA	NA	NA	NA	NA
URANIUM-238	NA	NA	NA	NA	NA
METALS (%)					
URANIUM-235	0.726	0.725	0.743	0.761	0.717
METALS (mg/kg) [3]					
TECHNETIUM-99	NA	NA	NA	NA	NA
TOTAL URANIUM	0.94	2.6	2.8	3	1.8
URANIUM-233	0.0037 U	0.0037 U	0.00365 U	0.0036 U	0.0036
URANIUM-234	0.00074 U	0.00074 U	0.000725 U	0.00071 U	0.00073
URANIUM-235	0.0068 J	0.019	0.021	0.023	0.013
URANIUM-236	0.00099 U	0.00099 U	0.00097 U	0.00095 U	0.00097
URANIUM-238	0.93	2.6	2.8	3	1.8

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	**196**
SAMPLE ID	**96-02**
SAMPLE DATE	**0610**
SAMPLE CODE	**mal**
RADIONUCLIDES (pCi/g) [1]	
THORIUM-228	
THORIUM-230	J
THORIUM-232	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	
URANIUM-236	U
URANIUM-238	
RAD GAMMA (pCi/g) [2]	
ACTINIUM-227	
ACTINIUM-228	
BISMUTH-212	
BISMUTH-214	
LEAD-210	
LEAD-212	
LEAD-214	
POTASSIUM-40	
PROTACTINIUM-231	
RADIUM-226	
RADIUM-228	
THALLIUM-208	
THORIUM-232	
THORIUM-234	
URANIUM-235	
URANIUM-238	
METALS (%)	
URANIUM-235	
METALS (mg/kg) [3]	
TECHNETIUM-99	
TOTAL URANIUM	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	
URANIUM-236	U
URANIUM-238	

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	SD-196	SD-197	SD-197	SD-197	SD-
SAMPLE ID	SD-196-SS	SD-197-01	SD-197-02	SD-197-SS	SD-1
SAMPLE DATE	20140610	20140611	20140611	20140611	2014
SAMPLE CODE	Normal	Normal	Normal	Normal	Nor
RADIONUCLIDES (pCi/g) [1]					
THORIUM-228	1.3	1.2	0.834	1.15	1.19
THORIUM-230	1.2 J	0.997	0.75	1.09	1.01
THORIUM-232	1.26	1.41	1.03	1.07	1.16
URANIUM-233	1.08 U	32.4 U	30.6 U	34.7 U	31.4
URANIUM-234	0.535 U	1.17 U	0.461 U	0.987 U	0.901
URANIUM-235	0.0394	0.0483	0.0251	0.0431	0.0443
URANIUM-236	0.0636 U	0.0581 U	0.0003 U	0.00003 U	0.00053
URANIUM-238	0.826	0.986	0.472	0.949	0.816
RAD GAMMA (pCi/g) [2]					
ACTINIUM-227	NA	NA	NA	NA	NA
ACTINIUM-228	NA	NA	NA	NA	NA
BISMUTH-212	NA	NA	NA	NA	NA
BISMUTH-214	NA	NA	NA	NA	NA
LEAD-210	NA	NA	NA	NA	NA
LEAD-212	NA	NA	NA	NA	NA
LEAD-214	NA	NA	NA	NA	NA
POTASSIUM-40	NA	NA	NA	NA	NA
PROTACTINIUM-231	NA	NA	NA	NA	NA
RADIUM-226	NA	NA	NA	NA	NA
RADIUM-228	NA	NA	NA	NA	NA
THALLIUM-208	NA	NA	NA	NA	NA
THORIUM-232	NA	NA	NA	NA	NA
THORIUM-234	NA	NA	NA	NA	NA
URANIUM-235	NA	NA	NA	NA	NA
URANIUM-238	NA	NA	NA	NA	NA
METALS (%)					
URANIUM-235	0.715	0.753	0.85	0.709	0.867
METALS (mg/kg) [3]					
TECHNETIUM-99	NA	NA	NA	NA	NA
TOTAL URANIUM	2.5	2.9	1.4	2.8	2.4
URANIUM-233	0.0037 U	0.0034 U	0.0032 U	0.0036 U	0.0033
URANIUM-234	0.00074 U	0.00067 U	0.00064 U	0.00072 U	0.00065
URANIUM-235	0.018	0.022	0.012	0.02	0.021
URANIUM-236	0.00098 U	0.0009 U	0.00085 U	0.00096 U	0.00087
URANIUM-238	2.5	2.9	1.4	2.8	2.4

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	**198**
SAMPLE ID	**98-01**
SAMPLE DATE	**0611**
SAMPLE CODE	**mal**
RADIONUCLIDES (pCi/g) [1]	
THORIUM-228	
THORIUM-230	
THORIUM-232	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	
URANIUM-236	U
URANIUM-238	
RAD GAMMA (pCi/g) [2]	
ACTINIUM-227	
ACTINIUM-228	
BISMUTH-212	
BISMUTH-214	
LEAD-210	
LEAD-212	
LEAD-214	
POTASSIUM-40	
PROTACTINIUM-231	
RADIUM-226	
RADIUM-228	
THALLIUM-208	
THORIUM-232	
THORIUM-234	
URANIUM-235	
URANIUM-238	
METALS (%)	
URANIUM-235	
METALS (mg/kg) [3]	
TECHNETIUM-99	
TOTAL URANIUM	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	
URANIUM-236	U
URANIUM-238	

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	SD-198	SD-198	SD-199	SD-199	SD-
SAMPLE ID	SD-198-02	SD-198-SS	SD-199-01	SD-199-02	SD-199-
SAMPLE DATE	20140611	20140611	20140611	20140611	2014
SAMPLE CODE	Normal	Normal	Normal	ORIG	Av
RADIONUCLIDES (pCi/g) [1]					
THORIUM-228	1.13	1.3	1.27	1.08	0.8875
THORIUM-230	1.01	1.45	1.05	0.66	0.7175
THORIUM-232	0.999	1.45	1.39	0.965	1.0225
URANIUM-233	32.7 U	31.9 U	30.5 U	33.1 U	32.75
URANIUM-234	0.956 U	1.35 U	1.46 U	1.22 U	1.067
URANIUM-235	0.0339	0.0468	0.0583	0.0489	0.045
URANIUM-236	0.0585 U	0.00045 U	0.00057 U	0.0594 U	0.0587
URANIUM-238	0.64	1.03	0.856	0.908	0.8775
RAD GAMMA (pCi/g) [2]					
ACTINIUM-227	NA	NA	NA	NA	NA
ACTINIUM-228	NA	NA	NA	NA	NA
BISMUTH-212	NA	NA	NA	NA	NA
BISMUTH-214	NA	NA	NA	NA	NA
LEAD-210	NA	NA	NA	NA	NA
LEAD-212	NA	NA	NA	NA	NA
LEAD-214	NA	NA	NA	NA	NA
POTASSIUM-40	NA	NA	NA	NA	NA
PROTACTINIUM-231	NA	NA	NA	NA	NA
RADIUM-226	NA	NA	NA	NA	NA
RADIUM-228	NA	NA	NA	NA	NA
THALLIUM-208	NA	NA	NA	NA	NA
THORIUM-232	NA	NA	NA	NA	NA
THORIUM-234	NA	NA	NA	NA	NA
URANIUM-235	NA	NA	NA	NA	NA
URANIUM-238	NA	NA	NA	NA	NA
METALS (%)					
URANIUM-235	0.835	0.705	1.07	0.845	0.7995
METALS (mg/kg) [3]					
TECHNETIUM-99	NA	NA	NA	NA	NA
TOTAL URANIUM	1.9	3.1	2.5	2.7	2.6
URANIUM-233	0.0034 U	0.0033 U	0.0032 U	0.0034 U	0.0034
URANIUM-234	0.00068 U	0.00066 U	0.00063 U	0.00069 U	0.00068
URANIUM-235	0.016	0.022	0.027	0.023	0.021
URANIUM-236	0.0009 U	0.00088 U	0.00084 U	0.00092 U	0.00091
URANIUM-238	1.9	3.1	2.5	2.7	2.6

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	**199**
SAMPLE ID	**02-AVG**
SAMPLE DATE	**0611**
SAMPLE CODE	**/g**
RADIONUCLIDES (pCi/g) [1]	
THORIUM-228	
THORIUM-230	
THORIUM-232	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	
URANIUM-236	U
URANIUM-238	
RAD GAMMA (pCi/g) [2]	
ACTINIUM-227	
ACTINIUM-228	
BISMUTH-212	
BISMUTH-214	
LEAD-210	
LEAD-212	
LEAD-214	
POTASSIUM-40	
PROTACTINIUM-231	
RADIUM-226	
RADIUM-228	
THALLIUM-208	
THORIUM-232	
THORIUM-234	
URANIUM-235	
URANIUM-238	
METALS (%)	
URANIUM-235	
METALS (mg/kg) [3]	
TECHNETIUM-99	
TOTAL URANIUM	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	
URANIUM-236	U
URANIUM-238	

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	SD-199	SD-199	SD-200	SD-200	SD-
SAMPLE ID	SD-199-02-D	SD-199-SS	SD-200-01	SD-200-02	SD-2(
SAMPLE DATE	20140611	20140611	20140610	20140610	2014
SAMPLE CODE	DUP	Normal	Normal	Normal	Nor
RADIONUCLIDES (pCi/g) [1]					
THORIUM-228	0.695	1.08	1.39	1.07	1.42
THORIUM-230	0.775	1.35	1.28 J	0.785 J	0.84
THORIUM-232	1.08	1.19	1.14	1.35	1.22
URANIUM-233	32.4 U	32.1 U	0.772 U	0.855 U	NA
URANIUM-234	0.914 U	0.953 U	1.35 U	1.55 U	NA
URANIUM-235	0.0411	0.048	0.0576	0.0602	NA
URANIUM-236	0.058 U	0.0575 U	0.00211 U	0.00122 U	NA
URANIUM-238	0.847	0.928	1.12	1.24	NA
RAD GAMMA (pCi/g) [2]					
ACTINIUM-227	NA	NA	NA	NA	NA
ACTINIUM-228	NA	NA	NA	NA	NA
BISMUTH-212	NA	NA	NA	NA	NA
BISMUTH-214	NA	NA	NA	NA	NA
LEAD-210	NA	NA	NA	NA	NA
LEAD-212	NA	NA	NA	NA	NA
LEAD-214	NA	NA	NA	NA	NA
POTASSIUM-40	NA	NA	NA	NA	NA
PROTACTINIUM-231	NA	NA	NA	NA	NA
RADIUM-226	NA	NA	NA	NA	NA
RADIUM-228	NA	NA	NA	NA	NA
THALLIUM-208	NA	NA	NA	NA	NA
THORIUM-232	NA	NA	NA	NA	NA
THORIUM-234	NA	NA	NA	NA	NA
URANIUM-235	NA	NA	NA	NA	NA
URANIUM-238	NA	NA	NA	NA	NA
METALS (%)					
URANIUM-235	0.754	0.78	0.812	0.751	NA
METALS (mg/kg) [3]					
TECHNETIUM-99	NA	NA	NA	NA	NA
TOTAL URANIUM	2.5	2.8	3.3	3.7	NA
URANIUM-233	0.0034 U	0.0033 U	0.0035 U	0.0034 U	NA
URANIUM-234	0.00067 U	0.00067 U	0.00069 U	0.00067 U	NA
URANIUM-235	0.019	0.022	0.027	0.028	NA
URANIUM-236	0.0009 U	0.00089 U	0.00092 U	0.0009 U	NA
URANIUM-238	2.5	2.8	3.3	3.7	NA

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	**200**
SAMPLE ID	**00-03**
SAMPLE DATE	**0610**
SAMPLE CODE	**mal**
RADIONUCLIDES (pCi/g) [1]	
THORIUM-228	
THORIUM-230	J
THORIUM-232	
URANIUM-233	
URANIUM-234	
URANIUM-235	
URANIUM-236	
URANIUM-238	
RAD GAMMA (pCi/g) [2]	
ACTINIUM-227	
ACTINIUM-228	
BISMUTH-212	
BISMUTH-214	
LEAD-210	
LEAD-212	
LEAD-214	
POTASSIUM-40	
PROTACTINIUM-231	
RADIUM-226	
RADIUM-228	
THALLIUM-208	
THORIUM-232	
THORIUM-234	
URANIUM-235	
URANIUM-238	
METALS (%)	
URANIUM-235	
METALS (mg/kg) [3]	
TECHNETIUM-99	
TOTAL URANIUM	
URANIUM-233	
URANIUM-234	
URANIUM-235	
URANIUM-236	
URANIUM-238	

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	SD-200	SD-201	SD-201	SD-201	SD-
SAMPLE ID	SD-200-SS	SD-201-01	SD-201-02	SD-201-SS	SD-2
SAMPLE DATE	20140610	20140610	20140610	20140610	2014
SAMPLE CODE	Normal	Normal	Normal	Normal	Nor
RADIONUCLIDES (pCi/g) [1]					
THORIUM-228	1.05	1.22	0.69	1.12	0.455
THORIUM-230	1.15 J	1.03 J	0.614 J	1.23 J	0.28
THORIUM-232	1.42	1.2	0.663	0.959	0.378
URANIUM-233	0.567 U	0.911 U	0.987 U	0.992 U	0.515
URANIUM-234	1.55 U	1.82 U	1.17 U	1.93 U	0.869
URANIUM-235	0.0558	0.0654	0.0408	0.0746	0.0317
URANIUM-236	0.0006 U	0.00224 U	0.00347 U	0.0037 U	0.00177
URANIUM-238	1.15	1.29	0.849	1.56	0.666
RAD GAMMA (pCi/g) [2]					
ACTINIUM-227	NA	NA	NA	NA	NA
ACTINIUM-228	NA	NA	NA	NA	NA
BISMUTH-212	NA	NA	NA	NA	NA
BISMUTH-214	NA	NA	NA	NA	NA
LEAD-210	NA	NA	NA	NA	NA
LEAD-212	NA	NA	NA	NA	NA
LEAD-214	NA	NA	NA	NA	NA
POTASSIUM-40	NA	NA	NA	NA	NA
PROTACTINIUM-231	NA	NA	NA	NA	NA
RADIUM-226	NA	NA	NA	NA	NA
RADIUM-228	NA	NA	NA	NA	NA
THALLIUM-208	NA	NA	NA	NA	NA
THORIUM-232	NA	NA	NA	NA	NA
THORIUM-234	NA	NA	NA	NA	NA
URANIUM-235	NA	NA	NA	NA	NA
URANIUM-238	NA	NA	NA	NA	NA
METALS (%)					
URANIUM-235	0.759	0.783	0.754	0.755	0.744
METALS (mg/kg) [3]					
TECHNETIUM-99	NA	NA	NA	NA	NA
TOTAL URANIUM	3.4	3.8	2.5	4.6	2
URANIUM-233	0.0035 U	0.0033 U	0.0033 U	0.0034 U	0.0032
URANIUM-234	0.0007 U	0.00067 U	0.00065 U	0.00069 U	0.00063
URANIUM-235	0.026	0.03	0.019	0.035	0.015
URANIUM-236	0.00093 U	0.00089 U	0.00087 U	0.00092 U	0.00084
URANIUM-238	3.4	3.8	2.5	4.6	2

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	**202**
SAMPLE ID	**02-01**
SAMPLE DATE	**0610**
SAMPLE CODE	**mal**
RADIONUCLIDES (pCi/g) [1]	
THORIUM-228	
THORIUM-230	UJ
THORIUM-232	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	
URANIUM-236	U
URANIUM-238	
RAD GAMMA (pCi/g) [2]	
ACTINIUM-227	
ACTINIUM-228	
BISMUTH-212	
BISMUTH-214	
LEAD-210	
LEAD-212	
LEAD-214	
POTASSIUM-40	
PROTACTINIUM-231	
RADIUM-226	
RADIUM-228	
THALLIUM-208	
THORIUM-232	
THORIUM-234	
URANIUM-235	
URANIUM-238	
METALS (%)	
URANIUM-235	
METALS (mg/kg) [3]	
TECHNETIUM-99	
TOTAL URANIUM	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	
URANIUM-236	U
URANIUM-238	

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	SD-202	SD-202	SD-203	SD-203	SD-
SAMPLE ID	SD-202-02	SD-202-SS	SD-203-01	SD-203-02	SD-2(
SAMPLE DATE	20140610	20140610	20140610	20140610	2014
SAMPLE CODE	Normal	Normal	Normal	Normal	Nor
RADIONUCLIDES (pCi/g) [1]					
THORIUM-228	1.12	0.652	1.33	0.621	1.09
THORIUM-230	0.66 J	0.558 J	0.937 J	0.684 J	1.27
THORIUM-232	1.33	0.717	1.24	0.615	1.47
URANIUM-233	1.02 U	0.503 U	1.03 U	1.04 U	1.18
URANIUM-234	0.479 U	1.33 U	1.28 U	1.69 U	1.61
URANIUM-235	0.0136	0.0467	0.0415	0.0675	0.0629
URANIUM-236	0.00178 U	0.00291 U	0.00325 U	0.00247 U	0.00258
URANIUM-238	0.28	0.959	0.865	1.09	1.31
RAD GAMMA (pCi/g) [2]					
ACTINIUM-227	NA	NA	NA	NA	NA
ACTINIUM-228	NA	NA	NA	NA	NA
BISMUTH-212	NA	NA	NA	NA	NA
BISMUTH-214	NA	NA	NA	NA	NA
LEAD-210	NA	NA	NA	NA	NA
LEAD-212	NA	NA	NA	NA	NA
LEAD-214	NA	NA	NA	NA	NA
POTASSIUM-40	NA	NA	NA	NA	NA
PROTACTINIUM-231	NA	NA	NA	NA	NA
RADIUM-226	NA	NA	NA	NA	NA
RADIUM-228	NA	NA	NA	NA	NA
THALLIUM-208	NA	NA	NA	NA	NA
THORIUM-232	NA	NA	NA	NA	NA
THORIUM-234	NA	NA	NA	NA	NA
URANIUM-235	NA	NA	NA	NA	NA
URANIUM-238	NA	NA	NA	NA	NA
METALS (%)					
URANIUM-235	0.753	0.753	0.725	0.931	0.738
METALS (mg/kg) [3]					
TECHNETIUM-99	NA	NA	NA	NA	NA
TOTAL URANIUM	0.84	2.9	2.6	3.3	3.9
URANIUM-233	0.0034 U	0.0034 U	0.0033 U	0.0035 U	0.0032
URANIUM-234	0.00068 U	0.00068 U	0.00066 U	0.0007 U	0.00064
URANIUM-235	0.0063 J	0.022	0.019	0.031	0.029
URANIUM-236	0.0009 U	0.00091 U	0.00088 U	0.00093 U	0.00085
URANIUM-238	0.83	2.9	2.6	3.3	3.9

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	203
SAMPLE ID	)3-SS
SAMPLE DATE	0610
SAMPLE CODE	mal
RADIONUCLIDES (pCi/g) [1]	
THORIUM-228	
THORIUM-230	J
THORIUM-232	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	
URANIUM-236	U
URANIUM-238	
RAD GAMMA (pCi/g) [2]	
ACTINIUM-227	
ACTINIUM-228	
BISMUTH-212	
BISMUTH-214	
LEAD-210	
LEAD-212	
LEAD-214	
POTASSIUM-40	
PROTACTINIUM-231	
RADIUM-226	
RADIUM-228	
THALLIUM-208	
THORIUM-232	
THORIUM-234	
URANIUM-235	
URANIUM-238	
METALS (%)	
URANIUM-235	
METALS (mg/kg) [3]	
TECHNETIUM-99	
TOTAL URANIUM	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	
URANIUM-236	U
URANIUM-238	

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	SD-204	SD-204	SD-204	SD-205	SD-
SAMPLE ID	SD-204-01	SD-204-02	SD-204-SS	SD-205-01	SD-2(
SAMPLE DATE	20140611	20140611	20140611	20140611	2014
SAMPLE CODE	Normal	Normal	Normal	Normal	Nor
RADIONUCLIDES (pCi/g) [1]					
THORIUM-228	1.22	0.92	0.356	0.929	1.17
THORIUM-230	0.885	0.755	0.412	0.977 J	0.931
THORIUM-232	1.03	0.655	0.377	1.03	1.23
URANIUM-233	32.2 U	33.3 U	35.5 U	32.9 U	33.8
URANIUM-234	0.224 U	0.212 U	0.128 U	2.69 U	0.434
URANIUM-235	0.0184	0.00882 U	0.0136 U	0.0884	0.0219
URANIUM-236	0.0576 U	0.00035 U	0.0636 U	0.0022 U	0.0606
URANIUM-238	0.423	0.199	0.287	0.934	0.484
RAD GAMMA (pCi/g) [2]					
ACTINIUM-227	NA	NA	NA	NA	NA
ACTINIUM-228	NA	NA	NA	NA	NA
BISMUTH-212	NA	NA	NA	NA	NA
BISMUTH-214	NA	NA	NA	NA	NA
LEAD-210	NA	NA	NA	NA	NA
LEAD-212	NA	NA	NA	NA	NA
LEAD-214	NA	NA	NA	NA	NA
POTASSIUM-40	NA	NA	NA	NA	NA
PROTACTINIUM-231	NA	NA	NA	NA	NA
RADIUM-226	NA	NA	NA	NA	NA
RADIUM-228	NA	NA	NA	NA	NA
THALLIUM-208	NA	NA	NA	NA	NA
THORIUM-232	NA	NA	NA	NA	NA
THORIUM-234	NA	NA	NA	NA	NA
URANIUM-235	NA	NA	NA	NA	NA
URANIUM-238	NA	NA	NA	NA	NA
METALS (%)					
URANIUM-235	0.65	0	0.736	1.44	0.709
METALS (mg/kg) [3]					
TECHNETIUM-99	NA	NA	NA	NA	NA
TOTAL URANIUM	1.3	0.59	0.86	2.8	1.4
URANIUM-233	0.0033 U	0.0035 U	0.0037 U	0.0034 U	0.0035
URANIUM-234	0.00067 U	0.00069 U	0.00074 U	0.00068 U	0.0007
URANIUM-235	0.0085 J	0.0047 U	0.0063 U	0.041	0.01
URANIUM-236	0.00089 U	0.00092 U	0.00098 U	0.00091 U	0.00094
URANIUM-238	1.3	0.59	0.85	2.8	1.4

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	205
SAMPLE ID	05-02
SAMPLE DATE	0611
SAMPLE CODE	mal
RADIONUCLIDES (pCi/g) [1]	
THORIUM-228	
THORIUM-230	J
THORIUM-232	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	
URANIUM-236	U
URANIUM-238	
RAD GAMMA (pCi/g) [2]	
ACTINIUM-227	
ACTINIUM-228	
BISMUTH-212	
BISMUTH-214	
LEAD-210	
LEAD-212	
LEAD-214	
POTASSIUM-40	
PROTACTINIUM-231	
RADIUM-226	
RADIUM-228	
THALLIUM-208	
THORIUM-232	
THORIUM-234	
URANIUM-235	
URANIUM-238	
METALS (%)	
URANIUM-235	
METALS (mg/kg) [3]	
TECHNETIUM-99	
TOTAL URANIUM	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	J
URANIUM-236	U
URANIUM-238	

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	SD-205	SD-205	SD-206	SD-206	SD-
SAMPLE ID	SD-205-03	SD-205-SS	SD-206-01	SD-206-02	SD-2(
SAMPLE DATE	20140611	20140611	20140612	20140612	2014
SAMPLE CODE	Normal	Normal	Normal	Normal	Nor
RADIONUCLIDES (pCi/g) [1]					
THORIUM-228	0.616	0.641	1.27	1.09	1.03
THORIUM-230	0.57 J	0.505 J	1.04	0.809 J	0.873
THORIUM-232	0.644	0.484	1.24	1.14	0.993
URANIUM-233	NA	33.7 U	31.5 U	33.4 U	10.3
URANIUM-234	NA	0.275 U	1.06 U	5.69	1.49
URANIUM-235	NA	0.0224	0.0438	0.187	0.055
URANIUM-236	NA	0.0604 U	0.00076 U	0.0097 U	0.00074
URANIUM-238	NA	0.46	0.792	0.994	1.05
RAD GAMMA (pCi/g) [2]					
ACTINIUM-227	NA	NA	NA	NA	NA
ACTINIUM-228	NA	NA	NA	NA	NA
BISMUTH-212	NA	NA	NA	NA	NA
BISMUTH-214	NA	NA	NA	NA	NA
LEAD-210	NA	NA	NA	NA	NA
LEAD-212	NA	NA	NA	NA	NA
LEAD-214	NA	NA	NA	NA	NA
POTASSIUM-40	NA	NA	NA	NA	NA
PROTACTINIUM-231	NA	NA	NA	NA	NA
RADIUM-226	NA	NA	NA	NA	NA
RADIUM-228	NA	NA	NA	NA	NA
THALLIUM-208	NA	NA	NA	NA	NA
THORIUM-232	NA	NA	NA	NA	NA
THORIUM-234	NA	NA	NA	NA	NA
URANIUM-235	NA	NA	NA	NA	NA
URANIUM-238	NA	NA	NA	NA	NA
METALS (%)					
URANIUM-235	NA	0.709	0.826	2.82	0.8
METALS (mg/kg) [3]					
TECHNETIUM-99	NA	NA	NA	NA	NA
TOTAL URANIUM	NA	1.4	2.4	3.1	3.1
URANIUM-233	NA	0.0035 U	0.0033 U	0.0035 U	0.0032
URANIUM-234	NA	0.0007 U	0.00065 U	0.00091 J	0.00064
URANIUM-235	NA	0.01 J	0.02	0.087	0.025
URANIUM-236	NA	0.00093 U	0.00087 U	0.00092 U	0.00085
URANIUM-238	NA	1.4	2.4	3	3.1

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	206
SAMPLE ID	)6-SS
SAMPLE DATE	0612
SAMPLE CODE	mal
RADIONUCLIDES (pCi/g) [1]	
THORIUM-228	
THORIUM-230	J
THORIUM-232	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	
URANIUM-236	U
URANIUM-238	
RAD GAMMA (pCi/g) [2]	
ACTINIUM-227	
ACTINIUM-228	
BISMUTH-212	
BISMUTH-214	
LEAD-210	
LEAD-212	
LEAD-214	
POTASSIUM-40	
PROTACTINIUM-231	
RADIUM-226	
RADIUM-228	
THALLIUM-208	
THORIUM-232	
THORIUM-234	
URANIUM-235	
URANIUM-238	
METALS (%)	
URANIUM-235	
METALS (mg/kg) [3]	
TECHNETIUM-99	
TOTAL URANIUM	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	
URANIUM-236	U
URANIUM-238	

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	SD-207	SD-207	SD-207	SD-208	SD-
SAMPLE ID	SD-207-01	SD-207-02	SD-207-SS	SD-208-01	SD-2(
SAMPLE DATE	20140611	20140611	20140611	20140611	2014
SAMPLE CODE	Normal	Normal	Normal	Normal	Nor
RADIONUCLIDES (pCi/g) [1]					
THORIUM-228	1.18	1.14	0.753	0.692	0.834
THORIUM-230	0.796 J	0.999 J	0.633 J	0.719	0.717
THORIUM-232	1.16	1.22	0.629	0.762	1.02
URANIUM-233	30.3 U	30.6 U	31.5 U	30.6 U	30.7
URANIUM-234	3.35 U	0.774 U	0.899 U	0.221 U	0.151
URANIUM-235	0.112	0.031	0.0487	0.0118 U	0.00775
URANIUM-236	0.00737 U	0.0548 U	0.0565 U	0.00021 U	0.055
URANIUM-238	0.804	0.645	0.96	0.256	0.19
RAD GAMMA (pCi/g) [2]					
ACTINIUM-227	NA	NA	NA	NA	NA
ACTINIUM-228	NA	NA	NA	NA	NA
BISMUTH-212	NA	NA	NA	NA	NA
BISMUTH-214	NA	NA	NA	NA	NA
LEAD-210	NA	NA	NA	NA	NA
LEAD-212	NA	NA	NA	NA	NA
LEAD-214	NA	NA	NA	NA	NA
POTASSIUM-40	NA	NA	NA	NA	NA
PROTACTINIUM-231	NA	NA	NA	NA	NA
RADIUM-226	NA	NA	NA	NA	NA
RADIUM-228	NA	NA	NA	NA	NA
THALLIUM-208	NA	NA	NA	NA	NA
THORIUM-232	NA	NA	NA	NA	NA
THORIUM-234	NA	NA	NA	NA	NA
URANIUM-235	NA	NA	NA	NA	NA
URANIUM-238	NA	NA	NA	NA	NA
METALS (%)					
URANIUM-235	2.12	0.731	0.787	0.706	0
METALS (mg/kg) [3]					
TECHNETIUM-99	0.000016 U	NA	NA	NA	NA
TOTAL URANIUM	2.5	1.9	2.9	0.77	0.56
URANIUM-233	0.0031 U	0.0032 U	0.0033 U	0.0032 U	0.0032
URANIUM-234	0.00063 U	0.00064 U	0.00065 U	0.00063 U	0.00064
URANIUM-235	0.052	0.014	0.023	0.0054 U	0.0043
URANIUM-236	0.00084 U	0.00085 U	0.00087 U	0.00085 U	0.00085
URANIUM-238	2.4	1.9	2.9	0.76	0.56

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	**208**
SAMPLE ID	**08-02**
SAMPLE DATE	**0611**
SAMPLE CODE	**mal**
RADIONUCLIDES (pCi/g) [1]	
THORIUM-228	
THORIUM-230	
THORIUM-232	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	U
URANIUM-236	U
URANIUM-238	
RAD GAMMA (pCi/g) [2]	
ACTINIUM-227	
ACTINIUM-228	
BISMUTH-212	
BISMUTH-214	
LEAD-210	
LEAD-212	
LEAD-214	
POTASSIUM-40	
PROTACTINIUM-231	
RADIUM-226	
RADIUM-228	
THALLIUM-208	
THORIUM-232	
THORIUM-234	
URANIUM-235	
URANIUM-238	
METALS (%)	
URANIUM-235	
METALS (mg/kg) [3]	
TECHNETIUM-99	
TOTAL URANIUM	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	U
URANIUM-236	U
URANIUM-238	

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	SD-208	SD-209	SD-209	SD-209	SD-
SAMPLE ID	SD-208-SS	SD-209-01	SD-209-02	SD-209-03	SD-2
SAMPLE DATE	20140611	20140611	20140611	20140611	2014
SAMPLE CODE	Normal	Normal	Normal	Normal	Nor
RADIONUCLIDES (pCi/g) [1]					
THORIUM-228	0.188	0.73	0.378	0.425	0.551
THORIUM-230	0.349 J	0.424	0.365	0.499	0.563
THORIUM-232	0.257	0.399	0.493	0.508	0.605
URANIUM-233	31.8 U	33.6 U	31.5 U	NA	33.9
URANIUM-234	0.444 U	4.34 U	0.0244 U	NA	0.0672
URANIUM-235	0.0202	0.00567 U	0.00498 U	NA	0.00793
URANIUM-236	0.0571 U	0.0601 U	0.0564 U	NA	0.0608
URANIUM-238	0.432	0.155	0.127	NA	0.201
RAD GAMMA (pCi/g) [2]					
ACTINIUM-227	NA	NA	NA	NA	NA
ACTINIUM-228	NA	NA	NA	NA	NA
BISMUTH-212	NA	NA	NA	NA	NA
BISMUTH-214	NA	NA	NA	NA	NA
LEAD-210	NA	NA	NA	NA	NA
LEAD-212	NA	NA	NA	NA	NA
LEAD-214	NA	NA	NA	NA	NA
POTASSIUM-40	NA	NA	NA	NA	NA
PROTACTINIUM-231	NA	NA	NA	NA	NA
RADIUM-226	NA	NA	NA	NA	NA
RADIUM-228	NA	NA	NA	NA	NA
THALLIUM-208	NA	NA	NA	NA	NA
THORIUM-232	NA	NA	NA	NA	NA
THORIUM-234	NA	NA	NA	NA	NA
URANIUM-235	NA	NA	NA	NA	NA
URANIUM-238	NA	NA	NA	NA	NA
METALS (%)					
URANIUM-235	0.718	0	0	NA	0
METALS (mg/kg) [3]					
TECHNETIUM-99	NA	NA	NA	NA	NA
TOTAL URANIUM	1.3	0.46	0.38	NA	0.6
URANIUM-233	0.0033 U	0.0035 U	0.0033 U	NA	0.0035
URANIUM-234	0.00066 U	0.0007 U	0.00065 U	NA	0.0007
URANIUM-235	0.0094 J	0.0047 U	0.0044 U	NA	0.0048
URANIUM-236	0.00088 U	0.00093 U	0.00087 U	NA	0.00094
URANIUM-238	1.3	0.46	0.38	NA	0.6

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	210
SAMPLE ID	10-01
SAMPLE DATE	0611
SAMPLE CODE	mal
RADIONUCLIDES (pCi/g) [1]	
THORIUM-228	
THORIUM-230	J
THORIUM-232	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	U
URANIUM-236	U
URANIUM-238	
RAD GAMMA (pCi/g) [2]	
ACTINIUM-227	
ACTINIUM-228	
BISMUTH-212	
BISMUTH-214	
LEAD-210	
LEAD-212	
LEAD-214	
POTASSIUM-40	
PROTACTINIUM-231	
RADIUM-226	
RADIUM-228	
THALLIUM-208	
THORIUM-232	
THORIUM-234	
URANIUM-235	
URANIUM-238	
METALS (%)	
URANIUM-235	
METALS (mg/kg) [3]	
TECHNETIUM-99	
TOTAL URANIUM	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	U
URANIUM-236	U
URANIUM-238	

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	SD-210	SD-210	SD-211	SD-211	SD-
SAMPLE ID	SD-210-02	SD-210-SS	SD-211-01	SD-211-02	SD-2
SAMPLE DATE	20140611	20140611	20140612	20140612	2014
SAMPLE CODE	Normal	Normal	Normal	Normal	Nor
RADIONUCLIDES (pCi/g) [1]					
THORIUM-228	0.579	0.274	1.31	1.08	1.2
THORIUM-230	0.506 J	0.406 J	0.882 J	0.928 J	1.21
THORIUM-232	0.571	0.219	1.18	0.984	1.41
URANIUM-233	31.1 U	35.3 U	32.9 U	34.4 U	34.8
URANIUM-234	0.107 U	0.845 U	0.306 U	0.53 U	0.287
URANIUM-235	0.00811 U	0.0379	0.0134	0.0118	0.0135
URANIUM-236	0.0557 U	0.00022 U	0.0589 U	0.0616 U	0.0623
URANIUM-238	0.194	0.686	0.292	0.258	0.301
RAD GAMMA (pCi/g) [2]					
ACTINIUM-227	NA	NA	NA	NA	NA
ACTINIUM-228	NA	NA	NA	NA	NA
BISMUTH-212	NA	NA	NA	NA	NA
BISMUTH-214	NA	NA	NA	NA	NA
LEAD-210	NA	NA	NA	NA	NA
LEAD-212	NA	NA	NA	NA	NA
LEAD-214	NA	NA	NA	NA	NA
POTASSIUM-40	NA	NA	NA	NA	NA
PROTACTINIUM-231	NA	NA	NA	NA	NA
RADIUM-226	NA	NA	NA	NA	NA
RADIUM-228	NA	NA	NA	NA	NA
THALLIUM-208	NA	NA	NA	NA	NA
THORIUM-232	NA	NA	NA	NA	NA
THORIUM-234	NA	NA	NA	NA	NA
URANIUM-235	NA	NA	NA	NA	NA
URANIUM-238	NA	NA	NA	NA	NA
METALS (%)					
URANIUM-235	0	0.892	0.708	0.709	0.684
METALS (mg/kg) [3]					
TECHNETIUM-99	NA	NA	NA	NA	NA
TOTAL URANIUM	0.58	2	0.88	0.78	0.91
URANIUM-233	0.0032 U	0.0037 U	0.0034 U	0.0036 U	0.0036
URANIUM-234	0.00065 U	0.00073 U	0.00068 U	0.00071 U	0.00072
URANIUM-235	0.0044 U	0.018	0.0062 J	0.0055 J	0.0062
URANIUM-236	0.00086 U	0.00098 U	0.00091 U	0.00095 U	0.00096
URANIUM-238	0.58	2	0.87	0.77	0.9

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	211
SAMPLE ID	11-SS
SAMPLE DATE	0612
SAMPLE CODE	mal
RADIONUCLIDES (pCi/g) [1]	
THORIUM-228	
THORIUM-230	
THORIUM-232	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	
URANIUM-236	U
URANIUM-238	
RAD GAMMA (pCi/g) [2]	
ACTINIUM-227	
ACTINIUM-228	
BISMUTH-212	
BISMUTH-214	
LEAD-210	
LEAD-212	
LEAD-214	
POTASSIUM-40	
PROTACTINIUM-231	
RADIUM-226	
RADIUM-228	
THALLIUM-208	
THORIUM-232	
THORIUM-234	
URANIUM-235	
URANIUM-238	
METALS (%)	
URANIUM-235	
METALS (mg/kg) [3]	
TECHNETIUM-99	
TOTAL URANIUM	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	J
URANIUM-236	U
URANIUM-238	

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	SD-212	SD-212	SD-212	SD-213	SD-
SAMPLE ID	SD-212-01	SD-212-02	SD-212-SS	SD-213-01	SD-2
SAMPLE DATE	20140612	20140612	20140612	20140612	2014
SAMPLE CODE	Normal	Normal	Normal	Normal	OF
RADIONUCLIDES (pCi/g) [1]					
THORIUM-228	1.24	1.1	0.964	0.998	1.14
THORIUM-230	1 J	1.17 J	0.923 J	0.979 J	1.15
THORIUM-232	1.12	1.01	1.03	1.17	1.18
URANIUM-233	31.8 U	33.6 U	31.5 U	30.5 U	34.3
URANIUM-234	0.94 U	0.919 U	0.964 U	0.867 U	0.717
URANIUM-235	0.0312	0.0327	0.039	0.0352	0.0283
URANIUM-236	0.0571 U	0.0601 U	0.0564 U	0.0547 U	0.0614
URANIUM-238	0.657	0.679	0.757	0.72	0.615
RAD GAMMA (pCi/g) [2]					
ACTINIUM-227	NA	NA	NA	NA	NA
ACTINIUM-228	NA	NA	NA	NA	NA
BISMUTH-212	NA	NA	NA	NA	NA
BISMUTH-214	NA	NA	NA	NA	NA
LEAD-210	NA	NA	NA	NA	NA
LEAD-212	NA	NA	NA	NA	NA
LEAD-214	NA	NA	NA	NA	NA
POTASSIUM-40	NA	NA	NA	NA	NA
PROTACTINIUM-231	NA	NA	NA	NA	NA
RADIUM-226	NA	NA	NA	NA	NA
RADIUM-228	NA	NA	NA	NA	NA
THALLIUM-208	NA	NA	NA	NA	NA
THORIUM-232	NA	NA	NA	NA	NA
THORIUM-234	NA	NA	NA	NA	NA
URANIUM-235	NA	NA	NA	NA	NA
URANIUM-238	NA	NA	NA	NA	NA
METALS (%)					
URANIUM-235	0.695	0.744	0.777	0.756	0.717
METALS (mg/kg) [3]					
TECHNETIUM-99	NA	NA	NA	NA	NA
TOTAL URANIUM	2	2	2.3	2.1	1.8
URANIUM-233	0.0033 U	0.0035 U	0.0033 U	0.0032 U	0.0036
URANIUM-234	0.00066 U	0.0007 U	0.00065 U	0.00063 U	0.00071
URANIUM-235	0.014	0.015	0.018	0.016	0.013
URANIUM-236	0.00088 U	0.00093 U	0.00087 U	0.00084 U	0.00095
URANIUM-238	2	2	2.3	2.1	1.8

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	213
SAMPLE ID	13-02
SAMPLE DATE	0612
SAMPLE CODE	IG
RADIONUCLIDES (pCi/g) [1]	
THORIUM-228	
THORIUM-230	J
THORIUM-232	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	
URANIUM-236	U
URANIUM-238	
RAD GAMMA (pCi/g) [2]	
ACTINIUM-227	
ACTINIUM-228	
BISMUTH-212	
BISMUTH-214	
LEAD-210	
LEAD-212	
LEAD-214	
POTASSIUM-40	
PROTACTINIUM-231	
RADIUM-226	
RADIUM-228	
THALLIUM-208	
THORIUM-232	
THORIUM-234	
URANIUM-235	
URANIUM-238	
METALS (%)	
URANIUM-235	
METALS (mg/kg) [3]	
TECHNETIUM-99	
TOTAL URANIUM	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	
URANIUM-236	U
URANIUM-238	

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	SD-213	SD-213	SD-213	SD-214	SD-
SAMPLE ID	SD-213-02-AVG	SD-213-02-D	SD-213-SS	SD-214-01	SD-2
SAMPLE DATE	20140612	20140612	20140612	20140612	2014
SAMPLE CODE	Avg	DUP	Normal	Normal	Nor
RADIONUCLIDES (pCi/g) [1]					
THORIUM-228	1.1	1.06	1.1	0.986	1.22
THORIUM-230	1.095	1.04 J	1.26	0.865 J	1.24
THORIUM-232	1.22	1.26	1.23	1.09	1.15
URANIUM-233	33.25 U	32.2 U	34.4 U	33.3 U	31.4
URANIUM-234	0.7525 U	0.788 U	0.952 U	1.02 U	0.737
URANIUM-235	0.0287	0.0291	0.0359	0.0389	0.0291
URANIUM-236	0.0596 U	0.0578 U	0.0617 U	0.0596 U	0.0562
URANIUM-238	0.615	0.615	0.758	0.801	0.601
RAD GAMMA (pCi/g) [2]					
ACTINIUM-227	NA	NA	NA	NA	NA
ACTINIUM-228	NA	NA	NA	NA	NA
BISMUTH-212	NA	NA	NA	NA	NA
BISMUTH-214	NA	NA	NA	NA	NA
LEAD-210	NA	NA	NA	NA	NA
LEAD-212	NA	NA	NA	NA	NA
LEAD-214	NA	NA	NA	NA	NA
POTASSIUM-40	NA	NA	NA	NA	NA
PROTACTINIUM-231	NA	NA	NA	NA	NA
RADIUM-226	NA	NA	NA	NA	NA
RADIUM-228	NA	NA	NA	NA	NA
THALLIUM-208	NA	NA	NA	NA	NA
THORIUM-232	NA	NA	NA	NA	NA
THORIUM-234	NA	NA	NA	NA	NA
URANIUM-235	NA	NA	NA	NA	NA
URANIUM-238	NA	NA	NA	NA	NA
METALS (%)					
URANIUM-235	0.717	0.717	0.734	0.744	0.717
METALS (mg/kg) [3]					
TECHNETIUM-99	NA	NA	NA	NA	NA
TOTAL URANIUM	1.8	1.8	2.3	2.4	1.8
URANIUM-233	0.00345 U	0.0033 U	0.0036 U	0.0035 U	0.0033
URANIUM-234	0.00069 U	0.00067 U	0.00071 U	0.00069 U	0.00065
URANIUM-235	0.013	0.013	0.017	0.018	0.013
URANIUM-236	0.00092 U	0.00089 U	0.00095 U	0.00092 U	0.00087
URANIUM-238	1.8	1.8	2.3	2.4	1.8

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	214
SAMPLE ID	14-02
SAMPLE DATE	0612
SAMPLE CODE	mal
RADIONUCLIDES (pCi/g) [1]	
THORIUM-228	
THORIUM-230	
THORIUM-232	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	
URANIUM-236	U
URANIUM-238	
RAD GAMMA (pCi/g) [2]	
ACTINIUM-227	
ACTINIUM-228	
BISMUTH-212	
BISMUTH-214	
LEAD-210	
LEAD-212	
LEAD-214	
POTASSIUM-40	
PROTACTINIUM-231	
RADIUM-226	
RADIUM-228	
THALLIUM-208	
THORIUM-232	
THORIUM-234	
URANIUM-235	
URANIUM-238	
METALS (%)	
URANIUM-235	
METALS (mg/kg) [3]	
TECHNETIUM-99	
TOTAL URANIUM	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	
URANIUM-236	U
URANIUM-238	

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	SD-214	SD-214	SD-215	SD-216	SD-
SAMPLE ID	SD-214-03	SD-214-SS	SD-215-SS	SD-216-01	SD-2
SAMPLE DATE	20140612	20140612	20140612	20140612	2014
SAMPLE CODE	Normal	Normal	Normal	Normal	Nor
RADIONUCLIDES (pCi/g) [1]					
THORIUM-228	0.865	0.855	0.898	0.946	0.69
THORIUM-230	0.433 J	0.948 J	0.499 J	0.895 J	0.583
THORIUM-232	0.856	1.04	1.01	0.956	0.688
URANIUM-233	NA	35.8 U	34.7 U	32.6 U	32.8
URANIUM-234	NA	0.943 U	0.242 U	0.32 U	0.158
URANIUM-235	NA	0.0328	0.00525 U	0.0112	0.00498
URANIUM-236	NA	0.0641 U	0.0621 U	0.0583 U	0.0588
URANIUM-238	NA	0.695	0.117	0.242	0.118
RAD GAMMA (pCi/g) [2]					
ACTINIUM-227	NA	NA	NA	NA	NA
ACTINIUM-228	NA	NA	NA	NA	NA
BISMUTH-212	NA	NA	NA	NA	NA
BISMUTH-214	NA	NA	NA	NA	NA
LEAD-210	NA	NA	NA	NA	NA
LEAD-212	NA	NA	NA	NA	NA
LEAD-214	NA	NA	NA	NA	NA
POTASSIUM-40	NA	NA	NA	NA	NA
PROTACTINIUM-231	NA	NA	NA	NA	NA
RADIUM-226	NA	NA	NA	NA	NA
RADIUM-228	NA	NA	NA	NA	NA
THALLIUM-208	NA	NA	NA	NA	NA
THORIUM-232	NA	NA	NA	NA	NA
THORIUM-234	NA	NA	NA	NA	NA
URANIUM-235	NA	NA	NA	NA	NA
URANIUM-238	NA	NA	NA	NA	NA
METALS (%)					
URANIUM-235	NA	0.709	0	0.717	0
METALS (mg/kg) [3]					
TECHNETIUM-99	NA	NA	NA	NA	NA
TOTAL URANIUM	NA	2.1	0.35	0.73	0.35
URANIUM-233	NA	0.0037 U	0.0036 U	0.0034 U	0.0034
URANIUM-234	NA	0.00074 U	0.00072 U	0.00068 U	0.00068
URANIUM-235	NA	0.015	0.0049 U	0.0052 J	0.0046
URANIUM-236	NA	0.00099 U	0.00096 U	0.0009 U	0.00091
URANIUM-238	NA	2.1	0.35	0.72	0.35

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	216
SAMPLE ID	16-02
SAMPLE DATE	0612
SAMPLE CODE	mal
RADIONUCLIDES (pCi/g) [1]	
THORIUM-228	
THORIUM-230	J
THORIUM-232	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	U
URANIUM-236	U
URANIUM-238	
RAD GAMMA (pCi/g) [2]	
ACTINIUM-227	
ACTINIUM-228	
BISMUTH-212	
BISMUTH-214	
LEAD-210	
LEAD-212	
LEAD-214	
POTASSIUM-40	
PROTACTINIUM-231	
RADIUM-226	
RADIUM-228	
THALLIUM-208	
THORIUM-232	
THORIUM-234	
URANIUM-235	
URANIUM-238	
METALS (%)	
URANIUM-235	
METALS (mg/kg) [3]	
TECHNETIUM-99	
TOTAL URANIUM	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	U
URANIUM-236	U
URANIUM-238	

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	SD-216	SD-217	SD-217	SD-217	SD-
SAMPLE ID	SD-216-SS	SD-217-01	SD-217-02	SD-217-SS	SD-2
SAMPLE DATE	20140612	20140612	20140612	20140612	2014
SAMPLE CODE	Normal	Normal	Normal	Normal	Nor
RADIONUCLIDES (pCi/g) [1]					
THORIUM-228	1.01	0.431	0.767	0.437	1.2
THORIUM-230	0.82 J	0.36 J	0.551 J	0.657 J	0.865
THORIUM-232	0.903	0.37	0.665	0.371	1.53
URANIUM-233	34.3 U	31.5 U	34.3 U	32.6 U	1.08
URANIUM-234	0.514 U	0.388 U	0.466 U	0.662 U	0.728
URANIUM-235	0.0157	0.016	0.0144	0.0209	0.0165
URANIUM-236	0.0615 U	0.0565 U	0.0614 U	0.0584 U	0.00255
URANIUM-238	0.333	0.315	0.31	0.441	0.353
RAD GAMMA (pCi/g) [2]					
ACTINIUM-227	NA	NA	NA	NA	NA
ACTINIUM-228	NA	NA	NA	NA	NA
BISMUTH-212	NA	NA	NA	NA	NA
BISMUTH-214	NA	NA	NA	NA	NA
LEAD-210	NA	NA	NA	NA	NA
LEAD-212	NA	NA	NA	NA	NA
LEAD-214	NA	NA	NA	NA	NA
POTASSIUM-40	NA	NA	NA	NA	NA
PROTACTINIUM-231	NA	NA	NA	NA	NA
RADIUM-226	NA	NA	NA	NA	NA
RADIUM-228	NA	NA	NA	NA	NA
THALLIUM-208	NA	NA	NA	NA	NA
THORIUM-232	NA	NA	NA	NA	NA
THORIUM-234	NA	NA	NA	NA	NA
URANIUM-235	NA	NA	NA	NA	NA
URANIUM-238	NA	NA	NA	NA	NA
METALS (%)					
URANIUM-235	0.722	0.781	0.723	0.741	0.754
METALS (mg/kg) [3]					
TECHNETIUM-99	NA	NA	NA	NA	NA
TOTAL URANIUM	1	0.95	0.93	1.3	1
URANIUM-233	0.0036 U	0.0033 U	0.0036 U	0.0034 U	0.0037
URANIUM-234	0.00071 U	0.00065 U	0.00071 U	0.00068 U	0.00074
URANIUM-235	0.0072 J	0.0074 J	0.0067 J	0.0097 J	0.0076
URANIUM-236	0.00095 U	0.00087 U	0.00095 U	0.0009 U	0.00099
URANIUM-238	0.99	0.94	0.92	1.3	1

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	218
SAMPLE ID	18-01
SAMPLE DATE	0610
SAMPLE CODE	mal
RADIONUCLIDES (pCi/g) [1]	
THORIUM-228	
THORIUM-230	J
THORIUM-232	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	
URANIUM-236	U
URANIUM-238	
RAD GAMMA (pCi/g) [2]	
ACTINIUM-227	
ACTINIUM-228	
BISMUTH-212	
BISMUTH-214	
LEAD-210	
LEAD-212	
LEAD-214	
POTASSIUM-40	
PROTACTINIUM-231	
RADIUM-226	
RADIUM-228	
THALLIUM-208	
THORIUM-232	
THORIUM-234	
URANIUM-235	
URANIUM-238	
METALS (%)	
URANIUM-235	
METALS (mg/kg) [3]	
TECHNETIUM-99	
TOTAL URANIUM	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	J
URANIUM-236	U
URANIUM-238	

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	SD-218	SD-218	SD-219	SD-219	SD-
SAMPLE ID	SD-218-02	SD-218-SS	SD-219-01	SD-219-02	SD-2
SAMPLE DATE	20140610	20140610	20140610	20140610	2014
SAMPLE CODE	Normal	Normal	Normal	Normal	Nor
RADIONUCLIDES (pCi/g) [1]					
THORIUM-228	1.53	0.925	1.09	1.04	1.15
THORIUM-230	0.746 J	0.755 J	0.781 J	0.608 J	1.17
THORIUM-232	1.18	0.928	0.886	0.926	1.05
URANIUM-233	1.17 U	1.48 U	0.659 U	0.848 U	0.898
URANIUM-234	0.37 U	0.583 U	1.44 U	0.604 U	1.19
URANIUM-235	0.0109	0.0134	0.0515	0.0182	0.0574
URANIUM-236	0.00068 U	0.00396 U	0.00139 U	0.00095 U	0.00121
URANIUM-238	0.228	0.278	1.07	0.384	1.2
RAD GAMMA (pCi/g) [2]					
ACTINIUM-227	NA	NA	NA	NA	NA
ACTINIUM-228	NA	NA	NA	NA	NA
BISMUTH-212	NA	NA	NA	NA	NA
BISMUTH-214	NA	NA	NA	NA	NA
LEAD-210	NA	NA	NA	NA	NA
LEAD-212	NA	NA	NA	NA	NA
LEAD-214	NA	NA	NA	NA	NA
POTASSIUM-40	NA	NA	NA	NA	NA
PROTACTINIUM-231	NA	NA	NA	NA	NA
RADIUM-226	NA	NA	NA	NA	NA
RADIUM-228	NA	NA	NA	NA	NA
THALLIUM-208	NA	NA	NA	NA	NA
THORIUM-232	NA	NA	NA	NA	NA
THORIUM-234	NA	NA	NA	NA	NA
URANIUM-235	NA	NA	NA	NA	NA
URANIUM-238	NA	NA	NA	NA	NA
METALS (%)					
URANIUM-235	0.73	0.741	0.744	0.758	0.744
METALS (mg/kg) [3]					
TECHNETIUM-99	NA	NA	NA	NA	NA
TOTAL URANIUM	0.69	0.84	3.2	1.1	3.6
URANIUM-233	0.0035 U	0.0033 U	0.0035 U	0.0036 U	0.0033
URANIUM-234	0.00069 U	0.00066 U	0.0007 U	0.00072 U	0.00065
URANIUM-235	0.005 J	0.0062 J	0.024	0.0084 J	0.027
URANIUM-236	0.00092 U	0.00088 U	0.00094 U	0.00096 U	0.00087
URANIUM-238	0.68	0.83	3.2	1.1	3.6

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	219
SAMPLE ID	19-03
SAMPLE DATE	0610
SAMPLE CODE	mal
RADIONUCLIDES (pCi/g) [1]	
THORIUM-228	
THORIUM-230	J
THORIUM-232	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	
URANIUM-236	U
URANIUM-238	
RAD GAMMA (pCi/g) [2]	
ACTINIUM-227	
ACTINIUM-228	
BISMUTH-212	
BISMUTH-214	
LEAD-210	
LEAD-212	
LEAD-214	
POTASSIUM-40	
PROTACTINIUM-231	
RADIUM-226	
RADIUM-228	
THALLIUM-208	
THORIUM-232	
THORIUM-234	
URANIUM-235	
URANIUM-238	
METALS (%)	
URANIUM-235	
METALS (mg/kg) [3]	
TECHNETIUM-99	
TOTAL URANIUM	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	
URANIUM-236	U
URANIUM-238	

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	SD-219	SD-220	SD-220	SD-220	SD-
SAMPLE ID	SD-219-SS	SD-220-01	SD-220-02	SD-220-SS	SD-2
SAMPLE DATE	20140610	20140610	20140610	20140610	2014
SAMPLE CODE	Normal	Normal	Normal	Normal	Nor
RADIONUCLIDES (pCi/g) [1]					
THORIUM-228	0.799	1.03	0.986	1.05	0.458
THORIUM-230	0.862 J	0.914 J	0.94 J	1.13 J	0.556
THORIUM-232	0.719	1.3	0.944	1.14	0.559
URANIUM-233	0.948 U	0.939 U	0.758 U	0.863 U	31.7
URANIUM-234	1.31 U	1.53 U	1.22 U	1.21 U	0.303
URANIUM-235	0.039	0.054	0.0429	0.0468	0.0122
URANIUM-236	0.00349 U	0.00187 U	0.00361 U	0.00211 U	0.00218
URANIUM-238	0.817	1.03	0.672	0.948	0.157
RAD GAMMA (pCi/g) [2]					
ACTINIUM-227	NA	NA	NA	NA	NA
ACTINIUM-228	NA	NA	NA	NA	NA
BISMUTH-212	NA	NA	NA	NA	NA
BISMUTH-214	NA	NA	NA	NA	NA
LEAD-210	NA	NA	NA	NA	NA
LEAD-212	NA	NA	NA	NA	NA
LEAD-214	NA	NA	NA	NA	NA
POTASSIUM-40	NA	NA	NA	NA	NA
PROTACTINIUM-231	NA	NA	NA	NA	NA
RADIUM-226	NA	NA	NA	NA	NA
RADIUM-228	NA	NA	NA	NA	NA
THALLIUM-208	NA	NA	NA	NA	NA
THORIUM-232	NA	NA	NA	NA	NA
THORIUM-234	NA	NA	NA	NA	NA
URANIUM-235	NA	NA	NA	NA	NA
URANIUM-238	NA	NA	NA	NA	NA
METALS (%)					
URANIUM-235	0.744	0.8	0.99	0.78	1.18
METALS (mg/kg) [3]					
TECHNETIUM-99	NA	NA	NA	NA	NA
TOTAL URANIUM	2.4	3.1	2	2.8	0.48
URANIUM-233	0.0031 U	0.0035 U	0.0032 U	0.0036 U	0.0033
URANIUM-234	0.00063 U	0.00071 U	0.00064 U	0.00072 U	0.00066
URANIUM-235	0.018	0.025	0.02	0.022	0.0056
URANIUM-236	0.00084 U	0.00095 U	0.00086 U	0.00096 U	0.00088
URANIUM-238	2.4	3.1	2	2.8	0.47

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	221
SAMPLE ID	21-01
SAMPLE DATE	0611
SAMPLE CODE	mal
RADIONUCLIDES (pCi/g) [1]	
THORIUM-228	
THORIUM-230	J
THORIUM-232	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	U
URANIUM-236	U
URANIUM-238	
RAD GAMMA (pCi/g) [2]	
ACTINIUM-227	
ACTINIUM-228	
BISMUTH-212	
BISMUTH-214	
LEAD-210	
LEAD-212	
LEAD-214	
POTASSIUM-40	
PROTACTINIUM-231	
RADIUM-226	
RADIUM-228	
THALLIUM-208	
THORIUM-232	
THORIUM-234	
URANIUM-235	
URANIUM-238	
METALS (%)	
URANIUM-235	
METALS (mg/kg) [3]	
TECHNETIUM-99	
TOTAL URANIUM	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	U
URANIUM-236	U
URANIUM-238	

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	SD-221	SD-221	SD-222	SD-222	SD-
SAMPLE ID	SD-221-02	SD-221-SS	SD-222-01	SD-222-02	SD-2
SAMPLE DATE	20140611	20140611	20140612	20140612	2014
SAMPLE CODE	Normal	Normal	Normal	Normal	Nor
RADIONUCLIDES (pCi/g) [1]					
THORIUM-228	0.697	0.446	0.639	0.421	0.767
THORIUM-230	0.687 J	0.434 J	0.689 J	0.436 J	0.495
THORIUM-232	0.677	0.407	0.487	0.338	0.647
URANIUM-233	32.2 U	35.9 U	34.9 U	31.9 U	35.7
URANIUM-234	4.16 U	0.591 U	0.631 U	0.39 U	0.206
URANIUM-235	0.00777 U	0.0165 J	0.0147	0.00933 U	0.00749
URANIUM-236	0.0577 U	0.00135 U	0.00037 U	0.0571 U	0.0639
URANIUM-238	0.188	0.228	0.324	0.206	0.174
RAD GAMMA (pCi/g) [2]					
ACTINIUM-227	NA	NA	NA	NA	NA
ACTINIUM-228	NA	NA	NA	NA	NA
BISMUTH-212	NA	NA	NA	NA	NA
BISMUTH-214	NA	NA	NA	NA	NA
LEAD-210	NA	NA	NA	NA	NA
LEAD-212	NA	NA	NA	NA	NA
LEAD-214	NA	NA	NA	NA	NA
POTASSIUM-40	NA	NA	NA	NA	NA
PROTACTINIUM-231	NA	NA	NA	NA	NA
RADIUM-226	NA	NA	NA	NA	NA
RADIUM-228	NA	NA	NA	NA	NA
THALLIUM-208	NA	NA	NA	NA	NA
THORIUM-232	NA	NA	NA	NA	NA
THORIUM-234	NA	NA	NA	NA	NA
URANIUM-235	NA	NA	NA	NA	NA
URANIUM-238	NA	NA	NA	NA	NA
METALS (%)					
URANIUM-235	0	1.11	0.703	0	0
METALS (mg/kg) [3]					
TECHNETIUM-99	NA	NA	NA	NA	NA
TOTAL URANIUM	0.56	0.69	0.97	0.61	0.52
URANIUM-233	0.0033 U	0.0037 U	0.0036 U	0.0033 U	0.0037
URANIUM-234	0.00067 U	0.00075 U	0.00072 U	0.00066 U	0.00074
URANIUM-235	0.0045 U	0.0076 J	0.0068 J	0.0045 U	0.005
URANIUM-236	0.00089 U	0.00099 U	0.00097 U	0.00088 U	0.00099
URANIUM-238	0.56	0.68	0.96	0.61	0.52

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	**222**
SAMPLE ID	**22-03**
SAMPLE DATE	**0612**
SAMPLE CODE	**mal**
RADIONUCLIDES (pCi/g) [1]	
THORIUM-228	
THORIUM-230	J
THORIUM-232	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	U
URANIUM-236	U
URANIUM-238	
RAD GAMMA (pCi/g) [2]	
ACTINIUM-227	
ACTINIUM-228	
BISMUTH-212	
BISMUTH-214	
LEAD-210	
LEAD-212	
LEAD-214	
POTASSIUM-40	
PROTACTINIUM-231	
RADIUM-226	
RADIUM-228	
THALLIUM-208	
THORIUM-232	
THORIUM-234	
URANIUM-235	
URANIUM-238	
METALS (%)	
URANIUM-235	
METALS (mg/kg) [3]	
TECHNETIUM-99	
TOTAL URANIUM	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	U
URANIUM-236	U
URANIUM-238	

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	SD-222	SD-223	SD-223	SD-223	SD-
SAMPLE ID	SD-222-SS	SD-223-01	SD-223-02	SD-223-SS	SD-2
SAMPLE DATE	20140612	20140613	20140613	20140613	2014
SAMPLE CODE	Normal	Normal	Normal	Normal	Nor
RADIONUCLIDES (pCi/g) [1]					
THORIUM-228	0.297	1.17	1.54	1.27	1.22
THORIUM-230	0.429 J	0.744 J	1.04 J	1.28	1
THORIUM-232	0.363	1.24	1.36	1.14	1.43
URANIUM-233	34.8 U	33.8 U	31.9 U	32.7 U	33.7
URANIUM-234	0.348 U	1.33 U	0.443 U	1.57 U	1.33
URANIUM-235	0.0068 U	0.0567	0.0148	0.0526	0.056
URANIUM-236	0.0624 U	0.0606 U	0.0572 U	0.0586 U	0.0604
URANIUM-238	0.156	1.21	0.334	1.07	1.2
RAD GAMMA (pCi/g) [2]					
ACTINIUM-227	NA	NA	NA	NA	NA
ACTINIUM-228	NA	NA	NA	NA	NA
BISMUTH-212	NA	NA	NA	NA	NA
BISMUTH-214	NA	NA	NA	NA	NA
LEAD-210	NA	NA	NA	NA	NA
LEAD-212	NA	NA	NA	NA	NA
LEAD-214	NA	NA	NA	NA	NA
POTASSIUM-40	NA	NA	NA	NA	NA
PROTACTINIUM-231	NA	NA	NA	NA	NA
RADIUM-226	NA	NA	NA	NA	NA
RADIUM-228	NA	NA	NA	NA	NA
THALLIUM-208	NA	NA	NA	NA	NA
THORIUM-232	NA	NA	NA	NA	NA
THORIUM-234	NA	NA	NA	NA	NA
URANIUM-235	NA	NA	NA	NA	NA
URANIUM-238	NA	NA	NA	NA	NA
METALS (%)					
URANIUM-235	0	0.717	0.682	0.744	0.717
METALS (mg/kg) [3]					
TECHNETIUM-99	NA	NA	NA	NA	NA
TOTAL URANIUM	0.47	3.6	1	3.2	3.6
URANIUM-233	0.0036 U	0.0035 U	0.0033 U	0.0034 U	0.0035
URANIUM-234	0.00072 U	0.0007 U	0.00066 U	0.00068 U	0.0007
URANIUM-235	0.0049 U	0.026	0.0068 J	0.024	0.026
URANIUM-236	0.00096 U	0.00094 U	0.00088 U	0.00091 U	0.00093
URANIUM-238	0.47	3.6	0.99	3.2	3.6

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	224
SAMPLE ID	24-01
SAMPLE DATE	0613
SAMPLE CODE	mal
RADIONUCLIDES (pCi/g) [1]	
THORIUM-228	
THORIUM-230	J
THORIUM-232	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	
URANIUM-236	U
URANIUM-238	
RAD GAMMA (pCi/g) [2]	
ACTINIUM-227	
ACTINIUM-228	
BISMUTH-212	
BISMUTH-214	
LEAD-210	
LEAD-212	
LEAD-214	
POTASSIUM-40	
PROTACTINIUM-231	
RADIUM-226	
RADIUM-228	
THALLIUM-208	
THORIUM-232	
THORIUM-234	
URANIUM-235	
URANIUM-238	
METALS (%)	
URANIUM-235	
METALS (mg/kg) [3]	
TECHNETIUM-99	
TOTAL URANIUM	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	
URANIUM-236	U
URANIUM-238	

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	SD-224	SD-224	SD-224	SD-225	SD-
SAMPLE ID	SD-224-02	SD-224-03	SD-224-SS	SD-225-01	SD-2
SAMPLE DATE	20140613	20140613	20140613	20140613	2014
SAMPLE CODE	Normal	Normal	Normal	Normal	Nor
RADIONUCLIDES (pCi/g) [1]					
THORIUM-228	0.8	NA	1.01	1.32	0.904
THORIUM-230	0.817 J	NA	1 J	1.35	0.952
THORIUM-232	0.777	NA	1.35	1.33	0.906
URANIUM-233	32 U	NA	34.2 U	32 U	31.3
URANIUM-234	1.12 U	NA	1.05 U	1.34 U	1.1
URANIUM-235	0.0419	NA	0.0356	0.0529	0.0397
URANIUM-236	0.0573 U	NA	0.0614 U	0.0573 U	0.0561
URANIUM-238	0.898	NA	0.78	1.11	0.86
RAD GAMMA (pCi/g) [2]					
ACTINIUM-227	NA	NA	NA	NA	NA
ACTINIUM-228	NA	NA	NA	NA	NA
BISMUTH-212	NA	NA	NA	NA	NA
BISMUTH-214	NA	NA	NA	NA	NA
LEAD-210	NA	NA	NA	NA	NA
LEAD-212	NA	NA	NA	NA	NA
LEAD-214	NA	NA	NA	NA	NA
POTASSIUM-40	NA	NA	NA	NA	NA
PROTACTINIUM-231	NA	NA	NA	NA	NA
RADIUM-226	NA	NA	NA	NA	NA
RADIUM-228	NA	NA	NA	NA	NA
THALLIUM-208	NA	NA	NA	NA	NA
THORIUM-232	NA	NA	NA	NA	NA
THORIUM-234	NA	NA	NA	NA	NA
URANIUM-235	NA	NA	NA	NA	NA
URANIUM-238	NA	NA	NA	NA	NA
METALS (%)					
URANIUM-235	0.699	NA	0.691	0.722	0.688
METALS (mg/kg) [3]					
TECHNETIUM-99	NA	NA	NA	NA	NA
TOTAL URANIUM	2.7	NA	2.3	3.3	2.6
URANIUM-233	0.0033 U	NA	0.0036 U	0.0033 U	0.0033
URANIUM-234	0.00066 U	NA	0.00071 U	0.00066 U	0.00065
URANIUM-235	0.019	NA	0.016	0.024	0.018
URANIUM-236	0.00088 U	NA	0.00095 U	0.00088 U	0.00087
URANIUM-238	2.7	NA	2.3	3.3	2.6

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	**225**
SAMPLE ID	**25-02**
SAMPLE DATE	**0613**
SAMPLE CODE	**mal**
RADIONUCLIDES (pCi/g) [1]	
THORIUM-228	
THORIUM-230	
THORIUM-232	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	
URANIUM-236	U
URANIUM-238	
RAD GAMMA (pCi/g) [2]	
ACTINIUM-227	
ACTINIUM-228	
BISMUTH-212	
BISMUTH-214	
LEAD-210	
LEAD-212	
LEAD-214	
POTASSIUM-40	
PROTACTINIUM-231	
RADIUM-226	
RADIUM-228	
THALLIUM-208	
THORIUM-232	
THORIUM-234	
URANIUM-235	
URANIUM-238	
METALS (%)	
URANIUM-235	
METALS (mg/kg) [3]	
TECHNETIUM-99	
TOTAL URANIUM	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	
URANIUM-236	U
URANIUM-238	

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	SD-225	SD-225	SD-226	SD-226	SD-
SAMPLE ID	SD-225-03	SD-225-SS	SD-226-01	SD-226-02	SD-2
SAMPLE DATE	20140613	20140613	20140613	20140613	2014
SAMPLE CODE	Normal	Normal	Normal	Normal	Nor
RADIONUCLIDES (pCi/g) [1]					
THORIUM-228	NA	1.34	1.21	1.23	NA
THORIUM-230	NA	1.45	0.979 J	1.03	NA
THORIUM-232	NA	1.39	1.36	1.05	NA
URANIUM-233	NA	35 U	34.7 U	32.5 U	NA
URANIUM-234	NA	1.45 U	1.67 U	0.853 U	NA
URANIUM-235	NA	0.0577	0.0597	0.0342	NA
URANIUM-236	NA	0.0627 U	0.0622 U	0.0582 U	NA
URANIUM-238	NA	1.21	1.25	0.725	NA
RAD GAMMA (pCi/g) [2]					
ACTINIUM-227	NA	NA	NA	NA	NA
ACTINIUM-228	NA	NA	NA	NA	NA
BISMUTH-212	NA	NA	NA	NA	NA
BISMUTH-214	NA	NA	NA	NA	NA
LEAD-210	NA	NA	NA	NA	NA
LEAD-212	NA	NA	NA	NA	NA
LEAD-214	NA	NA	NA	NA	NA
POTASSIUM-40	NA	NA	NA	NA	NA
PROTACTINIUM-231	NA	NA	NA	NA	NA
RADIUM-226	NA	NA	NA	NA	NA
RADIUM-228	NA	NA	NA	NA	NA
THALLIUM-208	NA	NA	NA	NA	NA
THORIUM-232	NA	NA	NA	NA	NA
THORIUM-234	NA	NA	NA	NA	NA
URANIUM-235	NA	NA	NA	NA	NA
URANIUM-238	NA	NA	NA	NA	NA
METALS (%)					
URANIUM-235	NA	0.744	0.751	0.722	NA
METALS (mg/kg) [3]					
TECHNETIUM-99	NA	NA	NA	NA	NA
TOTAL URANIUM	NA	3.6	3.7	2.2	NA
URANIUM-233	NA	0.0036 U	0.0036 U	0.0034 U	NA
URANIUM-234	NA	0.00073 U	0.00072 U	0.00067 U	NA
URANIUM-235	NA	0.027	0.028	0.016	NA
URANIUM-236	NA	0.00097 U	0.00096 U	0.0009 U	NA
URANIUM-238	NA	3.6	3.7	2.2	NA

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	**226**
SAMPLE ID	**26-03**
SAMPLE DATE	**0613**
SAMPLE CODE	**mal**
RADIONUCLIDES (pCi/g) [1]	
THORIUM-228	
THORIUM-230	
THORIUM-232	
URANIUM-233	
URANIUM-234	
URANIUM-235	
URANIUM-236	
URANIUM-238	
RAD GAMMA (pCi/g) [2]	
ACTINIUM-227	
ACTINIUM-228	
BISMUTH-212	
BISMUTH-214	
LEAD-210	
LEAD-212	
LEAD-214	
POTASSIUM-40	
PROTACTINIUM-231	
RADIUM-226	
RADIUM-228	
THALLIUM-208	
THORIUM-232	
THORIUM-234	
URANIUM-235	
URANIUM-238	
METALS (%)	
URANIUM-235	
METALS (mg/kg) [3]	
TECHNETIUM-99	
TOTAL URANIUM	
URANIUM-233	
URANIUM-234	
URANIUM-235	
URANIUM-236	
URANIUM-238	

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	SD-226	SD-227	SD-227	SD-227	SD-
SAMPLE ID	SD-226-SS	SD-227-01	SD-227-02	SD-227-SS	SD-2
SAMPLE DATE	20140613	20140613	20140613	20140613	2014
SAMPLE CODE	Normal	Normal	Normal	Normal	Nor
RADIONUCLIDES (pCi/g) [1]					
THORIUM-228	1.01	1.54	0.895	1.31	1.29
THORIUM-230	1.15 J	1.35	0.753	0.978	1.4
THORIUM-232	1.28	1.27	0.963	1.39	1.36
URANIUM-233	34.8 U	31.2 U	31.8 U	35 U	33.6
URANIUM-234	1.51 U	1.21 U	1.33 U	1.55 U	6.47
URANIUM-235	0.0631	0.053	0.0543	0.0649	0.206
URANIUM-236	0.0624 U	0.0558 U	0.0569 U	0.0628 U	0.00787
URANIUM-238	1.34	1.11	1.15	1.37	1.47
RAD GAMMA (pCi/g) [2]					
ACTINIUM-227	NA	NA	NA	NA	NA
ACTINIUM-228	NA	NA	NA	NA	NA
BISMUTH-212	NA	NA	NA	NA	NA
BISMUTH-214	NA	NA	NA	NA	NA
LEAD-210	NA	NA	NA	NA	NA
LEAD-212	NA	NA	NA	NA	NA
LEAD-214	NA	NA	NA	NA	NA
POTASSIUM-40	NA	NA	NA	NA	NA
PROTACTINIUM-231	NA	NA	NA	NA	NA
RADIUM-226	NA	NA	NA	NA	NA
RADIUM-228	NA	NA	NA	NA	NA
THALLIUM-208	NA	NA	NA	NA	NA
THORIUM-232	NA	NA	NA	NA	NA
THORIUM-234	NA	NA	NA	NA	NA
URANIUM-235	NA	NA	NA	NA	NA
URANIUM-238	NA	NA	NA	NA	NA
METALS (%)					
URANIUM-235	0.72	0.752	0.73	0.726	2.11
METALS (mg/kg) [3]					
TECHNETIUM-99	NA	NA	NA	NA	0.000017
TOTAL URANIUM	4	3.3	3.4	4.1	4.5
URANIUM-233	0.0036 U	0.0032 U	0.0033 U	0.0036 U	0.0035
URANIUM-234	0.00072 U	0.00065 U	0.00066 U	0.00073 U	0.001
URANIUM-235	0.029	0.025	0.025	0.03	0.095
URANIUM-236	0.00096 U	0.00086 U	0.00088 U	0.00097 U	0.00093
URANIUM-238	4	3.3	3.4	4.1	4.4

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

LOCATION	228
SAMPLE ID	28-01
SAMPLE DATE	0613
SAMPLE CODE	mal
RADIONUCLIDES (pCi/g) [1]	
THORIUM-228	
THORIUM-230	
THORIUM-232	
URANIUM-233	U
URANIUM-234	
URANIUM-235	
URANIUM-236	U
URANIUM-238	
RAD GAMMA (pCi/g) [2]	
ACTINIUM-227	
ACTINIUM-228	
BISMUTH-212	
BISMUTH-214	
LEAD-210	
LEAD-212	
LEAD-214	
POTASSIUM-40	
PROTACTINIUM-231	
RADIUM-226	
RADIUM-228	
THALLIUM-208	
THORIUM-232	
THORIUM-234	
URANIUM-235	
URANIUM-238	
METALS (%)	
URANIUM-235	
METALS (mg/kg) [3]	
TECHNETIUM-99	U
TOTAL URANIUM	
URANIUM-233	U
URANIUM-234	J
URANIUM-235	
URANIUM-236	U
URANIUM-238	

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	SD-228	SD-228	SD-228	SD-229	SD-
SAMPLE ID	SD-228-02	SD-228-03	SD-228-SS	SD-229-01	SD-2
SAMPLE DATE	20140613	20140613	20140613	20140616	2014
SAMPLE CODE	Normal	Normal	Normal	Normal	Nor
RADIONUCLIDES (pCi/g) [1]					
THORIUM-228	1.06	NA	1.32	0.964	0.842
THORIUM-230	0.797	NA	1.08	0.683	1.02
THORIUM-232	1.12	NA	1.4	1.04	0.837
URANIUM-233	33.7 U	NA	31.4 U	33.5 U	30.5
URANIUM-234	0.82 U	NA	1.64 U	0.435 U	0.179
URANIUM-235	0.0407	NA	0.0623	0.0137	0.0107
URANIUM-236	0.0603 U	NA	0.0563 U	0.06 U	0.0547
URANIUM-238	0.829	NA	1.32	0.296	0.237
RAD GAMMA (pCi/g) [2]					
ACTINIUM-227	NA	NA	NA	NA	NA
ACTINIUM-228	NA	NA	NA	NA	NA
BISMUTH-212	NA	NA	NA	NA	NA
BISMUTH-214	NA	NA	NA	NA	NA
LEAD-210	NA	NA	NA	NA	NA
LEAD-212	NA	NA	NA	NA	NA
LEAD-214	NA	NA	NA	NA	NA
POTASSIUM-40	NA	NA	NA	NA	NA
PROTACTINIUM-231	NA	NA	NA	NA	NA
RADIUM-226	NA	NA	NA	NA	NA
RADIUM-228	NA	NA	NA	NA	NA
THALLIUM-208	NA	NA	NA	NA	NA
THORIUM-232	NA	NA	NA	NA	NA
THORIUM-234	NA	NA	NA	NA	NA
URANIUM-235	NA	NA	NA	NA	NA
URANIUM-238	NA	NA	NA	NA	NA
METALS (%)					
URANIUM-235	0.754	NA	0.738	0.711	0.699
METALS (mg/kg) [3]					
TECHNETIUM-99	NA	NA	NA	NA	NA
TOTAL URANIUM	2.5	NA	3.9	0.89	0.72
URANIUM-233	0.0035 U	NA	0.0033 U	0.0035 U	0.0032
URANIUM-234	0.0007 U	NA	0.00065 U	0.00069 U	0.00063
URANIUM-235	0.019	NA	0.029	0.0063 J	0.005
URANIUM-236	0.00093 U	NA	0.00087 U	0.00093 U	0.00084
URANIUM-238	2.5	NA	3.9	0.88	0.71

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	229
SAMPLE ID	29-SS
SAMPLE DATE	0616
SAMPLE CODE	mal
RADIONUCLIDES (pCi/g) [1]	
THORIUM-228	
THORIUM-230	
THORIUM-232	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	
URANIUM-236	U
URANIUM-238	
RAD GAMMA (pCi/g) [2]	
ACTINIUM-227	
ACTINIUM-228	
BISMUTH-212	
BISMUTH-214	
LEAD-210	
LEAD-212	
LEAD-214	
POTASSIUM-40	
PROTACTINIUM-231	
RADIUM-226	
RADIUM-228	
THALLIUM-208	
THORIUM-232	
THORIUM-234	
URANIUM-235	
URANIUM-238	
METALS (%)	
URANIUM-235	
METALS (mg/kg) [3]	
TECHNETIUM-99	
TOTAL URANIUM	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	J
URANIUM-236	U
URANIUM-238	

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	SD-230	SD-230	SD-230	SD-230	SD-
SAMPLE ID	SD-230-01	SD-230-02	SD-230-03	SD-230-SS	SD-2
SAMPLE DATE	20140616	20140616	20140616	20140616	2014
SAMPLE CODE	Normal	Normal	Normal	Normal	Nor
RADIONUCLIDES (pCi/g) [1]					
THORIUM-228	0.535	0.733	NA	0.547	0.931
THORIUM-230	0.706	0.673	NA	0.638	1.23
THORIUM-232	0.522	0.583	NA	0.57	1.19
URANIUM-233	35.8 U	35.5 U	NA	34.8 U	31.5
URANIUM-234	0.37 U	0.473 U	NA	0.261 U	0.702
URANIUM-235	0.0114	0.016	NA	0.0116	0.0296
URANIUM-236	0.0642 U	0.0636 U	NA	0.0624 U	0.0564
URANIUM-238	0.246	0.336	NA	0.255	0.595
RAD GAMMA (pCi/g) [2]					
ACTINIUM-227	NA	NA	NA	NA	NA
ACTINIUM-228	NA	NA	NA	NA	NA
BISMUTH-212	NA	NA	NA	NA	NA
BISMUTH-214	NA	NA	NA	NA	NA
LEAD-210	NA	NA	NA	NA	NA
LEAD-212	NA	NA	NA	NA	NA
LEAD-214	NA	NA	NA	NA	NA
POTASSIUM-40	NA	NA	NA	NA	NA
PROTACTINIUM-231	NA	NA	NA	NA	NA
RADIUM-226	NA	NA	NA	NA	NA
RADIUM-228	NA	NA	NA	NA	NA
THALLIUM-208	NA	NA	NA	NA	NA
THORIUM-232	NA	NA	NA	NA	NA
THORIUM-234	NA	NA	NA	NA	NA
URANIUM-235	NA	NA	NA	NA	NA
URANIUM-238	NA	NA	NA	NA	NA
METALS (%)					
URANIUM-235	0.721	0.735	NA	0.706	0.772
METALS (mg/kg) [3]					
TECHNETIUM-99	NA	NA	NA	NA	NA
TOTAL URANIUM	0.74	1	NA	0.77	1.8
URANIUM-233	0.0037 U	0.0037 U	NA	0.0036 U	0.0033
URANIUM-234	0.00074 U	0.00074 U	NA	0.00072 U	0.00065
URANIUM-235	0.0053 J	0.0074 J	NA	0.0054 J	0.014
URANIUM-236	0.00099 U	0.00098 U	NA	0.00096 U	0.00087
URANIUM-238	0.73	1	NA	0.76	1.8

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	231
SAMPLE ID	31-01
SAMPLE DATE	0616
SAMPLE CODE	mal
RADIONUCLIDES (pCi/g) [1]	
THORIUM-228	
THORIUM-230	
THORIUM-232	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	
URANIUM-236	U
URANIUM-238	
RAD GAMMA (pCi/g) [2]	
ACTINIUM-227	
ACTINIUM-228	
BISMUTH-212	
BISMUTH-214	
LEAD-210	
LEAD-212	
LEAD-214	
POTASSIUM-40	
PROTACTINIUM-231	
RADIUM-226	
RADIUM-228	
THALLIUM-208	
THORIUM-232	
THORIUM-234	
URANIUM-235	
URANIUM-238	
METALS (%)	
URANIUM-235	
METALS (mg/kg) [3]	
TECHNETIUM-99	
TOTAL URANIUM	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	
URANIUM-236	U
URANIUM-238	

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	SD-231	SD-231	SD-232	SD-232	SD-
SAMPLE ID	SD-231-02	SD-231-SS	SD-232-01	SD-232-02	SD-23
SAMPLE DATE	20140616	20140616	20140616	20140616	2014
SAMPLE CODE	Normal	Normal	Normal	Normal	Nor
RADIONUCLIDES (pCi/g) [1]					
THORIUM-228	0.878	0.639	1.38	1.2	1.21
THORIUM-230	0.889	0.857	1.22	1.21	1.3
THORIUM-232	1.06	0.774	1.37	1.11	1.21
URANIUM-233	35 U	33 U	34.5 U	35.3 U	32.5
URANIUM-234	0.878 U	0.69 U	0.938 U	0.629 U	0.833
URANIUM-235	0.0284	0.0238	0.0331	0.0217	0.0293
URANIUM-236	0.0628 U	0.0591 U	0.0618 U	0.0633 U	0.0582
URANIUM-238	0.55	0.512	0.696	0.456	0.624
RAD GAMMA (pCi/g) [2]					
ACTINIUM-227	NA	NA	NA	NA	NA
ACTINIUM-228	NA	NA	NA	NA	NA
BISMUTH-212	NA	NA	NA	NA	NA
BISMUTH-214	NA	NA	NA	NA	NA
LEAD-210	NA	NA	NA	NA	NA
LEAD-212	NA	NA	NA	NA	NA
LEAD-214	NA	NA	NA	NA	NA
POTASSIUM-40	NA	NA	NA	NA	NA
PROTACTINIUM-231	NA	NA	NA	NA	NA
RADIUM-226	NA	NA	NA	NA	NA
RADIUM-228	NA	NA	NA	NA	NA
THALLIUM-208	NA	NA	NA	NA	NA
THORIUM-232	NA	NA	NA	NA	NA
THORIUM-234	NA	NA	NA	NA	NA
URANIUM-235	NA	NA	NA	NA	NA
URANIUM-238	NA	NA	NA	NA	NA
METALS (%)					
URANIUM-235	0.806	0.728	0.709	0.709	0.731
METALS (mg/kg) [3]					
TECHNETIUM-99	NA	NA	NA	NA	NA
TOTAL URANIUM	1.6	1.5	2.1	1.4	1.9
URANIUM-233	0.0036 U	0.0034 U	0.0036 U	0.0037 U	0.0034
URANIUM-234	0.00073 U	0.00068 U	0.00072 U	0.00073 U	0.00067
URANIUM-235	0.013	0.011	0.015	0.01 J	0.014
URANIUM-236	0.00097 U	0.00091 U	0.00095 U	0.00098 U	0.0009
URANIUM-238	1.6	1.5	2.1	1.4	1.9

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	232
SAMPLE ID	32-SS
SAMPLE DATE	0616
SAMPLE CODE	mal
RADIONUCLIDES (pCi/g) [1]	
THORIUM-228	
THORIUM-230	
THORIUM-232	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	
URANIUM-236	U
URANIUM-238	
RAD GAMMA (pCi/g) [2]	
ACTINIUM-227	
ACTINIUM-228	
BISMUTH-212	
BISMUTH-214	
LEAD-210	
LEAD-212	
LEAD-214	
POTASSIUM-40	
PROTACTINIUM-231	
RADIUM-226	
RADIUM-228	
THALLIUM-208	
THORIUM-232	
THORIUM-234	
URANIUM-235	
URANIUM-238	
METALS (%)	
URANIUM-235	
METALS (mg/kg) [3]	
TECHNETIUM-99	
TOTAL URANIUM	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	
URANIUM-236	U
URANIUM-238	

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	SD-233	SD-233	SD-233	SD-234	SD-
SAMPLE ID	SD-233-01	SD-233-02	SD-233-SS	SD-234-01	SD-23
SAMPLE DATE	20140616	20140616	20140616	20140613	2014
SAMPLE CODE	Normal	Normal	Normal	Normal	Nor
RADIONUCLIDES (pCi/g) [1]					
THORIUM-228	0.967	1.19	1.06	1.05	0.765
THORIUM-230	0.971	1.11	1.06	0.685	0.835
THORIUM-232	1.38	1.25	1.24	0.928	0.778
URANIUM-233	34 U	33.2 U	33.1 U	33.6 U	35
URANIUM-234	0.917 U	0.671 U	0.918 U	0.379 U	0.862
URANIUM-235	0.0319	0.0283	0.0319	0.0127	0.04
URANIUM-236	0.061 U	0.0594 U	0.0593 U	0.0602 U	0.0628
URANIUM-238	0.67	0.538	0.671	0.295	0.772
RAD GAMMA (pCi/g) [2]					
ACTINIUM-227	NA	NA	NA	NA	NA
ACTINIUM-228	NA	NA	NA	NA	NA
BISMUTH-212	NA	NA	NA	NA	NA
BISMUTH-214	NA	NA	NA	NA	NA
LEAD-210	NA	NA	NA	NA	NA
LEAD-212	NA	NA	NA	NA	NA
LEAD-214	NA	NA	NA	NA	NA
POTASSIUM-40	NA	NA	NA	NA	NA
PROTACTINIUM-231	NA	NA	NA	NA	NA
RADIUM-226	NA	NA	NA	NA	NA
RADIUM-228	NA	NA	NA	NA	NA
THALLIUM-208	NA	NA	NA	NA	NA
THORIUM-232	NA	NA	NA	NA	NA
THORIUM-234	NA	NA	NA	NA	NA
URANIUM-235	NA	NA	NA	NA	NA
URANIUM-238	NA	NA	NA	NA	NA
METALS (%)					
URANIUM-235	0.744	0.806	0.744	0.666	0.777
METALS (mg/kg) [3]					
TECHNETIUM-99	NA	NA	NA	NA	NA
TOTAL URANIUM	2	1.6	2	0.89	2.3
URANIUM-233	0.0035 U	0.0034 U	0.0034 U	0.0035 U	0.0036
URANIUM-234	0.00071 U	0.00069 U	0.00069 U	0.0007 U	0.00073
URANIUM-235	0.015	0.013	0.015	0.0059 J	0.018
URANIUM-236	0.00094 U	0.00092 U	0.00092 U	0.00093 U	0.00097
URANIUM-238	2	1.6	2	0.88	2.3

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	234
SAMPLE ID	34-SS
SAMPLE DATE	0613
SAMPLE CODE	mal
RADIONUCLIDES (pCi/g) [1]	
THORIUM-228	
THORIUM-230	
THORIUM-232	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	
URANIUM-236	U
URANIUM-238	
RAD GAMMA (pCi/g) [2]	
ACTINIUM-227	
ACTINIUM-228	
BISMUTH-212	
BISMUTH-214	
LEAD-210	
LEAD-212	
LEAD-214	
POTASSIUM-40	
PROTACTINIUM-231	
RADIUM-226	
RADIUM-228	
THALLIUM-208	
THORIUM-232	
THORIUM-234	
URANIUM-235	
URANIUM-238	
METALS (%)	
URANIUM-235	
METALS (mg/kg) [3]	
TECHNETIUM-99	
TOTAL URANIUM	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	
URANIUM-236	U
URANIUM-238	

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	SD-235	SD-235	SD-235	SD-236	SD-
SAMPLE ID	SD-235-01	SD-235-02	SD-235-SS	SD-236-01	SD-2
SAMPLE DATE	20140613	20140613	20140613	20140613	2014
SAMPLE CODE	Normal	Normal	Normal	Normal	Nor
RADIONUCLIDES (pCi/g) [1]					
THORIUM-228	1.16	1.08	0.913	0.562	0.555
THORIUM-230	0.894	1.04	0.729	0.447	0.582
THORIUM-232	1.32	1.12	0.904	0.389	0.658
URANIUM-233	33.8 U	34.5 U	31.1 U	31.5 U	34.5
URANIUM-234	1.61 U	2.45 U	1.2 U	0.276 U	0.353
URANIUM-235	0.0602	0.0873	0.0457	0.00893 U	0.0116
URANIUM-236	0.0605 U	0.00074 U	0.0557 U	0.0564 U	0.0617
URANIUM-238	1.12	1.27	0.818	0.208	0.281
RAD GAMMA (pCi/g) [2]					
ACTINIUM-227	NA	NA	NA	NA	NA
ACTINIUM-228	NA	NA	NA	NA	NA
BISMUTH-212	NA	NA	NA	NA	NA
BISMUTH-214	NA	NA	NA	NA	NA
LEAD-210	NA	NA	NA	NA	NA
LEAD-212	NA	NA	NA	NA	NA
LEAD-214	NA	NA	NA	NA	NA
POTASSIUM-40	NA	NA	NA	NA	NA
PROTACTINIUM-231	NA	NA	NA	NA	NA
RADIUM-226	NA	NA	NA	NA	NA
RADIUM-228	NA	NA	NA	NA	NA
THALLIUM-208	NA	NA	NA	NA	NA
THORIUM-232	NA	NA	NA	NA	NA
THORIUM-234	NA	NA	NA	NA	NA
URANIUM-235	NA	NA	NA	NA	NA
URANIUM-238	NA	NA	NA	NA	NA
METALS (%)					
URANIUM-235	0.841	1.04	0.867	0	0.639
METALS (mg/kg) [3]					
TECHNETIUM-99	NA	NA	NA	NA	NA
TOTAL URANIUM	3.3	3.8	2.4	0.62	0.85
URANIUM-233	0.0035 U	0.0036 U	0.0032 U	0.0033 U	0.0036
URANIUM-234	0.0007 U	0.00072 U	0.00064 U	0.00065 U	0.00072
URANIUM-235	0.028	0.04	0.021	0.0044 U	0.0054
URANIUM-236	0.00093 U	0.00095 U	0.00086 U	0.00087 U	0.00095
URANIUM-238	3.3	3.8	2.4	0.62	0.84

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	236
SAMPLE ID	36-02
SAMPLE DATE	0613
SAMPLE CODE	mal
RADIONUCLIDES (pCi/g) [1]	
THORIUM-228	
THORIUM-230	
THORIUM-232	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	
URANIUM-236	U
URANIUM-238	
RAD GAMMA (pCi/g) [2]	
ACTINIUM-227	
ACTINIUM-228	
BISMUTH-212	
BISMUTH-214	
LEAD-210	
LEAD-212	
LEAD-214	
POTASSIUM-40	
PROTACTINIUM-231	
RADIUM-226	
RADIUM-228	
THALLIUM-208	
THORIUM-232	
THORIUM-234	
URANIUM-235	
URANIUM-238	
METALS (%)	
URANIUM-235	
METALS (mg/kg) [3]	
TECHNETIUM-99	
TOTAL URANIUM	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	J
URANIUM-236	U
URANIUM-238	

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	SD-236	SD-237	SD-237	SD-237	SD-
SAMPLE ID	SD-236-SS	SD-237-01	SD-237-02	SD-237-02-AVG	SD-23
SAMPLE DATE	20140613	20140613	20140613	20140613	2014
SAMPLE CODE	Normal	Normal	ORIG	Avg	DU
RADIONUCLIDES (pCi/g) [1]					
THORIUM-228	0.335	1.55	1.27	1.205	1.14
THORIUM-230	0.271	1.11	0.986	1.048	1.11
THORIUM-232	0.208	1.51	1.39	1.265	1.14
URANIUM-233	33.6 U	36 U	32.7 U	33.8 U	34.9
URANIUM-234	0.168 U	1.36 U	3.47 U	2.955 U	2.44
URANIUM-235	0.003 U	0.054	0.123	0.1093	0.0956
URANIUM-236	0.0602 U	0.0646 U	0.00252 U	0.03256 U	0.0626
URANIUM-238	0.0929	1.05	1.29	1.33	1.37
RAD GAMMA (pCi/g) [2]					
ACTINIUM-227	NA	NA	NA	NA	NA
ACTINIUM-228	NA	NA	NA	NA	NA
BISMUTH-212	NA	NA	NA	NA	NA
BISMUTH-214	NA	NA	NA	NA	NA
LEAD-210	NA	NA	NA	NA	NA
LEAD-212	NA	NA	NA	NA	NA
LEAD-214	NA	NA	NA	NA	NA
POTASSIUM-40	NA	NA	NA	NA	NA
PROTACTINIUM-231	NA	NA	NA	NA	NA
RADIUM-226	NA	NA	NA	NA	NA
RADIUM-228	NA	NA	NA	NA	NA
THALLIUM-208	NA	NA	NA	NA	NA
THORIUM-232	NA	NA	NA	NA	NA
THORIUM-234	NA	NA	NA	NA	NA
URANIUM-235	NA	NA	NA	NA	NA
URANIUM-238	NA	NA	NA	NA	NA
METALS (%)					
URANIUM-235	0	0.8	1.48	1.27	1.06
METALS (mg/kg) [3]					
TECHNETIUM-99	NA	NA	NA	NA	NA
TOTAL URANIUM	0.28	3.1	3.9	4	4.1
URANIUM-233	0.0035 U	0.0037 U	0.0034 U	0.0035 U	0.0036
URANIUM-234	0.0007 U	0.00075 U	0.00068 U	0.000705 U	0.00073
URANIUM-235	0.0047 U	0.025	0.057	0.0505	0.044
URANIUM-236	0.00093 U	0.001 U	0.0009 U	0.000935 U	0.00097
URANIUM-238	0.28	3.1	3.8	3.95	4.1

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	237
SAMPLE ID	7-02-D
SAMPLE DATE	0613
SAMPLE CODE	JP
RADIONUCLIDES (pCi/g) [1]	
THORIUM-228	
THORIUM-230	
THORIUM-232	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	
URANIUM-236	U
URANIUM-238	
RAD GAMMA (pCi/g) [2]	
ACTINIUM-227	
ACTINIUM-228	
BISMUTH-212	
BISMUTH-214	
LEAD-210	
LEAD-212	
LEAD-214	
POTASSIUM-40	
PROTACTINIUM-231	
RADIUM-226	
RADIUM-228	
THALLIUM-208	
THORIUM-232	
THORIUM-234	
URANIUM-235	
URANIUM-238	
METALS (%)	
URANIUM-235	
METALS (mg/kg) [3]	
TECHNETIUM-99	
TOTAL URANIUM	
URANIUM-233	U
URANIUM-234	U
URANIUM-235	
URANIUM-236	U
URANIUM-238	

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-5
Data Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	SD-237
SAMPLE ID	SD-237-SS
SAMPLE DATE	20140613
SAMPLE CODE	Normal
RADIONUCLIDES (pCi/g) [1]	
THORIUM-228	1.09
THORIUM-230	1.04
THORIUM-232	0.944
URANIUM-233	31.9 U
URANIUM-234	1.67 U
URANIUM-235	0.0684
URANIUM-236	0.00031 U
URANIUM-238	0.872
RAD GAMMA (pCi/g) [2]	
ACTINIUM-227	NA
ACTINIUM-228	NA
BISMUTH-212	NA
BISMUTH-214	NA
LEAD-210	NA
LEAD-212	NA
LEAD-214	NA
POTASSIUM-40	NA
PROTACTINIUM-231	NA
RADIUM-226	NA
RADIUM-228	NA
THALLIUM-208	NA
THORIUM-232	NA
THORIUM-234	NA
URANIUM-235	NA
URANIUM-238	NA
METALS (%)	
URANIUM-235	1.22
METALS (mg/kg) [3]	
TECHNETIUM-99	NA
TOTAL URANIUM	2.6
URANIUM-233	0.0033 U
URANIUM-234	0.00066 U
URANIUM-235	0.032
URANIUM-236	0.00088 U
URANIUM-238	2.6

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-3
Data Results for Composite Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	SD-005E	SD-005E	SD-005W	SD-005W	SD-008
SAMPLE ID	SD-005E-01	SD-005E-02	SD-005W-01	SD-005W-02	SD-008-01
SAMPLE DATE	20140612	20140613	20140611	20140613	20140612
SAMPLE CODE	Original	Original	Original	Original	Original
RADIONUCLIDES (pCi/g) [1]					
THORIUM-228	NA	NA	NA	NA	NA
THORIUM-230	NA	NA	NA	NA	NA
THORIUM-232	NA	NA	NA	NA	NA
URANIUM-233	33.3 U	32.2 U	34.7 U	32.5 U	31.6 U
URANIUM-234	0.51 U	0.971 U	1.03 U	0.642 U	0.27 U
URANIUM-235	0.0146 U	0.0412	0.0399	0.0255	0.0162
URANIUM-236	0.0597 U	0.0577 U	0.0622 U	0.0583 U	0.0567 U
URANIUM-238	0.302	0.863	0.87	0.467	0.343
RAD GAMMA (pCi/g) [2]					
ACTINIUM-227	NA	NA	NA	NA	NA
ACTINIUM-228	0.507	1.38	1.43	1.08	0.895
BISMUTH-212	NA	NA	NA	NA	NA
BISMUTH-214	0.465	0.902	0.921	0.953	0.732
LEAD-210	NA	NA	NA	NA	NA
LEAD-212	0.48	1.41	1.25	1.04	0.92
LEAD-214	0.543	0.849	0.836	0.956	0.82
POTASSIUM-40	4.89	14.4	12.9	13.7	6.71
PROTACTINIUM-231	NA	NA	NA	NA	NA
RADIUM-226	0.465	0.902	0.921	0.953	0.732
RADIUM-228	0.507	1.38	1.43	1.08	0.895
THALLIUM-208	0.189	0.461	0.37	0.225	0.26
THORIUM-232	0.507	1.38	1.43	1.08	0.895
THORIUM-234	NA	NA	NA	NA	NA
URANIUM-235	0.149 U	0.843 U	0.0963 U	0.66 U	0.209 U
URANIUM-238	0.845 U	1.64 U	1.69 U	0.641 U	0.592 U
METALS (%)					
URANIUM-235	0.739	0.725	0.688	0.85	0.744
METALS (mg/kg) [3]					
TECHNETIUM-99	NA	NA	NA	NA	NA
TOTAL URANIUM	0.91	2.6	2.6	1.4	1
URANIUM-233	0.0035 U	0.0033 U	0.0036 U	0.0034 U	0.0033 U
URANIUM-234	0.00069 U	0.00067 U	0.00072 U	0.00068 U	0.00066 U
URANIUM-235	0.0067 U	0.019	0.018	0.012	0.0075 J
URANIUM-236	0.00092 U	0.00089 U	0.00096 U	0.0009 U	0.00088 U
URANIUM-238	0.9	2.6	2.6	1.4	1

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-4
Statistical Results for Composite Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

Chemical	Basic Descriptive Statistics									95% UCL Composite	95% UCL Background	PRG (pCi/g)
	Frequency of Detection	Mininum Non Detected	Maximum Non Detected	Mininum Detected	Maximum Detected	Sample of Maximum Detected	Mean of All Samples (1)	Mean of Positive Detects	Median			
RADIONUCLIDES (pCi/g) (2)												
URANIUM-235	4/5	0.0146	0.0146	0.0162	0.0412	SD-005E-02	0.026	0.031	0.026	0.04	0.06	3.67E+01
URANIUM-238	5/5	-	-	0.302	0.87	SD-005W-01	0.569	0.569	0.467	0.83	1.24	1.28E+02
RAD GAMMA (pCi/g) (3)												
ACTINIUM-228	5/5	-	-	0.507	1.43	SD-005W-01	1.06	1.06	1.08	1.42	2.02	NC
BISMUTH-214	5/5	-	-	0.465	0.953	SD-005W-02	0.795	0.795	0.902	0.99	1.3	NC
LEAD-212	5/5	-	-	0.48	1.41	SD-005E-02	1.02	1.02	1.04	1.36	1.47	NC
LEAD-214	5/5	-	-	0.543	0.956	SD-005W-02	0.801	0.801	0.836	0.95	1.25	NC
POTASSIUM-40	5/5	-	-	4.89	14.4	SD-005E-02	10.5	10.5	12.9	14.7(5)	18.8	NC
RADIUM-226	5/5	-	-	0.465	0.953	SD-005W-02	0.795	0.795	0.902	0.99	1.23	2.67E+00
RADIUM-228	5/5	-	-	0.507	1.43	SD-005W-01	1.06	1.06	1.08	1.42	1.85	6.33E+00
THALLIUM-208	5/5	-	-	0.189	0.461	SD-005E-02	0.301	0.301	0.260	0.41	0.7	NC
THORIUM-232	5/5	-	-	0.507	1.43	SD-005W-01	1.06	1.06	1.08	1.42	1.85	5.16E+02
METALS (%)												
URANIUM-235	5/5	-	-	0.688	0.85	SD-005W-02	0.749	0.749	0.739	0.81	0.75	3.67E+01
METALS (mg/kg) (4)												
TOTAL URANIUM	5/5	-	-	0.91	2.6	SD-005E-02, SD-005W-01	1.70	1.70	1.40	2.5	3.67	NC
URANIUM-235	4/5	0.0067	0.0067	0.0075 J	0.019	SD-005E-02	0.012	0.014	0.012	0.018	0.031	3.67E+01
URANIUM-238	5/5	-	-	0.9	2.6	SD-005E-02, SD-005W-01	1.70	1.70	1.40	2.5	3.67	1.28E+02

Footnotes:

For purposes of calculating the UCL, values were evaluated per the protocol established by the USEPA in the Pro-UCL software.

(USEPA, 2013. ProUCL Version 5.0.00 User Guide. Office of Research and Development, Washington, D.C. EPA/600/R 07/041. September.)

(1) - Average of all analytical results including one-half of the detection limit for non-detects.

(2) - Isotopic Uranium

(3) -Gamma Spectroscopy

(4) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)

(5) - Suggested UCL exceeds maximum concentration.

PRG - Preliminary Remediation Goals (as presented in Appendix D of the associated Work Plan)

pCi/g - picocuries per gram

mg/kg - milligrams per kilogram

% - Percent

J - Result is estimated

Table 4-1
Data Results for Background Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	SD-277	SD-277	SD-277	SD-278	SD-278
SAMPLE ID	SD-277-01A	SD-277-02A	SD-277-SSA	SD-278-01A	SD-278-02A
SAMPLE DATE	20140609	20140609	20140609	20140620	20140620
SAMPLE CODE	Normal	Normal	Normal	Normal	Normal
RADIONUCLIDES (pCi/g) [1]					
THORIUM-228	NA	NA	NA	NA	NA
THORIUM-230	NA	NA	NA	NA	NA
THORIUM-232	NA	NA	NA	NA	NA
URANIUM-233	NA	NA	NA	NA	NA
URANIUM-234	NA	NA	NA	NA	NA
URANIUM-235	NA	NA	NA	NA	NA
URANIUM-236	NA	NA	NA	NA	NA
URANIUM-238	NA	NA	NA	NA	NA
RAD GAMMA (pCi/g) [2]					
ACTINIUM-227	NA	NA	NA	NA	NA
ACTINIUM-228	NA	1.86	NA	1.38	1.21
BISMUTH-212	NA	NA	NA	NA	NA
BISMUTH-214	1.57	0.938	NA	0.773	0.769
LEAD-210	NA	NA	NA	NA	NA
LEAD-212	1.48	1.23	1.57	1.23	1.6
LEAD-214	1.33	1.11	NA	0.926	0.977
POTASSIUM-40	13	20	13.3	18.2	17.8
PROTACTINIUM-231	NA	NA	NA	NA	NA
RADIUM-226	1.57	0.938	0.339 U	0.773	0.769
RADIUM-228	1.3	1.86	1.13	1.38	1.21
THALLIUM-208	0.67	0.429	0.751	0.545	0.62
THORIUM-232	1.3	1.86	1.13	1.38	1.21
THORIUM-234	NA	NA	NA	NA	NA
URANIUM-235	0.244 U	0.17 U	0.468 U	0.275 U	0.235 U
URANIUM-238	1.83 U	1.97	3.34 U	1.92 U	1.68 U
METALS (%)					
URANIUM-235	NA	NA	NA	NA	NA
METALS (mg/kg) [3]					
TECHNETIUM-99	NA	NA	NA	NA	NA
TOTAL URANIUM	NA	NA	NA	NA	NA
URANIUM-233	NA	NA	NA	NA	NA
URANIUM-234	NA	NA	NA	NA	NA
URANIUM-235	NA	NA	NA	NA	NA
URANIUM-236	NA	NA	NA	NA	NA
URANIUM-238	NA	NA	NA	NA	NA

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-1
Data Results for Background Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

LOCATION	SD-278	SD-278	SD-279	SD-279	SD-279
SAMPLE ID	SD-278-03	SD-278-SSA	SD-279-01A	SD-279-02A	SD-279-SSA
SAMPLE DATE	20140620	20140620	20140609	20140609	20140609
SAMPLE CODE	Normal	Normal	Normal	Normal	Normal
RADIONUCLIDES (pCi/g) (1)					
THORIUM-228	1.69	NA	NA	NA	NA
THORIUM-230	1.23 J	NA	NA	NA	NA
THORIUM-232	1.42	NA	NA	NA	NA
URANIUM-233	30.8 U	NA	NA	NA	NA
URANIUM-234	1.32 U	NA	NA	NA	NA
URANIUM-235	0.049	NA	NA	NA	NA
URANIUM-236	0.00052 U	NA	NA	NA	NA
URANIUM-238	1.02	NA	NA	NA	NA
RAD GAMMA (pCi/g) (2)					
ACTINIUM-227	NA	NA	NA	NA	NA
ACTINIUM-228	NA	1.83	NA	0.931	2.36
BISMUTH-212	NA	NA	NA	NA	NA
BISMUTH-214	NA	0.948	NA	0.6	1.54
LEAD-210	NA	NA	NA	NA	NA
LEAD-212	NA	1	1.4	0.477	1.41
LEAD-214	NA	0.532	NA	0.565	1.47
POTASSIUM-40	NA	18.2	NA	6.96	14
PROTACTINIUM-231	NA	NA	NA	NA	NA
RADIUM-226	NA	0.948	0.279 U	0.6	1.54
RADIUM-228	NA	1.83	1.48	0.931	2.36
THALLIUM-208	NA	0.428	0.845	0.245	0.748
THORIUM-232	NA	1.83	1.48	0.931	2.36
THORIUM-234	NA	NA	NA	NA	NA
URANIUM-235	NA	0.188 U	0.434 U	0.166 U	0.0442 U
URANIUM-238	NA	1.9 U	3.99 U	1.13 U	1.51 U
METALS (%)					
URANIUM-235	0	NA	NA	NA	NA
METALS (mg/kg) (3)					
TECHNETIUM-99	NA	NA	NA	NA	NA
TOTAL URANIUM	3	NA	NA	NA	NA
URANIUM-233	0.64 U	NA	NA	NA	NA
URANIUM-234	0.13 U	NA	NA	NA	NA
URANIUM-235	0.86 U	NA	NA	NA	NA
URANIUM-236	0.17 U	NA	NA	NA	NA
URANIUM-238	3	NA	NA	NA	NA

Footnotes:
(1) - Isotopic Thorium/Uranium
(2) -Gamma Spectroscopy
(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)
pCi/g - picocuries per gram
mg/kg - milligrams per kilogram
% - Percent
U - Analyte is not detected. Sample quantitation limit presented.
J - Result is estimated
NA - Not Available

Table 4-2
Statistical Results for Background Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

Chemical	Basic Descriptive Statistics									95% UCL Background	PRG (pCi/g)
	Frequency of Detection	Mininum Non Detected	Maximum Non Detected	Mininum Detected	Maximum Detected	Sample of Maximum Detected	Mean of All Samples (1)	Mean of Positive Detects	Median		
RADIONUCLIDES (pCi/g) (2)											
THORIUM-228	10/10	-	-	0.607	1.69	SD-278-03	1.26	1.26	1.34	1.44	5.11E+03
THORIUM-230	10/10	-	-	0.508 J	1.38 J	SD-278-01	1.07	1.07	1.15	1.22	5.64E+02
THORIUM-232	10/10	-	-	0.539	1.42	SD-278-03	1.16	1.16	1.21	1.31	5.16E+02
URANIUM-235	10/10	-	-	0.0257	0.0878	SD-277-02	0.047	0.047	0.045	0.06	3.67E+01
URANIUM-238	10/10	-	-	0.539	1.83	SD-277-02	0.981	0.981	0.944	1.24	1.28E+02
RAD GAMMA (pCi/g) (3)											
ACTINIUM-228	6/6	-	-	0.931	2.36	SD-279-SSA	1.60	1.60	1.61	2.02	NC
BISMUTH-214	7/7	-	-	0.6	1.57	SD-277-01A	1.02	1.02	0.938	1.3	NC
LEAD-212	9/9	-	-	0.477	1.6	SD-278-02A	1.27	1.27	1.40	1.47	NC
LEAD-214	7/7	-	-	0.532	1.47	SD-279-SSA	0.987	0.987	0.977	1.25	NC
POTASSIUM-40	8/8	-	-	6.96	20	SD-277-02A	15.2	15.2	15.9	18.8	NC
RADIUM-226	7/9	0.279	0.339	0.6	1.57	SD-277-01A	0.827	1.02	0.773	1.23	2.67E+00
RADIUM-228	9/9	-	-	0.931	2.36	SD-279-SSA	1.50	1.50	1.38	1.85	6.33E+00
THALLIUM-208	9/9	-	-	0.245	0.845	SD-279-01A	0.587	0.587	0.620	0.7	NC
THORIUM-232	9/9	-	-	0.931	2.36	SD-279-SSA	1.50	1.50	1.38	1.85	5.16E+02
URANIUM-238	1/9	1.13	3.99	1.97	1.97	SD-277-02A	1.18	1.97	0.950	NA(5)	1.28E+02
METALS (%)											
URANIUM-235	6/6	-	-	0.725	0.761	SD-279-01	0.744	0.744	0.744	0.75	3.67E+01
METALS (mg/Kg) (4)											
TOTAL URANIUM	10/10	-	-	1.6	5.4	SD-277-02	2.91	2.91	2.80	3.67	NC
URANIUM-235	6/10	0.86	0.99	0.012	0.041	SD-277-02	0.200	0.024	0.033	0.031	3.67E+01
URANIUM-238	10/10	-	-	1.6	5.4	SD-277-02	2.91	2.91	2.80	3.67	1.28E+02

Footnotes:

For purposes of calculating the UCL, values were evaluated per the protocol established by the USEPA in the Pro-UCL software.

(USEPA, 2013. ProUCL Version 5.0.00 User Guide. Office of Research and Development, Washington, D.C. EPA/600/R 07/041. September.)

(1) - Average of all analytical results including one-half of the detection limit for non-detects.

(2) - Isotopic Thorium/Uranium

(3) -Gamma Spectroscopy

(4) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)

(5) - Insufficient number of samples to calculate the UCL.

NC - Not Calculated

NA - Not Available

UCL - Upper Confidence Limit

PRG - Preliminary Remediation Goals (as presented in Appendix D of the associated Work Plan)

pCi/g - picocuries per gram

mg/kg - milligrams per kilogram

% - Percent

J - Result is estimated

Table 4-6
Statistical Results for Site Samples
Sediment Sampling and Radiological Analyses-Dark Head Cove, 2014
Lockheed Martin Middle River Complex, Middle River, MD

Chemical	Basic Decriptive Statistics									95% UCL Site	95% UCL Background	PRG (pCi/g)
	Frequency of Detection	Mininum Non Detected	Maximum Non Detected	Mininum Detected	Maximum Detected	Sample of Maximum Detected	Mean of All Samples [1]	Mean of Positive Detects	Median			
RADIONUCLIDES (PCI/G) [2]												
THORIUM-228	128/128	-	-	0.188	1.55	SD-237-01	0.963	0.963	1.03	1.01	1.44	5.11E+03
THORIUM-230	127/128	0.28	0.28	0.271	1.45	SD-198-SS, SD-225-SS	0.861	0.867	0.879	0.9	1.22	5.64E+02
THORIUM-232	128/128	-	-	0.208	1.53	SD-218-01	0.977	0.977	1.03	1.03	1.31	5.16E+02
URANIUM-234	2/124	0.0244	4.34	5.69	6.47	SD-228-01	0.576	6.08	0.450	NA[4]	NA[5]	8.88E+02
URANIUM-235	107/124	0.003	0.0136	0.0107	0.206	SD-228-01	0.037	0.042	0.033	0.042	0.06	3.67E+01
URANIUM-238	124/124	-	-	0.0929	1.56	SD-201-SS	0.680	0.680	0.676	0.83	1.24	1.28E+02
METALS (%)												
URANIUM-235	110/110	-	-	0.639	2.82	SD-206-02	0.820	0.820	0.744	0.87	0.75	3.67E+01
METALS (MG/KG) [3]												
TOTAL URANIUM	124/124	-	-	0.28	4.6	SD-201-SS	2.03	2.03	2.00	2.47	3.67	NA
URANIUM-234	2/124	0.00063	0.00075	0.00091 J	0.001 J	SD-228-01	0.0004	0.0010	0.0003	NA[4]	NA[5]	8.88E+02
URANIUM-235	107/124	0.0043	0.0063	0.005 J	0.095	SD-228-01	0.017	0.019	0.015	0.02	0.031	3.67E+01
URANIUM-238	124/124	-	-	0.28	4.6	SD-201-SS	2.03	2.03	2.00	2.47	3.67	1.28E+02

Footnotes:

For purposes of calculating the UCL, values were evaluated per the protocol established by the USEPA in the Pro-UCL software.

(USEPA, 2013. ProUCL Version 5.0.00 User Guide. Office of Research and Development, Washington, D.C. EPA/600/R 07/041. September.)

(1) - Average of all analytical results including one-half of the detection limit for non-detects.

(2) - Isotopic Thorium/Uranium

(3) - Inductively Coupled Plasma Mass Spectrometry (ICP-MS)

(4) - Insufficient number of samples to calculate UCL.

(5) - Uranium-234 was not detected in the background.

NC - Not Calculated

NA - Not Available

UCL - Upper Confidence Limit

PRG - Preliminary Remediation Goals

pCi/g - picocuries per gram

mg/Kg - milligrams per kilogram

% - Percent

J - Result is estimated

APPENDIX C—LABORATORY SAMPLE REPORTS

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 680-102199-1

SDG Number: 680102199-1

Job Description: Sediments

For:
Tetra Tech, Inc.
20251 Century Blvd
Suite 200
Germantown, MD 20874

Attention: Mike Martin



Approved for release.
Jerry A Lanier
Project Manager I
7/23/2014 2:56 PM

Jerry A Lanier, Project Manager I
5102 LaRoche Avenue, Savannah, GA, 31404
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07/23/2014

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

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Table of Contents

Cover Title Page 1

Data Summaries 3

- Definitions 3
- Case Narrative 4
- Detection Summary 5
- Client Sample Results 8
- Tracer/Carrier Summary 18
- QC Sample Results 19
- QC Association 21
- Chronicle 23
- Certification Summary 30
- Method Summary 32
- Sample Summary 33
- Reagent Traceability 34
  - COAs 36

Radiochemistry Raw Data 91

- Alpha Spectroscopy 91
  - Method A-01-R Th 92
  - Daily Checks 173
  - Initial Calibrations 216
  - Monthly Calibration Verifications 303
  - Monthly Backgrounds 344
  - Run Logs 425

Shipping and Receiving Documents 434

- Client Chain of Custody 434

Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Sediments

Report Number: 680-102199-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 06/11/2014; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 1.1 C.

ISOTOPIC THORIUM

Samples SD-279-SS (680-102199-1), SD-279-01 (680-102199-2), SD-279-02 (680-102199-3), SD-277-SS (680-102199-7), SD-277-01 (680-102199-8), SD-277-02 (680-102199-9), SD-219-SS (680-102199-11), SD-219-01 (680-102199-12), SD-219-02 (680-102199-13), SD-219-03 (680-102199-14), SD-218-SS (680-102199-15), SD-218-01 (680-102199-16), SD-218-02 (680-102199-17), SD-203-SS (680-102199-18), SD-203-01 (680-102199-19), SD-203-02 (680-102199-20), SD-202-SS (680-102199-22), SD-202-01 (680-102199-23), SD-202-02 (680-102199-24), SD-195-SS (680-102199-25), SD-196-SS (680-102199-26), SD-196-01 (680-102199-27), SD-196-02 (680-102199-28), SD-220-SS (680-102199-30), SD-220-01 (680-102199-31), SD-220-02 (680-102199-32), SD-DUP-01 (680-102199-33), SD-201-SS (680-102199-35), SD-201-01 (680-102199-36), SD-201-02 (680-102199-37), SD-200-SS (680-102199-39), SD-200-01 (680-102199-40), SD-200-02 (680-102199-41) and SD-200-03 (680-102199-42) were analyzed for Isotopic Thorium in accordance with A01R_Th. The samples were leached on 06/12/2014, prepared on 06/16/2014 and 06/17/2014 and analyzed on 06/30/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-1
SDG: 680102199-1

Client Sample ID: SD-279-SS — **Lab Sample ID: 680-102199-1**

No Detections.

Client Sample ID: SD-279-01 — **Lab Sample ID: 680-102199-2**

No Detections.

Client Sample ID: SD-279-02 — **Lab Sample ID: 680-102199-3**

No Detections.

Client Sample ID: SD-277-SS — **Lab Sample ID: 680-102199-7**

No Detections.

Client Sample ID: SD-277-01 — **Lab Sample ID: 680-102199-8**

No Detections.

Client Sample ID: SD-277-02 — **Lab Sample ID: 680-102199-9**

No Detections.

Client Sample ID: SD-219-SS — **Lab Sample ID: 680-102199-11**

No Detections.

Client Sample ID: SD-219-01 — **Lab Sample ID: 680-102199-12**

No Detections.

Client Sample ID: SD-219-02 — **Lab Sample ID: 680-102199-13**

No Detections.

Client Sample ID: SD-219-03 — **Lab Sample ID: 680-102199-14**

No Detections.

Client Sample ID: SD-218-SS — **Lab Sample ID: 680-102199-15**

No Detections.

Client Sample ID: SD-218-01 — **Lab Sample ID: 680-102199-16**

No Detections.

Client Sample ID: SD-218-02 — **Lab Sample ID: 680-102199-17**

No Detections.

Client Sample ID: SD-203-SS — **Lab Sample ID: 680-102199-18**

No Detections.

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-1
SDG: 680102199-1

Client Sample ID: SD-203-01 — **Lab Sample ID: 680-102199-19**

No Detections.

Client Sample ID: SD-203-02 — **Lab Sample ID: 680-102199-20**

No Detections.

Client Sample ID: SD-202-SS — **Lab Sample ID: 680-102199-22**

No Detections.

Client Sample ID: SD-202-01 — **Lab Sample ID: 680-102199-23**

No Detections.

Client Sample ID: SD-202-02 — **Lab Sample ID: 680-102199-24**

No Detections.

Client Sample ID: SD-195-SS — **Lab Sample ID: 680-102199-25**

No Detections.

Client Sample ID: SD-196-SS — **Lab Sample ID: 680-102199-26**

No Detections.

Client Sample ID: SD-196-01 — **Lab Sample ID: 680-102199-27**

No Detections.

Client Sample ID: SD-196-02 — **Lab Sample ID: 680-102199-28**

No Detections.

Client Sample ID: SD-220-SS — **Lab Sample ID: 680-102199-30**

No Detections.

Client Sample ID: SD-220-01 — **Lab Sample ID: 680-102199-31**

No Detections.

Client Sample ID: SD-220-02 — **Lab Sample ID: 680-102199-32**

No Detections.

Client Sample ID: SD-DUP-01 — **Lab Sample ID: 680-102199-33**

No Detections.

Client Sample ID: SD-201-SS — **Lab Sample ID: 680-102199-35**

No Detections.

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-1
SDG: 680102199-1

Client Sample ID: SD-201-01 — **Lab Sample ID: 680-102199-36**

No Detections.

Client Sample ID: SD-201-02 — **Lab Sample ID: 680-102199-37**

No Detections.

Client Sample ID: SD-200-SS — **Lab Sample ID: 680-102199-39**

No Detections.

Client Sample ID: SD-200-01 — **Lab Sample ID: 680-102199-40**

No Detections.

Client Sample ID: SD-200-02 — **Lab Sample ID: 680-102199-41**

No Detections.

Client Sample ID: SD-200-03 — **Lab Sample ID: 680-102199-42**

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: SD-279-SS

Lab Sample ID: 680-102199-1

Date Collected: 06/09/14 15:40

Matrix: Solid

Date Received: 06/11/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.56		0.270	0.300	1.00	0.105	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	1.22		0.237	0.258	1.00	0.0699	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	1.29		0.243	0.266	1.00	0.0342	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*85.2*		*30 - 110*	*06/16/14 12:49*	*06/30/14 01:40*	*1*

Client Sample ID: SD-279-01

Lab Sample ID: 680-102199-2

Date Collected: 06/09/14 15:45

Matrix: Solid

Date Received: 06/11/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.05		0.218	0.235	1.00	0.0926	pCi/g	06/16/14 12:49	06/30/14 18:11	1
Thorium-230	0.839		0.194	0.207	1.00	0.0753	pCi/g	06/16/14 12:49	06/30/14 18:11	1
Thorium-232	1.01		0.211	0.227	1.00	0.0501	pCi/g	06/16/14 12:49	06/30/14 18:11	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*87.5*		*30 - 110*	*06/16/14 12:49*	*06/30/14 18:11*	*1*

Client Sample ID: SD-279-02

Lab Sample ID: 680-102199-3

Date Collected: 06/09/14 15:50

Matrix: Solid

Date Received: 06/11/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.607		0.167	0.175	1.00	0.0872	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	0.508		0.150	0.156	1.00	0.0331	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	0.539		0.157	0.164	1.00	0.0881	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*87.7*		*30 - 110*	*06/16/14 12:49*	*06/30/14 01:40*	*1*

Client Sample ID: SD-277-SS

Lab Sample ID: 680-102199-7

Date Collected: 06/09/14 18:10

Matrix: Solid

Date Received: 06/11/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.11		0.215	0.235	1.00	0.0629	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	1.04		0.208	0.225	1.00	0.0535	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	1.07		0.210	0.229	1.00	0.0467	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Client Sample ID: SD-277-SS

Lab Sample ID: 680-102199-7

Date Collected: 06/09/14 18:10

Matrix: Solid

Date Received: 06/11/14 09:30

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	92.1		30 - 110	06/16/14 12:49	06/30/14 01:40	1

Client Sample ID: SD-277-01

Lab Sample ID: 680-102199-8

Date Collected: 06/09/14 18:15

Matrix: Solid

Date Received: 06/11/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.45		0.260	0.287	1.00	0.104	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	1.17		0.232	0.252	1.00	0.0772	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	1.24		0.237	0.259	1.00	0.0514	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	86.3		30 - 110	06/16/14 12:49	06/30/14 01:40	1

Client Sample ID: SD-277-02

Lab Sample ID: 680-102199-9

Date Collected: 06/09/14 18:20

Matrix: Solid

Date Received: 06/11/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.38		0.246	0.272	1.00	0.0829	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	1.12		0.221	0.240	1.00	0.0674	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	1.17		0.225	0.246	1.00	0.0491	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	85.2		30 - 110	06/16/14 12:49	06/30/14 01:40	1

Client Sample ID: SD-219-SS

Lab Sample ID: 680-102199-11

Date Collected: 06/10/14 09:20

Matrix: Solid

Date Received: 06/11/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.799		0.199	0.210	1.00	0.117	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	0.862		0.201	0.213	1.00	0.0659	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	0.719		0.183	0.193	1.00	0.0656	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	83.1		30 - 110	06/16/14 12:49	06/30/14 01:40	1

Client Sample ID: SD-219-01

Lab Sample ID: 680-102199-12

Date Collected: 06/10/14 09:22

Matrix: Solid

Date Received: 06/11/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.09		0.223	0.242	1.00	0.0797	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	0.781		0.188	0.199	1.00	0.0583	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	0.886		0.199	0.213	1.00	0.0580	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*88.0*		*30 - 110*	*06/16/14 12:49*	*06/30/14 01:40*	*1*

Client Sample ID: SD-219-02

Lab Sample ID: 680-102199-13

Date Collected: 06/10/14 09:25

Matrix: Solid

Date Received: 06/11/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.04		0.220	0.237	1.00	0.0712	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	0.608		0.171	0.179	1.00	0.0889	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	0.926		0.207	0.222	1.00	0.0600	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*85.4*		*30 - 110*	*06/16/14 12:49*	*06/30/14 01:40*	*1*

Client Sample ID: SD-219-03

Lab Sample ID: 680-102199-14

Date Collected: 06/10/14 09:28

Matrix: Solid

Date Received: 06/11/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.15		0.239	0.258	1.00	0.110	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	1.17		0.238	0.258	1.00	0.0882	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	1.05		0.225	0.242	1.00	0.0875	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*82.2*		*30 - 110*	*06/16/14 12:49*	*06/30/14 01:40*	*1*

Client Sample ID: SD-218-SS

Lab Sample ID: 680-102199-15

Date Collected: 06/10/14 10:10

Matrix: Solid

Date Received: 06/11/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.925		0.204	0.218	1.00	0.0887	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	0.755		0.183	0.193	1.00	0.0665	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	0.928		0.201	0.216	1.00	0.0563	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Client Sample ID: SD-218-SS

Lab Sample ID: 680-102199-15

Date Collected: 06/10/14 10:10

Matrix: Solid

Date Received: 06/11/14 09:30

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	90.8		30 - 110	06/16/14 12:49	06/30/14 01:40	1

Client Sample ID: SD-218-01

Lab Sample ID: 680-102199-16

Date Collected: 06/10/14 10:12

Matrix: Solid

Date Received: 06/11/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.20		0.252	0.271	1.00	0.102	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	0.865		0.213	0.225	1.00	0.0835	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	1.53		0.281	0.309	1.00	0.0667	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	75.2		30 - 110	06/16/14 12:49	06/30/14 01:40	1

Client Sample ID: SD-218-02

Lab Sample ID: 680-102199-17

Date Collected: 06/10/14 10:14

Matrix: Solid

Date Received: 06/11/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.53		0.275	0.304	1.00	0.128	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	0.746		0.190	0.200	1.00	0.0767	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	1.18		0.237	0.257	1.00	0.0720	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	79.8		30 - 110	06/16/14 12:49	06/30/14 01:40	1

Client Sample ID: SD-203-SS

Lab Sample ID: 680-102199-18

Date Collected: 06/10/14 11:40

Matrix: Solid

Date Received: 06/11/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.09		0.222	0.241	1.00	0.0850	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	1.27		0.238	0.261	1.00	0.0647	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	1.47		0.255	0.283	1.00	0.0574	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	87.9		30 - 110	06/16/14 12:49	06/30/14 01:40	1

Client Sample ID: SD-203-01

Lab Sample ID: 680-102199-19

Date Collected: 06/10/14 11:45

Matrix: Solid

Date Received: 06/11/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.33		0.248	0.272	1.00	0.103	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	0.937		0.205	0.220	1.00	0.0509	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	1.24		0.234	0.256	1.00	0.0334	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*85.0*		*30 - 110*	*06/16/14 12:49*	*06/30/14 01:40*	*1*

Client Sample ID: SD-203-02

Lab Sample ID: 680-102199-20

Date Collected: 06/10/14 11:50

Matrix: Solid

Date Received: 06/11/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.621		0.164	0.172	1.00	0.0868	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	0.684		0.169	0.178	1.00	0.0473	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	0.615		0.160	0.168	1.00	0.0588	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*92.9*		*30 - 110*	*06/16/14 12:49*	*06/30/14 01:40*	*1*

Client Sample ID: SD-202-SS

Lab Sample ID: 680-102199-22

Date Collected: 06/10/14 12:20

Matrix: Solid

Date Received: 06/11/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.652		0.164	0.173	1.00	0.0661	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	0.558		0.151	0.158	1.00	0.0463	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	0.717		0.171	0.181	1.00	0.0461	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*91.6*		*30 - 110*	*06/16/14 12:49*	*06/30/14 01:40*	*1*

Client Sample ID: SD-202-01

Lab Sample ID: 680-102199-23

Date Collected: 06/10/14 12:25

Matrix: Solid

Date Received: 06/11/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.455		0.145	0.150	1.00	0.0885	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	0.280		0.111	0.113	1.00	0.0494	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	0.378		0.128	0.132	1.00	0.0324	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Client Sample ID: SD-202-01

Lab Sample ID: 680-102199-23

Date Collected: 06/10/14 12:25

Matrix: Solid

Date Received: 06/11/14 09:30

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	89.7		30 - 110	06/16/14 12:49	06/30/14 01:40	1

Client Sample ID: SD-202-02

Lab Sample ID: 680-102199-24

Date Collected: 06/10/14 12:30

Matrix: Solid

Date Received: 06/11/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.12		0.236	0.254	1.00	0.112	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	0.660		0.181	0.189	1.00	0.0914	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	1.33		0.253	0.276	1.00	0.0769	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	79.0		30 - 110	06/16/14 12:49	06/30/14 01:40	1

Client Sample ID: SD-195-SS

Lab Sample ID: 680-102199-25

Date Collected: 06/10/14 13:30

Matrix: Solid

Date Received: 06/11/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.07		0.211	0.229	1.00	0.0756	pCi/g	06/17/14 07:50	06/30/14 01:43	1
Thorium-230	0.676		0.167	0.177	1.00	0.0582	pCi/g	06/17/14 07:50	06/30/14 01:43	1
Thorium-232	0.936		0.195	0.210	1.00	0.0305	pCi/g	06/17/14 07:50	06/30/14 01:43	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	92.2		30 - 110	06/17/14 07:50	06/30/14 01:43	1

Client Sample ID: SD-196-SS

Lab Sample ID: 680-102199-26

Date Collected: 06/10/14 14:00

Matrix: Solid

Date Received: 06/11/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.30		0.242	0.265	1.00	0.0818	pCi/g	06/16/14 13:16	06/30/14 01:42	1
Thorium-230	1.20		0.233	0.254	1.00	0.0788	pCi/g	06/16/14 13:16	06/30/14 01:42	1
Thorium-232	1.26		0.237	0.259	1.00	0.0627	pCi/g	06/16/14 13:16	06/30/14 01:42	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	86.3		30 - 110	06/16/14 13:16	06/30/14 01:42	1

Client Sample ID: SD-196-01

Lab Sample ID: 680-102199-27

Date Collected: 06/10/14 14:05

Matrix: Solid

Date Received: 06/11/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.31		0.239	0.263	1.00	0.0765	pCi/g	06/16/14 13:16	06/30/14 01:42	1
Thorium-230	1.08		0.217	0.235	1.00	0.0697	pCi/g	06/16/14 13:16	06/30/14 01:42	1
Thorium-232	1.06		0.214	0.232	1.00	0.0694	pCi/g	06/16/14 13:16	06/30/14 01:42	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*86.7*		*30 - 110*	*06/16/14 13:16*	*06/30/14 01:42*	*1*

Client Sample ID: SD-196-02

Lab Sample ID: 680-102199-28

Date Collected: 06/10/14 14:10

Matrix: Solid

Date Received: 06/11/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.905		0.195	0.209	1.00	0.0733	pCi/g	06/16/14 13:16	06/30/14 01:42	1
Thorium-230	0.876		0.190	0.204	1.00	0.0470	pCi/g	06/16/14 13:16	06/30/14 01:42	1
Thorium-232	0.808		0.183	0.195	1.00	0.0534	pCi/g	06/16/14 13:16	06/30/14 01:42	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*93.1*		*30 - 110*	*06/16/14 13:16*	*06/30/14 01:42*	*1*

Client Sample ID: SD-220-SS

Lab Sample ID: 680-102199-30

Date Collected: 06/10/14 14:40

Matrix: Solid

Date Received: 06/11/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.05		0.217	0.234	1.00	0.0974	pCi/g	06/16/14 13:16	06/30/14 01:42	1
Thorium-230	1.13		0.222	0.241	1.00	0.0616	pCi/g	06/16/14 13:16	06/30/14 01:42	1
Thorium-232	1.14		0.223	0.243	1.00	0.0658	pCi/g	06/16/14 13:16	06/30/14 01:42	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*86.5*		*30 - 110*	*06/16/14 13:16*	*06/30/14 01:42*	*1*

Client Sample ID: SD-220-01

Lab Sample ID: 680-102199-31

Date Collected: 06/10/14 14:42

Matrix: Solid

Date Received: 06/11/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.03		0.211	0.228	1.00	0.0729	pCi/g	06/16/14 13:16	06/30/14 01:42	1
Thorium-230	0.914		0.200	0.215	1.00	0.0822	pCi/g	06/16/14 13:16	06/30/14 01:42	1
Thorium-232	1.30		0.236	0.260	1.00	0.0520	pCi/g	06/16/14 13:16	06/30/14 01:42	1

Client Sample ID: SD-220-01

Lab Sample ID: 680-102199-31

Date Collected: 06/10/14 14:42

Matrix: Solid

Date Received: 06/11/14 09:30

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	87.9		30 - 110	06/16/14 13:16	06/30/14 01:42	1

Client Sample ID: SD-220-02

Lab Sample ID: 680-102199-32

Date Collected: 06/10/14 14:44

Matrix: Solid

Date Received: 06/11/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.986		0.210	0.226	1.00	0.0717	pCi/g	06/16/14 13:16	06/30/14 01:43	1
Thorium-230	0.940		0.204	0.219	1.00	0.0505	pCi/g	06/16/14 13:16	06/30/14 01:43	1
Thorium-232	0.944		0.204	0.219	1.00	0.0331	pCi/g	06/16/14 13:16	06/30/14 01:43	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	82.3		30 - 110	06/16/14 13:16	06/30/14 01:43	1

Client Sample ID: SD-DUP-01

Lab Sample ID: 680-102199-33

Date Collected: 06/10/14 00:00

Matrix: Solid

Date Received: 06/11/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.17		0.226	0.246	1.00	0.100	pCi/g	06/16/14 13:16	06/30/14 01:43	1
Thorium-230	0.851		0.190	0.203	1.00	0.0679	pCi/g	06/16/14 13:16	06/30/14 01:43	1
Thorium-232	1.30		0.234	0.258	1.00	0.0594	pCi/g	06/16/14 13:16	06/30/14 01:43	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	90.6		30 - 110	06/16/14 13:16	06/30/14 01:43	1

Client Sample ID: SD-201-SS

Lab Sample ID: 680-102199-35

Date Collected: 06/10/14 15:10

Matrix: Solid

Date Received: 06/11/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.12		0.214	0.234	1.00	0.0872	pCi/g	06/16/14 13:16	06/30/14 01:43	1
Thorium-230	1.23		0.222	0.245	1.00	0.0605	pCi/g	06/16/14 13:16	06/30/14 01:43	1
Thorium-232	0.959		0.195	0.211	1.00	0.0449	pCi/g	06/16/14 13:16	06/30/14 01:43	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	95.9		30 - 110	06/16/14 13:16	06/30/14 01:43	1

Client Sample ID: SD-201-01

Lab Sample ID: 680-102199-36

Date Collected: 06/10/14 15:15

Matrix: Solid

Date Received: 06/11/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.22		0.225	0.248	1.00	0.0727	pCi/g	06/16/14 13:16	06/30/14 01:43	1
Thorium-230	1.03		0.206	0.223	1.00	0.0532	pCi/g	06/16/14 13:16	06/30/14 01:43	1
Thorium-232	1.20		0.221	0.243	1.00	0.0306	pCi/g	06/16/14 13:16	06/30/14 01:43	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*93.3*		*30 - 110*	*06/16/14 13:16*	*06/30/14 01:43*	*1*

Client Sample ID: SD-201-02

Lab Sample ID: 680-102199-37

Date Collected: 06/10/14 15:20

Matrix: Solid

Date Received: 06/11/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.690		0.177	0.186	1.00	0.105	pCi/g	06/16/14 13:16	06/30/14 01:43	1
Thorium-230	0.614		0.163	0.171	1.00	0.0719	pCi/g	06/16/14 13:16	06/30/14 01:43	1
Thorium-232	0.663		0.167	0.176	1.00	0.0427	pCi/g	06/16/14 13:16	06/30/14 01:43	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*93.3*		*30 - 110*	*06/16/14 13:16*	*06/30/14 01:43*	*1*

Client Sample ID: SD-200-SS

Lab Sample ID: 680-102199-39

Date Collected: 06/10/14 15:50

Matrix: Solid

Date Received: 06/11/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.05		0.207	0.225	1.00	0.0787	pCi/g	06/16/14 13:16	06/30/14 01:43	1
Thorium-230	1.15		0.214	0.235	1.00	0.0566	pCi/g	06/16/14 13:16	06/30/14 01:43	1
Thorium-232	1.42		0.237	0.266	1.00	0.0450	pCi/g	06/16/14 13:16	06/30/14 01:43	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*90.9*		*30 - 110*	*06/16/14 13:16*	*06/30/14 01:43*	*1*

Client Sample ID: SD-200-01

Lab Sample ID: 680-102199-40

Date Collected: 06/10/14 15:55

Matrix: Solid

Date Received: 06/11/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.39		0.244	0.270	1.00	0.106	pCi/g	06/16/14 13:16	06/30/14 01:43	1
Thorium-230	1.28		0.231	0.255	1.00	0.0538	pCi/g	06/16/14 13:16	06/30/14 01:43	1
Thorium-232	1.14		0.217	0.238	1.00	0.0536	pCi/g	06/16/14 13:16	06/30/14 01:43	1

Client Sample ID: SD-200-01

Date Collected: 06/10/14 15:55
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-40

Matrix: Solid

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.0*		*30 - 110*	*06/16/14 13:16*	*06/30/14 01:43*	*1*

Client Sample ID: SD-200-02

Date Collected: 06/10/14 16:00
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-41

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**1.07**		0.227	0.244	1.00	0.107	pCi/g	06/16/14 13:16	06/30/14 01:43	1
Thorium-230	**0.785**		0.193	0.204	1.00	0.0792	pCi/g	06/16/14 13:16	06/30/14 01:43	1
Thorium-232	**1.35**		0.250	0.275	1.00	0.0601	pCi/g	06/16/14 13:16	06/30/14 01:43	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*83.5*		*30 - 110*	*06/16/14 13:16*	*06/30/14 01:43*	*1*

Client Sample ID: SD-200-03

Date Collected: 06/10/14 16:05
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-42

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**1.42**		0.243	0.271	1.00	0.0789	pCi/g	06/16/14 13:16	06/30/14 01:43	1
Thorium-230	**0.840**		0.187	0.200	1.00	0.0587	pCi/g	06/16/14 13:16	06/30/14 01:43	1
Thorium-232	**1.22**		0.225	0.247	1.00	0.0603	pCi/g	06/16/14 13:16	06/30/14 01:43	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*88.6*		*30 - 110*	*06/16/14 13:16*	*06/30/14 01:43*	*1*

Tracer/Carrier Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-1
SDG: 680102199-1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)							
Lab Sample ID	Client Sample ID	Th-229 (30-110)							
680-102199-1	SD-279-SS	85.2							
680-102199-1 DU	SD-279-SS	89.4							
680-102199-2	SD-279-01	87.5							
680-102199-3	SD-279-02	87.7							
680-102199-7	SD-277-SS	92.1							
680-102199-8	SD-277-01	86.3							
680-102199-9	SD-277-02	85.2							
680-102199-11	SD-219-SS	83.1							
680-102199-12	SD-219-01	88.0							
680-102199-13	SD-219-02	85.4							
680-102199-14	SD-219-03	82.2							
680-102199-15	SD-218-SS	90.8							
680-102199-16	SD-218-01	75.2							
680-102199-17	SD-218-02	79.8							
680-102199-18	SD-203-SS	87.9							
680-102199-19	SD-203-01	85.0							
680-102199-20	SD-203-02	92.9							
680-102199-22	SD-202-SS	91.6							
680-102199-23	SD-202-01	89.7							
680-102199-24	SD-202-02	79.0							
680-102199-25	SD-195-SS	92.2							
680-102199-26	SD-196-SS	86.3							
680-102199-26 DU	SD-196-SS	97.0							
680-102199-27	SD-196-01	86.7							
680-102199-28	SD-196-02	93.1							
680-102199-30	SD-220-SS	86.5							
680-102199-31	SD-220-01	87.9							
680-102199-32	SD-220-02	82.3							
680-102199-33	SD-DUP-01	90.6							
680-102199-35	SD-201-SS	95.9							
680-102199-36	SD-201-01	93.3							
680-102199-37	SD-201-02	93.3							
680-102199-39	SD-200-SS	90.9							
680-102199-40	SD-200-01	89.0							
680-102199-41	SD-200-02	83.5							
680-102199-42	SD-200-03	88.6							
LCS 160-126996/2-A	Lab Control Sample	92.0							
LCS 160-126998/2-A	Lab Control Sample	85.8							
MB 160-126996/1-A	Method Blank	85.3							
MB 160-126998/1-A	Method Blank	85.4							

Tracer/Carrier Legend

Th-229 = Thorium-229

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Lab Sample ID: MB 160-126996/1-A
Matrix: Solid
Analysis Batch: 128984

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 126996

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.004757	U	0.0470	0.0470	1.00	0.106	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-230	0.1486		0.0813	0.0822	1.00	0.0520	pCi/g	06/16/14 12:49	06/30/14 01:40	1
Thorium-232	-0.005412	U	0.0245	0.0245	1.00	0.0800	pCi/g	06/16/14 12:49	06/30/14 01:40	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*85.3*		*30 - 110*	*06/16/14 12:49*	*06/30/14 01:40*	*1*

Lab Sample ID: LCS 160-126996/2-A
Matrix: Solid
Analysis Batch: 128945

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 126996

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Thorium-230			24.5	23.38		2.41	1.00	0.216	pCi/g	95	81 - 118		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*92.0*		*30 - 110*

Lab Sample ID: 680-102199-1 DU
Matrix: Solid
Analysis Batch: 128912

Client Sample ID: SD-279-SS
Prep Type: Total/NA
Prep Batch: 126996

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Thorium-228	1.56			1.089		0.236	1.00	0.0962	pCi/g			0.87	1
Thorium-230	1.22			1.257		0.254	1.00	0.0678	pCi/g			0.08	1
Thorium-232	1.29			1.220		0.249	1.00	0.0743	pCi/g			0.14	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Thorium-229	*89.4*		*30 - 110*

Lab Sample ID: MB 160-126998/1-A
Matrix: Solid
Analysis Batch: 128962

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 126998

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.04749	U	0.0667	0.0668	1.00	0.113	pCi/g	06/16/14 13:16	06/30/14 18:12	1
Thorium-230	0.1451		0.0892	0.0901	1.00	0.0951	pCi/g	06/16/14 13:16	06/30/14 18:12	1
Thorium-232	-0.007527	U	0.0185	0.0185	1.00	0.0768	pCi/g	06/16/14 13:16	06/30/14 18:12	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*85.4*		*30 - 110*	*06/16/14 13:16*	*06/30/14 18:12*	*1*

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry) (Continued)

Lab Sample ID: LCS 160-126998/2-A
Matrix: Solid
Analysis Batch: 128973

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 126998

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Thorium-230			24.5	25.53		2.63	1.00	0.149	pCi/g	104	81 - 118		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*85.8*		*30 - 110*

Lab Sample ID: 680-102199-26 DU
Matrix: Solid
Analysis Batch: 128957

Client Sample ID: SD-196-SS
Prep Type: Total/NA
Prep Batch: 126998

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Thorium-228	1.30			1.034		0.224	1.00	0.0914	pCi/g			0.55	1
Thorium-230	1.20			0.9540		0.212	1.00	0.0677	pCi/g			0.54	1
Thorium-232	1.26			1.116		0.230	1.00	0.0481	pCi/g			0.30	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Thorium-229	*97.0*		*30 - 110*

Rad

Leach Batch: 126552

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102199-1	SD-279-SS	Total/NA	Solid	Dry and Grind	
680-102199-1 DU	SD-279-SS	Total/NA	Solid	Dry and Grind	
680-102199-2	SD-279-01	Total/NA	Solid	Dry and Grind	
680-102199-3	SD-279-02	Total/NA	Solid	Dry and Grind	
680-102199-7	SD-277-SS	Total/NA	Solid	Dry and Grind	
680-102199-8	SD-277-01	Total/NA	Solid	Dry and Grind	
680-102199-9	SD-277-02	Total/NA	Solid	Dry and Grind	
680-102199-11	SD-219-SS	Total/NA	Solid	Dry and Grind	
680-102199-12	SD-219-01	Total/NA	Solid	Dry and Grind	
680-102199-13	SD-219-02	Total/NA	Solid	Dry and Grind	
680-102199-14	SD-219-03	Total/NA	Solid	Dry and Grind	
680-102199-15	SD-218-SS	Total/NA	Solid	Dry and Grind	
680-102199-16	SD-218-01	Total/NA	Solid	Dry and Grind	
680-102199-17	SD-218-02	Total/NA	Solid	Dry and Grind	
680-102199-18	SD-203-SS	Total/NA	Solid	Dry and Grind	
680-102199-19	SD-203-01	Total/NA	Solid	Dry and Grind	
680-102199-20	SD-203-02	Total/NA	Solid	Dry and Grind	
680-102199-22	SD-202-SS	Total/NA	Solid	Dry and Grind	
680-102199-23	SD-202-01	Total/NA	Solid	Dry and Grind	
680-102199-24	SD-202-02	Total/NA	Solid	Dry and Grind	
680-102199-25	SD-195-SS	Total/NA	Solid	Dry and Grind	
680-102199-26	SD-196-SS	Total/NA	Solid	Dry and Grind	
680-102199-26 DU	SD-196-SS	Total/NA	Solid	Dry and Grind	
680-102199-27	SD-196-01	Total/NA	Solid	Dry and Grind	
680-102199-28	SD-196-02	Total/NA	Solid	Dry and Grind	
680-102199-30	SD-220-SS	Total/NA	Solid	Dry and Grind	
680-102199-31	SD-220-01	Total/NA	Solid	Dry and Grind	
680-102199-32	SD-220-02	Total/NA	Solid	Dry and Grind	
680-102199-33	SD-DUP-01	Total/NA	Solid	Dry and Grind	
680-102199-35	SD-201-SS	Total/NA	Solid	Dry and Grind	
680-102199-36	SD-201-01	Total/NA	Solid	Dry and Grind	
680-102199-37	SD-201-02	Total/NA	Solid	Dry and Grind	
680-102199-39	SD-200-SS	Total/NA	Solid	Dry and Grind	
680-102199-40	SD-200-01	Total/NA	Solid	Dry and Grind	
680-102199-41	SD-200-02	Total/NA	Solid	Dry and Grind	
680-102199-42	SD-200-03	Total/NA	Solid	Dry and Grind	

Prep Batch: 126996

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102199-1	SD-279-SS	Total/NA	Solid	ExtChrom	126552
680-102199-1 DU	SD-279-SS	Total/NA	Solid	ExtChrom	126552
680-102199-2	SD-279-01	Total/NA	Solid	ExtChrom	126552
680-102199-3	SD-279-02	Total/NA	Solid	ExtChrom	126552
680-102199-7	SD-277-SS	Total/NA	Solid	ExtChrom	126552
680-102199-8	SD-277-01	Total/NA	Solid	ExtChrom	126552
680-102199-9	SD-277-02	Total/NA	Solid	ExtChrom	126552
680-102199-11	SD-219-SS	Total/NA	Solid	ExtChrom	126552
680-102199-12	SD-219-01	Total/NA	Solid	ExtChrom	126552
680-102199-13	SD-219-02	Total/NA	Solid	ExtChrom	126552
680-102199-14	SD-219-03	Total/NA	Solid	ExtChrom	126552
680-102199-15	SD-218-SS	Total/NA	Solid	ExtChrom	126552

Rad (Continued)

Prep Batch: 126996 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102199-16	SD-218-01	Total/NA	Solid	ExtChrom	126552
680-102199-17	SD-218-02	Total/NA	Solid	ExtChrom	126552
680-102199-18	SD-203-SS	Total/NA	Solid	ExtChrom	126552
680-102199-19	SD-203-01	Total/NA	Solid	ExtChrom	126552
680-102199-20	SD-203-02	Total/NA	Solid	ExtChrom	126552
680-102199-22	SD-202-SS	Total/NA	Solid	ExtChrom	126552
680-102199-23	SD-202-01	Total/NA	Solid	ExtChrom	126552
680-102199-24	SD-202-02	Total/NA	Solid	ExtChrom	126552
LCS 160-126996/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-126996/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Prep Batch: 126998

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102199-25	SD-195-SS	Total/NA	Solid	ExtChrom	126552
680-102199-26	SD-196-SS	Total/NA	Solid	ExtChrom	126552
680-102199-26 DU	SD-196-SS	Total/NA	Solid	ExtChrom	126552
680-102199-27	SD-196-01	Total/NA	Solid	ExtChrom	126552
680-102199-28	SD-196-02	Total/NA	Solid	ExtChrom	126552
680-102199-30	SD-220-SS	Total/NA	Solid	ExtChrom	126552
680-102199-31	SD-220-01	Total/NA	Solid	ExtChrom	126552
680-102199-32	SD-220-02	Total/NA	Solid	ExtChrom	126552
680-102199-33	SD-DUP-01	Total/NA	Solid	ExtChrom	126552
680-102199-35	SD-201-SS	Total/NA	Solid	ExtChrom	126552
680-102199-36	SD-201-01	Total/NA	Solid	ExtChrom	126552
680-102199-37	SD-201-02	Total/NA	Solid	ExtChrom	126552
680-102199-39	SD-200-SS	Total/NA	Solid	ExtChrom	126552
680-102199-40	SD-200-01	Total/NA	Solid	ExtChrom	126552
680-102199-41	SD-200-02	Total/NA	Solid	ExtChrom	126552
680-102199-42	SD-200-03	Total/NA	Solid	ExtChrom	126552
LCS 160-126998/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-126998/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-1
SDG: 680102199-1

Client Sample ID: SD-279-SS
Lab Sample ID: 680-102199-1
Date Collected: 06/09/14 15:40
Matrix: Solid
Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128901	06/30/14 01:40	MLK	TAL SL

Client Sample ID: SD-279-01
Lab Sample ID: 680-102199-2
Date Collected: 06/09/14 15:45
Matrix: Solid
Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128946	06/30/14 18:11	MLK	TAL SL

Client Sample ID: SD-279-02
Lab Sample ID: 680-102199-3
Date Collected: 06/09/14 15:50
Matrix: Solid
Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128933	06/30/14 01:40	MLK	TAL SL

Client Sample ID: SD-277-SS
Lab Sample ID: 680-102199-7
Date Collected: 06/09/14 18:10
Matrix: Solid
Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128935	06/30/14 01:40	MLK	TAL SL

Client Sample ID: SD-277-01
Lab Sample ID: 680-102199-8
Date Collected: 06/09/14 18:15
Matrix: Solid
Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128936	06/30/14 01:40	MLK	TAL SL

Client Sample ID: SD-277-02

Lab Sample ID: 680-102199-9

Date Collected: 06/09/14 18:20

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128937	06/30/14 01:40	MLK	TAL SL

Client Sample ID: SD-219-SS

Lab Sample ID: 680-102199-11

Date Collected: 06/10/14 09:20

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128938	06/30/14 01:40	MLK	TAL SL

Client Sample ID: SD-219-01

Lab Sample ID: 680-102199-12

Date Collected: 06/10/14 09:22

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128939	06/30/14 01:40	MLK	TAL SL

Client Sample ID: SD-219-02

Lab Sample ID: 680-102199-13

Date Collected: 06/10/14 09:25

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128940	06/30/14 01:40	MLK	TAL SL

Client Sample ID: SD-219-03

Lab Sample ID: 680-102199-14

Date Collected: 06/10/14 09:28

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128941	06/30/14 01:40	MLK	TAL SL

Client Sample ID: SD-218-SS
Lab Sample ID: 680-102199-15
Date Collected: 06/10/14 10:10
Matrix: Solid
Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128942	06/30/14 01:40	MLK	TAL SL

Client Sample ID: SD-218-01
Lab Sample ID: 680-102199-16
Date Collected: 06/10/14 10:12
Matrix: Solid
Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128943	06/30/14 01:40	MLK	TAL SL

Client Sample ID: SD-218-02
Lab Sample ID: 680-102199-17
Date Collected: 06/10/14 10:14
Matrix: Solid
Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128944	06/30/14 01:40	MLK	TAL SL

Client Sample ID: SD-203-SS
Lab Sample ID: 680-102199-18
Date Collected: 06/10/14 11:40
Matrix: Solid
Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128947	06/30/14 01:40	MLK	TAL SL

Client Sample ID: SD-203-01
Lab Sample ID: 680-102199-19
Date Collected: 06/10/14 11:45
Matrix: Solid
Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128948	06/30/14 01:40	MLK	TAL SL

Client Sample ID: SD-203-02

Lab Sample ID: 680-102199-20

Date Collected: 06/10/14 11:50

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128949	06/30/14 01:40	MLK	TAL SL

Client Sample ID: SD-202-SS

Lab Sample ID: 680-102199-22

Date Collected: 06/10/14 12:20

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128950	06/30/14 01:40	MLK	TAL SL

Client Sample ID: SD-202-01

Lab Sample ID: 680-102199-23

Date Collected: 06/10/14 12:25

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128952	06/30/14 01:40	MLK	TAL SL

Client Sample ID: SD-202-02

Lab Sample ID: 680-102199-24

Date Collected: 06/10/14 12:30

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126996	06/16/14 12:49	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128953	06/30/14 01:40	MLK	TAL SL

Client Sample ID: SD-195-SS

Lab Sample ID: 680-102199-25

Date Collected: 06/10/14 13:30

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126998	06/17/14 07:50	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128971	06/30/14 01:43	MLK	TAL SL

Client Sample ID: SD-196-SS

Lab Sample ID: 680-102199-26

Date Collected: 06/10/14 14:00

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126998	06/16/14 13:16	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128956	06/30/14 01:42	MLK	TAL SL

Client Sample ID: SD-196-01

Lab Sample ID: 680-102199-27

Date Collected: 06/10/14 14:05

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126998	06/16/14 13:16	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128958	06/30/14 01:42	MLK	TAL SL

Client Sample ID: SD-196-02

Lab Sample ID: 680-102199-28

Date Collected: 06/10/14 14:10

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126998	06/16/14 13:16	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129083	06/30/14 01:42	MLK	TAL SL

Client Sample ID: SD-220-SS

Lab Sample ID: 680-102199-30

Date Collected: 06/10/14 14:40

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126998	06/16/14 13:16	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128959	06/30/14 01:42	MLK	TAL SL

Client Sample ID: SD-220-01

Lab Sample ID: 680-102199-31

Date Collected: 06/10/14 14:42

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126998	06/16/14 13:16	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128960	06/30/14 01:42	MLK	TAL SL

Client Sample ID: SD-220-02

Lab Sample ID: 680-102199-32

Date Collected: 06/10/14 14:44

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126998	06/16/14 13:16	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128961	06/30/14 01:43	MLK	TAL SL

Client Sample ID: SD-DUP-01

Lab Sample ID: 680-102199-33

Date Collected: 06/10/14 00:00

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126998	06/16/14 13:16	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128963	06/30/14 01:43	MLK	TAL SL

Client Sample ID: SD-201-SS

Lab Sample ID: 680-102199-35

Date Collected: 06/10/14 15:10

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126998	06/16/14 13:16	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128964	06/30/14 01:43	MLK	TAL SL

Client Sample ID: SD-201-01

Lab Sample ID: 680-102199-36

Date Collected: 06/10/14 15:15

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126998	06/16/14 13:16	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128965	06/30/14 01:43	MLK	TAL SL

Client Sample ID: SD-201-02

Lab Sample ID: 680-102199-37

Date Collected: 06/10/14 15:20

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126998	06/16/14 13:16	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128966	06/30/14 01:43	MLK	TAL SL

Client Sample ID: SD-200-SS
Lab Sample ID: 680-102199-39

Date Collected: 06/10/14 15:50
Matrix: Solid
Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126998	06/16/14 13:16	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128967	06/30/14 01:43	MLK	TAL SL

Client Sample ID: SD-200-01
Lab Sample ID: 680-102199-40

Date Collected: 06/10/14 15:55
Matrix: Solid
Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126998	06/16/14 13:16	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128968	06/30/14 01:43	MLK	TAL SL

Client Sample ID: SD-200-02
Lab Sample ID: 680-102199-41

Date Collected: 06/10/14 16:00
Matrix: Solid
Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126998	06/16/14 13:16	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128969	06/30/14 01:43	MLK	TAL SL

Client Sample ID: SD-200-03
Lab Sample ID: 680-102199-42

Date Collected: 06/10/14 16:05
Matrix: Solid
Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			126552	06/12/14 11:21	DRO	TAL SL
Total/NA	Prep	ExtChrom			126998	06/16/14 13:16	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	128970	06/30/14 01:43	MLK	TAL SL

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Certification Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-1
SDG: 680102199-1

Laboratory: TestAmerica Savannah

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
	AFCEE		SAVLAB	
A2LA	DoD ELAP		399.01	02-28-15
A2LA	ISO/IEC 17025		399.01	02-28-15
Alabama	State Program	4	41450	06-30-15
Arkansas DEQ	State Program	6	88-0692	01-31-15
California	NELAP	9	3217CA	07-31-14 *
Colorado	State Program	8	N/A	12-31-14
Connecticut	State Program	1	PH-0161	03-31-15
Florida	NELAP	4	E87052	06-30-15
GA Dept. of Agriculture	State Program	4	N/A	06-30-14 *
Georgia	State Program	4	N/A	06-30-15
Georgia	State Program	4	803	06-30-15
Guam	State Program	9	09-005r	04-16-15
Hawaii	State Program	9	N/A	06-30-15
Illinois	NELAP	5	200022	11-30-14
Indiana	State Program	5	N/A	06-30-15
Iowa	State Program	7	353	07-01-15
Kentucky (DW)	State Program	4	90084	12-31-14
Kentucky (UST)	State Program	4	18	06-30-15
Louisiana	NELAP	6	30690	06-30-14 *
Louisiana (DW)	NELAP	6	LA140023	12-31-14
Maine	State Program	1	GA00006	08-16-14 *
Maryland	State Program	3	250	12-31-14
Massachusetts	State Program	1	M-GA006	06-30-15
Michigan	State Program	5	9925	06-30-14 *
Mississippi	State Program	4	N/A	06-30-14 *
Montana	State Program	8	CERT0081	01-01-15
Nebraska	State Program	7	TestAmerica-Savannah	06-30-14 *
New Jersey	NELAP	2	GA769	06-30-15
New Mexico	State Program	6	N/A	06-30-14 *
New York	NELAP	2	10842	03-31-15
North Carolina (DW)	State Program	4	13701	07-31-15
North Carolina (WW/SW)	State Program	4	269	12-31-14
Oklahoma	State Program	6	9984	08-31-14
Pennsylvania	NELAP	3	68-00474	06-30-15
Puerto Rico	State Program	2	GA00006	12-31-14
South Carolina	State Program	4	98001	06-30-14 *
Tennessee	State Program	4	TN02961	06-30-15
Texas	NELAP	6	T104704185-08-TX	11-30-14
USDA	Federal		SAV 3-04	06-11-17
Virginia	NELAP	3	460161	06-14-15
Washington	State Program	10	C805	06-10-15
West Virginia (DW)	State Program	3	9950C	12-31-14
West Virginia DEP	State Program	3	94	06-30-14 *
Wisconsin	State Program	5	999819810	08-31-14
Wyoming	State Program	8	8TMS-L	06-30-14 *

Laboratory: TestAmerica St. Louis

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

* Certification renewal pending - certification considered valid.

Laboratory: TestAmerica St. Louis (Continued)

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska	State Program	10	MO00054	06-30-15
California	NELAP	9	09266CA	03-31-15
Connecticut	State Program	1	PH-0241	03-31-15
Florida	NELAP	4	E87689	06-30-14 *
Illinois	NELAP	5	200023	11-30-14
Iowa	State Program	7	373	12-01-14
Kansas	NELAP	7	E-10236	10-31-14
Kentucky (DW)	State Program	4	90125	12-31-14
L-A-B	DoD ELAP		L2305	01-10-16
Louisiana	NELAP	6	04080	06-30-15
Maryland	State Program	3	310	09-30-14 *
Missouri	State Program	7	780	06-30-14 *
Nevada	State Program	9	MO000542013-1	07-31-14 *
New Jersey	NELAP	2	MO002	06-30-15
New Mexico	State Program	6		06-30-10 *
New York	NELAP	2	11616	03-31-15
North Dakota	State Program	8	R207	06-30-14 *
NRC	NRC		24-24817-01	12-31-22
Oklahoma	State Program	6	2013-049	08-31-14 *
Pennsylvania	NELAP	3	68-00540	02-28-15
South Carolina	State Program	4	85002001	06-30-14 *
Texas	NELAP	6	T104704193-13-6	07-31-14 *
USDA	Federal		P330-07-00122	01-09-17
USEPA Reg V SDWA	Federal	1	WG-15J	08-30-14
Utah	NELAP	8	MO000542013-5	07-31-14 *
Virginia	NELAP	3	2236	06-14-14 *
Washington	State Program	10	C592	08-30-14
West Virginia DEP	State Program	3	381	08-30-14

* Certification renewal pending - certification considered valid.

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-1
SDG: 680102199-1

Method	Method Description	Protocol	Laboratory
A-01-R	Isotopic Thorium (Alpha Spectrometry)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-1
SDG: 680102199-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-102199-1	SD-279-SS	Solid	06/09/14 15:40	06/11/14 09:30
680-102199-2	SD-279-01	Solid	06/09/14 15:45	06/11/14 09:30
680-102199-3	SD-279-02	Solid	06/09/14 15:50	06/11/14 09:30
680-102199-7	SD-277-SS	Solid	06/09/14 18:10	06/11/14 09:30
680-102199-8	SD-277-01	Solid	06/09/14 18:15	06/11/14 09:30
680-102199-9	SD-277-02	Solid	06/09/14 18:20	06/11/14 09:30
680-102199-11	SD-219-SS	Solid	06/10/14 09:20	06/11/14 09:30
680-102199-12	SD-219-01	Solid	06/10/14 09:22	06/11/14 09:30
680-102199-13	SD-219-02	Solid	06/10/14 09:25	06/11/14 09:30
680-102199-14	SD-219-03	Solid	06/10/14 09:28	06/11/14 09:30
680-102199-15	SD-218-SS	Solid	06/10/14 10:10	06/11/14 09:30
680-102199-16	SD-218-01	Solid	06/10/14 10:12	06/11/14 09:30
680-102199-17	SD-218-02	Solid	06/10/14 10:14	06/11/14 09:30
680-102199-18	SD-203-SS	Solid	06/10/14 11:40	06/11/14 09:30
680-102199-19	SD-203-01	Solid	06/10/14 11:45	06/11/14 09:30
680-102199-20	SD-203-02	Solid	06/10/14 11:50	06/11/14 09:30
680-102199-22	SD-202-SS	Solid	06/10/14 12:20	06/11/14 09:30
680-102199-23	SD-202-01	Solid	06/10/14 12:25	06/11/14 09:30
680-102199-24	SD-202-02	Solid	06/10/14 12:30	06/11/14 09:30
680-102199-25	SD-195-SS	Solid	06/10/14 13:30	06/11/14 09:30
680-102199-26	SD-196-SS	Solid	06/10/14 14:00	06/11/14 09:30
680-102199-27	SD-196-01	Solid	06/10/14 14:05	06/11/14 09:30
680-102199-28	SD-196-02	Solid	06/10/14 14:10	06/11/14 09:30
680-102199-30	SD-220-SS	Solid	06/10/14 14:40	06/11/14 09:30
680-102199-31	SD-220-01	Solid	06/10/14 14:42	06/11/14 09:30
680-102199-32	SD-220-02	Solid	06/10/14 14:44	06/11/14 09:30
680-102199-33	SD-DUP-01	Solid	06/10/14 00:00	06/11/14 09:30
680-102199-35	SD-201-SS	Solid	06/10/14 15:10	06/11/14 09:30
680-102199-36	SD-201-01	Solid	06/10/14 15:15	06/11/14 09:30
680-102199-37	SD-201-02	Solid	06/10/14 15:20	06/11/14 09:30
680-102199-39	SD-200-SS	Solid	06/10/14 15:50	06/11/14 09:30
680-102199-40	SD-200-01	Solid	06/10/14 15:55	06/11/14 09:30
680-102199-41	SD-200-02	Solid	06/10/14 16:00	06/11/14 09:30
680-102199-42	SD-200-03	Solid	06/10/14 16:05	06/11/14 09:30

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102199-1

SDG No.: 680102199-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
82232-334_00001	06/03/60		Eckert & Ziegler, Lot 82232-334		(Purchased Reagent)		Am-241	7.281 Bq
							Pu-239	7.137 Bq
							Thorium-230	7.63 Bq
82233-334_00001	06/03/60		Eckert & Zigler, Lot 82233-334		(Purchased Reagent)		Am-241	5.114 Bq
							Pu-239	6.064 Bq
							Thorium-230	4.95 Bq
82234-334_00001	06/02/60		Eckert & Zigler, Lot 82234-334		(Purchased Reagent)		Am-241	5.652 Bq
							Pu-239	5.936 Bq
							Thorium-230	5.685 Bq
82235-334_00001	06/04/60		Eckert & Ziegler, Lot 82235-334		(Purchased Reagent)		Am-241	7.466 Bq
							Pu-239	6.897 Bq
							Thorium-230	7.167 Bq
82236-334_00001	06/02/60		Eckert & Ziegler, Lot 82236-334		(Purchased Reagent)		Am-241	6.891 Bq
							Pu-239	6.664 Bq
							Thorium-230	7.107 Bq
82237-334_00003	06/01/60		Eckert & Ziegler, Lot 82237-334		(Purchased Reagent)		Am-241	5.608 Bq
							Pu-239	6.424 Bq
							Thorium-230	5.856 Bq
82240-334_00001	06/08/60		Eckert & Ziegler, Lot 82240-334		(Purchased Reagent)		Am-241	8.298 Bq
							Pu-239	7.163 Bq
							Thorium-230	6.304 Bq
82241-334_00001	06/08/60		Eckert & Ziegler, Lot 82241-334		(Purchased Reagent)		Am-241	6.638 Bq
							Pu-239	6.797 Bq
							Thorium-230	6.629 Bq
82242-334_00001	06/08/60		Eckert & Ziegler, Lot 82242-334		(Purchased Reagent)		Am-241	7.145 Bq
							Pu-239	6.414 Bq
							Thorium-230	6.583 Bq
82243-334_00001	06/09/60		Eckert & Ziegler, Lot 82243-334		(Purchased Reagent)		Am-241	6.39 Bq
							Pu-239	5.979 Bq
							Thorium-230	5.856 Bq
82244-334_00001	06/09/60		Eckert & Zigler, Lot 82244-334		(Purchased Reagent)		Am-241	6.897 Bq
							Pu-239	6.717 Bq
							Thorium-230	7.352 Bq
82245-334_00001	06/09/60		Eckert & Ziegler, Lot 82245-334		(Purchased Reagent)		Am-241	5.528 Bq
							Pu-239	5.437 Bq
							Thorium-230	6.727 Bq
82246-334_00001	06/09/60		Eckert & Ziegler, Lot 82246-334		(Purchased Reagent)		Am-241	6.002 Bq
							Pu-239	5.353 Bq
							Thorium-230	5.57 Bq
82247-334_00001	06/10/60		Eckert & Ziegler, Lot 82247-334		(Purchased Reagent)		Am-241	6.291 Bq
							Pu-239	5.746 Bq
							Thorium-230	6.251 Bq

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102199-1

SDG No.: 680102199-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
Th-229_00012	12/26/14	12/23/13	0.1M HNO3, Lot L0022	500 mL	Th-229_00004	15 mL	Thorium-229	67.9293 dpm/mL
.Th-229_00004	07/14/60	01/26/11	0.1M HNO3, Lot 0	100 mL	Th-229_00002	5.0613 g	Thorium-229	2264.31 dpm/mL
..Th-229_00002	07/14/60	Eckert & Ziegler, Lot 82832-334			(Purchased Reagent)		Thorium-229	745.63 Bq/g
TRM-2_00001	03/20/50	DOE, Lot TRM-2			(Purchased Reagent)		Pb-210	22.1 pCi/g
							Ra-226	25.4 pCi/g
							Thorium-230	24.5 pCi/g
							U-234	6.2 pCi/g
							U-238	6 pCi/g

Reagent

82232-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82232-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 3-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	7.630E+00	4420-4800	7.540E+04	0.7	1.1	2.6
Pu-239	7.137E+00	4950-5240	2.410E+04	0.7	1.1	2.6
Am-241	7.281E+00	5280-5600	4.326E+02	0.7	1.1	2.6
Total Activity	2.210E+01	3000-8000		0.4	1.1	2.3

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82233-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82233-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 3-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	4.950E+00	4420-4800	7.540E+04	0.8	1.1	2.7
Pu-239	6.064E+00	4950-5240	2.410E+04	0.7	1.1	2.6
Am-241	5.114E+00	5280-5600	4.326E+02	0.8	1.1	2.7
Total Activity	1.616E+01	3000-8000		0.1	1.1	2.2

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82234-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82234-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 2-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	5.685E+00	4420-4800	7.540E+04	0.9	1.1	2.8
Pu-239	5.936E+00	4950-5240	2.410E+04	0.9	1.1	2.8
Am-241	5.652E+00	5280-5600	4.326E+02	0.9	1.1	2.8
Total Activity	1.732E+01	3000-8000		0.5	1.1	2.4

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82235-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82235-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 4-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	7.167E+00	4420-4800	7.540E+04	0.8	1.1	2.7
Pu-239	6.897E+00	4950-5240	2.410E+04	0.8	1.1	2.7
Am-241	7.466E+00	5280-5600	4.326E+02	0.8	1.1	2.7
Total Activity	2.161E+01	3000-8000		0.5	1.1	2.4

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1958

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82236-334_00001

Eckert & Ziegler
Analytics

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Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82236-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 2-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	7.107E+00	4420-4800	7.540E+04	0.7	1.1	2.6
Pu-239	6.664E+00	4950-5240	2.410E+04	0.8	1.1	2.7
Am-241	6.891E+00	5280-5600	4.326E+02	0.7	1.1	2.6
Total Activity	2.071E+01	3000-8000		0.4	1.1	2.3

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.46 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82237-334_00003

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
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Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82237-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 1-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	5.856E+00	4420-4800	7.540E+04	1.0	1.1	3.0
Pu-239	6.424E+00	4950-5240	2.410E+04	0.9	1.1	2.8
Am-241	5.608E+00	5280-5600	4.326E+02	1.0	1.1	3.0
Total Activity	1.793E+01	3000-8000		0.6	1.1	2.5

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82240-334_00001

Eckert & Ziegler
Analytics

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Atlanta, Georgia 30318
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Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82240-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 8-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	6.304E+00	4420-4800	7.540E+04	0.9	1.1	2.8
Pu-239	7.163E+00	4950-5240	2.410E+04	0.8	1.1	2.7
Am-241	8.298E+00	5280-5600	4.326E+02	0.8	1.1	2.7
Total Activity	2.182E+01	3000-8000		0.5	1.1	2.4

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82241-334_00001

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Analytics

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Atlanta, Georgia 30318
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www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82241-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 8-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	6.629E+00	4420-4800	7.540E+04	0.8	1.1	2.7
Pu-239	6.797E+00	4950-5240	2.410E+04	0.8	1.1	2.7
Am-241	6.638E+00	5280-5600	4.326E+02	0.8	1.1	2.7
Total Activity	2.011E+01	3000-8000		0.4	1.1	2.3

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82242-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82242-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 8-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	6.583E+00	4420-4800	7.540E+04	0.9	1.1	2.8
Pu-239	6.414E+00	4950-5240	2.410E+04	0.9	1.1	2.8
Am-241	7.145E+00	5280-5600	4.326E+02	0.9	1.1	2.8
Total Activity	2.018E+01	3000-8000		0.6	1.1	2.5

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1958

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82243-334_00001

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Analytics

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Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82243-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 9-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	5.856E+00	4420-4800	7.540E+04	0.8	1.1	2.7
Pu-239	5.979E+00	4950-5240	2.410E+04	0.8	1.1	2.7
Am-241	6.390E+00	5280-5600	4.326E+02	0.8	1.1	2.7
Total Activity	1.827E+01	3000-8000		0.3	1.1	2.3

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY
HEALTH PHYSICS SOCIETY
FOUNDED 1966

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82244-334_00001

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www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82244-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 9-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	7.352E+00	4420-4800	7.540E+04	0.8	1.1	2.7
Pu-239	6.717E+00	4950-5240	2.410E+04	0.9	1.1	2.8
Am-241	6.897E+00	5280-5600	4.326E+02	0.9	1.1	2.8
Total Activity	2.101E+01	3000-8000		0.6	1.1	2.5

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY
HEALTH PHYSICS SOCIETY
FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82245-334_00001

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CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82245-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 9-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	6.727E+00	4420-4800	7.540E+04	1.0	1.1	3.0
Pu-239	5.437E+00	4950-5240	2.410E+04	1.1	1.1	3.1
Am-241	5.528E+00	5280-5600	4.326E+02	1.1	1.1	3.1
Total Activity	1.773E+01	3000-8000		0.8	1.1	2.7

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82246-334_00001

Eckert & Ziegler
Analytics

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Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82246-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 9-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	5.570E+00	4420-4800	7.540E+04	1.0	1.1	3.0
Pu-239	5.353E+00	4950-5240	2.410E+04	1.0	1.1	3.0
Am-241	6.002E+00	5280-5600	4.326E+02	1.0	1.1	3.0
Total Activity	1.696E+01	3000-8000		0.7	1.1	2.6

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY
HEALTH PHYSICS SOCIETY
FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06.24.2010
E. A. Taskaev, QA Manager Alternate

Reagent

82247-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82247-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 10-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	6.251E+00	4420-4800	7.540E+04	0.9	1.1	2.8
Pu-239	5.746E+00	4950-5240	2.410E+04	0.9	1.1	2.8
Am-241	6.291E+00	5280-5600	4.326E+02	0.9	1.1	2.8
Total Activity	1.832E+01	3000-8000		0.6	1.1	2.5

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

Th-229_00002

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82832-334

5 mL Liquid in Flame Sealed Vial

Customer: Test America/Earth City, MO
P.O. No.: 2370431, Item 1

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty*, % Type u_A	u_B	U	Reference Date (12:00 PM EST)
Th-229	2.681E+06	3.813E+03	0.3	1.0	2.1	07/14/2010

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: Th-228 - 1.25 Bq, Th-230 - 23.7 Bq, Th-232 - 1.5 Bq. 5.11380 grams 0.5M HNO3 solution.

Source Prepared by: _____
W. Mao, Radiochemist

QA Approved: _____ Date: 7/21/10
J. D. McCorvey, QA Manager Alternate

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1956

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Th-229_00012

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Th - 229 - 00012

Reagent ID: Th-229_00012

Description:	Th-229 Tracer	Expiration Date:	12/26/2014
No. of Bottles:	1	Laboratory:	TestAmerica St. Louis
Storage Location:	RAD Actinide STDs	Prepared By:	Bramblett, Megan L
Reagent Volume:	500.000 mL	Solvent:	0.1M HNO3
Creation Date:	12/23/2013	Solvent Lot:	L0022
Container(s):	282329		
Comment:			

282329
ID: Th-229_00012
Exp: 12/26/14 Prpd: MLM Crt: 12/23/13
Th-229 Tracer

Reagent Analyte Information

Analyte	Source ID	Source Exp. Date	Source Conc.	Source Conc. Units	Final Conc.	Final Conc. Units
Th-229	Th-229_00004	07/14/2060	2264.31000	dpm/mL	67.92931	dpm/mL

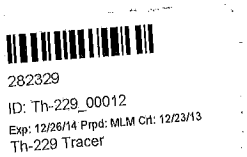
Source Reagents

Reagent	Description	Type	Expiration	Vendor	Vendor Lot #	Vendor Cat Lot #	Volume Used	Volume Units
Th-229_00004	Th-229 Parent		07/14/60				15.00000	mL

St. Louis Radiological Standard Reverification Form

Standard ID Number: Th-229_00012
True Value = 67.90686 DPM/L or g
Date Analyzed: 12/26/2013

Radionuclide: Th-229



Replicates

#1	69.113	DPM/L or g
#2	66.755	DPM/L or g
#3	68.034	DPM/L or g

Mean = 67.96733

1 sigma = 1.180413

1.96 sigma = 2.313609

True Value minus 5% = 64.51152 (True Value - 5%)
True Value plus 5% = 71.3022 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? Yes **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? Yes **(Acceptance Criteria)**

Standard Reverification Acceptable? Yes

Note: Criteria for reverification of radiological standards is taken from the DOE QSAS and LANL Statements of Work

Reviewed By/Date: RTM 12/30/2013

SOP Reference: STL-QA-0002, Current Revision

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:30:35AM 12/30/2013

Sample

Sample Name: Verification-1
SampleType: Sample
:
Sample Collection Date:

Spectrum #1 Analysis #1
Sample Volume : 0.1000mL
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: Th-229_0012
AnalysisID: 592567

Analyst: 60040

Tracer

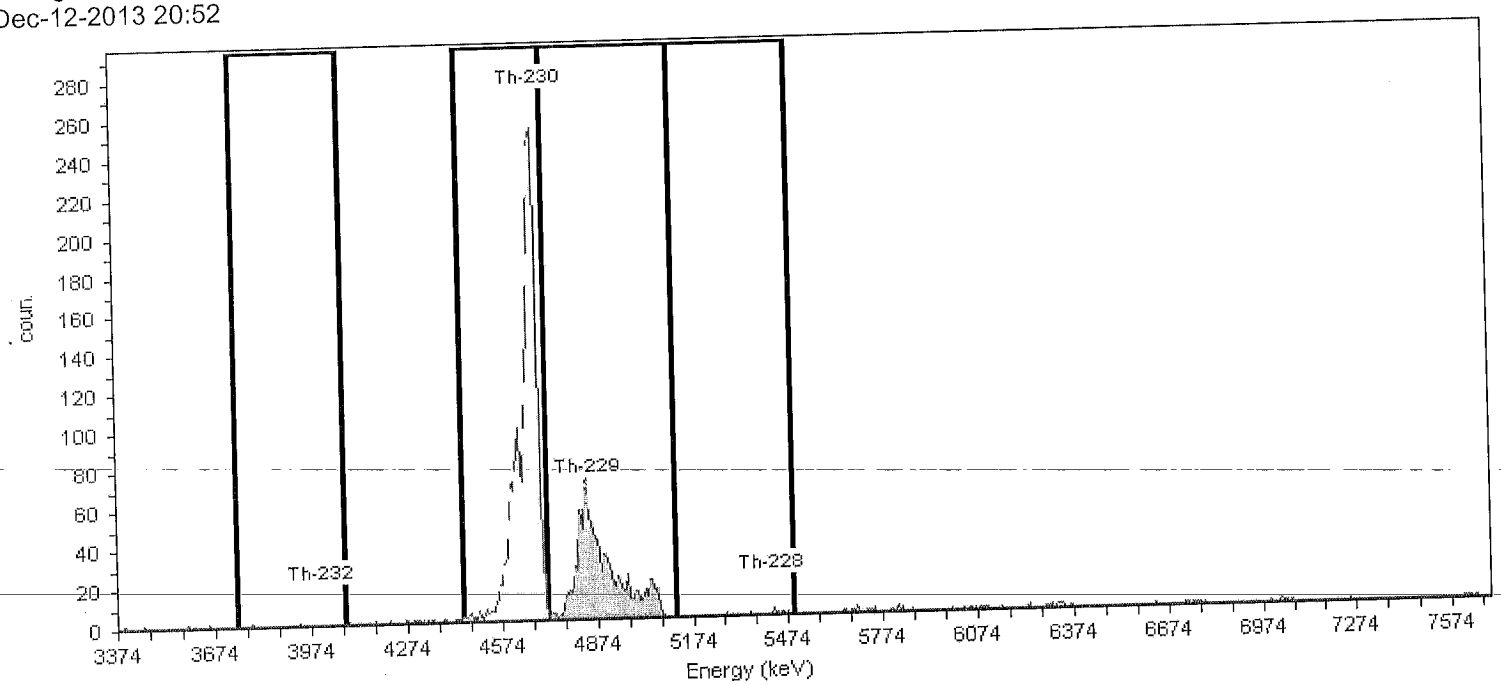
Tracer Name: Th-230_00017
Tracer Activity: 47.94 DPM/mL x (Vol.)0.30 mL = 14.38 DPM
Tracer Ref. Date: 4/11/2011 11:00:10AM

Tracer Nuclide: Th-230
Tracer Recovery: 90.73%

Acquisition

Detector: AV44
Serial Number: 50-051JJ1
Acquisition Start Date: 12/26/2013 4:26:11PM
Live Time: 600.00 min.
Real Time: 600.01 min.
Background Date: 12/12/2013 8:52:36PM
Background Info: Sample: ICB;AV44; Det: AV44; Spectrum #1; Dec-12-2013 20:52

Calibration Name: IC-9795;AV44-20130515
Calibration Date: 5/15/2013 9:25:41PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.64% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th-230_Tracer
Decay Correction: 12/26/2013 4:24:41PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	61.6	100.2	2	0.6250	1.38	0.095	DPM/mL
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	31.6	99.7	2079	0.0000	2079.38	130.481	DPM/mL
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	84.3	99.8	1004	3.7500	1000.25	69.113	DPM/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	36.0	99.8	8	7.5000	0.50	0.035	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:31:26AM 12/30/2013

Sample

Sample Name: Verification-2
SampleType: Sample
:
Sample Collection Date:

Spectrum #1 Analysis #1
Sample Volume : 0.1000mL
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: Th-229_0012
AnalysisID: 592570

Analyst: 60040

Tracer

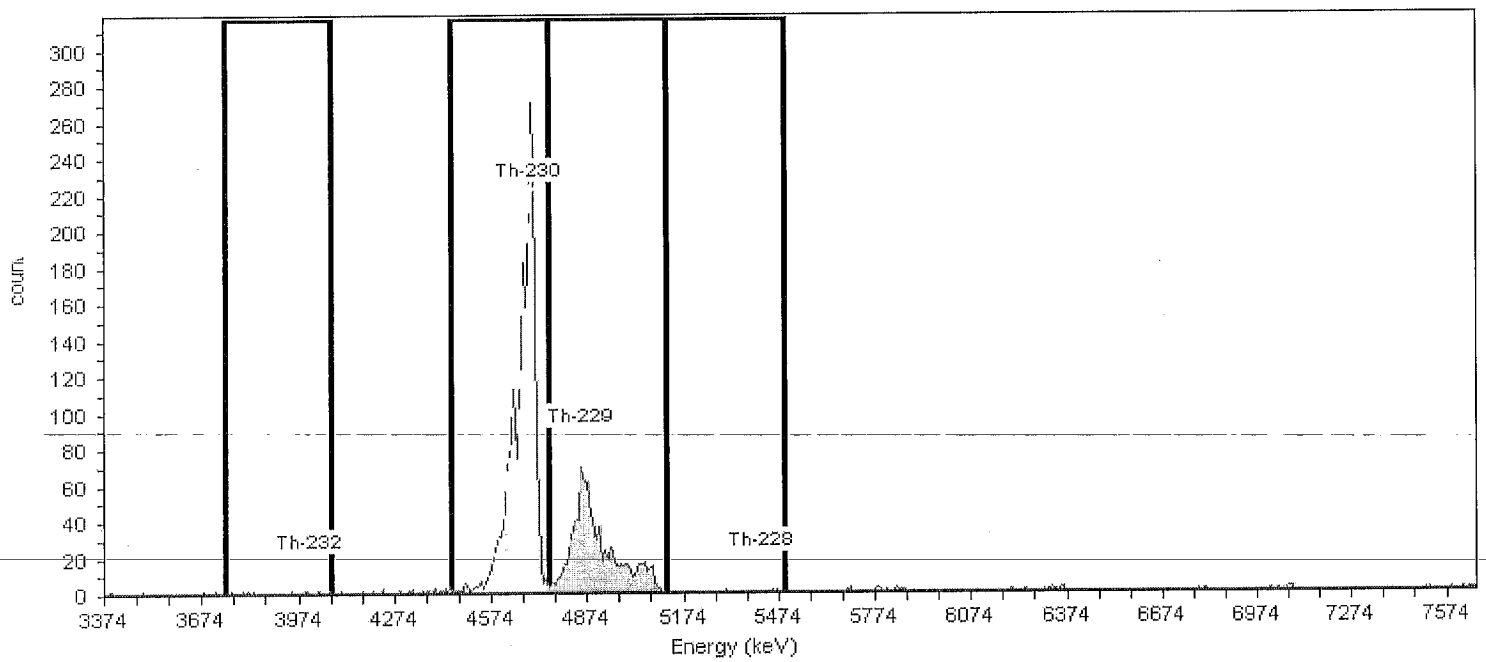
Tracer Name: Th-230_00017
Tracer Activity: 47.94 DPM/mL x (Vol.)0.30 mL = 14.38 DPM
Tracer Ref. Date: 4/11/2011 11:00:10AM

Tracer Nuclide: Th-230
Tracer Recovery: 95.22%

Acquisition

Detector: AV45
Serial Number: 48-158FF2
Acquisition Start Date: 12/26/2013 4:26:13PM
Live Time: 600.00 min.
Real Time: 600.01 min.
Background Date: 12/12/2013 8:52:38PM
Background Info: Sample: ICB;AV45; Det: AV45; Spectrum #1; Dec-12-2013 20:52

Calibration Name: IC-9817;AV45-20130515
Calibration Date: 5/15/2013 9:25:55PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.68% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th-230_Tracer
Decay Correction: 12/26/2013 4:24:41PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	37.3	100.2	7	0.0000	7.46	0.488	DPM/mL
Th-230	4688.0	4,687.5	0.5	4448.3	4754.1	64.3	99.7	2186	0.6250	2185.38	136.944	DPM/mL
Th-229	4848.0	4,845.3	2.7	4754.1	5119.5	79.8	99.8	1016	0.6250	1015.38	66.755	DPM/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	24.9	99.8	3	5.6250	-2.63	-0.173	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:32:04AM 12/30/2013

Sample

Sample Name: Verification-3
SampleType: Sample
Sample Collection Date:

Spectrum #1 Analysis #1
Sample Volume : 0.1000mL
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: Th-229_0012
AnalysisID: 592571

Analyst: 60040

Tracer

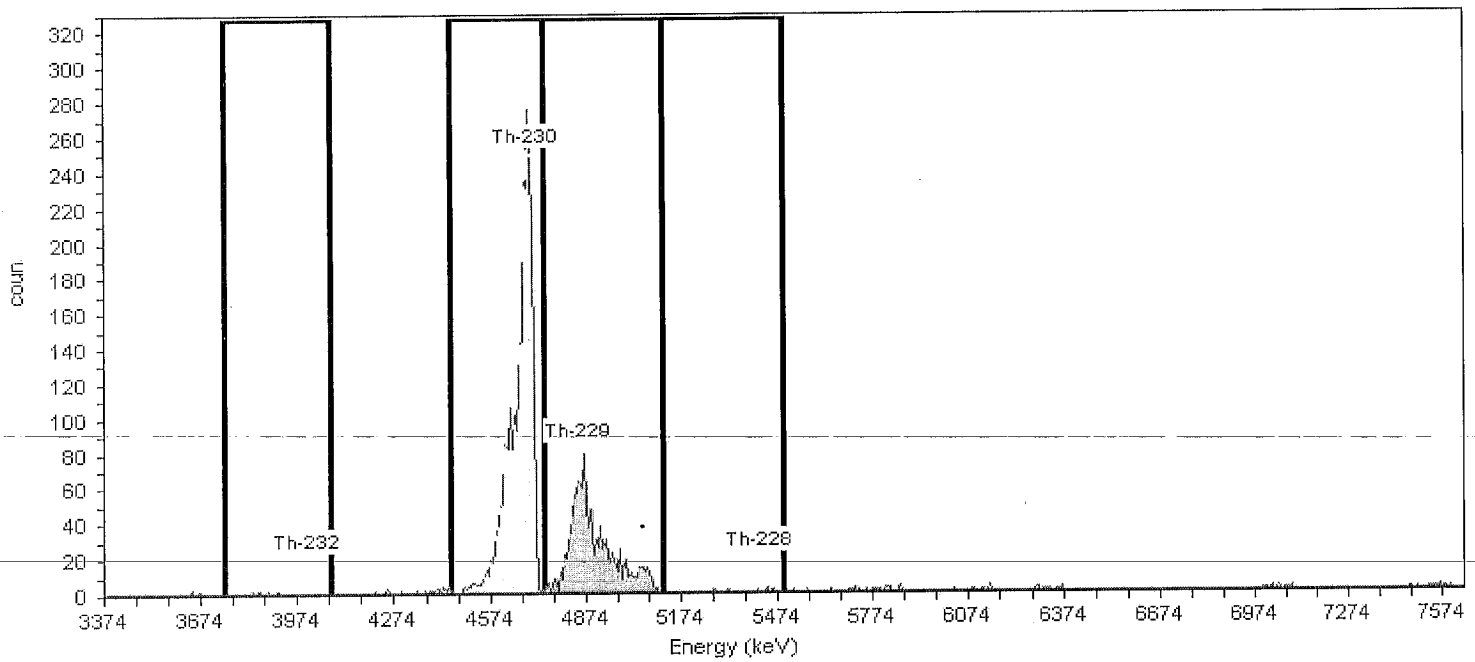
Tracer Name: Th-230_00017
Tracer Activity: 47.94 DPM/mL x (Vol.)0.30 mL = 14.38 DPM
Tracer Ref. Date: 4/11/2011 11:00:10AM

Tracer Nuclide: Th-230
Tracer Recovery: 93.94%

Acquisition

Detector: AV46
Serial Number: 49-202GG2
Acquisition Start Date: 12/26/2013 4:26:15PM
Live Time: 600.00 min.
Real Time: 600.01 min.
Background Date: 12/12/2013 8:52:40PM
Background Info: Sample: ICB;AV46; Det: AV46; Spectrum #1; Dec-12-2013 20:52

Calibration Name: IC-9884;AV46-20130515a
Calibration Date: 5/16/2013 12:12:59AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 27.46% +/- 0.39% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th-230_Tracer
Decay Correction: 12/26/2013 4:24:41PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	95.0	100.2	5	0.6250	4.38	0.282	DPM/mL
Th-230	4688.0	4,687.5	0.5	4448.3	4739.1	36.4	99.7	2219	0.0000	2219.00	135.103	DPM/mL
Th-229	4848.0	4,845.3	2.7	4739.1	5119.5	78.0	99.8	1052	1.2500	1050.75	68.034	DPM/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	15.7	99.8	7	4.3750	2.63	0.170	DPM/mL

Decay Correction

Thorium-229								
Initial Activity:	67.929	dpm						
Reference Date:	7/14/2010							
Current Date:	12/26/2013		(or date at which you wish to determine activity)					
Elapsed Time:	1261	days						
Half Life:	2680935	days	64342440					
Exponential Term:	0.999674026							
Corrected Activity:	67.90685689	dpm	30.58867427	pCi				

Lm 12/30/13

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Actinide Prep

Batch No. : —

Balance ID : —

Note: If a section below is not used, marked the N/A box and initial & date next to the N/A. i.e. Mark the N/A box if a tracer is not added to the sample(s) then initial and date next to the N/A

No.	Sample Number	Aliquot (g / mL)	MS	Initials
44 1	Verification 1	0.1		
45 2	1 2	1		
46 3	1 3	1		
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				

Tracer ☐ N/A

Initials / Date

Isotope : Th-230

Std Sol'n No. : Th-230.0007

Vol (mL) : 0.3

Ref Activity (dpm/mL) : 47.94 dpm/mL

Act Ref Date : 4-11-11

Samples Spiked and Traced By: MB 12/23/13 (Initials / Date)

Verification Signature & Date: [signature] 12/23/13 (Initials / Date)

LCS Standard ☐ N/A

Initials / Date

Isotope : Th-229

Std Sol'n ID. : Th-229-0002

Vol (mL) : 0.1

Ref Activity (dpm/mL) : 67.929 dpm/mL — corrected activity 67.9086

Act Ref Date : 7-14-10

SOP's applied in preparing these samples. Mark box to left for all that apply:

☐	ST-RC-0003 Rev.	☐	ST-RC-0040 Rev.	☐	ST-RC-0110 Rev.
☐	ST-RC-0004 Rev.	☐	ST-RC-0041 Rev.	☐	ST-RC-0120 Rev.
☐	ST-RC-0014 Rev.	☐	ST-RC-0050 Rev.	☐	ST-RC-0232 Rev.
☐	ST-RC-0020 Rev.	☐	ST-RC-0090 Rev.	☐	ST-RC-0238 Rev.
☐	ST-RC-0021 Rev.	☑	ST-RC-0100 Rev.	☐	ST-RC-0240 Rev.
				☐	ST-RC-0241 Rev.
				☑	ST-RC-0242 Rev.
				☐	ST-RC-5016 Rev.
				☐	
				☐	

Isotope(s)

αβ ☐	Iso Pu ☐	Tc-99 ☐	Iso Cm ☐
Iso Am ☐	Ra ☐	Iso Th ☑	Pu-241 ☐
KPA ☐	Sr ☐	Iso U ☐	Th-229 ☐
Np ☐	TAR ☐	C-14 ☑	Cl-36 ☐

Count Time		Matrix	
Long Count	☐	Soil	☐
Short Count	☐	H_2O	☐

Prepared By : MB

Date : 12/23/13

Reviewed by: _____

Date: _____

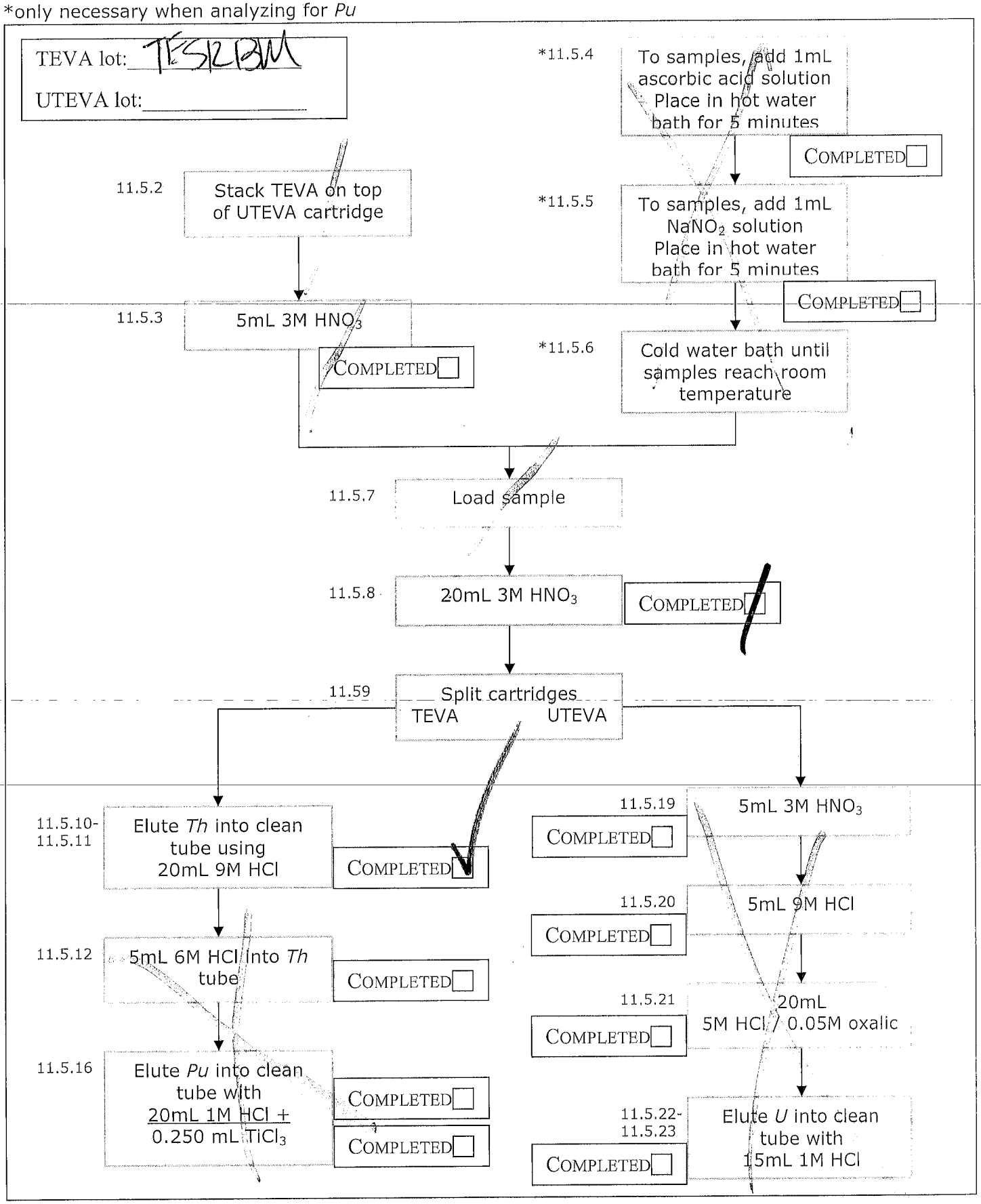
\\SIsvr01\RAD\MasterForms\RAD-0045 Rev(3)

Sequential Thorium, Plutonium and Uranium via TEVA/UTEVA ST-RC-0242

Batch: Th229 Verification

All rinses should flow at 1 mL/minute (only 3M HNO_3 may be done at 3 mL/minute)

*only necessary when analyzing for *Pu*



Reagent

TRM-2_00001

Perry, Doug E

From: Salmi, Douglas R
Sent: March 20, 2000 10:48 AM
To: Perry, Doug E; Puissant, Pamela M
Subject: FW: SRMs for radiochemistry LCSs

Pam, Doug
FYI

-----Original Message-----
From: Minteer@aol.com [mailto:Minteer@aol.com]
Sent: March 20, 2000 10:36 AM
To: drsalmi@sandia.gov
Cc: dbourne@doeal.gov; GLDechant@aol.com; crandallb@quanterra.com
Subject: SRMs for radiochemistry LCSs

Doug:

As we discussed by telephone, please send approximately 500 grams each of PEM-1, TRM-2, and NBHD to STL St. Louis. These are to be used by STL as laboratory control samples. As with our other laboratories, STL will be asked to provide summaries of the data obtained in quarterly progress reports. This is not to assess their proficiency, but rather to help us develop interlaboratory acceptance criteria. The known values (given below) for PEM and TRM are good because the samples are well characterized. The known values for NBHD result from a single analysis and hence should be taken as estimates. All the values below are in pCi/g.

PEM-1:

Parameter	Result	Std. Dev.
Pu-238	8.03	0.37
Pu-239	41.0	3.0
Am-241	32.5	1.1
Cs-137	73.5	0.9
U-234	5.99	0.2
U-235	0.27	0.04
U-238	18.1	0.5

TRM-2

Parameter	Result	Uncertainty
U-238	6.0	+/- 4.0
U-234	6.2	+/- 4.0
Th-230	24.5	+/- 0.6
Ra-226	25.4	+/- 0.9
Pb-210	22.1	+/- 1.2

NBHD

Parameter	Result	Uncertainty
Am-241	1.47	+/- 0.28
Ra-226	67.3	+/- 5.5
U-234	174	none available
U-235	8.7	"
U-238	212	"
Cs-137	52.1	+/- 4.6
Pb-210	78.3	+/- 2.4
Pu-239/40	4.7	+/- 0.63
Pu-238	0.3	+/- 0.11
Th-230	83.4	+/- 6.5

ALPHA SPECTROSCOPY

Method A-01-R Th

Isotopic Thorium (Alpha Spectrometry) by Method A-01-R

Prep Batch: 126996

, Extraction Chromatography Resin Actinide

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 126996

Lab ID: MB 160-126996/1-A
Client ID:
Sigma: 2
Analyzed: 06/30/14 01:40
Detector: AV8
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.004757	0.0470	0.0470	U	pCi/g	1.00	0.106	128984
Thorium-230	0.1486	0.0813	0.0822		pCi/g	1.00	0.0520	128984
Thorium-232	-0.005412	0.0245	0.0245	U	pCi/g	1.00	0.0800	128984

Tracer	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.217	0.441	0.622		pCi/g	0.0734	6.12	85.3	30 - 110

Lab ID: LCS 160-126996/2-A
Client ID:
Sigma: 2
Analyzed: 06/30/14 18:11
Detector: AV3
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	23.38	1.40	2.41		pCi/g	1.00	0.216	128945

Tracer	LCS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	11.31	0.937	1.33		pCi/g	0.162	12.3	92.0	30 - 110

Lab ID: 680-102199-1
Client ID: SD-279-SS
Sigma: 2
Analyzed: 06/30/14 01:40
Detector: AV10
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.56	0.270	0.300		pCi/g	1.00	0.105	128901
Thorium-230	1.22	0.237	0.258		pCi/g	1.00	0.0699	128901
Thorium-232	1.29	0.243	0.266		pCi/g	1.00	0.0342	128901

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.24	0.453	0.631		pCi/g	0.0721	6.15	85.2	30 - 110

Lab ID: 680-102199-1 DU
Client ID: SD-279-SS
Sigma: 2
Analyzed: 06/30/14 01:40
Detector: AV11
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.089	0.217	0.236		pCi/g	1.00	0.0962	128912
Thorium-230	1.257	0.231	0.254		pCi/g	1.00	0.0678	128912
Thorium-232	1.220	0.227	0.249		pCi/g	1.00	0.0743	128912

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 126996

Lab ID: 680-102199-1 DU
Client ID: SD-279-SS
Sigma: 2
Analyzed: 06/30/14 01:40
Detector: AV11
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Tracer	DU Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.477	0.453	0.646		pCi/g	0.0606	6.13	89.4	30 - 110

Lab ID: 680-102199-2
Client ID: SD-279-01
Sigma: 2
Analyzed: 06/30/14 18:11
Detector: AV4
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.05	0.218	0.235		pCi/g	1.00	0.0926	128946
Thorium-230	0.839	0.194	0.207		pCi/g	1.00	0.0753	128946
Thorium-232	1.01	0.211	0.227		pCi/g	1.00	0.0501	128946

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.33	0.455	0.638		pCi/g	0.0591	6.09	87.5	30 - 110

Lab ID: 680-102199-3
Client ID: SD-279-02
Sigma: 2
Analyzed: 06/30/14 01:40
Detector: AV13
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.607	0.167	0.175		pCi/g	1.00	0.0872	128933
Thorium-230	0.508	0.150	0.156		pCi/g	1.00	0.0331	128933
Thorium-232	0.539	0.157	0.164		pCi/g	1.00	0.0881	128933

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.38	0.457	0.643		pCi/g	0.0551	6.14	87.7	30 - 110

Lab ID: 680-102199-7
Client ID: SD-277-SS
Sigma: 2
Analyzed: 06/30/14 01:40
Detector: AV14
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.11	0.215	0.235		pCi/g	1.00	0.0629	128935
Thorium-230	1.04	0.208	0.225		pCi/g	1.00	0.0535	128935
Thorium-232	1.07	0.210	0.229		pCi/g	1.00	0.0467	128935

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.61	0.462	0.660		pCi/g	0.0646	6.09	92.1	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 126996

Lab ID: 680-102199-8
Client ID: SD-277-01
Sigma: 2
Analyzed: 06/30/14 01:40
Detector: AV15
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.45	0.260	0.287		pCi/g	1.00	0.104	128936
Thorium-230	1.17	0.232	0.252		pCi/g	1.00	0.0772	128936
Thorium-232	1.24	0.237	0.259		pCi/g	1.00	0.0514	128936

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.28	0.456	0.636		pCi/g	0.0696	6.12	86.3	30 - 110

Lab ID: 680-102199-9
Client ID: SD-277-02
Sigma: 2
Analyzed: 06/30/14 01:40
Detector: AV16
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.38	0.246	0.272		pCi/g	1.00	0.0829	128937
Thorium-230	1.12	0.221	0.240		pCi/g	1.00	0.0674	128937
Thorium-232	1.17	0.225	0.246		pCi/g	1.00	0.0491	128937

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.20	0.439	0.619		pCi/g	0.0421	6.11	85.2	30 - 110

Lab ID: 680-102199-11
Client ID: SD-219-SS
Sigma: 2
Analyzed: 06/30/14 01:40
Detector: AV17
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.799	0.199	0.210		pCi/g	1.00	0.117	128938
Thorium-230	0.862	0.201	0.213		pCi/g	1.00	0.0659	128938
Thorium-232	0.719	0.183	0.193		pCi/g	1.00	0.0656	128938

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.08	0.443	0.615		pCi/g	0.0500	6.12	83.1	30 - 110

Lab ID: 680-102199-12
Client ID: SD-219-01
Sigma: 2
Analyzed: 06/30/14 01:40
Detector: AV18
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.09	0.223	0.242		pCi/g	1.00	0.0797	128939
Thorium-230	0.781	0.188	0.199		pCi/g	1.00	0.0583	128939

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 126996

Lab ID: 680-102199-12 | Analyzed: 06/30/14 01:40 | Decay Corrected: No
Client ID: SD-219-01 | Detector: AV18 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-232	0.886	0.199	0.213		pCi/g	1.00	0.0580	128939

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.39	0.462	0.647		pCi/g	0.0296	6.13	88.0	30 - 110

Lab ID: 680-102199-13 | Analyzed: 06/30/14 01:40 | Decay Corrected: No
Client ID: SD-219-02 | Detector: AV19 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.04	0.220	0.237		pCi/g	1.00	0.0712	128940
Thorium-230	0.608	0.171	0.179		pCi/g	1.00	0.0889	128940
Thorium-232	0.926	0.207	0.222		pCi/g	1.00	0.0600	128940

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.24	0.457	0.634		pCi/g	0.0760	6.13	85.4	30 - 110

Lab ID: 680-102199-14 | Analyzed: 06/30/14 01:40 | Decay Corrected: No
Client ID: SD-219-03 | Detector: AV20 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.15	0.239	0.258		pCi/g	1.00	0.110	128941
Thorium-230	1.17	0.238	0.258		pCi/g	1.00	0.0882	128941
Thorium-232	1.05	0.225	0.242		pCi/g	1.00	0.0875	128941

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.01	0.443	0.611		pCi/g	0.0697	6.10	82.2	30 - 110

Lab ID: 680-102199-15 | Analyzed: 06/30/14 01:40 | Decay Corrected: No
Client ID: SD-218-SS | Detector: AV21 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.925	0.204	0.218		pCi/g	1.00	0.0887	128942
Thorium-230	0.755	0.183	0.193		pCi/g	1.00	0.0665	128942
Thorium-232	0.928	0.201	0.216		pCi/g	1.00	0.0563	128942

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 126996

Lab ID: 680-102199-15 | Analyzed: 06/30/14 01:40 | Decay Corrected: No
Client ID: SD-218-SS | Detector: AV21 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.57	0.469	0.663		pCi/g	0.0514	6.14	90.8	30 - 110

Lab ID: 680-102199-16 | Analyzed: 06/30/14 01:40 | Decay Corrected: No
Client ID: SD-218-01 | Detector: AV23 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.20	0.252	0.271		pCi/g	1.00	0.102	128943
Thorium-230	0.865	0.213	0.225		pCi/g	1.00	0.0835	128943
Thorium-232	1.53	0.281	0.309		pCi/g	1.00	0.0667	128943

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.61	0.424	0.574		pCi/g	0.0690	6.13	75.2	30 - 110

Lab ID: 680-102199-17 | Analyzed: 06/30/14 01:40 | Decay Corrected: No
Client ID: SD-218-02 | Detector: AV24 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.53	0.275	0.304		pCi/g	1.00	0.128	128944
Thorium-230	0.746	0.190	0.200		pCi/g	1.00	0.0767	128944
Thorium-232	1.18	0.237	0.257		pCi/g	1.00	0.0720	128944

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.86	0.430	0.593		pCi/g	0.0644	6.09	79.8	30 - 110

Lab ID: 680-102199-18 | Analyzed: 06/30/14 01:40 | Decay Corrected: No
Client ID: SD-203-SS | Detector: AV43 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.09	0.222	0.241		pCi/g	1.00	0.0850	128947
Thorium-230	1.27	0.238	0.261		pCi/g	1.00	0.0647	128947
Thorium-232	1.47	0.255	0.283		pCi/g	1.00	0.0574	128947

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.38	0.459	0.644		pCi/g	0.0632	6.13	87.9	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 126996

Lab ID: 680-102199-19 | Analyzed: 06/30/14 01:40 | Decay Corrected: No
Client ID: SD-203-01 | Detector: AV44 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.33	0.248	0.272		pCi/g	1.00	0.103	128948
Thorium-230	0.937	0.205	0.220		pCi/g	1.00	0.0509	128948
Thorium-232	1.24	0.234	0.256		pCi/g	1.00	0.0334	128948

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.18	0.444	0.622		pCi/g	0.0433	6.10	85.0	30 - 110

Lab ID: 680-102199-20 | Analyzed: 06/30/14 01:40 | Decay Corrected: No
Client ID: SD-203-02 | Detector: AV45 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.621	0.164	0.172		pCi/g	1.00	0.0868	128949
Thorium-230	0.684	0.169	0.178		pCi/g	1.00	0.0473	128949
Thorium-232	0.615	0.160	0.168		pCi/g	1.00	0.0588	128949

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.69	0.469	0.670		pCi/g	0.0502	6.13	92.9	30 - 110

Lab ID: 680-102199-22 | Analyzed: 06/30/14 01:40 | Decay Corrected: No
Client ID: SD-202-SS | Detector: AV46 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.652	0.164	0.173		pCi/g	1.00	0.0661	128950
Thorium-230	0.558	0.151	0.158		pCi/g	1.00	0.0463	128950
Thorium-232	0.717	0.171	0.181		pCi/g	1.00	0.0461	128950

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.58	0.457	0.654		pCi/g	0.0604	6.09	91.6	30 - 110

Lab ID: 680-102199-23 | Analyzed: 06/30/14 01:40 | Decay Corrected: No
Client ID: SD-202-01 | Detector: AV48 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.455	0.145	0.150		pCi/g	1.00	0.0885	128952
Thorium-230	0.280	0.111	0.113		pCi/g	1.00	0.0494	128952

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 126996

Lab ID: 680-102199-23
Client ID: SD-202-01
Sigma: 2
Analyzed: 06/30/14 01:40
Detector: AV48
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-232	0.378	0.128	0.132		pCi/g	1.00	0.0324	128952

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.50	0.463	0.654		pCi/g	0.0507	6.13	89.7	30 - 110

Lab ID: 680-102199-24
Client ID: SD-202-02
Sigma: 2
Analyzed: 06/30/14 01:40
Detector: AV49
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.12	0.236	0.254		pCi/g	1.00	0.112	128953
Thorium-230	0.660	0.181	0.189		pCi/g	1.00	0.0914	128953
Thorium-232	1.33	0.253	0.276		pCi/g	1.00	0.0769	128953

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.82	0.427	0.589		pCi/g	0.0695	6.10	79.0	30 - 110

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-126996/1-A	Thorium-228			0.004757	U	pCi/g							
MB 160-126996/1-A	Thorium-230			0.1486		pCi/g							
MB 160-126996/1-A	Thorium-232			-0.005412	U	pCi/g							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-126996/2-A	Thorium-230		24.5	23.38		pCi/g	95	81 - 118					

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
680-102199-1	Thorium-228	1.56		1.089		pCi/g			35	0.87	2.45	1	
680-102199-1	Thorium-230	1.22		1.257		pCi/g			3	0.08	0.23	1	
680-102199-1	Thorium-232	1.29		1.220		pCi/g			6	0.14	0.39	1	

Glossary:

Ts = Count Duration, Sample

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102199-1

SDG No.: 680102199-1

Batch Number: 126996 Batch Start Date: 06/16/14 12:49 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 06/27/14 13:07

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-126996/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-126996/2		ExtChrom, A-01-R		0.4977 g	0.2 mL	0.4977 g			
680-102199-A-1-A	SD-279-SS	ExtChrom, A-01-R	T	0.9958 g	0.2 mL				
680-102199-A-1-A DU	SD-279-SS	ExtChrom, A-01-R	T	0.9980 g	0.2 mL				
680-102199-A-2-A	SD-279-01	ExtChrom, A-01-R	T	1.0043 g	0.2 mL				
680-102199-A-3-A	SD-279-02	ExtChrom, A-01-R	T	0.9974 g	0.2 mL				
680-102199-A-7-A	SD-277-SS	ExtChrom, A-01-R	T	1.0046 g	0.2 mL				
680-102199-A-8-A	SD-277-01	ExtChrom, A-01-R	T	1.0002 g	0.2 mL				
680-102199-A-9-A	SD-277-02	ExtChrom, A-01-R	T	1.0022 g	0.2 mL				
680-102199-A-11-A	SD-219-SS	ExtChrom, A-01-R	T	1.0006 g	0.2 mL				
680-102199-A-12-A	SD-219-01	ExtChrom, A-01-R	T	0.9985 g	0.2 mL				
680-102199-A-13-A	SD-219-02	ExtChrom, A-01-R	T	0.9983 g	0.2 mL				
680-102199-A-14-A	SD-219-03	ExtChrom, A-01-R	T	1.0039 g	0.2 mL				
680-102199-A-15-A	SD-218-SS	ExtChrom, A-01-R	T	0.9975 g	0.2 mL				
680-102199-A-16-A	SD-218-01	ExtChrom, A-01-R	T	0.9980 g	0.2 mL				
680-102199-A-17-A	SD-218-02	ExtChrom, A-01-R	T	1.0043 g	0.2 mL				
680-102199-A-18-A	SD-203-SS	ExtChrom, A-01-R	T	0.9989 g	0.2 mL				
680-102199-A-19-A	SD-203-01	ExtChrom, A-01-R	T	1.0036 g	0.2 mL				
680-102199-A-20-A	SD-203-02	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
680-102199-A-22-A	SD-202-SS	ExtChrom, A-01-R	T	1.0043 g	0.2 mL				
680-102199-A-23-A	SD-202-01	ExtChrom, A-01-R	T	0.9988 g	0.2 mL				

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102199-1

SDG No.: 680102199-1

Batch Number: 126996 Batch Start Date: 06/16/14 12:49 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 06/27/14 13:07

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
680-102199-A-24-A	SD-202-02	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				

Batch Notes	
Balance ID	27050421
Column Analyst	nmn per scb
Column Date	6/27/14
CoPrecipitation Analyst	scb
CoPrecipitation Date	6/27/14
Person's name who witnessed reagent drop	NMN PER SCB
Analyst who added reagent	SCB
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102199-1

SDG No.: 680102199-1

Batch Number: 126998 Batch Start Date: 06/16/14 13:16 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 06/27/14 13:09

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-126998/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-126998/2		ExtChrom, A-01-R		0.4996 g	0.2 mL	0.4996 g			
680-102199-A-26 -A	SD-196-SS	ExtChrom, A-01-R	T	0.9974 g	0.2 mL				
680-102199-A-26 -A DU	SD-196-SS	ExtChrom, A-01-R	T	0.9990 g	0.2 mL				
680-102199-A-27 -A	SD-196-01	ExtChrom, A-01-R	T	1.0035 g	0.2 mL				
680-102199-A-28 -A	SD-196-02	ExtChrom, A-01-R	T	1.0014 g	0.2 mL				
680-102199-A-30 -A	SD-220-SS	ExtChrom, A-01-R	T	1.0023 g	0.2 mL				
680-102199-A-31 -A	SD-220-01	ExtChrom, A-01-R	T	1.0036 g	0.2 mL				
680-102199-A-32 -A	SD-220-02	ExtChrom, A-01-R	T	1.0030 g	0.2 mL				
680-102199-A-33 -A	SD-DUP-01	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				
680-102199-A-35 -A	SD-201-SS	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
680-102199-A-36 -A	SD-201-01	ExtChrom, A-01-R	T	0.9973 g	0.2 mL				
680-102199-A-37 -A	SD-201-02	ExtChrom, A-01-R	T	0.9971 g	0.2 mL				
680-102199-A-39 -A	SD-200-SS	ExtChrom, A-01-R	T	1.0013 g	0.2 mL				
680-102199-A-40 -A	SD-200-01	ExtChrom, A-01-R	T	1.0027 g	0.2 mL				
680-102199-A-41 -A	SD-200-02	ExtChrom, A-01-R	T	0.9980 g	0.2 mL				
680-102199-A-42 -A	SD-200-03	ExtChrom, A-01-R	T	1.0051 g	0.2 mL				
680-102199-A-25 -A	SD-195-SS	ExtChrom, A-01-R	T	1.0050 g	0.2 mL				

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102199-1

SDG No.: 680102199-1

Batch Number: 126998 Batch Start Date: 06/16/14 13:16 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 06/27/14 13:09

Batch Notes	
Balance ID	27050421
Column Analyst	nmn per scb
Column Date	6/27/14
CoPrecipitation Analyst	scb
CoPrecipitation Date	6/27/14
Person's name who witnessed reagent drop	nmn per scb
Analyst who added reagent	scb
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:41:40AM 6/30/2014

Sample

Sample Name: MB 160-126996/1-A
SampleType: Blank
: MB 160-126996/1-A
Sample Collection Date: 6/17/2014 8:33:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0000g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126996
AnalysisID: 613410

Analyst: 60040

Tracer

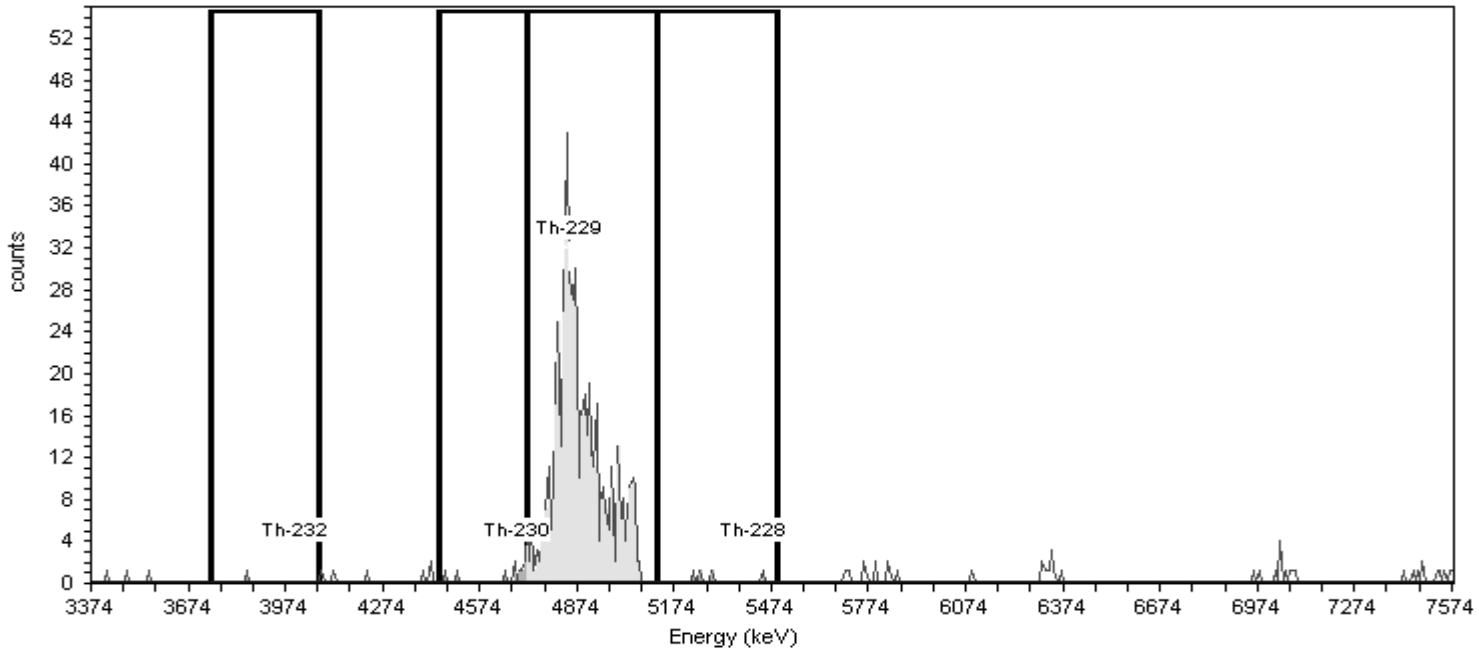
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 85.29%

Acquisition

Detector: AV8
Serial Number: 41-137Q6
Acquisition Start Date: 6/30/2014 1:40:06AM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/18/2014 7:08:22PM
Background Info: Sample: ICB;AV8; Det: AV8; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9792;AV8-20140505
Calibration Date: 5/6/2014 5:38:58PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.05% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:38:13AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	44.5	100.2	1	1.5000	-0.50	-0.005	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	26.9	99.7	14	0.2453	13.66	0.149	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	80.4	99.6	564	1.8750	562.03	5.219	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	9.7	99.8	4	3.5625	0.44	0.005	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:11:52PM 6/30/2014

Sample

Sample Name: LCS 160-126996/2-A
SampleType: Control
: LCS 160-126996/2-A
Sample Collection Date: 6/17/2014 8:33:00AM

Spectrum #2 Analysis #1
Sample Weight : 0.4977g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126996
AnalysisID: 613482

Analyst: 60040

Tracer

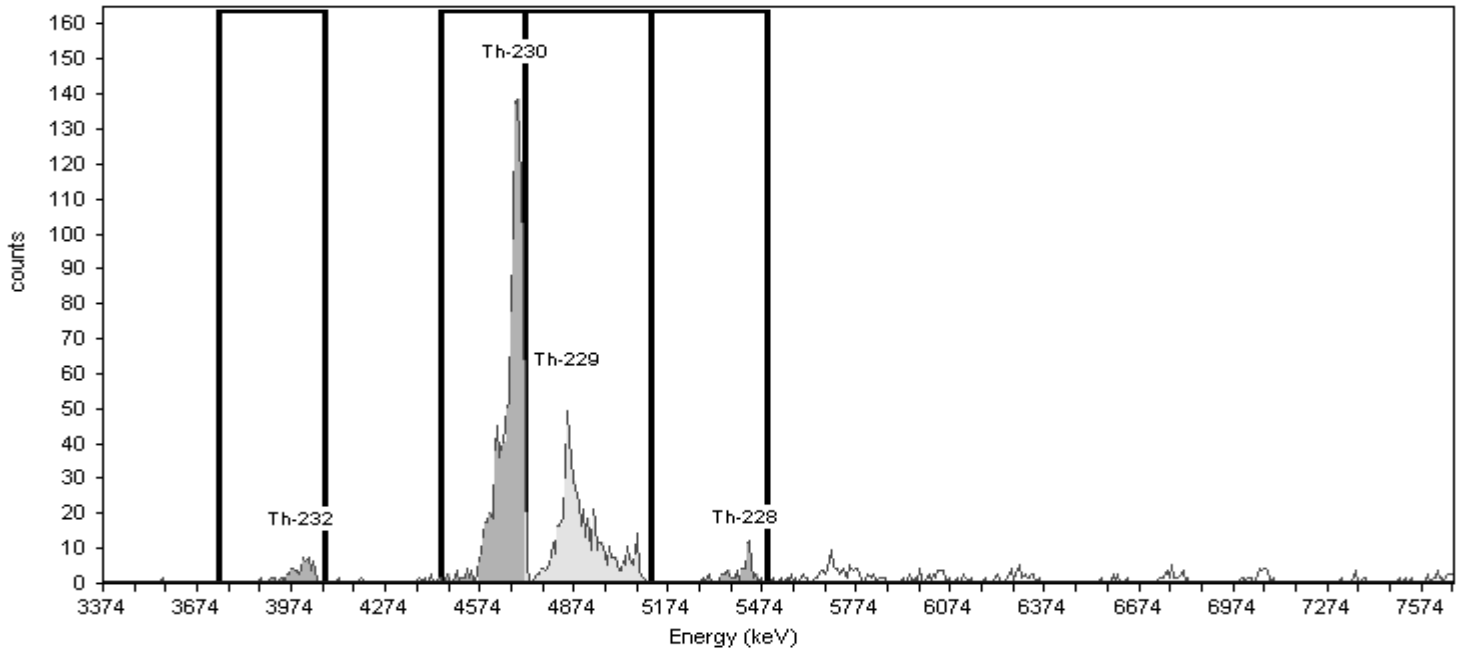
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 97.51%

Acquisition

Detector: AV3
Serial Number: 49-202 FF7
Acquisition Start Date: 6/30/2014 6:11:31PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/18/2014 7:10:38PM
Background Info: Sample: ICB;AV3; Det: AV3; Spectrum #1; Jun-18-2014 19:10

Calibration Name: IC-8875;AV3-20140505
Calibration Date: 5/6/2014 5:38:33PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.09% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:38:13AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	36.2	100.2	58	0.7500	57.25	1.129	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	46.4	99.7	1111	3.5683	1107.47	21.952	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	68.6	99.6	622	2.2558	619.78	11.990	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.8	99.8	59	0.5625	58.44	1.158	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:00:02PM 7/1/2014

Sample

Sample Name: LCS 160-126996/2-A
SampleType: Control
: LCS 160-126996/2-A
Sample Collection Date: 6/17/2014 8:33:00AM

Spectrum #2 Analysis #1
Sample Weight : 0.4977g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126996
AnalysisID: 613599

Analyst: 60040

Tracer

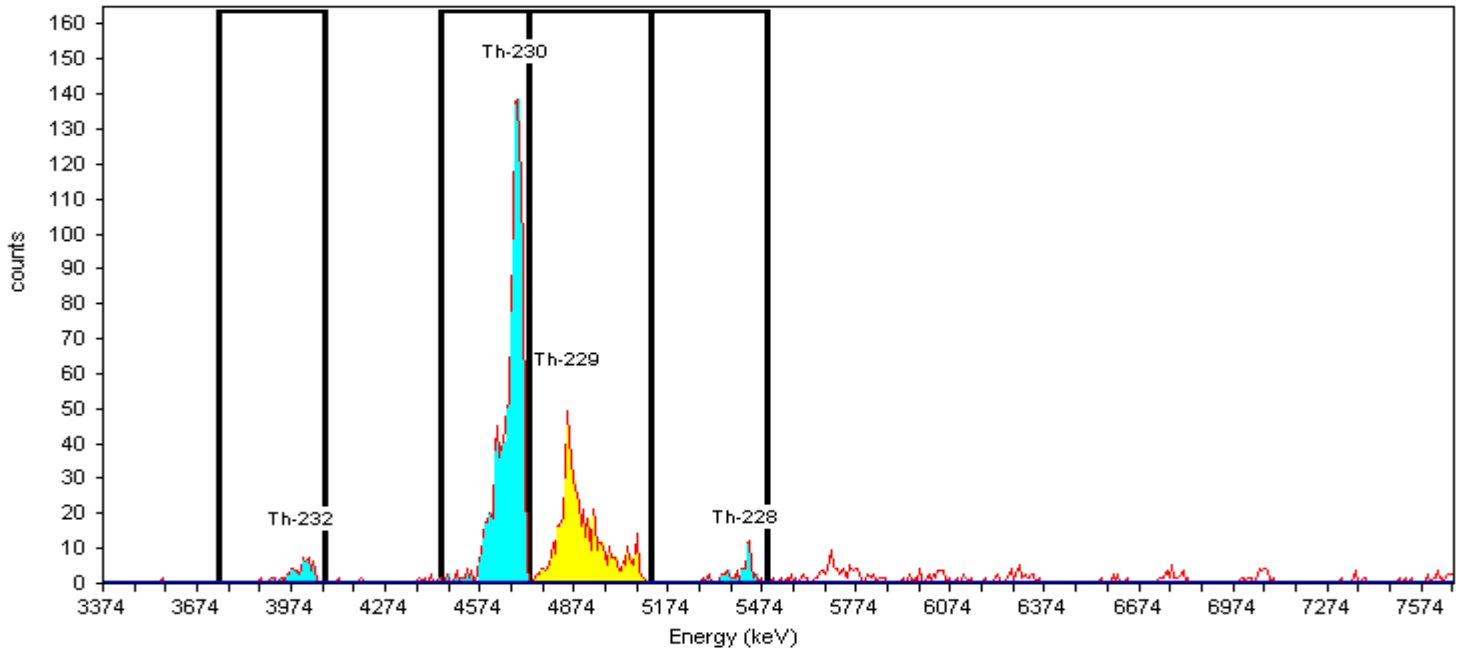
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 92.00%

Acquisition

Detector: AV3
Serial Number: 49-202 FF7
Acquisition Start Date: 6/30/2014 6:11:31PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/18/2014 7:10:38PM
Background Info: Sample: ICB;AV3; Det: AV3; Spectrum #1; Jun-18-2014 19:10

Calibration Name: IC-8875;AV3-20140505
Calibration Date: 5/6/2014 5:38:33PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.09% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:38:13AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/1/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	36.2	100.2	58	0.7500	57.25	1.197	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4731.7	25.0	99.7	1117	4.1250	1112.88	23.380	pCi/g
Th-229	4848.0	4,845.3	2.7	4731.7	5119.5	68.6	99.6	587	2.2500	584.75	11.312	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.8	99.8	59	0.5625	58.44	1.228	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:41:57AM 6/30/2014

Sample

Sample Name: 680-102199-A-1-B
SampleType: Sample
: 680-102199-A-1-B
Sample Collection Date: 6/9/2014 3:40:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9958g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126996
AnalysisID: 613413

Analyst: 60040

Tracer

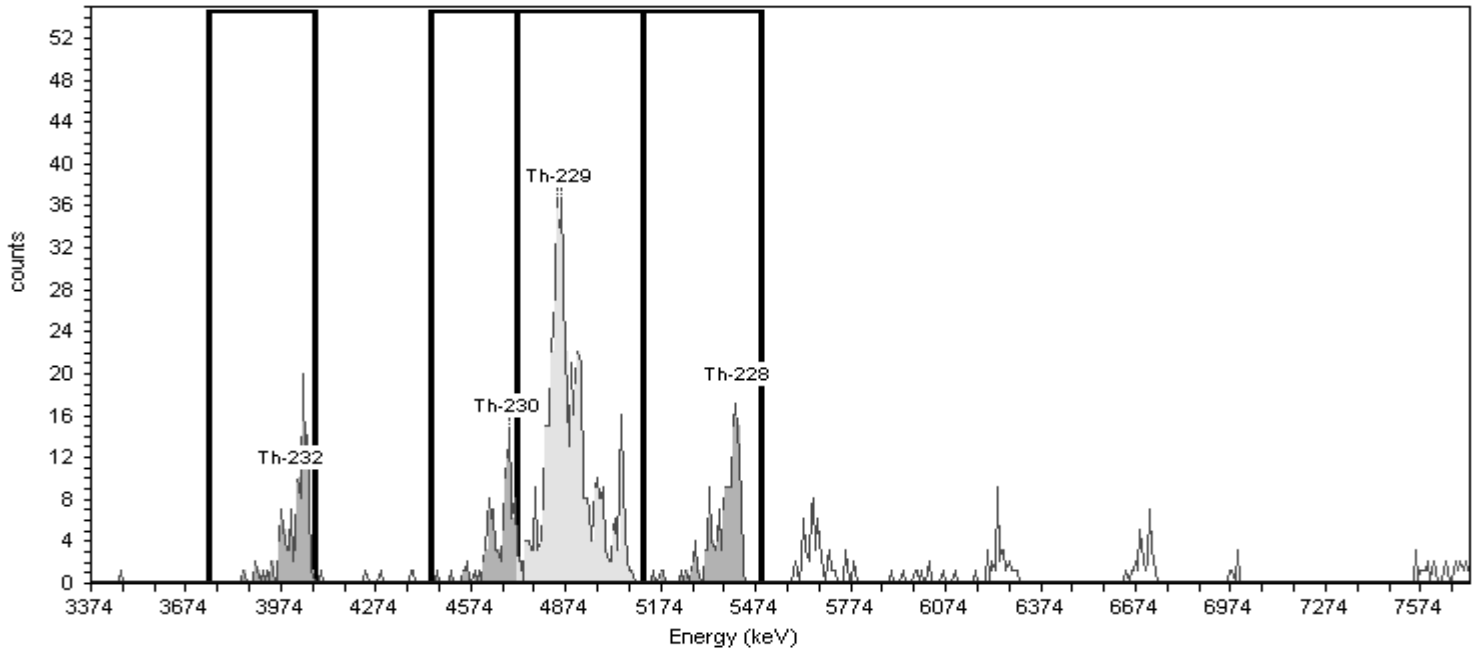
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 85.99%

Acquisition

Detector: AV10
Serial Number: 49-155N2
Acquisition Start Date: 6/30/2014 1:40:09AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:26PM
Background Info: Sample: ICB;AV10; Det: AV10; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9794;AV10-20140505
Calibration Date: 5/6/2014 5:39:10PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.84% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:38:13AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	30.9	100.2	113	0.0000	113.46	1.281	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	28.6	99.7	103	0.5625	102.41	1.162	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	99.2	99.6	543	1.6875	541.28	5.285	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	54.1	99.8	139	3.0000	136.00	1.542	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:42:40PM 6/30/2014

Sample

Sample Name: 680-102199-A-1-B
SampleType: Sample
: 680-102199-A-1-B
Sample Collection Date: 6/9/2014 3:40:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9958g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126996
AnalysisID: 613465

Analyst: 60040

Tracer

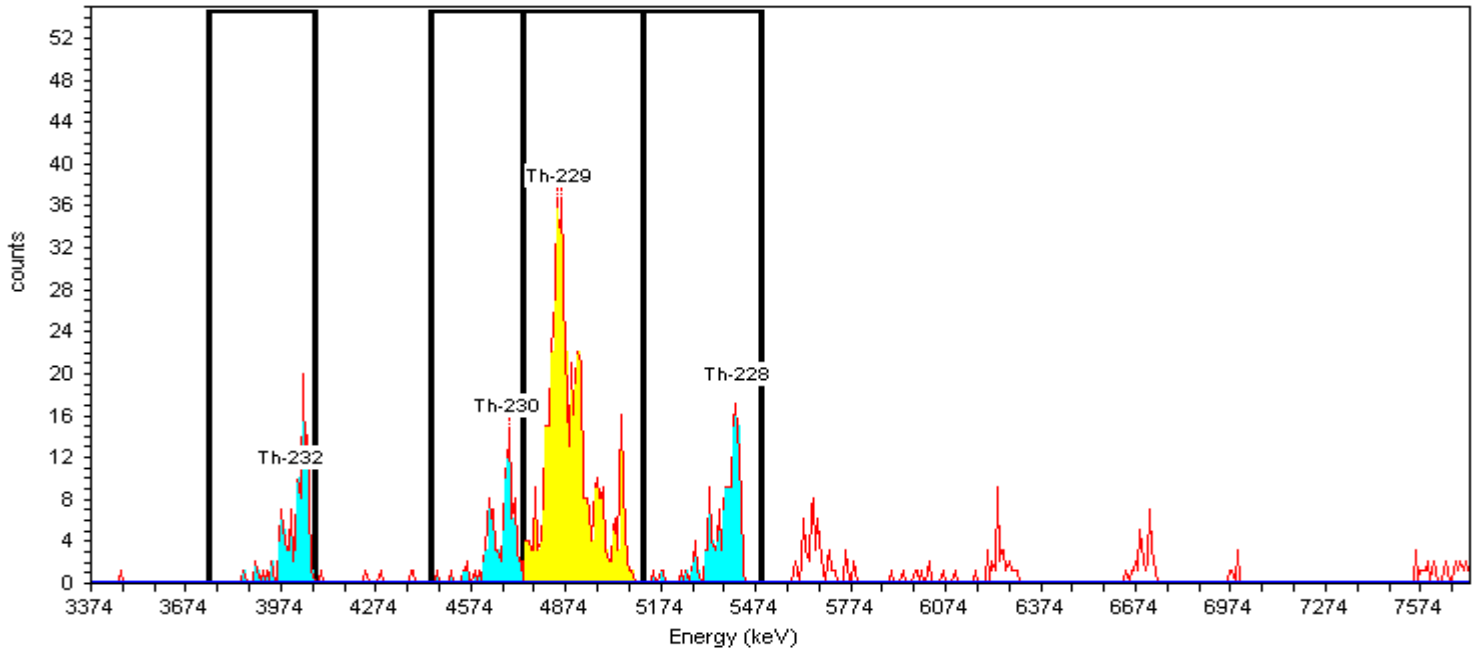
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 85.23%

Acquisition

Detector: AV10
Serial Number: 49-155N2
Acquisition Start Date: 6/30/2014 1:40:09AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:26PM
Background Info: Sample: ICB;AV10; Det: AV10; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9794;AV10-20140505
Calibration Date: 5/6/2014 5:39:10PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.84% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:38:13AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 6/30/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	30.9	100.2	113	0.0000	113.46	1.292	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4739.1	37.5	99.7	107	0.7500	106.25	1.216	pCi/g
Th-229	4848.0	4,845.3	2.7	4739.1	5119.5	99.2	99.6	538	1.5000	536.50	5.238	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	54.1	99.8	139	3.0000	136.00	1.556	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:43:09AM 6/30/2014

Sample

Sample Name: 680-102199-A-1-C DU
SampleType: Sample
: 680-102199-A-1-C DU
Sample Collection Date: 6/9/2014 3:40:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9980g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126996
AnalysisID: 613415

Analyst: 60040

Tracer

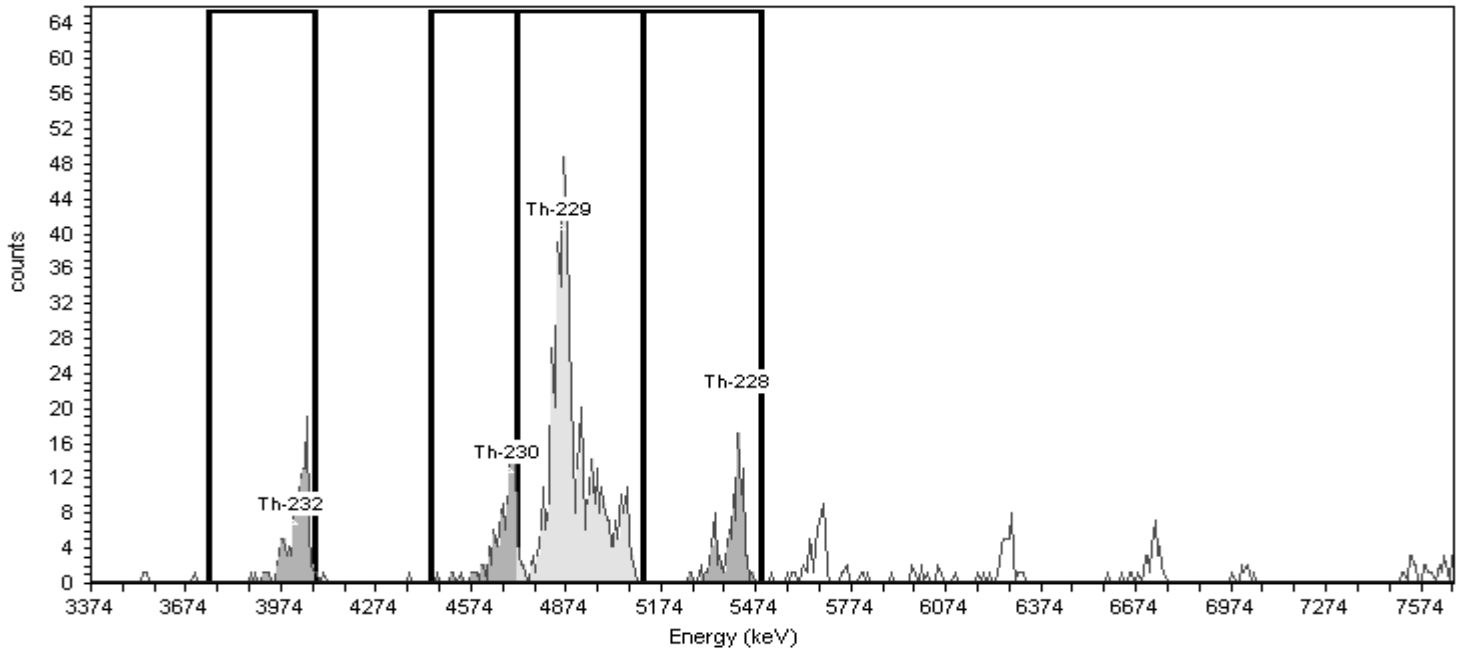
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 90.72%

Acquisition

Detector: AV11
Serial Number: 49-155dd2
Acquisition Start Date: 6/30/2014 1:40:11AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:27PM
Background Info: Sample: ICB;AV11; Det: AV11; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9795;AV11-20140505
Calibration Date: 5/6/2014 5:39:16PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.88% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:38:13AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	33.4	100.2	118	1.3280	117.13	1.202	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	292.9	99.7	114	0.7558	113.18	1.167	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	65.2	99.6	595	0.9433	593.99	5.563	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	59.8	99.8	107	2.9838	104.02	1.072	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:43:22PM 6/30/2014

Sample

Sample Name: 680-102199-A-1-C DU
SampleType: Sample
: 680-102199-A-1-C DU
Sample Collection Date: 6/9/2014 3:40:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9980g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126996
AnalysisID: 613466

Analyst: 60040

Tracer

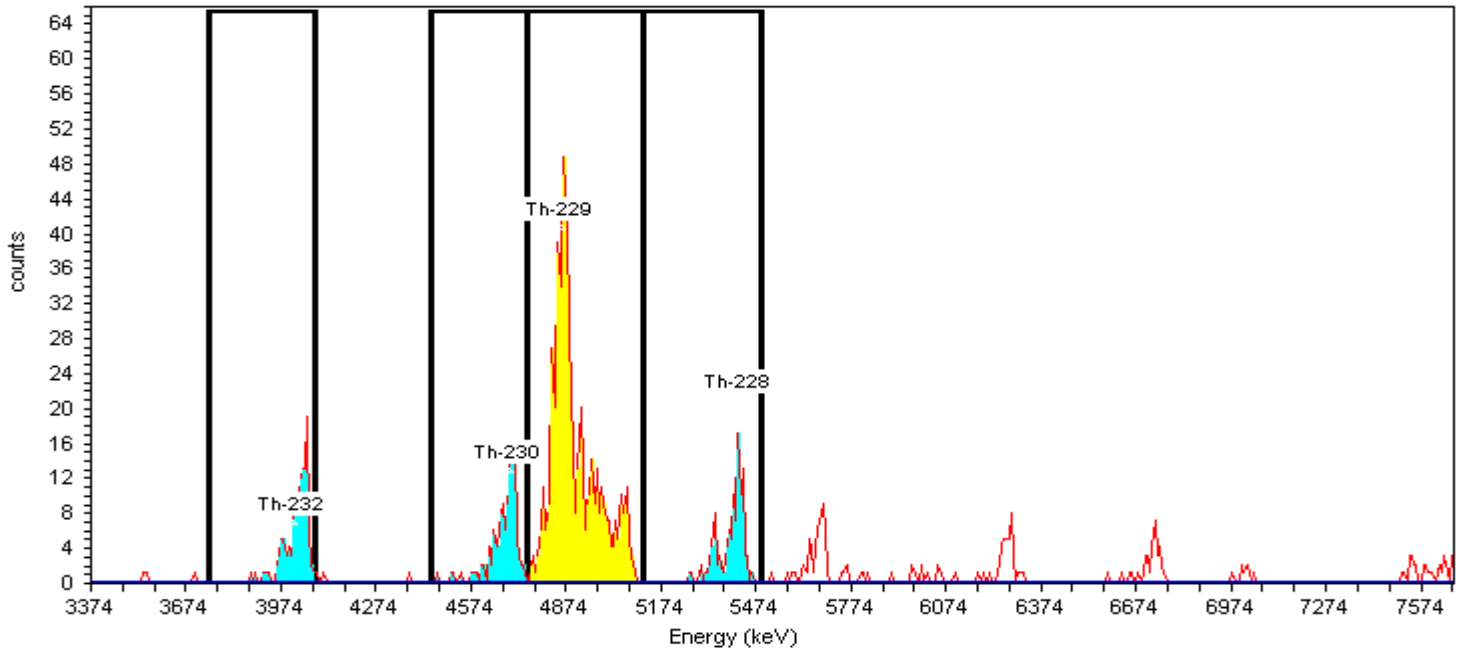
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 89.35%

Acquisition

Detector: AV11
Serial Number: 49-155dd2
Acquisition Start Date: 6/30/2014 1:40:11AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:27PM
Background Info: Sample: ICB;AV11; Det: AV11; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9795;AV11-20140505
Calibration Date: 5/6/2014 5:39:16PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.88% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:38:13AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 6/30/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	33.4	100.2	118	1.3280	117.13	1.220	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4746.6	14.2	99.7	121	0.9375	120.06	1.257	pCi/g
Th-229	4848.0	4,845.3	2.7	4746.6	5119.5	65.2	99.6	586	0.9375	585.06	5.479	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	59.8	99.8	107	2.9838	104.02	1.089	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:11:57PM 6/30/2014

Sample

Sample Name: 680-102199-A-2-B
SampleType: Sample
: 680-102199-A-2-B
Sample Collection Date: 6/9/2014 3:45:00PM

Spectrum #2 Analysis #1
Sample Weight : 1.0043g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126996
AnalysisID: 613483

Analyst: 60040

Tracer

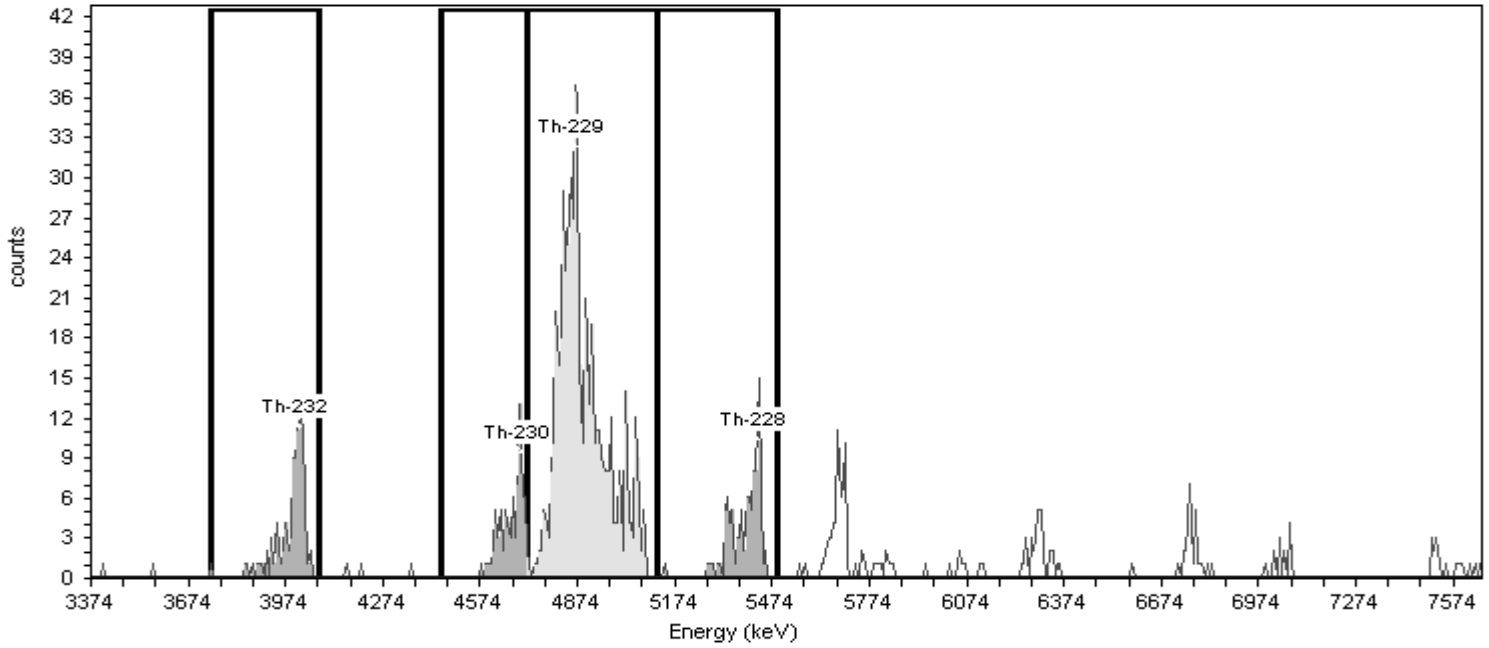
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 87.74%

Acquisition

Detector: AV4
Serial Number: 46-033Q4
Acquisition Start Date: 6/30/2014 6:11:32PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/18/2014 7:10:40PM
Background Info: Sample: ICB;AV4; Det: AV4; Spectrum #1; Jun-18-2014 19:10

Calibration Name: IC-8876;AV4-20140505
Calibration Date: 5/6/2014 5:38:40PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.82% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:38:13AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	48.1	100.2	92	0.1875	91.39	1.003	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	37.2	99.7	76	1.1134	74.86	0.826	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	92.2	99.6	553	1.1134	551.86	5.346	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	60.1	99.8	97	2.2500	94.75	1.045	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:01:19PM 7/1/2014

Sample

Sample Name: 680-102199-A-2-B
SampleType: Sample
: 680-102199-A-2-B
Sample Collection Date: 6/9/2014 3:45:00PM

Spectrum #2 Analysis #1
Sample Weight : 1.0043g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126996
AnalysisID: 613600

Analyst: 60040

Tracer

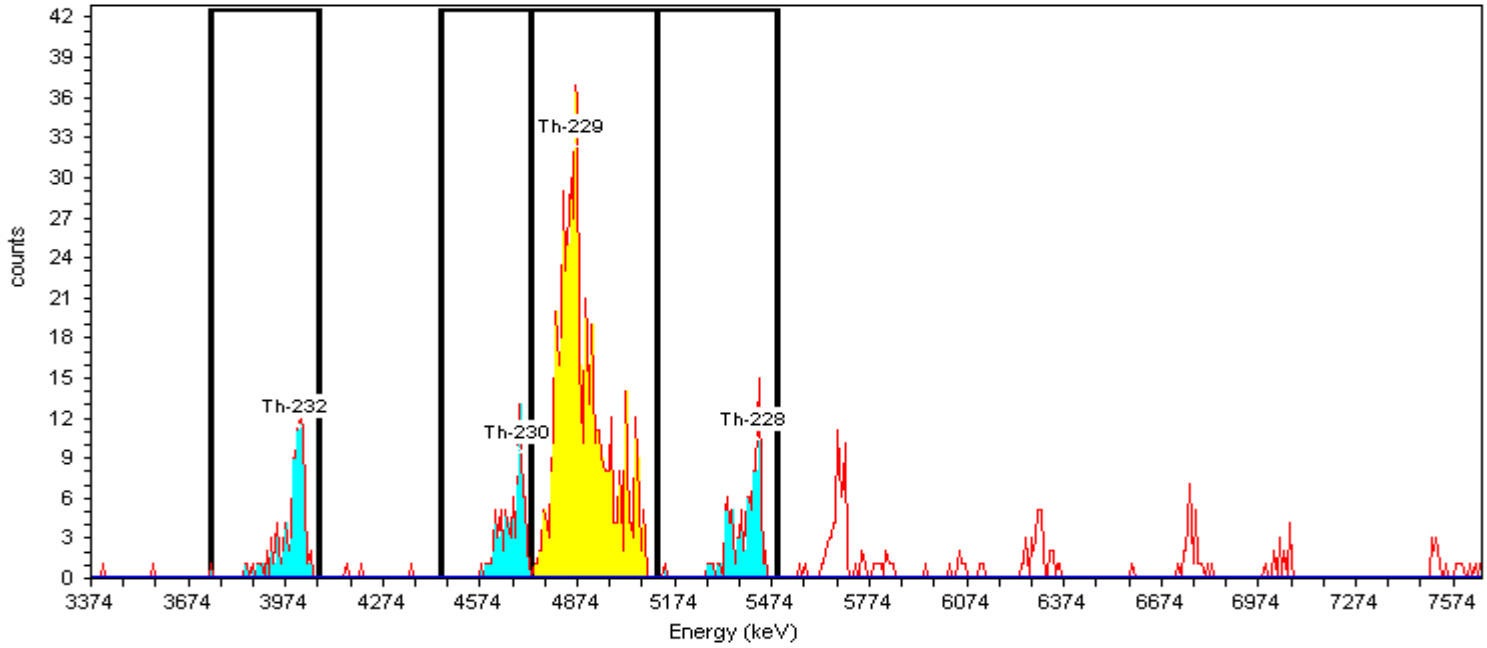
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 87.48%

Acquisition

Detector: AV4
Serial Number: 46-033Q4
Acquisition Start Date: 6/30/2014 6:11:32PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/18/2014 7:10:40PM
Background Info: Sample: ICB;AV4; Det: AV4; Spectrum #1; Jun-18-2014 19:10

Calibration Name: IC-8876;AV4-20140505
Calibration Date: 5/6/2014 5:38:40PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.82% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:38:13AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/1/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	48.1	100.2	92	0.1875	91.39	1.006	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4731.7	22.6	99.7	77	1.1250	75.88	0.839	pCi/g
Th-229	4848.0	4,845.3	2.7	4731.7	5119.5	92.2	99.6	551	0.7500	550.25	5.331	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	60.1	99.8	97	2.2500	94.75	1.048	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:43:27AM 6/30/2014

Sample

Sample Name: 680-102199-A-3-B
SampleType: Sample
: 680-102199-A-3-B
Sample Collection Date: 6/9/2014 3:50:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9974g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126996
AnalysisID: 613418

Analyst: 60040

Tracer

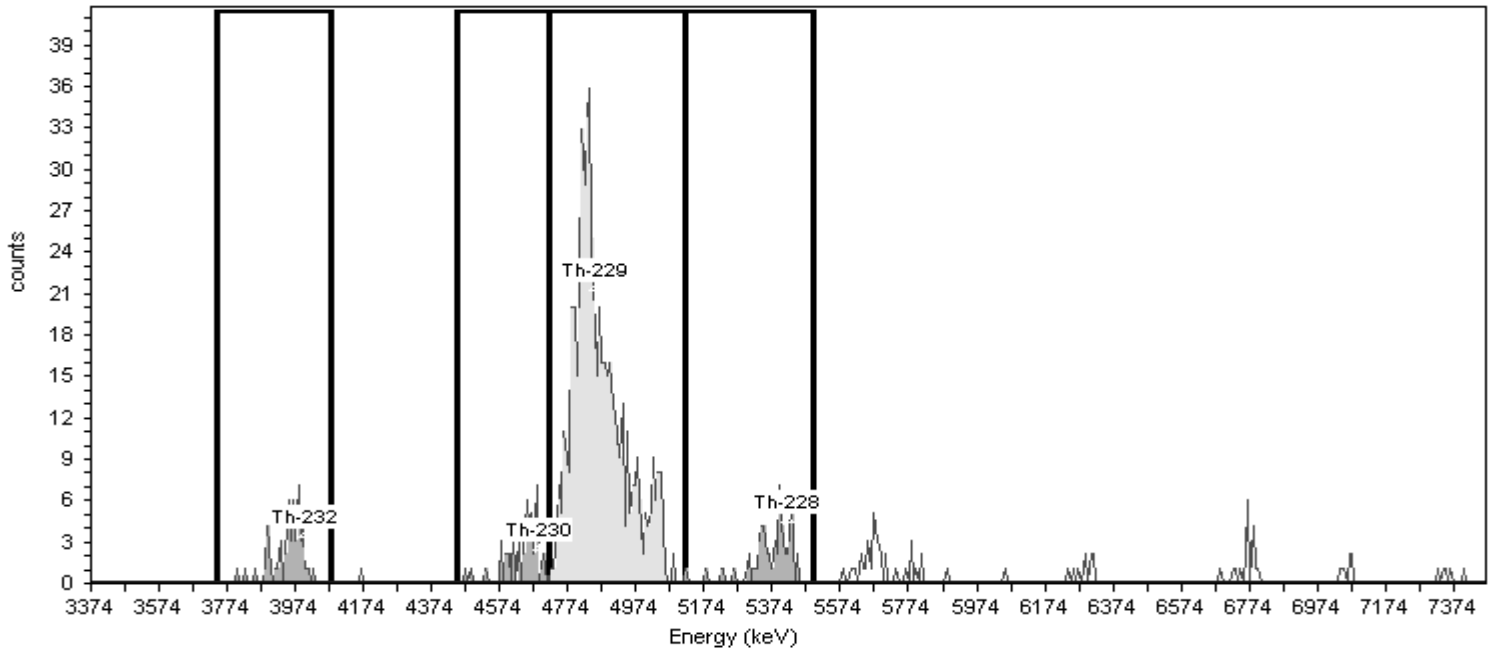
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 87.73%

Acquisition

Detector: AV13
Serial Number: 49-155M7
Acquisition Start Date: 6/30/2014 1:40:14AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:30PM
Background Info: Sample: ICB;AV13; Det: AV13; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9884;AV13-20140505
Calibration Date: 5/6/2014 5:39:28PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.99% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:38:13AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	60.0	100.2	51	1.9610	49.04	0.539	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	14.3	99.7	46	0.0000	46.03	0.508	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	104.9	99.6	556	0.5625	555.40	5.383	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	109.0	99.8	57	1.8750	55.06	0.607	pCi/g

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:43:33AM 6/30/2014

Sample

Sample Name: 680-102199-A-7-B
SampleType: Sample
: 680-102199-A-7-B
Sample Collection Date: 6/9/2014 6:10:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0046g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126996
AnalysisID: 613419

Analyst: 60040

Tracer

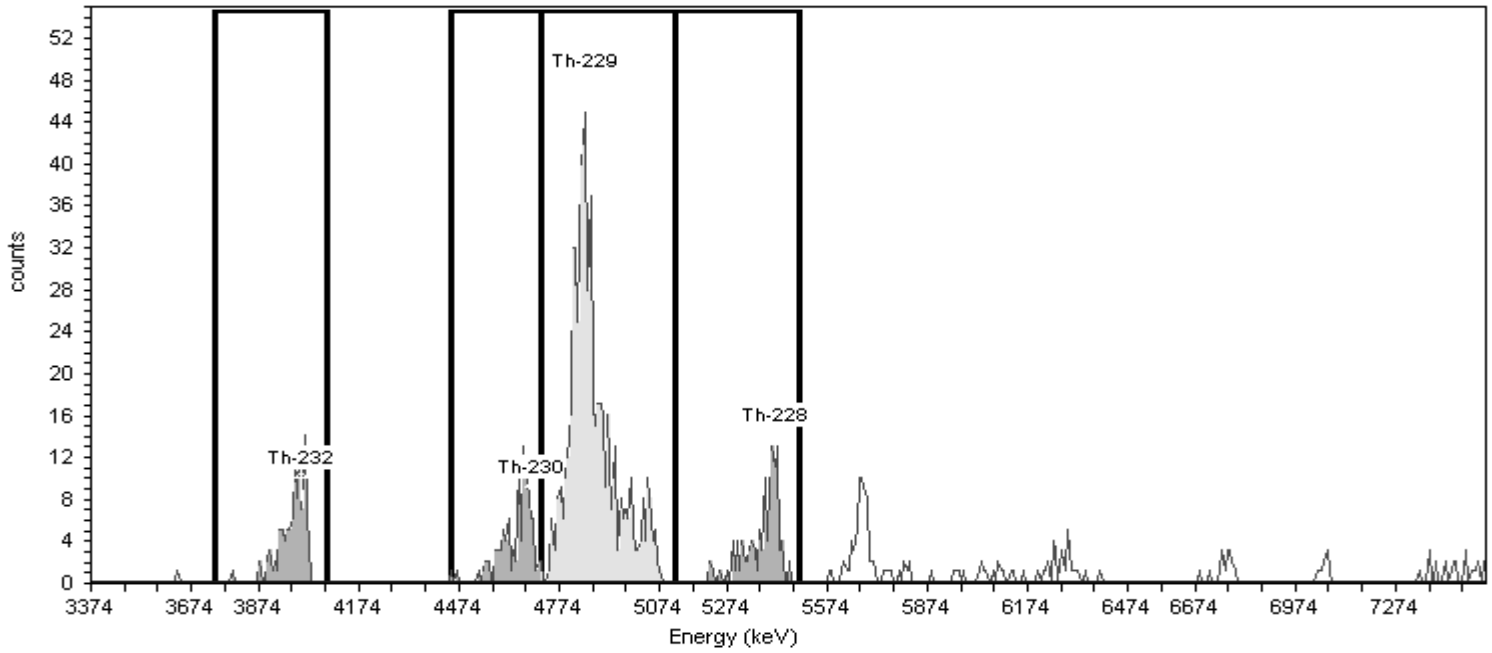
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 92.08%

Acquisition

Detector: AV14
Serial Number: 50-060W4
Acquisition Start Date: 6/30/2014 1:40:15AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:33PM
Background Info: Sample: ICB;AV14; Det: AV14; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9885;AV14-20140505
Calibration Date: 5/6/2014 5:39:36PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.34% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:38:13AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	63.2	100.2	105	0.1875	104.81	1.074	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	28.0	99.7	102	0.3750	101.26	1.043	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	71.6	99.6	592	1.1250	590.81	5.609	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	54.2	99.8	109	0.7500	108.25	1.114	pCi/g

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Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:43:38AM 6/30/2014

Sample

Sample Name: 680-102199-A-8-B
SampleType: Sample
: 680-102199-A-8-B
Sample Collection Date: 6/9/2014 6:15:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0002g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126996
AnalysisID: 613420

Analyst: 60040

Tracer

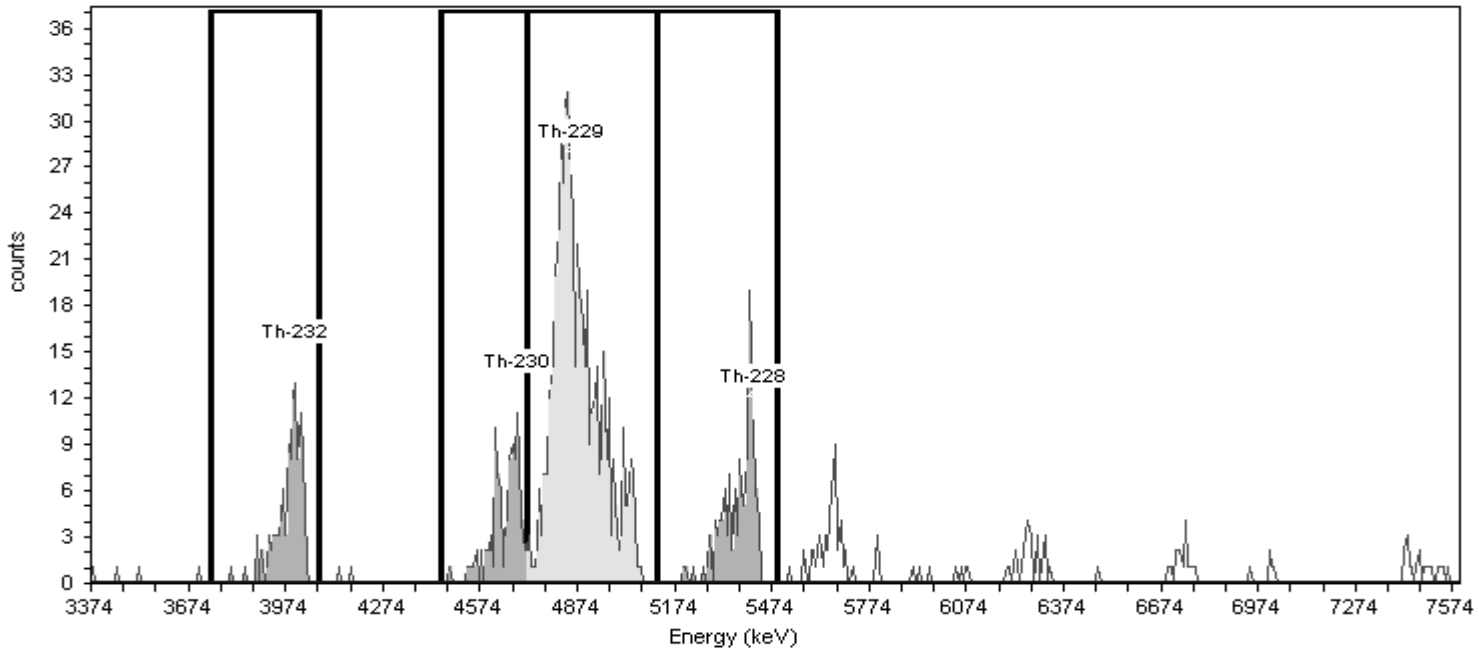
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 86.64%

Acquisition

Detector: AV15
Serial Number: 41-172C5
Acquisition Start Date: 6/30/2014 1:40:17AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:35PM
Background Info: Sample: ICB;AV15; Det: AV15; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9886;AV15-20140505
Calibration Date: 5/6/2014 5:39:42PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.62% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:38:13AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	68.8	100.2	110	0.1875	109.81	1.235	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	33.7	99.7	100	0.8136	99.22	1.122	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	110.5	99.6	542	1.3183	540.71	5.301	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	53.5	99.8	131	3.0000	128.00	1.446	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:47:15PM 6/30/2014

Sample

Sample Name: 680-102199-A-8-B
SampleType: Sample
: 680-102199-A-8-B
Sample Collection Date: 6/9/2014 6:15:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0002g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126996
AnalysisID: 613469

Analyst: 60040

Tracer

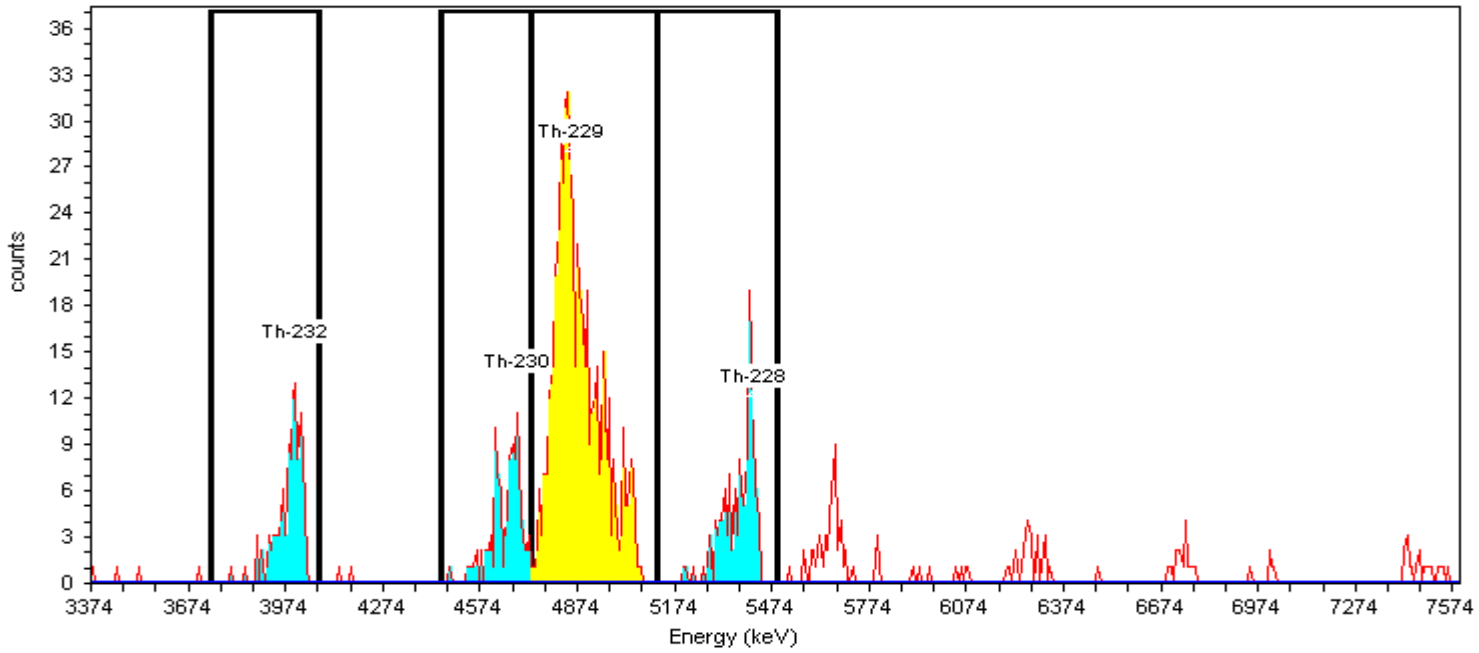
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 86.31%

Acquisition

Detector: AV15
Serial Number: 41-172C5
Acquisition Start Date: 6/30/2014 1:40:17AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:35PM
Background Info: Sample: ICB;AV15; Det: AV15; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9886;AV15-20140505
Calibration Date: 5/6/2014 5:39:42PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.62% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:38:13AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 6/30/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	68.8	100.2	110	0.1875	109.81	1.240	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4731.7	34.0	99.7	104	1.1250	102.88	1.167	pCi/g
Th-229	4848.0	4,845.3	2.7	4731.7	5119.5	110.5	99.6	540	1.3125	538.69	5.281	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	53.5	99.8	131	3.0000	128.00	1.452	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:43:44AM 6/30/2014

Sample

Sample Name: 680-102199-A-9-B
SampleType: Sample
: 680-102199-A-9-B
Sample Collection Date: 6/9/2014 6:20:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0022g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126996
AnalysisID: 613421

Analyst: 60040

Tracer

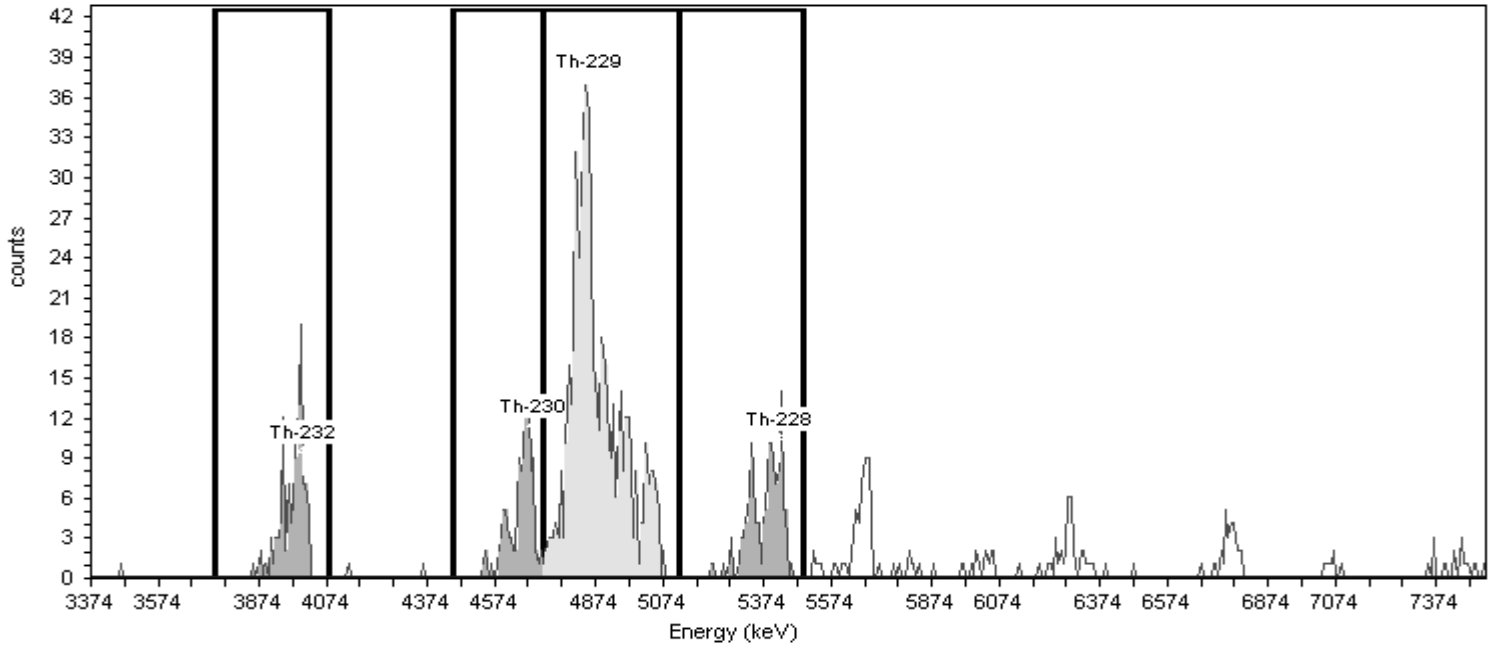
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 85.23%

Acquisition

Detector: AV16
Serial Number: 51-082B6
Acquisition Start Date: 6/30/2014 1:40:20AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:37PM
Background Info: Sample: ICB;AV16; Det: AV16; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-7107;AV16-20140505
Calibration Date: 5/5/2014 10:08:41PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.11% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:38:13AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	55.3	100.2	109	0.1875	108.81	1.174	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	25.0	99.7	104	0.8078	103.22	1.119	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	77.8	99.6	563	0.1875	562.84	5.204	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	119.1	99.8	129	1.6875	127.31	1.379	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:43:49AM 6/30/2014

Sample

Sample Name: 680-102199-A-11-B
SampleType: Sample
: 680-102199-A-11-B
Sample Collection Date: 6/10/2014 9:20:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0006g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126996
AnalysisID: 613422

Analyst: 60040

Tracer

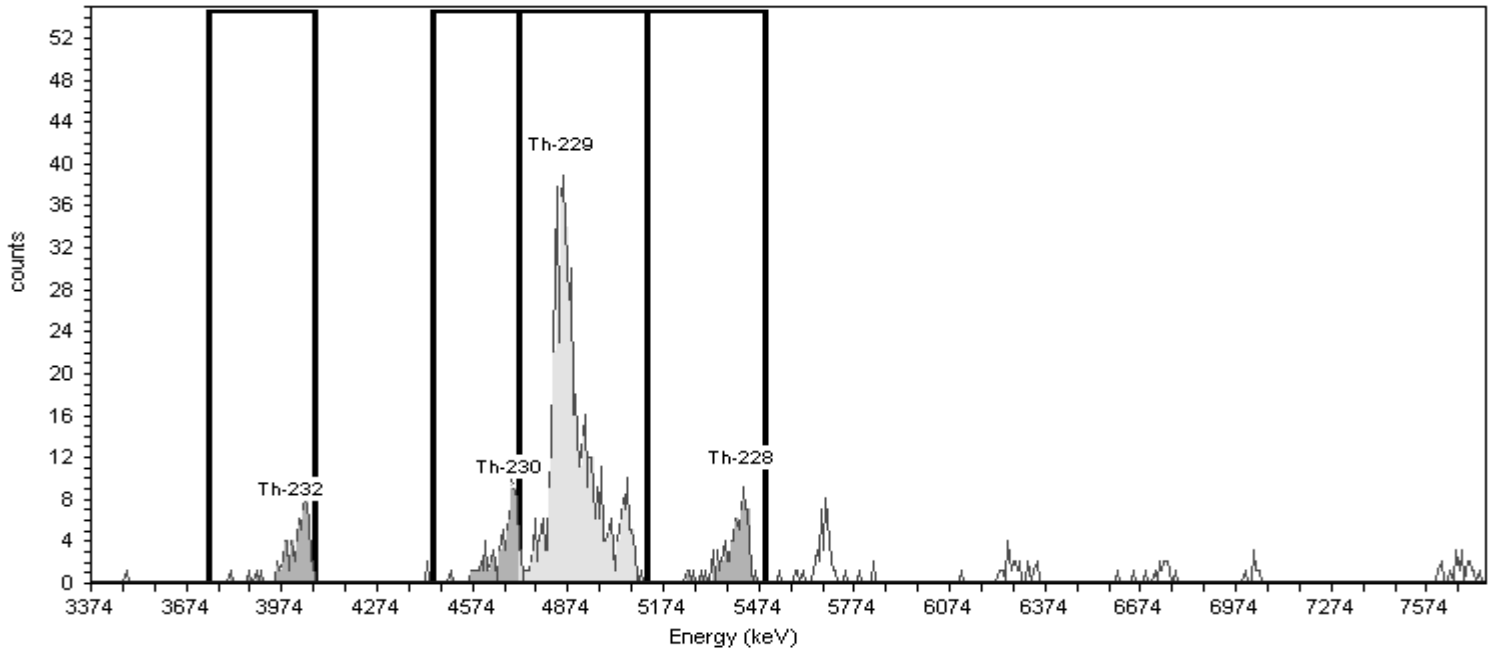
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 83.57%

Acquisition

Detector: AV17
Serial Number: 50-051C4
Acquisition Start Date: 6/30/2014 1:40:21AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:39PM
Background Info: Sample: ICB;AV17; Det: AV17; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-8874;AV17-20140505
Calibration Date: 5/5/2014 10:08:49PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.07% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:38:12AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	32.4	100.2	63	0.5625	62.35	0.714	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	52.6	99.7	72	0.5625	71.44	0.823	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	69.8	99.6	531	0.3750	530.63	5.111	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	60.9	99.8	73	3.9375	69.06	0.795	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:39:57PM 6/30/2014

Sample

Sample Name: 680-102199-A-11-B
SampleType: Sample
: 680-102199-A-11-B
Sample Collection Date: 6/10/2014 9:20:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0006g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126996
AnalysisID: 613462

Analyst: 60040

Tracer

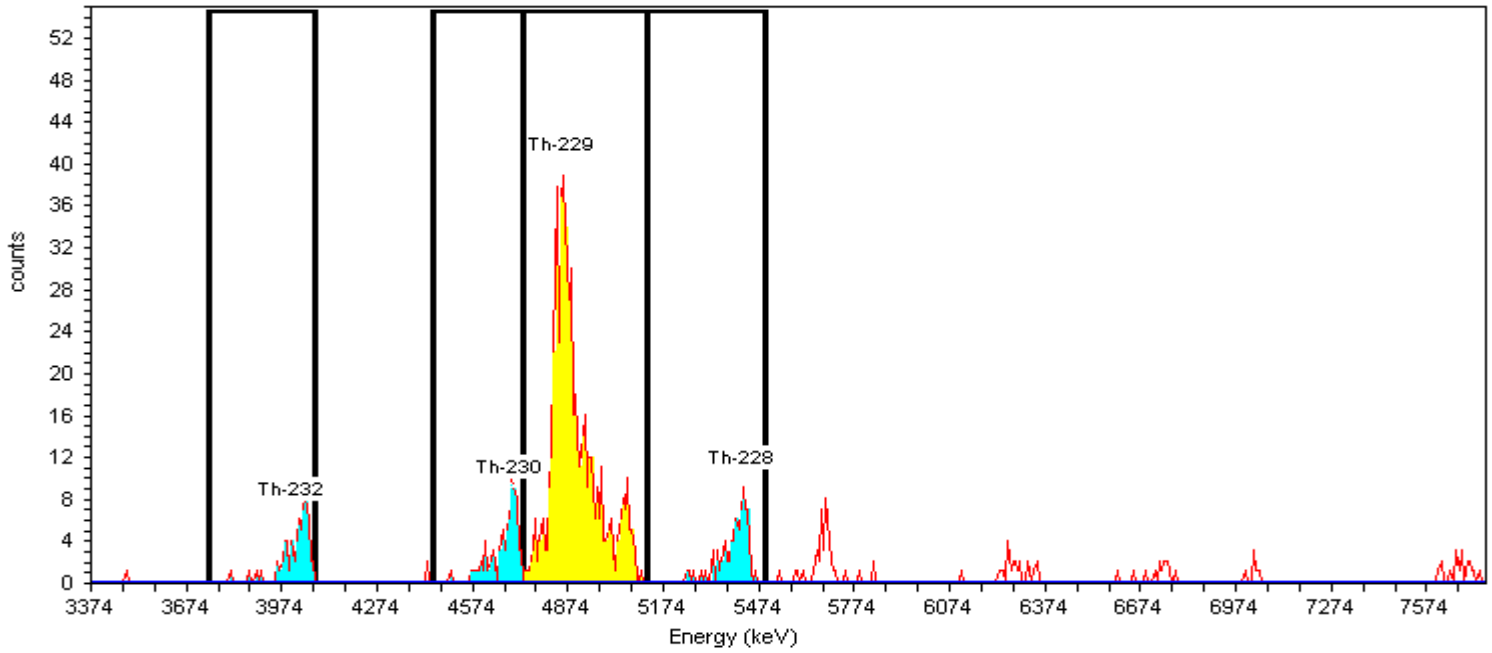
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 83.10%

Acquisition

Detector: AV17
Serial Number: 50-051C4
Acquisition Start Date: 6/30/2014 1:40:21AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:39PM
Background Info: Sample: ICB;AV17; Det: AV17; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-8874;AV17-20140505
Calibration Date: 5/5/2014 10:08:49PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.07% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:38:12AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 6/30/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	32.4	100.2	63	0.5625	62.35	0.719	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4731.7	26.8	99.7	75	0.5625	74.44	0.862	pCi/g
Th-229	4848.0	4,845.3	2.7	4731.7	5119.5	69.8	99.6	528	0.3750	527.63	5.082	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	60.9	99.8	73	3.9375	69.06	0.799	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:43:55AM 6/30/2014

Sample

Sample Name: 680-102199-A-12-B
SampleType: Sample
: 680-102199-A-12-B
Sample Collection Date: 6/10/2014 9:22:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9985g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126996
AnalysisID: 613423

Analyst: 60040

Tracer

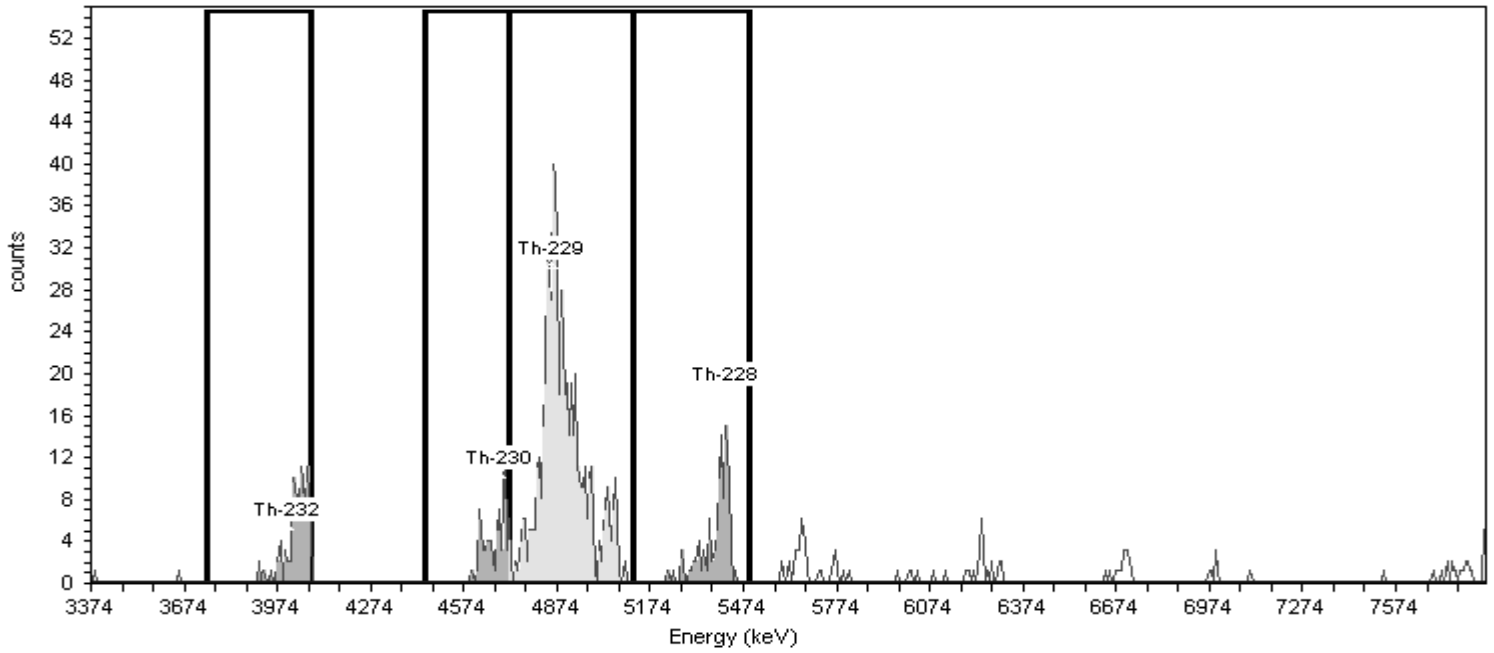
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 88.97%

Acquisition

Detector: AV18
Serial Number: 51-082C5
Acquisition Start Date: 6/30/2014 1:40:22AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:41PM
Background Info: Sample: ICB;AV18; Det: AV18; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-8875;AV18-20140505
Calibration Date: 5/5/2014 10:09:08PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.46% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:38:12AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	.0	100.2	80	0.3750	79.38	0.876	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	27.7	99.7	68	0.3750	67.50	0.749	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	89.1	99.6	552	0.0000	551.88	5.453	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	48.4	99.8	99	1.3125	97.69	1.083	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:40:44PM 6/30/2014

Sample

Sample Name: 680-102199-A-12-B
SampleType: Sample
: 680-102199-A-12-B
Sample Collection Date: 6/10/2014 9:22:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9985g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126996
AnalysisID: 613463

Analyst: 60040

Tracer

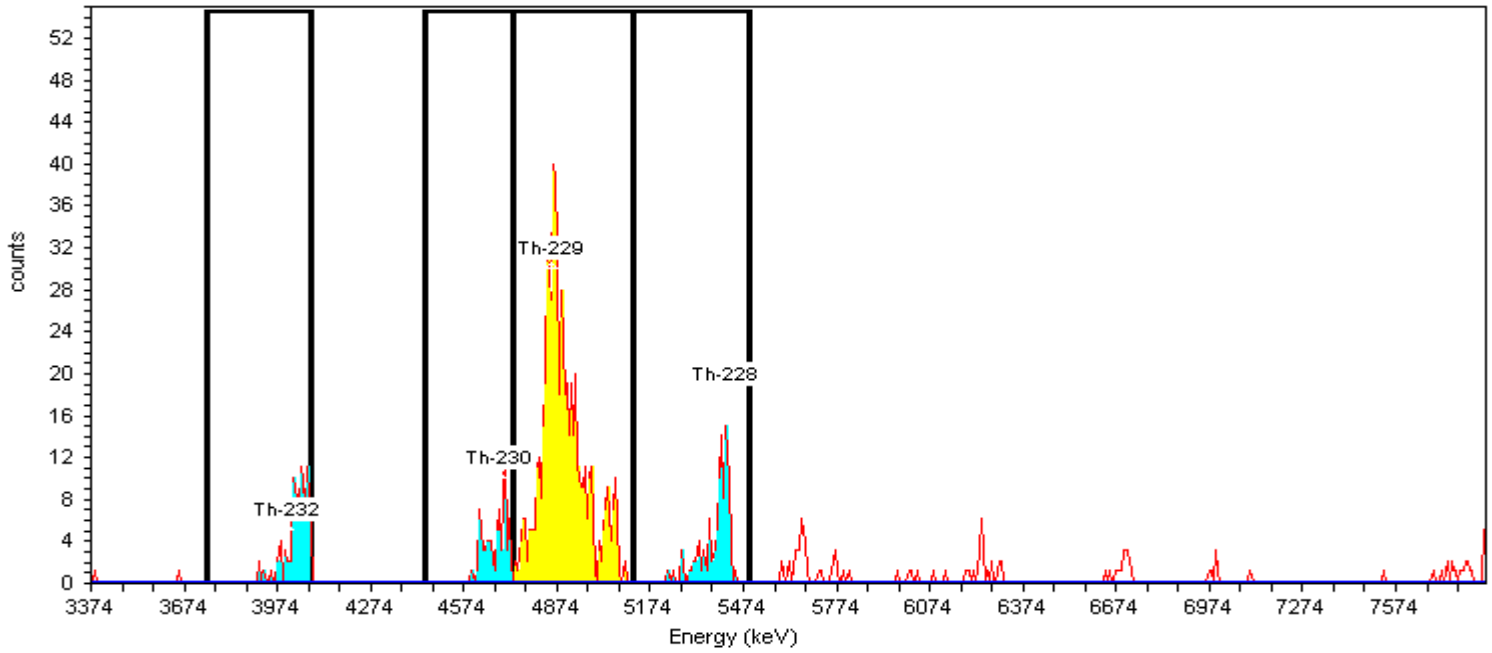
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 88.03%

Acquisition

Detector: AV18
Serial Number: 51-082C5
Acquisition Start Date: 6/30/2014 1:40:22AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:41PM
Background Info: Sample: ICB;AV18; Det: AV18; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-8875;AV18-20140505
Calibration Date: 5/5/2014 10:09:08PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.46% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:38:12AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 6/30/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	.0	100.2	80	0.3750	79.38	0.886	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4731.7	14.1	99.7	70	0.3750	69.63	0.781	pCi/g
Th-229	4848.0	4,845.3	2.7	4731.7	5119.5	89.1	99.6	546	0.0000	546.00	5.395	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	48.4	99.8	99	1.3125	97.69	1.095	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:44:01AM 6/30/2014

Sample

Sample Name: 680-102199-A-13-B
SampleType: Sample
: 680-102199-A-13-B
Sample Collection Date: 6/10/2014 9:25:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9983g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126996
AnalysisID: 613424

Analyst: 60040

Tracer

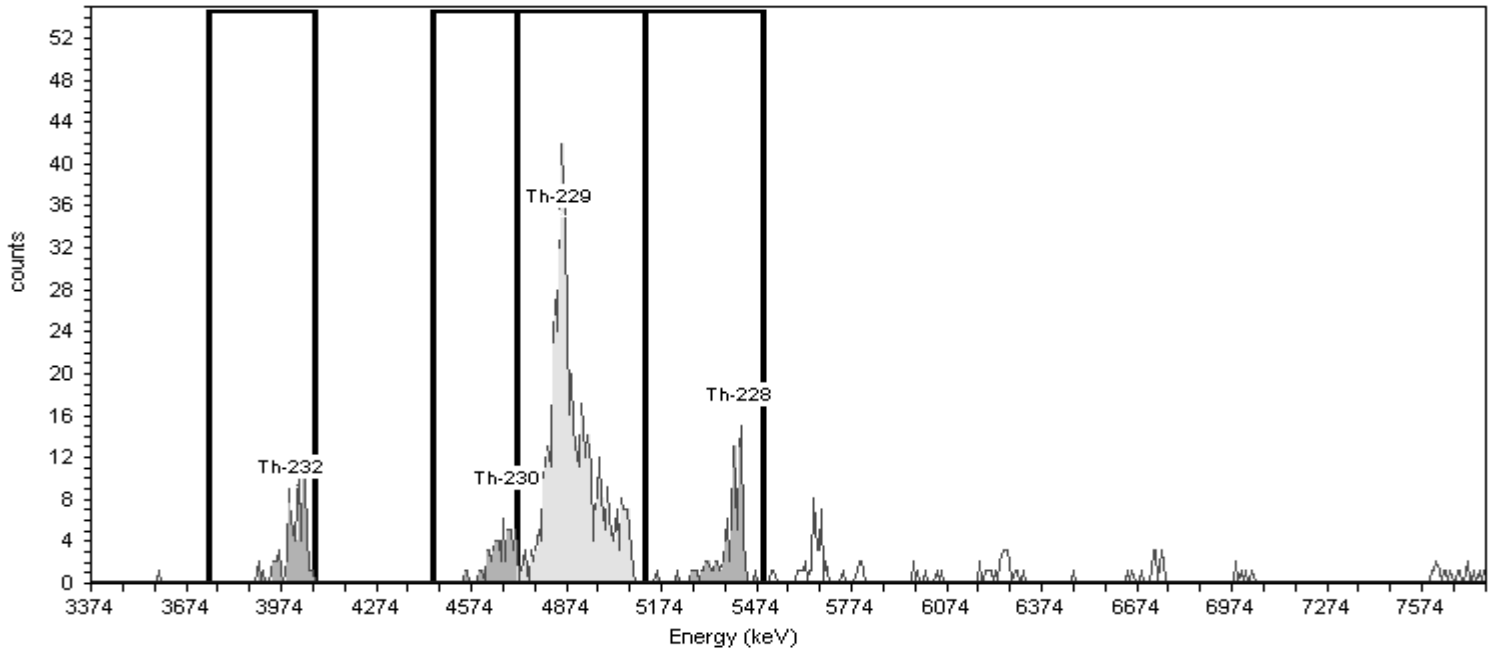
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 85.91%

Acquisition

Detector: AV19
Serial Number: 50-025FF5
Acquisition Start Date: 6/30/2014 1:40:24AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:42PM
Background Info: Sample: ICB;AV19; Det: AV19; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-8876;AV19-20140505
Calibration Date: 5/5/2014 10:09:02PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.34% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:38:12AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	25.4	100.2	80	0.3750	80.08	0.920	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	388.4	99.7	54	1.6817	52.23	0.603	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	69.3	99.6	532	1.6937	530.21	5.266	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	49.1	99.8	90	0.7620	89.24	1.030	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:41:36PM 6/30/2014

Sample

Sample Name: 680-102199-A-13-B
SampleType: Sample
: 680-102199-A-13-B
Sample Collection Date: 6/10/2014 9:25:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9983g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126996
AnalysisID: 613464

Analyst: 60040

Tracer

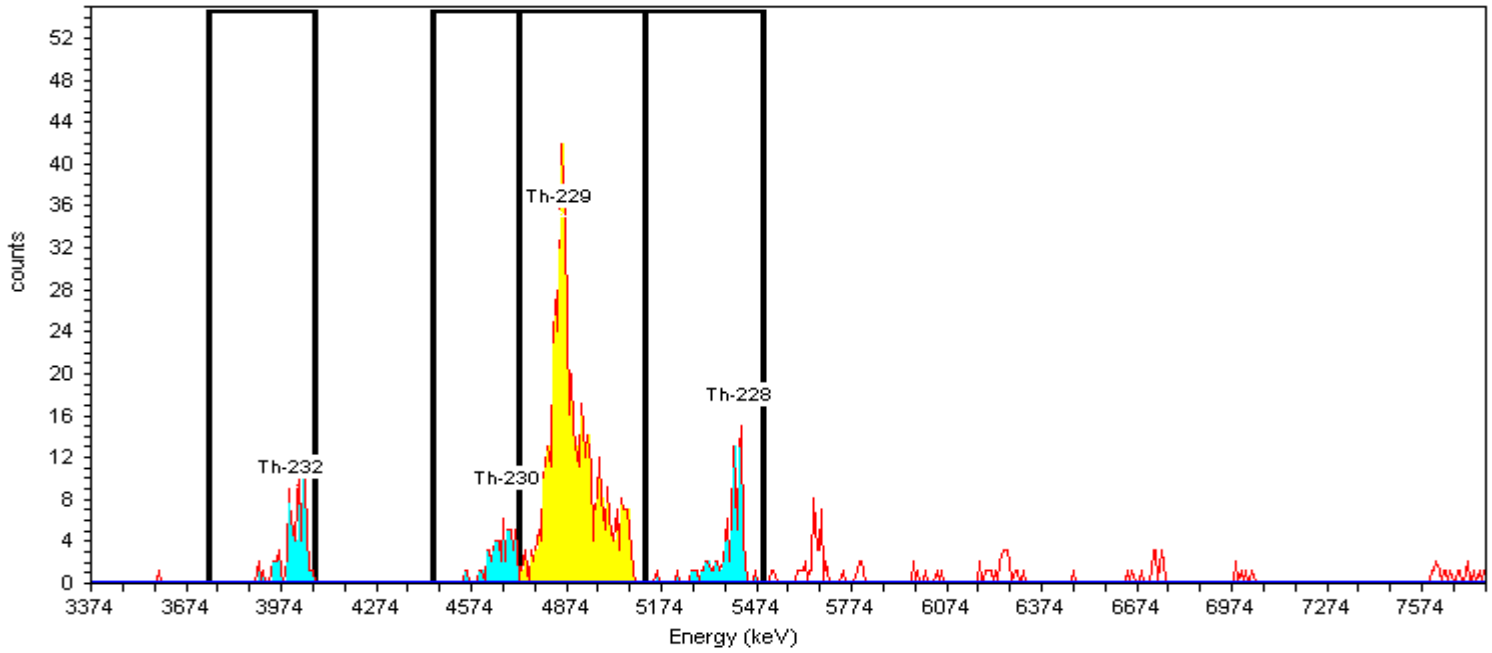
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 85.44%

Acquisition

Detector: AV19
Serial Number: 50-025FF5
Acquisition Start Date: 6/30/2014 1:40:24AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:42PM
Background Info: Sample: ICB;AV19; Det: AV19; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-8876;AV19-20140505
Calibration Date: 5/5/2014 10:09:02PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.34% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:38:12AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 6/30/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	25.4	100.2	80	0.3750	80.08	0.926	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4724.2	36.1	99.7	54	1.6875	52.31	0.608	pCi/g
Th-229	4848.0	4,845.3	2.7	4724.2	5119.5	69.3	99.6	529	1.6875	527.31	5.237	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	49.1	99.8	90	0.7620	89.24	1.036	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:44:07AM 6/30/2014

Sample

Sample Name: 680-102199-A-14-B
SampleType: Sample
: 680-102199-A-14-B
Sample Collection Date: 6/10/2014 9:28:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0039g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126996
AnalysisID: 613425

Analyst: 60040

Tracer

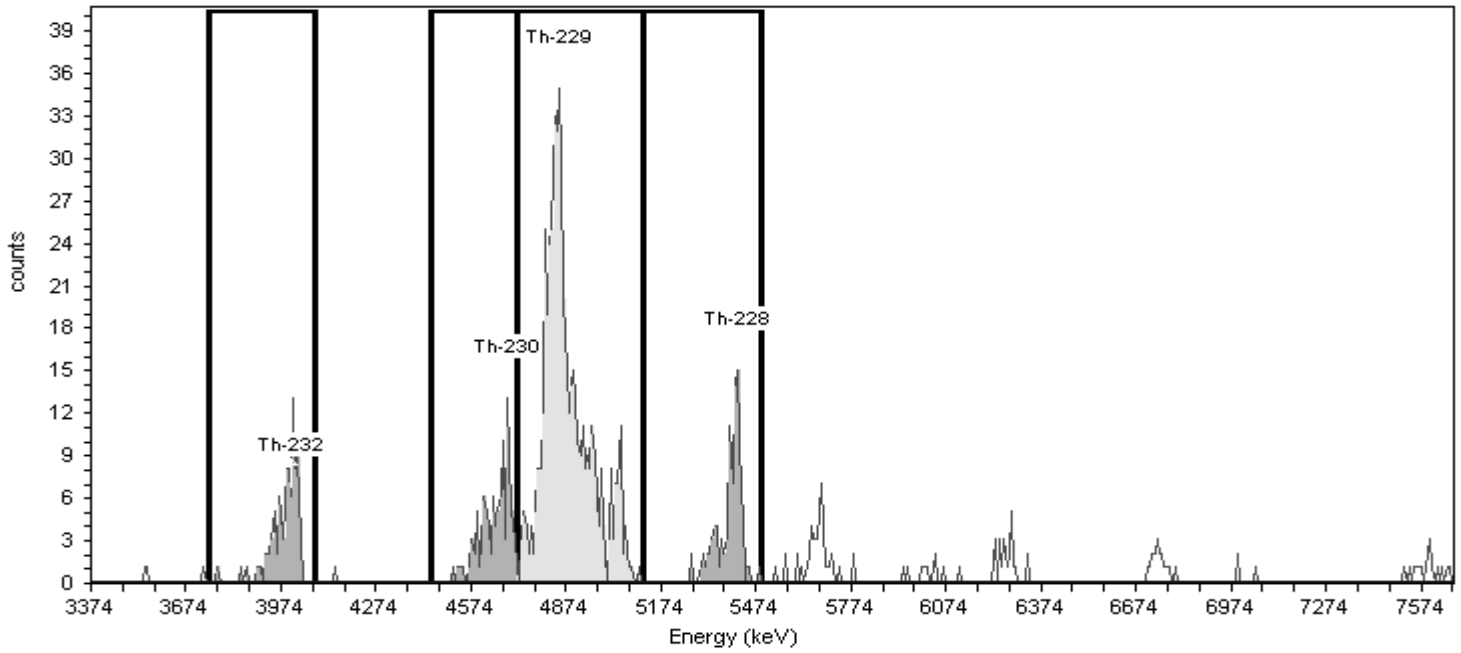
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 82.17%

Acquisition

Detector: AV20
Serial Number: 48-121A7
Acquisition Start Date: 6/30/2014 1:40:25AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:45PM
Background Info: Sample: ICB;AV20; Det: AV20; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-8877;AV20-20140505
Calibration Date: 5/5/2014 10:09:21PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.56% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:38:12AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	72.8	100.2	90	1.5000	88.50	1.048	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	35.1	99.7	100	1.5116	98.46	1.172	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	78.6	99.6	513	1.3241	511.64	5.009	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	49.8	99.8	100	3.0000	97.00	1.154	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:40:14AM 6/30/2014

Sample

Sample Name: 680-102199-A-15-B
SampleType: Sample
: 680-102199-A-15-B
Sample Collection Date: 6/10/2014 10:10:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9975g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126996
AnalysisID: 613404

Analyst: 60040

Tracer

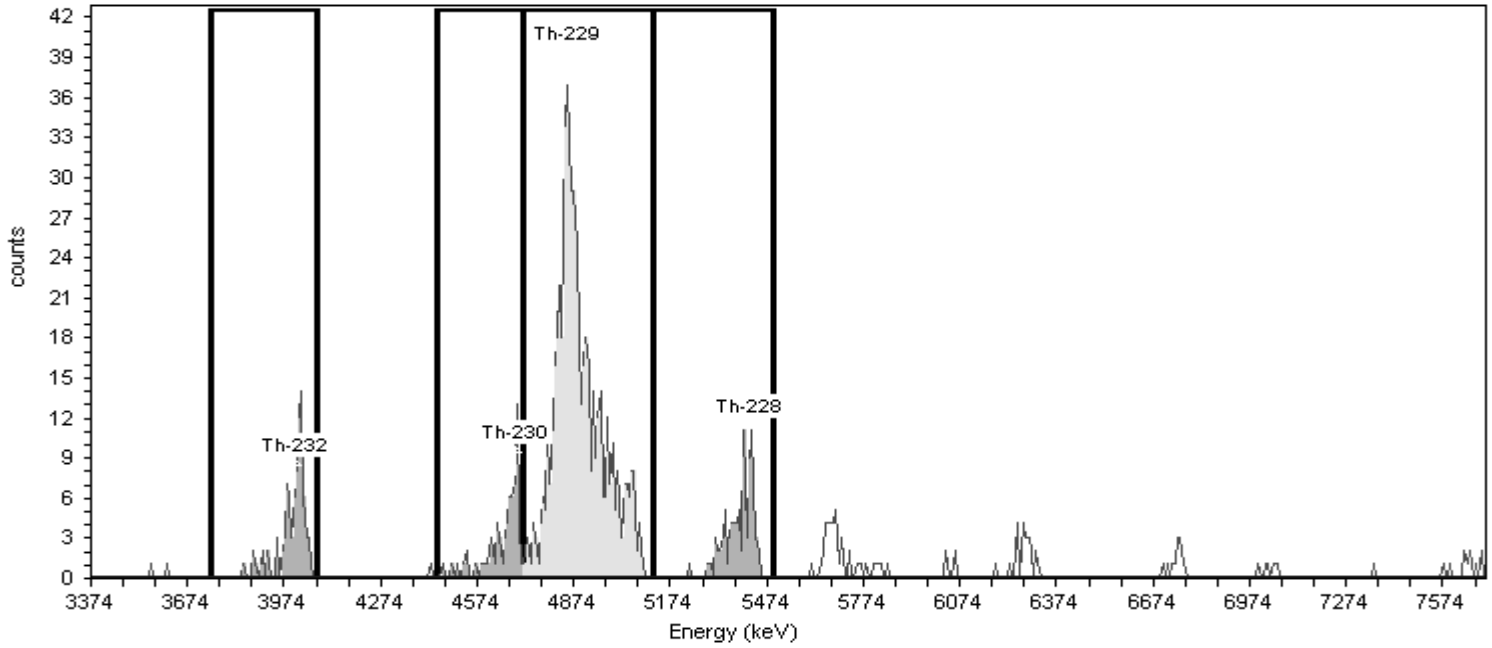
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 90.76%

Acquisition

Detector: AV21
Serial Number: 48-102BB6
Acquisition Start Date: 6/30/2014 1:40:26AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:46PM
Background Info: Sample: ICB;AV21; Det: AV21; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9520;AV21-20140505
Calibration Date: 5/5/2014 10:09:29PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.45% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:38:12AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	30.9	99.7	70	0.7500	69.31	0.755	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	83.4	99.6	563	0.3750	562.69	5.568	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	69.6	99.8	87	2.0625	84.94	0.925	pCi/g
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	46.8	100.2	86	0.3750	85.63	0.928	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:40:21AM 6/30/2014

Sample

Sample Name: 680-102199-A-16-B
SampleType: Sample
: 680-102199-A-16-B
Sample Collection Date: 6/10/2014 10:12:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9980g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126996
AnalysisID: 613405

Analyst: 60040

Tracer

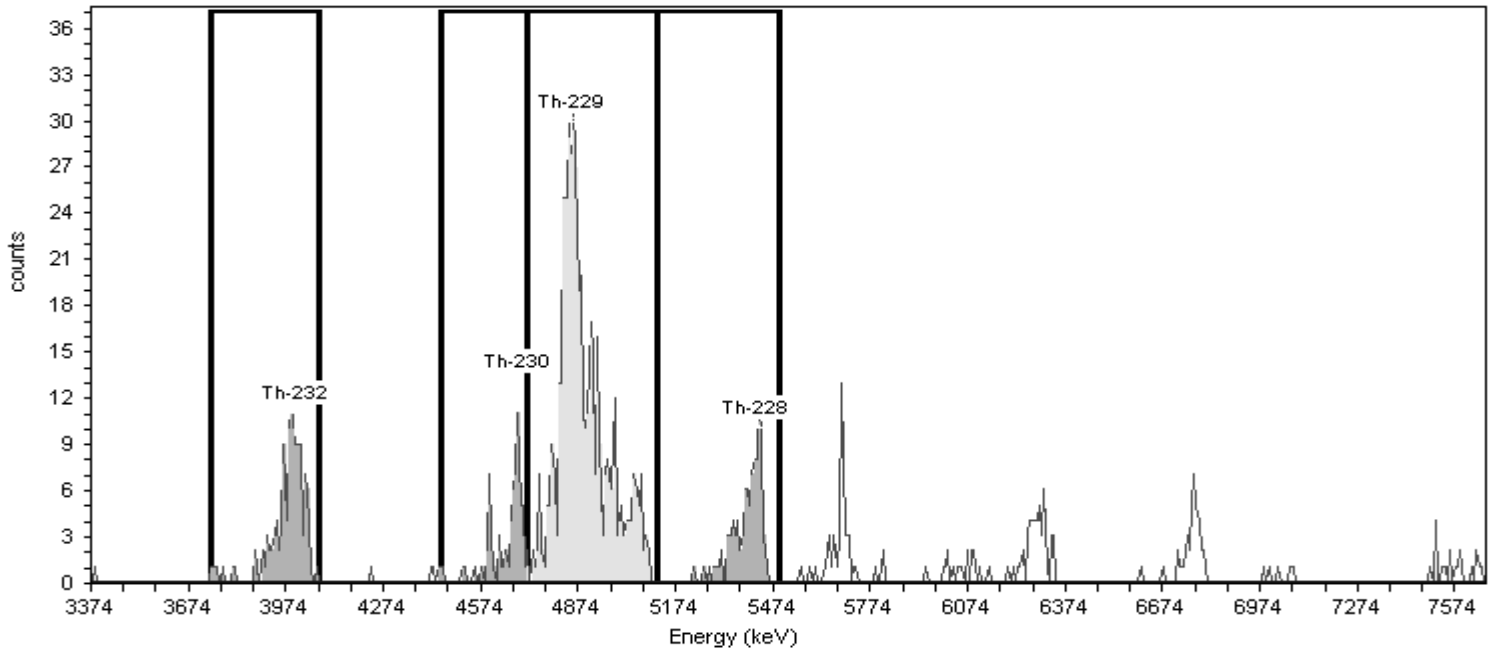
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 75.19%

Acquisition

Detector: AV23
Serial Number: 48-158FF3
Acquisition Start Date: 6/30/2014 1:40:27AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:49PM
Background Info: Sample: ICB;AV23; Det: AV23; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9792;AV23-20140505
Calibration Date: 5/5/2014 10:09:35PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.91% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:38:13AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	77.9	100.2	119	0.3750	119.08	1.529	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	32.5	99.7	68	0.9375	67.00	0.865	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	71.7	99.6	476	1.3125	474.63	4.611	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	67.4	99.8	95	1.8750	93.13	1.201	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:40:27AM 6/30/2014

Sample

Sample Name: 680-102199-A-17-B
SampleType: Sample
: 680-102199-A-17-B
Sample Collection Date: 6/10/2014 10:14:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0043g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126996
AnalysisID: 613406

Analyst: 60040

Tracer

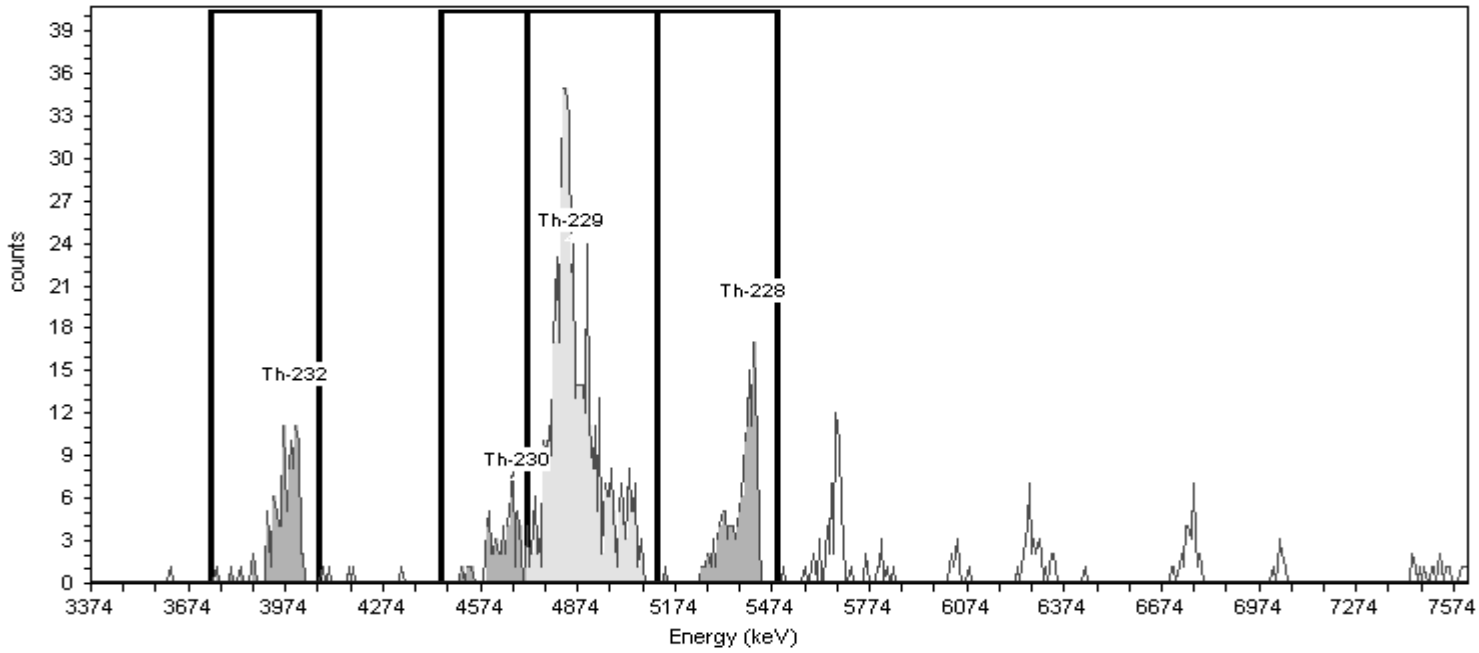
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 79.85%

Acquisition

Detector: AV24
Serial Number: 47-137Q4
Acquisition Start Date: 6/30/2014 1:40:29AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:51PM
Background Info: Sample: ICB;AV24; Det: AV24; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9793;AV24-20140505
Calibration Date: 5/5/2014 10:09:41PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.42% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:38:13AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	69.2	100.2	101	0.7500	100.25	1.182	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	12.3	99.7	64	0.9375	62.97	0.746	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	70.7	99.6	515	1.1250	513.78	4.866	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	52.0	99.8	134	4.7037	129.30	1.531	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:40:59AM 6/30/2014

Sample

Sample Name: 680-102199-A-18-B
SampleType: Sample
: 680-102199-A-18-B
Sample Collection Date: 6/10/2014 11:40:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9989g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126996
AnalysisID: 613407

Analyst: 60040

Tracer

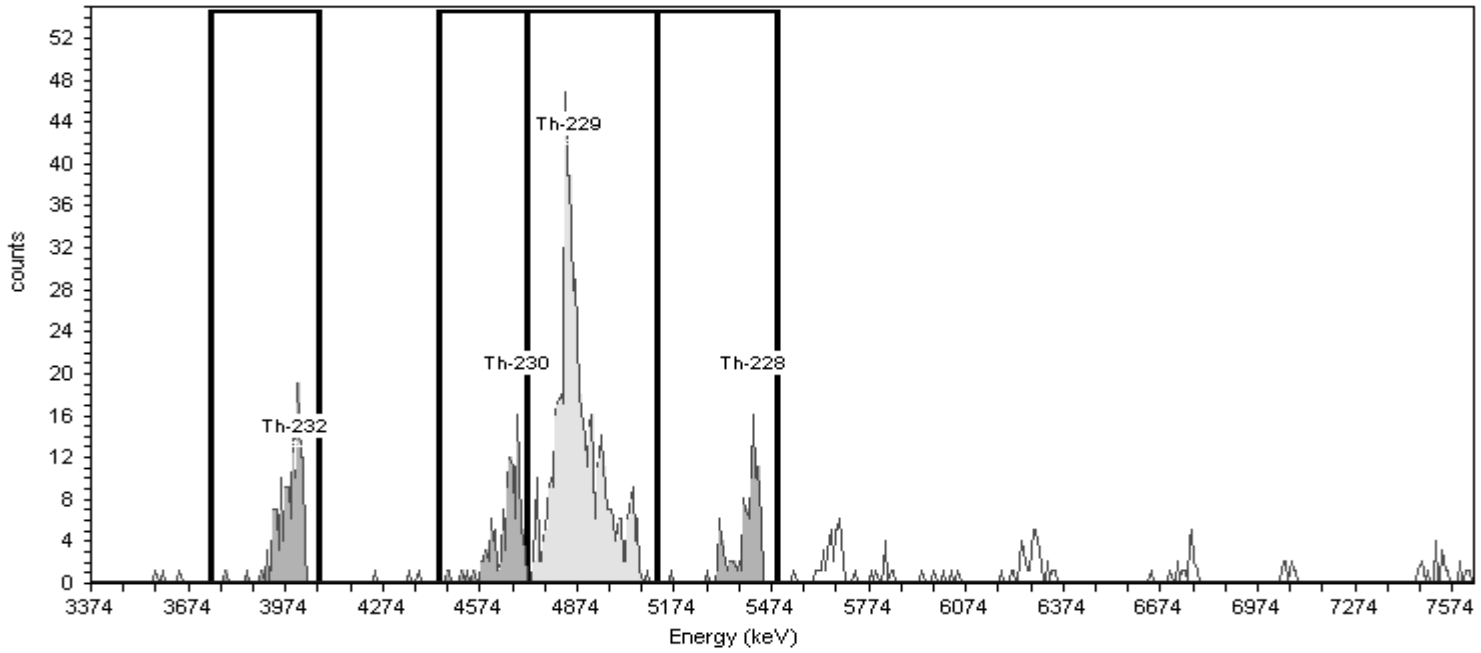
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 87.91%

Acquisition

Detector: AV43
Serial Number: 49-190X4
Acquisition Start Date: 6/30/2014 1:40:31AM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/19/2014 12:17:24AM
Background Info: Sample: ICB;AV43; Det: AV43; Spectrum #1; Jun-19-2014 00:17

Calibration Name: IC-9794;AV43-20140505
Calibration Date: 5/5/2014 10:09:47PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.74% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:38:13AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	74.8	100.2	133	0.3750	132.63	1.466	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	34.4	99.7	115	0.6203	114.38	1.270	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	69.7	99.6	552	0.9375	551.06	5.385	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.1	99.8	100	1.6875	98.31	1.091	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:41:29AM 6/30/2014

Sample

Sample Name: 680-102199-A-19-B
SampleType: Sample
: 680-102199-A-19-B
Sample Collection Date: 6/10/2014 11:45:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0036g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126996
AnalysisID: 613408

Analyst: 60040

Tracer

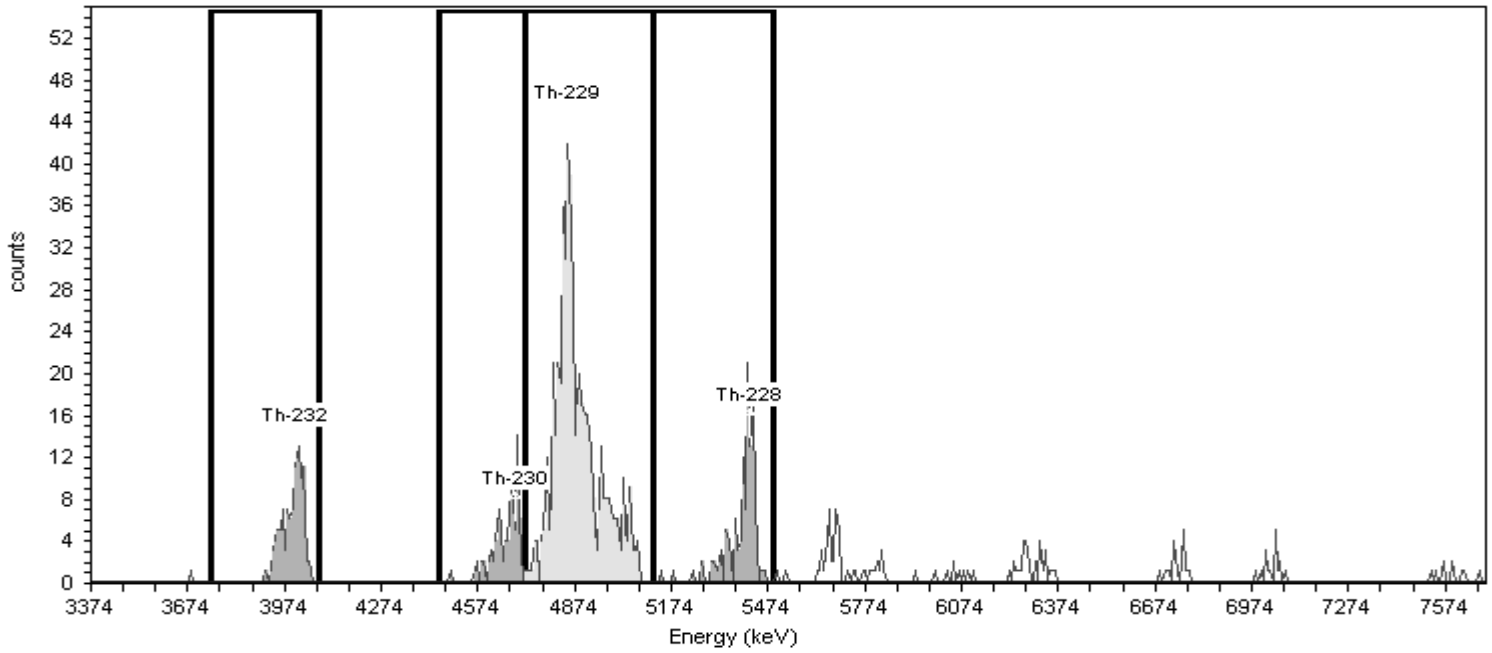
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 84.97%

Acquisition

Detector: AV44
Serial Number: 50-051JJ1
Acquisition Start Date: 6/30/2014 1:40:33AM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/19/2014 12:17:25AM
Background Info: Sample: ICB;AV44; Det: AV44; Spectrum #1; Jun-19-2014 00:17

Calibration Name: IC-9795;AV44-20140505
Calibration Date: 5/5/2014 10:09:57PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.32% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:38:13AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	39.2	100.2	111	0.0000	111.00	1.235	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	33.4	99.7	84	0.1875	83.81	0.937	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	72.4	99.6	545	0.1875	544.81	5.182	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	49.8	99.8	122	3.0000	119.09	1.331	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:41:35AM 6/30/2014

Sample

Sample Name: 680-102199-A-20-B
SampleType: Sample
: 680-102199-A-20-B
Sample Collection Date: 6/10/2014 11:50:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9979g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126996
AnalysisID: 613409

Analyst: 60040

Tracer

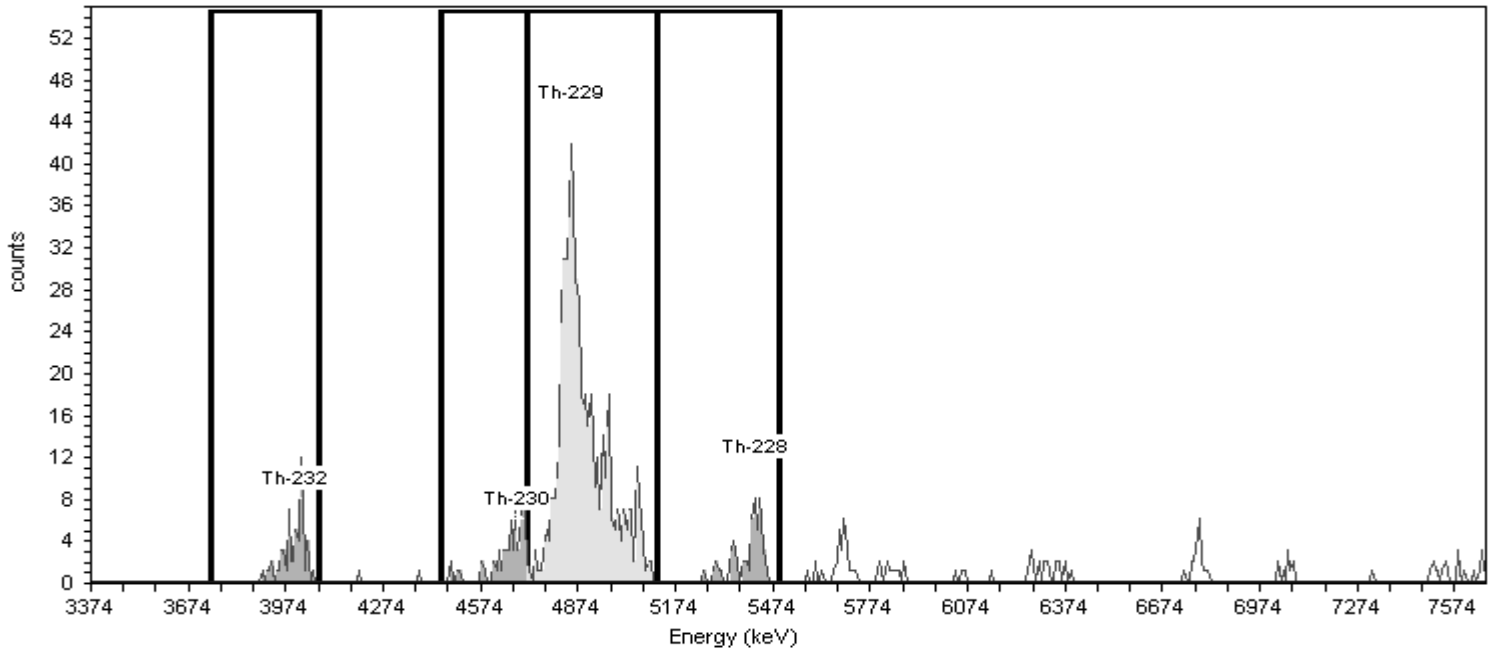
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 93.18%

Acquisition

Detector: AV45
Serial Number: 48-158FF2
Acquisition Start Date: 6/30/2014 1:40:35AM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/19/2014 12:17:28AM
Background Info: Sample: ICB;AV45; Det: AV45; Spectrum #1;
Jun-19-2014 00:17

Calibration Name: IC-9817;AV45-20140505
Calibration Date: 5/5/2014 10:10:03PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.06% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:38:13AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	54.8	100.2	60	0.5625	59.44	0.613	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	45.9	99.7	65	0.1875	64.78	0.671	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	73.0	99.6	592	0.3750	591.59	5.715	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	53.3	99.8	62	2.2338	59.77	0.619	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:44:28PM 6/30/2014

Sample

Sample Name: 680-102199-A-20-B
SampleType: Sample
: 680-102199-A-20-B
Sample Collection Date: 6/10/2014 11:50:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9979g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126996
AnalysisID: 613467

Analyst: 60040

Tracer

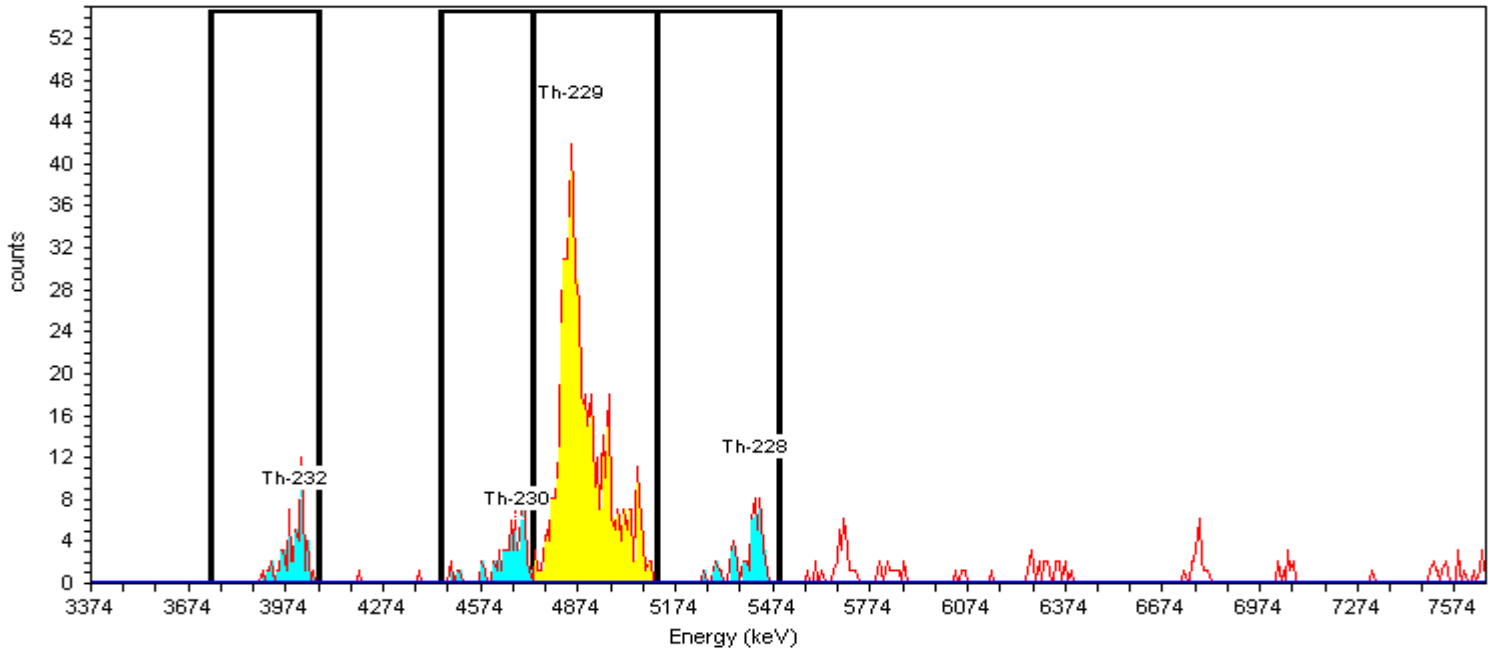
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 92.87%

Acquisition

Detector: AV45
Serial Number: 48-158FF2
Acquisition Start Date: 6/30/2014 1:40:35AM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/19/2014 12:17:28AM
Background Info: Sample: ICB;AV45; Det: AV45; Spectrum #1; Jun-19-2014 00:17

Calibration Name: IC-9817;AV45-20140505
Calibration Date: 5/5/2014 10:10:03PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.06% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:38:13AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 6/30/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	54.8	100.2	60	0.5625	59.44	0.615	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4731.7	25.5	99.7	66	0.1875	65.81	0.684	pCi/g
Th-229	4848.0	4,845.3	2.7	4731.7	5119.5	73.0	99.6	590	0.3750	589.63	5.695	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	53.3	99.8	62	2.2338	59.77	0.621	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:41:46AM 6/30/2014

Sample

Sample Name: 680-102199-A-22-B
SampleType: Sample
: 680-102199-A-22-B
Sample Collection Date: 6/10/2014 12:20:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0043g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126996
AnalysisID: 613411

Analyst: 60040

Tracer

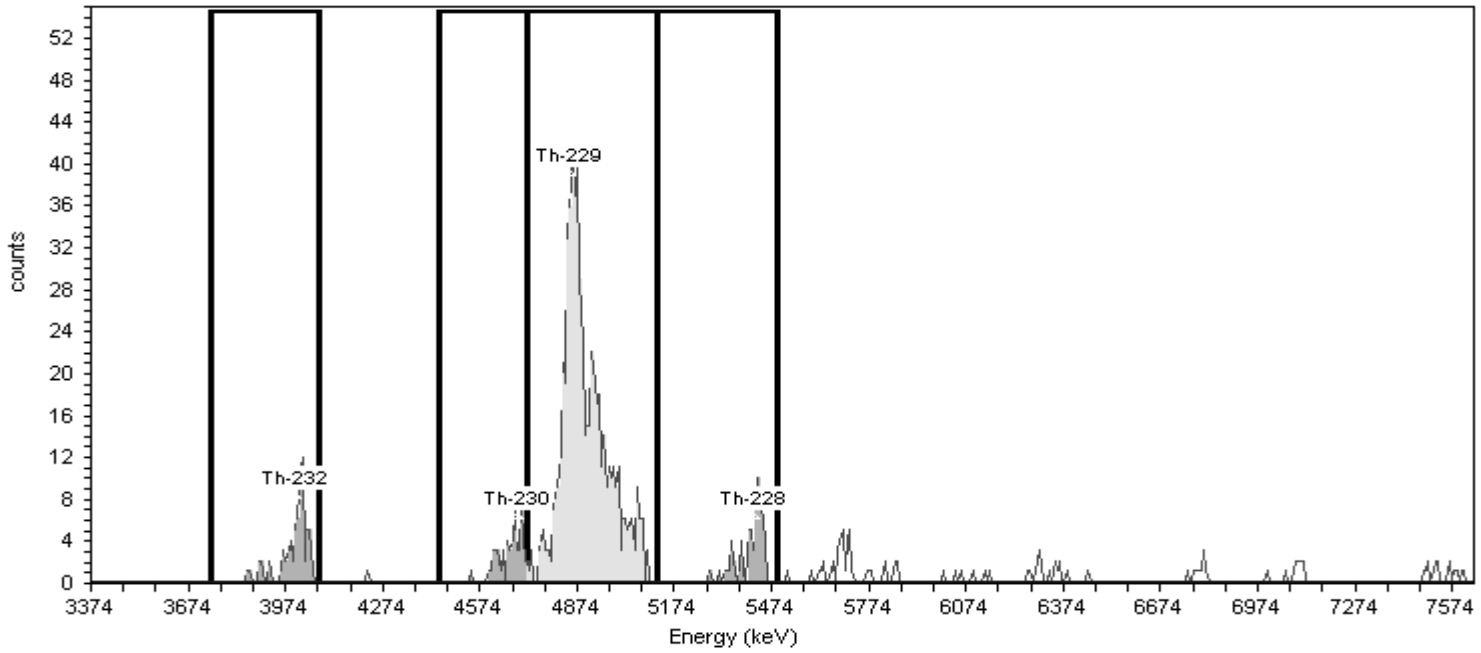
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 92.37%

Acquisition

Detector: AV46
Serial Number: 49-202GG2
Acquisition Start Date: 6/30/2014 1:40:36AM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/19/2014 12:17:29AM
Background Info: Sample: ICB;AV46; Det: AV46; Spectrum #1; Jun-19-2014 00:17

Calibration Name: IC-9884;AV46-20140505
Calibration Date: 5/5/2014 10:10:09PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.80% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:38:13AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	55.8	100.2	71	0.1875	70.81	0.711	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	39.4	99.7	51	0.1875	50.78	0.513	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	69.8	99.6	604	0.9375	603.03	5.628	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	39.4	99.8	65	0.9537	64.05	0.646	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:45:08PM 6/30/2014

Sample

Sample Name: 680-102199-A-22-B
SampleType: Sample
: 680-102199-A-22-B
Sample Collection Date: 6/10/2014 12:20:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0043g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126996
AnalysisID: 613468

Analyst: 60040

Tracer

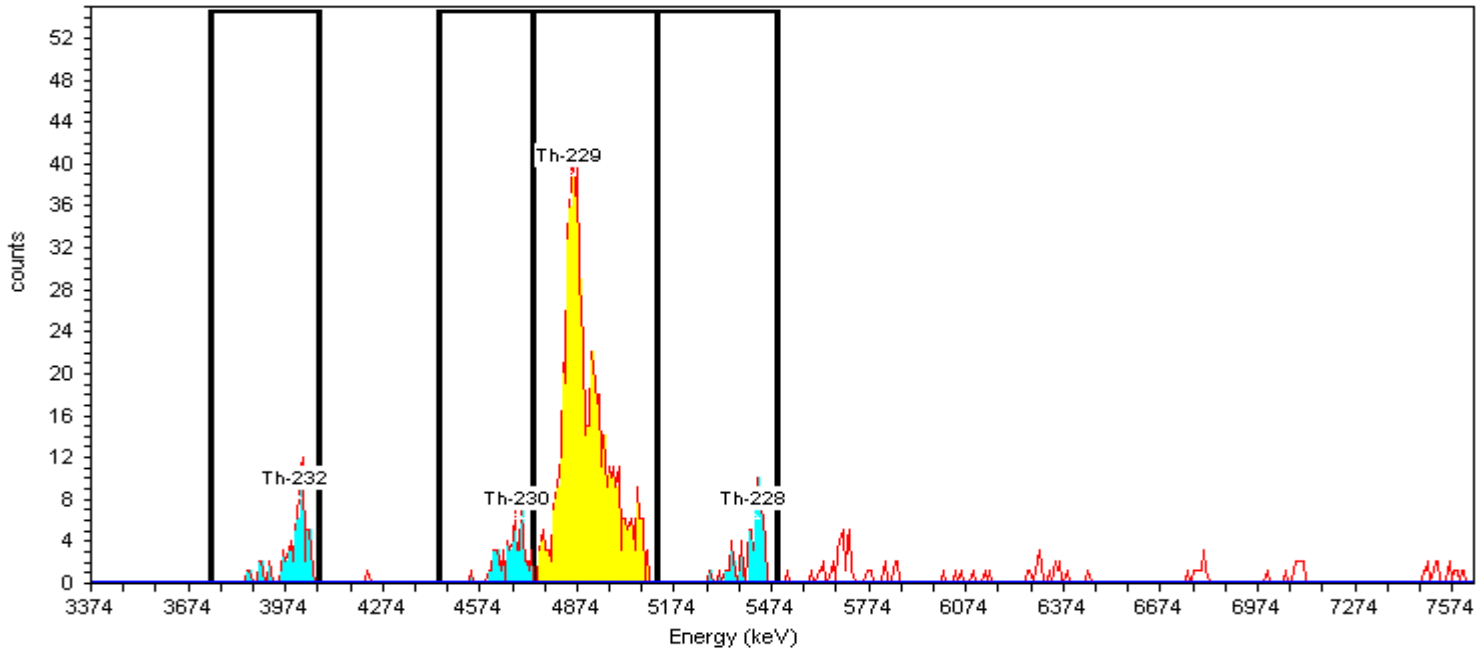
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 91.61%

Acquisition

Detector: AV46
Serial Number: 49-202GG2
Acquisition Start Date: 6/30/2014 1:40:36AM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/19/2014 12:17:29AM
Background Info: Sample: ICB;AV46; Det: AV46; Spectrum #1; Jun-19-2014 00:17

Calibration Name: IC-9884;AV46-20140505
Calibration Date: 5/5/2014 10:10:09PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.80% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:38:13AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 6/30/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	55.8	100.2	71	0.1875	70.81	0.717	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4739.1	13.1	99.7	55	0.1875	54.81	0.558	pCi/g
Th-229	4848.0	4,845.3	2.7	4739.1	5119.5	69.8	99.6	599	0.9375	598.06	5.582	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	39.4	99.8	65	0.9537	64.05	0.652	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:42:30AM 6/30/2014

Sample

Sample Name: 680-102199-A-23-B
SampleType: Sample
: 680-102199-A-23-B
Sample Collection Date: 6/10/2014 12:25:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9988g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126996
AnalysisID: 613414

Analyst: 60040

Tracer

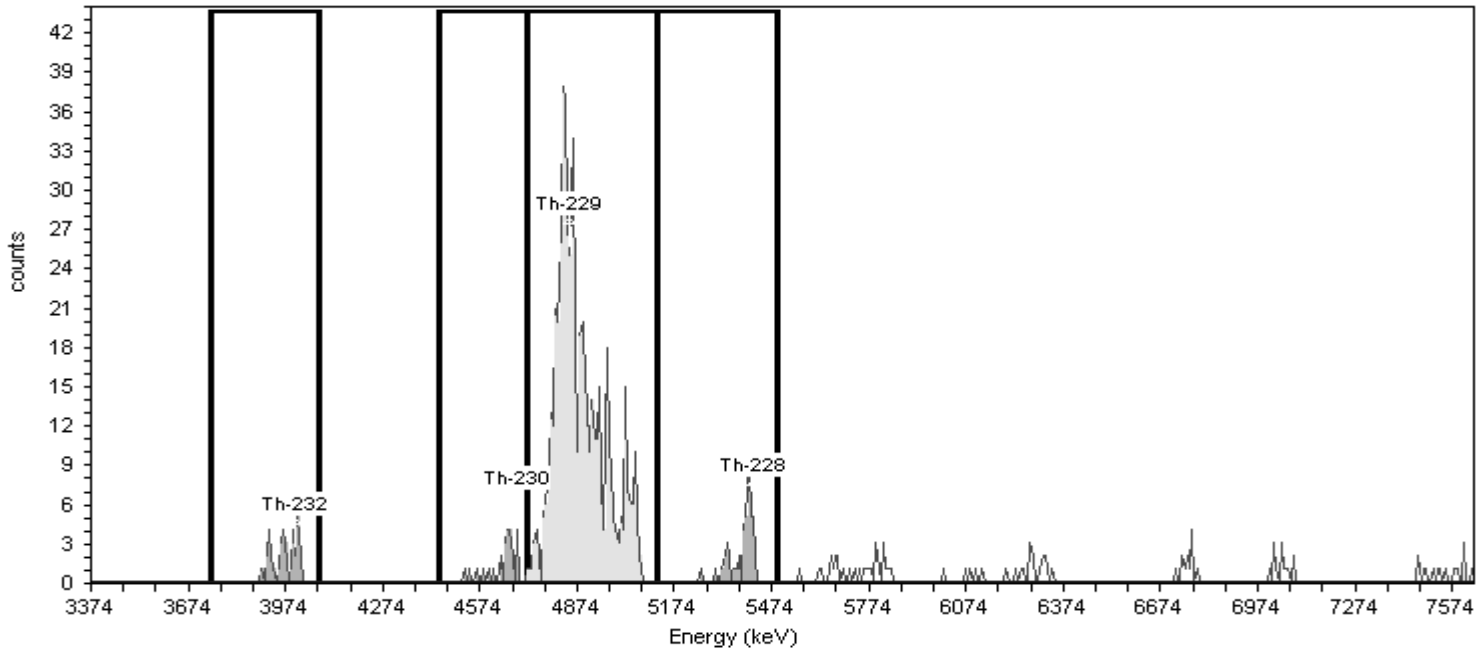
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 89.74%

Acquisition

Detector: AV48
Serial Number: 50-051JJ4
Acquisition Start Date: 6/30/2014 1:40:38AM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/19/2014 12:17:33AM
Background Info: Sample: ICB;AV48; Det: AV48; Spectrum #1; Jun-19-2014 00:17

Calibration Name: IC-9886;AV48-20140505
Calibration Date: 5/5/2014 10:10:22PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.78% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:38:13AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	120.9	100.2	35	0.0000	35.00	0.378	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	37.0	99.7	26	0.1875	25.81	0.280	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	82.5	99.6	564	0.3750	563.63	5.498	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	45.4	99.8	44	2.0625	41.94	0.455	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:43:15AM 6/30/2014

Sample

Sample Name: 680-102199-A-24-B
SampleType: Sample
: 680-102199-A-24-B
Sample Collection Date: 6/10/2014 12:30:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0029g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126996
AnalysisID: 613416

Analyst: 60040

Tracer

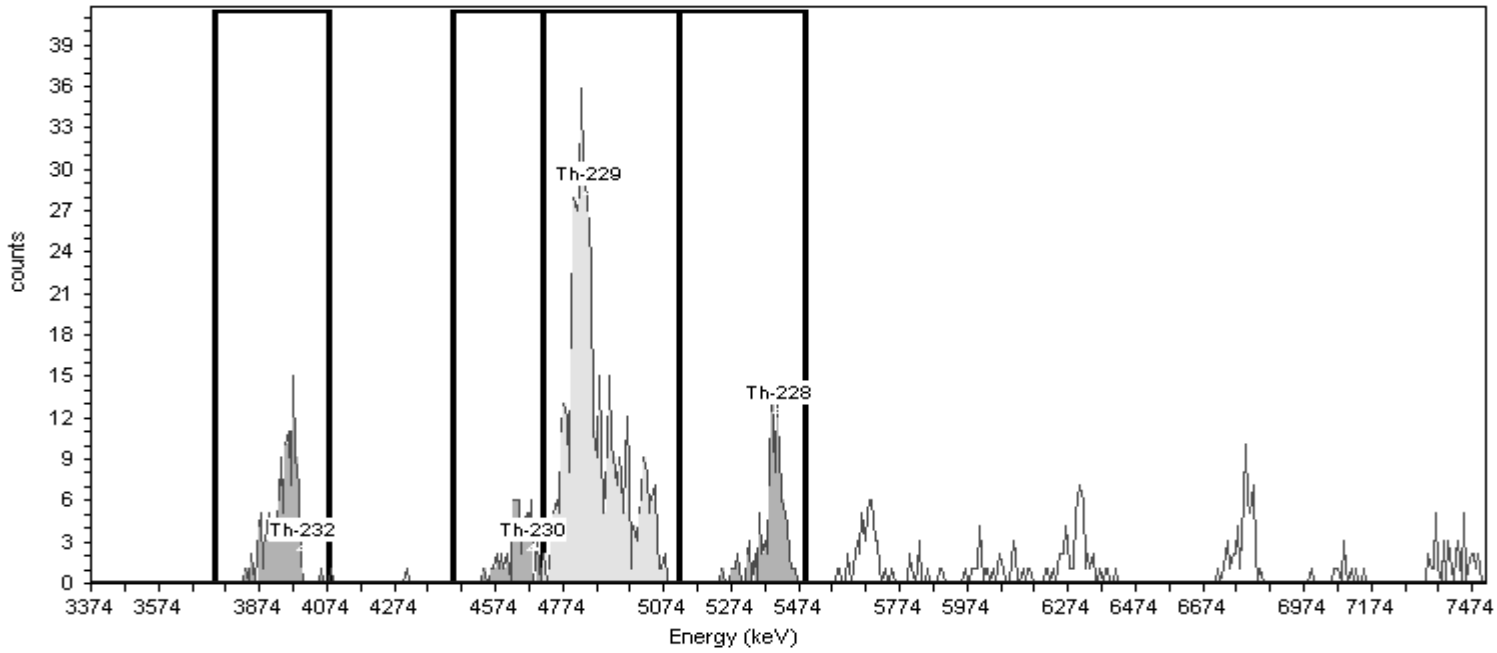
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 78.99%

Acquisition

Detector: AV49
Serial Number: 47-043hh4
Acquisition Start Date: 6/30/2014 1:40:39AM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/19/2014 12:17:35AM
Background Info: Sample: ICB;AV49; Det: AV49; Spectrum #1; Jun-19-2014 00:17

Calibration Name: IC-7107;AV49-20140504
Calibration Date: 5/5/2014 6:52:38PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.53% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:38:13AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	65.2	100.2	113	0.9375	112.06	1.332	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	36.0	99.7	57	1.6817	55.26	0.660	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	71.7	99.6	512	1.4822	510.46	4.820	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	53.7	99.8	97	3.1755	93.82	1.120	pCi/g

Prep Batch: 126998

, Extraction Chromatography Resin Actinide

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 126998

Lab ID: MB 160-126998/1-A
Client ID:
Sigma: 2
Analyzed: 06/30/14 18:12
Detector: AV6
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.04749	0.0667	0.0668	U	pCi/g	1.00	0.113	128962
Thorium-230	0.1451	0.0892	0.0901		pCi/g	1.00	0.0951	128962
Thorium-232	-0.007527	0.0185	0.0185	U	pCi/g	1.00	0.0768	128962

Tracer	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.225	0.451	0.629		pCi/g	0.0689	6.12	85.4	30 - 110

Lab ID: LCS 160-126998/2-A
Client ID:
Sigma: 2
Analyzed: 06/30/14 18:12
Detector: AV7
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	25.53	1.52	2.63		pCi/g	1.00	0.149	128973

Tracer	LCS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	10.50	0.905	1.26		pCi/g	0.118	12.2	85.8	30 - 110

Lab ID: 680-102199-26
Client ID: SD-196-SS
Sigma: 2
Analyzed: 06/30/14 01:42
Detector: AV53
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.30	0.242	0.265		pCi/g	1.00	0.0818	128956
Thorium-230	1.20	0.233	0.254		pCi/g	1.00	0.0788	128956
Thorium-232	1.26	0.237	0.259		pCi/g	1.00	0.0627	128956

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.29	0.450	0.633		pCi/g	0.0584	6.14	86.3	30 - 110

Lab ID: 680-102199-26 DU
Client ID: SD-196-SS
Sigma: 2
Analyzed: 06/30/14 01:42
Detector: AV54
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.034	0.206	0.224		pCi/g	1.00	0.0914	128957
Thorium-230	0.9540	0.196	0.212		pCi/g	1.00	0.0677	128957
Thorium-232	1.116	0.211	0.230		pCi/g	1.00	0.0481	128957

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 126998

Lab ID: 680-102199-26 DU
Client ID: SD-196-SS
Sigma: 2
Analyzed: 06/30/14 01:42
Detector: AV54
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Tracer	DU Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.941	0.480	0.692		pCi/g	0.0625	6.13	97.0	30 - 110

Lab ID: 680-102199-27
Client ID: SD-196-01
Sigma: 2
Analyzed: 06/30/14 01:42
Detector: AV55
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.31	0.239	0.263		pCi/g	1.00	0.0765	128958
Thorium-230	1.08	0.217	0.235		pCi/g	1.00	0.0697	128958
Thorium-232	1.06	0.214	0.232		pCi/g	1.00	0.0694	128958

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.28	0.444	0.628		pCi/g	0.0485	6.10	86.7	30 - 110

Lab ID: 680-102199-28
Client ID: SD-196-02
Sigma: 2
Analyzed: 06/30/14 01:42
Detector: AV56
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.905	0.195	0.209		pCi/g	1.00	0.0733	129083
Thorium-230	0.876	0.190	0.204		pCi/g	1.00	0.0470	129083
Thorium-232	0.808	0.183	0.195		pCi/g	1.00	0.0534	129083

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.69	0.468	0.669		pCi/g	0.0547	6.11	93.1	30 - 110

Lab ID: 680-102199-30
Client ID: SD-220-SS
Sigma: 2
Analyzed: 06/30/14 01:42
Detector: AV57
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.05	0.217	0.234		pCi/g	1.00	0.0974	128959
Thorium-230	1.13	0.222	0.241		pCi/g	1.00	0.0616	128959
Thorium-232	1.14	0.223	0.243		pCi/g	1.00	0.0658	128959

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.28	0.446	0.629		pCi/g	0.0806	6.11	86.5	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 126998

Lab ID: 680-102199-31 | Analyzed: 06/30/14 01:42 | Decay Corrected: No
Client ID: SD-220-01 | Detector: AV58 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.03	0.211	0.228		pCi/g	1.00	0.0729	128960
Thorium-230	0.914	0.200	0.215		pCi/g	1.00	0.0822	128960
Thorium-232	1.30	0.236	0.260		pCi/g	1.00	0.0520	128960

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.36	0.450	0.636		pCi/g	0.0537	6.10	87.9	30 - 110

Lab ID: 680-102199-32 | Analyzed: 06/30/14 01:43 | Decay Corrected: No
Client ID: SD-220-02 | Detector: AV59 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.986	0.210	0.226		pCi/g	1.00	0.0717	128961
Thorium-230	0.940	0.204	0.219		pCi/g	1.00	0.0505	128961
Thorium-232	0.944	0.204	0.219		pCi/g	1.00	0.0331	128961

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.02	0.428	0.601		pCi/g	0.0274	6.10	82.3	30 - 110

Lab ID: 680-102199-33 | Analyzed: 06/30/14 01:43 | Decay Corrected: No
Client ID: SD-DUP-01 | Detector: AV60 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.17	0.226	0.246		pCi/g	1.00	0.100	128963
Thorium-230	0.851	0.190	0.203		pCi/g	1.00	0.0679	128963
Thorium-232	1.30	0.234	0.258		pCi/g	1.00	0.0594	128963

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.52	0.458	0.652		pCi/g	0.0433	6.10	90.6	30 - 110

Lab ID: 680-102199-35 | Analyzed: 06/30/14 01:43 | Decay Corrected: No
Client ID: SD-201-SS | Detector: AV61 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.12	0.214	0.234		pCi/g	1.00	0.0872	128964
Thorium-230	1.23	0.222	0.245		pCi/g	1.00	0.0605	128964

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 126998

Lab ID: 680-102199-35 | Analyzed: 06/30/14 01:43 | Decay Corrected: No
Client ID: SD-201-SS | Detector: AV61 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-232	0.959	0.195	0.211		pCi/g	1.00	0.0449	128964

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.88	0.473	0.684		pCi/g	0.0581	6.13	95.9	30 - 110

Lab ID: 680-102199-36 | Analyzed: 06/30/14 01:43 | Decay Corrected: No
Client ID: SD-201-01 | Detector: AV62 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.22	0.225	0.248		pCi/g	1.00	0.0727	128965
Thorium-230	1.03	0.206	0.223		pCi/g	1.00	0.0532	128965
Thorium-232	1.20	0.221	0.243		pCi/g	1.00	0.0306	128965

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.73	0.468	0.671		pCi/g	0.0435	6.14	93.3	30 - 110

Lab ID: 680-102199-37 | Analyzed: 06/30/14 01:43 | Decay Corrected: No
Client ID: SD-201-02 | Detector: AV63 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.690	0.177	0.186		pCi/g	1.00	0.105	128966
Thorium-230	0.614	0.163	0.171		pCi/g	1.00	0.0719	128966
Thorium-232	0.663	0.167	0.176		pCi/g	1.00	0.0427	128966

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.72	0.476	0.677		pCi/g	0.0639	6.14	93.3	30 - 110

Lab ID: 680-102199-39 | Analyzed: 06/30/14 01:43 | Decay Corrected: No
Client ID: SD-200-SS | Detector: AV64 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.05	0.207	0.225		pCi/g	1.00	0.0787	128967
Thorium-230	1.15	0.214	0.235		pCi/g	1.00	0.0566	128967
Thorium-232	1.42	0.237	0.266		pCi/g	1.00	0.0450	128967

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 126998

Lab ID: 680-102199-39 | Analyzed: 06/30/14 01:43 | Decay Corrected: No
Client ID: SD-200-SS | Detector: AV64 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.55	0.448	0.647		pCi/g	0.0554	6.11	90.9	30 - 110

Lab ID: 680-102199-40 | Analyzed: 06/30/14 01:43 | Decay Corrected: No
Client ID: SD-200-01 | Detector: AV65 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.39	0.244	0.270		pCi/g	1.00	0.106	128968
Thorium-230	1.28	0.231	0.255		pCi/g	1.00	0.0538	128968
Thorium-232	1.14	0.217	0.238		pCi/g	1.00	0.0536	128968

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.43	0.448	0.639		pCi/g	0.0525	6.10	89.0	30 - 110

Lab ID: 680-102199-41 | Analyzed: 06/30/14 01:43 | Decay Corrected: No
Client ID: SD-200-02 | Detector: AV66 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.07	0.227	0.244		pCi/g	1.00	0.107	128969
Thorium-230	0.785	0.193	0.204		pCi/g	1.00	0.0792	128969
Thorium-232	1.35	0.250	0.275		pCi/g	1.00	0.0601	128969

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.12	0.447	0.620		pCi/g	0.0746	6.13	83.5	30 - 110

Lab ID: 680-102199-42 | Analyzed: 06/30/14 01:43 | Decay Corrected: No
Client ID: SD-200-03 | Detector: AV67 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.42	0.243	0.271		pCi/g	1.00	0.0789	128970
Thorium-230	0.840	0.187	0.200		pCi/g	1.00	0.0587	128970
Thorium-232	1.22	0.225	0.247		pCi/g	1.00	0.0603	128970

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.39	0.444	0.635		pCi/g	0.0416	6.09	88.6	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 126998

Lab ID:	680-102199-25	Analyzed:	06/30/14 01:43	Decay Corrected:	No
Client ID:	SD-195-SS	Detector:	AV68	Yield Truncated:	No
Sigma:	2	Dil Fac:	1	Ts:	180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.07	0.211	0.229		pCi/g	1.00	0.0756	128971
Thorium-230	0.676	0.167	0.177		pCi/g	1.00	0.0582	128971
Thorium-232	0.936	0.195	0.210		pCi/g	1.00	0.0305	128971

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.61	0.460	0.659		pCi/g	0.0430	6.09	92.2	30 - 110

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-126998/1-A	Thorium-228			0.04749	U	pCi/g							
MB 160-126998/1-A	Thorium-230			0.1451		pCi/g							
MB 160-126998/1-A	Thorium-232			-0.007527	U	pCi/g							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-126998/2-A	Thorium-230		24.5	25.53		pCi/g	104	81 - 118					

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
680-102199-26	Thorium-228	1.30		1.034		pCi/g			23	0.55	1.54	1	
680-102199-26	Thorium-230	1.20		0.9540		pCi/g			23	0.54	1.51	1	
680-102199-26	Thorium-232	1.26		1.116		pCi/g			12	0.30	0.84	1	

Glossary:

Ts = Count Duration, Sample

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102199-1

SDG No.: 680102199-1

Batch Number: 126996 Batch Start Date: 06/16/14 12:49 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 06/27/14 13:07

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-126996/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-126996/2		ExtChrom, A-01-R		0.4977 g	0.2 mL	0.4977 g			
680-102199-A-1-A	SD-279-SS	ExtChrom, A-01-R	T	0.9958 g	0.2 mL				
680-102199-A-1-A DU	SD-279-SS	ExtChrom, A-01-R	T	0.9980 g	0.2 mL				
680-102199-A-2-A	SD-279-01	ExtChrom, A-01-R	T	1.0043 g	0.2 mL				
680-102199-A-3-A	SD-279-02	ExtChrom, A-01-R	T	0.9974 g	0.2 mL				
680-102199-A-7-A	SD-277-SS	ExtChrom, A-01-R	T	1.0046 g	0.2 mL				
680-102199-A-8-A	SD-277-01	ExtChrom, A-01-R	T	1.0002 g	0.2 mL				
680-102199-A-9-A	SD-277-02	ExtChrom, A-01-R	T	1.0022 g	0.2 mL				
680-102199-A-11-A	SD-219-SS	ExtChrom, A-01-R	T	1.0006 g	0.2 mL				
680-102199-A-12-A	SD-219-01	ExtChrom, A-01-R	T	0.9985 g	0.2 mL				
680-102199-A-13-A	SD-219-02	ExtChrom, A-01-R	T	0.9983 g	0.2 mL				
680-102199-A-14-A	SD-219-03	ExtChrom, A-01-R	T	1.0039 g	0.2 mL				
680-102199-A-15-A	SD-218-SS	ExtChrom, A-01-R	T	0.9975 g	0.2 mL				
680-102199-A-16-A	SD-218-01	ExtChrom, A-01-R	T	0.9980 g	0.2 mL				
680-102199-A-17-A	SD-218-02	ExtChrom, A-01-R	T	1.0043 g	0.2 mL				
680-102199-A-18-A	SD-203-SS	ExtChrom, A-01-R	T	0.9989 g	0.2 mL				
680-102199-A-19-A	SD-203-01	ExtChrom, A-01-R	T	1.0036 g	0.2 mL				
680-102199-A-20-A	SD-203-02	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
680-102199-A-22-A	SD-202-SS	ExtChrom, A-01-R	T	1.0043 g	0.2 mL				
680-102199-A-23-A	SD-202-01	ExtChrom, A-01-R	T	0.9988 g	0.2 mL				

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102199-1

SDG No.: 680102199-1

Batch Number: 126996 Batch Start Date: 06/16/14 12:49 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 06/27/14 13:07

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
680-102199-A-24-A	SD-202-02	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				

Batch Notes	
Balance ID	27050421
Column Analyst	nmn per scb
Column Date	6/27/14
CoPrecipitation Analyst	scb
CoPrecipitation Date	6/27/14
Person's name who witnessed reagent drop	NMN PER SCB
Analyst who added reagent	SCB
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102199-1

SDG No.: 680102199-1

Batch Number: 126998 Batch Start Date: 06/16/14 13:16 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 06/27/14 13:09

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-126998/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-126998/2		ExtChrom, A-01-R		0.4996 g	0.2 mL	0.4996 g			
680-102199-A-26 -A	SD-196-SS	ExtChrom, A-01-R	T	0.9974 g	0.2 mL				
680-102199-A-26 -A DU	SD-196-SS	ExtChrom, A-01-R	T	0.9990 g	0.2 mL				
680-102199-A-27 -A	SD-196-01	ExtChrom, A-01-R	T	1.0035 g	0.2 mL				
680-102199-A-28 -A	SD-196-02	ExtChrom, A-01-R	T	1.0014 g	0.2 mL				
680-102199-A-30 -A	SD-220-SS	ExtChrom, A-01-R	T	1.0023 g	0.2 mL				
680-102199-A-31 -A	SD-220-01	ExtChrom, A-01-R	T	1.0036 g	0.2 mL				
680-102199-A-32 -A	SD-220-02	ExtChrom, A-01-R	T	1.0030 g	0.2 mL				
680-102199-A-33 -A	SD-DUP-01	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				
680-102199-A-35 -A	SD-201-SS	ExtChrom, A-01-R	T	0.9979 g	0.2 mL				
680-102199-A-36 -A	SD-201-01	ExtChrom, A-01-R	T	0.9973 g	0.2 mL				
680-102199-A-37 -A	SD-201-02	ExtChrom, A-01-R	T	0.9971 g	0.2 mL				
680-102199-A-39 -A	SD-200-SS	ExtChrom, A-01-R	T	1.0013 g	0.2 mL				
680-102199-A-40 -A	SD-200-01	ExtChrom, A-01-R	T	1.0027 g	0.2 mL				
680-102199-A-41 -A	SD-200-02	ExtChrom, A-01-R	T	0.9980 g	0.2 mL				
680-102199-A-42 -A	SD-200-03	ExtChrom, A-01-R	T	1.0051 g	0.2 mL				
680-102199-A-25 -A	SD-195-SS	ExtChrom, A-01-R	T	1.0050 g	0.2 mL				

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102199-1

SDG No.: 680102199-1

Batch Number: 126998 Batch Start Date: 06/16/14 13:16 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 06/27/14 13:09

Batch Notes	
Balance ID	27050421
Column Analyst	nmn per scb
Column Date	6/27/14
CoPrecipitation Analyst	scb
CoPrecipitation Date	6/27/14
Person's name who witnessed reagent drop	nmn per scb
Analyst who added reagent	scb
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:12:47PM 6/30/2014

Sample

Sample Name: MB 160-126998/1-A
SampleType: Blank
: MB 160-126998/1-A
Sample Collection Date: 6/17/2014 8:48:00AM

Spectrum #2 Analysis #1
Sample Weight : 1.0000g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126998
AnalysisID: 613484

Analyst: 60040

Tracer

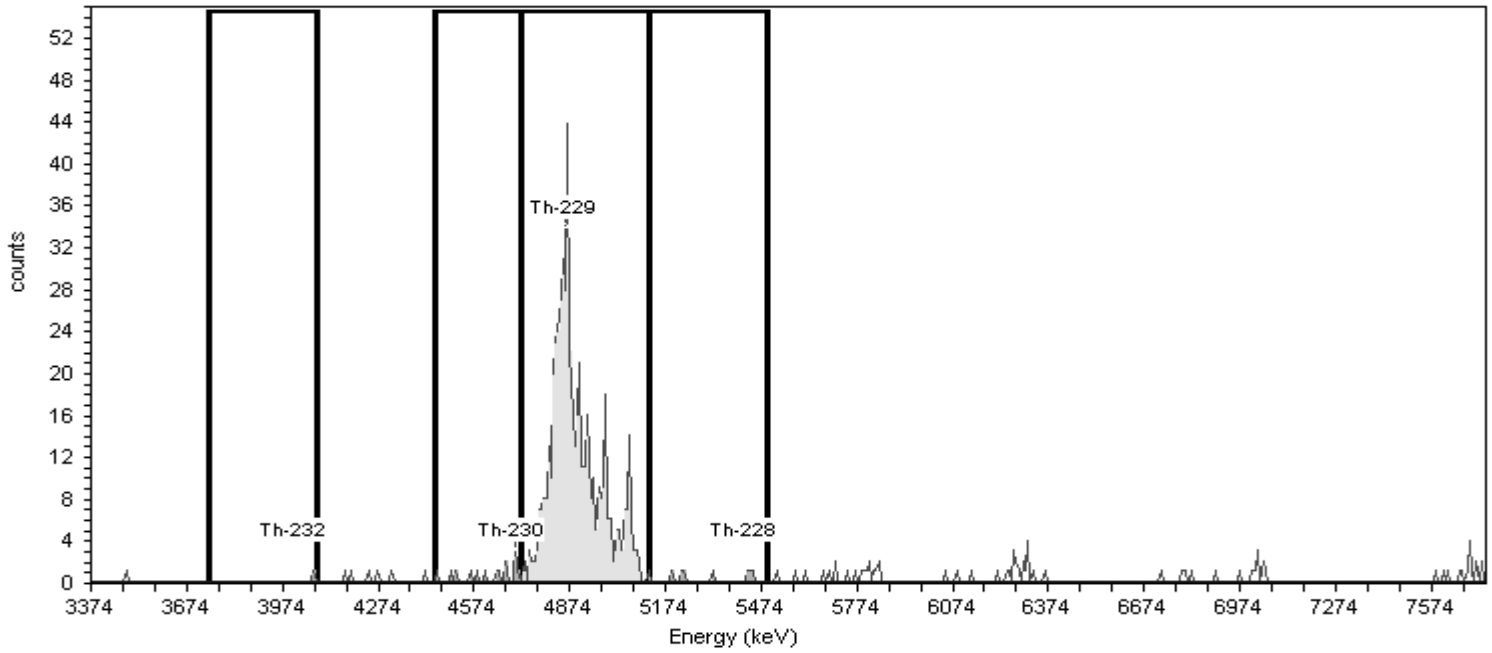
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 85.42%

Acquisition

Detector: AV6
Serial Number: 47-27FF2
Acquisition Start Date: 6/30/2014 6:12:37PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/18/2014 7:08:18PM
Background Info: Sample: ICB;AV6; Det: AV6; Spectrum #1;
Jun-18-2014 19:08

Calibration Name: IC-9520;AV6-20140505
Calibration Date: 5/6/2014 5:38:46PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.89% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:40:15AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	.3	100.2	0	1.1250	-0.67	-0.008	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	11.7	99.7	15	2.2500	12.78	0.145	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	78.7	99.6	540	1.3125	538.65	5.227	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	11.5	99.8	8	3.7500	4.19	0.048	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:12:53PM 6/30/2014

Sample

Sample Name: LCS 160-126998/2-A
SampleType: Control
: LCS 160-126998/2-A
Sample Collection Date: 6/17/2014 8:48:00AM

Spectrum #2 Analysis #1
Sample Weight : 0.4996g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126998
AnalysisID: 613485

Analyst: 60040

Tracer

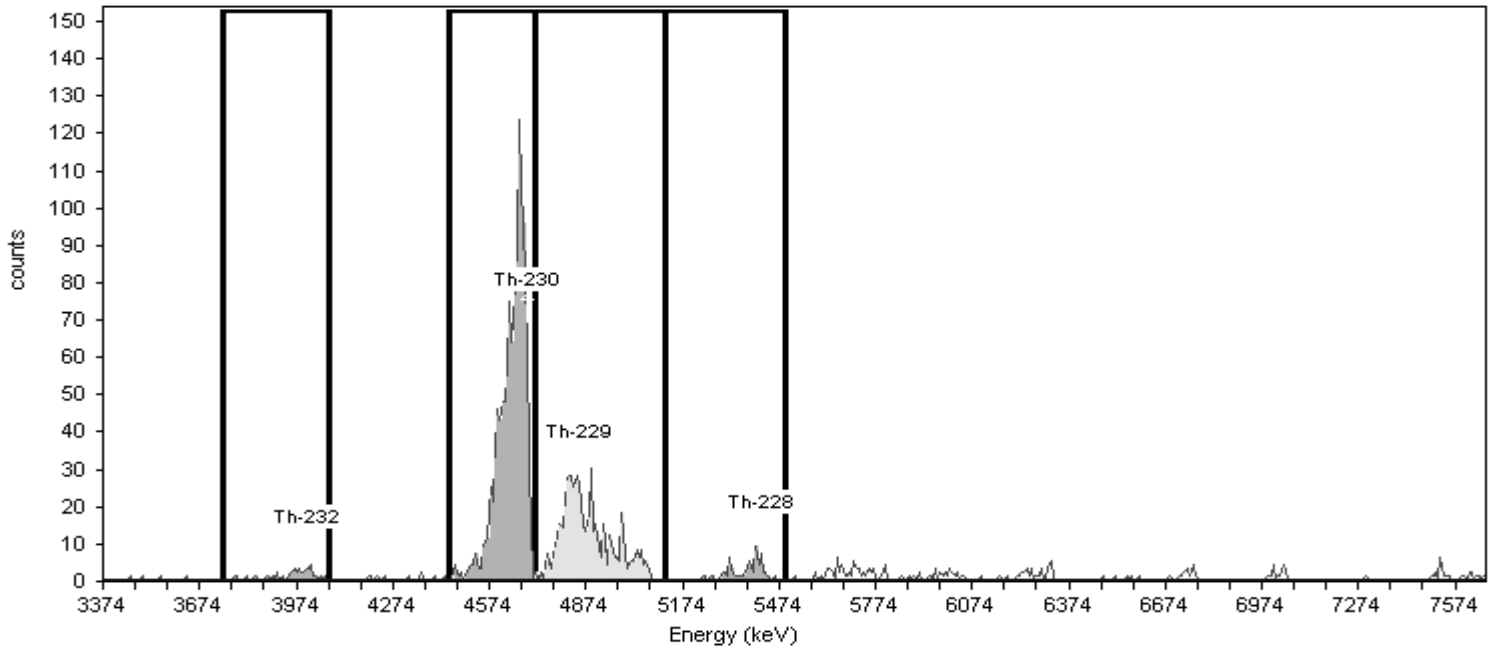
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 85.78%

Acquisition

Detector: AV7
Serial Number: 48-158EE5
Acquisition Start Date: 6/30/2014 6:12:39PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/18/2014 7:08:20PM
Background Info: Sample: ICB;AV7; Det: AV7; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-8877;AV7-20140507
Calibration Date: 5/7/2014 10:48:48PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.80% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:40:15AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	82.9	100.2	38	1.6875	36.31	0.820	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	24.9	99.7	1126	0.9953	1124.94	25.533	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	117.1	99.6	540	0.7380	539.20	10.508	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	113.9	99.8	63	2.7843	60.22	1.367	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:44:23AM 6/30/2014

Sample

Sample Name: 680-102199-A-26-B
SampleType: Sample
: 680-102199-A-26-B
Sample Collection Date: 6/10/2014 2:00:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9974g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126998
AnalysisID: 613428

Analyst: 60040

Tracer

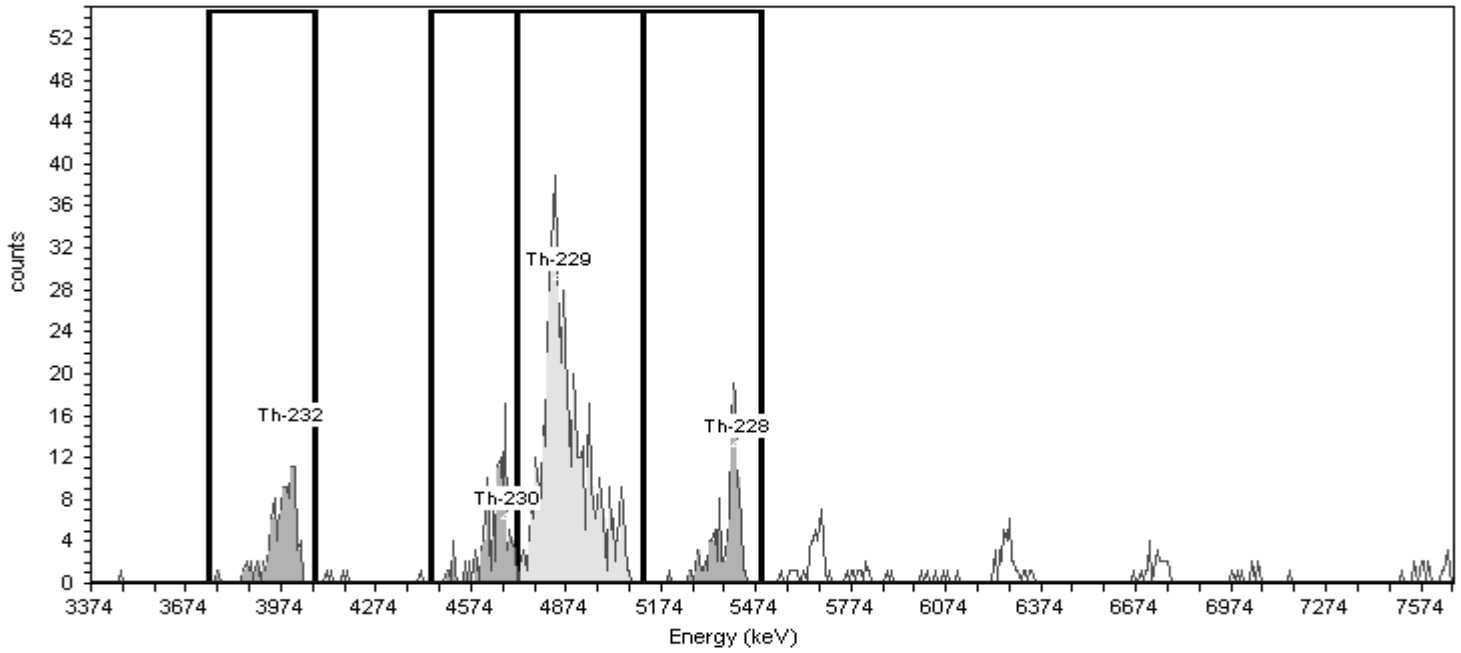
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 86.29%

Acquisition

Detector: AV53
Serial Number: 50-051A6
Acquisition Start Date: 6/30/2014 1:42:50AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:17:59AM
Background Info: Sample: ICB;AV53; Det: AV53; Spectrum #1; Jun-19-2014 00:17

Calibration Name: IC-8877;AV53-20140504
Calibration Date: 5/5/2014 6:53:06PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.32% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:40:15AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	86.7	100.2	115	0.5625	114.44	1.262	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	16.8	99.7	110	1.3125	108.69	1.204	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	89.8	99.6	554	0.7500	553.25	5.294	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	47.3	99.8	119	1.5000	117.50	1.301	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:44:30AM 6/30/2014

Sample

Sample Name: 680-102199-A-26-C DU
SampleType: Sample
: 680-102199-A-26-C DU
Sample Collection Date: 6/10/2014 2:00:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9990g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126998
AnalysisID: 613429

Analyst: 60040

Tracer

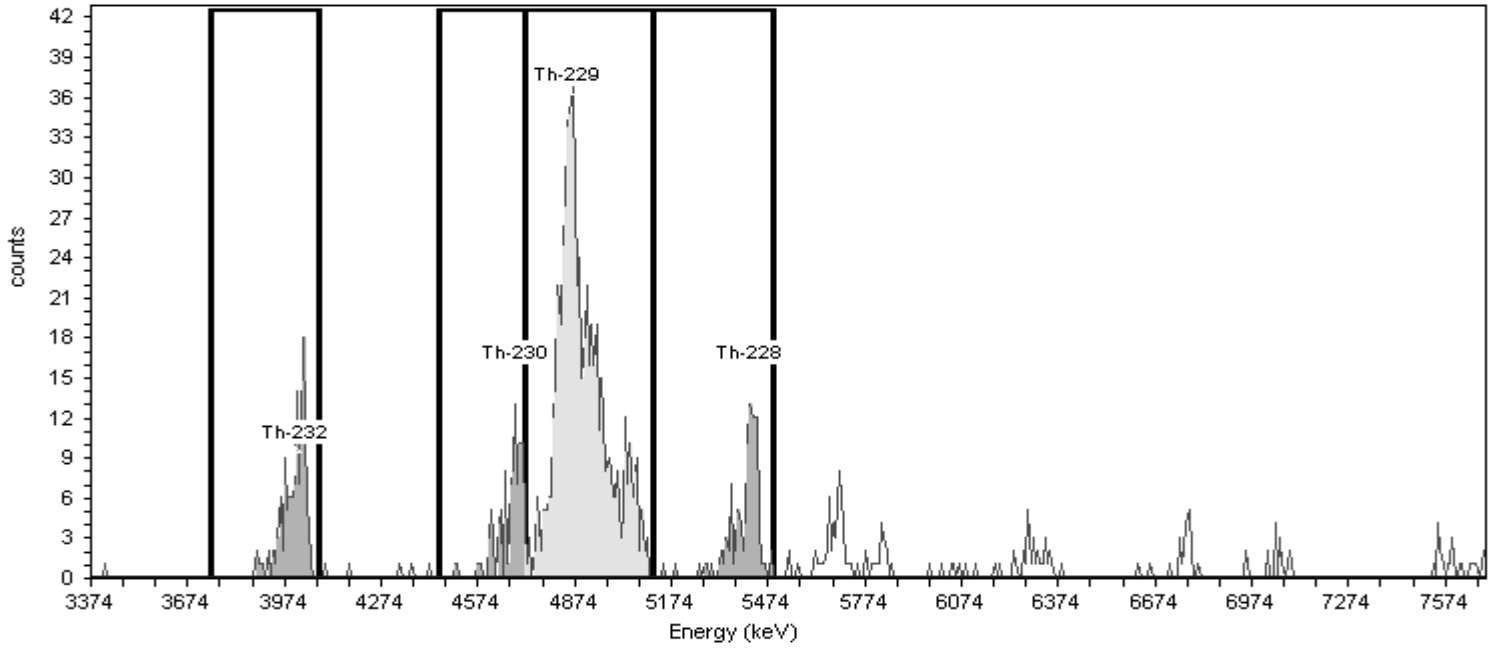
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 98.11%

Acquisition

Detector: AV54
Serial Number: 48-046II6
Acquisition Start Date: 6/30/2014 1:42:54AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:06AM
Background Info: Sample: ICB;AV54; Det: AV54; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-9520;AV54-20140504
Calibration Date: 5/5/2014 6:53:13PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.02% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:40:15AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	13.1	100.2	113	0.2672	112.73	1.104	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	138.9	99.7	93	1.1250	91.78	0.903	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	120.0	99.6	623	0.9375	621.97	6.010	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	53.4	99.8	107	2.9838	104.02	1.023	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:59:24PM 6/30/2014

Sample

Sample Name: 680-102199-A-26-C DU
SampleType: Sample
: 680-102199-A-26-C DU
Sample Collection Date: 6/10/2014 2:00:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9990g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126998
AnalysisID: 613470

Analyst: 60040

Tracer

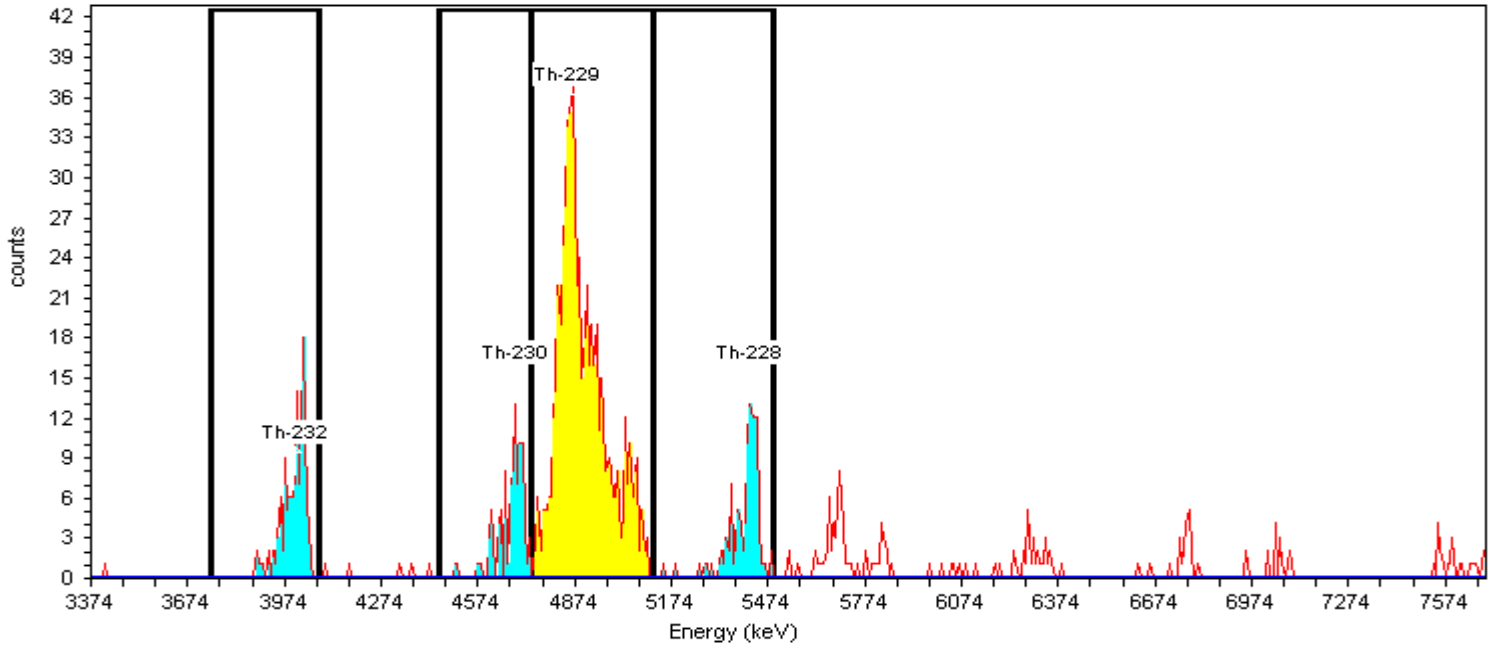
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 97.02%

Acquisition

Detector: AV54
Serial Number: 48-046II6
Acquisition Start Date: 6/30/2014 1:42:54AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:06AM
Background Info: Sample: ICB;AV54; Det: AV54; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-9520;AV54-20140504
Calibration Date: 5/5/2014 6:53:13PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.02% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:40:15AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 6/30/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	13.1	100.2	113	0.2672	112.73	1.116	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4739.1	20.6	99.7	97	1.1250	95.88	0.954	pCi/g
Th-229	4848.0	4,845.3	2.7	4739.1	5119.5	120.0	99.6	616	0.9375	615.06	5.944	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	53.4	99.8	107	2.9838	104.02	1.034	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:44:35AM 6/30/2014

Sample

Sample Name: 680-102199-A-27-B
SampleType: Sample
: 680-102199-A-27-B
Sample Collection Date: 6/10/2014 2:05:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0035g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126998
AnalysisID: 613430

Analyst: 60040

Tracer

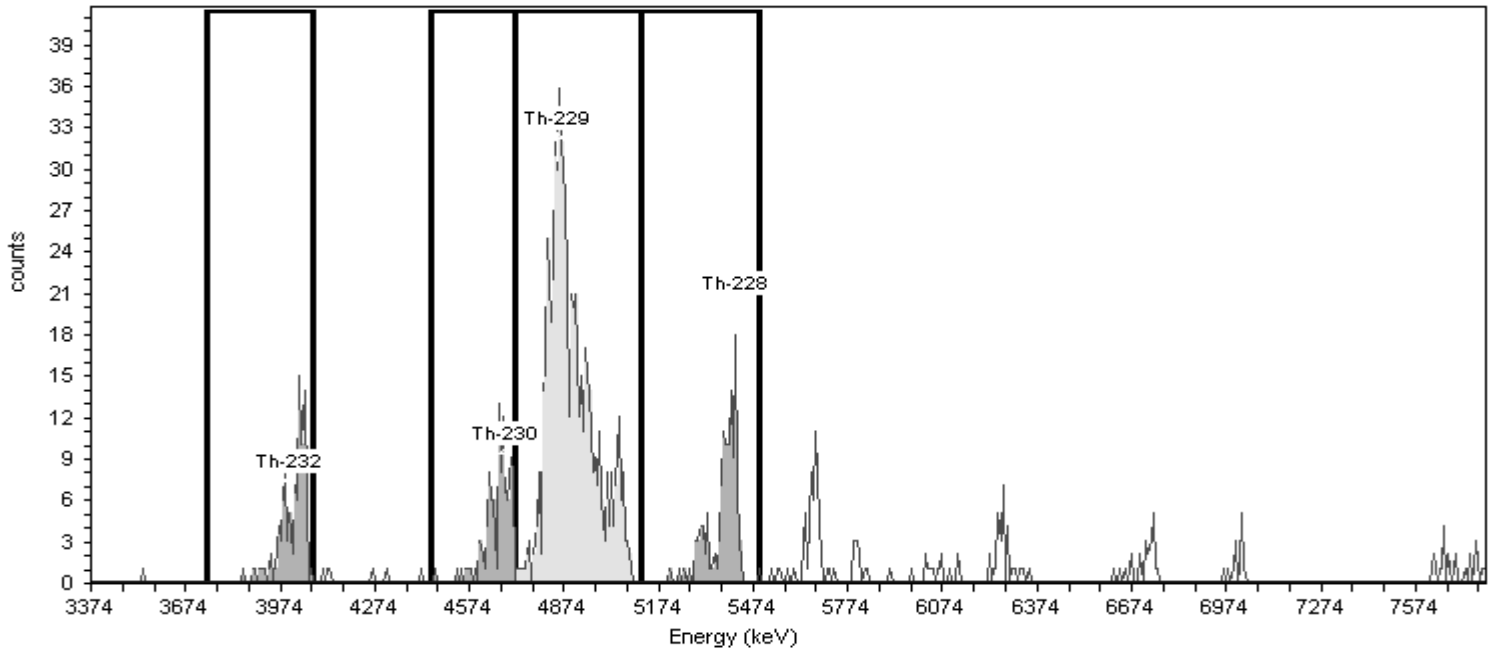
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 86.67%

Acquisition

Detector: AV55
Serial Number: 50-051C2
Acquisition Start Date: 6/30/2014 1:42:54AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:11AM
Background Info: Sample: ICB;AV55; Det: AV55; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-7107;AV55-20140507
Calibration Date: 5/7/2014 10:48:56PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.79% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:40:15AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	28.0	100.2	99	0.9375	98.52	1.056	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	89.2	99.7	101	0.9375	100.09	1.078	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	98.0	99.6	566	0.3750	565.66	5.285	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	56.9	99.8	123	1.3125	121.60	1.309	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:44:41AM 6/30/2014

Sample

Sample Name: 680-102199-A-28-B
SampleType: Sample
: 680-102199-A-28-B
Sample Collection Date: 6/10/2014 2:10:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0014g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126998
AnalysisID: 613431

Analyst: 60040

Tracer

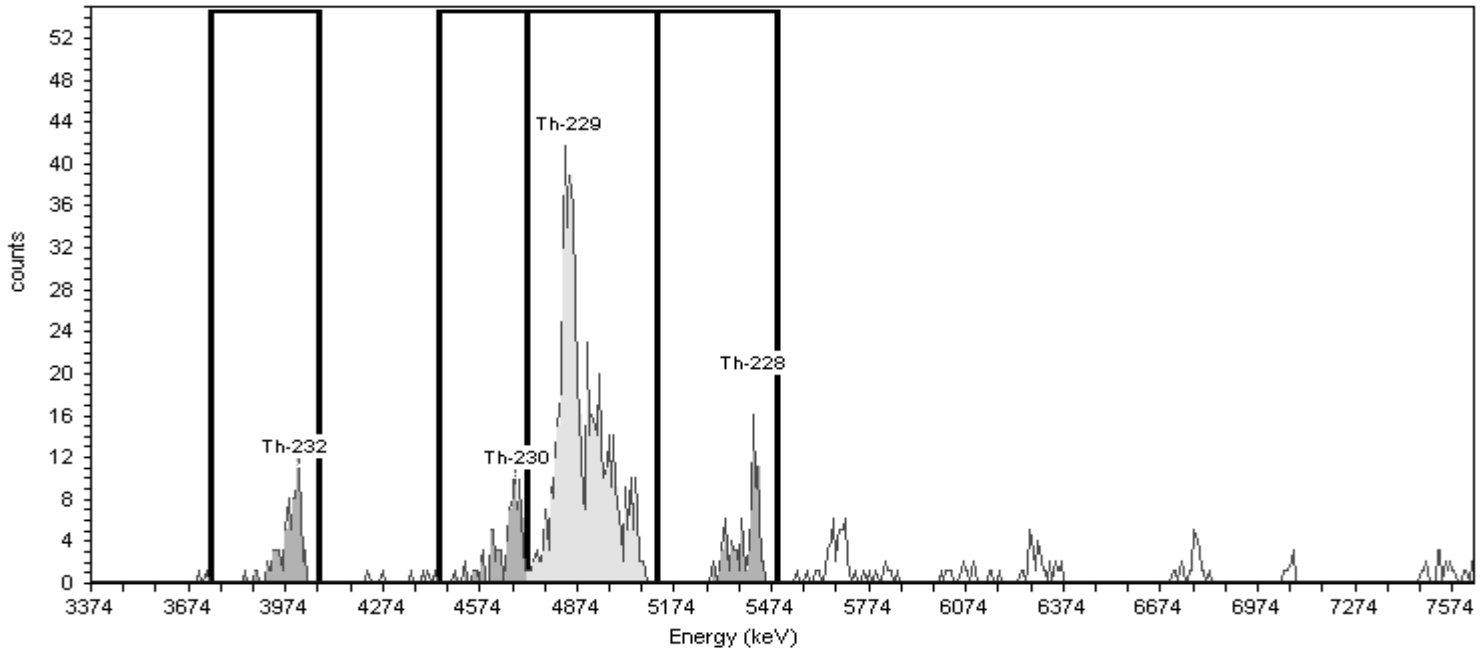
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 93.07%

Acquisition

Detector: AV56
Serial Number: 52-059EE5
Acquisition Start Date: 6/30/2014 1:42:55AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:17AM
Background Info: Sample: ICB;AV56; Det: AV56; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-9792;AV56-20140504
Calibration Date: 5/5/2014 6:53:34PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.09% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:40:15AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	58.8	100.2	79	0.3750	78.63	0.808	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	34.1	99.7	85	0.1875	84.81	0.876	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	62.6	99.6	592	0.5625	591.44	5.688	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	54.2	99.8	89	1.3125	87.69	0.905	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:44:47AM 6/30/2014

Sample

Sample Name: 680-102199-A-30-B
SampleType: Sample
: 680-102199-A-30-B
Sample Collection Date: 6/10/2014 2:40:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0023g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126998
AnalysisID: 613432

Analyst: 60040

Tracer

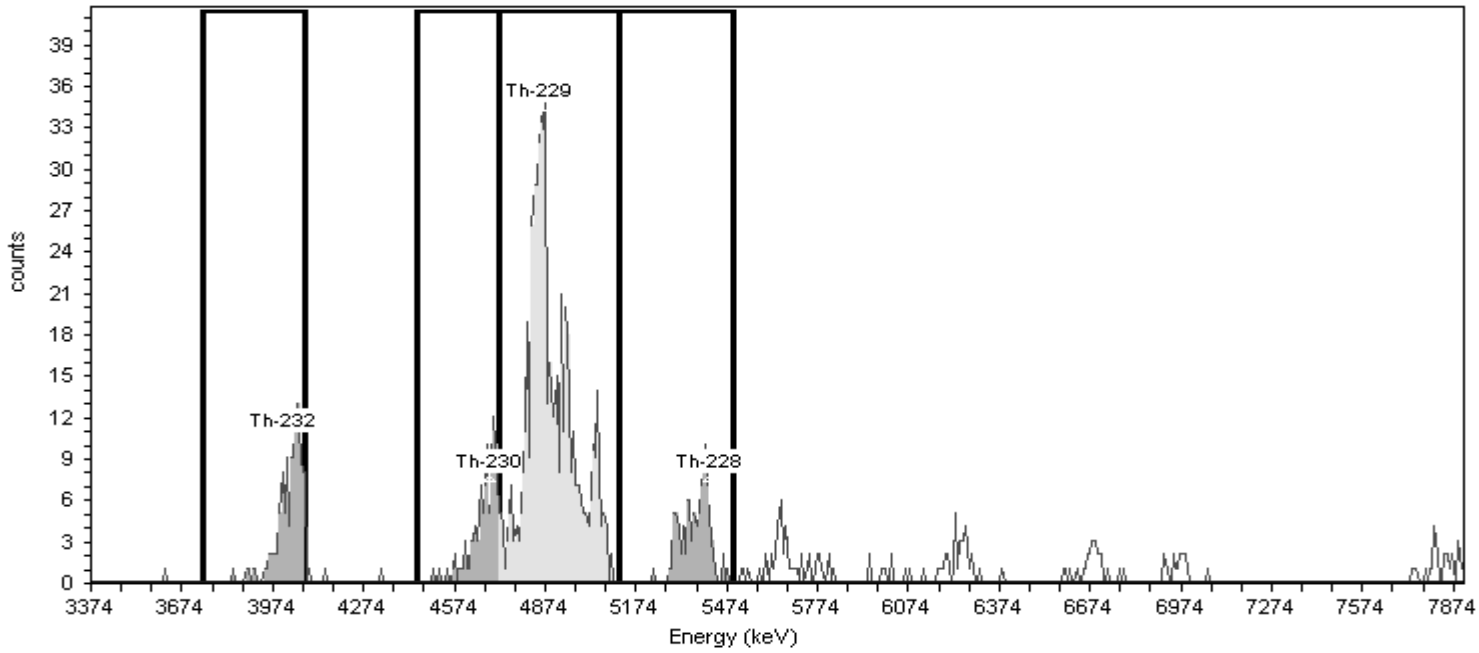
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 87.94%

Acquisition

Detector: AV57
Serial Number: 48-158EE3
Acquisition Start Date: 6/30/2014 1:42:57AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:24AM
Background Info: Sample: ICB;AV57; Det: AV57; Spectrum #1;
Jun-19-2014 00:18

Calibration Name: IC-9793;AV57-20140504
Calibration Date: 5/5/2014 6:53:40PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.74% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:40:15AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	46.8	100.2	107	0.7500	106.25	1.126	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	97.1	99.7	95	0.3750	94.63	1.008	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	71.2	99.6	575	2.2620	572.74	5.369	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	103.6	99.8	100	2.8082	97.19	1.035	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:00:10PM 6/30/2014

Sample

Sample Name: 680-102199-A-30-B
SampleType: Sample
: 680-102199-A-30-B
Sample Collection Date: 6/10/2014 2:40:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0023g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126998
AnalysisID: 613471

Analyst: 60040

Tracer

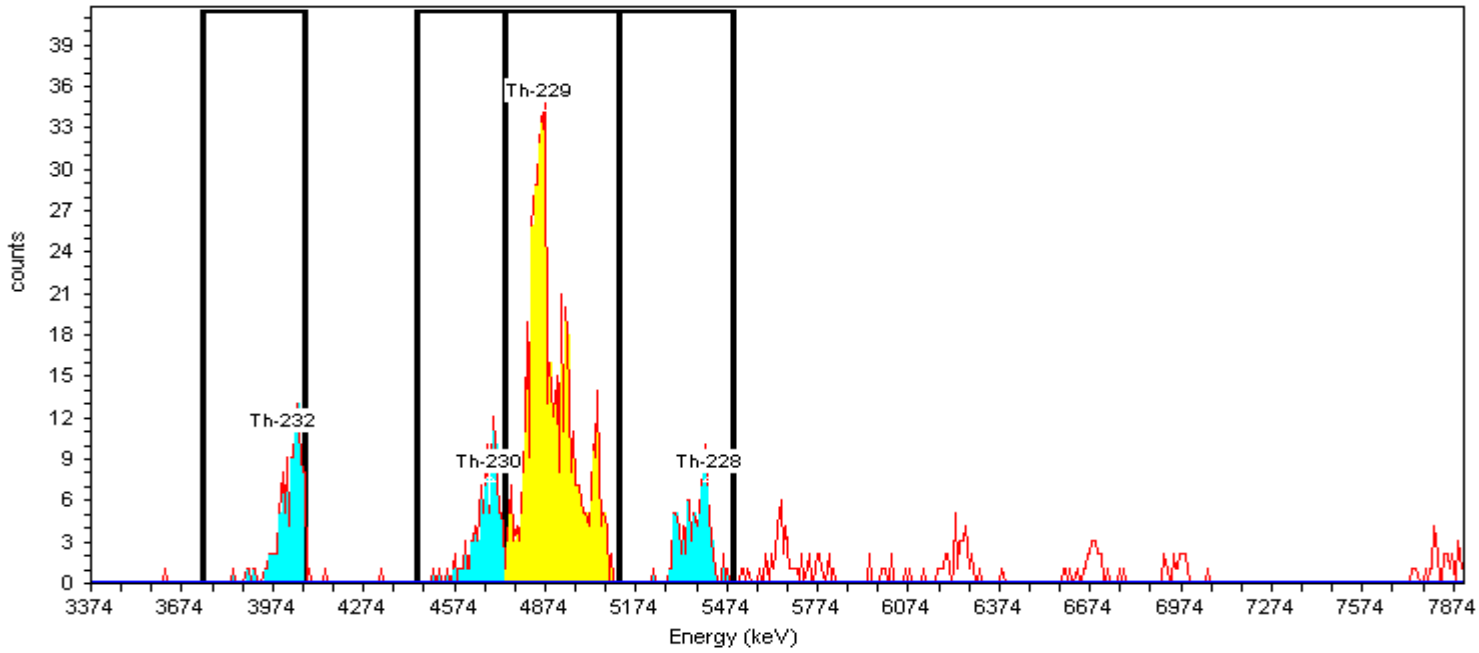
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 86.53%

Acquisition

Detector: AV57
Serial Number: 48-158EE3
Acquisition Start Date: 6/30/2014 1:42:57AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:24AM
Background Info: Sample: ICB;AV57; Det: AV57; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-9793;AV57-20140504
Calibration Date: 5/5/2014 6:53:40PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.74% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:40:15AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 6/30/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	46.8	100.2	107	0.7500	106.25	1.144	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4739.1	24.3	99.7	105	0.5625	104.44	1.130	pCi/g
Th-229	4848.0	4,845.3	2.7	4739.1	5119.5	71.2	99.6	566	2.4375	563.56	5.283	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	103.6	99.8	100	2.8082	97.19	1.051	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:44:53AM 6/30/2014

Sample

Sample Name: 680-102199-A-31-B
SampleType: Sample
: 680-102199-A-31-B
Sample Collection Date: 6/10/2014 2:42:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0036g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126998
AnalysisID: 613433

Analyst: 60040

Tracer

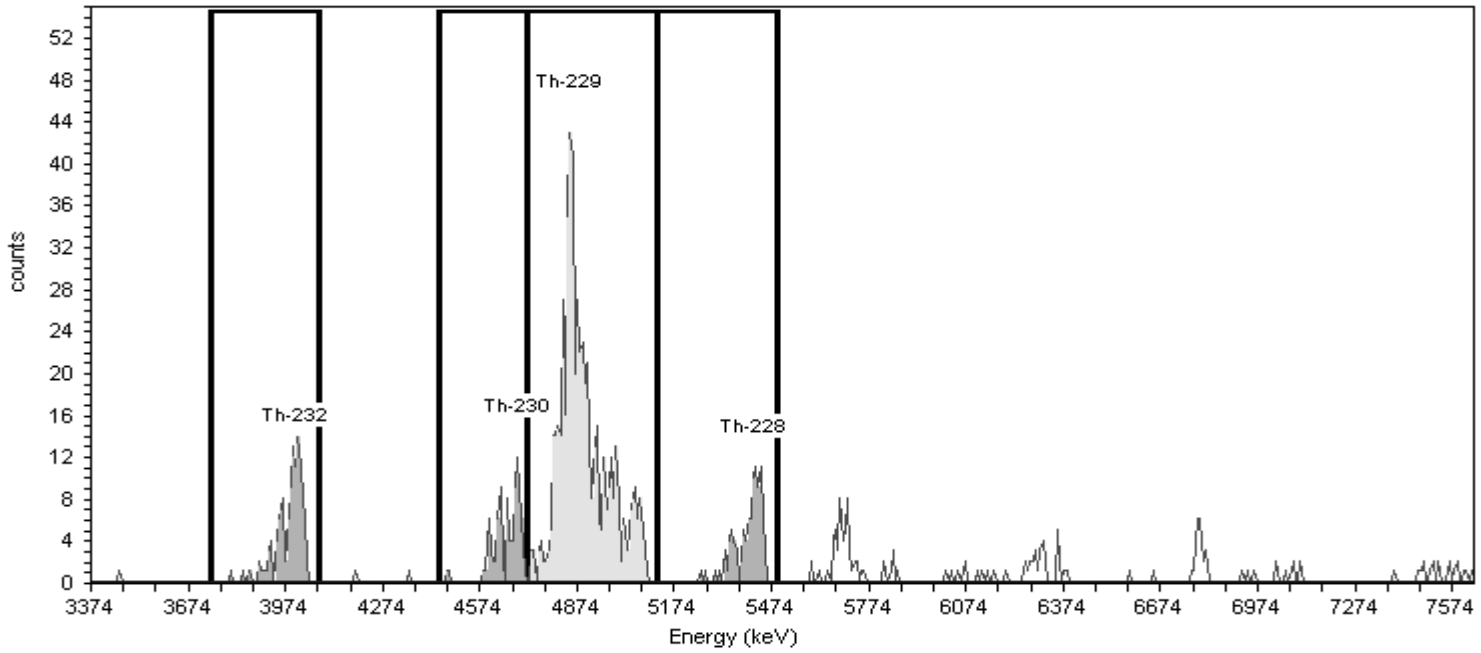
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 87.87%

Acquisition

Detector: AV58
Serial Number: 52-102 C5
Acquisition Start Date: 6/30/2014 1:42:59AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:31AM
Background Info: Sample: ICB;AV58; Det: AV58; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-9794;AV58-20140504
Calibration Date: 5/5/2014 6:53:46PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.56% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:40:15AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	71.3	100.2	122	0.2735	121.73	1.298	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	31.4	99.7	87	1.6933	85.31	0.914	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	89.6	99.6	569	0.5683	568.43	5.358	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	52.0	99.8	97	1.1250	95.88	1.027	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:44:58AM 6/30/2014

Sample

Sample Name: 680-102199-A-32-B
SampleType: Sample
: 680-102199-A-32-B
Sample Collection Date: 6/10/2014 2:44:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0030g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126998
AnalysisID: 613434

Analyst: 60040

Tracer

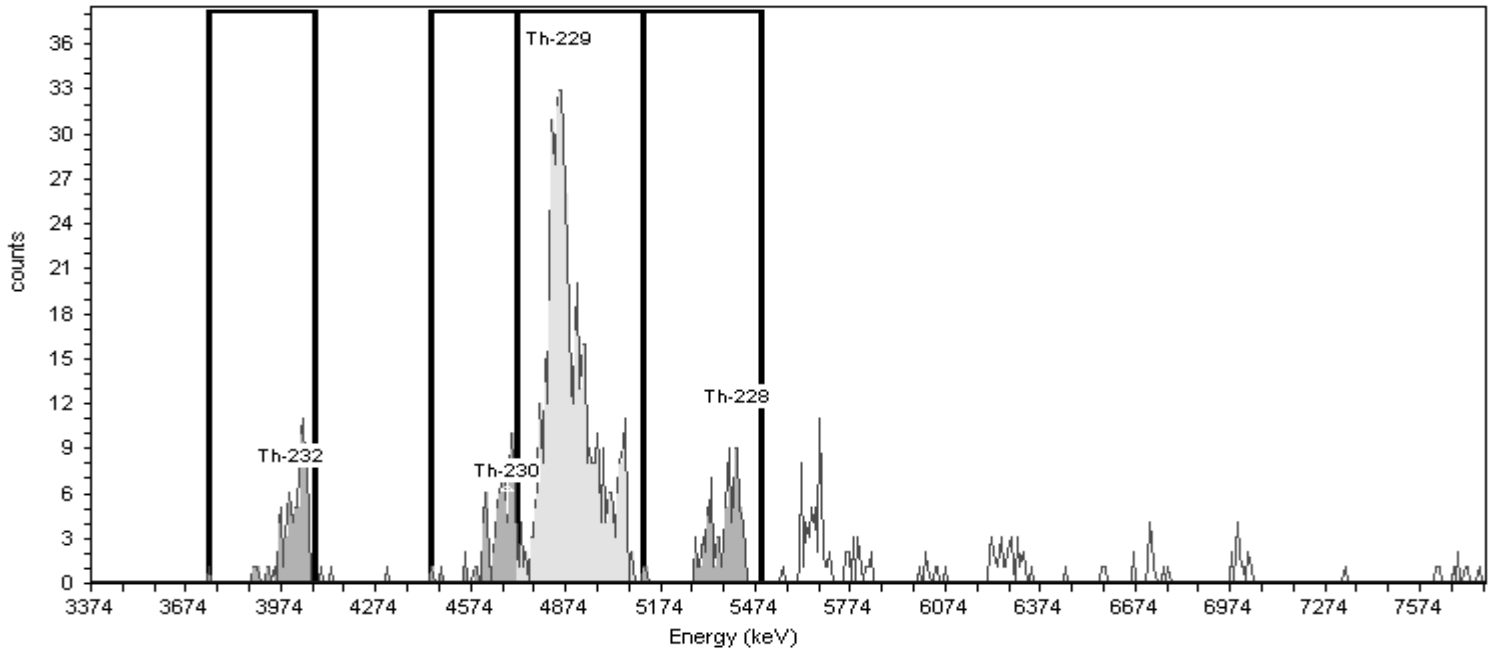
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 83.61%

Acquisition

Detector: AV59
Serial Number: 49-155M7
Acquisition Start Date: 6/30/2014 1:43:01AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:32AM
Background Info: Sample: ICB;AV59; Det: AV59; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-9795;AV59-20140504
Calibration Date: 5/5/2014 6:53:53PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.44% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:40:15AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	32.8	100.2	86	0.0000	85.57	0.929	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	46.6	99.7	77	0.1875	76.47	0.834	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	77.5	99.6	559	0.0000	558.91	5.101	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	113.0	99.8	90	0.9375	89.00	0.970	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:00:59PM 6/30/2014

Sample

Sample Name: 680-102199-A-32-B
SampleType: Sample
: 680-102199-A-32-B
Sample Collection Date: 6/10/2014 2:44:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0030g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126998
AnalysisID: 613472

Analyst: 60040

Tracer

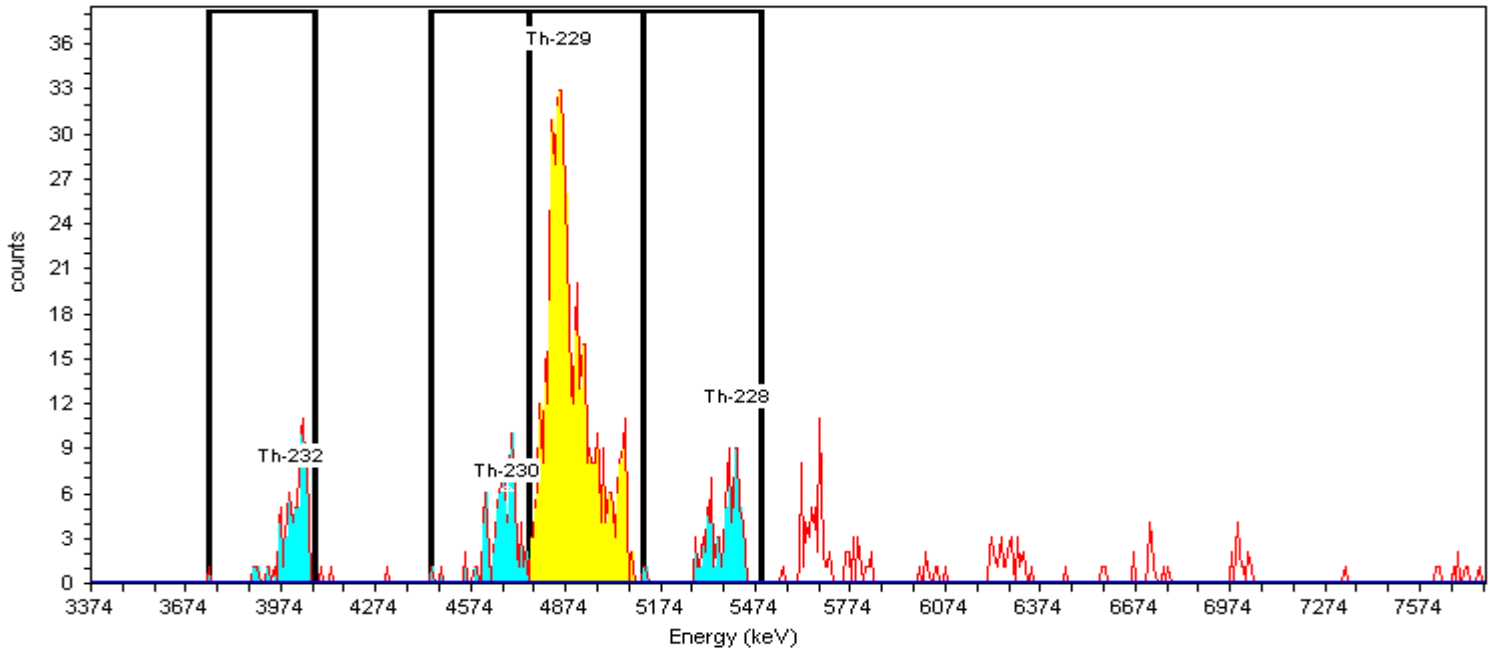
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 82.27%

Acquisition

Detector: AV59
Serial Number: 49-155M7
Acquisition Start Date: 6/30/2014 1:43:01AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:32AM
Background Info: Sample: ICB;AV59; Det: AV59; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-9795;AV59-20140504
Calibration Date: 5/5/2014 6:53:53PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 27.44% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:40:15AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 6/30/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	32.8	100.2	86	0.0000	85.57	0.944	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4754.1	84.6	99.7	85	0.1875	84.81	0.940	pCi/g
Th-229	4848.0	4,845.3	2.7	4754.1	5119.5	77.5	99.6	550	0.0000	550.00	5.020	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	113.0	99.8	90	0.9375	89.00	0.986	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:45:04AM 6/30/2014

Sample

Sample Name: 680-102199-A-33-B
SampleType: Sample
: 680-102199-A-33-B
Sample Collection Date: 6/10/2014 12:00:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0029g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126998
AnalysisID: 613435

Analyst: 60040

Tracer

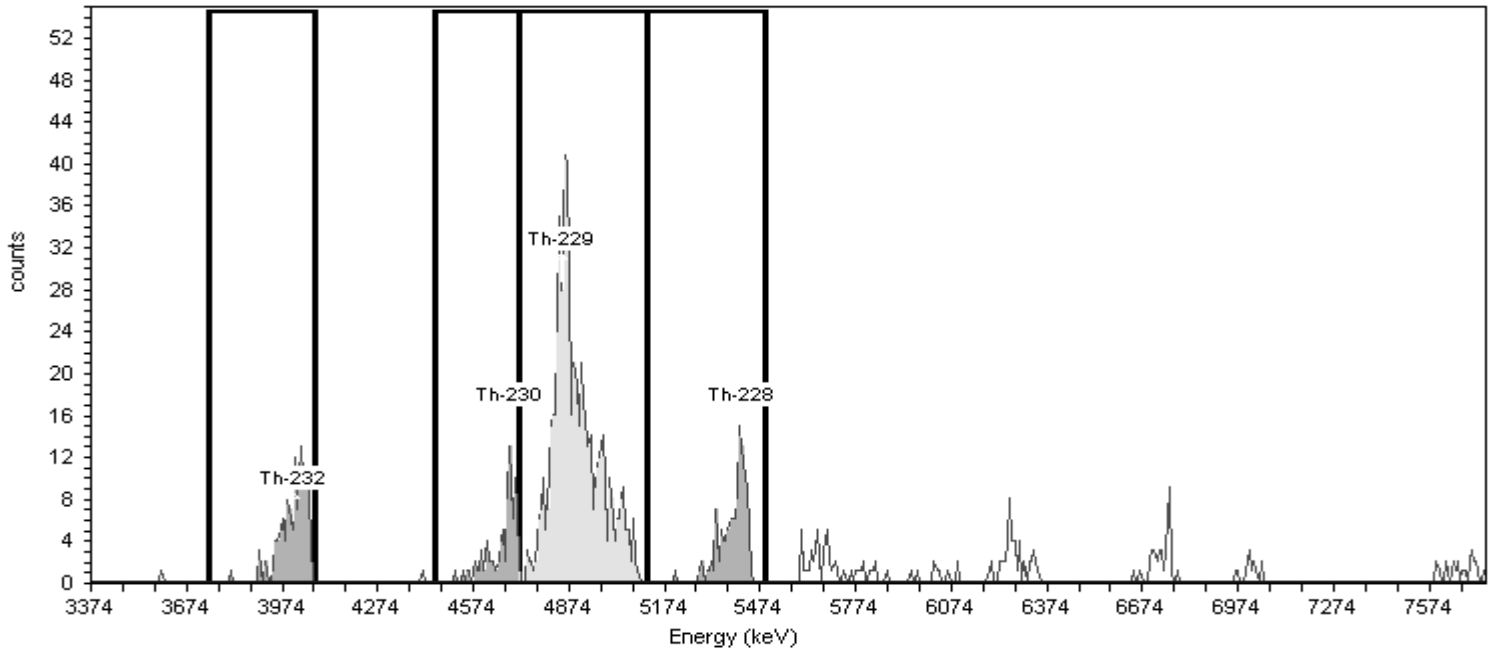
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 90.86%

Acquisition

Detector: AV60
Serial Number: 49-027117
Acquisition Start Date: 6/30/2014 1:43:03AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:33AM
Background Info: Sample: ICB;AV60; Det: AV60; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-9817;AV60-20140504
Calibration Date: 5/5/2014 6:53:59PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.33% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:40:15AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	58.5	99.8	115	3.3630	111.64	1.167	pCi/g
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	32.0	100.2	125	0.5625	124.44	1.295	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	44.9	99.7	82	0.9375	81.00	0.847	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	74.9	99.6	583	0.1755	582.76	5.544	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:01:45PM 6/30/2014

Sample

Sample Name: 680-102199-A-33-B
SampleType: Sample
: 680-102199-A-33-B
Sample Collection Date: 6/10/2014 12:00:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0029g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126998
AnalysisID: 613473

Analyst: 60040

Tracer

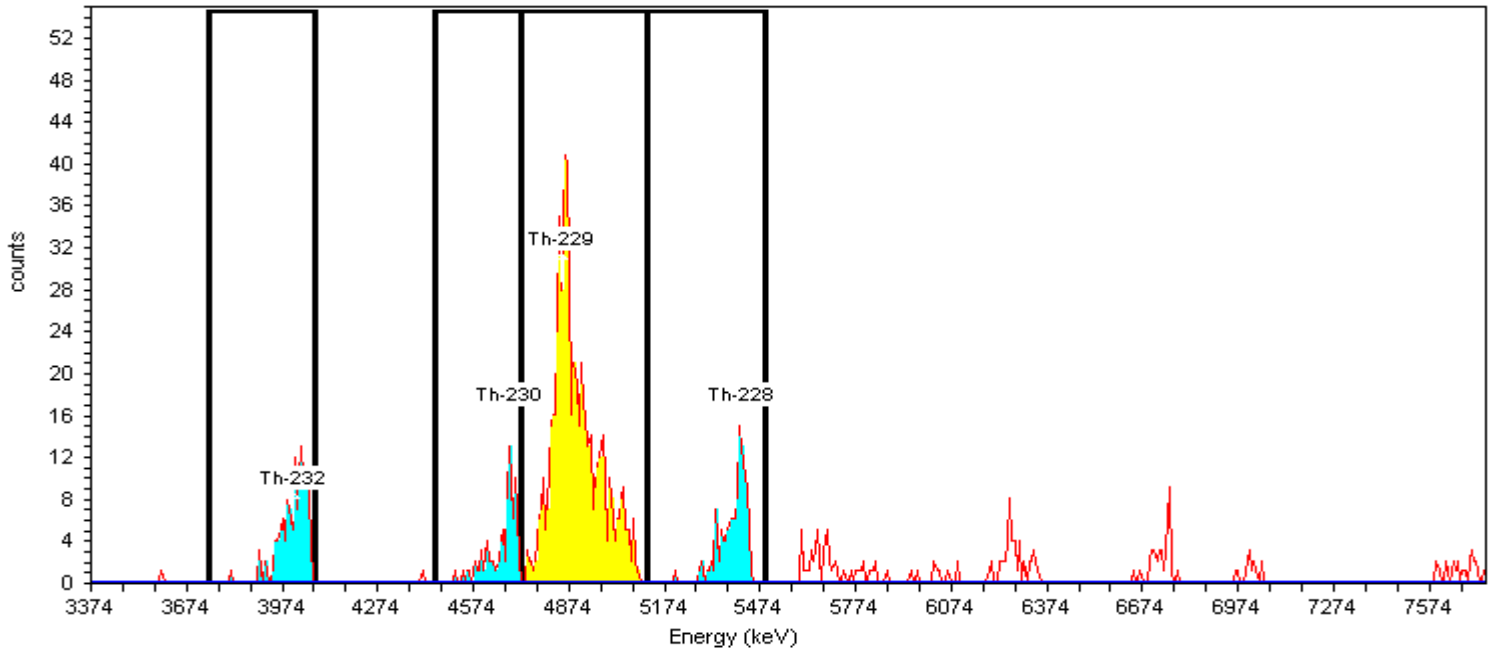
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 90.55%

Acquisition

Detector: AV60
Serial Number: 49-027117
Acquisition Start Date: 6/30/2014 1:43:03AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:33AM
Background Info: Sample: ICB;AV60; Det: AV60; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-9817;AV60-20140504
Calibration Date: 5/5/2014 6:53:59PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.33% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:40:15AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 6/30/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	32.0	100.2	125	0.5625	124.44	1.300	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4724.2	30.0	99.7	82	0.9375	81.06	0.851	pCi/g
Th-229	4848.0	4,845.3	2.7	4724.2	5119.5	74.9	99.6	581	0.1875	580.81	5.526	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	58.5	99.8	115	3.3630	111.64	1.171	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:45:21AM 6/30/2014

Sample

Sample Name: 680-102199-A-35-B
SampleType: Sample
: 680-102199-A-35-B
Sample Collection Date: 6/10/2014 3:10:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9979g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126998
AnalysisID: 613438

Analyst: 60040

Tracer

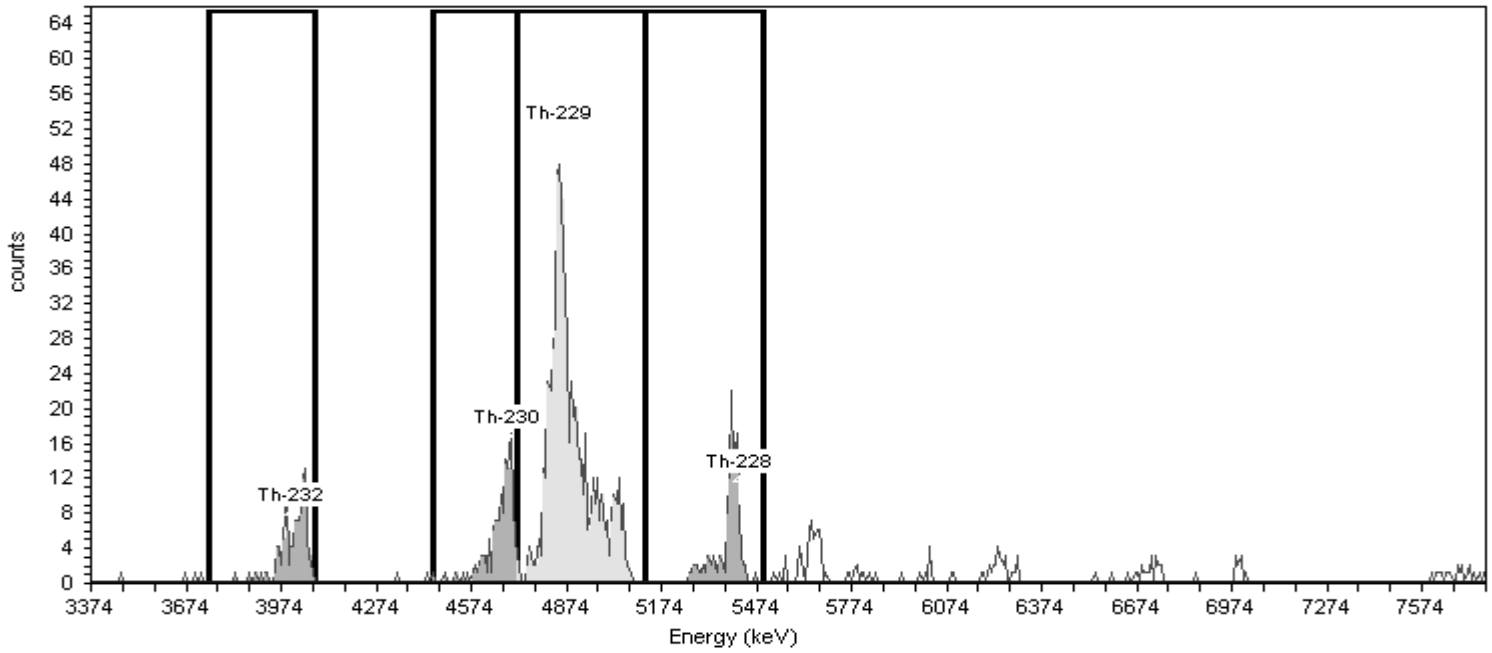
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 96.37%

Acquisition

Detector: AV61
Serial Number: 5-051JJ3
Acquisition Start Date: 6/30/2014 1:43:04AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:33AM
Background Info: Sample: ICB;AV61; Det: AV61; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-9884;AV61-20140504
Calibration Date: 5/5/2014 6:54:06PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.46% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:40:15AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	27.4	100.2	97	0.1875	97.27	0.955	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	35.7	99.7	123	0.1933	122.47	1.208	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	71.5	99.6	622	0.7558	621.21	5.910	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	47.0	99.8	116	2.6250	113.38	1.118	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:02:29PM 6/30/2014

Sample

Sample Name: 680-102199-A-35-B
SampleType: Sample
: 680-102199-A-35-B
Sample Collection Date: 6/10/2014 3:10:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9979g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126998
AnalysisID: 613474

Analyst: 60040

Tracer

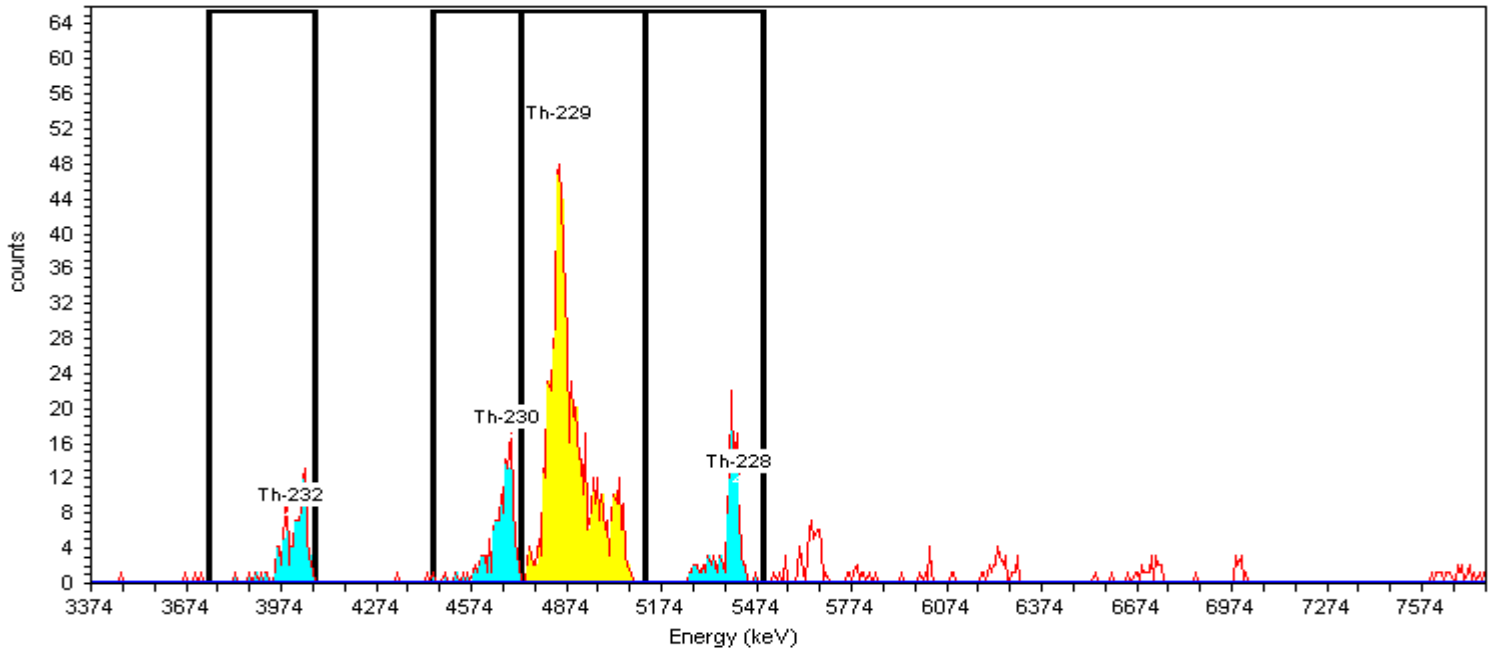
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 95.91%

Acquisition

Detector: AV61
Serial Number: 5-051JJ3
Acquisition Start Date: 6/30/2014 1:43:04AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:33AM
Background Info: Sample: ICB;AV61; Det: AV61; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-9884;AV61-20140504
Calibration Date: 5/5/2014 6:54:06PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.46% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:40:15AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 6/30/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	27.4	100.2	97	0.1875	97.27	0.959	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4731.7	17.6	99.7	125	0.7500	124.25	1.231	pCi/g
Th-229	4848.0	4,845.3	2.7	4731.7	5119.5	71.5	99.6	619	0.7500	618.25	5.882	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	47.0	99.8	116	2.6250	113.38	1.123	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:45:09AM 6/30/2014

Sample

Sample Name: 680-102199-A-36-B
SampleType: Sample
: 680-102199-A-36-B
Sample Collection Date: 6/10/2014 3:15:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9973g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126998
AnalysisID: 613436

Analyst: 60040

Tracer

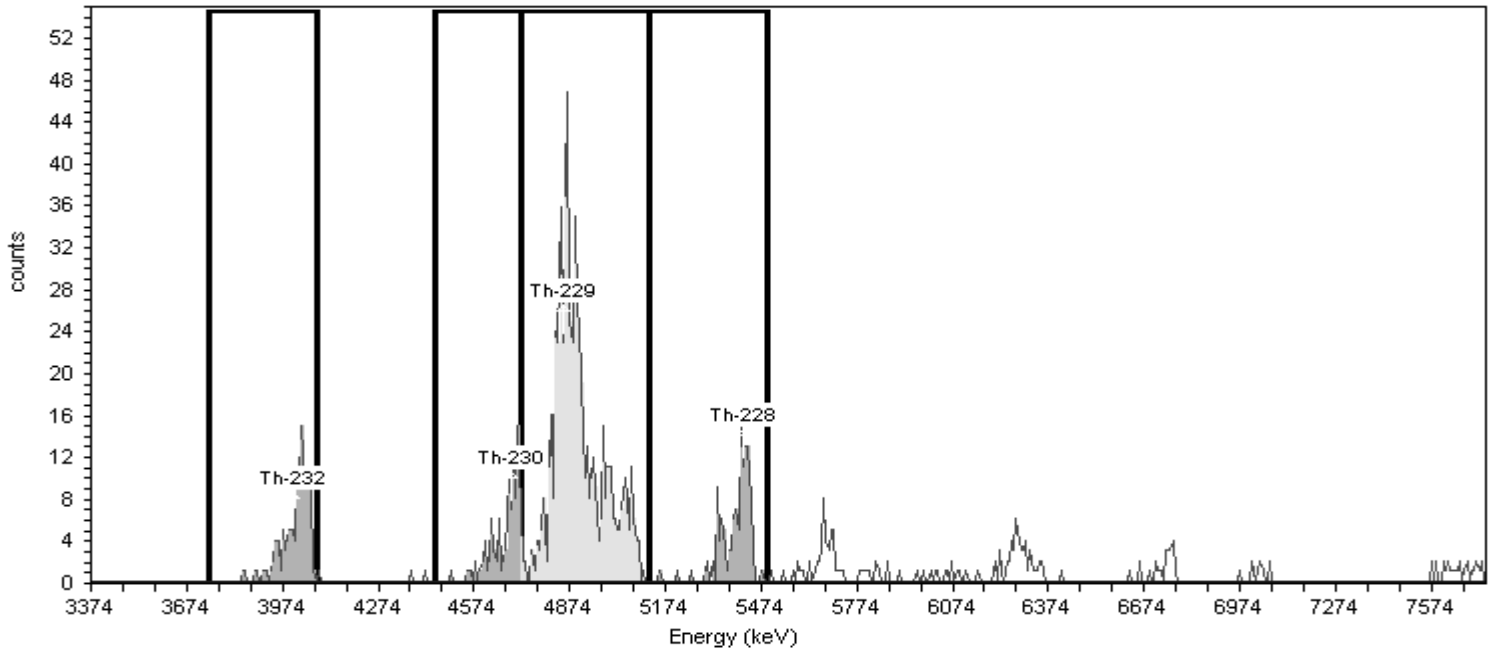
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 94.72%

Acquisition

Detector: AV62
Serial Number: 52-060FF2
Acquisition Start Date: 6/30/2014 1:43:06AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:34AM
Background Info: Sample: ICB;AV62; Det: AV62; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-9885;AV62-20140504
Calibration Date: 5/5/2014 6:54:13PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.34% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:40:15AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	37.2	100.2	117	0.0000	117.46	1.179	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	25.1	99.7	97	0.3750	96.47	0.973	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	90.2	99.6	608	0.1875	607.66	5.812	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	56.8	99.8	121	1.3125	119.69	1.207	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:03:14PM 6/30/2014

Sample

Sample Name: 680-102199-A-36-B
SampleType: Sample
: 680-102199-A-36-B
Sample Collection Date: 6/10/2014 3:15:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9973g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126998
AnalysisID: 613475

Analyst: 60040

Tracer

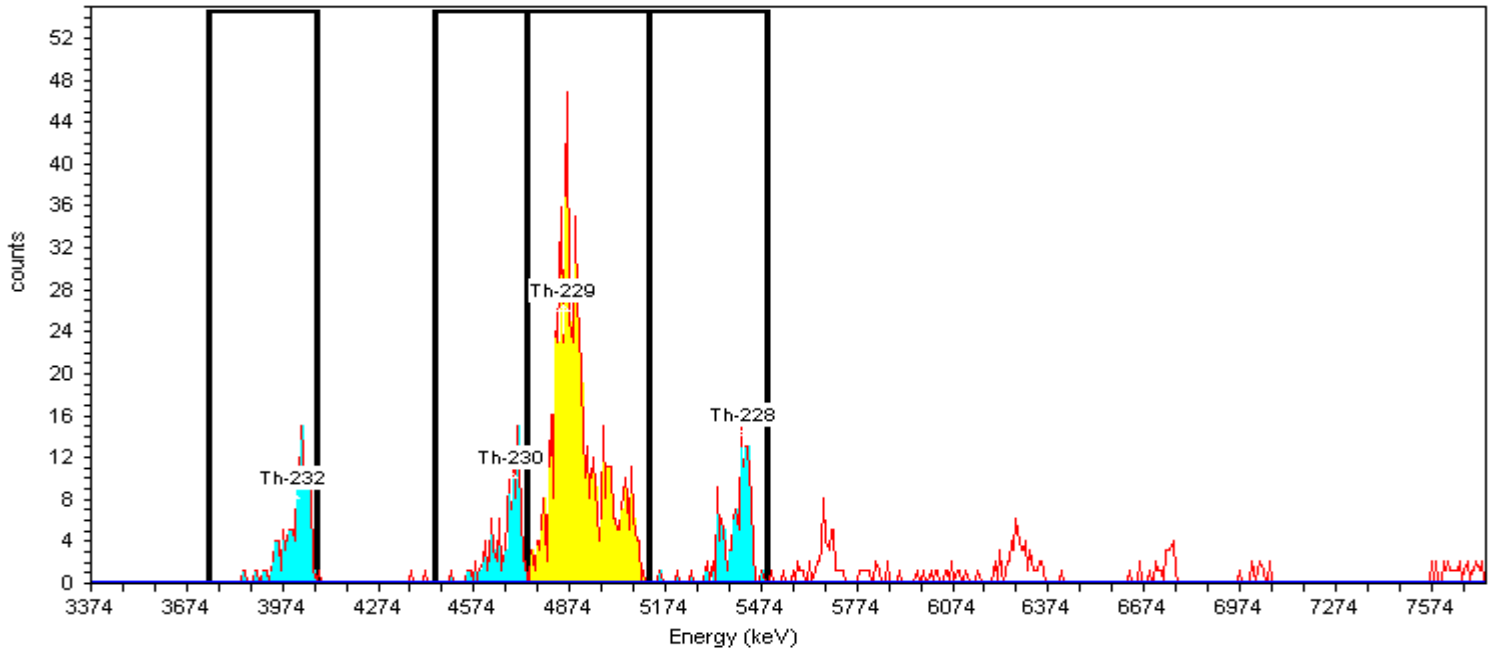
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 93.34%

Acquisition

Detector: AV62
Serial Number: 52-060FF2
Acquisition Start Date: 6/30/2014 1:43:06AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:34AM
Background Info: Sample: ICB;AV62; Det: AV62; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-9885;AV62-20140504
Calibration Date: 5/5/2014 6:54:13PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.34% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:40:15AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 6/30/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	37.2	100.2	117	0.0000	117.46	1.197	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4739.1	21.5	99.7	101	0.3750	100.63	1.030	pCi/g
Th-229	4848.0	4,845.3	2.7	4739.1	5119.5	90.2	99.6	599	0.1875	598.81	5.727	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	56.8	99.8	121	1.3125	119.69	1.225	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:45:15AM 6/30/2014

Sample

Sample Name: 680-102199-A-37-B
SampleType: Sample
: 680-102199-A-37-B
Sample Collection Date: 6/10/2014 3:20:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9971g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126998
AnalysisID: 613437

Analyst: 60040

Tracer

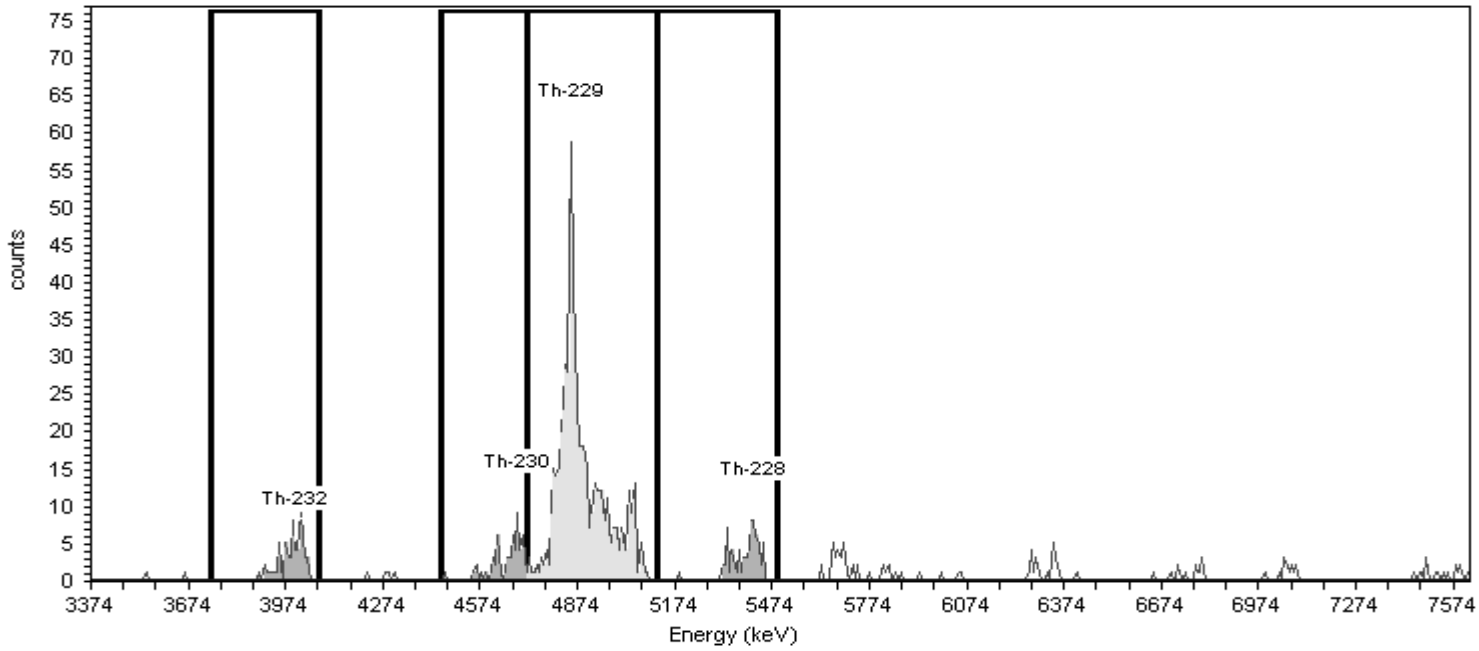
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 93.31%

Acquisition

Detector: AV63
Serial Number: 47-029ff2
Acquisition Start Date: 6/30/2014 1:43:08AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:35AM
Background Info: Sample: ICB;AV63; Det: AV63; Spectrum #1;
Jun-19-2014 00:18

Calibration Name: IC-9886;AV63-20140504
Calibration Date: 5/5/2014 6:54:19PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.48% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:40:15AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	70.8	100.2	63	0.0860	62.91	0.663	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	39.0	99.7	59	1.1192	57.94	0.614	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	65.6	99.6	580	0.9317	579.13	5.727	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	59.9	99.8	69	3.7500	65.25	0.690	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:45:27AM 6/30/2014

Sample

Sample Name: 680-102199-A-39-B
SampleType: Sample
: 680-102199-A-39-B
Sample Collection Date: 6/10/2014 3:50:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0013g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126998
AnalysisID: 613439

Analyst: 60040

Tracer

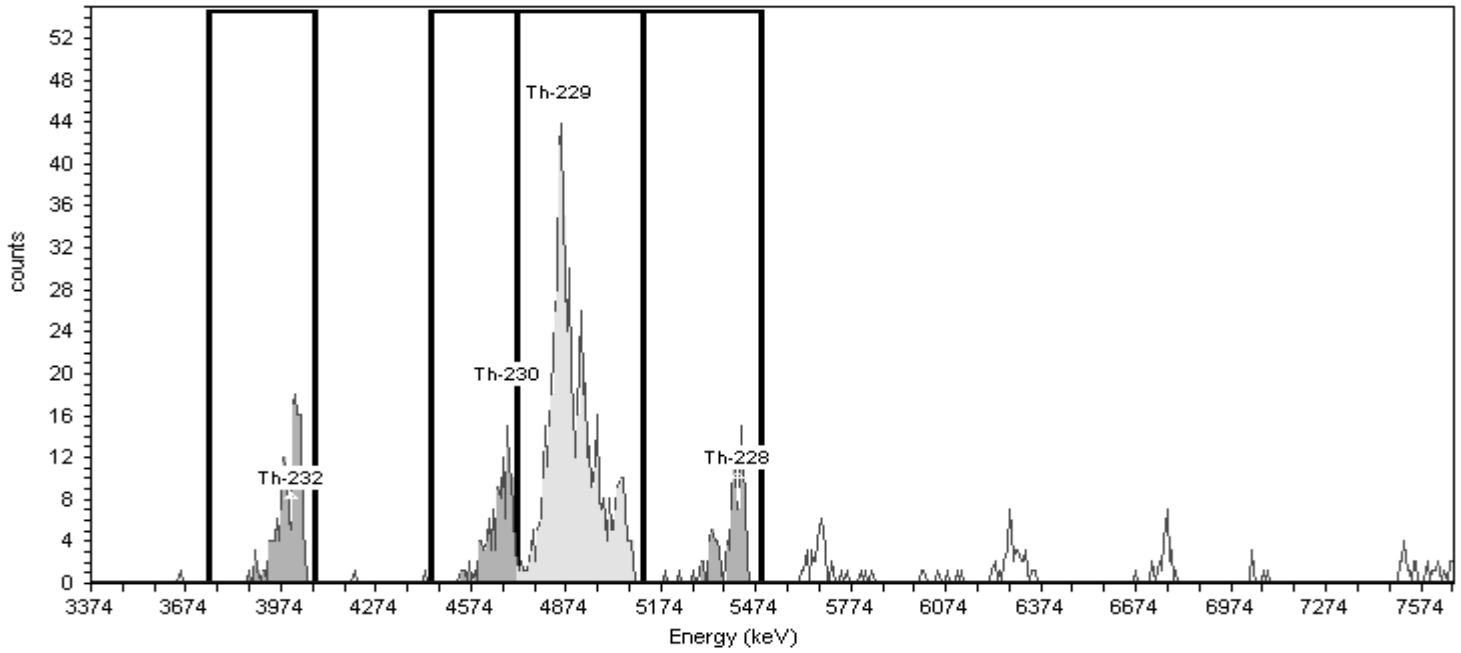
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 90.88%

Acquisition

Detector: AV64
Serial Number: 47-029ee4
Acquisition Start Date: 6/30/2014 1:43:09AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:36AM
Background Info: Sample: ICB;AV64; Det: AV64; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-7107;AV64-20140504a
Calibration Date: 5/4/2014 8:44:03PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.75% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:40:15AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	27.9	100.2	144	0.1875	143.81	1.423	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	38.5	99.7	116	0.5625	115.41	1.147	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	70.2	99.6	615	0.7620	614.21	5.554	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	56.6	99.8	108	1.8870	106.11	1.054	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:45:33AM 6/30/2014

Sample

Sample Name: 680-102199-A-40-B
SampleType: Sample
: 680-102199-A-40-B
Sample Collection Date: 6/10/2014 3:55:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0027g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126998
AnalysisID: 613440

Analyst: 60040

Tracer

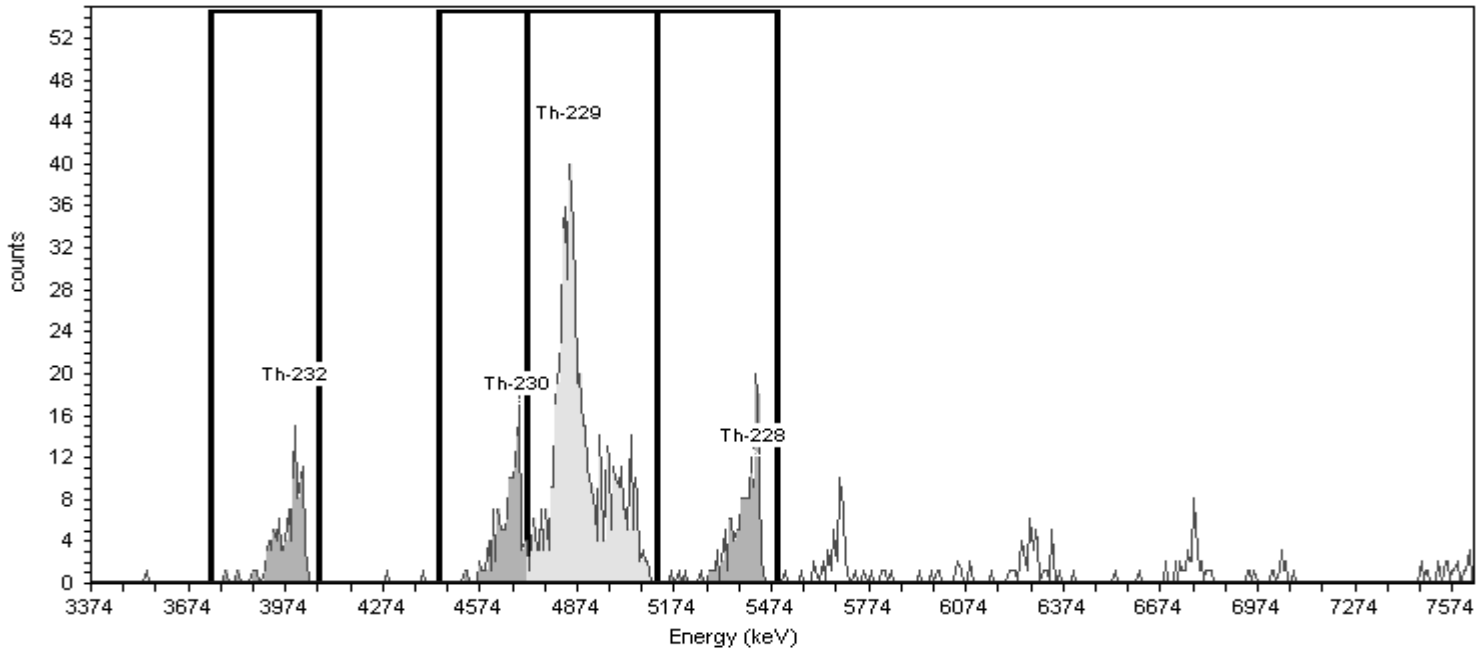
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 89.47%

Acquisition

Detector: AV65
Serial Number: 44-049JJ1
Acquisition Start Date: 6/30/2014 1:43:11AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 7:57:24PM
Background Info: Sample: ICB;AV65; Det: AV65; Spectrum #1; Jun-19-2014 19:57

Calibration Name: IC-8874;AV65-20140504
Calibration Date: 5/4/2014 8:43:55PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.13% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:40:15AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	63.5	100.2	111	0.3750	110.63	1.135	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	31.7	99.7	123	0.3750	122.53	1.264	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	76.7	99.6	592	0.5625	591.34	5.461	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	68.9	99.8	138	4.1250	133.88	1.380	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:05:16PM 6/30/2014

Sample

Sample Name: 680-102199-A-40-B
SampleType: Sample
: 680-102199-A-40-B
Sample Collection Date: 6/10/2014 3:55:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0027g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126998
AnalysisID: 613476

Analyst: 60040

Tracer

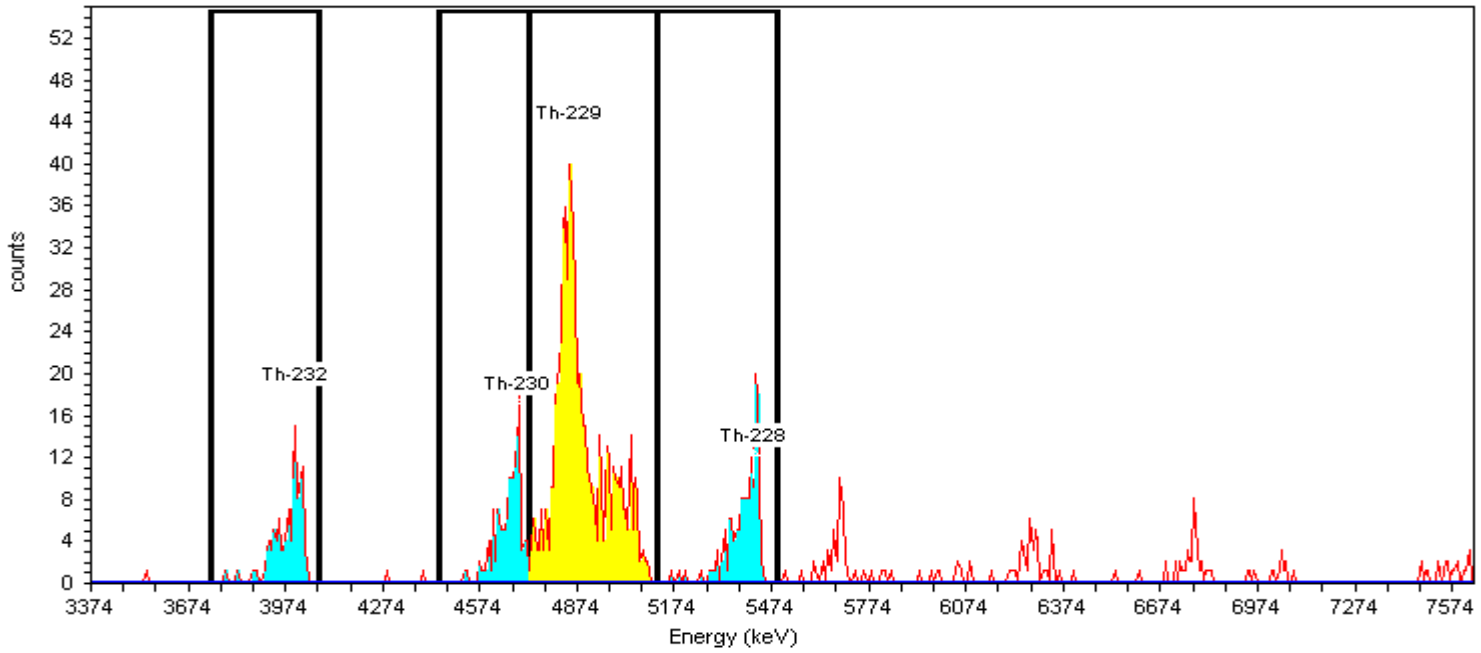
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 89.03%

Acquisition

Detector: AV65
Serial Number: 44-049JJ1
Acquisition Start Date: 6/30/2014 1:43:11AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 7:57:24PM
Background Info: Sample: ICB;AV65; Det: AV65; Spectrum #1; Jun-19-2014 19:57

Calibration Name: IC-8874;AV65-20140504
Calibration Date: 5/4/2014 8:43:55PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 27.13% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:40:15AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 6/30/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	63.5	100.2	111	0.3750	110.63	1.141	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4724.2	18.2	99.7	124	0.3750	123.63	1.281	pCi/g
Th-229	4848.0	4,845.3	2.7	4724.2	5119.5	76.7	99.6	589	0.5625	588.44	5.434	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	68.9	99.8	138	4.1250	133.88	1.386	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:45:38AM 6/30/2014

Sample

Sample Name: 680-102199-A-41-B
SampleType: Sample
: 680-102199-A-41-B
Sample Collection Date: 6/10/2014 4:00:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9980g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126998
AnalysisID: 613441

Analyst: 60040

Tracer

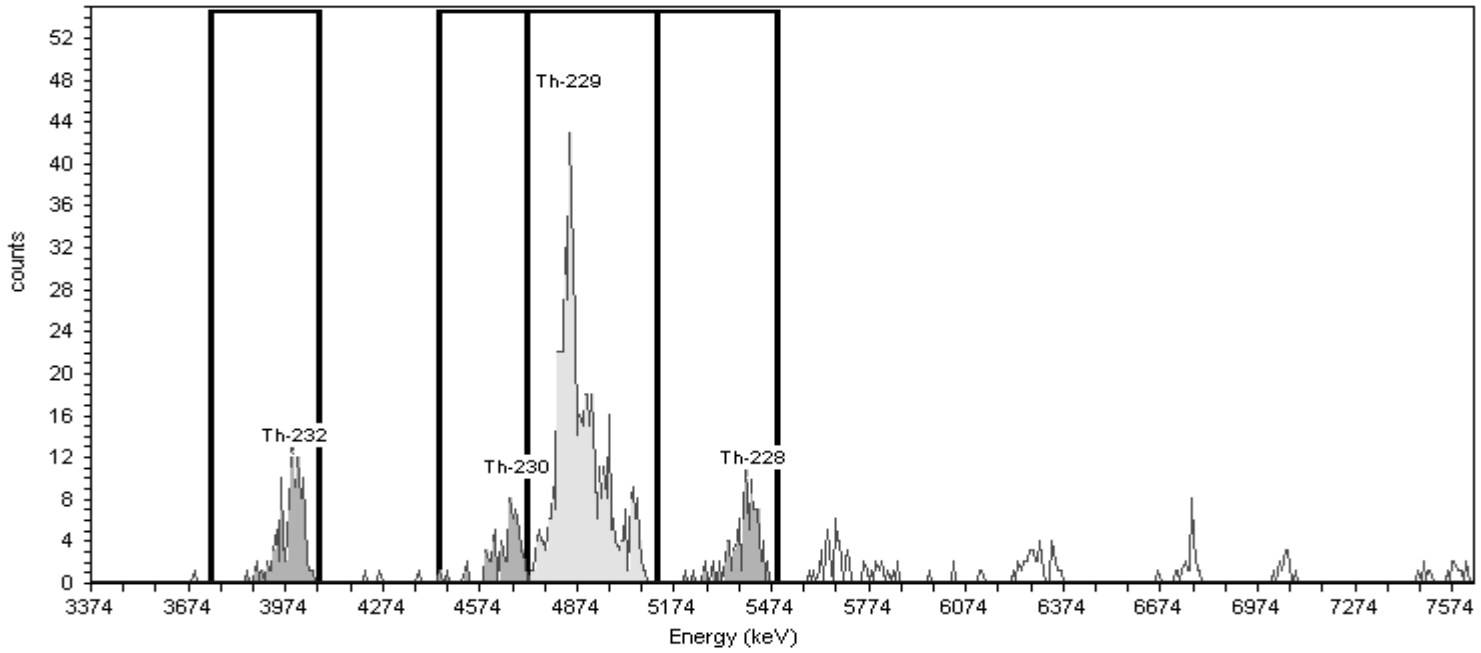
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 83.49%

Acquisition

Detector: AV66
Serial Number: 48-158EE2
Acquisition Start Date: 6/30/2014 1:43:12AM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:38AM
Background Info: Sample: ICB;AV66; Det: AV66; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-8875;AV66-20140504
Calibration Date: 5/4/2014 8:44:10PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.93% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:40:15AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	73.6	100.2	117	0.3750	116.63	1.348	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	35.3	99.7	69	1.1308	67.56	0.785	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	71.3	99.6	529	1.7053	527.29	5.119	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	76.6	99.8	95	3.0120	91.99	1.068	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:45:44AM 6/30/2014

Sample

Sample Name: 680-102199-A-42-B
SampleType: Sample
: 680-102199-A-42-B
Sample Collection Date: 6/10/2014 4:05:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0051g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126998
AnalysisID: 613442

Analyst: 60040

Tracer

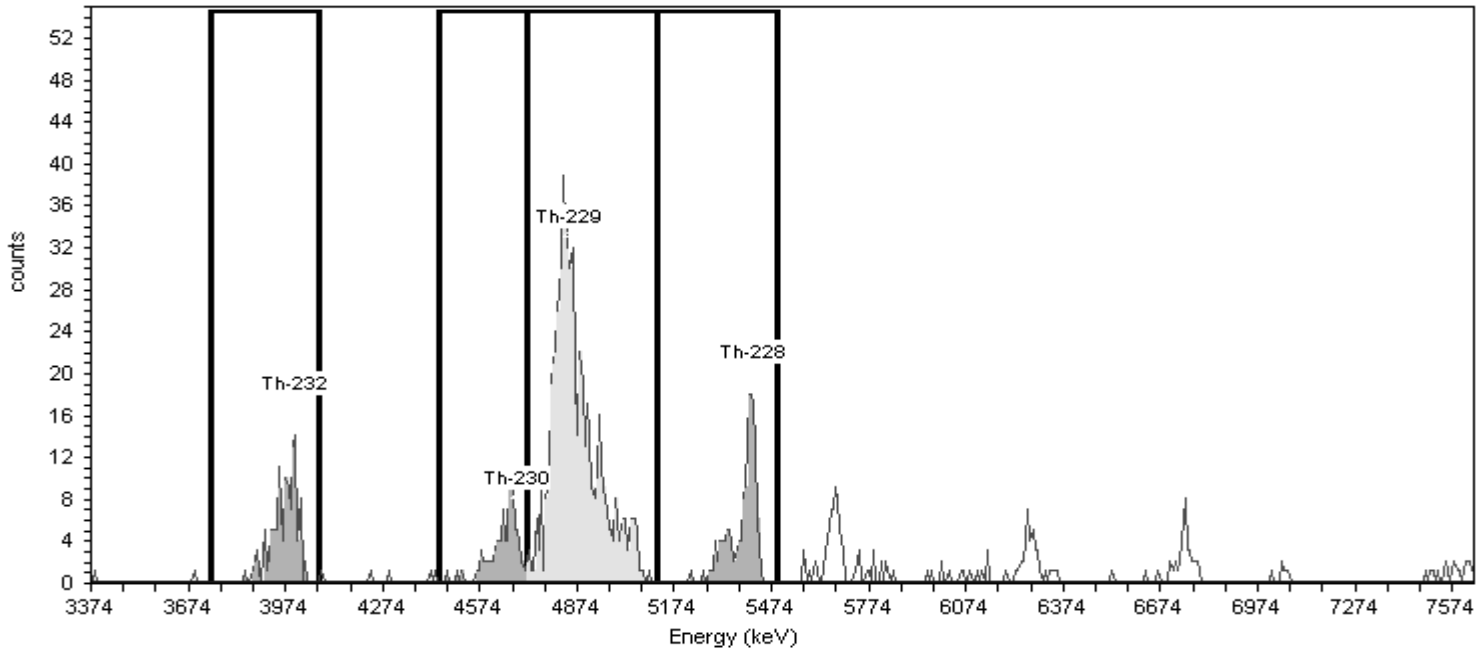
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 88.62%

Acquisition

Detector: AV67
Serial Number: 52-102 D7
Acquisition Start Date: 6/30/2014 1:43:15AM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/19/2014 12:18:39AM
Background Info: Sample: ICB;AV67; Det: AV67; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-8876;AV67-20140504
Calibration Date: 5/4/2014 8:44:15PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.32% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:40:15AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	89.0	100.2	120	0.6422	119.36	1.225	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	27.1	99.7	82	0.5625	81.47	0.840	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	90.2	99.6	590	0.1875	589.84	5.396	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	48.4	99.8	139	1.6875	137.31	1.415	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:45:50AM 6/30/2014

Sample

Sample Name: 680-102199-A-25-B
SampleType: Sample
: 680-102199-A-25-B
Sample Collection Date: 6/10/2014 1:30:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0050g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 126998
AnalysisID: 613443

Analyst: 60040

Tracer

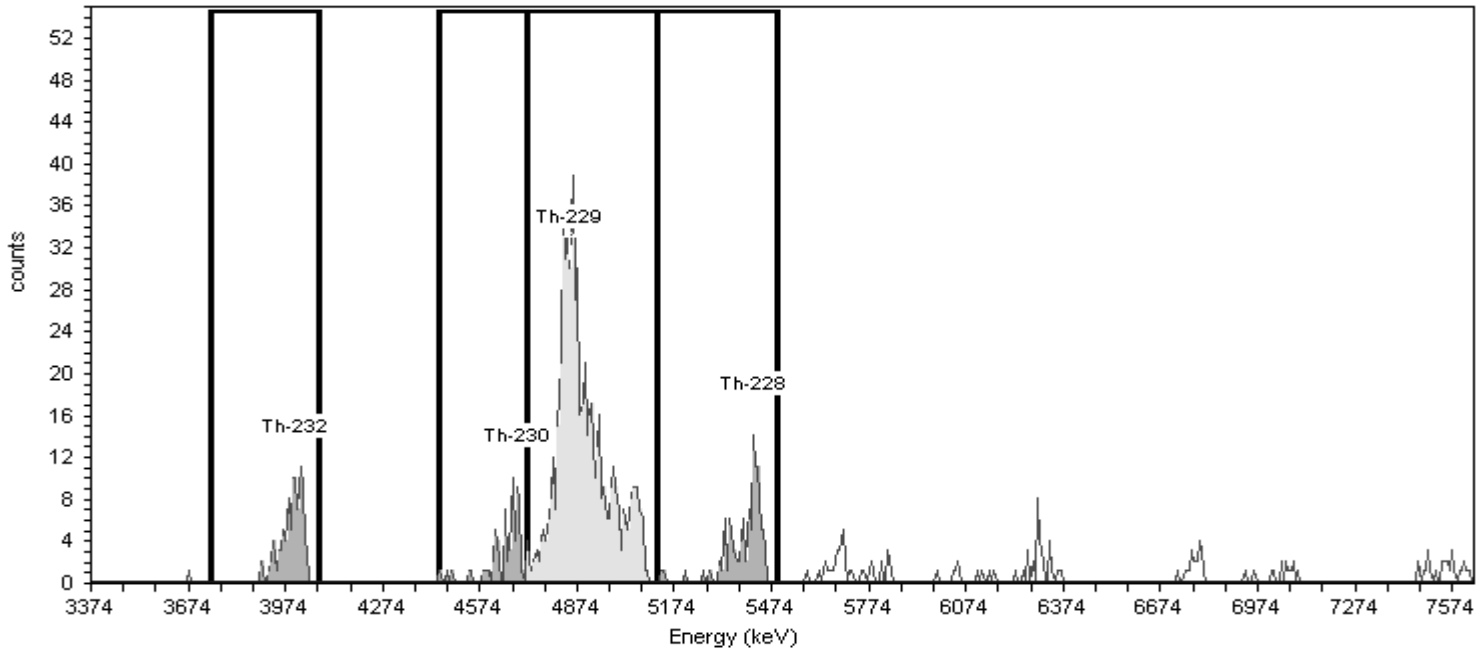
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 92.19%

Acquisition

Detector: AV68
Serial Number: 48-45884
Acquisition Start Date: 6/30/2014 1:43:15AM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/19/2014 12:18:40AM
Background Info: Sample: ICB;AV68; Det: AV68; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-8877;AV68-20140504
Calibration Date: 5/4/2014 8:44:22PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.49% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 6/30/2014 1:40:15AM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	72.1	100.2	92	0.0000	92.00	0.936	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	31.9	99.7	67	0.5625	66.07	0.676	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	81.1	99.6	595	0.1875	594.75	5.614	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	59.8	99.8	106	1.5000	104.50	1.068	pCi/g

Daily Checks

Alpha Spectroscopy Daily Pulser Check

Analysis Date: 06/30/14

		Gross Counts			FWHM (keV)			Pulser Center			Energy (keV)		
Detector	**Analysis Date**	**Result**	**Criteria**	**P/F**	**Result**	**Criteria**	**P/F**	**Result**	**Criteria**	**P/F**	**Result**	**Criteria**	**P/F**
AV3	06/30/14 00:01	7353	6995.6 - 7732.0	Pass	12.1	10 - 20	Pass	227.0	221.0 - 231.0	Pass	5060	5012.2 - 5092.2	Pass
AV4	06/30/14 00:01	7438	7058.9 - 7801.9	Pass	14.3	10 - 20	Pass	226.0	220.0 - 230.0	Pass	5053	5004.6 - 5084.6	Pass
AV6	06/30/14 00:01	7437	7050.8 - 7793.0	Pass	14.0	10 - 20	Pass	217.0	212.0 - 222.0	Pass	4985	4944.9 - 5024.9	Pass
AV7	06/30/14 00:01	7435	7003.5 - 7740.8	Pass	17.8	10 - 20	Pass	226.9	222.0 - 232.0	Pass	5059	5020.1 - 5100.1	Pass
AV8	06/30/14 00:01	7430	7052.4 - 7794.7	Pass	13.9	10 - 20	Pass	220.9	216.0 - 226.0	Pass	5015	4975.1 - 5055.1	Pass
AV10	06/30/14 00:02	7460	7323.5 - 8094.4	Pass	12.4	10 - 20	Pass	224.1	216.0 - 226.0	Pass	5038	4974.9 - 5054.9	Pass
AV11	06/30/14 00:02	7707	7322.5 - 8093.3	Pass	13.7	10 - 20	Pass	226.0	221.1 - 231.1	Pass	5053	5012.8 - 5092.8	Pass
AV13	06/30/14 00:01	7627	7244.9 - 8007.5	Pass	18.9	10 - 20	Pass	223.0	219.1 - 229.1	Pass	5030	4998.3 - 5078.3	Pass
AV14	06/30/14 00:01	7471	7236.1 - 7997.8	Pass	12.0	10 - 20	Pass	224.0	219.0 - 229.0	Pass	5037	4997.5 - 5077.5	Pass
AV15	06/30/14 00:01	7622	7313.8 - 8083.7	Pass	14.6	10 - 20	Pass	223.9	219.2 - 229.2	Pass	5037	4998.9 - 5078.9	Pass
AV16	06/30/14 00:01	7477	7055.7 - 7798.4	Pass	12.3	10 - 20	Pass	218.0	215.9 - 225.9	Pass	4993	4974.6 - 5054.6	Pass
AV17	06/30/14 00:02	7570	7224.6 - 7985.1	Pass	11.5	10 - 20	Pass	226.0	221.0 - 231.0	Pass	5052	5012.5 - 5092.5	Pass
AV18	06/30/14 00:02	7577	7204.8 - 7963.1	Pass	11.9	10 - 20	Pass	225.0	220.0 - 230.0	Pass	5045	5004.9 - 5084.9	Pass
AV19	06/30/14 00:02	7593	7231.9 - 7993.2	Pass	11.4	10 - 20	Pass	225.0	221.0 - 231.0	Pass	5045	5012.3 - 5092.3	Pass
AV20	06/30/14 00:02	7668	7255.1 - 8018.8	Pass	14.8	10 - 20	Pass	221.9	217.9 - 227.9	Pass	5022	4989.0 - 5069.0	Pass
AV21	06/30/14 00:02	7665	7278.7 - 8044.9	Pass	14.3	10 - 20	Pass	222.9	219.0 - 229.0	Pass	5030	4997.5 - 5077.5	Pass
AV23	06/30/14 00:02	7628	7259.0 - 8023.1	Pass	16.0	10 - 20	Pass	224.1	219.0 - 229.0	Pass	5038	4997.4 - 5077.4	Pass
AV24	06/30/14 00:02	7652	7259.6 - 8023.8	Pass	15.3	10 - 20	Pass	216.9	212.9 - 222.9	Pass	4985	4952.1 - 5032.1	Pass
AV43	06/30/14 01:04	7455	7041.9 - 7783.1	Pass	11.4	10 - 20	Pass	221.0	216.9 - 226.9	Pass	5015	4982.0 - 5062.0	Pass
AV44	06/30/14 00:18	7610	7220.7 - 7980.8	Pass	11.5	10 - 20	Pass	221.0	216.0 - 226.0	Pass	5015	4975.1 - 5055.1	Pass
AV45	06/30/14 00:18	7617	7219.6 - 7979.6	Pass	16.0	10 - 20	Pass	225.2	219.7 - 229.7	Pass	5046	5003.0 - 5083.0	Pass
AV46	06/30/14 00:18	7371	7134.7 - 7885.7	Pass	12.9	10 - 20	Pass	225.0	220.0 - 230.0	Pass	5045	5004.8 - 5084.8	Pass
AV48	06/30/14 00:18	7653	7068.1 - 7812.1	Pass	13.7	10 - 20	Pass	218.9	218.0 - 228.0	Pass	4999	4989.8 - 5069.8	Pass
AV49	06/30/14 00:18	7632	7226.6 - 7987.3	Pass	15.4	10 - 20	Pass	221.1	215.0 - 225.0	Pass	5016	4967.4 - 5047.4	Pass
AV53	06/30/14 00:18	7255	6906.6 - 7633.6	Pass	11.0	10 - 20	Pass	222.0	217.0 - 227.0	Pass	5023	4982.6 - 5062.6	Pass
AV54	06/30/14 00:18	7261	6918.5 - 7646.8	Pass	16.0	10 - 20	Pass	225.9	222.1 - 232.1	Pass	5052	5020.5 - 5100.5	Pass
AV55	06/30/14 00:18	7254	6899.4 - 7625.7	Pass	11.4	10 - 20	Pass	225.0	220.0 - 230.0	Pass	5045	5004.9 - 5084.9	Pass
AV56	06/30/14 00:19	6917	6868.1 - 7591.0	Pass	13.4	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	5004.9 - 5069.9	Pass
AV57	06/30/14 00:19	7288	6901.7 - 7628.2	Pass	18.9	10 - 20	Pass	229.0	224.0 - 234.0	Pass	5075	5034.9 - 5114.9	Pass
AV58	06/30/14 00:19	7032	6766.5 - 7478.7	Pass	12.6	10 - 20	Pass	223.9	219.0 - 229.0	Pass	5037	4997.2 - 5077.2	Pass
AV59	06/30/14 00:19	7253	6885.8 - 7610.6	Pass	18.2	10 - 20	Pass	222.9	217.9 - 227.9	Pass	5029	4989.1 - 5069.1	Pass
AV60	06/30/14 00:19	7227	6867.8 - 7590.7	Pass	17.5	10 - 20	Pass	220.9	216.2 - 226.2	Pass	5015	4976.7 - 5056.7	Pass
AV61	06/30/14 00:19	7209	6682.3 - 7385.7	Pass	16.5	10 - 20	Pass	223.0	219.0 - 229.0	Pass	5030	4997.8 - 5077.8	Pass
AV62	06/30/14 00:19	7247	6875.3 - 7599.0	Pass	18.7	10 - 20	Pass	221.9	217.1 - 227.1	Pass	5022	4983.0 - 5063.0	Pass
AV63	06/30/14 00:19	7243	6829.2 - 7548.0	Pass	13.8	10 - 20	Pass	223.0	217.9 - 227.9	Pass	5030	4989.3 - 5069.3	Pass
AV64	06/30/14 00:19	7241	6847.3 - 7568.1	Pass	13.8	10 - 20	Pass	225.0	219.4 - 229.4	Pass	5045	5000.4 - 5080.4	Pass
AV65	06/30/14 00:19	7226	6864.5 - 7587.1	Pass	15.3	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	4989.7 - 5069.7	Pass
AV66	06/30/14 00:19	7232	6865.2 - 7587.8	Pass	15.2	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	4989.9 - 5069.9	Pass
AV67	06/30/14 00:19	7122	6893.5 - 7619.1	Pass	13.3	10 - 20	Pass	228.1	221.9 - 231.9	Pass	5068	5019.4 - 5099.4	Pass

Alpha Spectroscopy Daily Pulser Check

Analysis Date: 06/30/14

		Gross Counts			FWHM (keV)			Pulser Center			Energy (keV)		
Detector	**Analysis Date**	**Result**	**Criteria**	**P/F**	**Result**	**Criteria**	**P/F**	**Result**	**Criteria**	**P/F**	**Result**	**Criteria**	**P/F**
AV68	06/30/14 00:19	7451	7080.3 - 7825.6	Pass	19.1	10 - 20	Pass	223.9	219.0 - 229.0	Pass	5037	4997.3 - 5077.3	Pass

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:07:28AM 6/30/2014

Sample

Sample Name: Pulser;AV3 Spectrum #6 Analysis #1
Comment:

Batch

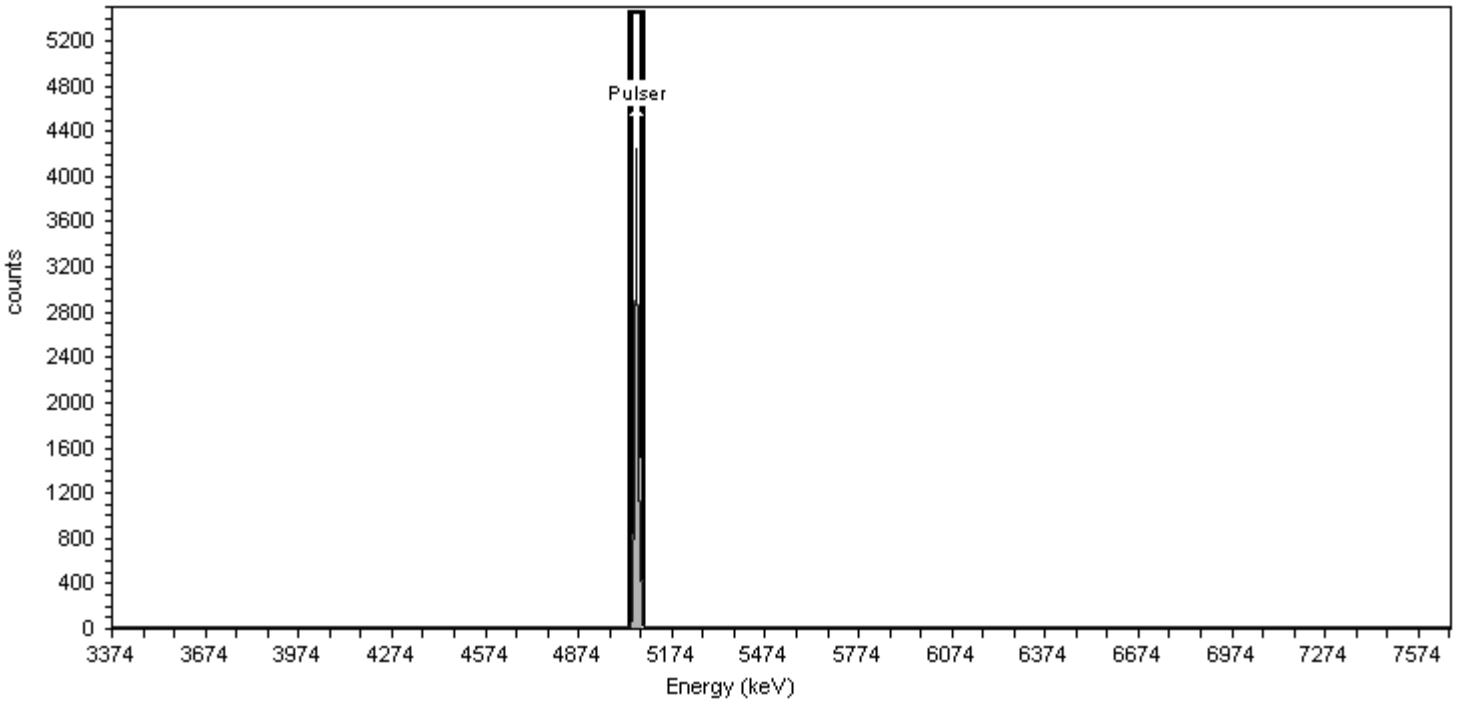
Batch Name: June2014a Analyst: 60040
Description:

Acquisition

Detector: AV3 , SN: 49-202 FF7
Acquisition Start Date: 6/30/2014 12:01:52AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-8875;AV3-20140505
Calibration Date: 5/6/2014 5:38:33PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.09% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5059.809	5039.285	5080.332	12.06	7,343.96	7,352.98

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:07:34AM 6/30/2014

Sample

Sample Name: Pulser;AV4 Spectrum #6 Analysis #1
Comment:

Batch

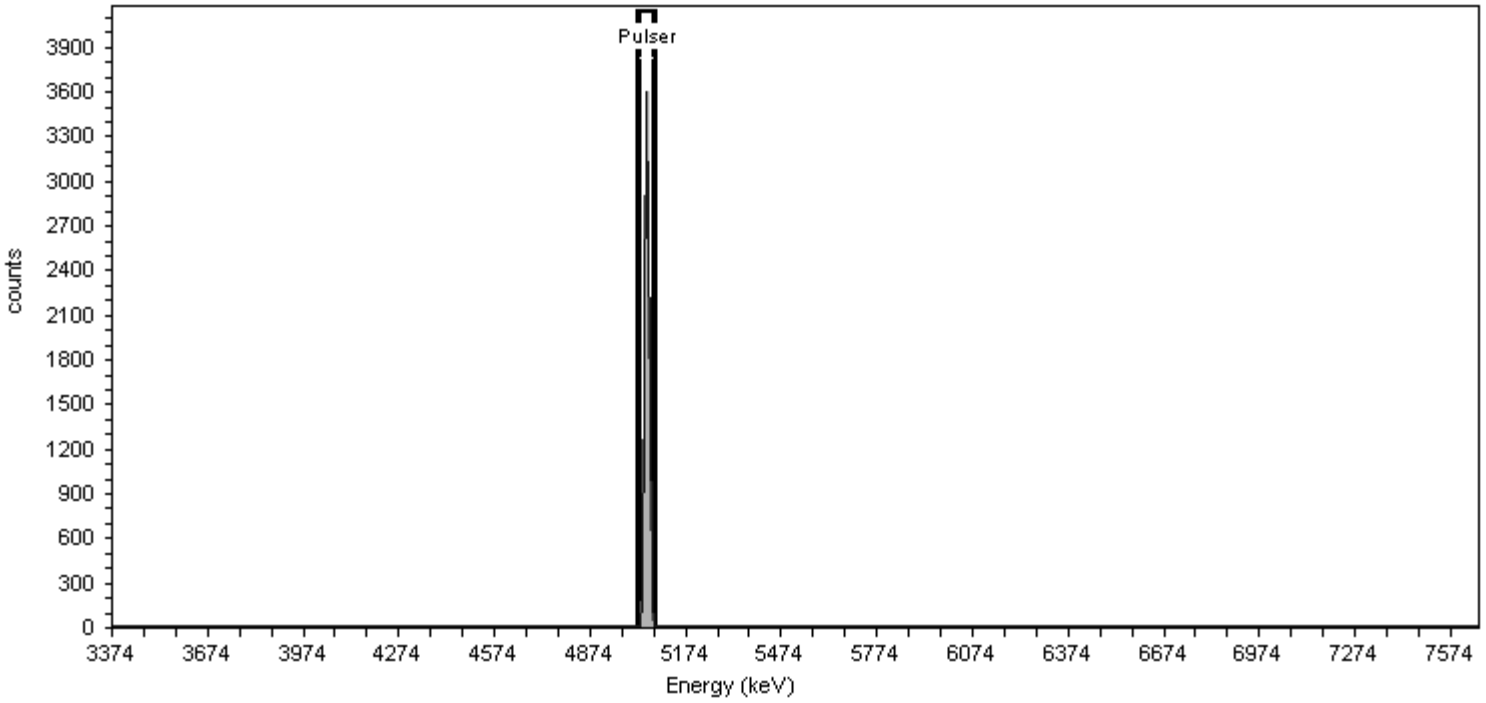
Batch Name: June2014a Analyst: 60040
Description:

Acquisition

Detector: AV4 , SN: 46-033Q4
Acquisition Start Date: 6/30/2014 12:01:53AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-8876;AV4-20140505
Calibration Date: 5/6/2014 5:38:40PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.82% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5052.576	5028.272	5076.880	14.28	7,379.50	7,438.18

TestAmerica
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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:05:22AM 6/30/2014

Sample

Sample Name: Pulser;AV6 Spectrum #6 Analysis #1
Comment:

Batch

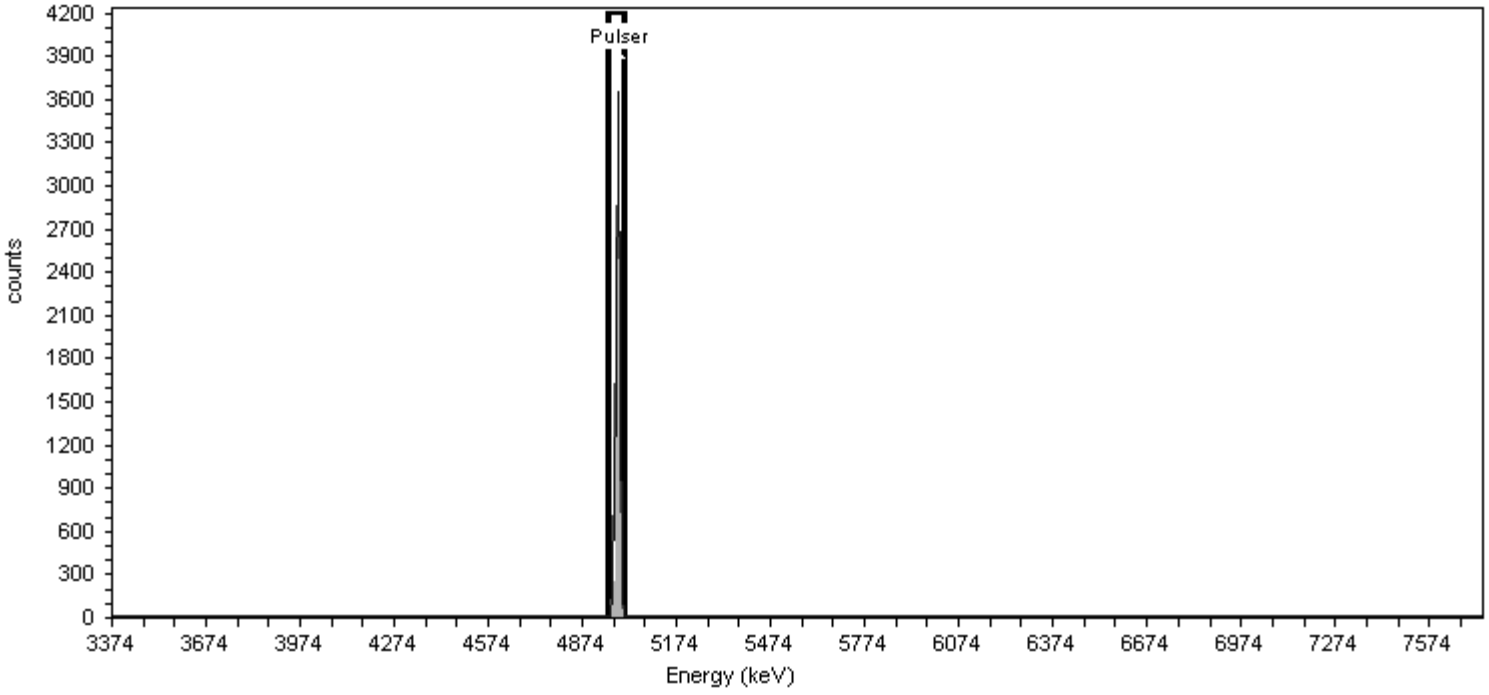
Batch Name: June2014a Analyst: 60040
Description:

Acquisition

Detector: AV6 , SN: 47-27FF2
Acquisition Start Date: 6/30/2014 12:01:56AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-9520;AV6-20140505
Calibration Date: 5/6/2014 5:38:46PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.89% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	4985.412	4961.558	5009.267	14.01	7,339.24	7,437.08

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:05:35AM 6/30/2014

Sample

Sample Name: Pulser;AV7 Spectrum #6 Analysis #1
Comment:

Batch

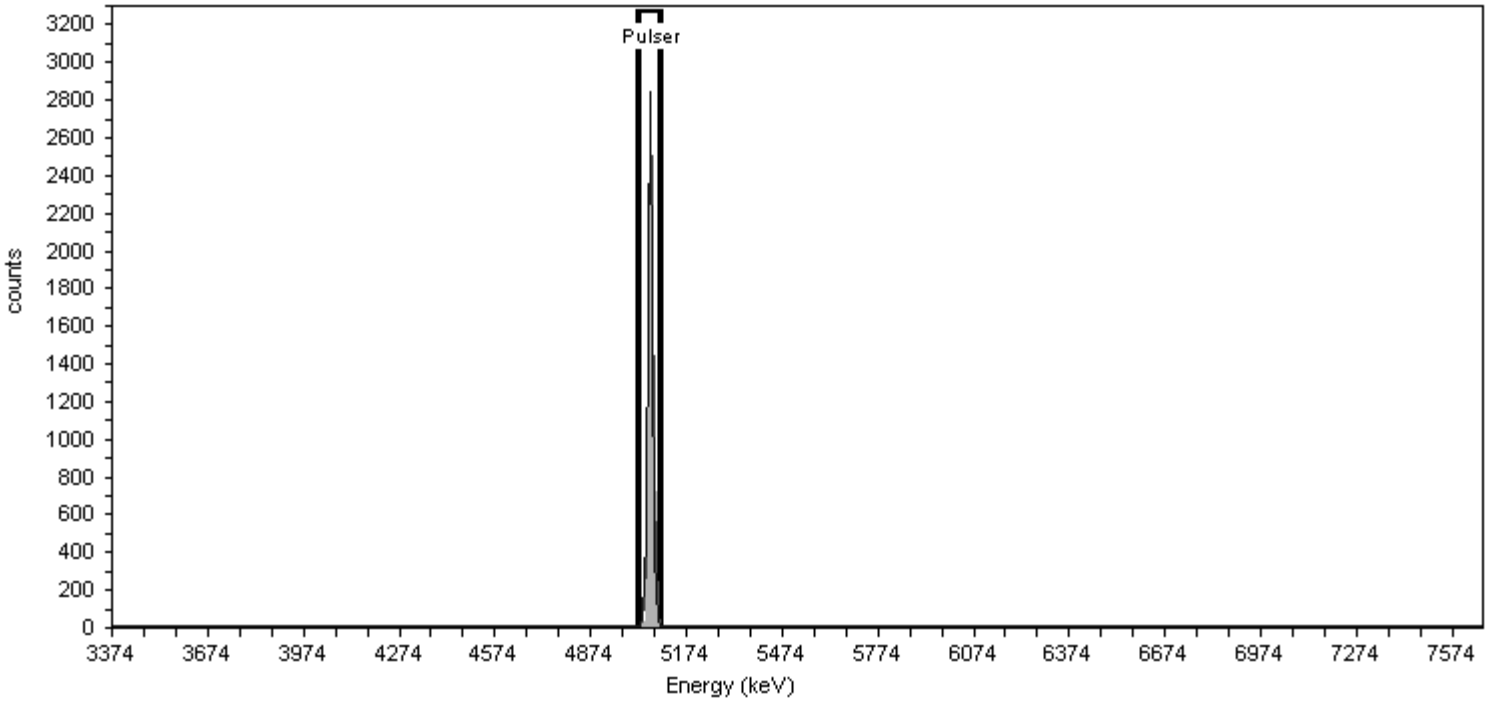
Batch Name: June2014a Analyst: 60040
Description:

Acquisition

Detector: AV7 , SN: 48-158EE5
Acquisition Start Date: 6/30/2014 12:01:57AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-8877;AV7-20140507
Calibration Date: 5/7/2014 10:48:48PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.80% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5059.343	5028.996	5089.691	17.83	7,281.97	7,434.99

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:05:44AM 6/30/2014

Sample

Sample Name: Pulser;AV8 Spectrum #6 Analysis #1
Comment:

Batch

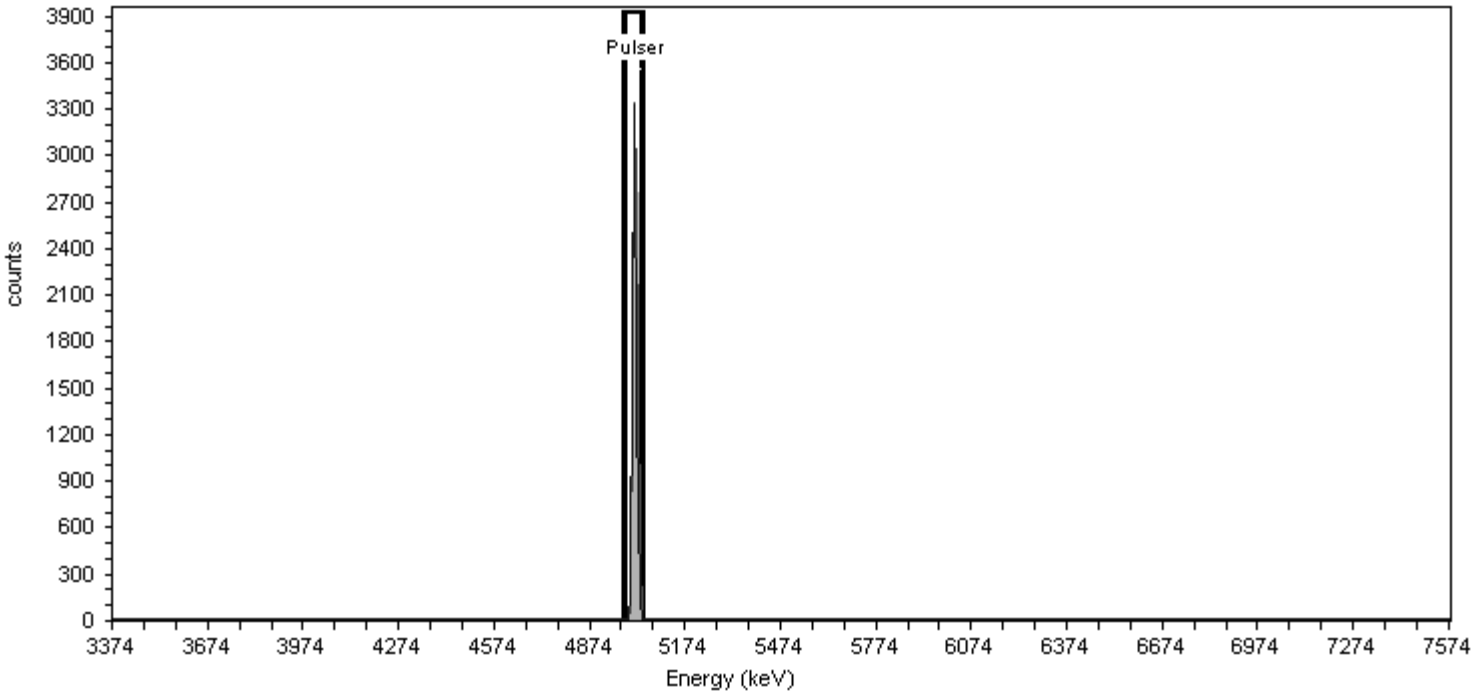
Batch Name: June2014a Analyst: 60040
Description:

Acquisition

Detector: AV8 , SN: 41-137Q6
Acquisition Start Date: 6/30/2014 12:01:59AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-9792;AV8-20140505
Calibration Date: 5/6/2014 5:38:58PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.05% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5014.589	4990.926	5038.251	13.90	6,668.00	7,430.38

TestAmerica
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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:05:56AM 6/30/2014

Sample

Sample Name: Pulser;AV10
Comment:

Spectrum #7 Analysis #1

Batch

Batch Name: June2014a
Description:

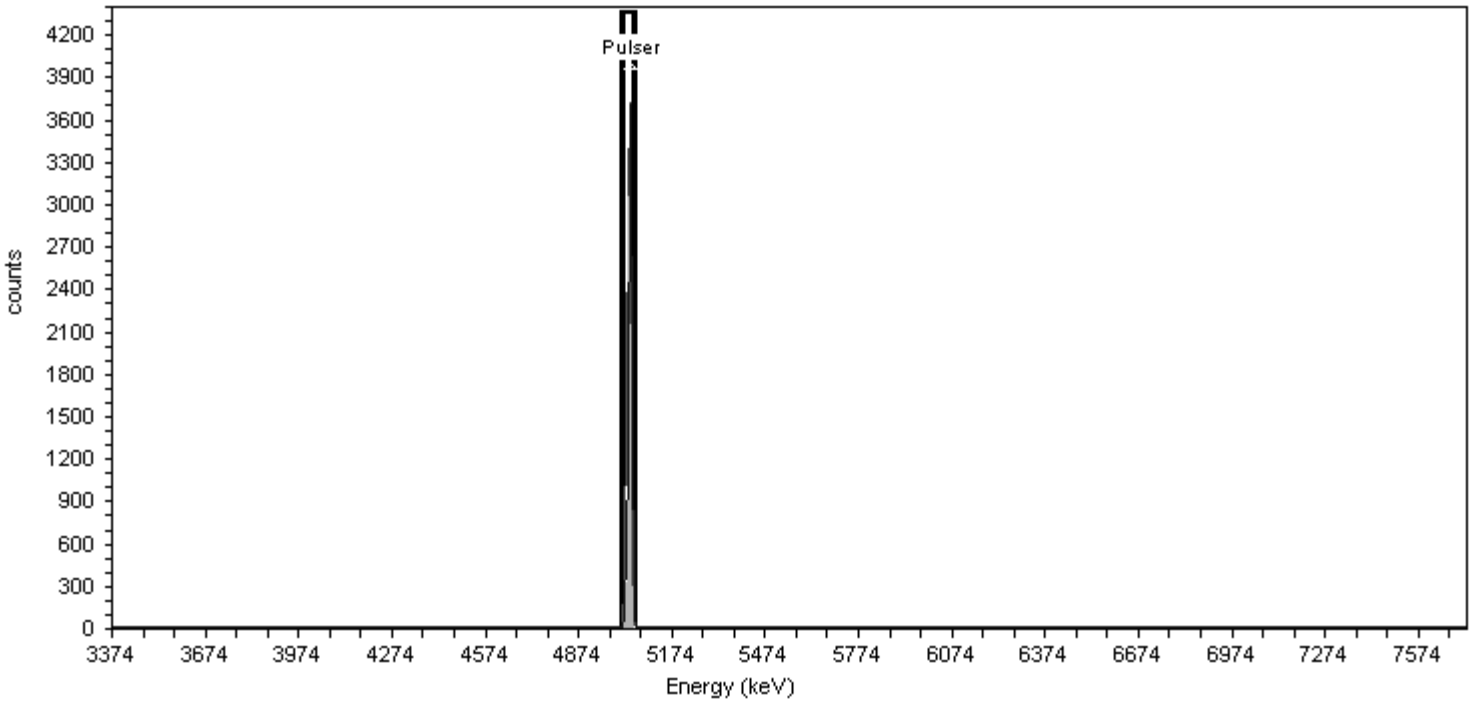
Analyst: 60040

Acquisition

Detector: AV10 , SN: 49-155N2
Acquisition Start Date: 6/30/2014 12:02:02AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9794;AV10-20140505
Calibration Date: 5/6/2014 5:39:10PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.84% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5037.988	5016.857	5059.119	12.41	6,625.65	7,459.95

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:03AM 6/30/2014

Sample

Sample Name: Pulser;AV11 Spectrum #6 Analysis #1
Comment:

Batch

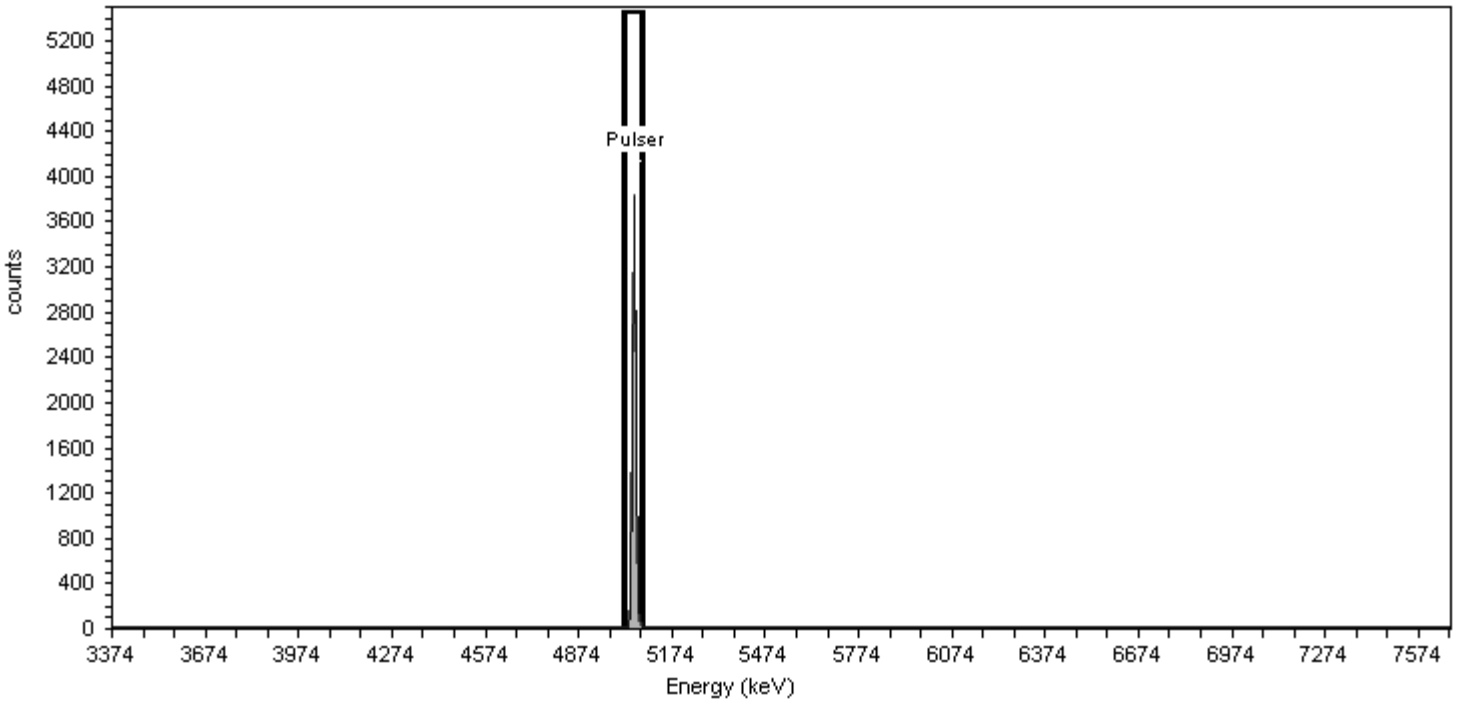
Batch Name: June2014a Analyst: 60040
Description:

Acquisition

Detector: AV11 , SN: 49-155dd2
Acquisition Start Date: 6/30/2014 12:02:04AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9795;AV11-20140505
Calibration Date: 5/6/2014 5:39:16PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.88% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5052.709	5029.427	5075.991	13.68	7,513.33	7,706.76

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:14AM 6/30/2014

Sample

Sample Name: Pulser;AV13 Spectrum #7 Analysis #1
Comment:

Batch

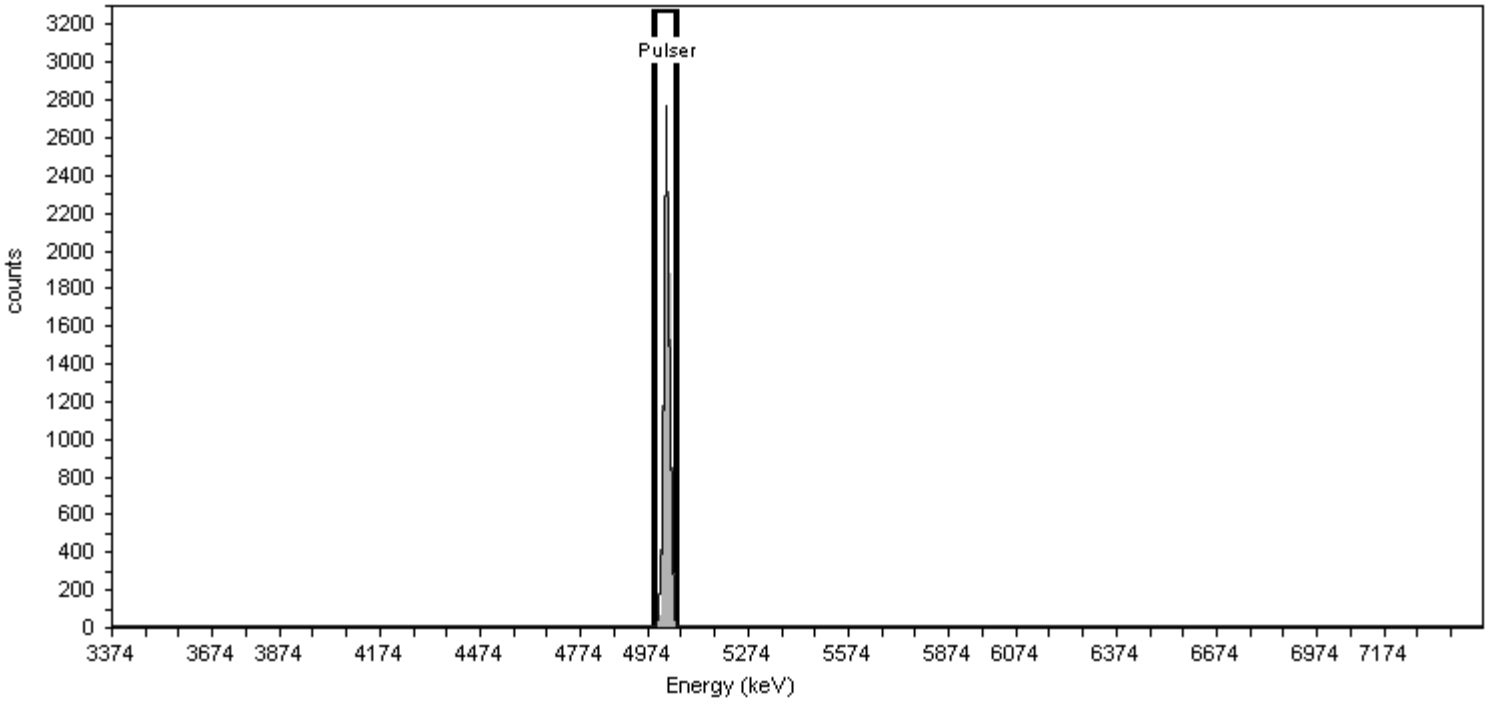
Batch Name: June2014a Analyst: 60040
Description:

Acquisition

Detector: AV13 , SN: 49-155M7
Acquisition Start Date: 6/30/2014 12:01:54AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9884;AV13-20140505
Calibration Date: 5/6/2014 5:39:28PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.99% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5030.006	4997.828	5062.184	18.90	7,513.02	7,627.12

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:19AM 6/30/2014

Sample

Sample Name: Pulser;AV14 Spectrum #6 Analysis #1
Comment:

Batch

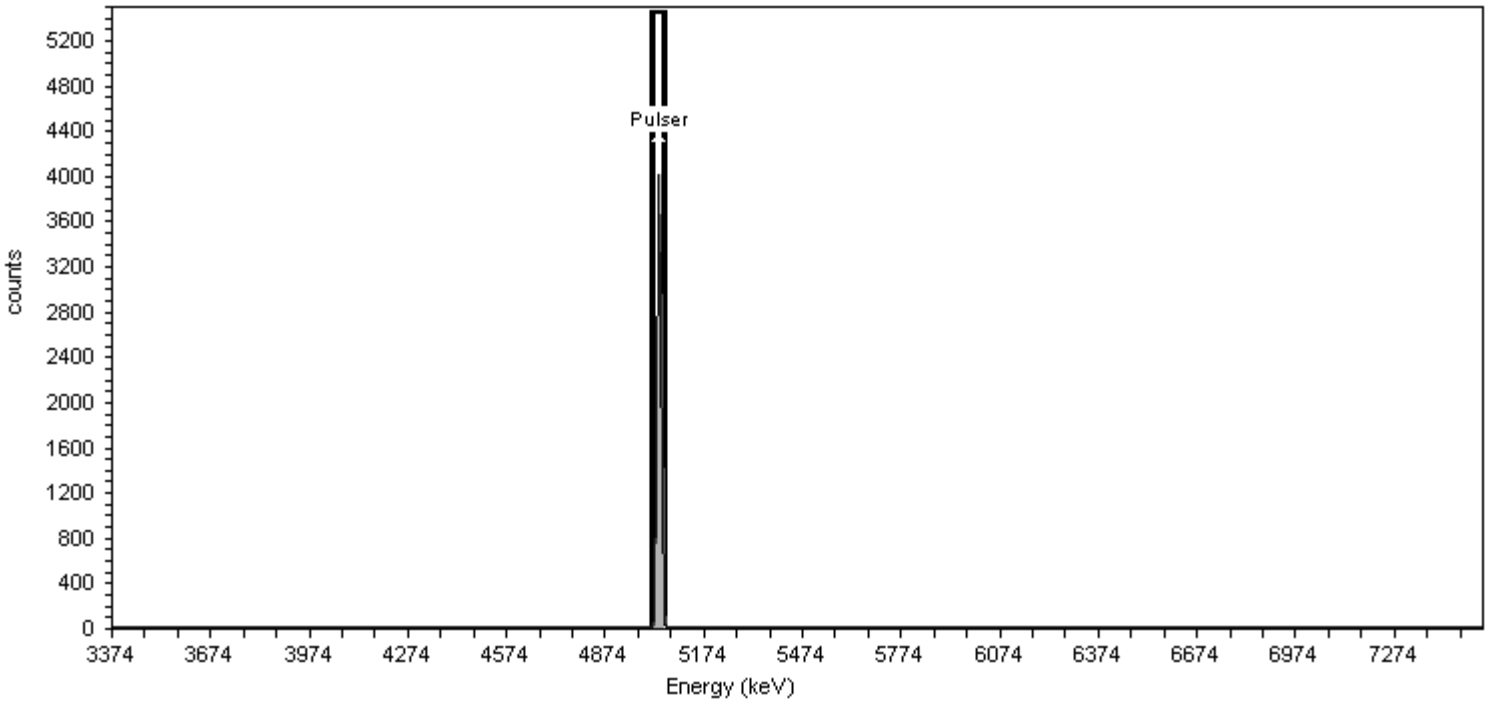
Batch Name: June2014a Analyst: 60040
Description:

Acquisition

Detector: AV14 , SN: 50-060W4
Acquisition Start Date: 6/30/2014 12:01:54AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9885;AV14-20140505
Calibration Date: 5/6/2014 5:39:36PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.34% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5037.146	5016.766	5057.526	11.97	6,898.62	7,471.31

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:26AM 6/30/2014

Sample

Sample Name: Pulser;AV15 Spectrum #6 Analysis #1
Comment:

Batch

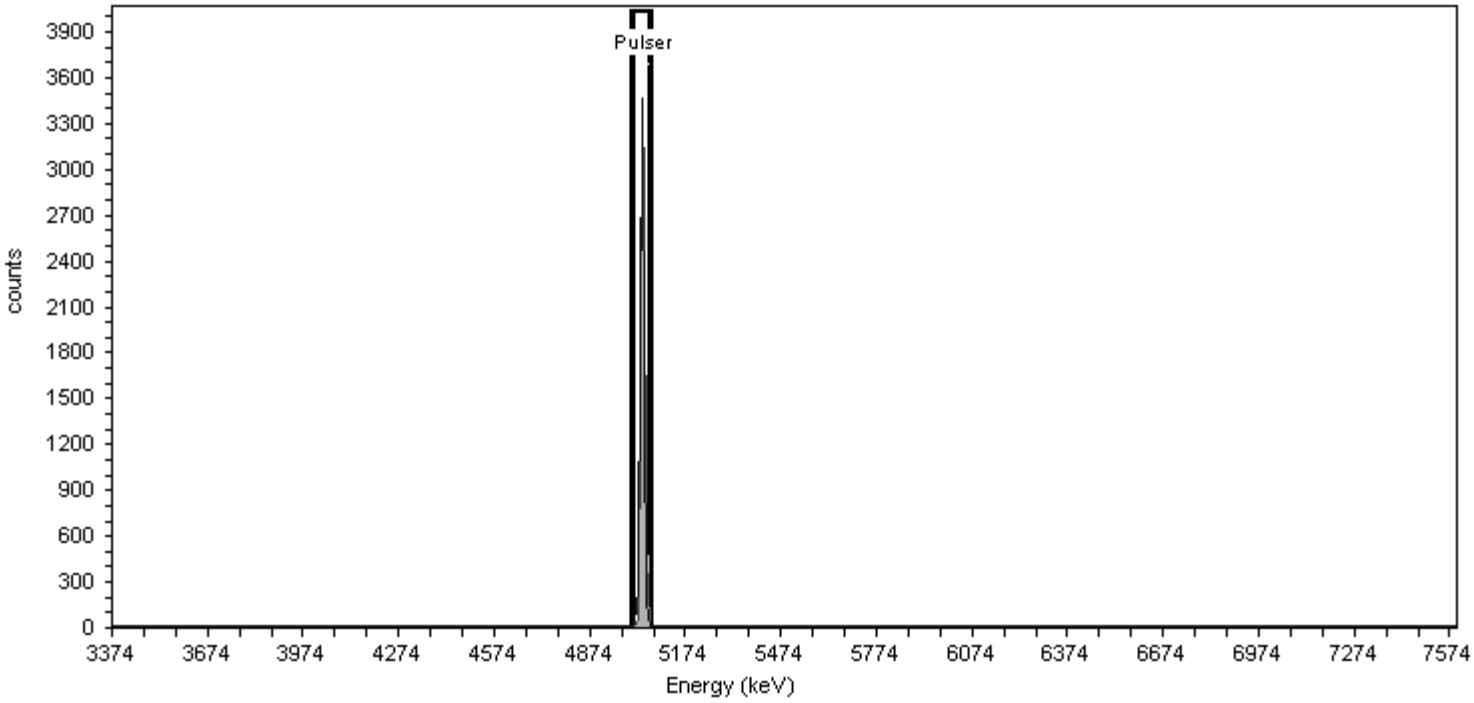
Batch Name: June2014a Analyst: 60040
Description:

Acquisition

Detector: AV15 , SN: 41-172C5
Acquisition Start Date: 6/30/2014 12:01:56AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9886;AV15-20140505
Calibration Date: 5/6/2014 5:39:42PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.62% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5036.783	5011.926	5061.640	14.60	7,267.55	7,621.62

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:32AM 6/30/2014

Sample

Sample Name: Pulser;AV16
Comment:

Spectrum #6 Analysis #1

Batch

Batch Name: June2014a
Description:

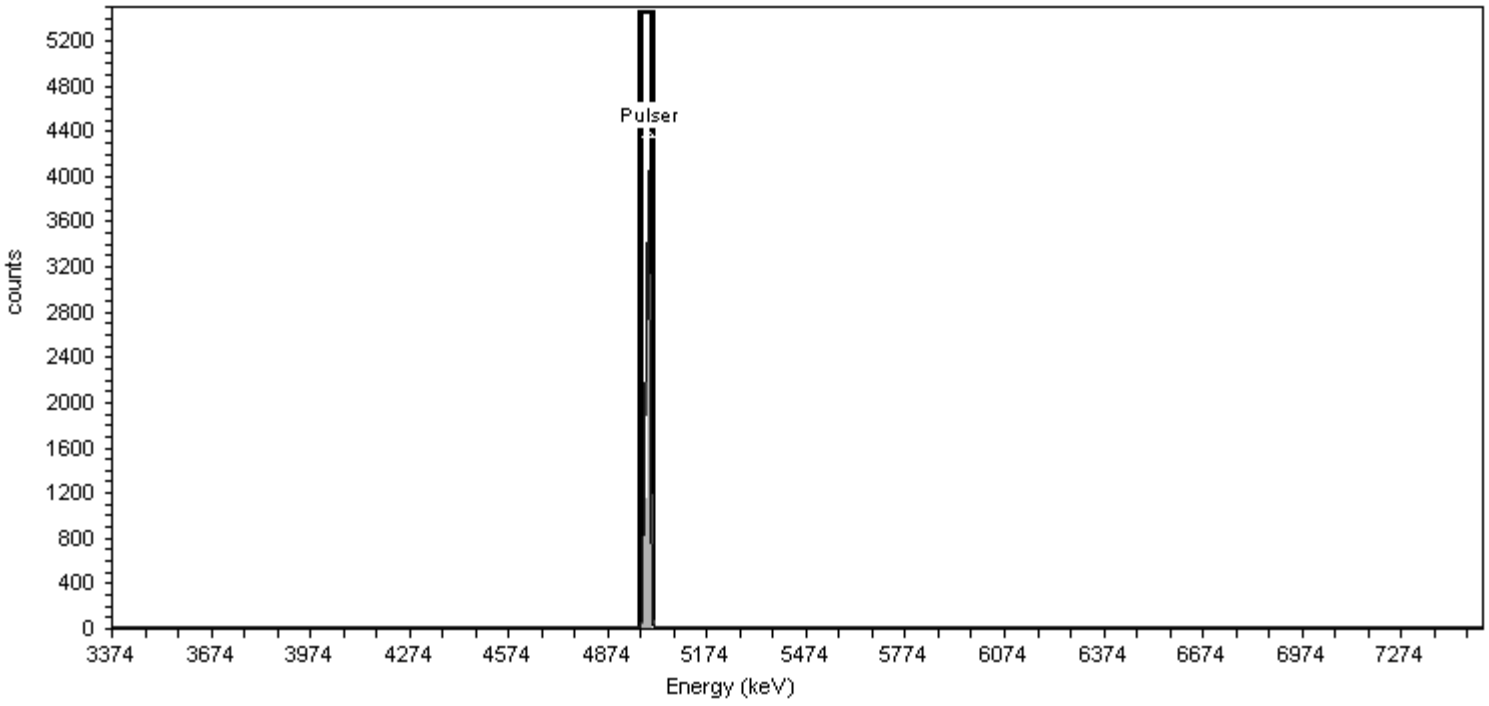
Analyst: 60040

Acquisition

Detector: AV16 , SN: 51-082B6
Acquisition Start Date: 6/30/2014 12:01:59AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-7107;AV16-20140505
Calibration Date: 5/5/2014 10:08:41PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.11% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	4992.509	4971.553	5013.465	12.31	7,144.65	7,477.04

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:38AM 6/30/2014

Sample

Sample Name: Pulser;AV17 Spectrum #6 Analysis #1
Comment:

Batch

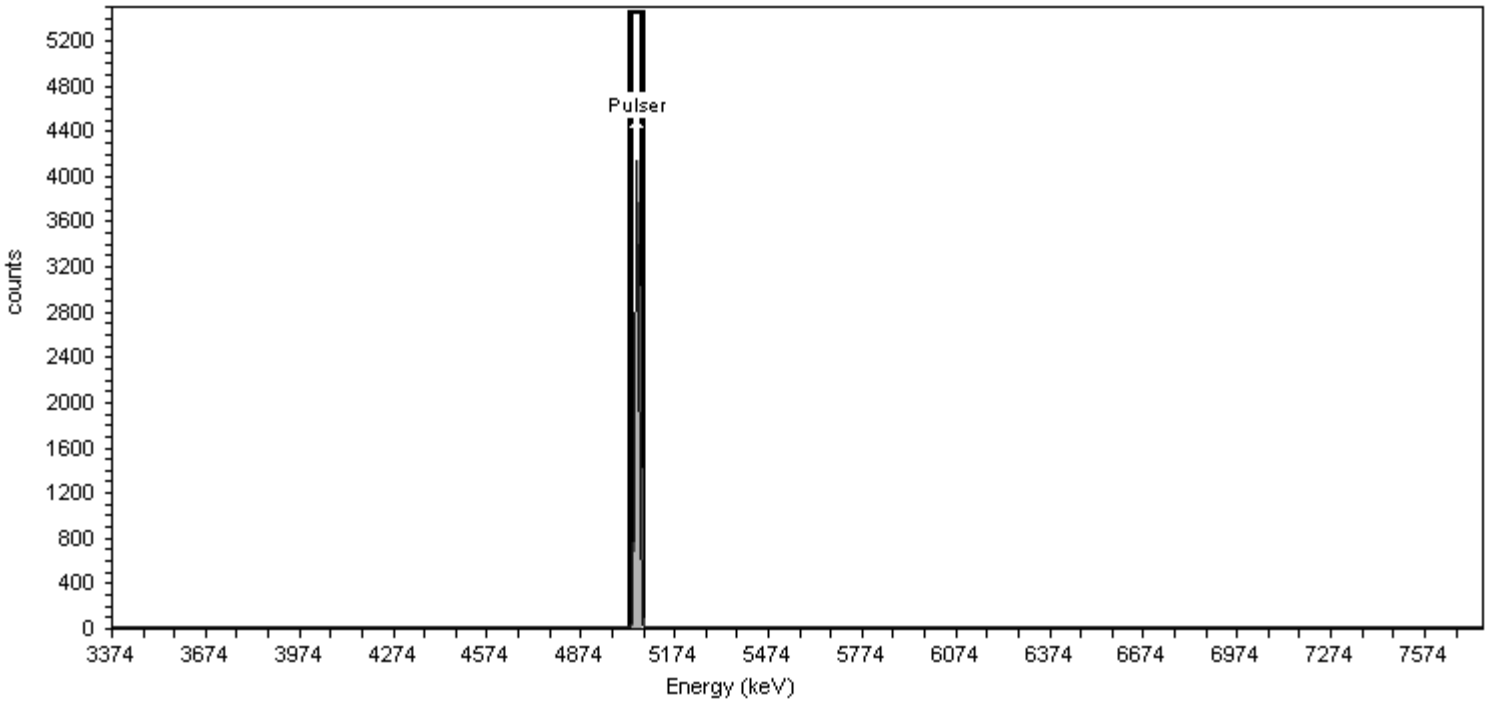
Batch Name: June2014a Analyst: 60040
Description:

Acquisition

Detector: AV17 , SN: 50-051C4
Acquisition Start Date: 6/30/2014 12:02:01AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8874;AV17-20140505
Calibration Date: 5/5/2014 10:08:49PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.07% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5052.042	5032.412	5071.671	11.53	6,849.23	7,570.26

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
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12:06:43AM 6/30/2014

Sample

Sample Name: Pulser;AV18 Spectrum #6 Analysis #1
Comment:

Batch

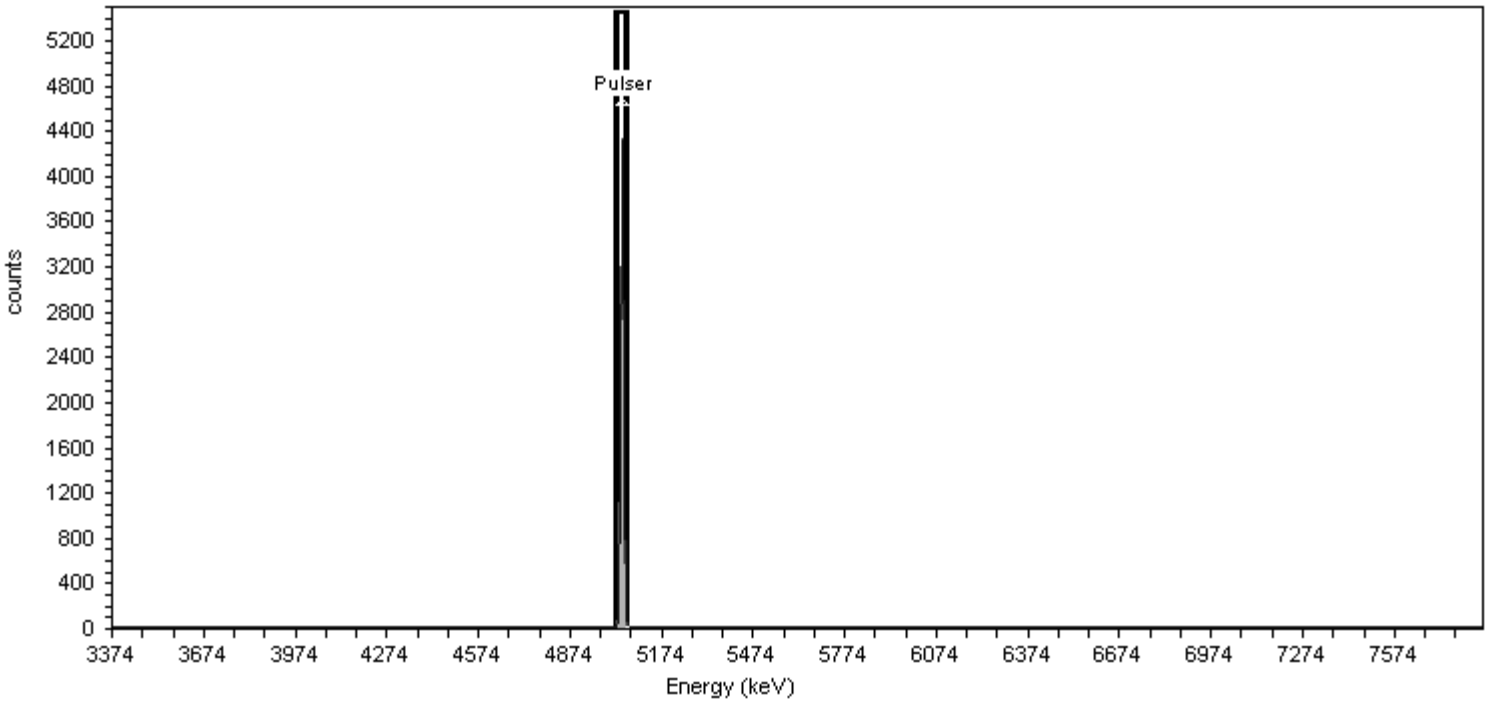
Batch Name: June2014a Analyst: 60040
Description:

Acquisition

Detector: AV18 , SN: 51-082C5
Acquisition Start Date: 6/30/2014 12:02:02AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8875;AV18-20140505
Calibration Date: 5/5/2014 10:09:08PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.46% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5045.021	5024.833	5065.209	11.86	7,352.72	7,577.45

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
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12:06:50AM 6/30/2014

Sample

Sample Name: Pulser;AV19 Spectrum #6 Analysis #1
Comment:

Batch

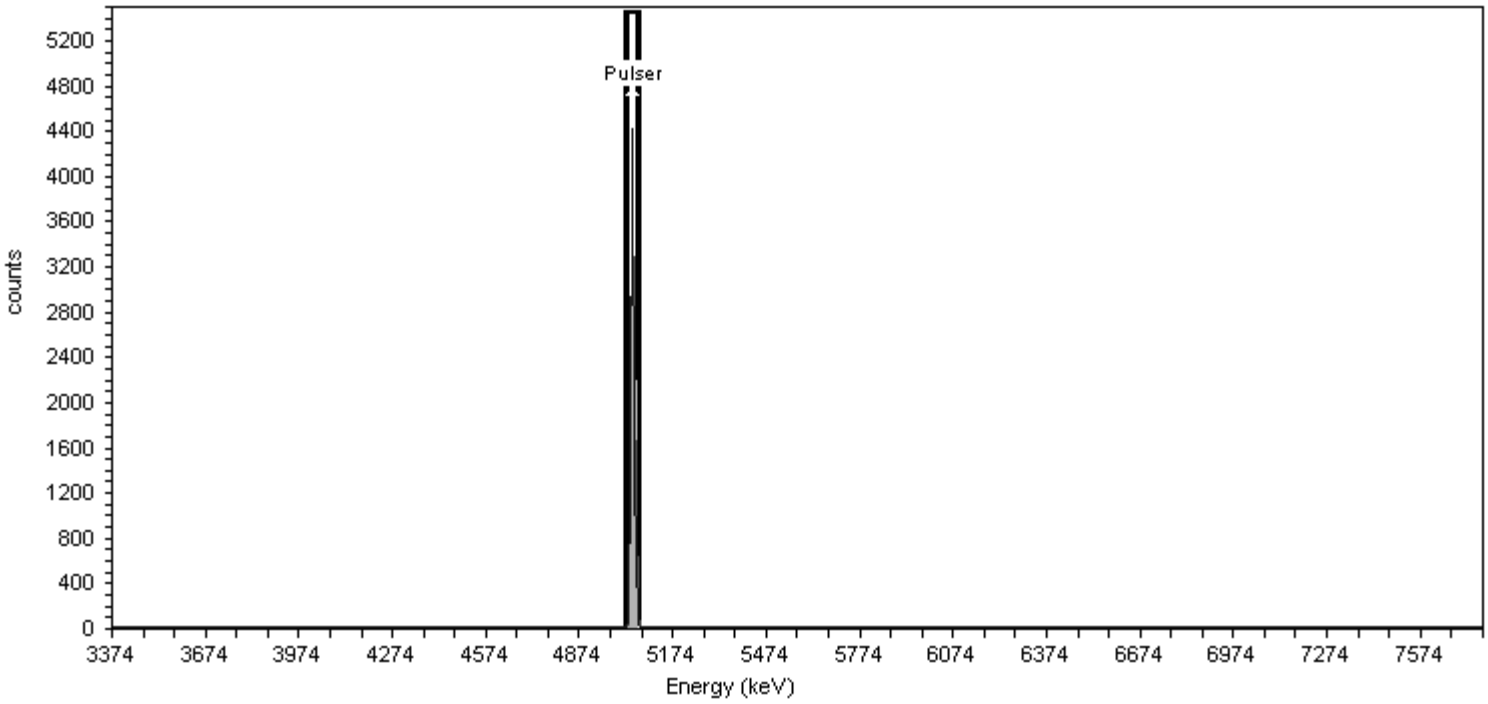
Batch Name: June2014a Analyst: 60040
Description:

Acquisition

Detector: AV19 , SN: 50-025FF5
Acquisition Start Date: 6/30/2014 12:02:04AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8876;AV19-20140505
Calibration Date: 5/5/2014 10:09:02PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.34% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5044.755	5025.291	5064.219	11.44	7,254.30	7,593.22

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TestAmerica St. Louis
13715 Rider Trail North
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12:06:56AM 6/30/2014

Sample

Sample Name: Pulser;AV20
Comment:

Spectrum #6 Analysis #1

Batch

Batch Name: June2014a
Description:

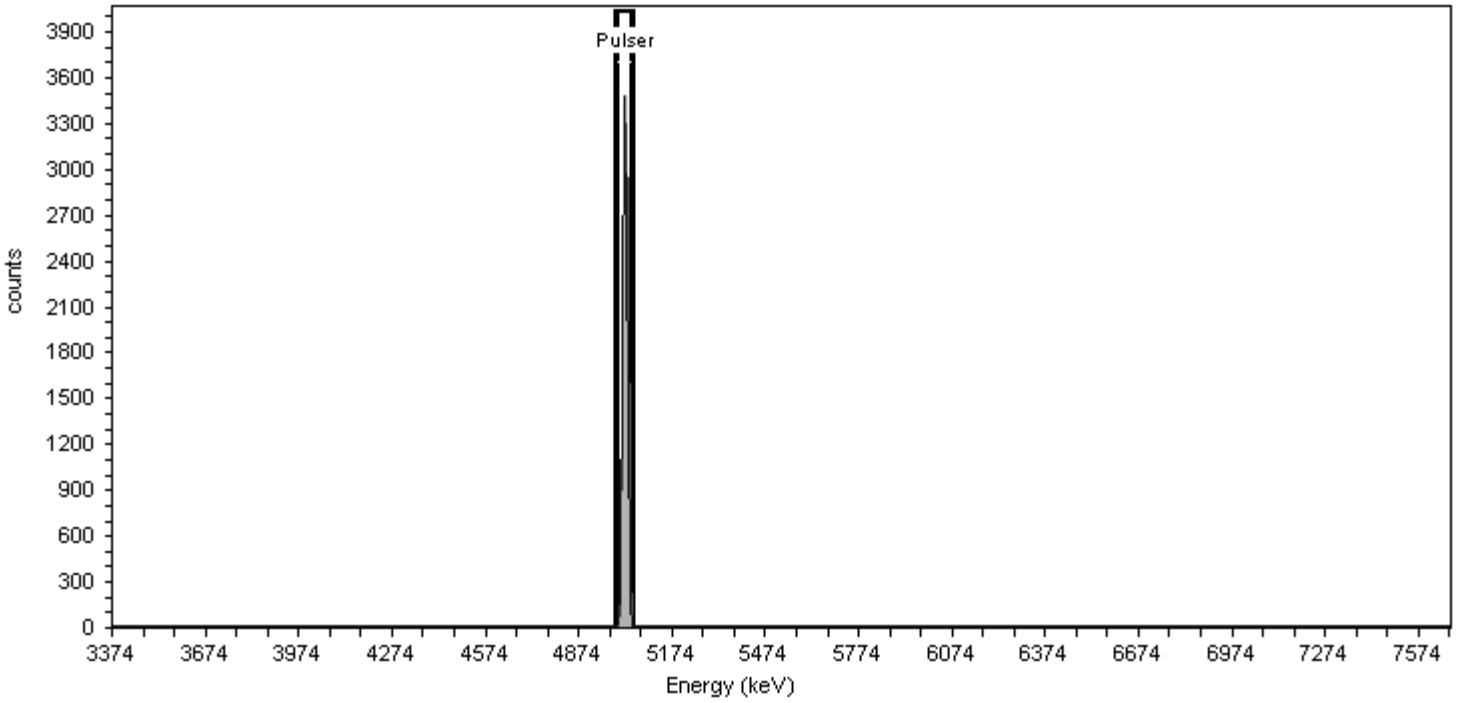
Analyst: 60040

Acquisition

Detector: AV20 , SN: 48-121A7
Acquisition Start Date: 6/30/2014 12:02:06AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8877;AV20-20140505
Calibration Date: 5/5/2014 10:09:21PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.56% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5021.896	4996.753	5047.039	14.77	7,370.19	7,668.10

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Alpha-Spectroscopy Pulser Report

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13715 Rider Trail North
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12:07:02AM 6/30/2014

Sample

Sample Name: Pulser;AV21 Spectrum #6 Analysis #1
Comment:

Batch

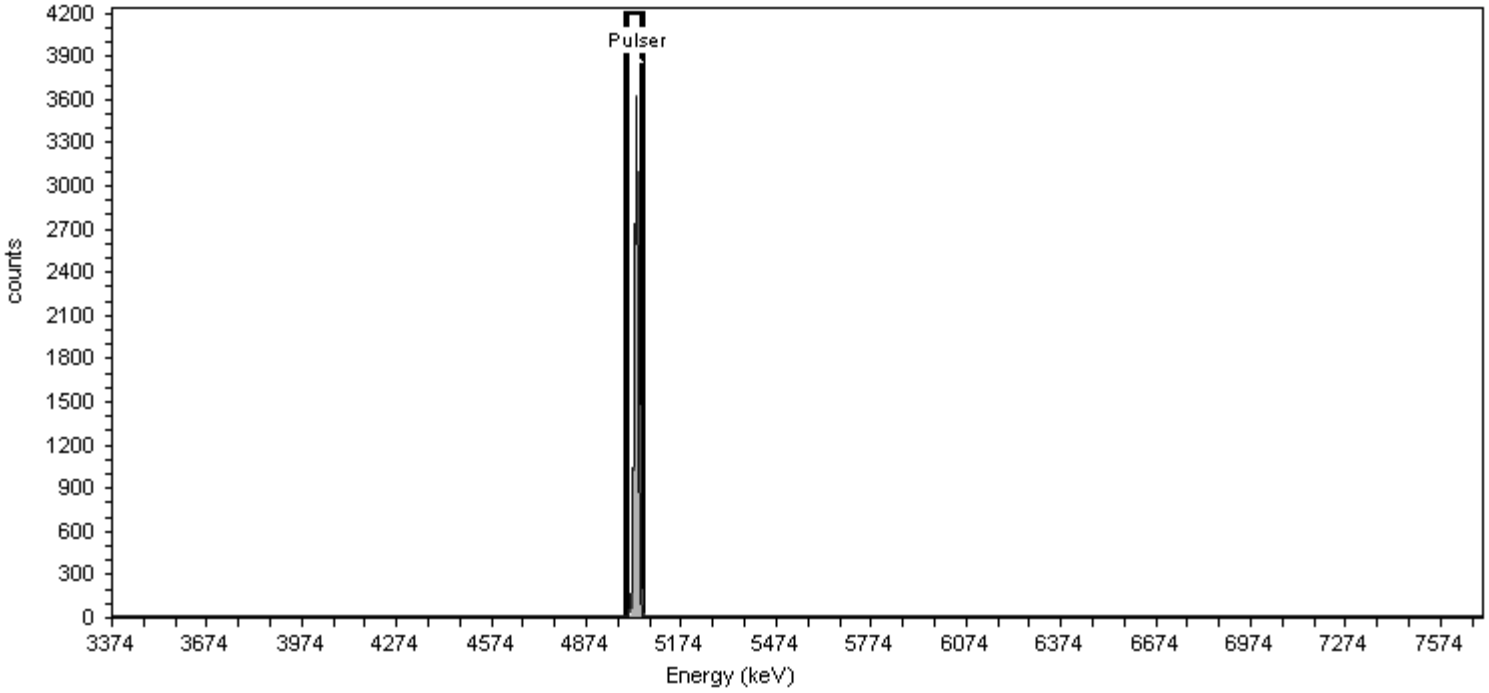
Batch Name: June2014a Analyst: 60040
Description:

Acquisition

Detector: AV21 , SN: 48-102BB6
Acquisition Start Date: 6/30/2014 12:02:08AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9520;AV21-20140505
Calibration Date: 5/5/2014 10:09:29PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.45% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5029.565	5005.250	5053.881	14.29	7,417.83	7,664.83

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Alpha-Spectroscopy Pulser Report

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12:07:10AM 6/30/2014

Sample

Sample Name: Pulser;AV23
Comment:

Spectrum #6 Analysis #1

Batch

Batch Name: June2014a
Description:

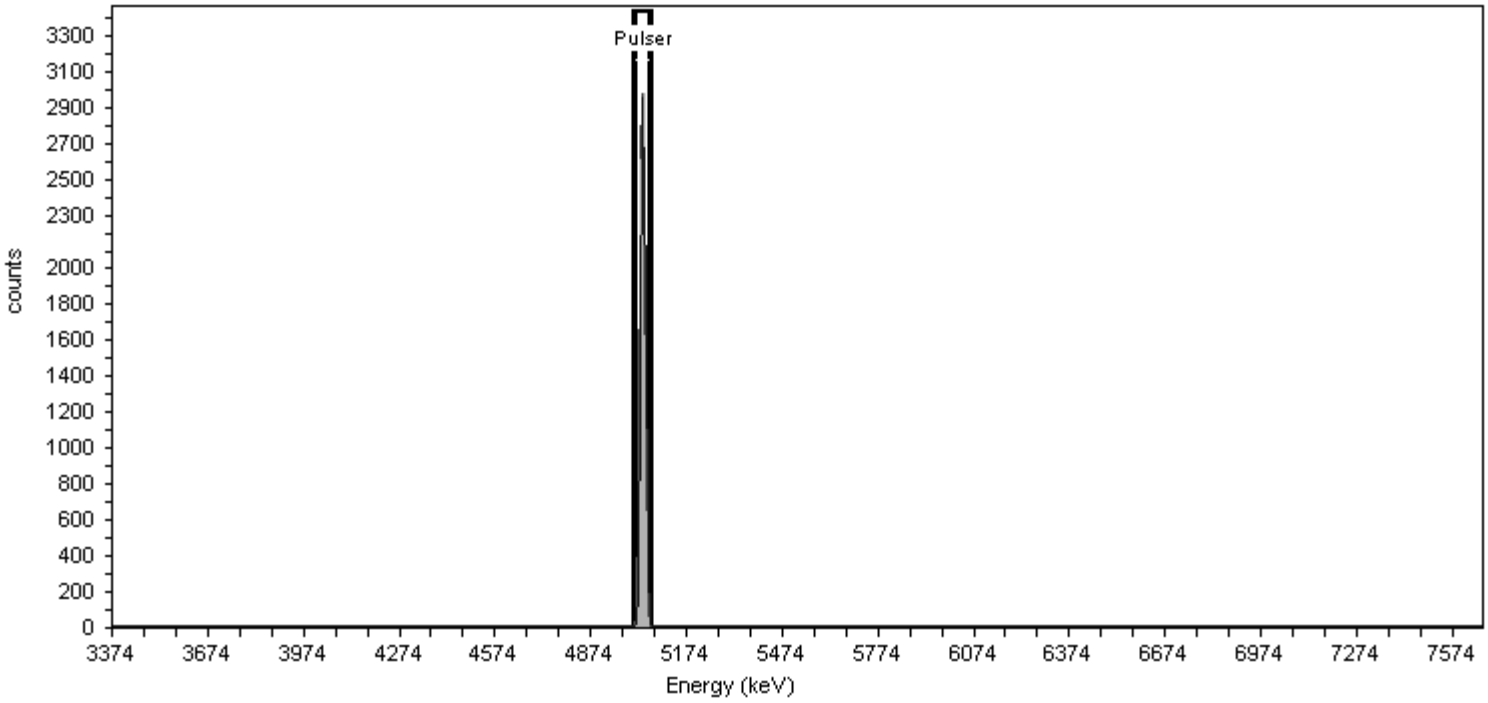
Analyst: 60040

Acquisition

Detector: AV23 , SN: 48-158FF3
Acquisition Start Date: 6/30/2014 12:02:10AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9792;AV23-20140505
Calibration Date: 5/5/2014 10:09:35PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.91% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5038.272	5011.009	5065.535	16.02	6,825.79	7,628.34

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
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12:07:16AM 6/30/2014

Sample

Sample Name: Pulser;AV24 Spectrum #6 Analysis #1
Comment:

Batch

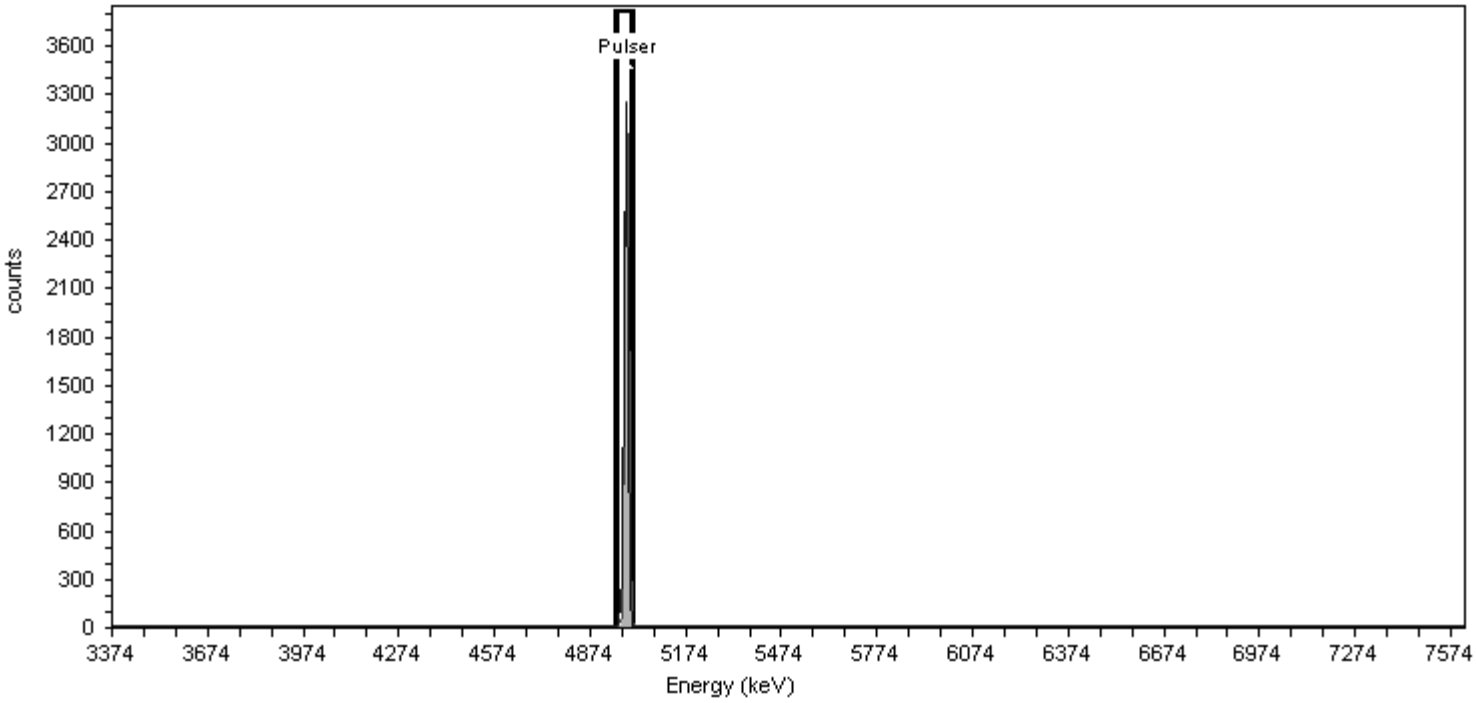
Batch Name: June2014a Analyst: 60040
Description:

Acquisition

Detector: AV24 , SN: 47-137Q4
Acquisition Start Date: 6/30/2014 12:02:12AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9793;AV24-20140505
Calibration Date: 5/5/2014 10:09:41PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.42% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	4984.519	4958.473	5010.565	15.30	7,153.59	7,651.52

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Alpha-Spectroscopy Pulser Report

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1:10:56AM 6/30/2014

Sample

Sample Name: Pulser;AV43 Spectrum #7 Analysis #1
Comment:

Batch

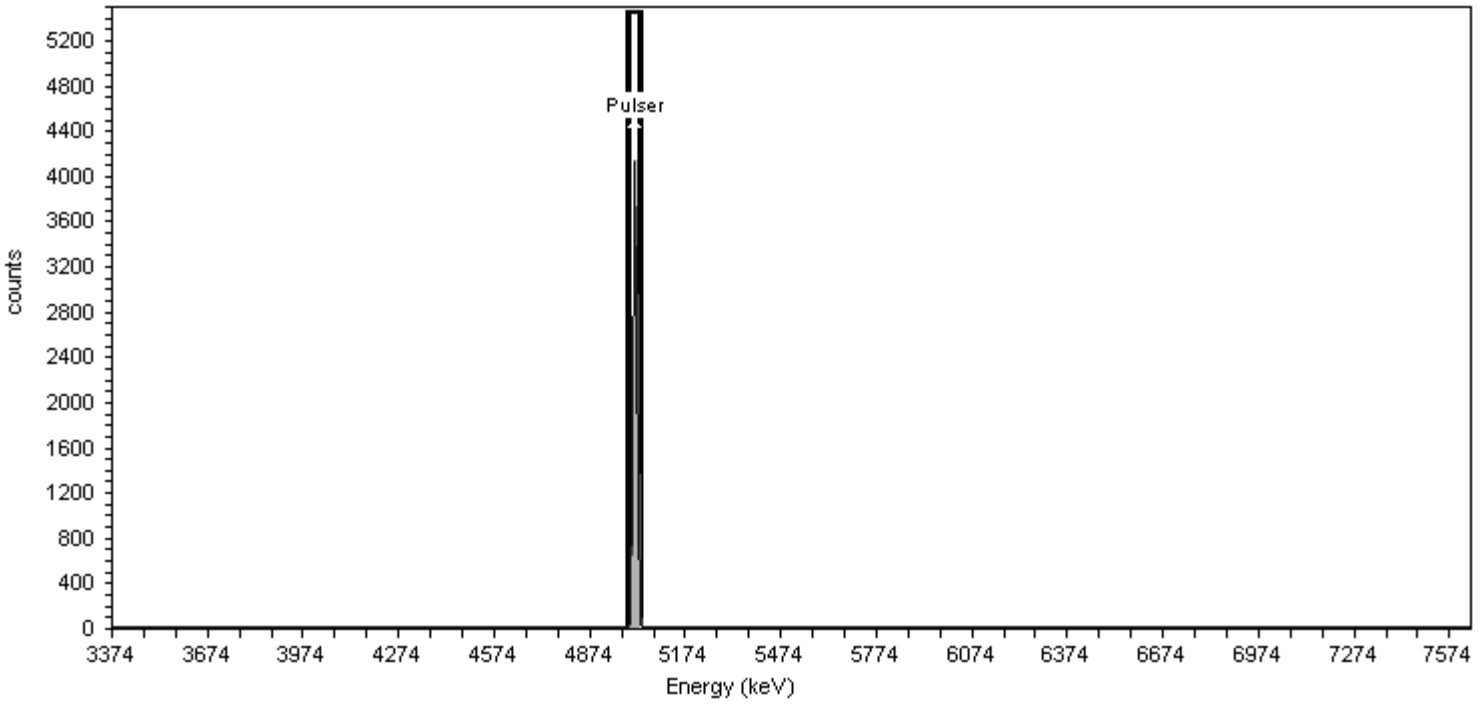
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV43 , SN: 49-190X4
Acquisition Start Date: 6/30/2014 1:04:17AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-9794;AV43-20140505
Calibration Date: 5/5/2014 10:09:47PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.74% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5014.771	4995.360	5034.183	11.40	6,760.02	7,454.93

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12:23:44AM 6/30/2014

Sample

Sample Name: Pulser;AV44 Spectrum #6 Analysis #1
Comment:

Batch

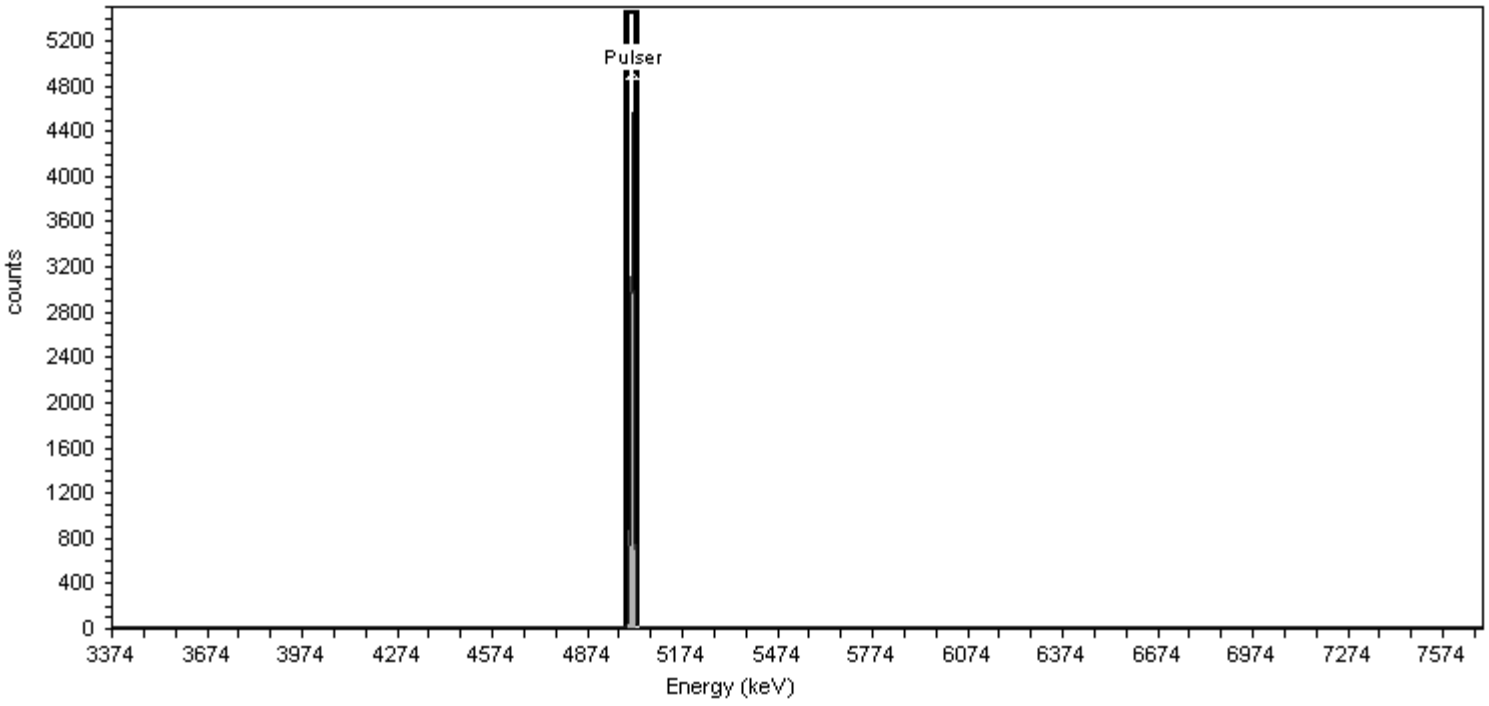
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV44 , SN: 50-051JJ1
Acquisition Start Date: 6/30/2014 12:18:42AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9795;AV44-20140505
Calibration Date: 5/5/2014 10:09:57PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.32% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5015.129	4995.625	5034.633	11.46	7,500.31	7,610.22

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Alpha-Spectroscopy Pulser Report

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12:23:51AM 6/30/2014

Sample

Sample Name: Pulser;AV45 Spectrum #6 Analysis #1
Comment:

Batch

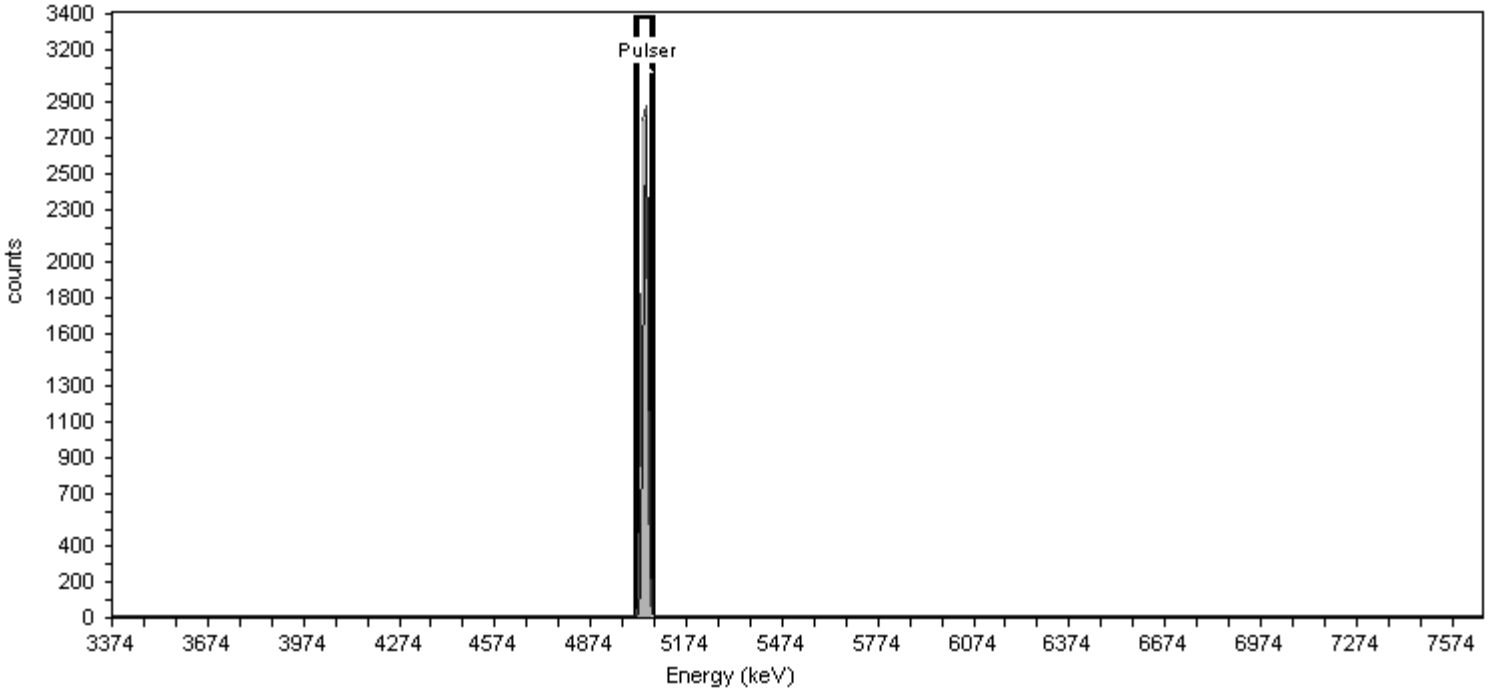
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV45 , SN: 48-158FF2
Acquisition Start Date: 6/30/2014 12:18:44AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9817;AV45-20140505
Calibration Date: 5/5/2014 10:10:03PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.06% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5046.229	5018.918	5073.540	16.05	6,626.74	7,617.16

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Alpha-Spectroscopy Pulser Report

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Earth City, MO 63045
12:23:57AM 6/30/2014

Sample

Sample Name: Pulser;AV46 Spectrum #6 Analysis #1
Comment:

Batch

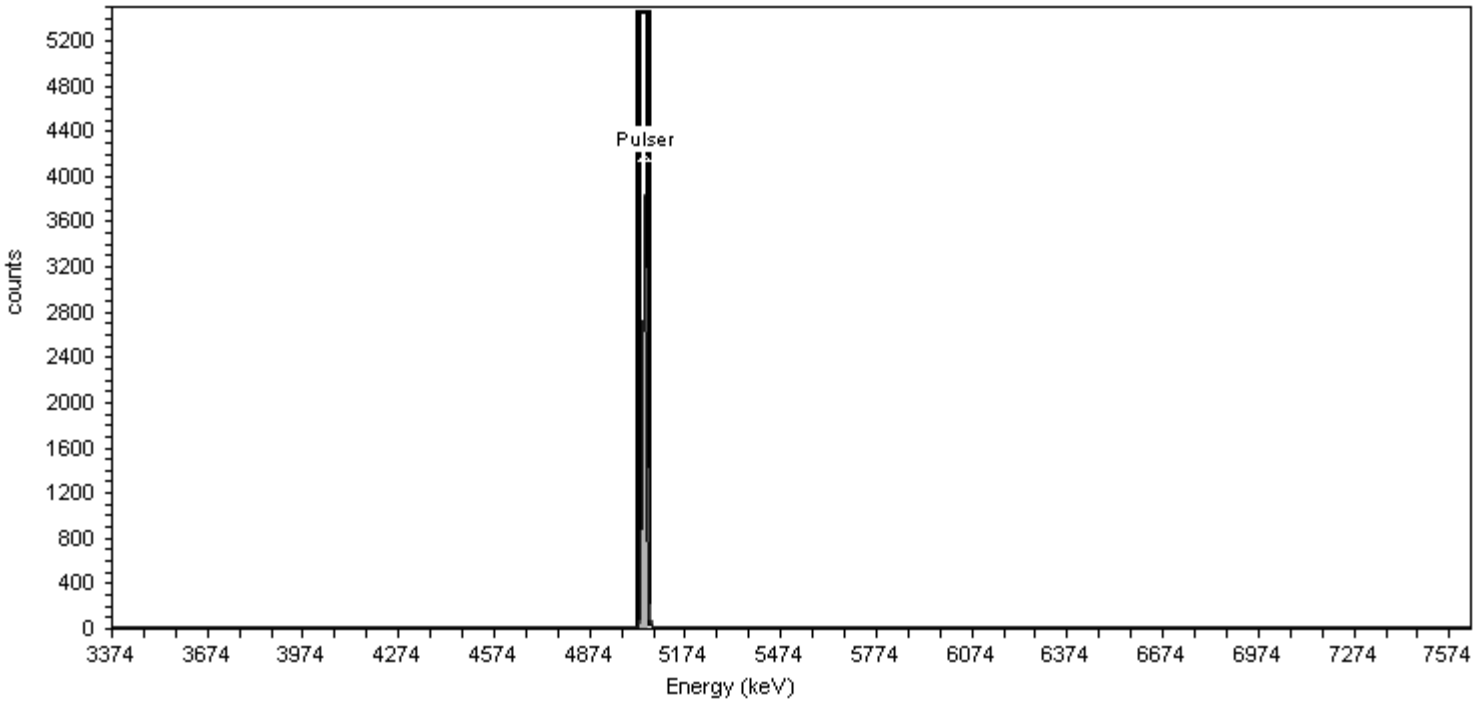
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV46 , SN: 49-202GG2
Acquisition Start Date: 6/30/2014 12:18:46AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9884;AV46-20140505
Calibration Date: 5/5/2014 10:10:09PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.80% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5044.644	5022.649	5066.639	12.92	7,090.62	7,370.72

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
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12:24:10AM 6/30/2014

Sample

Sample Name: Pulser;AV48 Spectrum #7 Analysis #1
Comment:

Batch

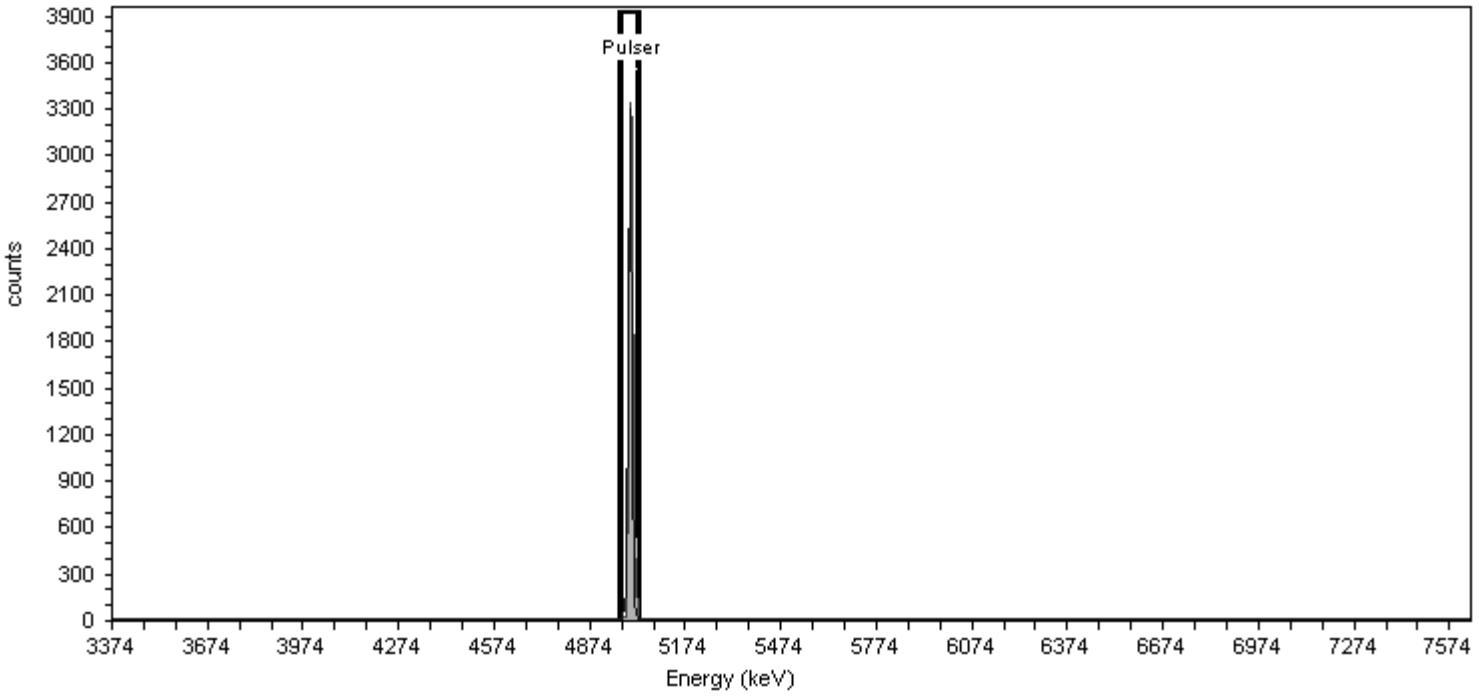
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV48 , SN: 50-051JJ4
Acquisition Start Date: 6/30/2014 12:18:49AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9886;AV48-20140505
Calibration Date: 5/5/2014 10:10:22PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.78% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	4999.306	4976.008	5022.603	13.69	6,555.18	7,652.81

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
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12:24:15AM 6/30/2014

Sample

Sample Name: Pulser;AV49
Comment:

Spectrum #6 Analysis #1

Batch

Batch Name: June2014b
Description:

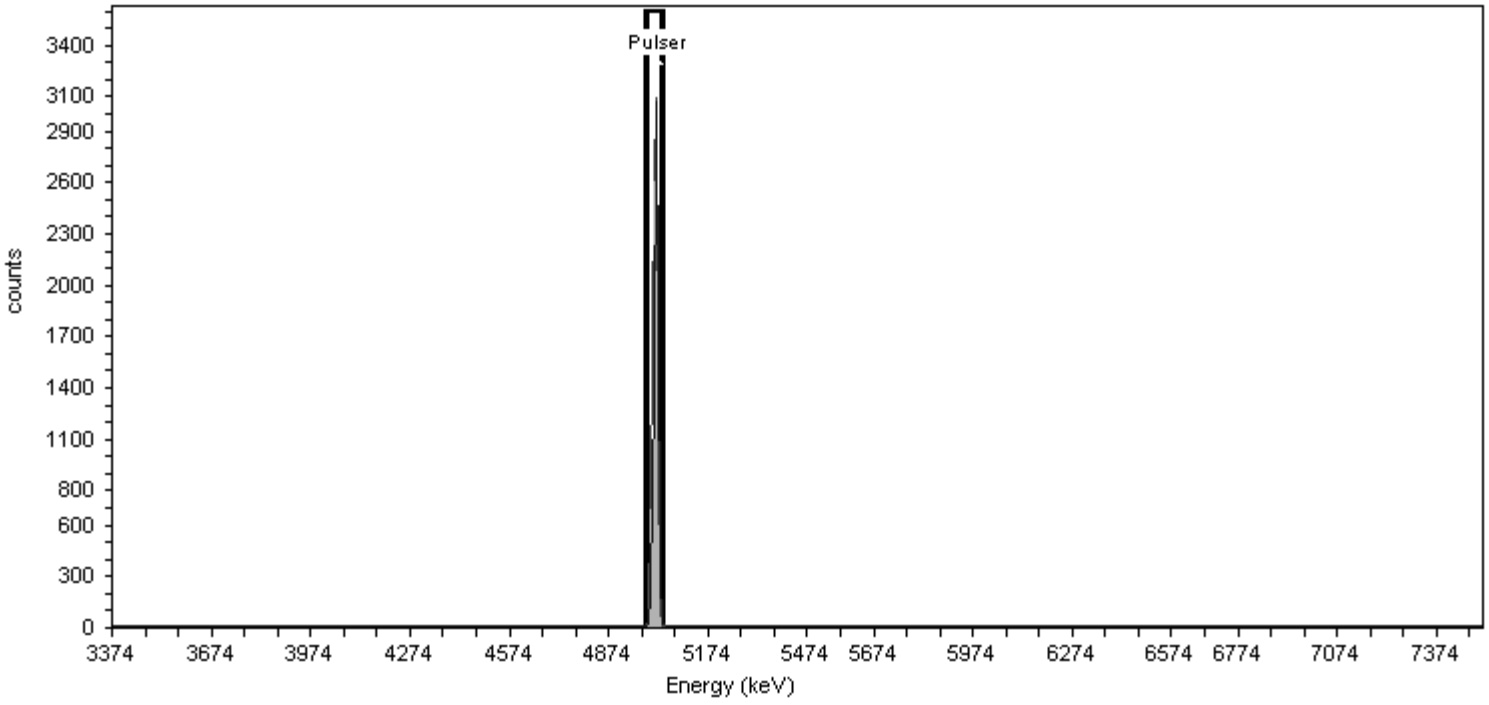
Analyst: 60040

Acquisition

Detector: AV49 , SN: 47-043hh4
Acquisition Start Date: 6/30/2014 12:18:50AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-7107;AV49-20140504
Calibration Date: 5/5/2014 6:52:38PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.53% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5015.917	4989.653	5042.181	15.43	6,855.91	7,632.39

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
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12:24:33AM 6/30/2014

Sample

Sample Name: Pulser;AV53 Spectrum #6 Analysis #1
Comment:

Batch

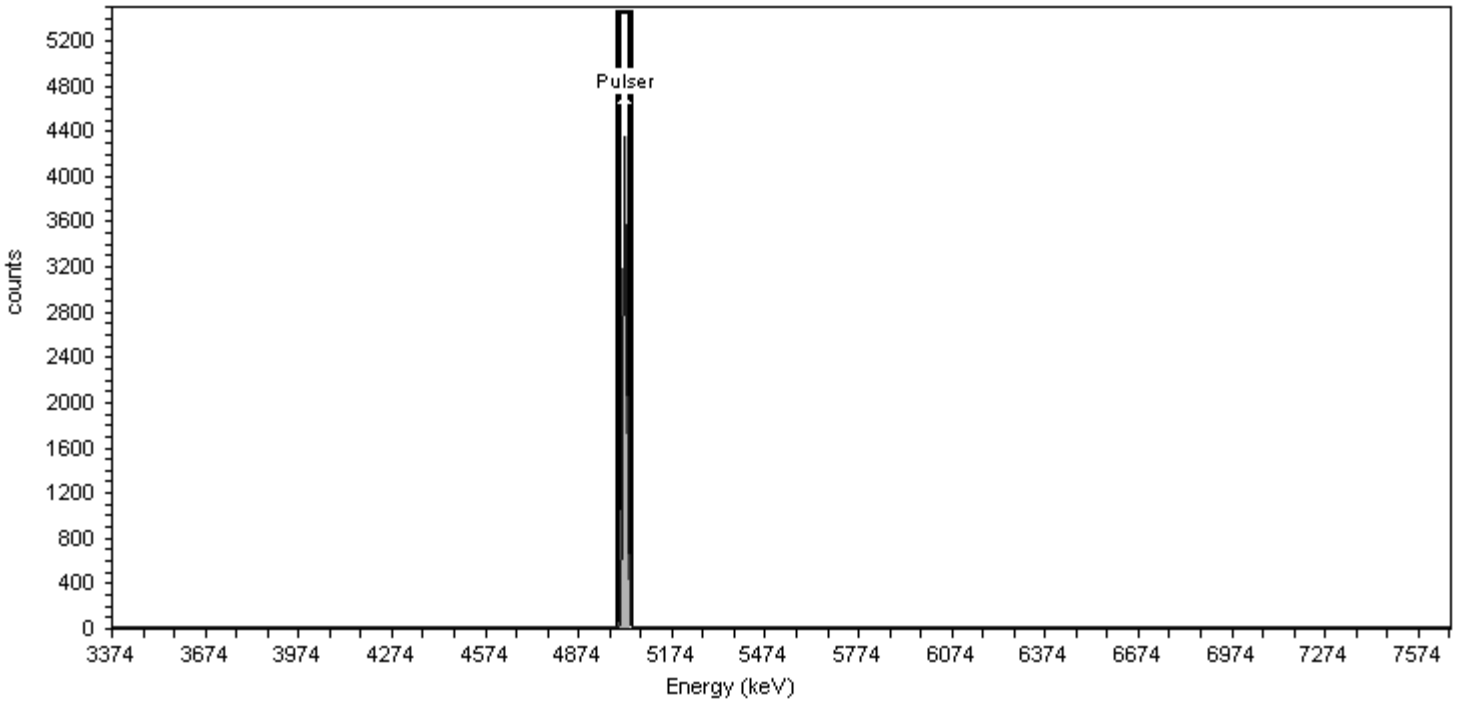
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV53 , SN: 50-051A6
Acquisition Start Date: 6/30/2014 12:18:56AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8877;AV53-20140504
Calibration Date: 5/5/2014 6:53:06PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.32% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5022.687	5003.991	5041.382	10.98	6,845.44	7,255.21

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Alpha-Spectroscopy Pulser Report

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13715 Rider Trail North
Earth City, MO 63045
12:24:39AM 6/30/2014

Sample

Sample Name: Pulser;AV54 Spectrum #6 Analysis #1
Comment:

Batch

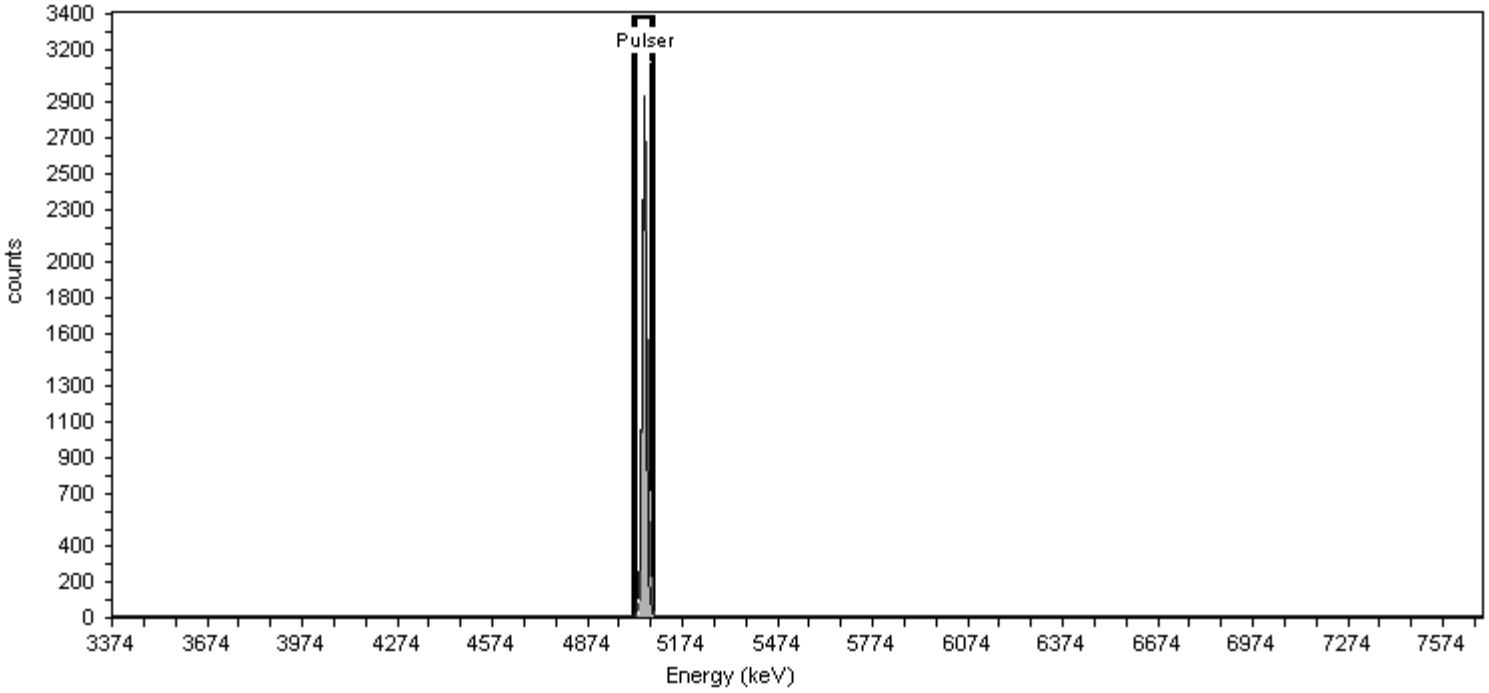
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV54 , SN: 48-046II6
Acquisition Start Date: 6/30/2014 12:18:57AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9520;AV54-20140504
Calibration Date: 5/5/2014 6:53:13PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.02% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5051.671	5024.516	5078.826	15.95	6,730.37	7,261.40

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:24:44AM 6/30/2014

Sample

Sample Name: Pulser;AV55 Spectrum #6 Analysis #1
Comment:

Batch

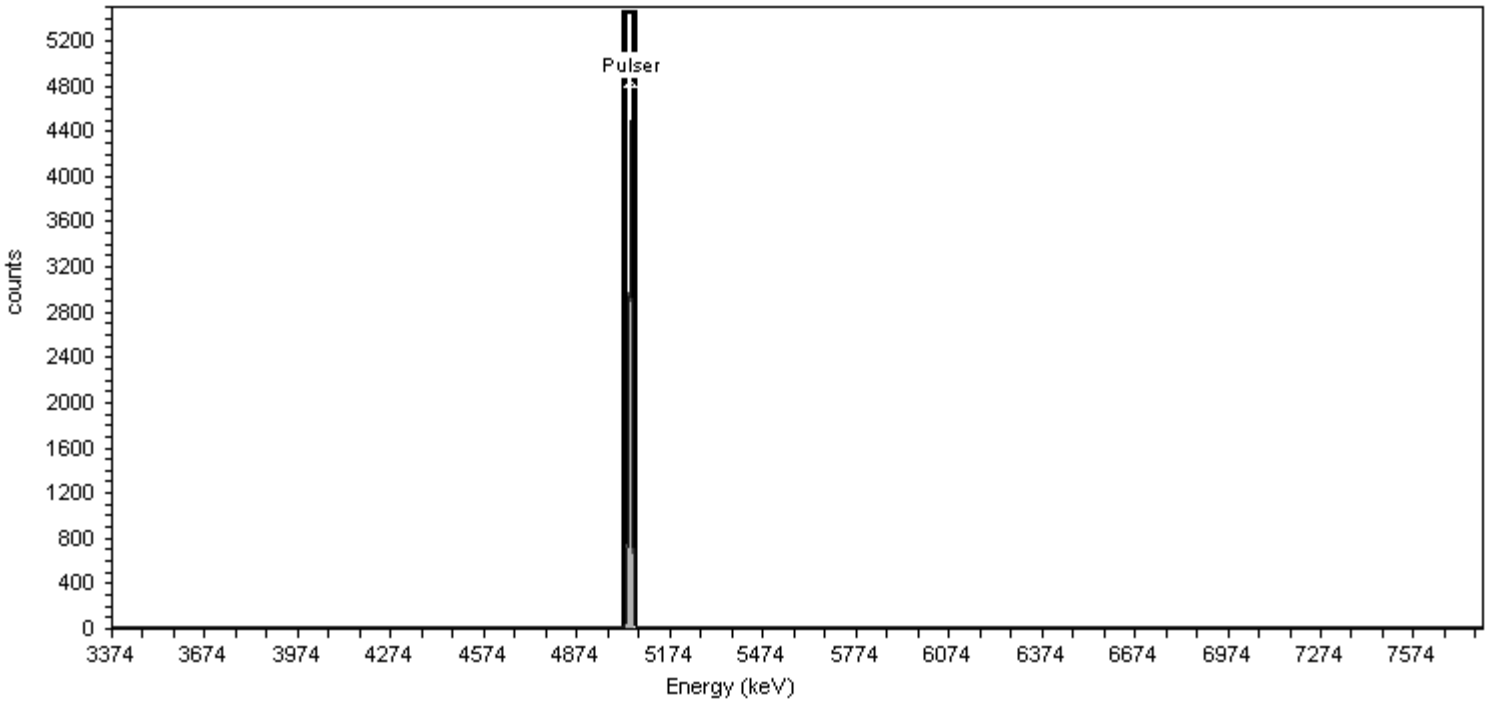
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV55 , SN: 50-051C2
Acquisition Start Date: 6/30/2014 12:18:59AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-7107;AV55-20140507
Calibration Date: 5/7/2014 10:48:56PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.79% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5044.901	5025.580	5064.223	11.35	7,300.19	7,253.82

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:48:45AM 7/2/2014

Sample

Sample Name: Pulser;AV56
Comment:

Spectrum #6 Analysis #1

Batch

Batch Name: June2014b
Description:

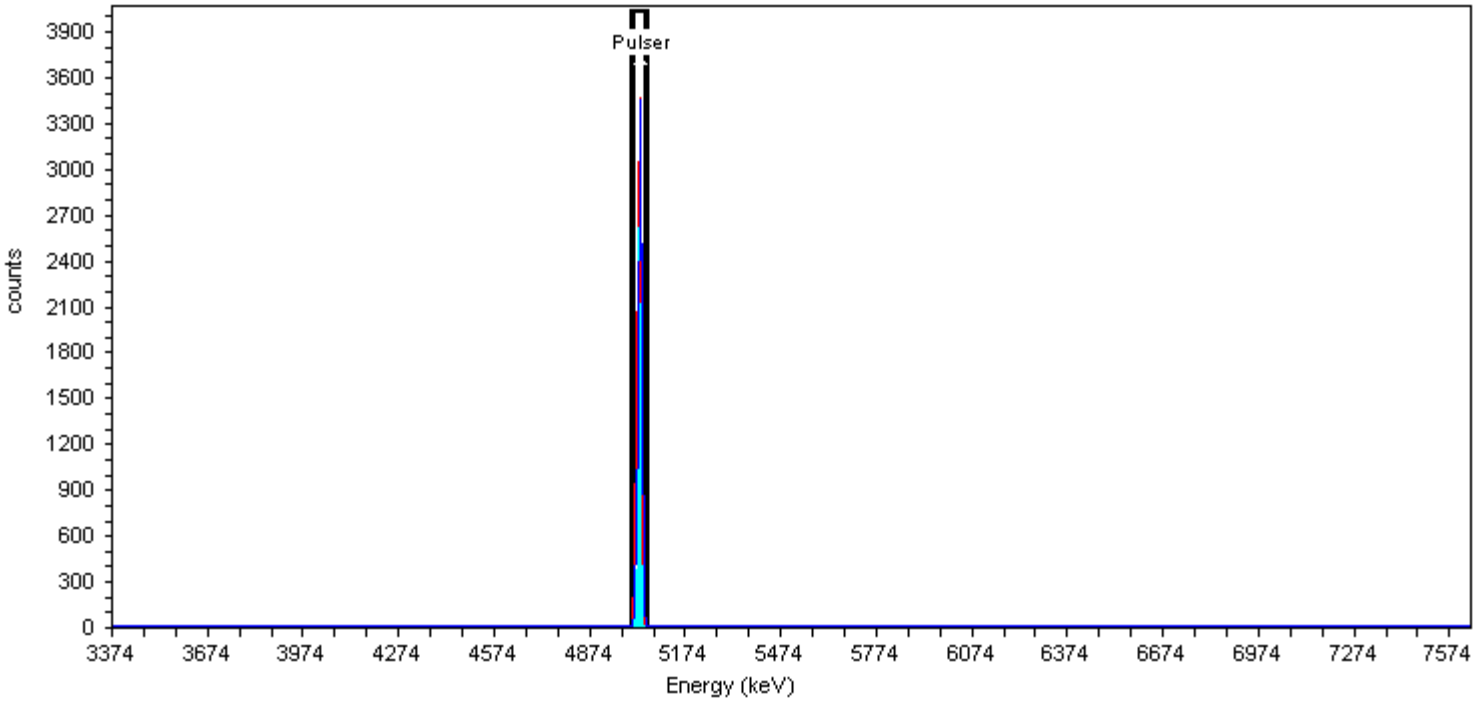
Analyst: 60040

Acquisition

Detector: AV56 , SN: 52-059EE5
Acquisition Start Date: 6/30/2014 12:19:00AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9792;AV56-20140504
Calibration Date: 5/5/2014 6:53:34PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.09% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5030.355	5007.618	5053.091	13.36	6,636.21	6,917.24

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:24:56AM 6/30/2014

Sample

Sample Name: Pulser;AV57 Spectrum #6 Analysis #1
Comment:

Batch

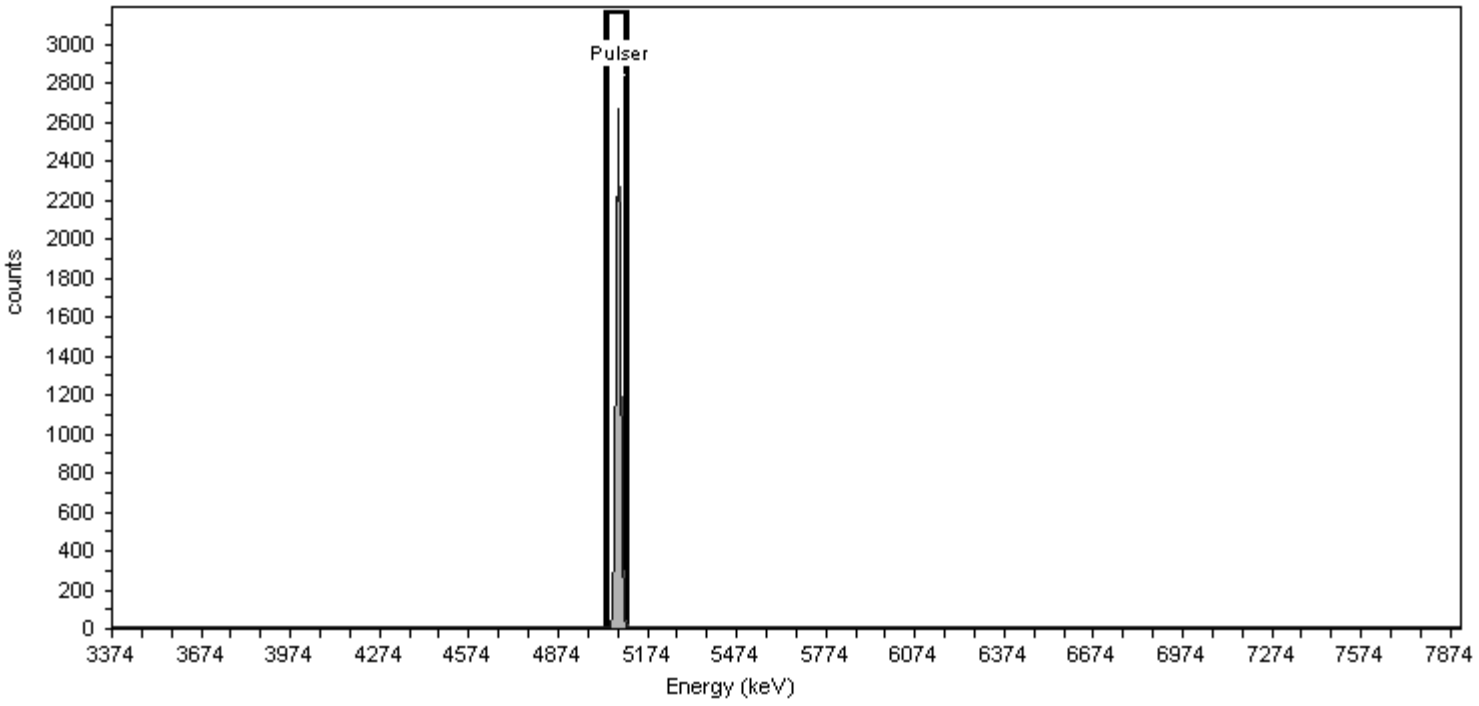
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV57 , SN: 48-158EE3
Acquisition Start Date: 6/30/2014 12:19:02AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9793;AV57-20140504
Calibration Date: 5/5/2014 6:53:40PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.74% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5074.585	5042.374	5106.796	18.92	7,244.75	7,287.86

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:25:02AM 6/30/2014

Sample

Sample Name: Pulser;AV58 Spectrum #6 Analysis #1
Comment:

Batch

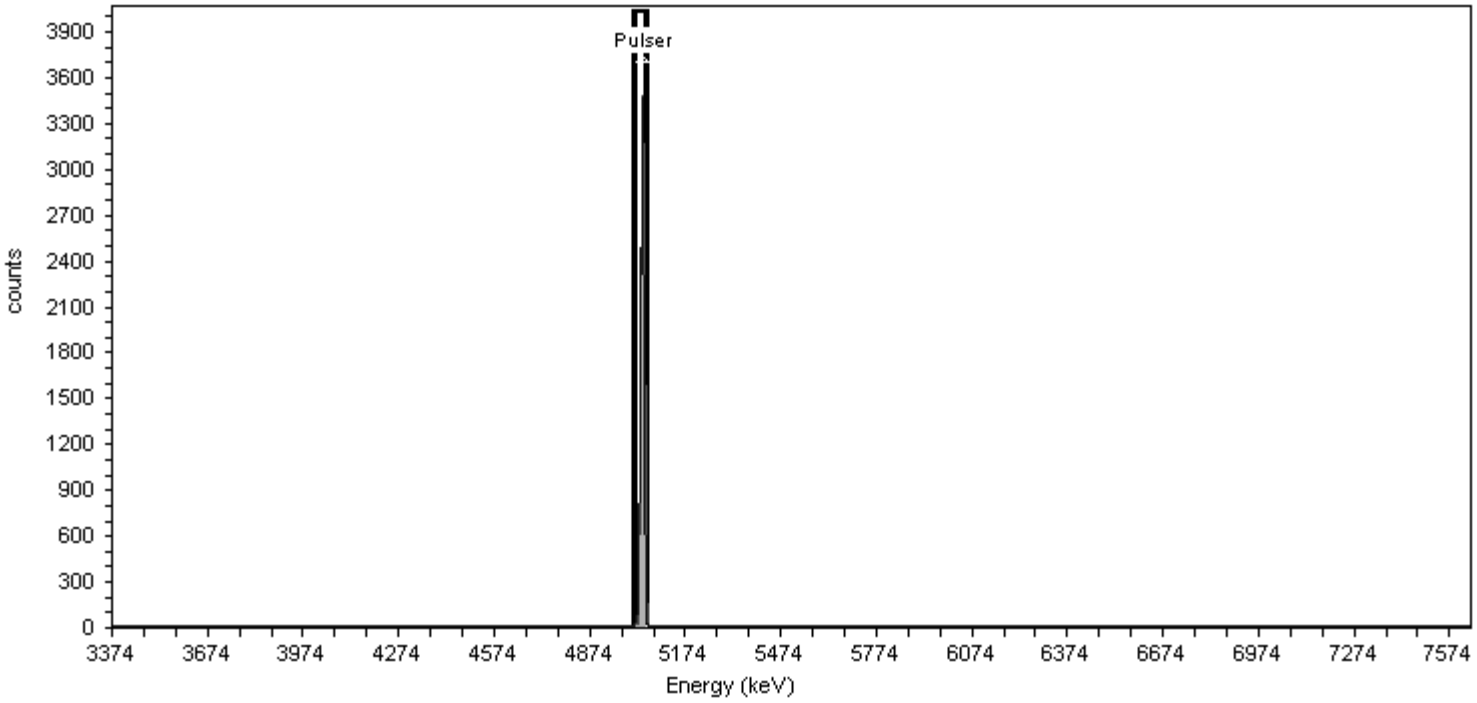
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV58 , SN: 52-102 C5
Acquisition Start Date: 6/30/2014 12:19:03AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9794;AV58-20140504
Calibration Date: 5/5/2014 6:53:46PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.56% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5036.909	5015.467	5058.351	12.60	6,299.81	7,032.25

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:25:07AM 6/30/2014

Sample

Sample Name: Pulser;AV59
Comment:

Spectrum #7 Analysis #1

Batch

Batch Name: June2014b
Description:

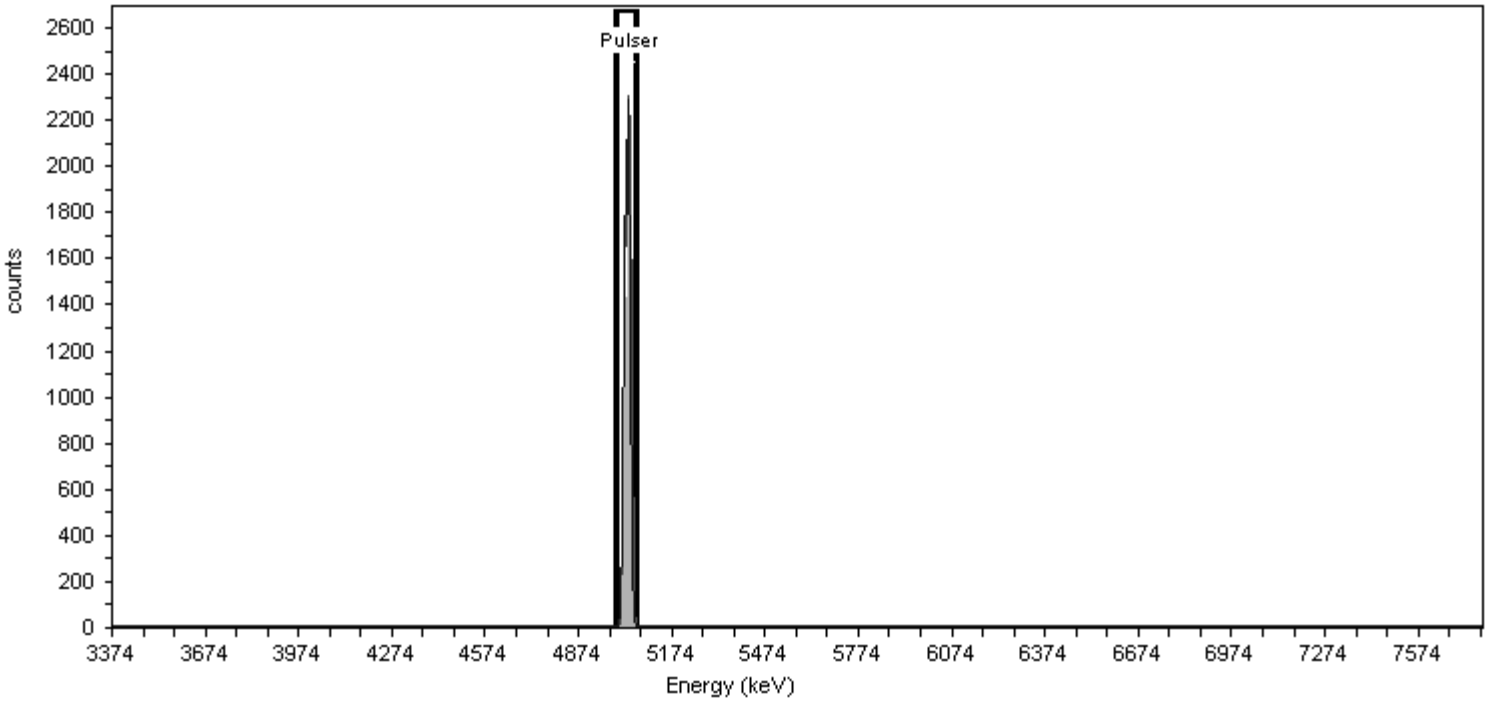
Analyst: 60040

Acquisition

Detector: AV59 , SN: 49-155M7
Acquisition Start Date: 6/30/2014 12:19:05AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9795;AV59-20140504
Calibration Date: 5/5/2014 6:53:53PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.44% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5029.062	4998.002	5060.122	18.25	6,028.04	7,252.96

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:25:13AM 6/30/2014

Sample

Sample Name: Pulser;AV60
Comment:

Spectrum #6 Analysis #1

Batch

Batch Name: June2014b
Description:

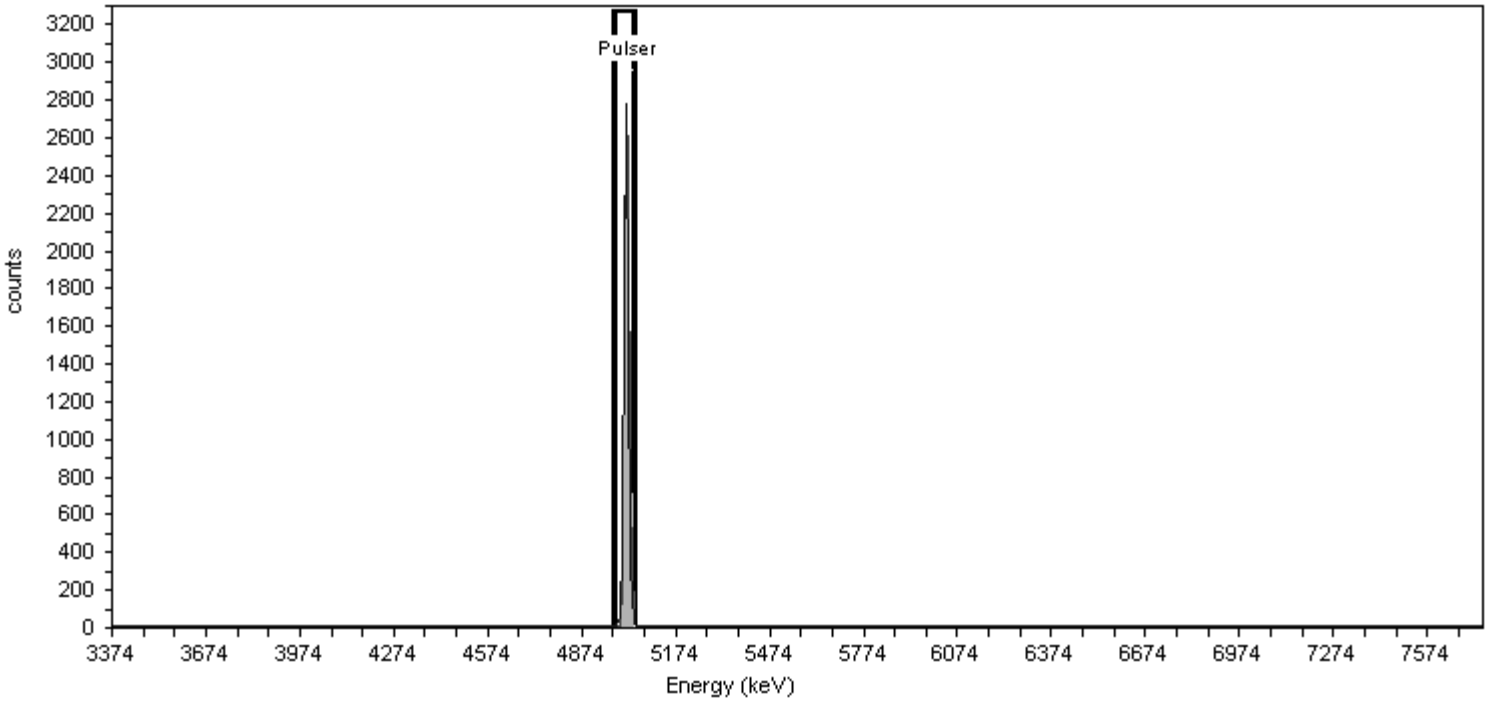
Analyst: 60040

Acquisition

Detector: AV60 , SN: 49-027117
Acquisition Start Date: 6/30/2014 12:19:06AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9817;AV60-20140504
Calibration Date: 5/5/2014 6:53:59PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.33% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5014.526	4984.736	5044.315	17.50	6,987.95	7,227.04

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:25:19AM 6/30/2014

Sample

Sample Name: Pulser;AV61 Spectrum #6 Analysis #1
Comment:

Batch

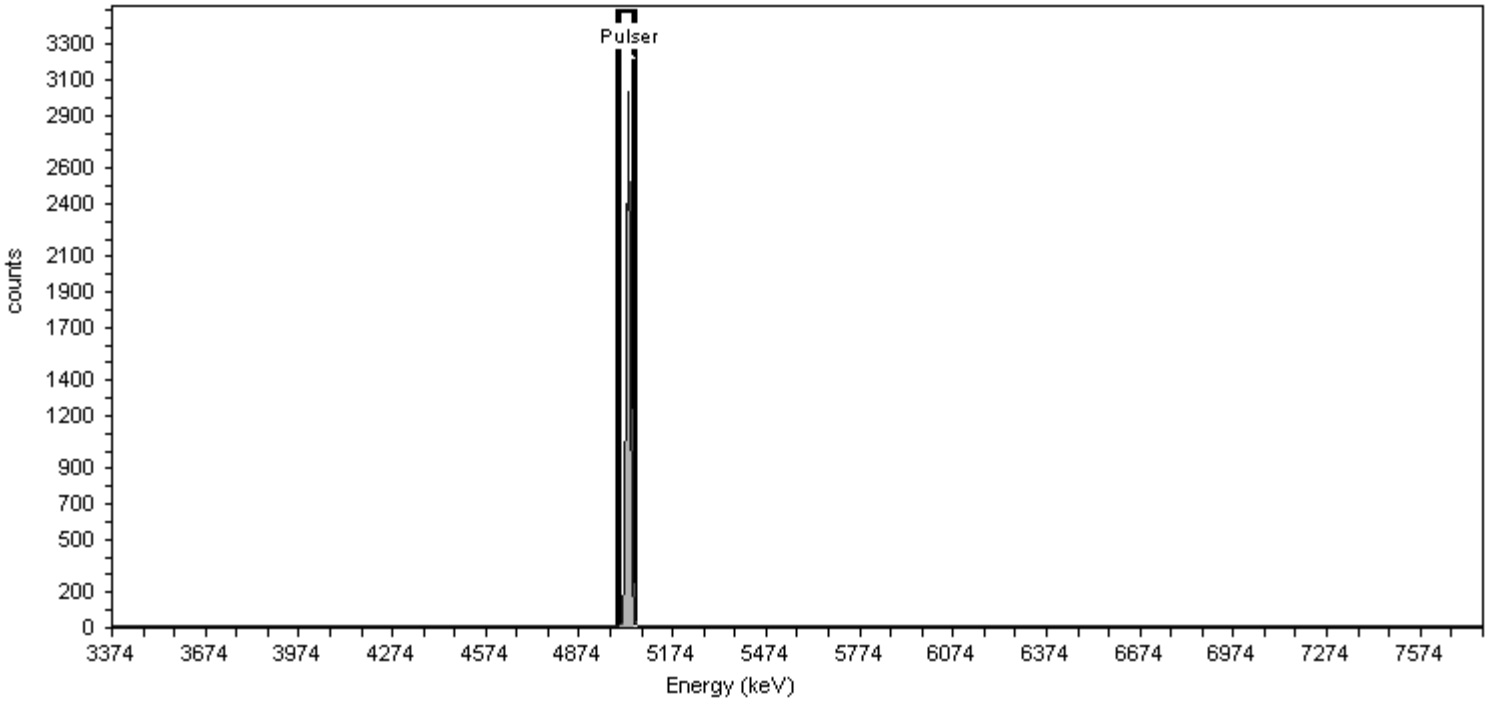
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV61 , SN: 5-051JJ3
Acquisition Start Date: 6/30/2014 12:19:09AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9884;AV61-20140504
Calibration Date: 5/5/2014 6:54:06PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.46% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5029.843	5001.786	5057.899	16.48	7,170.74	7,209.06

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:25:26AM 6/30/2014

Sample

Sample Name: Pulser;AV62 Spectrum #6 Analysis #1
Comment:

Batch

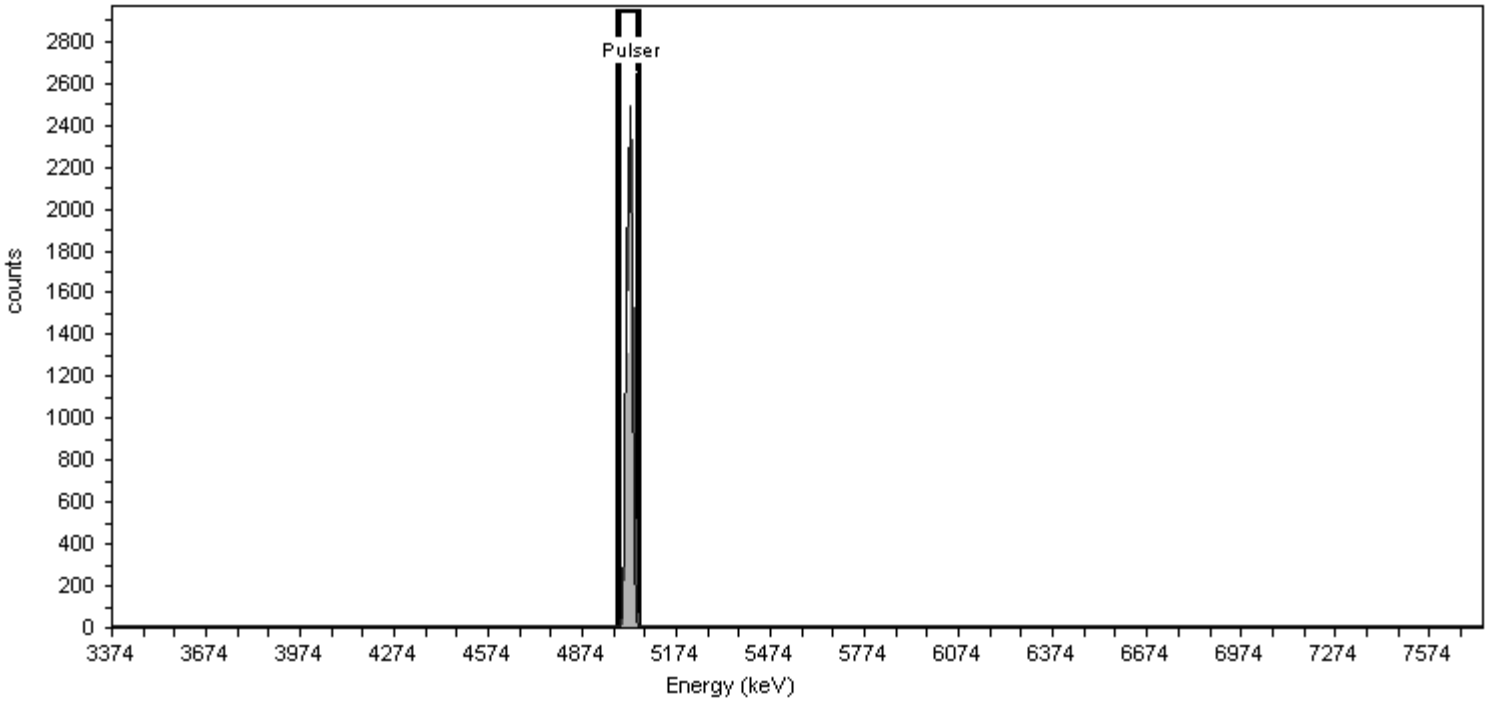
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV62 , SN: 52-060FF2
Acquisition Start Date: 6/30/2014 12:19:10AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9885;AV62-20140504
Calibration Date: 5/5/2014 6:54:13PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.34% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5021.892	4990.080	5053.704	18.69	6,684.50	7,246.64

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:25:31AM 6/30/2014

Sample

Sample Name: Pulser;AV63 Spectrum #6 Analysis #1
Comment:

Batch

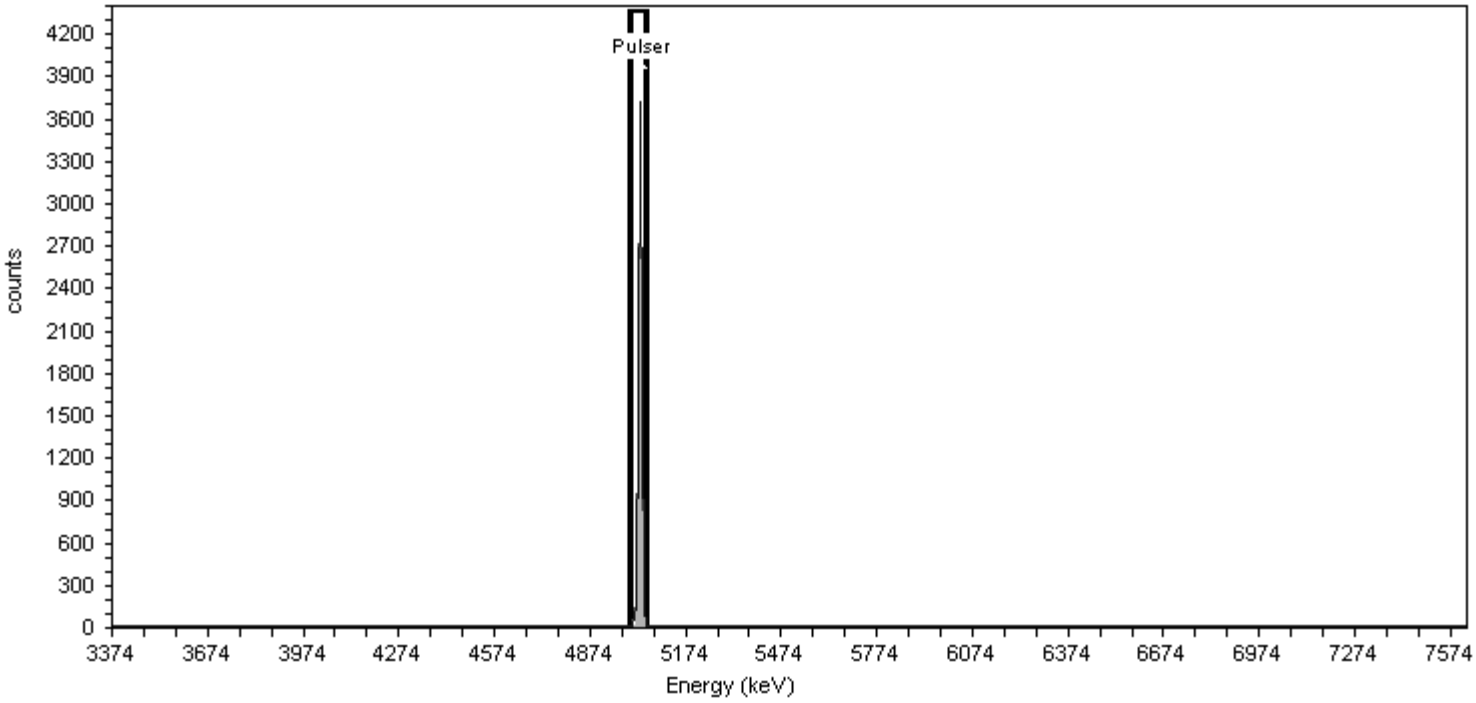
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV63 , SN: 47-029ff2
Acquisition Start Date: 6/30/2014 12:19:12AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9886;AV63-20140504
Calibration Date: 5/5/2014 6:54:19PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.48% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5030.022	5006.584	5053.460	13.77	7,354.97	7,243.45

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:25:37AM 6/30/2014

Sample

Sample Name: Pulser;AV64 Spectrum #6 Analysis #1
Comment:

Batch

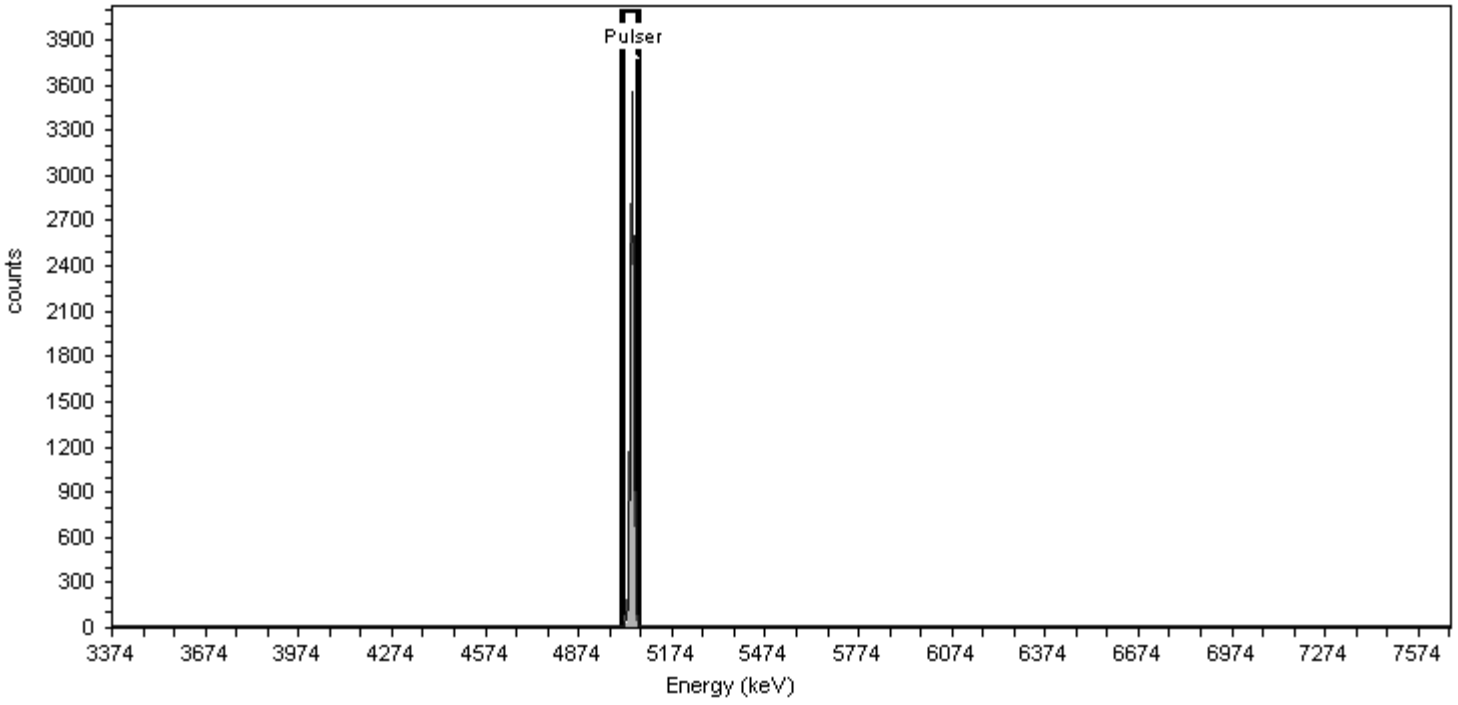
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV64 , SN: 47-029ee4
Acquisition Start Date: 6/30/2014 12:19:13AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-7107;AV64-20140504a
Calibration Date: 5/4/2014 8:44:03PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.75% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5045.065	5021.546	5068.583	13.82	7,034.51	7,240.95

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:25:43AM 6/30/2014

Sample

Sample Name: Pulser;AV65 Spectrum #6 Analysis #1
Comment:

Batch

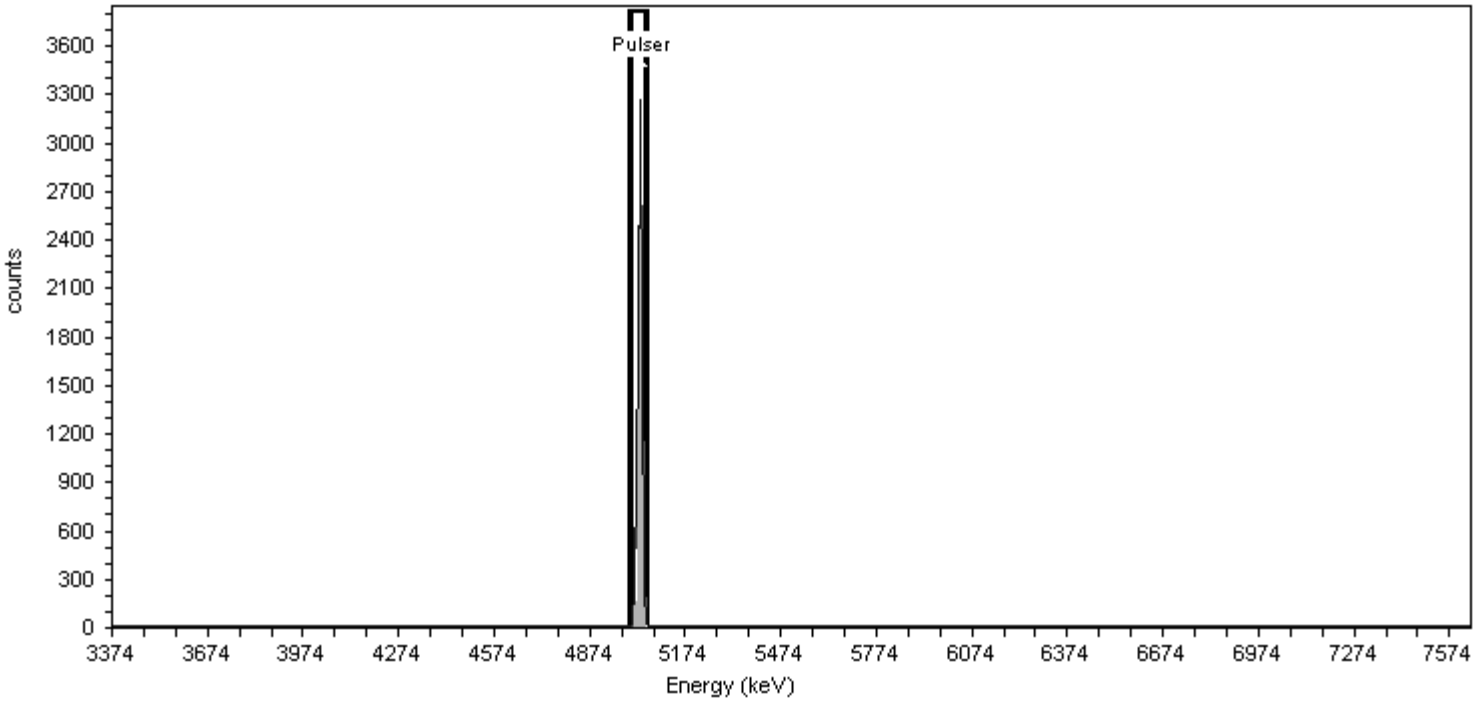
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV65 , SN: 44-049JJ1
Acquisition Start Date: 6/30/2014 12:19:15AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8874;AV65-20140504
Calibration Date: 5/4/2014 8:43:55PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.13% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5029.894	5003.871	5055.916	15.29	7,157.94	7,226.45

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:25:49AM 6/30/2014

Sample

Sample Name: Pulser;AV66 Spectrum #6 Analysis #1
Comment:

Batch

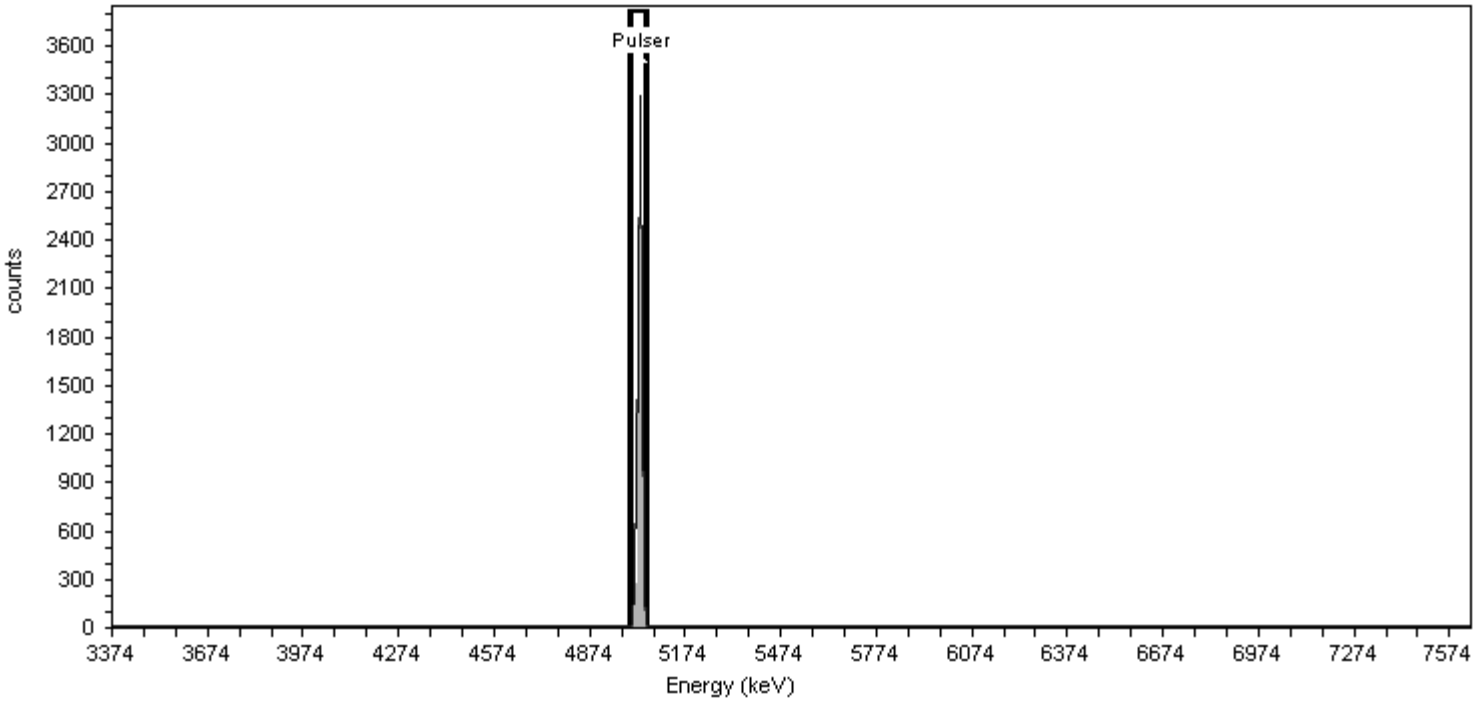
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV66 , SN: 48-158EE2
Acquisition Start Date: 6/30/2014 12:19:16AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8875;AV66-20140504
Calibration Date: 5/4/2014 8:44:10PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.93% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5030.004	5004.090	5055.919	15.22	7,178.44	7,231.77

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:25:55AM 6/30/2014

Sample

Sample Name: Pulser;AV67 Spectrum #6 Analysis #1
Comment:

Batch

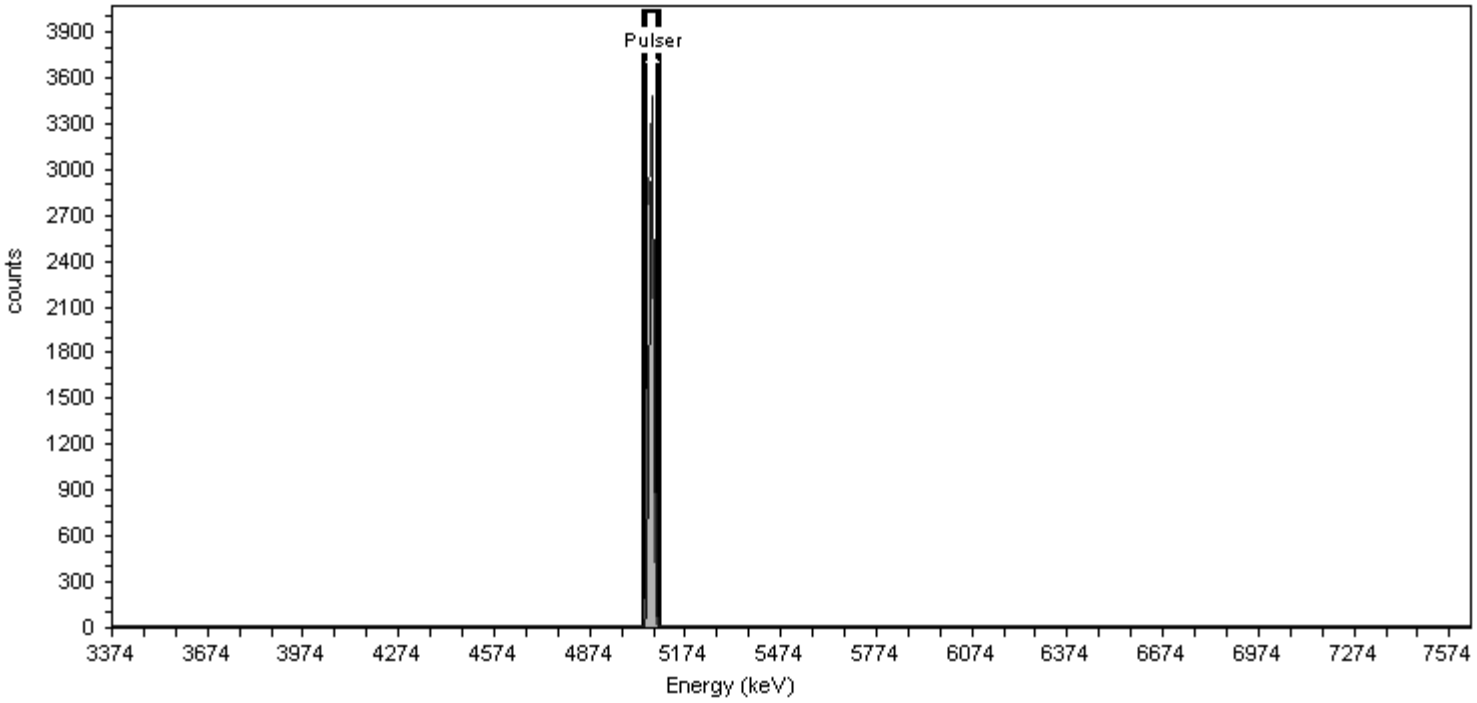
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV67 , SN: 52-102 D7
Acquisition Start Date: 6/30/2014 12:19:23AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8876;AV67-20140504
Calibration Date: 5/4/2014 8:44:15PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.32% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5067.741	5045.112	5090.371	13.29	6,623.96	7,121.54

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:26:00AM 6/30/2014

Sample

Sample Name: Pulser;AV68 Spectrum #8 Analysis #1
Comment:

Batch

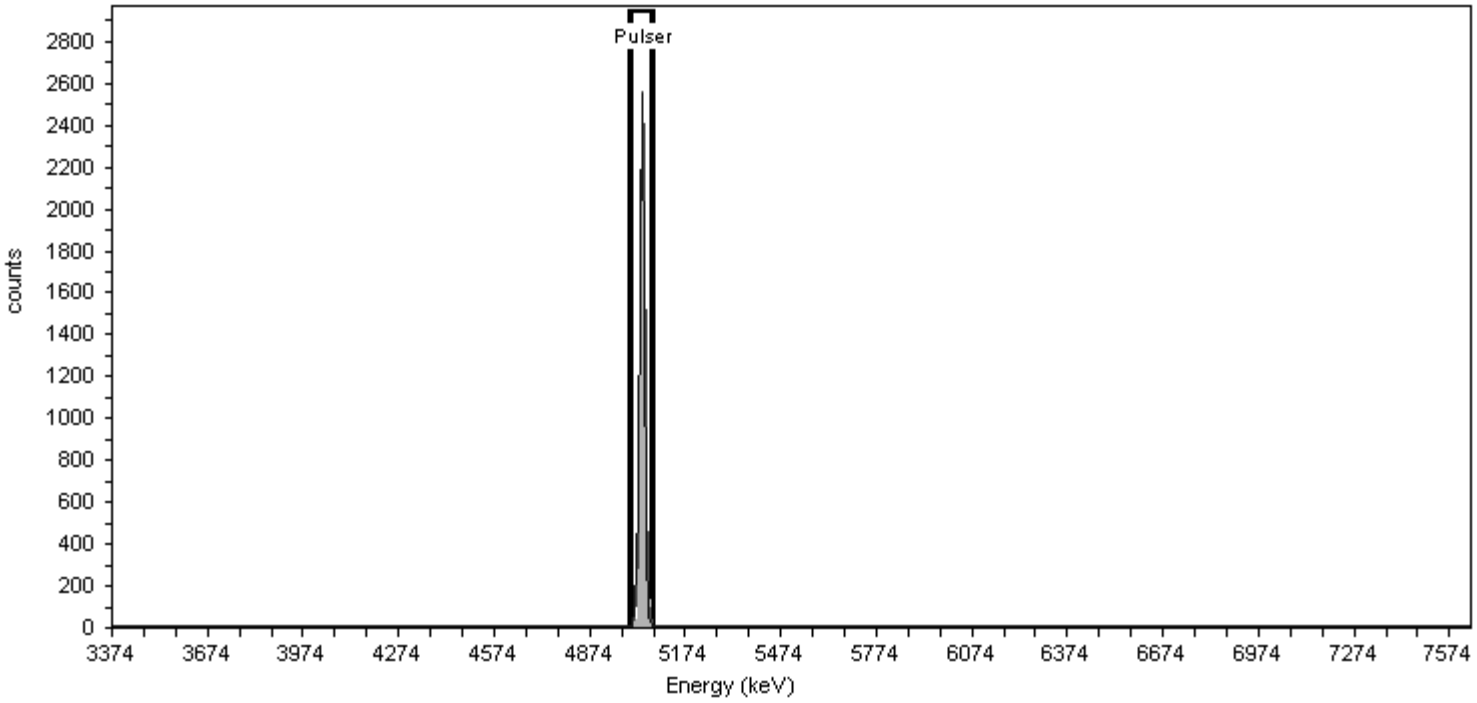
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV68 , SN: 48-45884
Acquisition Start Date: 6/30/2014 12:19:31AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8877;AV68-20140504
Calibration Date: 5/4/2014 8:44:22PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.49% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5036.625	5004.100	5069.151	19.11	7,014.90	7,451.49

Initial Calibrations

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:38:36PM 5/6/2014

Calibration

Sample Name: IC-8875;AV3-20140505
Description:
Detector: AV3

Calibration Date: 5/6/2014 5:38:33PM
Analyst: 60040

Source Info

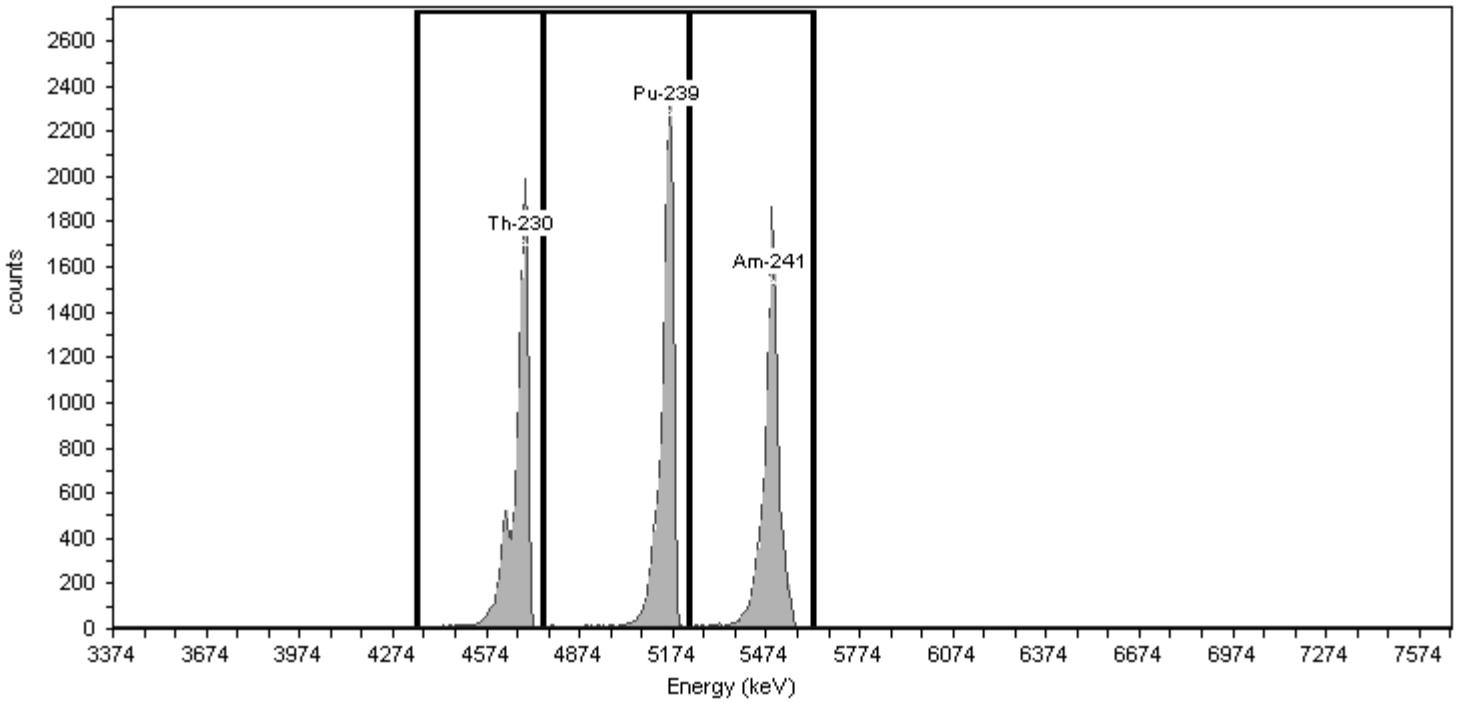
Certificate ID: 82234-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV3 , SN: 49-202 FF7
Acquisition Start Date: 5/5/2014 10:26:30PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 26.09% +/- 0.36% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	12,013.00	85.81
Pu-239	240	5.16	186	249	13,501.00	96.44
Am-241	284	5.49	249	303	12,324.00	88.03

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:38:43PM 5/6/2014

Calibration

Sample Name: IC-8876;AV4-20140505
Description:
Detector: AV4

Calibration Date: 5/6/2014 5:38:40PM
Analyst: 60040

Source Info

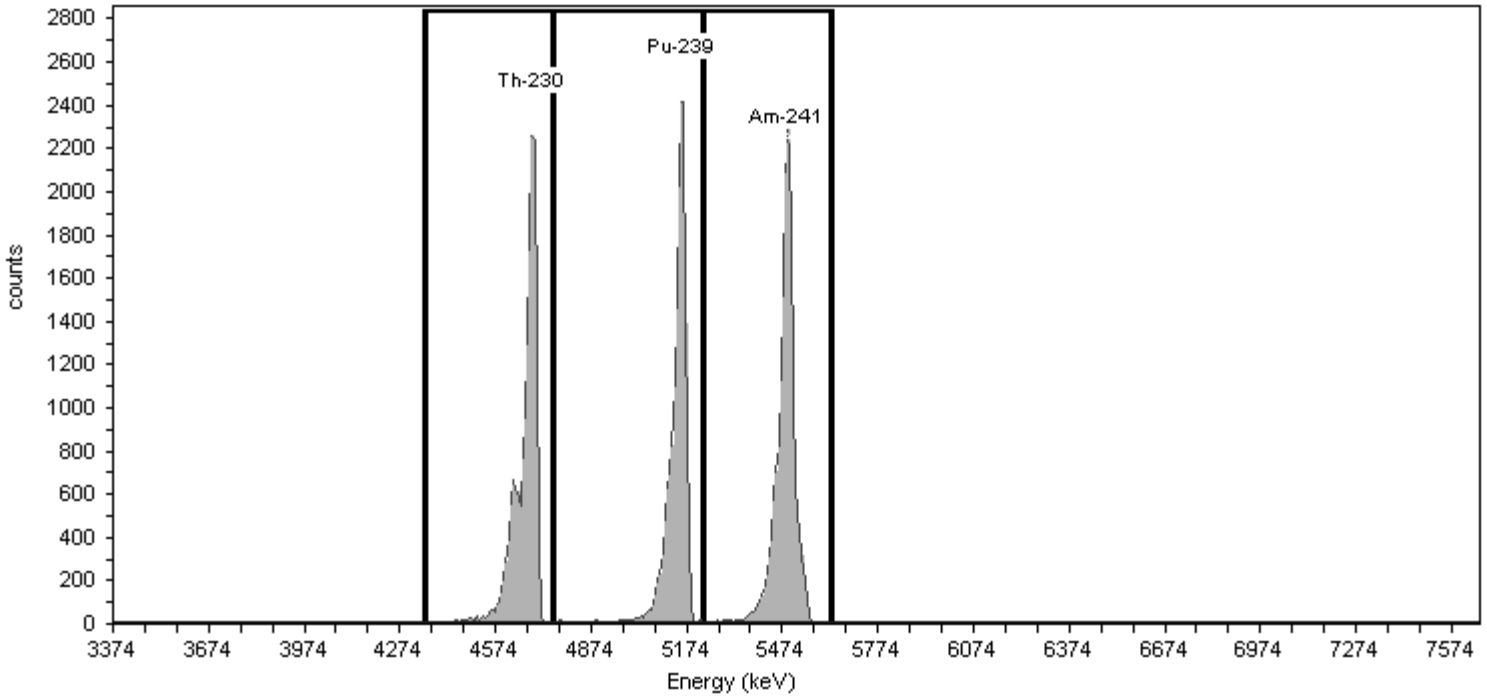
Certificate ID: 82235-334
Prepared by: Analytics

Certification Date: 6/4/2010 12:00:00PM
Description:

Acquisition

Detector: AV4 , SN: 46-033Q4
Acquisition Start Date: 5/5/2014 10:26:36PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 25.82% +/- 0.30% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	15,410.00	110.07
Pu-239	240	5.16	186	249	15,223.00	108.74
Am-241	284	5.49	249	303	15,993.00	114.24

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:38:50PM 5/6/2014

Calibration

Sample Name: IC-9520;AV6-20140505
Description:
Detector: AV6

Calibration Date: 5/6/2014 5:38:46PM
Analyst: 60040

Source Info

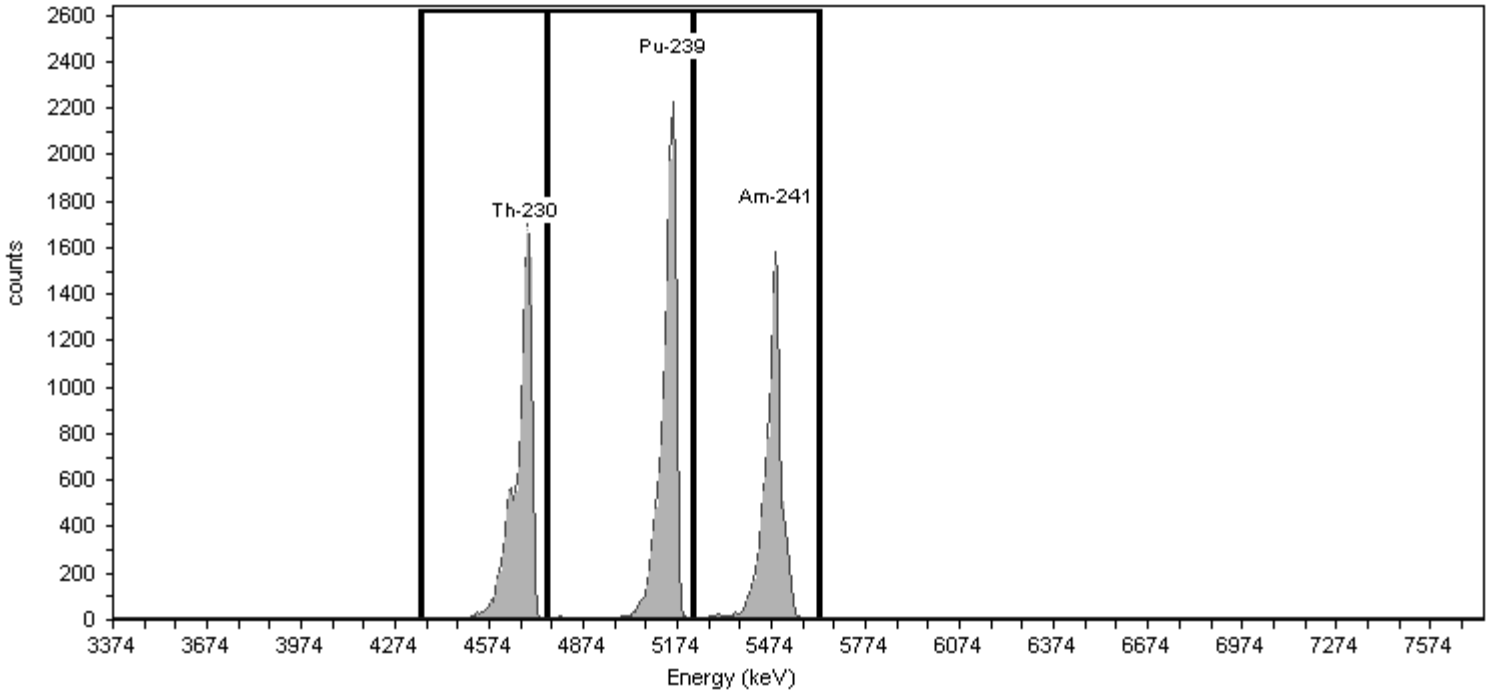
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV6 , SN: 47-27FF2
Acquisition Start Date: 5/5/2014 10:26:50PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 25.89% +/- 0.36% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	12,675.00	90.54
Pu-239	240	5.16	186	249	14,396.00	102.83
Am-241	284	5.49	249	303	11,748.00	83.91

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:48:53PM 5/7/2014

Calibration

Sample Name: IC-8877;AV7-20140507
Description:
Detector: AV7

Calibration Date: 5/7/2014 10:48:48PM
Analyst: 60040

Source Info

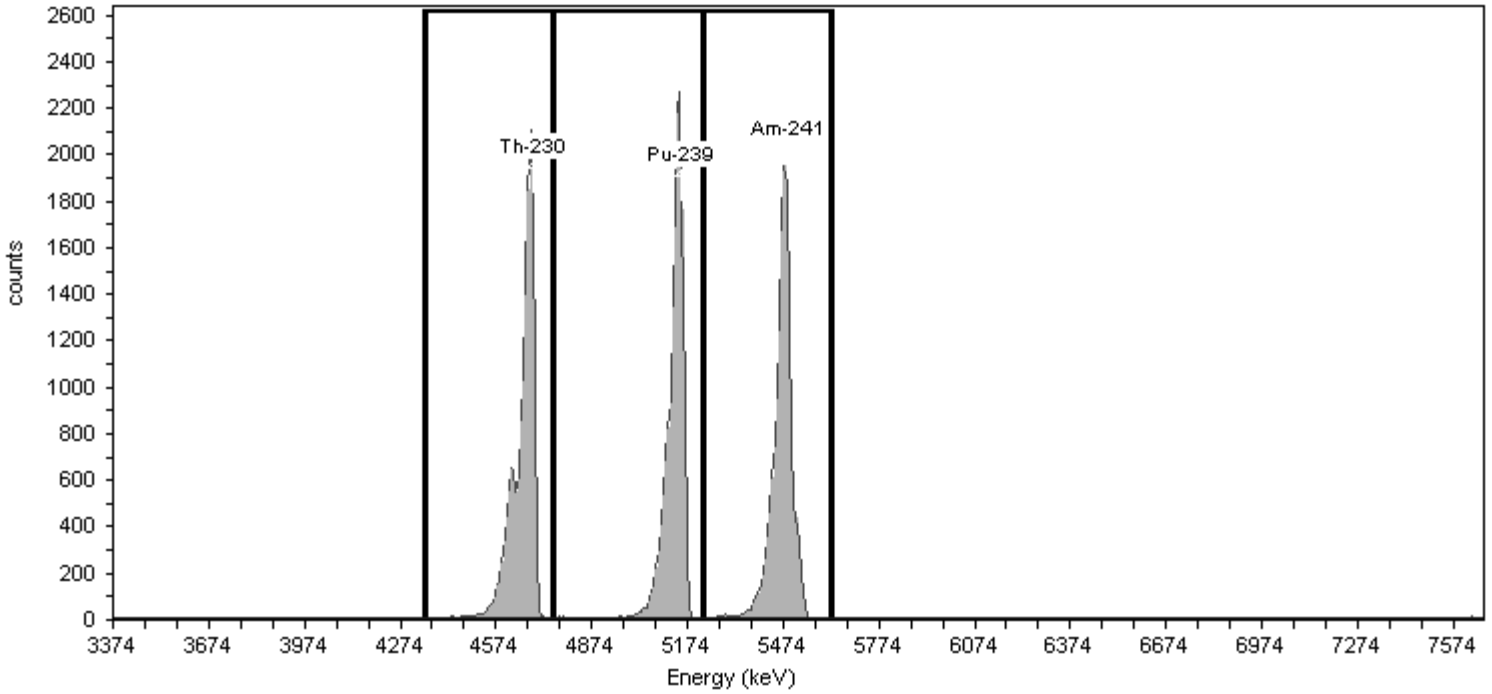
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV7 , SN: 48-158EE5
Acquisition Start Date: 5/7/2014 7:51:09PM
Live Time: 140.00 min.
Real Time: 140.02 min.
Efficiency: 25.80% +/- 0.31% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	15,068.00	107.63
Pu-239	240	5.16	186	249	15,043.00	107.45
Am-241	284	5.49	249	303	14,672.00	104.80

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:39:02PM 5/6/2014

Calibration

Sample Name: IC-9792;AV8-20140505
Description:
Detector: AV8

Calibration Date: 5/6/2014 5:38:58PM
Analyst: 60040

Source Info

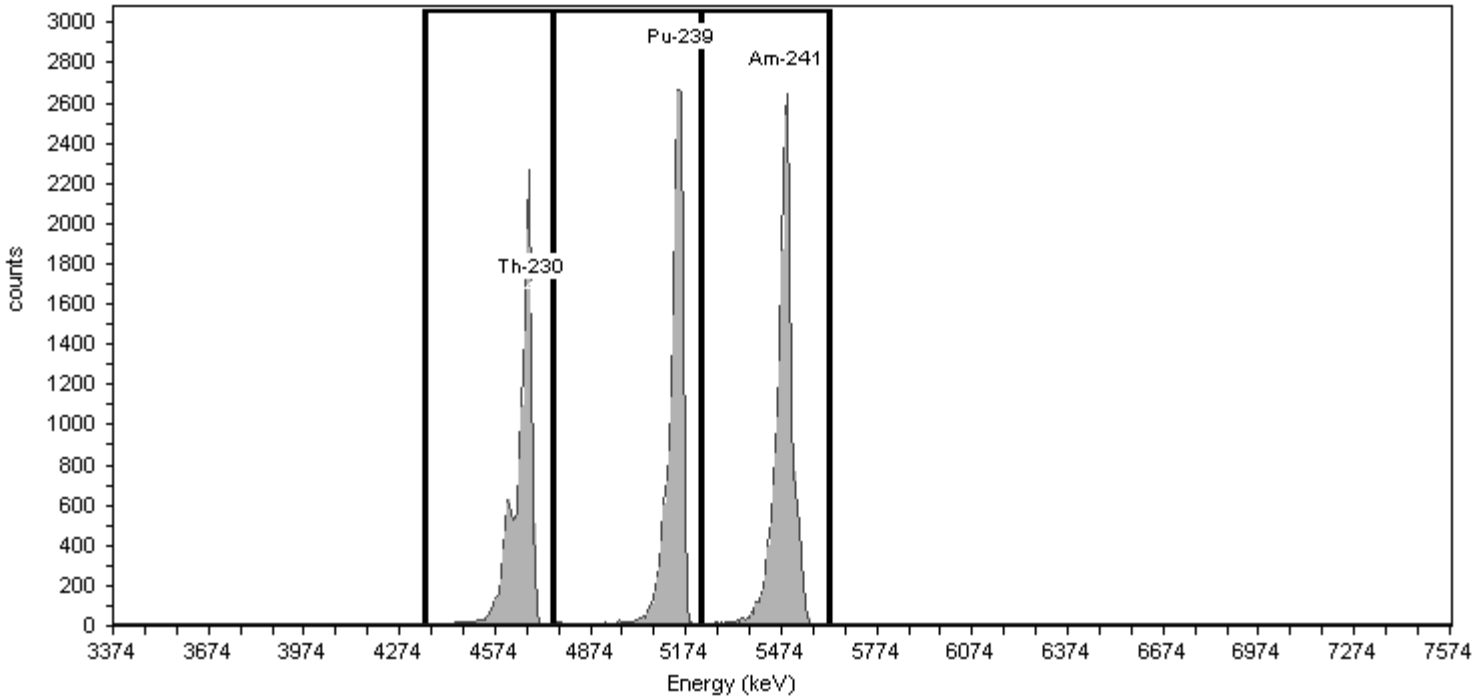
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV8 , SN: 41-137Q6
Acquisition Start Date: 5/5/2014 10:27:18PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 27.05% +/- 0.31% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,298.00	102.13
Pu-239	240	5.16	186	249	16,486.00	117.76
Am-241	284	5.49	249	303	18,583.00	132.74

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:39:13PM 5/6/2014

Calibration

Sample Name: IC-9794;AV10-20140505
Description:
Detector: AV10

Calibration Date: 5/6/2014 5:39:10PM
Analyst: 60040

Source Info

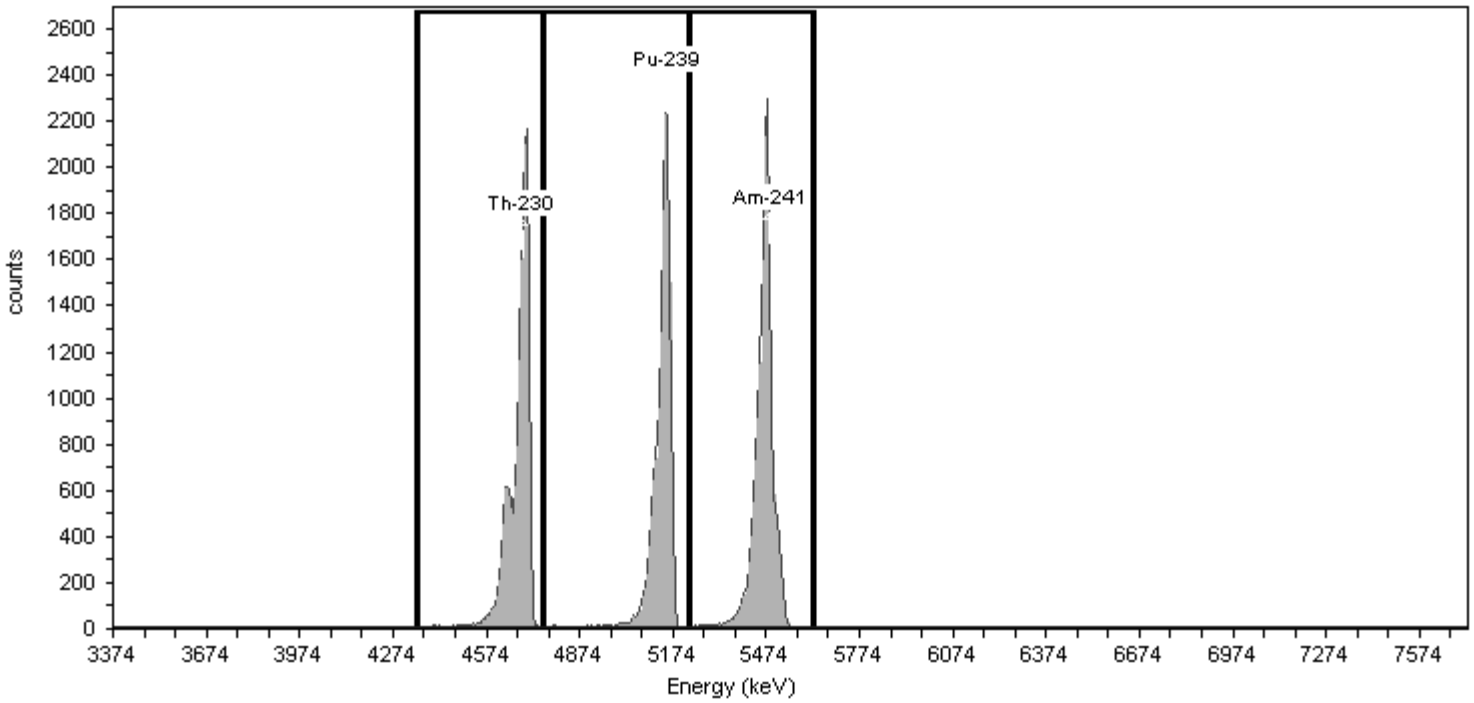
Certificate ID: 82242-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV10 , SN: 49-155N2
Acquisition Start Date: 5/5/2014 10:27:48PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 25.84% +/- 0.32% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,216.00	101.54
Pu-239	240	5.16	186	249	13,923.00	99.45
Am-241	284	5.49	249	303	15,497.00	110.69

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:39:19PM 5/6/2014

Calibration

Sample Name: IC-9795;AV11-20140505
Description:
Detector: AV11

Calibration Date: 5/6/2014 5:39:16PM
Analyst: 60040

Source Info

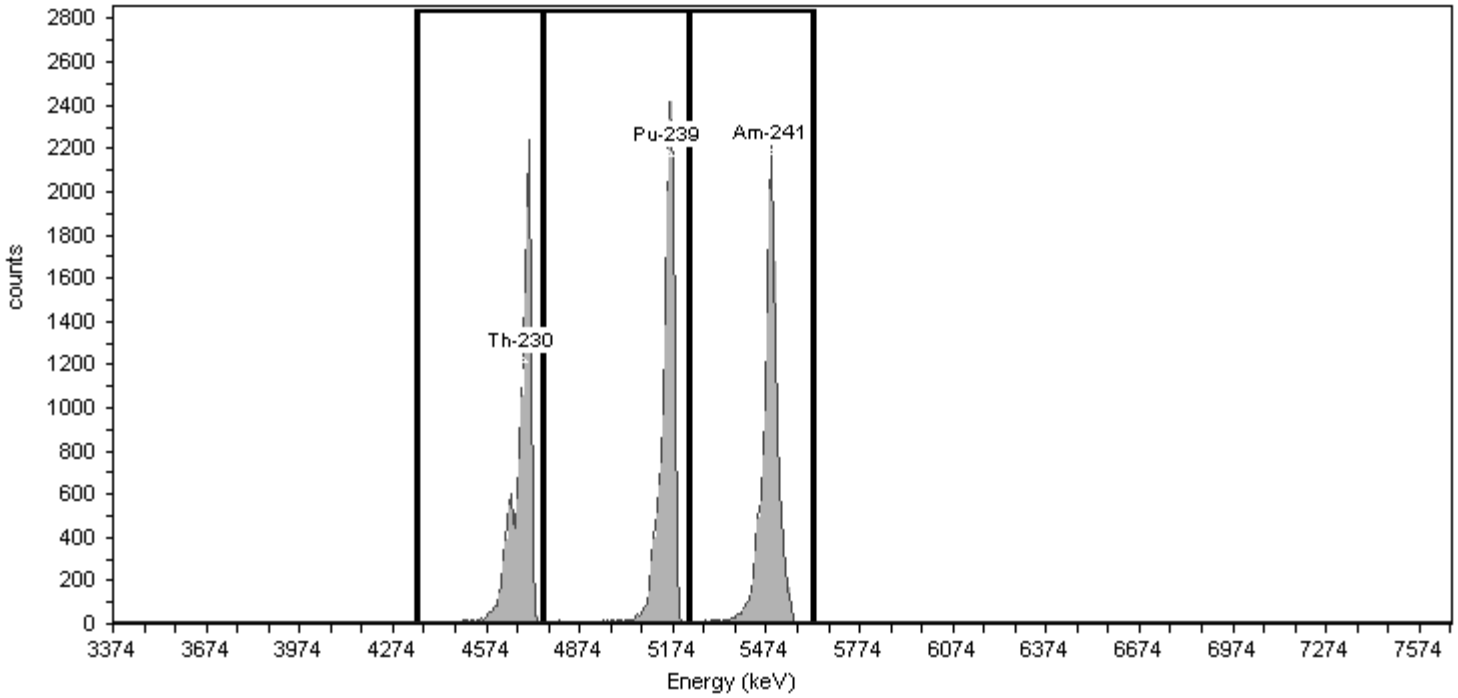
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV11 , SN: 49-155dd2
Acquisition Start Date: 5/5/2014 10:27:49PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 26.88% +/- 0.35% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	13,230.00	94.50
Pu-239	240	5.16	186	249	13,518.00	96.56
Am-241	284	5.49	249	303	14,326.00	102.33

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:39:31PM 5/6/2014

Calibration

Sample Name: IC-9884;AV13-20140505
Description:
Detector: AV13

Calibration Date: 5/6/2014 5:39:28PM
Analyst: 60040

Source Info

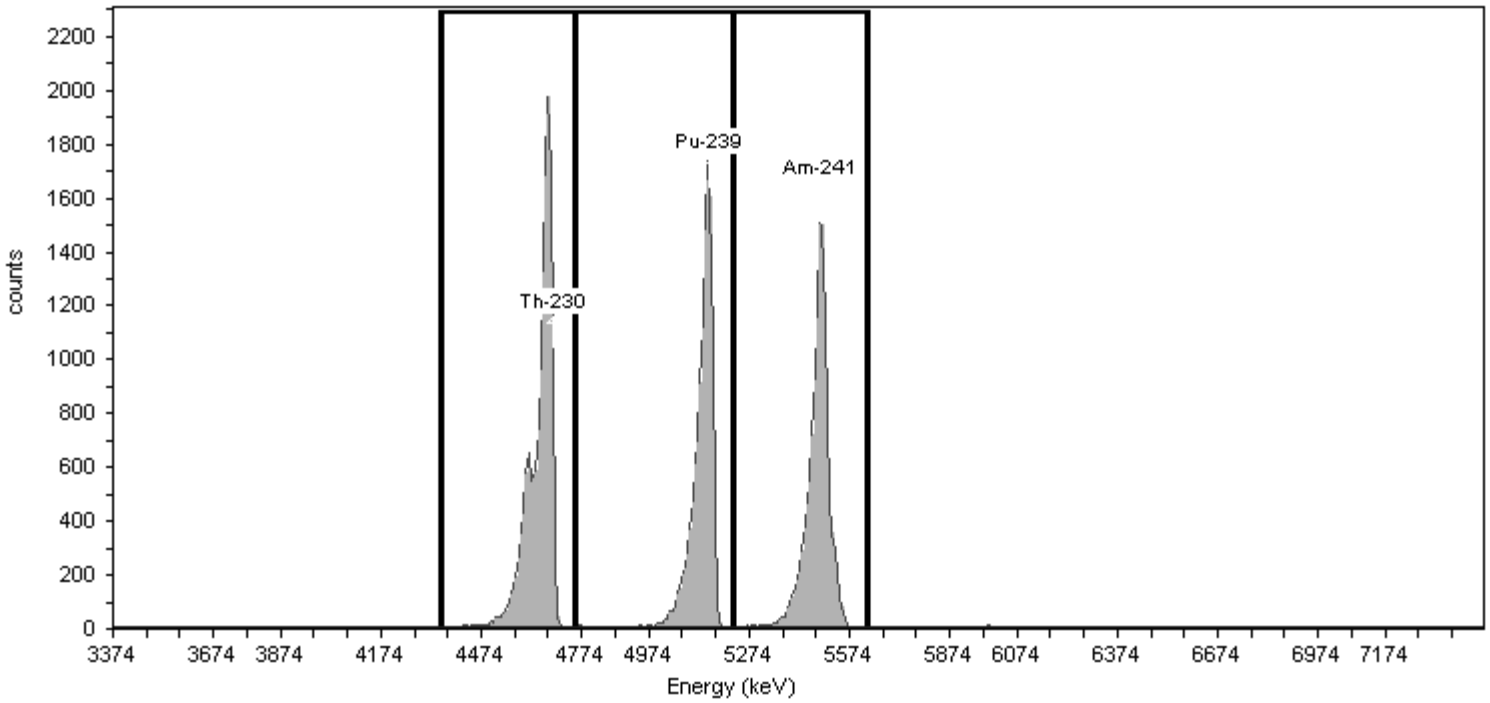
Certificate ID: 82245-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV13 , SN: 49-155M7
Acquisition Start Date: 5/5/2014 10:28:26PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 25.99% +/- 0.37% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,614.00	104.39
Pu-239	240	5.16	186	249	11,970.00	85.50
Am-241	284	5.49	249	303	11,995.00	85.68

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:39:39PM 5/6/2014

Calibration

Sample Name: IC-9885;AV14-20140505
Description:
Detector: AV14

Calibration Date: 5/6/2014 5:39:36PM
Analyst: 60040

Source Info

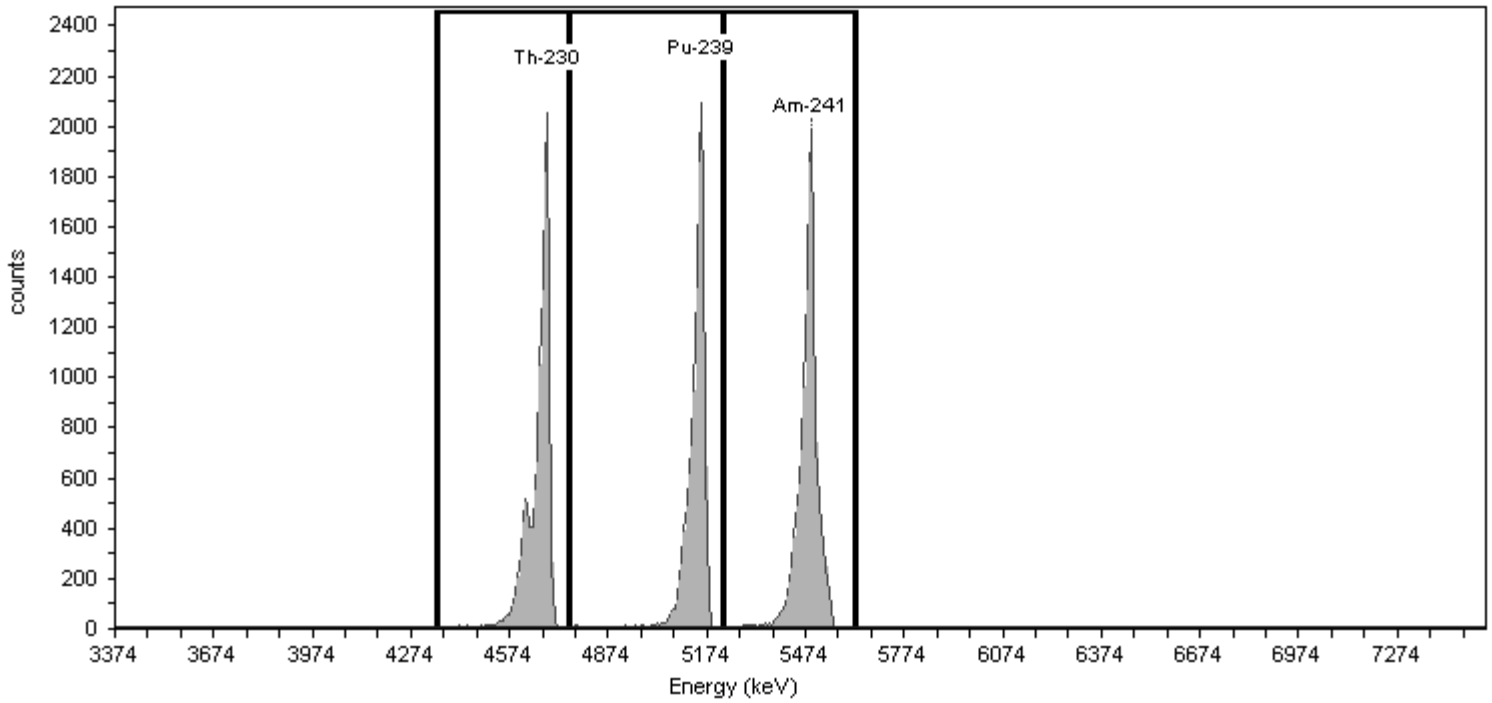
Certificate ID: 82246-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV14 , SN: 50-060W4
Acquisition Start Date: 5/5/2014 10:28:28PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 26.34% +/- 0.38% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	12,270.00	87.64
Pu-239	240	5.16	186	249	11,900.00	85.00
Am-241	284	5.49	249	303	13,210.00	94.36

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:39:45PM 5/6/2014

Calibration

Sample Name: IC-9886;AV15-20140505
Description:
Detector: AV15

Calibration Date: 5/6/2014 5:39:42PM
Analyst: 60040

Source Info

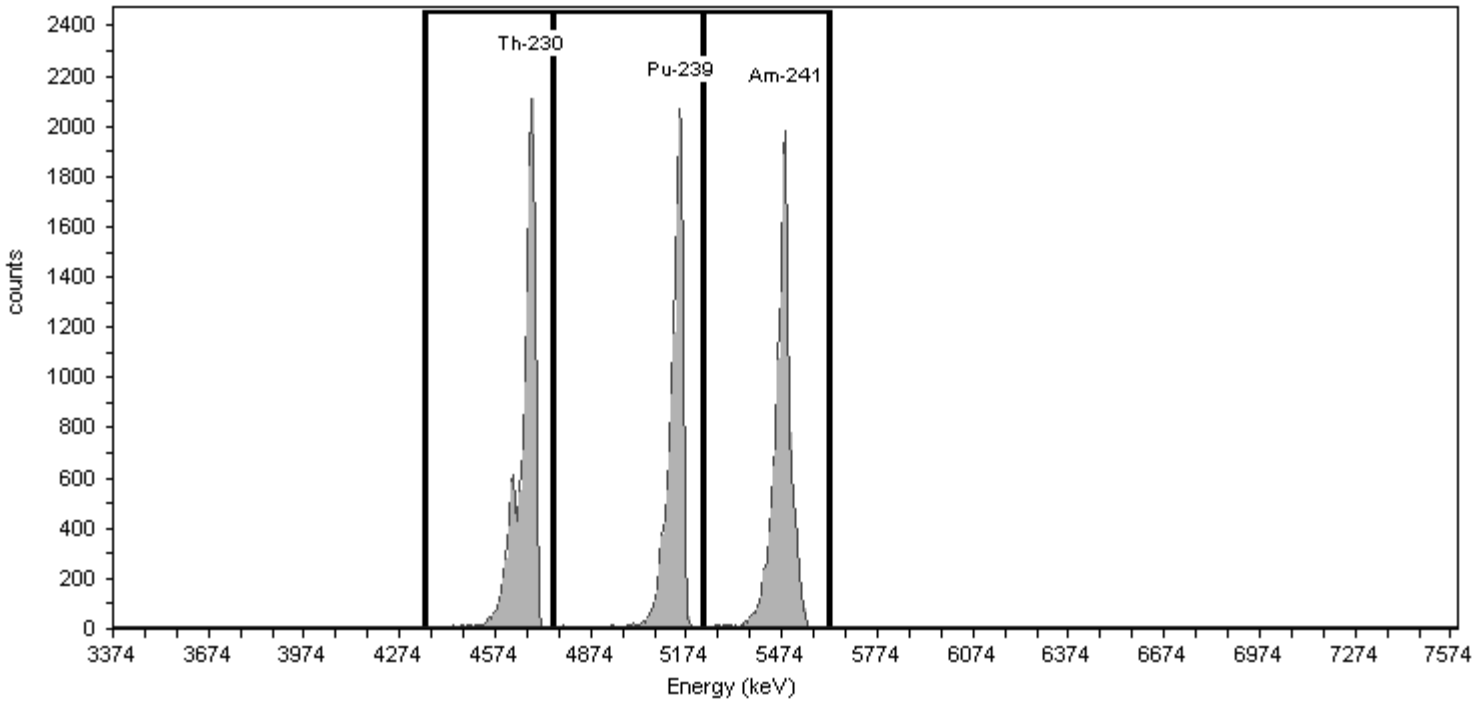
Certificate ID: 82247-334
Prepared by: Analytics

Certification Date: 6/10/2010 12:00:00PM
Description:

Acquisition

Detector: AV15 , SN: 41-172C5
Acquisition Start Date: 5/5/2014 10:28:49PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 25.62% +/- 0.34% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	13,308.00	95.06
Pu-239	240	5.16	186	249	12,470.00	89.07
Am-241	284	5.49	249	303	13,519.00	96.56

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:08:45PM 5/5/2014

Calibration

Sample Name: IC-7107;AV16-20140505
Description:
Detector: AV16

Calibration Date: 5/5/2014 10:08:41PM
Analyst: 60040

Source Info

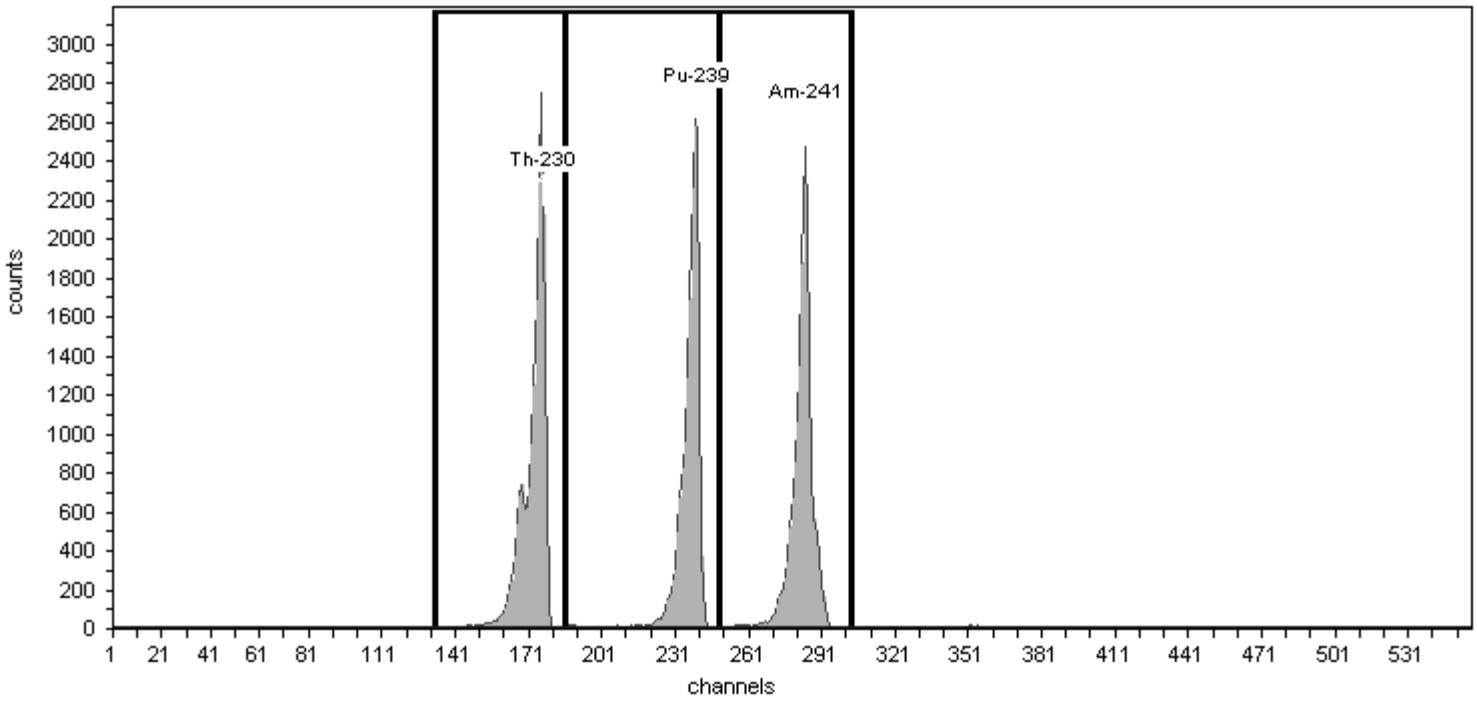
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV16 , SN: 51-082B6
Acquisition Start Date: 5/5/2014 7:27:49PM
Live Time: 140.00 min.
Real Time: 140.02 min.
Efficiency: 27.11% +/- 0.30% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	17,234.00	123.10
Pu-239	240	5.16	186	249	16,511.00	117.94
Am-241	284	5.49	249	303	16,391.00	117.08

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:08:53PM 5/5/2014

Calibration

Sample Name: IC-8874;AV17-20140505
Description:
Detector: AV17

Calibration Date: 5/5/2014 10:08:49PM
Analyst: 60040

Source Info

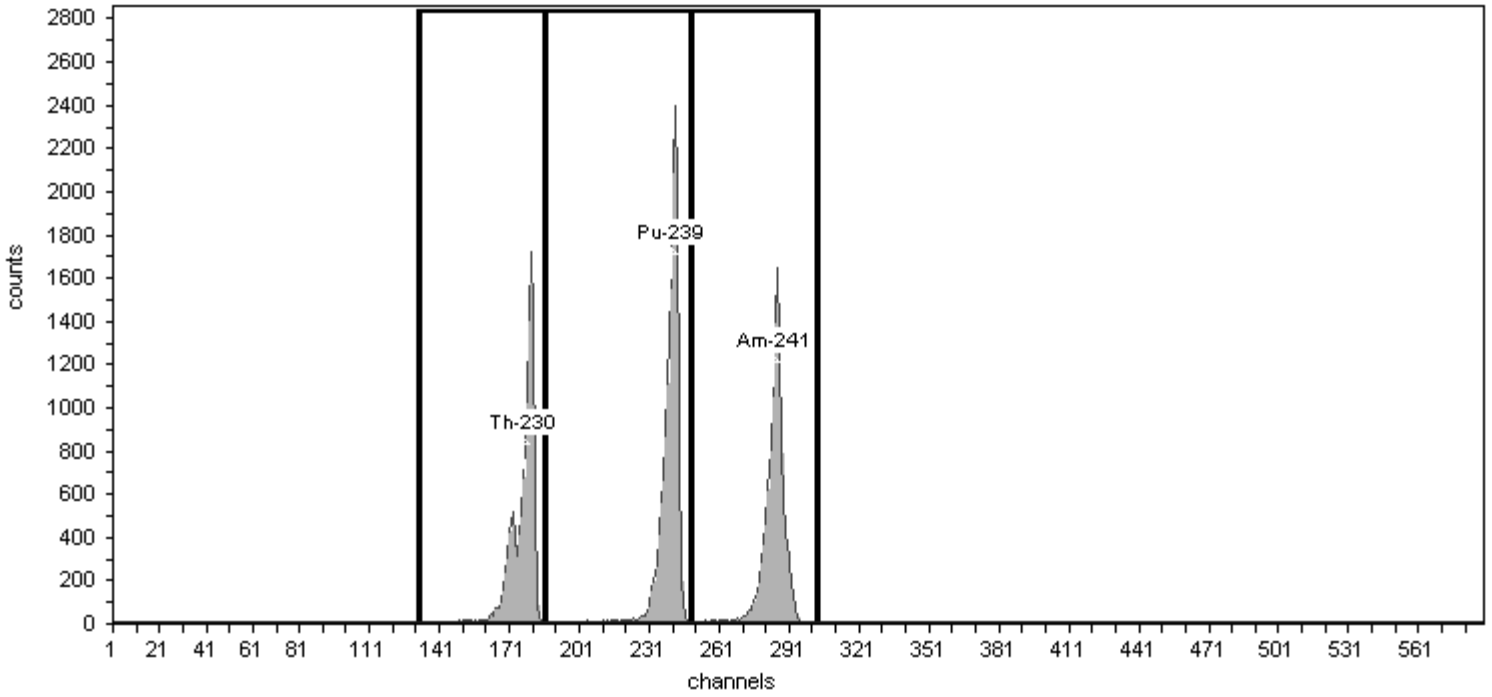
Certificate ID: 82233-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV17 , SN: 50-051C4
Acquisition Start Date: 5/5/2014 7:28:08PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 26.07% +/- 0.37% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	10,563.00	75.45
Pu-239	240	5.16	186	249	13,740.00	98.14
Am-241	284	5.49	249	303	10,934.00	78.10

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:09:15PM 5/5/2014

Calibration

Sample Name: IC-8875;AV18-20140505
Description:
Detector: AV18

Calibration Date: 5/5/2014 10:09:08PM
Analyst: 60040

Source Info

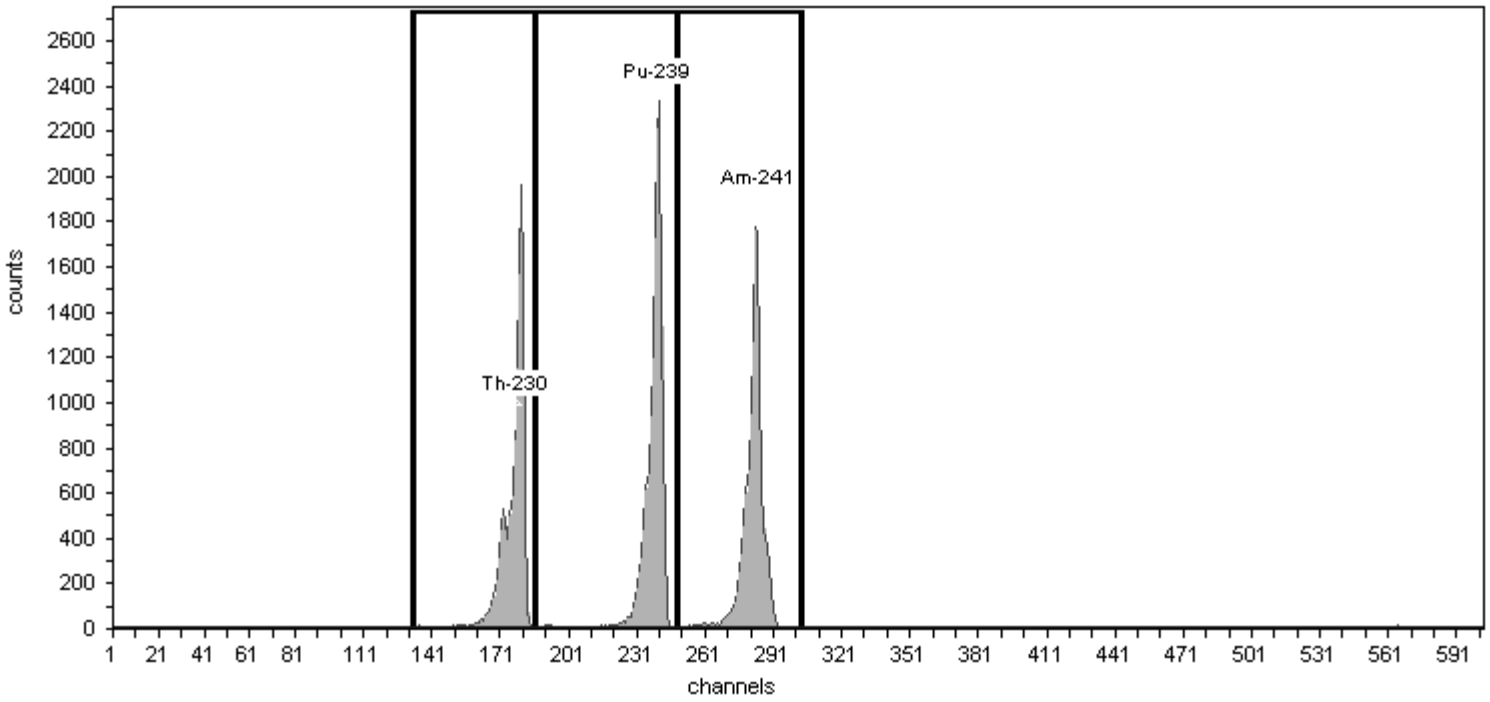
Certificate ID: 82234-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV18 , SN: 51-082C5
Acquisition Start Date: 5/5/2014 7:28:19PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 25.46% +/- 0.36% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	11,763.00	84.02
Pu-239	240	5.16	186	249	13,227.00	94.48
Am-241	284	5.49	249	303	11,935.00	85.25

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:09:08PM 5/5/2014

Calibration

Sample Name: IC-8876;AV19-20140505
Description:
Detector: AV19

Calibration Date: 5/5/2014 10:09:02PM
Analyst: 60040

Source Info

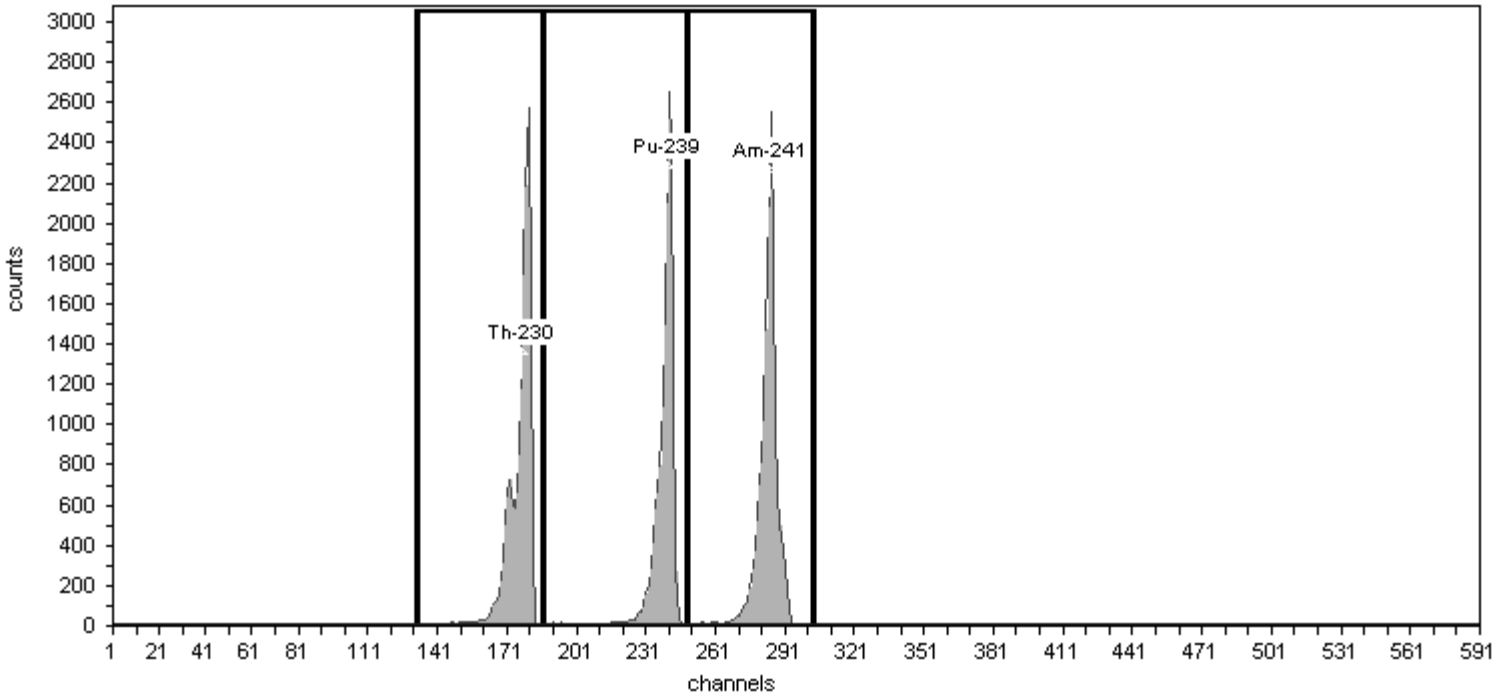
Certificate ID: 82235-334
Prepared by: Analytics

Certification Date: 6/4/2010 12:00:00PM
Description:

Acquisition

Detector: AV19 , SN: 50-025FF5
Acquisition Start Date: 5/5/2014 7:28:32PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 25.34% +/- 0.30% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	15,406.00	110.04
Pu-239	240	5.16	186	249	14,896.00	106.40
Am-241	284	5.49	249	303	15,462.00	110.44

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:09:25PM 5/5/2014

Calibration

Sample Name: IC-8877;AV20-20140505
Description:
Detector: AV20

Calibration Date: 5/5/2014 10:09:21PM
Analyst: 60040

Source Info

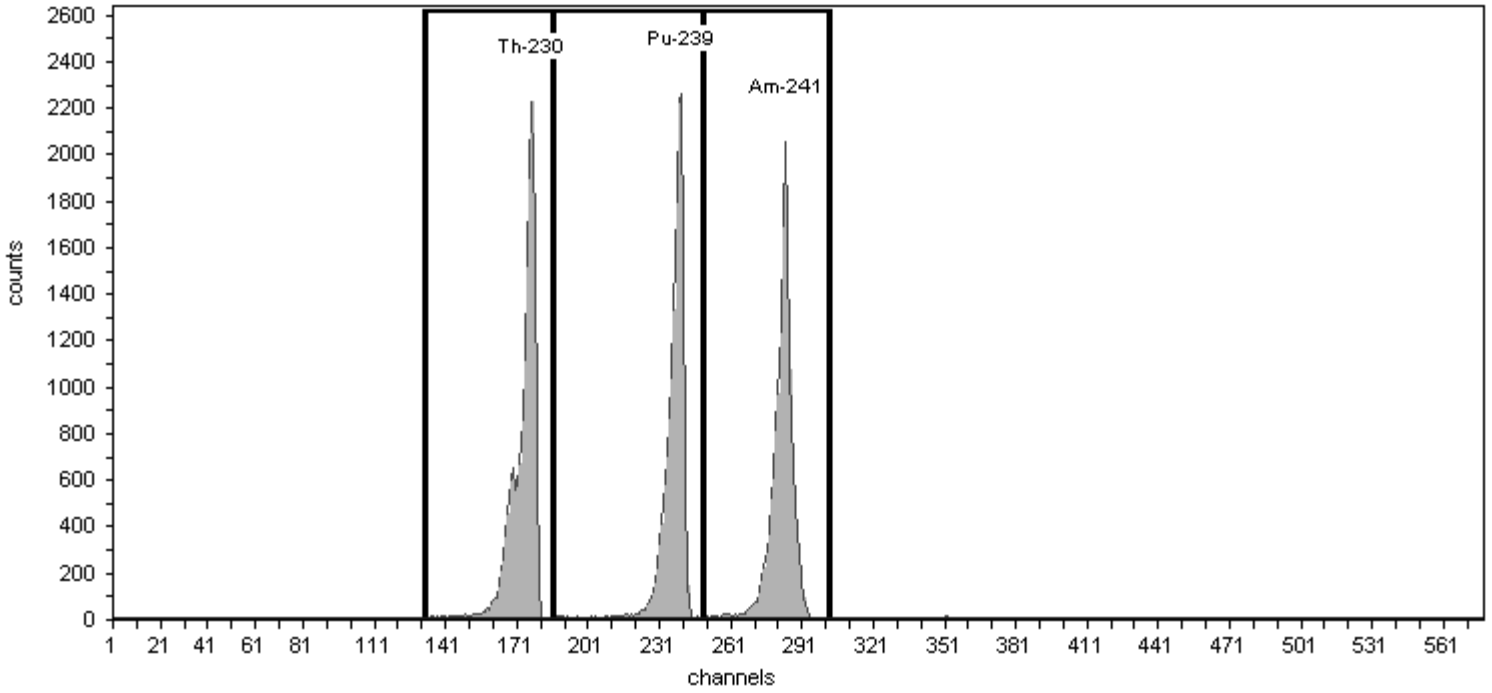
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV20 , SN: 48-121A7
Acquisition Start Date: 5/5/2014 7:28:49PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 25.56% +/- 0.31% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	15,158.00	108.27
Pu-239	240	5.16	186	249	14,844.00	106.03
Am-241	284	5.49	249	303	14,347.00	102.48

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:09:32PM 5/5/2014

Calibration

Sample Name: IC-9520;AV21-20140505
Description:
Detector: AV21

Calibration Date: 5/5/2014 10:09:29PM
Analyst: 60040

Source Info

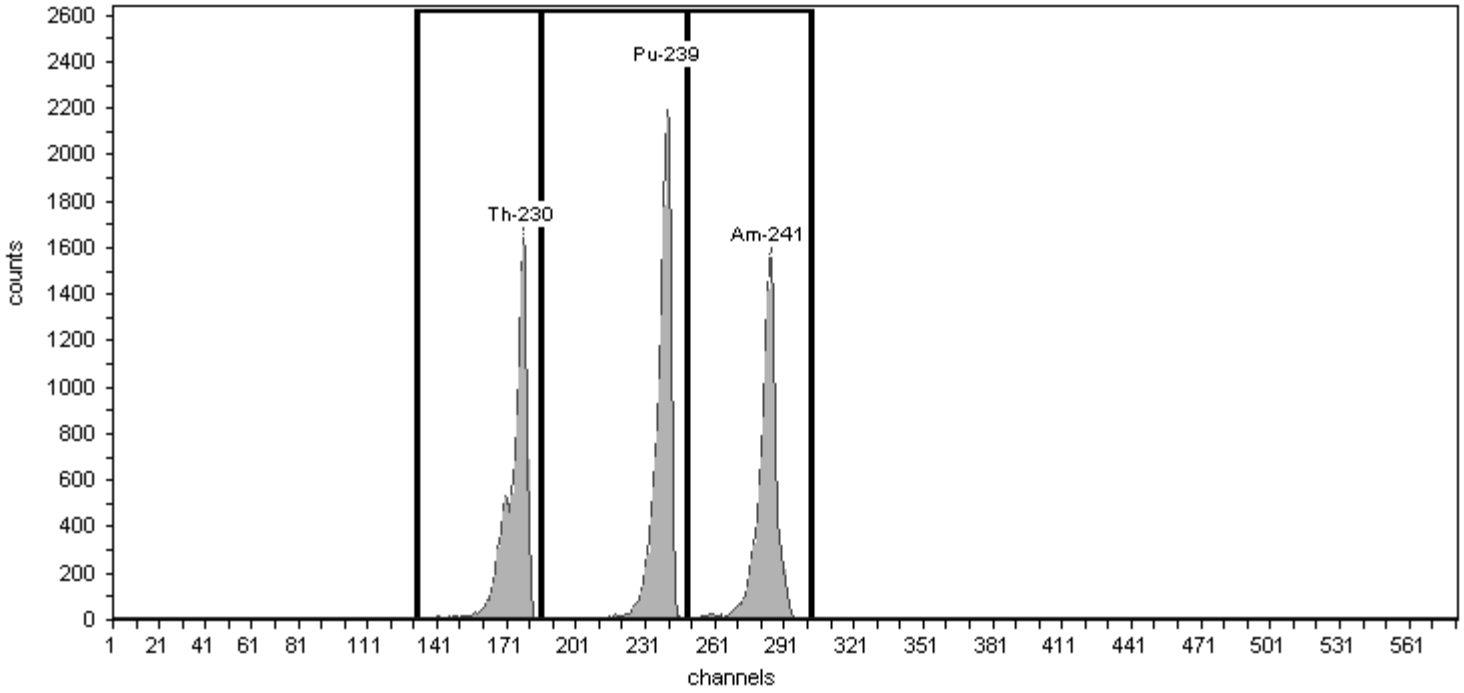
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV21 , SN: 48-102BB6
Acquisition Start Date: 5/5/2014 7:28:59PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 25.45% +/- 0.35% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	12,288.00	87.77
Pu-239	240	5.16	186	249	14,166.00	101.19
Am-241	284	5.49	249	303	11,709.00	83.64

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:09:39PM 5/5/2014

Calibration

Sample Name: IC-9792;AV23-20140505
Description:
Detector: AV23

Calibration Date: 5/5/2014 10:09:35PM
Analyst: 60040

Source Info

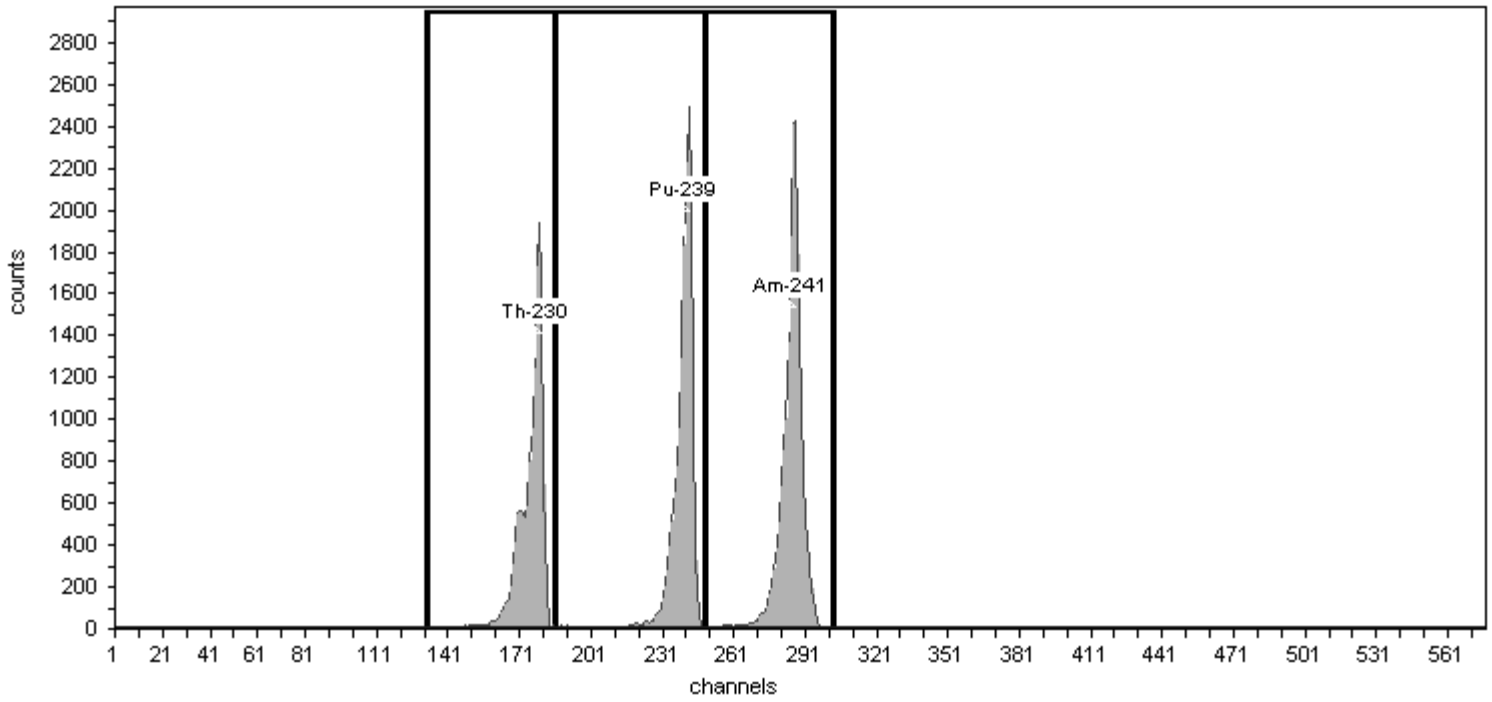
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV23 , SN: 48-158FF3
Acquisition Start Date: 5/5/2014 7:29:20PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 25.91% +/- 0.30% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	13,616.00	97.26
Pu-239	240	5.16	186	249	15,817.00	112.98
Am-241	284	5.49	249	303	17,844.00	127.46

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:09:45PM 5/5/2014

Calibration

Sample Name: IC-9793;AV24-20140505
Description:
Detector: AV24

Calibration Date: 5/5/2014 10:09:41PM
Analyst: 60040

Source Info

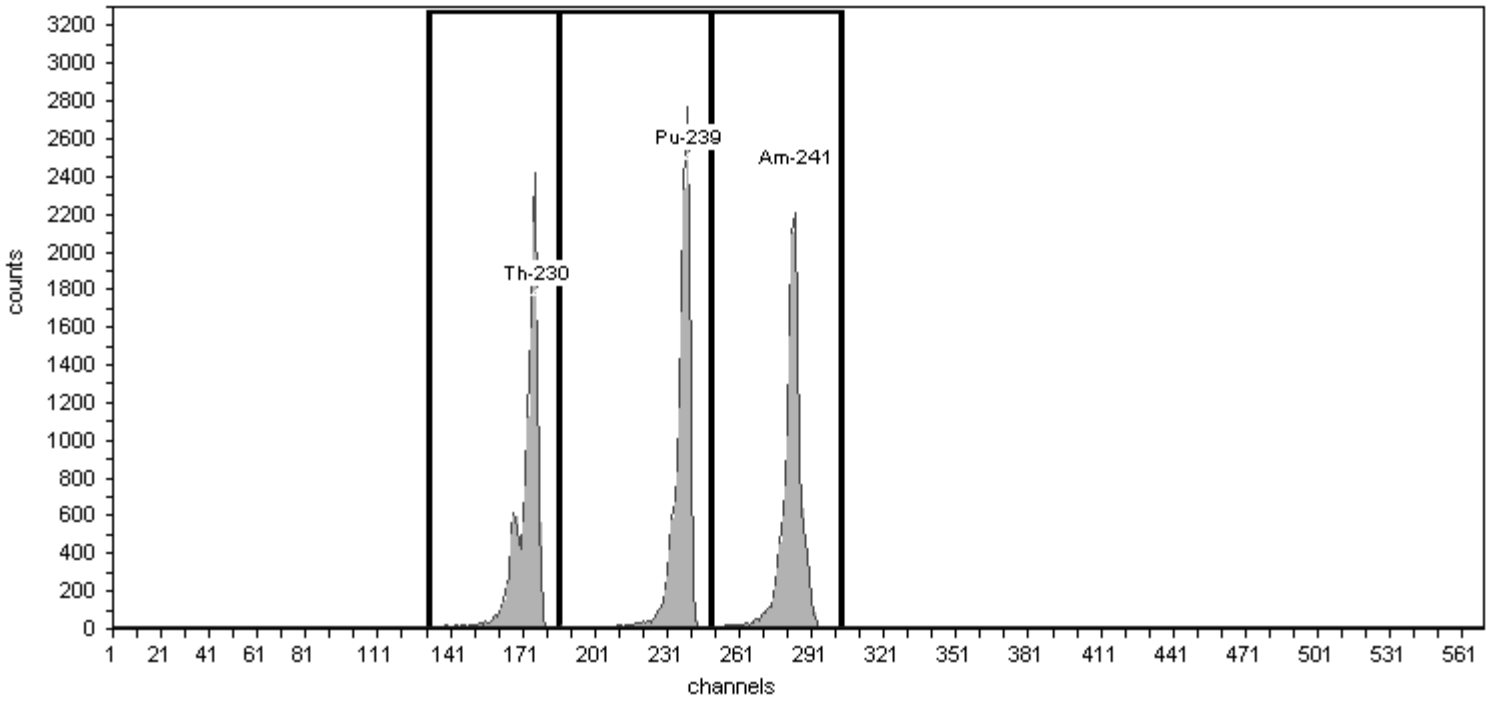
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV24 , SN: 47-137Q4
Acquisition Start Date: 5/5/2014 7:29:33PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 26.42% +/- 0.32% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,605.00	104.32
Pu-239	240	5.16	186	249	15,233.00	108.81
Am-241	284	5.49	249	303	14,607.00	104.34

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:09:51PM 5/5/2014

Calibration

Sample Name: IC-9794;AV43-20140505
Description:
Detector: AV43

Calibration Date: 5/5/2014 10:09:47PM
Analyst: 60040

Source Info

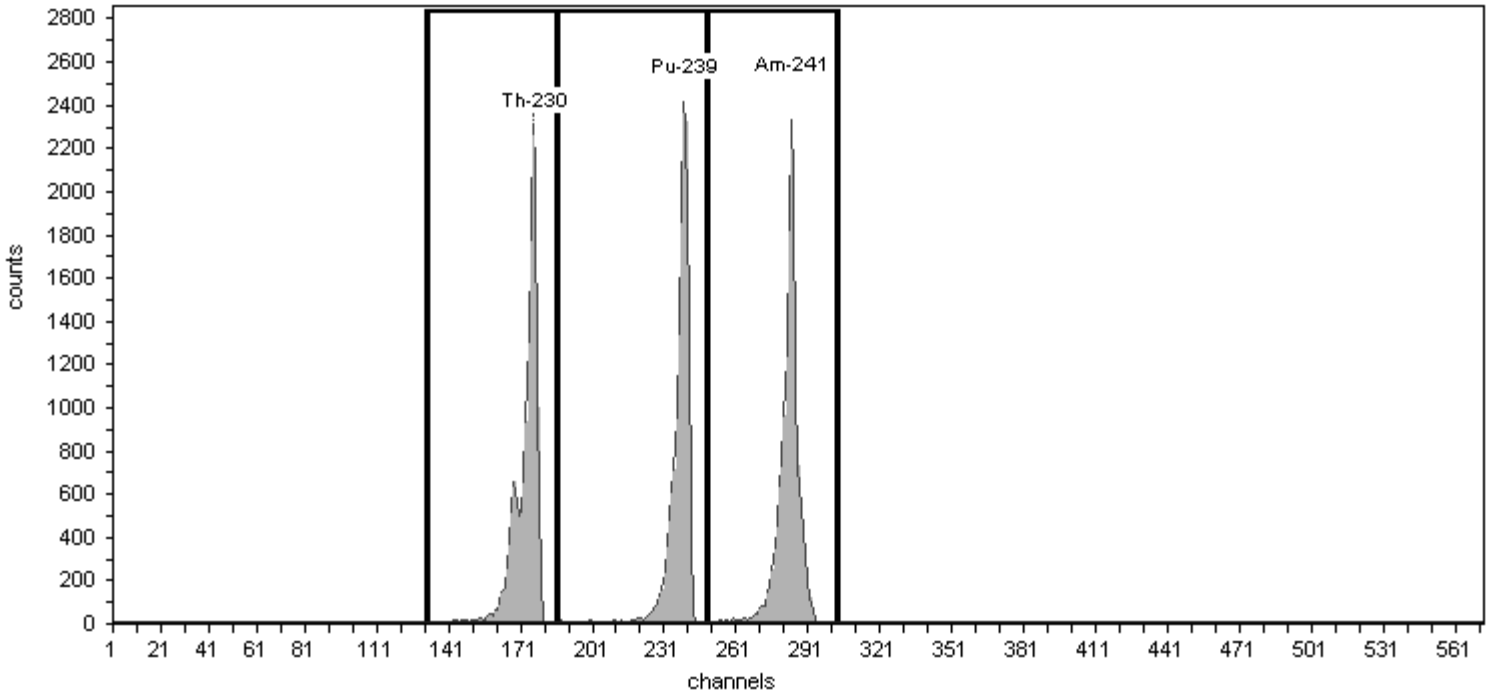
Certificate ID: 82242-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV43 , SN: 49-190X4
Acquisition Start Date: 5/5/2014 7:30:02PM
Live Time: 140.00 min.
Real Time: 140.08 min.
Efficiency: 25.74% +/- 0.32% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,478.00	103.41
Pu-239	240	5.16	186	249	13,913.00	99.38
Am-241	284	5.49	249	303	15,090.00	107.79

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:10:00PM 5/5/2014

Calibration

Sample Name: IC-9795;AV44-20140505
Description:
Detector: AV44

Calibration Date: 5/5/2014 10:09:57PM
Analyst: 60040

Source Info

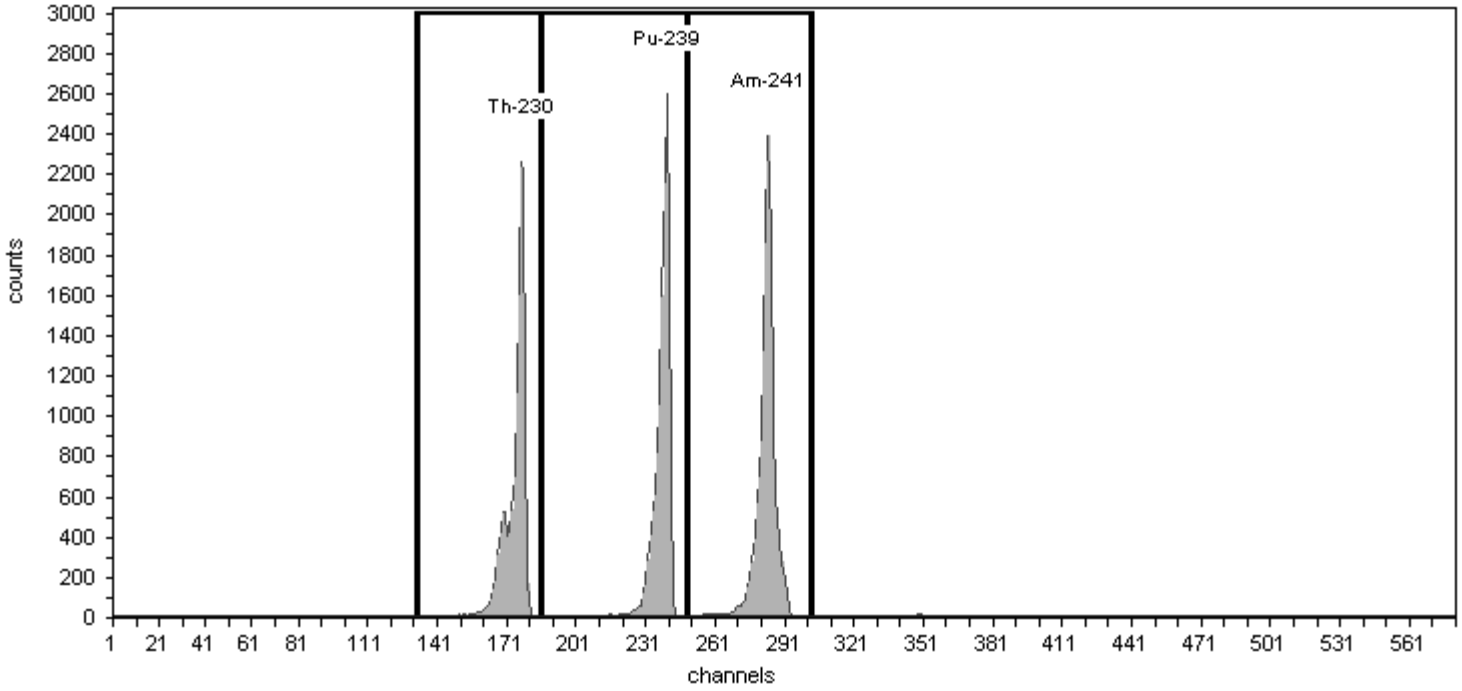
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV44 , SN: 50-051JJ1
Acquisition Start Date: 5/5/2014 7:30:18PM
Live Time: 140.00 min.
Real Time: 140.08 min.
Efficiency: 26.32% +/- 0.35% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	12,875.00	91.96
Pu-239	240	5.16	186	249	13,229.00	94.49
Am-241	284	5.49	249	303	14,113.00	100.81

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:10:06PM 5/5/2014

Calibration

Sample Name: IC-9817;AV45-20140505
Description:
Detector: AV45

Calibration Date: 5/5/2014 10:10:03PM
Analyst: 60040

Source Info

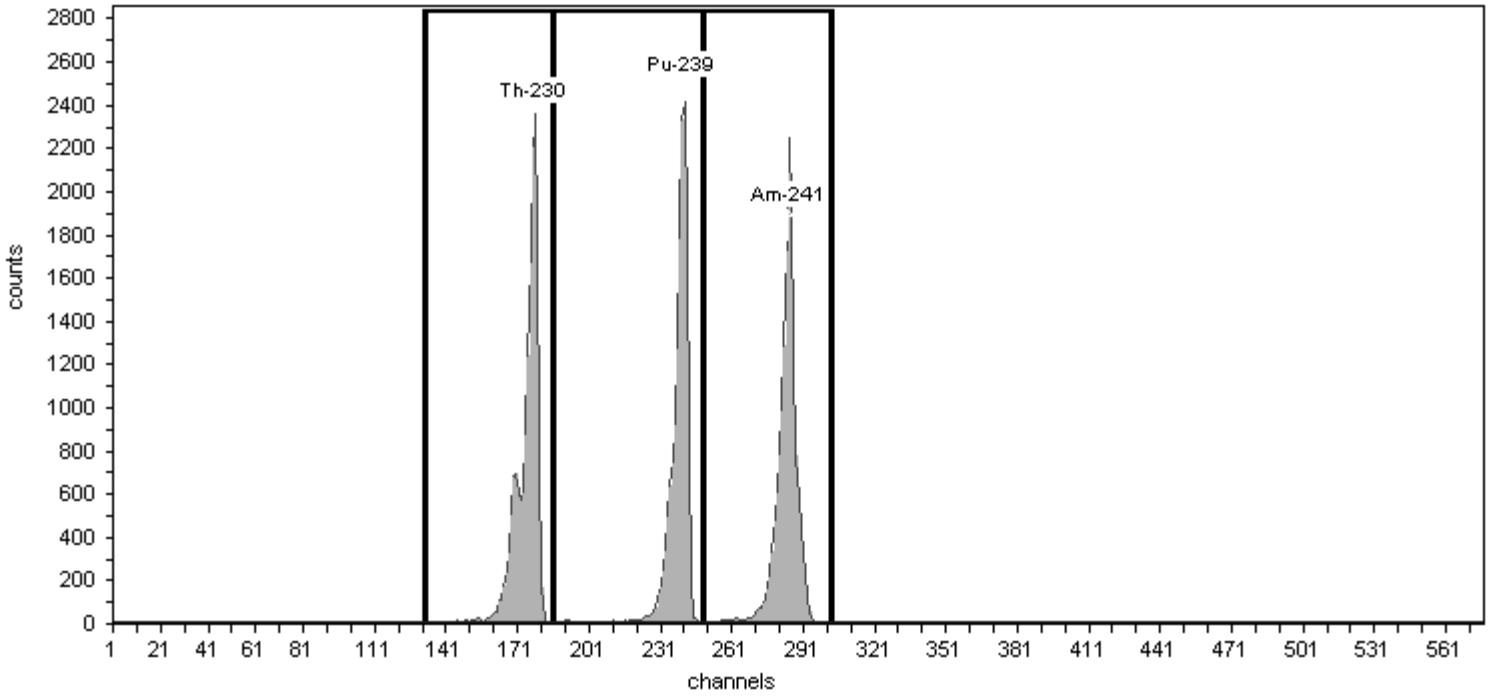
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV45 , SN: 48-158FF2
Acquisition Start Date: 5/5/2014 7:30:35PM
Live Time: 140.00 min.
Real Time: 140.08 min.
Efficiency: 26.06% +/- 0.31% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	16,022.00	114.44
Pu-239	240	5.16	186	249	14,730.00	105.21
Am-241	284	5.49	249	303	15,078.00	107.70

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:10:13PM 5/5/2014

Calibration

Sample Name: IC-9884;AV46-20140505
Description:
Detector: AV46

Calibration Date: 5/5/2014 10:10:09PM
Analyst: 60040

Source Info

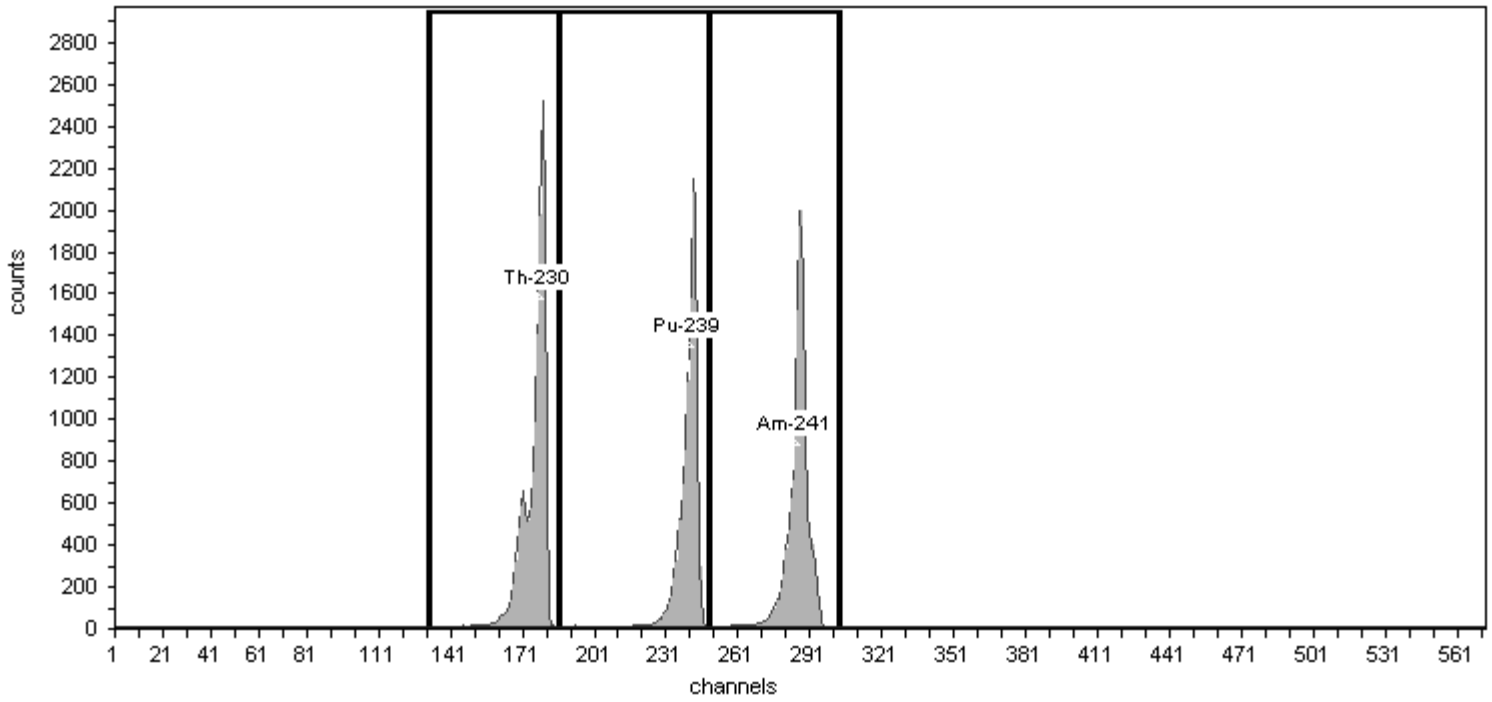
Certificate ID: 82245-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV46 , SN: 49-202GG2
Acquisition Start Date: 5/5/2014 7:30:55PM
Live Time: 140.00 min.
Real Time: 140.08 min.
Efficiency: 26.80% +/- 0.38% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,928.00	106.63
Pu-239	240	5.16	186	249	12,228.00	87.34
Am-241	284	5.49	249	303	12,660.00	90.43

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:10:25PM 5/5/2014

Calibration

Sample Name: IC-9886;AV48-20140505
Description:
Detector: AV48

Calibration Date: 5/5/2014 10:10:22PM
Analyst: 60040

Source Info

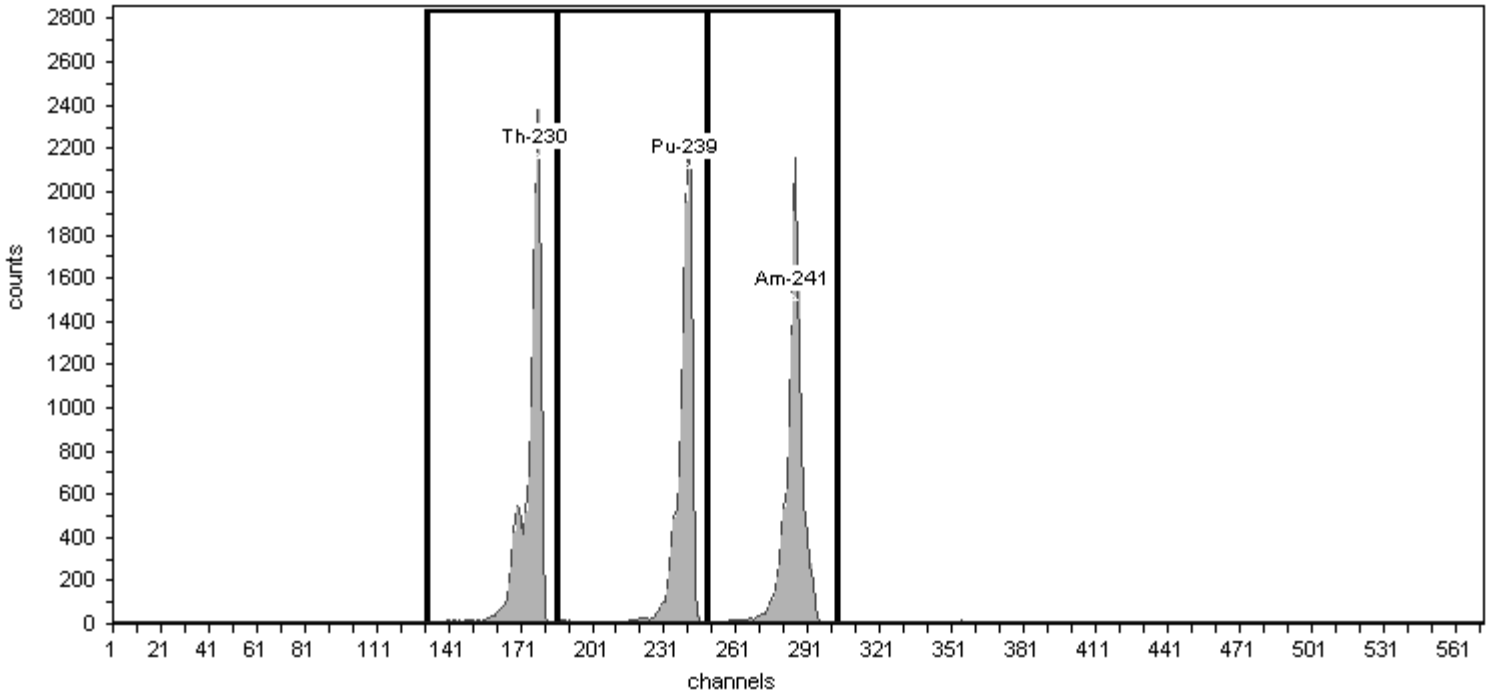
Certificate ID: 82247-334
Prepared by: Analytics

Certification Date: 6/10/2010 12:00:00PM
Description:

Acquisition

Detector: AV48 , SN: 50-051JJ4
Acquisition Start Date: 5/5/2014 7:32:02PM
Live Time: 140.00 min.
Real Time: 140.08 min.
Efficiency: 25.78% +/- 0.35% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	13,428.00	95.91
Pu-239	240	5.16	186	249	12,557.00	89.69
Am-241	284	5.49	249	303	13,561.00	96.86

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:52:45PM 5/5/2014

Calibration

Sample Name: IC-7107;AV49-20140504
Description:
Detector: AV49

Calibration Date: 5/5/2014 6:52:38PM
Analyst: 60040

Source Info

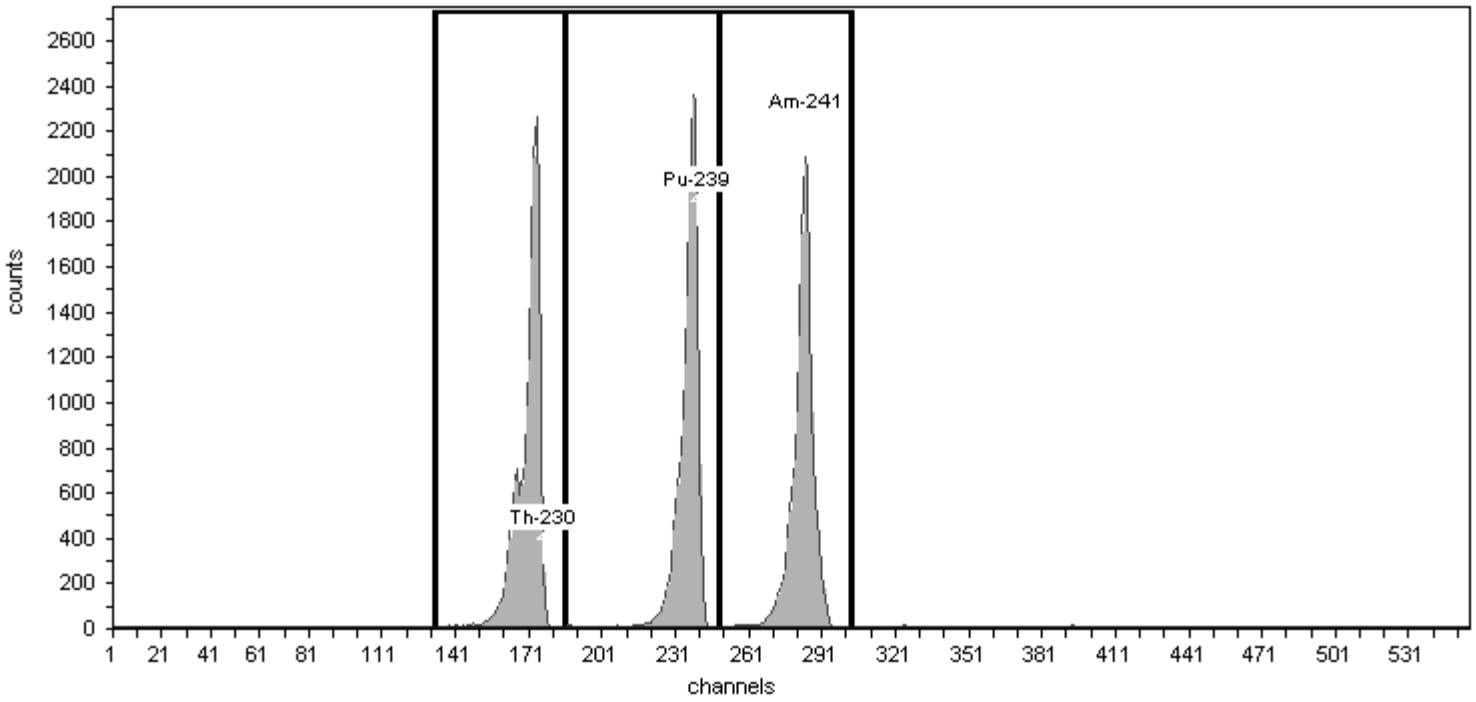
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV49 , SN: 47-043hh4
Acquisition Start Date: 5/4/2014 9:03:18PM
Live Time: 140.00 min.
Real Time: 140.03 min.
Efficiency: 26.53% +/- 0.30% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	16,670.00	119.07
Pu-239	240	5.16	186	249	16,300.00	116.43
Am-241	284	5.49	249	303	16,110.00	115.07

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:53:10PM 5/5/2014

Calibration

Sample Name: IC-8877;AV53-20140504
Description:
Detector: AV53

Calibration Date: 5/5/2014 6:53:06PM
Analyst: 60040

Source Info

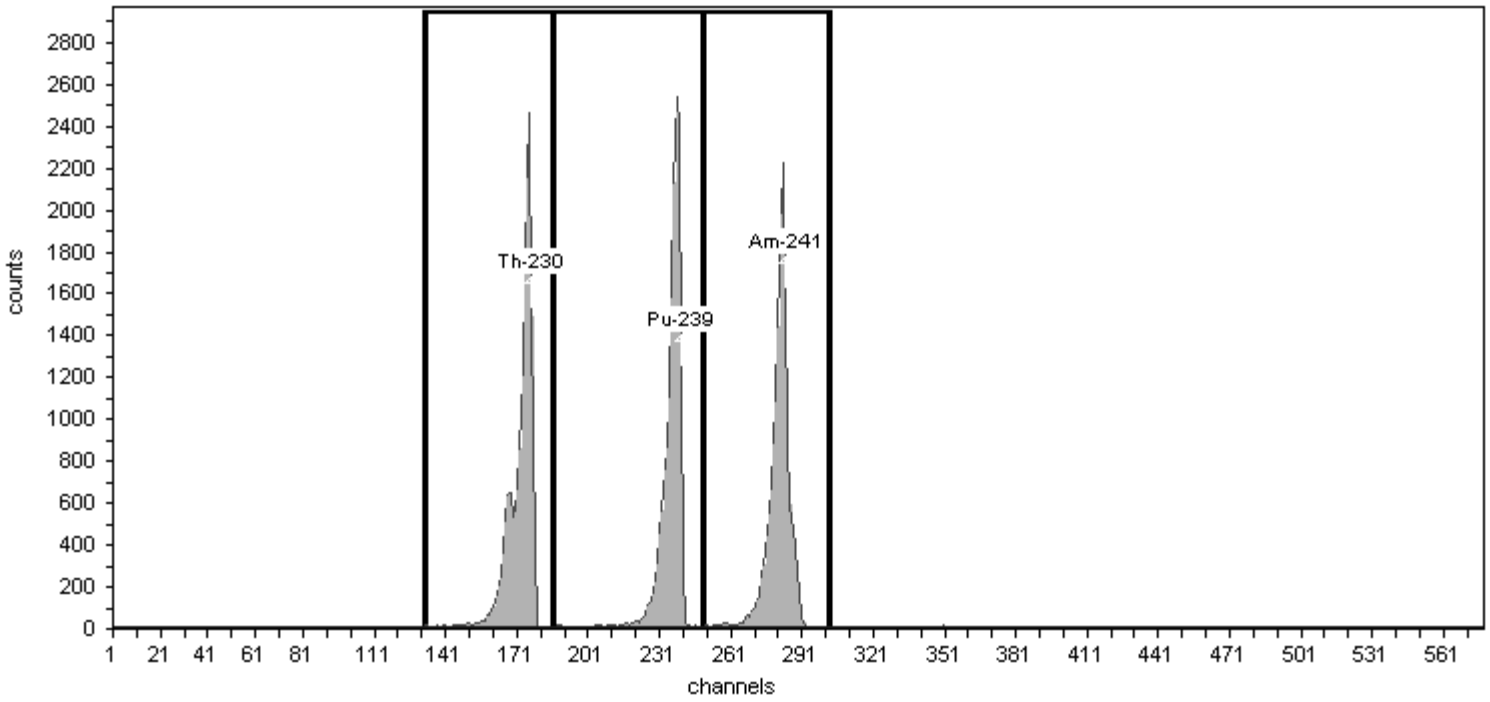
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV53 , SN: 50-051A6
Acquisition Start Date: 5/4/2014 9:04:11PM
Live Time: 140.00 min.
Real Time: 140.12 min.
Efficiency: 26.32% +/- 0.31% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	15,332.00	109.51
Pu-239	240	5.16	186	249	15,251.00	108.94
Am-241	284	5.49	249	303	15,087.00	107.76

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:53:17PM 5/5/2014

Calibration

Sample Name: IC-9520;AV54-20140504
Description:
Detector: AV54

Calibration Date: 5/5/2014 6:53:13PM
Analyst: 60040

Source Info

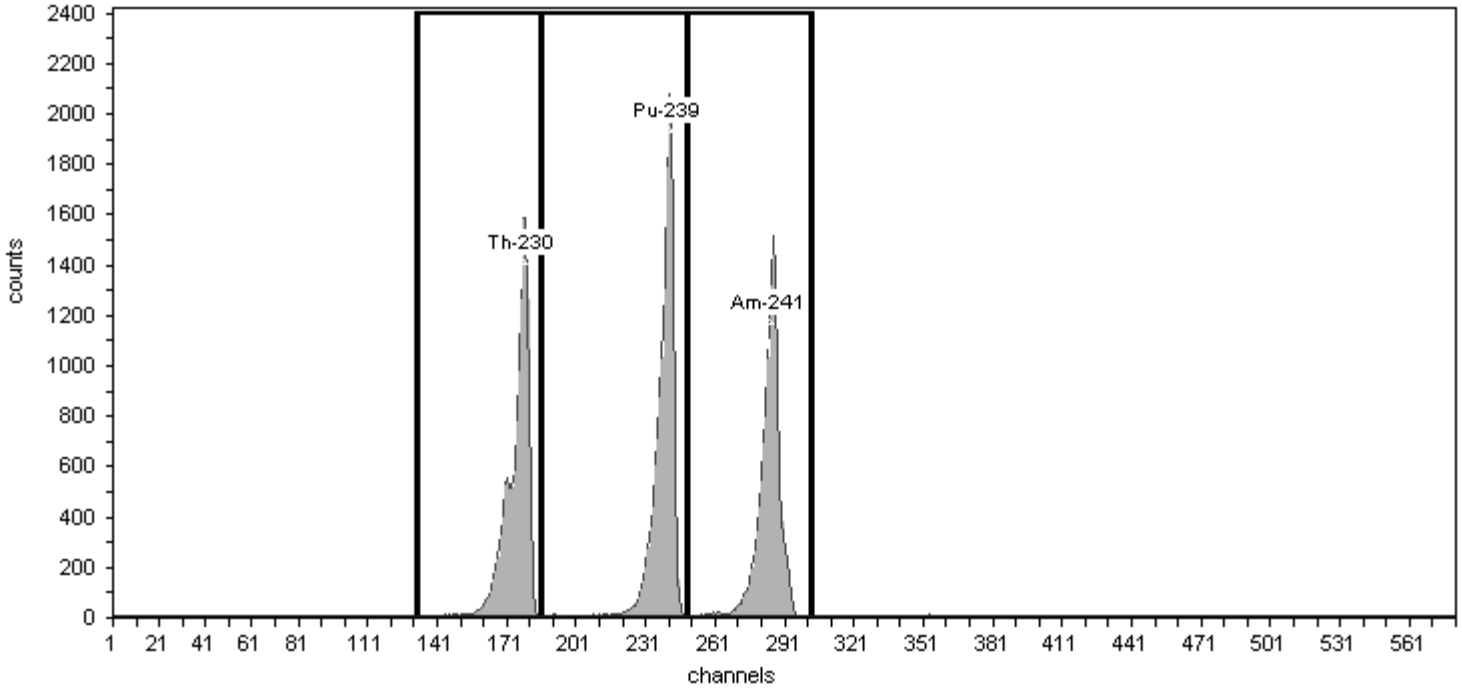
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV54 , SN: 48-046II6
Acquisition Start Date: 5/4/2014 9:04:26PM
Live Time: 140.00 min.
Real Time: 140.12 min.
Efficiency: 26.02% +/- 0.36% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	12,557.00	89.69
Pu-239	240	5.16	186	249	14,649.00	104.64
Am-241	284	5.49	249	303	11,824.00	84.46

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:48:59PM 5/7/2014

Calibration

Sample Name: IC-7107;AV55-20140507
Description:
Detector: AV55

Calibration Date: 5/7/2014 10:48:56PM
Analyst: 60040

Source Info

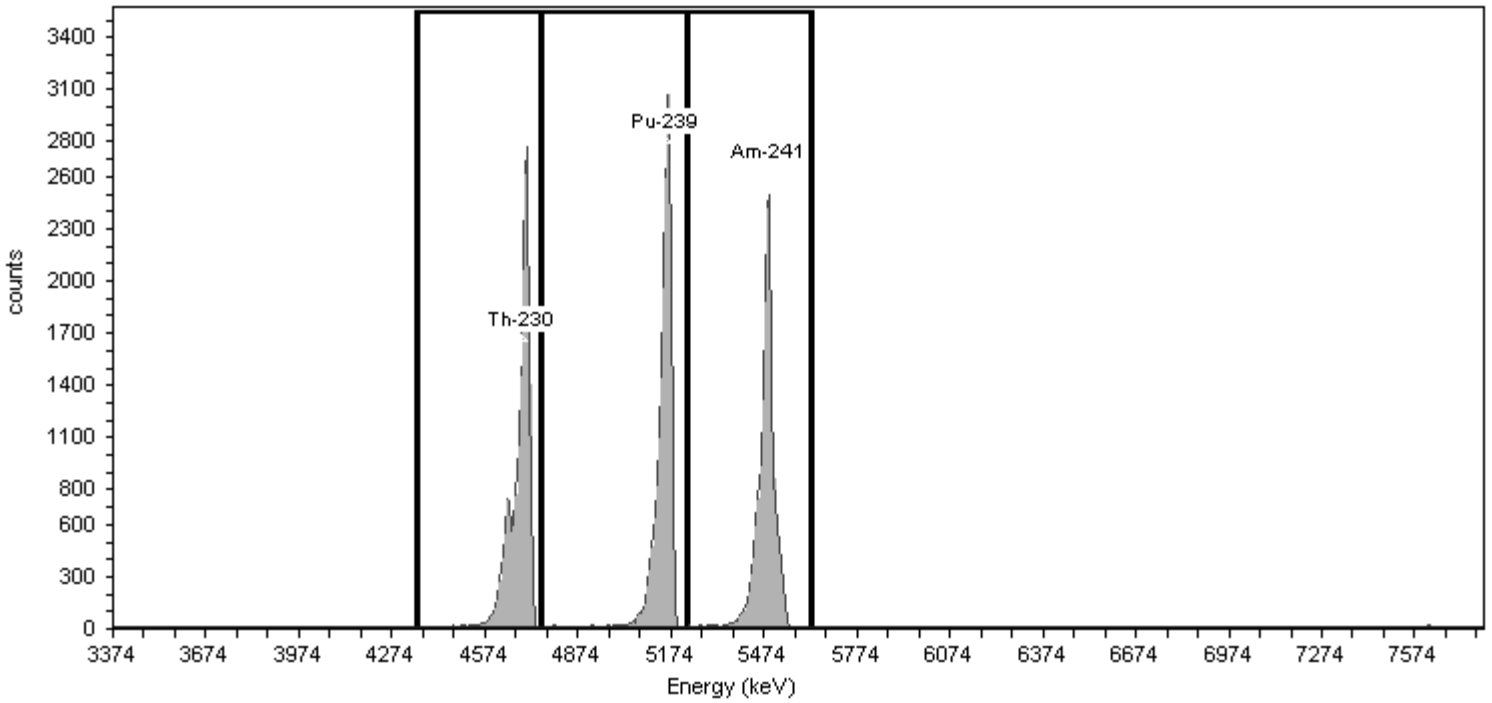
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV55 , SN: 50-051C2
Acquisition Start Date: 5/7/2014 7:51:23PM
Live Time: 140.00 min.
Real Time: 140.02 min.
Efficiency: 26.79% +/- 0.30% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	16,945.00	121.04
Pu-239	240	5.16	186	249	16,514.00	117.96
Am-241	284	5.49	249	303	16,110.00	115.07

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:53:38PM 5/5/2014

Calibration

Sample Name: IC-9792;AV56-20140504
Description:
Detector: AV56

Calibration Date: 5/5/2014 6:53:34PM
Analyst: 60040

Source Info

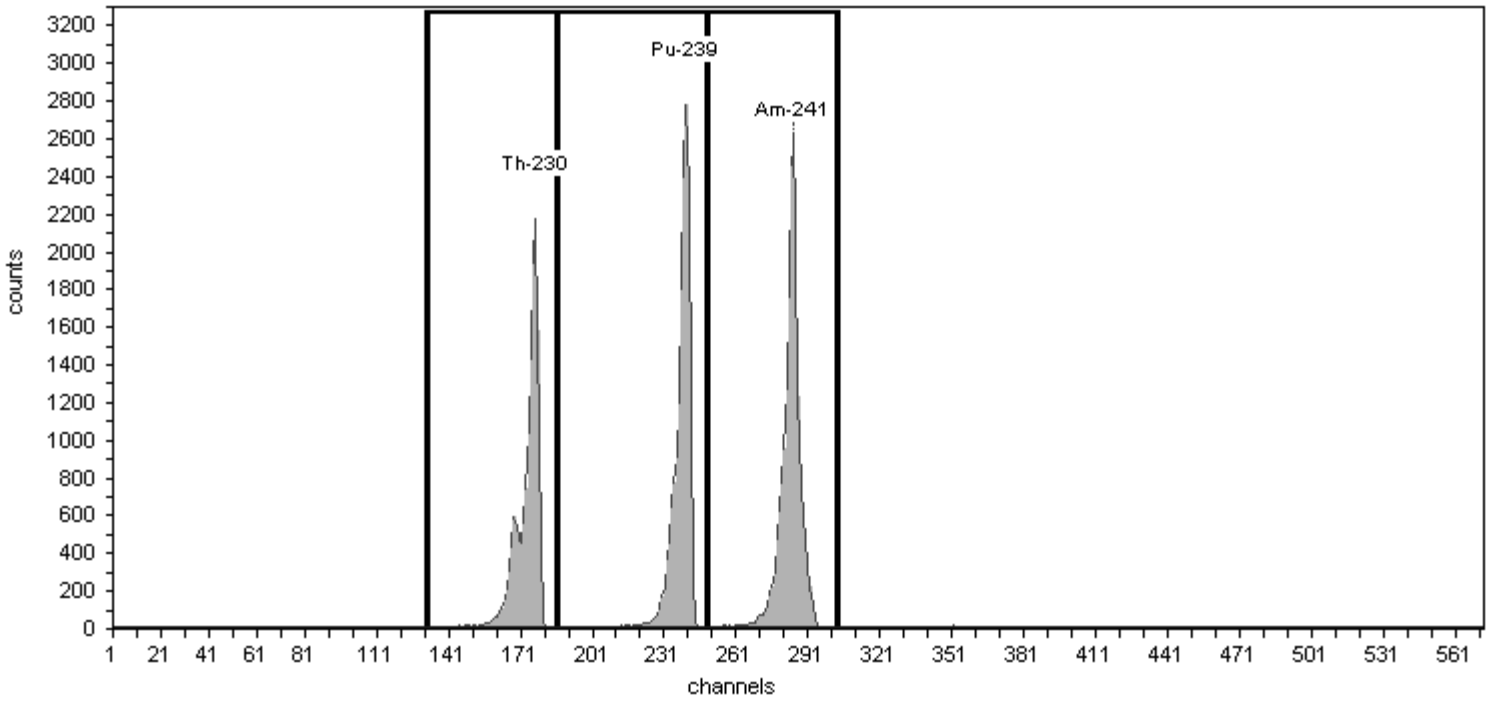
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV56 , SN: 52-059EE5
Acquisition Start Date: 5/4/2014 9:04:54PM
Live Time: 140.00 min.
Real Time: 140.12 min.
Efficiency: 26.09% +/- 0.30% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	13,567.00	96.91
Pu-239	240	5.16	186	249	15,909.00	113.64
Am-241	284	5.49	249	303	18,104.00	129.31

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:53:44PM 5/5/2014

Calibration

Sample Name: IC-9793;AV57-20140504
Description:
Detector: AV57

Calibration Date: 5/5/2014 6:53:40PM
Analyst: 60040

Source Info

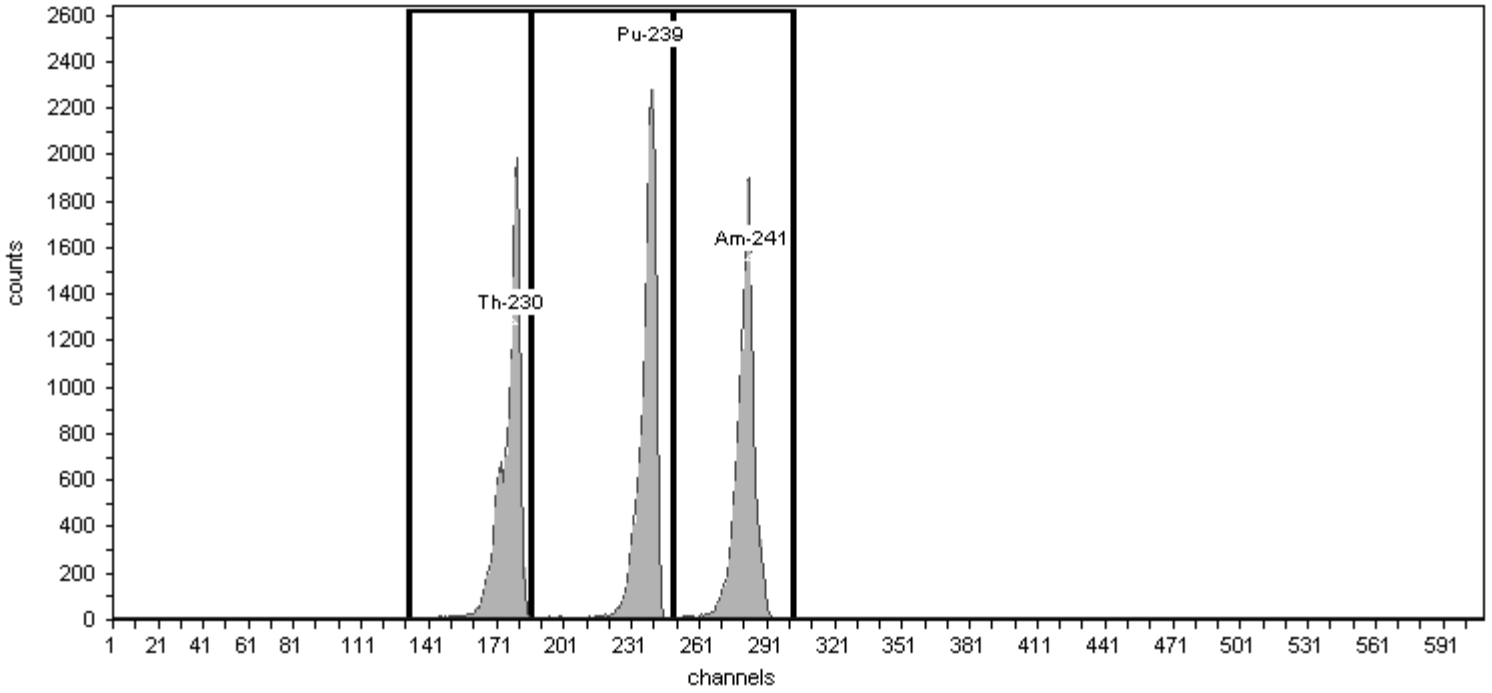
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV57 , SN: 48-158EE3
Acquisition Start Date: 5/4/2014 9:05:08PM
Live Time: 140.00 min.
Real Time: 140.12 min.
Efficiency: 26.74% +/- 0.33% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,915.00	106.54
Pu-239	240	5.16	186	249	15,361.00	109.72
Am-241	284	5.49	249	303	14,709.00	105.06

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:53:50PM 5/5/2014

Calibration

Sample Name: IC-9794;AV58-20140504
Description:
Detector: AV58

Calibration Date: 5/5/2014 6:53:46PM
Analyst: 60040

Source Info

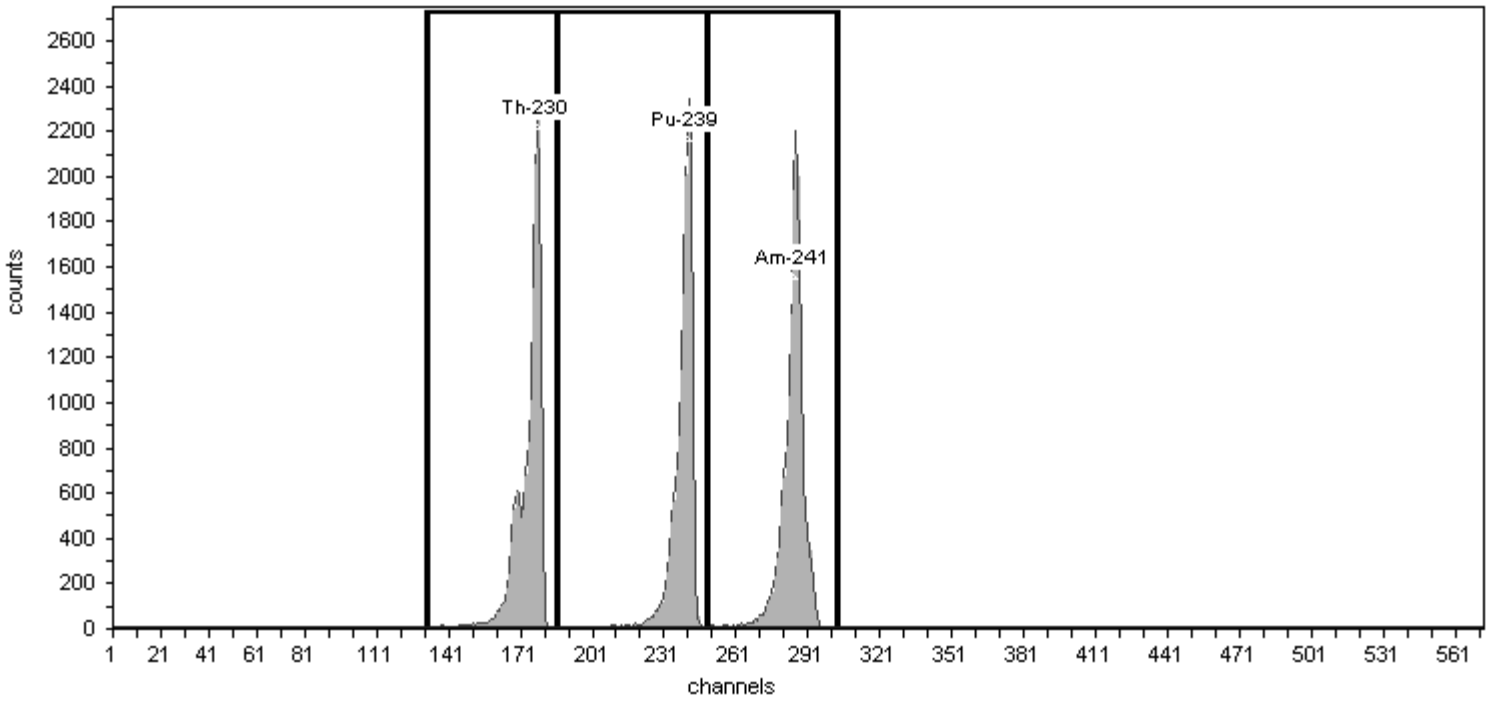
Certificate ID: 82242-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV58 , SN: 52-102 C5
Acquisition Start Date: 5/4/2014 9:05:25PM
Live Time: 140.00 min.
Real Time: 140.12 min.
Efficiency: 26.56% +/- 0.33% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,633.00	104.52
Pu-239	240	5.16	186	249	14,396.00	102.83
Am-241	284	5.49	249	303	15,822.00	113.01

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:53:56PM 5/5/2014

Calibration

Sample Name: IC-9795;AV59-20140504
Description:
Detector: AV59

Calibration Date: 5/5/2014 6:53:53PM
Analyst: 60040

Source Info

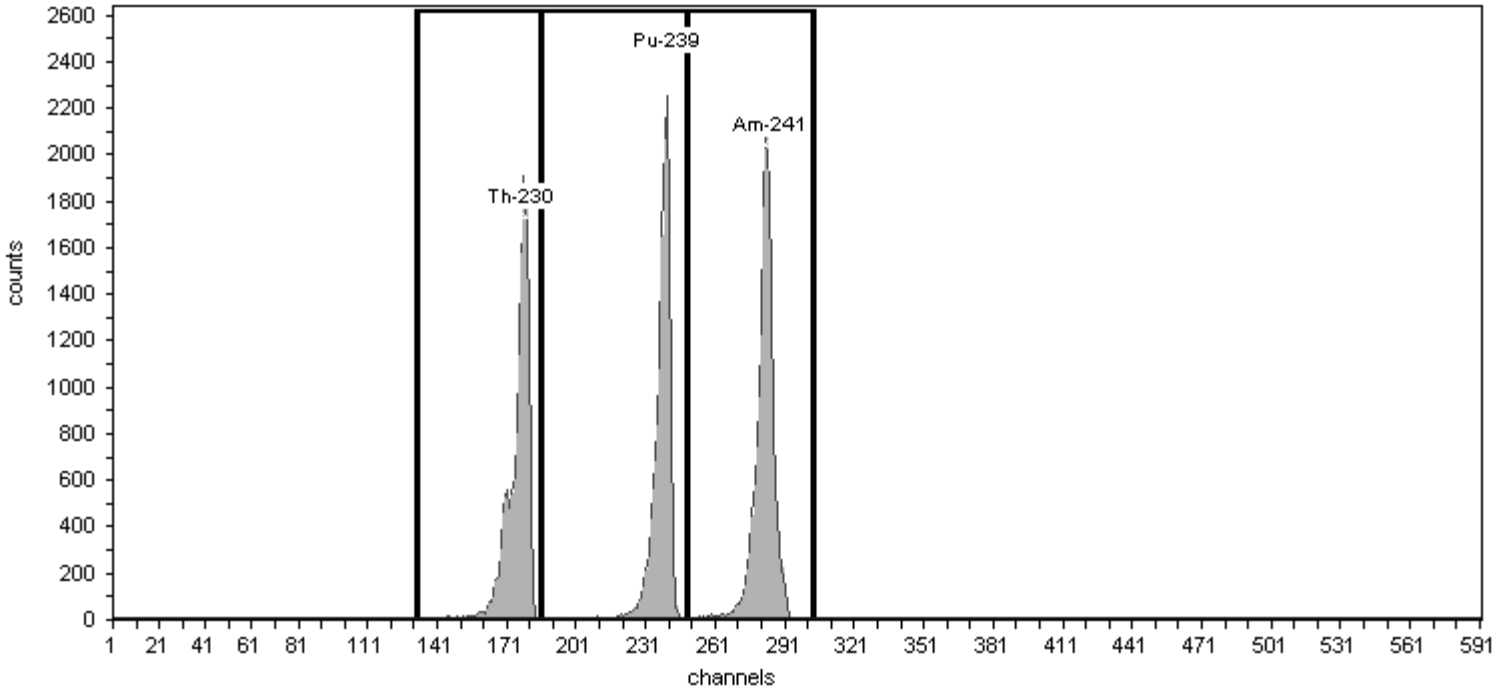
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV59 , SN: 49-155M7
Acquisition Start Date: 5/4/2014 9:05:42PM
Live Time: 140.00 min.
Real Time: 140.07 min.
Efficiency: 27.44% +/- 0.36% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	13,530.00	96.64
Pu-239	240	5.16	186	249	13,591.00	97.08
Am-241	284	5.49	249	303	14,815.00	105.82

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:54:03PM 5/5/2014

Calibration

Sample Name: IC-9817;AV60-20140504
Description:
Detector: AV60

Calibration Date: 5/5/2014 6:53:59PM
Analyst: 60040

Source Info

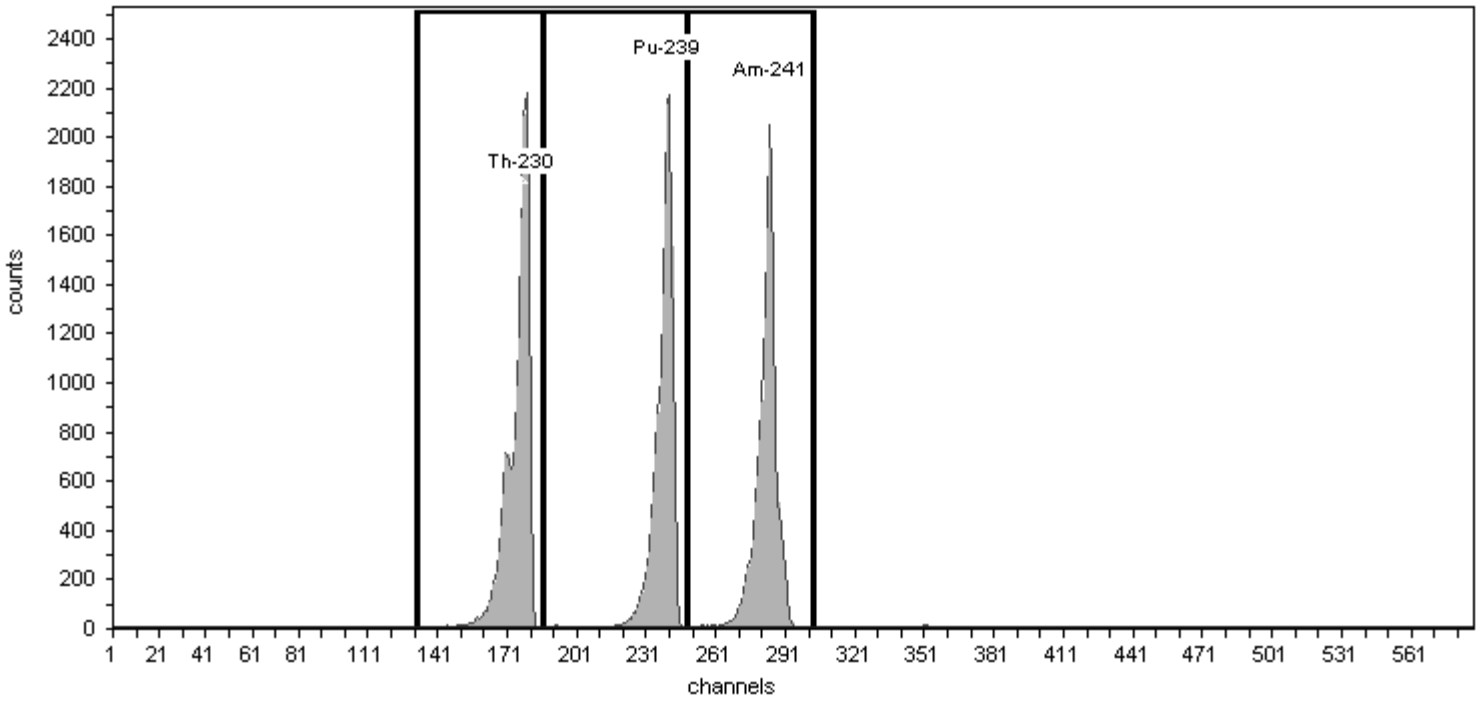
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV60 , SN: 49-027117
Acquisition Start Date: 5/4/2014 9:06:02PM
Live Time: 140.00 min.
Real Time: 140.07 min.
Efficiency: 26.33% +/- 0.32% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	16,279.00	116.28
Pu-239	240	5.16	186	249	14,858.00	106.13
Am-241	284	5.49	249	303	15,157.00	108.26

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:54:10PM 5/5/2014

Calibration

Sample Name: IC-9884;AV61-20140504
Description:
Detector: AV61

Calibration Date: 5/5/2014 6:54:06PM
Analyst: 60040

Source Info

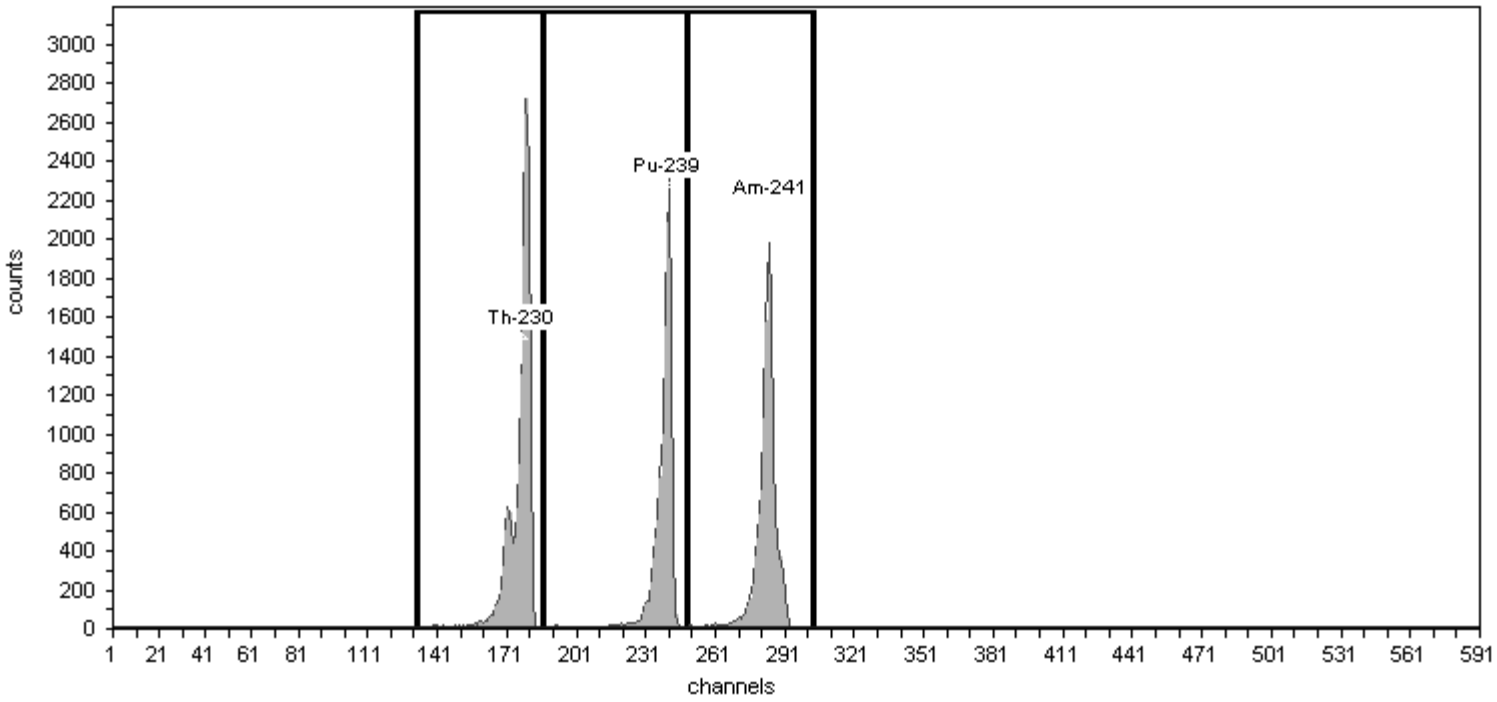
Certificate ID: 82245-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV61 , SN: 5-051JJ3
Acquisition Start Date: 5/4/2014 9:06:04PM
Live Time: 140.00 min.
Real Time: 140.07 min.
Efficiency: 26.46% +/- 0.38% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,902.00	106.44
Pu-239	240	5.16	186	249	12,091.00	86.36
Am-241	284	5.49	249	303	12,283.00	87.74

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:54:16PM 5/5/2014

Calibration

Sample Name: IC-9885;AV62-20140504
Description:
Detector: AV62

Calibration Date: 5/5/2014 6:54:13PM
Analyst: 60040

Source Info

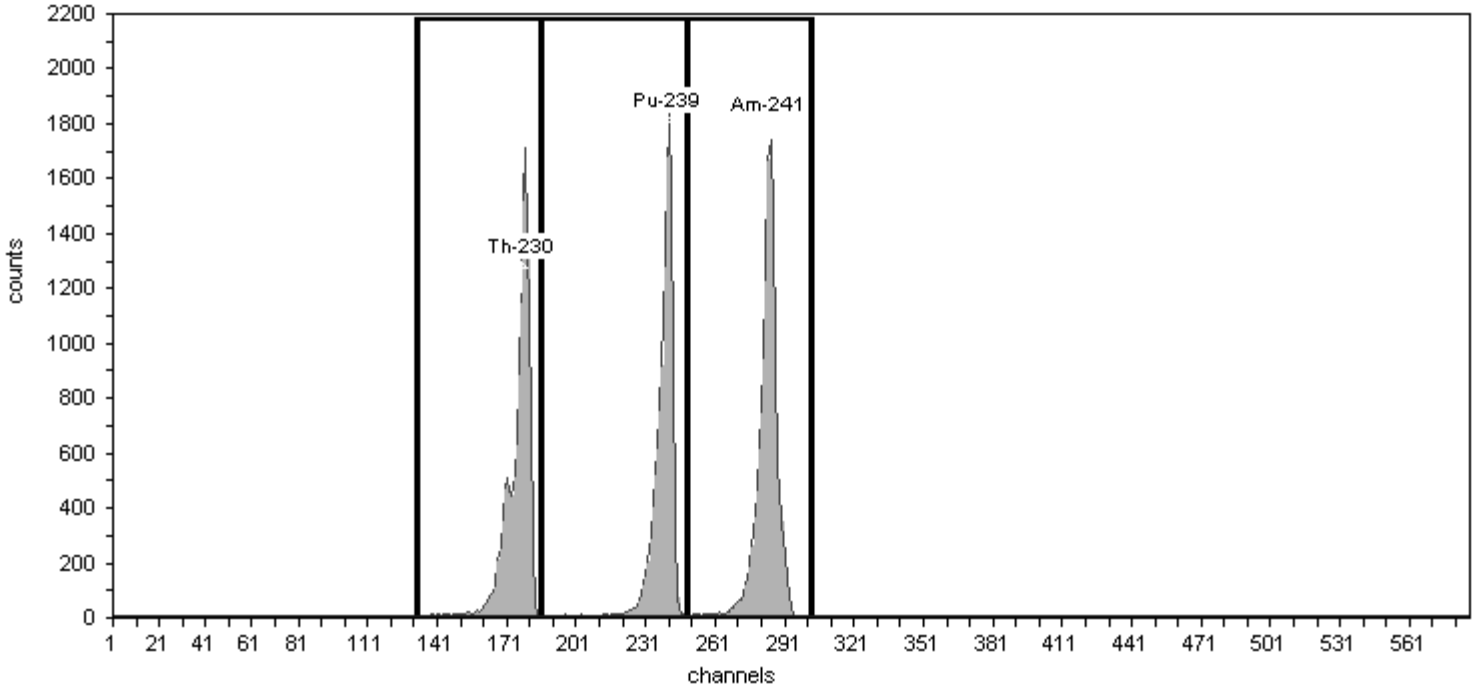
Certificate ID: 82246-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV62 , SN: 52-060FF2
Acquisition Start Date: 5/4/2014 9:06:28PM
Live Time: 140.00 min.
Real Time: 140.07 min.
Efficiency: 26.34% +/- 0.38% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	12,181.00	87.01
Pu-239	240	5.16	186	249	12,037.00	85.98
Am-241	284	5.49	249	303	13,168.00	94.06

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:54:23PM 5/5/2014

Calibration

Sample Name: IC-9886;AV63-20140504
Description:
Detector: AV63

Calibration Date: 5/5/2014 6:54:19PM
Analyst: 60040

Source Info

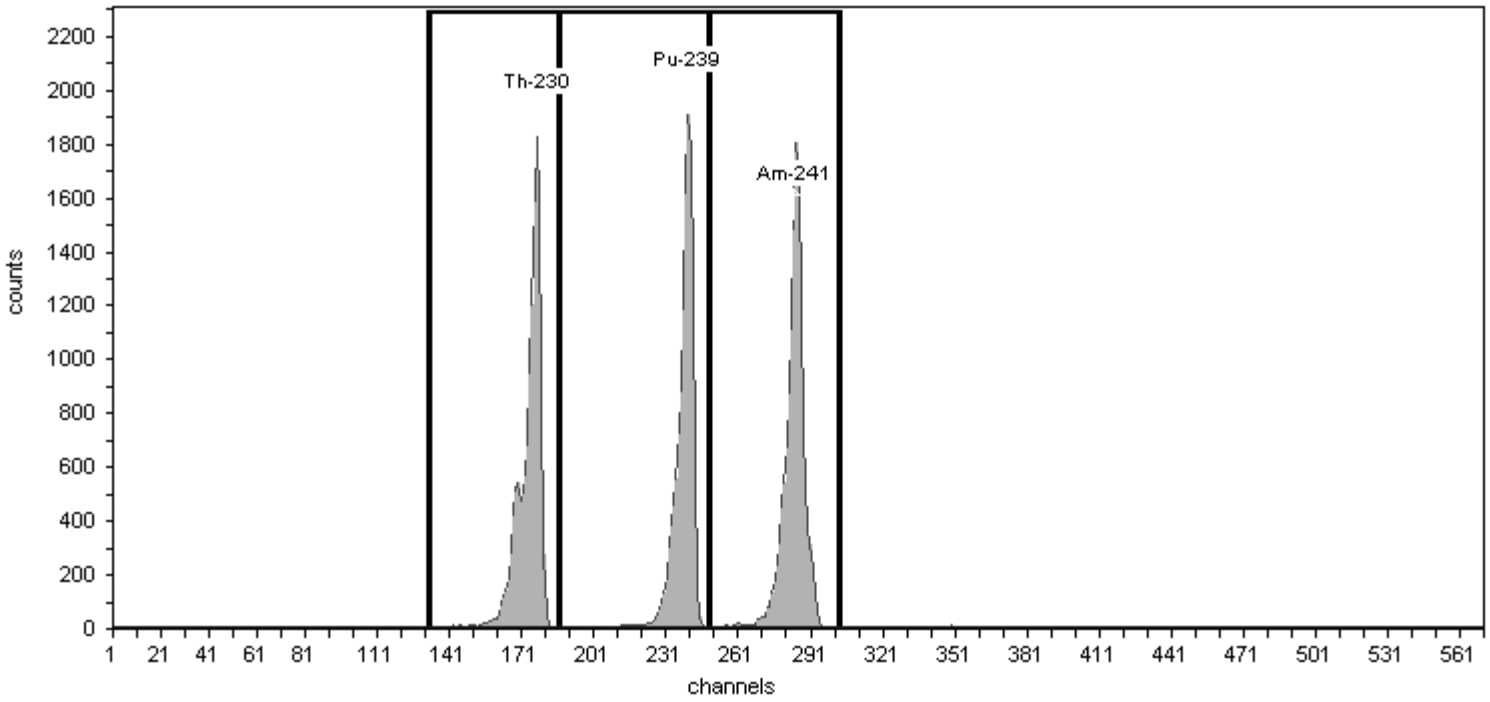
Certificate ID: 82247-334
Prepared by: Analytics

Certification Date: 6/10/2010 12:00:00PM
Description:

Acquisition

Detector: AV63 , SN: 47-029ff2
Acquisition Start Date: 5/4/2014 9:06:30PM
Live Time: 140.00 min.
Real Time: 140.07 min.
Efficiency: 25.48% +/- 0.34% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	13,102.00	93.59
Pu-239	240	5.16	186	249	12,548.00	89.63
Am-241	284	5.49	249	303	13,448.00	96.06

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:44:07PM 5/4/2014

Calibration

Sample Name: IC-7107;AV64-20140504a
Description:
Detector: AV64

Calibration Date: 5/4/2014 8:44:03PM
Analyst: 60040

Source Info

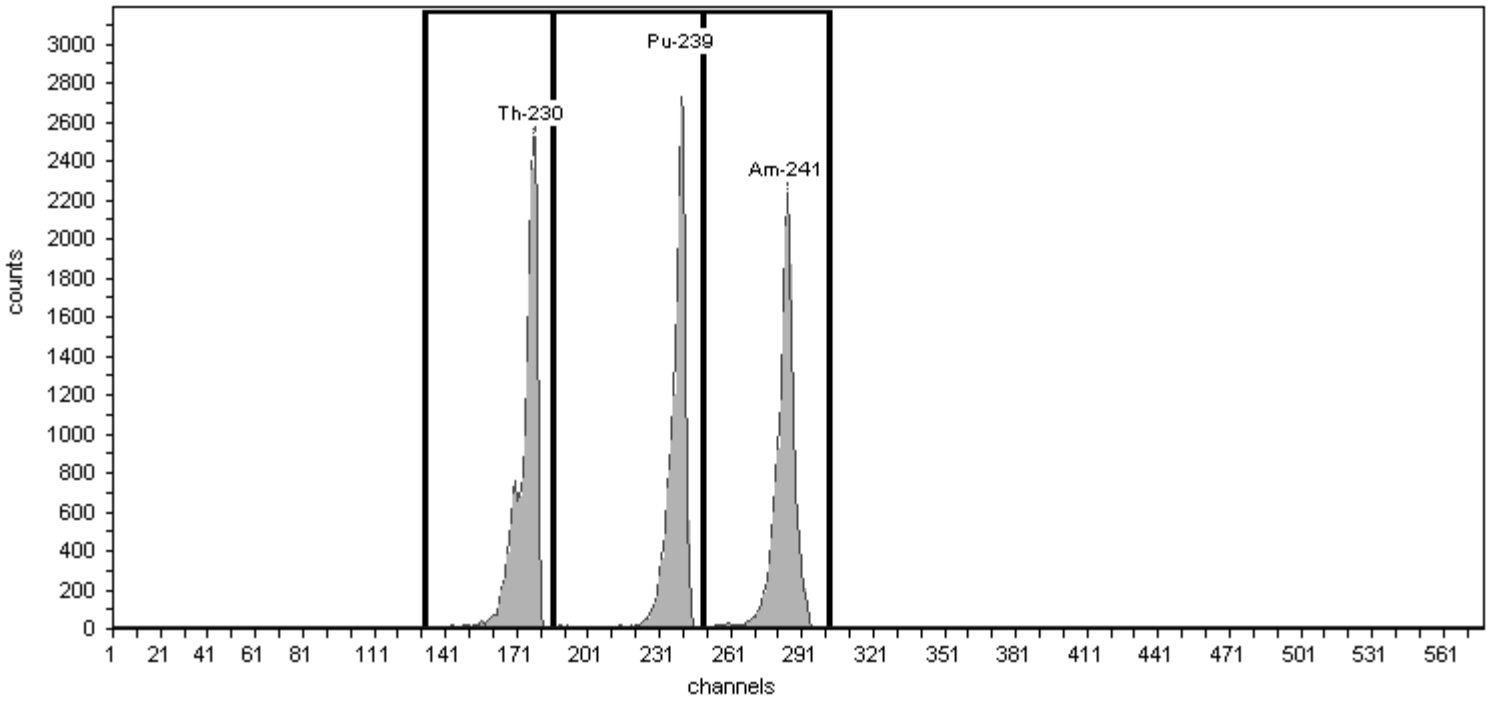
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV64 , SN: 47-029ee4
Acquisition Start Date: 5/4/2014 5:47:46PM
Live Time: 140.00 min.
Real Time: 140.04 min.
Efficiency: 27.75% +/- 0.31% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	17,513.00	125.09
Pu-239	240	5.16	186	249	17,121.00	122.29
Am-241	284	5.49	249	303	16,702.00	119.30

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:44:00PM 5/4/2014

Calibration

Sample Name: IC-8874;AV65-20140504
Description:
Detector: AV65

Calibration Date: 5/4/2014 8:43:55PM
Analyst: 60040

Source Info

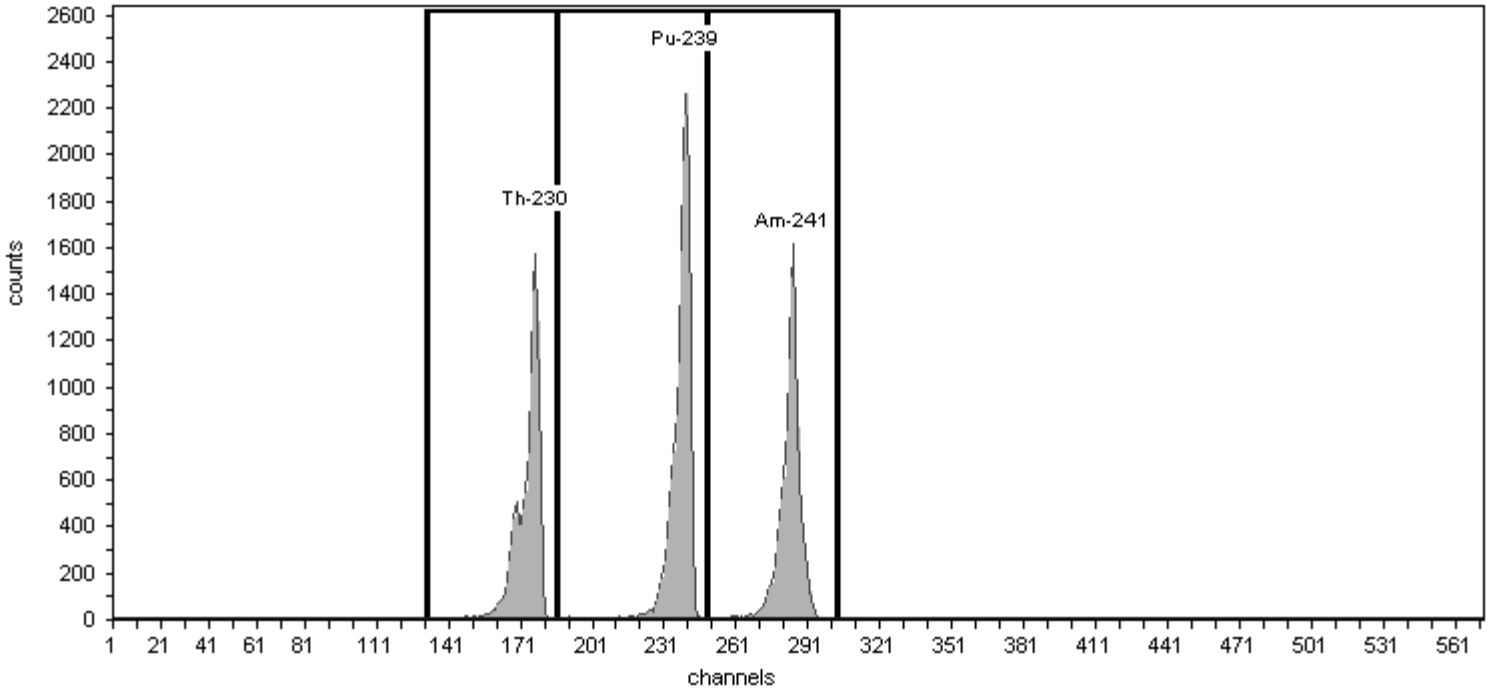
Certificate ID: 82233-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV65 , SN: 44-049JJ1
Acquisition Start Date: 5/4/2014 5:47:20PM
Live Time: 140.00 min.
Real Time: 140.04 min.
Efficiency: 27.13% +/- 0.38% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	10,885.00	77.75
Pu-239	240	5.16	186	249	14,355.00	102.54
Am-241	284	5.49	249	303	11,446.00	81.76

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:44:13PM 5/4/2014

Calibration

Sample Name: IC-8875;AV66-20140504
Description:
Detector: AV66

Calibration Date: 5/4/2014 8:44:10PM
Analyst: 60040

Source Info

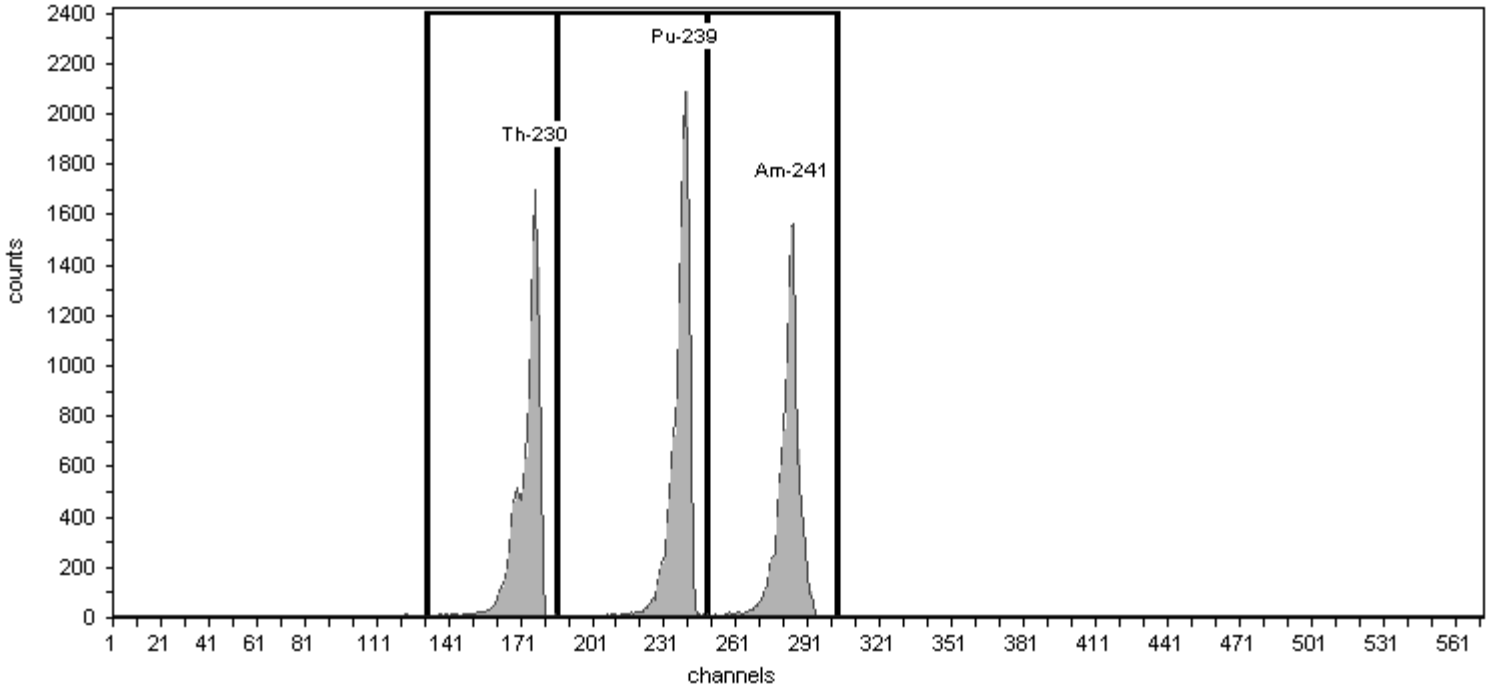
Certificate ID: 82234-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV66 , SN: 48-158EE2
Acquisition Start Date: 5/4/2014 5:47:59PM
Live Time: 140.00 min.
Real Time: 140.04 min.
Efficiency: 25.93% +/- 0.36% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	12,034.00	85.96
Pu-239	240	5.16	186	249	13,485.00	96.32
Am-241	284	5.49	249	303	12,078.00	86.27

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:44:19PM 5/4/2014

Calibration

Sample Name: IC-8876;AV67-20140504
Description:
Detector: AV67

Calibration Date: 5/4/2014 8:44:15PM
Analyst: 60040

Source Info

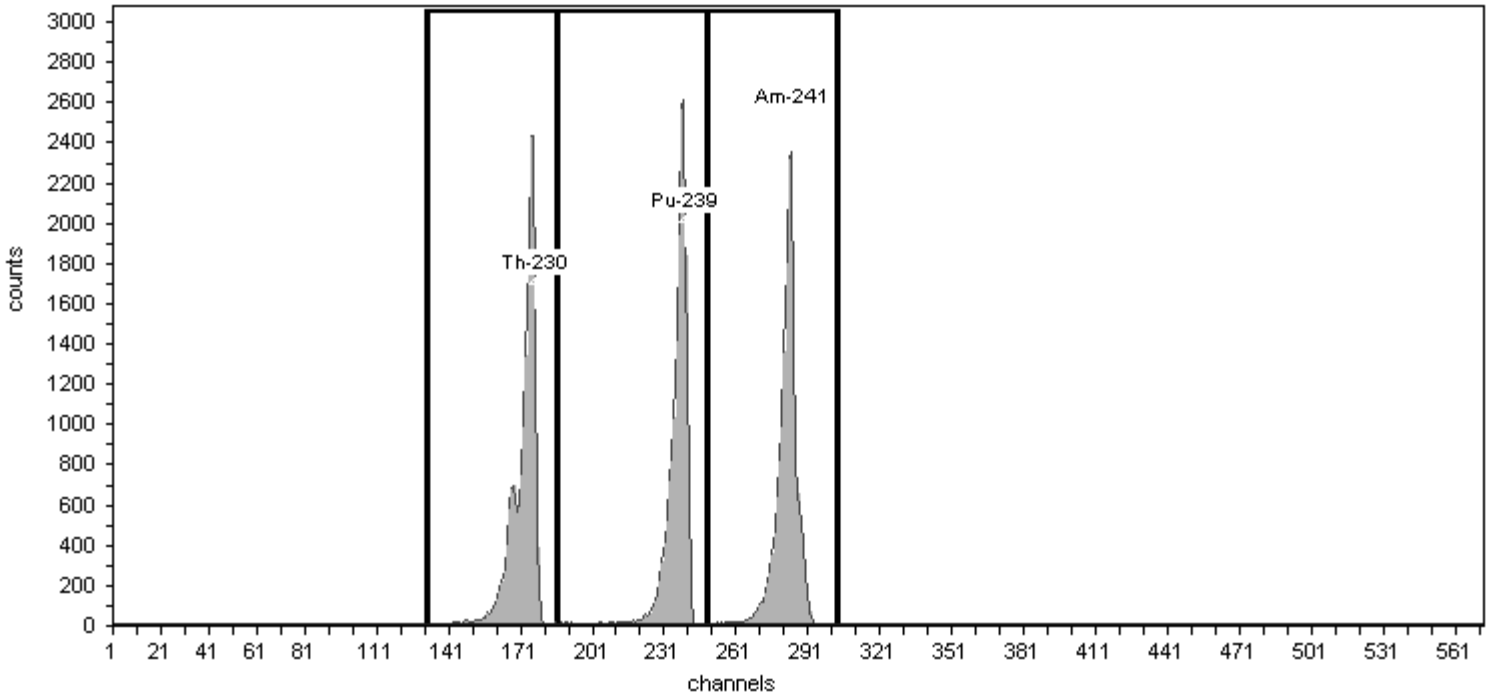
Certificate ID: 82235-334
Prepared by: Analytics

Certification Date: 6/4/2010 12:00:00PM
Description:

Acquisition

Detector: AV67 , SN: 52-102 D7
Acquisition Start Date: 5/4/2014 5:48:10PM
Live Time: 140.00 min.
Real Time: 140.12 min.
Efficiency: 27.32% +/- 0.32% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	16,552.00	118.23
Pu-239	240	5.16	186	249	16,093.00	114.95
Am-241	284	5.49	249	303	16,706.00	119.33

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:44:25PM 5/4/2014

Calibration

Sample Name: IC-8877;AV68-20140504
Description:
Detector: AV68

Calibration Date: 5/4/2014 8:44:22PM
Analyst: 60040

Source Info

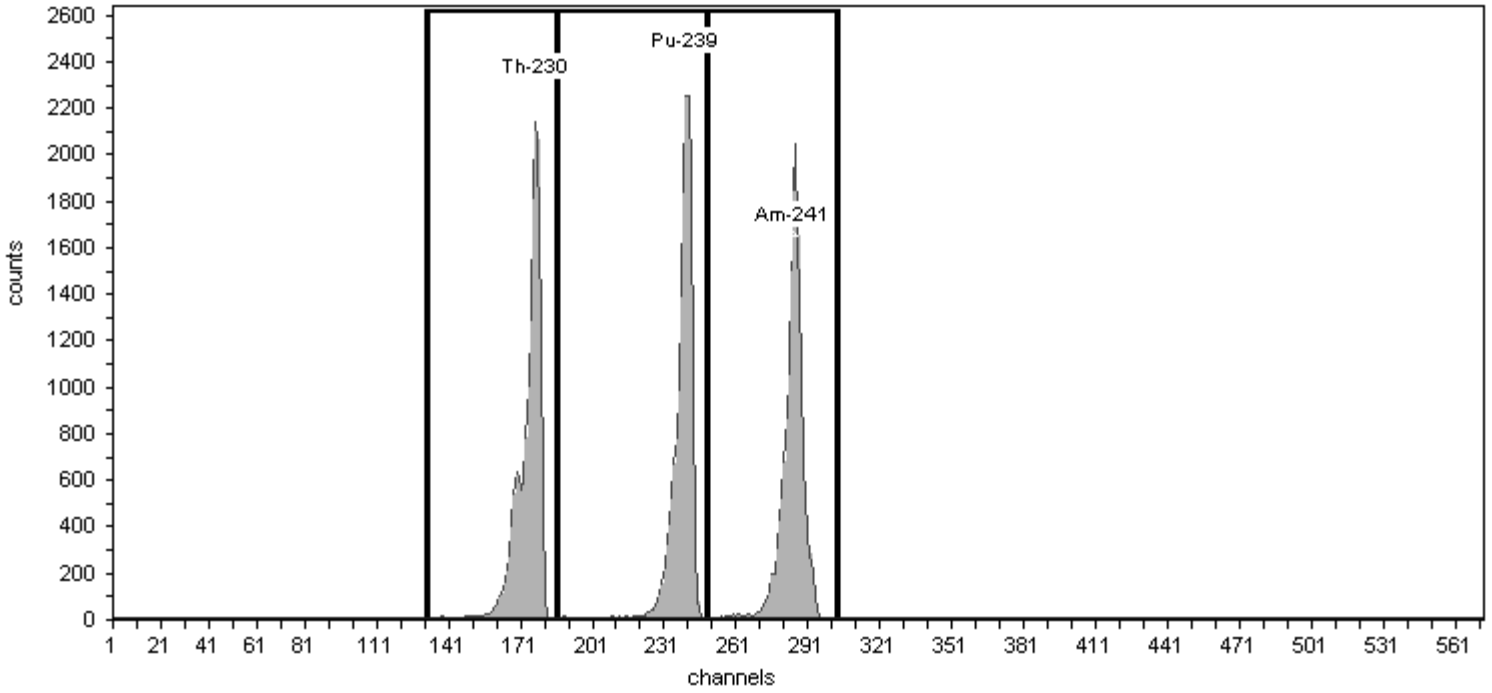
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV68 , SN: 48-45884
Acquisition Start Date: 5/4/2014 5:48:38PM
Live Time: 140.00 min.
Real Time: 140.12 min.
Efficiency: 26.49% +/- 0.31% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	15,401.00	110.01
Pu-239	240	5.16	186	249	15,531.00	110.94
Am-241	284	5.49	249	303	15,053.00	107.52

Initial Calibration Verifications

Alpha Spectroscopy Calibration Summary

Detector: AV3

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120519/1	05/05/14 22:26	82234-334_00001	0.2609	0.20-0.32		
ICV 160-120855/1	05/07/14 23:02	82233-334_00001	0.2696	0.20-0.32	103.3	95-105
CCV 160-127913/1	06/19/14 16:44	82234-334_00001	0.2566	0.20-0.32	98.3	95-105

Detector: AV4

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120520/1	05/05/14 22:26	82235-334_00001	0.2582	0.20-0.32		
ICV 160-120856/1	05/07/14 23:03	82234-334_00001	0.2599	0.20-0.32	100.6	95-105
CCV 160-127914/1	06/19/14 16:44	82235-334_00001	0.2590	0.20-0.32	100.3	95-105

Detector: AV6

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120521/1	05/05/14 22:26	82237-334_00003	0.2589	0.20-0.32		
ICV 160-120857/1	05/07/14 23:03	82236-334_00001	0.2622	0.20-0.32	101.3	95-105
CCV 160-127932/1	06/19/14 18:06	82237-334_00003	0.2606	0.20-0.32	100.7	95-105

Detector: AV7

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120843/1	05/07/14 19:51	82236-334_00001	0.2580	0.20-0.32		
ICV 160-120858/1	05/07/14 23:03	82237-334_00003	0.2546	0.20-0.32	98.6	95-105
CCV 160-127943/1	06/19/14 16:44	82236-334_00001	0.2549	0.20-0.32	98.8	95-105

Detector: AV8

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120523/1	05/05/14 22:27	82240-334_00001	0.2705	0.20-0.32		
ICV 160-121084/1	05/08/14 00:14	82234-334_00001	0.2639	0.20-0.32	97.6	95-105
CCV 160-127954/1	06/19/14 18:06	82240-334_00001	0.2668	0.20-0.32	98.6	95-105

Detector: AV10

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120512/1	05/05/14 22:27	82242-334_00001	0.2584	0.20-0.32		
ICV 160-120847/1	05/07/14 23:03	82241-334_00001	0.2593	0.20-0.32	100.3	95-105
CCV 160-127860/1	06/19/14 18:06	82242-334_00001	0.2552	0.20-0.32	98.7	95-105

Detector: AV11

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120513/1	05/05/14 22:27	82243-334_00001	0.2688	0.20-0.32		
ICV 160-120848/1	05/07/14 23:04	82242-334_00001	0.2598	0.20-0.32	96.6	95-105
CCV 160-127871/1	06/19/14 18:07	82243-334_00001	0.2647	0.20-0.32	98.5	95-105

Detector: AV13

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120515/1	05/05/14 22:28	82245-334_00001	0.2599	0.20-0.32		
ICV 160-120850/1	05/07/14 23:04	82244-334_00001	0.2556	0.20-0.32	98.4	95-105
CCV 160-127892/1	06/19/14 19:45	82245-334_00001	0.2566	0.20-0.32	98.7	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV14

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120516/1	05/05/14 22:28	82246-334_00001	0.2634	0.20-0.32		
ICV 160-120851/1	05/07/14 23:04	82245-334_00001	0.2665	0.20-0.32	101.2	95-105
CCV 160-127902/1	06/19/14 18:08	82246-334_00001	0.2615	0.20-0.32	99.3	95-105

Detector: AV15

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120517/1	05/05/14 22:28	82247-334_00001	0.2562	0.20-0.32		
ICV 160-120852/1	05/07/14 23:04	82246-334_00001	0.2590	0.20-0.32	101.1	95-105
CCV 160-127903/1	06/19/14 19:45	82247-334_00001	0.2528	0.20-0.32	98.7	95-105

Detector: AV16

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120398/1	05/05/14 19:27	82232-334_00001	0.2711	0.20-0.32		
ICV 160-121072/1	05/08/14 00:14	82247-334_00001	0.2609	0.20-0.32	96.2	95-105
CCV 160-127904/1	06/19/14 18:08	82232-334_00001	0.2712	0.20-0.32	100.1	95-105

Detector: AV17

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120399/1	05/05/14 19:28	82233-334_00001	0.2607	0.20-0.32		
ICV 160-121073/1	05/08/14 00:14	82232-334_00001	0.2633	0.20-0.32	101.0	95-105
CCV 160-127905/1	06/19/14 18:08	82233-334_00001	0.2613	0.20-0.32	100.2	95-105

Detector: AV18

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120400/1	05/05/14 19:28	82234-334_00001	0.2546	0.20-0.32		
ICV 160-121074/1	05/08/14 00:14	82233-334_00001	0.2618	0.20-0.32	102.8	95-105
CCV 160-127906/1	06/19/14 18:08	82234-334_00001	0.2539	0.20-0.32	99.7	95-105

Detector: AV19

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120401/1	05/05/14 19:28	82235-334_00001	0.2534	0.20-0.32		
ICV 160-121361/1	05/08/14 14:33	82235-334_00001	0.2496	0.20-0.32	98.5	95-105
CCV 160-127907/1	06/19/14 18:08	82235-334_00001	0.2536	0.20-0.32	100.1	95-105

Detector: AV20

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120402/1	05/05/14 19:28	82236-334_00001	0.2556	0.20-0.32		
ICV 160-120854/1	05/07/14 23:05	82235-334_00001	0.2551	0.20-0.32	99.8	95-105
CCV 160-127909/1	06/19/14 18:08	82236-334_00001	0.2577	0.20-0.32	100.8	95-105

Detector: AV21

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120403/1	05/05/14 19:28	82237-334_00003	0.2545	0.20-0.32		
ICV 160-121075/1	05/08/14 00:16	82236-334_00001	0.2553	0.20-0.32	100.3	95-105
CCV 160-127910/1	06/19/14 19:45	82237-334_00003	0.2545	0.20-0.32	100.0	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV23

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120404/1	05/05/14 19:29	82240-334_00001	0.2591	0.20-0.32		
ICV 160-121362/1	05/08/14 14:33	82233-334_00001	0.2592	0.20-0.32	100.0	95-105
CCV 160-127911/1	06/19/14 19:45	82240-334_00001	0.2586	0.20-0.32	99.8	95-105

Detector: AV24

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120405/1	05/05/14 19:29	82241-334_00001	0.2642	0.20-0.32		
ICV 160-121076/1	05/08/14 00:16	82240-334_00001	0.2662	0.20-0.32	100.8	95-105
CCV 160-127912/1	06/19/14 19:45	82241-334_00001	0.2644	0.20-0.32	100.1	95-105

Detector: AV43

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120406/1	05/05/14 19:30	82242-334_00001	0.2574	0.20-0.32		
ICV 160-121077/1	05/08/14 00:16	82241-334_00001	0.2568	0.20-0.32	99.8	95-105
CCV 160-127969/1	06/22/14 17:38	82242-334_00001	0.2558	0.20-0.32	99.4	95-105

Detector: AV44

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120407/1	05/05/14 19:30	82243-334_00001	0.2632	0.20-0.32		
ICV 160-121078/1	05/08/14 00:17	82242-334_00001	0.2594	0.20-0.32	98.6	95-105
CCV 160-127970/1	06/22/14 17:38	82243-334_00001	0.2633	0.20-0.32	100.0	95-105

Detector: AV45

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120408/1	05/05/14 19:30	82244-334_00001	0.2606	0.20-0.32		
ICV 160-121363/1	05/08/14 14:32	82243-334_00001	0.2658	0.20-0.32	102.0	95-105
CCV 160-127985/1	06/22/14 20:07	82244-334_00001	0.2609	0.20-0.32	100.1	95-105

Detector: AV46

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120409/1	05/05/14 19:30	82245-334_00001	0.2680	0.20-0.32		
ICV 160-121079/1	05/08/14 00:18	82244-334_00001	0.2610	0.20-0.32	97.4	95-105
CCV 160-127986/1	06/22/14 21:17	82245-334_00001	0.2669	0.20-0.32	99.6	95-105

Detector: AV48

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120411/1	05/05/14 19:32	82247-334_00001	0.2578	0.20-0.32		
ICV 160-121081/1	05/08/14 00:18	82246-334_00001	0.2600	0.20-0.32	100.9	95-105
CCV 160-127988/1	06/22/14 20:07	82247-334_00001	0.2577	0.20-0.32	99.9	95-105

Detector: AV49

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120271/1	05/04/14 21:03	82232-334_00001	0.2653	0.20-0.32		
ICV 160-121364/1	05/08/14 14:34	82247-334_00001	0.2545	0.20-0.32	95.9	95-105
CCV 160-127989/1	06/22/14 18:52	82232-334_00001	0.2674	0.20-0.32	100.8	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV53

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120275/1	05/04/14 21:04	82236-334_00001	0.2632	0.20-0.32		
ICV 160-121082/1	05/08/14 00:18	82235-334_00001	0.2648	0.20-0.32	100.6	95-105
CCV 160-127992/1	06/22/14 18:53	82236-334_00001	0.2651	0.20-0.32	100.7	95-105

Detector: AV54

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120276/1	05/04/14 21:04	82237-334_00003	0.2602	0.20-0.32		
ICV 160-121368/1	05/08/14 14:34	82236-334_00001	0.2609	0.20-0.32	100.3	95-105
CCV 160-127993/1	06/22/14 18:53	82237-334_00003	0.2628	0.20-0.32	101.0	95-105

Detector: AV55

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120842/1	05/07/14 19:51	82232-334_00001	0.2679	0.20-0.32		
ICV 160-121083/1	05/08/14 00:19	82237-334_00003	0.2569	0.20-0.32	95.9	95-105
CCV 160-127994/1	06/22/14 20:08	82232-334_00001	0.2683	0.20-0.32	100.2	95-105

Detector: AV56

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120278/1	05/04/14 21:04	82240-334_00001	0.2609	0.20-0.32		
ICV 160-121369/1	05/08/14 17:18	82247-334_00001	0.2519	0.20-0.32	96.5	95-105
CCV 160-127995/1	06/22/14 18:53	82240-334_00001	0.2626	0.20-0.32	100.7	95-105

Detector: AV57

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120279/1	05/04/14 21:05	82241-334_00001	0.2674	0.20-0.32		
ICV 160-121370/1	05/08/14 14:35	82240-334_00001	0.2676	0.20-0.32	100.1	95-105
CCV 160-127996/1	06/22/14 18:53	82241-334_00001	0.2692	0.20-0.32	100.7	95-105

Detector: AV58

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120280/1	05/04/14 21:05	82242-334_00001	0.2656	0.20-0.32		
ICV 160-121371/1	05/08/14 14:35	82241-334_00001	0.2710	0.20-0.32	102.0	95-105
CCV 160-127997/1	06/22/14 18:53	82242-334_00001	0.2631	0.20-0.32	99.1	95-105

Detector: AV59

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120281/1	05/04/14 21:05	82243-334_00001	0.2744	0.20-0.32		
ICV 160-121372/1	05/08/14 14:36	82242-334_00001	0.2677	0.20-0.32	97.5	95-105
CCV 160-127998/1	06/22/14 20:09	82243-334_00001	0.2720	0.20-0.32	99.1	95-105

Detector: AV60

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120282/1	05/04/14 21:06	82244-334_00001	0.2633	0.20-0.32		
ICV 160-121373/1	05/08/14 17:21	82243-334_00001	0.2725	0.20-0.32	103.5	95-105
CCV 160-127999/1	06/22/14 21:17	82244-334_00001	0.2629	0.20-0.32	99.8	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV61

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120283/1	05/04/14 21:06	82245-334_00001	0.2646	0.20-0.32		
ICV 160-121374/1	05/08/14 14:36	82244-334_00001	0.2581	0.20-0.32	97.5	95-105
CCV 160-128018/1	06/22/14 22:21	82245-334_00001	0.2622	0.20-0.32	99.1	95-105

Detector: AV62

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120284/1	05/04/14 21:06	82246-334_00001	0.2634	0.20-0.32		
ICV 160-121375/1	05/08/14 14:36	82245-334_00001	0.2622	0.20-0.32	99.6	95-105
CCV 160-128000/1	06/22/14 20:09	82246-334_00001	0.2650	0.20-0.32	100.6	95-105

Detector: AV63

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120285/1	05/04/14 21:06	82247-334_00001	0.2548	0.20-0.32		
ICV 160-121376/1	05/08/14 14:36	82246-334_00001	0.2601	0.20-0.32	102.1	95-105
CCV 160-128001/1	06/22/14 21:18	82247-334_00001	0.2557	0.20-0.32	100.3	95-105

Detector: AV64

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120041/1	05/04/14 17:47	82232-334_00001	0.2775	0.20-0.32		
ICV 160-121389/1	05/11/14 19:31	82247-334_00001	0.2666	0.20-0.32	96.1	95-105
CCV 160-128002/1	06/22/14 21:18	82232-334_00001	0.2776	0.20-0.32	100.0	95-105

Detector: AV65

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120042/1	05/04/14 17:47	82233-334_00001	0.2713	0.20-0.32		
ICV 160-121377/1	05/08/14 17:18	82232-334_00001	0.2712	0.20-0.32	99.9	95-105
CCV 160-128003/1	06/22/14 20:09	82233-334_00001	0.2695	0.20-0.32	99.3	95-105

Detector: AV66

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120043/1	05/04/14 17:47	82234-334_00001	0.2593	0.20-0.32		
ICV 160-121390/1	05/11/14 19:32	82233-334_00001	0.2667	0.20-0.32	102.9	95-105
CCV 160-128004/1	06/22/14 21:18	82234-334_00001	0.2570	0.20-0.32	99.1	95-105

Detector: AV67

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120044/1	05/04/14 17:48	82235-334_00001	0.2732	0.20-0.32		
ICV 160-121391/1	05/11/14 19:32	82234-334_00001	0.2702	0.20-0.32	98.9	95-105
CCV 160-128005/1	06/22/14 18:54	82235-334_00001	0.2782	0.20-0.32	101.8	95-105

Detector: AV68

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120045/1	05/04/14 17:48	82236-334_00001	0.2649	0.20-0.32		
ICV 160-121378/1	05/08/14 14:36	82235-334_00001	0.2630	0.20-0.32	99.3	95-105
CCV 160-128006/1	06/22/14 20:09	82236-334_00001	0.2631	0.20-0.32	99.3	95-105

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:05:47AM 5/8/2014

Calibration

Sample Name: ICV-8874;AV3-20140507
Description:
Detector: AV3

Calibration Date: 5/8/2014 12:05:44AM
Analyst: 60040

Source Info

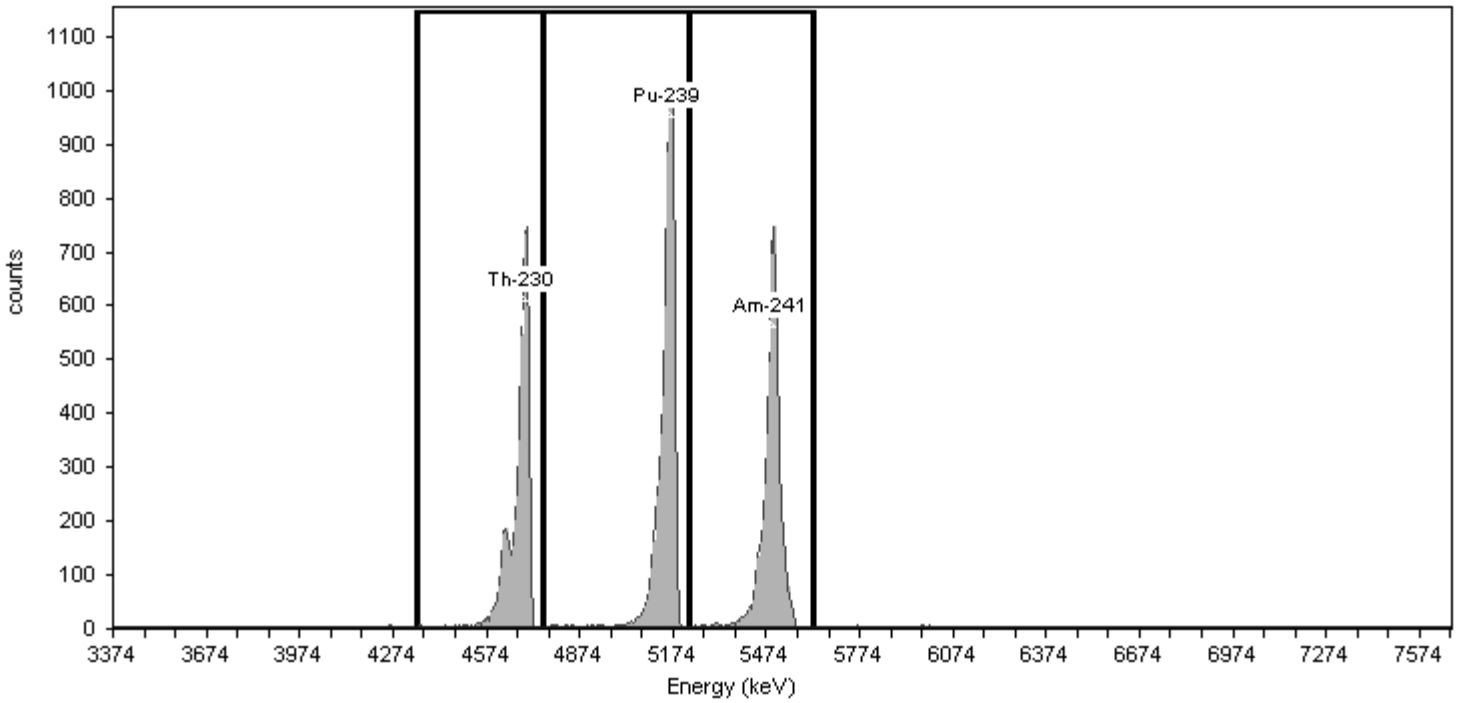
Certificate ID: 82233-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV3 , SN: 49-202 FF7
Acquisition Start Date: 5/7/2014 11:02:35PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 26.96% +/- 0.50% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	4,614.00	76.90
Pu-239	240	5.16	186	249	6,057.00	100.95
Am-241	284	5.49	249	303	4,958.00	82.63

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:05:53AM 5/8/2014

Calibration

Sample Name: ICV-8875;AV4-20140507
Description:
Detector: AV4

Calibration Date: 5/8/2014 12:05:50AM
Analyst: 60040

Source Info

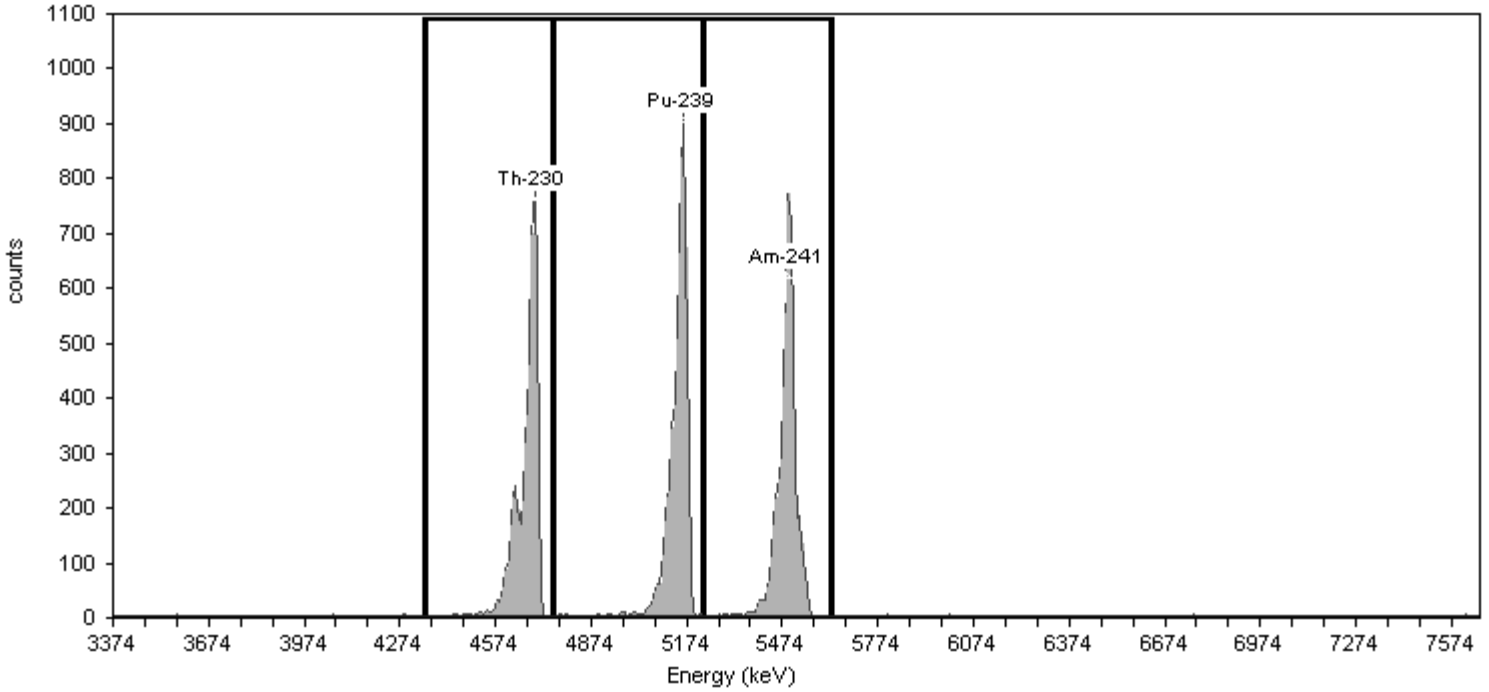
Certificate ID: 82234-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV4 , SN: 46-033Q4
Acquisition Start Date: 5/7/2014 11:03:00PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 25.99% +/- 0.48% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,162.00	86.03
Pu-239	240	5.16	186	249	5,783.00	96.38
Am-241	284	5.49	249	303	5,203.00	86.72

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:00AM 5/8/2014

Calibration

Sample Name: ICV-8877;AV6-20140507
Description:
Detector: AV6

Calibration Date: 5/8/2014 12:05:56AM
Analyst: 60040

Source Info

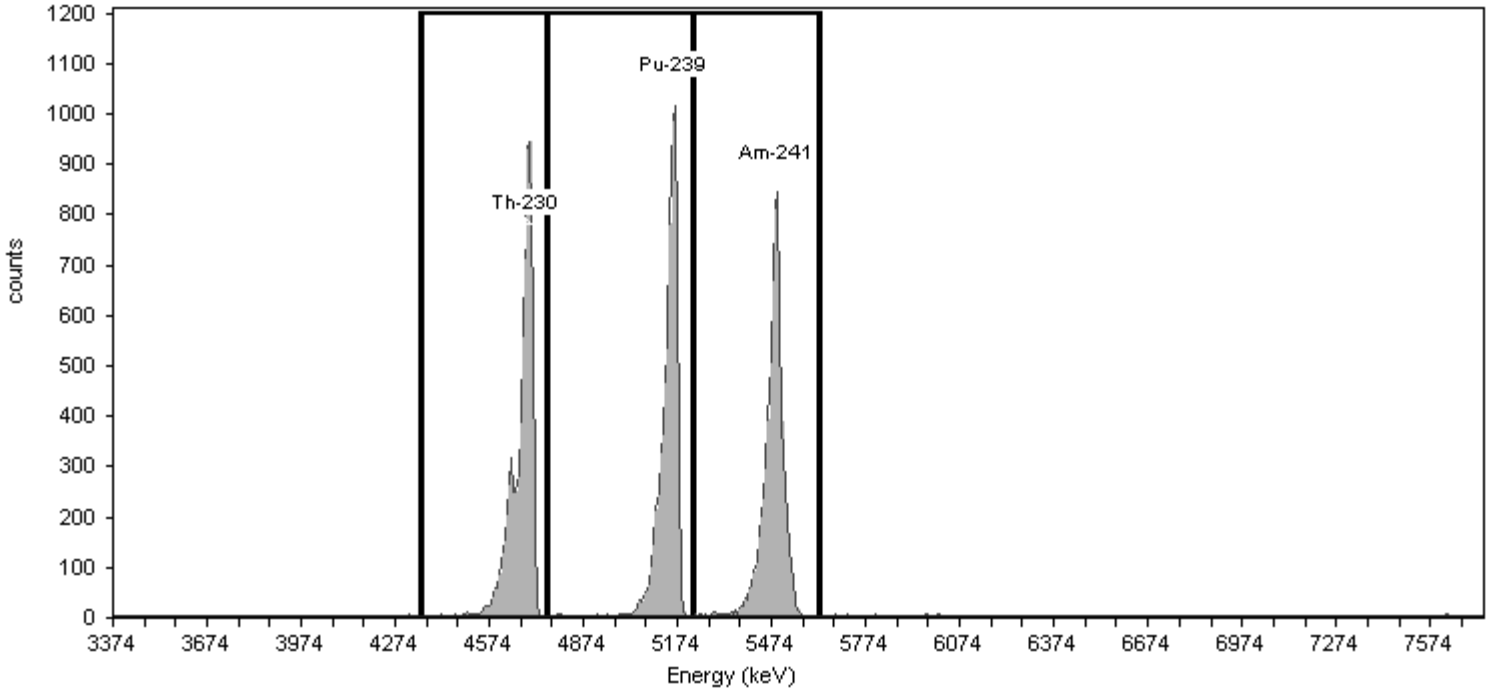
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV6 , SN: 47-27FF2
Acquisition Start Date: 5/7/2014 11:03:21PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 26.22% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,553.00	109.22
Pu-239	240	5.16	186	249	6,552.00	109.20
Am-241	284	5.49	249	303	6,392.00	106.53

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:07AM 5/8/2014

Calibration

Sample Name: ICV-9520;AV7-20140507
Description:
Detector: AV7

Calibration Date: 5/8/2014 12:06:03AM
Analyst: 60040

Source Info

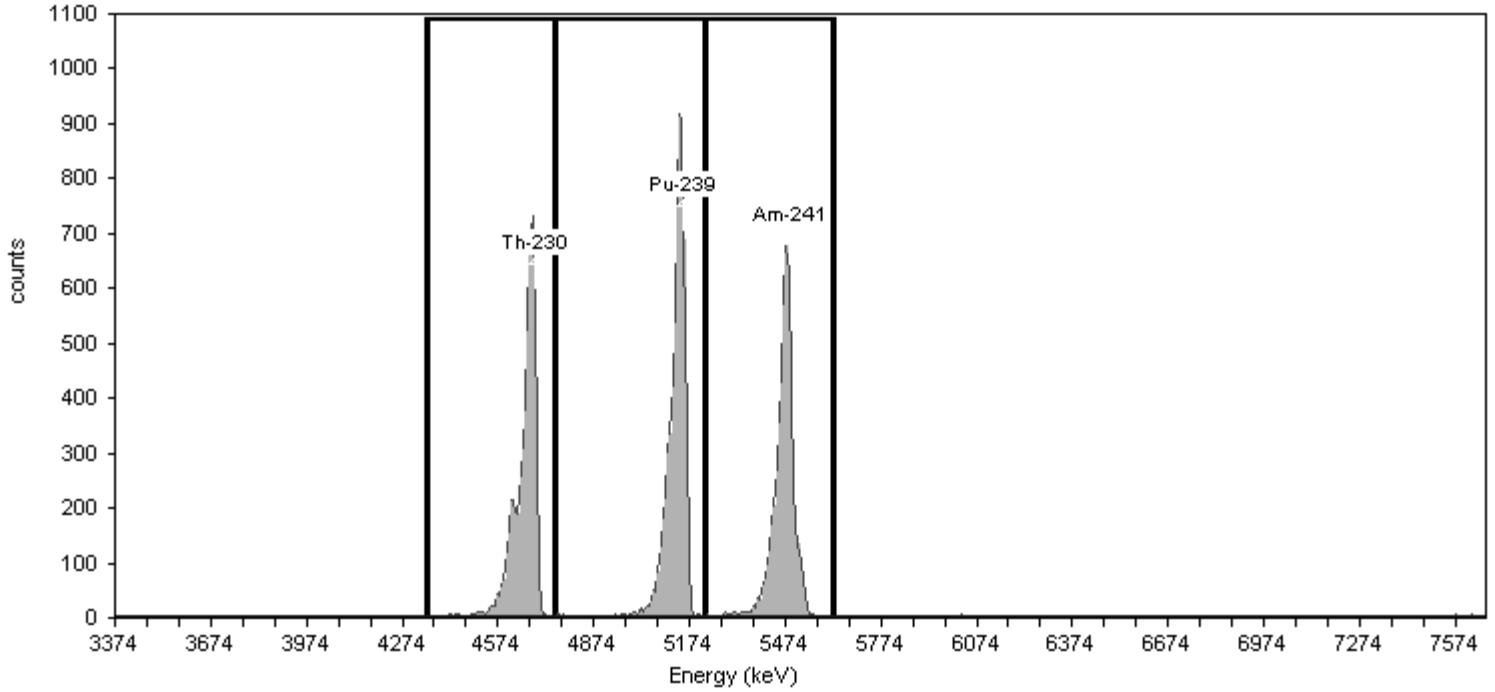
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV7 , SN: 48-158EE5
Acquisition Start Date: 5/7/2014 11:03:39PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 25.46% +/- 0.46% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,227.00	87.12
Pu-239	240	5.16	186	249	6,154.00	102.57
Am-241	284	5.49	249	303	4,991.00	83.18

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:19:28PM 5/8/2014

Calibration

Sample Name: ICV-8875;AV8-20140507
Description:
Detector: AV8

Calibration Date: 5/8/2014 2:19:23PM
Analyst: 60040

Source Info

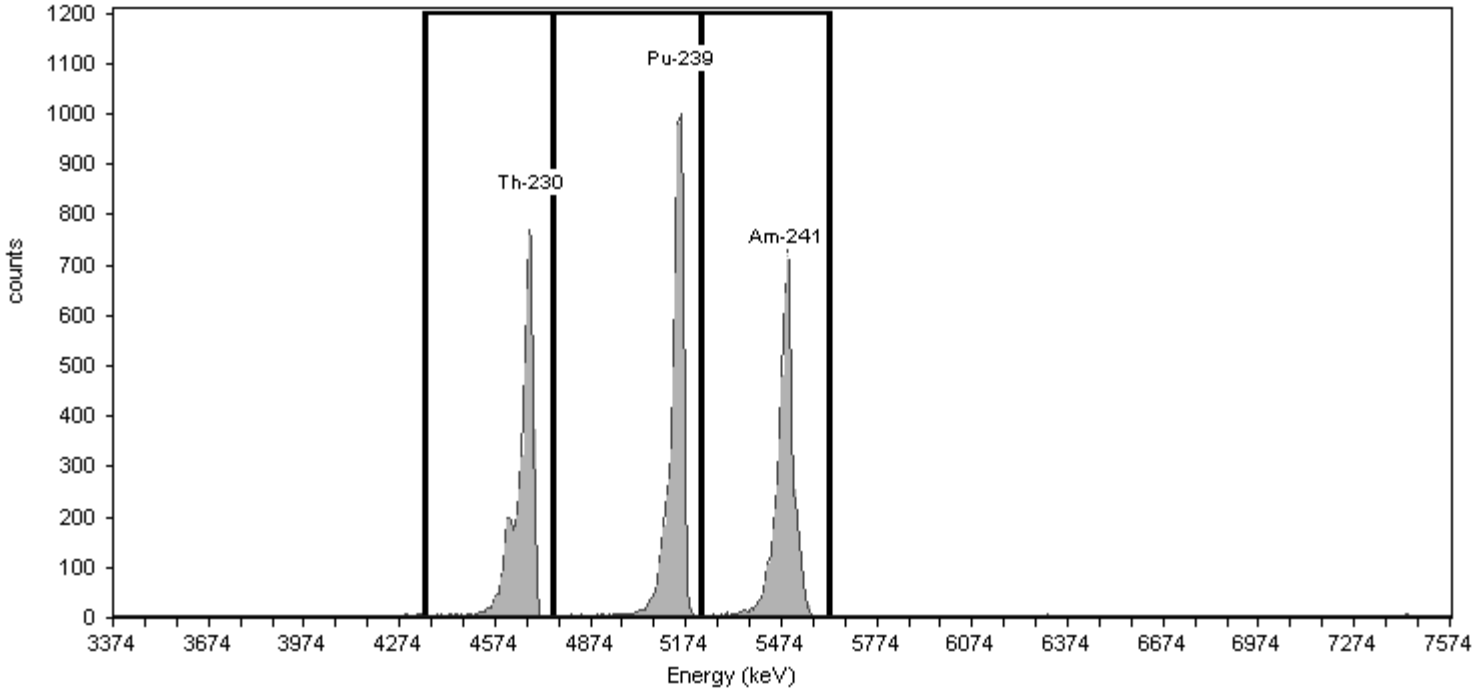
Certificate ID: 82234-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV8 , SN: 41-137Q6
Acquisition Start Date: 5/8/2014 12:14:03AM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.39% +/- 0.48% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,189.00	86.48
Pu-239	240	5.16	186	249	5,888.00	98.13
Am-241	284	5.49	249	303	5,329.00	88.82

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:20AM 5/8/2014

Calibration

Sample Name: ICV-9793;AV10-20140507
Description:
Detector: AV10

Calibration Date: 5/8/2014 12:06:16AM
Analyst: 60040

Source Info

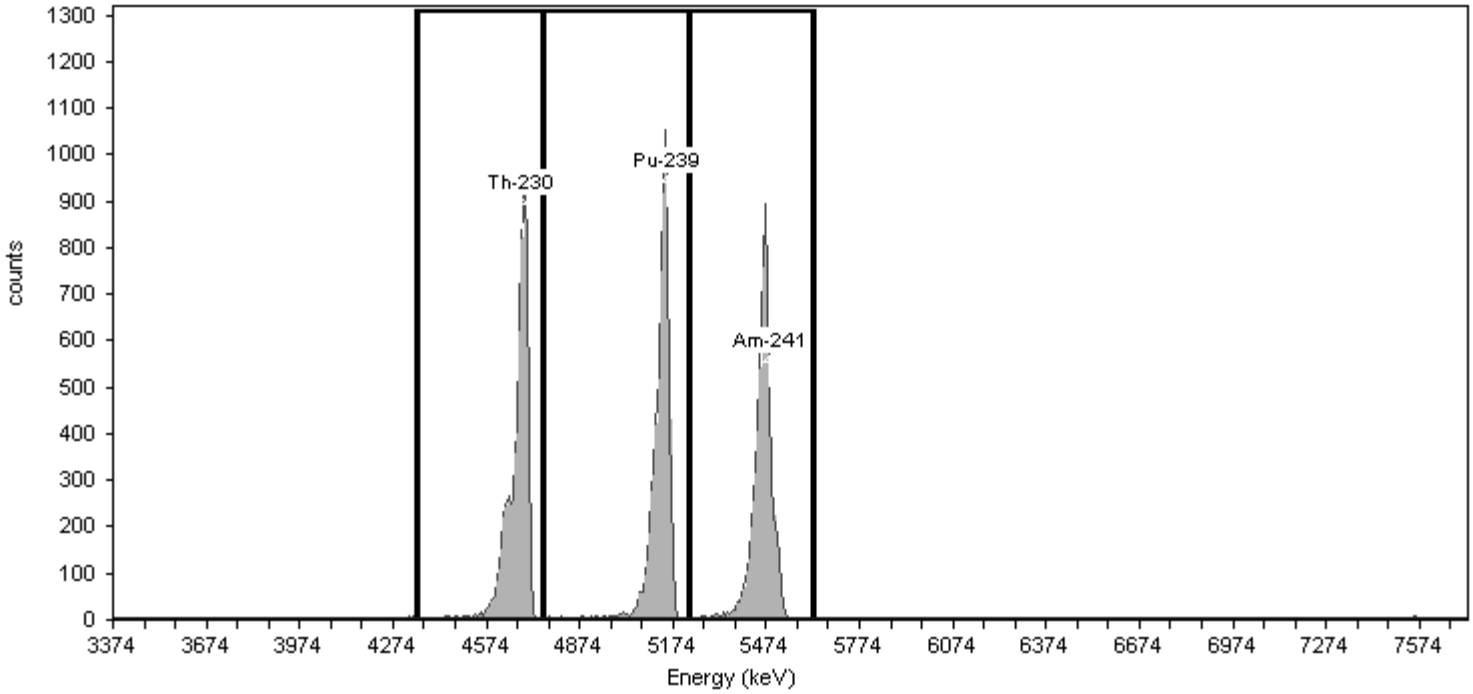
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV10 , SN: 49-155N2
Acquisition Start Date: 5/7/2014 11:03:59PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 25.93% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,246.00	104.10
Pu-239	240	5.16	186	249	6,407.00	106.78
Am-241	284	5.49	249	303	6,047.00	100.78

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:26AM 5/8/2014

Calibration

Sample Name: ICV-9794;AV11-20140507
Description:
Detector: AV11

Calibration Date: 5/8/2014 12:06:22AM
Analyst: 60040

Source Info

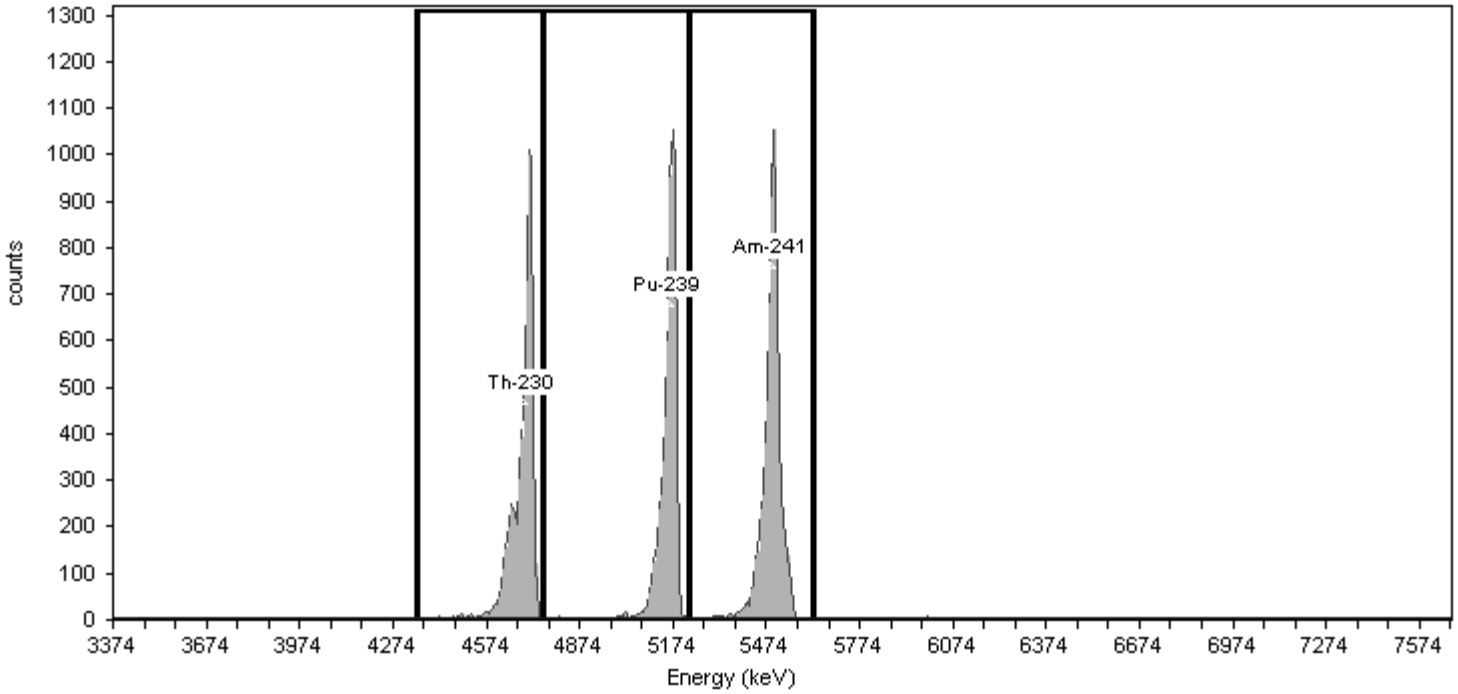
Certificate ID: 82242-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV11 , SN: 49-155dd2
Acquisition Start Date: 5/7/2014 11:04:13PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 25.98% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,238.00	103.97
Pu-239	240	5.16	186	249	5,922.00	98.70
Am-241	284	5.49	249	303	6,644.00	110.73

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:38AM 5/8/2014

Calibration

Sample Name: ICV-9817;AV13-20140507
Description:
Detector: AV13

Calibration Date: 5/8/2014 12:06:35AM
Analyst: 60040

Source Info

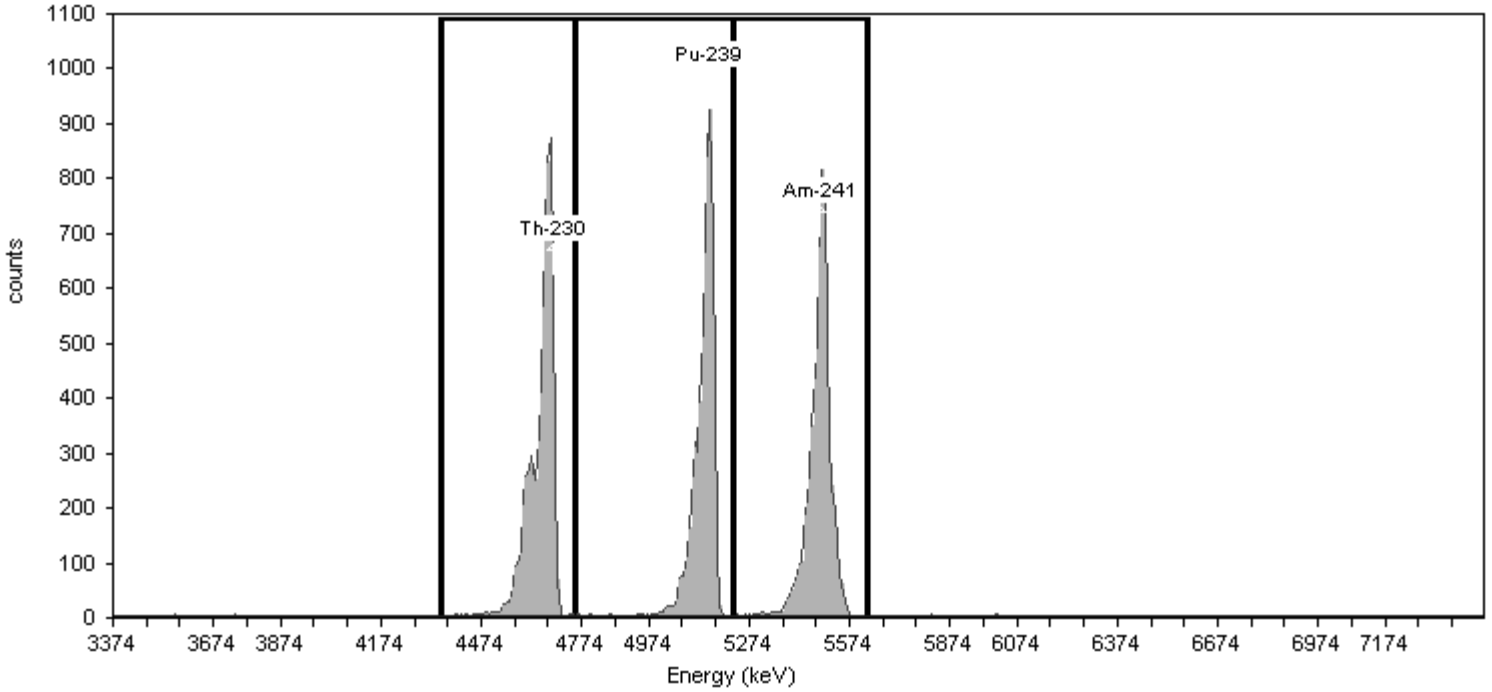
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV13 , SN: 49-155M7
Acquisition Start Date: 5/7/2014 11:04:39PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 25.56% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,777.00	112.95
Pu-239	240	5.16	186	249	6,153.00	102.55
Am-241	284	5.49	249	303	6,331.00	105.52

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:44AM 5/8/2014

Calibration

Sample Name: ICV-9884;AV14-20140507
Description:
Detector: AV14

Calibration Date: 5/8/2014 12:06:41AM
Analyst: 60040

Source Info

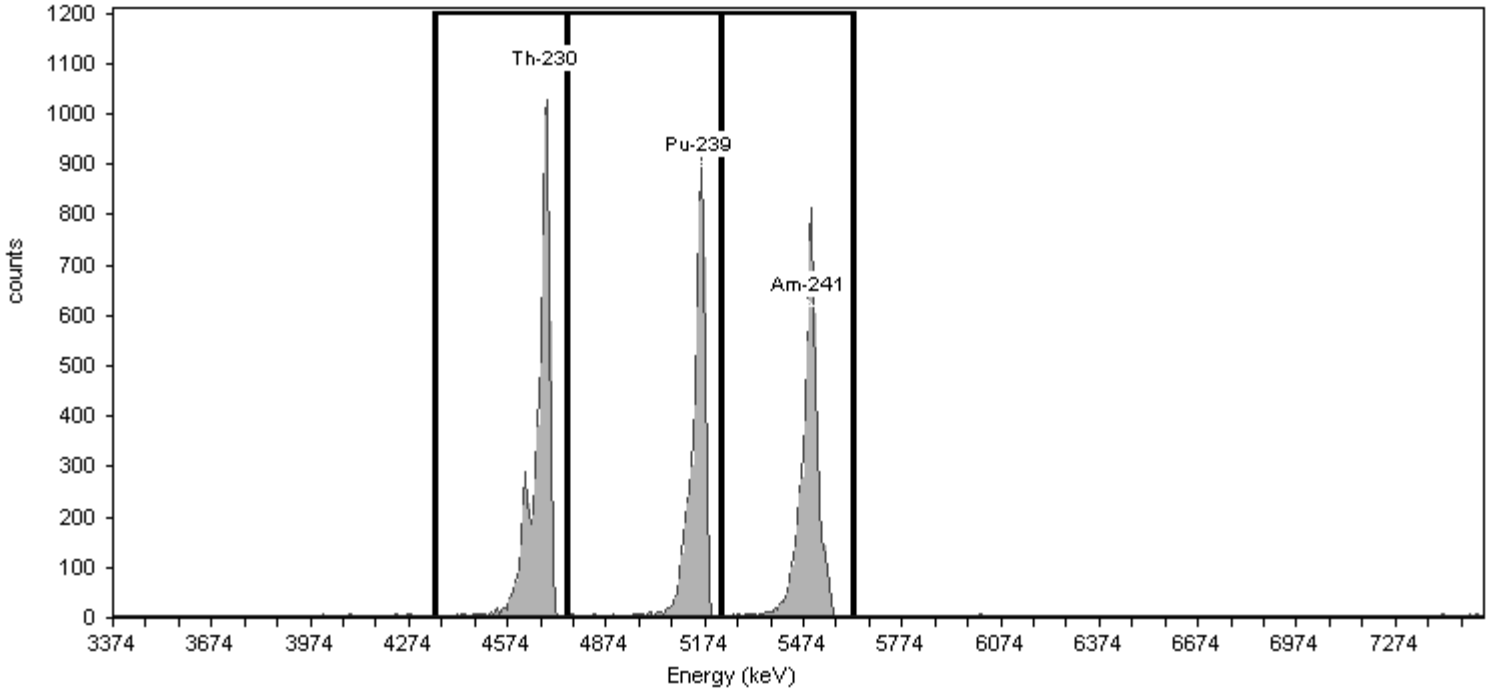
Certificate ID: 82245-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV14 , SN: 50-060W4
Acquisition Start Date: 5/7/2014 11:04:56PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 26.65% +/- 0.49% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,320.00	105.33
Pu-239	240	5.16	186	249	5,234.00	87.23
Am-241	284	5.49	249	303	5,413.00	90.22

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:50AM 5/8/2014

Calibration

Sample Name: ICV-9885;AV15-20140507
Description:
Detector: AV15

Calibration Date: 5/8/2014 12:06:47AM
Analyst: 60040

Source Info

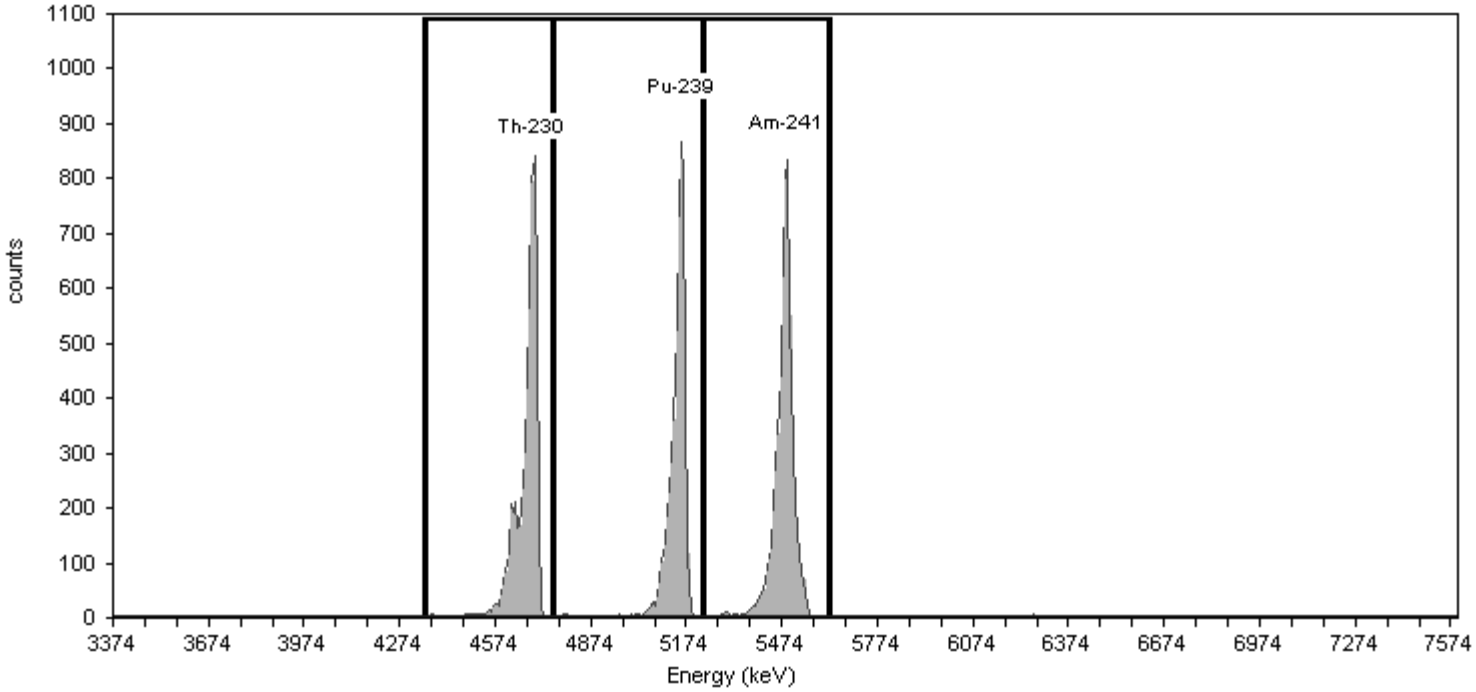
Certificate ID: 82246-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV15 , SN: 41-172C5
Acquisition Start Date: 5/7/2014 11:04:58PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 25.90% +/- 0.49% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,224.00	87.07
Pu-239	240	5.16	186	249	4,981.00	83.02
Am-241	284	5.49	249	303	5,544.00	92.40

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:19:38PM 5/8/2014

Calibration

Sample Name: ICV-9886;AV16-20140507
Description:
Detector: AV16

Calibration Date: 5/8/2014 2:19:34PM
Analyst: 60040

Source Info

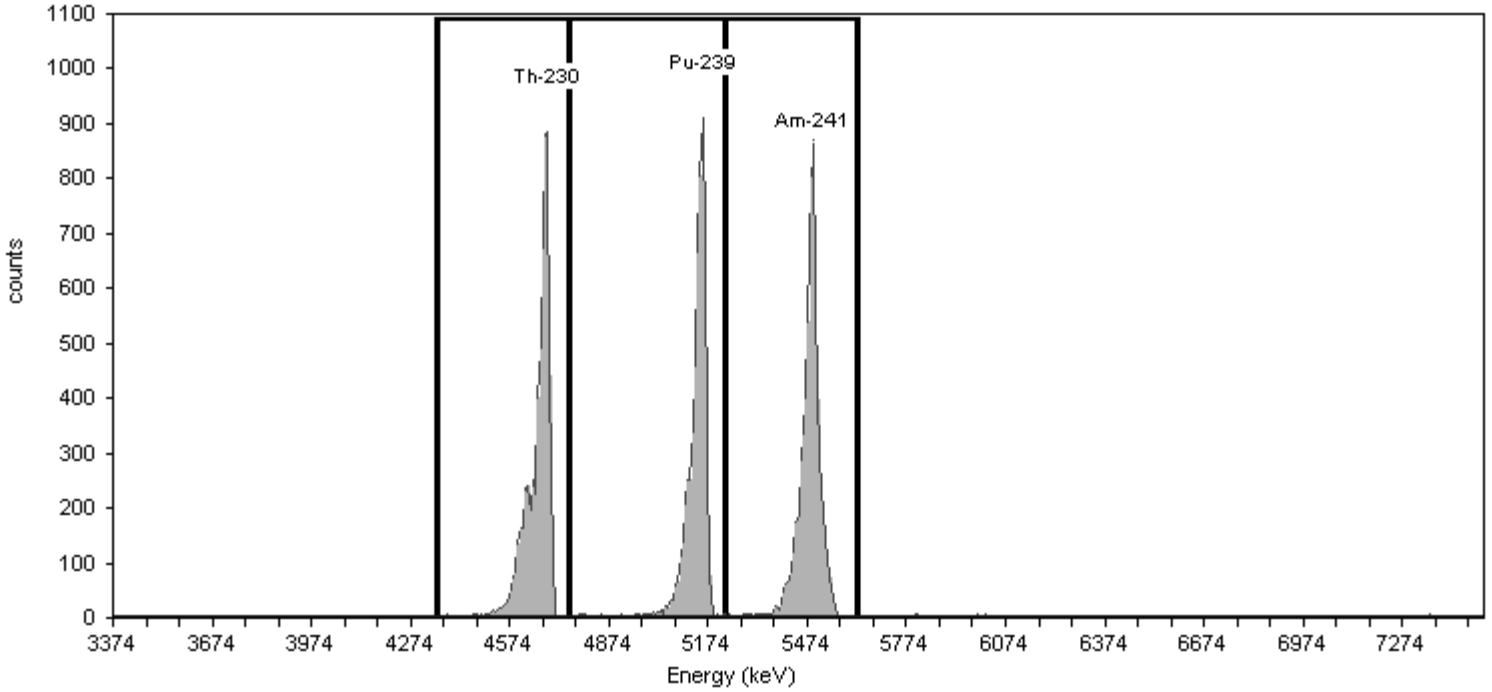
Certificate ID: 82247-334
Prepared by: Analytics

Certification Date: 6/10/2010 12:00:00PM
Description:

Acquisition

Detector: AV16 , SN: 51-082B6
Acquisition Start Date: 5/8/2014 12:14:17AM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.09% +/- 0.46% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,829.00	97.15
Pu-239	240	5.16	186	249	5,478.00	91.30
Am-241	284	5.49	249	303	5,844.00	97.40

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:19:44PM 5/8/2014

Calibration

Sample Name: ICV-7107;AV17-20140507
Description:
Detector: AV17

Calibration Date: 5/8/2014 2:19:41PM
Analyst: 60040

Source Info

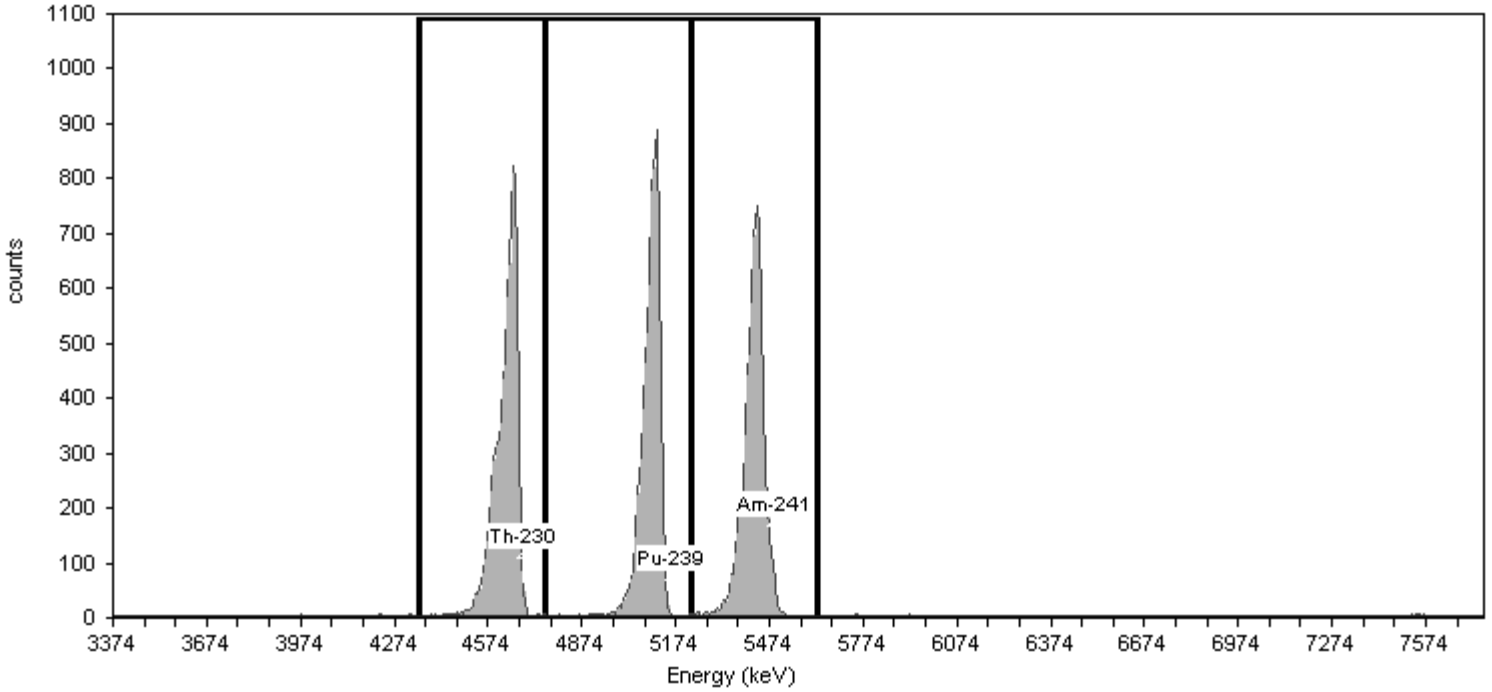
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV17 , SN: 50-051C4
Acquisition Start Date: 5/8/2014 12:14:34AM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 26.33% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	7,156.00	119.27
Pu-239	240	5.16	186	249	6,932.00	115.53
Am-241	284	5.49	249	303	6,785.00	113.08

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:19:50PM 5/8/2014

Calibration

Sample Name: ICV-8874;AV18-20140507
Description:
Detector: AV18

Calibration Date: 5/8/2014 2:19:46PM
Analyst: 60040

Source Info

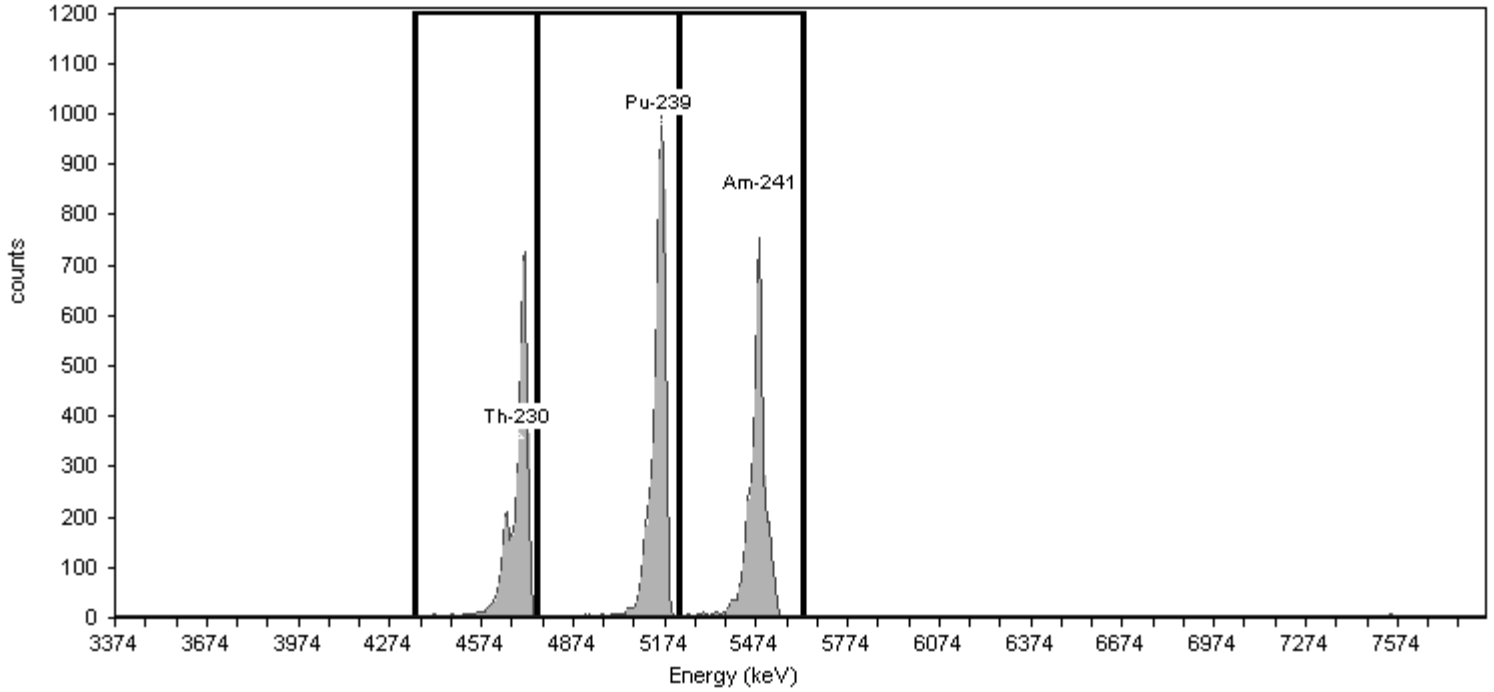
Certificate ID: 82233-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV18 , SN: 51-082C5
Acquisition Start Date: 5/8/2014 12:14:45AM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 26.18% +/- 0.49% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	4,525.00	75.42
Pu-239	240	5.16	186	249	5,794.00	96.57
Am-241	284	5.49	249	303	4,855.00	80.92

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:56:20PM 5/8/2014

Calibration

Sample Name: ICV-8876;AV19-050814
Description:
Detector: AV19

Calibration Date: 5/8/2014 4:56:13PM
Analyst: 60040

Source Info

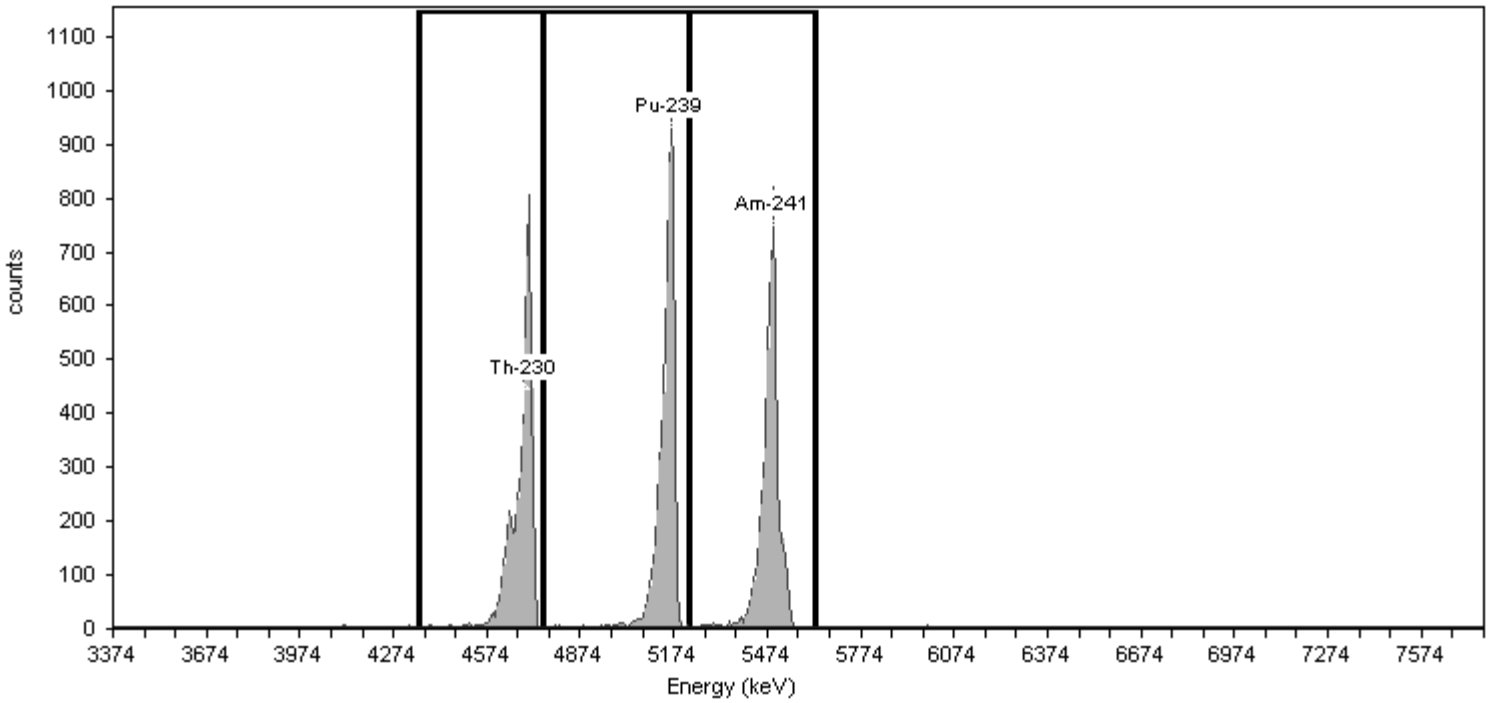
Certificate ID: 82234-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV19 , SN: 50-025FF5
Acquisition Start Date: 5/8/2014 2:33:29PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 24.96% +/- 0.46% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	4,852.00	80.87
Pu-239	240	5.16	186	249	5,673.00	94.55
Am-241	284	5.49	249	303	5,012.00	83.53

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:56AM 5/8/2014

Calibration

Sample Name: ICV-8876;AV20-20140507
Description:
Detector: AV20

Calibration Date: 5/8/2014 12:06:53AM
Analyst: 60040

Source Info

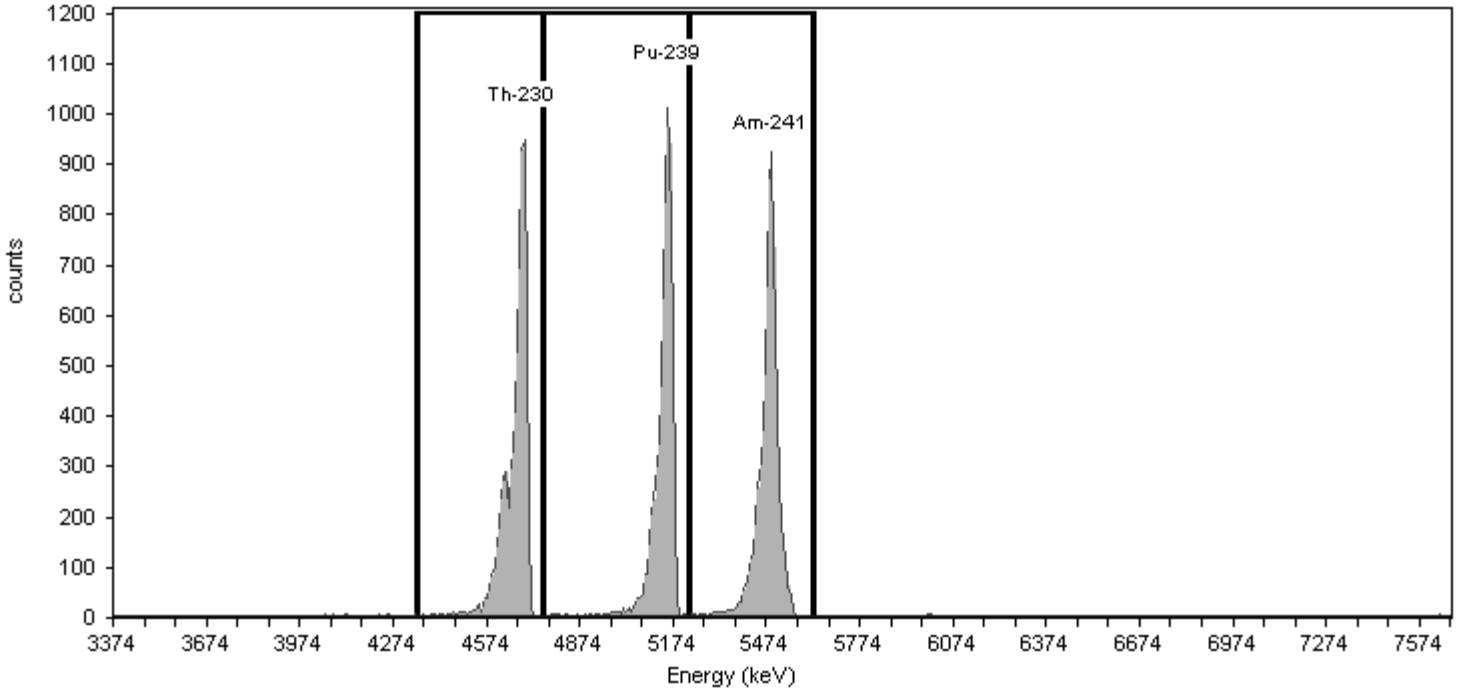
Certificate ID: 82235-334
Prepared by: Analytics

Certification Date: 6/4/2010 12:00:00PM
Description:

Acquisition

Detector: AV20 , SN: 48-121A7
Acquisition Start Date: 5/7/2014 11:05:20PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 25.51% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,706.00	111.77
Pu-239	240	5.16	186	249	6,368.00	106.13
Am-241	284	5.49	249	303	6,673.00	111.22

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:19:56PM 5/8/2014

Calibration

Sample Name: ICV-8877;AV21-20140507
Description:
Detector: AV21

Calibration Date: 5/8/2014 2:19:52PM
Analyst: 60040

Source Info

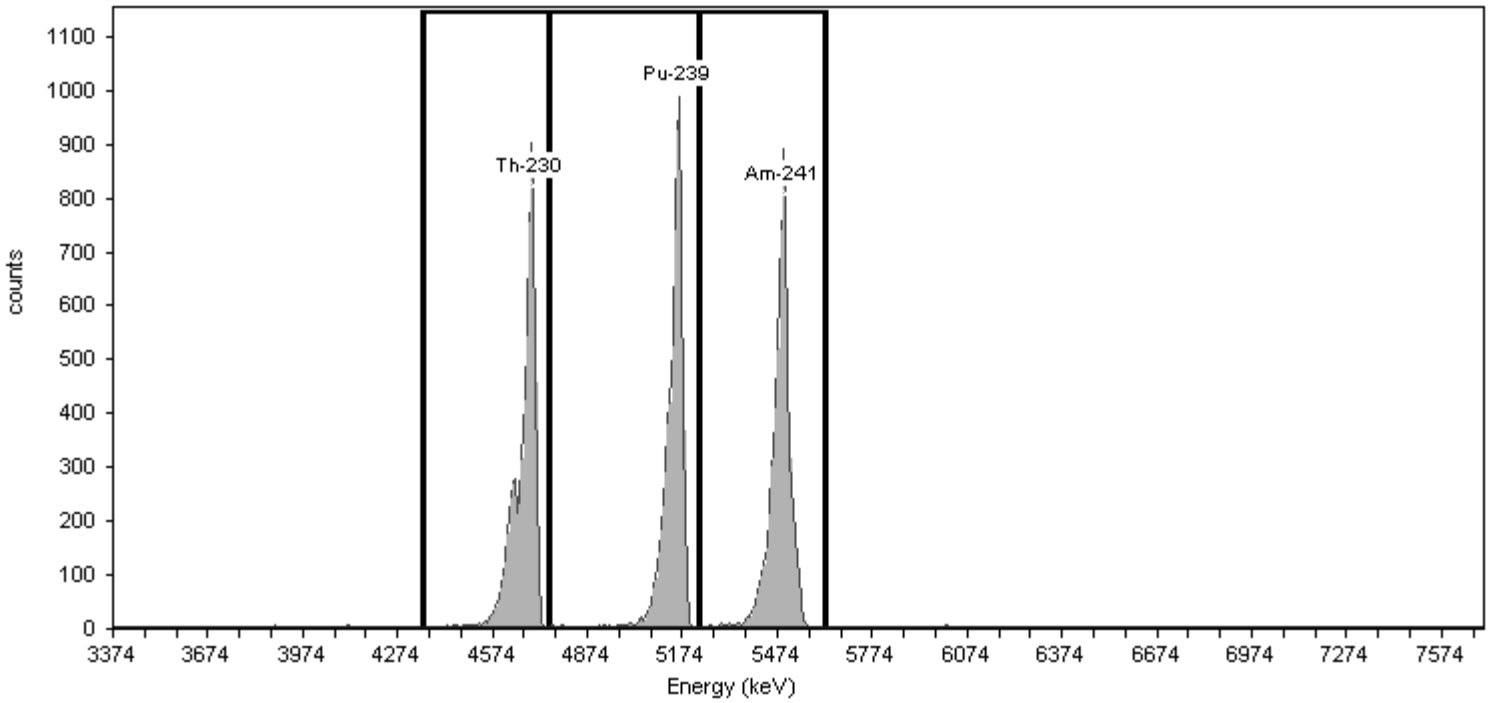
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV21 , SN: 48-102BB6
Acquisition Start Date: 5/8/2014 12:16:17AM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 25.53% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,251.00	104.18
Pu-239	240	5.16	186	249	6,383.00	106.38
Am-241	284	5.49	249	303	6,357.00	105.95

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:56:29PM 5/8/2014

Calibration

Sample Name: ICV-8874;AV23-050814
Description:
Detector: AV23

Calibration Date: 5/8/2014 4:56:26PM
Analyst: 60040

Source Info

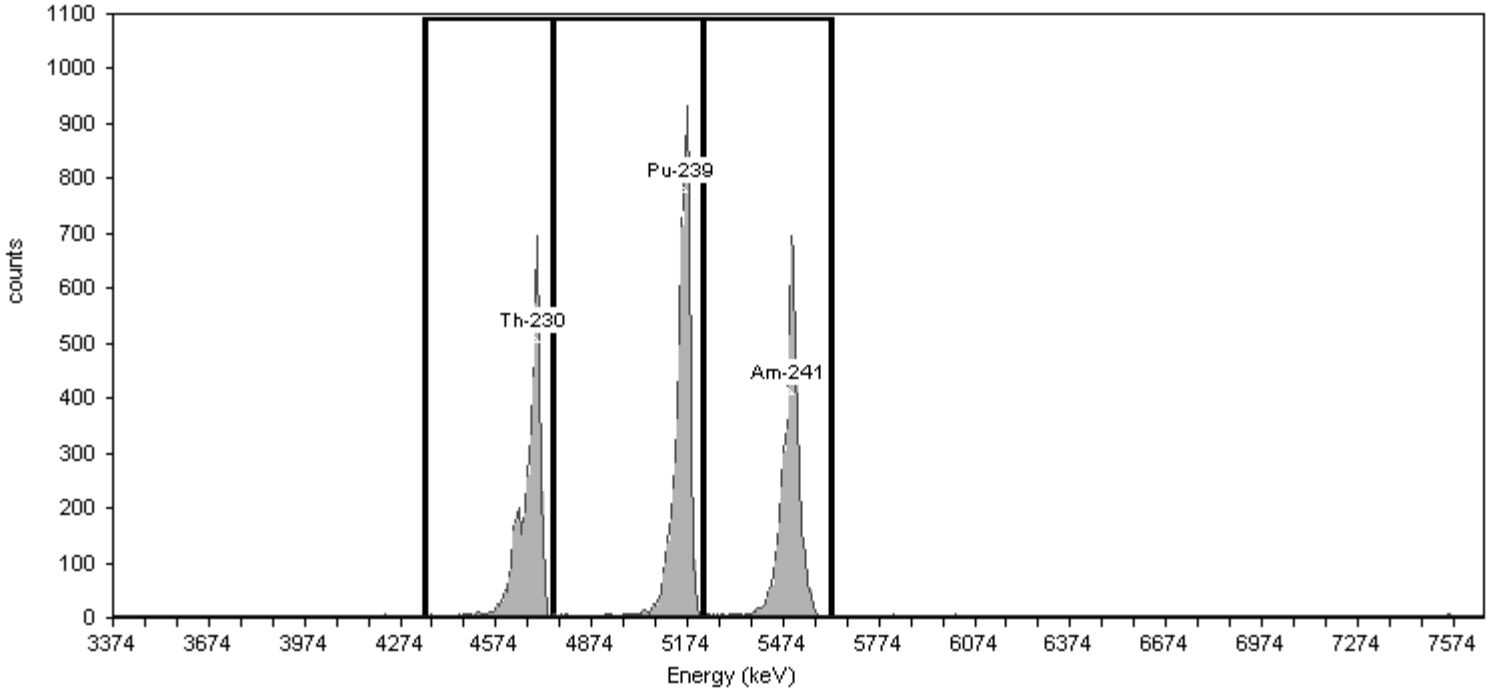
Certificate ID: 82233-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV23 , SN: 48-158FF3
Acquisition Start Date: 5/8/2014 2:33:47PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 25.92% +/- 0.49% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	4,512.00	75.20
Pu-239	240	5.16	186	249	5,789.00	96.48
Am-241	284	5.49	249	303	4,721.00	78.68

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:20:02PM 5/8/2014

Calibration

Sample Name: ICV-9792;AV24-20140507
Description:
Detector: AV24

Calibration Date: 5/8/2014 2:19:58PM
Analyst: 60040

Source Info

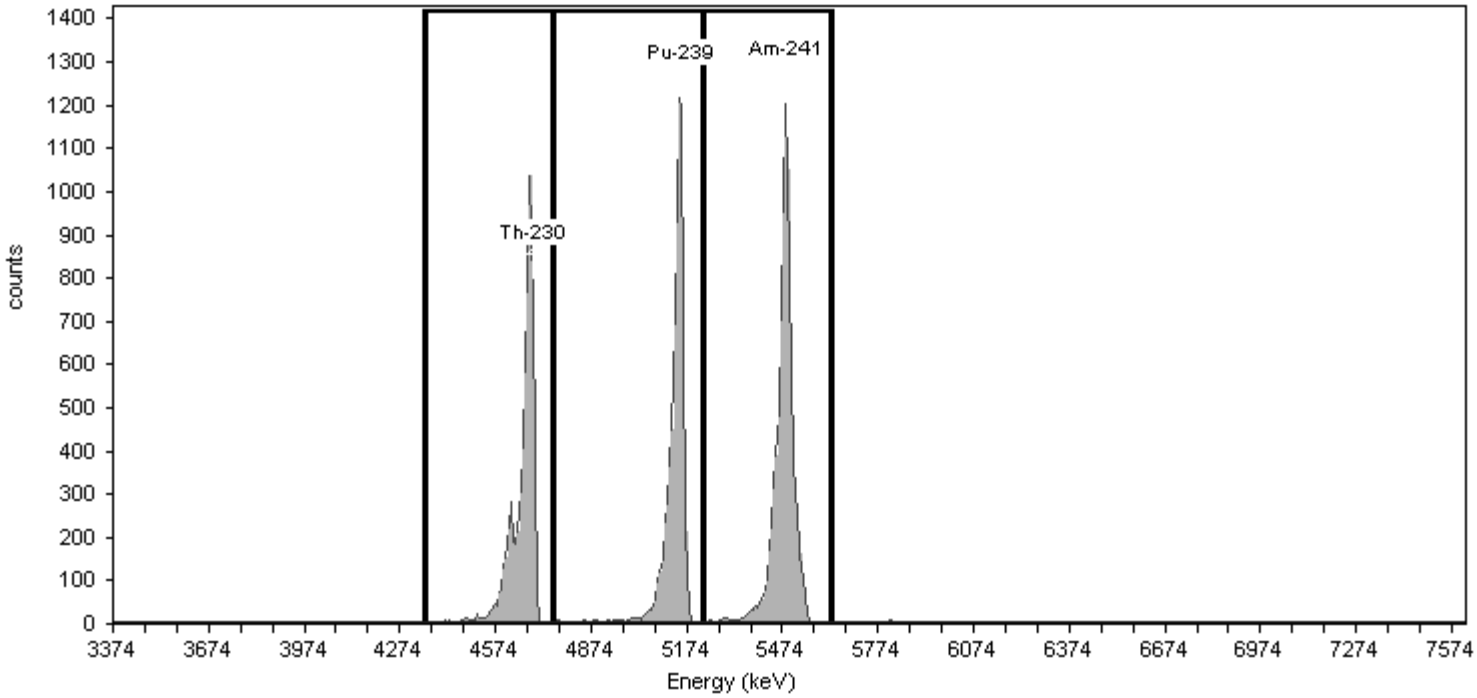
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV24 , SN: 47-137Q4
Acquisition Start Date: 5/8/2014 12:16:41AM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 26.62% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,034.00	100.57
Pu-239	240	5.16	186	249	6,927.00	115.45
Am-241	284	5.49	249	303	7,852.00	130.87

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:20:08PM 5/8/2014

Calibration

Sample Name: ICV-9793;AV43-20140507
Description:
Detector: AV43

Calibration Date: 5/8/2014 2:20:05PM
Analyst: 60040

Source Info

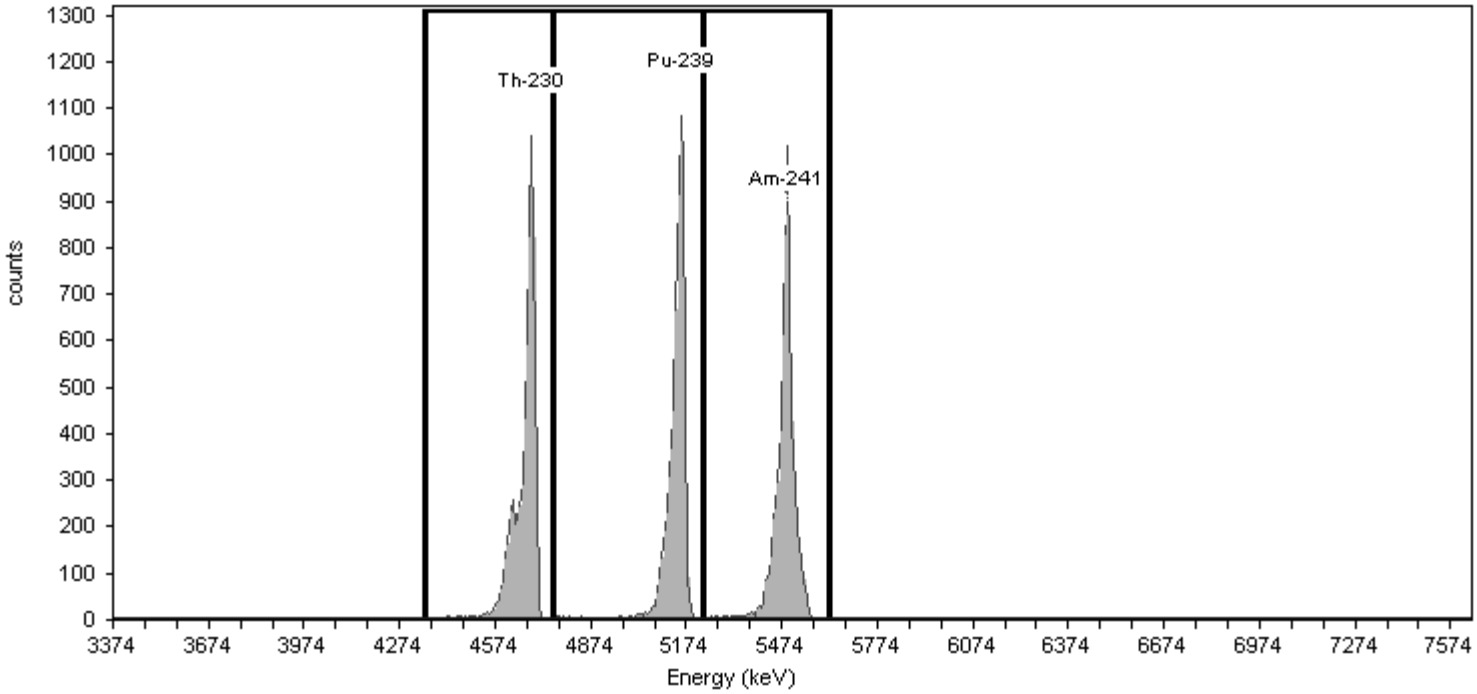
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV43 , SN: 49-190X4
Acquisition Start Date: 5/8/2014 12:16:52AM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 25.68% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,093.00	101.55
Pu-239	240	5.16	186	249	6,250.00	104.17
Am-241	284	5.49	249	303	6,174.00	102.90

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:20:18PM 5/8/2014

Calibration

Sample Name: ICV-9794;AV44-20140507
Description:
Detector: AV44

Calibration Date: 5/8/2014 2:20:13PM
Analyst: 60040

Source Info

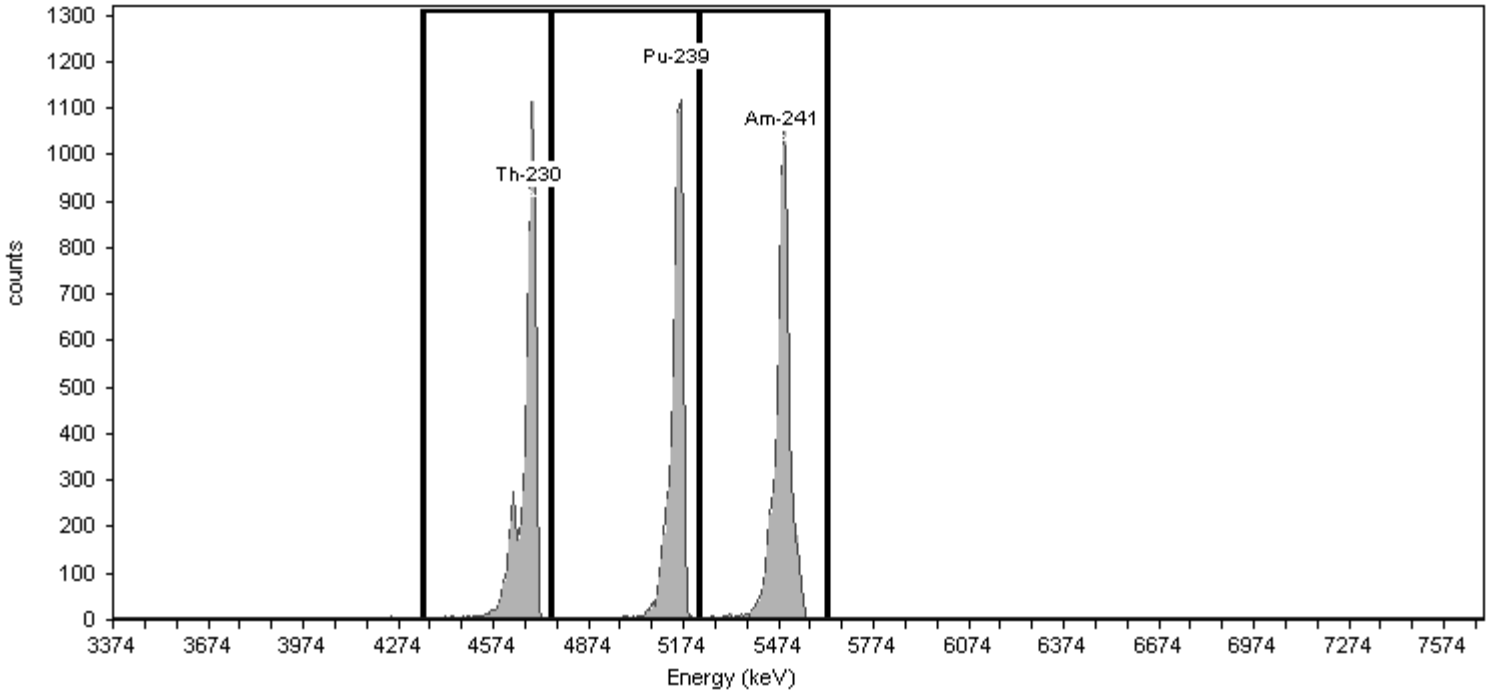
Certificate ID: 82242-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV44 , SN: 50-051JJ1
Acquisition Start Date: 5/8/2014 12:17:17AM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 25.94% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,074.00	101.23
Pu-239	240	5.16	186	249	5,990.00	99.83
Am-241	284	5.49	249	303	6,711.00	111.85

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:56:13PM 5/8/2014

Calibration

Sample Name: ICV-9795;AV45-050814
Description:
Detector: AV45

Calibration Date: 5/8/2014 4:56:08PM
Analyst: 60040

Source Info

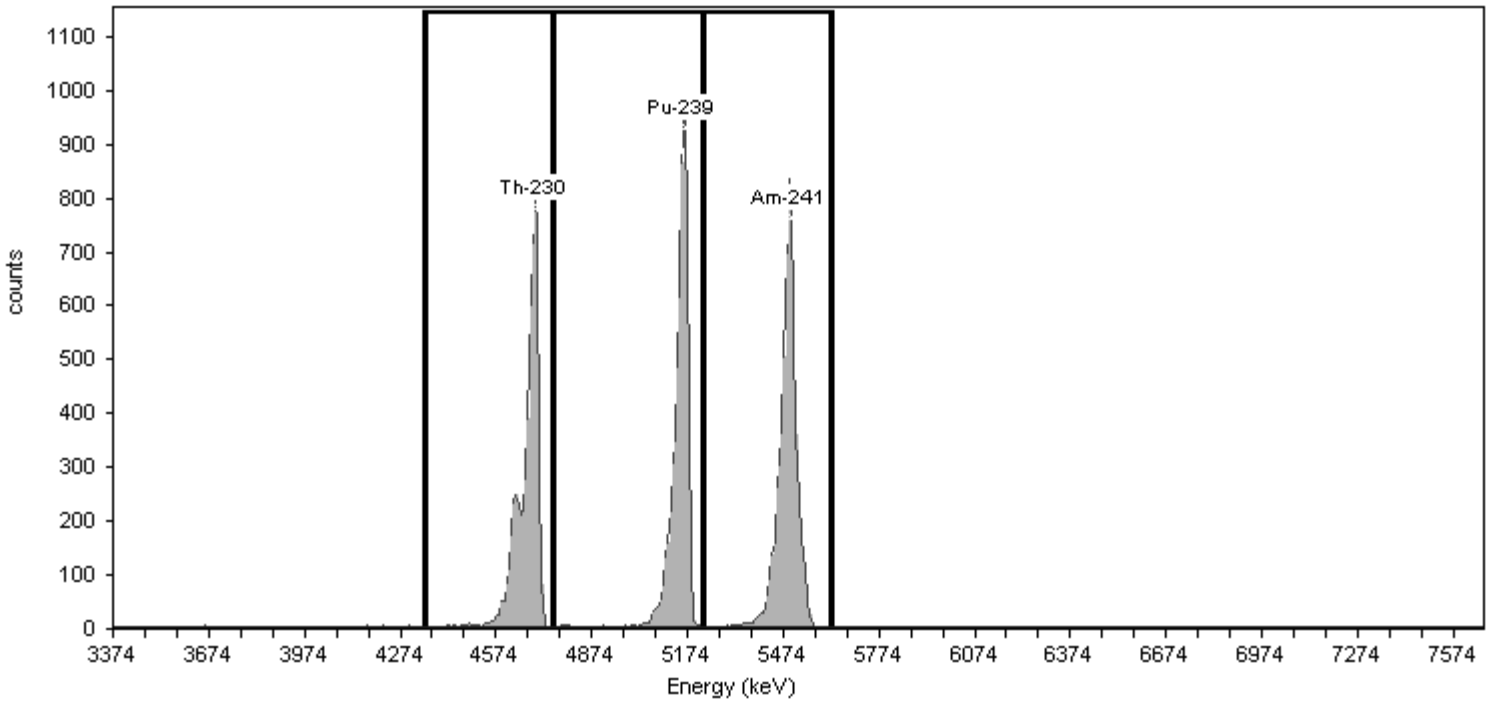
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV45 , SN: 48-158FF2
Acquisition Start Date: 5/8/2014 2:32:48PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.58% +/- 0.46% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,659.00	94.32
Pu-239	240	5.16	186	249	5,682.00	94.70
Am-241	284	5.49	249	303	6,066.00	101.10

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:20:40PM 5/8/2014

Calibration

Sample Name: ICV-9817;AV46-20140507
Description:
Detector: AV46

Calibration Date: 5/8/2014 2:20:37PM
Analyst: 60040

Source Info

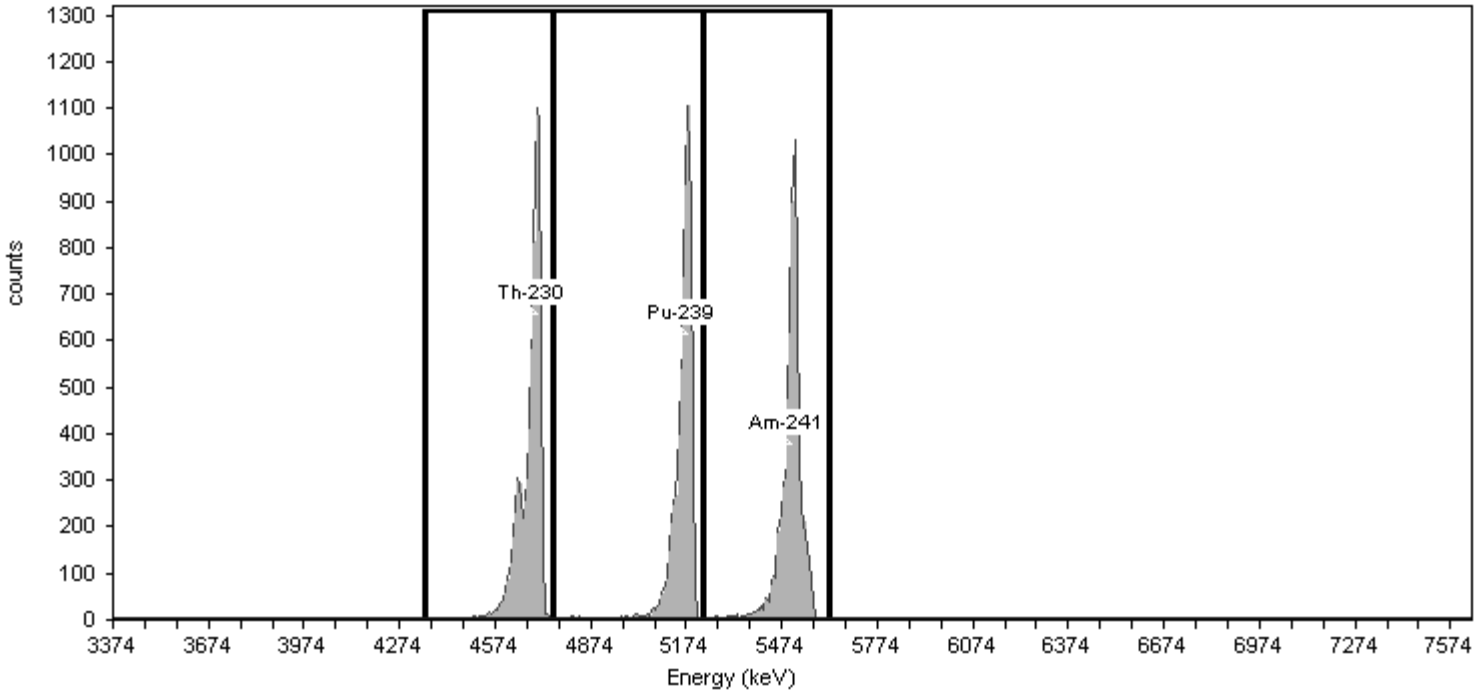
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV46 , SN: 49-202GG2
Acquisition Start Date: 5/8/2014 12:18:27AM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 26.10% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,959.00	115.98
Pu-239	240	5.16	186	249	6,287.00	104.78
Am-241	284	5.49	249	303	6,423.00	107.05

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:20:52PM 5/8/2014

Calibration

Sample Name: ICV-9885;AV48-20140507
Description:
Detector: AV48

Calibration Date: 5/8/2014 2:20:49PM
Analyst: 60040

Source Info

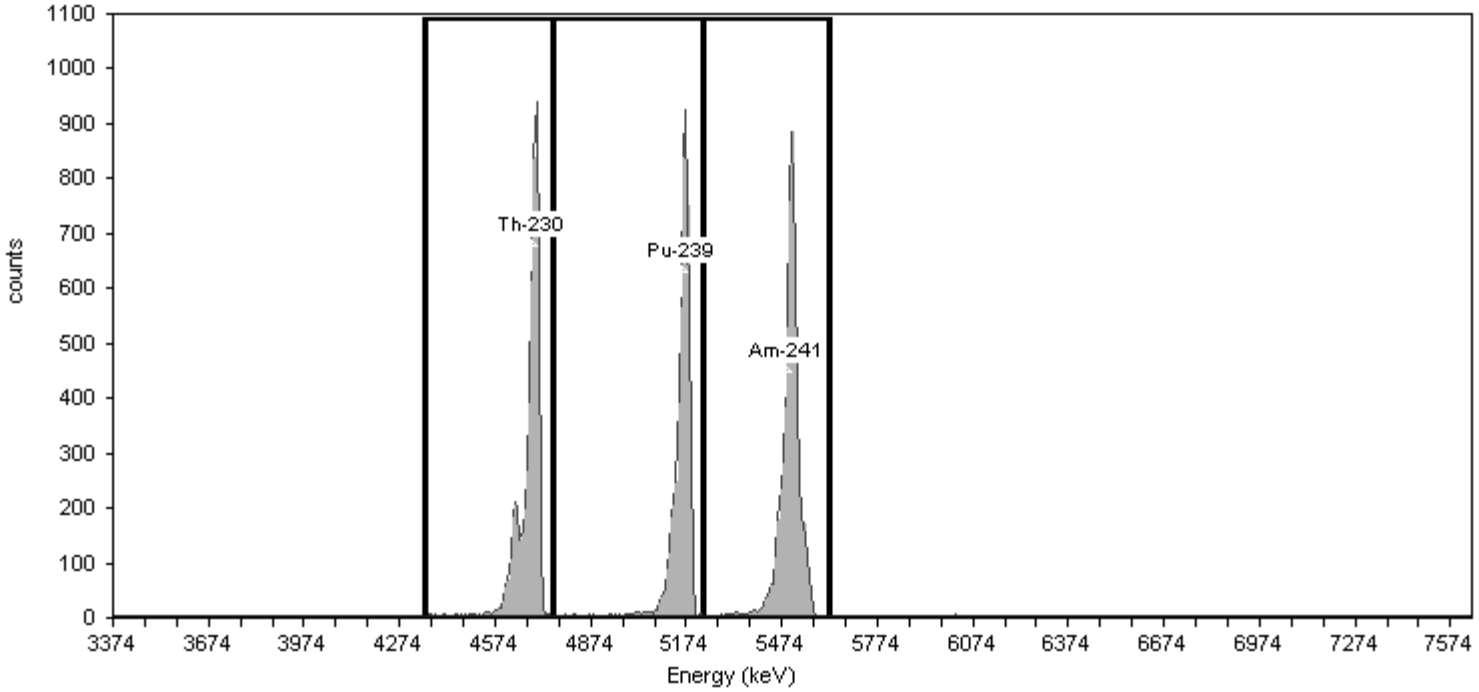
Certificate ID: 82246-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV48 , SN: 50-051JJ4
Acquisition Start Date: 5/8/2014 12:18:29AM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 26.00% +/- 0.49% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,274.00	87.90
Pu-239	240	5.16	186	249	4,946.00	82.43
Am-241	284	5.49	249	303	5,595.00	93.25

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:56:35PM 5/8/2014

Calibration

Sample Name: ICV-9886;AV49-050814
Description:
Detector: AV49

Calibration Date: 5/8/2014 4:56:32PM
Analyst: 60040

Source Info

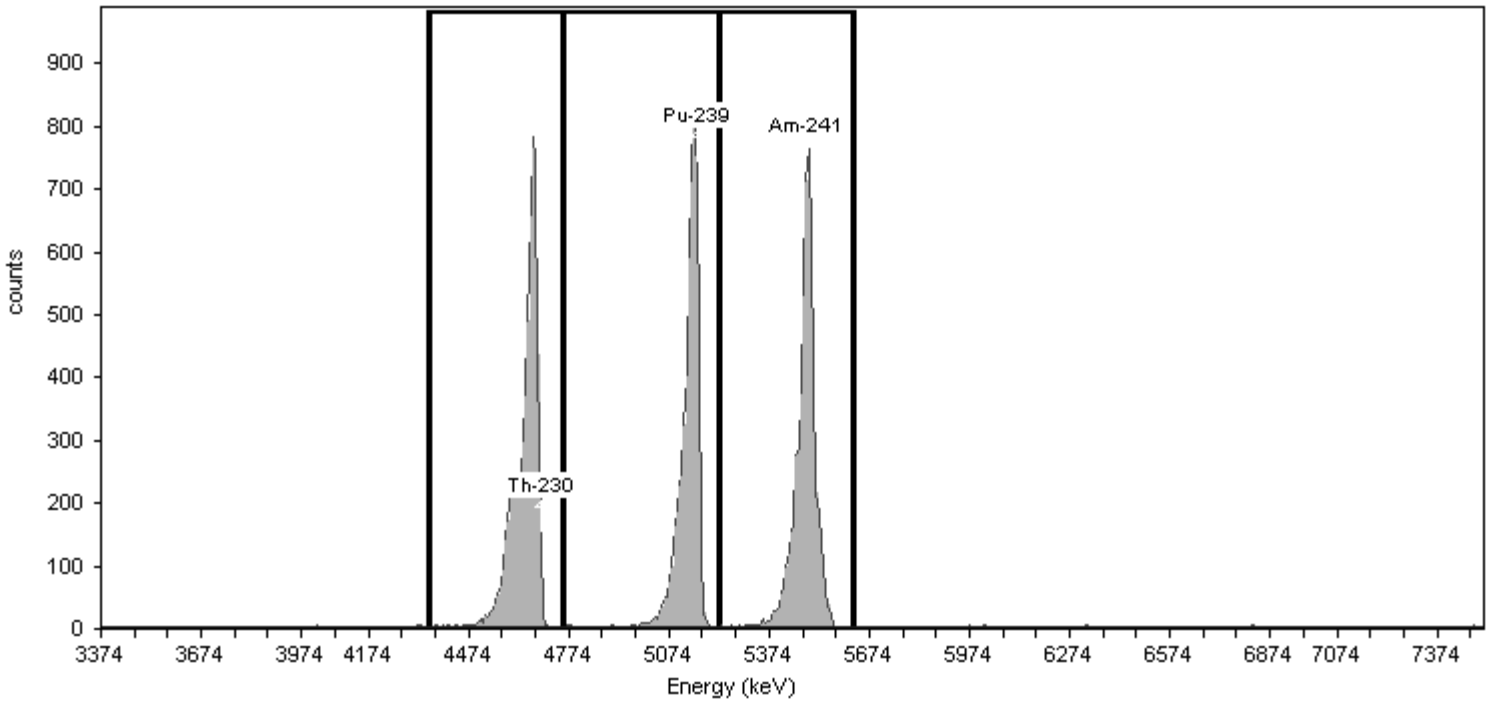
Certificate ID: 82247-334
Prepared by: Analytics

Certification Date: 6/10/2010 12:00:00PM
Description:

Acquisition

Detector: AV49 , SN: 47-043hh4
Acquisition Start Date: 5/8/2014 2:34:10PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 25.45% +/- 0.45% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,790.00	96.50
Pu-239	240	5.16	186	249	5,422.00	90.37
Am-241	284	5.49	249	303	5,531.00	92.18

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:21:00PM 5/8/2014

Calibration

Sample Name: ICV-8876;AV53-20140507
Description:
Detector: AV53

Calibration Date: 5/8/2014 2:20:55PM
Analyst: 60040

Source Info

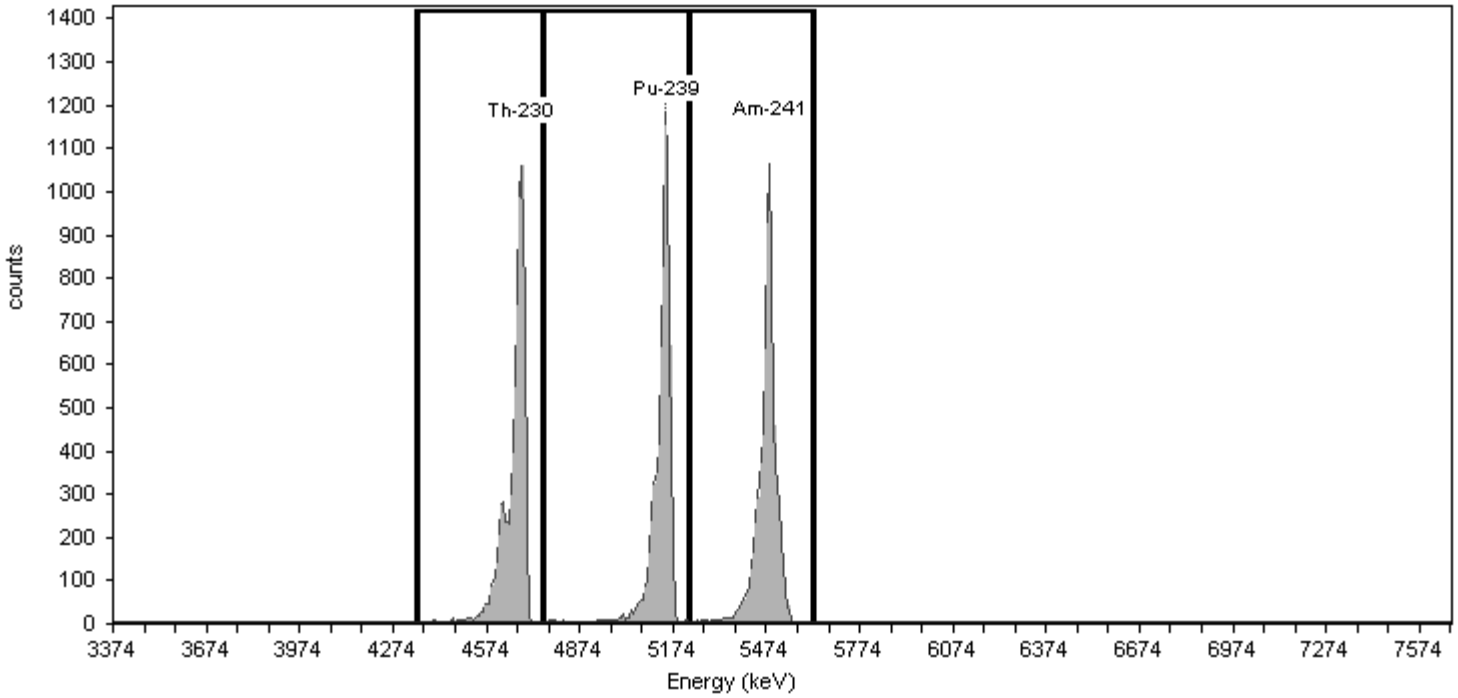
Certificate ID: 82235-334
Prepared by: Analytics

Certification Date: 6/4/2010 12:00:00PM
Description:

Acquisition

Detector: AV53 , SN: 50-051A6
Acquisition Start Date: 5/8/2014 12:18:30AM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.48% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,832.00	113.87
Pu-239	240	5.16	186	249	6,635.00	110.58
Am-241	284	5.49	249	303	7,020.00	117.00

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:56:47PM 5/8/2014

Calibration

Sample Name: ICV-8877;AV54-050814
Description:
Detector: AV54

Calibration Date: 5/8/2014 4:56:44PM
Analyst: 60040

Source Info

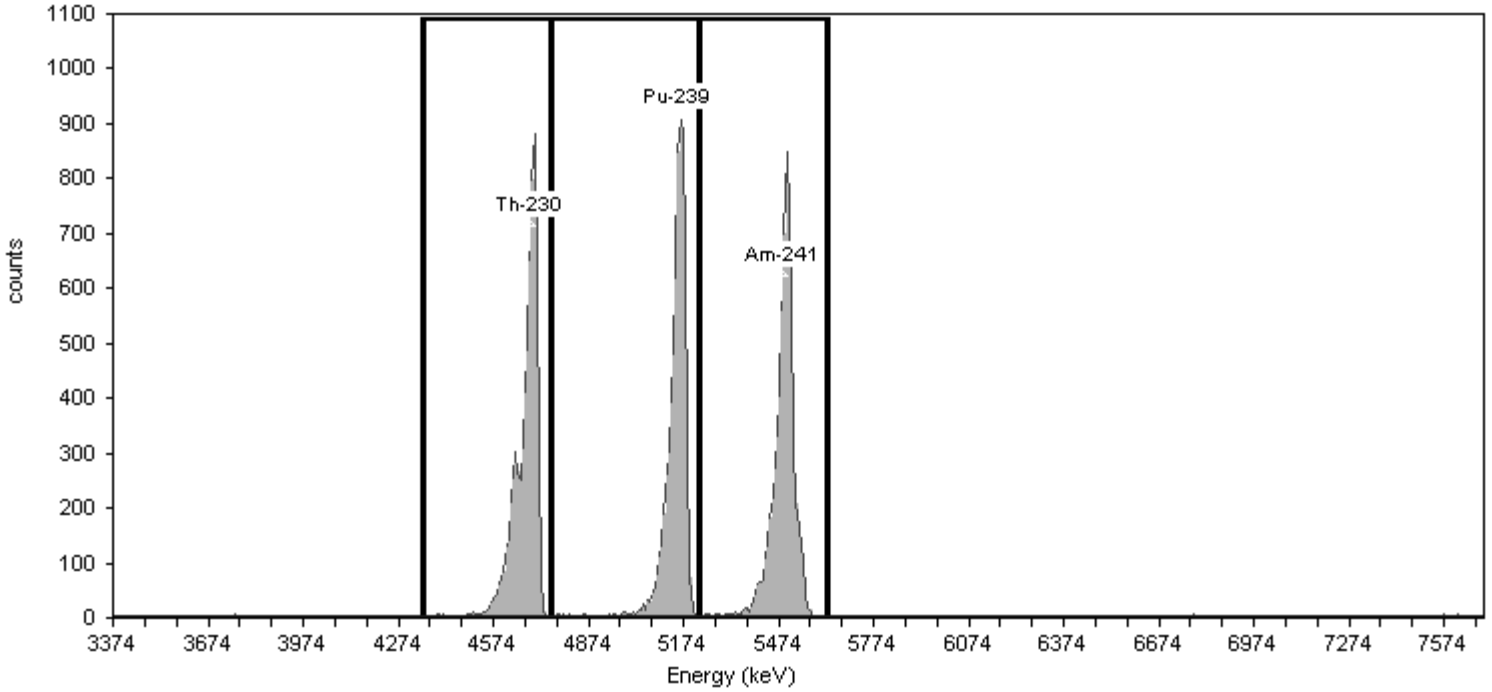
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV54 , SN: 48-046II6
Acquisition Start Date: 5/8/2014 2:34:44PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.09% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,474.00	107.90
Pu-239	240	5.16	186	249	6,518.00	108.63
Am-241	284	5.49	249	303	6,409.00	106.82

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:21:05PM 5/8/2014

Calibration

Sample Name: ICV-9520;AV55-20140507
Description:
Detector: AV55

Calibration Date: 5/8/2014 2:21:02PM
Analyst: 60040

Source Info

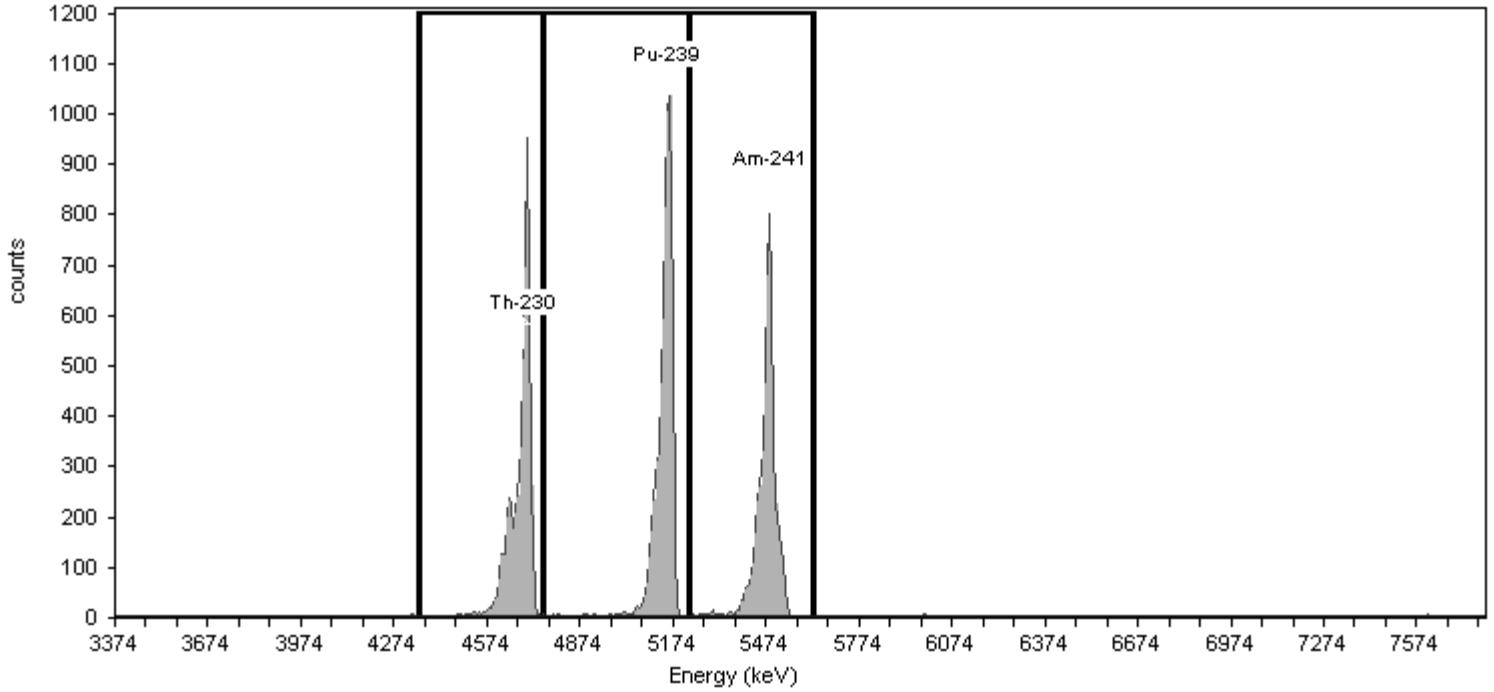
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV55 , SN: 50-051C2
Acquisition Start Date: 5/8/2014 12:19:12AM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 25.69% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,273.00	87.88
Pu-239	240	5.16	186	249	6,108.00	101.80
Am-241	284	5.49	249	303	5,136.00	85.60

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:24:33PM 5/11/2014

Calibration

Sample Name: ICV-9886;AV56-20140508
Description:
Detector: AV56

Calibration Date: 5/11/2014 7:11:51PM
Analyst: 60040

Source Info

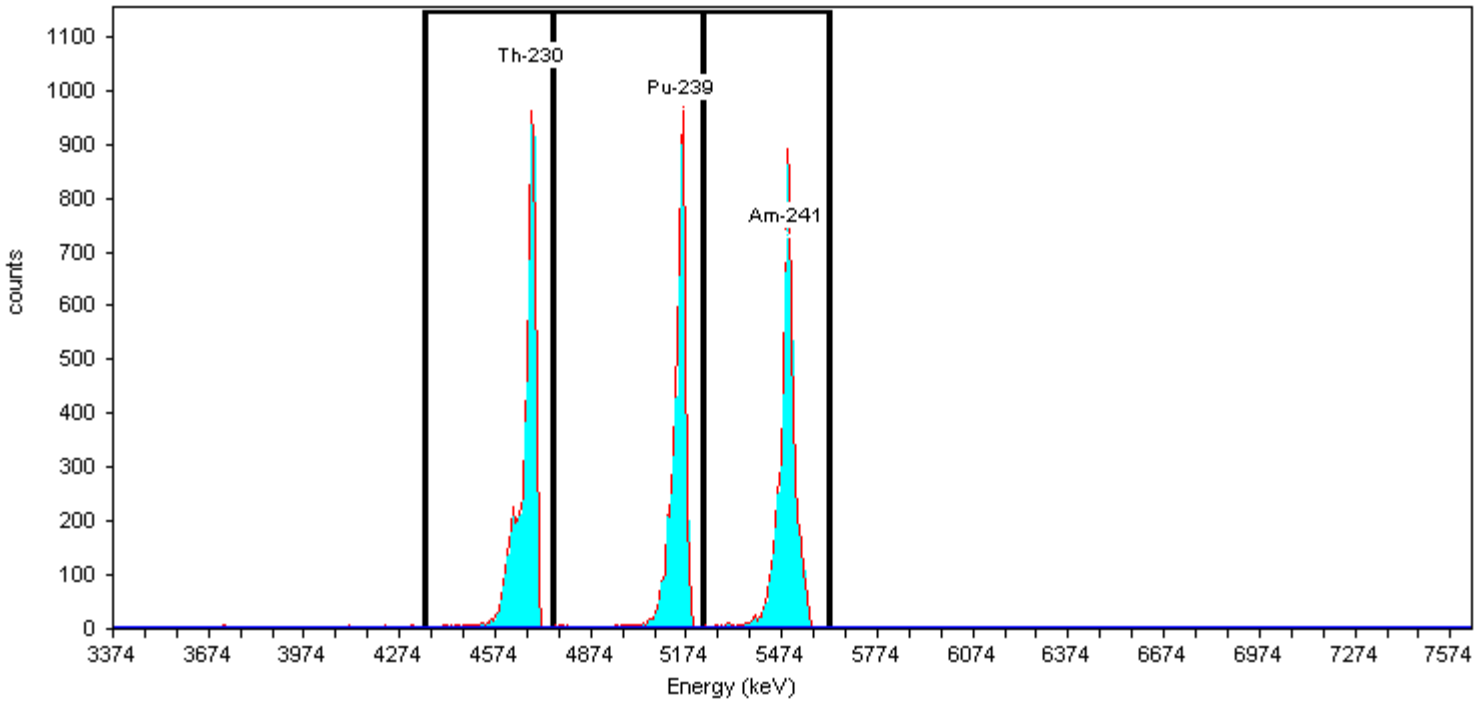
Certificate ID: 82247-334
Prepared by: Analytics

Certification Date: 6/10/2010 12:00:00PM
Description:

Acquisition

Detector: AV56 , SN: 52-059EE5
Acquisition Start Date: 5/8/2014 5:18:05PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 25.19% +/- 0.45% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,679.00	94.65
Pu-239	240	5.16	186	249	5,201.00	86.68
Am-241	284	5.49	249	303	5,671.00	94.52

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:56:53PM 5/8/2014

Calibration

Sample Name: ICV-9792;AV57-050814
Description:
Detector: AV57

Calibration Date: 5/8/2014 4:56:50PM
Analyst: 60040

Source Info

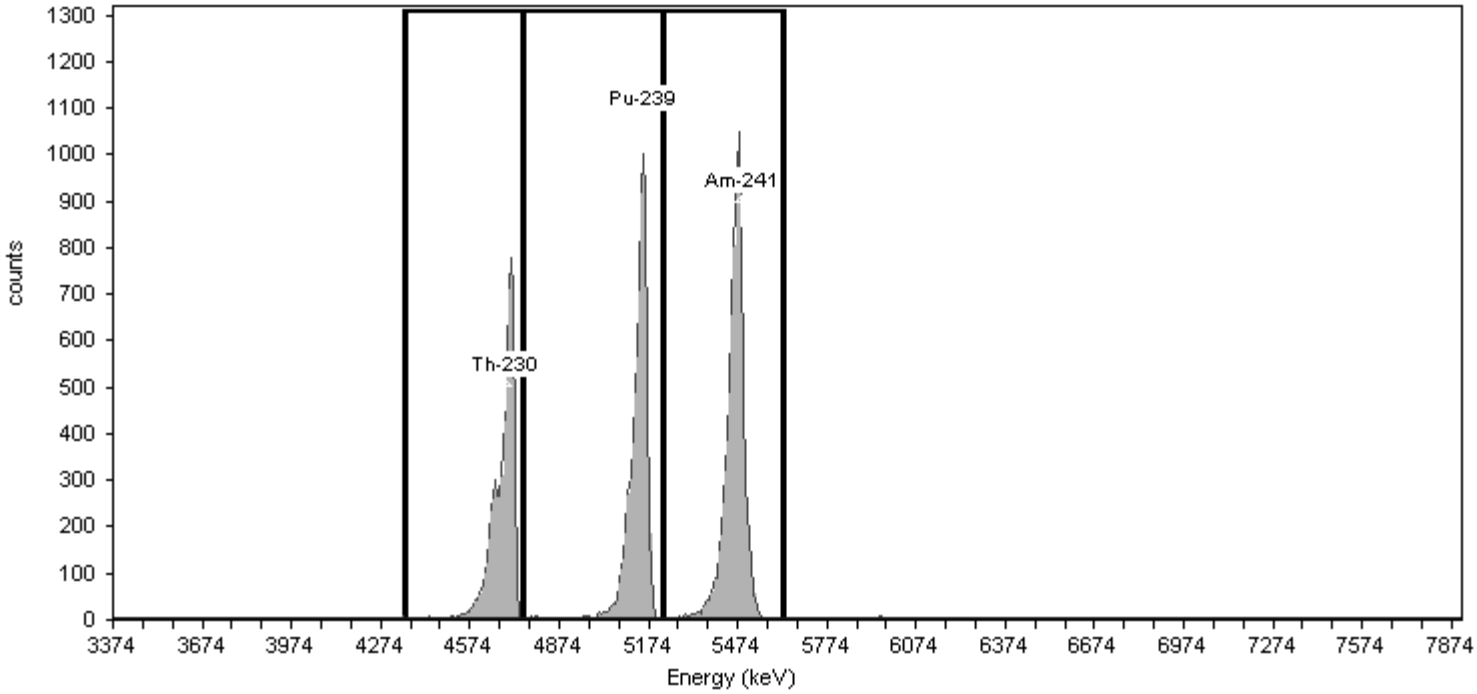
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV57 , SN: 48-158EE3
Acquisition Start Date: 5/8/2014 2:35:05PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.76% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,940.00	99.00
Pu-239	240	5.16	186	249	7,041.00	117.35
Am-241	284	5.49	249	303	7,940.00	132.33

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:56:59PM 5/8/2014

Calibration

Sample Name: ICV-9793;AV58-050814
Description:
Detector: AV58

Calibration Date: 5/8/2014 4:56:56PM
Analyst: 60040

Source Info

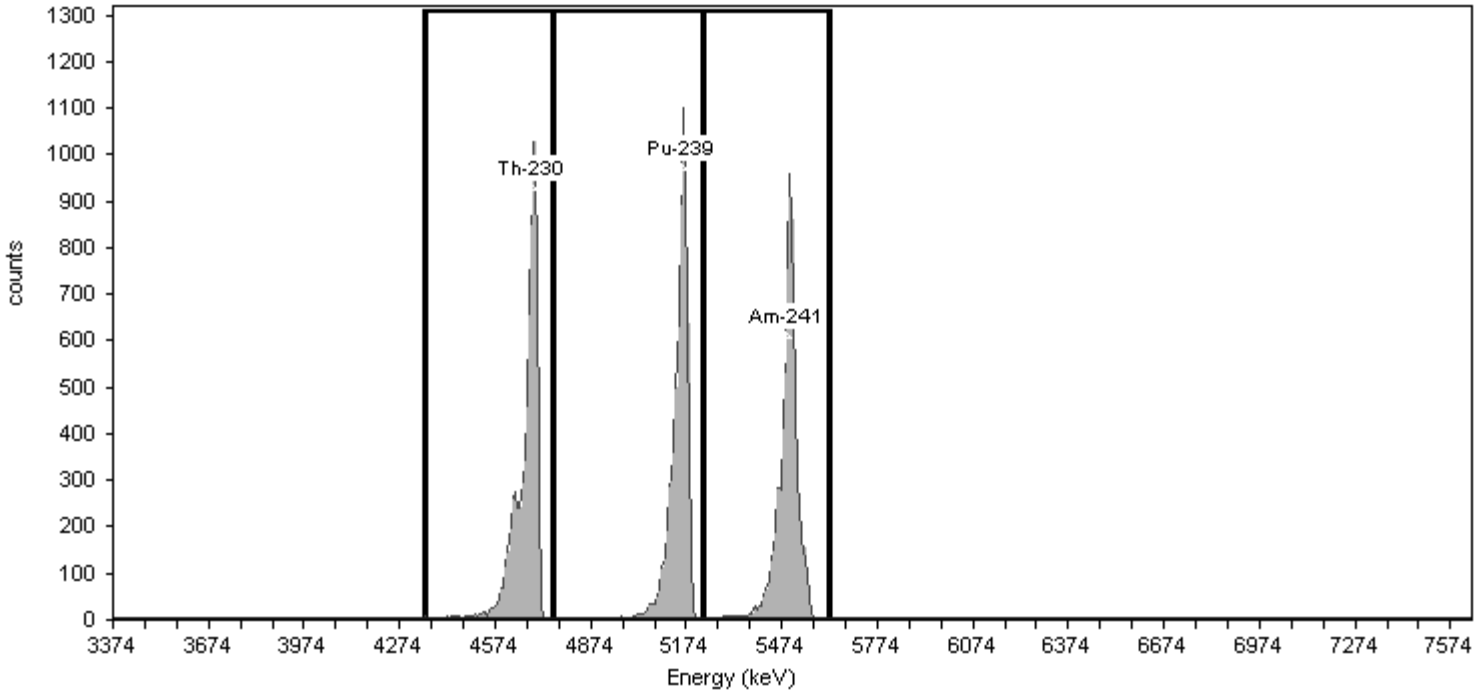
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV58 , SN: 52-102 C5
Acquisition Start Date: 5/8/2014 2:35:18PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 27.10% +/- 0.44% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,559.00	109.32
Pu-239	240	5.16	186	249	6,569.00	109.48
Am-241	284	5.49	249	303	6,413.00	106.88

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:57:08PM 5/8/2014

Calibration

Sample Name: ICV-9794;AV59-050814
Description:
Detector: AV59

Calibration Date: 5/8/2014 4:57:05PM
Analyst: 60040

Source Info

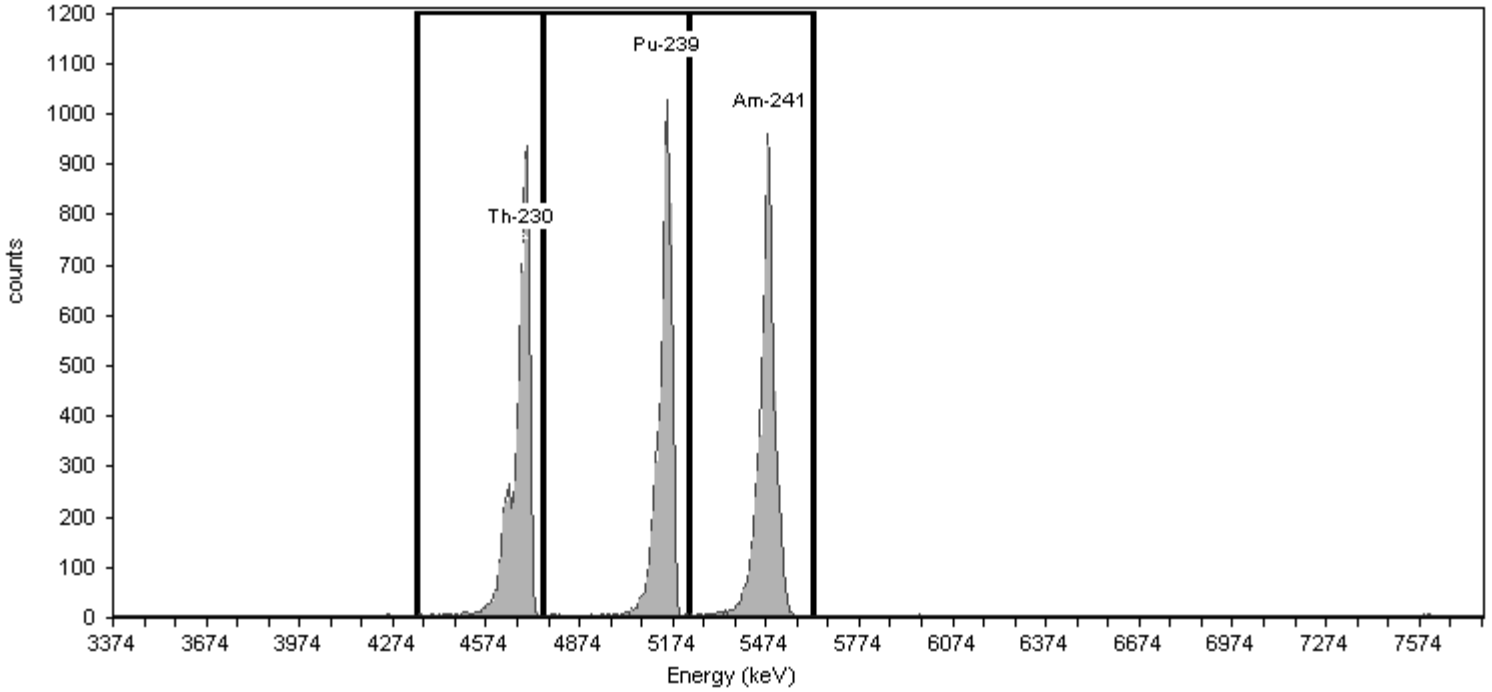
Certificate ID: 82242-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV59 , SN: 49-155M7
Acquisition Start Date: 5/8/2014 2:36:11PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.77% +/- 0.44% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,424.00	107.07
Pu-239	240	5.16	186	249	6,120.00	102.00
Am-241	284	5.49	249	303	6,829.00	113.82

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:24:44PM 5/11/2014

Calibration

Sample Name: ICV-9795;AV60-20140508
Description:
Detector: AV60

Calibration Date: 5/11/2014 7:13:44PM
Analyst: 60040

Source Info

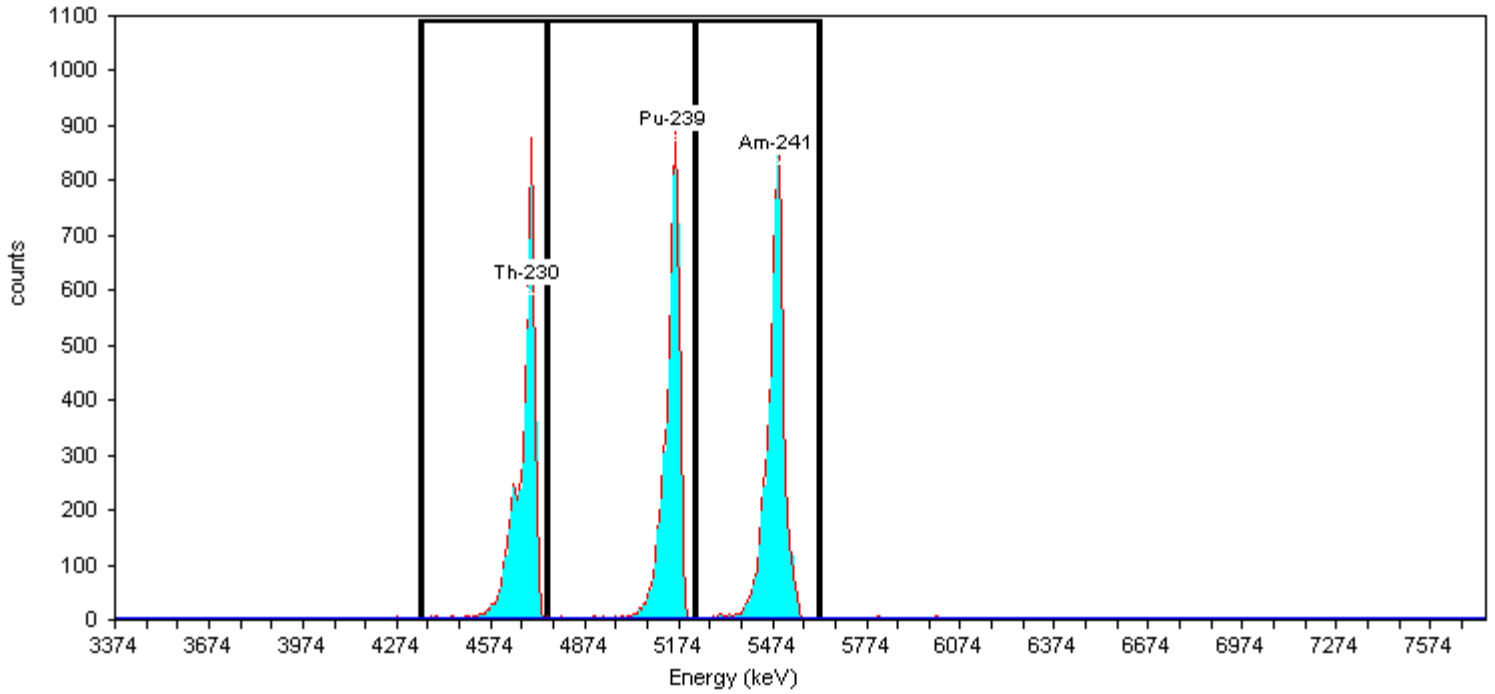
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV60 , SN: 49-027117
Acquisition Start Date: 5/8/2014 5:21:42PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 27.25% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,727.00	95.45
Pu-239	240	5.16	186	249	5,760.00	96.00
Am-241	284	5.49	249	303	6,362.00	106.03

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:57:49PM 5/8/2014

Calibration

Sample Name: ICV-9817;AV61-050814
Description:
Detector: AV61

Calibration Date: 5/8/2014 4:57:46PM
Analyst: 60040

Source Info

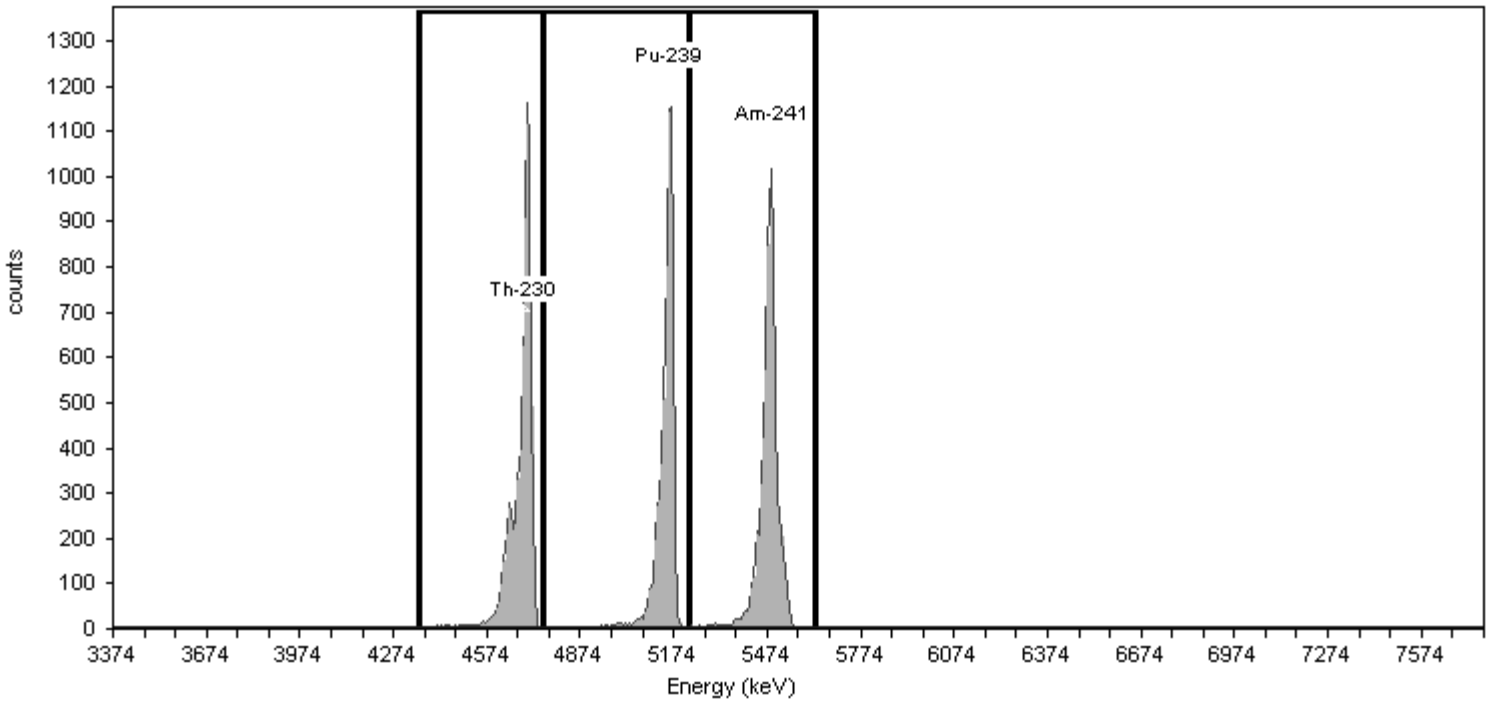
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV61 , SN: 5-051JJ3
Acquisition Start Date: 5/8/2014 2:36:18PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 25.81% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,807.00	113.45
Pu-239	240	5.16	186	249	6,203.00	103.38
Am-241	284	5.49	249	303	6,437.00	107.28

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:57:55PM 5/8/2014

Calibration

Sample Name: ICV-9884;AV62-050814
Description:
Detector: AV62

Calibration Date: 5/8/2014 4:57:52PM
Analyst: 60040

Source Info

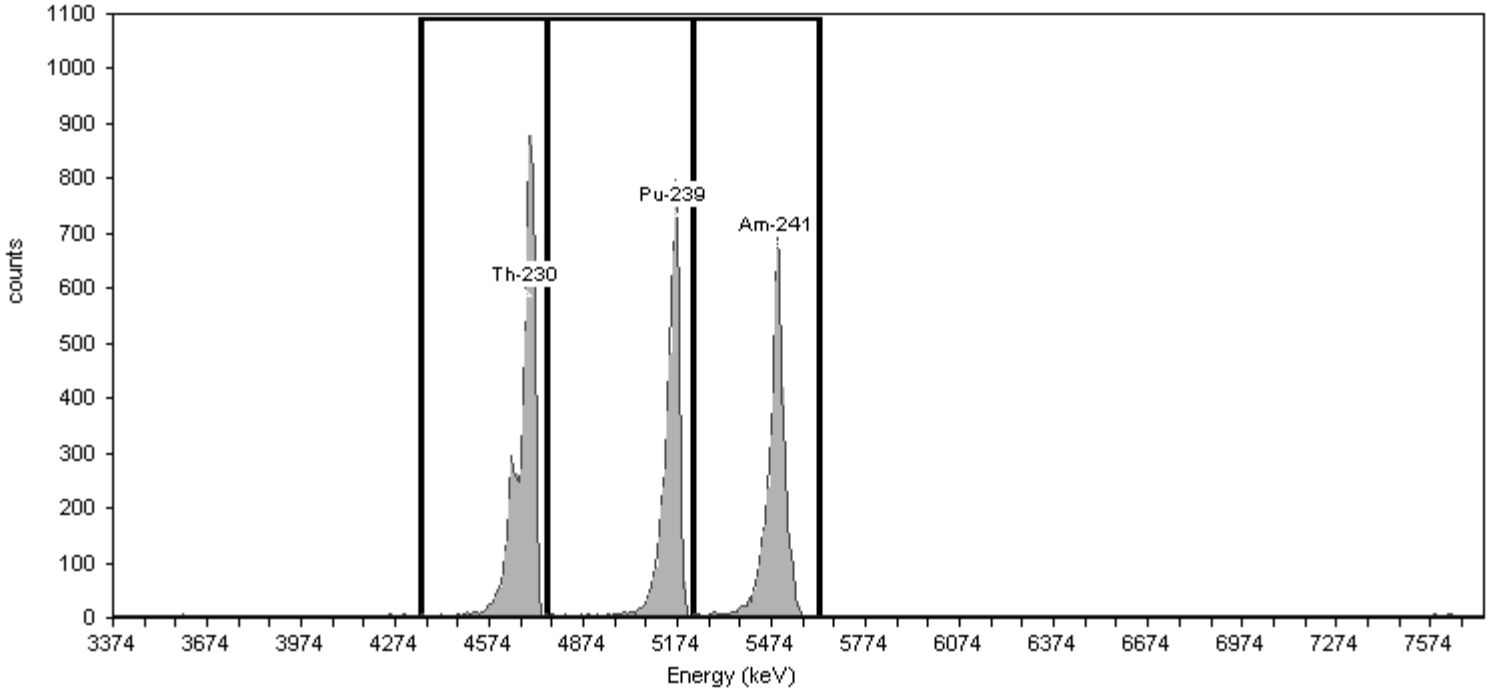
Certificate ID: 82245-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV62 , SN: 52-060FF2
Acquisition Start Date: 5/8/2014 2:36:19PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.22% +/- 0.48% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,368.00	106.13
Pu-239	240	5.16	186	249	5,206.00	86.77
Am-241	284	5.49	249	303	5,104.00	85.07

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:58:01PM 5/8/2014

Calibration

Sample Name: ICV-9885;AV63-050814
Description:
Detector: AV63

Calibration Date: 5/8/2014 4:57:58PM
Analyst: 60040

Source Info

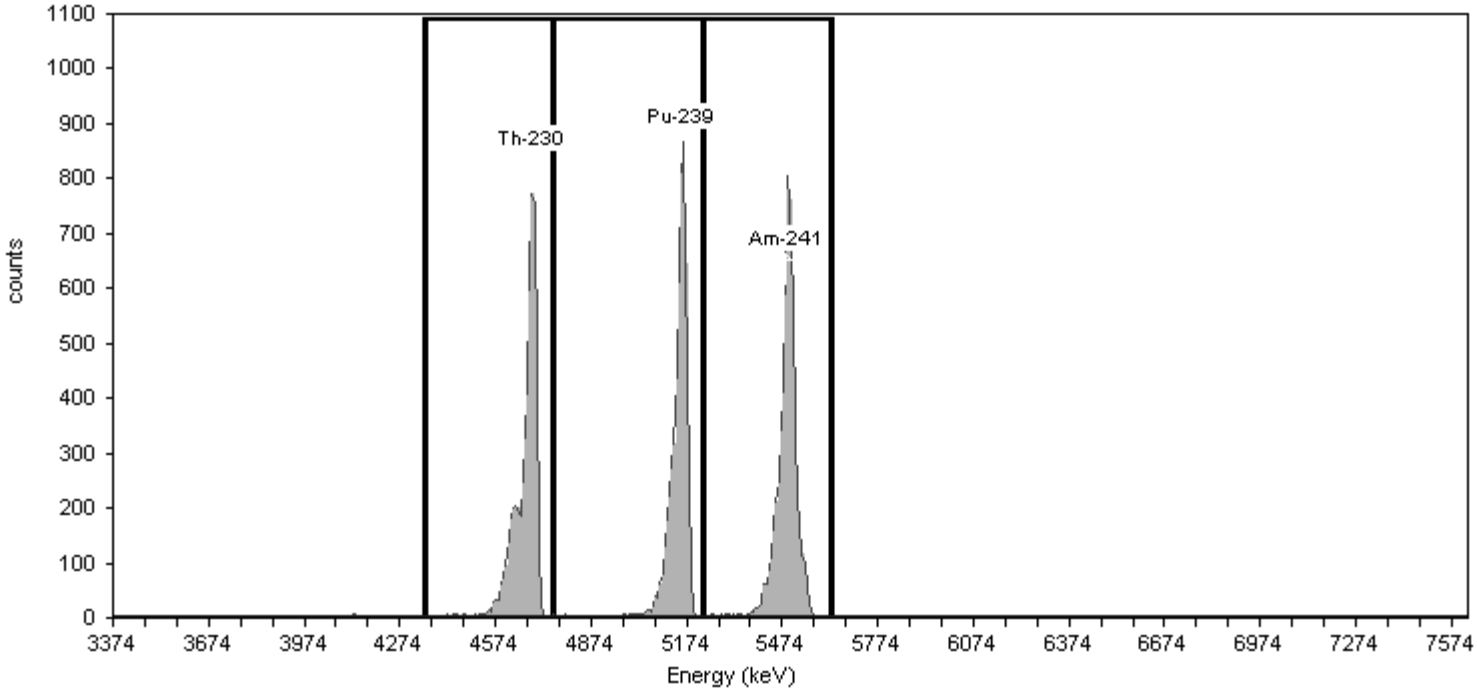
Certificate ID: 82246-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV63 , SN: 47-029ff2
Acquisition Start Date: 5/8/2014 2:36:20PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.01% +/- 0.49% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,165.00	86.08
Pu-239	240	5.16	186	249	5,120.00	85.33
Am-241	284	5.49	249	303	5,539.00	92.32

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:38:14PM 5/11/2014

Calibration

Sample Name: ICV-9886;AV64-20140511
Description:
Detector: AV64

Calibration Date: 5/11/2014 8:38:09PM
Analyst: 60040

Source Info

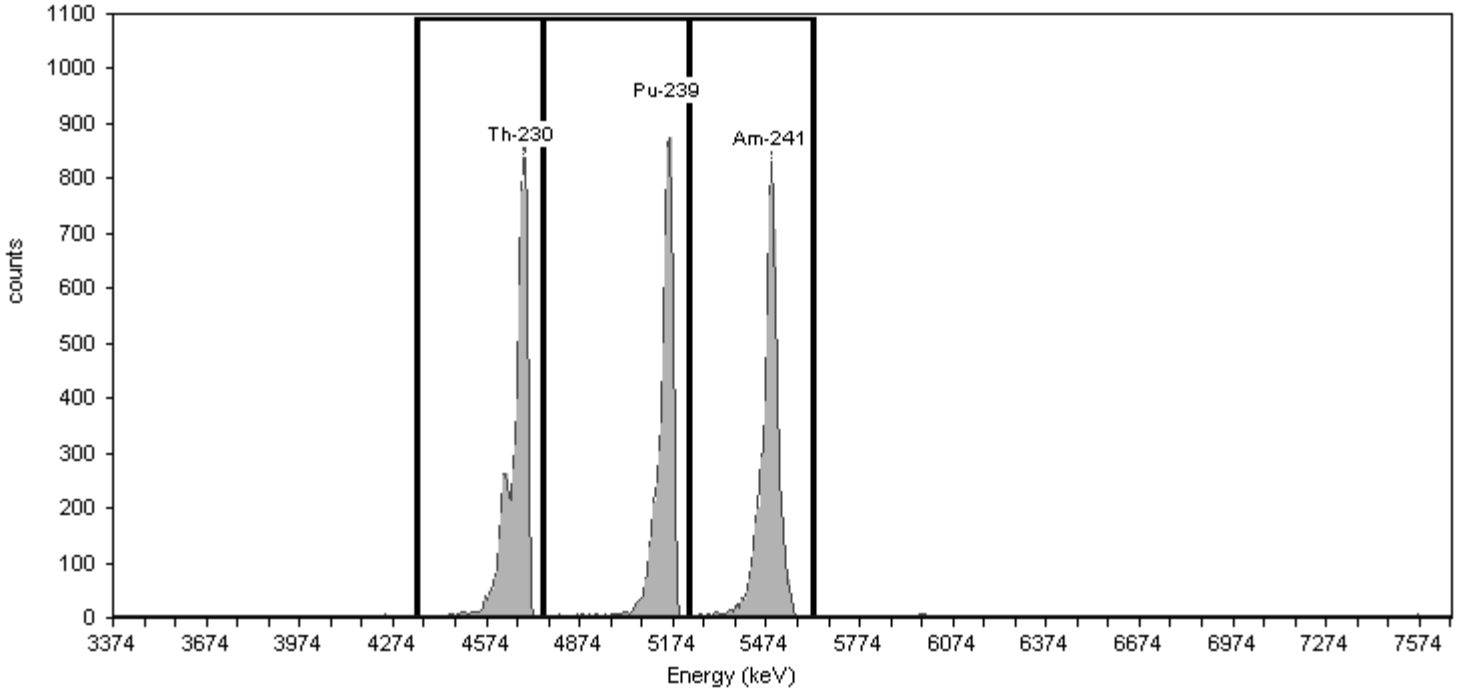
Certificate ID: 82247-334
Prepared by: Analytics

Certification Date: 6/10/2010 12:00:00PM
Description:

Acquisition

Detector: AV64 , SN: 47-029ee4
Acquisition Start Date: 5/11/2014 7:31:26PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.66% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,933.00	98.88
Pu-239	240	5.16	186	249	5,541.00	92.35
Am-241	284	5.49	249	303	6,049.00	100.82

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:24:54PM 5/11/2014

Calibration

Sample Name: ICV-7107;AV65-20140508
Description:
Detector: AV65

Calibration Date: 5/11/2014 7:11:57PM
Analyst: 60040

Source Info

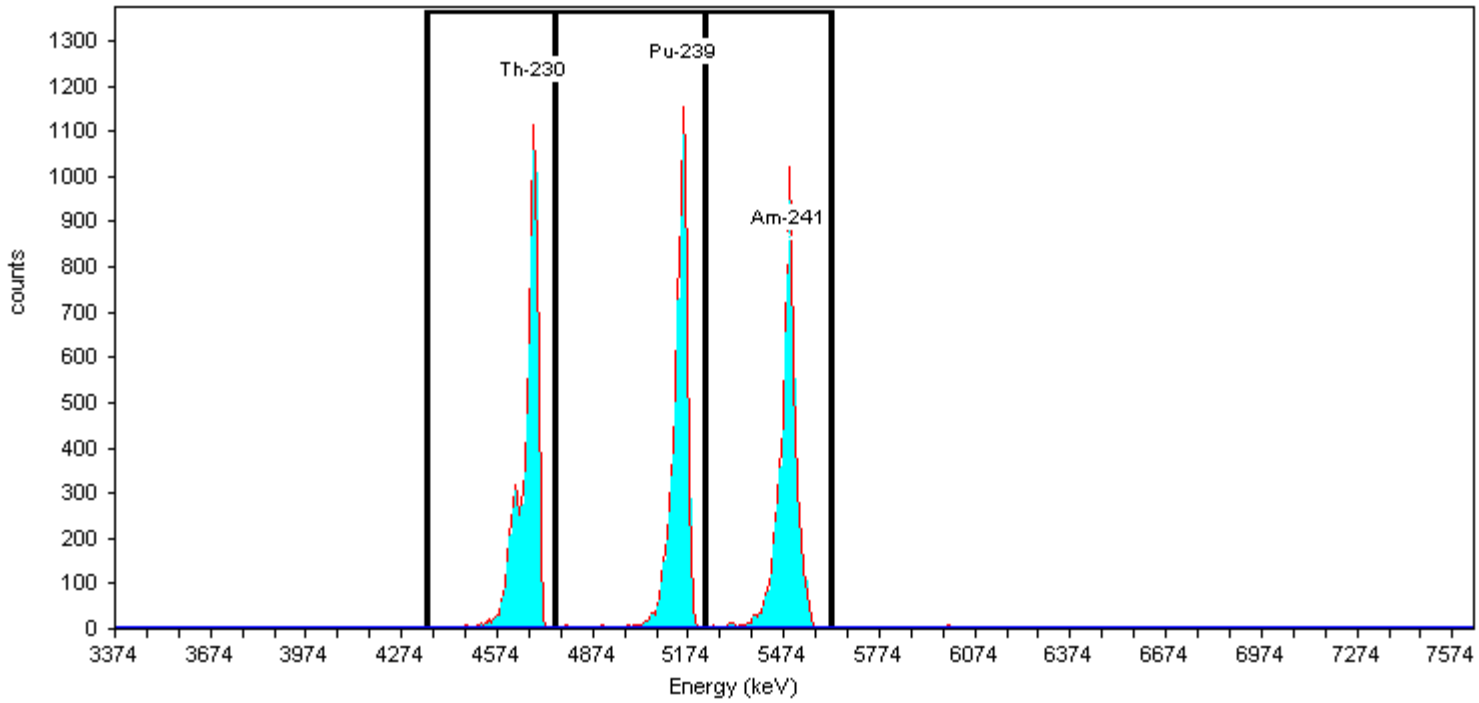
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV65 , SN: 44-049JJ1
Acquisition Start Date: 5/8/2014 5:18:33PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 27.12% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	7,390.00	123.17
Pu-239	240	5.16	186	249	7,136.00	118.93
Am-241	284	5.49	249	303	6,971.00	116.18

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:38:22PM 5/11/2014

Calibration

Sample Name: ICV-8874;AV66-20140511
Description:
Detector: AV66

Calibration Date: 5/11/2014 8:38:19PM
Analyst: 60040

Source Info

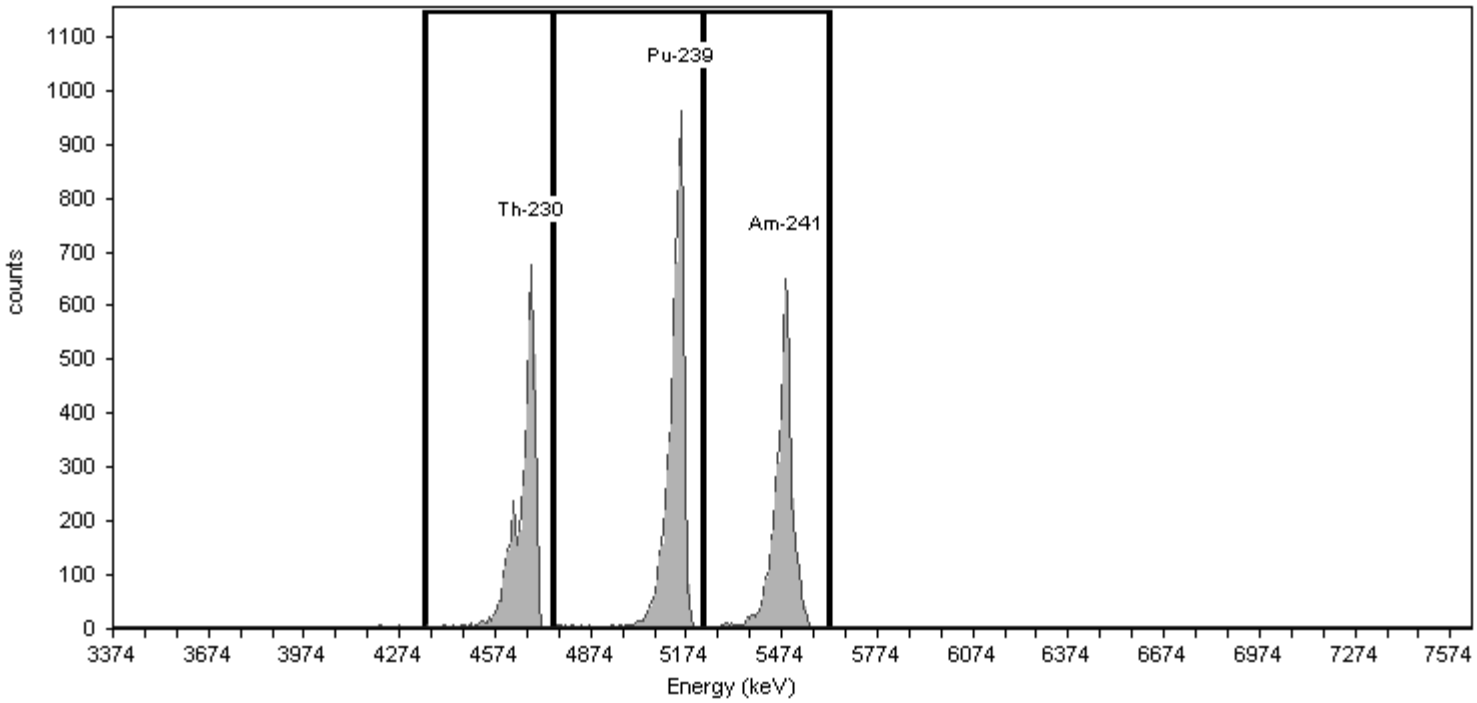
Certificate ID: 82233-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV66 , SN: 48-158EE2
Acquisition Start Date: 5/11/2014 7:32:00PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.67% +/- 0.50% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	4,596.00	76.60
Pu-239	240	5.16	186	249	6,078.00	101.30
Am-241	284	5.49	249	303	4,792.00	79.87

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:38:28PM 5/11/2014

Calibration

Sample Name: ICV-8875;AV67-20140511
Description:
Detector: AV67

Calibration Date: 5/11/2014 8:38:25PM
Analyst: 60040

Source Info

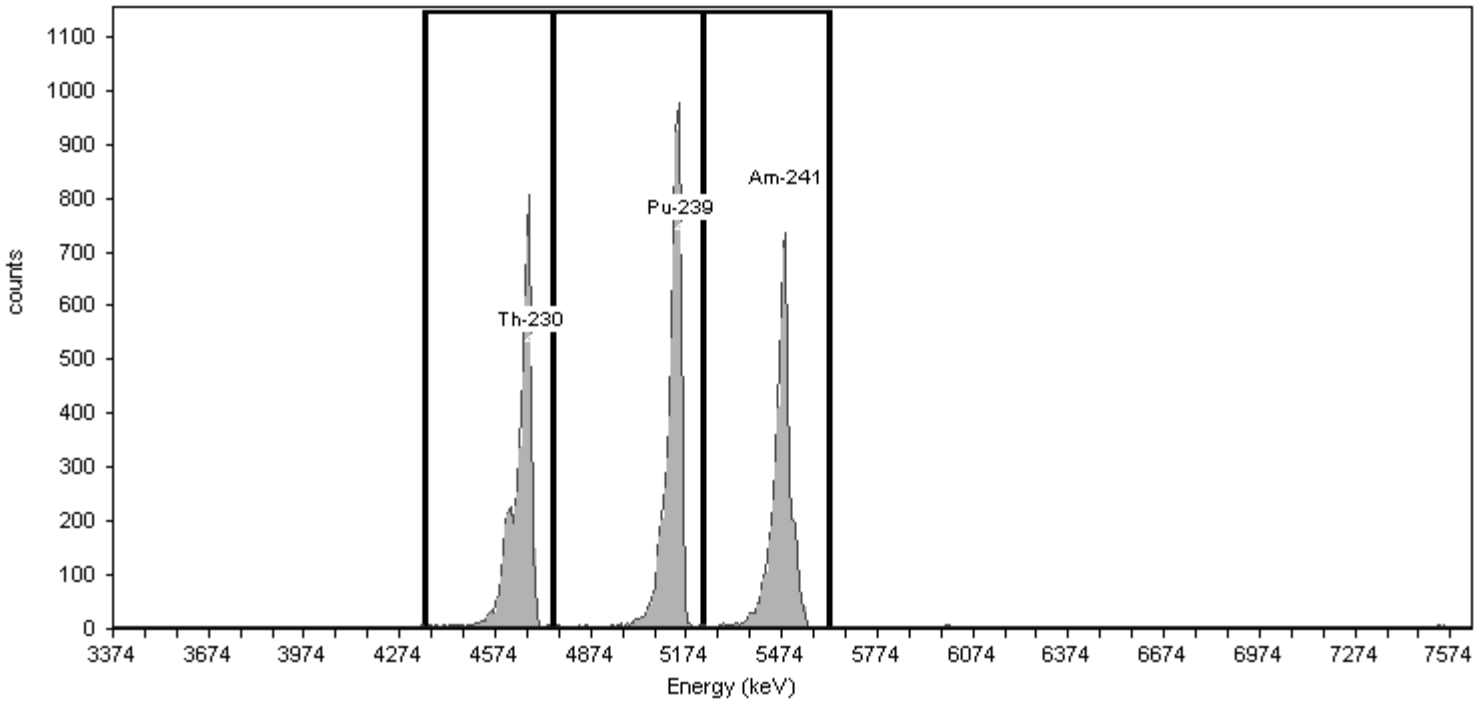
Certificate ID: 82234-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV67 , SN: 52-102 D7
Acquisition Start Date: 5/11/2014 7:32:06PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 27.02% +/- 0.49% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,466.00	91.10
Pu-239	240	5.16	186	249	6,008.00	100.13
Am-241	284	5.49	249	303	5,315.00	88.58

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:58:07PM 5/8/2014

Calibration

Sample Name: ICV-8876;AV68-050814
Description:
Detector: AV68

Calibration Date: 5/8/2014 4:58:04PM
Analyst: 60040

Source Info

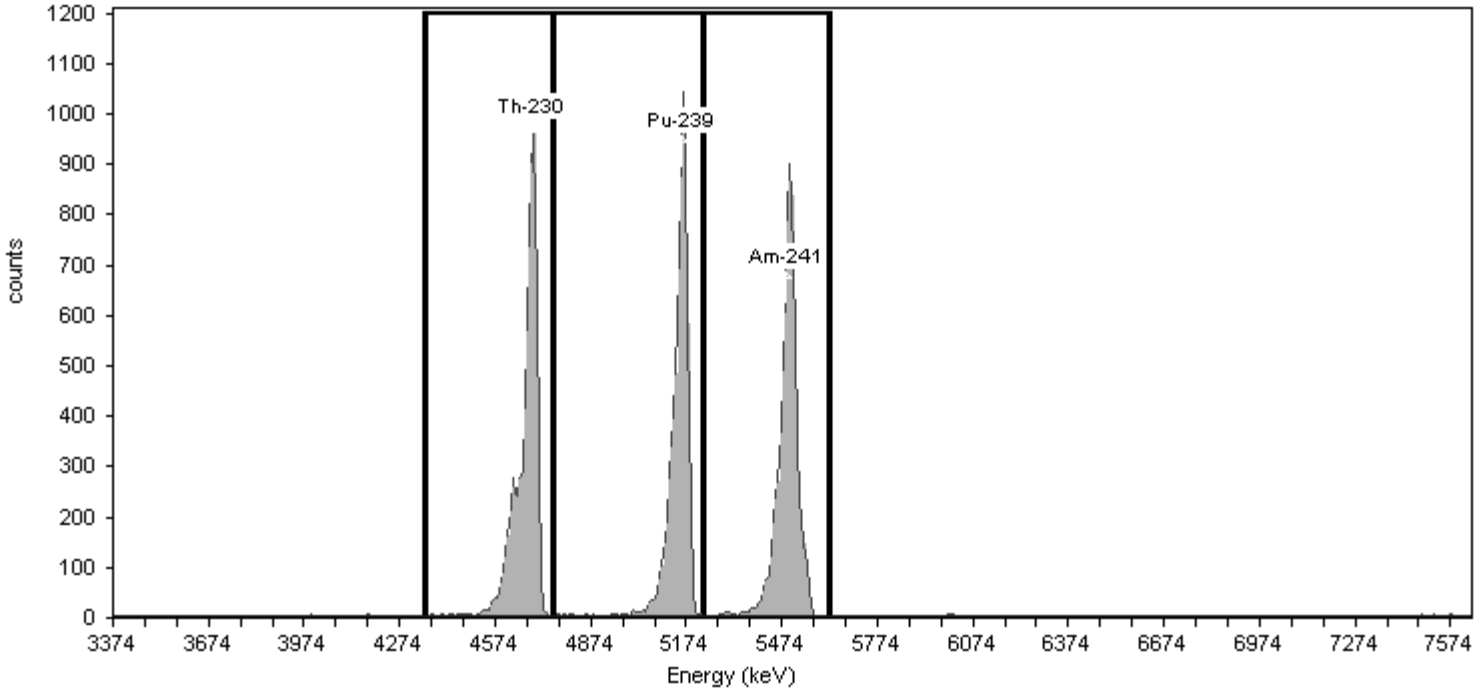
Certificate ID: 82235-334
Prepared by: Analytics

Certification Date: 6/4/2010 12:00:00PM
Description:

Acquisition

Detector: AV68 , SN: 48-45884
Acquisition Start Date: 5/8/2014 2:36:56PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.30% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,823.00	113.72
Pu-239	240	5.16	186	249	6,682.00	111.37
Am-241	284	5.49	249	303	6,857.00	114.28

Monthly Calibration Verifications

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:48:39PM 6/19/2014

Calibration

Sample Name: CCV-8875;AV3-20140619
Description:
Detector: AV3

Calibration Date: 6/19/2014 5:48:36PM
Analyst: 60040

Source Info

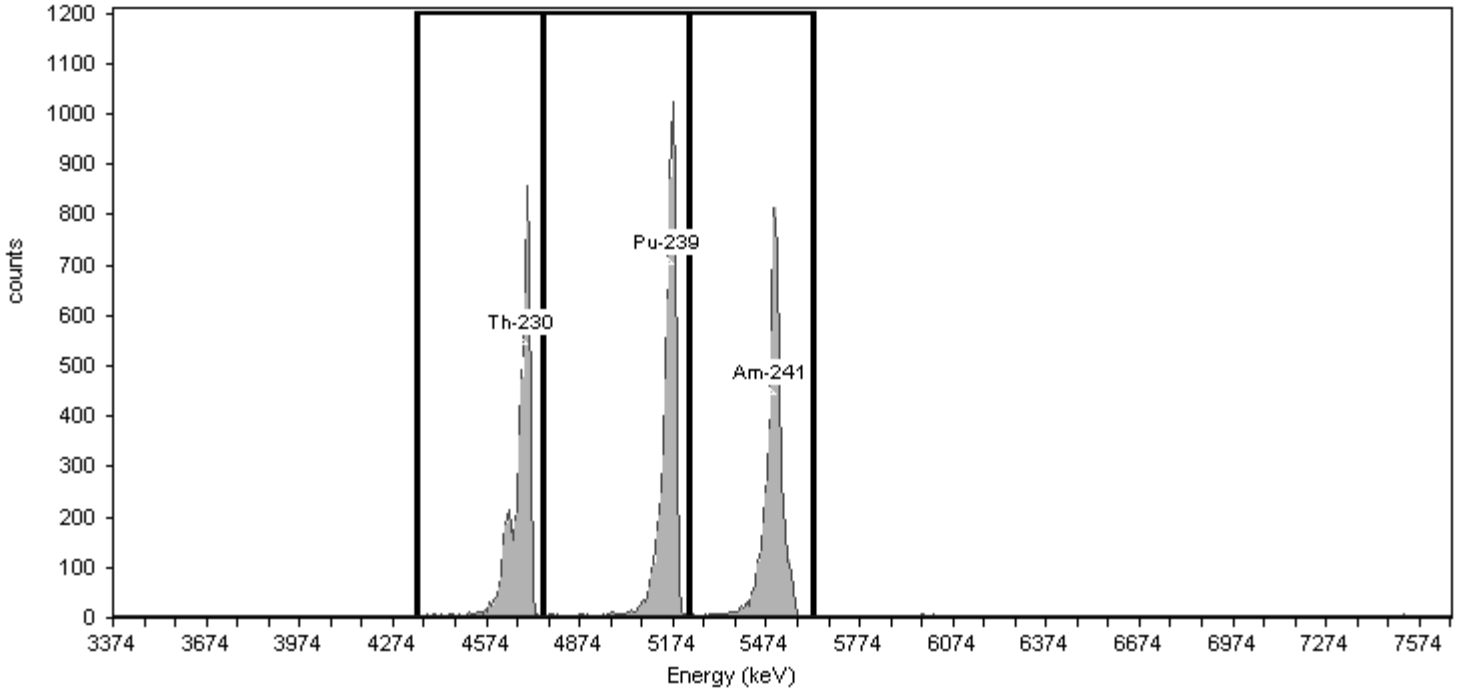
Certificate ID: 82234-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV3 , SN: 49-202 FF7
Acquisition Start Date: 6/19/2014 4:44:05PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 25.66% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,062.00	84.37
Pu-239	240	5.16	186	249	5,704.00	95.07
Am-241	284	5.49	249	303	5,177.00	86.28

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:48:45PM 6/19/2014

Calibration

Sample Name: CCV-8876;AV4-20140619
Description:
Detector: AV4

Calibration Date: 6/19/2014 5:48:42PM
Analyst: 60040

Source Info

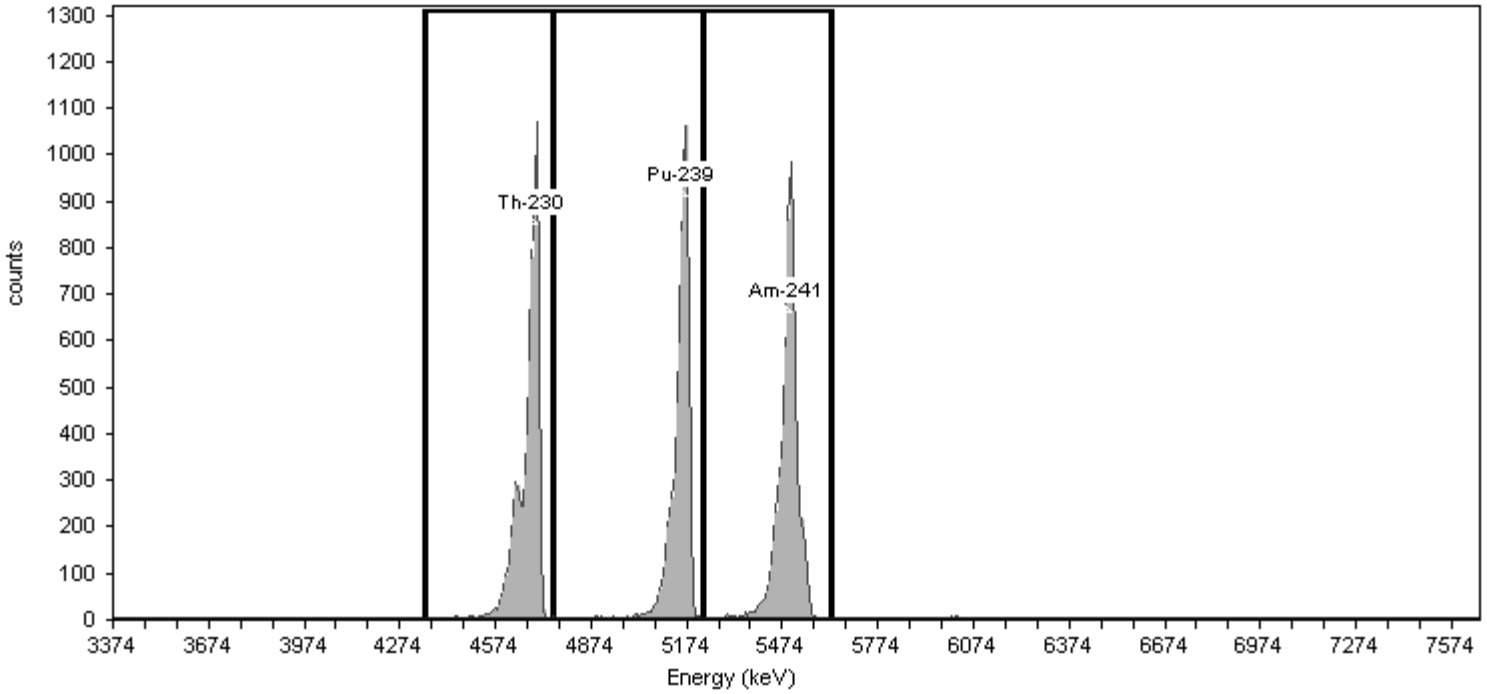
Certificate ID: 82235-334
Prepared by: Analytics

Certification Date: 6/4/2010 12:00:00PM
Description:

Acquisition

Detector: AV4 , SN: 46-033Q4
Acquisition Start Date: 6/19/2014 4:44:15PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 25.90% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,819.00	113.65
Pu-239	240	5.16	186	249	6,370.00	106.17
Am-241	284	5.49	249	303	6,852.00	114.20

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:34:49PM 6/19/2014

Calibration

Sample Name: CCV-9520;AV6-20140619
Description:
Detector: AV6

Calibration Date: 6/19/2014 7:34:43PM
Analyst: 60040

Source Info

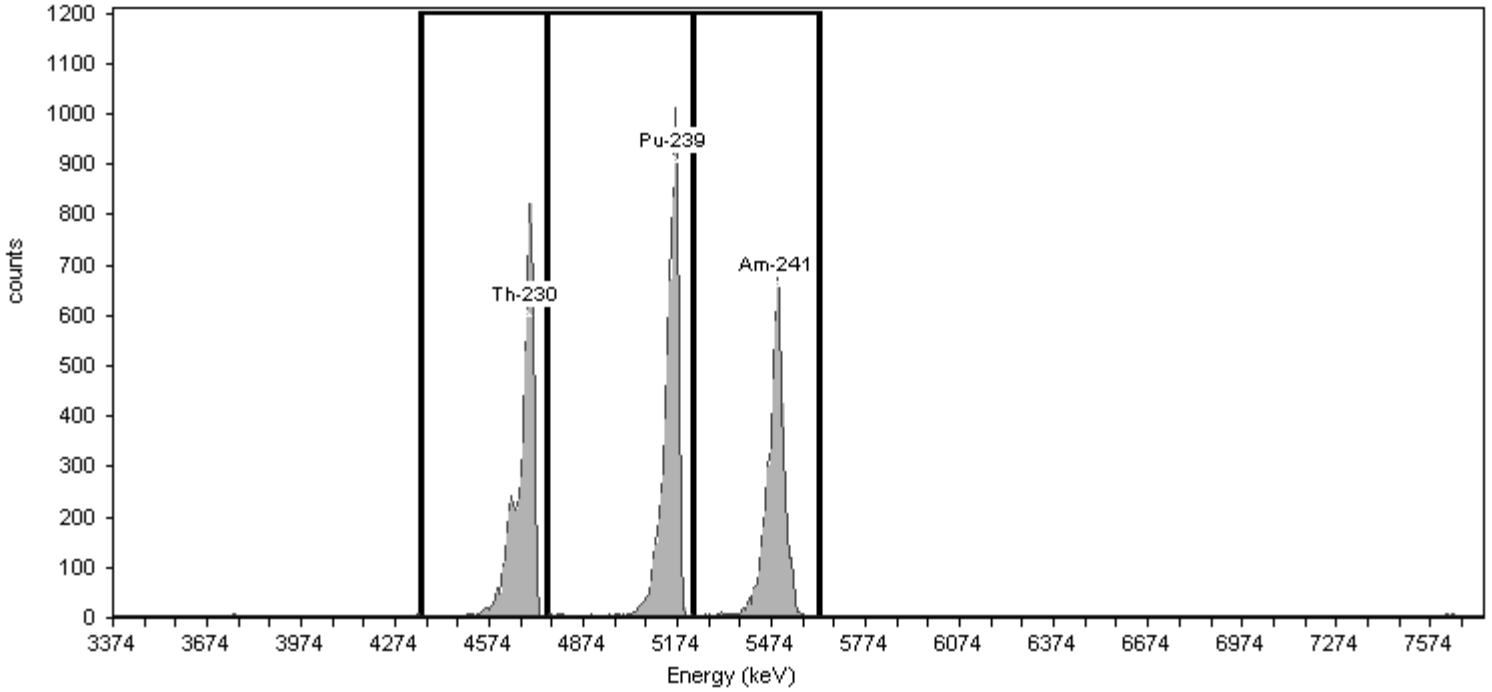
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV6 , SN: 47-27FF2
Acquisition Start Date: 6/19/2014 6:06:10PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.06% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,375.00	89.58
Pu-239	240	5.16	186	249	6,255.00	104.25
Am-241	284	5.49	249	303	5,126.00	85.43

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:48:52PM 6/19/2014

Calibration

Sample Name: CCV-8877;AV7-20140619
Description:
Detector: AV7

Calibration Date: 6/19/2014 5:48:49PM
Analyst: 60040

Source Info

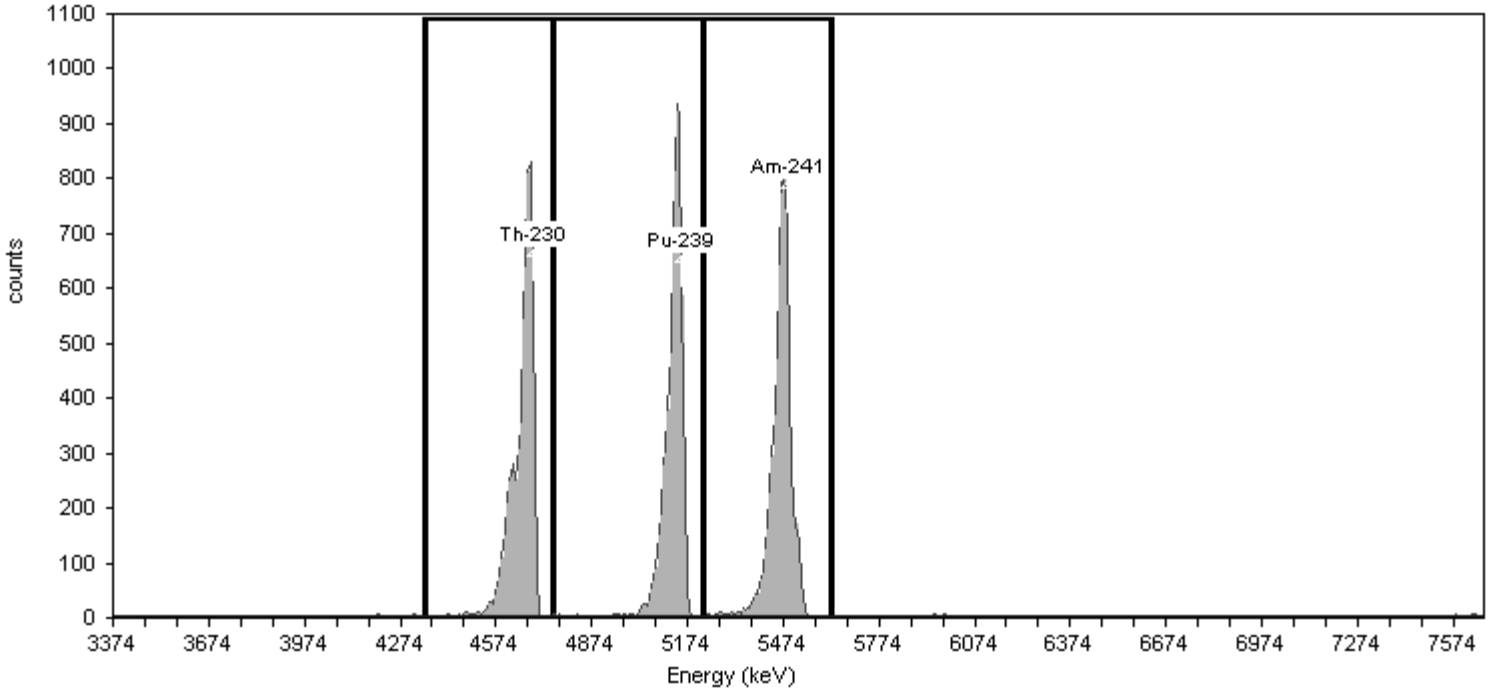
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV7 , SN: 48-158EE5
Acquisition Start Date: 6/19/2014 4:44:29PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 25.49% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,271.00	104.52
Pu-239	240	5.16	186	249	6,395.00	106.58
Am-241	284	5.49	249	303	6,298.00	104.97

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:35:00PM 6/19/2014

Calibration

Sample Name: CCV-9792;AV8-20140619
Description:
Detector: AV8

Calibration Date: 6/19/2014 7:34:56PM
Analyst: 60040

Source Info

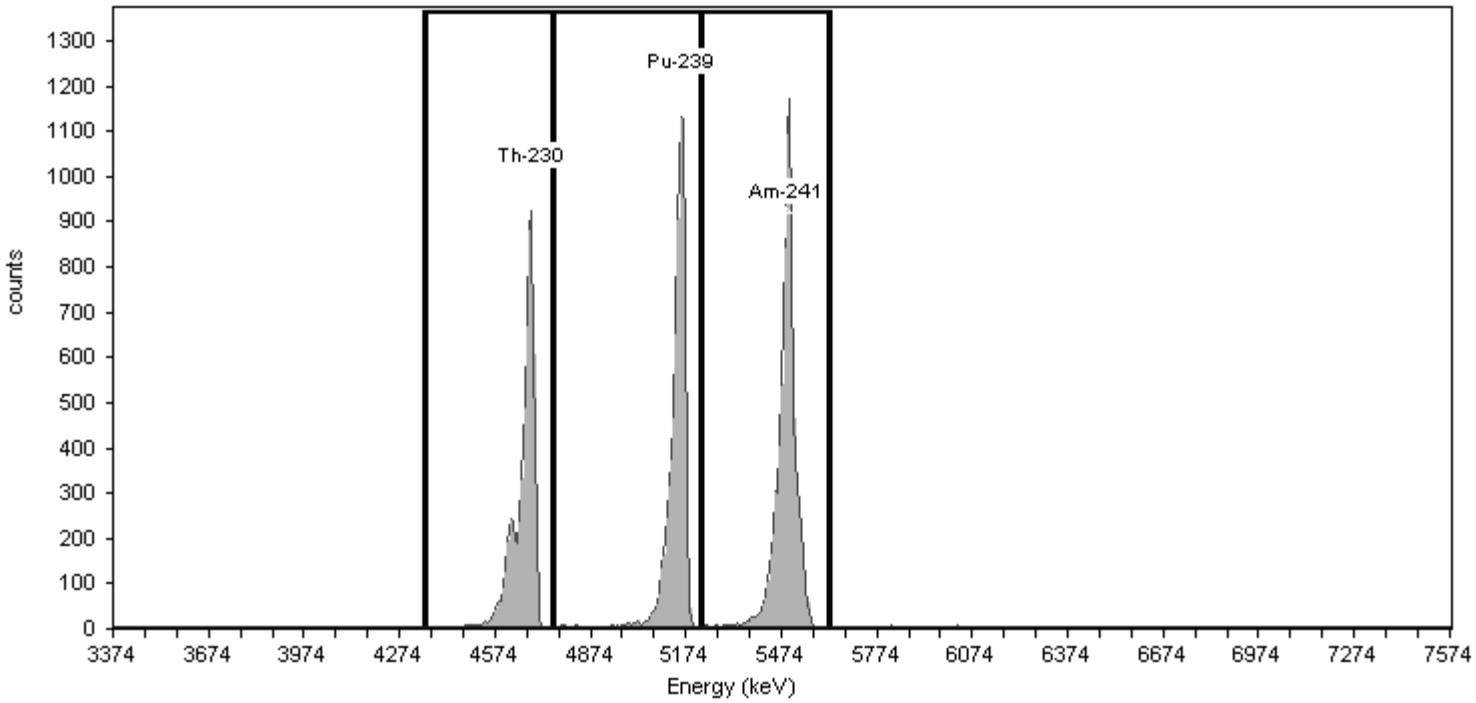
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV8 , SN: 41-137Q6
Acquisition Start Date: 6/19/2014 6:06:25PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.68% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,944.00	99.07
Pu-239	240	5.16	186	249	6,972.00	116.20
Am-241	284	5.49	249	303	7,944.00	132.40

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:35:13PM 6/19/2014

Calibration

Sample Name: CCV-9794;AV10-20140619
Description:
Detector: AV10

Calibration Date: 6/19/2014 7:35:09PM
Analyst: 60040

Source Info

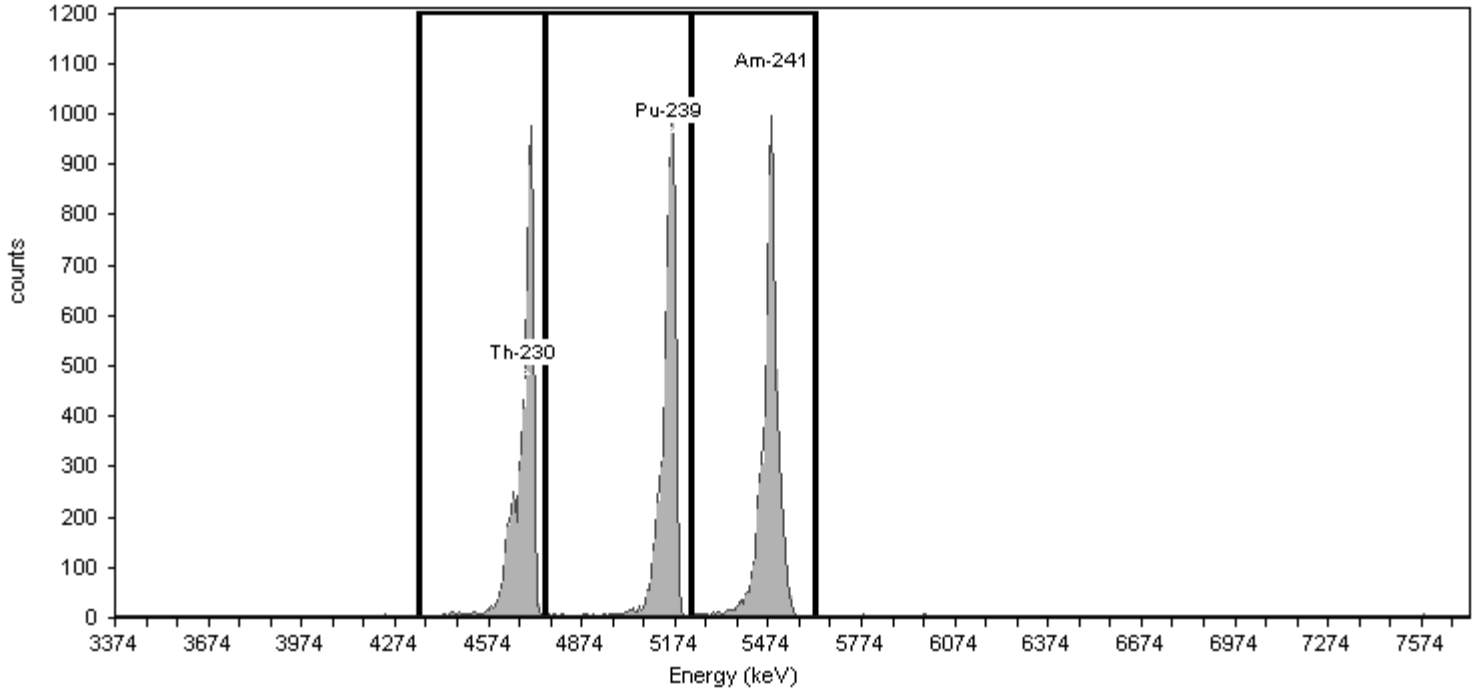
Certificate ID: 82242-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV10 , SN: 49-155N2
Acquisition Start Date: 6/19/2014 6:06:52PM
Live Time: 60.00 min.
Real Time: 60.36 min.
Efficiency: 25.52% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,044.00	100.73
Pu-239	240	5.16	186	249	5,811.00	96.85
Am-241	284	5.49	249	303	6,611.00	110.18

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:35:19PM 6/19/2014

Calibration

Sample Name: CCV-9795;AV11-20140619
Description:
Detector: AV11

Calibration Date: 6/19/2014 7:35:16PM
Analyst: 60040

Source Info

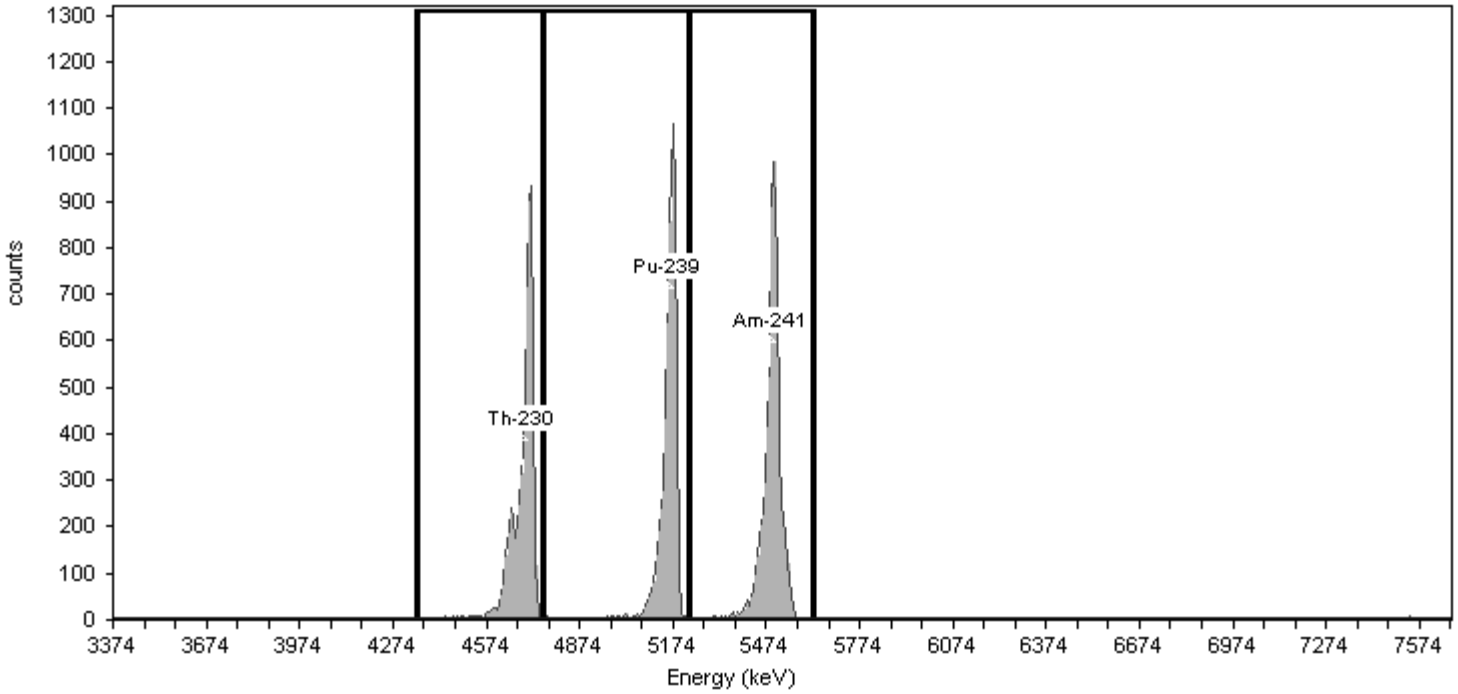
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV11 , SN: 49-155dd2
Acquisition Start Date: 6/19/2014 6:07:01PM
Live Time: 60.00 min.
Real Time: 60.36 min.
Efficiency: 26.47% +/- 0.46% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,658.00	94.30
Pu-239	240	5.16	186	249	5,667.00	94.45
Am-241	284	5.49	249	303	6,008.00	100.13

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:19:56PM 6/22/2014

Calibration

Sample Name: CCV-9884;AV13-20140619a
Description:
Detector: AV13

Calibration Date: 6/22/2014 5:19:48PM
Analyst: 60040

Source Info

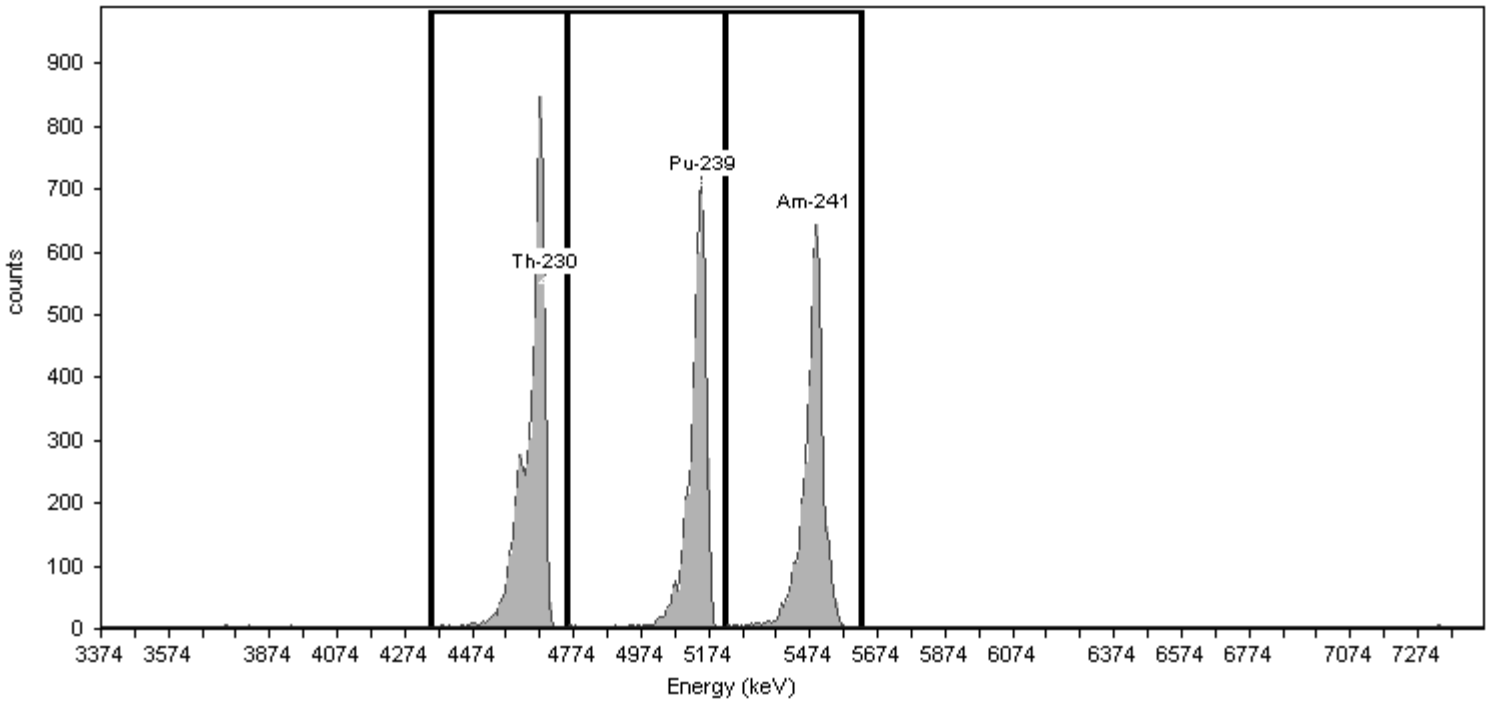
Certificate ID: 82245-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV13 , SN: 49-155M7
Acquisition Start Date: 6/19/2014 7:45:11PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 25.66% +/- 0.48% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,201.00	103.35
Pu-239	240	5.16	186	249	5,023.00	83.72
Am-241	284	5.49	249	303	5,096.00	84.93

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:35:46PM 6/19/2014

Calibration

Sample Name: CCV-9885;AV14-20140619
Description:
Detector: AV14

Calibration Date: 6/19/2014 7:35:43PM
Analyst: 60040

Source Info

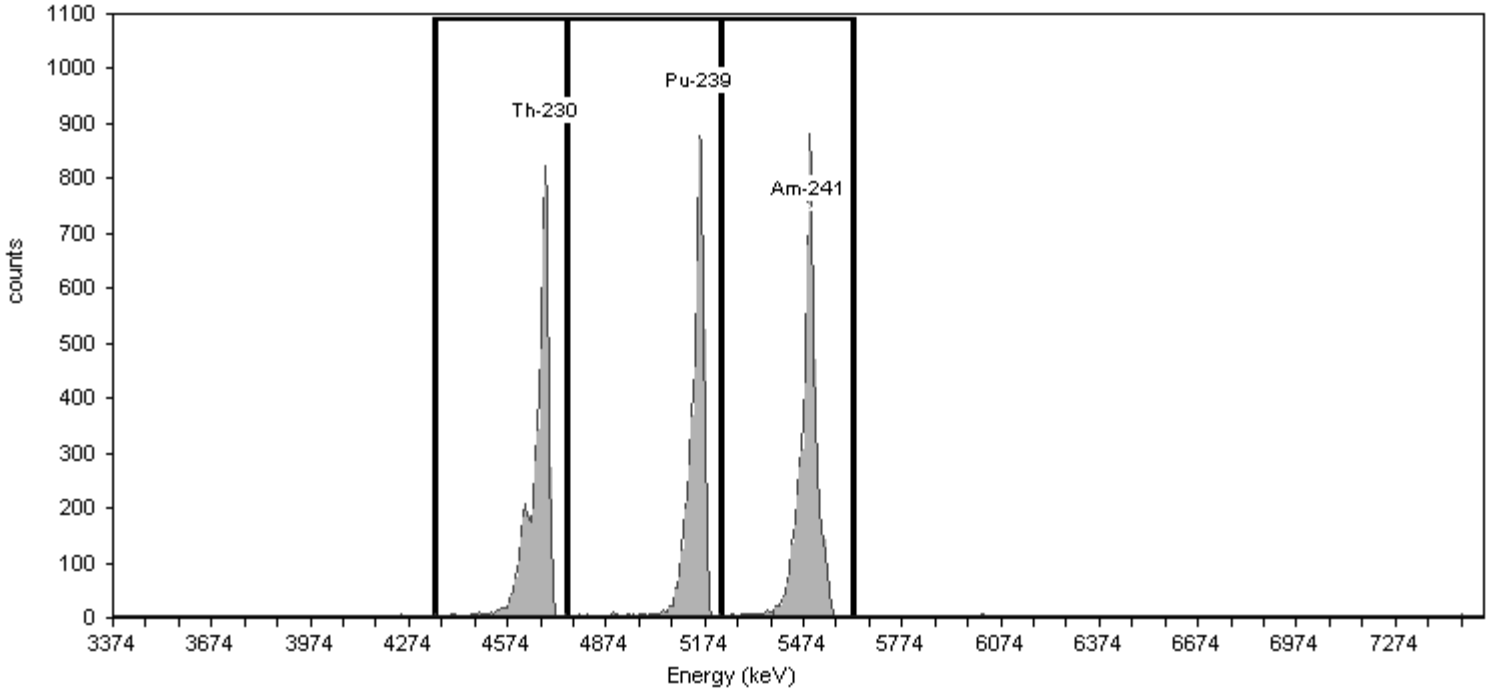
Certificate ID: 82246-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV14 , SN: 50-060W4
Acquisition Start Date: 6/19/2014 6:08:37PM
Live Time: 60.00 min.
Real Time: 60.36 min.
Efficiency: 26.15% +/- 0.49% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,216.00	86.93
Pu-239	240	5.16	186	249	5,025.00	83.75
Am-241	284	5.49	249	303	5,658.00	94.30

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:20:06PM 6/22/2014

Calibration

Sample Name: CCV-9886;AV15-20140619
Description:
Detector: AV15

Calibration Date: 6/22/2014 5:20:02PM
Analyst: 60040

Source Info

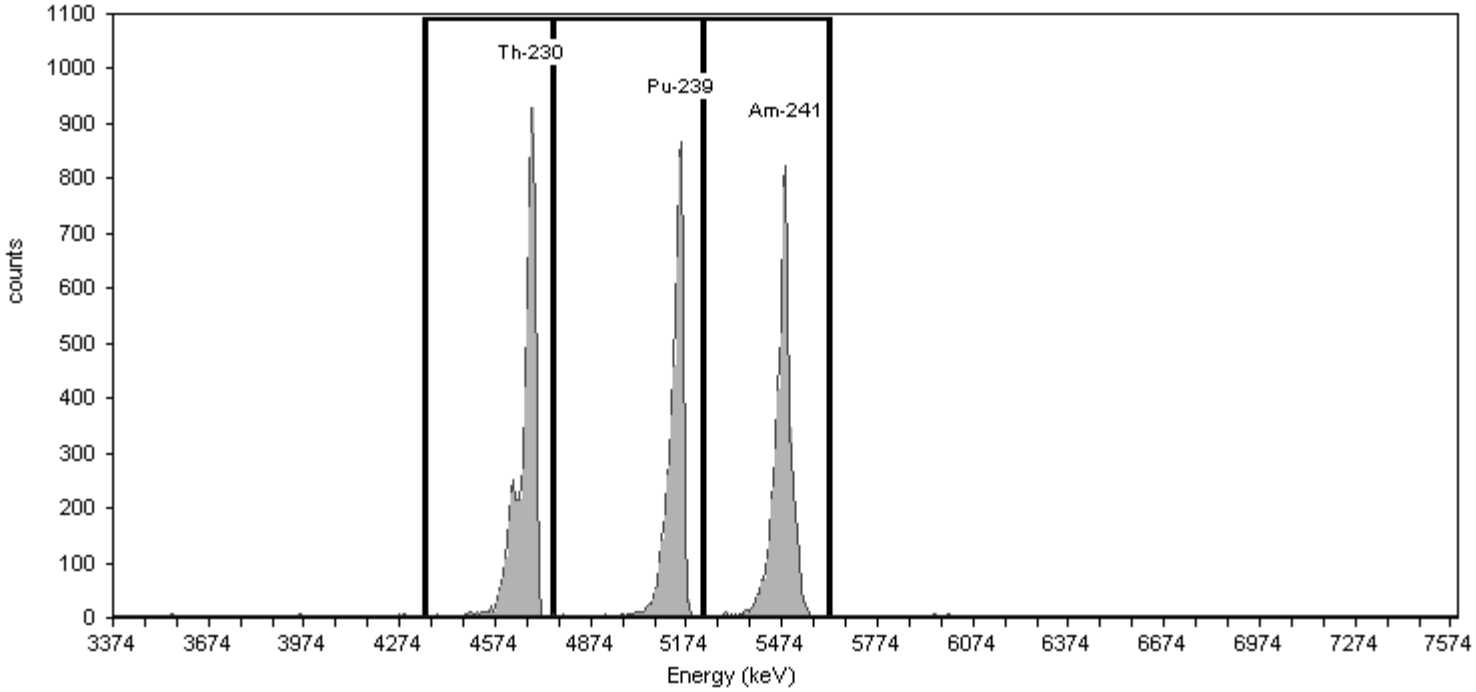
Certificate ID: 82247-334
Prepared by: Analytics

Certification Date: 6/10/2010 12:00:00PM
Description:

Acquisition

Detector: AV15 , SN: 41-172C5
Acquisition Start Date: 6/19/2014 7:45:33PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 25.28% +/- 0.45% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,765.00	96.08
Pu-239	240	5.16	186	249	5,241.00	87.35
Am-241	284	5.49	249	303	5,610.00	93.50

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:36:04PM 6/19/2014

Calibration

Sample Name: CCV-7107;AV16-20140619
Description:
Detector: AV16

Calibration Date: 6/19/2014 7:36:00PM
Analyst: 60040

Source Info

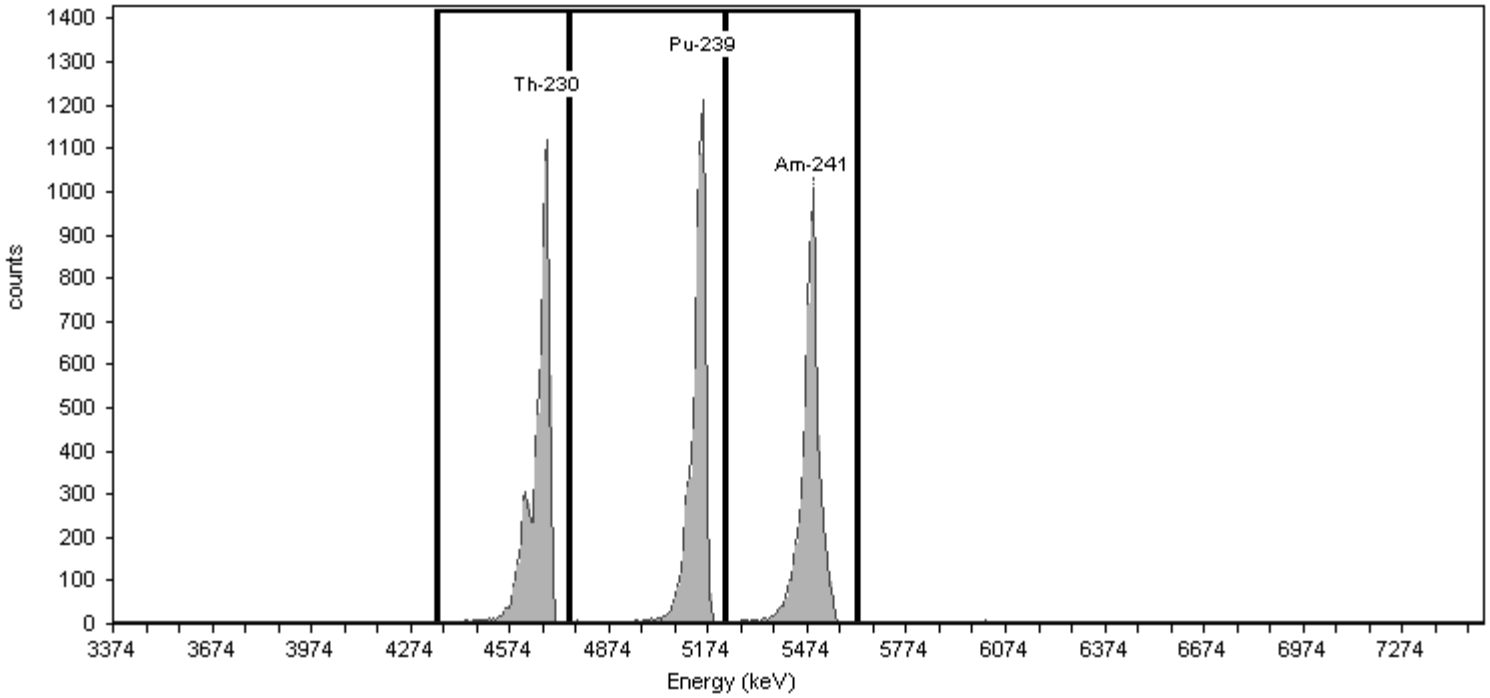
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV16 , SN: 51-082B6
Acquisition Start Date: 6/19/2014 6:08:38PM
Live Time: 60.00 min.
Real Time: 60.36 min.
Efficiency: 27.12% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	7,280.00	121.33
Pu-239	240	5.16	186	249	7,094.00	118.23
Am-241	284	5.49	249	303	7,128.00	118.80

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:35:52PM 6/19/2014

Calibration

Sample Name: CCV-8874;AV17-20140619
Description:
Detector: AV17

Calibration Date: 6/19/2014 7:35:49PM
Analyst: 60040

Source Info

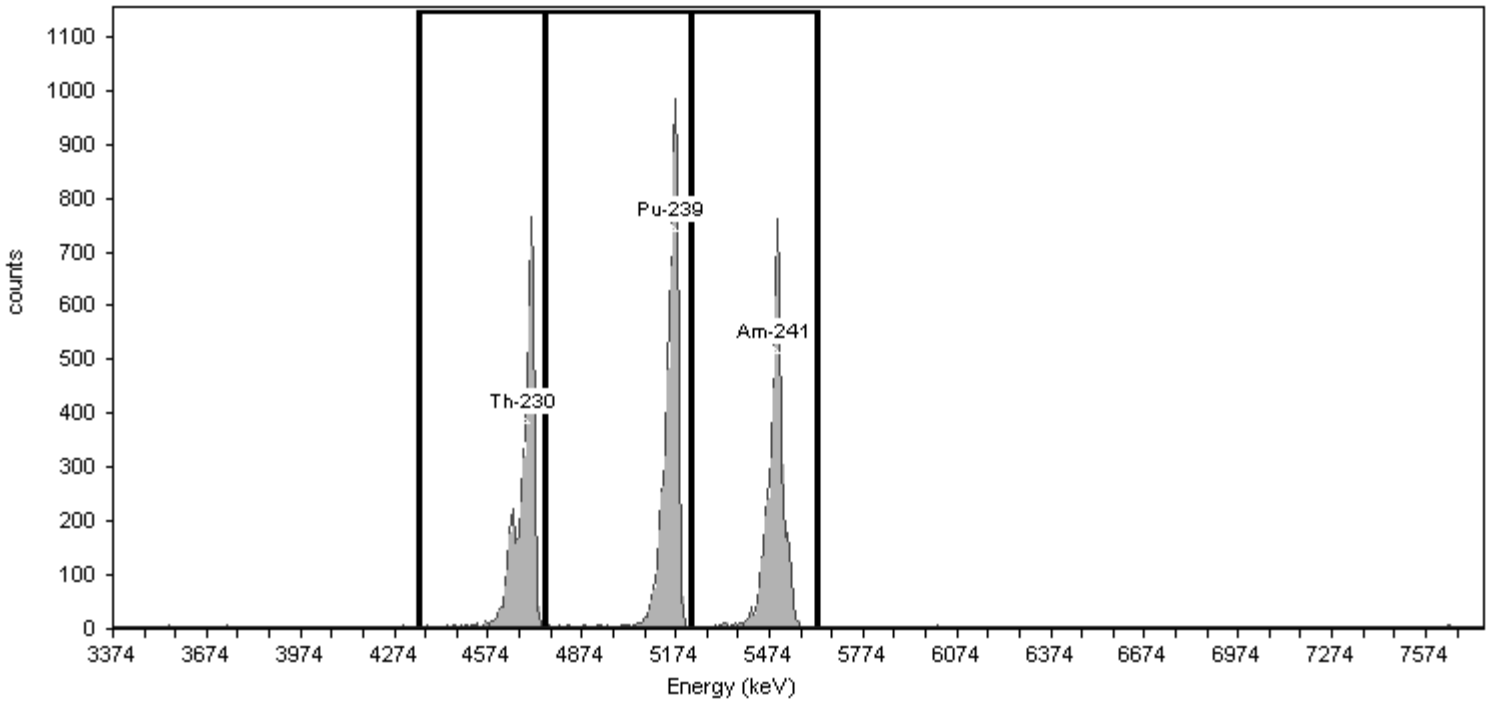
Certificate ID: 82233-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV17 , SN: 50-051C4
Acquisition Start Date: 6/19/2014 6:08:39PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 26.13% +/- 0.49% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	4,625.00	77.08
Pu-239	240	5.16	186	249	5,758.00	95.97
Am-241	284	5.49	249	303	4,757.00	79.28

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:35:58PM 6/19/2014

Calibration

Sample Name: CCV-8875;AV18-20140619
Description:
Detector: AV18

Calibration Date: 6/19/2014 7:35:55PM
Analyst: 60040

Source Info

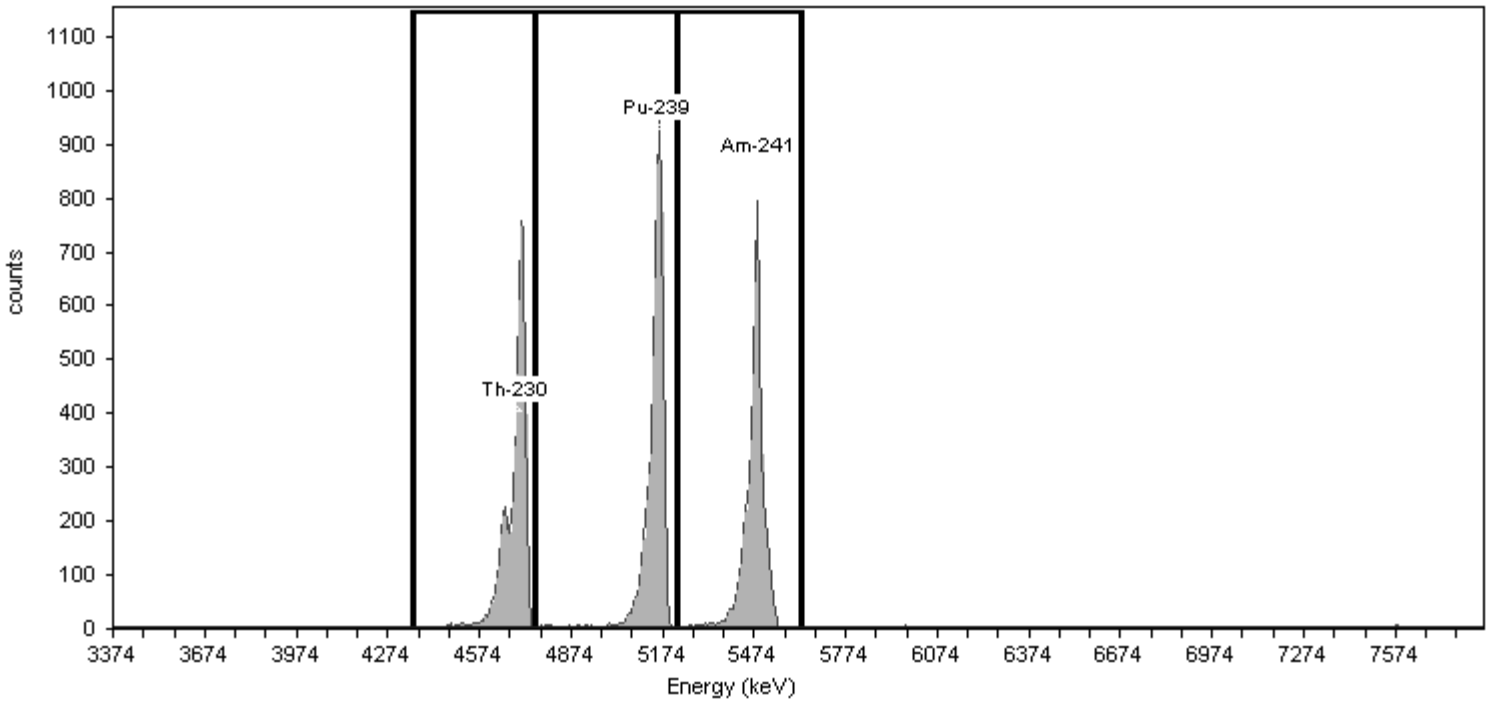
Certificate ID: 82234-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV18 , SN: 51-082C5
Acquisition Start Date: 6/19/2014 6:08:40PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 25.39% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,086.00	84.77
Pu-239	240	5.16	186	249	5,671.00	94.52
Am-241	284	5.49	249	303	5,020.00	83.67

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:36:09PM 6/19/2014

Calibration

Sample Name: CCV-8876;AV19-20140619
Description:
Detector: AV19

Calibration Date: 6/19/2014 7:36:06PM
Analyst: 60040

Source Info

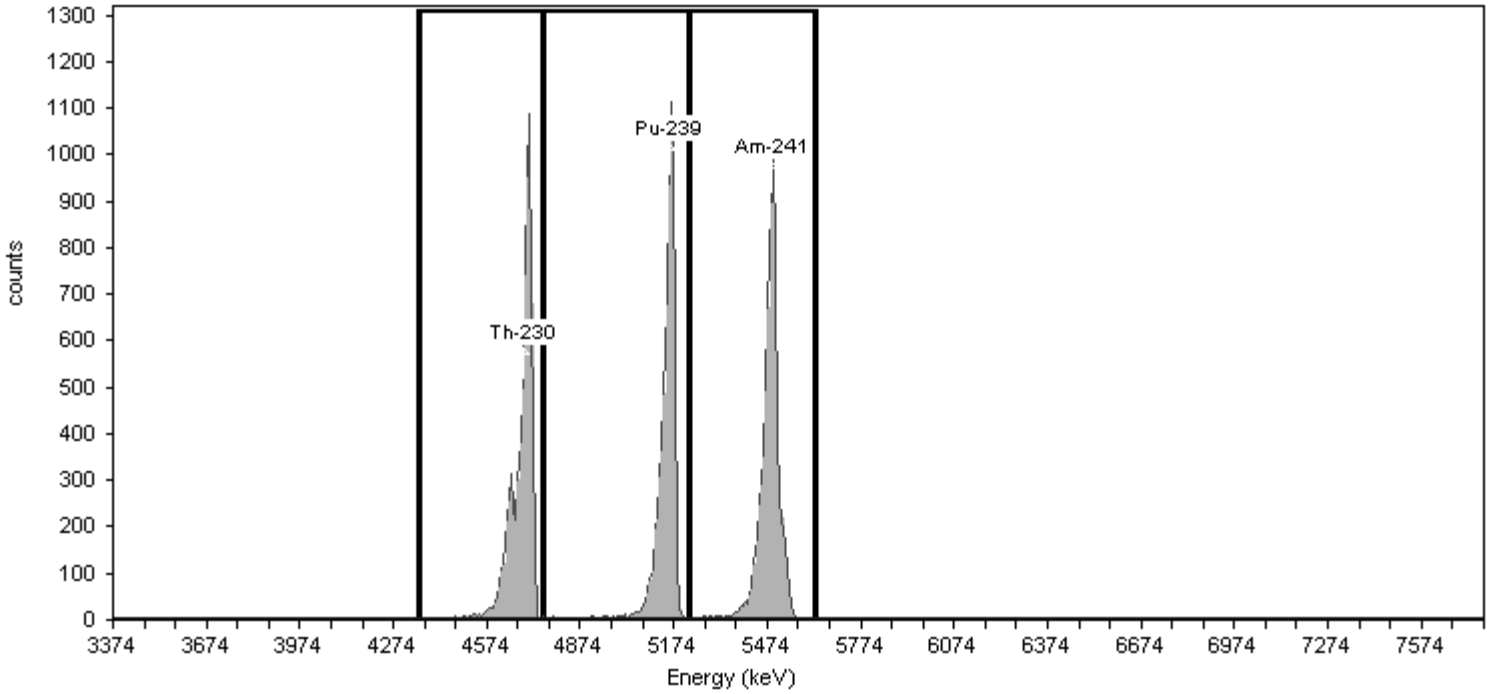
Certificate ID: 82235-334
Prepared by: Analytics

Certification Date: 6/4/2010 12:00:00PM
Description:

Acquisition

Detector: AV19 , SN: 50-025FF5
Acquisition Start Date: 6/19/2014 6:08:42PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 25.36% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,536.00	108.93
Pu-239	240	5.16	186	249	6,491.00	108.18
Am-241	284	5.49	249	303	6,610.00	110.17

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:36:15PM 6/19/2014

Calibration

Sample Name: CCV-8877;AV20-20140619
Description:
Detector: AV20

Calibration Date: 6/19/2014 7:36:12PM
Analyst: 60040

Source Info

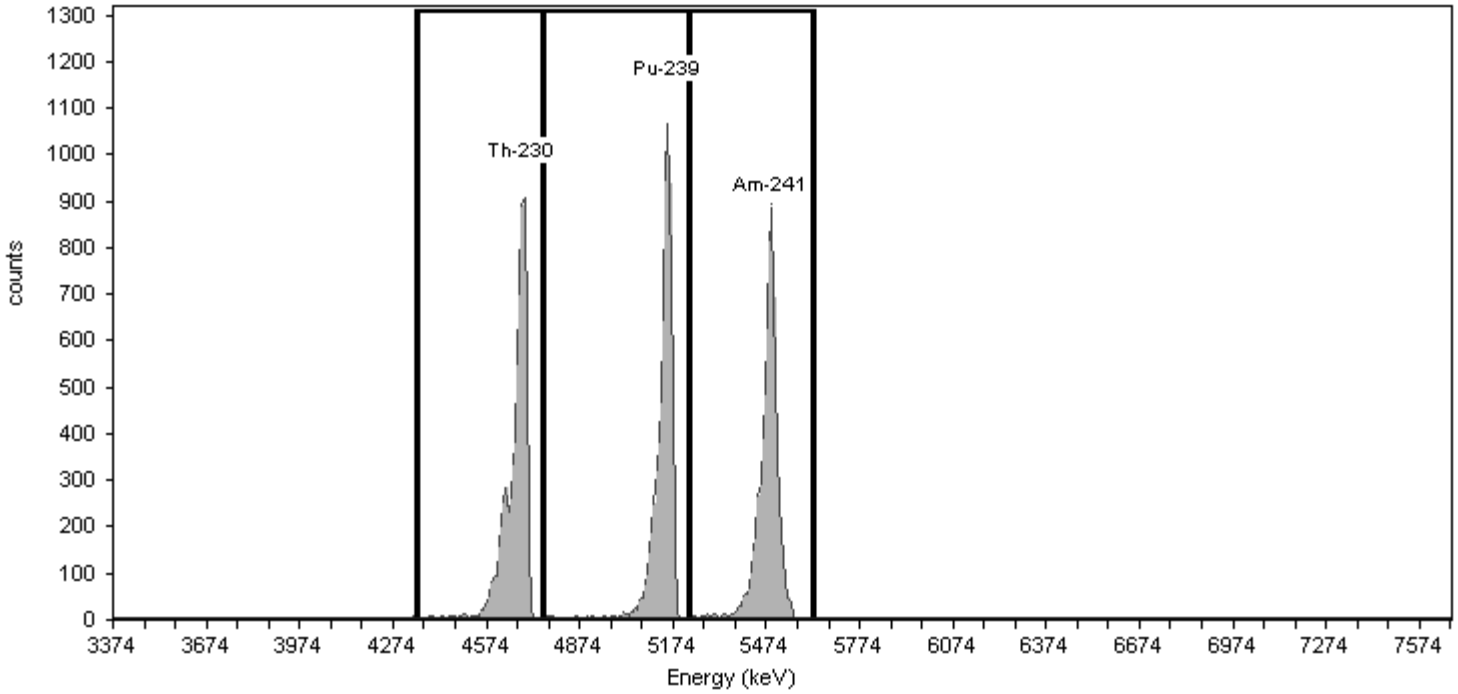
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV20 , SN: 48-121A7
Acquisition Start Date: 6/19/2014 6:08:43PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 25.77% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,402.00	106.70
Pu-239	240	5.16	186	249	6,444.00	107.40
Am-241	284	5.49	249	303	6,315.00	105.25

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:20:12PM 6/22/2014

Calibration

Sample Name: CCV-9520;AV21-20140619
Description:
Detector: AV21

Calibration Date: 6/22/2014 5:20:09PM
Analyst: 60040

Source Info

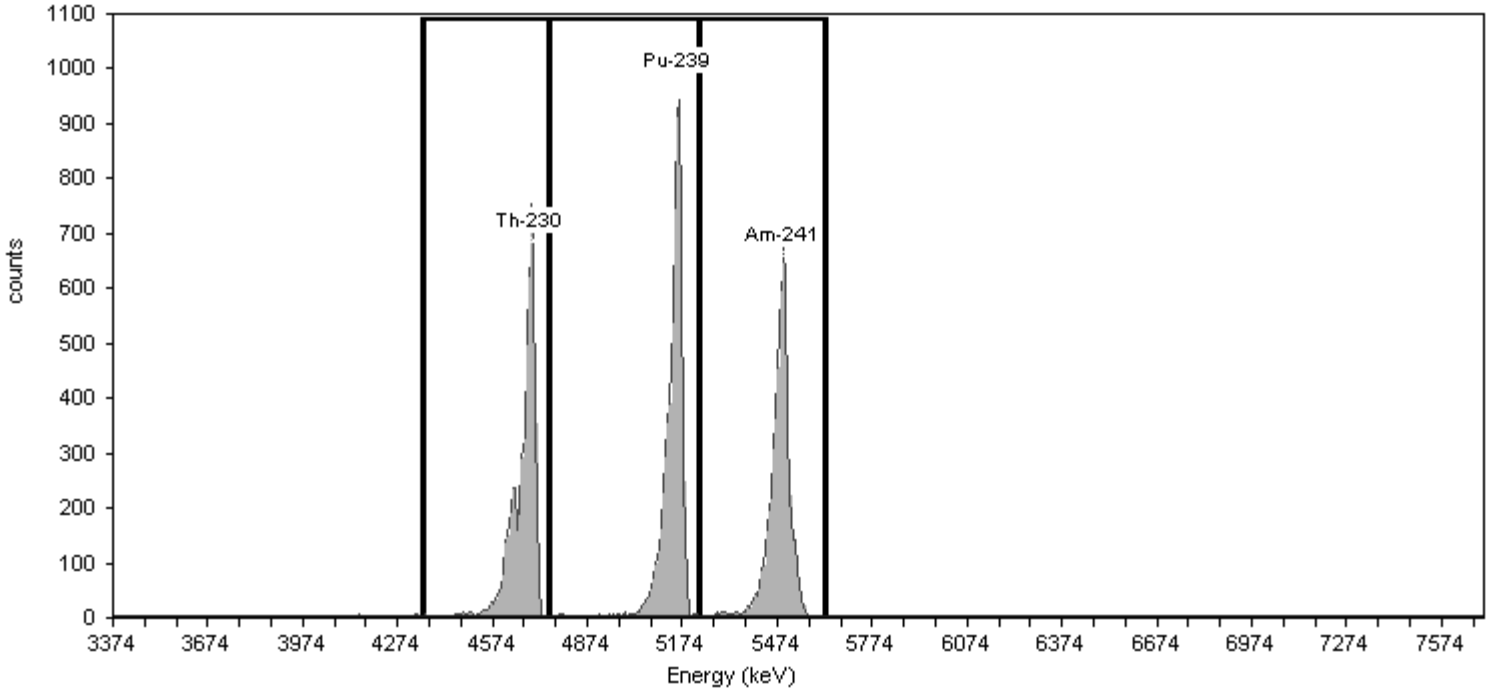
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV21 , SN: 48-102BB6
Acquisition Start Date: 6/19/2014 7:45:34PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 25.45% +/- 0.46% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,179.00	86.32
Pu-239	240	5.16	186	249	6,106.00	101.77
Am-241	284	5.49	249	303	5,079.00	84.65

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:20:18PM 6/22/2014

Calibration

Sample Name: CCV-9792;AV23-20140619
Description:
Detector: AV23

Calibration Date: 6/22/2014 5:20:15PM
Analyst: 60040

Source Info

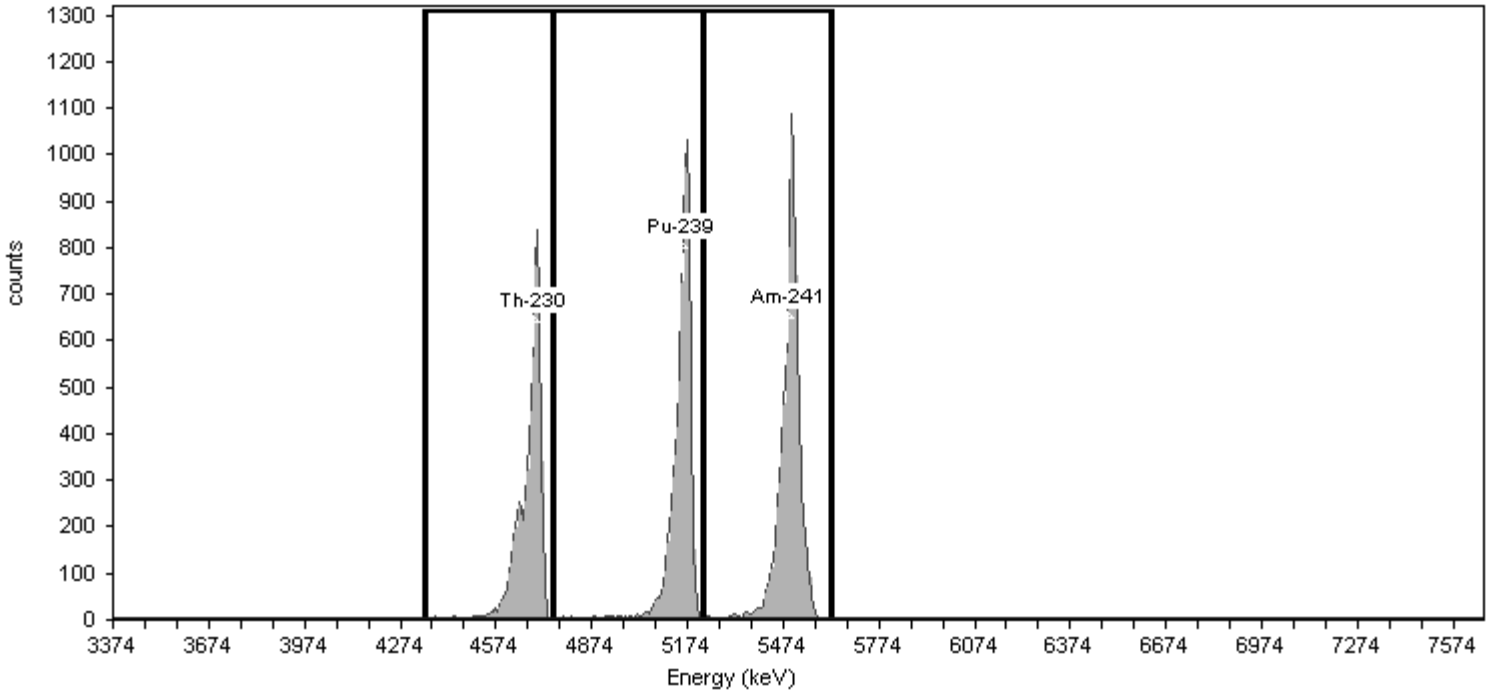
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV23 , SN: 48-158FF3
Acquisition Start Date: 6/19/2014 7:45:38PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 25.86% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,881.00	98.02
Pu-239	240	5.16	186	249	6,736.00	112.27
Am-241	284	5.49	249	303	7,607.00	126.78

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:20:24PM 6/22/2014

Calibration

Sample Name: CCV-9793;AV24-20140619
Description:
Detector: AV24

Calibration Date: 6/22/2014 5:20:21PM
Analyst: 60040

Source Info

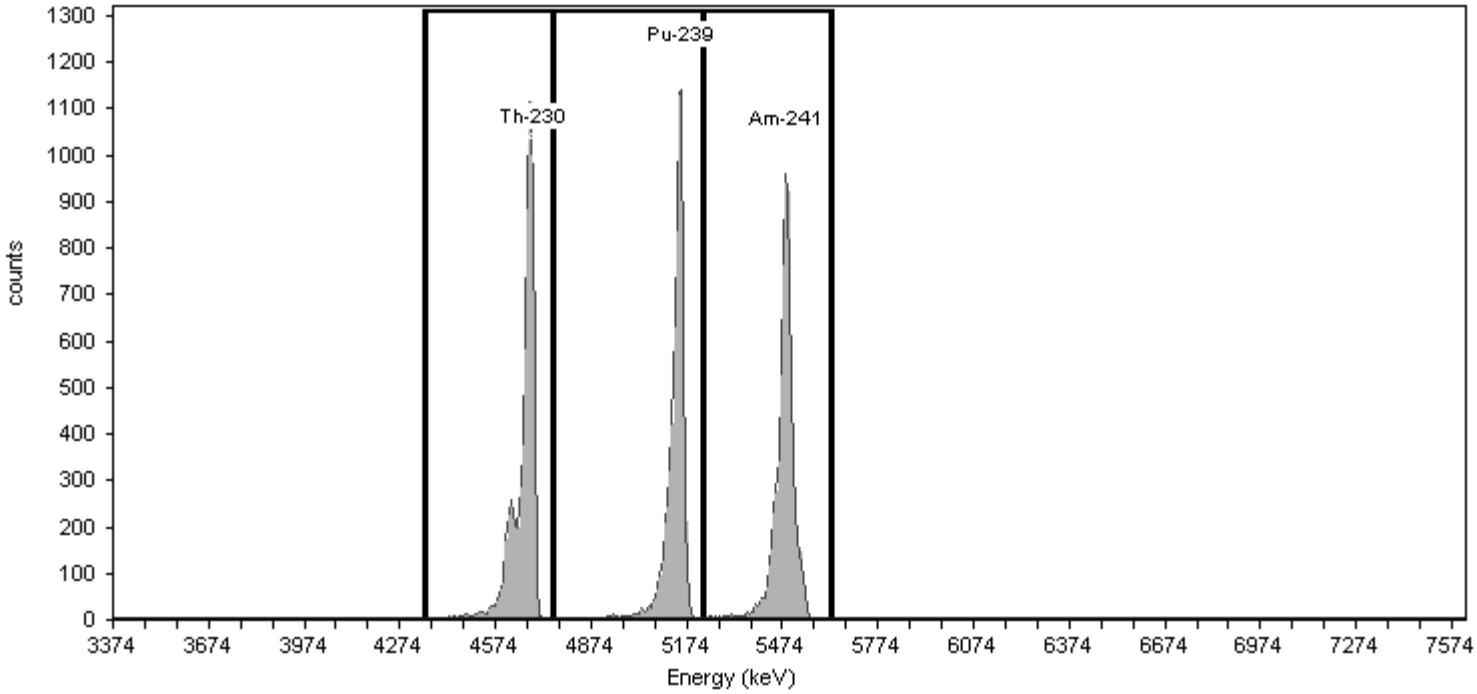
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV24 , SN: 47-137Q4
Acquisition Start Date: 6/19/2014 7:45:49PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.44% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,455.00	107.58
Pu-239	240	5.16	186	249	6,412.00	106.87
Am-241	284	5.49	249	303	6,203.00	103.38

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:41:16PM 6/22/2014

Calibration

Sample Name: CCV-9794;AV43-20140622
Description:
Detector: AV43

Calibration Date: 6/22/2014 6:41:13PM
Analyst: 60040

Source Info

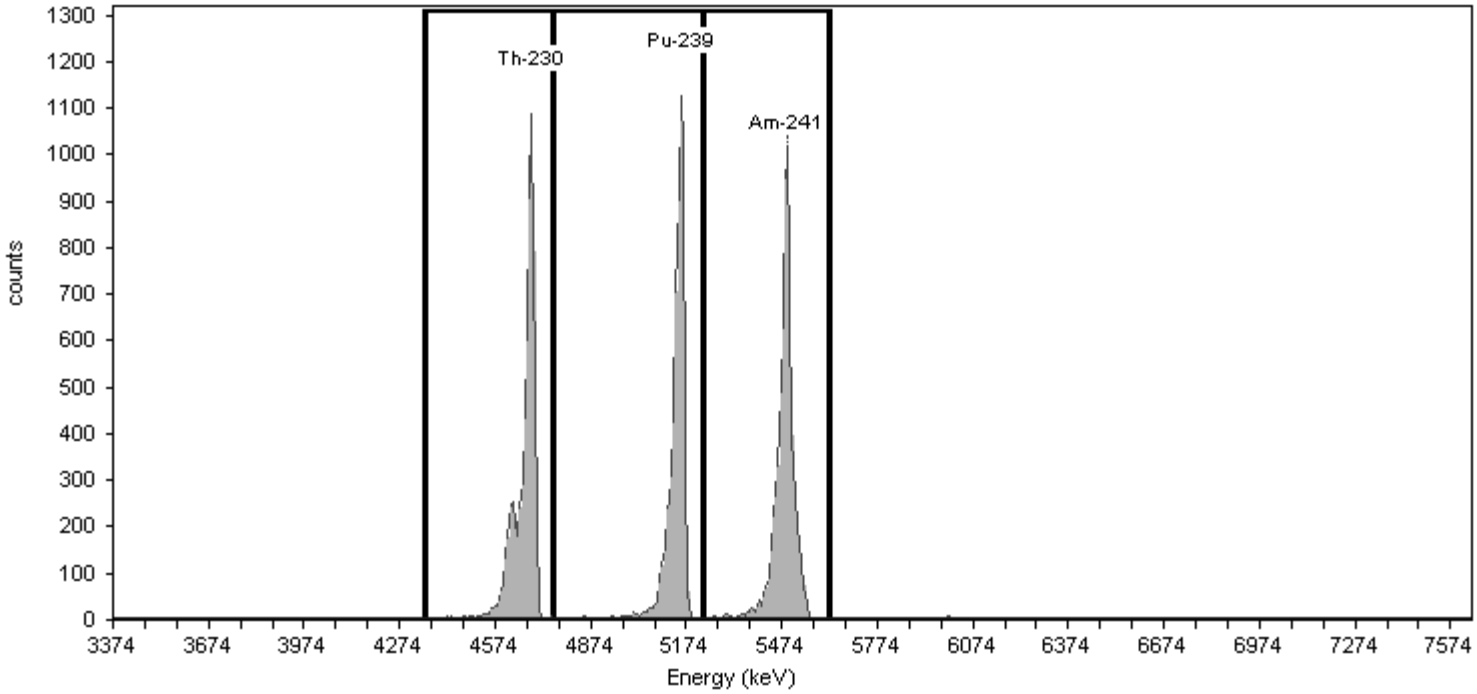
Certificate ID: 82242-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV43 , SN: 49-190X4
Acquisition Start Date: 6/22/2014 5:38:32PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 25.58% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,084.00	101.40
Pu-239	240	5.16	186	249	5,958.00	99.30
Am-241	284	5.49	249	303	6,471.00	107.85

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:41:22PM 6/22/2014

Calibration

Sample Name: CCV-9795;AV44-20140622
Description:
Detector: AV44

Calibration Date: 6/22/2014 6:41:19PM
Analyst: 60040

Source Info

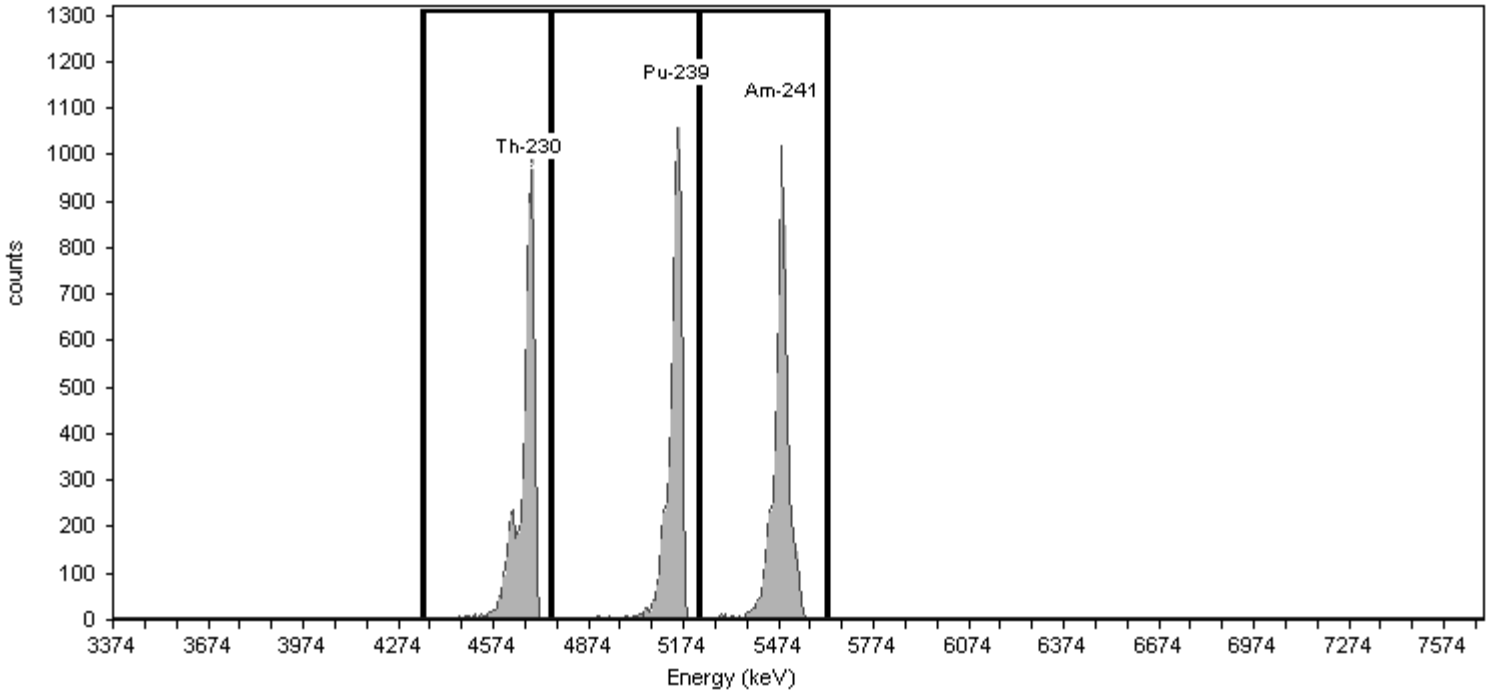
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV44 , SN: 50-051JJ1
Acquisition Start Date: 6/22/2014 5:38:54PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.33% +/- 0.46% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,581.00	93.02
Pu-239	240	5.16	186	249	5,685.00	94.75
Am-241	284	5.49	249	303	5,976.00	99.60

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:10:44PM 6/22/2014

Calibration

Sample Name: CCV-9817;AV45-20140622
Description:
Detector: AV45

Calibration Date: 6/22/2014 9:10:41PM
Analyst: 60040

Source Info

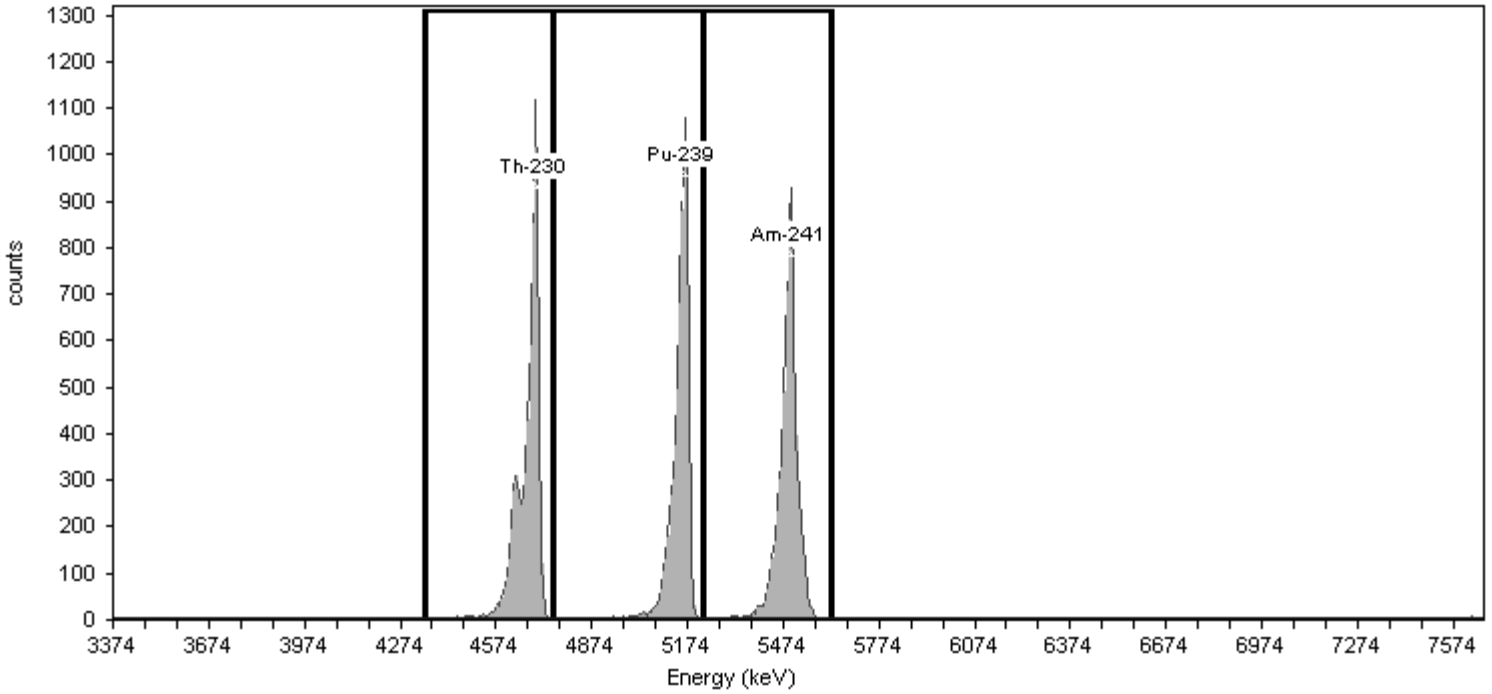
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV45 , SN: 48-158FF2
Acquisition Start Date: 6/22/2014 8:07:18PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.09% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,888.00	114.80
Pu-239	240	5.16	186	249	6,367.00	106.12
Am-241	284	5.49	249	303	6,402.00	106.70

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:18:25PM 6/22/2014

Calibration

Sample Name: CCV-9884;AV46-20140622
Description:
Detector: AV46

Calibration Date: 6/22/2014 10:18:20PM
Analyst: 60040

Source Info

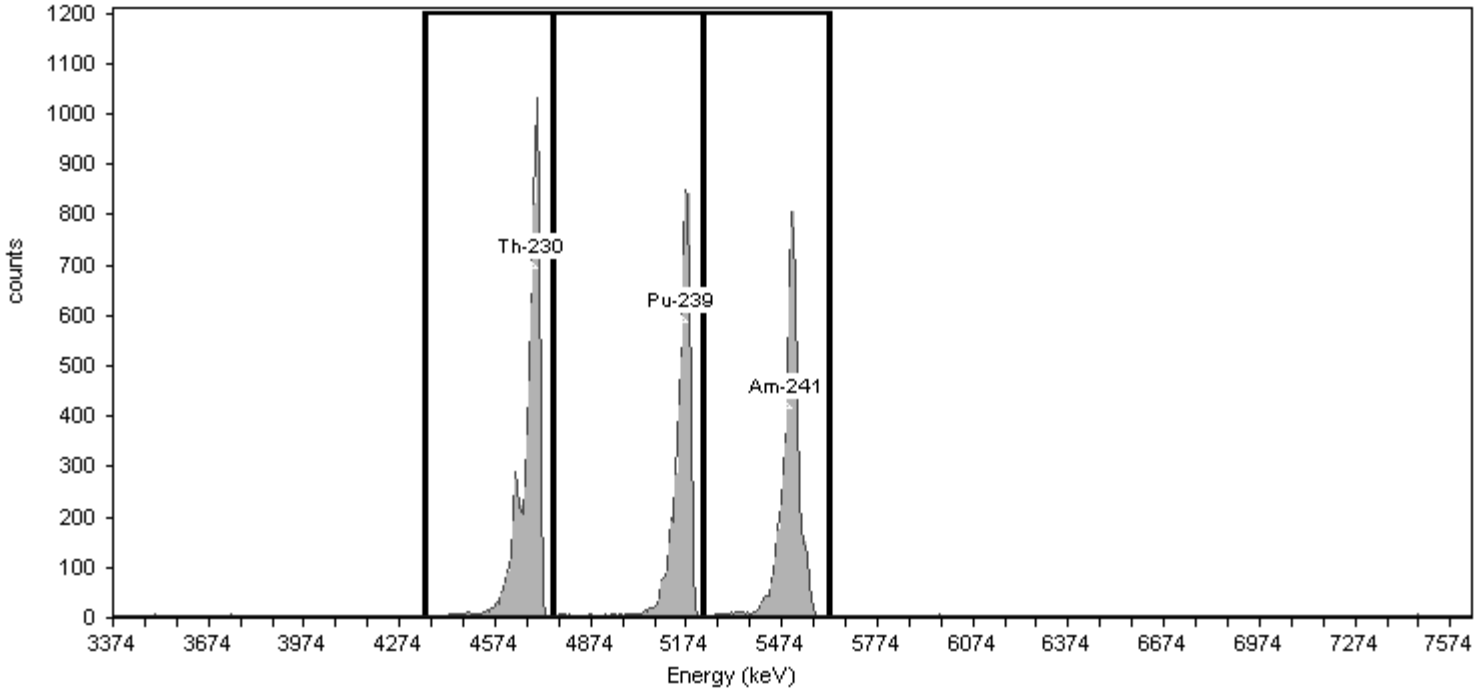
Certificate ID: 82245-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV46 , SN: 49-202GG2
Acquisition Start Date: 6/22/2014 9:17:40PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.69% +/- 0.49% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,425.00	107.08
Pu-239	240	5.16	186	249	5,164.00	86.07
Am-241	284	5.49	249	303	5,389.00	89.82

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:10:50PM 6/22/2014

Calibration

Sample Name: CCV-9886;AV48-20140622
Description:
Detector: AV48

Calibration Date: 6/22/2014 9:10:47PM
Analyst: 60040

Source Info

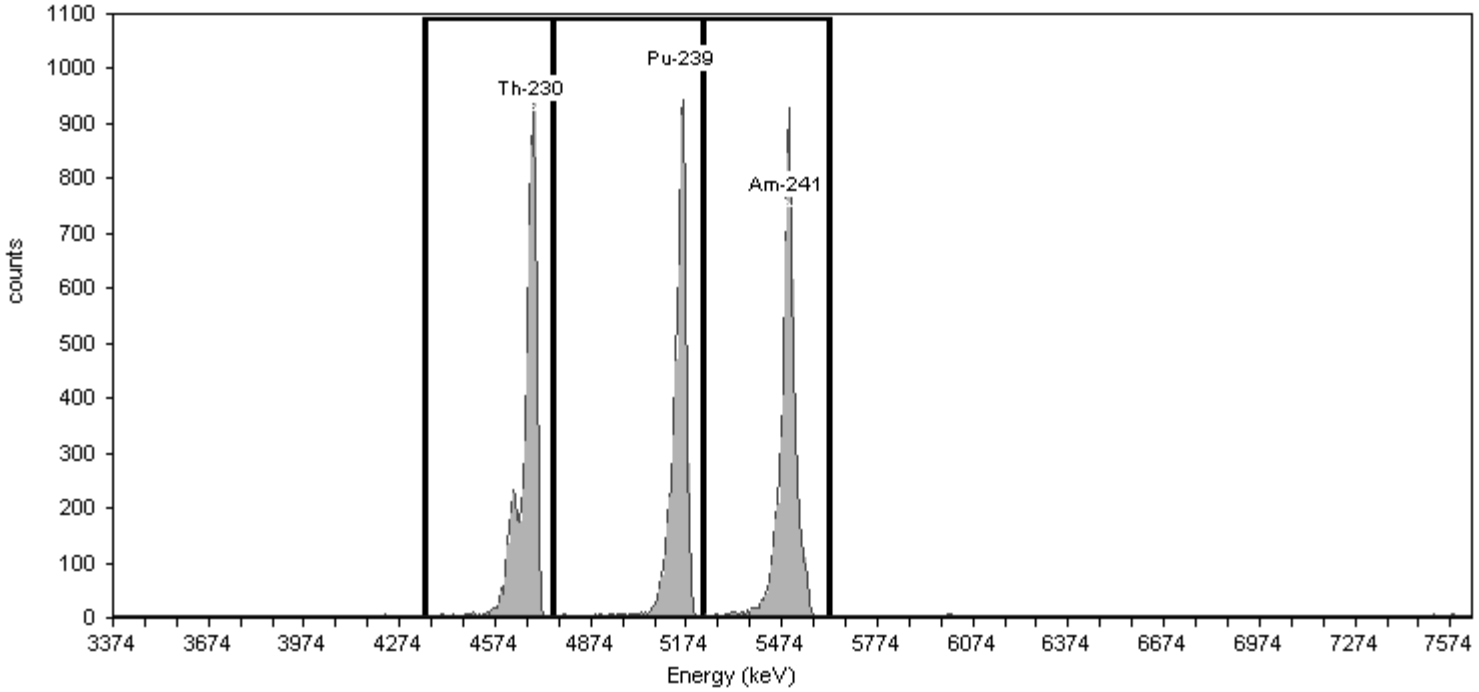
Certificate ID: 82247-334
Prepared by: Analytics

Certification Date: 6/10/2010 12:00:00PM
Description:

Acquisition

Detector: AV48 , SN: 50-051JJ4
Acquisition Start Date: 6/22/2014 8:07:38PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 25.77% +/- 0.46% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,682.00	94.70
Pu-239	240	5.16	186	249	5,407.00	90.12
Am-241	284	5.49	249	303	5,851.00	97.52

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:57:11PM 6/22/2014

Calibration

Sample Name: CCV-7107;AV49-20140622
Description:
Detector: AV49

Calibration Date: 6/22/2014 7:57:03PM
Analyst: 60040

Source Info

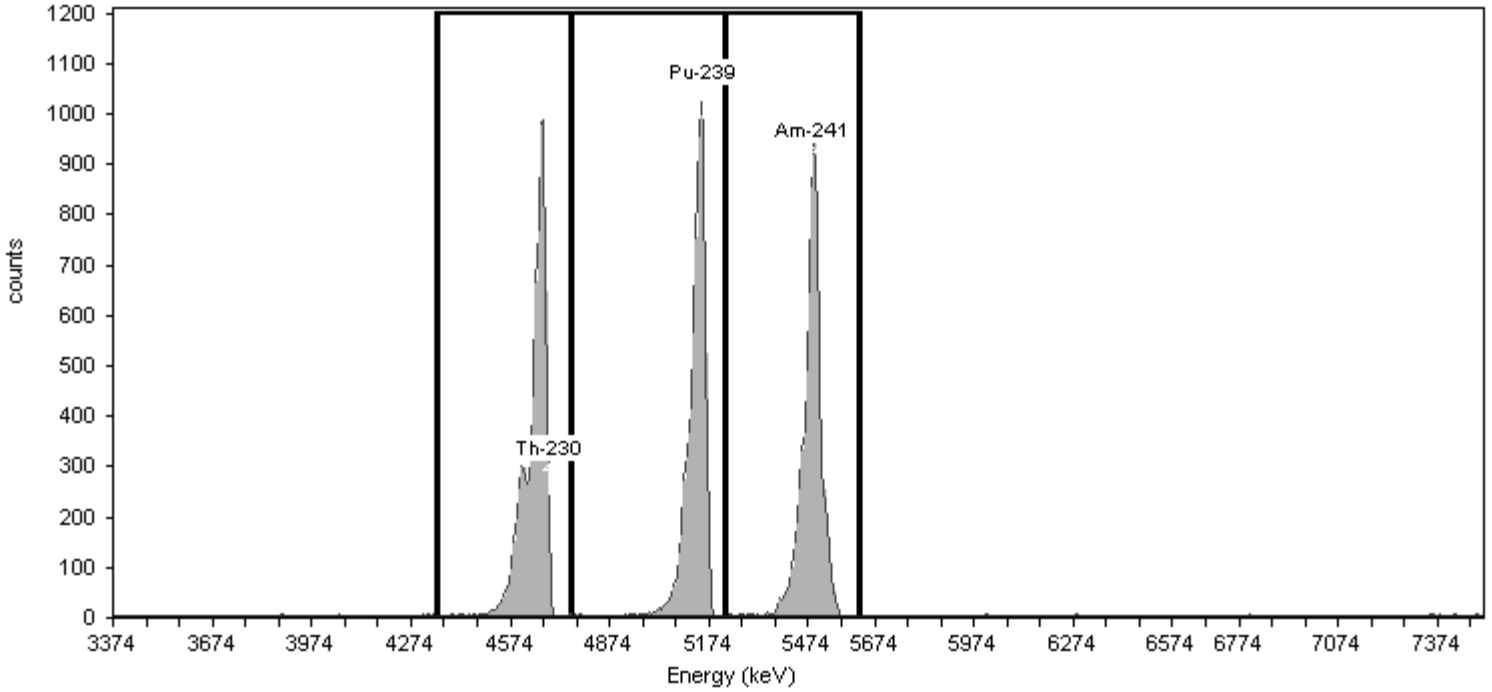
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV49 , SN: 47-043hh4
Acquisition Start Date: 6/22/2014 6:52:38PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.74% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	7,207.00	120.12
Pu-239	240	5.16	186	249	7,009.00	116.82
Am-241	284	5.49	249	303	6,983.00	116.38

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:57:27PM 6/22/2014

Calibration

Sample Name: CCV-8877;AV53-20140622
Description:
Detector: AV53

Calibration Date: 6/22/2014 7:57:23PM
Analyst: 60040

Source Info

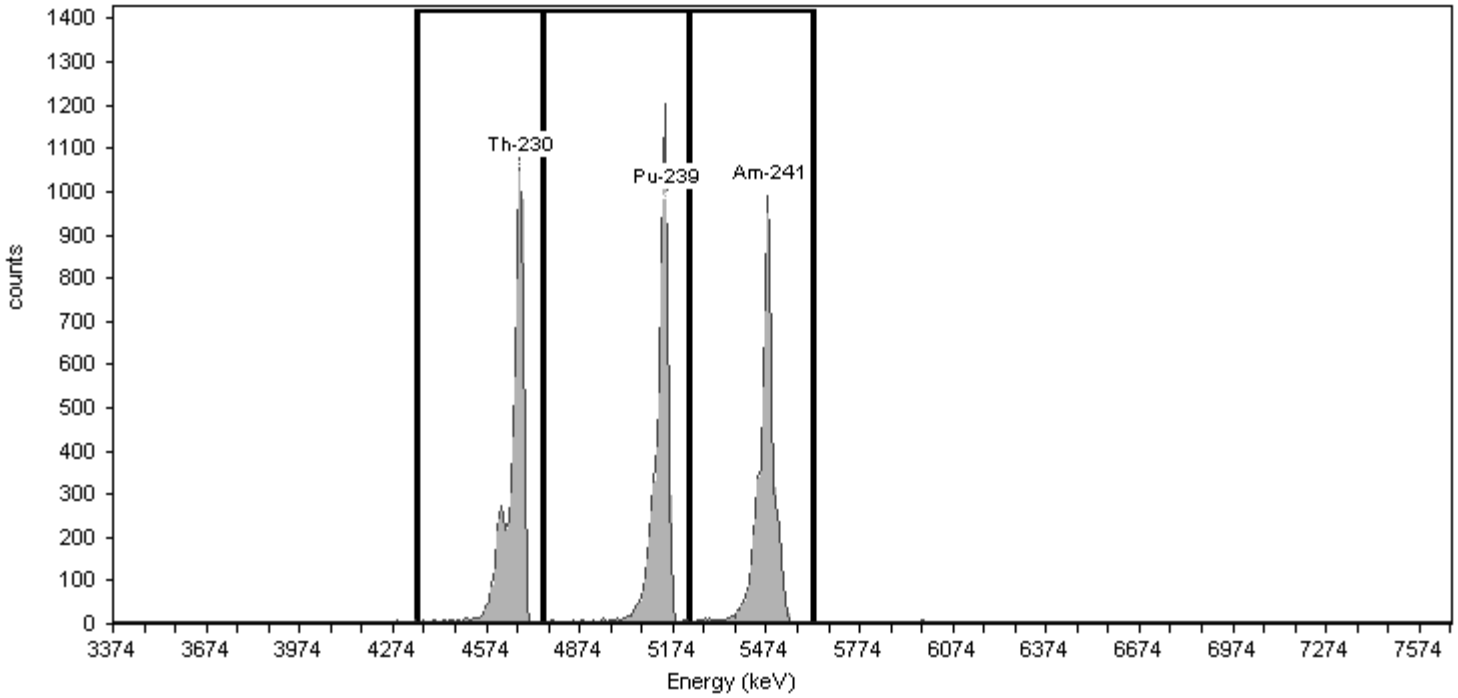
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV53 , SN: 50-051A6
Acquisition Start Date: 6/22/2014 6:53:01PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 26.51% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,536.00	108.93
Pu-239	240	5.16	186	249	6,690.00	111.50
Am-241	284	5.49	249	303	6,495.00	108.25

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:57:33PM 6/22/2014

Calibration

Sample Name: CCV-9520;AV54-20140622
Description:
Detector: AV54

Calibration Date: 6/22/2014 7:57:29PM
Analyst: 60040

Source Info

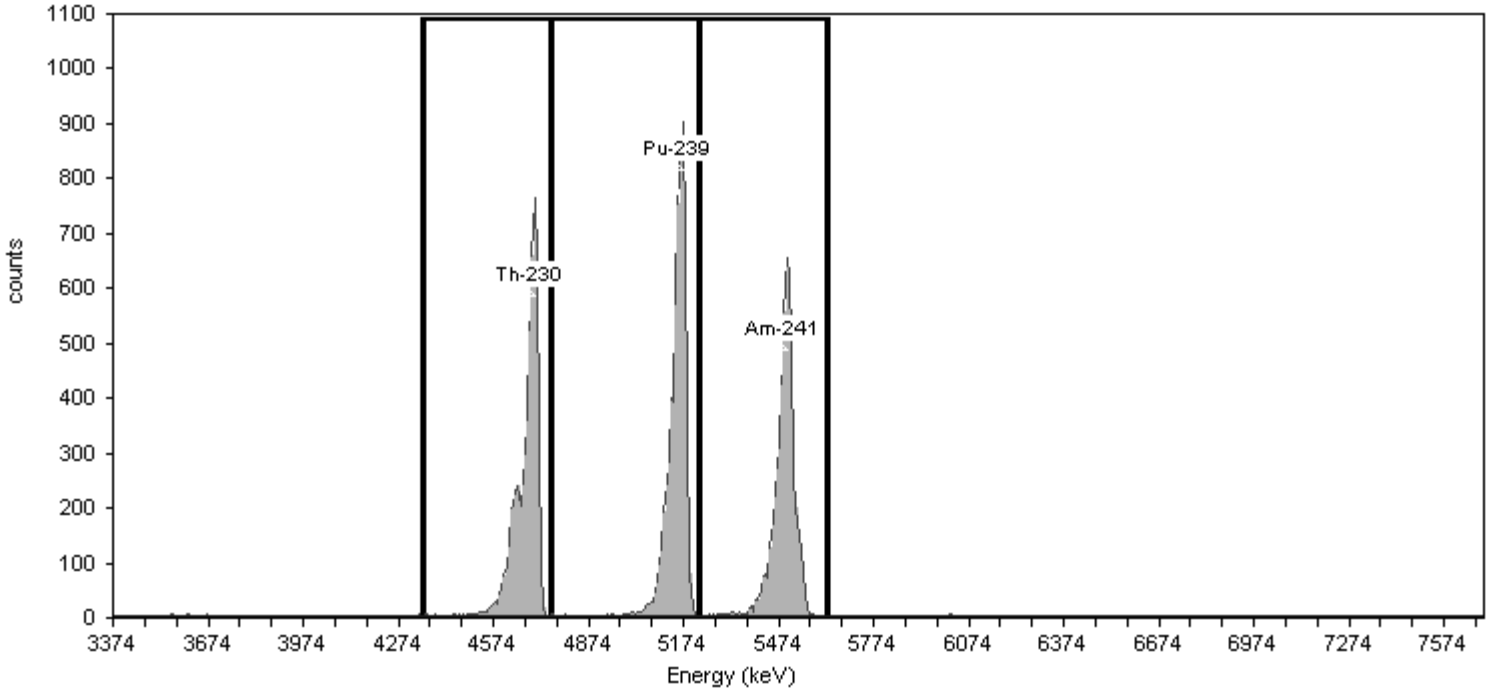
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV54 , SN: 48-046II6
Acquisition Start Date: 6/22/2014 6:53:11PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 26.28% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,514.00	91.90
Pu-239	240	5.16	186	249	6,221.00	103.68
Am-241	284	5.49	249	303	5,158.00	85.97

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:11:02PM 6/22/2014

Calibration

Sample Name: CCV-7107;AV55-20140622
Description:
Detector: AV55

Calibration Date: 6/22/2014 9:10:59PM
Analyst: 60040

Source Info

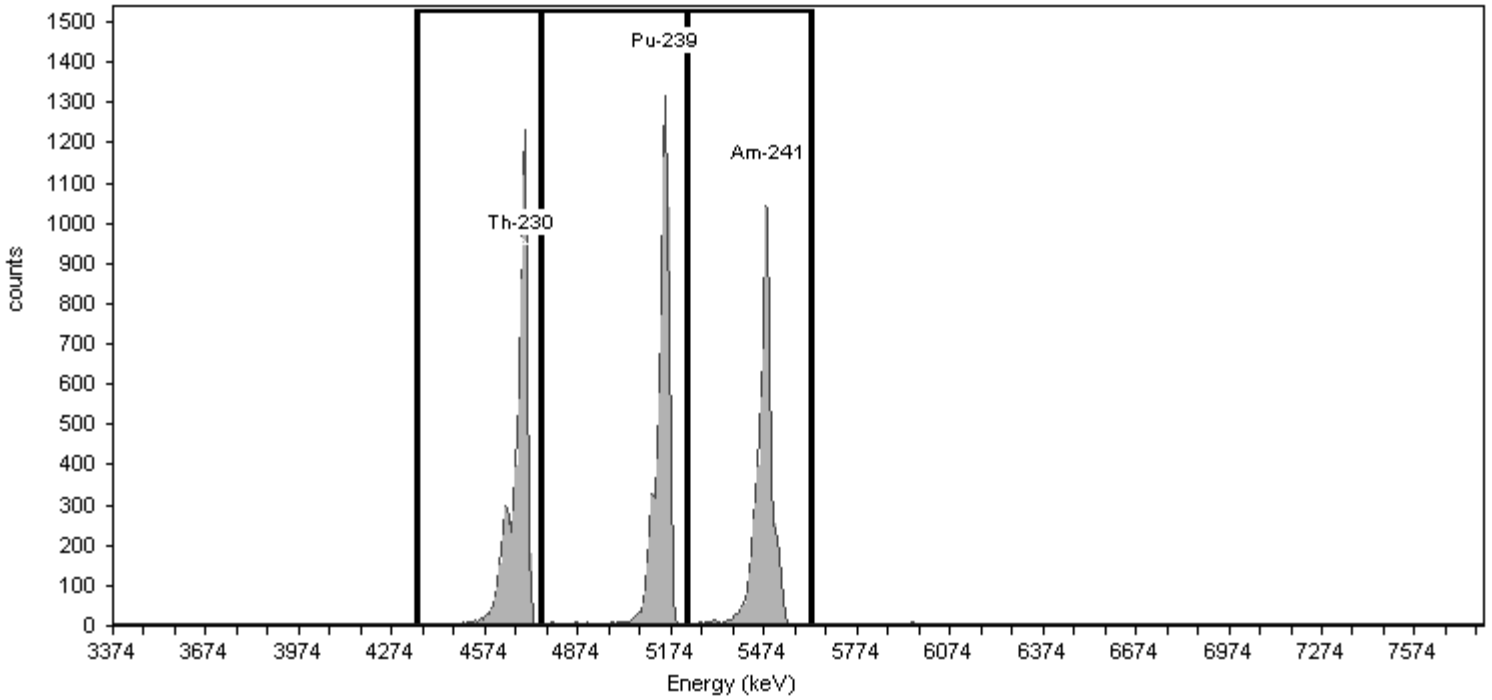
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV55 , SN: 50-051C2
Acquisition Start Date: 6/22/2014 8:08:07PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.83% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	7,262.00	121.03
Pu-239	240	5.16	186	249	7,151.00	119.18
Am-241	284	5.49	249	303	6,866.00	114.43

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:57:39PM 6/22/2014

Calibration

Sample Name: CCV-9792;AV56-20140622
Description:
Detector: AV56

Calibration Date: 6/22/2014 7:57:36PM
Analyst: 60040

Source Info

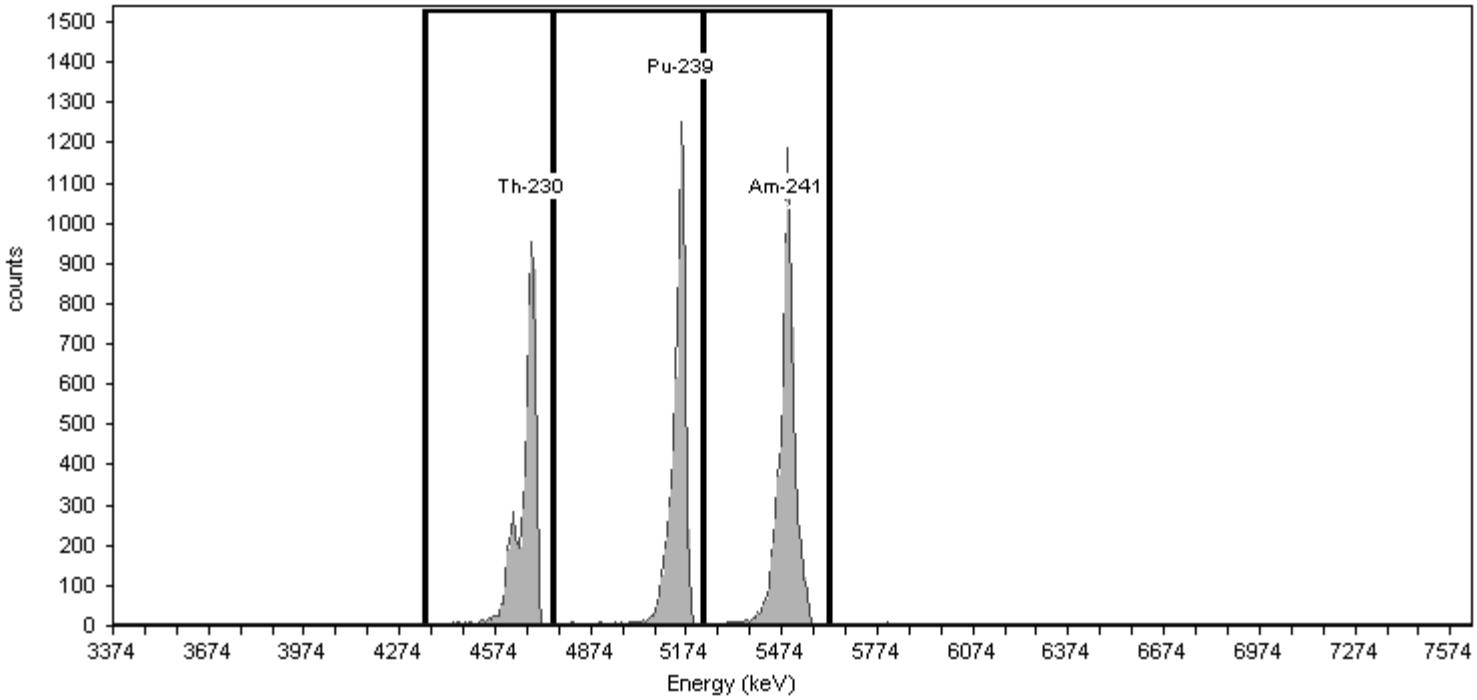
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV56 , SN: 52-059EE5
Acquisition Start Date: 6/22/2014 6:53:29PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 26.26% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,964.00	99.40
Pu-239	240	5.16	186	249	6,853.00	114.22
Am-241	284	5.49	249	303	7,721.00	128.68

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:57:45PM 6/22/2014

Calibration

Sample Name: CCV-9793;AV57-20140622
Description:
Detector: AV57

Calibration Date: 6/22/2014 7:57:42PM
Analyst: 60040

Source Info

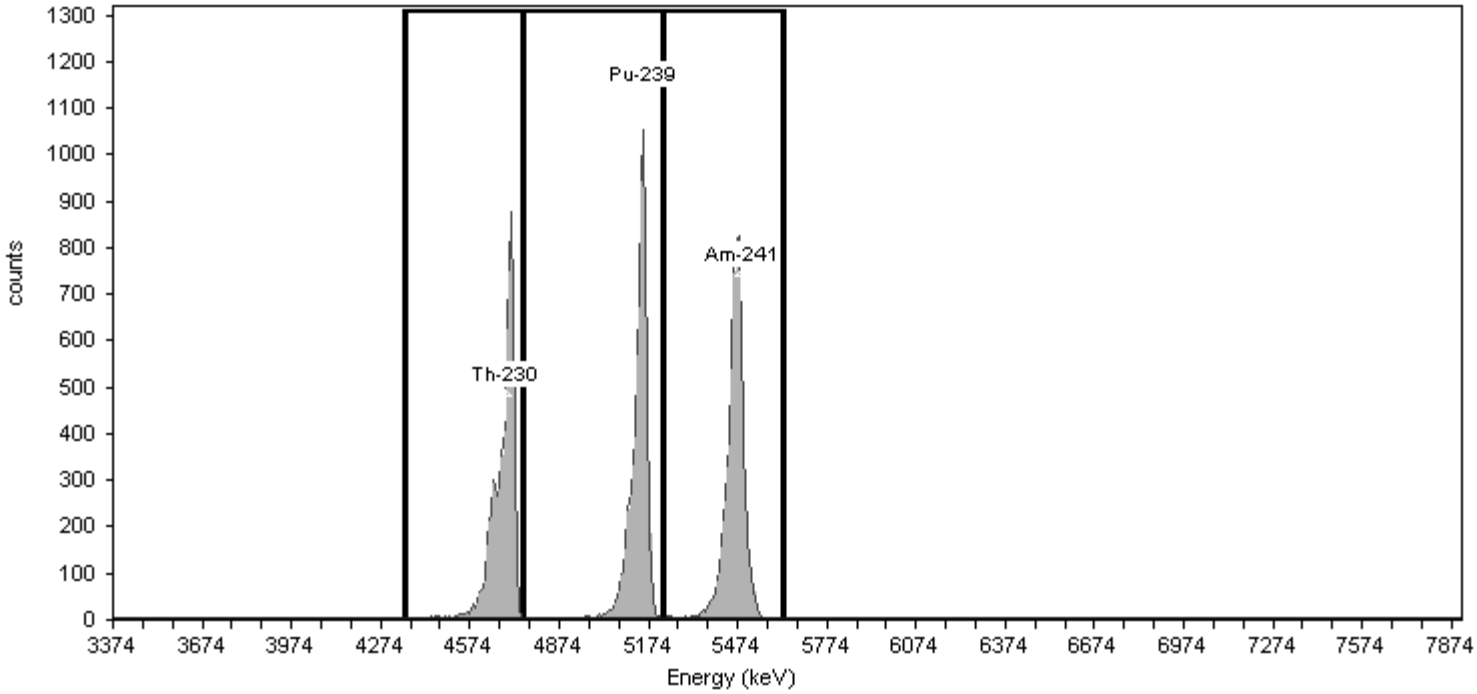
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV57 , SN: 48-158EE3
Acquisition Start Date: 6/22/2014 6:53:40PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 26.92% +/- 0.44% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,313.00	105.22
Pu-239	240	5.16	186	249	6,621.00	110.35
Am-241	284	5.49	249	303	6,480.00	108.00

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:57:52PM 6/22/2014

Calibration

Sample Name: CCV-9794;AV58-20140622
Description:
Detector: AV58

Calibration Date: 6/22/2014 7:57:48PM
Analyst: 60040

Source Info

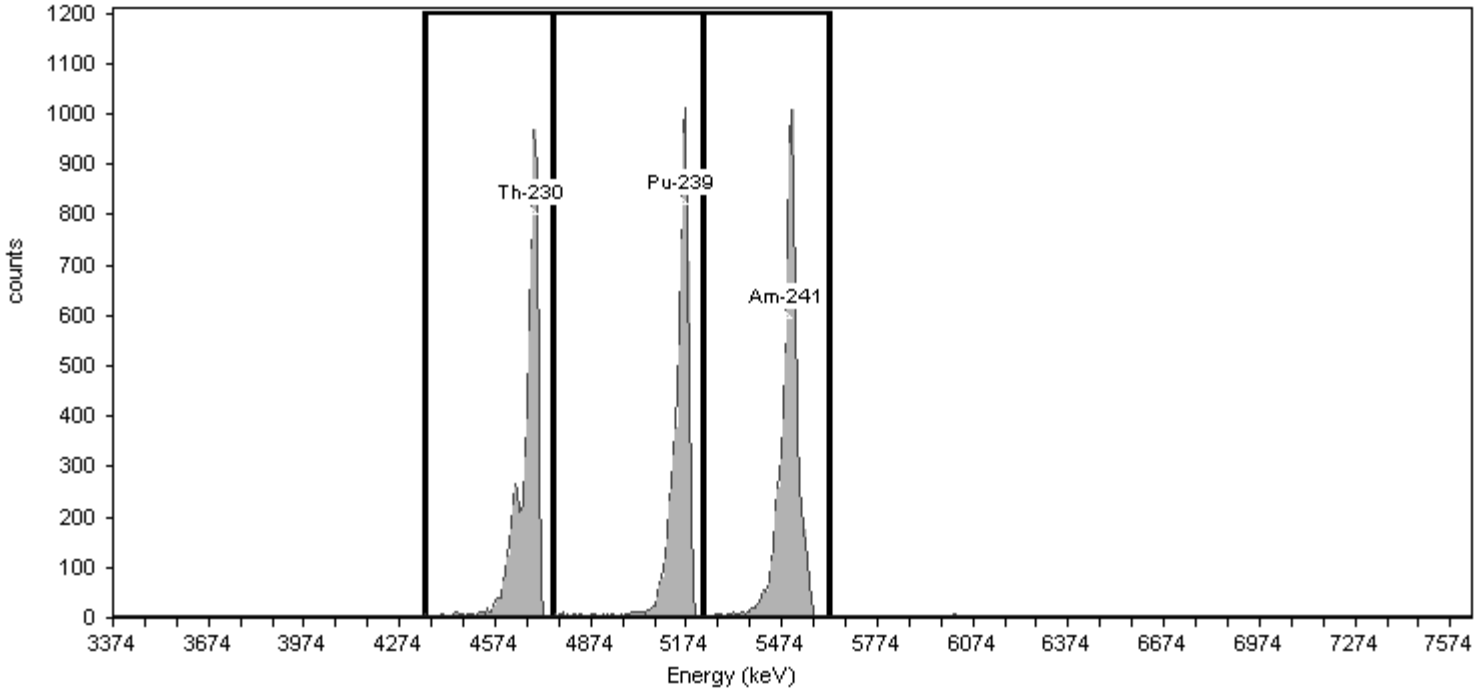
Certificate ID: 82242-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV58 , SN: 52-102 C5
Acquisition Start Date: 6/22/2014 6:53:50PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 26.31% +/- 0.44% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,121.00	102.02
Pu-239	240	5.16	186	249	6,054.00	100.90
Am-241	284	5.49	249	303	6,868.00	114.47

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:11:08PM 6/22/2014

Calibration

Sample Name: CCV-9795;AV59-20140622a
Description:
Detector: AV59

Calibration Date: 6/22/2014 9:11:04PM
Analyst: 60040

Source Info

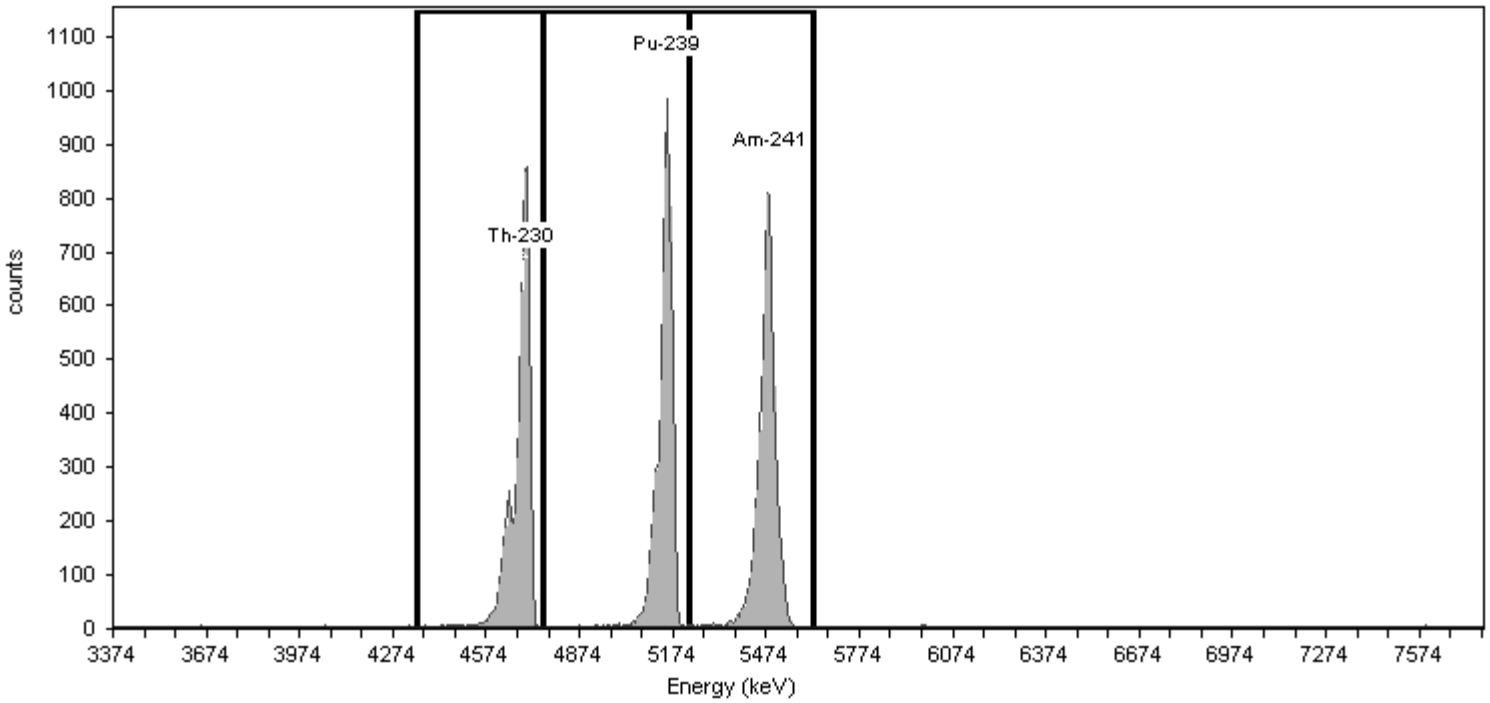
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV59 , SN: 49-155M7
Acquisition Start Date: 6/22/2014 8:09:03PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 27.20% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,730.00	95.50
Pu-239	240	5.16	186	249	5,948.00	99.13
Am-241	284	5.49	249	303	6,135.00	102.25

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:18:32PM 6/22/2014

Calibration

Sample Name: CCV-9817;AV60-20140622
Description:
Detector: AV60

Calibration Date: 6/22/2014 10:18:27PM
Analyst: 60040

Source Info

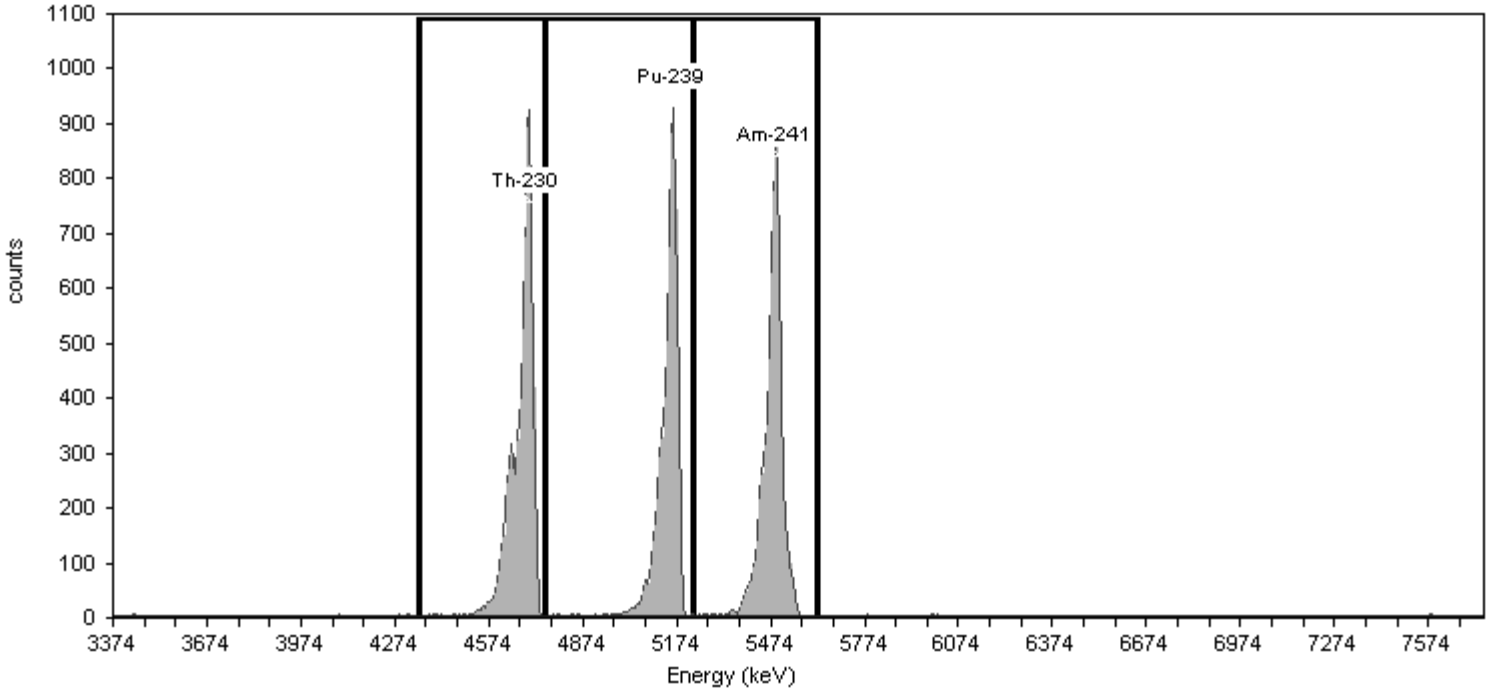
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV60 , SN: 49-027117
Acquisition Start Date: 6/22/2014 9:17:54PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.29% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	7,080.00	118.00
Pu-239	240	5.16	186	249	6,306.00	105.10
Am-241	284	5.49	249	303	6,421.00	107.02

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:22:15PM 6/22/2014

Calibration

Sample Name: CCV-9884;AV61-20140622
Description:
Detector: AV61

Calibration Date: 6/22/2014 11:22:10PM
Analyst: 60040

Source Info

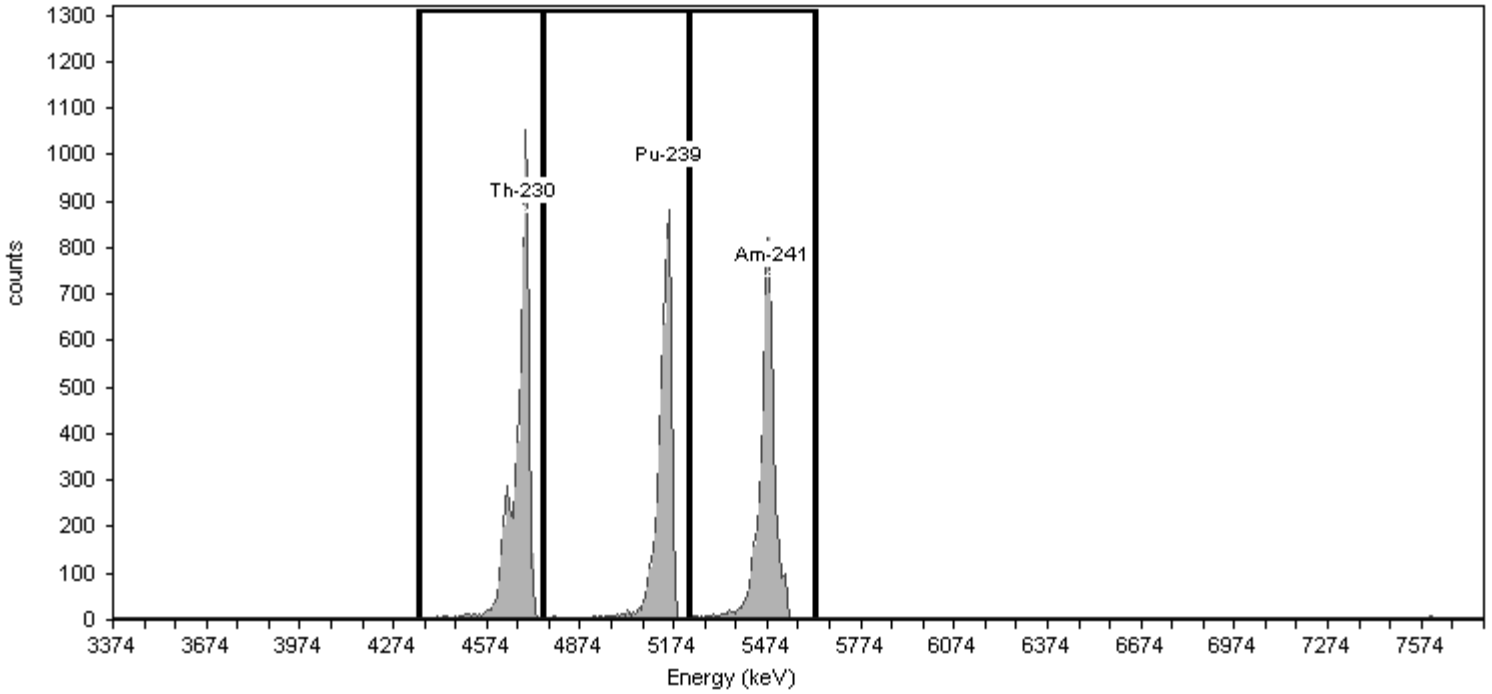
Certificate ID: 82245-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV61 , SN: 5-051JJ3
Acquisition Start Date: 6/22/2014 10:21:45PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.22% +/- 0.48% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,287.00	104.78
Pu-239	240	5.16	186	249	5,130.00	85.50
Am-241	284	5.49	249	303	5,261.00	87.68

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:11:16PM 6/22/2014

Calibration

Sample Name: CCV-9885;AV62-20140622
Description:
Detector: AV62

Calibration Date: 6/22/2014 9:11:13PM
Analyst: 60040

Source Info

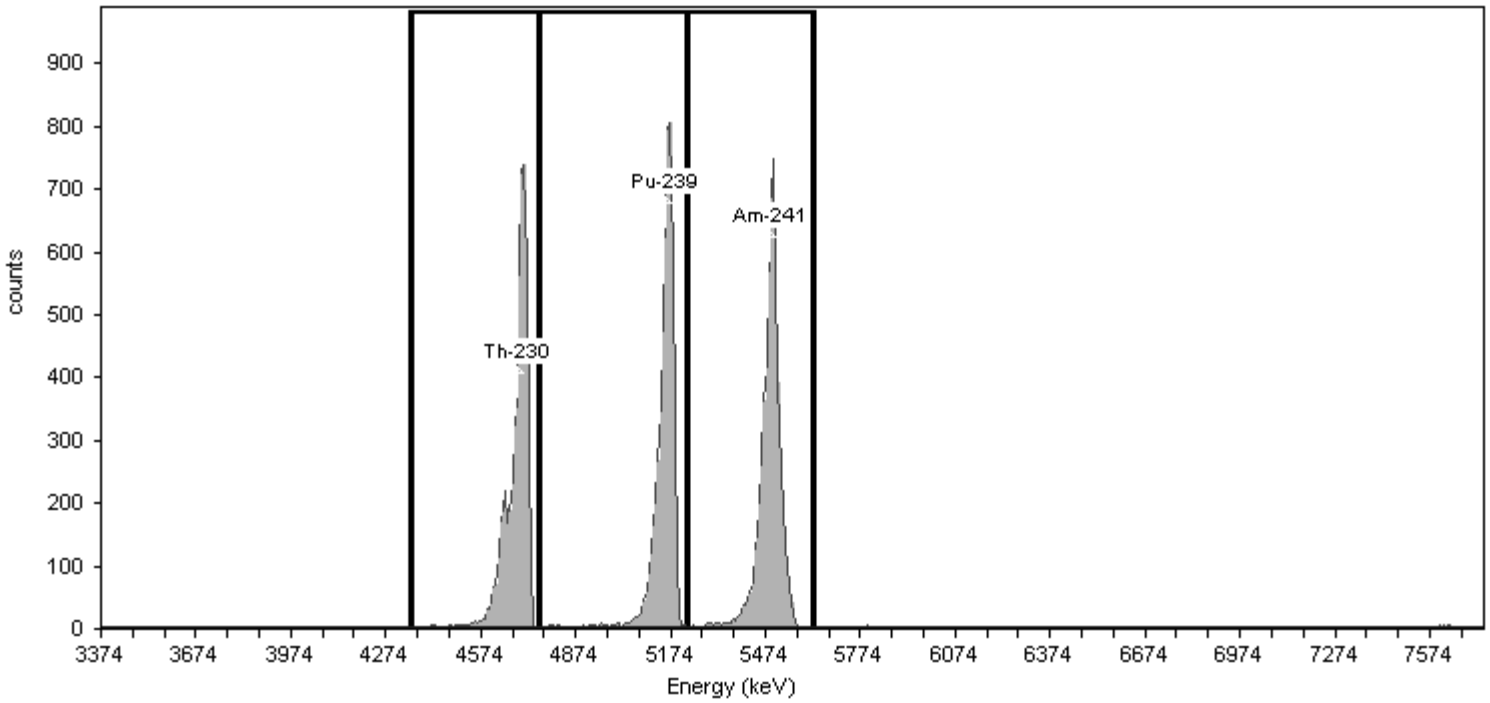
Certificate ID: 82246-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV62 , SN: 52-060FF2
Acquisition Start Date: 6/22/2014 8:09:10PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.50% +/- 0.50% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,284.00	88.07
Pu-239	240	5.16	186	249	5,185.00	86.42
Am-241	284	5.49	249	303	5,651.00	94.18

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:18:43PM 6/22/2014

Calibration

Sample Name: CCV-9886;AV63-20140622
Description:
Detector: AV63

Calibration Date: 6/22/2014 10:18:39PM
Analyst: 60040

Source Info

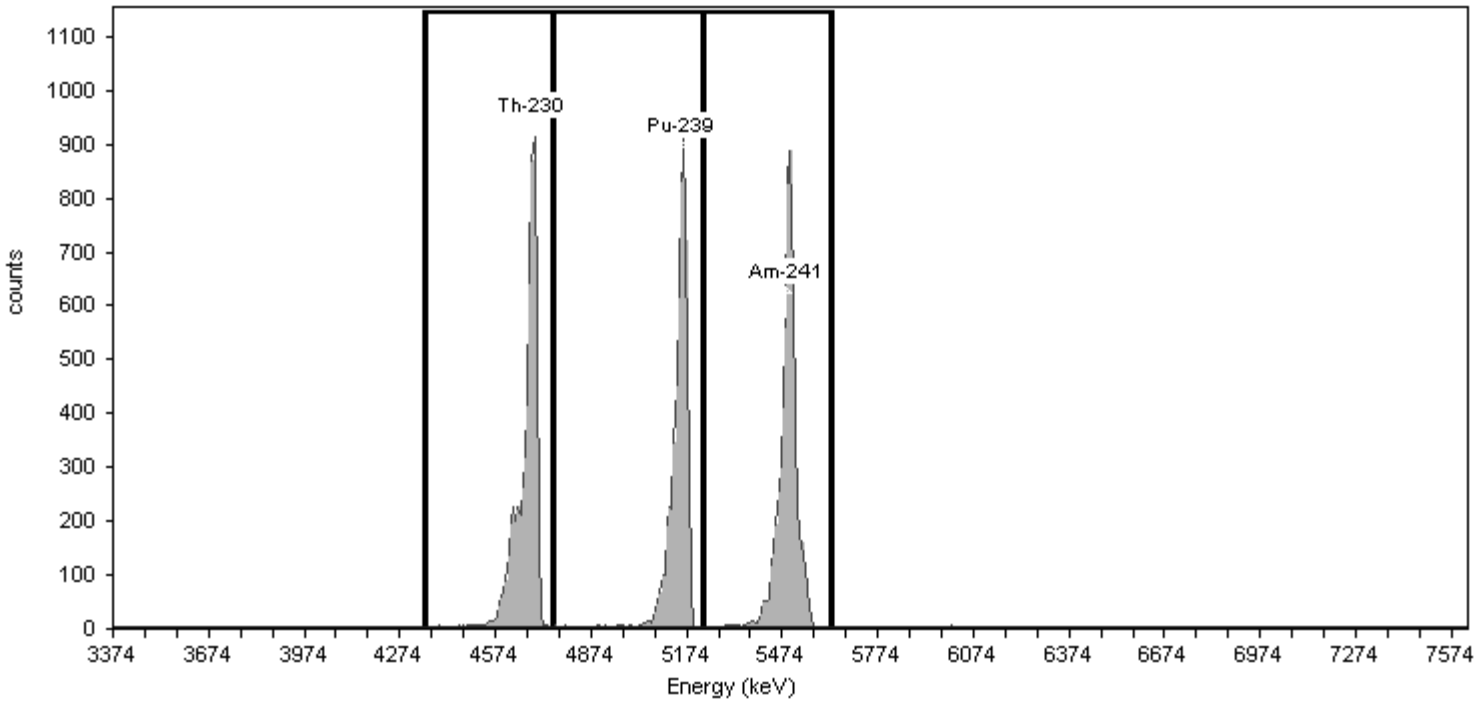
Certificate ID: 82247-334
Prepared by: Analytics

Certification Date: 6/10/2010 12:00:00PM
Description:

Acquisition

Detector: AV63 , SN: 47-029ff2
Acquisition Start Date: 6/22/2014 9:18:07PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 25.57% +/- 0.45% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,695.00	94.92
Pu-239	240	5.16	186	249	5,354.00	89.23
Am-241	284	5.49	249	303	5,757.00	95.95

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:18:51PM 6/22/2014

Calibration

Sample Name: CCV-7107;AV64-20140622
Description:
Detector: AV64

Calibration Date: 6/22/2014 10:18:48PM
Analyst: 60040

Source Info

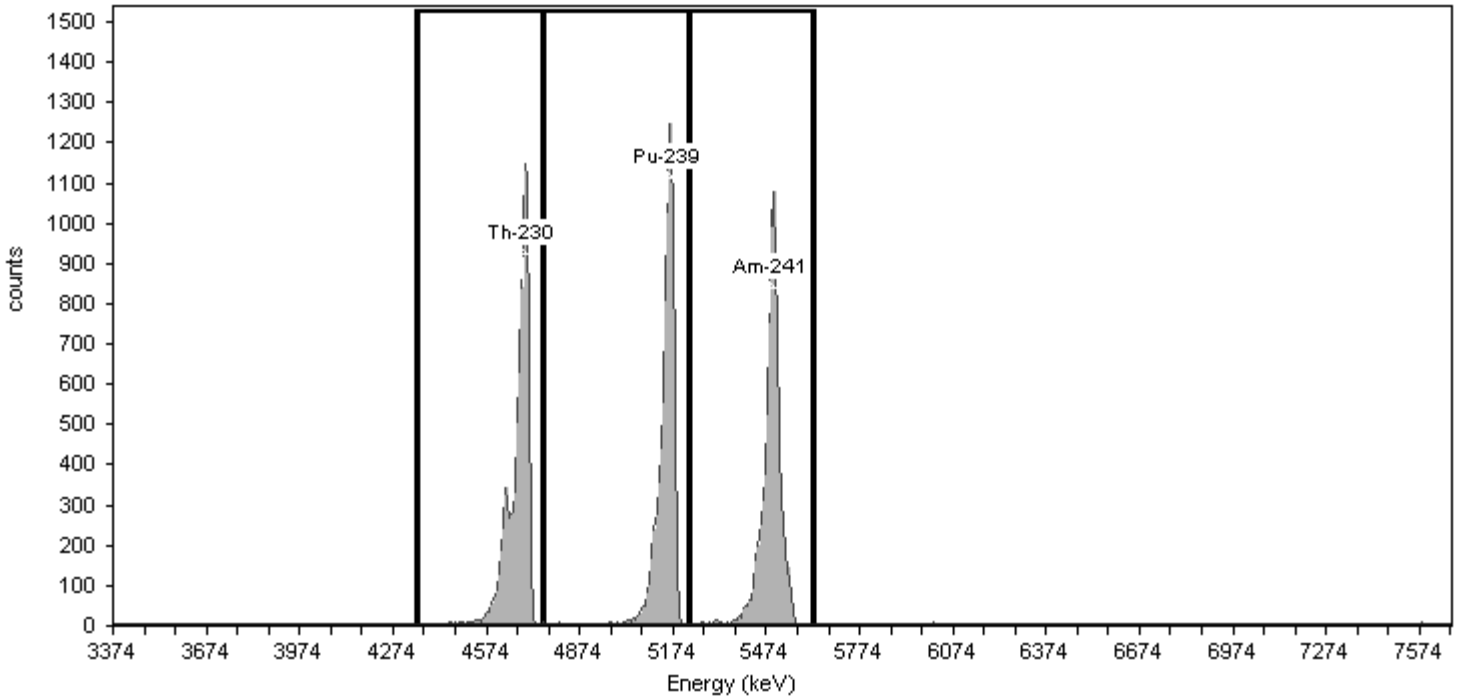
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV64 , SN: 47-029ee4
Acquisition Start Date: 6/22/2014 9:18:17PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 27.76% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	7,489.00	124.82
Pu-239	240	5.16	186	249	7,273.00	121.22
Am-241	284	5.49	249	303	7,239.00	120.65

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:11:24PM 6/22/2014

Calibration

Sample Name: CCV-8874;AV65-20140622
Description:
Detector: AV65

Calibration Date: 6/22/2014 9:11:20PM
Analyst: 60040

Source Info

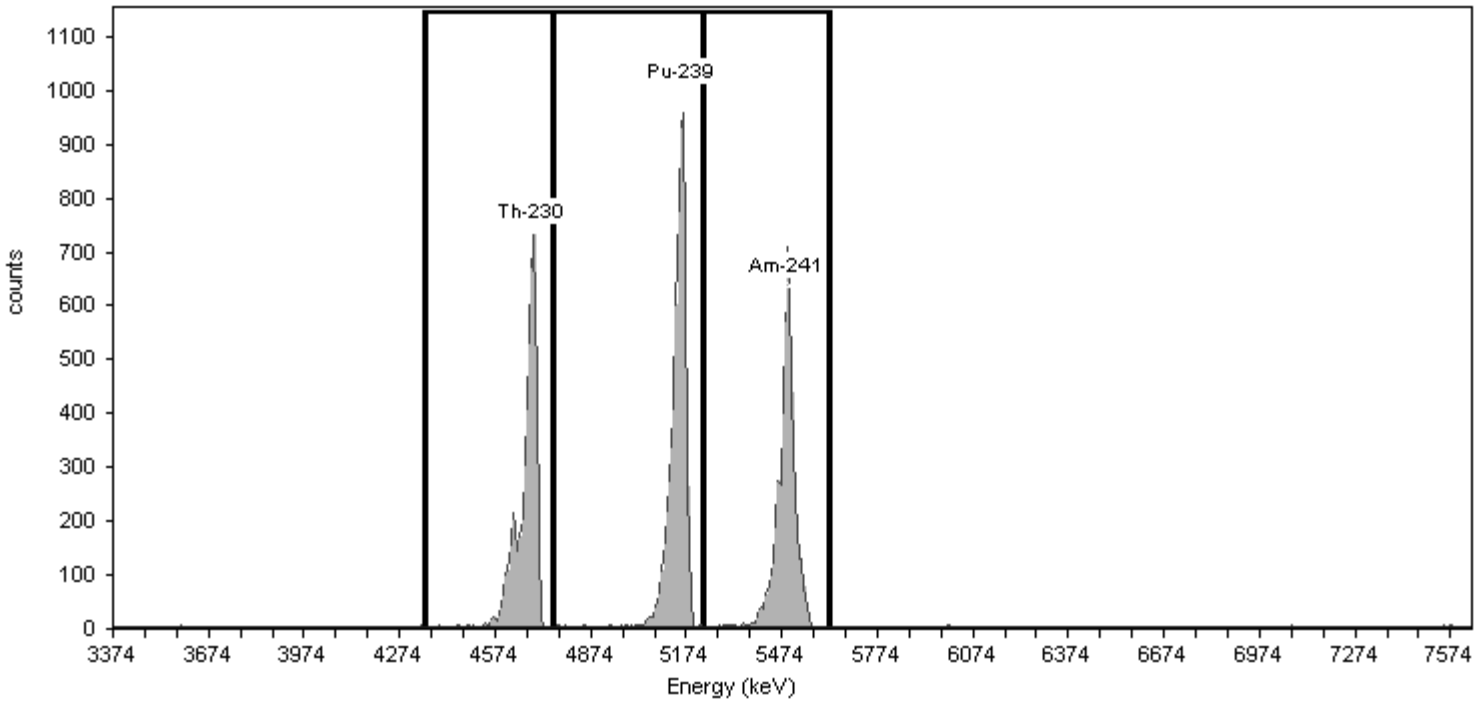
Certificate ID: 82233-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV65 , SN: 44-049JJ1
Acquisition Start Date: 6/22/2014 8:09:47PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.95% +/- 0.50% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	4,739.00	78.98
Pu-239	240	5.16	186	249	6,042.00	100.70
Am-241	284	5.49	249	303	4,836.00	80.60

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:18:57PM 6/22/2014

Calibration

Sample Name: CCV-8875;AV66-20140622
Description:
Detector: AV66

Calibration Date: 6/22/2014 10:18:53PM
Analyst: 60040

Source Info

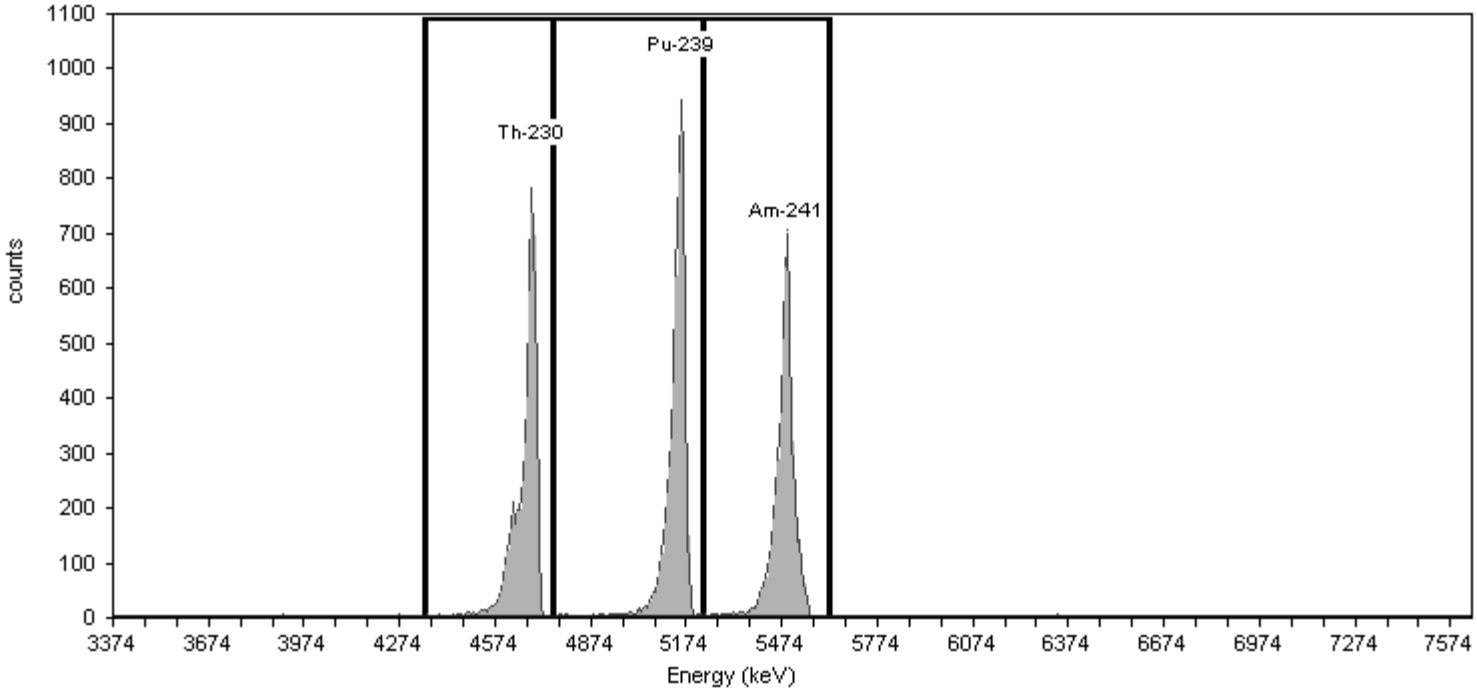
Certificate ID: 82234-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV66 , SN: 48-158EE2
Acquisition Start Date: 6/22/2014 9:18:27PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 25.70% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,101.00	85.02
Pu-239	240	5.16	186	249	5,821.00	97.02
Am-241	284	5.49	249	303	5,063.00	84.38

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:58:15PM 6/22/2014

Calibration

Sample Name: CCV-8876;AV67-20140622
Description:
Detector: AV67

Calibration Date: 6/22/2014 7:58:11PM
Analyst: 60040

Source Info

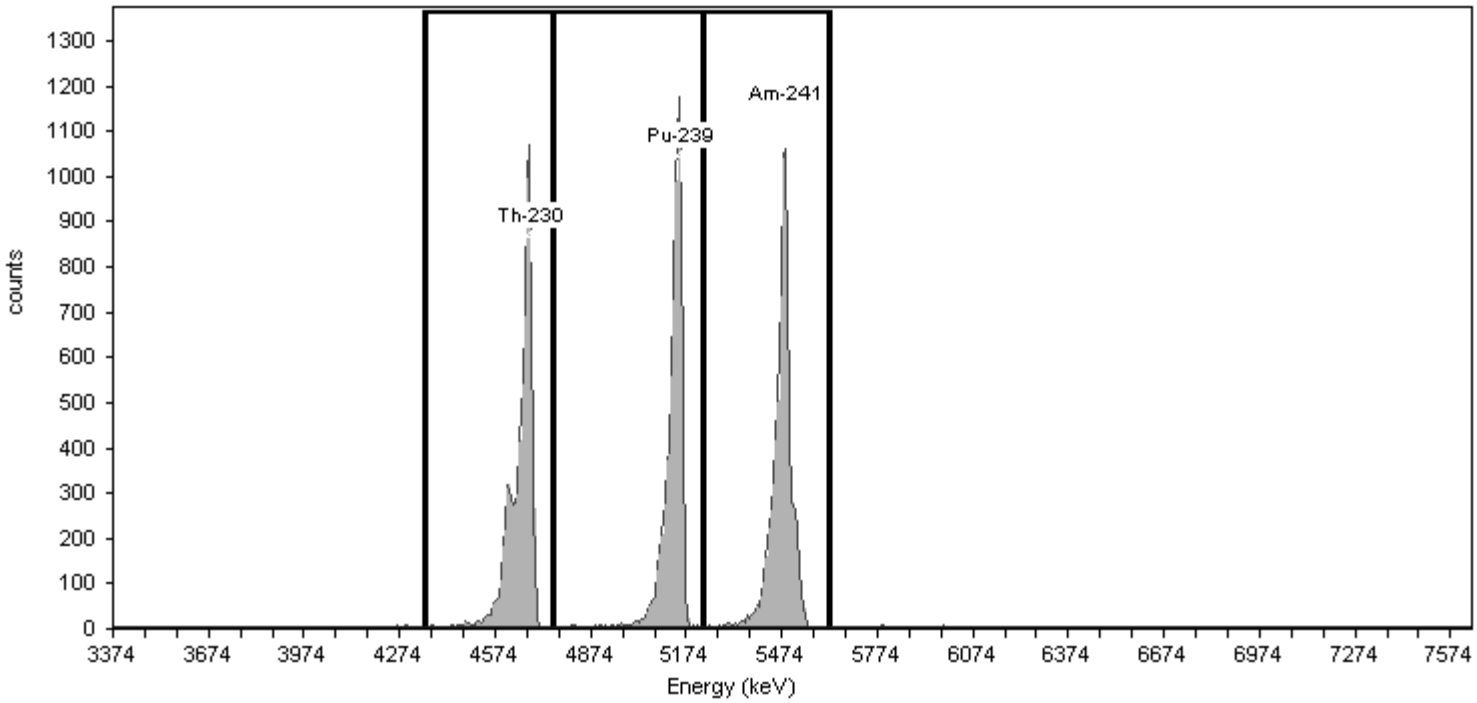
Certificate ID: 82235-334
Prepared by: Analytics

Certification Date: 6/4/2010 12:00:00PM
Description:

Acquisition

Detector: AV67 , SN: 52-102 D7
Acquisition Start Date: 6/22/2014 6:54:26PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 27.82% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	7,161.00	119.35
Pu-239	240	5.16	186	249	6,928.00	115.47
Am-241	284	5.49	249	303	7,431.00	123.85

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:11:30PM 6/22/2014

Calibration

Sample Name: CCV-8877;AV68-20140622
Description:
Detector: AV68

Calibration Date: 6/22/2014 9:11:26PM
Analyst: 60040

Source Info

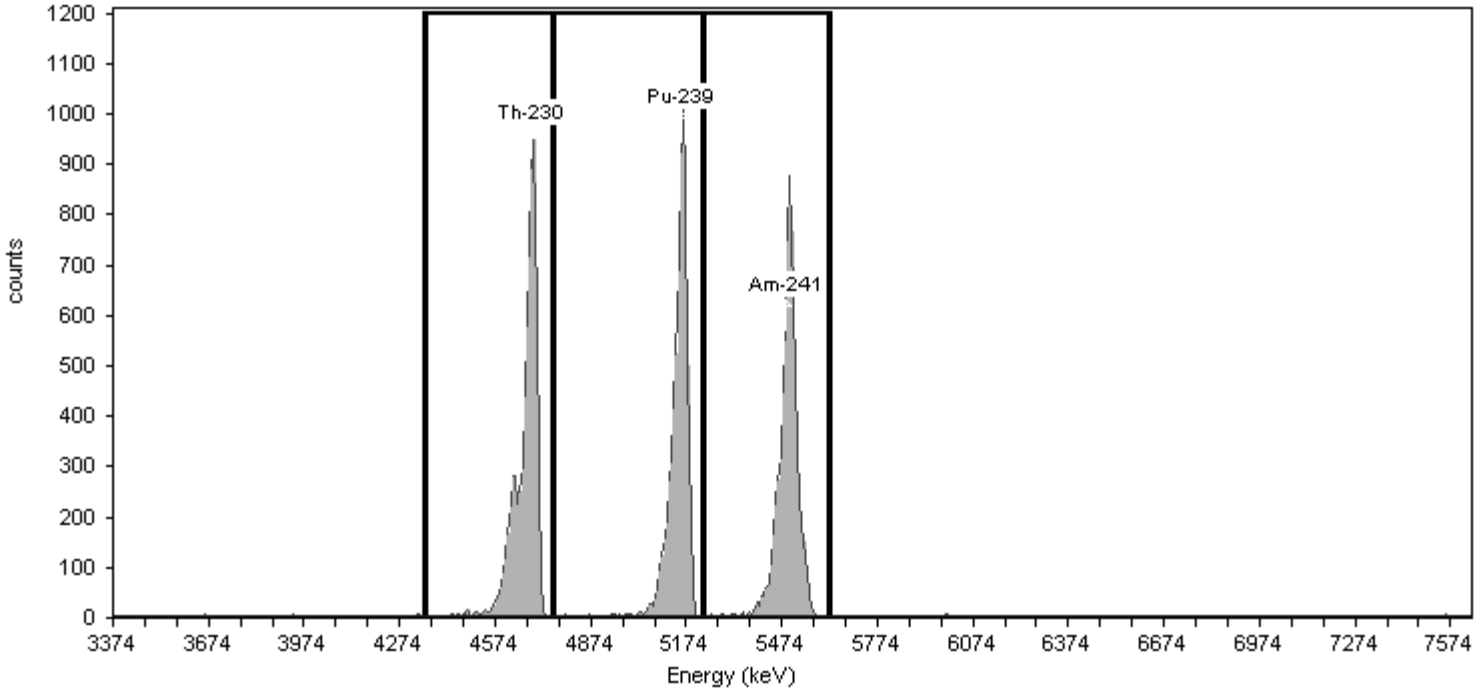
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV68 , SN: 48-45884
Acquisition Start Date: 6/22/2014 8:09:47PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 26.31% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,695.00	111.58
Pu-239	240	5.16	186	249	6,525.00	108.75
Am-241	284	5.49	249	303	6,331.00	105.52

Monthly Backgrounds

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:13:14AM 6/19/2014

Sample

Sample Name: ICB;AV3
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

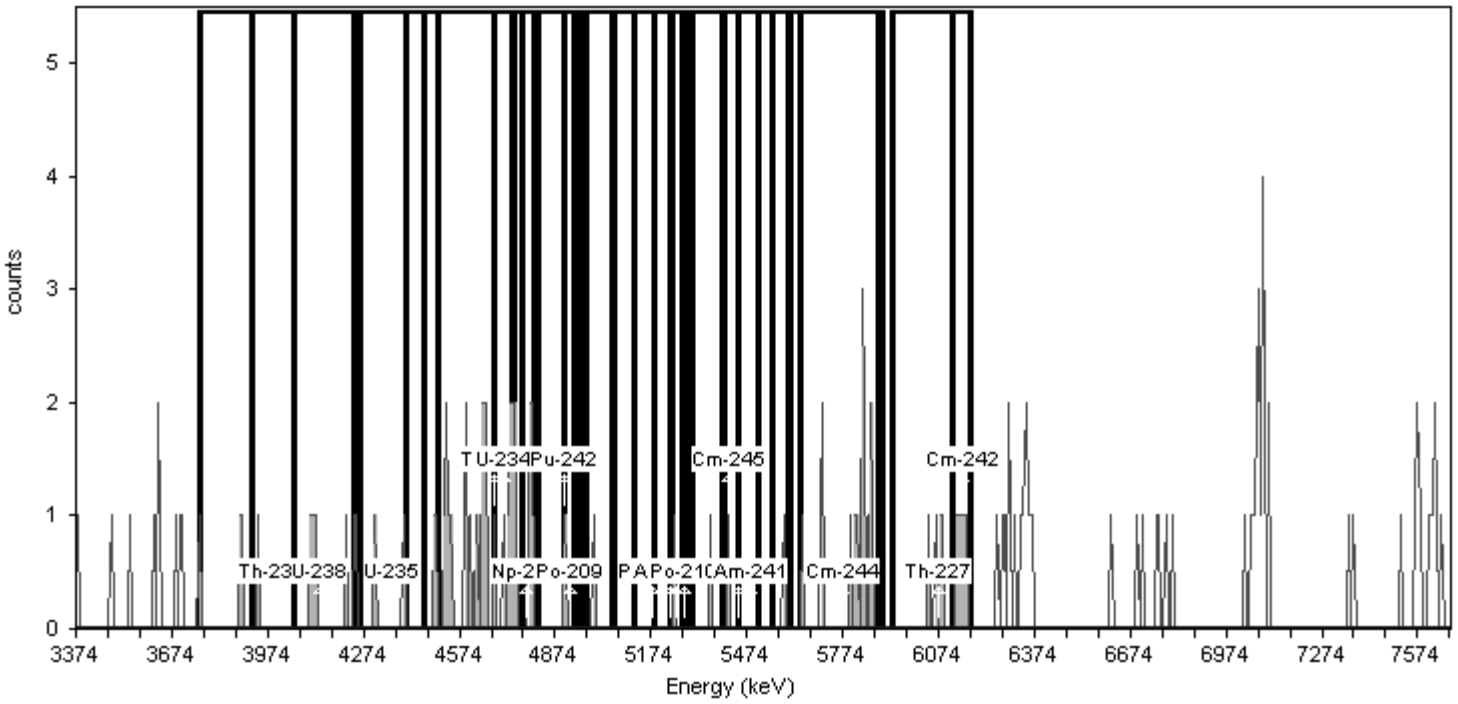
Analyst: 60040

Acquisition

Detector: AV3 , SN: 49-202 FF7
Acquisition Start Date: 6/18/2014 7:10:38PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-8875;AV3-20140505
Calibration Date: 5/6/2014 5:38:33PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.09% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 127.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	4.00	4.167E-003	2.329E-003
U-238	4.14	3.92	4.24	6.00	6.250E-003	2.756E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	26.00	2.708E-002	5.413E-003
U-234	4.71	4.51	4.82	28.00	2.917E-002	5.610E-003
Pu-242	4.90	4.68	4.95	14.00	1.458E-002	4.034E-003
Th-229	4.86	4.74	5.12	10.00	1.042E-002	3.455E-003
Np-237	4.78	4.77	4.81	4.00	4.167E-003	2.329E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	1.00	1.042E-003	1.473E-003
U-232	5.25	5.06	5.40	2.00	2.083E-003	1.804E-003
Th-228	5.45	5.19	5.51	3.00	3.125E-003	2.083E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	2.00	2.083E-003	1.804E-003
Am-241	5.48	5.30	5.60	3.00	3.125E-003	2.083E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	13.00	1.354E-002	3.898E-003
Cm-244	5.78	5.64	5.90	13.00	1.354E-002	3.898E-003
Th-227	6.07	5.93	6.18	9.00	9.375E-003	3.294E-003
Cm-242	6.15	6.12	6.18	5.00	5.208E-003	2.552E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:13:20AM 6/19/2014

Sample

Sample Name: ICB;AV4
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

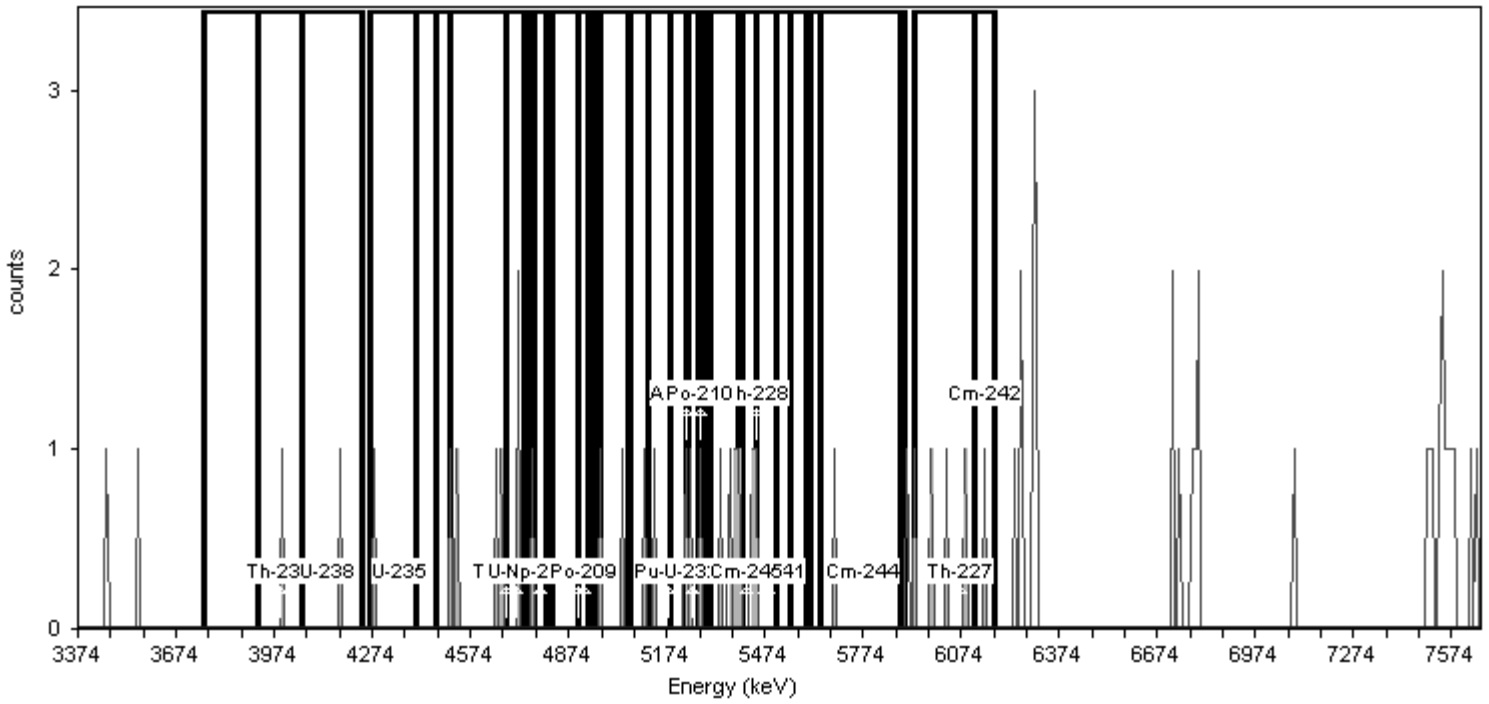
Analyst: 60040

Acquisition

Detector: AV4 , SN: 46-033Q4
Acquisition Start Date: 6/18/2014 7:10:40PM
Live Time: 960.00 min.
Real Time: 960.03 min.
Calibration Name: IC-8876;AV4-20140505
Calibration Date: 5/6/2014 5:38:40PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.82% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 64.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	7.00	7.292E-003	2.946E-003
Pu-242	4.90	4.68	4.95	3.00	3.125E-003	2.083E-003
Th-229	4.86	4.74	5.12	4.00	4.167E-003	2.329E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	5.00	5.208E-003	2.552E-003
Am-243	5.23	5.05	5.31	5.00	5.208E-003	2.552E-003
U-232	5.25	5.06	5.40	10.00	1.042E-002	3.455E-003
Th-228	5.45	5.19	5.51	11.00	1.146E-002	3.608E-003
Po-210	5.28	5.23	5.29	3.00	3.125E-003	2.083E-003
Pu-238	5.47	5.27	5.55	9.00	9.375E-003	3.294E-003
Am-241	5.48	5.30	5.60	8.00	8.333E-003	3.125E-003
Cm-245	5.42	5.40	5.45	4.00	4.167E-003	2.329E-003
Pu-236	5.76	5.61	5.89	1.00	1.042E-003	1.473E-003
Cm-244	5.78	5.64	5.90	1.00	1.042E-003	1.473E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:13:25AM 6/19/2014

Sample

Sample Name: ICB;AV6
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

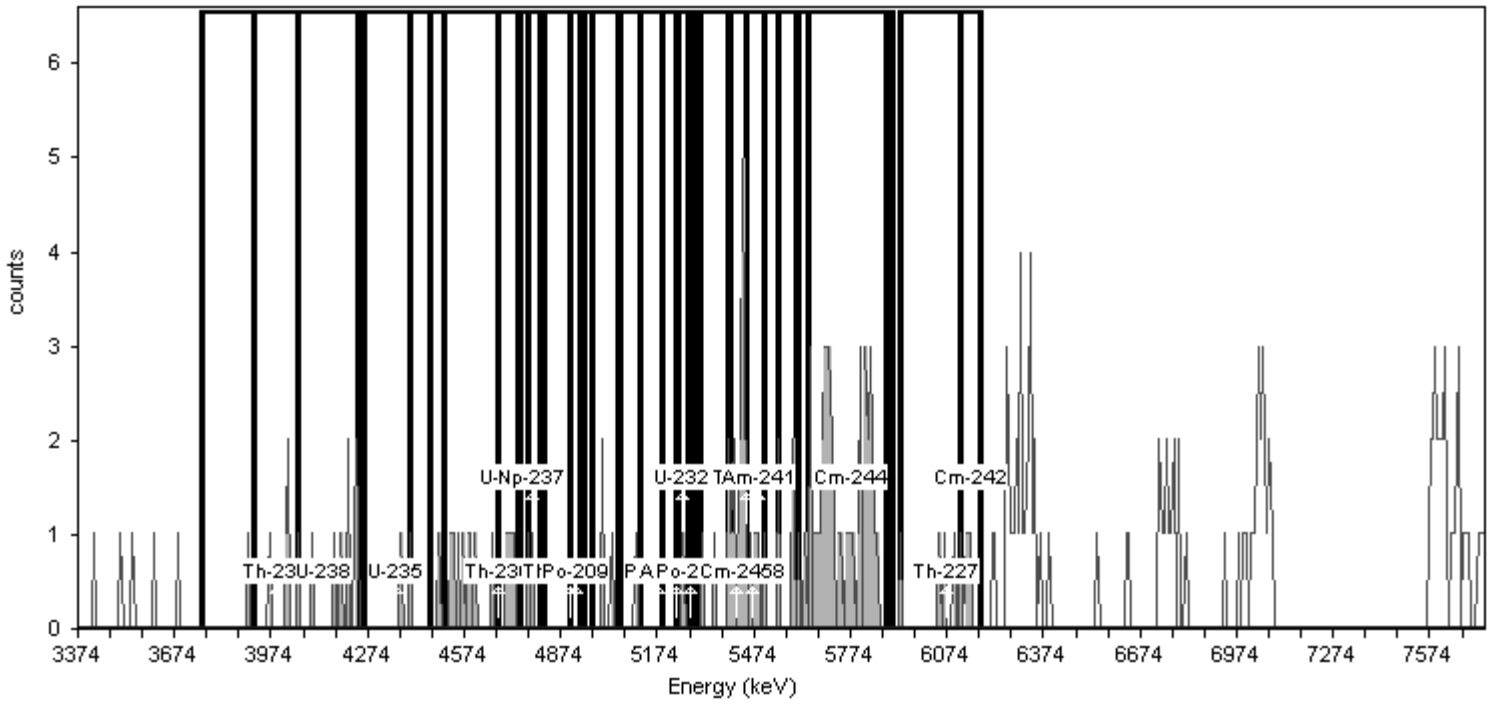
Analyst: 60040

Acquisition

Detector: AV6 , SN: 47-27FF2
Acquisition Start Date: 6/18/2014 7:08:18PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9520;AV6-20140505
Calibration Date: 5/6/2014 5:38:46PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.89% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 213.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	6.00	6.250E-003	2.756E-003
U-238	4.14	3.92	4.24	13.00	1.354E-002	3.898E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	14.00	1.458E-002	4.034E-003
U-234	4.71	4.51	4.82	14.00	1.458E-002	4.034E-003
Pu-242	4.90	4.68	4.95	6.00	6.250E-003	2.756E-003
Th-229	4.86	4.74	5.12	6.00	6.250E-003	2.756E-003
Np-237	4.78	4.77	4.81	2.00	2.083E-003	1.804E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	7.00	7.292E-003	2.946E-003
Th-228	5.45	5.19	5.51	21.00	2.187E-002	4.886E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	22.00	2.292E-002	4.996E-003
Am-241	5.48	5.30	5.60	24.00	2.500E-002	5.208E-003
Cm-245	5.42	5.40	5.45	14.00	1.458E-002	4.034E-003
Pu-236	5.76	5.61	5.89	44.00	4.583E-002	6.988E-003
Cm-244	5.78	5.64	5.90	42.00	4.375E-002	6.831E-003
Th-227	6.07	5.93	6.18	8.00	8.333E-003	3.125E-003
Cm-242	6.15	6.12	6.18	4.00	4.167E-003	2.329E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:13:31AM 6/19/2014

Sample

Sample Name: ICB;AV7
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

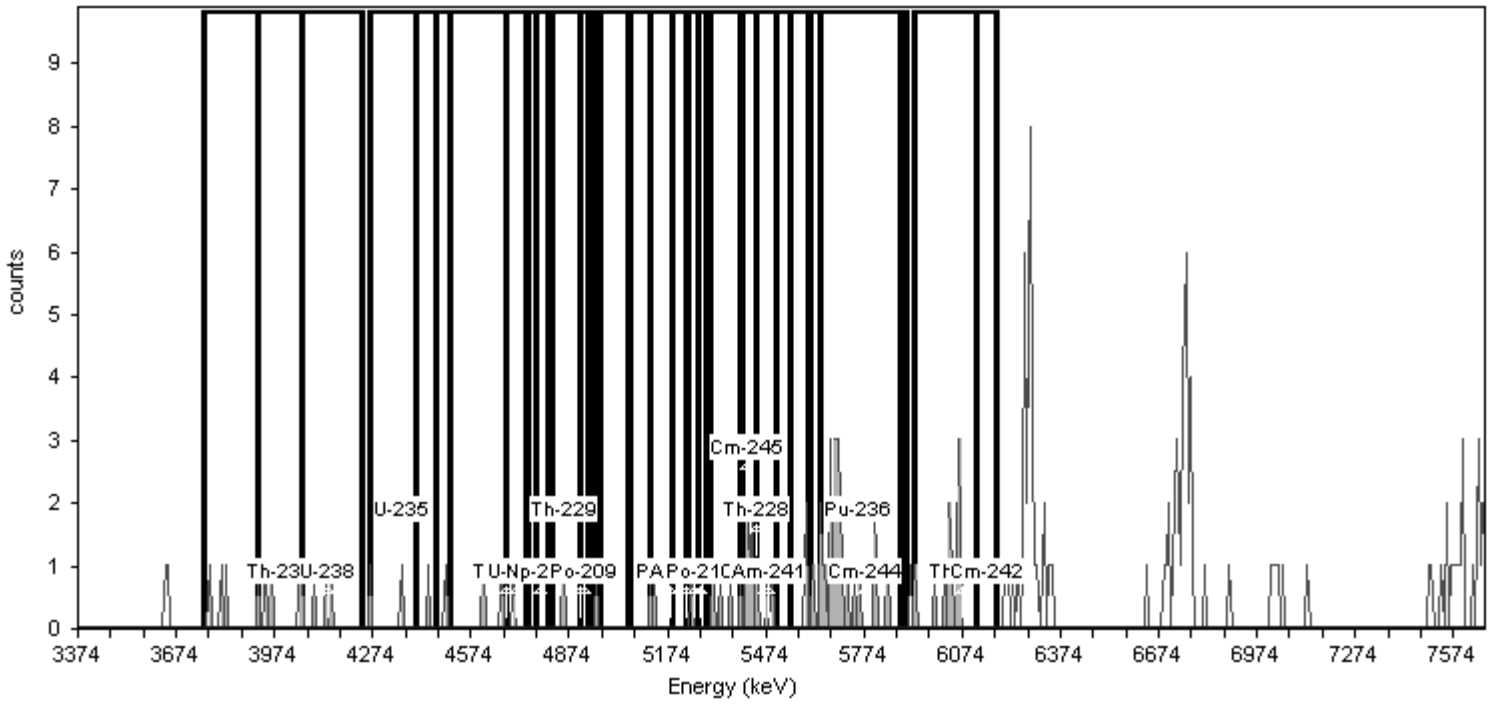
Analyst: 60040

Acquisition

Detector: AV7 , SN: 48-158EE5
Acquisition Start Date: 6/18/2014 7:08:20PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-8877;AV7-20140507
Calibration Date: 5/7/2014 10:48:48PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.80% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 167.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	9.00	9.375E-003	3.294E-003
U-238	4.14	3.92	4.24	9.00	9.375E-003	3.294E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	4.00	4.167E-003	2.329E-003
Pu-242	4.90	4.68	4.95	3.00	3.125E-003	2.083E-003
Th-229	4.86	4.74	5.12	4.00	4.167E-003	2.329E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	7.00	7.292E-003	2.946E-003
Th-228	5.45	5.19	5.51	13.00	1.354E-002	3.898E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	12.00	1.250E-002	3.756E-003
Am-241	5.48	5.30	5.60	14.00	1.458E-002	4.034E-003
Cm-245	5.42	5.40	5.45	7.00	7.292E-003	2.946E-003
Pu-236	5.76	5.61	5.89	26.00	2.708E-002	5.413E-003
Cm-244	5.78	5.64	5.90	25.00	2.604E-002	5.311E-003
Th-227	6.07	5.93	6.18	10.00	1.042E-002	3.455E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:13:36AM 6/19/2014

Sample

Sample Name: ICB;AV8
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

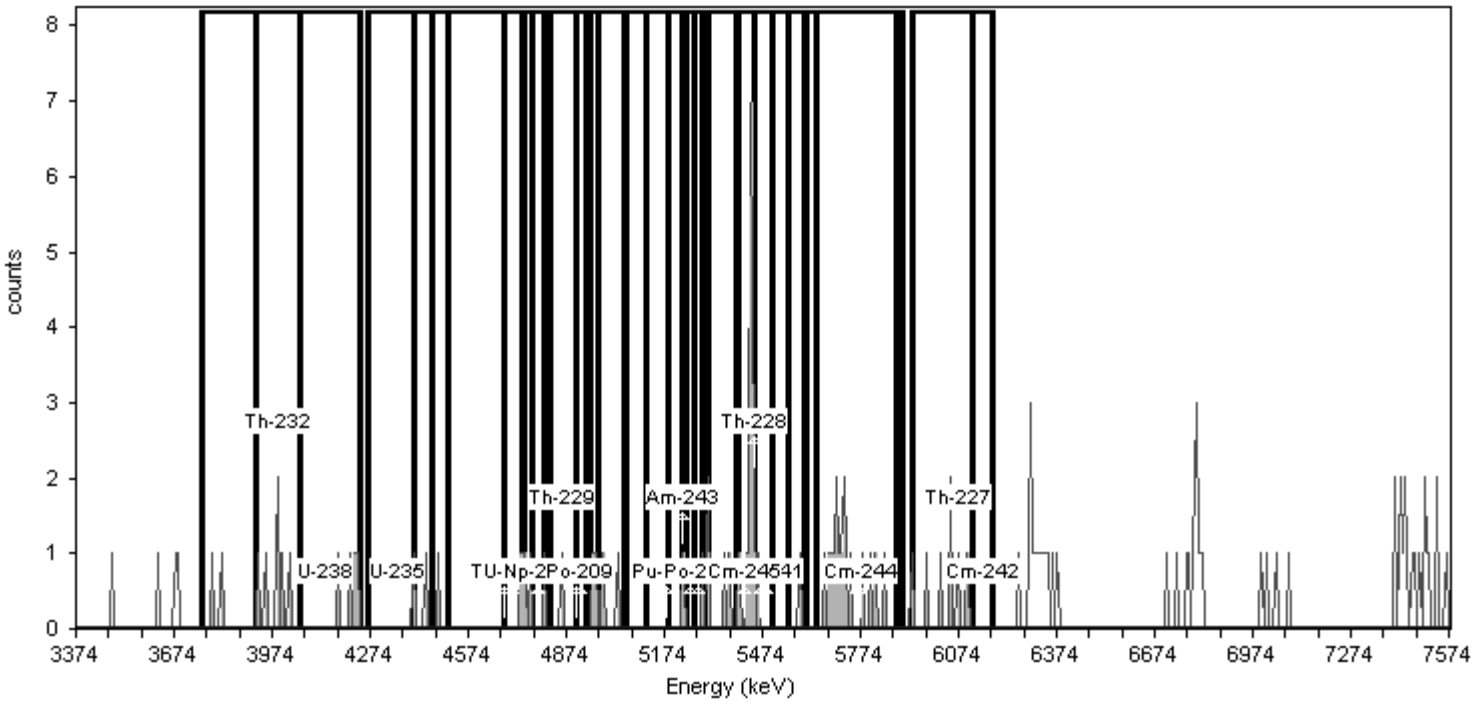
Analyst: 60040

Acquisition

Detector: AV8 , SN: 41-137Q6
Acquisition Start Date: 6/18/2014 7:08:22PM
Live Time: 960.01 min.
Real Time: 960.03 min.
Calibration Name: IC-9792;AV8-20140505
Calibration Date: 5/6/2014 5:38:58PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.05% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 119.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	8.00	8.333E-003	3.125E-003
U-238	4.14	3.92	4.24	10.00	1.042E-002	3.455E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	5.00	5.208E-003	2.552E-003
Pu-242	4.90	4.68	4.95	6.00	6.250E-003	2.756E-003
Th-229	4.86	4.74	5.12	9.00	9.375E-003	3.294E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	7.00	7.292E-003	2.946E-003
Th-228	5.45	5.19	5.51	19.00	1.979E-002	4.658E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	18.00	1.875E-002	4.540E-003
Am-241	5.48	5.30	5.60	18.00	1.875E-002	4.540E-003
Cm-245	5.42	5.40	5.45	12.00	1.250E-002	3.756E-003
Pu-236	5.76	5.61	5.89	16.00	1.667E-002	4.295E-003
Cm-244	5.78	5.64	5.90	16.00	1.667E-002	4.295E-003
Th-227	6.07	5.93	6.18	7.00	7.292E-003	2.946E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:26:33AM 6/19/2014

Sample

Sample Name: ICB;AV10
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

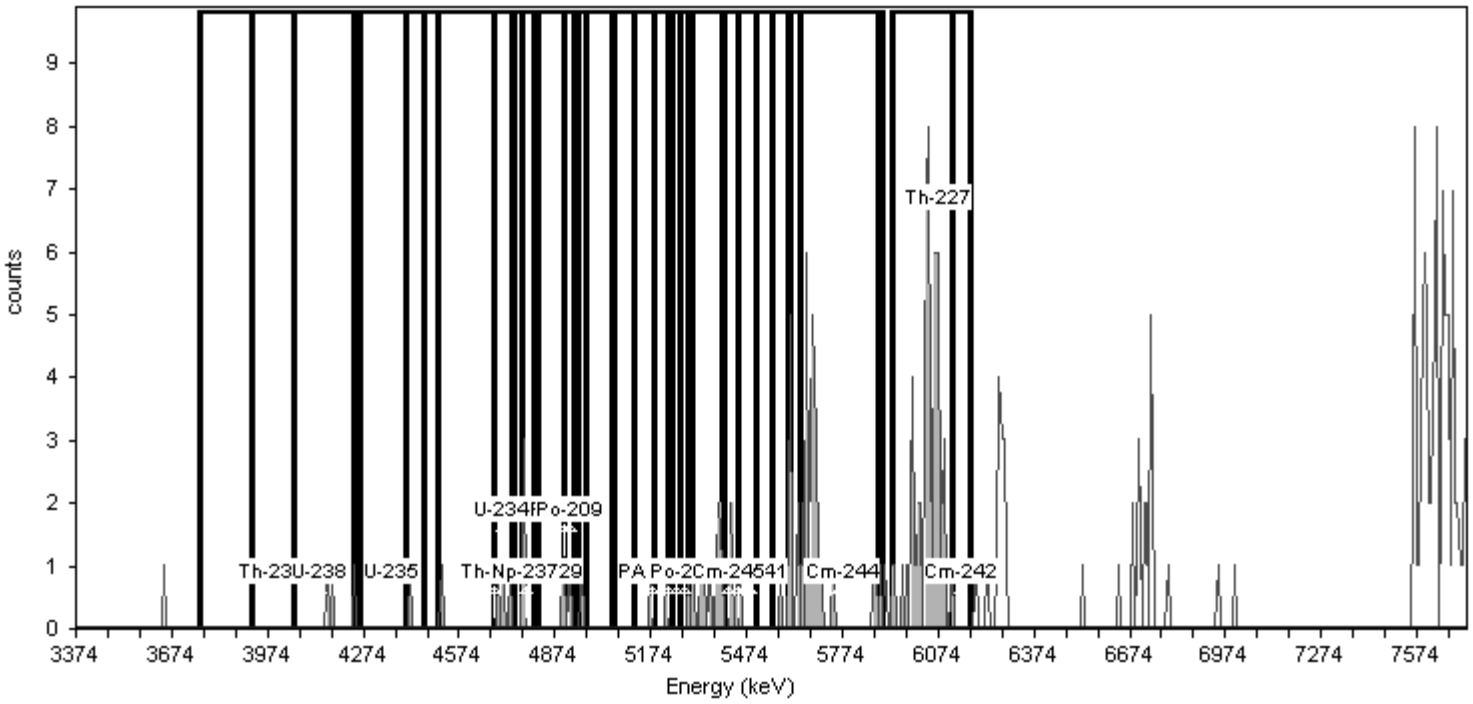
Acquisition

Detector: AV10 , SN: 49-155N2
Acquisition Start Date: 6/18/2014 7:08:26PM
Live Time: 960.00 min.
Real Time: 970.50 min.
Calibration Name: IC-9794;AV10-20140505
Calibration Date: 5/6/2014 5:39:10PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.84% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 237.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	5.00	5.208E-003	2.552E-003
U-234	4.71	4.51	4.82	8.00	8.333E-003	3.125E-003
Pu-242	4.90	4.68	4.95	10.00	1.042E-002	3.455E-003
Th-229	4.86	4.74	5.12	8.00	8.333E-003	3.125E-003
Np-237	4.78	4.77	4.81	4.00	4.167E-003	2.329E-003
Po-209	4.92	4.90	4.93	2.00	2.083E-003	1.804E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	12.00	1.250E-002	3.756E-003
Th-228	5.45	5.19	5.51	15.00	1.563E-002	4.167E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	14.00	1.458E-002	4.034E-003
Am-241	5.48	5.30	5.60	15.00	1.563E-002	4.167E-003
Cm-245	5.42	5.40	5.45	4.00	4.167E-003	2.329E-003
Pu-236	5.76	5.61	5.89	33.00	3.437E-002	6.074E-003
Cm-244	5.78	5.64	5.90	27.00	2.813E-002	5.512E-003
Th-227	6.07	5.93	6.18	52.00	5.417E-002	7.583E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:26:39AM 6/19/2014

Sample

Sample Name: ICB;AV11
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

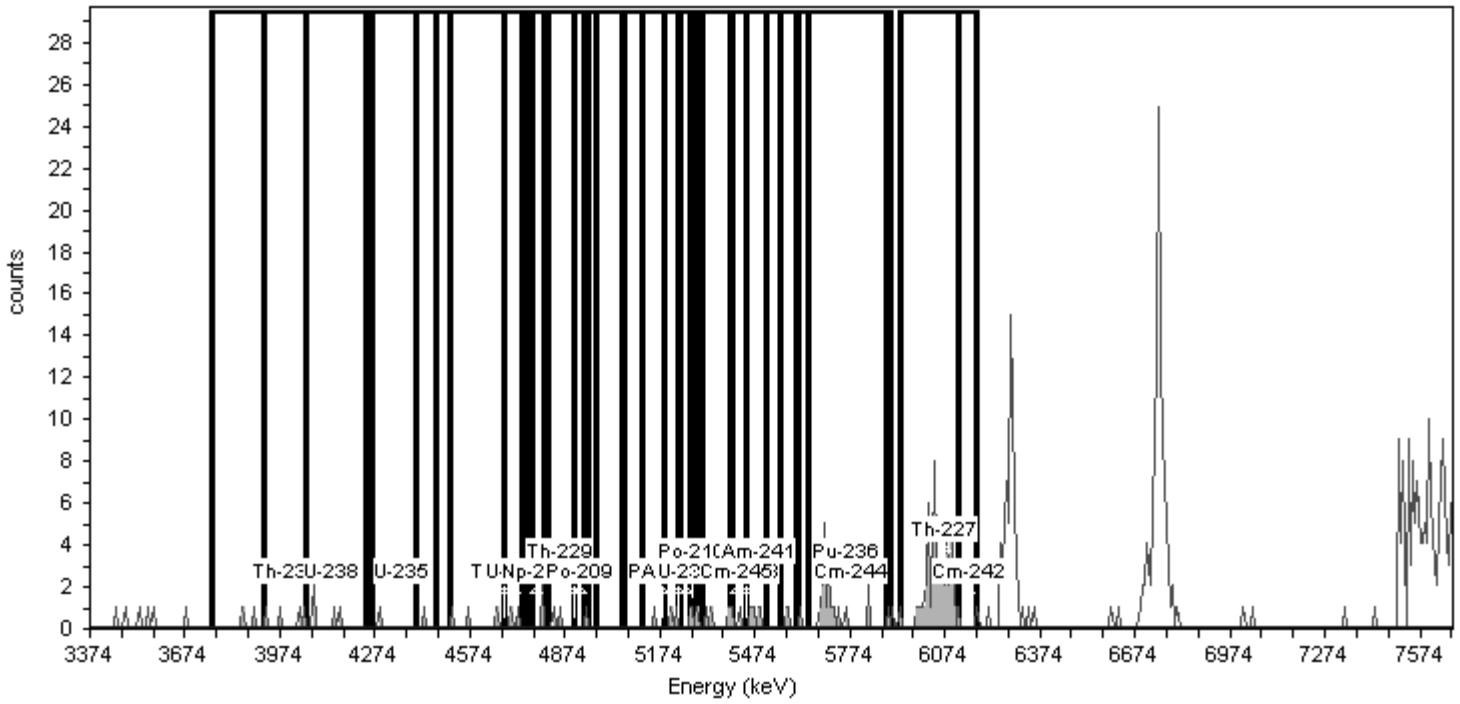
Acquisition

Detector: AV11 , SN: 49-155dd2
Acquisition Start Date: 6/18/2014 7:08:27PM
Live Time: 960.00 min.
Real Time: 970.50 min.
Calibration Name: IC-9795;AV11-20140505
Calibration Date: 5/6/2014 5:39:16PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.88% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 403.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	6.00	6.250E-003	2.756E-003
U-238	4.14	3.92	4.24	8.00	8.333E-003	3.125E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	7.00	7.292E-003	2.946E-003
Pu-242	4.90	4.68	4.95	7.00	7.292E-003	2.946E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	2.00	2.083E-003	1.804E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	6.00	6.250E-003	2.756E-003
U-232	5.25	5.06	5.40	11.00	1.146E-002	3.608E-003
Th-228	5.45	5.19	5.51	15.00	1.563E-002	4.167E-003
Po-210	5.28	5.23	5.29	3.00	3.125E-003	2.083E-003
Pu-238	5.47	5.27	5.55	13.00	1.354E-002	3.898E-003
Am-241	5.48	5.30	5.60	12.00	1.250E-002	3.756E-003
Cm-245	5.42	5.40	5.45	3.00	3.125E-003	2.083E-003
Pu-236	5.76	5.61	5.89	19.00	1.979E-002	4.658E-003
Cm-244	5.78	5.64	5.90	19.00	1.979E-002	4.658E-003
Th-227	6.07	5.93	6.18	52.00	5.417E-002	7.583E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:26:50AM 6/19/2014

Sample

Sample Name: ICB;AV13
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

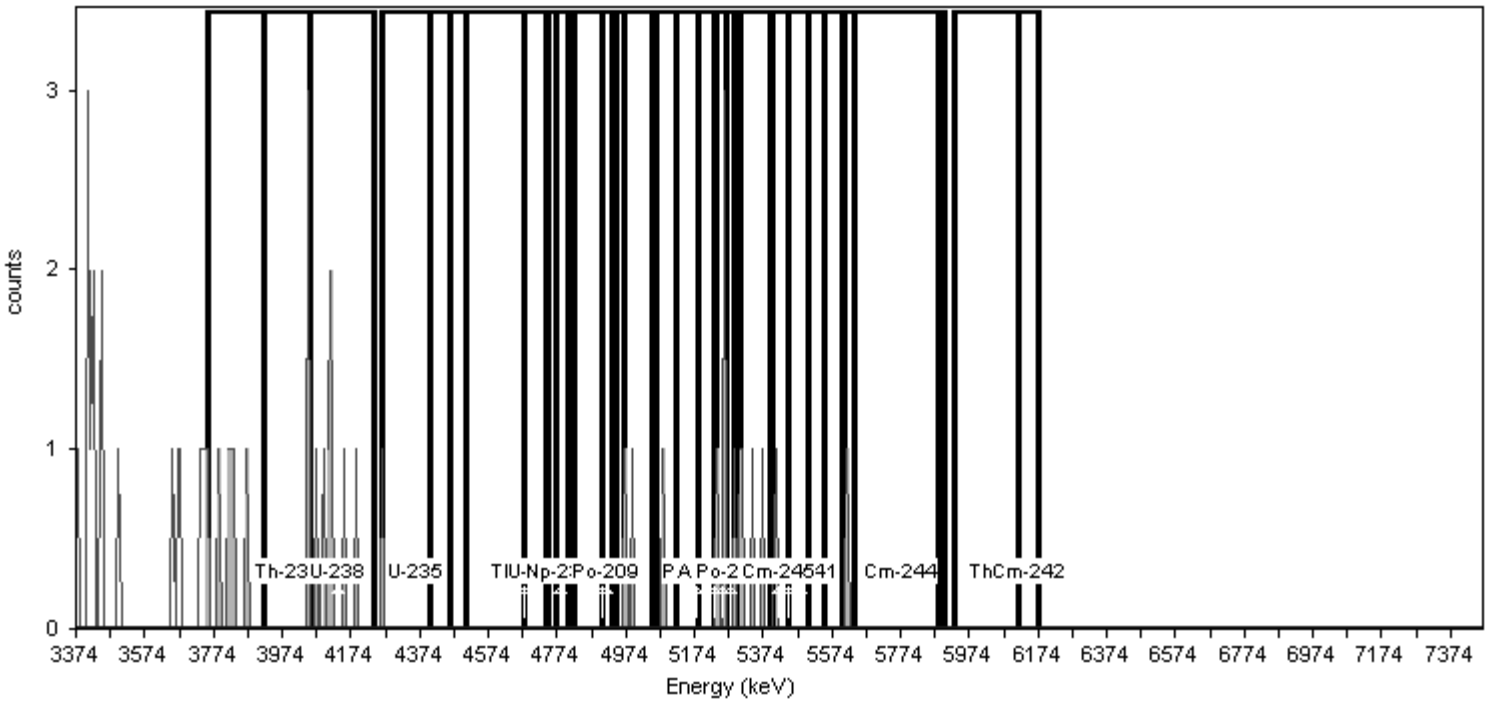
Analyst: 60040

Acquisition

Detector: AV13 , SN: 49-155M7
Acquisition Start Date: 6/18/2014 7:08:30PM
Live Time: 960.00 min.
Real Time: 970.52 min.
Calibration Name: IC-9884;AV13-20140505
Calibration Date: 5/6/2014 5:39:28PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.99% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 47.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	9.00	9.375E-003	3.294E-003
U-238	4.14	3.92	4.24	10.00	1.042E-002	3.455E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	0.00	0.000E+000	1.473E-003
U-234	4.71	4.51	4.82	0.00	0.000E+000	1.473E-003
Pu-242	4.90	4.68	4.95	0.00	0.000E+000	1.473E-003
Th-229	4.86	4.74	5.12	3.00	3.125E-003	2.083E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	7.00	7.292E-003	2.946E-003
U-232	5.25	5.06	5.40	10.00	1.042E-002	3.455E-003
Th-228	5.45	5.19	5.51	10.00	1.042E-002	3.455E-003
Po-210	5.28	5.23	5.29	5.00	5.208E-003	2.552E-003
Pu-238	5.47	5.27	5.55	6.00	6.250E-003	2.756E-003
Am-241	5.48	5.30	5.60	5.00	5.208E-003	2.552E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	1.00	1.042E-003	1.473E-003
Cm-244	5.78	5.64	5.90	0.00	0.000E+000	1.473E-003
Th-227	6.07	5.93	6.18	0.00	0.000E+000	1.473E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:26:57AM 6/19/2014

Sample

Sample Name: ICB;AV14
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

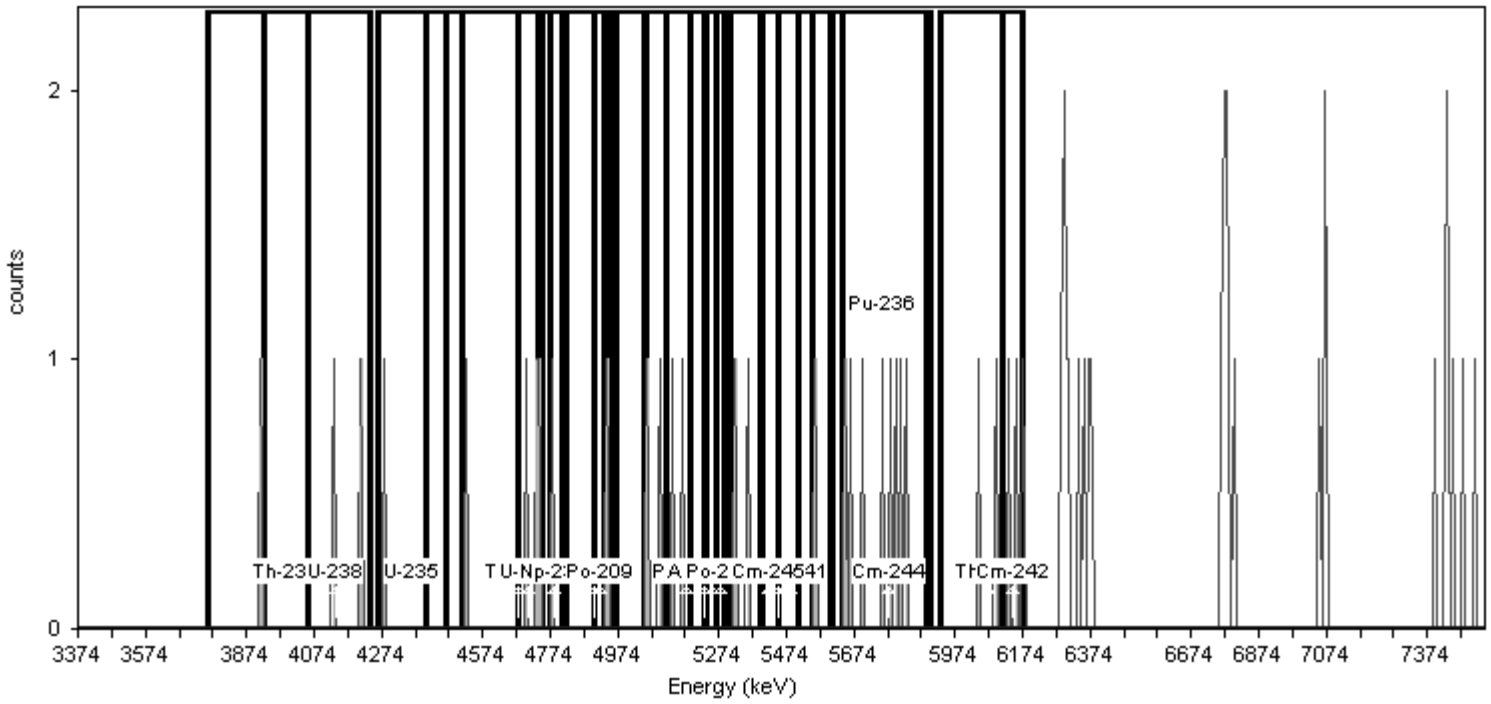
Acquisition

Detector: AV14 , SN: 50-060W4
Acquisition Start Date: 6/18/2014 7:08:33PM
Live Time: 960.00 min.
Real Time: 970.48 min.
Calibration Name: IC-9885;AV14-20140505
Calibration Date: 5/6/2014 5:39:36PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.34% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 57.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	4.00	4.167E-003	2.329E-003
U-234	4.71	4.51	4.82	5.00	5.208E-003	2.552E-003
Pu-242	4.90	4.68	4.95	5.00	5.208E-003	2.552E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	6.00	6.250E-003	2.756E-003
Th-228	5.45	5.19	5.51	2.00	2.083E-003	1.804E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	2.00	2.083E-003	1.804E-003
Am-241	5.48	5.30	5.60	3.00	3.125E-003	2.083E-003
Cm-245	5.42	5.40	5.45	0.00	0.000E+000	1.473E-003
Pu-236	5.76	5.61	5.89	8.00	8.333E-003	3.125E-003
Cm-244	5.78	5.64	5.90	8.00	8.333E-003	3.125E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:27:02AM 6/19/2014

Sample

Sample Name: ICB;AV15
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

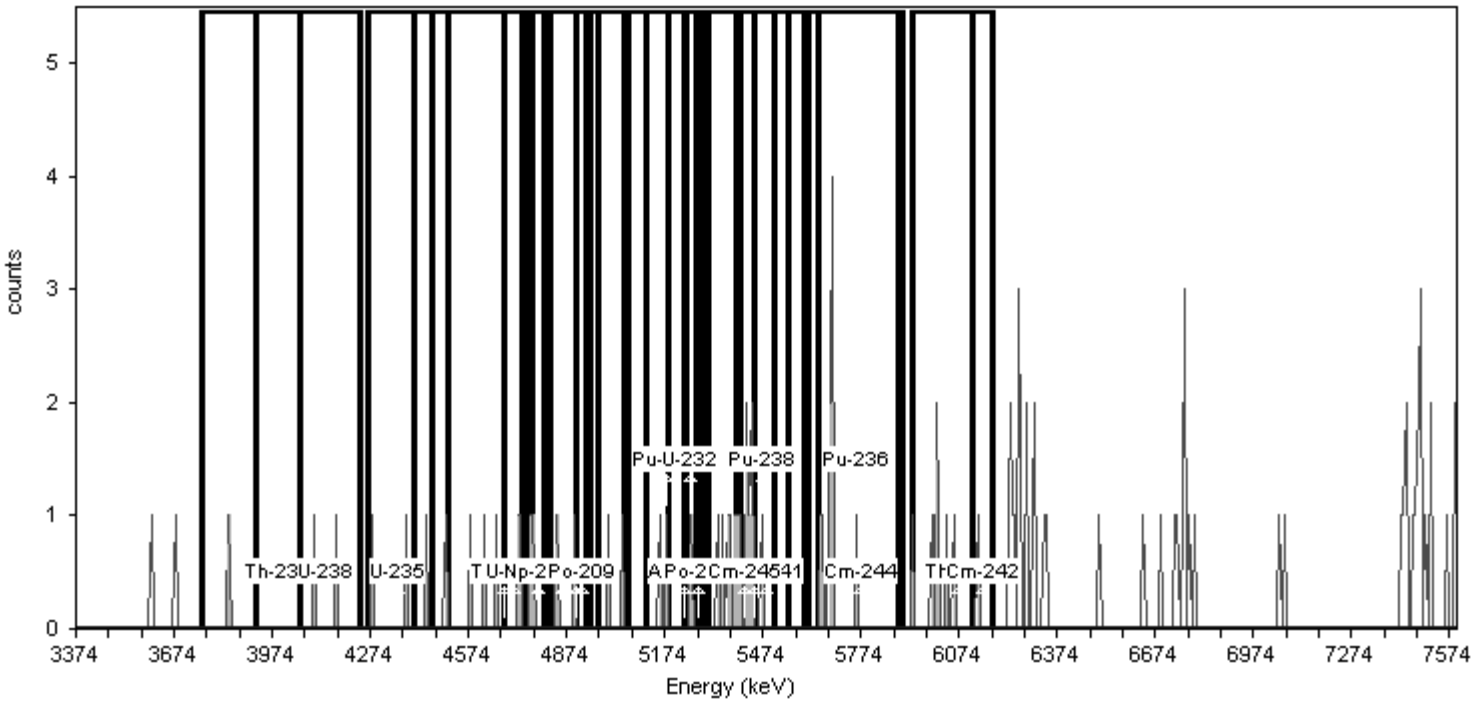
Acquisition

Detector: AV15 , SN: 41-172C5
Acquisition Start Date: 6/18/2014 7:08:35PM
Live Time: 960.00 min.
Real Time: 970.52 min.
Calibration Name: IC-9886;AV15-20140505
Calibration Date: 5/6/2014 5:39:42PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.62% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 96.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.68	4.40	4.75	7.00	7.292E-003	2.946E-003
U-234	4.71	4.51	4.82	7.00	7.292E-003	2.946E-003
Pu-242	4.90	4.68	4.95	6.00	6.250E-003	2.756E-003
Th-229	4.86	4.74	5.12	6.00	6.250E-003	2.756E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	10.00	1.042E-002	3.455E-003
Th-228	5.45	5.19	5.51	14.00	1.458E-002	4.034E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	13.00	1.354E-002	3.898E-003
Am-241	5.48	5.30	5.60	13.00	1.354E-002	3.898E-003
Cm-245	5.42	5.40	5.45	7.00	7.292E-003	2.946E-003
Pu-236	5.76	5.61	5.89	9.00	9.375E-003	3.294E-003
Cm-244	5.78	5.64	5.90	9.00	9.375E-003	3.294E-003
Th-227	6.07	5.93	6.18	8.00	8.333E-003	3.125E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:27:08AM 6/19/2014

Sample

Sample Name: ICB;AV16
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

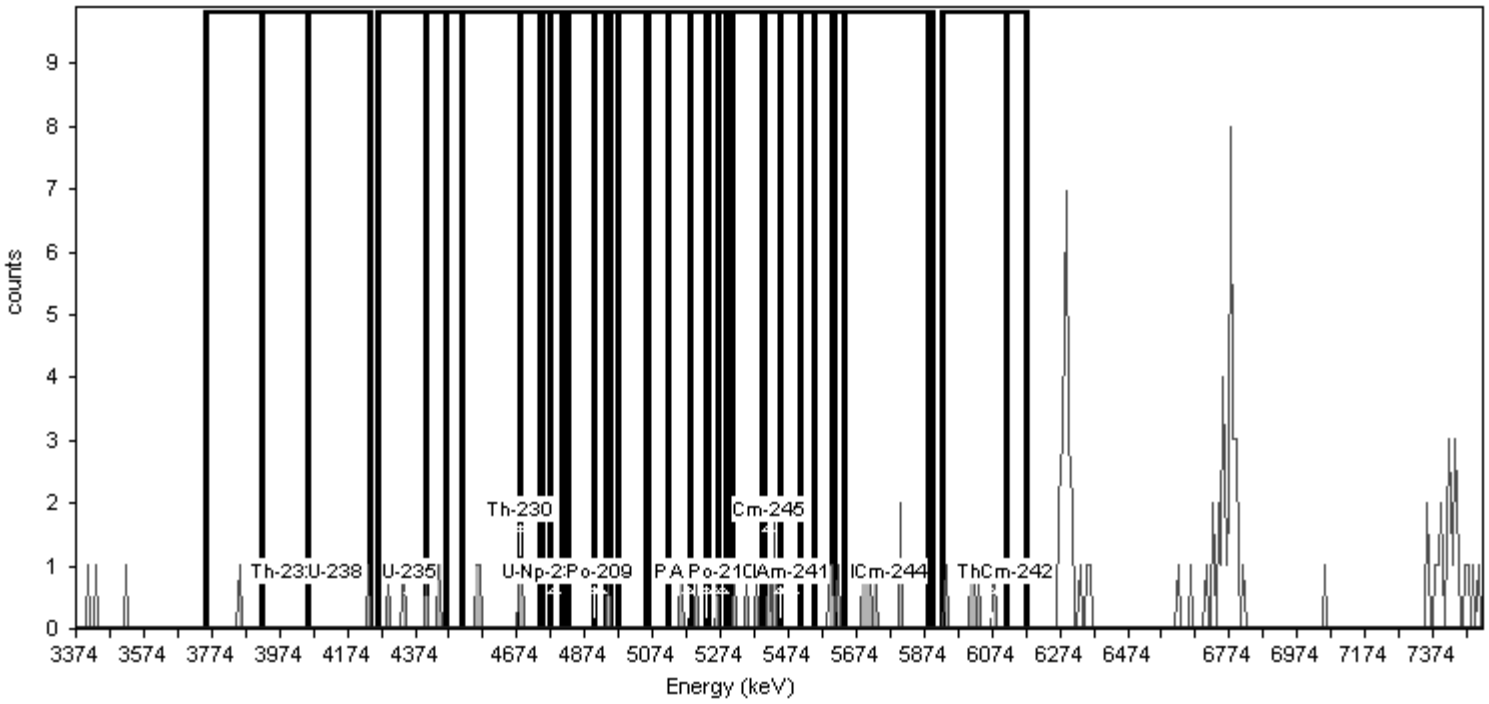
Analyst: 60040

Acquisition

Detector: AV16 , SN: 51-082B6
Acquisition Start Date: 6/18/2014 7:08:37PM
Live Time: 960.00 min.
Real Time: 970.48 min.
Calibration Name: IC-7107;AV16-20140505
Calibration Date: 5/5/2014 10:08:41PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.11% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 116.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	4.00	4.167E-003	2.329E-003
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	4.00	4.167E-003	2.329E-003
Pu-242	4.90	4.68	4.95	3.00	3.125E-003	2.083E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	6.00	6.250E-003	2.756E-003
Th-228	5.45	5.19	5.51	8.00	8.333E-003	3.125E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	6.00	6.250E-003	2.756E-003
Am-241	5.48	5.30	5.60	8.00	8.333E-003	3.125E-003
Cm-245	5.42	5.40	5.45	3.00	3.125E-003	2.083E-003
Pu-236	5.76	5.61	5.89	8.00	8.333E-003	3.125E-003
Cm-244	5.78	5.64	5.90	7.00	7.292E-003	2.946E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:13:46AM 6/19/2014

Sample

Sample Name: ICB;AV17
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

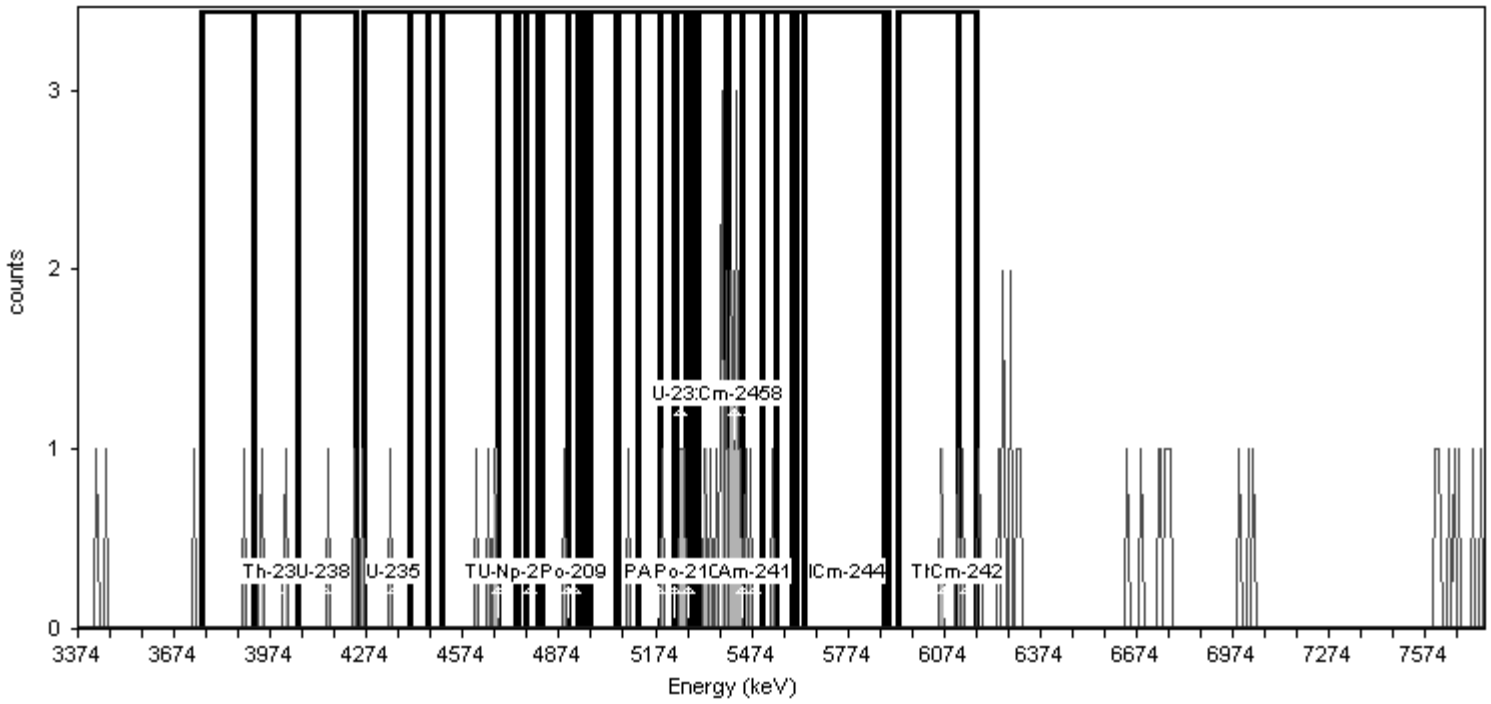
Analyst: 60040

Acquisition

Detector: AV17 , SN: 50-051C4
Acquisition Start Date: 6/18/2014 7:08:39PM
Live Time: 960.00 min.
Real Time: 960.05 min.
Calibration Name: IC-8874;AV17-20140505
Calibration Date: 5/5/2014 10:08:49PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.07% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 66.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	3.00	3.125E-003	2.083E-003
U-238	4.14	3.92	4.24	4.00	4.167E-003	2.329E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	3.00	3.125E-003	2.083E-003
U-234	4.71	4.51	4.82	3.00	3.125E-003	2.083E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	12.00	1.250E-002	3.756E-003
Th-228	5.45	5.19	5.51	21.00	2.187E-002	4.886E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	19.00	1.979E-002	4.658E-003
Am-241	5.48	5.30	5.60	19.00	1.979E-002	4.658E-003
Cm-245	5.42	5.40	5.45	10.00	1.042E-002	3.455E-003
Pu-236	5.76	5.61	5.89	0.00	0.000E+000	1.473E-003
Cm-244	5.78	5.64	5.90	0.00	0.000E+000	1.473E-003
Th-227	6.07	5.93	6.18	3.00	3.125E-003	2.083E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:13:52AM 6/19/2014

Sample

Sample Name: ICB;AV18
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

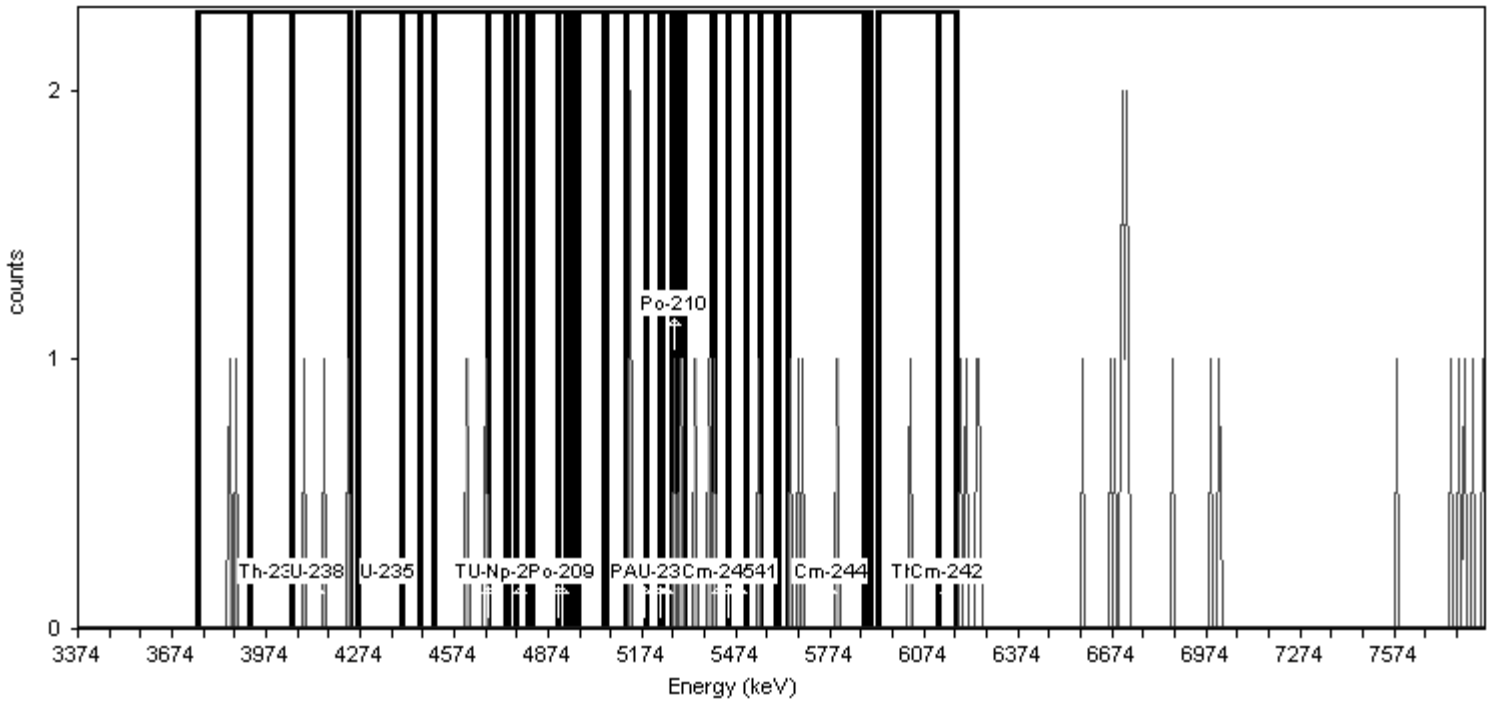
Acquisition

Detector: AV18 , SN: 51-082C5
Acquisition Start Date: 6/18/2014 7:08:41PM
Live Time: 960.00 min.
Real Time: 960.05 min.
Calibration Name: IC-8875;AV18-20140505
Calibration Date: 5/5/2014 10:09:08PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.46% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 42.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	2.00	2.083E-003	1.804E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	0.00	0.000E+000	1.473E-003
Th-229	4.86	4.74	5.12	0.00	0.000E+000	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	7.00	7.292E-003	2.946E-003
Th-228	5.45	5.19	5.51	5.00	5.208E-003	2.552E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	6.00	6.250E-003	2.756E-003
Am-241	5.48	5.30	5.60	5.00	5.208E-003	2.552E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	4.00	4.167E-003	2.329E-003
Cm-244	5.78	5.64	5.90	4.00	4.167E-003	2.329E-003
Th-227	6.07	5.93	6.18	1.00	1.042E-003	1.473E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:13:58AM 6/19/2014

Sample

Sample Name: ICB;AV19
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

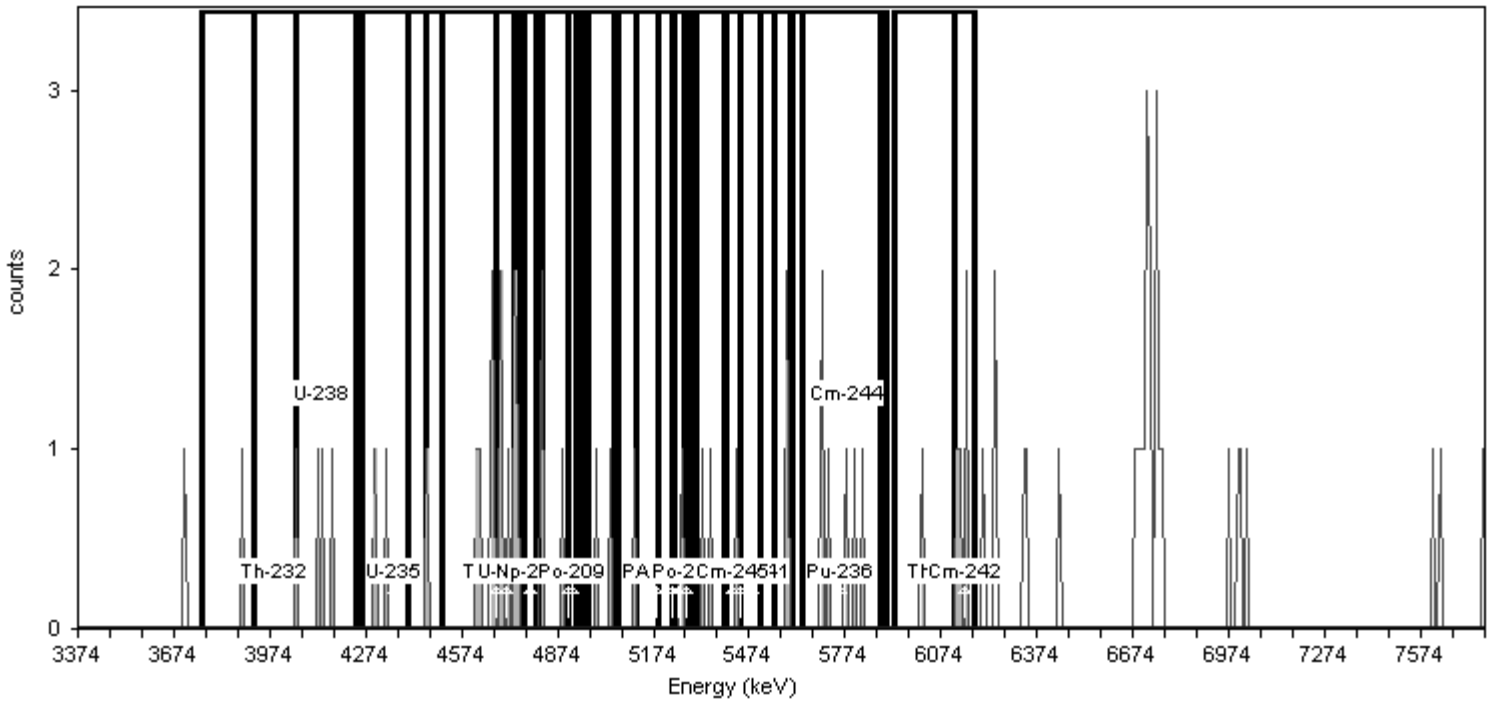
Acquisition

Detector: AV19 , SN: 50-025FF5
Acquisition Start Date: 6/18/2014 7:08:42PM
Live Time: 960.00 min.
Real Time: 960.05 min.
Calibration Name: IC-8876;AV19-20140505
Calibration Date: 5/5/2014 10:09:02PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.34% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 73.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	4.00	4.167E-003	2.329E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.68	4.40	4.75	12.00	1.250E-002	3.756E-003
U-234	4.71	4.51	4.82	13.00	1.354E-002	3.898E-003
Pu-242	4.90	4.68	4.95	9.00	9.375E-003	3.294E-003
Th-229	4.86	4.74	5.12	9.00	9.375E-003	3.294E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	4.00	4.167E-003	2.329E-003
Th-228	5.45	5.19	5.51	4.00	4.167E-003	2.329E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	3.00	3.125E-003	2.083E-003
Am-241	5.48	5.30	5.60	6.00	6.250E-003	2.756E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	6.00	6.250E-003	2.756E-003
Cm-244	5.78	5.64	5.90	6.00	6.250E-003	2.756E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	4.00	4.167E-003	2.329E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:14:04AM 6/19/2014

Sample

Sample Name: ICB;AV20
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

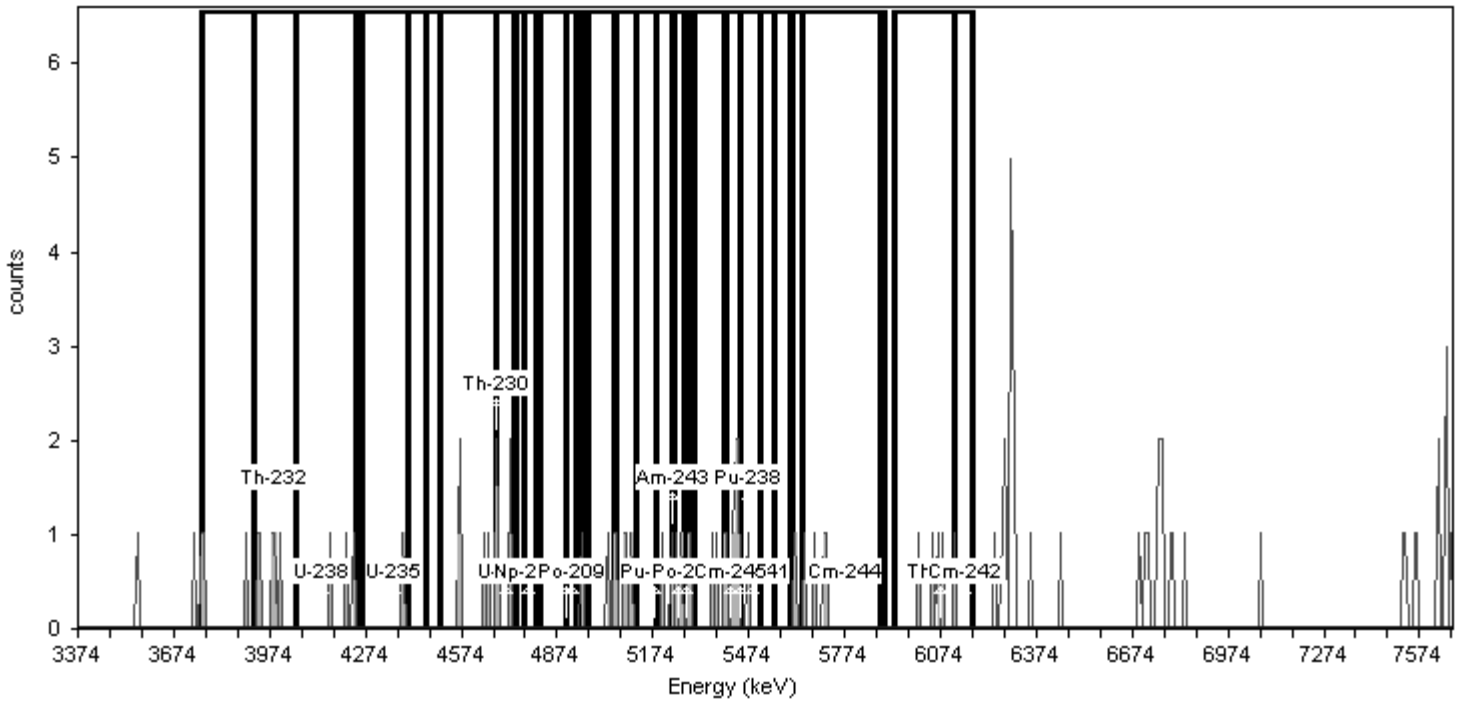
Analyst: 60040

Acquisition

Detector: AV20 , SN: 48-121A7
Acquisition Start Date: 6/18/2014 7:08:45PM
Live Time: 960.00 min.
Real Time: 960.05 min.
Calibration Name: IC-8877;AV20-20140505
Calibration Date: 5/5/2014 10:09:21PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.56% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 97.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	8.00	8.333E-003	3.125E-003
U-238	4.14	3.92	4.24	8.00	8.333E-003	3.125E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	10.00	1.042E-002	3.455E-003
U-234	4.71	4.51	4.82	10.00	1.042E-002	3.455E-003
Pu-242	4.90	4.68	4.95	6.00	6.250E-003	2.756E-003
Th-229	4.86	4.74	5.12	7.00	7.292E-003	2.946E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	8.00	8.333E-003	3.125E-003
Am-243	5.23	5.05	5.31	11.00	1.146E-002	3.608E-003
U-232	5.25	5.06	5.40	14.00	1.458E-002	4.034E-003
Th-228	5.45	5.19	5.51	16.00	1.667E-002	4.295E-003
Po-210	5.28	5.23	5.29	5.00	5.208E-003	2.552E-003
Pu-238	5.47	5.27	5.55	12.00	1.250E-002	3.756E-003
Am-241	5.48	5.30	5.60	10.00	1.042E-002	3.455E-003
Cm-245	5.42	5.40	5.45	7.00	7.292E-003	2.946E-003
Pu-236	5.76	5.61	5.89	5.00	5.208E-003	2.552E-003
Cm-244	5.78	5.64	5.90	4.00	4.167E-003	2.329E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:14:16AM 6/19/2014

Sample

Sample Name: ICB;AV21
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

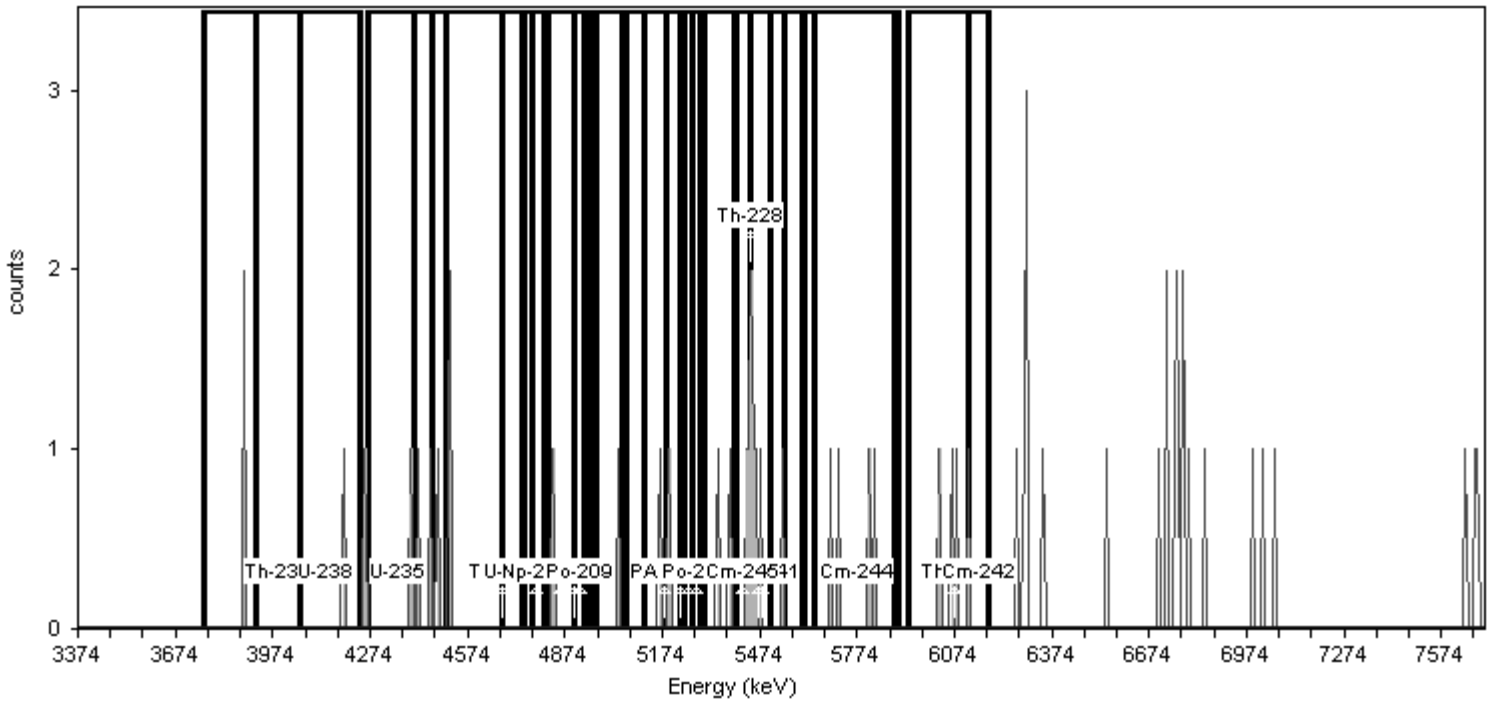
Acquisition

Detector: AV21 , SN: 48-102BB6
Acquisition Start Date: 6/18/2014 7:08:46PM
Live Time: 960.00 min.
Real Time: 960.05 min.
Calibration Name: IC-9520;AV21-20140505
Calibration Date: 5/5/2014 10:09:29PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.45% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 55.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.68	4.40	4.75	5.00	5.208E-003	2.552E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	4.00	4.167E-003	2.329E-003
Th-228	5.45	5.19	5.51	10.00	1.042E-002	3.455E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	10.00	1.042E-002	3.455E-003
Am-241	5.48	5.30	5.60	10.00	1.042E-002	3.455E-003
Cm-245	5.42	5.40	5.45	4.00	4.167E-003	2.329E-003
Pu-236	5.76	5.61	5.89	4.00	4.167E-003	2.329E-003
Cm-244	5.78	5.64	5.90	4.00	4.167E-003	2.329E-003
Th-227	6.07	5.93	6.18	4.00	4.167E-003	2.329E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:14:22AM 6/19/2014

Sample

Sample Name: ICB;AV23
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

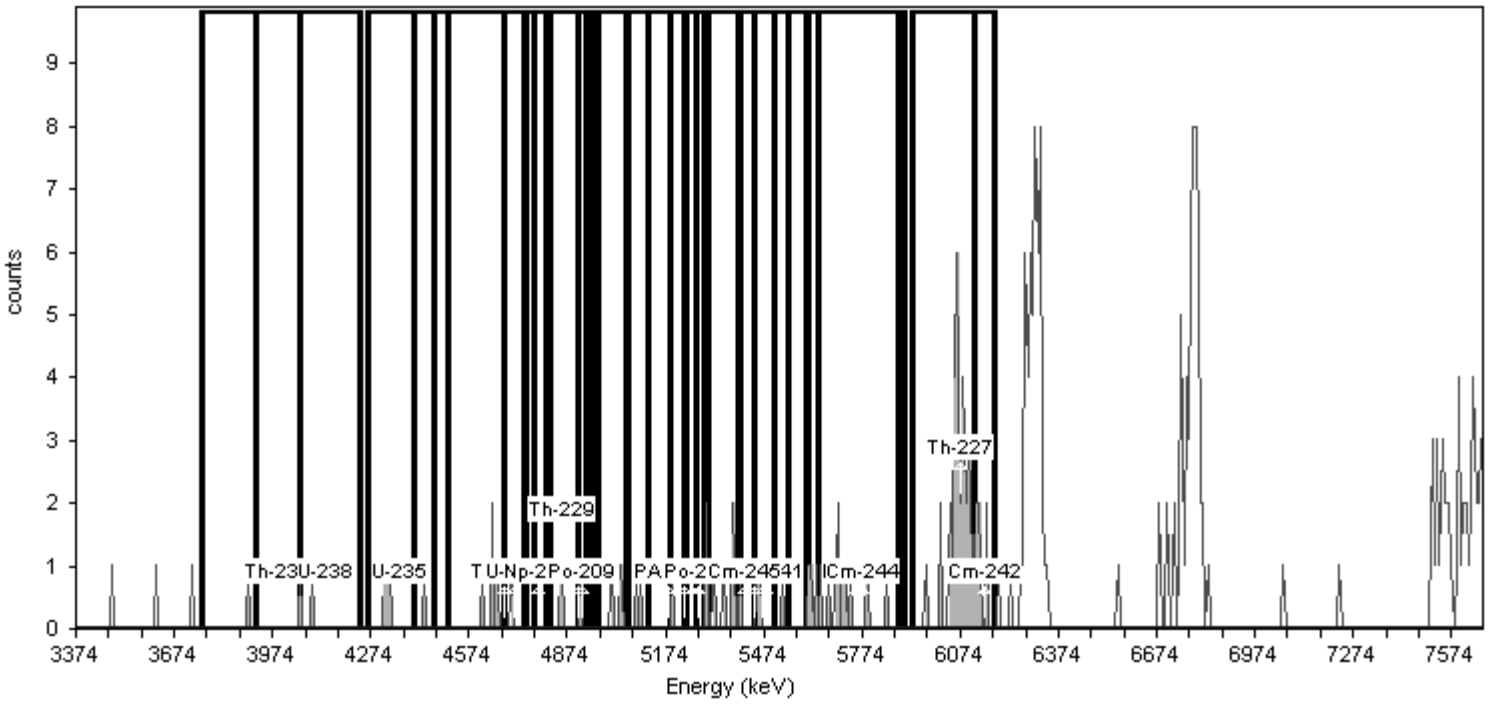
Acquisition

Detector: AV23 , SN: 48-158FF3
Acquisition Start Date: 6/18/2014 7:08:49PM
Live Time: 960.00 min.
Real Time: 960.05 min.
Calibration Name: IC-9792;AV23-20140505
Calibration Date: 5/5/2014 10:09:35PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.91% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 234.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	4.00	4.167E-003	2.329E-003
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	5.00	5.208E-003	2.552E-003
Pu-242	4.90	4.68	4.95	4.00	4.167E-003	2.329E-003
Th-229	4.86	4.74	5.12	7.00	7.292E-003	2.946E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	5.00	5.208E-003	2.552E-003
Am-243	5.23	5.05	5.31	5.00	5.208E-003	2.552E-003
U-232	5.25	5.06	5.40	10.00	1.042E-002	3.455E-003
Th-228	5.45	5.19	5.51	10.00	1.042E-002	3.455E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	10.00	1.042E-002	3.455E-003
Am-241	5.48	5.30	5.60	10.00	1.042E-002	3.455E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	13.00	1.354E-002	3.898E-003
Cm-244	5.78	5.64	5.90	10.00	1.042E-002	3.455E-003
Th-227	6.07	5.93	6.18	38.00	3.958E-002	6.505E-003
Cm-242	6.15	6.12	6.18	7.00	7.292E-003	2.946E-003

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:14:27AM 6/19/2014

Sample

Sample Name: ICB;AV24
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

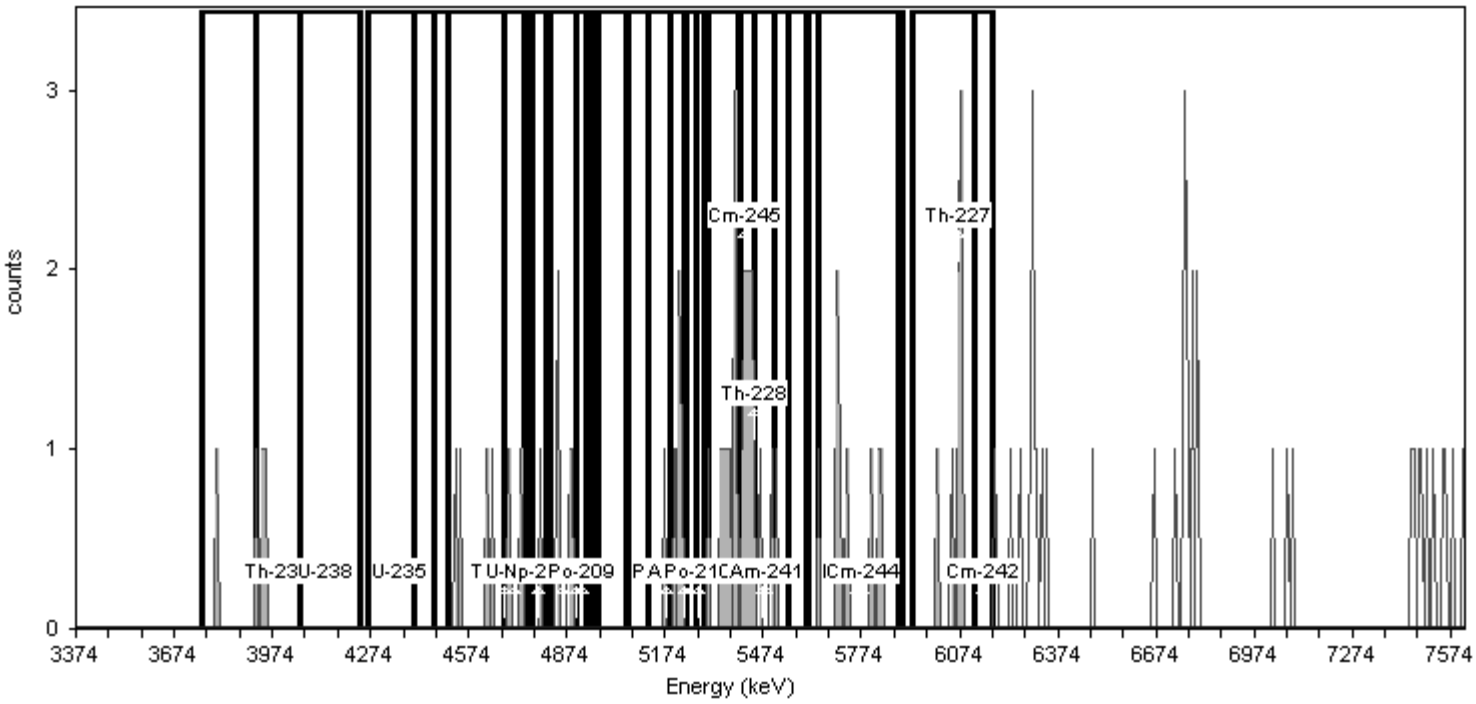
Acquisition

Detector: AV24 , SN: 47-137Q4
Acquisition Start Date: 6/18/2014 7:08:51PM
Live Time: 960.00 min.
Real Time: 960.05 min.
Calibration Name: IC-9793;AV24-20140505
Calibration Date: 5/5/2014 10:09:41PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.42% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 93.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	4.00	4.167E-003	2.329E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	7.00	7.292E-003	2.946E-003
Pu-242	4.90	4.68	4.95	7.00	7.292E-003	2.946E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	5.00	5.208E-003	2.552E-003
Am-243	5.23	5.05	5.31	6.00	6.250E-003	2.756E-003
U-232	5.25	5.06	5.40	14.00	1.458E-002	4.034E-003
Th-228	5.45	5.19	5.51	25.00	2.604E-002	5.311E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	22.00	2.292E-002	4.996E-003
Am-241	5.48	5.30	5.60	22.00	2.292E-002	4.996E-003
Cm-245	5.42	5.40	5.45	10.00	1.042E-002	3.455E-003
Pu-236	5.76	5.61	5.89	8.00	8.333E-003	3.125E-003
Cm-244	5.78	5.64	5.90	8.00	8.333E-003	3.125E-003
Th-227	6.07	5.93	6.18	7.00	7.292E-003	2.946E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:35:57PM 6/19/2014

Sample

Sample Name: ICB;AV43
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

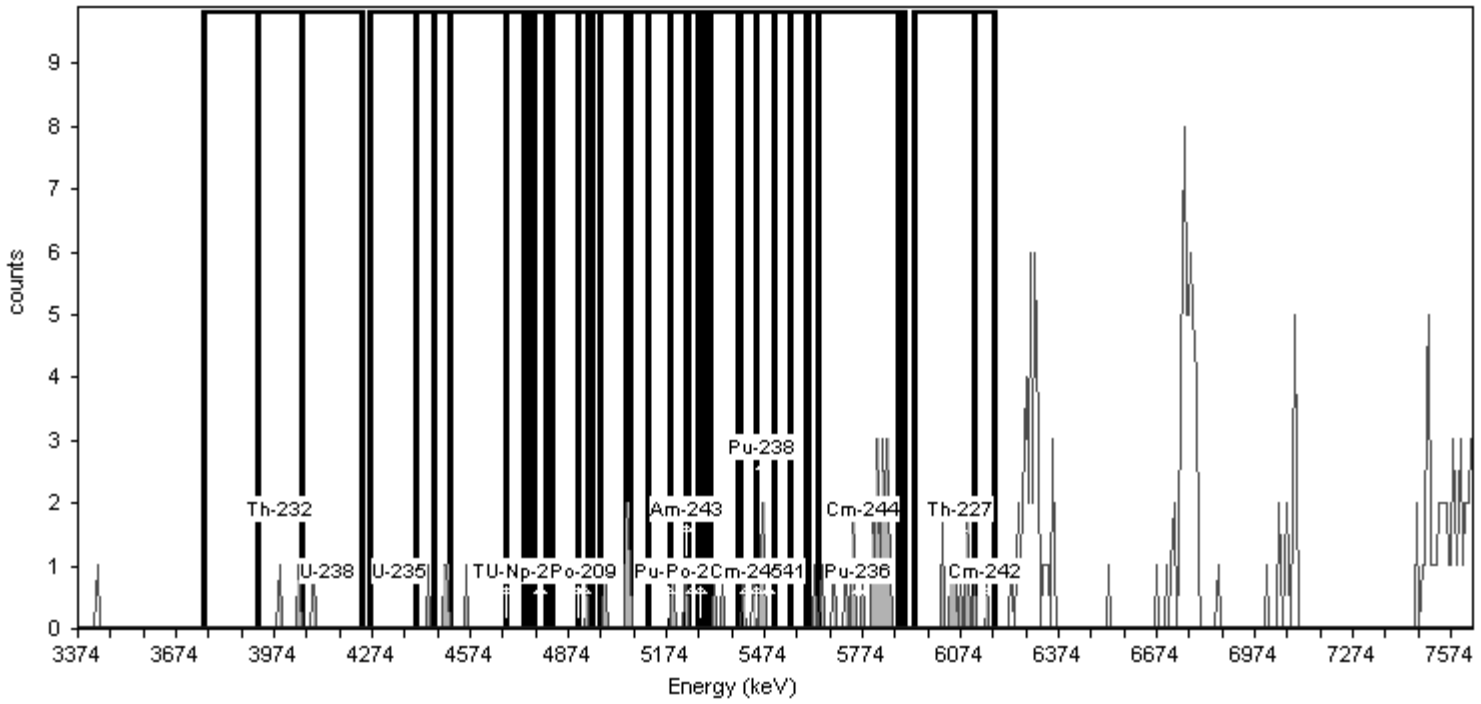
Analyst: 60040

Acquisition

Detector: AV43 , SN: 49-190X4
Acquisition Start Date: 6/19/2014 12:17:24AM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9794;AV43-20140505
Calibration Date: 5/5/2014 10:09:47PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.74% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 195.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	4.00	4.167E-003	2.329E-003
U-234	4.71	4.51	4.82	1.00	1.042E-003	1.473E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	6.00	6.250E-003	2.756E-003
Am-243	5.23	5.05	5.31	5.00	5.208E-003	2.552E-003
U-232	5.25	5.06	5.40	5.00	5.208E-003	2.552E-003
Th-228	5.45	5.19	5.51	9.00	9.375E-003	3.294E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	7.00	7.292E-003	2.946E-003
Am-241	5.48	5.30	5.60	7.00	7.292E-003	2.946E-003
Cm-245	5.42	5.40	5.45	2.00	2.083E-003	1.804E-003
Pu-236	5.76	5.61	5.89	23.00	2.396E-002	5.103E-003
Cm-244	5.78	5.64	5.90	22.00	2.292E-002	4.996E-003
Th-227	6.07	5.93	6.18	10.00	1.042E-002	3.455E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:36:08PM 6/19/2014

Sample

Sample Name: ICB;AV44
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

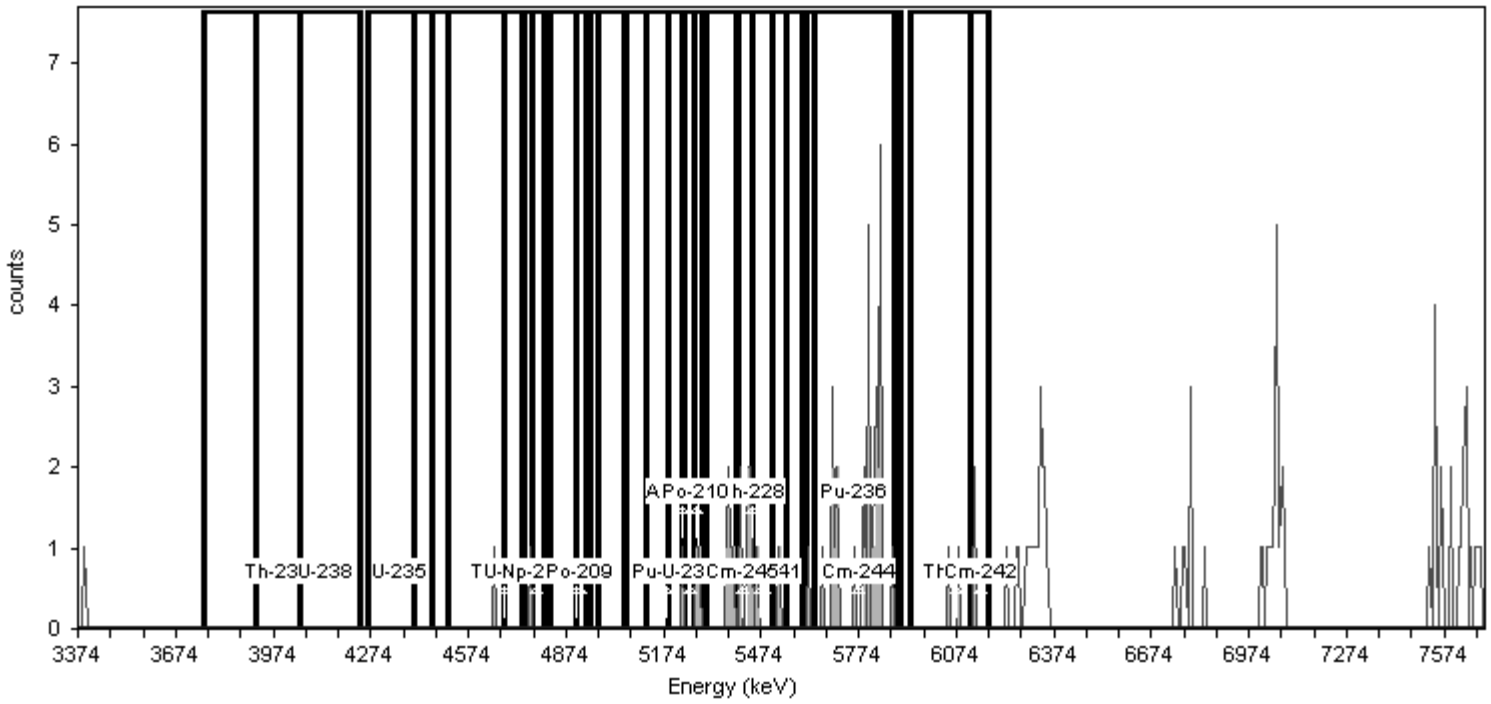
Analyst: 60040

Acquisition

Detector: AV44 , SN: 50-051JJ1
Acquisition Start Date: 6/19/2014 12:17:25AM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9795;AV44-20140505
Calibration Date: 5/5/2014 10:09:57PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.32% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 114.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	0.00	0.000E+000	1.473E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	1.00	1.042E-003	1.473E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	8.00	8.333E-003	3.125E-003
Th-228	5.45	5.19	5.51	16.00	1.667E-002	4.295E-003
Po-210	5.28	5.23	5.29	3.00	3.125E-003	2.083E-003
Pu-238	5.47	5.27	5.55	16.00	1.667E-002	4.295E-003
Am-241	5.48	5.30	5.60	14.00	1.458E-002	4.034E-003
Cm-245	5.42	5.40	5.45	7.00	7.292E-003	2.946E-003
Pu-236	5.76	5.61	5.89	29.00	3.021E-002	5.705E-003
Cm-244	5.78	5.64	5.90	28.00	2.917E-002	5.610E-003
Th-227	6.07	5.93	6.18	4.00	4.167E-003	2.329E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:36:14PM 6/19/2014

Sample

Sample Name: ICB;AV45
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

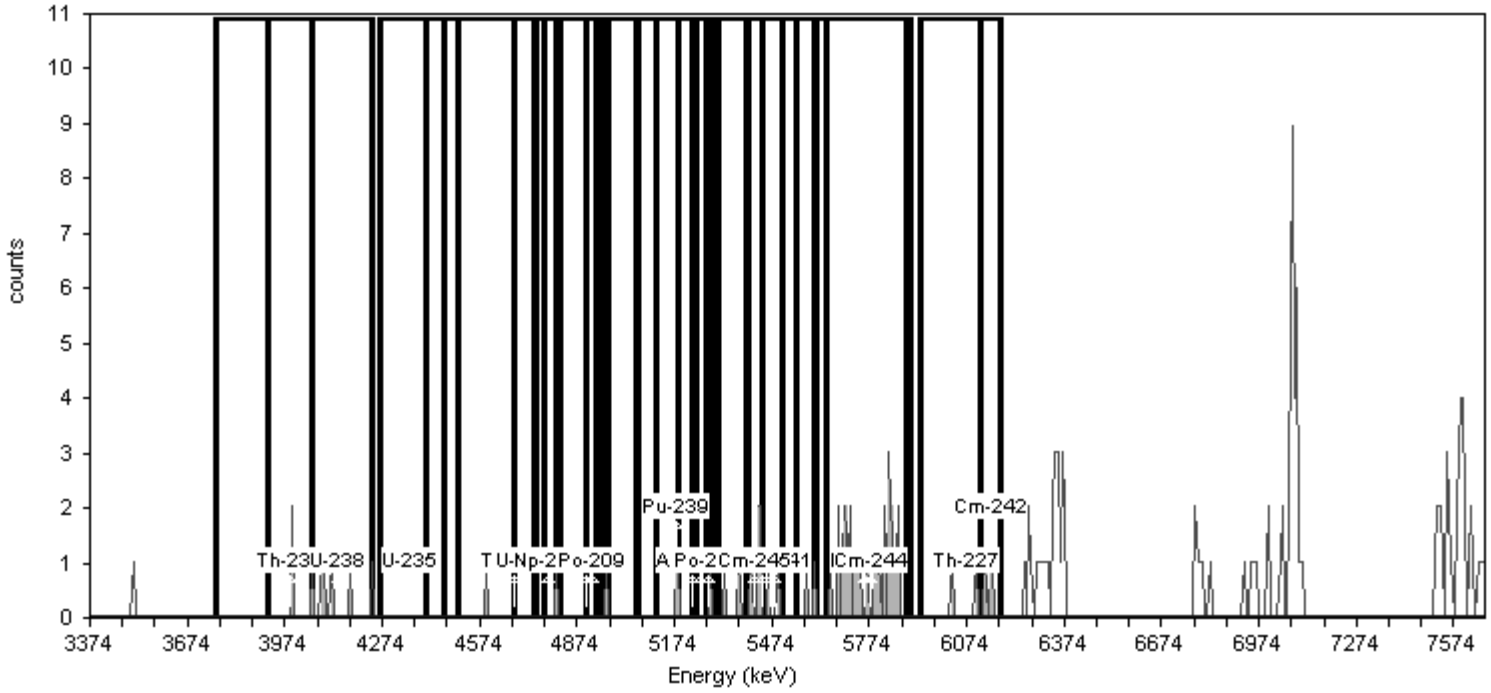
Analyst: 60040

Acquisition

Detector: AV45 , SN: 48-158FF2
Acquisition Start Date: 6/19/2014 12:17:28AM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9817;AV45-20140505
Calibration Date: 5/5/2014 10:10:03PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.06% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 153.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	3.00	3.125E-003	2.083E-003
U-238	4.14	3.92	4.24	8.00	8.333E-003	3.125E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	1.00	1.042E-003	1.473E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	5.00	5.208E-003	2.552E-003
Th-228	5.45	5.19	5.51	11.00	1.146E-002	3.608E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	10.00	1.042E-002	3.455E-003
Am-241	5.48	5.30	5.60	11.00	1.146E-002	3.608E-003
Cm-245	5.42	5.40	5.45	5.00	5.208E-003	2.552E-003
Pu-236	5.76	5.61	5.89	27.00	2.813E-002	5.512E-003
Cm-244	5.78	5.64	5.90	27.00	2.813E-002	5.512E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:36:19PM 6/19/2014

Sample

Sample Name: ICB;AV46
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

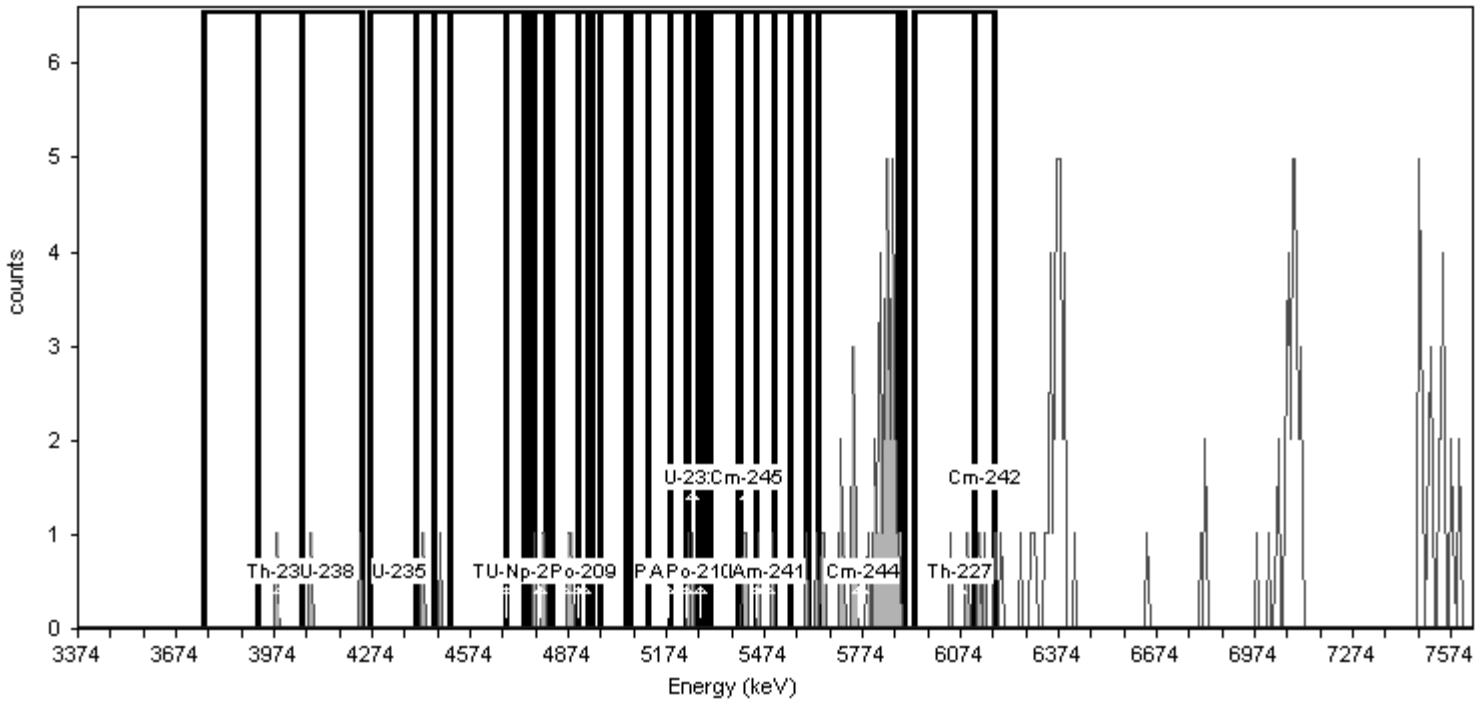
Acquisition

Detector: AV46 , SN: 49-202GG2
Acquisition Start Date: 6/19/2014 12:17:29AM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9884;AV46-20140505
Calibration Date: 5/5/2014 10:10:09PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.80% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 154.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	2.00	2.083E-003	1.804E-003
U-234	4.71	4.51	4.82	3.00	3.125E-003	2.083E-003
Pu-242	4.90	4.68	4.95	5.00	5.208E-003	2.552E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	3.00	3.125E-003	2.083E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	2.00	2.083E-003	1.804E-003
Th-228	5.45	5.19	5.51	6.00	6.250E-003	2.756E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	4.00	4.167E-003	2.329E-003
Am-241	5.48	5.30	5.60	5.00	5.208E-003	2.552E-003
Cm-245	5.42	5.40	5.45	2.00	2.083E-003	1.804E-003
Pu-236	5.76	5.61	5.89	38.00	3.958E-002	6.505E-003
Cm-244	5.78	5.64	5.90	37.00	3.854E-002	6.421E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:33:32PM 6/19/2014

Sample

Sample Name: ICB;AV48
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

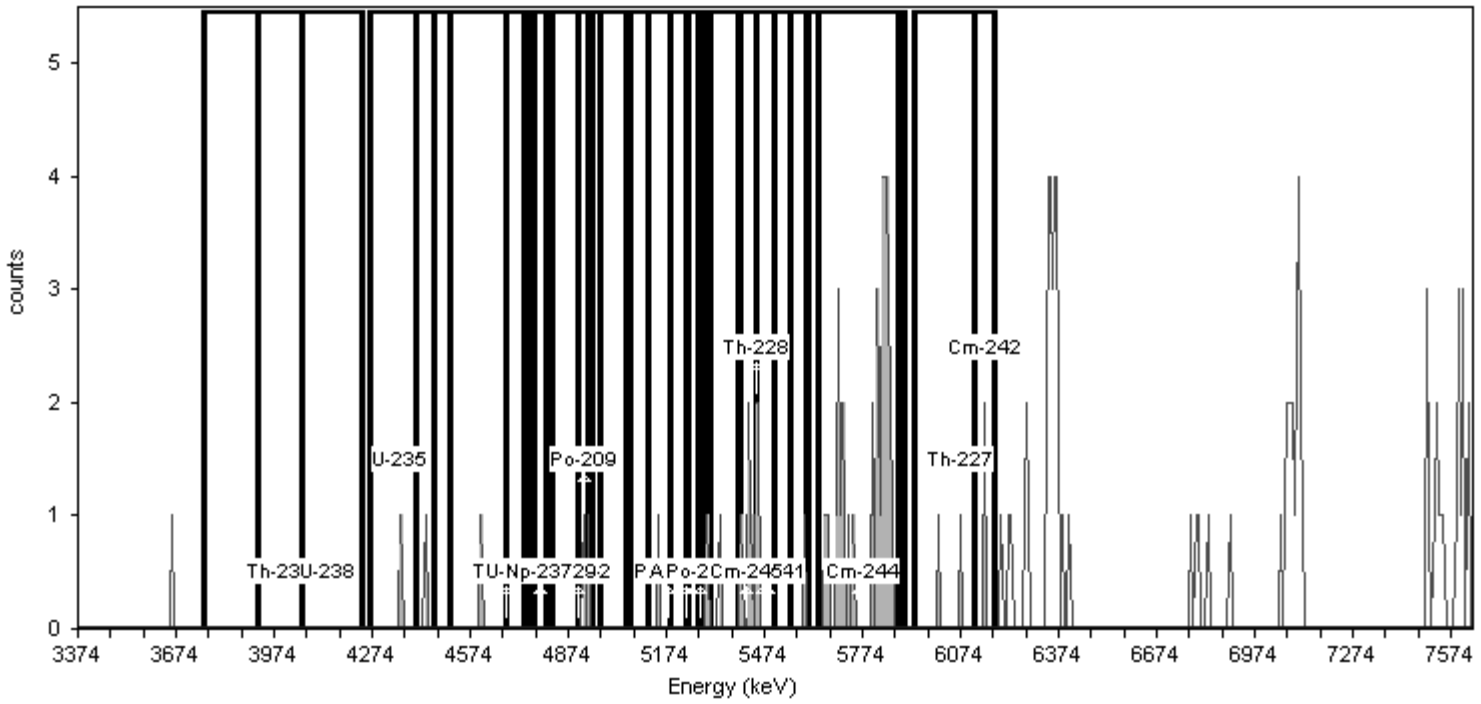
Analyst: 60040

Acquisition

Detector: AV48 , SN: 50-051JJ4
Acquisition Start Date: 6/19/2014 12:17:33AM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9886;AV48-20140505
Calibration Date: 5/5/2014 10:10:22PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.78% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 124.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	0.00	0.000E+000	1.473E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	2.00	2.083E-003	1.804E-003
U-234	4.71	4.51	4.82	1.00	1.042E-003	1.473E-003
Pu-242	4.90	4.68	4.95	2.00	2.083E-003	1.804E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	2.00	2.083E-003	1.804E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	4.00	4.167E-003	2.329E-003
Th-228	5.45	5.19	5.51	10.00	1.042E-002	3.455E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	10.00	1.042E-002	3.455E-003
Am-241	5.48	5.30	5.60	11.00	1.146E-002	3.608E-003
Cm-245	5.42	5.40	5.45	6.00	6.250E-003	2.756E-003
Pu-236	5.76	5.61	5.89	33.00	3.437E-002	6.074E-003
Cm-244	5.78	5.64	5.90	33.00	3.437E-002	6.074E-003
Th-227	6.07	5.93	6.18	4.00	4.167E-003	2.329E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:33:37PM 6/19/2014

Sample

Sample Name: ICB;AV49
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

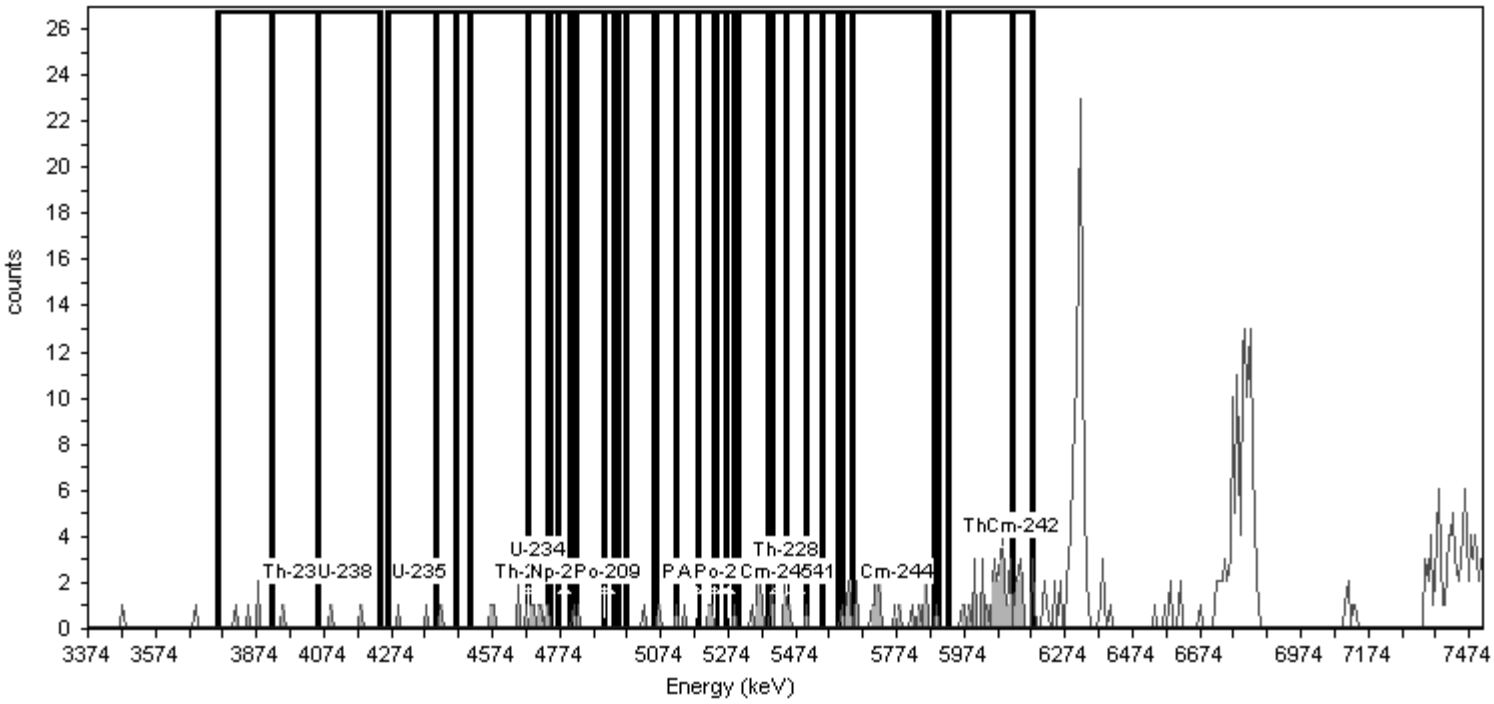
Analyst: 60040

Acquisition

Detector: AV49 , SN: 47-043hh4
Acquisition Start Date: 6/19/2014 12:17:35AM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-7107;AV49-20140504
Calibration Date: 5/5/2014 6:52:38PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.53% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 390.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	5.00	5.208E-003	2.552E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.68	4.40	4.75	12.00	1.250E-002	3.756E-003
U-234	4.71	4.51	4.82	12.00	1.250E-002	3.756E-003
Pu-242	4.90	4.68	4.95	8.00	8.333E-003	3.125E-003
Th-229	4.86	4.74	5.12	6.00	6.250E-003	2.756E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	6.00	6.250E-003	2.756E-003
Am-243	5.23	5.05	5.31	6.00	6.250E-003	2.756E-003
U-232	5.25	5.06	5.40	14.00	1.458E-002	4.034E-003
Th-228	5.45	5.19	5.51	16.00	1.667E-002	4.295E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	14.00	1.458E-002	4.034E-003
Am-241	5.48	5.30	5.60	13.00	1.354E-002	3.898E-003
Cm-245	5.42	5.40	5.45	5.00	5.208E-003	2.552E-003
Pu-236	5.76	5.61	5.89	21.00	2.187E-002	4.886E-003
Cm-244	5.78	5.64	5.90	18.00	1.875E-002	4.541E-003
Th-227	6.07	5.93	6.18	41.00	4.271E-002	6.751E-003
Cm-242	6.15	6.12	6.18	11.00	1.146E-002	3.608E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:33:59PM 6/19/2014

Sample

Sample Name: ICB;AV53
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

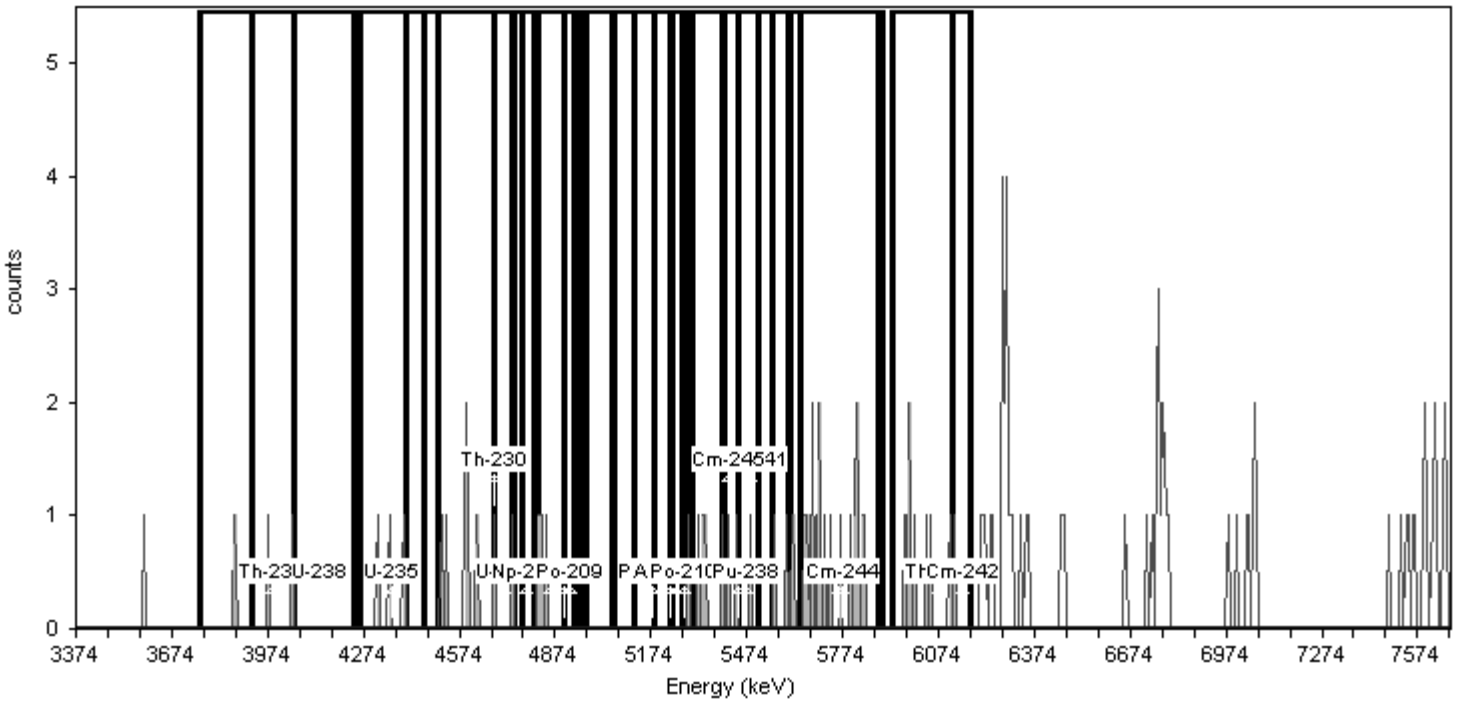
Analyst: 60040

Acquisition

Detector: AV53 , SN: 50-051A6
Acquisition Start Date: 6/19/2014 12:17:59AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-8877;AV53-20140504
Calibration Date: 5/5/2014 6:53:06PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.32% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 111.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	3.00	3.125E-003	2.083E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.68	4.40	4.75	8.00	8.333E-003	3.125E-003
U-234	4.71	4.51	4.82	9.00	9.375E-003	3.294E-003
Pu-242	4.90	4.68	4.95	5.00	5.208E-003	2.552E-003
Th-229	4.86	4.74	5.12	4.00	4.167E-003	2.329E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	0.00	0.000E+000	1.473E-003
Am-243	5.23	5.05	5.31	1.00	1.042E-003	1.473E-003
U-232	5.25	5.06	5.40	5.00	5.208E-003	2.552E-003
Th-228	5.45	5.19	5.51	8.00	8.333E-003	3.125E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	8.00	8.333E-003	3.125E-003
Am-241	5.48	5.30	5.60	9.00	9.375E-003	3.294E-003
Cm-245	5.42	5.40	5.45	3.00	3.125E-003	2.083E-003
Pu-236	5.76	5.61	5.89	16.00	1.667E-002	4.295E-003
Cm-244	5.78	5.64	5.90	15.00	1.563E-002	4.167E-003
Th-227	6.07	5.93	6.18	8.00	8.333E-003	3.125E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:05PM 6/19/2014

Sample

Sample Name: ICB;AV54
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

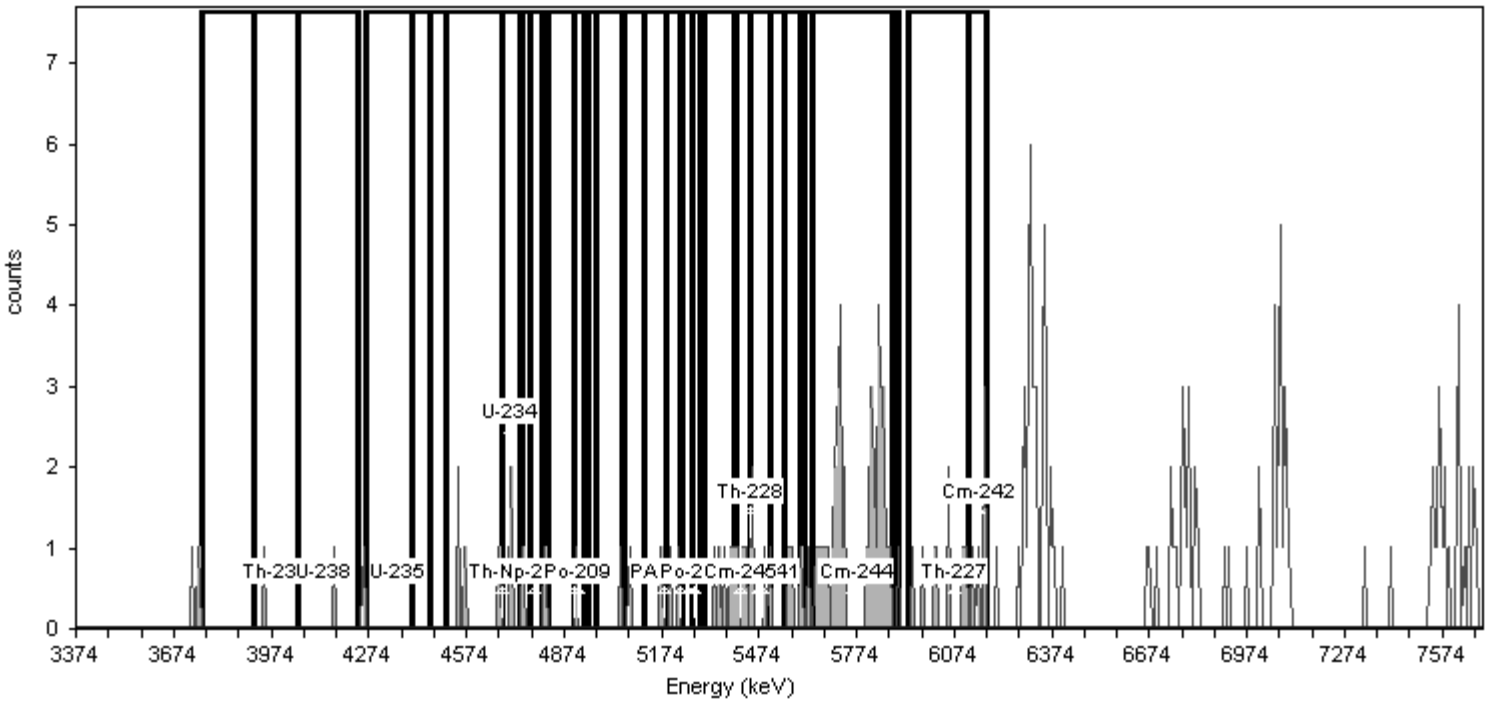
Analyst: 60040

Acquisition

Detector: AV54 , SN: 48-046II6
Acquisition Start Date: 6/19/2014 12:18:06AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9520;AV54-20140504
Calibration Date: 5/5/2014 6:53:13PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.02% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 195.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	7.00	7.292E-003	2.946E-003
U-234	4.71	4.51	4.82	8.00	8.333E-003	3.125E-003
Pu-242	4.90	4.68	4.95	5.00	5.208E-003	2.552E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	5.00	5.208E-003	2.552E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	10.00	1.042E-002	3.455E-003
Th-228	5.45	5.19	5.51	16.00	1.667E-002	4.295E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	14.00	1.458E-002	4.034E-003
Am-241	5.48	5.30	5.60	17.00	1.771E-002	4.419E-003
Cm-245	5.42	5.40	5.45	6.00	6.250E-003	2.756E-003
Pu-236	5.76	5.61	5.89	41.00	4.271E-002	6.751E-003
Cm-244	5.78	5.64	5.90	41.00	4.271E-002	6.751E-003
Th-227	6.07	5.93	6.18	13.00	1.354E-002	3.898E-003
Cm-242	6.15	6.12	6.18	5.00	5.208E-003	2.552E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:10PM 6/19/2014

Sample

Sample Name: ICB;AV55
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

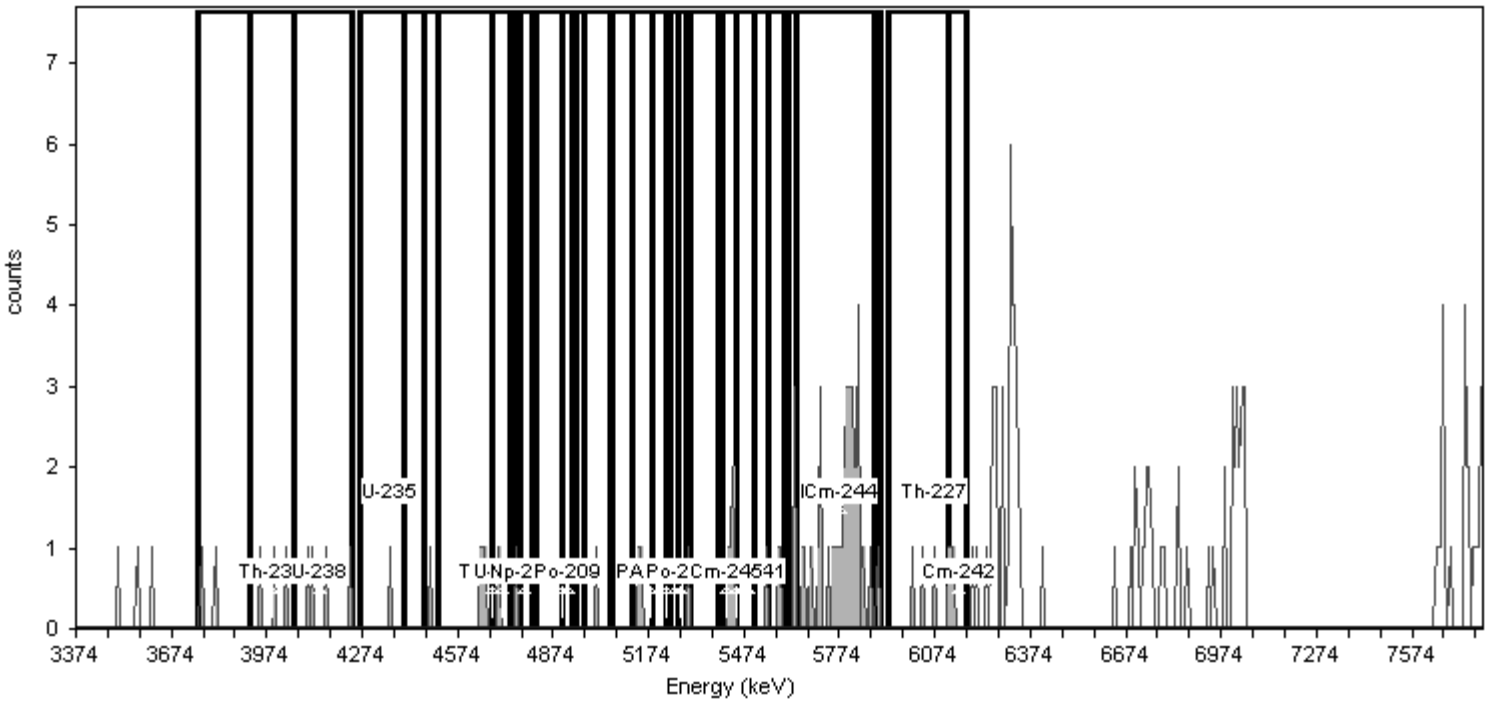
Analyst: 60040

Acquisition

Detector: AV55 , SN: 50-051C2
Acquisition Start Date: 6/19/2014 12:18:11AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-7107;AV55-20140507
Calibration Date: 5/7/2014 10:48:56PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.79% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 168.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	5.00	5.208E-003	2.552E-003
U-238	4.14	3.92	4.24	7.00	7.292E-003	2.946E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	5.00	5.208E-003	2.552E-003
U-234	4.71	4.51	4.82	5.00	5.208E-003	2.552E-003
Pu-242	4.90	4.68	4.95	2.00	2.083E-003	1.804E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	3.00	3.125E-003	2.083E-003
Th-228	5.45	5.19	5.51	5.00	5.208E-003	2.552E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	6.00	6.250E-003	2.756E-003
Am-241	5.48	5.30	5.60	8.00	8.333E-003	3.125E-003
Cm-245	5.42	5.40	5.45	4.00	4.167E-003	2.329E-003
Pu-236	5.76	5.61	5.89	37.00	3.854E-002	6.421E-003
Cm-244	5.78	5.64	5.90	35.00	3.646E-002	6.250E-003
Th-227	6.07	5.93	6.18	6.00	6.250E-003	2.756E-003
Cm-242	6.15	6.12	6.18	3.00	3.125E-003	2.083E-003

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:16PM 6/19/2014

Sample

Sample Name: ICB;AV56
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

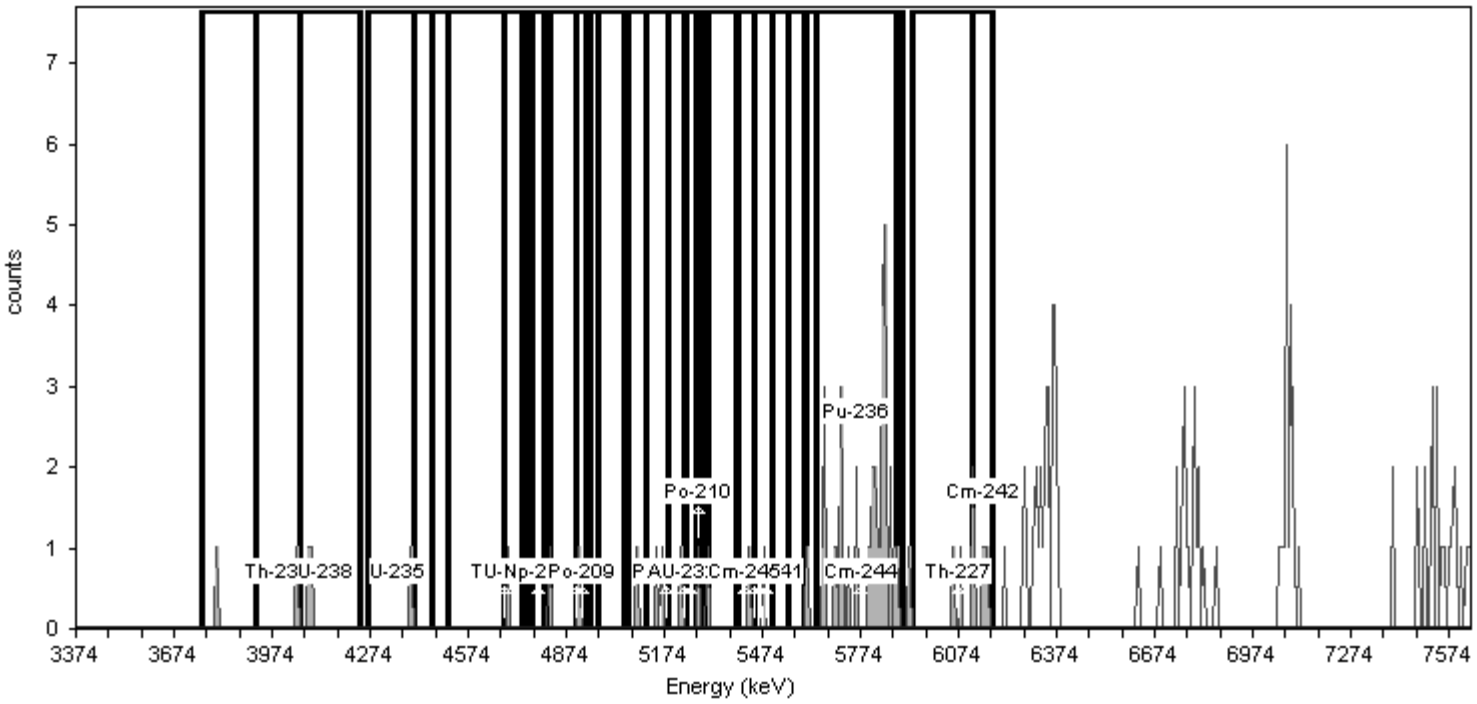
Analyst: 60040

Acquisition

Detector: AV56 , SN: 52-059EE5
Acquisition Start Date: 6/19/2014 12:18:17AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9792;AV56-20140504
Calibration Date: 5/5/2014 6:53:34PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.09% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 143.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	1.00	1.042E-003	1.473E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	3.00	3.125E-003	2.083E-003
Th-229	4.86	4.74	5.12	3.00	3.125E-003	2.083E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	6.00	6.250E-003	2.756E-003
U-232	5.25	5.06	5.40	6.00	6.250E-003	2.756E-003
Th-228	5.45	5.19	5.51	5.00	5.208E-003	2.552E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	4.00	4.167E-003	2.329E-003
Am-241	5.48	5.30	5.60	3.00	3.125E-003	2.083E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	34.00	3.542E-002	6.163E-003
Cm-244	5.78	5.64	5.90	33.00	3.437E-002	6.074E-003
Th-227	6.07	5.93	6.18	8.00	8.333E-003	3.125E-003
Cm-242	6.15	6.12	6.18	6.00	6.250E-003	2.756E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:21PM 6/19/2014

Sample

Sample Name: ICB;AV57
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

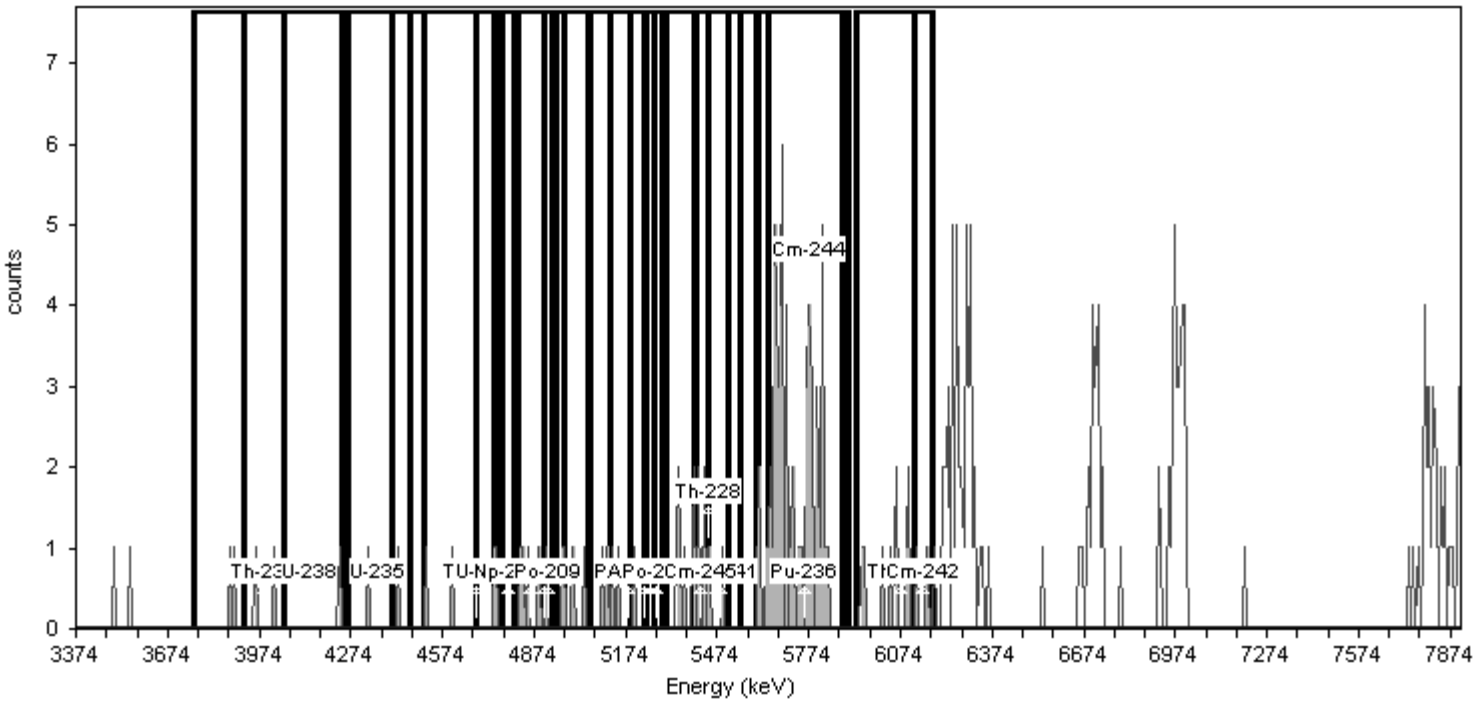
Acquisition

Detector: AV57 , SN: 48-158EE3
Acquisition Start Date: 6/19/2014 12:18:24AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9793;AV57-20140504
Calibration Date: 5/5/2014 6:53:40PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.74% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 233.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	4.00	4.167E-003	2.329E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	5.00	5.208E-003	2.552E-003
U-234	4.71	4.51	4.82	4.00	4.167E-003	2.329E-003
Pu-242	4.90	4.68	4.95	7.00	7.292E-003	2.946E-003
Th-229	4.86	4.74	5.12	13.00	1.354E-002	3.898E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	8.00	8.333E-003	3.125E-003
Am-243	5.23	5.05	5.31	5.00	5.208E-003	2.552E-003
U-232	5.25	5.06	5.40	11.00	1.146E-002	3.608E-003
Th-228	5.45	5.19	5.51	13.00	1.354E-002	3.898E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	12.00	1.250E-002	3.756E-003
Am-241	5.48	5.30	5.60	12.00	1.250E-002	3.756E-003
Cm-245	5.42	5.40	5.45	7.00	7.292E-003	2.946E-003
Pu-236	5.76	5.61	5.89	58.00	6.042E-002	8.001E-003
Cm-244	5.78	5.64	5.90	55.00	5.729E-002	7.795E-003
Th-227	6.07	5.93	6.18	11.00	1.146E-002	3.608E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:28PM 6/19/2014

Sample

Sample Name: ICB;AV58
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

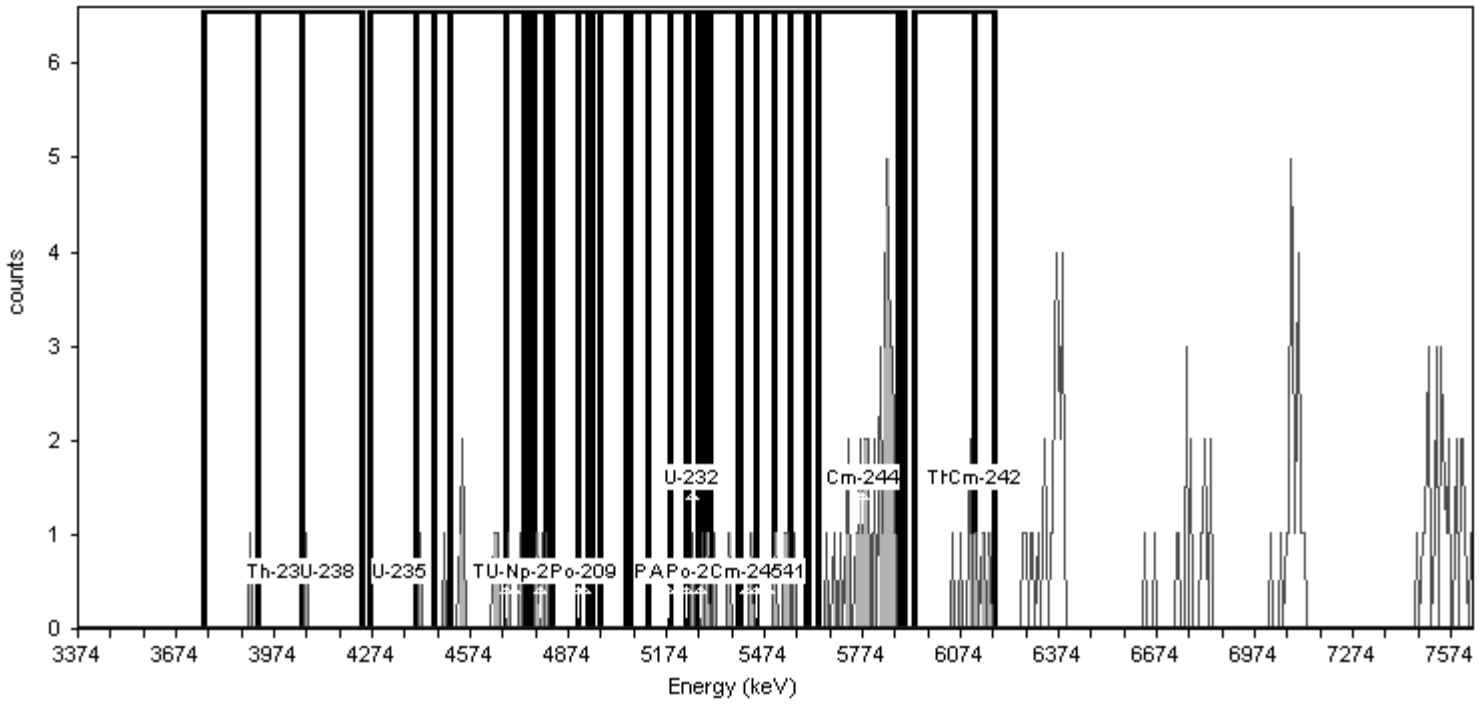
Acquisition

Detector: AV58 , SN: 52-102 C5
Acquisition Start Date: 6/19/2014 12:18:31AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9794;AV58-20140504
Calibration Date: 5/5/2014 6:53:46PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.56% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 160.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	11.00	1.146E-002	3.608E-003
U-234	4.71	4.51	4.82	12.00	1.250E-002	3.756E-003
Pu-242	4.90	4.68	4.95	5.00	5.208E-003	2.552E-003
Th-229	4.86	4.74	5.12	3.00	3.125E-003	2.083E-003
Np-237	4.78	4.77	4.81	3.00	3.125E-003	2.083E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	0.00	0.000E+000	1.473E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	5.00	5.208E-003	2.552E-003
Th-228	5.45	5.19	5.51	7.00	7.292E-003	2.946E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	8.00	8.333E-003	3.125E-003
Am-241	5.48	5.30	5.60	8.00	8.333E-003	3.125E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	37.00	3.854E-002	6.421E-003
Cm-244	5.78	5.64	5.90	37.00	3.854E-002	6.421E-003
Th-227	6.07	5.93	6.18	9.00	9.375E-003	3.294E-003
Cm-242	6.15	6.12	6.18	5.00	5.208E-003	2.552E-003

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:33PM 6/19/2014

Sample

Sample Name: ICB;AV59
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

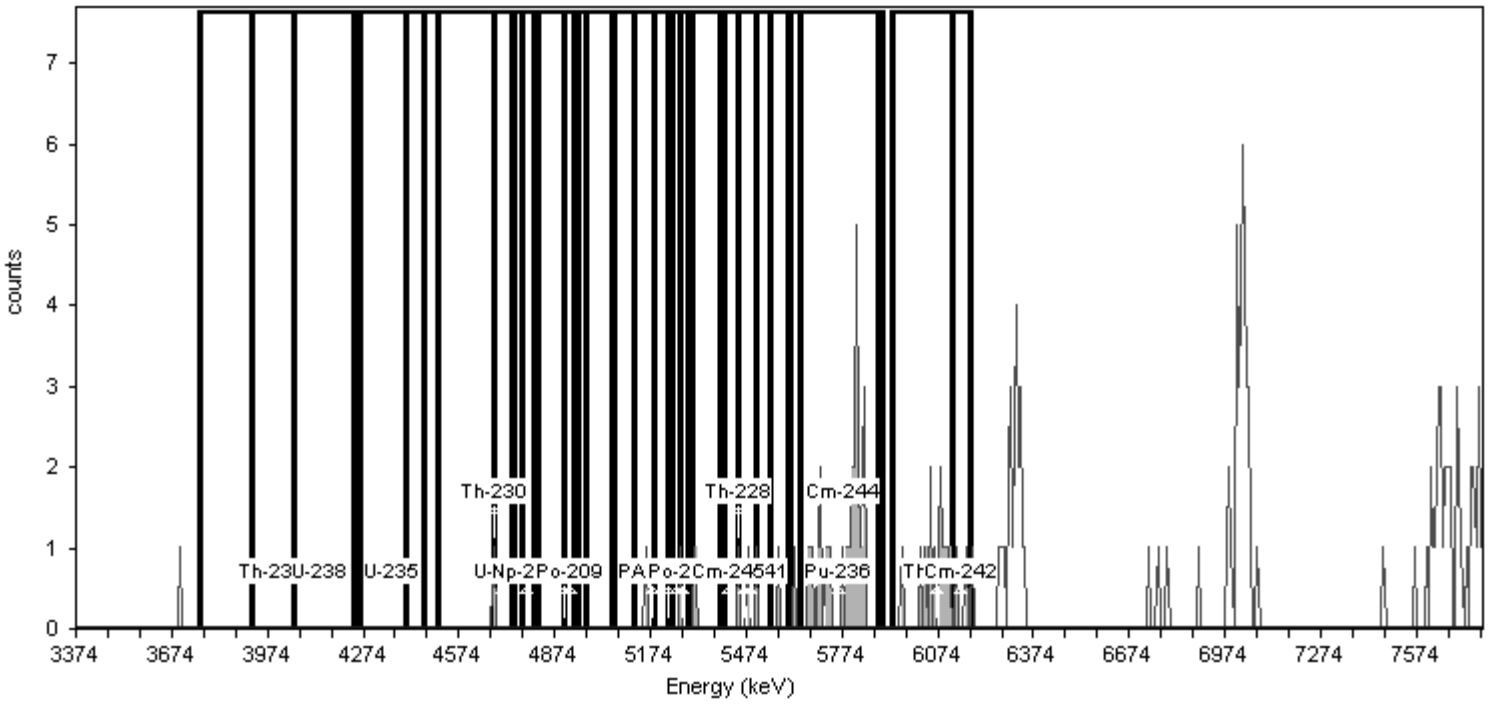
Acquisition

Detector: AV59 , SN: 49-155M7
Acquisition Start Date: 6/19/2014 12:18:32AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9795;AV59-20140504
Calibration Date: 5/5/2014 6:53:53PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.44% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 141.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	0.00	0.000E+000	1.473E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	1.00	1.042E-003	1.473E-003
U-234	4.71	4.51	4.82	1.00	1.042E-003	1.473E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	0.00	0.000E+000	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	3.00	3.125E-003	2.083E-003
Th-228	5.45	5.19	5.51	5.00	5.208E-003	2.552E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	5.00	5.208E-003	2.552E-003
Am-241	5.48	5.30	5.60	5.00	5.208E-003	2.552E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	27.00	2.813E-002	5.512E-003
Cm-244	5.78	5.64	5.90	26.00	2.708E-002	5.413E-003
Th-227	6.07	5.93	6.18	14.00	1.458E-002	4.034E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:39PM 6/19/2014

Sample

Sample Name: ICB;AV60
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

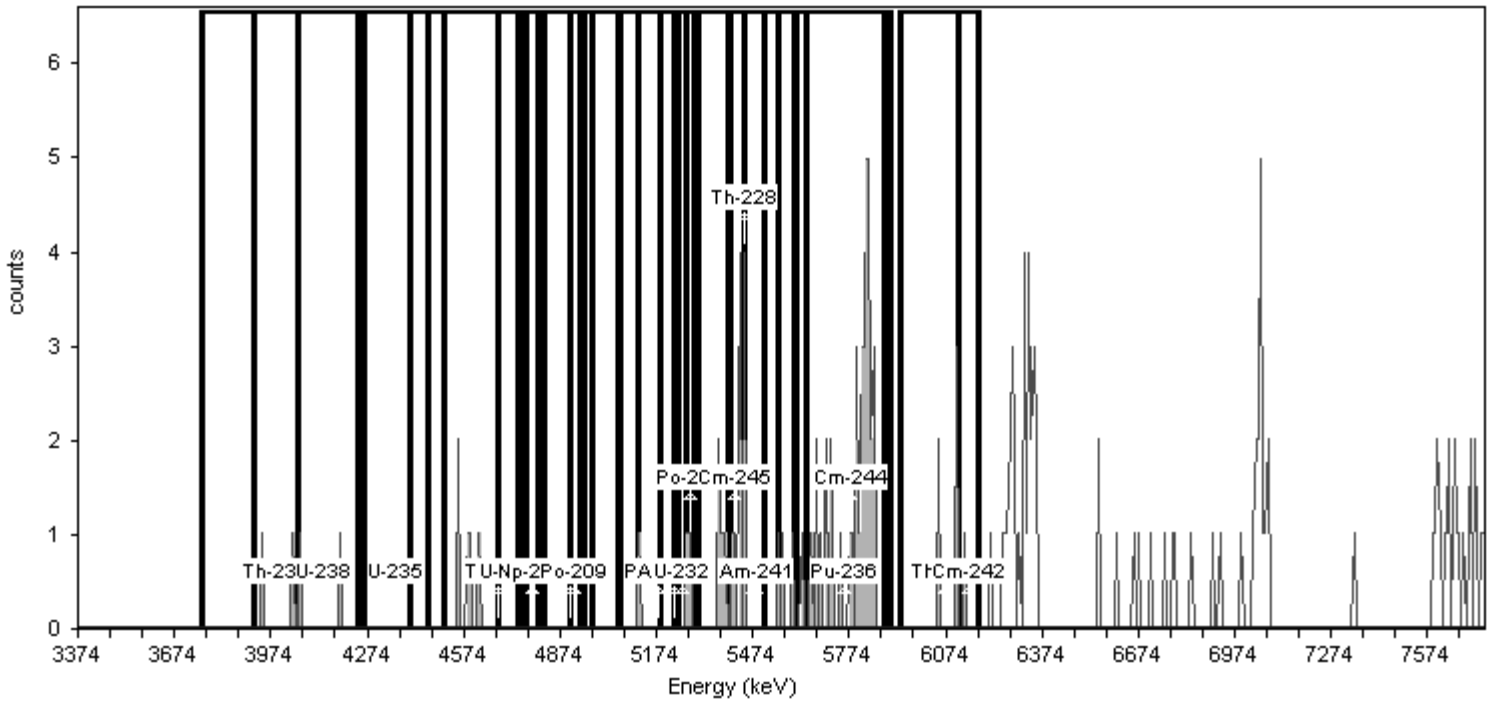
Acquisition

Detector: AV60 , SN: 49-027117
Acquisition Start Date: 6/19/2014 12:18:33AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9817;AV60-20140504
Calibration Date: 5/5/2014 6:53:59PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.33% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 151.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	4.00	4.167E-003	2.329E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	5.00	5.208E-003	2.552E-003
U-234	4.71	4.51	4.82	5.00	5.208E-003	2.552E-003
Pu-242	4.90	4.68	4.95	0.00	0.000E+000	1.473E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	8.00	8.333E-003	3.125E-003
Th-228	5.45	5.19	5.51	17.00	1.771E-002	4.419E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	18.00	1.875E-002	4.541E-003
Am-241	5.48	5.30	5.60	18.00	1.875E-002	4.541E-003
Cm-245	5.42	5.40	5.45	10.00	1.042E-002	3.455E-003
Pu-236	5.76	5.61	5.89	38.00	3.958E-002	6.505E-003
Cm-244	5.78	5.64	5.90	37.00	3.854E-002	6.421E-003
Th-227	6.07	5.93	6.18	6.00	6.250E-003	2.756E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:44PM 6/19/2014

Sample

Sample Name: ICB;AV61
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

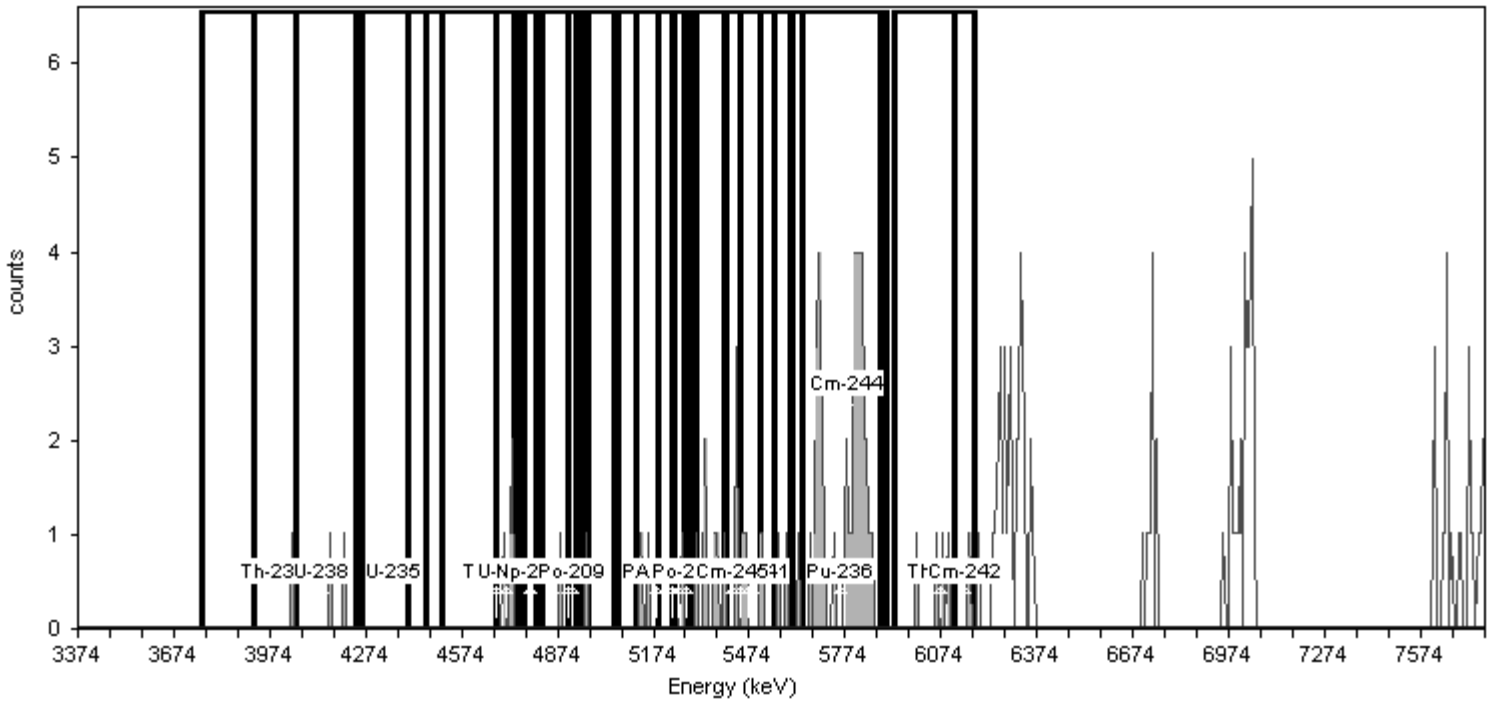
Analyst: 60040

Acquisition

Detector: AV61 , SN: 5-051JJ3
Acquisition Start Date: 6/19/2014 12:18:33AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9884;AV61-20140504
Calibration Date: 5/5/2014 6:54:06PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.46% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 159.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	4.00	4.167E-003	2.329E-003
U-234	4.71	4.51	4.82	4.00	4.167E-003	2.329E-003
Pu-242	4.90	4.68	4.95	5.00	5.208E-003	2.552E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	9.00	9.375E-003	3.294E-003
Th-228	5.45	5.19	5.51	13.00	1.354E-002	3.898E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	13.00	1.354E-002	3.898E-003
Am-241	5.48	5.30	5.60	15.00	1.563E-002	4.167E-003
Cm-245	5.42	5.40	5.45	4.00	4.167E-003	2.329E-003
Pu-236	5.76	5.61	5.89	41.00	4.271E-002	6.751E-003
Cm-244	5.78	5.64	5.90	40.00	4.167E-002	6.670E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:50PM 6/19/2014

Sample

Sample Name: ICB;AV62
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

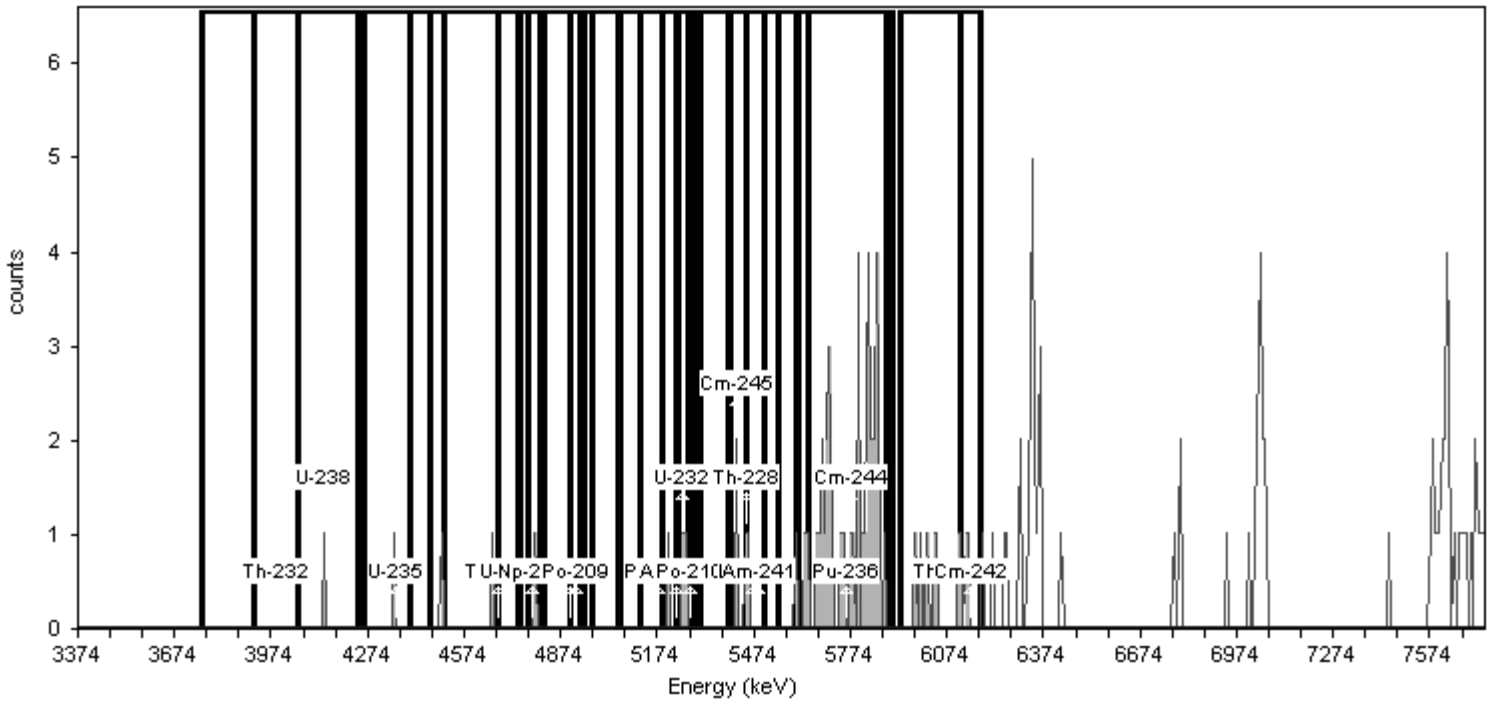
Acquisition

Detector: AV62 , SN: 52-060FF2
Acquisition Start Date: 6/19/2014 12:18:34AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9885;AV62-20140504
Calibration Date: 5/5/2014 6:54:13PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.34% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 132.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	2.00	2.083E-003	1.804E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	3.00	3.125E-003	2.083E-003
Th-228	5.45	5.19	5.51	7.00	7.292E-003	2.946E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	4.00	4.167E-003	2.329E-003
Am-241	5.48	5.30	5.60	5.00	5.208E-003	2.552E-003
Cm-245	5.42	5.40	5.45	3.00	3.125E-003	2.083E-003
Pu-236	5.76	5.61	5.89	39.00	4.062E-002	6.588E-003
Cm-244	5.78	5.64	5.90	38.00	3.958E-002	6.505E-003
Th-227	6.07	5.93	6.18	9.00	9.375E-003	3.294E-003
Cm-242	6.15	6.12	6.18	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:56PM 6/19/2014

Sample

Sample Name: ICB;AV63
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

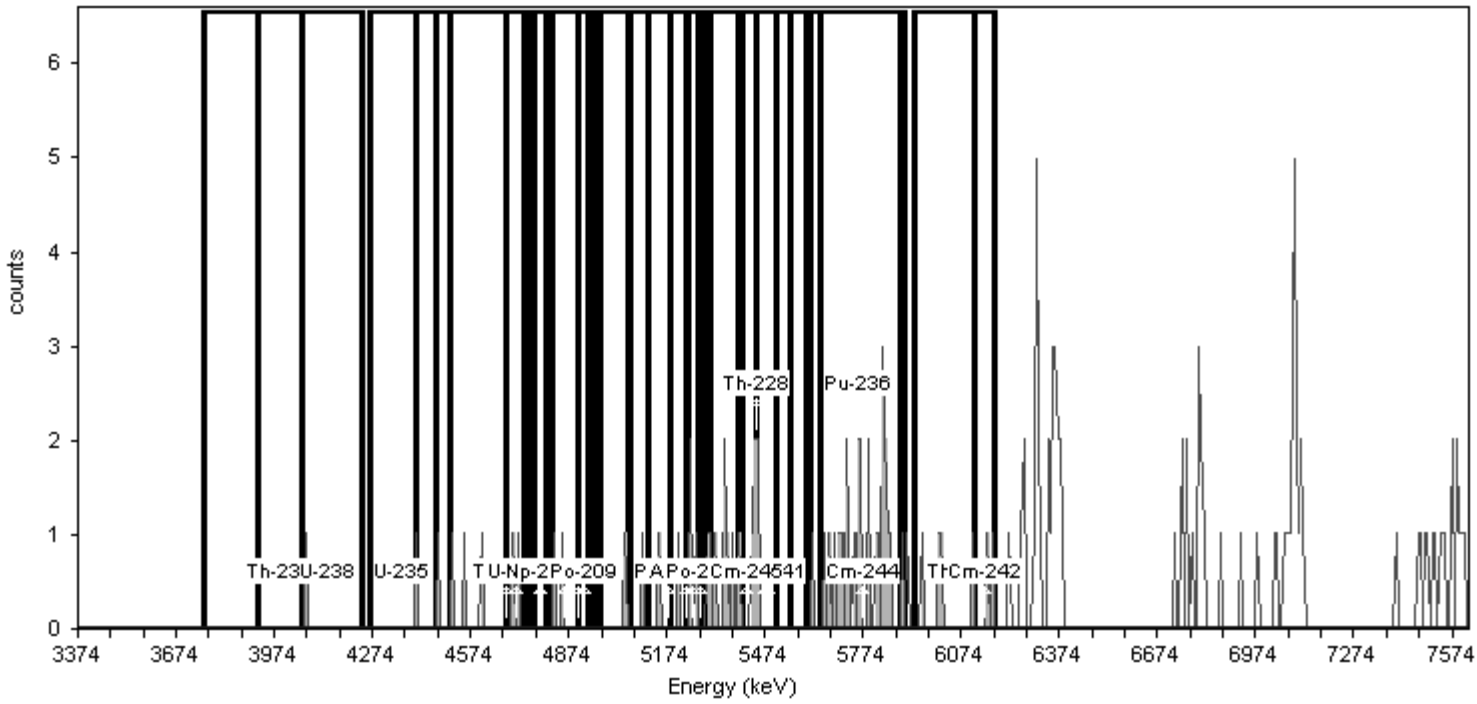
Analyst: 60040

Acquisition

Detector: AV63 , SN: 47-029ff2
Acquisition Start Date: 6/19/2014 12:18:35AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9886;AV63-20140504
Calibration Date: 5/5/2014 6:54:19PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.48% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 141.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	7.00	7.292E-003	2.946E-003
U-234	4.71	4.51	4.82	5.00	5.208E-003	2.552E-003
Pu-242	4.90	4.68	4.95	4.00	4.167E-003	2.329E-003
Th-229	4.86	4.74	5.12	4.00	4.167E-003	2.329E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	8.00	8.333E-003	3.125E-003
U-232	5.25	5.06	5.40	14.00	1.458E-002	4.034E-003
Th-228	5.45	5.19	5.51	19.00	1.979E-002	4.658E-003
Po-210	5.28	5.23	5.29	3.00	3.125E-003	2.083E-003
Pu-238	5.47	5.27	5.55	15.00	1.563E-002	4.167E-003
Am-241	5.48	5.30	5.60	15.00	1.563E-002	4.167E-003
Cm-245	5.42	5.40	5.45	6.00	6.250E-003	2.756E-003
Pu-236	5.76	5.61	5.89	25.00	2.604E-002	5.311E-003
Cm-244	5.78	5.64	5.90	25.00	2.604E-002	5.311E-003
Th-227	6.07	5.93	6.18	6.00	6.250E-003	2.756E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:35:01PM 6/19/2014

Sample

Sample Name: ICB;AV64
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

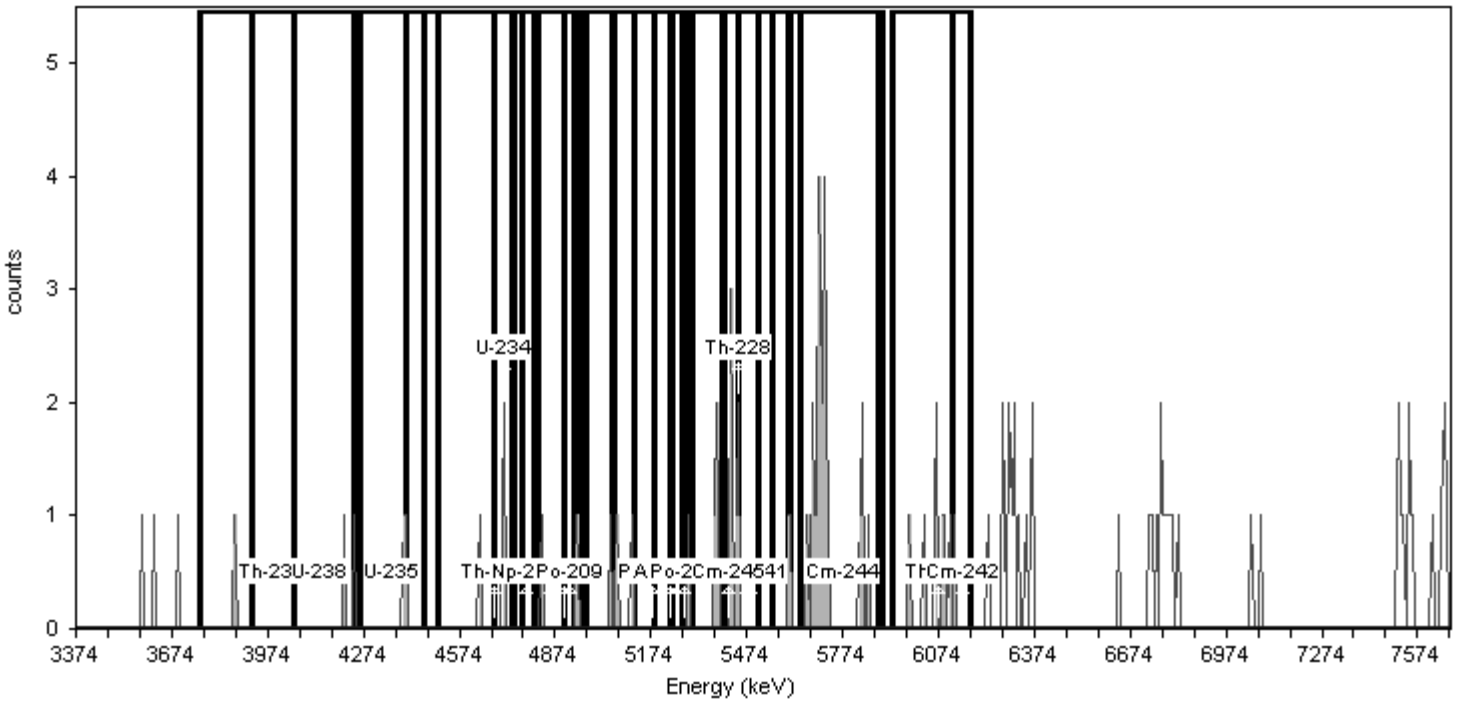
Acquisition

Detector: AV64 , SN: 47-029ee4
Acquisition Start Date: 6/19/2014 12:18:36AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-7107;AV64-20140504a
Calibration Date: 5/4/2014 8:44:03PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.75% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 100.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	4.00	4.167E-003	2.329E-003
U-234	4.71	4.51	4.82	3.00	3.125E-003	2.083E-003
Pu-242	4.90	4.68	4.95	4.00	4.167E-003	2.329E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	6.00	6.250E-003	2.756E-003
Th-228	5.45	5.19	5.51	10.00	1.042E-002	3.455E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	10.00	1.042E-002	3.455E-003
Am-241	5.48	5.30	5.60	10.00	1.042E-002	3.455E-003
Cm-245	5.42	5.40	5.45	6.00	6.250E-003	2.756E-003
Pu-236	5.76	5.61	5.89	23.00	2.396E-002	5.103E-003
Cm-244	5.78	5.64	5.90	22.00	2.292E-002	4.996E-003
Th-227	6.07	5.93	6.18	8.00	8.333E-003	3.125E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:22:41PM 6/22/2014

Sample

Sample Name: ICB;AV65
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014c
Description:

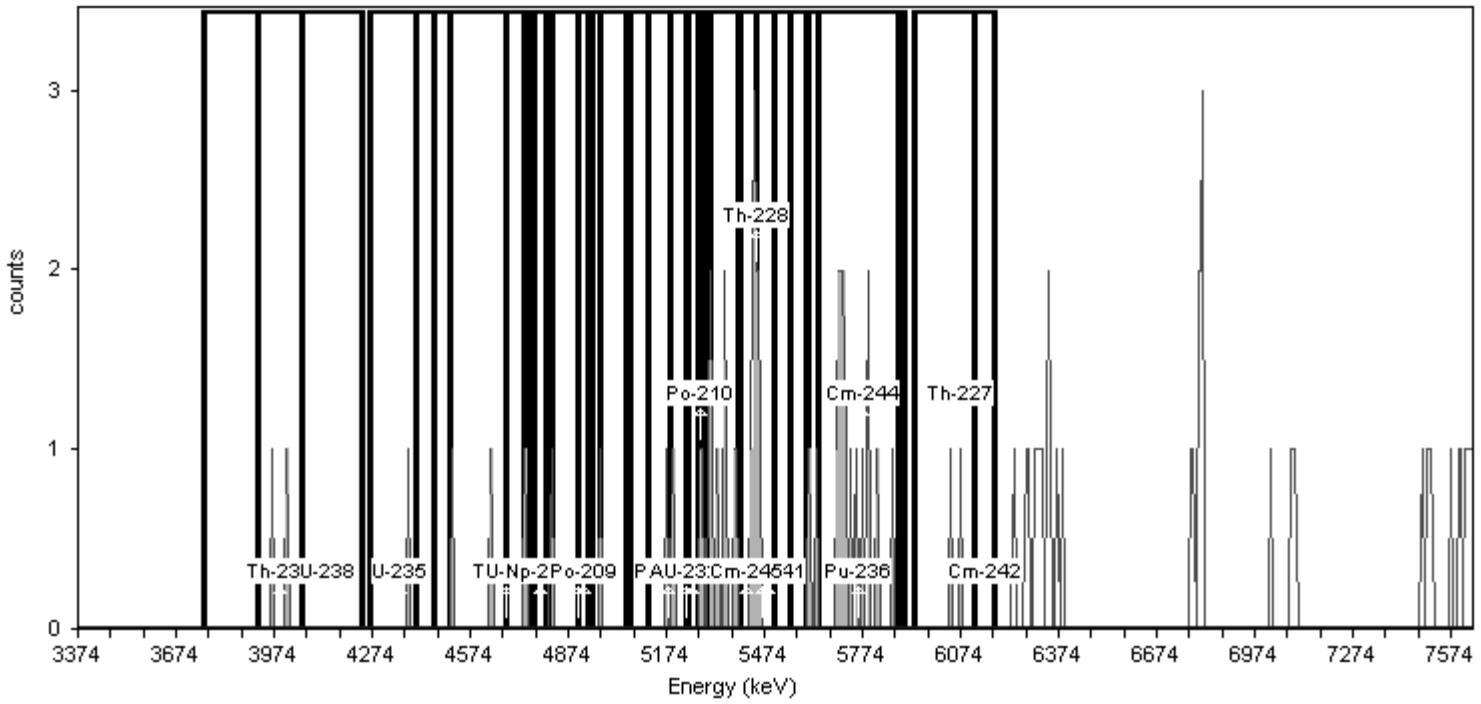
Analyst: 60040

Acquisition

Detector: AV65 , SN: 44-049JJ1
Acquisition Start Date: 6/19/2014 7:57:24PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8874;AV65-20140504
Calibration Date: 5/4/2014 8:43:55PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.13% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 84.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	3.00	3.125E-003	2.083E-003
U-234	4.71	4.51	4.82	4.00	4.167E-003	2.329E-003
Pu-242	4.90	4.68	4.95	2.00	2.083E-003	1.804E-003
Th-229	4.86	4.74	5.12	3.00	3.125E-003	2.083E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	6.00	6.250E-003	2.756E-003
U-232	5.25	5.06	5.40	13.00	1.354E-002	3.898E-003
Th-228	5.45	5.19	5.51	21.00	2.187E-002	4.886E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	20.00	2.083E-002	4.774E-003
Am-241	5.48	5.30	5.60	18.00	1.875E-002	4.541E-003
Cm-245	5.42	5.40	5.45	6.00	6.250E-003	2.756E-003
Pu-236	5.76	5.61	5.89	17.00	1.771E-002	4.419E-003
Cm-244	5.78	5.64	5.90	15.00	1.563E-002	4.167E-003
Th-227	6.07	5.93	6.18	2.00	2.083E-003	1.804E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:35:12PM 6/19/2014

Sample

Sample Name: ICB;AV66
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

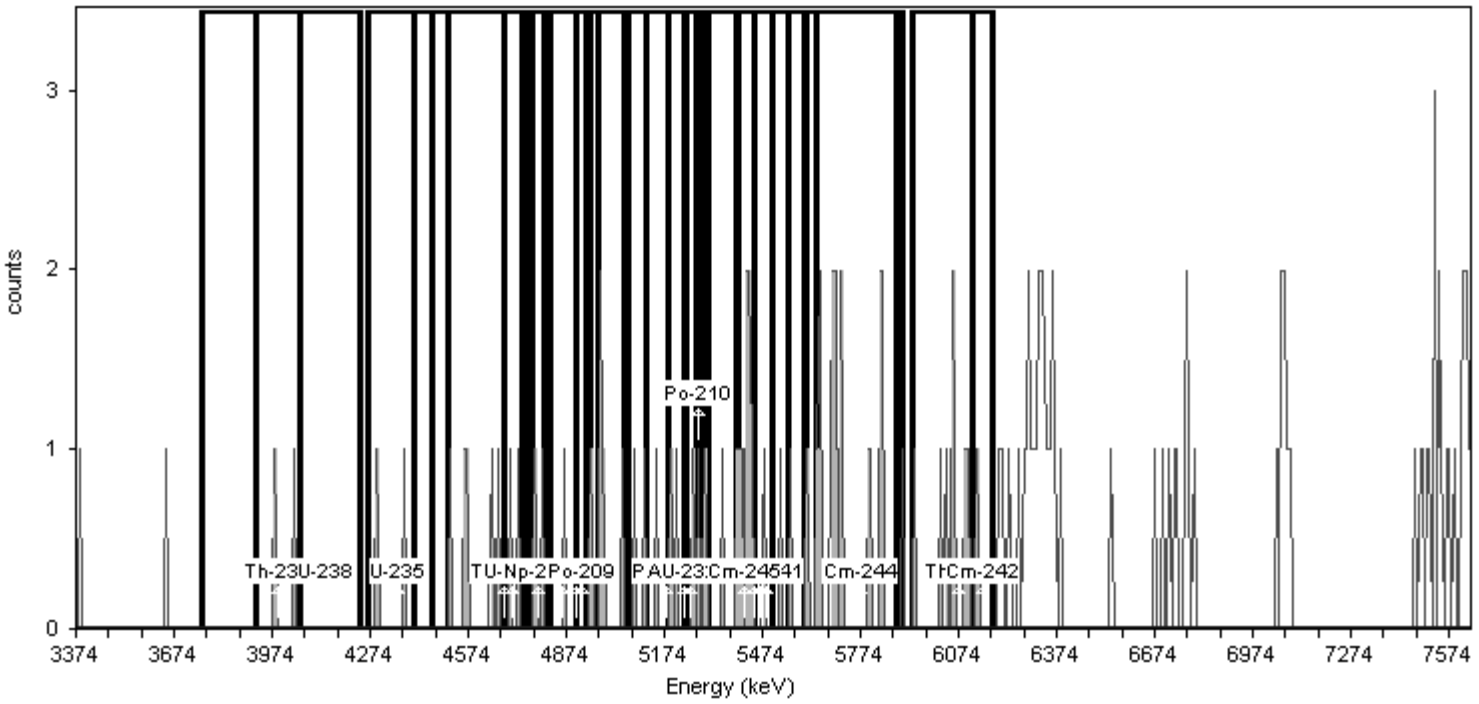
Analyst: 60040

Acquisition

Detector: AV66 , SN: 48-158EE2
Acquisition Start Date: 6/19/2014 12:18:38AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-8875;AV66-20140504
Calibration Date: 5/4/2014 8:44:10PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.93% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 131.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	7.00	7.292E-003	2.946E-003
U-234	4.71	4.51	4.82	9.00	9.375E-003	3.294E-003
Pu-242	4.90	4.68	4.95	6.00	6.250E-003	2.756E-003
Th-229	4.86	4.74	5.12	10.00	1.042E-002	3.455E-003
Np-237	4.78	4.77	4.81	2.00	2.083E-003	1.804E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	9.00	9.375E-003	3.294E-003
Am-243	5.23	5.05	5.31	8.00	8.333E-003	3.125E-003
U-232	5.25	5.06	5.40	11.00	1.146E-002	3.608E-003
Th-228	5.45	5.19	5.51	15.00	1.563E-002	4.167E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	13.00	1.354E-002	3.898E-003
Am-241	5.48	5.30	5.60	13.00	1.354E-002	3.898E-003
Cm-245	5.42	5.40	5.45	8.00	8.333E-003	3.125E-003
Pu-236	5.76	5.61	5.89	18.00	1.875E-002	4.541E-003
Cm-244	5.78	5.64	5.90	18.00	1.875E-002	4.541E-003
Th-227	6.07	5.93	6.18	8.00	8.333E-003	3.125E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:35:18PM 6/19/2014

Sample

Sample Name: ICB;AV67
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

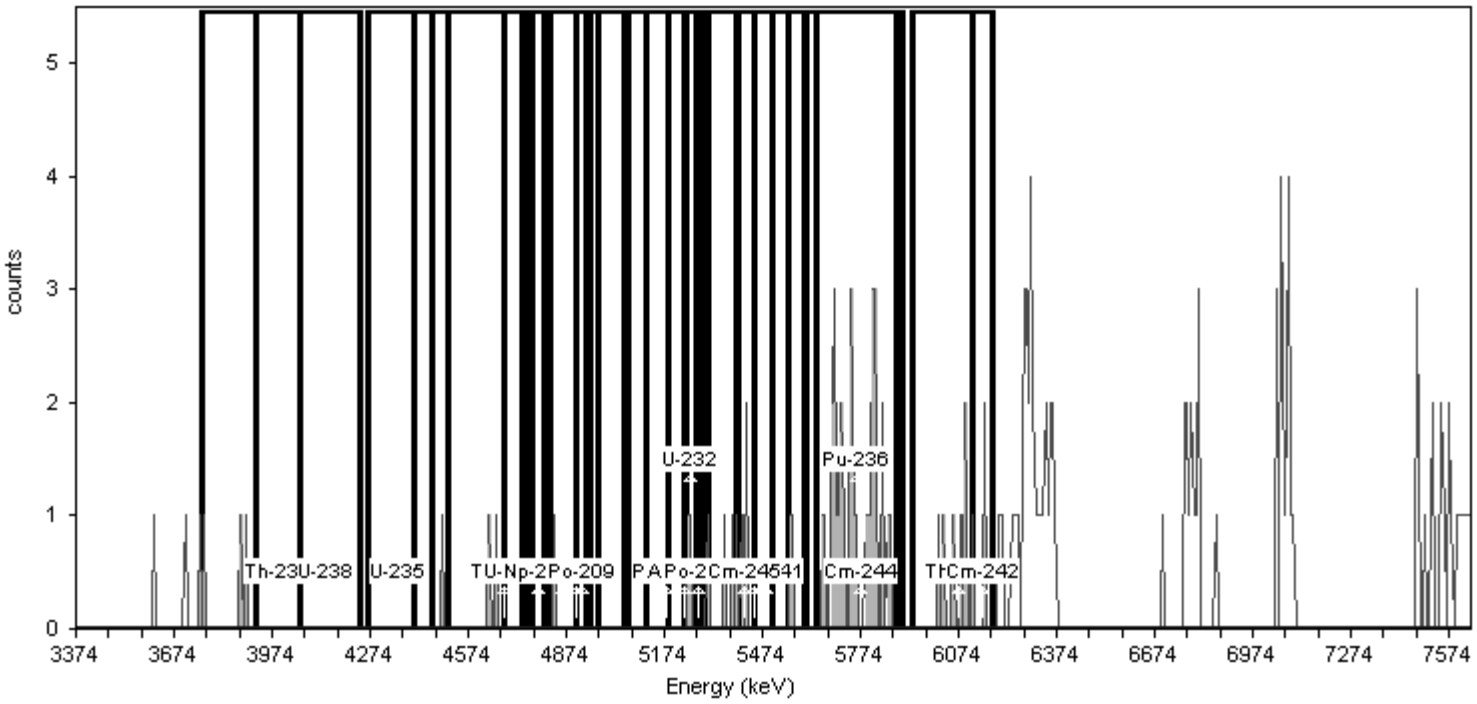
Analyst: 60040

Acquisition

Detector: AV67 , SN: 52-102 D7
Acquisition Start Date: 6/19/2014 12:18:39AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-8876;AV67-20140504
Calibration Date: 5/4/2014 8:44:15PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.32% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 140.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	3.00	3.125E-003	2.083E-003
U-238	4.14	3.92	4.24	0.00	0.000E+000	1.473E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	3.00	3.125E-003	2.083E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	0.00	0.000E+000	1.473E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	6.00	6.250E-003	2.756E-003
Th-228	5.45	5.19	5.51	9.00	9.375E-003	3.294E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	7.00	7.292E-003	2.946E-003
Am-241	5.48	5.30	5.60	9.00	9.375E-003	3.294E-003
Cm-245	5.42	5.40	5.45	4.00	4.167E-003	2.329E-003
Pu-236	5.76	5.61	5.89	30.00	3.125E-002	5.800E-003
Cm-244	5.78	5.64	5.90	30.00	3.125E-002	5.800E-003
Th-227	6.07	5.93	6.18	9.00	9.375E-003	3.294E-003
Cm-242	6.15	6.12	6.18	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:35:24PM 6/19/2014

Sample

Sample Name: ICB;AV68
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

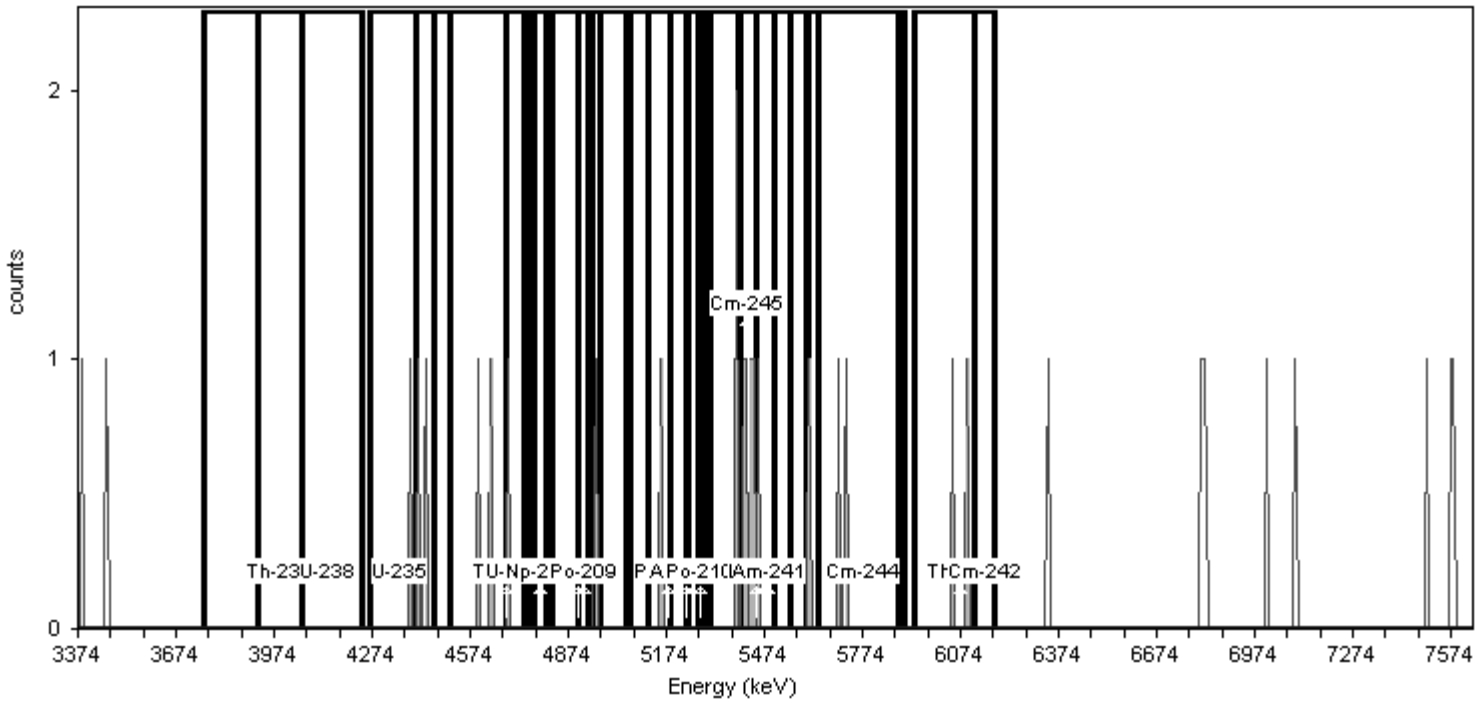
Analyst: 60040

Acquisition

Detector: AV68 , SN: 48-45884
Acquisition Start Date: 6/19/2014 12:18:40AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-8877;AV68-20140504
Calibration Date: 5/4/2014 8:44:22PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.49% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 31.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	0.00	0.000E+000	1.473E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.68	4.40	4.75	5.00	5.208E-003	2.552E-003
U-234	4.71	4.51	4.82	3.00	3.125E-003	2.083E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	1.00	1.042E-003	1.473E-003
U-232	5.25	5.06	5.40	3.00	3.125E-003	2.083E-003
Th-228	5.45	5.19	5.51	7.00	7.292E-003	2.946E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	7.00	7.292E-003	2.946E-003
Am-241	5.48	5.30	5.60	7.00	7.292E-003	2.946E-003
Cm-245	5.42	5.40	5.45	4.00	4.167E-003	2.329E-003
Pu-236	5.76	5.61	5.89	3.00	3.125E-003	2.083E-003
Cm-244	5.78	5.64	5.90	2.00	2.083E-003	1.804E-003
Th-227	6.07	5.93	6.18	2.00	2.083E-003	1.804E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

Run Logs

Alpha Spectroscopy Run Log

Detector: AV3

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:26	140	IC 160-120519/1		120519			PS
05/07/14 23:02	60	ICV 160-120855/1		120855			PS
06/18/14 19:10	960	ICB 160-127828/1		127828			PS
06/19/14 16:44	60	CCV 160-127913/1		127913			PS
06/30/14 00:01	1	PULSER 160-128945/1		128945			
06/30/14 01:38	180	ZZZZZ		128945			
06/30/14 01:40	180	ZZZZZ		128945			
06/30/14 18:11	180	LCS 160-126996/2-A		128945	126996	A-01-R	MLK

Detector: AV4

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:26	140	IC 160-120520/1		120520			PS
05/07/14 23:03	60	ICV 160-120856/1		120856			PS
06/18/14 19:10	960	ICB 160-127829/1		127829			PS
06/19/14 16:44	60	CCV 160-127914/1		127914			PS
06/30/14 00:01	1	PULSER 160-128946/1		128946			
06/30/14 01:38	180	ZZZZZ		128946			
06/30/14 01:40	180	ZZZZZ		128946			
06/30/14 18:11	180	680-102199-2	SD-279-01	128946	126996	A-01-R	MLK

Detector: AV6

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:26	140	IC 160-120521/1		120521			PS
05/07/14 23:03	60	ICV 160-120857/1		120857			PS
06/18/14 19:08	960	ICB 160-127830/1		127830			PS
06/19/14 18:06	60	CCV 160-127932/1		127932			PS
06/30/14 00:01	1	PULSER 160-128962/1		128962			
06/30/14 01:38	180	ZZZZZ		128962			
06/30/14 01:42	180	ZZZZZ		128962			
06/30/14 18:12	180	MB 160-126998/1-A		128962	126998	A-01-R	MLK

Detector: AV7

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/07/14 19:51	140	IC 160-120843/1		120843			PS
05/07/14 23:03	60	ICV 160-120858/1		120858			PS
06/18/14 19:08	960	ICB 160-127831/1		127831			PS
06/19/14 16:44	60	CCV 160-127943/1		127943			PS
06/30/14 00:01	1	PULSER 160-128973/1		128973			
06/30/14 01:38	180	ZZZZZ		128973			
06/30/14 01:42	180	ZZZZZ		128973			
06/30/14 18:12	180	LCS 160-126998/2-A		128973	126998	A-01-R	MLK

Detector: AV8

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:27	140	IC 160-120523/1		120523			PS
05/08/14 00:14	60	ICV 160-121084/1		121084			PS
06/18/14 19:08	960	ICB 160-127837/1		127837			PS
06/19/14 18:06	60	CCV 160-127954/1		127954			PS
06/30/14 00:01	1	PULSER 160-128984/1		128984			

Alpha Spectroscopy Run Log

Detector: AV8 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
06/30/14 01:40	180	MB 160-126996/1-A		128984	126996	A-01-R	MLK

Detector: AV10

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:27	140	IC 160-120512/1		120512			PS
05/07/14 23:03	60	ICV 160-120847/1		120847			PS
06/18/14 19:08	960	ICB 160-127776/1		127776			PS
06/19/14 18:06	60	CCV 160-127860/1		127860			PS
06/30/14 00:02	1	PULSER 160-128901/1		128901			MLK
06/30/14 01:40	180	680-102199-1	SD-279-SS	128901	126996	A-01-R	MLK

Detector: AV11

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:27	140	IC 160-120513/1		120513			PS
05/07/14 23:04	60	ICV 160-120848/1		120848			PS
06/18/14 19:08	960	ICB 160-127786/1		127786			PS
06/19/14 18:07	60	CCV 160-127871/1		127871			PS
06/30/14 00:02	1	PULSER 160-128912/1		128912			MLK
06/30/14 01:40	180	680-102199-1 DU	SD-279-SS DU	128912	126996	A-01-R	MLK

Detector: AV13

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:28	140	IC 160-120515/1		120515			PS
05/07/14 23:04	60	ICV 160-120850/1		120850			PS
06/18/14 19:08	960	ICB 160-127807/1		127807			PS
06/19/14 19:45	60	CCV 160-127892/1		127892			PS
06/30/14 00:01	1	PULSER 160-128933/1		128933			MLK
06/30/14 01:40	180	680-102199-3	SD-279-02	128933	126996	A-01-R	MLK

Detector: AV14

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:28	140	IC 160-120516/1		120516			PS
05/07/14 23:04	60	ICV 160-120851/1		120851			PS
06/18/14 19:08	960	ICB 160-127817/1		127817			PS
06/19/14 18:08	60	CCV 160-127902/1		127902			PS
06/30/14 00:01	1	PULSER 160-128935/1		128935			MLK
06/30/14 01:40	180	680-102199-7	SD-277-SS	128935	126996	A-01-R	MLK

Detector: AV15

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:28	140	IC 160-120517/1		120517			PS
05/07/14 23:04	60	ICV 160-120852/1		120852			PS
06/18/14 19:08	960	ICB 160-127818/1		127818			PS
06/19/14 19:45	60	CCV 160-127903/1		127903			PS
06/30/14 00:01	1	PULSER 160-128936/1		128936			MLK
06/30/14 01:40	180	680-102199-8	SD-277-01	128936	126996	A-01-R	MLK

Alpha Spectroscopy Run Log

Detector: AV16

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:27	140	IC 160-120398/1		120398			PS
05/08/14 00:14	60	ICV 160-121072/1		121072			PS
06/18/14 19:08	960	ICB 160-127819/1		127819			PS
06/19/14 18:08	60	CCV 160-127904/1		127904			PS
06/30/14 00:01	1	PULSER 160-128937/1		128937			MLK
06/30/14 01:40	180	680-102199-9	SD-277-02	128937	126996	A-01-R	MLK

Detector: AV17

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:28	140	IC 160-120399/1		120399			PS
05/08/14 00:14	60	ICV 160-121073/1		121073			PS
06/18/14 19:08	960	ICB 160-127820/1		127820			PS
06/19/14 18:08	60	CCV 160-127905/1		127905			PS
06/30/14 00:02	1	PULSER 160-128938/1		128938			MLK
06/30/14 01:40	180	680-102199-11	SD-219-SS	128938	126996	A-01-R	MLK

Detector: AV18

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:28	140	IC 160-120400/1		120400			PS
05/08/14 00:14	60	ICV 160-121074/1		121074			PS
06/18/14 19:08	960	ICB 160-127821/1		127821			PS
06/19/14 18:08	60	CCV 160-127906/1		127906			PS
06/30/14 00:02	1	PULSER 160-128939/1		128939			MLK
06/30/14 01:40	180	680-102199-12	SD-219-01	128939	126996	A-01-R	MLK

Detector: AV19

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:28	140	IC 160-120401/1		120401			PS
05/08/14 14:33	60	ICV 160-121361/1		121361			PS
06/18/14 19:08	960	ICB 160-127822/1		127822			PS
06/19/14 18:08	60	CCV 160-127907/1		127907			PS
06/30/14 00:02	1	PULSER 160-128940/1		128940			MLK
06/30/14 01:40	180	680-102199-13	SD-219-02	128940	126996	A-01-R	MLK

Detector: AV20

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:28	140	IC 160-120402/1		120402			PS
05/07/14 23:05	60	ICV 160-120854/1		120854			PS
06/18/14 19:08	960	ICB 160-127824/1		127824			PS
06/19/14 18:08	60	CCV 160-127909/1		127909			PS
06/30/14 00:02	1	PULSER 160-128941/1		128941			MLK
06/30/14 01:40	180	680-102199-14	SD-219-03	128941	126996	A-01-R	MLK

Detector: AV21

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:28	140	IC 160-120403/1		120403			PS
05/08/14 00:16	60	ICV 160-121075/1		121075			PS

Alpha Spectroscopy Run Log

Detector: AV21 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
06/18/14 19:08	960	ICB 160-127825/1		127825			PS
06/19/14 19:45	60	CCV 160-127910/1		127910			PS
06/30/14 00:02	1	PULSER 160-128942/1		128942			MLK
06/30/14 01:40	180	680-102199-15	SD-218-SS	128942	126996	A-01-R	MLK

Detector: AV23

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:29	140	IC 160-120404/1		120404			PS
05/08/14 14:33	60	ICV 160-121362/1		121362			PS
06/18/14 19:08	960	ICB 160-127826/1		127826			PS
06/19/14 19:45	60	CCV 160-127911/1		127911			PS
06/30/14 00:02	1	PULSER 160-128943/1		128943			MLK
06/30/14 01:40	180	680-102199-16	SD-218-01	128943	126996	A-01-R	MLK

Detector: AV24

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:29	140	IC 160-120405/1		120405			PS
05/08/14 00:16	60	ICV 160-121076/1		121076			PS
06/18/14 19:08	960	ICB 160-127827/1		127827			PS
06/19/14 19:45	60	CCV 160-127912/1		127912			PS
06/30/14 00:02	1	PULSER 160-128944/1		128944			MLK
06/30/14 01:40	180	680-102199-17	SD-218-02	128944	126996	A-01-R	MLK

Detector: AV43

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:30	140	IC 160-120406/1		120406			PS
05/08/14 00:16	60	ICV 160-121077/1		121077			PS
06/19/14 00:17	960	ICB 160-127915/1		127915			PS
06/22/14 17:38	60	CCV 160-127969/1		127969			PS
06/30/14 01:04	1	PULSER 160-128947/1		128947			
06/30/14 01:04	1	PULSER 160-128947/2		128947			MLK
06/30/14 01:40	180	680-102199-18	SD-203-SS	128947	126996	A-01-R	MLK
06/30/14 18:10	960	ZZZZZ		128947			

Detector: AV44

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:30	140	IC 160-120407/1		120407			PS
05/08/14 00:17	60	ICV 160-121078/1		121078			PS
06/19/14 00:17	960	ICB 160-127916/1		127916			PS
06/22/14 17:38	60	CCV 160-127970/1		127970			PS
06/30/14 00:18	1	PULSER 160-128948/1		128948			MLK
06/30/14 01:40	180	680-102199-19	SD-203-01	128948	126996	A-01-R	MLK
06/30/14 18:10	960	ZZZZZ		128948			

Detector: AV45

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:30	140	IC 160-120408/1		120408			PS

Alpha Spectroscopy Run Log

Detector: AV45 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/08/14 14:32	60	ICV 160-121363/1		121363			PS
06/19/14 00:17	960	ICB 160-127917/1		127917			PS
06/22/14 20:07	60	CCV 160-127985/1		127985			PS
06/30/14 00:18	1	PULSER 160-128949/1		128949			MLK
06/30/14 01:40	180	680-102199-20	SD-203-02	128949	126996	A-01-R	MLK
06/30/14 18:10	960	ZZZZZ		128949			

Detector: AV46

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:30	140	IC 160-120409/1		120409			PS
05/08/14 00:18	60	ICV 160-121079/1		121079			PS
06/19/14 00:17	960	ICB 160-127918/1		127918			PS
06/22/14 21:17	60	CCV 160-127986/1		127986			PS
06/30/14 00:18	1	PULSER 160-128950/1		128950			MLK
06/30/14 01:40	180	680-102199-22	SD-202-SS	128950	126996	A-01-R	MLK
06/30/14 18:10	960	ZZZZZ		128950			

Detector: AV48

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:32	140	IC 160-120411/1		120411			PS
05/08/14 00:18	60	ICV 160-121081/1		121081			PS
06/19/14 00:17	960	ICB 160-127920/1		127920			PS
06/22/14 20:07	60	CCV 160-127988/1		127988			PS
06/30/14 00:18	1	PULSER 160-128952/1		128952			MLK
06/30/14 01:40	180	680-102199-23	SD-202-01	128952	126996	A-01-R	MLK
06/30/14 18:10	960	ZZZZZ		128952			

Detector: AV49

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:03	140	IC 160-120271/1		120271			PS
05/08/14 14:34	60	ICV 160-121364/1		121364			PS
06/19/14 00:17	960	ICB 160-127921/1		127921			PS
06/22/14 18:52	60	CCV 160-127989/1		127989			PS
06/30/14 00:18	1	PULSER 160-128953/1		128953			MLK
06/30/14 01:40	180	680-102199-24	SD-202-02	128953	126996	A-01-R	MLK

Detector: AV53

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:04	140	IC 160-120275/1		120275			PS
05/08/14 00:18	60	ICV 160-121082/1		121082			PS
06/19/14 00:17	960	ICB 160-127925/1		127925			PS
06/22/14 18:53	60	CCV 160-127992/1		127992			PS
06/30/14 00:18	1	PULSER 160-128956/1		128956			MLK
06/30/14 01:42	180	680-102199-26	SD-196-SS	128956	126998	A-01-R	MLK

Alpha Spectroscopy Run Log

Detector: AV54

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:04	140	IC 160-120276/1		120276			PS
05/08/14 14:34	60	ICV 160-121368/1		121368			PS
06/19/14 00:18	960	ICB 160-127926/1		127926			PS
06/22/14 18:53	60	CCV 160-127993/1		127993			PS
06/30/14 00:18	1	PULSER 160-128957/1		128957			MLK
06/30/14 01:42	180	680-102199-26 DU	SD-196-SS DU	128957	126998	A-01-R	MLK

Detector: AV55

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/07/14 19:51	140	IC 160-120842/1		120842			PS
05/08/14 00:19	60	ICV 160-121083/1		121083			PS
06/19/14 00:18	960	ICB 160-127927/1		127927			PS
06/22/14 20:08	60	CCV 160-127994/1		127994			PS
06/30/14 00:18	1	PULSER 160-128958/1		128958			MLK
06/30/14 01:42	180	680-102199-27	SD-196-01	128958	126998	A-01-R	MLK

Detector: AV56

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:04	140	IC 160-120278/1		120278			PS
05/08/14 17:18	60	ICV 160-121369/1		121369			PS
06/19/14 00:18	960	ICB 160-127928/1		127928			PS
06/22/14 18:53	60	CCV 160-127995/1		127995			PS
06/30/14 00:19	1	PULSER 160-129083/1		129083			MLK
06/30/14 01:42	180	680-102199-28	SD-196-02	129083	126998	A-01-R	MLK

Detector: AV57

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:05	140	IC 160-120279/1		120279			PS
05/08/14 14:35	60	ICV 160-121370/1		121370			PS
06/19/14 00:18	960	ICB 160-127929/1		127929			PS
06/22/14 18:53	60	CCV 160-127996/1		127996			PS
06/30/14 00:19	1	PULSER 160-128959/1		128959			MLK
06/30/14 01:42	180	680-102199-30	SD-220-SS	128959	126998	A-01-R	MLK

Detector: AV58

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:05	140	IC 160-120280/1		120280			PS
05/08/14 14:35	60	ICV 160-121371/1		121371			PS
06/19/14 00:18	960	ICB 160-127930/1		127930			PS
06/22/14 18:53	60	CCV 160-127997/1		127997			PS
06/30/14 00:19	1	PULSER 160-128960/1		128960			MLK
06/30/14 01:42	180	680-102199-31	SD-220-01	128960	126998	A-01-R	MLK

Detector: AV59

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:05	140	IC 160-120281/1		120281			PS
05/08/14 14:36	60	ICV 160-121372/1		121372			PS

Alpha Spectroscopy Run Log

Detector: AV59 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
06/19/14 00:18	960	ICB 160-127931/1		127931			PS
06/22/14 20:09	60	CCV 160-127998/1		127998			PS
06/30/14 00:19	1	PULSER 160-128961/1		128961			MLK
06/30/14 01:43	180	680-102199-32	SD-220-02	128961	126998	A-01-R	MLK

Detector: AV60

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:06	140	IC 160-120282/1		120282			PS
05/08/14 17:21	60	ICV 160-121373/1		121373			PS
06/19/14 00:18	960	ICB 160-127933/1		127933			PS
06/22/14 21:17	60	CCV 160-127999/1		127999			PS
06/30/14 00:19	1	PULSER 160-128963/1		128963			MLK
06/30/14 01:43	180	680-102199-33	SD-DUP-01	128963	126998	A-01-R	MLK

Detector: AV61

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:06	140	IC 160-120283/1		120283			PS
05/08/14 14:36	60	ICV 160-121374/1		121374			PS
06/19/14 00:18	960	ICB 160-127934/1		127934			PS
06/22/14 22:21	60	CCV 160-128018/1		128018			PS
06/30/14 00:19	1	PULSER 160-128964/1		128964			MLK
06/30/14 01:43	180	680-102199-35	SD-201-SS	128964	126998	A-01-R	MLK

Detector: AV62

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:06	140	IC 160-120284/1		120284			PS
05/08/14 14:36	60	ICV 160-121375/1		121375			PS
06/19/14 00:18	960	ICB 160-127935/1		127935			PS
06/22/14 20:09	60	CCV 160-128000/1		128000			PS
06/30/14 00:19	1	PULSER 160-128965/1		128965			MLK
06/30/14 01:43	180	680-102199-36	SD-201-01	128965	126998	A-01-R	MLK

Detector: AV63

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:06	140	IC 160-120285/1		120285			PS
05/08/14 14:36	60	ICV 160-121376/1		121376			PS
06/19/14 00:18	960	ICB 160-127936/1		127936			PS
06/22/14 21:18	60	CCV 160-128001/1		128001			PS
06/30/14 00:19	1	PULSER 160-128966/1		128966			MLK
06/30/14 01:43	180	680-102199-37	SD-201-02	128966	126998	A-01-R	MLK

Detector: AV64

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 17:47	140	IC 160-120041/1		120041			PS
05/11/14 19:31	60	ICV 160-121389/1		121389			PS
06/19/14 00:18	960	ICB 160-127937/1		127937			PS
06/22/14 21:18	60	CCV 160-128002/1		128002			PS

Alpha Spectroscopy Run Log

Detector: AV64 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
06/30/14 00:19	1	PULSER 160-128967/1		128967			MLK
06/30/14 01:43	180	680-102199-39	SD-200-SS	128967	126998	A-01-R	MLK

Detector: AV65

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 17:47	140	IC 160-120042/1		120042			PS
05/08/14 17:18	60	ICV 160-121377/1		121377			PS
06/19/14 00:18	960	ICB 160-127938/1		127938			
06/19/14 19:57	960	ICB 160-127938/2		127938			PS
06/22/14 20:09	60	CCV 160-128003/1		128003			PS
06/30/14 00:19	1	PULSER 160-128968/1		128968			MLK
06/30/14 01:43	180	680-102199-40	SD-200-01	128968	126998	A-01-R	MLK

Detector: AV66

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 17:47	140	IC 160-120043/1		120043			PS
05/11/14 19:32	60	ICV 160-121390/1		121390			PS
06/19/14 00:18	960	ICB 160-127939/1		127939			PS
06/22/14 21:18	60	CCV 160-128004/1		128004			PS
06/30/14 00:19	1	PULSER 160-128969/1		128969			MLK
06/30/14 01:43	180	680-102199-41	SD-200-02	128969	126998	A-01-R	MLK

Detector: AV67

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 17:48	140	IC 160-120044/1		120044			PS
05/11/14 19:32	60	ICV 160-121391/1		121391			PS
06/19/14 00:18	960	ICB 160-127940/1		127940			PS
06/22/14 18:54	60	CCV 160-128005/1		128005			PS
06/30/14 00:19	1	PULSER 160-128970/1		128970			MLK
06/30/14 01:43	180	680-102199-42	SD-200-03	128970	126998	A-01-R	MLK

Detector: AV68

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 17:48	140	IC 160-120045/1		120045			PS
05/08/14 14:36	60	ICV 160-121378/1		121378			PS
06/19/14 00:18	960	ICB 160-127941/1		127941			PS
06/22/14 20:09	60	CCV 160-128006/1		128006			PS
06/30/14 00:19	1	PULSER 160-128971/1		128971			MLK
06/30/14 01:43	180	680-102199-25	SD-195-SS	128971	126998	A-01-R	MLK

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: S. Gamon	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.46
Client Contact: Mike Martin	Phone: (703)341-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page 1 of 4
Company: Tetra Tech, Inc.		Analysis Requested		Job #: 680-102199
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
City: Germantown	TAT Requested (days): Standard			
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			Other:
Email: Michael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	X	N	N		
SD-279-SS	6/9/14	1540	C	Solid				X				
SD-279-01		1545	C	Solid				X				
SD-279-02		1550	C	Solid				X				
SD-279-03		1555	C	Solid				X				Hold Pending analysis SS to 02
SD-278-SS		1740	C	Solid				X				
SD-278-01		1745	C	Solid				X				
SD-277-SS		1810	C	Solid				X				
SD-277-01		1815	C	Solid				X				
SD-277-02		1820	C	Solid				X				
SD-277-03	↓	1825	C	Solid				X				Hold Pending analysis SS to 02
SD-219-SS	6/10/14	0920	C	Solid				X				

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	6-10-14 / 1625	TT		6/10/14 1645	TestAmerica
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	6/10/14 1735	TestAmerica	Clark	6-11-14 0930	TA STL
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: S. Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.1
Client Contact: Mike Martin	Phone:	E-Mail: jerry.lanier@testamericainc.com		Page: Page 2 of 4
Company: Tetra Tech, Inc.				Job #: 680-102199
Address: 20251 Century Blvd Suite 200	Due Date Requested:			
City: Germantown	TAT Requested (days): Standard			
State, Zip: MD, 20874	PO #: Purchase Order not required			
Phone:	WO #:			
Email: Michael.Martin@tetratech.com	Project #: 68012942			
Project Name: Sediments	SSOW#:			
Site:				

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2SO3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - Di Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of Containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-219-01	6/10/14	0922	C	Solid				X				
SD-219-02	6/10/14	0925	C	Solid				X				
SD-219-03	6/10/14	0928	C	Solid				X				[redacted]
SD-218-SS		1010	C	Solid				X				
SD-218-01		1012	C	Solid				X				
SD-218-02		1014	C	Solid				X				
SD-203-SS		1140	C	Solid				X				
SD-203-01		1145	C	Solid				X				
SD-203-02		1150	C	Solid				X				
SD-203-03		1155	C	Solid				X				Hold for any analysis SS 6/10/14
SD-202-SS		1220	C	Solid				X				

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6-10-14 / 1625	TT		6/10/14 / 1645	TestAmerica
2		6/10/14 / 1735	TT		10-11-14 0930	STL
3		Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: S. Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.5
Client Contact: Mike Martin	Phone:	E-Mail: jerry.lanier@testamericainc.com		Page: Page 3 of 4
Company: Tetra Tech, Inc.		Analysis Requested		Job #: 680-102199
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes:
City: Germantown	TAT Requested (days):			A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			
Email: Mlchael.Martin@tetratech.com	WO #:			Other:
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/226	Total Number of containers	Special Instructions/Note:
		Preservation Code:					N	N	N	N		
SD-202-01	6/10/14	1225	C	Solid				X				
SD-202-02		1230	C	Solid				X				
SD-195-55		1330	C	Solid				X				
SD-196-55		1400	C	Solid								
SD-196-01		1405	C	Solid								
SD-196-02		1410	C	Solid								
SD-196-03		1415	C	Solid								Hold pending analysis SS to 02
SD-220-55		1440		Solid								
SD-220-01		1442		Solid								
SD-220-02		1444		Solid								
SD-DUP-01		0000	C	Solid				X				

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	[signature]	6-10-14 / 1625	TT	[signature]	6/10/14 / 1645	TestAmerica
2	[signature]	6/10/14 / 1735	TestAmerica	[signature]	6-11-14 0930	TA STL
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.2
Client Contact: Mike Martin	Phone:	E-Mail: jerry.lanier@testamericainc.com		Page: Page None 4 of 4
Company: Tetra Tech, Inc.		Analysis Requested		Job #: 680-102199

Address: 20251 Century Blvd Suite 200	Due Date Requested:
City: Germantown	TAT Requested (days):
State, Zip: MD, 20874	
Phone:	PO #: Purchase Order not required
Email: Michael.Martin@tetratech.com	WO #:
Project Name: Sediments	Project #: 68012942
Site:	SSOW#:

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2SO3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
		Preservation Code:					N	N	N	N		
SD-220-03	6/10/14	1496	C	Solid				X				Hold pending analysis SS to 02
SD-201-SS		1510	C	Solid				X				
SD-201-01		1515	C	Solid				X				
SD-201-02		1520	C	Solid				X				
SD-201-03		1525	C	Solid				X				Hold pending analysis SS to 02
SD-200-SS		1550	C	Solid				X				
SD-200-01		1555	C	Solid				X				
SD-200-02		1600	C	Solid				X				
SD-200-03		1605	C	Solid				X				
				Solid								
				Solid								

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	6-10-14 / 1625			6/10/14 / 1645	TestAmerica
Relinquished by:	Date/Time: 6/10/14 / 1735	Company TestAmerica	Received by: Gil Clarke	Date/Time: 6-11-14 0930	Company TA STL
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 680-102199-3

SDG Number: 680102199-3

Job Description: Sediments

For:
Tetra Tech, Inc.
20251 Century Blvd
Suite 200
Germantown, MD 20874

Attention: Mike Martin



Approved for release.
Jerry A Lanier
Project Manager I
9/12/2014 12:26 PM

Jerry A Lanier, Project Manager I
5102 LaRoche Avenue, Savannah, GA, 31404
(912)354-7858 e.3410
jerry.lanier@testamericainc.com
09/12/2014
Revision: 2

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

Savannah Certifications and ID #s: A2LA: 0399.01; AL: 41450; ARDEQ: 88-0692; ARDOH; AZ: AZ0741; CA: 03217CA; CO; CT: PH0161; DE; FL: E87052; GA: 803; Guam; HI; IL: 200022; IN: C-GA-02; IA: 353; KS: E-10322; KY EPPC: 90084; KY UST; LA DEQ: 30690; LA DHH: LA080008; ME: 2008022; MD: 250; MA: M-GA006; MI: 9925; MS; NFESC: 249; NV: GA00006; NJ: GA769; NM; NY: 10842; NC DWQ: 269; NC DHHS: 13701; PA: 68-00474; PR: GA00006; RI: LAO00244; SC: 98001001; TN: TN0296; TX: T104704185; USEPA: GA00006; VT: VT-87052; VA: 00302; WA; WV DEP: 094; WV DHHR: 9950 C; WI DNR: 999819810; WY/EPAR8: 8TMS-Q

Table of Contents

Cover Title Page 1

Data Summaries 4

- Definitions 4
- Case Narrative 5
- Detection Summary 7
- Client Sample Results 12
- Default Detection Limits 32
- QC Sample Results 33
- QC Association 37
- Chronicle 41
- Certification Summary 50
- Method Summary 52
- Sample Summary 53
- Reagent Traceability 54
  - COAs 70

Inorganic Sample Data 99

- Metals Data 99
  - Met Cover Page 100
  - Met Sample Data 101
  - Met QC Data 134
    - Met ICV/CCV 134
    - Met CRQL 146
    - Met Blanks 147
    - Met ICSA/ICSAB 152
    - Met MS/MSD/PDS 154
    - Met LCS/LCSD 158

Table of Contents

Met Serial Dilution 160

Met MDL 162

Met Linear Ranges 165

Met Preparation Log 166

Met Analysis Run Log 168

Met ICP/MS Int Stds 179

Met Raw Data 182

Met Prep Data 469

Subcontracted Data 473

Shipping and Receiving Documents 474

Client Chain of Custody 475

Sample Receipt Checklist 479

Qualifiers

Metals

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
*	LCS or LCSD exceeds the control limits
^	ICV,CCV,ICB,CCB, ISA, ISB, CRI, CRA, DLCK or MRL standard: Instrument related QC exceeds the control limits.

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Sediments

Report Number: 680-102199-3

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 06/11/2014; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 1.1 C.

A revised report was necessary to correct the dilution factors for samples SD-196-SS (680-102199-26), SD-196-01 (680-102199-27), SD-196-02 (680-102199-28) for isotopic uranium activity and also the final volume that was used.

TOTAL URANIUM

Samples SD-279-SS (680-102199-1), SD-279-01 (680-102199-2), SD-279-02 (680-102199-3), SD-277-SS (680-102199-7), SD-277-01 (680-102199-8), SD-277-02 (680-102199-9), SD-219-SS (680-102199-11), SD-219-01 (680-102199-12), SD-219-02 (680-102199-13), SD-219-03 (680-102199-14), SD-218-SS (680-102199-15), SD-218-01 (680-102199-16), SD-218-02 (680-102199-17), SD-203-SS (680-102199-18), SD-203-01 (680-102199-19), SD-203-02 (680-102199-20), SD-202-SS (680-102199-22), SD-202-01 (680-102199-23), SD-202-02 (680-102199-24), SD-195-SS (680-102199-25), SD-196-SS (680-102199-26), SD-196-01 (680-102199-27), SD-196-02 (680-102199-28), SD-220-SS (680-102199-30), SD-220-01 (680-102199-31), SD-220-02 (680-102199-32), SD-DUP-01 (680-102199-33), SD-201-SS (680-102199-35), SD-201-01 (680-102199-36), SD-201-02 (680-102199-37), SD-200-SS (680-102199-39), SD-200-01 (680-102199-40) and SD-200-02 (680-102199-41) were analyzed for Total Uranium in accordance with EPA SW-846 6020A. The samples were analyzed on 08/19/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM

Samples SD-279-SS (680-102199-1), SD-279-01 (680-102199-2), SD-279-02 (680-102199-3), SD-277-SS (680-102199-7), SD-277-01 (680-102199-8), SD-277-02 (680-102199-9), SD-219-SS (680-102199-11), SD-219-01 (680-102199-12), SD-219-02 (680-102199-13), SD-219-03 (680-102199-14), SD-218-SS (680-102199-15), SD-218-01 (680-102199-16), SD-218-02 (680-102199-17), SD-203-SS (680-102199-18), SD-203-01 (680-102199-19), SD-203-02 (680-102199-20), SD-202-SS (680-102199-22), SD-202-01 (680-102199-23), SD-202-02 (680-102199-24), SD-195-SS (680-102199-25), SD-196-SS (680-102199-26), SD-196-01 (680-102199-27), SD-196-02 (680-102199-28), SD-220-SS (680-102199-30), SD-220-01 (680-102199-31), SD-220-02 (680-102199-32), SD-DUP-01 (680-102199-33), SD-201-SS (680-102199-35), SD-201-01 (680-102199-36), SD-201-02 (680-102199-37), SD-200-SS (680-102199-39), SD-200-01 (680-102199-40) and SD-200-02 (680-102199-41) were analyzed for Isotopic Uranium in accordance with EPA SW-846 6020A. The samples were prepared on 08/12/2014 and analyzed on 08/14/2014 and 08/18/2014.

The instrument blank contained uranium 233 greater than the reporting limit (RL), and were not reanalyzed because the associated samples were non-detect for uranium 233 . The data have been qualified and reported. (ICB 160-138778/13)

The ICB was outside upper QC limits for uranium 233. All of the samples were bracketed by CCB's that were withing limits. (ICB 160-138156/10)

Due to the high concentration of uranium 238, the matrix spike / matrix spike duplicate (MS/MSD) for could not be evaluated for accuracy and precision. The associated laboratory control sample (LCS) met acceptance criteria. (680-102199-1 MS), (680-102199-1 MSD)

The presence of the '4' qualifier indicates analytes where the concentration in the unspiked sample exceeded four times the spiking amount.

Refer to the QC report for details.

Samples SD-279-SS (680-102199-1)[5X], SD-279-01 (680-102199-2)[5X], SD-279-02 (680-102199-3)[5X], SD-277-SS (680-102199-7)[5X], SD-277-01 (680-102199-8)[5X], SD-277-02 (680-102199-9)[5X], SD-219-SS (680-102199-11)[5X], SD-219-01 (680-102199-12)[5X], SD-219-02 (680-102199-13)[5X], SD-219-03 (680-102199-14)[5X], SD-218-SS (680-102199-15)[5X], SD-218-01 (680-102199-16)[5X], SD-218-02 (680-102199-17)[5X], SD-203-SS (680-102199-18)[5X], SD-203-01 (680-102199-19)[5X], SD-203-02 (680-102199-20)[5X], SD-202-SS (680-102199-22)[5X], SD-202-01 (680-102199-23)[5X], SD-202-02 (680-102199-24)[5X], SD-195-SS (680-102199-25)[5X], SD-196-SS (680-102199-26)[5X], SD-196-01 (680-102199-27)[5X], SD-196-02 (680-102199-28)[5X], SD-220-SS (680-102199-30)[5X],

SD-220-01 (680-102199-31)[5X], SD-220-02 (680-102199-32)[5X], SD-DUP-01 (680-102199-33)[5X], SD-201-SS (680-102199-35)[5X], SD-201-01 (680-102199-36)[5X], SD-201-02 (680-102199-37)[5X], SD-200-SS (680-102199-39)[5X], SD-200-01 (680-102199-40)[5X] and SD-200-02 (680-102199-41)[5X] required dilution prior to analysis due to high salt content. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM PERCENTAGE

Samples SD-279-SS (680-102199-1), SD-279-01 (680-102199-2), SD-279-02 (680-102199-3), SD-277-SS (680-102199-7), SD-277-01 (680-102199-8), SD-277-02 (680-102199-9), SD-219-SS (680-102199-11), SD-219-01 (680-102199-12), SD-219-02 (680-102199-13), SD-219-03 (680-102199-14), SD-218-SS (680-102199-15), SD-218-01 (680-102199-16), SD-218-02 (680-102199-17), SD-203-SS (680-102199-18), SD-203-01 (680-102199-19), SD-203-02 (680-102199-20), SD-202-SS (680-102199-22), SD-202-01 (680-102199-23), SD-202-02 (680-102199-24), SD-195-SS (680-102199-25), SD-196-SS (680-102199-26), SD-196-01 (680-102199-27), SD-196-02 (680-102199-28), SD-220-SS (680-102199-30), SD-220-01 (680-102199-31), SD-220-02 (680-102199-32), SD-DUP-01 (680-102199-33), SD-201-SS (680-102199-35), SD-201-01 (680-102199-36), SD-201-02 (680-102199-37), SD-200-SS (680-102199-39), SD-200-01 (680-102199-40) and SD-200-02 (680-102199-41) were analyzed for Isotopic Uranium Percentage in accordance with EPA SW-846 6020A. The samples were analyzed on 08/19/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM ACTIVITY

Samples SD-279-SS (680-102199-1), SD-279-01 (680-102199-2), SD-279-02 (680-102199-3), SD-277-SS (680-102199-7), SD-277-01 (680-102199-8), SD-277-02 (680-102199-9), SD-219-SS (680-102199-11), SD-219-01 (680-102199-12), SD-219-02 (680-102199-13), SD-219-03 (680-102199-14), SD-218-SS (680-102199-15), SD-218-01 (680-102199-16), SD-218-02 (680-102199-17), SD-203-SS (680-102199-18), SD-203-01 (680-102199-19), SD-203-02 (680-102199-20), SD-202-SS (680-102199-22), SD-202-01 (680-102199-23), SD-202-02 (680-102199-24), SD-195-SS (680-102199-25), SD-196-SS (680-102199-26), SD-196-01 (680-102199-27), SD-196-02 (680-102199-28), SD-220-SS (680-102199-30), SD-220-01 (680-102199-31), SD-220-02 (680-102199-32), SD-DUP-01 (680-102199-33), SD-201-SS (680-102199-35), SD-201-01 (680-102199-36), SD-201-02 (680-102199-37), SD-200-SS (680-102199-39), SD-200-01 (680-102199-40) and SD-200-02 (680-102199-41) were analyzed for Isotopic Uranium Activity in accordance with EPA SW-846 6020A. The samples were prepared on 08/12/2014 and analyzed on 08/14/2014 and 08/18/2014.

U-238 was detected in method blanks MB 160-137278/1-A, and MB 160-137385/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged. Refer to the QC report for details.

Samples SD-279-SS (680-102199-1)[5X], SD-279-01 (680-102199-2)[5X], SD-279-02 (680-102199-3)[5X], SD-277-SS (680-102199-7)[5X], SD-277-01 (680-102199-8)[5X], SD-277-02 (680-102199-9)[5X], SD-219-SS (680-102199-11)[5X], SD-219-01 (680-102199-12)[5X], SD-219-02 (680-102199-13)[5X], SD-219-03 (680-102199-14)[5X], SD-218-SS (680-102199-15)[5X], SD-218-01 (680-102199-16)[5X], SD-218-02 (680-102199-17)[5X], SD-203-SS (680-102199-18)[5X], SD-203-01 (680-102199-19)[5X], SD-203-02 (680-102199-20)[5X], SD-202-SS (680-102199-22)[5X], SD-202-01 (680-102199-23)[5X], SD-202-02 (680-102199-24)[5X], SD-195-SS (680-102199-25)[5X], SD-220-SS (680-102199-30)[5X], SD-220-01 (680-102199-31)[5X], SD-220-02 (680-102199-32)[5X], SD-DUP-01 (680-102199-33)[5X], SD-201-SS (680-102199-35)[5X], SD-201-01 (680-102199-36)[5X], SD-201-02 (680-102199-37)[5X], SD-200-SS (680-102199-39)[5X], SD-200-01 (680-102199-40)[5X] and SD-200-02 (680-102199-41)[5X] required dilution prior to analysis due to high salt content. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-3
SDG: 680102199-3

Client Sample ID: SD-279-SS — Lab Sample ID: 680-102199-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.019		0.012	0.0049	mg/Kg	5		6020A	Total/NA
U-238	2.6	B	0.012	0.00072	mg/Kg	5		6020A	Total/NA
Total Uranium	2.6		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-279-01 — Lab Sample ID: 680-102199-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.023		0.011	0.0045	mg/Kg	5		6020A	Total/NA
U-238	3.0	B	0.011	0.00067	mg/Kg	5		6020A	Total/NA
Total Uranium	3.0		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-279-02 — Lab Sample ID: 680-102199-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.012		0.011	0.0045	mg/Kg	5		6020A	Total/NA
U-238	1.6	B	0.011	0.00066	mg/Kg	5		6020A	Total/NA
Total Uranium	1.6		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-277-SS — Lab Sample ID: 680-102199-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.024		0.011	0.0046	mg/Kg	5		6020A	Total/NA
U-238	3.2	B	0.011	0.00068	mg/Kg	5		6020A	Total/NA
Total Uranium	3.2		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-277-01 — Lab Sample ID: 680-102199-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.023		0.011	0.0043	mg/Kg	5		6020A	Total/NA
U-238	3.1	B	0.011	0.00064	mg/Kg	5		6020A	Total/NA
Total Uranium	3.1		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-277-02 — Lab Sample ID: 680-102199-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.041		0.012	0.0047	mg/Kg	5		6020A	Total/NA
U-238	5.4	B	0.012	0.00069	mg/Kg	5		6020A	Total/NA
Total Uranium	5.4		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-219-SS — Lab Sample ID: 680-102199-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.018		0.010	0.0042	mg/Kg	5		6020A	Total/NA
U-238	2.4	B	0.010	0.00063	mg/Kg	5		6020A	Total/NA
Total Uranium	2.4		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-219-01 — Lab Sample ID: 680-102199-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.024		0.012	0.0048	mg/Kg	5		6020A	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: SD-219-01 (Continued) — Lab Sample ID: 680-102199-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-238	3.2	B	0.012	0.00070	mg/Kg	5		6020A	Total/NA
Total Uranium	3.2		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-219-02 — Lab Sample ID: 680-102199-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.0084	J	0.012	0.0049	mg/Kg	5		6020A	Total/NA
U-238	1.1	B	0.012	0.00072	mg/Kg	5		6020A	Total/NA
Total Uranium	1.1		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-219-03 — Lab Sample ID: 680-102199-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.027		0.011	0.0044	mg/Kg	5		6020A	Total/NA
U-238	3.6	B	0.011	0.00065	mg/Kg	5		6020A	Total/NA
Total Uranium	3.6		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-218-SS — Lab Sample ID: 680-102199-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.0062	J	0.011	0.0044	mg/Kg	5		6020A	Total/NA
U-238	0.83	B	0.011	0.00066	mg/Kg	5		6020A	Total/NA
Total Uranium	0.84		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-218-01 — Lab Sample ID: 680-102199-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.0076	J	0.012	0.0050	mg/Kg	5		6020A	Total/NA
U-238	1.0	B	0.012	0.00074	mg/Kg	5		6020A	Total/NA
Total Uranium	1.0		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-218-02 — Lab Sample ID: 680-102199-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.0050	J	0.012	0.0047	mg/Kg	5		6020A	Total/NA
U-238	0.68	B	0.012	0.00069	mg/Kg	5		6020A	Total/NA
Total Uranium	0.69		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-203-SS — Lab Sample ID: 680-102199-18

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.029		0.011	0.0043	mg/Kg	5		6020A	Total/NA
U-238	3.9	B	0.011	0.00064	mg/Kg	5		6020A	Total/NA
Total Uranium	3.9		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-203-01 — Lab Sample ID: 680-102199-19

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.019		0.011	0.0045	mg/Kg	5		6020A	Total/NA
U-238	2.6	B	0.011	0.00066	mg/Kg	5		6020A	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: SD-203-01 (Continued) — Lab Sample ID: 680-102199-19

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Uranium	2.6		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-203-02 — Lab Sample ID: 680-102199-20

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.031		0.012	0.0047	mg/Kg	5		6020A	Total/NA
U-238	3.3	B	0.012	0.00070	mg/Kg	5		6020A	Total/NA
Total Uranium	3.3		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-202-SS — Lab Sample ID: 680-102199-22

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.022		0.011	0.0046	mg/Kg	5		6020A	Total/NA
U-238	2.9	B	0.011	0.00068	mg/Kg	5		6020A	Total/NA
Total Uranium	2.9		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-202-01 — Lab Sample ID: 680-102199-23

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.015		0.011	0.0043	mg/Kg	5		6020A	Total/NA
U-238	2.0	B	0.011	0.00063	mg/Kg	5		6020A	Total/NA
Total Uranium	2.0		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-202-02 — Lab Sample ID: 680-102199-24

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.0063	J ^	0.011	0.0046	mg/Kg	5		6020A	Total/NA
U-238	0.83	B	0.011	0.00068	mg/Kg	5		6020A	Total/NA
Total Uranium	0.84		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-195-SS — Lab Sample ID: 680-102199-25

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.0068	J	0.012	0.0050	mg/Kg	5		6020A	Total/NA
U-238	0.93	B	0.012	0.00074	mg/Kg	5		6020A	Total/NA
Total Uranium	0.94		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-196-SS — Lab Sample ID: 680-102199-26

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.018		0.012	0.0050	mg/Kg	5		6020A	Total/NA
U-238	2.5	B	0.012	0.00074	mg/Kg	5		6020A	Total/NA
Total Uranium	2.5		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-196-01 — Lab Sample ID: 680-102199-27

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.019		0.012	0.0050	mg/Kg	5		6020A	Total/NA
U-238	2.6	B	0.012	0.00074	mg/Kg	5		6020A	Total/NA
Total Uranium	2.6		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-3
SDG: 680102199-3

Client Sample ID: SD-196-02 — Lab Sample ID: 680-102199-28

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.013		0.012	0.0049	mg/Kg	5		6020A	Total/NA
U-238	1.8	B	0.012	0.00073	mg/Kg	5		6020A	Total/NA
Total Uranium	1.8		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-220-SS — Lab Sample ID: 680-102199-30

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.022		0.012	0.0049	mg/Kg	5		6020A	Total/NA
U-238	2.8	B	0.012	0.00072	mg/Kg	5		6020A	Total/NA
Total Uranium	2.8		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-220-01 — Lab Sample ID: 680-102199-31

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.025		0.012	0.0048	mg/Kg	5		6020A	Total/NA
U-238	3.1	B	0.012	0.00071	mg/Kg	5		6020A	Total/NA
Total Uranium	3.1		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-220-02 — Lab Sample ID: 680-102199-32

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.020		0.011	0.0044	mg/Kg	5		6020A	Total/NA
U-238	2.0	B	0.011	0.00064	mg/Kg	5		6020A	Total/NA
Total Uranium	2.0		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-DUP-01 — Lab Sample ID: 680-102199-33

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.023		0.012	0.0048	mg/Kg	5		6020A	Total/NA
U-238	3.0	B	0.012	0.00071	mg/Kg	5		6020A	Total/NA
Total Uranium	3.0		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-201-SS — Lab Sample ID: 680-102199-35

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.035		0.011	0.0046	mg/Kg	5		6020A	Total/NA
U-238	4.6	B	0.011	0.00069	mg/Kg	5		6020A	Total/NA
Total Uranium	4.6		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-201-01 — Lab Sample ID: 680-102199-36

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.030		0.011	0.0045	mg/Kg	5		6020A	Total/NA
U-238	3.8	B	0.011	0.00067	mg/Kg	5		6020A	Total/NA
Total Uranium	3.8		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-201-02 — Lab Sample ID: 680-102199-37

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.019		0.011	0.0044	mg/Kg	5		6020A	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: SD-201-02 (Continued) — Lab Sample ID: 680-102199-37

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-238	2.5	B	0.011	0.00065	mg/Kg	5		6020A	Total/NA
Total Uranium	2.5		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-200-SS — Lab Sample ID: 680-102199-39

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.026		0.012	0.0047	mg/Kg	5		6020A	Total/NA
U-238	3.4	B	0.012	0.00070	mg/Kg	5		6020A	Total/NA
Total Uranium	3.4		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-200-01 — Lab Sample ID: 680-102199-40

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.027		0.012	0.0047	mg/Kg	5		6020A	Total/NA
U-238	3.3	B	0.012	0.00069	mg/Kg	5		6020A	Total/NA
Total Uranium	3.3		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-200-02 — Lab Sample ID: 680-102199-41

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.028		0.011	0.0046	mg/Kg	5		6020A	Total/NA
U-238	3.7	B	0.011	0.00067	mg/Kg	5		6020A	Total/NA
Total Uranium	3.7		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: SD-279-SS

Lab Sample ID: 680-102199-1

Date Collected: 06/09/14 15:40

Matrix: Solid

Date Received: 06/11/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/12/14 10:34	08/14/14 13:50	5
U-234	ND		0.012	0.00072	mg/Kg		08/12/14 10:34	08/14/14 13:50	5
U-235	**0.019**		0.012	0.0049	mg/Kg		08/12/14 10:34	08/14/14 13:50	5
U-236	ND		0.012	0.00096	mg/Kg		08/12/14 10:34	08/14/14 13:50	5
U-238	**2.6**	**B**	0.012	0.00072	mg/Kg		08/12/14 10:34	08/14/14 13:50	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**2.6**		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	0.560	U	0.178	0.185	116	34.7	pCi/g	08/12/14 10:34	08/14/14 13:50	5
U-234	1.33	U	0.204	0.238	74.8	4.49	pCi/g	08/12/14 10:34	08/14/14 13:50	5
U-235	**0.0420**		0.000282	0.00387	0.0260	0.0106	pCi/g	08/12/14 10:34	08/14/14 13:50	5
U-236	0.00124	U	0.00186	0.00186	0.777	0.0622	pCi/g	08/12/14 10:34	08/14/14 13:50	5
U-238	**0.868**		0.00108	0.0798	0.00404	0.000243	pCi/g	08/12/14 10:34	08/14/14 13:50	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.725**						%		08/19/14 12:11	1

Client Sample ID: SD-279-01

Lab Sample ID: 680-102199-2

Date Collected: 06/09/14 15:45

Matrix: Solid

Date Received: 06/11/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0033	mg/Kg		08/12/14 10:34	08/14/14 14:08	5
U-234	ND		0.011	0.00067	mg/Kg		08/12/14 10:34	08/14/14 14:08	5
U-235	**0.023**		0.011	0.0045	mg/Kg		08/12/14 10:34	08/14/14 14:08	5
U-236	ND		0.011	0.00089	mg/Kg		08/12/14 10:34	08/14/14 14:08	5
U-238	**3.0**	**B**	0.011	0.00067	mg/Kg		08/12/14 10:34	08/14/14 14:08	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**3.0**		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	1.00	U	0.758	0.764	108	32.3	pCi/g	08/12/14 10:34	08/14/14 14:08	5
U-234	1.31	U	0.620	0.632	69.5	4.17	pCi/g	08/12/14 10:34	08/14/14 14:08	5
U-235	**0.0486**		0.00485	0.00660	0.0241	0.00982	pCi/g	08/12/14 10:34	08/14/14 14:08	5
U-236	0.000780	U	0.00319	0.00319	0.722	0.0578	pCi/g	08/12/14 10:34	08/14/14 14:08	5
U-238	**1.02**		0.0979	0.136	0.00375	0.000226	pCi/g	08/12/14 10:34	08/14/14 14:08	5

Client Sample ID: SD-279-01

Lab Sample ID: 680-102199-2

Date Collected: 06/09/14 15:45

Matrix: Solid

Date Received: 06/11/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.761						%		08/19/14 12:11	1

Client Sample ID: SD-279-02

Lab Sample ID: 680-102199-3

Date Collected: 06/09/14 15:50

Matrix: Solid

Date Received: 06/11/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0033	mg/Kg		08/12/14 10:34	08/14/14 14:13	5
U-234	ND		0.011	0.00066	mg/Kg		08/12/14 10:34	08/14/14 14:13	5
U-235	0.012		0.011	0.0045	mg/Kg		08/12/14 10:34	08/14/14 14:13	5
U-236	ND		0.011	0.00088	mg/Kg		08/12/14 10:34	08/14/14 14:13	5
U-238	1.6	B	0.011	0.00066	mg/Kg		08/12/14 10:34	08/14/14 14:13	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.6		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	0.462	U	0.383	0.385	106	31.8	pCi/g	08/12/14 10:34	08/14/14 14:13	5
U-234	0.794	U	0.436	0.443	68.5	4.11	pCi/g	08/12/14 10:34	08/14/14 14:13	5
U-235	0.0257		0.00297	0.00379	0.0238	0.00968	pCi/g	08/12/14 10:34	08/14/14 14:13	5
U-236	0.000285	U	0.00126	0.00126	0.712	0.0570	pCi/g	08/12/14 10:34	08/14/14 14:13	5
U-238	0.539		0.0589	0.0770	0.00370	0.000222	pCi/g	08/12/14 10:34	08/14/14 14:13	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.744						%		08/19/14 12:11	1

Client Sample ID: SD-277-SS

Lab Sample ID: 680-102199-7

Date Collected: 06/09/14 18:10

Matrix: Solid

Date Received: 06/11/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0034	mg/Kg		08/12/14 10:34	08/14/14 14:18	5
U-234	ND		0.011	0.00068	mg/Kg		08/12/14 10:34	08/14/14 14:18	5
U-235	0.024		0.011	0.0046	mg/Kg		08/12/14 10:34	08/14/14 14:18	5
U-236	ND		0.011	0.00091	mg/Kg		08/12/14 10:34	08/14/14 14:18	5
U-238	3.2	B	0.011	0.00068	mg/Kg		08/12/14 10:34	08/14/14 14:18	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.2		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Client Sample ID: SD-277-SS

Lab Sample ID: 680-102199-7

Date Collected: 06/09/14 18:10

Matrix: Solid

Date Received: 06/11/14 09:30

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	1.06	U	0.213	0.234	110	32.9	pCi/g	08/12/14 10:34	08/14/14 14:18	5
U-234	1.30	U	0.495	0.509	70.8	4.25	pCi/g	08/12/14 10:34	08/14/14 14:18	5
U-235	**0.0514**		0.00505	0.00692	0.0246	0.0100	pCi/g	08/12/14 10:34	08/14/14 14:18	5
U-236	0.000677	U	0.000549	0.000552	0.736	0.0590	pCi/g	08/12/14 10:34	08/14/14 14:18	5
U-238	**1.07**		0.116	0.152	0.00383	0.000230	pCi/g	08/12/14 10:34	08/14/14 14:18	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.744**						%		08/19/14 12:11	1

Client Sample ID: SD-277-01

Lab Sample ID: 680-102199-8

Date Collected: 06/09/14 18:15

Matrix: Solid

Date Received: 06/11/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0032	mg/Kg		08/12/14 10:34	08/14/14 14:22	5
U-234	ND		0.011	0.00064	mg/Kg		08/12/14 10:34	08/14/14 14:22	5
U-235	**0.023**		0.011	0.0043	mg/Kg		08/12/14 10:34	08/14/14 14:22	5
U-236	ND		0.011	0.00086	mg/Kg		08/12/14 10:34	08/14/14 14:22	5
U-238	**3.1**	**B**	0.011	0.00064	mg/Kg		08/12/14 10:34	08/14/14 14:22	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**3.1**		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	0.813	U	0.699	0.703	103	31.0	pCi/g	08/12/14 10:34	08/14/14 14:22	5
U-234	1.11	U	0.285	0.303	66.6	4.00	pCi/g	08/12/14 10:34	08/14/14 14:22	5
U-235	**0.0498**		0.00681	0.00821	0.0231	0.00943	pCi/g	08/12/14 10:34	08/14/14 14:22	5
U-236	0.000249	U	0.00191	0.00191	0.693	0.0555	pCi/g	08/12/14 10:34	08/14/14 14:22	5
U-238	**1.03**		0.127	0.158	0.00360	0.000216	pCi/g	08/12/14 10:34	08/14/14 14:22	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.736**						%		08/19/14 12:11	1

Client Sample ID: SD-277-02

Lab Sample ID: 680-102199-9

Date Collected: 06/09/14 18:20

Matrix: Solid

Date Received: 06/11/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0035	mg/Kg		08/12/14 10:34	08/14/14 14:27	5
U-234	ND		0.012	0.00069	mg/Kg		08/12/14 10:34	08/14/14 14:27	5
U-235	**0.041**		0.012	0.0047	mg/Kg		08/12/14 10:34	08/14/14 14:27	5
U-236	ND		0.012	0.00092	mg/Kg		08/12/14 10:34	08/14/14 14:27	5
U-238	**5.4**	**B**	0.012	0.00069	mg/Kg		08/12/14 10:34	08/14/14 14:27	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**5.4**		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	1.25	U	0.215	0.243	111	33.3	pCi/g	08/12/14 10:34	08/14/14 14:27	5
U-234	2.09	U	0.776	0.799	71.6	4.30	pCi/g	08/12/14 10:34	08/14/14 14:27	5
U-235	**0.0878**		0.00922	0.0123	0.0249	0.0101	pCi/g	08/12/14 10:34	08/14/14 14:27	5
U-236	0.00146	U	0.00140	0.00140	0.745	0.0596	pCi/g	08/12/14 10:34	08/14/14 14:27	5
U-238	**1.83**		0.177	0.244	0.00387	0.000233	pCi/g	08/12/14 10:34	08/14/14 14:27	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.754**						%		08/19/14 12:11	1

Client Sample ID: SD-219-SS

Lab Sample ID: 680-102199-11

Date Collected: 06/10/14 09:20

Matrix: Solid

Date Received: 06/11/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.010	0.0031	mg/Kg		08/12/14 10:34	08/14/14 14:41	5
U-234	ND		0.010	0.00063	mg/Kg		08/12/14 10:34	08/14/14 14:41	5
U-235	**0.018**		0.010	0.0042	mg/Kg		08/12/14 10:34	08/14/14 14:41	5
U-236	ND		0.010	0.00084	mg/Kg		08/12/14 10:34	08/14/14 14:41	5
U-238	**2.4**	**B**	0.010	0.00063	mg/Kg		08/12/14 10:34	08/14/14 14:41	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**2.4**		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	0.948	U	0.375	0.385	101	30.3	pCi/g	08/12/14 10:34	08/14/14 14:41	5
U-234	1.31	U	0.105	0.160	65.1	3.91	pCi/g	08/12/14 10:34	08/14/14 14:41	5
U-235	**0.0390**		0.00502	0.00617	0.0226	0.00921	pCi/g	08/12/14 10:34	08/14/14 14:41	5
U-236	0.00349	U	0.000249	0.000406	0.677	0.0542	pCi/g	08/12/14 10:34	08/14/14 14:41	5
U-238	**0.817**		0.0844	0.113	0.00352	0.000211	pCi/g	08/12/14 10:34	08/14/14 14:41	5

Client Sample ID: SD-219-SS

Lab Sample ID: 680-102199-11

Date Collected: 06/10/14 09:20

Matrix: Solid

Date Received: 06/11/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.744						%		08/19/14 12:11	1

Client Sample ID: SD-219-01

Lab Sample ID: 680-102199-12

Date Collected: 06/10/14 09:22

Matrix: Solid

Date Received: 06/11/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0035	mg/Kg		08/12/14 10:34	08/14/14 14:46	5
U-234	ND		0.012	0.00070	mg/Kg		08/12/14 10:34	08/14/14 14:46	5
U-235	0.024		0.012	0.0048	mg/Kg		08/12/14 10:34	08/14/14 14:46	5
U-236	ND		0.012	0.00094	mg/Kg		08/12/14 10:34	08/14/14 14:46	5
U-238	3.2	B	0.012	0.00070	mg/Kg		08/12/14 10:34	08/14/14 14:46	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.2		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	0.659	U	0.592	0.595	113	33.9	pCi/g	08/12/14 10:34	08/14/14 14:46	5
U-234	1.44	U	0.286	0.315	72.9	4.38	pCi/g	08/12/14 10:34	08/14/14 14:46	5
U-235	0.0515		0.00498	0.00688	0.0253	0.0103	pCi/g	08/12/14 10:34	08/14/14 14:46	5
U-236	0.00139	U	0.00165	0.00165	0.758	0.0607	pCi/g	08/12/14 10:34	08/14/14 14:46	5
U-238	1.07		0.0863	0.131	0.00394	0.000237	pCi/g	08/12/14 10:34	08/14/14 14:46	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.744						%		08/19/14 12:11	1

Client Sample ID: SD-219-02

Lab Sample ID: 680-102199-13

Date Collected: 06/10/14 09:25

Matrix: Solid

Date Received: 06/11/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/12/14 10:34	08/14/14 14:50	5
U-234	ND		0.012	0.00072	mg/Kg		08/12/14 10:34	08/14/14 14:50	5
U-235	0.0084	J	0.012	0.0049	mg/Kg		08/12/14 10:34	08/14/14 14:50	5
U-236	ND		0.012	0.00096	mg/Kg		08/12/14 10:34	08/14/14 14:50	5
U-238	1.1	B	0.012	0.00072	mg/Kg		08/12/14 10:34	08/14/14 14:50	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.1		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Client Sample ID: SD-219-02

Date Collected: 06/10/14 09:25
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-13

Matrix: Solid

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	0.848	U	0.411	0.419	115	34.6	pCi/g	08/12/14 10:34	08/14/14 14:50	5
U-234	0.604	U	0.235	0.242	74.4	4.47	pCi/g	08/12/14 10:34	08/14/14 14:50	5
U-235	**0.0182**		0.00227	0.00282	0.0259	0.0105	pCi/g	08/12/14 10:34	08/14/14 14:50	5
U-236	0.000959	U	0.00136	0.00136	0.774	0.0620	pCi/g	08/12/14 10:34	08/14/14 14:50	5
U-238	**0.384**		0.0573	0.0673	0.00402	0.000242	pCi/g	08/12/14 10:34	08/14/14 14:50	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.758**						%		08/19/14 12:11	1

Client Sample ID: SD-219-03

Date Collected: 06/10/14 09:28
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-14

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0033	mg/Kg		08/12/14 10:34	08/14/14 14:55	5
U-234	ND		0.011	0.00065	mg/Kg		08/12/14 10:34	08/14/14 14:55	5
U-235	**0.027**		0.011	0.0044	mg/Kg		08/12/14 10:34	08/14/14 14:55	5
U-236	ND		0.011	0.00087	mg/Kg		08/12/14 10:34	08/14/14 14:55	5
U-238	**3.6**	**B**	0.011	0.00065	mg/Kg		08/12/14 10:34	08/14/14 14:55	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**3.6**		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	0.898	U	0.394	0.403	104	31.3	pCi/g	08/12/14 10:34	08/14/14 14:55	5
U-234	1.19	U	0.552	0.563	67.5	4.05	pCi/g	08/12/14 10:34	08/14/14 14:55	5
U-235	**0.0574**		0.00750	0.00917	0.0234	0.00954	pCi/g	08/12/14 10:34	08/14/14 14:55	5
U-236	0.00121	U	0.00159	0.00160	0.701	0.0562	pCi/g	08/12/14 10:34	08/14/14 14:55	5
U-238	**1.20**		0.134	0.173	0.00364	0.000219	pCi/g	08/12/14 10:34	08/14/14 14:55	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.744**						%		08/19/14 12:11	1

Client Sample ID: SD-218-SS

Lab Sample ID: 680-102199-15

Date Collected: 06/10/14 10:10

Matrix: Solid

Date Received: 06/11/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0033	mg/Kg		08/12/14 10:34	08/14/14 15:00	5
U-234	ND		0.011	0.00066	mg/Kg		08/12/14 10:34	08/14/14 15:00	5
U-235	**0.0062**	**J**	0.011	0.0044	mg/Kg		08/12/14 10:34	08/14/14 15:00	5
U-236	ND		0.011	0.00088	mg/Kg		08/12/14 10:34	08/14/14 15:00	5
U-238	**0.83**	**B**	0.011	0.00066	mg/Kg		08/12/14 10:34	08/14/14 15:00	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**0.84**		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	1.48	U	0.392	0.415	105	31.6	pCi/g	08/12/14 10:34	08/14/14 15:00	5
U-234	0.583	U	0.320	0.325	68.1	4.09	pCi/g	08/12/14 10:34	08/14/14 15:00	5
U-235	**0.0134**		0.000834	0.00149	0.0237	0.00963	pCi/g	08/12/14 10:34	08/14/14 15:00	5
U-236	0.00396	U	0.00441	0.00443	0.708	0.0567	pCi/g	08/12/14 10:34	08/14/14 15:00	5
U-238	**0.278**		0.0298	0.0392	0.00368	0.000221	pCi/g	08/12/14 10:34	08/14/14 15:00	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.741**						%		08/19/14 12:11	1

Client Sample ID: SD-218-01

Lab Sample ID: 680-102199-16

Date Collected: 06/10/14 10:12

Matrix: Solid

Date Received: 06/11/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0037	mg/Kg		08/12/14 10:34	08/14/14 15:04	5
U-234	ND		0.012	0.00074	mg/Kg		08/12/14 10:34	08/14/14 15:04	5
U-235	**0.0076**	**J**	0.012	0.0050	mg/Kg		08/12/14 10:34	08/14/14 15:04	5
U-236	ND		0.012	0.00099	mg/Kg		08/12/14 10:34	08/14/14 15:04	5
U-238	**1.0**	**B**	0.012	0.00074	mg/Kg		08/12/14 10:34	08/14/14 15:04	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**1.0**		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	1.08	U	0.670	0.677	119	35.7	pCi/g	08/12/14 10:34	08/14/14 15:04	5
U-234	0.728	U	0.388	0.394	76.8	4.61	pCi/g	08/12/14 10:34	08/14/14 15:04	5
U-235	**0.0165**		0.00330	0.00364	0.0267	0.0109	pCi/g	08/12/14 10:34	08/14/14 15:04	5
U-236	0.00255	U	0.00330	0.00331	0.798	0.0639	pCi/g	08/12/14 10:34	08/14/14 15:04	5
U-238	**0.353**		0.0620	0.0700	0.00415	0.000249	pCi/g	08/12/14 10:34	08/14/14 15:04	5

Client Sample ID: SD-218-01

Lab Sample ID: 680-102199-16

Date Collected: 06/10/14 10:12

Matrix: Solid

Date Received: 06/11/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.754						%		08/19/14 12:11	1

Client Sample ID: SD-218-02

Lab Sample ID: 680-102199-17

Date Collected: 06/10/14 10:14

Matrix: Solid

Date Received: 06/11/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0035	mg/Kg		08/12/14 10:34	08/14/14 15:09	5
U-234	ND		0.012	0.00069	mg/Kg		08/12/14 10:34	08/14/14 15:09	5
U-235	0.0050	J	0.012	0.0047	mg/Kg		08/12/14 10:34	08/14/14 15:09	5
U-236	ND		0.012	0.00092	mg/Kg		08/12/14 10:34	08/14/14 15:09	5
U-238	0.68	B	0.012	0.00069	mg/Kg		08/12/14 10:34	08/14/14 15:09	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.69		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	1.17	U	0.733	0.741	111	33.3	pCi/g	08/12/14 10:34	08/14/14 15:09	5
U-234	0.370	U	0.0786	0.0857	71.7	4.30	pCi/g	08/12/14 10:34	08/14/14 15:09	5
U-235	0.0109		0.00106	0.00146	0.0249	0.0101	pCi/g	08/12/14 10:34	08/14/14 15:09	5
U-236	0.000686	U	0.00203	0.00203	0.745	0.0597	pCi/g	08/12/14 10:34	08/14/14 15:09	5
U-238	0.228		0.0310	0.0374	0.00387	0.000233	pCi/g	08/12/14 10:34	08/14/14 15:09	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.730						%		08/19/14 12:11	1

Client Sample ID: SD-203-SS

Lab Sample ID: 680-102199-18

Date Collected: 06/10/14 11:40

Matrix: Solid

Date Received: 06/11/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0032	mg/Kg		08/12/14 10:34	08/14/14 15:14	5
U-234	ND		0.011	0.00064	mg/Kg		08/12/14 10:34	08/14/14 15:14	5
U-235	0.029		0.011	0.0043	mg/Kg		08/12/14 10:34	08/14/14 15:14	5
U-236	ND		0.011	0.00085	mg/Kg		08/12/14 10:34	08/14/14 15:14	5
U-238	3.9	B	0.011	0.00064	mg/Kg		08/12/14 10:34	08/14/14 15:14	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.9		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Client Sample ID: SD-203-SS

Lab Sample ID: 680-102199-18

Date Collected: 06/10/14 11:40

Matrix: Solid

Date Received: 06/11/14 09:30

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	1.18	U	0.601	0.611	102	30.6	pCi/g	08/12/14 10:34	08/14/14 15:14	5
U-234	1.61	U	1.08	1.09	65.9	3.95	pCi/g	08/12/14 10:34	08/14/14 15:14	5
U-235	**0.0629**		0.00526	0.00782	0.0229	0.00932	pCi/g	08/12/14 10:34	08/14/14 15:14	5
U-236	0.00258	U	0.00281	0.00282	0.685	0.0549	pCi/g	08/12/14 10:34	08/14/14 15:14	5
U-238	**1.31**		0.0924	0.152	0.00356	0.000214	pCi/g	08/12/14 10:34	08/14/14 15:14	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.738**						%		08/19/14 12:11	1

Client Sample ID: SD-203-01

Lab Sample ID: 680-102199-19

Date Collected: 06/10/14 11:45

Matrix: Solid

Date Received: 06/11/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0033	mg/Kg		08/12/14 10:34	08/14/14 15:18	5
U-234	ND		0.011	0.00066	mg/Kg		08/12/14 10:34	08/14/14 15:18	5
U-235	**0.019**		0.011	0.0045	mg/Kg		08/12/14 10:34	08/14/14 15:18	5
U-236	ND		0.011	0.00088	mg/Kg		08/12/14 10:34	08/14/14 15:18	5
U-238	**2.6**	**B**	0.011	0.00066	mg/Kg		08/12/14 10:34	08/14/14 15:18	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**2.6**		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	1.03	U	0.0919	0.132	106	31.8	pCi/g	08/12/14 10:34	08/14/14 15:18	5
U-234	1.28	U	0.229	0.258	68.5	4.11	pCi/g	08/12/14 10:34	08/14/14 15:18	5
U-235	**0.0415**		0.00437	0.00580	0.0238	0.00969	pCi/g	08/12/14 10:34	08/14/14 15:18	5
U-236	0.00325	U	0.00285	0.00286	0.712	0.0570	pCi/g	08/12/14 10:34	08/14/14 15:18	5
U-238	**0.865**		0.0644	0.102	0.00370	0.000222	pCi/g	08/12/14 10:34	08/14/14 15:18	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.725**						%		08/19/14 12:11	1

Client Sample ID: SD-203-02

Date Collected: 06/10/14 11:50
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-20

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0035	mg/Kg		08/12/14 10:34	08/14/14 15:23	5
U-234	ND		0.012	0.00070	mg/Kg		08/12/14 10:34	08/14/14 15:23	5
U-235	**0.031**		0.012	0.0047	mg/Kg		08/12/14 10:34	08/14/14 15:23	5
U-236	ND		0.012	0.00093	mg/Kg		08/12/14 10:34	08/14/14 15:23	5
U-238	**3.3**	**B**	0.012	0.00070	mg/Kg		08/12/14 10:34	08/14/14 15:23	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**3.3**		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	1.04	U	0.713	0.719	112	33.6	pCi/g	08/12/14 10:34	08/14/14 15:23	5
U-234	1.69	U	0.339	0.373	72.4	4.34	pCi/g	08/12/14 10:34	08/14/14 15:23	5
U-235	**0.0675**		0.00588	0.00855	0.0251	0.0102	pCi/g	08/12/14 10:34	08/14/14 15:23	5
U-236	0.00247	U	0.00243	0.00244	0.752	0.0603	pCi/g	08/12/14 10:34	08/14/14 15:23	5
U-238	**1.09**		0.0957	0.139	0.00391	0.000235	pCi/g	08/12/14 10:34	08/14/14 15:23	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.931**						%		08/19/14 12:11	1

Client Sample ID: SD-202-SS

Date Collected: 06/10/14 12:20
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-22

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0034	mg/Kg		08/12/14 10:34	08/14/14 15:37	5
U-234	ND		0.011	0.00068	mg/Kg		08/12/14 10:34	08/14/14 15:37	5
U-235	**0.022**		0.011	0.0046	mg/Kg		08/12/14 10:34	08/14/14 15:37	5
U-236	ND		0.011	0.00091	mg/Kg		08/12/14 10:34	08/14/14 15:37	5
U-238	**2.9**	**B**	0.011	0.00068	mg/Kg		08/12/14 10:34	08/14/14 15:37	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**2.9**		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	0.503	U	0.282	0.285	109	32.8	pCi/g	08/12/14 10:34	08/14/14 15:37	5
U-234	1.33	U	0.156	0.198	70.6	4.24	pCi/g	08/12/14 10:34	08/14/14 15:37	5
U-235	**0.0467**		0.00678	0.00803	0.0245	0.00999	pCi/g	08/12/14 10:34	08/14/14 15:37	5
U-236	0.00291	U	0.00148	0.00150	0.734	0.0588	pCi/g	08/12/14 10:34	08/14/14 15:37	5
U-238	**0.959**		0.132	0.159	0.00381	0.000229	pCi/g	08/12/14 10:34	08/14/14 15:37	5

Client Sample ID: SD-202-SS

Lab Sample ID: 680-102199-22

Date Collected: 06/10/14 12:20

Matrix: Solid

Date Received: 06/11/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.753						%		08/19/14 12:11	1

Client Sample ID: SD-202-01

Lab Sample ID: 680-102199-23

Date Collected: 06/10/14 12:25

Matrix: Solid

Date Received: 06/11/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0032	mg/Kg		08/12/14 10:34	08/14/14 15:42	5
U-234	ND		0.011	0.00063	mg/Kg		08/12/14 10:34	08/14/14 15:42	5
U-235	0.015		0.011	0.0043	mg/Kg		08/12/14 10:34	08/14/14 15:42	5
U-236	ND		0.011	0.00084	mg/Kg		08/12/14 10:34	08/14/14 15:42	5
U-238	2.0	B	0.011	0.00063	mg/Kg		08/12/14 10:34	08/14/14 15:42	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.0		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	0.515	U	0.362	0.366	101	30.4	pCi/g	08/12/14 10:34	08/14/14 15:42	5
U-234	0.869	U	0.425	0.433	65.4	3.93	pCi/g	08/12/14 10:34	08/14/14 15:42	5
U-235	0.0317		0.00406	0.00500	0.0227	0.00925	pCi/g	08/12/14 10:34	08/14/14 15:42	5
U-236	0.00177	U	0.00278	0.00278	0.680	0.0545	pCi/g	08/12/14 10:34	08/14/14 15:42	5
U-238	0.666		0.106	0.122	0.00353	0.000212	pCi/g	08/12/14 10:34	08/14/14 15:42	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.744						%		08/19/14 12:11	1

Client Sample ID: SD-202-02

Lab Sample ID: 680-102199-24

Date Collected: 06/10/14 12:30

Matrix: Solid

Date Received: 06/11/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^ *	0.011	0.0034	mg/Kg		08/12/14 10:34	08/14/14 15:46	5
U-234	ND	^	0.011	0.00068	mg/Kg		08/12/14 10:34	08/14/14 15:46	5
U-235	0.0063	J ^	0.011	0.0046	mg/Kg		08/12/14 10:34	08/14/14 15:46	5
U-236	ND	^	0.011	0.00090	mg/Kg		08/12/14 10:34	08/14/14 15:46	5
U-238	0.83	B	0.011	0.00068	mg/Kg		08/12/14 10:34	08/14/14 15:46	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.84		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Client Sample ID: SD-202-02

Date Collected: 06/10/14 12:30
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-24

Matrix: Solid

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	1.02	U	0.304	0.318	109	32.6	pCi/g	08/12/14 10:34	08/14/14 15:46	5
U-234	0.479	U	0.0493	0.0661	70.1	4.20	pCi/g	08/12/14 10:34	08/14/14 15:46	5
U-235	**0.0136**		0.00143	0.00190	0.0243	0.00991	pCi/g	08/12/14 10:34	08/14/14 15:46	5
U-236	0.00178	U	0.00131	0.00132	0.728	0.0583	pCi/g	08/12/14 10:34	08/14/14 15:46	5
U-238	**0.280**		0.0200	0.0326	0.00378	0.000227	pCi/g	08/12/14 10:34	08/14/14 15:46	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.753**						%		08/19/14 12:11	1

Client Sample ID: SD-195-SS

Date Collected: 06/10/14 13:30
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-25

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0037	mg/Kg		08/12/14 10:34	08/14/14 15:51	5
U-234	ND		0.012	0.00074	mg/Kg		08/12/14 10:34	08/14/14 15:51	5
U-235	**0.0068**	**J**	0.012	0.0050	mg/Kg		08/12/14 10:34	08/14/14 15:51	5
U-236	ND		0.012	0.00099	mg/Kg		08/12/14 10:34	08/14/14 15:51	5
U-238	**0.93**	**B**	0.012	0.00074	mg/Kg		08/12/14 10:34	08/14/14 15:51	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**0.94**		0.0050	0.00030	mg/Kg			08/19/14 12:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	1.25	U	0.609	0.620	119	35.7	pCi/g	08/12/14 10:34	08/14/14 15:51	5
U-234	0.415	U	0.199	0.203	76.9	4.61	pCi/g	08/12/14 10:34	08/14/14 15:51	5
U-235	**0.0148**		0.00234	0.00270	0.0267	0.0109	pCi/g	08/12/14 10:34	08/14/14 15:51	5
U-236	0.00189	U	0.000569	0.000595	0.799	0.0640	pCi/g	08/12/14 10:34	08/14/14 15:51	5
U-238	**0.312**		0.0479	0.0558	0.00415	0.000250	pCi/g	08/12/14 10:34	08/14/14 15:51	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.726**						%		08/19/14 12:11	1

Client Sample ID: SD-196-SS

Lab Sample ID: 680-102199-26

Date Collected: 06/10/14 14:00

Matrix: Solid

Date Received: 06/11/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0037	mg/Kg		08/12/14 10:57	08/18/14 15:56	5
U-234	ND		0.012	0.00074	mg/Kg		08/12/14 10:57	08/18/14 15:56	5
U-235	**0.018**		0.012	0.0050	mg/Kg		08/12/14 10:57	08/18/14 15:56	5
U-236	ND		0.012	0.00098	mg/Kg		08/12/14 10:57	08/18/14 15:56	5
U-238	**2.5**	**B**	0.012	0.00074	mg/Kg		08/12/14 10:57	08/18/14 15:56	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**2.5**		0.0050	0.00030	mg/Kg			08/19/14 12:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	1.08	U	0.962	0.967	118	35.5	pCi/g	08/12/14 10:57	08/18/14 15:56	5
U-234	0.535	U	0.230	0.236	76.4	4.59	pCi/g	08/12/14 10:57	08/18/14 15:56	5
U-235	**0.0394**		0.00107	0.00378	0.0265	0.0108	pCi/g	08/12/14 10:57	08/18/14 15:56	5
U-236	-0.00419	U	0.00222	0.00225	0.794	0.0636	pCi/g	08/12/14 10:57	08/18/14 15:56	5
U-238	**0.826**		0.0112	0.0768	0.00413	0.000248	pCi/g	08/12/14 10:57	08/18/14 15:56	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.715**						%		08/19/14 12:17	1

Client Sample ID: SD-196-01

Lab Sample ID: 680-102199-27

Date Collected: 06/10/14 14:05

Matrix: Solid

Date Received: 06/11/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0037	mg/Kg		08/12/14 11:13	08/18/14 16:01	5
U-234	ND		0.012	0.00074	mg/Kg		08/12/14 11:13	08/18/14 16:01	5
U-235	**0.019**		0.012	0.0050	mg/Kg		08/12/14 11:13	08/18/14 16:01	5
U-236	ND		0.012	0.00099	mg/Kg		08/12/14 11:13	08/18/14 16:01	5
U-238	**2.6**	**B**	0.012	0.00074	mg/Kg		08/12/14 11:13	08/18/14 16:01	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**2.6**		0.0050	0.00030	mg/Kg			08/19/14 12:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	0.472	U	0.556	0.558	119	35.7	pCi/g	08/12/14 11:13	08/18/14 16:01	5
U-234	0.883	U	0.427	0.434	76.9	4.61	pCi/g	08/12/14 11:13	08/18/14 16:01	5
U-235	**0.0420**		0.00162	0.00419	0.0267	0.0109	pCi/g	08/12/14 11:13	08/18/14 16:01	5
U-236	-0.00524	U	0.00339	0.00342	0.799	0.0640	pCi/g	08/12/14 11:13	08/18/14 16:01	5
U-238	**0.862**		0.0149	0.0807	0.00415	0.000250	pCi/g	08/12/14 11:13	08/18/14 16:01	5

Client Sample ID: SD-196-01

Lab Sample ID: 680-102199-27

Date Collected: 06/10/14 14:05

Matrix: Solid

Date Received: 06/11/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.725						%		08/19/14 12:17	1

Client Sample ID: SD-196-02

Lab Sample ID: 680-102199-28

Date Collected: 06/10/14 14:10

Matrix: Solid

Date Received: 06/11/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/12/14 11:13	08/18/14 16:05	5
U-234	ND		0.012	0.00073	mg/Kg		08/12/14 11:13	08/18/14 16:05	5
U-235	0.013		0.012	0.0049	mg/Kg		08/12/14 11:13	08/18/14 16:05	5
U-236	ND		0.012	0.00097	mg/Kg		08/12/14 11:13	08/18/14 16:05	5
U-238	1.8	B	0.012	0.00073	mg/Kg		08/12/14 11:13	08/18/14 16:05	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.8		0.0050	0.00030	mg/Kg			08/19/14 12:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	0.131	U	0.285	0.286	117	35.1	pCi/g	08/12/14 11:13	08/18/14 16:05	5
U-234	0.493	U	0.181	0.187	75.6	4.53	pCi/g	08/12/14 11:13	08/18/14 16:05	5
U-235	0.0283		0.000788	0.00272	0.0262	0.0107	pCi/g	08/12/14 11:13	08/18/14 16:05	5
U-236	-0.00452	U	0.00196	0.00201	0.785	0.0629	pCi/g	08/12/14 11:13	08/18/14 16:05	5
U-238	0.590		0.0251	0.0598	0.00408	0.000245	pCi/g	08/12/14 11:13	08/18/14 16:05	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.717						%		08/19/14 12:17	1

Client Sample ID: SD-220-SS

Lab Sample ID: 680-102199-30

Date Collected: 06/10/14 14:40

Matrix: Solid

Date Received: 06/11/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/12/14 10:57	08/14/14 16:05	5
U-234	ND		0.012	0.00072	mg/Kg		08/12/14 10:57	08/14/14 16:05	5
U-235	0.022		0.012	0.0049	mg/Kg		08/12/14 10:57	08/14/14 16:05	5
U-236	ND		0.012	0.00096	mg/Kg		08/12/14 10:57	08/14/14 16:05	5
U-238	2.8	B	0.012	0.00072	mg/Kg		08/12/14 10:57	08/14/14 16:05	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.8		0.0050	0.00030	mg/Kg			08/19/14 12:19	1

Client Sample ID: SD-220-SS

Date Collected: 06/10/14 14:40
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-30

Matrix: Solid

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	0.863	U	0.513	0.519	115	34.6	pCi/g	08/12/14 10:57	08/14/14 16:05	5
U-234	1.21	U	0.129	0.171	74.5	4.47	pCi/g	08/12/14 10:57	08/14/14 16:05	5
U-235	**0.0468**		0.000635	0.00435	0.0259	0.0105	pCi/g	08/12/14 10:57	08/14/14 16:05	5
U-236	0.00211	U	0.00130	0.00132	0.775	0.0620	pCi/g	08/12/14 10:57	08/14/14 16:05	5
U-238	**0.948**		0.0142	0.0884	0.00403	0.000242	pCi/g	08/12/14 10:57	08/14/14 16:05	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.780**						%		08/19/14 12:16	1

Client Sample ID: SD-220-01

Date Collected: 06/10/14 14:42
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-31

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0035	mg/Kg		08/12/14 10:57	08/14/14 17:00	5
U-234	ND		0.012	0.00071	mg/Kg		08/12/14 10:57	08/14/14 17:00	5
U-235	**0.025**		0.012	0.0048	mg/Kg		08/12/14 10:57	08/14/14 17:00	5
U-236	ND		0.012	0.00095	mg/Kg		08/12/14 10:57	08/14/14 17:00	5
U-238	**3.1**	**B**	0.012	0.00071	mg/Kg		08/12/14 10:57	08/14/14 17:00	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**3.1**		0.0050	0.00030	mg/Kg			08/19/14 12:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	0.939	U	0.911	0.915	114	34.2	pCi/g	08/12/14 10:57	08/14/14 17:00	5
U-234	1.53	U	0.246	0.283	73.6	4.41	pCi/g	08/12/14 10:57	08/14/14 17:00	5
U-235	**0.0540**		0.00662	0.00828	0.0255	0.0104	pCi/g	08/12/14 10:57	08/14/14 17:00	5
U-236	0.00187	U	0.00105	0.00106	0.764	0.0612	pCi/g	08/12/14 10:57	08/14/14 17:00	5
U-238	**1.03**		0.107	0.143	0.00397	0.000239	pCi/g	08/12/14 10:57	08/14/14 17:00	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.800**						%		08/19/14 12:16	1

Client Sample ID: SD-220-02

Lab Sample ID: 680-102199-32

Date Collected: 06/10/14 14:44

Matrix: Solid

Date Received: 06/11/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0032	mg/Kg		08/12/14 10:57	08/14/14 17:05	5
U-234	ND		0.011	0.00064	mg/Kg		08/12/14 10:57	08/14/14 17:05	5
U-235	**0.020**		0.011	0.0044	mg/Kg		08/12/14 10:57	08/14/14 17:05	5
U-236	ND		0.011	0.00086	mg/Kg		08/12/14 10:57	08/14/14 17:05	5
U-238	**2.0**	**B**	0.011	0.00064	mg/Kg		08/12/14 10:57	08/14/14 17:05	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**2.0**		0.0050	0.00030	mg/Kg			08/19/14 12:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	0.758	U	0.418	0.424	104	31.1	pCi/g	08/12/14 10:57	08/14/14 17:05	5
U-234	1.22	U	0.173	0.206	66.9	4.01	pCi/g	08/12/14 10:57	08/14/14 17:05	5
U-235	**0.0429**		0.00384	0.00550	0.0232	0.00946	pCi/g	08/12/14 10:57	08/14/14 17:05	5
U-236	0.00361	U	0.00184	0.00187	0.695	0.0557	pCi/g	08/12/14 10:57	08/14/14 17:05	5
U-238	**0.672**		0.0438	0.0758	0.00361	0.000217	pCi/g	08/12/14 10:57	08/14/14 17:05	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.990**						%		08/19/14 12:16	1

Client Sample ID: SD-DUP-01

Lab Sample ID: 680-102199-33

Date Collected: 06/10/14 00:00

Matrix: Solid

Date Received: 06/11/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/12/14 10:57	08/14/14 17:10	5
U-234	ND		0.012	0.00071	mg/Kg		08/12/14 10:57	08/14/14 17:10	5
U-235	**0.023**		0.012	0.0048	mg/Kg		08/12/14 10:57	08/14/14 17:10	5
U-236	ND		0.012	0.00095	mg/Kg		08/12/14 10:57	08/14/14 17:10	5
U-238	**3.0**	**B**	0.012	0.00071	mg/Kg		08/12/14 10:57	08/14/14 17:10	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**3.0**		0.0050	0.00030	mg/Kg			08/19/14 12:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	0.643	U	0.193	0.202	115	34.4	pCi/g	08/12/14 10:57	08/14/14 17:10	5
U-234	1.29	U	0.602	0.614	74.1	4.45	pCi/g	08/12/14 10:57	08/14/14 17:10	5
U-235	**0.0496**		0.00485	0.00666	0.0257	0.0105	pCi/g	08/12/14 10:57	08/14/14 17:10	5
U-236	0.00148	U	0.00132	0.00133	0.770	0.0617	pCi/g	08/12/14 10:57	08/14/14 17:10	5
U-238	**1.02**		0.0946	0.133	0.00400	0.000241	pCi/g	08/12/14 10:57	08/14/14 17:10	5

Client Sample ID: SD-DUP-01

Lab Sample ID: 680-102199-33

Date Collected: 06/10/14 00:00

Matrix: Solid

Date Received: 06/11/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.761						%		08/19/14 12:17	1

Client Sample ID: SD-201-SS

Lab Sample ID: 680-102199-35

Date Collected: 06/10/14 15:10

Matrix: Solid

Date Received: 06/11/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0034	mg/Kg		08/12/14 10:57	08/14/14 17:14	5
U-234	ND		0.011	0.00069	mg/Kg		08/12/14 10:57	08/14/14 17:14	5
U-235	0.035		0.011	0.0046	mg/Kg		08/12/14 10:57	08/14/14 17:14	5
U-236	ND		0.011	0.00092	mg/Kg		08/12/14 10:57	08/14/14 17:14	5
U-238	4.6	B	0.011	0.00069	mg/Kg		08/12/14 10:57	08/14/14 17:14	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	4.6		0.0050	0.00030	mg/Kg			08/19/14 12:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	0.992	U	0.286	0.300	110	33.1	pCi/g	08/12/14 10:57	08/14/14 17:14	5
U-234	1.93	U	0.245	0.303	71.2	4.27	pCi/g	08/12/14 10:57	08/14/14 17:14	5
U-235	0.0746		0.00660	0.00952	0.0247	0.0101	pCi/g	08/12/14 10:57	08/14/14 17:14	5
U-236	0.00370	U	0.000581	0.000673	0.740	0.0593	pCi/g	08/12/14 10:57	08/14/14 17:14	5
U-238	1.56		0.166	0.219	0.00384	0.000231	pCi/g	08/12/14 10:57	08/14/14 17:14	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.755						%		08/19/14 12:17	1

Client Sample ID: SD-201-01

Lab Sample ID: 680-102199-36

Date Collected: 06/10/14 15:15

Matrix: Solid

Date Received: 06/11/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0033	mg/Kg		08/12/14 10:57	08/14/14 17:19	5
U-234	ND		0.011	0.00067	mg/Kg		08/12/14 10:57	08/14/14 17:19	5
U-235	0.030		0.011	0.0045	mg/Kg		08/12/14 10:57	08/14/14 17:19	5
U-236	ND		0.011	0.00089	mg/Kg		08/12/14 10:57	08/14/14 17:19	5
U-238	3.8	B	0.011	0.00067	mg/Kg		08/12/14 10:57	08/14/14 17:19	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.8		0.0050	0.00030	mg/Kg			08/19/14 12:19	1

Client Sample ID: SD-201-01

Date Collected: 06/10/14 15:15
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-36

Matrix: Solid

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	0.911	U	0.138	0.161	107	32.1	pCi/g	08/12/14 10:57	08/14/14 17:19	5
U-234	1.82	U	0.301	0.344	69.1	4.15	pCi/g	08/12/14 10:57	08/14/14 17:19	5
U-235	**0.0654**		0.00682	0.00910	0.0240	0.00977	pCi/g	08/12/14 10:57	08/14/14 17:19	5
U-236	0.00224	U	0.00159	0.00160	0.718	0.0575	pCi/g	08/12/14 10:57	08/14/14 17:19	5
U-238	**1.29**		0.135	0.179	0.00373	0.000224	pCi/g	08/12/14 10:57	08/14/14 17:19	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.783**						%		08/19/14 12:17	1

Client Sample ID: SD-201-02

Date Collected: 06/10/14 15:20
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-37

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0033	mg/Kg		08/12/14 10:57	08/14/14 17:24	5
U-234	ND		0.011	0.00065	mg/Kg		08/12/14 10:57	08/14/14 17:24	5
U-235	**0.019**		0.011	0.0044	mg/Kg		08/12/14 10:57	08/14/14 17:24	5
U-236	ND		0.011	0.00087	mg/Kg		08/12/14 10:57	08/14/14 17:24	5
U-238	**2.5**	**B**	0.011	0.00065	mg/Kg		08/12/14 10:57	08/14/14 17:24	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**2.5**		0.0050	0.00030	mg/Kg			08/19/14 12:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	0.987	U	1.18	1.18	105	31.5	pCi/g	08/12/14 10:57	08/14/14 17:24	5
U-234	1.17	U	0.207	0.233	67.8	4.07	pCi/g	08/12/14 10:57	08/14/14 17:24	5
U-235	**0.0408**		0.00229	0.00440	0.0235	0.00959	pCi/g	08/12/14 10:57	08/14/14 17:24	5
U-236	0.00347	U	0.00365	0.00367	0.704	0.0564	pCi/g	08/12/14 10:57	08/14/14 17:24	5
U-238	**0.849**		0.0609	0.0990	0.00366	0.000220	pCi/g	08/12/14 10:57	08/14/14 17:24	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.754**						%		08/19/14 12:17	1

Client Sample ID: SD-200-SS

Lab Sample ID: 680-102199-39

Date Collected: 06/10/14 15:50

Matrix: Solid

Date Received: 06/11/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0035	mg/Kg		08/12/14 10:57	08/14/14 17:29	5
U-234	ND		0.012	0.00070	mg/Kg		08/12/14 10:57	08/14/14 17:29	5
U-235	**0.026**		0.012	0.0047	mg/Kg		08/12/14 10:57	08/14/14 17:29	5
U-236	ND		0.012	0.00093	mg/Kg		08/12/14 10:57	08/14/14 17:29	5
U-238	**3.4**	**B**	0.012	0.00070	mg/Kg		08/12/14 10:57	08/14/14 17:29	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**3.4**		0.0050	0.00030	mg/Kg			08/19/14 12:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	0.567	U	0.668	0.670	113	33.8	pCi/g	08/12/14 10:57	08/14/14 17:29	5
U-234	1.55	U	0.185	0.234	72.7	4.36	pCi/g	08/12/14 10:57	08/14/14 17:29	5
U-235	**0.0558**		0.00534	0.00741	0.0253	0.0103	pCi/g	08/12/14 10:57	08/14/14 17:29	5
U-236	0.000605	U	0.00154	0.00154	0.756	0.0605	pCi/g	08/12/14 10:57	08/14/14 17:29	5
U-238	**1.15**		0.123	0.163	0.00393	0.000236	pCi/g	08/12/14 10:57	08/14/14 17:29	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.759**						%		08/19/14 12:17	1

Client Sample ID: SD-200-01

Lab Sample ID: 680-102199-40

Date Collected: 06/10/14 15:55

Matrix: Solid

Date Received: 06/11/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0035	mg/Kg		08/12/14 10:57	08/14/14 17:33	5
U-234	ND		0.012	0.00069	mg/Kg		08/12/14 10:57	08/14/14 17:33	5
U-235	**0.027**		0.012	0.0047	mg/Kg		08/12/14 10:57	08/14/14 17:33	5
U-236	ND		0.012	0.00092	mg/Kg		08/12/14 10:57	08/14/14 17:33	5
U-238	**3.3**	**B**	0.012	0.00069	mg/Kg		08/12/14 10:57	08/14/14 17:33	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**3.3**		0.0050	0.00030	mg/Kg			08/19/14 12:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	0.772	U	0.319	0.327	111	33.3	pCi/g	08/12/14 10:57	08/14/14 17:33	5
U-234	1.35	U	0.546	0.560	71.6	4.30	pCi/g	08/12/14 10:57	08/14/14 17:33	5
U-235	**0.0576**		0.00551	0.00764	0.0249	0.0101	pCi/g	08/12/14 10:57	08/14/14 17:33	5
U-236	0.00211	U	0.000588	0.000620	0.744	0.0596	pCi/g	08/12/14 10:57	08/14/14 17:33	5
U-238	**1.12**		0.114	0.153	0.00387	0.000233	pCi/g	08/12/14 10:57	08/14/14 17:33	5

Client Sample ID: SD-200-01

Lab Sample ID: 680-102199-40

Date Collected: 06/10/14 15:55

Matrix: Solid

Date Received: 06/11/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.812**						%		08/19/14 12:17	1

Client Sample ID: SD-200-02

Lab Sample ID: 680-102199-41

Date Collected: 06/10/14 16:00

Matrix: Solid

Date Received: 06/11/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0034	mg/Kg		08/12/14 10:57	08/14/14 17:38	5
U-234	ND		0.011	0.00067	mg/Kg		08/12/14 10:57	08/14/14 17:38	5
U-235	**0.028**		0.011	0.0046	mg/Kg		08/12/14 10:57	08/14/14 17:38	5
U-236	ND		0.011	0.00090	mg/Kg		08/12/14 10:57	08/14/14 17:38	5
U-238	**3.7**	**B**	0.011	0.00067	mg/Kg		08/12/14 10:57	08/14/14 17:38	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**3.7**		0.0050	0.00030	mg/Kg			08/19/14 12:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	0.855	U	0.246	0.259	108	32.4	pCi/g	08/12/14 10:57	08/14/14 17:38	5
U-234	1.55	U	0.235	0.275	69.7	4.19	pCi/g	08/12/14 10:57	08/14/14 17:38	5
U-235	**0.0602**		0.00632	0.00840	0.0242	0.00986	pCi/g	08/12/14 10:57	08/14/14 17:38	5
U-236	0.00122	U	0.00289	0.00289	0.725	0.0581	pCi/g	08/12/14 10:57	08/14/14 17:38	5
U-238	**1.24**		0.137	0.178	0.00377	0.000226	pCi/g	08/12/14 10:57	08/14/14 17:38	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.751**						%		08/19/14 12:17	1

Default Detection Limits

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-3
SDG: 680102199-3

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	RL	MDL	Units	Method
U-233	0.0050	0.0015	mg/Kg	6020A
U-234	0.0050	0.00030	mg/Kg	6020A
U-235	0.0050	0.0020	mg/Kg	6020A
U-236	0.0050	0.00040	mg/Kg	6020A
U-238	0.0050	0.00030	mg/Kg	6020A

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	RL	MDL	Units	Method
Total Uranium	0.0050	0.00030	mg/Kg	6020A

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Lab Sample ID: MB 160-137278/1-A
Matrix: Solid
Analysis Batch: 138156

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 137278

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.0049	0.0015	mg/Kg		08/12/14 10:34	08/14/14 13:31	2
U-234	ND		0.0049	0.00029	mg/Kg		08/12/14 10:34	08/14/14 13:31	2
U-235	ND		0.0049	0.0020	mg/Kg		08/12/14 10:34	08/14/14 13:31	2
U-236	ND		0.0049	0.00039	mg/Kg		08/12/14 10:34	08/14/14 13:31	2
U-238	0.00212	J	0.0049	0.00029	mg/Kg		08/12/14 10:34	08/14/14 13:31	2

Lab Sample ID: LCS 160-137278/2-A
Matrix: Solid
Analysis Batch: 138156

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 137278

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
U-234	0.00716	0.00705		mg/Kg		98	80 - 120
U-235	0.420	0.416		mg/Kg		99	80 - 120
U-238	0.436	0.432		mg/Kg		99	80 - 120

Lab Sample ID: 680-102199-1 MS
Matrix: Solid
Analysis Batch: 138156

Client Sample ID: SD-279-SS
Prep Type: Total/NA
Prep Batch: 137278

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
U-234	ND		0.00715	0.00698	J	mg/Kg		98	75 - 125
U-235	0.019		0.419	0.437		mg/Kg		100	75 - 125
U-238	2.6	B	0.434	3.54	4	mg/Kg		222	75 - 125

Lab Sample ID: 680-102199-1 MSD
Matrix: Solid
Analysis Batch: 138156

Client Sample ID: SD-279-SS
Prep Type: Total/NA
Prep Batch: 137278

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
U-234	ND		0.00798	0.00717	J	mg/Kg		90	75 - 125	3	20
U-235	0.019		0.468	0.438		mg/Kg		89	75 - 125	0	20
U-238	2.6	B	0.485	3.25	4	mg/Kg		138	75 - 125	9	20

Lab Sample ID: MB 160-137385/1-A
Matrix: Solid
Analysis Batch: 138156

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 137385

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.0042	0.0013	mg/Kg		08/12/14 10:57	08/14/14 15:56	2
U-234	ND		0.0042	0.00025	mg/Kg		08/12/14 10:57	08/14/14 15:56	2
U-235	ND		0.0042	0.0017	mg/Kg		08/12/14 10:57	08/14/14 15:56	2
U-236	ND		0.0042	0.00033	mg/Kg		08/12/14 10:57	08/14/14 15:56	2
U-238	0.0114		0.0042	0.00025	mg/Kg		08/12/14 10:57	08/14/14 15:56	2

Method: 6020A - Metals (ICP/MS), Isotopic Uranium (Continued)

Lab Sample ID: LCS 160-137385/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 138156 — **Prep Batch: 137385**

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
U-234			0.00789	0.00850		mg/Kg		108	80 - 120		
U-235			0.463	0.505		mg/Kg		109	80 - 120		
U-238			0.480	0.527		mg/Kg		110	80 - 120		

Lab Sample ID: 680-102199-30 MS — **Client Sample ID: SD-220-SS**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 138156 — **Prep Batch: 137385**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
U-234	ND		0.00710	0.00765	J	mg/Kg		108	75 - 125		
U-235	0.022		0.417	0.467		mg/Kg		107	75 - 125		
U-238	2.8	B	0.432	3.31	4	mg/Kg		114	75 - 125		

Lab Sample ID: 680-102199-30 MSD — **Client Sample ID: SD-220-SS**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 138156 — **Prep Batch: 137385**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
U-234	ND		0.00800	0.00859	J	mg/Kg		107	75 - 125	12	20
U-235	0.022		0.469	0.523		mg/Kg		107	75 - 125	11	20
U-238	2.8	B	0.486	3.38	4	mg/Kg		116	75 - 125	2	20

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Lab Sample ID: MB 160-137278/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 138157 — **Prep Batch: 137278**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	0.08905	U	0.127	0.128	47.4	14.2	pCi/g	08/12/14 10:34	08/14/14 13:31	2
U-234	0.02691	U	0.0835	0.0836	30.6	1.84	pCi/g	08/12/14 10:34	08/14/14 13:31	2
U-235	0.00004504	U	0.0000347	0.0000350	0.0106	0.00433	pCi/g	08/12/14 10:34	08/14/14 13:31	2
U-236	0.0003815	U	0.000918	0.000919	0.318	0.0255	pCi/g	08/12/14 10:34	08/14/14 13:31	2
U-238	0.0007113		0.0000284	0.0000713	0.00165	0.0000993	pCi/g	08/12/14 10:34	08/14/14 13:31	2

Lab Sample ID: LCS 160-137278/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 138157 — **Prep Batch: 137278**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-235			0.908	0.8996		0.0940	0.00936	0.00381	pCi/g	99	80 - 120		
U-238			0.146	0.1451		0.0149	0.00146	0.0000875	pCi/g	99	80 - 120		

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity) (Continued)

Lab Sample ID: 680-102199-1 MS — **Client Sample ID: SD-279-SS**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 138157 — **Prep Batch: 137278**

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-235	0.0420		0.905	0.9442		0.0873	0.0233	0.00951	pCi/g	100	75 - 125		
U-238	0.868		0.146	1.191		0.113	0.00363	0.000218	pCi/g	222	75 - 125		

Lab Sample ID: 680-102199-1 MSD — **Client Sample ID: SD-279-SS**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 138157 — **Prep Batch: 137278**

Analyte	Sample Result	Sample Qual	Spike Added	MSD Result	MSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
U-235	0.0420		1.01	0.9463		0.0934	0.0261	0.0106	pCi/g	89	75 - 125	0.01	1
U-238	0.868		0.163	1.092		0.105	0.00406	0.000244	pCi/g	138	75 - 125	0.45	1

Lab Sample ID: MB 160-137385/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 138157 — **Prep Batch: 137385**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	0.07248	U	0.128	0.128	40.3	12.1	pCi/g	08/12/14 10:57	08/14/14 15:56	2
U-234	0.04680	U	0.0643	0.0645	26.0	1.56	pCi/g	08/12/14 10:57	08/14/14 15:56	2
U-235	0.0002319	U	0.000119	0.000121	0.00903	0.00368	pCi/g	08/12/14 10:57	08/14/14 15:56	2
U-236	0.0008215	U	0.00130	0.00130	0.270	0.0216	pCi/g	08/12/14 10:57	08/14/14 15:56	2
U-238	0.003841		0.000390	0.000526	0.00140	0.0000844	pCi/g	08/12/14 10:57	08/14/14 15:56	2

Lab Sample ID: LCS 160-137385/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 138157 — **Prep Batch: 137385**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-235			1.00	1.092		0.119	0.0103	0.00420	pCi/g	109	80 - 120		
U-238			0.161	0.1772		0.0197	0.00160	0.0000964	pCi/g	110	80 - 120		

Lab Sample ID: 680-102199-30 MS — **Client Sample ID: SD-220-SS**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 138157 — **Prep Batch: 137385**

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-235	0.0468		0.900	1.009		0.0968	0.0232	0.00945	pCi/g	107	75 - 125		
U-238	0.948		0.145	1.113		0.106	0.00361	0.000217	pCi/g	114	75 - 125		

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity) (Continued)

Lab Sample ID: 680-102199-30 MSD
Matrix: Solid
Analysis Batch: 138157

Client Sample ID: SD-220-SS
Prep Type: Total/NA
Prep Batch: 137385

Analyte	Sample Result	Sample Qual	Spike Added	MSD Result	MSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
U-235	0.0468		1.01	1.129		0.106	0.0261	0.0106	pCi/g	107	75 - 125	0.59	1
U-238	0.948		0.163	1.137		0.106	0.00406	0.000244	pCi/g	116	75 - 125	0.11	1

Metals

Prep Batch: 137278

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102199-1	SD-279-SS	Total/NA	Solid	3050B	
680-102199-1 MS	SD-279-SS	Total/NA	Solid	3050B	
680-102199-1 MSD	SD-279-SS	Total/NA	Solid	3050B	
680-102199-1 SD	SD-279-SS	Total/NA	Solid	3050B	
680-102199-2	SD-279-01	Total/NA	Solid	3050B	
680-102199-3	SD-279-02	Total/NA	Solid	3050B	
680-102199-7	SD-277-SS	Total/NA	Solid	3050B	
680-102199-8	SD-277-01	Total/NA	Solid	3050B	
680-102199-9	SD-277-02	Total/NA	Solid	3050B	
680-102199-11	SD-219-SS	Total/NA	Solid	3050B	
680-102199-12	SD-219-01	Total/NA	Solid	3050B	
680-102199-13	SD-219-02	Total/NA	Solid	3050B	
680-102199-14	SD-219-03	Total/NA	Solid	3050B	
680-102199-15	SD-218-SS	Total/NA	Solid	3050B	
680-102199-16	SD-218-01	Total/NA	Solid	3050B	
680-102199-17	SD-218-02	Total/NA	Solid	3050B	
680-102199-18	SD-203-SS	Total/NA	Solid	3050B	
680-102199-19	SD-203-01	Total/NA	Solid	3050B	
680-102199-20	SD-203-02	Total/NA	Solid	3050B	
680-102199-22	SD-202-SS	Total/NA	Solid	3050B	
680-102199-23	SD-202-01	Total/NA	Solid	3050B	
680-102199-24	SD-202-02	Total/NA	Solid	3050B	
680-102199-25	SD-195-SS	Total/NA	Solid	3050B	
LCS 160-137278/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 160-137278/1-A	Method Blank	Total/NA	Solid	3050B	

Prep Batch: 137385

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102199-26	SD-196-SS	Total/NA	Solid	3050B	
680-102199-27	SD-196-01	Total/NA	Solid	3050B	
680-102199-28	SD-196-02	Total/NA	Solid	3050B	
680-102199-30	SD-220-SS	Total/NA	Solid	3050B	
680-102199-30 MS	SD-220-SS	Total/NA	Solid	3050B	
680-102199-30 MSD	SD-220-SS	Total/NA	Solid	3050B	
680-102199-30 SD	SD-220-SS	Total/NA	Solid	3050B	
680-102199-31	SD-220-01	Total/NA	Solid	3050B	
680-102199-32	SD-220-02	Total/NA	Solid	3050B	
680-102199-33	SD-DUP-01	Total/NA	Solid	3050B	
680-102199-35	SD-201-SS	Total/NA	Solid	3050B	
680-102199-36	SD-201-01	Total/NA	Solid	3050B	
680-102199-37	SD-201-02	Total/NA	Solid	3050B	
680-102199-39	SD-200-SS	Total/NA	Solid	3050B	
680-102199-40	SD-200-01	Total/NA	Solid	3050B	
680-102199-41	SD-200-02	Total/NA	Solid	3050B	
LCS 160-137385/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 160-137385/1-A	Method Blank	Total/NA	Solid	3050B	

Analysis Batch: 138156

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102199-1	SD-279-SS	Total/NA	Solid	6020A	137278
680-102199-1 MS	SD-279-SS	Total/NA	Solid	6020A	137278

Metals (Continued)

Analysis Batch: 138156 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102199-1 MSD	SD-279-SS	Total/NA	Solid	6020A	137278
680-102199-1 SD	SD-279-SS	Total/NA	Solid	6020A	137278
680-102199-2	SD-279-01	Total/NA	Solid	6020A	137278
680-102199-3	SD-279-02	Total/NA	Solid	6020A	137278
680-102199-7	SD-277-SS	Total/NA	Solid	6020A	137278
680-102199-8	SD-277-01	Total/NA	Solid	6020A	137278
680-102199-9	SD-277-02	Total/NA	Solid	6020A	137278
680-102199-11	SD-219-SS	Total/NA	Solid	6020A	137278
680-102199-12	SD-219-01	Total/NA	Solid	6020A	137278
680-102199-13	SD-219-02	Total/NA	Solid	6020A	137278
680-102199-14	SD-219-03	Total/NA	Solid	6020A	137278
680-102199-15	SD-218-SS	Total/NA	Solid	6020A	137278
680-102199-16	SD-218-01	Total/NA	Solid	6020A	137278
680-102199-17	SD-218-02	Total/NA	Solid	6020A	137278
680-102199-18	SD-203-SS	Total/NA	Solid	6020A	137278
680-102199-19	SD-203-01	Total/NA	Solid	6020A	137278
680-102199-20	SD-203-02	Total/NA	Solid	6020A	137278
680-102199-22	SD-202-SS	Total/NA	Solid	6020A	137278
680-102199-23	SD-202-01	Total/NA	Solid	6020A	137278
680-102199-24	SD-202-02	Total/NA	Solid	6020A	137278
680-102199-25	SD-195-SS	Total/NA	Solid	6020A	137278
680-102199-30	SD-220-SS	Total/NA	Solid	6020A	137385
680-102199-30 MS	SD-220-SS	Total/NA	Solid	6020A	137385
680-102199-30 MSD	SD-220-SS	Total/NA	Solid	6020A	137385
680-102199-30 SD	SD-220-SS	Total/NA	Solid	6020A	137385
680-102199-31	SD-220-01	Total/NA	Solid	6020A	137385
680-102199-32	SD-220-02	Total/NA	Solid	6020A	137385
680-102199-33	SD-DUP-01	Total/NA	Solid	6020A	137385
680-102199-35	SD-201-SS	Total/NA	Solid	6020A	137385
680-102199-36	SD-201-01	Total/NA	Solid	6020A	137385
680-102199-37	SD-201-02	Total/NA	Solid	6020A	137385
680-102199-39	SD-200-SS	Total/NA	Solid	6020A	137385
680-102199-40	SD-200-01	Total/NA	Solid	6020A	137385
680-102199-41	SD-200-02	Total/NA	Solid	6020A	137385
CRI 160-138156/11	DL		Solid	6020A	
CRI 160-138156/12	DL		Solid	6020A	
ICSA 160-138156/13	ICS		Solid	6020A	
ICSAB 160-138156/14	ICS		Solid	6020A	
LCS 160-137278/2-A	Lab Control Sample	Total/NA	Solid	6020A	137278
LCS 160-137385/2-A	Lab Control Sample	Total/NA	Solid	6020A	137385
MB 160-137278/1-A	Method Blank	Total/NA	Solid	6020A	137278
MB 160-137385/1-A	Method Blank	Total/NA	Solid	6020A	137385

Analysis Batch: 138778

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102199-26	SD-196-SS	Total/NA	Solid	6020A	137385
680-102199-27	SD-196-01	Total/NA	Solid	6020A	137385
680-102199-28	SD-196-02	Total/NA	Solid	6020A	137385
CRI 160-138778/14	DL		Solid	6020A	
CRI 160-138778/15	DL		Solid	6020A	
ICSA 160-138778/16	ICS		Solid	6020A	

Metals (Continued)

Analysis Batch: 138778 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
ICSAB 160-138778/1	ICS		Solid	6020A	

Analysis Batch: 138798

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102199-1	SD-279-SS	Total/NA	Solid	6020A	
680-102199-2	SD-279-01	Total/NA	Solid	6020A	
680-102199-3	SD-279-02	Total/NA	Solid	6020A	
680-102199-7	SD-277-SS	Total/NA	Solid	6020A	
680-102199-8	SD-277-01	Total/NA	Solid	6020A	
680-102199-9	SD-277-02	Total/NA	Solid	6020A	
680-102199-11	SD-219-SS	Total/NA	Solid	6020A	
680-102199-12	SD-219-01	Total/NA	Solid	6020A	
680-102199-13	SD-219-02	Total/NA	Solid	6020A	
680-102199-14	SD-219-03	Total/NA	Solid	6020A	
680-102199-15	SD-218-SS	Total/NA	Solid	6020A	
680-102199-16	SD-218-01	Total/NA	Solid	6020A	
680-102199-17	SD-218-02	Total/NA	Solid	6020A	
680-102199-18	SD-203-SS	Total/NA	Solid	6020A	
680-102199-19	SD-203-01	Total/NA	Solid	6020A	
680-102199-20	SD-203-02	Total/NA	Solid	6020A	
680-102199-22	SD-202-SS	Total/NA	Solid	6020A	
680-102199-23	SD-202-01	Total/NA	Solid	6020A	
680-102199-24	SD-202-02	Total/NA	Solid	6020A	
680-102199-25	SD-195-SS	Total/NA	Solid	6020A	

Analysis Batch: 138800

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102199-26	SD-196-SS	Total/NA	Solid	6020A	
680-102199-27	SD-196-01	Total/NA	Solid	6020A	
680-102199-28	SD-196-02	Total/NA	Solid	6020A	
680-102199-30	SD-220-SS	Total/NA	Solid	6020A	
680-102199-31	SD-220-01	Total/NA	Solid	6020A	
680-102199-32	SD-220-02	Total/NA	Solid	6020A	
680-102199-33	SD-DUP-01	Total/NA	Solid	6020A	
680-102199-35	SD-201-SS	Total/NA	Solid	6020A	
680-102199-36	SD-201-01	Total/NA	Solid	6020A	
680-102199-37	SD-201-02	Total/NA	Solid	6020A	
680-102199-39	SD-200-SS	Total/NA	Solid	6020A	
680-102199-40	SD-200-01	Total/NA	Solid	6020A	
680-102199-41	SD-200-02	Total/NA	Solid	6020A	

Rad

Prep Batch: 137278

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102199-1	SD-279-SS	Total/NA	Solid	3050B	
680-102199-1 MS	SD-279-SS	Total/NA	Solid	3050B	
680-102199-1 MSD	SD-279-SS	Total/NA	Solid	3050B	
680-102199-1 SD	SD-279-SS	Total/NA	Solid	3050B	
680-102199-2	SD-279-01	Total/NA	Solid	3050B	

Rad (Continued)

Prep Batch: 137278 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102199-3	SD-279-02	Total/NA	Solid	3050B	
680-102199-7	SD-277-SS	Total/NA	Solid	3050B	
680-102199-8	SD-277-01	Total/NA	Solid	3050B	
680-102199-9	SD-277-02	Total/NA	Solid	3050B	
680-102199-11	SD-219-SS	Total/NA	Solid	3050B	
680-102199-12	SD-219-01	Total/NA	Solid	3050B	
680-102199-13	SD-219-02	Total/NA	Solid	3050B	
680-102199-14	SD-219-03	Total/NA	Solid	3050B	
680-102199-15	SD-218-SS	Total/NA	Solid	3050B	
680-102199-16	SD-218-01	Total/NA	Solid	3050B	
680-102199-17	SD-218-02	Total/NA	Solid	3050B	
680-102199-18	SD-203-SS	Total/NA	Solid	3050B	
680-102199-19	SD-203-01	Total/NA	Solid	3050B	
680-102199-20	SD-203-02	Total/NA	Solid	3050B	
680-102199-22	SD-202-SS	Total/NA	Solid	3050B	
680-102199-23	SD-202-01	Total/NA	Solid	3050B	
680-102199-24	SD-202-02	Total/NA	Solid	3050B	
680-102199-25	SD-195-SS	Total/NA	Solid	3050B	
LCS 160-137278/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 160-137278/1-A	Method Blank	Total/NA	Solid	3050B	

Prep Batch: 137385

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102199-26	SD-196-SS	Total/NA	Solid	3050B	
680-102199-27	SD-196-01	Total/NA	Solid	3050B	
680-102199-28	SD-196-02	Total/NA	Solid	3050B	
680-102199-30	SD-220-SS	Total/NA	Solid	3050B	
680-102199-30 MS	SD-220-SS	Total/NA	Solid	3050B	
680-102199-30 MSD	SD-220-SS	Total/NA	Solid	3050B	
680-102199-30 SD	SD-220-SS	Total/NA	Solid	3050B	
680-102199-31	SD-220-01	Total/NA	Solid	3050B	
680-102199-32	SD-220-02	Total/NA	Solid	3050B	
680-102199-33	SD-DUP-01	Total/NA	Solid	3050B	
680-102199-35	SD-201-SS	Total/NA	Solid	3050B	
680-102199-36	SD-201-01	Total/NA	Solid	3050B	
680-102199-37	SD-201-02	Total/NA	Solid	3050B	
680-102199-39	SD-200-SS	Total/NA	Solid	3050B	
680-102199-40	SD-200-01	Total/NA	Solid	3050B	
680-102199-41	SD-200-02	Total/NA	Solid	3050B	
LCS 160-137385/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 160-137385/1-A	Method Blank	Total/NA	Solid	3050B	

Client Sample ID: SD-279-SS
Lab Sample ID: 680-102199-1

Date Collected: 06/09/14 15:40
Matrix: Solid
Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 13:50	KLE	TAL SL
Total/NA	Analysis	6020A		1	138798	08/19/14 12:18	KLE	TAL SL
Total/NA	Analysis	6020A		1	138796	08/19/14 12:11	KLE	TAL SL
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 13:50	KLE	TAL SL

Client Sample ID: SD-279-01
Lab Sample ID: 680-102199-2

Date Collected: 06/09/14 15:45
Matrix: Solid
Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 14:08	KLE	TAL SL
Total/NA	Analysis	6020A		1	138798	08/19/14 12:18	KLE	TAL SL
Total/NA	Analysis	6020A		1	138796	08/19/14 12:11	KLE	TAL SL
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 14:08	KLE	TAL SL

Client Sample ID: SD-279-02
Lab Sample ID: 680-102199-3

Date Collected: 06/09/14 15:50
Matrix: Solid
Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 14:13	KLE	TAL SL
Total/NA	Analysis	6020A		1	138798	08/19/14 12:18	KLE	TAL SL
Total/NA	Analysis	6020A		1	138796	08/19/14 12:11	KLE	TAL SL
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 14:13	KLE	TAL SL

Client Sample ID: SD-277-SS
Lab Sample ID: 680-102199-7

Date Collected: 06/09/14 18:10
Matrix: Solid
Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 14:18	KLE	TAL SL
Total/NA	Analysis	6020A		1	138798	08/19/14 12:18	KLE	TAL SL
Total/NA	Analysis	6020A		1	138796	08/19/14 12:11	KLE	TAL SL
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 14:18	KLE	TAL SL

Client Sample ID: SD-277-01

Lab Sample ID: 680-102199-8

Date Collected: 06/09/14 18:15

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 14:22	KLE	TAL SL
Total/NA	Analysis	6020A		1	138798	08/19/14 12:18	KLE	TAL SL
Total/NA	Analysis	6020A		1	138796	08/19/14 12:11	KLE	TAL SL
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 14:22	KLE	TAL SL

Client Sample ID: SD-277-02

Lab Sample ID: 680-102199-9

Date Collected: 06/09/14 18:20

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 14:27	KLE	TAL SL
Total/NA	Analysis	6020A		1	138798	08/19/14 12:18	KLE	TAL SL
Total/NA	Analysis	6020A		1	138796	08/19/14 12:11	KLE	TAL SL
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 14:27	KLE	TAL SL

Client Sample ID: SD-219-SS

Lab Sample ID: 680-102199-11

Date Collected: 06/10/14 09:20

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 14:41	KLE	TAL SL
Total/NA	Analysis	6020A		1	138798	08/19/14 12:18	KLE	TAL SL
Total/NA	Analysis	6020A		1	138796	08/19/14 12:11	KLE	TAL SL
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 14:41	KLE	TAL SL

Client Sample ID: SD-219-01

Lab Sample ID: 680-102199-12

Date Collected: 06/10/14 09:22

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 14:46	KLE	TAL SL
Total/NA	Analysis	6020A		1	138798	08/19/14 12:18	KLE	TAL SL
Total/NA	Analysis	6020A		1	138796	08/19/14 12:11	KLE	TAL SL
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 14:46	KLE	TAL SL

Client Sample ID: SD-219-02

Lab Sample ID: 680-102199-13

Date Collected: 06/10/14 09:25

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 14:50	KLE	TAL SL
Total/NA	Analysis	6020A		1	138798	08/19/14 12:18	KLE	TAL SL
Total/NA	Analysis	6020A		1	138796	08/19/14 12:11	KLE	TAL SL
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 14:50	KLE	TAL SL

Client Sample ID: SD-219-03

Lab Sample ID: 680-102199-14

Date Collected: 06/10/14 09:28

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 14:55	KLE	TAL SL
Total/NA	Analysis	6020A		1	138798	08/19/14 12:18	KLE	TAL SL
Total/NA	Analysis	6020A		1	138796	08/19/14 12:11	KLE	TAL SL
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 14:55	KLE	TAL SL

Client Sample ID: SD-218-SS

Lab Sample ID: 680-102199-15

Date Collected: 06/10/14 10:10

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 15:00	KLE	TAL SL
Total/NA	Analysis	6020A		1	138798	08/19/14 12:18	KLE	TAL SL
Total/NA	Analysis	6020A		1	138796	08/19/14 12:11	KLE	TAL SL
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 15:00	KLE	TAL SL

Client Sample ID: SD-218-01

Lab Sample ID: 680-102199-16

Date Collected: 06/10/14 10:12

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 15:04	KLE	TAL SL
Total/NA	Analysis	6020A		1	138798	08/19/14 12:18	KLE	TAL SL
Total/NA	Analysis	6020A		1	138796	08/19/14 12:11	KLE	TAL SL
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 15:04	KLE	TAL SL

Client Sample ID: SD-218-02

Lab Sample ID: 680-102199-17

Date Collected: 06/10/14 10:14

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 15:09	KLE	TAL SL
Total/NA	Analysis	6020A		1	138798	08/19/14 12:18	KLE	TAL SL
Total/NA	Analysis	6020A		1	138796	08/19/14 12:11	KLE	TAL SL
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 15:09	KLE	TAL SL

Client Sample ID: SD-203-SS

Lab Sample ID: 680-102199-18

Date Collected: 06/10/14 11:40

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 15:14	KLE	TAL SL
Total/NA	Analysis	6020A		1	138798	08/19/14 12:18	KLE	TAL SL
Total/NA	Analysis	6020A		1	138796	08/19/14 12:11	KLE	TAL SL
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 15:14	KLE	TAL SL

Client Sample ID: SD-203-01

Lab Sample ID: 680-102199-19

Date Collected: 06/10/14 11:45

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 15:18	KLE	TAL SL
Total/NA	Analysis	6020A		1	138798	08/19/14 12:18	KLE	TAL SL
Total/NA	Analysis	6020A		1	138796	08/19/14 12:11	KLE	TAL SL
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 15:18	KLE	TAL SL

Client Sample ID: SD-203-02

Lab Sample ID: 680-102199-20

Date Collected: 06/10/14 11:50

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 15:23	KLE	TAL SL
Total/NA	Analysis	6020A		1	138798	08/19/14 12:18	KLE	TAL SL
Total/NA	Analysis	6020A		1	138796	08/19/14 12:11	KLE	TAL SL
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 15:23	KLE	TAL SL

Client Sample ID: SD-202-SS

Lab Sample ID: 680-102199-22

Date Collected: 06/10/14 12:20

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 15:37	KLE	TAL SL
Total/NA	Analysis	6020A		1	138798	08/19/14 12:18	KLE	TAL SL
Total/NA	Analysis	6020A		1	138796	08/19/14 12:11	KLE	TAL SL
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 15:37	KLE	TAL SL

Client Sample ID: SD-202-01

Lab Sample ID: 680-102199-23

Date Collected: 06/10/14 12:25

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 15:42	KLE	TAL SL
Total/NA	Analysis	6020A		1	138798	08/19/14 12:18	KLE	TAL SL
Total/NA	Analysis	6020A		1	138796	08/19/14 12:11	KLE	TAL SL
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 15:42	KLE	TAL SL

Client Sample ID: SD-202-02

Lab Sample ID: 680-102199-24

Date Collected: 06/10/14 12:30

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 15:46	KLE	TAL SL
Total/NA	Analysis	6020A		1	138798	08/19/14 12:18	KLE	TAL SL
Total/NA	Analysis	6020A		1	138796	08/19/14 12:11	KLE	TAL SL
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 15:46	KLE	TAL SL

Client Sample ID: SD-195-SS

Lab Sample ID: 680-102199-25

Date Collected: 06/10/14 13:30

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 15:51	KLE	TAL SL
Total/NA	Analysis	6020A		1	138798	08/19/14 12:18	KLE	TAL SL
Total/NA	Analysis	6020A		1	138796	08/19/14 12:11	KLE	TAL SL
Total/NA	Prep	3050B			137278	08/12/14 10:34	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 15:51	KLE	TAL SL

Client Sample ID: SD-196-SS

Lab Sample ID: 680-102199-26

Date Collected: 06/10/14 14:00

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137385	08/12/14 10:57	SMD	TAL SL
Total/NA	Analysis	6020A		5	138778	08/18/14 15:56	MTS	TAL SL
Total/NA	Analysis	6020A		1	138800	08/19/14 12:19	KLE	TAL SL
Total/NA	Analysis	6020A		1	138797	08/19/14 12:17	KLE	TAL SL
Total/NA	Prep	3050B			137385	08/12/14 10:57	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138779	08/18/14 15:56	KLE	TAL SL

Client Sample ID: SD-196-01

Lab Sample ID: 680-102199-27

Date Collected: 06/10/14 14:05

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137385	08/12/14 11:13	SMD	TAL SL
Total/NA	Analysis	6020A		5	138778	08/18/14 16:01	MTS	TAL SL
Total/NA	Analysis	6020A		1	138800	08/19/14 12:19	KLE	TAL SL
Total/NA	Analysis	6020A		1	138797	08/19/14 12:17	KLE	TAL SL
Total/NA	Prep	3050B			137385	08/12/14 11:13	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138779	08/18/14 16:01	KLE	TAL SL

Client Sample ID: SD-196-02

Lab Sample ID: 680-102199-28

Date Collected: 06/10/14 14:10

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137385	08/12/14 11:13	SMD	TAL SL
Total/NA	Analysis	6020A		5	138778	08/18/14 16:05	MTS	TAL SL
Total/NA	Analysis	6020A		1	138800	08/19/14 12:19	KLE	TAL SL
Total/NA	Analysis	6020A		1	138797	08/19/14 12:17	KLE	TAL SL
Total/NA	Prep	3050B			137385	08/12/14 11:13	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138779	08/18/14 16:05	KLE	TAL SL

Client Sample ID: SD-220-SS

Lab Sample ID: 680-102199-30

Date Collected: 06/10/14 14:40

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137385	08/12/14 10:57	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 16:05	KLE	TAL SL
Total/NA	Analysis	6020A		1	138800	08/19/14 12:19	KLE	TAL SL
Total/NA	Analysis	6020A		1	138797	08/19/14 12:16	KLE	TAL SL
Total/NA	Prep	3050B			137385	08/12/14 10:57	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 16:05	KLE	TAL SL

Client Sample ID: SD-220-01

Lab Sample ID: 680-102199-31

Date Collected: 06/10/14 14:42

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137385	08/12/14 10:57	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 17:00	KLE	TAL SL
Total/NA	Analysis	6020A		1	138800	08/19/14 12:19	KLE	TAL SL
Total/NA	Analysis	6020A		1	138797	08/19/14 12:16	KLE	TAL SL
Total/NA	Prep	3050B			137385	08/12/14 10:57	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 17:00	KLE	TAL SL

Client Sample ID: SD-220-02

Lab Sample ID: 680-102199-32

Date Collected: 06/10/14 14:44

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137385	08/12/14 10:57	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 17:05	KLE	TAL SL
Total/NA	Analysis	6020A		1	138800	08/19/14 12:19	KLE	TAL SL
Total/NA	Analysis	6020A		1	138797	08/19/14 12:16	KLE	TAL SL
Total/NA	Prep	3050B			137385	08/12/14 10:57	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 17:05	KLE	TAL SL

Client Sample ID: SD-DUP-01

Lab Sample ID: 680-102199-33

Date Collected: 06/10/14 00:00

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137385	08/12/14 10:57	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 17:10	KLE	TAL SL
Total/NA	Analysis	6020A		1	138800	08/19/14 12:19	KLE	TAL SL
Total/NA	Analysis	6020A		1	138797	08/19/14 12:17	KLE	TAL SL
Total/NA	Prep	3050B			137385	08/12/14 10:57	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 17:10	KLE	TAL SL

Client Sample ID: SD-201-SS

Lab Sample ID: 680-102199-35

Date Collected: 06/10/14 15:10

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137385	08/12/14 10:57	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 17:14	KLE	TAL SL
Total/NA	Analysis	6020A		1	138800	08/19/14 12:19	KLE	TAL SL
Total/NA	Analysis	6020A		1	138797	08/19/14 12:17	KLE	TAL SL
Total/NA	Prep	3050B			137385	08/12/14 10:57	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 17:14	KLE	TAL SL

Client Sample ID: SD-201-01

Lab Sample ID: 680-102199-36

Date Collected: 06/10/14 15:15

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137385	08/12/14 10:57	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 17:19	KLE	TAL SL
Total/NA	Analysis	6020A		1	138800	08/19/14 12:19	KLE	TAL SL
Total/NA	Analysis	6020A		1	138797	08/19/14 12:17	KLE	TAL SL
Total/NA	Prep	3050B			137385	08/12/14 10:57	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 17:19	KLE	TAL SL

Client Sample ID: SD-201-02

Lab Sample ID: 680-102199-37

Date Collected: 06/10/14 15:20

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137385	08/12/14 10:57	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 17:24	KLE	TAL SL
Total/NA	Analysis	6020A		1	138800	08/19/14 12:19	KLE	TAL SL
Total/NA	Analysis	6020A		1	138797	08/19/14 12:17	KLE	TAL SL
Total/NA	Prep	3050B			137385	08/12/14 10:57	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 17:24	KLE	TAL SL

Client Sample ID: SD-200-SS

Lab Sample ID: 680-102199-39

Date Collected: 06/10/14 15:50

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137385	08/12/14 10:57	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 17:29	KLE	TAL SL
Total/NA	Analysis	6020A		1	138800	08/19/14 12:19	KLE	TAL SL
Total/NA	Analysis	6020A		1	138797	08/19/14 12:17	KLE	TAL SL
Total/NA	Prep	3050B			137385	08/12/14 10:57	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 17:29	KLE	TAL SL

Client Sample ID: SD-200-01

Lab Sample ID: 680-102199-40

Date Collected: 06/10/14 15:55

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137385	08/12/14 10:57	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 17:33	KLE	TAL SL
Total/NA	Analysis	6020A		1	138800	08/19/14 12:19	KLE	TAL SL
Total/NA	Analysis	6020A		1	138797	08/19/14 12:17	KLE	TAL SL
Total/NA	Prep	3050B			137385	08/12/14 10:57	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 17:33	KLE	TAL SL

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-3
SDG: 680102199-3

Client Sample ID: SD-200-02
Date Collected: 06/10/14 16:00
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-41
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137385	08/12/14 10:57	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 17:38	KLE	TAL SL
Total/NA	Analysis	6020A		1	138800	08/19/14 12:19	KLE	TAL SL
Total/NA	Analysis	6020A		1	138797	08/19/14 12:17	KLE	TAL SL
Total/NA	Prep	3050B			137385	08/12/14 10:57	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 17:38	KLE	TAL SL

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Certification Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-3
SDG: 680102199-3

Laboratory: TestAmerica Savannah

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
	AFCEE		SAVLAB	
A2LA	DoD ELAP		399.01	02-28-15
A2LA	ISO/IEC 17025		399.01	02-28-15
Alabama	State Program	4	41450	06-30-15
Arkansas DEQ	State Program	6	88-0692	01-31-15
California	NELAP	9	3217CA	07-31-14 *
Colorado	State Program	8	N/A	12-31-14
Connecticut	State Program	1	PH-0161	03-31-15
Florida	NELAP	4	E87052	06-30-15
GA Dept. of Agriculture	State Program	4	N/A	06-12-17
Georgia	State Program	4	N/A	06-30-15
Georgia	State Program	4	803	06-30-15
Guam	State Program	9	09-005r	04-16-15
Hawaii	State Program	9	N/A	06-30-15
Illinois	NELAP	5	200022	11-30-14
Indiana	State Program	5	N/A	06-30-15
Iowa	State Program	7	353	07-01-15
Kentucky (DW)	State Program	4	90084	12-31-14
Kentucky (UST)	State Program	4	18	06-30-15
Louisiana	NELAP	6	30690	06-30-14 *
Louisiana (DW)	NELAP	6	LA140023	12-31-14
Maine	State Program	1	GA00006	08-16-14 *
Maryland	State Program	3	250	12-31-14
Massachusetts	State Program	1	M-GA006	06-30-15
Michigan	State Program	5	9925	06-30-15
Mississippi	State Program	4	N/A	06-30-15
Montana	State Program	8	CERT0081	01-01-15
Nebraska	State Program	7	TestAmerica-Savannah	06-30-15
New Jersey	NELAP	2	GA769	06-30-15
New Mexico	State Program	6	N/A	06-30-15
New York	NELAP	2	10842	03-31-15
North Carolina (DW)	State Program	4	13701	07-31-15
North Carolina (WW/SW)	State Program	4	269	12-31-14
Oklahoma	State Program	6	9984	08-31-14 *
Pennsylvania	NELAP	3	68-00474	06-30-15
Puerto Rico	State Program	2	GA00006	12-31-14
South Carolina	State Program	4	98001	06-30-14 *
Tennessee	State Program	4	TN02961	06-30-15
Texas	NELAP	6	T104704185-08-TX	11-30-14
USDA	Federal		SAV 3-04	06-11-17
Virginia	NELAP	3	460161	06-14-15
Washington	State Program	10	C805	06-10-15
West Virginia (DW)	State Program	3	9950C	12-31-14
West Virginia DEP	State Program	3	94	06-30-15
Wisconsin	State Program	5	999819810	08-31-15
Wyoming	State Program	8	8TMS-L	06-30-15

Laboratory: TestAmerica St. Louis

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

* Certification renewal pending - certification considered valid.

Laboratory: TestAmerica St. Louis (Continued)

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska	State Program	10	MO00054	06-30-15
California	NELAP	9	2886	03-31-15
Connecticut	State Program	1	PH-0241	03-31-15
Florida	NELAP	4	E87689	06-30-15
Illinois	NELAP	5	200023	11-30-14
Iowa	State Program	7	373	12-01-14
Kansas	NELAP	7	E-10236	10-31-14 *
Kentucky (DW)	State Program	4	90125	12-31-14
L-A-B	DoD ELAP		L2305	01-10-16
Louisiana	NELAP	6	04080	06-30-15
Maryland	State Program	3	310	09-30-15
Missouri	State Program	7	780	06-30-14 *
Nevada	State Program	9	MO000542013-1	07-31-14 *
New Jersey	NELAP	2	MO002	06-30-15
New Mexico	State Program	6		06-30-10 *
New York	NELAP	2	11616	03-31-15
North Dakota	State Program	8	R207	06-30-14 *
NRC	NRC		24-24817-01	12-31-22
Oklahoma	State Program	6	9997	08-31-15
Pennsylvania	NELAP	3	68-00540	02-28-15
South Carolina	State Program	4	85002001	06-30-14 *
Texas	NELAP	6	T104704193-13-6	07-31-15
USDA	Federal		P330-07-00122	01-09-17
USEPA Reg V SDWA	Federal	1	WG-15J	08-30-14
Utah	NELAP	8	MO000542013-5	07-31-15
Virginia	NELAP	3	460230	06-14-15
Washington	State Program	10	C592	08-30-15
West Virginia DEP	State Program	3	381	12-31-14 *

* Certification renewal pending - certification considered valid.

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-3
SDG: 680102199-3

Method	Method Description	Protocol	Laboratory
6020A	Metals (ICP/MS), Isotopic Uranium	SW846	TAL SL
6020A	Metals (ICP/MS), Total Uranium	SW846	TAL SL
6020A	Metals (ICP/MS), Isotopic Uranium Percentage	SW846	TAL SL
6020A Activity	Metals (ICP/MS), Isotopic Uranium (Activity)	SW846	TAL SL

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-3
SDG: 680102199-3

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-102199-1	SD-279-SS	Solid	06/09/14 15:40	06/11/14 09:30
680-102199-2	SD-279-01	Solid	06/09/14 15:45	06/11/14 09:30
680-102199-3	SD-279-02	Solid	06/09/14 15:50	06/11/14 09:30
680-102199-7	SD-277-SS	Solid	06/09/14 18:10	06/11/14 09:30
680-102199-8	SD-277-01	Solid	06/09/14 18:15	06/11/14 09:30
680-102199-9	SD-277-02	Solid	06/09/14 18:20	06/11/14 09:30
680-102199-11	SD-219-SS	Solid	06/10/14 09:20	06/11/14 09:30
680-102199-12	SD-219-01	Solid	06/10/14 09:22	06/11/14 09:30
680-102199-13	SD-219-02	Solid	06/10/14 09:25	06/11/14 09:30
680-102199-14	SD-219-03	Solid	06/10/14 09:28	06/11/14 09:30
680-102199-15	SD-218-SS	Solid	06/10/14 10:10	06/11/14 09:30
680-102199-16	SD-218-01	Solid	06/10/14 10:12	06/11/14 09:30
680-102199-17	SD-218-02	Solid	06/10/14 10:14	06/11/14 09:30
680-102199-18	SD-203-SS	Solid	06/10/14 11:40	06/11/14 09:30
680-102199-19	SD-203-01	Solid	06/10/14 11:45	06/11/14 09:30
680-102199-20	SD-203-02	Solid	06/10/14 11:50	06/11/14 09:30
680-102199-22	SD-202-SS	Solid	06/10/14 12:20	06/11/14 09:30
680-102199-23	SD-202-01	Solid	06/10/14 12:25	06/11/14 09:30
680-102199-24	SD-202-02	Solid	06/10/14 12:30	06/11/14 09:30
680-102199-25	SD-195-SS	Solid	06/10/14 13:30	06/11/14 09:30
680-102199-26	SD-196-SS	Solid	06/10/14 14:00	06/11/14 09:30
680-102199-27	SD-196-01	Solid	06/10/14 14:05	06/11/14 09:30
680-102199-28	SD-196-02	Solid	06/10/14 14:10	06/11/14 09:30
680-102199-30	SD-220-SS	Solid	06/10/14 14:40	06/11/14 09:30
680-102199-31	SD-220-01	Solid	06/10/14 14:42	06/11/14 09:30
680-102199-32	SD-220-02	Solid	06/10/14 14:44	06/11/14 09:30
680-102199-33	SD-DUP-01	Solid	06/10/14 00:00	06/11/14 09:30
680-102199-35	SD-201-SS	Solid	06/10/14 15:10	06/11/14 09:30
680-102199-36	SD-201-01	Solid	06/10/14 15:15	06/11/14 09:30
680-102199-37	SD-201-02	Solid	06/10/14 15:20	06/11/14 09:30
680-102199-39	SD-200-SS	Solid	06/10/14 15:50	06/11/14 09:30
680-102199-40	SD-200-01	Solid	06/10/14 15:55	06/11/14 09:30
680-102199-41	SD-200-02	Solid	06/10/14 16:00	06/11/14 09:30

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
ISOU Cal 1_00018	08/15/14	08/08/14	2%HCL 2%HNO3, Lot 376565	50 mL	ISOU Cal Low_00006	0.25 mL	U-233	0.000515225 ug/L
							U-236	0.000889887 ug/L
							U-234	0.000826729 ug/L
							U-235	0.0484747 ug/L
							U-238	0.0502596 ug/L
							Total Uranium	0.05 ug/L
.ISOU Cal Low_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU Cal Int_00006	1 mL	U-233	0.103045 ug/L
							U-236	0.177977 ug/L
							U-234	0.165346 ug/L
							U-235	9.69494 ug/L
							U-238	10.0519 ug/L
							Total Uranium	10 ug/L
..ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
...ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
....ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
...ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
....ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
...ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
....ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
...STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
ISOU Cal 1_00019	08/25/14	08/18/14	2%HCL 2%HNO3, Lot 376565	50 mL	ISOU Cal Low_00006	0.25 mL	U-233	0.000515225 ug/L
							U-236	0.000889887 ug/L

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							U-234	0.000826729 ug/L
							U-235	0.0484747 ug/L
							U-238	0.0502596 ug/L
							Total Uranium	0.05 ug/L
.ISOU Cal Low_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU Cal Int_00006	1 mL	U-233	0.103045 ug/L
							U-236	0.177977 ug/L
							U-234	0.165346 ug/L
							U-235	9.69494 ug/L
							U-238	10.0519 ug/L
							Total Uranium	10 ug/L
..ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
...ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
....ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
...ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
....ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
...ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
....ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
...STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
ISOU Cal 2_00019	08/15/14	08/08/14	2% Nitric Acid, Lot 376565	50 mL	ISOU Cal Int_00006	0.15 mL	U-233	0.0309135 ug/L
							U-236	0.0533932 ug/L
							U-234	0.0496037 ug/L
							U-235	2.90848 ug/L
							U-238	3.01557 ug/L

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Total Uranium	3 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
ISOU Cal 2_00020	08/25/14	08/18/14	2% Nitric Acid, Lot 376565	50 mL	ISOU Cal Int_00006	0.15 mL	U-233	0.0309135 ug/L
							U-236	0.0533932 ug/L
							U-234	0.0496037 ug/L
							U-235	2.90848 ug/L
							U-238	3.01557 ug/L
							Total Uranium	3 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
ISOU Cal 3_00018	08/15/14	08/08/14	2% Nitric Acid, Lot 376565	100 mL	ISOU Cal Int_00006	0.5 mL	U-233	0.0515225 ug/L
							U-236	0.0889887 ug/L
							U-234	0.0826729 ug/L
							U-235	4.84747 ug/L
							U-238	5.02596 ug/L
							Total Uranium	5 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
ISOU Cal 3_00019	08/25/14	08/18/14	2% Nitric Acid, Lot 376565	100 mL	ISOU Cal Int_00006	0.5 mL	U-233	0.0515225 ug/L
							U-236	0.0889887 ug/L
							U-234	0.0826729 ug/L
							U-235	4.84747 ug/L
							U-238	5.02596 ug/L
							Total Uranium	5 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
ISOU Cal 4_00018	08/15/14	08/08/14	2% Nitric Acid, Lot 376565	50 mL	ISOU Cal Int_00006	0.5 mL	U-233	0.103045 ug/L
							U-236	0.177977 ug/L
							U-234	0.165346 ug/L
							U-235	9.69494 ug/L
							U-238	10.0519 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		U-238	1000 ug/mL
ISOU Cal 4_00019	08/25/14	08/18/14	2% Nitric Acid, Lot 376565	50 mL	ISOU Cal Int_00006	0.5 mL	U-233	0.103045 ug/L
							U-236	0.177977 ug/L
							U-234	0.165346 ug/L
							U-235	9.69494 ug/L
							U-238	10.0519 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		U-238	1000 ug/mL
ISOU Cal 5_00018	08/15/14	08/08/14	2% Nitric Acid, Lot 376565	50 mL	ISOU Cal Int_00006	1.5 mL	U-233	0.309135 ug/L
							U-236	0.533932 ug/L
							U-234	0.496037 ug/L
							U-235	29.0848 ug/L
							U-238	30.1557 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		U-238	1000 ug/mL
ISOU Cal 5_00019	08/25/14	08/18/14	2% Nitric Acid, Lot 376565	50 mL	ISOU Cal Int_00006	1.5 mL	U-233	0.309135 ug/L
							U-236	0.533932 ug/L
							U-234	0.496037 ug/L
							U-235	29.0848 ug/L
							U-238	30.1557 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	U-238	1005.19 ug/L

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		U-238	1000 ug/mL
ISOU ICSAB_00019	08/15/14	08/08/14	2% Nitric Acid, Lot 376565	50 mL	ISOU Cal Int_00006	0.25 mL	U-233	0.0515225 ug/L
							U-236	0.0889887 ug/L
							U-234	0.0826729 ug/L
							U-235	4.84747 ug/L
							U-238	5.02596 ug/L
							Total Uranium	5 ug/L
					MS ICSA_00012	2.5 mL	Al	50000 ug/L
							Ca	50000 ug/L
							Chlorine	500000 ug/L
							Fe	50000 ug/L
							K	50000 ug/L
							Mg	50000 ug/L
							Mo	1000 ug/L
							Na	50000 ug/L
							P	50000 ug/L
							Sulfur	50000 ug/L
							Ti	1000 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
.MS ICSA_00012	12/19/14	Inorganic Ventures, Lot G2-MEB476152			(Purchased Reagent)		Al	1000 ug/mL
							Ca	1000 ug/mL
							Chlorine	10000 ug/mL
							Fe	1000 ug/mL
							K	1000 ug/mL
							Mg	1000 ug/mL
							Mo	20 ug/mL
							Na	1000 ug/mL
							P	1000 ug/mL
							Sulfur	1000 ug/mL
							Ti	20 ug/mL
ISOU ICSAB_00020	08/25/14	08/18/14	2% Nitric Acid, Lot 376565	50 mL	ISOU Cal Int_00006	0.25 mL	U-233	0.0515225 ug/L
							U-236	0.0889887 ug/L
							U-234	0.0826729 ug/L
							U-235	4.84747 ug/L
							U-238	5.02596 ug/L
							Total Uranium	5 ug/L
					MS ICSA_00014	2.5 mL	Al	50000 ug/L
							Ca	50000 ug/L
							Chlorine	500000 ug/L
							Fe	50000 ug/L
							K	50000 ug/L
							Mg	50000 ug/L
							Mo	1000 ug/L
							Na	50000 ug/L
							P	50000 ug/L
							Sulfur	50000 ug/L
							Ti	1000 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
.MS ICSA_00014	07/01/15	Inorganic Ventures, Lot G2-MEB476152MCA			(Purchased Reagent)		Al	1000 ug/mL
							Ca	1000 ug/mL
							Chlorine	10000 ug/mL
							Fe	1000 ug/mL
							K	1000 ug/mL
							Mg	1000 ug/mL
							Mo	20 ug/mL
							Na	1000 ug/mL
							P	1000 ug/mL
							Sulfur	1000 ug/mL
							Ti	20 ug/mL
ISOU ICV(3)_00017	08/14/14	08/08/14	2% Nitric Acid, Lot 365730	50 mL	ISOU QC Low_00003	0.25 mL	U-234	0.000417422 ug/L
							U-235	0.000528391 ug/L
							U-238	0.0488908 ug/L
							U-233	0.223475 ug/L
							U-236	0.0000372865 ug/L
.ISOU QC Low_00003	08/14/14	05/14/14	2%HCL 2%HNO3, Lot 355914	100 mL	ISOU QC Int_00005	1 mL	U-234	0.0834844 ug/L
							U-235	0.105678 ug/L
							U-238	9.77816 ug/L

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							U-233	44.695 ug/L
							U-236	0.00745731 ug/L
..ISOU QC Int_00005	11/01/14	05/14/14	2%HCL 2%HNO3, Lot 355914	100 mL	ISOU UNAT_00002	1 mL	U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-238	977.816 ug/L
					ISOU-I 233 QC_00005	10 mL	U-233	4469.5 ug/L
							U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-236	0.745731 ug/L
							U-238	977.816 ug/L
...ISOU UNAT_00002	11/13/14	11/11/13	1M HNO3, Lot n/a	200 mL	ISOU U parent_00001	20 mL	U-234	5.10149 ug/L
							U-235	701.888 ug/L
							U-238	96754.7 ug/L
....ISOU U parent_00001	08/01/47	05/03/13	1M HNO3, Lot n/a	200 mL	ISOU ampule_00001	19.2509 g	U-234	51.0149 ug/L
							U-235	7018.88 ug/L
							U-238	967547 ug/L
.....ISOU ampule_00001	03/30/58	New Brunswick Lab, Lot CRM 145			(Purchased Reagent)		U-234	0.53 ug/g
							U-235	72.92 ug/g
							U-238	10052 ug/g
...ISOU-I 233 QC_00005	12/20/14	12/20/13	2%HCL 2% HNO3, Lot 250193	100 mL	ISOU-C 233 QC_00005	9.3263 g	U-233	44695 ug/L
							U-234	82.9742 ug/L
							U-235	35.4894 ug/L
							U-236	7.45731 ug/L
							U-238	102.695 ug/L
....ISOU-C 233 QC_00005	12/20/18	New Brunswick Laboratory, Lot CRM 111-A			(Purchased Reagent)		U-233	479.236 ug/g
							U-234	0.88968 ug/g
							U-235	0.38053 ug/g
							U-236	0.07996 ug/g
							U-238	1.10114 ug/g
ISOU ICV(3)_00018	08/14/14	08/18/14	2% Nitric Acid, Lot 365730	50 mL	ISOU QC Low_00004	0.25 mL	U-234	0.000417422 ug/L
							U-235	0.000528391 ug/L
							U-238	0.0488908 ug/L
							U-233	0.223475 ug/L
							U-236	0.0000372865 ug/L
.ISOU QC Low_00004	11/01/14	08/18/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU QC Int_00005	1 mL	U-234	0.0834844 ug/L
							U-235	0.105678 ug/L
							U-238	9.77816 ug/L
							U-233	44.695 ug/L
							U-236	0.00745731 ug/L

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..ISOU QC Int_00005	11/01/14	05/14/14	2%HCL 2%HNO3, Lot 355914	100 mL	ISOU UNAT_00002	1 mL	U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-238	977.816 ug/L
					ISOU-I 233 QC_00005	10 mL	U-233	4469.5 ug/L
							U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-236	0.745731 ug/L
							U-238	977.816 ug/L
...ISOU UNAT_00002	11/13/14	11/11/13	1M HNO3, Lot n/a	200 mL	ISOU U parent_00001	20 mL	U-234	5.10149 ug/L
							U-235	701.888 ug/L
							U-238	96754.7 ug/L
....ISOU U parent_00001	08/01/47	05/03/13	1M HNO3, Lot n/a	200 mL	ISOU ampule_00001	19.2509 g	U-234	51.0149 ug/L
							U-235	7018.88 ug/L
							U-238	967547 ug/L
.....ISOU ampule_00001	03/30/58	New Brunswick Lab, Lot CRM 145			(Purchased Reagent)		U-234	0.53 ug/g
							U-235	72.92 ug/g
							U-238	10052 ug/g
...ISOU-I 233 QC_00005	12/20/14	12/20/13	2%HCL 2% HNO3, Lot 250193	100 mL	ISOU-C 233 QC_00005	9.3263 g	U-233	44695 ug/L
							U-234	82.9742 ug/L
							U-235	35.4894 ug/L
							U-236	7.45731 ug/L
							U-238	102.695 ug/L
....ISOU-C 233 QC_00005	12/20/18	New Brunswick Laboratory, Lot CRM 111-A			(Purchased Reagent)		U-233	479.236 ug/g
							U-234	0.88968 ug/g
							U-235	0.38053 ug/g
							U-236	0.07996 ug/g
							U-238	1.10114 ug/g
ISOU ICV(4,8)_00017	08/15/14	08/08/14	2% Nitric Acid, Lot 376565	50 mL	ISOU QC Int_00005	0.5 mL	U-234	0.0834844 ug/L
							U-235	0.105678 ug/L
							U-238	9.77816 ug/L
							U-233	44.695 ug/L
							U-236	0.00745731 ug/L
.ISOU QC Int_00005	11/01/14	05/14/14	2%HCL 2%HNO3, Lot 355914	100 mL	ISOU UNAT_00002	1 mL	U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-238	977.816 ug/L
					ISOU-I 233 QC_00005	10 mL	U-233	4469.5 ug/L
							U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-236	0.745731 ug/L
							U-238	977.816 ug/L
..ISOU UNAT_00002	11/13/14	11/11/13	1M HNO3, Lot n/a	200 mL	ISOU U parent_00001	20 mL	U-234	5.10149 ug/L
							U-235	701.888 ug/L

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							U-238	96754.7 ug/L
...ISOU U parent_00001	08/01/47	05/03/13	1M HNO3, Lot n/a	200 mL	ISOU ampule_00001	19.2509 g	U-234	51.0149 ug/L
							U-235	7018.88 ug/L
							U-238	967547 ug/L
....ISOU ampule_00001	03/30/58	New Brunswick Lab, Lot CRM 145			(Purchased Reagent)		U-234	0.53 ug/g
							U-235	72.92 ug/g
							U-238	10052 ug/g
..ISOU-I 233 QC_00005	12/20/14	12/20/13	2%HCL 2% HNO3, Lot 250193	100 mL	ISOU-C 233 QC_00005	9.3263 g	U-233	44695 ug/L
							U-234	82.9742 ug/L
							U-235	35.4894 ug/L
							U-236	7.45731 ug/L
							U-238	102.695 ug/L
...ISOU-C 233 QC_00005	12/20/18	New Brunswick Laboratory, Lot CRM 111-A			(Purchased Reagent)		U-233	479.236 ug/g
							U-234	0.88968 ug/g
							U-235	0.38053 ug/g
							U-236	0.07996 ug/g
							U-238	1.10114 ug/g
ISOU ICV(4,8)_00018	08/25/14	08/18/14	2% Nitric Acid, Lot 376565	50 mL	ISOU QC Int_00005	0.5 mL	U-234	0.0834844 ug/L
							U-235	0.105678 ug/L
							U-238	9.77816 ug/L
							U-233	44.695 ug/L
							U-236	0.00745731 ug/L
.ISOU QC Int_00005	11/01/14	05/14/14	2%HCL 2%HNO3, Lot 355914	100 mL	ISOU UNAT_00002	1 mL	U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-238	977.816 ug/L
					ISOU-I 233 QC_00005	10 mL	U-233	4469.5 ug/L
							U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-236	0.745731 ug/L
							U-238	977.816 ug/L
..ISOU UNAT_00002	11/13/14	11/11/13	1M HNO3, Lot n/a	200 mL	ISOU U parent_00001	20 mL	U-234	5.10149 ug/L
							U-235	701.888 ug/L
							U-238	96754.7 ug/L
...ISOU U parent_00001	08/01/47	05/03/13	1M HNO3, Lot n/a	200 mL	ISOU ampule_00001	19.2509 g	U-234	51.0149 ug/L
							U-235	7018.88 ug/L
							U-238	967547 ug/L
....ISOU ampule_00001	03/30/58	New Brunswick Lab, Lot CRM 145			(Purchased Reagent)		U-234	0.53 ug/g
							U-235	72.92 ug/g
							U-238	10052 ug/g
..ISOU-I 233 QC_00005	12/20/14	12/20/13	2%HCL 2% HNO3, Lot 250193	100 mL	ISOU-C 233 QC_00005	9.3263 g	U-233	44695 ug/L
							U-234	82.9742 ug/L

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							U-235	35.4894 ug/L
							U-236	7.45731 ug/L
							U-238	102.695 ug/L
...ISOU-C 233 QC_00005	12/20/18	New Brunswick Laboratory, Lot CRM 111-A			(Purchased Reagent)		U-233	479.236 ug/g
							U-234	0.88968 ug/g
							U-235	0.38053 ug/g
							U-236	0.07996 ug/g
							U-238	1.10114 ug/g
ISOU ICV(5,6)_00019	08/15/14	08/08/14	2% Nitric Acid, Lot 376565	50 mL	ISOU QC Int_00005	5 mL	U-234	0.834844 ug/L
							U-235	1.05678 ug/L
							U-238	97.7816 ug/L
							U-233	446.95 ug/L
							U-236	0.0745731 ug/L
.ISOU QC Int_00005	11/01/14	05/14/14	2%HCL 2%HNO3, Lot 355914	100 mL	ISOU UNAT_00002	1 mL	U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-238	977.816 ug/L
					ISOU-I 233 QC_00005	10 mL	U-233	4469.5 ug/L
							U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-236	0.745731 ug/L
							U-238	977.816 ug/L
..ISOU UNAT_00002	11/13/14	11/11/13	1M HNO3, Lot n/a	200 mL	ISOU U parent_00001	20 mL	U-234	5.10149 ug/L
							U-235	701.888 ug/L
							U-238	96754.7 ug/L
...ISOU U parent_00001	08/01/47	05/03/13	1M HNO3, Lot n/a	200 mL	ISOU ampule_00001	19.2509 g	U-234	51.0149 ug/L
							U-235	7018.88 ug/L
							U-238	967547 ug/L
....ISOU ampule_00001	03/30/58	New Brunswick Lab, Lot CRM 145			(Purchased Reagent)		U-234	0.53 ug/g
							U-235	72.92 ug/g
							U-238	10052 ug/g
..ISOU-I 233 QC_00005	12/20/14	12/20/13	2%HCL 2% HNO3, Lot 250193	100 mL	ISOU-C 233 QC_00005	9.3263 g	U-233	44695 ug/L
							U-234	82.9742 ug/L
							U-235	35.4894 ug/L
							U-236	7.45731 ug/L
							U-238	102.695 ug/L
...ISOU-C 233 QC_00005	12/20/18	New Brunswick Laboratory, Lot CRM 111-A			(Purchased Reagent)		U-233	479.236 ug/g
							U-234	0.88968 ug/g
							U-235	0.38053 ug/g
							U-236	0.07996 ug/g
							U-238	1.10114 ug/g
ISOU ICV(5,6)_00020	08/25/14	08/18/14	2% Nitric Acid, Lot 376565	50 mL	ISOU QC Int_00005	5 mL	U-234	0.834844 ug/L
							U-235	1.05678 ug/L

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							U-238	97.7816 ug/L
							U-233	446.95 ug/L
							U-236	0.0745731 ug/L
.ISOU QC Int_00005	11/01/14	05/14/14	2%HCL 2%HNO3, Lot 355914	100 mL	ISOU UNAT_00002	1 mL	U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-238	977.816 ug/L
					ISOU-I 233 QC_00005	10 mL	U-233	4469.5 ug/L
							U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-236	0.745731 ug/L
							U-238	977.816 ug/L
..ISOU UNAT_00002	11/13/14	11/11/13	1M HNO3, Lot n/a	200 mL	ISOU U parent_00001	20 mL	U-234	5.10149 ug/L
							U-235	701.888 ug/L
							U-238	96754.7 ug/L
...ISOU U parent_00001	08/01/47	05/03/13	1M HNO3, Lot n/a	200 mL	ISOU ampule_00001	19.2509 g	U-234	51.0149 ug/L
							U-235	7018.88 ug/L
							U-238	967547 ug/L
....ISOU ampule_00001	03/30/58	New Brunswick Lab, Lot CRM 145			(Purchased Reagent)		U-234	0.53 ug/g
							U-235	72.92 ug/g
							U-238	10052 ug/g
..ISOU-I 233 QC_00005	12/20/14	12/20/13	2%HCL 2% HNO3, Lot 250193	100 mL	ISOU-C 233 QC_00005	9.3263 g	U-233	44695 ug/L
							U-234	82.9742 ug/L
							U-235	35.4894 ug/L
							U-236	7.45731 ug/L
							U-238	102.695 ug/L
...ISOU-C 233 QC_00005	12/20/18	New Brunswick Laboratory, Lot CRM 111-A			(Purchased Reagent)		U-233	479.236 ug/g
							U-234	0.88968 ug/g
							U-235	0.38053 ug/g
							U-236	0.07996 ug/g
							U-238	1.10114 ug/g
ISOU Prep Spk_00002	12/01/14	07/09/14	2%HCL 2%HNO3, Lot 397367	100 mL	ISOU-I 233CAL_00002	1 mL	U-233	947.058 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
.ISOU-I 233CAL_00002	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00006	5.1938 g	U-233	94705.8 ug/L
..ISOU-C 233CAL_00006	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1823.44 ug/g
.ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
.ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
..ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
.STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL

Reagent

ISOU ampule_00001

New Brunswick Laboratory
U.S. Department of Energy

Certificate of Analysis
CRM 145

228405
ID ISOU ampule_00001
Exp:03/30/58 Prpd:KLE Opn:05/03/13
UNAT Ampoule

Uranyl (Normal) Nitrate Assay and Isotopic Solution

Uranium Mass Fraction: 0.0101356 g U/g solution ± 0.0000011 g U/g solution
[10.1356 mg U/g solution ± 0.0011 mg U/g solution]

	$^{234}U/^{238}U$	$^{235}U/^{238}U$
Atom Ratio:	0.000052841	0.0072543
Atom Ratio Uncertainty:	0.000000082	0.0000040

	^{234}U	^{235}U	^{238}U
Atom Percent:	0.0052458	0.72017	99.27458
Atom Percent Uncertainty:	0.0000081	0.00039	0.00039
Weight Percent:	0.0051579	0.71114	99.28370
Weight Percent Uncertainty:	0.0000080	0.00038	0.00038

Relative Atomic Weight: 238.028918
Relative Atomic Weight Uncertainty: 0.000012

Note: ^{233}U and ^{236}U were not detected. The detection limit of uranium ratios for the technique used is 5×10^{-9}.

This Certified Reference Material (CRM) is a uranium concentration and isotopic solution standard intended for use in calibration of and/or quality control for uranium analysis methods. Each unit of CRM 145 consists of approximately 20-mL of uranyl nitrate solution in 1M nitric acid, contained in a sealed glass ampoule.

NOTE: The vial should be handled under proper radiologically-controlled conditions at all times.

The certified uranium content value is based on the mass of high-purity metal dissolved and diluted to a known solution mass. The stated uranium concentration was calculated as the prepared value and verified experimentally by the NBL-modified Davies and Gray titration. The certified uranium isotopic composition and atomic weight is based upon measurements performed on multiple samples by two different measurement techniques on a Thermal Ionization Mass Spectrometer (TIMS), calibrated using CRM U030-A as primary comparator and CRM 129-A as a quality control sample. The isotopic values are shared with CRM 112-A, uranium (normal) metal standard which was the source of uranium used to produce the solutions.

RAD13-0018
UNAT Spike
marrss
None
Prep/Opened: 5/3/2013
Exp(1): 5/10/2014
Exp(2): 5/10/2014

All uncertainties for the certified values are expressed as expanded uncertainties (U) where $U = k*u_c$, where u_c is the

September 30, 2010
Argonne, Illinois

www.nbl.doe.gov
Page 1 of 2

Jon Neuhoff, Director
New Brunswick Laboratory

(Revision of Certificate dated March 30, 2008)

127971
ID: UNAT_00008
Exp: 05/10/14 Prpd: SB Crt: 05/03/13
UNAT spike

combined standard uncertainty and the coverage factor k = 2. Uncertainties were determined according to the JCGM 100:2008 *Guide to the Expression of Uncertainty in Measurement*. The coverage factor of 2 was chosen to provide an approximate 95% level of confidence. The input quantities associated with the uranium content included uncertainties due to weighing, CRM 112-A purity, and buoyancy factors. The input quantities associated with the uranium isotopic composition included uncertainties from the certified value for CRM U030-A, measurement precision, and background corrections associated with the analytical techniques.

The CRM was produced by dissolving uranium metal in a single batch and container, with extensive mixing of the resultant solution followed by dispensation into individual bottles. Subsequent measurements of a random sampling of the total lot produced did not indicate any inhomogeneity in uranium concentration or isotopic composition. The minimum sample sizes taken from packaged units and measured were 30 mg U by titration and 1 µg U by TIMS. The NBL makes no recommendation as to the minimum sample size to be used to ensure concentration or isotopic homogeneity.

Users are cautioned that once the vial is opened, the uranium concentration and/or isotopic composition of the material may be affected by evaporative losses or environmental contamination. User's should take appropriate precautions to safeguard the material before, during and after use to ensure valid certificate values.

Recommended Procedure for Ampoule Handling and Dispensing of Solution

1. The ampoule contains a strongly acidic solution of uranium. Appropriate precautions should be taken.

2. Before opening the ampoule, ensure that any dried uranium or condensed liquid in the neck or body of the ampoule is re-dissolved into solution. This can be accomplished by inverting the ampoule repeatedly.

3. The glass ampoules are scored at the neck for ease of opening. However, glass burrs and fragments pose a cut hazard to anyone opening the ampoules. Appropriate precautions should be taken.

4. Lightly moisten the scored line on the neck with distilled water to help ensure a clean break at the score.

5. Because of the narrow neck of the ampoule it may be difficult or impossible to pour the solution out. Here is one possible method:

    a. Obtain approximately 12-cm length of plastic capillary tubing (e.g. i.d. 0f 0.1", o.d. of 0.16").
    b. Insert one end of the capillary tubing fully into the ampoule
    c. Fold the remaining length of tubing along the outside of the ampoule, ensuring that the tube is not crimped and will allow the free flow of air through the tube and into the ampoule.
    d. Holding the ampoule and tubing in one hand, and a beaker or dispensing bottle in another, invert the ampoule over the container allowing the solution to drain into it.
    e. The capillary tubing allows air to flow into the ampoule, eliminating the "airlock" created by the narrow neck of the open ampoule.

6. The user should be wary of evaporative losses once the ampoule is opened, and prevent uranium contamination of the sample. It is recommended that the entire solution be accurately weighed and aliquanted as soon as possible after opening the sample. Precautions should be taken (clean glass/plastic ware, air filtration, etc) to prevent uranium contamination of the CRM with subsequent perturbation of the isotopic composition.

Reagent

ISOU-C 233 QC_00005

New Brunswick Laboratory
U.S. Department of Energy

Certificate of Analysis
CRM 111-A
Uranium-233 in Nitrate Form
Uranium Spike Assay and Isotopic Solution Standard

280627
ID ISOU-C 233 QC_00005
Exp 12/20/18 Prpd:KLE Opn:12/20/13
233 QC

Uranium Concentration : 2.06684 ± 0.00052 μmoles U/gram solution

	U-233	U-234	U-235	U-236	U-238
Atom Percent:	**99.4911**	**0.1847**	**0.0790**	**0.0166**	**0.2286**
Uncertainty:	**0.0006**	**0.0002**	**0.0002**	**0.0002**	**0.0004**

Relative Atomic Weight : 233.055

This Certified Reference Material (CRM) is intended for use as a spike in the analysis of uranium materials by isotope dilution mass spectrometry (IDMS). Each unit of CRM 111-A consists of approximately 5 milligrams of uranium dissolved in 10 grams of 0.8 N HNO_3. This solution is contained in a sealed glass ampoule.

NOTE: *The ampoule should be handled under proper radiologically-controlled conditions at all times.*

The indicated uncertainties for the certified values are 95% confidence intervals for the means. The uncertainty assigned to the uranium assay includes components due to analytical variation. The uncertainties assigned to the isotopic abundance values include random measurement variations and a component based on the uncertainties associated with the determination of the mass discrimination correction factors.

The uranium elemental concentration was determined by the NBL-modified Davies-Gray titrimetric method [Reference: A. R. Eberle, M. W. Lerner, C. G. Goldbeck, and C. J. Rodden, NBL-252 (1970), pp. 1-25] using NBL CRM 112-A (uranium (normal) metal assay standard) as a control to verify the measurement system. The uranium isotopic composition was determined by thermal ionization mass spectrometry using NBL CRM 111 (U-233 spike) to demonstrate compatibility. The uranium assay value obtained by chemical analysis was verified by IDMS using NBL CRM 115 (uranium (depleted) metal assay standard) and NBL CRM 135 (U-235 spike) as spikes. For both the isotopic abundance and the IDMS assay measurements, mass discrimination correction factors were established using NBL CRM U500 and were applied to the calculations. The total impurity content was less than 1600 μg/g U as determined by inductively-coupled plasma atomic emission spectrometry on a subsample of the master

March 30, 2008
Argonne, Illinois

www.nbl.doe.gov

Jon Neuhoff, Director
New Brunswick Laboratory

(Editorial revision of Certificate dated January 18, 1990)

solution. Iron is the dominant impurity at 1330 μg/g U. Calcium, zinc, sodium, and magnesium were also found at 90, 50,50, and 10 μg/g U respectively. These impurity values are provided for information only; the impurity values are not certified.

The starting material from which this CRM was prepared was supplied by Argonne National Laboratory (ANL). Preparation and packaging of CRM 111-A were carried out by V. E. Connolly, M. I. Spaletto, F. P. Orlowicz, and F. E. Jones, NBL. Titrimetric assay measurements were performed by M. I. Spaletto, NBL; IDMS assay measurements were performed by V. E. Connolly, NBL; isotopic abundance measurements were performed by M. A. Legel and F. E. Jones, NBL; impurity measurements were performed by E. A. Huff and associates, ANL; statistical assessment of the data for certification was performed by M. D. Soriano, NBL. Project technical direction was provided by V. E. Connolly, NBL; overall technical direction and coordination of the preparation, certification, and issuance of this CRM was provided by N. M. Trahey, NBL.

RECOMMENDED PROCEDURE FOR USING CRM 111-A

The package is designed to prepare a solution having a known concentration of uranium on a weight basis. Once prepared, it is suggested that all the solution be immediately distributed as subportions for later use as individual spikes. After the spike has been added to a sample and isotopic equilibrium has been assured, a chemical separation should be performed to remove isobaric isotopes before mass spectrometric analysis.

Shake the ampoule vigorously before opening to homogenize contents. Secure in an upright position and allow solution trapped in the ampoule tip to drain back into the reservoir. Wrap the ampoule in a small cloth or towel, and break off the tip at the pre-scored line. Discard the tip, transfer the solution to a tared container, and proceed to distribute it as weighed portions into suitable containers for use as spikes.

If a more dilute solution is desired, transfer the solution to a larger tared container, weigh, dilute and weigh again, mix vigorously, and distribute all the solution as weighed portions.

Reagent

ISOU-C 233CAL_00006

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404-352-8677
Fax 404-352-2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

95301
U-233 5 mL Liquid in Flame Sealed Vial

280632
ID ISOU-C 233CAL_00006
Exp 12/19/18 Prpd KLE Opn 12/19/13
233 CAL

Customer: TestAmerica - St. Louis
P.O. No.: 2548635, Item 1 Product Code: 8055

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide calibration and purity were checked by germanium gamma-ray spectrometry, liquid scintillation counting, and/or alpha spectrometry, as applicable. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty* , % Type u_A	u_B	U	Reference Date (12:00 PM EST)
U-233	5.815E+07	3.705E+03	0.1	0.6	1.2	12/12/2013

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: U-232 4.811 Bq; U-234 4.450 Bq; α-impurities<0.001%; γ-impurities<0.1%.
5.23229 g 1M HNO3 solution. Carrier free.
Original material calibrated by New Brunswick Laboratory as CRM 111-A.

Source Prepared by: K. Eardley, Radiochemist

QC Approved: J.D. McCorvey, Counting Room Manager Date: 12 Dec 13

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

ISOU-C 233CAL_00007

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

95301
U-233 5 mL Liquid in Flame Sealed Vial

288644
ID ISOU-C 233CAL_00007
Exp 12/19/18 Prpd KLE Opn 12/19/13
233 CAL

Customer: TestAmerica - St. Louis
P.O. No.: 2548635, Item 1 Product Code: 8055

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide calibration and purity were checked by germanium gamma-ray spectrometry, liquid scintillation counting, and/or alpha spectrometry, as applicable. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty* , % Type u_A	u_B	U	Reference Date (12:00 PM EST)
U-233	5.815E+07	3.705E+03	0.1	0.6	1.2	12/12/2013

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: U-232 4.811 Bq; U-234 4.450 Bq; α-impurities<0.001%; γ-impurities<0.1%.
5.23229 g 1M HNO3 solution. Carrier free.
Original material calibrated by New Brunswick Laboratory as CRM 111-A.

Source Prepared by: K. Eardley, Radiochemist

QC Approved: J.D. McCorvey, Counting Room Manager Date: 12 Dec 13

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

ISOU-C 236_00002

Eckert & Ziegler
Isotope Products

24937 Avenue Tibbitts
Valencia, California 91355

Tel 661•309•1010
Fax 661•257•8303

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

Radionuclide:	U-236	**Customer:**	TEST AMERICA
Half-life:	(2.342 ± 0.003)E+07 years	**P.O. No.:**	2380469
Catalog No.:	7336	**Reference Date:**	15-Oct-10 12:00 PST
Source No.:	1480-21	**Contained Radioactivity: (Total alpha)**	0.01017 µCi 376.3 Bq

Physical Description:

A.	Mass of solution:	5.01498 g in 5 mL V-Vial
B.	Chemical form:	$UO_2(NO_3)_2$ in 0.1M HNO_3
C.	Carrier content:	None
D.	Density:	1.0016 g/mL @ 20°C

MT02535-10
ISOU U-236 QC CONC
elyk
.1M HN03
Prep/Opened: 10/5/2010
Exp(1): 10/5/2020
Exp(2): 10/5/2020

281584
ID ISOU-C 236_00002
Exp 10/05/15 Prpd KLE Opn 10/05/10
236 CAL

Radioimpurities:

See Technical Data Sheet

Radionuclide Concentration: 0.002028 µCi/g, 75.04 Bq/g

Method of Calibration:

This source was prepared from a weighed aliquot of solution whose activity in µCi/g was determined using a liquid scintillation counter.

Uncertainty of Measurement:

A.	Type A (random) uncertainty:	± 0.9 %
B.	Type B (systematic) uncertainty:	± 3.0 %
C.	Uncertainty in aliquot weighing:	± 0.4 %
D.	Total uncertainty at the 99% confidence level:	± 3.2 %

Notes:

- See reverse side for leak test(s) performed on this source.
- EZIP participates in a NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (as in NRC Regulatory Guide 4.15).
- Nuclear data was taken from "Table of Radioactive Isotopes", edited by Virginia Shirley, 1986.
- This solution has a working life of 5 years.

Daniel James Van Dalsem
Quality Control

21-Sep-10
Date

EZIP Ref. No.: 1480-21

Reagent

ISOU-C Enrich_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

95302

279791
ID: ISOU-C Enrich_00001
Exp:10/16/18 Prpd:KLE Opn:12/19/13
U enriched (234 and 235)

U-Enriched (97%) 5 mL Liquid in Flame Sealed Vial

Customer: Test America - St. Louis
P.O. No.: 2547082, Item 1 Product Code: 8235

This standard radionuclide source was prepared using an aliquot measured gravimetrically from a master radionuclide solution. The master radionuclide solution was prepared by dissolution of Uranium Oxide in 2.5M nitric acid. Total activity was calibrated by liquid scintillation counting. Atomic mass and weight percentages were certified by New Brunswick Laboratory. Radionuclide purity and calibration were checked by liquid scintillation counting and gamma-ray spectrometry. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July, 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date 12-December-2013 12:00 PM EST

Isotope	Activity (Bq)	Half-Life, Days	Uncertainty Type*, (%) u_A	u_B	U
U-234	3.924 E+04	8.967 E+07	1.9	0.9	4.2
U-235	7.991 E+02	2.571 E+11	1.9	0.9	4.2
U-236	3.653 E+01	8.554 E+09	1.9	0.9	4.2
U-238	6.653 E-01	1.632 E+12	1.9	0.9	4.2

***Uncertainty:** U – Relative expanded uncertainty, k=2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: α-impurities (other than decay products)< 0.1%; β-impurities(other than decay products)<0.1%; γ-impurities (other than decay products)<0.1%.
5.20568 grams of 1M HNO_3 solution with Uranium 1.97 mg/g.
Original material certified by New Brunswick Laboratory as CRM U970.

Source Prepared By: _____
R. Ormsby, Radiochemist

QA Approved: _____ 12 DEC 13
J.D. McCorvey, Counting Room Manager

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

MS ICSA_00012

INORGANIC VENTURES™
300 Technology Drive
Christiansburg, VA 24073 · USA
inorganicventures.com
tel: 800.669.6799 · 540.585.3030
fax: 540.585.3012
info@inorganicventures.com

CERTIFICATE OF ANALYSIS

1.0 **INORGANIC VENTURES** is an ISO Guide 34 "General Requirements for the Competence of Reference Material Producers" and ISO 9001 registered manufacturer. Our manufacturing laboratory is accredited to ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories."

ACCREDITED Testing Laboratory Certificate 883.01

ACCREDITED Reference Material Producer Certificate 883.02

2.0 **DESCRIPTION OF CRM** **Stock Solution**

Catalog No.:	6020ICS-0A
Lot Number:	**G2-MEB476152**
Matrix:	1.4% HNO3(v/v)

278024
ID: MS ICSA_00012
Exp:12/19/14 Prpd:CCB Opn:12/19/13
ICSA

10,000 µg/mL ea:
Chloride,

2,000 µg/mL ea:
C,

1,000 µg/mL ea:
Al, Ca, Fe, K, Mg, Na, P, S,

20 µg/mL ea:
Mo, Ti

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

ELEMENT	CERTIFIED VALUE	ELEMENT	CERTIFIED VALUE	ELEMENT	CERTIFIED VALUE
Aluminum, Al	1,002 ± 6 µg/mL	Calcium, Ca	1,002 ± 6 µg/mL	Carbon, C	2,004 ± 13 µg/mL
Chloride, Chloride	10,020.0 ± 50.0 µg/mL	Iron, Fe	1,002 ± 7 µg/mL	Magnesium, Mg	1,002 ± 4 µg/mL
Molybdenum, Mo	20.04 ± 0.14 µg/mL	Phosphorus, P	1,002 ± 7 µg/mL	Potassium, K	1,002 ± 4 µg/mL
Sodium, Na	1,002 ± 7 µg/mL	Sulfur, S	1,002 ± 5 µg/mL	Titanium, Ti	20.04 ± 0.13 µg/mL

Certified Density: 1.034 g/mL (measured at 20 ± 1° C)

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

$$\text{Certified Value } (\bar{x}) = \frac{\Sigma x_i}{n}$$

$$\text{Uncertainty } (\pm) = 2\,[\,\Sigma(s_i)^2\,]^{1/2}$$

($\bar{x}$) = mean
x_i = individual results
n = number of measurements
2 = the coverage factor.
$[\,\Sigma(s_i)^2\,]^{1/2}$ = The square root of the sum of the squares of the most common errors (where 's' stands for the standard deviation) from instrumental measurement, density, NIST SRM uncertainty, weighing, dilution to volume, homogeneity, long term stability and short term stability.

4.0 TRACEBILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

· "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

· This product is Traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRMs are available, the term 'in-house std.' is specified.

- The Calculated Value is a value calculated from the weight of a starting material that has been certified directly vs. a NIST SRM/RM. See section 4.2 for balance traceability.

4.1 ASSAY INFORMATION

ELEMENT	METHOD	NIST SRM#	SRM LOT#
Al	ICP Assay	3101a	060502
Al	EDTA	928	928
C	Gravimetric		See Sec. 4.2
Ca	ICP Assay	3109a	050825
Ca	EDTA	928	928
Chloride	Acidimetric	84L	84L
Fe	ICP Assay	3126a	051031
Fe	EDTA	928	928
K	Gravimetric		See Sec. 4.2
K	ICP Assay	3141a	051220
Mg	ICP Assay	3131a	050302
Mg	EDTA	928	928
Mo	Calculated		See Sec. 4.2
Mo	ICP Assay	3134	891307
Na	Gravimetric		See Sec. 4.2
Na	ICP Assay	3152a	010728
P	ICP Assay	3139a	060717
P	Acidimetric	84L	84L
S	Acidimetric	84k	84k
Ti	ICP Assay	3162a	060808

4.2 BALANCE CALIBRATION - All analytical balances are calibrated yearly by an accredited calibration laboratory and are traceable to a class E 2 analytical weight set with NIST Traceability. All balances are checked daily using an in-house procedure. The weights used for testing are annually compared to master weights and are traceable to the National Institute of Standards and Technology (NIST).

4.3 THERMOMETER CALIBRATION - All thermometers are NIST traceable through thermometers that are calibrated by an A2LA accredited calibration laboratory.

4.4 GLASSWARE CALIBRATION - An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM's.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP-MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

s Al	M Dy < 0.000100	O Li 0.002000	M Pr < 0.000100	M Te < 0.012007
M Sb < 0.000600	M Er < 0.000100	M Lu < 0.000100	M Re < 0.000100	M Tb < 0.000100
O As < 0.020000	M Eu < 0.000100	s Mg	M Rh < 0.000100	M Tl < 0.000100
O Ba < 0.000200	M Gd < 0.000100	O Mn 0.003000	M Rb < 0.020012	M Th < 0.000100
O Be < 0.000090	M Ga < 0.001001	O Hg < 0.005000	M Ru < 0.000100	M Tm < 0.000100
M Bi < 0.005003	O Ge < 0.015000	s Mo	M Sm < 0.000100	M Sn < 0.003002
O B < 0.005000	M Au < 0.001001	M Nd < 0.000100	O Sc < 0.000700	s Ti
O Cd < 0.001000	M Hf < 0.002001	O Ni < 0.002000	M Se < 0.050029	O W < 0.007000
s Ca	M Ho < 0.000100	M Nb < 0.002001	n Si	M U < 0.000100
M Ce < 0.000500	M In < 0.001001	n Os	M Ag < 0.001001	O V < 0.004000
M Cs < 0.001001	M Ir < 0.000100	M Pd < 0.003002	s Na	M Yb < 0.000100
O Cr < 0.010000	s Fe	s P	O Sr 0.005000	M Y < 0.000100
M Co < 0.001001	M La < 0.000200	M Pt < 0.000100	s S	M Zn 0.016610
O Cu < 0.020000	M Pb 0.002001	s K	M Ta < 0.001001	M Zr < 0.004002

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
HPLC, IC, TLC, ISE, IR, NMR, UV/VIS, MS, Capillary Electrophoresis, Potentiometry, Wet Chemistry and Voltammetry
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact Technical Staff

This CRM was manufactured using 18 megohm doubly deionized water that has been filtered through a 0.2 micron filter.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep **Tightly** sealed when not in use. Store and use at 20 ± 4°C. **Do Not** pipette from the container. **Do Not** return portions removed from pipetting to container.

Element Specific Information - For specific information regarding any element: Contact technical staff.

Uranium Note: If uranium is present in this standard, it is natural abundance unless specified in Section 3.0.

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Safety Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous.

Inorganic Ventures homogeneity data indicate that the end user should take a minimum sample size of 0.2mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration
- SAI Global File Number 010105

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration"
- Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 "General Requirements for the Competence of Reference Material Producers"
- Reference Materials Production - Accredited A2LA Certificate Number 883.02

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission
- Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission
- Reporting Defects and Non-Compliance

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies of chemically-stable solutions performed at the manufacturer's facility show a CRM shelf-life of twenty one months for solutions packaged in 125-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life. Manufacturer concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

11.3 Chemical Stability - Studies have been conducted on this or similar CRMs and it has been demonstrated that this CRM is chemically stable for a period of not less than two years provided the "Storage & Handling" conditions are followed that are described in section 7.0.

Certification Date: July 12, 2013

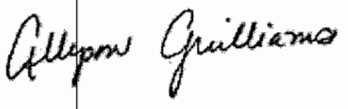
Expiration Date: EXPIRES 01/2015

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By: Zach Saunders
Product Documentation Technician



Certificate Approved By: Allyson Guilliams
Quality Control Supervisor



Certifying Officer: Paul Gaines
PhD., Senior Technical Director



Reagent

MS ICSA_00014

INORGANIC VENTURES
300 Technology Drive
Christiansburg, VA 24073 USA
inorganicventures.com

CERTIFICATE OF ANALYSIS

1.0 **INORGANIC VENTURES** is an ISO Guide 34 "General Requirements for the Competence of Reference Material Producers" and ISO 9001 registered manufacturer. Our manufacturing laboratory is accredited to ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories."

ACCREDITED Testing Laboratory Certificate 883.01

ACCREDITED Reference Material Producer Certificate 883.02

2.0 **DESCRIPTION OF CRM**

Stock Solution

Catalog No.: 6020ICS-0A

Lot Number: **G2-MEB476152MCA**

Matrix: 1.4% HNO3(v/v)

397615
ID: MS ICSA_00014
Exp:07/01/15 Prpd:CCB Opn:07/03/14
ICSA

10,000 µg/mL ea:
Chloride,

2,000 µg/mL ea:
C,

1,000 µg/mL ea:
Al, Ca, Fe, K, Mg, Na, P, S,

20 µg/mL ea:
Mo, Ti

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

ELEMENT	CERTIFIED VALUE	ELEMENT	CERTIFIED VALUE	ELEMENT	CERTIFIED VALUE
Aluminum, Al	1,002 ± 6 µg/mL	Calcium, Ca	1,002 ± 6 µg/mL	Carbon, C	2,004 ± 13 µg/mL
Chloride, Chloride	10,020.0 ± 50.0 µg/mL	Iron, Fe	1,002 ± 7 µg/mL	Magnesium, Mg	1,002 ± 4 µg/mL
Molybdenum, Mo	20.04 ± 0.14 µg/mL	Phosphorus, P	1,002 ± 7 µg/mL	Potassium, K	1,002 ± 4 µg/mL
Sodium, Na	1,002 ± 7 µg/mL	Sulfur, S	1,002 ± 5 µg/mL	Titanium, Ti	20.04 ± 0.13 µg/mL

Certified Density: 1.034 g/mL (measured at 20 ± 1° C)

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

$$\text{Certified Value } (\bar{x}) = \frac{\Sigma x_i}{n}$$

$$\text{Uncertainty } (\pm) = 2\,[\,\Sigma(s_i)^2\,]^{1/2}$$

($\bar{x}$) = mean

x_i = individual results

n = number of measurements

2 = the coverage factor.

$[\,\Sigma(s_i)^2\,]^{1/2}$ = The square root of the sum of the squares of the most common errors (where 's' stands for the standard deviation) from instrumental measurement, density, NIST SRM uncertainty, weighing, dilution to volume, homogeneity, long term stability and short term stability.

4.0 TRACEBILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

· "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)
· This product is Traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRMs are available, the term 'in-house std.' is specified.
- The Calculated Value is a value calculated from the weight of a starting material that has been certified directly vs. a NIST SRM/RM. See section 4.2 for balance traceability.

4.1 ASSAY INFORMATION

ELEMENT	METHOD	NIST SRM#	SRM LOT#
Al	ICP Assay	3101a	060502
Al	EDTA	928	928
C	Gravimetric		See Sec. 4.2
Ca	ICP Assay	3109a	050825
Ca	EDTA	928	928
Chloride	Acidimetric	84L	84L
Fe	ICP Assay	3126a	051031
Fe	EDTA	928	928
K	Gravimetric		See Sec. 4.2
K	ICP Assay	3141a	051220
Mg	ICP Assay	3131a	050302
Mg	EDTA	928	928
Mo	Calculated		See Sec. 4.2
Mo	ICP Assay	3134	891307
Na	Gravimetric		See Sec. 4.2
Na	ICP Assay	3152a	010728
P	ICP Assay	3139a	060717
P	Acidimetric	84L	84L
S	Acidimetric	84k	84k
Ti	ICP Assay	3162a	060808

4.2 BALANCE CALIBRATION - All analytical balances are calibrated yearly by an accredited calibration laboratory and are traceable to a class E 2 analytical weight set with NIST Traceability. All balances are checked daily using an in-house procedure. The weights used for testing are annually compared to master weights and are traceable to the National Institute of Standards and Technology (NIST).

4.3 THERMOMETER CALIBRATION - All thermometers are NIST traceable through thermometers that are calibrated by an A2LA accredited calibration laboratory.

4.4 GLASSWARE CALIBRATION - An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM's.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP-MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

s	Al		M	Dy	< 0.000100	O	Li	0.002000	M	Pr	< 0.000100	M	Te	< 0.012007
M	Sb	< 0.000600	M	Er	< 0.000100	M	Lu	< 0.000100	M	Re	< 0.000100	M	Tb	< 0.000100
O	As	< 0.020000	M	Eu	< 0.000100	s	Mg		M	Rh	< 0.000100	M	Tl	< 0.000100
O	Ba	< 0.000200	M	Gd	< 0.000100	O	Mn	0.003000	M	Rb	< 0.020012	M	Th	< 0.000100
O	Be	< 0.000090	M	Ga	< 0.001001	O	Hg	< 0.005000	M	Ru	< 0.000100	M	Tm	< 0.000100
M	Bi	< 0.005003	O	Ge	< 0.015000	s	Mo		M	Sm	< 0.000100	M	Sn	< 0.003002
O	B	< 0.005000	M	Au	< 0.001001	M	Nd	< 0.000100	O	Sc	< 0.000700	s	Ti	
O	Cd	0.003400	M	Hf	< 0.002001	O	Ni	< 0.002000	M	Se	< 0.050029	O	W	< 0.007000
s	Ca		M	Ho	< 0.000100	M	Nb	< 0.002001	n	Si		M	U	< 0.000100
M	Ce	< 0.000500	M	In	< 0.001001	n	Os		M	Ag	< 0.001001	O	V	< 0.004000
M	Cs	< 0.001001	M	Ir	< 0.000100	M	Pd	< 0.003002	s	Na		M	Yb	< 0.000100
O	Cr	< 0.010000	s	Fe		s	P		O	Sr	0.005000	M	Y	< 0.000100
M	Co	< 0.001001	M	La	< 0.000200	M	Pt	< 0.000100	s	S		M	Zn	0.016610
O	Cu	< 0.020000	M	Pb	0.002001	s	K		M	Ta	< 0.001001	M	Zr	< 0.004002

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
HPLC, IC, TLC, ISE, IR, NMR, UV/VIS, MS, Capillary Electrophoresis, Potentiometry, Wet Chemistry and Voltammetry
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact Technical Staff

This CRM was manufactured using 18 megohm doubly deionized water that has been filtered through a 0.2 micron filter.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep **Tightly** sealed when not in use. Store and use at 20 ± 4°C. **Do Not** pipette from the container. **Do Not** return portions removed from pipetting to container.

Element Specific Information - For specific information regarding any element: Contact technical staff.

Uranium Note: If uranium is present in this standard, it is natural abundance unless specified in Section 3.0.

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Safety Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous.

Inorganic Ventures homogeneity data indicate that the end user should take a minimum sample size of 0.2mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration
- SAI Global File Number 010105

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration"
- Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 "General Requirements for the Competence of Reference Material Producers"
- Reference Materials Production - Accredited A2LA Certificate Number 883.02

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission
- Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission
- Reporting Defects and Non-Compliance

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies of chemically-stable solutions performed at the manufacturer's facility show a CRM shelf-life of twenty one months for solutions packaged in 125-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life. Manufacturer concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

11.3 Chemical Stability - Studies have been conducted on this or similar CRMs and it has been demonstrated that this CRM is chemically stable for a period of not less than two years provided the "Storage & Handling" conditions are followed that are described in section 7.0.

Certification Date: July 12, 2013

Expiration Date: EXPIRES 1[illegible]2015

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By: Zach Saunders
Product Documentation Technician

Zachary Saunders

Certificate Approved By: Allyson Guilliams
Quality Control Supervisor

Allyson Guilliams

Certifying Officer: Paul Gaines
PhD., Senior Technical Director

Paul R Gaines

Reagent

STD U_00005

INORGANIC VENTURES™
CUSTOMER SUPPLY DRIVE
CHARLOTTESVILLE, VA 24073-3427
WWW.INORGANICVENTURES.COM

CERTIFICATE OF ANALYSIS

260559
ID STD U_00005
Exp 12/01/14 Prpd:REV Opn:12/02/13
U 1000PPM

1.0 **INORGANIC VENTURES** is an ISO Guide 34 "General Requirements for the Competence of Reference Material Producers" and ISO 9001 registered manufacturer. Our manufacturing laboratory is accredited to ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories."

ACCREDITED Testing Laboratory Certificate 883.01

ACCREDITED Reference Material Producer Certificate 883.02

2.0 DESCRIPTION OF CRM **1000 µg/mL Uranium in 2% (v/v) HNO3**

Catalog Number:	CGU1-1, CGU1-2, and CGU1-5
Lot Number:	**F2-U01098**
Starting Material:	UO2(NO3)2.6H2O
Starting Material Purity (%):	99.9979
Starting Material Lot No:	1627
Matrix:	2% (v/v) HNO3

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 1,003 ± 6 µg/mL - weighted mean

Certified Density: 1.010 g/mL (measured at 20 ± 1°C)

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

Certified Value $(\bar{x}) = \frac{\Sigma x_i}{n}$

($\bar{x}$) = mean

x_i = individual results

n = number of measurements

Uncertainty $(\pm) = 2\,[\,\Sigma(s_i)^2\,]^{1/2}$

2 = the coverage factor.

$[\,\Sigma(s_i)^2\,]^{1/2}$ = The square root of the sum of the squares of the most common errors (where 's' stands for the standard deviation) from instrumental measurement, density, NIST SRM uncertainty, weighing, dilution to volume, homogeneity, long term stability and short term stability.

Certified Abundance: The 235U in this standard is depleted. The Certified abundances in Atom % are as follows:

IV's Certified Abundance

Isotope	Atom%
Uranium 238U	99.6 ± 0.1
235U	0.42 ± 0.05

4.0 TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

· "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

· This product is Traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRMs are available, the term 'in-house std.' is specified.

- The Calculated Value is a value calculated from the weight of a starting material that has been certified directly vs. a NIST SRM/RM. See section 4.2 for balance traceability.

4.1 **Assay Method #1** **1,003 ± 4 µg/mL**
ICP Assay NIST SRM 3164 Lot Number: 080521

Assay Method #2 **1,002 ± 3 µg/mL**
Calculated NIST SRM Lot Number: See Sec. 4.2

4.2 **BALANCE CALIBRATION -** All analytical balances are calibrated yearly by an accredited calibration laboratory and are traceable to a class E 2 analytical weight set with NIST Traceability. All balances are checked daily using an in-house procedure. The weights used for testing are annually compared to master weights and are traceable to the National Institute of Standards and Technology (NIST).

4.3 **THERMOMETER CALIBRATION -** All thermometers are NIST traceable through thermometers that are calibrated by an A2LA accredited calibration laboratory.

4.4 **GLASSWARE CALIBRATION -** An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM's.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

CRM's solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O Al < 0.050000	M Dy < 0.015093	M Li < 0.025154	M Pr < 0.000755	M Te < 0.075463
M Sb < 0.001258	M Er < 0.012577	M Lu < 0.001006	M Re < 0.002515	M Tb < 0.000755
M As < 0.025154	M Eu < 0.007546	M Mg < 0.075463	M Rh < 0.002515	M Tl < 0.002515
M Ba < 0.025154	M Gd < 0.002515	M Mn < 0.010062	M Rb < 0.002515	M Th < 0.002515
M Be < 0.001258	M Ga < 0.002515	i Hg	M Ru < 0.005031	M Tm < 0.001006
M Bi < 0.001006	M Ge < 0.015093	M Mo < 0.005031	M Sm < 0.002515	O Sn < 0.100000
M B < 0.176080	M Au < 0.007546	M Nd < 0.005031	M Sc < 0.025154	M Ti < 0.125772
M Cd < 0.007546	M Hf < 0.005031	M Ni < 0.020123	M Se < 0.020123	M W < 0.025154
O Ca 0.003976	M Ho < 0.001258	M Nb < 0.001258	i Si	s U
M Ce < 0.012577	M In < 0.025154	n Os	M Ag < 0.005031	M V < 0.005031
M Cs < 0.000755	M Ir < 0.012577	M Pd < 0.012577	O Na 0.039757	M Yb < 0.002515
M Cr < 0.012577	M Fe < 0.503087	i P	M Sr < 0.001258	M Y < 0.100617
M Co < 0.007546	M La < 0.001258	M Pt < 0.005031	i S	M Zn < 0.025154
M Cu < 0.015093	M Pb < 0.007546	i K	M Ta < 0.017608	M Zr < 0.012577

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
HPLC, IC, TLC, ISE, IR, NMR, UV/VIS, MS, Capillary Eletrophoresis, Potentiometry, Wet Chemistry and Voltammetry
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact Technical Staff

This CRM was manufactured using 18 megohm-doubly deionized water that has been filtered through a 0.2 micron filter.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 238.0289; +6 ; 8; UO_2^{2+}(uranyl)

Chemical Compatibility - Soluble in HCl and HNO_3. Avoid H_3PO_4. H_2SO_4 and HF matrices should not be a problem depending upon [U]. Although the UO_2^{2+} ion is distinctly basic, any U^{+4} will precipitate in basic media. UO_2^{2+}salts are generally soluble in water and UO_2^{2+} is stable with most metals and inorganic anions. The uranyl phosphate is insoluble in water. UF_4 and UF_6 are water soluble.

Stability - 2-100 ppb levels stable for months in 1% HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 2-5% HNO_3 / LDPE container.

U Containing Samples (Preparation and Solution) - Metal (Dissolves rapidly in HCl and HNO_3); Oxide (Soluble in HNO_3); Ores (Digest for 1-2 hours with 1 gram of ore to 30 mL 1:1 HNO_3. Silica insolubles are removed by filtration after bringing the sample to fumes with conc. H_2SO_4.)

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Type	Interferences (underlined indicates severe)
ICP-OES 385.958 nm	0.3 / 0.01 µg/mL	1	ion	Th, Fe
ICP-OES 367.007 nm	0.3 / 0.02 µg/mL	1	ion	Th, Ce
ICP-OES 263.553 nm	0.3 / 0.01 µg/mL	1	ion	Ce, Ir, Th, Rh, W, Zr, Ta, Ti, V, Hf, Fe, Re, Ru
ICP-MS 238 amu	2 ppt	n/a	M+	206Pb16O2

Uranium Note: If uranium is present in this standard, it is natural abundance unless specified in Section 3.0.

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Safety Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to an in house procedure and is guaranteed to be homogeneous. Inorganic Ventures homogeneity data indicate that the end user should take a minimum sample size of 0.2mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration
- SAI Global File Number 010105

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration"
- Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 "General Requirements for the Competence of Reference Material Producers"
- Reference Materials Production - Accredited A2LA Certificate Number 883.02

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission
- Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission
- Reporting Defects and Non-Compliance

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability.

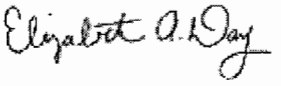
11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life. Manufacturer concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

11.3 Chemical Stability - Studies have been conducted on this or similar CRMs and it has been demonstrated that this CRM is chemically stable for a period of not less than two years provided the "Storage & Handling" conditions are followed that are described in section 7.0.

Certification Date: September 07, 2012
Expiration Date:

01 Dec 2014

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	Stephan Blaakman Manufacturing Tech	
Certificate Approved By:	Elizabeth Day Quality Assurance Specialist	
Certifying Officer:	Paul Gaines PhD., Senior Technical Director	

METALS

COVER PAGE
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102199-3

SDG No.: 680102199-3

Project: Sediments

Client Sample ID	Lab Sample ID
SD-279-SS	680-102199-1
SD-279-01	680-102199-2
SD-279-02	680-102199-3
SD-277-SS	680-102199-7
SD-277-01	680-102199-8
SD-277-02	680-102199-9
SD-219-SS	680-102199-11
SD-219-01	680-102199-12
SD-219-02	680-102199-13
SD-219-03	680-102199-14
SD-218-SS	680-102199-15
SD-218-01	680-102199-16
SD-218-02	680-102199-17
SD-203-SS	680-102199-18
SD-203-01	680-102199-19
SD-203-02	680-102199-20
SD-202-SS	680-102199-22
SD-202-01	680-102199-23
SD-202-02	680-102199-24
SD-195-SS	680-102199-25
SD-196-SS	680-102199-26
SD-196-01	680-102199-27
SD-196-02	680-102199-28
SD-220-SS	680-102199-30
SD-220-01	680-102199-31
SD-220-02	680-102199-32
SD-DUP-01	680-102199-33
SD-201-SS	680-102199-35
SD-201-01	680-102199-36
SD-201-02	680-102199-37
SD-200-SS	680-102199-39
SD-200-01	680-102199-40
SD-200-02	680-102199-41

Comments:

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-279-SS
Lab Sample ID: 680-102199-1
Lab Name: TestAmerica St. Louis
Job No.: 680-102199-3
SDG ID.: 680102199-3
Matrix: Solid
Date Sampled: 06/09/2014 15:40
Reporting Basis: WET
Date Received: 06/11/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0036	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00072	mg/Kg			5	6020A
15117-96-1	U-235	0.019	0.012	0.0049	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00096	mg/Kg			5	6020A
7440-61-1	U-238	2.6	0.012	0.00072	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	2.6	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-279-01 Lab Sample ID: 680-102199-2

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG ID.: 680102199-3

Matrix: Solid Date Sampled: 06/09/2014 15:45

Reporting Basis: WET Date Received: 06/11/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0033	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00067	mg/Kg			5	6020A
15117-96-1	U-235	0.023	0.011	0.0045	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00089	mg/Kg			5	6020A
7440-61-1	U-238	3.0	0.011	0.00067	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	3.0	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-279-02 Lab Sample ID: 680-102199-3

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG ID.: 680102199-3

Matrix: Solid Date Sampled: 06/09/2014 15:50

Reporting Basis: WET Date Received: 06/11/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0033	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00066	mg/Kg			5	6020A
15117-96-1	U-235	0.012	0.011	0.0045	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00088	mg/Kg			5	6020A
7440-61-1	U-238	1.6	0.011	0.00066	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	1.6	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-277-SS
Lab Sample ID: 680-102199-7
Lab Name: TestAmerica St. Louis
Job No.: 680-102199-3
SDG ID.: 680102199-3
Matrix: Solid
Date Sampled: 06/09/2014 18:10
Reporting Basis: WET
Date Received: 06/11/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0034	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00068	mg/Kg			5	6020A
15117-96-1	U-235	0.024	0.011	0.0046	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00091	mg/Kg			5	6020A
7440-61-1	U-238	3.2	0.011	0.00068	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	3.2	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-277-01 Lab Sample ID: 680-102199-8

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG ID.: 680102199-3

Matrix: Solid Date Sampled: 06/09/2014 18:15

Reporting Basis: WET Date Received: 06/11/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0032	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00064	mg/Kg			5	6020A
15117-96-1	U-235	0.023	0.011	0.0043	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00086	mg/Kg			5	6020A
7440-61-1	U-238	3.1	0.011	0.00064	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	3.1	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-277-02 Lab Sample ID: 680-102199-9

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG ID.: 680102199-3

Matrix: Solid Date Sampled: 06/09/2014 18:20

Reporting Basis: WET Date Received: 06/11/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0035	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00069	mg/Kg			5	6020A
15117-96-1	U-235	0.041	0.012	0.0047	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00092	mg/Kg			5	6020A
7440-61-1	U-238	5.4	0.012	0.00069	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	5.4	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-219-SS
Lab Sample ID: 680-102199-11
Lab Name: TestAmerica St. Louis
Job No.: 680-102199-3
SDG ID.: 680102199-3
Matrix: Solid
Date Sampled: 06/10/2014 09:20
Reporting Basis: WET
Date Received: 06/11/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.010	0.0031	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.010	0.00063	mg/Kg			5	6020A
15117-96-1	U-235	0.018	0.010	0.0042	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.010	0.00084	mg/Kg			5	6020A
7440-61-1	U-238	2.4	0.010	0.00063	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	2.4	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-219-01 Lab Sample ID: 680-102199-12

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG ID.: 680102199-3

Matrix: Solid Date Sampled: 06/10/2014 09:22

Reporting Basis: WET Date Received: 06/11/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0035	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00070	mg/Kg			5	6020A
15117-96-1	U-235	0.024	0.012	0.0048	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00094	mg/Kg			5	6020A
7440-61-1	U-238	3.2	0.012	0.00070	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	3.2	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-219-02 Lab Sample ID: 680-102199-13

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG ID.: 680102199-3

Matrix: Solid Date Sampled: 06/10/2014 09:25

Reporting Basis: WET Date Received: 06/11/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0036	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00072	mg/Kg			5	6020A
15117-96-1	U-235	0.0084	0.012	0.0049	mg/Kg	J		5	6020A
13982-70-2	U-236	ND	0.012	0.00096	mg/Kg			5	6020A
7440-61-1	U-238	1.1	0.012	0.00072	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	1.1	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-219-03 Lab Sample ID: 680-102199-14

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG ID.: 680102199-3

Matrix: Solid Date Sampled: 06/10/2014 09:28

Reporting Basis: WET Date Received: 06/11/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0033	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00065	mg/Kg			5	6020A
15117-96-1	U-235	0.027	0.011	0.0044	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00087	mg/Kg			5	6020A
7440-61-1	U-238	3.6	0.011	0.00065	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	3.6	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-218-SS
Lab Sample ID: 680-102199-15
Lab Name: TestAmerica St. Louis
Job No.: 680-102199-3
SDG ID.: 680102199-3
Matrix: Solid
Date Sampled: 06/10/2014 10:10
Reporting Basis: WET
Date Received: 06/11/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0033	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00066	mg/Kg			5	6020A
15117-96-1	U-235	0.0062	0.011	0.0044	mg/Kg	J		5	6020A
13982-70-2	U-236	ND	0.011	0.00088	mg/Kg			5	6020A
7440-61-1	U-238	0.83	0.011	0.00066	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	0.84	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-218-01 Lab Sample ID: 680-102199-16

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG ID.: 680102199-3

Matrix: Solid Date Sampled: 06/10/2014 10:12

Reporting Basis: WET Date Received: 06/11/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0037	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00074	mg/Kg			5	6020A
15117-96-1	U-235	0.0076	0.012	0.0050	mg/Kg	J		5	6020A
13982-70-2	U-236	ND	0.012	0.00099	mg/Kg			5	6020A
7440-61-1	U-238	1.0	0.012	0.00074	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	1.0	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-218-02 Lab Sample ID: 680-102199-17

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG ID.: 680102199-3

Matrix: Solid Date Sampled: 06/10/2014 10:14

Reporting Basis: WET Date Received: 06/11/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0035	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00069	mg/Kg			5	6020A
15117-96-1	U-235	0.0050	0.012	0.0047	mg/Kg	J		5	6020A
13982-70-2	U-236	ND	0.012	0.00092	mg/Kg			5	6020A
7440-61-1	U-238	0.68	0.012	0.00069	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	0.69	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-203-SS
Lab Sample ID: 680-102199-18
Lab Name: TestAmerica St. Louis
Job No.: 680-102199-3
SDG ID.: 680102199-3
Matrix: Solid
Date Sampled: 06/10/2014 11:40
Reporting Basis: WET
Date Received: 06/11/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0032	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00064	mg/Kg			5	6020A
15117-96-1	U-235	0.029	0.011	0.0043	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00085	mg/Kg			5	6020A
7440-61-1	U-238	3.9	0.011	0.00064	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	3.9	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-203-01 Lab Sample ID: 680-102199-19

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG ID.: 680102199-3

Matrix: Solid Date Sampled: 06/10/2014 11:45

Reporting Basis: WET Date Received: 06/11/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0033	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00066	mg/Kg			5	6020A
15117-96-1	U-235	0.019	0.011	0.0045	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00088	mg/Kg			5	6020A
7440-61-1	U-238	2.6	0.011	0.00066	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	2.6	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-203-02 Lab Sample ID: 680-102199-20

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG ID.: 680102199-3

Matrix: Solid Date Sampled: 06/10/2014 11:50

Reporting Basis: WET Date Received: 06/11/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0035	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00070	mg/Kg			5	6020A
15117-96-1	U-235	0.031	0.012	0.0047	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00093	mg/Kg			5	6020A
7440-61-1	U-238	3.3	0.012	0.00070	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	3.3	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-202-SS
Lab Sample ID: 680-102199-22
Lab Name: TestAmerica St. Louis
Job No.: 680-102199-3
SDG ID.: 680102199-3
Matrix: Solid
Date Sampled: 06/10/2014 12:20
Reporting Basis: WET
Date Received: 06/11/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0034	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00068	mg/Kg			5	6020A
15117-96-1	U-235	0.022	0.011	0.0046	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00091	mg/Kg			5	6020A
7440-61-1	U-238	2.9	0.011	0.00068	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	2.9	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-202-01 Lab Sample ID: 680-102199-23

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG ID.: 680102199-3

Matrix: Solid Date Sampled: 06/10/2014 12:25

Reporting Basis: WET Date Received: 06/11/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0032	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00063	mg/Kg			5	6020A
15117-96-1	U-235	0.015	0.011	0.0043	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00084	mg/Kg			5	6020A
7440-61-1	U-238	2.0	0.011	0.00063	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	2.0	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-202-02 Lab Sample ID: 680-102199-24

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG ID.: 680102199-3

Matrix: Solid Date Sampled: 06/10/2014 12:30

Reporting Basis: WET Date Received: 06/11/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0034	mg/Kg		^ *	5	6020A
13966-29-5	U-234	ND	0.011	0.00068	mg/Kg		^	5	6020A
15117-96-1	U-235	0.0063	0.011	0.0046	mg/Kg	J	^	5	6020A
13982-70-2	U-236	ND	0.011	0.00090	mg/Kg		^	5	6020A
7440-61-1	U-238	0.83	0.011	0.00068	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	0.84	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-195-SS
Lab Sample ID: 680-102199-25
Lab Name: TestAmerica St. Louis
Job No.: 680-102199-3
SDG ID.: 680102199-3
Matrix: Solid
Date Sampled: 06/10/2014 13:30
Reporting Basis: WET
Date Received: 06/11/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0037	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00074	mg/Kg			5	6020A
15117-96-1	U-235	0.0068	0.012	0.0050	mg/Kg	J		5	6020A
13982-70-2	U-236	ND	0.012	0.00099	mg/Kg			5	6020A
7440-61-1	U-238	0.93	0.012	0.00074	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	0.94	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-196-SS
Lab Sample ID: 680-102199-26
Lab Name: TestAmerica St. Louis
Job No.: 680-102199-3
SDG ID.: 680102199-3
Matrix: Solid
Date Sampled: 06/10/2014 14:00
Reporting Basis: WET
Date Received: 06/11/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0037	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00074	mg/Kg			5	6020A
15117-96-1	U-235	0.018	0.012	0.0050	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00098	mg/Kg			5	6020A
7440-61-1	U-238	2.5	0.012	0.00074	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	2.5	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-196-01 Lab Sample ID: 680-102199-27

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG ID.: 680102199-3

Matrix: Solid Date Sampled: 06/10/2014 14:05

Reporting Basis: WET Date Received: 06/11/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0037	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00074	mg/Kg			5	6020A
15117-96-1	U-235	0.019	0.012	0.0050	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00099	mg/Kg			5	6020A
7440-61-1	U-238	2.6	0.012	0.00074	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	2.6	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-196-02 Lab Sample ID: 680-102199-28

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG ID.: 680102199-3

Matrix: Solid Date Sampled: 06/10/2014 14:10

Reporting Basis: WET Date Received: 06/11/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0036	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00073	mg/Kg			5	6020A
15117-96-1	U-235	0.013	0.012	0.0049	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00097	mg/Kg			5	6020A
7440-61-1	U-238	1.8	0.012	0.00073	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	1.8	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-220-SS
Lab Sample ID: 680-102199-30
Lab Name: TestAmerica St. Louis
Job No.: 680-102199-3
SDG ID.: 680102199-3
Matrix: Solid
Date Sampled: 06/10/2014 14:40
Reporting Basis: WET
Date Received: 06/11/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0036	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00072	mg/Kg			5	6020A
15117-96-1	U-235	0.022	0.012	0.0049	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00096	mg/Kg			5	6020A
7440-61-1	U-238	2.8	0.012	0.00072	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	2.8	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-220-01 Lab Sample ID: 680-102199-31

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG ID.: 680102199-3

Matrix: Solid Date Sampled: 06/10/2014 14:42

Reporting Basis: WET Date Received: 06/11/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0035	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00071	mg/Kg			5	6020A
15117-96-1	U-235	0.025	0.012	0.0048	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00095	mg/Kg			5	6020A
7440-61-1	U-238	3.1	0.012	0.00071	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	3.1	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-220-02 Lab Sample ID: 680-102199-32

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG ID.: 680102199-3

Matrix: Solid Date Sampled: 06/10/2014 14:44

Reporting Basis: WET Date Received: 06/11/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0032	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00064	mg/Kg			5	6020A
15117-96-1	U-235	0.020	0.011	0.0044	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00086	mg/Kg			5	6020A
7440-61-1	U-238	2.0	0.011	0.00064	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	2.0	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-DUP-01 Lab Sample ID: 680-102199-33

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG ID.: 680102199-3

Matrix: Solid Date Sampled: 06/10/2014 00:00

Reporting Basis: WET Date Received: 06/11/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0036	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00071	mg/Kg			5	6020A
15117-96-1	U-235	0.023	0.012	0.0048	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00095	mg/Kg			5	6020A
7440-61-1	U-238	3.0	0.012	0.00071	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	3.0	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-201-SS
Lab Sample ID: 680-102199-35
Lab Name: TestAmerica St. Louis
Job No.: 680-102199-3
SDG ID.: 680102199-3
Matrix: Solid
Date Sampled: 06/10/2014 15:10
Reporting Basis: WET
Date Received: 06/11/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0034	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00069	mg/Kg			5	6020A
15117-96-1	U-235	0.035	0.011	0.0046	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00092	mg/Kg			5	6020A
7440-61-1	U-238	4.6	0.011	0.00069	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	4.6	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-201-01 Lab Sample ID: 680-102199-36

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG ID.: 680102199-3

Matrix: Solid Date Sampled: 06/10/2014 15:15

Reporting Basis: WET Date Received: 06/11/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0033	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00067	mg/Kg			5	6020A
15117-96-1	U-235	0.030	0.011	0.0045	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00089	mg/Kg			5	6020A
7440-61-1	U-238	3.8	0.011	0.00067	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	3.8	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-201-02 Lab Sample ID: 680-102199-37

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG ID.: 680102199-3

Matrix: Solid Date Sampled: 06/10/2014 15:20

Reporting Basis: WET Date Received: 06/11/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0033	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00065	mg/Kg			5	6020A
15117-96-1	U-235	0.019	0.011	0.0044	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00087	mg/Kg			5	6020A
7440-61-1	U-238	2.5	0.011	0.00065	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	2.5	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-200-SS
Lab Sample ID: 680-102199-39
Lab Name: TestAmerica St. Louis
Job No.: 680-102199-3
SDG ID.: 680102199-3
Matrix: Solid
Date Sampled: 06/10/2014 15:50
Reporting Basis: WET
Date Received: 06/11/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0035	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00070	mg/Kg			5	6020A
15117-96-1	U-235	0.026	0.012	0.0047	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00093	mg/Kg			5	6020A
7440-61-1	U-238	3.4	0.012	0.00070	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	3.4	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-200-01 Lab Sample ID: 680-102199-40

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG ID.: 680102199-3

Matrix: Solid Date Sampled: 06/10/2014 15:55

Reporting Basis: WET Date Received: 06/11/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0035	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00069	mg/Kg			5	6020A
15117-96-1	U-235	0.027	0.012	0.0047	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00092	mg/Kg			5	6020A
7440-61-1	U-238	3.3	0.012	0.00069	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	3.3	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-200-02 Lab Sample ID: 680-102199-41

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG ID.: 680102199-3

Matrix: Solid Date Sampled: 06/10/2014 16:00

Reporting Basis: WET Date Received: 06/11/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0034	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00067	mg/Kg			5	6020A
15117-96-1	U-235	0.028	0.011	0.0046	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00090	mg/Kg			5	6020A
7440-61-1	U-238	3.7	0.011	0.00067	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	3.7	0.0050	0.00030	mg/Kg			1	6020A

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

ICV Source: ISOU ICV(3)_00017 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00018

Analyte	ICV 160-138156/7 08/14/2014 12:02				CCV 160-138156/15 08/14/2014 12:40				CCV 160-138156/27 08/14/2014 13:36			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.229		0.223	102	0.0524		0.0515	102	0.0520		0.0515	101

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

ICV Source: ISOU ICV(3)_00017 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00018

Analyte	CCV 160-138156/39 08/14/2014 14:32				CCV 160-138156/51 08/14/2014 15:28				CCV 160-138156/63 08/14/2014 16:26			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.0533		0.0515	103	0.0532		0.0515	103	0.0540		0.0515	105

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

ICV Source: ISOU ICV(3)_00017 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00018

Analyte	CCV 160-138156/75 08/14/2014 17:47											
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.0554		0.0515	108								

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

ICV Source: ISOU ICV(4,8)_00017 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00018

Analyte	ICV 160-138156/8 08/14/2014 12:07				CCV 160-138156/15 08/14/2014 12:40				CCV 160-138156/27 08/14/2014 13:36			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0867		0.0835	104	0.0831		0.0827	101	0.0831		0.0827	101
U-238	9.82		9.78	100	5.14		5.03	102	5.13		5.03	102

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

ICV Source: ISOU ICV(4,8)_00017 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00018

Analyte	CCV 160-138156/39 08/14/2014 14:32				CCV 160-138156/51 08/14/2014 15:28				CCV 160-138156/63 08/14/2014 16:26			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0859		0.0827	104	0.0872		0.0827	105	0.0867		0.0827	105
U-238	5.34		5.03	106	5.41		5.03	108	5.41		5.03	108

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

ICV Source: ISOU ICV(4,8)_00017 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00018

Analyte	CCV 160-138156/75 08/14/2014 17:47											
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0893		0.0827	108								
U-238	5.50		5.03	109								

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

ICV Source: ISOU ICV(5,6)_00019 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00018

Analyte	ICV 160-138156/9 08/14/2014 12:12				CCV 160-138156/15 08/14/2014 12:40				CCV 160-138156/27 08/14/2014 13:36			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	1.14		1.06	108	4.97		4.85	102	4.95		4.85	102
U-236	0.0692		0.0746	93	0.0895		0.0890	101	0.0892		0.0890	100

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

ICV Source: ISOU ICV(5,6)_00019 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00018

Analyte	CCV 160-138156/39 08/14/2014 14:32				CCV 160-138156/51 08/14/2014 15:28				CCV 160-138156/63 08/14/2014 16:26			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	5.13		4.85	106	5.20		4.85	107	5.20		4.85	107
U-236	0.0923		0.0890	104	0.0937		0.0890	105	0.0949		0.0890	107

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

ICV Source: ISOU ICV(5,6)_00019 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00018

Analyte	CCV 160-138156/75 08/14/2014 17:47											
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	5.33		4.85	110								
U-236	0.0966		0.0890	109								

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

ICV Source: ISOU ICV(3)_00018 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	ICV 160-138778/10 08/18/2014 14:58				CCV 160-138778/2 08/18/2014 15:36				CCV 160-138778/27 08/18/2014 16:43			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.231		0.223	103	0.0536		0.0515	104	0.0540		0.0515	105

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

ICV Source: ISOU ICV(4,8)_00018 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	ICV 160-138778/11 08/18/2014 15:03				CCV 160-138778/2 08/18/2014 15:36				CCV 160-138778/27 08/18/2014 16:43			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0880		0.0835	105	0.0841		0.0827	102	0.0878		0.0827	106
U-238	9.96		9.78	102	5.22		5.03	104	5.45		5.03	109

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

ICV Source: ISOU ICV(5,6)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	ICV 160-138778/12 08/18/2014 15:08				CCV 160-138778/2 08/18/2014 15:36				CCV 160-138778/27 08/18/2014 16:43			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	1.11		1.06	105	5.02		4.85	104	5.26		4.85	109
U-236	0.0671		0.0746	90	0.0904		0.0890	102	0.0936		0.0890	105

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2B-IN
CRQL CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Method: 6020A Instrument ID: ICPMS6100

Lab Sample ID: CRI 160-138156/11 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 1_00018

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-235	0.0485	0.0493	J	102	70-130
U-238	0.0503	0.0489	J	97	70-130

Lab Sample ID: CRI 160-138156/12 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 2_00019

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-233	0.0309	0.0355	J	115	70-130
U-234	0.0496	0.0501		101	70-130
U-236	0.0534	0.0533		100	70-130

Lab Sample ID: CRI 160-138778/14 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 1_00019

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-235	0.0485	0.0496	J	102	70-130
U-238	0.0503	0.0541		108	70-130

Lab Sample ID: CRI 160-138778/15 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 2_00020

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-233	0.0309	0.0353	J	114	70-130
U-234	0.0496	0.0496	J	100	70-130
U-236	0.0534	0.0537		101	70-130

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IIB-IN

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Concentration Units: ug/L

Analyte	RL	ICB 160-138156/10 08/14/2014 12:16		CCB 160-138156/16 08/14/2014 12:44		CCB 160-138156/28 08/14/2014 13:40		CCB 160-138156/40 08/14/2014 14:36	
		Found	C	Found	C	Found	C	Found	C
U-233	0.050	0.0503		0.0146	J	0.0129	J	0.0134	J
U-234	0.050	ND		ND		ND		ND	
U-235	0.050	ND		ND		ND		ND	
U-236	0.050	ND		ND		ND		ND	
U-238	0.050	ND		ND		ND		ND	

Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Concentration Units: ug/L

Analyte	RL	CCB 160-138156/52 08/14/2014 15:32		CCB 160-138156/64 08/14/2014 16:32		CCB 160-138156/76 08/14/2014 17:52			
		Found	C	Found	C	Found	C	Found	C
U-233	0.050	0.0137	J	0.0139	J	0.0139	J		
U-234	0.050	ND		ND		ND			
U-235	0.050	ND		ND		ND			
U-236	0.050	ND		ND		ND			
U-238	0.050	ND		ND		ND			

Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Concentration Units: ug/L

Analyte	RL	ICB 160-138778/13 08/18/2014 15:12		CCB 160-138778/3 08/18/2014 15:40		CCB 160-138778/28 08/18/2014 16:47			
		Found	C	Found	C	Found	C	Found	C
U-233	0.050	0.0973		0.0113	J	0.0109	J		
U-234	0.050	ND		ND		ND			
U-235	0.050	ND		ND		ND			
U-236	0.050	ND		ND		ND			
U-238	0.050	0.0211	J	ND		ND			

Italicized analytes were not requested for this sequence.

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Concentration Units: mg/Kg Lab Sample ID: MB 160-137278/1-A

Instrument Code: ICPMS6100 Batch No.: 138156

CAS No.	Analyte	Concentration	C	Q	Method
13968-55-3	U-233	ND			6020A_U
13966-29-5	U-234	ND			6020A_U
15117-96-1	U-235	ND			6020A_U
13982-70-2	U-236	ND			6020A_U
7440-61-1	U-238	0.00212	J		6020A_U

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Concentration Units: mg/Kg Lab Sample ID: MB 160-137385/1-A

Instrument Code: ICPMS6100 Batch No.: 138156

CAS No.	Analyte	Concentration	C	Q	Method
13968-55-3	U-233	ND			6020A_U
13966-29-5	U-234	ND			6020A_U
15117-96-1	U-235	ND			6020A_U
13982-70-2	U-236	ND			6020A_U
7440-61-1	U-238	0.0114			6020A_U

4A-IN
INTERFERENCE CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Lab Sample ID: ICSAB 160-138156/14 Instrument ID: ICPMS6100

Lab File ID: 081414m1.rep ICS Source: ISOU ICSAB_00019

Concentration Units: ug/L

Analyte	True Solution AB	Found Solution AB	Percent Recovery
U-233	**0.0515**	**0.0550**	**107**
U-234	**0.0827**	**0.0863**	**104**
U-235	**4.85**	**5.18**	**107**
U-236	**0.0890**	**0.0927**	**104**
U-238	**5.03**	**5.41**	**108**

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IVA-IN

4A-IN
INTERFERENCE CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Lab Sample ID: ICSAB 160-138778/1 Instrument ID: ICPMS6100

Lab File ID: 081814M3.rep ICS Source: ISOU ICSAB_00020

Concentration Units: ug/L

Analyte	True Solution AB	Found Solution AB	Percent Recovery
U-233	**0.0515**	**0.0543**	**105**
U-234	**0.0827**	**0.0844**	**102**
U-235	**4.85**	**5.06**	**104**
U-236	**0.0890**	**0.0901**	**101**
U-238	**5.03**	**5.27**	**105**

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IVA-IN

5A-IN
MATRIX SPIKE SAMPLE RECOVERY
METALS

Client ID: SD-279-SS MS
Lab ID: 680-102199-1 MS
Lab Name: TestAmerica St. Louis
Job No.: 680-102199-3
SDG No.: 680102199-3
Matrix: Solid
Concentration Units: mg/Kg
% Solids:

Analyte	SSR	C	Sample Result (SR)	C	Spike Added (SA)	%R	Control Limit %R	Q	Method
U-234	0.00698	J	ND		0.00715	98	75-125		6020A
U-235	0.437		0.019		0.419	100	75-125		6020A
U-238	3.54		2.6		0.434	222	75-125	4	6020A

SSR = Spiked Sample Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VA - IN

5A-IN
MATRIX SPIKE SAMPLE RECOVERY
METALS

Client ID: SD-220-SS MS
Lab ID: 680-102199-30 MS
Lab Name: TestAmerica St. Louis
Job No.: 680-102199-3
SDG No.: 680102199-3
Matrix: Solid
Concentration Units: mg/Kg
% Solids:

Analyte	SSR	C	Sample Result (SR)	C	Spike Added (SA)	%R	Control Limit %R	Q	Method
U-234	0.00765	J	ND		0.00710	108	75-125		6020A
U-235	0.467		0.022		0.417	107	75-125		6020A
U-238	3.31		2.8		0.432	114	75-125	4	6020A

SSR = Spiked Sample Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VA - IN

5A-IN
MATRIX SPIKE DUPLICATE SAMPLE RECOVERY
METALS

Client ID: SD-279-SS MSD
Lab ID: 680-102199-1 MSD
Lab Name: TestAmerica St. Louis
Job No.: 680-102199-3
SDG No.: 680102199-3
Matrix: Solid
Concentration Units: mg/Kg
% Solids:

Analyte	(SDR)	C	Spike Added (SA)	%R	Control Limit %R	RPD	RPD Limit	Q	Method
U-234	0.00717	J	0.00798	90	75-125	3	20		6020A
U-235	0.438		0.468	89	75-125	0	20		6020A
U-238	3.25		0.485	138	75-125	9	20	4	6020A

SDR = Sample Duplicate Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VD - IN

5A-IN
MATRIX SPIKE DUPLICATE SAMPLE RECOVERY
METALS

Client ID: SD-220-SS MSD
Lab ID: 680-102199-30 MSD
Lab Name: TestAmerica St. Louis
Job No.: 680-102199-3
SDG No.: 680102199-3
Matrix: Solid
Concentration Units: mg/Kg
% Solids:

Analyte	(SDR)	C	Spike Added (SA)	%R	Control Limit %R	RPD	RPD Limit	Q	Method
U-234	0.00859	J	0.00800	107	75-125	12	20		6020A
U-235	0.523		0.469	107	75-125	11	20		6020A
U-238	3.38		0.486	116	75-125	2	20	4	6020A

SDR = Sample Duplicate Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VD - IN

7A-IN
LAB CONTROL SAMPLE
METALS

Lab ID: LCS 160-137278/2-A

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

Sample Matrix: Solid LCS Source: ISOU Prep Spk_00002

Analyte	Solid(mg/Kg)							
	True	Found	C	%R	Limits		Q	Method
U-234	0.00716	0.00705		98	80	120		6020A
U-235	0.420	0.416		99	80	120		6020A
U-238	0.436	0.432		99	80	120		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

7A-IN
LAB CONTROL SAMPLE
METALS

Lab ID: LCS 160-137385/2-A

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

Sample Matrix: Solid LCS Source: ISOU Prep Spk_00002

Analyte	Solid(mg/Kg)							
	True	Found	C	%R	Limits		Q	Method
U-234	0.00789	0.00850		108	80	120		6020A
U-235	0.463	0.505		109	80	120		6020A
U-238	0.480	0.527		110	80	120		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

8-IN
ICP-AES AND ICP-MS SERIAL DILUTIONS
METALS

Lab ID: 680-102199-1

SDG No: 680102199-3

Lab Name: TestAmerica St. Louis Job No: 680-102199-3

Matrix: Solid Concentration Units: mg/Kg

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Method
U-233	ND		ND		NC		6020A
U-234	ND		ND		NC		6020A
U-235	0.019		ND		NC		6020A
U-236	ND		ND		NC		6020A
U-238	2.6		2.66		3.1		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIII-IN

8-IN
ICP-AES AND ICP-MS SERIAL DILUTIONS
METALS

Lab ID: 680-102199-30

SDG No: 680102199-3

Lab Name: TestAmerica St. Louis Job No: 680-102199-3

Matrix: Solid Concentration Units: mg/Kg

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Method
U-233	ND		ND		NC		6020A
U-234	ND		ND		NC		6020A
U-235	0.022		ND		NC		6020A
U-236	ND		ND		NC		6020A
U-238	2.8		2.88		2.0		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIII-IN

9-IN
DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102199-3

SDG Number: 680102199-3

Matrix: Solid Instrument ID: ICPMS6100

Method: 6020A MDL Date: 08/05/2013 10:01

Prep Method: 3050B

Analyte	Wavelength/ Mass	RL (mg/Kg)	MDL (mg/Kg)
U-233	233	0.005	0.0015
U-234	234	0.005	0.0003
U-235	235	0.005	0.00203
U-236	236	0.005	0.0004
U-238	238	0.005	0.0003

9-IN
CALIBRATION BLANK DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102199-3

SDG Number: 680102199-3

Matrix: Solid Instrument ID: ICPMS6100

Method: 6020A XMDL Date: 07/18/2014 15:08

Analyte	Wavelength/ Mass	XRL (ug/L)	XMDL (ug/L)
U-233	233	0.05	0.0066
U-234	234	0.05	0.0021
U-235	235	0.05	0.0034
U-236	236	0.05	0.0015
U-238	238	0.05	0.0082

9-IN
DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102199-3

SDG Number: 680102199-3

Matrix: Solid Instrument ID: NOEQUIP

Method: 6020A MDL Date: 06/12/2013 14:02

Analyte	Wavelength/ Mass	RL (mg/Kg)	MDL (mg/Kg)
Total Uranium		0.005	0.0003

11-IN
LINEAR RANGES
METALS

Lab Name: TestAmerica St. Louis Job No: 680-102199-3

SDG No.: 680102199-3

Instrument ID: ICPMS6100 Date: 02/14/2012 11:04

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	Method
U-233		2000	6020A
U-234		2000	6020A
U-235		2000	6020A
U-236		2000	6020A
U-238		2000	6020A

12-IN
PREPARATION LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Prep Method: 3050B

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight (g)	Initial Volume	Final Volume (mL)
MB 160-137278/1-A	08/12/2014 10:34	137278	0.5086		50
LCS 160-137278/2-A	08/12/2014 10:34	137278	0.5770		50
680-102199-1	08/12/2014 10:34	137278	0.5201		50
680-102199-1 MS	08/12/2014 10:34	137278	0.5785		50
680-102199-1 MSD	08/12/2014 10:34	137278	0.5179		50
680-102199-2	08/12/2014 10:34	137278	0.5598		50
680-102199-3	08/12/2014 10:34	137278	0.5679		50
680-102199-7	08/12/2014 10:34	137278	0.5491		50
680-102199-8	08/12/2014 10:34	137278	0.5835		50
680-102199-9	08/12/2014 10:34	137278	0.5428		50
680-102199-11	08/12/2014 10:34	137278	0.5971		50
680-102199-12	08/12/2014 10:34	137278	0.5334		50
680-102199-13	08/12/2014 10:34	137278	0.5224		50
680-102199-14	08/12/2014 10:34	137278	0.5765		50
680-102199-15	08/12/2014 10:34	137278	0.5709		50
680-102199-16	08/12/2014 10:34	137278	0.5066		50
680-102199-17	08/12/2014 10:34	137278	0.5424		50
680-102199-18	08/12/2014 10:34	137278	0.5901		50
680-102199-19	08/12/2014 10:34	137278	0.5677		50
680-102199-20	08/12/2014 10:34	137278	0.5373		50
680-102199-22	08/12/2014 10:34	137278	0.5508		50
680-102199-23	08/12/2014 10:34	137278	0.5945		50
680-102199-24	08/12/2014 10:34	137278	0.5550		50
680-102199-25	08/12/2014 10:34	137278	0.5058		50

12-IN
PREPARATION LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Prep Method: 3050B

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight (g)	Initial Volume	Final Volume (mL)
MB 160-137385/1-A	08/12/2014 10:57	137385	0.5983		50
LCS 160-137385/2-A	08/12/2014 10:57	137385	0.5239		50
680-102199-30	08/12/2014 10:57	137385	0.5218		50
680-102199-30 MS	08/12/2014 10:57	137385	0.5818		50
680-102199-30 MSD	08/12/2014 10:57	137385	0.5170		50
680-102199-31	08/12/2014 10:57	137385	0.5287		50
680-102199-32	08/12/2014 10:57	137385	0.5815		50
680-102199-33	08/12/2014 10:57	137385	0.5246		50
680-102199-35	08/12/2014 10:57	137385	0.5464		50
680-102199-36	08/12/2014 10:57	137385	0.5630		50
680-102199-37	08/12/2014 10:57	137385	0.5738		50
680-102199-39	08/12/2014 10:57	137385	0.5349		50
680-102199-40	08/12/2014 10:57	137385	0.5430		50
680-102199-41	08/12/2014 10:57	137385	0.5576		50
680-102199-26	08/12/2014 10:57	137385	0.5088		50
680-102199-27	08/12/2014 11:13	137385	0.5057		50
680-102199-28	08/12/2014 11:13	137385	0.5147		50

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/14/2014 11:32 End Date: 08/15/2014 00:12

Lab Sample Id	D/F	Type	Time	Analytes																											
				U-233	U-234	U-235	U-236	U-238																							
ICIS 160-138156/1	1		11:32	X	X	X	X	X																							
IC 160-138156/2	1		11:39	X	X	X	X	X																							
IC 160-138156/3	1		11:43	X	X	X	X	X																							
IC 160-138156/4	1		11:48	X	X	X	X	X																							
IC 160-138156/5	1		11:53	X	X	X	X	X																							
IC 160-138156/6	1		11:58	X	X	X	X	X																							
ICV 160-138156/7	1		12:02	X																											
ICV 160-138156/8	1		12:07		X			X																							
ICV 160-138156/9	1		12:12			X	X																								
ICB 160-138156/10	1		12:16	X	X	X	X	X																							
CRI 160-138156/11	1		12:21			X		X																							
CRI 160-138156/12	1		12:26	X	X		X																								
ICSA 160-138156/13	1		12:30	X	X	X	X	X																							
ICSAB 160-138156/14	1		12:35	X	X	X	X	X																							
CCV 160-138156/15	1		12:40	X	X	X	X	X																							
CCB 160-138156/16	1		12:44	X	X	X	X	X																							
ZZZZZZ			12:49																												
ZZZZZZ			12:54																												
ZZZZZZ			12:58																												
ZZZZZZ			13:03																												
ZZZZZZ			13:08																												
ZZZZZZ			13:12																												
ZZZZZZ			13:17																												
ZZZZZZ			13:22																												
ZZZZZZ			13:26																												
MB 160-137278/1-A	2	T	13:31	X	X	X	X	X																							
CCV 160-138156/27	1		13:36	X	X	X	X	X																							
CCB 160-138156/28	1		13:40	X	X	X	X	X																							
LCS 160-137278/2-A	2	T	13:45		X	X		X																							
680-102199-1	5	T	13:50	X	X	X	X	X																							
680-102199-1 SD	25	T	13:54	X	X	X	X	X																							
680-102199-1 MS	5	T	13:59		X	X		X																							
680-102199-1 MSD	5	T	14:04		X	X		X																							
680-102199-2	5	T	14:08	X	X	X	X	X																							
680-102199-3	5	T	14:13	X	X	X	X	X																							
680-102199-7	5	T	14:18	X	X	X	X	X																							
680-102199-8	5	T	14:22	X	X	X	X	X																							
680-102199-9	5	T	14:27	X	X	X	X	X																							
CCV 160-138156/39	1		14:32	X	X	X	X	X																							

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/14/2014 11:32 End Date: 08/15/2014 00:12

Lab Sample Id	D/F	Type	Time	Analytes																										
				U-233	U-234	U-235	U-236	U-238																						
CCB 160-138156/40	1		14:36	X	X	X	X	X																						
680-102199-11	5	T	14:41	X	X	X	X	X																						
680-102199-12	5	T	14:46	X	X	X	X	X																						
680-102199-13	5	T	14:50	X	X	X	X	X																						
680-102199-14	5	T	14:55	X	X	X	X	X																						
680-102199-15	5	T	15:00	X	X	X	X	X																						
680-102199-16	5	T	15:04	X	X	X	X	X																						
680-102199-17	5	T	15:09	X	X	X	X	X																						
680-102199-18	5	T	15:14	X	X	X	X	X																						
680-102199-19	5	T	15:18	X	X	X	X	X																						
680-102199-20	5	T	15:23	X	X	X	X	X																						
CCV 160-138156/51	1		15:28	X	X	X	X	X																						
CCB 160-138156/52	1		15:32	X	X	X	X	X																						
680-102199-22	5	T	15:37	X	X	X	X	X																						
680-102199-23	5	T	15:42	X	X	X	X	X																						
680-102199-24	5	T	15:46	X	X	X	X	X																						
680-102199-25	5	T	15:51	X	X	X	X	X																						
MB 160-137385/1-A	2	T	15:56	X	X	X	X	X																						
LCS 160-137385/2-A	2	T	16:00		X	X		X																						
680-102199-30	5	T	16:05	X	X	X	X	X																						
680-102199-30 SD	25	T	16:10	X	X	X	X	X																						
680-102199-30 MS	5	T	16:14		X	X		X																						
680-102199-30 MSD	5	T	16:19		X	X		X																						
CCV 160-138156/63	1		16:26	X	X	X	X	X																						
CCB 160-138156/64	1		16:32	X	X	X	X	X																						
680-102199-31	5	T	17:00	X	X	X	X	X																						
680-102199-32	5	T	17:05	X	X	X	X	X																						
680-102199-33	5	T	17:10	X	X	X	X	X																						
680-102199-35	5	T	17:14	X	X	X	X	X																						
680-102199-36	5	T	17:19	X	X	X	X	X																						
680-102199-37	5	T	17:24	X	X	X	X	X																						
680-102199-39	5	T	17:29	X	X	X	X	X																						
680-102199-40	5	T	17:33	X	X	X	X	X																						
680-102199-41	5	T	17:38	X	X	X	X	X																						
ZZZZZZ			17:43																											
CCV 160-138156/75	1		17:47	X	X	X	X	X																						
CCB 160-138156/76	1		17:52	X	X	X	X	X																						
ZZZZZZ			17:57																											
ZZZZZZ			18:01																											

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/14/2014 11:32 End Date: 08/15/2014 00:12

Lab Sample Id	D/F	Type	Time	Analytes																										
				U-233	U-234	U-235	U-236	U-238																						
ZZZZZZ			18:06																											
CCV 160-138156/80			18:11																											
CCB 160-138156/81			18:15																											
ICIS 160-138156/82			18:20	X	X	X	X	X																						
IC 160-138156/83			18:27	X	X	X	X	X																						
IC 160-138156/84			18:31	X	X	X	X	X																						
IC 160-138156/85			18:36	X	X	X	X	X																						
IC 160-138156/86			18:41	X	X	X	X	X																						
IC 160-138156/87			18:45	X	X	X	X	X																						
ICV 160-138156/88			18:50																											
ICV 160-138156/89			18:55																											
ICV 160-138156/90			18:59																											
ICB 160-138156/91			19:04																											
CRI 160-138156/92			19:09																											
CRI 160-138156/93			19:13																											
ICSA 160-138156/94			19:18																											
ICSAB 160-138156/95			19:23																											
CCV 160-138156/96			19:27																											
CCB 160-138156/97			19:32																											
ZZZZZZ			19:37																											
ZZZZZZ			19:41																											
ZZZZZZ			19:46																											
ZZZZZZ			19:51																											
ZZZZZZ			19:55																											
CCV 160-138156/103			20:00																											
CCB 160-138156/104			20:05																											
ZZZZZZ			20:09																											
ZZZZZZ			20:14																											
ZZZZZZ			20:19																											
ZZZZZZ			20:23																											
ZZZZZZ			20:28																											
ZZZZZZ			20:33																											
ZZZZZZ			20:37																											
ZZZZZZ			20:42																											
ZZZZZZ			20:47																											
ZZZZZZ			20:51																											
CCV 160-138156/115			20:56																											
CCB 160-138156/116			21:01																											
ZZZZZZ			21:05																											

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/14/2014 11:32 End Date: 08/15/2014 00:12

Lab Sample Id	D/F	Type	Time	Analytes																										
				U-233	U-234	U-235	U-236	U-238																						
ZZZZZZ			21:10																											
ZZZZZZ			21:15																											
ZZZZZZ			21:19																											
ZZZZZZ			21:24																											
ZZZZZZ			21:29																											
ZZZZZZ			21:33																											
ZZZZZZ			21:38																											
ZZZZZZ			21:43																											
ZZZZZZ			21:48																											
CCV 160-138156/127			21:52																											
CCB 160-138156/128			21:57																											
ZZZZZZ			22:02																											
ZZZZZZ			22:06																											
ZZZZZZ			22:11																											
ZZZZZZ			22:16																											
ZZZZZZ			22:20																											
ZZZZZZ			22:25																											
ZZZZZZ			22:30																											
ZZZZZZ			22:34																											
ZZZZZZ			22:39																											
ZZZZZZ			22:44																											
CCV 160-138156/139			22:48																											
CCB 160-138156/140			22:53																											
ZZZZZZ			22:58																											
ZZZZZZ			23:02																											
ZZZZZZ			23:07																											
ZZZZZZ			23:12																											
ZZZZZZ			23:16																											
ZZZZZZ			23:21																											
ZZZZZZ			23:26																											
ZZZZZZ			23:30																											
ZZZZZZ			23:35																											
ZZZZZZ			23:40																											
CCV 160-138156/151			23:44																											
CCB 160-138156/152			23:49																											
ZZZZZZ			23:54																											
ZZZZZZ			23:58																											
ZZZZZZ			00:03																											
CCV 160-138156/156			00:08																											

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/14/2014 11:32 End Date: 08/15/2014 00:12

Lab Sample Id	D/F	Type	Time	Analytes																									
				U-233	U-234	U-235	U-236	U-238																					
CCB 160-138156/157			00:12																										

Prep Types:
T = Total/NA

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/18/2014 14:28 End Date: 08/18/2014 23:43

Lab Sample Id	D/F	Type	Time	Analytes																											
				U-233	U-234	U-235	U-236	U-238																							
ICSAB 160-138778/1	1		15:31	X	X	X	X	X																							
CCV 160-138778/2	1		15:36	X	X	X	X	X																							
CCB 160-138778/3	1		15:40	X	X	X	X	X																							
ICIS 160-138778/4			14:28	X	X	X	X	X																							
IC 160-138778/5	1		14:35	X	X	X	X	X																							
IC 160-138778/6	1		14:40	X	X	X	X	X																							
IC 160-138778/7	1		14:44	X	X	X	X	X																							
IC 160-138778/8	1		14:49	X	X	X	X	X																							
IC 160-138778/9	1		14:54	X	X	X	X	X																							
ICV 160-138778/10	1		14:58	X																											
ICV 160-138778/11	1		15:03		X			X																							
ICV 160-138778/12	1		15:08			X	X																								
ICB 160-138778/13	1		15:12	X	X	X	X	X																							
CRI 160-138778/14	1		15:17			X		X																							
CRI 160-138778/15	1		15:22	X	X		X																								
ICSA 160-138778/16	1		15:26	X	X	X	X	X																							
680-102199-26	5	T	15:56	X	X	X	X	X																							
680-102199-27	5	T	16:01	X	X	X	X	X																							
680-102199-28	5	T	16:05	X	X	X	X	X																							
ZZZZZZ			16:10																												
ZZZZZZ			16:15																												
ZZZZZZ			16:19																												
ZZZZZZ			16:24																												
ZZZZZZ			16:29																												
ZZZZZZ			16:33																												
ZZZZZZ			16:38																												
CCV 160-138778/27	1		16:43	X	X	X	X	X																							
CCB 160-138778/28	1		16:47	X	X	X	X	X																							
ZZZZZZ			16:52																												
ZZZZZZ			16:57																												
ZZZZZZ			17:02																												
ZZZZZZ			17:06																												
ZZZZZZ			17:11																												
ZZZZZZ			17:15																												
ZZZZZZ			17:20																												
ZZZZZZ			17:25																												
ZZZZZZ			17:29																												
ZZZZZZ			17:34																												
CCV 160-138778/39			17:39																												

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/18/2014 14:28 End Date: 08/18/2014 23:43

Lab Sample Id	D/F	Type	Time	Analytes																										
				U-233	U-234	U-235	U-236	U-238																						
CCB 160-138778/40			17:44																											
ZZZZZZ			17:48																											
ZZZZZZ			17:53																											
ZZZZZZ			17:58																											
ZZZZZZ			18:02																											
ZZZZZZ			18:07																											
ZZZZZZ			18:12																											
ZZZZZZ			18:16																											
ZZZZZZ			18:21																											
ZZZZZZ			18:26																											
ZZZZZZ			18:30																											
CCV 160-138778/51			18:35																											
CCB 160-138778/52			18:40																											
ZZZZZZ			18:44																											
ZZZZZZ			18:49																											
ZZZZZZ			18:54																											
ZZZZZZ			18:58																											
ZZZZZZ			19:03																											
ZZZZZZ			19:08																											
ZZZZZZ			19:12																											
ZZZZZZ			19:17																											
ZZZZZZ			19:22																											
ZZZZZZ			19:26																											
CCV 160-138778/63			19:31																											
CCB 160-138778/64			19:36																											
ZZZZZZ			19:40																											
ZZZZZZ			19:45																											
ZZZZZZ			19:50																											
ZZZZZZ			19:54																											
ZZZZZZ			19:59																											
ZZZZZZ			20:04																											
ZZZZZZ			20:08																											
ZZZZZZ			20:13																											
ZZZZZZ			20:18																											
ZZZZZZ			20:22																											
CCV 160-138778/75			20:27																											
CCB 160-138778/76			20:32																											
ZZZZZZ			20:36																											
ZZZZZZ			20:41																											

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/18/2014 14:28 End Date: 08/18/2014 23:43

Lab Sample Id	D/F	Type	Time	Analytes																									
				U-233	U-234	U-235	U-236	U-238																					
ZZZZZZ			20:46																										
ZZZZZZ			20:50																										
ZZZZZZ			20:55																										
ZZZZZZ			21:00																										
ZZZZZZ			21:04																										
ZZZZZZ			21:09																										
ZZZZZZ			21:14																										
ZZZZZZ			21:18																										
CCV 160-138778/87			21:23																										
CCB 160-138778/88			21:28																										
ZZZZZZ			21:32																										
ZZZZZZ			21:37																										
ZZZZZZ			21:42																										
ZZZZZZ			21:46																										
ZZZZZZ			21:51																										
ZZZZZZ			21:56																										
ZZZZZZ			22:00																										
ZZZZZZ			22:05																										
ZZZZZZ			22:10																										
ZZZZZZ			22:14																										
CCV 160-138778/99			22:19																										
CCB 160-138778/100			22:24																										
ZZZZZZ			22:28																										
ZZZZZZ			22:33																										
ZZZZZZ			22:38																										
ZZZZZZ			22:42																										
ZZZZZZ			22:47																										
ZZZZZZ			22:52																										
ZZZZZZ			22:56																										
ZZZZZZ			23:01																										
ZZZZZZ			23:06																										
ZZZZZZ			23:10																										
CCV 160-138778/111			23:15																										
CCB 160-138778/112			23:20																										
ZZZZZZ			23:24																										
ZZZZZZ			23:29																										
ZZZZZZ			23:34																										
CCV 160-138778/116			23:38																										
CCB 160-138778/117			23:43																										

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/18/2014 14:28 End Date: 08/18/2014 23:43

Lab Sample Id	D/F	Type	Time	Analytes																												
				U-233	U-234	U-235	U-236	U-238																									

Prep Types:
T = Total/NA

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Instrument ID: NOEQUIP Analysis Method: 6020A

Start Date: 08/19/2014 12:18 End Date: 08/19/2014 12:18

Lab Sample Id	D/F	Type	Time	Analytes																								
				U																								
680-102199-1	1	T	12:18	X																								
680-102199-2	1	T	12:18	X																								
680-102199-3	1	T	12:18	X																								
680-102199-7	1	T	12:18	X																								
680-102199-8	1	T	12:18	X																								
680-102199-9	1	T	12:18	X																								
680-102199-11	1	T	12:18	X																								
680-102199-12	1	T	12:18	X																								
680-102199-13	1	T	12:18	X																								
680-102199-14	1	T	12:18	X																								
680-102199-15	1	T	12:18	X																								
680-102199-16	1	T	12:18	X																								
680-102199-17	1	T	12:18	X																								
680-102199-18	1	T	12:18	X																								
680-102199-19	1	T	12:18	X																								
680-102199-20	1	T	12:18	X																								
680-102199-22	1	T	12:18	X																								
680-102199-23	1	T	12:18	X																								
680-102199-24	1	T	12:18	X																								
680-102199-25	1	T	12:18	X																								
ZZZZZZ			12:18																									
ZZZZZZ			12:18																									
ZZZZZZ			12:18																									

Prep Types:
T = Total/NA

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Instrument ID: NOEQUIP Analysis Method: 6020A

Start Date: 08/19/2014 12:19 End Date: 08/19/2014 12:19

Lab Sample Id	D/F	Type	Time	Analytes																								
				U																								
680-102199-30	1	T	12:19	X																								
680-102199-31	1	T	12:19	X																								
680-102199-32	1	T	12:19	X																								
680-102199-33	1	T	12:19	X																								
680-102199-35	1	T	12:19	X																								
680-102199-36	1	T	12:19	X																								
680-102199-37	1	T	12:19	X																								
680-102199-39	1	T	12:19	X																								
680-102199-40	1	T	12:19	X																								
680-102199-41	1	T	12:19	X																								
ZZZZZZ			12:19																									
680-102199-26	1	T	12:19	X																								
680-102199-27	1	T	12:19	X																								
680-102199-28	1	T	12:19	X																								

Prep Types:
T = Total/NA

FORM XIII-IN

15-IN
ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

ICP-MS Instrument ID: ICPMS6100 Start Date: 08/14/2014 End Date: 08/14/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
ICIS 160-138156/1	11:32										
IC 160-138156/2	11:39										
IC 160-138156/3	11:43										
IC 160-138156/4	11:48										
IC 160-138156/5	11:53										
IC 160-138156/6	11:58										
ICV 160-138156/7	12:02	100									
ICV 160-138156/8	12:07	101									
ICV 160-138156/9	12:12	98									
ICB 160-138156/10	12:16	99									
CRI 160-138156/11	12:21	100									
CRI 160-138156/12	12:26	100									
ICSA 160-138156/13	12:30	91									
ICSAB 160-138156/14	12:35	91									
CCV 160-138156/15	12:40	98									
CCB 160-138156/16	12:44	99									
MB 160-137278/1-A	13:31	102									
CCV 160-138156/27	13:36	99									
CCB 160-138156/28	13:40	100									
LCS 160-137278/2-A	13:45	104									
680-102199-1	13:50	96									
680-102199-1 SD	13:54	97									
680-102199-1 MS	13:59	95									
680-102199-1 MSD	14:04	96									
680-102199-2	14:08	94									
680-102199-3	14:13	96									
680-102199-7	14:18	95									
680-102199-8	14:22	95									
680-102199-9	14:27	93									
CCV 160-138156/39	14:32	95									
CCB 160-138156/40	14:36	95									
680-102199-11	14:41	90									
680-102199-12	14:46	93									
680-102199-13	14:50	101									
680-102199-14	14:55	101									
680-102199-15	15:00	93									
680-102199-16	15:04	100									
680-102199-17	15:09	101									
680-102199-18	15:14	90									
680-102199-19	15:18	86									
680-102199-20	15:23	89									
CCV 160-138156/51	15:28	94									

FORM XV - IN

15-IN
ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

ICP-MS Instrument ID: ICPMS6100 Start Date: 08/14/2014 End Date: 08/14/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
CCB 160-138156/52	15:32	94									
680-102199-22	15:37	89									
680-102199-23	15:42	92									
680-102199-24	15:46	97									
680-102199-25	15:51	96									
MB 160-137385/1-A	15:56	94									
LCS 160-137385/2-A	16:00	95									
680-102199-30	16:05	90									
680-102199-30 SD	16:10	93									
680-102199-30 MS	16:14	90									
680-102199-30 MSD	16:19	90									
CCV 160-138156/63	16:26	92									
CCB 160-138156/64	16:32	92									
680-102199-31	17:00	90									
680-102199-32	17:05	86									
680-102199-33	17:10	91									
680-102199-35	17:14	90									
680-102199-36	17:19	92									
680-102199-37	17:24	84									
680-102199-39	17:29	89									
680-102199-40	17:33	91									
680-102199-41	17:38	89									
CCV 160-138156/75	17:47	90									
CCB 160-138156/76	17:52	90									

15-IN
ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

ICP-MS Instrument ID: ICPMS6100 Start Date: 08/18/2014 End Date: 08/18/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
IC 160-138778/5	14:35										
IC 160-138778/6	14:40										
IC 160-138778/7	14:44										
IC 160-138778/8	14:49										
IC 160-138778/9	14:54										
ICV 160-138778/10	14:58	100									
ICV 160-138778/11	15:03	100									
ICV 160-138778/12	15:08	100									
ICB 160-138778/13	15:12	99									
CRI 160-138778/14	15:17	100									
CRI 160-138778/15	15:22	99									
ICSA 160-138778/16	15:26	95									
ICSAB 160-138778/1	15:31	94									
CCV 160-138778/2	15:36	100									
CCB 160-138778/3	15:40	100									
680-102199-26	15:56	96									
680-102199-27	16:01	98									
680-102199-28	16:05	97									
CCV 160-138778/27	16:43	96									
CCB 160-138778/28	16:47	98									

KE 8/15/14
081414M1

A Batch 138156
138157

Sample/Batch Report

TA ST. LOUIS - PERKIN ELMER ELAN 6100 - METHOD 6020 / 200.8 QUANTITATIVE ANALYSIS REPORT

User Name: stlmetals
Computer Name: SLICP03
Sample File: D:\Elandata\Sample\SW846 ISOU.sam
Report Date/Time: Friday, August 15, 2014 10:31:08
Method File: d:\Elandata\Method\2014 isou.mth
Tuning File: d:\Elandata\Tuning\epa tuning.tun
Optimization File: d:\Elandata\Optimize\epa2008.dac
Calibration File: D:\Elandata\System\081414M1.cal
Calibration Type: External Calibration
Number of Replicates: 3
Number of Readings: 1
Number of Sweeps: 100
Dual Detector Mode: Dual

A/S Loc.	Batch ID	Sample ID	Description	Aliquot Vol.	Diluted Vol.
11		Test			
12		Test			
13		IDL			
14		IDL			
15		IDL			
16		IDL			
17		IDL			
18		IDL			
19		IDL			
20	137278	MB	2		
21		LCS	2		
22		680-102199-A-1-H	5		
23		680-102199-A-1-H SD	25		
24		680-102199-A-1-I MS	5		
25		680-102199-A-1-J MSD	5		
26		680-102199-A-2-F	5		
27		680-102199-A-3-F	5		
28		680-102199-A-7-F	5		
29		680-102199-A-8-F	5		
30		680-102199-A-9-F	5		
31		680-102199-A-11-F	5		
32		680-102199-A-12-D	5		
33		680-102199-A-13-D	5		
34		680-102199-A-14-D	5		
35		680-102199-A-15-D	5		
36		680-102199-A-16-D	5		
37		680-102199-A-17-D	5		
38		680-102199-A-18-D	5		
39		680-102199-A-19-D	5		
40		680-102199-A-20-D	5		
41		680-102199-A-22-E	5		
42		680-102199-A-23-E	5		
43		680-102199-A-24-E	5		
44		680-102199-A-25-E	5		
45	137385	MB	2		
46		LCS	2		
47		680-102199-A-30-D	5		
48		680-102199-A-30-D SD	25		
49		680-102199-A-30-E MS	5		
50		680-102199-A-30-F MS	5		
51		680-102199-A-31-D	5		

All

All

52		680-102199-A-32-D	5
53		680-102199-A-33-D	5
54		680-102199-A-35-D	5
55		680-102199-A-36-D	5
56		680-102199-A-37-C	5
57		680-102199-A-39-C	5
58		680-102199-A-40-C	5
59		680-102199-A-41-C	5
60	KE 8/15/14	680-102199-A-~~26-G~~ 42-E	5
61		680-102199-A-26-G	5
62		680-102199-A-27-F	5
63		680-102199-A-28-E	5
10		CCV 59,89	5
1		CCB	5
119		TEST	2
120		TEST	2
71	137068	MB	2
72		LCS	2
73		680-102380-A-1-C	5
74		680-102380-A-1-C SD	25
75		680-102380-A-1-D MS	5
76		680-102380-A-1-E MSD	5
77		680-102380-A-2-C	5
78		680-102380-A-3-C	5
79		680-102380-A-5-C	5
80		680-102380-A-6-C	5
81		680-102380-A-7-C	5
82		680-102380-A-8-C	5
83		680-102380-A-9-C	5
84		680-102380-A-10-D	5
85		680-102380-A-12-C	5
86		680-102380-A-13-C	5
87		680-102380-A-14-C	5
88		680-102380-A-16-C	5
89		680-102380-A-17-C	5
90		680-102380-A-18-C	5
91		680-102380-A-20-C	5
92		680-102380-A-21-C	5
93		680-102380-A-22-C	5
94		680-102380-A-23-C	5
95		680-102380-A-24-C	5
96	137069	MB	2
97		LCS	2
98		680-102380-A-26-C	5
99		680-102380-A-26-C SD	25
100		680-102380-A-26-D MS	5
101		680-102380-A-26-E MSD	5
102		680-102380-A-27-C	5
103		680-102380-A-28-C	5
104		680-102380-A-29-C	5
105		680-102380-A-30-C	5
106		680-102380-A-31-C	5
107		680-102380-A-33-C	5
108		680-102380-A-34-C	5
109		680-102380-A-35-C	5
110		680-102380-A-36-C	5
111	136716	MB	2
112		LCS	2
113		160-7752-A-1-D	100
114		160-7752-A-1-D SD	500

All

CCV/CCB

Recalc ICV|ICB|LLC|A|AB (3d)|CCV|CCB (3d)

All except 233

All

115	160-7752-A-1-E MS	100	A4
116	160-7752-A-1-F MSD	100	

Quantitative Analysis Calibration Report

File Name: 081414M1.cal
File Path: D:\Elandata\System
Calibration Type: External Calibration

Analyte	Mass	Curve Type	Slope	Intercept	Corr. Coeff.
Ho (IS)	164.930	Linear Thru Zero	0.000000	0.00	0.000000
U	233.000	Linear Thru Zero	0.047070	0.00	0.999991
U	234.041	Linear Thru Zero	0.035815	0.00	0.999992
U	235.044	Linear Thru Zero	0.033635	0.00	0.999999
U	236.000	Linear Thru Zero	0.050401	0.00	0.999991
U	238.050	Linear Thru Zero	0.030546	0.00	0.999996

Quantitative Analysis Calibration Report

File Name: 081414M1-2.cal
File Path: D:\Elandata\System
Calibration Type: External Calibration

Analyte	Mass	Curve Type	Slope	Intercept	Corr. Coeff.
Ho (IS)	164.930	Linear Thru Zero	0.000000	0.00	0.000000
U	233.000	Linear Thru Zero	0.047029	0.00	0.998961
U	234.041	Linear Thru Zero	0.038136	0.00	0.999983
U	235.044	Linear Thru Zero	0.035670	0.00	0.999999
U	236.000	Linear Thru Zero	0.053770	0.00	0.999985
U	238.050	Linear Thru Zero	0.032474	0.00	0.999995

Instrument Tuning Report

File Name: EPA TUNING.tun
File Path: d:\Elandata\Tuning
Sample ID: Sample
Sample Date/Time: Thursday, August 14, 2014 10:56:01

Analyte	Exact Mass	Meas. Mass	Mass DAC	Res. DAC	Meas. Pk. Width	Custom Res.
Li	7.016	7.025	1570	2065	0.664	
Mg	23.985	23.979	5688	2080	0.686	
Rh	102.905	102.879	24919	2080	0.695	
Ce	139.905	139.929	33931	2120	0.669	
Pb	207.977	207.977	50415	2310	0.644	

Replicates: 6

Daily Performance Report

Sample ID: Sample
Sample Date/Time: Thursday, August 14, 2014 11:15:17
Sample Description:
Method File: d:\Elandata\Method\DAILY EPA.mth
Dataset File: d:\Elandata\Dataset\daily3\Sample.133
Tuning File: d:\Elandata\Tuning\EPA TUNING.tun
Optimization File: d:\Elandata\Optimize\EPA2008.dac
Dual Detector Mode: Pulse

Acq. Dead Time(ns): 35
Current Dead Time (ns): 35

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Net Intens. SD	Net Intens. RSD
	Li	7.0	2087.0	2087.041	60.767	2.9
	Mg	24.0	10755.0	10755.047	106.876	1.0
	Rh	102.9	147381.2	147381.218	1223.762	0.8
	Pb	208.0	139015.8	139015.833	1351.618	1.0
⎡>	Ba	137.9	188127.6	188127.561	1693.691	0.9
⎣	Ba++	69.0	1326.2	0.007	0.000	1.2
⎡>	Ce	139.9	229805.5	229805.494	1819.264	0.8
⎣	CeO	155.9	3856.5	0.017	0.000	1.3
	Bkgd	220.0	5.6	5.556	1.047	18.8

Current Optimization File Data

Current Value	Description
0.97	Nebulizer Gas Flow
5.75	Lens Voltage
1400.00	ICP RF Power
-2156.25	Analog Stage Voltage
1200.00	Pulse Stage Voltage
70.00	Discriminator Threshold
-6.00	AC Rod Offset
60.00	Service DAC 1
0.00	Quadrupole Rod Offset

Current Autolens Data

Analyte	Mass	Num of Pts	DAC Value	Maximum Intensity
Be	9	33	7.3	1941.1
Mg	24	33	5.3	18569.4
Co	59	33	5.5	52159.4
Rh	103	33	6.3	196415.7
In	115	33	6.3	277235.2
Ba	138	33	6.3	270242.1
Ce	140	33	6.5	340126.4
Pb	208	33	7.8	231107.7

QUANTITATIVE ANALYSIS REPORT

Sample ID: Blank

Sample Date/Time: Thursday, August 14, 2014 11:32:38
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081414M1\Blank.001

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			884012.991	ug/L	
	233	**U**			5.867	ug/L	
	234	**U**			5.000	ug/L	
	235	**U**			5.600	ug/L	
	236	**U**			4.400	ug/L	
	238	**U**			114.400	ug/L	

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 1

Sample Date/Time: Thursday, August 14, 2014 11:39:18
Autosampler Position: 191
Dataset File: D:\Elandata\Dataset\081414M1\Standard 1.002

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			883133.637	ug/L	884012.991
	233	**U**			26.600	ug/L	5.867
	234	**U**			29.933	ug/L	5.000
	235	**U**	**0.048500**	2.307	1484.677	ug/L	5.600
	236	**U**			43.600	ug/L	4.400
	238	**U**	**0.050300**	2.780	1415.670	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 2
Sample Date/Time: Thursday, August 14, 2014 11:43:59
Autosampler Position: 192
Dataset File: D:\Elandata\Dataset\081414M1\Standard 2.003

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			878805.873	ug/L	884012.991
	233	**U**			1298.526	ug/L	5.867
	234	**U**	**0.049600**	3.192	1596.289	ug/L	5.000
	235	**U**	**2.945940**	2.470	89397.002	ug/L	5.600
	236	**U**	**0.053400**	3.437	2431.807	ug/L	4.400
	238	**U**	**3.291590**	2.062	84877.853	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 3
Sample Date/Time: Thursday, August 14, 2014 11:48:40
Autosampler Position: 193
Dataset File: D:\Elandata\Dataset\081414M1\Standard 3.004

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			856476.593	ug/L	884012.991
	233	**U**	**0.051500**	2.874	2060.082	ug/L	5.867
	234	**U**	**0.078725**	2.316	2467.080	ug/L	5.000
	235	**U**	**4.766798**	1.965	141000.670	ug/L	5.600
	236	**U**	**0.086592**	1.716	3843.117	ug/L	4.400
	238	**U**	**5.306269**	1.860	133296.138	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 4
Sample Date/Time: Thursday, August 14, 2014 11:53:21
Autosampler Position: 194
Dataset File: D:\Elandata\Dataset\081414M1\Standard 4.005

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			877890.169	ug/L	884012.991
	233	**U**	**0.102947**	2.093	4209.755	ug/L	5.867
	234	**U**	**0.164865**	1.764	5140.993	ug/L	5.000
	235	**U**	**9.694894**	2.287	287225.622	ug/L	5.600
	236	**U**	**0.177436**	1.874	7792.594	ug/L	4.400
	238	**U**	**10.051812**	2.120	271678.899	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 5
Sample Date/Time: Thursday, August 14, 2014 11:58:02
Autosampler Position: 195
Dataset File: D:\Elandata\Dataset\081414M1\Standard 5.006

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			879442.439	ug/L	884012.991
	233	**U**	**0.309590**	1.818	12812.083	ug/L	5.867
	234	**U**	**0.496510**	2.123	15630.555	ug/L	5.000
	235	**U**	**29.071161**	2.170	859197.132	ug/L	5.600
	236	**U**	**0.534370**	1.748	23673.756	ug/L	4.400
	238	**U**	**30.127471**	2.313	808689.455	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 1

Sample Date/Time: Thursday, August 14, 2014 12:02:44
Autosampler Position: 196
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 1.007

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			881910.061	ug/L	884012.991
	233	**U**	**0.229050**	2.343	9504.898	ug/L	5.867
	234	**U**	**0.000471**	10.891	19.933	ug/L	5.000
	235	**U**	**0.004469**	22.035	139.267	ug/L	5.600
	236	**U**	**0.000101**	27.688	8.867	ug/L	4.400
	238	**U**	**0.050573**	1.340	1476.276	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.762**	
	U	233		**102.483**
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 2

Sample Date/Time: Thursday, August 14, 2014 12:07:25
Autosampler Position: 197
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 2.008

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			888529.957	ug/L	884012.991
	233	**U**	**42.446169**	2.793	1773153.466	ug/L	5.867
	234	**U**	**0.086694**	3.293	2760.067	ug/L	5.000
	235	**U**	**0.110694**	2.839	3309.984	ug/L	5.600
	236	**U**	**0.006891**	6.036	312.270	ug/L	4.400
	238	**U**	**9.823007**	3.052	266379.972	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.511**	
	U	233		
	U	234		**103.825**
	U	235		
	U	236		
	U	238		**100.458**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 3

Sample Date/Time: Thursday, August 14, 2014 12:12:06
Autosampler Position: 198
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 3.009

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			865864.354	ug/L	884012.991
	233	**U**	**466.010062**	1.823	18980429.567	ug/L	5.867
	234	**U**	**0.894320**	1.271	27726.444	ug/L	5.000
	235	**U**	**1.142721**	1.617	33266.725	ug/L	5.600
	236	**U**	**0.069236**	1.325	3024.387	ug/L	4.400
	238	**U**	**103.114397**	1.548	2725855.180	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.947**	
	U	233		
	U	234		
	U	235		**108.130**
	U	236		**92.810**
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 4

Sample Date/Time: Thursday, August 14, 2014 12:16:46
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 4.010

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			871117.680	ug/L	884012.991
	233	**U**	**0.050268**	40.050	2100.575	ug/L	5.867
	234	**U**	**0.000071**	148.677	7.267	ug/L	5.000
	235	**U**	**0.000302**	30.980	14.467	ug/L	5.600
	236	**U**	**0.000024**	93.062	5.333	ug/L	4.400
	238	**U**	**0.007699**	50.966	321.804	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.541**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 5

Sample Date/Time: Thursday, August 14, 2014 12:21:26
Autosampler Position: 191
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 5.011

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			885682.174	ug/L	884012.991
	233	**U**	**0.009837**	28.964	413.806	ug/L	5.867
	234	**U**	**0.000870**	9.626	32.533	ug/L	5.000
	235	**U**	**0.049298**	3.085	1472.409	ug/L	5.600
	236	**U**	**0.000910**	1.945	45.067	ug/L	4.400
	238	**U**	**0.048934**	3.692	1436.539	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.189**	
	U	233		
	U	234		
	U	235		**101.645**
	U	236		
	U	238		**97.285**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Thursday, August 14, 2014 12:26:07
Autosampler Position: 192
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 6.012

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			887961.417	ug/L	884012.991
	233	**U**	**0.035513**	3.611	1491.478	ug/L	5.867
	234	**U**	**0.050078**	1.879	1596.756	ug/L	5.000
	235	**U**	**2.972217**	1.688	88738.617	ug/L	5.600
	236	**U**	**0.053273**	0.324	2388.333	ug/L	4.400
	238	**U**	**3.074030**	2.027	83449.968	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.447**	
	U	233		**114.929**
	U	234		**100.963**
	U	235		
	U	236		**99.761**
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Thursday, August 14, 2014 12:30:48
Autosampler Position: 199
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 7.013

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			801596.229	ug/L	884012.991
	233	**U**	**0.001267**	23.998	52.667	ug/L	5.867
	234	**U**	**0.000048**	25.103	5.933	ug/L	5.000
	235	**U**	**0.000256**	39.174	11.867	ug/L	5.600
	236	**U**	**0.000047**	53.051	5.867	ug/L	4.400
	238	**U**	**-0.002503**	7.101	42.267	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.677**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 8

Sample Date/Time: Thursday, August 14, 2014 12:35:30
Autosampler Position: 200
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 8.014

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			800363.929	ug/L	884012.991
	233	**U**	**0.055018**	2.636	2076.084	ug/L	5.867
	234	**U**	**0.086314**	3.249	2475.815	ug/L	5.000
	235	**U**	**5.175939**	2.463	139220.185	ug/L	5.600
	236	**U**	**0.092736**	1.604	3743.291	ug/L	4.400
	238	**U**	**5.408102**	2.307	132207.756	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.538**	
	U	233		**106.830**
	U	234		**104.370**
	U	235		**106.775**
	U	236		**104.198**
	U	238		**107.605**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Thursday, August 14, 2014 12:40:11
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 9.015

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			862825.686	ug/L	884012.991
	233	**U**	**0.052358**	2.347	2130.026	ug/L	5.867
	234	**U**	**0.083093**	3.589	2568.698	ug/L	5.000
	235	**U**	**4.966144**	3.133	143936.821	ug/L	5.600
	236	**U**	**0.089518**	2.935	3892.397	ug/L	4.400
	238	**U**	**5.141413**	2.959	135445.792	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.603**	
	U	233		**101.667**
	U	234		**100.475**
	U	235		**102.448**
	U	236		**100.582**
	U	238		**102.298**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 14, 2014 12:44:51
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 10.016

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			874734.796	ug/L	884012.991
	233	**U**	**0.014572**	7.329	607.080	ug/L	5.867
	234	**U**	**0.000067**	54.208	7.000	ug/L	5.000
	235	**U**	**0.001676**	9.332	55.000	ug/L	5.600
	236	**U**	**0.000037**	62.613	6.000	ug/L	4.400
	238	**U**	**0.001253**	20.403	146.934	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.950**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Test

Sample Date/Time: Thursday, August 14, 2014 12:49:31
Autosampler Position: 11
Dataset File: D:\Elandata\Dataset\081414M1\Test.017

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			868578.405	ug/L	884012.991
	233	**U**	**0.001244**	21.426	57.000	ug/L	5.867
	234	**U**	**0.000438**	7.615	18.533	ug/L	5.000
	235	**U**	**0.024586**	4.056	722.752	ug/L	5.600
	236	**U**	**0.000415**	3.520	22.467	ug/L	4.400
	238	**U**	**0.022629**	4.660	711.818	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.254**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Test

Sample Date/Time: Thursday, August 14, 2014 12:54:11
Autosampler Position: 12
Dataset File: D:\Elandata\Dataset\081414M1\Test.018

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			860589.025	ug/L	884012.991
	233	**U**	**0.001258**	7.489	56.800	ug/L	5.867
	234	**U**	**0.000881**	15.735	31.867	ug/L	5.000
	235	**U**	**0.050213**	3.550	1457.074	ug/L	5.600
	236	**U**	**0.000936**	11.727	44.800	ug/L	4.400
	238	**U**	**0.047427**	2.860	1356.731	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.350**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: IDL

Sample Date/Time: Thursday, August 14, 2014 12:58:51
Autosampler Position: 13
Dataset File: D:\Elandata\Dataset\081414M1\IDL.019

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			879010.399	ug/L	884012.991
	233	**U**	**0.000440**	14.106	23.933	ug/L	5.867
	234	**U**	**0.000036**	133.663	6.067	ug/L	5.000
	235	**U**	**0.000060**	115.259	7.267	ug/L	5.600
	236	**U**	**0.000024**	111.996	5.467	ug/L	4.400
	238	**U**	**-0.003644**	0.595	15.933	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.434**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: IDL

Sample Date/Time: Thursday, August 14, 2014 13:03:31
Autosampler Position: 14
Dataset File: D:\Elandata\Dataset\081414M1\IDL.020

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			878187.613	ug/L	884012.991
	233	**U**	**0.000454**	12.936	24.600	ug/L	5.867
	234	**U**	**0.000013**	276.796	5.400	ug/L	5.000
	235	**U**	**0.000005**	514.315	5.733	ug/L	5.600
	236	**U**	**0.000052**	14.780	6.667	ug/L	4.400
	238	**U**	**-0.003591**	2.662	17.333	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.341**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: IDL

Sample Date/Time: Thursday, August 14, 2014 13:08:11

Autosampler Position: 15

Dataset File: D:\Elandata\Dataset\081414M1\IDL.021

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			874660.923	ug/L	884012.991
	233	**U**	**0.000203**	29.184	14.267	ug/L	5.867
	234	**U**	**0.000011**	278.945	5.267	ug/L	5.000
	235	**U**	**0.000019**	243.349	6.067	ug/L	5.600
	236	**U**	**0.000034**	131.629	5.800	ug/L	4.400
	238	**U**	**-0.003654**	3.736	15.667	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.942**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: IDL

Sample Date/Time: Thursday, August 14, 2014 13:12:51
Autosampler Position: 16
Dataset File: D:\Elandata\Dataset\081414M1\IDL.022

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			878125.747	ug/L	884012.991
	233	**U**	**0.000115**	14.593	10.600	ug/L	5.867
	234	**U**	**-0.000004**	519.788	4.800	ug/L	5.000
	235	**U**	**0.000028**	194.948	6.467	ug/L	5.600
	236	**U**	**0.000021**	121.884	5.267	ug/L	4.400
	238	**U**	**-0.003702**	1.922	14.267	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.334**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: IDL

Sample Date/Time: Thursday, August 14, 2014 13:17:32
Autosampler Position: 17
Dataset File: D:\Elandata\Dataset\081414M1\IDL.023

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			882719.211	ug/L	884012.991
	233	**U**	**0.000088**	40.658	9.467	ug/L	5.867
	234	**U**	**0.000012**	325.440	5.333	ug/L	5.000
	235	**U**	**-0.000026**	37.605	4.800	ug/L	5.600
	236	**U**	**0.000006**	667.195	4.733	ug/L	4.400
	238	**U**	**-0.003594**	5.205	17.133	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.854**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: IDL

Sample Date/Time: Thursday, August 14, 2014 13:22:11
Autosampler Position: 18
Dataset File: D:\Elandata\Dataset\081414M1\IDL.024

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			868426.841	ug/L	884012.991
	233	**U**	**0.000065**	19.625	8.400	ug/L	5.867
	234	**U**	**-0.000004**	246.233	4.800	ug/L	5.000
	235	**U**	**0.000003**	1414.821	5.600	ug/L	5.600
	236	**U**	**0.000043**	53.607	6.200	ug/L	4.400
	238	**U**	**-0.003688**	0.494	14.533	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.237**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: IDL

Sample Date/Time: Thursday, August 14, 2014 13:26:51
Autosampler Position: 19
Dataset File: D:\Elandata\Dataset\081414M1\IDL.025

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			870264.030	ug/L	884012.991
	233	**U**	**0.000042**	50.526	7.467	ug/L	5.867
	234	**U**	**0.000031**	88.240	5.867	ug/L	5.000
	235	**U**	**0.000074**	70.706	7.667	ug/L	5.600
	236	**U**	**0.000033**	44.532	5.733	ug/L	4.400
	238	**U**	**-0.003732**	0.867	13.400	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.445**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: MB

Sample Date/Time: Thursday, August 14, 2014 13:31:32
Autosampler Position: 20
Dataset File: D:\Elandata\Dataset\081414M1\MB.026

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			903157.949	ug/L	884012.991
	233	**U**	**0.000047**	71.529	8.000	ug/L	5.867
	234	**U**	**0.000022**	155.163	5.800	ug/L	5.000
	235	**U**	**0.000106**	38.528	8.933	ug/L	5.600
	236	**U**	**0.000030**	120.354	5.867	ug/L	4.400
	238	**U**	**0.010763**	1.996	413.606	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**102.166**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9

Sample Date/Time: Thursday, August 14, 2014 13:36:12

Autosampler Position: 10

Dataset File: D:\Elandata\Dataset\081414M1\QC Std 9.027

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			872474.513	ug/L	884012.991
	233	**U**	**0.051981**	1.618	2139.027	ug/L	5.867
	234	**U**	**0.083095**	2.047	2599.370	ug/L	5.000
	235	**U**	**4.945295**	2.325	144987.045	ug/L	5.600
	236	**U**	**0.089194**	1.613	3923.873	ug/L	4.400
	238	**U**	**5.132297**	1.938	136780.651	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.695**	
	U	233		**100.934**
	U	234		**100.477**
	U	235		**102.017**
	U	236		**100.218**
	U	238		**102.117**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 14, 2014 13:40:52
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 10.028

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			886127.129	ug/L	884012.991
	233	**U**	**0.012864**	2.907	541.877	ug/L	5.867
	234	**U**	**0.000046**	106.238	6.533	ug/L	5.000
	235	**U**	**0.001390**	10.732	46.867	ug/L	5.600
	236	**U**	**0.000034**	44.752	5.933	ug/L	4.400
	238	**U**	**0.000621**	21.716	131.401	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.239**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: LCS

Sample Date/Time: Thursday, August 14, 2014 13:45:31
Autosampler Position: 21
Dataset File: D:\Elandata\Dataset\081414M1\LCS.029

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			917897.146	ug/L	884012.991
	233	**U**	**0.002563**	3.454	116.734	ug/L	5.867
	234	**U**	**0.040681**	1.526	1341.863	ug/L	5.000
	235	**U**	**2.402078**	2.478	74094.472	ug/L	5.600
	236	**U**	**0.043484**	2.518	2014.342	ug/L	4.400
	238	**U**	**2.491088**	2.280	69900.615	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**103.833**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-1-H

Sample Date/Time: Thursday, August 14, 2014 13:50:11

Autosampler Position: 22

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-1-H.030

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			847732.446	ug/L	884012.991
	233	**U**	**0.000121**	15.897	10.467	ug/L	5.867
	234	**U**	**0.000446**	7.630	18.333	ug/L	5.000
	235	**U**	**0.040431**	0.336	1158.114	ug/L	5.600
	236	**U**	**0.000040**	74.650	5.933	ug/L	4.400
	238	**U**	**5.370183**	0.062	139167.813	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.896**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-1-H SD
Sample Date/Time: Thursday, August 14, 2014 13:54:50
Autosampler Position: 23
Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-1-H SD.031

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			860783.735	ug/L	884012.991
	233	**U**	**0.000076**	92.149	8.867	ug/L	5.867
	234	**U**	**0.000061**	68.656	6.733	ug/L	5.000
	235	**U**	**0.008187**	3.297	242.335	ug/L	5.600
	236	**U**	**0.000011**	299.924	4.800	ug/L	4.400
	238	**U**	**1.106905**	1.749	29199.096	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.372**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-1-I MS

Sample Date/Time: Thursday, August 14, 2014 13:59:30

Autosampler Position: 24

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-1-I MS.032

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			840369.245	ug/L	884012.991
	233	**U**	**0.001185**	6.289	52.467	ug/L	5.867
	234	**U**	**0.016151**	1.614	490.875	ug/L	5.000
	235	**U**	**1.011082**	0.475	28585.717	ug/L	5.600
	236	**U**	**0.016869**	1.532	718.551	ug/L	4.400
	238	**U**	**8.200261**	1.086	210596.577	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.063**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-1-J MSD

Sample Date/Time: Thursday, August 14, 2014 14:04:10

Autosampler Position: 25

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-1-J MSD.033

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			848127.834	ug/L	884012.991
	233	**U**	**0.001009**	6.611	45.933	ug/L	5.867
	234	**U**	**0.014856**	2.686	455.807	ug/L	5.000
	235	**U**	**0.907174**	1.781	25876.288	ug/L	5.600
	236	**U**	**0.015716**	1.613	675.883	ug/L	4.400
	238	**U**	**6.733730**	1.318	174520.555	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.941**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-2-F

Sample Date/Time: Thursday, August 14, 2014 14:08:50

Autosampler Position: 26

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-2-F.034

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			828080.232	ug/L	884012.991
	233	**U**	**0.000233**	37.814	14.600	ug/L	5.867
	234	**U**	**0.000471**	23.689	18.667	ug/L	5.000
	235	**U**	**0.050404**	4.983	1408.269	ug/L	5.600
	236	**U**	**0.000027**	204.597	5.267	ug/L	4.400
	238	**U**	**6.812442**	4.786	172314.472	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.673**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-3-F

Sample Date/Time: Thursday, August 14, 2014 14:13:30

Autosampler Position: 27

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-3-F.035

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			850676.018	ug/L	884012.991
	233	**U**	**0.000109**	41.372	10.000	ug/L	5.867
	234	**U**	**0.000290**	27.475	13.600	ug/L	5.000
	235	**U**	**0.027030**	5.768	777.821	ug/L	5.600
	236	**U**	**0.000010**	221.632	4.667	ug/L	4.400
	238	**U**	**3.640614**	5.466	94578.650	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.229**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-7-F

Sample Date/Time: Thursday, August 14, 2014 14:18:09

Autosampler Position: 28

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-7-F.036

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			841167.034	ug/L	884012.991
	233	**U**	**0.000241**	10.061	15.133	ug/L	5.867
	234	**U**	**0.000459**	19.039	18.533	ug/L	5.000
	235	**U**	**0.052227**	4.914	1481.544	ug/L	5.600
	236	**U**	**0.000023**	40.509	5.133	ug/L	4.400
	238	**U**	**6.980835**	5.449	179284.332	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.153**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-8-F

Sample Date/Time: Thursday, August 14, 2014 14:22:49

Autosampler Position: 29

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-8-F.037

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			841356.414	ug/L	884012.991
	233	**U**	**0.000197**	42.991	13.333	ug/L	5.867
	234	**U**	**0.000417**	12.820	17.333	ug/L	5.000
	235	**U**	**0.053822**	6.833	1527.348	ug/L	5.600
	236	**U**	**0.000009**	383.735	4.533	ug/L	4.400
	238	**U**	**7.156959**	6.156	183904.755	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.175**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-9-F

Sample Date/Time: Thursday, August 14, 2014 14:27:29

Autosampler Position: 30

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-9-F.038

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			819174.096	ug/L	884012.991
	233	**U**	**0.000281**	8.601	16.267	ug/L	5.867
	234	**U**	**0.000728**	18.593	25.933	ug/L	5.000
	235	**U**	**0.088208**	5.251	2433.941	ug/L	5.600
	236	**U**	**0.000049**	47.859	6.067	ug/L	4.400
	238	**U**	**11.826652**	4.835	295848.474	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.665**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Thursday, August 14, 2014 14:32:09
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 9.039

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			841976.395	ug/L	884012.991
	233	**U**	**0.053273**	2.373	2115.157	ug/L	5.867
	234	**U**	**0.085920**	2.178	2594.503	ug/L	5.000
	235	**U**	**5.125912**	1.898	145109.808	ug/L	5.600
	236	**U**	**0.092322**	0.879	3921.005	ug/L	4.400
	238	**U**	**5.340479**	1.394	137404.643	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.245**	
	U	233		**103.443**
	U	234		**103.894**
	U	235		**105.743**
	U	236		**103.733**
	U	238		**106.259**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 14, 2014 14:36:49

Autosampler Position: 1

Dataset File: D:\Elandata\Dataset\081414M1\QC Std 10.040

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			835957.711	ug/L	884012.991
	233	**U**	**0.013435**	2.726	533.677	ug/L	5.867
	234	**U**	**0.000078**	20.706	7.067	ug/L	5.000
	235	**U**	**0.001965**	14.721	60.867	ug/L	5.600
	236	**U**	**0.000120**	44.942	9.133	ug/L	4.400
	238	**U**	**0.001707**	22.328	152.001	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.564**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-11-F

Sample Date/Time: Thursday, August 14, 2014 14:41:29

Autosampler Position: 31

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-11-F.041

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			796002.069	ug/L	884012.991
	233	**U**	**0.000235**	19.791	14.067	ug/L	5.867
	234	**U**	**0.000504**	4.009	18.867	ug/L	5.000
	235	**U**	**0.043089**	6.444	1157.780	ug/L	5.600
	236	**U**	**0.000129**	3.560	9.133	ug/L	4.400
	238	**U**	**5.808803**	5.160	141253.917	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.044**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-12-D
Sample Date/Time: Thursday, August 14, 2014 14:46:09
Autosampler Position: 32
Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-12-D.042

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			823053.193	ug/L	884012.991
	233	**U**	**0.000146**	44.895	11.067	ug/L	5.867
	234	**U**	**0.000494**	9.937	19.200	ug/L	5.000
	235	**U**	**0.050859**	4.835	1411.936	ug/L	5.600
	236	**U**	**0.000046**	59.140	6.000	ug/L	4.400
	238	**U**	**6.768099**	4.045	170139.312	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.104**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-13-D
Sample Date/Time: Thursday, August 14, 2014 14:50:50
Autosampler Position: 33
Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-13-D.043

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			888435.869	ug/L	884012.991
	233	**U**	**0.000184**	24.243	13.533	ug/L	5.867
	234	**U**	**0.000203**	19.447	11.467	ug/L	5.000
	235	**U**	**0.017604**	6.232	530.810	ug/L	5.600
	236	**U**	**0.000031**	70.914	5.800	ug/L	4.400
	238	**U**	**2.387956**	7.462	64775.966	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.500**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-14-D

Sample Date/Time: Thursday, August 14, 2014 14:55:31

Autosampler Position: 34

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-14-D.044

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			890112.500	ug/L	884012.991
	233	**U**	**0.000215**	21.945	14.933	ug/L	5.867
	234	**U**	**0.000441**	23.195	19.000	ug/L	5.000
	235	**U**	**0.061214**	6.538	1835.251	ug/L	5.600
	236	**U**	**0.000043**	66.070	6.400	ug/L	4.400
	238	**U**	**8.238397**	5.561	223779.414	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.690**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-15-D

Sample Date/Time: Thursday, August 14, 2014 15:00:11

Autosampler Position: 35

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-15-D.045

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			823668.101	ug/L	884012.991
	233	**U**	**0.000351**	13.246	19.067	ug/L	5.867
	234	**U**	**0.000214**	27.455	10.933	ug/L	5.000
	235	**U**	**0.014184**	3.106	397.872	ug/L	5.600
	236	**U**	**0.000140**	55.637	9.867	ug/L	4.400
	238	**U**	**1.885851**	5.364	47487.944	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.174**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-16-D

Sample Date/Time: Thursday, August 14, 2014 15:04:50

Autosampler Position: 36

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-16-D.046

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			879952.360	ug/L	884012.991
	233	**U**	**0.000227**	31.026	15.200	ug/L	5.867
	234	**U**	**0.000237**	26.675	12.400	ug/L	5.000
	235	**U**	**0.015478**	10.010	462.541	ug/L	5.600
	236	**U**	**0.000080**	64.593	7.867	ug/L	4.400
	238	**U**	**2.126484**	8.790	57146.604	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.541**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-17-D

Sample Date/Time: Thursday, August 14, 2014 15:09:30

Autosampler Position: 37

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-17-D.047

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			890372.349	ug/L	884012.991
	233	**U**	**0.000264**	31.255	16.933	ug/L	5.867
	234	**U**	**0.000129**	10.627	9.133	ug/L	5.000
	235	**U**	**0.010953**	4.867	333.404	ug/L	5.600
	236	**U**	**0.000023**	147.792	5.467	ug/L	4.400
	238	**U**	**1.471714**	6.802	40094.657	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.719**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-18-D

Sample Date/Time: Thursday, August 14, 2014 15:14:10

Autosampler Position: 38

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-18-D.048

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			792995.931	ug/L	884012.991
	233	**U**	**0.000290**	25.400	16.067	ug/L	5.867
	234	**U**	**0.000612**	33.539	21.800	ug/L	5.000
	235	**U**	**0.068695**	4.181	1836.185	ug/L	5.600
	236	**U**	**0.000094**	54.508	7.733	ug/L	4.400
	238	**U**	**9.205656**	3.525	222976.764	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.704**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-19-D

Sample Date/Time: Thursday, August 14, 2014 15:18:50

Autosampler Position: 39

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-19-D.049

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			758399.642	ug/L	884012.991
	233	**U**	**0.000242**	4.477	13.667	ug/L	5.867
	234	**U**	**0.000468**	8.931	17.000	ug/L	5.000
	235	**U**	**0.043577**	5.265	1115.977	ug/L	5.600
	236	**U**	**0.000114**	43.848	8.133	ug/L	4.400
	238	**U**	**5.843205**	3.721	135425.752	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**85.791**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-20-D

Sample Date/Time: Thursday, August 14, 2014 15:23:29

Autosampler Position: 40

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-20-D.050

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			787415.787	ug/L	884012.991
	233	**U**	**0.000231**	34.416	13.733	ug/L	5.867
	234	**U**	**0.000584**	10.014	20.933	ug/L	5.000
	235	**U**	**0.067106**	4.357	1781.111	ug/L	5.600
	236	**U**	**0.000082**	49.259	7.200	ug/L	4.400
	238	**U**	**6.992655**	4.374	168171.586	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.073**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9

Sample Date/Time: Thursday, August 14, 2014 15:28:09
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 9.051

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			828718.947	ug/L	884012.991
	233	**U**	**0.053179**	3.714	2077.618	ug/L	5.867
	234	**U**	**0.087154**	1.734	2589.902	ug/L	5.000
	235	**U**	**5.202533**	1.646	144938.992	ug/L	5.600
	236	**U**	**0.093705**	1.419	3916.071	ug/L	4.400
	238	**U**	**5.405071**	2.233	136831.461	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.745**	
	U	233		**103.261**
	U	234		**105.385**
	U	235		**107.324**
	U	236		**105.286**
	U	238		**107.544**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 14, 2014 15:32:49
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 10.052

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			827205.512	ug/L	884012.991
	233	**U**	**0.013705**	4.242	538.143	ug/L	5.867
	234	**U**	**0.000114**	39.429	8.000	ug/L	5.000
	235	**U**	**0.001929**	13.262	59.133	ug/L	5.600
	236	**U**	**0.000081**	29.866	7.467	ug/L	4.400
	238	**U**	**0.001556**	9.259	146.467	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.574**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-22-E

Sample Date/Time: Thursday, August 14, 2014 15:37:29

Autosampler Position: 41

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-22-E.053

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			786806.448	ug/L	884012.991
	233	**U**	**0.000115**	27.997	9.467	ug/L	5.867
	234	**U**	**0.000472**	5.840	17.733	ug/L	5.000
	235	**U**	**0.047658**	7.255	1264.056	ug/L	5.600
	236	**U**	**0.000099**	25.458	7.800	ug/L	4.400
	238	**U**	**6.286899**	6.890	150934.935	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.004**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-23-E

Sample Date/Time: Thursday, August 14, 2014 15:42:08
Autosampler Position: 42
Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-23-E.054

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			812783.758	ug/L	884012.991
	233	**U**	**0.000127**	35.216	10.200	ug/L	5.867
	234	**U**	**0.000332**	24.485	14.200	ug/L	5.000
	235	**U**	**0.034894**	6.399	957.432	ug/L	5.600
	236	**U**	**0.000065**	78.609	6.667	ug/L	4.400
	238	**U**	**4.713620**	7.959	116879.696	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.943**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-24-E

Sample Date/Time: Thursday, August 14, 2014 15:46:49
Autosampler Position: 43
Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-24-E.055

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			852883.793	ug/L	884012.991
	233	**U**	**0.000236**	14.844	15.133	ug/L	5.867
	234	**U**	**0.000171**	5.139	10.067	ug/L	5.000
	235	**U**	**0.013964**	5.248	405.406	ug/L	5.600
	236	**U**	**0.000061**	36.871	6.867	ug/L	4.400
	238	**U**	**1.848241**	3.565	48213.224	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.479**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-25-E

Sample Date/Time: Thursday, August 14, 2014 15:51:29

Autosampler Position: 44

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-25-E.056

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			847323.357	ug/L	884012.991
	233	**U**	**0.000262**	24.418	16.067	ug/L	5.867
	234	**U**	**0.000135**	24.023	8.867	ug/L	5.000
	235	**U**	**0.013825**	7.915	398.539	ug/L	5.600
	236	**U**	**0.000059**	15.087	6.733	ug/L	4.400
	238	**U**	**1.875700**	7.689	48560.952	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.850**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: MB

Sample Date/Time: Thursday, August 14, 2014 15:56:10
Autosampler Position: 45
Dataset File: D:\Elandata\Dataset\081414M1\MB.057

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			832456.661	ug/L	884012.991
	233	**U**	**0.000045**	88.459	7.333	ug/L	5.867
	234	**U**	**0.000045**	68.723	6.000	ug/L	5.000
	235	**U**	**0.000642**	25.750	23.067	ug/L	5.600
	236	**U**	**0.000076**	78.963	7.267	ug/L	4.400
	238	**U**	**0.068371**	5.075	1842.786	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.168**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: LCS

Sample Date/Time: Thursday, August 14, 2014 16:00:51
Autosampler Position: 46
Dataset File: D:\Elandata\Dataset\081414M1\LCS.058

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			837121.309	ug/L	884012.991
	233	**U**	**0.002848**	4.116	117.734	ug/L	5.867
	234	**U**	**0.044544**	2.528	1338.796	ug/L	5.000
	235	**U**	**2.647195**	2.942	74449.920	ug/L	5.600
	236	**U**	**0.047231**	1.265	1995.873	ug/L	4.400
	238	**U**	**2.762795**	3.111	70661.588	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.696**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-30-D
Sample Date/Time: Thursday, August 14, 2014 16:05:31
Autosampler Position: 47
Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-30-D.059

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			794250.528	ug/L	884012.991
	233	**U**	**0.000187**	29.713	12.267	ug/L	5.867
	234	**U**	**0.000407**	5.321	16.067	ug/L	5.000
	235	**U**	**0.045196**	0.679	1212.318	ug/L	5.600
	236	**U**	**0.000068**	30.942	6.667	ug/L	4.400
	238	**U**	**5.887123**	0.748	142928.844	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.846**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-30-D SD

Sample Date/Time: Thursday, August 14, 2014 16:10:10

Autosampler Position: 48

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-30-D SD.060

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			823241.610	ug/L	884012.991
	233	**U**	**0.000061**	77.249	7.800	ug/L	5.867
	234	**U**	**0.000126**	32.696	8.400	ug/L	5.000
	235	**U**	**0.009309**	6.052	262.469	ug/L	5.600
	236	**U**	**0.000045**	53.609	5.933	ug/L	4.400
	238	**U**	**1.200964**	1.957	30288.832	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.126**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-30-E MS

Sample Date/Time: Thursday, August 14, 2014 16:14:50

Autosampler Position: 49

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-30-E MS.061

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			793688.046	ug/L	884012.991
	233	**U**	**0.001221**	5.290	50.933	ug/L	5.867
	234	**U**	**0.017794**	1.641	510.142	ug/L	5.000
	235	**U**	**1.086454**	1.359	29002.084	ug/L	5.600
	236	**U**	**0.018482**	1.413	743.086	ug/L	4.400
	238	**U**	**7.707719**	1.269	186923.902	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.782**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-30-F MSD

Sample Date/Time: Thursday, August 14, 2014 16:19:29

Autosampler Position: 50

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-30-F MSD.062

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			798053.940	ug/L	884012.991
	233	**U**	**0.001306**	7.304	54.400	ug/L	5.867
	234	**U**	**0.017772**	3.674	512.209	ug/L	5.000
	235	**U**	**1.080567**	0.823	29006.759	ug/L	5.600
	236	**U**	**0.018629**	0.766	753.220	ug/L	4.400
	238	**U**	**6.998104**	0.658	170677.164	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.276**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9

Sample Date/Time: Thursday, August 14, 2014 16:26:55
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 9.063

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			813069.805	ug/L	884012.991
	233	**U**	**0.054003**	2.194	2070.350	ug/L	5.867
	234	**U**	**0.086748**	1.385	2529.358	ug/L	5.000
	235	**U**	**5.198440**	2.185	142048.931	ug/L	5.600
	236	**U**	**0.094931**	2.530	3890.530	ug/L	4.400
	238	**U**	**5.407247**	2.420	134270.169	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.975**	
	U	233		**104.860**
	U	234		**104.895**
	U	235		**107.240**
	U	236		**106.664**
	U	238		**107.588**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 14, 2014 16:32:01
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 10.064

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			814886.326	ug/L	884012.991
	233	**U**	**0.013877**	3.990	536.810	ug/L	5.867
	234	**U**	**0.000101**	19.309	7.533	ug/L	5.000
	235	**U**	**0.001818**	19.665	54.600	ug/L	5.600
	236	**U**	**0.000087**	61.094	7.533	ug/L	4.400
	238	**U**	**0.001495**	43.075	142.001	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.180**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-31-D

Sample Date/Time: Thursday, August 14, 2014 17:00:59

Autosampler Position: 51

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-31-D.065

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			795990.260	ug/L	884012.991
	233	**U**	**0.000206**	48.538	13.000	ug/L	5.867
	234	**U**	**0.000519**	8.058	19.267	ug/L	5.000
	235	**U**	**0.052832**	6.135	1417.870	ug/L	5.600
	236	**U**	**0.000061**	28.069	6.400	ug/L	4.400
	238	**U**	**6.472706**	5.215	157326.848	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.043**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-32-D

Sample Date/Time: Thursday, August 14, 2014 17:05:39

Autosampler Position: 52

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-32-D.066

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			758167.724	ug/L	884012.991
	233	**U**	**0.000183**	27.580	11.533	ug/L	5.867
	234	**U**	**0.000456**	7.094	16.667	ug/L	5.000
	235	**U**	**0.046151**	4.473	1180.982	ug/L	5.600
	236	**U**	**0.000130**	25.433	8.733	ug/L	4.400
	238	**U**	**4.652002**	3.257	107787.390	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**85.764**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-33-D

Sample Date/Time: Thursday, August 14, 2014 17:10:19

Autosampler Position: 53

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-33-D.067

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			803551.921	ug/L	884012.991
	233	**U**	**0.000140**	15.039	10.600	ug/L	5.867
	234	**U**	**0.000434**	23.396	17.000	ug/L	5.000
	235	**U**	**0.048188**	4.888	1306.460	ug/L	5.600
	236	**U**	**0.000048**	44.685	5.933	ug/L	4.400
	238	**U**	**6.378996**	4.631	156566.641	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.898**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-35-D
Sample Date/Time: Thursday, August 14, 2014 17:14:59
Autosampler Position: 54
Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-35-D.068

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			798654.986	ug/L	884012.991
	233	**U**	**0.000225**	14.407	13.733	ug/L	5.867
	234	**U**	**0.000677**	6.368	23.867	ug/L	5.000
	235	**U**	**0.075488**	4.418	2032.011	ug/L	5.600
	236	**U**	**0.000125**	7.857	9.000	ug/L	4.400
	238	**U**	**10.137619**	5.314	247292.004	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.344**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-36-D

Sample Date/Time: Thursday, August 14, 2014 17:19:40

Autosampler Position: 55

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-36-D.069

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			811354.951	ug/L	884012.991
	233	**U**	**0.000213**	7.552	13.533	ug/L	5.867
	234	**U**	**0.000657**	8.286	23.667	ug/L	5.000
	235	**U**	**0.068181**	5.215	1864.655	ug/L	5.600
	236	**U**	**0.000078**	35.417	7.200	ug/L	4.400
	238	**U**	**8.646001**	5.214	214235.794	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.781**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-37-C

Sample Date/Time: Thursday, August 14, 2014 17:24:19

Autosampler Position: 56

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-37-C.070

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			743680.413	ug/L	884012.991
	233	**U**	**0.000235**	59.572	13.200	ug/L	5.867
	234	**U**	**0.000430**	8.869	15.667	ug/L	5.000
	235	**U**	**0.043369**	2.799	1089.308	ug/L	5.600
	236	**U**	**0.000123**	52.703	8.333	ug/L	4.400
	238	**U**	**5.795581**	3.587	131712.391	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**84.126**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-39-C

Sample Date/Time: Thursday, August 14, 2014 17:29:00

Autosampler Position: 57

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-39-C.071

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			788055.311	ug/L	884012.991
	233	**U**	**0.000126**	58.830	9.867	ug/L	5.867
	234	**U**	**0.000532**	5.995	19.467	ug/L	5.000
	235	**U**	**0.055213**	4.789	1467.409	ug/L	5.600
	236	**U**	**0.000020**	127.298	4.733	ug/L	4.400
	238	**U**	**7.331960**	5.361	176443.384	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.145**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-40-C
Sample Date/Time: Thursday, August 14, 2014 17:33:41
Autosampler Position: 58
Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-40-C.072

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			801819.296	ug/L	884012.991
	233	**U**	**0.000174**	20.657	11.867	ug/L	5.867
	234	**U**	**0.000471**	20.237	18.000	ug/L	5.000
	235	**U**	**0.057899**	4.780	1565.086	ug/L	5.600
	236	**U**	**0.000071**	13.913	6.867	ug/L	4.400
	238	**U**	**7.226504**	5.082	176928.925	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.702**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-41-C

Sample Date/Time: Thursday, August 14, 2014 17:38:21

Autosampler Position: 59

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-41-C.073

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			782436.231	ug/L	884012.991
	233	**U**	**0.000198**	14.394	12.467	ug/L	5.867
	234	**U**	**0.000555**	7.604	20.000	ug/L	5.000
	235	**U**	**0.062166**	5.243	1639.494	ug/L	5.600
	236	**U**	**0.000042**	118.497	5.533	ug/L	4.400
	238	**U**	**8.256850**	5.495	197243.669	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.510**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-26-G

Sample Date/Time: Thursday, August 14, 2014 17:43:01

Autosampler Position: 60

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-26-G.074

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			786659.262	ug/L	884012.991
	233	**U**	**0.000290**	14.295	15.933	ug/L	5.867
	234	**U**	**0.000240**	35.477	11.133	ug/L	5.000
	235	**U**	**0.018114**	8.213	482.942	ug/L	5.600
	236	**U**	**0.000053**	36.408	6.000	ug/L	4.400
	238	**U**	**2.442217**	6.839	58647.044	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.987**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Thursday, August 14, 2014 17:47:42
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 9.075

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			791078.042	ug/L	884012.991
	233	**U**	**0.055438**	3.873	2066.216	ug/L	5.867
	234	**U**	**0.089340**	2.702	2532.891	ug/L	5.000
	235	**U**	**5.332038**	2.615	141725.718	ug/L	5.600
	236	**U**	**0.096631**	4.544	3849.385	ug/L	4.400
	238	**U**	**5.496587**	2.654	132774.036	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.487**	
	U	233		**107.647**
	U	234		**108.029**
	U	235		**109.996**
	U	236		**108.574**
	U	238		**109.365**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 14, 2014 17:52:22
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 10.076

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			791164.262	ug/L	884012.991
	233	**U**	**0.013891**	3.288	521.810	ug/L	5.867
	234	**U**	**0.000079**	35.614	6.733	ug/L	5.000
	235	**U**	**0.002378**	15.193	67.867	ug/L	5.600
	236	**U**	**0.000111**	27.614	8.400	ug/L	4.400
	238	**U**	**0.001878**	34.204	147.334	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.497**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-26-G

Sample Date/Time: Thursday, August 14, 2014 17:57:02

Autosampler Position: 61

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-26-G.077

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			777893.096	ug/L	884012.991
	233	**U**	**0.000237**	28.280	13.800	ug/L	5.867
	234	**U**	**0.000509**	13.498	18.533	ug/L	5.000
	235	**U**	**0.052401**	5.804	1374.666	ug/L	5.600
	236	**U**	**0.000051**	57.270	5.867	ug/L	4.400
	238	**U**	**6.921015**	4.837	164419.384	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**87.996**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-27-F

Sample Date/Time: Thursday, August 14, 2014 18:01:42

Autosampler Position: 62

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-27-F.078

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			796360.861	ug/L	884012.991
	233	**U**	**0.000189**	24.656	12.333	ug/L	5.867
	234	**U**	**0.000454**	4.699	17.467	ug/L	5.000
	235	**U**	**0.047554**	4.323	1277.657	ug/L	5.600
	236	**U**	**0.000073**	55.940	6.867	ug/L	4.400
	238	**U**	**6.209144**	4.643	151000.696	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.085**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-28-E

Sample Date/Time: Thursday, August 14, 2014 18:06:22

Autosampler Position: 63

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-28-E.079

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			773632.205	ug/L	884012.991
	233	**U**	**0.000198**	30.742	12.333	ug/L	5.867
	234	**U**	**0.000343**	12.901	13.867	ug/L	5.000
	235	**U**	**0.038691**	4.109	1011.036	ug/L	5.600
	236	**U**	**0.000111**	38.345	8.133	ug/L	4.400
	238	**U**	**5.176400**	4.850	122315.807	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**87.514**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: CCV

Sample Date/Time: Thursday, August 14, 2014 18:11:02
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081414M1\CCV.080

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			794040.248	ug/L	884012.991
	233	**U**	**0.056100**	2.323	2099.888	ug/L	5.867
	234	**U**	**0.089540**	1.763	2549.094	ug/L	5.000
	235	**U**	**5.357085**	3.125	142881.264	ug/L	5.600
	236	**U**	**0.096082**	2.885	3844.251	ug/L	4.400
	238	**U**	**5.563402**	2.154	134910.317	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.822**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: CCB

Sample Date/Time: Thursday, August 14, 2014 18:15:43
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081414M1\CCB.081

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			797723.624	ug/L	884012.991
	233	**U**	**0.013875**	3.320	525.610	ug/L	5.867
	234	**U**	**0.000083**	53.723	6.933	ug/L	5.000
	235	**U**	**0.002926**	28.390	82.600	ug/L	5.600
	236	**U**	**0.000113**	42.503	8.467	ug/L	4.400
	238	**U**	**0.002811**	33.640	170.734	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.239**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Blank

Sample Date/Time: Thursday, August 14, 2014 18:20:22
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081414M1\Blank.082

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			787112.810	ug/L	
	233	**U**			520.743	ug/L	
	234	**U**			5.000	ug/L	
	235	**U**			43.667	ug/L	
	236	**U**			8.267	ug/L	
	238	**U**			128.001	ug/L	

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 1
Sample Date/Time: Thursday, August 14, 2014 18:27:03
Autosampler Position: 191
Dataset File: D:\Elandata\Dataset\081414M1\Standard 1.083

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			802700.876	ug/L	787112.810
	233	**U**			387.739	ug/L	520.743
	234	**U**			33.133	ug/L	5.000
	235	**U**	**0.048500**	2.974	1423.604	ug/L	43.667
	236	**U**			45.733	ug/L	8.267
	238	**U**	**0.050300**	3.563	1433.939	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 2
Sample Date/Time: Thursday, August 14, 2014 18:31:44
Autosampler Position: 192
Dataset File: D:\Elandata\Dataset\081414M1\Standard 2.084

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			804449.017	ug/L	787112.810
	233	**U**			1399.402	ug/L	520.743
	234	**U**	**0.049600**	2.849	1540.950	ug/L	5.000
	235	**U**	**3.050233**	2.782	86993.772	ug/L	43.667
	236	**U**	**0.053400**	2.127	2367.396	ug/L	8.267
	238	**U**	**3.158584**	2.749	82200.534	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 3
Sample Date/Time: Thursday, August 14, 2014 18:36:25
Autosampler Position: 193
Dataset File: D:\Elandata\Dataset\081414M1\Standard 3.085

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			783109.503	ug/L	787112.810
	233	**U**	**0.051500**	2.339	2024.277	ug/L	520.743
	234	**U**	**0.082657**	2.842	2495.952	ug/L	5.000
	235	**U**	**5.009070**	2.422	139049.120	ug/L	43.667
	236	**U**	**0.088014**	1.660	3793.638	ug/L	8.267
	238	**U**	**5.213016**	2.570	131988.518	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 4
Sample Date/Time: Thursday, August 14, 2014 18:41:06
Autosampler Position: 194
Dataset File: D:\Elandata\Dataset\081414M1\Standard 4.086

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			799992.356	ug/L	787112.810
	233	**U**	**0.105625**	3.753	4040.438	ug/L	520.743
	234	**U**	**0.164913**	3.098	4952.392	ug/L	5.000
	235	**U**	**9.694902**	3.139	277167.498	ug/L	43.667
	236	**U**	**0.177437**	3.659	7532.453	ug/L	8.267
	238	**U**	**10.051803**	2.943	263375.322	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 5
Sample Date/Time: Thursday, August 14, 2014 18:45:47
Autosampler Position: 195
Dataset File: D:\Elandata\Dataset\081414M1\Standard 5.087

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			798811.363	ug/L	787112.810
	233	**U**	**0.314031**	2.411	12314.311	ug/L	520.743
	234	**U**	**0.496918**	2.255	15128.882	ug/L	5.000
	235	**U**	**29.074695**	2.810	827558.148	ug/L	43.667
	236	**U**	**0.534714**	2.406	22952.709	ug/L	8.267
	238	**U**	**30.123891**	2.661	780717.667	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 1

Sample Date/Time: Thursday, August 14, 2014 18:50:28
Autosampler Position: 196
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 1.088

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			790840.723	ug/L	787112.810
	233	**U**	**0.231121**	1.995	9111.909	ug/L	520.743
	234	**U**	**0.000801**	17.650	29.133	ug/L	5.000
	235	**U**	**0.019928**	22.805	603.413	ug/L	43.667
	236	**U**	**0.000317**	29.632	21.733	ug/L	8.267
	238	**U**	**0.067385**	6.994	1856.854	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.474**	
	U	233		**103.410**
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 2
Sample Date/Time: Thursday, August 14, 2014 18:55:09
Autosampler Position: 197
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 2.089

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			792374.375	ug/L	787112.810
	233	**U**	**45.590351**	1.722	1698239.868	ug/L	520.743
	234	**U**	**0.087186**	1.755	2637.710	ug/L	5.000
	235	**U**	**0.111740**	2.266	3199.492	ug/L	43.667
	236	**U**	**0.006655**	4.014	291.470	ug/L	8.267
	238	**U**	**10.000586**	2.384	257216.438	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.668**	
	U	233		
	U	234		**104.415**
	U	235		
	U	236		
	U	238		**102.274**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 3

Sample Date/Time: Thursday, August 14, 2014 18:59:50
Autosampler Position: 198
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 3.090

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			799219.339	ug/L	787112.810
	233	**U**	**474.043953**	1.857	17804206.740	ug/L	520.743
	234	**U**	**0.867279**	1.615	26420.517	ug/L	5.000
	235	**U**	**1.108441**	2.249	31613.720	ug/L	43.667
	236	**U**	**0.067713**	2.498	2915.498	ug/L	8.267
	238	**U**	**99.440656**	2.181	2578608.702	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.538**	
	U	233		
	U	234		
	U	235		**104.887**
	U	236		**90.768**
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 4

Sample Date/Time: Thursday, August 14, 2014 19:04:30
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 4.091

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			792480.812	ug/L	787112.810
	233	**U**	**0.063668**	44.065	2851.168	ug/L	520.743
	234	**U**	**0.000118**	48.841	8.533	ug/L	5.000
	235	**U**	**0.000075**	48.482	46.133	ug/L	43.667
	236	**U**	**-0.000017**	39.451	7.600	ug/L	8.267
	238	**U**	**0.013322**	43.036	465.208	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.682**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 5

Sample Date/Time: Thursday, August 14, 2014 19:09:11
Autosampler Position: 191
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 5.092

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			805810.641	ug/L	787112.810
	233	**U**	**0.009275**	50.763	880.428	ug/L	520.743
	234	**U**	**0.000886**	7.760	32.333	ug/L	5.000
	235	**U**	**0.047563**	4.004	1409.203	ug/L	43.667
	236	**U**	**0.000802**	7.360	43.133	ug/L	8.267
	238	**U**	**0.051471**	3.336	1476.010	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**102.375**	
	U	233		
	U	234		
	U	235		**98.069**
	U	236		
	U	238		**102.328**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Thursday, August 14, 2014 19:13:52
Autosampler Position: 192
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 6.093

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			804052.149	ug/L	787112.810
	233	**U**	**0.024728**	4.148	1465.342	ug/L	520.743
	234	**U**	**0.049810**	2.223	1531.216	ug/L	5.000
	235	**U**	**2.979542**	3.049	85390.879	ug/L	43.667
	236	**U**	**0.053571**	3.509	2321.122	ug/L	8.267
	238	**U**	**3.086376**	2.493	80636.282	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**102.152**	
	U	233		**80.027**
	U	234		**100.423**
	U	235		
	U	236		**100.320**
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Thursday, August 14, 2014 19:18:33
Autosampler Position: 199
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 7.094

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			769434.080	ug/L	787112.810
	233	**U**	**-0.011550**	0.781	91.000	ug/L	520.743
	234	**U**	**0.000028**	182.391	5.667	ug/L	5.000
	235	**U**	**-0.000628**	3.503	25.467	ug/L	43.667
	236	**U**	**-0.000043**	54.596	6.333	ug/L	8.267
	238	**U**	**-0.002927**	5.964	52.000	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.754**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 8
Sample Date/Time: Thursday, August 14, 2014 19:23:13
Autosampler Position: 200
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 8.095

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			770079.319	ug/L	787112.810
	233	**U**	**0.040210**	3.224	1963.602	ug/L	520.743
	234	**U**	**0.081259**	2.168	2389.600	ug/L	5.000
	235	**U**	**4.865077**	2.470	133533.706	ug/L	43.667
	236	**U**	**0.086703**	1.915	3595.120	ug/L	8.267
	238	**U**	**5.045086**	2.659	126143.342	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.836**	
	U	233		**78.077**
	U	234		**98.257**
	U	235		**100.363**
	U	236		**97.419**
	U	238		**100.382**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Thursday, August 14, 2014 19:27:54
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 9.096

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			833547.712	ug/L	787112.810
	233	**U**	**0.039227**	2.944	2087.419	ug/L	520.743
	234	**U**	**0.078928**	1.543	2512.688	ug/L	5.000
	235	**U**	**4.752211**	1.954	141231.784	ug/L	43.667
	236	**U**	**0.085682**	2.290	3845.651	ug/L	8.267
	238	**U**	**4.917316**	2.553	133104.643	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**105.899**	
	U	233		**76.168**
	U	234		**95.439**
	U	235		**98.034**
	U	236		**96.272**
	U	238		**97.840**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 14, 2014 19:32:35
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 10.097

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			834925.148	ug/L	787112.810
	233	**U**	**0.010899**	14.211	977.900	ug/L	520.743
	234	**U**	**0.000099**	34.229	8.400	ug/L	5.000
	235	**U**	**0.001229**	31.620	82.467	ug/L	43.667
	236	**U**	**-0.000044**	34.803	6.800	ug/L	8.267
	238	**U**	**0.003493**	30.018	229.335	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**106.074**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: TEST

Sample Date/Time: Thursday, August 14, 2014 19:37:14
Autosampler Position: 119
Dataset File: D:\Elandata\Dataset\081414M1\TEST.098

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			845901.561	ug/L	787112.810
	233	**U**	**-0.013319**	0.470	29.733	ug/L	520.743
	234	**U**	**0.000419**	26.865	18.933	ug/L	5.000
	235	**U**	**0.022715**	3.288	731.552	ug/L	43.667
	236	**U**	**0.000370**	10.691	25.667	ug/L	8.267
	238	**U**	**0.029554**	1.425	949.032	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**107.469**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: TEST

Sample Date/Time: Thursday, August 14, 2014 19:41:55
Autosampler Position: 120
Dataset File: D:\Elandata\Dataset\081414M1\TEST.099

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			855565.118	ug/L	787112.810
	233	**U**	**-0.013450**	0.822	24.667	ug/L	520.743
	234	**U**	**0.000380**	21.029	17.733	ug/L	5.000
	235	**U**	**0.022822**	5.202	742.486	ug/L	43.667
	236	**U**	**0.000376**	19.128	26.133	ug/L	8.267
	238	**U**	**0.023736**	3.860	797.622	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**108.697**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: MB

Sample Date/Time: Thursday, August 14, 2014 19:46:35
Autosampler Position: 71
Dataset File: D:\Elandata\Dataset\081414M1\MB.100

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			854809.039	ug/L	787112.810
	233	**U**	**-0.013774**	0.392	11.867	ug/L	520.743
	234	**U**	**0.000038**	151.502	6.600	ug/L	5.000
	235	**U**	**-0.001192**	2.321	11.067	ug/L	43.667
	236	**U**	**-0.000086**	25.103	5.000	ug/L	8.267
	238	**U**	**0.007639**	8.480	350.404	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**108.601**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: LCS

Sample Date/Time: Thursday, August 14, 2014 19:51:15
Autosampler Position: 72
Dataset File: D:\Elandata\Dataset\081414M1\LCS.101

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			849998.104	ug/L	787112.810
	233	**U**	**-0.011195**	1.272	114.600	ug/L	520.743
	234	**U**	**0.039466**	1.188	1284.191	ug/L	5.000
	235	**U**	**2.371621**	2.259	71890.749	ug/L	43.667
	236	**U**	**0.042570**	1.710	1953.200	ug/L	8.267
	238	**U**	**2.433233**	2.449	67237.533	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**107.989**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-1-C
Sample Date/Time: Thursday, August 14, 2014 19:55:55
Autosampler Position: 73
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-1-C.102

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			773591.707	ug/L	787112.810
	233	**U**	**-0.013738**	0.208	12.000	ug/L	520.743
	234	**U**	**0.000356**	6.915	15.400	ug/L	5.000
	235	**U**	**0.034798**	1.512	1003.169	ug/L	43.667
	236	**U**	**-0.000056**	31.230	5.800	ug/L	8.267
	238	**U**	**4.897644**	1.234	123168.544	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.282**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Thursday, August 14, 2014 20:00:35
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 9.103

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			837873.604	ug/L	787112.810
	233	**U**	**0.038246**	3.098	2059.482	ug/L	520.743
	234	**U**	**0.078132**	2.212	2499.819	ug/L	5.000
	235	**U**	**4.672840**	2.190	139581.772	ug/L	43.667
	236	**U**	**0.083834**	2.339	3782.568	ug/L	8.267
	238	**U**	**4.858315**	2.050	132219.144	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**106.449**	
	U	233		**74.263**
	U	234		**94.476**
	U	235		**96.397**
	U	236		**94.195**
	U	238		**96.666**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 14, 2014 20:05:16
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 10.104

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			837259.746	ug/L	787112.810
	233	**U**	**0.007150**	9.891	834.824	ug/L	520.743
	234	**U**	**0.000084**	69.531	7.933	ug/L	5.000
	235	**U**	**0.001894**	57.596	101.600	ug/L	43.667
	236	**U**	**-0.000004**	657.409	8.600	ug/L	8.267
	238	**U**	**0.003497**	35.504	229.802	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**106.371**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-1-C SD

Sample Date/Time: Thursday, August 14, 2014 20:09:55

Autosampler Position: 74

Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-1-C SD.105

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			813646.043	ug/L	787112.810
	233	**U**	**-0.013850**	0.071	8.333	ug/L	520.743
	234	**U**	**0.000079**	35.970	7.600	ug/L	5.000
	235	**U**	**0.005839**	4.417	214.402	ug/L	43.667
	236	**U**	**-0.000082**	17.711	4.933	ug/L	8.267
	238	**U**	**0.955395**	1.403	25367.383	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**103.371**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-1-D MS

Sample Date/Time: Thursday, August 14, 2014 20:14:35

Autosampler Position: 75

Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-1-D MS.106

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			767213.626	ug/L	787112.810
	233	**U**	**-0.012771**	0.742	46.800	ug/L	520.743
	234	**U**	**0.015691**	2.226	464.008	ug/L	5.000
	235	**U**	**0.953139**	0.772	26127.944	ug/L	43.667
	236	**U**	**0.016336**	1.248	681.950	ug/L	8.267
	238	**U**	**5.801864**	1.020	144681.350	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.472**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-1-E MSD

Sample Date/Time: Thursday, August 14, 2014 20:19:15

Autosampler Position: 76

Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-1-E MSD.107

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			767480.853	ug/L	787112.810
	233	**U**	**-0.012730**	0.754	48.333	ug/L	520.743
	234	**U**	**0.015564**	0.871	460.341	ug/L	5.000
	235	**U**	**0.954333**	0.550	26167.014	ug/L	43.667
	236	**U**	**0.016376**	1.368	683.950	ug/L	8.267
	238	**U**	**5.578810**	0.323	139172.336	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.506**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-2-C

Sample Date/Time: Thursday, August 14, 2014 20:23:56

Autosampler Position: 77

Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-2-C.108

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			781660.340	ug/L	787112.810
	233	**U**	**-0.013679**	0.268	14.267	ug/L	520.743
	234	**U**	**0.000459**	23.501	18.600	ug/L	5.000
	235	**U**	**0.055545**	3.953	1591.422	ug/L	43.667
	236	**U**	**-0.000049**	26.296	6.133	ug/L	8.267
	238	**U**	**7.636507**	3.050	193886.016	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.307**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-3-C
Sample Date/Time: Thursday, August 14, 2014 20:28:36
Autosampler Position: 78
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-3-C.109

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			728647.617	ug/L	787112.810
	233	**U**	**-0.013762**	0.066	10.467	ug/L	520.743
	234	**U**	**0.000405**	6.057	15.867	ug/L	5.000
	235	**U**	**0.043823**	4.486	1179.049	ug/L	43.667
	236	**U**	**-0.000069**	71.496	4.933	ug/L	8.267
	238	**U**	**6.040052**	2.847	142995.623	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.572**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-5-C
Sample Date/Time: Thursday, August 14, 2014 20:33:16
Autosampler Position: 79
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-5-C.110

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			755103.710	ug/L	787112.810
	233	**U**	**-0.013677**	0.231	13.867	ug/L	520.743
	234	**U**	**0.000556**	11.335	20.800	ug/L	5.000
	235	**U**	**0.053789**	4.283	1490.278	ug/L	43.667
	236	**U**	**-0.000052**	75.981	5.800	ug/L	8.267
	238	**U**	**7.052940**	3.171	173031.239	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.933**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-6-C
Sample Date/Time: Thursday, August 14, 2014 20:37:57
Autosampler Position: 80
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-6-C.111

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			775413.906	ug/L	787112.810
	233	**U**	**-0.013657**	0.275	15.000	ug/L	520.743
	234	**U**	**0.000458**	8.571	18.467	ug/L	5.000
	235	**U**	**0.056058**	4.657	1592.889	ug/L	43.667
	236	**U**	**-0.000069**	63.408	5.267	ug/L	8.267
	238	**U**	**7.674108**	3.760	193306.236	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.514**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-7-C
Sample Date/Time: Thursday, August 14, 2014 20:42:37
Autosampler Position: 81
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-7-C.112

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			899749.945	ug/L	787112.810
	233	**U**	**-0.013721**	0.475	14.667	ug/L	520.743
	234	**U**	**0.000161**	37.899	11.200	ug/L	5.000
	235	**U**	**0.015462**	6.282	545.610	ug/L	43.667
	236	**U**	**-0.000091**	21.534	5.067	ug/L	8.267
	238	**U**	**2.249163**	3.434	65820.254	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**114.310**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-8-C
Sample Date/Time: Thursday, August 14, 2014 20:47:18
Autosampler Position: 82
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-8-C.113

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			762656.293	ug/L	787112.810
	233	**U**	**-0.013670**	0.061	14.267	ug/L	520.743
	234	**U**	**0.000503**	17.147	19.467	ug/L	5.000
	235	**U**	**0.060598**	3.095	1690.233	ug/L	43.667
	236	**U**	**-0.000072**	50.552	5.067	ug/L	8.267
	238	**U**	**8.266125**	4.030	204740.221	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.893**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-9-C
Sample Date/Time: Thursday, August 14, 2014 20:51:58
Autosampler Position: 83
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-9-C.114

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			781594.001	ug/L	787112.810
	233	**U**	**-0.013712**	0.224	13.067	ug/L	520.743
	234	**U**	**0.000560**	8.742	21.667	ug/L	5.000
	235	**U**	**0.057479**	5.950	1645.295	ug/L	43.667
	236	**U**	**-0.000070**	42.237	5.267	ug/L	8.267
	238	**U**	**7.749097**	4.998	196742.879	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.299**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Thursday, August 14, 2014 20:56:39
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 9.115

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			789648.539	ug/L	787112.810
	233	**U**	**0.040789**	4.190	2035.278	ug/L	520.743
	234	**U**	**0.083878**	1.530	2529.491	ug/L	5.000
	235	**U**	**4.989798**	1.680	140506.895	ug/L	43.667
	236	**U**	**0.089947**	2.562	3823.912	ug/L	8.267
	238	**U**	**5.187408**	2.342	133047.014	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.322**	
	U	233		**79.202**
	U	234		**101.425**
	U	235		**102.935**
	U	236		**101.064**
	U	238		**103.214**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 14, 2014 21:01:20

Autosampler Position: 1

Dataset File: D:\Elandata\Dataset\081414M1\QC Std 10.116

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			786939.429	ug/L	787112.810
	233	**U**	**0.011306**	1.361	938.831	ug/L	520.743
	234	**U**	**0.000111**	49.893	8.267	ug/L	5.000
	235	**U**	**0.001407**	42.618	82.400	ug/L	43.667
	236	**U**	**-0.000054**	30.089	6.000	ug/L	8.267
	238	**U**	**0.004093**	19.413	231.669	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.978**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-10-D
Sample Date/Time: Thursday, August 14, 2014 21:05:59
Autosampler Position: 84
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-10-D.117

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			782166.074	ug/L	787112.810
	233	**U**	**-0.013703**	0.060	13.400	ug/L	520.743
	234	**U**	**0.000305**	9.427	14.067	ug/L	5.000
	235	**U**	**0.035192**	3.200	1024.570	ug/L	43.667
	236	**U**	**-0.000055**	78.282	5.867	ug/L	8.267
	238	**U**	**4.801160**	2.619	122005.148	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.372**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-12-C
Sample Date/Time: Thursday, August 14, 2014 21:10:39
Autosampler Position: 85
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-12-C.118

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			769995.848	ug/L	787112.810
	233	**U**	**-0.013726**	0.416	12.333	ug/L	520.743
	234	**U**	**0.000482**	26.050	19.000	ug/L	5.000
	235	**U**	**0.055113**	5.327	1555.351	ug/L	43.667
	236	**U**	**-0.000046**	38.120	6.200	ug/L	8.267
	238	**U**	**7.448677**	4.488	186256.222	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.825**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-13-C
Sample Date/Time: Thursday, August 14, 2014 21:15:19
Autosampler Position: 86
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-13-C.119

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			749159.568	ug/L	787112.810
	233	**U**	**-0.013722**	0.565	12.200	ug/L	520.743
	234	**U**	**0.000486**	24.326	18.600	ug/L	5.000
	235	**U**	**0.055329**	5.277	1519.214	ug/L	43.667
	236	**U**	**-0.000074**	34.721	4.867	ug/L	8.267
	238	**U**	**7.469235**	3.742	181752.917	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.178**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-14-C
Sample Date/Time: Thursday, August 14, 2014 21:19:59
Autosampler Position: 87
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-14-C.120

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			734643.710	ug/L	787112.810
	233	**U**	**-0.013770**	0.245	10.267	ug/L	520.743
	234	**U**	**0.000407**	8.535	16.067	ug/L	5.000
	235	**U**	**0.042366**	1.271	1150.846	ug/L	43.667
	236	**U**	**-0.000064**	24.195	5.200	ug/L	8.267
	238	**U**	**5.904939**	2.491	140982.934	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.334**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-16-C
Sample Date/Time: Thursday, August 14, 2014 21:24:39
Autosampler Position: 88
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-16-C.121

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			759039.453	ug/L	787112.810
	233	**U**	**-0.013618**	0.061	16.067	ug/L	520.743
	234	**U**	**0.000605**	7.298	22.333	ug/L	5.000
	235	**U**	**0.066275**	4.721	1835.985	ug/L	43.667
	236	**U**	**-0.000095**	28.383	4.067	ug/L	8.267
	238	**U**	**9.039695**	4.150	222852.223	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.433**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-17-C

Sample Date/Time: Thursday, August 14, 2014 21:29:19

Autosampler Position: 89

Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-17-C.122

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			770346.379	ug/L	787112.810
	233	**U**	**-0.013704**	0.749	13.133	ug/L	520.743
	234	**U**	**0.002240**	3.254	70.667	ug/L	5.000
	235	**U**	**0.204728**	6.196	5663.390	ug/L	43.667
	236	**U**	**0.000262**	18.984	18.933	ug/L	8.267
	238	**U**	**9.425881**	5.198	235747.551	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.870**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-18-C
Sample Date/Time: Thursday, August 14, 2014 21:33:59
Autosampler Position: 90
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-18-C.123

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			732185.056	ug/L	787112.810
	233	**U**	**-0.013750**	0.219	10.933	ug/L	520.743
	234	**U**	**0.000283**	16.947	12.533	ug/L	5.000
	235	**U**	**0.040485**	5.562	1097.576	ug/L	43.667
	236	**U**	**-0.000063**	8.618	5.200	ug/L	8.267
	238	**U**	**5.295842**	5.462	125993.628	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.022**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-20-C
Sample Date/Time: Thursday, August 14, 2014 21:38:40
Autosampler Position: 91
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-20-C.124

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			747749.444	ug/L	787112.810
	233	**U**	**-0.013775**	0.195	10.267	ug/L	520.743
	234	**U**	**0.000286**	21.295	12.867	ug/L	5.000
	235	**U**	**0.038175**	4.897	1058.506	ug/L	43.667
	236	**U**	**-0.000063**	12.967	5.333	ug/L	8.267
	238	**U**	**4.737187**	5.572	115018.924	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.999**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-21-C
Sample Date/Time: Thursday, August 14, 2014 21:43:20
Autosampler Position: 92
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-21-C.125

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			813928.987	ug/L	787112.810
	233	**U**	**-0.013771**	0.376	11.333	ug/L	520.743
	234	**U**	**0.000131**	28.675	9.200	ug/L	5.000
	235	**U**	**0.012680**	9.616	412.206	ug/L	43.667
	236	**U**	**-0.000072**	19.355	5.400	ug/L	8.267
	238	**U**	**1.886324**	5.500	49908.972	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**103.407**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-22-C
Sample Date/Time: Thursday, August 14, 2014 21:48:01
Autosampler Position: 93
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-22-C.126

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			730498.920	ug/L	787112.810
	233	**U**	**-0.013742**	0.177	11.200	ug/L	520.743
	234	**U**	**0.000450**	13.929	17.200	ug/L	5.000
	235	**U**	**0.049143**	3.790	1320.261	ug/L	43.667
	236	**U**	**-0.000039**	76.681	6.133	ug/L	8.267
	238	**U**	**5.660014**	4.228	134304.019	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.807**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Thursday, August 14, 2014 21:52:42
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 9.127

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			793363.158	ug/L	787112.810
	233	**U**	**0.040014**	3.803	2015.276	ug/L	520.743
	234	**U**	**0.081714**	2.683	2474.348	ug/L	5.000
	235	**U**	**4.923838**	3.447	139172.093	ug/L	43.667
	236	**U**	**0.088215**	3.695	3765.297	ug/L	8.267
	238	**U**	**5.116208**	3.000	131766.239	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.794**	
	U	233		**77.697**
	U	234		**98.808**
	U	235		**101.575**
	U	236		**99.118**
	U	238		**101.797**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 14, 2014 21:57:22

Autosampler Position: 1

Dataset File: D:\Elandata\Dataset\081414M1\QC Std 10.128

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			778356.861	ug/L	787112.810
	233	**U**	**0.011167**	5.859	922.696	ug/L	520.743
	234	**U**	**0.000088**	84.326	7.467	ug/L	5.000
	235	**U**	**0.001551**	11.645	86.134	ug/L	43.667
	236	**U**	**-0.000001**	2796.915	8.133	ug/L	8.267
	238	**U**	**0.004380**	11.292	236.869	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.888**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-23-C
Sample Date/Time: Thursday, August 14, 2014 22:02:02
Autosampler Position: 94
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-23-C.129

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			755143.150	ug/L	787112.810
	233	**U**	**-0.013694**	0.044	13.267	ug/L	520.743
	234	**U**	**0.000553**	13.873	20.733	ug/L	5.000
	235	**U**	**0.059614**	4.996	1646.228	ug/L	43.667
	236	**U**	**-0.000059**	23.147	5.533	ug/L	8.267
	238	**U**	**7.137109**	3.253	175050.974	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.938**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-24-C
Sample Date/Time: Thursday, August 14, 2014 22:06:43
Autosampler Position: 95
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-24-C.130

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			752669.239	ug/L	787112.810
	233	**U**	**-0.013741**	0.494	11.533	ug/L	520.743
	234	**U**	**0.000827**	9.160	28.533	ug/L	5.000
	235	**U**	**0.084724**	3.122	2315.454	ug/L	43.667
	236	**U**	**0.000024**	129.707	8.867	ug/L	8.267
	238	**U**	**7.915540**	3.168	193511.423	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.624**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: MB

Sample Date/Time: Thursday, August 14, 2014 22:11:23
Autosampler Position: 96
Dataset File: D:\Elandata\Dataset\081414M1\MB .131

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			810182.586	ug/L	787112.810
	233	**U**	**-0.013946**	0.160	4.600	ug/L	520.743
	234	**U**	**-0.000030**	70.212	4.200	ug/L	5.000
	235	**U**	**-0.001276**	1.323	8.067	ug/L	43.667
	236	**U**	**-0.000086**	21.698	4.733	ug/L	8.267
	238	**U**	**0.002618**	12.435	200.268	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**102.931**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: LCS

Sample Date/Time: Thursday, August 14, 2014 22:16:03
Autosampler Position: 97
Dataset File: D:\Elandata\Dataset\081414M1\LCS.132

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			798243.845	ug/L	787112.810
	233	**U**	**-0.010925**	0.586	117.867	ug/L	520.743
	234	**U**	**0.043420**	1.827	1325.995	ug/L	5.000
	235	**U**	**2.624844**	2.748	74695.884	ug/L	43.667
	236	**U**	**0.046882**	2.727	2018.409	ug/L	8.267
	238	**U**	**2.702807**	3.392	70091.839	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.414**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-26-C

Sample Date/Time: Thursday, August 14, 2014 22:20:43

Autosampler Position: 98

Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-26-C.133

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			785255.071	ug/L	787112.810
	233	**U**	**-0.013893**	0.386	6.400	ug/L	520.743
	234	**U**	**0.000058**	83.829	6.667	ug/L	5.000
	235	**U**	**0.002990**	15.999	126.867	ug/L	43.667
	236	**U**	**-0.000055**	56.182	5.933	ug/L	8.267
	238	**U**	**0.595102**	1.420	15295.859	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.764**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-26-C SD

Sample Date/Time: Thursday, August 14, 2014 22:25:23

Autosampler Position: 99

Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-26-C SD.134

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			773600.360	ug/L	787112.810
	233	**U**	**-0.013896**	0.177	6.200	ug/L	520.743
	234	**U**	**0.000046**	121.250	6.267	ug/L	5.000
	235	**U**	**-0.000361**	24.092	33.067	ug/L	43.667
	236	**U**	**-0.000093**	39.802	4.200	ug/L	8.267
	238	**U**	**0.118046**	2.029	3088.868	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.283**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-26-D MS

Sample Date/Time: Thursday, August 14, 2014 22:30:03
Autosampler Position: 100
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-26-D MS.135

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			773219.610	ug/L	787112.810
	233	**U**	**-0.012785**	0.642	46.600	ug/L	520.743
	234	**U**	**0.015974**	1.929	475.741	ug/L	5.000
	235	**U**	**0.967966**	1.444	26728.466	ug/L	43.667
	236	**U**	**0.017230**	1.768	724.685	ug/L	8.267
	238	**U**	**1.655556**	1.726	41674.202	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.235**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-26-E MSD

Sample Date/Time: Thursday, August 14, 2014 22:34:44

Autosampler Position: 101

Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-26-E MSD.136

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			792510.295	ug/L	787112.810
	233	**U**	**-0.012918**	0.363	42.800	ug/L	520.743
	234	**U**	**0.014959**	1.610	456.941	ug/L	5.000
	235	**U**	**0.910093**	1.706	25757.748	ug/L	43.667
	236	**U**	**0.016196**	0.880	698.350	ug/L	8.267
	238	**U**	**1.544072**	2.198	39840.035	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.686**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-27-C
Sample Date/Time: Thursday, August 14, 2014 22:39:24
Autosampler Position: 102
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-27-C.137

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			795484.764	ug/L	787112.810
	233	**U**	**-0.013825**	0.154	9.067	ug/L	520.743
	234	**U**	**0.000102**	29.136	8.133	ug/L	5.000
	235	**U**	**0.009491**	7.376	312.870	ug/L	43.667
	236	**U**	**-0.000073**	22.234	5.267	ug/L	8.267
	238	**U**	**1.419699**	5.506	36746.004	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.064**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-28-C
Sample Date/Time: Thursday, August 14, 2014 22:44:04
Autosampler Position: 103
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-28-C.138

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			836195.170	ug/L	787112.810
	233	**U**	**-0.013852**	0.096	8.467	ug/L	520.743
	234	**U**	**0.000119**	55.720	9.067	ug/L	5.000
	235	**U**	**0.011289**	7.502	382.472	ug/L	43.667
	236	**U**	**-0.000074**	11.692	5.467	ug/L	8.267
	238	**U**	**1.751724**	4.450	47651.224	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**106.236**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9

Sample Date/Time: Thursday, August 14, 2014 22:48:45

Autosampler Position: 10

Dataset File: D:\Elandata\Dataset\081414M1\QC Std 9.139

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			784033.925	ug/L	787112.810
	233	**U**	**0.041081**	1.660	2032.478	ug/L	520.743
	234	**U**	**0.084073**	2.600	2516.222	ug/L	5.000
	235	**U**	**5.036020**	1.892	140784.698	ug/L	43.667
	236	**U**	**0.090685**	2.319	3827.847	ug/L	8.267
	238	**U**	**5.225916**	1.877	133094.345	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.609**	
	U	233		**79.768**
	U	234		**101.660**
	U	235		**103.889**
	U	236		**101.893**
	U	238		**103.980**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 14, 2014 22:53:26
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 10.140

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			777189.379	ug/L	787112.810
	233	**U**	**0.012724**	4.333	978.300	ug/L	520.743
	234	**U**	**0.000078**	44.228	7.200	ug/L	5.000
	235	**U**	**0.001725**	2.389	91.000	ug/L	43.667
	236	**U**	**-0.000046**	82.937	6.267	ug/L	8.267
	238	**U**	**0.004419**	4.861	237.669	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.739**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-29-C
Sample Date/Time: Thursday, August 14, 2014 22:58:06
Autosampler Position: 104
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-29-C.141

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			745971.076	ug/L	787112.810
	233	**U**	**-0.013764**	0.202	10.667	ug/L	520.743
	234	**U**	**0.000610**	17.418	22.133	ug/L	5.000
	235	**U**	**0.071769**	3.102	1950.400	ug/L	43.667
	236	**U**	**0.000011**	193.613	8.267	ug/L	8.267
	238	**U**	**5.885708**	3.103	142648.897	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.773**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-30-C
Sample Date/Time: Thursday, August 14, 2014 23:02:46
Autosampler Position: 105
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-30-C.142

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			764935.220	ug/L	787112.810
	233	**U**	**-0.013706**	0.210	13.000	ug/L	520.743
	234	**U**	**0.000439**	5.433	17.667	ug/L	5.000
	235	**U**	**0.050109**	2.069	1409.403	ug/L	43.667
	236	**U**	**-0.000045**	65.660	6.200	ug/L	8.267
	238	**U**	**6.242418**	2.490	155135.648	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.182**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-31-C

Sample Date/Time: Thursday, August 14, 2014 23:07:27

Autosampler Position: 106

Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-31-C.143

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			752811.908	ug/L	787112.810
	233	**U**	**-0.013681**	0.591	13.667	ug/L	520.743
	234	**U**	**0.001233**	9.966	40.133	ug/L	5.000
	235	**U**	**0.126164**	4.472	3428.145	ug/L	43.667
	236	**U**	**0.000086**	39.607	11.400	ug/L	8.267
	238	**U**	**8.481258**	3.091	207384.956	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.642**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-33-C
Sample Date/Time: Thursday, August 14, 2014 23:12:08
Autosampler Position: 107
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-33-C.144

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			739595.215	ug/L	787112.810
	233	**U**	**-0.013729**	0.303	11.800	ug/L	520.743
	234	**U**	**0.000810**	6.157	27.533	ug/L	5.000
	235	**U**	**0.091463**	3.784	2453.077	ug/L	43.667
	236	**U**	**-0.000003**	826.022	7.667	ug/L	8.267
	238	**U**	**8.419317**	3.577	202248.334	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.963**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-34-C
Sample Date/Time: Thursday, August 14, 2014 23:16:48
Autosampler Position: 108
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-34-C.145

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			738691.086	ug/L	787112.810
	233	**U**	**-0.013740**	0.278	11.400	ug/L	520.743
	234	**U**	**0.000515**	33.782	19.133	ug/L	5.000
	235	**U**	**0.061936**	4.744	1671.965	ug/L	43.667
	236	**U**	**-0.000061**	43.376	5.333	ug/L	8.267
	238	**U**	**8.435712**	4.851	202347.479	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.848**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-35-C
Sample Date/Time: Thursday, August 14, 2014 23:21:28
Autosampler Position: 109
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-35-C.146

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			757820.432	ug/L	787112.810
	233	**U**	**-0.013728**	0.319	12.133	ug/L	520.743
	234	**U**	**0.000450**	12.000	17.800	ug/L	5.000
	235	**U**	**0.056948**	1.745	1581.021	ug/L	43.667
	236	**U**	**-0.000076**	44.265	4.867	ug/L	8.267
	238	**U**	**7.630253**	2.548	187813.814	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.279**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-36-C
Sample Date/Time: Thursday, August 14, 2014 23:26:07
Autosampler Position: 110
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-36-C.147

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			773377.424	ug/L	787112.810
	233	**U**	**-0.013766**	0.318	11.000	ug/L	520.743
	234	**U**	**0.000485**	19.920	19.267	ug/L	5.000
	235	**U**	**0.057218**	5.455	1619.425	ug/L	43.667
	236	**U**	**-0.000083**	29.693	4.667	ug/L	8.267
	238	**U**	**7.753679**	4.976	194646.195	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.255**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: MB

Sample Date/Time: Thursday, August 14, 2014 23:30:48
Autosampler Position: 111
Dataset File: D:\Elandata\Dataset\081414M1\MB.148

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			781560.499	ug/L	787112.810
	233	**U**	**-0.013932**	0.293	4.933	ug/L	520.743
	234	**U**	**-0.000018**	214.444	4.400	ug/L	5.000
	235	**U**	**-0.001298**	4.151	7.133	ug/L	43.667
	236	**U**	**-0.000100**	20.842	4.000	ug/L	8.267
	238	**U**	**0.001389**	7.408	162.401	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.295**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: LCS

Sample Date/Time: Thursday, August 14, 2014 23:35:28
Autosampler Position: 112
Dataset File: D:\Elandata\Dataset\081414M1\LCS.149

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			787550.857	ug/L	787112.810
	233	**U**	**-0.011041**	1.465	112.200	ug/L	520.743
	234	**U**	**0.043859**	1.972	1321.595	ug/L	5.000
	235	**U**	**2.622057**	2.480	73639.008	ug/L	43.667
	236	**U**	**0.047197**	1.603	2005.874	ug/L	8.267
	238	**U**	**2.734739**	1.975	70020.709	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.056**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7752-A-1-D

Sample Date/Time: Thursday, August 14, 2014 23:40:08
Autosampler Position: 113
Dataset File: D:\Elandata\Dataset\081414M1\160-7752-A-1-D.150

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			774128.652	ug/L	787112.810
	233	**U**	**-0.013918**	0.132	5.467	ug/L	520.743
	234	**U**	**0.009920**	1.896	297.670	ug/L	5.000
	235	**U**	**1.187186**	1.777	32799.936	ug/L	43.667
	236	**U**	**-0.000037**	68.949	6.533	ug/L	8.267
	238	**U**	**158.317757**	1.693	3977280.956	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.350**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	238	

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Thursday, August 14, 2014 23:44:49
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 9.151

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			778435.804	ug/L	787112.810
	233	**U**	**0.041059**	3.122	2016.076	ug/L	520.743
	234	**U**	**0.084015**	1.732	2497.152	ug/L	5.000
	235	**U**	**5.046614**	2.473	140023.730	ug/L	43.667
	236	**U**	**0.091214**	1.586	3823.446	ug/L	8.267
	238	**U**	**5.268596**	1.734	133212.242	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.898**	
	U	233		**79.726**
	U	234		**101.590**
	U	235		**104.108**
	U	236		**102.488**
	U	238		**104.829**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 14, 2014 23:49:29

Autosampler Position: 1

Dataset File: D:\Elandata\Dataset\081414M1\QC Std 10.152

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			870709.895	ug/L	787112.810
	233	**U**	**-0.013845**	0.197	9.133	ug/L	520.743
	234	**U**	**0.000055**	31.171	7.333	ug/L	5.000
	235	**U**	**-0.001165**	5.601	12.067	ug/L	43.667
	236	**U**	**-0.000008**	320.728	8.733	ug/L	8.267
	238	**U**	**-0.003129**	11.795	52.267	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**110.621**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7752-A-1-D SD

Sample Date/Time: Thursday, August 14, 2014 23:54:09
Autosampler Position: 114
Dataset File: D:\Elandata\Dataset\081414M1\160-7752-A-1-D SD.153

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			751447.484	ug/L	787112.810
	233	**U**	**-0.013941**	0.084	4.467	ug/L	520.743
	234	**U**	**0.002058**	11.724	63.733	ug/L	5.000
	235	**U**	**0.232128**	2.488	6257.105	ug/L	43.667
	236	**U**	**-0.000039**	71.074	6.267	ug/L	8.267
	238	**U**	**30.743932**	2.725	749477.655	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.469**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7752-A-1-E MS

Sample Date/Time: Thursday, August 14, 2014 23:58:50
Autosampler Position: 115
Dataset File: D:\Elandata\Dataset\081414M1\160-7752-A-1-E MS.154

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			766590.999	ug/L	787112.810
	233	**U**	**-0.013881**	0.342	6.667	ug/L	520.743
	234	**U**	**0.011103**	3.175	329.270	ug/L	5.000
	235	**U**	**1.288058**	2.249	35233.042	ug/L	43.667
	236	**U**	**0.000820**	6.086	41.800	ug/L	8.267
	238	**U**	**166.190657**	2.150	4133728.976	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.393**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	238	

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7752-A-1-F MSD

Sample Date/Time: Friday, August 15, 2014 00:03:30
Autosampler Position: 116
Dataset File: D:\Elandata\Dataset\081414M1\160-7752-A-1-F MSD.155

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			762074.598	ug/L	787112.810
	233	**U**	**-0.013876**	0.144	6.867	ug/L	520.743
	234	**U**	**0.011910**	1.134	350.938	ug/L	5.000
	235	**U**	**1.374804**	2.138	37382.297	ug/L	43.667
	236	**U**	**0.000890**	13.831	44.267	ug/L	8.267
	238	**U**	**176.104024**	1.587	4355764.724	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.819**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	238	

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Friday, August 15, 2014 00:08:11
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 9.156

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			774727.465	ug/L	787112.810
	233	**U**	**0.042078**	5.496	2042.146	ug/L	520.743
	234	**U**	**0.084978**	4.128	2511.087	ug/L	5.000
	235	**U**	**5.069396**	3.080	139950.220	ug/L	43.667
	236	**U**	**0.091481**	2.882	3814.243	ug/L	8.267
	238	**U**	**5.298056**	3.074	133240.382	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.426**	
	U	233		**81.705**
	U	234		**102.755**
	U	235		**104.578**
	U	236		**102.787**
	U	238		**105.415**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Friday, August 15, 2014 00:12:52
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 10.157

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			911307.265	ug/L	787112.810
	233	**U**	**-0.013864**	0.053	8.733	ug/L	520.743
	234	**U**	**0.000082**	32.904	8.600	ug/L	5.000
	235	**U**	**-0.001133**	7.913	13.867	ug/L	43.667
	236	**U**	**-0.000012**	115.291	9.000	ug/L	8.267
	238	**U**	**-0.002178**	14.387	83.334	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**115.778**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

KC 8/19/14
File: 081814M3

A Batch 137778
137779

Sample/Batch Report

TA ST. LOUIS - PERKIN ELMER ELAN 6100 - METHOD 6020 / 200.8 QUANTITATIVE ANALYSIS REPORT

User Name: stlmetals
Computer Name: SLICP03
Sample File: D:\Elandata\Sample\SW846 TEMP1.sam
Report Date/Time: Tuesday, August 19, 2014 10:32:45
Method File: d:\Elandata\Method\2014 isou.mth
Tuning File: d:\Elandata\Tuning\epa tuning.tun
Optimization File: d:\Elandata\Optimize\epa2008.dac
Calibration File: D:\Elandata\System\081814M3.cal
Calibration Type: External Calibration
Number of Replicates: 3
Number of Readings: 1
Number of Sweeps: 100
Dual Detector Mode: Dual

A/S Loc.	Batch ID	Sample ID	Description	Aliquot Vol.	Diluted Vol.
11	137385	680-102199-A-26-G	5x		
12		680-102199-A-27-F	5x		
13		680-102199-A-28-E	5x		
14	137772	425520	2x		
15		425521	2x		
16		680-102327-A-1-E	5x		
17		680-102327-A-1-E SD	25x		
18		680-102327-A-1-F MS	5x		
19		680-102327-A-1-G MS	5x		
20		680-102327-A-2-D	5x		
21		680-102327-A-3-D	5x		
22		680-102327-A-5-C	5x		
23		680-102327-A-6-C	5x		
24		680-102327-A-7-C	5x		
25		680-102327-A-9-C	5x		
26		680-102327-A-10-C	5x		
27		680-102327-A-11-C	5x		
28		680-102327-A-13-C	5x		
29		680-102327-A-14-C	5x		
30		680-102327-A-15-E	5x		
31		680-102327-A-16-C	5x		
32		680-102327-A-17-C	5x		
33		680-102327-A-18-C	5x		
34		680-102327-A-19-C	5x		
35		680-102327-A-21-C	5x		
36		680-102327-A-22-C	5x		
37		680-102327-A-23-C	5x		
38	137774	425544	2x		
39		425545	2x		
40		680-102327-A-25-D	5x		
41		680-102327-A-25-D SD	25x		
42		680-102327-A-25-E MS	5x		
43		680-102327-A-25-F MS	5x		
44		680-102327-A-26-C	5x		
45		680-102327-A-27-C	5x		
46		680-102327-A-28-C	5x		
47		680-102327-A-29-C	5x		
48		680-102327-A-30-C	5x		
49		680-102327-A-31-C	5x		
50		680-102327-A-32-C	5x		
51		680-102327-A-34-C	5x		

- All

- All

52		680-102327-A-35-C	5x
53		680-102327-A-36-C	5x
54	137068	MB	2
55		LCS	2
56		680-102380-A-1-C	5
57		680-102380-A-1-C SD	25
58		680-102380-A-1-D MS	5
59		680-102380-A-1-E MSD	5
60		680-102380-A-2-C	5
61		680-102380-A-3-C	5
62		680-102380-A-5-C	5
63		680-102380-A-6-C	5
64		680-102380-A-7-C	5
65		680-102380-A-8-C	5
66		680-102380-A-9-C	5
67		680-102380-A-10-D	5
68		680-102380-A-12-C	5
69		680-102380-A-13-C	5
70		680-102380-A-14-C	5
71		680-102380-A-16-C	5
72		680-102380-A-17-C	5
73		680-102380-A-18-C	5
74		680-102380-A-20-C	5
75		680-102380-A-21-C	5
76		680-102380-A-22-C	5
77		680-102380-A-23-C	5
78		680-102380-A-24-C	5
79	137069	MB	2
80		LCS	2
81		680-102380-A-26-C	5
82		680-102380-A-26-C SD	25
83		680-102380-A-26-D MS	5
84		680-102380-A-26-E MS	5
85		680-102380-A-27-C	5
86		680-102380-A-28-C	5
87		680-102380-A-29-C	5
88		680-102380-A-30-C	5
89		680-102380-A-31-C	5
90		680-102380-A-33-C	5
91		680-102380-A-34-C	5
92		680-102380-A-35-C	5
93		680-102380-A-36-C	5



Quantitative Analysis Calibration Report

File Name: 081814M3.cal
File Path: D:\Elandata\System
Calibration Type: External Calibration

Analyte	Mass	Curve Type	Slope	Intercept	Corr. Coeff.
Ho (IS)	164.930	Linear Thru Zero	0.000000	0.00	0.000000
U	233.000	Linear Thru Zero	0.046320	0.00	0.999997
U	234.041	Linear Thru Zero	0.035173	0.00	1.000000
U	235.044	Linear Thru Zero	0.032972	0.00	0.999992
U	236.000	Linear Thru Zero	0.050402	0.00	0.999999
U	238.050	Linear Thru Zero	0.029513	0.00	0.999995

Instrument Tuning Report

File Name: EPA TUNING.tun
File Path: d:\Elandata\Tuning
Sample ID: Sample
Sample Date/Time: Monday, August 18, 2014 08:27:15

Analyte	Exact Mass	Meas. Mass	Mass DAC	Res. DAC	Meas. Pk. Width	Custom Res.
Li	7.016	7.025	1570	2065	0.658	
Mg	23.985	23.979	5688	2080	0.686	
Rh	102.905	102.879	24919	2080	0.696	
Ce	139.905	139.929	33931	2120	0.672	
Pb	207.977	207.977	50415	2310	0.656	

Replicates: 6

Daily Performance Report

Sample ID: Sample
Sample Date/Time: Monday, August 18, 2014 09:05:14
Sample Description:
Method File: d:\Elandata\Method\DAILY EPA.mth
Dataset File: d:\Elandata\Dataset\daily3\Sample.135
Tuning File: d:\Elandata\Tuning\EPA TUNING.tun
Optimization File: d:\Elandata\Optimize\EPA2008.dac
Dual Detector Mode: Pulse

Acq. Dead Time(ns): 35
Current Dead Time (ns): 35

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Net Intens. SD	Net Intens. RSD
	Li	7.0	2197.2	2197.169	111.010	5.1
	Mg	24.0	13213.6	13213.556	351.050	2.7
	Rh	102.9	210971.1	210971.109	4399.659	2.1
	Pb	208.0	200853.6	200853.594	3286.709	1.6
⌈>	Ba	137.9	262035.7	262035.741	4133.500	1.6
⌊	Ba++	69.0	1892.2	0.007	0.000	1.6
⌈>	Ce	139.9	319642.0	319641.984	5458.595	1.7
⌊	CeO	155.9	7347.1	0.023	0.000	1.0
	Bkgd	220.0	5.4	5.444	1.377	25.3

Current Optimization File Data

Current Value	Description
0.97	Nebulizer Gas Flow
5.75	Lens Voltage
1400.00	ICP RF Power
-2156.25	Analog Stage Voltage
1200.00	Pulse Stage Voltage
70.00	Discriminator Threshold
-6.00	AC Rod Offset
60.00	Service DAC 1
0.00	Quadrupole Rod Offset

Current Autolens Data

Analyte	Mass	Num of Pts	DAC Value	Maximum Intensity
Be	9	33	6.8	2196.8
Mg	24	33	4.8	22637.3
Co	59	33	5.8	76899.1
Rh	103	33	6.0	281253.3
In	115	33	6.0	393649.6
Ba	138	33	6.3	380041.4
Ce	140	33	6.5	471954.9
Pb	208	33	8.0	315860.7

QUANTITATIVE ANALYSIS REPORT

Sample ID: Blank

Sample Date/Time: Monday, August 18, 2014 14:28:51
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081814M3\Blank.001

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			823597.028	ug/L	
	233	**U**			17.600	ug/L	
	234	**U**			8.400	ug/L	
	235	**U**			11.000	ug/L	
	236	**U**			13.400	ug/L	
	238	**U**			59.467	ug/L	

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 1
Sample Date/Time: Monday, August 18, 2014 14:35:31
Autosampler Position: 191
Dataset File: D:\Elandata\Dataset\081814M3\Standard 1.002

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			844212.763	ug/L	823597.028
	233	**U**	**0.000342**	16.215	31.333	ug/L	17.600
	234	**U**	**0.000717**	10.010	29.800	ug/L	8.400
	235	**U**	**0.049242**	1.937	1380.800	ug/L	11.000
	236	**U**	**0.000845**	3.810	49.667	ug/L	13.400
	238	**U**	**0.049263**	3.174	1287.058	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 2
Sample Date/Time: Monday, August 18, 2014 14:40:11
Autosampler Position: 192
Dataset File: D:\Elandata\Dataset\081814M3\Standard 2.003

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			830524.267	ug/L	823597.028
	233	**U**	**0.030847**	1.198	1204.718	ug/L	17.600
	234	**U**	**0.049696**	3.072	1458.474	ug/L	8.400
	235	**U**	**2.973367**	1.851	81378.101	ug/L	11.000
	236	**U**	**0.053636**	1.248	2257.645	ug/L	13.400
	238	**U**	**3.072357**	1.393	75328.407	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 3
Sample Date/Time: Monday, August 18, 2014 14:44:52
Autosampler Position: 193
Dataset File: D:\Elandata\Dataset\081814M3\Standard 3.004

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			825681.886	ug/L	823597.028
	233	**U**	**0.051693**	3.491	1991.606	ug/L	17.600
	234	**U**	**0.082728**	4.207	2406.603	ug/L	8.400
	235	**U**	**4.920751**	3.402	133773.833	ug/L	11.000
	236	**U**	**0.087763**	2.924	3661.203	ug/L	13.400
	238	**U**	**5.078466**	2.908	123652.166	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 4
Sample Date/Time: Monday, August 18, 2014 14:49:32
Autosampler Position: 194
Dataset File: D:\Elandata\Dataset\081814M3\Standard 4.005

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			821822.408	ug/L	823597.028
	233	**U**	**0.102294**	3.450	3905.601	ug/L	17.600
	234	**U**	**0.165252**	2.568	4779.534	ug/L	8.400
	235	**U**	**9.807923**	3.019	265414.925	ug/L	11.000
	236	**U**	**0.177483**	4.275	7350.959	ug/L	13.400
	238	**U**	**10.146151**	3.138	245795.262	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 5
Sample Date/Time: Monday, August 18, 2014 14:54:13
Autosampler Position: 195
Dataset File: D:\Elandata\Dataset\081814M3\Standard 5.006

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			821935.331	ug/L	823597.028
	233	**U**	**0.309303**	1.660	11785.333	ug/L	17.600
	234	**U**	**0.496006**	1.712	14338.136	ug/L	8.400
	235	**U**	**29.047125**	2.099	786522.759	ug/L	11.000
	236	**U**	**0.534049**	2.300	22116.191	ug/L	13.400
	238	**U**	**30.123951**	1.903	730243.435	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 1

Sample Date/Time: Monday, August 18, 2014 14:58:54
Autosampler Position: 196
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 1.007

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			823343.436	ug/L	823597.028
	233	**U**	**0.230920**	2.145	8816.123	ug/L	17.600
	234	**U**	**0.000453**	9.106	21.533	ug/L	8.400
	235	**U**	**0.010041**	20.744	284.603	ug/L	11.000
	236	**U**	**0.000120**	16.820	18.400	ug/L	13.400
	238	**U**	**0.058780**	3.934	1487.678	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.969**	
	U	233		**103.320**
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 2
Sample Date/Time: Monday, August 18, 2014 15:03:34
Autosampler Position: 197
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 2.008

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			821102.659	ug/L	823597.028
	233	**U**	**43.424094**	2.070	1650209.146	ug/L	17.600
	234	**U**	**0.088004**	1.654	2548.294	ug/L	8.400
	235	**U**	**0.113878**	2.630	3091.135	ug/L	11.000
	236	**U**	**0.006802**	3.311	294.603	ug/L	13.400
	238	**U**	**9.955167**	2.734	241033.021	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.697**	
	U	233		
	U	234		**105.394**
	U	235		
	U	236		
	U	238		**101.810**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 3

Sample Date/Time: Monday, August 18, 2014 15:08:15
Autosampler Position: 198
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 3.009

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			820309.044	ug/L	823597.028
	233	**U**	**443.303875**	1.411	16835023.106	ug/L	17.600
	234	**U**	**0.871858**	1.557	25149.078	ug/L	8.400
	235	**U**	**1.107327**	1.210	29948.473	ug/L	11.000
	236	**U**	**0.067141**	1.473	2787.739	ug/L	13.400
	238	**U**	**97.328072**	1.731	2354748.413	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.601**	
	U	233		
	U	234		
	U	235		**104.781**
	U	236		**90.002**
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 4

Sample Date/Time: Monday, August 18, 2014 15:12:55
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 4.010

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			817603.402	ug/L	823597.028
	233	**U**	**0.097251**	10.501	3695.481	ug/L	17.600
	234	**U**	**0.000133**	21.401	12.133	ug/L	8.400
	235	**U**	**0.000323**	26.157	19.533	ug/L	11.000
	236	**U**	**-0.000104**	14.316	9.000	ug/L	13.400
	238	**U**	**0.021112**	12.282	567.145	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.272**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 5

Sample Date/Time: Monday, August 18, 2014 15:17:35
Autosampler Position: 191
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 5.011

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			825677.739	ug/L	823597.028
	233	**U**	**0.022394**	22.330	867.027	ug/L	17.600
	234	**U**	**0.000714**	7.842	29.200	ug/L	8.400
	235	**U**	**0.049620**	2.126	1361.265	ug/L	11.000
	236	**U**	**0.000789**	22.127	46.000	ug/L	13.400
	238	**U**	**0.054072**	3.556	1375.400	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.253**	
	U	233		
	U	234		
	U	235		**102.309**
	U	236		
	U	238		**107.500**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6
Sample Date/Time: Monday, August 18, 2014 15:22:15
Autosampler Position: 192
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 6.012

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			817466.065	ug/L	823597.028
	233	**U**	**0.035265**	5.512	1349.797	ug/L	17.600
	234	**U**	**0.049614**	2.339	1433.672	ug/L	8.400
	235	**U**	**2.998098**	3.470	80703.405	ug/L	11.000
	236	**U**	**0.053708**	2.320	2223.973	ug/L	13.400
	238	**U**	**3.108687**	2.432	74984.451	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.256**	
	U	233		**114.126**
	U	234		**100.029**
	U	235		
	U	236		**100.577**
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Monday, August 18, 2014 15:26:56
Autosampler Position: 199
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 7.013

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			784443.597	ug/L	823597.028
	233	**U**	**0.002176**	10.741	95.534	ug/L	17.600
	234	**U**	**-0.000046**	145.453	6.667	ug/L	8.400
	235	**U**	**0.000394**	34.785	20.533	ug/L	11.000
	236	**U**	**0.000025**	348.361	13.600	ug/L	13.400
	238	**U**	**0.000286**	113.091	63.067	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.246**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 8

Sample Date/Time: Monday, August 18, 2014 15:31:37
Autosampler Position: 200
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 8.014

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			776476.782	ug/L	823597.028
	233	**U**	**0.054286**	1.414	1968.002	ug/L	17.600
	234	**U**	**0.084444**	2.077	2312.454	ug/L	8.400
	235	**U**	**5.057302**	1.914	129388.853	ug/L	11.000
	236	**U**	**0.090061**	1.861	3534.571	ug/L	13.400
	238	**U**	**5.267588**	1.875	120674.368	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.279**	
	U	233		**105.410**
	U	234		**102.109**
	U	235		**104.328**
	U	236		**101.192**
	U	238		**104.809**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Monday, August 18, 2014 15:36:17
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 9.015

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			826480.641	ug/L	823597.028
	233	**U**	**0.053572**	1.602	2067.416	ug/L	17.600
	234	**U**	**0.084136**	1.319	2453.144	ug/L	8.400
	235	**U**	**5.022172**	1.998	136761.908	ug/L	11.000
	236	**U**	**0.090446**	3.918	3775.299	ug/L	13.400
	238	**U**	**5.215171**	2.102	127161.520	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.350**	
	U	233		**104.024**
	U	234		**101.736**
	U	235		**103.603**
	U	236		**101.624**
	U	238		**103.766**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Monday, August 18, 2014 15:40:57

Autosampler Position: 1

Dataset File: D:\Elandata\Dataset\081814M3\QC Std 10.016

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			820030.226	ug/L	823597.028
	233	**U**	**0.011264**	4.757	444.540	ug/L	17.600
	234	**U**	**0.000014**	273.133	8.733	ug/L	8.400
	235	**U**	**0.001674**	12.862	56.200	ug/L	11.000
	236	**U**	**-0.000069**	19.545	10.467	ug/L	13.400
	238	**U**	**0.004196**	11.309	160.268	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.567**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-26-G

Sample Date/Time: Monday, August 18, 2014 15:56:37

Autosampler Position: 11

Dataset File: D:\Elandata\Dataset\081814M3\680-102199-A-26-G.017

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			788190.967	ug/L	823597.028
	233	**U**	**0.000229**	44.362	25.133	ug/L	17.600
	234	**U**	**0.000175**	21.533	12.867	ug/L	8.400
	235	**U**	**0.037124**	1.356	975.567	ug/L	11.000
	236	**U**	**-0.000132**	26.451	7.533	ug/L	13.400
	238	**U**	**5.003578**	0.676	116433.998	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.701**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-27-F
Sample Date/Time: Monday, August 18, 2014 16:01:16
Autosampler Position: 12
Dataset File: D:\Elandata\Dataset\081814M3\680-102199-A-27-F.018

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			802986.173	ug/L	823597.028
	233	**U**	**0.000099**	58.950	20.867	ug/L	17.600
	234	**U**	**0.000287**	24.158	16.267	ug/L	8.400
	235	**U**	**0.039339**	1.933	1051.972	ug/L	11.000
	236	**U**	**-0.000164**	32.296	6.467	ug/L	13.400
	238	**U**	**5.186952**	0.865	122976.773	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.497**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-28-E

Sample Date/Time: Monday, August 18, 2014 16:05:56

Autosampler Position: 13

Dataset File: D:\Elandata\Dataset\081814M3\680-102199-A-28-E.019

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			795434.196	ug/L	823597.028
	233	**U**	**0.000028**	108.911	18.067	ug/L	17.600
	234	**U**	**0.000163**	18.400	12.667	ug/L	8.400
	235	**U**	**0.026975**	1.391	718.018	ug/L	11.000
	236	**U**	**-0.000144**	21.694	7.200	ug/L	13.400
	238	**U**	**3.616532**	2.123	84924.288	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.581**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 425520
Sample Date/Time: Monday, August 18, 2014 16:10:36
Autosampler Position: 14
Dataset File: D:\Elandata\Dataset\081814M3\425520.020

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			839199.971	ug/L	823597.028
	233	**U**	**-0.000176**	12.762	11.133	ug/L	17.600
	234	**U**	**-0.000091**	7.473	5.867	ug/L	8.400
	235	**U**	**-0.000108**	60.189	8.200	ug/L	11.000
	236	**U**	**-0.000130**	34.502	8.200	ug/L	13.400
	238	**U**	**0.000968**	25.018	84.334	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.894**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 425521

Sample Date/Time: Monday, August 18, 2014 16:15:16
Autosampler Position: 15
Dataset File: D:\Elandata\Dataset\081814M3\425521.021

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			830123.222	ug/L	823597.028
	233	**U**	**0.002572**	7.533	116.534	ug/L	17.600
	234	**U**	**0.042506**	1.250	1249.121	ug/L	8.400
	235	**U**	**2.565980**	2.300	70187.572	ug/L	11.000
	236	**U**	**0.046131**	1.711	1942.466	ug/L	13.400
	238	**U**	**2.649758**	1.940	64932.480	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.792**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-1-E

Sample Date/Time: Monday, August 18, 2014 16:19:56
Autosampler Position: 16
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-1-E.022

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			788738.336	ug/L	823597.028
	233	**U**	**0.000048**	33.494	18.600	ug/L	17.600
	234	**U**	**0.000218**	20.156	14.067	ug/L	8.400
	235	**U**	**0.038310**	1.217	1006.569	ug/L	11.000
	236	**U**	**-0.000176**	17.271	5.800	ug/L	13.400
	238	**U**	**5.121751**	1.139	119258.492	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.768**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-1-E SD

Sample Date/Time: Monday, August 18, 2014 16:24:37

Autosampler Position: 17

Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-1-E SD.023

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			804500.850	ug/L	823597.028
	233	**U**	**-0.000133**	23.600	12.200	ug/L	17.600
	234	**U**	**-0.000012**	131.122	7.867	ug/L	8.400
	235	**U**	**0.007978**	0.446	222.402	ug/L	11.000
	236	**U**	**-0.000163**	10.264	6.467	ug/L	13.400
	238	**U**	**1.051275**	0.458	25017.578	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.681**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-1-F MS

Sample Date/Time: Monday, August 18, 2014 16:29:17

Autosampler Position: 18

Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-1-F MS.024

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			774268.998	ug/L	823597.028
	233	**U**	**0.000942**	15.756	50.200	ug/L	17.600
	234	**U**	**0.017437**	0.498	482.741	ug/L	8.400
	235	**U**	**1.056448**	1.525	26970.976	ug/L	11.000
	236	**U**	**0.017886**	2.734	710.151	ug/L	13.400
	238	**U**	**7.348992**	1.287	167939.680	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.011**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-1-G MSD

Sample Date/Time: Monday, August 18, 2014 16:33:58

Autosampler Position: 19

Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-1-G MSD.025

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			775548.376	ug/L	823597.028
	233	**U**	**0.000907**	16.514	49.133	ug/L	17.600
	234	**U**	**0.014758**	4.173	410.206	ug/L	8.400
	235	**U**	**0.932995**	1.349	23862.583	ug/L	11.000
	236	**U**	**0.015937**	1.511	635.481	ug/L	13.400
	238	**U**	**7.063324**	1.200	161689.663	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.166**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-2-D

Sample Date/Time: Monday, August 18, 2014 16:38:37

Autosampler Position: 20

Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-2-D.026

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			768809.792	ug/L	823597.028
	233	**U**	**-0.000051**	78.973	14.600	ug/L	17.600
	234	**U**	**0.000327**	34.746	16.667	ug/L	8.400
	235	**U**	**0.045737**	2.017	1169.915	ug/L	11.000
	236	**U**	**-0.000143**	26.216	6.933	ug/L	13.400
	238	**U**	**5.262074**	0.423	119451.441	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.348**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Monday, August 18, 2014 16:43:19
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 9.027

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			793278.428	ug/L	823597.028
	233	**U**	**0.054031**	3.662	1999.473	ug/L	17.600
	234	**U**	**0.087797**	2.754	2455.144	ug/L	8.400
	235	**U**	**5.263724**	2.426	137558.048	ug/L	11.000
	236	**U**	**0.093626**	2.109	3753.227	ug/L	13.400
	238	**U**	**5.453345**	2.088	127627.621	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.319**	
	U	233		**104.915**
	U	234		**106.163**
	U	235		**108.586**
	U	236		**105.198**
	U	238		**108.505**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Monday, August 18, 2014 16:47:59
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 10.028

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			808048.561	ug/L	823597.028
	233	**U**	**0.010928**	5.710	425.273	ug/L	17.600
	234	**U**	**-0.000015**	239.448	7.800	ug/L	8.400
	235	**U**	**0.001531**	15.402	51.667	ug/L	11.000
	236	**U**	**-0.000158**	14.334	6.667	ug/L	13.400
	238	**U**	**0.004764**	7.930	171.601	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.112**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-3-D

Sample Date/Time: Monday, August 18, 2014 16:52:39

Autosampler Position: 21

Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-3-D.029

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			800560.717	ug/L	823597.028
	233	**U**	**-0.000096**	47.426	13.533	ug/L	17.600
	234	**U**	**0.000141**	9.732	12.133	ug/L	8.400
	235	**U**	**0.033381**	0.300	891.828	ug/L	11.000
	236	**U**	**-0.000144**	20.328	7.200	ug/L	13.400
	238	**U**	**4.534452**	0.610	107185.437	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.203**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-5-C
Sample Date/Time: Monday, August 18, 2014 16:57:20
Autosampler Position: 22
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-5-C.030

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			768033.349	ug/L	823597.028
	233	**U**	**-0.000033**	206.541	15.200	ug/L	17.600
	234	**U**	**0.000338**	20.816	16.933	ug/L	8.400
	235	**U**	**0.046519**	2.882	1187.583	ug/L	11.000
	236	**U**	**-0.000174**	10.632	5.733	ug/L	13.400
	238	**U**	**6.270487**	2.192	142117.205	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.254**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-6-C
Sample Date/Time: Monday, August 18, 2014 17:02:00
Autosampler Position: 23
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-6-C.031

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			789619.755	ug/L	823597.028
	233	**U**	**-0.000115**	18.618	12.667	ug/L	17.600
	234	**U**	**0.000364**	18.844	18.200	ug/L	8.400
	235	**U**	**0.045054**	0.590	1183.516	ug/L	11.000
	236	**U**	**-0.000165**	5.643	6.267	ug/L	13.400
	238	**U**	**6.146745**	1.146	143309.852	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.875**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-7-C
Sample Date/Time: Monday, August 18, 2014 17:06:40
Autosampler Position: 24
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-7-C.032

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			823264.537	ug/L	823597.028
	233	**U**	**-0.000104**	41.042	13.600	ug/L	17.600
	234	**U**	**0.000135**	37.575	12.333	ug/L	8.400
	235	**U**	**0.022730**	1.716	627.947	ug/L	11.000
	236	**U**	**-0.000162**	13.861	6.667	ug/L	13.400
	238	**U**	**3.143174**	1.069	76414.835	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.960**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-9-C

Sample Date/Time: Monday, August 18, 2014 17:11:20
Autosampler Position: 25
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-9-C.033

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			749321.234	ug/L	823597.028
	233	**U**	**-0.000102**	109.594	12.400	ug/L	17.600
	234	**U**	**0.000266**	37.657	14.600	ug/L	8.400
	235	**U**	**0.044387**	2.465	1106.243	ug/L	11.000
	236	**U**	**-0.000167**	17.106	5.867	ug/L	13.400
	238	**U**	**5.958640**	0.581	131827.709	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.982**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-10-C
Sample Date/Time: Monday, August 18, 2014 17:15:59
Autosampler Position: 26
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-10-C.034

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			788759.263	ug/L	823597.028
	233	**U**	**-0.000130**	38.862	12.067	ug/L	17.600
	234	**U**	**0.000375**	18.926	18.400	ug/L	8.400
	235	**U**	**0.049575**	1.853	1299.259	ug/L	11.000
	236	**U**	**-0.000139**	31.438	7.267	ug/L	13.400
	238	**U**	**5.740528**	1.461	133641.197	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.770**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-11-C
Sample Date/Time: Monday, August 18, 2014 17:20:39
Autosampler Position: 27
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-11-C.035

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			768840.857	ug/L	823597.028
	233	**U**	**-0.000100**	20.305	12.867	ug/L	17.600
	234	**U**	**0.000280**	24.982	15.467	ug/L	8.400
	235	**U**	**0.044568**	1.392	1139.645	ug/L	11.000
	236	**U**	**-0.000135**	20.593	7.267	ug/L	13.400
	238	**U**	**6.068490**	1.269	137715.107	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.352**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-13-C
Sample Date/Time: Monday, August 18, 2014 17:25:19
Autosampler Position: 28
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-13-C.036

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			757932.442	ug/L	823597.028
	233	**U**	**-0.000109**	15.827	12.400	ug/L	17.600
	234	**U**	**0.000189**	32.090	12.733	ug/L	8.400
	235	**U**	**0.035980**	3.755	908.829	ug/L	11.000
	236	**U**	**-0.000130**	27.202	7.333	ug/L	13.400
	238	**U**	**4.852335**	1.048	108588.257	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.027**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-14-C
Sample Date/Time: Monday, August 18, 2014 17:29:59
Autosampler Position: 29
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-14-C.037

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			790335.449	ug/L	823597.028
	233	**U**	**-0.000046**	135.144	15.200	ug/L	17.600
	234	**U**	**0.000222**	18.584	14.200	ug/L	8.400
	235	**U**	**0.038462**	1.208	1012.769	ug/L	11.000
	236	**U**	**-0.000145**	13.631	7.067	ug/L	13.400
	238	**U**	**5.139324**	1.571	119901.101	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.961**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-15-E

Sample Date/Time: Monday, August 18, 2014 17:34:40

Autosampler Position: 30

Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-15-E.038

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			728582.697	ug/L	823597.028
	233	**U**	**-0.000002**	3651.887	15.533	ug/L	17.600
	234	**U**	**0.000153**	33.662	11.333	ug/L	8.400
	235	**U**	**0.020090**	0.870	492.275	ug/L	11.000
	236	**U**	**-0.000006**	501.985	11.667	ug/L	13.400
	238	**U**	**2.544898**	0.771	54765.950	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.463**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Monday, August 18, 2014 17:39:20
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 9.039

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			805236.626	ug/L	823597.028
	233	**U**	**0.053835**	1.732	2023.877	ug/L	17.600
	234	**U**	**0.086812**	3.090	2463.813	ug/L	8.400
	235	**U**	**5.177205**	2.825	137311.762	ug/L	11.000
	236	**U**	**0.092782**	3.707	3772.965	ug/L	13.400
	238	**U**	**5.410376**	3.066	128472.142	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.771**	
	U	233		**104.534**
	U	234		**104.972**
	U	235		**106.802**
	U	236		**104.249**
	U	238		**107.650**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Monday, August 18, 2014 17:44:01
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 10.040

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			805532.125	ug/L	823597.028
	233	**U**	**0.010763**	1.757	419.073	ug/L	17.600
	234	**U**	**0.000026**	236.934	8.933	ug/L	8.400
	235	**U**	**0.001855**	15.275	59.733	ug/L	11.000
	236	**U**	**0.000028**	86.616	14.200	ug/L	13.400
	238	**U**	**0.004718**	6.042	170.134	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.807**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-16-C
Sample Date/Time: Monday, August 18, 2014 17:48:41
Autosampler Position: 31
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-16-C.041

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			798279.372	ug/L	823597.028
	233	**U**	**-0.000110**	78.972	12.933	ug/L	17.600
	234	**U**	**0.000061**	100.381	9.867	ug/L	8.400
	235	**U**	**0.013116**	0.904	355.938	ug/L	11.000
	236	**U**	**-0.000067**	142.773	10.200	ug/L	13.400
	238	**U**	**1.750170**	1.184	41276.319	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.926**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-17-C

Sample Date/Time: Monday, August 18, 2014 17:53:21

Autosampler Position: 32

Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-17-C.042

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			801762.958	ug/L	823597.028
	233	**U**	**-0.000123**	26.778	12.533	ug/L	17.600
	234	**U**	**0.000008**	47.565	8.400	ug/L	8.400
	235	**U**	**0.009841**	2.301	270.936	ug/L	11.000
	236	**U**	**-0.000167**	10.393	6.267	ug/L	13.400
	238	**U**	**1.351866**	0.785	32041.744	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.349**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-18-C

Sample Date/Time: Monday, August 18, 2014 17:58:02

Autosampler Position: 33

Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-18-C.043

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			840184.386	ug/L	823597.028
	233	**U**	**-0.000190**	21.232	10.533	ug/L	17.600
	234	**U**	**-0.000066**	83.060	6.600	ug/L	8.400
	235	**U**	**0.008570**	0.736	248.602	ug/L	11.000
	236	**U**	**-0.000162**	13.089	6.800	ug/L	13.400
	238	**U**	**1.184804**	2.300	29416.472	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**102.014**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-19-C
Sample Date/Time: Monday, August 18, 2014 18:02:42
Autosampler Position: 34
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-19-C.044

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			813642.482	ug/L	823597.028
	233	**U**	**-0.000210**	16.608	9.467	ug/L	17.600
	234	**U**	**-0.000056**	53.469	6.667	ug/L	8.400
	235	**U**	**0.005626**	5.811	161.534	ug/L	11.000
	236	**U**	**-0.000193**	2.740	5.333	ug/L	13.400
	238	**U**	**0.807687**	2.788	19435.617	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.791**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-21-C
Sample Date/Time: Monday, August 18, 2014 18:07:23
Autosampler Position: 35
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-21-C.045

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			785320.505	ug/L	823597.028
	233	**U**	**-0.000211**	28.892	9.067	ug/L	17.600
	234	**U**	**0.000012**	646.233	8.400	ug/L	8.400
	235	**U**	**0.012591**	2.481	336.271	ug/L	11.000
	236	**U**	**-0.000154**	15.992	6.667	ug/L	13.400
	238	**U**	**1.645180**	1.121	38172.848	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.353**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-22-C
Sample Date/Time: Monday, August 18, 2014 18:12:02
Autosampler Position: 36
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-22-C.046

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			808401.786	ug/L	823597.028
	233	**U**	**-0.000170**	10.599	10.933	ug/L	17.600
	234	**U**	**0.000057**	76.132	9.867	ug/L	8.400
	235	**U**	**0.019961**	1.987	542.877	ug/L	11.000
	236	**U**	**-0.000207**	14.902	4.733	ug/L	13.400
	238	**U**	**2.739444**	1.286	65407.602	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.155**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-23-C
Sample Date/Time: Monday, August 18, 2014 18:16:42
Autosampler Position: 37
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-23-C.047

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			800306.635	ug/L	823597.028
	233	**U**	**-0.000139**	51.485	11.867	ug/L	17.600
	234	**U**	**0.000021**	132.822	8.733	ug/L	8.400
	235	**U**	**0.009680**	5.011	265.936	ug/L	11.000
	236	**U**	**-0.000197**	9.921	5.067	ug/L	13.400
	238	**U**	**1.331847**	1.037	31502.881	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.172**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 425544

Sample Date/Time: Monday, August 18, 2014 18:21:22
Autosampler Position: 38
Dataset File: D:\Elandata\Dataset\081814M3\425544.048

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			796922.748	ug/L	823597.028
	233	**U**	**-0.000250**	19.469	7.733	ug/L	17.600
	234	**U**	**-0.000086**	36.127	5.733	ug/L	8.400
	235	**U**	**-0.000178**	28.604	6.000	ug/L	11.000
	236	**U**	**-0.000160**	4.586	6.533	ug/L	13.400
	238	**U**	**0.001477**	7.993	92.267	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.761**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 425545

Sample Date/Time: Monday, August 18, 2014 18:26:01
Autosampler Position: 39
Dataset File: D:\Elandata\Dataset\081814M3\425545.049

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			788491.010	ug/L	823597.028
	233	**U**	**0.002429**	2.606	105.467	ug/L	17.600
	234	**U**	**0.043705**	4.860	1217.519	ug/L	8.400
	235	**U**	**2.609542**	2.826	67767.992	ug/L	11.000
	236	**U**	**0.047231**	4.109	1886.391	ug/L	13.400
	238	**U**	**2.723862**	2.930	63360.679	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.737**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-25-D
Sample Date/Time: Monday, August 18, 2014 18:30:41
Autosampler Position: 40
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-25-D.050

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			843940.465	ug/L	823597.028
	233	**U**	**-0.000229**	1.743	9.067	ug/L	17.600
	234	**U**	**-0.000018**	196.351	8.067	ug/L	8.400
	235	**U**	**0.008558**	1.806	249.269	ug/L	11.000
	236	**U**	**-0.000163**	14.385	6.800	ug/L	13.400
	238	**U**	**1.165767**	2.186	29073.445	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**102.470**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Monday, August 18, 2014 18:35:22
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 9.051

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			777393.309	ug/L	823597.028
	233	**U**	**0.054630**	3.060	1981.337	ug/L	17.600
	234	**U**	**0.088293**	3.223	2419.072	ug/L	8.400
	235	**U**	**5.311193**	2.659	136002.018	ug/L	11.000
	236	**U**	**0.095373**	1.493	3747.359	ug/L	13.400
	238	**U**	**5.567558**	1.662	127706.191	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.390**	
	U	233		**106.077**
	U	234		**106.764**
	U	235		**109.566**
	U	236		**107.161**
	U	238		**110.777**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Monday, August 18, 2014 18:40:02

Autosampler Position: 1

Dataset File: D:\Elandata\Dataset\081814M3\QC Std 10.052

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			780613.066	ug/L	823597.028
	233	**U**	**0.010994**	2.946	414.139	ug/L	17.600
	234	**U**	**-0.000081**	24.698	5.733	ug/L	8.400
	235	**U**	**0.002361**	29.906	70.400	ug/L	11.000
	236	**U**	**-0.000132**	27.427	7.467	ug/L	13.400
	238	**U**	**0.005400**	13.962	180.001	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.781**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-25-D SD

Sample Date/Time: Monday, August 18, 2014 18:44:42

Autosampler Position: 41

Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-25-D SD.053

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			793065.200	ug/L	823597.028
	233	**U**	**-0.000275**	8.219	6.800	ug/L	17.600
	234	**U**	**-0.000098**	23.667	5.333	ug/L	8.400
	235	**U**	**0.001902**	10.174	60.200	ug/L	11.000
	236	**U**	**-0.000171**	26.476	6.000	ug/L	13.400
	238	**U**	**0.247929**	2.589	5862.007	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.293**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-25-E MS

Sample Date/Time: Monday, August 18, 2014 18:49:22

Autosampler Position: 42

Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-25-E MS.054

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			836638.606	ug/L	823597.028
	233	**U**	**0.000839**	8.972	50.467	ug/L	17.600
	234	**U**	**0.016915**	4.066	505.676	ug/L	8.400
	235	**U**	**1.014753**	1.663	27992.151	ug/L	11.000
	236	**U**	**0.017773**	0.695	763.087	ug/L	13.400
	238	**U**	**2.210204**	2.038	54599.718	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.583**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-25-F MSD

Sample Date/Time: Monday, August 18, 2014 18:54:02

Autosampler Position: 43

Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-25-F MSD.055

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			819984.680	ug/L	823597.028
	233	**U**	**0.000763**	10.990	46.533	ug/L	17.600
	234	**U**	**0.016302**	2.608	478.141	ug/L	8.400
	235	**U**	**1.001288**	0.808	27075.729	ug/L	11.000
	236	**U**	**0.017680**	1.429	744.286	ug/L	13.400
	238	**U**	**1.992402**	0.931	48261.400	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.561**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-26-C

Sample Date/Time: Monday, August 18, 2014 18:58:43

Autosampler Position: 44

Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-26-C.056

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			801635.417	ug/L	823597.028
	233	**U**	**-0.000201**	5.312	9.667	ug/L	17.600
	234	**U**	**-0.000049**	158.575	6.800	ug/L	8.400
	235	**U**	**0.007494**	3.069	208.935	ug/L	11.000
	236	**U**	**-0.000165**	23.973	6.333	ug/L	13.400
	238	**U**	**1.063872**	0.223	25227.741	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.333**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-27-C
Sample Date/Time: Monday, August 18, 2014 19:03:23
Autosampler Position: 45
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-27-C.057

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			716639.445	ug/L	823597.028
	233	**U**	**-0.000264**	17.350	6.533	ug/L	17.600
	234	**U**	**0.000287**	44.441	14.533	ug/L	8.400
	235	**U**	**0.037196**	0.187	888.494	ug/L	11.000
	236	**U**	**-0.000165**	44.889	5.667	ug/L	13.400
	238	**U**	**4.194646**	0.589	88770.086	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**87.013**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-28-C
Sample Date/Time: Monday, August 18, 2014 19:08:04
Autosampler Position: 46
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-28-C.058

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			799567.664	ug/L	823597.028
	233	**U**	**-0.000212**	17.990	9.200	ug/L	17.600
	234	**U**	**-0.000032**	86.885	7.267	ug/L	8.400
	235	**U**	**0.008931**	4.770	245.735	ug/L	11.000
	236	**U**	**-0.000151**	35.167	6.867	ug/L	13.400
	238	**U**	**1.226256**	2.556	28968.556	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.082**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-29-C

Sample Date/Time: Monday, August 18, 2014 19:12:44

Autosampler Position: 47

Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-29-C.059

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			791788.826	ug/L	823597.028
	233	**U**	**-0.000203**	2.704	9.467	ug/L	17.600
	234	**U**	**-0.000005**	387.900	7.933	ug/L	8.400
	235	**U**	**0.009827**	3.027	266.936	ug/L	11.000
	236	**U**	**-0.000181**	4.483	5.667	ug/L	13.400
	238	**U**	**1.373862**	3.337	32130.028	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.138**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-30-C
Sample Date/Time: Monday, August 18, 2014 19:17:24
Autosampler Position: 48
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-30-C.060

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			785306.131	ug/L	823597.028
	233	**U**	**-0.000241**	20.590	8.000	ug/L	17.600
	234	**U**	**0.000334**	23.615	17.200	ug/L	8.400
	235	**U**	**0.048200**	3.510	1257.389	ug/L	11.000
	236	**U**	**-0.000163**	12.894	6.333	ug/L	13.400
	238	**U**	**6.014397**	1.417	139399.368	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.351**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-31-C
Sample Date/Time: Monday, August 18, 2014 19:22:04
Autosampler Position: 49
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-31-C.061

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			763676.437	ug/L	823597.028
	233	**U**	**-0.000147**	39.799	11.133	ug/L	17.600
	234	**U**	**0.000586**	1.471	23.533	ug/L	8.400
	235	**U**	**0.072299**	1.559	1830.184	ug/L	11.000
	236	**U**	**-0.000087**	53.579	9.067	ug/L	13.400
	238	**U**	**5.099550**	1.744	114940.724	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.725**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-32-C
Sample Date/Time: Monday, August 18, 2014 19:26:43
Autosampler Position: 50
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-32-C.062

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			726085.295	ug/L	823597.028
	233	**U**	**-0.000162**	24.483	10.067	ug/L	17.600
	234	**U**	**0.000235**	12.557	13.400	ug/L	8.400
	235	**U**	**0.033322**	0.753	807.423	ug/L	11.000
	236	**U**	**-0.000143**	2.767	6.600	ug/L	13.400
	238	**U**	**4.522647**	0.413	96971.193	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.160**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Monday, August 18, 2014 19:31:24
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 9.063

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			787688.396	ug/L	823597.028
	233	**U**	**0.053683**	2.671	1973.937	ug/L	17.600
	234	**U**	**0.086942**	2.034	2415.271	ug/L	8.400
	235	**U**	**5.208721**	2.710	135137.616	ug/L	11.000
	236	**U**	**0.094200**	3.137	3748.092	ug/L	13.400
	238	**U**	**5.473612**	2.908	127142.086	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.640**	
	U	233		**104.239**
	U	234		**105.129**
	U	235		**107.452**
	U	236		**105.842**
	U	238		**108.908**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Monday, August 18, 2014 19:36:04
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 10.064

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			755708.408	ug/L	823597.028
	233	**U**	**0.011330**	3.064	412.206	ug/L	17.600
	234	**U**	**-0.000033**	116.119	6.867	ug/L	8.400
	235	**U**	**0.002079**	23.051	61.333	ug/L	11.000
	236	**U**	**-0.000099**	3.363	8.533	ug/L	13.400
	238	**U**	**0.005644**	9.854	179.868	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.757**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-34-C
Sample Date/Time: Monday, August 18, 2014 19:40:44
Autosampler Position: 51
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-34-C.065

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			756105.500	ug/L	823597.028
	233	**U**	**-0.000222**	2.315	8.400	ug/L	17.600
	234	**U**	**0.000134**	40.525	11.267	ug/L	8.400
	235	**U**	**0.022036**	1.190	559.611	ug/L	11.000
	236	**U**	**-0.000156**	25.540	6.333	ug/L	13.400
	238	**U**	**2.841868**	0.391	63474.891	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.805**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-35-C
Sample Date/Time: Monday, August 18, 2014 19:45:24
Autosampler Position: 52
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-35-C.066

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			762170.851	ug/L	823597.028
	233	**U**	**-0.000162**	32.233	10.600	ug/L	17.600
	234	**U**	**0.000696**	13.883	26.467	ug/L	8.400
	235	**U**	**0.079596**	1.333	2010.608	ug/L	11.000
	236	**U**	**-0.000051**	86.304	10.400	ug/L	13.400
	238	**U**	**5.734972**	1.677	129055.935	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.542**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-36-C
Sample Date/Time: Monday, August 18, 2014 19:50:04
Autosampler Position: 53
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-36-C.067

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			751964.358	ug/L	823597.028
	233	**U**	**-0.000224**	10.531	8.267	ug/L	17.600
	234	**U**	**0.000071**	50.430	9.533	ug/L	8.400
	235	**U**	**0.019691**	2.274	498.009	ug/L	11.000
	236	**U**	**-0.000183**	13.162	5.267	ug/L	13.400
	238	**U**	**2.685104**	0.451	59644.912	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.302**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: MB

Sample Date/Time: Monday, August 18, 2014 19:54:45
Autosampler Position: 54
Dataset File: D:\Elandata\Dataset\081814M3\MB.068

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			778278.906	ug/L	823597.028
	233	**U**	**-0.000274**	7.062	6.733	ug/L	17.600
	234	**U**	**-0.000111**	29.979	4.933	ug/L	8.400
	235	**U**	**-0.000100**	108.359	7.733	ug/L	11.000
	236	**U**	**-0.000166**	11.974	6.133	ug/L	13.400
	238	**U**	**0.010361**	3.005	294.203	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.498**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: LCS

Sample Date/Time: Monday, August 18, 2014 19:59:25
Autosampler Position: 55
Dataset File: D:\Elandata\Dataset\081814M3\LCS.069

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			764545.297	ug/L	823597.028
	233	**U**	**0.002735**	5.215	113.134	ug/L	17.600
	234	**U**	**0.046413**	2.891	1254.455	ug/L	8.400
	235	**U**	**2.765708**	1.927	69675.035	ug/L	11.000
	236	**U**	**0.049562**	1.981	1920.863	ug/L	13.400
	238	**U**	**2.877860**	1.853	64942.130	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.830**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-1-C
Sample Date/Time: Monday, August 18, 2014 20:04:05
Autosampler Position: 56
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-1-C.070

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			750808.073	ug/L	823597.028
	233	**U**	**-0.000123**	66.364	11.733	ug/L	17.600
	234	**U**	**0.000250**	34.110	14.267	ug/L	8.400
	235	**U**	**0.039525**	1.791	988.301	ug/L	11.000
	236	**U**	**-0.000184**	19.099	5.267	ug/L	13.400
	238	**U**	**5.273145**	1.280	116880.509	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.162**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-1-C SD

Sample Date/Time: Monday, August 18, 2014 20:08:46

Autosampler Position: 57

Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-1-C SD.071

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			765687.155	ug/L	823597.028
	233	**U**	**-0.000249**	5.401	7.533	ug/L	17.600
	234	**U**	**-0.000039**	93.357	6.733	ug/L	8.400
	235	**U**	**0.008008**	0.857	212.402	ug/L	11.000
	236	**U**	**-0.000200**	6.810	4.733	ug/L	13.400
	238	**U**	**1.088937**	1.618	24666.769	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.969**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-1-D MS

Sample Date/Time: Monday, August 18, 2014 20:13:27

Autosampler Position: 58

Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-1-D MS.072

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			754388.095	ug/L	823597.028
	233	**U**	**0.000908**	7.961	47.800	ug/L	17.600
	234	**U**	**0.017064**	0.867	460.474	ug/L	8.400
	235	**U**	**1.054041**	1.361	26223.517	ug/L	11.000
	236	**U**	**0.018108**	1.881	700.951	ug/L	13.400
	238	**U**	**6.449856**	1.089	143635.279	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.597**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-1-E MSD

Sample Date/Time: Monday, August 18, 2014 20:18:07

Autosampler Position: 59

Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-1-E MSD.073

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			730520.575	ug/L	823597.028
	233	**U**	**0.000893**	14.939	45.733	ug/L	17.600
	234	**U**	**0.017557**	1.290	458.474	ug/L	8.400
	235	**U**	**1.088843**	0.576	26234.141	ug/L	11.000
	236	**U**	**0.018989**	0.806	710.951	ug/L	13.400
	238	**U**	**6.380736**	0.861	137607.234	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.699**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-2-C
Sample Date/Time: Monday, August 18, 2014 20:22:46
Autosampler Position: 60
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-2-C.074

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			743401.623	ug/L	823597.028
	233	**U**	**-0.000088**	5.159	12.867	ug/L	17.600
	234	**U**	**0.000326**	19.281	16.133	ug/L	8.400
	235	**U**	**0.049108**	2.003	1214.052	ug/L	11.000
	236	**U**	**-0.000170**	0.891	5.733	ug/L	13.400
	238	**U**	**6.576087**	1.018	144313.564	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.263**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Monday, August 18, 2014 20:27:27
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 9.075

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			774633.133	ug/L	823597.028
	233	**U**	**0.054257**	3.052	1961.001	ug/L	17.600
	234	**U**	**0.088490**	3.116	2415.871	ug/L	8.400
	235	**U**	**5.283381**	2.622	134811.690	ug/L	11.000
	236	**U**	**0.095350**	3.355	3730.287	ug/L	13.400
	238	**U**	**5.550248**	2.412	126819.129	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.055**	
	U	233		**105.354**
	U	234		**107.001**
	U	235		**108.992**
	U	236		**107.134**
	U	238		**110.433**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Monday, August 18, 2014 20:32:07
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 10.076

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			762603.856	ug/L	823597.028
	233	**U**	**0.011187**	2.791	411.606	ug/L	17.600
	234	**U**	**-0.000001**	2744.448	7.733	ug/L	8.400
	235	**U**	**0.001807**	9.428	55.467	ug/L	11.000
	236	**U**	**-0.000109**	15.681	8.200	ug/L	13.400
	238	**U**	**0.005376**	6.333	175.734	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.594**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-3-C
Sample Date/Time: Monday, August 18, 2014 20:36:47
Autosampler Position: 61
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-3-C.077

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			729635.309	ug/L	823597.028
	233	**U**	**-0.000113**	31.590	11.800	ug/L	17.600
	234	**U**	**0.000258**	6.387	14.067	ug/L	8.400
	235	**U**	**0.032031**	3.248	780.755	ug/L	11.000
	236	**U**	**-0.000144**	48.023	6.600	ug/L	13.400
	238	**U**	**4.352884**	0.508	93789.580	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.591**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-5-C
Sample Date/Time: Monday, August 18, 2014 20:41:26
Autosampler Position: 62
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-5-C.078

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			732585.703	ug/L	823597.028
	233	**U**	**-0.000106**	61.107	12.067	ug/L	17.600
	234	**U**	**0.000355**	23.839	16.600	ug/L	8.400
	235	**U**	**0.044938**	2.428	1095.642	ug/L	11.000
	236	**U**	**-0.000156**	24.430	6.133	ug/L	13.400
	238	**U**	**5.632190**	0.492	121825.845	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.950**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-6-C

Sample Date/Time: Monday, August 18, 2014 20:46:06

Autosampler Position: 63

Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-6-C.079

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			749864.589	ug/L	823597.028
	233	**U**	**-0.000117**	56.768	12.000	ug/L	17.600
	234	**U**	**0.000327**	8.019	16.267	ug/L	8.400
	235	**U**	**0.043910**	2.299	1095.909	ug/L	11.000
	236	**U**	**-0.000185**	18.154	5.200	ug/L	13.400
	238	**U**	**5.858059**	1.802	129705.264	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.048**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-7-C

Sample Date/Time: Monday, August 18, 2014 20:50:46

Autosampler Position: 64

Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-7-C.080

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			836755.101	ug/L	823597.028
	233	**U**	**-0.000110**	34.460	13.667	ug/L	17.600
	234	**U**	**-0.000014**	185.498	8.133	ug/L	8.400
	235	**U**	**0.013571**	2.076	385.472	ug/L	11.000
	236	**U**	**-0.000148**	11.374	7.333	ug/L	13.400
	238	**U**	**1.823310**	0.831	45076.984	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.598**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-8-C

Sample Date/Time: Monday, August 18, 2014 20:55:26

Autosampler Position: 65

Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-8-C.081

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			729449.191	ug/L	823597.028
	233	**U**	**-0.000150**	25.909	10.533	ug/L	17.600
	234	**U**	**0.000308**	14.726	15.333	ug/L	8.400
	235	**U**	**0.047904**	2.583	1161.781	ug/L	11.000
	236	**U**	**-0.000170**	17.779	5.600	ug/L	13.400
	238	**U**	**6.419047**	0.930	138222.252	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.569**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-9-C
Sample Date/Time: Monday, August 18, 2014 21:00:06
Autosampler Position: 66
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-9-C.082

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			751659.507	ug/L	823597.028
	233	**U**	**-0.000191**	22.325	9.400	ug/L	17.600
	234	**U**	**0.000267**	17.398	14.733	ug/L	8.400
	235	**U**	**0.044080**	0.934	1102.309	ug/L	11.000
	236	**U**	**-0.000187**	6.265	5.133	ug/L	13.400
	238	**U**	**5.979512**	0.791	132706.566	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.265**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-10-D

Sample Date/Time: Monday, August 18, 2014 21:04:47

Autosampler Position: 67

Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-10-D.083

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			756111.997	ug/L	823597.028
	233	**U**	**-0.000114**	39.946	12.133	ug/L	17.600
	234	**U**	**0.000161**	16.265	12.000	ug/L	8.400
	235	**U**	**0.030760**	1.464	777.155	ug/L	11.000
	236	**U**	**-0.000177**	3.922	5.533	ug/L	13.400
	238	**U**	**4.186141**	0.533	93462.601	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.806**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-12-C
Sample Date/Time: Monday, August 18, 2014 21:09:27
Autosampler Position: 68
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-12-C.084

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			751060.086	ug/L	823597.028
	233	**U**	**-0.000176**	23.759	9.933	ug/L	17.600
	234	**U**	**0.000276**	9.686	14.933	ug/L	8.400
	235	**U**	**0.043013**	0.524	1075.307	ug/L	11.000
	236	**U**	**-0.000173**	4.869	5.667	ug/L	13.400
	238	**U**	**5.762604**	0.960	127784.108	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.193**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-13-C
Sample Date/Time: Monday, August 18, 2014 21:14:08
Autosampler Position: 69
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-13-C.085

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			739210.935	ug/L	823597.028
	233	**U**	**-0.000161**	13.112	10.267	ug/L	17.600
	234	**U**	**0.000335**	34.247	16.200	ug/L	8.400
	235	**U**	**0.044921**	0.312	1104.776	ug/L	11.000
	236	**U**	**-0.000162**	16.082	6.000	ug/L	13.400
	238	**U**	**5.967989**	1.206	130275.468	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.754**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-14-C
Sample Date/Time: Monday, August 18, 2014 21:18:48
Autosampler Position: 70
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-14-C.086

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			737023.325	ug/L	823597.028
	233	**U**	**-0.000170**	14.964	9.933	ug/L	17.600
	234	**U**	**0.000263**	8.729	14.333	ug/L	8.400
	235	**U**	**0.030972**	2.238	762.487	ug/L	11.000
	236	**U**	**-0.000158**	38.474	6.067	ug/L	13.400
	238	**U**	**4.086260**	1.210	88937.346	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.488**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Monday, August 18, 2014 21:23:29
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 9.087

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			760138.815	ug/L	823597.028
	233	**U**	**0.057500**	3.414	2038.012	ug/L	17.600
	234	**U**	**0.093710**	3.253	2509.887	ug/L	8.400
	235	**U**	**5.538062**	1.835	138713.481	ug/L	11.000
	236	**U**	**0.099360**	1.577	3816.644	ug/L	13.400
	238	**U**	**5.764522**	2.105	129266.819	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.295**	
	U	233		**111.650**
	U	234		**113.313**
	U	235		**114.246**
	U	236		**111.641**
	U	238		**114.696**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q
U	234	Q
U	235	Q
U	236	Q
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Monday, August 18, 2014 21:28:10

Autosampler Position: 1

Dataset File: D:\Elandata\Dataset\081814M3\QC Std 10.088

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			763991.045	ug/L	823597.028
	233	**U**	**0.011114**	1.627	409.539	ug/L	17.600
	234	**U**	**-0.000028**	99.335	7.000	ug/L	8.400
	235	**U**	**0.003173**	27.702	89.200	ug/L	11.000
	236	**U**	**-0.000111**	18.403	8.200	ug/L	13.400
	238	**U**	**0.006580**	15.715	202.535	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.763**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-16-C
Sample Date/Time: Monday, August 18, 2014 21:32:50
Autosampler Position: 71
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-16-C.089

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			742704.793	ug/L	823597.028
	233	**U**	**-0.000097**	11.528	12.533	ug/L	17.600
	234	**U**	**0.000335**	12.553	16.333	ug/L	8.400
	235	**U**	**0.054043**	1.566	1332.929	ug/L	11.000
	236	**U**	**-0.000200**	3.304	4.600	ug/L	13.400
	238	**U**	**7.263563**	0.908	159251.949	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.178**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-17-C
Sample Date/Time: Monday, August 18, 2014 21:37:29
Autosampler Position: 72
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-17-C.090

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			738631.069	ug/L	823597.028
	233	**U**	**-0.000132**	33.138	11.267	ug/L	17.600
	234	**U**	**0.001329**	6.757	42.067	ug/L	8.400
	235	**U**	**0.149076**	1.071	3639.931	ug/L	11.000
	236	**U**	**0.000055**	75.764	14.067	ug/L	13.400
	238	**U**	**6.933285**	0.418	151184.322	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.684**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-18-C
Sample Date/Time: Monday, August 18, 2014 21:42:09
Autosampler Position: 73
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-18-C.091

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			731873.124	ug/L	823597.028
	233	**U**	**-0.000174**	13.620	9.733	ug/L	17.600
	234	**U**	**0.000174**	2.777	11.933	ug/L	8.400
	235	**U**	**0.029132**	1.061	712.618	ug/L	11.000
	236	**U**	**-0.000153**	6.991	6.267	ug/L	13.400
	238	**U**	**3.845228**	1.310	83114.273	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.863**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-20-C
Sample Date/Time: Monday, August 18, 2014 21:46:49
Autosampler Position: 74
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-20-C.092

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			736360.676	ug/L	823597.028
	233	**U**	**-0.000234**	16.899	7.800	ug/L	17.600
	234	**U**	**0.000258**	16.965	14.200	ug/L	8.400
	235	**U**	**0.029398**	0.642	723.485	ug/L	11.000
	236	**U**	**-0.000129**	10.272	7.200	ug/L	13.400
	238	**U**	**3.588997**	1.154	78030.959	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.408**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-21-C

Sample Date/Time: Monday, August 18, 2014 21:51:29

Autosampler Position: 75

Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-21-C.093

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			787212.723	ug/L	823597.028
	233	**U**	**-0.000193**	26.887	9.733	ug/L	17.600
	234	**U**	**-0.000015**	145.850	7.600	ug/L	8.400
	235	**U**	**0.010242**	5.886	276.203	ug/L	11.000
	236	**U**	**-0.000193**	11.099	5.133	ug/L	13.400
	238	**U**	**1.389740**	1.183	32332.580	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.582**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-22-C
Sample Date/Time: Monday, August 18, 2014 21:56:09
Autosampler Position: 76
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-22-C.094

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			722540.871	ug/L	823597.028
	233	**U**	**-0.000206**	20.574	8.533	ug/L	17.600
	234	**U**	**0.000235**	4.956	13.333	ug/L	8.400
	235	**U**	**0.038459**	0.707	925.763	ug/L	11.000
	236	**U**	**-0.000167**	9.268	5.667	ug/L	13.400
	238	**U**	**4.419762**	0.470	94295.260	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**87.730**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-23-C
Sample Date/Time: Monday, August 18, 2014 22:00:49
Autosampler Position: 77
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-23-C.095

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			748237.037	ug/L	823597.028
	233	**U**	**-0.000177**	40.155	9.933	ug/L	17.600
	234	**U**	**0.000289**	15.987	15.200	ug/L	8.400
	235	**U**	**0.044460**	3.376	1105.909	ug/L	11.000
	236	**U**	**-0.000167**	8.225	5.867	ug/L	13.400
	238	**U**	**5.386528**	0.875	118984.772	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.850**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-24-C
Sample Date/Time: Monday, August 18, 2014 22:05:29
Autosampler Position: 78
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-24-C.096

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			746885.867	ug/L	823597.028
	233	**U**	**-0.000165**	44.815	10.200	ug/L	17.600
	234	**U**	**0.000549**	14.135	22.000	ug/L	8.400
	235	**U**	**0.066058**	0.950	1636.894	ug/L	11.000
	236	**U**	**-0.000139**	24.506	6.933	ug/L	13.400
	238	**U**	**6.156322**	0.897	135775.651	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.686**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: MB

Sample Date/Time: Monday, August 18, 2014 22:10:10
Autosampler Position: 79
Dataset File: D:\Elandata\Dataset\081814M3\MB.097

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			767799.544	ug/L	823597.028
	233	**U**	**-0.000288**	9.549	6.200	ug/L	17.600
	234	**U**	**-0.000084**	38.459	5.533	ug/L	8.400
	235	**U**	**-0.000137**	37.869	6.733	ug/L	11.000
	236	**U**	**-0.000189**	18.902	5.133	ug/L	13.400
	238	**U**	**0.004065**	12.125	147.067	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.225**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: LCS

Sample Date/Time: Monday, August 18, 2014 22:14:50
Autosampler Position: 80
Dataset File: D:\Elandata\Dataset\081814M3\LCS.098

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			775101.331	ug/L	823597.028
	233	**U**	**0.002707**	1.882	113.800	ug/L	17.600
	234	**U**	**0.046912**	1.290	1286.258	ug/L	8.400
	235	**U**	**2.775612**	2.036	70886.923	ug/L	11.000
	236	**U**	**0.049904**	2.610	1960.268	ug/L	13.400
	238	**U**	**2.880496**	1.642	65903.349	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.112**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Monday, August 18, 2014 22:19:31
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 9.099

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			773371.228	ug/L	823597.028
	233	**U**	**0.055495**	2.510	2002.541	ug/L	17.600
	234	**U**	**0.089394**	2.758	2436.875	ug/L	8.400
	235	**U**	**5.308495**	2.854	135212.586	ug/L	11.000
	236	**U**	**0.095849**	2.023	3745.625	ug/L	13.400
	238	**U**	**5.555196**	1.903	126745.877	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.902**	
	U	233		**107.757**
	U	234		**108.094**
	U	235		**109.510**
	U	236		**107.696**
	U	238		**110.531**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Monday, August 18, 2014 22:24:12

Autosampler Position: 1

Dataset File: D:\Elandata\Dataset\081814M3\QC Std 10.100

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			775007.030	ug/L	823597.028
	233	**U**	**0.011063**	1.635	413.473	ug/L	17.600
	234	**U**	**-0.000012**	238.274	7.600	ug/L	8.400
	235	**U**	**0.002582**	15.940	75.867	ug/L	11.000
	236	**U**	**-0.000153**	16.571	6.600	ug/L	13.400
	238	**U**	**0.006097**	6.360	195.068	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.100**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-26-C
Sample Date/Time: Monday, August 18, 2014 22:28:52
Autosampler Position: 81
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-26-C.101

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			769767.261	ug/L	823597.028
	233	**U**	**-0.000268**	13.660	6.933	ug/L	17.600
	234	**U**	**-0.000035**	170.963	6.867	ug/L	8.400
	235	**U**	**0.005026**	4.486	137.667	ug/L	11.000
	236	**U**	**-0.000186**	28.186	5.267	ug/L	13.400
	238	**U**	**0.676281**	0.763	15419.197	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.464**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-26-C SD

Sample Date/Time: Monday, August 18, 2014 22:33:33

Autosampler Position: 82

Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-26-C SD.102

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			767740.246	ug/L	823597.028
	233	**U**	**-0.000296**	8.397	5.867	ug/L	17.600
	234	**U**	**-0.000099**	23.663	5.133	ug/L	8.400
	235	**U**	**0.000827**	10.550	31.267	ug/L	11.000
	236	**U**	**-0.000196**	16.511	4.867	ug/L	13.400
	238	**U**	**0.135252**	2.601	3117.340	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.218**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-26-D MS

Sample Date/Time: Monday, August 18, 2014 22:38:13

Autosampler Position: 83

Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-26-D MS.103

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			777499.230	ug/L	823597.028
	233	**U**	**0.000882**	9.579	48.467	ug/L	17.600
	234	**U**	**0.018147**	1.260	504.009	ug/L	8.400
	235	**U**	**1.103801**	2.199	28285.794	ug/L	11.000
	236	**U**	**0.019703**	2.082	784.222	ug/L	13.400
	238	**U**	**1.885760**	2.083	43296.158	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.403**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-26-E MSD

Sample Date/Time: Monday, August 18, 2014 22:42:52

Autosampler Position: 84

Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-26-E MSD.104

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			796446.156	ug/L	823597.028
	233	**U**	**0.000847**	7.265	48.200	ug/L	17.600
	234	**U**	**0.017067**	1.067	486.142	ug/L	8.400
	235	**U**	**1.039466**	1.296	27296.411	ug/L	11.000
	236	**U**	**0.018683**	3.916	762.020	ug/L	13.400
	238	**U**	**1.768133**	0.840	41608.044	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.703**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-27-C
Sample Date/Time: Monday, August 18, 2014 22:47:32
Autosampler Position: 85
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-27-C.105

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			804403.435	ug/L	823597.028
	233	**U**	**-0.000278**	8.180	6.800	ug/L	17.600
	234	**U**	**-0.000056**	58.908	6.600	ug/L	8.400
	235	**U**	**0.007935**	4.681	220.868	ug/L	11.000
	236	**U**	**-0.000223**	17.583	4.000	ug/L	13.400
	238	**U**	**1.088234**	4.854	25838.887	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.670**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-28-C

Sample Date/Time: Monday, August 18, 2014 22:52:12

Autosampler Position: 86

Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-28-C.106

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			814662.947	ug/L	823597.028
	233	**U**	**-0.000222**	17.776	9.000	ug/L	17.600
	234	**U**	**-0.000028**	206.584	7.467	ug/L	8.400
	235	**U**	**0.009999**	4.080	279.136	ug/L	11.000
	236	**U**	**-0.000202**	12.263	4.933	ug/L	13.400
	238	**U**	**1.397643**	1.398	33647.410	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.915**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-29-C
Sample Date/Time: Monday, August 18, 2014 22:56:52
Autosampler Position: 87
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-29-C.107

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			745371.137	ug/L	823597.028
	233	**U**	**-0.000205**	27.041	8.867	ug/L	17.600
	234	**U**	**0.000324**	18.764	16.067	ug/L	8.400
	235	**U**	**0.055680**	1.476	1378.133	ug/L	11.000
	236	**U**	**-0.000159**	24.596	6.133	ug/L	13.400
	238	**U**	**4.642478**	2.001	102161.080	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.502**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-30-C
Sample Date/Time: Monday, August 18, 2014 23:01:32
Autosampler Position: 88
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-30-C.108

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			771673.787	ug/L	823597.028
	233	**U**	**-0.000178**	14.540	10.133	ug/L	17.600
	234	**U**	**0.000276**	24.525	15.400	ug/L	8.400
	235	**U**	**0.038958**	0.559	1001.502	ug/L	11.000
	236	**U**	**-0.000221**	14.167	3.933	ug/L	13.400
	238	**U**	**4.758425**	0.809	108417.498	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.696**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-31-C
Sample Date/Time: Monday, August 18, 2014 23:06:12
Autosampler Position: 89
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-31-C.109

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			756143.896	ug/L	823597.028
	233	**U**	**-0.000149**	28.949	10.933	ug/L	17.600
	234	**U**	**0.000844**	9.202	30.133	ug/L	8.400
	235	**U**	**0.101917**	2.464	2551.361	ug/L	11.000
	236	**U**	**-0.000092**	11.354	8.800	ug/L	13.400
	238	**U**	**6.832128**	2.150	152537.495	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.810**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-33-C
Sample Date/Time: Monday, August 18, 2014 23:10:52
Autosampler Position: 90
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-33-C.110

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			739751.089	ug/L	823597.028
	233	**U**	**-0.000159**	30.521	10.400	ug/L	17.600
	234	**U**	**0.000560**	18.244	22.133	ug/L	8.400
	235	**U**	**0.070199**	1.518	1722.504	ug/L	11.000
	236	**U**	**-0.000138**	32.907	6.867	ug/L	13.400
	238	**U**	**6.447810**	1.245	140833.728	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.820**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Monday, August 18, 2014 23:15:33
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 9.111

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			773819.765	ug/L	823597.028
	233	**U**	**0.056255**	1.871	2031.345	ug/L	17.600
	234	**U**	**0.090806**	3.613	2475.681	ug/L	8.400
	235	**U**	**5.436033**	3.055	138530.644	ug/L	11.000
	236	**U**	**0.097840**	2.642	3824.579	ug/L	13.400
	238	**U**	**5.705651**	2.971	130197.319	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.956**	
	U	233		**109.233**
	U	234		**109.801**
	U	235		**112.141**
	U	236		**109.932**
	U	238		**113.525**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	235	Q
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Monday, August 18, 2014 23:20:14
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 10.112

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			776518.769	ug/L	823597.028
	233	**U**	**0.011319**	1.599	423.540	ug/L	17.600
	234	**U**	**-0.000077**	28.684	5.800	ug/L	8.400
	235	**U**	**0.002476**	12.121	73.600	ug/L	11.000
	236	**U**	**-0.000162**	11.324	6.267	ug/L	13.400
	238	**U**	**0.006098**	9.888	195.268	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.284**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-34-C
Sample Date/Time: Monday, August 18, 2014 23:24:53
Autosampler Position: 91
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-34-C.113

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			734413.209	ug/L	823597.028
	233	**U**	**-0.000145**	34.369	10.733	ug/L	17.600
	234	**U**	**0.000314**	6.462	15.600	ug/L	8.400
	235	**U**	**0.046095**	1.962	1125.844	ug/L	11.000
	236	**U**	**-0.000187**	16.409	5.000	ug/L	13.400
	238	**U**	**6.145897**	2.010	133251.401	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.171**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-35-C
Sample Date/Time: Monday, August 18, 2014 23:29:34
Autosampler Position: 92
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-35-C.114

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			741761.383	ug/L	823597.028
	233	**U**	**-0.000150**	33.208	10.733	ug/L	17.600
	234	**U**	**0.000383**	17.248	17.600	ug/L	8.400
	235	**U**	**0.050187**	1.403	1236.987	ug/L	11.000
	236	**U**	**-0.000222**	19.305	3.800	ug/L	13.400
	238	**U**	**6.731097**	0.938	147405.589	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.064**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-36-C

Sample Date/Time: Monday, August 18, 2014 23:34:15

Autosampler Position: 93

Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-36-C.115

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			766381.777	ug/L	823597.028
	233	**U**	**-0.000197**	20.757	9.400	ug/L	17.600
	234	**U**	**0.000201**	20.566	13.200	ug/L	8.400
	235	**U**	**0.042690**	0.534	1089.042	ug/L	11.000
	236	**U**	**-0.000177**	15.961	5.667	ug/L	13.400
	238	**U**	**5.759494**	0.922	130295.860	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.053**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Monday, August 18, 2014 23:38:56
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 9.116

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			773273.725	ug/L	823597.028
	233	**U**	**0.057441**	2.348	2071.884	ug/L	17.600
	234	**U**	**0.091663**	3.740	2497.352	ug/L	8.400
	235	**U**	**5.491401**	2.938	139842.117	ug/L	11.000
	236	**U**	**0.098979**	2.798	3865.857	ug/L	13.400
	238	**U**	**5.726721**	2.853	130587.302	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.890**	
	U	233		**111.536**
	U	234		**110.838**
	U	235		**113.283**
	U	236		**111.212**
	U	238		**113.944**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q
U	234	Q
U	235	Q
U	236	Q
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Monday, August 18, 2014 23:43:36
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 10.117

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			778226.496	ug/L	823597.028
	233	**U**	**0.011449**	2.941	428.940	ug/L	17.600
	234	**U**	**-0.000056**	117.400	6.333	ug/L	8.400
	235	**U**	**0.002887**	24.816	83.667	ug/L	11.000
	236	**U**	**-0.000164**	7.634	6.200	ug/L	13.400
	238	**U**	**0.006776**	10.067	211.135	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.491**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

Quantitative Analysis Calibration Report

File Name: 081814M3.cal
File Path: D:\Elandata\System
Calibration Type: External Calibration

Analyte	Mass	Curve Type	Slope	Intercept	Corr. Coeff.
Ho (IS)	164.930	Linear Thru Zero	0.000000	0.00	0.000000
U	233.000	Linear Thru Zero	0.046320	0.00	0.999997
U	234.041	Linear Thru Zero	0.035173	0.00	1.000000
U	235.044	Linear Thru Zero	0.032972	0.00	0.999992
U	236.000	Linear Thru Zero	0.050402	0.00	0.999999
U	238.050	Linear Thru Zero	0.029513	0.00	0.999995

METALS BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Batch Number: 137278 Batch Start Date: 08/12/14 10:34 Batch Analyst: Davis, Shanika M

Batch Method: 3050B Batch End Date: 08/13/14 14:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	FinalAmount	ISOU Prep Spk 00002			
MB 160-137278/1		3050B, 6020A		0.5086 g	50 mL				
LCS 160-137278/2		3050B, 6020A		0.5770 g	50 mL	0.25 mL			
680-102199-A-1	SD-279-SS	3050B, 6020A	T	0.5201 g	50 mL				
680-102199-A-1 MS	SD-279-SS	3050B, 6020A	T	0.5785 g	50 mL	0.25 mL			
680-102199-A-1 MSD	SD-279-SS	3050B, 6020A	T	0.5179 g	50 mL	0.25 mL			
680-102199-A-2	SD-279-01	3050B, 6020A	T	0.5598 g	50 mL				
680-102199-A-3	SD-279-02	3050B, 6020A	T	0.5679 g	50 mL				
680-102199-A-7	SD-277-SS	3050B, 6020A	T	0.5491 g	50 mL				
680-102199-A-8	SD-277-01	3050B, 6020A	T	0.5835 g	50 mL				
680-102199-A-9	SD-277-02	3050B, 6020A	T	0.5428 g	50 mL				
680-102199-A-11	SD-219-SS	3050B, 6020A	T	0.5971 g	50 mL				
680-102199-A-12	SD-219-01	3050B, 6020A	T	0.5334 g	50 mL				
680-102199-A-13	SD-219-02	3050B, 6020A	T	0.5224 g	50 mL				
680-102199-A-14	SD-219-03	3050B, 6020A	T	0.5765 g	50 mL				
680-102199-A-15	SD-218-SS	3050B, 6020A	T	0.5709 g	50 mL				
680-102199-A-16	SD-218-01	3050B, 6020A	T	0.5066 g	50 mL				
680-102199-A-17	SD-218-02	3050B, 6020A	T	0.5424 g	50 mL				
680-102199-A-18	SD-203-SS	3050B, 6020A	T	0.5901 g	50 mL				
680-102199-A-19	SD-203-01	3050B, 6020A	T	0.5677 g	50 mL				
680-102199-A-20	SD-203-02	3050B, 6020A	T	0.5373 g	50 mL				
680-102199-A-22	SD-202-SS	3050B, 6020A	T	0.5508 g	50 mL				
680-102199-A-23	SD-202-01	3050B, 6020A	T	0.5945 g	50 mL				
680-102199-A-24	SD-202-02	3050B, 6020A	T	0.5550 g	50 mL				
680-102199-A-25	SD-195-SS	3050B, 6020A	T	0.5058 g	50 mL				

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

METALS BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Batch Number: 137278 Batch Start Date: 08/12/14 10:34 Batch Analyst: Davis, Shanika M

Batch Method: 3050B Batch End Date: 08/13/14 14:00

Batch Notes	
Balance ID	27150548
Hydrogen peroxide lot number	408031
Lot # of hydrochloric acid	422962
Lot # of Nitric Acid	422893
Hot Block ID number	HOTBLOCK1
Oven, Bath or Block Temperature 1	94.0 Degrees C
Pipette ID	M-PREP-2
ID number of the thermometer	111815886
Digestion Tube/Cup Lot #	191064

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

METALS BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Batch Number: 137385 Batch Start Date: 08/12/14 10:56 Batch Analyst: Davis, Shanika M

Batch Method: 3050B Batch End Date: 08/13/14 14:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	FinalAmount	ISOU Prep Spk 00002			
MB 160-137385/1		3050B, 6020A		0.5983 g	50 mL				
LCS 160-137385/2		3050B, 6020A		0.5239 g	50 mL	0.25 mL			
680-102199-A-30	SD-220-SS	3050B, 6020A	T	0.5218 g	50 mL				
680-102199-A-30 MS	SD-220-SS	3050B, 6020A	T	0.5818 g	50 mL	0.25 mL			
680-102199-A-30 MSD	SD-220-SS	3050B, 6020A	T	0.5170 g	50 mL	0.25 mL			
680-102199-A-31	SD-220-01	3050B, 6020A	T	0.5287 g	50 mL				
680-102199-A-32	SD-220-02	3050B, 6020A	T	0.5815 g	50 mL				
680-102199-A-33	SD-DUP-01	3050B, 6020A	T	0.5246 g	50 mL				
680-102199-A-35	SD-201-SS	3050B, 6020A	T	0.5464 g	50 mL				
680-102199-A-36	SD-201-01	3050B, 6020A	T	0.5630 g	50 mL				
680-102199-A-37	SD-201-02	3050B, 6020A	T	0.5738 g	50 mL				
680-102199-A-39	SD-200-SS	3050B, 6020A	T	0.5349 g	50 mL				
680-102199-A-40	SD-200-01	3050B, 6020A	T	0.5430 g	50 mL				
680-102199-A-41	SD-200-02	3050B, 6020A	T	0.5576 g	50 mL				
680-102199-A-26	SD-196-SS	3050B, 6020A	T	0.5088 g	50 mL				
680-102199-A-27	SD-196-01	3050B, 6020A	T	0.5057 g	50 mL				
680-102199-A-28	SD-196-02	3050B, 6020A	T	0.5147 g	50 mL				

Batch Notes	
Balance ID	27150548
Hydrogen peroxide lot number	408031
Lot # of hydrochloric acid	422962
Lot # of Nitric Acid	422893
Hot Block ID number	HOTBLOCK1
Oven, Bath or Block Temperature 1	94.0 Degrees C
Pipette ID	M-PREP-2
ID number of the thermometer	111815886
Digestion Tube/Cup Lot #	191064

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

METALS BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102199-3

SDG No.: 680102199-3

Batch Number: 137385 Batch Start Date: 08/12/14 10:56 Batch Analyst: Davis, Shanika M

Batch Method: 3050B Batch End Date: 08/13/14 14:00

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

Subcontract Data

Shipping and Receiving Documents

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: S. Gamon	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.46
Client Contact: Mike Martin	Phone: (703)341-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~1 of 1~~ 1 of 4
Company: Tetra Tech, Inc.		Analysis Requested		Job #: 680-102199
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes:
City: Germantown	TAT Requested (days): Standard			A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			
Email: Michael.Martin@tetratech.com	WO #:			Other:
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	K	N	N		
SD-279-SS	6/9/14	1540	C	Solid				X				
SD-279-01		1545	C	Solid				X				
SD-279-02		1550	C	Solid				X				
SD-279-03		1555	C	Solid				X				Hold Pending analysis SS to 02
SD-278-SS		1740	C	Solid				X				
SD-278-01		1745	C	Solid				X				
SD-277-SS		1810	C	Solid				X				
SD-277-01		1815	C	Solid				X				
SD-277-02		1820	C	Solid				X				
SD-277-03	↓	1825	C	Solid				X				Hold Pending analysis SS to 02
SD-219-SS	6/10/14	0920	C	Solid				X				

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	6-10-14 / 1625	TT		6/10/14 1645	TestAmerica
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	6/10/14 1735	TestAmerica	Ali Clark	6-11-14 0930	TA STL
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: S. Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.1
Client Contact: Mike Martin	Phone:	E-Mail: jerry.lanier@testamericainc.com		Page: Page 2 of 4
Company: Tetra Tech, Inc.				Job #: 680-102199
Address: 20251 Century Blvd Suite 200	Due Date Requested:	Analysis Requested		Preservation Codes:
City: Germantown	TAT Requested (days): Standard			A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - Di Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
State, Zip: MD, 20874	PO #: Purchase Order not required			
Phone:	WO #:			Other:
Email: Michael.Martin@tetratech.com				
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of Containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-219-01	6/10/14	0922	C	Solid				X				
SD-219-02	6/10/14	0925	C	Solid				X				
SD-219-03	6/10/14	0928	C	Solid				X				[redacted]
SD-218-SS		1010	C	Solid				X				
SD-218-01		1012	C	Solid				X				
SD-218-02		1014	C	Solid				X				
SD-203-SS		1140	C	Solid				X				
SD-203-01		1145	C	Solid				X				
SD-203-02		1150	C	Solid				X				
SD-203-03		1155	C	Solid				X				Hold for any analysis SS 6/10/14
SD-202-SS		1220	C	Solid				X				

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	[signature]	6-10-14 / 1625	TT	[signature]	6/10/14 / 1645	TestAmerica
2	[signature]	6/10/14 / 1735	TT	[signature]	10-11-14 0930	TA STL
3						

Custody Seals Intact: △ Yes △ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: S. Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.5
Client Contact: Mike Martin	Phone:	E-Mail: jerry.lanier@testamericainc.com		Page: Page 3 of 4
Company: Tetra Tech, Inc.		Analysis Requested		Job #: 680-102199

Address: 20251 Century Blvd Suite 200	Due Date Requested:	
City: Germantown	TAT Requested (days):	
State, Zip: MD, 20874		
Phone:	PO #: Purchase Order not required	
Email: Michael.Martin@tetratech.com	WO #:	
Project Name: Sediments	Project #: 68012942	
Site:	SSOW#:	

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/226	Total Number of containers	Special Instructions/Note:
		Preservation Code:					N	N	N	N		
SD-202-01	6/10/14	1225	C	Solid				X				
SD-202-02		1230	C	Solid				X				
SD-195-SS		1330	C	Solid				X				
SD-196-SS		1400	C	Solid								
SD-196-01		1405	C	Solid								
SD-196-02		1410	C	Solid								
SD-196-03		1415	C	Solid								Hold pending analysis SS to 02
SD-220-SS		1440		Solid								
SD-220-01		1442		Solid								
SD-220-02		1444		Solid								
SD-DUP-01		0000	C	Solid				X				

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	6-10-14 / 1625	TT		6/10/14 / 1695	TestAmerica
Relinquished by:	6/10/14 / 1735	TestAmerica	Received by:	6-11-14 0930	TA STL
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: △ Yes △ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.2
Client Contact: Mike Martin	Phone:	E-Mail: jerry.lanier@testamericainc.com		Page: Page Name: 4 of 4
Company: Tetra Tech, Inc.		Analysis Requested		Job #: 680-102199

Address: 20251 Century Blvd Suite 200	Due Date Requested:
City: Germantown	TAT Requested (days):
State, Zip: MD, 20874	
Phone:	PO #: Purchase Order not required
Email: Michael.Martin@tetratech.com	WO #:
Project Name: Sediments	Project #: 68012942
Site:	SSOW#:

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2SO3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
		Preservation Code:					N	N	N	N		
SD-220-03	6/10/14	1496	C	Solid				X				Hold pending analysis SS to 02
SD-201-SS		1510	C	Solid				X				
SD-201-01		1515	C	Solid				X				
SD-201-02		1520	C	Solid				X				
SD-201-03		1525	C	Solid				X				Hold pending analysis SS to 02
SD-200-SS		1550	C	Solid				X				
SD-200-01		1555	C	Solid				X				
SD-200-02		1600	C	Solid				X				
SD-200-03		1605	C	Solid				X				
				Solid								
				Solid								

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time: 6-10-14 / 1625	Company	Received by:	Date/Time: 6/10/14 / 1645	Company: TestAmerica
Relinquished by:	Date/Time: 6/10/14 / 1735	Company: TestAmerica	Received by: Gil Clarke	Date/Time: 6-11-14 0930	Company: TA STL
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-102199-3
SDG Number: 680102199-3

Login Number: 102199
List Number: 1
Creator: Daughtry, Beth A

List Source: TestAmerica Savannah

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.		
The cooler's custody seal, if present, is intact.		
Sample custody seals, if present, are intact.		
The cooler or samples do not appear to have been compromised or tampered with.		
Samples were received on ice.		
Cooler Temperature is acceptable.		
Cooler Temperature is recorded.		
COC is present.		
COC is filled out in ink and legible.		
COC is filled out with all pertinent information.		
Is the Field Sampler's name present on COC?		
There are no discrepancies between the containers received and the COC.		
Samples are received within Holding Time.		
Sample containers have legible labels.		
Containers are not broken or leaking.		
Sample collection date/times are provided.		
Appropriate sample containers are used.		
Sample bottles are completely filled.		
Sample Preservation Verified.		
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs		
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").		
Multiphasic samples are not present.		
Samples do not require splitting or compositing.		
Residual Chlorine Checked.		

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 680-102199-4

SDG Number: 680102199-1

Job Description: Sediments

For:
Tetra Tech, Inc.
20251 Century Blvd
Suite 200
Germantown, MD 20874

Attention: Mike Martin



Approved for release.
Jerry A Lanier
Project Manager I
9/12/2014 1:23 PM

Jerry A Lanier, Project Manager I
5102 LaRoche Avenue, Savannah, GA, 31404
(912)354-7858 e.3410
jerry.lanier@testamericainc.com
09/12/2014

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

Savannah Certifications and ID #s: A2LA: 0399.01; AL: 41450; ARDEQ: 88-0692; ARDOH; AZ: AZ0741; CA: 03217CA; CO; CT: PH0161; DE; FL: E87052; GA: 803; Guam; HI; IL: 200022; IN: C-GA-02; IA: 353; KS: E-10322; KY EPPC: 90084; KY UST; LA DEQ: 30690; LA DHH: LA080008; ME: 2008022; MD: 250; MA: M-GA006; MI: 9925; MS; NFESC: 249; NV: GA00006; NJ: GA769; NM; NY: 10842; NC DWQ: 269; NC DHHS: 13701; PA: 68-00474; PR: GA00006; RI: LAO00244; SC: 98001001; TN: TN0296; TX: T104704185; USEPA: GA00006; VT: VT-87052; VA: 00302; WA; WV DEP: 094; WV DHHR: 9950 C; WI DNR: 999819810; WY/EPAR8: 8TMS-Q

Table of Contents

Cover Title Page 1

Data Summaries 3

- Definitions 3
- Case Narrative 4
- Client Sample Results 5
- QC Sample Results 10
- QC Association 12
- Chronicle 13
- Certification Summary 15
- Method Summary 17
- Sample Summary 18
- Reagent Traceability 19
  - COAs 22

Radiochemistry Raw Data 142

- Gamma Spectroscopy 142
  - Method GA-01-R Ra-226 143
  - Daily Checks 463
  - Initial Calibrations 576
  - Initial Calibration Verifications 614
  - Annual Calibration Verifications 648
  - Monthly Backgrounds 673
  - Run Logs 703

Shipping and Receiving Documents 708

- Client Chain of Custody 708

Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.
F	Duplicate RPD exceeds the control limit

Rad TICs

Qualifier	Qualifier Description
F	Duplicate RPD exceeds the control limit

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Sediments

Report Number: 680-102199-4

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 06/11/2014; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 1.1 C.

RADIUM-226 AND OTHER GAMMA EMITTERS (GS)

Samples SD-279-SS (680-102199-1), SD-279-01 (680-102199-2), SD-279-02 (680-102199-3), SD-277-SS (680-102199-7), SD-277-01 (680-102199-8) and SD-277-02 (680-102199-9) were analyzed for Radium-226 and other gamma emitters (GS) in accordance with The Department of Energy. The samples were leached on 08/12/2014, prepared on 08/11/2014 and analyzed on 08/14/2014, 08/27/2014, 09/08/2014 and 09/10/2014.

Method(s) GA-01-R: Prep Batch #137389: Ra-226 by gamma spectroscopy is typically determined by inference from daughters (e.g. Bi-214) after sealing the sample in an appropriate counting geometry/container and waiting 21 days to allow the Ra-226 decay chain through Rn-222 to reach secular equilibrium. Such an approach is considered to be the most reliable and representative means for establishing the true Ra-226 concentration in the sample. The method requested by the client to report Ra-226, using its own 186 keV gamma-ray emission, is subject to interference and potential bias due to the 185.7 keV U-235 gamma ray. Experience also indicates gamma spectroscopy software does not consistently assign accurate peak areas to Ra-226 (186 keV), with the problem compounded by slight drift of the instrumentation. The laboratory considers Ra-226 reported based upon the 186 keV gamma-ray emission to be best used by the client in a qualitative fashion.
The following samples were affected: (680-102199-1), (680-102199-1 DU), (680-102199-2), (680-102199-7), (680-102199-8), (680-102199-9), (MB 160-137389/1-A), SD-277-01 (680-102199-8), SD-277-02 (680-102199-9), SD-277-SS (680-102199-7), SD-279-01 (680-102199-2), SD-279-SS (680-102199-1).
Prep Batch #137389: The reporting limit for radium-226 analyzed by gamma spectroscopy was not met. The data is reported with the MDC achieved.
Prep Batch #137389: The RER was outside of the acceptance limits of 1 for actinium-227. Both the sample and duplicate activity were less than the MDC.

Several analytes exceeded the RPD limit for the duplicate of sample SD-279-SSDU (680-102199-1). Refer to the QC report for details.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

RADIUM-226 AND OTHER GAMMA EMITTERS (GS)

Samples SD-279-SS (680-102199-1), SD-279-01 (680-102199-2), SD-279-02 (680-102199-3), SD-277-SS (680-102199-7), SD-277-01 (680-102199-8) and SD-277-02 (680-102199-9) were analyzed for Radium-226 and other gamma emitters (GS) in accordance with approved methodologies. The samples were leached on 08/07/2014, prepared on 08/11/2014 and analyzed on 09/02/2014 and 09/03/2014.

Method(s) Fill_Geo-21: Insufficient sample was provided for the following sample(s) to fill a geometry (e.g. tuna can) calibrated for Ra-226 analysis by gamma spectroscopy: (680-102199-1), (680-102199-1 DU), (680-102199-2), (680-102199-3), (680-102199-7), (680-102199-8), (680-102199-9), SD-277-01 (680-102199-8), SD-277-02 (680-102199-9), SD-277-SS (680-102199-7), SD-279-01 (680-102199-2), SD-279-02 (680-102199-3), SD-279-SS (680-102199-1) a 25mL geometry was used instead.
Gamma (batch:137115)

Americium-241, Cesium-137, Cobalt-60 and Uranium-235 exceeded the RPD limit for the duplicate of sample SD-279-SSDU (680-102199-1). Refer to the QC report for details.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Client Sample ID: SD-279-SS

Lab Sample ID: 680-102199-1

Date Collected: 06/09/14 15:40

Matrix: Solid

Date Received: 06/11/14 09:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.616	U	0.422	0.427		0.649	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Radium-226	**1.54**		0.559	0.579	1.00	0.657	pCi/g	08/11/14 14:47	09/02/14 12:02	1
Actinium 228	**2.33**		0.457	0.509		0.315	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Radium-228	**2.36**		0.716	0.751		0.446	pCi/g	08/11/14 14:47	09/02/14 12:02	1
Bismuth-212	**3.10**		1.58	1.60		1.66	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Bismuth-214	**1.19**		0.413	0.429		0.483	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Lead-210	2.59	U	1.85	1.90		2.78	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Lead-212	**1.31**		0.234	0.274		0.312	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Thorium-232	**2.36**		0.716	0.751		0.446	pCi/g	08/11/14 14:47	09/02/14 12:02	1
Lead-214	**1.05**		0.305	0.322		0.393	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Uranium-235	0.0442	U	0.821	0.821		1.43	pCi/g	08/11/14 14:47	09/02/14 12:02	1
Potassium-40	**17.2**		2.96	3.39		2.67	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Uranium-238	1.51	U	1.46	1.47		3.54	pCi/g	08/11/14 14:47	09/02/14 12:02	1
Protactinium-231	0.405	U	0.483	0.485		5.01	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Radium-226	**7.19**		3.01	3.16	1.00	3.28	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Radium-228	**2.33**		0.457	0.509		0.315	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Thorium-232	**2.33**		0.457	0.509		0.315	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Thorium-234	2.48	U	2.13	2.15		2.85	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Thallium-208	**0.503**		0.179	0.186		0.209	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Uranium-235	-0.427	U	17.1	17.1		0.979	pCi/g	08/11/14 14:47	09/08/14 18:04	1
Uranium-238	2.48	U	2.13	2.15		2.85	pCi/g	08/11/14 14:47	09/08/14 18:04	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Ac-228	*2.36*		*0.716*	*0.751*		*0.446*	*pCi/g*	*08/11/14 14:47*	*09/02/14 12:02*	*1*
Bi-214	*1.54*		*0.559*	*0.579*		*0.657*	*pCi/g*	*08/11/14 14:47*	*09/02/14 12:02*	*1*
K-40	*14.0*		*5.03*	*5.21*		*6.93*	*pCi/g*	*08/11/14 14:47*	*09/02/14 12:02*	*1*
Pb-212	*1.41*		*0.422*	*0.448*		*0.521*	*pCi/g*	*08/11/14 14:47*	*09/02/14 12:02*	*1*
Pb-214	*1.47*		*0.623*	*0.639*		*0.682*	*pCi/g*	*08/11/14 14:47*	*09/02/14 12:02*	*1*
Tl-208	*0.748*		*0.325*	*0.333*		*0.287*	*pCi/g*	*08/11/14 14:47*	*09/02/14 12:02*	*1*

Client Sample ID: SD-279-01

Lab Sample ID: 680-102199-2

Date Collected: 06/09/14 15:45

Matrix: Solid

Date Received: 06/11/14 09:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.322	U	0.881	0.882		1.51	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Radium-226	0.279	U	0.460	0.461	1.00	0.826	pCi/g	08/11/14 14:47	09/02/14 14:33	1
Actinium 228	**1.90**		0.599	0.627		1.17	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Radium-228	**1.48**		0.559	0.577		1.15	pCi/g	08/11/14 14:47	09/02/14 14:33	1
Bismuth-212	0.806	U	2.42	2.43		4.27	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Bismuth-214	**1.29**		0.630	0.642		0.724	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Lead-210	2.22	U	2.48	2.50		3.65	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Lead-212	**1.20**		0.357	0.380		0.456	pCi/g	08/11/14 14:47	08/14/14 13:35	1

Client Sample ID: SD-279-01

Date Collected: 06/09/14 15:45
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-2

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-232	**1.48**		0.559	0.577		1.15	pCi/g	08/11/14 14:47	09/02/14 14:33	1
Lead-214	**1.26**		0.467	0.483		0.585	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Uranium-235	0.434	U	0.664	0.666		1.16	pCi/g	08/11/14 14:47	09/02/14 14:33	1
Potassium-40	**10.0**		4.10	4.21		5.91	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Uranium-238	3.99	U	3.03	3.06		4.03	pCi/g	08/11/14 14:47	09/02/14 14:33	1
Protactinium-231	-0.159	U	0.523	0.523		6.02	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Radium-226	3.60	U	4.03	4.06	1.00	5.64	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Radium-228	**1.90**		0.599	0.627		1.17	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Thorium-232	**1.90**		0.599	0.627		1.17	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Thorium-234	2.51	U	2.63	2.65		3.78	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Thallium-208	**0.719**		0.280	0.289		0.244	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Uranium-235	0.388	U	0.441	0.442		1.17	pCi/g	08/11/14 14:47	08/14/14 13:35	1
Uranium-238	2.51	U	2.63	2.65		3.78	pCi/g	08/11/14 14:47	08/14/14 13:35	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Pb-212	*1.40*		*0.445*	*0.470*		*0.497*	*pCi/g*	*08/11/14 14:47*	*09/02/14 14:33*	*1*
Tl-208	*0.845*		*0.245*	*0.259*		*0.163*	*pCi/g*	*08/11/14 14:47*	*09/02/14 14:33*	*1*

Client Sample ID: SD-279-02

Date Collected: 06/09/14 15:50
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-3

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.0502	U	0.350	0.350		0.595	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Radium-226	**0.600**		0.197	0.206	1.00	0.213	pCi/g	08/11/14 14:47	09/02/14 15:06	1
Actinium 228	**0.771**		0.224	0.237		0.200	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Radium-228	**0.931**		0.357	0.369		0.318	pCi/g	08/11/14 14:47	09/02/14 15:06	1
Bismuth-212	**1.30**		0.565	0.581		0.521	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Bismuth-214	**0.516**		0.153	0.162		0.160	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Lead-210	0.418	U	0.688	0.690		1.05	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Lead-212	**0.472**		0.102	0.119		0.133	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Thorium-232	**0.931**		0.357	0.369		0.318	pCi/g	08/11/14 14:47	09/02/14 15:06	1
Lead-214	**0.552**		0.120	0.133		0.137	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Uranium-235	0.166	U	0.318	0.318		0.509	pCi/g	08/11/14 14:47	09/02/14 15:06	1
Potassium-40	**7.51**		1.37	1.57		1.22	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Uranium-238	1.13	U	1.29	1.30		1.85	pCi/g	08/11/14 14:47	09/02/14 15:06	1
Protactinium-231	-0.730	U	1.23	1.23		2.06	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Radium-226	**1.45**		1.04	1.07	1.00	1.40	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Radium-228	**0.771**		0.224	0.237		0.200	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Thorium-232	**0.771**		0.224	0.237		0.200	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Thorium-234	0.678	U	0.662	0.666		1.04	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Thallium-208	**0.282**		0.0780	0.0833		0.0671	pCi/g	08/11/14 14:47	09/10/14 20:45	1
Uranium-235	0.121	U	0.146	0.147		0.240	pCi/g	08/11/14 14:47	09/10/14 20:45	1

Client Sample ID: SD-279-02

Date Collected: 06/09/14 15:50
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-3

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Uranium-238	0.678	U	0.662	0.666		1.04	pCi/g	08/11/14 14:47	09/10/14 20:45	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Ac-228	*0.931*		*0.357*	*0.369*		*0.318*	*pCi/g*	*08/11/14 14:47*	*09/02/14 15:06*	*1*
Bi-214	*0.600*		*0.197*	*0.206*		*0.213*	*pCi/g*	*08/11/14 14:47*	*09/02/14 15:06*	*1*
K-40	*6.96*		*1.33*	*1.50*		*1.36*	*pCi/g*	*08/11/14 14:47*	*09/02/14 15:06*	*1*
Pb-212	*0.477*		*0.137*	*0.151*		*0.178*	*pCi/g*	*08/11/14 14:47*	*09/02/14 15:06*	*1*
Pb-214	*0.565*		*0.203*	*0.211*		*0.236*	*pCi/g*	*08/11/14 14:47*	*09/02/14 15:06*	*1*
Tl-208	*0.245*		*0.0914*	*0.0949*		*0.105*	*pCi/g*	*08/11/14 14:47*	*09/02/14 15:06*	*1*

Client Sample ID: SD-277-SS

Date Collected: 06/09/14 18:10
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-7

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.431	U	0.429	0.432		0.679	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Radium-226	0.339	U	0.403	0.404	1.00	0.789	pCi/g	08/11/14 14:47	09/02/14 17:48	1
Actinium 228	1.24	U	0.664	0.675		1.36	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Radium-228	**1.13**		0.567	0.577		1.11	pCi/g	08/11/14 14:47	09/02/14 17:48	1
Bismuth-212	1.32	U	2.07	2.07		3.49	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Bismuth-214	**1.18**		0.645	0.655		0.721	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Lead-210	-0.881	U	3.04	3.04		4.06	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Lead-212	**1.37**		0.416	0.442		0.497	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Thorium-232	**1.13**		0.567	0.577		1.11	pCi/g	08/11/14 14:47	09/02/14 17:48	1
Lead-214	0.290	U	0.444	0.445		0.787	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Uranium-235	0.468	U	0.431	0.433		1.45	pCi/g	08/11/14 14:47	09/02/14 17:48	1
Potassium-40	**13.2**		4.53	4.70		6.09	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Uranium-238	3.34	U	2.61	2.63		3.70	pCi/g	08/11/14 14:47	09/02/14 17:48	1
Protactinium-231	0.509	U	0.723	0.725		6.97	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Radium-226	3.09	U	4.49	4.51	1.00	6.23	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Radium-228	1.24	U	0.664	0.675		1.36	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Thorium-232	1.24	U	0.664	0.675		1.36	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Thorium-234	2.22	U	2.52	2.53		3.77	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Thallium-208	**0.501**		0.208	0.214		0.209	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Uranium-235	0.323	U	0.743	0.743		1.08	pCi/g	08/11/14 14:47	08/27/14 10:16	1
Uranium-238	2.22	U	2.52	2.53		3.77	pCi/g	08/11/14 14:47	08/27/14 10:16	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
K-40	*13.3*		*4.56*	*4.74*		*6.14*	*pCi/g*	*08/11/14 14:47*	*09/02/14 17:48*	*1*
Pb-212	*1.57*		*0.433*	*0.465*		*0.491*	*pCi/g*	*08/11/14 14:47*	*09/02/14 17:48*	*1*
Tl-208	*0.751*		*0.234*	*0.245*		*0.184*	*pCi/g*	*08/11/14 14:47*	*09/02/14 17:48*	*1*

Client Sample ID: SD-277-01

Date Collected: 06/09/14 18:15
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-8

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.0953	U	0.448	0.448		1.87	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Radium-226	**1.57**		0.536	0.557	1.00	0.597	pCi/g	08/11/14 14:47	09/03/14 09:10	1
Actinium 228	**1.82**		0.320	0.365		0.366	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Radium-228	**1.30**		0.590	0.603		1.30	pCi/g	08/11/14 14:47	09/03/14 09:10	1
Bismuth-212	0.836	U	1.07	1.08		1.77	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Bismuth-214	**0.901**		0.327	0.338		0.308	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Lead-210	**3.39**		1.27	1.34		1.65	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Lead-212	**1.06**		0.192	0.223		0.219	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Thorium-232	**1.30**		0.590	0.603		1.30	pCi/g	08/11/14 14:47	09/03/14 09:10	1
Lead-214	**1.10**		0.201	0.228		0.208	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Uranium-235	0.244	U	0.237	0.238		1.19	pCi/g	08/11/14 14:47	09/03/14 09:10	1
Potassium-40	**17.3**		2.58	3.08		0.706	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Uranium-238	1.83	U	1.41	1.42		3.52	pCi/g	08/11/14 14:47	09/03/14 09:10	1
Protactinium-231	-0.000753	U	0.00178	0.00179		2.99	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Radium-226	**5.27**		1.97	2.10	1.00	2.04	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Radium-228	**1.82**		0.320	0.365		0.366	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Thorium-232	**1.82**		0.320	0.365		0.366	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Thorium-234	**2.45**		1.07	1.10		1.52	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Thallium-208	**0.468**		0.121	0.130		0.0959	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Uranium-235	0.105	U	0.228	0.229		0.561	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Uranium-238	**2.45**		1.07	1.10		1.52	pCi/g	08/11/14 14:47	08/14/14 16:25	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Bi-214	*1.57*		*0.536*	*0.557*		*0.597*	*pCi/g*	*08/11/14 14:47*	*09/03/14 09:10*	*1*
K-40	*13.0*		*4.11*	*4.30*		*5.28*	*pCi/g*	*08/11/14 14:47*	*09/03/14 09:10*	*1*
Pb-212	*1.48*		*0.354*	*0.388*		*0.405*	*pCi/g*	*08/11/14 14:47*	*09/03/14 09:10*	*1*
Pb-214	*1.33*		*0.450*	*0.468*		*0.531*	*pCi/g*	*08/11/14 14:47*	*09/03/14 09:10*	*1*
Tl-208	*0.670*		*0.215*	*0.224*		*0.169*	*pCi/g*	*08/11/14 14:47*	*09/03/14 09:10*	*1*

Client Sample ID: SD-277-02

Date Collected: 06/09/14 18:20
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-9

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.169	U	0.685	0.685		1.19	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Radium-226	**0.938**		0.197	0.217	1.00	0.201	pCi/g	08/11/14 14:47	09/03/14 09:11	1
Actinium 228	**1.82**		0.745	0.766		0.904	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Radium-228	**1.86**		0.427	0.463		0.246	pCi/g	08/11/14 14:47	09/03/14 09:11	1
Bismuth-212	1.93	U	2.29	2.30		3.74	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Bismuth-214	**1.05**		0.460	0.472		0.489	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Lead-210	1.84	U	2.39	2.40		3.31	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Lead-212	**1.37**		0.288	0.324		0.324	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Thorium-232	**1.86**		0.427	0.463		0.246	pCi/g	08/11/14 14:47	09/03/14 09:11	1

Client Sample ID: SD-277-02
Date Collected: 06/09/14 18:20
Date Received: 06/11/14 09:30

Lab Sample ID: 680-102199-9
Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Lead-214	**0.573**		0.322	0.327		0.531	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Uranium-235	0.170	U	0.307	0.307		0.514	pCi/g	08/11/14 14:47	09/03/14 09:11	1
Potassium-40	**14.9**		3.99	4.24		4.68	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Uranium-238	**1.97**		1.00	1.02		1.47	pCi/g	08/11/14 14:47	09/03/14 09:11	1
Protactinium-231	-0.571	U	3.67	3.67		6.42	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Radium-226	3.97	U	3.25	3.29	1.00	4.53	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Radium-228	**1.82**		0.745	0.766		0.904	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Thorium-232	**1.82**		0.745	0.766		0.904	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Thorium-234	2.14	U	1.21	1.23		3.35	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Thallium-208	**0.418**		0.212	0.216		0.295	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Uranium-235	0.600	U	0.597	0.599		0.973	pCi/g	08/11/14 14:47	08/14/14 16:25	1
Uranium-238	2.14	U	1.21	1.23		3.35	pCi/g	08/11/14 14:47	08/14/14 16:25	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Ac-228	*1.86*		*0.427*	*0.463*		*0.246*	*pCi/g*	*08/11/14 14:47*	*09/03/14 09:11*	*1*
Bi-214	*0.938*		*0.197*	*0.217*		*0.201*	*pCi/g*	*08/11/14 14:47*	*09/03/14 09:11*	*1*
K-40	*20.0*		*2.62*	*3.25*		*0.631*	*pCi/g*	*08/11/14 14:47*	*09/03/14 09:11*	*1*
Pb-212	*1.23*		*0.193*	*0.234*		*0.202*	*pCi/g*	*08/11/14 14:47*	*09/03/14 09:11*	*1*
Pb-214	*1.11*		*0.201*	*0.228*		*0.192*	*pCi/g*	*08/11/14 14:47*	*09/03/14 09:11*	*1*
Tl-208	*0.429*		*0.0995*	*0.108*		*0.0695*	*pCi/g*	*08/11/14 14:47*	*09/03/14 09:11*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-137115/1-A
Matrix: Solid
Analysis Batch: 141130

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 137115

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.2749	U	11.0	11.0	1.00	0.757	pCi/g	08/11/14 14:47	09/02/14 09:53	1
Radium-228	0.07116	U	0.205	0.206		1.23	pCi/g	08/11/14 14:47	09/02/14 09:53	1
Thorium-232	0.07116	U	0.205	0.206		1.23	pCi/g	08/11/14 14:47	09/02/14 09:53	1
Uranium-235	0.01779	U	0.422	0.422		0.767	pCi/g	08/11/14 14:47	09/02/14 09:53	1
Uranium-238	0.8991	U	1.29	1.30		3.01	pCi/g	08/11/14 14:47	09/02/14 09:53	1

Other Detected Radionuclides	*MB Result*	*MB Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*08/11/14 14:47*	*09/02/14 09:53*	*1*

Lab Sample ID: LCS 160-137115/2-A
Matrix: Solid
Analysis Batch: 141135

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 137115

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Americium-241			981	1011		100		1.95	pCi/g	103	87 - 116		
Cesium-137			362	383.2		37.5		1.36	pCi/g	106	87 - 120		
Cobalt-60			383	416.2		40.0		1.03	pCi/g	109	87 - 115		

Lab Sample ID: 680-102199-1 DU
Matrix: Solid
Analysis Batch: 141135

Client Sample ID: SD-279-SS
Prep Type: Total/NA
Prep Batch: 137115

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Radium-226	1.54			0.9620		0.356	1.00	0.360	pCi/g			0.62	1
Radium-228	2.36			1.725		0.428		0.324	pCi/g			0.54	1
Thorium-232	2.36			1.725		0.428		0.324	pCi/g			0.54	1
Uranium-235	0.0442	U		0.2379	U	0.340		0.626	pCi/g			0.17	1
Uranium-238	1.51	U		2.152		1.43		1.94	pCi/g			0.22	1

Lab Sample ID: MB 160-137389/1-A
Matrix: Solid
Analysis Batch: 137825

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 137389

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.01251	U	0.821	0.821		1.45	pCi/g	08/11/14 14:47	08/13/14 18:36	1
Actinium 228	0.1554	U	0.266	0.267		1.08	pCi/g	08/11/14 14:47	08/13/14 18:36	1
Bismuth-212	0.6622	U	1.78	1.78		3.18	pCi/g	08/11/14 14:47	08/13/14 18:36	1
Bismuth-214	-0.03500	U	0.410	0.410		0.657	pCi/g	08/11/14 14:47	08/13/14 18:36	1
Lead-210	0.3779	U	2.00	2.00		3.36	pCi/g	08/11/14 14:47	08/13/14 18:36	1
Lead-212	0.03745	U	0.237	0.237		0.454	pCi/g	08/11/14 14:47	08/13/14 18:36	1
Lead-214	-0.1398	U	0.751	0.751		0.614	pCi/g	08/11/14 14:47	08/13/14 18:36	1
Potassium-40	-1.543	U	6.48	6.48		5.49	pCi/g	08/11/14 14:47	08/13/14 18:36	1
Protactinium-231	-0.2578	U	0.833	0.833		7.22	pCi/g	08/11/14 14:47	08/13/14 18:36	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: MB 160-137389/1-A
Matrix: Solid
Analysis Batch: 137825

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 137389

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.9022	U	4.12	4.13	1.00	5.40	pCi/g	08/11/14 14:47	08/13/14 18:36	1
Radium-228	0.1554	U	0.266	0.267		1.08	pCi/g	08/11/14 14:47	08/13/14 18:36	1
Thorium-232	0.1554	U	0.266	0.267		1.08	pCi/g	08/11/14 14:47	08/13/14 18:36	1
Thorium-234	1.124	U	1.11	1.12		2.97	pCi/g	08/11/14 14:47	08/13/14 18:36	1
Thallium-208	0.03963	U	0.176	0.176		0.256	pCi/g	08/11/14 14:47	08/13/14 18:36	1
Uranium-235	0.2933	U	0.661	0.662		1.11	pCi/g	08/11/14 14:47	08/13/14 18:36	1
Uranium-238	1.124	U	1.11	1.12		2.97	pCi/g	08/11/14 14:47	08/13/14 18:36	1

Lab Sample ID: LCS 160-137389/2-A
Matrix: Solid
Analysis Batch: 137825

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 137389

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Americium-241			981	1059		105		3.49	pCi/g	108	87 - 116		
Cesium-137			363	377.5		37.1		2.26	pCi/g	104	87 - 120		
Cobalt-60			386	427.7		41.2		1.15	pCi/g	111	87 - 115		

Lab Sample ID: 680-102199-1 DU
Matrix: Solid
Analysis Batch: 142798

Client Sample ID: SD-279-SS
Prep Type: Total/NA
Prep Batch: 137389

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Actinium-227	0.616	U		-1.058	U F	0.864		1.39	pCi/g			1.30	1
Actinium 228	2.33			2.130		0.447		0.295	pCi/g			0.20	1
Bismuth-212	3.10			0.5711	U	1.48		2.54	pCi/g			0.82	1
Bismuth-214	1.19			1.081		0.350		0.333	pCi/g			0.14	1
Lead-210	2.59	U		2.573		1.35		1.80	pCi/g			0.01	1
Lead-212	1.31			1.318		0.283		0.240	pCi/g			0.01	1
Lead-214	1.05			1.199		0.280		0.235	pCi/g			0.25	1
Potassium-40	17.2			18.06		3.49		2.51	pCi/g			0.13	1
Protactinium-231	0.405	U		-1.685	U	2.64		4.39	pCi/g			0.67	1
Radium-226	7.19			3.829		2.38	1.00	2.93	pCi/g			0.61	1
Radium-228	2.33			2.130		0.447		0.295	pCi/g			0.20	1
Thorium-232	2.33			2.130		0.447		0.295	pCi/g			0.20	1
Thorium-234	2.48	U		1.594	U	1.66		2.22	pCi/g			0.23	1
Thallium-208	0.503			0.5512		0.155		0.125	pCi/g			0.14	1
Uranium-235	-0.427	U		0.2206	U	0.394		0.615	pCi/g			0.04	1
Uranium-238	2.48	U		1.594	U	1.66		2.22	pCi/g			0.23	1

Rad

Leach Batch: 136662

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102199-1	SD-279-SS	Total/NA	Solid	Dry and Grind	
680-102199-1 DU	SD-279-SS	Total/NA	Solid	Dry and Grind	
680-102199-2	SD-279-01	Total/NA	Solid	Dry and Grind	
680-102199-3	SD-279-02	Total/NA	Solid	Dry and Grind	
680-102199-7	SD-277-SS	Total/NA	Solid	Dry and Grind	
680-102199-8	SD-277-01	Total/NA	Solid	Dry and Grind	
680-102199-9	SD-277-02	Total/NA	Solid	Dry and Grind	

Prep Batch: 137115

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102199-1	SD-279-SS	Total/NA	Solid	Fill_Geo-21	136662
680-102199-1 DU	SD-279-SS	Total/NA	Solid	Fill_Geo-21	136662
680-102199-2	SD-279-01	Total/NA	Solid	Fill_Geo-21	136662
680-102199-3	SD-279-02	Total/NA	Solid	Fill_Geo-21	136662
680-102199-7	SD-277-SS	Total/NA	Solid	Fill_Geo-21	136662
680-102199-8	SD-277-01	Total/NA	Solid	Fill_Geo-21	136662
680-102199-9	SD-277-02	Total/NA	Solid	Fill_Geo-21	136662
LCS 160-137115/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-137115/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

Leach Batch: 137168

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102199-1	SD-279-SS	Total/NA	Solid	Dry and Grind	
680-102199-1 DU	SD-279-SS	Total/NA	Solid	Dry and Grind	
680-102199-2	SD-279-01	Total/NA	Solid	Dry and Grind	
680-102199-3	SD-279-02	Total/NA	Solid	Dry and Grind	
680-102199-7	SD-277-SS	Total/NA	Solid	Dry and Grind	
680-102199-8	SD-277-01	Total/NA	Solid	Dry and Grind	
680-102199-9	SD-277-02	Total/NA	Solid	Dry and Grind	

Prep Batch: 137389

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102199-1	SD-279-SS	Total/NA	Solid	Fill_Geo-0	137168
680-102199-1 DU	SD-279-SS	Total/NA	Solid	Fill_Geo-0	137168
680-102199-2	SD-279-01	Total/NA	Solid	Fill_Geo-0	137168
680-102199-3	SD-279-02	Total/NA	Solid	Fill_Geo-0	137168
680-102199-7	SD-277-SS	Total/NA	Solid	Fill_Geo-0	137168
680-102199-8	SD-277-01	Total/NA	Solid	Fill_Geo-0	137168
680-102199-9	SD-277-02	Total/NA	Solid	Fill_Geo-0	137168
LCS 160-137389/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-0	
MB 160-137389/1-A	Method Blank	Total/NA	Solid	Fill_Geo-0	

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-4
SDG: 680102199-1

Client Sample ID: SD-279-SS

Lab Sample ID: 680-102199-1

Date Collected: 06/09/14 15:40

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			136662	08/07/14 14:45	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			137115	08/11/14 14:47	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	141130	09/02/14 12:02	EMN	TAL SL
Total/NA	Prep	Fill_Geo-0			137389	08/11/14 14:47	JDL	TAL SL
Total/NA	Leach	Dry and Grind			137168	08/12/14 08:31	DRO	TAL SL
Total/NA	Analysis	GA-01-R		1	142436	09/08/14 18:04	EMN	TAL SL

Client Sample ID: SD-279-01

Lab Sample ID: 680-102199-2

Date Collected: 06/09/14 15:45

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Fill_Geo-0			137389	08/11/14 14:47	JDL	TAL SL
Total/NA	Leach	Dry and Grind			137168	08/12/14 08:31	DRO	TAL SL
Total/NA	Analysis	GA-01-R		1	138111	08/14/14 13:35	RTM	TAL SL
Total/NA	Leach	Dry and Grind			136662	08/07/14 14:45	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			137115	08/11/14 14:47	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	141130	09/02/14 14:33	EMN	TAL SL

Client Sample ID: SD-279-02

Lab Sample ID: 680-102199-3

Date Collected: 06/09/14 15:50

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			136662	08/07/14 14:45	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			137115	08/11/14 14:47	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	141148	09/02/14 15:06	EMN	TAL SL
Total/NA	Prep	Fill_Geo-0			137389	08/11/14 14:47	JDL	TAL SL
Total/NA	Leach	Dry and Grind			137168	08/12/14 08:31	DRO	TAL SL
Total/NA	Analysis	GA-01-R		1	143246	09/10/14 20:45	SMP	TAL SL

Client Sample ID: SD-277-SS

Lab Sample ID: 680-102199-7

Date Collected: 06/09/14 18:10

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Fill_Geo-0			137389	08/11/14 14:47	JDL	TAL SL
Total/NA	Leach	Dry and Grind			137168	08/12/14 08:31	DRO	TAL SL
Total/NA	Analysis	GA-01-R		1	140477	08/27/14 10:16	SMP	TAL SL
Total/NA	Leach	Dry and Grind			136662	08/07/14 14:45	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			137115	08/11/14 14:47	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	141130	09/02/14 17:48	EMN	TAL SL

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-4
SDG: 680102199-1

Client Sample ID: SD-277-01

Lab Sample ID: 680-102199-8

Date Collected: 06/09/14 18:15

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Fill_Geo-0			137389	08/11/14 14:47	JDL	TAL SL
Total/NA	Leach	Dry and Grind			137168	08/12/14 08:31	DRO	TAL SL
Total/NA	Analysis	GA-01-R		1	138050	08/14/14 16:25	RTM	TAL SL
Total/NA	Leach	Dry and Grind			136662	08/07/14 14:45	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			137115	08/11/14 14:47	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	141691	09/03/14 09:10	SMP	TAL SL

Client Sample ID: SD-277-02

Lab Sample ID: 680-102199-9

Date Collected: 06/09/14 18:20

Matrix: Solid

Date Received: 06/11/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Fill_Geo-0			137389	08/11/14 14:47	JDL	TAL SL
Total/NA	Leach	Dry and Grind			137168	08/12/14 08:31	DRO	TAL SL
Total/NA	Analysis	GA-01-R		1	138111	08/14/14 16:25	RTM	TAL SL
Total/NA	Leach	Dry and Grind			136662	08/07/14 14:45	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			137115	08/11/14 14:47	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	141692	09/03/14 09:11	SMP	TAL SL

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Certification Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-4
SDG: 680102199-1

Laboratory: TestAmerica Savannah

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
	AFCEE		SAVLAB	
A2LA	DoD ELAP		399.01	02-28-15
A2LA	ISO/IEC 17025		399.01	02-28-15
Alabama	State Program	4	41450	06-30-15
Arkansas DEQ	State Program	6	88-0692	01-31-15
California	NELAP	9	3217CA	07-31-14 *
Colorado	State Program	8	N/A	12-31-14
Connecticut	State Program	1	PH-0161	03-31-15
Florida	NELAP	4	E87052	06-30-15
GA Dept. of Agriculture	State Program	4	N/A	06-12-17
Georgia	State Program	4	N/A	06-30-15
Georgia	State Program	4	803	06-30-15
Guam	State Program	9	09-005r	04-16-15
Hawaii	State Program	9	N/A	06-30-15
Illinois	NELAP	5	200022	11-30-14
Indiana	State Program	5	N/A	06-30-15
Iowa	State Program	7	353	07-01-15
Kentucky (DW)	State Program	4	90084	12-31-14
Kentucky (UST)	State Program	4	18	06-30-15
Louisiana	NELAP	6	30690	06-30-14 *
Louisiana (DW)	NELAP	6	LA140023	12-31-14
Maine	State Program	1	GA00006	08-16-14 *
Maryland	State Program	3	250	12-31-14
Massachusetts	State Program	1	M-GA006	06-30-15
Michigan	State Program	5	9925	06-30-15
Mississippi	State Program	4	N/A	06-30-15
Montana	State Program	8	CERT0081	01-01-15
Nebraska	State Program	7	TestAmerica-Savannah	06-30-15
New Jersey	NELAP	2	GA769	06-30-15
New Mexico	State Program	6	N/A	06-30-15
New York	NELAP	2	10842	03-31-15
North Carolina (DW)	State Program	4	13701	07-31-15
North Carolina (WW/SW)	State Program	4	269	12-31-14
Oklahoma	State Program	6	9984	08-31-14 *
Pennsylvania	NELAP	3	68-00474	06-30-15
Puerto Rico	State Program	2	GA00006	12-31-14
South Carolina	State Program	4	98001	06-30-14 *
Tennessee	State Program	4	TN02961	06-30-15
Texas	NELAP	6	T104704185-08-TX	11-30-14
USDA	Federal		SAV 3-04	06-11-17
Virginia	NELAP	3	460161	06-14-15
Washington	State Program	10	C805	06-10-15
West Virginia (DW)	State Program	3	9950C	12-31-14
West Virginia DEP	State Program	3	94	06-30-15
Wisconsin	State Program	5	999819810	08-31-15
Wyoming	State Program	8	8TMS-L	06-30-15

Laboratory: TestAmerica St. Louis

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

* Certification renewal pending - certification considered valid.

Certification Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-4
SDG: 680102199-1

Laboratory: TestAmerica St. Louis (Continued)

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska	State Program	10	MO00054	06-30-15
California	NELAP	9	2886	03-31-15
Connecticut	State Program	1	PH-0241	03-31-15
Florida	NELAP	4	E87689	06-30-15
Illinois	NELAP	5	200023	11-30-14
Iowa	State Program	7	373	12-01-14
Kansas	NELAP	7	E-10236	10-31-14 *
Kentucky (DW)	State Program	4	90125	12-31-14
L-A-B	DoD ELAP		L2305	01-10-16
Louisiana	NELAP	6	04080	06-30-15
Maryland	State Program	3	310	09-30-15
Missouri	State Program	7	780	06-30-14 *
Nevada	State Program	9	MO000542013-1	07-31-14 *
New Jersey	NELAP	2	MO002	06-30-15
New Mexico	State Program	6		06-30-10 *
New York	NELAP	2	11616	03-31-15
North Dakota	State Program	8	R207	06-30-14 *
NRC	NRC		24-24817-01	12-31-22
Oklahoma	State Program	6	9997	08-31-15
Pennsylvania	NELAP	3	68-00540	02-28-15
South Carolina	State Program	4	85002001	06-30-14 *
Texas	NELAP	6	T104704193-13-6	07-31-15
USDA	Federal		P330-07-00122	01-09-17
Utah	NELAP	8	MO000542013-5	07-31-15
Virginia	NELAP	3	460230	06-14-15
Washington	State Program	10	C592	08-30-15
West Virginia DEP	State Program	3	381	12-31-14 *

* Certification renewal pending - certification considered valid.

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-4
SDG: 680102199-1

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102199-4
SDG: 680102199-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-102199-1	SD-279-SS	Solid	06/09/14 15:40	06/11/14 09:30
680-102199-2	SD-279-01	Solid	06/09/14 15:45	06/11/14 09:30
680-102199-3	SD-279-02	Solid	06/09/14 15:50	06/11/14 09:30
680-102199-7	SD-277-SS	Solid	06/09/14 18:10	06/11/14 09:30
680-102199-8	SD-277-01	Solid	06/09/14 18:15	06/11/14 09:30
680-102199-9	SD-277-02	Solid	06/09/14 18:20	06/11/14 09:30

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102199-4

SDG No.: 680102199-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
25mL Solid_00002	03/01/16		Eckert & Ziegler, Lot 83814-334		(Purchased Reagent)		Americium-241	211 Bq
							Cd-109	2880 Bq
							Ce-139	96 Bq
							Cesium-137	80 Bq
							Co-57	62 Bq
							Cobalt-60	131 Bq
							Hg-203	207 Bq
							Lead-210	2573 Bq
							Sn-113	169 Bq
							Y-88	276 Bq
25mL solid_00003	02/09/17		Eckert & Ziegler, Lot 90099		(Purchased Reagent)		Americium-241	205 Bq
							Cd-109	2883 Bq
							Ce-139	97 Bq
							Cesium-137	82 Bq
							Co-57	64 Bq
							Cobalt-60	129 Bq
							Hg-203	206 Bq
							Lead-210	3630 Bq
							Sn-113	170 Bq
							Y-88	170 Bq
25mLD=1_00001	03/02/16		Eckert & Ziegler, Lot 83925-334		(Purchased Reagent)		Americium-241	867.9 Bq
							Cd-109	12608 Bq
							Ce-139	418.6 Bq
							Cesium-137	349.5 Bq
							Co-57	273 Bq
							Cobalt-60	574.7 Bq
							Hg-203	905.4 Bq
							Sn-113	741.4 Bq
							Y-88	1209 Bq
25mLD=1_00002	02/09/17		Eckert & Ziegler, Lot 90101		(Purchased Reagent)		Americium-241	864.4 Bq
							Cd-109	12507 Bq
							Ce-139	419.6 Bq
							Cesium-137	356.9 Bq
							Co-57	276.6 Bq
							Cobalt-60	561.2 Bq
							Hg-203	893.6 Bq
							Sn-113	738.1 Bq
							Y-88	1214.6 Bq
25mLD=1_00004	03/02/16		Eckert & Ziegler, Lot 81593-334		(Purchased Reagent)		Americium-241	928.5 Bq
							Cesium-137	370.8 Bq
							Cobalt-60	592 Bq
25mLD=1_00005	07/01/66		Eckert & Ziegler, Lot 85520-334		(Purchased Reagent)		Americium-241	912.4 Bq
							Cd-109	12877.9 Bq
							Ce-139	432.4 Bq
							Cesium-137	364.3 Bq
							Co-57	290.2 Bq

Lab Name: TestAmerica St. Louis Job No.: 680-102199-4

SDG No.: 680102199-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Cobalt-60	573.6 Bq
							Hg-203	936.3 Bq
							Sn-113	749.5 Bq
							Y-88	1243.2 Bq
25mLD=1_00006	11/19/14	Eckert & Ziegler, Lot 85520-334			(Purchased Reagent)		Americium-241	2191.11 dpm/g
							Cesium-137	874.93 dpm/g
							Cobalt-60	1377.46 dpm/g
Source C_00001	04/01/59	02/23/12	water, Lot 79670-334	1.0148 g	Gamma Ampuole_00001	1.0148 g	Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
.Gamma Ampuole_00001	04/07/59	Analytics, Lot 79670-334			(Purchased Reagent)		Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
Source D_00001	04/01/59	02/23/11	water, Lot 79670-334	0.9781 g	Gamma Ampuole_00001	0.9781 g	Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
.Gamma Ampuole_00001	04/07/59	Analytics, Lot 79670-334			(Purchased Reagent)		Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
Source H_00002	01/01/51	01/01/12	wataer, Lot 83725-334	10 mL	Gamma Ampuole_00003	2.1184 g	Americium-241	1924.27 Bq
							Cd-109	27950 Bq
							Ce-139	927.965 Bq

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102199-4

SDG No.: 680102199-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Cesium-137	774.911 Bq
							Co-57	605.079 Bq
							Cobalt-60	1273.92 Bq
							Hg-203	2007.23 Bq
							Sn-113	1643.41 Bq
							Y-88	2681.34 Bq
.Gamma Ampuole_00003	01/19/61		Analytics, Lot 83725-334		(Purchased Reagent)		Americium-241	9083.6 Bq
							Cd-109	131939 Bq
							Ce-139	4380.5 Bq
							Cesium-137	3658 Bq
							Co-57	2856.3 Bq
							Cobalt-60	6013.6 Bq
							Hg-203	9475.2 Bq
							Sn-113	7757.8 Bq
							Y-88	12657.4 Bq
Tuna Can LCS_00002	01/22/14		Analytics, Lot 74139-334		(Purchased Reagent)		Americium-241	219 dpm/g
							Cesium-137	82.3 dpm/g
							Cobalt-60	136 dpm/g
Tuna Can LCS_00003	10/31/14		Analytics, Lot 74139-334		(Purchased Reagent)		Americium-241	219 dpm/g
							Cesium-137	82.3 dpm/g
							Cobalt-60	136 dpm/g

Reagent

25mL Solid_00002

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

83814-334

1.0 Liter Sand in 1 Liter Wide Mouth HDPE Silgan Jar

Customer: Test America St. Louis
P.O. No.: 2395112, Item 1
Reference Date: 01-Jan-2011 12:00 PM EST **Grams of Master Source:** 0.016927

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Pb-210	46.5	8.120E+03	———	3.021E+03	0.1	2.1	4.1	4π LS
Am-241	59.5	1.580E+05	———	2.090E+03	0.1	1.7	3.5	4π LS
Cd-109	88.0	4.626E+02	1.697E+05	2.873E+03	0.8	2.3	4.9	HPGe
Co-57	122.1	2.718E+02	8.711E+04	1.475E+03	0.5	2.0	4.1	HPGe
Ce-139	165.9	1.376E+02	1.247E+05	2.111E+03	0.5	1.9	3.9	HPGe
Hg-203	279.2	4.661E+01	2.753E+05	4.660E+03	0.4	1.9	3.9	HPGe
Sn-113	391.7	1.151E+02	1.769E+05	2.994E+03	0.5	1.9	3.9	HPGe
Cs-137	661.7	1.098E+04	1.109E+05	1.877E+03	0.7	1.9	4.0	HPGe
Y-88	898.0	1.066E+02	4.224E+05	7.150E+03	0.5	1.9	3.9	HPGe
Co-60	1173.2	1.925E+03	2.142E+05	3.626E+03	0.6	1.9	4.0	HPGe
Co-60	1332.5	1.925E+03	2.143E+05	3.627E+03	0.6	1.9	4.0	HPGe
Y-88	1836.1	1.066E+02	4.472E+05	7.570E+03	0.5	1.9	3.9	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Corporate Office
Laboratory

Comments:
1550 grams of sand. Homogeneous down to 10 gram aliquot.
This standard will expire one year after the reference date.

Source Prepared by: _____
Z. Dimitrova, Radiochemist

QA Approved: _____ Date: 2/11/11
J. D. McCorvey, QA Manager Alternate

Reagent

25mL solid_00003

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

90099
1.0 Liter Sand in 1 Liter Wide Mouth HDPE Silgan Jar

Customer: TestAmerica St. Louis / Earth City, MO
P.O. No.: 2454150, Item 1
Reference Date: 01-Jan-2012 12:00 PM EST **Grams of Master Source:** 0.017180

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Additional radionuclides were added gravimetrically from solutions calibrated by gamma-ray spectrometry, ionization chamber, or liquid scintillation counting. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty* , % Type u_A	u_B	U	Calibration Method*
Pb-210	46.5	8.109E+03	———	3.094E+03	0.1	2.1	4.1	4π LS
Am-241	59.5	1.580E+05	———	2.037E+03	0.1	1.7	3.5	4π LS
Cd-109	88.0	4.626E+02	1.677E+05	2.881E+03	0.5	2.3	4.7	HPGe
Co-57	122.1	2.718E+02	8.795E+04	1.511E+03	0.4	2.0	4.1	HPGe
Ce-139	165.9	1.376E+02	1.245E+05	2.139E+03	0.4	1.9	3.9	HPGe
Hg-203	279.2	4.661E+01	2.707E+05	4.651E+03	0.3	1.9	3.8	HPGe
Sn-113	391.7	1.151E+02	1.755E+05	3.015E+03	0.4	1.9	3.9	HPGe
Cs-137	661.7	1.098E+04	1.128E+05	1.938E+03	0.7	1.9	4.0	HPGe
Y-88	898.0	1.066E+02	4.228E+05	7.264E+03	0.5	1.9	3.9	HPGe
Co-60	1173.2	1.925E+03	2.084E+05	3.580E+03	0.6	1.9	4.0	HPGe
Co-60	1332.5	1.925E+03	2.084E+05	3.581E+03	0.7	1.9	4.0	HPGe
Y-88	1836.1	1.066E+02	4.476E+05	7.690E+03	0.7	1.9	4.0	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Comments:
1550 grams of sand. Homogenous down to 10 grams aliquot.
This standard will expire one year after the reference date.

Source Prepared by: _____
Z. Dimitrova, Radiochemist

QA Approved: _____ Date: 30 JAN 12
J.D. McCorvey, Counting Room Manager

Reagent

25mLD=1_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

83925-334

5 mL Liquid in Flame Sealed Vial

Customer: Test America St. Louis
P.O. No.: 2401509, Item 2
Reference Date: 01-Jan-2011 12:00 PM EST **Grams of Master Source:** 0.028010

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	1.580E+05	———	3.254E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	4.626E+02	1.697E+05	4.753E+03	0.8	1.7	3.8	HPGe
Co-57	122.1	2.718E+02	8.711E+04	2.440E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	1.376E+02	1.247E+05	3.493E+03	0.5	1.1	2.4	HPGe
Hg-203	279.2	4.661E+01	2.753E+05	7.711E+03	0.4	1.1	2.3	HPGe
Sn-113	391.7	1.151E+02	1.769E+05	4.955E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	1.098E+04	1.109E+05	3.106E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	1.066E+02	4.224E+05	1.183E+04	0.5	1.1	2.4	HPGe
Co-60	1173.2	1.925E+03	2.142E+05	6.000E+03	0.6	1.1	2.5	HPGe
Co-60	1332.5	1.925E+03	2.143E+05	6.003E+03	0.6	1.1	2.5	HPGe
Y-88	1836.1	1.066E+02	4.472E+05	1.253E+04	0.5	1.1	2.4	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Comments:
5.29152 g 4M HCl solution with approximately 30 µg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the reference date.

Source Prepared by: _____
W. Mao, Radiochemist

QA Approved: _____ Date: 2/23/11
J. D. McCorvey, QA Manager Alternate

Reagent

25mLD=1_00002

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

90101
5 mL Liquid in Flame Sealed Vial

Customer: TestAmerica St. Louis / Earth City, MO
P.O. No.: 2454150, Item 3
Reference Date: 01-Jan-2012 12:00 PM EST **Grams of Master Source:** 0.028219

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty* , % Type u_A	u_B	U	Calibration Method*
Am-241	59.5	1.580E+05	———	3.253E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	4.626E+02	1.677E+05	4.733E+03	0.5	1.7	3.5	HPGe
Co-57	122.1	2.718E+02	8.795E+04	2.482E+03	0.4	1.3	2.7	HPGe
Ce-139	165.9	1.376E+02	1.245E+05	3.514E+03	0.4	1.1	2.3	HPGe
Hg-203	279.2	4.661E+01	2.707E+05	7.639E+03	0.3	1.1	2.3	HPGe
Sn-113	391.7	1.151E+02	1.755E+05	4.952E+03	0.4	1.1	2.3	HPGe
Cs-137	661.7	1.098E+04	1.128E+05	3.184E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	1.066E+02	4.228E+05	1.193E+04	0.5	1.1	2.4	HPGe
Co-60	1173.2	1.925E+03	2.084E+05	5.881E+03	0.6	1.1	2.5	HPGe
Co-60	1332.5	1.925E+03	2.084E+05	5.882E+03	0.7	1.1	2.6	HPGe
Y-88	1836.1	1.066E+02	4.476E+05	1.263E+04	0.7	1.1	2.6	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia 30318

Comments:
5.31144g 4M HCl solution with approximately 30 µg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the reference date.

Source Prepared by: _____
M. Williford, Radiochemist

QA Approved: _____ Date: 30 JAN 12
J.D. McCorvey, Counting Room Manager

Reagent

25mLD=1_00004

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

81593-334

5 mL Liquid in Flame Sealed Vial

Customer: Test America/Earth City, MO
P.O. No.: 2344874, Item 2
Reference Date: 01-Jan-2010 12:00 PM EST **Grams of Master Source:** 0.030007

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty , % Type u_A	u_B	U	Calibration Method
Am-241	59.5	1.580E+05	———	3.474E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	4.626E+02	1.606E+05	4.819E+03	0.4	1.7	3.5	HPGe
Co-57	122.1	2.718E+02	8.471E+04	2.542E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	1.376E+02	1.209E+05	3.628E+03	0.4	1.1	2.4	HPGe
Hg-203	279.2	4.661E+01	2.726E+05	8.180E+03	0.4	1.1	2.3	HPGe
Sn-113	391.7	1.151E+02	1.672E+05	5.017E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	1.098E+04	1.096E+05	3.289E+03	0.6	1.2	2.7	HPGe
Y-88	898.0	1.066E+02	4.077E+05	1.223E+04	0.4	1.1	2.4	HPGe
Co-60	1173.2	1.925E+03	2.055E+05	6.166E+03	0.5	1.1	2.4	HPGe
Co-60	1332.5	1.925E+03	2.056E+05	6.169E+03	0.7	1.1	2.6	HPGe
Y-88	1836.1	1.066E+02	4.308E+05	1.293E+04	0.5	1.1	2.4	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

70016
ID: 0.5L Marn LCS_000
Exp:01/01/50 Prpd:JW Opn:03/
Gamma 05L Marn LCS

ACCREDITED SOURCE CALIBRATION LABORATORY
HEALTH PHYSICS SOCIETY
FOUNDED 1956

Comments:
5.31128 grams 4M HCl solution with approximately 30 microg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y.
This standard will expire one year after the reference date.

Source Prepared by: _____
W. Mao, Radiochemist

QA Approved: _____ for _____ Date: 2-22-10
J. D. McCorvey, QA Manager Alternate

Reagent

25mLD=1_00005

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

85520-334

5 mL Liquid in Flame Sealed Vial

Customer: Test America St. Louis
P.O. No.: 2434437, Item 1
Reference Date: 01-Jul-2011 12:00 PM EST **Grams of Master Source:** 0.029166

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	1.580E+05	———	3.368E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	4.626E+02	1.639E+05	4.780E+03	0.5	1.7	3.5	HPGe
Co-57	122.1	2.718E+02	8.758E+04	2.554E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	1.376E+02	1.218E+05	3.552E+03	0.5	1.1	2.4	HPGe
Hg-203	279.2	4.661E+01	2.692E+05	7.851E+03	0.4	1.1	2.3	HPGe
Sn-113	391.7	1.151E+02	1.691E+05	4.932E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	1.098E+04	1.093E+05	3.188E+03	0.6	1.2	2.7	HPGe
Y-88	898.0	1.066E+02	4.105E+05	1.197E+04	0.4	1.1	2.3	HPGe
Co-60	1173.2	1.925E+03	2.022E+05	5.897E+03	0.5	1.1	2.4	HPGe
Co-60	1332.5	1.925E+03	2.022E+05	5.897E+03	0.5	1.1	2.4	HPGe
Y-88	1836.1	1.066E+02	4.346E+05	1.268E+04	0.5	1.1	2.4	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Comments:
5.32298 g 4M HCl solution with approximately 30 µg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the reference date.

Source Prepared by: _____
Z. Dimitrova, Radiochemist

QA Approved: _____ Date: 8/18/11
J. D. McCorvey, QA Manager Alternate

Reagent

25mLD=1_00006

St. Louis Radiological Standard Reverification Form

Standard ID Number: 25mLD=1_00006 (255235)
True Value = 912.96 Bq/Sample
Date Analyzed: 11/19/2013

Radionuclide: Am-241

	Replicates	
#1	952.6	Bq/Sample
#2	944.9	Bq/Sample
#3	929.5	Bq/Sample

Mean = 942.3333

1 sigma = 11.76194

1.96 sigma = 23.05341

True Value minus 5% = 867.312 (True Value - 5%)
True Value plus 5% = 958.608 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? Yes **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? Yes **(Acceptance Criteria)**

Standard Reverification Acceptable? Yes

Note: Criteria for reverification of radiological standards is taken from the DOE QSAS and LANL Statements of Work

Reviewed By/Date: Jody Watson 11/22/13

SOP Reference: STL-QA-0002, Current Revision

St. Louis Radiological Standard Reverification Form

Standard ID Number: 25mLD=1_00006 (255235)
True Value = 364.56 Bq/Sample
Date Analyzed: 11/19/2013

Radionuclide: Cs-137

	Replicates	
#1	384.1	Bq/Sample
#2	379.3	Bq/Sample
#3	375.5	Bq/Sample

Mean = 379.6333

1 sigma = 4.309679

1.96 sigma = 8.446971

True Value minus 5% = 346.332 (True Value - 5%)
True Value plus 5% = 382.788 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? Yes **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? Yes **(Acceptance Criteria)**

Standard Reverification Acceptable? Yes

Note: Criteria for reverification of radiological standards is taken from the DOE QSAS and LANL Statements of Work

Reviewed By/Date: Jody Watson 11/22/13

SOP Reference: STL-QA-0002, Current Revision

St. Louis Radiological Standard Reverification Form

Standard ID Number: 25mLD=1_00006 (255235)
True Value = 573.94 Bq/Sample
Date Analyzed: 11/19/2013

Radionuclide: Co-60

	Replicates	
#1	594.4	Bq/Sample
#2	587.6	Bq/Sample
#3	580.1	Bq/Sample

Mean = 587.3667

1 sigma = 7.152855

1.96 sigma = 14.0196

True Value minus 5% = 545.243 (True Value - 5%)
True Value plus 5% = 602.637 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? Yes **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? Yes **(Acceptance Criteria)**

Standard Reverification Acceptable? Yes

Note: Criteria for reverification of radiological standards is taken from the DOE QSAS and LANL Statements of Work

Reviewed By/Date: Jody Watson 11/22/13

SOP Reference: STL-QA-0002, Current Revision

Gamma LCS per Geometry - 25mL D=1

Reagent ID: 25mLD=1_00006
Container: 255235
Reference date 1/1/2011
Calibration Standard: 85520-334
Standard volume: 5.32298 g/vial
Standard volume transferred: 0.518 g/geometry

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	dpm/g	Bq/sample
Am-241	3368	327.8	0.359	105748.46	912.96
Cs-137	3188	310.2	0.851	42226.51	364.56
Co-60	5897	573.9	0.999856	66479.86	573.94

Reviewed By: Jody Watson

Date: 12/1/2013

SOP Reference: ST-RD-0102, Current Rev **Form:** RAD-0080 **Revised:** 11/27/2013

Test America St. Louis Spectrum ID: 10_85520-334_20130886

Sample Description: 25mL d=1_85520-334_2011Cal
Detector: Ge10 S/N08316756
Batch ID: 25mL d
Work Order Number: 85520-334
Lot Number: 2011Cal

Decay to Time: 7/1/2011 12:00 Live Time: 7200 sec
Acquisition Time: 11/19/2013 12:24:33 Real Time: 7382 sec
Analysis Time: 11/19/2013 14:27 Dead Time: 2.47 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 10_Liquid_D=1 25ml.Clb
Efficiency Cal Desc: 10_25mlD=1_90101_030512
Efficiency Cal Date: 3/7/2012 13:02
Energy Cal Date: 2/23/2012 09:27
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 10_2013-11-02_0117.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
K-40	3.824E+00	46.0	1.757E+00	1.767E+00	5.698E+00
CO-60	5.944E+02	0.3	2.007E+00	2.854E+01	1.216E+00
CS-134	-2.768E-01	142.1	3.933E-01	3.936E-01	2.285E+00
CS-137	3.841E+02	0.4	1.692E+00	1.878E+01	1.408E+00
EU-152	3.968E+01	0.9	3.543E-01	1.957E+00	3.469E+00
EU-154	1.757E+00	31.0	5.454E-01	5.519E-01	1.567E+01
EU-155	1.894E-01	103.1	1.953E-01	1.956E-01	2.497E+00
TL-208	-1.517E-01	1035.0	1.570E+00	1.570E+00	2.567E+00
PB-210	-5.279E+00	33190.0	1.752E+03	1.752E+03	2.261E+01
PB-212	1.052E+00	77.7	8.170E-01	8.190E-01	3.504E+00
PB-214	2.825E-01	206.0	5.819E-01	5.821E-01	2.202E+00
BI-212	2.082E-02	55190.0	1.149E+01	1.149E+01	3.832E+01
BI-214	-5.390E-02	121.4	6.543E-02	6.548E-02	2.226E+00
AC-228	2.041E+00	132.4	2.703E+00	2.705E+00	8.961E+00
Pa-234	2.256E+00	115.7	2.611E+00	2.613E+00	2.093E+00
TH-234	1.136E+00	79.8	9.057E-01	9.074E-01	7.957E+00
PA-234M	5.972E+01	103.4	6.172E+01	6.179E+01	2.259E+02
U-235	5.344E-01	185.0	9.886E-01	9.889E-01	3.283E+00
AM-241	9.526E+02	0.2	2.082E+00	4.724E+01	2.290E+00
Total	2.044E+03				

Analyst: Jody Watson

TestAmerica, Inc Spectrum name: 10_85520-334_20130886.An1

Sample description
25mL d=1_85520-334_2011Cal

Spectrum Filename: C:\User\SPC\Det10\10_85520-334_20130886.An1

Acquisition information
Start time: 11/19/2013 12:24:33 PM
Live time: 7200
Real time: 7382
Dead time: 2.47 %
Detector ID: 10

Detector system
Ge10 S/N08316756

Calibration
Filename: 10_Liquid_D=1 25ml.Clb
10_25mlD=1_90101_030512

Energy Calibration
Created: 2/23/2012 9:27:47 AM
Zero offset: 0.044 keV
Gain: 0.250 keV/channel
Quadratic: -1.974E-08 keV/channel^2

Efficiency Calibration
Created: 3/7/2012 1:02:43 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 2.26 %
Log(Eff): -3.625053E-01 + (-1.308041E-01*Log(E)) +
(-5.582707E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.24 %
Log(Eff): -1.180856E+01 + (4.456856E+00*Log(E)) +
(-5.152261E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.56keV)
Stop channel: 8000 (1999.70keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	7/1/2011 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	10_2013-11-02_0117.PBC 11/2/2013 1:17:18 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 29 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 0.1277

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.56	3337.	4.76	0.91	8.699E-02				
43.58	1070.	14.47	1.31	9.764E-02				
49.50	5519.	5.17	1.29	1.041E-01				
59.51	271894.	0.22	0.87	1.108E-01	59.54	35.900	9.526E+02	AM241
63.26	-4.	62.55	0.68	1.123E-01	63.29	3.810	PBC<MDA	TH234
73.56	277.	35.58	0.73	1.141E-01				
86.54	148.	184.79	0.87	1.131E-01	86.54	30.700	PBC<MDA	EU155
88.00	106174.	0.34	0.91	1.128E-01				
92.39	230.	35.46	0.94	1.118E-01	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	PBC<MDA	AC228
93.07	63.	116.89	0.88	1.116E-01	93.35	5.810	PBC<MDA	U235
					93.35	5.561	7.934E-01	AC228
103.27	266.	36.23	1.01	1.086E-01				
122.02	20666.	0.89	0.95	1.014E-01	121.78	28.580	1.118E+02	EU152
123.10	279.	31.03	0.91	1.010E-01	123.10	40.790	PBC<MDA	EU154
					123.10	40.790	1.140E+00	EU154
136.45	2594.	4.65	0.92	9.535E-02				
145.32	39.	184.98	0.93	9.223E-02	143.79	10.960	PBC<MDA	U235
165.76	2706.	4.84	1.08	8.307E-02				
238.50	-10.	153.05	1.02	6.380E-02	238.63	43.300	PBC<MDA	PB212
289.14	174.	36.58	0.84	5.521E-02				
295.38	34.	133.22	1.08	5.436E-02	295.09	19.300	PBC<MDA	PB214
					295.09	19.300	PBC<MDA	PB214
298.17	88.	77.69	1.08	5.367E-02	300.03	3.280	PBC<MDA	PB212
310.34	185.	52.64	0.97	5.229E-02				
351.89	26.	135.64	1.13	4.742E-02	351.93	37.600	PBC<MDA	PB214
					351.93	37.600	PBC<MDA	PB214
391.69	1154.	9.69	1.31	4.356E-02				

470.49	235.	43.73	0.52	3.757E-02			
563.36	19.	365.02	1.33	3.237E-02	563.24	8.350	PBC<MDA CS134
581.65	-12.	265.63	1.35	3.144E-02	583.02	84.500	PBC<MDA TL208
609.02	97.	55.05	0.46	3.031E-02			
637.18	27.	256.76	1.40	2.917E-02	636.97	7.170	HL>Cutoff I131
661.75	62978.	0.44	1.44	2.824E-02	661.66	85.210	3.841E+02 CS137
672.96	161.	39.59	0.68	2.784E-02			
679.85	140.	39.62	0.59	2.759E-02			
760.25	15.	174.38	0.37	2.505E-02			
766.73	49.	150.11	1.52	2.487E-02	766.41	0.294	PBC<MDA PA234M
					766.41	0.294	9.321E+01 PA234M
875.61	62.	124.16	1.61	2.218E-02	873.23	12.270	PBC<MDA EU154
					873.23	12.270	3.809E+00 EU154
881.75	22.	374.15	1.62	2.201E-02	880.53	6.000	PBC<MDA Pa234
					880.53	6.000	2.360E+00 Pa234
883.51	55.	157.85	1.62	2.195E-02	883.24	9.600	PBC<MDA Pa234
					883.24	9.600	3.626E+00 Pa234
887.17	42.	87.16	0.30	2.187E-02			
898.14	867.	14.16	1.93	2.163E-02			

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
911.67	68.	104.84	1.64	2.136E-02	911.07	29.000	PBC<MDA	AC228
					911.07	29.000	PBC<MDA	AC228
945.53	84.	115.72	1.67	2.065E-02	946.02	13.400	PBC<MDA	Pa234
					946.02	13.400	4.227E+00	Pa234
961.61	74.	125.00	0.29	2.035E-02				
964.21	52.	129.64	1.69	2.030E-02	964.11	14.605	PBC<MDA	EU152
999.49	57.	142.13	1.72	1.963E-02	1001.00	0.837	PBC<MDA	PA234M
					1001.00	0.837	4.795E+01	PA234M
1058.24	145.	38.31	1.77	1.867E-02				
1064.54	96.	54.60	1.77	1.857E-02				
1114.31	79.	97.50	1.81	1.784E-02	1112.07	13.644	PBC<MDA	EU152
1173.48	52543.	0.48	1.87	1.698E-02	1173.24	99.900	5.888E+02	CO60
1278.13	3.	720.12	1.94	1.573E-02	1274.54	35.190	PBC<MDA	EU154
					1274.54	35.190	9.771E-02	EU154
1332.79	47632.	0.47	1.97	1.509E-02	1332.50	99.980	6.001E+02	CO60
1384.11	0.	943.40	0.15	1.457E-02				
1461.10	41.	45.95	2.08	1.384E-02	1460.83	10.670	PBC<MDA	K40
1764.41	13.	121.39	2.30	1.156E-02	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
146.01	36.56	6557.	3337.	3.836E+04	4.76	0.913	-	s
174.08	43.58	7222.	1070.	1.095E+04	11.65	1.311	-	s
197.75	49.50	21690.	5519.	5.302E+04	4.01	1.293	-	s
293.94	73.56	4044.	277.	2.428E+03	35.58	0.729	-	
351.68	88.00	6705.	106034.	9.401E+05	0.33	0.908	-	
412.72	103.27	2692.	288.	2.650E+03	26.18	1.009	-	s
545.42	136.45	2982.	2594.	2.720E+04	4.65	0.918	-	
662.58	165.76	3230.	2723.	3.278E+04	3.52	1.081	-	M
1155.97	289.14	1448.	174.	3.146E+03	36.58	0.841	-	
1240.73	310.34	2536.	185.	3.538E+03	52.64	0.975	-	s
1566.08	391.69	2726.	1154.	2.650E+04	9.69	1.314	-	sM
1881.20	470.49	2816.	235.	6.255E+03	43.73	0.517	-	sM
2435.26	609.02	918.	97.	3.201E+03	55.05	0.463	-	l
2690.99	672.96	1064.	161.	5.784E+03	39.59	0.682	-	s
2718.57	679.85	925.	140.	5.068E+03	39.62	0.588	-	s
3040.13	760.25	365.	15.	5.988E+02	174.38	0.373	-	sc
3547.85	887.17	649.	42.	1.921E+03	87.16	0.303	-	sc
3591.76	898.14	2750.	867.	4.008E+04	14.16	1.934	-	s
3846.02	961.61	1602.	89.	4.372E+03	64.51	1.688	-	sc
4231.43	1058.04	992.	82.	4.393E+03	67.44	0.660	-	sM
4256.63	1064.33	615.	96.	5.189E+03	40.61	0.783	-	sM

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.76	59.51	19516.	271894.	37.763	0.22	0.871
EU-155	345.84	86.54	37248.	148.	0.021	184.79	0.868s
TH-234	370.03	92.59	2618.	90.	0.013	31.06	0.874D
AC-228	373.06	93.35	3130.	178.	0.025	37.31	0.875D
U-235	373.06	93.35	2659.	63.	0.009	116.89	0.875D
EU-155	421.51	105.47	3920.	-86.	-0.012	103.12	0.888s
EU-152	487.70	122.02	3345.	20666.	2.870	0.89	0.953
EU-154	492.02	123.10	3606.	279.	0.039	31.03	0.906s
U-235	580.84	145.32	2569.	39.	0.005	184.98	0.927s
U-235	653.07	163.38	8287.	-43.	-0.006	299.93	0.947s
U-235	825.82	206.58	3458.	-83.	-0.011	101.36	0.989s
PB-214	969.66	242.55	3847.	-86.	-0.012	133.34	1.025s
I-131	1136.45	284.26	3570.	-91.	-0.013	93.20	1.067s
PB-214	1180.93	295.38	3364.	34.	0.005	133.22	1.078s
PB-212	1192.08	298.17	2310.	88.	0.012	77.69	1.083s
PB-214	1406.89	351.89	3601.	26.	0.004	135.64	1.133s
I-131	1456.06	364.18	3640.	-48.	-0.007	177.39	1.146s
BE-7	1911.46	478.06	4149.	-69.	-0.010	131.92	1.254s
CS-134	2252.64	563.36	2342.	19.	0.003	365.02	1.334
Pa-234	2281.22	570.51	2335.	-52.	-0.007	132.63	1.340s
CS-134	2417.43	604.57	2168.	-47.	-0.006	142.10	1.372s
I-131	2547.87	637.18	2365.	27.	0.004	256.76	1.402s
CS-137	2646.16	661.75	2397.	62978.	8.747	0.44	1.439
EU-154	2910.17	727.75	1325.	-27.	-0.004	190.97	1.480s
PA-234M	3066.09	766.73	2689.	49.	0.007	150.11	1.518s
EU-152	3113.07	778.48	2758.	-28.	-0.004	263.30	1.529s
BI-212	3144.65	786.37	2795.	-41.	-0.006	183.10	1.535s
CS-134	3183.63	796.12	2892.	-46.	-0.006	166.15	1.544s
CS-134	3207.84	802.17	2971.	-29.	-0.004	262.61	1.550s
EU-154	3501.60	875.61	2890.	62.	0.009	124.16	1.612s
Pa-234	3526.20	881.75	3514.	22.	0.003	374.15	1.618s
Pa-234	3533.23	883.51	3745.	55.	0.008	157.85	1.620s
AC-228	3645.86	911.67	4060.	68.	0.009	104.84	1.644s
Pa-234	3781.33	945.53	4707.	84.	0.012	115.72	1.674s
EU-152	3855.66	964.11	2242.	52.	0.007	129.64	1.690D
EU-154	3990.97	997.93	3509.	-28.	-0.004	303.26	1.717s
PA-234M	3997.21	999.49	3221.	57.	0.008	142.13	1.721s
EU-152	4456.58	1114.31	2915.	79.	0.011	97.50	1.812
CO-60	4693.31	1173.48	1520.	52543.	7.298	0.48	1.870
EU-154	5112.06	1278.13	266.	3.	0.000	720.12	1.942s
CO-60	5330.75	1332.79	405.	47632.	6.616	0.47	1.965
EU-152	5634.63	1408.73	198.	-16.	-0.002	126.85	2.045s
K-40	5844.24	1461.10	154.	41.	0.006	45.95	2.084s
BI-214	7058.13	1764.41	125.	13.	0.002	121.39	2.301s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-2.4666E+00				5.31E+01	
			477.60	-2.467E+00	&(	1.077E+01 1.32E+02 1.05E+01	G
K-40	N	3.8242E+00				4.66E+11	
			1460.83	3.824E+00	?(	5.698E+00 4.60E+01 1.07E+01	G
CO-60	F	5.9444E+02				1.93E+03	
			1332.50	6.001E+02	(	1.216E+00 4.74E-01 1.00E+02	G
			1173.24	5.888E+02	(	2.066E+00 4.80E-01 9.99E+01	G
I-131	I	-1.9688E-02				8.02E+00	
			364.48	-1.785E-01	&(	1.050E+00 1.77E+02 8.17E+01	G
			284.30	-3.704E+00	+	1.141E+01 9.32E+01 6.14E+00	G
			636.97	1.790E+00	?(	1.528E+01 2.57E+02 7.17E+00	G
CS-134	I	-2.7680E-01				7.54E+02	
			604.71	-4.845E-01	?(	2.285E+00 1.42E+02 9.76E+01	G
			795.87	-6.911E-01	+	3.809E+00 1.66E+02 8.55E+01	G
			569.32	-1.016E-01	&	1.436E+01 4.24E+03 1.54E+01	G
			801.95	-4.385E+00	&	3.825E+01 2.63E+02 8.69E+00	G
			563.24	2.152E+00	(	2.614E+01 3.65E+02 8.35E+00	G
CS-137	I	3.8408E+02				1.10E+04	
			661.66	3.841E+02	(	1.408E+00 4.41E-01 8.52E+01	G
EU-152	F	3.9683E+01				4.94E+03	
			344.29	8.202E-02	&(	3.469E+00 1.27E+03 2.65E+01	G
			121.78	1.118E+02	(	1.473E+00 8.93E-01 2.86E+01	G
			778.92	-1.399E+00	-	1.224E+01 2.63E+02 1.29E+01	G
			964.11	2.750E+00	(	1.182E+01 1.30E+02 1.46E+01	G
			1112.07	5.084E+00	(	1.640E+01 9.75E+01 1.36E+01	G
			1408.00	-8.350E-01	-	3.563E+00 1.27E+02 2.10E+01	G
EU-154	I	1.7573E+00				3.14E+03	
			873.23	3.809E+00	&(	1.567E+01 1.24E+02 1.23E+01	G
			123.10	1.140E+00	?(	1.155E+00 3.10E+01 4.08E+01	G
			1274.54	9.771E-02	-	2.394E+00 7.20E+02 3.52E+01	G
			723.36	-8.627E-01	-	5.487E+00 1.91E+02 2.02E+01	G
			1004.77	-9.286E-02	%	1.365E+01 4.42E+03 1.80E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			996.33	-2.231E+00 +		2.247E+01	3.03E+02	1.06E+01 G
EU-155	I	1.8944E-01					1.81E+03	
			105.31	-7.322E-01 ?(		2.497E+00	1.03E+02	2.12E+01 G
			86.54	8.259E-01 ?(		5.039E+00	1.85E+02	3.07E+01 G
TL-208	N	-1.5170E-01					6.98E+02	
			583.02	-1.517E-01 &(P		2.567E+00	2.66E+02	8.45E+01 G
			277.28	5.226E-01 %		2.574E+01	1.48E+03	6.31E+00 G
			860.56	-9.312E-01 %		3.211E+01	1.04E+03	1.24E+01 G
PB-210	N	-5.2791E+00					8.14E+03	
			46.54	-5.279E+00 %(P		2.261E+01	1.67E+04	4.25E+00 G
PB-212	N	1.0517E+00					6.98E+02	
			238.63	-1.243E-01 %(P		3.504E+00	1.53E+02	4.33E+01 G
			300.03	1.658E+01 &(		4.254E+01	7.77E+01	3.28E+00 G
PB-214	N	2.8253E-01					5.84E+05	
			351.93	1.996E-01 (P		2.202E+00	1.36E+02	3.76E+01 G
			295.09	4.441E-01 (P		3.618E+00	1.33E+02	1.93E+01 G
			242.00	-2.557E+00 & P		8.647E+00	1.33E+02	7.43E+00 G
BI-212	N	2.0819E-02					6.98E+02	
			727.17	2.082E-02 &(		3.832E+01	5.52E+04	7.55E+00 G
			785.42	-4.344E+01 &		2.640E+02	1.83E+02	1.28E+00 G
BI-214	N	-5.3900E-02					5.84E+05	
			609.31	-4.210E-01 %(P		2.226E+00	1.72E+03	4.61E+01 G
			1120.29	-8.208E-01 % P		1.304E+01	1.98E+03	1.51E+01 G
			1764.49	1.045E+00 ?(		4.283E+00	1.21E+02	1.54E+01 G
AC-228	N	2.0409E+00					2.10E+03	
			911.07	2.041E+00 ?(P		8.961E+00	1.05E+02	2.90E+01 G
			968.97	-1.034E+00 & P		1.572E+01	2.29E+03	1.75E+01 G
			338.32	-6.700E-01 & P		8.740E+00	1.02E+05	1.20E+01 G
							Energy duplication	
			93.35	5.323E+00 & P		7.865E+00	3.73E+01	5.56E+00 XA
Pa-234	N	2.2562E+00					1.63E+12	
			131.29	2.367E-02 &(		2.093E+00	2.66E+03	1.80E+01 G
			569.47	-2.736E+00 &		1.204E+01	1.33E+02	8.20E+00 G
			946.02	4.227E+00 ?(		1.618E+01	1.16E+02	1.34E+01 G
			883.24	3.626E+00 &(		1.897E+01	1.58E+02	9.60E+00 G
			880.53	2.360E+00 &(		2.933E+01	3.74E+02	6.00E+00 G
TH-234	N	1.1356E+00					1.63E+12	
			63.29	-1.452E-01 %(P		7.957E+00	6.25E+01	3.81E+00 G
			92.59	2.009E+00 (P		5.367E+00	3.11E+01	5.58E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234M	N	5.9718E+01					1.63E+12	
			1001.00	4.795E+01	&(	2.259E+02	1.42E+02	8.37E-01 G
			766.41	9.321E+01	&(	4.641E+02	1.50E+02	2.94E-01 G
U-235	N	5.3442E-01					2.57E+11	
			143.79	5.344E-01	?(	3.283E+00	1.85E+02	1.10E+01 G
			205.33	-3.212E+00	&	1.077E+01	1.01E+02	5.01E+00 G
			163.38	-1.398E+00	&	1.389E+01	3.00E+02	5.08E+00 G
								Energy duplication
			93.35	1.345E+00		5.208E+00	1.17E+02	5.81E+00 X
AM-241	T	9.5260E+02					1.58E+05	
			59.54	9.526E+02	(	2.290E+00	2.19E-01	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
EU-155	86.54	37248.	148.	0.021	184.79	8.259E-01	
AC-228	93.35	3130.	178.	0.025	37.31	5.323E+00	P
EU-155	105.47	3920.	-86.	-0.012	103.12	-7.322E-01	
EU-154	123.10	3606.	279.	0.039	31.03	1.140E+00	
PB-214	242.55	3847.	-86.	-0.012	133.34	-2.557E+00	P
I-131	284.26	3570.	-91.	-0.013	93.20	0.000E+00	
PB-214	295.38	3364.	34.	0.005	133.22	4.441E-01	P
PB-212	298.17	2310.	88.	0.012	77.69	1.658E+01	
PB-214	351.89	3601.	26.	0.004	135.64	1.996E-01	P
I-131	364.18	3640.	-48.	-0.007	177.39	0.000E+00	
BE-7	478.06	4149.	-69.	-0.010	131.92	0.000E+00	
Pa-234	570.51	2335.	-52.	-0.007	132.63	-2.736E+00	
I-131	637.18	2365.	27.	0.004	256.76	0.000E+00	
EU-154	727.75	1325.	-27.	-0.004	190.97	-8.627E-01	
PA-234M	766.73	2689.	49.	0.007	150.11	9.321E+01	
BI-212	786.37	2795.	-41.	-0.006	183.10	-4.344E+01	
EU-154	875.61	2890.	62.	0.009	124.16	3.809E+00	
Pa-234	881.75	3514.	22.	0.003	374.15	2.360E+00	
Pa-234	883.51	3745.	55.	0.008	157.85	3.626E+00	
AC-228	911.67	4060.	68.	0.009	104.84	2.041E+00	P
Pa-234	945.53	4707.	84.	0.012	115.72	4.227E+00	
EU-154	997.93	3509.	-28.	-0.004	303.26	-2.231E+00	
PA-234M	999.49	3221.	57.	0.008	142.13	4.795E+01	
EU-154	1278.13	266.	3.	0.000	720.12	9.771E-02	
K-40	1461.10	154.	41.	0.006	45.95	3.824E+00	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting		MDA Bq/Sample
BE-7	#A	-2.4666E+00	>12 Halflives	1.3192E+02%	1.0774E+01	
K-40	#A	3.8242E+00	3.8242E+00	4.595E+01%		5.70E+00
CO-60		4.3427E+02	5.9444E+02	3.376E-01%		1.22E+00
I-131	#A	-1.9688E-02	>12 Halflives	1.5604E+02%	1.0501E+00	
CS-134	A	-1.2419E-01	-2.7680E-01	1.421E+02%		2.28E+00
CS-137		3.6346E+02	3.8408E+02	4.405E-01%		1.41E+00
EU-152	C	3.5117E+01	3.9683E+01	8.928E-01%		3.47E+00
EU-154	#A	1.4495E+00	1.7573E+00	3.103E+01%		1.57E+01
EU-155	#A	1.3570E-01	1.8944E-01	1.031E+02%		2.50E+00
TL-208	#A	-6.3781E-02	-1.5170E-01	1.035E+03%		2.57E+00
PB-210	#A	-4.9016E+00	-5.2791E+00	3.319E+04%		2.26E+01

PB-212	#A	4.4216E-01	1.0517E+00	7.769E+01%	3.50E+00
PB-214	#A	2.8224E-01	2.8253E-01	2.060E+02%	2.20E+00
BI-212	A	8.7531E-03	2.0819E-02	5.519E+04%	3.83E+01
BI-214	#A	-5.3844E-02	-5.3900E-02	1.214E+02%	2.23E+00
AC-228	#A	1.5305E+00	2.0409E+00	1.324E+02%	8.96E+00
Pa-234	#C	2.2562E+00	2.2562E+00	1.157E+02%	2.09E+00
TH-234	A	1.1356E+00	1.1356E+00	7.975E+01%	7.96E+00
PA-234M	#A	5.9718E+01	5.9718E+01	1.034E+02%	2.26E+02
U-235	A	5.3442E-01	5.3442E-01	1.850E+02%	3.28E+00
AM-241		9.4896E+02	9.5260E+02	2.186E-01%	2.29E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (1057.9 to 1999.7 keV) 1.747E+03 Bq/Sample
Total Decayed Activity (1057.9 to 1999.7 keV) 1.9311187E+03 Bq/Sample

The library has energies which are not separable.

Test America St. Louis Spectrum ID: 11_85520-334_20131678

Sample Description: 25mL d=1_85520-334_2011Cal
Detector: Ge11 S/N09363993
Batch ID: 25mL d
Work Order Number: 85520-334
Lot Number: 2011Cal

Decay to Time: 7/1/2011 12:00 Live Time: 7200 sec
Acquisition Time: 11/21/2013 10:41:53 Real Time: 7391 sec
Analysis Time: 11/22/2013 08:47 Dead Time: 2.58 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 11_Liquid_D=1 25ml.Clb
Efficiency Cal Desc: 11_25mLd=1cal_90101_032712
Efficiency Cal Date: 4/2/2012 17:34
Energy Cal Date: 2/28/2012 13:09
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 11_2013-11-02_0145.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
K-40	-4.291E-01	495.4	2.126E+00	2.126E+00	6.105E+00
CO-60	5.876E+02	0.3	1.928E+00	2.820E+01	1.130E+00
CS-134	3.347E-01	210.0	7.030E-01	7.032E-01	2.335E+00
CS-137	3.793E+02	0.4	1.642E+00	1.854E+01	1.394E+00
EU-152	3.881E+01	0.8	3.041E-01	1.906E+00	3.281E+00
EU-154	6.352E+01	0.8	4.846E-01	3.108E+00	1.160E+01
EU-155	-1.068E+00	60.0	6.405E-01	6.429E-01	2.110E+00
TL-208	6.654E-01	114.6	7.628E-01	7.635E-01	2.732E+00
PB-210	-6.363E+01	12.4	7.887E+00	8.881E+00	2.279E+01
PB-212	-3.044E-01	150.9	4.595E-01	4.598E-01	2.602E+00
PB-214	2.033E-01	300.8	6.114E-01	6.115E-01	2.037E+00
BI-212	4.626E+00	81.3	3.761E+00	3.767E+00	3.779E+01
BI-214	1.548E+00	44.6	6.910E-01	6.951E-01	1.665E+00
AC-228	7.662E-01	214.0	1.640E+00	1.640E+00	7.619E+00
Pa-234	1.311E+00	103.8	1.361E+00	1.362E+00	2.050E+00
TH-234	-6.300E+01	6.3	3.995E+00	5.043E+00	1.142E+01
PA-234M	-4.522E+01	244.2	1.104E+02	1.104E+02	2.266E+02
U-235	6.141E-02	184.1	1.130E-01	1.131E-01	3.611E+00
AM-241	9.449E+02	0.2	2.004E+00	4.685E+01	2.220E+00
Total	2.024E+03				

Analyst: Jody Watson

TestAmerica, Inc Spectrum name: 11_85520-334_20131678.An1

Sample description
25mL d=1_85520-334_2011Cal

Spectrum Filename: C:\User\SPC\Det11\11_85520-334_20131678.An1

Acquisition information
Start time: 11/21/2013 10:41:53 AM
Live time: 7200
Real time: 7391
Dead time: 2.58 %
Detector ID: 11

Detector system
Ge11 S/N09363993

Calibration
Filename: 11_Liquid_D=1 25ml.Clb
11_25mLd=1cal_90101_032712

Energy Calibration
Created: 2/28/2012 1:09:34 PM
Zero offset: 0.055 keV
Gain: 0.250 keV/channel
Quadratic: -2.946E-08 keV/channel^2

Efficiency Calibration
Created: 4/2/2012 5:34:04 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 2.41 %
Log(Eff): -6.288737E-01 + (-1.993453E-02*Log(E)) + (-6.475168E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.36 %
Log(Eff): -1.198743E+01 + (4.557082E+00*Log(E)) + (-5.253999E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.58keV)
Stop channel: 8000 (1999.47keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	7/1/2011 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	11_2013-11-02_0145.PBC 11/2/2013 1:45:59 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 14 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 0.1385

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.67	3345.	5.41	0.91	9.166E-02				
43.68	1247.	13.82	1.53	1.033E-01				
49.67	6428.	4.68	1.47	1.104E-01				
59.59	286616.	0.21	0.87	1.178E-01	59.54	35.900	9.449E+02	AM241
74.96	140.	73.84	0.44	1.217E-01				
86.54	88.	231.75	0.94	1.208E-01	86.54	30.700	PBC<MDA	EU155
88.06	111216.	0.35	0.91	1.205E-01				
92.62	-62.	130.72	0.94	1.194E-01	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	PBC<MDA	AC228
93.94	77.	119.25	0.94	1.192E-01	93.35	5.561	PBC<MDA	AC228
					93.35	5.810	1.549E+00	U235
93.94	77.	119.25	0.94	1.192E-01	93.35	5.561	PBC<MDA	AC228
					93.35	5.810	1.549E+00	U235
98.98	109.	64.03	0.69	1.175E-01				
122.11	21697.	0.83	0.94	1.085E-01	121.78	28.580	1.097E+02	EU152
					123.10	40.790	8.292E+01	EU154
					121.78	28.580	1.097E+02	EU152
136.54	2679.	4.39	0.98	1.020E-01				
154.95	118.	56.79	0.75	9.367E-02				
163.38	21.	617.59	1.01	8.992E-02	163.38	5.080	PBC<MDA	U235
165.98	2794.	4.66	1.03	8.867E-02				
205.45	25.	363.00	1.05	7.647E-02	205.33	5.010	PBC<MDA	U235
253.63	122.	58.79	1.09	6.563E-02				
255.11	125.	50.56	1.09	6.535E-02				
296.34	-3.	333.55	1.13	5.862E-02	295.09	19.300	PBC<MDA	PB214
299.50	58.	150.95	1.13	5.789E-02	300.03	3.280	PBC<MDA	PB212
338.80	33.	265.49	1.17	5.280E-02	338.32	12.010	PBC<MDA	AC228
					338.32	12.010	9.670E-01	AC228

353.17	28.	112.62	1.18	5.121E-02	351.93	37.600	PBC<MDA	PB214
364.53	110.	82.05	1.19	4.982E-02	364.48	81.700	HL>Cutoff	I131
					364.48	81.700	HL>Cutoff	I131
391.52	1029.	11.99	1.29	4.709E-02				
398.80	200.	45.02	0.52	4.640E-02				
604.44	35.	210.03	1.40	3.295E-02	604.71	97.620	PBC<MDA	CS134
609.74	168.	34.72	0.39	3.274E-02	609.31	46.090	PBC<MDA	BI214
661.81	67180.	0.43	1.42	3.050E-02	661.66	85.210	3.793E+02	CS137
723.38	38.	191.70	1.50	2.824E-02	723.36	20.220	PBC<MDA	EU154
					723.36	20.220	1.113E+00	EU154
787.04	272.	33.45	0.80	2.622E-02	785.42	1.280	2.680E+02	BI212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
861.19	74.	114.64	1.62	2.422E-02	860.56	12.420	PBC<MDA	TL208
880.36	80.	110.33	1.64	2.373E-02	880.53	6.000	PBC<MDA	Pa234
883.20	14.	637.00	1.64	2.366E-02	883.24	9.600	PBC<MDA	Pa234
898.25	858.	15.97	1.53	2.331E-02				
913.96	25.	335.80	1.66	2.301E-02	911.07	29.000	PBC<MDA	AC228
					911.07	29.000	6.830E-01	AC228
943.60	48.	94.23	0.54	2.229E-02				
964.07	58.	168.09	1.71	2.186E-02	964.11	14.605	PBC<MDA	EU152
					964.11	14.605	2.868E+00	EU152
1112.66	66.	130.32	1.83	1.917E-02	1112.07	13.644	PBC<MDA	EU152
					1112.07	13.644	3.940E+00	EU152
1152.21	83.	44.48	0.43	1.855E-02				
1168.25	95.	43.32	1.87	1.831E-02				
1173.46	56258.	0.43	1.88	1.824E-02	1173.24	99.900	5.874E+02	CO60
1332.74	50320.	0.46	1.99	1.617E-02	1332.50	99.980	5.919E+02	CO60
1460.75	-5.	52.32	2.10	1.481E-02	1460.83	10.670	PBC<MDA	K40
1764.81	3.	74.86	2.34	1.232E-02	1764.49	15.400	PBC<MDA	BI214
1836.31	439.	7.59	2.12	1.184E-02				

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
146.36	36.67	8005.	3345.	3.649E+04	5.41	0.911	-	s
174.40	43.68	8538.	1247.	1.208E+04	10.85	1.528	-	s
198.34	49.67	24129.	6504.	5.891E+04	3.60	1.470	-	s
299.45	74.96	4520.	140.	1.150E+03	73.84	0.439	-	sc
351.82	88.06	8343.	111130.	9.225E+05	0.32	0.907	-	
395.45	98.98	1905.	109.	9.273E+02	64.03	0.686	-	s
545.63	136.54	2901.	2679.	2.626E+04	4.39	0.981	-	
619.21	154.95	1640.	118.	1.260E+03	56.79	0.746	-	s
663.31	165.98	3264.	2790.	3.147E+04	3.46	1.033	-	
1013.77	253.69	2508.	122.	1.858E+03	58.79	1.090	-	D
1019.67	255.16	1943.	125.	1.917E+03	50.56	1.092	-	D
1565.14	391.52	3277.	1029.	2.186E+04	11.99	1.292	-	
1594.24	398.80	2248.	200.	4.299E+03	45.02	0.515	-	s
3147.08	787.04	1802.	190.	7.233E+03	32.47	0.803	-	sM
3591.96	898.25	3254.	858.	3.679E+04	15.97	1.533	-	s
3773.39	943.60	942.	48.	2.175E+03	90.62	0.536	-	sc
4608.13	1152.21	480.	83.	4.474E+03	44.48	0.433	-	s
4672.26	1168.24	270.	18.	9.829E+02	131.23	0.520	-	sc
7346.62	1836.31	96.	439.	3.707E+04	7.59	2.120	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	188.90	47.31	21904.	-1933.	-0.268	11.71	0.901s
AM-241	237.97	59.59	20715.	286616.	39.808	0.21	0.874
TH-234	245.11	61.37	6356.	-2065.	-0.287	6.09	0.916s
EU-155	345.74	86.54	20652.	88.	0.012	231.75	0.938s
TH-234	370.02	92.62	4388.	-62.	-0.009	130.72	0.943s
AC-228	372.95	93.35	4202.	77.	0.011	119.25	0.944D
U-235	372.95	93.35	4202.	77.	0.011	119.25	0.944D
EU-155	415.96	104.11	3190.	-135.	-0.019	59.99	0.955s
EU-152	487.94	122.11	3615.	21720.	3.017	0.78	0.970
EU-154	487.94	122.11	2912.	21778.	3.025	0.76	0.971s
Pa-234	526.95	131.87	3474.	-81.	-0.011	103.78	0.979s
U-235	576.04	144.15	3575.	-46.	-0.006	184.07	0.990s
U-235	652.92	163.38	8768.	21.	0.003	617.59	1.008s
U-235	821.14	205.45	3965.	25.	0.003	363.00	1.047s
PB-212	966.60	241.83	2456.	-99.	-0.014	167.56	1.077s
TL-208	1111.64	278.11	3977.	-69.	-0.010	130.72	1.112s
PB-212	1197.17	299.50	3852.	58.	0.008	150.95	1.132s
AC-228	1354.33	338.80	3842.	33.	0.005	265.49	1.167s
PB-214	1411.76	353.17	3594.	28.	0.004	112.62	1.179s
I-131	1457.21	364.53	3994.	110.	0.015	82.05	1.190s
BE-7	1907.82	477.21	4669.	-116.	-0.016	83.96	1.290s
CS-134	2248.07	562.29	2403.	-55.	-0.008	126.53	1.365s
CS-134	2416.67	604.44	2641.	35.	0.005	210.03	1.401s
BI-214	2437.87	609.74	1459.	168.	0.023	34.72	0.392s
I-131	2546.13	636.81	2577.	-39.	-0.005	183.43	1.429s
CS-137	2646.13	661.81	2747.	67180.	9.331	0.43	1.419
EU-154	2892.42	723.38	2598.	38.	0.005	191.70	1.503s
BI-212	2910.25	727.84	2645.	-54.	-0.007	136.02	1.507s
PA-234M	3065.25	766.59	2772.	-62.	-0.009	134.32	1.540s
BI-212	3145.62	786.68	2667.	83.	0.011	89.05	1.556
CS-134	3223.04	806.03	1854.	-16.	-0.002	370.97	1.570s
TL-208	3443.70	861.19	3590.	74.	0.010	114.64	1.620s
EU-154	3472.72	868.44	1828.	-35.	-0.005	173.99	1.630s
Pa-234	3520.40	880.36	3827.	80.	0.011	110.33	1.637s
Pa-234	3531.77	883.20	3903.	14.	0.002	637.00	1.639s
AC-228	3654.81	913.96	3398.	25.	0.003	335.80	1.662s
EU-152	3855.31	964.07	4776.	58.	0.008	168.09	1.706s
AC-228	3870.98	967.99	4197.	-96.	-0.013	95.99	1.710s
EU-154	3977.94	994.72	3446.	-25.	-0.003	332.05	1.733s
PA-234M	4002.04	1000.74	3761.	-58.	-0.008	197.51	1.737s
EU-152	4449.87	1112.66	3627.	66.	0.009	130.32	1.828s
CO-60	4693.09	1173.44	1670.	55858.	7.758	0.47	1.829
EU-154	5093.29	1273.44	463.	-22.	-0.003	138.63	1.958s
CO-60	5330.62	1332.74	401.	50320.	6.989	0.46	1.993

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	5641.49	1410.41	192.	-13.	-0.002	151.92	2.064s
K-40	5843.00	1460.75	205.	-5.	-0.001	52.32	2.105s
BI-214	7060.30	1764.81	187.	3.	0.000	74.86	2.336s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-3.8111E+00				5.31E+01	
			477.60	-3.811E+00	&(	1.057E+01 8.40E+01	1.05E+01 G
K-40	N	-4.2914E-01				4.66E+11	
			1460.83	-4.291E-01	&(P	6.105E+00 5.23E+01	1.07E+01 G
CO-60	F	5.8755E+02				1.93E+03	
			1332.50	5.919E+02	(	1.130E+00 4.60E-01	1.00E+02 G
			1173.24	5.832E+02	(	2.017E+00 4.68E-01	9.99E+01 G
I-131	I	3.7561E-01				8.02E+00	
			364.48	3.756E-01	(	1.018E+00 8.20E+01	8.17E+01 G
			284.30	-2.772E-02	%	1.061E+01 1.15E+04	6.14E+00 G
			636.97	-2.423E+00	&	1.476E+01 1.83E+02	7.17E+00 G
CS-134	I	3.3470E-01				7.54E+02	
			604.71	3.347E-01	*(	2.335E+00 2.10E+02	9.76E+01 G
			795.87	-1.862E-02	&	3.451E+00 5.56E+03	8.55E+01 G
			569.32	1.523E-01	&	1.386E+01 2.73E+03	1.54E+01 G
			801.95	-2.276E+00	&	2.814E+01 3.71E+02	8.69E+00 G
			563.24	-5.848E+00	+	2.453E+01 1.27E+02	8.35E+00 G
CS-137	I	3.7930E+02				1.10E+04	
			661.66	3.793E+02	(	1.394E+00 4.33E-01	8.52E+01 G
EU-152	F	3.8813E+01				4.94E+03	
			344.29	0.000E+00	(	3.281E+00 1.00E+03	2.65E+01 G
			121.78	1.098E+02	(	1.430E+00 7.83E-01	2.86E+01 G
			778.92	-2.513E-01	&	1.146E+01 1.37E+03	1.29E+01 G
			964.11	2.868E+00	?(	1.597E+01 1.68E+02	1.46E+01 G
			1112.07	3.940E+00	?(	1.701E+01 1.30E+02	1.36E+01 G
			1408.00	-6.384E-01	&	3.274E+00 1.52E+02	2.10E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	I 6.3521E+01					3.14E+03	
		873.23-2.005E+00		?(	1.160E+01	1.74E+02	1.23E+01 G
		123.10 8.323E+01		?(	9.714E-01	7.63E-01	4.08E+01 G
		1274.54-6.299E-01		&	2.920E+00	1.39E+02	3.52E+01 G
		723.36 1.113E+00		-	7.086E+00	1.92E+02	2.02E+01 G
		1004.77 1.097E-01		%	1.269E+01	3.48E+03	1.80E+01 G
		996.33-1.876E+00		&	2.069E+01	3.32E+02	1.06E+01 G
EU-155	I -1.0677E+00					1.81E+03	
		105.31-1.068E+00		?(	2.110E+00	6.00E+01	2.12E+01 G
		86.54 4.595E-01		+	3.519E+00	2.32E+02	3.07E+01 G
TL-208	N 6.6539E-01					6.98E+02	
		583.02-4.382E-01		%(P	2.732E+00	1.02E+03	8.45E+01 G
		277.28-5.850E+00		+	2.532E+01	1.31E+02	6.31E+00 G
		860.56 8.173E+00		?(	3.101E+01	1.15E+02	1.24E+01 G
PB-210	N -6.3627E+01					8.14E+03	
		46.54-6.363E+01		?(P	2.279E+01	1.17E+01	4.25E+00 G
PB-212	N -3.0438E-01					6.98E+02	
		238.63-1.098E+00		&(P	2.602E+00	1.68E+02	4.33E+01 G
		300.03 1.017E+01		?(	5.088E+01	1.51E+02	3.28E+00 G
PB-214	N 2.0329E-01					5.84E+05	
		351.93 2.033E-01		&(P	2.037E+00	1.13E+02	3.76E+01 G
		295.09-3.136E-02		& P	3.553E+00	3.34E+02	1.93E+01 G
		242.00-9.728E-01		& P	8.261E+00	8.72E+02	7.43E+00 G
BI-212	N 4.6263E+00					6.98E+02	
		727.17-8.380E+00		?(	3.779E+01	1.36E+02	7.55E+00 G
		785.42 8.135E+01		(	2.395E+02	8.91E+01	1.28E+00 G
BI-214	N 1.5484E+00					5.84E+05	
		609.31 1.548E+00		(P	1.665E+00	3.47E+01	4.61E+01 G
		1120.29-5.945E-01		% P	1.182E+01	1.35E+03	1.51E+01 G
		1764.49 2.563E-01		- P	4.862E+00	7.49E+01	1.54E+01 G
AC-228	N 7.6620E-01					2.10E+03	
		911.07 6.830E-01		&(	7.619E+00	3.36E+02	2.90E+01 G
		968.97-4.682E+00		+	1.486E+01	9.60E+01	1.75E+01 G
		338.32 9.670E-01		?(	8.521E+00	2.65E+02	1.20E+01 G
						Energy duplication	
		93.35 2.159E+00		&	8.520E+00	1.19E+02	5.56E+00 XA
Pa-234	N 1.3111E+00					1.63E+12	
		131.29-5.970E-01		?(	2.050E+00	1.04E+02	1.80E+01 G
		569.47-1.067E-02		&	1.167E+01	3.28E+04	8.20E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		946.02	1.798E-01	%	1.541E+01	2.58E+03	1.34E+01 G
		883.24	8.487E-01	?(	1.796E+01	6.37E+02	9.60E+00 G
		880.53	7.776E+00	?(	2.839E+01	1.10E+02	6.00E+00 G
TH-234	N -6.2997E+01					1.63E+12	
		63.29-6.300E+01		?(P	1.142E+01	6.09E+00	3.81E+00 G
		92.59-1.291E+00		+ P	6.486E+00	1.31E+02	5.58E+00 G
PA-234M	N -4.5218E+01					1.63E+12	
		1001.00-4.522E+01		&(P	2.266E+02	1.98E+02	8.37E-01 G
		766.41-1.086E+02		+ P	4.365E+02	1.34E+02	2.94E-01 G
U-235	N 6.1411E-02					2.57E+11	
		143.79-5.916E-01		?(	3.611E+00	1.84E+02	1.10E+01 G
		205.33	8.907E-01	?(	1.074E+01	3.63E+02	5.01E+00 G
		163.38	6.523E-01	&(	1.335E+01	6.18E+02	5.08E+00 G
							Energy duplication
		93.35	1.549E+00	&	6.112E+00	1.19E+02	5.81E+00 X
AM-241	T 9.4494E+02					1.58E+05	
		59.54	9.449E+02	(	2.220E+00	2.12E-01	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average

R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	47.31	21904.	-1933.	-0.268	11.71	-6.363E+01	P
TH-234	61.37	6356.	-2065.	-0.287	6.09	-6.300E+01	P
EU-155	86.54	20652.	88.	0.012	231.75	4.595E-01	
TH-234	92.62	4388.	-62.	-0.009	130.72	-1.291E+00	P
AC-228	93.35	4202.	77.	0.011	119.25	2.159E+00	
U-235	93.35	4202.	77.	0.011	119.25	1.549E+00	
EU-155	104.11	3190.	-135.	-0.019	59.99	-1.068E+00	
EU-152	122.11	3615.	21720.	3.017	0.78	1.098E+02	
EU-154	122.11	2912.	21778.	3.025	0.76	8.323E+01	
Pa-234	131.87	3474.	-81.	-0.011	103.78	-5.970E-01	
U-235	144.15	3575.	-46.	-0.006	184.07	-5.916E-01	
U-235	163.38	8768.	21.	0.003	617.59	6.523E-01	
U-235	205.45	3965.	25.	0.003	363.00	8.907E-01	
PB-212	241.83	2456.	-99.	-0.014	167.56	-1.098E+00	P
TL-208	278.11	3977.	-69.	-0.010	130.72	-5.850E+00	
PB-212	299.50	3852.	58.	0.008	150.95	1.017E+01	
AC-228	338.80	3842.	33.	0.005	265.49	9.670E-01	
PB-214	353.17	3594.	28.	0.004	112.62	2.033E-01	P
I-131	364.53	3994.	110.	0.015	82.05	0.000E+00	
BE-7	477.21	4669.	-116.	-0.016	83.96	0.000E+00	
CS-134	562.29	2403.	-55.	-0.008	126.53	-5.848E+00	
CS-134	604.44	2641.	35.	0.005	210.03	3.347E-01	
I-131	636.81	2577.	-39.	-0.005	183.43	0.000E+00	
EU-154	723.38	2598.	38.	0.005	191.70	1.113E+00	
PA-234M	766.59	2772.	-62.	-0.009	134.32	-1.086E+02	P
CS-134	806.03	1854.	-16.	-0.002	370.97	-2.276E+00	
TL-208	861.19	3590.	74.	0.010	114.64	8.173E+00	
EU-154	868.44	1828.	-35.	-0.005	173.99	-2.005E+00	
Pa-234	880.36	3827.	80.	0.011	110.33	7.776E+00	
Pa-234	883.20	3903.	14.	0.002	637.00	8.487E-01	
AC-228	913.96	3398.	25.	0.003	335.80	6.830E-01	
EU-152	964.07	4776.	58.	0.008	168.09	2.868E+00	
AC-228	967.99	4197.	-96.	-0.013	95.99	-4.682E+00	
EU-154	994.72	3446.	-25.	-0.003	332.05	-1.876E+00	
PA-234M	1000.74	3761.	-58.	-0.008	197.51	-4.522E+01	P
EU-152	1112.66	3627.	66.	0.009	130.32	3.940E+00	
EU-154	1273.44	463.	-22.	-0.003	138.63	-6.299E-01	
EU-152	1410.41	192.	-13.	-0.002	151.92	-6.384E-01	
K-40	1460.75	205.	-5.	-0.001	52.32	-4.291E-01	P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

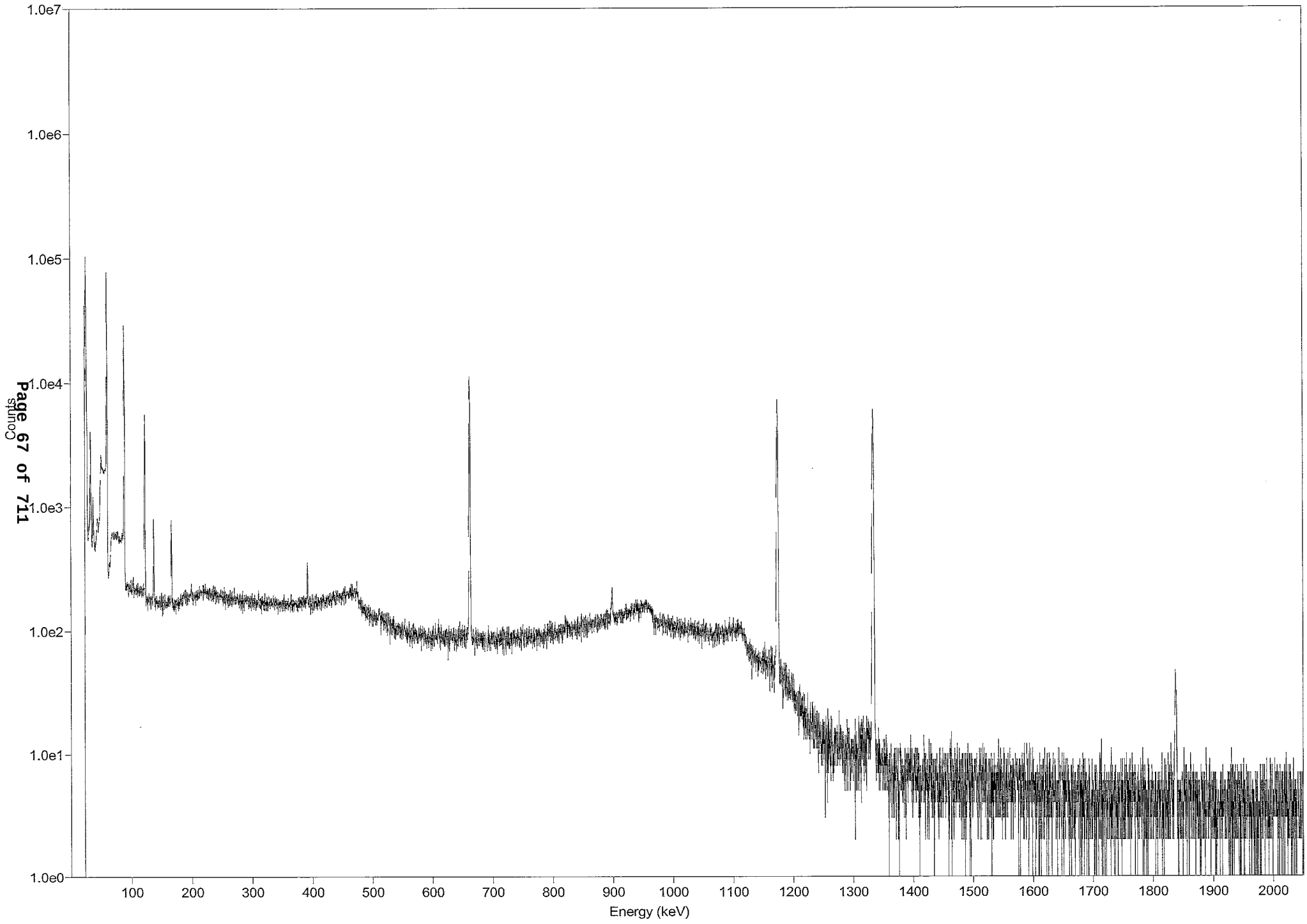
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma	MDA Bq/Sample
BE-7	#A	-3.8111E+00	>12 Halflives	8.3960E+01%	1.0568E+01	
K-40	#A	-4.2914E-01	-4.2914E-01	4.954E+02%		6.10E+00
CO-60		4.2893E+02	5.8755E+02	3.282E-01%		1.13E+00
I-131	#A	3.7561E-01	>12 Halflives	8.2046E+01%	1.0178E+00	
CS-134	#A	1.4990E-01	3.3470E-01	2.100E+02%		2.33E+00
CS-137		3.5890E+02	3.7930E+02	4.329E-01%		1.39E+00
EU-152	#C	3.4338E+01	3.8813E+01	7.834E-01%		3.28E+00
EU-154	#C	5.2371E+01	6.3521E+01	7.629E-01%		1.16E+01
EU-155	#A	-7.6421E-01	-1.0677E+00	5.999E+01%		2.11E+00
TL-208	#A	2.7922E-01	6.6539E-01	1.146E+02%		2.73E+00
PB-210	#A	-5.9066E+01	-6.3627E+01	1.240E+01%		2.28E+01
PB-212	#A	-1.2773E-01	-3.0438E-01	1.509E+02%		2.60E+00
PB-214	#A	2.0308E-01	2.0329E-01	3.008E+02%		2.04E+00
BI-212	A	1.9414E+00	4.6263E+00	8.129E+01%		3.78E+01
BI-214	A	1.5468E+00	1.5484E+00	4.463E+01%		1.66E+00
AC-228	#A	5.7421E-01	7.6620E-01	2.140E+02%		7.62E+00
Pa-234	#A	1.3111E+00	1.3111E+00	1.038E+02%		2.05E+00
TH-234	#A	-6.2997E+01	-6.2997E+01	6.341E+00%		1.14E+01
PA-234M	#A	-4.5218E+01	-4.5218E+01	2.442E+02%		2.27E+02
U-235	#A	6.1411E-02	6.1411E-02	1.841E+02%		3.61E+00
AM-241		9.4132E+02	9.4494E+02	2.121E-01%		2.22E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (391.5 to 1999.5 keV) 1.731E+03 Bq/Sample
Total Decayed Activity (391.5 to 1999.5 keV) 1.9133364E+03 Bq/Sample

The library has energies which are not separable.


25mL d=1_85520-334_2011Cal. 11_85520-334_20131678.spc.
1.0e7
1.0e6
1.0e5
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Counts
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)

Test America St. Louis Spectrum ID: 12_85520-334_20131748

Sample Description: 25mL d=1_85520-334_2011Cal
Detector: Ge12 S/N10034336
Batch ID: 25mL d
Work Order Number: 85520-334
Lot Number: 2011Cal

Decay to Time: 7/1/2011 12:00 Live Time: 7200 sec
Acquisition Time: 11/21/2013 13:15:58 Real Time: 7380 sec
Analysis Time: 11/22/2013 08:48 Dead Time: 2.43 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Liquid_D=1 25ml.Clb
Efficiency Cal Desc: Ge12_25mLd=1Cal_85520-334_090111
Efficiency Cal Date: 9/2/2011 07:07
Energy Cal Date: 2/28/2012 13:26
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 12_2013-11-02_0118.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
K-40	1.328E+00	125.4	1.665E+00	1.666E+00	5.782E+00
CO-60	5.801E+02	0.3	1.933E+00	2.788E+01	1.792E+00
CS-134	-4.648E-03	14240.0	6.621E-01	6.621E-01	2.206E+00
CS-137	3.755E+02	0.4	1.597E+00	1.849E+01	1.435E+00
EU-152	3.875E+01	1.2	4.555E-01	1.944E+00	3.059E+00
EU-154	1.670E+01	3.2	5.318E-01	9.717E-01	1.589E+01
EU-155	2.919E+02	0.4	1.097E+00	1.543E+01	2.313E+00
TL-208	3.490E-01	229.7	8.017E-01	8.018E-01	2.563E+00
PB-210	-5.288E+00	1028.0	5.436E+01	5.436E+01	1.710E+01
PB-212	9.578E-01	140.1	1.342E+00	1.343E+00	3.046E+00
PB-214	6.643E-01	74.1	4.923E-01	4.934E-01	1.984E+00
BI-212	-2.901E-01	3672.0	1.065E+01	1.065E+01	3.549E+01
BI-214	-4.340E-01	31500.0	1.367E+02	1.367E+02	2.085E+00
AC-228	-1.533E+00	161.8	2.480E+00	2.481E+00	8.215E+00
Pa-234	8.428E-01	73.9	6.225E-01	6.239E-01	1.977E+00
TH-234	-1.358E+02	3.7	5.050E+00	8.799E+00	1.488E+01
PA-234M	8.401E+00	618.6	5.197E+01	5.197E+01	1.757E+02
U-235	4.430E-01	129.4	5.734E-01	5.738E-01	3.578E+00
AM-241	9.295E+02	0.2	2.016E+00	5.151E+01	2.360E+00
Total	2.245E+03				

Analyst: Jody Watson

TestAmerica, Inc Spectrum name: 12_85520-334_20131748.An1

Sample description
25mL d=1_85520-334_2011Cal

Spectrum Filename: C:\User\SPC\Det12\12_85520-334_20131748.An1

Acquisition information
Start time: 11/21/2013 1:15:58 PM
Live time: 7200
Real time: 7380
Dead time: 2.43 %
Detector ID: 12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_Liquid_D=1 25ml.Clb
Ge12_25mLd=1Cal_85520-334_090111

Energy Calibration
Created: 2/28/2012 1:26:42 PM
Zero offset: 0.049 keV
Gain: 0.250 keV/channel
Quadratic: -3.945E-08 keV/channel^2

Efficiency Calibration
Created: 9/2/2011 7:07:23 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 2.02 %
Log(Eff): -6.442716E-01 + (-8.678082E-03*Log(E)) + (-6.444773E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.33 %
Log(Eff): -1.236768E+01 + (4.728110E+00*Log(E)) + (-5.423915E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.58keV)
Stop channel: 8000 (1999.36keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	7/1/2011 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2013-11-02_0118.PBC 11/2/2013 1:18:59 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 32 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 298.3564

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.67	3542.	5.15	1.26	9.307E-02				
43.52	810.	20.35	0.44	1.054E-01				
49.74	5767.	5.38	1.66	1.137E-01				
59.59	291952.	0.22	1.16	1.220E-01	59.54	35.900	9.295E+02	AM241
88.10	114715.	0.34	1.20	1.260E-01	86.54	30.700	5.743E+02	EU155
92.91	10.	947.66	0.93	1.248E-01	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	2.578E-01	AC228
					93.35	5.810	1.849E-01	U235
					92.59	5.584	PBC<MDA	TH234
					93.35	5.810	1.849E-01	U235
					93.35	5.561	2.578E-01	AC228
92.91	10.	947.66	0.93	1.248E-01	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	2.578E-01	AC228
					93.35	5.810	1.849E-01	U235
122.16	22476.	0.91	1.20	1.139E-01	121.78	28.580	1.082E+02	EU152
123.10	6162.	3.18	0.96	1.135E-01	123.10	40.790	2.242E+01	EU154
136.56	2684.	4.60	1.19	1.072E-01				
165.92	2918.	5.11	1.21	9.325E-02				
188.41	122.	64.64	0.69	8.557E-02				
199.66	148.	58.11	0.49	8.223E-02				
203.95	62.	129.44	1.04	8.065E-02	205.33	5.010	PBC<MDA	U235
					205.33	5.010	2.120E+00	U235
235.05	71.	69.39	0.52	7.333E-02				
237.66	41.	74.01	1.07	7.254E-02	238.63	43.300	PBC<MDA	PB212
242.01	31.	300.44	1.07	7.182E-02	242.00	7.430	PBC<MDA	PB214
285.59	87.	59.37	0.48	6.367E-02	284.30	6.140	HL>Cutoff	I131
293.55	28.	280.40	1.12	6.215E-02	295.09	19.300	PBC<MDA	PB214
301.27	48.	185.20	1.13	6.139E-02	300.03	3.280	PBC<MDA	PB212

352.55	119.	74.11	1.18	5.443E-02	351.93	37.600	PBC<MDA PB214
355.87	120.	63.84	0.50	5.397E-02			
391.72	1079.	11.61	1.53	5.011E-02			
583.33	-16.	410.66	1.38	3.640E-02	583.02	84.500	PBC<MDA TL208
					583.02	84.500	PBC<MDA TL208
637.26	43.	171.14	1.43	3.381E-02	636.97	7.170	HL>Cutoff I131
661.73	71374.	0.43	1.64	3.274E-02	661.66	85.210	3.755E+02 CS137
702.74	36.	98.78	0.47	3.111E-02			
722.73	75.	98.26	1.50	3.035E-02	723.36	20.220	PBC<MDA EU154

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
766.36	12.	618.61	1.54	2.887E-02	766.41	0.294	PBC<MDA	PA234M
					766.41	0.294	2.029E+01	PA234M
778.99	44.	176.59	1.55	2.847E-02	778.92	12.940	PBC<MDA	EU152
860.26	38.	207.57	1.62	2.610E-02	860.56	12.420	PBC<MDA	TL208
					860.56	12.420	PBC<MDA	TL208
879.98	222.	48.80	0.45	2.559E-02				
898.06	940.	14.24	2.10	2.513E-02				
945.19	71.	142.70	1.69	2.400E-02	946.02	13.400	PBC<MDA	Pa234
					946.02	13.400	3.064E+00	Pa234
995.90	31.	291.33	1.73	2.291E-02	996.33	10.600	PBC<MDA	EU154
1003.92	50.	71.39	0.32	2.275E-02				
1018.86	39.	89.60	0.57	2.245E-02				
1095.65	101.	72.07	0.57	2.102E-02				
1113.29	122.	70.44	1.82	2.074E-02	1112.07	13.644	PBC<MDA	EU152
1123.19	99.	46.78	1.83	2.056E-02				
1126.64	62.	90.78	1.83	2.050E-02				
1173.29	59718.	0.47	2.00	1.975E-02	1173.24	99.900	5.759E+02	CO60
1272.67	6.	478.08	1.95	1.829E-02	1274.54	35.190	PBC<MDA	EU154
1315.23	113.	29.73	0.63	1.776E-02				
1332.57	53870.	0.47	2.07	1.755E-02	1332.50	99.980	5.842E+02	CO60
1460.29	16.	46.00	2.08	1.609E-02	1460.83	10.670	PBC<MDA	K40
1759.91	-7.	96.92	2.30	1.342E-02	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
146.34	36.67	8117.	3542.	3.805E+04	5.15	1.256	-	s
173.72	43.52	8322.	810.	7.686E+03	16.30	0.442	-	s
198.59	49.74	25855.	5767.	5.073E+04	5.38	1.657	-	s
351.91	88.10	107387.	16148.	1.282E+05	2.98	1.201	-	s
545.60	136.56	3278.	2684.	2.503E+04	4.60	1.190	-	sM
662.94	165.92	4002.	2918.	3.129E+04	3.58	1.206	-	sM
752.86	188.41	2158.	122.	1.428E+03	64.64	0.685	-	sM
797.82	199.66	2416.	148.	1.800E+03	58.11	0.490	-	sM
939.27	235.05	1178.	71.	9.682E+02	69.39	0.519	-	sc
1141.31	285.59	1208.	75.	1.175E+03	66.72	0.481	-	sc
1422.28	355.87	1916.	120.	2.224E+03	52.39	0.504	-	sM
1565.62	391.72	3373.	1079.	2.152E+04	11.61	1.530	-	sM
2809.41	702.74	567.	36.	1.157E+03	98.78	0.469	-	sc
3518.43	879.98	2461.	221.	8.639E+03	32.44	0.447	-	sM
3590.80	898.06	3185.	940.	3.740E+04	14.24	2.102	-	sM
4014.33	1003.92	612.	50.	2.197E+03	71.39	0.320	-	lc
4074.14	1018.86	591.	39.	1.737E+03	89.60	0.570	-	lc
4381.40	1095.65	1485.	101.	4.804E+03	72.07	0.569	-	sM
4491.61	1122.75	1018.	99.	4.805E+03	46.78	1.830	-	D
4505.44	1126.21	1551.	62.	3.022E+03	90.78	1.833	-	c
5260.26	1315.23	211.	113.	6.371E+03	29.73	0.635	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.95	59.59	25113.	291952.	40.549	0.22	1.162s
TH-234	245.89	61.58	11655.	-4618.	-0.641	3.66	0.905
EU-155	351.91	88.10	19336.	98583.	13.692	0.38	0.928s
AC-228	372.89	93.35	4181.	10.	0.001	947.66	0.934D
U-235	372.89	93.35	4181.	10.	0.001	947.66	0.934D
EU-152	486.50	121.78	9141.	15680.	2.178	1.18	0.961D
EU-154	491.79	123.10	16163.	6162.	0.856	3.18	0.963D
Pa-234	526.76	131.85	3570.	-115.	-0.016	73.86	0.970s
U-235	574.86	143.88	3881.	-27.	-0.004	332.79	0.982s
U-235	645.89	161.65	2482.	-124.	-0.017	57.31	1.001s
U-235	814.95	203.95	3156.	62.	0.009	129.44	1.040s
PB-212	949.71	237.66	3775.	41.	0.006	74.01	1.071s
PB-214	967.12	242.01	4211.	31.	0.004	300.44	1.075
TL-208	1117.98	279.75	2905.	-25.	-0.003	306.65	1.107s
I-131	1141.63	285.67	3643.	13.	0.002	658.63	1.114
PB-214	1173.16	293.55	3124.	28.	0.004	280.40	1.124
PB-212	1204.00	301.27	3906.	48.	0.007	185.20	1.128s
AC-228	1354.85	339.00	3997.	-68.	-0.009	132.87	1.163s
EU-152	1372.70	343.46	3689.	-80.	-0.011	108.31	1.169s
PB-214	1409.03	352.55	3853.	119.	0.017	74.11	1.176s
BE-7	1911.27	478.16	4498.	-57.	-0.008	166.57	1.289
CS-134	2238.13	559.90	1555.	-21.	-0.003	270.06	1.365s
CS-134	2275.37	569.21	2635.	-30.	-0.004	240.00	1.370s
Pa-234	2275.47	569.23	2635.	-29.	-0.004	249.18	1.371s
I-131	2547.54	637.26	2656.	43.	0.006	171.14	1.429
CS-137	2645.39	661.73	3358.	71374.	9.913	0.43	1.641
EU-154	2889.40	722.73	2655.	75.	0.010	98.26	1.503s
PA-234M	3063.90	766.36	2935.	12.	0.002	618.61	1.540s
EU-152	3114.44	778.99	2965.	44.	0.006	176.59	1.550
BI-212	3138.24	784.94	3017.	-45.	-0.006	172.98	1.556s
CS-134	3184.30	796.46	3094.	-39.	-0.005	200.02	1.565s
CS-134	3206.65	802.04	3158.	-35.	-0.005	228.19	1.570s
TL-208	3439.53	860.26	3843.	38.	0.005	207.57	1.618s
EU-154	3495.50	874.25	4020.	-43.	-0.006	208.59	1.629s
AC-228	3642.48	910.98	4607.	-60.	-0.008	161.81	1.660s
Pa-234	3779.34	945.19	5089.	71.	0.010	142.70	1.689s
EU-152	3853.82	963.80	4872.	-57.	-0.008	172.28	1.703
EU-154	3982.27	995.90	3958.	31.	0.004	291.33	1.729s
EU-154	4015.55	1004.22	3969.	-50.	-0.007	180.35	1.736s
EU-152	4452.01	1113.29	3616.	122.	0.017	70.44	1.821
BI-214	4481.03	1120.54	3061.	-56.	-0.008	199.20	1.828s
CO-60	4692.13	1173.29	2548.	59718.	8.294	0.47	1.999
EU-154	5089.88	1272.67	404.	6.	0.001	478.08	1.946s
CO-60	5329.66	1332.57	1216.	53870.	7.482	0.47	2.071

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	5626.60	1406.74	236.	-3.	0.000	624.31	2.046
K-40	5840.97	1460.29	218.	16.	0.002	46.00	2.085s
BI-214	7040.80	1759.91	140.	-7.	-0.001	96.92	2.297s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	Peak MDA Value Bq/Sample	COMMENTS
BE-7	C	-1.7605E+00				5.31E+01	
			477.60	-1.760E+00	(	9.716E+00	1.67E+02 1.05E+01 G
K-40	N	1.3275E+00				4.66E+11	
			1460.83	1.328E+00	&(P	5.782E+00	4.60E+01 1.07E+01 G
CO-60	F	5.8008E+02				1.93E+03	
			1332.50	5.842E+02	(	1.792E+00	4.73E-01 1.00E+02 G
			1173.24	5.759E+02	(	2.295E+00	4.70E-01 9.99E+01 G
I-131	I	2.1591E-01				8.02E+00	
			364.48	6.489E-04	%(	9.420E-01	4.36E+04 8.17E+01 G
			284.30	4.610E-01	(	1.009E+01	6.59E+02 6.14E+00 G
			636.97	2.459E+00	(	1.397E+01	1.71E+02 7.17E+00 G
CS-134	I	-4.6482E-03				7.54E+02	
			604.71	-4.648E-03	&(	2.206E+00	1.42E+04 9.76E+01 G
			795.87	-5.120E-01	+	3.399E+00	2.00E+02 8.55E+01 G
			569.32	-1.648E+00	&	1.314E+01	2.40E+02 1.54E+01 G
			801.95	-4.490E+00	&	3.401E+01	2.28E+02 8.69E+00 G
			563.24	-2.054E+00	+	1.849E+01	2.70E+02 8.35E+00 G
CS-137	I	3.7553E+02				1.10E+04	
			661.66	3.755E+02	(	1.435E+00	4.25E-01 8.52E+01 G
EU-152	F	3.8751E+01				4.94E+03	
			344.29	-8.535E-01	?(	3.059E+00	1.08E+02 2.65E+01 G
			121.78	7.547E+01	(	2.158E+00	1.18E+00 2.86E+01 G
			778.92	1.865E+00	-	1.093E+01	1.77E+02 1.29E+01 G
			964.11	-2.618E+00	-	1.494E+01	1.72E+02 1.46E+01 G
			1112.07	6.754E+00	-	1.570E+01	7.04E+01 1.36E+01 G
			1408.00	-1.568E-01	-	3.335E+00	6.24E+02 2.10E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	I 1.6703E+01					3.14E+03	
		873.23	-2.297E+00	&(	1.589E+01	2.09E+02	1.23E+01 G
		123.10	2.242E+01	(	2.165E+00	3.18E+00	4.08E+01 G
		1274.54	1.561E-01	&	2.521E+00	4.78E+02	3.52E+01 G
		723.36	2.050E+00	&	6.666E+00	9.83E+01	2.02E+01 G
		1004.77	-2.039E+00	&	1.219E+01	1.80E+02	1.80E+01 G
		996.33	2.123E+00	-	2.052E+01	2.91E+02	1.06E+01 G
EU-155	I 2.9192E+02					1.81E+03	
		105.31	-2.068E-02	%(	2.313E+00	3.36E+03	2.12E+01 G
		86.54	4.935E+02	?(	3.258E+00	3.76E-01	3.07E+01 G
TL-208	N 3.4896E-01					6.98E+02	
		583.02	-1.739E-01	&(P	2.563E+00	4.11E+02	8.45E+01 G
		277.28	-2.008E+00	+	2.047E+01	3.07E+02	6.31E+00 G
		860.56	3.906E+00	?(P	2.978E+01	2.08E+02	1.24E+01 G
PB-210	N -5.2878E+00					8.14E+03	
		46.54	-5.288E+00	%(P	1.710E+01	5.63E+02	4.25E+00 G
PB-212	N 9.5779E-01					6.98E+02	
		238.63	4.343E-01	(P	3.046E+00	7.40E+01	4.33E+01 G
		300.03	7.869E+00	?(	4.832E+01	1.85E+02	3.28E+00 G
PB-214	N 6.6429E-01					5.84E+05	
		351.93	8.109E-01	&(	1.984E+00	7.41E+01	3.76E+01 G
		295.09	3.275E-01	(	3.051E+00	2.80E+02	1.93E+01 G
		242.00	7.973E-01	(	7.949E+00	3.00E+02	7.43E+00 G
BI-212	N -2.9011E-01					6.98E+02	
		727.17	-2.901E-01	%(	3.549E+01	3.67E+03	7.55E+00 G
		785.42	-4.123E+01	&	2.366E+02	1.73E+02	1.28E+00 G
BI-214	N -4.3401E-01					5.84E+05	
		609.31	-4.340E-01	%(P	2.085E+00	1.57E+04	4.61E+01 G
		1120.29	-2.501E+00	+ P	1.164E+01	1.99E+02	1.51E+01 G
		1764.49	-4.431E-01	+ P	3.896E+00	9.69E+01	1.54E+01 G
AC-228	N -1.5327E+00					2.10E+03	
		911.07	-1.533E+00	&(	8.215E+00	1.62E+02	2.90E+01 G
		968.97	2.384E-01	&	1.436E+01	1.81E+03	1.75E+01 G
		338.32	-1.859E+00	&	8.180E+00	1.33E+02	1.20E+01 G
							Energy duplication
		93.35	2.578E-01	&	8.118E+00	9.48E+02	5.56E+00 XA
Pa-234	N 8.4277E-01					1.63E+12	
		131.29	-8.110E-01	?(	1.977E+00	7.39E+01	1.80E+01 G
		569.47	-1.333E+00	&	1.104E+01	2.49E+02	8.20E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		946.02	3.064E+00	&(	1.448E+01	1.43E+02	1.34E+01 G
		883.24-5.451E-02		%	1.720E+01	9.49E+03	9.60E+00 G
		880.53	5.600E-02	%	2.716E+01	1.46E+04	6.00E+00 G
TH-234	N -1.3582E+02					1.63E+12	
		63.29-1.358E+02		?(P	1.488E+01	3.66E+00	3.81E+00 G
		92.59-2.668E+00		% P	6.336E+00	3.29E+03	5.58E+00 G
PA-234M	N 8.4009E+00					1.63E+12	
		1001.00	4.226E+00	%(	1.757E+02	1.25E+03	8.37E-01 G
		766.41	2.029E+01	?(	4.175E+02	6.19E+02	2.94E-01 G
U-235	N 4.4297E-01					2.57E+11	
		143.79-3.238E-01		?(	3.578E+00	3.33E+02	1.10E+01 G
		205.33	2.120E+00	&(	9.093E+00	1.29E+02	5.01E+00 G
		163.38-3.600E+00		+	6.792E+00	5.73E+01	5.08E+00 G
						Energy duplication	
		93.35	1.849E-01	&	5.823E+00	9.48E+02	5.81E+00 X
AM-241	T 9.2951E+02					1.58E+05	
		59.54	9.295E+02	*(	2.360E+00	2.17E-01	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average

R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-234	61.58	11655.	-4618.	-0.641	3.66	-1.358E+02	P
EU-155	88.10	19336.	98583.	13.692	0.38	4.935E+02	
AC-228	93.35	4181.	10.	0.001	947.66	2.578E-01	
U-235	93.35	4181.	10.	0.001	947.66	1.849E-01	
Pa-234	131.85	3570.	-115.	-0.016	73.86	-8.110E-01	
U-235	143.88	3881.	-27.	-0.004	332.79	-3.238E-01	
U-235	161.65	2482.	-124.	-0.017	57.31	-3.600E+00	
U-235	203.95	3156.	62.	0.009	129.44	2.120E+00	
PB-212	237.66	3775.	41.	0.006	74.01	4.343E-01	P
TL-208	279.75	2905.	-25.	-0.003	306.65	-2.008E+00	
PB-212	301.27	3906.	48.	0.007	185.20	7.869E+00	
AC-228	339.00	3997.	-68.	-0.009	132.87	-1.859E+00	
BE-7	478.16	4498.	-57.	-0.008	166.57	0.000E+00	
CS-134	559.90	1555.	-21.	-0.003	270.06	-2.054E+00	
CS-134	569.21	2635.	-30.	-0.004	240.00	-1.648E+00	
Pa-234	569.23	2635.	-29.	-0.004	249.18	-1.333E+00	
PA-234M	766.36	2935.	12.	0.002	618.61	2.029E+01	
BI-212	784.94	3017.	-45.	-0.006	172.98	-4.123E+01	
CS-134	796.46	3094.	-39.	-0.005	200.02	-5.120E-01	
CS-134	802.04	3158.	-35.	-0.005	228.19	-4.490E+00	
TL-208	860.26	3843.	38.	0.005	207.57	3.906E+00	P
AC-228	910.98	4607.	-60.	-0.008	161.81	-1.533E+00	
Pa-234	945.19	5089.	71.	0.010	142.70	3.064E+00	
BI-214	1120.54	3061.	-56.	-0.008	199.20	-2.501E+00	P
BI-214	1759.91	140.	-7.	-0.001	96.92	-4.431E-01	P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting		MDA Bq/Sample
BE-7	#A	-1.7605E+00	>12 Halflives	1.6657E+02%	9.7156E+00	
K-40	#A	1.3275E+00	1.3275E+00	1.254E+02%		5.78E+00
CO-60		4.2346E+02	5.8008E+02	3.333E-01%		1.79E+00
I-131	A	2.1591E-01	>12 Halflives	1.7114E+02%	9.4197E-01	
CS-134	#A	-2.0816E-03	-4.6482E-03	1.424E+04%		2.21E+00
CS-137		3.5533E+02	3.7553E+02	4.252E-01%		1.44E+00
EU-152	C	3.4282E+01	3.8751E+01	1.175E+00%		3.06E+00
EU-154	C	1.3770E+01	1.6703E+01	3.184E+00%		1.59E+01
EU-155	#C	2.0894E+02	2.9192E+02	3.758E-01%		2.31E+00
TL-208	#A	1.4642E-01	3.4896E-01	2.297E+02%		2.56E+00

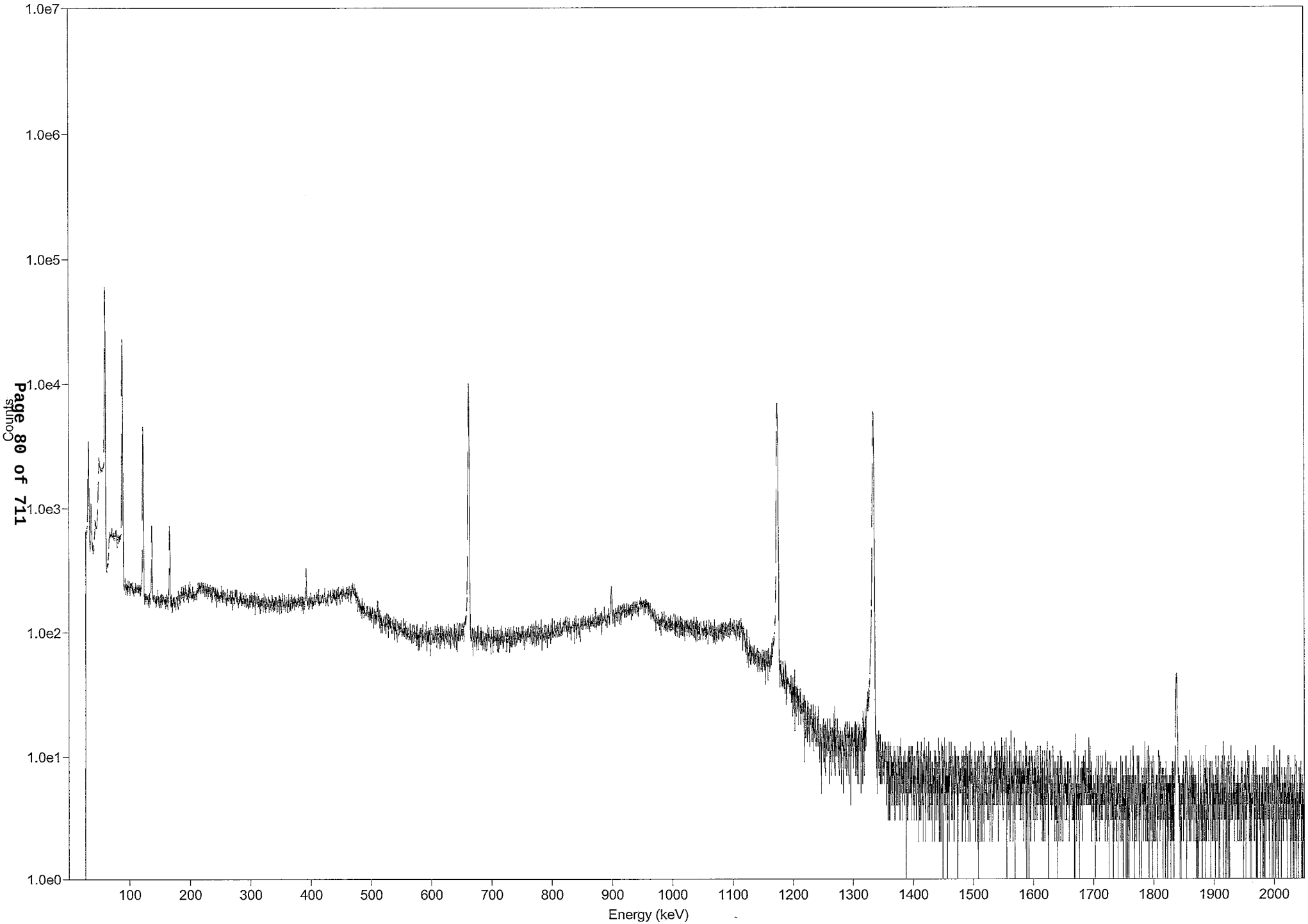
PB-210 #A	-4.9087E+00	-5.2878E+00	1.028E+03%	1.71E+01
PB-212 #A	4.0188E-01	9.5779E-01	1.401E+02%	3.05E+00
PB-214 A	6.6360E-01	6.6429E-01	7.411E+01%	1.98E+00
BI-212 #A	-1.2173E-01	-2.9011E-01	3.672E+03%	3.55E+01
BI-214 #A	-4.3356E-01	-4.3401E-01	3.150E+04%	2.09E+00
AC-228 #A	-1.1486E+00	-1.5327E+00	1.618E+02%	8.22E+00
Pa-234 #A	8.4277E-01	8.4277E-01	7.386E+01%	1.98E+00
TH-234 #A	-1.3582E+02	-1.3582E+02	3.718E+00%	1.49E+01
PA-234M#A	8.4009E+00	8.4009E+00	6.186E+02%	1.76E+02
U-235 #A	4.4297E-01	4.4297E-01	1.294E+02%	3.58E+00
AM-241 #	9.2596E+02	9.2951E+02	2.168E-01%	2.36E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (1173.0 to 1999.4 keV) 1.705E+03 Bq/Sample
Total Decayed Activity (1173.0 to 1999.4 keV) 1.8851224E+03 Bq/Sample

The library has energies which are not separable.


25mL d=1_85520-334_2011Cal. 12_85520-334_20131748.spc.
1.0e7
1.0e6
1.0e5
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Counts
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

85520-334
5 mL Liquid in Flame Sealed Vial

Customer: Test America St. Louis
P.O. No.: 2434437, Item 1
Reference Date: 01-Jul-2011 12:00 PM EST **Grams of Master Source:** 0.029166

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	1.580E+05	———	3.368E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	4.626E+02	1.639E+05	4.780E+03	0.5	1.7	3.5	HPGe
Co-57	122.1	2.718E+02	8.758E+04	2.554E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	1.376E+02	1.218E+05	3.552E+03	0.5	1.1	2.4	HPGe
Hg-203	279.2	4.661E+01	2.692E+05	7.851E+03	0.4	1.1	2.3	HPGe
Sn-113	391.7	1.151E+02	1.691E+05	4.932E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	1.098E+04	1.093E+05	3.188E+03	0.6	1.2	2.7	HPGe
Y-88	898.0	1.066E+02	4.105E+05	1.197E+04	0.4	1.1	2.3	HPGe
Co-60	1173.2	1.925E+03	2.022E+05	5.897E+03	0.5	1.1	2.4	HPGe
Co-60	1332.5	1.925E+03	2.022E+05	5.897E+03	0.5	1.1	2.4	HPGe
Y-88	1836.1	1.066E+02	4.346E+05	1.268E+04	0.5	1.1	2.4	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1966

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Comments:
5.32298 g 4M HCl solution with approximately 30 µg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the reference date.

Source Prepared by: _____
Z. Dimitrova, Radiochemist

QA Approved: _____ Date: 8/18/11
J. D. McCorvey, QA Manager Alternate

Reagent

Gamma Ampuole_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

Customer: TestAmerica St. Louis
P.O. No.: 2303925, Item 1
Calibration Date: 01-Apr-2009 12:00 EST **Grams of Master Source:** 0.028371

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	157860	———	3.390E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	462.60	1.691E+05	4.798E+03	0.4	1.7	3.5	HPGe
Co-57	122.1	271.79	8.904E+04	2.526E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	137.6	1.256E+05	3.563E+03	0.4	1.1	2.3	HPGe
Hg-203	279.2	46.61	2.788E+05	7.910E+03	0.3	1.1	2.3	HPGe
Sn-113	391.7	115.1	1.725E+05	4.894E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	10983	1.120E+05	3.178E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	106.6	4.205E+05	1.193E+04	0.8	1.1	2.7	HPGe
Co-60	1173.2	1925.4	2.184E+05	6.196E+03	0.7	1.1	2.6	HPGe
Co-60	1332.5	1925.4	2.185E+05	6.199E+03	0.7	1.1	2.6	HPGe
Y-88	1836.1	106.6	4.444E+05	1.261E+04	0.7	1.1	2.6	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
5.31740 grams 4M HCl solution with approximately 30 microg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the calibration date.

Source Prepared by: _____ for
W. Mao, Radiochemist

QA Approved: _____ Date: 5-13-09
D. M. Montgomery, QA Manager

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Gamma Ampuole_00003

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

83725-334

5 mL Liquid in Flame Sealed Vial

Customer: Test America St. Louis/Earth City, MO
P.O. No.: 2397508, Item 1
Reference Date: 01-Jan-2011 12:00 PM EST **Grams of Master Source:** 0.028066

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	1.580E+05	———	3.261E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	4.626E+02	1.697E+05	4.763E+03	0.8	1.7	3.8	HPGe
Co-57	122.1	2.718E+02	8.711E+04	2.445E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	1.376E+02	1.247E+05	3.500E+03	0.5	1.1	2.4	HPGe
Hg-203	279.2	4.661E+01	2.753E+05	7.727E+03	0.4	1.1	2.3	HPGe
Sn-113	391.7	1.151E+02	1.769E+05	4.965E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	1.098E+04	1.109E+05	3.113E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	1.066E+02	4.224E+05	1.186E+04	0.5	1.1	2.4	HPGe
Co-60	1173.2	1.925E+03	2.142E+05	6.012E+03	0.6	1.1	2.5	HPGe
Co-60	1332.5	1.925E+03	2.143E+05	6.015E+03	0.6	1.1	2.5	HPGe
Y-88	1836.1	1.066E+02	4.472E+05	1.255E+04	0.5	1.1	2.4	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Comments:
5.30203 grams 4M HCl solution with approximately 30 µg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the reference date.

Source Prepared by: MTaskaeva
M. I. Taskaeva, Radiochemist

QA Approved: _____ Date: 13 JAN 11
J. D. McCorvey, QA Manager Alternate

Reagent

Source C_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

Customer: TestAmerica St. Louis
P.O. No.: 2303925, Item 1
Calibration Date: 01-Apr-2009 12:00 EST **Grams of Master Source:** 0.028371

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	157860	———	3.390E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	462.60	1.691E+05	4.798E+03	0.4	1.7	3.5	HPGe
Co-57	122.1	271.79	8.904E+04	2.526E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	137.6	1.256E+05	3.563E+03	0.4	1.1	2.3	HPGe
Hg-203	279.2	46.61	2.788E+05	7.910E+03	0.3	1.1	2.3	HPGe
Sn-113	391.7	115.1	1.725E+05	4.894E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	10983	1.120E+05	3.178E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	106.6	4.205E+05	1.193E+04	0.8	1.1	2.7	HPGe
Co-60	1173.2	1925.4	2.184E+05	6.196E+03	0.7	1.1	2.6	HPGe
Co-60	1332.5	1925.4	2.185E+05	6.199E+03	0.7	1.1	2.6	HPGe
Y-88	1836.1	106.6	4.444E+05	1.261E+04	0.7	1.1	2.6	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
5.31740 grams 4M HCl solution with approximately 30 microg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the calibration date.

Source Prepared by: _____ for
W. Mao, Radiochemist

QA Approved: _____ Date: 5-13-09
D. M. Montgomery, QA Manager

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Source D_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

Customer: TestAmerica St. Louis
P.O. No.: 2303925, Item 1
Calibration Date: 01-Apr-2009 12:00 EST **Grams of Master Source:** 0.028371

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	157860	———	3.390E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	462.60	1.691E+05	4.798E+03	0.4	1.7	3.5	HPGe
Co-57	122.1	271.79	8.904E+04	2.526E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	137.6	1.256E+05	3.563E+03	0.4	1.1	2.3	HPGe
Hg-203	279.2	46.61	2.788E+05	7.910E+03	0.3	1.1	2.3	HPGe
Sn-113	391.7	115.1	1.725E+05	4.894E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	10983	1.120E+05	3.178E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	106.6	4.205E+05	1.193E+04	0.8	1.1	2.7	HPGe
Co-60	1173.2	1925.4	2.184E+05	6.196E+03	0.7	1.1	2.6	HPGe
Co-60	1332.5	1925.4	2.185E+05	6.199E+03	0.7	1.1	2.6	HPGe
Y-88	1836.1	106.6	4.444E+05	1.261E+04	0.7	1.1	2.6	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
5.31740 grams 4M HCl solution with approximately 30 microg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the calibration date.

Source Prepared by: _____ for
W. Mao, Radiochemist

QA Approved: _____ Date: 5-13-09
D. M. Montgomery, QA Manager

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Source H_00002

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

83725-334

5 mL Liquid in Flame Sealed Vial

Customer: Test America St. Louis/Earth City, MO
P.O. No.: 2397508, Item 1
Reference Date: 01-Jan-2011 12:00 PM EST **Grams of Master Source:** 0.028066

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	1.580E+05	———	3.261E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	4.626E+02	1.697E+05	4.763E+03	0.8	1.7	3.8	HPGe
Co-57	122.1	2.718E+02	8.711E+04	2.445E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	1.376E+02	1.247E+05	3.500E+03	0.5	1.1	2.4	HPGe
Hg-203	279.2	4.661E+01	2.753E+05	7.727E+03	0.4	1.1	2.3	HPGe
Sn-113	391.7	1.151E+02	1.769E+05	4.965E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	1.098E+04	1.109E+05	3.113E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	1.066E+02	4.224E+05	1.186E+04	0.5	1.1	2.4	HPGe
Co-60	1173.2	1.925E+03	2.142E+05	6.012E+03	0.6	1.1	2.5	HPGe
Co-60	1332.5	1.925E+03	2.143E+05	6.015E+03	0.6	1.1	2.5	HPGe
Y-88	1836.1	1.066E+02	4.472E+05	1.255E+04	0.5	1.1	2.4	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Comments:
5.30203 grams 4M HCl solution with approximately 30 µg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the reference date.

Source Prepared by: MTaskaeva
M. I. Taskaeva, Radiochemist

QA Approved: _____ Date: 13 JAN 11
J. D. McCorvey, QA Manager Alternate

Reagent

Tuna Can LCS_00002

Rec'd : 12-26-06

ANALYTICS
An Isotope Products Laboratories Company

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

74139-334
1.0 Liter Sand in 1 Liter Wide Mouth HDPE "S" Bottle

Customer: Severn Trent Laboratories/Earth City, MO
P.O. No.: 2169577, Item 1
Calibration Date: 01-Oct-2006 12:00 EST **Grams of Master Source:** 0.01552

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty , % Type u_A	u_B	U	Calibration Method
Pb-210	46.5	8145.9	———	3079.8	0.33	1.46	2.99	4π LS
Am-241	59.5	157860	———	2034.3	0.33	1.46	2.99	4π LS
Cd-109	88.0	462.60	189000	2933.5	0.57	1.70	3.59	HPGe
Co-57	122.1	271.79	94570	1467.8	0.34	1.30	2.69	HPGe
Ce-139	165.9	137.6	133800	2076.7	0.35	1.10	2.31	HPGe
Hg-203	279.2	46.61	295300	4583	0.40	1.10	2.34	HPGe
Sn-113	391.7	115.1	185600	2880.7	0.42	1.10	2.35	HPGe
Cs-137	661.7	10983	116700	1811.3	0.70	1.20	2.78	HPGe
Y-88	898.0	106.60	455400	7068	0.50	1.10	2.42	HPGe
Co-60	1173.2	1925.4	226900	3522	0.60	1.10	2.51	HPGe
Co-60	1332.5	1925.4	227000	3523	0.90	1.10	2.84	HPGe
Y-88	1836.1	106.6	481200	7469	0.90	1.10	2.84	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
1550 grams of sand. NOTE: Homogeneity was checked by the addition of Tc-99 tracer to the solution used to spike the sand. Ten 10-gram aliquots were removed after mixing and counted to measure the Tc-99. The standard deviation for the 10 measurements was 1.3% with a range of 4.8%. This demonstrates reasonable homogeneity for this source material down to a 10-gram aliquot.
This standard will expire one year after the calibration date.

Source Prepared by: M. I. Taskaeva, Radiochemist

QA Approved: for D. M. Montgomery, QA Manager Date: 12-21-06

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Gamma LCS per Geometry

Geometry: Tuna Can
Reference date 10/1/2006
Calibration Standard: 74139-334
Standard volume g / vial 1550
volume transferred in g / geometry 341.9

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	dpm/g
Am-241	2034.3	449	0.359	219.35
Cs-137	1811.3	400	0.851	82.39
Co-60	3523	777	0.999856	136.39

Reviewed By: Chris Hough

Date: 3/15/2013

Reagent

Tuna Can LCS_00003

Rec'd : 12-26-06

ANALYTICS
An Isotope Products Laboratories Company

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

74139-334
1.0 Liter Sand in 1 Liter Wide Mouth HDPE "S" Bottle

Customer: Severn Trent Laboratories/Earth City, MO
P.O. No.: 2169577, Item 1
Calibration Date: 01-Oct-2006 12:00 EST **Grams of Master Source:** 0.01552

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Pb-210	46.5	8145.9	———	3079.8	0.33	1.46	2.99	4π LS
Am-241	59.5	157860	———	2034.3	0.33	1.46	2.99	4π LS
Cd-109	88.0	462.60	189000	2933.5	0.57	1.70	3.59	HPGe
Co-57	122.1	271.79	94570	1467.8	0.34	1.30	2.69	HPGe
Ce-139	165.9	137.6	133800	2076.7	0.35	1.10	2.31	HPGe
Hg-203	279.2	46.61	295300	4583	0.40	1.10	2.34	HPGe
Sn-113	391.7	115.1	185600	2880.7	0.42	1.10	2.35	HPGe
Cs-137	661.7	10983	116700	1811.3	0.70	1.20	2.78	HPGe
Y-88	898.0	106.60	455400	7068	0.50	1.10	2.42	HPGe
Co-60	1173.2	1925.4	226900	3522	0.60	1.10	2.51	HPGe
Co-60	1332.5	1925.4	227000	3523	0.90	1.10	2.84	HPGe
Y-88	1836.1	106.6	481200	7469	0.90	1.10	2.84	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
1550 grams of sand. NOTE: Homogeneity was checked by the addition of Tc-99 tracer to the solution used to spike the sand. Ten 10-gram aliquots were removed after mixing and counted to measure the Tc-99. The standard deviation for the 10 measurements was 1.3% with a range of 4.8%. This demonstrates reasonable homogeneity for this source material down to a 10-gram aliquot.
This standard will expire one year after the calibration date.

Source Prepared by: M. I. Taskaeva, Radiochemist

QA Approved: D. M. Montgomery, QA Manager Date: 12-21-06

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

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ANALYSIS OF UNCERTAINTY FOR MIXED GAMMA STANDARDS
BATCH 127
CALIBRATION DATE: October 1, 2006 12:00 EST

Isotope	Energy (keV)	Calibration Method[1]	Statistics[2]	Calibration[2]	Peak Fitting[2]	Geometry[2]	Impurities[2]	Weighing	Combined Standard Uncertainty	Relative Expanded Uncertinty (k=2)
Cd-109	88	HPGe	0.16	1.1	0.88	0.8	0	0.2	1.64	3.3
Co-57	122	HPGe	0.23	1.1	0.71	0.7	0	0.2	1.52	3.0
Ce-139	166	HPGe	0.17	1.0	0.58	0.7	0	0.2	1.38	2.8
Hg-203	279	HPGe	0.11	1.1	0.34	0.7	0	0.2	1.37	2.7
Sn-113	392	HPGe	0.21	1.0	0.35	0.7	0	0.2	1.30	2.6
Cs-137	662	HPGe	0.36	1.1	0.60	0.7	0	0.2	1.49	3.0
Y-88	898	HPGe	0.19	1.0	0.33	0.7	0	0.2	1.29	2.6
Co-60	1173	HPGe	0.31	.97	0.45	0.7	0	0.2	1.33	2.7
Co-60	1332	HPGe	0.33	.93	0.48	0.7	0	0.2	1.32	2.6
Y-88	1836	HPGe	0.24	1.0	0.35	0.7	0	0.2	1.31	2.6
Optional Additional Isotopes										
Pb-210	46.5	4π LS	0.33	1.1	0	0.9	0.30	0.2	1.50	3.0
Am-241	59.5	4π LS	0.33	1.1	0	0.9	0.30	0.2	1.50	3.0
Sr-85	514	IC	0.30	1.1	0	0.7	0.17	0.2	1.36	2.7
Cs-134	605	IC	0.30	1.0	0	0.8	0.17	0.2	1.34	2.7
Cs-134	796	IC	0.30	1.0	0	0.8	0.17	0.2	1.34	2.7
Mn-54	835	IC	0.30	1.0	0	0.8	0.17	0.2	1.34	2.7
Zn-65	1116	IC	0.30	1.0	0	0.8	0.17	0.2	1.34	2.7

[1]Calibration Methods:

4π LS (4 pi Liquid Scintillation Counting)
HPGe (High Purity Germanium Gamma Ray Spectrometer)
IC (Gamma Ray Ionization Chamber)

[2]As Percent (%)from counting data

No interfering gamma emitting impurities were detected during calibration. Depending on the resolution and energy dispersion (keV/channel) of the measuring system, the following spectral conflicts may occur: (1) between the 88 keV gamma-ray and the X-rays emitted in the decay of Hg-203, (2) between the 1333 keV gamma-ray and the 1325 keV single escape peak from the 1836 keV gamma-ray.

St. Louis Radiological Standard Reverification Form

Standard ID Number: Tuna Can LCS_00003 (259586)
True Value = 1249.94 Bq/Sample
Date Analyzed: 10/31/2013

Radionuclide: Am-241

	Replicates	
#1	1215	Bq/Sample
#2	1264	Bq/Sample
#3	1267	Bq/Sample

Mean = 1248.667

1 sigma = 29.19475

1.96 sigma = 57.22171

True Value minus 5% = 1187.443 (True Value - 5%)
True Value plus 5% = 1312.437 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? **Yes** **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? **Yes** **(Acceptance Criteria)**

Standard Reverification Acceptable? **Yes**

Note: Criteria for reverification of radiological standards is taken from the DOE QSAS and LANL Statements of Work

Reviewed By/Date: Jody Watson 12/1/13

SOP Reference: STL-QA-0002, Current Revision

St. Louis Radiological Standard Reverification Form

Standard ID Number: Tuna Can LCS_00003 (259586)
True Value = 469.49 Bq/Sample
Date Analyzed: 10/31/2013

Radionuclide: Cs-137

	Replicates	
#1	451.6	Bq/Sample
#2	477.4	Bq/Sample
#3	455.6	Bq/Sample

Mean = 461.5333

1 sigma = 13.88572

1.96 sigma = 27.21602

True Value minus 5% = 446.0155 (True Value - 5%)
True Value plus 5% = 492.9645 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? Yes **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? Yes **(Acceptance Criteria)**

Standard Reverification Acceptable? Yes

Note: Criteria for reverification of radiological standards is taken from the DOE QSAS and LANL Statements of Work

Reviewed By/Date: Jody Watson 12/1/14

SOP Reference: STL-QA-0002, Current Revision

St. Louis Radiological Standard Reverification Form

Standard ID Number: Tuna Can LCS_00003 (259586)
True Value = 777 Bq/Sample
Date Analyzed: 10/31/2013

Radionuclide: Co-60

	Replicates	
#1	724.3	Bq/Sample
#2	774.1	Bq/Sample
#3	770	Bq/Sample

Mean = 756.1333

1 sigma = 27.64459

1.96 sigma = 54.1834

True Value minus 5% = 738.15 (True Value - 5%)
True Value plus 5% = 815.85 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? Yes **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? Yes **(Acceptance Criteria)**

Standard Reverification Acceptable? Yes

Note: Criteria for reverification of radiological standards is taken from the DOE QSAS and LANL Statements of Work

Reviewed By/Date: Jody Watson 12/1/14

SOP Reference: STL-QA-0002, Current Revision

Gamma LCS per Geometry - Tuna Can

Reagent ID: Tuna Can LCS_00003
Container: 259586
Reference date 10/1/2006
Calibration Standard: 74139-334
Standard volume: 1550 g/vial
Standard volume transferred: 341.9 g/geometry

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	dpm/g	Bq/sample
Am-241	2034.3	448.7	0.359	219.35	1249.94
Cs-137	1811.3	399.5	0.851	82.39	469.49
Co-60	3522	776.9	0.999856	136.36	777.00

Reviewed By: Jody Watson

Date: 12/1/2013

SOP Reference: ST-RD-0102, Current Rev **Form:** RAD-0080 **Revised:** 11/27/2013

Test America St. Louis Spectrum ID: 9_Gamma_20130915

Sample Description: 77739_Gamma_LCS 160-77739~2-A
Detector: Ge9 S/N100228730
Batch ID: 77739
Work Order Number: Gamma
Lot Number: LCS 160-77739~2-A

Decay to Time: 10/1/2006 12:00 Live Time: 1800 sec
Acquisition Time: 10/31/2013 08:28:21 Real Time: 1810 sec
Analysis Time: 11/11/2013 19:50 Dead Time: 0.57 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 9_Soil_TunaCan.Clb
Efficiency Cal Desc: 9_Soil_TunaCan_90099_050312
Efficiency Cal Date: 6/14/2012 10:19
Energy Cal Date: 3/1/2012 13:57
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 9_2013-10-05_0100.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
K-40	5.305E-01	769.5	4.082E+00	4.082E+00	1.578E+01
CO-60	7.243E+02	1.0	7.254E+00	3.708E+01	3.977E+00
CS-134	7.235E+00	93.6	6.774E+00	6.784E+00	2.680E+01
CS-137	4.516E+02	1.0	4.733E+00	2.396E+01	3.540E+00
EU-152	6.293E+00	42.6	2.678E+00	2.698E+00	1.271E+01
EU-154	4.025E+00	75.0	3.020E+00	3.027E+00	5.177E+01
EU-155	5.881E+00	110.2	6.478E+00	6.486E+00	2.150E+01
TL-208	3.059E+01	64.6	1.977E+01	1.984E+01	3.918E+01
PB-210	1.442E+04	0.9	1.325E+02	8.572E+02	2.204E+02
PB-212	5.630E+01	36.7	2.065E+01	2.097E+01	6.722E+01
PB-214	5.714E+00	34.9	1.996E+00	2.018E+00	6.384E+00
BI-212	9.580E+01	152.1	1.457E+02	1.458E+02	4.895E+02
BI-214	7.078E+00	34.4	2.432E+00	2.460E+00	4.992E+00
AC-228	1.477E+01	57.1	8.428E+00	8.462E+00	3.552E+01
Pa-234	5.684E+00	65.7	3.737E+00	3.748E+00	9.406E+00
TH-234	-2.970E+02	9.4	2.787E+01	3.191E+01	8.608E+01
PA-234M	9.991E+01	80.0	7.990E+01	8.006E+01	4.336E+02
U-235	-4.791E+00	104.0	4.982E+00	4.988E+00	1.653E+01
AM-241	1.215E+03	0.8	9.198E+00	6.370E+01	1.316E+01
Total	1.715E+04				

Analyst: Jody Watson

TestAmerica, Inc Spectrum name: 9_Gamma_20130915.An1

Sample description
77739_Gamma_LCS 160-77739~2-A

Spectrum Filename: C:\User\SPC\Det9\9_Gamma_20130915.An1

Acquisition information
Start time: 10/31/2013 8:28:21 AM
Live time: 1800
Real time: 1810
Dead time: 0.57 %
Detector ID: 9

Detector system
Ge9 S/N100228730

Calibration
Filename: 9_Soil_TunaCan.Clb
9_Soil_TunaCan_90099_050312

Energy Calibration
Created: 3/1/2012 1:57:17 PM
Zero offset: 0.074 keV
Gain: 0.250 keV/channel
Quadratic: -2.269E-08 keV/channel^2

Efficiency Calibration
Created: 6/14/2012 10:19:51 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.30 %
Log(Eff): -8.079856E-01 + (-2.367265E-01*Log(E)) + (-3.950640E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.42 %
Log(Eff): -2.387916E+01 + (8.875647E+00*Log(E)) + (-9.401100E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.59keV)
Stop channel: 8000 (1999.34keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	9_2013-10-05_0100.PBC 10/5/2013 1:00:21 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 35 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 134.9778

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.60	401.	16.10	1.13	1.639E-02				
46.55	22813.	0.92	0.93	2.578E-02	46.54	4.250	1.442E+04	PB210
59.57	28391.	0.76	0.93	3.661E-02	59.54	35.900	1.215E+03	AM241
77.08	140.	39.21	0.98	4.675E-02				
88.08	1206.	7.29	1.06	5.052E-02				
93.88	58.	87.63	1.04	5.171E-02	93.35	5.561	PBC<MDA	AC228
					93.35	5.810	1.069E+01	U235
					92.59	5.584	1.115E+01	TH234
					93.35	5.810	1.069E+01	U235
					93.35	5.561	2.622E+01	AC228
93.88	58.	87.63	1.04	5.171E-02	93.35	5.561	PBC<MDA	AC228
					93.35	5.810	1.069E+01	U235
105.44	44.	110.15	1.05	5.318E-02	105.31	21.200	PBC<MDA	EU155
					105.31	21.200	5.881E+00	EU155
122.44	45.	108.81	1.07	5.305E-02	121.78	28.580	PBC<MDA	EU152
					121.78	28.580	2.352E+00	EU152
131.16	35.	137.33	1.08	5.216E-02	131.29	18.000	PBC<MDA	Pa234
161.84	5.	850.44	1.11	4.676E-02	163.38	5.080	PBC<MDA	U235
					163.38	5.080	1.068E+00	U235
191.89	75.	47.73	0.55	4.310E-02				
199.99	66.	64.08	0.38	4.195E-02				
238.40	138.	27.30	0.91	3.734E-02	238.63	43.300	6.216E+01	PB212
242.14	11.	403.77	1.18	3.697E-02	242.00	7.430	PBC<MDA	PB214
276.94	34.	114.35	1.21	3.372E-02	277.28	6.310	PBC<MDA	TL208
283.56	5.	702.33	1.22	3.315E-02	284.30	6.140	HL>Cutoff	I131
294.85	92.	54.23	0.49	3.232E-02	295.09	19.300	PBC<MDA	PB214
300.38	48.	84.68	1.24	3.195E-02	300.03	3.280	PBC<MDA	PB212
338.25	45.	84.62	1.27	2.949E-02	338.32	12.010	PBC<MDA	AC228

					338.32	12.010	1.661E+01 AC228
344.89	28.	130.46	1.27	2.905E-02	344.29	26.500	PBC<MDA EU152
					344.29	26.500	2.923E+00 EU152
351.72	86.	44.07	1.28	2.860E-02	351.93	37.600	PBC<MDA PB214
367.42	39.	64.82	0.53	2.775E-02			
519.92	99.	37.67	0.41	2.164E-02			
562.86	22.	127.02	1.47	2.040E-02	563.24	8.350	PBC<MDA CS134
570.13	20.	136.61	1.47	2.024E-02	569.32	15.380	PBC<MDA CS134

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					569.47	8.200	6.589E+00	Pa234
570.13	20.	136.24	1.47	2.024E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	6.607E+00	Pa234
583.13	40.	60.64	1.48	1.989E-02	583.02	84.500	PBC<MDA	TL208
609.58	105.	31.70	0.98	1.925E-02	609.31	46.090	6.578E+00	BI214
661.61	10643.	1.05	1.45	1.810E-02	661.66	85.210	4.516E+02	CS137
712.89	39.	39.12	0.70	1.711E-02				
727.11	17.	152.13	1.60	1.686E-02	727.17	7.550	PBC<MDA	BI212
766.71	33.	79.97	1.63	1.620E-02	766.41	0.294	PBC<MDA	PA234M
					766.41	0.294	3.867E+02	PA234M
779.17	59.	42.55	1.64	1.600E-02	778.92	12.940	PBC<MDA	EU152
					778.92	12.940	2.273E+01	EU152
797.04	6.	290.73	1.66	1.565E-02	801.95	8.690	PBC<MDA	CS134
860.47	19.	137.44	1.71	1.482E-02	860.56	12.420	PBC<MDA	TL208
883.68	19.	133.89	1.72	1.456E-02	880.53	6.000	PBC<MDA	Pa234
					883.24	9.600	7.529E+00	Pa234
910.66	44.	76.62	1.75	1.418E-02	911.07	29.000	PBC<MDA	AC228
					911.07	29.000	1.400E+01	AC228
943.80	24.	117.47	1.77	1.377E-02	946.02	13.400	PBC<MDA	Pa234
964.12	14.	228.97	1.79	1.357E-02	964.11	14.605	PBC<MDA	EU152
					964.11	14.605	5.560E+00	EU152
996.48	16.	177.62	1.81	1.323E-02	996.33	10.600	PBC<MDA	EU154
					996.33	10.600	1.149E+01	EU154
1121.05	28.	81.71	1.90	1.206E-02	1120.29	15.100	PBC<MDA	BI214
1173.15	5976.	1.44	1.98	1.163E-02	1173.24	99.900	7.254E+02	CO60
1272.28	11.	75.03	2.01	1.088E-02	1274.54	35.190	PBC<MDA	EU154
					1274.54	35.190	2.924E+00	EU154
1332.36	5385.	1.39	2.00	1.050E-02	1332.50	99.980	7.231E+02	CO60
1460.86	1.	76.97	2.13	9.749E-03	1460.83	10.670	PBC<MDA	K40
1764.37	7.	64.03	2.31	8.350E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
146.03	36.60	1187.	401.	2.444E+04	16.10	1.125	-	
307.92	77.08	958.	140.	2.995E+03	39.21	0.976	-	s
351.89	88.08	1452.	1215.	2.405E+04	5.28	1.055	-	
767.05	191.89	448.	75.	1.732E+03	47.73	0.547	-	s
799.44	199.99	552.	66.	1.585E+03	64.08	0.381	-	s
1469.05	367.42	225.	39.	1.407E+03	56.65	0.534	-	sM
2079.05	519.92	287.	99.	4.576E+03	37.67	0.415	-	sM
2850.97	712.89	70.	39.	2.299E+03	39.12	0.697	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.85	46.55	5511.	22813.	12.674	0.92	0.933
AM-241	237.89	59.57	4281.	28391.	15.773	0.76	0.933
TH-234	245.32	61.42	2410.	-799.	-0.444	9.38	1.014s
TH-234	365.80	91.55	1239.	-50.	-0.028	101.12	1.042s
AC-228	372.98	93.35	1253.	58.	0.032	87.63	1.043D
U-235	372.98	93.35	1253.	58.	0.032	87.63	1.043D
EU-155	421.32	105.44	1171.	44.	0.025	110.15	1.054s
EU-152	489.29	122.44	1159.	45.	0.025	108.81	1.070s
Pa-234	524.18	131.16	1124.	35.	0.019	137.33	1.079s
U-235	574.13	143.65	1203.	-48.	-0.026	103.98	1.091s
U-235	646.89	161.84	752.	5.	0.003	850.44	1.109s
U-235	821.22	205.44	1091.	-13.	-0.007	349.16	1.148s
PB-212	953.27	238.46	993.	125.	0.070	36.68	1.179
PB-214	968.00	242.14	1005.	11.	0.006	403.77	1.182
TL-208	1107.16	276.94	791.	34.	0.019	114.35	1.214
I-131	1133.66	283.56	738.	5.	0.003	702.33	1.221
PB-214	1178.79	294.85	573.	92.	0.051	54.23	0.490s
PB-212	1200.93	300.38	789.	48.	0.026	84.68	1.235
AC-228	1352.39	338.25	701.	45.	0.025	84.62	1.270s
EU-152	1378.94	344.89	662.	28.	0.016	130.46	1.275s
PB-214	1406.26	351.72	669.	86.	0.048	44.07	1.282
I-131	1455.88	364.13	713.	-34.	-0.019	113.88	1.293
BE-7	1909.01	477.42	744.	-6.	-0.003	644.25	1.392s
CS-134	2250.78	562.86	388.	22.	0.012	127.02	1.466s
CS-134	2279.86	570.13	352.	20.	0.011	136.61	1.471s
Pa-234	2279.88	570.13	352.	20.	0.011	136.24	1.471
TL-208	2331.87	583.13	356.	40.	0.022	60.64	1.482s
CS-134	2410.14	602.69	309.	-17.	-0.010	144.66	1.500s
BI-214	2437.68	609.58	271.	105.	0.058	31.70	0.982s
CS-137	2645.82	661.61	300.	10643.	5.913	1.05	1.452
BI-212	2907.87	727.11	318.	17.	0.009	152.13	1.601s
PA-234M	3066.30	766.71	335.	33.	0.018	79.97	1.633s
EU-152	3116.13	779.17	285.	59.	0.033	42.55	1.643s
CS-134	3187.66	797.04	169.	6.	0.004	290.73	1.661s
TL-208	3441.43	860.47	347.	19.	0.011	137.44	1.707
Pa-234	3534.30	883.68	311.	19.	0.010	133.89	1.722
AC-228	3642.26	910.66	550.	44.	0.025	76.62	1.746s
Pa-234	3774.84	943.80	378.	24.	0.013	117.47	1.772
EU-152	3856.15	964.12	492.	14.	0.008	228.97	1.786s
AC-228	3874.97	968.82	503.	-12.	-0.007	261.56	1.790s
EU-154	3985.65	996.48	415.	16.	0.009	177.62	1.810s
BI-214	4484.12	1121.05	307.	28.	0.016	81.71	1.901
CO-60	4692.63	1173.15	172.	5976.	3.320	1.44	1.975
EU-154	5089.34	1272.28	31.	11.	0.006	75.03	2.008s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	5329.81	1332.36	33.	5385.	2.991	1.39	1.997
K-40	5844.14	1460.86	33.	1.	0.001	76.97	2.131
BI-214	7059.18	1764.37	18.	7.	0.004	64.03	2.314s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	Peak MDA Value Bq/Sample		COMMENTS
BE-7	C	-1.3766E+00				5.31E+01		
			477.60	-1.377E+00	&(	2.979E+01	6.44E+02 1.05E+01 G	
K-40	N	5.3052E-01				4.66E+11		
			1460.83	5.305E-01	(P	1.578E+01	7.70E+01 1.07E+01 G	
CO-60	F	7.2427E+02				1.93E+03		
			1332.50	7.231E+02	(	3.977E+00	1.39E+00 1.00E+02 G	
			1173.24	7.254E+02	(	7.748E+00	1.44E+00 9.99E+01 G	
I-131	I	-6.5562E-01				8.02E+00		
			364.48	-8.173E-01	(	3.098E+00	1.14E+02 8.17E+01 G	
			284.30	1.496E+00	(	3.530E+01	7.02E+02 6.14E+00 G	
			636.97	-6.785E-01	%	3.837E+01	1.67E+03 7.17E+00 G	
CS-134	I	7.2349E+00				7.54E+02		
			604.71	-5.518E+00	?(	2.680E+01	1.45E+02 9.76E+01 G	
			795.87	5.593E-02	%	3.854E+01	2.03E+04 8.55E+01 G	
			569.32	3.786E+01	?(	1.733E+02	1.37E+02 1.54E+01 G	
			801.95	2.811E+01	&(	2.787E+02	2.91E+02 8.69E+00 G	
			563.24	7.820E+01	?(	3.322E+02	1.27E+02 8.35E+00 G	
CS-137	I	4.5157E+02				1.10E+04		
			661.66	4.516E+02	(	3.540E+00	1.05E+00 8.52E+01 G	
EU-152	F	6.2931E+00				4.94E+03		
			344.29	2.923E+00	(	1.271E+01	1.30E+02 2.65E+01 G	
			121.78	2.352E+00	&(	8.497E+00	1.09E+02 2.86E+01 G	
			778.92	2.273E+01	(	3.138E+01	4.25E+01 1.29E+01 G	
			964.11	5.560E+00	?(	4.275E+01	2.29E+02 1.46E+01 G	
			1112.07	3.764E-02	&	4.286E+01	3.35E+04 1.36E+01 G	
			1408.00	2.382E-01	%	9.762E+00	1.12E+03 2.10E+01 G	

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	I	4.0247E+00					3.14E+03	
			873.23	7.271E-01	&(	5.177E+01	2.10E+03	1.23E+01 G
			123.10	6.921E-02	&	7.391E+00	3.19E+03	4.08E+01 G
			1274.54	2.924E+00	?(	7.338E+00	7.50E+01	3.52E+01 G
			723.36	4.766E-01	%	2.324E+01	1.43E+03	2.02E+01 G
			1004.77	4.567E-01	%	3.539E+01	2.28E+03	1.80E+01 G
			996.33	1.149E+01	(	6.852E+01	1.78E+02	1.06E+01 G
EU-155	I	5.8806E+00					1.81E+03	
			105.31	5.881E+00	(	2.150E+01	1.10E+02	2.12E+01 G
			86.54	-3.761E-01	%	1.959E+01	1.56E+03	3.07E+01 G
TL-208	N	3.0591E+01					6.98E+02	
			583.02	1.750E+01	?(P	3.918E+01	6.06E+01	8.45E+01 G
			277.28	1.153E+02	(P	4.564E+02	1.14E+02	6.31E+00 G
			860.56	7.666E+01	(	3.531E+02	1.37E+02	1.24E+01 G
PB-210	N	1.4424E+04					8.14E+03	
			46.54	1.442E+04	(	2.204E+02	9.19E-01	4.25E+00 G
PB-212	N	5.6299E+01					6.98E+02	
			238.63	5.630E+01	?(	6.722E+01	3.67E+01	4.33E+01 G
			300.03	3.298E+02	+	9.255E+02	8.47E+01	3.28E+00 G
PB-214	N	5.7137E+00					5.84E+05	
			351.93	4.435E+00	?(	6.384E+00	4.41E+01	3.76E+01 G
			295.09	8.205E+00	(	1.021E+01	5.42E+01	1.93E+01 G
			242.00	2.259E+00	-	3.053E+01	4.04E+02	7.43E+00 G
BI-212	N	9.5804E+01					6.98E+02	
			727.17	9.580E+01	&(	4.895E+02	1.52E+02	7.55E+00 G
			785.42	5.436E+01	&	2.991E+03	1.62E+03	1.28E+00 G
BI-214	N	7.0777E+00					5.84E+05	
			609.31	6.578E+00	(P	4.992E+00	3.17E+01	4.61E+01 G
			1120.29	8.602E+00	(P	2.581E+01	8.17E+01	1.51E+01 G
			1764.49	3.099E+00	- P	9.807E+00	6.40E+01	1.54E+01 G
AC-228	N	1.4766E+01					2.10E+03	
			911.07	1.400E+01	?(	3.552E+01	7.66E+01	2.90E+01 G
			968.97	-6.746E+00	-	5.930E+01	2.62E+02	1.75E+01 G
			338.32	1.661E+01	(	4.660E+01	8.46E+01	1.20E+01 G
								Energy duplication
			93.35	2.622E+01	&	7.608E+01	8.76E+01	5.56E+00 XA
Pa-234	N	5.6844E+00					1.63E+12	
			131.29	2.059E+00	?(	9.406E+00	1.37E+02	1.80E+01 G
			569.47	6.607E+00	(	3.016E+01	1.36E+02	8.20E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		946.02	7.154E+00	(	2.808E+01	1.17E+02	1.34E+01 G
		883.24	0.000E+00	-	4.308E+01	1.00E+03	9.60E+00 G
		880.53	1.202E+01	(	5.396E+01	1.34E+02	6.00E+00 G
TH-234	N -2.9703E+02					1.63E+12	
		63.29-2.970E+02		(	8.608E+01	9.38E+00	3.81E+00 G
		92.59-9.593E+00		&	3.217E+01	1.01E+02	5.58E+00 G
PA-234M	N 9.9914E+01					1.63E+12	
		1001.00-8.049E-01		%(	4.336E+02	1.58E+04	8.37E-01 G
		766.41	3.867E+02	&(	1.026E+03	8.00E+01	2.94E-01 G
U-235	N -4.7913E+00					2.57E+11	
		143.79-4.791E+00		?(	1.653E+01	1.04E+02	1.10E+01 G
		205.33-3.609E+00		&	4.212E+01	3.49E+02	5.01E+00 G
		163.38	1.068E+00	+	3.053E+01	8.50E+02	5.08E+00 G
							Energy duplication
		93.35	1.069E+01	&	3.101E+01	8.76E+01	5.81E+00 X
AM-241	T 1.2145E+03					1.58E+05	
		59.54	1.215E+03	(	1.316E+01	7.57E-01	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average

R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
TH-234	61.42	2410.	-799.	-0.444	9.38	-2.970E+02
TH-234	91.55	1239.	-50.	-0.028	101.12	-9.593E+00
AC-228	93.35	1253.	58.	0.032	87.63	2.622E+01
U-235	93.35	1253.	58.	0.032	87.63	1.069E+01
EU-155	105.44	1171.	44.	0.025	110.15	5.881E+00
EU-152	122.44	1159.	45.	0.025	108.81	2.352E+00
U-235	143.65	1203.	-48.	-0.026	103.98	-4.791E+00
U-235	161.84	752.	5.	0.003	850.44	1.068E+00
U-235	205.44	1091.	-13.	-0.007	349.16	-3.609E+00
AC-228	338.25	701.	45.	0.025	84.62	1.661E+01
EU-152	344.89	662.	28.	0.016	130.46	2.923E+00
BE-7	477.42	744.	-6.	-0.003	644.25	0.000E+00
CS-134	562.86	388.	22.	0.012	127.02	7.820E+01
CS-134	570.13	352.	20.	0.011	136.61	3.786E+01
CS-134	602.69	309.	-17.	-0.010	144.66	-5.518E+00
PA-234M	766.71	335.	33.	0.018	79.97	3.867E+02
EU-152	779.17	285.	59.	0.033	42.55	2.273E+01
CS-134	797.04	169.	6.	0.004	290.73	2.811E+01
AC-228	910.66	550.	44.	0.025	76.62	1.400E+01
EU-152	964.12	492.	14.	0.008	228.97	5.560E+00
AC-228	968.82	503.	-12.	-0.007	261.56	-6.746E+00
EU-154	996.48	415.	16.	0.009	177.62	1.149E+01
EU-154	1272.28	31.	11.	0.006	75.03	2.924E+00

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting		MDA Bq/Sample
BE-7	#A	-1.3766E+00	>12 Halflives	6.4425E+02%	2.9788E+01	
K-40	A	5.3052E-01	5.3052E-01	7.695E+02%		1.58E+01
CO-60		2.8537E+02	7.2427E+02	1.001E+00%		3.98E+00
I-131	A	-6.5562E-01	>12 Halflives	1.1388E+02%	3.0977E+00	
CS-134	#A	6.7120E-01	7.2349E+00	9.362E+01%		2.68E+01
CS-137		3.8340E+02	4.5157E+02	1.048E+00%		3.54E+00
EU-152	#A	4.3789E+00	6.2931E+00	4.255E+01%		1.27E+01
EU-154	#A	2.2731E+00	4.0247E+00	7.503E+01%		5.18E+01
EU-155	#A	2.1856E+00	5.8806E+00	1.102E+02%		2.15E+01
TL-208	A	2.3406E+00	3.0591E+01	6.464E+01%		3.92E+01
PB-210		1.1574E+04	1.4424E+04	9.188E-01%		2.20E+02
PB-212	A	4.3076E+00	5.6299E+01	3.668E+01%		6.72E+01

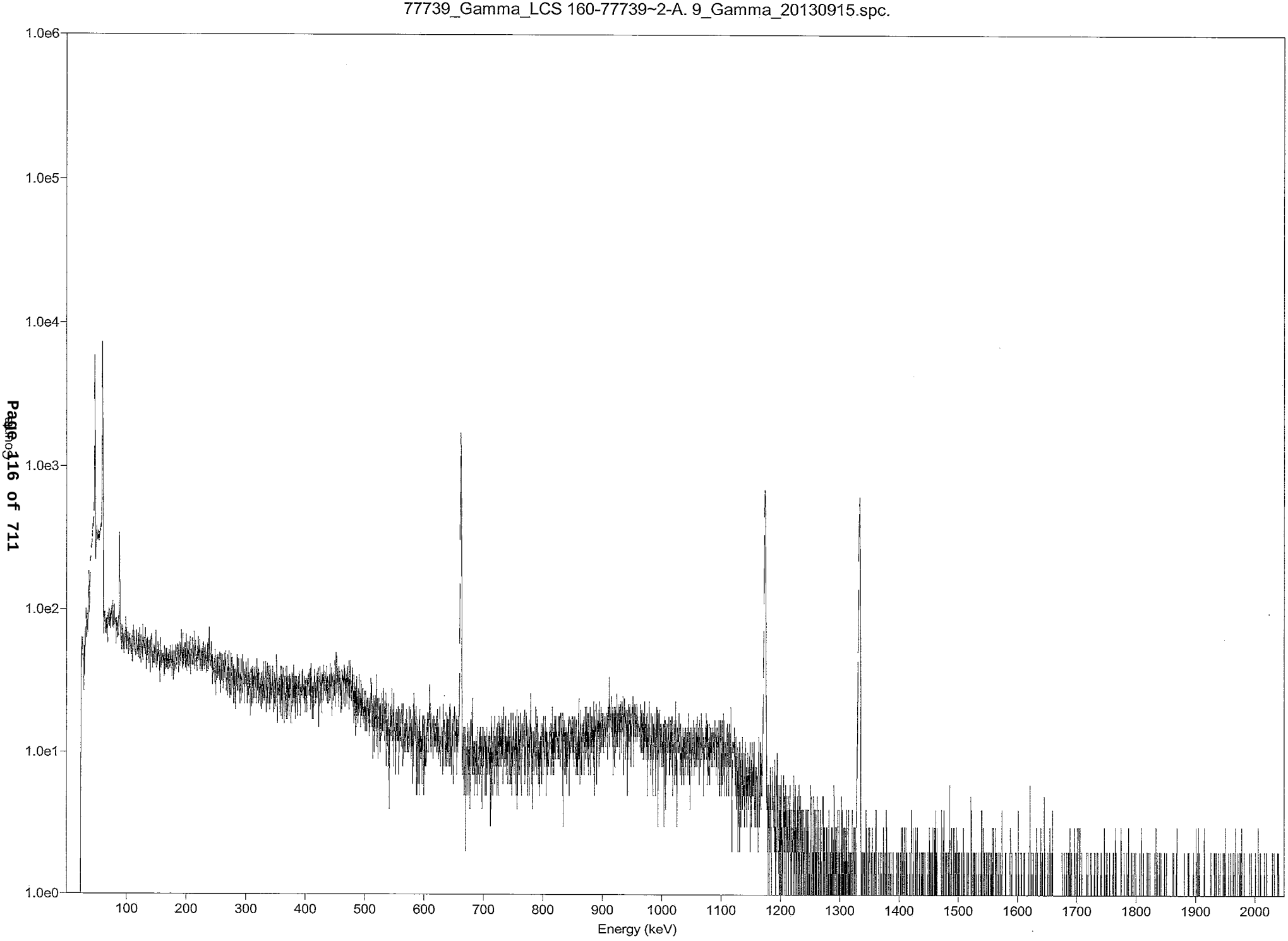
PB-214	A	5.6962E+00	5.7137E+00	3.494E+01%	6.38E+00
BI-212	#A	7.3301E+00	9.5804E+01	1.521E+02%	4.89E+02
BI-214		7.0561E+00	7.0777E+00	3.436E+01%	4.99E+00
AC-228	#A	6.2874E+00	1.4766E+01	5.708E+01%	3.55E+01
Pa-234	A	5.6844E+00	5.6844E+00	6.574E+01%	9.41E+00
TH-234	#A	-2.9703E+02	-2.9703E+02	9.384E+00%	8.61E+01
PA-234M	#A	9.9914E+01	9.9914E+01	7.997E+01%	4.34E+02
U-235	#A	-4.7913E+00	-4.7913E+00	1.040E+02%	1.65E+01
AM-241		1.2008E+03	1.2145E+03	7.573E-01%	1.32E+01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

S U M M A R Y

Total Activity (37.6 to 1999.3 keV) 1.346E+04 Bq/Sample
Total Decayed Activity (37.6 to 1999.3 keV) 1.6883195E+04 Bq/Sample

The library has energies which are not separable.


77739_Gamma_LCS 160-77739~2-A. 9_Gamma_20130915.spc.
1.0e6
1.0e5
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Log
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)

Test America St. Louis Spectrum ID: 11_Gamma_20131574

Sample Description: 77739_Gamma_LCS 160-77739~2-A
Detector: Ge11 S/N09363993
Batch ID: 77739
Work Order Number: Gamma
Lot Number: LCS 160-77739~2-A

Decay to Time: 10/1/2006 12:00 Live Time: 1800 sec
Acquisition Time: 10/31/2013 09:57:50 Real Time: 1893 sec
Analysis Time: 11/11/2013 19:53 Dead Time: 4.93 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 11_Soil_TunaCan.Clb
Efficiency Cal Desc: Ge11_TunaCanCal_90099_032912
Efficiency Cal Date: 4/2/2012 17:29
Energy Cal Date: 2/28/2012 13:09
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 11_2013-10-05_0101.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
K-40	-3.130E+00	551.4	1.726E+01	1.726E+01	1.982E+01
CO-60	7.741E+02	1.0	7.995E+00	3.968E+01	3.551E+00
CS-134	5.627E+00	57.9	3.259E+00	3.273E+00	3.600E+01
CS-137	4.774E+02	1.1	5.441E+00	2.542E+01	4.209E+00
EU-152	2.514E+00	70.6	1.774E+00	1.779E+00	1.482E+01
EU-154	2.899E+00	99.0	2.868E+00	2.872E+00	6.079E+01
EU-155	-4.263E-01	1708.0	7.281E+00	7.281E+00	2.440E+01
TL-208	4.864E+01	31.0	1.507E+01	1.528E+01	3.485E+01
PB-210	1.502E+04	1.0	1.504E+02	8.949E+02	2.572E+02
PB-212	9.754E+01	22.9	2.231E+01	2.319E+01	5.738E+01
PB-214	8.604E+00	23.5	2.021E+00	2.070E+00	5.061E+00
BI-212	3.977E+02	48.0	1.908E+02	1.919E+02	5.097E+02
BI-214	2.554E+00	72.7	1.857E+00	1.862E+00	6.709E+00
AC-228	2.142E+01	41.5	8.893E+00	8.960E+00	3.627E+01
Pa-234	3.857E+00	167.3	6.451E+00	6.454E+00	7.418E+00
TH-234	-8.093E+01	34.3	2.773E+01	2.805E+01	7.226E+01
PA-234M	2.658E+01	103.4	2.749E+01	2.752E+01	5.227E+02
U-235	4.288E+00	110.2	4.726E+00	4.731E+00	1.716E+01
AM-241	1.264E+03	0.8	1.065E+01	6.644E+01	1.590E+01
Total	1.816E+04				

Analyst: Jody Watson

TestAmerica, Inc Spectrum name: 11_Gamma_20131574.An1

Sample description
77739_Gamma_LCS 160-77739~2-A

Spectrum Filename: C:\User\SPC\Det11\11_Gamma_20131574.An1

Acquisition information
Start time: 10/31/2013 9:57:50 AM
Live time: 1800
Real time: 1893
Dead time: 4.93 %
Detector ID: 11

Detector system
Ge11 S/N09363993

Calibration
Filename: 11_Soil_TunaCan.Clb
Ge11_TunaCanCal_90099_032912

Energy Calibration
Created: 2/28/2012 1:09:34 PM
Zero offset: 0.055 keV
Gain: 0.250 keV/channel
Quadratic: -2.946E-08 keV/channel^2

Efficiency Calibration
Created: 4/2/2012 5:29:36 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.14 %
Log(Eff): -6.858644E-01 + (-3.337421E-01*Log(E)) + (-3.199860E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.72 %
Log(Eff): -2.393599E+01 + (8.833910E+00*Log(E)) + (-9.364157E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.58keV)
Stop channel: 8000 (1999.47keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	11_2013-10-05_0101.PBC 10/5/2013 1:01:56 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 20 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 46.5155

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.68	379.	16.28	1.05	1.405E-02				
40.49	133.	55.66	1.66	1.711E-02				
46.62	19658.	0.86	0.90	2.193E-02	46.54	4.250	1.460E+04	PB210
49.77	415.	28.03	0.60	2.434E-02				
55.95	145.	50.29	0.62	2.870E-02				
59.56	25028.	0.84	0.88	3.101E-02	59.54	35.900	1.264E+03	AM241
77.07	147.	27.49	0.93	3.947E-02				
79.28	92.	44.04	0.93	4.022E-02				
88.07	1082.	8.02	0.97	4.263E-02				
93.79	56.	88.49	0.94	4.362E-02	93.35	5.561	PBC<MDA	AC228
					93.35	5.810	1.224E+01	U235
					93.35	5.561	3.003E+01	AC228
93.79	56.	88.49	0.94	4.362E-02	93.35	5.561	PBC<MDA	AC228
					93.35	5.810	1.224E+01	U235
122.18	61.	70.58	0.97	4.466E-02	121.78	28.580	PBC<MDA	EU152
143.95	39.	110.20	0.99	4.238E-02	143.79	10.960	PBC<MDA	U235
205.37	11.	379.21	1.05	3.439E-02	205.33	5.010	PBC<MDA	U235
238.51	197.	20.94	0.80	3.106E-02	238.63	43.300	9.754E+01	PB212
					242.00	7.430	4.711E+01	PB214
276.63	35.	99.46	1.11	2.800E-02	277.28	6.310	PBC<MDA	TL208
283.85	38.	97.31	1.12	2.752E-02	284.30	6.140	HL>Cutoff	I131
295.03	118.	34.12	0.33	2.681E-02	295.09	19.300	1.273E+01	PB214
338.09	43.	83.18	1.17	2.436E-02	338.32	12.010	PBC<MDA	AC228
					338.32	12.010	1.900E+01	AC228
351.83	104.	27.31	1.27	2.369E-02	351.93	37.600	6.484E+00	PB214
430.82	38.	58.13	0.50	2.050E-02				
582.88	93.	29.40	0.81	1.643E-02	583.02	84.500	4.864E+01	TL208
609.24	36.	53.14	1.41	1.591E-02	609.31	46.090	PBC<MDA	BI214

					609.31	46.090	PBC<MDA BI214
661.78	9292.	1.14	1.38	1.495E-02	661.66	85.210	4.774E+02 CS137
727.09	28.	78.07	1.51	1.392E-02	727.17	7.550	PBC<MDA BI212
766.55	21.	103.43	1.54	1.338E-02	766.41	0.294	PBC<MDA PA234M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
777.51	11.	209.97	1.55	1.322E-02	778.92	12.940	PBC<MDA	EU152
783.74	37.	55.82	1.56	1.313E-02	785.42	1.280	PBC<MDA	BI212
794.26	21.	97.99	1.57	1.300E-02	795.87	85.530	PBC<MDA	CS134
					795.87	85.530	1.118E+01	CS134
803.02	24.	97.75	1.57	1.293E-02	801.95	8.690	PBC<MDA	CS134
					801.95	8.690	1.296E+02	CS134
809.12	83.	35.39	0.57	1.284E-02				
881.76	16.	167.27	1.64	1.203E-02	880.53	6.000	PBC<MDA	Pa234
					880.53	6.000	1.263E+01	Pa234
911.09	50.	56.96	1.66	1.172E-02	911.07	29.000	PBC<MDA	AC228
					911.07	29.000	1.937E+01	AC228
946.06	15.	197.34	1.69	1.139E-02	946.02	13.400	PBC<MDA	Pa234
					946.02	13.400	5.589E+00	Pa234
964.47	6.	552.78	1.71	1.122E-02	964.11	14.605	PBC<MDA	EU152
969.64	40.	73.12	1.71	1.118E-02	968.97	17.460	PBC<MDA	AC228
					968.97	17.460	2.650E+01	AC228
995.59	5.	472.23	1.73	1.094E-02	996.33	10.600	PBC<MDA	EU154
					996.33	10.600	4.659E+00	EU154
1005.86	25.	98.95	1.74	1.087E-02	1004.77	18.010	PBC<MDA	EU154
					1004.77	18.010	1.238E+01	EU154
1111.78	13.	217.05	1.83	1.004E-02	1112.07	13.644	PBC<MDA	EU152
1120.17	-3.	815.86	1.83	9.985E-03	1120.29	15.100	PBC<MDA	BI214
					1120.29	15.100	PBC<MDA	BI214
1173.37	5261.	1.46	1.87	9.629E-03	1173.24	99.900	7.711E+02	CO60
1332.61	4798.	1.46	2.01	8.708E-03	1332.50	99.980	7.771E+02	CO60
1408.05	2.	375.29	2.06	8.334E-03	1408.00	21.005	PBC<MDA	EU152
1461.51	-5.	196.71	2.10	8.093E-03	1460.83	10.670	PBC<MDA	K40
1764.74	4.	76.03	2.34	6.950E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
146.42	36.68	1142.	379.	2.697E+04	16.28	1.053	-	s
161.64	40.49	2139.	133.	7.772E+03	55.66	1.663	-	s
198.72	49.77	3929.	415.	1.703E+04	28.03	0.596	-	sM
223.43	55.95	2399.	145.	5.063E+03	50.29	0.624	-	sM
307.85	76.98	749.	144.	3.650E+03	28.13	0.929	-	D
316.66	79.18	776.	92.	2.284E+03	44.14	0.931	-	D
351.83	88.07	1541.	1188.	2.786E+04	5.50	0.967	-	M
1722.30	430.82	189.	38.	1.838E+03	58.13	0.499	-	sM
3235.39	809.12	156.	83.	6.465E+03	35.39	0.565	-	sM

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.97	46.58	5420.	20194.	11.219	1.00	0.891
AM-241	237.87	59.56	4487.	25028.	13.905	0.84	0.879
TH-234	245.79	61.54	1206.	-184.	-0.102	30.79	0.916s
EU-155	344.35	86.20	1723.	-110.	-0.061	54.41	0.938s
TH-234	380.25	95.17	736.	-49.	-0.027	217.31	0.943s
AC-228	372.95	93.35	1192.	56.	0.031	88.49	0.944D
U-235	372.95	93.35	1192.	56.	0.031	88.49	0.944D
EU-152	488.19	122.18	902.	61.	0.034	70.58	0.970
Pa-234	515.00	128.88	487.	-5.	-0.003	614.61	0.979s
U-235	575.24	143.95	913.	39.	0.022	110.20	0.990
U-235	653.29	163.47	852.	-24.	-0.013	174.70	1.008s
U-235	820.79	205.37	802.	11.	0.006	379.21	1.047s
PB-212	953.29	238.51	493.	181.	0.100	20.94	0.805s
TL-208	1105.71	276.63	601.	35.	0.020	99.46	1.112
I-131	1134.60	283.85	649.	38.	0.021	97.31	1.118s
PB-214	1179.31	295.03	449.	118.	0.066	34.12	0.326s
AC-228	1351.48	338.09	606.	43.	0.024	83.18	1.167s
EU-152	1375.50	344.10	616.	-11.	-0.006	332.03	1.172s
PB-214	1406.43	351.83	281.	104.	0.058	27.31	1.272
I-131	1459.85	365.19	588.	-9.	-0.005	397.04	1.190s
CS-134	2276.28	569.34	325.	-6.	-0.003	443.16	1.371s
TL-208	2330.42	582.88	188.	93.	0.052	29.40	0.812s
CS-134	2420.48	605.39	382.	-27.	-0.015	105.10	1.401s
BI-214	2435.87	609.24	337.	36.	0.020	53.14	1.405
I-131	2546.22	636.83	346.	-21.	-0.011	129.62	1.429s
CS-137	2645.99	661.78	289.	9292.	5.162	1.14	1.383
BI-212	2907.26	727.09	233.	28.	0.016	78.07	1.507s
PA-234M	3065.10	766.55	231.	21.	0.012	103.43	1.540s
EU-152	3108.94	777.51	242.	11.	0.006	209.97	1.551
BI-212	3133.87	783.74	191.	37.	0.020	55.82	1.556s
CS-134	3175.96	794.26	196.	21.	0.012	97.99	1.565s
CS-134	3210.97	803.02	270.	24.	0.014	97.75	1.570s
EU-154	3489.14	872.55	366.	-19.	-0.011	144.57	1.630s
Pa-234	3525.99	881.76	369.	16.	0.009	167.27	1.637s
AC-228	3643.32	911.09	388.	50.	0.028	56.96	1.662s
Pa-234	3783.25	946.06	451.	15.	0.009	197.34	1.691s
EU-152	3856.91	964.47	471.	6.	0.003	552.78	1.706
AC-228	3877.61	969.64	400.	40.	0.022	73.12	1.710s
EU-154	3981.42	995.59	334.	5.	0.003	472.23	1.733s
PA-234M	3998.45	999.85	318.	-11.	-0.006	222.98	1.737s
EU-154	4022.53	1005.86	285.	25.	0.014	98.95	1.740s
EU-152	4446.33	1111.78	362.	13.	0.007	217.05	1.828
CO-60	4692.81	1173.37	99.	5261.	2.923	1.46	1.869
EU-154	5088.59	1272.27	32.	-3.	-0.002	240.74	1.958s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	5330.12	1332.61	17.	4798.	2.666	1.46	2.011
EU-152	5632.05	1408.05	23.	2.	0.001	375.29	2.064s
K-40	5846.05	1461.51	36.	-5.	-0.003	196.71	2.105s
BI-214	7060.05	1764.74	19.	4.	0.002	76.03	2.336s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	5.0838E-01				5.31E+01	
			477.60	5.084E-01	%(	3.156E+01	1.84E+03 1.05E+01 G
K-40	N	-3.1300E+00				4.66E+11	
			1460.83	-3.130E+00	?(P	1.982E+01	1.97E+02 1.07E+01 G
CO-60	F	7.7409E+02				1.93E+03	
			1332.50	7.771E+02	(	3.551E+00	1.46E+00 1.00E+02 G
			1173.24	7.711E+02	(	7.193E+00	1.46E+00 9.99E+01 G
I-131	I	6.2628E-01				8.02E+00	
			364.48	-2.551E-01	?(	3.405E+00	3.97E+02 8.17E+01 G
			284.30	1.235E+01	&(	3.994E+01	9.73E+01 6.14E+00 G
			636.97	-1.037E+01	+	4.501E+01	1.30E+02 7.17E+00 G
CS-134	I	5.6266E+00				7.54E+02	
			604.71	-1.027E+01	?(	3.600E+01	1.05E+02 9.76E+01 G
			795.87	1.118E+01	&(	3.663E+01	9.80E+01 8.55E+01 G
			569.32	-1.345E+01	+	2.019E+02	4.43E+02 1.54E+01 G
			801.95	1.296E+02	(	4.227E+02	9.78E+01 8.69E+00 G
			563.24	8.247E+00	&	3.713E+02	1.33E+03 8.35E+00 G
CS-137	I	4.7736E+02				1.10E+04	
			661.66	4.774E+02	(	4.209E+00	1.14E+00 8.52E+01 G
EU-152	F	2.5135E+00				4.94E+03	
			344.29	-1.329E+00	?(	1.482E+01	3.32E+02 2.65E+01 G
			121.78	3.826E+00	(	8.921E+00	7.06E+01 2.86E+01 G
			778.92	4.945E+00	(	3.511E+01	2.10E+02 1.29E+01 G
			964.11	2.713E+00	(	5.060E+01	5.53E+02 1.46E+01 G
			1112.07	7.290E+00	(	5.327E+01	2.17E+02 1.36E+01 G
			1408.00	8.363E-01	&(	1.138E+01	3.75E+02 2.10E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	I 2.8987E+00					3.14E+03	
		873.23-1.254E+01	?(	6.079E+01	1.45E+02	1.23E+01	G
		123.10-1.484E-01	&	7.938E+00	1.59E+03	4.08E+01	G
		1274.54-1.049E+00	+	8.950E+00	2.41E+02	3.52E+01	G
		723.36 0.000E+00	+	3.157E+01	1.00E+03	2.02E+01	G
		1004.77 1.238E+01	?(	4.090E+01	9.90E+01	1.80E+01	G
		996.33 4.659E+00	?(	7.449E+01	4.72E+02	1.06E+01	G
EU-155	I -4.2626E-01					1.81E+03	
		105.31-4.263E-01	%(	2.440E+01	1.71E+03	2.12E+01	G
		86.54-1.262E+01	+	2.258E+01	5.44E+01	3.07E+01	G
TL-208	N 4.8643E+01					6.98E+02	
		583.02 4.864E+01	(P	3.485E+01	2.94E+01	8.45E+01	G
		277.28 1.453E+02	+	4.806E+02	9.95E+01	6.31E+00	G
		860.56 1.003E+01	%	4.122E+02	1.21E+03	1.24E+01	G
PB-210	N 1.5023E+04					8.14E+03	
		46.54 1.502E+04	(P	2.572E+02	1.00E+00	4.25E+00	G
PB-212	N 9.7541E+01					6.98E+02	
		238.63 9.754E+01	(P	5.738E+01	2.09E+01	4.33E+01	G
		300.03-3.442E+00	%	9.786E+02	8.43E+03	3.28E+00	G
PB-214	N 8.6039E+00					5.84E+05	
		351.93 6.484E+00	(P	5.061E+00	2.73E+01	3.76E+01	G
		295.09 1.273E+01	(P	1.092E+01	3.41E+01	1.93E+01	G
		242.00-1.846E-01	& P	2.604E+01	9.18E+02	7.43E+00	G
BI-212	N 3.9766E+02					6.98E+02	
		727.17 1.966E+02	?(	5.097E+02	7.81E+01	7.55E+00	G
		785.42 1.584E+03	&(	2.899E+03	5.58E+01	1.28E+00	G
BI-214	N 2.5543E+00					5.84E+05	
		609.31 2.760E+00	(P	6.709E+00	5.31E+01	4.61E+01	G
		1120.29-9.480E-01	% P	2.996E+01	8.16E+02	1.51E+01	G
		1764.49 1.937E+00	&(P	1.185E+01	7.60E+01	1.54E+01	G
AC-228	N 2.1423E+01					2.10E+03	
		911.07 1.937E+01	?(	3.627E+01	5.70E+01	2.90E+01	G
		968.97 2.650E+01	&(	6.414E+01	7.31E+01	1.75E+01	G
		338.32 1.900E+01	(	5.238E+01	8.32E+01	1.20E+01	G
						Energy duplication	
		93.35 3.003E+01	*	8.802E+01	8.85E+01	5.56E+00	XA
Pa-234	N 3.8567E+00					1.63E+12	
		131.29-3.578E-01	&(	7.418E+00	6.15E+02	1.80E+01	G
		569.47 4.218E-01	%	3.150E+01	2.19E+03	8.20E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		946.02	5.589E+00	&(	3.703E+01	1.97E+02	1.34E+01 G
		883.24	1.525E-01	%	4.471E+01	8.64E+03	9.60E+00 G
		880.53	1.263E+01	&(	7.094E+01	1.67E+02	6.00E+00 G
TH-234	N -8.0934E+01					1.63E+12	
		63.29-8.093E+01		?(P	7.226E+01	3.08E+01	3.81E+00 G
		92.59-1.124E+01		& P	2.953E+01	2.17E+02	5.58E+00 G
PA-234M	N 2.6576E+01					1.63E+12	
		1001.00-6.951E+01		&(	5.227E+02	2.23E+02	8.37E-01 G
		766.41	3.001E+02	&(	1.038E+03	1.03E+02	2.94E-01 G
U-235	N 4.2884E+00					2.57E+11	
		143.79	4.687E+00	?(	1.716E+01	1.10E+02	1.10E+01 G
		205.33	3.417E+00	?(	4.342E+01	3.79E+02	5.01E+00 G
		163.38-6.618E+00		+	3.859E+01	1.75E+02	5.08E+00 G
						Energy duplication	
		93.35	1.224E+01	*	3.587E+01	8.85E+01	5.81E+00 X
AM-241	T 1.2637E+03					1.58E+05	
		59.54	1.264E+03	(	1.590E+01	8.43E-01	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average

R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-234	61.54	1206.	-184.	-0.102	30.79	-8.093E+01	P
EU-155	86.20	1723.	-110.	-0.061	54.41	-1.262E+01	
TH-234	95.17	736.	-49.	-0.027	217.31	-1.124E+01	P
AC-228	93.35	1192.	56.	0.031	88.49	3.003E+01	
U-235	93.35	1192.	56.	0.031	88.49	1.224E+01	
Pa-234	128.88	487.	-5.	-0.003	614.61	-3.578E-01	
U-235	143.95	913.	39.	0.022	110.20	4.687E+00	
U-235	163.47	852.	-24.	-0.013	174.70	-6.618E+00	
U-235	205.37	802.	11.	0.006	379.21	3.417E+00	
I-131	283.85	649.	38.	0.021	97.31	0.000E+00	
AC-228	338.09	606.	43.	0.024	83.18	1.900E+01	
I-131	365.19	588.	-9.	-0.005	397.04	0.000E+00	
CS-134	569.34	325.	-6.	-0.003	443.16	-1.345E+01	
CS-134	605.39	382.	-27.	-0.015	105.10	-1.027E+01	
BI-214	609.24	337.	36.	0.020	53.14	2.760E+00	P
I-131	636.83	346.	-21.	-0.011	129.62	0.000E+00	
BI-212	727.09	233.	28.	0.016	78.07	1.966E+02	
PA-234M	766.55	231.	21.	0.012	103.43	3.001E+02	
BI-212	783.74	191.	37.	0.020	55.82	1.584E+03	
CS-134	794.26	196.	21.	0.012	97.99	1.118E+01	
CS-134	803.02	270.	24.	0.014	97.75	1.296E+02	
EU-154	872.55	366.	-19.	-0.011	144.57	-1.254E+01	
Pa-234	881.76	369.	16.	0.009	167.27	1.263E+01	
AC-228	911.09	388.	50.	0.028	56.96	1.937E+01	
Pa-234	946.06	451.	15.	0.009	197.34	5.589E+00	
AC-228	969.64	400.	40.	0.022	73.12	2.650E+01	
EU-154	995.59	334.	5.	0.003	472.23	4.659E+00	
PA-234M	999.85	318.	-11.	-0.006	222.98	-6.951E+01	
EU-154	1005.86	285.	25.	0.014	98.95	1.238E+01	
EU-154	1272.27	32.	-3.	-0.002	240.74	-1.049E+00	
K-40	1461.51	36.	-5.	-0.003	196.71	-3.130E+00	P
BI-214	1764.74	19.	4.	0.002	76.03	1.937E+00	P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

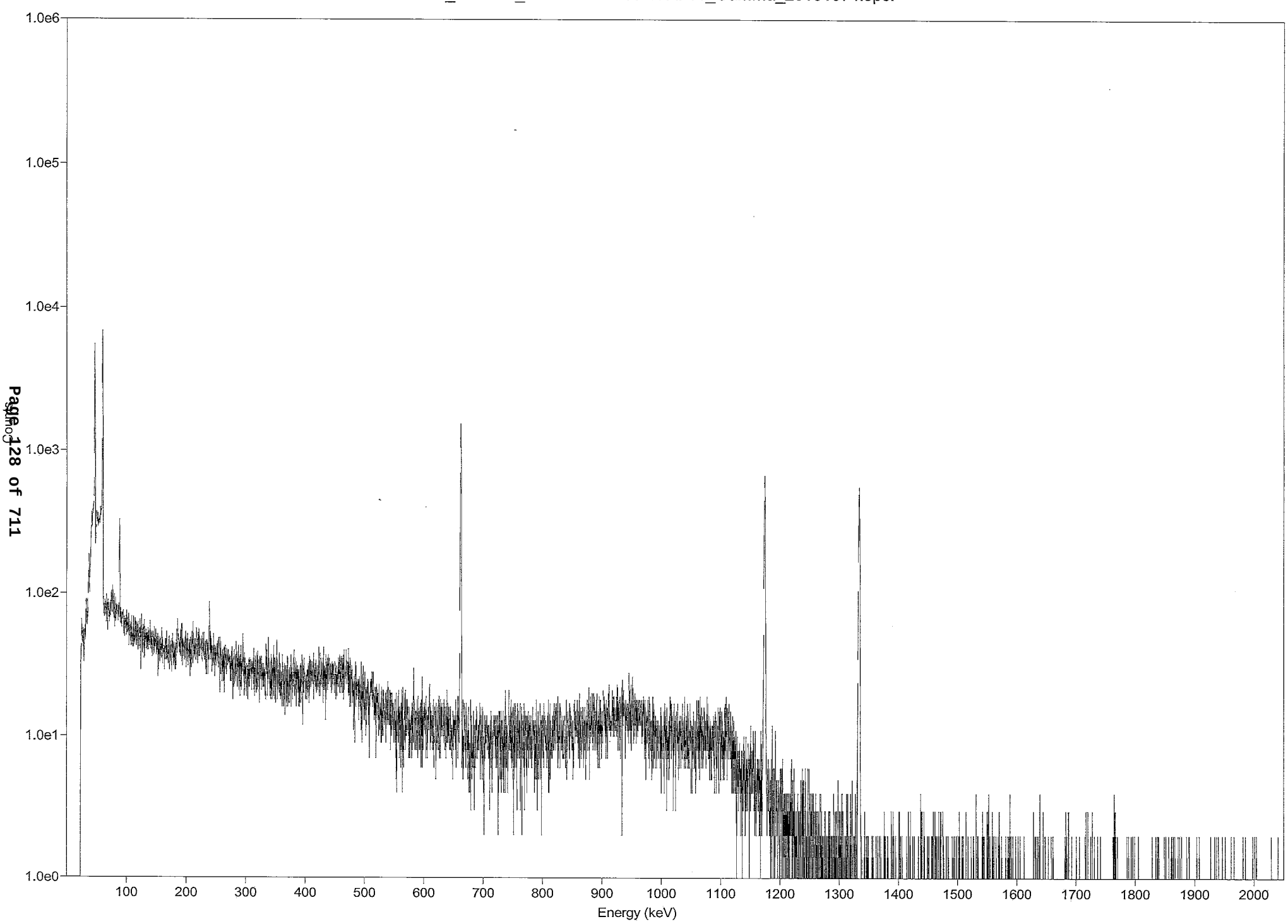
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting		MDA Bq/Sample
BE-7	A	5.0838E-01	>12 Halflives	1.8406E+03%	3.1560E+01	
K-40	#A	-3.1300E+00	-3.1300E+00	5.514E+02%		1.98E+01
CO-60		3.0499E+02	7.7409E+02	1.033E+00%		3.55E+00
I-131	#A	6.2628E-01	>12 Halflives	9.7311E+01%	3.4047E+00	
CS-134	#A	5.2196E-01	5.6266E+00	5.793E+01%		3.60E+01
CS-137		4.0529E+02	4.7736E+02	1.140E+00%		4.21E+00
EU-152	A	1.7489E+00	2.5135E+00	7.058E+01%		1.48E+01
EU-154	#A	1.6371E+00	2.8987E+00	9.895E+01%		6.08E+01
EU-155	#A	-1.5842E-01	-4.2626E-01	1.708E+03%		2.44E+01
TL-208		3.7216E+00	4.8643E+01	3.099E+01%		3.48E+01
PB-210		1.2054E+04	1.5023E+04	1.001E+00%		2.57E+02
PB-212		7.4625E+00	9.7541E+01	2.288E+01%		5.74E+01
PB-214		8.5775E+00	8.6039E+00	2.349E+01%		5.06E+00
BI-212	#A	3.0424E+01	3.9766E+02	4.799E+01%		5.10E+02
BI-214	#A	2.5465E+00	2.5543E+00	7.270E+01%		6.71E+00
AC-228	#A	9.1217E+00	2.1423E+01	4.151E+01%		3.63E+01
Pa-234	#A	3.8567E+00	3.8567E+00	1.673E+02%		7.42E+00
TH-234	#A	-8.0934E+01	-8.0934E+01	3.426E+01%		7.23E+01
PA-234M	#A	2.6576E+01	2.6576E+01	1.034E+02%		5.23E+02
U-235	#A	4.2884E+00	4.2884E+00	1.102E+02%		1.72E+01
AM-241		1.2494E+03	1.2637E+03	8.426E-01%		1.59E+01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

S U M M A R Y

Total Activity (87.9 to 1999.5 keV) 1.403E+04 Bq/Sample
Total Decayed Activity (87.9 to 1999.5 keV) 1.7692848E+04 Bq/Sample

The library has energies which are not separable.


77739_Gamma_LCS 160-77739~2-A. 11_Gamma_20131574.spc.
1.0e6
1.0e5
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Counts
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)

Test America St. Louis Spectrum ID: 15_Gamma_20131338

Sample Description: 77739_Gamma_LCS 160-77739~2-A
Detector: Ge15 SN/11012216
Batch ID: 77739
Work Order Number: Gamma
Lot Number: LCS 160-77739~2-A

Decay to Time: 10/1/2006 12:00 Live Time: 1800 sec
Acquisition Time: 10/31/2013 10:54:41 Real Time: 1807 sec
Analysis Time: 11/11/2013 12:28 Dead Time: 0.38 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 15_Soil_TunaCan.Clb
Efficiency Cal Desc: 15_TunaCan_90099_032212
Efficiency Cal Date: 3/22/2012 13:03
Energy Cal Date: 2/28/2012 16:29
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 15_2013-10-05_0052.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
K-40	3.365E+00	147.9	4.978E+00	4.980E+00	1.890E+01
CO-60	7.700E+02	1.2	9.559E+00	3.982E+01	5.695E+00
CS-134	5.179E+00	73.9	3.829E+00	3.839E+00	3.939E+01
CS-137	4.556E+02	1.3	6.088E+00	2.447E+01	5.061E+00
EU-152	4.086E+00	106.8	4.362E+00	4.367E+00	1.678E+01
EU-154	1.345E+01	155.0	2.084E+01	2.085E+01	7.011E+01
EU-155	1.419E+00	123.9	1.757E+00	1.759E+00	2.813E+01
TL-208	4.567E+01	43.4	1.980E+01	1.994E+01	5.254E+01
PB-210	1.493E+04	1.1	1.619E+02	8.917E+02	2.762E+02
PB-212	1.324E+02	21.1	2.790E+01	2.919E+01	6.645E+01
PB-214	6.175E+00	39.3	2.429E+00	2.450E+00	8.077E+00
BI-212	4.218E+02	59.0	2.489E+02	2.499E+02	5.958E+02
BI-214	6.688E+00	33.6	2.247E+00	2.274E+00	5.883E+00
AC-228	1.495E+01	55.3	8.263E+00	8.298E+00	4.572E+01
Pa-234	3.895E+00	85.0	3.312E+00	3.318E+00	1.110E+01
TH-234	-3.768E+02	9.8	3.708E+01	4.199E+01	1.088E+02
PA-234M	1.072E+02	159.5	1.710E+02	1.710E+02	5.770E+02
U-235	5.110E+00	111.1	5.678E+00	5.684E+00	1.888E+01
AM-241	1.267E+03	0.9	1.133E+01	6.673E+01	1.689E+01
Total	1.820E+04				

Analyst: Jody Watson

TestAmerica, Inc. Spectrum name: 15_Gamma_20131338.An1

Sample description
77739_Gamma_LCS 160-77739~2-A

Spectrum Filename: C:\User\SPC\Det15\15_Gamma_20131338.An1

Acquisition information

Start time:	10/31/2013 10:54:41 AM
Live time:	1800
Real time:	1807
Dead time:	0.38 %
Detector ID:	15

Detector system
Ge15 SN/11012216

Calibration

Filename:	15_Soil_TunaCan.Clb

15_TunaCan_90099_032212

Energy Calibration

Created:	2/28/2012 4:29:17 PM
Zero offset:	0.044 keV
Gain:	0.250 keV/channel
Quadratic:	-3.267E-08 keV/channel^2

Efficiency Calibration

Created:	3/22/2012 1:03:01 PM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 1.00 %
Log(Eff):	-6.894897E-01 + (-3.290613E-01*Log(E)) + (-3.875629E-02*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 1.13 %
Log(Eff):	-2.362677E+01 + (8.666669E+00*Log(E)) + (-9.214638E-01*Log(E)^2)

Library Files

Main analysis library:	Client_Routine Short Rev1.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.57keV)
Stop channel:	8000 (1999.52keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	15_2013-10-05_0052.PBC 10/5/2013 12:52:55 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 22 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 0.0729

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
40.83	107.	69.92	0.27	1.564E-02				
46.57	16947.	0.93	0.95	1.956E-02	46.54	4.250	1.409E+04	PB210
49.39	13.	607.24	0.95	2.141E-02				
59.56	22159.	0.89	0.99	2.738E-02	59.54	35.900	1.267E+03	AM241
77.46	120.	41.83	0.82	3.462E-02				
84.09	32.	123.88	0.98	3.679E-02	86.54	30.700	PBC<MDA	EU155
88.11	901.	7.82	1.12	3.707E-02				
92.79	98.	44.60	0.51	3.778E-02	92.59	5.584	PBC<MDA	TH234
					92.59	5.584	1.948E+01	TH234
93.24	5.	773.45	0.99	3.785E-02	93.35	5.561	PBC<MDA	AC228
					93.35	5.810	1.178E+00	U235
112.41	97.	39.62	0.77	3.882E-02				
121.38	35.	121.43	1.02	3.848E-02	121.78	28.580	PBC<MDA	EU152
					121.78	28.580	2.539E+00	EU152
124.36	78.	43.12	0.45	3.831E-02				
131.26	48.	85.04	1.02	3.775E-02	131.29	18.000	PBC<MDA	Pa234
					131.29	18.000	3.938E+00	Pa234
143.74	37.	111.11	1.04	3.639E-02	143.79	10.960	PBC<MDA	U235
					143.79	10.960	5.110E+00	U235
181.54	53.	54.86	0.41	3.176E-02				
185.96	61.	51.19	0.62	3.120E-02				
228.17	43.	62.64	0.30	2.681E-02				
233.55	23.	89.52	0.49	2.634E-02				
238.59	205.	19.87	1.43	2.592E-02	238.63	43.300	1.324E+02	PB212
243.73	4.	848.75	1.12	2.565E-02	242.00	7.430	PBC<MDA	PB214
					242.00	7.430	1.143E+00	PB214
246.53	44.	71.15	0.34	2.529E-02				
277.43	21.	164.07	1.15	2.513E-02	277.28	6.310	PBC<MDA	TL208

					277.28	6.310	PBC<MDA	TL208
289.99	45.	62.18	0.31	2.235E-02				
295.38	45.	74.52	1.17	2.205E-02	295.09	19.300	PBC<MDA	PB214
					295.09	19.300	5.882E+00	PB214
338.60	50.	55.28	0.30	1.983E-02	338.32	12.010	PBC<MDA	AC228
344.74	4.	742.34	1.21	1.956E-02	344.29	26.500	PBC<MDA	EU152
					344.29	26.500	6.704E-01	EU152
351.99	82.	39.34	1.22	1.923E-02	351.93	37.600	PBC<MDA	PB214
					351.93	37.600	6.325E+00	PB214
362.41	3.	994.26	1.23	1.871E-02	364.48	81.700	HL>Cutoff	I131
					364.48	81.700	HL>Cutoff	I131
434.37	25.	69.79	0.47	1.628E-02				
540.45	22.	51.83	0.32	1.364E-02				
563.18	29.	73.94	1.39	1.319E-02	563.24	8.350	PBC<MDA	CS134
					563.24	8.350	1.594E+02	CS134
583.36	55.	38.89	1.41	1.282E-02	583.02	84.500	PBC<MDA	TL208
					583.02	84.500	PBC<MDA	TL208
609.27	82.	30.58	0.70	1.236E-02	609.31	46.090	7.344E+00	BI214
637.24	36.	60.77	1.45	1.192E-02	636.97	7.170	HL>Cutoff	I131
					636.97	7.170	HL>Cutoff	I131
661.74	6850.	1.34	1.48	1.154E-02	661.66	85.210	4.556E+02	CS137

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
726.85	34.	59.01	1.52	1.067E-02	727.17	7.550	PBC<MDA	BI212
775.52	2.	756.00	1.56	1.007E-02	778.92	12.940	PBC<MDA	EU152
					778.92	12.940	1.462E+00	EU152
785.23	19.	107.79	1.57	9.998E-03	785.42	1.280	PBC<MDA	BI212
860.96	12.	207.24	1.62	9.252E-03	860.56	12.420	PBC<MDA	TL208
					860.56	12.420	7.432E+01	TL208
872.69	15.	154.96	1.63	9.137E-03	873.23	12.270	PBC<MDA	EU154
					873.23	12.270	1.345E+01	EU154
880.64	6.	446.96	1.64	9.072E-03	880.53	6.000	PBC<MDA	Pa234
					883.24	9.600	3.612E+00	Pa234
					880.53	6.000	5.764E+00	Pa234
881.05	4.	542.69	1.64	9.048E-03	880.53	6.000	PBC<MDA	Pa234
					883.24	9.600	2.646E+00	Pa234
					883.24	9.600	2.646E+00	Pa234
910.94	42.	55.81	0.50	8.812E-03	911.07	29.000	2.145E+01	AC228
969.54	11.	233.14	1.70	8.357E-03	968.97	17.460	PBC<MDA	AC228
998.60	13.	159.52	1.72	8.125E-03	1001.00	0.837	PBC<MDA	PA234M
1043.81	22.	49.44	0.50	7.836E-03				
1113.40	21.	106.75	1.80	7.416E-03	1112.07	13.644	PBC<MDA	EU152
					1112.07	13.644	1.645E+01	EU152
1120.71	3.	324.01	1.80	7.368E-03	1120.29	15.100	PBC<MDA	BI214
1173.35	3847.	1.77	1.69	7.076E-03	1173.24	99.900	7.674E+02	CO60
1274.60	4.	168.52	1.90	6.579E-03	1274.54	35.190	PBC<MDA	EU154
					1274.54	35.190	1.833E+00	EU154
1332.66	3465.	1.74	1.93	6.324E-03	1332.50	99.980	7.726E+02	CO60
1461.86	4.	71.29	2.02	5.828E-03	1460.83	10.670	PBC<MDA	K40
1764.84	6.	62.35	2.18	4.916E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
163.02	40.83	2072.	107.	6.861E+03	69.92	0.275	-	s
197.05	49.34	2432.	256.	1.197E+04	32.03	0.813	-	M
309.42	77.46	800.	120.	3.466E+03	41.83	0.818	-	s
352.00	88.11	1017.	901.	2.430E+04	6.01	1.125	-	s
370.26	92.79	564.	97.	2.580E+03	35.89	0.989	-	D
449.15	112.41	460.	97.	2.499E+03	39.62	0.767	-	
496.92	124.36	413.	96.	2.498E+03	31.71	0.446	-	s
725.46	181.54	293.	53.	1.658E+03	54.86	0.413	-	s
743.15	185.96	347.	61.	1.966E+03	51.19	0.620	-	s
911.90	228.17	273.	43.	1.604E+03	62.64	0.301	-	s
933.42	233.55	188.	23.	8.795E+02	89.52	0.493	-	sc
985.29	246.53	312.	44.	1.740E+03	71.15	0.344	-	sM
1159.03	289.99	246.	45.	2.014E+03	62.18	0.308	-	sM
1736.34	434.37	127.	25.	1.526E+03	69.79	0.469	-	sc
2160.53	540.45	54.	22.	1.613E+03	51.83	0.320	-	s
4174.07	1043.81	40.	22.	2.871E+03	49.44	0.500	-	sM

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.77	46.52	4987.	17937.	9.965	1.08	0.948
AM-241	237.90	59.56	3943.	22159.	12.310	0.89	0.989
TH-234	245.27	61.41	2137.	-756.	-0.420	9.58	0.962s
EU-155	335.93	84.09	763.	32.	0.018	123.88	0.983s
TH-234	370.20	92.66	1149.	52.	0.029	63.10	0.989s
AC-228	372.95	93.35	648.	5.	0.003	773.45	0.989D
U-235	372.95	93.35	981.	89.	0.049	50.97	0.989D
EU-155	421.17	105.41	1063.	-14.	-0.008	319.41	1.000s
EU-152	485.01	121.38	884.	35.	0.019	121.43	1.015s
EU-154	491.96	123.12	1007.	-29.	-0.016	154.75	1.017s
Pa-234	524.49	131.26	815.	48.	0.027	85.04	1.024s
U-235	574.37	143.74	812.	37.	0.020	111.11	1.036s
U-235	652.91	163.39	727.	-19.	-0.010	203.98	1.053s
PB-212	953.55	238.59	460.	205.	0.114	19.87	1.430s
PB-214	974.11	243.73	548.	4.	0.002	848.75	1.123s
TL-208	1108.85	277.43	600.	21.	0.012	164.07	1.154s
I-131	1131.84	283.18	485.	-11.	-0.006	281.74	1.160s
PB-214	1180.60	295.38	538.	45.	0.025	74.52	1.170
AC-228	1353.39	338.60	238.	50.	0.028	55.28	0.297s
EU-152	1377.94	344.74	520.	4.	0.002	742.34	1.212s
PB-214	1406.93	351.99	480.	82.	0.046	39.34	1.219
I-131	1448.61	362.41	377.	3.	0.002	994.26	1.229s
BE-7	1908.87	477.52	536.	-7.	-0.004	497.88	1.324s
CS-134	2251.43	563.18	220.	29.	0.016	73.94	1.394s
CS-134	2276.67	569.49	238.	-18.	-0.010	122.24	1.399s
Pa-234	2276.53	569.45	236.	-17.	-0.010	127.24	1.399s
TL-208	2332.17	583.36	264.	55.	0.031	38.89	1.410
CS-134	2417.07	604.59	274.	-16.	-0.009	146.27	1.427s
BI-214	2435.76	609.27	152.	75.	0.042	30.58	0.701s
I-131	2547.65	637.24	223.	36.	0.020	60.77	1.452s
CS-137	2645.63	661.74	248.	6850.	3.806	1.34	1.481
EU-154	2890.98	723.08	251.	-25.	-0.014	92.05	1.519s
BI-212	2906.06	726.85	185.	34.	0.019	59.01	1.522s
EU-152	3100.71	775.52	162.	2.	0.001	756.00	1.561s
BI-212	3139.57	785.23	208.	19.	0.011	107.79	1.566s
TL-208	3442.52	860.96	291.	12.	0.007	207.24	1.622s
EU-154	3489.45	872.69	274.	15.	0.009	154.96	1.631s
Pa-234	3521.25	880.64	316.	6.	0.003	446.96	1.636s
Pa-234	3522.88	881.05	250.	4.	0.002	542.69	1.638s
AC-228	3643.08	911.09	347.	25.	0.014	106.08	1.658s
Pa-234	3767.65	942.23	214.	-2.	-0.001	998.44	1.683s
AC-228	3876.90	969.54	319.	11.	0.006	233.14	1.699
EU-154	3986.82	997.01	298.	-15.	-0.008	169.19	1.718s
PA-234M	3993.17	998.60	212.	13.	0.007	159.52	1.722s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	4452.54	1113.40	237.	21.	0.012	106.75	1.797s
BI-214	4481.79	1120.71	179.	3.	0.002	324.01	1.803
CO-60	4692.45	1173.35	117.	3847.	2.137	1.77	1.694
EU-154	5097.64	1274.60	24.	4.	0.002	168.52	1.902s
CO-60	5330.02	1332.66	24.	3465.	1.925	1.74	1.926
K-40	5847.16	1461.86	16.	4.	0.002	71.29	2.015s
BI-214	7060.16	1764.84	15.	6.	0.004	62.35	2.180s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-2.3099E+00				5.31E+01	
			477.60	-2.310E+00	&(	3.873E+01 4.98E+02 1.05E+01	G
K-40	N	3.3645E+00				4.66E+11	
			1460.83	3.365E+00	&(P	1.890E+01 7.13E+01 1.07E+01	G
CO-60	F	7.7002E+02				1.93E+03	
			1332.50	7.726E+02	(	5.695E+00 1.74E+00 1.00E+02	G
			1173.24	7.674E+02	(	1.058E+01 1.77E+00 9.99E+01	G
I-131	I	1.9868E+00				8.02E+00	
			364.48	1.005E-01	&(	3.386E+00 9.94E+02 8.17E+01	G
			284.30	-4.432E+00	+	4.199E+01 2.82E+02 6.14E+00	G
			636.97	2.348E+01	(	4.698E+01 6.08E+01 7.17E+00	G
CS-134	I	5.1785E+00				7.54E+02	
			604.71	-8.013E+00	?(	3.939E+01 1.46E+02 9.76E+01	G
			795.87	2.035E-01	%	5.332E+01 7.67E+03 8.55E+01	G
			569.32	-5.420E+01	+	2.223E+02 1.22E+02 1.54E+01	G
			801.95	-5.550E+00	&	5.174E+02 2.73E+03 8.69E+00	G
			563.24	1.594E+02	&(	3.908E+02 7.39E+01 8.35E+00	G
CS-137	I	4.5561E+02				1.10E+04	
			661.66	4.556E+02	(	5.061E+00 1.34E+00 8.52E+01	G
EU-152	F	4.0858E+00				4.94E+03	
			344.29	6.704E-01	&(	1.678E+01 7.42E+02 2.65E+01	G
			121.78	2.539E+00	*(	1.026E+01 1.21E+02 2.86E+01	G
			778.92	1.462E+00	?(	3.795E+01 7.56E+02 1.29E+01	G
			964.11	1.838E-01	&	5.194E+01 8.29E+03 1.46E+01	G
			1112.07	1.645E+01	&(	5.876E+01 1.07E+02 1.36E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1408.00	-9.699E-03 %		1.274E+01	3.45E+04	2.10E+01 G
EU-154	I	1.3449E+01					3.14E+03	
			873.23	1.345E+01 &(		7.011E+01	1.55E+02	1.23E+01 G
			123.10	-1.835E+00 -		9.460E+00	1.55E+02	4.08E+01 G
			1274.54	1.833E+00 -		1.090E+01	1.69E+02	3.52E+01 G
			723.36	-1.133E+01 +		3.476E+01	9.20E+01	2.02E+01 G
			1004.77	-4.802E-01 &		5.487E+01	3.35E+03	1.80E+01 G
			996.33	-1.660E+01 &		9.452E+01	1.69E+02	1.06E+01 G
EU-155	I	1.4186E+00					1.81E+03	
			105.31	-2.635E+00 ?(		2.813E+01	3.19E+02	2.12E+01 G
			86.54	4.218E+00 ?(		1.740E+01	1.24E+02	3.07E+01 G
TL-208	N	4.5666E+01					6.98E+02	
			583.02	3.712E+01 ?(P		5.254E+01	3.89E+01	8.45E+01 G
			277.28	1.037E+02 &(P		5.816E+02	1.64E+02	6.31E+00 G
			860.56	7.432E+01 ?(		5.196E+02	2.07E+02	1.24E+01 G
PB-210	N	1.4933E+04					8.14E+03	
			46.54	1.493E+04 (P		2.762E+02	1.08E+00	4.25E+00 G
PB-212	N	1.3244E+02					6.98E+02	
			238.63	1.324E+02 (P		6.645E+01	1.99E+01	4.33E+01 G
			300.03	-5.919E+00 %		1.025E+03	5.11E+03	3.28E+00 G
PB-214	N	6.1745E+00					5.84E+05	
			351.93	6.325E+00 (		8.077E+00	3.93E+01	3.76E+01 G
			295.09	5.882E+00 ?(		1.450E+01	7.45E+01	1.93E+01 G
			242.00	1.143E+00 -		3.269E+01	8.49E+02	7.43E+00 G
BI-212	N	4.2178E+02					6.98E+02	
			727.17	3.071E+02 (		5.958E+02	5.90E+01	7.55E+00 G
			785.42	1.098E+03 (		3.967E+03	1.08E+02	1.28E+00 G
BI-214	N	6.6878E+00					5.84E+05	
			609.31	7.344E+00 (P		5.883E+00	3.06E+01	4.61E+01 G
			1120.29	1.624E+00 - P		3.260E+01	3.24E+02	1.51E+01 G
			1764.49	4.725E+00 ?(P		1.524E+01	6.23E+01	1.54E+01 G
AC-228	N	1.4948E+01					2.10E+03	
			911.07	1.291E+01 ?(		4.572E+01	1.06E+02	2.90E+01 G
			968.97	9.765E+00 (		7.681E+01	2.33E+02	1.75E+01 G
			338.32	2.739E+01 (		4.087E+01	5.53E+01	1.20E+01 G
								Energy duplication
			93.35	2.891E+00 -		7.523E+01	7.73E+02	5.56E+00 XA

Nuclide		Ave activity	Energy	Activity	Code	Peak MDA	Comments
Pa-234	N	3.8949E+00				1.63E+12	
			131.29	3.938E+00	&(	1.110E+01 8.50E+01	1.80E+01 G
			569.47	-9.005E+00	+	3.848E+01 1.27E+02	8.20E+00 G
			946.02	-1.010E+00	-	3.446E+01 9.98E+02	1.34E+01 G
			883.24	2.646E+00	?(	4.886E+01 5.43E+02	9.60E+00 G
			880.53	5.764E+00	&(	8.727E+01 4.47E+02	6.00E+00 G
TH-234	N	-3.7684E+02				1.63E+12	
			63.29	-3.768E+02	?(P	1.088E+02 9.58E+00	3.81E+00 G
			92.59	1.379E+01	+ P	4.233E+01 6.31E+01	5.58E+00 G
PA-234M	N	1.0717E+02				1.63E+12	
			1001.00	1.072E+02	?(	5.770E+02 1.60E+02	8.37E-01 G
			766.41	1.437E+01	%	1.209E+03 2.45E+03	2.94E-01 G
U-235	N	5.1103E+00				2.57E+11	
			143.79	5.110E+00	(	1.888E+01 1.11E+02	1.10E+01 G
			205.33	1.168E+00	&	5.126E+01 1.31E+03	5.01E+00 G
			163.38	-6.110E+00	+	4.168E+01 2.04E+02	5.08E+00 G
							Energy duplication
			93.35	2.244E+01	&	3.756E+01 5.10E+01	5.81E+00 X
AM-241	T	1.2671E+03				1.58E+05	
			59.54	1.267E+03	(	1.689E+01 8.94E-01	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

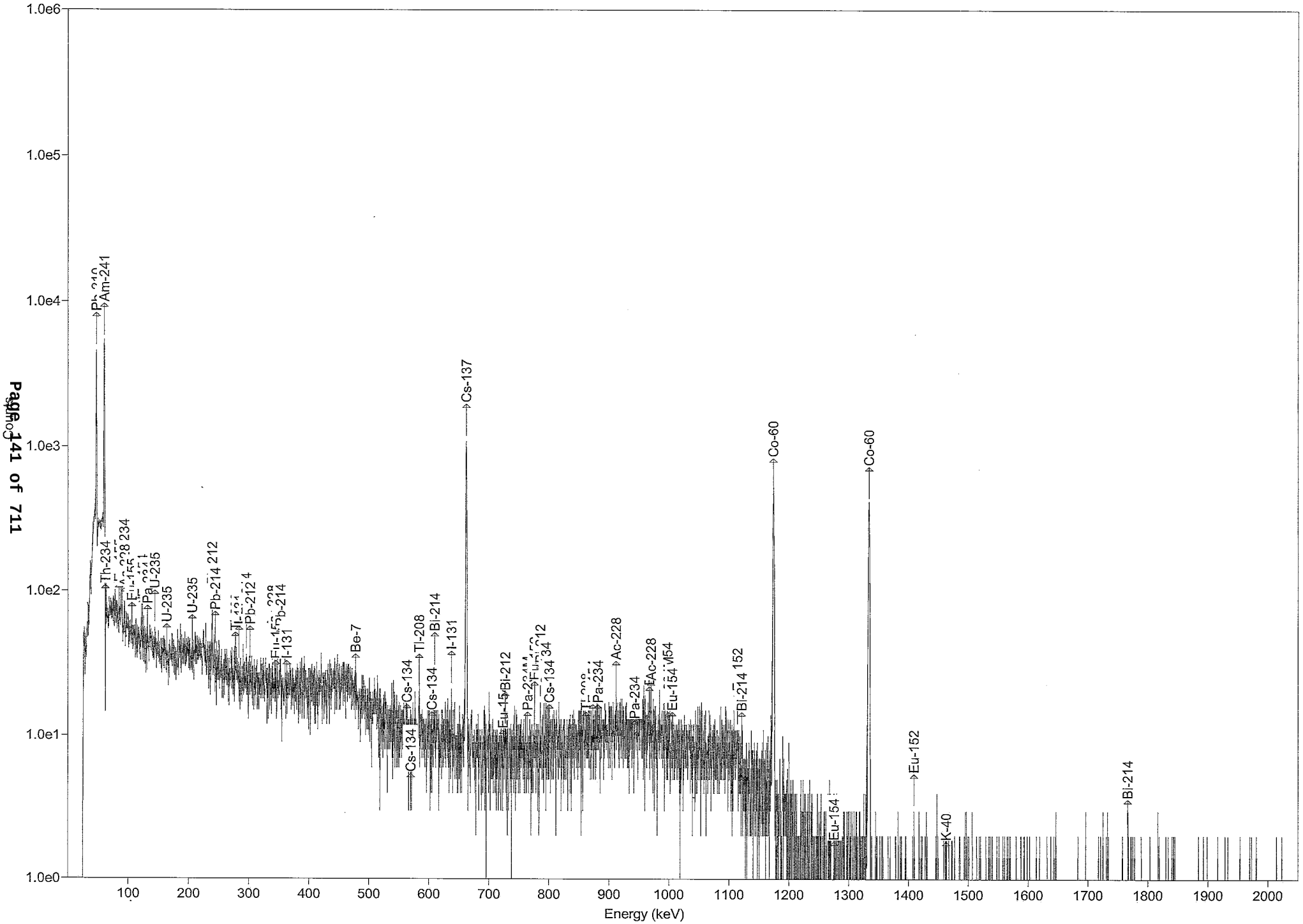
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting		MDA Bq/Sample
BE-7	#A	-2.3099E+00	>12 Halflives	4.9788E+02%	3.8727E+01	
K-40	#A	3.3645E+00	3.3645E+00	1.479E+02%		1.89E+01
CO-60		3.0338E+02	7.7002E+02	1.241E+00%		5.69E+00
I-131	#A	1.9868E+00	>12 Halflives	6.0769E+01%	3.3861E+00	
CS-134	#A	4.8037E-01	5.1785E+00	7.394E+01%		3.94E+01
CS-137		3.8683E+02	4.5561E+02	1.336E+00%		5.06E+00
EU-152	#A	2.8429E+00	4.0858E+00	1.068E+02%		1.68E+01
EU-154	#A	7.5957E+00	1.3449E+01	1.550E+02%		7.01E+01
EU-155	#A	5.2723E-01	1.4186E+00	1.239E+02%		2.81E+01
TL-208	#A	3.4936E+00	4.5666E+01	4.336E+01%		5.25E+01
PB-210		1.1982E+04	1.4933E+04	1.084E+00%		2.76E+02
PB-212	#	1.0132E+01	1.3244E+02	2.107E+01%		6.64E+01
PB-214	#A	6.1556E+00	6.1745E+00	3.934E+01%		8.08E+00
BI-212	#A	3.2268E+01	4.2178E+02	5.901E+01%		5.96E+02
BI-214		6.6673E+00	6.6878E+00	3.360E+01%		5.88E+00
AC-228	A	6.3644E+00	1.4948E+01	5.528E+01%		4.57E+01
Pa-234	#A	3.8949E+00	3.8949E+00	8.504E+01%		1.11E+01
TH-234	#A	-3.7684E+02	-3.7684E+02	9.841E+00%		1.09E+02
PA-234M	#A	1.0717E+02	1.0717E+02	1.595E+02%		5.77E+02
U-235	#A	5.1103E+00	5.1103E+00	1.111E+02%		1.89E+01
AM-241		1.2528E+03	1.2671E+03	8.940E-01%		1.69E+01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (112.4 to 1999.5 keV) 1.394E+04 Bq/Sample
Total Decayed Activity (112.4 to 1999.5 keV) 1.7565109E+04 Bq/Sample

The library has energies which are not separable.


77739_Gamma_LCS 160-77739~2-A. 15_Gamma_20131338.spc.
Counts
1.0e6
1.0e5
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)
Pb-210
Am-241
Th-234
Th-228 234
Pa-231
U-235
U-235
U-235
Pb-214 212
Pb-212 4
I-131
Be-7
Cs-134
Cs-134
Tl-208
Bi-214
Cs-134
I-131
Cs-137
Eu-15 Bi-212
Pa-234 212
Cs-134 34
Pa-234
Ac-228
Pa-234
Ac-228
Eu-154 54
Bi-214 152
Co-60
Co-60
Eu-154
Eu-152
K-40
Bi-214

GAMMA SPECTROSCOPY

Method GA-01-R
Ra-226

Radium-226 & Other Gamma Emitters (GS) by Method GA-01-R

Prep Batch: 137115

Fill Geometry, 21-Day In-Growth

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 137115

Lab ID: MB 160-137115/1-A | Analyzed: 09/02/14 09:53 | Ts: 120 | Sigma: 2
Client ID: | Detector: GV4 | Decay Corrected: No

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	-0.2749	11.0	11.0	U	pCi/g	1.00	0.757	141130
Radium-228	0.07116	0.205	0.206	U	pCi/g		1.23	141130
Thorium-232	0.07116	0.205	0.206	U	pCi/g		1.23	141130
Uranium-235	0.01779	0.422	0.422	U	pCi/g		0.767	141130
Uranium-238	0.8991	1.29	1.30	U	pCi/g		3.01	141130

Other Detected Radionuclides	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Other Detected Radionuclide	None				pCi/g	

Lab ID: LCS 160-137115/2-A | Analyzed: 09/02/14 12:02 | Ts: 120 | Sigma: 2
Client ID: | Detector: GV7 | Decay Corrected: No

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Americium-241	1011	3.76	100		pCi/g		1.95	141135
Cesium-137	383.2	3.25	37.5		pCi/g		1.36	141135
Cobalt-60	416.2	3.01	40.0		pCi/g		1.03	141135

Lab ID: 680-102199-1 | Analyzed: 09/02/14 12:02 | Ts: 120 | Sigma: 2
Client ID: SD-279-SS | Detector: GV4 | Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	1.54	0.559	0.579		pCi/g	1.00	0.657	141130
Radium-228	2.36	0.716	0.751		pCi/g		0.446	141130
Thorium-232	2.36	0.716	0.751		pCi/g		0.446	141130
Uranium-235	0.0442	0.821	0.821	U	pCi/g		1.43	141130
Uranium-238	1.51	1.46	1.47	U	pCi/g		3.54	141130

Other Detected Radionuclides	Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Ac-228	2.36	0.716	0.751		pCi/g	0.446
Bi-214	1.54	0.559	0.579		pCi/g	0.657
K-40	14.0	5.03	5.21		pCi/g	6.93
Pb-212	1.41	0.422	0.448		pCi/g	0.521
Pb-214	1.47	0.623	0.639		pCi/g	0.682
Tl-208	0.748	0.325	0.333		pCi/g	0.287

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 137115

Lab ID: 680-102199-1 DU | Analyzed: 09/02/14 14:34 | Ts: 120 | Sigma: 2
Client ID: SD-279-SS | Detector: GV7 | Decay Corrected: No

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.9620	0.343	0.356		pCi/g	1.00	0.360	141135
Radium-228	1.725	0.394	0.428		pCi/g		0.324	141135
Thorium-232	1.725	0.394	0.428		pCi/g		0.324	141135
Uranium-235	0.2379	0.339	0.340	U	pCi/g		0.626	141135
Uranium-238	2.152	1.41	1.43		pCi/g		1.94	141135

Other Detected Radionuclides	DU Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Ac-228	1.725	0.394	0.428		pCi/g	0.324
Bi-214	0.9620	0.343	0.356		pCi/g	0.360
K-40	23.21	3.26	3.96		pCi/g	0.843
Pb-212	1.279	0.223	0.262		pCi/g	0.243
Pb-214	0.9692	0.235	0.253		pCi/g	0.257
Tl-208	0.2731	0.113	0.116	F	pCi/g	0.150

Lab ID: 680-102199-2 | Analyzed: 09/02/14 14:33 | Ts: 120 | Sigma: 2
Client ID: SD-279-01 | Detector: GV4 | Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.279	0.460	0.461	U	pCi/g	1.00	0.826	141130
Radium-228	1.48	0.559	0.577		pCi/g		1.15	141130
Thorium-232	1.48	0.559	0.577		pCi/g		1.15	141130
Uranium-235	0.434	0.664	0.666	U	pCi/g		1.16	141130
Uranium-238	3.99	3.03	3.06	U	pCi/g		4.03	141130

Other Detected Radionuclides	Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Pb-212	1.40	0.445	0.470		pCi/g	0.497
Tl-208	0.845	0.245	0.259		pCi/g	0.163

Lab ID: 680-102199-3 | Analyzed: 09/02/14 15:06 | Ts: 120 | Sigma: 2
Client ID: SD-279-02 | Detector: GV17 | Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.600	0.197	0.206		pCi/g	1.00	0.213	141148
Radium-228	0.931	0.357	0.369		pCi/g		0.318	141148
Thorium-232	0.931	0.357	0.369		pCi/g		0.318	141148
Uranium-235	0.166	0.318	0.318	U	pCi/g		0.509	141148
Uranium-238	1.13	1.29	1.30	U	pCi/g		1.85	141148

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 137115

Lab ID: 680-102199-3 Analyzed: 09/02/14 15:06 Ts: 120 Sigma: 2
Client ID: SD-279-02 Detector: GV17 Decay Corrected: No

Other Detected Radionuclides	Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Ac-228	0.931	0.357	0.369		pCi/g	0.318
Bi-214	0.600	0.197	0.206		pCi/g	0.213
K-40	6.96	1.33	1.50		pCi/g	1.36
Pb-212	0.477	0.137	0.151		pCi/g	0.178
Pb-214	0.565	0.203	0.211		pCi/g	0.236
Tl-208	0.245	0.0914	0.0949		pCi/g	0.105

Lab ID: 680-102199-7 Analyzed: 09/02/14 17:48 Ts: 120 Sigma: 2
Client ID: SD-277-SS Detector: GV4 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.339	0.403	0.404	U	pCi/g	1.00	0.789	141130
Radium-228	1.13	0.567	0.577		pCi/g		1.11	141130
Thorium-232	1.13	0.567	0.577		pCi/g		1.11	141130
Uranium-235	0.468	0.431	0.433	U	pCi/g		1.45	141130
Uranium-238	3.34	2.61	2.63	U	pCi/g		3.70	141130

Other Detected Radionuclides	Result	Count Unc	Total Unc	Qualifier	Unit	MDC
K-40	13.3	4.56	4.74		pCi/g	6.14
Pb-212	1.57	0.433	0.465		pCi/g	0.491
Tl-208	0.751	0.234	0.245		pCi/g	0.184

Lab ID: 680-102199-8 Analyzed: 09/03/14 09:10 Ts: 120 Sigma: 2
Client ID: SD-277-01 Detector: GV4 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	1.57	0.536	0.557		pCi/g	1.00	0.597	141691
Radium-228	1.30	0.590	0.603		pCi/g		1.30	141691
Thorium-232	1.30	0.590	0.603		pCi/g		1.30	141691
Uranium-235	0.244	0.237	0.238	U	pCi/g		1.19	141691
Uranium-238	1.83	1.41	1.42	U	pCi/g		3.52	141691

Other Detected Radionuclides	Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Bi-214	1.57	0.536	0.557		pCi/g	0.597
K-40	13.0	4.11	4.30		pCi/g	5.28
Pb-212	1.48	0.354	0.388		pCi/g	0.405
Pb-214	1.33	0.450	0.468		pCi/g	0.531
Tl-208	0.670	0.215	0.224		pCi/g	0.169

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 137115

Lab ID: 680-102199-9 Analyzed: 09/03/14 09:11 Ts: 120 Sigma: 2
Client ID: SD-277-02 Detector: GV7 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.938	0.197	0.217		pCi/g	1.00	0.201	141692
Radium-228	1.86	0.427	0.463		pCi/g		0.246	141692
Thorium-232	1.86	0.427	0.463		pCi/g		0.246	141692
Uranium-235	0.170	0.307	0.307	U	pCi/g		0.514	141692
Uranium-238	1.97	1.00	1.02		pCi/g		1.47	141692

Other Detected Radionuclides	Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Ac-228	1.86	0.427	0.463		pCi/g	0.246
Bi-214	0.938	0.197	0.217		pCi/g	0.201
K-40	20.0	2.62	3.25		pCi/g	0.631
Pb-212	1.23	0.193	0.234		pCi/g	0.202
Pb-214	1.11	0.201	0.228		pCi/g	0.192
Tl-208	0.429	0.0995	0.108		pCi/g	0.0695

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-137115/1-A	Radium-226			-0.2749	U	pCi/g							
MB 160-137115/1-A	Radium-228			0.07116	U	pCi/g							
MB 160-137115/1-A	Thorium-232			0.07116	U	pCi/g							
MB 160-137115/1-A	Uranium-235			0.01779	U	pCi/g							
MB 160-137115/1-A	Uranium-238			0.8991	U	pCi/g							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-137115/2-A	Americium-241		981	1011		pCi/g	103	87 - 116					
LCS 160-137115/2-A	Cesium-137		362	383.2		pCi/g	106	87 - 120					
LCS 160-137115/2-A	Cobalt-60		383	416.2		pCi/g	109	87 - 115					

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
680-102199-1	Radium-226	1.54		0.9620		pCi/g			46	0.62	1.70	1	
680-102199-1	Radium-228	2.36		1.725		pCi/g			31	0.54	1.47	1	
680-102199-1	Thorium-232	2.36		1.725		pCi/g			31	0.54	1.47	1	
680-102199-1	Uranium-235	0.0442		0.2379	U	pCi/g			137	0.17	0.44	1	
680-102199-1	Uranium-238	1.51		2.152		pCi/g			35	0.22	0.63	1	

Glossary:

Ts = Count Duration, Sample

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102199-4

SDG No.: 680102199-1

Batch Number: 137115 Batch Start Date: 08/11/14 14:47 Batch Analyst: Lockhart, Justin D

Batch Method: Fill_Geo-21 Batch End Date: 08/11/14 16:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	TareWeight	GrossWeight	InitialAmount	IngDecDate1	IngDecDate3	Geometry
MB 160-137115/1		Fill_Geo-21, GA-01-R				25 g	08/11/2014	09/01/2014	25mL d=1
LCS 160-137115/2		Fill_Geo-21, GA-01-R				25 g	08/11/2014	09/01/2014	25mL d=1
680-102199-A-1-D	SD-279-SS	Fill_Geo-21, GA-01-R	T	37.1 g	59.4 g	22.3 g	08/11/2014	09/01/2014	25mL d=1
680-102199-A-1-D DU	SD-279-SS	Fill_Geo-21, GA-01-R	T	37.1 g	59.4 g	22.3 g	08/11/2014	09/01/2014	25mL d=1
680-102199-A-2-C	SD-279-01	Fill_Geo-21, GA-01-R	T	36.9 g	60.9 g	24 g	08/11/2014	09/01/2014	25mL d=1
680-102199-A-3-C	SD-279-02	Fill_Geo-21, GA-01-R	T	37.1 g	88.0 g	50.9 g	08/11/2014	09/01/2014	25mL solid
680-102199-A-7-C	SD-277-SS	Fill_Geo-21, GA-01-R	T	37.0 g	61.0 g	24 g	08/11/2014	09/01/2014	25mL d=1
680-102199-A-8-C	SD-277-01	Fill_Geo-21, GA-01-R	T	37.5 g	64.1 g	26.6 g	08/11/2014	09/01/2014	25mL d=1
680-102199-A-9-C	SD-277-02	Fill_Geo-21, GA-01-R	T	37.6 g	67.4 g	29.8 g	08/11/2014	09/01/2014	25mL d=1

Lab Sample ID	Client Sample ID	Method Chain	Basis	25mLD=1 00006					
MB 160-137115/1		Fill_Geo-21, GA-01-R							
LCS 160-137115/2		Fill_Geo-21, GA-01-R		# mL					
680-102199-A-1-D	SD-279-SS	Fill_Geo-21, GA-01-R	T						
680-102199-A-1-D DU	SD-279-SS	Fill_Geo-21, GA-01-R	T						
680-102199-A-2-C	SD-279-01	Fill_Geo-21, GA-01-R	T						
680-102199-A-3-C	SD-279-02	Fill_Geo-21, GA-01-R	T						
680-102199-A-7-C	SD-277-SS	Fill_Geo-21, GA-01-R	T						
680-102199-A-8-C	SD-277-01	Fill_Geo-21, GA-01-R	T						
680-102199-A-9-C	SD-277-02	Fill_Geo-21, GA-01-R	T						

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102199-4

SDG No.: 680102199-1

Batch Number: 137115 Batch Start Date: 08/11/14 14:47 Batch Analyst: Lockhart, Justin D

Batch Method: Fill_Geo-21 Batch End Date: 08/11/14 16:00

Batch Notes	
Balance ID	1121432711
SOP Number	ST-RC-0003 ST-RC-0025

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102199-4

SDG No.: 680102199-1

Batch Number: 137389 Batch Start Date: 08/12/14 11:54 Batch Analyst: Lockhart, Justin D

Batch Method: Fill_Geo-0 Batch End Date:

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	TareWeight	GrossWeight	Geometry	25mLD=1 00006	
MB 160-137389/1		Fill_Geo-0, GA-01-R		25 g			25mL d=1		
LCS 160-137389/2		Fill_Geo-0, GA-01-R		25 g			25mL d=1	# mL	
680-102199-A-1-G	SD-279-SS	Fill_Geo-0, GA-01-R	T	22.3 g	37.1 g	59.4 g	25mL d=1		
680-102199-A-1-G DU	SD-279-SS	Fill_Geo-0, GA-01-R	T	22.3 g	37.1 g	59.4 g	25mL d=1		
680-102199-A-2-E	SD-279-01	Fill_Geo-0, GA-01-R	T	24 g	36.9 g	60.9 g	25mL d=1		
680-102199-A-3-E	SD-279-02	Fill_Geo-0, GA-01-R	T	50.9 g	37.1 g	88.0 g	25mL solid		
680-102199-A-7-E	SD-277-SS	Fill_Geo-0, GA-01-R	T	24 g	37.0 g	61.0 g	25mL d=1		
680-102199-A-8-E	SD-277-01	Fill_Geo-0, GA-01-R	T	26.6 g	37.5 g	64.1 g	25mL d=1		
680-102199-A-9-E	SD-277-02	Fill_Geo-0, GA-01-R	T	29.8 g	37.6 g	67.4 g	25mL d=1		

Batch Notes	
Balance ID	1121432711
SOP Number	ST-RC-0003 ST-RC-0025

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

Test America St. Louis Spectrum ID: 4_Gamma_20141700

Sample Description: 137115_Gamma_MB 160-137115~1-A
Detector: Ge 4 SN/181
Batch ID: 137115
Work Order Number: Gamma
Lot Number: MB 160-137115~1-A

Decay to Time: 9/2/2014 09:53 Live Time: 7200 sec
Acquisition Time: 9/2/2014 09:53:57 Real Time: 7208 sec
Analysis Time: 9/2/2014 11:54 Dead Time: 0.11 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 4_Liquid_D=1 25ml.Clb
Efficiency Cal Desc: 4_Liquid_D=1 25ml_90101_030512
Efficiency Cal Date: 3/27/2012 20:51
Energy Cal Date: 2/28/2012 14:55
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 4_2014-08-09_2125.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-1.839E-02	3138.0	5.770E-01	5.770E-01	2.102E+00
K-40	-1.540E+00	220.8	3.400E+00	3.401E+00	5.145E+00
CO-60	6.049E-02	126.9	7.674E-02	7.679E-02	4.390E-01
I-131	3.882E-02	147.0	5.708E-02	5.711E-02	2.277E-01
CS-134	3.525E-02	135.0	4.757E-02	4.760E-02	2.957E-01
CS-137	-6.600E-04	14680.0	9.691E-02	9.691E-02	3.533E-01
EU-152	1.629E-01	91.3	1.487E-01	1.489E-01	7.647E-01
EU-154	5.386E-01	81.4	4.383E-01	4.390E-01	2.629E+00
EU-155	1.182E-01	39.6	4.678E-02	4.718E-02	4.082E-01
TL-208	6.090E-03	628.9	3.830E-02	3.830E-02	3.358E-01
PB-210	1.164E+00	79.8	9.279E-01	9.309E-01	3.098E+00
PB-212	1.008E-02	1073.0	1.082E-01	1.082E-01	4.184E-01
PB-214	1.231E-01	111.7	1.374E-01	1.375E-01	5.283E-01
BI-212	4.273E-02	2065.0	8.822E-01	8.822E-01	3.316E+00
BI-214	-2.543E-01	2000.0	5.086E+00	5.086E+00	7.001E-01
AC-228	6.582E-02	144.4	9.502E-02	9.507E-02	1.142E+00
Pa-234	4.071E-01	57.8	2.353E-01	2.361E-01	4.420E-01
TH-234	8.317E-01	71.9	5.979E-01	5.993E-01	2.783E+00
PA-234M	2.925E+00	238.1	6.964E+00	6.966E+00	3.771E+01
U-235	1.646E-02	1187.0	1.954E-01	1.954E-01	7.094E-01
AM-241	2.744E-02	229.7	6.302E-02	6.304E-02	2.204E-01
Total	6.574E+00				

Analyst: ashley silas

TestAmerica Spectrum name: 4_Gamma_20141700.An1

Sample description
137115_Gamma_MB 160-137115~1-A

Spectrum Filename: C:\User\SPC\Det4\4_Gamma_20141700.An1

Acquisition information
Start time: 9/2/2014 9:53:57 AM
Live time: 7200
Real time: 7208
Dead time: 0.11 %
Detector ID: 4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_Liquid_D=1 25ml.Clb
4_Liquid_D=1 25ml_90101_030512

Energy Calibration
Created: 2/28/2012 2:55:17 PM
Zero offset: 0.091 keV
Gain: 0.250 keV/channel
Quadratic: -2.917E-08 keV/channel^2

Efficiency Calibration
Created: 3/27/2012 8:51:45 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.48 %
Log(Eff): 8.809878E-01 + (-6.811249E-01*Log(E)) +
(-1.909804E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -1.031199E+01 + (3.529752E+00*Log(E)) +
(-4.143154E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (1999.44keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/2/2014 9:53:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	4_2014-08-09_2125.PBC 8/9/2014 9:25:56 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 6 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0183

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.52	90.	18.01	0.62	5.686E-02	46.54	4.250	PBC<MDA	PB210
59.95	4.	229.67	0.81	6.042E-02	59.54	35.900	PBC<MDA	AM241
63.27	61.	22.43	0.91	6.085E-02	63.29	3.810	PBC<MDA	TH234
87.29	26.	39.58	0.84	6.016E-02	86.54	30.700	PBC<MDA	EU155
92.72	24.	17.68	1.28	5.937E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.810	PBC<MDA	U235
					93.35	5.561	PBC<MDA	AC228
					93.35	5.810	PBC<MDA	U235
					93.35	5.561	PBC<MDA	AC228
92.95	65.	22.09	0.84	5.926E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.810	2.639E+00	U235
					93.35	5.561	2.757E+00	AC228
92.95	65.	22.09	0.84	5.926E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.810	2.639E+00	U235
					93.35	5.561	2.757E+00	AC228
122.04	10.	93.03	0.87	5.389E-02	121.78	28.580	PBC<MDA	EU152
					123.10	40.790	6.074E-02	EU154
122.05	9.	107.70	0.87	5.415E-02	121.78	28.580	PBC<MDA	EU152
					123.10	40.790	5.966E-02	EU154
132.08	16.	57.79	0.88	5.223E-02	131.29	18.000	PBC<MDA	Pa234
185.51	50.	25.74	0.85	4.086E-02				
238.42	1.	40.30	0.98	3.269E-02	238.63	43.300	PBC<MDA	PB212
278.05	1.	762.92	1.01	2.859E-02	277.28	6.310	PBC<MDA	TL208
284.78	6.	147.02	1.02	2.796E-02	284.30	6.140	PBC<MDA	I131

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
340.89	5.	144.36	1.07	2.391E-02	338.32	12.010	PBC<MDA	AC228
351.94	8.	32.77	1.08	2.307E-02	351.93	37.600	PBC<MDA	PB214
364.47	1.	915.11	1.09	2.235E-02	364.48	81.700	PBC<MDA	I131
563.28	2.	262.42	1.26	1.501E-02	563.24	8.350	PBC<MDA	CS134
568.46	4.	160.98	1.27	1.486E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	4.894E-01	Pa234
568.83	6.	134.97	1.27	1.486E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	6.335E-01	Pa234
766.71	3.	238.07	1.44	1.127E-02	766.41	0.294	PBC<MDA	PA234M
795.58	2.	345.31	1.46	1.088E-02	795.87	85.530	PBC<MDA	CS134
803.29	1.	724.36	1.47	1.081E-02	801.95	8.690	PBC<MDA	CS134
873.22	3.	220.08	1.53	9.976E-03	873.23	12.270	PBC<MDA	EU154
882.73	5.	109.79	1.53	9.869E-03	883.24	9.600	PBC<MDA	Pa234
964.61	6.	91.26	1.60	9.088E-03	964.11	14.605	PBC<MDA	EU152
995.76	5.	81.38	1.63	8.810E-03	996.33	10.600	PBC<MDA	EU154
1173.15	3.	140.52	1.77	7.545E-03	1173.24	99.900	PBC<MDA	CO60
1334.22	3.	211.27	1.89	6.683E-03	1332.50	99.980	PBC<MDA	CO60
1461.14	-7.	78.02	1.99	6.120E-03	1460.83	10.670	PBC<MDA	K40

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
741.30	185.51	37.	50.	1.228E+03	25.74	0.855	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.62	46.52	121.	20.	0.003	18.01	0.620
AM-241	239.28	59.95	46.	4.	0.001	229.67	0.812s
TH-234	252.55	63.27	88.	10.	0.001	22.43	0.905s
EU-155	348.61	87.29	38.	26.	0.004	39.58	0.837s
TH-234	370.29	92.72	126.	24.	0.003	17.68	1.280s
U-235	372.83	93.35	72.	65.	0.009	22.09	0.843D
AC-228	372.83	93.35	72.	65.	0.009	22.09	0.843D
EU-152	487.56	122.05	47.	9.	0.001	107.70	0.870s
EU-154	487.52	122.04	35.	10.	0.001	93.03	0.871s
Pa-234	527.65	132.08	34.	16.	0.002	57.79	0.878s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	652.26	163.24	78.	-10.	-0.001	124.26	0.908s
PB-214	971.42	243.07	61.	-11.	-0.002	115.71	0.979s
TL-208	1111.31	278.05	37.	1.	0.000	762.92	1.011s
I-131	1138.22	284.78	32.	6.	0.001	147.02	1.018s
PB-214	1183.69	296.15	81.	-23.	-0.003	97.15	1.027s
AC-228	1362.58	340.89	20.	5.	0.001	144.36	1.066s
PB-214	1406.75	351.94	42.	8.	0.001	32.77	1.078s
I-131	1456.86	364.47	34.	1.	0.000	915.11	1.089s
CS-134	2251.99	563.28	14.	2.	0.000	262.42	1.264s
CS-134	2274.17	568.83	25.	6.	0.001	134.97	1.269s
Pa-234	2272.71	568.46	22.	4.	0.001	160.98	1.269s
CS-134	2417.14	604.58	32.	-3.	0.000	296.55	1.300s
PA-234M	3065.70	766.71	18.	3.	0.000	238.07	1.437s
BI-212	3136.18	784.33	21.	-3.	0.000	254.98	1.453s
CS-134	3181.22	795.58	15.	2.	0.000	345.31	1.462s
CS-134	3212.03	803.29	18.	1.	0.000	724.36	1.467s
EU-154	3491.83	873.22	19.	3.	0.000	220.08	1.526s
Pa-234	3515.02	879.02	23.	-5.	-0.001	131.65	1.532s
Pa-234	3529.84	882.73	10.	5.	0.001	109.79	1.534s
Pa-234	3777.77	944.69	19.	-5.	-0.001	129.61	1.586s
EU-152	3857.46	964.61	11.	6.	0.001	91.26	1.601s
EU-154	3982.11	995.76	6.	5.	0.001	81.38	1.627s
CO-60	4691.96	1173.15	10.	3.	0.000	140.52	1.769s
EU-154	5100.89	1275.33	16.	-3.	0.000	174.14	1.848s
CO-60	5336.60	1334.22	16.	3.	0.000	211.27	1.893s
EU-152	5621.17	1405.32	8.	-2.	0.000	230.02	1.951s
K-40	5844.63	1461.14	21.	-7.	-0.001	78.02	1.991s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-1.8387E-02				5.31E+01	
			477.60	-1.839E-02	%(	2.102E+00 3.14E+03	1.05E+01 G
K-40	N	-1.5396E+00				4.66E+11	
			1460.83	-1.540E+00	?(P	5.145E+00 7.80E+01	1.07E+01 G
CO-60	F	6.0489E-02				1.93E+03	
			1332.50	5.735E-02	?(	4.390E-01 2.11E+02	1.00E+02 G
			1173.24	6.363E-02	?(	3.221E-01 1.41E+02	9.99E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
I-131	I	3.8823E-02					8.02E+00	
			364.48	6.911E-03	&(	2.277E-01	9.15E+02	8.17E+01 G
			284.30	4.635E-01	?(	2.372E+00	1.47E+02	6.14E+00 G
			636.97	0.000E+00	-	4.501E+00	1.00E+03	7.17E+00 G
CS-134	I	3.5245E-02					7.54E+02	
			604.71	-2.803E-02	?(	2.957E-01	2.97E+02	9.76E+01 G
			795.87	2.454E-02	&(	3.124E-01	3.45E+02	8.55E+01 G
			569.32	3.377E-01	?(	1.590E+00	1.35E+02	1.54E+01 G
			801.95	1.247E-01	?(	3.343E+00	7.24E+02	8.69E+00 G
			563.24	2.346E-01	?(	2.258E+00	2.62E+02	8.35E+00 G
CS-137	I	-6.6000E-04					1.10E+04	
			661.66	-6.600E-04	&(	3.533E-01	1.47E+04	8.52E+01 G
EU-152	F	1.6292E-01					4.94E+03	
			344.29	0.000E+00	?(	7.647E-01	1.00E+03	2.65E+01 G
			121.78	8.474E-02	&(	3.110E-01	1.08E+02	2.86E+01 G
			778.92	0.000E+00	-	2.688E+00	1.00E+03	1.29E+01 G
			964.11	6.115E-01	?(	1.923E+00	9.13E+01	1.46E+01 G
			1112.07	0.000E+00	-	2.357E+00	1.00E+03	1.36E+01 G
			1408.00	-1.865E-01	+	1.619E+00	2.30E+02	2.10E+01 G
EU-154	I	5.3855E-01					3.14E+03	
			873.23	3.320E-01	?(	2.629E+00	2.20E+02	1.23E+01 G
			123.10	6.074E-02	-	1.918E-01	9.30E+01	4.08E+01 G
			1274.54	-1.909E-01	+	1.194E+00	1.74E+02	3.52E+01 G
			723.36	0.000E+00	-	1.408E+00	1.00E+03	2.02E+01 G
			1004.77	-2.273E-02	%	1.859E+00	2.17E+03	1.80E+01 G
			996.33	7.776E-01	?(	2.162E+00	8.14E+01	1.06E+01 G
EU-155	I	1.1817E-01					1.81E+03	
			105.31	1.064E-02	%(	4.082E-01	1.08E+03	2.12E+01 G
			86.54	1.924E-01	&(	2.378E-01	3.96E+01	3.07E+01 G
TL-208	N	6.0901E-03					6.98E+02	
			583.02	0.000E+00	?(	3.358E-01	1.00E+03	8.45E+01 G
			277.28	8.765E-02	?(	2.395E+00	7.63E+02	6.31E+00 G
			860.56	0.000E+00	-	3.549E+00	1.00E+03	1.24E+01 G
PB-210	N	1.1636E+00					8.14E+03	
			46.54	1.164E+00	(P	3.098E+00	1.80E+01	4.25E+00 G
PB-212	N	1.0082E-02					6.98E+02	
			238.63	1.008E-02	%(P	4.184E-01	4.03E+01	4.33E+01 G
			300.03	-3.976E-01	% P	4.521E+00	1.68E+03	3.28E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	N	1.2306E-01					5.84E+05	
			351.93	1.231E-01	(P	5.283E-01	3.28E+01	3.76E+01 G
			295.09	-6.200E-01	+ P	1.191E+00	9.72E+01	1.93E+01 G
			242.00	-6.278E-01	+ P	2.263E+00	1.16E+02	7.43E+00 G
BI-212	N	4.2731E-02					6.98E+02	
			727.17	4.273E-02	&(	3.316E+00	2.06E+03	7.55E+00 G
			785.42	-2.591E+00	+	2.379E+01	2.55E+02	1.28E+00 G
BI-214	N	-2.5432E-01					5.84E+05	
			609.31	-2.543E-01	%(P	7.001E-01	1.00E+03	4.61E+01 G
			1120.29	0.000E+00	+	3.535E+00	1.00E+03	1.51E+01 G
			1764.49	-1.561E+00	% P	6.341E+00	1.00E+03	1.54E+01 G
AC-228	N	6.5820E-02					2.10E+03	
			911.07	4.896E-05	%(	1.142E+00	6.24E+05	2.90E+01 G
			968.97	8.335E-03	&	6.930E-01	1.69E+03	1.75E+01 G
			338.32	2.246E-01	?(	1.143E+00	1.44E+02	1.20E+01 G
							Energy duplication	
			93.35	2.757E+00	*	1.777E+00	2.21E+01	5.56E+00 XA
Pa-234	N	4.0710E-01					1.63E+12	
			131.29	2.344E-01	&(	4.420E-01	5.78E+01	1.80E+01 G
			569.47	4.894E-01	?(	2.786E+00	1.61E+02	8.20E+00 G
			946.02	-5.654E-01	-	2.572E+00	1.30E+02	1.34E+01 G
			883.24	6.607E-01	?(	2.556E+00	1.10E+02	9.60E+00 G
			880.53	-1.279E+00	-	5.881E+00	1.32E+02	6.00E+00 G
TH-234	N	8.3170E-01					1.63E+12	
			63.29	5.907E-01	*(P	2.783E+00	2.24E+01	3.81E+00 G
			92.59	9.961E-01	*(P	2.307E+00	1.77E+01	5.58E+00 G
PA-234M	N	2.9254E+00					1.63E+12	
			1001.00	1.193E-01	%(	3.771E+01	8.30E+03	8.37E-01 G
			766.41	1.091E+01	?(	9.402E+01	2.38E+02	2.94E-01 G
U-235	N	1.6455E-02					2.57E+11	
			143.79	1.645E-02	%(	7.094E-01	1.19E+03	1.10E+01 G
			205.33	0.000E+00	-	3.092E+00	1.00E+03	5.01E+00 G
			163.38	-6.200E-01	+	2.620E+00	1.24E+02	5.08E+00 G
							Energy duplication	
			93.35	2.639E+00	*	1.701E+00	2.21E+01	5.81E+00 X
AM-241	T	2.7439E-02					1.58E+05	
			59.54	2.744E-02	?(	2.204E-01	2.30E+02	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.

! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
AM-241	59.95	46.	4.	0.001	229.67	2.744E-02	
EU-155	87.29	38.	26.	0.004	39.58	1.924E-01	
U-235	93.35	72.	65.	0.009	22.09	2.639E+00	
AC-228	93.35	72.	65.	0.009	22.09	2.757E+00	
EU-152	122.05	47.	9.	0.001	107.70	8.474E-02	
EU-154	122.04	35.	10.	0.001	93.03	6.074E-02	
Pa-234	132.08	34.	16.	0.002	57.79	2.344E-01	
U-235	163.24	78.	-10.	-0.001	124.26	-6.200E-01	
PB-214	243.07	61.	-11.	-0.002	115.71	-6.278E-01	P
TL-208	278.05	37.	1.	0.000	762.92	8.765E-02	
I-131	284.78	32.	6.	0.001	147.02	4.635E-01	
PB-214	296.15	81.	-23.	-0.003	97.15	-6.200E-01	P
AC-228	340.89	20.	5.	0.001	144.36	2.246E-01	
PB-214	351.94	42.	8.	0.001	32.77	1.231E-01	P
I-131	364.47	34.	1.	0.000	915.11	6.911E-03	
CS-134	563.28	14.	2.	0.000	262.42	2.346E-01	
CS-134	568.83	25.	6.	0.001	134.97	3.377E-01	
Pa-234	568.46	22.	4.	0.001	160.98	4.894E-01	
CS-134	604.58	32.	-3.	0.000	296.55	-2.803E-02	
PA-234M	766.71	18.	3.	0.000	238.07	1.091E+01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
BI-212	784.33	21.	-3.	0.000	254.98	-2.591E+00		
CS-134	795.58	15.	2.	0.000	345.31	2.454E-02		
CS-134	803.29	18.	1.	0.000	724.36	1.247E-01		
EU-154	873.22	19.	3.	0.000	220.08	3.320E-01		
Pa-234	879.02	23.	-5.	-0.001	131.65	-1.279E+00		
Pa-234	882.73	10.	5.	0.001	109.79	6.607E-01		
Pa-234	944.69	19.	-5.	-0.001	129.61	-5.654E-01		
EU-152	964.61	11.	6.	0.001	91.26	6.115E-01		
EU-154	995.76	6.	5.	0.001	81.38	7.776E-01		
CO-60	1173.15	10.	3.	0.000	140.52	6.363E-02		
EU-154	1275.33	16.	-3.	0.000	174.14	-1.909E-01		
CO-60	1334.22	16.	3.	0.000	211.27	5.735E-02		
EU-152	1405.32	8.	-2.	0.000	230.02	-1.865E-01		
K-40	1461.14	21.	-7.	-0.001	78.02	-1.540E+00	P	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	-1.8387E-02	-1.8387E-02	3.138E+03%	2.10E+00
K-40	#A	-1.5396E+00	-1.5396E+00	2.208E+02%	5.15E+00
CO-60	#A	6.0489E-02	6.0489E-02	1.269E+02%	4.39E-01
I-131	#A	3.8821E-02	3.8823E-02	1.470E+02%	2.28E-01
CS-134	#A	3.5245E-02	3.5245E-02	1.350E+02%	2.96E-01
CS-137	#A	-6.6000E-04	-6.6000E-04	1.468E+04%	3.53E-01
EU-152	#A	1.6292E-01	1.6292E-01	9.126E+01%	7.65E-01
EU-154	#A	5.3855E-01	5.3855E-01	8.138E+01%	2.63E+00
EU-155	#A	1.1817E-01	1.1817E-01	3.958E+01%	4.08E-01
TL-208	#A	6.0901E-03	6.0901E-03	6.289E+02%	3.36E-01
PB-210	A	1.1636E+00	1.1636E+00	7.975E+01%	3.10E+00
PB-212	#A	1.0082E-02	1.0082E-02	1.073E+03%	4.18E-01
PB-214	#A	1.2306E-01	1.2306E-01	1.117E+02%	5.28E-01
BI-212	#A	4.2731E-02	4.2731E-02	2.065E+03%	3.32E+00
BI-214	#A	-2.5432E-01	-2.5432E-01	2.000E+03%	7.00E-01
AC-228	#A	6.5820E-02	6.5820E-02	1.444E+02%	1.14E+00
Pa-234	#A	4.0710E-01	4.0710E-01	5.779E+01%	4.42E-01
TH-234	#A	8.3170E-01	8.3170E-01	7.189E+01%	2.78E+00
PA-234M	#A	2.9254E+00	2.9254E+00	2.381E+02%	3.77E+01
U-235	#A	1.6455E-02	1.6455E-02	1.187E+03%	7.09E-01
AM-241	#A	2.7439E-02	2.7439E-02	2.297E+02%	2.20E-01

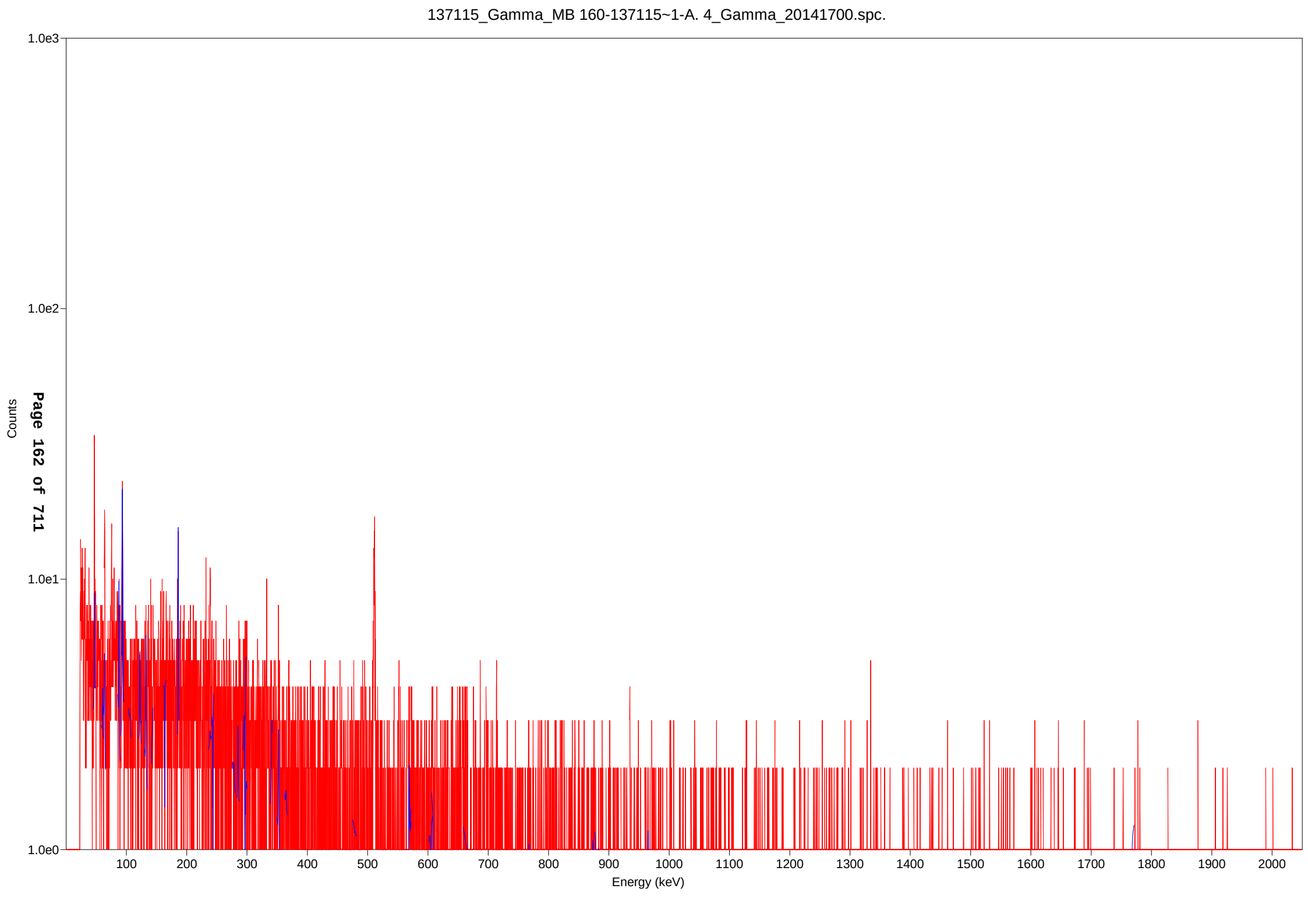
\# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.4 keV)   0.000E+00 Bq/Sample
Total Decayed Activity (37.6 to 1999.4 keV) 0.0000000E+00 Bq/Sample

The library has energies which are not separable.


137115_Gamma_MB 160-137115~1-A. 4_Gamma_20141700.spc.
1.0e3
1.0e2
1.0e1
1.0e0
Counts
Page 162 of 711
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)

Test America St. Louis Spectrum ID: 7_Gamma_20141975

Sample Description: 137115_Gamma_LCS 160-137115~2-A
Detector: Ge 7 SN/154
Batch ID: 137115
Work Order Number: Gamma
Lot Number: LCS 160-137115~2-A

Decay to Time: 9/2/2014 12:02 Live Time: 7200 sec
Acquisition Time: 9/2/2014 12:02:27 Real Time: 7432 sec
Analysis Time: 9/2/2014 14:06 Dead Time: 3.12 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 7_Liquid_D=1 25ml.Clb
Efficiency Cal Desc: 7_25mld=1_90101_032612
Efficiency Cal Date: 3/28/2012 09:22
Energy Cal Date: 2/23/2012 08:40
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 7_2014-08-09_2137.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	2.197E-02	12710.0	2.793E+00	2.793E+00	9.286E+00
K-40	2.782E-01	732.0	2.036E+00	2.036E+00	6.944E+00
CO-60	3.850E+02	0.4	1.391E+00	1.849E+01	9.539E-01
I-131	-2.008E-02	197.3	3.961E-02	3.962E-02	9.296E-01
CS-134	1.893E-01	101.3	1.917E-01	1.919E-01	9.269E-01
CS-137	3.545E+02	0.4	1.501E+00	1.733E+01	1.255E+00
EU-152	2.455E+01	1.1	2.687E-01	1.220E+00	2.422E+00
EU-154	-4.684E-02	154.3	7.229E-02	7.233E-02	1.244E+01
EU-155	2.558E-01	81.7	2.090E-01	2.094E-01	1.260E+00
TL-208	-3.168E-01	101.4	3.212E-01	3.216E-01	1.063E+00
PB-210	-2.462E+01	22.5	5.538E+00	5.759E+00	1.572E+01
PB-212	-4.087E-01	99.0	4.046E-01	4.052E-01	1.276E+00
PB-214	4.428E-01	48.6	2.152E-01	2.162E-01	1.953E+00
BI-212	-7.304E-01	204.3	1.492E+00	1.493E+00	1.617E+01
BI-214	5.930E-02	76.7	4.547E-02	4.557E-02	1.692E+00
AC-228	4.072E-01	291.9	1.189E+00	1.189E+00	6.700E+00
Pa-234	2.331E+00	101.6	2.369E+00	2.371E+00	1.672E+00
TH-234	-6.054E+00	79.7	4.825E+00	4.834E+00	8.279E+00
PA-234M	4.573E+01	152.3	6.967E+01	6.970E+01	2.309E+02
U-235	6.834E-01	153.3	1.048E+00	1.048E+00	2.924E+00
AM-241	9.354E+02	0.2	1.740E+00	4.637E+01	1.808E+00
Total	1.750E+03				

Analyst: ashley silas

TestAmerica Spectrum name: 7_Gamma_20141975.An1

Sample description
137115_Gamma_LCS 160-137115~2-A

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20141975.An1

Acquisition information
Start time: 9/2/2014 12:02:27 PM
Live time: 7200
Real time: 7432
Dead time: 3.12 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Liquid_D=1 25ml.Clb
7_25mld=1_90101_032612

Energy Calibration
Created: 2/23/2012 8:40:56 AM
Zero offset: 0.117 keV
Gain: 0.250 keV/channel
Quadratic: 3.508E-09 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 9:22:15 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.82 %
Log(Eff): -7.206837E-02 + (-5.220592E-02*Log(E)) +
(-7.214522E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.58 %
Log(Eff): -1.343090E+01 + (5.323811E+00*Log(E)) +
(-6.125181E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (2000.12keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/2/2014 12:02:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2014-08-09_2137.PBC 8/9/2014 9:37:15 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 23 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0471

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.62	4209.	3.79	1.05	1.105E-01				
43.28	483.	26.99	0.78	1.265E-01				
49.57	7856.	3.91	1.48	1.377E-01				
59.59	360241.	0.19	0.90	1.490E-01	59.54	35.900	9.354E+02	AM241
77.66	628.	21.46	1.93	1.553E-01				
86.78	212.	87.68	0.88	1.540E-01	86.54	30.700	PBC<MDA	EU155
88.03	93396.	0.38	0.94	1.536E-01				
92.43	25.	70.29	0.89	1.521E-01	92.59	5.584	PBC<MDA	TH234
					92.59	5.584	PBC<MDA	TH234
93.65	43.	153.29	0.89	1.518E-01	93.35	5.561	PBC<MDA	AC228
					93.35	5.810	6.834E-01	U235
99.02	302.	32.59	0.62	1.494E-01				
102.95	294.	35.45	0.99	1.475E-01				
122.00	13644.	1.26	1.00	1.365E-01	121.78	28.580	4.852E+01	EU152
					121.78	28.580	4.852E+01	EU152
123.10	60.	154.33	0.92	1.358E-01	123.10	40.790	PBC<MDA	EU154
					123.10	40.790	1.504E-01	EU154
131.49	49.	173.63	0.93	1.306E-01	131.29	18.000	PBC<MDA	Pa234
136.37	1711.	7.06	1.14	1.273E-01				
144.23	32.	165.78	0.94	1.225E-01	143.79	10.960	PBC<MDA	U235
165.76	829.	12.26	0.89	1.085E-01				
204.06	171.	49.82	0.50	9.159E-02				
205.43	48.	153.27	1.01	9.113E-02	205.33	5.010	PBC<MDA	U235
240.13	161.	48.60	1.04	7.948E-02	242.00	7.430	PBC<MDA	PB214
					242.00	7.430	3.786E+00	PB214
283.53	138.	47.04	0.55	6.941E-02	284.30	6.140	4.509E+00	I131
302.93	41.	174.96	1.10	6.607E-02	300.03	3.280	PBC<MDA	PB212
					300.03	3.280	2.656E+00	PB212
445.18	123.	70.00	0.34	4.625E-02				
563.14	73.	101.26	1.36	3.700E-02	563.24	8.350	PBC<MDA	CS134
637.37	22.	338.57	1.43	3.282E-02	636.97	7.170	PBC<MDA	I131
654.45	72.	74.70	0.45	3.195E-02				
661.72	68744.	0.42	1.50	3.116E-02	661.66	85.210	3.545E+02	CS137
779.28	53.	79.11	0.70	2.683E-02	778.92	12.940	2.106E+00	EU152

					778.92	12.940	2.106E+00	EU152
785.71	22.	355.64	1.57	2.662E-02	785.42	1.280	PBC<MDA	BI212
825.13	142.	58.65	0.46	2.532E-02				
879.85	86.	105.56	1.65	2.368E-02	880.53	6.000	PBC<MDA	Pa234
918.43	102.	54.90	0.51	2.267E-02				
969.36	33.	291.85	1.72	2.145E-02	968.97	17.460	PBC<MDA	AC228
999.89	57.	152.33	1.75	2.073E-02	1001.00	0.837	PBC<MDA	PA234M
1143.42	47.	68.80	0.47	1.800E-02				

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1173.32	47836.	0.52	1.91	1.751E-02	1173.24	99.900	3.797E+02	CO60
1268.03	76.	34.81	0.36	1.611E-02				
1325.32	53.	40.80	2.00	1.535E-02				
1332.68	41171.	0.51	2.01	1.526E-02	1332.50	99.980	3.747E+02	CO60
1407.06	15.	150.96	2.06	1.437E-02	1408.00	21.005	PBC<MDA	EU152
					1408.00	21.005	6.753E-01	EU152
1461.69	3.	732.01	2.10	1.380E-02	1460.83	10.670	PBC<MDA	K40
1764.09	24.	74.43	2.29	1.117E-02	1764.49	15.400	PBC<MDA	BI214
1915.13	60.	37.88	0.34	1.018E-02				

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
146.04	36.62	5553.	4209.	3.809E+04	3.79	1.046	-	s
172.65	43.28	5834.	483.	3.821E+03	26.99	0.783	-	
197.82	49.57	24921.	8084.	5.870E+04	2.98	1.479	-	s
310.19	77.66	5529.	628.	4.043E+03	21.46	1.928	-	sM
351.70	88.03	7069.	93184.	6.066E+05	0.35	0.938	-	M
395.64	99.02	2809.	302.	2.019E+03	32.59	0.623	-	s
411.36	102.95	2965.	349.	2.366E+03	22.70	0.994	-	M
487.60	122.00	17241.	213.	1.560E+03	87.45	1.001	-	c
545.06	136.37	3219.	1711.	1.344E+04	7.06	1.141	-	s
662.65	165.76	2897.	1011.	9.319E+03	8.16	0.887	-	s
816.27	204.06	2602.	124.	1.354E+03	58.86	1.005	-	D
1133.78	283.53	1537.	219.	3.162E+03	26.15	0.554	-	s
1780.41	445.18	2430.	123.	2.659E+03	70.00	0.344	-	s
2617.52	654.45	986.	72.	2.243E+03	74.70	0.446	-	sc
3116.85	779.28	726.	57.	2.125E+03	68.12	0.704	-	sc
3300.25	825.13	1760.	142.	5.589E+03	58.65	0.465	-	sM
3673.45	918.43	1202.	102.	4.476E+03	54.90	0.512	-	s
4573.43	1143.42	428.	47.	2.610E+03	68.80	0.467	-	sc
5071.84	1268.03	156.	76.	4.718E+03	34.81	0.364	-	s
5300.59	1325.22	102.	27.	1.758E+03	62.20	0.317	-	sM
7660.08	1915.13	77.	60.	5.861E+03	37.88	0.345	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	189.54	47.50	18628.	-1000.	-0.139	21.00	0.836s
AM-241	237.91	59.59	22161.	360241.	50.033	0.19	0.905
TH-234	252.27	63.18	5371.	-252.	-0.035	60.45	0.854s
EU-155	346.68	86.78	17182.	212.	0.029	87.68	0.880
TH-234	369.28	92.43	4075.	25.	0.004	70.29	0.886s
U-235	372.97	93.35	4029.	43.	0.006	153.29	0.887D
EU-155	417.63	104.51	3577.	-62.	-0.009	137.85	0.900s
EU-152	487.62	122.01	4020.	13372.	1.857	1.09	0.918
EU-154	491.98	123.10	4259.	60.	0.008	154.33	0.919s
Pa-234	525.53	131.49	3618.	49.	0.007	173.63	0.928s
U-235	576.50	144.23	3605.	32.	0.004	165.78	0.941
U-235	655.78	164.04	4461.	-321.	-0.045	29.98	0.962
U-235	820.94	205.33	2663.	48.	0.007	153.27	1.007D
PB-212	954.60	238.74	4635.	-161.	-0.022	79.53	1.041s
PB-214	960.14	240.13	2980.	161.	0.022	48.60	1.045s
TL-208	1107.93	277.07	4072.	-61.	-0.008	148.29	1.081s
I-131	1133.64	283.50	3754.	-82.	-0.011	105.91	1.089
PB-212	1211.38	302.93	2608.	41.	0.006	174.96	1.105
AC-228	1354.56	338.73	4298.	-48.	-0.007	192.32	1.144s
EU-152	1370.65	342.75	3297.	-28.	-0.004	287.99	1.150s
PB-214	1410.39	352.68	4160.	-34.	-0.005	270.13	1.157s
I-131	1458.47	364.70	4146.	-45.	-0.006	202.55	1.170s
CS-134	2252.25	563.14	2732.	73.	0.010	101.26	1.364s
CS-134	2276.97	569.32	2737.	-51.	-0.007	146.65	1.369s
Pa-234	2277.38	569.42	2748.	-59.	-0.008	127.27	1.370s
TL-208	2326.33	581.65	2411.	-69.	-0.010	101.42	1.382s
CS-134	2427.81	607.02	2275.	-19.	-0.003	361.02	1.403s
BI-214	2423.90	606.05	1658.	-64.	-0.009	130.34	1.407s
I-131	2549.19	637.37	2870.	22.	0.003	338.57	1.433
CS-137	2646.61	661.72	2665.	68744.	9.548	0.42	1.496
BI-212	2908.64	727.23	2883.	-37.	-0.005	204.31	1.515s
PA-234M	3067.42	766.92	3068.	-59.	-0.008	134.53	1.550s
BI-212	3142.57	785.71	3089.	22.	0.003	355.64	1.567
CS-134	3185.16	796.36	3133.	-58.	-0.008	136.24	1.576s
CS-134	3212.45	803.18	3285.	-63.	-0.009	128.99	1.581s
TL-208	3445.98	861.56	3962.	-27.	-0.004	326.43	1.632s
EU-154	3505.47	876.43	3107.	-15.	-0.002	532.23	1.643s
Pa-234	3519.12	879.85	4125.	86.	0.012	105.56	1.649
Pa-234	3771.36	942.90	3778.	-66.	-0.009	132.98	1.704s
EU-152	3858.83	964.77	5061.	-19.	-0.003	517.99	1.719s
AC-228	3877.19	969.36	4509.	33.	0.005	291.85	1.724s
PA-234M	3999.30	999.89	3758.	57.	0.008	152.33	1.750s
EU-154	4016.80	1004.26	4064.	-88.	-0.012	103.34	1.753s
EU-152	4448.04	1112.07	3708.	-13.	-0.002	660.52	1.839s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-214	4480.84	1120.27	3182.	-40.	-0.006	200.88	1.845s
CO-60	4693.03	1173.32	1716.	47836.	6.644	0.52	1.911
EU-154	5116.82	1279.27	350.	-18.	-0.003	146.79	1.963s
CO-60	5330.04	1332.58	480.	42883.	5.956	0.51	2.039
EU-152	5627.96	1407.06	238.	15.	0.002	150.96	2.059s
K-40	5846.45	1461.69	231.	3.	0.000	732.01	2.095s
BI-214	7055.96	1764.09	155.	24.	0.003	74.43	2.290s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Peak Code	Peak MDA Value Bq/Sample	COMMENTS
BE-7	C	2.1974E-02				5.31E+01	
			477.60	2.197E-02	%(	9.286E+00 1.27E+04	1.05E+01 G
K-40	N	2.7816E-01				4.66E+11	
			1460.83	2.782E-01	&(	6.944E+00 7.32E+02	1.07E+01 G
CO-60	F	3.8500E+02				1.93E+03	
			1332.50	3.903E+02	(	9.539E-01 5.07E-01	1.00E+02 G
			1173.24	3.797E+02	(	1.554E+00 5.15E-01	9.99E+01 G
I-131	I	-2.0077E-02				8.02E+00	
			364.48	-1.384E-01	?(	9.296E-01 2.03E+02	8.17E+01 G
			284.30	-2.697E+00	+	9.451E+00 1.06E+02	6.14E+00 G
			636.97	1.328E+00	(	1.495E+01 3.39E+02	7.17E+00 G
CS-134	I	1.8927E-01				7.54E+02	
			604.71	-7.713E-02	?(	9.269E-01 3.61E+02	9.76E+01 G
			795.87	-3.609E-01	+	1.629E+00 1.36E+02	8.55E+01 G
			569.32	-1.250E+00	+	6.079E+00 1.47E+02	1.54E+01 G
			801.95	-3.872E+00	+	1.655E+01 1.29E+02	8.69E+00 G
			563.24	3.304E+00	?(	1.107E+01 1.01E+02	8.35E+00 G
CS-137	I	3.5450E+02				1.10E+04	
			661.66	3.545E+02	(	1.255E+00 4.23E-01	8.52E+01 G
EU-152	F	2.4551E+01				4.94E+03	
			344.29	-2.532E-01	?(	2.422E+00 2.88E+02	2.65E+01 G
			121.78	4.755E+01	(	1.060E+00 1.09E+00	2.86E+01 G
			778.92	-2.191E-01	%	1.038E+01 1.42E+03	1.29E+01 G
			964.11	-8.576E-01	&	1.474E+01 5.18E+02	1.46E+01 G
			1112.07	-7.163E-01	-	1.572E+01 6.61E+02	1.36E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1408.00	6.753E-01	&	3.433E+00	1.51E+02	2.10E+01 G
EU-154	I	-4.6843E-02					3.14E+03	
			873.23	-7.027E-01	&(	1.244E+01	5.32E+02	1.23E+01 G
			123.10	1.504E-01	?(	7.692E-01	1.54E+02	4.08E+01 G
			1274.54	-4.497E-01	&	2.214E+00	1.47E+02	3.52E+01 G
			723.36	1.655E-01	&	5.717E+00	1.04E+03	2.02E+01 G
			1004.77	-3.276E+00	+	1.120E+01	1.03E+02	1.80E+01 G
			996.33	5.184E-01	%	1.880E+01	1.09E+03	1.06E+01 G
EU-155	I	2.5580E-01					1.81E+03	
			105.31	-2.759E-01	?(	1.260E+00	1.38E+02	2.12E+01 G
			86.54	6.230E-01	(	1.802E+00	8.77E+01	3.07E+01 G
TL-208	N	-3.1675E-01					6.98E+02	
			583.02	-3.167E-01	?(	1.063E+00	1.01E+02	8.45E+01 G
			277.28	-1.900E+00	+	9.334E+00	1.48E+02	6.31E+00 G
			860.56	-1.260E+00	&	1.365E+01	3.26E+02	1.24E+01 G
PB-210	N	-2.4617E+01					8.14E+03	
			46.54	-2.462E+01	?(P	1.572E+01	2.10E+01	4.25E+00 G
PB-212	N	-4.0867E-01					6.98E+02	
			238.63	-6.408E-01	?(P	1.276E+00	7.95E+01	4.33E+01 G
			300.03	2.656E+00	&(	1.543E+01	1.75E+02	3.28E+00 G
PB-214	N	4.4278E-01					5.84E+05	
			351.93	-2.179E-01	?(	1.953E+00	2.70E+02	3.76E+01 G
			295.09	-2.182E-02	&	3.369E+00	4.64E+03	1.93E+01 G
			242.00	3.786E+00	?(	6.047E+00	4.86E+01	7.43E+00 G
BI-212	N	-7.3035E-01					6.98E+02	
			727.17	-2.384E+00	&(	1.617E+01	2.04E+02	7.55E+00 G
			785.42	9.025E+00	(	1.067E+02	3.56E+02	1.28E+00 G
BI-214	N	5.9300E-02					5.84E+05	
			609.31	-5.635E-01	&(P	1.692E+00	1.30E+02	4.61E+01 G
			1120.29	-2.021E+00	& P	1.327E+01	2.01E+02	1.51E+01 G
			1764.49	1.923E+00	?(P	4.908E+00	7.44E+01	1.54E+01 G
AC-228	N	4.0723E-01					2.10E+03	
			911.07	-7.560E-02	&(	6.700E+00	2.67E+03	2.90E+01 G
			968.97	1.209E+00	&(	1.171E+01	2.92E+02	1.75E+01 G
			338.32	-9.410E-01	&	5.999E+00	1.92E+02	1.20E+01 G
							Energy	duplication
			93.35	0.000E+00	}	4.910E+00	7.19E+03	5.56E+00 XA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Pa-234	N	2.3314E+00					1.63E+12	
			131.29	2.905E-01	?(	1.672E+00	1.74E+02	1.80E+01 G
			569.47	-2.710E+00	+	1.143E+01	1.27E+02	8.20E+00 G
			946.02	-3.095E+00	&	1.363E+01	1.33E+02	1.34E+01 G
			883.24	2.873E-01	&	1.900E+01	1.99E+03	9.60E+00 G
			880.53	8.454E+00	(	2.952E+01	1.06E+02	6.00E+00 G
TH-234	N	-6.0539E+00					1.63E+12	
			63.29	-6.054E+00	?(P	8.279E+00	6.05E+01	3.81E+00 G
			92.59	4.157E-01	+ P	4.908E+00	7.03E+01	5.58E+00 G
PA-234M	N	4.5733E+01					1.63E+12	
			1001.00	4.573E+01	?(	2.309E+02	1.52E+02	8.37E-01 G
			766.41	-1.013E+02	+	4.516E+02	1.35E+02	2.94E-01 G
U-235	N	6.8344E-01					2.57E+11	
			143.79	3.307E-01	&(P	2.924E+00	1.66E+02	1.10E+01 G
			205.33	1.455E+00	(	7.398E+00	1.53E+02	5.01E+00 G
			163.38	-7.971E+00	+	7.805E+00	3.00E+01	5.08E+00 G
								Energy duplication
			93.35	6.834E-01	}	4.699E+00	1.53E+02	5.81E+00 X
AM-241	T	9.3541E+02					1.58E+05	
			59.54	9.354E+02	(	1.808E+00	1.86E-01	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	47.50	18628.	-1000.	-0.139	21.00	-2.462E+01	P
TH-234	63.18	5371.	-252.	-0.035	60.45	-6.054E+00	P
TH-234	92.43	4075.	25.	0.004	70.29	4.157E-01	P
EU-152	122.01	4020.	13372.	1.857	1.09	4.755E+01	
EU-154	123.10	4259.	60.	0.008	154.33	1.504E-01	
PB-212	238.74	4635.	-161.	-0.022	79.53	-6.408E-01	P
PB-214	240.13	2980.	161.	0.022	48.60	3.786E+00	
TL-208	277.07	4072.	-61.	-0.008	148.29	-1.900E+00	
PB-212	302.93	2608.	41.	0.006	174.96	2.656E+00	
EU-152	342.75	3297.	-28.	-0.004	287.99	-2.532E-01	
PB-214	352.68	4160.	-34.	-0.005	270.13	-2.179E-01	
CS-134	563.14	2732.	73.	0.010	101.26	3.304E+00	
CS-134	569.32	2737.	-51.	-0.007	146.65	-1.250E+00	
TL-208	581.65	2411.	-69.	-0.010	101.42	-3.167E-01	
CS-134	607.02	2275.	-19.	-0.003	361.02	-7.713E-02	
PA-234M	766.92	3068.	-59.	-0.008	134.53	-1.013E+02	
CS-134	796.36	3133.	-58.	-0.008	136.24	-3.609E-01	
CS-134	803.18	3285.	-63.	-0.009	128.99	-3.872E+00	
TL-208	861.56	3962.	-27.	-0.004	326.43	-1.260E+00	
EU-154	876.43	3107.	-15.	-0.002	532.23	-7.027E-01	
EU-152	964.77	5061.	-19.	-0.003	517.99	-8.576E-01	
PA-234M	999.89	3758.	57.	0.008	152.33	4.573E+01	
EU-154	1004.26	4064.	-88.	-0.012	103.34	-3.276E+00	
EU-152	1112.07	3708.	-13.	-0.002	660.52	-7.163E-01	
EU-154	1279.27	350.	-18.	-0.003	146.79	-4.497E-01	
EU-152	1407.06	238.	15.	0.002	150.96	6.753E-01	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	2.1974E-02	2.1974E-02	1.271E+04%	9.29E+00
K-40	#A	2.7816E-01	2.7816E-01	7.320E+02%	6.94E+00
CO-60		3.8500E+02	3.8500E+02	3.612E-01%	9.54E-01
I-131	A	-2.0076E-02	-2.0077E-02	1.973E+02%	9.30E-01
CS-134	#A	1.8927E-01	1.8927E-01	1.013E+02%	9.27E-01
CS-137		3.5450E+02	3.5450E+02	4.234E-01%	1.25E+00

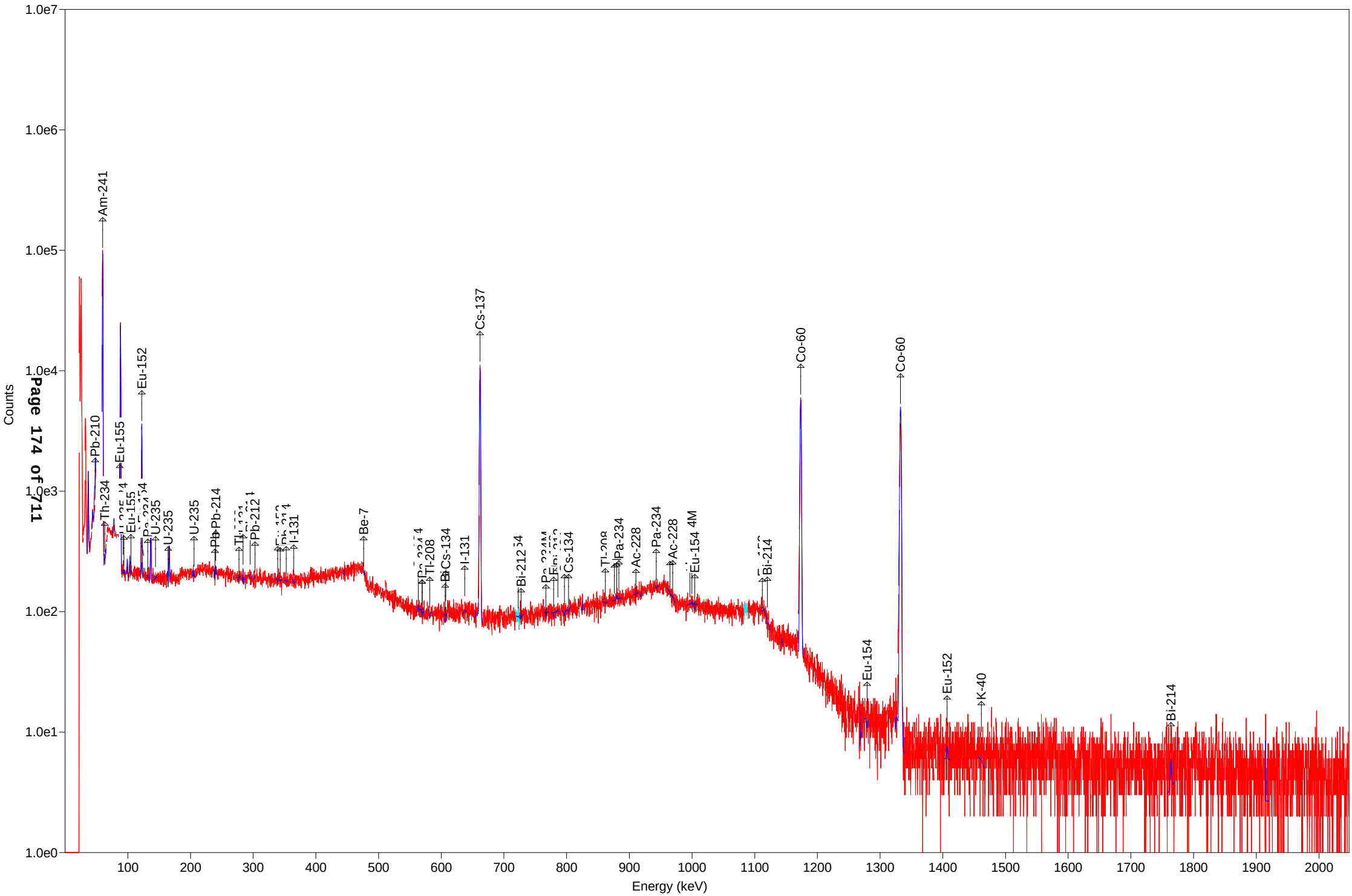
EU-152	#C	2.4551E+01	2.4551E+01	1.094E+00%	2.42E+00
EU-154	#A	-4.6843E-02	-4.6843E-02	1.543E+02%	1.24E+01
EU-155	A	2.5580E-01	2.5580E-01	8.169E+01%	1.26E+00
TL-208	#A	-3.1675E-01	-3.1675E-01	1.014E+02%	1.06E+00
PB-210	#A	-2.4617E+01	-2.4617E+01	2.250E+01%	1.57E+01
PB-212	#A	-4.0867E-01	-4.0867E-01	9.900E+01%	1.28E+00
PB-214	#A	4.4278E-01	4.4278E-01	4.860E+01%	1.95E+00
BI-212	A	-7.3035E-01	-7.3035E-01	2.043E+02%	1.62E+01
BI-214	#A	5.9300E-02	5.9300E-02	7.669E+01%	1.69E+00
AC-228	#A	4.0723E-01	4.0723E-01	2.919E+02%	6.70E+00
Pa-234	C	2.3314E+00	2.3314E+00	1.016E+02%	1.67E+00
TH-234	#A	-6.0539E+00	-6.0539E+00	7.971E+01%	8.28E+00
PA-234M	#A	4.5733E+01	4.5733E+01	1.523E+02%	2.31E+02
U-235	A	6.8344E-01	6.8344E-01	1.533E+02%	2.92E+00
AM-241		9.3541E+02	9.3541E+02	1.860E-01%	1.81E+00

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (338.1 to 2000.1 keV) 1.675E+03 Bq/Sample
Total Decayed Activity (338.1 to 2000.1 keV) 1.6749042E+03 Bq/Sample

The library has energies which are not separable.


137115_Gamma_LCS 160-137115~2-A. 7_Gamma_20141975.spc.
Counts
Energy (keV)
1.0e7
1.0e6
1.0e5
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Am-241
Pb-210
Th-234
Eu-155
Eu-152
U-235
Pb-214
Pb-212
I-131
Be-7
Cs-134
Cs-137
Bi-212
Tl-208
Pa-234
Ac-228
Eu-154
Co-60
Bi-214
K-40

Test America St. Louis Spectrum ID: 4_Gamma_20141701

Sample Description: 137115_Gamma_680-102199-A-1-E
Detector: Ge 4 SN/181
Batch ID: 137115
Work Order Number: Gamma
Lot Number: 680-102199-A-1-E

Decay to Time: 9/2/2014 12:01 Live Time: 7200 sec
Acquisition Time: 9/2/2014 12:02:00 Real Time: 7208 sec
Analysis Time: 9/2/2014 14:02 Dead Time: 0.11 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 4_Liquid_D=1 25ml.Clb
Efficiency Cal Desc: 4_Liquid_D=1 25ml_90101_030512
Efficiency Cal Date: 3/27/2012 20:51
Energy Cal Date: 2/28/2012 14:55
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 4_2014-08-09_2125.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	1.253E-03	43110.0	5.400E-01	5.400E-01	1.984E+00
K-40	1.159E+01	17.9	2.074E+00	2.148E+00	5.717E+00
CO-60	-6.019E-03	1712.0	1.031E-01	1.031E-01	3.939E-01
I-131	4.531E-03	1246.0	5.646E-02	5.646E-02	2.057E-01
CS-134	4.940E-02	172.7	8.534E-02	8.537E-02	2.988E-01
CS-137	3.236E-01	24.5	7.913E-02	8.068E-02	1.565E-01
EU-152	1.032E-01	83.8	8.651E-02	8.665E-02	7.416E-01
EU-154	1.553E-01	114.5	1.779E-01	1.781E-01	2.812E+00
EU-155	-4.358E-02	360.3	1.570E-01	1.570E-01	5.431E-01
TL-208	6.175E-01	21.7	1.340E-01	1.374E-01	2.370E-01
PB-210	3.520E+00	34.0	1.198E+00	1.219E+00	3.422E+00
PB-212	1.166E+00	14.9	1.739E-01	1.849E-01	4.295E-01
PB-214	1.209E+00	21.2	2.569E-01	2.635E-01	5.631E-01
BI-212	1.990E-01	395.2	7.864E-01	7.865E-01	4.317E+00
BI-214	1.272E+00	18.1	2.307E-01	2.388E-01	5.423E-01
AC-228	1.947E+00	15.2	2.953E-01	3.099E-01	3.682E-01
Pa-234	4.421E-01	78.7	3.481E-01	3.488E-01	5.857E-01
TH-234	1.242E+00	48.5	6.022E-01	6.053E-01	2.918E+00
PA-234M	1.220E+01	96.5	1.177E+01	1.179E+01	4.290E+01
U-235	3.643E-02	930.0	3.388E-01	3.388E-01	1.181E+00
AM-241	-6.369E-02	146.1	9.308E-02	9.313E-02	3.167E-01
Total	3.608E+01				

Analyst: ashley silas

TestAmerica Spectrum name: 4_Gamma_20141701.An1

Sample description
137115_Gamma_680-102199-A-1-E

Spectrum Filename: C:\User\SPC\Det4\4_Gamma_20141701.An1

Acquisition information
Start time: 9/2/2014 12:02:00 PM
Live time: 7200
Real time: 7208
Dead time: 0.11 %
Detector ID: 4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_Liquid_D=1 25ml.Clb
4_Liquid_D=1 25ml_90101_030512

Energy Calibration
Created: 2/28/2012 2:55:17 PM
Zero offset: 0.091 keV
Gain: 0.250 keV/channel
Quadratic: -2.917E-08 keV/channel^2

Efficiency Calibration
Created: 3/27/2012 8:51:45 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.48 %
Log(Eff): 8.809878E-01 + (-6.811249E-01*Log(E)) +
(-1.909804E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -1.031199E+01 + (3.529752E+00*Log(E)) +
(-4.143154E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (1999.44keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/2/2014 12:01:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	4_2014-08-09_2125.PBC 8/9/2014 9:25:56 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 19 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 0.1831

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.44	131.	15.96	0.81	5.683E-02	46.54	4.250	3.520E+00	PB210
63.50	67.	20.57	0.38	6.087E-02	63.29	3.810	PBC<MDA	TH234
74.91	91.	16.44	0.83	6.109E-02				
77.24	125.	13.99	0.83	6.098E-02				
92.74	134.	14.27	1.12	5.935E-02	92.59	5.584	2.574E+00	TH234
					93.35	5.810	5.419E+00	U235
					93.35	5.810	5.419E+00	U235
93.36	29.	66.59	0.84	5.926E-02	93.35	5.561	PBC<MDA	AC228
121.13	13.	83.82	0.87	5.415E-02	121.78	28.580	PBC<MDA	EU152
131.78	13.	93.02	0.88	5.223E-02	131.29	18.000	PBC<MDA	Pa234
144.62	1.	929.99	0.89	4.968E-02	143.79	10.960	PBC<MDA	U235
					143.79	10.960	3.643E-02	U235
238.48	146.	12.22	0.84	3.271E-02	238.63	43.300	1.171E+00	PB212
241.00	19.	54.37	0.98	3.229E-02	242.00	7.430	PBC<MDA	PB214
277.00	24.	45.43	1.01	2.859E-02	277.28	6.310	PBC<MDA	TL208
295.11	54.	17.91	0.93	2.704E-02	295.09	19.300	1.433E+00	PB214
300.21	7.	97.81	1.03	2.664E-02	300.03	3.280	PBC<MDA	PB212
337.96	35.	37.78	0.74	2.391E-02	338.32	12.010	1.677E+00	AC228
351.86	70.	16.78	1.05	2.307E-02	351.93	37.600	1.113E+00	PB214
583.17	52.	21.71	0.65	1.454E-02	583.02	84.500	5.842E-01	TL208
604.90	5.	172.75	1.30	1.405E-02	604.71	97.620	PBC<MDA	CS134
609.35	59.	15.12	0.80	1.396E-02	609.31	46.090	1.272E+00	BI214
661.59	26.	24.45	0.50	1.293E-02	661.66	85.210	3.236E-01	CS137
766.05	6.	99.70	1.44	1.127E-02	766.41	0.294	PBC<MDA	PA234M
785.87	2.	395.25	1.45	1.102E-02	785.42	1.280	PBC<MDA	BI212
					785.42	1.280	1.509E+00	BI212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
860.14	8.	84.73	1.52	1.011E-02	860.56	12.420	PBC<MDA	TL208
880.95	5.	127.07	1.53	9.898E-03	880.53	6.000	PBC<MDA	Pa234
910.54	35.	16.90	0.94	9.585E-03	911.07	29.000	1.749E+00	AC228
969.25	28.	18.90	0.33	9.045E-03	968.97	17.460	2.463E+00	AC228
1001.11	4.	165.22	1.63	8.771E-03	1001.00	0.837	PBC<MDA	PA234M
					1004.77	18.010	3.402E-01	EU154
1001.15	5.	114.54	1.63	8.740E-03	1001.00	0.837	8.587E+00	PA234M
					1004.77	18.010	4.005E-01	EU154
1112.29	3.	164.52	1.72	7.939E-03	1112.07	13.644	PBC<MDA	EU152
1119.62	5.	124.14	1.73	7.884E-03	1120.29	15.100	PBC<MDA	BI214
1274.43	1.	307.90	1.85	6.973E-03	1274.54	35.190	PBC<MDA	EU154
1460.91	54.	14.39	1.99	6.120E-03	1460.83	10.670	1.159E+01	K40
1764.83	-4.	90.61	2.21	5.102E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
298.91	74.86	100.	84.	1.370E+03	24.44	0.762	-	s
308.24	77.20	90.	134.	2.197E+03	15.00	0.745	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.28	46.44	149.	61.	0.009	15.96	0.807s
AM-241	237.61	59.53	101.	-10.	-0.001	146.14	0.812
TH-234	253.49	63.50	97.	17.	0.002	20.57	0.383s
EU-155	344.85	86.35	139.	-2.	0.000	741.70	0.837s
TH-234	369.79	92.59	155.	34.	0.005	15.45	0.843D
U-235	372.83	93.35	77.	124.	0.017	13.44	0.843D
AC-228	372.83	93.35	170.	29.	0.004	66.59	0.843D
EU-155	422.53	105.78	92.	-4.	-0.001	360.34	0.854s
EU-152	483.90	121.13	56.	13.	0.002	83.82	0.870
EU-154	494.25	123.72	100.	-17.	-0.002	85.80	0.871s
Pa-234	526.48	131.78	63.	13.	0.002	93.02	0.878s
U-235	577.79	144.62	88.	1.	0.000	929.99	0.890s
PB-212	953.10	238.48	78.	119.	0.017	12.22	0.843s
PB-214	963.16	241.00	52.	19.	0.003	54.37	0.979s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	1107.11	277.00	46.	24.	0.003	45.43	1.011
I-131	1136.26	284.29	41.	-4.	0.000	263.81	1.018s
PB-214	1179.54	295.11	29.	54.	0.007	17.91	0.933
PB-212	1199.92	300.21	45.	7.	0.001	97.81	1.032
AC-228	1350.87	337.96	37.	35.	0.005	37.78	0.736s
EU-152	1375.99	344.24	43.	-4.	-0.001	253.11	1.071s
PB-214	1406.44	351.86	48.	70.	0.010	16.78	1.052s
CS-134	2252.60	563.44	39.	-6.	-0.001	161.10	1.264s
CS-134	2276.38	569.38	26.	-1.	0.000	606.88	1.269s
Pa-234	2275.89	569.26	28.	-1.	0.000	703.12	1.269s
TL-208	2331.55	583.17	15.	52.	0.007	21.71	0.645s
CS-134	2418.46	604.90	33.	5.	0.001	172.75	1.300s
BI-214	2436.25	609.35	23.	59.	0.008	15.12	0.802s
I-131	2544.98	636.53	28.	-1.	0.000	667.25	1.327s
CS-137	2645.19	661.59	4.	26.	0.004	24.45	0.498s
EU-154	2888.55	722.43	25.	-4.	0.000	203.31	1.401s
PA-234M	3063.06	766.05	16.	6.	0.001	99.70	1.437s
EU-152	3116.43	779.39	21.	-3.	0.000	253.50	1.448s
BI-212	3142.34	785.87	18.	2.	0.000	395.25	1.453s
CS-134	3181.83	795.74	21.	-2.	0.000	300.63	1.462s
TL-208	3439.48	860.14	17.	8.	0.001	84.73	1.516s
Pa-234	3522.73	880.95	19.	5.	0.001	127.07	1.532s
Pa-234	3530.23	882.82	23.	-2.	0.000	289.40	1.534s
AC-228	3641.14	910.54	0.	35.	0.005	16.90	0.937s
AC-228	3876.04	969.25	0.	28.	0.004	18.90	0.333s
EU-154	3984.89	996.46	20.	-2.	0.000	315.52	1.627s
PA-234M	4003.49	1001.11	18.	4.	0.001	165.22	1.631s
EU-154	4003.67	1001.15	11.	5.	0.001	114.54	1.634s
EU-152	4448.39	1112.29	14.	3.	0.000	164.52	1.720s
BI-214	4477.73	1119.62	16.	5.	0.001	124.14	1.727s
CO-60	4690.97	1172.91	18.	-1.	0.000	549.11	1.769s
EU-154	5097.26	1274.43	10.	1.	0.000	307.90	1.848s
EU-152	5627.93	1407.01	9.	-1.	0.000	374.67	1.951s
K-40	5843.69	1460.91	27.	54.	0.008	14.39	1.991
BI-214	7060.48	1764.83	16.	-4.	-0.001	90.61	2.214s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	Peak MDA Value Bq/Sample	COMMENTS
BE-7	C	1.2526E-03				5.31E+01	
			477.60	1.253E-03	&(	1.984E+00 4.31E+04 1.05E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
K-40	N	1.1588E+01					4.66E+11	
			1460.83	1.159E+01	?(P	5.717E+00	1.44E+01	1.07E+01 G
CO-60	F	-6.0192E-03					1.93E+03	
			1332.50	-6.019E-03	%(	3.939E-01	1.71E+03	1.00E+02 G
			1173.24	-2.067E-02	+	4.183E-01	5.49E+02	9.99E+01 G
I-131	I	4.5307E-03					8.02E+00	
			364.48	4.531E-03	%(	2.057E-01	1.25E+03	8.17E+01 G
			284.30	-2.862E-01	+	2.657E+00	2.64E+02	6.14E+00 G
			636.97	-1.638E-01	+	3.959E+00	6.67E+02	7.17E+00 G
CS-134	I	4.9399E-02					7.54E+02	
			604.71	4.940E-02	(	2.988E-01	1.73E+02	9.76E+01 G
			795.87	-3.272E-02	+	3.562E-01	3.01E+02	8.55E+01 G
			569.32	-7.326E-02	+	1.613E+00	6.07E+02	1.54E+01 G
			801.95	0.000E+00	&	2.985E+00	1.00E+03	8.69E+00 G
			563.24	-6.260E-01	+	3.508E+00	1.61E+02	8.35E+00 G
CS-137	I	3.2360E-01					1.10E+04	
			661.66	3.236E-01	(	1.565E-01	2.45E+01	8.52E+01 G
EU-152	F	1.0320E-01					4.94E+03	
			344.29	-8.344E-02	?(	7.416E-01	2.53E+02	2.65E+01 G
			121.78	1.202E-01	&(	3.383E-01	8.38E+01	2.86E+01 G
			778.92	-2.533E-01	+	2.314E+00	2.54E+02	1.29E+01 G
			964.11	2.744E-02	&	2.321E+00	2.26E+03	1.46E+01 G
			1112.07	4.300E-01	?(	2.546E+00	1.65E+02	1.36E+01 G
			1408.00	-1.199E-01	+	1.716E+00	3.75E+02	2.10E+01 G
EU-154	I	1.5532E-01					3.14E+03	
			873.23	0.000E+00	?(	2.812E+00	1.00E+03	1.23E+01 G
			123.10	-1.084E-01	+	3.111E-01	8.58E+01	4.08E+01 G
			1274.54	8.401E-02	?(	9.749E-01	3.08E+02	3.52E+01 G
			723.36	-2.064E-01	&	1.491E+00	2.03E+02	2.02E+01 G
			1004.77	4.005E-01	?(	1.618E+00	1.15E+02	1.80E+01 G
			996.33	-3.052E-01	+	3.498E+00	3.16E+02	1.06E+01 G
EU-155	I	-4.3576E-02					1.81E+03	
			105.31	-4.358E-02	?(	5.431E-01	3.60E+02	2.12E+01 G
			86.54	-1.695E-02	+	4.329E-01	7.42E+02	3.07E+01 G
TL-208	N	6.1753E-01					6.98E+02	
			583.02	5.842E-01	(	2.370E-01	2.17E+01	8.45E+01 G
			277.28	1.831E+00	+	2.654E+00	4.54E+01	6.31E+00 G
			860.56	8.444E-01	?(	2.431E+00	8.47E+01	1.24E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-210	N	3.5196E+00					8.14E+03	
			46.54	3.520E+00	*(P	3.422E+00	1.60E+01	4.25E+00 G
PB-212	N	1.1662E+00					6.98E+02	
			238.63	1.171E+00	*(P	4.295E-01	1.22E+01	4.33E+01 G
			300.03	1.106E+00	(P	5.395E+00	9.78E+01	3.28E+00 G
PB-214	N	1.2093E+00					5.84E+05	
			351.93	1.113E+00	(P	5.631E-01	1.68E+01	3.76E+01 G
			295.09	1.433E+00	(P	7.419E-01	1.79E+01	1.93E+01 G
			242.00	1.116E+00	&(P	2.096E+00	5.44E+01	7.43E+00 G
BI-212	N	1.9896E-01					6.98E+02	
			727.17	-2.308E-02	%(	4.317E+00	5.13E+03	7.55E+00 G
			785.42	1.509E+00	?(	2.190E+01	3.95E+02	1.28E+00 G
BI-214	N	1.2716E+00					5.84E+05	
			609.31	1.272E+00	(P	5.423E-01	1.51E+01	4.61E+01 G
			1120.29	5.675E-01	-	2.477E+00	1.24E+02	1.51E+01 G
			1764.49	-6.830E-01	- P	3.824E+00	9.06E+01	1.54E+01 G
AC-228	N	1.9472E+00					2.10E+03	
			911.07	1.749E+00	(	3.682E-01	1.69E+01	2.90E+01 G
			968.97	2.463E+00	(	6.482E-01	1.89E+01	1.75E+01 G
			338.32	1.677E+00	(	1.509E+00	3.78E+01	1.20E+01 G
								Energy duplication
			93.35	1.216E+00	-	2.676E+00	6.66E+01	5.56E+00 XA
Pa-234	N	4.4210E-01					1.63E+12	
			131.29	1.868E-01	?(	5.857E-01	9.30E+01	1.80E+01 G
			569.47	-1.215E-01	-	3.097E+00	7.03E+02	8.20E+00 G
			946.02	0.000E+00	-	1.234E+00	1.00E+03	1.34E+01 G
			883.24	-3.534E-01	+	3.683E+00	2.89E+02	9.60E+00 G
			880.53	1.208E+00	?(	5.379E+00	1.27E+02	6.00E+00 G
TH-234	N	1.2422E+00					1.63E+12	
			63.29	9.901E-01	(P	2.918E+00	2.06E+01	3.81E+00 G
			92.59	1.414E+00	(P	2.546E+00	1.54E+01	5.58E+00 G
PA-234M	N	1.2201E+01					1.63E+12	
			1001.00	7.294E+00	&(	4.290E+01	1.65E+02	8.37E-01 G
			766.41	2.617E+01	?(	9.010E+01	9.97E+01	2.94E-01 G
U-235	N	3.6430E-02					2.57E+11	
			143.79	3.643E-02	?(	1.181E+00	9.30E+02	1.10E+01 G
			205.33	0.000E+00	-	3.517E+00	1.00E+03	5.01E+00 G
			163.38	0.000E+00	-	2.228E+00	1.00E+03	5.08E+00 G
								Energy duplication
			93.35	5.009E+00	?	1.760E+00	1.34E+01	5.81E+00 X

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AM-241	T -6.3689E-02					1.58E+05	
		59.54	-6.369E-02	(	3.167E-01	1.46E+02	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
AM-241	59.53	101.	-10.	-0.001	146.14	-6.369E-02
EU-155	86.35	139.	-2.	0.000	741.70	-1.695E-02
U-235	93.35	77.	124.	0.017	13.44	5.009E+00
EU-155	105.78	92.	-4.	-0.001	360.34	-4.358E-02
EU-152	121.13	56.	13.	0.002	83.82	1.202E-01
EU-154	123.72	100.	-17.	-0.002	85.80	-1.084E-01
Pa-234	131.78	63.	13.	0.002	93.02	1.868E-01
U-235	144.62	88.	1.	0.000	929.99	3.643E-02
I-131	284.29	41.	-4.	0.000	263.81	-2.862E-01
EU-152	344.24	43.	-4.	-0.001	253.11	-8.344E-02
CS-134	563.44	39.	-6.	-0.001	161.10	-6.260E-01
CS-134	569.38	26.	-1.	0.000	606.88	-7.326E-02

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Pa-234	569.26	28.	-1.	0.000	703.12	-1.215E-01	
CS-134	604.90	33.	5.	0.001	172.75	4.940E-02	
I-131	636.53	28.	-1.	0.000	667.25	-1.638E-01	
EU-154	722.43	25.	-4.	0.000	203.31	-2.064E-01	
PA-234M	766.05	16.	6.	0.001	99.70	2.617E+01	
EU-152	779.39	21.	-3.	0.000	253.50	-2.533E-01	
BI-212	785.87	18.	2.	0.000	395.25	1.509E+00	
CS-134	795.74	21.	-2.	0.000	300.63	-3.272E-02	
Pa-234	880.95	19.	5.	0.001	127.07	1.208E+00	
Pa-234	882.82	23.	-2.	0.000	289.40	-3.534E-01	
EU-154	996.46	20.	-2.	0.000	315.52	-3.052E-01	
PA-234M	1001.11	18.	4.	0.001	165.22	7.294E+00	
EU-154	1001.15	11.	5.	0.001	114.54	4.005E-01	
EU-152	1112.29	14.	3.	0.000	164.52	4.300E-01	
CO-60	1172.91	18.	-1.	0.000	549.11	-2.067E-02	
EU-154	1274.43	10.	1.	0.000	307.90	8.401E-02	
EU-152	1407.01	9.	-1.	0.000	374.67	-1.199E-01	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

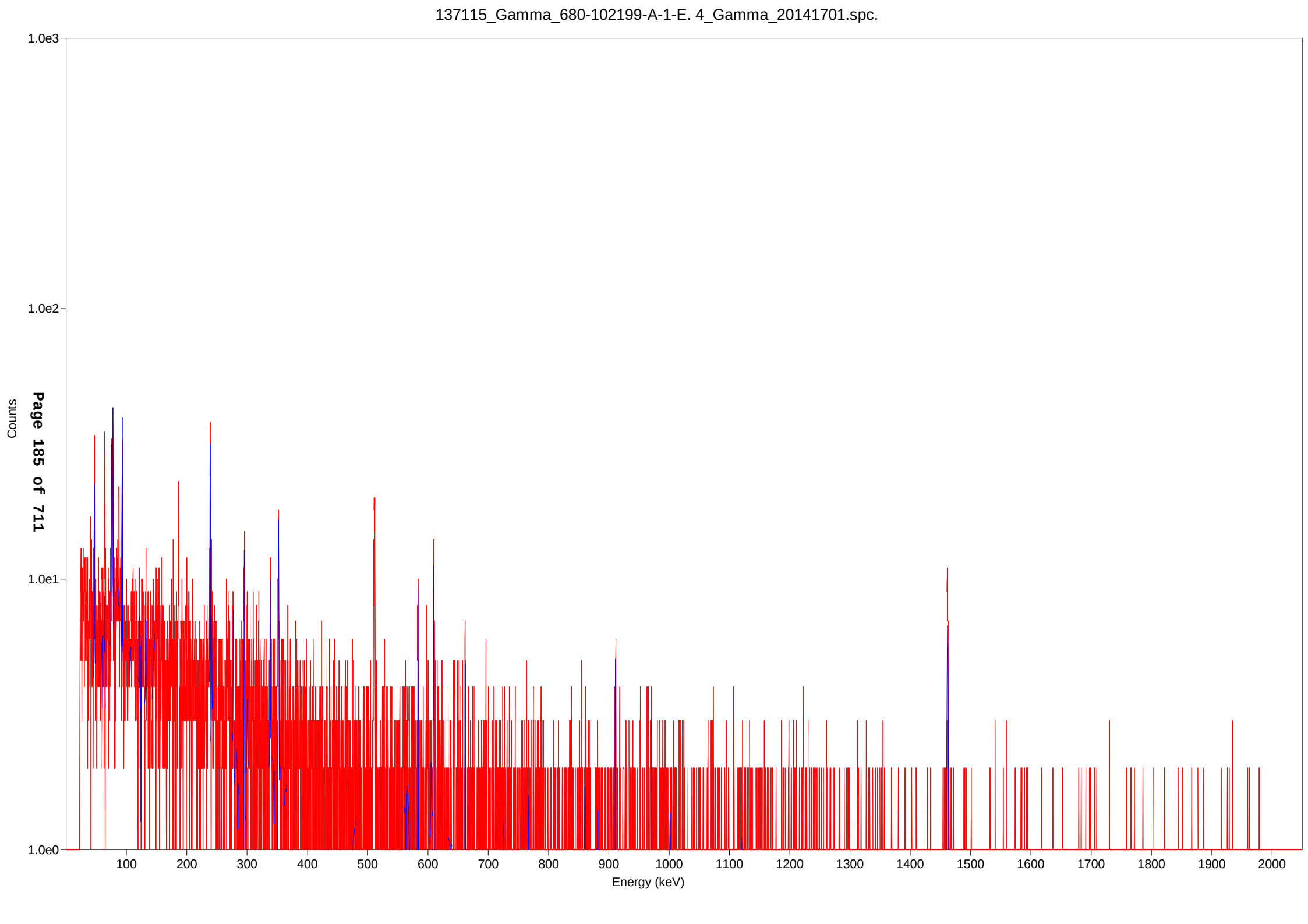
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	1.2526E-03	1.2526E-03	4.311E+04%	1.98E+00
K-40	#	1.1588E+01	1.1588E+01	1.789E+01%	5.72E+00
CO-60	#A	-6.0192E-03	-6.0192E-03	1.712E+03%	3.94E-01
I-131	#A	4.5305E-03	4.5307E-03	1.246E+03%	2.06E-01
CS-134	#A	4.9399E-02	4.9399E-02	1.727E+02%	2.99E-01
CS-137		3.2360E-01	3.2360E-01	2.445E+01%	1.56E-01
EU-152	#A	1.0320E-01	1.0320E-01	8.382E+01%	7.42E-01
EU-154	#A	1.5532E-01	1.5532E-01	1.145E+02%	2.81E+00
EU-155	#A	-4.3576E-02	-4.3576E-02	3.603E+02%	5.43E-01
TL-208		6.1753E-01	6.1753E-01	2.171E+01%	2.37E-01
PB-210	#	3.5196E+00	3.5196E+00	3.404E+01%	3.42E+00
PB-212		1.1662E+00	1.1662E+00	1.491E+01%	4.30E-01
PB-214		1.2093E+00	1.2093E+00	2.124E+01%	5.63E-01
BI-212	#A	1.9896E-01	1.9896E-01	3.952E+02%	4.32E+00
BI-214		1.2716E+00	1.2716E+00	1.814E+01%	5.42E-01
AC-228		1.9472E+00	1.9472E+00	1.517E+01%	3.68E-01
Pa-234	#A	4.4210E-01	4.4210E-01	7.874E+01%	5.86E-01
TH-234	A	1.2422E+00	1.2422E+00	4.848E+01%	2.92E+00
PA-234M	#A	1.2201E+01	1.2201E+01	9.648E+01%	4.29E+01
U-235	#A	3.6430E-02	3.6430E-02	9.300E+02%	1.18E+00
AM-241	#A	-6.3689E-02	-6.3689E-02	1.461E+02%	3.17E-01

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (238.5 to 1999.4 keV) 2.164E+01 Bq/Sample
Total Decayed Activity (238.5 to 1999.4 keV) 2.1643427E+01 Bq/Sample

The library has energies which are not separable.


137115_Gamma_680-102199-A-1-E. 4_Gamma_20141701.spc.
1.0e3
1.0e2
1.0e1
1.0e0
Counts
Page 185 of 711
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)

Test America St. Louis Spectrum ID: 7_Gamma_20141976

Sample Description: 137115_Gamma_680-102199-A-1-F DU
Detector: Ge 7 SN/154
Batch ID: 137115
Work Order Number: Gamma
Lot Number: 680-102199-A-1-F DU

Decay to Time: 9/2/2014 14:34 Live Time: 7200 sec
Acquisition Time: 9/2/2014 14:34:48 Real Time: 7321 sec
Analysis Time: 9/2/2014 16:37 Dead Time: 1.65 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 7_Liquid_D=1 25ml.Clb
Efficiency Cal Desc: 7_25mld=1_90101_032612
Efficiency Cal Date: 3/28/2012 09:22
Energy Cal Date: 2/23/2012 08:40
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 7_2014-08-09_2137.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-2.633E-01	122.1	3.216E-01	3.219E-01	1.100E+00
K-40	1.915E+01	7.0	1.344E+00	1.632E+00	6.952E-01
CO-60	3.788E-02	118.2	4.478E-02	4.481E-02	1.589E-01
I-131	5.986E-02	61.2	3.663E-02	3.674E-02	9.131E-02
CS-134	4.797E-02	59.8	2.869E-02	2.879E-02	1.343E-01
CS-137	1.093E-01	46.4	5.066E-02	5.094E-02	1.614E-01
EU-152	1.343E-01	52.9	7.111E-02	7.141E-02	2.566E-01
EU-154	4.022E-01	76.7	3.083E-01	3.089E-01	1.037E+00
EU-155	1.791E-01	24.9	4.459E-02	4.556E-02	2.128E-01
TL-208	2.253E-01	20.7	4.666E-02	4.793E-02	1.238E-01
PB-210	2.028E+00	28.6	5.797E-01	5.941E-01	1.608E+00
PB-212	1.056E+00	8.7	9.195E-02	1.081E-01	2.006E-01
PB-214	7.997E-01	12.1	9.698E-02	1.044E-01	2.120E-01
BI-212	2.195E+00	20.6	4.516E-01	4.641E-01	8.169E-01
BI-214	7.937E-01	17.8	1.415E-01	1.467E-01	2.968E-01
AC-228	1.423E+00	11.4	1.625E-01	1.764E-01	2.676E-01
Pa-234	1.144E-01	177.7	2.033E-01	2.034E-01	3.027E-01
TH-234	1.776E+00	32.8	5.822E-01	5.887E-01	1.603E+00
PA-234M	6.966E+00	89.6	6.244E+00	6.253E+00	2.013E+01
U-235	1.963E-01	71.2	1.398E-01	1.401E-01	5.169E-01
AM-241	-1.554E-02	271.6	4.220E-02	4.221E-02	1.445E-01
Total	3.769E+01				

Analyst: Curtis Carey

TestAmerica Spectrum name: 7_Gamma_20141976.An1

Sample description
137115_Gamma_680-102199-A-1-F DU

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20141976.An1

Acquisition information
Start time: 9/2/2014 2:34:48 PM
Live time: 7200
Real time: 7321
Dead time: 1.65 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Liquid_D=1 25ml.Clb
7_25mld=1_90101_032612

Energy Calibration
Created: 2/23/2012 8:40:56 AM
Zero offset: 0.117 keV
Gain: 0.250 keV/channel
Quadratic: 3.508E-09 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 9:22:15 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.82 %
Log(Eff): -7.206837E-02 + (-5.220592E-02*Log(E)) +
(-7.214522E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.58 %
Log(Eff): -1.343090E+01 + (5.323811E+00*Log(E)) +
(-6.125181E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (2000.12keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/2/2014 2:34:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2014-08-09_2137.PBC 8/9/2014 9:37:15 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 22 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1122

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.67	154.	15.32	0.76	1.330E-01	46.54	4.250	2.028E+00	PB210
63.23	154.	15.72	0.82	1.515E-01	63.29	3.810	1.776E+00	TH234
74.79	182.	11.32	0.87	1.552E-01				
77.14	254.	8.79	0.87	1.553E-01				
87.15	106.	19.29	1.25	1.538E-01	86.54	30.700	3.099E-01	EU155
					86.54	30.700	3.099E-01	EU155
92.70	196.	14.72	1.27	1.521E-01	92.59	5.584	1.531E+00	TH234
					93.35	5.561	3.224E+00	AC228
					93.35	5.810	3.086E+00	U235
					93.35	5.810	3.086E+00	U235
105.61	20.	71.57	0.90	1.463E-01	105.31	21.200	PBC<MDA	EU155
					105.31	21.200	8.956E-02	EU155
131.22	4.	390.67	0.93	1.306E-01	131.29	18.000	PBC<MDA	Pa234
143.62	10.	48.12	0.94	1.225E-01	143.79	10.960	PBC<MDA	U235
					143.79	10.960	PBC<MDA	U235
162.93	13.	86.19	0.96	1.100E-01	163.38	5.080	PBC<MDA	U235
					163.38	5.080	3.264E-01	U235
185.83	117.	18.07	1.17	9.883E-02				
205.45	9.	133.29	1.01	9.113E-02	205.33	5.010	PBC<MDA	U235
					205.33	5.010	2.722E-01	U235
209.00	31.	42.18	0.62	8.981E-02				
238.65	304.	7.58	0.89	8.042E-02	238.63	43.300	1.056E+00	PB212
277.86	16.	69.49	1.08	7.076E-02	277.28	6.310	PBC<MDA	TL208
282.73	9.	103.87	1.09	6.924E-02	284.30	6.140	PBC<MDA	I131
					284.30	6.140	2.874E-01	I131
295.22	70.	19.87	0.76	6.704E-02	295.09	19.300	7.515E-01	PB214
299.74	25.	45.60	1.10	6.607E-02	300.03	3.280	PBC<MDA	PB212
338.16	67.	23.10	0.93	5.942E-02	338.32	12.010	1.301E+00	AC228
343.08	17.	52.94	1.15	5.849E-02	344.29	26.500	PBC<MDA	EU152
352.16	128.	13.91	1.37	5.735E-02	351.93	37.600	8.244E-01	PB214
364.97	14.	64.71	1.17	5.557E-02	364.48	81.700	PBC<MDA	I131
					364.48	81.700	4.276E-02	I131
569.76	2.	365.19	1.37	3.661E-02	569.32	15.380	PBC<MDA	CS134

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					569.47	8.200	9.996E-02	Pa234
570.00	1.	821.33	1.37	3.661E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	4.585E-02	Pa234
583.14	104.	13.02	1.20	3.577E-02	583.02	84.500	4.777E-01	TL208
609.23	82.	14.34	0.95	3.428E-02	609.31	46.090	7.175E-01	BI214
661.53	21.	46.35	1.46	3.161E-02	661.66	85.210	PBC<MDA	CS137
727.59	34.	20.57	0.28	2.877E-02	727.17	7.550	2.195E+00	BI212
766.16	5.	170.47	1.55	2.729E-02	766.41	0.294	PBC<MDA	PA234M
795.51	13.	59.81	1.58	2.626E-02	795.87	85.530	PBC<MDA	CS134
802.53	5.	159.78	1.58	2.606E-02	801.95	8.690	PBC<MDA	CS134
860.94	35.	27.85	0.27	2.425E-02	860.56	12.420	1.614E+00	TL208
875.56	8.	76.65	1.64	2.389E-02	873.23	12.270	PBC<MDA	EU154
881.20	4.	177.73	1.65	2.368E-02	880.53	6.000	PBC<MDA	Pa234
911.26	69.	14.12	0.51	2.286E-02	911.07	29.000	1.452E+00	AC228
946.77	3.	183.46	1.70	2.199E-02	946.02	13.400	PBC<MDA	Pa234
969.19	39.	21.00	1.28	2.145E-02	968.97	17.460	1.459E+00	AC228
1001.12	8.	89.63	1.75	2.073E-02	1001.00	0.837	PBC<MDA	PA234M
1120.50	37.	20.08	0.39	1.840E-02	1120.29	15.100	1.827E+00	BI214
1333.24	4.	118.22	2.01	1.526E-02	1332.50	99.980	PBC<MDA	CO60
1407.94	2.	207.94	2.06	1.437E-02	1408.00	21.005	PBC<MDA	EU152
1460.75	203.	7.02	1.12	1.380E-02	1460.83	10.670	1.915E+01	K40
1764.93	13.	42.61	2.29	1.117E-02	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
298.82	74.81	137.	146.	9.431E+02	15.44	0.860	-	
308.22	77.16	158.	231.	1.487E+03	11.72	0.859	-	s
348.19	87.15	180.	23.	1.527E+02	83.23	1.251	-	sc
742.95	185.83	77.	117.	1.187E+03	18.07	1.170	-	s
835.60	209.00	42.	31.	3.451E+02	34.59	0.622	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.25	46.67	181.	82.	0.011	15.32	0.756s
AM-241	239.17	59.90	129.	-6.	-0.001	271.61	0.850s
TH-234	252.47	63.23	188.	74.	0.010	15.72	0.824s
EU-155	348.27	87.17	168.	82.	0.011	24.90	0.880s
TH-234	369.93	92.59	268.	26.	0.004	16.69	0.886D
AC-228	372.97	93.35	239.	54.	0.008	42.34	0.887D
U-235	372.97	93.35	161.	148.	0.021	14.65	0.887D
EU-155	422.01	105.61	92.	20.	0.003	71.57	0.900s
EU-154	494.26	123.67	105.	-4.	-0.001	391.84	0.919s
Pa-234	524.47	131.22	108.	4.	0.001	390.67	0.928s
U-235	574.09	143.62	103.	10.	0.001	48.12	0.941s
U-235	651.31	162.93	57.	13.	0.002	86.19	0.962s
U-235	821.40	205.45	67.	9.	0.001	133.29	1.007s
PB-212	954.21	238.65	104.	265.	0.037	7.58	0.889
TL-208	1111.09	277.86	54.	16.	0.002	69.49	1.081
I-131	1130.58	282.73	37.	9.	0.001	103.87	1.089s
PB-214	1180.53	295.22	39.	70.	0.010	19.87	0.763s
PB-212	1198.60	299.74	52.	25.	0.003	45.60	1.105s
AC-228	1352.28	338.16	41.	67.	0.009	23.10	0.927
EU-152	1371.99	343.08	31.	17.	0.002	52.94	1.150s
PB-214	1408.30	352.16	42.	128.	0.018	13.91	1.374s
I-131	1459.55	364.97	34.	14.	0.002	64.71	1.170s
BE-7	1907.13	476.86	51.	-9.	-0.001	122.14	1.282s
CS-134	2257.01	564.33	30.	-1.	0.000	876.97	1.364
CS-134	2278.74	569.76	30.	2.	0.000	365.19	1.369s
Pa-234	2279.72	570.00	33.	1.	0.000	821.33	1.370s
TL-208	2332.43	583.18	27.	49.	0.007	20.71	1.382
CS-134	2415.51	603.95	41.	-2.	0.000	540.09	1.403s
BI-214	2436.64	609.23	44.	82.	0.011	14.34	0.955s
CS-137	2645.84	661.53	38.	21.	0.003	46.35	1.455s
BI-212	2910.09	727.59	5.	34.	0.005	20.57	0.283s
PA-234M	3064.37	766.16	29.	5.	0.001	170.47	1.550s
CS-134	3181.77	795.51	26.	13.	0.002	59.81	1.576
CS-134	3209.86	802.53	30.	5.	0.001	159.78	1.581s
TL-208	3443.50	860.94	10.	35.	0.005	27.85	0.274s
EU-154	3501.98	875.56	17.	8.	0.001	76.65	1.643s
Pa-234	3524.55	881.20	23.	4.	0.001	177.73	1.649s
Pa-234	3540.54	885.20	34.	-6.	-0.001	144.30	1.651s
AC-228	3644.80	911.26	5.	69.	0.010	14.12	0.511s
Pa-234	3786.83	946.77	17.	3.	0.000	183.46	1.704s
EU-152	3867.59	966.96	46.	-11.	-0.002	89.17	1.719s
AC-228	3876.51	969.19	7.	39.	0.005	21.00	1.278s
PA-234M	4004.22	1001.12	23.	8.	0.001	89.63	1.750s
EU-154	4013.83	1003.52	35.	-7.	-0.001	121.40	1.753s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	4448.59	1112.21	23.	-5.	-0.001	135.40	1.839s
BI-214	4481.74	1120.50	4.	37.	0.005	20.08	0.386s
CO-60	4685.09	1171.34	25.	-7.	-0.001	108.27	1.886s
CO-60	5332.66	1333.24	10.	4.	0.001	118.22	2.005s
EU-152	5631.47	1407.94	12.	2.	0.000	207.94	2.059s
K-40	5842.68	1460.75	0.	203.	0.028	7.02	1.117s
BI-214	7059.33	1764.93	10.	13.	0.002	42.61	2.290s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	-2.6331E-01				5.31E+01		
			477.60	-2.633E-01	?(	1.100E+00	1.22E+02	1.05E+01 G
K-40	N	1.9149E+01				4.66E+11		
			1460.83	1.915E+01	(	6.952E-01	7.02E+00	1.07E+01 G
CO-60	F	3.7876E-02				1.93E+03		
			1332.50	3.788E-02	?(	1.589E-01	1.18E+02	1.00E+02 G
			1173.24	-5.561E-02	+	2.074E-01	1.08E+02	9.99E+01 G
I-131	I	5.9855E-02				8.02E+00		
			364.48	4.276E-02	?(	9.131E-02	6.47E+01	8.17E+01 G
			284.30	2.874E-01	?(	1.019E+00	1.04E+02	6.14E+00 G
			636.97	2.241E-02	%	1.684E+00	2.07E+03	7.17E+00 G
CS-134	I	4.7971E-02				7.54E+02		
			604.71	-6.991E-03	?(	1.343E-01	5.40E+02	9.76E+01 G
			795.87	8.297E-02	(	1.622E-01	5.98E+01	8.55E+01 G
			569.32	5.328E-02	&(	6.968E-01	3.65E+02	1.54E+01 G
			801.95	3.115E-01	?(	1.742E+00	1.60E+02	8.69E+00 G
			563.24	-3.990E-02	+	1.266E+00	8.77E+02	8.35E+00 G
CS-137	I	1.0931E-01				1.10E+04		
			661.66	1.093E-01	(	1.614E-01	4.63E+01	8.52E+01 G
EU-152	F	1.3431E-01				4.94E+03		
			344.29	1.501E-01	?(	2.566E-01	5.29E+01	2.65E+01 G
			121.78	-1.533E-03	%	1.692E-01	3.16E+03	2.86E+01 G
			778.92	8.545E-03	%	9.876E-01	3.13E+03	1.29E+01 G
			964.11	-5.046E-01	-	1.518E+00	8.92E+01	1.46E+01 G
			1112.07	-2.882E-01	-	1.366E+00	1.35E+02	1.36E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1408.00	1.144E-01	?(	8.711E-01	2.08E+02	2.10E+01 G
EU-154	I	4.0220E-01					3.14E+03	
			873.23	4.022E-01	?(	1.037E+00	7.66E+01	1.23E+01 G
			123.10	-9.342E-03	&	1.264E-01	3.92E+02	4.08E+01 G
			1274.54	0.000E+00	-	4.625E-01	1.00E+03	3.52E+01 G
			723.36	-1.765E-03	%	6.949E-01	1.08E+04	2.02E+01 G
			1004.77	-2.688E-01	-	1.125E+00	1.21E+02	1.80E+01 G
			996.33	0.000E+00	-	2.679E+00	1.00E+03	1.06E+01 G
EU-155	I	1.7908E-01					1.81E+03	
			105.31	8.956E-02	&(	2.128E-01	7.16E+01	2.12E+01 G
			86.54	2.409E-01	&(	1.851E-01	2.49E+01	3.07E+01 G
TL-208	N	2.2531E-01					6.98E+02	
			583.02	2.253E-01	?(	1.238E-01	2.07E+01	8.45E+01 G
			277.28	4.972E-01	&	1.146E+00	6.95E+01	6.31E+00 G
			860.56	1.614E+00	+	8.045E-01	2.78E+01	1.24E+01 G
PB-210	N	2.0281E+00					8.14E+03	
			46.54	2.028E+00	*(P	1.608E+00	1.53E+01	4.25E+00 G
PB-212	N	1.0556E+00					6.98E+02	
			238.63	1.056E+00	(P	2.006E-01	7.58E+00	4.33E+01 G
			300.03	1.596E+00	+	2.327E+00	4.56E+01	3.28E+00 G
PB-214	N	7.9965E-01					5.84E+05	
			351.93	8.244E-01	(	2.120E-01	1.39E+01	3.76E+01 G
			295.09	7.515E-01	(	3.415E-01	1.99E+01	1.93E+01 G
			242.00	-8.162E-03	%	1.238E+00	4.37E+03	7.43E+00 G
BI-212	N	2.1953E+00					6.98E+02	
			727.17	2.195E+00	(	8.169E-01	2.06E+01	7.55E+00 G
			785.42	0.000E+00	-	1.021E+01	1.00E+03	1.28E+00 G
BI-214	N	7.9374E-01					5.84E+05	
			609.31	7.175E-01	(P	2.968E-01	1.43E+01	4.61E+01 G
			1120.29	1.827E+00	+ P	6.265E-01	2.01E+01	1.51E+01 G
			1764.49	1.022E+00	?(P	1.425E+00	4.26E+01	1.54E+01 G
AC-228	N	1.4232E+00					2.10E+03	
			911.07	1.452E+00	(	2.676E-01	1.41E+01	2.90E+01 G
			968.97	1.459E+00	(	5.468E-01	2.10E+01	1.75E+01 G
			338.32	1.301E+00	(	6.347E-01	2.31E+01	1.20E+01 G
								Energy duplication
			93.35	8.956E-01	-	1.228E+00	4.23E+01	5.56E+00 XA

Nuclide		Ave activity	Energy		Activity	Code	Peak	MDA	Comments
Pa-234	N	1.1439E-01						1.63E+12	
			131.29	2.246E-02	?(	3.027E-01	3.91E+02	1.80E+01	G
			569.47	4.585E-02	&(	1.357E+00	8.21E+02	8.20E+00	G
			946.02	1.580E-01	?(	1.040E+00	1.83E+02	1.34E+01	G
			883.24	-3.673E-01	+	1.841E+00	1.44E+02	9.60E+00	G
			880.53	3.864E-01	?(	2.435E+00	1.78E+02	6.00E+00	G
TH-234	N	1.7758E+00						1.63E+12	
			63.29	1.776E+00	@(P	1.603E+00	1.57E+01	3.81E+00	G
			92.59	4.259E-01	- P	1.292E+00	1.67E+01	5.58E+00	G
PA-234M	N	6.9662E+00						1.63E+12	
			1001.00	6.602E+00	?(	2.013E+01	8.96E+01	8.37E-01	G
			766.41	8.004E+00	?(	4.795E+01	1.70E+02	2.94E-01	G
U-235	N	1.9627E-01						2.57E+11	
			143.79	1.013E-01	*(P	5.169E-01	4.81E+01	1.10E+01	G
			205.33	2.722E-01	&(	1.240E+00	1.33E+02	5.01E+00	G
			163.38	3.264E-01	&(	9.455E-01	8.62E+01	5.08E+00	G
								Energy duplication	
			93.35	2.328E+00	?	9.731E-01	1.47E+01	5.81E+00	X
AM-241	T	-1.5537E-02						1.58E+05	
			59.54	-1.554E-02	&(	1.445E-01	2.72E+02	3.59E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
AM-241	59.90	129.	-6.	-0.001	271.61	-1.554E-02	
EU-155	87.17	168.	82.	0.011	24.90	2.409E-01	
U-235	93.35	161.	148.	0.021	14.65	2.328E+00	
EU-155	105.61	92.	20.	0.003	71.57	8.956E-02	
EU-154	123.67	105.	-4.	-0.001	391.84	-9.342E-03	
Pa-234	131.22	108.	4.	0.001	390.67	2.246E-02	
U-235	143.62	103.	10.	0.001	48.12	1.013E-01	P
U-235	162.93	57.	13.	0.002	86.19	3.264E-01	
U-235	205.45	67.	9.	0.001	133.29	2.722E-01	
I-131	282.73	37.	9.	0.001	103.87	2.874E-01	
EU-152	343.08	31.	17.	0.002	52.94	1.501E-01	
I-131	364.97	34.	14.	0.002	64.71	4.276E-02	
BE-7	476.86	51.	-9.	-0.001	122.14	-2.633E-01	
Pa-234	570.00	33.	1.	0.000	821.33	4.585E-02	
CS-137	661.53	38.	21.	0.003	46.35	1.093E-01	
PA-234M	766.16	29.	5.	0.001	170.47	8.004E+00	
EU-154	875.56	17.	8.	0.001	76.65	4.022E-01	
Pa-234	881.20	23.	4.	0.001	177.73	3.864E-01	
Pa-234	885.20	34.	-6.	-0.001	144.30	-3.673E-01	
Pa-234	946.77	17.	3.	0.000	183.46	1.580E-01	
EU-152	966.96	46.	-11.	-0.002	89.17	-5.046E-01	
PA-234M	1001.12	23.	8.	0.001	89.63	6.602E+00	
EU-154	1003.52	35.	-7.	-0.001	121.40	-2.688E-01	
EU-152	1112.21	23.	-5.	-0.001	135.40	-2.882E-01	
CO-60	1171.34	25.	-7.	-0.001	108.27	-5.561E-02	
CO-60	1333.24	10.	4.	0.001	118.22	3.788E-02	
EU-152	1407.94	12.	2.	0.000	207.94	1.144E-01	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	-2.6331E-01	-2.6331E-01	1.221E+02%	1.10E+00
K-40		1.9149E+01	1.9149E+01	7.019E+00%	6.95E-01
CO-60	#A	3.7876E-02	3.7876E-02	1.182E+02%	1.59E-01
I-131	#A	5.9852E-02	5.9855E-02	6.119E+01%	9.13E-02
CS-134	A	4.7971E-02	4.7971E-02	5.981E+01%	1.34E-01

CS-137 #A	1.0931E-01	1.0931E-01	4.635E+01%	1.61E-01
EU-152 #A	1.3431E-01	1.3431E-01	5.294E+01%	2.57E-01
EU-154 #A	4.0220E-01	4.0220E-01	7.665E+01%	1.04E+00
EU-155 #A	1.7908E-01	1.7908E-01	2.490E+01%	2.13E-01
TL-208	2.2531E-01	2.2531E-01	2.071E+01%	1.24E-01
PB-210 #	2.0281E+00	2.0281E+00	2.858E+01%	1.61E+00
PB-212	1.0556E+00	1.0556E+00	8.711E+00%	2.01E-01
PB-214	7.9965E-01	7.9965E-01	1.213E+01%	2.12E-01
BI-212	2.1953E+00	2.1953E+00	2.057E+01%	8.17E-01
BI-214	7.9374E-01	7.9374E-01	1.783E+01%	2.97E-01
AC-228	1.4232E+00	1.4232E+00	1.142E+01%	2.68E-01
Pa-234 #A	1.1439E-01	1.1439E-01	1.777E+02%	3.03E-01
TH-234	1.7758E+00	1.7758E+00	3.279E+01%	1.60E+00
PA-234M#A	6.9662E+00	6.9662E+00	8.963E+01%	2.01E+01
U-235 #A	1.9627E-01	1.9627E-01	7.123E+01%	5.17E-01
AM-241 #A	-1.5537E-02	-1.5537E-02	2.716E+02%	1.45E-01

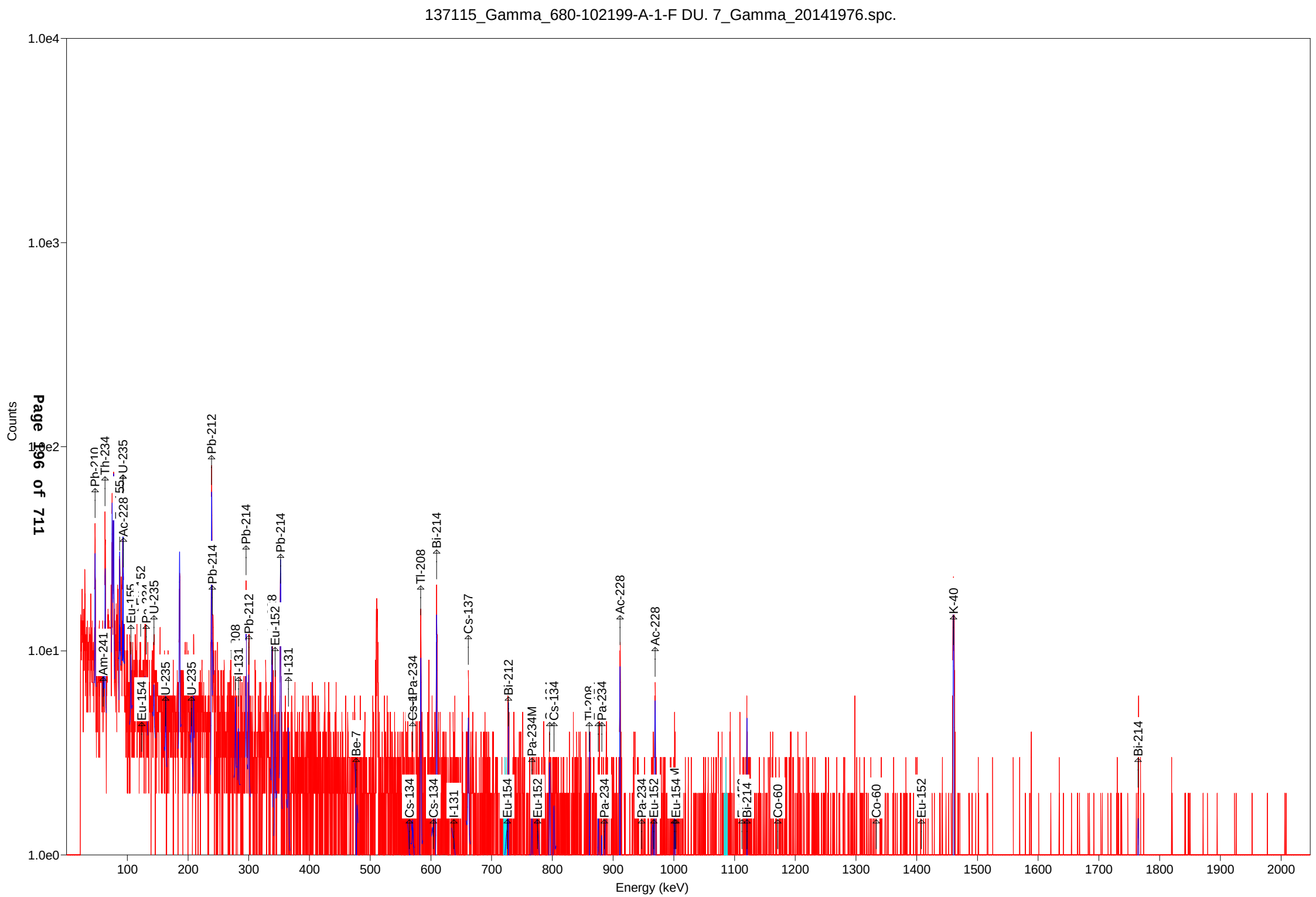
  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (185.6 to 2000.1 keV) 2.945E+01 Bq/Sample
Total Decayed Activity (185.6 to 2000.1 keV) 2.9446012E+01 Bq/Sample

The library has energies which are not separable.

137115_Gamma_680-102199-A-1-F DU. 7_Gamma_20141976.spc.



Test America St. Louis Spectrum ID: 4_Gamma_20141702

Sample Description: 137115_Gamma_680-102199-A-2-D
Detector: Ge 4 SN/181
Batch ID: 137115
Work Order Number: Gamma
Lot Number: 680-102199-A-2-D

Decay to Time: 9/2/2014 14:32 Live Time: 7200 sec
Acquisition Time: 9/2/2014 14:33:32 Real Time: 7208 sec
Analysis Time: 9/2/2014 16:34 Dead Time: 0.12 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 4_Liquid_D=1 25ml.Clb
Efficiency Cal Desc: 4_Liquid_D=1 25ml_90101_030512
Efficiency Cal Date: 3/27/2012 20:51
Energy Cal Date: 2/28/2012 14:55
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 4_2014-08-09_2125.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	3.425E-02	1797.0	6.156E-01	6.156E-01	2.226E+00
K-40	3.685E+00	40.8	1.505E+00	1.515E+00	5.329E+00
CO-60	-3.738E-03	246.0	9.194E-03	9.196E-03	3.624E-01
I-131	-1.256E-03	5153.0	6.473E-02	6.473E-02	2.338E-01
CS-134	7.334E-02	134.5	9.868E-02	9.874E-02	3.268E-01
CS-137	1.220E-02	710.7	8.670E-02	8.670E-02	3.169E-01
EU-152	1.523E-01	103.9	1.583E-01	1.585E-01	7.583E-01
EU-154	1.581E-01	190.0	3.004E-01	3.005E-01	2.104E+00
EU-155	1.769E-01	79.5	1.406E-01	1.409E-01	4.700E-01
TL-208	7.500E-01	14.5	1.089E-01	1.149E-01	1.445E-01
PB-210	1.959E+00	54.1	1.059E+00	1.067E+00	3.289E+00
PB-212	1.243E+00	15.9	1.974E-01	2.085E-01	4.414E-01
PB-214	6.202E-01	30.3	1.880E-01	1.904E-01	6.155E-01
BI-212	1.923E+00	76.5	1.470E+00	1.473E+00	3.835E+00
BI-214	2.476E-01	82.6	2.045E-01	2.048E-01	7.334E-01
AC-228	1.314E+00	18.9	2.483E-01	2.563E-01	1.019E+00
Pa-234	2.088E-01	89.2	1.863E-01	1.866E-01	5.413E-01
TH-234	3.546E+00	38.0	1.348E+00	1.359E+00	3.579E+00
PA-234M	-1.676E-01	6748.0	1.131E+01	1.131E+01	4.234E+01
U-235	3.858E-01	76.5	2.950E-01	2.956E-01	1.033E+00
AM-241	5.571E-02	168.8	9.402E-02	9.406E-02	3.208E-01
Total	1.654E+01				

Analyst: Curtis Carey

TestAmerica Spectrum name: 4_Gamma_20141702.An1

Sample description
137115_Gamma_680-102199-A-2-D

Spectrum Filename: C:\User\SPC\Det4\4_Gamma_20141702.An1

Acquisition information
Start time: 9/2/2014 2:33:32 PM
Live time: 7200
Real time: 7208
Dead time: 0.12 %
Detector ID: 4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_Liquid_D=1 25ml.Clb
4_Liquid_D=1 25ml_90101_030512

Energy Calibration
Created: 2/28/2012 2:55:17 PM
Zero offset: 0.091 keV
Gain: 0.250 keV/channel
Quadratic: -2.917E-08 keV/channel^2

Efficiency Calibration
Created: 3/27/2012 8:51:45 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.48 %
Log(Eff): 8.809878E-01 + (-6.811249E-01*Log(E)) +
(-1.909804E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -1.031199E+01 + (3.529752E+00*Log(E)) +
(-4.143154E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (1999.44keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/2/2014 2:32:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	4_2014-08-09_2125.PBC 8/9/2014 9:25:56 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 15 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1039

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.60	104.	17.81	0.45	5.690E-02	46.54	4.250	PBC<MDA	PB210
60.29	9.	168.76	0.81	6.042E-02	59.54	35.900	PBC<MDA	AM241
63.41	110.	20.45	1.05	6.086E-02	63.29	3.810	PBC<MDA	TH234
74.98	92.	14.26	0.83	6.108E-02				
77.24	120.	13.33	0.83	6.097E-02				
92.81	114.	15.79	0.79	5.934E-02	92.59	5.584	PBC<MDA	TH234
93.39	7.	186.89	0.84	5.926E-02	93.35	5.810	PBC<MDA	U235
					93.35	5.561	2.949E-01	AC228
93.39	29.	42.85	0.84	5.926E-02	93.35	5.810	PBC<MDA	U235
					93.35	5.561	1.203E+00	AC228
105.53	15.	79.51	0.85	5.730E-02	105.31	21.200	PBC<MDA	EU155
					105.31	21.200	1.768E-01	EU155
121.60	11.	103.92	0.87	5.415E-02	121.78	28.580	PBC<MDA	EU152
					121.78	28.580	9.994E-02	EU152
131.23	12.	89.23	0.88	5.223E-02	131.29	18.000	PBC<MDA	Pa234
143.15	16.	76.48	0.89	4.968E-02	143.79	10.960	PBC<MDA	U235
162.31	7.	144.21	0.91	4.578E-02	163.38	5.080	PBC<MDA	U235
205.77	4.	256.11	0.95	3.736E-02	205.33	5.010	PBC<MDA	U235
238.52	153.	13.15	1.09	3.271E-02	238.63	43.300	1.243E+00	PB212
241.88	6.	178.39	0.98	3.229E-02	242.00	7.430	PBC<MDA	PB214
					242.00	7.430	PBC<MDA	PB214
277.46	1.	740.21	1.01	2.859E-02	277.28	6.310	PBC<MDA	TL208
295.13	8.	57.21	1.03	2.704E-02	295.09	19.300	PBC<MDA	PB214
					295.09	19.300	PBC<MDA	PB214
299.50	2.	188.34	1.03	2.664E-02	300.03	3.280	PBC<MDA	PB212
337.89	22.	45.98	1.07	2.391E-02	338.32	12.010	PBC<MDA	AC228
351.68	39.	20.51	1.08	2.307E-02	351.93	37.600	6.201E-01	PB214
					351.93	37.600	6.201E-01	PB214
569.77	4.	172.89	1.27	1.486E-02				

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
582.97	66.	14.52	0.48	1.454E-02	583.02	84.500	7.500E-01	TL208
606.73	3.	286.48	1.30	1.405E-02	604.71	97.620	PBC<MDA	CS134
609.32	11.	40.73	1.30	1.396E-02	609.31	46.090	PBC<MDA	BI214
661.90	1.	710.69	1.35	1.293E-02	661.66	85.210	PBC<MDA	CS137
727.85	10.	76.45	1.40	1.184E-02	727.17	7.550	PBC<MDA	BI212
777.46	3.	134.10	1.45	1.110E-02	778.92	12.940	PBC<MDA	EU152
					778.92	12.940	3.381E-01	EU152
785.36	5.	133.52	1.45	1.102E-02	785.42	1.280	PBC<MDA	BI212
795.85	2.	396.12	1.46	1.088E-02	795.87	85.530	PBC<MDA	CS134
801.69	5.	144.16	1.47	1.081E-02	801.95	8.690	PBC<MDA	CS134
861.36	3.	185.21	1.52	1.011E-02	860.56	12.420	PBC<MDA	TL208
872.15	2.	212.81	1.53	9.976E-03	873.23	12.270	PBC<MDA	EU154
883.71	2.	309.39	1.53	9.869E-03	883.24	9.600	PBC<MDA	Pa234
911.07	15.	44.94	1.56	9.585E-03	911.07	29.000	PBC<MDA	AC228
968.77	28.	18.90	0.67	9.045E-03	968.97	17.460	2.463E+00	AC228
1000.44	1.	444.68	1.63	8.810E-03	996.33	10.600	PBC<MDA	EU154
					1001.00	0.837	1.917E+00	PA234M
1112.06	3.	197.78	1.72	7.939E-03	1112.07	13.644	PBC<MDA	EU152
					1112.07	13.644	3.675E-01	EU152
1171.60	1.	404.46	1.77	7.545E-03	1173.24	99.900	PBC<MDA	CO60
1274.18	2.	286.36	1.85	6.973E-03	1274.54	35.190	PBC<MDA	EU154
1460.67	17.	23.14	1.99	6.120E-03	1460.83	10.670	PBC<MDA	K40
1763.62	-6.	201.65	2.21	5.102E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
299.69	75.06	48.	85.	1.392E+03	16.84	0.918	-	
308.72	77.31	89.	125.	2.055E+03	16.37	0.840	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.94	46.60	137.	34.	0.005	17.81	0.449s
AM-241	240.66	60.29	103.	9.	0.001	168.76	0.812s
TH-234	253.12	63.41	150.	59.	0.008	20.45	1.047s
TH-234	369.79	92.59	143.	21.	0.003	16.39	0.843D
U-235	372.83	93.35	157.	7.	0.001	186.89	0.843D
AC-228	372.83	93.35	157.	29.	0.004	42.85	0.843D

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-155	421.53	105.53	68.	15.	0.002	79.51	0.854s
EU-152	485.76	121.60	61.	11.	0.002	103.92	0.870
Pa-234	524.26	131.23	53.	12.	0.002	89.23	0.878s
U-235	571.93	143.15	66.	16.	0.002	76.48	0.890s
U-235	648.52	162.31	52.	7.	0.001	144.21	0.908s
U-235	822.30	205.77	49.	4.	0.001	256.11	0.946s
PB-212	953.24	238.52	82.	127.	0.018	13.15	1.091s
PB-214	966.66	241.88	86.	6.	0.001	178.39	0.979s
TL-208	1108.93	277.46	51.	1.	0.000	740.21	1.011
I-131	1139.74	285.16	64.	-9.	-0.001	124.67	1.018s
PB-214	1179.59	295.13	59.	8.	0.001	57.21	1.027
PB-212	1197.06	299.50	42.	2.	0.000	188.34	1.032s
AC-228	1350.61	337.89	39.	22.	0.003	45.98	1.066s
PB-214	1405.73	351.68	59.	39.	0.005	20.51	1.078s
CS-134	2256.12	564.32	28.	-4.	-0.001	199.21	1.264s
CS-134	2277.91	569.77	25.	4.	0.001	172.89	1.269s
TL-208	2330.74	582.97	5.	66.	0.009	14.52	0.484s
CS-134	2425.78	606.73	40.	3.	0.000	286.48	1.300s
BI-214	2436.12	609.32	45.	11.	0.002	40.73	1.304s
CS-137	2646.43	661.90	23.	1.	0.000	710.69	1.348s
BI-212	2910.24	727.85	22.	10.	0.001	76.45	1.404s
PA-234M	3068.30	767.36	36.	-5.	-0.001	181.48	1.437s
EU-152	3108.72	777.46	9.	3.	0.000	134.10	1.448s
BI-212	3140.30	785.36	16.	5.	0.001	133.52	1.453s
CS-134	3182.27	795.85	18.	2.	0.000	396.12	1.462s
CS-134	3205.65	801.69	21.	5.	0.001	144.16	1.467s
TL-208	3444.36	861.36	14.	3.	0.000	185.21	1.516s
EU-154	3487.52	872.15	12.	2.	0.000	212.81	1.526s
Pa-234	3519.91	880.24	20.	-2.	0.000	309.58	1.532s
Pa-234	3533.77	883.71	14.	2.	0.000	309.39	1.534s
AC-228	3643.25	911.07	14.	15.	0.002	44.94	1.557s
Pa-234	3784.04	946.26	19.	-1.	0.000	470.27	1.586s
EU-152	3863.92	966.22	31.	-9.	-0.001	98.84	1.601s
AC-228	3874.11	968.77	0.	28.	0.004	18.90	0.666s
EU-154	4000.81	1000.44	10.	1.	0.000	444.68	1.627s
EU-152	4447.48	1112.06	15.	3.	0.000	197.78	1.720s
CO-60	4685.73	1171.60	17.	1.	0.000	404.46	1.769s
EU-154	5096.27	1274.18	18.	2.	0.000	286.36	1.848s
CO-60	5349.41	1337.42	10.	-2.	0.000	280.07	1.893s
K-40	5842.72	1460.67	23.	17.	0.002	23.14	1.991s
BI-214	7055.61	1763.62	19.	-6.	-0.001	201.65	2.214s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	Peak MDA Value Bq/Sample	COMMENTS
BE-7	C	3.4245E-02				5.31E+01	
			477.60	3.425E-02	%(	2.226E+00 1.80E+03 1.05E+01	G
K-40	N	3.6850E+00				4.66E+11	
			1460.83	3.685E+00	?(P	5.329E+00 2.31E+01 1.07E+01	G
CO-60	F	-3.7377E-03				1.93E+03	
			1332.50	-3.451E-02	?(	3.624E-01 2.80E+02 1.00E+02	G
			1173.24	2.706E-02	&(	4.030E-01 4.04E+02 9.99E+01	G
I-131	I	-1.2562E-03				8.02E+00	
			364.48	-1.256E-03	%(	2.338E-01 5.15E+03 8.17E+01	G
			284.30	-7.618E-01	+	3.240E+00 1.25E+02 6.14E+00	G
			636.97	-9.755E-02	%	3.857E+00 1.08E+03 7.17E+00	G
CS-134	I	7.3340E-02				7.54E+02	
			604.71	3.234E-02	&(	3.268E-01 2.86E+02 9.76E+01	G
			795.87	2.313E-02	&(	3.360E-01 3.96E+02 8.55E+01	G
			569.32	2.574E-01	&(	1.572E+00 1.73E+02 1.54E+01	G
			801.95	7.024E-01	&(	3.564E+00 1.44E+02 8.69E+00	G
			563.24	-4.299E-01	&	3.029E+00 1.99E+02 8.35E+00	G
CS-137	I	1.2199E-02				1.10E+04	
			661.66	1.220E-02	?(	3.169E-01 7.11E+02 8.52E+01	G
EU-152	F	1.5231E-01				4.94E+03	
			344.29	7.274E-03	%(	7.583E-01 2.92E+03 2.65E+01	G
			121.78	9.994E-02	(	3.520E-01 1.04E+02 2.86E+01	G
			778.92	3.381E-01	?(	1.632E+00 1.34E+02 1.29E+01	G
			964.11	-8.951E-01	+	3.019E+00 9.88E+01 1.46E+01	G
			1112.07	3.675E-01	&(	2.633E+00 1.98E+02 1.36E+01	G
			1408.00	1.755E-02	%	1.692E+00 2.45E+03 2.10E+01	G
EU-154	I	1.5806E-01				3.14E+03	
			873.23	2.690E-01	?(	2.104E+00 2.13E+02 1.23E+01	G
			123.10	7.144E-03	%	2.533E-01 1.01E+03 4.08E+01	G
			1274.54	1.216E-01	?(	1.268E+00 2.86E+02 3.52E+01	G
			723.36	0.000E+00	-	2.213E+00 1.00E+03 2.02E+01	G
			1004.77	0.000E+00	-	2.204E+00 1.00E+03 1.80E+01	G
			996.33	1.507E-01	?(	2.555E+00 4.45E+02 1.06E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	1.7685E-01					1.81E+03	
			105.31	1.768E-01	(	4.700E-01	7.95E+01	2.12E+01 G
			86.54	0.000E+00	-	4.160E-01	1.00E+03	3.07E+01 G
TL-208	N	7.5003E-01					6.98E+02	
			583.02	7.500E-01	(	1.445E-01	1.45E+01	8.45E+01 G
			277.28	1.062E-01	-	2.781E+00	7.40E+02	6.31E+00 G
			860.56	3.340E-01	-	2.237E+00	1.85E+02	1.24E+01 G
PB-210	N	1.9585E+00					8.14E+03	
			46.54	1.959E+00	(P	3.289E+00	1.78E+01	4.25E+00 G
PB-212	N	1.2427E+00					6.98E+02	
			238.63	1.243E+00	*(P	4.414E-01	1.32E+01	4.33E+01 G
			300.03	3.012E-01	- P	5.235E+00	1.88E+02	3.28E+00 G
PB-214	N	6.2015E-01					5.84E+05	
			351.93	6.201E-01	@(P	6.155E-01	2.05E+01	3.76E+01 G
			295.09	2.216E-01	- P	1.025E+00	5.72E+01	1.93E+01 G
			242.00	3.742E-01	- P	2.657E+00	1.78E+02	7.43E+00 G
BI-212	N	1.9225E+00					6.98E+02	
			727.17	1.495E+00	&(	3.835E+00	7.64E+01	7.55E+00 G
			785.42	4.445E+00	?(	2.097E+01	1.34E+02	1.28E+00 G
BI-214	N	2.4761E-01					5.84E+05	
			609.31	2.476E-01	&(P	7.334E-01	4.07E+01	4.61E+01 G
			1120.29	5.607E-02	%	3.076E+00	1.50E+03	1.51E+01 G
			1764.49	-1.141E+00	+ P	4.084E+00	2.02E+02	1.54E+01 G
AC-228	N	1.3140E+00					2.10E+03	
			911.07	7.333E-01	?(	1.019E+00	4.49E+01	2.90E+01 G
			968.97	2.463E+00	(	6.482E-01	1.89E+01	1.75E+01 G
			338.32	1.046E+00	&(	1.533E+00	4.60E+01	1.20E+01 G
								Energy duplication
			93.35	1.203E+00	}	2.576E+00	4.28E+01	5.56E+00 XA
Pa-234	N	2.0876E-01					1.63E+12	
			131.29	1.800E-01	(	5.413E-01	8.92E+01	1.80E+01 G
			569.47	1.858E-02	&	3.295E+00	4.88E+03	8.20E+00 G
			946.02	-1.480E-01	-	2.557E+00	4.70E+02	1.34E+01 G
			883.24	2.627E-01	&(	2.996E+00	3.09E+02	9.60E+00 G
			880.53	-4.913E-01	+	5.520E+00	3.10E+02	6.00E+00 G
TH-234	N	3.5460E+00					1.63E+12	
			63.29	3.546E+00	(P	3.579E+00	2.04E+01	3.81E+00 G
			92.59	8.606E-01	- P	2.452E+00	1.64E+01	5.58E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234M	N -1.6756E-01					1.63E+12	
		1001.00	-1.676E-01	&(	4.234E+01	6.75E+03	8.37E-01 G
		766.41	-2.022E+01	&	1.284E+02	1.81E+02	2.94E-01 G
U-235	N 3.8575E-01					2.57E+11	
		143.79	4.048E-01	&(	1.033E+00	7.65E+01	1.10E+01 G
		205.33	2.935E-01	?(	2.629E+00	2.56E+02	5.01E+00 G
		163.38	4.357E-01	?(	2.163E+00	1.44E+02	5.08E+00 G
						Energy duplication	
		93.35	2.823E-01	}	2.466E+00	1.87E+02	5.81E+00 X
AM-241	T 5.5710E-02					1.58E+05	
		59.54	5.571E-02	?(	3.208E-01	1.69E+02	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
AM-241	60.29	103.	9.	0.001	168.76	5.571E-02	
EU-155	105.53	68.	15.	0.002	79.51	1.768E-01	
EU-152	121.60	61.	11.	0.002	103.92	9.994E-02	
Pa-234	131.23	53.	12.	0.002	89.23	1.800E-01	
PB-214	241.88	86.	6.	0.001	178.39	3.742E-01	P
I-131	285.16	64.	-9.	-0.001	124.67	-7.618E-01	
PB-214	295.13	59.	8.	0.001	57.21	2.216E-01	P
PB-214	351.68	59.	39.	0.005	20.51	6.201E-01	P
CS-134	564.32	28.	-4.	-0.001	199.21	-4.299E-01	
CS-134	569.77	25.	4.	0.001	172.89	2.574E-01	
CS-134	606.73	40.	3.	0.000	286.48	3.234E-02	
BI-214	609.32	45.	11.	0.002	40.73	2.476E-01	P
CS-137	661.90	23.	1.	0.000	710.69	1.220E-02	
BI-212	727.85	22.	10.	0.001	76.45	1.495E+00	
PA-234M	767.36	36.	-5.	-0.001	181.48	-2.022E+01	
EU-152	777.46	9.	3.	0.000	134.10	3.381E-01	
BI-212	785.36	16.	5.	0.001	133.52	4.445E+00	
CS-134	795.85	18.	2.	0.000	396.12	2.313E-02	
CS-134	801.69	21.	5.	0.001	144.16	7.024E-01	
EU-154	872.15	12.	2.	0.000	212.81	2.690E-01	
Pa-234	880.24	20.	-2.	0.000	309.58	-4.913E-01	
Pa-234	883.71	14.	2.	0.000	309.39	2.627E-01	
Pa-234	946.26	19.	-1.	0.000	470.27	-1.480E-01	
EU-152	966.22	31.	-9.	-0.001	98.84	-8.951E-01	
EU-154	1000.44	10.	1.	0.000	444.68	1.507E-01	
EU-152	1112.06	15.	3.	0.000	197.78	3.675E-01	
CO-60	1171.60	17.	1.	0.000	404.46	2.706E-02	
EU-154	1274.18	18.	2.	0.000	286.36	1.216E-01	
CO-60	1337.42	10.	-2.	0.000	280.07	-3.451E-02	
BI-214	1763.62	19.	-6.	-0.001	201.65	-1.141E+00	P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	3.4245E-02	3.4245E-02	1.797E+03%	2.23E+00
K-40	#A	3.6850E+00	3.6850E+00	4.084E+01%	5.33E+00
CO-60	#A	-3.7377E-03	-3.7377E-03	2.460E+02%	3.62E-01
I-131	#A	-1.2561E-03	-1.2562E-03	5.153E+03%	2.34E-01
CS-134	#A	7.3340E-02	7.3340E-02	1.345E+02%	3.27E-01
CS-137	#A	1.2199E-02	1.2199E-02	7.107E+02%	3.17E-01

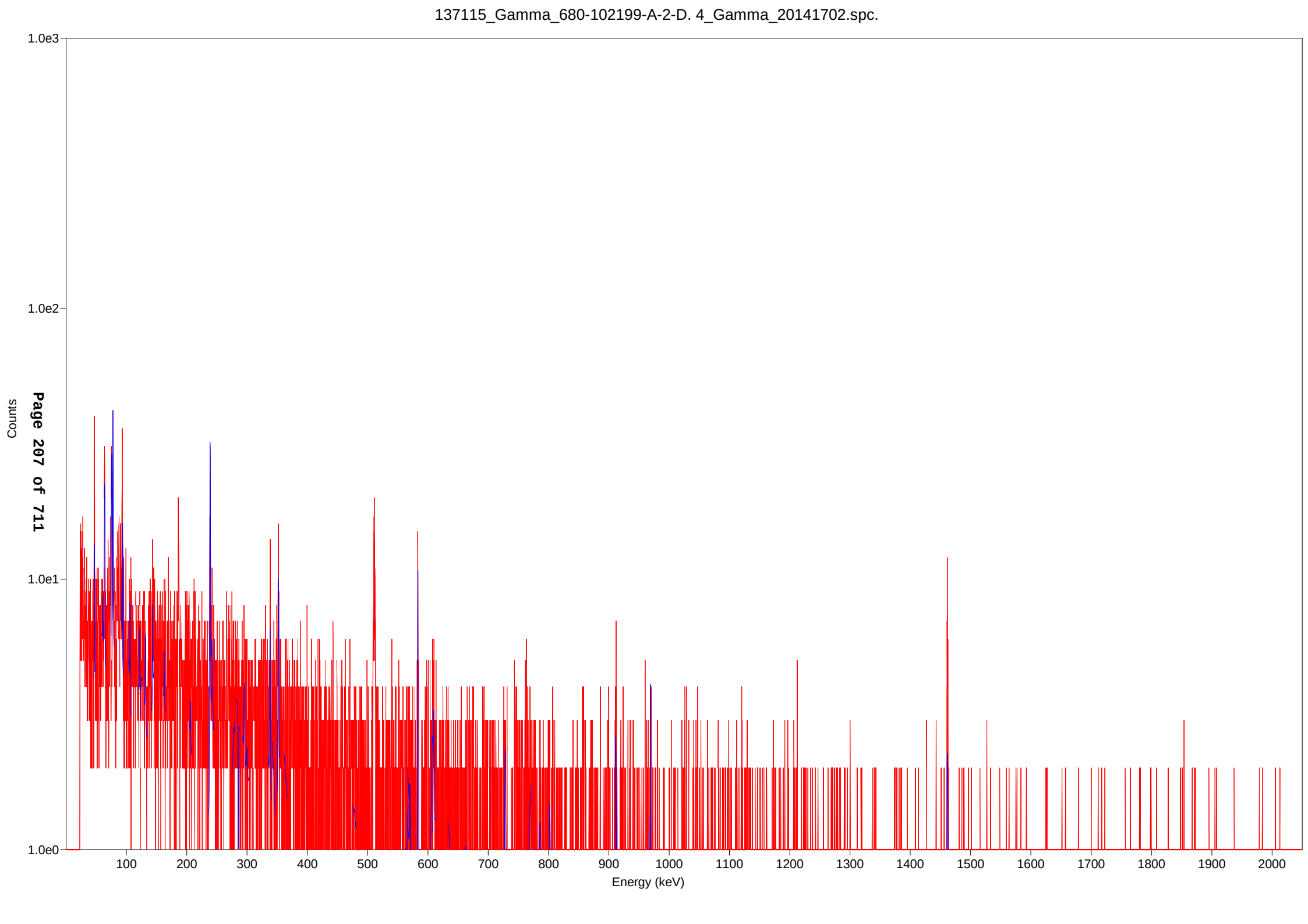
EU-152 #A	1.5231E-01	1.5231E-01	1.039E+02%	7.58E-01
EU-154 #A	1.5806E-01	1.5806E-01	1.900E+02%	2.10E+00
EU-155 #A	1.7685E-01	1.7685E-01	7.951E+01%	4.70E-01
TL-208	7.5002E-01	7.5003E-01	1.452E+01%	1.44E-01
PB-210 #A	1.9585E+00	1.9585E+00	5.408E+01%	3.29E+00
PB-212 #	1.2427E+00	1.2427E+00	1.589E+01%	4.41E-01
PB-214 #	6.2015E-01	6.2015E-01	3.031E+01%	6.16E-01
BI-212 #A	1.9225E+00	1.9225E+00	7.645E+01%	3.84E+00
BI-214 #A	2.4761E-01	2.4761E-01	8.257E+01%	7.33E-01
AC-228	1.3140E+00	1.3140E+00	1.890E+01%	1.02E+00
Pa-234 #A	2.0876E-01	2.0876E-01	8.923E+01%	5.41E-01
TH-234 A	3.5460E+00	3.5460E+00	3.800E+01%	3.58E+00
PA-234M#A	-1.6756E-01	-1.6756E-01	6.748E+03%	4.23E+01
U-235 A	3.8575E-01	3.8575E-01	7.648E+01%	1.03E+00
AM-241 #A	5.5710E-02	5.5710E-02	1.688E+02%	3.21E-01

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (143.7 to 1999.4 keV) 1.250E+01 Bq/Sample
Total Decayed Activity (143.7 to 1999.4 keV) 1.2496272E+01 Bq/Sample

The library has energies which are not separable.


137115_Gamma_680-102199-A-2-D. 4_Gamma_20141702.spc.
1.0e3
1.0e2
1.0e1
1.0e0
Counts
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)

Test America St. Louis Spectrum ID: 17_Gamma_20141413

Sample Description: 137115_Gamma_680-102199-A-3-D
Detector: Ge17 SN/11080671
Batch ID: 137115
Work Order Number: Gamma
Lot Number: 680-102199-A-3-D

Decay to Time: 9/2/2014 15:05 Live Time: 7200 sec
Acquisition Time: 9/2/2014 15:06:55 Real Time: 7225 sec
Analysis Time: 9/2/2014 17:07 Dead Time: 0.34 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 17_Soil_25ml.Clb
Efficiency Cal Desc: 17_25mlSoil_90099_032712
Efficiency Cal Date: 4/3/2012 07:53
Energy Cal Date: 2/29/2012 10:33
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 17_2014-08-09_2126.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-3.687E-02	1001.0	3.692E-01	3.692E-01	1.318E+00
K-40	1.311E+01	9.5	1.248E+00	1.417E+00	2.554E+00
CO-60	0.000E+00	1000.0	2.800E-02	2.800E-02	3.978E-01
I-131	-2.641E-02	191.6	5.062E-02	5.064E-02	1.744E-01
CS-134	2.734E-02	88.9	2.430E-02	2.434E-02	1.955E-01
CS-137	3.037E-02	178.1	5.409E-02	5.411E-02	1.895E-01
EU-152	1.209E-01	65.0	7.857E-02	7.882E-02	5.705E-01
EU-154	8.131E-02	141.8	1.153E-01	1.154E-01	1.412E+00
EU-155	-5.598E-02	231.4	1.295E-01	1.296E-01	4.413E-01
TL-208	4.617E-01	18.7	8.610E-02	8.937E-02	1.981E-01
PB-210	1.311E+00	64.7	8.483E-01	8.518E-01	3.036E+00
PB-212	8.984E-01	14.4	1.293E-01	1.418E-01	3.355E-01
PB-214	1.064E+00	17.9	1.907E-01	1.986E-01	4.435E-01
BI-212	2.775E-02	220.0	6.106E-02	6.108E-02	2.416E+00
BI-214	1.131E+00	16.4	1.853E-01	1.944E-01	4.016E-01
AC-228	1.753E+00	19.2	3.359E-01	3.476E-01	5.995E-01
Pa-234	2.530E-01	67.7	1.713E-01	1.718E-01	5.664E-01
TH-234	2.132E+00	57.1	1.218E+00	1.223E+00	3.480E+00
PA-234M	-1.371E+01	190.6	2.614E+01	2.615E+01	3.045E+01
U-235	3.119E-01	95.9	2.992E-01	2.996E-01	9.585E-01
AM-241	5.647E-02	151.7	8.570E-02	8.575E-02	2.894E-01
Total	2.276E+01				

Analyst: Curtis Carey

TestAmerica, Inc. Spectrum name: 17_Gamma_20141413.An1

Sample description
137115_Gamma_680-102199-A-3-D

Spectrum Filename: C:\User\SPC\Det17\17_Gamma_20141413.An1

Acquisition information
Start time:	9/2/2014 3:06:55 PM
Live time:	7200
Real time:	7225
Dead time:	0.34 %
Detector ID:	17

Detector system
Ge17 SN/11080671

Calibration
Filename: 17_Soil_25ml.Clb
17_25mlSoil_90099_032712

Energy Calibration
Created:	2/29/2012 10:33:23 AM
Zero offset:	0.108 keV
Gain:	0.250 keV/channel
Quadratic:	-2.584E-08 keV/channel^2

Efficiency Calibration
Created:	4/3/2012 7:53:15 AM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 1.37 %
Log(Eff):	1.993817E-01 + (-3.634387E-01*Log(E)) + (-3.575305E-02*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 0.22 %
Log(Eff):	-1.059921E+01 + (3.730142E+00*Log(E)) + (-4.231490E-01*Log(E)^2)

Library Files
Main analysis library:	Client_Routine Short Rev1.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.63keV)
Stop channel:	8000 (1999.54keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/2/2014 3:05:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	17_2014-08-09_2126.PBC 8/9/2014 9:26:48 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 18 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1792

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.60	174.	12.06	0.79	8.092E-02	46.54	4.250	PBC<MDA	PB210
59.24	13.	151.75	0.79	8.872E-02	59.54	35.900	PBC<MDA	AM241
63.32	172.	17.49	0.87	9.007E-02	63.29	3.810	PBC<MDA	TH234
74.84	131.	16.26	0.80	9.234E-02				
77.15	202.	10.91	0.80	9.252E-02				
89.85	51.	29.26	0.82	9.234E-02				
92.59	196.	11.53	0.82	9.209E-02	92.59	5.584	PBC<MDA	TH234
93.27	51.	50.98	0.82	9.202E-02	93.35	5.561	PBC<MDA	AC228
					93.35	5.810	1.314E+00	U235
122.51	3.	574.31	0.85	8.676E-02	121.78	28.580	PBC<MDA	EU152
130.94	28.	67.69	0.85	8.441E-02	131.29	18.000	PBC<MDA	Pa234
143.62	13.	57.74	0.74	8.113E-02	143.79	10.960	PBC<MDA	U235
163.82	17.	95.93	0.27	7.583E-02	163.38	5.080	PBC<MDA	U235
205.26	6.	121.61	0.92	6.396E-02	205.33	5.010	PBC<MDA	U235
209.12	48.	31.68	0.69	6.310E-02				
238.55	208.	11.07	0.85	5.716E-02	238.63	43.300	8.984E-01	PB212
241.53	41.	33.27	0.59	5.655E-02	242.00	7.430	PBC<MDA	PB214
277.35	9.	110.16	0.99	5.098E-02	277.28	6.310	PBC<MDA	TL208
295.21	97.	19.59	1.06	4.859E-02	295.09	19.300	1.071E+00	PB214
300.16	17.	79.47	1.01	4.799E-02	300.03	3.280	PBC<MDA	PB212
338.25	60.	27.61	0.38	4.373E-02	338.32	12.010	1.596E+00	AC228
351.86	149.	14.53	0.96	4.240E-02	351.93	37.600	1.003E+00	PB214
563.96	5.	241.46	1.25	2.911E-02	563.24	8.350	PBC<MDA	CS134
					563.24	8.350	2.595E-01	CS134
583.33	96.	15.66	0.81	2.828E-02	583.02	84.500	4.682E-01	TL208
609.52	122.	12.99	1.28	2.728E-02	609.31	46.090	1.069E+00	BI214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
662.06	5.	178.13	1.33	2.550E-02	661.66	85.210	PBC<MDA	CS137
766.39	5.	104.02	1.42	2.256E-02	766.41	0.294	PBC<MDA	PA234M
781.37	11.	65.01	1.43	2.225E-02	778.92	12.940	PBC<MDA	EU152
785.85	3.	275.56	1.44	2.210E-02	785.42	1.280	PBC<MDA	BI212
796.19	9.	88.88	1.45	2.186E-02	795.87	85.530	PBC<MDA	CS134
					795.87	85.530	6.449E-02	CS134
860.24	4.	202.06	1.50	2.046E-02	860.56	12.420	PBC<MDA	TL208
911.15	71.	19.16	1.57	1.949E-02	911.07	29.000	1.753E+00	AC228
969.26	16.	54.60	1.59	1.850E-02	968.97	17.460	PBC<MDA	AC228
997.05	1.	667.92	1.62	1.806E-02	996.33	10.600	PBC<MDA	EU154
					1001.00	0.837	PBC<MDA	PA234M
1112.58	3.	213.92	1.71	1.643E-02	1112.07	13.644	PBC<MDA	EU152
1120.29	23.	20.77	0.66	1.633E-02	1120.29	15.100	PBC<MDA	BI214
1275.02	5.	141.84	1.84	1.459E-02	1274.54	35.190	PBC<MDA	EU154
1460.79	154.	8.06	0.71	1.294E-02	1460.83	10.670	1.311E+01	K40
1764.13	-6.	60.46	2.21	1.094E-02	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
299.01	74.90	177.	126.	1.368E+03	19.35	0.815	-	
308.23	77.20	138.	182.	1.963E+03	12.92	0.737	-	
359.27	89.97	64.	43.	4.639E+02	31.48	0.736	-	sM
835.67	209.12	64.	48.	7.581E+02	31.68	0.686	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.86	46.60	242.	32.	0.005	12.06	0.786
AM-241	236.41	59.24	187.	13.	0.002	151.75	0.787s
TH-234	252.72	63.32	319.	53.	0.007	17.49	0.872
TH-234	369.74	92.59	331.	27.	0.004	12.80	0.818D
AC-228	372.78	93.35	307.	51.	0.007	50.98	0.819D
EU-155	416.29	104.23	155.	-8.	-0.001	231.37	0.830s
EU-152	489.38	122.51	150.	3.	0.000	574.31	0.846s
Pa-234	523.08	130.94	162.	28.	0.004	67.69	0.855s
U-235	573.79	143.62	158.	13.	0.002	57.74	0.736

TestAmerica, Inc. Spectrum name: 17_Gamma_20141413.An1

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	654.54	163.82	84.	17.	0.002	95.93	0.267s
U-235	820.22	205.26	136.	6.	0.001	121.61	0.924
PB-212	953.33	238.55	150.	160.	0.022	11.07	0.849
PB-214	965.26	241.53	98.	41.	0.006	33.27	0.589s
TL-208	1108.51	277.35	93.	9.	0.001	110.16	0.990
PB-214	1179.91	295.21	91.	72.	0.010	19.59	1.062
PB-212	1199.72	300.16	80.	17.	0.002	79.47	1.011
AC-228	1352.50	338.37	66.	36.	0.005	35.70	1.046s
PB-214	1406.44	351.86	107.	115.	0.016	14.53	0.964
I-131	1457.91	364.73	72.	-6.	-0.001	191.64	1.070s
CS-134	2254.72	563.96	58.	5.	0.001	241.46	1.247s
CS-134	2274.39	568.88	61.	-3.	0.000	324.19	1.252s
Pa-234	2284.43	571.39	46.	-4.	-0.001	256.23	1.253s
TL-208	2332.18	583.33	45.	81.	0.011	15.66	0.813s
CS-134	2420.61	605.44	56.	-5.	-0.001	224.28	1.283s
BI-214	2436.95	609.52	52.	97.	0.013	12.99	1.281
I-131	2544.31	636.36	40.	-2.	0.000	386.92	1.312s
CS-137	2647.10	662.06	33.	5.	0.001	178.13	1.333s
EU-154	2892.83	723.49	37.	-2.	0.000	402.91	1.386s
BI-212	2905.58	726.68	37.	-3.	0.000	343.12	1.390s
PA-234M	3064.42	766.39	38.	5.	0.001	104.02	1.423
EU-152	3124.38	781.37	18.	11.	0.001	65.01	1.434s
BI-212	3142.28	785.85	28.	3.	0.000	275.56	1.439s
CS-134	3183.63	796.19	25.	9.	0.001	88.88	1.448s
CS-134	3204.17	801.32	27.	-5.	-0.001	170.36	1.453s
TL-208	3439.87	860.24	34.	4.	0.001	202.06	1.503s
EU-154	3501.54	875.65	23.	-1.	0.000	470.27	1.514s
Pa-234	3532.41	883.37	37.	-2.	0.000	398.79	1.522s
AC-228	3643.58	911.15	22.	71.	0.010	19.16	1.575s
Pa-234	3783.40	946.10	28.	-2.	0.000	427.51	1.574s
AC-228	3876.08	969.26	31.	16.	0.002	54.60	1.593s
EU-154	3987.25	997.05	24.	1.	0.000	667.92	1.616s
PA-234M	3988.91	997.46	42.	-24.	-0.003	286.39	1.620s
EU-154	4024.28	1006.31	35.	-8.	-0.001	106.42	1.623s
EU-152	4449.54	1112.58	19.	3.	0.000	213.92	1.710s
BI-214	4480.37	1120.29	25.	23.	0.003	20.77	0.663s
CO-60	4691.89	1173.15	21.	-2.	0.000	312.04	1.760s
EU-154	5099.56	1275.02	24.	5.	0.001	141.84	1.840s
K-40	5843.10	1460.79	24.	130.	0.018	8.06	0.708s
BI-214	7057.40	1764.13	29.	-6.	-0.001	60.46	2.211s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-3.6870E-02				5.31E+01	
			477.60	-3.687E-02	%(	1.318E+00 1.00E+03 1.05E+01	G
K-40	N	1.3106E+01				4.66E+11	
			1460.83	1.311E+01	(P	2.554E+00 8.06E+00 1.07E+01	G
I-131	I	-2.6413E-02				8.02E+00	
			364.48	-2.641E-02	?(	1.744E-01 1.92E+02 8.17E+01	G
			284.30	6.418E-02	%	2.695E+00 1.22E+03 6.14E+00	G
			636.97	-1.733E-01	+	2.378E+00 3.87E+02 7.17E+00	G
CS-134	I	2.7338E-02				7.54E+02	
			604.71	-2.507E-02	?(	1.955E-01 2.24E+02 9.76E+01	G
			795.87	6.449E-02	(	1.947E-01 8.89E+01 8.55E+01	G
			569.32	-1.077E-01	+	1.220E+00 3.24E+02 1.54E+01	G
			801.95	-3.314E-01	&	1.987E+00 1.70E+02 8.69E+00	G
			563.24	2.595E-01	&(	2.180E+00 2.41E+02 8.35E+00	G
CS-137	I	3.0365E-02				1.10E+04	
			661.66	3.037E-02	*(	1.895E-01 1.78E+02 8.52E+01	G
EU-152	F	1.2085E-01				4.94E+03	
			344.29	9.143E-03	%(	5.705E-01 1.79E+03 2.65E+01	G
			121.78	1.699E-02	&(	3.350E-01 5.74E+02 2.86E+01	G
			778.92	5.088E-01	?(	1.091E+00 6.50E+01 1.29E+01	G
			964.11	0.000E+00	-	1.524E+00 1.00E+03 1.46E+01	G
			1112.07	1.874E-01	?(	1.440E+00 2.14E+02 1.36E+01	G
			1408.00	-3.148E-02	%	1.213E+00 1.05E+03 2.10E+01	G
EU-154	I	8.1313E-02				3.14E+03	
			873.23	-8.258E-02	&(	1.412E+00 4.70E+02 1.23E+01	G
			123.10	4.017E-03	%	2.484E-01 1.80E+03 4.08E+01	G
			1274.54	1.399E-01	?(	6.948E-01 1.42E+02 3.52E+01	G
			723.36	-6.245E-02	+	8.958E-01 4.03E+02 2.02E+01	G
			1004.77	-3.561E-01	+	1.297E+00 1.06E+02 1.80E+01	G
			996.33	7.660E-02	&(	1.864E+00 6.68E+02 1.06E+01	G
EU-155	I	-5.5984E-02				1.81E+03	
			105.31	-5.598E-02	?(	4.413E-01 2.31E+02 2.12E+01	G
			86.54	-1.127E-02	&	3.982E-01 1.04E+03 3.07E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	N	4.6170E-01					6.98E+02	
			583.02	4.682E-01	(P	1.981E-01	1.57E+01	8.45E+01 G
			277.28	3.740E-01	(P	2.055E+00	1.10E+02	6.31E+00 G
			860.56	2.312E-01	-	1.643E+00	2.02E+02	1.24E+01 G
PB-210	N	1.3111E+00					8.14E+03	
			46.54	1.311E+00	(P	3.036E+00	1.21E+01	4.25E+00 G
PB-212	N	8.9836E-01					6.98E+02	
			238.63	8.984E-01	(P	3.355E-01	1.11E+01	4.33E+01 G
			300.03	1.478E+00	+	3.922E+00	7.95E+01	3.28E+00 G
PB-214	N	1.0638E+00					5.84E+05	
			351.93	1.003E+00	(P	4.435E-01	1.45E+01	3.76E+01 G
			295.09	1.071E+00	(P	6.971E-01	1.96E+01	1.93E+01 G
			242.00	1.355E+00	(P	1.615E+00	3.33E+01	7.43E+00 G
BI-212	N	2.7751E-02					6.98E+02	
			727.17	-1.983E-01	&(	2.416E+00	3.43E+02	7.55E+00 G
			785.42	1.361E+00	?(	1.339E+01	2.76E+02	1.28E+00 G
BI-214	N	1.1306E+00					5.84E+05	
			609.31	1.069E+00	(P	4.016E-01	1.30E+01	4.61E+01 G
			1120.29	1.318E+00	(P	1.455E+00	2.08E+01	1.51E+01 G
			1764.49	-4.593E-01	- P	2.302E+00	6.05E+01	1.54E+01 G
AC-228	N	1.7525E+00					2.10E+03	
			911.07	1.753E+00	(	5.995E-01	1.92E+01	2.90E+01 G
			968.97	6.980E-01	-	1.235E+00	5.46E+01	1.75E+01 G
			338.32	9.614E-01	-	1.073E+00	3.57E+01	1.20E+01 G
								Energy duplication
			93.35	1.373E+00		2.291E+00	5.10E+01	5.56E+00 XA
Pa-234	N	2.5300E-01					1.63E+12	
			131.29	2.530E-01	(	5.664E-01	6.77E+01	1.80E+01 G
			569.47	-2.241E-01	-	2.013E+00	2.56E+02	8.20E+00 G
			946.02	-9.676E-02	-	1.491E+00	4.28E+02	1.34E+01 G
			883.24	-1.576E-01	-	2.236E+00	3.99E+02	9.60E+00 G
			880.53	6.487E-03	%	3.291E+00	1.39E+04	6.00E+00 G
TH-234	N	2.1319E+00					1.63E+12	
			63.29	2.132E+00	(P	3.480E+00	1.75E+01	3.81E+00 G
			92.59	7.264E-01	- P	2.363E+00	1.28E+01	5.58E+00 G
PA-234M	N	-1.3714E+01					1.63E+12	
			1001.00	-2.192E+01	&(P	3.045E+01	2.86E+02	8.37E-01 G
			766.41	9.643E+00	(P	6.594E+01	1.04E+02	2.94E-01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
U-235	N 3.1186E-01					2.57E+11	
		143.79	1.966E-01	(P	9.585E-01	5.77E+01 1.10E+01	G
		205.33	2.710E-01	(P	2.472E+00	1.22E+02 5.01E+00	G
		163.38	6.009E-01	(	1.641E+00	9.59E+01 5.08E+00	G
							Energy duplication
		93.35	0.000E+00	-	1.915E-01	0.00E+00 5.81E+00	X
AM-241	T 5.6472E-02					1.58E+05	
		59.54	5.647E-02	?(	2.894E-01	1.52E+02 3.59E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
AM-241	59.24	187.	13.	0.002	151.75	5.647E-02
EU-155	104.23	155.	-8.	-0.001	231.37	-5.598E-02
EU-152	122.51	150.	3.	0.000	574.31	1.699E-02
Pa-234	130.94	162.	28.	0.004	67.69	2.530E-01
I-131	364.73	72.	-6.	-0.001	191.64	-2.641E-02
CS-134	563.96	58.	5.	0.001	241.46	2.595E-01

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	568.88	61.	-3.	0.000	324.19	-1.077E-01	
Pa-234	571.39	46.	-4.	-0.001	256.23	-2.241E-01	
CS-134	605.44	56.	-5.	-0.001	224.28	-2.507E-02	
I-131	636.36	40.	-2.	0.000	386.92	-1.733E-01	
CS-137	662.06	33.	5.	0.001	178.13	3.037E-02	
EU-154	723.49	37.	-2.	0.000	402.91	-6.245E-02	
BI-212	726.68	37.	-3.	0.000	343.12	-1.983E-01	
EU-152	781.37	18.	11.	0.001	65.01	5.088E-01	
BI-212	785.85	28.	3.	0.000	275.56	1.361E+00	
CS-134	796.19	25.	9.	0.001	88.88	6.449E-02	
CS-134	801.32	27.	-5.	-0.001	170.36	-3.314E-01	
EU-154	875.65	23.	-1.	0.000	470.27	-8.258E-02	
Pa-234	883.37	37.	-2.	0.000	398.79	-1.576E-01	
Pa-234	946.10	28.	-2.	0.000	427.51	-9.676E-02	
EU-154	997.05	24.	1.	0.000	667.92	7.660E-02	
EU-154	1006.31	35.	-8.	-0.001	106.42	-3.561E-01	
EU-152	1112.58	19.	3.	0.000	213.92	1.874E-01	
CO-60	1173.15	21.	-2.	0.000	312.04	-1.886E-02	
EU-154	1275.02	24.	5.	0.001	141.84	1.399E-01	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

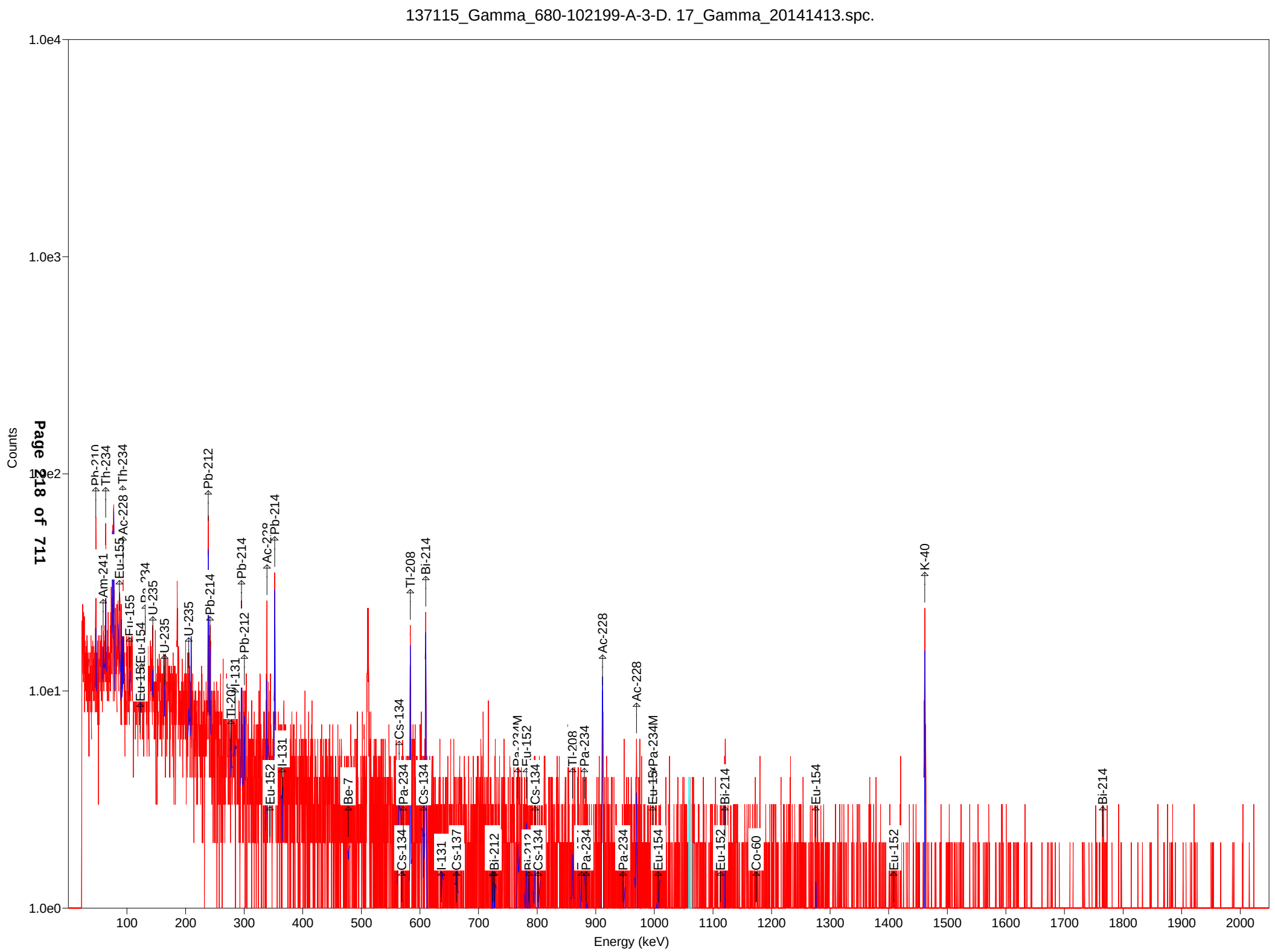
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	-3.6870E-02	-3.6870E-02	1.001E+03%	1.32E+00
K-40		1.3106E+01	1.3106E+01	9.524E+00%	2.55E+00
CO-60	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.98E-01
I-131	#A	-2.6410E-02	-2.6413E-02	1.916E+02%	1.74E-01
CS-134	#A	2.7338E-02	2.7338E-02	8.888E+01%	1.95E-01
CS-137	#A	3.0365E-02	3.0365E-02	1.781E+02%	1.90E-01
EU-152	#A	1.2085E-01	1.2085E-01	6.501E+01%	5.70E-01
EU-154	#A	8.1313E-02	8.1313E-02	1.418E+02%	1.41E+00
EU-155	#A	-5.5984E-02	-5.5984E-02	2.314E+02%	4.41E-01
TL-208		4.6170E-01	4.6170E-01	1.865E+01%	1.98E-01
PB-210	A	1.3111E+00	1.3111E+00	6.470E+01%	3.04E+00
PB-212		8.9835E-01	8.9836E-01	1.439E+01%	3.35E-01
PB-214		1.0638E+00	1.0638E+00	1.793E+01%	4.44E-01
BI-212	#A	2.7751E-02	2.7751E-02	2.200E+02%	2.42E+00
BI-214		1.1306E+00	1.1306E+00	1.639E+01%	4.02E-01
AC-228		1.7525E+00	1.7525E+00	1.916E+01%	5.99E-01
Pa-234	#A	2.5300E-01	2.5300E-01	6.769E+01%	5.66E-01
TH-234	A	2.1319E+00	2.1319E+00	5.713E+01%	3.48E+00
PA-234M	A	-1.3714E+01	-1.3714E+01	1.906E+02%	3.05E+01
U-235	A	3.1186E-01	3.1186E-01	9.593E+01%	9.59E-01
AM-241	#A	5.6472E-02	5.6472E-02	1.517E+02%	2.89E-01

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (143.7 to 1999.5 keV) 2.054E+01 Bq/Sample
Total Decayed Activity (143.7 to 1999.5 keV) 2.0544733E+01 Bq/Sample

The library has energies which are not separable.


137115_Gamma_680-102199-A-3-D. 17_Gamma_20141413.spc.
Counts
Energy (keV)
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Pb-210
Th-234
Ac-228
Th-234
Am-241
Eu-155
Fu-155
Eu-154
U-235
U-235
U-235
Pb-212
Pb-214
Pb-214
Pb-212
Ac-228
Pb-214
Tl-208
Bi-214
Cs-134
Be-7
I-131
Eu-152
Pa-234
Cs-134
I-131
Cs-137
Bi-212
Cs-134
Tl-208
Pa-234
Ac-228
Pa-234
Eu-154
Pa-234M
Eu-154
Bi-214
Eu-152
Co-60
Eu-154
Eu-152
K-40
Bi-214

Test America St. Louis Spectrum ID: 4_Gamma_20141703

Sample Description: 137115_Gamma_680-102199-A-7-D
Detector: Ge 4 SN/181
Batch ID: 137115
Work Order Number: Gamma
Lot Number: 680-102199-A-7-D

Decay to Time: 9/2/2014 17:47 Live Time: 7200 sec
Acquisition Time: 9/2/2014 17:48:02 Real Time: 7206 sec
Analysis Time: 9/2/2014 19:48 Dead Time: 0.09 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 4_Liquid_D=1 25ml.Clb
Efficiency Cal Desc: 4_Liquid_D=1 25ml_90101_030512
Efficiency Cal Date: 3/27/2012 20:51
Energy Cal Date: 2/28/2012 14:55
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 4_2014-08-09_2125.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-2.558E-01	228.7	5.850E-01	5.851E-01	2.077E+00
K-40	1.177E+01	17.2	2.024E+00	2.103E+00	5.457E+00
CO-60	9.255E-02	97.8	9.049E-02	9.060E-02	3.171E-01
I-131	1.465E-01	78.8	1.154E-01	1.156E-01	2.322E-01
CS-134	5.394E-02	62.3	3.362E-02	3.372E-02	3.046E-01
CS-137	9.135E-03	828.6	7.569E-02	7.569E-02	2.810E-01
EU-152	7.738E-02	99.9	7.727E-02	7.736E-02	7.425E-01
EU-154	5.327E-02	195.7	1.043E-01	1.043E-01	2.598E+00
EU-155	1.895E-01	54.3	1.028E-01	1.033E-01	4.936E-01
TL-208	6.670E-01	15.6	1.037E-01	1.087E-01	1.632E-01
PB-210	3.002E+00	37.1	1.114E+00	1.131E+00	3.310E+00
PB-212	1.390E+00	13.8	1.923E-01	2.063E-01	4.364E-01
PB-214	8.245E-01	21.6	1.777E-01	1.821E-01	5.299E-01
BI-212	-2.813E-01	394.3	1.109E+00	1.109E+00	4.011E+00
BI-214	3.007E-01	59.5	1.788E-01	1.794E-01	7.010E-01
AC-228	1.002E+00	25.1	2.517E-01	2.563E-01	9.861E-01
Pa-234	2.810E-01	60.8	1.709E-01	1.714E-01	6.397E-01
TH-234	2.967E+00	39.1	1.159E+00	1.168E+00	3.289E+00
PA-234M	-3.073E+00	339.2	1.042E+01	1.042E+01	3.854E+01
U-235	4.156E-01	46.1	1.914E-01	1.924E-01	1.290E+00
AM-241	9.073E-02	91.4	8.292E-02	8.304E-02	2.788E-01
Total	2.333E+01				

Analyst: Curtis Carey

TestAmerica Spectrum name: 4_Gamma_20141703.An1

Sample description
137115_Gamma_680-102199-A-7-D

Spectrum Filename: C:\User\SPC\Det4\4_Gamma_20141703.An1

Acquisition information
Start time: 9/2/2014 5:48:02 PM
Live time: 7200
Real time: 7206
Dead time: 0.09 %
Detector ID: 4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_Liquid_D=1 25ml.Clb
4_Liquid_D=1 25ml_90101_030512

Energy Calibration
Created: 2/28/2012 2:55:17 PM
Zero offset: 0.091 keV
Gain: 0.250 keV/channel
Quadratic: -2.917E-08 keV/channel^2

Efficiency Calibration
Created: 3/27/2012 8:51:45 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.48 %
Log(Eff): 8.809878E-01 + (-6.811249E-01*Log(E)) +
(-1.909804E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -1.031199E+01 + (3.529752E+00*Log(E)) +
(-4.143154E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (1999.44keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/2/2014 5:47:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	4_2014-08-09_2125.PBC 8/9/2014 9:25:56 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 13 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.2109

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.55	122.	15.94	1.28	5.688E-02	46.54	4.250	PBC<MDA	PB210
60.01	14.	91.39	0.81	6.042E-02	59.54	35.900	PBC<MDA	AM241
63.24	100.	19.28	0.62	6.085E-02	63.29	3.810	PBC<MDA	TH234
74.83	83.	19.37	0.83	6.109E-02				
77.28	112.	14.92	0.83	6.098E-02				
87.29	29.	54.28	0.84	6.016E-02	86.54	30.700	PBC<MDA	EU155
92.73	115.	17.58	1.07	5.935E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.810	4.652E+00	U235
					93.35	5.810	4.652E+00	U235
93.31	32.	56.03	0.84	5.926E-02	93.35	5.561	PBC<MDA	AC228
105.98	13.	99.98	0.85	5.730E-02	105.31	21.200	PBC<MDA	EU155
121.64	7.	203.32	0.87	5.415E-02	121.78	28.580	PBC<MDA	EU152
123.22	2.	710.40	0.87	5.389E-02	123.10	40.790	PBC<MDA	EU154
162.77	22.	46.05	0.91	4.578E-02	163.38	5.080	PBC<MDA	U235
					163.38	5.080	1.312E+00	U235
186.06	91.	20.35	1.15	4.075E-02				
238.49	168.	11.66	0.47	3.271E-02	238.63	43.300	1.390E+00	PB212
277.27	7.	131.08	1.01	2.859E-02	277.28	6.310	PBC<MDA	TL208
283.68	12.	78.78	1.02	2.796E-02	284.30	6.140	PBC<MDA	I131
295.03	48.	26.26	0.68	2.704E-02	295.09	19.300	1.011E+00	PB214
300.81	14.	61.18	1.03	2.664E-02	300.03	3.280	PBC<MDA	PB212
337.85	54.	25.12	1.26	2.391E-02	338.32	12.010	2.628E+00	AC228
351.61	46.	19.26	1.29	2.307E-02	351.93	37.600	7.286E-01	PB214
364.21	8.	113.19	1.09	2.235E-02	364.48	81.700	PBC<MDA	I131
569.63	12.	62.33	1.27	1.486E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.343E+00	Pa234
					569.47	8.200	1.343E+00	Pa234

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
569.64	12.	60.80	1.27	1.486E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.369E+00	Pa234
582.82	60.	15.55	1.10	1.454E-02	583.02	84.500	6.746E-01	TL208
609.27	16.	33.82	1.30	1.396E-02	609.31	46.090	PBC<MDA	BI214
637.54	3.	228.25	1.33	1.339E-02	636.97	7.170	PBC<MDA	I131
657.91	1.	828.59	1.35	1.293E-02	661.66	85.210	PBC<MDA	CS137
778.88	5.	124.31	1.45	1.110E-02	778.92	12.940	PBC<MDA	EU152
880.03	1.	882.07	1.53	9.898E-03	880.53	6.000	PBC<MDA	Pa234
					880.53	6.000	1.705E-01	Pa234
911.32	12.	52.17	1.56	9.585E-03	911.07	29.000	PBC<MDA	AC228
968.83	6.	116.03	1.60	9.045E-03	968.97	17.460	PBC<MDA	AC228
1004.48	3.	195.69	1.63	8.740E-03	1004.77	18.010	PBC<MDA	EU154
1120.00	2.	397.53	1.73	7.884E-03	1120.29	15.100	PBC<MDA	BI214
1334.17	4.	97.77	1.89	6.683E-03	1332.50	99.980	PBC<MDA	CO60
1461.15	55.	13.88	1.99	6.120E-03	1460.83	10.670	1.177E+01	K40

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
298.89	74.86	95.	85.	1.386E+03	22.25	0.856	-	
308.67	77.30	98.	114.	1.878E+03	17.97	0.837	-	
743.48	186.06	56.	91.	2.233E+03	20.35	1.146	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.73	46.55	139.	52.	0.007	15.94	1.279s
AM-241	239.54	60.01	77.	14.	0.002	91.39	0.812s
TH-234	252.44	63.24	125.	50.	0.007	19.28	0.620s
EU-155	348.58	87.29	111.	29.	0.004	54.28	0.837s
TH-234	369.79	92.59	168.	15.	0.002	19.07	0.843D
U-235	372.83	93.35	99.	93.	0.013	18.31	0.843D
AC-228	372.83	93.35	144.	32.	0.004	56.03	0.843D
EU-155	423.32	105.98	75.	13.	0.002	99.98	0.854
EU-152	485.91	121.64	91.	7.	0.001	203.32	0.870s
EU-154	492.26	123.22	95.	2.	0.000	710.40	0.871s
Pa-234	520.52	130.29	76.	-12.	-0.002	106.26	0.878s
U-235	650.37	162.77	40.	22.	0.003	46.05	0.908s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-212	953.11	238.49	80.	142.	0.020	11.66	0.466s
PB-214	968.37	242.30	86.	-16.	-0.002	93.36	0.979s
TL-208	1108.19	277.27	43.	7.	0.001	131.08	1.011
I-131	1133.82	283.68	37.	12.	0.002	78.78	1.018s
PB-214	1179.21	295.03	43.	38.	0.005	26.26	0.682s
PB-212	1202.32	300.81	49.	14.	0.002	61.18	1.032
AC-228	1350.44	337.85	32.	54.	0.008	25.12	1.261
EU-152	1372.01	343.25	43.	-5.	-0.001	181.55	1.071s
PB-214	1405.43	351.61	42.	46.	0.006	19.26	1.290
I-131	1455.82	364.21	35.	8.	0.001	113.19	1.089s
BE-7	1904.36	476.37	28.	-3.	0.000	228.67	1.189s
CS-134	2251.35	563.12	24.	-3.	0.000	261.87	1.264s
CS-134	2277.35	569.63	21.	12.	0.002	62.33	1.269s
Pa-234	2277.43	569.64	21.	12.	0.002	60.80	1.269s
TL-208	2330.12	582.82	6.	60.	0.008	15.55	1.100
CS-134	2420.42	605.40	35.	-5.	-0.001	173.01	1.300s
BI-214	2435.91	609.27	41.	16.	0.002	33.82	1.304s
I-131	2549.01	637.54	22.	3.	0.000	228.25	1.327s
CS-137	2630.49	657.91	18.	1.	0.000	828.59	1.348s
EU-154	2891.69	723.21	26.	-2.	0.000	297.56	1.401s
BI-212	2905.76	726.73	25.	-2.	0.000	394.30	1.404s
PA-234M	3068.34	767.37	28.	-1.	0.000	622.64	1.437s
EU-152	3114.38	778.88	19.	5.	0.001	124.31	1.448s
CS-134	3187.90	797.26	29.	-7.	-0.001	117.98	1.462s
EU-154	3492.88	873.49	19.	-1.	0.000	575.84	1.526s
Pa-234	3519.05	880.03	20.	1.	0.000	882.07	1.532s
AC-228	3644.24	911.32	13.	12.	0.002	52.17	1.557s
AC-228	3874.36	968.83	24.	6.	0.001	116.03	1.605s
EU-154	3986.93	996.97	18.	-3.	0.000	191.12	1.627s
PA-234M	4004.99	1001.48	14.	-2.	0.000	339.18	1.631s
EU-154	4017.01	1004.48	16.	3.	0.000	195.69	1.634s
EU-152	4450.28	1112.76	19.	-4.	-0.001	171.82	1.720s
BI-214	4479.26	1120.00	21.	2.	0.000	397.53	1.727s
CO-60	4694.53	1173.80	15.	-1.	0.000	707.23	1.769s
CO-60	5336.37	1334.17	7.	4.	0.001	97.77	1.893s
K-40	5844.67	1461.15	24.	55.	0.008	13.88	1.991s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	Peak MDA Value Bq/Sample		COMMENTS
BE-7	C	-2.5584E-01				5.31E+01		
			477.60	-2.558E-01	?(	2.077E+00	2.29E+02	1.05E+01 G
K-40	N	1.1769E+01				4.66E+11		
			1460.83	1.177E+01	(P	5.457E+00	1.39E+01	1.07E+01 G
CO-60	F	9.2551E-02				1.93E+03		
			1332.50	9.255E-02	?(	3.171E-01	9.78E+01	1.00E+02 G
			1173.24	-1.462E-02	-	3.863E-01	7.07E+02	9.99E+01 G
I-131	I	1.4647E-01				8.02E+00		
			364.48	5.976E-02	(	2.322E-01	1.13E+02	8.17E+01 G
			284.30	9.602E-01	*(	2.537E+00	7.88E+01	6.14E+00 G
			636.97	4.376E-01	&(	3.578E+00	2.28E+02	7.17E+00 G
CS-134	I	5.3942E-02				7.54E+02		
			604.71	-5.034E-02	?(	3.046E-01	1.73E+02	9.76E+01 G
			795.87	-1.018E-01	+	4.146E-01	1.18E+02	8.55E+01 G
			569.32	7.158E-01	(	1.464E+00	6.23E+01	1.54E+01 G
			801.95	2.895E-02	%	3.794E+00	3.56E+03	8.69E+00 G
			563.24	-3.039E-01	+	2.852E+00	2.62E+02	8.35E+00 G
CS-137	I	9.1345E-03				1.10E+04		
			661.66	9.135E-03	?(	2.810E-01	8.29E+02	8.52E+01 G
EU-152	F	7.7377E-02				4.94E+03		
			344.29	-1.175E-01	?(	7.425E-01	1.82E+02	2.65E+01 G
			121.78	6.072E-02	&(	4.238E-01	2.03E+02	2.86E+01 G
			778.92	5.132E-01	?(	2.232E+00	1.24E+02	1.29E+01 G
			964.11	-1.367E-02	&	3.276E+00	6.65E+03	1.46E+01 G
			1112.07	-4.795E-01	+	2.937E+00	1.72E+02	1.36E+01 G
			1408.00	0.000E+00	-	2.201E+00	1.00E+03	2.10E+01 G
EU-154	I	5.3274E-02				3.14E+03		
			873.23	-1.224E-01	?(	2.598E+00	5.76E+02	1.23E+01 G
			123.10	1.233E-02	?(	3.043E-01	7.10E+02	4.08E+01 G
			1274.54	0.000E+00	+	1.832E+00	1.00E+03	3.52E+01 G
			723.36	-1.430E-01	+	1.526E+00	2.98E+02	2.02E+01 G
			1004.77	2.657E-01	&(	1.876E+00	1.96E+02	1.80E+01 G
			996.33	-4.872E-01	+	3.340E+00	1.91E+02	1.06E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I 1.8945E-01					1.81E+03	
		105.31	1.462E-01	&(	4.936E-01	1.00E+02	2.12E+01 G
		86.54	2.193E-01	&(	3.891E-01	5.43E+01	3.07E+01 G
TL-208	N 6.6700E-01					6.98E+02	
		583.02	6.746E-01	(	1.632E-01	1.55E+01	8.45E+01 G
		277.28	5.647E-01	(	2.549E+00	1.31E+02	6.31E+00 G
		860.56	0.000E+00	&	3.889E+00	1.00E+03	1.24E+01 G
PB-210	N 3.0024E+00					8.14E+03	
		46.54	3.002E+00	(P	3.310E+00	1.59E+01	4.25E+00 G
PB-212	N 1.3899E+00					6.98E+02	
		238.63	1.390E+00	(P	4.364E-01	1.17E+01	4.33E+01 G
		300.03	2.258E+00	+ P	5.639E+00	6.12E+01	3.28E+00 G
PB-214	N 8.2452E-01					5.84E+05	
		351.93	7.286E-01	(P	5.299E-01	1.93E+01	3.76E+01 G
		295.09	1.011E+00	(P	8.854E-01	2.63E+01	1.93E+01 G
		242.00	-9.013E-01	& P	2.662E+00	9.34E+01	7.43E+00 G
BI-212	N -2.8131E-01					6.98E+02	
		727.17	-2.813E-01	?(	4.011E+00	3.94E+02	7.55E+00 G
		785.42	0.000E+00	+	1.525E+01	1.00E+03	1.28E+00 G
BI-214	N 3.0073E-01					5.84E+05	
		609.31	3.354E-01	*(P	7.010E-01	3.38E+01	4.61E+01 G
		1120.29	1.950E-01	?(	2.822E+00	3.98E+02	1.51E+01 G
		1764.49	-1.561E+00	% P	2.927E+00	1.00E+03	1.54E+01 G
AC-228	N 1.0020E+00					2.10E+03	
		911.07	5.951E-01	?(	9.861E-01	5.22E+01	2.90E+01 G
		968.97	5.590E-01	?(	2.247E+00	1.16E+02	1.75E+01 G
		338.32	2.628E+00	(	1.400E+00	2.51E+01	1.20E+01 G
							Energy duplication
		93.35	1.346E+00		2.471E+00	5.60E+01	5.56E+00 XA
Pa-234	N 2.8099E-01					1.63E+12	
		131.29	-1.779E-01	?(	6.397E-01	1.06E+02	1.80E+01 G
		569.47	1.369E+00	(	2.724E+00	6.08E+01	8.20E+00 G
		946.02	-4.138E-04	%	2.468E+00	1.59E+05	1.34E+01 G
		883.24	-3.564E-02	%	2.919E+00	2.16E+03	9.60E+00 G
		880.53	1.705E-01	?(	5.545E+00	8.82E+02	6.00E+00 G
TH-234	N 2.9669E+00					1.63E+12	
		63.29	2.967E+00	*(P	3.289E+00	1.93E+01	3.81E+00 G
		92.59	6.118E-01	- P	2.647E+00	1.91E+01	5.58E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234M	N -3.0726E+00					1.63E+12	
		1001.00	-3.073E+00	?(	3.854E+01	3.39E+02	8.37E-01 G
		766.41	-5.087E+00	+	1.146E+02	6.23E+02	2.94E-01 G
U-235	N 4.1560E-01					2.57E+11	
		143.79	0.000E+00	(	1.290E+00	1.00E+03	1.10E+01 G
		205.33	-4.549E-02	%	2.703E+00	1.67E+03	5.01E+00 G
		163.38	1.312E+00	&(	1.926E+00	4.60E+01	5.08E+00 G
						Energy duplication	
		93.35	3.755E+00	?	1.976E+00	1.83E+01	5.81E+00 X
AM-241	T 9.0731E-02					1.58E+05	
		59.54	9.073E-02	?(	2.788E-01	9.14E+01	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
AM-241	60.01	77.	14.	0.002	91.39	9.073E-02	
EU-155	87.29	111.	29.	0.004	54.28	2.193E-01	
U-235	93.35	99.	93.	0.013	18.31	3.755E+00	
EU-155	105.98	75.	13.	0.002	99.98	1.462E-01	
EU-152	121.64	91.	7.	0.001	203.32	6.072E-02	
EU-154	123.22	95.	2.	0.000	710.40	1.233E-02	
Pa-234	130.29	76.	-12.	-0.002	106.26	-1.779E-01	
U-235	162.77	40.	22.	0.003	46.05	1.312E+00	
I-131	283.68	37.	12.	0.002	78.78	9.602E-01	
EU-152	343.25	43.	-5.	-0.001	181.55	-1.175E-01	
I-131	364.21	35.	8.	0.001	113.19	5.976E-02	
BE-7	476.37	28.	-3.	0.000	228.67	-2.558E-01	
CS-134	563.12	24.	-3.	0.000	261.87	-3.039E-01	
CS-134	569.63	21.	12.	0.002	62.33	7.158E-01	
Pa-234	569.64	21.	12.	0.002	60.80	1.369E+00	
CS-134	605.40	35.	-5.	-0.001	173.01	-5.034E-02	
BI-214	609.27	41.	16.	0.002	33.82	3.354E-01	P
I-131	637.54	22.	3.	0.000	228.25	4.376E-01	
CS-137	657.91	18.	1.	0.000	828.59	9.135E-03	
EU-154	723.21	26.	-2.	0.000	297.56	-1.430E-01	
BI-212	726.73	25.	-2.	0.000	394.30	-2.813E-01	
PA-234M	767.37	28.	-1.	0.000	622.64	-5.087E+00	
EU-152	778.88	19.	5.	0.001	124.31	5.132E-01	
CS-134	797.26	29.	-7.	-0.001	117.98	-1.018E-01	
EU-154	873.49	19.	-1.	0.000	575.84	-1.224E-01	
Pa-234	880.03	20.	1.	0.000	882.07	1.705E-01	
EU-154	996.97	18.	-3.	0.000	191.12	-4.872E-01	
PA-234M	1001.48	14.	-2.	0.000	339.18	-3.073E+00	
EU-154	1004.48	16.	3.	0.000	195.69	2.657E-01	
EU-152	1112.76	19.	-4.	-0.001	171.82	-4.795E-01	
BI-214	1120.00	21.	2.	0.000	397.53	1.950E-01	
CO-60	1173.80	15.	-1.	0.000	707.23	-1.462E-02	
CO-60	1334.17	7.	4.	0.001	97.77	9.255E-02	
K-40	1461.15	24.	55.	0.008	13.88	1.177E+01	P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

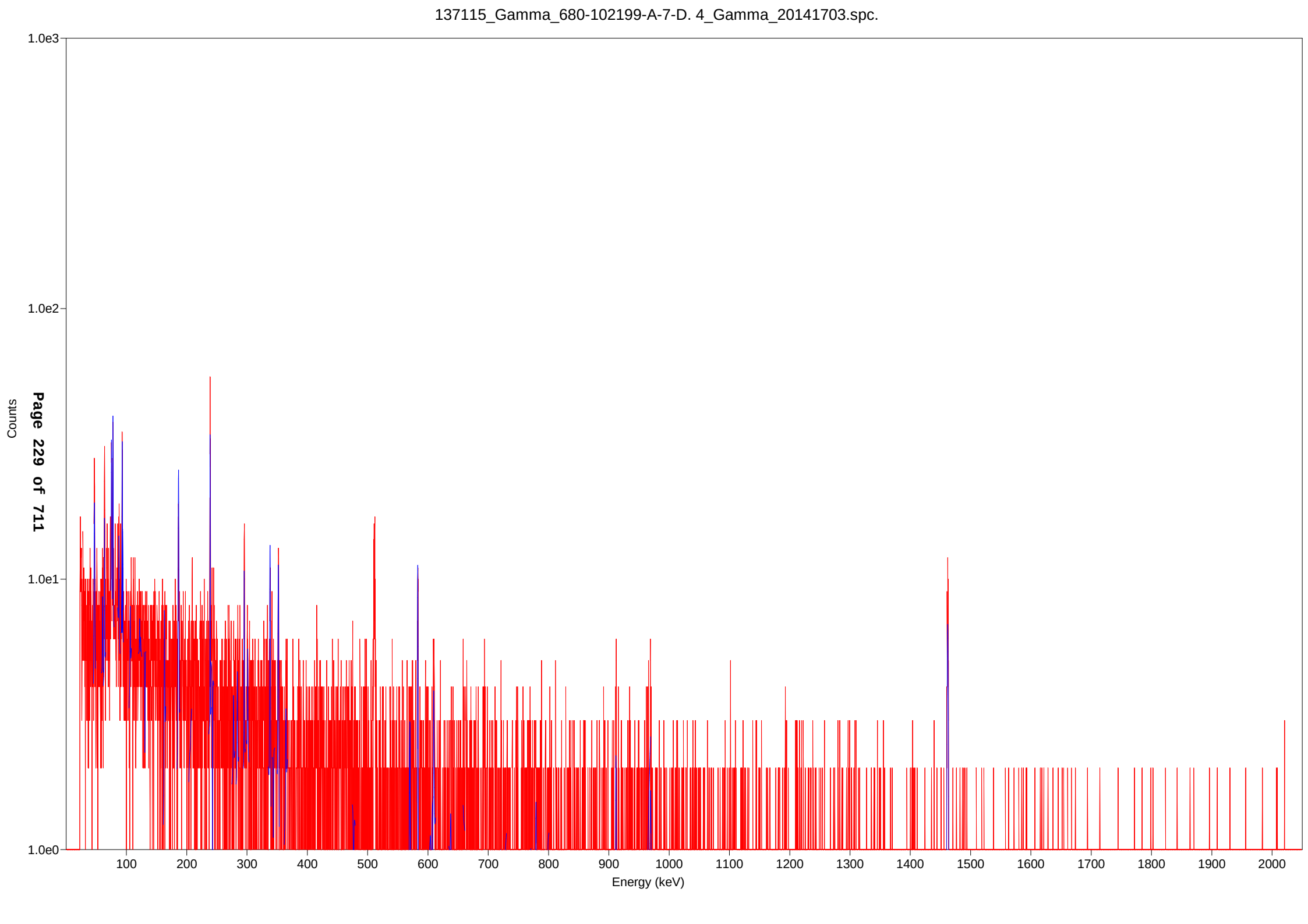
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	-2.5583E-01	-2.5584E-01	2.287E+02%	2.08E+00
K-40	#	1.1769E+01	1.1769E+01	1.720E+01%	5.46E+00
CO-60	#A	9.2551E-02	9.2551E-02	9.777E+01%	3.17E-01
I-131	#A	1.4646E-01	1.4647E-01	7.878E+01%	2.32E-01
CS-134	#A	5.3942E-02	5.3942E-02	6.233E+01%	3.05E-01
CS-137	#A	9.1345E-03	9.1345E-03	8.286E+02%	2.81E-01
EU-152	#A	7.7377E-02	7.7377E-02	9.986E+01%	7.42E-01
EU-154	#A	5.3274E-02	5.3274E-02	1.957E+02%	2.60E+00
EU-155	#A	1.8945E-01	1.8945E-01	5.428E+01%	4.94E-01
TL-208		6.6700E-01	6.6700E-01	1.555E+01%	1.63E-01
PB-210	#A	3.0024E+00	3.0024E+00	3.711E+01%	3.31E+00
PB-212		1.3899E+00	1.3899E+00	1.383E+01%	4.36E-01
PB-214		8.2452E-01	8.2452E-01	2.155E+01%	5.30E-01
BI-212	#A	-2.8131E-01	-2.8131E-01	3.943E+02%	4.01E+00
BI-214	#A	3.0073E-01	3.0073E-01	5.947E+01%	7.01E-01
AC-228		1.0020E+00	1.0020E+00	2.512E+01%	9.86E-01
Pa-234	#A	2.8099E-01	2.8099E-01	6.080E+01%	6.40E-01
TH-234	A	2.9669E+00	2.9669E+00	3.905E+01%	3.29E+00
PA-234M	#A	-3.0726E+00	-3.0726E+00	3.392E+02%	3.85E+01
U-235	#A	4.1560E-01	4.1560E-01	4.605E+01%	1.29E+00
AM-241	#A	9.0731E-02	9.0731E-02	9.139E+01%	2.79E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (185.9 to 1999.4 keV) 9.853E+00 Bq/Sample
Total Decayed Activity (185.9 to 1999.4 keV) 9.8527288E+00 Bq/Sample

The library has energies which are not separable.


137115_Gamma_680-102199-A-7-D. 4_Gamma_20141703.spc.
1.0e3
1.0e2
1.0e1
1.0e0
Counts
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)

Test America St. Louis Spectrum ID: 4_Gamma_20141711

Sample Description: 137115_Gamma_680-102199-A-8-D
Detector: Ge 4 SN/181
Batch ID: 137115
Work Order Number: Gamma
Lot Number: 680-102199-A-8-D

Decay to Time: 9/3/2014 09:10 Live Time: 7200 sec
Acquisition Time: 9/3/2014 09:10:23 Real Time: 7207 sec
Analysis Time: 9/3/2014 11:10 Dead Time: 0.10 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 4_Liquid_D=1 25ml.Clb
Efficiency Cal Desc: 4_Liquid_D=1 25ml_90101_030512
Efficiency Cal Date: 3/27/2012 20:51
Energy Cal Date: 2/28/2012 14:55
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 4_2014-08-09_2125.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	0.000E+00	1000.0	1.512E-01	1.512E-01	2.145E+00
K-40	1.280E+01	15.8	2.022E+00	2.115E+00	5.196E+00
CO-60	4.953E-02	162.7	8.058E-02	8.062E-02	4.068E-01
I-131	1.420E-01	76.3	1.084E-01	1.086E-01	2.134E-01
CS-134	5.502E-02	69.6	3.827E-02	3.836E-02	3.024E-01
CS-137	4.130E-01	27.5	1.137E-01	1.155E-01	3.238E-01
EU-152	1.198E-02	738.2	8.846E-02	8.846E-02	6.036E-01
EU-154	3.304E-01	128.2	4.236E-01	4.239E-01	2.666E+00
EU-155	3.563E-01	22.6	8.050E-02	8.261E-02	5.085E-01
TL-208	6.596E-01	16.0	1.056E-01	1.104E-01	1.667E-01
PB-210	2.275E+00	47.7	1.084E+00	1.094E+00	3.407E+00
PB-212	1.459E+00	11.9	1.741E-01	1.910E-01	3.990E-01
PB-214	1.311E+00	16.9	2.214E-01	2.303E-01	5.222E-01
BI-212	8.499E-01	150.5	1.279E+00	1.280E+00	3.740E+00
BI-214	1.542E+00	17.1	2.637E-01	2.742E-01	5.873E-01
AC-228	1.278E+00	22.7	2.901E-01	2.966E-01	1.284E+00
Pa-234	2.194E-01	190.1	4.171E-01	4.172E-01	7.853E-01
TH-234	1.806E+00	38.4	6.932E-01	6.988E-01	3.461E+00
PA-234M	5.995E+00	188.7	1.131E+01	1.132E+01	4.071E+01
U-235	2.402E-01	48.6	1.167E-01	1.173E-01	1.175E+00
AM-241	1.453E-02	656.8	9.541E-02	9.541E-02	3.301E-01
Total	3.181E+01				

Analyst: ashley silas

TestAmerica Spectrum name: 4_Gamma_20141711.An1

Sample description
137115_Gamma_680-102199-A-8-D

Spectrum Filename: C:\User\SPC\Det4\4_Gamma_20141711.An1

Acquisition information
Start time: 9/3/2014 9:10:23 AM
Live time: 7200
Real time: 7207
Dead time: 0.10 %
Detector ID: 4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_Liquid_D=1 25ml.Clb
4_Liquid_D=1 25ml_90101_030512

Energy Calibration
Created: 2/28/2012 2:55:17 PM
Zero offset: 0.091 keV
Gain: 0.250 keV/channel
Quadratic: -2.917E-08 keV/channel^2

Efficiency Calibration
Created: 3/27/2012 8:51:45 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.48 %
Log(Eff): 8.809878E-01 + (-6.811249E-01*Log(E)) +
(-1.909804E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -1.031199E+01 + (3.529752E+00*Log(E)) +
(-4.143154E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (1999.44keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/3/2014 9:10:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	4_2014-08-09_2125.PBC 8/9/2014 9:25:56 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 16 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1336

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.54	109.	17.31	0.75	5.687E-02	46.54	4.250	PBC<MDA	PB210
59.78	2.	656.84	0.81	6.042E-02	59.54	35.900	PBC<MDA	AM241
63.41	90.	21.38	0.80	6.086E-02	63.29	3.810	PBC<MDA	TH234
74.84	107.	14.59	0.83	6.109E-02				
77.10	174.	9.69	0.83	6.099E-02				
87.17	77.	18.10	0.84	6.008E-02	86.54	30.700	5.801E-01	EU155
					86.54	30.700	5.801E-01	EU155
90.00	38.	36.79	0.84	5.972E-02				
92.71	86.	20.65	0.84	5.934E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.810	3.459E+00	U235
					93.35	5.561	3.614E+00	AC228
					93.35	5.810	3.459E+00	U235
					93.35	5.561	3.614E+00	AC228
105.57	8.	171.41	0.85	5.730E-02	105.31	21.200	PBC<MDA	EU155
					105.31	21.200	8.651E-02	EU155
120.11	1.	738.19	0.87	5.415E-02	121.78	28.580	PBC<MDA	EU152
163.31	14.	78.59	0.91	4.578E-02	163.38	5.080	PBC<MDA	U235
					163.38	5.080	8.412E-01	U235
203.84	13.	78.07	0.95	3.736E-02	205.33	5.010	PBC<MDA	U235
					205.33	5.010	9.624E-01	U235
238.38	175.	10.14	0.98	3.272E-02	238.63	43.300	1.459E+00	PB212
284.48	7.	140.67	1.02	2.796E-02	284.30	6.140	PBC<MDA	I131
294.94	50.	25.10	0.91	2.704E-02	295.09	19.300	1.344E+00	PB214
299.82	16.	48.68	1.03	2.664E-02	300.03	3.280	PBC<MDA	PB212
338.08	31.	33.79	1.07	2.391E-02	338.32	12.010	PBC<MDA	AC228
					338.32	12.010	1.494E+00	AC228
351.68	81.	13.74	1.25	2.307E-02	351.93	37.600	1.294E+00	PB214
365.21	8.	101.95	1.09	2.235E-02	364.48	81.700	PBC<MDA	I131
583.21	58.	16.01	0.34	1.454E-02	583.02	84.500	6.596E-01	TL208
609.27	71.	14.68	1.31	1.396E-02	609.31	46.090	1.542E+00	BI214
635.89	5.	149.16	1.33	1.339E-02	636.97	7.170	PBC<MDA	I131

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
661.30	33.	27.54	1.35	1.293E-02	661.66	85.210	4.130E-01	CS137
723.38	3.	233.12	1.40	1.190E-02	723.36	20.220	PBC<MDA	EU154
726.87	2.	369.46	1.40	1.184E-02	727.17	7.550	PBC<MDA	BI212
786.25	4.	150.53	1.45	1.102E-02	785.42	1.280	PBC<MDA	BI212
795.17	9.	69.56	1.46	1.088E-02	795.87	85.530	PBC<MDA	CS134
					795.87	85.530	1.316E-01	CS134
874.06	5.	128.24	1.53	9.976E-03	873.23	12.270	PBC<MDA	EU154
879.85	4.	190.08	1.53	9.898E-03	880.53	6.000	PBC<MDA	Pa234
911.43	20.	40.89	1.56	9.585E-03	911.07	29.000	PBC<MDA	AC228
					911.07	29.000	1.015E+00	AC228
968.81	18.	42.70	1.60	9.045E-03	968.97	17.460	PBC<MDA	AC228
					968.97	17.460	1.566E+00	AC228
1001.35	3.	188.72	1.63	8.771E-03	1001.00	0.837	PBC<MDA	PA234M
1173.75	2.	353.74	1.77	7.545E-03	1173.24	99.900	PBC<MDA	CO60
1274.21	2.	218.61	1.85	6.973E-03	1274.54	35.190	PBC<MDA	EU154
1332.93	3.	162.70	1.89	6.683E-03	1332.50	99.980	PBC<MDA	CO60
1460.73	60.	12.95	1.99	6.120E-03	1460.83	10.670	1.280E+01	K40
1763.72	-3.	78.51	2.21	5.102E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
298.94	74.87	74.	102.	1.661E+03	16.64	0.767	-	
307.96	77.12	70.	154.	2.531E+03	12.15	0.588	-	s
348.40	87.24	141.	6.	9.175E+01	308.15	0.842	-	sc
359.72	90.07	63.	39.	6.475E+02	37.26	0.373	-	sM

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.68	46.54	147.	40.	0.005	17.31	0.749
AM-241	238.60	59.78	110.	2.	0.000	656.84	0.812s
TH-234	253.11	63.41	140.	39.	0.005	21.38	0.795
EU-155	348.28	87.21	97.	72.	0.010	22.59	0.837s
TH-234	370.58	92.79	173.	34.	0.005	18.85	0.866
U-235	372.83	93.35	118.	100.	0.014	18.35	0.843D
AC-228	372.83	93.35	118.	100.	0.014	18.35	0.843D
EU-155	421.67	105.57	80.	8.	0.001	171.41	0.854s
EU-152	479.81	120.11	54.	1.	0.000	738.19	0.870s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	577.41	144.52	87.	-14.	-0.002	94.82	0.890s
U-235	652.51	163.31	54.	14.	0.002	78.59	0.908s
U-235	814.59	203.84	45.	13.	0.002	78.07	0.946s
PB-212	952.70	238.38	66.	149.	0.021	10.14	0.975
PB-214	959.85	240.17	76.	-17.	-0.002	82.61	0.979
TL-208	1103.91	276.20	62.	-10.	-0.001	117.77	1.011
I-131	1137.02	284.48	47.	7.	0.001	140.67	1.018s
PB-214	1178.85	294.94	50.	50.	0.007	25.10	0.910s
PB-212	1198.34	299.82	37.	16.	0.002	48.68	1.032s
AC-228	1351.34	338.08	39.	31.	0.004	33.79	1.066s
PB-214	1405.73	351.68	41.	81.	0.011	13.74	1.252s
I-131	1459.82	365.21	29.	8.	0.001	101.95	1.089s
CS-134	2253.96	563.78	26.	-3.	0.000	237.34	1.264s
CS-134	2276.90	569.51	32.	-4.	-0.001	224.37	1.269s
Pa-234	2276.42	569.39	35.	-5.	-0.001	190.04	1.269s
TL-208	2331.67	583.21	7.	58.	0.008	16.01	0.339s
CS-134	2414.42	603.89	34.	-1.	0.000	694.97	1.300s
BI-214	2435.91	609.27	28.	71.	0.010	14.68	1.308
I-131	2542.38	635.89	23.	5.	0.001	149.16	1.327s
CS-137	2644.05	661.30	24.	33.	0.005	27.54	1.348s
EU-154	2892.37	723.38	22.	3.	0.000	233.12	1.401s
BI-212	2906.34	726.87	21.	2.	0.000	369.46	1.404s
BI-212	3143.88	786.25	19.	4.	0.001	150.53	1.453s
CS-134	3179.55	795.17	14.	9.	0.001	69.56	1.462s
CS-134	3199.90	800.26	28.	-9.	-0.001	88.75	1.467s
EU-154	3495.18	874.06	20.	5.	0.001	128.24	1.526s
Pa-234	3518.33	879.85	21.	4.	0.000	190.08	1.532s
Pa-234	3528.40	882.37	18.	-5.	-0.001	120.49	1.534
AC-228	3644.69	911.43	24.	20.	0.003	40.89	1.557s
Pa-234	3783.27	946.07	18.	-3.	0.000	225.18	1.586
AC-228	3874.26	968.81	20.	18.	0.002	42.70	1.605s
PA-234M	4004.48	1001.35	16.	3.	0.000	188.72	1.631s
EU-154	4019.34	1005.07	18.	-1.	0.000	491.24	1.634s
CO-60	4694.35	1173.75	15.	2.	0.000	353.74	1.769s
EU-154	5096.38	1274.21	11.	2.	0.000	218.61	1.848s
CO-60	5331.42	1332.93	13.	3.	0.000	162.70	1.893s
K-40	5843.00	1460.73	22.	60.	0.008	12.95	1.991s
BI-214	7056.00	1763.72	17.	-3.	0.000	78.51	2.214s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
K-40	N	1.2801E+01				4.66E+11	
			1460.83	1.280E+01	(P	5.196E+00	1.29E+01 1.07E+01 G
CO-60	F	4.9529E-02				1.93E+03	
			1332.50	6.942E-02	&(	4.068E-01	1.63E+02 1.00E+02 G
			1173.24	2.962E-02	?(	3.865E-01	3.54E+02 9.99E+01 G
I-131	I	1.4198E-01				8.02E+00	
			364.48	6.115E-02	?(	2.134E-01	1.02E+02 8.17E+01 G
			284.30	5.807E-01	(	2.815E+00	1.41E+02 6.14E+00 G
			636.97	6.874E-01	&(	3.607E+00	1.49E+02 7.17E+00 G
CS-134	I	5.5020E-02				7.54E+02	
			604.71	-1.211E-02	?(	3.024E-01	6.95E+02 9.76E+01 G
			795.87	1.316E-01	&(	3.045E-01	6.96E+01 8.55E+01 G
			569.32	-2.215E-01	+	1.757E+00	2.24E+02 1.54E+01 G
			801.95	-1.347E+00	&	4.054E+00	8.87E+01 8.69E+00 G
			563.24	-3.481E-01	+	2.945E+00	2.37E+02 8.35E+00 G
CS-137	I	4.1299E-01				1.10E+04	
			661.66	4.130E-01	&(	3.238E-01	2.75E+01 8.52E+01 G
EU-152	F	1.1984E-02				4.94E+03	
			344.29	1.125E-02	%(	6.036E-01	1.47E+03 2.65E+01 G
			121.78	1.267E-02	?(	3.304E-01	7.38E+02 2.86E+01 G
			778.92	3.328E-03	%	2.604E+00	2.14E+04 1.29E+01 G
			964.11	4.372E-02	%	2.408E+00	1.48E+03 1.46E+01 G
			1112.07	0.000E+00	&	9.659E-01	1.00E+03 1.36E+01 G
			1408.00	0.000E+00	-	2.201E+00	1.00E+03 2.10E+01 G
EU-154	I	3.3035E-01				3.14E+03	
			873.23	5.936E-01	?(	2.666E+00	1.28E+02 1.23E+01 G
			123.10	7.807E-03	&	2.960E-01	1.09E+03 4.08E+01 G
			1274.54	1.289E-01	-	1.038E+00	2.19E+02 3.52E+01 G
			723.36	1.706E-01	?(	1.425E+00	2.33E+02 2.02E+01 G
			1004.77	-1.100E-01	-	1.990E+00	4.91E+02 1.80E+01 G
			996.33	-3.716E-02	%	2.875E+00	2.03E+03 1.06E+01 G
EU-155	I	3.5633E-01				1.81E+03	
			105.31	8.651E-02	(	5.085E-01	1.71E+02 2.12E+01 G
			86.54	5.426E-01	?(	3.652E-01	2.26E+01 3.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	N	6.5957E-01					6.98E+02	
			583.02	6.596E-01	*(	1.667E-01	1.60E+01	8.45E+01 G
			277.28	-7.559E-01	-	3.032E+00	1.18E+02	6.31E+00 G
			860.56	0.000E+00	&	3.169E+00	1.00E+03	1.24E+01 G
PB-210	N	2.2746E+00					8.14E+03	
			46.54	2.275E+00	(P	3.407E+00	1.73E+01	4.25E+00 G
PB-212	N	1.4586E+00					6.98E+02	
			238.63	1.459E+00	(P	3.990E-01	1.01E+01	4.33E+01 G
			300.03	2.586E+00	+ P	4.942E+00	4.87E+01	3.28E+00 G
PB-214	N	1.3112E+00					5.84E+05	
			351.93	1.294E+00	(P	5.222E-01	1.37E+01	3.76E+01 G
			295.09	1.344E+00	*(P	9.535E-01	2.51E+01	1.93E+01 G
			242.00	-9.587E-01	- P	2.506E+00	8.26E+01	7.43E+00 G
BI-212	N	8.4991E-01					6.98E+02	
			727.17	2.784E-01	?(	3.740E+00	3.69E+02	7.55E+00 G
			785.42	4.221E+00	?(	2.250E+01	1.51E+02	1.28E+00 G
BI-214	N	1.5415E+00					5.84E+05	
			609.31	1.542E+00	(P	5.873E-01	1.47E+01	4.61E+01 G
			1120.29	0.000E+00	-	2.170E+00	1.00E+03	1.51E+01 G
			1764.49	-4.793E-01	- P	3.908E+00	7.85E+01	1.54E+01 G
AC-228	N	1.2781E+00					2.10E+03	
			911.07	1.015E+00	(	1.284E+00	4.09E+01	2.90E+01 G
			968.97	1.566E+00	?(	2.072E+00	4.27E+01	1.75E+01 G
			338.32	1.494E+00	(	1.540E+00	3.38E+01	1.20E+01 G
							Energy duplication	
			93.35	4.208E+00	?	2.246E+00	1.83E+01	5.56E+00 XA
Pa-234	N	2.1944E-01					1.63E+12	
			131.29	1.841E-02	%(	7.853E-01	1.23E+03	1.80E+01 G
			569.47	-5.163E-01	+	3.442E+00	1.90E+02	8.20E+00 G
			946.02	-3.135E-01	+	2.546E+00	2.25E+02	1.34E+01 G
			883.24	-7.802E-01	+	3.288E+00	1.20E+02	9.60E+00 G
			880.53	8.225E-01	&(	5.579E+00	1.90E+02	6.00E+00 G
TH-234	N	1.8057E+00					1.63E+12	
			63.29	2.358E+00	(P	3.461E+00	2.14E+01	3.81E+00 G
			92.59	1.429E+00	(P	2.680E+00	1.89E+01	5.58E+00 G
PA-234M	N	5.9946E+00					1.63E+12	
			1001.00	5.995E+00	?(	4.071E+01	1.89E+02	8.37E-01 G
			766.41	-2.231E-01	%	9.957E+01	1.20E+04	2.94E-01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
U-235	N	2.4020E-01					2.57E+11	
			143.79	-3.685E-01 ?	(	1.175E+00	9.48E+01	1.10E+01 G
			205.33	9.624E-01 ?	(	2.515E+00	7.81E+01	5.01E+00 G
			163.38	8.412E-01	(	2.211E+00	7.86E+01	5.08E+00 G
								Energy duplication
			93.35	4.027E+00 ?		2.150E+00	1.83E+01	5.81E+00 X
AM-241	T	1.4526E-02					1.58E+05	
			59.54	1.453E-02 &	(	3.301E-01	6.57E+02	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
AM-241	59.78	110.	2.	0.000	656.84	1.453E-02
EU-155	87.21	97.	72.	0.010	22.59	5.426E-01
U-235	93.35	118.	100.	0.014	18.35	4.027E+00
AC-228	93.35	118.	100.	0.014	18.35	4.208E+00
EU-155	105.57	80.	8.	0.001	171.41	8.651E-02
EU-152	120.11	54.	1.	0.000	738.19	1.267E-02

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
U-235	144.52	87.	-14.	-0.002	94.82	-3.685E-01		
U-235	163.31	54.	14.	0.002	78.59	8.412E-01		
U-235	203.84	45.	13.	0.002	78.07	9.624E-01		
I-131	284.48	47.	7.	0.001	140.67	5.807E-01		
AC-228	338.08	39.	31.	0.004	33.79	1.494E+00		
I-131	365.21	29.	8.	0.001	101.95	6.115E-02		
CS-134	563.78	26.	-3.	0.000	237.34	-3.481E-01		
CS-134	569.51	32.	-4.	-0.001	224.37	-2.215E-01		
CS-134	603.89	34.	-1.	0.000	694.97	-1.211E-02		
I-131	635.89	23.	5.	0.001	149.16	6.874E-01		
EU-154	723.38	22.	3.	0.000	233.12	1.706E-01		
BI-212	726.87	21.	2.	0.000	369.46	2.784E-01		
BI-212	786.25	19.	4.	0.001	150.53	4.221E+00		
CS-134	795.17	14.	9.	0.001	69.56	1.316E-01		
CS-134	800.26	28.	-9.	-0.001	88.75	-1.347E+00		
EU-154	874.06	20.	5.	0.001	128.24	5.936E-01		
AC-228	911.43	24.	20.	0.003	40.89	1.015E+00		
AC-228	968.81	20.	18.	0.002	42.70	1.566E+00		
PA-234M	1001.35	16.	3.	0.000	188.72	5.995E+00		
EU-154	1005.07	18.	-1.	0.000	491.24	-1.100E-01		
CO-60	1173.75	15.	2.	0.000	353.74	2.962E-02		
EU-154	1274.21	11.	2.	0.000	218.61	1.289E-01		
CO-60	1332.93	13.	3.	0.000	162.70	6.942E-02		
K-40	1460.73	22.	60.	0.008	12.95	1.280E+01	P	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.14E+00
K-40	#	1.2801E+01	1.2801E+01	1.580E+01%	5.20E+00
CO-60	#A	4.9529E-02	4.9529E-02	1.627E+02%	4.07E-01
I-131	#A	1.4198E-01	1.4198E-01	7.632E+01%	2.13E-01
CS-134	#A	5.5020E-02	5.5020E-02	6.956E+01%	3.02E-01
CS-137		4.1299E-01	4.1299E-01	2.754E+01%	3.24E-01
EU-152	#A	1.1984E-02	1.1984E-02	7.382E+02%	6.04E-01
EU-154	#A	3.3035E-01	3.3035E-01	1.282E+02%	2.67E+00
EU-155	#A	3.5633E-01	3.5633E-01	2.259E+01%	5.09E-01
TL-208	#	6.5957E-01	6.5957E-01	1.601E+01%	1.67E-01
PB-210	A	2.2746E+00	2.2746E+00	4.767E+01%	3.41E+00
PB-212		1.4586E+00	1.4586E+00	1.194E+01%	3.99E-01
PB-214	#	1.3112E+00	1.3112E+00	1.688E+01%	5.22E-01
BI-212	#A	8.4991E-01	8.4991E-01	1.505E+02%	3.74E+00
BI-214		1.5415E+00	1.5415E+00	1.711E+01%	5.87E-01
AC-228	#A	1.2781E+00	1.2781E+00	2.270E+01%	1.28E+00

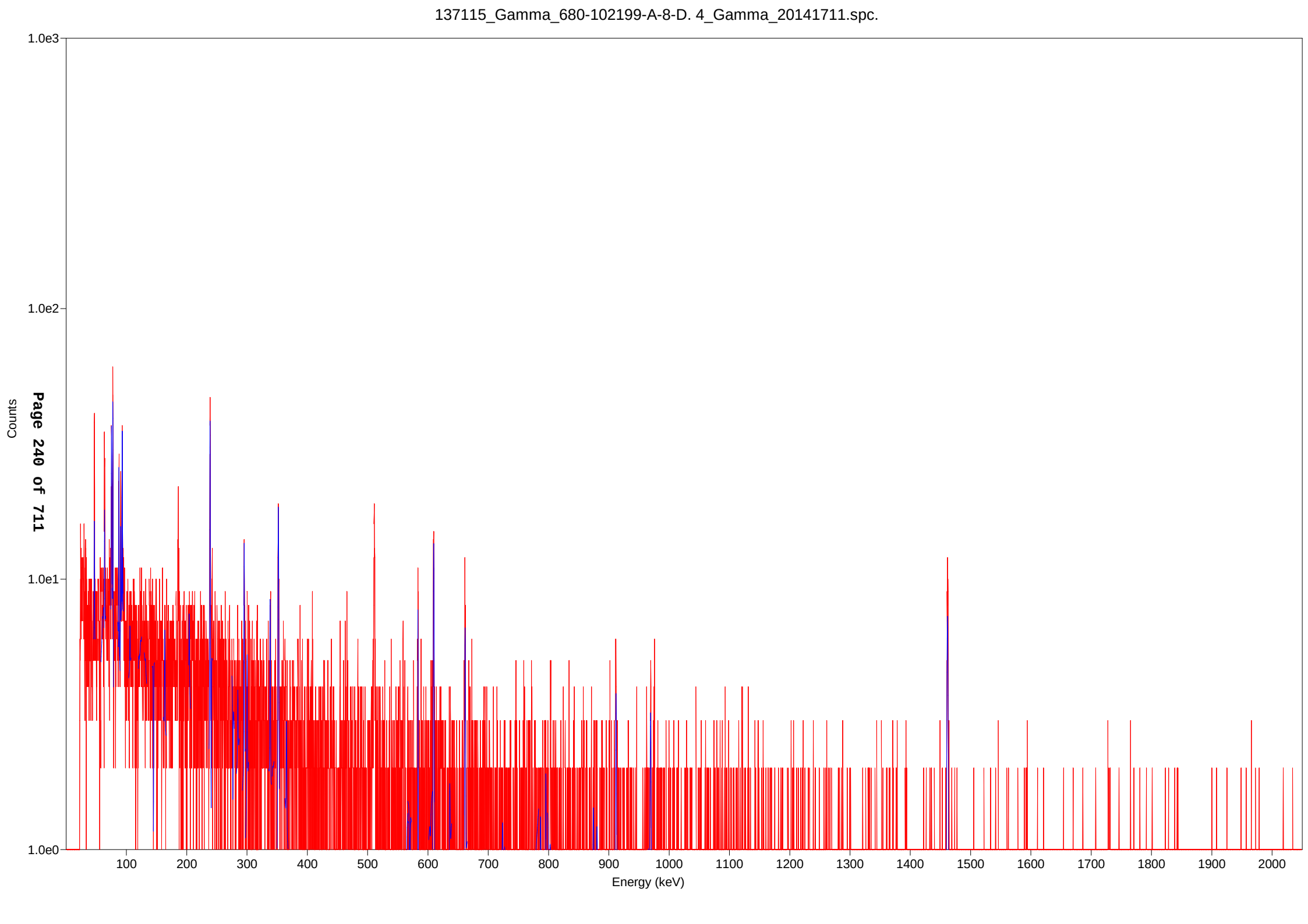
Pa-234 #A	2.1944E-01	2.1944E-01	1.901E+02%	7.85E-01
TH-234 A	1.8057E+00	1.8057E+00	3.839E+01%	3.46E+00
PA-234M#A	5.9946E+00	5.9946E+00	1.887E+02%	4.07E+01
U-235 #A	2.4020E-01	2.4020E-01	4.861E+01%	1.18E+00
AM-241 #A	1.4526E-02	1.4526E-02	6.568E+02%	3.30E-01

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

--- S U M M A R Y ---

Total Activity (946.0 to 1999.4 keV) 9.464E+00 Bq/Sample
Total Decayed Activity (946.0 to 1999.4 keV) 9.4642162E+00 Bq/Sample

The library has energies which are not separable.


137115_Gamma_680-102199-A-8-D. 4_Gamma_20141711.spc.
1.0e3
1.0e2
1.0e1
1.0e0
Counts
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)

Test America St. Louis Spectrum ID: 7_Gamma_20141987

Sample Description: 137115_Gamma_680-102199-A-9-D
Detector: Ge 7 SN/154
Batch ID: 137115
Work Order Number: Gamma
Lot Number: 680-102199-A-9-D

Decay to Time: 9/3/2014 09:10 Live Time: 7200 sec
Acquisition Time: 9/3/2014 09:11:13 Real Time: 7318 sec
Analysis Time: 9/3/2014 11:13 Dead Time: 1.62 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 7_Liquid_D=1 25ml.Clb
Efficiency Cal Desc: 7_25mld=1_90101_032612
Efficiency Cal Date: 3/28/2012 09:22
Energy Cal Date: 2/23/2012 08:40
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 7_2014-08-09_2137.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-1.939E-01	151.9	2.945E-01	2.947E-01	1.020E+00
K-40	2.207E+01	6.5	1.443E+00	1.794E+00	6.952E-01
CO-60	1.455E-02	406.3	5.910E-02	5.910E-02	2.157E-01
I-131	1.340E-03	137.9	1.848E-03	1.850E-03	1.101E-01
CS-134	-1.135E-01	51.8	5.883E-02	5.909E-02	1.915E-01
CS-137	-2.822E-02	157.4	4.442E-02	4.444E-02	1.548E-01
EU-152	9.963E-02	136.5	1.360E-01	1.360E-01	3.636E-01
EU-154	2.082E-01	156.2	3.252E-01	3.254E-01	1.149E+00
EU-155	1.753E-02	302.0	5.293E-02	5.293E-02	2.835E-01
TL-208	4.733E-01	11.6	5.486E-02	5.949E-02	7.667E-02
PB-210	1.606E+00	38.3	6.155E-01	6.241E-01	1.684E+00
PB-212	1.356E+00	7.8	1.064E-01	1.290E-01	2.227E-01
PB-214	1.228E+00	9.0	1.106E-01	1.255E-01	2.120E-01
BI-212	1.838E+00	30.1	5.534E-01	5.606E-01	1.694E+00
BI-214	1.034E+00	10.5	1.088E-01	1.199E-01	2.220E-01
AC-228	2.056E+00	11.5	2.355E-01	2.555E-01	2.714E-01
Pa-234	2.182E-01	61.7	1.345E-01	1.349E-01	2.566E-01
TH-234	2.169E+00	25.5	5.522E-01	5.623E-01	1.622E+00
PA-234M	6.460E+00	84.5	5.459E+00	5.468E+00	1.852E+01
U-235	1.874E-01	90.3	1.691E-01	1.694E-01	5.665E-01
AM-241	1.791E-03	2232.0	3.998E-02	3.998E-02	1.386E-01
Total	4.104E+01				

Analyst: ashley silas

TestAmerica Spectrum name: 7_Gamma_20141987.An1

Sample description
137115_Gamma_680-102199-A-9-D

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20141987.An1

Acquisition information
Start time: 9/3/2014 9:11:13 AM
Live time: 7200
Real time: 7318
Dead time: 1.62 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Liquid_D=1 25ml.Clb
7_25mld=1_90101_032612

Energy Calibration
Created: 2/23/2012 8:40:56 AM
Zero offset: 0.117 keV
Gain: 0.250 keV/channel
Quadratic: 3.508E-09 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 9:22:15 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.82 %
Log(Eff): -7.206837E-02 + (-5.220592E-02*Log(E)) +
(-7.214522E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.58 %
Log(Eff): -1.343090E+01 + (5.323811E+00*Log(E)) +
(-6.125181E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (2000.12keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/3/2014 9:10:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2014-08-09_2137.PBC 8/9/2014 9:37:15 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 21 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0779

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.74	136.	18.32	0.59	1.331E-01	46.54	4.250	PBC<MDA	PB210
63.33	170.	13.48	0.65	1.516E-01	63.29	3.810	2.169E+00	TH234
74.82	202.	10.81	0.87	1.552E-01				
77.15	311.	7.93	0.87	1.553E-01				
86.54	9.	302.00	0.88	1.540E-01	86.54	30.700	PBC<MDA	EU155
					86.54	30.700	2.568E-02	EU155
87.17	97.	18.04	0.88	1.538E-01				
89.91	70.	24.58	0.88	1.530E-01				
92.71	198.	11.46	0.89	1.521E-01	92.59	5.584	1.565E+00	TH234
					93.35	5.810	3.119E+00	U235
					93.35	5.810	3.119E+00	U235
93.19	106.	23.76	0.89	1.518E-01	93.35	5.561	1.736E+00	AC228
122.80	2.	634.11	0.92	1.358E-01	123.10	40.790	PBC<MDA	EU154
131.27	12.	108.32	0.93	1.306E-01	131.29	18.000	PBC<MDA	Pa234
143.60	5.	64.15	0.94	1.225E-01	143.79	10.960	PBC<MDA	U235
					143.79	10.960	PBC<MDA	U235
163.27	13.	90.25	0.96	1.100E-01	163.38	5.080	PBC<MDA	U235
					163.38	5.080	3.281E-01	U235
205.67	12.	129.61	1.01	9.113E-02	205.33	5.010	PBC<MDA	U235
					205.33	5.010	3.513E-01	U235
238.65	379.	7.03	0.69	8.042E-02	238.63	43.300	1.356E+00	PB212
241.87	86.	21.87	1.75	7.948E-02	242.00	7.430	2.034E+00	PB214
277.33	19.	61.34	1.08	7.076E-02	277.28	6.310	PBC<MDA	TL208
284.64	7.	137.92	1.09	6.924E-02	284.30	6.140	PBC<MDA	I131
295.23	124.	14.57	1.66	6.704E-02	295.09	19.300	1.337E+00	PB214
300.81	18.	53.84	1.10	6.607E-02	300.03	3.280	PBC<MDA	PB212
338.38	70.	20.39	1.09	5.941E-02	338.32	12.010	1.353E+00	AC228
344.24	2.	714.43	1.15	5.849E-02	344.29	26.500	PBC<MDA	EU152
					344.29	26.500	1.450E-02	EU152
352.09	182.	10.58	1.03	5.733E-02	351.93	37.600	1.172E+00	PB214
563.79	2.	416.67	1.36	3.700E-02	563.24	8.350	PBC<MDA	CS134
					563.24	8.350	9.464E-02	CS134

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
583.31	101.	11.59	1.02	3.576E-02	583.02	84.500	4.640E-01	TL208
609.34	138.	9.00	0.84	3.427E-02	609.31	46.090	1.034E+00	BI214
637.58	1.	731.65	1.43	3.282E-02	636.97	7.170	PBC<MDA	I131
727.30	30.	30.11	1.51	2.877E-02	727.17	7.550	1.926E+00	BI212
785.80	3.	212.90	1.57	2.662E-02	785.42	1.280	PBC<MDA	BI212
860.79	1.	994.07	1.63	2.425E-02	860.56	12.420	PBC<MDA	TL208
872.63	4.	156.17	1.64	2.389E-02	873.23	12.270	PBC<MDA	EU154
879.62	4.	115.93	1.65	2.361E-02	883.24	9.600	PBC<MDA	Pa234
911.04	98.	11.45	1.39	2.286E-02	911.07	29.000	2.056E+00	AC228
946.02	8.	95.08	1.70	2.199E-02	946.02	13.400	PBC<MDA	Pa234
969.08	30.	30.01	1.72	2.145E-02	968.97	17.460	1.130E+00	AC228
1001.30	8.	84.50	1.75	2.073E-02	1001.00	0.837	PBC<MDA	PA234M
1112.20	5.	136.47	1.84	1.855E-02	1112.07	13.644	PBC<MDA	EU152
					1112.07	13.644	2.650E-01	EU152
1120.11	8.	88.42	1.85	1.840E-02	1120.29	15.100	PBC<MDA	BI214
1334.40	2.	406.26	2.01	1.526E-02	1332.50	99.980	PBC<MDA	CO60
1460.90	234.	6.54	2.56	1.380E-02	1460.83	10.670	2.207E+01	K40

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
298.83	74.82	138.	181.	1.164E+03	12.98	0.769	-	
308.15	77.15	140.	310.	1.997E+03	8.72	0.915	-	
348.18	87.15	108.	94.	6.098E+02	18.77	1.249	-	s
359.16	89.90	107.	52.	3.419E+02	35.07	0.622	-	sM

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.52	46.74	199.	65.	0.009	18.32	0.593s
TH-234	252.89	63.33	193.	90.	0.013	13.48	0.652s
EU-155	345.74	86.54	344.	9.	0.001	302.00	0.880s
TH-234	369.93	92.59	331.	46.	0.006	16.57	0.886D
U-235	372.97	93.35	216.	168.	0.023	14.54	0.887D
AC-228	372.97	93.35	261.	106.	0.015	23.76	0.887D
EU-154	490.80	122.80	100.	2.	0.000	634.11	0.919s
Pa-234	524.66	131.27	76.	12.	0.002	108.32	0.928s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	574.00	143.60	125.	5.	0.001	64.15	0.941s
U-235	652.69	163.27	64.	13.	0.002	90.25	0.962s
U-235	822.31	205.67	106.	12.	0.002	129.61	1.007s
PB-212	954.22	238.65	130.	340.	0.047	7.03	0.686s
PB-214	967.09	241.87	78.	86.	0.012	21.87	1.750s
TL-208	1108.97	277.33	60.	19.	0.003	61.34	1.081s
I-131	1138.22	284.64	50.	7.	0.001	137.92	1.089s
PB-214	1180.57	295.23	46.	124.	0.017	14.57	1.664s
PB-212	1202.88	300.81	39.	18.	0.003	53.84	1.105s
AC-228	1353.17	338.38	38.	70.	0.010	20.39	1.089
EU-152	1376.61	344.24	66.	2.	0.000	714.43	1.150s
PB-214	1408.03	352.09	42.	182.	0.025	10.58	1.034
I-131	1455.47	363.95	51.	-8.	-0.001	138.45	1.170s
BE-7	1912.75	478.26	43.	-6.	-0.001	151.93	1.282s
CS-134	2254.87	563.79	37.	2.	0.000	416.67	1.364s
Pa-234	2279.61	569.98	37.	-1.	0.000	733.35	1.370s
TL-208	2332.96	583.31	9.	101.	0.014	11.59	1.015s
CS-134	2428.51	607.20	88.	-28.	-0.004	51.84	1.403s
BI-214	2437.07	609.34	23.	118.	0.016	9.00	0.844s
I-131	2550.05	637.58	37.	1.	0.000	731.65	1.433s
CS-137	2645.80	661.52	34.	-5.	-0.001	157.42	1.455
EU-154	2895.59	723.97	55.	-9.	-0.001	121.31	1.511s
BI-212	2908.93	727.30	26.	30.	0.004	30.11	1.515
EU-152	3115.49	778.94	33.	-5.	-0.001	178.04	1.561s
BI-212	3142.93	785.80	22.	3.	0.000	212.90	1.567s
CS-134	3185.91	796.54	29.	-6.	-0.001	134.16	1.576s
CS-134	3207.51	801.94	30.	-1.	0.000	762.22	1.581s
TL-208	3442.90	860.79	28.	1.	0.000	994.07	1.632s
EU-154	3490.28	872.63	21.	4.	0.001	156.17	1.643s
Pa-234	3518.21	879.62	10.	4.	0.001	115.93	1.651s
AC-228	3643.92	911.04	5.	98.	0.014	11.45	1.386s
Pa-234	3783.81	946.02	27.	8.	0.001	95.08	1.704s
EU-152	3863.72	965.99	50.	-4.	-0.001	271.16	1.719s
AC-228	3876.07	969.08	27.	30.	0.004	30.01	1.724s
EU-154	3987.60	996.96	30.	-3.	0.000	277.35	1.746s
PA-234M	4004.93	1001.30	19.	8.	0.001	84.50	1.750s
EU-152	4448.54	1112.20	19.	5.	0.001	136.47	1.839s
BI-214	4480.17	1120.11	23.	8.	0.001	88.42	1.845s
CO-60	5337.30	1334.40	20.	2.	0.000	406.26	2.005s
K-40	5843.28	1460.90	0.	234.	0.032	6.54	2.561s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	Peak MDA Value Bq/Sample	COMMENTS
BE-7	C	-1.9387E-01				5.31E+01	
			477.60	-1.939E-01	?(	1.020E+00	1.52E+02 1.05E+01 G
K-40	N	2.2074E+01				4.66E+11	
			1460.83	2.207E+01	(	6.952E-01	6.54E+00 1.07E+01 G
CO-60	F	1.4547E-02				1.93E+03	
			1332.50	1.455E-02	?(	2.157E-01	4.06E+02 1.00E+02 G
			1173.24	0.000E+00	-	2.062E-01	1.00E+03 9.99E+01 G
I-131	I	1.3402E-03				8.02E+00	
			364.48	-2.311E-02	&(	1.101E-01	1.38E+02 8.17E+01 G
			284.30	2.459E-01	?(	1.166E+00	1.38E+02 6.14E+00 G
			636.97	7.059E-02	?(	1.849E+00	7.32E+02 7.17E+00 G
CS-134	I	-1.1350E-01				7.54E+02	
			604.71	-1.135E-01	?(	1.915E-01	5.18E+01 9.76E+01 G
			795.87	-3.655E-02	+	1.706E-01	1.34E+02 8.55E+01 G
			569.32	-3.084E-03	%	7.156E-01	6.39E+03 1.54E+01 G
			801.95	-6.254E-02	+	1.724E+00	7.62E+02 8.69E+00 G
			563.24	9.464E-02	+	1.403E+00	4.17E+02 8.35E+00 G
CS-137	I	-2.8216E-02				1.10E+04	
			661.66	-2.822E-02	(	1.548E-01	1.57E+02 8.52E+01 G
EU-152	F	9.9629E-02				4.94E+03	
			344.29	1.450E-02	?(	3.636E-01	7.14E+02 2.65E+01 G
			121.78	2.405E-03	&	1.465E-01	1.73E+03 2.86E+01 G
			778.92	-1.878E-01	+	1.172E+00	1.78E+02 1.29E+01 G
			964.11	-1.654E-01	+	1.570E+00	2.71E+02 1.46E+01 G
			1112.07	2.650E-01	&(	1.272E+00	1.36E+02 1.36E+01 G
			1408.00	0.000E+00	-	9.710E-01	1.00E+03 2.10E+01 G
EU-154	I	2.0824E-01				3.14E+03	
			873.23	2.082E-01	?(	1.149E+00	1.56E+02 1.23E+01 G
			123.10	5.613E-03	-	1.234E-01	6.34E+02 4.08E+01 G
			1274.54	-9.992E-03	%	5.795E-01	1.57E+03 3.52E+01 G
			723.36	-2.128E-01	+	8.821E-01	1.21E+02 2.02E+01 G
			1004.77	-2.422E-02	%	1.039E+00	1.18E+03 1.80E+01 G
			996.33	-1.801E-01	+	1.779E+00	2.77E+02 1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	1.7525E-02					1.81E+03	
			105.31	5.720E-03	%(	2.835E-01	1.44E+03	2.12E+01 G
			86.54	2.568E-02	&(	2.619E-01	3.02E+02	3.07E+01 G
TL-208	N	4.7334E-01					6.98E+02	
			583.02	4.640E-01	(	7.667E-02	1.16E+01	8.45E+01 G
			277.28	5.991E-01	?(	1.209E+00	6.13E+01	6.31E+00 G
			860.56	3.520E-02	-	1.270E+00	9.94E+02	1.24E+01 G
PB-210	N	1.6055E+00					8.14E+03	
			46.54	1.606E+00	*(P	1.684E+00	1.83E+01	4.25E+00 G
PB-212	N	1.3560E+00					6.98E+02	
			238.63	1.356E+00	(P	2.227E-01	7.03E+00	4.33E+01 G
			300.03	1.169E+00	-	2.041E+00	5.38E+01	3.28E+00 G
PB-214	N	1.2279E+00					5.84E+05	
			351.93	1.172E+00	(	2.120E-01	1.06E+01	3.76E+01 G
			295.09	1.337E+00	@(	3.665E-01	1.46E+01	1.93E+01 G
			242.00	2.034E+00	+	1.029E+00	2.19E+01	7.43E+00 G
BI-212	N	1.8380E+00					6.98E+02	
			727.17	1.926E+00	(	1.694E+00	3.01E+01	7.55E+00 G
			785.42	1.320E+00	?(	1.004E+01	2.13E+02	1.28E+00 G
BI-214	N	1.0340E+00					5.84E+05	
			609.31	1.034E+00	(P	2.220E-01	9.00E+00	4.61E+01 G
			1120.29	3.787E-01	- P	1.246E+00	8.84E+01	1.51E+01 G
			1764.49	-5.829E-02	% P	1.995E+00	1.00E+03	1.54E+01 G
AC-228	N	2.0563E+00					2.10E+03	
			911.07	2.056E+00	@(	2.714E-01	1.15E+01	2.90E+01 G
			968.97	1.130E+00	-	9.915E-01	3.00E+01	1.75E+01 G
			338.32	1.353E+00	-	6.082E-01	2.04E+01	1.20E+01 G
								Energy duplication
			93.35	1.736E+00		1.284E+00	2.38E+01	5.56E+00 XA
Pa-234	N	2.1815E-01					1.63E+12	
			131.29	6.996E-02	&(	2.566E-01	1.08E+02	1.80E+01 G
			569.47	-5.503E-02	-	1.445E+00	7.33E+02	8.20E+00 G
			946.02	3.887E-01	&(	1.261E+00	9.51E+01	1.34E+01 G
			883.24	2.579E-01	?(	1.060E+00	1.16E+02	9.60E+00 G
			880.53	-3.790E-03	%	1.984E+00	1.38E+04	6.00E+00 G
TH-234	N	2.1686E+00					1.63E+12	
			63.29	2.169E+00	(P	1.622E+00	1.35E+01	3.81E+00 G
			92.59	7.533E-01	- P	1.430E+00	1.66E+01	5.58E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234M	N 6.4604E+00					1.63E+12	
		1001.00	6.460E+00	?(	1.852E+01	8.45E+01	8.37E-01 G
		766.41	-1.318E+00	%	5.390E+01	1.14E+03	2.94E-01 G
U-235	N 1.8742E-01					2.57E+11	
		143.79	4.729E-02	(P	5.665E-01	6.42E+01	1.10E+01 G
		205.33	3.513E-01	&(	1.544E+00	1.30E+02	5.01E+00 G
		163.38	3.281E-01	?(	9.966E-01	9.02E+01	5.08E+00 G
							Energy duplication
		93.35	2.651E+00	&	1.120E+00	1.45E+01	5.81E+00 X
AM-241	T 1.7911E-03					1.58E+05	
		59.54	1.791E-03	%(	1.386E-01	2.23E+03	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
EU-155	86.54	344.	9.	0.001	302.00	2.568E-02	
U-235	93.35	216.	168.	0.023	14.54	2.651E+00	
EU-154	122.80	100.	2.	0.000	634.11	5.613E-03	
Pa-234	131.27	76.	12.	0.002	108.32	6.996E-02	
U-235	143.60	125.	5.	0.001	64.15	4.729E-02	P
U-235	163.27	64.	13.	0.002	90.25	3.281E-01	
U-235	205.67	106.	12.	0.002	129.61	3.513E-01	
I-131	284.64	50.	7.	0.001	137.92	2.459E-01	
EU-152	344.24	66.	2.	0.000	714.43	1.450E-02	
I-131	363.95	51.	-8.	-0.001	138.45	-2.311E-02	
BE-7	478.26	43.	-6.	-0.001	151.93	-1.939E-01	
CS-134	563.79	37.	2.	0.000	416.67	9.464E-02	
Pa-234	569.98	37.	-1.	0.000	733.35	-5.503E-02	
CS-134	607.20	88.	-28.	-0.004	51.84	-1.135E-01	
I-131	637.58	37.	1.	0.000	731.65	7.059E-02	
CS-137	661.52	34.	-5.	-0.001	157.42	-2.822E-02	
EU-154	723.97	55.	-9.	-0.001	121.31	-2.128E-01	
BI-212	727.30	26.	30.	0.004	30.11	1.926E+00	
EU-152	778.94	33.	-5.	-0.001	178.04	-1.878E-01	
BI-212	785.80	22.	3.	0.000	212.90	1.320E+00	
CS-134	796.54	29.	-6.	-0.001	134.16	-3.655E-02	
CS-134	801.94	30.	-1.	0.000	762.22	-6.254E-02	
EU-154	872.63	21.	4.	0.001	156.17	2.082E-01	
Pa-234	879.62	10.	4.	0.001	115.93	2.579E-01	
Pa-234	946.02	27.	8.	0.001	95.08	3.887E-01	
EU-152	965.99	50.	-4.	-0.001	271.16	-1.654E-01	
EU-154	996.96	30.	-3.	0.000	277.35	-1.801E-01	
PA-234M	1001.30	19.	8.	0.001	84.50	6.460E+00	
EU-152	1112.20	19.	5.	0.001	136.47	2.650E-01	
CO-60	1334.40	20.	2.	0.000	406.26	1.455E-02	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	-1.9387E-01	-1.9387E-01	1.519E+02%	1.02E+00
K-40		2.2074E+01	2.2074E+01	6.537E+00%	6.95E-01
CO-60	#A	1.4547E-02	1.4547E-02	4.063E+02%	2.16E-01
I-131	#A	1.3401E-03	1.3402E-03	1.379E+02%	1.10E-01
CS-134	#A	-1.1350E-01	-1.1350E-01	5.184E+01%	1.91E-01
CS-137	#A	-2.8216E-02	-2.8216E-02	1.574E+02%	1.55E-01

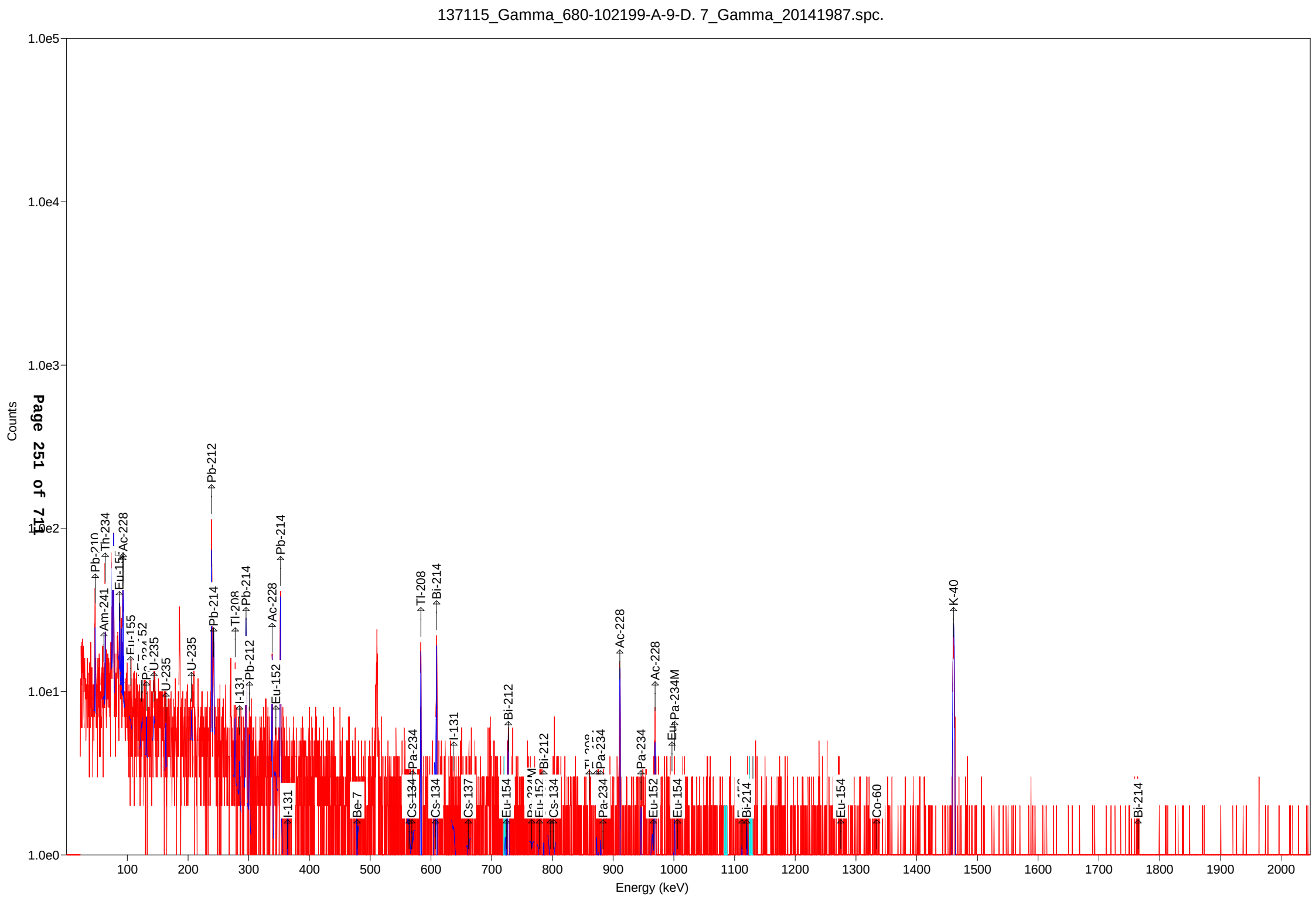
EU-152 #A	9.9629E-02	9.9629E-02	1.365E+02%	3.64E-01
EU-154 #A	2.0824E-01	2.0824E-01	1.562E+02%	1.15E+00
EU-155 #A	1.7525E-02	1.7525E-02	3.020E+02%	2.83E-01
TL-208	4.7334E-01	4.7334E-01	1.159E+01%	7.67E-02
PB-210 #A	1.6055E+00	1.6055E+00	3.834E+01%	1.68E+00
PB-212	1.3560E+00	1.3560E+00	7.847E+00%	2.23E-01
PB-214	1.2279E+00	1.2279E+00	9.006E+00%	2.12E-01
BI-212 #	1.8380E+00	1.8380E+00	3.011E+01%	1.69E+00
BI-214	1.0340E+00	1.0340E+00	1.053E+01%	2.22E-01
AC-228	2.0563E+00	2.0563E+00	1.145E+01%	2.71E-01
Pa-234 #A	2.1815E-01	2.1815E-01	6.166E+01%	2.57E-01
TH-234	2.1686E+00	2.1686E+00	2.546E+01%	1.62E+00
PA-234M#A	6.4604E+00	6.4604E+00	8.450E+01%	1.85E+01
U-235 #A	1.8742E-01	1.8742E-01	9.025E+01%	5.66E-01
AM-241 #A	1.7911E-03	1.7911E-03	2.232E+03%	1.39E-01

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (238.6 to 2000.1 keV) 3.200E+01 Bq/Sample
Total Decayed Activity (238.6 to 2000.1 keV) 3.1995384E+01 Bq/Sample

The library has energies which are not separable.


137115_Gamma_680-102199-A-9-D. 7_Gamma_20141987.spc.
Counts
1.0e5
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Energy (keV)
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Pb-210
Th-234
Am-241
Ac-228
Eu-155
U-235
U-235
U-235
Pb-212
Pb-214
Tl-208
Pb-214
I-131
Pb-212
Ac-228
Pb-214
Eu-152
I-131
Be-7
Pa-234
Cs-134
Cs-134
Tl-208
Bi-214
Cs-137
I-131
Eu-154
Bi-212
Bi-212
Cs-134
Pa-234
Ac-228
Pa-234
Eu-152
Ac-228
Eu-154
Pa-234M
Bi-214
Eu-154
Co-60
K-40
Bi-214

Prep Batch: 137389

Fill Geometry, No In-Growth

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 137389

Lab ID: MB 160-137389/1-A | Analyzed: 08/13/14 18:36 | Ts: 120 | Sigma: 2
Client ID: | Detector: GV4 | Decay Corrected: No

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.01251	0.821	0.821	U	pCi/g		1.45	137825
Radium-226	-0.9022	4.12	4.13	U	pCi/g	1.00	5.40	137825
Radium-228	0.1554	0.266	0.267	U	pCi/g		1.08	137825
Thorium-232	0.1554	0.266	0.267	U	pCi/g		1.08	137825
Thorium-234	1.124	1.11	1.12	U	pCi/g		2.97	137825
Thallium-208	0.03963	0.176	0.176	U	pCi/g		0.256	137825
Uranium-235	0.2933	0.661	0.662	U	pCi/g		1.11	137825
Uranium-238	1.124	1.11	1.12	U	pCi/g		2.97	137825
Actinium 228	0.1554	0.266	0.267	U	pCi/g		1.08	137825
Bismuth-212	0.6622	1.78	1.78	U	pCi/g		3.18	137825
Bismuth-214	-0.03500	0.410	0.410	U	pCi/g		0.657	137825
Lead-210	0.3779	2.00	2.00	U	pCi/g		3.36	137825
Lead-212	0.03745	0.237	0.237	U	pCi/g		0.454	137825
Lead-214	-0.1398	0.751	0.751	U	pCi/g		0.614	137825
Potassium-40	-1.543	6.48	6.48	U	pCi/g		5.49	137825
Protactinium-231	-0.2578	0.833	0.833	U	pCi/g		7.22	137825

Lab ID: LCS 160-137389/2-A | Analyzed: 08/13/14 20:43 | Ts: 120 | Sigma: 2
Client ID: | Detector: GV4 | Decay Corrected: No

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Americium-241	1059	6.18	105		pCi/g		3.49	137825
Cesium-137	377.5	5.07	37.1		pCi/g		2.26	137825
Cobalt-60	427.7	4.52	41.2		pCi/g		1.15	137825

Lab ID: 680-102199-1 | Analyzed: 09/08/14 18:04 | Ts: 120 | Sigma: 2
Client ID: SD-279-SS | Detector: GV12 | Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.616	0.422	0.427	U	pCi/g		0.649	142436
Radium-226	7.19	3.01	3.16		pCi/g	1.00	3.28	142436
Radium-228	2.33	0.457	0.509		pCi/g		0.315	142436
Thorium-232	2.33	0.457	0.509		pCi/g		0.315	142436
Thorium-234	2.48	2.13	2.15	U	pCi/g		2.85	142436
Thallium-208	0.503	0.179	0.186		pCi/g		0.209	142436
Uranium-235	-0.427	17.1	17.1	U	pCi/g		0.979	142436

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 137389

Lab ID: 680-102199-1 Analyzed: 09/08/14 18:04 Ts: 120 Sigma: 2
Client ID: SD-279-SS Detector: GV12 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-238	2.48	2.13	2.15	U	pCi/g		2.85	142436
Actinium 228	2.33	0.457	0.509		pCi/g		0.315	142436
Bismuth-212	3.10	1.58	1.60		pCi/g		1.66	142436
Bismuth-214	1.19	0.413	0.429		pCi/g		0.483	142436
Lead-210	2.59	1.85	1.90	U	pCi/g		2.78	142436
Lead-212	1.31	0.234	0.274		pCi/g		0.312	142436
Lead-214	1.05	0.305	0.322		pCi/g		0.393	142436
Potassium-40	17.2	2.96	3.39		pCi/g		2.67	142436
Protactinium-231	0.405	0.483	0.485	U	pCi/g		5.01	142436

Lab ID: 680-102199-1 DU Analyzed: 09/09/14 11:54 Ts: 120 Sigma: 2
Client ID: SD-279-SS Detector: GV7 Decay Corrected: No

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	-1.058	0.857	0.864	U F	pCi/g		1.39	142798
Radium-226	3.829	2.32	2.38		pCi/g	1.00	2.93	142798
Radium-228	2.130	0.397	0.447		pCi/g		0.295	142798
Thorium-232	2.130	0.397	0.447		pCi/g		0.295	142798
Thorium-234	1.594	1.65	1.66	U	pCi/g		2.22	142798
Thallium-208	0.5512	0.146	0.155		pCi/g		0.125	142798
Uranium-235	0.2206	0.393	0.394	U	pCi/g		0.615	142798
Uranium-238	1.594	1.65	1.66	U	pCi/g		2.22	142798
Actinium 228	2.130	0.397	0.447		pCi/g		0.295	142798
Bismuth-212	0.5711	1.47	1.48	U	pCi/g		2.54	142798
Bismuth-214	1.081	0.334	0.350		pCi/g		0.333	142798
Lead-210	2.573	1.31	1.35		pCi/g		1.80	142798
Lead-212	1.318	0.245	0.283		pCi/g		0.240	142798
Lead-214	1.199	0.254	0.280		pCi/g		0.235	142798
Potassium-40	18.06	3.02	3.49		pCi/g		2.51	142798
Protactinium-231	-1.685	2.63	2.64	U	pCi/g		4.39	142798

Lab ID: 680-102199-2 Analyzed: 08/14/14 13:35 Ts: 120 Sigma: 2
Client ID: SD-279-01 Detector: GV4 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.322	0.881	0.882	U	pCi/g		1.51	138111

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 137389

Lab ID: 680-102199-2 Analyzed: 08/14/14 13:35 Ts: 120 Sigma: 2
Client ID: SD-279-01 Detector: GV4 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	3.60	4.03	4.06	U	pCi/g	1.00	5.64	138111
Radium-228	1.90	0.599	0.627		pCi/g		1.17	138111
Thorium-232	1.90	0.599	0.627		pCi/g		1.17	138111
Thorium-234	2.51	2.63	2.65	U	pCi/g		3.78	138111
Thallium-208	0.719	0.280	0.289		pCi/g		0.244	138111
Uranium-235	0.388	0.441	0.442	U	pCi/g		1.17	138111
Uranium-238	2.51	2.63	2.65	U	pCi/g		3.78	138111
Actinium 228	1.90	0.599	0.627		pCi/g		1.17	138111
Bismuth-212	0.806	2.42	2.43	U	pCi/g		4.27	138111
Bismuth-214	1.29	0.630	0.642		pCi/g		0.724	138111
Lead-210	2.22	2.48	2.50	U	pCi/g		3.65	138111
Lead-212	1.20	0.357	0.380		pCi/g		0.456	138111
Lead-214	1.26	0.467	0.483		pCi/g		0.585	138111
Potassium-40	10.0	4.10	4.21		pCi/g		5.91	138111
Protactinium-231	-0.159	0.523	0.523	U	pCi/g		6.02	138111

Lab ID: 680-102199-3 Analyzed: 09/10/14 20:45 Ts: 120 Sigma: 2
Client ID: SD-279-02 Detector: GV7 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	-0.0502	0.350	0.350	U	pCi/g		0.595	143246
Radium-226	1.45	1.04	1.07		pCi/g	1.00	1.40	143246
Radium-228	0.771	0.224	0.237		pCi/g		0.200	143246
Thorium-232	0.771	0.224	0.237		pCi/g		0.200	143246
Thorium-234	0.678	0.662	0.666	U	pCi/g		1.04	143246
Thallium-208	0.282	0.0780	0.0833		pCi/g		0.0671	143246
Uranium-235	0.121	0.146	0.147	U	pCi/g		0.240	143246
Uranium-238	0.678	0.662	0.666	U	pCi/g		1.04	143246
Actinium 228	0.771	0.224	0.237		pCi/g		0.200	143246
Bismuth-212	1.30	0.565	0.581		pCi/g		0.521	143246
Bismuth-214	0.516	0.153	0.162		pCi/g		0.160	143246
Lead-210	0.418	0.688	0.690	U	pCi/g		1.05	143246
Lead-212	0.472	0.102	0.119		pCi/g		0.133	143246
Lead-214	0.552	0.120	0.133		pCi/g		0.137	143246
Potassium-40	7.51	1.37	1.57		pCi/g		1.22	143246
Protactinium-231	-0.730	1.23	1.23	U	pCi/g		2.06	143246

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 137389

Lab ID: 680-102199-7 Analyzed: 08/27/14 10:16 Ts: 120 Sigma: 2
Client ID: SD-277-SS Detector: GV4 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.431	0.429	0.432	U	pCi/g		0.679	140477
Radium-226	3.09	4.49	4.51	U	pCi/g	1.00	6.23	140477
Radium-228	1.24	0.664	0.675	U	pCi/g		1.36	140477
Thorium-232	1.24	0.664	0.675	U	pCi/g		1.36	140477
Thorium-234	2.22	2.52	2.53	U	pCi/g		3.77	140477
Thallium-208	0.501	0.208	0.214		pCi/g		0.209	140477
Uranium-235	0.323	0.743	0.743	U	pCi/g		1.08	140477
Uranium-238	2.22	2.52	2.53	U	pCi/g		3.77	140477
Actinium 228	1.24	0.664	0.675	U	pCi/g		1.36	140477
Bismuth-212	1.32	2.07	2.07	U	pCi/g		3.49	140477
Bismuth-214	1.18	0.645	0.655		pCi/g		0.721	140477
Lead-210	-0.881	3.04	3.04	U	pCi/g		4.06	140477
Lead-212	1.37	0.416	0.442		pCi/g		0.497	140477
Lead-214	0.290	0.444	0.445	U	pCi/g		0.787	140477
Potassium-40	13.2	4.53	4.70		pCi/g		6.09	140477
Protactinium-231	0.509	0.723	0.725	U	pCi/g		6.97	140477

Lab ID: 680-102199-8 Analyzed: 08/14/14 16:25 Ts: 120 Sigma: 2
Client ID: SD-277-01 Detector: GV7 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.0953	0.448	0.448	U	pCi/g		1.87	138050
Radium-226	5.27	1.97	2.10		pCi/g	1.00	2.04	138050
Radium-228	1.82	0.320	0.365		pCi/g		0.366	138050
Thorium-232	1.82	0.320	0.365		pCi/g		0.366	138050
Thorium-234	2.45	1.07	1.10		pCi/g		1.52	138050
Thallium-208	0.468	0.121	0.130		pCi/g		0.0959	138050
Uranium-235	0.105	0.228	0.229	U	pCi/g		0.561	138050
Uranium-238	2.45	1.07	1.10		pCi/g		1.52	138050
Actinium 228	1.82	0.320	0.365		pCi/g		0.366	138050
Bismuth-212	0.836	1.07	1.08	U	pCi/g		1.77	138050
Bismuth-214	0.901	0.327	0.338		pCi/g		0.308	138050
Lead-210	3.39	1.27	1.34		pCi/g		1.65	138050
Lead-212	1.06	0.192	0.223		pCi/g		0.219	138050
Lead-214	1.10	0.201	0.228		pCi/g		0.208	138050
Potassium-40	17.3	2.58	3.08		pCi/g		0.706	138050

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 137389

Lab ID: 680-102199-8 Analyzed: 08/14/14 16:25 Ts: 120 Sigma: 2
Client ID: SD-277-01 Detector: GV7 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Protactinium-231	-0.000753	0.00178	0.00179	U	pCi/g		2.99	138050

Lab ID: 680-102199-9 Analyzed: 08/14/14 16:25 Ts: 120 Sigma: 2
Client ID: SD-277-02 Detector: GV4 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.169	0.685	0.685	U	pCi/g		1.19	138111
Radium-226	3.97	3.25	3.29	U	pCi/g	1.00	4.53	138111
Radium-228	1.82	0.745	0.766		pCi/g		0.904	138111
Thorium-232	1.82	0.745	0.766		pCi/g		0.904	138111
Thorium-234	2.14	1.21	1.23	U	pCi/g		3.35	138111
Thallium-208	0.418	0.212	0.216		pCi/g		0.295	138111
Uranium-235	0.600	0.597	0.599	U	pCi/g		0.973	138111
Uranium-238	2.14	1.21	1.23	U	pCi/g		3.35	138111
Actinium 228	1.82	0.745	0.766		pCi/g		0.904	138111
Bismuth-212	1.93	2.29	2.30	U	pCi/g		3.74	138111
Bismuth-214	1.05	0.460	0.472		pCi/g		0.489	138111
Lead-210	1.84	2.39	2.40	U	pCi/g		3.31	138111
Lead-212	1.37	0.288	0.324		pCi/g		0.324	138111
Lead-214	0.573	0.322	0.327		pCi/g		0.531	138111
Potassium-40	14.9	3.99	4.24		pCi/g		4.68	138111
Protactinium-231	-0.571	3.67	3.67	U	pCi/g		6.42	138111

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 137389

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-137389/1-A	Actinium-227			0.01251	U	pCi/g							
MB 160-137389/1-A	Radium-226			-0.9022	U	pCi/g							
MB 160-137389/1-A	Radium-228			0.1554	U	pCi/g							
MB 160-137389/1-A	Thorium-232			0.1554	U	pCi/g							
MB 160-137389/1-A	Thorium-234			1.124	U	pCi/g							
MB 160-137389/1-A	Thallium-208			0.03963	U	pCi/g							
MB 160-137389/1-A	Uranium-235			0.2933	U	pCi/g							
MB 160-137389/1-A	Uranium-238			1.124	U	pCi/g							
MB 160-137389/1-A	Actinium 228			0.1554	U	pCi/g							
MB 160-137389/1-A	Bismuth-212			0.6622	U	pCi/g							
MB 160-137389/1-A	Bismuth-214			-0.03500	U	pCi/g							
MB 160-137389/1-A	Lead-210			0.3779	U	pCi/g							
MB 160-137389/1-A	Lead-212			0.03745	U	pCi/g							
MB 160-137389/1-A	Lead-214			-0.1398	U	pCi/g							
MB 160-137389/1-A	Potassium-40			-1.543	U	pCi/g							
MB 160-137389/1-A	Protactinium-231			-0.2578	U	pCi/g							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-137389/2-A	Americium-241		981	1059		pCi/g	108	87 - 116					
LCS 160-137389/2-A	Cesium-137		363	377.5		pCi/g	104	87 - 120					
LCS 160-137389/2-A	Cobalt-60		386	427.7		pCi/g	111	87 - 115					

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
680-102199-1	Actinium-227	0.616		-1.058	U F	pCi/g			756	1.30	3.47	1	
680-102199-1	Radium-226	7.19		3.829		pCi/g			61	0.61	1.70	1	
680-102199-1	Radium-228	2.33		2.130		pCi/g			9	0.20	0.58	1	
680-102199-1	Thorium-232	2.33		2.130		pCi/g			9	0.20	0.58	1	
680-102199-1	Thorium-234	2.48		1.594	U	pCi/g			44	0.23	0.66	1	
680-102199-1	Thallium-208	0.503		0.5512		pCi/g			9	0.14	0.40	1	
680-102199-1	Uranium-235	-0.427		0.2206	U	pCi/g			628	0.04	0.08	1	
680-102199-1	Uranium-238	2.48		1.594	U	pCi/g			44	0.23	0.66	1	
680-102199-1	Actinium 228	2.33		2.130		pCi/g			9	0.20	0.58	1	
680-102199-1	Bismuth-212	3.10		0.5711	U	pCi/g			138	0.82	2.32	1	
680-102199-1	Bismuth-214	1.19		1.081		pCi/g			9	0.14	0.38	1	
680-102199-1	Lead-210	2.59		2.573		pCi/g			0.8	0.01	0.02	1	
680-102199-1	Lead-212	1.31		1.318		pCi/g			0.3	0.01	0.02	1	
680-102199-1	Lead-214	1.05		1.199		pCi/g			14	0.25	0.72	1	
680-102199-1	Potassium-40	17.2		18.06		pCi/g			5	0.13	0.36	1	

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 137389

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
680-102199-1	Protactinium-231	0.405		-1.685	U	pCi/g			327	0.67	1.56	1	

Glossary:

Ts = Count Duration, Sample

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102199-4

SDG No.: 680102199-1

Batch Number: 137115 Batch Start Date: 08/11/14 14:47 Batch Analyst: Lockhart, Justin D

Batch Method: Fill_Geo-21 Batch End Date: 08/11/14 16:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	TareWeight	GrossWeight	InitialAmount	IngDecDate1	IngDecDate3	Geometry
MB 160-137115/1		Fill_Geo-21, GA-01-R				25 g	08/11/2014	09/01/2014	25mL d=1
LCS 160-137115/2		Fill_Geo-21, GA-01-R				25 g	08/11/2014	09/01/2014	25mL d=1
680-102199-A-1-D	SD-279-SS	Fill_Geo-21, GA-01-R	T	37.1 g	59.4 g	22.3 g	08/11/2014	09/01/2014	25mL d=1
680-102199-A-1-D DU	SD-279-SS	Fill_Geo-21, GA-01-R	T	37.1 g	59.4 g	22.3 g	08/11/2014	09/01/2014	25mL d=1
680-102199-A-2-C	SD-279-01	Fill_Geo-21, GA-01-R	T	36.9 g	60.9 g	24 g	08/11/2014	09/01/2014	25mL d=1
680-102199-A-3-C	SD-279-02	Fill_Geo-21, GA-01-R	T	37.1 g	88.0 g	50.9 g	08/11/2014	09/01/2014	25mL solid
680-102199-A-7-C	SD-277-SS	Fill_Geo-21, GA-01-R	T	37.0 g	61.0 g	24 g	08/11/2014	09/01/2014	25mL d=1
680-102199-A-8-C	SD-277-01	Fill_Geo-21, GA-01-R	T	37.5 g	64.1 g	26.6 g	08/11/2014	09/01/2014	25mL d=1
680-102199-A-9-C	SD-277-02	Fill_Geo-21, GA-01-R	T	37.6 g	67.4 g	29.8 g	08/11/2014	09/01/2014	25mL d=1

Lab Sample ID	Client Sample ID	Method Chain	Basis	25mLD=1 00006					
MB 160-137115/1		Fill_Geo-21, GA-01-R							
LCS 160-137115/2		Fill_Geo-21, GA-01-R		# mL					
680-102199-A-1-D	SD-279-SS	Fill_Geo-21, GA-01-R	T						
680-102199-A-1-D DU	SD-279-SS	Fill_Geo-21, GA-01-R	T						
680-102199-A-2-C	SD-279-01	Fill_Geo-21, GA-01-R	T						
680-102199-A-3-C	SD-279-02	Fill_Geo-21, GA-01-R	T						
680-102199-A-7-C	SD-277-SS	Fill_Geo-21, GA-01-R	T						
680-102199-A-8-C	SD-277-01	Fill_Geo-21, GA-01-R	T						
680-102199-A-9-C	SD-277-02	Fill_Geo-21, GA-01-R	T						

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102199-4

SDG No.: 680102199-1

Batch Number: 137115 Batch Start Date: 08/11/14 14:47 Batch Analyst: Lockhart, Justin D

Batch Method: Fill_Geo-21 Batch End Date: 08/11/14 16:00

Batch Notes	
Balance ID	1121432711
SOP Number	ST-RC-0003 ST-RC-0025

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102199-4

SDG No.: 680102199-1

Batch Number: 137389 Batch Start Date: 08/12/14 11:54 Batch Analyst: Lockhart, Justin D

Batch Method: Fill_Geo-0 Batch End Date:

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	TareWeight	GrossWeight	Geometry	25mLD=1 00006	
MB 160-137389/1		Fill_Geo-0, GA-01-R		25 g			25mL d=1		
LCS 160-137389/2		Fill_Geo-0, GA-01-R		25 g			25mL d=1	# mL	
680-102199-A-1-G	SD-279-SS	Fill_Geo-0, GA-01-R	T	22.3 g	37.1 g	59.4 g	25mL d=1		
680-102199-A-1-G DU	SD-279-SS	Fill_Geo-0, GA-01-R	T	22.3 g	37.1 g	59.4 g	25mL d=1		
680-102199-A-2-E	SD-279-01	Fill_Geo-0, GA-01-R	T	24 g	36.9 g	60.9 g	25mL d=1		
680-102199-A-3-E	SD-279-02	Fill_Geo-0, GA-01-R	T	50.9 g	37.1 g	88.0 g	25mL solid		
680-102199-A-7-E	SD-277-SS	Fill_Geo-0, GA-01-R	T	24 g	37.0 g	61.0 g	25mL d=1		
680-102199-A-8-E	SD-277-01	Fill_Geo-0, GA-01-R	T	26.6 g	37.5 g	64.1 g	25mL d=1		
680-102199-A-9-E	SD-277-02	Fill_Geo-0, GA-01-R	T	29.8 g	37.6 g	67.4 g	25mL d=1		

Batch Notes	
Balance ID	1121432711
SOP Number	ST-RC-0003 ST-RC-0025

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

Test America St. Louis Spectrum ID: 4_Gamma_20141547

Sample Description: 137389_Gamma_MB 160-137389~1-A
Detector: Ge 4 SN/181
Batch ID: 137389
Work Order Number: Gamma
Lot Number: MB 160-137389~1-A

Decay to Time: 8/13/2014 18:35 Live Time: 7200 sec
Acquisition Time: 8/13/2014 18:36:18 Real Time: 7207 sec
Analysis Time: 8/13/2014 20:36 Dead Time: 0.09 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 4_Liquid_D=1 25ml.Clb
Efficiency Cal Desc: 4_Liquid_D=1 25ml_90101_030512
Efficiency Cal Date: 3/27/2012 20:51
Energy Cal Date: 2/28/2012 14:55
Library: Client_ Long_no ingrowth Rev3.li
Bkgd Correction File: 4_2014-08-09_2125.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	4.849E-02	987.0	4.786E-01	4.786E-01	1.769E+00
NA-22	-4.758E-02	232.5	1.106E-01	1.107E-01	4.042E-01
K-40	-1.428E+00	209.9	2.997E+00	2.998E+00	5.078E+00
Sc-46	0.000E+00	1000.0	2.833E-02	2.833E-02	4.559E-01
CR-51	1.503E-01	288.9	4.343E-01	4.344E-01	1.550E+00
MN-54	5.039E-02	155.0	7.808E-02	7.812E-02	2.789E-01
FE-59	0.000E+00	707.1	6.125E-02	6.125E-02	5.786E-01
Co-56	1.287E-01	64.6	8.317E-02	8.340E-02	2.737E-01
CO-57	3.597E-02	91.0	3.273E-02	3.279E-02	1.057E-01
CO-58	-4.979E-03	1520.0	7.570E-02	7.570E-02	2.834E-01
CO-60	3.231E-02	341.3	1.103E-01	1.103E-01	4.095E-01
ZN-65	1.191E-01	138.8	1.653E-01	1.654E-01	5.959E-01
NB-94	5.533E-02	139.5	7.718E-02	7.723E-02	2.717E-01
ZR-95	-2.953E-02	460.6	1.360E-01	1.360E-01	5.008E-01
NB-95	-3.162E-02	258.7	8.179E-02	8.180E-02	2.950E-01
RU-103	3.707E-03	1460.0	5.411E-02	5.411E-02	2.019E-01
RH-106	7.643E-02	878.4	6.713E-01	6.713E-01	2.470E+00
AG-108M	3.002E-02	130.0	3.904E-02	3.907E-02	2.111E-01
AG-110M	-1.143E-01	118.2	1.351E-01	1.352E-01	4.698E-01
SN-113	-4.043E-03	2395.0	9.682E-02	9.682E-02	3.464E-01
SB-124	2.647E-02	309.5	8.193E-02	8.194E-02	2.917E-01
SB-125	1.017E-01	122.4	1.244E-01	1.245E-01	5.692E-01
I-131	7.582E-02	141.7	1.074E-01	1.075E-01	2.224E-01
Gd-153	3.535E-02	188.2	6.653E-02	6.656E-02	2.620E-01
Ga-68	0.000E+00	1000.0	5.213E-01	5.213E-01	2.186E+01
Tc-99m	-6.441E-03	662.0	4.264E-02	4.265E-02	1.490E-01
BA-133	-3.829E-02	234.5	8.981E-02	8.983E-02	3.155E-01
CS-134	9.359E-02	131.0	1.226E-01	1.227E-01	3.017E-01
CS-137	6.556E-03	1203.0	7.885E-02	7.885E-02	2.923E-01
CE-139	7.362E-02	54.0	3.977E-02	4.009E-02	1.291E-01
Ba-140	0.000E+00	1000.0	1.149E-01	1.149E-01	9.449E-01
La-140	2.091E-02	202.7	4.239E-02	4.240E-02	1.909E-01
CE-141	-3.789E-02	194.7	7.377E-02	7.379E-02	2.539E-01
CE-144	2.445E-01	109.4	2.676E-01	2.678E-01	9.100E-01
PM-144	8.958E-02	88.4	7.923E-02	7.935E-02	2.698E-01
EU-152	5.405E-02	107.3	5.800E-02	5.805E-02	6.745E-01
EU-154	6.994E-02	93.1	6.512E-02	6.520E-02	2.616E+00
EU-155	-3.520E-02	398.8	1.404E-01	1.404E-01	4.888E-01
HF-181	3.229E-02	113.6	3.667E-02	3.671E-02	3.019E-01
Ta-182	6.279E-02	429.6	2.698E-01	2.698E-01	1.006E+00
Hg-203	-1.362E-02	421.9	5.747E-02	5.747E-02	2.033E-01
TL-208	3.666E-02	222.6	8.158E-02	8.160E-02	2.364E-01
pm-146	-1.761E-02	82.7	1.457E-02	1.459E-02	9.264E-01

y-88	-2.138E-03	4460.0	9.532E-02	9.532E-02	3.549E-01
Cd-109	5.056E-01	114.5	5.787E-01	5.793E-01	1.983E+00
Ra-226	-8.346E-01	228.5	1.907E+00	1.908E+00	4.997E+00
PB-210	3.496E-01	264.7	9.252E-01	9.255E-01	3.112E+00
PB-212	3.464E-02	317.0	1.098E-01	1.098E-01	4.199E-01
PB-214	-1.294E-01	268.5	3.474E-01	3.475E-01	5.682E-01
BI-207	5.995E-02	113.3	6.794E-02	6.801E-02	2.122E-01
BI-212	6.125E-01	134.6	8.243E-01	8.248E-01	2.940E+00
BI-214	-3.237E-02	585.9	1.897E-01	1.897E-01	6.074E-01
BI-210M	-4.280E-02	208.4	8.918E-02	8.921E-02	3.117E-01
RA-224	-8.428E-01	147.3	1.241E+00	1.242E+00	4.255E+00
AC-228	1.438E-01	85.7	1.232E-01	1.234E-01	9.986E-01
TH-227	1.157E-02	3281.0	3.796E-01	3.796E-01	1.342E+00
TH-229	1.377E+00	54.3	7.483E-01	7.531E-01	2.427E+00
TH-234	1.040E+00	49.4	5.135E-01	5.160E-01	2.743E+00
PA-231	-2.385E-01	161.4	3.851E-01	3.852E-01	6.682E+00
PA-233	6.274E-02	249.7	1.566E-01	1.567E-01	4.028E-01
PA-234	1.484E-01	139.0	2.062E-01	2.064E-01	5.932E-01
PA-234M	-5.118E-01	2094.0	1.072E+01	1.072E+01	4.030E+01
U-235	2.713E-01	112.8	3.059E-01	3.062E-01	1.027E+00
AM-241	3.629E-02	174.5	6.331E-02	6.334E-02	2.198E-01
Ir-192	4.593E-03	1042.0	4.786E-02	4.786E-02	1.738E-01
Np-237	2.452E-01	80.7	1.979E-01	1.983E-01	6.628E-01
Total	6.658E+00				

Analyst: Rachel Mueller

TestAmerica Spectrum name: 4_Gamma_20141547.An1

Sample description
137389_Gamma_MB 160-137389~1-A

Spectrum Filename: C:\User\SPC\Det4\4_Gamma_20141547.An1

Acquisition information
Start time: 8/13/2014 6:36:18 PM
Live time: 7200
Real time: 7207
Dead time: 0.09 %
Detector ID: 4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_Liquid_D=1 25ml.Clb
4_Liquid_D=1 25ml_90101_030512

Energy Calibration
Created: 2/28/2012 2:55:17 PM
Zero offset: 0.091 keV
Gain: 0.250 keV/channel
Quadratic: -2.917E-08 keV/channel^2

Efficiency Calibration
Created: 3/27/2012 8:51:45 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.48 %
Log(Eff): 8.809878E-01 + (-6.811249E-01*Log(E)) +
(-1.909804E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -1.031199E+01 + (3.529752E+00*Log(E)) +
(-4.143154E-01*Log(E)^2)

Library Files
Main analysis library: Client_ Long_no ingrowth Rev3.li
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (1999.44keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/13/2014 6:35:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	4_2014-08-09_2125.PBC 8/9/2014 9:25:56 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 10 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1899

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.68	76.	21.33	0.88	5.693E-02	46.54	4.250	PBC<MDA	PB210
58.89	6.	174.46	0.81	6.042E-02	59.54	35.900	PBC<MDA	AM241
63.44	73.	18.45	0.58	6.087E-02	63.29	3.810	PBC<MDA	TH234
86.49	14.	80.70	0.84	6.016E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.046E-01	EU155
					86.54	30.700	1.046E-01	EU155
88.04	8.	114.46	0.84	5.998E-02	88.04	3.790	PBC<MDA	Cd109
92.65	93.	16.73	0.85	5.936E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	3.905E+00	AC228
99.10	4.	219.12	0.85	5.863E-02	97.50	30.000	PBC<MDA	Gd153
102.77	3.	306.07	0.85	5.767E-02	103.20	21.800	PBC<MDA	Gd153
121.39	6.	173.75	0.87	5.415E-02	121.78	28.580	PBC<MDA	EU152
122.25	10.	93.11	0.87	5.389E-02	122.06	85.600	PBC<MDA	CO57
					123.10	40.790	6.495E-02	EU154
122.31	11.	91.01	0.87	5.409E-02	122.06	85.600	PBC<MDA	CO57
					123.10	40.790	7.248E-02	EU154
131.64	7.	141.33	0.88	5.187E-02	131.29	18.000	PBC<MDA	PA234
					133.02	43.300	4.066E-02	HF181
133.54	10.	109.45	0.88	5.177E-02	133.54	11.090	PBC<MDA	CE144
136.58	2.	619.41	0.88	5.117E-02	136.47	10.680	PBC<MDA	CO57
138.05	9.	113.57	0.88	5.121E-02	136.30	5.850	PBC<MDA	HF181
144.57	7.	178.88	0.89	4.968E-02	143.79	10.960	PBC<MDA	U235

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
165.02	19.	54.02	0.91	4.508E-02	165.85	79.900	PBC<MDA	CE139
185.82	-8.	39.69	0.93	4.077E-02	185.99	3.280	PBC<MDA	Ra226
192.71	17.	54.33	0.94	3.937E-02	193.51	4.400	PBC<MDA	TH229
205.44	7.	137.35	0.95	3.736E-02	205.33	5.010	PBC<MDA	U235
238.51	4.	37.47	0.98	3.269E-02	238.63	43.300	PBC<MDA	PB212
299.94	3.	256.29	1.03	2.663E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	6.946E-01	PA231
					300.18	6.200	2.757E-01	PA233
300.02	3.	263.87	1.03	2.663E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	6.948E-01	PA231
					300.18	6.200	2.758E-01	PA233
300.02	0.	263.81	1.03	2.664E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
					300.18	6.200	PBC<MDA	PA233
311.73	2.	428.57	1.04	2.572E-02	312.01	36.000	PBC<MDA	PA233
321.55	3.	288.90	1.05	2.513E-02	320.08	9.940	PBC<MDA	CR51
328.58	4.	202.75	1.06	2.453E-02	328.76	20.300	PBC<MDA	La140
338.15	8.	85.69	1.07	2.391E-02	338.32	12.010	PBC<MDA	AC228
351.73	-8.	81.62	1.08	2.307E-02	351.93	37.600	PBC<MDA	PB214
363.86	2.	328.85	1.09	2.235E-02	364.48	81.700	PBC<MDA	I131
463.09	2.	368.16	1.18	1.796E-02	463.37	10.470	PBC<MDA	SB125
475.99	1.	986.95	1.19	1.747E-02	477.60	10.520	PBC<MDA	BE7
510.79	60.	24.34	1.22	1.639E-02	511.86	20.000	2.554E+00	RH106
569.53	5.	138.97	1.27	1.486E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	5.146E-01	PA234
					569.70	97.740	4.319E-02	BI207
569.63	5.	137.82	1.27	1.485E-02	569.32	15.380	2.770E-01	CS134
					569.47	8.200	5.198E-01	PA234
					569.70	97.740	4.362E-02	BI207
569.63	5.	131.01	1.27	1.486E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	5.398E-01	PA234
					569.70	97.740	4.531E-02	BI207
600.15	6.	122.41	1.30	1.414E-02	600.50	17.860	PBC<MDA	SB125
602.63	3.	309.54	1.30	1.410E-02	602.73	98.260	PBC<MDA	SB124
604.74	1.	675.40	1.30	1.405E-02	604.71	97.620	PBC<MDA	CS134
608.23	-1.	66.16	1.30	1.396E-02	609.31	46.090	PBC<MDA	BI214
614.12	5.	130.03	1.31	1.385E-02	614.28	89.850	PBC<MDA	AG108M
620.79	1.	878.37	1.31	1.369E-02	621.92	9.930	PBC<MDA	RH106
634.02	3.	256.76	1.33	1.341E-02	635.89	11.310	PBC<MDA	SB125
637.31	5.	141.67	1.33	1.339E-02	636.97	7.170	PBC<MDA	I131
696.65	8.	88.44	1.38	1.232E-02	696.54	99.000	PBC<MDA	PM144
702.67	5.	139.48	1.38	1.223E-02	702.63	97.900	PBC<MDA	NB94
725.97	4.	134.57	1.40	1.184E-02	727.17	7.550	PBC<MDA	BI212
734.40	5.	107.43	1.41	1.171E-02	735.72	22.500	PBC<MDA	pm146
779.67	4.	164.22	1.45	1.110E-02	778.92	12.940	PBC<MDA	EU152
804.07	4.	137.33	1.47	1.081E-02	801.95	8.690	PBC<MDA	CS134
834.56	4.	154.97	1.49	1.041E-02	834.85	99.980	PBC<MDA	MN54
845.57	10.	64.61	1.50	1.027E-02	846.77	99.935	PBC<MDA	Co56

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
860.41	3.	222.57	1.52	1.011E-02	860.56	12.420	PBC<MDA	TL208
968.26	3.	158.69	1.60	9.045E-03	968.97	17.460	PBC<MDA	AC228
1004.38	1.	520.55	1.63	8.740E-03	1004.77	18.010	PBC<MDA	EU154
1063.72	4.	179.95	1.68	8.281E-03	1063.66	74.500	PBC<MDA	BI207
1117.03	3.	138.77	1.72	7.916E-03	1115.55	50.600	PBC<MDA	ZN65
1121.19	1.	429.64	1.73	7.877E-03	1121.30	34.900	PBC<MDA	Ta182
1332.46	2.	341.30	1.89	6.683E-03	1332.50	99.980	PBC<MDA	CO60
1460.17	-7.	70.58	1.99	6.120E-03	1460.83	10.670	PBC<MDA	K40
1764.23	-6.	178.96	2.21	5.102E-03	1764.49	15.400	PBC<MDA	BI214
1771.01	2.	204.31	2.22	5.083E-03	1771.35	15.480	PBC<MDA	Co56

No unknown peaks passed sensitivity test.

This section based on library: Client_ Long_no ingrowth Rev3.li

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.24	46.68	122.	6.	0.001	21.33	0.884s
TH-227	199.40	49.97	61.	-3.	0.000	347.14	0.803s
AM-241	235.06	58.89	46.	6.	0.001	174.46	0.812s
TH-234	253.26	63.44	85.	23.	0.003	18.45	0.576s
Np-237	345.40	86.49	56.	14.	0.002	80.70	0.837D
EU-155	345.61	86.54	83.	-2.	0.000	545.23	0.837
Cd-109	351.60	88.04	41.	8.	0.001	114.46	0.839D
TH-234	370.03	92.65	117.	20.	0.003	16.73	0.850s
AC-228	370.35	92.73	55.	74.	0.010	18.33	0.843s
Gd-153	395.82	99.10	43.	4.	0.001	219.12	0.847
Gd-153	410.48	102.77	51.	3.	0.000	306.07	0.853s
EU-155	423.12	105.93	74.	-3.	0.000	398.83	0.855s
EU-152	484.94	121.39	54.	6.	0.001	173.75	0.870
CO-57	488.61	122.31	49.	11.	0.002	91.01	0.870s
EU-154	488.36	122.25	41.	10.	0.001	93.11	0.871s
PA-234	524.53	131.29	65.	-1.	0.000	916.18	0.878s
HF-181	525.91	131.64	40.	7.	0.001	141.33	0.880s
CE-144	533.50	133.54	56.	10.	0.001	109.45	0.880s
HF-181	551.54	138.05	47.	9.	0.001	113.57	0.883s
CO-57	545.64	136.58	69.	2.	0.000	619.41	0.883s
Tc-99m	560.22	140.22	75.	-2.	0.000	662.03	0.887s
U-235	577.61	144.57	65.	7.	0.001	178.88	0.890s
CE-141	581.06	145.43	77.	-6.	-0.001	194.67	0.891s
Ba-140	647.06	161.94	60.	-6.	-0.001	196.29	0.907s
U-235	646.05	161.69	39.	-1.	0.000	958.41	0.908s
CE-139	659.36	165.02	44.	19.	0.003	54.02	0.910s
Ra-226	742.52	185.82	95.	-8.	-0.001	39.69	0.929s
TH-229	770.07	192.71	35.	17.	0.002	54.33	0.935s
U-235	820.98	205.44	39.	7.	0.001	137.35	0.946

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-212	953.21	238.51	74.	4.	0.000	37.47	0.976s
RA-224	964.28	241.28	67.	-8.	-0.001	147.31	0.979s
PB-214	964.26	241.28	54.	-6.	-0.001	228.69	0.979s
TH-227	1022.42	255.82	53.	-2.	0.000	481.63	0.992s
BI-210M	1063.28	266.04	43.	-5.	-0.001	208.38	1.001s
Hg-203	1111.98	278.22	45.	-2.	0.000	421.85	1.013s
Ir-192	1181.89	295.70	45.	-2.	0.000	530.96	1.028s
PA-231	1199.14	300.02	36.	3.	0.000	263.87	1.032s
PA-233	1198.83	299.94	34.	3.	0.000	256.29	1.032s
PA-231	1211.59	303.13	53.	-6.	-0.001	186.09	1.034s
BA-133	1211.49	303.11	53.	-6.	-0.001	188.46	1.034s
Ir-192	1231.52	308.11	47.	-5.	-0.001	205.79	1.039s
PA-233	1245.99	311.73	27.	2.	0.000	428.57	1.043s
CR-51	1285.26	321.55	29.	3.	0.000	288.90	1.050s
La-140	1313.35	328.58	35.	4.	0.001	202.75	1.058
AC-228	1351.61	338.15	22.	8.	0.001	85.69	1.066s
EU-152	1374.34	343.83	35.	-4.	-0.001	215.54	1.071s
PB-214	1405.95	351.73	49.	-8.	-0.001	81.62	1.078s
BA-133	1426.28	356.82	40.	-4.	-0.001	234.54	1.082s
I-131	1454.43	363.86	32.	2.	0.000	328.85	1.089s
SB-125	1709.50	427.64	20.	-4.	-0.001	153.36	1.146s
pm-146	1813.75	453.71	37.	-2.	0.000	352.18	1.168s
SB-125	1851.27	463.09	21.	2.	0.000	368.16	1.177s
Ir-192	1868.49	467.40	27.	-5.	-0.001	161.59	1.181s
PM-144	1906.20	476.83	28.	-1.	0.000	773.47	1.189s
BE-7	1902.84	475.99	20.	1.	0.000	986.95	1.189s
RH-106	2042.04	510.79	78.	60.	0.008	24.34	1.219s
CS-134	2248.49	562.41	26.	-6.	-0.001	132.51	1.264s
CS-134	2277.37	569.63	17.	5.	0.001	131.01	1.269s
PA-234	2276.98	569.53	17.	5.	0.001	138.97	1.269s
BI-207	2277.36	569.63	17.	5.	0.001	137.82	1.269s
SB-125	2399.44	600.15	24.	6.	0.001	122.41	1.296s
SB-124	2409.36	602.63	32.	3.	0.000	309.54	1.298s
CS-134	2417.80	604.74	34.	1.	0.000	675.40	1.300s
BI-214	2431.77	608.23	30.	-1.	0.000	66.16	1.304s
RU-103	2442.19	610.84	32.	-7.	-0.001	126.43	1.305s
AG-108M	2455.32	614.12	19.	5.	0.001	130.03	1.308s
PM-144	2472.87	618.51	28.	-1.	0.000	593.14	1.311s
RH-106	2482.01	620.79	21.	1.	0.000	878.37	1.314s
SB-125	2534.92	634.02	23.	3.	0.000	256.76	1.326s
I-131	2548.09	637.31	22.	5.	0.001	141.67	1.327s
PM-144	2785.46	696.65	20.	8.	0.001	88.44	1.378s
NB-94	2809.52	702.67	20.	5.	0.001	139.48	1.383s
SB-124	2890.28	722.86	21.	-1.	0.000	476.27	1.400s
AG-108M	2893.91	723.76	25.	-6.	-0.001	124.13	1.401s
EU-154	2893.88	723.76	26.	-6.	-0.001	121.99	1.401s
ZR-95	2893.89	723.76	24.	-6.	-0.001	124.60	1.401s
BI-212	2902.74	725.97	12.	4.	0.001	134.57	1.404

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
pm-146	2936.45	734.40	13.	5.	0.001	107.43	1.411s
pm-146	2986.01	746.79	25.	-6.	-0.001	125.84	1.421s
ZR-95	3031.51	758.16	18.	-1.	0.000	460.63	1.429s
NB-95	3060.70	765.46	21.	-3.	0.000	258.69	1.437s
PA-234M	3057.12	764.56	18.	-2.	0.000	275.88	1.437s
EU-152	3117.54	779.67	15.	4.	0.000	164.22	1.448s
BI-212	3141.29	785.60	20.	-1.	0.000	917.58	1.453s
CS-134	3182.35	795.87	23.	-2.	0.000	276.45	1.462s
CS-134	3215.18	804.07	17.	4.	0.001	137.33	1.467s
MN-54	3337.14	834.56	15.	4.	0.001	154.97	1.494s
Co-56	3381.20	845.57	14.	10.	0.001	64.61	1.504s
TL-208	3440.54	860.41	19.	3.	0.000	222.57	1.516s
PA-234	3533.36	883.61	26.	-6.	-0.001	124.18	1.534s
AG-110M	3533.35	883.60	21.	-6.	-0.001	118.21	1.536s
AC-228	3654.64	913.92	14.	-1.	0.000	579.66	1.557s
EU-152	3856.48	964.36	19.	-2.	0.000	318.73	1.601s
AC-228	3872.07	968.26	11.	3.	0.000	158.69	1.605s
EU-154	4016.58	1004.38	14.	1.	0.000	520.55	1.634s
RH-106	4200.27	1050.28	12.	-2.	0.000	229.15	1.671s
BI-207	4254.02	1063.72	19.	4.	0.001	179.95	1.682s
ZN-65	4467.37	1117.03	10.	3.	0.000	138.77	1.723s
Sc-46	4478.63	1119.85	16.	-1.	0.000	929.84	1.727s
Ta-182	4484.02	1121.19	14.	1.	0.000	429.64	1.728s
Ta-182	4755.95	1189.14	9.	-1.	0.000	379.53	1.781s
NA-22	5096.64	1274.27	14.	-2.	0.000	232.54	1.848s
EU-154	5096.70	1274.28	14.	-2.	0.000	232.25	1.848s
CO-60	5329.55	1332.46	13.	2.	0.000	341.30	1.893s
AG-110M	5546.05	1386.55	4.	0.	0.000	956.04	1.932s
K-40	5840.75	1460.17	21.	-7.	-0.001	70.58	1.991s
BI-214	7058.06	1764.23	17.	-6.	-0.001	178.96	2.214s
Co-56	7085.22	1771.01	9.	2.	0.000	204.31	2.219s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	4.8491E-02				5.31E+01		
			477.60	4.849E-02	?(	1.769E+00	9.87E+02 1.05E+01	G
NA-22	C	-4.7579E-02				9.50E+02		
			1274.53	-4.758E-02	?(	4.042E-01	2.33E+02 9.99E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
K-40	N	-1.4277E+00					4.66E+11	
			1460.83	-1.428E+00	?(P	5.078E+00	7.06E+01	1.07E+01 G
CR-51	F	1.5034E-01					2.77E+01	
			320.08	1.503E-01	?(	1.550E+00	2.89E+02	9.94E+00 G
MN-54	C	5.0386E-02					3.12E+02	
			834.85	5.039E-02	&(	2.789E-01	1.55E+02	1.00E+02 G
Co-56	C	1.2873E-01					7.73E+01	
			846.77	1.287E-01	&(	2.737E-01	6.46E+01	9.99E+01 G
			1238.28	0.000E+00	-	2.728E-01	1.00E+03	6.61E+01 G
			1037.84	-9.574E-03	%	1.858E+00	4.91E+03	1.41E+01 G
			1771.35	3.795E-01	?	2.887E+00	2.04E+02	1.55E+01 A
CO-57	C	3.5969E-02					2.72E+02	
			122.06	3.441E-02	?(	1.057E-01	9.10E+01	8.56E+01 G
			136.47	4.850E-02	&(	1.052E+00	6.19E+02	1.07E+01 G
CO-58	C	-4.9794E-03					7.09E+01	
			810.78	-4.979E-03	%(	2.834E-01	1.52E+03	9.95E+01 G
CO-60	F	3.2305E-02					1.93E+03	
			1332.50	3.230E-02	&(	4.095E-01	3.41E+02	1.00E+02 G
			1173.24	3.646E-04	%	3.556E-01	2.54E+04	9.99E+01 G
ZN-65	F	1.1914E-01					2.44E+02	
			1115.55	1.191E-01	?(	5.959E-01	1.39E+02	5.06E+01 G
NB-94	I	5.5332E-02					7.41E+06	
			702.63	5.533E-02	?(	2.717E-01	1.39E+02	9.79E+01 G
			871.10	0.000E+00	&	3.718E-01	1.00E+03	9.99E+01 G
ZR-95	I	-2.9532E-02					6.40E+01	
			756.73	-2.953E-02	?(	5.008E-01	4.61E+02	5.45E+01 G
			724.20	-1.554E-01	+	6.737E-01	1.25E+02	4.42E+01 G
NB-95	I	-3.1615E-02					6.40E+01	
			765.79	-3.162E-02	?(	2.950E-01	2.59E+02	9.98E+01 G
RU-103	I	3.7073E-03					3.93E+01	
			497.05	3.707E-03	&(	2.019E-01	1.46E+03	9.09E+01 G
			610.30	-1.156E+00	+	5.054E+00	1.26E+02	5.75E+00 GA
RH-106	I	7.6430E-02					3.74E+02	
			621.92	7.643E-02	?(	2.470E+00	8.78E+02	9.93E+00 G
			1050.36	-2.387E+00	+	2.012E+01	2.29E+02	1.56E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			511.86	2.554E+00	?	1.853E+00	2.43E+01	2.00E+01 GA
AG-108M	C	3.0024E-02					1.53E+05	
			433.94	4.202E-03	%(	2.111E-01	1.37E+03	9.05E+01 G
			722.94	-7.773E-02	+	3.352E-01	1.24E+02	9.08E+01 G
			614.28	5.603E-02	?(	2.557E-01	1.30E+02	8.98E+01 G
AG-110M	F	-1.1428E-01					2.50E+02	
			884.68	-1.143E-01	?(	4.698E-01	1.18E+02	7.27E+01 G
			657.76	3.082E-03	%	2.963E-01	2.62E+03	9.46E+01 G
			937.49	-1.193E-03	%	9.242E-01	2.05E+04	3.44E+01 G
			1384.30	-2.766E-02	+	1.097E+00	9.56E+02	2.43E+01 G
			763.94	-7.539E-03	%	1.280E+00	4.56E+03	2.23E+01 G
SN-113	F	-4.0427E-03					1.15E+02	
			391.69	-4.043E-03	%(	3.464E-01	2.39E+03	6.40E+01 G
SB-124	F	2.6467E-02					6.02E+01	
			602.73	2.647E-02	?(	2.917E-01	3.10E+02	9.83E+01 G
			1690.98	0.000E+00	-	4.029E-01	1.00E+03	4.78E+01 G
			722.79	-1.500E-01	+	2.609E+00	4.76E+02	1.08E+01 G
SB-125	I	1.0166E-01					1.01E+03	
			427.88	-1.049E-01	?(	5.692E-01	1.53E+02	2.96E+01 G
			600.50	3.311E-01	?(	1.408E+00	1.22E+02	1.79E+01 G
			635.89	2.509E-01	?(	2.311E+00	2.57E+02	1.13E+01 G
			463.37	1.331E-01	?(	1.781E+00	3.68E+02	1.05E+01 G
I-131	I	7.5820E-02					8.02E+00	
			364.48	1.898E-02	?(	2.224E-01	3.29E+02	8.17E+01 G
			284.30	-3.148E-02	%	2.119E+00	1.84E+03	6.14E+00 G
			636.97	7.236E-01	?(	3.598E+00	1.42E+02	7.17E+00 G
Gd-153	F	3.5346E-02					2.42E+02	
			97.50	3.415E-02	(	2.620E-01	2.19E+02	3.00E+01 G
			103.20	3.699E-02	?(	3.970E-01	3.06E+02	2.18E+01 G
Tc-99m	I	-6.4414E-03					2.51E-01	
			140.51	-6.441E-03	&(	1.490E-01	6.62E+02	8.93E+01 G
BA-133	F	-3.8291E-02					3.85E+03	
			356.00	-3.829E-02	?(	3.155E-01	2.35E+02	6.20E+01 G
			302.85	-1.602E-01	+	1.047E+00	1.88E+02	1.83E+01 G
			383.84	-2.359E-02	&	2.156E+00	2.53E+03	8.94E+00 GA
			80.99	1.758E-04	%	2.343E-01	3.73E+04	3.41E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-134	I	9.3592E-02				7.54E+02		
			604.71	1.243E-02	?(	3.017E-01	6.75E+02	9.76E+01 G
			795.87	-3.725E-02	+	3.708E-01	2.76E+02	8.55E+01 G
			569.32	2.877E-01	&(	1.328E+00	1.31E+02	1.54E+01 G
			801.95	6.617E-01	?(	3.212E+00	1.37E+02	8.69E+00 G
			563.24	-6.348E-01	+	2.931E+00	1.33E+02	8.35E+00 G
CS-137	I	6.5559E-03				1.10E+04		
			661.66	6.556E-03	%(	2.923E-01	1.20E+03	8.52E+01 G
CE-139	F	7.3617E-02				1.38E+02		
			165.85	7.362E-02	&(	1.291E-01	5.40E+01	7.99E+01 G
La-140	I	2.0906E-02				1.28E+01		
			1596.21	0.000E+00	?(	1.909E-01	1.00E+03	9.54E+01 G
			487.02	2.669E-04	%	4.600E-01	4.68E+04	4.55E+01 G
			328.76	1.192E-01	?(	8.486E-01	2.03E+02	2.03E+01 G
			815.77	1.742E-03	&	1.250E+00	1.91E+04	2.33E+01 G
CE-141	I	-3.7892E-02				3.25E+01		
			145.44	-3.789E-02	?(	2.539E-01	1.95E+02	4.82E+01 G
CE-144	I	2.4446E-01				2.85E+02		
			133.54	2.445E-01	(	9.100E-01	1.09E+02	1.11E+01 G
PM-144	C	8.9579E-02				3.63E+02		
			696.54	8.958E-02	(	2.698E-01	8.84E+01	9.90E+01 G
			618.06	-1.291E-02	-	2.770E-01	5.93E+02	9.91E+01 G
			476.81	-1.831E-02	-	5.137E-01	7.73E+02	4.20E+01 G
EU-152	F	5.4051E-02				4.94E+03		
			344.29	-8.890E-02	?(	6.745E-01	2.16E+02	2.65E+01 G
			1112.07	0.000E+00	+	3.828E+00	1.00E+03	1.36E+01 G
			121.78	5.510E-02	&(	3.311E-01	1.74E+02	2.86E+01 G
			778.92	3.445E-01	?(	2.026E+00	1.64E+02	1.29E+01 G
			964.11	-2.079E-01	+	2.412E+00	3.19E+02	1.46E+01 G
			244.69	-3.961E-02	%	1.737E+00	1.22E+03	7.58E+00 G
			1408.00	-2.869E-03	%	1.983E+00	1.80E+04	2.10E+01 GA
EU-154	I	6.9937E-02				3.14E+03		
			873.23	5.546E-02	&(	2.616E+00	1.27E+03	1.23E+01 G
			123.10	6.495E-02	&(	2.049E-01	9.31E+01	4.08E+01 G
			1274.54	-1.353E-01	+	1.148E+00	2.32E+02	3.52E+01 G
			723.36	-3.612E-01	+	1.528E+00	1.22E+02	2.02E+01 G
			1004.77	9.109E-02	?(	1.773E+00	5.21E+02	1.80E+01 G
			996.33	5.826E-02	&	2.742E+00	1.23E+03	1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	-3.5201E-02					1.81E+03	
			105.31	-3.520E-02	?(	4.888E-01	3.99E+02	2.12E+01 G
			86.54	-1.786E-02	+	3.390E-01	5.45E+02	3.07E+01 G
HF-181	F	3.2292E-02					4.24E+01	
			482.00	0.000E+00	?(	3.019E-01	1.00E+03	8.05E+01 G
			133.02	4.066E-02	&(	1.988E-01	1.41E+02	4.33E+01 G
			345.83	1.823E-02	%	1.099E+00	1.66E+03	1.51E+01 G
			136.30	4.147E-01	&(	1.609E+00	1.14E+02	5.85E+00 G
Ta-182	F	6.2791E-02					1.14E+02	
			1121.30	6.279E-02	?(	1.006E+00	4.30E+02	3.49E+01 G
			1221.41	0.000E+00	-	2.523E+00	1.00E+03	2.70E+01 G
			1189.05	-1.310E-01	+	1.899E+00	3.80E+02	1.62E+01 G
Hg-203	F	-1.3623E-02					4.66E+01	
			279.20	-1.362E-02	&(	2.033E-01	4.22E+02	8.15E+01 G
TL-208	N	3.6656E-02					6.98E+02	
			583.02	-4.642E-03	%(	2.364E-01	1.35E+03	8.45E+01 G
			277.28	-6.833E-03	&	2.319E+00	9.38E+03	6.31E+00 G
			860.56	3.176E-01	&(	2.546E+00	2.23E+02	1.24E+01 G
pm-146	C	-1.7612E-02					2.02E+03	
			747.16	-2.118E-01	?(	9.264E-01	1.26E+02	3.40E+01 G
			735.72	2.758E-01	?(	1.035E+00	1.07E+02	2.25E+01 G
			453.88	-2.916E-02	+	3.645E-01	3.52E+02	6.50E+01 G
y-88	F	-2.1375E-03					1.07E+02	
			898.04	-2.137E-03	%(	3.549E-01	4.46E+03	9.37E+01 G
			1836.06	0.000E+00	+	7.115E-01	1.00E+03	9.92E+01 G
Cd-109	F	5.0564E-01					4.53E+02	
			88.04	5.056E-01	(	1.983E+00	1.14E+02	3.79E+00 G
Ra-226	N	-8.3455E-01					5.84E+05	
			185.99	-8.346E-01	(P	4.997E+00	3.97E+01	3.28E+00 G
PB-210	N	3.4957E-01					8.14E+03	
			46.54	3.496E-01	(P	3.112E+00	2.13E+01	4.25E+00 G
PB-212	N	3.4637E-02					6.98E+02	
			238.63	3.464E-02	(P	4.199E-01	3.75E+01	4.33E+01 G
			300.03	5.310E-02	& P	5.039E+00	2.64E+02	3.28E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-214	N	-1.2936E-01					5.84E+05	
			351.93	-1.294E-01	(P	5.682E-01	8.16E+01	3.76E+01 G
			295.09	-2.685E-01 %	P	9.569E-01	2.20E+03	1.93E+01 G
			242.00	-3.246E-01 +	P	2.143E+00	2.29E+02	7.43E+00 GA
BI-207	C	5.9952E-02					1.18E+04	
			569.70	4.362E-02 &(		2.122E-01	1.38E+02	9.77E+01 G
			1063.66	8.138E-02 ?(		5.225E-01	1.80E+02	7.45E+01 G
BI-212	N	6.1253E-01					6.98E+02	
			727.17	6.125E-01 &(		2.940E+00	1.35E+02	7.55E+00 G
			785.42	-6.824E-01 +		2.312E+01	9.18E+02	1.28E+00 GA
BI-214	N	-3.2371E-02					5.84E+05	
			609.31	-3.237E-02 &(P		6.074E-01	6.62E+01	4.61E+01 G
			1120.29	-6.533E-03 %		2.463E+00	9.98E+03	1.51E+01 G
			1764.49	-1.143E+00 & P		3.838E+00	1.79E+02	1.54E+01 G
BI-210M	T	-4.2798E-02					1.10E+09	
			265.83	-4.280E-02 ?(		3.117E-01	2.08E+02	5.00E+01 G
			304.90	5.241E-03 %		6.389E-01	3.41E+03	2.80E+01 G
RA-224	N	-8.4277E-01					6.98E+02	
			240.99	-8.428E-01 ?(		4.255E+00	1.47E+02	4.10E+00 G
AC-228	N	1.4375E-01					2.10E+03	
			911.16	-4.594E-02 &(		9.986E-01	5.80E+02	2.90E+01 G
			968.97	2.774E-01 ?(		1.594E+00	1.59E+02	1.75E+01 G
			338.32	4.076E-01 ?(		1.185E+00	8.57E+01	1.20E+01 G
			93.35	3.130E+00 ?		1.577E+00	1.83E+01	5.56E+00 XA
TH-227	N	1.1569E-02					7.95E+03	
			235.97	1.157E-02 %(		1.342E+00	3.28E+03	1.23E+01 G
			50.14	-9.617E-02 +		1.167E+00	3.47E+02	8.00E+00 G
			256.24	-1.402E-01 &		2.377E+00	4.82E+02	7.00E+00 G
TH-229	N	1.3773E+00					2.68E+06	
			193.51	1.377E+00 ?(		2.427E+00	5.43E+01	4.40E+00 G
			210.85	0.000E+00 -		4.445E+00	1.00E+03	2.99E+00 G
TH-234	N	1.0398E+00					1.63E+12	
			63.29	1.349E+00 (P		2.743E+00	1.85E+01	3.81E+00 G
			92.59	8.285E-01 *(P		2.227E+00	1.67E+01	5.58E+00 G
PA-231	N	-2.3851E-01					1.20E+07	
			302.65	-1.036E+00 ?(		6.682E+00	1.86E+02	2.88E+00 G
			300.07	6.948E-01 &(		6.482E+00	2.64E+02	2.46E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-233	C	6.2736E-02					7.82E+08	
			312.01	2.606E-02	?(	4.028E-01	4.29E+02	3.60E+01 G
			300.18	2.757E-01	?(	2.502E+00	2.56E+02	6.20E+00 G
PA-234	N	1.4841E-01					1.63E+12	
			131.29	-1.841E-02	&(	5.932E-01	9.16E+02	1.80E+01 G
			946.02	-5.036E-02	%	2.314E+00	1.22E+03	1.34E+01 G
			569.47	5.146E-01	&(	2.526E+00	1.39E+02	8.20E+00 G
			883.24	-8.935E-01	+	3.853E+00	1.24E+02	9.60E+00 G
			880.53	0.000E+00	-	6.702E+00	1.00E+03	6.00E+00 GA
PA-234M	N	-5.1180E-01					1.63E+12	
			1001.00	-5.118E-01	%(	4.030E+01	2.09E+03	8.37E-01 G
			766.41	-9.417E+00	+	9.442E+01	2.76E+02	2.94E-01 G
U-235	N	2.7126E-01					2.57E+11	
			143.79	1.666E-01	?(	1.027E+00	1.79E+02	1.10E+01 G
			205.33	5.003E-01	?(	2.374E+00	1.37E+02	5.01E+00 G
			163.38	-5.525E-02	&	1.896E+00	9.58E+02	5.08E+00 G
AM-241	T	3.6289E-02					1.58E+05	
			59.54	3.629E-02	(	2.198E-01	1.74E+02	3.59E+01 G
Ir-192	F	4.5929E-03					7.40E+01	
			316.49	4.593E-03	&(	1.738E-01	1.04E+03	8.70E+01 G
			468.06	-7.162E-02	+	4.065E-01	1.62E+02	5.18E+01 G
			308.44	-8.100E-02	+	5.812E-01	2.06E+02	3.18E+01 G
			295.95	-3.068E-02	&	5.777E-01	5.31E+02	3.02E+01 G
Np-237	F	2.4521E-01					2.14E+06	
			86.49	2.452E-01	(	6.628E-01	8.07E+01	1.31E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.

P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	49.97	61.	-3.	0.000	347.14	-9.617E-02	
AM-241	58.89	46.	6.	0.001	174.46	3.629E-02	
EU-155	86.54	83.	-2.	0.000	545.23	-1.786E-02	
AC-228	92.73	55.	74.	0.010	18.33	3.130E+00	
Gd-153	99.10	43.	4.	0.001	219.12	3.415E-02	
Gd-153	102.77	51.	3.	0.000	306.07	3.699E-02	
EU-155	105.93	74.	-3.	0.000	398.83	-3.520E-02	
EU-152	121.39	54.	6.	0.001	173.75	5.510E-02	
CO-57	122.31	49.	11.	0.002	91.01	3.441E-02	
EU-154	122.25	41.	10.	0.001	93.11	6.495E-02	
PA-234	131.29	65.	-1.	0.000	916.18	-1.841E-02	
HF-181	131.64	40.	7.	0.001	141.33	4.066E-02	
CE-144	133.54	56.	10.	0.001	109.45	2.445E-01	
HF-181	138.05	47.	9.	0.001	113.57	4.147E-01	
CO-57	136.58	69.	2.	0.000	619.41	4.850E-02	
Tc-99m	140.22	75.	-2.	0.000	662.03	-6.441E-03	
U-235	144.57	65.	7.	0.001	178.88	1.666E-01	
CE-141	145.43	77.	-6.	-0.001	194.67	-3.789E-02	
Ba-140	161.94	60.	-6.	-0.001	196.29	-2.784E-01	
U-235	161.69	39.	-1.	0.000	958.41	-5.525E-02	
CE-139	165.02	44.	19.	0.003	54.02	7.362E-02	
Ra-226	185.82	95.	-8.	-0.001	39.69	-8.346E-01	P
TH-229	192.71	35.	17.	0.002	54.33	1.377E+00	
U-235	205.44	39.	7.	0.001	137.35	5.003E-01	
PB-212	238.51	74.	4.	0.000	37.47	3.464E-02	P
RA-224	241.28	67.	-8.	-0.001	147.31	-8.428E-01	
PB-214	241.28	54.	-6.	-0.001	228.69	-3.246E-01	P
TH-227	255.82	53.	-2.	0.000	481.63	-1.402E-01	
BI-210M	266.04	43.	-5.	-0.001	208.38	-4.280E-02	
Hg-203	278.22	45.	-2.	0.000	421.85	-1.362E-02	
Ir-192	295.70	45.	-2.	0.000	530.96	-3.068E-02	
PA-231	300.02	36.	3.	0.000	263.87	6.948E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
PA-233	299.94	34.	3.	0.000	256.29	2.757E-01		
PA-231	303.13	53.	-6.	-0.001	186.09	-1.036E+00		
BA-133	303.11	53.	-6.	-0.001	188.46	-1.602E-01		
Ir-192	308.11	47.	-5.	-0.001	205.79	-8.100E-02		
PA-233	311.73	27.	2.	0.000	428.57	2.606E-02		
CR-51	321.55	29.	3.	0.000	288.90	1.503E-01		
La-140	328.58	35.	4.	0.001	202.75	1.192E-01		
AC-228	338.15	22.	8.	0.001	85.69	4.076E-01		
EU-152	343.83	35.	-4.	-0.001	215.54	-8.890E-02		
PB-214	351.73	49.	-8.	-0.001	81.62	-1.294E-01	P	
BA-133	356.82	40.	-4.	-0.001	234.54	-3.829E-02		
I-131	363.86	32.	2.	0.000	328.85	1.898E-02		
SB-125	427.64	20.	-4.	-0.001	153.36	-1.049E-01		
pm-146	453.71	37.	-2.	0.000	352.18	-2.916E-02		
SB-125	463.09	21.	2.	0.000	368.16	1.331E-01		
Ir-192	467.40	27.	-5.	-0.001	161.59	-7.162E-02		
PM-144	476.83	28.	-1.	0.000	773.47	-1.831E-02		
BE-7	475.99	20.	1.	0.000	986.95	4.849E-02		
RH-106	510.79	78.	60.	0.008	24.34	2.554E+00		
CS-134	562.41	26.	-6.	-0.001	132.51	-6.348E-01		
CS-134	569.63	17.	5.	0.001	131.01	2.877E-01		
PA-234	569.53	17.	5.	0.001	138.97	5.146E-01		
BI-207	569.63	17.	5.	0.001	137.82	4.362E-02		
SB-125	600.15	24.	6.	0.001	122.41	3.311E-01		
SB-124	602.63	32.	3.	0.000	309.54	2.647E-02		
CS-134	604.74	34.	1.	0.000	675.40	1.243E-02		
BI-214	608.23	30.	-1.	0.000	66.16	-3.237E-02	P	
RU-103	610.84	32.	-7.	-0.001	126.43	-1.156E+00		
AG-108M	614.12	19.	5.	0.001	130.03	5.603E-02		
PM-144	618.51	28.	-1.	0.000	593.14	-1.291E-02		
RH-106	620.79	21.	1.	0.000	878.37	7.643E-02		
SB-125	634.02	23.	3.	0.000	256.76	2.509E-01		
I-131	637.31	22.	5.	0.001	141.67	7.236E-01		
PM-144	696.65	20.	8.	0.001	88.44	8.958E-02		
NB-94	702.67	20.	5.	0.001	139.48	5.533E-02		
SB-124	722.86	21.	-1.	0.000	476.27	-1.500E-01		
AG-108M	723.76	25.	-6.	-0.001	124.13	-7.773E-02		
EU-154	723.76	26.	-6.	-0.001	121.99	-3.612E-01		
ZR-95	723.76	24.	-6.	-0.001	124.60	-1.554E-01		
BI-212	725.97	12.	4.	0.001	134.57	6.125E-01		
pm-146	734.40	13.	5.	0.001	107.43	2.758E-01		
pm-146	746.79	25.	-6.	-0.001	125.84	-2.118E-01		
ZR-95	758.16	18.	-1.	0.000	460.63	-2.953E-02		
NB-95	765.46	21.	-3.	0.000	258.69	-3.162E-02		
PA-234M	764.56	18.	-2.	0.000	275.88	-9.417E+00		
EU-152	779.67	15.	4.	0.000	164.22	3.445E-01		
BI-212	785.60	20.	-1.	0.000	917.58	-6.824E-01		
CS-134	795.87	23.	-2.	0.000	276.45	-3.725E-02		

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
CS-134	804.07	17.	4.	0.001	137.33	6.617E-01		
MN-54	834.56	15.	4.	0.001	154.97	5.039E-02		
Co-56	845.57	14.	10.	0.001	64.61	1.287E-01		
TL-208	860.41	19.	3.	0.000	222.57	3.176E-01		
PA-234	883.61	26.	-6.	-0.001	124.18	-8.935E-01		
AG-110M	883.60	21.	-6.	-0.001	118.21	-1.143E-01		
AC-228	913.92	14.	-1.	0.000	579.66	-4.594E-02		
EU-152	964.36	19.	-2.	0.000	318.73	-2.079E-01		
AC-228	968.26	11.	3.	0.000	158.69	2.774E-01		
EU-154	1004.38	14.	1.	0.000	520.55	9.109E-02		
RH-106	1050.28	12.	-2.	0.000	229.15	-2.387E+00		
BI-207	1063.72	19.	4.	0.001	179.95	8.138E-02		
ZN-65	1117.03	10.	3.	0.000	138.77	1.191E-01		
Sc-46	1119.85	16.	-1.	0.000	929.84	-1.074E-02		
Ta-182	1121.19	14.	1.	0.000	429.64	6.279E-02		
Ta-182	1189.14	9.	-1.	0.000	379.53	-1.310E-01		
NA-22	1274.27	14.	-2.	0.000	232.54	-4.758E-02		
EU-154	1274.28	14.	-2.	0.000	232.25	-1.353E-01		
CO-60	1332.46	13.	2.	0.000	341.30	3.230E-02		
AG-110M	1386.55	4.	0.	0.000	956.04	-2.766E-02		
K-40	1460.17	21.	-7.	-0.001	70.58	-1.428E+00		P
BI-214	1764.23	17.	-6.	-0.001	178.96	-1.143E+00		P
Co-56	1771.01	9.	2.	0.000	204.31	3.795E-01		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

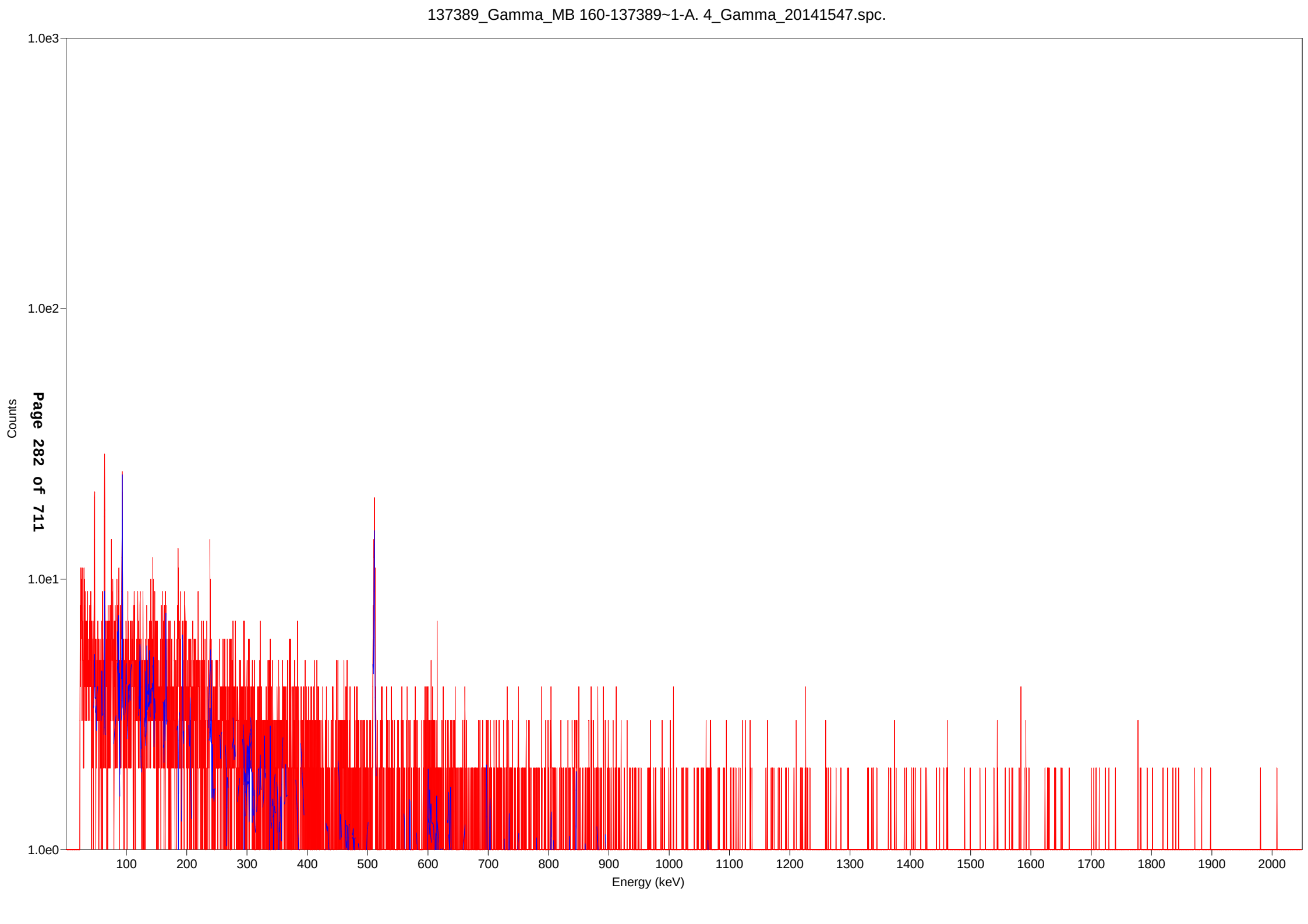
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	4.8490E-02	4.8491E-02	9.870E+02%	1.77E+00
NA-22	#A	-4.7579E-02	-4.7579E-02	2.325E+02%	4.04E-01
K-40	#A	-1.4277E+00	-1.4277E+00	2.099E+02%	5.08E+00
Sc-46	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.56E-01
CR-51	#A	1.5034E-01	1.5034E-01	2.889E+02%	1.55E+00
MN-54	#A	5.0386E-02	5.0386E-02	1.550E+02%	2.79E-01
FE-59	#A	0.0000E+00	0.0000E+00	7.071E+02%	5.79E-01
Co-56	#A	1.2873E-01	1.2873E-01	6.461E+01%	2.74E-01
CO-57	#A	3.5969E-02	3.5969E-02	9.101E+01%	1.06E-01
CO-58	#A	-4.9793E-03	-4.9794E-03	1.520E+03%	2.83E-01
CO-60	#A	3.2305E-02	3.2305E-02	3.413E+02%	4.09E-01
ZN-65	#A	1.1914E-01	1.1914E-01	1.388E+02%	5.96E-01
NB-94	#A	5.5332E-02	5.5332E-02	1.395E+02%	2.72E-01
ZR-95	#A	-2.9532E-02	-2.9532E-02	4.606E+02%	5.01E-01
NB-95	#A	-3.1615E-02	-3.1615E-02	2.587E+02%	2.95E-01
RU-103	#A	3.7072E-03	3.7073E-03	1.460E+03%	2.02E-01
RH-106	#A	7.6430E-02	7.6430E-02	8.784E+02%	2.47E+00

AG-108M#A	3.0024E-02	3.0024E-02	1.300E+02%	2.11E-01
AG-110M#A	-1.1428E-01	-1.1428E-01	1.182E+02%	4.70E-01
SN-113 #A	-4.0427E-03	-4.0427E-03	2.395E+03%	3.46E-01
SB-124 #A	2.6467E-02	2.6467E-02	3.095E+02%	2.92E-01
SB-125 #A	1.0166E-01	1.0166E-01	1.224E+02%	5.69E-01
I-131 #A	7.5815E-02	7.5820E-02	1.417E+02%	2.22E-01
Gd-153 #A	3.5346E-02	3.5346E-02	1.882E+02%	2.62E-01
Ga-68 #A	0.0000E+00	0.0000E+00	1.000E+03%	2.19E+01
Tc-99m #A	-6.4253E-03	-6.4414E-03	6.620E+02%	1.49E-01
BA-133 #A	-3.8291E-02	-3.8291E-02	2.345E+02%	3.16E-01
CS-134 #A	9.3592E-02	9.3592E-02	1.310E+02%	3.02E-01
CS-137 #A	6.5559E-03	6.5559E-03	1.203E+03%	2.92E-01
CE-139 #A	7.3617E-02	7.3617E-02	5.402E+01%	1.29E-01
Ba-140 #A	0.0000E+00	0.0000E+00	1.000E+03%	9.45E-01
La-140 #A	2.0905E-02	2.0906E-02	2.027E+02%	1.91E-01
CE-141 #A	-3.7892E-02	-3.7892E-02	1.947E+02%	2.54E-01
CE-144 #A	2.4446E-01	2.4446E-01	1.094E+02%	9.10E-01
PM-144 #A	8.9579E-02	8.9579E-02	8.844E+01%	2.70E-01
EU-152 #A	5.4051E-02	5.4051E-02	1.073E+02%	6.74E-01
EU-154 #A	6.9937E-02	6.9937E-02	9.311E+01%	2.62E+00
EU-155 #A	-3.5201E-02	-3.5201E-02	3.988E+02%	4.89E-01
HF-181 #A	3.2292E-02	3.2292E-02	1.136E+02%	3.02E-01
Ta-182 #A	6.2791E-02	6.2791E-02	4.296E+02%	1.01E+00
Hg-203 #A	-1.3623E-02	-1.3623E-02	4.219E+02%	2.03E-01
TL-208 #A	3.6656E-02	3.6656E-02	2.226E+02%	2.36E-01
pm-146 #A	-1.7612E-02	-1.7612E-02	8.273E+01%	9.26E-01
y-88 #A	-2.1375E-03	-2.1375E-03	4.460E+03%	3.55E-01
Cd-109 A	5.0564E-01	5.0564E-01	1.145E+02%	1.98E+00
Ra-226 #A	-8.3455E-01	-8.3455E-01	2.285E+02%	5.00E+00
PB-210 #A	3.4957E-01	3.4957E-01	2.647E+02%	3.11E+00
PB-212 #A	3.4637E-02	3.4637E-02	3.170E+02%	4.20E-01
PB-214 #A	-1.2936E-01	-1.2936E-01	2.685E+02%	5.68E-01
BI-207 #A	5.9952E-02	5.9952E-02	1.133E+02%	2.12E-01
BI-212 #A	6.1253E-01	6.1253E-01	1.346E+02%	2.94E+00
BI-214 #A	-3.2371E-02	-3.2371E-02	5.859E+02%	6.07E-01
BI-210M#A	-4.2798E-02	-4.2798E-02	2.084E+02%	3.12E-01
RA-224 #A	-8.4277E-01	-8.4277E-01	1.473E+02%	4.26E+00
AC-228 #A	1.4375E-01	1.4375E-01	8.569E+01%	9.99E-01
TH-227 #A	1.1569E-02	1.1569E-02	3.281E+03%	1.34E+00
TH-229 #A	1.3773E+00	1.3773E+00	5.433E+01%	2.43E+00
TH-234 A	1.0398E+00	1.0398E+00	4.938E+01%	2.74E+00
PA-231 #A	-2.3851E-01	-2.3851E-01	1.614E+02%	6.68E+00
PA-233 #A	6.2736E-02	6.2736E-02	2.497E+02%	4.03E-01
PA-234 #A	1.4841E-01	1.4841E-01	1.390E+02%	5.93E-01
PA-234M#A	-5.1180E-01	-5.1180E-01	2.094E+03%	4.03E+01
U-235 #A	2.7126E-01	2.7126E-01	1.128E+02%	1.03E+00
AM-241 #A	3.6289E-02	3.6289E-02	1.745E+02%	2.20E-01
Ir-192 #A	4.5929E-03	4.5929E-03	1.042E+03%	1.74E-01
Np-237 A	2.4521E-01	2.4521E-01	8.070E+01%	6.63E-01

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (	92.4 to 1999.4 keV)	1.040E+00	Bq/Sample
Total Decayed Activity (	92.4 to 1999.4 keV)	1.0398334E+00	Bq/Sample


137389_Gamma_MB 160-137389~1-A. 4_Gamma_20141547.spc.
1.0e3
1.0e2
1.0e1
1.0e0
Counts
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)

Test America St. Louis Spectrum ID: 4_Gamma_20141548

Sample Description: 137389_Gamma_LCS 160-137389~2-A
Detector: Ge 4 SN/181
Batch ID: 137389
Work Order Number: Gamma
Lot Number: LCS 160-137389~2-A

Decay to Time: 8/13/2014 20:43 Live Time: 7200 sec
Acquisition Time: 8/13/2014 20:43:57 Real Time: 7317 sec
Analysis Time: 8/13/2014 22:46 Dead Time: 1.60 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 4_Liquid_D=1 25ml.Clb
Efficiency Cal Desc: 4_Liquid_D=1 25ml_90101_030512
Efficiency Cal Date: 3/27/2012 20:51
Energy Cal Date: 2/28/2012 14:55
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 4_2014-08-09_2125.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-2.268E+00	221.5	5.025E+00	5.026E+00	1.671E+01
K-40	-8.163E-01	468.3	3.823E+00	3.823E+00	8.096E+00
CO-60	3.956E+02	0.5	2.090E+00	1.906E+01	1.061E+00
I-131	2.994E-01	134.5	4.028E-01	4.031E-01	1.339E+00
CS-134	3.106E-01	122.2	3.795E-01	3.798E-01	1.664E+00
CS-137	3.492E+02	0.7	2.346E+00	1.716E+01	2.089E+00
EU-152	2.300E+01	1.7	3.804E-01	1.178E+00	4.128E+00
EU-154	2.606E+00	82.5	2.148E+00	2.152E+00	2.246E+01
EU-155	-5.580E-01	124.9	6.970E-01	6.976E-01	2.312E+00
TL-208	8.200E-01	58.8	4.824E-01	4.840E-01	1.765E+00
PB-210	-4.820E+00	1302.0	6.277E+01	6.277E+01	1.978E+01
PB-212	9.520E-01	87.1	8.290E-01	8.306E-01	2.075E+00
PB-214	9.621E-01	101.1	9.728E-01	9.739E-01	3.208E+00
BI-212	7.019E-01	979.7	6.876E+00	6.877E+00	2.305E+01
BI-214	5.916E-01	184.8	1.094E+00	1.094E+00	3.525E+00
AC-228	-2.295E+00	137.9	3.166E+00	3.168E+00	1.051E+01
Pa-234	2.064E+00	145.5	3.004E+00	3.006E+00	2.875E+00
TH-234	-7.449E+00	105.7	7.871E+00	7.879E+00	1.110E+01
PA-234M	0.000E+00	1000.0	2.991E+01	2.991E+01	3.671E+02
U-235	5.373E+00	16.3	8.736E-01	9.116E-01	5.202E+00
AM-241	9.799E+02	0.3	2.859E+00	4.863E+01	3.228E+00
Total	1.762E+03				

Analyst: Rachel Mueller

TestAmerica Spectrum name: 4_Gamma_20141548.An1

Sample description
137389_Gamma_LCS 160-137389~2-A

Spectrum Filename: C:\User\SPC\Det4\4_Gamma_20141548.An1

Acquisition information
Start time: 8/13/2014 8:43:57 PM
Live time: 7200
Real time: 7317
Dead time: 1.60 %
Detector ID: 4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_Liquid_D=1 25ml.Clb
4_Liquid_D=1 25ml_90101_030512

Energy Calibration
Created: 2/28/2012 2:55:17 PM
Zero offset: 0.091 keV
Gain: 0.250 keV/channel
Quadratic: -2.917E-08 keV/channel^2

Efficiency Calibration
Created: 3/27/2012 8:51:45 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.48 %
Log(Eff): 8.809878E-01 + (-6.811249E-01*Log(E)) +
(-1.909804E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -1.031199E+01 + (3.529752E+00*Log(E)) +
(-4.143154E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (1999.44keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/13/2014 8:43:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	4_2014-08-09_2125.PBC 8/9/2014 9:25:56 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 21 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0601

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.57	1644.	6.66	0.76	5.106E-02				
43.24	285.	31.60	0.53	5.531E-02				
49.59	1723.	10.78	0.97	5.804E-02				
59.64	153023.	0.29	0.77	6.043E-02	59.54	35.900	9.799E+02	AM241
88.16	40443.	0.56	0.80	5.996E-02				
92.43	-18.	111.78	0.84	5.937E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.810	PBC<MDA	U235
122.11	5929.	1.88	0.85	5.408E-02	121.78	28.580	5.321E+01	EU152
					121.78	28.580	5.321E+01	EU152
132.05	37.	159.40	0.88	5.223E-02	131.29	18.000	PBC<MDA	Pa234
					131.29	18.000	5.426E-01	Pa234
136.52	906.	6.91	0.79	5.116E-02				
143.49	23.	261.80	0.89	4.968E-02	143.79	10.960	PBC<MDA	U235
					143.79	10.960	5.969E-01	U235
165.67	396.	17.21	0.77	4.534E-02	163.38	5.080	2.365E+01	U235
204.46	26.	218.64	0.95	3.736E-02	205.33	5.010	PBC<MDA	U235
					205.33	5.010	1.937E+00	U235
214.23	64.	57.88	0.43	3.598E-02				
238.54	20.	135.19	0.98	3.269E-02	238.63	43.300	PBC<MDA	PB212
240.99	59.	99.42	0.98	3.229E-02	242.00	7.430	PBC<MDA	PB214
277.90	105.	58.83	1.01	2.859E-02	277.28	6.310	PBC<MDA	TL208
288.56	50.	73.39	0.38	2.759E-02				
294.65	4.	417.35	1.03	2.704E-02	295.09	19.300	PBC<MDA	PB214
300.69	68.	83.48	1.03	2.664E-02	300.03	3.280	PBC<MDA	PB212
351.84	30.	124.38	1.08	2.307E-02	351.93	37.600	PBC<MDA	PB214
366.99	39.	134.54	1.09	2.235E-02	364.48	81.700	PBC<MDA	I131
386.96	139.	54.97	0.51	2.117E-02				
405.69	74.	54.60	0.77	2.027E-02				
438.97	99.	49.43	0.48	1.887E-02				
497.89	52.	73.34	0.48	1.681E-02				
573.43	53.	91.67	0.26	1.476E-02				
582.96	25.	189.95	1.28	1.454E-02	583.02	84.500	PBC<MDA	TL208
609.40	26.	127.88	1.30	1.432E-02	609.31	46.090	PBC<MDA	BI214
					609.31	46.090	PBC<MDA	BI214

657.80	130.	29.19	1.35	1.300E-02				
661.55	27862.	0.61	1.35	1.293E-02	661.66	85.210	3.513E+02	CS137
723.18	59.	82.45	1.40	1.190E-02	723.36	20.220	PBC<MDA	EU154
					723.36	20.220	3.432E+00	EU154
729.58	5.	979.67	1.40	1.184E-02	727.17	7.550	PBC<MDA	BI212
795.70	14.	371.40	1.46	1.088E-02	795.87	85.530	PBC<MDA	CS134
804.00	40.	122.17	1.47	1.081E-02	801.95	8.690	PBC<MDA	CS134
821.61	140.	41.82	0.53	1.056E-02				

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
873.08	11.	541.63	1.53	9.976E-03	873.23	12.270	PBC<MDA	EU154
					873.23	12.270	1.243E+00	EU154
880.46	26.	232.29	1.53	9.898E-03	880.53	6.000	PBC<MDA	Pa234
					880.53	6.000	6.018E+00	Pa234
891.53	182.	45.51	0.47	9.783E-03				
911.06	34.	77.70	0.42	9.585E-03				
945.64	21.	333.51	1.59	9.251E-03	946.02	13.400	PBC<MDA	Pa234
					946.02	13.400	2.338E+00	Pa234
956.46	90.	45.03	0.34	9.156E-03				
1104.56	28.	92.47	0.70	7.990E-03				
1112.83	47.	122.06	1.72	7.939E-03	1112.07	13.644	PBC<MDA	EU152
					1112.07	13.644	6.006E+00	EU152
1121.11	6.	900.75	1.73	7.884E-03	1120.29	15.100	PBC<MDA	BI214
					1120.29	15.100	6.547E-01	BI214
1144.55	89.	45.79	0.49	7.725E-03				
1173.26	21467.	0.75	1.72	7.545E-03	1173.24	99.900	3.955E+02	CO60
1332.53	19032.	0.74	1.86	6.683E-03	1332.50	99.980	3.956E+02	CO60
1460.23	-4.	105.18	1.99	6.120E-03	1460.83	10.670	PBC<MDA	K40

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
145.83	36.57	2952.	1644.	3.221E+04	6.66	0.761	-	s
172.51	43.24	2942.	285.	5.158E+03	31.60	0.530	-	s
197.88	49.59	10936.	1723.	2.968E+04	10.78	0.974	-	s
352.07	88.16	2802.	40443.	6.745E+05	0.56	0.799	-	M
487.81	122.11	7516.	110.	2.042E+03	111.42	0.853	-	c
545.42	136.52	1006.	906.	1.771E+04	6.91	0.793	-	
661.96	165.67	1560.	110.	2.421E+03	51.79	0.772	-	s
856.13	214.23	654.	64.	1.779E+03	57.88	0.430	-	s
1153.34	288.56	590.	50.	1.800E+03	73.39	0.381	-	sc
1546.81	386.96	1425.	139.	6.567E+03	54.97	0.514	-	s
1621.73	405.69	668.	74.	3.650E+03	54.60	0.772	-	s
1754.79	438.97	867.	99.	5.265E+03	49.43	0.481	-	s
1990.44	497.89	561.	52.	3.093E+03	73.34	0.482	-	sc
2292.59	573.43	623.	55.	3.705E+03	65.97	0.263	-	sc
2630.00	657.79	398.	50.	3.808E+03	65.25	0.400	-	sM
3285.32	821.61	822.	140.	1.325E+04	41.82	0.532	-	s
3565.06	891.53	1336.	182.	1.860E+04	45.51	0.465	-	s
3643.22	911.06	332.	34.	3.547E+03	77.70	0.419	-	lc
3824.84	956.46	621.	90.	9.829E+03	45.03	0.335	-	sM
4417.47	1104.56	289.	28.	3.463E+03	92.47	0.705	-	sc
4577.49	1144.55	393.	89.	1.152E+04	45.79	0.487	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	238.05	59.64	11577.	153023.	21.253	0.29	0.773
TH-234	245.36	61.47	1536.	-124.	-0.017	75.01	0.816s
TH-234	369.17	92.43	1942.	-18.	-0.002	111.78	0.843s
EU-155	421.60	105.55	1834.	-49.	-0.007	124.89	0.854
EU-152	487.83	122.12	1736.	5832.	0.810	1.65	0.870s
EU-154	491.77	123.10	2031.	-14.	-0.002	469.81	0.871s
Pa-234	527.56	132.05	1695.	37.	0.005	159.40	0.878s
U-235	573.28	143.49	1865.	23.	0.003	261.80	0.890
U-235	662.58	165.83	1188.	319.	0.044	16.26	0.908s
U-235	817.08	204.46	1616.	26.	0.004	218.64	0.946s
PB-212	953.33	238.54	2006.	20.	0.003	135.19	0.976s
PB-214	963.10	240.99	1751.	59.	0.008	99.42	0.979s
TL-208	1110.72	277.90	1848.	105.	0.015	58.83	1.011s
I-131	1132.87	283.44	1696.	-7.	-0.001	841.66	1.018s
PB-212	1201.85	300.69	1739.	68.	0.009	83.48	1.032
PB-214	1406.38	351.84	1798.	30.	0.004	124.38	1.078s
I-131	1466.93	366.99	1372.	39.	0.005	134.54	1.089s
BE-7	1907.87	477.24	2195.	-30.	-0.004	221.54	1.189s
CS-134	2249.10	562.56	1164.	-29.	-0.004	169.35	1.264s
CS-134	2276.95	569.53	1095.	-14.	-0.002	342.17	1.269s
Pa-234	2280.45	570.40	1087.	-26.	-0.004	178.80	1.269s
TL-208	2330.70	582.96	1084.	25.	0.003	189.95	1.281s
CS-134	2418.01	604.79	1203.	-10.	-0.001	498.62	1.300s
BI-214	2436.44	609.40	1187.	26.	0.004	127.88	1.304s
I-131	2548.51	637.42	1194.	-37.	-0.005	134.53	1.327s
CS-137	2645.03	661.55	1223.	27694.	3.846	0.67	1.333
EU-154	2891.56	723.18	1172.	59.	0.008	82.45	1.401s
BI-212	2917.19	729.58	977.	5.	0.001	979.67	1.404s
PA-234M	3061.93	765.77	1226.	-16.	-0.002	305.09	1.437s
BI-212	3141.84	785.74	1378.	-31.	-0.004	173.02	1.453s
CS-134	3181.68	795.70	1381.	14.	0.002	371.40	1.462
CS-134	3214.89	804.00	1165.	40.	0.006	122.17	1.467s
TL-208	3435.81	859.22	1463.	-15.	-0.002	363.49	1.516s
EU-154	3491.24	873.08	1755.	11.	0.002	541.63	1.526s
Pa-234	3520.77	880.46	1773.	26.	0.004	232.29	1.532s
AC-228	3640.49	910.38	1985.	-46.	-0.006	137.94	1.557s
Pa-234	3781.54	945.64	2411.	21.	0.003	333.51	1.586s
EU-152	3856.22	964.30	2199.	-75.	-0.010	89.60	1.601s
EU-152	4450.56	1112.83	1611.	47.	0.007	122.06	1.720s
BI-214	4483.70	1121.11	1275.	6.	0.001	900.75	1.727s
CO-60	4692.39	1173.26	666.	21467.	2.982	0.75	1.720
EU-154	5102.02	1275.61	121.	-12.	-0.002	133.18	1.848s
CO-60	5329.84	1332.53	108.	19032.	2.643	0.74	1.864
EU-152	5630.16	1407.56	45.	-5.	-0.001	189.51	1.951s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
K-40	5840.97	1460.23	58.	-4.	-0.001	105.18	1.991s
BI-214	7055.88	1763.68	56.	-13.	-0.002	243.65	2.214s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-2.2682E+00				5.31E+01	
			477.60	-2.268E+00	&(	1.671E+01 2.22E+02 1.05E+01	G
K-40	N	-8.1630E-01				4.66E+11	
			1460.83	-8.163E-01	?(P	8.096E+00 1.05E+02 1.07E+01	G
CO-60	F	3.9558E+02				1.93E+03	
			1332.50	3.956E+02	(	1.061E+00 7.40E-01 1.00E+02	G
			1173.24	3.955E+02	(	2.266E+00 7.55E-01 9.99E+01	G
I-131	I	2.9939E-01				8.02E+00	
			364.48	2.994E-01	?(	1.339E+00 1.35E+02 8.17E+01	G
			284.30	-5.625E-01	&	1.581E+01 8.42E+02 6.14E+00	G
			636.97	-5.314E+00	+	2.377E+01 1.35E+02 7.17E+00	G
CS-134	I	3.1061E-01				7.54E+02	
			604.71	-9.980E-02	&(	1.664E+00 4.99E+02 9.76E+01	G
			795.87	2.117E-01	(	2.624E+00 3.71E+02 8.55E+01	G
			569.32	-8.337E-01	&	9.535E+00 3.42E+02 1.54E+01	G
			801.95	5.895E+00	?(	2.393E+01 1.22E+02 8.69E+00	G
			563.24	-3.177E+00	+	1.792E+01 1.69E+02 8.35E+00	G
CS-137	I	3.4916E+02				1.10E+04	
			661.66	3.492E+02	(	2.089E+00 6.72E-01 8.52E+01	G
EU-152	F	2.3001E+01				4.94E+03	
			344.29	1.129E-01	%(	4.128E+00 1.09E+03 2.65E+01	G
			121.78	5.234E+01	?(	1.767E+00 1.65E+00 2.86E+01	G
			778.92	2.082E-01	%	1.648E+01 2.37E+03 1.29E+01	G
			964.11	-7.811E+00	+	2.315E+01 8.96E+01 1.46E+01	G
			1112.07	6.006E+00	*(	2.433E+01 1.22E+02 1.36E+01	G
			1408.00	-5.344E-01	-	3.528E+00 1.90E+02 2.10E+01	G
EU-154	I	2.6056E+00				3.14E+03	
			873.23	1.243E+00	&(	2.246E+01 5.42E+02 1.23E+01	G
			123.10	-8.587E-02	-	1.344E+00 4.70E+02 4.08E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1274.54	-6.783E-01	+	3.059E+00	1.33E+02	3.52E+01 G
			723.36	3.432E+00	(	9.366E+00	8.24E+01	2.02E+01 G
			1004.77	3.963E-01	%	1.689E+01	1.28E+03	1.80E+01 G
			996.33	-3.436E-01	&	2.640E+01	2.30E+03	1.06E+01 G
EU-155	I	-5.5804E-01					1.81E+03	
			105.31	-5.580E-01	?(	2.312E+00	1.25E+02	2.12E+01 G
			86.54	0.000E+00	+	5.543E-02	0.00E+00	3.07E+01 G
TL-208	N	8.1998E-01					6.98E+02	
			583.02	2.787E-01	?(	1.765E+00	1.90E+02	8.45E+01 G
			277.28	8.068E+00	(	1.563E+01	5.88E+01	6.31E+00 G
			860.56	-1.649E+00	+	2.000E+01	3.63E+02	1.24E+01 G
PB-210	N	-4.8198E+00					8.14E+03	
			46.54	-4.820E+00	%(P	1.978E+01	7.13E+02	4.25E+00 G
PB-212	N	9.5204E-01					6.98E+02	
			238.63	2.010E-01	?(P	2.075E+00	1.35E+02	4.33E+01 G
			300.03	1.087E+01	(P	3.132E+01	8.35E+01	3.28E+00 G
PB-214	N	9.6213E-01					5.84E+05	
			351.93	4.771E-01	(P	3.208E+00	1.24E+02	3.76E+01 G
			295.09	9.806E-02	& P	5.269E+00	4.17E+02	1.93E+01 G
			242.00	3.417E+00	&(P	1.145E+01	9.94E+01	7.43E+00 G
BI-212	N	7.0191E-01					6.98E+02	
			727.17	7.019E-01	?(	2.305E+01	9.80E+02	7.55E+00 G
			785.42	-3.004E+01	&	1.730E+02	1.73E+02	1.28E+00 G
BI-214	N	5.9163E-01					5.84E+05	
			609.31	5.710E-01	?(P	3.525E+00	1.28E+02	4.61E+01 G
			1120.29	6.547E-01	?(	1.973E+01	9.01E+02	1.51E+01 G
			1764.49	-2.283E+00	+ P	6.657E+00	2.44E+02	1.54E+01 G
AC-228	N	-2.2953E+00					2.10E+03	
			911.07	-2.295E+00	?(	1.051E+01	1.38E+02	2.90E+01 G
			968.97	-3.826E-01	%	1.619E+01	1.27E+03	1.75E+01 G
			338.32	-2.927E-01	%	1.001E+01	1.03E+03	1.20E+01 G
							Energy	duplication
			93.35	-5.036E-02	%	7.231E+00	4.29E+03	5.56E+00 XA
Pa-234	N	2.0642E+00					1.63E+12	
			131.29	5.426E-01	@(	2.875E+00	1.59E+02	1.80E+01 G
			569.47	-2.991E+00	+	1.783E+01	1.79E+02	8.20E+00 G
			946.02	2.338E+00	&(	2.594E+01	3.34E+02	1.34E+01 G
			883.24	2.191E-01	%	2.895E+01	3.96E+03	9.60E+00 G
			880.53	6.018E+00	?(	4.653E+01	2.32E+02	6.00E+00 G

Nuclide		Ave activity	Energy		Activity	Code	Peak	MDA	Comments
TH-234	N	-7.4490E+00						1.63E+12	
			63.29	-7.449E+00	?(P		1.110E+01	7.50E+01	3.81E+00 G
			92.59	-7.452E-01	+ P		8.717E+00	1.12E+02	5.58E+00 G
U-235	N	5.3727E+00						2.57E+11	
			143.79	5.969E-01	?(		5.202E+00	2.62E+02	1.10E+01 G
			205.33	1.937E+00	(		1.410E+01	2.19E+02	5.01E+00 G
			163.38	1.906E+01	&(		9.753E+00	1.63E+01	5.08E+00 G
									Energy duplication
			93.35	7.050E-03	&		7.390E+00	3.13E+04	5.81E+00 X
AM-241	T	9.7989E+02						1.58E+05	
			59.54	9.799E+02	(		3.228E+00	2.92E-01	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-234	61.47	1536.	-124.	-0.017	75.01	-7.449E+00	P
TH-234	92.43	1942.	-18.	-0.002	111.78	-7.452E-01	P
EU-155	105.55	1834.	-49.	-0.007	124.89	-5.580E-01	
EU-152	122.12	1736.	5832.	0.810	1.65	5.234E+01	
EU-154	123.10	2031.	-14.	-0.002	469.81	-8.587E-02	
Pa-234	132.05	1695.	37.	0.005	159.40	5.426E-01	
U-235	143.49	1865.	23.	0.003	261.80	5.969E-01	
U-235	165.83	1188.	319.	0.044	16.26	1.906E+01	
U-235	204.46	1616.	26.	0.004	218.64	1.937E+00	
PB-214	240.99	1751.	59.	0.008	99.42	3.417E+00	P
TL-208	277.90	1848.	105.	0.015	58.83	8.068E+00	
I-131	283.44	1696.	-7.	-0.001	841.66	-5.625E-01	
PB-214	351.84	1798.	30.	0.004	124.38	4.771E-01	P
I-131	366.99	1372.	39.	0.005	134.54	2.994E-01	
BE-7	477.24	2195.	-30.	-0.004	221.54	-2.268E+00	
Pa-234	570.40	1087.	-26.	-0.004	178.80	-2.991E+00	
TL-208	582.96	1084.	25.	0.003	189.95	2.787E-01	
BI-214	609.40	1187.	26.	0.004	127.88	5.710E-01	P
I-131	637.42	1194.	-37.	-0.005	134.53	-5.314E+00	
EU-154	723.18	1172.	59.	0.008	82.45	3.432E+00	
BI-212	729.58	977.	5.	0.001	979.67	7.019E-01	
PA-234M	765.77	1226.	-16.	-0.002	305.09	-6.824E+01	
BI-212	785.74	1378.	-31.	-0.004	173.02	-3.004E+01	
TL-208	859.22	1463.	-15.	-0.002	363.49	-1.649E+00	
EU-154	873.08	1755.	11.	0.002	541.63	1.243E+00	
Pa-234	880.46	1773.	26.	0.004	232.29	6.018E+00	
AC-228	910.38	1985.	-46.	-0.006	137.94	-2.295E+00	
Pa-234	945.64	2411.	21.	0.003	333.51	2.338E+00	
EU-152	964.30	2199.	-75.	-0.010	89.60	-7.811E+00	
EU-152	1112.83	1611.	47.	0.007	122.06	6.006E+00	
BI-214	1121.11	1275.	6.	0.001	900.75	6.547E-01	
EU-154	1275.61	121.	-12.	-0.002	133.18	-6.783E-01	
EU-152	1407.56	45.	-5.	-0.001	189.51	-5.344E-01	
K-40	1460.23	58.	-4.	-0.001	105.18	-8.163E-01	P
BI-214	1763.68	56.	-13.	-0.002	243.65	-2.283E+00	P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

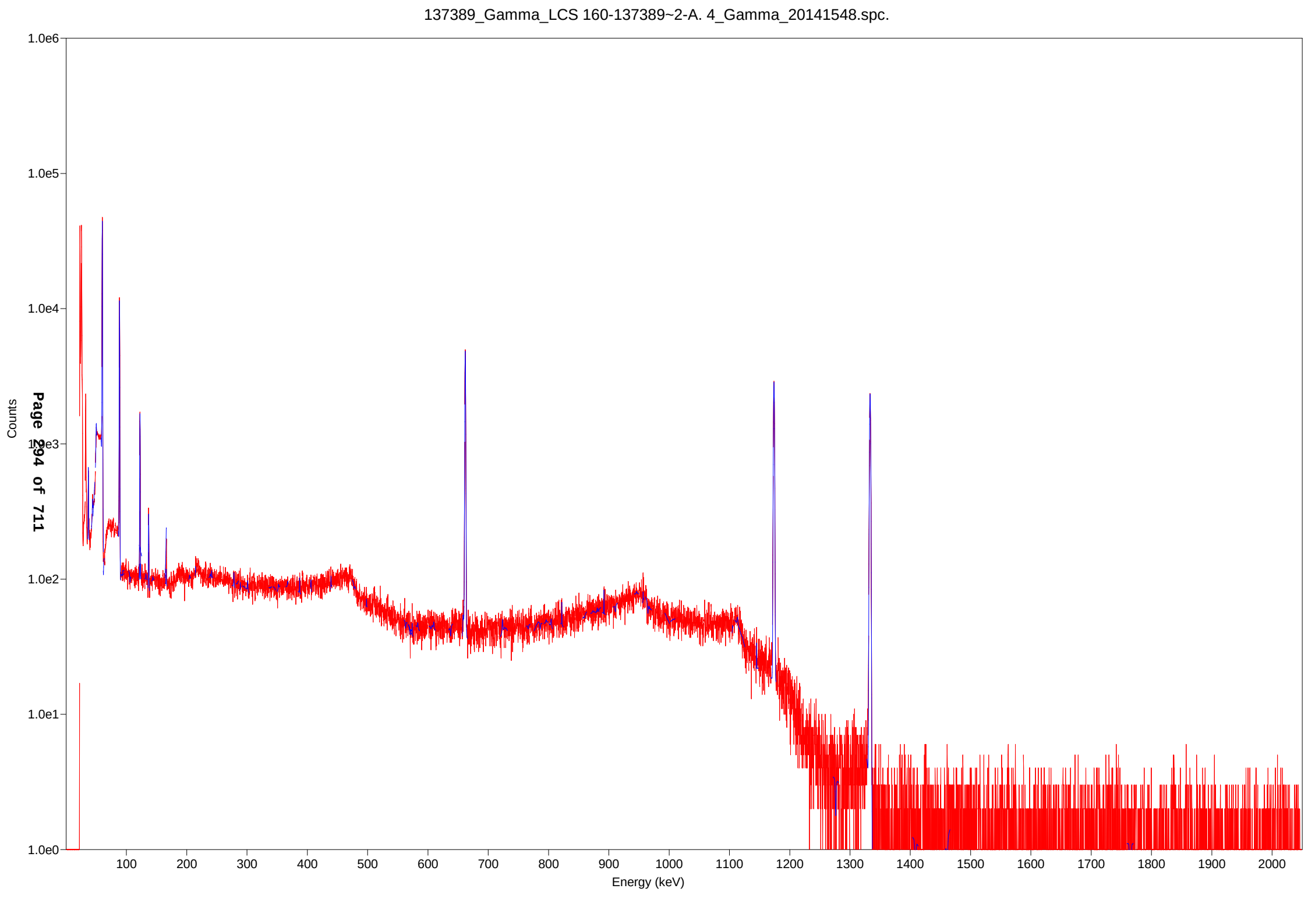
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	-2.2682E+00	-2.2682E+00	2.215E+02%	1.67E+01
K-40	#A	-8.1630E-01	-8.1630E-01	4.683E+02%	8.10E+00
CO-60		3.9558E+02	3.9558E+02	5.284E-01%	1.06E+00
I-131	#A	2.9937E-01	2.9939E-01	1.345E+02%	1.34E+00
CS-134	A	3.1061E-01	3.1061E-01	1.222E+02%	1.66E+00
CS-137		3.4916E+02	3.4916E+02	6.719E-01%	2.09E+00
EU-152	#C	2.3001E+01	2.3001E+01	1.654E+00%	4.13E+00
EU-154	#A	2.6056E+00	2.6056E+00	8.245E+01%	2.25E+01
EU-155	#A	-5.5804E-01	-5.5804E-01	1.249E+02%	2.31E+00
TL-208	#A	8.1998E-01	8.1998E-01	5.883E+01%	1.77E+00
PB-210	#A	-4.8198E+00	-4.8198E+00	1.302E+03%	1.98E+01
PB-212	A	9.5204E-01	9.5204E-01	8.707E+01%	2.07E+00
PB-214	#A	9.6213E-01	9.6213E-01	1.011E+02%	3.21E+00
BI-212	#A	7.0191E-01	7.0191E-01	9.797E+02%	2.31E+01
BI-214	#A	5.9163E-01	5.9163E-01	1.848E+02%	3.53E+00
AC-228	#A	-2.2953E+00	-2.2953E+00	1.379E+02%	1.05E+01
Pa-234	#A	2.0642E+00	2.0642E+00	1.455E+02%	2.87E+00
TH-234	#A	-7.4490E+00	-7.4490E+00	1.057E+02%	1.11E+01
PA-234M	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.67E+02
U-235	#C	5.3727E+00	5.3727E+00	1.626E+01%	5.20E+00
AM-241		9.7989E+02	9.7989E+02	2.918E-01%	3.23E+00

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (105.1 to 1999.4 keV) 1.725E+03 Bq/Sample
Total Decayed Activity (105.1 to 1999.4 keV) 1.7246321E+03 Bq/Sample

The library has energies which are not separable.


137389_Gamma_LCS 160-137389~2-A. 4_Gamma_20141548.spc.
1.0e6
1.0e5
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Counts
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)

Test America St. Louis Spectrum ID: 12_Gamma_20142000

Sample Description: 137389_Gamma_680-102199-A-1-K
Detector: Ge12 S/N10034336
Batch ID: 137389
Work Order Number: Gamma
Lot Number: 680-102199-A-1-K

Decay to Time: 9/8/2014 18:04 Live Time: 7200 sec
Acquisition Time: 9/8/2014 18:04:49 Real Time: 7216 sec
Analysis Time: 9/8/2014 20:05 Dead Time: 0.22 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Liquid_D=1 25ml.Clb
Efficiency Cal Desc: Ge12_25mLd=1Cal_85520-334_090111
Efficiency Cal Date: 9/2/2011 07:07
Energy Cal Date: 2/28/2012 13:26
Library: Client_ Long_no ingrowth Rev3.li
Bkgd Correction File: 12_2014-09-06_0552.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	7.878E-02	400.5	3.155E-01	3.155E-01	1.110E+00
NA-22	0.000E+00	1000.0	3.398E-02	3.398E-02	1.970E-01
K-40	1.418E+01	8.6	1.221E+00	1.400E+00	2.202E+00
Sc-46	7.049E-02	34.3	2.417E-02	2.442E-02	1.543E-01
CR-51	3.494E-01	94.1	3.288E-01	3.292E-01	1.105E+00
MN-54	-6.236E-03	758.5	4.729E-02	4.730E-02	1.688E-01
FE-59	0.000E+00	1000.0	7.037E-02	7.037E-02	3.075E-01
Co-56	1.411E-02	262.3	3.701E-02	3.702E-02	1.601E-01
CO-57	1.508E-02	149.0	2.247E-02	2.248E-02	7.631E-02
CO-58	4.246E-02	104.2	4.423E-02	4.428E-02	1.512E-01
CO-60	9.720E-03	330.7	3.214E-02	3.215E-02	1.868E-01
ZN-65	-8.389E-02	155.6	1.306E-01	1.306E-01	4.519E-01
NB-94	2.316E-02	176.6	4.091E-02	4.093E-02	1.428E-01
ZR-95	-4.875E-02	148.6	7.247E-02	7.251E-02	2.526E-01
NB-95	-6.262E-03	706.9	4.427E-02	4.427E-02	1.578E-01
RU-103	1.919E-02	170.8	3.278E-02	3.279E-02	1.144E-01
RH-106	-2.385E-01	178.6	4.260E-01	4.261E-01	1.476E+00
AG-108M	-3.808E-02	107.1	4.077E-02	4.082E-02	1.381E-01
AG-110M	-1.378E-02	418.7	5.771E-02	5.771E-02	2.075E-01
SN-113	7.510E-02	68.8	5.166E-02	5.179E-02	1.713E-01
SB-124	-1.422E-03	3294.0	4.683E-02	4.683E-02	1.649E-01
SB-125	1.253E-01	66.5	8.332E-02	8.354E-02	4.715E-01
I-131	-1.405E-02	168.6	2.369E-02	2.370E-02	1.402E-01
Gd-153	6.445E-02	104.2	6.715E-02	6.725E-02	2.254E-01
Ga-68	-1.327E+00	203.0	2.695E+00	2.696E+00	9.532E+00
Tc-99m	1.208E-02	232.6	2.811E-02	2.812E-02	9.593E-02
BA-133	6.637E-02	64.4	4.273E-02	4.285E-02	1.410E-01
CS-134	-3.568E-02	137.6	4.910E-02	4.914E-02	1.678E-01
CS-137	-1.365E-01	173.0	2.362E-01	2.363E-01	2.039E-01
CE-139	-1.570E-02	208.0	3.266E-02	3.268E-02	1.112E-01
Ba-140	6.495E-02	208.8	1.356E-01	1.356E-01	4.837E-01
La-140	1.694E-02	287.3	4.866E-02	4.867E-02	1.813E-01
CE-141	2.397E-02	198.7	4.761E-02	4.763E-02	1.621E-01
CE-144	-1.647E-01	131.0	2.157E-01	2.158E-01	7.273E-01
PM-144	3.537E-02	55.6	1.967E-02	1.974E-02	1.462E-01
EU-152	1.630E-01	67.2	1.095E-01	1.098E-01	3.669E-01
EU-154	4.845E-02	801.7	3.884E-01	3.884E-01	1.390E+00
EU-155	1.558E-01	41.3	6.438E-02	6.490E-02	3.078E-01
HF-181	7.518E-02	55.4	4.167E-02	4.183E-02	8.868E-02

Ta-182	3.209E-01	46.1	1.480E-01	1.488E-01	5.308E-01
Hg-203	1.074E-03	3714.0	3.987E-02	3.987E-02	1.384E-01
TL-208	4.152E-01	17.8	7.380E-02	7.655E-02	1.726E-01
pm-146	-5.977E-02	195.3	1.167E-01	1.167E-01	4.102E-01
y-88	4.120E-02	110.1	4.535E-02	4.540E-02	1.563E-01
Cd-109	1.353E+00	47.6	6.443E-01	6.482E-01	2.099E+00
Ra-226	5.930E+00	20.9	1.240E+00	1.306E+00	2.710E+00
PB-210	2.140E+00	35.7	7.633E-01	7.818E-01	2.293E+00
PB-212	1.085E+00	8.9	9.654E-02	1.132E-01	2.573E-01
PB-214	8.635E-01	14.6	1.260E-01	1.328E-01	3.241E-01
BI-207	-2.593E-02	380.0	9.855E-02	9.856E-02	1.343E-01
BI-212	2.558E+00	25.4	6.502E-01	6.621E-01	1.369E+00
BI-214	9.786E-01	17.4	1.702E-01	1.769E-01	3.988E-01
BI-210M	-5.618E-02	115.5	6.491E-02	6.497E-02	2.191E-01
RA-224	1.156E+00	71.8	8.299E-01	8.323E-01	2.752E+00
AC-228	1.919E+00	9.8	1.884E-01	2.102E-01	2.600E-01
TH-227	5.080E-01	34.3	1.741E-01	1.763E-01	5.357E-01
TH-229	2.631E-01	219.2	5.768E-01	5.770E-01	2.206E+00
TH-234	2.049E+00	42.9	8.789E-01	8.856E-01	2.350E+00
PA-231	3.344E-01	59.6	1.993E-01	2.000E-01	4.132E+00
PA-233	1.569E-01	65.0	1.019E-01	1.022E-01	2.490E-01
PA-234	1.598E-01	79.5	1.270E-01	1.273E-01	4.227E-01
PA-234M	0.000E+00	1000.0	3.253E+00	3.253E+00	2.720E+01
U-235	-3.521E-01	2000.0	7.041E+00	7.041E+00	8.078E-01
AM-241	7.784E-02	82.8	6.445E-02	6.459E-02	2.146E-01
Ir-192	1.236E-01	18.7	2.313E-02	2.411E-02	1.315E-01
Np-237	3.977E-01	50.2	1.995E-01	2.006E-01	6.521E-01
Total	3.856E+01				

Analyst: Curtis Carey

TestAmerica, Inc Spectrum name: 12_Gamma_20142000.An1

Sample description
137389_Gamma_680-102199-A-1-K

Spectrum Filename: C:\User\SPC\Det12\12_Gamma_20142000.An1

Acquisition information
Start time: 9/8/2014 6:04:49 PM
Live time: 7200
Real time: 7216
Dead time: 0.22 %
Detector ID: 12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_Liquid_D=1 25ml.Clb
Ge12_25mLd=1Cal_85520-334_090111

Energy Calibration
Created: 2/28/2012 1:26:42 PM
Zero offset: 0.049 keV
Gain: 0.250 keV/channel
Quadratic: -3.945E-08 keV/channel^2

Efficiency Calibration
Created: 9/2/2011 7:07:23 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 2.02 %
Log(Eff): -6.442716E-01 + (-8.678082E-03*Log(E)) +
(-6.444773E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.33 %
Log(Eff): -1.236768E+01 + (4.728110E+00*Log(E)) +
(-5.423915E-01*Log(E)^2)

Library Files
Main analysis library: Client_ Long_no ingrowth Rev3.li
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.58keV)
Stop channel: 8000 (1999.36keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/8/2014 6:04:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2014-09-06_0552.PBC 9/6/2014 5:52:55 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 30 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 0.0807

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.61	194.	13.25	1.38	1.098E-01	46.54	4.250	PBC<MDA	PB210
59.69	25.	82.80	0.90	1.220E-01	59.54	35.900	PBC<MDA	AM241
63.08	161.	18.56	0.78	1.239E-01	63.29	3.810	PBC<MDA	TH234
74.73	144.	16.20	0.92	1.268E-01				
77.11	199.	12.34	0.92	1.270E-01				
87.30	47.	47.62	0.93	1.260E-01	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.667E-01	EU155
					88.04	3.790	1.353E+00	Cd109
87.34	44.	55.99	0.93	1.263E-01	86.49	13.100	3.682E-01	Np237
					86.54	30.700	1.571E-01	EU155
					88.04	3.790	1.275E+00	Cd109
87.35	47.	50.17	0.93	1.263E-01	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.697E-01	EU155
					88.04	3.790	1.378E+00	Cd109
92.65	220.	13.14	0.99	1.250E-01	92.59	5.584	1.819E+00	TH234
93.31	54.	44.18	0.93	1.248E-01	93.35	5.561	PBC<MDA	AC228
97.68	17.	104.19	0.94	1.236E-01	97.50	30.000	PBC<MDA	Gd153
105.63	28.	60.75	0.95	1.210E-01	105.31	21.200	PBC<MDA	EU155
121.75	7.	243.21	0.96	1.141E-01	121.78	28.580	PBC<MDA	EU152
					121.78	28.580	2.784E-02	EU152
122.25	11.	149.02	0.96	1.140E-01	122.06	85.600	PBC<MDA	CO57
131.24	23.	79.48	0.97	1.097E-01	131.29	18.000	PBC<MDA	PA234
137.89	4.	363.46	0.98	1.074E-01	136.30	5.850	PBC<MDA	HF181
140.09	7.	232.64	0.98	1.054E-01	140.51	89.300	PBC<MDA	Tc99m

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
144.44	9.	198.66	0.98	1.030E-01	145.44	48.200	PBC<MDA	CE141
162.58	8.	208.79	1.00	9.487E-02	162.66	6.220	PBC<MDA	Ba140
185.80	124.	20.31	0.64	8.639E-02	185.99	3.280	5.930E+00	Ra226
193.68	7.	257.30	1.03	8.402E-02	193.51	4.400	PBC<MDA	TH229
210.87	5.	354.95	1.05	7.917E-02	210.85	2.990	PBC<MDA	TH229
235.85	33.	34.27	1.07	7.313E-02	235.97	12.300	PBC<MDA	TH227
238.43	306.	9.64	1.10	7.259E-02	238.63	43.300	1.123E+00	PB212
240.87	25.	71.82	1.07	7.203E-02	240.99	4.100	PBC<MDA	RA224
241.88	36.	30.14	1.07	7.182E-02	242.00	7.430	PBC<MDA	PB214
256.54	7.	191.72	1.09	6.892E-02	256.24	7.000	PBC<MDA	TH227
277.38	14.	84.71	0.27	6.507E-02	277.28	6.310	PBC<MDA	TL208
282.66	3.	367.17	1.11	6.389E-02	284.30	6.140	PBC<MDA	I131
294.83	108.	18.76	0.79	6.219E-02	295.09	19.300	9.649E-01	PB214
					295.95	30.160	7.983E-01	Ir192
300.29	22.	59.62	1.13	6.139E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	2.061E+00	PA231
					300.18	6.200	8.181E-01	PA233
300.29	22.	59.62	1.13	6.138E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	2.061E+00	PA231
					300.18	6.200	8.182E-01	PA233
300.30	21.	64.95	1.13	6.137E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.931E+00	PA231
					300.18	6.200	7.664E-01	PA233
305.70	4.	322.12	1.13	6.066E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	3.348E-02	BI210M
306.01	2.	572.61	1.13	6.066E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	1.967E-02	BI210M
308.77	22.	63.27	1.14	6.014E-02	308.44	31.750	PBC<MDA	Ir192
					308.44	31.750	1.584E-01	Ir192
314.25	8.	139.88	1.14	5.962E-02	312.01	36.000	PBC<MDA	PA233
320.71	15.	94.08	1.15	5.849E-02	320.08	9.940	PBC<MDA	CR51
338.25	86.	21.98	0.54	5.610E-02	338.32	12.010	1.780E+00	AC228
344.73	19.	55.43	1.17	5.516E-02	344.29	26.500	PBC<MDA	EU152
					345.83	15.070	3.254E-01	HF181
344.79	17.	67.22	1.17	5.535E-02	344.29	26.500	PBC<MDA	EU152
					345.83	15.070	2.910E-01	HF181
					344.29	26.500	1.649E-01	EU152
351.85	163.	11.95	1.07	5.444E-02	351.93	37.600	8.114E-01	PB214
357.66	16.	64.38	1.18	5.395E-02	356.00	62.050	PBC<MDA	BA133
					356.00	62.050	6.636E-02	BA133
392.34	17.	68.79	1.21	5.012E-02	391.69	64.000	PBC<MDA	SN113
463.35	16.	66.47	1.28	4.389E-02	463.37	10.470	PBC<MDA	SB125
468.49	13.	74.92	1.28	4.354E-02	468.06	51.750	PBC<MDA	Ir192
					468.06	51.750	7.753E-02	Ir192
474.92	1.	894.90	1.29	4.290E-02	476.81	42.000	PBC<MDA	PM144
477.52	3.	400.53	1.29	4.284E-02	477.60	10.520	PBC<MDA	BE7
486.05	7.	94.47	1.29	4.253E-02	482.00	80.500	PBC<MDA	HF181
497.17	5.	170.80	1.31	4.148E-02	497.05	90.900	PBC<MDA	RU103
					497.05	90.900	1.919E-02	RU103
511.01	114.	17.56	1.32	4.051E-02	511.86	20.000	1.961E+00	RH106
					511.86	20.000	1.961E+00	RH106
583.33	121.	13.35	0.86	3.638E-02	583.02	84.500	4.104E-01	TL208
609.33	156.	12.69	1.14	3.509E-02	609.31	46.090	9.786E-01	BI214
					610.30	5.750	1.076E+01	RU103
					610.30	5.750	1.076E+01	RU103

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
618.29	17.	55.61	1.41	3.467E-02	618.06	99.100	PBC<MDA	PM144
697.29	3.	334.83	1.48	3.134E-02	696.54	99.000	PBC<MDA	PM144
703.60	5.	176.64	1.49	3.111E-02	702.63	97.900	PBC<MDA	NB94
727.11	42.	25.42	0.46	3.021E-02	727.17	7.550	2.558E+00	BI212
779.35	7.	113.13	1.55	2.847E-02	778.92	12.940	PBC<MDA	EU152
					778.92	12.940	2.820E-01	EU152
783.17	5.	73.69	0.24	2.834E-02				
785.44	6.	110.80	1.56	2.827E-02	785.42	1.280	PBC<MDA	BI212
810.13	8.	104.17	1.58	2.750E-02	810.78	99.460	PBC<MDA	CO58
860.98	36.	29.92	0.55	2.610E-02	860.56	12.420	1.543E+00	TL208
873.44	1.	801.69	1.63	2.576E-02	873.23	12.270	PBC<MDA	EU154
897.12	7.	110.09	1.65	2.513E-02	898.04	93.700	PBC<MDA	y88
911.34	107.	11.11	1.04	2.481E-02	911.16	29.000	2.059E+00	AC228
964.56	2.	409.74	1.70	2.360E-02	964.11	14.605	PBC<MDA	EU152
					964.11	14.605	8.391E-02	EU152
968.98	53.	16.14	1.58	2.349E-02	968.97	17.460	1.784E+00	AC228
1061.04	2.	85.61	1.78	2.160E-02	1063.66	74.500	PBC<MDA	BI207
1112.20	3.	265.18	1.82	2.074E-02	1112.07	13.644	PBC<MDA	EU152
					1112.07	13.644	1.309E-01	EU152
1120.23	6.	32.41	1.83	2.060E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1120.55	99.987	PBC<MDA	Sc46
1120.90	25.	34.30	1.83	2.060E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	1.672E-01	Sc46
					1121.30	34.900	4.794E-01	Ta182
1121.24	19.	46.12	1.83	2.058E-02	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	3.635E-01	Ta182
1173.06	2.	330.70	1.87	1.975E-02	1173.24	99.900	PBC<MDA	CO60
1189.35	5.	149.89	1.88	1.951E-02	1189.05	16.200	PBC<MDA	Ta182
1237.63	3.	262.27	1.92	1.879E-02	1238.28	66.070	PBC<MDA	Co56
1407.12	5.	137.41	2.05	1.666E-02	1408.00	21.005	PBC<MDA	EU152
					1408.00	21.005	1.836E-01	EU152
1460.67	175.	7.63	1.66	1.609E-02	1460.83	10.670	1.418E+01	K40
1595.98	2.	287.28	2.18	1.479E-02	1596.21	95.400	PBC<MDA	La140
1764.08	5.	29.61	2.30	1.342E-02	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
298.24	74.67	288.	114.	8.949E+02	29.48	0.839	-	
307.77	77.06	261.	181.	1.423E+03	14.68	1.223	-	s
3131.26	783.17	16.	6.	2.041E+02	106.87	1.554	-	sc

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_ Long_no ingrowth Rev3.li

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.07	46.61	254.	72.	0.010	13.25	1.378s
TH-227	199.59	49.99	207.	-19.	-0.003	107.85	0.893s
AM-241	238.34	59.69	194.	25.	0.003	82.80	0.902
TH-234	251.90	63.08	274.	70.	0.010	18.56	0.783s
BA-133	325.35	81.46	214.	-19.	-0.003	109.89	0.922s
Np-237	348.91	87.35	259.	47.	0.007	50.17	0.928s
EU-155	348.88	87.34	280.	44.	0.006	55.99	0.928s
Cd-109	348.69	87.30	222.	47.	0.006	47.62	0.929s
TH-234	369.85	92.59	315.	23.	0.003	15.10	0.933D
AC-228	372.89	93.35	260.	54.	0.008	44.18	0.934D
Gd-153	390.19	97.68	152.	17.	0.002	104.19	0.938s
Gd-153	407.71	102.06	121.	-12.	-0.002	128.70	0.944s
EU-155	421.97	105.63	135.	28.	0.004	60.75	0.946s
EU-152	486.40	121.75	123.	7.	0.001	243.21	0.961s
CO-57	488.41	122.25	119.	11.	0.001	149.02	0.962s
EU-154	492.97	123.39	144.	-13.	-0.002	129.92	0.963s
PA-234	524.35	131.24	152.	23.	0.003	79.48	0.970s
HF-181	531.44	133.02	164.	-10.	-0.001	181.86	0.972s
CE-144	531.65	133.07	168.	-14.	-0.002	130.97	0.973s
HF-181	550.92	137.89	105.	4.	0.001	363.46	0.975s
Tc-99m	559.71	140.09	140.	7.	0.001	232.64	0.979s
CE-141	577.07	144.44	141.	9.	0.001	198.66	0.984s
Ba-140	649.58	162.58	130.	8.	0.001	208.79	1.000s
CE-139	662.73	165.87	149.	-8.	-0.001	208.02	1.003s
Ra-226	742.43	185.80	127.	121.	0.017	20.31	0.643s
TH-229	773.92	193.68	144.	7.	0.001	257.30	1.029s
TH-229	842.61	210.87	142.	5.	0.001	354.95	1.045s
TH-227	942.96	235.97	47.	33.	0.005	34.27	1.069D
PB-212	953.60	238.63	142.	245.	0.034	7.34	1.071D
RA-224	963.01	240.99	143.	25.	0.003	71.82	1.073D
PB-214	967.05	242.00	103.	36.	0.005	30.14	1.074D
EU-152	976.34	244.32	163.	-19.	-0.003	96.58	1.077s
TH-227	1025.17	256.54	82.	7.	0.001	191.72	1.088s
BI-210M	1060.93	265.48	116.	-14.	-0.002	115.55	1.097s
TL-208	1108.52	277.38	46.	14.	0.002	84.71	0.267s
I-131	1129.61	282.66	77.	3.	0.000	367.17	1.114s
PB-214	1178.25	294.83	91.	83.	0.012	18.76	0.787s
Ir-192	1179.08	295.03	69.	79.	0.011	18.72	1.125s
PB-212	1200.10	300.29	78.	22.	0.003	59.62	1.128
PA-231	1200.10	300.29	78.	22.	0.003	59.62	1.128s
PA-233	1200.13	300.30	82.	21.	0.003	64.95	1.128s
PA-231	1206.55	301.91	113.	-14.	-0.002	107.48	1.131s
BA-133	1206.46	301.88	113.	-14.	-0.002	111.92	1.131s
Ba-140	1221.71	305.70	85.	4.	0.001	322.12	1.133s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-210M	1222.96	306.01	94.	2.	0.000	572.61	1.133s
Ir-192	1233.99	308.77	84.	22.	0.003	63.27	1.136s
PA-233	1255.91	314.25	59.	8.	0.001	139.88	1.139s
Ir-192	1261.54	315.66	97.	-18.	-0.003	80.14	1.143s
CR-51	1281.74	320.71	87.	15.	0.002	94.08	1.147s
La-140	1301.04	325.54	40.	-4.	-0.001	254.55	1.155s
AC-228	1351.87	338.25	59.	86.	0.012	21.98	0.544s
EU-152	1378.00	344.79	60.	17.	0.002	67.22	1.169s
HF-181	1377.77	344.73	49.	19.	0.003	55.43	1.170s
PB-214	1406.22	351.85	93.	120.	0.017	11.95	1.065s
BA-133	1429.44	357.66	45.	16.	0.002	64.38	1.180s
I-131	1455.63	364.21	77.	-8.	-0.001	168.61	1.187s
BA-133	1533.50	383.68	75.	-6.	-0.001	200.69	1.205s
SN-113	1568.10	392.34	62.	17.	0.002	68.79	1.212s
AG-108M	1737.61	434.73	70.	-11.	-0.002	107.08	1.250s
pm-146	1815.30	454.16	70.	-7.	-0.001	167.87	1.268s
SB-125	1852.05	463.35	48.	16.	0.002	66.47	1.277s
Ir-192	1872.61	468.49	38.	13.	0.002	74.92	1.281s
PM-144	1898.31	474.92	43.	1.	0.000	894.90	1.289s
BE-7	1908.69	477.52	51.	3.	0.000	400.53	1.289s
HF-181	1942.82	486.05	17.	7.	0.001	94.47	1.293s
RU-103	1987.30	497.17	37.	5.	0.001	170.80	1.307s
RH-106	2042.64	511.01	145.	114.	0.016	17.56	1.320s
CS-134	2251.41	563.22	52.	-5.	-0.001	229.56	1.365s
TL-208	2331.83	583.33	58.	91.	0.013	13.35	0.864s
SB-125	2401.36	600.71	72.	-2.	0.000	589.89	1.398s
CS-134	2412.41	603.48	70.	-9.	-0.001	137.61	1.401s
BI-214	2435.84	609.33	88.	114.	0.016	12.69	1.140
RU-103	2435.70	609.30	50.	144.	0.020	10.85	1.406s
AG-108M	2456.14	614.41	67.	-12.	-0.002	102.36	1.410s
PM-144	2471.64	618.29	38.	17.	0.002	55.61	1.413s
RH-106	2485.38	621.72	52.	-6.	-0.001	178.63	1.416s
SB-125	2547.21	637.18	38.	-4.	-0.001	208.40	1.428s
I-131	2546.87	637.09	41.	-4.	-0.001	214.19	1.429s
AG-110M	2631.19	658.18	88.	-8.	-0.001	177.18	1.447s
CS-137	2655.07	664.15	67.	-27.	-0.004	105.62	1.451s
PM-144	2787.63	697.29	41.	3.	0.000	334.83	1.480s
NB-94	2812.86	703.60	38.	5.	0.001	176.64	1.486s
SB-124	2888.47	722.50	56.	-5.	-0.001	219.07	1.503s
AG-108M	2888.39	722.48	56.	-5.	-0.001	226.27	1.503s
EU-154	2888.60	722.53	57.	-6.	-0.001	177.51	1.503s
BI-212	2906.90	727.11	18.	42.	0.006	25.42	0.459s
pm-146	2984.11	746.41	33.	-4.	-0.001	195.28	1.524s
ZR-95	3038.72	760.06	32.	-6.	-0.001	148.64	1.532s
AG-110M	3050.06	762.90	32.	-2.	0.000	362.46	1.538s
NB-95	3062.79	766.08	42.	-1.	0.000	706.93	1.539s
EU-152	3115.87	779.35	32.	7.	0.001	113.13	1.550s
BI-212	3140.15	785.42	23.	6.	0.001	110.80	1.556D

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	3186.18	796.92	42.	-6.	-0.001	169.80	1.565s
CO-58	3239.01	810.13	34.	8.	0.001	104.17	1.577s
La-140	3261.74	815.81	35.	-2.	0.000	407.18	1.581s
MN-54	3340.83	835.58	41.	-1.	0.000	758.47	1.597s
TL-208	3442.43	860.98	16.	36.	0.005	29.92	0.554s
NB-94	3478.56	870.01	38.	-3.	0.000	272.73	1.627s
EU-154	3492.30	873.44	39.	1.	0.000	801.69	1.629s
PA-234	3537.13	884.65	26.	-1.	0.000	515.28	1.637s
AG-110M	3534.84	884.08	29.	-2.	0.000	418.73	1.638s
Sc-46	3558.78	890.06	30.	-5.	-0.001	167.59	1.642s
y-88	3587.03	897.12	26.	7.	0.001	110.09	1.649s
AC-228	3643.92	911.34	5.	107.	0.015	11.11	1.041s
AG-110M	3748.12	937.39	42.	-9.	-0.001	113.34	1.682s
EU-152	3856.86	964.56	35.	2.	0.000	409.74	1.703s
AC-228	3874.55	968.98	5.	53.	0.007	16.14	1.583
EU-154	4017.03	1004.59	36.	-2.	0.000	363.77	1.736s
RH-106	4204.57	1051.46	33.	-3.	0.000	285.24	1.772s
BI-207	4242.92	1061.04	22.	2.	0.000	85.61	1.783s
Ga-68	4306.05	1076.82	29.	-4.	-0.001	203.03	1.794s
EU-152	4447.65	1112.20	24.	3.	0.000	265.18	1.821s
ZN-65	4467.71	1117.21	45.	-6.	-0.001	155.64	1.824s
BI-214	4480.00	1120.29	43.	6.	0.001	32.41	1.828D
Sc-46	4482.45	1120.90	24.	25.	0.003	34.30	1.828s
Ta-182	4484.06	1121.30	28.	19.	0.003	46.12	1.828D
CO-60	4691.20	1173.06	31.	2.	0.000	330.70	1.869s
Ta-182	4756.42	1189.35	28.	5.	0.001	149.89	1.881s
Co-56	4949.64	1237.63	32.	3.	0.000	262.27	1.919s
FE-59	5174.49	1293.80	25.	-2.	0.000	305.48	1.959
EU-152	5628.13	1407.12	18.	5.	0.001	137.41	2.046s
K-40	5842.51	1460.67	28.	175.	0.024	7.63	1.662
La-140	6384.30	1595.98	11.	2.	0.000	287.28	2.181s
SB-124	6762.72	1690.48	14.	-2.	0.000	268.13	2.247s
BI-214	7057.48	1764.08	19.	5.	0.001	29.61	2.297s
Co-56	7084.53	1770.83	17.	-4.	-0.001	147.07	2.302s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Peak Code	Peak MDA Value Bq/Sample	COMMENTS
BE-7	C	7.8775E-02				5.31E+01	
			477.60	7.877E-02	?(1.110E+00	4.01E+02	1.05E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
K-40	N 1.4183E+01					4.66E+11	
		1460.83	1.418E+01	(P	2.202E+00	7.63E+00	1.07E+01 G
Sc-46	F 7.0487E-02					8.38E+01	
		889.28	-2.625E-02	?(	1.543E-01	1.68E+02	1.00E+02 G
		1120.55	1.672E-01	?(	1.715E-01	3.43E+01	1.00E+02 G
CR-51	F 3.4944E-01					2.77E+01	
		320.08	3.494E-01	?(	1.105E+00	9.41E+01	9.94E+00 G
MN-54	C -6.2355E-03					3.12E+02	
		834.85	-6.236E-03	?(	1.688E-01	7.58E+02	1.00E+02 G
Co-56	C 1.4111E-02					7.73E+01	
		846.77	4.168E-04	%(	1.601E-01	1.06E+04	9.99E+01 G
		1238.28	3.482E-02	?(	3.242E-01	2.62E+02	6.61E+01 G
		1037.84	1.270E-02	%	1.312E+00	2.85E+03	1.41E+01 G
		1771.35	-2.818E-01	+	1.470E+00	1.47E+02	1.55E+01 A
CO-57	C 1.5079E-02					2.72E+02	
		122.06	1.508E-02	?(	7.631E-02	1.49E+02	8.56E+01 G
		136.47	1.475E-02	%	5.376E-01	1.04E+03	1.07E+01 G
CO-58	C 4.2460E-02					7.09E+01	
		810.78	4.246E-02	?(	1.512E-01	1.04E+02	9.95E+01 G
CO-60	F 9.7195E-03					1.93E+03	
		1332.50	2.450E-03	%(	1.868E-01	2.06E+03	1.00E+02 G
		1173.24	1.700E-02	?(	2.007E-01	3.31E+02	9.99E+01 G
ZN-65	F -8.3887E-02					2.44E+02	
		1115.55	-8.389E-02	?(	4.519E-01	1.56E+02	5.06E+01 G
NB-94	I 2.3161E-02					7.41E+06	
		702.63	2.316E-02	&(	1.428E-01	1.77E+02	9.79E+01 G
		871.10	-1.766E-02	&	1.700E-01	2.73E+02	9.99E+01 G
ZR-95	I -4.8754E-02					6.40E+01	
		756.73	-4.875E-02	&(	2.526E-01	1.49E+02	5.45E+01 G
		724.20	0.000E+00	&	4.536E-01	1.00E+03	4.42E+01 G
NB-95	I -6.2624E-03					6.40E+01	
		765.79	-6.262E-03	?(	1.578E-01	7.07E+02	9.98E+01 G
RU-103	I 1.9189E-02					3.93E+01	
		497.05	1.919E-02	?(	1.144E-01	1.71E+02	9.09E+01 G
		610.30	9.921E+00	?	2.457E+00	1.08E+01	5.75E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RH-106	I	-2.3847E-01					3.74E+02	
			621.92	-2.385E-01	?(	1.476E+00	1.79E+02	9.93E+00 G
			1050.36	-1.189E+00	+	1.204E+01	2.85E+02	1.56E+00 G
			511.86	1.961E+00	&	1.007E+00	1.76E+01	2.00E+01 GA
AG-108M	C	-3.8079E-02					1.53E+05	
			433.94	-3.808E-02	?(	1.381E-01	1.07E+02	9.05E+01 G
			722.94	-2.405E-02	+	1.893E-01	2.26E+02	9.08E+01 G
			614.28	-5.218E-02	+	1.807E-01	1.02E+02	8.98E+01 G
AG-110M	F	-1.3782E-02					2.50E+02	
			884.68	-1.378E-02	&(	2.075E-01	4.19E+02	7.27E+01 G
			657.76	-3.417E-02	&	2.074E-01	1.77E+02	9.46E+01 G
			937.49	-1.423E-01	+	5.520E-01	1.13E+02	3.44E+01 G
			1384.30	0.000E+00	+	8.841E-01	1.00E+03	2.43E+01 G
			763.94	-4.869E-02	+	6.300E-01	3.62E+02	2.23E+01 G
SN-113	F	7.5104E-02					1.15E+02	
			391.69	7.510E-02	&(	1.713E-01	6.88E+01	6.40E+01 G
SB-124	F	-1.4216E-03					6.02E+01	
			602.73	-1.422E-03	%(	1.649E-01	3.29E+03	9.83E+01 G
			1690.98	-4.260E-02	+	4.197E-01	2.68E+02	4.78E+01 G
			722.79	-2.092E-01	+	1.592E+00	2.19E+02	1.08E+01 G
SB-125	I	1.2534E-01					1.01E+03	
			427.88	0.000E+00	?(	4.715E-01	1.00E+03	2.96E+01 G
			600.50	-4.499E-02	+	9.277E-01	5.90E+02	1.79E+01 G
			635.89	-1.565E-01	+	1.144E+00	2.08E+02	1.13E+01 G
			463.37	4.797E-01	&(	1.055E+00	6.65E+01	1.05E+01 G
I-131	I	-1.4048E-02					8.02E+00	
			364.48	-2.424E-02	?(	1.402E-01	1.69E+02	8.17E+01 G
			284.30	1.216E-01	?(	1.551E+00	3.67E+02	6.14E+00 G
			636.97	-2.493E-01	+	1.871E+00	2.14E+02	7.17E+00 G
Gd-153	F	6.4445E-02					2.42E+02	
			97.50	6.444E-02	?(	2.254E-01	1.04E+02	3.00E+01 G
			103.20	-6.473E-02	+	2.819E-01	1.29E+02	2.18E+01 G
Ga-68	C	-1.3274E+00					4.71E-02	
			1077.40	-1.327E+00	?(	9.532E+00	2.03E+02	3.30E+00 G
Tc-99m	I	1.2082E-02					2.51E-01	
			140.51	1.208E-02	&(	9.593E-02	2.33E+02	8.93E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BA-133	F 6.6365E-02					3.85E+03	
		356.00	6.636E-02	&(	1.410E-01	6.44E+01	6.20E+01 G
		302.85	-1.718E-01	-	6.487E-01	1.12E+02	1.83E+01 G
		383.84	-1.900E-01	-	1.314E+00	2.01E+02	8.94E+00 GA
		80.99	-6.184E-02	-	2.278E-01	1.10E+02	3.41E+01 GA
CS-134	I -3.5683E-02					7.54E+02	
		604.71	-3.568E-02	&(	1.678E-01	1.38E+02	9.76E+01 G
		795.87	-3.256E-02	+	1.922E-01	1.70E+02	8.55E+01 G
		569.32	0.000E+00	+	1.011E+00	1.00E+03	1.54E+01 G
		801.95	3.650E-02	%	1.716E+00	1.30E+03	8.69E+00 G
		563.24	-2.016E-01	+	1.613E+00	2.30E+02	8.35E+00 G
CS-137	I -1.3649E-01					1.10E+04	
		661.66	-1.365E-01	(P	2.039E-01	1.06E+02	8.52E+01 G
CE-139	F -1.5699E-02					1.38E+02	
		165.85	-1.570E-02	?(	1.112E-01	2.08E+02	7.99E+01 G
Ba-140	I 6.4952E-02					1.28E+01	
		537.26	7.367E-03	%(	4.837E-01	1.83E+03	2.44E+01 G
		162.66	1.848E-01	?(	1.317E+00	2.09E+02	6.22E+00 G
		304.85	2.185E-01	?(	2.437E+00	3.22E+02	4.29E+00 G
La-140	I 1.6939E-02					1.28E+01	
		1596.21	1.694E-02	?(	1.813E-01	2.87E+02	9.54E+01 G
		487.02	0.000E+00	-	2.675E-01	1.00E+03	4.55E+01 G
		328.76	-4.312E-02	+	3.862E-01	2.55E+02	2.03E+01 G
		815.77	-4.518E-02	+	6.564E-01	4.07E+02	2.33E+01 G
CE-141	I 2.3968E-02					3.25E+01	
		145.44	2.397E-02	?(	1.621E-01	1.99E+02	4.82E+01 G
CE-144	I -1.6467E-01					2.85E+02	
		133.54	-1.647E-01	?(	7.273E-01	1.31E+02	1.11E+01 G
PM-144	C 3.5365E-02					3.63E+02	
		696.54	1.235E-02	&(	1.462E-01	3.35E+02	9.90E+01 G
		618.06	6.992E-02	@(	1.265E-01	5.56E+01	9.91E+01 G
		476.81	8.070E-03	?(	2.574E-01	8.95E+02	4.20E+01 G
EU-152	F 1.6295E-01					4.94E+03	
		344.29	1.649E-01	?(	3.669E-01	6.72E+01	2.65E+01 G
		1112.07	1.309E-01	?(	1.246E+00	2.65E+02	1.36E+01 G
		121.78	2.784E-02	&	2.318E-01	2.43E+02	2.86E+01 G
		778.92	2.820E-01	&(	1.097E+00	1.13E+02	1.29E+01 G
		964.11	8.391E-02	?(	1.226E+00	4.10E+02	1.46E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			244.69	-4.947E-01	+	1.600E+00	9.66E+01	7.58E+00 G
			1408.00	1.836E-01	?	8.897E-01	1.37E+02	2.10E+01 GA
EU-154	I	4.8447E-02					3.14E+03	
			873.23	4.845E-02	&(	1.390E+00	8.02E+02	1.23E+01 G
			123.10	-4.009E-02	+	1.759E-01	1.30E+02	4.08E+01 G
			1274.54	0.000E+00	-	5.595E-01	1.00E+03	3.52E+01 G
			723.36	-1.401E-01	+	8.595E-01	1.78E+02	2.02E+01 G
			1004.77	-8.039E-02	+	1.040E+00	3.64E+02	1.80E+01 G
			996.33	0.000E+00	&	2.033E+00	1.00E+03	1.06E+01 G
EU-155	I	1.5584E-01					1.81E+03	
			105.31	1.540E-01	*(	3.078E-01	6.07E+01	2.12E+01 G
			86.54	1.571E-01	&(	2.889E-01	5.60E+01	3.07E+01 G
HF-181	F	7.5179E-02					4.24E+01	
			482.00	2.733E-02	&(	8.868E-02	9.45E+01	8.05E+01 G
			133.02	-2.980E-02	-	1.839E-01	1.82E+02	4.33E+01 G
			345.83	3.254E-01	?(	5.877E-01	5.54E+01	1.51E+01 G
			136.30	8.902E-02	?(	1.116E+00	3.63E+02	5.85E+00 G
Ta-182	F	3.2088E-01					1.14E+02	
			1121.30	3.635E-01	(	5.308E-01	4.61E+01	3.49E+01 G
			1221.41	1.311E-02	%	7.263E-01	1.52E+03	2.70E+01 G
			1189.05	2.290E-01	&(	1.201E+00	1.50E+02	1.62E+01 G
Hg-203	F	1.0735E-03					4.66E+01	
			279.20	1.073E-03	%(	1.384E-01	3.71E+03	8.15E+01 G
TL-208	N	4.1518E-01					6.98E+02	
			583.02	4.104E-01	*(P	1.726E-01	1.34E+01	8.45E+01 G
			277.28	4.792E-01	(	1.159E+00	8.47E+01	6.31E+00 G
			860.56	1.543E+00	+	9.148E-01	2.99E+01	1.24E+01 G
pm-146	C	-5.9767E-02					2.02E+03	
			747.16	-5.977E-02	?(	4.102E-01	1.95E+02	3.40E+01 G
			735.72	2.973E-03	%	6.057E-01	5.62E+03	2.25E+01 G
			453.88	-3.452E-02	+	1.992E-01	1.68E+02	6.50E+01 G
y-88	F	4.1196E-02					1.07E+02	
			898.04	4.120E-02	?(	1.563E-01	1.10E+02	9.37E+01 G
			1836.06	0.000E+00	-	7.991E-02	1.00E+03	9.92E+01 G
Cd-109	F	1.3531E+00					4.53E+02	
			88.04	1.353E+00	?(	2.099E+00	4.76E+01	3.79E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ra-226	N	5.9299E+00					5.84E+05	
			185.99	5.930E+00	*(P	2.710E+00	2.03E+01	3.28E+00 G
PB-210	N	2.1396E+00					8.14E+03	
			46.54	2.140E+00	*(P	2.293E+00	1.32E+01	4.25E+00 G
PB-212	N	1.0846E+00					6.98E+02	
			238.63	1.085E+00	(P	2.573E-01	7.34E+00	4.33E+01 G
			300.03	1.546E+00	+	3.027E+00	5.96E+01	3.28E+00 GA
PB-214	N	8.6345E-01					5.84E+05	
			351.93	8.114E-01	*(P	3.241E-01	1.20E+01	3.76E+01 G
			295.09	9.649E-01	*(P	5.452E-01	1.88E+01	1.93E+01 G
			242.00	9.422E-01	P	1.300E+00	3.01E+01	7.43E+00 GA
BI-207	C	-2.5933E-02					1.18E+04	
			569.70	-5.654E-02	%(P	1.343E-01	4.55E+03	9.77E+01 G
			1063.66	1.422E-02	?(P	2.104E-01	8.56E+01	7.45E+01 G
BI-212	N	2.5575E+00					6.98E+02	
			727.17	2.558E+00	(	1.369E+00	2.54E+01	7.55E+00 G
			785.42	2.487E+00		9.530E+00	1.11E+02	1.28E+00 GA
BI-214	N	9.7856E-01					5.84E+05	
			609.31	9.786E-01	(P	3.988E-01	1.27E+01	4.61E+01 G
			1120.29	2.773E-01	- P	1.482E+00	3.24E+01	1.51E+01 G
			1764.49	3.072E-01	- P	1.558E+00	2.96E+01	1.54E+01 G
BI-210M	T	-5.6176E-02					1.10E+09	
			265.83	-5.618E-02	?(	2.191E-01	1.16E+02	5.00E+01 G
			304.90	1.967E-02	+	3.910E-01	5.73E+02	2.80E+01 G
RA-224	N	1.1555E+00					6.98E+02	
			240.99	1.155E+00	(	2.752E+00	7.18E+01	4.10E+00 G
AC-228	N	1.9193E+00					2.10E+03	
			911.16	2.059E+00	*(	2.600E-01	1.11E+01	2.90E+01 G
			968.97	1.784E+00	(	4.562E-01	1.61E+01	1.75E+01 G
			338.32	1.780E+00	(	7.918E-01	2.20E+01	1.20E+01 G
			93.35	1.085E+00	-	1.557E+00	4.42E+01	5.56E+00 XA
TH-227	N	5.0804E-01					7.95E+03	
			235.97	5.080E-01	(	5.357E-01	3.43E+01	1.23E+01 G
			50.14	-2.934E-01	-	1.060E+00	1.08E+02	8.00E+00 G
			256.24	1.959E-01	-	1.290E+00	1.92E+02	7.00E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-229	N	2.6314E-01					2.68E+06	
			193.51	2.510E-01	(	2.206E+00	2.57E+02	4.40E+00 G
			210.85	2.810E-01	?(	3.419E+00	3.55E+02	2.99E+00 G
TH-234	N	2.0489E+00					1.63E+12	
			63.29	2.049E+00	*(P	2.350E+00	1.86E+01	3.81E+00 G
			92.59	4.485E-01	- P	1.701E+00	1.51E+01	5.58E+00 G
PA-231	N	3.3436E-01					1.20E+07	
			302.65	-1.141E+00	?(	4.132E+00	1.07E+02	2.88E+00 G
			300.07	2.061E+00	&(	4.036E+00	5.96E+01	2.46E+00 G
PA-233	C	1.5688E-01					7.82E+08	
			312.01	5.191E-02	&(	2.490E-01	1.40E+02	3.60E+01 G
			300.18	7.664E-01	&(	1.644E+00	6.50E+01	6.20E+00 G
PA-234	N	1.5981E-01					1.63E+12	
			131.29	1.598E-01	(	4.227E-01	7.95E+01	1.80E+01 G
			946.02	-3.148E-03	%	1.038E+00	8.88E+03	1.34E+01 G
			569.47	0.000E+00	-	1.889E+00	1.00E+03	8.20E+00 G
			883.24	-7.971E-02	&	1.489E+00	5.15E+02	9.60E+00 G
			880.53	3.679E-02	&	2.121E+00	1.55E+03	6.00E+00 GA
U-235	N	-3.5205E-01					2.57E+11	
			143.79	-3.521E-01	%(P	8.078E-01	1.00E+03	1.10E+01 G
			205.33	5.072E-02	%	1.980E+00	1.13E+03	5.01E+00 G
			163.38	-7.283E-02	% P	1.701E+00	9.13E+03	5.08E+00 G
AM-241	T	7.7842E-02					1.58E+05	
			59.54	7.784E-02	?(	2.146E-01	8.28E+01	3.59E+01 G
Ir-192	F	1.2356E-01					7.40E+01	
			316.49	-4.916E-02	&(	1.315E-01	8.01E+01	8.70E+01 G
			468.06	7.753E-02	+	1.940E-01	7.49E+01	5.18E+01 G
			308.44	1.584E-01	?(	3.305E-01	6.33E+01	3.18E+01 G
			295.95	5.853E-01	?(	3.084E-01	1.87E+01	3.02E+01 G
Np-237	F	3.9772E-01					2.14E+06	
			86.49	3.977E-01	&(	6.521E-01	5.02E+01	1.31E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went
negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.

% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
BA-133	81.46	214.	-19.	-0.003	109.89	-6.184E-02
Np-237	87.35	259.	47.	0.007	50.17	3.977E-01
EU-155	87.34	280.	44.	0.006	55.99	1.571E-01
Cd-109	87.30	222.	47.	0.006	47.62	1.353E+00
Gd-153	97.68	152.	17.	0.002	104.19	6.444E-02
Gd-153	102.06	121.	-12.	-0.002	128.70	-6.473E-02
EU-155	105.63	135.	28.	0.004	60.75	1.540E-01
EU-152	121.75	123.	7.	0.001	243.21	2.784E-02
CO-57	122.25	119.	11.	0.001	149.02	1.508E-02
EU-154	123.39	144.	-13.	-0.002	129.92	-4.009E-02
PA-234	131.24	152.	23.	0.003	79.48	1.598E-01
HF-181	133.02	164.	-10.	-0.001	181.86	-2.980E-02
CE-144	133.07	168.	-14.	-0.002	130.97	-1.647E-01
HF-181	137.89	105.	4.	0.001	363.46	8.902E-02
Tc-99m	140.09	140.	7.	0.001	232.64	1.208E-02
CE-141	144.44	141.	9.	0.001	198.66	2.397E-02
Ba-140	162.58	130.	8.	0.001	208.79	1.848E-01
CE-139	165.87	149.	-8.	-0.001	208.02	-1.570E-02
TH-229	193.68	144.	7.	0.001	257.30	2.510E-01
TH-229	210.87	142.	5.	0.001	354.95	2.810E-01
EU-152	244.32	163.	-19.	-0.003	96.58	-4.947E-01
BI-210M	265.48	116.	-14.	-0.002	115.55	-5.618E-02
I-131	282.66	77.	3.	0.000	367.17	1.216E-01
Ir-192	295.03	69.	79.	0.011	18.72	5.853E-01

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-231	300.29	78.	22.	0.003	59.62	2.061E+00	
PA-233	300.30	82.	21.	0.003	64.95	7.664E-01	
PA-231	301.91	113.	-14.	-0.002	107.48	-1.141E+00	
BA-133	301.88	113.	-14.	-0.002	111.92	-1.718E-01	
Ba-140	305.70	85.	4.	0.001	322.12	2.185E-01	
BI-210M	306.01	94.	2.	0.000	572.61	1.967E-02	
Ir-192	308.77	84.	22.	0.003	63.27	1.584E-01	
PA-233	314.25	59.	8.	0.001	139.88	5.191E-02	
Ir-192	315.66	97.	-18.	-0.003	80.14	-4.916E-02	
CR-51	320.71	87.	15.	0.002	94.08	3.494E-01	
La-140	325.54	40.	-4.	-0.001	254.55	-4.312E-02	
EU-152	344.79	60.	17.	0.002	67.22	1.649E-01	
HF-181	344.73	49.	19.	0.003	55.43	3.254E-01	
BA-133	357.66	45.	16.	0.002	64.38	6.636E-02	
I-131	364.21	77.	-8.	-0.001	168.61	-2.424E-02	
BA-133	383.68	75.	-6.	-0.001	200.69	-1.900E-01	
SN-113	392.34	62.	17.	0.002	68.79	7.510E-02	
AG-108M	434.73	70.	-11.	-0.002	107.08	-3.808E-02	
pm-146	454.16	70.	-7.	-0.001	167.87	-3.452E-02	
SB-125	463.35	48.	16.	0.002	66.47	4.797E-01	
Ir-192	468.49	38.	13.	0.002	74.92	7.753E-02	
PM-144	474.92	43.	1.	0.000	894.90	8.070E-03	
BE-7	477.52	51.	3.	0.000	400.53	7.877E-02	
HF-181	486.05	17.	7.	0.001	94.47	2.733E-02	
RU-103	497.17	37.	5.	0.001	170.80	1.919E-02	
RH-106	511.01	145.	114.	0.016	17.56	1.961E+00	
CS-134	563.22	52.	-5.	-0.001	229.56	-2.016E-01	
SB-125	600.71	72.	-2.	0.000	589.89	-4.499E-02	
CS-134	603.48	70.	-9.	-0.001	137.61	-3.568E-02	
RU-103	609.30	50.	144.	0.020	10.85	9.921E+00	
AG-108M	614.41	67.	-12.	-0.002	102.36	-5.218E-02	
PM-144	618.29	38.	17.	0.002	55.61	6.992E-02	
RH-106	621.72	52.	-6.	-0.001	178.63	-2.385E-01	
SB-125	637.18	38.	-4.	-0.001	208.40	-1.565E-01	
I-131	637.09	41.	-4.	-0.001	214.19	-2.493E-01	
AG-110M	658.18	88.	-8.	-0.001	177.18	-3.417E-02	
CS-137	664.15	67.	-27.	-0.004	105.62	-1.365E-01	P
PM-144	697.29	41.	3.	0.000	334.83	1.235E-02	
NB-94	703.60	38.	5.	0.001	176.64	2.316E-02	
SB-124	722.50	56.	-5.	-0.001	219.07	-2.092E-01	
AG-108M	722.48	56.	-5.	-0.001	226.27	-2.405E-02	
EU-154	722.53	57.	-6.	-0.001	177.51	-1.401E-01	
pm-146	746.41	33.	-4.	-0.001	195.28	-5.977E-02	
ZR-95	760.06	32.	-6.	-0.001	148.64	-4.875E-02	
AG-110M	762.90	32.	-2.	0.000	362.46	-4.869E-02	
NB-95	766.08	42.	-1.	0.000	706.93	-6.262E-03	
EU-152	779.35	32.	7.	0.001	113.13	2.820E-01	
CS-134	796.92	42.	-6.	-0.001	169.80	-3.256E-02	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
CO-58	810.13		34.	8.	0.001	104.17	4.246E-02	
La-140	815.81		35.	-2.	0.000	407.18	-4.518E-02	
MN-54	835.58		41.	-1.	0.000	758.47	-6.236E-03	
NB-94	870.01		38.	-3.	0.000	272.73	-1.766E-02	
EU-154	873.44		39.	1.	0.000	801.69	4.845E-02	
PA-234	884.65		26.	-1.	0.000	515.28	-7.971E-02	
AG-110M	884.08		29.	-2.	0.000	418.73	-1.378E-02	
Sc-46	890.06		30.	-5.	-0.001	167.59	-2.625E-02	
y-88	897.12		26.	7.	0.001	110.09	4.120E-02	
AG-110M	937.39		42.	-9.	-0.001	113.34	-1.423E-01	
EU-152	964.56		35.	2.	0.000	409.74	8.391E-02	
EU-154	1004.59		36.	-2.	0.000	363.77	-8.039E-02	
RH-106	1051.46		33.	-3.	0.000	285.24	-1.189E+00	
BI-207	1061.04		22.	2.	0.000	85.61	1.422E-02	P
Ga-68	1076.82		29.	-4.	-0.001	203.03	-1.327E+00	
EU-152	1112.20		24.	3.	0.000	265.18	1.309E-01	
ZN-65	1117.21		45.	-6.	-0.001	155.64	-8.389E-02	
Sc-46	1120.90		24.	25.	0.003	34.30	1.672E-01	
CO-60	1173.06		31.	2.	0.000	330.70	1.700E-02	
Co-56	1237.63		32.	3.	0.000	262.27	3.482E-02	
FE-59	1293.80		25.	-2.	0.000	305.48	-4.256E-02	
EU-152	1407.12		18.	5.	0.001	137.41	1.836E-01	
La-140	1595.98		11.	2.	0.000	287.28	1.694E-02	
SB-124	1690.48		14.	-2.	0.000	268.13	-4.260E-02	
Co-56	1770.83		17.	-4.	-0.001	147.07	-2.818E-01	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	7.8774E-02	7.8775E-02	4.005E+02%	1.11E+00
NA-22	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.97E-01
K-40		1.4183E+01	1.4183E+01	8.612E+00%	2.20E+00
Sc-46	#A	7.0486E-02	7.0487E-02	3.430E+01%	1.54E-01
CR-51	#A	3.4944E-01	3.4944E-01	9.408E+01%	1.11E+00
MN-54	#A	-6.2355E-03	-6.2355E-03	7.585E+02%	1.69E-01
FE-59	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.08E-01
Co-56	#A	1.4111E-02	1.4111E-02	2.623E+02%	1.60E-01
CO-57	#A	1.5079E-02	1.5079E-02	1.490E+02%	7.63E-02
CO-58	#A	4.2460E-02	4.2460E-02	1.042E+02%	1.51E-01
CO-60	#A	9.7195E-03	9.7195E-03	3.307E+02%	1.87E-01
ZN-65	#A	-8.3887E-02	-8.3887E-02	1.556E+02%	4.52E-01
NB-94	#A	2.3161E-02	2.3161E-02	1.766E+02%	1.43E-01
ZR-95	#A	-4.8754E-02	-4.8754E-02	1.486E+02%	2.53E-01
NB-95	#A	-6.2624E-03	-6.2624E-03	7.069E+02%	1.58E-01

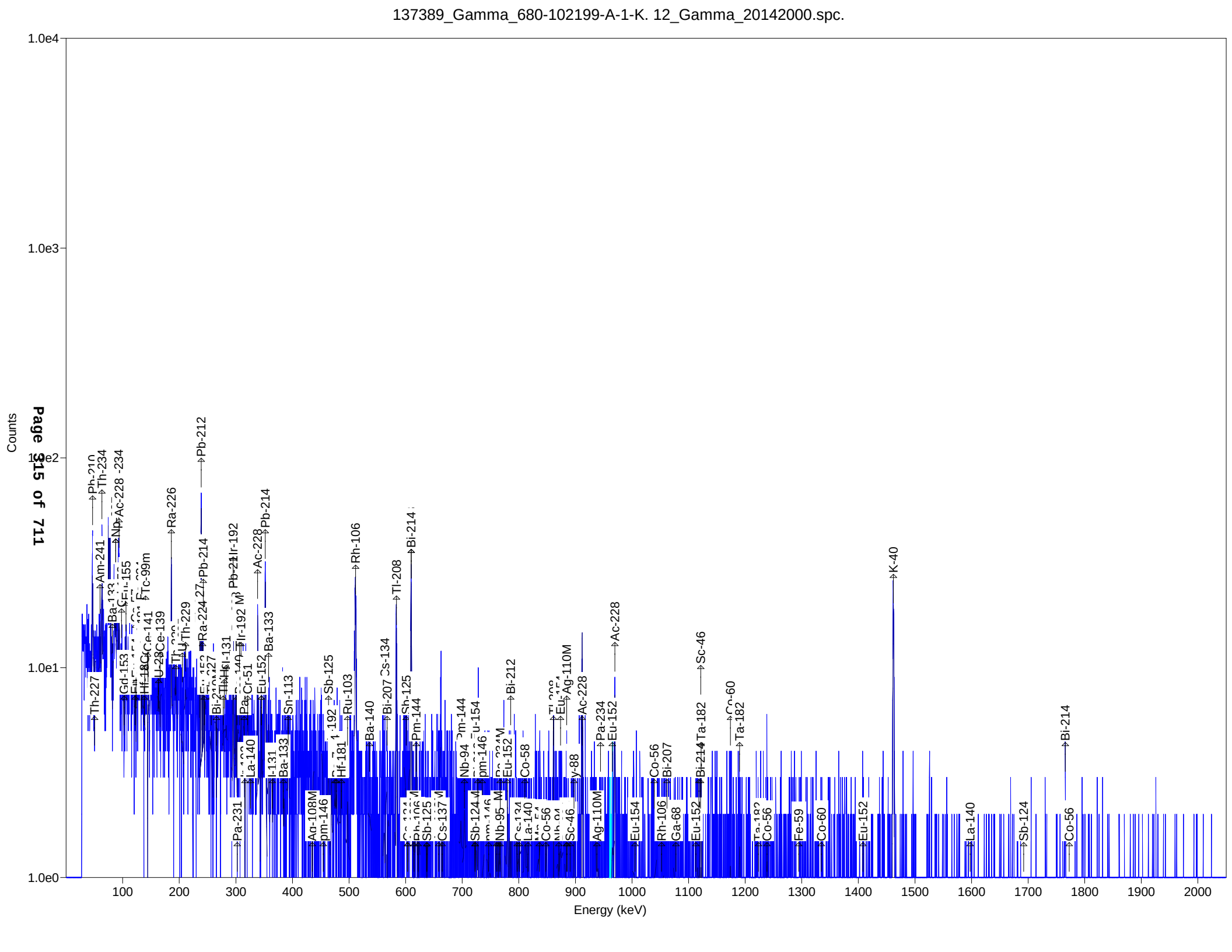
RU-103 #A	1.9189E-02	1.9189E-02	1.708E+02%	1.14E-01
RH-106 #A	-2.3847E-01	-2.3847E-01	1.786E+02%	1.48E+00
AG-108M#A	-3.8079E-02	-3.8079E-02	1.071E+02%	1.38E-01
AG-110M#A	-1.3782E-02	-1.3782E-02	4.187E+02%	2.08E-01
SN-113 #A	7.5103E-02	7.5104E-02	6.879E+01%	1.71E-01
SB-124 #A	-1.4215E-03	-1.4216E-03	3.294E+03%	1.65E-01
SB-125 #A	1.2534E-01	1.2534E-01	6.647E+01%	4.72E-01
I-131 #A	-1.4048E-02	-1.4048E-02	1.686E+02%	1.40E-01
Gd-153 #A	6.4445E-02	6.4445E-02	1.042E+02%	2.25E-01
Ga-68 #A	-1.3164E+00	-1.3274E+00	2.030E+02%	9.53E+00
Tc-99m #A	1.2063E-02	1.2082E-02	2.326E+02%	9.59E-02
BA-133 #A	6.6365E-02	6.6365E-02	6.438E+01%	1.41E-01
CS-134 #A	-3.5683E-02	-3.5683E-02	1.376E+02%	1.68E-01
CS-137 #A	-1.3649E-01	-1.3649E-01	1.730E+02%	2.04E-01
CE-139 #A	-1.5699E-02	-1.5699E-02	2.080E+02%	1.11E-01
Ba-140 #A	6.4950E-02	6.4952E-02	2.088E+02%	4.84E-01
La-140 #A	1.6938E-02	1.6939E-02	2.873E+02%	1.81E-01
CE-141 #A	2.3967E-02	2.3968E-02	1.987E+02%	1.62E-01
CE-144 #A	-1.6467E-01	-1.6467E-01	1.310E+02%	7.27E-01
PM-144 #A	3.5365E-02	3.5365E-02	5.561E+01%	1.46E-01
EU-152 #A	1.6295E-01	1.6295E-01	6.722E+01%	3.67E-01
EU-154 #A	4.8447E-02	4.8447E-02	8.017E+02%	1.39E+00
EU-155 #A	1.5584E-01	1.5584E-01	4.131E+01%	3.08E-01
HF-181 #A	7.5179E-02	7.5179E-02	5.543E+01%	8.87E-02
Ta-182 A	3.2088E-01	3.2088E-01	4.612E+01%	5.31E-01
Hg-203 #A	1.0735E-03	1.0735E-03	3.714E+03%	1.38E-01
TL-208	4.1518E-01	4.1518E-01	1.777E+01%	1.73E-01
pm-146 #A	-5.9767E-02	-5.9767E-02	1.953E+02%	4.10E-01
y-88 #A	4.1196E-02	4.1196E-02	1.101E+02%	1.56E-01
Cd-109 #A	1.3531E+00	1.3531E+00	4.762E+01%	2.10E+00
Ra-226 #	5.9299E+00	5.9299E+00	2.091E+01%	2.71E+00
PB-210 #A	2.1396E+00	2.1396E+00	3.568E+01%	2.29E+00
PB-212	1.0846E+00	1.0846E+00	8.901E+00%	2.57E-01
PB-214	8.6345E-01	8.6345E-01	1.459E+01%	3.24E-01
BI-207 #A	-2.5933E-02	-2.5933E-02	3.800E+02%	1.34E-01
BI-212	2.5575E+00	2.5575E+00	2.542E+01%	1.37E+00
BI-214	9.7856E-01	9.7856E-01	1.740E+01%	3.99E-01
BI-210M#A	-5.6176E-02	-5.6176E-02	1.155E+02%	2.19E-01
RA-224 A	1.1555E+00	1.1555E+00	7.182E+01%	2.75E+00
AC-228	1.9193E+00	1.9193E+00	9.815E+00%	2.60E-01
TH-227 A	5.0804E-01	5.0804E-01	3.427E+01%	5.36E-01
TH-229 #A	2.6314E-01	2.6314E-01	2.192E+02%	2.21E+00
TH-234 A	2.0489E+00	2.0489E+00	4.289E+01%	2.35E+00
PA-231 #A	3.3436E-01	3.3436E-01	5.962E+01%	4.13E+00
PA-233 #A	1.5688E-01	1.5688E-01	6.495E+01%	2.49E-01
PA-234 #A	1.5981E-01	1.5981E-01	7.948E+01%	4.23E-01
PA-234M#A	0.0000E+00	0.0000E+00	1.000E+03%	2.72E+01
U-235 #A	-3.5205E-01	-3.5205E-01	2.000E+03%	8.08E-01
AM-241 #A	7.7842E-02	7.7842E-02	8.280E+01%	2.15E-01

Ir-192 #A	1.2356E-01	1.2356E-01	1.872E+01%	1.31E-01
Np-237 #A	3.9772E-01	3.9772E-01	5.017E+01%	6.52E-01

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (1189.0 to 1999.4 keV) 3.295E+01 Bq/Sample
Total Decayed Activity (1189.0 to 1999.4 keV) 3.2949318E+01 Bq/Sample


137389_Gamma_680-102199-A-1-K. 12_Gamma_20142000.spc.
Counts
Energy (keV)
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Th-227
Am-241
Ba-133
Gd-153
Eu-155
Tc-99m
Ce-139
Ra-226
Th-229
Pb-212
Pb-214
Ra-224
Bi-211
Pa-231
La-140
Ba-133
Sn-113
Ac-228
Pb-214
Ir-192
Cr-51
Eu-152
Ba-133
Sb-125
Ru-103
Rh-106
Ba-140
Bi-207
Cs-134
Tl-208
Bi-214
Sb-125
Pm-144
Nb-94
Pm-146
Eu-154
Co-58
Bi-212
Ag-110M
Ac-228
Pa-234
Eu-152
Co-56
Bi-207
Rh-106
Ga-68
Sc-46
Ta-182
Co-60
K-40
Fe-59
Bi-214
Co-56
Sb-124
La-140
Eu-152
Co-56
Ta-182
Co-60
Sc-46
Ac-228
Y-88
Ag-110M
Nb-95
Eu-152
Co-58
Co-56
Sc-46
Eu-154
Cs-137
Sb-125
Ag-108M
Pm-146
Hf-181
Ce-141
Tc-99m
U-235
Th-229
Ra-224
Bi-211
Pa-231
Ir-192
Pb-214
Ac-228
Eu-152
Ba-133
Sn-113

Test America St. Louis Spectrum ID: 7_Gamma_20142027

Sample Description: 137389_Gamma_680-102199-A-1-L DU
Detector: Ge 7 SN/154
Batch ID: 137389
Work Order Number: Gamma
Lot Number: 680-102199-A-1-L DU

Decay to Time: 9/9/2014 11:53 Live Time: 7200 sec
Acquisition Time: 9/9/2014 11:54:12 Real Time: 7319 sec
Analysis Time: 9/9/2014 13:57 Dead Time: 1.62 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 7_Liquid_D=1 25ml.Clb
Efficiency Cal Desc: 7_25mld=1_90101_032612
Efficiency Cal Date: 3/28/2012 09:22
Energy Cal Date: 2/23/2012 08:40
Library: Client_ Long_no ingrowth Rev3.li
Bkgd Correction File: 7_2014-09-06_0610.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	3.036E-03	8267.0	2.510E-01	2.510E-01	9.090E-01
NA-22	5.005E-03	1113.0	5.573E-02	5.573E-02	2.059E-01
K-40	1.490E+01	8.4	1.248E+00	1.441E+00	2.071E+00
Sc-46	6.945E-03	198.5	1.379E-02	1.379E-02	1.614E-01
CR-51	-1.080E-01	184.1	1.989E-01	1.990E-01	6.957E-01
MN-54	-1.108E-02	414.0	4.588E-02	4.588E-02	1.640E-01
FE-59	-9.744E-02	115.3	1.123E-01	1.124E-01	3.865E-01
Co-56	3.390E-02	154.2	5.225E-02	5.228E-02	1.504E-01
CO-57	-1.420E-02	105.4	1.497E-02	1.499E-02	5.065E-02
CO-58	-1.377E-02	317.2	4.369E-02	4.369E-02	1.558E-01
CO-60	4.521E-03	532.9	2.409E-02	2.409E-02	1.598E-01
ZN-65	1.149E-01	102.8	1.181E-01	1.183E-01	4.049E-01
NB-94	4.282E-03	555.7	2.379E-02	2.379E-02	2.015E-01
ZR-95	1.522E-02	433.1	6.589E-02	6.590E-02	2.462E-01
NB-95	0.000E+00	1000.0	1.612E-02	1.612E-02	2.008E-01
RU-103	-7.891E-03	394.5	3.113E-02	3.113E-02	1.110E-01
RH-106	2.515E-01	109.4	2.750E-01	2.753E-01	9.540E-01
AG-108M	1.222E-02	149.5	1.827E-02	1.828E-02	1.015E-01
AG-110M	-4.432E-03	329.0	1.458E-02	1.458E-02	1.787E-01
SN-113	3.414E-02	107.7	3.678E-02	3.681E-02	1.259E-01
SB-124	4.420E-02	98.7	4.363E-02	4.368E-02	8.811E-02
SB-125	1.329E-01	65.0	8.640E-02	8.664E-02	2.519E-01
I-131	6.843E-03	574.4	3.931E-02	3.931E-02	1.307E-01
Gd-153	2.965E-03	1512.0	4.483E-02	4.483E-02	1.557E-01
Ga-68	-4.512E-01	597.7	2.697E+00	2.697E+00	9.832E+00
Tc-99m	-1.020E-02	216.8	2.211E-02	2.212E-02	7.558E-02
BA-133	9.518E-03	429.4	4.087E-02	4.087E-02	1.438E-01
CS-134	6.344E-02	47.9	3.038E-02	3.053E-02	9.365E-02
CS-137	8.023E-02	69.8	5.596E-02	5.610E-02	1.858E-01
CE-139	-8.019E-04	2613.0	2.095E-02	2.095E-02	7.329E-02
Ba-140	2.379E-01	59.1	1.406E-01	1.411E-01	4.631E-01
La-140	1.756E-02	95.2	1.672E-02	1.674E-02	2.622E-01
CE-141	-1.443E-02	234.8	3.387E-02	3.388E-02	1.164E-01
CE-144	3.343E-02	396.4	1.325E-01	1.325E-01	4.589E-01
PM-144	1.762E-02	86.9	1.532E-02	1.534E-02	1.357E-01
EU-152	2.201E-02	106.6	2.347E-02	2.349E-02	3.012E-01
EU-154	7.528E-02	182.2	1.371E-01	1.372E-01	1.328E+00
EU-155	4.490E-02	148.6	6.670E-02	6.675E-02	2.269E-01
HF-181	-7.377E-05	287.4	2.120E-04	2.121E-04	1.247E-01
Ta-182	1.591E-01	102.5	1.631E-01	1.632E-01	6.368E-01
Hg-203	6.306E-03	438.4	2.765E-02	2.765E-02	9.676E-02
TL-208	4.548E-01	13.2	6.000E-02	6.401E-02	1.033E-01
pm-146	-8.469E-02	147.4	1.248E-01	1.249E-01	4.342E-01

y-88	4.280E-02	99.6	4.261E-02	4.266E-02	1.654E-01
Cd-109	4.438E-01	97.6	4.330E-01	4.336E-01	1.451E+00
Ra-226	3.160E+00	30.3	9.587E-01	9.824E-01	2.414E+00
PB-210	2.123E+00	25.5	5.403E-01	5.572E-01	1.489E+00
PB-212	1.088E+00	9.3	1.012E-01	1.169E-01	1.979E-01
PB-214	9.896E-01	10.6	1.049E-01	1.153E-01	1.937E-01
BI-207	7.767E-02	28.3	2.197E-02	2.229E-02	4.672E-02
BI-212	4.713E-01	129.0	6.081E-01	6.085E-01	2.094E+00
BI-214	8.916E-01	15.5	1.378E-01	1.445E-01	2.750E-01
BI-210M	6.168E-02	71.4	4.405E-02	4.416E-02	1.299E-01
RA-224	-2.680E+00	45.7	1.225E+00	1.233E+00	3.995E+00
AC-228	1.758E+00	9.3	1.636E-01	1.843E-01	2.437E-01
TH-227	-8.733E-01	40.5	3.534E-01	3.566E-01	1.144E+00
TH-229	3.358E-01	137.3	4.610E-01	4.614E-01	1.568E+00
TH-234	1.316E+00	51.7	6.799E-01	6.829E-01	1.835E+00
PA-231	-1.391E+00	78.1	1.086E+00	1.088E+00	3.619E+00
PA-233	7.483E-02	54.4	4.068E-02	4.084E-02	2.251E-01
PA-234	8.916E-02	105.8	9.436E-02	9.447E-02	3.018E-01
PA-234M	9.238E-01	464.1	4.287E+00	4.287E+00	1.601E+01
U-235	1.820E-01	89.1	1.622E-01	1.624E-01	5.075E-01
AM-241	-1.593E-02	250.2	3.986E-02	3.987E-02	1.367E-01
Ir-192	1.360E-01	20.4	2.776E-02	2.876E-02	9.107E-02
Np-237	4.654E-04	24220.0	1.127E-01	1.127E-01	3.900E-01
Total	3.096E+01				

Analyst: Curtis Carey

TestAmerica Spectrum name: 7_Gamma_20142027.An1

Sample description
137389_Gamma_680-102199-A-1-L DU

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20142027.An1

Acquisition information
Start time: 9/9/2014 11:54:12 AM
Live time: 7200
Real time: 7319
Dead time: 1.62 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Liquid_D=1 25ml.Clb
7_25mld=1_90101_032612

Energy Calibration
Created: 2/23/2012 8:40:56 AM
Zero offset: 0.117 keV
Gain: 0.250 keV/channel
Quadratic: 3.508E-09 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 9:22:15 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.82 %
Log(Eff): -7.206837E-02 + (-5.220592E-02*Log(E)) +
(-7.214522E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.58 %
Log(Eff): -1.343090E+01 + (5.323811E+00*Log(E)) +
(-6.125181E-01*Log(E)^2)

Library Files
Main analysis library: Client_ Long_no ingrowth Rev3.li
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (2000.12keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/9/2014 11:53:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2014-09-06_0610.PBC 9/6/2014 6:10:25 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 33 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0987

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.75	149.	14.70	1.29	1.331E-01	46.54	4.250	2.123E+00	PB210
50.61	4.	357.02	0.84	1.386E-01	50.14	8.000	PBC<MDA	TH227
57.55	28.	45.36	0.61	1.473E-01				
63.50	139.	20.34	1.01	1.517E-01	63.29	3.810	PBC<MDA	TH234
74.83	173.	12.49	0.87	1.552E-01				
77.23	212.	10.69	0.87	1.553E-01				
80.99	12.	138.15	0.87	1.550E-01	80.99	34.060	PBC<MDA	BA133
87.42	90.	21.03	0.39	1.538E-01				
87.92	19.	97.56	0.88	1.536E-01	88.04	3.790	PBC<MDA	Cd109
92.46	8.	18.47	0.89	1.521E-01	92.59	5.584	PBC<MDA	TH234
93.22	77.	30.68	0.89	1.518E-01	93.35	5.561	1.267E+00	AC228
105.66	10.	148.57	0.90	1.463E-01	105.31	21.200	PBC<MDA	EU155
121.61	12.	106.61	0.92	1.367E-01	121.78	28.580	PBC<MDA	EU152
133.42	5.	287.45	0.93	1.295E-01	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	4.557E-02	CE144
133.64	3.	396.39	0.93	1.291E-01	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	3.343E-02	CE144
143.57	13.	113.69	0.94	1.225E-01	143.79	10.960	PBC<MDA	U235
185.86	74.	18.33	1.47	9.876E-02	185.99	3.280	3.160E+00	Ra226
193.22	10.	137.26	0.99	9.565E-02	193.51	4.400	PBC<MDA	TH229
205.43	10.	137.24	1.01	9.113E-02	205.33	5.010	PBC<MDA	U235
238.65	273.	9.31	1.29	8.042E-02	238.63	43.300	1.087E+00	PB212
256.53	2.	464.51	1.06	7.572E-02	256.24	7.000	PBC<MDA	TH227
266.10	8.	123.29	1.07	7.337E-02	265.83	50.000	PBC<MDA	BI210M
277.22	27.	40.06	1.20	7.076E-02	277.28	6.310	PBC<MDA	TL208

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
279.34	3.	438.44	1.08	7.034E-02	279.20	81.460	PBC<MDA	Hg203
295.35	83.	17.99	0.58	6.698E-02	295.09	19.300	8.910E-01	PB214
					295.95	30.160	5.716E-01	Ir192
300.18	21.	54.36	1.10	6.607E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.761E+00	PA231
					300.18	6.200	6.990E-01	PA233
300.18	21.	54.36	1.10	6.606E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.761E+00	PA231
					300.18	6.200	6.990E-01	PA233
300.18	21.	54.36	1.10	6.604E-02	300.03	3.280	1.321E+00	PB212
					300.07	2.460	1.761E+00	PA231
					300.18	6.200	6.990E-01	PA233
305.06	15.	72.67	1.11	6.515E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	1.161E-01	BI210M
305.08	15.	72.09	1.11	6.515E-02	304.85	4.290	7.634E-01	Ba140
					304.90	28.000	1.170E-01	BI210M
317.17	8.	136.32	1.12	6.304E-02	316.49	87.040	PBC<MDA	Ir192
					316.49	87.040	1.944E-02	Ir192
328.91	8.	123.79	1.13	6.095E-02	328.76	20.300	PBC<MDA	La140
338.46	83.	16.68	1.22	5.942E-02	338.32	12.010	1.609E+00	AC228
352.07	162.	11.22	1.49	5.733E-02	351.93	37.600	1.040E+00	PB214
356.82	2.	429.41	1.16	5.676E-02	356.00	62.050	PBC<MDA	BA133
384.40	8.	129.37	1.19	5.302E-02	383.84	8.940	PBC<MDA	BA133
390.62	8.	107.72	1.20	5.205E-02	391.69	64.000	PBC<MDA	SN113
462.94	15.	65.02	1.27	4.455E-02	463.37	10.470	PBC<MDA	SB125
476.95	3.	269.66	1.28	4.337E-02	476.81	42.000	PBC<MDA	PM144
					477.60	10.520	9.788E-02	BE7
487.50	3.	248.05	1.29	4.251E-02	487.02	45.500	PBC<MDA	La140
511.62	48.	29.87	1.31	4.055E-02	511.86	20.000	8.182E-01	RH106
					511.86	20.000	8.182E-01	RH106
537.28	10.	93.25	1.34	3.872E-02	537.26	24.390	PBC<MDA	Ba140
569.63	7.	108.92	1.37	3.662E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	3.090E-01	PA234
					569.70	97.740	2.594E-02	BI207
					569.47	8.200	3.090E-01	PA234
569.66	7.	105.84	1.37	3.661E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	3.144E-01	PA234
					569.70	97.740	2.639E-02	BI207
569.66	20.	28.28	0.50	3.659E-02	569.32	15.380	4.933E-01	CS134
					569.47	8.200	9.254E-01	PA234
					569.70	97.740	7.767E-02	BI207
583.15	99.	13.21	0.87	3.578E-02	583.02	84.500	4.548E-01	TL208
602.73	5.	133.61	1.40	3.464E-02	602.73	98.260	PBC<MDA	SB124
604.71	5.	141.67	1.40	3.453E-02	604.71	97.620	PBC<MDA	CS134
609.21	79.	15.72	1.41	3.422E-02	609.31	46.090	PBC<MDA	BI214
					610.30	5.750	5.549E+00	RU103
					610.30	5.750	5.549E+00	RU103
609.26	101.	13.25	1.89	3.428E-02	609.31	46.090	8.916E-01	BI214
					610.30	5.750	7.158E+00	RU103
618.80	6.	109.36	1.42	3.360E-02	621.92	9.930	PBC<MDA	RH106
					621.92	9.930	2.515E-01	RH106
620.72	8.	86.92	1.42	3.380E-02				
636.02	1.	574.45	1.43	3.282E-02	635.89	11.310	PBC<MDA	SB125
					636.97	7.170	8.482E-02	I131

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
636.03	5.	152.56	1.43	3.287E-02	635.89	11.310	PBC<MDA	SB125
					636.97	7.170	3.046E-01	I131
661.87	16.	69.76	1.46	3.161E-02	661.66	85.210	PBC<MDA	CS137
723.37	6.	149.49	1.51	2.894E-02	722.79	10.810	2.689E-01	SB124
					722.94	90.840	3.201E-02	AG108M
					723.36	20.220	1.439E-01	EU154
					722.94	90.840	3.201E-02	AG108M
723.39	6.	145.31	1.51	2.895E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	3.287E-02	AG108M
					723.36	20.220	1.478E-01	EU154
723.47	5.	182.17	1.51	2.892E-02	722.79	10.810	PBC<MDA	SB124
					722.94	90.840	2.713E-02	AG108M
					723.36	20.220	1.219E-01	EU154
725.89	2.	488.66	1.51	2.889E-02	724.20	44.150	PBC<MDA	ZR95
727.59	7.	129.04	1.51	2.877E-02	727.17	7.550	PBC<MDA	BI212
735.97	2.	426.79	1.52	2.844E-02	735.72	22.500	PBC<MDA	pm146
755.49	1.	715.11	1.54	2.764E-02	756.73	54.460	PBC<MDA	ZR95
764.38	1.	568.62	1.55	2.738E-02	763.94	22.280	PBC<MDA	AG110M
795.43	16.	47.89	1.58	2.626E-02	795.87	85.530	PBC<MDA	CS134
814.33	6.	106.02	1.59	2.561E-02	815.77	23.280	PBC<MDA	La140
846.50	5.	154.15	1.62	2.465E-02	846.77	99.935	PBC<MDA	Co56
860.01	15.	57.32	1.63	2.425E-02	860.56	12.420	PBC<MDA	TL208
870.34	1.	555.70	1.64	2.395E-02	871.10	99.890	PBC<MDA	NB94
897.89	4.	167.98	1.66	2.321E-02	898.04	93.700	PBC<MDA	y88
911.39	88.	11.62	1.55	2.286E-02	911.16	29.000	1.850E+00	AC228
969.30	46.	19.14	0.64	2.145E-02	968.97	17.460	1.706E+00	AC228
998.64	1.	541.56	1.75	2.083E-02	996.33	10.600	PBC<MDA	EU154
1003.67	1.	464.07	1.75	2.073E-02	1001.00	0.837	PBC<MDA	PA234M
1034.04	2.	331.15	1.78	1.995E-02	1037.84	14.130	PBC<MDA	Co56
1064.22	3.	204.66	1.80	1.944E-02	1063.66	74.500	PBC<MDA	BI207
1115.83	8.	102.79	1.84	1.848E-02	1115.55	50.600	PBC<MDA	ZN65
1119.86	-1.	214.21	1.85	1.840E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1121.12	5.	160.51	1.85	1.838E-02	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.136E-01	Ta182
1121.20	4.	232.80	1.85	1.840E-02	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	7.996E-02	Ta182
1173.71	1.	532.91	1.89	1.752E-02	1173.24	99.900	PBC<MDA	CO60
1191.49	5.	127.44	1.90	1.727E-02	1189.05	16.200	PBC<MDA	Ta182
1460.90	158.	7.56	1.69	1.380E-02	1460.83	10.670	1.490E+01	K40
1764.72	8.	58.12	2.29	1.117E-02	1764.49	15.400	PBC<MDA	BI214
1837.54	4.	106.97	2.33	1.068E-02	1836.06	99.200	PBC<MDA	y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
229.76	57.55	47.	31.	2.135E+02	35.49	0.609	- s
298.88	74.83	152.	154.	9.914E+02	15.72	0.673	- M

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
308.50	77.23	160.	219.	1.408E+03	12.33	1.064	- sM
348.78	87.42	102.	71.	4.611E+02	23.39	0.881	- D

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_ Long_no ingrowth Rev3.li

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.54	46.75	154.	86.	0.012	14.70	1.294s
TH-227	202.01	50.61	124.	4.	0.001	357.02	0.840s
AM-241	235.28	58.93	115.	-6.	-0.001	250.20	0.850s
TH-234	253.54	63.50	249.	55.	0.008	20.34	1.009s
BA-133	323.53	80.99	138.	12.	0.002	138.15	0.874s
EU-155	337.39	84.46	131.	-2.	0.000	688.18	0.880
Cd-109	351.73	88.04	155.	19.	0.003	97.56	0.881D
TH-234	369.93	92.59	311.	8.	0.001	18.47	0.886D
AC-228	372.97	93.35	241.	77.	0.011	30.68	0.887D
Gd-153	420.20	105.16	96.	-8.	-0.001	178.30	0.898s
EU-155	422.22	105.66	106.	10.	0.001	148.57	0.900s
EU-152	486.04	121.61	71.	12.	0.002	106.61	0.918s
CO-57	493.22	123.41	73.	-12.	-0.002	105.39	0.918s
EU-154	492.30	123.18	89.	-15.	-0.002	92.86	0.919s
PA-234	521.94	130.59	108.	-2.	0.000	648.22	0.928s
HF-181	533.26	133.42	89.	5.	0.001	287.45	0.930s
CE-144	534.15	133.64	92.	3.	0.000	396.39	0.930s
HF-181	549.41	137.46	95.	-4.	-0.001	315.50	0.933s
Tc-99m	561.29	140.42	120.	-7.	-0.001	216.79	0.938s
U-235	573.87	143.57	99.	13.	0.002	113.69	0.941s
CE-141	578.08	144.62	99.	-6.	-0.001	234.76	0.943s
Ra-226	743.05	185.86	132.	74.	0.010	18.33	1.475s
TH-229	772.49	193.22	92.	10.	0.001	137.26	0.994s
U-235	821.34	205.43	82.	10.	0.001	137.24	1.007s
TH-229	848.00	212.10	98.	-9.	-0.001	167.83	1.012s
TH-227	946.33	236.68	291.	-63.	-0.009	40.47	1.039s
PB-212	954.23	238.65	101.	273.	0.038	9.31	1.294s
RA-224	960.33	240.18	384.	-63.	-0.009	45.70	1.044s
PB-214	973.24	243.40	129.	-10.	-0.001	165.14	1.045s
TH-227	1025.76	256.53	55.	2.	0.000	464.51	1.060s
BI-210M	1064.05	266.10	46.	8.	0.001	123.29	1.069
TL-208	1108.52	277.22	30.	27.	0.004	40.06	1.200

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Hg-203	1117.01	279.34	64.	3.	0.000	438.44	1.083s
PB-214	1181.06	295.35	40.	83.	0.012	17.99	0.580s
Ir-192	1180.55	295.23	64.	69.	0.010	20.42	1.101s
PB-212	1200.37	300.18	52.	21.	0.003	54.36	1.105s
PA-231	1200.38	300.18	52.	21.	0.003	54.36	1.105s
PA-233	1200.38	300.18	52.	21.	0.003	54.36	1.105s
PA-231	1206.81	301.79	100.	-19.	-0.003	78.09	1.107s
BA-133	1206.68	301.76	104.	-23.	-0.003	67.06	1.108s
Ba-140	1219.89	305.06	54.	15.	0.002	72.67	1.110s
BI-210M	1219.96	305.08	54.	15.	0.002	72.09	1.110s
PA-233	1247.72	312.02	55.	-5.	-0.001	198.59	1.117s
Ir-192	1268.33	317.17	51.	8.	0.001	136.32	1.121s
CR-51	1292.40	323.19	37.	-5.	-0.001	184.11	1.125s
La-140	1315.29	328.91	41.	8.	0.001	123.79	1.134s
AC-228	1353.48	338.46	29.	83.	0.011	16.68	1.224s
PB-214	1407.93	352.07	34.	162.	0.022	11.22	1.487s
BA-133	1426.95	356.82	53.	2.	0.000	429.41	1.161
BA-133	1537.27	384.40	49.	8.	0.001	129.37	1.189s
SN-113	1562.14	390.62	35.	8.	0.001	107.72	1.197s
AG-108M	1733.31	433.41	38.	-2.	0.000	374.03	1.239s
SB-125	1851.43	462.94	40.	15.	0.002	65.02	1.268s
Ir-192	1872.23	468.14	51.	-3.	0.000	396.37	1.272s
PM-144	1907.48	476.95	36.	3.	0.000	269.66	1.281s
HF-181	1931.91	483.05	37.	-2.	0.000	547.37	1.286s
La-140	1949.69	487.50	33.	3.	0.000	248.05	1.291s
RU-103	1987.89	497.05	35.	-2.	0.000	394.49	1.300s
RH-106	2046.17	511.62	78.	48.	0.007	29.87	1.315s
Ba-140	2148.83	537.28	38.	10.	0.001	93.25	1.339s
CS-134	2247.97	562.06	37.	-8.	-0.001	111.75	1.364s
CS-134	2278.21	569.63	23.	7.	0.001	108.92	1.369
PA-234	2278.34	569.66	22.	7.	0.001	105.84	1.370s
BI-207	2278.37	569.66	4.	20.	0.003	28.28	0.497s
TL-208	2332.30	583.15	18.	99.	0.014	13.21	0.873s
SB-125	2405.66	601.49	40.	-3.	0.000	302.48	1.399s
SB-124	2410.64	602.73	16.	5.	0.001	133.61	1.401D
CS-134	2418.55	604.71	18.	5.	0.001	141.67	1.403D
BI-214	2436.77	609.26	38.	101.	0.014	13.25	1.888s
RU-103	2436.57	609.21	37.	79.	0.011	15.72	1.408s
AG-108M	2451.64	612.98	49.	-15.	-0.002	71.62	1.412s
PM-144	2482.59	620.72	21.	8.	0.001	86.92	1.415s
RH-106	2474.92	618.80	19.	6.	0.001	109.36	1.419s
SB-125	2543.82	636.03	28.	5.	0.001	152.56	1.432s
I-131	2543.82	636.02	33.	1.	0.000	574.45	1.433s
AG-110M	2639.64	659.98	59.	-9.	-0.001	126.13	1.452s
CS-137	2647.20	661.87	51.	16.	0.002	69.76	1.455s
SB-124	2893.29	723.39	38.	6.	0.001	145.31	1.511s
AG-108M	2893.19	723.37	38.	6.	0.001	149.49	1.511s
EU-154	2893.63	723.47	41.	5.	0.001	182.17	1.511s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
ZR-95	2903.31	725.89	49.	2.	0.000	488.66	1.512s
BI-212	2910.10	727.59	42.	7.	0.001	129.04	1.515s
pm-146	2943.60	735.97	21.	2.	0.000	426.79	1.523s
pm-146	2988.80	747.27	34.	-6.	-0.001	147.39	1.533s
ZR-95	3021.70	755.49	26.	1.	0.000	715.11	1.541s
AG-110M	3057.25	764.38	26.	1.	0.000	568.62	1.548s
CS-134	3181.47	795.43	20.	16.	0.002	47.89	1.576
CO-58	3246.94	811.80	31.	-3.	0.000	317.21	1.589s
La-140	3257.05	814.33	18.	6.	0.001	106.02	1.593s
MN-54	3338.58	834.71	33.	-2.	0.000	413.95	1.610s
Co-56	3385.75	846.50	26.	5.	0.001	154.15	1.620s
TL-208	3439.77	860.01	27.	15.	0.002	57.32	1.632s
NB-94	3481.10	870.34	32.	1.	0.000	555.70	1.641s
PA-234	3523.45	880.93	29.	-1.	0.000	942.54	1.649s
AG-110M	3554.48	888.68	17.	-2.	0.000	331.30	1.653s
Sc-46	3553.95	888.55	28.	-2.	0.000	321.57	1.657s
y-88	3591.32	897.89	25.	4.	0.001	167.98	1.664s
AC-228	3645.30	911.39	4.	88.	0.012	11.62	1.551
PA-234	3782.48	945.68	24.	-1.	0.000	507.40	1.704s
EU-152	3851.86	963.03	33.	-4.	-0.001	201.74	1.719s
AC-228	3876.95	969.30	7.	46.	0.006	19.14	0.642s
EU-154	3994.32	998.64	20.	1.	0.000	541.56	1.746s
PA-234M	4014.41	1003.67	14.	1.	0.000	464.07	1.750s
EU-154	4020.88	1005.28	22.	-3.	0.000	235.20	1.753s
Co-56	4135.91	1034.04	13.	2.	0.000	331.15	1.780s
BI-207	4256.63	1064.22	24.	3.	0.000	204.66	1.801s
Ga-68	4313.08	1078.33	23.	-1.	0.000	597.65	1.812s
FE-59	4396.31	1099.14	33.	-7.	-0.001	115.30	1.829s
EU-152	4442.35	1110.65	31.	-7.	-0.001	116.78	1.839s
ZN-65	4463.05	1115.83	28.	8.	0.001	102.79	1.842s
Sc-46	4484.52	1121.20	35.	4.	0.001	232.80	1.845s
Ta-182	4484.23	1121.12	33.	5.	0.001	160.51	1.846s
CO-60	4694.58	1173.71	25.	1.	0.000	532.91	1.887s
Ta-182	4765.67	1191.49	19.	5.	0.001	127.44	1.898s
FE-59	5167.16	1291.86	18.	-1.	0.000	909.87	1.975s
AG-110M	5528.50	1382.20	23.	-5.	-0.001	142.80	2.042s
K-40	5843.30	1460.90	17.	158.	0.022	7.56	1.692s
La-140	6381.47	1595.45	18.	-3.	0.000	238.82	2.185s
BI-214	7058.46	1764.72	10.	8.	0.001	58.12	2.290s
y-88	7349.72	1837.54	9.	4.	0.001	106.97	2.332s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	Peak MDA Value Bq/Sample		COMMENTS
BE-7	C	3.0359E-03				5.31E+01		
			477.60	3.036E-03	%(	9.090E-01	8.27E+03	1.05E+01 G
NA-22	C	5.0054E-03				9.50E+02		
			1274.53	5.005E-03	&(	2.059E-01	1.11E+03	9.99E+01 G
K-40	N	1.4899E+01				4.66E+11		
			1460.83	1.490E+01	@(P	2.071E+00	7.56E+00	1.07E+01 G
Sc-46	F	6.9448E-03				8.38E+01		
			889.28	-1.400E-02	?(	1.614E-01	3.22E+02	1.00E+02 G
			1120.55	2.789E-02	?(	2.290E-01	2.33E+02	1.00E+02 G
CR-51	F	-1.0803E-01				2.77E+01		
			320.08	-1.080E-01	?(	6.957E-01	1.84E+02	9.94E+00 G
MN-54	C	-1.1082E-02				3.12E+02		
			834.85	-1.108E-02	?(	1.640E-01	4.14E+02	1.00E+02 G
FE-59	F	-9.7440E-02				4.45E+01		
			1099.25	-9.744E-02	?(	3.865E-01	1.15E+02	5.65E+01 G
			1291.60	-1.337E-02	+	4.524E-01	9.10E+02	4.32E+01 G
Co-56	C	3.3895E-02				7.73E+01		
			846.77	2.781E-02	?(	1.504E-01	1.54E+02	9.99E+01 G
			1238.28	-6.397E-03	%	3.419E-01	1.47E+03	6.61E+01 G
			1037.84	7.690E-02	?(	9.477E-01	3.31E+02	1.41E+01 G
			1771.35	-2.194E-02	%	1.603E+00	1.92E+03	1.55E+01 A
CO-57	C	-1.4202E-02				2.72E+02		
			122.06	-1.420E-02	?(	5.065E-02	1.05E+02	8.56E+01 G
			136.47	4.804E-03	%	4.795E-01	2.86E+03	1.07E+01 G
CO-58	C	-1.3772E-02				7.09E+01		
			810.78	-1.377E-02	?(	1.558E-01	3.17E+02	9.95E+01 G
CO-60	F	4.5205E-03				1.93E+03		
			1332.50	-1.633E-03	%(	1.598E-01	2.52E+03	1.00E+02 G
			1173.24	1.068E-02	?(	2.066E-01	5.33E+02	9.99E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ZN-65	F	1.1493E-01					2.44E+02	
			1115.55	1.149E-01	?(	4.049E-01	1.03E+02	5.06E+01 G
NB-94	I	4.2817E-03					7.41E+06	
			702.63	0.000E+00	?(	2.015E-01	1.00E+03	9.79E+01 G
			871.10	8.478E-03	?(	1.692E-01	5.56E+02	9.99E+01 G
ZR-95	I	1.5216E-02					6.40E+01	
			756.73	9.478E-03	?(	2.462E-01	7.15E+02	5.45E+01 G
			724.20	2.229E-02	?(	3.848E-01	4.89E+02	4.42E+01 G
RU-103	I	-7.8914E-03					3.93E+01	
			497.05	-7.891E-03	?(	1.110E-01	3.94E+02	9.09E+01 G
			610.30	5.549E+00	?	2.195E+00	1.57E+01	5.75E+00 GA
RH-106	I	2.5148E-01					3.74E+02	
			621.92	2.515E-01	?(	9.540E-01	1.09E+02	9.93E+00 G
			1050.36	1.675E-01	%	1.103E+01	1.78E+03	1.56E+00 G
			511.86	8.182E-01	*	7.509E-01	2.99E+01	2.00E+01 GA
AG-108M	C	1.2223E-02					1.53E+05	
			433.94	-7.643E-03	&(	1.015E-01	3.74E+02	9.05E+01 G
			722.94	3.201E-02	?(	1.661E-01	1.49E+02	9.08E+01 G
			614.28	-6.766E-02	+	1.612E-01	7.16E+01	8.98E+01 G
AG-110M	F	-4.4318E-03					2.50E+02	
			884.68	-1.473E-02	?(	1.787E-01	3.31E+02	7.27E+01 G
			657.76	-4.126E-02	+	1.779E-01	1.26E+02	9.46E+01 G
			937.49	-5.626E-05	%	4.219E-01	2.01E+05	3.44E+01 G
			1384.30	-1.944E-01	+	9.744E-01	1.43E+02	2.43E+01 G
			763.94	2.918E-02	?(	6.017E-01	5.69E+02	2.23E+01 G
SN-113	F	3.4140E-02					1.15E+02	
			391.69	3.414E-02	&(	1.259E-01	1.08E+02	6.40E+01 G
SB-124	F	4.4200E-02					6.02E+01	
			602.73	1.868E-02	(	8.811E-02	1.34E+02	9.83E+01 G
			1690.98	0.000E+00	-	8.052E-01	1.00E+03	4.78E+01 G
			722.79	2.762E-01	?(	1.391E+00	1.45E+02	1.08E+01 G
SB-125	I	1.3288E-01					1.01E+03	
			427.88	-7.252E-04	%(	2.519E-01	9.44E+03	2.96E+01 G
			600.50	-6.746E-02	+	7.207E-01	3.02E+02	1.79E+01 G
			635.89	1.920E-01	&(	1.025E+00	1.53E+02	1.13E+01 G
			463.37	4.467E-01	?(	9.591E-01	6.50E+01	1.05E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
I-131	I	6.8432E-03					8.02E+00	
			364.48	0.000E+00	?(	1.307E-01	1.00E+03	8.17E+01 G
			284.30	-2.793E-03	%	1.322E+00	1.34E+04	6.14E+00 G
			636.97	8.482E-02	?(	1.749E+00	5.74E+02	7.17E+00 G
Gd-153	F	2.9646E-03					2.42E+02	
			97.50	2.965E-03	%(	1.557E-01	1.51E+03	3.00E+01 G
			103.20	-3.428E-02	+	2.091E-01	1.78E+02	2.18E+01 G
Ga-68	C	-4.5123E-01					4.71E-02	
			1077.40	-4.512E-01	?(	9.832E+00	5.98E+02	3.30E+00 G
Tc-99m	I	-1.0198E-02					2.51E-01	
			140.51	-1.020E-02	?(	7.558E-02	2.17E+02	8.93E+01 G
BA-133	F	9.5180E-03					3.85E+03	
			356.00	9.518E-03	?(	1.438E-01	4.29E+02	6.20E+01 G
			302.85	-2.622E-01	+	5.815E-01	6.71E+01	1.83E+01 G
			383.84	2.320E-01	&	1.030E+00	1.29E+02	8.94E+00 GA
			80.99	3.231E-02	&	1.510E-01	1.38E+02	3.41E+01 GA
CS-134	I	6.3441E-02					7.54E+02	
			604.71	1.872E-02	(	9.365E-02	1.42E+02	9.76E+01 G
			795.87	9.627E-02	(	1.456E-01	4.79E+01	8.55E+01 G
			569.32	1.647E-01	(	6.194E-01	1.09E+02	1.54E+01 G
			801.95	3.293E-02	%	1.448E+00	1.19E+03	8.69E+00 G
			563.24	-3.666E-01	+	1.404E+00	1.12E+02	8.35E+00 G
CS-137	I	8.0227E-02					1.10E+04	
			661.66	8.023E-02	(	1.858E-01	6.98E+01	8.52E+01 G
CE-139	F	-8.0187E-04					1.38E+02	
			165.85	-8.019E-04	%(	7.329E-02	2.61E+03	7.99E+01 G
Ba-140	I	2.3786E-01					1.28E+01	
			537.26	1.465E-01	(	4.631E-01	9.32E+01	2.44E+01 G
			162.66	7.556E-03	%	9.725E-01	3.69E+03	6.22E+00 G
			304.85	7.574E-01	&(	1.832E+00	7.27E+01	4.29E+00 G
La-140	I	1.7558E-02					1.28E+01	
			1596.21	-3.034E-02	?(	2.622E-01	2.39E+02	9.54E+01 G
			487.02	2.399E-02	?(	2.107E-01	2.48E+02	4.55E+01 G
			328.76	8.610E-02	&(	3.663E-01	1.24E+02	2.03E+01 G
			815.77	1.415E-01	?(	5.199E-01	1.06E+02	2.33E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-141	I	-1.4428E-02					3.25E+01	
			145.44	-1.443E-02	?(	1.164E-01	2.35E+02	4.82E+01 G
CE-144	I	3.3432E-02					2.85E+02	
			133.54	3.343E-02	(	4.589E-01	3.96E+02	1.11E+01 G
PM-144	C	1.7624E-02					3.63E+02	
			696.54	-1.322E-03	%(	1.357E-01	2.83E+03	9.90E+01 G
			618.06	3.365E-02	&(	9.939E-02	8.69E+01	9.91E+01 G
			476.81	2.448E-02	(	2.335E-01	2.70E+02	4.20E+01 G
EU-152	F	2.2012E-02					4.94E+03	
			344.29	1.237E-03	%(	3.012E-01	6.80E+03	2.65E+01 G
			1112.07	-3.898E-01	+	1.569E+00	1.17E+02	1.36E+01 G
			121.78	4.127E-02	?(	1.490E-01	1.07E+02	2.86E+01 G
			778.92	1.195E-03	%	1.148E+00	2.64E+04	1.29E+01 G
			964.11	-1.833E-01	+	1.302E+00	2.02E+02	1.46E+01 G
			244.69	1.932E-02	%	9.123E-01	1.34E+03	7.58E+00 G
			1408.00	-9.068E-03	%	1.075E+00	3.19E+03	2.10E+01 GA
EU-154	I	7.5277E-02					3.14E+03	
			873.23	-1.153E-03	%(	1.328E+00	3.16E+04	1.23E+01 G
			123.10	-3.758E-02	+	1.172E-01	9.29E+01	4.08E+01 G
			1274.54	1.349E-02	&	5.779E-01	1.16E+03	3.52E+01 G
			723.36	1.219E-01	(	7.745E-01	1.82E+02	2.02E+01 G
			1004.77	-1.080E-01	+	9.116E-01	2.35E+02	1.80E+01 G
			996.33	7.473E-02	?(	1.485E+00	5.42E+02	1.06E+01 G
EU-155	I	4.4897E-02					1.81E+03	
			105.31	4.490E-02	&(	2.269E-01	1.49E+02	2.12E+01 G
			86.54	-6.951E-03	-	1.649E-01	6.88E+02	3.07E+01 G
HF-181	F	-7.3765E-05					4.24E+01	
			482.00	-6.375E-03	?(	1.247E-01	5.47E+02	8.05E+01 G
			133.02	1.164E-02	&(	1.155E-01	2.87E+02	4.33E+01 G
			345.83	9.663E-04	%	5.331E-01	1.54E+04	1.51E+01 G
			136.30	-8.234E-02	+	8.967E-01	3.15E+02	5.85E+00 G
Ta-182	F	1.5911E-01					1.14E+02	
			1121.30	1.136E-01	?(	6.368E-01	1.61E+02	3.49E+01 G
			1221.41	-1.320E-02	%	7.873E-01	1.63E+03	2.70E+01 G
			1189.05	2.572E-01	?(	1.148E+00	1.27E+02	1.62E+01 G
Hg-203	F	6.3062E-03					4.66E+01	
			279.20	6.306E-03	&(	9.676E-02	4.38E+02	8.15E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	N	4.5477E-01					6.98E+02	
			583.02	4.548E-01	*(	1.033E-01	1.32E+01	8.45E+01 G
			277.28	8.399E-01	+	8.783E-01	4.01E+01	6.31E+00 G
			860.56	6.707E-01	&	1.251E+00	5.73E+01	1.24E+01 G
pm-146	C	-8.4685E-02					2.02E+03	
			747.16	-8.468E-02	?(	4.342E-01	1.47E+02	3.40E+01 G
			735.72	3.390E-02	+	5.271E-01	4.27E+02	2.25E+01 G
			453.88	0.000E+00	&	1.677E-01	1.00E+03	6.50E+01 G
y-88	F	4.2795E-02					1.07E+02	
			898.04	2.791E-02	?(	1.654E-01	1.68E+02	9.37E+01 G
			1836.06	5.685E-02	?(	2.146E-01	1.07E+02	9.92E+01 G
Cd-109	F	4.4383E-01					4.53E+02	
			88.04	4.438E-01	(	1.451E+00	9.76E+01	3.79E+00 G
Ra-226	N	3.1596E+00					5.84E+05	
			185.99	3.160E+00	*(P	2.414E+00	1.83E+01	3.28E+00 G
PB-210	N	2.1231E+00					8.14E+03	
			46.54	2.123E+00	*(P	1.489E+00	1.47E+01	4.25E+00 G
PB-212	N	1.0875E+00					6.98E+02	
			238.63	1.087E+00	(	1.979E-01	9.31E+00	4.33E+01 G
			300.03	1.321E+00	?	2.336E+00	5.44E+01	3.28E+00 GA
PB-214	N	9.8956E-01					5.84E+05	
			351.93	1.040E+00	*(	1.937E-01	1.12E+01	3.76E+01 G
			295.09	8.910E-01	(	3.455E-01	1.80E+01	1.93E+01 G
			242.00	-2.332E-01	-	1.309E+00	1.65E+02	7.43E+00 GA
BI-207	C	7.7667E-02					1.18E+04	
			569.70	7.767E-02	(	4.672E-02	2.83E+01	9.77E+01 G
			1063.66	3.342E-02	&	2.435E-01	2.05E+02	7.45E+01 G
BI-212	N	4.7125E-01					6.98E+02	
			727.17	4.713E-01	(	2.094E+00	1.29E+02	7.55E+00 G
			785.42	-1.810E-01	&	9.487E+00	1.41E+03	1.28E+00 GA
BI-214	N	8.9161E-01					5.84E+05	
			609.31	8.916E-01	@(P	2.750E-01	1.32E+01	4.61E+01 G
			1120.29	-5.532E-02	% P	1.626E+00	2.14E+02	1.51E+01 G
			1764.49	6.316E-01	& P	1.398E+00	5.81E+01	1.54E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-210M	T	6.1684E-02					1.10E+09	
			265.83	3.072E-02	&(	1.299E-01	1.23E+02	5.00E+01 G
			304.90	1.170E-01	&(	2.805E-01	7.21E+01	2.80E+01 G
RA-224	N	-2.6799E+00					6.98E+02	
			240.99	-2.680E+00	&(	3.995E+00	4.57E+01	4.10E+00 G
AC-228	N	1.7578E+00					2.10E+03	
			911.16	1.850E+00	(	2.437E-01	1.16E+01	2.90E+01 G
			968.97	1.706E+00	@(	5.579E-01	1.91E+01	1.75E+01 G
			338.32	1.609E+00	*(	5.440E-01	1.67E+01	1.20E+01 G
			93.35	1.267E+00	-	1.234E+00	3.07E+01	5.56E+00 XA
TH-227	N	-8.7329E-01					7.95E+03	
			235.97	-8.733E-01	?(	1.144E+00	4.05E+01	1.23E+01 G
			50.14	5.586E-02	+	6.853E-01	3.57E+02	8.00E+00 G
			256.24	5.975E-02	+	9.762E-01	4.65E+02	7.00E+00 G
TH-229	N	3.3582E-01					2.68E+06	
			193.51	3.358E-01	?(	1.568E+00	1.37E+02	4.40E+00 G
			210.85	-4.437E-01	+	2.543E+00	1.68E+02	2.99E+00 G
TH-234	N	1.3155E+00					1.63E+12	
			63.29	1.315E+00	(P	1.835E+00	2.03E+01	3.81E+00 G
			92.59	1.247E-01	- P	1.389E+00	1.85E+01	5.58E+00 G
PA-231	N	-1.3906E+00					1.20E+07	
			302.65	-1.391E+00	?(	3.619E+00	7.81E+01	2.88E+00 G
			300.07	1.761E+00	+	3.116E+00	5.44E+01	2.46E+00 G
PA-233	C	7.4831E-02					7.82E+08	
			312.01	-3.267E-02	?(	2.251E-01	1.99E+02	3.60E+01 G
			300.18	6.990E-01	?(	1.237E+00	5.44E+01	6.20E+00 G
PA-234	N	8.9156E-02					1.63E+12	
			131.29	-1.345E-02	?(	3.018E-01	6.48E+02	1.80E+01 G
			946.02	-6.505E-02	+	1.200E+00	5.07E+02	1.34E+01 G
			569.47	3.144E-01	(	1.147E+00	1.06E+02	8.20E+00 G
			883.24	-8.110E-03	%	1.599E+00	5.37E+03	9.60E+00 G
			880.53	-7.889E-02	+	2.698E+00	9.43E+02	6.00E+00 GA
PA-234M	N	9.2379E-01					1.63E+12	
			1001.00	9.238E-01	?(	1.601E+01	4.64E+02	8.37E-01 G
			766.41	4.644E-01	%	4.989E+01	2.96E+03	2.94E-01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

U-235    N   1.8201E-01                                      2.57E+11
                          143.79 1.321E-01  (  5.075E-01 1.14E+02 1.10E+01 G
                          205.33 2.913E-01 ?(  1.363E+00 1.37E+02 5.01E+00 G
                          163.38 2.617E-02 %   9.496E-01 1.03E+03 5.08E+00 G

AM-241   T  -1.5931E-02                                      1.58E+05
                           59.54-1.593E-02 ?(  1.367E-01 2.50E+02 3.59E+01 G

Ir-192   F   1.3597E-01                                      7.40E+01
                          316.49 1.944E-02 &(  9.107E-02 1.36E+02 8.70E+01 G
                          468.06-1.570E-02 +   2.189E-01 3.96E+02 5.18E+01 G
                          308.44 3.048E-03 %   2.213E-01 2.03E+03 3.18E+01 G
                          295.95 4.723E-01 ?(  2.749E-01 2.04E+01 3.02E+01 G

Np-237   F   4.6536E-04                                      2.14E+06
                           86.49 4.654E-04 %(  3.900E-01 2.42E+04 1.31E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
TH-227	50.61	124.	4.	0.001	357.02	5.586E-02
AM-241	58.93	115.	-6.	-0.001	250.20	-1.593E-02
BA-133	80.99	138.	12.	0.002	138.15	3.231E-02
Gd-153	105.16	96.	-8.	-0.001	178.30	-3.428E-02
EU-152	121.61	71.	12.	0.002	106.61	4.127E-02
CO-57	123.41	73.	-12.	-0.002	105.39	-1.420E-02
EU-154	123.18	89.	-15.	-0.002	92.86	-3.758E-02
PA-234	130.59	108.	-2.	0.000	648.22	-1.345E-02
HF-181	133.42	89.	5.	0.001	287.45	1.164E-02
CE-144	133.64	92.	3.	0.000	396.39	3.343E-02
HF-181	137.46	95.	-4.	-0.001	315.50	-8.234E-02
Tc-99m	140.42	120.	-7.	-0.001	216.79	-1.020E-02
U-235	143.57	99.	13.	0.002	113.69	1.321E-01
CE-141	144.62	99.	-6.	-0.001	234.76	-1.443E-02
TH-229	193.22	92.	10.	0.001	137.26	3.358E-01
U-235	205.43	82.	10.	0.001	137.24	2.913E-01
TH-229	212.10	98.	-9.	-0.001	167.83	-4.437E-01
TH-227	236.68	291.	-63.	-0.009	40.47	-8.733E-01
RA-224	240.18	384.	-63.	-0.009	45.70	-2.680E+00
TH-227	256.53	55.	2.	0.000	464.51	5.975E-02
BI-210M	266.10	46.	8.	0.001	123.29	3.072E-02
Hg-203	279.34	64.	3.	0.000	438.44	6.306E-03
Ir-192	295.23	64.	69.	0.010	20.42	4.723E-01
PA-231	300.18	52.	21.	0.003	54.36	1.761E+00
PA-233	300.18	52.	21.	0.003	54.36	6.990E-01
PA-231	301.79	100.	-19.	-0.003	78.09	-1.391E+00
BA-133	301.76	104.	-23.	-0.003	67.06	-2.622E-01
Ba-140	305.06	54.	15.	0.002	72.67	7.574E-01
BI-210M	305.08	54.	15.	0.002	72.09	1.170E-01
PA-233	312.02	55.	-5.	-0.001	198.59	-3.267E-02
Ir-192	317.17	51.	8.	0.001	136.32	1.944E-02
CR-51	323.19	37.	-5.	-0.001	184.11	-1.080E-01
La-140	328.91	41.	8.	0.001	123.79	8.610E-02
BA-133	356.82	53.	2.	0.000	429.41	9.518E-03
BA-133	384.40	49.	8.	0.001	129.37	2.320E-01
SN-113	390.62	35.	8.	0.001	107.72	3.414E-02
AG-108M	433.41	38.	-2.	0.000	374.03	-7.643E-03
SB-125	462.94	40.	15.	0.002	65.02	4.467E-01
Ir-192	468.14	51.	-3.	0.000	396.37	-1.570E-02
PM-144	476.95	36.	3.	0.000	269.66	2.448E-02
HF-181	483.05	37.	-2.	0.000	547.37	-6.375E-03
La-140	487.50	33.	3.	0.000	248.05	2.399E-02
RU-103	497.05	35.	-2.	0.000	394.49	-7.891E-03
RH-106	511.62	78.	48.	0.007	29.87	8.182E-01

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ba-140	537.28	38.	10.	0.001	93.25	1.465E-01	
PA-234	569.66	22.	7.	0.001	105.84	3.144E-01	
SB-125	601.49	40.	-3.	0.000	302.48	-6.746E-02	
RU-103	609.21	37.	79.	0.011	15.72	5.549E+00	
AG-108M	612.98	49.	-15.	-0.002	71.62	-6.766E-02	
PM-144	620.72	21.	8.	0.001	86.92	3.365E-02	
RH-106	618.80	19.	6.	0.001	109.36	2.515E-01	
SB-125	636.03	28.	5.	0.001	152.56	1.920E-01	
I-131	636.02	33.	1.	0.000	574.45	8.482E-02	
AG-110M	659.98	59.	-9.	-0.001	126.13	-4.126E-02	
CS-137	661.87	51.	16.	0.002	69.76	8.023E-02	
AG-108M	723.37	38.	6.	0.001	149.49	3.201E-02	
EU-154	723.47	41.	5.	0.001	182.17	1.219E-01	
ZR-95	725.89	49.	2.	0.000	488.66	2.229E-02	
BI-212	727.59	42.	7.	0.001	129.04	4.713E-01	
pm-146	735.97	21.	2.	0.000	426.79	3.390E-02	
pm-146	747.27	34.	-6.	-0.001	147.39	-8.468E-02	
ZR-95	755.49	26.	1.	0.000	715.11	9.478E-03	
AG-110M	764.38	26.	1.	0.000	568.62	2.918E-02	
CO-58	811.80	31.	-3.	0.000	317.21	-1.377E-02	
La-140	814.33	18.	6.	0.001	106.02	1.415E-01	
MN-54	834.71	33.	-2.	0.000	413.95	-1.108E-02	
Co-56	846.50	26.	5.	0.001	154.15	2.781E-02	
NB-94	870.34	32.	1.	0.000	555.70	8.478E-03	
PA-234	880.93	29.	-1.	0.000	942.54	-7.889E-02	
AG-110M	888.68	17.	-2.	0.000	331.30	-1.473E-02	
Sc-46	888.55	28.	-2.	0.000	321.57	-1.400E-02	
y-88	897.89	25.	4.	0.001	167.98	2.791E-02	
PA-234	945.68	24.	-1.	0.000	507.40	-6.505E-02	
EU-152	963.03	33.	-4.	-0.001	201.74	-1.833E-01	
EU-154	998.64	20.	1.	0.000	541.56	7.473E-02	
PA-234M	1003.67	14.	1.	0.000	464.07	9.238E-01	
EU-154	1005.28	22.	-3.	0.000	235.20	-1.080E-01	
Co-56	1034.04	13.	2.	0.000	331.15	7.690E-02	
Ga-68	1078.33	23.	-1.	0.000	597.65	-4.512E-01	
FE-59	1099.14	33.	-7.	-0.001	115.30	-9.744E-02	
EU-152	1110.65	31.	-7.	-0.001	116.78	-3.898E-01	
ZN-65	1115.83	28.	8.	0.001	102.79	1.149E-01	
Sc-46	1121.20	35.	4.	0.001	232.80	2.789E-02	
CO-60	1173.71	25.	1.	0.000	532.91	1.068E-02	
FE-59	1291.86	18.	-1.	0.000	909.87	-1.337E-02	
AG-110M	1382.20	23.	-5.	-0.001	142.80	-1.944E-01	
La-140	1595.45	18.	-3.	0.000	238.82	-3.034E-02	
y-88	1837.54	9.	4.	0.001	106.97	5.685E-02	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	3.0359E-03	3.0359E-03	8.267E+03%	9.09E-01
NA-22	#A	5.0054E-03	5.0054E-03	1.113E+03%	2.06E-01
K-40	#	1.4899E+01	1.4899E+01	8.376E+00%	2.07E+00
Sc-46	#A	6.9448E-03	6.9448E-03	1.985E+02%	1.61E-01
CR-51	#A	-1.0802E-01	-1.0803E-01	1.841E+02%	6.96E-01
MN-54	#A	-1.1082E-02	-1.1082E-02	4.140E+02%	1.64E-01
FE-59	#A	-9.7439E-02	-9.7440E-02	1.153E+02%	3.86E-01
Co-56	#A	3.3895E-02	3.3895E-02	1.542E+02%	1.50E-01
CO-57	#A	-1.4202E-02	-1.4202E-02	1.054E+02%	5.06E-02
CO-58	#A	-1.3772E-02	-1.3772E-02	3.172E+02%	1.56E-01
CO-60	#A	4.5205E-03	4.5205E-03	5.329E+02%	1.60E-01
ZN-65	#A	1.1493E-01	1.1493E-01	1.028E+02%	4.05E-01
NB-94	#A	4.2817E-03	4.2817E-03	5.557E+02%	2.02E-01
ZR-95	#A	1.5216E-02	1.5216E-02	4.331E+02%	2.46E-01
NB-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.01E-01
RU-103	#A	-7.8913E-03	-7.8914E-03	3.945E+02%	1.11E-01
RH-106	#A	2.5148E-01	2.5148E-01	1.094E+02%	9.54E-01
AG-108M	#A	1.2223E-02	1.2223E-02	1.495E+02%	1.02E-01
AG-110M	#A	-4.4318E-03	-4.4318E-03	3.290E+02%	1.79E-01
SN-113	#A	3.4140E-02	3.4140E-02	1.077E+02%	1.26E-01
SB-124	A	4.4200E-02	4.4200E-02	9.870E+01%	8.81E-02
SB-125	#A	1.3288E-01	1.3288E-01	6.502E+01%	2.52E-01
I-131	#A	6.8427E-03	6.8432E-03	5.744E+02%	1.31E-01
Gd-153	#A	2.9646E-03	2.9646E-03	1.512E+03%	1.56E-01
Ga-68	#A	-4.4573E-01	-4.5123E-01	5.977E+02%	9.83E+00
Tc-99m	#A	-1.0175E-02	-1.0198E-02	2.168E+02%	7.56E-02
BA-133	#A	9.5180E-03	9.5180E-03	4.294E+02%	1.44E-01
CS-134	A	6.3441E-02	6.3441E-02	4.789E+01%	9.36E-02
CS-137	#A	8.0227E-02	8.0227E-02	6.976E+01%	1.86E-01
CE-139	#A	-8.0187E-04	-8.0187E-04	2.613E+03%	7.33E-02
Ba-140	#A	2.3785E-01	2.3786E-01	5.911E+01%	4.63E-01
La-140	#A	1.7557E-02	1.7558E-02	9.524E+01%	2.62E-01
CE-141	#A	-1.4427E-02	-1.4428E-02	2.348E+02%	1.16E-01
CE-144	#A	3.3432E-02	3.3432E-02	3.964E+02%	4.59E-01
PM-144	#A	1.7624E-02	1.7624E-02	8.692E+01%	1.36E-01
EU-152	#A	2.2012E-02	2.2012E-02	1.066E+02%	3.01E-01
EU-154	#A	7.5277E-02	7.5277E-02	1.822E+02%	1.33E+00
EU-155	#A	4.4897E-02	4.4897E-02	1.486E+02%	2.27E-01
HF-181	#A	-7.3764E-05	-7.3765E-05	2.874E+02%	1.25E-01
Ta-182	#A	1.5911E-01	1.5911E-01	1.025E+02%	6.37E-01
Hg-203	#A	6.3062E-03	6.3062E-03	4.384E+02%	9.68E-02
TL-208		4.5477E-01	4.5477E-01	1.321E+01%	1.03E-01
pm-146	#A	-8.4685E-02	-8.4685E-02	1.474E+02%	4.34E-01

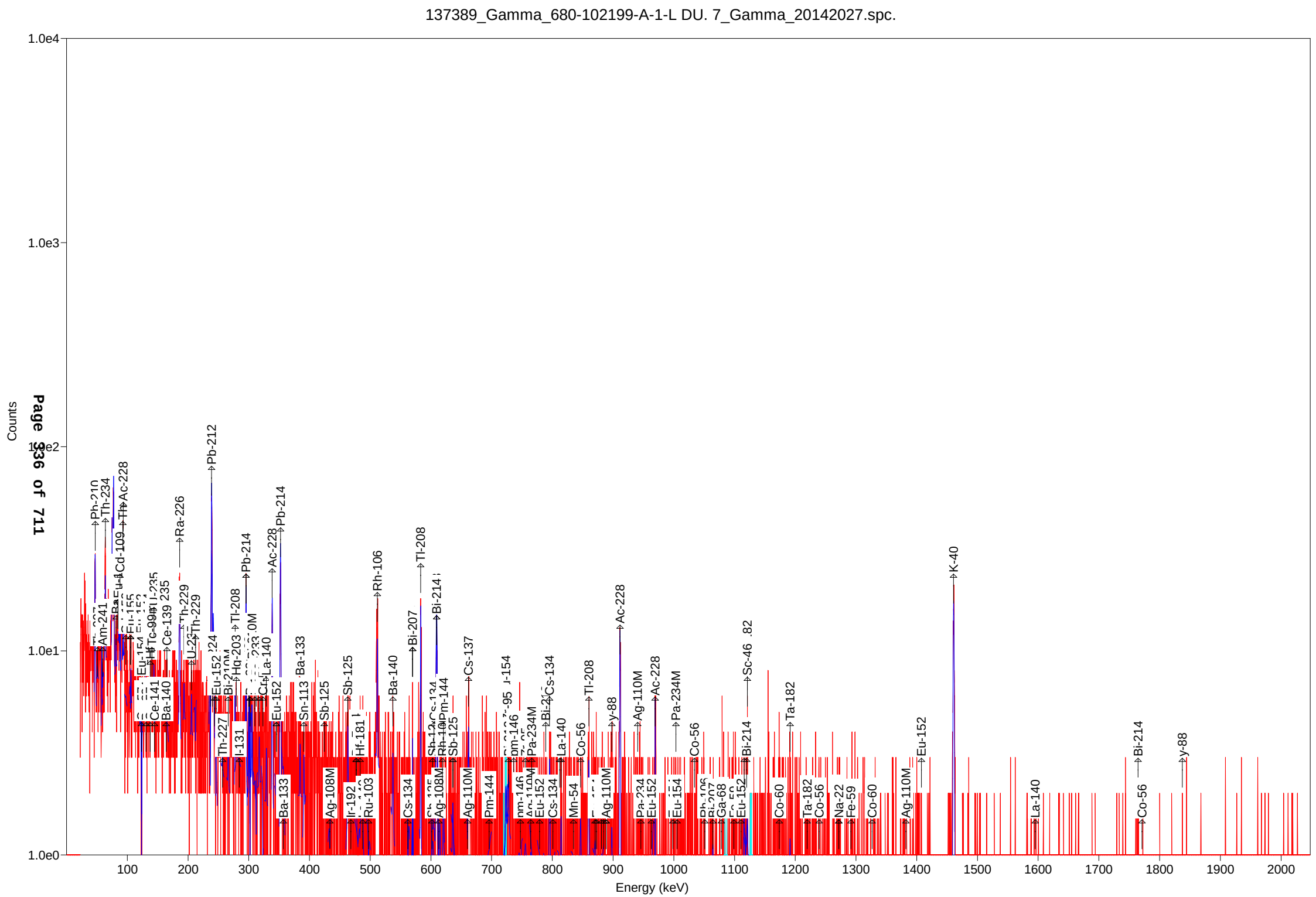
y-88	#A	4.2795E-02	4.2795E-02	9.958E+01%	1.65E-01
Cd-109	A	4.4383E-01	4.4383E-01	9.756E+01%	1.45E+00
Ra-226	#	3.1596E+00	3.1596E+00	3.034E+01%	2.41E+00
PB-210	#	2.1231E+00	2.1231E+00	2.545E+01%	1.49E+00
PB-212		1.0875E+00	1.0875E+00	9.309E+00%	1.98E-01
PB-214	#	9.8956E-01	9.8956E-01	1.060E+01%	1.94E-01
BI-207		7.7667E-02	7.7667E-02	2.828E+01%	4.67E-02
BI-212	#A	4.7125E-01	4.7125E-01	1.290E+02%	2.09E+00
BI-214	#	8.9161E-01	8.9161E-01	1.546E+01%	2.75E-01
BI-210M	#A	6.1684E-02	6.1684E-02	7.141E+01%	1.30E-01
RA-224	#A	-2.6799E+00	-2.6799E+00	4.570E+01%	3.99E+00
AC-228		1.7578E+00	1.7578E+00	9.308E+00%	2.44E-01
TH-227	#A	-8.7329E-01	-8.7329E-01	4.047E+01%	1.14E+00
TH-229	#A	3.3582E-01	3.3582E-01	1.373E+02%	1.57E+00
TH-234	A	1.3155E+00	1.3155E+00	5.168E+01%	1.83E+00
PA-231	#A	-1.3906E+00	-1.3906E+00	7.809E+01%	3.62E+00
PA-233	#A	7.4831E-02	7.4831E-02	5.436E+01%	2.25E-01
PA-234	#A	8.9156E-02	8.9156E-02	1.058E+02%	3.02E-01
PA-234M	#A	9.2379E-01	9.2379E-01	4.641E+02%	1.60E+01
U-235	#A	1.8201E-01	1.8201E-01	8.911E+01%	5.08E-01
AM-241	#A	-1.5931E-02	-1.5931E-02	2.502E+02%	1.37E-01
Ir-192	#C	1.3597E-01	1.3597E-01	2.042E+01%	9.11E-02
Np-237	A	4.6536E-04	4.6536E-04	2.422E+04%	3.90E-01

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

--- S U M M A R Y ---

Total Activity (1121.1 to 2000.1 keV) 2.676E+01 Bq/Sample
Total Decayed Activity (1121.1 to 2000.1 keV) 2.6756294E+01 Bq/Sample

137389_Gamma_680-102199-A-1-L DU. 7_Gamma_20142027.spc.



Test America St. Louis Spectrum ID: 4_Gamma_20141557

Sample Description: 137389_Gamma_680-102199-A-2-G
Detector: Ge 4 SN/181
Batch ID: 137389
Work Order Number: Gamma
Lot Number: 680-102199-A-2-G

Decay to Time: 8/14/2014 13:35 Live Time: 7200 sec
Acquisition Time: 8/14/2014 13:35:28 Real Time: 7207 sec
Analysis Time: 8/14/2014 15:36 Dead Time: 0.10 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 4_Liquid_D=1 25ml.Clb
Efficiency Cal Desc: 4_Liquid_D=1 25ml_90101_030512
Efficiency Cal Date: 3/27/2012 20:51
Energy Cal Date: 2/28/2012 14:55
Library: Client_ Long_no ingrowth Rev3.li
Bkgd Correction File: 4_2014-08-09_2125.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	3.229E-01	181.9	5.874E-01	5.876E-01	2.071E+00
NA-22	5.228E-02	162.1	8.474E-02	8.478E-02	3.122E-01
K-40	8.915E+00	20.4	1.819E+00	1.870E+00	5.251E+00
Sc-46	5.527E-02	65.9	3.641E-02	3.651E-02	3.178E-01
CR-51	2.097E-01	267.5	5.609E-01	5.610E-01	1.964E+00
MN-54	3.682E-02	223.3	8.220E-02	8.222E-02	2.970E-01
FE-59	8.811E-02	207.5	1.828E-01	1.829E-01	6.606E-01
Co-56	9.773E-02	102.6	1.003E-01	1.004E-01	2.450E-01
CO-57	2.325E-02	130.5	3.035E-02	3.037E-02	1.043E-01
CO-58	8.849E-02	105.8	9.364E-02	9.374E-02	3.229E-01
CO-60	4.085E-02	189.0	7.721E-02	7.724E-02	2.919E-01
ZN-65	-8.295E-02	246.8	2.047E-01	2.048E-01	7.450E-01
NB-94	0.000E+00	1000.0	5.685E-02	5.685E-02	3.455E-01
ZR-95	0.000E+00	1000.0	3.103E-02	3.103E-02	3.420E-01
NB-95	0.000E+00	1000.0	8.183E-02	8.183E-02	3.430E-01
RU-103	-1.775E-02	308.3	5.470E-02	5.471E-02	1.999E-01
RH-106	-7.751E-02	883.5	6.848E-01	6.848E-01	2.514E+00
AG-108M	-2.209E-02	303.0	6.694E-02	6.695E-02	2.380E-01
AG-110M	-4.471E-02	280.5	1.254E-01	1.255E-01	4.543E-01
SN-113	1.027E-01	85.5	8.786E-02	8.800E-02	2.969E-01
SB-124	-1.901E-02	359.1	6.825E-02	6.826E-02	2.474E-01
SB-125	1.194E-01	116.5	1.390E-01	1.391E-01	7.054E-01
I-131	2.178E-02	269.9	5.880E-02	5.881E-02	2.097E-01
Gd-153	7.808E-02	108.0	8.434E-02	8.447E-02	2.870E-01
Ga-68	-3.113E-01	1741.0	5.420E+00	5.420E+00	2.021E+01
Tc-99m	0.000E+00	1000.0	3.183E-02	3.183E-02	1.616E-01
BA-133	2.987E-02	253.2	7.564E-02	7.565E-02	2.693E-01
CS-134	9.754E-03	807.8	7.879E-02	7.879E-02	2.850E-01
CS-137	4.467E-04	17840.0	7.969E-02	7.969E-02	2.966E-01
CE-139	3.184E-02	115.5	3.677E-02	3.684E-02	1.260E-01
Ba-140	2.637E-01	66.8	1.761E-01	1.765E-01	9.625E-01
La-140	2.340E-02	73.2	1.714E-02	1.718E-02	3.797E-01
CE-141	5.529E-02	105.9	5.858E-02	5.864E-02	1.995E-01
CE-144	1.896E-01	158.0	2.996E-01	2.997E-01	1.027E+00
PM-144	2.775E-02	171.1	4.748E-02	4.750E-02	3.064E-01
EU-152	1.141E-02	200.3	2.285E-02	2.286E-02	6.556E-01
EU-154	7.586E-02	159.0	1.206E-01	1.207E-01	2.667E+00
EU-155	1.608E-01	79.7	1.281E-01	1.284E-01	4.289E-01
HF-181	2.990E-02	165.1	4.937E-02	4.939E-02	2.372E-01
Ta-182	4.393E-01	57.6	2.531E-01	2.540E-01	1.007E+00
Hg-203	-2.427E-02	219.5	5.327E-02	5.329E-02	1.872E-01
TL-208	6.388E-01	19.8	1.271E-01	1.282E-01	2.169E-01
pm-146	-6.097E-02	95.5	5.821E-02	5.828E-02	9.062E-01

y-88	-2.665E-02	340.2	9.066E-02	9.067E-02	3.326E-01
Cd-109	1.454E-01	689.2	1.002E+00	1.002E+00	3.452E+00
Ra-226	3.197E+00	56.0	1.790E+00	1.803E+00	5.005E+00
PB-210	1.968E+00	56.0	1.102E+00	1.109E+00	3.241E+00
PB-212	1.066E+00	14.9	1.585E-01	1.686E-01	4.045E-01
PB-214	1.116E+00	18.6	2.076E-01	2.145E-01	5.193E-01
BI-207	0.000E+00	1000.0	3.827E-02	3.828E-02	3.737E-01
BI-212	7.159E-01	150.4	1.076E+00	1.077E+00	3.793E+00
BI-214	1.149E+00	24.3	2.796E-01	2.851E-01	6.433E-01
BI-210M	4.209E-02	81.4	3.425E-02	3.432E-02	3.319E-01
RA-224	-4.701E+00	45.3	2.132E+00	2.147E+00	6.917E+00
AC-228	1.689E+00	15.8	2.661E-01	2.783E-01	1.042E+00
TH-227	2.858E-01	136.8	3.911E-01	3.914E-01	1.340E+00
TH-229	2.611E-01	197.3	5.151E-01	5.154E-01	3.022E+00
TH-234	2.228E+00	52.5	1.170E+00	1.175E+00	3.355E+00
PA-231	-1.416E-01	163.9	2.321E-01	2.322E-01	5.342E+00
PA-233	-4.146E-02	344.7	1.429E-01	1.429E-01	5.044E-01
PA-234	-1.140E-01	171.9	1.959E-01	1.960E-01	6.712E-01
PA-234M	6.766E-01	1640.0	1.109E+01	1.109E+01	4.150E+01
U-235	3.442E-01	56.9	1.958E-01	1.965E-01	1.041E+00
AM-241	7.466E-02	108.2	8.079E-02	8.088E-02	2.736E-01
Ir-192	7.103E-02	68.0	4.829E-02	4.845E-02	2.231E-01
Np-237	-2.989E-01	101.9	3.046E-01	3.050E-01	1.023E+00
Total	2.727E+01				

Analyst: ashley silas

TestAmerica Spectrum name: 4_Gamma_20141557.An1

Sample description
137389_Gamma_680-102199-A-2-G

Spectrum Filename: C:\User\SPC\Det4\4_Gamma_20141557.An1

Acquisition information
Start time: 8/14/2014 1:35:28 PM
Live time: 7200
Real time: 7207
Dead time: 0.10 %
Detector ID: 4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_Liquid_D=1 25ml.Clb
4_Liquid_D=1 25ml_90101_030512

Energy Calibration
Created: 2/28/2012 2:55:17 PM
Zero offset: 0.091 keV
Gain: 0.250 keV/channel
Quadratic: -2.917E-08 keV/channel^2

Efficiency Calibration
Created: 3/27/2012 8:51:45 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.48 %
Log(Eff): 8.809878E-01 + (-6.811249E-01*Log(E)) + (-1.909804E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -1.031199E+01 + (3.529752E+00*Log(E)) + (-4.143154E-01*Log(E)^2)

Library Files
Main analysis library: Client_ Long_no ingrowth Rev3.li
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (1999.44keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/14/2014 1:35:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	4_2014-08-09_2125.PBC 8/9/2014 9:25:56 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 18 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.2078

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.45	104.	18.49	0.76	5.683E-02	46.54	4.250	PBC<MDA	PB210
59.61	12.	108.21	0.81	6.042E-02	59.54	35.900	PBC<MDA	AM241
63.42	88.	22.19	0.40	6.087E-02	63.29	3.810	PBC<MDA	TH234
74.96	71.	21.02	0.83	6.109E-02				
77.20	143.	12.00	0.83	6.098E-02				
88.04	2.	689.22	0.84	5.998E-02	88.04	3.790	PBC<MDA	Cd109
92.71	120.	16.35	1.17	5.936E-02	92.59	5.584	PBC<MDA	TH234
93.38	27.	69.07	0.84	5.926E-02	93.35	5.561	PBC<MDA	AC228
98.56	10.	108.02	0.85	5.863E-02	97.50	30.000	PBC<MDA	Gd153
105.35	14.	79.72	0.85	5.730E-02	105.31	21.200	PBC<MDA	EU155
119.66	3.	290.83	0.87	5.415E-02	121.78	28.580	PBC<MDA	EU152
121.43	8.	130.52	0.87	5.409E-02	122.06	85.600	PBC<MDA	CO57
123.27	4.	323.09	0.87	5.389E-02	123.10	40.790	PBC<MDA	EU154
132.16	2.	686.63	0.88	5.187E-02	133.02	43.300	PBC<MDA	HF181
134.13	8.	158.02	0.88	5.177E-02	133.54	11.090	PBC<MDA	CE144
144.53	9.	105.95	0.89	4.935E-02	145.44	48.200	PBC<MDA	CE141
162.88	16.	56.88	0.91	4.578E-02	162.66	6.220	PBC<MDA	Ba140
					163.38	5.080	9.565E-01	U235
162.89	15.	66.76	0.91	4.592E-02	162.66	6.220	PBC<MDA	Ba140
					163.38	5.080	8.883E-01	U235
166.71	8.	115.51	0.91	4.508E-02	165.85	79.900	PBC<MDA	CE139
185.58	69.	24.98	0.89	4.085E-02	185.99	3.280	PBC<MDA	Ra226
205.44	9.	134.79	0.95	3.736E-02	205.33	5.010	PBC<MDA	U235

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
210.11	5.	197.28	0.95	3.649E-02	210.85	2.990	PBC<MDA	TH229
					210.85	2.990	6.985E-01	TH229
235.24	8.	136.83	0.97	3.302E-02	235.97	12.300	PBC<MDA	TH227
238.55	135.	11.97	0.84	3.270E-02	238.63	43.300	1.066E+00	PB212
241.92	10.	112.91	0.98	3.229E-02	242.00	7.430	PBC<MDA	PB214
244.91	5.	202.64	0.98	3.197E-02	244.69	7.580	PBC<MDA	EU152
295.09	49.	25.42	0.39	2.704E-02	295.09	19.300	1.313E+00	PB214
295.95	1.	661.90	1.03	2.697E-02	295.95	30.160	PBC<MDA	Ir192
					295.95	30.160	2.491E-02	Ir192
302.88	-1.	251.79	1.03	2.664E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
					302.65	2.880	PBC<MDA	PA231
302.95	2.	234.66	1.03	2.663E-02				
304.61	10.	89.20	1.04	2.626E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	1.801E-01	BI210M
304.63	10.	81.39	1.04	2.626E-02	304.85	4.290	1.246E+00	Ba140
					304.90	28.000	1.909E-01	BI210M
306.34	10.	67.98	1.04	2.598E-02	308.44	31.750	PBC<MDA	Ir192
					308.44	31.750	1.732E-01	Ir192
316.10	8.	130.64	1.05	2.539E-02	316.49	87.040	PBC<MDA	Ir192
					316.49	87.040	4.975E-02	Ir192
320.68	4.	267.48	1.05	2.513E-02	320.08	9.940	PBC<MDA	CR51
329.48	13.	73.23	1.06	2.453E-02	328.76	20.300	PBC<MDA	La140
338.06	47.	23.90	0.32	2.391E-02	338.32	12.010	2.274E+00	AC228
351.66	82.	16.13	1.00	2.308E-02	351.93	37.600	1.014E+00	PB214
355.82	3.	253.19	1.08	2.283E-02	356.00	62.050	PBC<MDA	BA133
364.15	3.	269.93	1.09	2.235E-02	364.48	81.700	PBC<MDA	I131
391.70	10.	85.52	1.11	2.093E-02	391.69	64.000	PBC<MDA	SN113
462.74	6.	116.45	1.18	1.796E-02	463.37	10.470	PBC<MDA	SB125
477.16	4.	181.91	1.19	1.747E-02	476.81	42.000	PBC<MDA	PM144
					477.60	10.520	3.229E-01	BE7
					476.81	42.000	8.076E-02	PM144
477.27	5.	171.09	1.19	1.749E-02	476.81	42.000	PBC<MDA	PM144
					477.60	10.520	3.489E-01	BE7
481.28	4.	165.12	1.19	1.732E-02	482.00	80.500	PBC<MDA	HF181
511.01	80.	18.23	1.22	1.639E-02	511.86	20.000	3.405E+00	RH106
					511.86	20.000	3.405E+00	RH106
583.47	56.	19.48	0.62	1.454E-02	583.02	84.500	6.388E-01	TL208
603.11	1.	807.75	1.30	1.405E-02	604.71	97.620	PBC<MDA	CS134
609.15	65.	19.92	0.48	1.396E-02	609.31	46.090	1.149E+00	BI214
					610.30	5.750	1.127E+01	RU103
727.58	5.	150.36	1.40	1.184E-02	727.17	7.550	PBC<MDA	BI212
734.98	4.	157.69	1.41	1.171E-02	735.72	22.500	PBC<MDA	pm146
779.15	1.	990.06	1.45	1.110E-02	778.92	12.940	PBC<MDA	EU152
786.52	4.	195.87	1.45	1.102E-02	785.42	1.280	PBC<MDA	BI212
811.11	7.	105.82	1.47	1.070E-02	810.78	99.460	PBC<MDA	CO58
833.79	3.	223.26	1.49	1.041E-02	834.85	99.980	PBC<MDA	MN54
847.99	4.	132.47	1.50	1.027E-02	846.77	99.935	PBC<MDA	Co56
860.66	1.	526.66	1.52	1.011E-02	860.56	12.420	PBC<MDA	TL208
880.44	6.	94.64	1.53	9.898E-03	880.53	6.000	PBC<MDA	PA234
911.22	22.	33.16	1.56	9.585E-03	911.16	29.000	1.088E+00	AC228
969.26	26.	23.71	0.59	9.045E-03	968.97	17.460	2.287E+00	AC228
1005.92	2.	332.07	1.63	8.740E-03	1004.77	18.010	PBC<MDA	EU154
1038.48	4.	156.81	1.66	8.476E-03	1037.84	14.130	PBC<MDA	Co56
1100.29	3.	207.49	1.71	8.027E-03	1099.25	56.500	PBC<MDA	FE59

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1119.13	2.	275.92	1.73	7.884E-03	1120.29	15.100	PBC<MDA	BI214
1121.24	9.	65.88	1.73	7.882E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	4.531E-01	Ta182
1121.28	9.	68.33	1.73	7.877E-03	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	4.443E-01	Ta182
1220.94	6.	92.82	1.81	7.262E-03	1221.41	27.000	PBC<MDA	Ta182
1274.04	3.	162.51	1.85	6.973E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.481E-01	EU154
1274.05	3.	162.09	1.85	6.973E-03	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	1.485E-01	EU154
1334.36	2.	189.03	1.89	6.683E-03	1332.50	99.980	PBC<MDA	CO60
1460.70	42.	15.51	1.99	6.120E-03	1460.83	10.670	8.915E+00	K40
1764.80	-1.	55.15	2.21	5.102E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
299.41	74.99	84.	62.	1.009E+03	28.12	0.644	-	
308.36	77.22	73.	147.	2.405E+03	12.84	0.998	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_ Long_no ingrowth Rev3.li

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.33	46.45	133.	34.	0.005	18.49	0.757s
AM-241	237.94	59.61	74.	12.	0.002	108.21	0.812s
TH-234	253.18	63.42	131.	37.	0.005	22.19	0.404s
Np-237	344.20	86.19	141.	-17.	-0.002	101.92	0.837s
Cd-109	351.60	88.04	133.	2.	0.000	689.22	0.839s
TH-234	369.79	92.59	165.	11.	0.001	19.64	0.843D
AC-228	372.83	93.35	155.	27.	0.004	69.07	0.843D
Gd-153	393.65	98.56	52.	10.	0.001	108.02	0.847s
Gd-153	412.09	103.17	82.	-7.	-0.001	191.95	0.853s
EU-155	420.79	105.35	56.	14.	0.002	79.72	0.855s
EU-152	477.99	119.66	30.	3.	0.000	290.83	0.870s
CO-57	485.11	121.43	47.	8.	0.001	130.52	0.870s
EU-154	492.45	123.27	64.	4.	0.000	323.09	0.871s
PA-234	524.77	131.36	84.	-8.	-0.001	171.91	0.878s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
HF-181	527.99	132.16	63.	2.	0.000	686.63	0.880s
CE-144	535.88	134.13	73.	8.	0.001	158.02	0.880s
CO-57	549.40	137.52	88.	-10.	-0.001	141.93	0.883s
U-235	573.76	143.61	67.	-3.	0.000	388.37	0.890s
CE-141	577.46	144.53	46.	9.	0.001	105.95	0.891s
Ba-140	650.86	162.89	42.	15.	0.002	66.76	0.907s
U-235	650.83	162.88	33.	16.	0.002	56.88	0.908s
CE-139	666.13	166.71	41.	8.	0.001	115.51	0.910s
Ra-226	741.58	185.58	95.	31.	0.004	24.98	0.894
U-235	820.97	205.44	64.	9.	0.001	134.79	0.946s
TH-229	839.65	210.11	56.	5.	0.001	197.28	0.951s
TH-227	940.12	235.24	61.	8.	0.001	136.83	0.974
PB-212	953.38	238.55	68.	109.	0.015	11.97	0.838
RA-224	958.53	239.84	185.	-45.	-0.006	45.34	0.979s
PB-214	966.85	241.92	72.	10.	0.001	112.91	0.979s
EU-152	978.81	244.91	51.	5.	0.001	202.64	0.982s
BI-210M	1062.86	265.94	49.	-4.	-0.001	230.39	1.001s
TL-208	1104.28	276.29	51.	-7.	-0.001	141.16	1.011s
Hg-203	1122.49	280.85	37.	-4.	-0.001	219.51	1.013s
PB-214	1179.46	295.09	52.	49.	0.007	25.42	0.386s
Ir-192	1182.88	295.95	46.	1.	0.000	661.90	1.028s
PA-231	1210.85	302.95	12.	2.	0.000	234.66	1.032s
PA-233	1191.15	298.02	31.	-7.	-0.001	119.01	1.032s
PA-231	1208.74	302.42	33.	-4.	-0.001	229.00	1.034s
BA-133	1202.91	300.96	22.	-3.	0.000	199.53	1.034s
Ba-140	1217.51	304.61	31.	10.	0.001	89.20	1.036s
BI-210M	1217.60	304.63	29.	10.	0.001	81.39	1.036s
Ir-192	1224.41	306.34	19.	10.	0.001	67.98	1.039s
PA-233	1245.32	311.57	44.	-3.	0.000	344.75	1.042s
Ir-192	1263.45	316.10	50.	8.	0.001	130.64	1.047s
CR-51	1281.76	320.68	49.	4.	0.001	267.48	1.050s
La-140	1316.94	329.48	37.	13.	0.002	73.23	1.057s
AC-228	1351.28	338.06	19.	47.	0.007	23.90	0.322s
EU-152	1374.95	343.98	33.	-4.	-0.001	200.32	1.071s
PB-214	1405.65	351.66	41.	63.	0.009	16.13	0.996
BA-133	1422.30	355.82	28.	3.	0.000	253.19	1.082s
I-131	1455.60	364.15	28.	3.	0.000	269.93	1.089s
BA-133	1537.80	384.71	32.	-4.	-0.001	221.96	1.107s
SN-113	1565.78	391.70	31.	10.	0.001	85.52	1.114s
AG-108M	1739.76	435.21	33.	-3.	0.000	303.04	1.151s
pm-146	1812.86	453.49	29.	-1.	0.000	764.17	1.168s
SB-125	1849.86	462.74	23.	6.	0.001	116.45	1.177s
PM-144	1907.98	477.27	29.	5.	0.001	171.09	1.189s
BE-7	1907.54	477.16	28.	4.	0.001	181.91	1.189s
HF-181	1924.03	481.28	21.	4.	0.001	165.12	1.193s
La-140	1945.52	486.66	33.	-4.	-0.001	210.60	1.198s
RU-103	1991.62	498.18	17.	-2.	0.000	308.26	1.206s
RH-106	2042.92	511.01	67.	80.	0.011	18.23	1.219s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-234	2283.80	571.24	24.	-2.	0.000	391.01	1.269s
TL-208	2332.72	583.47	12.	56.	0.008	19.48	0.624s
SB-125	2402.47	600.91	39.	-5.	-0.001	200.83	1.296s
SB-124	2423.54	606.17	22.	-2.	0.000	359.12	1.298s
CS-134	2411.27	603.11	30.	1.	0.000	807.75	1.300s
BI-214	2435.45	609.15	34.	53.	0.007	19.92	0.476s
RU-103	2434.99	609.04	29.	40.	0.006	24.78	1.305s
AG-108M	2453.59	613.69	36.	-1.	0.000	680.59	1.308s
PM-144	2472.24	618.35	29.	-3.	0.000	299.22	1.311s
RH-106	2488.48	622.41	22.	-1.	0.000	883.55	1.314s
SB-125	2530.76	632.98	18.	-1.	0.000	456.19	1.326s
AG-110M	2631.10	658.06	27.	-3.	0.000	262.64	1.345s
SB-124	2892.84	723.50	24.	-4.	-0.001	162.14	1.400s
AG-108M	2892.93	723.52	25.	-5.	-0.001	152.85	1.401s
EU-154	2893.82	723.74	26.	-5.	-0.001	151.66	1.401s
ZR-95	2893.44	723.65	27.	-5.	-0.001	142.60	1.402s
BI-212	2909.17	727.58	22.	5.	0.001	150.36	1.404s
pm-146	2938.77	734.98	19.	4.	0.001	157.69	1.411s
pm-146	2993.57	748.68	24.	-7.	-0.001	107.68	1.421s
AG-110M	3053.61	763.69	18.	-2.	0.000	293.62	1.435s
EU-152	3115.47	779.15	18.	1.	0.000	990.06	1.448s
BI-212	3144.95	786.52	22.	4.	0.000	195.87	1.453s
CS-134	3180.08	795.30	22.	-1.	0.000	566.06	1.462s
CS-134	3200.32	800.36	19.	-1.	0.000	960.27	1.467s
CO-58	3243.34	811.11	22.	7.	0.001	105.82	1.474s
La-140	3259.19	815.08	25.	-3.	0.000	218.04	1.478s
MN-54	3334.07	833.79	18.	3.	0.000	223.26	1.494s
Co-56	3390.86	847.99	11.	4.	0.001	132.47	1.504s
TL-208	3441.54	860.66	22.	1.	0.000	526.66	1.516s
NB-94	3490.13	872.80	22.	-4.	-0.001	174.92	1.524s
EU-154	3489.44	872.63	20.	-2.	0.000	301.36	1.526s
PA-234	3520.71	880.44	14.	6.	0.001	94.64	1.532s
PA-234	3535.60	884.17	19.	-1.	0.000	441.80	1.534s
AG-110M	3533.89	883.74	20.	-2.	0.000	280.54	1.536s
Sc-46	3550.97	888.01	18.	-3.	0.000	186.62	1.539s
y-88	3588.77	897.46	17.	-2.	0.000	340.23	1.547s
AC-228	3643.83	911.22	15.	22.	0.003	33.16	1.557s
PA-234	3781.02	945.50	20.	-4.	-0.001	159.80	1.586s
AC-228	3876.08	969.26	3.	26.	0.004	23.71	0.594s
EU-154	4022.77	1005.92	16.	2.	0.000	332.07	1.634s
Co-56	4153.03	1038.48	15.	4.	0.001	156.81	1.661s
BI-207	4249.36	1062.55	23.	-3.	0.000	214.23	1.682s
FE-59	4400.37	1100.29	16.	3.	0.000	207.49	1.710s
EU-152	4449.54	1112.58	13.	-1.	0.000	406.39	1.720s
ZN-65	4458.78	1114.88	16.	-2.	0.000	246.80	1.723s
BI-214	4475.75	1119.13	16.	2.	0.000	275.92	1.727s
Sc-46	4484.22	1121.24	13.	9.	0.001	65.88	1.727s
Ta-182	4484.38	1121.28	14.	9.	0.001	68.33	1.728s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	4690.40	1172.76	23.	-3.	0.000	245.25	1.769s
Ta-182	4883.20	1220.94	13.	6.	0.001	92.82	1.807s
NA-22	5095.76	1274.05	8.	3.	0.000	162.09	1.848s
EU-154	5095.72	1274.04	8.	3.	0.000	162.51	1.848s
CO-60	5337.14	1334.36	6.	2.	0.000	189.03	1.893s
EU-152	5628.15	1407.06	11.	-1.	0.000	737.80	1.951s
K-40	5842.85	1460.70	22.	42.	0.006	15.51	1.991s
La-140	6387.44	1596.73	7.	-2.	0.000	211.07	2.091s
SB-124	6764.45	1690.90	14.	-4.	-0.001	153.28	2.161s
BI-214	7060.35	1764.80	15.	-1.	0.000	55.15	2.214s
Co-56	7082.20	1770.26	13.	-2.	0.000	333.06	2.219s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	3.2291E-01				5.31E+01		
			477.60	3.229E-01	&(	2.071E+00	1.82E+02	1.05E+01 G
NA-22	C	5.2282E-02				9.50E+02		
			1274.53	5.228E-02	&(	3.122E-01	1.62E+02	9.99E+01 G
K-40	N	8.9150E+00				4.66E+11		
			1460.83	8.915E+00	?(P	5.251E+00	1.55E+01	1.07E+01 G
Sc-46	F	5.5269E-02				8.38E+01		
			889.28	-4.751E-02	?(	3.178E-01	1.87E+02	1.00E+02 G
			1120.55	1.580E-01	?(	3.435E-01	6.59E+01	1.00E+02 G
CR-51	F	2.0971E-01				2.77E+01		
			320.08	2.097E-01	&(	1.964E+00	2.67E+02	9.94E+00 G
MN-54	C	3.6818E-02				3.12E+02		
			834.85	3.682E-02	?(	2.970E-01	2.23E+02	1.00E+02 G
FE-59	F	8.8109E-02				4.45E+01		
			1099.25	8.811E-02	&(	6.606E-01	2.07E+02	5.65E+01 G
			1291.60	-8.102E-03	%	1.130E+00	3.77E+03	4.32E+01 G
Co-56	C	9.7732E-02				7.73E+01		
			846.77	5.175E-02	?(	2.450E-01	1.32E+02	9.99E+01 G
			1238.28	-6.467E-03	%	6.732E-01	2.79E+03	6.61E+01 G
			1037.84	4.230E-01	&(	2.374E+00	1.57E+02	1.41E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		1771.35	-2.809E-01	+	3.472E+00	3.33E+02	1.55E+01 A
CO-57	C 2.3253E-02					2.72E+02	
		122.06	2.325E-02	&(	1.043E-01	1.31E+02	8.56E+01 G
		136.47	-2.434E-01	+	1.177E+00	1.42E+02	1.07E+01 G
CO-58	C 8.8489E-02					7.09E+01	
		810.78	8.849E-02	?(	3.229E-01	1.06E+02	9.95E+01 G
CO-60	F 4.0846E-02					1.93E+03	
		1332.50	4.085E-02	?(	2.919E-01	1.89E+02	1.00E+02 G
		1173.24	-5.217E-02	+	4.590E-01	2.45E+02	9.99E+01 G
ZN-65	F -8.2948E-02					2.44E+02	
		1115.55	-8.295E-02	?(	7.450E-01	2.47E+02	5.06E+01 G
RU-103	I -1.7745E-02					3.93E+01	
		497.05	-1.775E-02	&(	1.999E-01	3.08E+02	9.09E+01 G
		610.30	6.955E+00	?	4.848E+00	2.48E+01	5.75E+00 GA
RH-106	I -7.7506E-02					3.74E+02	
		621.92	-7.751E-02	?(	2.514E+00	8.84E+02	9.93E+00 G
		1050.36	0.000E+00	+	2.646E+01	1.00E+03	1.56E+00 G
		511.86	3.405E+00	?	1.733E+00	1.82E+01	2.00E+01 GA
AG-108M	C -2.2091E-02					1.53E+05	
		433.94	-2.209E-02	?(	2.380E-01	3.03E+02	9.05E+01 G
		722.94	-6.275E-02	+	3.367E-01	1.53E+02	9.08E+01 G
		614.28	-1.398E-02	+	3.410E-01	6.81E+02	8.98E+01 G
AG-110M	F -4.4711E-02					2.50E+02	
		884.68	-4.471E-02	?(	4.543E-01	2.81E+02	7.27E+01 G
		657.76	-3.231E-02	&	3.031E-01	2.63E+02	9.46E+01 G
		937.49	0.000E+00	+	9.697E-01	1.00E+03	3.44E+01 G
		1384.30	0.000E+00	+	1.402E+00	1.00E+03	2.43E+01 G
		763.94	-1.168E-01	+	1.248E+00	2.94E+02	2.23E+01 G
SN-113	F 1.0273E-01					1.15E+02	
		391.69	1.027E-01	(	2.969E-01	8.55E+01	6.40E+01 G
SB-124	F -1.9006E-02					6.02E+01	
		602.73	-1.901E-02	?(	2.474E-01	3.59E+02	9.83E+01 G
		1690.98	-2.007E-01	+	1.101E+00	1.53E+02	4.78E+01 G
		722.79	-4.840E-01	+	2.766E+00	1.62E+02	1.08E+01 G
SB-125	I 1.1937E-01					1.01E+03	
		427.88	0.000E+00	&(	7.054E-01	1.00E+03	2.96E+01 G
		600.50	-2.501E-01	+	1.758E+00	2.01E+02	1.79E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			635.89	-1.233E-01	+	2.068E+00	4.56E+02	1.13E+01 G
			463.37	4.569E-01	&(	1.845E+00	1.16E+02	1.05E+01 G
I-131	I	2.1783E-02					8.02E+00	
			364.48	2.178E-02	?(	2.097E-01	2.70E+02	8.17E+01 G
			284.30	1.103E-02	&	2.586E+00	6.52E+03	6.14E+00 G
			636.97	-8.607E-02	%	3.671E+00	1.16E+03	7.17E+00 G
Gd-153	F	7.8080E-02					2.42E+02	
			97.50	7.808E-02	?(	2.870E-01	1.08E+02	3.00E+01 G
			103.20	-7.517E-02	+	4.958E-01	1.92E+02	2.18E+01 G
Ga-68	C	-3.1127E-01					4.71E-02	
			1077.40	-3.113E-01	%(	2.021E+01	1.74E+03	3.30E+00 G
BA-133	F	2.9874E-02					3.85E+03	
			356.00	2.987E-02	&(	2.693E-01	2.53E+02	6.20E+01 G
			302.85	-9.963E-02	+	7.087E-01	2.00E+02	1.83E+01 G
			383.84	-2.721E-01	&	2.133E+00	2.22E+02	8.94E+00 GA
			80.99	0.000E+00	&	3.643E-01	1.00E+03	3.41E+01 GA
CS-134	I	9.7540E-03					7.54E+02	
			604.71	9.754E-03	?(	2.850E-01	8.08E+02	9.76E+01 G
			795.87	-1.777E-02	+	3.675E-01	5.66E+02	8.55E+01 G
			569.32	0.000E+00	-	1.972E+00	1.00E+03	1.54E+01 G
			801.95	-9.553E-02	&	3.398E+00	9.60E+02	8.69E+00 G
			563.24	-6.813E-02	%	3.057E+00	1.23E+03	8.35E+00 G
CS-137	I	4.4670E-04					1.10E+04	
			661.66	4.467E-04	%(	2.966E-01	1.78E+04	8.52E+01 G
CE-139	F	3.1835E-02					1.38E+02	
			165.85	3.184E-02	?(	1.260E-01	1.16E+02	7.99E+01 G
Ba-140	I	2.6373E-01					1.28E+01	
			537.26	-1.382E-02	%(	9.625E-01	1.90E+03	2.44E+01 G
			162.66	7.233E-01	?(	1.598E+00	6.68E+01	6.22E+00 G
			304.85	1.175E+00	(	3.553E+00	8.92E+01	4.29E+00 G
La-140	I	2.3403E-02					1.28E+01	
			1596.21	-4.751E-02	?(	3.797E-01	2.11E+02	9.54E+01 G
			487.02	-7.016E-02	+	5.210E-01	2.11E+02	4.55E+01 G
			328.76	3.566E-01	&(	8.710E-01	7.32E+01	2.03E+01 G
			815.77	-1.868E-01	+	1.451E+00	2.18E+02	2.33E+01 G
CE-141	I	5.5289E-02					3.25E+01	
			145.44	5.529E-02	?(	1.995E-01	1.06E+02	4.82E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-144	I	1.8958E-01					2.85E+02	
			133.54	1.896E-01	&(	1.027E+00	1.58E+02	1.11E+01 G
PM-144	C	2.7753E-02					3.63E+02	
			696.54	2.508E-03	%(	3.064E-01	3.34E+03	9.90E+01 G
			618.06	-2.651E-02	+	2.833E-01	2.99E+02	9.91E+01 G
			476.81	8.726E-02	&(	5.246E-01	1.71E+02	4.20E+01 G
EU-152	F	1.1407E-02					4.94E+03	
			344.29	-9.299E-02	?(	6.556E-01	2.00E+02	2.65E+01 G
			1112.07	-1.658E-01	+	2.515E+00	4.06E+02	1.36E+01 G
			121.78	2.434E-02	&	2.525E-01	2.91E+02	2.86E+01 G
			778.92	5.964E-02	&(	2.191E+00	9.90E+02	1.29E+01 G
			964.11	2.252E-04	%	2.877E+00	3.49E+05	1.46E+01 G
			244.69	2.940E-01	?(	2.071E+00	2.03E+02	7.58E+00 G
			1408.00	-6.850E-02	+	1.924E+00	7.38E+02	2.10E+01 GA
EU-154	I	7.5862E-02					3.14E+03	
			873.23	-2.440E-01	?(	2.667E+00	3.01E+02	1.23E+01 G
			123.10	2.250E-02	+	2.535E-01	3.23E+02	4.08E+01 G
			1274.54	1.481E-01	&(	8.869E-01	1.63E+02	3.52E+01 G
			723.36	-2.847E-01	+	1.515E+00	1.52E+02	2.02E+01 G
			1004.77	1.526E-01	?(	1.864E+00	3.32E+02	1.80E+01 G
			996.33	0.000E+00	-	3.720E+00	1.00E+03	1.06E+01 G
EU-155	I	1.6075E-01					1.81E+03	
			105.31	1.607E-01	(	4.289E-01	7.97E+01	2.12E+01 G
			86.54	-1.075E-02	%	4.102E-01	1.10E+03	3.07E+01 G
HF-181	F	2.9898E-02					4.24E+01	
			482.00	4.051E-02	(	2.372E-01	1.65E+02	8.05E+01 G
			133.02	1.016E-02	&(	2.452E-01	6.87E+02	4.33E+01 G
			345.83	1.457E-02	&	7.850E-01	1.42E+03	1.51E+01 G
			136.30	-7.425E-03	%	1.988E+00	7.61E+03	5.85E+00 G
Ta-182	F	4.3927E-01					1.14E+02	
			1121.30	4.443E-01	?(	1.007E+00	6.83E+01	3.49E+01 G
			1221.41	4.328E-01	?(	1.383E+00	9.28E+01	2.70E+01 G
			1189.05	0.000E+00	-	8.481E-01	1.00E+03	1.62E+01 G
Hg-203	F	-2.4269E-02					4.66E+01	
			279.20	-2.427E-02	?(	1.872E-01	2.20E+02	8.15E+01 G
TL-208	N	6.3884E-01					6.98E+02	
			583.02	6.388E-01	(	2.169E-01	1.95E+01	8.45E+01 G
			277.28	-5.690E-01	-	2.764E+00	1.41E+02	6.31E+00 G
			860.56	1.422E-01	-	2.733E+00	5.27E+02	1.24E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
pm-146	C	-6.0968E-02					2.02E+03	
			747.16	-2.441E-01	?(	9.062E-01	1.08E+02	3.40E+01 G
			735.72	2.158E-01	(	1.208E+00	1.58E+02	2.25E+01 G
			453.88	-1.176E-02	+	3.253E-01	7.64E+02	6.50E+01 G
y-88	F	-2.6647E-02					1.07E+02	
			898.04	-2.665E-02	?(	3.326E-01	3.40E+02	9.37E+01 G
			1836.06	0.000E+00	+	9.742E-01	1.00E+03	9.92E+01 G
Cd-109	F	1.4536E-01					4.53E+02	
			88.04	1.454E-01	?(	3.452E+00	6.89E+02	3.79E+00 G
Ra-226	N	3.1969E+00					5.84E+05	
			185.99	3.197E+00	(P	5.005E+00	2.50E+01	3.28E+00 G
PB-210	N	1.9681E+00					8.14E+03	
			46.54	1.968E+00	*(P	3.241E+00	1.85E+01	4.25E+00 G
PB-212	N	1.0661E+00					6.98E+02	
			238.63	1.066E+00	(P	4.045E-01	1.20E+01	4.33E+01 G
			300.03	-1.432E-01	% P	3.315E+00	2.52E+02	3.28E+00 GA
PB-214	N	1.1155E+00					5.84E+05	
			351.93	1.014E+00	(P	5.193E-01	1.61E+01	3.76E+01 G
			295.09	1.313E+00	(P	9.636E-01	2.54E+01	1.93E+01 G
			242.00	5.771E-01	- P	2.449E+00	1.13E+02	7.43E+00 GA
BI-212	N	7.1586E-01					6.98E+02	
			727.17	7.159E-01	&(	3.793E+00	1.50E+02	7.55E+00 G
			785.42	3.485E+00	&	2.432E+01	1.96E+02	1.28E+00 GA
BI-214	N	1.1492E+00					5.84E+05	
			609.31	1.149E+00	(P	6.433E-01	1.99E+01	4.61E+01 G
			1120.29	2.433E-01	-	2.458E+00	2.76E+02	1.51E+01 G
			1764.49	-1.265E-01	- P	3.648E+00	5.51E+01	1.54E+01 G
BI-210M	T	4.2089E-02					1.10E+09	
			265.83	-4.127E-02	?(	3.319E-01	2.30E+02	5.00E+01 G
			304.90	1.909E-01	(	5.235E-01	8.14E+01	2.80E+01 G
RA-224	N	-4.7013E+00					6.98E+02	
			240.99	-4.701E+00	&(	6.917E+00	4.53E+01	4.10E+00 G
AC-228	N	1.6893E+00					2.10E+03	
			911.16	1.088E+00	?(	1.042E+00	3.32E+01	2.90E+01 G
			968.97	2.287E+00	(	9.482E-01	2.37E+01	1.75E+01 G
			338.32	2.274E+00	*(	1.114E+00	2.39E+01	1.20E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			93.35	1.121E+00		2.562E+00	6.91E+01	5.56E+00 XA
TH-227	N	2.8583E-01					7.95E+03	
			235.97	2.858E-01	&(	1.340E+00	1.37E+02	1.23E+01 G
			50.14	-3.069E-02	%	1.165E+00	1.08E+03	8.00E+00 G
			256.24	-5.247E-03	%	2.512E+00	1.35E+04	7.00E+00 G
TH-229	N	2.6110E-01					2.68E+06	
			193.51	-3.612E-02	&(	3.022E+00	2.36E+03	4.40E+00 G
			210.85	6.985E-01	?(	4.778E+00	1.97E+02	2.99E+00 G
TH-234	N	2.2281E+00					1.63E+12	
			63.29	2.228E+00	@(P	3.355E+00	2.22E+01	3.81E+00 G
			92.59	4.416E-01	- P	2.625E+00	1.96E+01	5.58E+00 G
PA-231	N	-1.4158E-01					1.20E+07	
			302.65	-6.600E-01	?(	5.342E+00	2.29E+02	2.88E+00 G
			300.07	4.654E-01	?(	4.021E+00	2.35E+02	2.46E+00 G
PA-233	C	-4.1456E-02					7.82E+08	
			312.01	-4.146E-02	&(	5.044E-01	3.45E+02	3.60E+01 G
			300.18	-5.844E-01	+	2.400E+00	1.19E+02	6.20E+00 G
PA-234	N	-1.1395E-01					1.63E+12	
			131.29	-1.140E-01	?(	6.712E-01	1.72E+02	1.80E+01 G
			946.02	-4.659E-01	+	2.638E+00	1.60E+02	1.34E+01 G
			569.47	-2.071E-01	+	2.929E+00	3.91E+02	8.20E+00 G
			883.24	-2.088E-01	+	3.382E+00	4.42E+02	9.60E+00 G
			880.53	1.434E+00	?	4.679E+00	9.46E+01	6.00E+00 GA
PA-234M	N	6.7658E-01					1.63E+12	
			1001.00	6.766E-01	%(	4.150E+01	1.64E+03	8.37E-01 G
			766.41	1.483E+00	%	9.038E+01	1.63E+03	2.94E-01 G
U-235	N	3.4417E-01					2.57E+11	
			143.79	-7.681E-02	?(	1.041E+00	3.88E+02	1.10E+01 G
			205.33	6.442E-01	&(	2.970E+00	1.35E+02	5.01E+00 G
			163.38	9.565E-01	?(	1.772E+00	5.69E+01	5.08E+00 G
AM-241	T	7.4662E-02					1.58E+05	
			59.54	7.466E-02	&(	2.736E-01	1.08E+02	3.59E+01 G
Ir-192	F	7.1033E-02					7.40E+01	
			316.49	4.975E-02	&(	2.231E-01	1.31E+02	8.70E+01 G
			468.06	2.928E-03	%	3.993E-01	3.72E+03	5.18E+01 G
			308.44	1.732E-01	?(	3.904E-01	6.80E+01	3.18E+01 G
			295.95	2.491E-02	?(	5.853E-01	6.62E+02	3.02E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Np-237	F -2.9889E-01					2.14E+06	
		86.49	-2.989E-01	?(	1.023E+00	1.02E+02	1.31E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
AM-241	59.61	74.	12.	0.002	108.21	7.466E-02
Np-237	86.19	141.	-17.	-0.002	101.92	-2.989E-01
Cd-109	88.04	133.	2.	0.000	689.22	1.454E-01
Gd-153	98.56	52.	10.	0.001	108.02	7.808E-02
Gd-153	103.17	82.	-7.	-0.001	191.95	-7.517E-02
EU-155	105.35	56.	14.	0.002	79.72	1.607E-01
EU-152	119.66	30.	3.	0.000	290.83	2.434E-02
CO-57	121.43	47.	8.	0.001	130.52	2.325E-02
EU-154	123.27	64.	4.	0.000	323.09	2.250E-02
PA-234	131.36	84.	-8.	-0.001	171.91	-1.140E-01
HF-181	132.16	63.	2.	0.000	686.63	1.016E-02
CE-144	134.13	73.	8.	0.001	158.02	1.896E-01

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-57	137.52	88.	-10.	-0.001	141.93	-2.434E-01	
CE-141	144.53	46.	9.	0.001	105.95	5.529E-02	
Ba-140	162.89	42.	15.	0.002	66.76	7.233E-01	
CE-139	166.71	41.	8.	0.001	115.51	3.184E-02	
TH-229	210.11	56.	5.	0.001	197.28	6.985E-01	
TH-227	235.24	61.	8.	0.001	136.83	2.858E-01	
RA-224	239.84	185.	-45.	-0.006	45.34	-4.701E+00	
EU-152	244.91	51.	5.	0.001	202.64	2.940E-01	
BI-210M	265.94	49.	-4.	-0.001	230.39	-4.127E-02	
Hg-203	280.85	37.	-4.	-0.001	219.51	-2.427E-02	
Ir-192	295.95	46.	1.	0.000	661.90	2.491E-02	
PA-231	302.95	12.	2.	0.000	234.66	4.654E-01	
PA-233	298.02	31.	-7.	-0.001	119.01	-5.844E-01	
PA-231	302.42	33.	-4.	-0.001	229.00	-6.600E-01	
BA-133	300.96	22.	-3.	0.000	199.53	-9.963E-02	
Ba-140	304.61	31.	10.	0.001	89.20	1.175E+00	
BI-210M	304.63	29.	10.	0.001	81.39	1.909E-01	
Ir-192	306.34	19.	10.	0.001	67.98	1.732E-01	
PA-233	311.57	44.	-3.	0.000	344.75	-4.146E-02	
Ir-192	316.10	50.	8.	0.001	130.64	4.975E-02	
CR-51	320.68	49.	4.	0.001	267.48	2.097E-01	
La-140	329.48	37.	13.	0.002	73.23	3.566E-01	
EU-152	343.98	33.	-4.	-0.001	200.32	-9.299E-02	
BA-133	355.82	28.	3.	0.000	253.19	2.987E-02	
I-131	364.15	28.	3.	0.000	269.93	2.178E-02	
BA-133	384.71	32.	-4.	-0.001	221.96	-2.721E-01	
SN-113	391.70	31.	10.	0.001	85.52	1.027E-01	
AG-108M	435.21	33.	-3.	0.000	303.04	-2.209E-02	
pm-146	453.49	29.	-1.	0.000	764.17	-1.176E-02	
SB-125	462.74	23.	6.	0.001	116.45	4.569E-01	
PM-144	477.27	29.	5.	0.001	171.09	8.726E-02	
BE-7	477.16	28.	4.	0.001	181.91	3.229E-01	
HF-181	481.28	21.	4.	0.001	165.12	4.051E-02	
La-140	486.66	33.	-4.	-0.001	210.60	-7.016E-02	
RU-103	498.18	17.	-2.	0.000	308.26	-1.775E-02	
RH-106	511.01	67.	80.	0.011	18.23	3.405E+00	
PA-234	571.24	24.	-2.	0.000	391.01	-2.071E-01	
SB-125	600.91	39.	-5.	-0.001	200.83	-2.501E-01	
SB-124	606.17	22.	-2.	0.000	359.12	-1.901E-02	
CS-134	603.11	30.	1.	0.000	807.75	9.754E-03	
RU-103	609.04	29.	40.	0.006	24.78	6.955E+00	
AG-108M	613.69	36.	-1.	0.000	680.59	-1.398E-02	
PM-144	618.35	29.	-3.	0.000	299.22	-2.651E-02	
RH-106	622.41	22.	-1.	0.000	883.55	-7.751E-02	
SB-125	632.98	18.	-1.	0.000	456.19	-1.233E-01	
AG-110M	658.06	27.	-3.	0.000	262.64	-3.231E-02	
SB-124	723.50	24.	-4.	-0.001	162.14	-4.840E-01	
AG-108M	723.52	25.	-5.	-0.001	152.85	-6.275E-02	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
EU-154	723.74	26.	-5.	-0.001	151.66	-2.847E-01		
ZR-95	723.65	27.	-5.	-0.001	142.60	-1.421E-01		
BI-212	727.58	22.	5.	0.001	150.36	7.159E-01		
pm-146	734.98	19.	4.	0.001	157.69	2.158E-01		
pm-146	748.68	24.	-7.	-0.001	107.68	-2.441E-01		
AG-110M	763.69	18.	-2.	0.000	293.62	-1.168E-01		
EU-152	779.15	18.	1.	0.000	990.06	5.964E-02		
BI-212	786.52	22.	4.	0.000	195.87	3.485E+00		
CS-134	795.30	22.	-1.	0.000	566.06	-1.777E-02		
CS-134	800.36	19.	-1.	0.000	960.27	-9.553E-02		
CO-58	811.11	22.	7.	0.001	105.82	8.849E-02		
La-140	815.08	25.	-3.	0.000	218.04	-1.868E-01		
MN-54	833.79	18.	3.	0.000	223.26	3.682E-02		
Co-56	847.99	11.	4.	0.001	132.47	5.175E-02		
NB-94	872.80	22.	-4.	-0.001	174.92	-5.549E-02		
EU-154	872.63	20.	-2.	0.000	301.36	-2.440E-01		
PA-234	880.44	14.	6.	0.001	94.64	1.434E+00		
PA-234	884.17	19.	-1.	0.000	441.80	-2.088E-01		
AG-110M	883.74	20.	-2.	0.000	280.54	-4.471E-02		
Sc-46	888.01	18.	-3.	0.000	186.62	-4.751E-02		
y-88	897.46	17.	-2.	0.000	340.23	-2.665E-02		
PA-234	945.50	20.	-4.	-0.001	159.80	-4.659E-01		
EU-154	1005.92	16.	2.	0.000	332.07	1.526E-01		
Co-56	1038.48	15.	4.	0.001	156.81	4.230E-01		
BI-207	1062.55	23.	-3.	0.000	214.23	-7.311E-02		
FE-59	1100.29	16.	3.	0.000	207.49	8.811E-02		
EU-152	1112.58	13.	-1.	0.000	406.39	-1.658E-01		
ZN-65	1114.88	16.	-2.	0.000	246.80	-8.295E-02		
Sc-46	1121.24	13.	9.	0.001	65.88	1.580E-01		
Ta-182	1121.28	14.	9.	0.001	68.33	4.443E-01		
CO-60	1172.76	23.	-3.	0.000	245.25	-5.217E-02		
Ta-182	1220.94	13.	6.	0.001	92.82	4.328E-01		
NA-22	1274.05	8.	3.	0.000	162.09	5.228E-02		
EU-154	1274.04	8.	3.	0.000	162.51	1.481E-01		
CO-60	1334.36	6.	2.	0.000	189.03	4.085E-02		
EU-152	1407.06	11.	-1.	0.000	737.80	-6.850E-02		
K-40	1460.70	22.	42.	0.006	15.51	8.915E+00	P	
La-140	1596.73	7.	-2.	0.000	211.07	-4.751E-02		
SB-124	1690.90	14.	-4.	-0.001	153.28	-2.007E-01		
Co-56	1770.26	13.	-2.	0.000	333.06	-2.809E-01		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

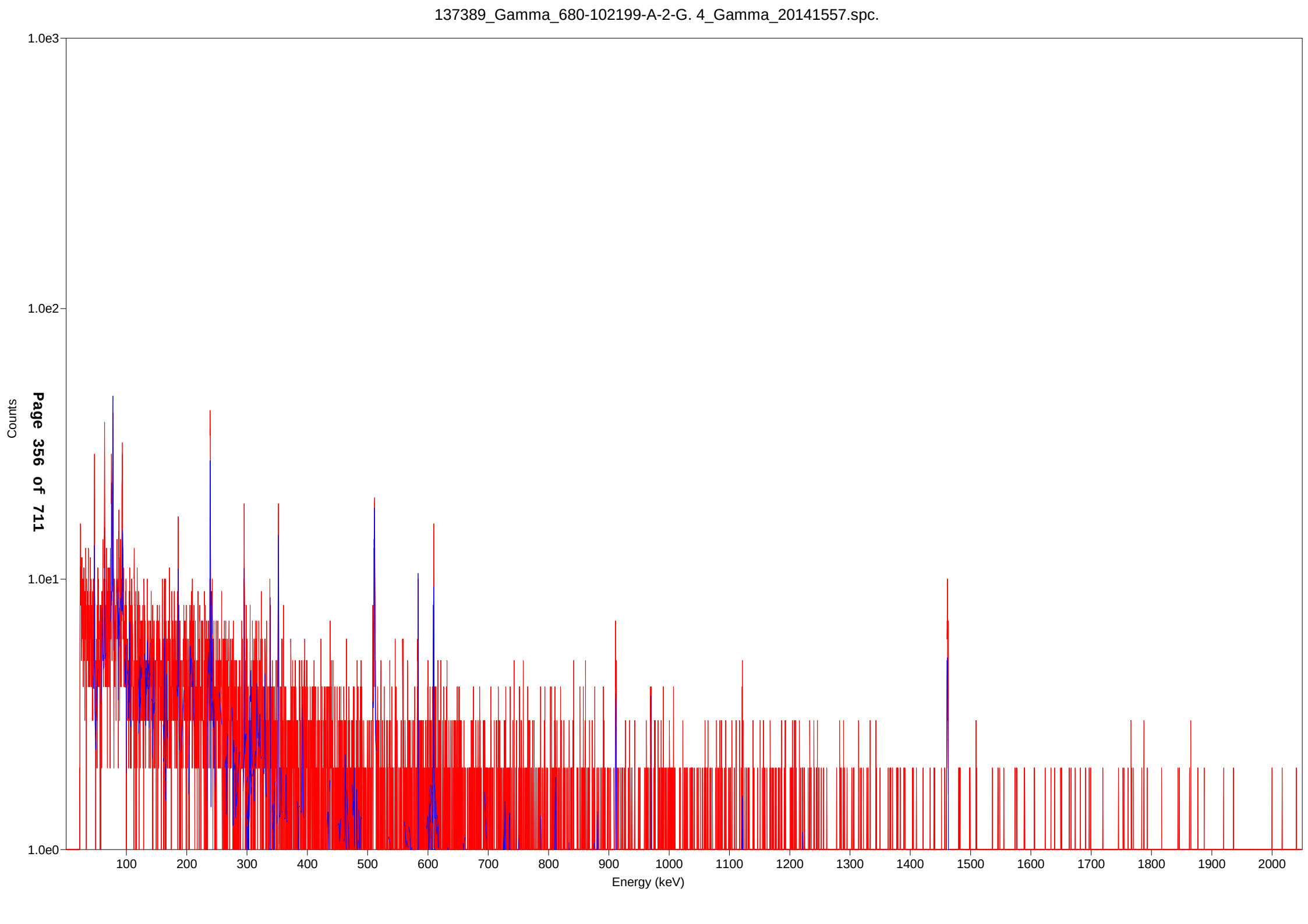
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	3.2291E-01	3.2291E-01	1.819E+02%	2.07E+00
NA-22	#A	5.2282E-02	5.2282E-02	1.621E+02%	3.12E-01
K-40	#	8.9150E+00	8.9150E+00	2.041E+01%	5.25E+00
Sc-46	#A	5.5269E-02	5.5269E-02	6.588E+01%	3.18E-01
CR-51	#A	2.0971E-01	2.0971E-01	2.675E+02%	1.96E+00
MN-54	#A	3.6818E-02	3.6818E-02	2.233E+02%	2.97E-01
FE-59	#A	8.8108E-02	8.8109E-02	2.075E+02%	6.61E-01
Co-56	#A	9.7732E-02	9.7732E-02	1.026E+02%	2.45E-01
CO-57	#A	2.3253E-02	2.3253E-02	1.305E+02%	1.04E-01
CO-58	#A	8.8489E-02	8.8489E-02	1.058E+02%	3.23E-01
CO-60	#A	4.0846E-02	4.0846E-02	1.890E+02%	2.92E-01
ZN-65	#A	-8.2948E-02	-8.2948E-02	2.468E+02%	7.45E-01
NB-94	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.45E-01
ZR-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.42E-01
NB-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.43E-01
RU-103	#A	-1.7745E-02	-1.7745E-02	3.083E+02%	2.00E-01
RH-106	#A	-7.7506E-02	-7.7506E-02	8.835E+02%	2.51E+00
AG-108M	#A	-2.2091E-02	-2.2091E-02	3.030E+02%	2.38E-01
AG-110M	#A	-4.4711E-02	-4.4711E-02	2.805E+02%	4.54E-01
SN-113	#A	1.0273E-01	1.0273E-01	8.552E+01%	2.97E-01
SB-124	#A	-1.9005E-02	-1.9006E-02	3.591E+02%	2.47E-01
SB-125	#A	1.1937E-01	1.1937E-01	1.165E+02%	7.05E-01
I-131	#A	2.1782E-02	2.1783E-02	2.699E+02%	2.10E-01
Gd-153	#A	7.8080E-02	7.8080E-02	1.080E+02%	2.87E-01
Ga-68	#A	-3.0978E-01	-3.1127E-01	1.741E+03%	2.02E+01
Tc-99m	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.62E-01
BA-133	#A	2.9874E-02	2.9874E-02	2.532E+02%	2.69E-01
CS-134	#A	9.7540E-03	9.7540E-03	8.078E+02%	2.85E-01
CS-137	#A	4.4670E-04	4.4670E-04	1.784E+04%	2.97E-01
CE-139	#A	3.1835E-02	3.1835E-02	1.155E+02%	1.26E-01
Ba-140	#A	2.6372E-01	2.6373E-01	6.676E+01%	9.63E-01
La-140	#A	2.3403E-02	2.3403E-02	7.323E+01%	3.80E-01
CE-141	#A	5.5288E-02	5.5289E-02	1.059E+02%	2.00E-01
CE-144	#A	1.8958E-01	1.8958E-01	1.580E+02%	1.03E+00
PM-144	#A	2.7753E-02	2.7753E-02	1.711E+02%	3.06E-01
EU-152	#A	1.1407E-02	1.1407E-02	2.003E+02%	6.56E-01
EU-154	#A	7.5862E-02	7.5862E-02	1.590E+02%	2.67E+00
EU-155	#A	1.6075E-01	1.6075E-01	7.972E+01%	4.29E-01
HF-181	#A	2.9898E-02	2.9898E-02	1.651E+02%	2.37E-01
Ta-182	#A	4.3927E-01	4.3927E-01	5.763E+01%	1.01E+00
Hg-203	#A	-2.4269E-02	-2.4269E-02	2.195E+02%	1.87E-01
TL-208		6.3884E-01	6.3884E-01	1.948E+01%	2.17E-01
pm-146	#A	-6.0968E-02	-6.0968E-02	9.547E+01%	9.06E-01

y-88	#A	-2.6647E-02	-2.6647E-02	3.402E+02%	3.33E-01
Cd-109	#A	1.4536E-01	1.4536E-01	6.892E+02%	3.45E+00
Ra-226	A	3.1969E+00	3.1969E+00	5.599E+01%	5.00E+00
PB-210	#A	1.9681E+00	1.9681E+00	5.598E+01%	3.24E+00
PB-212		1.0661E+00	1.0661E+00	1.487E+01%	4.05E-01
PB-214		1.1155E+00	1.1155E+00	1.861E+01%	5.19E-01
BI-207	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.74E-01
BI-212	#A	7.1586E-01	7.1586E-01	1.504E+02%	3.79E+00
BI-214		1.1492E+00	1.1492E+00	2.433E+01%	6.43E-01
BI-210M	#A	4.2089E-02	4.2089E-02	8.139E+01%	3.32E-01
RA-224	#A	-4.7013E+00	-4.7013E+00	4.534E+01%	6.92E+00
AC-228		1.6893E+00	1.6893E+00	1.575E+01%	1.04E+00
TH-227	#A	2.8583E-01	2.8583E-01	1.368E+02%	1.34E+00
TH-229	#A	2.6110E-01	2.6110E-01	1.973E+02%	3.02E+00
TH-234	A	2.2281E+00	2.2281E+00	5.250E+01%	3.35E+00
PA-231	#A	-1.4158E-01	-1.4158E-01	1.639E+02%	5.34E+00
PA-233	#A	-4.1456E-02	-4.1456E-02	3.447E+02%	5.04E-01
PA-234	#A	-1.1395E-01	-1.1395E-01	1.719E+02%	6.71E-01
PA-234M	#A	6.7658E-01	6.7658E-01	1.640E+03%	4.15E+01
U-235	#A	3.4417E-01	3.4417E-01	5.688E+01%	1.04E+00
AM-241	#A	7.4662E-02	7.4662E-02	1.082E+02%	2.74E-01
Ir-192	#A	7.1033E-02	7.1033E-02	6.798E+01%	2.23E-01
Np-237	#A	-2.9889E-01	-2.9889E-01	1.019E+02%	1.02E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (143.7 to 1999.4 keV) 1.305E+01 Bq/Sample
Total Decayed Activity (143.7 to 1999.4 keV) 1.3052130E+01 Bq/Sample


137389_Gamma_680-102199-A-2-G. 4_Gamma_20141557.spc.
1.0e3
1.0e2
1.0e1
1.0e0
Counts
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)

Test America St. Louis Spectrum ID: 7_Gamma_20142051

Sample Description: 137389_Gamma_680-102199-A-3-G
Detector: Ge 7 SN/154
Batch ID: 137389
Work Order Number: Gamma
Lot Number: 680-102199-A-3-G

Decay to Time: 9/10/2014 20:44 Live Time: 7200 sec
Acquisition Time: 9/10/2014 20:45:13 Real Time: 7316 sec
Analysis Time: 9/10/2014 22:47 Dead Time: 1.59 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 7_Soil_25mL.Clb
Efficiency Cal Desc: Ge7_25mLSolidCal_90099_030712
Efficiency Cal Date: 3/9/2012 13:29
Energy Cal Date: 2/23/2012 08:40
Library: Client_ Long_no ingrowth Rev3.li
Bkgd Correction File: 7_2014-09-06_0610.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	1.980E-01	131.4	2.601E-01	2.603E-01	9.068E-01
NA-22	-1.431E-05	408300.0	5.841E-02	5.841E-02	2.188E-01
K-40	1.414E+01	9.1	1.291E+00	1.480E+00	2.300E+00
Sc-46	3.349E-02	100.8	3.374E-02	3.379E-02	1.280E-01
CR-51	1.144E-01	223.1	2.553E-01	2.554E-01	8.914E-01
MN-54	5.583E-02	78.5	4.384E-02	4.393E-02	1.476E-01
FE-59	-3.523E-04	27450.0	9.669E-02	9.669E-02	3.585E-01
Co-56	1.248E-02	195.8	2.444E-02	2.445E-02	1.697E-01
CO-57	-2.082E-02	96.6	2.011E-02	2.014E-02	6.762E-02
CO-58	9.931E-03	448.0	4.449E-02	4.450E-02	1.610E-01
CO-60	2.504E-02	144.7	3.622E-02	3.625E-02	2.103E-01
ZN-65	5.060E-03	2465.0	1.247E-01	1.247E-01	4.552E-01
NB-94	-1.638E-02	255.4	4.182E-02	4.183E-02	1.490E-01
ZR-95	4.533E-03	439.1	1.990E-02	1.990E-02	2.847E-01
NB-95	0.000E+00	1000.0	8.206E-03	8.206E-03	1.994E-01
RU-103	4.323E-02	85.2	3.684E-02	3.691E-02	1.244E-01
RH-106	1.169E-01	352.6	4.121E-01	4.122E-01	1.683E+00
AG-108M	3.629E-02	84.1	3.051E-02	3.057E-02	1.030E-01
AG-110M	2.126E-02	119.3	2.535E-02	2.538E-02	3.317E-01
SN-113	-1.422E-02	306.0	4.352E-02	4.352E-02	1.537E-01
SB-124	2.476E-02	169.5	4.197E-02	4.199E-02	1.352E-01
SB-125	4.340E-02	117.4	5.094E-02	5.099E-02	3.431E-01
I-131	1.496E-02	114.7	1.717E-02	1.718E-02	1.062E-01
Gd-153	-4.424E-03	1091.0	4.828E-02	4.828E-02	1.686E-01
Ga-68	-8.823E-01	371.2	3.275E+00	3.276E+00	1.178E+01
Tc-99m	9.052E-03	215.9	1.955E-02	1.956E-02	6.755E-02
BA-133	-8.475E-03	613.7	5.201E-02	5.201E-02	1.824E-01
CS-134	2.566E-02	170.6	4.378E-02	4.380E-02	3.349E-01
CS-137	6.603E-04	6750.0	4.457E-02	4.457E-02	1.627E-01
CE-139	3.900E-02	61.4	2.392E-02	2.421E-02	7.872E-02
Ba-140	1.247E-01	67.5	8.423E-02	8.448E-02	4.531E-01
La-140	1.754E-02	81.4	1.428E-02	1.431E-02	2.669E-01
CE-141	-1.417E-02	267.4	3.789E-02	3.789E-02	1.305E-01
CE-144	-8.406E-03	1325.0	1.114E-01	1.114E-01	3.961E-01
PM-144	-1.102E-03	4153.0	4.578E-02	4.578E-02	1.651E-01
EU-152	5.122E-02	173.6	8.890E-02	8.894E-02	3.753E-01
EU-154	7.811E-03	4089.0	3.194E-01	3.194E-01	1.196E+00
EU-155	1.183E-01	62.7	7.414E-02	7.443E-02	2.443E-01
HF-181	1.164E-02	283.5	3.298E-02	3.299E-02	1.235E-01
Ta-182	0.000E+00	1000.0	1.241E-01	1.241E-01	7.561E-01
Hg-203	1.893E-02	121.0	2.291E-02	2.293E-02	7.910E-02
TL-208	5.306E-01	13.8	7.311E-02	7.844E-02	1.264E-01
pm-146	4.101E-02	315.4	1.294E-01	1.294E-01	4.625E-01

y-88	9.829E-03	513.7	5.049E-02	5.049E-02	1.836E-01
Cd-109	8.819E-01	70.0	6.174E-01	6.194E-01	2.044E+00
Ra-226	2.723E+00	36.0	9.807E-01	1.009E+00	2.645E+00
PB-210	7.867E-01	82.4	6.481E-01	6.497E-01	1.984E+00
PB-212	8.894E-01	10.8	9.623E-02	1.121E-01	2.509E-01
PB-214	1.039E+00	10.9	1.133E-01	1.255E-01	2.574E-01
BI-207	3.764E-02	94.8	3.566E-02	3.572E-02	1.491E-01
BI-212	2.454E+00	21.7	5.317E-01	5.467E-01	9.818E-01
BI-214	9.723E-01	14.8	1.443E-01	1.529E-01	3.013E-01
BI-210M	2.115E-02	67.5	1.428E-02	1.434E-02	1.711E-01
RA-224	1.320E+00	66.4	8.765E-01	8.805E-01	2.897E+00
AC-228	1.451E+00	14.5	2.110E-01	2.236E-01	3.772E-01
TH-227	-9.449E-02	348.3	3.291E-01	3.292E-01	1.120E+00
TH-229	-1.314E-01	396.4	5.209E-01	5.210E-01	1.801E+00
TH-234	1.276E+00	48.9	6.236E-01	6.271E-01	1.963E+00
PA-231	-1.374E+00	84.3	1.158E+00	1.160E+00	3.874E+00
PA-233	6.296E-02	61.0	3.841E-02	3.856E-02	2.973E-01
PA-234	1.440E-01	117.4	1.690E-01	1.692E-01	3.159E-01
PA-234M	4.153E-01	679.3	2.821E+00	2.821E+00	2.343E+01
U-235	2.272E-01	60.6	1.376E-01	1.381E-01	4.522E-01
AM-241	-3.078E-02	185.2	5.702E-02	5.704E-02	1.938E-01
Ir-192	1.068E-01	17.8	1.898E-02	2.000E-02	1.310E-01
Np-237	3.071E-01	52.3	1.607E-01	1.616E-01	5.250E-01
Total	3.102E+01				

Analyst: Siobhan Perry

TestAmerica Spectrum name: 7_Gamma_20142051.An1

Sample description
137389_Gamma_680-102199-A-3-G

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20142051.An1

Acquisition information
Start time: 9/10/2014 8:45:13 PM
Live time: 7200
Real time: 7316
Dead time: 1.59 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Soil_25mL.Clb
Ge7_25mLSolidCal_90099_030712

Energy Calibration
Created: 2/23/2012 8:40:56 AM
Zero offset: 0.117 keV
Gain: 0.250 keV/channel
Quadratic: 3.508E-09 keV/channel^2

Efficiency Calibration
Created: 3/9/2012 1:29:42 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.53 %
Log(Eff): 7.199650E-01 + (-3.527641E-01*Log(E)) + (-4.778753E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.27 %
Log(Eff): -1.235982E+01 + (4.659795E+00*Log(E)) + (-5.277660E-01*Log(E)^2)

Library Files
Main analysis library: Client_ Long_no ingrowth Rev3.li
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (2000.12keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/10/2014 8:44:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2014-09-06_0610.PBC 9/6/2014 6:10:25 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 24 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 0.1702

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.39	25.	23.66	0.77	1.056E-01	46.54	4.250	PBC<MDA	PB210
63.35	42.	16.34	1.51	1.210E-01	63.29	3.810	PBC<MDA	TH234
77.30	125.	22.98	0.50	1.254E-01				
87.87	36.	52.32	0.88	1.255E-01	86.49	13.100	PBC<MDA	Np237
					88.04	3.790	1.062E+00	Cd109
87.90	30.	70.01	0.88	1.254E-01	86.49	13.100	PBC<MDA	Np237
					88.04	3.790	8.819E-01	Cd109
88.58	8.	223.34	0.88	1.255E-01				
92.76	132.	20.56	0.62	1.248E-01	92.59	5.584	PBC<MDA	TH234
93.36	23.	93.52	0.89	1.247E-01	93.35	5.561	PBC<MDA	AC228
105.24	22.	62.66	0.90	1.218E-01	105.31	21.200	PBC<MDA	EU155
131.97	12.	117.38	0.93	1.122E-01				
139.22	6.	215.95	0.94	1.083E-01	140.51	89.300	PBC<MDA	Tc99m
142.71	19.	60.60	0.94	1.069E-01	143.79	10.960	PBC<MDA	U235
161.00	8.	142.38	0.96	9.866E-02	162.66	6.220	PBC<MDA	Ba140
165.40	22.	61.35	0.96	9.716E-02	165.85	79.900	PBC<MDA	CE139
185.65	105.	19.45	0.90	8.831E-02	185.99	3.280	2.723E+00	Ra226
205.23	2.	784.57	1.01	8.101E-02	205.33	5.010	PBC<MDA	U235
238.76	197.	10.67	1.04	7.107E-02	238.63	43.300	8.896E-01	PB212
241.11	27.	66.41	1.04	7.048E-02	240.99	4.100	PBC<MDA	RA224
241.96	51.	23.92	1.04	7.024E-02	242.00	7.430	1.366E+00	PB214
277.14	22.	44.64	1.08	6.226E-02	277.28	6.310	PBC<MDA	TL208
279.06	7.	121.03	1.08	6.188E-02	279.20	81.460	PBC<MDA	Hg203
284.11	10.	114.74	1.09	6.089E-02	284.30	6.140	PBC<MDA	I131

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
295.30	103.	16.59	1.53	5.890E-02	295.09	19.300	1.259E+00	PB214
					295.95	30.160	8.075E-01	Ir192
					295.95	30.160	8.075E-01	Ir192
295.34	76.	17.78	1.10	5.874E-02	295.09	19.300	9.321E-01	PB214
					295.95	30.160	5.980E-01	Ir192
300.03	19.	61.00	1.10	5.800E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.831E+00	PA231
					300.18	6.200	7.267E-01	PA233
300.04	19.	61.08	1.10	5.802E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.829E+00	PA231
					300.18	6.200	7.259E-01	PA233
300.04	19.	61.16	1.10	5.802E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	1.827E+00	PA231
					300.18	6.200	7.249E-01	PA233
304.71	13.	67.53	1.11	5.720E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	1.156E-01	BI210M
304.71	13.	67.54	1.11	5.719E-02	304.85	4.290	7.547E-01	Ba140
					304.90	28.000	1.156E-01	BI210M
320.38	4.	223.15	1.13	5.474E-02	320.08	9.940	PBC<MDA	CR51
328.55	13.	81.40	1.13	5.343E-02	328.76	20.300	PBC<MDA	La140
338.55	76.	23.39	0.61	5.206E-02	338.32	12.010	1.688E+00	AC228
345.85	4.	283.47	1.15	5.103E-02	345.83	15.070	PBC<MDA	HF181
352.07	126.	14.15	1.35	5.022E-02	351.93	37.600	9.268E-01	PB214
433.58	10.	84.06	1.24	4.139E-02	433.94	90.480	PBC<MDA	AG108M
463.18	4.	227.97	1.27	3.892E-02	463.37	10.470	PBC<MDA	SB125
477.10	6.	131.36	1.28	3.783E-02	476.81	42.000	PBC<MDA	PM144
					477.60	10.520	1.980E-01	BE7
					476.81	42.000	4.953E-02	PM144
497.35	10.	85.22	1.30	3.643E-02	497.05	90.900	PBC<MDA	RU103
					497.05	90.900	4.323E-02	RU103
510.72	97.	15.54	1.31	3.543E-02	511.86	20.000	1.894E+00	RH106
					511.86	20.000	1.894E+00	RH106
569.87	2.	465.42	1.37	3.200E-02	569.47	8.200	PBC<MDA	PA234
571.26	4.	263.93	1.37	3.199E-02	569.70	97.740	PBC<MDA	BI207
583.07	101.	13.84	1.62	3.129E-02	583.02	84.500	5.306E-01	TL208
601.32	5.	158.88	1.40	3.041E-02	600.50	17.860	PBC<MDA	SB125
602.09	5.	169.50	1.40	3.030E-02	602.73	98.260	PBC<MDA	SB124
609.39	97.	12.63	1.42	2.999E-02	609.31	46.090	9.723E-01	BI214
					610.30	5.750	7.806E+00	RU103
					610.30	5.750	7.806E+00	RU103
609.53	77.	15.83	1.41	2.994E-02	609.31	46.090	PBC<MDA	BI214
					610.30	5.750	6.208E+00	RU103
657.61	7.	119.26	1.45	2.784E-02	657.76	94.640	PBC<MDA	AG110M
722.35	2.	439.12	1.51	2.534E-02	722.94	90.840	PBC<MDA	AG108M
					724.20	44.150	1.885E-02	ZR95
					723.36	20.220	4.111E-02	EU154
727.79	34.	21.67	0.64	2.524E-02	727.17	7.550	2.454E+00	BI212
747.55	2.	315.40	1.53	2.458E-02	747.16	34.000	PBC<MDA	pm146
766.24	1.	919.82	1.55	2.397E-02	763.94	22.280	PBC<MDA	AG110M
					765.79	99.790	4.703E-03	NB95
					766.41	0.294	1.598E+00	PA234M
785.88	5.	156.10	1.57	2.339E-02	785.42	1.280	PBC<MDA	BI212
795.11	5.	170.61	1.58	2.309E-02	795.87	85.530	PBC<MDA	CS134
801.90	4.	199.90	1.58	2.292E-02	801.95	8.690	PBC<MDA	CS134

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
810.57	2.	448.04	1.59	2.267E-02	810.78	99.460	PBC<MDA	CO58
835.53	9.	78.51	1.61	2.202E-02	834.85	99.980	PBC<MDA	MN54
862.46	1.	498.86	1.63	2.136E-02	860.56	12.420	PBC<MDA	TL208
884.34	5.	120.19	1.65	2.081E-02	883.24	9.600	PBC<MDA	PA234
					884.68	72.680	4.699E-02	AG110M
897.64	1.	513.68	1.66	2.047E-02	898.04	93.700	PBC<MDA	y88
911.29	57.	17.28	0.98	2.018E-02	911.16	29.000	1.353E+00	AC228
946.49	2.	330.72	1.70	1.943E-02	946.02	13.400	PBC<MDA	PA234
963.92	4.	214.47	1.72	1.906E-02	964.11	14.605	PBC<MDA	EU152
969.91	12.	70.33	1.72	1.896E-02	968.97	17.460	PBC<MDA	AC228
1036.59	1.	949.90	1.78	1.769E-02	1037.84	14.130	PBC<MDA	Co56
1048.06	2.	352.62	1.79	1.747E-02	1050.36	1.560	PBC<MDA	RH106
					1050.36	1.560	8.608E-01	RH106
1064.67	6.	94.75	1.80	1.725E-02	1063.66	74.500	PBC<MDA	BI207
1111.09	2.	433.03	1.84	1.649E-02	1112.07	13.644	PBC<MDA	EU152
1121.34	8.	100.76	1.85	1.636E-02	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.829E-01	Ta182
1172.43	4.	144.67	1.89	1.560E-02	1173.24	99.900	PBC<MDA	CO60
1237.63	4.	195.83	1.94	1.476E-02	1238.28	66.070	PBC<MDA	Co56
1332.45	1.	488.01	2.01	1.368E-02	1332.50	99.980	PBC<MDA	CO60
1405.91	1.	709.62	2.06	1.292E-02	1408.00	21.005	PBC<MDA	EU152
1460.80	135.	8.11	0.85	1.243E-02	1460.83	10.670	1.414E+01	K40
1691.60	1.	395.10	2.24	1.065E-02	1690.98	47.790	PBC<MDA	SB124
1764.53	6.	63.61	2.29	1.018E-02	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
308.78	77.30	221.	125.	9.971E+02	19.05	0.504	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_ Long_no ingrowth Rev3.li

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.12	46.39	174.	25.	0.004	23.66	0.769
TH-227	197.87	49.58	124.	-20.	-0.003	80.82	0.840s
AM-241	237.55	59.50	148.	-9.	-0.001	185.24	0.850s
TH-234	252.94	63.35	180.	42.	0.006	16.34	1.507s
BA-133	323.77	81.05	146.	-11.	-0.001	163.71	0.874s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Np-237	351.06	87.87	163.	36.	0.005	52.32	0.880s
EU-155	353.89	88.58	167.	8.	0.001	223.34	0.880s
Cd-109	351.17	87.90	208.	30.	0.004	70.01	0.881s
TH-234	369.93	92.59	263.	-25.	-0.004	21.84	0.886D
AC-228	372.97	93.35	211.	23.	0.003	93.52	0.887D
Gd-153	412.15	103.14	123.	-14.	-0.002	116.86	0.898s
EU-155	420.56	105.24	84.	22.	0.003	62.66	0.900s
EU-152	487.23	121.91	97.	-15.	-0.002	95.53	0.918s
CO-57	487.23	121.91	96.	-15.	-0.002	96.59	0.918s
EU-154	487.21	121.91	74.	-14.	-0.002	89.09	0.919s
PA-234	527.45	131.97	86.	12.	0.002	117.38	0.928s
Tc-99m	556.48	139.22	71.	6.	0.001	215.95	0.938s
U-235	570.42	142.71	58.	19.	0.003	60.60	0.941s
CE-141	579.74	145.04	95.	-5.	-0.001	267.43	0.943s
Ba-140	643.59	161.00	60.	8.	0.001	142.38	0.961s
U-235	654.01	163.60	110.	-11.	-0.001	140.46	0.962s
CE-139	661.19	165.40	78.	22.	0.003	61.35	0.965s
Ra-226	742.19	185.65	126.	57.	0.008	19.45	0.902s
TH-229	774.98	193.84	97.	-4.	0.000	396.39	0.994s
U-235	820.55	205.23	72.	2.	0.000	784.57	1.007s
TH-229	843.53	210.98	103.	-1.	0.000	971.71	1.012s
TH-227	950.56	237.73	216.	-6.	-0.001	348.34	1.039s
PB-212	954.15	238.63	129.	197.	0.027	10.82	1.041D
RA-224	963.57	240.99	153.	27.	0.004	66.41	1.044D
PB-214	967.61	242.00	63.	38.	0.005	33.86	1.045D
EU-152	980.62	245.25	76.	-6.	-0.001	221.18	1.048s
BI-210M	1066.37	266.68	63.	-7.	-0.001	156.69	1.069s
TL-208	1108.77	277.28	37.	22.	0.003	44.64	1.081D
Hg-203	1116.44	279.20	31.	7.	0.001	121.03	1.083D
I-131	1136.09	284.11	57.	10.	0.001	114.74	1.089s
PB-214	1180.85	295.30	42.	103.	0.014	16.59	1.528s
Ir-192	1181.01	295.34	54.	76.	0.011	17.78	1.100s
PB-212	1199.81	300.04	56.	19.	0.003	61.16	1.105
PA-231	1199.79	300.04	56.	19.	0.003	61.08	1.105s
PA-233	1199.76	300.03	56.	19.	0.003	61.00	1.105s
PA-231	1211.63	303.00	87.	-16.	-0.002	84.27	1.107s
BA-133	1211.63	303.00	86.	-16.	-0.002	85.58	1.108s
Ba-140	1218.50	304.71	34.	13.	0.002	67.53	1.110s
BI-210M	1218.50	304.71	34.	13.	0.002	67.54	1.110s
Ir-192	1232.61	308.24	51.	-3.	0.000	310.94	1.113s
PA-233	1248.99	312.33	75.	-7.	-0.001	168.75	1.117s
CR-51	1281.17	320.38	48.	4.	0.001	223.15	1.125s
La-140	1313.84	328.55	53.	13.	0.002	81.40	1.134s
AC-228	1353.84	338.55	48.	76.	0.011	23.39	0.611s
EU-152	1375.85	344.05	53.	-5.	-0.001	193.88	1.150s
HF-181	1383.06	345.85	48.	4.	0.000	283.47	1.151s
PB-214	1407.95	352.07	48.	126.	0.018	14.15	1.346s
BA-133	1424.21	356.14	66.	-2.	0.000	613.69	1.161s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
I-131	1470.51	367.71	35.	-3.	0.000	268.46	1.170s
BA-133	1534.92	383.81	45.	-2.	0.000	491.83	1.189s
SN-113	1565.07	391.35	40.	-3.	0.000	305.96	1.197s
SB-125	1714.28	428.65	36.	-4.	-0.001	216.26	1.233s
AG-108M	1734.01	433.58	29.	10.	0.001	84.06	1.239s
pm-146	1814.77	453.77	47.	-5.	-0.001	209.77	1.259s
SB-125	1852.39	463.18	36.	4.	0.001	227.97	1.268s
BE-7	1908.09	477.10	25.	6.	0.001	131.36	1.282s
RU-103	1989.09	497.35	33.	10.	0.001	85.22	1.300s
RH-106	2042.58	510.72	64.	97.	0.013	15.54	1.315s
CS-134	2256.00	564.07	37.	-7.	-0.001	131.26	1.364s
CS-134	2274.86	568.79	43.	-4.	-0.001	230.36	1.369s
PA-234	2279.21	569.87	44.	2.	0.000	465.42	1.370s
BI-207	2284.73	571.26	44.	4.	0.001	263.93	1.370s
TL-208	2332.01	583.07	21.	101.	0.014	13.84	1.625
SB-125	2404.99	601.32	35.	5.	0.001	158.88	1.399s
SB-124	2408.08	602.09	32.	5.	0.001	169.50	1.401s
BI-214	2437.27	609.39	34.	97.	0.013	12.63	1.423
RU-103	2437.84	609.53	36.	77.	0.011	15.83	1.408s
AG-108M	2458.73	614.75	46.	-5.	-0.001	182.80	1.412s
PM-144	2471.91	618.05	43.	-5.	-0.001	198.07	1.415s
SB-125	2542.30	635.65	30.	-4.	-0.001	191.27	1.432s
AG-110M	2630.15	657.61	33.	7.	0.001	119.26	1.452s
NB-94	2813.37	703.41	28.	-3.	0.000	255.38	1.493s
SB-124	2899.12	724.85	29.	-3.	0.000	268.74	1.511s
ZR-95	2889.15	722.35	21.	2.	0.000	439.12	1.512s
BI-212	2910.89	727.79	5.	34.	0.005	21.67	0.641s
pm-146	2937.26	734.38	28.	-4.	-0.001	199.16	1.523s
pm-146	2989.94	747.55	29.	2.	0.000	315.40	1.533s
AG-110M	3062.72	765.75	26.	-1.	0.000	526.87	1.548s
PA-234M	3064.68	766.24	27.	1.	0.000	919.82	1.550s
EU-152	3112.57	778.21	34.	-3.	0.000	247.01	1.561s
BI-212	3143.24	785.88	24.	5.	0.001	156.10	1.567
CS-134	3180.16	795.11	28.	5.	0.001	170.61	1.576s
CS-134	3207.33	801.90	24.	4.	0.000	199.90	1.581s
CO-58	3242.00	810.57	25.	2.	0.000	448.04	1.589s
MN-54	3341.85	835.53	20.	9.	0.001	78.51	1.610s
Co-56	3383.89	846.04	26.	-3.	0.000	249.58	1.620s
TL-208	3449.57	862.46	25.	1.	0.000	498.86	1.632s
NB-94	3484.25	871.13	23.	-4.	-0.001	184.20	1.641s
PA-234	3537.11	884.34	16.	5.	0.001	120.19	1.651s
y-88	3590.29	897.64	24.	1.	0.000	513.68	1.664s
AC-228	3644.92	911.29	8.	57.	0.008	17.28	0.978s
AG-110M	3749.63	937.47	21.	-1.	0.000	715.84	1.697s
PA-234	3785.69	946.49	19.	2.	0.000	330.72	1.704s
EU-152	3855.42	963.92	33.	4.	0.001	214.47	1.719s
AC-228	3879.39	969.91	31.	12.	0.002	70.33	1.724s
EU-154	3984.32	996.14	32.	-5.	-0.001	159.69	1.746s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	4011.00	1002.81	26.	-6.	-0.001	123.88	1.753s
Co-56	4146.11	1036.59	22.	1.	0.000	949.90	1.780s
RH-106	4191.97	1048.06	17.	2.	0.000	352.62	1.790s
BI-207	4258.44	1064.67	14.	6.	0.001	94.75	1.801s
Ga-68	4310.73	1077.75	27.	-2.	0.000	371.23	1.812s
EU-152	4444.09	1111.09	26.	2.	0.000	433.03	1.839s
Sc-46	4485.09	1121.34	25.	8.	0.001	100.76	1.845s
CO-60	4689.45	1172.43	17.	4.	0.001	144.67	1.886s
Ta-182	4761.20	1190.37	21.	-4.	-0.001	167.49	1.898s
Co-56	4950.25	1237.63	26.	4.	0.001	195.83	1.936s
CO-60	5329.52	1332.45	15.	1.	0.000	488.01	2.005s
AG-110M	5544.52	1386.20	14.	-3.	0.000	171.93	2.042s
EU-152	5623.33	1405.91	11.	1.	0.000	709.62	2.059s
K-40	5842.89	1460.80	17.	135.	0.019	8.11	0.850s
La-140	6384.81	1596.29	15.	-1.	0.000	471.83	2.185s
SB-124	6766.04	1691.60	8.	1.	0.000	395.10	2.245s
BI-214	7057.71	1764.53	8.	6.	0.001	63.61	2.290s
Co-56	7073.42	1768.45	17.	-5.	-0.001	120.03	2.294s
y-88	7345.94	1836.59	12.	-2.	0.000	331.30	2.331s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	Peak MDA Value Bq/Sample	Peak COMMENTS
BE-7	C	1.9803E-01					5.31E+01
			477.60	1.980E-01	(	9.068E-01	1.31E+02 1.05E+01 G
NA-22	C	-1.4305E-05					9.50E+02
			1274.53	-1.430E-05	%(	2.188E-01	4.08E+05 9.99E+01 G
K-40	N	1.4135E+01					4.66E+11
			1460.83	1.414E+01	(P	2.300E+00	8.11E+00 1.07E+01 G
Sc-46	F	3.3487E-02					8.38E+01
			889.28	3.160E-03	%(	1.280E-01	1.06E+03 1.00E+02 G
			1120.55	6.381E-02	&(	2.205E-01	1.01E+02 1.00E+02 G
CR-51	F	1.1442E-01					2.77E+01
			320.08	1.144E-01	?(	8.914E-01	2.23E+02 9.94E+00 G
MN-54	C	5.5834E-02					3.12E+02
			834.85	5.583E-02	?(	1.476E-01	7.85E+01 1.00E+02 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
FE-59	F -3.5230E-04					4.45E+01	
		1099.25	-3.523E-04	%(	3.585E-01	2.74E+04	5.65E+01 G
		1291.60	1.389E-02	%	5.606E-01	1.10E+03	4.32E+01 G
Co-56	C 1.2482E-02					7.73E+01	
		846.77	-1.905E-02	?(	1.697E-01	2.50E+02	9.99E+01 G
		1238.28	5.455E-02	&(	3.784E-01	1.96E+02	6.61E+01 G
		1037.84	3.882E-02	?(	1.356E+00	9.50E+02	1.41E+01 G
		1771.35	-4.556E-01	+	1.916E+00	1.20E+02	1.55E+01 A
CO-57	C -2.0818E-02					2.72E+02	
		122.06	-2.082E-02	?(	6.762E-02	9.66E+01	8.56E+01 G
		136.47	0.000E+00	+	6.838E-01	1.00E+03	1.07E+01 G
CO-58	C 9.9306E-03					7.09E+01	
		810.78	9.931E-03	?(	1.610E-01	4.48E+02	9.95E+01 G
CO-60	F 2.5040E-02					1.93E+03	
		1332.50	1.158E-02	?(	2.103E-01	4.88E+02	1.00E+02 G
		1173.24	3.851E-02	?(	1.973E-01	1.45E+02	9.99E+01 G
ZN-65	F 5.0600E-03					2.44E+02	
		1115.55	5.060E-03	%(	4.552E-01	2.47E+03	5.06E+01 G
NB-94	I -1.6377E-02					7.41E+06	
		702.63	-1.638E-02	?(	1.490E-01	2.55E+02	9.79E+01 G
		871.10	-2.516E-02	+	1.646E-01	1.84E+02	9.99E+01 G
ZR-95	I 4.5326E-03					6.40E+01	
		756.73	-7.075E-03	&(	2.847E-01	1.11E+03	5.45E+01 G
		724.20	1.885E-02	?(	3.017E-01	4.39E+02	4.42E+01 G
RU-103	I 4.3229E-02					3.93E+01	
		497.05	4.323E-02	?(	1.244E-01	8.52E+01	9.09E+01 G
		610.30	6.208E+00	?	2.467E+00	1.58E+01	5.75E+00 GA
RH-106	I 1.1687E-01					3.74E+02	
		621.92	0.000E+00	(	1.683E+00	1.00E+03	9.93E+00 G
		1050.36	8.608E-01	?(	1.114E+01	3.53E+02	1.56E+00 G
		511.86	1.894E+00	?	7.859E-01	1.55E+01	2.00E+01 GA
AG-108M	C 3.6294E-02					1.53E+05	
		433.94	3.629E-02	?(	1.030E-01	8.41E+01	9.05E+01 G
		722.94	4.171E-03	&	1.687E-01	1.12E+03	9.08E+01 G
		614.28	-2.792E-02	-	1.775E-01	1.83E+02	8.98E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AG-110M	F	2.1258E-02					2.50E+02	
			884.68	0.000E+00	?(	3.317E-01	1.00E+03	7.27E+01 G
			657.76	3.758E-02	?(	1.545E-01	1.19E+02	9.46E+01 G
			937.49	-1.873E-02	+	4.929E-01	7.16E+02	3.44E+01 G
			1384.30	-1.414E-01	+	8.761E-01	1.72E+02	2.43E+01 G
			763.94	-3.610E-02	+	6.888E-01	5.27E+02	2.23E+01 G
SN-113	F	-1.4222E-02					1.15E+02	
			391.69	-1.422E-02	?(	1.537E-01	3.06E+02	6.40E+01 G
SB-124	F	2.4759E-02					6.02E+01	
			602.73	2.276E-02	?(	1.352E-01	1.70E+02	9.83E+01 G
			1690.98	2.887E-02	?(	4.382E-01	3.95E+02	4.78E+01 G
			722.79	-1.475E-01	&	1.412E+00	2.69E+02	1.08E+01 G
SB-125	I	4.3402E-02					1.01E+03	
			427.88	-4.511E-02	?(	3.431E-01	2.16E+02	2.96E+01 G
			600.50	1.394E-01	?(	7.722E-01	1.59E+02	1.79E+01 G
			635.89	-1.773E-01	+	1.196E+00	1.91E+02	1.13E+01 G
			463.37	1.298E-01	?(	1.043E+00	2.28E+02	1.05E+01 G
I-131	I	1.4960E-02					8.02E+00	
			364.48	-1.118E-02	?(	1.062E-01	2.68E+02	8.17E+01 G
			284.30	3.627E-01	(	1.418E+00	1.15E+02	6.14E+00 G
			636.97	-2.060E-02	%	1.817E+00	2.41E+03	7.17E+00 G
Gd-153	F	-4.4244E-03					2.42E+02	
			97.50	-4.424E-03	&(	1.686E-01	1.09E+03	3.00E+01 G
			103.20	-7.188E-02	+	2.834E-01	1.17E+02	2.18E+01 G
Ga-68	C	-8.8225E-01					4.71E-02	
			1077.40	-8.822E-01	&(	1.178E+01	3.71E+02	3.30E+00 G
Tc-99m	I	9.0524E-03					2.51E-01	
			140.51	9.052E-03	?(	6.755E-02	2.16E+02	8.93E+01 G
BA-133	F	-8.4745E-03					3.85E+03	
			356.00	-8.474E-03	?(	1.824E-01	6.14E+02	6.20E+01 G
			302.85	-2.107E-01	+	6.040E-01	8.56E+01	1.83E+01 G
			383.84	-6.549E-02	+	1.141E+00	4.92E+02	8.94E+00 GA
			80.99	-3.448E-02	+	1.915E-01	1.64E+02	3.41E+01 GA
CS-134	I	2.5659E-02					7.54E+02	
			604.71	0.000E+00	?(	3.349E-01	1.00E+03	9.76E+01 G
			795.87	3.223E-02	&(	1.933E-01	1.71E+02	8.55E+01 G
			569.32	-1.163E-01	+	9.385E-01	2.30E+02	1.54E+01 G
			801.95	2.493E-01	?(	1.772E+00	2.00E+02	8.69E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			563.24	-3.539E-01	&	1.604E+00	1.31E+02	8.35E+00 G
CS-137	I	6.6029E-04					1.10E+04	
			661.66	6.603E-04	%(	1.627E-01	6.75E+03	8.52E+01 G
CE-139	F	3.8995E-02					1.38E+02	
			165.85	3.900E-02	(	7.872E-02	6.13E+01	7.99E+01 G
Ba-140	I	1.2473E-01					1.28E+01	
			537.26	0.000E+00	&(	4.531E-01	1.00E+03	2.44E+01 G
			162.66	1.793E-01	?(	8.760E-01	1.42E+02	6.22E+00 G
			304.85	7.547E-01	(	1.689E+00	6.75E+01	4.29E+00 G
La-140	I	1.7536E-02					1.28E+01	
			1596.21	-1.522E-02	?(	2.669E-01	4.72E+02	9.54E+01 G
			487.02	4.094E-03	%	2.441E-01	1.65E+03	4.55E+01 G
			328.76	1.715E-01	&(	4.680E-01	8.14E+01	2.03E+01 G
			815.77	0.000E+00	-	9.852E-01	1.00E+03	2.33E+01 G
CE-141	I	-1.4167E-02					3.25E+01	
			145.44	-1.417E-02	?(	1.305E-01	2.67E+02	4.82E+01 G
CE-144	I	-8.4062E-03					2.85E+02	
			133.54	-8.406E-03	%(	3.961E-01	1.33E+03	1.11E+01 G
PM-144	C	-1.1024E-03					3.63E+02	
			696.54	-1.102E-03	%(	1.651E-01	4.15E+03	9.90E+01 G
			618.06	-2.270E-02	+	1.570E-01	1.98E+02	9.91E+01 G
			476.81	0.000E+00	&	2.812E-01	1.00E+03	4.20E+01 G
EU-152	F	5.1222E-02					4.94E+03	
			344.29	-5.579E-02	?(	3.753E-01	1.94E+02	2.65E+01 G
			1112.07	1.051E-01	?(	1.643E+00	4.33E+02	1.36E+01 G
			121.78	-6.332E-02	+	2.033E-01	9.55E+01	2.86E+01 G
			778.92	-1.565E-01	+	1.366E+00	2.47E+02	1.29E+01 G
			964.11	1.951E-01	?(	1.475E+00	2.14E+02	1.46E+01 G
			244.69	-1.494E-01	+	1.141E+00	2.21E+02	7.58E+00 G
			1408.00	3.481E-02	?	9.408E-01	7.10E+02	2.10E+01 GA
EU-154	I	7.8108E-03					3.14E+03	
			873.23	7.811E-03	&(	1.196E+00	4.09E+03	1.23E+01 G
			123.10	-4.203E-02	&	1.258E-01	8.91E+01	4.08E+01 G
			1274.54	-4.884E-04	%	6.215E-01	3.40E+04	3.52E+01 G
			723.36	0.000E+00	-	1.601E+00	1.00E+03	2.02E+01 G
			1004.77	-2.581E-01	+	1.110E+00	1.24E+02	1.80E+01 G
			996.33	-3.679E-01	+	2.054E+00	1.60E+02	1.06E+01 G

Nuclide		Ave activity	Energy		Activity	Code	Peak	MDA	Comments
EU-155	I	1.1833E-01						1.81E+03	
			105.31	1.183E-01	(	2.443E-01	6.27E+01	2.12E+01	G
			86.54	2.987E-02	-	2.269E-01	2.23E+02	3.07E+01	G
HF-181	F	1.1635E-02						4.24E+01	
			482.00	1.854E-03	%(	1.235E-01	1.82E+03	8.05E+01	G
			133.02	-3.804E-04	&	1.293E-01	9.70E+03	4.33E+01	G
			345.83	6.388E-02	?(	6.350E-01	2.83E+02	1.51E+01	G
			136.30	0.000E+00	-	1.237E+00	1.00E+03	5.85E+00	G
Hg-203	F	1.8928E-02						4.66E+01	
			279.20	1.893E-02	(	7.910E-02	1.21E+02	8.15E+01	G
TL-208	N	5.3058E-01						6.98E+02	
			583.02	5.306E-01	(	1.264E-01	1.38E+01	8.45E+01	G
			277.28	7.761E-01	+	1.099E+00	4.46E+01	6.31E+00	G
			860.56	7.537E-02	-	1.363E+00	4.99E+02	1.24E+01	G
pm-146	C	4.1012E-02						2.02E+03	
			747.16	4.101E-02	?(	4.625E-01	3.15E+02	3.40E+01	G
			735.72	-9.642E-02	+	6.790E-01	1.99E+02	2.25E+01	G
			453.88	-2.553E-02	+	1.868E-01	2.10E+02	6.50E+01	G
y-88	F	9.8286E-03						1.07E+02	
			898.04	9.829E-03	?(	1.836E-01	5.14E+02	9.37E+01	G
			1836.06	-2.198E-02	+	2.716E-01	3.31E+02	9.92E+01	G
Cd-109	F	8.8187E-01						4.53E+02	
			88.04	8.819E-01	&(	2.044E+00	7.00E+01	3.79E+00	G
Ra-226	N	2.7227E+00						5.84E+05	
			185.99	2.723E+00	*(P	2.645E+00	1.94E+01	3.28E+00	G
PB-210	N	7.8669E-01						8.14E+03	
			46.54	7.867E-01	(P	1.984E+00	2.37E+01	4.25E+00	G
PB-212	N	8.8939E-01						6.98E+02	
			238.63	8.894E-01	(	2.509E-01	1.08E+01	4.33E+01	G
			300.03	1.370E+00	+	2.754E+00	6.12E+01	3.28E+00	GA
PB-214	N	1.0393E+00						5.84E+05	
			351.93	9.268E-01	*(	2.574E-01	1.42E+01	3.76E+01	G
			295.09	1.259E+00	*(	4.021E-01	1.66E+01	1.93E+01	G
			242.00	1.007E+00		1.058E+00	3.39E+01	7.43E+00	GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-207	C	3.7643E-02					1.18E+04	
			569.70	1.608E-02	?(	1.491E-01	2.64E+02	9.77E+01 G
			1063.66	6.593E-02	?(	2.154E-01	9.47E+01	7.45E+01 G
BI-212	N	2.4536E+00					6.98E+02	
			727.17	2.454E+00	(	9.818E-01	2.17E+01	7.55E+00 G
			785.42	2.154E+00		1.183E+01	1.56E+02	1.28E+00 GA
BI-214	N	9.7226E-01					5.84E+05	
			609.31	9.723E-01	(P	3.013E-01	1.26E+01	4.61E+01 G
			1120.29	-2.904E-01	& P	8.388E-01	1.00E+03	1.51E+01 G
			1764.49	5.365E-01	& P	1.381E+00	6.36E+01	1.54E+01 G
BI-210M	T	2.1146E-02					1.10E+09	
			265.83	-3.177E-02	?(	1.711E-01	1.57E+02	5.00E+01 G
			304.90	1.156E-01	(	2.587E-01	6.75E+01	2.80E+01 G
RA-224	N	1.3197E+00					6.98E+02	
			240.99	1.320E+00	(	2.897E+00	6.64E+01	4.10E+00 G
AC-228	N	1.4513E+00					2.10E+03	
			911.16	1.353E+00	@(	3.772E-01	1.73E+01	2.90E+01 G
			968.97	5.109E-01	-	1.195E+00	7.03E+01	1.75E+01 G
			338.32	1.688E+00	*(	7.774E-01	2.34E+01	1.20E+01 G
			93.35	4.520E-01	-	1.412E+00	9.35E+01	5.56E+00 XA
TH-227	N	-9.4488E-02					7.95E+03	
			235.97	-9.449E-02	?(	1.120E+00	3.48E+02	1.23E+01 G
			50.14	-3.199E-01	+	8.619E-01	8.08E+01	8.00E+00 G
			256.24	-2.967E-04	%	1.169E+00	1.11E+05	7.00E+00 G
TH-229	N	-1.3142E-01					2.68E+06	
			193.51	-1.314E-01	?(	1.801E+00	3.96E+02	4.40E+00 G
			210.85	-8.682E-02	+	2.929E+00	9.72E+02	2.99E+00 G
TH-234	N	1.2760E+00					1.63E+12	
			63.29	1.276E+00	*(P	1.963E+00	1.63E+01	3.81E+00 G
			92.59	-5.042E-01	- P	1.561E+00	2.18E+01	5.58E+00 G
PA-231	N	-1.3739E+00					1.20E+07	
			302.65	-1.374E+00	?(	3.874E+00	8.43E+01	2.88E+00 G
			300.07	1.829E+00	+	3.672E+00	6.11E+01	2.46E+00 G
PA-233	C	6.2963E-02					7.82E+08	
			312.01	-5.134E-02	?(	2.973E-01	1.69E+02	3.60E+01 G
			300.18	7.267E-01	*(	1.457E+00	6.10E+01	6.20E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234	N	1.4400E-01					1.63E+12	
			131.29	7.941E-02	&(	3.159E-01	1.17E+02	1.80E+01 G
			946.02	1.015E-01	?(	1.224E+00	3.31E+02	1.34E+01 G
			569.47	1.080E-01	?(	1.781E+00	4.65E+02	8.20E+00 G
			883.24	3.552E-01	&(	1.496E+00	1.20E+02	9.60E+00 G
			880.53	0.000E+00	-	2.842E+00	1.00E+03	6.00E+00 GA
PA-234M	N	4.1527E-01					1.63E+12	
			1001.00	0.000E+00	?(	2.343E+01	1.00E+03	8.37E-01 G
			766.41	1.598E+00	?(	5.341E+01	9.20E+02	2.94E-01 G
U-235	N	2.2715E-01					2.57E+11	
			143.79	2.271E-01	?(	4.522E-01	6.06E+01	1.10E+01 G
			205.33	5.253E-02	-	1.444E+00	7.85E+02	5.01E+00 G
			163.38	-3.000E-01	-	1.431E+00	1.40E+02	5.08E+00 G
AM-241	T	-3.0782E-02					1.58E+05	
			59.54	-3.078E-02	?(	1.938E-01	1.85E+02	3.59E+01 G
Ir-192	F	1.0675E-01					7.40E+01	
			316.49	0.000E+00	?(	1.310E-01	1.00E+03	8.70E+01 G
			468.06	0.000E+00	(	2.367E-01	1.00E+03	5.18E+01 G
			308.44	-2.550E-02	+	2.781E-01	3.11E+02	3.18E+01 G
			295.95	5.980E-01	*(	2.892E-01	1.78E+01	3.02E+01 G
Np-237	F	3.0707E-01					2.14E+06	
			86.49	3.071E-01	?(	5.250E-01	5.23E+01	1.31E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went
negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide
failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the
library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes: Peak Codes:

T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
TH-227	49.58	124.	-20.	-0.003	80.82	-3.199E-01
AM-241	59.50	148.	-9.	-0.001	185.24	-3.078E-02
BA-133	81.05	146.	-11.	-0.001	163.71	-3.448E-02
Np-237	87.87	163.	36.	0.005	52.32	3.071E-01
EU-155	88.58	167.	8.	0.001	223.34	2.987E-02
Cd-109	87.90	208.	30.	0.004	70.01	8.819E-01
Gd-153	103.14	123.	-14.	-0.002	116.86	-7.188E-02
EU-155	105.24	84.	22.	0.003	62.66	1.183E-01
EU-152	121.91	97.	-15.	-0.002	95.53	-6.332E-02
CO-57	121.91	96.	-15.	-0.002	96.59	-2.082E-02
EU-154	121.91	74.	-14.	-0.002	89.09	-4.203E-02
PA-234	131.97	86.	12.	0.002	117.38	7.941E-02
Tc-99m	139.22	71.	6.	0.001	215.95	9.052E-03
U-235	142.71	58.	19.	0.003	60.60	2.271E-01
CE-141	145.04	95.	-5.	-0.001	267.43	-1.417E-02
Ba-140	161.00	60.	8.	0.001	142.38	1.793E-01
U-235	163.60	110.	-11.	-0.001	140.46	-3.000E-01
CE-139	165.40	78.	22.	0.003	61.35	3.900E-02
TH-229	193.84	97.	-4.	0.000	396.39	-1.314E-01
U-235	205.23	72.	2.	0.000	784.57	5.253E-02
TH-229	210.98	103.	-1.	0.000	971.71	-8.682E-02
TH-227	237.73	216.	-6.	-0.001	348.34	-9.449E-02
EU-152	245.25	76.	-6.	-0.001	221.18	-1.494E-01
BI-210M	266.68	63.	-7.	-0.001	156.69	-3.177E-02
I-131	284.11	57.	10.	0.001	114.74	3.627E-01
Ir-192	295.34	54.	76.	0.011	17.78	5.980E-01
PA-231	300.04	56.	19.	0.003	61.08	1.829E+00
PA-233	300.03	56.	19.	0.003	61.00	7.267E-01
PA-231	303.00	87.	-16.	-0.002	84.27	-1.374E+00
BA-133	303.00	86.	-16.	-0.002	85.58	-2.107E-01
Ba-140	304.71	34.	13.	0.002	67.53	7.547E-01
BI-210M	304.71	34.	13.	0.002	67.54	1.156E-01
Ir-192	308.24	51.	-3.	0.000	310.94	-2.550E-02
PA-233	312.33	75.	-7.	-0.001	168.75	-5.134E-02
CR-51	320.38	48.	4.	0.001	223.15	1.144E-01
La-140	328.55	53.	13.	0.002	81.40	1.715E-01

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	344.05	53.	-5.	-0.001	193.88	-5.579E-02	
HF-181	345.85	48.	4.	0.000	283.47	6.388E-02	
BA-133	356.14	66.	-2.	0.000	613.69	-8.474E-03	
I-131	367.71	35.	-3.	0.000	268.46	-1.118E-02	
BA-133	383.81	45.	-2.	0.000	491.83	-6.549E-02	
SN-113	391.35	40.	-3.	0.000	305.96	-1.422E-02	
SB-125	428.65	36.	-4.	-0.001	216.26	-4.511E-02	
AG-108M	433.58	29.	10.	0.001	84.06	3.629E-02	
pm-146	453.77	47.	-5.	-0.001	209.77	-2.553E-02	
SB-125	463.18	36.	4.	0.001	227.97	1.298E-01	
BE-7	477.10	25.	6.	0.001	131.36	1.980E-01	
RU-103	497.35	33.	10.	0.001	85.22	4.323E-02	
RH-106	510.72	64.	97.	0.013	15.54	1.894E+00	
CS-134	564.07	37.	-7.	-0.001	131.26	-3.539E-01	
CS-134	568.79	43.	-4.	-0.001	230.36	-1.163E-01	
PA-234	569.87	44.	2.	0.000	465.42	1.080E-01	
BI-207	571.26	44.	4.	0.001	263.93	1.608E-02	
SB-125	601.32	35.	5.	0.001	158.88	1.394E-01	
SB-124	602.09	32.	5.	0.001	169.50	2.276E-02	
RU-103	609.53	36.	77.	0.011	15.83	6.208E+00	
AG-108M	614.75	46.	-5.	-0.001	182.80	-2.792E-02	
PM-144	618.05	43.	-5.	-0.001	198.07	-2.270E-02	
SB-125	635.65	30.	-4.	-0.001	191.27	-1.773E-01	
AG-110M	657.61	33.	7.	0.001	119.26	3.758E-02	
NB-94	703.41	28.	-3.	0.000	255.38	-1.638E-02	
SB-124	724.85	29.	-3.	0.000	268.74	-1.475E-01	
ZR-95	722.35	21.	2.	0.000	439.12	1.885E-02	
pm-146	734.38	28.	-4.	-0.001	199.16	-9.642E-02	
pm-146	747.55	29.	2.	0.000	315.40	4.101E-02	
AG-110M	765.75	26.	-1.	0.000	526.87	-3.610E-02	
PA-234M	766.24	27.	1.	0.000	919.82	1.598E+00	
EU-152	778.21	34.	-3.	0.000	247.01	-1.565E-01	
CS-134	795.11	28.	5.	0.001	170.61	3.223E-02	
CS-134	801.90	24.	4.	0.000	199.90	2.493E-01	
CO-58	810.57	25.	2.	0.000	448.04	9.931E-03	
MN-54	835.53	20.	9.	0.001	78.51	5.583E-02	
Co-56	846.04	26.	-3.	0.000	249.58	-1.905E-02	
NB-94	871.13	23.	-4.	-0.001	184.20	-2.516E-02	
PA-234	884.34	16.	5.	0.001	120.19	3.552E-01	
y-88	897.64	24.	1.	0.000	513.68	9.829E-03	
AG-110M	937.47	21.	-1.	0.000	715.84	-1.873E-02	
PA-234	946.49	19.	2.	0.000	330.72	1.015E-01	
EU-152	963.92	33.	4.	0.001	214.47	1.951E-01	
EU-154	996.14	32.	-5.	-0.001	159.69	-3.679E-01	
EU-154	1002.81	26.	-6.	-0.001	123.88	-2.581E-01	
Co-56	1036.59	22.	1.	0.000	949.90	3.882E-02	
RH-106	1048.06	17.	2.	0.000	352.62	8.608E-01	
BI-207	1064.67	14.	6.	0.001	94.75	6.593E-02	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ga-68	1077.75	27.	-2.	0.000	371.23	-8.822E-01	
EU-152	1111.09	26.	2.	0.000	433.03	1.051E-01	
Sc-46	1121.34	25.	8.	0.001	100.76	6.381E-02	
CO-60	1172.43	17.	4.	0.001	144.67	3.851E-02	
Ta-182	1190.37	21.	-4.	-0.001	167.49	-2.268E-01	
Co-56	1237.63	26.	4.	0.001	195.83	5.455E-02	
CO-60	1332.45	15.	1.	0.000	488.01	1.158E-02	
AG-110M	1386.20	14.	-3.	0.000	171.93	-1.414E-01	
EU-152	1405.91	11.	1.	0.000	709.62	3.481E-02	
La-140	1596.29	15.	-1.	0.000	471.83	-1.522E-02	
SB-124	1691.60	8.	1.	0.000	395.10	2.887E-02	
Co-56	1768.45	17.	-5.	-0.001	120.03	-4.556E-01	
y-88	1836.59	12.	-2.	0.000	331.30	-2.198E-02	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	1.9803E-01	1.9803E-01	1.314E+02%	9.07E-01
NA-22	#A	-1.4305E-05	-1.4305E-05	4.083E+05%	2.19E-01
K-40	#	1.4135E+01	1.4135E+01	9.136E+00%	2.30E+00
Sc-46	#A	3.3487E-02	3.3487E-02	1.008E+02%	1.28E-01
CR-51	#A	1.1441E-01	1.1442E-01	2.231E+02%	8.91E-01
MN-54	#A	5.5834E-02	5.5834E-02	7.851E+01%	1.48E-01
FE-59	#A	-3.5230E-04	-3.5230E-04	2.745E+04%	3.58E-01
Co-56	#A	1.2482E-02	1.2482E-02	1.958E+02%	1.70E-01
CO-57	#A	-2.0818E-02	-2.0818E-02	9.659E+01%	6.76E-02
CO-58	#A	9.9306E-03	9.9306E-03	4.480E+02%	1.61E-01
CO-60	#A	2.5040E-02	2.5040E-02	1.447E+02%	2.10E-01
ZN-65	#A	5.0600E-03	5.0600E-03	2.465E+03%	4.55E-01
NB-94	#A	-1.6377E-02	-1.6377E-02	2.554E+02%	1.49E-01
ZR-95	#A	4.5325E-03	4.5326E-03	4.391E+02%	2.85E-01
NB-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.99E-01
RU-103	#A	4.3229E-02	4.3229E-02	8.522E+01%	1.24E-01
RH-106	#A	1.1687E-01	1.1687E-01	3.526E+02%	1.68E+00
AG-108M	#A	3.6294E-02	3.6294E-02	8.406E+01%	1.03E-01
AG-110M	#A	2.1258E-02	2.1258E-02	1.193E+02%	3.32E-01
SN-113	#A	-1.4222E-02	-1.4222E-02	3.060E+02%	1.54E-01
SB-124	#A	2.4759E-02	2.4759E-02	1.695E+02%	1.35E-01
SB-125	#A	4.3402E-02	4.3402E-02	1.174E+02%	3.43E-01
I-131	#A	1.4959E-02	1.4960E-02	1.147E+02%	1.06E-01
Gd-153	#A	-4.4244E-03	-4.4244E-03	1.091E+03%	1.69E-01
Ga-68	#A	-8.7134E-01	-8.8225E-01	3.712E+02%	1.18E+01
Tc-99m	#A	9.0313E-03	9.0524E-03	2.159E+02%	6.75E-02
BA-133	#A	-8.4745E-03	-8.4745E-03	6.137E+02%	1.82E-01

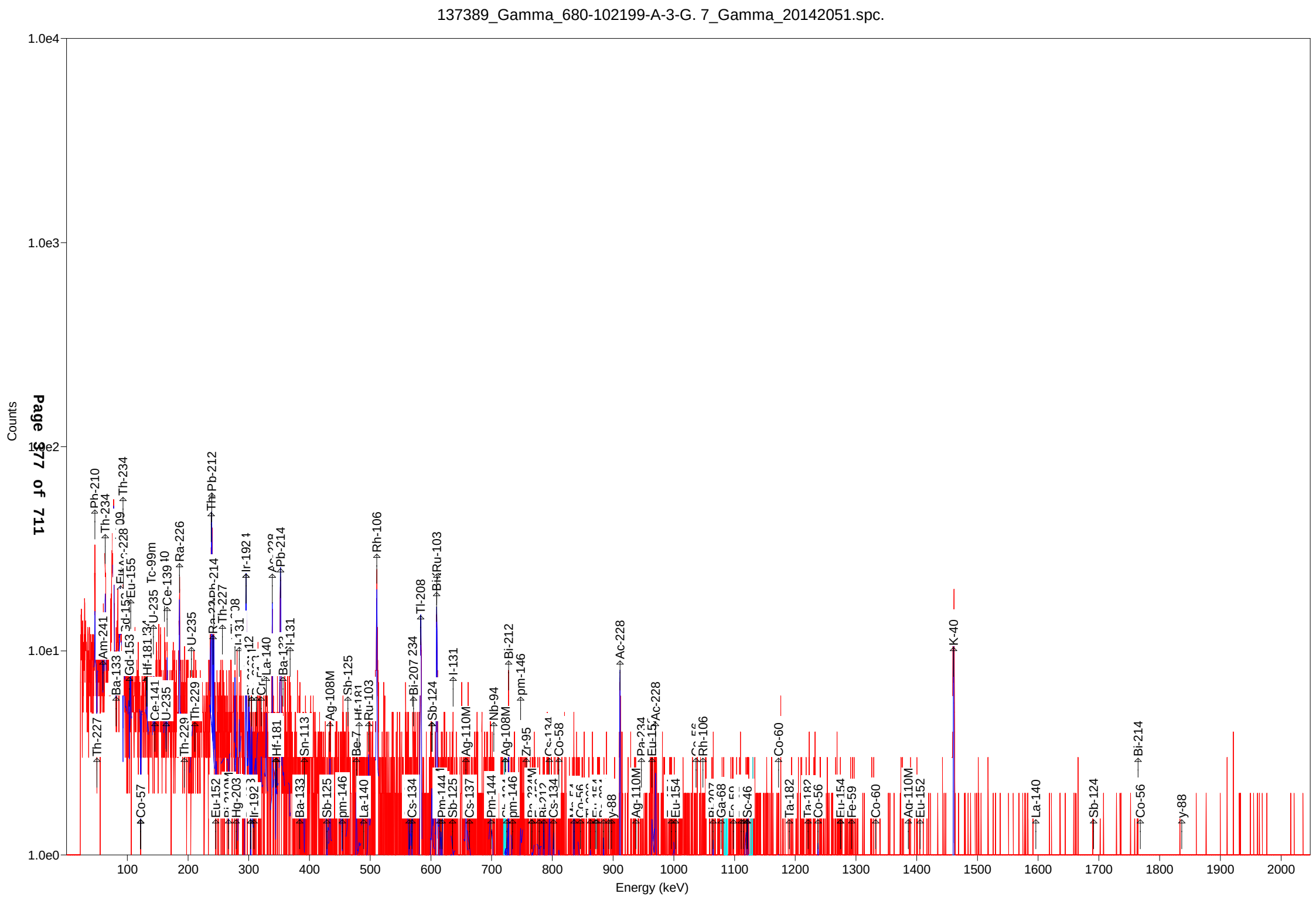
CS-134 #A	2.5659E-02	2.5659E-02	1.706E+02%	3.35E-01
CS-137 #A	6.6029E-04	6.6029E-04	6.750E+03%	1.63E-01
CE-139 #A	3.8995E-02	3.8995E-02	6.135E+01%	7.87E-02
Ba-140 #A	1.2472E-01	1.2473E-01	6.753E+01%	4.53E-01
La-140 #A	1.7535E-02	1.7536E-02	8.140E+01%	2.67E-01
CE-141 #A	-1.4166E-02	-1.4167E-02	2.674E+02%	1.31E-01
CE-144 #A	-8.4062E-03	-8.4062E-03	1.325E+03%	3.96E-01
PM-144 #A	-1.1024E-03	-1.1024E-03	4.153E+03%	1.65E-01
EU-152 #A	5.1222E-02	5.1222E-02	1.736E+02%	3.75E-01
EU-154 #A	7.8108E-03	7.8108E-03	4.089E+03%	1.20E+00
EU-155 #A	1.1833E-01	1.1833E-01	6.266E+01%	2.44E-01
HF-181 #A	1.1634E-02	1.1635E-02	2.835E+02%	1.24E-01
Ta-182 #A	0.0000E+00	0.0000E+00	1.000E+03%	7.56E-01
Hg-203 A	1.8928E-02	1.8928E-02	1.210E+02%	7.91E-02
TL-208	5.3058E-01	5.3058E-01	1.384E+01%	1.26E-01
pm-146 #A	4.1012E-02	4.1012E-02	3.154E+02%	4.63E-01
y-88 #A	9.8285E-03	9.8286E-03	5.137E+02%	1.84E-01
Cd-109 #A	8.8187E-01	8.8187E-01	7.001E+01%	2.04E+00
Ra-226 #	2.7227E+00	2.7227E+00	3.602E+01%	2.65E+00
PB-210 A	7.8669E-01	7.8669E-01	8.238E+01%	1.98E+00
PB-212	8.8939E-01	8.8939E-01	1.082E+01%	2.51E-01
PB-214	1.0393E+00	1.0393E+00	1.090E+01%	2.57E-01
BI-207 #A	3.7643E-02	3.7643E-02	9.475E+01%	1.49E-01
BI-212	2.4536E+00	2.4536E+00	2.167E+01%	9.82E-01
BI-214	9.7226E-01	9.7226E-01	1.484E+01%	3.01E-01
BI-210M#A	2.1146E-02	2.1146E-02	6.754E+01%	1.71E-01
RA-224 A	1.3197E+00	1.3197E+00	6.641E+01%	2.90E+00
AC-228	1.4513E+00	1.4513E+00	1.454E+01%	3.77E-01
TH-227 #A	-9.4488E-02	-9.4488E-02	3.483E+02%	1.12E+00
TH-229 #A	-1.3142E-01	-1.3142E-01	3.964E+02%	1.80E+00
TH-234 #A	1.2760E+00	1.2760E+00	4.887E+01%	1.96E+00
PA-231 #A	-1.3739E+00	-1.3739E+00	8.427E+01%	3.87E+00
PA-233 #A	6.2963E-02	6.2963E-02	6.100E+01%	2.97E-01
PA-234 #A	1.4400E-01	1.4400E-01	1.174E+02%	3.16E-01
PA-234M#A	4.1527E-01	4.1527E-01	6.793E+02%	2.34E+01
U-235 #A	2.2715E-01	2.2715E-01	6.060E+01%	4.52E-01
AM-241 #A	-3.0782E-02	-3.0782E-02	1.852E+02%	1.94E-01
Ir-192 #A	1.0675E-01	1.0675E-01	1.778E+01%	1.31E-01
Np-237 #A	3.0707E-01	3.0707E-01	5.232E+01%	5.25E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

TestAmerica Spectrum name: 7_Gamma_20142051.An1

---------- S U M M A R Y ----------

Total Activity (295.1 to 2000.1 keV)	2.547E+01	Bq/Sample
Total Decayed Activity (295.1 to 2000.1 keV)	2.5470301E+01	Bq/Sample


137389_Gamma_680-102199-A-3-G. 7_Gamma_20142051.spc.
Counts
Energy (keV)
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Ph-210
Th-234
Am-241
Ba-133
Gd-153
Eu-155
Tc-99m
Hf-181
Ce-141
U-235
Th-229
Co-57
Ce-139
Ra-226
Th-227
Eu-152
Hg-203
Ir-192
Pb-212
Ra-224
Pb-214
Th-227
Ba-133
Sn-113
Sb-125
Ag-108M
Pm-146
La-140
Be-7
Hf-181
Ru-103
Rh-106
Cs-134
Bi-207
Tl-208
Sb-124
Pm-144
Sb-125
Cs-137
Ag-110M
Pm-144
Nb-94
Ag-108M
Pm-146
Bi-212
Zr-95
pm-146
Co-58
Cs-134
y-88
Ac-228
Ag-110M
Pa-234
Eu-154
Ac-228
Rh-106
Ga-68
Sc-46
Co-60
Ta-182
Co-56
Eu-154
Fe-59
Co-60
Ag-110M
Eu-152
K-40
La-140
Sb-124
Bi-214
Co-56
y-88

Test America St. Louis Spectrum ID: 4_Gamma_20141662

Sample Description: 137389_Gamma_680-102199-A-7-G
Detector: Ge 4 SN/181
Batch ID: 137389
Work Order Number: Gamma
Lot Number: 680-102199-A-7-G

Decay to Time: 8/27/2014 10:15 Live Time: 7200 sec
Acquisition Time: 8/27/2014 10:16:13 Real Time: 7214 sec
Analysis Time: 8/27/2014 12:16 Dead Time: 0.20 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 4_Liquid_D=1 25ml.Clb
Efficiency Cal Desc: 4_Liquid_D=1 25ml_90101_030512
Efficiency Cal Date: 3/27/2012 20:51
Energy Cal Date: 2/28/2012 14:55
Library: Client_Routine Long_Rev7.lib
Bkgd Correction File: 4_2014-08-09_2125.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-1.389E-01	428.5	5.951E-01	5.952E-01	2.137E+00
NA-22	-6.244E-02	215.4	1.345E-01	1.345E-01	4.816E-01
K-40	1.170E+01	17.2	2.009E+00	2.087E+00	5.407E+00
Sc-46	0.000E+00	1000.0	2.833E-02	2.833E-02	3.186E-01
CR-51	-1.860E-01	304.9	5.670E-01	5.670E-01	1.989E+00
MN-54	8.281E-02	99.0	8.195E-02	8.205E-02	2.830E-01
FE-59	9.250E-02	68.1	6.297E-02	6.313E-02	7.152E-01
Co-56	1.271E-01	56.2	7.145E-02	7.172E-02	2.753E-01
CO-57	-1.674E-02	67.1	1.123E-02	1.126E-02	1.330E-01
CO-58	0.000E+00	1000.0	2.611E-02	2.611E-02	3.173E-01
CO-60	-4.191E-02	336.9	1.412E-01	1.412E-01	5.113E-01
ZN-65	1.454E-02	1348.0	1.959E-01	1.959E-01	7.353E-01
NB-94	3.766E-02	224.4	8.450E-02	8.452E-02	3.012E-01
ZR-95	5.559E-02	217.0	1.206E-01	1.206E-01	4.407E-01
NB-95	-6.517E-05	123100.0	8.022E-02	8.022E-02	2.977E-01
RU-103	1.396E-02	453.7	6.334E-02	6.334E-02	2.300E-01
RH-106	1.108E+00	77.3	8.560E-01	8.577E-01	2.615E+00
AG-108M	-2.255E-02	291.8	6.581E-02	6.582E-02	2.341E-01
AG-110M	8.865E-02	152.4	1.351E-01	1.352E-01	4.059E-01
SN-113	-6.368E-03	1162.0	7.398E-02	7.398E-02	2.704E-01
SB-124	6.621E-02	122.5	8.110E-02	8.117E-02	2.507E-01
SB-125	2.444E-01	74.3	1.816E-01	1.820E-01	5.343E-01
I-131	7.404E-02	91.9	6.807E-02	6.817E-02	2.950E-01
Gd-153	1.668E-01	54.1	9.019E-02	9.070E-02	2.935E-01
Ga-68	3.392E+00	142.1	4.820E+00	4.824E+00	1.725E+01
Tc-99m	4.537E-02	96.1	4.361E-02	4.368E-02	1.470E-01
BA-133	-9.161E-04	104.5	9.576E-04	9.586E-04	3.286E-01
CS-134	1.718E-03	88.8	1.525E-03	1.527E-03	3.273E-01
CS-137	7.988E-02	104.2	8.327E-02	8.336E-02	2.878E-01
CE-139	-8.376E-04	6097.0	5.107E-02	5.107E-02	1.786E-01
Ba-140	1.079E-01	151.7	1.637E-01	1.638E-01	8.795E-01
La-140	4.591E-02	140.6	6.457E-02	6.461E-02	1.909E-01
CE-141	5.466E-02	132.4	7.237E-02	7.241E-02	2.469E-01
CE-144	9.170E-02	325.0	2.981E-01	2.981E-01	1.035E+00
PM-144	9.086E-03	185.9	1.689E-02	1.690E-02	3.282E-01
EU-152	-8.243E-02	239.1	1.971E-01	1.971E-01	6.942E-01
EU-154	4.331E-01	148.6	6.435E-01	6.438E-01	2.298E+00
EU-155	1.485E-01	90.9	1.350E-01	1.352E-01	4.545E-01
HF-181	3.593E-02	113.7	4.084E-02	4.088E-02	2.848E-01
Ta-182	3.824E-02	400.7	1.532E-01	1.533E-01	1.186E+00
Hg-203	1.567E-03	3519.0	5.514E-02	5.514E-02	1.977E-01
TL-208	4.447E-01	20.8	9.240E-02	9.489E-02	1.858E-01
pm-146	4.987E-02	357.8	1.784E-01	1.784E-01	6.673E-01

y-88	4.587E-02	95.8	4.394E-02	4.400E-02	3.315E-01
Cd-113m	-5.881E+02	159.9	9.404E+02	9.410E+02	3.228E+03
Cd-109	0.000E+00	0.0	8.350E-01	8.350E-01	2.917E+00
Cf-251	-9.762E-02	220.7	2.154E-01	2.155E-01	7.473E-01
Cf-249	-4.195E-03	98.7	4.141E-03	4.146E-03	2.977E-01
Sn-126	1.479E-01	239.7	3.546E-01	3.547E-01	1.216E+00
PB-210	-7.820E-01	172.7	1.351E+00	1.352E+00	3.609E+00
PB-212	1.213E+00	15.2	1.849E-01	1.961E-01	4.414E-01
PB-214	2.576E-01	76.6	1.973E-01	1.977E-01	6.986E-01
BI-207	0.000E+00	1000.0	6.629E-02	6.629E-02	3.737E-01
BI-212	1.170E+00	78.5	9.183E-01	9.201E-01	3.101E+00
BI-214	1.049E+00	27.3	2.864E-01	2.909E-01	6.404E-01
BI-210M	8.244E-02	114.2	9.418E-02	9.427E-02	3.219E-01
RA-224	-4.908E+00	47.4	2.324E+00	2.339E+00	7.569E+00
AC-228	1.109E+00	26.6	2.951E-01	2.999E-01	1.180E+00
TH-227	3.828E-01	49.8	1.905E-01	1.916E-01	6.034E-01
TH-229	-2.528E-01	379.9	9.602E-01	9.603E-01	3.346E+00
TH-234	1.151E+00	77.9	8.965E-01	8.983E-01	3.318E+00
PA-231	4.521E-01	71.0	3.209E-01	3.217E-01	6.191E+00
PA-233	1.767E-01	90.5	1.599E-01	1.601E-01	4.151E-01
PA-234	7.398E-02	97.6	7.220E-02	7.229E-02	6.535E-01
PA-234M	7.276E+00	147.9	1.076E+01	1.077E+01	3.917E+01
U-235	2.870E-01	114.9	3.297E-01	3.300E-01	9.599E-01
AM-241	1.118E-02	763.2	8.531E-02	8.532E-02	2.971E-01
Np-237	0.000E+00	0.0	2.919E-01	2.919E-01	1.010E+00
Ir-192	2.625E-04	23760.0	6.236E-02	6.236E-02	2.225E-01
Cs-136	-1.398E-03	4777.0	6.679E-02	6.679E-02	2.551E-01
Np-239	8.670E-02	146.0	1.266E-01	1.267E-01	4.342E-01
Nd-147	-1.646E-01	276.7	4.555E-01	4.556E-01	1.643E+00
Total	3.382E+01				

Analyst: Elizabeth Newns

TestAmerica Spectrum name: 4_Gamma_20141662.An1

Sample description
137389_Gamma_680-102199-A-7-G

Spectrum Filename: C:\User\SPC\Det4\4_Gamma_20141662.An1

Acquisition information
Start time: 8/27/2014 10:16:13 AM
Live time: 7200
Real time: 7214
Dead time: 0.20 %
Detector ID: 4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_Liquid_D=1 25ml.Clb
4_Liquid_D=1 25ml_90101_030512

Energy Calibration
Created: 2/28/2012 2:55:17 PM
Zero offset: 0.091 keV
Gain: 0.250 keV/channel
Quadratic: -2.917E-08 keV/channel^2

Efficiency Calibration
Created: 3/27/2012 8:51:45 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.48 %
Log(Eff): 8.809878E-01 + (-6.811249E-01*Log(E)) +
(-1.909804E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -1.031199E+01 + (3.529752E+00*Log(E)) +
(-4.143154E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Long_Rev7.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (1999.44keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/27/2014 10:15:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	4_2014-08-09_2125.PBC 8/9/2014 9:25:56 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 18 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1697

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.66	-14.	28.31	0.80	5.687E-02	46.54	4.250	PBC<MDA	PB210
59.29	2.	763.21	0.81	6.042E-02	59.54	35.900	PBC<MDA	AM241
63.29	84.	22.30	0.92	6.085E-02	63.29	3.810	PBC<MDA	TH234
64.32	6.	239.74	0.82	6.094E-02	64.28	9.700	PBC<MDA	Sn126
74.93	91.	16.93	0.83	6.109E-02				
77.38	130.	12.74	0.83	6.097E-02				
87.48	6.	239.76	0.84	6.011E-02	86.94	9.040	PBC<MDA	Sn126
					87.57	37.500	3.570E-02	Sn126
87.57	24.	239.76	0.84	6.004E-02	86.94	9.040	6.127E-01	Sn126
					87.57	37.500	1.479E-01	Sn126
92.56	-7.	24.69	0.84	5.937E-02	92.59	5.584	PBC<MDA	TH234
93.32	28.	65.77	0.84	5.926E-02	93.35	5.561	PBC<MDA	AC228
98.71	21.	54.06	0.85	5.863E-02	97.50	30.000	PBC<MDA	Gd153
104.76	3.	385.34	0.85	5.767E-02	103.70	24.000	PBC<MDA	Np239
105.53	8.	146.04	0.86	5.715E-02	105.31	21.200	PBC<MDA	EU155
					106.13	22.700	8.670E-02	Np239
					106.13	22.700	8.670E-02	Np239
105.64	13.	90.87	0.85	5.730E-02	105.31	21.200	PBC<MDA	EU155
					106.13	22.700	1.408E-01	Np239
120.44	2.	626.58	0.87	5.415E-02	121.78	28.580	PBC<MDA	EU152
133.39	4.	325.03	0.88	5.177E-02	133.54	11.090	PBC<MDA	CE144
136.36	12.	113.67	0.88	5.117E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	3.000E-01	CO57
136.36	12.	113.67	0.88	5.121E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	3.000E-01	CO57

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
141.09	13.	96.10	0.89	5.035E-02	140.51	89.300	PBC<MDA	Tc99m
144.78	9.	132.39	0.89	4.935E-02	145.44	48.200	PBC<MDA	CE141
161.56	7.	151.67	0.91	4.592E-02	162.66	6.220	PBC<MDA	Ba140
163.21	8.	153.34	0.91	4.578E-02	163.38	5.080	PBC<MDA	U235
204.96	10.	114.87	0.95	3.736E-02	205.33	5.010	PBC<MDA	U235
233.06	11.	49.76	0.97	3.302E-02	235.97	12.300	PBC<MDA	TH227
238.56	150.	12.57	0.94	3.270E-02	238.63	43.300	1.213E+00	PB212
241.70	13.	98.83	0.98	3.229E-02	242.00	7.430	PBC<MDA	PB214
256.40	6.	168.99	0.99	3.068E-02	256.24	7.000	PBC<MDA	TH227
265.61	9.	114.23	1.00	2.969E-02	265.83	50.000	PBC<MDA	BI210M
277.33	3.	303.74	1.01	2.859E-02	277.28	6.310	PBC<MDA	TL208
295.09	-1.	120.28	1.03	2.704E-02	295.09	19.300	PBC<MDA	PB214
298.13	9.	68.86	1.03	2.664E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
298.18	12.	70.98	1.03	2.663E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	2.525E+00	PA231
299.71	11.	90.50	1.03	2.663E-02	300.18	6.200	PBC<MDA	PA233
304.12	7.	125.49	1.03	2.641E-02	302.85	18.330	PBC<MDA	BA133
314.86	4.	219.55	1.04	2.572E-02	312.01	36.000	PBC<MDA	PA233
329.29	6.	140.65	1.06	2.453E-02	328.76	20.300	PBC<MDA	La140
332.73	6.	136.62	1.06	2.422E-02	333.44	15.510	PBC<MDA	Cf249
337.80	34.	27.68	1.07	2.391E-02	338.32	12.010	1.660E+00	AC228
351.52	16.	35.62	1.08	2.307E-02	351.93	37.600	PBC<MDA	PB214
428.23	4.	153.95	1.15	1.931E-02	427.88	29.600	PBC<MDA	SB125
497.85	2.	453.66	1.21	1.684E-02	497.05	90.900	PBC<MDA	RU103
					497.05	90.900	1.396E-02	RU103
511.01	67.	19.11	1.22	1.639E-02	511.86	20.000	2.848E+00	RH106
					511.86	20.000	2.848E+00	RH106
536.99	1.	462.41	1.24	1.568E-02	537.26	24.390	PBC<MDA	Ba140
563.24	4.	185.45	1.26	1.501E-02	563.24	8.350	PBC<MDA	CS134
569.26	5.	157.84	1.27	1.486E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	6.047E-01	PA234
					569.70	97.740	5.075E-02	BI207
569.29	5.	155.68	1.27	1.486E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	6.169E-01	PA234
					569.70	97.740	5.177E-02	BI207
583.16	39.	20.78	1.03	1.454E-02	583.02	84.500	4.447E-01	TL208
600.42	6.	131.57	1.30	1.414E-02	600.50	17.860	PBC<MDA	SB125
601.47	6.	122.50	1.30	1.410E-02	602.73	98.260	PBC<MDA	SB124
609.32	49.	21.98	0.38	1.396E-02	609.31	46.090	1.048E+00	BI214
					610.30	5.750	8.417E+00	RU103
609.49	28.	36.16	1.30	1.393E-02	609.31	46.090	PBC<MDA	BI214
					610.30	5.750	4.859E+00	RU103
					610.30	5.750	4.859E+00	RU103
617.55	4.	185.92	1.31	1.377E-02	618.06	99.100	PBC<MDA	PM144
622.16	10.	77.25	1.31	1.369E-02	621.92	9.930	PBC<MDA	RH106
					621.92	9.930	1.008E+00	RH106
636.66	7.	91.94	1.33	1.339E-02	636.97	7.170	PBC<MDA	I131
638.60	5.	93.18	1.33	1.341E-02				
661.94	6.	104.24	1.35	1.293E-02	661.66	85.210	PBC<MDA	CS137
701.60	3.	224.37	1.38	1.223E-02	702.63	97.900	PBC<MDA	NB94
727.06	8.	78.47	1.40	1.184E-02	727.17	7.550	PBC<MDA	BI212
746.74	1.	357.76	1.42	1.154E-02	747.16	34.000	PBC<MDA	pm146
					747.16	34.000	4.987E-02	pm146

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
755.58	2.	216.97	1.43	1.141E-02	756.73	54.460	PBC<MDA	ZR95
764.03	2.	301.00	1.43	1.131E-02	763.94	22.280	PBC<MDA	AG110M
766.74	2.	379.11	1.44	1.127E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	6.833E+00	PA234M
785.19	4.	168.22	1.45	1.102E-02	785.42	1.280	PBC<MDA	BI212
816.36	2.	293.37	1.48	1.063E-02	815.77	23.280	PBC<MDA	La140
					818.50	100.000	2.750E-02	Cs136
835.83	6.	98.96	1.49	1.041E-02	834.85	99.980	PBC<MDA	MN54
859.00	1.	365.61	1.52	1.011E-02	860.56	12.420	PBC<MDA	TL208
872.96	4.	148.57	1.53	9.976E-03	873.23	12.270	PBC<MDA	EU154
886.12	1.	950.98	1.54	9.854E-03	884.68	72.680	PBC<MDA	AG110M
911.17	20.	38.70	1.56	9.585E-03	911.07	29.000	PBC<MDA	AC228
968.76	10.	64.10	1.60	9.045E-03	968.97	17.460	PBC<MDA	AC228
1001.79	4.	147.89	1.63	8.771E-03	1001.00	0.837	PBC<MDA	PA234M
1050.55	2.	396.30	1.67	8.381E-03	1050.36	1.560	PBC<MDA	RH106
					1050.36	1.560	1.744E+00	RH106
1077.35	4.	142.11	1.69	8.181E-03	1077.40	3.300	PBC<MDA	Ga68
1120.24	3.	212.26	1.73	7.884E-03	1120.29	15.100	PBC<MDA	BI214
1221.81	2.	400.74	1.81	7.262E-03	1221.41	27.000	PBC<MDA	Ta182
1237.98	11.	56.23	1.82	7.168E-03	1238.28	66.070	PBC<MDA	Co56
1291.97	7.	68.08	1.86	6.885E-03	1291.60	43.200	PBC<MDA	FE59
1384.21	3.	152.41	1.93	6.444E-03	1384.30	24.290	PBC<MDA	AG110M
1460.63	55.	13.84	1.99	6.120E-03	1460.83	10.670	1.170E+01	K40
1690.32	1.	292.78	2.16	5.316E-03	1690.98	47.790	PBC<MDA	SB124
1764.45	-2.	73.13	2.21	5.102E-03	1764.49	15.400	PBC<MDA	BI214
1836.40	3.	95.78	2.26	4.909E-03	1836.06	99.200	PBC<MDA	y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
299.19	74.93	88.	76.	1.244E+03	23.73	0.787	-	
309.01	77.39	82.	124.	2.026E+03	15.30	0.803	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Routine Long_Rev7.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.19	46.66	166.	-14.	-0.002	28.31	0.800s
TH-227	198.33	49.70	91.	-6.	-0.001	221.35	0.803s
AM-241	236.64	59.29	88.	2.	0.000	763.21	0.812s
TH-234	252.64	63.29	128.	19.	0.003	21.37	0.816D
Sn-126	256.61	64.28	111.	6.	0.001	239.74	0.817D
BA-133	321.06	80.40	97.	-4.	-0.001	338.56	0.832s
Sn-126	347.20	86.94	77.	6.	0.001	239.76	0.838D
Sn-126	349.72	87.57	65.	24.	0.003	239.76	0.838D
Nd-147	364.56	91.28	222.	-32.	-0.004	68.43	0.841s
TH-234	369.79	92.59	173.	-7.	-0.001	24.69	0.843D
AC-228	372.83	93.35	153.	28.	0.004	65.77	0.843D
Gd-153	394.24	98.71	55.	21.	0.003	54.06	0.847s
Gd-153	418.43	104.76	61.	3.	0.000	385.34	0.853s
Np-239	413.09	103.42	83.	-5.	-0.001	242.61	0.853s
EU-155	421.96	105.64	63.	13.	0.002	90.87	0.854s
Np-239	421.52	105.53	64.	8.	0.001	146.04	0.855s
EU-152	481.12	120.44	54.	2.	0.000	626.58	0.870s
CO-57	489.62	122.56	80.	-19.	-0.003	71.20	0.870s
EU-154	489.80	122.61	66.	-17.	-0.002	72.91	0.871s
PA-234	526.69	131.84	79.	-11.	-0.002	114.84	0.878s
CE-144	532.91	133.39	74.	4.	0.001	325.03	0.880s
HF-181	544.76	136.36	84.	12.	0.002	113.67	0.883s
CO-57	544.76	136.36	84.	12.	0.002	113.67	0.883s
Tc-99m	563.68	141.09	73.	13.	0.002	96.10	0.887s
CE-141	578.43	144.78	72.	9.	0.001	132.39	0.891s
Ba-140	645.53	161.56	49.	7.	0.001	151.67	0.907s
U-235	652.13	163.21	74.	8.	0.001	153.34	0.908s
Cf-251	703.69	176.11	61.	-5.	-0.001	220.68	0.920s
TH-229	771.09	192.96	70.	-3.	0.000	379.87	0.935s
U-235	819.05	204.96	60.	10.	0.001	114.87	0.946s
TH-229	843.19	211.00	63.	-8.	-0.001	147.80	0.951s
Cf-251	898.28	224.77	49.	-8.	-0.001	135.02	0.966s
TH-227	931.42	233.06	10.	11.	0.002	49.76	0.974s
PB-212	953.42	238.56	82.	124.	0.017	12.57	0.942
RA-224	959.30	240.04	224.	-47.	-0.007	47.35	0.978s
PB-214	965.97	241.70	94.	13.	0.002	98.83	0.979s
TH-227	1024.72	256.40	45.	6.	0.001	168.99	0.992s
Cd-113m	1054.77	263.91	70.	-8.	-0.001	159.89	0.999s
BI-210M	1061.55	265.61	46.	9.	0.001	114.23	1.001
TL-208	1108.42	277.33	49.	3.	0.000	303.74	1.011s
PB-212	1191.61	298.13	32.	9.	0.001	68.86	1.032
PA-231	1191.80	298.18	30.	12.	0.002	70.98	1.032s
PA-233	1197.91	299.71	41.	11.	0.001	90.50	1.032s
PA-231	1206.81	301.93	45.	-7.	-0.001	136.29	1.034s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BA-133	1215.56	304.12	30.	7.	0.001	125.49	1.034s
Ba-140	1218.81	304.94	48.	-3.	0.000	325.25	1.036s
BI-210M	1219.24	305.04	50.	-3.	0.000	312.76	1.036s
Ir-192	1232.95	308.47	55.	-4.	-0.001	257.18	1.039s
PA-233	1258.50	314.86	29.	4.	0.000	219.55	1.043s
CR-51	1279.08	320.01	50.	-3.	0.000	304.88	1.050s
La-140	1316.20	329.29	38.	6.	0.001	140.65	1.058s
Cf-249	1329.95	332.73	34.	6.	0.001	136.62	1.062s
AC-228	1350.22	337.80	28.	34.	0.005	27.68	1.066s
Cs-136	1360.07	340.26	61.	-13.	-0.002	88.56	1.068s
EU-152	1382.50	345.87	37.	-4.	-0.001	239.09	1.071s
HF-181	1373.51	343.62	34.	-4.	-0.001	191.33	1.073s
PB-214	1405.09	351.52	77.	16.	0.002	35.62	1.078s
BA-133	1427.90	357.23	44.	-6.	-0.001	167.20	1.082s
BA-133	1535.81	384.21	44.	-5.	-0.001	205.35	1.107s
Cf-249	1547.72	387.19	34.	-6.	-0.001	142.49	1.110s
SB-125	1711.87	428.23	17.	4.	0.001	153.95	1.146
AG-108M	1732.85	433.48	32.	-3.	0.000	291.83	1.151s
pm-146	1814.67	453.94	27.	-2.	0.000	347.74	1.168s
BE-7	1909.19	477.57	30.	-2.	0.000	428.45	1.189s
La-140	1945.21	486.58	40.	-8.	-0.001	114.84	1.198s
RU-103	1990.30	497.85	24.	2.	0.000	453.66	1.206s
RH-106	2042.92	511.01	49.	67.	0.009	19.11	1.219s
Nd-147	2129.45	532.65	22.	-2.	0.000	276.74	1.236s
Ba-140	2146.84	536.99	21.	1.	0.000	462.41	1.241s
CS-134	2251.81	563.24	24.	4.	0.001	185.45	1.264s
CS-134	2276.03	569.29	33.	5.	0.001	155.68	1.269s
PA-234	2275.88	569.26	32.	5.	0.001	157.84	1.269s
TL-208	2331.49	583.16	9.	39.	0.005	20.78	1.027
SB-125	2400.51	600.42	28.	6.	0.001	131.57	1.296s
SB-124	2404.74	601.47	23.	6.	0.001	122.50	1.298s
CS-134	2417.94	604.77	40.	-9.	-0.001	110.82	1.300s
BI-214	2436.12	609.32	33.	49.	0.007	21.98	0.382s
RU-103	2436.80	609.49	37.	28.	0.004	36.16	1.305s
AG-108M	2455.53	614.17	36.	-5.	-0.001	177.62	1.308s
PM-144	2469.05	617.55	25.	4.	0.001	185.92	1.311s
RH-106	2487.48	622.16	24.	10.	0.001	77.25	1.315s
SB-125	2553.22	638.60	10.	5.	0.001	93.18	1.326s
I-131	2545.47	636.66	16.	7.	0.001	91.94	1.327s
AG-110M	2631.17	658.08	28.	-4.	-0.001	181.12	1.345s
CS-137	2646.60	661.94	19.	6.	0.001	104.24	1.348s
PM-144	2786.22	696.84	31.	-2.	0.000	410.75	1.378s
NB-94	2805.24	701.60	25.	3.	0.000	224.37	1.383s
SB-124	2894.87	724.01	29.	-6.	-0.001	139.18	1.400s
AG-108M	2894.59	723.93	29.	-5.	-0.001	149.63	1.401s
EU-154	2894.64	723.95	28.	-5.	-0.001	152.87	1.401s
ZR-95	2894.46	723.90	23.	-4.	0.000	195.47	1.401s
BI-212	2907.10	727.06	14.	8.	0.001	78.47	1.404s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
pm-146	2985.83	746.74	12.	1.	0.000	357.76	1.421s
ZR-95	3021.16	755.58	13.	2.	0.000	216.97	1.429s
AG-110M	3054.97	764.03	20.	2.	0.000	301.00	1.435s
PA-234M	3065.83	766.74	18.	2.	0.000	379.11	1.437s
BI-212	3139.62	785.19	22.	4.	0.001	168.22	1.453s
CS-134	3202.49	800.90	29.	-5.	-0.001	173.49	1.467s
La-140	3264.34	816.36	18.	2.	0.000	293.37	1.478s
MN-54	3342.21	835.83	16.	6.	0.001	98.96	1.494s
TL-208	3434.94	859.00	14.	1.	0.000	365.61	1.516s
NB-94	3482.39	870.87	23.	-5.	-0.001	139.81	1.524s
EU-154	3490.79	872.96	14.	4.	0.001	148.57	1.526s
PA-234	3527.73	882.20	21.	-3.	0.000	261.77	1.532s
AG-110M	3543.42	886.12	15.	1.	0.000	950.98	1.536s
AC-228	3643.64	911.17	20.	20.	0.003	38.70	1.557s
PA-234	3785.17	946.54	19.	-4.	-0.001	178.79	1.586s
AC-228	3874.05	968.76	17.	10.	0.001	64.10	1.605s
PA-234M	4006.23	1001.79	15.	4.	0.001	147.89	1.631s
Co-56	4152.91	1038.45	17.	-4.	-0.001	140.31	1.661s
RH-106	4201.32	1050.55	20.	2.	0.000	396.30	1.671s
BI-207	4252.29	1063.28	18.	-1.	0.000	720.49	1.682s
Ga-68	4308.57	1077.35	12.	4.	0.001	142.11	1.693s
FE-59	4395.90	1099.17	20.	-3.	0.000	236.96	1.710s
EU-152	4444.18	1111.24	17.	-2.	0.000	295.77	1.720s
BI-214	4480.20	1120.24	18.	3.	0.000	212.26	1.727s
CO-60	4689.67	1172.58	12.	-1.	0.000	920.93	1.769s
Ta-182	4754.48	1188.78	23.	-6.	-0.001	122.24	1.781s
Ta-182	4886.70	1221.81	20.	2.	0.000	400.74	1.807s
Co-56	4951.38	1237.98	13.	11.	0.002	56.23	1.820s
NA-22	5100.65	1275.27	21.	-3.	0.000	215.38	1.848s
EU-154	5100.65	1275.27	21.	-3.	0.000	215.22	1.848s
FE-59	5167.48	1291.97	8.	7.	0.001	68.08	1.861s
CO-60	5332.47	1333.19	22.	-2.	0.000	336.93	1.893s
AG-110M	5536.69	1384.21	11.	3.	0.000	152.41	1.932s
K-40	5842.59	1460.63	24.	55.	0.008	13.84	1.991
SB-124	6762.12	1690.32	9.	1.	0.000	292.78	2.161s
BI-214	7058.96	1764.45	17.	-2.	0.000	73.13	2.214s
y-88	7347.06	1836.40	3.	3.	0.000	95.78	2.265s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-1.3891E-01				5.31E+01	
			477.60	-1.389E-01	?(	2.137E+00 4.28E+02 1.05E+01	G
NA-22	C	-6.2438E-02				9.50E+02	
			1274.53	-6.244E-02	?(	4.816E-01 2.15E+02 9.99E+01	G
K-40	N	1.1698E+01				4.66E+11	
			1460.83	1.170E+01	(P	5.407E+00 1.38E+01 1.07E+01	G
CR-51	F	-1.8597E-01				2.77E+01	
			320.08	-1.860E-01	?(	1.989E+00 3.05E+02 9.94E+00	G
MN-54	C	8.2813E-02				3.12E+02	
			834.85	8.281E-02	?(	2.830E-01 9.90E+01 1.00E+02	G
FE-59	F	9.2502E-02				4.45E+01	
			1099.25	-8.374E-02	?(	7.152E-01 2.37E+02 5.65E+01	G
			1291.60	3.230E-01	?(	7.276E-01 6.81E+01 4.32E+01	G
Co-56	C	1.2707E-01				7.73E+01	
			846.77	0.000E+00	?(	2.753E-01 1.00E+03 9.99E+01	G
			1238.28	3.193E-01	?(	5.778E-01 5.62E+01 6.61E+01	G
			1037.84	-5.071E-01	+	2.518E+00 1.40E+02 1.41E+01	G
			1771.35	-1.296E-02	%	3.549E+00 7.20E+03 1.55E+01	A
CO-57	C	-1.6744E-02				2.72E+02	
			122.06	-5.626E-02	?(	1.330E-01 7.12E+01 8.56E+01	G
			136.47	3.000E-01	(	1.155E+00 1.14E+02 1.07E+01	G
CO-60	F	-4.1907E-02				1.93E+03	
			1332.50	-4.191E-02	?(	5.113E-01 3.37E+02 1.00E+02	G
			1173.24	-9.791E-03	+	3.437E-01 9.21E+02 9.99E+01	G
ZN-65	F	1.4536E-02				2.44E+02	
			1115.55	1.454E-02	%(	7.353E-01 1.35E+03 5.06E+01	G
NB-94	I	3.7660E-02				7.41E+06	
			702.63	3.766E-02	?(	3.012E-01 2.24E+02 9.79E+01	G
			871.10	-7.141E-02	+	3.498E-01 1.40E+02 9.99E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ZR-95	I	5.5588E-02					6.40E+01	
			756.73	5.559E-02	&(	4.407E-01	2.17E+02	5.45E+01 G
			724.20	-9.524E-02	+	6.624E-01	1.95E+02	4.42E+01 G
NB-95	I	-6.5166E-05					6.40E+01	
			765.79	-6.517E-05	&(	2.977E-01	1.23E+05	9.98E+01 G
RU-103	I	1.3962E-02					3.93E+01	
			497.05	1.396E-02	?(	2.300E-01	4.54E+02	9.09E+01 G
			610.30	4.859E+00	?	5.407E+00	3.62E+01	5.75E+00 GA
RH-106	I	1.1080E+00					3.74E+02	
			621.92	1.008E+00	(	2.615E+00	7.73E+01	9.93E+00 G
			1050.36	1.744E+00	?(	2.520E+01	3.96E+02	1.56E+00 G
			511.86	2.848E+00	?	1.495E+00	1.91E+01	2.00E+01 GA
AG-108M	C	-2.2551E-02					1.53E+05	
			433.94	-2.255E-02	?(	2.341E-01	2.92E+02	9.05E+01 G
			722.94	-6.804E-02	&	3.558E-01	1.50E+02	9.08E+01 G
			614.28	-5.542E-02	+	3.441E-01	1.78E+02	8.98E+01 G
AG-110M	F	8.8654E-02					2.50E+02	
			884.68	1.138E-02	&(	4.059E-01	9.51E+02	7.27E+01 G
			657.76	-4.821E-02	+	3.078E-01	1.81E+02	9.46E+01 G
			937.49	1.353E-02	%	1.071E+00	2.15E+03	3.44E+01 G
			1384.30	2.933E-01	?(	1.614E+00	1.52E+02	2.43E+01 G
			763.94	1.176E-01	?(	1.286E+00	3.01E+02	2.23E+01 G
SN-113	F	-6.3681E-03					1.15E+02	
			391.69	-6.368E-03	%(	2.704E-01	1.16E+03	6.40E+01 G
SB-124	F	6.6205E-02					6.02E+01	
			602.73	5.883E-02	?(	2.507E-01	1.23E+02	9.83E+01 G
			1690.98	8.138E-02	?(	9.019E-01	2.93E+02	4.78E+01 G
			722.79	-6.151E-01	&	2.983E+00	1.39E+02	1.08E+01 G
SB-125	I	2.4437E-01					1.01E+03	
			427.88	9.762E-02	?(	5.343E-01	1.54E+02	2.96E+01 G
			600.50	3.271E-01	&(	1.497E+00	1.32E+02	1.79E+01 G
			635.89	4.978E-01	?(	1.605E+00	9.32E+01	1.13E+01 G
			463.37	3.283E-04	%	1.643E+00	1.33E+05	1.05E+01 G
I-131	I	7.4042E-02					8.02E+00	
			364.48	-5.784E-03	%(	2.950E-01	1.44E+03	8.17E+01 G
			284.30	-6.328E-02	&	2.924E+00	1.30E+03	6.14E+00 G
			636.97	9.836E-01	(	3.101E+00	9.19E+01	7.17E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Gd-153	F	1.6682E-01					2.42E+02	
			97.50	1.668E-01	?(	2.935E-01	5.41E+01	3.00E+01 G
			103.20	3.196E-02	&	4.310E-01	3.85E+02	2.18E+01 G
Ga-68	C	3.3918E+00					4.71E-02	
			1077.40	3.392E+00	?(	1.725E+01	1.42E+02	3.30E+00 G
Tc-99m	I	4.5373E-02					2.51E-01	
			140.51	4.537E-02	&(	1.470E-01	9.61E+01	8.93E+01 G
BA-133	F	-9.1614E-04					3.85E+03	
			356.00	-5.659E-02	&(	3.286E-01	1.67E+02	6.20E+01 G
			302.85	1.876E-01	?(	8.147E-01	1.25E+02	1.83E+01 G
			383.84	-3.402E-01	+	2.440E+00	2.05E+02	8.94E+00 GA
			80.99	-2.799E-02	+	3.272E-01	3.39E+02	3.41E+01 GA
CS-134	I	1.7179E-03					7.54E+02	
			604.71	-8.635E-02	?(	3.273E-01	1.11E+02	9.76E+01 G
			795.87	1.377E-03	%	4.129E-01	8.22E+03	8.55E+01 G
			569.32	3.288E-01	?(	1.786E+00	1.56E+02	1.54E+01 G
			801.95	-6.781E-01	+	4.134E+00	1.73E+02	8.69E+00 G
			563.24	4.288E-01	?(	2.820E+00	1.85E+02	8.35E+00 G
CS-137	I	7.9881E-02					1.10E+04	
			661.66	7.988E-02	?(	2.878E-01	1.04E+02	8.52E+01 G
CE-139	F	-8.3755E-04					1.38E+02	
			165.85	-8.376E-04	%(	1.786E-01	6.10E+03	7.99E+01 G
Ba-140	I	1.0794E-01					1.28E+01	
			537.26	5.212E-02	?(	8.795E-01	4.62E+02	2.44E+01 G
			162.66	3.268E-01	&(	1.712E+00	1.52E+02	6.22E+00 G
			304.85	-3.770E-01	+	4.312E+00	3.25E+02	4.29E+00 G
La-140	I	4.5907E-02					1.28E+01	
			1596.21	0.000E+00	?(	1.909E-01	1.00E+03	9.54E+01 G
			487.02	-1.448E-01	+	5.702E-01	1.15E+02	4.55E+01 G
			328.76	1.793E-01	?(	8.731E-01	1.41E+02	2.03E+01 G
			815.77	1.177E-01	?(	1.258E+00	2.93E+02	2.33E+01 G
CE-141	I	5.4660E-02					3.25E+01	
			145.44	5.466E-02	?(	2.469E-01	1.32E+02	4.82E+01 G
CE-144	I	9.1701E-02					2.85E+02	
			133.54	9.170E-02	?(	1.035E+00	3.25E+02	1.11E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PM-144	C 9.0862E-03				3.63E+02		
		696.54	-2.231E-02	?(	3.282E-01	4.11E+02	9.90E+01 G
		618.06	4.045E-02	&(	2.662E-01	1.86E+02	9.91E+01 G
		476.81	0.000E+00	-	6.153E-01	1.00E+03	4.20E+01 G
EU-152	F -8.2426E-02				4.94E+03		
		344.29	-8.243E-02	?(	6.942E-01	2.39E+02	2.65E+01 G
		1112.07	-2.619E-01	+	2.827E+00	2.96E+02	1.36E+01 G
		121.78	1.507E-02	&	3.330E-01	6.27E+02	2.86E+01 G
		778.92	0.000E+00	+	2.352E+00	1.00E+03	1.29E+01 G
		964.11	0.000E+00	&	4.992E+00	1.00E+03	1.46E+01 G
		244.69	-1.258E-02	&	1.810E+00	4.00E+03	7.58E+00 G
		1408.00	3.275E-02	%	1.681E+00	1.31E+03	2.10E+01 GA
EU-154	I 4.3311E-01				3.14E+03		
		873.23	4.331E-01	&(	2.298E+00	1.49E+02	1.23E+01 G
		123.10	-1.057E-01	-	2.564E-01	7.29E+01	4.08E+01 G
		1274.54	-1.775E-01	-	1.368E+00	2.15E+02	3.52E+01 G
		723.36	-2.959E-01	+	1.583E+00	1.53E+02	2.02E+01 G
		1004.77	8.872E-04	%	2.029E+00	6.12E+04	1.80E+01 G
		996.33	4.525E-02	%	3.258E+00	1.92E+03	1.06E+01 G
EU-155	I 1.4854E-01				1.81E+03		
		105.31	1.485E-01	?(	4.545E-01	9.09E+01	2.12E+01 G
		86.54	0.000E+00	}	2.901E-01	6.48E+02	3.07E+01 G
HF-181	F 3.5926E-02				4.24E+01		
		482.00	-1.236E-03	&(	2.848E-01	6.34E+03	8.05E+01 G
		133.02	4.998E-03	%	2.747E-01	1.57E+03	4.33E+01 G
		345.83	-1.748E-01	+	1.174E+00	1.91E+02	1.51E+01 G
		136.30	5.473E-01	(	2.107E+00	1.14E+02	5.85E+00 G
Ta-182	F 3.8240E-02				1.14E+02		
		1121.30	-1.982E-02	%(	1.186E+00	1.61E+03	3.49E+01 G
		1221.41	1.133E-01	?(	1.659E+00	4.01E+02	2.70E+01 G
		1189.05	-6.734E-01	+	2.864E+00	1.22E+02	1.62E+01 G
Hg-203	F 1.5667E-03				4.66E+01		
		279.20	1.567E-03	%(	1.977E-01	3.52E+03	8.15E+01 G
TL-208	N 4.4474E-01				6.98E+02		
		583.02	4.447E-01	(	1.858E-01	2.08E+01	8.45E+01 G
		277.28	2.560E-01	-	2.729E+00	3.04E+02	6.31E+00 G
		860.56	1.622E-01	&	2.203E+00	3.66E+02	1.24E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
pm-146	C	4.9869E-02					2.02E+03	
			747.16	4.987E-02	&(	6.673E-01	3.58E+02	3.40E+01 G
			735.72	6.677E-03	&	1.145E+00	4.56E+03	2.25E+01 G
			453.88	-2.532E-02	+	3.162E-01	3.48E+02	6.50E+01 G
y-88	F	4.5874E-02					1.07E+02	
			898.04	-2.232E-03	%(	3.315E-01	3.95E+03	9.37E+01 G
			1836.06	9.131E-02	?(	3.114E-01	9.58E+01	9.92E+01 G
Cd-113m		-5.8814E+02					5.33E+03	
			263.70	-5.881E+02	?(	3.228E+03	1.60E+02	6.00E-03 K
Cf-251	T	-9.7618E-02					3.28E+05	
			176.60	-9.762E-02	?(	7.473E-01	2.21E+02	1.70E+01 G
			227.00	-4.922E-01	+	2.284E+00	1.35E+02	6.30E+00 GA
Cf-249	T	-4.1953E-03					1.28E+05	
			387.95	-6.017E-02	?(	2.977E-01	1.42E+02	6.60E+01 G
			333.44	2.340E-01	?(	1.108E+00	1.37E+02	1.55E+01 G
Sn-126		1.4790E-01					3.65E+07	
			87.57	1.479E-01	}	2.487E-01	2.40E+02	3.75E+01 GA
			64.28	1.479E-01	(	1.216E+00	2.40E+02	9.70E+00 G
			86.94	1.479E-01	}	1.117E+00	2.40E+02	9.04E+00 GA
PB-210	N	-7.8204E-01					8.14E+03	
			46.54	-7.820E-01	*(P	3.609E+00	2.83E+01	4.25E+00 G
PB-212	N	1.2133E+00					6.98E+02	
			238.63	1.213E+00	(P	4.414E-01	1.26E+01	4.33E+01 G
			300.03	1.477E+00	P	4.642E+00	6.89E+01	3.28E+00 GA
PB-214	N	2.5758E-01					5.84E+05	
			351.93	2.576E-01	*(P	6.986E-01	3.56E+01	3.76E+01 G
			295.09	-3.246E-02	% P	1.096E+00	1.20E+02	1.93E+01 G
			242.00	7.703E-01	& P	2.769E+00	9.88E+01	7.43E+00 GA
BI-212	N	1.1703E+00					6.98E+02	
			727.17	1.170E+00	?(	3.101E+00	7.85E+01	7.55E+00 G
			785.42	4.093E+00	?	2.437E+01	1.68E+02	1.28E+00 GA
BI-214	N	1.0485E+00					5.84E+05	
			609.31	1.048E+00	(P	6.404E-01	2.20E+01	4.61E+01 G
			1120.29	3.416E-01	-	2.613E+00	2.12E+02	1.51E+01 G
			1764.49	-4.244E-01	- P	3.843E+00	7.31E+01	1.54E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-210M	T	8.2442E-02					1.10E+09	
			265.83	8.244E-02	?(	3.219E-01	1.14E+02	5.00E+01 G
			304.90	-6.159E-02	-	6.759E-01	3.13E+02	2.80E+01 G
RA-224	N	-4.9078E+00					6.98E+02	
			240.99	-4.908E+00	(	7.569E+00	4.74E+01	4.10E+00 G
AC-228	N	1.1092E+00					2.10E+03	
			911.07	1.003E+00	?(	1.180E+00	3.87E+01	2.90E+01 G
			968.97	9.065E-01	?(	1.912E+00	6.41E+01	1.75E+01 G
			338.32	1.660E+00	&(	1.323E+00	2.77E+01	1.20E+01 G
			93.35	1.171E+00		2.545E+00	6.58E+01	5.56E+00 XA
TH-227	N	3.8282E-01					7.95E+03	
			235.97	3.881E-01	&(	6.034E-01	4.98E+01	1.23E+01 G
			50.14	-1.848E-01	-	1.406E+00	2.21E+02	8.00E+00 G
			256.24	3.736E-01	&(	2.191E+00	1.69E+02	7.00E+00 G
TH-229	N	-2.5276E-01					2.68E+06	
			193.51	-2.528E-01	?(	3.346E+00	3.80E+02	4.40E+00 G
			210.85	-9.976E-01	+	5.060E+00	1.48E+02	2.99E+00 G
TH-234	N	1.1509E+00					1.63E+12	
			63.29	1.151E+00	(P	3.318E+00	2.14E+01	3.81E+00 G
			92.59	-2.861E-01	- P	2.680E+00	2.47E+01	5.58E+00 G
PA-231	N	4.5208E-01					1.20E+07	
			302.65	-1.318E+00	?(	6.191E+00	1.36E+02	2.88E+00 G
			300.07	2.525E+00	&(	5.966E+00	7.10E+01	2.46E+00 G
PA-233	C	1.7668E-01					7.82E+08	
			312.01	5.333E-02	?(	4.151E-01	2.20E+02	3.60E+01 G
			300.18	8.929E-01	&(	2.733E+00	9.05E+01	6.20E+00 G
PA-234	N	7.3975E-02					1.63E+12	
			131.29	-1.678E-01	?(	6.535E-01	1.15E+02	1.80E+01 G
			946.02	-4.067E-01	+	2.594E+00	1.79E+02	1.34E+01 G
			569.47	6.047E-01	&(	3.333E+00	1.58E+02	8.20E+00 G
			883.24	-5.921E-02	%	3.503E+00	1.60E+03	9.60E+00 G
			880.53	-5.916E-01	+	5.587E+00	2.62E+02	6.00E+00 GA
PA-234M	N	7.2759E+00					1.63E+12	
			1001.00	7.431E+00	&(	3.917E+01	1.48E+02	8.37E-01 G
			766.41	6.833E+00	?(	9.488E+01	3.79E+02	2.94E-01 G

Nuclide		Ave activity	Energy		Activity	Code	Peak	MDA	Comments
U-235	N	2.8701E-01						2.57E+11	
			143.79	-1.049E-02	&(		9.599E-01	2.58E+03	1.10E+01 G
			205.33	7.367E-01	?(		2.881E+00	1.15E+02	5.01E+00 G
			163.38	4.853E-01	?(		2.549E+00	1.53E+02	5.08E+00 G
AM-241	T	1.1178E-02						1.58E+05	
			59.54	1.118E-02	?(		2.971E-01	7.63E+02	3.59E+01 G
Ir-192	F	2.6245E-04						7.40E+01	
			316.49	2.625E-04	%(		2.225E-01	2.38E+04	8.70E+01 G
			468.06	-6.998E-03	%		4.351E-01	1.72E+03	5.18E+01 G
			308.44	-7.022E-02	+		6.298E-01	2.57E+02	3.18E+01 G
			295.95	0.000E+00	-		6.047E-01	1.00E+03	3.02E+01 G
Cs-136	F	-1.3981E-03						1.30E+01	
			818.50	-1.398E-03	%(		2.551E-01	4.78E+03	1.00E+02 G
			1048.07	1.101E-02	&		4.879E-01	1.20E+03	8.00E+01 G
			340.57	-1.640E-01	+		4.886E-01	8.86E+01	4.69E+01 G
Np-239	T	8.6704E-02						2.36E+00	
			103.70	-5.498E-02	&		4.601E-01	2.43E+02	2.40E+01 X
			106.13	8.670E-02	?(		4.342E-01	1.46E+02	2.27E+01 G
			99.50	0.000E+00	-		6.483E-01	1.00E+03	1.50E+01 X
Nd-147		-1.6458E-01						1.11E+01	
			531.00	-1.646E-01	?(		1.643E+00	2.77E+02	1.30E+01 G
			91.10	-2.628E-01	+		5.948E-01	6.84E+01	2.83E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes: Peak Codes:

T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.66	166.	-14.	-0.002	28.31	-7.820E-01	P
TH-227	49.70	91.	-6.	-0.001	221.35	-1.848E-01	
AM-241	59.29	88.	2.	0.000	763.21	1.118E-02	
BA-133	80.40	97.	-4.	-0.001	338.56	-2.799E-02	
Nd-147	91.28	222.	-32.	-0.004	68.43	-2.628E-01	
Gd-153	98.71	55.	21.	0.003	54.06	1.668E-01	
Gd-153	104.76	61.	3.	0.000	385.34	3.196E-02	
Np-239	103.42	83.	-5.	-0.001	242.61	-5.498E-02	
Np-239	105.53	64.	8.	0.001	146.04	8.670E-02	
EU-152	120.44	54.	2.	0.000	626.58	1.507E-02	
CO-57	122.56	80.	-19.	-0.003	71.20	-5.626E-02	
EU-154	122.61	66.	-17.	-0.002	72.91	-1.057E-01	
PA-234	131.84	79.	-11.	-0.002	114.84	-1.678E-01	
CE-144	133.39	74.	4.	0.001	325.03	9.170E-02	
HF-181	136.36	84.	12.	0.002	113.67	5.473E-01	
CO-57	136.36	84.	12.	0.002	113.67	3.000E-01	
Tc-99m	141.09	73.	13.	0.002	96.10	4.537E-02	
CE-141	144.78	72.	9.	0.001	132.39	5.466E-02	
Ba-140	161.56	49.	7.	0.001	151.67	3.268E-01	
U-235	163.21	74.	8.	0.001	153.34	4.853E-01	
Cf-251	176.11	61.	-5.	-0.001	220.68	-9.762E-02	
TH-229	192.96	70.	-3.	0.000	379.87	-2.528E-01	
U-235	204.96	60.	10.	0.001	114.87	7.367E-01	
TH-229	211.00	63.	-8.	-0.001	147.80	-9.976E-01	
Cf-251	224.77	49.	-8.	-0.001	135.02	-4.922E-01	
TH-227	233.06	10.	11.	0.002	49.76	3.881E-01	
RA-224	240.04	224.	-47.	-0.007	47.35	-4.908E+00	
PB-214	241.70	94.	13.	0.002	98.83	7.703E-01	P
TH-227	256.40	45.	6.	0.001	168.99	3.736E-01	
Cd-113m	263.91	70.	-8.	-0.001	159.89	-5.881E+02	
BI-210M	265.61	46.	9.	0.001	114.23	8.244E-02	
PA-231	298.18	30.	12.	0.002	70.98	2.525E+00	
PA-233	299.71	41.	11.	0.001	90.50	8.929E-01	
PA-231	301.93	45.	-7.	-0.001	136.29	-1.318E+00	
BA-133	304.12	30.	7.	0.001	125.49	1.876E-01	
Ba-140	304.94	48.	-3.	0.000	325.25	-3.770E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
BI-210M	305.04	50.	-3.	0.000	312.76	-6.159E-02		
Ir-192	308.47	55.	-4.	-0.001	257.18	-7.022E-02		
PA-233	314.86	29.	4.	0.000	219.55	5.333E-02		
CR-51	320.01	50.	-3.	0.000	304.88	-1.860E-01		
La-140	329.29	38.	6.	0.001	140.65	1.793E-01		
Cf-249	332.73	34.	6.	0.001	136.62	2.340E-01		
Cs-136	340.26	61.	-13.	-0.002	88.56	-1.640E-01		
EU-152	345.87	37.	-4.	-0.001	239.09	-8.243E-02		
HF-181	343.62	34.	-4.	-0.001	191.33	-1.748E-01		
PB-214	351.52	77.	16.	0.002	35.62	2.576E-01	P	
BA-133	357.23	44.	-6.	-0.001	167.20	-5.659E-02		
BA-133	384.21	44.	-5.	-0.001	205.35	-3.402E-01		
Cf-249	387.19	34.	-6.	-0.001	142.49	-6.017E-02		
SB-125	428.23	17.	4.	0.001	153.95	9.762E-02		
AG-108M	433.48	32.	-3.	0.000	291.83	-2.255E-02		
pm-146	453.94	27.	-2.	0.000	347.74	-2.532E-02		
BE-7	477.57	30.	-2.	0.000	428.45	-1.389E-01		
La-140	486.58	40.	-8.	-0.001	114.84	-1.448E-01		
RU-103	497.85	24.	2.	0.000	453.66	1.396E-02		
RH-106	511.01	49.	67.	0.009	19.11	2.848E+00		
Nd-147	532.65	22.	-2.	0.000	276.74	-1.646E-01		
Ba-140	536.99	21.	1.	0.000	462.41	5.212E-02		
CS-134	563.24	24.	4.	0.001	185.45	4.288E-01		
CS-134	569.29	33.	5.	0.001	155.68	3.288E-01		
PA-234	569.26	32.	5.	0.001	157.84	6.047E-01		
SB-125	600.42	28.	6.	0.001	131.57	3.271E-01		
SB-124	601.47	23.	6.	0.001	122.50	5.883E-02		
CS-134	604.77	40.	-9.	-0.001	110.82	-8.635E-02		
RU-103	609.49	37.	28.	0.004	36.16	4.859E+00		
AG-108M	614.17	36.	-5.	-0.001	177.62	-5.542E-02		
PM-144	617.55	25.	4.	0.001	185.92	4.045E-02		
RH-106	622.16	24.	10.	0.001	77.25	1.008E+00		
SB-125	638.60	10.	5.	0.001	93.18	4.978E-01		
I-131	636.66	16.	7.	0.001	91.94	9.836E-01		
AG-110M	658.08	28.	-4.	-0.001	181.12	-4.821E-02		
CS-137	661.94	19.	6.	0.001	104.24	7.988E-02		
PM-144	696.84	31.	-2.	0.000	410.75	-2.231E-02		
NB-94	701.60	25.	3.	0.000	224.37	3.766E-02		
SB-124	724.01	29.	-6.	-0.001	139.18	-6.151E-01		
AG-108M	723.93	29.	-5.	-0.001	149.63	-6.804E-02		
EU-154	723.95	28.	-5.	-0.001	152.87	-2.959E-01		
ZR-95	723.90	23.	-4.	0.000	195.47	-9.524E-02		
BI-212	727.06	14.	8.	0.001	78.47	1.170E+00		
pm-146	746.74	12.	1.	0.000	357.76	4.987E-02		
ZR-95	755.58	13.	2.	0.000	216.97	5.559E-02		
AG-110M	764.03	20.	2.	0.000	301.00	1.176E-01		
PA-234M	766.74	18.	2.	0.000	379.11	6.833E+00		
BI-212	785.19	22.	4.	0.001	168.22	4.093E+00		

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
CS-134	800.90	29.	-5.	-0.001	173.49	-6.781E-01		
La-140	816.36	18.	2.	0.000	293.37	1.177E-01		
MN-54	835.83	16.	6.	0.001	98.96	8.281E-02		
NB-94	870.87	23.	-5.	-0.001	139.81	-7.141E-02		
EU-154	872.96	14.	4.	0.001	148.57	4.331E-01		
PA-234	882.20	21.	-3.	0.000	261.77	-5.916E-01		
AG-110M	886.12	15.	1.	0.000	950.98	1.138E-02		
PA-234	946.54	19.	-4.	-0.001	178.79	-4.067E-01		
PA-234M	1001.79	15.	4.	0.001	147.89	7.431E+00		
Co-56	1038.45	17.	-4.	-0.001	140.31	-5.071E-01		
RH-106	1050.55	20.	2.	0.000	396.30	1.744E+00		
BI-207	1063.28	18.	-1.	0.000	720.49	-1.913E-02		
Ga-68	1077.35	12.	4.	0.001	142.11	3.392E+00		
FE-59	1099.17	20.	-3.	0.000	236.96	-8.374E-02		
EU-152	1111.24	17.	-2.	0.000	295.77	-2.619E-01		
CO-60	1172.58	12.	-1.	0.000	920.93	-9.791E-03		
Ta-182	1188.78	23.	-6.	-0.001	122.24	-6.734E-01		
Ta-182	1221.81	20.	2.	0.000	400.74	1.133E-01		
Co-56	1237.98	13.	11.	0.002	56.23	3.193E-01		
NA-22	1275.27	21.	-3.	0.000	215.38	-6.244E-02		
EU-154	1275.27	21.	-3.	0.000	215.22	-1.775E-01		
FE-59	1291.97	8.	7.	0.001	68.08	3.230E-01		
CO-60	1333.19	22.	-2.	0.000	336.93	-4.191E-02		
AG-110M	1384.21	11.	3.	0.000	152.41	2.933E-01		
K-40	1460.63	24.	55.	0.008	13.84	1.170E+01	P	
SB-124	1690.32	9.	1.	0.000	292.78	8.138E-02		
y-88	1836.40	3.	3.	0.000	95.78	9.131E-02		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	-1.3890E-01	-1.3891E-01	4.285E+02%	2.14E+00
NA-22	#A	-6.2438E-02	-6.2438E-02	2.154E+02%	4.82E-01
K-40	#	1.1698E+01	1.1698E+01	1.718E+01%	5.41E+00
Sc-46	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.19E-01
CR-51	#A	-1.8596E-01	-1.8597E-01	3.049E+02%	1.99E+00
MN-54	#A	8.2813E-02	8.2813E-02	9.896E+01%	2.83E-01
FE-59	#A	9.2501E-02	9.2502E-02	6.808E+01%	7.15E-01
Co-56	#A	1.2707E-01	1.2707E-01	5.623E+01%	2.75E-01
CO-57	#A	-1.6744E-02	-1.6744E-02	6.706E+01%	1.33E-01
CO-58	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.17E-01
CO-60	#A	-4.1907E-02	-4.1907E-02	3.369E+02%	5.11E-01
ZN-65	#A	1.4536E-02	1.4536E-02	1.348E+03%	7.35E-01
NB-94	#A	3.7660E-02	3.7660E-02	2.244E+02%	3.01E-01

ZR-95	#A	5.5588E-02	5.5588E-02	2.170E+02%	4.41E-01
NB-95	#A	-6.5165E-05	-6.5166E-05	1.231E+05%	2.98E-01
RU-103	#A	1.3961E-02	1.3962E-02	4.537E+02%	2.30E-01
RH-106	#A	1.1080E+00	1.1080E+00	7.725E+01%	2.62E+00
AG-108M	#A	-2.2551E-02	-2.2551E-02	2.918E+02%	2.34E-01
AG-110M	#A	8.8653E-02	8.8654E-02	1.524E+02%	4.06E-01
SN-113	#A	-6.3681E-03	-6.3681E-03	1.162E+03%	2.70E-01
SB-124	#A	6.6205E-02	6.6205E-02	1.225E+02%	2.51E-01
SB-125	#A	2.4437E-01	2.4437E-01	7.431E+01%	5.34E-01
I-131	#A	7.4037E-02	7.4042E-02	9.194E+01%	2.95E-01
Gd-153	#A	1.6682E-01	1.6682E-01	5.406E+01%	2.93E-01
Ga-68	#A	3.3498E+00	3.3918E+00	1.421E+02%	1.72E+01
Tc-99m	#A	4.5268E-02	4.5373E-02	9.610E+01%	1.47E-01
BA-133	#A	-9.1614E-04	-9.1614E-04	1.045E+02%	3.29E-01
CS-134	#A	1.7179E-03	1.7179E-03	8.876E+01%	3.27E-01
CS-137	#A	7.9881E-02	7.9881E-02	1.042E+02%	2.88E-01
CE-139	#A	-8.3755E-04	-8.3755E-04	6.097E+03%	1.79E-01
Ba-140	#A	1.0794E-01	1.0794E-01	1.517E+02%	8.80E-01
La-140	#A	4.5905E-02	4.5907E-02	1.406E+02%	1.91E-01
CE-141	#A	5.4659E-02	5.4660E-02	1.324E+02%	2.47E-01
CE-144	#A	9.1701E-02	9.1701E-02	3.250E+02%	1.04E+00
PM-144	#A	9.0861E-03	9.0862E-03	1.859E+02%	3.28E-01
EU-152	#A	-8.2426E-02	-8.2426E-02	2.391E+02%	6.94E-01
EU-154	#A	4.3311E-01	4.3311E-01	1.486E+02%	2.30E+00
EU-155	A	1.4854E-01	1.4854E-01	9.087E+01%	4.55E-01
HF-181	#A	3.5925E-02	3.5926E-02	1.137E+02%	2.85E-01
Ta-182	#A	3.8240E-02	3.8240E-02	4.007E+02%	1.19E+00
Hg-203	#A	1.5667E-03	1.5667E-03	3.519E+03%	1.98E-01
TL-208		4.4474E-01	4.4474E-01	2.078E+01%	1.86E-01
pm-146	#A	4.9869E-02	4.9869E-02	3.578E+02%	6.67E-01
y-88	#A	4.5874E-02	4.5874E-02	9.578E+01%	3.31E-01
Cd-113m	#A	-5.8814E+02	-5.8814E+02	1.599E+02%	3.23E+03
Cd-109	#A	0.0000E+00	0.0000E+00	0.000E+00%	2.92E+00
Cf-251	#A	-9.7618E-02	-9.7618E-02	2.207E+02%	7.47E-01
Cf-249	#A	-4.1953E-03	-4.1953E-03	9.870E+01%	2.98E-01
Sn-126	A	1.4790E-01	1.4790E-01	2.397E+02%	1.22E+00
PB-210	#A	-7.8204E-01	-7.8204E-01	1.727E+02%	3.61E+00
PB-212		1.2133E+00	1.2133E+00	1.524E+01%	4.41E-01
PB-214	#A	2.5758E-01	2.5758E-01	7.659E+01%	6.99E-01
BI-207	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.74E-01
BI-212	#A	1.1703E+00	1.1703E+00	7.847E+01%	3.10E+00
BI-214		1.0485E+00	1.0485E+00	2.731E+01%	6.40E-01
BI-210M	#A	8.2442E-02	8.2442E-02	1.142E+02%	3.22E-01
RA-224	#A	-4.9078E+00	-4.9078E+00	4.735E+01%	7.57E+00
AC-228	A	1.1092E+00	1.1092E+00	2.661E+01%	1.18E+00
TH-227	#A	3.8282E-01	3.8282E-01	4.976E+01%	6.03E-01
TH-229	#A	-2.5276E-01	-2.5276E-01	3.799E+02%	3.35E+00
TH-234	A	1.1509E+00	1.1509E+00	7.789E+01%	3.32E+00
PA-231	#A	4.5208E-01	4.5208E-01	7.098E+01%	6.19E+00

PA-233 #A	1.7668E-01	1.7668E-01	9.050E+01%	4.15E-01
PA-234 #A	7.3975E-02	7.3975E-02	9.760E+01%	6.53E-01
PA-234M#A	7.2759E+00	7.2759E+00	1.479E+02%	3.92E+01
U-235 #A	2.8701E-01	2.8701E-01	1.149E+02%	9.60E-01
AM-241 #A	1.1178E-02	1.1178E-02	7.632E+02%	2.97E-01
Np-237 #A	0.0000E+00	0.0000E+00	0.000E+00%	1.01E+00
Ir-192 #A	2.6245E-04	2.6245E-04	2.376E+04%	2.22E-01
Cs-136 #A	-1.3981E-03	-1.3981E-03	4.777E+03%	2.55E-01
Np-239 #A	8.6682E-02	8.6704E-02	1.460E+02%	4.34E-01
Nd-147 #A	-1.6458E-01	-1.6458E-01	2.767E+02%	1.64E+00

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (105.1 to 1999.4 keV) 3.816E+00 Bq/Sample
Total Decayed Activity (105.1 to 1999.4 keV) 3.8156729E+00 Bq/Sample

Test America St. Louis Spectrum ID: 4_Gamma_20141662

Sample Description: 137389_Gamma_680-102199-A-7-G
Detector: Ge 4 SN/181
Batch ID: 137389
Work Order Number: Gamma
Lot Number: 680-102199-A-7-G

Decay to Time: 8/27/2014 19:51 Live Time: 7200 sec
Acquisition Time: 8/27/2014 10:16:13 Real Time: 7214 sec
Analysis Time: 8/27/2014 19:51 Dead Time: 0.20 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 4_Liquid_D=1 25ml.Clb
Efficiency Cal Desc: 4_Liquid_D=1 25ml_90101_030512
Efficiency Cal Date: 3/27/2012 20:51
Energy Cal Date: 2/28/2012 14:55
Library: Client_ Long_no ingrowth Rev3.li
Bkgd Correction File: 4_2014-08-09_2125.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-1.382E-01	428.5	5.920E-01	5.921E-01	2.125E+00
NA-22	-6.242E-02	215.4	1.344E-01	1.345E-01	4.815E-01
K-40	1.170E+01	17.2	2.009E+00	2.087E+00	5.407E+00
Sc-46	0.000E+00	1000.0	2.824E-02	2.824E-02	3.176E-01
CR-51	-1.841E-01	304.9	5.613E-01	5.614E-01	1.969E+00
MN-54	8.274E-02	99.0	8.188E-02	8.198E-02	2.827E-01
FE-59	9.193E-02	68.1	6.258E-02	6.274E-02	7.108E-01
Co-56	1.266E-01	56.2	7.120E-02	7.146E-02	2.743E-01
CO-57	-1.673E-02	67.1	1.122E-02	1.125E-02	1.329E-01
CO-58	0.000E+00	1000.0	2.601E-02	2.601E-02	3.160E-01
CO-60	-4.190E-02	336.9	1.412E-01	1.412E-01	5.112E-01
ZN-65	1.452E-02	1348.0	1.957E-01	1.957E-01	7.344E-01
NB-94	3.766E-02	224.4	8.450E-02	8.452E-02	3.012E-01
ZR-95	5.535E-02	217.0	1.201E-01	1.201E-01	4.388E-01
NB-95	-6.488E-05	123100.0	7.987E-02	7.987E-02	2.965E-01
RU-103	1.386E-02	453.7	6.289E-02	6.290E-02	2.284E-01
RH-106	1.107E+00	77.3	8.553E-01	8.570E-01	2.613E+00
AG-108M	-2.255E-02	291.8	6.581E-02	6.582E-02	2.341E-01
AG-110M	8.856E-02	152.4	1.350E-01	1.350E-01	4.055E-01
SN-113	-6.353E-03	1162.0	7.380E-02	7.380E-02	2.697E-01
SB-124	6.590E-02	122.5	8.073E-02	8.079E-02	2.496E-01
SB-125	2.443E-01	74.3	1.815E-01	1.819E-01	5.342E-01
I-131	7.153E-02	91.9	6.576E-02	6.585E-02	2.850E-01
Gd-153	1.666E-01	54.1	9.009E-02	9.060E-02	2.931E-01
Ga-68	9.397E-03	142.1	1.335E-02	1.336E-02	4.779E-02
Tc-99m	1.502E-02	96.1	1.444E-02	1.446E-02	4.867E-02
BA-133	-9.161E-04	104.5	9.576E-04	9.586E-04	3.285E-01
CS-134	1.717E-03	88.8	1.524E-03	1.527E-03	3.272E-01
CS-137	7.988E-02	104.2	8.327E-02	8.336E-02	2.878E-01
CE-139	-8.359E-04	6097.0	5.096E-02	5.096E-02	1.783E-01
Ba-140	1.056E-01	151.7	1.602E-01	1.603E-01	8.606E-01
La-140	4.492E-02	140.6	6.318E-02	6.322E-02	1.868E-01
CE-141	5.420E-02	132.4	7.175E-02	7.180E-02	2.448E-01
CE-144	9.161E-02	325.0	2.978E-01	2.978E-01	1.034E+00
PM-144	9.079E-03	185.9	1.688E-02	1.689E-02	3.279E-01
EU-152	-8.242E-02	239.1	1.971E-01	1.971E-01	6.942E-01
EU-154	4.331E-01	148.6	6.434E-01	6.438E-01	2.298E+00
EU-155	1.485E-01	90.9	1.350E-01	1.352E-01	4.545E-01
HF-181	3.569E-02	113.7	4.057E-02	4.061E-02	2.829E-01
Ta-182	3.815E-02	400.7	1.529E-01	1.529E-01	1.183E+00
Hg-203	1.558E-03	3519.0	5.481E-02	5.481E-02	1.965E-01
TL-208	4.446E-01	20.8	9.236E-02	9.486E-02	1.857E-01
pm-146	4.986E-02	357.8	1.784E-01	1.784E-01	6.672E-01

y-88	4.576E-02	95.8	4.383E-02	4.388E-02	3.306E-01
Cd-109	1.557E+00	51.2	7.973E-01	8.014E-01	2.588E+00
Ra-226	2.747E+00	72.6	1.995E+00	2.003E+00	5.529E+00
PB-210	-7.820E-01	172.7	1.351E+00	1.352E+00	3.609E+00
PB-212	1.213E+00	15.2	1.849E-01	1.961E-01	4.413E-01
PB-214	2.576E-01	76.6	1.973E-01	1.977E-01	6.986E-01
BI-207	0.000E+00	1000.0	6.629E-02	6.629E-02	3.737E-01
BI-212	1.170E+00	78.5	9.180E-01	9.197E-01	3.100E+00
BI-214	1.049E+00	27.3	2.864E-01	2.909E-01	6.404E-01
BI-210M	8.244E-02	114.2	9.418E-02	9.427E-02	3.219E-01
RA-224	-4.906E+00	47.4	2.323E+00	2.338E+00	7.566E+00
AC-228	1.098E+00	26.9	2.949E-01	2.996E-01	1.211E+00
TH-227	3.828E-01	49.8	1.905E-01	1.916E-01	6.033E-01
TH-229	-2.528E-01	379.9	9.602E-01	9.603E-01	3.346E+00
TH-234	1.969E+00	56.8	1.118E+00	1.122E+00	3.347E+00
PA-231	4.521E-01	71.0	3.209E-01	3.217E-01	6.191E+00
PA-233	1.767E-01	90.5	1.599E-01	1.601E-01	4.151E-01
PA-234	7.398E-02	97.6	7.220E-02	7.229E-02	6.535E-01
PA-234M	7.276E+00	147.9	1.076E+01	1.077E+01	3.917E+01
U-235	2.870E-01	114.9	3.297E-01	3.300E-01	9.599E-01
AM-241	1.118E-02	763.2	8.531E-02	8.532E-02	2.971E-01
Ir-192	2.615E-04	23760.0	6.213E-02	6.213E-02	2.216E-01
Np-237	0.000E+00	0.0	2.919E-01	2.919E-01	1.010E+00
Total	3.527E+01				

Analyst: Siobhan Perry

TestAmerica Spectrum name: 4_Gamma_20141662.An1

Sample description
137389_Gamma_680-102199-A-7-G

Spectrum Filename: C:\User\SPC\Det4\4_Gamma_20141662.An1

Acquisition information
Start time: 8/27/2014 10:16:13 AM
Live time: 7200
Real time: 7214
Dead time: 0.20 %
Detector ID: 4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_Liquid_D=1 25ml.Clb
4_Liquid_D=1 25ml_90101_030512

Energy Calibration
Created: 2/28/2012 2:55:17 PM
Zero offset: 0.091 keV
Gain: 0.250 keV/channel
Quadratic: -2.917E-08 keV/channel^2

Efficiency Calibration
Created: 3/27/2012 8:51:45 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.48 %
Log(Eff): 8.809878E-01 + (-6.811249E-01*Log(E)) +
(-1.909804E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -1.031199E+01 + (3.529752E+00*Log(E)) +
(-4.143154E-01*Log(E)^2)

Library Files
Main analysis library: Client_ Long_no ingrowth Rev3.li
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (1999.44keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/27/2014 7:51:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	4_2014-08-09_2125.PBC 8/9/2014 9:25:56 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 15 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1737

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.66	-14.	28.31	0.80	5.687E-02	46.54	4.250	PBC<MDA	PB210
59.29	2.	763.21	0.81	6.042E-02	59.54	35.900	PBC<MDA	AM241
63.29	84.	22.30	0.92	6.085E-02	63.29	3.810	PBC<MDA	TH234
74.93	91.	16.93	0.83	6.109E-02				
77.38	130.	12.74	0.83	6.097E-02				
88.04	25.	51.22	0.84	5.998E-02	88.04	3.790	PBC<MDA	Cd109
92.56	-7.	24.69	0.84	5.937E-02	92.59	5.584	PBC<MDA	TH234
93.32	28.	65.77	0.84	5.926E-02	93.35	5.561	PBC<MDA	AC228
98.71	21.	54.06	0.85	5.863E-02	97.50	30.000	PBC<MDA	Gd153
104.76	3.	385.34	0.85	5.767E-02	103.20	21.800	PBC<MDA	Gd153
105.64	13.	90.87	0.85	5.730E-02	105.31	21.200	PBC<MDA	EU155
120.44	2.	626.58	0.87	5.415E-02	121.78	28.580	PBC<MDA	EU152
133.39	4.	325.03	0.88	5.177E-02	133.54	11.090	PBC<MDA	CE144
136.36	12.	113.67	0.88	5.117E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	2.997E-01	CO57
136.36	12.	113.67	0.88	5.121E-02	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	2.997E-01	CO57
141.09	13.	96.10	0.89	5.035E-02	140.51	89.300	PBC<MDA	Tc99m
144.78	9.	132.39	0.89	4.935E-02	145.44	48.200	PBC<MDA	CE141
161.56	7.	151.67	0.91	4.592E-02	162.66	6.220	PBC<MDA	Ba140
163.21	8.	153.34	0.91	4.578E-02	163.38	5.080	PBC<MDA	U235
185.86	26.	29.70	0.63	4.077E-02	185.99	3.280	PBC<MDA	Ra226
204.96	10.	114.87	0.95	3.736E-02	205.33	5.010	PBC<MDA	U235

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
233.06	11.	49.76	0.97	3.302E-02	235.97	12.300	PBC<MDA	TH227
238.56	150.	12.57	0.94	3.270E-02	238.63	43.300	1.213E+00	PB212
241.70	13.	98.83	0.98	3.229E-02	242.00	7.430	PBC<MDA	PB214
256.40	6.	168.99	0.99	3.068E-02	256.24	7.000	PBC<MDA	TH227
265.61	9.	114.23	1.00	2.969E-02	265.83	50.000	PBC<MDA	BI210M
277.33	3.	303.74	1.01	2.859E-02	277.28	6.310	PBC<MDA	TL208
295.09	-1.	120.28	1.03	2.704E-02	295.09	19.300	PBC<MDA	PB214
298.13	9.	68.86	1.03	2.664E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	PBC<MDA	PA231
298.18	12.	70.98	1.03	2.663E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	2.525E+00	PA231
299.71	11.	90.50	1.03	2.663E-02	300.18	6.200	PBC<MDA	PA233
304.12	7.	125.49	1.03	2.641E-02	302.85	18.330	PBC<MDA	BA133
314.86	4.	219.55	1.04	2.572E-02	312.01	36.000	PBC<MDA	PA233
329.29	6.	140.65	1.06	2.453E-02	328.76	20.300	PBC<MDA	La140
337.80	34.	27.68	1.07	2.391E-02	338.32	12.010	1.660E+00	AC228
351.52	16.	35.62	1.08	2.307E-02	351.93	37.600	PBC<MDA	PB214
428.23	4.	153.95	1.15	1.931E-02	427.88	29.600	PBC<MDA	SB125
497.85	2.	453.66	1.21	1.684E-02	497.05	90.900	PBC<MDA	RU103
					497.05	90.900	1.386E-02	RU103
511.01	67.	19.11	1.22	1.639E-02	511.86	20.000	2.846E+00	RH106
					511.86	20.000	2.846E+00	RH106
536.99	1.	462.41	1.24	1.568E-02	537.26	24.390	PBC<MDA	Ba140
563.24	4.	185.45	1.26	1.501E-02	563.24	8.350	PBC<MDA	CS134
569.26	5.	157.84	1.27	1.486E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	6.047E-01	PA234
					569.70	97.740	5.075E-02	BI207
569.29	5.	155.68	1.27	1.486E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	6.169E-01	PA234
					569.70	97.740	5.177E-02	BI207
583.16	39.	20.78	1.03	1.454E-02	583.02	84.500	4.446E-01	TL208
600.42	6.	131.57	1.30	1.414E-02	600.50	17.860	PBC<MDA	SB125
601.47	6.	122.50	1.30	1.410E-02	602.73	98.260	PBC<MDA	SB124
609.32	49.	21.98	0.38	1.396E-02	609.31	46.090	1.048E+00	BI214
					610.30	5.750	8.358E+00	RU103
609.49	28.	36.16	1.30	1.393E-02	609.31	46.090	PBC<MDA	BI214
					610.30	5.750	4.824E+00	RU103
					610.30	5.750	4.824E+00	RU103
617.55	4.	185.92	1.31	1.377E-02	618.06	99.100	PBC<MDA	PM144
622.16	10.	77.25	1.31	1.369E-02	621.92	9.930	PBC<MDA	RH106
					621.92	9.930	1.007E+00	RH106
636.66	7.	91.94	1.33	1.339E-02	636.97	7.170	PBC<MDA	I131
638.60	5.	93.18	1.33	1.341E-02				
661.94	6.	104.24	1.35	1.293E-02	661.66	85.210	PBC<MDA	CS137
701.60	3.	224.37	1.38	1.223E-02	702.63	97.900	PBC<MDA	NB94
727.06	8.	78.47	1.40	1.184E-02	727.17	7.550	PBC<MDA	BI212
746.74	1.	357.76	1.42	1.154E-02	747.16	34.000	PBC<MDA	pm146
					747.16	34.000	4.986E-02	pm146
755.58	2.	216.97	1.43	1.141E-02	756.73	54.460	PBC<MDA	ZR95
764.03	2.	301.00	1.43	1.131E-02	763.94	22.280	PBC<MDA	AG110M
766.74	2.	379.11	1.44	1.127E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	6.833E+00	PA234M
785.19	4.	168.22	1.45	1.102E-02	785.42	1.280	PBC<MDA	BI212
816.36	2.	293.37	1.48	1.063E-02	815.77	23.280	PBC<MDA	La140

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
835.83	6.	98.96	1.49	1.041E-02	834.85	99.980	PBC<MDA	MN54
859.00	1.	365.61	1.52	1.011E-02	860.56	12.420	PBC<MDA	TL208
872.96	4.	148.57	1.53	9.976E-03	873.23	12.270	PBC<MDA	EU154
886.12	1.	950.98	1.54	9.854E-03	884.68	72.680	PBC<MDA	AG110M
911.17	20.	40.20	1.56	9.585E-03	911.16	29.000	PBC<MDA	AC228
968.76	10.	64.10	1.60	9.045E-03	968.97	17.460	PBC<MDA	AC228
1001.79	4.	147.89	1.63	8.771E-03	1001.00	0.837	PBC<MDA	PA234M
1050.55	2.	396.30	1.67	8.381E-03	1050.36	1.560	PBC<MDA	RH106
					1050.36	1.560	1.742E+00	RH106
1077.35	4.	142.11	1.69	8.181E-03	1077.40	3.300	PBC<MDA	Ga68
1120.24	3.	212.26	1.73	7.884E-03	1120.29	15.100	PBC<MDA	BI214
1221.81	2.	400.74	1.81	7.262E-03	1221.41	27.000	PBC<MDA	Ta182
1237.98	11.	56.23	1.82	7.168E-03	1238.28	66.070	PBC<MDA	Co56
1291.97	7.	68.08	1.86	6.885E-03	1291.60	43.200	PBC<MDA	FE59
1384.21	3.	152.41	1.93	6.444E-03	1384.30	24.290	PBC<MDA	AG110M
1460.63	55.	13.84	1.99	6.120E-03	1460.83	10.670	1.170E+01	K40
1690.32	1.	292.78	2.16	5.316E-03	1690.98	47.790	PBC<MDA	SB124
1764.45	-2.	73.13	2.21	5.102E-03	1764.49	15.400	PBC<MDA	BI214
1836.40	3.	95.78	2.26	4.909E-03	1836.06	99.200	PBC<MDA	y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
299.19	74.93	88.	76.	1.244E+03	23.73	0.787	-	
309.01	77.39	82.	124.	2.026E+03	15.30	0.803	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_ Long_no ingrowth Rev3.li

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.19	46.66	166.	-14.	-0.002	28.31	0.800s
TH-227	198.33	49.70	91.	-6.	-0.001	221.35	0.803s
AM-241	236.64	59.29	88.	2.	0.000	763.21	0.812s
TH-234	252.65	63.29	130.	33.	0.005	22.30	0.922s
BA-133	321.06	80.40	97.	-4.	-0.001	338.56	0.832s
Cd-109	351.60	88.04	73.	25.	0.004	51.22	0.839D
TH-234	369.79	92.59	173.	-7.	-0.001	24.69	0.843D
AC-228	372.83	93.35	153.	28.	0.004	65.77	0.843D
Gd-153	394.24	98.71	55.	21.	0.003	54.06	0.847s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Gd-153	418.43	104.76	61.	3.	0.000	385.34	0.853s
EU-155	421.96	105.64	63.	13.	0.002	90.87	0.854s
EU-152	481.12	120.44	54.	2.	0.000	626.58	0.870s
CO-57	489.62	122.56	80.	-19.	-0.003	71.20	0.870s
EU-154	489.80	122.61	66.	-17.	-0.002	72.91	0.871s
PA-234	526.69	131.84	79.	-11.	-0.002	114.84	0.878s
CE-144	532.91	133.39	74.	4.	0.001	325.03	0.880s
HF-181	544.76	136.36	84.	12.	0.002	113.67	0.883s
CO-57	544.76	136.36	84.	12.	0.002	113.67	0.883s
Tc-99m	563.68	141.09	73.	13.	0.002	96.10	0.887s
CE-141	578.43	144.78	72.	9.	0.001	132.39	0.891s
Ba-140	645.53	161.56	49.	7.	0.001	151.67	0.907s
U-235	652.13	163.21	74.	8.	0.001	153.34	0.908s
Ra-226	742.67	185.86	118.	26.	0.004	29.70	0.625s
TH-229	771.09	192.96	70.	-3.	0.000	379.87	0.935s
U-235	819.05	204.96	60.	10.	0.001	114.87	0.946s
TH-229	843.19	211.00	63.	-8.	-0.001	147.80	0.951s
TH-227	931.42	233.06	10.	11.	0.002	49.76	0.974s
PB-212	953.42	238.56	82.	124.	0.017	12.57	0.942
RA-224	959.30	240.04	224.	-47.	-0.007	47.35	0.978s
PB-214	965.97	241.70	94.	13.	0.002	98.83	0.979s
TH-227	1024.72	256.40	45.	6.	0.001	168.99	0.992s
BI-210M	1061.55	265.61	46.	9.	0.001	114.23	1.001
TL-208	1108.42	277.33	49.	3.	0.000	303.74	1.011s
PB-212	1191.61	298.13	32.	9.	0.001	68.86	1.032
PA-231	1191.80	298.18	30.	12.	0.002	70.98	1.032s
PA-233	1197.91	299.71	41.	11.	0.001	90.50	1.032s
PA-231	1206.81	301.93	45.	-7.	-0.001	136.29	1.034s
BA-133	1215.56	304.12	30.	7.	0.001	125.49	1.034s
Ba-140	1218.81	304.94	48.	-3.	0.000	325.25	1.036s
BI-210M	1219.24	305.04	50.	-3.	0.000	312.76	1.036s
Ir-192	1232.95	308.47	55.	-4.	-0.001	257.18	1.039s
PA-233	1258.50	314.86	29.	4.	0.000	219.55	1.043s
CR-51	1279.08	320.01	50.	-3.	0.000	304.88	1.050s
La-140	1316.20	329.29	38.	6.	0.001	140.65	1.058s
AC-228	1350.22	337.80	28.	34.	0.005	27.68	1.066s
EU-152	1382.50	345.87	37.	-4.	-0.001	239.09	1.071s
HF-181	1373.51	343.62	34.	-4.	-0.001	191.33	1.073s
PB-214	1405.09	351.52	77.	16.	0.002	35.62	1.078s
BA-133	1427.90	357.23	44.	-6.	-0.001	167.20	1.082s
BA-133	1535.81	384.21	44.	-5.	-0.001	205.35	1.107s
SB-125	1711.87	428.23	17.	4.	0.001	153.95	1.146
AG-108M	1732.85	433.48	32.	-3.	0.000	291.83	1.151s
pm-146	1814.67	453.94	27.	-2.	0.000	347.74	1.168s
BE-7	1909.19	477.57	30.	-2.	0.000	428.45	1.189s
La-140	1945.21	486.58	40.	-8.	-0.001	114.84	1.198s
RU-103	1990.30	497.85	24.	2.	0.000	453.66	1.206s
RH-106	2042.92	511.01	49.	67.	0.009	19.11	1.219s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ba-140	2146.84	536.99	21.	1.	0.000	462.41	1.241s
CS-134	2251.81	563.24	24.	4.	0.001	185.45	1.264s
CS-134	2276.03	569.29	33.	5.	0.001	155.68	1.269s
PA-234	2275.88	569.26	32.	5.	0.001	157.84	1.269s
TL-208	2331.49	583.16	9.	39.	0.005	20.78	1.027
SB-125	2400.51	600.42	28.	6.	0.001	131.57	1.296s
SB-124	2404.74	601.47	23.	6.	0.001	122.50	1.298s
CS-134	2417.94	604.77	40.	-9.	-0.001	110.82	1.300s
BI-214	2436.12	609.32	33.	49.	0.007	21.98	0.382s
RU-103	2436.80	609.49	37.	28.	0.004	36.16	1.305s
AG-108M	2455.53	614.17	36.	-5.	-0.001	177.62	1.308s
PM-144	2469.05	617.55	25.	4.	0.001	185.92	1.311s
RH-106	2487.48	622.16	24.	10.	0.001	77.25	1.315s
SB-125	2553.22	638.60	10.	5.	0.001	93.18	1.326s
I-131	2545.47	636.66	16.	7.	0.001	91.94	1.327s
AG-110M	2631.17	658.08	28.	-4.	-0.001	181.12	1.345s
CS-137	2646.60	661.94	19.	6.	0.001	104.24	1.348s
PM-144	2786.22	696.84	31.	-2.	0.000	410.75	1.378s
NB-94	2805.24	701.60	25.	3.	0.000	224.37	1.383s
SB-124	2894.87	724.01	29.	-6.	-0.001	139.18	1.400s
AG-108M	2894.59	723.93	29.	-5.	-0.001	149.63	1.401s
EU-154	2894.64	723.95	28.	-5.	-0.001	152.87	1.401s
ZR-95	2894.46	723.90	23.	-4.	0.000	195.47	1.401s
BI-212	2907.10	727.06	14.	8.	0.001	78.47	1.404s
pm-146	2985.83	746.74	12.	1.	0.000	357.76	1.421s
ZR-95	3021.16	755.58	13.	2.	0.000	216.97	1.429s
AG-110M	3054.97	764.03	20.	2.	0.000	301.00	1.435s
PA-234M	3065.83	766.74	18.	2.	0.000	379.11	1.437s
BI-212	3139.62	785.19	22.	4.	0.001	168.22	1.453s
CS-134	3202.49	800.90	29.	-5.	-0.001	173.49	1.467s
La-140	3264.34	816.36	18.	2.	0.000	293.37	1.478s
MN-54	3342.21	835.83	16.	6.	0.001	98.96	1.494s
TL-208	3434.94	859.00	14.	1.	0.000	365.61	1.516s
NB-94	3482.39	870.87	23.	-5.	-0.001	139.81	1.524s
EU-154	3490.79	872.96	14.	4.	0.001	148.57	1.526s
PA-234	3527.73	882.20	21.	-3.	0.000	261.77	1.532s
AG-110M	3543.42	886.12	15.	1.	0.000	950.98	1.536s
AC-228	3643.64	911.17	21.	20.	0.003	40.20	1.557s
PA-234	3785.17	946.54	19.	-4.	-0.001	178.79	1.586s
AC-228	3874.05	968.76	17.	10.	0.001	64.10	1.605s
PA-234M	4006.23	1001.79	15.	4.	0.001	147.89	1.631s
Co-56	4152.91	1038.45	17.	-4.	-0.001	140.31	1.661s
RH-106	4201.32	1050.55	20.	2.	0.000	396.30	1.671s
BI-207	4252.29	1063.28	18.	-1.	0.000	720.49	1.682s
Ga-68	4308.57	1077.35	12.	4.	0.001	142.11	1.693s
FE-59	4395.90	1099.17	20.	-3.	0.000	236.96	1.710s
EU-152	4444.18	1111.24	17.	-2.	0.000	295.77	1.720s
BI-214	4480.20	1120.24	18.	3.	0.000	212.26	1.727s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	4689.67	1172.58	12.	-1.	0.000	920.93	1.769s
Ta-182	4754.48	1188.78	23.	-6.	-0.001	122.24	1.781s
Ta-182	4886.70	1221.81	20.	2.	0.000	400.74	1.807s
Co-56	4951.38	1237.98	13.	11.	0.002	56.23	1.820s
NA-22	5100.65	1275.27	21.	-3.	0.000	215.38	1.848s
EU-154	5100.65	1275.27	21.	-3.	0.000	215.22	1.848s
FE-59	5167.48	1291.97	8.	7.	0.001	68.08	1.861s
CO-60	5332.47	1333.19	22.	-2.	0.000	336.93	1.893s
AG-110M	5536.69	1384.21	11.	3.	0.000	152.41	1.932s
K-40	5842.59	1460.63	24.	55.	0.008	13.84	1.991
SB-124	6762.12	1690.32	9.	1.	0.000	292.78	2.161s
BI-214	7058.96	1764.45	17.	-2.	0.000	73.13	2.214s
y-88	7347.06	1836.40	3.	3.	0.000	95.78	2.265s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-1.3818E-01				5.31E+01	
			477.60	-1.382E-01	?(	2.125E+00 4.28E+02	1.05E+01 G
NA-22	C	-6.2420E-02				9.50E+02	
			1274.53	-6.242E-02	?(	4.815E-01 2.15E+02	9.99E+01 G
K-40	N	1.1698E+01				4.66E+11	
			1460.83	1.170E+01	(P	5.407E+00 1.38E+01	1.07E+01 G
CR-51	F	-1.8412E-01				2.77E+01	
			320.08	-1.841E-01	?(	1.969E+00 3.05E+02	9.94E+00 G
MN-54	C	8.2740E-02				3.12E+02	
			834.85	8.274E-02	?(	2.827E-01 9.90E+01	1.00E+02 G
FE-59	F	9.1928E-02				4.45E+01	
			1099.25	-8.322E-02	?(	7.108E-01 2.37E+02	5.65E+01 G
			1291.60	3.210E-01	?(	7.231E-01 6.81E+01	4.32E+01 G
Co-56	C	1.2661E-01				7.73E+01	
			846.77	0.000E+00	?(	2.743E-01 1.00E+03	9.99E+01 G
			1238.28	3.181E-01	?(	5.757E-01 5.62E+01	6.61E+01 G
			1037.84	-5.053E-01	+	2.509E+00 1.40E+02	1.41E+01 G
			1771.35	-1.291E-02	%	3.536E+00 7.20E+03	1.55E+01 A

Nuclide		Ave activity	Energy		Activity	Code	Peak	MDA	Comments
CO-57	C	-1.6727E-02						2.72E+02	
			122.06	-5.621E-02	?(		1.329E-01	7.12E+01	8.56E+01 G
			136.47	2.997E-01	(		1.154E+00	1.14E+02	1.07E+01 G
CO-60	F	-4.1901E-02						1.93E+03	
			1332.50	-4.190E-02	?(		5.112E-01	3.37E+02	1.00E+02 G
			1173.24	-9.790E-03	+		3.437E-01	9.21E+02	9.99E+01 G
ZN-65	F	1.4520E-02						2.44E+02	
			1115.55	1.452E-02	%(		7.344E-01	1.35E+03	5.06E+01 G
NB-94	I	3.7660E-02						7.41E+06	
			702.63	3.766E-02	?(		3.012E-01	2.24E+02	9.79E+01 G
			871.10	-7.141E-02	+		3.498E-01	1.40E+02	9.99E+01 G
ZR-95	I	5.5348E-02						6.40E+01	
			756.73	5.535E-02	&(		4.388E-01	2.17E+02	5.45E+01 G
			724.20	-9.483E-02	+		6.596E-01	1.95E+02	4.42E+01 G
NB-95	I	-6.4884E-05						6.40E+01	
			765.79	-6.488E-05	&(		2.965E-01	1.23E+05	9.98E+01 G
RU-103	I	1.3863E-02						3.93E+01	
			497.05	1.386E-02	?(		2.284E-01	4.54E+02	9.09E+01 G
			610.30	4.824E+00	?		5.369E+00	3.62E+01	5.75E+00 GA
RH-106	I	1.1072E+00						3.74E+02	
			621.92	1.007E+00	(		2.613E+00	7.73E+01	9.93E+00 G
			1050.36	1.742E+00	?(		2.518E+01	3.96E+02	1.56E+00 G
			511.86	2.846E+00	?		1.494E+00	1.91E+01	2.00E+01 GA
AG-108M	C	-2.2550E-02						1.53E+05	
			433.94	-2.255E-02	?(		2.341E-01	2.92E+02	9.05E+01 G
			722.94	-6.804E-02	&		3.558E-01	1.50E+02	9.08E+01 G
			614.28	-5.542E-02	+		3.441E-01	1.78E+02	8.98E+01 G
AG-110M	F	8.8555E-02						2.50E+02	
			884.68	1.137E-02	&(		4.055E-01	9.51E+02	7.27E+01 G
			657.76	-4.815E-02	+		3.075E-01	1.81E+02	9.46E+01 G
			937.49	1.352E-02	%		1.070E+00	2.15E+03	3.44E+01 G
			1384.30	2.929E-01	?(		1.612E+00	1.52E+02	2.43E+01 G
			763.94	1.175E-01	?(		1.284E+00	3.01E+02	2.23E+01 G
SN-113	F	-6.3528E-03						1.15E+02	
			391.69	-6.353E-03	%(		2.697E-01	1.16E+03	6.40E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-124	F	6.5901E-02					6.02E+01	
			602.73	5.855E-02	?(	2.496E-01	1.23E+02	9.83E+01 G
			1690.98	8.101E-02	?(	8.977E-01	2.93E+02	4.78E+01 G
			722.79	-6.123E-01	&	2.969E+00	1.39E+02	1.08E+01 G
SB-125	I	2.4430E-01					1.01E+03	
			427.88	9.759E-02	?(	5.342E-01	1.54E+02	2.96E+01 G
			600.50	3.270E-01	&(	1.496E+00	1.32E+02	1.79E+01 G
			635.89	4.976E-01	?(	1.604E+00	9.32E+01	1.13E+01 G
			463.37	3.282E-04	%	1.642E+00	1.33E+05	1.05E+01 G
I-131	I	7.1526E-02					8.02E+00	
			364.48	-5.587E-03	%(	2.850E-01	1.44E+03	8.17E+01 G
			284.30	-6.113E-02	&	2.824E+00	1.30E+03	6.14E+00 G
			636.97	9.502E-01	(	2.995E+00	9.19E+01	7.17E+00 G
Gd-153	F	1.6662E-01					2.42E+02	
			97.50	1.666E-01	?(	2.931E-01	5.41E+01	3.00E+01 G
			103.20	3.192E-02	&	4.305E-01	3.85E+02	2.18E+01 G
Ga-68	C	9.3973E-03					4.71E-02	
			1077.40	9.397E-03	?(	4.779E-02	1.42E+02	3.30E+00 G
Tc-99m	I	1.5021E-02					2.51E-01	
			140.51	1.502E-02	&(	4.867E-02	9.61E+01	8.93E+01 G
BA-133	F	-9.1608E-04					3.85E+03	
			356.00	-5.659E-02	&(	3.285E-01	1.67E+02	6.20E+01 G
			302.85	1.875E-01	?(	8.146E-01	1.25E+02	1.83E+01 G
			383.84	-3.401E-01	+	2.440E+00	2.05E+02	8.94E+00 GA
			80.99	-2.799E-02	+	3.271E-01	3.39E+02	3.41E+01 GA
CS-134	I	1.7172E-03					7.54E+02	
			604.71	-8.631E-02	?(	3.272E-01	1.11E+02	9.76E+01 G
			795.87	1.376E-03	%	4.127E-01	8.22E+03	8.55E+01 G
			569.32	3.287E-01	?(	1.785E+00	1.56E+02	1.54E+01 G
			801.95	-6.778E-01	+	4.133E+00	1.73E+02	8.69E+00 G
			563.24	4.286E-01	?(	2.819E+00	1.85E+02	8.35E+00 G
CS-137	I	7.9879E-02					1.10E+04	
			661.66	7.988E-02	?(	2.878E-01	1.04E+02	8.52E+01 G
CE-139	F	-8.3587E-04					1.38E+02	
			165.85	-8.359E-04	%(	1.783E-01	6.10E+03	7.99E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ba-140	I	1.0562E-01					1.28E+01	
			537.26	5.100E-02	?(	8.606E-01	4.62E+02	2.44E+01 G
			162.66	3.198E-01	&(	1.675E+00	1.52E+02	6.22E+00 G
			304.85	-3.689E-01	+	4.219E+00	3.25E+02	4.29E+00 G
La-140	I	4.4920E-02					1.28E+01	
			1596.21	0.000E+00	?(	1.868E-01	1.00E+03	9.54E+01 G
			487.02	-1.417E-01	+	5.579E-01	1.15E+02	4.55E+01 G
			328.76	1.754E-01	?(	8.543E-01	1.41E+02	2.03E+01 G
			815.77	1.152E-01	?(	1.231E+00	2.93E+02	2.33E+01 G
CE-141	I	5.4196E-02					3.25E+01	
			145.44	5.420E-02	?(	2.448E-01	1.32E+02	4.82E+01 G
CE-144	I	9.1612E-02					2.85E+02	
			133.54	9.161E-02	?(	1.034E+00	3.25E+02	1.11E+01 G
PM-144	C	9.0792E-03					3.63E+02	
			696.54	-2.229E-02	?(	3.279E-01	4.11E+02	9.90E+01 G
			618.06	4.042E-02	&(	2.660E-01	1.86E+02	9.91E+01 G
			476.81	0.000E+00	-	6.148E-01	1.00E+03	4.20E+01 G
EU-152	F	-8.2421E-02					4.94E+03	
			344.29	-8.242E-02	?(	6.942E-01	2.39E+02	2.65E+01 G
			1112.07	-2.618E-01	+	2.827E+00	2.96E+02	1.36E+01 G
			121.78	1.507E-02	&	3.330E-01	6.27E+02	2.86E+01 G
			778.92	0.000E+00	+	2.352E+00	1.00E+03	1.29E+01 G
			964.11	0.000E+00	&	4.992E+00	1.00E+03	1.46E+01 G
			244.69	-1.258E-02	&	1.810E+00	4.00E+03	7.58E+00 G
			1408.00	3.275E-02	%	1.681E+00	1.31E+03	2.10E+01 GA
EU-154	I	4.3307E-01					3.14E+03	
			873.23	4.331E-01	&(	2.298E+00	1.49E+02	1.23E+01 G
			123.10	-1.057E-01	-	2.564E-01	7.29E+01	4.08E+01 G
			1274.54	-1.775E-01	-	1.368E+00	2.15E+02	3.52E+01 G
			723.36	-2.958E-01	+	1.583E+00	1.53E+02	2.02E+01 G
			1004.77	8.871E-04	%	2.029E+00	6.12E+04	1.80E+01 G
			996.33	4.525E-02	%	3.258E+00	1.92E+03	1.06E+01 G
EU-155	I	1.4851E-01					1.81E+03	
			105.31	1.485E-01	?(	4.545E-01	9.09E+01	2.12E+01 G
			86.54	0.000E+00	}	2.822E-01	6.48E+02	3.07E+01 G
HF-181	F	3.5692E-02					4.24E+01	
			482.00	-1.228E-03	&(	2.829E-01	6.34E+03	8.05E+01 G
			133.02	4.965E-03	%	2.729E-01	1.57E+03	4.33E+01 G
			345.83	-1.737E-01	+	1.166E+00	1.91E+02	1.51E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		136.30	5.437E-01	(	2.094E+00	1.14E+02	5.85E+00 G
Ta-182	F 3.8148E-02					1.14E+02	
		1121.30	-1.977E-02	%(	1.183E+00	1.61E+03	3.49E+01 G
		1221.41	1.130E-01	?(	1.655E+00	4.01E+02	2.70E+01 G
		1189.05	-6.718E-01	+	2.858E+00	1.22E+02	1.62E+01 G
Hg-203	F 1.5575E-03					4.66E+01	
		279.20	1.557E-03	%(	1.965E-01	3.52E+03	8.15E+01 G
TL-208	N 4.4456E-01					6.98E+02	
		583.02	4.446E-01	(	1.857E-01	2.08E+01	8.45E+01 G
		277.28	2.559E-01	-	2.728E+00	3.04E+02	6.31E+00 G
		860.56	1.621E-01	&	2.202E+00	3.66E+02	1.24E+01 G
pm-146	C 4.9862E-02					2.02E+03	
		747.16	4.986E-02	&(	6.672E-01	3.58E+02	3.40E+01 G
		735.72	6.676E-03	&	1.145E+00	4.56E+03	2.25E+01 G
		453.88	-2.532E-02	+	3.162E-01	3.48E+02	6.50E+01 G
y-88	F 4.5755E-02					1.07E+02	
		898.04	-2.226E-03	%(	3.306E-01	3.95E+03	9.37E+01 G
		1836.06	9.108E-02	?(	3.105E-01	9.58E+01	9.92E+01 G
Cd-109	F 1.5566E+00					4.53E+02	
		88.04	1.557E+00	(	2.588E+00	5.12E+01	3.79E+00 G
Ra-226	N 2.7468E+00					5.84E+05	
		185.99	2.747E+00	(P	5.529E+00	2.97E+01	3.28E+00 G
PB-210	N -7.8201E-01					8.14E+03	
		46.54	-7.820E-01	*(P	3.609E+00	2.83E+01	4.25E+00 G
PB-212	N 1.2128E+00					6.98E+02	
		238.63	1.213E+00	(P	4.413E-01	1.26E+01	4.33E+01 G
		300.03	1.476E+00	P	4.640E+00	6.89E+01	3.28E+00 GA
PB-214	N 2.5758E-01					5.84E+05	
		351.93	2.576E-01	*(P	6.986E-01	3.56E+01	3.76E+01 G
		295.09	-3.246E-02	% P	1.096E+00	1.20E+02	1.93E+01 G
		242.00	7.703E-01	& P	2.769E+00	9.88E+01	7.43E+00 GA
BI-212	N 1.1698E+00					6.98E+02	
		727.17	1.170E+00	?(	3.100E+00	7.85E+01	7.55E+00 G
		785.42	4.091E+00	?	2.436E+01	1.68E+02	1.28E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-214	N	1.0485E+00					5.84E+05	
			609.31	1.048E+00	(P	6.404E-01	2.20E+01	4.61E+01 G
			1120.29	3.416E-01	-	2.613E+00	2.12E+02	1.51E+01 G
			1764.49	-4.244E-01	- P	3.843E+00	7.31E+01	1.54E+01 G
BI-210M	T	8.2442E-02					1.10E+09	
			265.83	8.244E-02	?(	3.219E-01	1.14E+02	5.00E+01 G
			304.90	-6.159E-02	-	6.759E-01	3.13E+02	2.80E+01 G
RA-224	N	-4.9059E+00					6.98E+02	
			240.99	-4.906E+00	(	7.566E+00	4.74E+01	4.10E+00 G
AC-228	N	1.0981E+00					2.10E+03	
			911.16	9.809E-01	?(	1.211E+00	4.02E+01	2.90E+01 G
			968.97	9.063E-01	?(	1.911E+00	6.41E+01	1.75E+01 G
			338.32	1.660E+00	&(	1.323E+00	2.77E+01	1.20E+01 G
			93.35	1.171E+00		2.545E+00	6.58E+01	5.56E+00 XA
TH-227	N	3.8281E-01					7.95E+03	
			235.97	3.881E-01	&(	6.033E-01	4.98E+01	1.23E+01 G
			50.14	-1.848E-01	-	1.406E+00	2.21E+02	8.00E+00 G
			256.24	3.736E-01	&(	2.191E+00	1.69E+02	7.00E+00 G
TH-229	N	-2.5276E-01					2.68E+06	
			193.51	-2.528E-01	?(	3.346E+00	3.80E+02	4.40E+00 G
			210.85	-9.976E-01	+	5.060E+00	1.48E+02	2.99E+00 G
TH-234	N	1.9685E+00					1.63E+12	
			63.29	1.969E+00	@(P	3.347E+00	2.23E+01	3.81E+00 G
			92.59	-2.861E-01	- P	2.680E+00	2.47E+01	5.58E+00 G
PA-231	N	4.5208E-01					1.20E+07	
			302.65	-1.318E+00	?(	6.191E+00	1.36E+02	2.88E+00 G
			300.07	2.525E+00	&(	5.966E+00	7.10E+01	2.46E+00 G
PA-233	C	1.7668E-01					7.82E+08	
			312.01	5.333E-02	?(	4.151E-01	2.20E+02	3.60E+01 G
			300.18	8.929E-01	&(	2.733E+00	9.05E+01	6.20E+00 G
PA-234	N	7.3975E-02					1.63E+12	
			131.29	-1.678E-01	?(	6.535E-01	1.15E+02	1.80E+01 G
			946.02	-4.067E-01	+	2.594E+00	1.79E+02	1.34E+01 G
			569.47	6.047E-01	&(	3.333E+00	1.58E+02	8.20E+00 G
			883.24	-5.921E-02	%	3.503E+00	1.60E+03	9.60E+00 G
			880.53	-5.916E-01	+	5.587E+00	2.62E+02	6.00E+00 GA

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-234M  N   7.2759E+00                                      1.63E+12
                         1001.00 7.431E+00 &(  3.917E+01 1.48E+02 8.37E-01 G
                          766.41 6.833E+00 ?(  9.488E+01 3.79E+02 2.94E-01 G

U-235    N   2.8701E-01                                      2.57E+11
                          143.79-1.049E-02 &(  9.599E-01 2.58E+03 1.10E+01 G
                          205.33 7.367E-01 ?(  2.881E+00 1.15E+02 5.01E+00 G
                          163.38 4.853E-01 ?(  2.549E+00 1.53E+02 5.08E+00 G

AM-241   T   1.1178E-02                                      1.58E+05
                           59.54 1.118E-02 ?(  2.971E-01 7.63E+02 3.59E+01 G

Ir-192   F   2.6147E-04                                      7.40E+01
                          316.49 2.615E-04 %(  2.216E-01 2.38E+04 8.70E+01 G
                          468.06-6.972E-03 %   4.335E-01 1.72E+03 5.18E+01 G
                          308.44-6.995E-02 +   6.274E-01 2.57E+02 3.18E+01 G
                          295.95 0.000E+00 -   6.025E-01 1.00E+03 3.02E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.66	166.	-14.	-0.002	28.31	-7.820E-01	P
TH-227	49.70	91.	-6.	-0.001	221.35	-1.848E-01	
AM-241	59.29	88.	2.	0.000	763.21	1.118E-02	
BA-133	80.40	97.	-4.	-0.001	338.56	-2.799E-02	
Gd-153	98.71	55.	21.	0.003	54.06	1.666E-01	
Gd-153	104.76	61.	3.	0.000	385.34	3.192E-02	
EU-152	120.44	54.	2.	0.000	626.58	1.507E-02	
CO-57	122.56	80.	-19.	-0.003	71.20	-5.621E-02	
EU-154	122.61	66.	-17.	-0.002	72.91	-1.057E-01	
PA-234	131.84	79.	-11.	-0.002	114.84	-1.678E-01	
CE-144	133.39	74.	4.	0.001	325.03	9.161E-02	
HF-181	136.36	84.	12.	0.002	113.67	5.437E-01	
CO-57	136.36	84.	12.	0.002	113.67	2.997E-01	
Tc-99m	141.09	73.	13.	0.002	96.10	1.502E-02	
CE-141	144.78	72.	9.	0.001	132.39	5.420E-02	
Ba-140	161.56	49.	7.	0.001	151.67	3.198E-01	
U-235	163.21	74.	8.	0.001	153.34	4.853E-01	
TH-229	192.96	70.	-3.	0.000	379.87	-2.528E-01	
U-235	204.96	60.	10.	0.001	114.87	7.367E-01	
TH-229	211.00	63.	-8.	-0.001	147.80	-9.976E-01	
TH-227	233.06	10.	11.	0.002	49.76	3.881E-01	
RA-224	240.04	224.	-47.	-0.007	47.35	-4.906E+00	
PB-214	241.70	94.	13.	0.002	98.83	7.703E-01	P
TH-227	256.40	45.	6.	0.001	168.99	3.736E-01	
BI-210M	265.61	46.	9.	0.001	114.23	8.244E-02	
PA-231	298.18	30.	12.	0.002	70.98	2.525E+00	
PA-233	299.71	41.	11.	0.001	90.50	8.929E-01	
PA-231	301.93	45.	-7.	-0.001	136.29	-1.318E+00	
BA-133	304.12	30.	7.	0.001	125.49	1.875E-01	
Ba-140	304.94	48.	-3.	0.000	325.25	-3.689E-01	
BI-210M	305.04	50.	-3.	0.000	312.76	-6.159E-02	
Ir-192	308.47	55.	-4.	-0.001	257.18	-6.995E-02	
PA-233	314.86	29.	4.	0.000	219.55	5.333E-02	
CR-51	320.01	50.	-3.	0.000	304.88	-1.841E-01	
La-140	329.29	38.	6.	0.001	140.65	1.754E-01	
EU-152	345.87	37.	-4.	-0.001	239.09	-8.242E-02	
HF-181	343.62	34.	-4.	-0.001	191.33	-1.737E-01	
PB-214	351.52	77.	16.	0.002	35.62	2.576E-01	P
BA-133	357.23	44.	-6.	-0.001	167.20	-5.659E-02	
BA-133	384.21	44.	-5.	-0.001	205.35	-3.401E-01	
SB-125	428.23	17.	4.	0.001	153.95	9.759E-02	
AG-108M	433.48	32.	-3.	0.000	291.83	-2.255E-02	
pm-146	453.94	27.	-2.	0.000	347.74	-2.532E-02	
BE-7	477.57	30.	-2.	0.000	428.45	-1.382E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
La-140	486.58		40.	-8.	-0.001	114.84	-1.417E-01
RU-103	497.85		24.	2.	0.000	453.66	1.386E-02
RH-106	511.01		49.	67.	0.009	19.11	2.846E+00
Ba-140	536.99		21.	1.	0.000	462.41	5.100E-02
CS-134	563.24		24.	4.	0.001	185.45	4.286E-01
CS-134	569.29		33.	5.	0.001	155.68	3.287E-01
PA-234	569.26		32.	5.	0.001	157.84	6.047E-01
SB-125	600.42		28.	6.	0.001	131.57	3.270E-01
SB-124	601.47		23.	6.	0.001	122.50	5.855E-02
CS-134	604.77		40.	-9.	-0.001	110.82	-8.631E-02
RU-103	609.49		37.	28.	0.004	36.16	4.824E+00
AG-108M	614.17		36.	-5.	-0.001	177.62	-5.542E-02
PM-144	617.55		25.	4.	0.001	185.92	4.042E-02
RH-106	622.16		24.	10.	0.001	77.25	1.007E+00
SB-125	638.60		10.	5.	0.001	93.18	4.976E-01
I-131	636.66		16.	7.	0.001	91.94	9.502E-01
AG-110M	658.08		28.	-4.	-0.001	181.12	-4.815E-02
CS-137	661.94		19.	6.	0.001	104.24	7.988E-02
PM-144	696.84		31.	-2.	0.000	410.75	-2.229E-02
NB-94	701.60		25.	3.	0.000	224.37	3.766E-02
SB-124	724.01		29.	-6.	-0.001	139.18	-6.123E-01
AG-108M	723.93		29.	-5.	-0.001	149.63	-6.804E-02
EU-154	723.95		28.	-5.	-0.001	152.87	-2.958E-01
ZR-95	723.90		23.	-4.	0.000	195.47	-9.483E-02
BI-212	727.06		14.	8.	0.001	78.47	1.170E+00
pm-146	746.74		12.	1.	0.000	357.76	4.986E-02
ZR-95	755.58		13.	2.	0.000	216.97	5.535E-02
AG-110M	764.03		20.	2.	0.000	301.00	1.175E-01
PA-234M	766.74		18.	2.	0.000	379.11	6.833E+00
BI-212	785.19		22.	4.	0.001	168.22	4.091E+00
CS-134	800.90		29.	-5.	-0.001	173.49	-6.778E-01
La-140	816.36		18.	2.	0.000	293.37	1.152E-01
MN-54	835.83		16.	6.	0.001	98.96	8.274E-02
NB-94	870.87		23.	-5.	-0.001	139.81	-7.141E-02
EU-154	872.96		14.	4.	0.001	148.57	4.331E-01
PA-234	882.20		21.	-3.	0.000	261.77	-5.916E-01
AG-110M	886.12		15.	1.	0.000	950.98	1.137E-02
PA-234	946.54		19.	-4.	-0.001	178.79	-4.067E-01
PA-234M	1001.79		15.	4.	0.001	147.89	7.431E+00
Co-56	1038.45		17.	-4.	-0.001	140.31	-5.053E-01
RH-106	1050.55		20.	2.	0.000	396.30	1.742E+00
BI-207	1063.28		18.	-1.	0.000	720.49	-1.913E-02
Ga-68	1077.35		12.	4.	0.001	142.11	9.397E-03
FE-59	1099.17		20.	-3.	0.000	236.96	-8.322E-02
EU-152	1111.24		17.	-2.	0.000	295.77	-2.618E-01
CO-60	1172.58		12.	-1.	0.000	920.93	-9.790E-03
Ta-182	1188.78		23.	-6.	-0.001	122.24	-6.718E-01
Ta-182	1221.81		20.	2.	0.000	400.74	1.130E-01

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
Co-56	1237.98	13.	11.	0.002	56.23	3.181E-01		
NA-22	1275.27	21.	-3.	0.000	215.38	-6.242E-02		
EU-154	1275.27	21.	-3.	0.000	215.22	-1.775E-01		
FE-59	1291.97	8.	7.	0.001	68.08	3.210E-01		
CO-60	1333.19	22.	-2.	0.000	336.93	-4.190E-02		
AG-110M	1384.21	11.	3.	0.000	152.41	2.929E-01		
K-40	1460.63	24.	55.	0.008	13.84	1.170E+01	P	
SB-124	1690.32	9.	1.	0.000	292.78	8.101E-02		
y-88	1836.40	3.	3.	0.000	95.78	9.108E-02		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

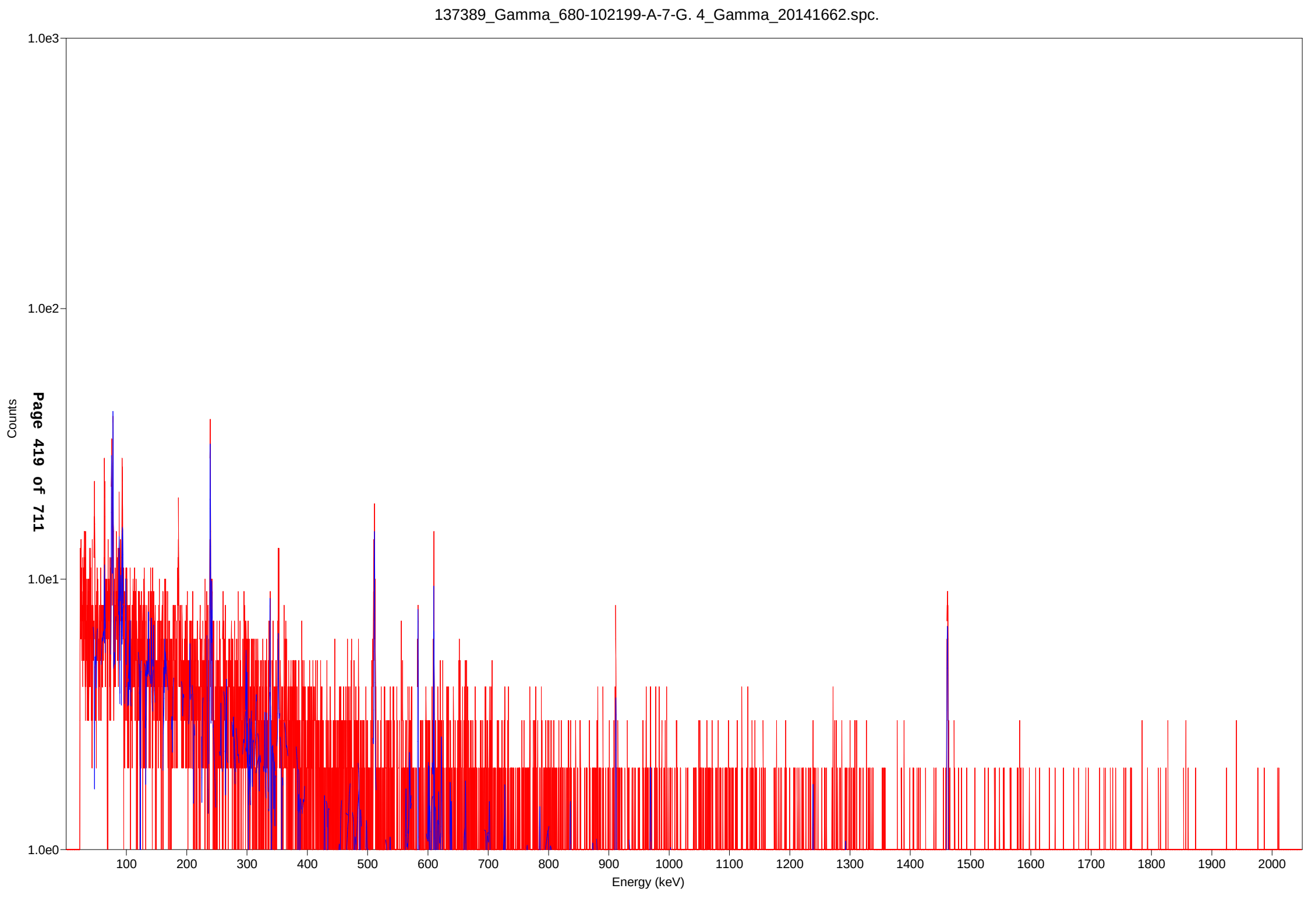
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	-1.3890E-01	-1.3818E-01	4.285E+02%	2.13E+00
NA-22	#A	-6.2438E-02	-6.2420E-02	2.154E+02%	4.81E-01
K-40	#	1.1698E+01	1.1698E+01	1.718E+01%	5.41E+00
Sc-46	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.18E-01
CR-51	#A	-1.8596E-01	-1.8412E-01	3.049E+02%	1.97E+00
MN-54	#A	8.2813E-02	8.2740E-02	9.896E+01%	2.83E-01
FE-59	#A	9.2501E-02	9.1928E-02	6.808E+01%	7.11E-01
Co-56	#A	1.2707E-01	1.2661E-01	5.623E+01%	2.74E-01
CO-57	#A	-1.6744E-02	-1.6727E-02	6.706E+01%	1.33E-01
CO-58	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.16E-01
CO-60	#A	-4.1907E-02	-4.1901E-02	3.369E+02%	5.11E-01
ZN-65	#A	1.4536E-02	1.4520E-02	1.348E+03%	7.34E-01
NB-94	#A	3.7660E-02	3.7660E-02	2.244E+02%	3.01E-01
ZR-95	#A	5.5588E-02	5.5348E-02	2.170E+02%	4.39E-01
NB-95	#A	-6.5165E-05	-6.4884E-05	1.231E+05%	2.96E-01
RU-103	#A	1.3961E-02	1.3863E-02	4.537E+02%	2.28E-01
RH-106	#A	1.1080E+00	1.1072E+00	7.725E+01%	2.61E+00
AG-108M	#A	-2.2551E-02	-2.2550E-02	2.918E+02%	2.34E-01
AG-110M	#A	8.8653E-02	8.8555E-02	1.524E+02%	4.05E-01
SN-113	#A	-6.3681E-03	-6.3528E-03	1.162E+03%	2.70E-01
SB-124	#A	6.6205E-02	6.5901E-02	1.225E+02%	2.50E-01
SB-125	#A	2.4437E-01	2.4430E-01	7.431E+01%	5.34E-01
I-131	#A	7.4037E-02	7.1526E-02	9.194E+01%	2.85E-01
Gd-153	#A	1.6682E-01	1.6662E-01	5.406E+01%	2.93E-01
Ga-68	#A	3.3498E+00	9.3973E-03	1.421E+02%	4.78E-02
Tc-99m	#A	4.5268E-02	1.5021E-02	9.610E+01%	4.87E-02
BA-133	#A	-9.1614E-04	-9.1608E-04	1.045E+02%	3.29E-01
CS-134	#A	1.7179E-03	1.7172E-03	8.876E+01%	3.27E-01
CS-137	#A	7.9881E-02	7.9879E-02	1.042E+02%	2.88E-01
CE-139	#A	-8.3755E-04	-8.3587E-04	6.097E+03%	1.78E-01
Ba-140	#A	1.0794E-01	1.0562E-01	1.517E+02%	8.61E-01

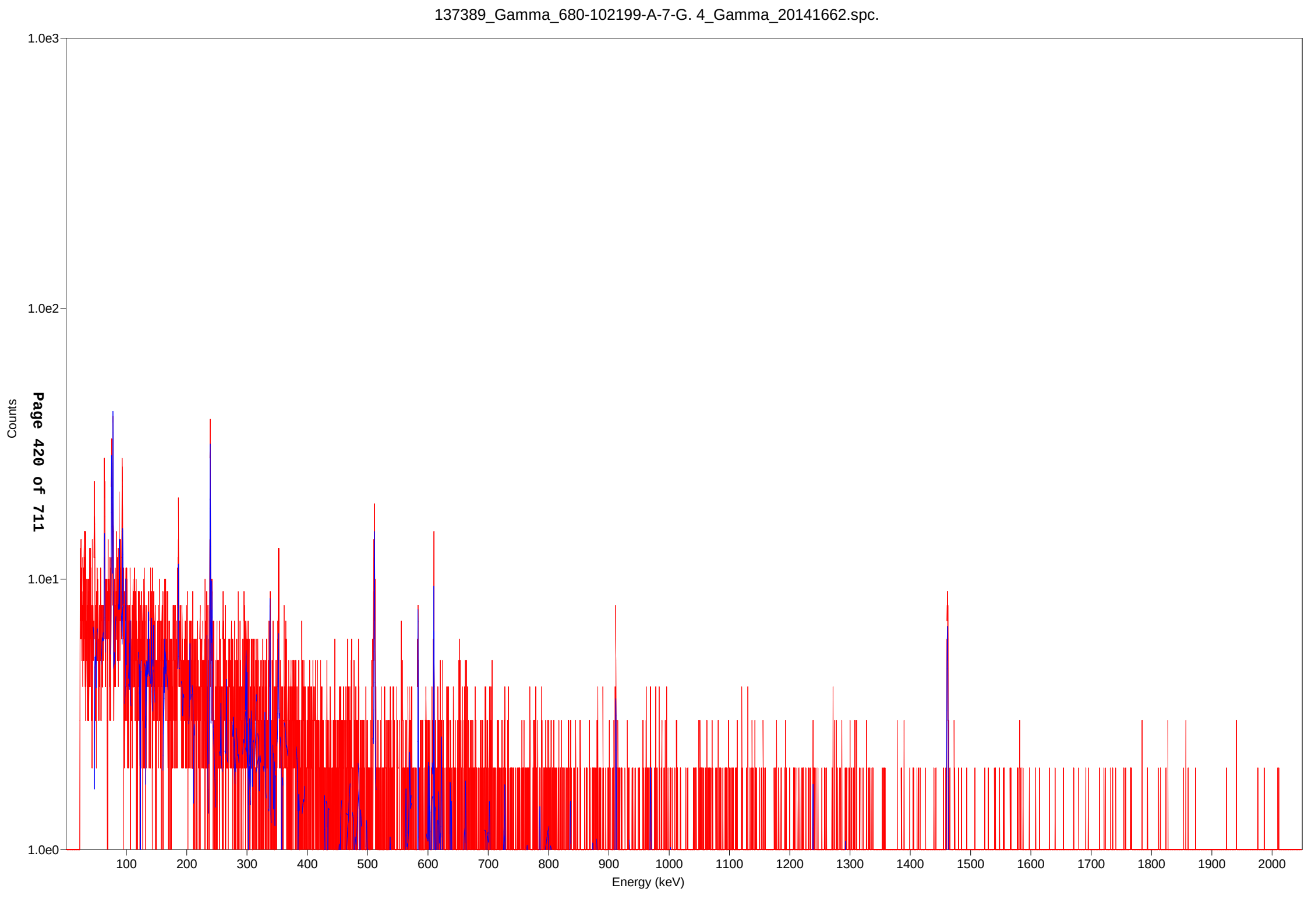
La-140 #A	4.5905E-02	4.4920E-02	1.406E+02%	1.87E-01
CE-141 #A	5.4659E-02	5.4196E-02	1.324E+02%	2.45E-01
CE-144 #A	9.1701E-02	9.1612E-02	3.250E+02%	1.03E+00
PM-144 #A	9.0861E-03	9.0792E-03	1.859E+02%	3.28E-01
EU-152 #A	-8.2426E-02	-8.2421E-02	2.391E+02%	6.94E-01
EU-154 #A	4.3311E-01	4.3307E-01	1.486E+02%	2.30E+00
EU-155 A	1.4854E-01	1.4851E-01	9.087E+01%	4.54E-01
HF-181 #A	3.5925E-02	3.5692E-02	1.137E+02%	2.83E-01
Ta-182 #A	3.8240E-02	3.8148E-02	4.007E+02%	1.18E+00
Hg-203 #A	1.5667E-03	1.5575E-03	3.519E+03%	1.96E-01
TL-208	4.4474E-01	4.4456E-01	2.078E+01%	1.86E-01
pm-146 #A	4.9869E-02	4.9862E-02	3.578E+02%	6.67E-01
y-88 #A	4.5874E-02	4.5755E-02	9.578E+01%	3.31E-01
Cd-109 A	1.5576E+00	1.5566E+00	5.122E+01%	2.59E+00
Ra-226 #A	2.7468E+00	2.7468E+00	7.262E+01%	5.53E+00
PB-210 #A	-7.8204E-01	-7.8201E-01	1.727E+02%	3.61E+00
PB-212	1.2133E+00	1.2128E+00	1.524E+01%	4.41E-01
PB-214 #A	2.5758E-01	2.5758E-01	7.659E+01%	6.99E-01
BI-207 #A	0.0000E+00	0.0000E+00	1.000E+03%	3.74E-01
BI-212 #A	1.1703E+00	1.1698E+00	7.847E+01%	3.10E+00
BI-214	1.0485E+00	1.0485E+00	2.731E+01%	6.40E-01
BI-210M#A	8.2442E-02	8.2442E-02	1.142E+02%	3.22E-01
RA-224 #A	-4.9078E+00	-4.9059E+00	4.735E+01%	7.57E+00
AC-228 A	1.0982E+00	1.0981E+00	2.685E+01%	1.21E+00
TH-227 #A	3.8282E-01	3.8281E-01	4.976E+01%	6.03E-01
TH-229 #A	-2.5276E-01	-2.5276E-01	3.799E+02%	3.35E+00
TH-234 #A	1.9685E+00	1.9685E+00	5.678E+01%	3.35E+00
PA-231 #A	4.5208E-01	4.5208E-01	7.098E+01%	6.19E+00
PA-233 #A	1.7668E-01	1.7668E-01	9.050E+01%	4.15E-01
PA-234 #A	7.3975E-02	7.3975E-02	9.760E+01%	6.53E-01
PA-234M#A	7.2759E+00	7.2759E+00	1.479E+02%	3.92E+01
U-235 #A	2.8701E-01	2.8701E-01	1.149E+02%	9.60E-01
AM-241 #A	1.1178E-02	1.1178E-02	7.632E+02%	2.97E-01
Ir-192 #A	2.6245E-04	2.6147E-04	2.376E+04%	2.22E-01
Np-237 #A	0.0000E+00	0.0000E+00	0.000E+00%	1.01E+00

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (105.1 to 1999.4 keV) 1.008E+01 Bq/Sample
Total Decayed Activity (105.1 to 1999.4 keV) 1.0075836E+01 Bq/Sample


137389_Gamma_680-102199-A-7-G. 4_Gamma_20141662.spc.
1.0e3
1.0e2
1.0e1
1.0e0
Counts
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)


137389_Gamma_680-102199-A-7-G. 4_Gamma_20141662.spc.
1.0e3
1.0e2
1.0e1
1.0e0
Counts
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)

Test America St. Louis Spectrum ID: 7_Gamma_20141817

Sample Description: 137389_Gamma_680-102199-A-8-G
Detector: Ge 7 SN/154
Batch ID: 137389
Work Order Number: Gamma
Lot Number: 680-102199-A-8-G

Decay to Time: 8/14/2014 16:24 Live Time: 7200 sec
Acquisition Time: 8/14/2014 16:25:09 Real Time: 7318 sec
Analysis Time: 8/14/2014 18:28 Dead Time: 1.61 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 7_Liquid_D=1 25ml.Clb
Efficiency Cal Desc: 7_25mld=1_90101_032612
Efficiency Cal Date: 3/28/2012 09:22
Energy Cal Date: 2/23/2012 08:40
Library: Client_ Long_no ingrowth Rev3.li
Bkgd Correction File: 7_2014-08-09_2137.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	3.996E-03	7010.0	2.801E-01	2.801E-01	1.005E+00
NA-22	-2.869E-02	198.0	5.680E-02	5.681E-02	2.033E-01
K-40	1.707E+01	7.4	1.269E+00	1.514E+00	6.952E-01
Sc-46	7.616E-03	506.8	3.860E-02	3.860E-02	1.413E-01
CR-51	-9.588E-04	24460.0	2.345E-01	2.345E-01	8.334E-01
MN-54	2.113E-02	171.6	3.626E-02	3.627E-02	1.291E-01
FE-59	0.000E+00	1000.0	5.071E-02	5.071E-02	2.630E-01
Co-56	-3.717E-03	183.2	6.810E-03	6.812E-03	1.764E-01
CO-57	-3.519E-03	451.7	1.590E-02	1.590E-02	5.516E-02
CO-58	3.915E-02	100.0	3.913E-02	3.917E-02	1.343E-01
CO-60	-4.262E-03	1294.0	5.513E-02	5.513E-02	2.052E-01
ZN-65	-6.104E-02	210.6	1.286E-01	1.286E-01	4.521E-01
NB-94	1.054E-02	143.6	1.513E-02	1.514E-02	1.454E-01
ZR-95	6.516E-03	1089.0	7.093E-02	7.093E-02	2.573E-01
NB-95	4.010E-03	1018.0	4.082E-02	4.082E-02	1.475E-01
RU-103	2.181E-02	128.1	2.793E-02	2.795E-02	9.713E-02
RH-106	6.853E-02	584.5	4.006E-01	4.006E-01	1.307E+00
AG-108M	0.000E+00	1000.0	2.050E-02	2.050E-02	1.208E-01
AG-110M	-4.223E-03	374.2	1.580E-02	1.580E-02	2.108E-01
SN-113	7.084E-03	755.4	5.351E-02	5.351E-02	1.867E-01
SB-124	-6.687E-03	574.1	3.839E-02	3.839E-02	1.364E-01
SB-125	1.392E-01	44.7	6.227E-02	6.263E-02	2.758E-01
I-131	-5.467E-03	652.6	3.568E-02	3.568E-02	1.251E-01
Gd-153	-5.035E-02	103.3	5.201E-02	5.209E-02	1.747E-01
Ga-68	-1.330E-01	1518.0	2.020E+00	2.020E+00	7.666E+00
Tc-99m	-4.559E-03	437.9	1.996E-02	1.996E-02	6.905E-02
BA-133	-5.874E-03	877.6	5.155E-02	5.155E-02	1.798E-01
CS-134	4.931E-02	46.2	2.276E-02	2.288E-02	1.682E-01
CS-137	6.085E-01	14.1	8.577E-02	9.075E-02	1.411E-01
CE-139	-2.601E-02	94.3	2.453E-02	2.459E-02	8.231E-02
Ba-140	1.104E-01	85.2	9.411E-02	9.426E-02	4.714E-01
La-140	3.868E-03	118.6	4.587E-03	4.591E-03	2.023E-01
CE-141	3.769E-03	788.9	2.973E-02	2.973E-02	1.039E-01
CE-144	-8.201E-02	165.7	1.359E-01	1.360E-01	4.644E-01
PM-144	1.706E-02	141.8	2.419E-02	2.421E-02	1.295E-01
EU-152	1.780E-01	46.7	8.315E-02	8.359E-02	2.646E-01
EU-154	7.914E-02	41.7	3.298E-02	3.320E-02	1.184E+00
EU-155	1.129E-01	53.9	6.090E-02	6.118E-02	1.986E-01
HF-181	3.544E-02	41.2	1.461E-02	1.471E-02	1.179E-01
Ta-182	0.000E+00	707.1	3.900E-02	3.900E-02	7.511E-01
Hg-203	-2.314E-02	133.5	3.090E-02	3.092E-02	1.053E-01
TL-208	4.609E-01	13.8	6.368E-02	6.375E-02	9.443E-02
pm-146	3.330E-02	77.5	2.580E-02	2.585E-02	4.029E-01

y-88	2.872E-02	111.2	3.194E-02	3.197E-02	1.583E-01
Cd-109	1.930E-01	240.9	4.650E-01	4.651E-01	1.580E+00
Ra-226	5.188E+00	18.7	9.692E-01	1.031E+00	2.012E+00
PB-210	3.333E+00	18.7	6.233E-01	6.590E-01	1.625E+00
PB-212	1.042E+00	9.1	9.450E-02	1.099E-01	2.158E-01
PB-214	1.081E+00	9.2	9.903E-02	1.120E-01	2.049E-01
BI-207	2.176E-02	159.3	3.465E-02	3.467E-02	1.143E-01
BI-212	8.228E-01	64.2	5.285E-01	5.300E-01	1.742E+00
BI-214	8.867E-01	18.1	1.608E-01	1.665E-01	3.034E-01
BI-210M	-6.987E-04	95.4	6.666E-04	6.676E-04	1.644E-01
RA-224	-2.703E+00	44.7	1.209E+00	1.218E+00	3.939E+00
AC-228	1.792E+00	8.8	1.575E-01	1.796E-01	3.603E-01
TH-227	9.384E-02	235.0	2.205E-01	2.206E-01	1.836E+00
TH-229	3.172E-01	131.3	4.167E-01	4.171E-01	1.420E+00
TH-234	2.409E+00	22.0	5.288E-01	5.418E-01	1.495E+00
PA-231	-7.415E-04	118.4	8.781E-04	8.788E-04	2.943E+00
PA-233	3.158E-02	166.3	5.251E-02	5.253E-02	2.699E-01
PA-234	6.269E-02	201.4	1.262E-01	1.263E-01	3.100E-01
PA-234M	5.221E+00	104.7	5.464E+00	5.470E+00	1.887E+01
U-235	1.035E-01	108.6	1.124E-01	1.125E-01	5.522E-01
AM-241	3.529E-02	117.4	4.142E-02	4.146E-02	1.398E-01
Ir-192	1.746E-01	16.5	2.880E-02	3.036E-02	1.055E-01
Np-237	4.224E-01	26.8	1.132E-01	1.153E-01	3.468E-01
Total	4.236E+01				

Analyst: ashley silas

TestAmerica Spectrum name: 7_Gamma_20141817.An1

Sample description
137389_Gamma_680-102199-A-8-G

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20141817.An1

Acquisition information
Start time: 8/14/2014 4:25:09 PM
Live time: 7200
Real time: 7318
Dead time: 1.61 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Liquid_D=1 25ml.Clb
7_25mld=1_90101_032612

Energy Calibration
Created: 2/23/2012 8:40:56 AM
Zero offset: 0.117 keV
Gain: 0.250 keV/channel
Quadratic: 3.508E-09 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 9:22:15 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.82 %
Log(Eff): -7.206837E-02 + (-5.220592E-02*Log(E)) +
(-7.214522E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.58 %
Log(Eff): -1.343090E+01 + (5.323811E+00*Log(E)) +
(-6.125181E-01*Log(E)^2)

Library Files
Main analysis library: Client_ Long_no ingrowth Rev3.li
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (2000.12keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/14/2014 4:24:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2014-08-09_2137.PBC 8/9/2014 9:37:15 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 28 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1427

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.58	207.	12.25	0.81	1.328E-01	46.54	4.250	3.333E+00	PB210
50.05	6.	235.02	0.84	1.386E-01	50.14	8.000	PBC<MDA	TH227
58.40	14.	117.40	0.85	1.490E-01	59.54	35.900	PBC<MDA	AM241
63.26	180.	12.19	0.89	1.516E-01	63.29	3.810	2.409E+00	TH234
74.66	219.	10.05	0.87	1.552E-01				
77.18	301.	7.53	0.87	1.553E-01				
86.54	2.	978.89	0.88	1.540E-01	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	7.336E-03	EU155
					86.54	30.700	7.336E-03	EU155
86.72	61.	26.81	0.88	1.540E-01	86.49	13.100	4.224E-01	Np237
					86.54	30.700	1.803E-01	EU155
88.27	8.	240.89	0.88	1.536E-01	88.04	3.790	PBC<MDA	Cd109
89.70	70.	22.67	0.88	1.531E-01				
92.65	169.	11.63	0.89	1.521E-01	92.59	5.584	PBC<MDA	TH234
93.28	52.	44.21	0.89	1.518E-01	93.35	5.561	PBC<MDA	AC228
105.47	25.	53.93	0.90	1.463E-01	105.31	21.200	PBC<MDA	EU155
					105.31	21.200	1.129E-01	EU155
122.98	33.	41.67	0.92	1.358E-01	122.06	85.600	PBC<MDA	CO57
					123.10	40.790	8.211E-02	EU154
131.13	2.	827.57	0.93	1.306E-01	131.29	18.000	PBC<MDA	PA234
143.62	36.	44.64	0.44	1.226E-01				
143.85	2.	788.91	0.94	1.214E-01	143.79	10.960	PBC<MDA	U235
					145.44	48.200	3.769E-03	CE141
143.97	-5.	103.41	0.94	1.225E-01	143.79	10.960	PBC<MDA	U235
					145.44	48.200	PBC<MDA	CE141
161.01	13.	85.24	0.96	1.104E-01	162.66	6.220	PBC<MDA	Ba140
163.41	14.	108.64	0.96	1.100E-01	163.38	5.080	PBC<MDA	U235

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
185.57	121.	18.68	1.40	9.876E-02	185.99	3.280	5.188E+00	Ra226
194.60	10.	131.35	0.99	9.565E-02	193.51	4.400	PBC<MDA	TH229
205.26	7.	183.63	1.01	9.113E-02	205.33	5.010	PBC<MDA	U235
235.97	7.	533.65	1.04	8.119E-02	235.97	12.300	PBC<MDA	TH227
238.67	301.	7.88	0.98	8.042E-02	238.63	43.300	1.042E+00	PB212
241.91	54.	39.06	1.23	7.948E-02	242.00	7.430	1.270E+00	PB214
277.91	9.	123.13	1.08	7.076E-02	277.28	6.310	PBC<MDA	TL208
295.37	92.	16.50	1.10	6.687E-02	295.09	19.300	9.881E-01	PB214
					295.95	30.160	6.339E-01	Ir192
					295.95	30.160	6.339E-01	Ir192
295.39	98.	14.93	1.24	6.704E-02	295.09	19.300	1.054E+00	PB214
					295.95	30.160	6.761E-01	Ir192
301.06	6.	166.25	1.10	6.604E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	5.416E-01	PA231
					300.18	6.200	2.150E-01	PA233
301.14	7.	156.97	1.10	6.607E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	5.569E-01	PA231
					300.18	6.200	2.210E-01	PA233
301.15	7.	156.18	1.10	6.606E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	5.596E-01	PA231
					300.18	6.200	2.221E-01	PA233
304.17	7.	129.15	1.11	6.515E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	5.603E-02	BI210M
304.18	8.	125.24	1.11	6.515E-02	304.85	4.290	3.768E-01	Ba140
					304.90	28.000	5.773E-02	BI210M
317.01	6.	198.40	1.12	6.304E-02	316.49	87.040	PBC<MDA	Ir192
					316.49	87.040	1.542E-02	Ir192
338.40	88.	15.36	1.29	5.940E-02	338.32	12.010	1.723E+00	AC228
344.20	21.	41.22	1.15	5.826E-02	344.29	26.500	PBC<MDA	EU152
					345.83	15.070	3.257E-01	HF181
344.30	20.	46.72	1.15	5.849E-02	344.29	26.500	PBC<MDA	EU152
					345.83	15.070	3.142E-01	HF181
352.04	170.	10.62	1.03	5.734E-02	351.93	37.600	1.095E+00	PB214
384.39	1.	799.52	1.19	5.302E-02	383.84	8.940	PBC<MDA	BA133
391.69	2.	755.36	1.20	5.205E-02	391.69	64.000	PBC<MDA	SN113
453.06	11.	77.48	1.26	4.542E-02	453.88	65.000	PBC<MDA	pm146
463.50	22.	44.74	1.27	4.455E-02	463.37	10.470	PBC<MDA	SB125
485.50	6.	118.59	1.29	4.251E-02	487.02	45.500	PBC<MDA	La140
					487.02	45.500	4.343E-02	La140
497.21	6.	128.10	1.30	4.170E-02	497.05	90.900	PBC<MDA	RU103
					497.05	90.900	2.180E-02	RU103
510.81	104.	15.73	1.31	4.055E-02	511.86	20.000	1.785E+00	RH106
					511.86	20.000	1.785E+00	RH106
537.41	2.	534.08	1.34	3.872E-02	537.26	24.390	PBC<MDA	Ba140
563.28	1.	889.86	1.36	3.700E-02	563.24	8.350	PBC<MDA	CS134
568.29	3.	298.82	1.37	3.662E-02	569.32	15.380	PBC<MDA	CS134
570.03	5.	159.26	1.37	3.659E-02	569.47	8.200	2.450E-01	PA234
					569.70	97.740	2.056E-02	BI207
570.20	4.	201.36	1.37	3.661E-02	569.47	8.200	PBC<MDA	PA234
					569.70	97.740	1.598E-02	BI207
582.86	100.	12.95	1.66	3.578E-02	583.02	84.500	4.609E-01	TL208
598.99	4.	202.98	1.40	3.477E-02	600.50	17.860	PBC<MDA	SB125
609.31	112.	14.93	0.89	3.428E-02	609.31	46.090	8.127E-01	BI214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					610.30	5.750	7.929E+00	RU103
616.45	4.	173.14	1.42	3.380E-02	618.06	99.100	PBC<MDA	PM144
661.73	118.	14.10	1.10	3.160E-02	661.66	85.210	6.085E-01	CS137
696.58	3.	224.57	1.49	3.004E-02	696.54	99.000	PBC<MDA	PM144
727.38	13.	64.23	1.51	2.877E-02	727.17	7.550	PBC<MDA	BI212
761.11	1.	592.58	1.55	2.738E-02	763.94	22.280	PBC<MDA	AG110M
794.31	16.	46.15	1.58	2.626E-02	795.87	85.530	PBC<MDA	CS134
810.29	7.	99.95	1.59	2.577E-02	810.78	99.460	PBC<MDA	CO58
836.99	4.	171.57	1.61	2.502E-02	834.85	99.980	PBC<MDA	MN54
861.03	2.	365.85	1.63	2.425E-02	860.56	12.420	PBC<MDA	TL208
871.04	5.	143.60	1.64	2.395E-02	871.10	99.890	PBC<MDA	NB94
873.14	1.	469.86	1.64	2.389E-02	873.23	12.270	PBC<MDA	EU154
885.27	1.	734.31	1.65	2.361E-02				
889.22	1.	506.81	1.66	2.344E-02	889.28	99.984	PBC<MDA	Sc46
					889.28	99.984	7.616E-03	Sc46
898.18	6.	111.19	1.66	2.321E-02	898.04	93.700	PBC<MDA	y88
911.41	91.	13.31	1.72	2.286E-02	911.16	29.000	1.913E+00	AC228
969.25	44.	16.80	0.93	2.145E-02	968.97	17.460	1.638E+00	AC228
1001.24	7.	104.66	1.75	2.073E-02	1001.00	0.837	PBC<MDA	PA234M
1038.86	1.	565.94	1.78	1.995E-02	1037.84	14.130	PBC<MDA	Co56
1050.01	1.	605.57	1.79	1.970E-02	1050.36	1.560	PBC<MDA	RH106
					1050.36	1.560	5.047E-01	RH106
1064.50	2.	300.05	1.80	1.944E-02	1063.66	74.500	PBC<MDA	BI207
1119.85	11.	59.18	1.85	1.840E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1120.55	99.987	PBC<MDA	Sc46
1238.46	2.	467.20	1.94	1.653E-02	1238.28	66.070	PBC<MDA	Co56
1407.25	5.	110.35	2.06	1.437E-02	1408.00	21.005	PBC<MDA	EU152
1460.95	181.	7.43	2.31	1.380E-02	1460.83	10.670	1.707E+01	K40
1764.75	14.	33.35	2.29	1.117E-02	1764.49	15.400	1.108E+00	BI214
1836.82	1.	324.79	2.33	1.068E-02	1836.06	99.200	PBC<MDA	y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
298.19	74.66	140.	231.	1.489E+03	11.43	0.837	-	s
308.29	77.18	152.	308.	1.984E+03	8.03	0.985	-	
359.52	89.76	104.	58.	3.814E+02	27.91	0.883	-	D
574.06	143.62	65.	36.	2.910E+02	44.64	0.440	-	l

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_ Long_no ingrowth Rev3.li

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.89	46.58	185.	135.	0.019	12.25	0.809s
TH-227	199.75	50.05	111.	6.	0.001	235.02	0.840s
AM-241	233.15	58.40	120.	14.	0.002	117.40	0.850s
TH-234	252.61	63.26	163.	100.	0.014	12.19	0.891s
Np-237	345.53	86.49	105.	61.	0.009	26.81	0.880D
EU-155	345.74	86.54	298.	2.	0.000	978.89	0.880s
Cd-109	351.73	88.04	186.	8.	0.001	240.89	0.882D
TH-234	369.93	92.59	234.	40.	0.006	14.09	0.886D
AC-228	372.97	93.35	234.	52.	0.007	44.21	0.887D
Gd-153	388.55	97.24	134.	-16.	-0.002	103.29	0.892s
Gd-153	411.60	103.01	114.	-16.	-0.002	94.90	0.898s
EU-155	421.46	105.47	80.	25.	0.004	53.93	0.900s
EU-152	486.79	121.80	109.	-13.	-0.002	119.59	0.918s
CO-57	492.83	123.31	88.	-3.	0.000	451.69	0.918s
EU-154	491.49	122.98	77.	33.	0.005	41.67	0.919
PA-234	524.10	131.13	114.	2.	0.000	827.57	0.928s
HF-181	531.96	133.09	108.	-9.	-0.001	168.17	0.930s
CE-144	531.06	132.87	94.	-8.	-0.001	165.71	0.930s
HF-181	544.79	136.30	116.	-11.	-0.002	136.16	0.933s
CO-57	545.22	136.41	118.	-11.	-0.002	138.32	0.934s
Tc-99m	563.27	140.92	100.	-3.	0.000	437.86	0.938s
U-235	575.46	143.97	118.	-5.	-0.001	103.41	0.941s
CE-141	575.00	143.85	78.	2.	0.000	788.91	0.943s
Ba-140	643.65	161.01	58.	13.	0.002	85.24	0.961s
U-235	653.23	163.41	106.	14.	0.002	108.64	0.962
CE-139	666.41	166.70	108.	-16.	-0.002	94.28	0.965s
Ra-226	741.90	185.57	90.	121.	0.017	18.68	1.397s
TH-229	778.01	194.60	75.	10.	0.001	131.35	0.994s
U-235	820.66	205.26	73.	7.	0.001	183.63	1.007
TH-229	842.91	210.82	105.	-7.	-0.001	207.58	1.012s
TH-227	943.50	235.97	770.	7.	0.001	533.65	1.039s
PB-212	954.29	238.67	122.	261.	0.036	7.88	0.979
RA-224	960.03	240.10	373.	-64.	-0.009	44.72	1.044s
PB-214	967.25	241.91	102.	54.	0.007	39.06	1.234s
EU-152	977.69	244.51	113.	-13.	-0.002	115.81	1.048s
BI-210M	1062.23	265.65	76.	-9.	-0.001	143.96	1.070s
TL-208	1111.26	277.91	60.	9.	0.001	123.13	1.081s
Hg-203	1116.50	279.22	76.	-10.	-0.001	133.54	1.083s
PB-214	1181.22	295.39	37.	98.	0.014	14.93	1.241
Ir-192	1181.14	295.37	69.	92.	0.013	16.50	1.100
PB-212	1204.20	301.14	49.	7.	0.001	156.97	1.105s
PA-231	1204.26	301.15	49.	7.	0.001	156.18	1.105s
PA-233	1203.90	301.06	52.	6.	0.001	166.25	1.105s
PA-231	1210.67	302.76	64.	-7.	-0.001	178.03	1.107s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BA-133	1210.86	302.80	69.	-8.	-0.001	152.61	1.108s
Ba-140	1216.34	304.17	41.	7.	0.001	129.15	1.110s
BI-210M	1216.35	304.18	41.	8.	0.001	125.24	1.110s
Ir-192	1230.69	307.76	45.	-3.	0.000	354.39	1.113s
Ir-192	1267.68	317.01	70.	6.	0.001	198.40	1.121s
La-140	1318.02	329.59	67.	-7.	-0.001	161.75	1.134s
AC-228	1353.27	338.40	28.	88.	0.012	15.36	1.287
EU-152	1376.85	344.30	33.	20.	0.003	46.72	1.150s
HF-181	1376.47	344.20	26.	21.	0.003	41.22	1.151s
PB-214	1407.82	352.04	39.	170.	0.024	10.62	1.025
BA-133	1423.13	355.87	85.	-1.	0.000	877.61	1.161s
I-131	1456.23	364.14	67.	-2.	0.000	652.62	1.170s
BA-133	1537.21	384.39	49.	1.	0.000	799.52	1.189s
SN-113	1566.43	391.69	82.	2.	0.000	755.36	1.197s
SB-125	1699.33	424.91	30.	-2.	0.000	349.64	1.233s
pm-146	1811.94	453.06	32.	11.	0.002	77.48	1.259s
SB-125	1853.69	463.50	39.	22.	0.003	44.74	1.268s
Ir-192	1867.09	466.85	35.	-5.	-0.001	173.49	1.272s
PM-144	1905.98	476.57	39.	-2.	0.000	440.44	1.281s
HF-181	1933.10	483.35	33.	-5.	-0.001	177.81	1.286s
La-140	1941.69	485.50	23.	6.	0.001	118.59	1.291s
RU-103	1988.53	497.21	26.	6.	0.001	128.10	1.300s
RH-106	2042.95	510.81	82.	104.	0.014	15.73	1.315s
Ba-140	2149.34	537.41	40.	2.	0.000	534.08	1.339s
CS-134	2252.82	563.28	32.	1.	0.000	889.86	1.364s
CS-134	2272.86	568.29	32.	3.	0.000	298.82	1.369s
PA-234	2280.52	570.20	32.	4.	0.001	201.36	1.370s
BI-207	2279.82	570.03	33.	5.	0.001	159.26	1.370s
TL-208	2331.14	582.86	15.	100.	0.014	12.95	1.664s
SB-125	2395.67	598.99	37.	4.	0.001	202.98	1.399s
SB-124	2408.47	602.19	43.	-2.	0.000	574.09	1.401s
BI-214	2436.94	609.31	47.	92.	0.013	14.93	0.889s
RU-103	2436.85	609.28	33.	77.	0.011	15.51	1.408s
AG-108M	2455.10	613.85	51.	-8.	-0.001	126.49	1.412s
PM-144	2465.51	616.45	26.	4.	0.001	173.14	1.415s
SB-125	2542.59	635.72	36.	-5.	-0.001	194.96	1.432s
I-131	2542.37	635.66	33.	-5.	-0.001	173.81	1.433s
CS-137	2646.65	661.73	28.	118.	0.016	14.10	1.104s
PM-144	2786.04	696.58	29.	3.	0.000	224.57	1.487s
NB-94	2813.93	703.55	36.	-1.	0.000	672.02	1.493s
AG-108M	2900.44	725.18	37.	-7.	-0.001	127.18	1.511s
BI-212	2909.27	727.38	28.	13.	0.002	64.23	1.515s
pm-146	2942.86	735.78	32.	-4.	-0.001	202.53	1.523s
AG-110M	3044.19	761.11	18.	1.	0.000	592.58	1.548s
PA-234M	3067.03	766.82	31.	-2.	0.000	521.04	1.550s
CS-134	3176.98	794.31	20.	16.	0.002	46.15	1.576s
CO-58	3240.90	810.29	22.	7.	0.001	99.95	1.589s
MN-54	3347.71	836.99	19.	4.	0.001	171.57	1.610s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Co-56	3385.76	846.50	38.	-5.	-0.001	183.22	1.620s
TL-208	3443.86	861.03	22.	2.	0.000	365.85	1.632s
NB-94	3483.91	871.04	20.	5.	0.001	143.60	1.641s
EU-154	3492.29	873.14	23.	1.	0.000	469.86	1.643s
PA-234	3540.81	885.27	18.	1.	0.000	734.31	1.651s
AG-110M	3535.67	883.98	25.	-2.	0.000	457.15	1.653s
Sc-46	3556.61	889.22	21.	1.	0.000	506.81	1.657s
y-88	3592.48	898.18	22.	6.	0.001	111.19	1.664s
AC-228	3645.40	911.41	10.	91.	0.013	13.31	1.719s
PA-234	3786.21	946.62	30.	-1.	0.000	595.28	1.704s
EU-152	3851.36	962.90	33.	-6.	-0.001	135.29	1.719s
AC-228	3876.74	969.25	3.	44.	0.006	16.80	0.927s
PA-234M	4004.69	1001.24	20.	7.	0.001	104.66	1.750s
Co-56	4155.20	1038.86	15.	1.	0.000	565.94	1.780s
RH-106	4199.78	1050.01	22.	1.	0.000	605.57	1.790s
BI-207	4257.74	1064.50	25.	2.	0.000	300.05	1.801s
ZN-65	4459.19	1114.86	35.	-4.	-0.001	210.61	1.842s
BI-214	4479.15	1119.85	20.	11.	0.002	59.18	1.846s
Co-56	4953.58	1238.46	29.	2.	0.000	467.20	1.936s
NA-22	5099.02	1274.82	20.	-3.	0.000	197.95	1.963s
EU-154	5099.02	1274.82	20.	-3.	0.000	197.95	1.963s
FE-59	5170.20	1292.62	16.	-3.	0.000	219.87	1.975s
AG-110M	5531.19	1382.87	26.	-5.	-0.001	153.45	2.042s
EU-152	5628.68	1407.25	14.	5.	0.001	110.35	2.059s
K-40	5843.48	1460.95	0.	181.	0.025	7.43	2.313
La-140	6368.41	1592.19	10.	-1.	0.000	356.50	2.185s
BI-214	7058.62	1764.75	5.	14.	0.002	33.35	2.290s
Co-56	7076.74	1769.29	20.	-7.	-0.001	101.44	2.294s
y-88	7346.84	1836.82	8.	1.	0.000	324.79	2.332s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	Peak MDA Value Bq/Sample		COMMENTS
BE-7	C	3.9957E-03				5.31E+01		
			477.60	3.996E-03	&(	1.005E+00	7.01E+03	1.05E+01 G
NA-22	C	-2.8693E-02				9.50E+02		
			1274.53	-2.869E-02	?(	2.033E-01	1.98E+02	9.99E+01 G
K-40	N	1.7074E+01				4.66E+11		
			1460.83	1.707E+01	(	6.952E-01	7.43E+00	1.07E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Sc-46	F	7.6163E-03					8.38E+01	
			889.28	7.616E-03	?(	1.413E-01	5.07E+02	1.00E+02 G
			1120.55	0.000E+00	-	2.345E-01	1.00E+03	1.00E+02 G
CR-51	F	-9.5878E-04					2.77E+01	
			320.08	-9.588E-04	%(	8.334E-01	2.45E+04	9.94E+00 G
MN-54	C	2.1132E-02					3.12E+02	
			834.85	2.113E-02	?(	1.291E-01	1.72E+02	1.00E+02 G
Co-56	C	-3.7167E-03					7.73E+01	
			846.77	-2.753E-02	?(	1.764E-01	1.83E+02	9.99E+01 G
			1238.28	2.118E-02	?(	3.560E-01	4.67E+02	6.61E+01 G
			1037.84	4.830E-02	?(	1.020E+00	5.66E+02	1.41E+01 G
			1771.35	-5.400E-01	+	1.888E+00	1.01E+02	1.55E+01 A
CO-57	C	-3.5192E-03					2.72E+02	
			122.06	-3.519E-03	?(	5.516E-02	4.52E+02	8.56E+01 G
			136.47	-1.161E-01	+	5.444E-01	1.38E+02	1.07E+01 G
CO-58	C	3.9146E-02					7.09E+01	
			810.78	3.915E-02	(	1.343E-01	9.99E+01	9.95E+01 G
CO-60	F	-4.2619E-03					1.93E+03	
			1332.50	-4.262E-03	%(	2.052E-01	1.29E+03	1.00E+02 G
			1173.24	0.000E+00	+	1.499E-01	1.00E+03	9.99E+01 G
ZN-65	F	-6.1041E-02					2.44E+02	
			1115.55	-6.104E-02	?(	4.521E-01	2.11E+02	5.06E+01 G
NB-94	I	1.0536E-02					7.41E+06	
			702.63	-6.034E-03	?(	1.454E-01	6.72E+02	9.79E+01 G
			871.10	2.678E-02	?(	1.356E-01	1.44E+02	9.99E+01 G
ZR-95	I	6.5158E-03					6.40E+01	
			756.73	6.516E-03	%(	2.573E-01	1.09E+03	5.45E+01 G
			724.20	6.952E-03	%	3.024E-01	1.20E+03	4.42E+01 G
NB-95	I	4.0100E-03					6.40E+01	
			765.79	4.010E-03	%(	1.475E-01	1.02E+03	9.98E+01 G
RU-103	I	2.1805E-02					3.93E+01	
			497.05	2.180E-02	&(	9.713E-02	1.28E+02	9.09E+01 G
			610.30	5.461E+00	?	2.088E+00	1.55E+01	5.75E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RH-106	I	6.8525E-02					3.74E+02	
			621.92	0.000E+00	?(	1.307E+00	1.00E+03	9.93E+00 G
			1050.36	5.047E-01	?(	1.117E+01	6.06E+02	1.56E+00 G
			511.86	1.785E+00	?	7.701E-01	1.57E+01	2.00E+01 GA
AG-110M	F	-4.2228E-03					2.50E+02	
			884.68	-1.273E-02	?(	2.108E-01	4.57E+02	7.27E+01 G
			657.76	9.512E-03	&	4.264E-01	1.32E+03	9.46E+01 G
			937.49	0.000E+00	+	6.012E-01	1.00E+03	3.44E+01 G
			1384.30	-1.924E-01	+	1.036E+00	1.53E+02	2.43E+01 G
			763.94	2.353E-02	?(	5.148E-01	5.93E+02	2.23E+01 G
SN-113	F	7.0843E-03					1.15E+02	
			391.69	7.084E-03	?(	1.867E-01	7.55E+02	6.40E+01 G
SB-124	F	-6.6872E-03					6.02E+01	
			602.73	-6.687E-03	&(	1.364E-01	5.74E+02	9.83E+01 G
			1690.98	1.712E-03	%	5.423E-01	8.43E+03	4.78E+01 G
			722.79	-3.011E-02	&	1.176E+00	1.07E+03	1.08E+01 G
SB-125	I	1.3917E-01					1.01E+03	
			427.88	-2.204E-02	?(	2.758E-01	3.50E+02	2.96E+01 G
			600.50	9.759E-02	?(	6.949E-01	2.03E+02	1.79E+01 G
			635.89	-1.685E-01	+	1.151E+00	1.95E+02	1.13E+01 G
			463.37	6.659E-01	(	9.459E-01	4.47E+01	1.05E+01 G
I-131	I	-5.4666E-03					8.02E+00	
			364.48	-5.467E-03	&(	1.251E-01	6.53E+02	8.17E+01 G
			284.30	7.487E-03	%	1.457E+00	5.55E+03	6.14E+00 G
			636.97	-2.867E-01	+	1.745E+00	1.74E+02	7.17E+00 G
Gd-153	F	-5.0354E-02					2.42E+02	
			97.50	-5.035E-02	?(	1.747E-01	1.03E+02	3.00E+01 G
			103.20	-7.124E-02	+	2.269E-01	9.49E+01	2.18E+01 G
Ga-68	C	-1.3303E-01					4.71E-02	
			1077.40	-1.330E-01	%(	7.666E+00	1.52E+03	3.30E+00 G
Tc-99m	I	-4.5593E-03					2.51E-01	
			140.51	-4.559E-03	?(	6.905E-02	4.38E+02	8.93E+01 G
BA-133	F	-5.8736E-03					3.85E+03	
			356.00	-5.874E-03	&(	1.798E-01	8.78E+02	6.20E+01 G
			302.85	-9.152E-02	+	4.789E-01	1.53E+02	1.83E+01 G
			383.84	3.647E-02	?	1.034E+00	8.00E+02	8.94E+00 GA
			80.99	3.301E-04	%	1.559E-01	1.37E+04	3.41E+01 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-134	I	4.9310E-02					7.54E+02	
			604.71	3.215E-03	%(	1.682E-01	1.49E+03	9.76E+01 G
			795.87	9.962E-02	?(	1.443E-01	4.62E+01	8.55E+01 G
			569.32	6.695E-02	?(	7.123E-01	2.99E+02	1.54E+01 G
			801.95	1.024E-02	%	1.720E+00	4.61E+03	8.69E+00 G
			563.24	4.043E-02	?(	1.299E+00	8.90E+02	8.35E+00 G
CS-137	I	6.0850E-01					1.10E+04	
			661.66	6.085E-01	(	1.411E-01	1.41E+01	8.52E+01 G
CE-139	F	-2.6014E-02					1.38E+02	
			165.85	-2.601E-02	?(	8.231E-02	9.43E+01	7.99E+01 G
Ba-140	I	1.1041E-01					1.28E+01	
			537.26	2.478E-02	&(	4.714E-01	5.34E+02	2.44E+01 G
			162.66	2.701E-01	?(	7.733E-01	8.52E+01	6.22E+00 G
			304.85	3.657E-01	&(	1.626E+00	1.29E+02	4.29E+00 G
La-140	I	3.8679E-03					1.28E+01	
			1596.21	-1.500E-02	?(	2.023E-01	3.57E+02	9.54E+01 G
			487.02	4.343E-02	&(	1.789E-01	1.19E+02	4.55E+01 G
			328.76	-8.231E-02	+	4.575E-01	1.62E+02	2.03E+01 G
			815.77	-5.324E-03	&	4.654E-01	2.30E+03	2.33E+01 G
CE-141	I	3.7687E-03					3.25E+01	
			145.44	3.769E-03	&(	1.039E-01	7.89E+02	4.82E+01 G
CE-144	I	-8.2012E-02					2.85E+02	
			133.54	-8.201E-02	?(	4.644E-01	1.66E+02	1.11E+01 G
PM-144	C	1.7063E-02					3.63E+02	
			696.54	1.626E-02	?(	1.295E-01	2.25E+02	9.90E+01 G
			618.06	1.787E-02	&(	1.091E-01	1.73E+02	9.91E+01 G
			476.81	-1.554E-02	&	2.434E-01	4.40E+02	4.20E+01 G
EU-152	F	1.7798E-01					4.94E+03	
			344.29	1.780E-01	*(	2.646E-01	4.67E+01	2.65E+01 G
			1112.07	-1.997E-02	%	1.368E+00	1.86E+03	1.36E+01 G
			121.78	-4.506E-02	&	1.822E-01	1.20E+02	2.86E+01 G
			778.92	0.000E+00	-	1.271E+00	1.00E+03	1.29E+01 G
			964.11	-2.775E-01	-	1.302E+00	1.35E+02	1.46E+01 G
			244.69	-3.107E-01	-	1.215E+00	1.16E+02	7.58E+00 G
			1408.00	2.384E-01	?	9.197E-01	1.10E+02	2.10E+01 GA
EU-154	I	7.9142E-02					3.14E+03	
			873.23	6.929E-02	?(	1.184E+00	4.70E+02	1.23E+01 G
			123.10	8.211E-02	(	1.091E-01	4.17E+01	4.08E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1274.54	-8.149E-02	+	5.774E-01	1.98E+02	3.52E+01 G
			723.36	0.000E+00	&	9.873E-01	1.00E+03	2.02E+01 G
			1004.77	-8.729E-03	&	1.006E+00	3.15E+03	1.80E+01 G
			996.33	2.477E-02	&	1.583E+00	1.74E+03	1.06E+01 G
EU-155	I	1.1293E-01					1.81E+03	
			105.31	1.129E-01	?(	1.986E-01	5.39E+01	2.12E+01 G
			86.54	7.336E-03	&	2.441E-01	9.79E+02	3.07E+01 G
HF-181	F	3.5439E-02					4.24E+01	
			482.00	-1.891E-02	&(	1.179E-01	1.78E+02	8.05E+01 G
			133.02	-2.208E-02	&	1.266E-01	1.68E+02	4.33E+01 G
			345.83	3.257E-01	&(	4.168E-01	4.12E+01	1.51E+01 G
			136.30	-2.140E-01	+	9.880E-01	1.36E+02	5.85E+00 G
Hg-203	F	-2.3135E-02					4.66E+01	
			279.20	-2.314E-02	&(	1.053E-01	1.34E+02	8.15E+01 G
TL-208	N	4.6089E-01					6.98E+02	
			583.02	4.609E-01	(	9.443E-02	1.29E+01	8.45E+01 G
			277.28	2.863E-01	&	1.204E+00	1.23E+02	6.31E+00 G
			860.56	8.602E-02	-	1.141E+00	3.66E+02	1.24E+01 G
pm-146	C	3.3297E-02					2.02E+03	
			747.16	-3.564E-03	%(	4.029E-01	3.10E+03	3.40E+01 G
			735.72	-8.857E-02	+	6.320E-01	2.03E+02	2.25E+01 G
			453.88	5.258E-02	?(	1.366E-01	7.75E+01	6.50E+01 G
y-88	F	2.8723E-02					1.07E+02	
			898.04	4.115E-02	&(	1.583E-01	1.11E+02	9.37E+01 G
			1836.06	1.699E-02	?(	2.105E-01	3.25E+02	9.92E+01 G
Cd-109	F	1.9303E-01					4.53E+02	
			88.04	1.930E-01	(	1.580E+00	2.41E+02	3.79E+00 G
Ra-226	N	5.1877E+00					5.84E+05	
			185.99	5.188E+00	(	2.012E+00	1.87E+01	3.28E+00 G
PB-210	N	3.3328E+00					8.14E+03	
			46.54	3.333E+00	@(P	1.625E+00	1.23E+01	4.25E+00 G
PB-212	N	1.0423E+00					6.98E+02	
			238.63	1.042E+00	(P	2.158E-01	7.88E+00	4.33E+01 G
			300.03	4.176E-01	-	2.265E+00	1.57E+02	3.28E+00 GA
PB-214	N	1.0810E+00					5.84E+05	
			351.93	1.095E+00	(	2.049E-01	1.06E+01	3.76E+01 G
			295.09	1.054E+00	(	3.327E-01	1.49E+01	1.93E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			242.00	1.270E+00		1.171E+01	3.91E+01	7.43E+00 GA
BI-207	C	2.1759E-02					1.18E+04	
			569.70	2.056E-02	&(	1.143E-01	1.59E+02	9.77E+01 G
			1063.66	2.333E-02	?(	2.514E-01	3.00E+02	7.45E+01 G
BI-212	N	8.2281E-01					6.98E+02	
			727.17	8.228E-01	(	1.742E+00	6.42E+01	7.55E+00 G
			785.42	0.000E+00	-	1.371E+01	1.00E+03	1.28E+00 GA
BI-214	N	8.8666E-01					5.84E+05	
			609.31	8.127E-01	@(P	3.034E-01	1.49E+01	4.61E+01 G
			1120.29	5.739E-01	- P	1.181E+00	5.92E+01	1.51E+01 G
			1764.49	1.108E+00	?(P	1.069E+00	3.33E+01	1.54E+01 G
BI-210M	T	-6.9871E-04					1.10E+09	
			265.83	-3.342E-02	?(	1.644E-01	1.44E+02	5.00E+01 G
			304.90	5.773E-02	&(	2.487E-01	1.25E+02	2.80E+01 G
RA-224	N	-2.7032E+00					6.98E+02	
			240.99	-2.703E+00	&(	3.939E+00	4.47E+01	4.10E+00 G
AC-228	N	1.7920E+00					2.10E+03	
			911.16	1.913E+00	@(	3.603E-01	1.33E+01	2.90E+01 G
			968.97	1.638E+00	(	3.915E-01	1.68E+01	1.75E+01 G
			338.32	1.723E+00	(	5.284E-01	1.54E+01	1.20E+01 G
			93.35	8.488E-01	-	1.218E+00	4.42E+01	5.56E+00 XA
TH-227	N	9.3836E-02					7.95E+03	
			235.97	1.025E-01	(	1.836E+00	5.34E+02	1.23E+01 G
			50.14	8.049E-02	*(	6.485E-01	2.35E+02	8.00E+00 G
			256.24	1.244E-02	%	1.141E+00	2.62E+03	7.00E+00 G
TH-229	N	3.1724E-01					2.68E+06	
			193.51	3.172E-01	?(	1.420E+00	1.31E+02	4.40E+00 G
			210.85	-3.698E-01	+	2.629E+00	2.08E+02	2.99E+00 G
TH-234	N	2.4092E+00					1.63E+12	
			63.29	2.409E+00	@(P	1.495E+00	1.22E+01	3.81E+00 G
			92.59	6.614E-01	- P	1.209E+00	1.41E+01	5.58E+00 G
PA-231	N	-7.4154E-04					1.20E+07	
			302.65	-4.794E-01	?(	2.943E+00	1.78E+02	2.88E+00 G
			300.07	5.596E-01	?(	3.020E+00	1.56E+02	2.46E+00 G
PA-233	C	3.1582E-02					7.82E+08	
			312.01	0.000E+00	?(	2.699E-01	1.00E+03	3.60E+01 G
			300.18	2.150E-01	?(	1.235E+00	1.66E+02	6.20E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234	N	6.2692E-02				1.63E+12		
			131.29	1.083E-02	?(	3.100E-01	8.28E+02	1.80E+01 G
			946.02	-6.201E-02	&	1.331E+00	5.95E+02	1.34E+01 G
			569.47	1.904E-01	?(	1.350E+00	2.01E+02	8.20E+00 G
			883.24	5.089E-02	?(	1.383E+00	7.34E+02	9.60E+00 G
			880.53	0.000E+00	-	2.605E+00	1.00E+03	6.00E+00 GA
PA-234M	N	5.2208E+00				1.63E+12		
			1001.00	5.221E+00	?(	1.887E+01	1.05E+02	8.37E-01 G
			766.41	-2.653E+00	-	4.969E+01	5.21E+02	2.94E-01 G
U-235	N	1.0347E-01				2.57E+11		
			143.79	-5.418E-02	?(P	5.522E-01	1.03E+02	1.10E+01 G
			205.33	2.044E-01	?(	1.291E+00	1.84E+02	5.01E+00 G
			163.38	3.441E-01	(	1.261E+00	1.09E+02	5.08E+00 G
AM-241	T	3.5286E-02				1.58E+05		
			59.54	3.529E-02	&(	1.398E-01	1.17E+02	3.59E+01 G
Ir-192	F	1.7458E-01				7.40E+01		
			316.49	1.542E-02	&(	1.055E-01	1.98E+02	8.70E+01 G
			468.06	-3.042E-02	+	1.845E-01	1.73E+02	5.18E+01 G
			308.44	-1.834E-02	+	2.294E-01	3.54E+02	3.18E+01 G
			295.95	6.339E-01	&(	2.858E-01	1.65E+01	3.02E+01 G
Np-237	F	4.2240E-01				2.14E+06		
			86.49	4.224E-01	(	3.468E-01	2.68E+01	1.31E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes: Peak Codes:

T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
TH-227	50.05	111.	6.	0.001	235.02	8.049E-02
AM-241	58.40	120.	14.	0.002	117.40	3.529E-02
EU-155	86.54	298.	2.	0.000	978.89	7.336E-03
Gd-153	97.24	134.	-16.	-0.002	103.29	-5.035E-02
Gd-153	103.01	114.	-16.	-0.002	94.90	-7.124E-02
EU-155	105.47	80.	25.	0.004	53.93	1.129E-01
EU-152	121.80	109.	-13.	-0.002	119.59	-4.506E-02
CO-57	123.31	88.	-3.	0.000	451.69	-3.519E-03
EU-154	122.98	77.	33.	0.005	41.67	8.211E-02
PA-234	131.13	114.	2.	0.000	827.57	1.083E-02
HF-181	133.09	108.	-9.	-0.001	168.17	-2.208E-02
CE-144	132.87	94.	-8.	-0.001	165.71	-8.201E-02
HF-181	136.30	116.	-11.	-0.002	136.16	-2.140E-01
CO-57	136.41	118.	-11.	-0.002	138.32	-1.161E-01
Tc-99m	140.92	100.	-3.	0.000	437.86	-4.559E-03
CE-141	143.85	78.	2.	0.000	788.91	3.769E-03
Ba-140	161.01	58.	13.	0.002	85.24	2.701E-01
CE-139	166.70	108.	-16.	-0.002	94.28	-2.601E-02
TH-229	194.60	75.	10.	0.001	131.35	3.172E-01
TH-229	210.82	105.	-7.	-0.001	207.58	-3.698E-01
TH-227	235.97	770.	7.	0.001	533.65	1.025E-01
RA-224	240.10	373.	-64.	-0.009	44.72	-2.703E+00
EU-152	244.51	113.	-13.	-0.002	115.81	-3.107E-01
BI-210M	265.65	76.	-9.	-0.001	143.96	-3.342E-02
Hg-203	279.22	76.	-10.	-0.001	133.54	-2.314E-02
Ir-192	295.37	69.	92.	0.013	16.50	6.339E-01
PA-231	301.15	49.	7.	0.001	156.18	5.596E-01
PA-233	301.06	52.	6.	0.001	166.25	2.150E-01
PA-231	302.76	64.	-7.	-0.001	178.03	-4.794E-01
BA-133	302.80	69.	-8.	-0.001	152.61	-9.152E-02
Ba-140	304.17	41.	7.	0.001	129.15	3.657E-01
BI-210M	304.18	41.	8.	0.001	125.24	5.773E-02
Ir-192	307.76	45.	-3.	0.000	354.39	-1.834E-02
Ir-192	317.01	70.	6.	0.001	198.40	1.542E-02
La-140	329.59	67.	-7.	-0.001	161.75	-8.231E-02
EU-152	344.30	33.	20.	0.003	46.72	1.780E-01

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
HF-181	344.20	26.	21.	0.003	41.22	3.257E-01	
BA-133	355.87	85.	-1.	0.000	877.61	-5.874E-03	
I-131	364.14	67.	-2.	0.000	652.62	-5.467E-03	
BA-133	384.39	49.	1.	0.000	799.52	3.647E-02	
SN-113	391.69	82.	2.	0.000	755.36	7.084E-03	
SB-125	424.91	30.	-2.	0.000	349.64	-2.204E-02	
pm-146	453.06	32.	11.	0.002	77.48	5.258E-02	
SB-125	463.50	39.	22.	0.003	44.74	6.659E-01	
Ir-192	466.85	35.	-5.	-0.001	173.49	-3.042E-02	
PM-144	476.57	39.	-2.	0.000	440.44	-1.554E-02	
HF-181	483.35	33.	-5.	-0.001	177.81	-1.891E-02	
La-140	485.50	23.	6.	0.001	118.59	4.343E-02	
RU-103	497.21	26.	6.	0.001	128.10	2.180E-02	
RH-106	510.81	82.	104.	0.014	15.73	1.785E+00	
Ba-140	537.41	40.	2.	0.000	534.08	2.478E-02	
CS-134	563.28	32.	1.	0.000	889.86	4.043E-02	
CS-134	568.29	32.	3.	0.000	298.82	6.695E-02	
PA-234	570.20	32.	4.	0.001	201.36	1.904E-01	
BI-207	570.03	33.	5.	0.001	159.26	2.056E-02	
SB-125	598.99	37.	4.	0.001	202.98	9.759E-02	
SB-124	602.19	43.	-2.	0.000	574.09	-6.687E-03	
RU-103	609.28	33.	77.	0.011	15.51	5.461E+00	
AG-108M	613.85	51.	-8.	-0.001	126.49	-3.758E-02	
PM-144	616.45	26.	4.	0.001	173.14	1.787E-02	
SB-125	635.72	36.	-5.	-0.001	194.96	-1.685E-01	
I-131	635.66	33.	-5.	-0.001	173.81	-2.867E-01	
PM-144	696.58	29.	3.	0.000	224.57	1.626E-02	
NB-94	703.55	36.	-1.	0.000	672.02	-6.034E-03	
AG-108M	725.18	37.	-7.	-0.001	127.18	-3.751E-02	
BI-212	727.38	28.	13.	0.002	64.23	8.228E-01	
pm-146	735.78	32.	-4.	-0.001	202.53	-8.857E-02	
AG-110M	761.11	18.	1.	0.000	592.58	2.353E-02	
PA-234M	766.82	31.	-2.	0.000	521.04	-2.653E+00	
CS-134	794.31	20.	16.	0.002	46.15	9.962E-02	
CO-58	810.29	22.	7.	0.001	99.95	3.915E-02	
MN-54	836.99	19.	4.	0.001	171.57	2.113E-02	
Co-56	846.50	38.	-5.	-0.001	183.22	-2.753E-02	
NB-94	871.04	20.	5.	0.001	143.60	2.678E-02	
EU-154	873.14	23.	1.	0.000	469.86	6.929E-02	
PA-234	885.27	18.	1.	0.000	734.31	5.089E-02	
AG-110M	883.98	25.	-2.	0.000	457.15	-1.273E-02	
Sc-46	889.22	21.	1.	0.000	506.81	7.616E-03	
y-88	898.18	22.	6.	0.001	111.19	4.115E-02	
PA-234	946.62	30.	-1.	0.000	595.28	-6.201E-02	
EU-152	962.90	33.	-6.	-0.001	135.29	-2.775E-01	
PA-234M	1001.24	20.	7.	0.001	104.66	5.221E+00	
Co-56	1038.86	15.	1.	0.000	565.94	4.830E-02	
RH-106	1050.01	22.	1.	0.000	605.57	5.047E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-207	1064.50	25.	2.	0.000	300.05	2.333E-02	
ZN-65	1114.86	35.	-4.	-0.001	210.61	-6.104E-02	
Co-56	1238.46	29.	2.	0.000	467.20	2.118E-02	
NA-22	1274.82	20.	-3.	0.000	197.95	-2.869E-02	
EU-154	1274.82	20.	-3.	0.000	197.95	-8.149E-02	
FE-59	1292.62	16.	-3.	0.000	219.87	-5.392E-02	
AG-110M	1382.87	26.	-5.	-0.001	153.45	-1.924E-01	
EU-152	1407.25	14.	5.	0.001	110.35	2.384E-01	
La-140	1592.19	10.	-1.	0.000	356.50	-1.500E-02	
Co-56	1769.29	20.	-7.	-0.001	101.44	-5.400E-01	
y-88	1836.82	8.	1.	0.000	324.79	1.699E-02	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	3.9957E-03	3.9957E-03	7.010E+03%	1.00E+00
NA-22	#A	-2.8693E-02	-2.8693E-02	1.980E+02%	2.03E-01
K-40		1.7074E+01	1.7074E+01	7.433E+00%	6.95E-01
Sc-46	#A	7.6162E-03	7.6163E-03	5.068E+02%	1.41E-01
CR-51	#A	-9.5876E-04	-9.5878E-04	2.446E+04%	8.33E-01
MN-54	#A	2.1132E-02	2.1132E-02	1.716E+02%	1.29E-01
FE-59	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.63E-01
Co-56	#A	-3.7166E-03	-3.7167E-03	1.832E+02%	1.76E-01
CO-57	#A	-3.5192E-03	-3.5192E-03	4.517E+02%	5.52E-02
CO-58	#A	3.9145E-02	3.9146E-02	9.995E+01%	1.34E-01
CO-60	#A	-4.2619E-03	-4.2619E-03	1.294E+03%	2.05E-01
ZN-65	#A	-6.1041E-02	-6.1041E-02	2.106E+02%	4.52E-01
NB-94	#A	1.0536E-02	1.0536E-02	1.436E+02%	1.45E-01
ZR-95	#A	6.5157E-03	6.5158E-03	1.089E+03%	2.57E-01
NB-95	#A	4.0100E-03	4.0100E-03	1.018E+03%	1.47E-01
RU-103	#A	2.1805E-02	2.1805E-02	1.281E+02%	9.71E-02
RH-106	#A	6.8525E-02	6.8525E-02	5.845E+02%	1.31E+00
AG-108M	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.21E-01
AG-110M	#A	-4.2228E-03	-4.2228E-03	3.742E+02%	2.11E-01
SN-113	#A	7.0843E-03	7.0843E-03	7.554E+02%	1.87E-01
SB-124	#A	-6.6872E-03	-6.6872E-03	5.741E+02%	1.36E-01
SB-125	#A	1.3917E-01	1.3917E-01	4.474E+01%	2.76E-01
I-131	#A	-5.4662E-03	-5.4666E-03	6.526E+02%	1.25E-01
Gd-153	#A	-5.0354E-02	-5.0354E-02	1.033E+02%	1.75E-01
Ga-68	#A	-1.3147E-01	-1.3303E-01	1.518E+03%	7.67E+00
Tc-99m	#A	-4.5493E-03	-4.5593E-03	4.379E+02%	6.91E-02
BA-133	#A	-5.8736E-03	-5.8736E-03	8.776E+02%	1.80E-01
CS-134	#A	4.9310E-02	4.9310E-02	4.615E+01%	1.68E-01
CS-137		6.0850E-01	6.0850E-01	1.410E+01%	1.41E-01

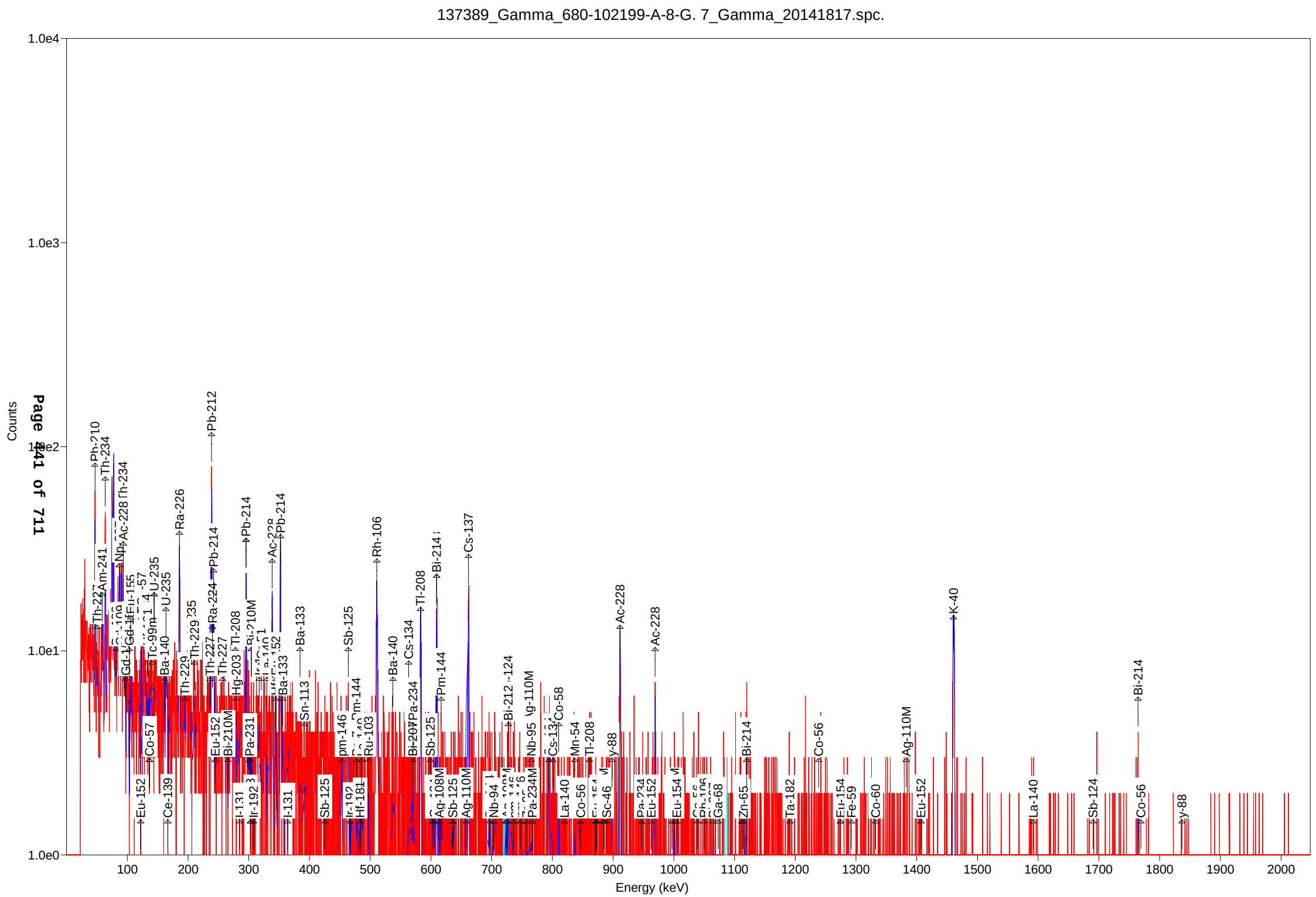
CE-139	#A	-2.6014E-02	-2.6014E-02	9.428E+01%	8.23E-02
Ba-140	#A	1.1040E-01	1.1041E-01	8.524E+01%	4.71E-01
La-140	#A	3.8678E-03	3.8679E-03	1.186E+02%	2.02E-01
CE-141	#A	3.7686E-03	3.7687E-03	7.889E+02%	1.04E-01
CE-144	#A	-8.2012E-02	-8.2012E-02	1.657E+02%	4.64E-01
PM-144	#A	1.7063E-02	1.7063E-02	1.418E+02%	1.29E-01
EU-152	#A	1.7798E-01	1.7798E-01	4.672E+01%	2.65E-01
EU-154	#A	7.9142E-02	7.9142E-02	4.167E+01%	1.18E+00
EU-155	#A	1.1293E-01	1.1293E-01	5.393E+01%	1.99E-01
HF-181	#A	3.5438E-02	3.5439E-02	4.122E+01%	1.18E-01
Ta-182	#A	0.0000E+00	0.0000E+00	7.071E+02%	7.51E-01
Hg-203	#A	-2.3135E-02	-2.3135E-02	1.335E+02%	1.05E-01
TL-208		4.6089E-01	4.6089E-01	1.295E+01%	9.44E-02
pm-146	#A	3.3296E-02	3.3297E-02	7.748E+01%	4.03E-01
y-88	#A	2.8723E-02	2.8723E-02	1.112E+02%	1.58E-01
Cd-109	A	1.9303E-01	1.9303E-01	2.409E+02%	1.58E+00
Ra-226		5.1877E+00	5.1877E+00	1.868E+01%	2.01E+00
PB-210	#	3.3328E+00	3.3328E+00	1.870E+01%	1.63E+00
PB-212		1.0423E+00	1.0423E+00	9.066E+00%	2.16E-01
PB-214		1.0810E+00	1.0810E+00	9.161E+00%	2.05E-01
BI-207	#A	2.1759E-02	2.1759E-02	1.593E+02%	1.14E-01
BI-212	#A	8.2281E-01	8.2281E-01	6.423E+01%	1.74E+00
BI-214	#	8.8666E-01	8.8666E-01	1.814E+01%	3.03E-01
BI-210M	#A	-6.9871E-04	-6.9871E-04	9.541E+01%	1.64E-01
RA-224	#A	-2.7032E+00	-2.7032E+00	4.472E+01%	3.94E+00
AC-228		1.7920E+00	1.7920E+00	8.788E+00%	3.60E-01
TH-227	#A	9.3836E-02	9.3836E-02	2.350E+02%	1.84E+00
TH-229	#A	3.1724E-01	3.1724E-01	1.313E+02%	1.42E+00
TH-234		2.4092E+00	2.4092E+00	2.195E+01%	1.50E+00
PA-231	#A	-7.4154E-04	-7.4154E-04	1.184E+02%	2.94E+00
PA-233	#A	3.1582E-02	3.1582E-02	1.663E+02%	2.70E-01
PA-234	#A	6.2692E-02	6.2692E-02	2.014E+02%	3.10E-01
PA-234M	#A	5.2208E+00	5.2208E+00	1.047E+02%	1.89E+01
U-235	A	1.0347E-01	1.0347E-01	1.086E+02%	5.52E-01
AM-241	#A	3.5286E-02	3.5286E-02	1.174E+02%	1.40E-01
Ir-192	#C	1.7458E-01	1.7458E-01	1.650E+01%	1.06E-01
Np-237		4.2240E-01	4.2240E-01	2.681E+01%	3.47E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

TestAmerica Spectrum name: 7_Gamma_20141817.An1

---------- S U M M A R Y ----------

Total Activity (1188.8 to 2000.1 keV)	3.430E+01	Bq/Sample
Total Decayed Activity (1188.8 to 2000.1 keV)	3.4297428E+01	Bq/Sample


137389_Gamma_680-102199-A-8-G. 7_Gamma_20141817.spc.
Counts
Energy (keV)
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Pb-210
Th-234
Am-241
Th-227
Ac-228
Th-234
Eu-155
Gd-153
Co-57
Tc-99m
U-235
Ba-140
Ra-226
Th-229
Th-229
Pb-212
Pb-214
Ra-224
Th-227
Th-227
Eu-152
Bi-210M
Hg-203
Tl-208
Pa-231
Ir-192
I-131
Bi-210M
Ra-140
Eu-152
Ba-133
I-131
Ba-133
Sn-113
Sb-125
Sb-125
pm-146
Ir-192
Hf-181
Pm-144
Ru-103
Rh-106
Ba-140
Bi-207
Pa-234
Cs-134
Tl-208
Sb-125
Ag-108M
Sb-125
Ag-110M
Pm-144
Bi-214
Cs-137
Nb-94
Bi-212
Pa-234M
Bi-212
Nb-95
Ag-110M
Cs-134
Co-58
La-140
Co-56
Mn-54
Tl-208
Sc-46
Ac-228
Ac-228
Pa-234
Eu-152
Eu-154
Co-56
Ga-68
Bi-214
Zn-65
Ta-182
Co-56
Eu-154
Fe-59
Co-60
Ag-110M
Eu-152
K-40
La-140
Sb-124
Bi-214
Co-56
y-88

Test America St. Louis Spectrum ID: 4_Gamma_20141558

Sample Description: 137389_Gamma_680-102199-A-9-G
Detector: Ge 4 SN/181
Batch ID: 137389
Work Order Number: Gamma
Lot Number: 680-102199-A-9-G

Decay to Time: 8/14/2014 16:25 Live Time: 7200 sec
Acquisition Time: 8/14/2014 16:25:31 Real Time: 7208 sec
Analysis Time: 8/14/2014 18:26 Dead Time: 0.11 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 4_Liquid_D=1 25ml.Clb
Efficiency Cal Desc: 4_Liquid_D=1 25ml_90101_030512
Efficiency Cal Date: 3/27/2012 20:51
Energy Cal Date: 2/28/2012 14:55
Library: Client_ Long_no ingrowth Rev3.li
Bkgd Correction File: 4_2014-08-09_2125.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	1.956E-02	2461.0	4.812E-01	4.812E-01	1.785E+00
NA-22	-2.783E-02	356.9	9.932E-02	9.933E-02	3.719E-01
K-40	1.646E+01	13.4	2.199E+00	2.338E+00	5.159E+00
Sc-46	9.445E-02	44.8	4.227E-02	4.251E-02	3.595E-01
CR-51	-1.605E-01	279.8	4.490E-01	4.491E-01	1.597E+00
MN-54	-1.126E-02	800.7	9.019E-02	9.019E-02	3.306E-01
FE-59	5.507E-02	337.6	1.859E-01	1.859E-01	6.804E-01
Co-56	1.315E-01	69.6	9.144E-02	9.166E-02	2.898E-01
CO-57	-7.091E-05	42550.0	3.017E-02	3.017E-02	1.075E-01
CO-58	-3.519E-02	277.9	9.778E-02	9.780E-02	3.497E-01
CO-60	3.889E-02	132.1	5.140E-02	5.143E-02	7.772E-01
ZN-65	0.000E+00	1000.0	4.904E-02	4.904E-02	1.328E+00
NB-94	7.352E-02	123.5	9.081E-02	9.088E-02	3.148E-01
ZR-95	2.512E-02	610.9	1.534E-01	1.534E-01	5.601E-01
NB-95	5.416E-02	157.2	8.511E-02	8.515E-02	3.006E-01
RU-103	-3.206E-04	23600.0	7.566E-02	7.566E-02	2.738E-01
RH-106	-2.370E-01	302.4	7.167E-01	7.168E-01	2.582E+00
AG-108M	0.000E+00	707.1	1.610E-02	1.610E-02	2.478E-01
AG-110M	3.487E-02	130.9	4.564E-02	4.567E-02	4.754E-01
SN-113	9.530E-02	88.9	8.472E-02	8.485E-02	2.873E-01
SB-124	4.879E-02	167.0	8.150E-02	8.154E-02	2.857E-01
SB-125	2.280E-01	60.1	1.369E-01	1.373E-01	6.979E-01
I-131	2.776E-03	1834.0	5.091E-02	5.091E-02	1.878E-01
Gd-153	-8.334E-02	147.3	1.228E-01	1.229E-01	4.171E-01
Ga-68	-6.829E-02	7979.0	5.449E+00	5.449E+00	2.037E+01
Tc-99m	7.419E-04	5750.0	4.266E-02	4.266E-02	1.498E-01
BA-133	1.026E-01	80.8	8.293E-02	8.308E-02	2.791E-01
CS-134	9.048E-02	97.6	8.828E-02	8.839E-02	2.990E-01
CS-137	0.000E+00	1000.0	3.566E-02	3.566E-02	3.747E-01
CE-139	-4.636E-02	118.6	5.499E-02	5.509E-02	1.862E-01
Ba-140	2.277E-01	135.1	3.076E-01	3.078E-01	7.689E-01
La-140	1.907E-02	368.8	7.034E-02	7.035E-02	8.033E-01
CE-141	-6.065E-02	139.9	8.488E-02	8.493E-02	2.886E-01
CE-144	-1.152E-02	2751.0	3.168E-01	3.168E-01	1.108E+00
PM-144	3.898E-02	58.8	2.293E-02	2.301E-02	2.733E-01
EU-152	1.365E-01	99.6	1.360E-01	1.361E-01	7.549E-01
EU-154	1.987E-02	3723.0	7.399E-01	7.399E-01	2.740E+00
EU-155	3.517E-01	34.0	1.194E-01	1.208E-01	3.645E-01
HF-181	1.220E-02	497.7	6.073E-02	6.073E-02	2.607E-01
Ta-182	6.747E-01	42.1	2.842E-01	2.860E-01	8.487E-01
Hg-203	-2.943E-02	248.6	7.315E-02	7.316E-02	2.533E-01
TL-208	4.614E-01	25.8	1.191E-01	1.188E-01	3.257E-01
pm-146	1.669E-01	119.5	1.994E-01	1.996E-01	8.303E-01

y-88	-2.827E-02	373.2	1.055E-01	1.055E-01	3.822E-01
Cd-109	1.212E+00	81.3	9.855E-01	9.875E-01	3.287E+00
Ra-226	4.374E+00	41.0	1.792E+00	1.816E+00	4.996E+00
PB-210	2.026E+00	65.1	1.319E+00	1.325E+00	3.655E+00
PB-212	1.508E+00	10.5	1.589E-01	1.784E-01	3.573E-01
PB-214	6.323E-01	28.1	1.778E-01	1.804E-01	5.852E-01
BI-207	8.329E-02	94.7	7.885E-02	7.896E-02	2.516E-01
BI-212	2.130E+00	59.3	1.263E+00	1.268E+00	4.128E+00
BI-214	1.160E+00	21.9	2.538E-01	2.600E-01	5.388E-01
BI-210M	1.779E-01	38.0	6.762E-02	6.823E-02	2.033E-01
RA-224	-7.117E+00	34.5	2.454E+00	2.483E+00	7.853E+00
AC-228	2.012E+00	20.4	4.109E-01	4.222E-01	9.968E-01
TH-227	1.866E-01	202.4	3.777E-01	3.778E-01	1.309E+00
TH-229	-1.041E+00	102.1	1.063E+00	1.065E+00	3.590E+00
TH-234	2.358E+00	28.4	6.695E-01	6.794E-01	3.699E+00
PA-231	-6.290E-01	321.9	2.025E+00	2.025E+00	7.074E+00
PA-233	-3.934E-02	362.1	1.425E-01	1.425E-01	5.032E-01
PA-234	1.071E-01	259.6	2.780E-01	2.780E-01	7.215E-01
PA-234M	9.281E+00	119.2	1.106E+01	1.107E+01	3.887E+01
U-235	6.616E-01	49.7	3.289E-01	3.304E-01	1.073E+00
AM-241	1.709E-01	39.5	6.748E-02	6.801E-02	2.112E-01
Ir-192	1.340E-01	33.8	4.523E-02	4.583E-02	1.806E-01
Np-237	3.999E-01	62.2	2.488E-01	2.496E-01	8.195E-01
Total	4.828E+01				

Analyst: ashley silas

TestAmerica Spectrum name: 4_Gamma_20141558.An1

Sample description
137389_Gamma_680-102199-A-9-G

Spectrum Filename: C:\User\SPC\Det4\4_Gamma_20141558.An1

Acquisition information
Start time: 8/14/2014 4:25:31 PM
Live time: 7200
Real time: 7208
Dead time: 0.11 %
Detector ID: 4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_Liquid_D=1 25ml.Clb
4_Liquid_D=1 25ml_90101_030512

Energy Calibration
Created: 2/28/2012 2:55:17 PM
Zero offset: 0.091 keV
Gain: 0.250 keV/channel
Quadratic: -2.917E-08 keV/channel^2

Efficiency Calibration
Created: 3/27/2012 8:51:45 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.48 %
Log(Eff): 8.809878E-01 + (-6.811249E-01*Log(E)) +
(-1.909804E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -1.031199E+01 + (3.529752E+00*Log(E)) +
(-4.143154E-01*Log(E)^2)

Library Files
Main analysis library: Client_ Long_no ingrowth Rev3.li
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (1999.44keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/14/2014 4:25:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	4_2014-08-09_2125.PBC 8/9/2014 9:25:56 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 18 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1410

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.56	105.	21.93	0.75	5.688E-02	46.54	4.250	PBC<MDA	PB210
57.84	27.	39.50	0.81	6.042E-02	59.54	35.900	PBC<MDA	AM241
63.36	69.	30.08	0.80	6.086E-02	63.29	3.810	PBC<MDA	TH234
74.85	118.	13.92	0.83	6.109E-02				
77.26	171.	10.17	0.83	6.098E-02				
80.87	3.	474.25	0.83	6.071E-02	80.99	34.060	PBC<MDA	BA133
86.49	23.	62.22	0.84	6.016E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.706E-01	EU155
					86.54	30.700	1.706E-01	EU155
88.04	20.	81.31	0.84	5.998E-02	88.04	3.790	PBC<MDA	Cd109
90.16	54.	23.88	0.84	5.971E-02				
92.79	123.	14.49	0.84	5.934E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	5.192E+00	AC228
					93.35	5.561	5.192E+00	AC228
105.86	31.	33.96	0.85	5.730E-02	105.31	21.200	PBC<MDA	EU155
					105.31	21.200	3.517E-01	EU155
132.80	1.	848.39	0.88	5.187E-02	133.02	43.300	PBC<MDA	HF181
143.71	20.	63.83	0.89	4.968E-02	143.79	10.960	PBC<MDA	U235
161.76	3.	343.91	0.91	4.592E-02	162.66	6.220	PBC<MDA	Ba140
163.27	17.	76.22	0.91	4.578E-02	163.38	5.080	PBC<MDA	U235
185.51	42.	21.47	1.02	4.077E-02	185.99	3.280	PBC<MDA	Ra226
235.54	5.	202.38	0.97	3.302E-02	235.97	12.300	PBC<MDA	TH227
238.50	180.	9.00	0.95	3.271E-02	238.63	43.300	1.508E+00	PB212
241.42	31.	36.29	0.98	3.229E-02	242.00	7.430	PBC<MDA	PB214
					242.00	7.430	PBC<MDA	PB214
265.52	21.	38.02	0.39	2.969E-02	265.83	50.000	PBC<MDA	BI210M
295.18	42.	28.37	0.69	2.703E-02	295.09	19.300	PBC<MDA	PB214
					295.95	30.160	7.257E-01	Ir192
					295.09	19.300	8.517E-01	PB214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
305.45	7.	132.98	1.04	2.626E-02	304.85	4.290	9.076E-01	Ba140
					304.90	28.000	1.391E-01	BI210M
305.47	7.	139.55	1.04	2.626E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	1.336E-01	BI210M
317.48	7.	117.98	1.05	2.539E-02	316.49	87.040	PBC<MDA	Ir192
					316.49	87.040	4.440E-02	Ir192
338.37	22.	54.33	1.07	2.391E-02	338.32	12.010	PBC<MDA	AC228
					338.32	12.010	1.053E+00	AC228
351.87	40.	19.24	1.08	2.307E-02	351.93	37.600	6.418E-01	PB214
					351.93	37.600	6.418E-01	PB214
356.11	10.	80.84	1.08	2.283E-02	356.00	62.050	PBC<MDA	BA133
392.48	9.	88.90	1.11	2.093E-02	391.69	64.000	PBC<MDA	SN113
462.97	13.	60.05	1.18	1.796E-02	463.37	10.470	PBC<MDA	SB125
464.79	1.	413.74	1.18	1.779E-02	468.06	51.750	PBC<MDA	Ir192
					468.06	51.750	1.968E-02	Ir192
482.17	1.	520.75	1.19	1.732E-02	482.00	80.500	PBC<MDA	HF181
510.79	84.	17.40	1.22	1.639E-02	511.86	20.000	3.551E+00	RH106
					511.86	20.000	3.551E+00	RH106
536.97	4.	162.74	1.24	1.568E-02	537.26	24.390	PBC<MDA	Ba140
562.57	3.	218.40	1.26	1.501E-02	563.24	8.350	PBC<MDA	CS134
569.41	3.	221.65	1.27	1.485E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	3.800E-01	PA234
					569.70	97.740	3.189E-02	BI207
569.47	3.	259.61	1.27	1.486E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	3.329E-01	PA234
					569.70	97.740	2.794E-02	BI207
569.49	3.	236.17	1.27	1.486E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	3.623E-01	PA234
					569.70	97.740	3.041E-02	BI207
583.13	40.	25.29	1.28	1.454E-02	583.02	84.500	4.534E-01	TL208
602.10	5.	167.05	1.30	1.410E-02	602.73	98.260	PBC<MDA	SB124
605.07	5.	166.71	1.30	1.405E-02	604.71	97.620	PBC<MDA	CS134
609.75	48.	17.59	0.89	1.396E-02	609.31	46.090	1.041E+00	BI214
611.34	6.	142.04	1.30	1.393E-02	610.30	5.750	PBC<MDA	RU103
					610.30	5.750	9.771E-01	RU103
618.45	9.	58.83	1.31	1.377E-02	618.06	99.100	PBC<MDA	PM144
659.14	6.	130.89	1.35	1.300E-02	657.76	94.640	PBC<MDA	AG110M
702.11	6.	123.50	1.38	1.223E-02	702.63	97.900	PBC<MDA	NB94
727.29	14.	59.33	1.40	1.184E-02	727.17	7.550	PBC<MDA	BI212
735.18	4.	182.59	1.41	1.171E-02	735.72	22.500	PBC<MDA	pm146
746.13	4.	154.19	1.42	1.154E-02	747.16	34.000	PBC<MDA	pm146
756.50	1.	610.93	1.43	1.141E-02	756.73	54.460	PBC<MDA	ZR95
767.94	4.	157.15	1.44	1.128E-02	765.79	99.790	PBC<MDA	NB95
794.65	2.	277.19	1.46	1.088E-02	795.87	85.530	PBC<MDA	CS134
802.47	4.	172.89	1.47	1.081E-02	801.95	8.690	PBC<MDA	CS134
814.96	2.	368.82	1.48	1.063E-02	815.77	23.280	PBC<MDA	La140
846.49	7.	94.06	1.50	1.027E-02	846.77	99.935	PBC<MDA	Co56
860.62	5.	135.51	1.52	1.011E-02	860.56	12.420	PBC<MDA	TL208
881.43	4.	174.67	1.53	9.898E-03	880.53	6.000	PBC<MDA	PA234
884.71	1.	886.38	1.53	9.869E-03	883.24	9.600	PBC<MDA	PA234
					884.68	72.680	1.521E-02	AG110M
911.14	40.	20.42	1.56	9.585E-03	911.16	29.000	2.012E+00	AC228
					911.16	29.000	2.012E+00	AC228
959.29	3.	130.69	1.60	9.088E-03	964.11	14.605	PBC<MDA	EU152
968.27	6.	111.58	1.60	9.045E-03	968.97	17.460	PBC<MDA	AC228
					968.97	17.460	5.492E-01	AC228

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1000.70	5.	119.21	1.63	8.771E-03	1001.00	0.837	PBC<MDA	PA234M
1063.67	7.	94.68	1.68	8.281E-03	1063.66	74.500	PBC<MDA	BI207
1101.80	2.	337.59	1.71	8.027E-03	1099.25	56.500	PBC<MDA	FE59
1112.20	3.	177.68	1.72	7.939E-03	1112.07	13.644	PBC<MDA	EU152
1119.76	13.	45.53	1.73	7.884E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	2.298E-01	Sc46
					1121.30	34.900	6.587E-01	Ta182
1119.78	13.	42.12	1.73	7.877E-03	1120.29	15.100	1.558E+00	BI214
					1120.55	99.987	2.353E-01	Sc46
					1121.30	34.900	6.747E-01	Ta182
1119.82	13.	44.75	1.73	7.882E-03	1120.29	15.100	1.531E+00	BI214
					1120.55	99.987	2.312E-01	Sc46
					1121.30	34.900	6.628E-01	Ta182
1172.48	4.	132.15	1.77	7.545E-03	1173.24	99.900	PBC<MDA	CO60
1220.78	1.	846.50	1.81	7.262E-03	1221.41	27.000	PBC<MDA	Ta182
1237.07	7.	102.48	1.82	7.168E-03	1238.28	66.070	PBC<MDA	Co56
1460.72	77.	11.41	1.99	6.120E-03	1460.83	10.670	1.646E+01	K40
1763.54	0.	63.67	2.21	5.102E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
298.84	74.84	118.	106.	1.743E+03	21.37	0.847	-	
308.47	77.25	81.	153.	2.515E+03	12.74	0.660	-	
360.11	90.17	46.	42.	6.951E+02	28.52	0.534	-	sM

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_ Long_no ingrowth Rev3.li

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.77	46.56	171.	35.	0.005	21.93	0.755
AM-241	230.88	57.84	42.	27.	0.004	39.50	0.812s
TH-234	252.92	63.36	160.	19.	0.003	30.08	0.802
BA-133	322.92	80.87	94.	3.	0.000	474.25	0.832s
Np-237	345.40	86.49	88.	23.	0.003	62.22	0.837D
Cd-109	351.60	88.04	120.	20.	0.003	81.31	0.839D
TH-234	370.62	92.80	165.	77.	0.011	14.55	0.995s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	370.61	92.80	111.	119.	0.017	15.51	0.843s
Gd-153	387.17	96.94	116.	-11.	-0.001	147.34	0.847s
Gd-153	412.89	103.37	75.	-9.	-0.001	137.87	0.853s
EU-155	422.86	105.86	39.	31.	0.004	33.96	0.854
EU-154	488.15	122.20	53.	-7.	-0.001	153.57	0.871s
HF-181	530.55	132.80	79.	1.	0.000	848.39	0.880s
HF-181	545.05	136.43	94.	-9.	-0.001	150.20	0.883s
CO-57	544.78	136.36	94.	-10.	-0.001	147.56	0.883s
U-235	574.16	143.71	71.	20.	0.003	63.83	0.890s
CE-141	581.02	145.42	100.	-10.	-0.001	139.94	0.891s
Ba-140	646.35	161.76	61.	3.	0.000	343.91	0.907s
U-235	652.38	163.27	72.	17.	0.002	76.22	0.908
CE-139	663.09	165.95	96.	-12.	-0.002	118.63	0.910s
Ra-226	741.29	185.51	95.	42.	0.006	21.47	1.024s
TH-229	770.33	192.77	81.	-13.	-0.002	102.15	0.935s
U-235	821.02	205.45	65.	-8.	-0.001	147.35	0.946s
TH-229	841.42	210.55	85.	-10.	-0.001	131.39	0.951s
TH-227	941.31	235.54	58.	5.	0.001	202.38	0.974s
PB-212	953.14	238.50	52.	154.	0.021	9.00	0.949
RA-224	958.99	239.96	242.	-68.	-0.009	34.48	0.978s
PB-214	964.85	241.42	53.	31.	0.004	36.29	0.979s
EU-152	973.26	243.53	64.	-11.	-0.001	111.25	0.982s
BI-210M	1061.20	265.52	17.	21.	0.003	38.02	0.390s
Hg-203	1115.63	279.13	72.	-5.	-0.001	248.57	1.013s
I-131	1134.36	283.82	56.	-8.	-0.001	129.50	1.018s
PB-214	1179.44	295.09	68.	23.	0.003	36.36	1.027s
Ir-192	1179.36	295.07	50.	34.	0.005	33.75	1.028s
PA-231	1203.21	301.04	65.	-4.	-0.001	317.46	1.032s
PA-233	1196.77	299.43	70.	-1.	0.000	906.44	1.032s
PA-231	1211.56	303.12	60.	-3.	0.000	321.95	1.034s
BA-133	1210.66	302.90	61.	-4.	0.000	313.27	1.034s
Ba-140	1220.96	305.47	45.	7.	0.001	139.55	1.036s
BI-210M	1220.85	305.45	44.	7.	0.001	132.98	1.036
Ir-192	1234.08	308.75	52.	-4.	-0.001	259.53	1.039s
PA-233	1246.91	311.96	44.	-3.	0.000	362.08	1.043s
Ir-192	1268.97	317.48	31.	7.	0.001	117.98	1.047s
CR-51	1277.87	319.71	31.	-3.	0.000	279.81	1.050s
La-140	1317.51	329.62	46.	-5.	-0.001	184.90	1.058s
AC-228	1352.49	338.37	59.	22.	0.003	54.33	1.066s
EU-152	1377.02	344.50	45.	-5.	-0.001	201.62	1.071s
PB-214	1406.49	351.87	53.	40.	0.006	19.24	1.078
BA-133	1423.45	356.11	31.	10.	0.001	80.84	1.082s
SN-113	1568.90	392.48	29.	9.	0.001	88.90	1.114s
SB-125	1710.97	428.01	31.	-2.	0.000	504.53	1.146s
pm-146	1815.07	454.04	29.	-4.	-0.001	196.70	1.168s
SB-125	1850.78	462.97	25.	13.	0.002	60.05	1.177s
Ir-192	1858.05	464.79	14.	1.	0.000	413.74	1.181s
PM-144	1908.54	477.41	23.	-1.	0.000	624.13	1.189s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
HF-181	1927.58	482.17	25.	1.	0.000	520.75	1.193s
RH-106	2042.03	510.79	64.	84.	0.012	17.40	1.219s
Ba-140	2146.75	536.97	16.	4.	0.001	162.74	1.241s
CS-134	2249.12	562.57	23.	3.	0.000	218.40	1.264s
CS-134	2276.83	569.49	27.	3.	0.000	236.17	1.269s
PA-234	2276.72	569.47	27.	3.	0.000	259.61	1.269s
BI-207	2276.51	569.41	26.	3.	0.000	221.65	1.269s
TL-208	2331.38	583.13	31.	40.	0.006	25.29	1.281s
SB-125	2401.26	600.60	35.	-3.	0.000	248.56	1.296s
SB-124	2407.26	602.10	31.	5.	0.001	167.05	1.298s
CS-134	2419.11	605.07	33.	5.	0.001	166.71	1.300
BI-214	2437.86	609.75	23.	48.	0.007	17.59	0.889s
RU-103	2444.22	611.34	29.	6.	0.001	142.04	1.305s
AG-108M	2458.73	614.97	27.	-6.	-0.001	134.98	1.308s
PM-144	2472.64	618.45	11.	9.	0.001	58.83	1.311s
RH-106	2485.66	621.71	23.	-2.	0.000	302.40	1.315s
SB-125	2545.17	636.58	25.	-5.	-0.001	152.59	1.326s
I-131	2545.24	636.60	27.	-5.	-0.001	144.91	1.327s
AG-110M	2635.39	659.14	23.	6.	0.001	130.89	1.345s
PM-144	2778.80	694.99	21.	-2.	0.000	406.97	1.378s
NB-94	2807.30	702.11	27.	6.	0.001	123.50	1.383s
SB-124	2894.03	723.79	29.	-4.	-0.001	189.64	1.400s
EU-154	2893.98	723.78	33.	-5.	-0.001	160.15	1.401s
ZR-95	2898.34	724.87	34.	-3.	0.000	275.01	1.401s
BI-212	2908.03	727.29	26.	14.	0.002	59.33	1.404s
pm-146	2939.58	735.18	20.	4.	0.000	182.59	1.411s
pm-146	2983.39	746.13	20.	4.	0.001	154.19	1.421s
ZR-95	3024.85	756.50	23.	1.	0.000	610.93	1.429s
NB-95	3070.63	767.94	22.	4.	0.001	157.15	1.437s
EU-152	3114.43	778.89	25.	-1.	0.000	865.29	1.448s
BI-212	3142.29	785.85	22.	-2.	0.000	404.39	1.453s
CS-134	3177.49	794.65	21.	2.	0.000	277.19	1.462s
CS-134	3208.78	802.47	25.	4.	0.001	172.89	1.467s
CO-58	3247.74	812.21	27.	-3.	0.000	277.88	1.474s
La-140	3258.72	814.96	20.	2.	0.000	368.82	1.478s
MN-54	3338.66	834.94	22.	-1.	0.000	800.74	1.494s
Co-56	3384.89	846.49	16.	7.	0.001	94.06	1.504s
TL-208	3441.42	860.62	18.	5.	0.001	135.51	1.516s
NB-94	3485.70	871.69	26.	-3.	0.000	258.52	1.524s
PA-234	3524.66	881.43	19.	4.	0.001	174.67	1.532s
PA-234	3537.77	884.71	24.	1.	0.000	886.38	1.534s
Sc-46	3554.40	888.86	24.	-3.	0.000	237.54	1.539s
y-88	3593.83	898.72	23.	-2.	0.000	373.16	1.547s
AC-228	3643.51	911.14	14.	40.	0.006	20.42	1.557s
AG-110M	3748.64	937.41	21.	-4.	-0.001	170.60	1.579s
PA-234	3782.28	945.82	28.	-3.	0.000	260.61	1.586s
EU-152	3836.17	959.29	6.	3.	0.000	130.69	1.601
AC-228	3872.09	968.27	21.	6.	0.001	111.58	1.605s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	3986.52	996.86	28.	-6.	-0.001	125.54	1.627s
PA-234M	4001.87	1000.70	15.	5.	0.001	119.21	1.631s
EU-154	4035.49	1009.10	7.	0.	0.000	804.16	1.634s
Co-56	4150.01	1037.72	22.	-3.	0.000	249.57	1.661s
RH-106	4201.28	1050.54	28.	-7.	-0.001	119.69	1.671s
BI-207	4253.83	1063.67	17.	7.	0.001	94.68	1.681s
FE-59	4406.41	1101.80	18.	2.	0.000	337.59	1.710s
EU-152	4448.02	1112.20	15.	3.	0.000	177.68	1.720s
BI-214	4478.27	1119.76	11.	13.	0.002	45.53	1.727s
Sc-46	4478.51	1119.82	11.	13.	0.002	44.75	1.727s
Ta-182	4478.35	1119.78	9.	13.	0.002	42.12	1.728s
CO-60	4689.27	1172.48	13.	4.	0.001	132.15	1.769s
Ta-182	4882.55	1220.78	21.	1.	0.000	846.50	1.807s
Co-56	4947.76	1237.07	20.	7.	0.001	102.48	1.820s
NA-22	5101.78	1275.55	12.	-1.	0.000	356.85	1.848s
EU-154	5101.69	1275.53	12.	-1.	0.000	350.92	1.848s
EU-152	5629.29	1407.35	20.	-4.	0.000	187.36	1.951s
K-40	5842.94	1460.72	21.	77.	0.011	11.41	1.991s
SB-124	6764.17	1690.83	14.	-2.	0.000	315.38	2.161s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	1.9555E-02				5.31E+01	
			477.60	1.955E-02	%(	1.785E+00 2.46E+03	1.05E+01 G
NA-22	C	-2.7831E-02				9.50E+02	
			1274.53	-2.783E-02	?(	3.719E-01 3.57E+02	9.99E+01 G
K-40	N	1.6461E+01				4.66E+11	
			1460.83	1.646E+01	(P	5.159E+00 1.14E+01	1.07E+01 G
Sc-46	F	9.4446E-02				8.38E+01	
			889.28	-4.230E-02	?(	3.595E-01 2.38E+02	1.00E+02 G
			1120.55	2.312E-01	?(	3.161E-01 4.48E+01	1.00E+02 G
CR-51	F	-1.6046E-01				2.77E+01	
			320.08	-1.605E-01	?(	1.597E+00 2.80E+02	9.94E+00 G
MN-54	C	-1.1263E-02				3.12E+02	
			834.85	-1.126E-02	?(	3.306E-01 8.01E+02	1.00E+02 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
FE-59	F	5.5067E-02					4.45E+01	
			1099.25	5.507E-02	?(	6.804E-01	3.38E+02	5.65E+01 G
			1291.60	-2.819E-03	%	8.690E-01	8.00E+03	4.32E+01 G
Co-56	C	1.3147E-01					7.73E+01	
			846.77	8.967E-02	?(	2.898E-01	9.41E+01	9.99E+01 G
			1238.28	1.947E-01	?(	6.879E-01	1.02E+02	6.61E+01 G
			1037.84	-3.209E-01	+	2.875E+00	2.50E+02	1.41E+01 G
			1771.35	9.675E-03	%	2.772E+00	7.21E+03	1.55E+01 A
CO-57	C	-7.0907E-05					2.72E+02	
			122.06	-7.091E-05	&(	1.075E-01	4.25E+04	8.56E+01 G
			136.47	-2.416E-01	+	1.215E+00	1.48E+02	1.07E+01 G
CO-58	C	-3.5189E-02					7.09E+01	
			810.78	-3.519E-02	?(	3.497E-01	2.78E+02	9.95E+01 G
CO-60	F	3.8893E-02					1.93E+03	
			1332.50	0.000E+00	?(	7.772E-01	1.00E+03	1.00E+02 G
			1173.24	7.782E-02	?(	3.650E-01	1.32E+02	9.99E+01 G
NB-94	I	7.3524E-02					7.41E+06	
			702.63	7.352E-02	?(	3.148E-01	1.24E+02	9.79E+01 G
			871.10	-4.003E-02	&	3.697E-01	2.59E+02	9.99E+01 G
ZR-95	I	2.5115E-02					6.40E+01	
			756.73	2.512E-02	&(	5.601E-01	6.11E+02	5.45E+01 G
			724.20	-8.165E-02	+	7.956E-01	2.75E+02	4.42E+01 G
NB-95	I	5.4160E-02					6.40E+01	
			765.79	5.416E-02	?(	3.006E-01	1.57E+02	9.98E+01 G
RU-103	I	-3.2061E-04					3.93E+01	
			497.05	-3.206E-04	%(	2.738E-01	2.36E+04	9.09E+01 G
			610.30	9.771E-01	?	4.837E+00	1.42E+02	5.75E+00 GA
RH-106	I	-2.3701E-01					3.74E+02	
			621.92	-2.370E-01	?(	2.582E+00	3.02E+02	9.93E+00 G
			1050.36	-6.985E+00	+	2.892E+01	1.20E+02	1.56E+00 G
			511.86	3.551E+00	?	1.699E+00	1.74E+01	2.00E+01 GA
AG-110M	F	3.4870E-02					2.50E+02	
			884.68	-1.066E-03	%(	4.754E-01	1.20E+04	7.27E+01 G
			657.76	6.247E-02	?(	2.854E-01	1.31E+02	9.46E+01 G
			937.49	-1.707E-01	+	1.034E+00	1.71E+02	3.44E+01 G
			1384.30	-2.234E-02	%	1.823E+00	2.16E+03	2.43E+01 G
			763.94	1.056E-02	%	1.241E+00	3.15E+03	2.23E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SN-113	F	9.5301E-02					1.15E+02	
			391.69	9.530E-02	?(	2.873E-01	8.89E+01	6.40E+01 G
SB-124	F	4.8791E-02					6.02E+01	
			602.73	4.879E-02	?(	2.857E-01	1.67E+02	9.83E+01 G
			1690.98	-9.352E-02	+	1.091E+00	3.15E+02	4.78E+01 G
			722.79	-4.450E-01	+	2.978E+00	1.90E+02	1.08E+01 G
SB-125	I	2.2796E-01					1.01E+03	
			427.88	-3.850E-02	?(	6.979E-01	5.05E+02	2.96E+01 G
			600.50	-1.891E-01	+	1.661E+00	2.49E+02	1.79E+01 G
			635.89	-4.446E-01	+	2.382E+00	1.53E+02	1.13E+01 G
			463.37	9.813E-01	?(	1.927E+00	6.01E+01	1.05E+01 G
I-131	I	2.7764E-03					8.02E+00	
			364.48	2.776E-03	%(	1.878E-01	1.83E+03	8.17E+01 G
			284.30	-6.895E-01	+	3.057E+00	1.29E+02	6.14E+00 G
			636.97	-7.661E-01	+	3.882E+00	1.45E+02	7.17E+00 G
Gd-153	F	-8.3341E-02					2.42E+02	
			97.50	-8.334E-02	?(	4.171E-01	1.47E+02	3.00E+01 G
			103.20	-1.009E-01	+	4.750E-01	1.38E+02	2.18E+01 G
Ga-68	C	-6.8285E-02					4.71E-02	
			1077.40	-6.829E-02	%(	2.037E+01	7.98E+03	3.30E+00 G
Tc-99m	I	7.4185E-04					2.51E-01	
			140.51	7.419E-04	%(	1.498E-01	5.75E+03	8.93E+01 G
BA-133	F	1.0259E-01					3.85E+03	
			356.00	1.026E-01	(	2.791E-01	8.08E+01	6.20E+01 G
			302.85	-1.024E-01	-	1.119E+00	3.13E+02	1.83E+01 G
			383.84	-4.839E-02	&	2.209E+00	1.27E+03	8.94E+00 GA
			80.99	1.954E-02	-	3.213E-01	4.74E+02	3.41E+01 GA
CS-134	I	9.0483E-02					7.54E+02	
			604.71	5.128E-02	&(	2.990E-01	1.67E+02	9.76E+01 G
			795.87	3.604E-02	&(	3.606E-01	2.77E+02	8.55E+01 G
			569.32	1.931E-01	&(	1.624E+00	2.36E+02	1.54E+01 G
			801.95	6.299E-01	?(	3.845E+00	1.73E+02	8.69E+00 G
			563.24	3.561E-01	?(	2.778E+00	2.18E+02	8.35E+00 G
CE-139	F	-4.6359E-02					1.38E+02	
			165.85	-4.636E-02	?(	1.862E-01	1.19E+02	7.99E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ba-140	I	2.2772E-01					1.28E+01	
			537.26	1.321E-01	?(	7.689E-01	1.63E+02	2.44E+01 G
			162.66	1.586E-01	?(	1.905E+00	3.44E+02	6.22E+00 G
			304.85	8.718E-01	?(	4.195E+00	1.40E+02	4.29E+00 G
La-140	I	1.9073E-02					1.28E+01	
			1596.21	0.000E+00	?(	8.033E-01	1.00E+03	9.54E+01 G
			487.02	-3.091E-04	%	4.924E-01	4.36E+04	4.55E+01 G
			328.76	-1.483E-01	+	9.539E-01	1.85E+02	2.03E+01 G
			815.77	9.723E-02	?(	1.308E+00	3.69E+02	2.33E+01 G
CE-141	I	-6.0654E-02					3.25E+01	
			145.44	-6.065E-02	&(	2.886E-01	1.40E+02	4.82E+01 G
CE-144	I	-1.1515E-02					2.85E+02	
			133.54	-1.151E-02	%(	1.108E+00	2.75E+03	1.11E+01 G
PM-144	C	3.8981E-02					3.63E+02	
			696.54	-1.842E-02	?(	2.733E-01	4.07E+02	9.90E+01 G
			618.06	9.633E-02	&(	1.832E-01	5.88E+01	9.91E+01 G
			476.81	-2.091E-02	+	4.762E-01	6.24E+02	4.20E+01 G
EU-152	F	1.3651E-01					4.94E+03	
			344.29	-1.073E-01	?(	7.549E-01	2.02E+02	2.65E+01 G
			1112.07	4.207E-01	&(	2.689E+00	1.78E+02	1.36E+01 G
			121.78	-2.423E-04	&	3.270E-01	3.79E+04	2.86E+01 G
			778.92	-7.900E-02	+	2.496E+00	8.65E+02	1.29E+01 G
			964.11	3.134E-01	&(	1.494E+00	1.31E+02	1.46E+01 G
			244.69	-6.075E-01	+	2.296E+00	1.11E+02	7.58E+00 G
			1408.00	-3.693E-01	+	2.469E+00	1.87E+02	2.10E+01 GA
EU-154	I	1.9874E-02					3.14E+03	
			873.23	1.987E-02	&(	2.740E+00	3.72E+03	1.23E+01 G
			123.10	-4.370E-02	+	2.314E-01	1.54E+02	4.08E+01 G
			1274.54	-8.049E-02	+	1.057E+00	3.51E+02	3.52E+01 G
			723.36	-3.033E-01	+	1.696E+00	1.60E+02	2.02E+01 G
			1004.77	-4.149E-02	+	1.320E+00	8.04E+02	1.80E+01 G
			996.33	-9.280E-01	+	4.042E+00	1.26E+02	1.06E+01 G
EU-155	I	3.5173E-01					1.81E+03	
			105.31	3.517E-01	&(	3.645E-01	3.40E+01	2.12E+01 G
			86.54	-8.931E-03	&	5.308E-01	1.74E+03	3.07E+01 G
HF-181	F	1.2201E-02					4.24E+01	
			482.00	1.380E-02	&(	2.607E-01	5.21E+02	8.05E+01 G
			133.02	9.221E-03	?(	2.733E-01	8.48E+02	4.33E+01 G
			345.83	0.000E+00	-	1.455E+00	1.00E+03	1.51E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		136.30	-4.333E-01	&	2.219E+00	1.50E+02	5.85E+00 G
Ta-182	F 6.7465E-01					1.14E+02	
		1121.30	6.747E-01	?(	8.487E-01	4.21E+01	3.49E+01 G
		1221.41	5.517E-02	-	1.717E+00	8.47E+02	2.70E+01 G
		1189.05	0.000E+00	-	2.008E+00	1.00E+03	1.62E+01 G
Hg-203	F -2.9428E-02					4.66E+01	
		279.20	-2.943E-02	?(	2.533E-01	2.49E+02	8.15E+01 G
TL-208	N 4.6142E-01					6.98E+02	
		583.02	4.534E-01	@(	3.257E-01	2.53E+01	8.45E+01 G
		277.28	-5.869E-03	%	2.966E+00	1.43E+04	6.31E+00 G
		860.56	5.161E-01	?(	2.466E+00	1.36E+02	1.24E+01 G
pm-146	C 1.6687E-01					2.02E+03	
		747.16	1.522E-01	?(	8.303E-01	1.54E+02	3.40E+01 G
		735.72	1.891E-01	&(	1.232E+00	1.83E+02	2.25E+01 G
		453.88	-4.695E-02	-	3.260E-01	1.97E+02	6.50E+01 G
y-88	F -2.8272E-02					1.07E+02	
		898.04	-2.827E-02	?(	3.822E-01	3.73E+02	9.37E+01 G
		1836.06	0.000E+00	+	7.115E-01	1.00E+03	9.92E+01 G
Cd-109	F 1.2121E+00					4.53E+02	
		88.04	1.212E+00	(	3.287E+00	8.13E+01	3.79E+00 G
Ra-226	N 4.3741E+00					5.84E+05	
		185.99	4.374E+00	*(P	4.996E+00	2.15E+01	3.28E+00 G
PB-210	N 2.0256E+00					8.14E+03	
		46.54	2.026E+00	(P	3.655E+00	2.19E+01	4.25E+00 G
PB-212	N 1.5076E+00					6.98E+02	
		238.63	1.508E+00	(P	3.573E-01	9.00E+00	4.33E+01 G
		300.03	-5.617E-01	% P	6.883E+00	2.05E+03	3.28E+00 GA
PB-214	N 6.3226E-01					5.84E+05	
		351.93	6.418E-01	(P	5.852E-01	1.92E+01	3.76E+01 G
		295.09	6.137E-01	(P	1.096E+00	3.64E+01	1.93E+01 G
		242.00	1.809E+00	+ P	2.128E+00	3.63E+01	7.43E+00 GA
BI-207	C 8.3287E-02					1.18E+04	
		569.70	3.189E-02	?(	2.516E-01	2.22E+02	9.77E+01 G
		1063.66	1.507E-01	?(	4.902E-01	9.47E+01	7.45E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-212	N	2.1295E+00					6.98E+02	
			727.17	2.129E+00	(	4.128E+00	5.93E+01	7.55E+00 G
			785.42	-1.643E+00	-	2.416E+01	4.04E+02	1.28E+00 GA
BI-214	N	1.1597E+00					5.84E+05	
			609.31	1.041E+00	@(P	5.388E-01	1.76E+01	4.61E+01 G
			1120.29	1.521E+00	?(	2.127E+00	4.55E+01	1.51E+01 G
			1764.49	-7.562E-02	% P	4.065E+00	6.37E+01	1.54E+01 G
BI-210M	T	1.7786E-01					1.10E+09	
			265.83	1.996E-01	(	2.033E-01	3.80E+01	5.00E+01 G
			304.90	1.391E-01	(	6.367E-01	1.33E+02	2.80E+01 G
RA-224	N	-7.1172E+00					6.98E+02	
			240.99	-7.117E+00	(	7.853E+00	3.45E+01	4.10E+00 G
AC-228	N	2.0119E+00					2.10E+03	
			911.16	2.012E+00	(	9.968E-01	2.04E+01	2.90E+01 G
			968.97	5.492E-01	-	2.123E+00	1.12E+02	1.75E+01 G
			338.32	1.053E+00	-	1.863E+00	5.43E+01	1.20E+01 G
			93.35	5.014E+00	+	2.180E+00	1.55E+01	5.56E+00 XA
TH-227	N	1.8662E-01					7.95E+03	
			235.97	1.866E-01	?(	1.309E+00	2.02E+02	1.23E+01 G
			50.14	-8.411E-04	&	1.505E+00	5.14E+04	8.00E+00 G
			256.24	1.541E-02	&	2.058E+00	3.71E+03	7.00E+00 G
TH-229	N	-1.0411E+00					2.68E+06	
			193.51	-1.041E+00	&(	3.590E+00	1.02E+02	4.40E+00 G
			210.85	-1.303E+00	&	5.825E+00	1.31E+02	2.99E+00 G
TH-234	N	2.3579E+00					1.63E+12	
			63.29	1.110E+00	(P	3.699E+00	3.01E+01	3.81E+00 G
			92.59	3.209E+00	*(P	2.624E+00	1.46E+01	5.58E+00 G
PA-231	N	-6.2904E-01					1.20E+07	
			302.65	-6.290E-01	&(	7.074E+00	3.22E+02	2.88E+00 G
			300.07	-7.696E-01	+	8.514E+00	3.17E+02	2.46E+00 G
PA-233	C	-3.9344E-02					7.82E+08	
			312.01	-3.934E-02	?(	5.032E-01	3.62E+02	3.60E+01 G
			300.18	-1.102E-01	+	3.504E+00	9.06E+02	6.20E+00 G
PA-234	N	1.0707E-01					1.63E+12	
			131.29	0.000E+00	&(	7.215E-01	1.00E+03	1.80E+01 G
			946.02	-3.284E-01	+	3.052E+00	2.61E+02	1.34E+01 G
			569.47	3.329E-01	?(	3.083E+00	2.60E+02	8.20E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			883.24	1.150E-01	?(	3.727E+00	8.86E+02	9.60E+00 G
			880.53	8.544E-01	?	5.326E+00	1.75E+02	6.00E+00 GA
PA-234M	N	9.2808E+00					1.63E+12	
			1001.00	9.281E+00	&(	3.887E+01	1.19E+02	8.37E-01 G
			766.41	-2.197E-01	%	1.066E+02	1.32E+04	2.94E-01 G
U-235	N	6.6162E-01					2.57E+11	
			143.79	5.094E-01	*(	1.073E+00	6.38E+01	1.10E+01 G
			205.33	-5.909E-01	-	2.986E+00	1.47E+02	5.01E+00 G
			163.38	9.900E-01	?(	2.516E+00	7.62E+01	5.08E+00 G
AM-241	T	1.7086E-01					1.58E+05	
			59.54	1.709E-01	?(	2.112E-01	3.95E+01	3.59E+01 G
Ir-192	F	1.3401E-01					7.40E+01	
			316.49	4.440E-02	?(	1.806E-01	1.18E+02	8.70E+01 G
			468.06	1.968E-02	&(	3.031E-01	4.14E+02	5.18E+01 G
			308.44	-6.736E-02	+	6.109E-01	2.60E+02	3.18E+01 G
			295.95	5.888E-01	?(	6.117E-01	3.38E+01	3.02E+01 G
Np-237	F	3.9985E-01					2.14E+06	
			86.49	3.999E-01	(	8.195E-01	6.22E+01	1.31E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape

C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
BA-133	80.87	94.	3.	0.000	474.25	1.954E-02	
AC-228	92.80	111.	119.	0.017	15.51	5.014E+00	
Gd-153	96.94	116.	-11.	-0.001	147.34	-8.334E-02	
Gd-153	103.37	75.	-9.	-0.001	137.87	-1.009E-01	
EU-155	105.86	39.	31.	0.004	33.96	3.517E-01	
EU-154	122.20	53.	-7.	-0.001	153.57	-4.370E-02	
HF-181	132.80	79.	1.	0.000	848.39	9.221E-03	
HF-181	136.43	94.	-9.	-0.001	150.20	-4.333E-01	
CO-57	136.36	94.	-10.	-0.001	147.56	-2.416E-01	
U-235	143.71	71.	20.	0.003	63.83	5.094E-01	
CE-141	145.42	100.	-10.	-0.001	139.94	-6.065E-02	
Ba-140	161.76	61.	3.	0.000	343.91	1.586E-01	
U-235	163.27	72.	17.	0.002	76.22	9.900E-01	
CE-139	165.95	96.	-12.	-0.002	118.63	-4.636E-02	
TH-229	192.77	81.	-13.	-0.002	102.15	-1.041E+00	
U-235	205.45	65.	-8.	-0.001	147.35	-5.909E-01	
TH-229	210.55	85.	-10.	-0.001	131.39	-1.303E+00	
TH-227	235.54	58.	5.	0.001	202.38	1.866E-01	
RA-224	239.96	242.	-68.	-0.009	34.48	-7.117E+00	
PB-214	241.42	53.	31.	0.004	36.29	1.809E+00	P
EU-152	243.53	64.	-11.	-0.001	111.25	-6.075E-01	
Hg-203	279.13	72.	-5.	-0.001	248.57	-2.943E-02	
I-131	283.82	56.	-8.	-0.001	129.50	-6.895E-01	
PB-214	295.09	68.	23.	0.003	36.36	6.137E-01	P
Ir-192	295.07	50.	34.	0.005	33.75	5.888E-01	
PA-231	301.04	65.	-4.	-0.001	317.46	-7.696E-01	
PA-233	299.43	70.	-1.	0.000	906.44	-1.102E-01	
PA-231	303.12	60.	-3.	0.000	321.95	-6.290E-01	
BA-133	302.90	61.	-4.	0.000	313.27	-1.024E-01	
Ba-140	305.47	45.	7.	0.001	139.55	8.718E-01	
Ir-192	308.75	52.	-4.	-0.001	259.53	-6.736E-02	
PA-233	311.96	44.	-3.	0.000	362.08	-3.934E-02	
Ir-192	317.48	31.	7.	0.001	117.98	4.440E-02	
CR-51	319.71	31.	-3.	0.000	279.81	-1.605E-01	
La-140	329.62	46.	-5.	-0.001	184.90	-1.483E-01	
AC-228	338.37	59.	22.	0.003	54.33	1.053E+00	
EU-152	344.50	45.	-5.	-0.001	201.62	-1.073E-01	
PB-214	351.87	53.	40.	0.006	19.24	6.418E-01	P
BA-133	356.11	31.	10.	0.001	80.84	1.026E-01	
SN-113	392.48	29.	9.	0.001	88.90	9.530E-02	
SB-125	428.01	31.	-2.	0.000	504.53	-3.850E-02	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
pm-146	454.04	29.	-4.	-0.001	196.70	-4.695E-02	
SB-125	462.97	25.	13.	0.002	60.05	9.813E-01	
Ir-192	464.79	14.	1.	0.000	413.74	1.968E-02	
PM-144	477.41	23.	-1.	0.000	624.13	-2.091E-02	
HF-181	482.17	25.	1.	0.000	520.75	1.380E-02	
RH-106	510.79	64.	84.	0.012	17.40	3.551E+00	
Ba-140	536.97	16.	4.	0.001	162.74	1.321E-01	
CS-134	562.57	23.	3.	0.000	218.40	3.561E-01	
CS-134	569.49	27.	3.	0.000	236.17	1.931E-01	
PA-234	569.47	27.	3.	0.000	259.61	3.329E-01	
BI-207	569.41	26.	3.	0.000	221.65	3.189E-02	
TL-208	583.13	31.	40.	0.006	25.29	4.534E-01	
SB-125	600.60	35.	-3.	0.000	248.56	-1.891E-01	
SB-124	602.10	31.	5.	0.001	167.05	4.879E-02	
CS-134	605.07	33.	5.	0.001	166.71	5.128E-02	
RU-103	611.34	29.	6.	0.001	142.04	9.771E-01	
AG-108M	614.97	27.	-6.	-0.001	134.98	-6.408E-02	
PM-144	618.45	11.	9.	0.001	58.83	9.633E-02	
RH-106	621.71	23.	-2.	0.000	302.40	-2.370E-01	
SB-125	636.58	25.	-5.	-0.001	152.59	-4.446E-01	
I-131	636.60	27.	-5.	-0.001	144.91	-7.661E-01	
AG-110M	659.14	23.	6.	0.001	130.89	6.247E-02	
PM-144	694.99	21.	-2.	0.000	406.97	-1.842E-02	
NB-94	702.11	27.	6.	0.001	123.50	7.352E-02	
SB-124	723.79	29.	-4.	-0.001	189.64	-4.450E-01	
EU-154	723.78	33.	-5.	-0.001	160.15	-3.033E-01	
ZR-95	724.87	34.	-3.	0.000	275.01	-8.165E-02	
BI-212	727.29	26.	14.	0.002	59.33	2.129E+00	
pm-146	735.18	20.	4.	0.000	182.59	1.891E-01	
pm-146	746.13	20.	4.	0.001	154.19	1.522E-01	
ZR-95	756.50	23.	1.	0.000	610.93	2.512E-02	
NB-95	767.94	22.	4.	0.001	157.15	5.416E-02	
EU-152	778.89	25.	-1.	0.000	865.29	-7.900E-02	
BI-212	785.85	22.	-2.	0.000	404.39	-1.643E+00	
CS-134	794.65	21.	2.	0.000	277.19	3.604E-02	
CS-134	802.47	25.	4.	0.001	172.89	6.299E-01	
CO-58	812.21	27.	-3.	0.000	277.88	-3.519E-02	
La-140	814.96	20.	2.	0.000	368.82	9.723E-02	
MN-54	834.94	22.	-1.	0.000	800.74	-1.126E-02	
Co-56	846.49	16.	7.	0.001	94.06	8.967E-02	
TL-208	860.62	18.	5.	0.001	135.51	5.161E-01	
NB-94	871.69	26.	-3.	0.000	258.52	-4.003E-02	
PA-234	881.43	19.	4.	0.001	174.67	8.544E-01	
PA-234	884.71	24.	1.	0.000	886.38	1.150E-01	
Sc-46	888.86	24.	-3.	0.000	237.54	-4.230E-02	
y-88	898.72	23.	-2.	0.000	373.16	-2.827E-02	
AC-228	911.14	14.	40.	0.006	20.42	2.012E+00	
AG-110M	937.41	21.	-4.	-0.001	170.60	-1.707E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
PA-234	945.82	28.	-3.	0.000	260.61	-3.284E-01		
EU-152	959.29	6.	3.	0.000	130.69	3.134E-01		
AC-228	968.27	21.	6.	0.001	111.58	5.492E-01		
EU-154	996.86	28.	-6.	-0.001	125.54	-9.280E-01		
PA-234M	1000.70	15.	5.	0.001	119.21	9.281E+00		
EU-154	1009.10	7.	0.	0.000	804.16	-4.149E-02		
Co-56	1037.72	22.	-3.	0.000	249.57	-3.209E-01		
RH-106	1050.54	28.	-7.	-0.001	119.69	-6.985E+00		
BI-207	1063.67	17.	7.	0.001	94.68	1.507E-01		
FE-59	1101.80	18.	2.	0.000	337.59	5.507E-02		
EU-152	1112.20	15.	3.	0.000	177.68	4.207E-01		
Sc-46	1119.82	11.	13.	0.002	44.75	2.312E-01		
Ta-182	1119.78	9.	13.	0.002	42.12	6.747E-01		
CO-60	1172.48	13.	4.	0.001	132.15	7.782E-02		
Ta-182	1220.78	21.	1.	0.000	846.50	5.517E-02		
Co-56	1237.07	20.	7.	0.001	102.48	1.947E-01		
NA-22	1275.55	12.	-1.	0.000	356.85	-2.783E-02		
EU-154	1275.53	12.	-1.	0.000	350.92	-8.049E-02		
EU-152	1407.35	20.	-4.	0.000	187.36	-3.693E-01		
K-40	1460.72	21.	77.	0.011	11.41	1.646E+01	P	
SB-124	1690.83	14.	-2.	0.000	315.38	-9.352E-02		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

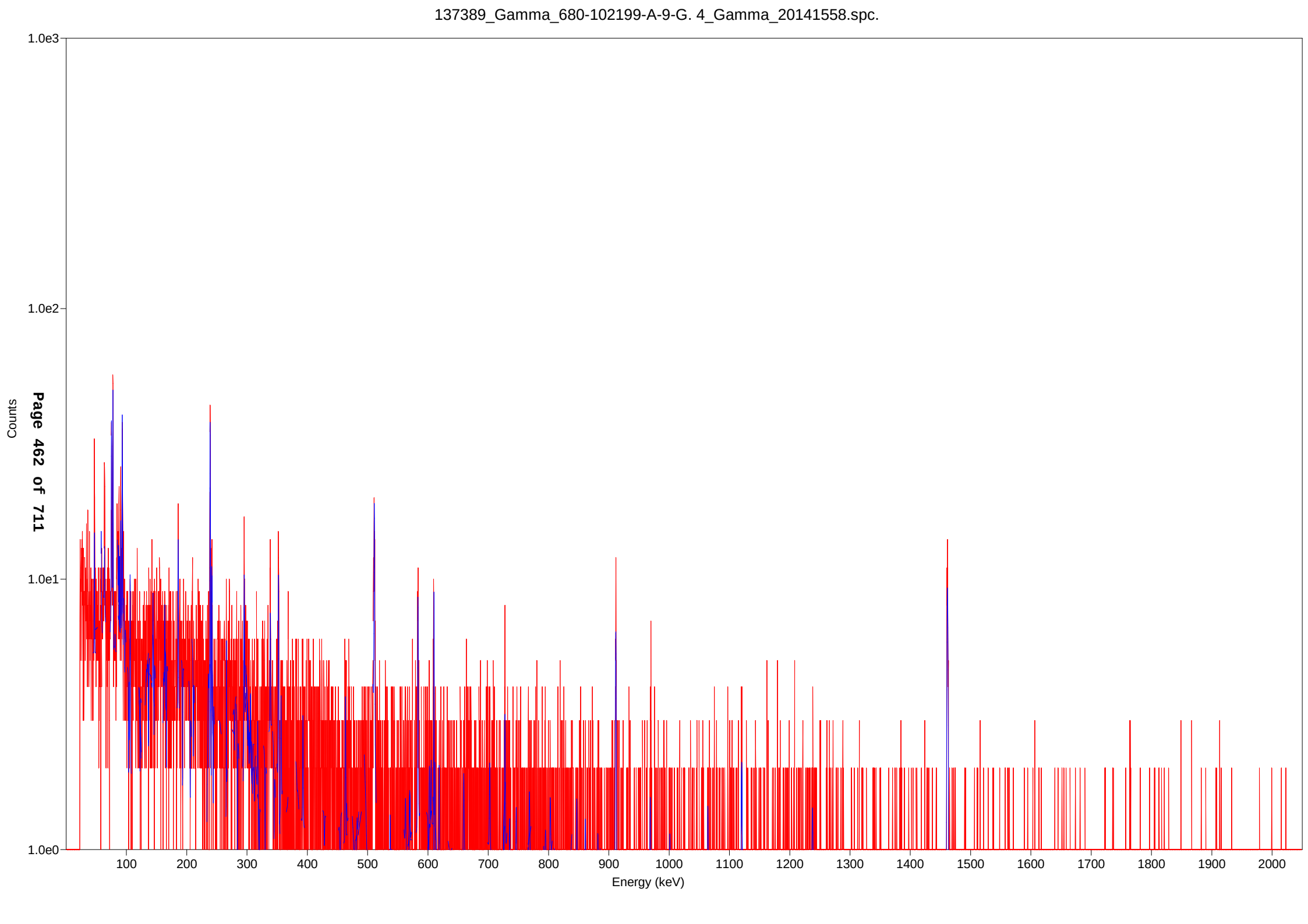
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	1.9555E-02	1.9555E-02	2.461E+03%	1.79E+00
NA-22	#A	-2.7831E-02	-2.7831E-02	3.569E+02%	3.72E-01
K-40	#	1.6461E+01	1.6461E+01	1.336E+01%	5.16E+00
Sc-46	#A	9.4445E-02	9.4446E-02	4.475E+01%	3.60E-01
CR-51	#A	-1.6046E-01	-1.6046E-01	2.798E+02%	1.60E+00
MN-54	#A	-1.1263E-02	-1.1263E-02	8.007E+02%	3.31E-01
FE-59	#A	5.5067E-02	5.5067E-02	3.376E+02%	6.80E-01
Co-56	#A	1.3147E-01	1.3147E-01	6.955E+01%	2.90E-01
CO-57	#A	-7.0907E-05	-7.0907E-05	4.255E+04%	1.08E-01
CO-58	#A	-3.5189E-02	-3.5189E-02	2.779E+02%	3.50E-01
CO-60	#A	3.8893E-02	3.8893E-02	1.321E+02%	7.77E-01
ZN-65	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.33E+00
NB-94	#A	7.3524E-02	7.3524E-02	1.235E+02%	3.15E-01
ZR-95	#A	2.5115E-02	2.5115E-02	6.109E+02%	5.60E-01
NB-95	#A	5.4160E-02	5.4160E-02	1.572E+02%	3.01E-01
RU-103	#A	-3.2060E-04	-3.2061E-04	2.360E+04%	2.74E-01
RH-106	#A	-2.3701E-01	-2.3701E-01	3.024E+02%	2.58E+00
AG-108M	#A	0.0000E+00	0.0000E+00	7.071E+02%	2.48E-01
AG-110M	#A	3.4870E-02	3.4870E-02	1.309E+02%	4.75E-01

SN-113	#A	9.5301E-02	9.5301E-02	8.890E+01%	2.87E-01
SB-124	#A	4.8790E-02	4.8791E-02	1.670E+02%	2.86E-01
SB-125	#A	2.2796E-01	2.2796E-01	6.005E+01%	6.98E-01
I-131	#A	2.7763E-03	2.7764E-03	1.834E+03%	1.88E-01
Gd-153	#A	-8.3341E-02	-8.3341E-02	1.473E+02%	4.17E-01
Ga-68	#A	-6.7925E-02	-6.8285E-02	7.979E+03%	2.04E+01
Tc-99m	#A	7.4112E-04	7.4185E-04	5.750E+03%	1.50E-01
BA-133	#A	1.0259E-01	1.0259E-01	8.084E+01%	2.79E-01
CS-134	#A	9.0483E-02	9.0483E-02	9.757E+01%	2.99E-01
CS-137	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.75E-01
CE-139	#A	-4.6359E-02	-4.6359E-02	1.186E+02%	1.86E-01
Ba-140	#A	2.2772E-01	2.2772E-01	1.351E+02%	7.69E-01
La-140	#A	1.9072E-02	1.9073E-02	3.688E+02%	8.03E-01
CE-141	#A	-6.0654E-02	-6.0654E-02	1.399E+02%	2.89E-01
CE-144	#A	-1.1514E-02	-1.1515E-02	2.751E+03%	1.11E+00
PM-144	#A	3.8981E-02	3.8981E-02	5.883E+01%	2.73E-01
EU-152	#A	1.3651E-01	1.3651E-01	9.961E+01%	7.55E-01
EU-154	#A	1.9874E-02	1.9874E-02	3.723E+03%	2.74E+00
EU-155	#A	3.5173E-01	3.5173E-01	3.396E+01%	3.64E-01
HF-181	#A	1.2201E-02	1.2201E-02	4.977E+02%	2.61E-01
Ta-182	#A	6.7465E-01	6.7465E-01	4.212E+01%	8.49E-01
Hg-203	#A	-2.9428E-02	-2.9428E-02	2.486E+02%	2.53E-01
TL-208	#	4.6142E-01	4.6142E-01	2.529E+01%	3.26E-01
pm-146	#A	1.6687E-01	1.6687E-01	1.195E+02%	8.30E-01
y-88	#A	-2.8272E-02	-2.8272E-02	3.732E+02%	3.82E-01
Cd-109	A	1.2121E+00	1.2121E+00	8.131E+01%	3.29E+00
Ra-226	#A	4.3741E+00	4.3741E+00	4.096E+01%	5.00E+00
PB-210	A	2.0256E+00	2.0256E+00	6.512E+01%	3.65E+00
PB-212		1.5076E+00	1.5076E+00	1.054E+01%	3.57E-01
PB-214	#	6.3226E-01	6.3226E-01	2.812E+01%	5.85E-01
BI-207	#A	8.3287E-02	8.3287E-02	9.468E+01%	2.52E-01
BI-212	#A	2.1295E+00	2.1295E+00	5.933E+01%	4.13E+00
BI-214	#	1.1597E+00	1.1597E+00	2.188E+01%	5.39E-01
BI-210M	A	1.7786E-01	1.7786E-01	3.802E+01%	2.03E-01
RA-224	#A	-7.1172E+00	-7.1172E+00	3.448E+01%	7.85E+00
AC-228	#	2.0119E+00	2.0119E+00	2.042E+01%	9.97E-01
TH-227	#A	1.8662E-01	1.8662E-01	2.024E+02%	1.31E+00
TH-229	#A	-1.0411E+00	-1.0411E+00	1.021E+02%	3.59E+00
TH-234	A	2.3579E+00	2.3579E+00	2.840E+01%	3.70E+00
PA-231	#A	-6.2904E-01	-6.2904E-01	3.219E+02%	7.07E+00
PA-233	#A	-3.9344E-02	-3.9344E-02	3.621E+02%	5.03E-01
PA-234	#A	1.0707E-01	1.0707E-01	2.596E+02%	7.22E-01
PA-234M	#A	9.2808E+00	9.2808E+00	1.192E+02%	3.89E+01
U-235	#A	6.6162E-01	6.6162E-01	4.971E+01%	1.07E+00
AM-241	#A	1.7086E-01	1.7086E-01	3.950E+01%	2.11E-01
Ir-192	#A	1.3401E-01	1.3401E-01	3.375E+01%	1.81E-01
Np-237	A	3.9985E-01	3.9985E-01	6.222E+01%	8.19E-01

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (	90.1 to 1999.4 keV)	9.645E+00	Bq/Sample
Total Decayed Activity (	90.1 to 1999.4 keV)	9.6446781E+00	Bq/Sample


137389_Gamma_680-102199-A-9-G. 4_Gamma_20141558.spc.
1.0e3
1.0e2
1.0e1
1.0e0
Counts
Page 462 of 711
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)

Daily Checks

Test America
St. Louis
Background Check

Spectrum: 4_20140813002_BG
Acquired: 8/13/2014 12:43:53 AM
Detector: Ge 4 SN/181
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.32	1.20	1.24	1.30	1.39	1.43	PASS

Analyst: Rachel Mueller Reviewer: ashley silas

TestAmerica Spectrum name: 4_20140813002_BG.An1

Sample description
Background Contamination Check

Spectrum Filename: C:\User\SPC\Det4\4_20140813002_BG.An1

Acquisition information
Start time: 8/13/2014 12:43:53 AM
Live time: 1800
Real time: 1802
Dead time: 0.09 %
Detector ID: 4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_QC.Clb
4_QA-D_Rad11-0018_032612

Energy Calibration
Created: 2/28/2012 2:55:17 PM
Zero offset: 0.091 keV
Gain: 0.250 keV/channel
Quadratic: -2.917E-08 keV/channel^2

Efficiency Calibration
Created: 3/27/2012 7:34:55 AM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (1999.44keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 2 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 1.0000

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc

No unknown peaks passed sensitivity test.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.94	46.60	6.	22.	0.013	29.17	0.763

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS	COMMENTS
PB-210	N	8.3236E+00				8.14E+03	
			46.54	8.324E+00	?(	5.398E+00	2.92E+01 4.25E+00 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.

```
  ! - Peak is part of a multiplet and this area went
      negative during deconvolution.
  ? - Peak is too narrow.
  @ - Peak is too wide at FW25M, but ok at FWHM.
  % - Peak fails sensitivity test.
  $ - Peak identified, but first peak of this nuclide
      failed one or more qualification tests.
  + - Peak activity higher than counting uncertainty range.
  - - Peak activity lower than counting uncertainty range.
  = - Peak outside analysis energy range.
  & - Calculated peak centroid is not close enough to the
      library energy centroid for positive identification.
  P - Peakbackground subtraction
  } - Peak is too close to another for the activity
      to be found directly.

  Nuclide Codes:                      Peak Codes:
  T - Thermal Neutron Activation      G - Gamma Ray
  F - Fast Neutron Activation         X - X-Ray
  I - Fission Product                 P - Positron Decay
  N - Naturally Occurring Isotope     S - Single-Escape
  P - Photon Reaction                 D - Double-Escape
  C - Charged Particle Reaction       K - Key Line
  M - No MDA Calculation              A - Not in Average
  R - Coincidence Corrected           C - Coincidence Peak
  H - Halflife limit exceeded
```

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Activity	Time of Count Uncertainty 1 Sigma Counting	MDA DPS
BE-7	<	1.5348E+00		
NA-22	<	5.0059E-01		
K-40	<	4.8985E+00		
Sc-46	<	3.9205E-01		
CR-51	<	1.9214E+00		
MN-54	<	3.5513E-01		
FE-59	<	7.8867E-01		
Co-56	<	3.6277E-01		
CO-57	<	1.2051E-01		
CO-58	<	3.4270E-01		
CO-60	<	5.2255E-01		
ZN-65	<	8.8910E-01		

NB-94	<	2.9513E-01		
ZR-95	<	5.7430E-01		
NB-95	<	3.1781E-01		
RU-103	<	1.4914E-01		
RH-106	<	2.2095E+00		
AG-108M	<	1.2558E-01		
AG-110M	<	5.3464E-01		
SN-113	<	3.6275E-01		
SB-124	<	2.0391E-01		
SB-125	<	6.1699E-01		
I-131	<	1.4941E-01		
BA-133	<	1.5320E-01		
CS-134	<	2.6134E-01		
CS-137	<	3.2058E-01		
CE-139	<	2.1136E-01		
Ba-140	<	6.3383E-01		
La-140	<	5.4812E-01		
CE-141	<	1.3678E-01		
CE-144	<	1.3770E+00		
PM-144	<	2.8937E-01		
EU-152	<	5.1253E-01		
EU-154	<	3.0996E+00		
EU-155	<	3.0262E-01		
HF-181	<	1.6099E-01		
Ta-182	<	1.2935E+00		
Hg-203	<	1.0091E-01		
TL-208	<	2.7473E-01		
pm-146	<	9.0667E-01		
y-88	<	4.2545E-01		
PB-210	#	8.3236E+00	2.9172E+01%	5.398E+00
PB-212	<	5.1324E-01		
PB-214	<	3.6681E-01		
BI-207	<	1.7836E-01		
BI-212	<	3.9639E+00		
BI-214	<	4.4806E-01		
BI-210M	<	3.2775E-01		
RA-224	<	1.8784E+00		
AC-228	<	1.3842E+00		
TH-227	<	6.2098E-01		
TH-229	<	4.5716E+00		
TH-234	<	7.7152E+00		
PA-231	<	2.9771E+00		
PA-233	<	4.3174E-01		
PA-234	<	6.3592E-01		
PA-234M	<	5.0342E+01		
Ra-226	<	4.1254E+00		
U-235	<	1.3581E+00		
AM-241	<	2.5953E-01		
Np-237	<	9.0098E-01		

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

--- S U M M A R Y ---

Total Activity (37.6 to 1999.4 keV) 8.324E+00 DPS

Test America
St. Louis
Quality Control Check

Spectrum: 4_20140813003_QCAsLeft
Acquired: 8/13/2014 1:54:50 AM
Detector: Ge 4 SN/181
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.00	239.00	240.00	PASS
Energy	59.54	59.22	59.29	59.64	59.79	59.86	PASS
FWHM	0.77	0.00	0.00	0.77	1.87	1.97	PASS
ActivityDiff	650.60	-5.00	-4.00	0.66	4.00	5.00	PASS
QA-662							
FWHM	1.34	0.00	0.00	1.33	3.04	3.14	PASS
ActivityDiff	609.90	-5.00	-4.00	-3.33	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.80	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.52	1333.01	1333.26	PASS
FWHM	1.84	0.00	0.00	1.80	4.04	4.14	PASS
ActivityDiff	1189.70	-5.00	-4.00	-2.29	4.00	5.00	PASS

Analyst: Rachel Mueller Reviewer: ashley silas

TestAmerica Spectrum name: 4_20140813003_QCAsLeft.An1

Sample description
Quality control Check (QC Source 'D') Post Stabilization

Spectrum Filename: C:\User\SPC\Det4\4_20140813003_QCAsLeft.An1

Acquisition information
Start time:	8/13/2014 1:54:50 AM
Live time:	1000
Real time:	1017
Dead time:	1.70 %
Detector ID:	4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_QC.Clb
4_QA-D_Rad11-0018_032612

Energy Calibration
Created:	2/28/2012 2:55:17 PM
Zero offset:	0.091 keV
Gain:	0.250 keV/channel
Quadratic:	-2.917E-08 keV/channel^2

Efficiency Calibration
Created:	3/27/2012 7:34:55 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_QC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (1999.44keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	1.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

TestAmerica Spectrum name: 4_20140813003_QCAsLeft.An1

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	4/1/2009 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 5 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0756

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. GPS	Nuc
59.64	28162.	0.66	0.77	4.402E-02	59.54	100.000	6.463E+02	QA60
88.15	3079.	2.22	0.79	6.283E-02	88.03	100.000	9.235E+02	QA88
661.55	8348.	1.17	1.33	1.500E-02	661.66	100.000	6.302E+02	QA662
1173.27	5283.	1.55	1.63	8.791E-03	1173.23	100.000	1.217E+03	QA1173
1332.52	4710.	1.47	1.80	7.837E-03	1332.51	100.000	1.217E+03	QA1332

No unknown peaks passed sensitivity test.

This section based on library: DET_QC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
QA-60	238.08	59.64	1564.	28162.	28.162	0.66	0.772
QA-88	352.03	88.15	450.	3079.	3.079	2.22	0.791
QA-662	2645.04	661.55	245.	8348.	8.348	1.17	1.332
QA-1173	4692.41	1173.27	180.	5283.	5.283	1.55	1.634
QA-1332	5329.80	1332.52	9.	4710.	4.710	1.47	1.799

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity GPS	Peak Energy keV	Peak Activity GPS		Peak Code	MDA Value GPS		COMMENTS
QA-60		6.4633E+02					1.58E+05		
			59.54	6.463E+02	(	4.292E+00	6.56E-01	1.00E+02	G
QA-88		9.2354E+02					4.63E+02		
			88.03	9.235E+02	(	3.046E+01	2.22E+00	1.00E+02	G
QA-662		6.3024E+02					1.10E+04		
			661.66	6.302E+02	(	5.715E+00	1.17E+00	1.00E+02	G
QA-1173		1.2171E+03					1.92E+03		
			1173.23	1.217E+03	(	1.503E+01	1.55E+00	1.00E+02	G
QA-1332		1.2170E+03					1.92E+03		
			1332.51	1.217E+03	(	4.379E+00	1.47E+00	1.00E+02	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average

TestAmerica Spectrum name: 4_20140813003_QCAsLeft.An1

R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity GPS	Time Corrected Activity GPS	Uncertainty 1 Sigma Counting	MDA
QA-60		6.4080E+02	6.4633E+02	6.563E-01%	4.29E+00
QA-88		4.9011E+01	9.2354E+02	2.216E+00%	3.05E+01
QA-122	<	1.5995E+00	2.3680E+02		
QA-166			>12 Halflives		
QA-279			>12 Halflives		
QA-392			>12 Halflives		
QA-514			>12 Halflives		
QA-662		5.5693E+02	6.3024E+02	1.170E+00%	5.72E+00
QA-898			>12 Halflives		
QA-1173		6.0097E+02	1.2171E+03	1.545E+00%	1.50E+01
QA-1332		6.0095E+02	1.2170E+03	1.465E+00%	4.38E+00
QA-1836			>12 Halflives		

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.4 keV) 2.449E+03 GPS
Total Decayed Activity (37.6 to 1999.4 keV) 4.6342373E+03 GPS

Test America
St. Louis
Background Check

Spectrum: 4_20140814001_BG
Acquired: 8/14/2014 12:01:07 AM
Detector: Ge 4 SN/181
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.32	1.20	1.24	1.26	1.39	1.43	PASS

Analyst: Rachel Mueller Reviewer: Rachel Mueller

TestAmerica Spectrum name: 4_20140814001_BG.An1

Sample description
Background Contamination Check

Spectrum Filename: C:\User\SPC\Det4\4_20140814001_BG.An1

Acquisition information
Start time:	8/14/2014 12:01:07 AM
Live time:	1800
Real time:	1802
Dead time:	0.10 %
Detector ID:	4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_QC.Clb
4_QA-D_Rad11-0018_032612

Energy Calibration
Created:	2/28/2012 2:55:17 PM
Zero offset:	0.091 keV
Gain:	0.250 keV/channel
Quadratic:	-2.917E-08 keV/channel^2

Efficiency Calibration
Created:	3/27/2012 7:34:55 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (1999.44keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 2 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.2281

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc

No unknown peaks passed sensitivity test.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.41	46.72	2.	22.	0.012	23.17	0.707

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS	COMMENTS
PB-210	N	8.2620E+00				8.14E+03	
			46.54	8.262E+00	(	3.228E+00	2.32E+01 4.25E+00 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.

! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- - - -

NB-94	<	2.9513E-01		
ZR-95	<	5.7430E-01		
NB-95	<	3.1781E-01		
RU-103	<	1.4914E-01		
RH-106	<	2.2095E+00		
AG-108M	<	1.8371E-01		
AG-110M	<	5.3464E-01		
SN-113	<	3.2687E-01		
SB-124	<	2.9830E-01		
SB-125	<	3.7799E-01		
I-131	<	1.9326E-01		
BA-133	<	1.5320E-01		
CS-134	<	2.0710E-01		
CS-137	<	3.2058E-01		
CE-139	<	2.1136E-01		
Ba-140	<	6.3383E-01		
La-140	<	5.4812E-01		
CE-141	<	1.3678E-01		
CE-144	<	7.3405E-01		
PM-144	<	2.8937E-01		
EU-152	<	4.4212E-01		
EU-154	<	3.0996E+00		
EU-155	<	5.7997E-01		
HF-181	<	2.0316E-01		
Ta-182	<	1.2935E+00		
Hg-203	<	1.0091E-01		
TL-208	<	2.1771E-01		
pm-146	<	9.0667E-01		
y-88	<	4.2545E-01		
PB-210		8.2620E+00	2.3170E+01%	3.228E+00
PB-212	<	5.2703E-01		
PB-214	<	7.4589E-01		
BI-207	<	1.7836E-01		
BI-212	<	3.9639E+00		
BI-214	<	5.6541E-01		
BI-210M	<	1.6061E-01		
RA-224	<	1.8784E+00		
AC-228	<	1.7467E+00		
TH-227	<	6.2098E-01		
TH-229	<	3.1107E+00		
TH-234	<	7.0600E+00		
PA-231	<	2.9771E+00		
PA-233	<	2.4234E-01		
PA-234	<	3.5694E-01		
PA-234M	<	5.0342E+01		
Ra-226	<	4.8746E+00		
U-235	<	1.8293E+00		
AM-241	<	3.2750E-01		
Np-237	<	5.0573E-01		

```
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
----------------------------   S U M M A R Y   ----------------------------
Total Activity (   37.6 to  1999.4 keV)     8.262E+00  DPS
```

Test America
St. Louis
Quality Control Check

Spectrum: 4_20140814002_QCAsLeft
Acquired: 8/14/2014 1:04:27 AM
Detector: Ge 4 SN/181
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.54	59.22	59.29	59.60	59.79	59.86	PASS
FWHM	0.77	0.00	0.00	0.76	1.87	1.97	PASS
ActivityDiff	650.60	-5.00	-4.00	-3.19	4.00	5.00	PASS
QA-662							
FWHM	1.34	0.00	0.00	1.30	3.04	3.14	PASS
ActivityDiff	609.90	-5.00	-4.00	-3.32	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.60	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.49	1333.01	1333.26	PASS
FWHM	1.84	0.00	0.00	1.87	4.04	4.14	PASS
ActivityDiff	1189.70	-5.00	-4.00	0.92	4.00	5.00	PASS

Analyst: Rachel Mueller Reviewer: Rachel Mueller

TestAmerica Spectrum name: 4_20140814002_QCAsLeft.An1

Sample description
Quality control Check (QC Source 'D') Post Stabilization

Spectrum Filename: C:\User\SPC\Det4\4_20140814002_QCAsLeft.An1

Acquisition information
Start time:	8/14/2014 1:04:27 AM
Live time:	1000
Real time:	1017
Dead time:	1.71 %
Detector ID:	4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_QC.Clb
4_QA-D_Rad11-0018_032612

Energy Calibration
Created:	2/28/2012 2:55:17 PM
Zero offset:	0.091 keV
Gain:	0.250 keV/channel
Quadratic:	-2.917E-08 keV/channel^2

Efficiency Calibration
Created:	3/27/2012 7:34:55 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_QC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (1999.44keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	1.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	4/1/2009 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 6 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0688

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. GPS	Nuc
59.60	29253.	0.65	0.76	4.399E-02	59.54	100.000	6.714E+02	QA60
88.12	3080.	2.22	0.79	6.283E-02	88.03	100.000	9.253E+02	QA88
661.50	8346.	1.18	1.30	1.500E-02	661.66	100.000	6.302E+02	QA662
1173.19	5215.	1.48	1.74	8.791E-03	1173.23	100.000	1.202E+03	QA1173
1332.49	4560.	1.49	1.87	7.837E-03	1332.51	100.000	1.179E+03	QA1332

No unknown peaks passed sensitivity test.

This section based on library: DET_QC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
QA-60	237.92	59.60	1770.	29253.	29.253	0.65	0.764
QA-88	351.94	88.12	435.	3080.	3.080	2.22	0.791
QA-662	2644.85	661.50	238.	8346.	8.346	1.18	1.303
QA-1173	4692.11	1173.19	105.	5215.	5.215	1.48	1.737
QA-1332	5329.64	1332.49	11.	4560.	4.560	1.49	1.874

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity GPS	Peak Energy keV	Peak Activity GPS		Peak Code	MDA Value GPS		COMMENTS
QA-60		6.7137E+02					1.58E+05		
			59.54	6.714E+02	(	4.562E+00	6.54E-01	1.00E+02	G
QA-88		9.2528E+02					4.63E+02		
			88.03	9.253E+02	(	3.000E+01	2.22E+00	1.00E+02	G
QA-662		6.3016E+02					1.10E+04		
			661.66	6.302E+02	(	5.633E+00	1.18E+00	1.00E+02	G
QA-1173		1.2018E+03					1.92E+03		
			1173.23	1.202E+03	(	1.163E+01	1.48E+00	1.00E+02	G
QA-1332		1.1787E+03					1.92E+03		
			1332.51	1.179E+03	(	4.756E+00	1.49E+00	1.00E+02	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average

R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity GPS	Time Corrected Activity GPS	Uncertainty 1 Sigma Counting	MDA
QA-60		6.6562E+02	6.7137E+02	6.542E-01%	4.56E+00
QA-88		4.9032E+01	9.2528E+02	2.219E+00%	3.00E+01
QA-122	<	1.1818E+00	1.7539E+02		
QA-166			>12 Halflives		
QA-279			>12 Halflives		
QA-392			>12 Halflives		
QA-514			>12 Halflives		
QA-662		5.5682E+02	6.3016E+02	1.180E+00%	5.63E+00
QA-898			>12 Halflives		
QA-1173		5.9323E+02	1.2018E+03	1.477E+00%	1.16E+01
QA-1332		5.8181E+02	1.1787E+03	1.493E+00%	4.76E+00
QA-1836			>12 Halflives		

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.4 keV) 2.447E+03 GPS
Total Decayed Activity (37.6 to 1999.4 keV) 4.6073242E+03 GPS

Test America
St. Louis
Background Check

Spectrum: 4_20140827001_BG
Acquired: 8/27/2014 12:01:12 AM
Detector: Ge 4 SN/181
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.32	1.20	1.24	1.28	1.39	1.43	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

TestAmerica Spectrum name: 4_20140827001_BG.An1

Sample description
Background Contamination Check

Spectrum Filename: C:\User\SPC\Det4\4_20140827001_BG.An1

Acquisition information
Start time: 8/27/2014 12:01:12 AM
Live time: 1800
Real time: 1802
Dead time: 0.10 %
Detector ID: 4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_QC.Clb
4_QA-D_Rad11-0018_032612

Energy Calibration
Created: 2/28/2012 2:55:17 PM
Zero offset: 0.091 keV
Gain: 0.250 keV/channel
Quadratic: -2.917E-08 keV/channel^2

Efficiency Calibration
Created: 3/27/2012 7:34:55 AM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (1999.44keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

TestAmerica Spectrum name: 4_20140827001_BG.An1

Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 0 cutoff: 5.00E+01%

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc

No unknown peaks passed sensitivity test.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS	COMMENTS

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.

- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- - - -

SB-124	<	2.5732E-01
SB-125	<	3.7799E-01
I-131	<	2.1094E-01
BA-133	<	2.7294E-01
CS-134	<	2.0710E-01
CS-137	<	5.2328E-01
CE-139	<	2.4153E-01
Ba-140	<	6.3383E-01
La-140	<	5.4812E-01
CE-141	<	2.6215E-01
CE-144	<	5.8170E-01
PM-144	<	2.8937E-01
EU-152	<	5.7189E-01
EU-154	<	5.0595E+00
EU-155	<	3.0262E-01
HF-181	<	1.6099E-01
Ta-182	<	1.2935E+00
Hg-203	<	1.0091E-01
TL-208	<	4.4426E-01
pm-146	<	9.0667E-01
y-88	<	4.2545E-01
PB-210	<	9.4480E+00
PB-212	<	4.0122E-01
PB-214	<	4.8055E-01
BI-207	<	1.7836E-01
BI-212	<	3.9639E+00
BI-214	<	4.4806E-01
BI-210M	<	2.0268E-01
RA-224	<	1.8784E+00
AC-228	<	1.3842E+00
TH-227	<	1.5306E+00
TH-229	<	2.8916E+00
TH-234	<	8.8667E+00
PA-231	<	5.3039E+00
PA-233	<	3.0581E-01
PA-234	<	6.8408E-01
PA-234M	<	5.0342E+01
Ra-226	<	6.4032E+00
U-235	<	7.5679E-01
AM-241	<	3.7965E-01
Np-237	<	5.0573E-01

  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

TestAmerica Spectrum name: 4_20140827001_BG.An1

---------- S U M M A R Y ----------
Total Activity (37.6 to 1999.4 keV) 0.000E+00 DPS

Test America
St. Louis
Quality Control Check

Spectrum: 4_20140827002_QCAsLeft
Acquired: 8/27/2014 1:10:40 AM
Detector: Ge 4 SN/181
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.00	239.00	240.00	PASS
Energy	59.54	59.22	59.29	59.63	59.79	59.86	PASS
FWHM	0.77	0.00	0.00	0.80	1.87	1.97	PASS
ActivityDiff	650.60	-5.00	-4.00	-1.71	4.00	5.00	PASS
QA-662							
FWHM	1.34	0.00	0.00	1.32	3.04	3.14	PASS
ActivityDiff	609.90	-5.00	-4.00	-0.90	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.30	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.65	1333.01	1333.26	PASS
FWHM	1.84	0.00	0.00	1.73	4.04	4.14	PASS
ActivityDiff	1189.70	-5.00	-4.00	-1.28	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

TestAmerica Spectrum name: 4_20140827002_QCAsLeft.An1

Sample description
Quality control Check (QC Source 'D') Post Stabilization

Spectrum Filename: C:\User\SPC\Det4\4_20140827002_QCAsLeft.An1

Acquisition information
Start time:	8/27/2014 1:10:40 AM
Live time:	1000
Real time:	1017
Dead time:	1.69 %
Detector ID:	4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_QC.Clb
4_QA-D_Rad11-0018_032612

Energy Calibration
Created:	2/28/2012 2:55:17 PM
Zero offset:	0.091 keV
Gain:	0.250 keV/channel
Quadratic:	-2.917E-08 keV/channel^2

Efficiency Calibration
Created:	3/27/2012 7:34:55 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_QC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (1999.44keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	1.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

TestAmerica Spectrum name: 4_20140827002_QCAsLeft.An1

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	4/1/2009 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 5 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0889

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. GPS	Nuc
59.63	28831.	0.65	0.80	4.401E-02	59.54	100.000	6.617E+02	QA60
88.15	3037.	2.33	0.80	6.283E-02	88.03	100.000	9.302E+02	QA88
661.60	8144.	1.22	1.32	1.499E-02	661.66	100.000	6.154E+02	QA662
1173.35	5126.	1.51	1.72	8.790E-03	1173.23	100.000	1.187E+03	QA1173
1332.65	4639.	1.49	1.73	7.837E-03	1332.51	100.000	1.205E+03	QA1332

No unknown peaks passed sensitivity test.

This section based on library: DET_QC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
QA-60	238.03	59.63	1524.	28831.	28.831	0.65	0.800
QA-88	352.03	88.15	492.	3037.	3.037	2.33	0.798
QA-662	2645.23	661.60	261.	8144.	8.144	1.22	1.316
QA-1173	4692.74	1173.35	140.	5126.	5.127	1.51	1.719
QA-1332	5330.31	1332.65	23.	4639.	4.639	1.49	1.732

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Nuclide Code	Average Activity GPS	Peak Energy keV	Peak Activity GPS		Peak Code	MDA Value GPS			COMMENTS
QA-60		6.6172E+02					1.58E+05			
			59.54	6.617E+02	(	4.238E+00	6.46E-01	1.00E+02	G	
QA-88		9.3021E+02					4.63E+02			
			88.03	9.302E+02	(	3.249E+01	2.33E+00	1.00E+02	G	
QA-662		6.1539E+02					1.10E+04			
			661.66	6.154E+02	(	5.897E+00	1.22E+00	1.00E+02	G	
QA-1173		1.1870E+03					1.92E+03			
			1173.23	1.187E+03	(	1.337E+01	1.51E+00	1.00E+02	G	
QA-1332		1.2049E+03					1.92E+03			
			1332.51	1.205E+03	(	6.466E+00	1.49E+00	1.00E+02	G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average

R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity GPS	Time Corrected Activity GPS	Uncertainty 1 Sigma Counting	MDA
QA-60		6.5601E+02	6.6172E+02	6.459E-01%	4.24E+00
QA-88		4.8342E+01	9.3021E+02	2.329E+00%	3.25E+01
QA-122	<	1.6646E+00	2.5538E+02		
QA-166			>12 Halflives		
QA-279			>12 Halflives		
QA-392			>12 Halflives		
QA-514			>12 Halflives		
QA-662		5.4332E+02	6.1539E+02	1.216E+00%	5.90E+00
QA-898			>12 Halflives		
QA-1173		5.8316E+02	1.1870E+03	1.509E+00%	1.34E+01
QA-1332		5.9197E+02	1.2049E+03	1.492E+00%	6.47E+00
QA-1836			>12 Halflives		

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.4 keV) 2.423E+03 GPS
Total Decayed Activity (37.6 to 1999.4 keV) 4.5992080E+03 GPS

Test America
St. Louis
Background Check

Spectrum: 4_20140902001_BG
Acquired: 9/2/2014 12:02:10 AM
Detector: Ge 4 SN/181
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.32	1.20	1.24	1.30	1.39	1.43	PASS

Analyst: Rachel Mueller Reviewer: Rachel Mueller

Test America
St. Louis
Quality Control Check

Spectrum: 4_20140902002_QCAsLeft
Acquired: 9/2/2014 1:08:34 AM
Detector: Ge 4 SN/181
  Quality Control Evaluation Criteria:
  1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
  2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.10	239.00	240.00	PASS
Energy	59.54	59.22	59.29	59.66	59.79	59.86	PASS
FWHM	0.77	0.00	0.00	0.77	1.87	1.97	PASS
ActivityDiff	650.60	-5.00	-4.00	-0.83	4.00	5.00	PASS
QA-662							
FWHM	1.34	0.00	0.00	1.33	3.04	3.14	PASS
ActivityDiff	609.90	-5.00	-4.00	-2.50	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.00	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.59	1333.01	1333.26	PASS
FWHM	1.84	0.00	0.00	1.83	4.04	4.14	PASS
ActivityDiff	1189.70	-5.00	-4.00	-1.55	4.00	5.00	PASS

Analyst: Rachel Mueller Reviewer: Rachel Mueller

Test America
St. Louis
Background Check

Spectrum: 4_20140903001_BG
Acquired: 9/3/2014 12:01:51 AM
Detector: Ge 4 SN/181
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.32	1.20	1.24	1.32	1.39	1.43	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

Test America
St. Louis
Quality Control Check

Spectrum: 4_20140903002_QCAsLeft
Acquired: 9/3/2014 1:50:18 AM
Detector: Ge 4 SN/181
  Quality Control Evaluation Criteria:
  1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
  2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.80	239.00	240.00	PASS
Energy	59.54	59.22	59.29	59.59	59.79	59.86	PASS
FWHM	0.77	0.00	0.00	0.77	1.87	1.97	PASS
ActivityDiff	650.60	-5.00	-4.00	0.30	4.00	5.00	PASS
QA-662							
FWHM	1.34	0.00	0.00	1.33	3.04	3.14	PASS
ActivityDiff	609.90	-5.00	-4.00	-0.55	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.80	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.52	1333.01	1333.26	PASS
FWHM	1.84	0.00	0.00	1.85	4.04	4.14	PASS
ActivityDiff	1189.70	-5.00	-4.00	-1.95	4.00	5.00	PASS

Analyst: Rachel Mueller Reviewer: Rachel Mueller

Test America
St. Louis
Quality Control Check

Spectrum: 7_20140814002_QCAsLeft
Acquired: 8/14/2014 1:04:43 AM
Detector: Ge 7 SN/154
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.80	239.00	240.00	PASS
Energy	59.58	59.04	59.29	59.57	59.79	60.04	PASS
FWHM	0.84	0.00	0.00	0.84	1.94	2.04	PASS
ActivityDiff	647.00	-5.00	-4.00	-0.92	4.00	5.00	PASS
QA-662							
FWHM	1.45	0.00	0.00	1.43	3.15	3.25	PASS
ActivityDiff	606.50	-5.00	-4.00	0.50	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.50	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.71	1333.01	1333.26	PASS
FWHM	1.98	0.00	0.00	1.99	4.18	4.28	PASS
ActivityDiff	1183.00	-5.00	-4.00	0.50	4.00	5.00	PASS

Analyst: Rachel Mueller Reviewer: Jody Watson

TestAmerica Spectrum name: 7_20140814002_QCAsLeft.An1

Sample description
Quality control Check (QC Source 'C') Post Stabilization

Spectrum Filename: C:\User\SPC\Det7\7_20140814002_QCAsLeft.An1

Acquisition information
Start time:	8/14/2014 1:04:43 AM
Live time:	1000
Real time:	1030
Dead time:	2.87 %
Detector ID:	7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_QC.Clb
Ge7_QC

Energy Calibration
Created:	2/23/2012 8:40:56 AM
Zero offset:	0.117 keV
Gain:	0.250 keV/channel
Quadratic:	3.508E-09 keV/channel^2

Efficiency Calibration
Created:	1/6/2011 8:06:10 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_QC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (2000.12keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	1.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

TestAmerica Spectrum name: 7_20140814002_QCAsLeft.An1

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	4/1/2009 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 6 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0653

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. GPS	Nuc
59.57	73481.	0.40	0.84	1.136E-01	59.54	100.000	6.529E+02	QA60
88.02	9173.	1.31	0.92	1.845E-01	88.03	100.000	9.383E+02	QA88
122.00	680.	6.55	0.92	1.962E-01	122.06	100.000	5.141E+02	QA122
661.77	24964.	0.67	1.43	4.681E-02	661.66	100.000	6.035E+02	QA662
1173.44	13874.	0.95	1.92	2.392E-02	1173.23	100.000	1.175E+03	QA1173
1332.71	12349.	0.95	1.99	2.125E-02	1332.51	100.000	1.177E+03	QA1332

No unknown peaks passed sensitivity test.

This section based on library: DET_QC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
QA-60	237.82	59.57	3295.	73481.	73.481	0.40	0.837
QA-88	351.65	88.02	1251.	9173.	9.173	1.31	0.919
QA-122	487.61	122.01	842.	740.	0.739	8.52	0.852s
QA-662	2646.79	661.77	612.	24964.	24.964	0.67	1.431
QA-1173	4693.51	1173.44	521.	13874.	13.874	0.95	1.917
QA-1332	5330.56	1332.71	158.	12349.	12.349	0.95	1.987

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity GPS	Peak Energy keV	Peak Activity GPS	Code	MDA Value GPS	COMMENTS
QA-60		6.5293E+02				1.58E+05	
			59.54	6.529E+02 (		2.401E+00 3.99E-01 1.00E+02	G
QA-88		9.3825E+02				4.63E+02	
			88.03	9.383E+02 (		1.713E+01 1.31E+00 1.00E+02	G
QA-122		5.5926E+02				2.72E+02	
			122.06	5.593E+02 @(		1.043E+02 8.52E+00 1.00E+02	G
QA-662		6.0349E+02				1.10E+04	
			661.66	6.035E+02 (		2.852E+00 6.74E-01 1.00E+02	G
QA-1173		1.1749E+03				1.92E+03	
			1173.23	1.175E+03 (		9.240E+00 9.49E-01 1.00E+02	G
QA-1332		1.1771E+03				1.92E+03	
			1332.51	1.177E+03 (		5.836E+00 9.46E-01 1.00E+02	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape

C - Charged Particle Reaction K - Key Line
M - No MDA Calculation A - Not in Average
R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity GPS	Time Corrected Activity GPS	Uncertainty 1 Sigma Counting	MDA
QA-60	6.4733E+02	6.5293E+02	3.994E-01%	2.40E+00
QA-88	4.9719E+01	9.3825E+02	1.307E+00%	1.71E+01
QA-122 #	3.7683E+00	5.5926E+02	8.515E+00%	1.04E+02
QA-166		>12 Halflives		
QA-279		>12 Halflives		
QA-392		>12 Halflives		
QA-514		>12 Halflives		
QA-662	5.3325E+02	6.0349E+02	6.742E-01%	2.85E+00
QA-898		>12 Halflives		
QA-1173	5.7994E+02	1.1749E+03	9.494E-01%	9.24E+00
QA-1332	5.8104E+02	1.1771E+03	9.456E-01%	5.84E+00
QA-1836		>12 Halflives		

\# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.1 keV) 2.395E+03 GPS
Total Decayed Activity (37.6 to 2000.1 keV) 5.1059697E+03 GPS

Test America
St. Louis
Background Check

Spectrum: 7_20140814003_BG
Acquired: 8/14/2014 1:28:03 AM
Detector: Ge 7 SN/154
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.34	1.40	1.45	PASS

Analyst: Rachel Mueller Reviewer: Jody Watson

TestAmerica Spectrum name: 7_20140814003_BG.An1

Sample description
Background Contamination Check

Spectrum Filename: C:\User\SPC\Det7\7_20140814003_BG.An1

Acquisition information
Start time:	8/14/2014 1:28:03 AM
Live time:	1800
Real time:	1828
Dead time:	1.55 %
Detector ID:	7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_QC.Clb
Ge7_QC

Energy Calibration
Created:	2/23/2012 8:40:56 AM
Zero offset:	0.117 keV
Gain:	0.250 keV/channel
Quadratic:	3.508E-09 keV/channel^2

Efficiency Calibration
Created:	1/6/2011 8:06:10 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (2000.12keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 1 cutoff: 5.00E+01%

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
63.41	36.	19.70	0.76	1.232E-01				

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
253.22	63.41	4.	36.	2.896E+02	19.70	0.762	-

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Peak Code	MDA Value DPS	COMMENTS

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	<	5.6504E-01		
NA-22	<	1.8434E-01		
K-40	<	3.6833E+00		
Sc-46	<	1.2787E-01		
CR-51	<	1.0058E+00		
MN-54	<	1.1516E-01		
FE-59	<	2.7928E-01		
Co-56	<	1.1777E-01		
CO-57	<	5.5198E-02		
CO-58	<	1.1088E-01		
CO-60	<	1.9268E-01		
ZN-65	<	4.0040E-01		
NB-94	<	9.4723E-02		
ZR-95	<	1.8500E-01		
NB-95	<	1.0245E-01		
RU-103	<	6.7685E-02		
RH-106	<	7.9941E-01		
AG-108M	<	6.1057E-02		
AG-110M	<	1.7428E-01		
SN-113	<	2.2086E-01		
SB-124	<	1.6675E-01		
SB-125	<	1.8482E-01		
I-131	<	7.0041E-02		
BA-133	<	1.3488E-01		
CS-134	<	7.8190E-02		
CS-137	<	2.0945E-01		
CE-139	<	2.9893E-02		
Ba-140	<	2.7196E-01		
La-140	<	2.3065E-01		
CE-141	<	1.2290E-01		
CE-144	<	2.8466E-01		
PM-144	<	9.2839E-02		
EU-152	<	1.5679E-01		
EU-154	<	1.0091E+00		
EU-155	<	1.8065E-01		
HF-181	<	7.4411E-02		
Ta-182	<	4.6290E-01		
Hg-203	<	5.8763E-02		
TL-208	<	1.4063E-01		
pm-146	<	2.9187E-01		
y-88	<	1.3891E-01		
PB-210	<	5.1262E+00		
PB-212	<	1.3618E-01		

PB-214	<	1.6695E-01
BI-207	<	7.2427E-02
BI-212	<	1.8641E+00
BI-214	<	3.2069E-01
BI-210M	<	1.1172E-01
RA-224	<	8.9544E-01
AC-228	<	4.5399E-01
TH-227	<	6.1722E-01
TH-229	<	7.3333E-01
TH-234	<	3.8198E+00
PA-231	<	1.2304E+00
PA-233	<	1.0180E-01
PA-234	<	2.6969E-01
PA-234M	<	1.7081E+01
Ra-226	<	2.4976E+00
U-235	<	2.5631E-01
AM-241	<	2.8301E-01
Np-237	<	4.0953E-01

  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.1 keV) 0.000E+00 DPS

Test America
St. Louis
Quality Control Check

Spectrum: 7_20140902001_QCAsLeft
Acquired: 9/2/2014 12:24:13 AM
Detector: Ge 7 SN/154
  Quality Control Evaluation Criteria:
  1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
  2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.58	59.04	59.29	59.59	59.79	60.04	PASS
FWHM	0.84	0.00	0.00	0.90	1.94	2.04	PASS
ActivityDiff	647.00	-5.00	-4.00	0.08	4.00	5.00	PASS
QA-662							
FWHM	1.45	0.00	0.00	1.49	3.15	3.25	PASS
ActivityDiff	606.50	-5.00	-4.00	0.13	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.10	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.60	1333.01	1333.26	PASS
FWHM	1.98	0.00	0.00	1.97	4.18	4.28	PASS
ActivityDiff	1183.00	-5.00	-4.00	-0.45	4.00	5.00	PASS

Analyst: Rachel Mueller Reviewer: Rachel Mueller

TestAmerica Spectrum name: 7_20140902001_QCAsLeft.An1

Sample description
Quality control Check (QC Source 'C') Post Stabilization

Spectrum Filename: C:\User\SPC\Det7\7_20140902001_QCAsLeft.An1

Acquisition information
Start time:	9/2/2014 12:24:13 AM
Live time:	1000
Real time:	1030
Dead time:	2.90 %
Detector ID:	7

Detector system
Ge 7 SN/154

Calibration
Filename:	7_QC.Clb

Ge7_QC

Energy Calibration
Created:	2/23/2012 8:40:56 AM
Zero offset:	0.117 keV
Gain:	0.250 keV/channel
Quadratic:	3.508E-09 keV/channel^2

Efficiency Calibration
Created:	1/6/2011 8:06:10 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_QC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (2000.12keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	1.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

TestAmerica Spectrum name: 7_20140902001_QCAsLeft.An1

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	4/1/2009 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 6 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0487

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. GPS	Nuc
49.54	901.	9.67	1.15	8.859E-02				
59.59	72750.	0.41	0.90	1.136E-01	59.54	100.000	6.465E+02	QA60
88.05	8757.	1.28	0.96	1.845E-01	88.03	100.000	9.215E+02	QA88
661.74	25025.	0.70	1.49	4.681E-02	661.66	100.000	6.057E+02	QA662
1173.36	13907.	0.99	1.86	2.392E-02	1173.23	100.000	1.186E+03	QA1173
1332.60	12382.	0.94	1.97	2.125E-02	1332.51	100.000	1.188E+03	QA1332

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
197.71	49.54	2115.	901.	1.017E+04	9.67	1.147	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_QC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
QA-60	237.93	59.59	3689.	72750.	72.750	0.41	0.900
QA-88	351.75	88.05	1051.	8757.	8.757	1.28	0.963
QA-662	2646.68	661.74	960.	25025.	25.025	0.70	1.491
QA-1173	4693.16	1173.36	616.	13907.	13.907	0.99	1.858
QA-1332	5330.11	1332.60	140.	12382.	12.382	0.94	1.970

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity GPS	Peak Energy keV	Peak Activity GPS	Code	MDA Value GPS	COMMENTS
QA-60		6.4649E+02				1.58E+05	
			59.54	6.465E+02	(	2.539E+00 4.08E-01 1.00E+02 G	
QA-88		9.2155E+02				4.63E+02	
			88.03	9.215E+02	(	1.618E+01 1.28E+00 1.00E+02 G	
QA-662		6.0569E+02				1.10E+04	
			661.66	6.057E+02	(	3.560E+00 7.05E-01 1.00E+02 G	
QA-1173		1.1858E+03				1.92E+03	
			1173.23	1.186E+03	(	1.010E+01 9.90E-01 1.00E+02 G	
QA-1332		1.1883E+03				1.92E+03	
			1332.51	1.188E+03	(	5.552E+00 9.37E-01 1.00E+02 G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the

library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity GPS	Time Corrected Activity GPS	Uncertainty 1 Sigma Counting	MDA
QA-60		6.4089E+02	6.4649E+02	4.080E-01%	2.54E+00
QA-88		4.7465E+01	9.2155E+02	1.282E+00%	1.62E+01
QA-122	<	7.5984E-01	1.1836E+02		
QA-166		>12 Halflives			
QA-279		>12 Halflives			
QA-392		>12 Halflives			
QA-514		>12 Halflives			
QA-662		5.3456E+02	6.0569E+02	7.048E-01%	3.56E+00
QA-898		>12 Halflives			
QA-1173		5.8132E+02	1.1858E+03	9.896E-01%	1.01E+01
QA-1332		5.8258E+02	1.1883E+03	9.368E-01%	5.55E+00
QA-1836		>12 Halflives			

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.1 keV) 2.387E+03 GPS
Total Decayed Activity (37.6 to 2000.1 keV) 4.5478354E+03 GPS

Test America
St. Louis
Background Check

Spectrum: 7_20140902002_BG
Acquired: 9/2/2014 12:49:35 AM
Detector: Ge 7 SN/154
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.29	1.40	1.45	PASS

Analyst: Rachel Mueller Reviewer: Rachel Mueller

TestAmerica Spectrum name: 7_20140902002_BG.An1

Sample description
Background Contamination Check

Spectrum Filename: C:\User\SPC\Det7\7_20140902002_BG.An1

Acquisition information
Start time:	9/2/2014 12:49:35 AM
Live time:	1800
Real time:	1829
Dead time:	1.60 %
Detector ID:	7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_QC.Clb
Ge7_QC

Energy Calibration
Created:	2/23/2012 8:40:56 AM
Zero offset:	0.117 keV
Gain:	0.250 keV/channel
Quadratic:	3.508E-09 keV/channel^2

Efficiency Calibration
Created:	1/6/2011 8:06:10 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (2000.12keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 3 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0337

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc

No unknown peaks passed sensitivity test.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
TH-234	252.83	63.32	10.	30.	0.017	28.54	0.530s
TH-234	369.91	92.59	10.	31.	0.017	26.21	0.850s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS	COMMENTS
TH-234	N	3.5608E+00				1.63E+12	
			63.29	3.561E+00	(	2.071E+00	2.85E+01 3.81E+00 G
			92.59	1.658E+00	-	9.328E-01	2.62E+01 5.58E+00 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went
negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide
failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the
library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Activity	Time of Count Uncertainty 1 Sigma Counting	MDA
	DPS		
BE-7	<	1.1530E+00	
NA-22	<	1.8434E-01	
K-40	<	1.9219E+00	
Sc-46	<	1.2787E-01	
CR-51	<	6.2011E-01	
MN-54	<	2.0516E-01	
FE-59	<	2.7928E-01	
Co-56	<	2.0982E-01	
CO-57	<	7.9588E-02	
CO-58	<	1.1088E-01	

CO-60	<	1.9268E-01		
ZN-65	<	3.1730E-01		
NB-94	<	9.4723E-02		
ZR-95	<	1.8500E-01		
NB-95	<	1.0245E-01		
RU-103	<	6.7685E-02		
RH-106	<	1.4242E+00		
AG-108M	<	8.9319E-02		
AG-110M	<	1.7428E-01		
SN-113	<	8.0798E-02		
SB-124	<	7.7339E-02		
SB-125	<	2.7037E-01		
I-131	<	9.8884E-02		
BA-133	<	7.0380E-02		
CS-134	<	1.2763E-01		
CS-137	<	1.0264E-01		
CE-139	<	2.9893E-02		
Ba-140	<	2.7196E-01		
La-140	<	2.3065E-01		
CE-141	<	1.2689E-01		
CE-144	<	3.7293E-01		
PM-144	<	9.2839E-02		
EU-152	<	1.5679E-01		
EU-154	<	1.0091E+00		
EU-155	<	1.6552E-01		
HF-181	<	7.4411E-02		
Ta-182	<	4.6290E-01		
Hg-203	<	4.0170E-02		
TL-208	<	8.6154E-02		
pm-146	<	2.9187E-01		
y-88	<	1.3891E-01		
PB-210	<	3.8779E+00		
PB-212	<	1.5797E-01		
PB-214	<	1.4401E-01		
BI-207	<	1.3881E-01		
BI-212	<	1.2743E+00		
BI-214	<	1.6733E-01		
BI-210M	<	1.2018E-01		
RA-224	<	1.5299E+00		
AC-228	<	4.5399E-01		
TH-227	<	2.3314E-01		
TH-229	<	1.3160E+00		
TH-234		3.5608E+00	2.8545E+01%	2.071E+00
PA-231	<	1.2304E+00		
PA-233	<	2.6041E-01		
PA-234	<	1.1909E-01		
PA-234M	<	1.7081E+01		
Ra-226	<	1.9566E+00		
U-235	<	5.7208E-01		

AM-241 < 2.9108E-01
Np-237 < 1.7300E-01
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
---------- S U M M A R Y ----------
Total Activity (37.6 to 2000.1 keV) 3.561E+00 DPS

Test America
St. Louis
Quality Control Check

Spectrum: 7_20140903001_QCAsLeft
Acquired: 9/3/2014 12:23:57 AM
Detector: Ge 7 SN/154
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.58	59.04	59.29	59.59	59.79	60.04	PASS
FWHM	0.84	0.00	0.00	0.84	1.94	2.04	PASS
ActivityDiff	647.00	-5.00	-4.00	2.34	4.00	5.00	PASS
QA-662							
FWHM	1.45	0.00	0.00	1.44	3.15	3.25	PASS
ActivityDiff	606.50	-5.00	-4.00	-0.06	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.40	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.69	1333.01	1333.26	PASS
FWHM	1.98	0.00	0.00	2.01	4.18	4.28	PASS
ActivityDiff	1183.00	-5.00	-4.00	0.19	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

Test America
St. Louis
Background Check

Spectrum: 7_20140903002_BG
Acquired: 9/3/2014 12:47:47 AM
Detector: Ge 7 SN/154
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.28	1.40	1.45	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

Test America
St. Louis
Background Check

Spectrum: 7_20140909001_BG
Acquired: 9/9/2014 6:50:34 AM
Detector: Ge 7 SN/154
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.25	1.40	1.45	PASS

Analyst: Jody Watson Reviewer: Jody Watson

TestAmerica Spectrum name: 7_20140909001_BG.An1

Sample description
Background Contamination Check

Spectrum Filename: C:\User\SPC\Det7\7_20140909001_BG.An1

Acquisition information
Start time:	9/9/2014 6:50:34 AM
Live time:	1800
Real time:	1827
Dead time:	1.50 %
Detector ID:	7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_QC.Clb
Ge7_QC

Energy Calibration
Created:	2/23/2012 8:40:56 AM
Zero offset:	0.117 keV
Gain:	0.250 keV/channel
Quadratic:	3.508E-09 keV/channel^2

Efficiency Calibration
Created:	1/6/2011 8:06:10 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (2000.12keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

```
       Half lives decay limit:    12.000
       Activity range factor:      2.000
       Min. step backg. energy     0.000
       Multiplet shift channel     2.000

 Corrections                          Status          Comments
       Decay correct to date:          NO
       Decay during acquisition:       NO
       Decay during collection:        NO
       True coincidence correction:    NO
       Peaked background correction:   NO
       Absorption (Internal):          NO
       Geometry correction:            NO
       Random summing:                 NO


 total peaks alloc.    0 cutoff: 5.00E+01%

 *****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
  Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
  Energy                             Factor    Energy   Ratio    DPS
 ____________________________________________________________________________
 No unknown peaks passed sensitivity test.

------------------------------------------------------------
 This section based on library: DET_Long Background PBC.lib


 ************** I D E N T I F I E D   P E A K    S U M M A R Y **************
 Nuclide  Peak    Centroid  Background  Net Area   Intensity   Uncert  FWHM
          Channel Energy    Counts      Counts     Cts/Sec  1 Sigma %  keV
 ____________________________________________________________________________

 *****   S U M M A R Y   O F   L I B R A R Y   P E A K   U S A G E   *****
- Nuclide -  Average     ------------- Peak --------------
Name   Code  Activity     Energy   Activity Code MDA Value
             DPS           keV     DPS           DPS            COMMENTS
 ____________________________________________________________________________
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
```

- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- - - -

SB-124	<	7.7339E-02
SB-125	<	1.8482E-01
I-131	<	8.1195E-02
BA-133	<	7.0380E-02
CS-134	<	1.4985E-01
CS-137	<	1.0264E-01
CE-139	<	2.9893E-02
Ba-140	<	2.7196E-01
La-140	<	2.3065E-01
CE-141	<	1.0989E-01
CE-144	<	3.9707E-01
PM-144	<	9.2839E-02
EU-152	<	3.1995E-01
EU-154	<	1.0091E+00
EU-155	<	1.4834E-01
HF-181	<	7.4411E-02
Ta-182	<	4.6290E-01
Hg-203	<	7.6986E-02
TL-208	<	8.6154E-02
pm-146	<	2.9187E-01
y-88	<	1.3891E-01
PB-210	<	4.5497E+00
PB-212	<	1.7071E-01
PB-214	<	3.2144E-01
BI-207	<	7.2427E-02
BI-212	<	1.6080E+00
BI-214	<	3.7893E-01
BI-210M	<	7.9132E-02
RA-224	<	1.1583E+00
AC-228	<	4.5399E-01
TH-227	<	3.4105E-01
TH-229	<	1.3160E+00
TH-234	<	3.4505E+00
PA-231	<	2.5107E+00
PA-233	<	1.0180E-01
PA-234	<	1.7421E-01
PA-234M	<	1.7081E+01
Ra-226	<	2.3332E+00
U-235	<	2.9713E-01
AM-241	<	2.2755E-01
Np-237	<	2.5308E-01

  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------
Total Activity (37.6 to 2000.1 keV) 0.000E+00 DPS

Test America
St. Louis
Background Check

Spectrum: 7_20140910002_BG
Acquired: 9/10/2014 12:43:33 AM
Detector: Ge 7 SN/154
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.31	1.40	1.45	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

TestAmerica Spectrum name: 7_20140910002_BG.An1

Sample description
Background Contamination Check

Spectrum Filename: C:\User\SPC\Det7\7_20140910002_BG.An1

Acquisition information
Start time:	9/10/2014 12:43:33 AM
Live time:	1800
Real time:	1825
Dead time:	1.37 %
Detector ID:	7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_QC.Clb
Ge7_QC

Energy Calibration
Created:	2/23/2012 8:40:56 AM
Zero offset:	0.117 keV
Gain:	0.250 keV/channel
Quadratic:	3.508E-09 keV/channel^2

Efficiency Calibration
Created:	1/6/2011 8:06:10 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (2000.12keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

```
       Half lives decay limit:    12.000
       Activity range factor:      2.000
       Min. step backg. energy     0.000
       Multiplet shift channel     2.000

 Corrections                          Status          Comments
       Decay correct to date:          NO
       Decay during acquisition:       NO
       Decay during collection:        NO
       True coincidence correction:    NO
       Peaked background correction:   NO
       Absorption (Internal):          NO
       Geometry correction:            NO
       Random summing:                 NO


 total peaks alloc.    2 cutoff: 5.00E+01%

 *****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
  Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
  Energy                             Factor    Energy   Ratio    DPS
 ____________________________________________________________________________
 No unknown peaks passed sensitivity test.

------------------------------------------------------------
 This section based on library: DET_Long Background PBC.lib


 ************** I D E N T I F I E D   P E A K    S U M M A R Y **************
 Nuclide  Peak    Centroid  Background  Net Area   Intensity   Uncert  FWHM
          Channel Energy    Counts      Counts     Cts/Sec  1 Sigma %  keV
 ____________________________________________________________________________

 *****   S U M M A R Y   O F   L I B R A R Y   P E A K   U S A G E   *****
- Nuclide -  Average     ------------- Peak --------------
Name   Code  Activity     Energy   Activity Code MDA Value
             DPS           keV     DPS           DPS            COMMENTS
 ____________________________________________________________________________
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
```

- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- - - -

SB-124	<	1.1314E-01
SB-125	<	2.7037E-01
I-131	<	5.5504E-02
BA-133	<	7.0380E-02
CS-134	<	9.8668E-02
CS-137	<	1.2952E-01
CE-139	<	3.7723E-02
Ba-140	<	5.5495E-01
La-140	<	2.3065E-01
CE-141	<	4.6421E-02
CE-144	<	4.7961E-01
PM-144	<	9.2839E-02
EU-152	<	1.9786E-01
EU-154	<	1.0091E+00
EU-155	<	3.1676E-01
HF-181	<	1.5184E-01
Ta-182	<	4.6290E-01
Hg-203	<	4.0170E-02
TL-208	<	1.2603E-01
pm-146	<	2.9187E-01
y-88	<	1.3891E-01
PB-210	<	3.7099E+00
PB-212	<	2.0356E-01
PB-214	<	1.8628E-01
BI-207	<	7.2427E-02
BI-212	<	1.2743E+00
BI-214	<	3.4145E-01
BI-210M	<	1.1172E-01
RA-224	<	2.1645E+00
AC-228	<	4.5399E-01
TH-227	<	2.9420E-01
TH-229	<	8.5012E-01
TH-234	<	3.4990E+00
PA-231	<	1.5526E+00
PA-233	<	1.0180E-01
PA-234	<	2.8191E-01
PA-234M	<	2.4987E+01
Ra-226	<	2.5497E+00
U-235	<	3.8926E-01
AM-241	<	2.3786E-01
Np-237	<	2.1831E-01

  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

TestAmerica Spectrum name: 7_20140910002_BG.An1

--- S U M M A R Y ---

Total Activity (37.6 to 2000.1 keV) 0.000E+00 DPS

Test America
St. Louis
Quality Control Check

Spectrum: 7_20140909003_QCAsLeft
Acquired: 9/9/2014 9:07:07 AM
Detector: Ge 7 SN/154
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.00	239.00	240.00	PASS
Energy	59.58	59.04	59.29	59.62	59.79	60.04	PASS
FWHM	0.84	0.00	0.00	1.23	1.94	2.04	PASS
ActivityDiff	647.00	-5.00	-4.00	0.37	4.00	5.00	PASS
QA-662							
FWHM	1.45	0.00	0.00	1.71	3.15	3.25	PASS
ActivityDiff	606.50	-5.00	-4.00	0.05	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.10	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.62	1333.01	1333.26	PASS
FWHM	1.98	0.00	0.00	2.21	4.18	4.28	PASS
ActivityDiff	1183.00	-5.00	-4.00	-1.38	4.00	5.00	PASS

Analyst: Jody Watson Reviewer: Jody Watson

TestAmerica Spectrum name: 7_20140909003_QCAsLeft.An1

Sample description
Quality control Check (QC Source 'C') Post Stabilization

Spectrum Filename: C:\User\SPC\Det7\7_20140909003_QCAsLeft.An1

Acquisition information
Start time:	9/9/2014 9:07:07 AM
Live time:	1000
Real time:	1029
Dead time:	2.84 %
Detector ID:	7

Detector system
Ge 7 SN/154

Calibration
Filename:	7_QC.Clb

Ge7_QC

Energy Calibration
Created:	2/23/2012 8:40:56 AM
Zero offset:	0.117 keV
Gain:	0.250 keV/channel
Quadratic:	3.508E-09 keV/channel^2

Efficiency Calibration
Created:	1/6/2011 8:06:10 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_QC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (2000.12keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	1.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	4/1/2009 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 6 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0605

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. GPS	Nuc
59.62	72536.	0.41	1.23	1.137E-01	59.54	100.000	6.446E+02	QA60
88.05	8692.	1.43	1.25	1.845E-01	88.03	100.000	9.248E+02	QA88
661.74	25034.	0.70	1.71	4.681E-02	661.66	100.000	6.062E+02	QA662
1173.37	13859.	0.99	2.03	2.392E-02	1173.23	100.000	1.185E+03	QA1173
1332.62	12463.	0.93	2.21	2.125E-02	1332.51	100.000	1.199E+03	QA1332

No unknown peaks passed sensitivity test.

This section based on library: DET_QC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
QA-60	238.04	59.62	4031.	72536.	72.536	0.41	1.234s
QA-88	351.79	88.05	1484.	8692.	8.692	1.43	1.246s
QA-662	2646.69	661.74	944.	25034.	25.034	0.70	1.713
QA-1173	4693.21	1173.37	594.	13859.	13.859	0.99	2.032
QA-1332	5330.18	1332.62	120.	12463.	12.463	0.93	2.210

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity GPS	Peak Energy keV	Peak Activity GPS		Code	MDA Value GPS		COMMENTS
QA-60		6.4461E+02					1.58E+05		
			59.54	6.446E+02	*(	2.653E+00	4.12E-01	1.00E+02	G
QA-88		9.2482E+02					4.63E+02		
			88.03	9.248E+02	*(	1.939E+01	1.43E+00	1.00E+02	G
QA-662		6.0619E+02					1.10E+04		
			661.66	6.062E+02	(	3.533E+00	7.03E-01	1.00E+02	G
QA-1173		1.1848E+03					1.92E+03		
			1173.23	1.185E+03	(	9.941E+00	9.90E-01	1.00E+02	G
QA-1332		1.1993E+03					1.92E+03		
			1332.51	1.199E+03	(	5.173E+00	9.32E-01	1.00E+02	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average

R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity GPS	Time Corrected Activity GPS	Uncertainty 1 Sigma Counting	MDA
QA-60 #	6.3901E+02	6.4461E+02	4.121E-01%	2.65E+00
QA-88 #	4.7111E+01	9.2482E+02	1.426E+00%	1.94E+01
QA-122 <	7.9528E-01	1.2623E+02		
QA-166		>12 Halflives		
QA-279		>12 Halflives		
QA-392		>12 Halflives		
QA-514		>12 Halflives		
QA-662	5.3475E+02	6.0619E+02	7.035E-01%	3.53E+00
QA-898		>12 Halflives		
QA-1173	5.7933E+02	1.1848E+03	9.896E-01%	9.94E+00
QA-1332	5.8639E+02	1.1993E+03	9.317E-01%	5.17E+00
QA-1836		>12 Halflives		

\# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.1 keV) 2.387E+03 GPS
Total Decayed Activity (37.6 to 2000.1 keV) 4.5597490E+03 GPS

Test America
St. Louis
Quality Control Check

Spectrum: 7_20140910001_QCAsLeft
Acquired: 9/10/2014 12:23:22 AM
Detector: Ge 7 SN/154
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.58	59.04	59.29	59.60	59.79	60.04	PASS
FWHM	0.84	0.00	0.00	1.00	1.94	2.04	PASS
ActivityDiff	647.00	-5.00	-4.00	0.84	4.00	5.00	PASS
QA-662							
FWHM	1.45	0.00	0.00	1.55	3.15	3.25	PASS
ActivityDiff	606.50	-5.00	-4.00	0.16	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.50	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.71	1333.01	1333.26	PASS
FWHM	1.98	0.00	0.00	2.08	4.18	4.28	PASS
ActivityDiff	1183.00	-5.00	-4.00	-1.19	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

TestAmerica Spectrum name: 7_20140910001_QCAsLeft.An1

Sample description
Quality control Check (QC Source 'C') Post Stabilization

Spectrum Filename: C:\User\SPC\Det7\7_20140910001_QCAsLeft.An1

Acquisition information
Start time:	9/10/2014 12:23:22 AM
Live time:	1000
Real time:	1026
Dead time:	2.57 %
Detector ID:	7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_QC.Clb
Ge7_QC

Energy Calibration
Created:	2/23/2012 8:40:56 AM
Zero offset:	0.117 keV
Gain:	0.250 keV/channel
Quadratic:	3.508E-09 keV/channel^2

Efficiency Calibration
Created:	1/6/2011 8:06:10 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_QC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (2000.12keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	1.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	4/1/2009 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 6 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0851

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. GPS	Nuc
59.60	72196.	0.41	1.00	1.137E-01	59.54	100.000	6.416E+02	QA60
88.07	8479.	1.43	1.01	1.845E-01	88.03	100.000	9.030E+02	QA88
661.78	25006.	0.68	1.55	4.681E-02	661.66	100.000	6.055E+02	QA662
1173.45	13725.	0.95	1.98	2.392E-02	1173.23	100.000	1.174E+03	QA1173
1332.71	12437.	0.92	2.08	2.125E-02	1332.51	100.000	1.197E+03	QA1332

No unknown peaks passed sensitivity test.

This section based on library: DET_QC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
QA-60	237.97	59.60	3645.	72196.	72.196	0.41	1.001s
QA-88	351.84	88.07	1386.	8479.	8.479	1.43	1.013
QA-662	2646.85	661.78	698.	25006.	25.006	0.68	1.554
QA-1173	4693.52	1173.45	492.	13725.	13.725	0.95	1.975
QA-1332	5330.54	1332.71	80.	12437.	12.437	0.92	2.083

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity GPS	Peak Energy keV	Peak Activity GPS		Peak Code	MDA Value GPS		COMMENTS
QA-60		6.4159E+02					1.58E+05		
			59.54	6.416E+02	*(	2.524E+00	4.09E-01	1.00E+02	G
QA-88		9.0302E+02					4.63E+02		
			88.03	9.030E+02	(	1.877E+01	1.43E+00	1.00E+02	G
QA-662		6.0554E+02					1.10E+04		
			661.66	6.055E+02	(	3.046E+00	6.78E-01	1.00E+02	G
QA-1173		1.1737E+03					1.92E+03		
			1173.23	1.174E+03	(	9.071E+00	9.55E-01	1.00E+02	G
QA-1332		1.1971E+03					1.92E+03		
			1332.51	1.197E+03	(	4.273E+00	9.19E-01	1.00E+02	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average

R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity GPS	Time Corrected Activity GPS	Uncertainty 1 Sigma Counting	MDA
QA-60	#	6.3601E+02	6.4159E+02	4.094E-01%	2.52E+00
QA-88		4.5957E+01	9.0302E+02	1.431E+00%	1.88E+01
QA-122	<	6.9628E-01	1.1069E+02		
QA-166			>12 Halflives		
QA-279			>12 Halflives		
QA-392			>12 Halflives		
QA-514			>12 Halflives		
QA-662		5.3416E+02	6.0554E+02	6.778E-01%	3.05E+00
QA-898			>12 Halflives		
QA-1173		5.7373E+02	1.1737E+03	9.547E-01%	9.07E+00
QA-1332		5.8517E+02	1.1971E+03	9.185E-01%	4.27E+00
QA-1836			>12 Halflives		

\# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.1 keV) 2.375E+03 GPS
Total Decayed Activity (37.6 to 2000.1 keV) 4.5208696E+03 GPS

Test America
St. Louis
Quality Control Check

Spectrum: 7_20140910001_QCAsLeft
Acquired: 9/10/2014 12:23:22 AM
Detector: Ge 7 SN/154
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.58	59.04	59.29	59.60	59.79	60.04	PASS
FWHM	0.84	0.00	0.00	1.00	1.94	2.04	PASS
ActivityDiff	647.00	-5.00	-4.00	0.84	4.00	5.00	PASS
QA-662							
FWHM	1.45	0.00	0.00	1.55	3.15	3.25	PASS
ActivityDiff	606.50	-5.00	-4.00	0.16	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.50	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.71	1333.01	1333.26	PASS
FWHM	1.98	0.00	0.00	2.08	4.18	4.28	PASS
ActivityDiff	1183.00	-5.00	-4.00	-1.19	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

Test America
St. Louis
Quality Control Check

Spectrum: 7_20140910001_QCAsLeft
Acquired: 9/10/2014 12:23:22 AM
Detector: Ge 7 SN/154
  Quality Control Evaluation Criteria:
  1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
  2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.58	59.04	59.29	59.60	59.79	60.04	PASS
FWHM	0.84	0.00	0.00	1.00	1.94	2.04	PASS
ActivityDiff	647.00	-5.00	-4.00	0.84	4.00	5.00	PASS
QA-662							
FWHM	1.45	0.00	0.00	1.55	3.15	3.25	PASS
ActivityDiff	606.50	-5.00	-4.00	0.16	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.50	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.71	1333.01	1333.26	PASS
FWHM	1.98	0.00	0.00	2.08	4.18	4.28	PASS
ActivityDiff	1183.00	-5.00	-4.00	-1.19	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

TestAmerica Spectrum name: 7_20140910001_QCAsLeft.An1

Sample description
Quality control Check (QC Source 'C') Post Stabilization

Spectrum Filename: C:\User\SPC\Det7\7_20140910001_QCAsLeft.An1

Acquisition information
Start time:	9/10/2014 12:23:22 AM
Live time:	1000
Real time:	1026
Dead time:	2.57 %
Detector ID:	7

Detector system
Ge 7 SN/154

Calibration
Filename:	7_QC.Clb

Ge7_QC

Energy Calibration
Created:	2/23/2012 8:40:56 AM
Zero offset:	0.117 keV
Gain:	0.250 keV/channel
Quadratic:	3.508E-09 keV/channel^2

Efficiency Calibration
Created:	1/6/2011 8:06:10 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_QC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (2000.12keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	1.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	4/1/2009 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 6 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0851

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. GPS	Nuc
59.60	72196.	0.41	1.00	1.137E-01	59.54	100.000	6.416E+02	QA60
88.07	8479.	1.43	1.01	1.845E-01	88.03	100.000	9.030E+02	QA88
661.78	25006.	0.68	1.55	4.681E-02	661.66	100.000	6.055E+02	QA662
1173.45	13725.	0.95	1.98	2.392E-02	1173.23	100.000	1.174E+03	QA1173
1332.71	12437.	0.92	2.08	2.125E-02	1332.51	100.000	1.197E+03	QA1332

No unknown peaks passed sensitivity test.

This section based on library: DET_QC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
QA-60	237.97	59.60	3645.	72196.	72.196	0.41	1.001s
QA-88	351.84	88.07	1386.	8479.	8.479	1.43	1.013
QA-662	2646.85	661.78	698.	25006.	25.006	0.68	1.554
QA-1173	4693.52	1173.45	492.	13725.	13.725	0.95	1.975
QA-1332	5330.54	1332.71	80.	12437.	12.437	0.92	2.083

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Nuclide Code	Average Activity GPS	Peak Energy keV	Peak Activity GPS	Peak Code	MDA Value GPS		COMMENTS
QA-60		6.4159E+02				1.58E+05		
			59.54	6.416E+02	*(	2.524E+00	4.09E-01	1.00E+02 G
QA-88		9.0302E+02				4.63E+02		
			88.03	9.030E+02	(	1.877E+01	1.43E+00	1.00E+02 G
QA-662		6.0554E+02				1.10E+04		
			661.66	6.055E+02	(	3.046E+00	6.78E-01	1.00E+02 G
QA-1173		1.1737E+03				1.92E+03		
			1173.23	1.174E+03	(	9.071E+00	9.55E-01	1.00E+02 G
QA-1332		1.1971E+03				1.92E+03		
			1332.51	1.197E+03	(	4.273E+00	9.19E-01	1.00E+02 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average

R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity GPS	Time Corrected Activity GPS	Uncertainty 1 Sigma Counting	MDA
QA-60 #	6.3601E+02	6.4159E+02	4.094E-01%	2.52E+00
QA-88	4.5957E+01	9.0302E+02	1.431E+00%	1.88E+01
QA-122 <	6.9628E-01	1.1069E+02		
QA-166		>12 Halflives		
QA-279		>12 Halflives		
QA-392		>12 Halflives		
QA-514		>12 Halflives		
QA-662	5.3416E+02	6.0554E+02	6.778E-01%	3.05E+00
QA-898		>12 Halflives		
QA-1173	5.7373E+02	1.1737E+03	9.547E-01%	9.07E+00
QA-1332	5.8517E+02	1.1971E+03	9.185E-01%	4.27E+00
QA-1836		>12 Halflives		

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.1 keV) 2.375E+03 GPS
Total Decayed Activity (37.6 to 2000.1 keV) 4.5208696E+03 GPS

Test America
St. Louis
Background Check

Spectrum: 7_20140910002_BG
Acquired: 9/10/2014 12:43:33 AM
Detector: Ge 7 SN/154
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.31	1.40	1.45	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

Test America
St. Louis
Background Check

Spectrum: 7_20140910002_BG
Acquired: 9/10/2014 12:43:33 AM
Detector: Ge 7 SN/154
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.31	1.40	1.45	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

TestAmerica Spectrum name: 7_20140910002_BG.An1

Sample description
Background Contamination Check

Spectrum Filename: C:\User\SPC\Det7\7_20140910002_BG.An1

Acquisition information
Start time:	9/10/2014 12:43:33 AM
Live time:	1800
Real time:	1825
Dead time:	1.37 %
Detector ID:	7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_QC.Clb
Ge7_QC

Energy Calibration
Created:	2/23/2012 8:40:56 AM
Zero offset:	0.117 keV
Gain:	0.250 keV/channel
Quadratic:	3.508E-09 keV/channel^2

Efficiency Calibration
Created:	1/6/2011 8:06:10 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (2000.12keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

```
       Half lives decay limit:    12.000
       Activity range factor:      2.000
       Min. step backg. energy     0.000
       Multiplet shift channel     2.000

 Corrections                          Status          Comments
       Decay correct to date:          NO
       Decay during acquisition:       NO
       Decay during collection:        NO
       True coincidence correction:    NO
       Peaked background correction:   NO
       Absorption (Internal):          NO
       Geometry correction:            NO
       Random summing:                 NO


 total peaks alloc.    2 cutoff: 5.00E+01%

 *****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
  Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
  Energy                             Factor    Energy   Ratio    DPS
 ____________________________________________________________________________
 No unknown peaks passed sensitivity test.

 ------------------------------------------------------------
 This section based on library: DET_Long Background PBC.lib


 ************** I D E N T I F I E D   P E A K    S U M M A R Y **************
 Nuclide  Peak    Centroid  Background  Net Area   Intensity   Uncert  FWHM
          Channel Energy    Counts      Counts     Cts/Sec  1 Sigma %  keV
 ____________________________________________________________________________

 *****   S U M M A R Y   O F   L I B R A R Y   P E A K   U S A G E   *****
- Nuclide -  Average     ------------- Peak --------------
Name   Code  Activity     Energy   Activity Code MDA Value
             DPS           keV     DPS           DPS            COMMENTS
 ____________________________________________________________________________
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
```

- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - -

SB-124	<	1.1314E-01
SB-125	<	2.7037E-01
I-131	<	5.5504E-02
BA-133	<	7.0380E-02
CS-134	<	9.8668E-02
CS-137	<	1.2952E-01
CE-139	<	3.7723E-02
Ba-140	<	5.5495E-01
La-140	<	2.3065E-01
CE-141	<	4.6421E-02
CE-144	<	4.7961E-01
PM-144	<	9.2839E-02
EU-152	<	1.9786E-01
EU-154	<	1.0091E+00
EU-155	<	3.1676E-01
HF-181	<	1.5184E-01
Ta-182	<	4.6290E-01
Hg-203	<	4.0170E-02
TL-208	<	1.2603E-01
pm-146	<	2.9187E-01
y-88	<	1.3891E-01
PB-210	<	3.7099E+00
PB-212	<	2.0356E-01
PB-214	<	1.8628E-01
BI-207	<	7.2427E-02
BI-212	<	1.2743E+00
BI-214	<	3.4145E-01
BI-210M	<	1.1172E-01
RA-224	<	2.1645E+00
AC-228	<	4.5399E-01
TH-227	<	2.9420E-01
TH-229	<	8.5012E-01
TH-234	<	3.4990E+00
PA-231	<	1.5526E+00
PA-233	<	1.0180E-01
PA-234	<	2.8191E-01
PA-234M	<	2.4987E+01
Ra-226	<	2.5497E+00
U-235	<	3.8926E-01
AM-241	<	2.3786E-01
Np-237	<	2.1831E-01

  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

TestAmerica Spectrum name: 7_20140910002_BG.An1

--- S U M M A R Y ---

Total Activity (37.6 to 2000.1 keV) 0.000E+00 DPS

Test America
St. Louis
Background Check

Spectrum: 12_20140908001_BG
Acquired: 9/8/2014 7:37:57 AM
Detector: Ge12 S/N10034336
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.16	1.95	2.02	2.19	2.29	2.36	PASS

Analyst: Jody Watson Reviewer: Jody Watson

Test America
St. Louis
Quality Control Check

Spectrum: 12_20140908002_QCAsLeft
Acquired: 9/8/2014 8:36:05 AM
Detector: Ge12 S/N10034336
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.80	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.57	59.79	60.04	PASS
FWHM	0.90	0.00	0.00	1.08	2.00	2.10	PASS
ActivityDiff	691.00	-5.00	-4.00	0.33	4.00	5.00	PASS
QA-662							
FWHM	1.48	0.00	0.00	1.57	3.18	3.28	PASS
ActivityDiff	659.00	-5.00	-4.00	0.71	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.20	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.47	1333.01	1333.26	PASS
FWHM	2.00	0.00	0.00	2.08	4.20	4.30	PASS
ActivityDiff	1274.00	-5.00	-4.00	0.83	4.00	5.00	PASS

Analyst: Jody Watson Reviewer: Jody Watson

Test America
St. Louis
Quality Control Check

Spectrum: 17_20140902001_QCAsLeft
Acquired: 9/2/2014 12:26:30 AM
Detector: Ge17 SN/11080671
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.63	59.79	60.04	PASS
FWHM	0.77	0.00	0.00	0.77	1.87	1.97	PASS
ActivityDiff	691.00	-5.00	-4.00	0.09	4.00	5.00	PASS
QA-662							
FWHM	1.37	0.00	0.00	1.32	3.07	3.17	PASS
ActivityDiff	659.00	-5.00	-4.00	2.15	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.70	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.54	1333.01	1333.26	PASS
FWHM	1.88	0.00	0.00	1.83	4.08	4.18	PASS
ActivityDiff	1274.00	-5.00	-4.00	-0.75	4.00	5.00	PASS

Analyst: Rachel Mueller Reviewer: Rachel Mueller

Test America
St. Louis
Quality Control Check

Spectrum: 17_20140902001_QCAsLeft
Acquired: 9/2/2014 12:26:30 AM
Detector: Ge17 SN/11080671
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.63	59.79	60.04	PASS
FWHM	0.77	0.00	0.00	0.77	1.87	1.97	PASS
ActivityDiff	691.00	-5.00	-4.00	0.09	4.00	5.00	PASS
QA-662							
FWHM	1.37	0.00	0.00	1.32	3.07	3.17	PASS
ActivityDiff	659.00	-5.00	-4.00	2.15	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.70	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.54	1333.01	1333.26	PASS
FWHM	1.88	0.00	0.00	1.83	4.08	4.18	PASS
ActivityDiff	1274.00	-5.00	-4.00	-0.75	4.00	5.00	PASS

Analyst: Rachel Mueller Reviewer: Rachel Mueller

TestAmerica, Inc. Spectrum name: 17_20140902001_QCAsLeft.An1

Sample description
Quality control Check (QC Source 'H') Post Stabilization

Spectrum Filename: C:\User\SPC\Det17\17_20140902001_QCAsLeft.An1

Acquisition information
Start time:	9/2/2014 12:26:30 AM
Live time:	1000
Real time:	1015
Dead time:	1.48 %
Detector ID:	17

Detector system
Ge17 SN/11080671

Calibration
Filename: 17_QC.Clb
17_QC_83725-334_SOURCE H_042211

Energy Calibration
Created:	2/29/2012 10:33:23 AM
Zero offset:	0.108 keV
Gain:	0.250 keV/channel
Quadratic:	-2.584E-08 keV/channel^2

Efficiency Calibration
Created:	5/1/2011 11:17:56 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_QC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.63keV)
Stop channel:	8000 (1999.54keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	1.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

```
       Half lives decay limit:    12.000
       Activity range factor:      2.000
       Min. step backg. energy     0.000
       Multiplet shift channel     2.000

Corrections                          Status          Comments
       Decay correct to date:         YES       1/1/2011 12:00:00 PM
       Decay during acquisition:      YES
       Decay during collection:       NO
       True coincidence correction:   NO
       Peaked background correction:  NO
       Absorption (Internal):         NO
       Geometry correction:           NO
       Random summing:                NO


total peaks alloc.    6 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0593
```

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. GPS	Nuc
59.63	51938.	0.48	0.77	7.579E-02	59.54	100.000	6.904E+02	QA60
88.09	15088.	0.95	0.80	1.113E-01	88.03	100.000	1.009E+03	QA88
121.99	2068.	3.40	0.87	1.155E-01	122.06	100.000	5.453E+02	QA122
661.70	19891.	0.76	1.32	3.357E-02	661.66	100.000	6.448E+02	QA662
1173.29	14744.	0.90	1.75	1.896E-02	1173.23	100.000	1.259E+03	QA1173
1332.54	13507.	0.89	1.83	1.705E-02	1332.51	100.000	1.284E+03	QA1332

No unknown peaks passed sensitivity test.

This section based on library: DET_QC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
QA-60	237.98	59.63	2813.	51938.	51.938	0.48	0.773
QA-88	351.77	88.09	1355.	15088.	15.088	0.95	0.799
QA-122	487.30	121.99	717.	2068.	2.068	3.40	0.872
QA-662	2645.65	661.70	598.	19891.	19.891	0.76	1.324
QA-1173	4692.44	1173.29	390.	14744.	14.744	0.90	1.754
QA-1332	5329.77	1332.54	117.	13507.	13.507	0.89	1.832

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Nuclide Code	Average Activity GPS	Peak Energy keV	Peak Activity GPS		Peak Code	MDA Value GPS		COMMENTS
QA-60		6.9038E+02					1.58E+05		
			59.54	6.904E+02	(	3.322E+00	4.80E-01	1.00E+02	G
QA-88		1.0085E+03					4.63E+02		
			88.03	1.009E+03	(	1.165E+01	9.54E-01	1.00E+02	G
QA-122		5.4526E+02					2.72E+02		
			122.06	5.453E+02	(	3.361E+01	3.40E+00	1.00E+02	G
QA-662		6.4481E+02					1.10E+04		
			661.66	6.448E+02	(	3.782E+00	7.64E-01	1.00E+02	G
QA-1173		1.2594E+03					1.92E+03		
			1173.23	1.259E+03	(	8.092E+00	9.02E-01	1.00E+02	G
QA-1332		1.2835E+03					1.92E+03		
			1332.51	1.284E+03	(	5.047E+00	8.88E-01	1.00E+02	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape

C - Charged Particle Reaction K - Key Line
M - No MDA Calculation A - Not in Average
R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity GPS	Time Corrected Activity GPS	Uncertainty 1 Sigma Counting	MDA
QA-60		6.8633E+02	6.9038E+02	4.804E-01%	3.32E+00
QA-88		1.3553E+02	1.0085E+03	9.544E-01%	1.16E+01
QA-122		1.7905E+01	5.4526E+02	3.397E+00%	3.36E+01
QA-166	<	1.1346E+00	9.6680E+02		
QA-279			>12 Halflives		
QA-392	<	2.5191E+00	8.0277E+03		
QA-514			>12 Halflives		
QA-662		5.9254E+02	6.4481E+02	7.638E-01%	3.78E+00
QA-898			>12 Halflives		
QA-1173		7.7745E+02	1.2594E+03	9.016E-01%	8.09E+00
QA-1332		7.9233E+02	1.2835E+03	8.879E-01%	5.05E+00
QA-1836			>12 Halflives		

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 3.002E+03 GPS
Total Decayed Activity (37.6 to 1999.5 keV) 5.4318867E+03 GPS

Test America
St. Louis
Background Check

Spectrum: 17_20140902002_BG
Acquired: 9/2/2014 12:46:44 AM
Detector: Ge17 SN/11080671
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.36	2.23	2.27	2.38	2.45	2.50	PASS

Analyst: Rachel Mueller Reviewer: Rachel Mueller

Test America
St. Louis
Background Check

Spectrum: 17_20140902002_BG
Acquired: 9/2/2014 12:46:44 AM
Detector: Ge17 SN/11080671
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.36	2.23	2.27	2.38	2.45	2.50	PASS

Analyst: Rachel Mueller Reviewer: Rachel Mueller

TestAmerica, Inc. Spectrum name: 17_20140902002_BG.An1

Sample description
Background Contamination Check

Spectrum Filename: C:\User\SPC\Det17\17_20140902002_BG.An1

Acquisition information
Start time:	9/2/2014 12:46:44 AM
Live time:	1800
Real time:	1806
Dead time:	0.34 %
Detector ID:	17

Detector system
Ge17 SN/11080671

Calibration
Filename:	17_QC.Clb

17_QC_83725-334_SOURCE H_042211

Energy Calibration
Created:	2/29/2012 10:33:23 AM
Zero offset:	0.108 keV
Gain:	0.250 keV/channel
Quadratic:	-2.584E-08 keV/channel^2

Efficiency Calibration
Created:	5/1/2011 11:17:56 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.63keV)
Stop channel:	8000 (1999.54keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 6 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.2554

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.53	57.	20.50	0.61	5.941E-02	46.54	4.250	1.247E+01	PB210
92.75	46.	19.74	0.92	1.119E-01	92.59	5.584	4.061E+00	TH234
					93.35	5.561	4.074E+00	AC228
185.61	48.	22.18	0.77	9.850E-02	185.72	54.000	PBC<MDA	U235
					185.99	3.280	8.283E+00	Ra226

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
370.40	92.75	13.	46.	4.081E+02	19.74	0.921	-	M

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.58	46.53	21.	57.	0.031	20.50	0.613s
Ra-226	741.65	185.61	16.	48.	0.027	22.18	0.770

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Peak Code	MDA Value DPS	COMMENTS
PB-210	N	1.2469E+01				8.14E+03	
			46.54	1.247E+01	*(	5.333E+00	2.05E+01 4.25E+00 G
Ra-226		8.2825E+00				5.84E+05	
			185.99	8.283E+00	(	3.655E+00	2.22E+01 3.28E+00 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average

R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	<	1.0682E+00	
NA-22	<	2.3087E-01	
K-40	<	2.3857E+00	
Sc-46	<	1.6963E-01	
CR-51	<	6.0542E-01	
MN-54	<	1.5515E-01	
FE-59	<	3.5771E-01	
Co-56	<	1.5818E-01	
CO-57	<	1.3523E-01	
CO-58	<	1.5028E-01	
CO-60	<	2.4023E-01	
ZN-65	<	4.0512E-01	
NB-94	<	1.3122E-01	
ZR-95	<	4.5203E-01	
NB-95	<	2.8619E-01	
RU-103	<	1.2725E-01	
RH-106	<	1.1375E+00	
AG-108M	<	9.2497E-02	
AG-110M	<	2.3153E-01	
SN-113	<	2.2015E-01	
SB-124	<	2.1272E-01	
SB-125	<	6.0457E-01	
I-131	<	1.5406E-01	
BA-133	<	2.1120E-01	
CS-134	<	1.1212E-01	
CS-137	<	1.4314E-01	
CE-139	<	1.1769E-01	
Ba-140	<	4.0011E-01	
La-140	<	2.8480E-01	
CE-141	<	2.4933E-01	
CE-144	<	1.1184E+00	
PM-144	<	2.6271E-01	
EU-152	<	5.0413E-01	
EU-154	<	1.3452E+00	
EU-155	<	5.5589E-01	

HF-181	<	1.6287E-01			
Ta-182	<	5.9034E-01			
Hg-203	<	1.7768E-01			
TL-208	<	2.6877E-01			
pm-146	<	4.0105E-01			
y-88	<	3.2739E-01			
PB-210	#	1.2469E+01	2.0496E+01%		5.333E+00
PB-212	<	3.6423E-01			
PB-214	<	5.7228E-01			
BI-207	<	2.6945E-01			
BI-212	<	3.1312E+00			
BI-214	<	6.1254E-01			
BI-210M	<	1.0190E-01			
RA-224	<	3.3636E+00			
AC-228	<	9.7864E-01			
TH-227	<	5.5879E-01			
TH-229	<	1.8425E+00			
TH-234	<	5.2747E+00			
PA-231	<	2.4917E+00			
PA-233	<	2.6570E-01			
PA-234	<	5.6758E-01			
PA-234M	<	2.2258E+01			
Ra-226		8.2825E+00	2.2180E+01%		3.655E+00
U-235	<	7.8566E-01			
AM-241	<	4.7083E-01			
Np-237	<	4.1794E-01			

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

S U M M A R Y

Total Activity (37.6 to 1999.5 keV) 2.075E+01 DPS

Initial Calibrations

Gamma Verification per Geometry

Detector: Ge 04

Geometry: 25 mL D=1

Reference date 1/1/2012

Calibration Standard: 90101

Standard volume g / vial 5.31144

Standard volume transferred in g / geometry 0.5067

lab ID# of cal standard 6706

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	abundance	activity Bq/sample	Count Results	%recovery
Am-241	3253	310	0.359	**864.4**	870.13	100.7
Cd-109	4733	452	0.0361	**12507.4**	12351	98.7
Co-57	2482	237	0.856	**276.6**	282	101.9
Ce-139	3514	335	0.799	**419.6**	409.08	97.5
Hg-203	7639	729	0.8155	**893.6**	934.77	104.6
Sn-113	4952	472	0.64	**738.1**	740.3	100.3
Cs-137	3184	304	0.851	**356.9**	350.56	98.2
Y-88	11930	1138	0.937	**1214.6**	1183.9	97.5
Co-60	5881	561	0.99974	**561.2**	558.63	99.5
Co-60	5882	561	0.99986	**561.2**	561.14	100.0
Y-88	12630	1205	0.992	**1214.6**	1239.2	102.0

Reviewed By: Jody watson

Date: 3/5/2012

Calibration Data from file: 4_Liquid_D=1 25ml.Clb
Energy Calibration Date: 3/27/2012 Time: 8:51:16 PM
Efficiency Calibration Date: 3/27/2012 Time: 8:51:45 PM

Calibration Description:
4_Liquid_D=1 25ml_90101_030512

Energy Calibration Fit
Energy = 0.0651 +0.250131*Channel -2.88088e-008*Channel**2
FWHM (ch) = 2.9461 +0.001043*Channel -2.99169e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
238.09	59.54	59.62	-0.13%	0.79	0.80	-1.22%
352.11	88.03	88.13	-0.12%	0.82	0.83	-1.13%
487.94	122.06	122.11	-0.04%	0.86	0.86	-0.41%
662.73	165.85	165.82	0.02%	0.91	0.91	-0.13%
1115.56	279.17	279.06	0.04%	1.04	1.02	2.48%
1565.31	391.69	391.53	0.04%	1.15	1.13	2.01%
2645.35	661.66	661.55	0.02%	1.35	1.37	-1.92%
3591.75	898.02	898.10	-0.01%	1.57	1.58	-0.25%
4693.13	1173.24	1173.33	-0.01%	1.79	1.79	-0.28%
5330.61	1332.50	1332.60	-0.01%	1.92	1.91	0.50%
7345.84	1836.01	1835.93	0.00%	2.25	2.25	-0.01%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.4766 %
Ln(Eff) = 0.8810 -0.681125*Ln(Eng) -0.019098*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.2753 %
Ln(Eff) = -10.3120 +3.529752*Ln(Eng) -0.414315*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
59.54	6.0541E-002	6.0417E-002	0.20%
88.03	5.8352E-002	5.9979E-002	-2.79%
122.06	5.5100E-002	5.4094E-002	1.83%
165.85	========== Knee ==========		
165.85	4.3994E-002	4.5085E-002	-2.48%
279.17	2.9708E-002	2.8418E-002	4.34%
391.69	2.1015E-002	2.0933E-002	0.39%
661.66	1.2703E-002	1.2928E-002	-1.77%
898.02	9.4729E-003	9.7164E-003	-2.57%
1173.24	7.5060E-003	7.5454E-003	-0.52%
1332.50	6.6834E-003	6.6830E-003	0.01%
1836.01	5.0093E-003	4.9096E-003	1.99%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Am-241	59.54	35.70	1.58E+005	868.35	310.00	1.80%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	12521.00	452.00	3.50%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	276.87	237.00	2.70%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	419.27	335.00	2.30%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	894.48	729.00	2.30%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	737.50	472.00	2.30%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	356.77	304.00	2.80%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1214.50	1138.00	2.40%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	561.56	561.00	2.50%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	561.10	561.00	2.60%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1214.70	1205.00	2.60%	1/1/2012 11:00:00 AM

ORTEC g v - i (1087) Env32 G53W4.25 3/27/2012 8:52:55 PM Page 1
TestAmerica Spectrum name: 4_D=125mL_20120084.An1

Sample description
4_D=125mL_90101_030512

Spectrum Filename: W:\SPC\Det4\4_D=125mL_20120084.An1

Acquisition information
Start time: 3/5/2012 9:42:23 PM
Live time: 3600
Real time: 3764
Dead time: 4.37 %
Detector ID: 4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_Liquid_D=1 25ml.Clb
4_Liquid_D=1 25ml_90101_030512

Energy Calibration
Created: 3/27/2012 8:51:16 PM
Zero offset: 0.065 keV
Gain: 0.250 keV/channel
Quadratic: -2.881E-08 keV/channel^2

Efficiency Calibration
Created: 3/27/2012 8:51:45 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.48 %
Log(Eff): 8.809878E-01 + (-6.811249E-01*Log(E)) +
(-1.909804E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -1.031199E+01 + (3.529752E+00*Log(E)) +
(-4.143154E-01*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.58keV)
Stop channel: 8000 (1999.27keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (1087) Env32 G53W4.25 3/27/2012 8:52:55 PM Page 2
TestAmerica Spectrum name: 4_D=125mL_20120084.An1
Page 1

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0741

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
38.00	8025.	2.56	0.80	5.211E-02				
59.62	67544.	0.53	0.79	6.043E-02	59.54	35.700	8.701E+02	AM241
70.89	2777.	4.84	0.81	6.117E-02				
72.97	4782.	2.95	0.81	6.115E-02				
82.53	1308.	9.44	0.82	6.058E-02				
88.13	87415.	0.43	0.82	5.997E-02	88.03	3.610	1.235E+04	CD109
122.11	39884.	0.68	0.86	5.408E-02	122.06	85.600	2.820E+02	CO57
136.47	4743.	3.33	0.90	5.117E-02				
165.82	38348.	0.66	0.91	4.531E-02	165.85	79.900	4.091E+02	Ce139
199.01	1361.	7.90	1.16	3.840E-02				
254.98	1129.	9.91	0.90	3.082E-02				
279.06	29723.	0.73	1.04	2.843E-02	279.17	81.500	9.291E+02	Hg203
391.53	24219.	0.83	1.15	2.094E-02	391.69	64.000	7.403E+02	SN113
661.55	13846.	1.23	1.35	1.293E-02	661.66	85.210	3.506E+02	CS137
898.10	25520.	0.77	1.57	9.716E-03	898.02	93.700	1.184E+03	Y898
1173.33	14811.	0.99	1.79	7.545E-03	1173.24	99.900	5.586E+02	Co1173
1332.59	13188.	1.10	1.92	6.683E-03	1332.50	99.982	5.611E+02	Co1332
1835.93	14289.	0.87	2.25	4.910E-03	1836.01	99.200	1.239E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
151.65	38.00	8922.	8025.	1.540E+05	2.56	0.800	- s
283.17	70.89	8050.	2248.	3.675E+04	7.04	0.842	- D
291.48	72.97	7402.	4470.	7.310E+04	3.11	0.812	- D
329.58	82.50	7298.	1596.	2.635E+04	9.60	1.124	- s
545.35	136.47	5256.	4743.	9.269E+04	3.33	0.903	-

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
795.45	199.01	3061.	1361.	3.543E+04	7.90	1.156	- s
1019.26	254.98	2847.	1129.	3.663E+04	9.91	0.899	-

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	238.09	59.62	14266.	67544.	18.762	0.53	0.789
CD-109	352.11	88.13	12363.	87415.	24.282	0.43	0.819
CO-57	487.94	122.11	7672.	39884.	11.079	0.68	0.859
Ce-139	662.73	165.82	5915.	38348.	10.652	0.66	0.905
Hg-203	1115.57	279.07	3524.	29903.	8.306	0.73	1.045
SN-113	1565.31	391.53	2943.	24219.	6.727	0.83	1.150
CS-137	2645.35	661.55	2660.	13846.	3.846	1.23	1.348
Y-898	3591.74	898.10	1949.	25520.	7.089	0.77	1.573
Co-1173	4693.14	1173.33	975.	14811.	4.114	0.99	1.790
Co-1332	5330.61	1332.59	939.	13188.	3.663	1.10	1.922
Y-1836	7345.85	1835.93	131.	14289.	3.969	0.87	2.249

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq	COMMENTS
AM-241		8.7013E+02				1.58E+05	
			59.54	8.701E+02	(	7.205E+00 5.28E-01 3.57E+01	G
CD-109		1.2351E+04				4.63E+02	
			88.03	1.235E+04	(	7.359E+01 4.26E-01 3.61E+00	G
CO-57		2.8200E+02				2.72E+02	
			122.06	2.820E+02	(	2.905E+00 6.84E-01 8.56E+01	G
Ce-139		4.0908E+02				1.38E+02	
			165.85	4.091E+02	(	3.852E+00 6.65E-01 7.99E+01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
Hg-203	9.3477E+02				4.66E+01	
		279.17	9.348E+02	(	8.732E+00 7.29E-01 8.15E+01	G
SN-113	7.4030E+02				1.15E+02	

		391.69	7.403E+02	(7.810E+00	8.30E-01	6.40E+01	G
CS-137	3.5056E+02					1.10E+04	
		661.66	3.506E+02	(6.154E+00	1.23E+00	8.52E+01	G
Y-898	1.1839E+03					1.07E+02	
		898.02	1.184E+03	(9.671E+00	7.69E-01	9.37E+01	G
Co-1173	5.5863E+02					1.93E+03	
		1173.24	5.586E+02	(5.589E+00	9.86E-01	9.99E+01	G
Co-1332	5.6114E+02					1.93E+03	
		1332.50	5.611E+02	(6.191E+00	1.10E+00	1.00E+02	G
Y-1836	1.2392E+03					1.07E+02	
		1836.01	1.239E+03	(4.855E+00	8.71E-01	9.92E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average

R - Coincidence Corrected
C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity	Time Corrected Activity	Uncertainty 1 Sigma Counting	MDA

	Bq	Bq		
AM-241	8.6988E+02	8.7013E+02	5.276E-01%	7.21E+00
CD-109	1.1214E+04	1.2351E+04	4.264E-01%	7.36E+01
CO-57	2.3926E+02	2.8200E+02	6.839E-01%	2.91E+00
Ce-139	2.9571E+02	4.0908E+02	6.647E-01%	3.85E+00
Hg-203	3.5864E+02	9.3477E+02	7.290E-01%	8.73E+00
SN-113	5.0216E+02	7.4030E+02	8.300E-01%	7.81E+00
CS-137	3.4913E+02	3.5056E+02	1.228E+00%	6.15E+00
Y-898	7.7862E+02	1.1839E+03	7.690E-01%	9.67E+00
Co-1173	5.4582E+02	5.5863E+02	9.856E-01%	5.59E+00
Co-1332	5.4827E+02	5.6114E+02	1.095E+00%	6.19E+00
Y-1836	8.1500E+02	1.2392E+03	8.709E-01%	4.85E+00

  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (82.4 to 1999.3 keV) 1.652E+04 Bq
Total Decayed Activity (82.4 to 1999.3 keV) 1.9481035E+04 Bq

Gamma Verification per Geometry

Detector: Ge7

Geometry: 25mL solid

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 56

lab ID# of cal standard Rad12-0010

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	112	0.0425	2630	2647.2	100.6
Am-241	2037	74	0.359	205	205.94	100.5
Cd-109	2881	104	0.0361	2883	2885.4	100.1
Co-57	1511	55	0.856	64	64.298	100.8
Ce-139	2139	77	0.799	97	93.788	97.0
Hg-203	4651	168	0.8146	206	213.53	103.5
Sn-113	3015	109	0.64	170	172.61	101.4
Cs-137	1938	70	0.851	82	84.005	102.1
Y-88	7264	262	0.937	280	264.1	94.3
Co-60	3580	129	0.99974	129	126.18	97.5
Co-60	3581	129	0.999856	129	129.57	100.1
Y-88	7690	278	0.992	280	288.85	103.1

Reviewed By: Jody Watson

Date: 3/7/2012

Calibration Data from file: 7_Soil_25ml.Clb
Energy Calibration Date: 3/28/2012 Time: 8:56:59 AM
Efficiency Calibration Date: 3/28/2012 Time: 8:57:12 AM

Calibration Description:
7_25mLSoil_90099_030712

Energy Calibration Fit
Energy = 0.0996 +0.249961*Channel +4.92759e-009*Channel**2
FWHM (ch) = 3.0351 +0.001152*Channel -4.05318e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.98	46.54	46.59	-0.10%	0.83	0.81	2.22%
237.92	59.54	59.57	-0.05%	0.84	0.83	1.72%
351.75	88.03	88.02	0.01%	0.87	0.86	0.84%
487.64	122.06	121.99	0.06%	0.91	0.90	1.29%
662.74	165.85	165.76	0.05%	0.93	0.95	-1.76%
1116.68	279.17	279.23	-0.02%	1.03	1.07	-3.69%
1566.71	391.69	391.73	-0.01%	1.16	1.19	-2.22%
2646.42	661.66	661.64	0.00%	1.48	1.45	2.29%
3592.07	898.02	898.04	-0.00%	1.63	1.66	-2.26%
4692.81	1173.24	1173.23	0.00%	1.91	1.89	1.10%
5329.80	1332.50	1332.48	0.00%	2.03	2.01	1.27%
7343.75	1836.01	1836.02	-0.00%	2.31	2.33	-0.68%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.5270 %
Ln(Eff) = 0.7200 -0.352764*Ln(Eng) -0.0477875*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 0.2695 %
Ln(Eff) = -12.3598 +4.659795*Ln(Eng) -0.527766*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	1.0606E-001	1.0558E-001	0.45%
59.54	1.1795E-001	1.1873E-001	-0.65%
88.03	1.2622E-001	1.2540E-001	0.65%
122.06	1.1607E-001	1.1598E-001	0.08%
165.85	========== Knee ==========		
165.85	9.4576E-002	9.7159E-002	-2.73%
279.17	6.4148E-002	6.1888E-002	3.52%
391.69	4.6144E-002	4.5518E-002	1.36%
661.66	2.8309E-002	2.7684E-002	2.21%
898.02	1.9341E-002	2.0472E-002	-5.85%
1173.24	1.5248E-002	1.5605E-002	-2.34%
1332.50	1.3738E-002	1.3680E-002	0.42%
1836.01	1.0055E-002	9.7524E-003	3.01%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	2635.30	112.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	207.28	74.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	2880.90	104.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	64.25	55.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	96.37	77.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	206.13	168.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	170.31	109.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	82.15	70.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	279.62	262.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	129.13	129.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	129.03	129.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	280.24	278.00	4.00%	1/1/2012 11:00:00 AM

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 8:58:08 AM
TestAmerica Spectrum name: 7_25mLSoil_20120399.An1

Sample description
7_Soil_25mL_90099

Spectrum Filename: C:\User\SPC\Det7\7_25mLSoil_20120399.An1

Acquisition information
Start time: 3/7/2012 11:02:17 AM
Live time: 7200
Real time: 7370
Dead time: 2.30 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Soil_25ml.Clb
7_25mLSoil_90099_030712

Energy Calibration
Created: 3/28/2012 8:56:59 AM
Zero offset: 0.100 keV
Gain: 0.250 keV/channel
Quadratic: 4.928E-09 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 8:57:12 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.53 %
Log(Eff): 7.199650E-01 + (-3.527641E-01*Log(E)) +
(-4.778753E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.27 %
Log(Eff): -1.235982E+01 + (4.659795E+00*Log(E)) +
(-5.277660E-01*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix & Pb.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.59keV)
Stop channel: 8000 (2000.11keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 0.0351

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
37.87	3155.	4.76	0.80	9.113E-02				
46.59	85050.	0.44	0.83	1.056E-01	46.54	4.250	2.647E+03	Pb210
59.58	62828.	0.52	0.84	1.188E-01	59.54	35.700	2.059E+02	AM241
70.82	2496.	5.45	0.84	1.241E-01				
72.94	4222.	3.28	0.84	1.246E-01				
82.42	1862.	6.76	0.85	1.257E-01				
84.86	1513.	8.51	0.86	1.256E-01				
88.03	85472.	0.37	0.86	1.254E-01	88.03	3.610	2.895E+03	CD109
121.99	38839.	0.66	0.92	1.160E-01	122.06	85.600	6.430E+01	CO57
136.38	4758.	3.00	0.94	1.101E-01				
165.76	37598.	0.64	0.96	9.732E-02	165.85	79.900	9.379E+01	Ce139
198.99	1749.	7.06	1.10	8.322E-02				
255.04	1266.	9.14	1.17	6.705E-02				
279.23	29071.	0.68	1.09	6.188E-02	279.17	81.500	2.135E+02	Hg203
391.73	24329.	0.82	1.22	4.551E-02	391.69	64.000	1.726E+02	SN113
661.64	14208.	1.16	1.48	2.768E-02	661.66	85.210	8.401E+01	CS137
898.04	23747.	0.76	1.63	2.047E-02	898.02	93.700	2.641E+02	Y898
1173.23	13830.	1.02	1.91	1.560E-02	1173.24	99.900	1.262E+02	Co1173
1332.48	12460.	1.10	2.03	1.368E-02	1332.50	99.982	1.296E+02	Co1332
1835.99	13099.	0.94	2.32	9.752E-03	1836.01	99.200	2.888E+02	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
151.10	37.88	9720.	3155.	3.463E+04	4.76	0.802	-	D
282.97	70.83	7572.	2203.	1.776E+04	6.79	0.855	-	D
291.42	72.94	7075.	3828.	3.071E+04	3.94	0.876	-	D
339.09	84.85	7530.	1513.	4.518E+03	8.51	0.855	-	lD

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 8:58:08 AM
TestAmerica Spectrum name: 7_25mLSoil_20120399.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
545.19	136.38	4478.	4758.	4.323E+04	3.00	0.936	-
795.68	198.99	3525.	1749.	2.102E+04	7.06	1.101	-
1019.90	255.04	2907.	1266.	1.888E+04	9.14	1.169	-

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.98	46.59	15688.	85050.	11.812	0.44	0.831
AM-241	237.94	59.58	11866.	62828.	8.726	0.52	0.840
CD-109	351.75	88.02	10767.	85190.	11.832	0.43	0.877
CO-57	487.64	121.99	6229.	38839.	5.394	0.66	0.923
Ce-139	662.74	165.76	4533.	37598.	5.222	0.64	0.955
Hg-203	1116.68	279.23	2521.	29071.	4.038	0.68	1.088
SN-113	1566.70	391.73	2644.	24329.	3.379	0.82	1.222
CS-137	2646.42	661.64	2287.	14208.	1.973	1.16	1.484
Y-898	3592.07	898.04	1556.	23747.	3.298	0.76	1.626
Co-1173	4692.81	1173.23	895.	13830.	1.921	1.02	1.909
Co-1332	5329.80	1332.48	770.	12460.	1.731	1.10	2.032
Y-1836	7343.64	1835.99	221.	13099.	1.819	0.94	2.318

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq	COMMENTS
Pb-210	N	2.6472E+03				8.15E+03	
			46.54	2.647E+03	(	1.825E+01 4.44E-01 4.25E+00	G
AM-241		2.0594E+02				1.58E+05	
			59.54	2.059E+02	(	1.673E+00 5.24E-01 3.57E+01	G
CD-109		2.8854E+03				4.63E+02	
			88.03	2.885E+03	(	1.647E+01 4.26E-01 3.61E+00	G

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 8:58:08 AM
TestAmerica Spectrum name: 7_25mLSoil_20120399.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-57	6.4298E+01					2.72E+02	
		122.06	6.430E+01	(	6.133E-01	6.55E-01	8.56E+01 G
Ce-139	9.3788E+01					1.38E+02	
		165.85	9.379E+01	(	7.894E-01	6.36E-01	7.99E+01 G
Hg-203	2.1353E+02					4.66E+01	
		279.17	2.135E+02	(	1.738E+00	6.84E-01	8.15E+01 G
SN-113	1.7261E+02					1.15E+02	
		391.69	1.726E+02	(	1.719E+00	8.20E-01	6.40E+01 G
CS-137	8.4005E+01					1.10E+04	
		661.66	8.401E+01	(	1.334E+00	1.16E+00	8.52E+01 G
Y-898	2.6410E+02					1.07E+02	
		898.02	2.641E+02	(	2.075E+00	7.63E-01	9.37E+01 G
Co-1173	1.2618E+02					1.93E+03	
		1173.24	1.262E+02	(	1.297E+00	1.02E+00	9.99E+01 G
Co-1332	1.2957E+02					1.93E+03	
		1332.50	1.296E+02	(	1.373E+00	1.10E+00	1.00E+02 G
Y-1836	2.8885E+02					1.07E+02	
		1836.01	2.888E+02	(	1.587E+00	9.41E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation

Peak Codes:
G - Gamma Ray

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 8:58:08 AM
TestAmerica Spectrum name: 7_25mLSoil_20120399.An1

F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
Pb-210	2.6324E+03	2.6472E+03	4.440E-01%	1.83E+01
AM-241	2.0588E+02	2.0594E+02	5.238E-01%	1.67E+00
CD-109	2.6137E+03	2.8854E+03	4.262E-01%	1.65E+01
CO-57	5.4337E+01	6.4298E+01	6.554E-01%	6.13E-01
Ce-139	6.7266E+01	9.3788E+01	6.364E-01%	7.89E-01
Hg-203	8.0052E+01	2.1353E+02	6.843E-01%	1.74E+00
SN-113	1.1599E+02	1.7261E+02	8.195E-01%	1.72E+00
CS-137	8.3656E+01	8.4005E+01	1.160E+00%	1.33E+00
Y-898	1.7194E+02	2.6410E+02	7.630E-01%	2.07E+00
Co-1173	1.2321E+02	1.2618E+02	1.017E+00%	1.30E+00
Co-1332	1.2653E+02	1.2957E+02	1.095E+00%	1.37E+00
Y-1836	1.8805E+02	2.8885E+02	9.412E-01%	1.59E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (40.8 to 2000.1 keV) 6.463E+03 Bq
Total Decayed Activity (40.8 to 2000.1 keV) 7.1755029E+03 Bq

Analyzed by: _____
Admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica

Gamma Verification per Geometry

Detector: Ge 07

Geometry: 25 mL D=1

Reference date 1/1/2012

Calibration Standard: 90101

Standard volume g / vial 5.31144

Standard volume transferred in g / geometry 0.5067

lab ID# of cal standard 6706

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	abundance	activity Bq/sample	Count Results	%recovery
Am-241	3253	310	0.359	**864.4**	869.15	100.5
Cd-109	4733	452	0.0361	**12507.4**	12148	97.1
Co-57	2482	237	0.856	**276.6**	279.17	100.9
Ce-139	3514	335	0.799	**419.6**	404.29	96.4
Hg-203	7639	729	0.8155	**893.6**	945.2	105.8
Sn-113	4952	472	0.64	**738.1**	747.38	101.3
Cs-137	3184	304	0.851	**356.9**	362.35	101.5
Y-88	11930	1138	0.937	**1214.6**	1152.4	94.9
Co-60	5881	561	0.99974	**561.2**	549.99	98.0
Co-60	5882	561	0.99986	**561.2**	546.72	97.4
Y-88	12630	1205	0.992	**1214.6**	1282.9	105.6

Reviewed By: Megan McAfee

Date: 4/9/2012

Calibration Data from file: 7_Liquid_D=1 25ml.Clb
Energy Calibration Date: 3/28/2012 Time: 9:22:02 AM
Efficiency Calibration Date: 3/28/2012 Time: 9:22:15 AM

Calibration Description:
7_25mld=1_90101_032612

Energy Calibration Fit
Energy = 0.1293 +0.249936*Channel +5.39796e-009*Channel**2
FWHM (ch) = 3.3547 +0.000987*Channel -1.43509e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
237.88	59.54	59.58	-0.08%	0.87	0.90	-2.98%
351.72	88.03	88.04	-0.01%	0.92	0.92	-0.97%
487.62	122.06	122.00	0.05%	0.97	0.96	1.05%
662.71	165.85	165.77	0.05%	1.00	1.00	0.16%
1116.69	279.17	279.24	-0.02%	1.13	1.11	1.86%
1566.76	391.69	391.73	-0.01%	1.23	1.22	1.16%
2646.58	661.66	661.64	0.00%	1.45	1.47	-0.95%
3592.29	898.02	898.04	-0.00%	1.70	1.68	1.52%
4693.09	1173.24	1173.22	0.00%	1.92	1.92	0.09%
5330.14	1332.50	1332.48	0.00%	2.01	2.05	-2.08%
7344.29	1836.01	1836.02	-0.00%	2.47	2.46	0.64%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.8221 %
Ln(Eff) = -0.0721 -0.052206*Ln(Eng) -0.0721452*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 0.5792 %
Ln(Eff) = -13.4309 +5.323811*Ln(Eng) -0.612518*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
59.54	1.4913E-001	1.4900E-001	0.09%
88.03	1.5172E-001	1.5361E-001	-1.25%
122.06	1.3762E-001	1.3648E-001	0.83%
165.85	========== Knee ==========		
165.85	1.0437E-001	1.0822E-001	-3.69%
279.17	7.4359E-002	7.0345E-002	5.40%
391.69	5.2758E-002	5.2053E-002	1.34%
661.66	3.2103E-002	3.1608E-002	1.54%
898.02	2.2024E-002	2.3208E-002	-5.37%
1173.24	1.7155E-002	1.7515E-002	-2.10%
1332.50	1.4872E-002	1.5263E-002	-2.63%
1836.01	1.1283E-002	1.0682E-002	5.33%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Am-241	59.54	35.70	1.58E+005	868.35	310.00	1.80%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	12521.00	452.00	3.50%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	276.87	237.00	2.70%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	419.27	335.00	2.30%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	894.48	729.00	2.30%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	737.50	472.00	2.30%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	356.77	304.00	2.80%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1214.50	1138.00	2.40%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	561.56	561.00	2.50%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	561.10	561.00	2.60%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1214.70	1205.00	2.60%	1/1/2012 11:00:00 AM

7_25mLd=1_20120466

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 9:23:02 AM Page 1
TestAmerica Spectrum name: 7_25mLd=1_20120466.An1

Sample description
7_25mLd=1_90101_032612

Spectrum Filename: C:\User\SPC\Det7\7_25mLd=1_20120466.An1

Acquisition information
Start time: 3/26/2012 11:32:07 AM
Live time: 3600
Real time: 3867
Dead time: 6.91 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Liquid_D=1 25ml.Clb
7_25mld=1_90101_032612

Energy Calibration
Created: 3/28/2012 9:22:02 AM
Zero offset: 0.129 keV
Gain: 0.250 keV/channel
Quadratic: 5.398E-09 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 9:22:15 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.82 %
Log(Eff): -7.206837E-02 + (-5.220592E-02*Log(E)) +
(-7.214522E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.58 %
Log(Eff): -1.343090E+01 + (5.323811E+00*Log(E)) +
(-6.125181E-01*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.62keV)
Stop channel: 8000 (1999.96keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 9:23:02 AM Page 2
TestAmerica Spectrum name: 7_25mLd=1_20120466.An1
Page 1

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0313

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
37.89	18099.	1.63	0.97	1.139E-01				
49.55	3924.	6.74	1.61	1.377E-01				
59.58	166371.	0.31	0.87	1.490E-01	59.54	35.700	8.692E+02	AM241
70.85	5190.	3.61	0.91	1.546E-01				
72.93	8628.	2.25	0.91	1.550E-01				
82.44	3595.	4.73	0.92	1.548E-01				
85.00	3017.	5.54	0.92	1.544E-01				
88.04	217134.	0.22	0.92	1.536E-01	88.03	3.610	1.235E+04	CD109
122.00	94526.	0.40	0.97	1.365E-01	122.06	85.600	2.792E+02	CO57
136.37	11722.	1.94	1.00	1.273E-01				
165.77	82020.	0.42	1.00	1.085E-01	165.85	79.900	4.043E+02	Ce139
199.05	6340.	3.15	1.15	9.348E-02				
203.83	1685.	9.26	1.37	9.168E-02				
255.17	2643.	5.31	1.22	7.599E-02				
279.24	55124.	0.51	1.13	7.033E-02	279.17	81.500	9.452E+02	Hg203
391.73	53714.	0.53	1.23	5.205E-02	391.69	64.000	7.474E+02	SN113
661.64	34945.	0.77	1.45	3.161E-02	661.66	85.210	3.623E+02	CS137
898.04	51902.	0.54	1.71	2.321E-02	898.02	93.700	1.152E+03	Y898
1173.22	33601.	0.66	1.92	1.752E-02	1173.24	99.900	5.500E+02	Co1173
1332.48	29130.	0.74	2.01	1.526E-02	1332.50	99.982	5.467E+02	Co1332
1836.00	28155.	0.66	2.48	1.068E-02	1836.01	99.200	1.283E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
151.07	37.89	15344.	18099.	1.589E+05	1.63	0.970	-	s
197.75	49.55	18878.	3924.	2.850E+04	6.74	1.609	-	s
282.95	70.83	14930.	5190.	3.358E+04	3.61	0.908	-	D
291.26	72.91	14501.	8628.	5.568E+04	2.25	0.910	-	D
329.28	82.43	15722.	2688.	1.736E+04	8.73	1.074	-	D

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
339.57	84.99	12459.	3017.	4.589E+03	5.54	0.922	- D
545.11	136.37	9624.	11722.	9.209E+04	1.94	0.996	-
795.87	199.05	8021.	6340.	6.782E+04	3.15	1.154	-
815.01	203.83	6179.	1685.	1.838E+04	9.26	1.370	- s
1020.41	255.17	4656.	2643.	3.478E+04	5.31	1.225	-

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.88	59.58	22227.	166371.	46.214	0.31	0.871
CD-109	351.72	88.04	14627.	213505.	59.307	0.24	0.916
CO-57	487.62	122.00	10857.	94526.	26.257	0.40	0.968
Ce-139	662.71	165.77	8746.	82020.	22.783	0.42	1.002
Hg-203	1116.69	279.24	5408.	55124.	15.312	0.51	1.131
SN-113	1566.76	391.73	5105.	53714.	14.921	0.53	1.231
CS-137	2646.57	661.64	5888.	34945.	9.707	0.77	1.453
Y-898	3592.28	898.04	3972.	51902.	14.417	0.54	1.705
Co-1173	4693.09	1173.22	2232.	33601.	9.334	0.66	1.920
Co-1332	5330.14	1332.48	2107.	29130.	8.092	0.74	2.010
Y-1836	7344.19	1836.00	619.	28155.	7.821	0.66	2.479

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq		COMMENTS
AM-241		8.6915E+02				1.58E+05		
			59.54	8.692E+02	(	3.644E+00	3.06E-01 3.57E+01 G	
CD-109		1.2148E+04				4.63E+02		
			88.03	1.215E+04	(	3.222E+01	2.42E-01 3.61E+00 G	
CO-57		2.7917E+02				2.72E+02		
			122.06	2.792E+02	(	1.442E+00	3.98E-01 8.56E+01 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
Ce-139	4.0429E+02				1.38E+02	

		165.85	4.043E+02	(2.162E+00	4.25E-01	7.99E+01	G
Hg-203	9.452OE+02					4.66E+01	
		279.17	9.452E+02	(5.922E+00	5.11E-01	8.15E+01	G
SN-113	7.4738E+02					1.15E+02	
		391.69	7.474E+02	(4.670E+00	5.30E-01	6.40E+01	G
CS-137	3.6235E+02					1.10E+04	
		661.66	3.623E+02	(3.736E+00	7.69E-01	8.52E+01	G
Y-898	1.1524E+03					1.07E+02	
		898.02	1.152E+03	(6.582E+00	5.42E-01	9.37E+01	G
Co-1173	5.4999E+02					1.93E+03	
		1173.24	5.500E+02	(3.648E+00	6.63E-01	9.99E+01	G
Co-1332	5.4672E+02					1.93E+03	
		1332.50	5.467E+02	(4.065E+00	7.36E-01	1.00E+02	G
Y-1836	1.2829E+03					1.07E+02	
		1836.01	1.283E+03	(5.405E+00	6.62E-01	9.92E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape

P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
AM-241	8.6883E+02	8.6915E+02	3.059E-01%	3.64E+00
CD-109	1.0695E+04	1.2148E+04	2.421E-01%	3.22E+01
CO-57	2.2475E+02	2.7917E+02	3.980E-01%	1.44E+00
Ce-139	2.6348E+02	4.0429E+02	4.248E-01%	2.16E+00
Hg-203	2.6708E+02	9.4520E+02	5.114E-01%	5.92E+00
SN-113	4.4788E+02	7.4738E+02	5.297E-01%	4.67E+00
CS-137	3.6041E+02	3.6235E+02	7.691E-01%	3.74E+00
Y-898	6.6300E+02	1.1524E+03	5.417E-01%	6.58E+00
Co-1173	5.3341E+02	5.4999E+02	6.628E-01%	3.65E+00
Co-1332	5.3023E+02	5.4672E+02	7.362E-01%	4.07E+00
Y-1836	7.3808E+02	1.2829E+03	6.621E-01%	5.40E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

S U M M A R Y

Total Activity (82.4 to 2000.0 keV) 1.559E+04 Bq
Total Decayed Activity (82.4 to 2000.0 keV) 1.9287574E+04 Bq

Gamma Verification per Geometry

Detector: Ge 12

Geometry: 25 mL D=1

Reference date 7/1/2011

Calibration Standard: 85520-334

Standard volume g / vial 5.32298

Standard volume transferred in g / geometry 0.5177

lab ID# of cal standard Rad11-0100

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	abundance	activity Bq/sample	Count Results	%recovery
Am-241	3368	328	0.359	**912.4**	920.15	100.8
Cd-109	4780	465	0.0361	**12877.9**	12656	98.3
Co-57	2554	248	0.856	**290.2**	291.13	100.3
Ce-139	3552	345	0.799	**432.4**	418.17	96.7
Hg-203	7851	764	0.8155	**936.3**	987.93	105.5
Sn-113	4932	480	0.64	**749.5**	754.46	100.7
Cs-137	3188	310	0.851	**364.3**	370.02	101.6
Y-88	11970	1164	0.937	**1242.4**	1170.6	94.2
Co-60	5897	574	0.99974	**573.7**	565.76	98.6
Co-60	5897	574	0.99986	**573.6**	571.12	99.6
Y-88	12680	1233	0.992	**1243.2**	1279.6	102.9

Reviewed By: Jody Watson

Date: 9/2/2011

Calibration Data from file: 12_Liquid_D=1 25ml.Clb
Energy Calibration Date: 9/2/2011 Time: 6:53:12 AM
Efficiency Calibration Date: 9/2/2011 Time: 7:07:23 AM

Calibration Description:
Ge12_25mLd=1Cal_85520-334_090111

Energy Calibration Fit
Energy = 0.0253 +0.250193*Channel -3.73323e-008*Channel**2
FWHM (ch) = 3.4026 +0.000931*Channel -1.46035e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
238.02	59.54	59.57	-0.06%	0.89	0.91	-2.15%
351.85	88.03	88.05	-0.02%	0.92	0.93	-1.08%
487.91	122.06	122.09	-0.02%	0.96	0.96	-0.20%
663.09	165.85	165.91	-0.04%	1.01	1.00	1.04%
1115.48	279.17	279.06	0.04%	1.13	1.11	2.39%
1565.43	391.69	391.59	0.02%	1.21	1.21	0.20%
2645.59	661.66	661.67	-0.00%	1.44	1.44	0.18%
3591.20	898.02	898.03	-0.00%	1.64	1.64	-0.19%
4692.60	1173.24	1173.26	-0.00%	1.86	1.86	-0.23%
5330.26	1332.50	1332.56	-0.00%	1.97	1.99	-0.63%
7346.20	1836.01	1835.97	0.00%	2.37	2.36	0.33%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 2.0247 %
Ln(Eff) = -0.6443 -0.008678*Ln(Eng) -0.0644477*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 0.3253 %
Ln(Eff) = -12.3677 +4.728110*Ln(Eng) -0.542392*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
59.54	1.2217E-001	1.2198E-001	0.15%
88.03	1.2499E-001	1.2600E-001	-0.81%
122.06	1.1455E-001	1.1399E-001	0.49%
165.85	========== Knee ==========		
165.85	9.0351E-002	9.3275E-002	-3.24%
279.17	6.8283E-002	6.4748E-002	5.18%
391.69	5.0419E-002	5.0116E-002	0.60%
661.66	3.3299E-002	3.2740E-002	1.68%
898.02	2.3688E-002	2.5134E-002	-6.10%
1173.24	1.9444E-002	1.9747E-002	-1.56%
1332.50	1.7456E-002	1.7547E-002	-0.52%
1836.01	1.3296E-002	1.2913E-002	2.88%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Am-241	59.54	35.90	1.58E+005	913.65	328.00	3.10%	7/1/2011 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	12881.00	465.00	3.80%	7/1/2011 11:00:00 AM
Co-57	122.06	85.59	2.72E+002	289.75	248.00	2.80%	7/1/2011 11:00:00 AM
Ce-139	165.85	80.00	1.38E+002	431.25	345.00	2.40%	7/1/2011 11:00:00 AM
Hg-203	279.17	81.55	4.66E+001	936.85	764.00	2.40%	7/1/2011 11:00:00 AM
Sn-113	391.69	64.17	1.15E+002	748.01	480.00	2.50%	7/1/2011 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	363.81	310.00	3.06%	7/1/2011 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1242.30	1164.00	2.60%	7/1/2011 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	574.57	574.00	2.70%	7/1/2011 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	574.10	574.00	2.80%	7/1/2011 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1242.90	1233.00	2.40%	7/1/2011 11:00:00 AM

```
     ORTEC g v - i (3263) Env32  G53W4.25  9/7/2011 11:36:58 AM
TestAmerica, Inc                Spectrum name: 12_Liquid25mLD=1_20111905.An1

Sample description
     12_25mLD=1_85520-334_090111


Spectrum Filename: C:\User\SPC\Det12\12_Liquid25mLD=1_20111905.An1

Acquisition information
       Start time:                 9/1/2011 7:20:35 PM
       Live time:               3600
       Real time:               3910
       Dead time:                  7.93 %
       Detector ID:                   12

Detector system
     Ge12 SN/10034336


Calibration
       Filename:                   12_Liquid_D=1  25ml.Clb
     Ge12_25mLd=1Cal_85520-334_090111


       Energy Calibration
            Created:               9/2/2011 6:53:12 AM
            Zero offset:           0.025 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -3.733E-08 keV/channel^2

       Efficiency Calibration
            Created:               9/2/2011 7:07:23 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   2.02 %
            Log(Eff):             -6.442716E-01 + (-8.678082E-03*Log(E) ) +
                                   ( -6.444773E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   0.33 %
            Log(Eff):             -1.236768E+01 + ( 4.728110E+00*Log(E) ) +
                                   ( -5.423915E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.55keV )
       Stop channel:            8000 (  1999.18keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

Random error: 1.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	7/1/2011 11:00:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2011-08-29_0027.PBC 8/29/2011 12:27:29 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0354

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
37.95	18040.	1.92	0.95	9.568E-02				
43.81	2028.	10.97	1.36	1.059E-01				
49.75	3200.	8.37	1.11	1.137E-01				
59.57	144216.	0.33	0.89	1.220E-01	59.54	35.700	9.202E+02	AM241
66.47	1541.	13.90	1.31	1.252E-01				
70.79	6146.	3.16	0.92	1.263E-01				
72.92	10060.	2.03	0.92	1.266E-01				
74.98	273.	59.35	0.92	1.269E-01				
78.22	335.	48.82	0.92	1.270E-01				
82.39	3883.	4.51	0.93	1.268E-01				
85.03	3028.	5.65	0.93	1.265E-01				
88.06	190362.	0.24	0.93	1.260E-01	88.03	3.610	1.276E+04	CD109
108.45	219.	76.25	0.58	1.198E-01				
122.09	87233.	0.43	0.96	1.140E-01	122.06	85.600	2.911E+02	CO57
136.49	11055.	2.31	1.00	1.073E-01				
165.91	81961.	0.44	1.01	9.325E-02	165.85	79.900	4.182E+02	Ce139
199.10	5807.	3.69	1.18	8.239E-02				
203.74	1635.	9.95	1.46	8.108E-02				
255.05	2590.	6.27	1.08	6.915E-02				
279.06	74286.	0.43	1.13	6.477E-02	279.17	81.500	9.879E+02	Hg203
306.64	83.	67.91	0.64	6.040E-02				
380.14	197.	40.64	0.53	5.129E-02				
391.59	59843.	0.50	1.21	5.013E-02	391.69	64.000	7.545E+02	SN113
439.97	295.	41.21	0.34	4.574E-02				
471.77	327.	34.30	0.90	4.326E-02				
556.09	40.	92.49	0.27	3.785E-02				
661.67	37016.	0.76	1.44	3.274E-02	661.66	85.210	3.700E+02	CS137
694.65	102.	80.83	0.33	3.142E-02				
795.40	166.	43.52	0.75	2.796E-02				
813.89	1034.	10.43	1.66	2.740E-02				
878.46	95.	57.57	0.38	2.563E-02				
885.57	103.	55.74	1.63	2.545E-02				
890.63	46.	126.79	1.63	2.532E-02				
898.03	66170.	0.46	1.64	2.513E-02	898.02	93.700	1.171E+03	Y898
912.48	1536.	10.38	1.68	2.478E-02				

942.97	206.	37.00	0.68	2.407E-02				
991.92	163.	45.99	0.66	2.300E-02				
1074.29	227.	42.42	0.49	2.140E-02				
1093.58	145.	34.01	1.27	2.106E-02				
1173.25	39287.	0.64	1.86	1.975E-02	1173.24	99.900	5.658E+02	Co1173
1223.27	101.	41.56	1.90	1.900E-02				
1229.31	146.	31.53	1.91	1.891E-02				
1332.55	35270.	0.67	1.97	1.755E-02	1332.50	99.982	5.711E+02	Co1332
1354.39	35.	63.31	0.50	1.728E-02				
1380.13	141.	55.53	0.35	1.698E-02				
1416.98	51.	44.76	0.49	1.656E-02				
1528.36	153.	49.74	0.62	1.541E-02				
1571.00	129.	40.23	2.17	1.502E-02				
1577.83	125.	48.97	2.17	1.495E-02				
1583.43	146.	36.47	2.18	1.490E-02				
1641.97	184.	43.10	0.30	1.439E-02				
1835.95	39341.	0.58	2.38	1.291E-02	1836.01	99.200	1.280E+03	Y1836
1913.70	62.	29.12	0.47	1.240E-02				

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
151.58	37.95	24558.	18040.	1.886E+05	1.92	0.946	-	s
175.00	43.81	14233.	2028.	1.915E+04	10.97	1.360	-	s
198.76	49.75	19592.	3200.	2.815E+04	8.37	1.106	-	s
265.59	66.47	14003.	1541.	1.231E+04	13.90	1.310	-	s

ORTEC g v - i (3263) Env32 G53W4.25 9/7/2011 11:36:58 AM
TestAmerica, Inc Spectrum name: 12_Liquid25mLD=1_20111905.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM		Suspected
282.88	70.80	15719.	6224.	4.927E+04	3.12	0.917	-	D
291.39	72.93	15681.	10231.	8.078E+04	1.99	0.919	-	D
299.58	74.98	13037.	273.	2.156E+03	59.35	0.921	-	D
312.58	78.23	14109.	453.	3.565E+03	46.93	0.620	-	s
329.19	82.38	16336.	3255.	2.568E+04	7.38	1.059	-	s
339.76	85.03	12888.	686.	5.421E+03	27.31	0.736	-	M
433.40	108.45	8736.	219.	1.828E+03	76.25	0.576	-	s
545.48	136.49	12026.	11055.	1.031E+05	2.31	1.002	-	
795.80	199.10	8918.	5807.	7.048E+04	3.69	1.181	-	s
814.33	203.74	6471.	1635.	2.016E+04	9.95	1.462	-	s
1019.47	255.05	5710.	2590.	3.746E+04	6.27	1.084	-	
1225.73	306.64	1434.	83.	1.377E+03	67.91	0.643	-	c
1519.64	380.14	2185.	197.	3.834E+03	40.64	0.535	-	s
1758.88	439.97	3477.	295.	6.449E+03	41.21	0.344	-	s
1886.06	471.77	3193.	327.	7.554E+03	34.30	0.905	-	s
2223.30	556.09	731.	40.	1.061E+03	92.49	0.266	-	sc
2777.51	694.65	2232.	102.	3.247E+03	80.83	0.329	-	sc
3180.57	795.40	1452.	166.	5.955E+03	43.52	0.754	-	s
3254.52	813.89	2196.	1034.	3.775E+04	10.43	1.664	-	s
3512.87	878.46	1078.	95.	3.694E+03	57.57	0.379	-	s
3540.94	885.47	891.	79.	3.117E+03	58.55	0.654	-	s
3561.19	890.54	744.	63.	2.488E+03	62.51	0.497	-	sc
3649.00	912.48	3875.	1536.	6.198E+04	10.38	1.676	-	s
3770.98	942.97	1675.	206.	8.545E+03	37.00	0.679	-	s
3966.89	991.92	1488.	163.	7.086E+03	45.99	0.664	-	s
4296.49	1074.29	1932.	227.	1.059E+04	42.42	0.486	-	s
4373.70	1093.58	853.	145.	6.870E+03	34.01	1.270	-	s
4893.18	1223.37	757.	141.	7.439E+03	41.38	0.772	-	s
4917.35	1229.41	1065.	297.	1.570E+04	27.53	0.842	-	s
5417.66	1354.39	228.	35.	2.025E+03	63.31	0.501	-	sc
5520.71	1380.13	1089.	141.	8.305E+03	55.53	0.349	-	s
5668.26	1416.98	235.	51.	3.079E+03	44.76	0.495	-	s
6114.22	1528.36	1214.	153.	9.947E+03	49.74	0.624	-	s
6284.70	1570.94	1354.	174.	1.162E+04	45.38	0.328	-	s
6312.06	1577.77	1119.	102.	6.810E+03	65.08	0.670	-	s
6334.48	1583.37	585.	99.	6.643E+03	39.91	0.447	-	s
6569.15	1641.97	1073.	184.	1.276E+04	43.10	0.303	-	s
7657.55	1913.70	66.	62.	5.000E+03	29.12	0.466	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	238.02	59.57	21801.	144216.	40.060	0.33	0.887
CD-109	351.85	88.05	17748.	188754.	52.432	0.27	0.923
CO-57	487.91	122.09	12190.	87233.	24.231	0.43	0.962
Ce-139	663.09	165.91	10469.	81961.	22.767	0.44	1.014
Hg-203	1115.48	279.06	6263.	74286.	20.635	0.43	1.133
SN-113	1565.43	391.59	5690.	59843.	16.623	0.50	1.209
CS-137	2645.59	661.67	6528.	37016.	10.282	0.76	1.444
Y-898	3591.19	898.03	4552.	66170.	18.381	0.46	1.636
Co-1173	4692.55	1173.25	3024.	39287.	10.913	0.64	1.860
Co-1332	5330.25	1332.55	2607.	35270.	9.797	0.67	1.974
Y-1836	7346.10	1835.95	1309.	39341.	10.928	0.58	2.377

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
AM-241		9.2015E+02				1.58E+05		
			59.54	9.202E+02	(	4.407E+00	3.34E-01 3.57E+01	G
CD-109		1.2656E+04				4.63E+02		
			88.03	1.266E+04	(	4.181E+01	2.70E-01 3.61E+00	G
CO-57		2.9113E+02				2.72E+02		
			122.06	2.911E+02	(	1.726E+00	4.29E-01 8.56E+01	G
Ce-139		4.1817E+02				1.38E+02		
			165.85	4.182E+02	(	2.446E+00	4.44E-01 7.99E+01	G
Hg-203		9.8793E+02				4.66E+01		
			279.17	9.879E+02	(	4.940E+00	4.33E-01 8.15E+01	G
SN-113		7.5446E+02				1.15E+02		
			391.69	7.545E+02	(	4.466E+00	5.02E-01 6.40E+01	G
CS-137		3.7002E+02				1.10E+04		
			661.66	3.700E+02	(	3.791E+00	7.56E-01 8.52E+01	G

ORTEC g v - i (3263) Env32 G53W4.25 9/7/2011 11:36:58 AM
TestAmerica, Inc Spectrum name: 12_Liquid25mLD=1_20111905.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Y-898	1.1706E+03					1.07E+02	
		898.02	1.171E+03	(	5.610E+00	4.64E-01	9.37E+01 G
Co-1173	5.6576E+02					1.93E+03	
		1173.24	5.658E+02	(	3.729E+00	6.41E-01	9.99E+01 G
Co-1332	5.7112E+02					1.93E+03	
		1332.50	5.711E+02	(	3.896E+00	6.66E-01	1.00E+02 G
Y-1836	1.2796E+03					1.07E+02	
		1836.01	1.280E+03	(	5.571E+00	5.80E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- - - -

ORTEC g v - i (3263) Env32 G53W4.25 9/7/2011 11:36:58 AM
TestAmerica, Inc Spectrum name: 12_Liquid25mLD=1_20111905.An1

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
AM-241	9.1990E+02	9.2015E+02	3.336E-01%	4.41E+00
CD-109	1.1527E+04	1.2656E+04	2.700E-01%	4.18E+01
CO-57	2.4833E+02	2.9113E+02	4.290E-01%	1.73E+00
Ce-139	3.0549E+02	4.1817E+02	4.442E-01%	2.45E+00
Hg-203	3.9104E+02	9.8793E+02	4.331E-01%	4.94E+00
SN-113	5.1827E+02	7.5446E+02	5.018E-01%	4.47E+00
CS-137	3.6857E+02	3.7002E+02	7.562E-01%	3.79E+00
Y-898	7.8046E+02	1.1706E+03	4.639E-01%	5.61E+00
Co-1173	5.5320E+02	5.6576E+02	6.413E-01%	3.73E+00
Co-1332	5.5844E+02	5.7112E+02	6.665E-01%	3.90E+00
Y-1836	8.5312E+02	1.2796E+03	5.796E-01%	5.57E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (78.1 to 1999.2 keV) 1.702E+04 Bq/Sample
Total Decayed Activity (78.1 to 1999.2 keV) 1.9984479E+04 Bq/Sample

Analyzed by: _____
admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica, Inc

Gamma Verification per Geometry

Detector: Ge17

Geometry: 25mL solid

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 56

lab ID# of cal standard 6701

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	112	0.0425	2630	2656.9	101.0
Am-241	2037	74	0.359	205	205.05	100.0
Cd-109	2881	104	0.0361	2883	2896.9	100.5
Co-57	1511	55	0.856	64	64.687	101.4
Ce-139	2139	77	0.799	97	94.403	97.6
Hg-203	4651	168	0.8146	206	213.24	103.4
Sn-113	3015	109	0.64	170	169.12	99.4
Cs-137	1938	70	0.851	82	84.917	103.2
Y-88	7264	262	0.937	280	266.71	95.2
Co-60	3580	129	0.99974	129	126.25	97.6
Co-60	3581	129	0.999856	129	129.91	100.4
Y-88	7690	278	0.992	280	286.49	102.3

Reviewed By: Megan McAfee

Date: 4/9/2012

Calibration Data from file: 17_Soil_25ml.Clb
Energy Calibration Date: 4/3/2012 Time: 7:52:59 AM
Efficiency Calibration Date: 4/3/2012 Time: 7:53:15 AM

Calibration Description:
17_25mlSoil_90099_032712

Energy Calibration Fit
Energy = 0.2064 +0.250095*Channel -2.42378e-008*Channel**2
FWHM (ch) = 2.9543 +0.001005*Channel -3.26871e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.64	46.54	46.63	-0.20%	0.77	0.79	-2.18%
237.57	59.54	59.62	-0.14%	0.78	0.80	-1.80%
351.39	88.03	88.09	-0.06%	0.85	0.83	2.52%
487.02	122.06	122.00	0.05%	0.85	0.86	-0.93%
661.89	165.85	165.73	0.07%	0.89	0.90	-1.65%
1115.18	279.17	279.08	0.03%	1.03	1.01	2.51%
1565.42	391.69	391.65	0.01%	1.13	1.11	1.81%
2645.55	661.66	661.68	-0.00%	1.35	1.35	0.13%
3591.36	898.02	898.08	-0.01%	1.54	1.53	0.37%
4692.57	1173.24	1173.26	-0.00%	1.69	1.74	-2.99%
5329.92	1332.50	1332.51	-0.00%	1.87	1.84	1.24%
7345.55	1836.01	1835.99	0.00%	2.15	2.14	0.25%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.3673 %
Ln(Eff) = 0.1994 -0.363439*Ln(Eng) -0.035753*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 0.2201 %
Ln(Eff) = -10.5992 +3.730142*Ln(Eng) -0.423149*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	8.1536E-002	8.0871E-002	0.82%
59.54	8.7762E-002	8.8717E-002	-1.09%
88.03	9.2996E-002	9.2477E-002	0.56%
122.06	8.7289E-002	8.6693E-002	0.68%
165.85	========== Knee ==========		
165.85	7.3345E-002	7.4858E-002	-2.06%
279.17	5.2502E-002	5.0720E-002	3.39%
391.69	3.8706E-002	3.8969E-002	-0.68%
661.66	2.6356E-002	2.5497E-002	3.26%
898.02	1.8829E-002	1.9735E-002	-4.81%
1173.24	1.5335E-002	1.5684E-002	-2.28%
1332.50	1.4130E-002	1.4034E-002	0.68%
1836.01	1.0791E-002	1.0553E-002	2.21%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	2635.30	112.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	207.28	74.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	2880.90	104.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	64.25	55.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	96.37	77.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	206.13	168.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	170.31	109.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	82.15	70.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	279.62	262.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	129.13	129.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	129.03	129.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	280.24	278.00	4.00%	1/1/2012 11:00:00 AM

ORTEC g v - i (1087) Env32 G53W4.25 4/3/2012 7:54:12 AM Page 1
TestAmerica, Inc. Spectrum name: 17_Soil25mL_20120269.An1

Sample description
17_Soil25mL_90099_032712

Spectrum Filename: C:\User\SPC\Det17\17_Soil25mL_20120269.An1

Acquisition information
Start time: 3/27/2012 3:45:02 PM
Live time: 7200
Real time: 7292
Dead time: 1.26 %
Detector ID: 17

Detector system
Ge17 SN/11080671

Calibration
Filename: 17_Soil_25ml.Clb
17_25mlSoil_90099_032712

Energy Calibration
Created: 4/3/2012 7:52:59 AM
Zero offset: 0.206 keV
Gain: 0.250 keV/channel
Quadratic: -2.424E-08 keV/channel^2

Efficiency Calibration
Created: 4/3/2012 7:53:15 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.37 %
Log(Eff): 1.993817E-01 + (-3.634387E-01*Log(E)) + (-3.575305E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.22 %
Log(Eff): -1.059921E+01 + (3.730142E+00*Log(E)) + (-4.231490E-01*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix & Pb.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.72keV)
Stop channel: 8000 (1999.42keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (1087) Env32 G53W4.25 4/3/2012 7:54:12 AM Page 2
TestAmerica, Inc. Spectrum name: 17_Soil25mL_20120269.An1
Page 1

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0577

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
37.91	2828.	4.80	0.78	7.202E-02				
46.63	65270.	0.52	0.77	8.095E-02	46.54	4.250	2.657E+03	Pb210
59.62	46742.	0.60	0.78	8.875E-02	59.54	35.700	2.051E+02	AM241
70.81	1350.	8.66	0.81	9.181E-02				
72.96	2280.	5.31	0.81	9.212E-02				
88.09	61194.	0.49	0.85	9.247E-02	88.03	3.610	2.897E+03	CD109
122.00	27742.	0.77	0.85	8.671E-02	122.06	85.600	6.469E+01	CO57
136.43	3533.	3.51	0.89	8.308E-02				
165.73	26338.	0.77	0.89	7.519E-02	165.85	79.900	9.440E+01	Ce139
198.90	1087.	8.90	1.16	6.549E-02				
279.08	17623.	0.89	1.03	5.073E-02	279.17	81.500	2.132E+02	Hg203
391.65	18070.	0.96	1.13	3.897E-02	391.69	64.000	1.691E+02	SN113
661.68	13211.	1.06	1.35	2.550E-02	661.66	85.210	8.492E+01	CS137
898.08	20273.	0.84	1.54	1.973E-02	898.02	93.700	2.667E+02	Y898
1173.26	13808.	1.02	1.69	1.568E-02	1173.24	99.900	1.263E+02	Co1173
1332.50	12723.	1.02	1.87	1.403E-02	1332.50	99.982	1.299E+02	Co1332
1835.96	12328.	0.94	2.15	1.055E-02	1836.01	99.200	2.865E+02	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
150.77	37.93	7784.	2828.	3.928E+04	4.80	0.777	-	D
290.82	72.94	5703.	2043.	2.217E+04	6.43	0.812	-	D
544.70	136.43	3395.	3533.	4.253E+04	3.51	0.887	-	
794.53	198.90	2365.	1087.	1.660E+04	8.90	1.158	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.64	46.63	13200.	65270.	9.065	0.52	0.768
AM-241	237.57	59.62	8928.	46742.	6.492	0.60	0.784
CD-109	351.39	88.09	7401.	61194.	8.499	0.49	0.847
CO-57	487.02	122.00	4554.	27742.	3.853	0.77	0.851
Ce-139	661.89	165.73	3493.	26338.	3.658	0.77	0.887
Hg-203	1115.18	279.08	1833.	17623.	2.448	0.89	1.035
SN-113	1565.42	391.65	2146.	18070.	2.510	0.96	1.132
CS-137	2645.55	661.68	1357.	13211.	1.835	1.06	1.348
Y-898	3591.36	898.08	1364.	20273.	2.816	0.84	1.541
Co-1173	4692.54	1173.26	845.	13808.	1.918	1.02	1.688
Co-1332	5329.90	1332.50	551.	12723.	1.767	1.02	1.868
Y-1836	7345.43	1835.96	150.	12328.	1.712	0.94	2.151

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq		COMMENTS
Pb-210	N	2.6569E+03				8.15E+03		
			46.54	2.657E+03	(	2.190E+01	5.17E-01 4.25E+00	G
AM-241		2.0505E+02				1.58E+05		
			59.54	2.051E+02	(	1.944E+00	6.03E-01 3.57E+01	G
CD-109		2.8969E+03				4.63E+02		
			88.03	2.897E+03	(	1.911E+01	4.89E-01 3.61E+00	G
CO-57		6.4687E+01				2.72E+02		
			122.06	6.469E+01	(	7.396E-01	7.73E-01 8.56E+01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
Ce-139	9.4403E+01				1.38E+02	
		165.85	9.440E+01	(	9.969E-01 7.73E-01 7.99E+01	G
Hg-203	2.1324E+02				4.66E+01	
		279.17	2.132E+02	(	2.447E+00 8.91E-01 8.15E+01	G
SN-113	1.6912E+02				1.15E+02	
		391.69	1.691E+02	(	2.046E+00 9.57E-01 6.40E+01	G

CS-137	8.4917E+01							1.10E+04	
		661.66	8.492E+01	(	1.121E+00	1.06E+00	8.52E+01	G	
Y-898	2.6671E+02							1.07E+02	
		898.02	2.667E+02	(	2.300E+00	8.35E-01	9.37E+01	G	
Co-1173	1.2625E+02							1.93E+03	
		1173.24	1.263E+02	(	1.263E+00	1.02E+00	9.99E+01	G	
Co-1332	1.2991E+02							1.93E+03	
		1332.50	1.299E+02	(	1.145E+00	1.02E+00	1.00E+02	G	
Y-1836	2.8649E+02							1.07E+02	
		1836.01	2.865E+02	(	1.387E+00	9.41E-01	9.92E+01	G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape

P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty Counting 1 Sigma	MDA

Pb-210	2.6375E+03	2.6569E+03	5.165E-01%	2.19E+01
AM-241	2.0498E+02	2.0505E+02	6.031E-01%	1.94E+00
CD-109	2.5459E+03	2.8969E+03	4.891E-01%	1.91E+01
CO-57	5.1922E+01	6.4687E+01	7.728E-01%	7.40E-01
Ce-139	6.1159E+01	9.4403E+01	7.732E-01%	9.97E-01
Hg-203	5.9211E+01	2.1324E+02	8.909E-01%	2.45E+00
SN-113	1.0063E+02	1.6912E+02	9.565E-01%	2.05E+00
CS-137	8.4456E+01	8.4917E+01	1.058E+00%	1.12E+00
Y-898	1.5227E+02	2.6671E+02	8.354E-01%	2.30E+00
Co-1173	1.2240E+02	1.2625E+02	1.021E+00%	1.26E+00
Co-1332	1.2594E+02	1.2991E+02	1.018E+00%	1.14E+00
Y-1836	1.6356E+02	2.8649E+02	9.407E-01%	1.39E+00

  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (46.5 to 1999.4 keV) 6.310E+03 Bq
Total Decayed Activity (46.5 to 1999.4 keV) 7.1946113E+03 Bq

Initial Calibration Verifications

2nd Source Verification

Detector: Ge 4

Geometry: 25 mL D=1

Reference date 1/1/2011

Source: 85520-334

Standard volume g / vial 5.32298

Standard volume transferred in g / geometry 0.5177

lab ID# of cal standard 6673

Isotope	Certified Activity gammas/sec	Geometry Activity	Abundance	Activity Bq/sample	Count Results	%recovery
Am-241	3368	328	0.359	**912.4**	960.81	105.3
Cs-137	3188	310	0.851	**364.3**	371.48	102.0
Co-60	5897	574	0.99974	**573.7**	614.66	107.1
Co-60	5897	574	0.99986	**573.6**	619.49	108.0

Reviewed By: Jody Watson

Date: 3/8/2012

ORTEC g v - i (3135) Env32 G53W4.25 3/27/2012 8:58:04 PM Page 1
TestAmerica Spectrum name: 4_D=125mL2nd_20120098.An1

Sample description
4_D=125mL_85520-334_2ndsource_030812

Spectrum Filename: W:\SPC\Det4\4_D=125mL2nd_20120098.An1

Acquisition information
Start time: 3/8/2012 3:13:50 AM
Live time: 3600
Real time: 3733
Dead time: 3.56 %
Detector ID: 4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_Liquid_D=1 25ml.Clb
4_Liquid_D=1 25ml_90101_030512

Energy Calibration
Created: 3/27/2012 8:51:16 PM
Zero offset: 0.065 keV
Gain: 0.250 keV/channel
Quadratic: -2.881E-08 keV/channel^2

Efficiency Calibration
Created: 3/27/2012 8:51:45 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.48 %
Log(Eff): 8.809878E-01 + (-6.811249E-01*Log(E)) + (-1.909804E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -1.031199E+01 + (3.529752E+00*Log(E)) + (-4.143154E-01*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.58keV)
Stop channel: 8000 (1999.27keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (3135) Env32 G53W4.25 3/27/2012 8:58:04 PM Page 2
TestAmerica Spectrum name: 4_D=125mL2nd_20120098.An1
Page 1

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2011 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0708

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
37.80	4081.	3.50	0.87	5.196E-02				
44.00	335.	28.24	0.86	5.570E-02				
49.32	965.	13.36	0.98	5.795E-02				
59.57	74149.	0.45	0.79	6.042E-02	59.54	35.700	9.568E+02	AM241
73.01	375.	29.92	1.02	6.115E-02				
88.10	73864.	0.42	0.81	5.997E-02	88.03	3.610	1.809E+04	CD109
122.06	27233.	0.71	0.86	5.409E-02	122.06	85.600	4.912E+02	CO57
136.46	3315.	3.07	0.89	5.117E-02				
165.77	16324.	1.00	0.95	4.532E-02	165.85	79.900	1.107E+03	Ce139
195.59	73.	58.82	0.94	3.899E-02				
199.02	600.	9.28	0.94	3.839E-02				
203.61	382.	20.59	0.76	3.764E-02				
229.52	38.	88.77	0.52	3.385E-02				
254.98	500.	12.21	1.05	3.082E-02				
278.99	2010.	4.05	1.08	2.843E-02	279.17	81.500	1.475E+04	Hg203
391.47	8465.	1.54	1.16	2.094E-02	391.69	64.000	2.363E+03	SN113
425.89	32.	75.99	0.32	1.940E-02				
489.73	133.	42.27	0.78	1.707E-02				
661.54	14400.	1.04	1.39	1.293E-02	661.66	85.210	3.731E+02	CS137
686.80	111.	39.50	0.75	1.249E-02				
717.92	107.	45.74	0.69	1.198E-02				
813.41	333.	17.28	1.91	1.066E-02				
898.05	7995.	1.72	1.51	9.716E-03	898.02	93.700	4.039E+03	Y898
981.05	72.	60.97	0.32	8.939E-03				
1173.29	14575.	0.97	1.75	7.545E-03	1173.24	99.900	6.274E+02	Co1173
1332.58	12862.	0.97	1.91	6.683E-03	1332.50	99.982	6.246E+02	Co1332
1835.95	4416.	1.57	2.03	4.910E-03	1836.01	99.200	4.170E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide

150.86	37.80	4264.	4081.	7.853E+04	3.50	0.869	-	s
175.65	44.00	2872.	335.	6.014E+03	28.24	0.861	-	s
196.92	49.32	5524.	965.	1.666E+04	13.36	0.984	-	s
291.63	73.01	4314.	375.	6.135E+03	29.92	1.016	-	s
545.31	136.46	1923.	3315.	6.478E+04	3.07	0.894	-	

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
782.01	195.65	606.	32.	8.208E+02	110.22	0.457	-	c
795.72	199.08	1400.	546.	1.423E+04	12.92	1.065	-	s
813.82	203.61	1516.	382.	1.015E+04	20.59	0.765	-	s
917.44	229.52	550.	38.	1.123E+03	88.77	0.518	-	sc
1019.25	254.98	1020.	500.	1.624E+04	12.21	1.049	-	
1702.73	425.89	312.	32.	1.667E+03	75.99	0.316	-	c
1958.09	489.73	821.	133.	7.772E+03	42.27	0.784	-	s
2746.37	686.80	572.	111.	8.889E+03	39.50	0.747	-	s
2870.88	717.92	601.	107.	8.957E+03	45.74	0.687	-	s
3252.91	813.41	638.	333.	3.123E+04	17.28	1.905	-	s
3923.65	981.05	538.	72.	8.110E+03	60.97	0.323	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.92	59.57	8382.	74149.	20.597	0.45	0.787
CD-109	351.96	88.10	5292.	73864.	20.518	0.42	0.805
CO-57	487.75	122.06	2536.	27233.	7.565	0.71	0.858
Ce-139	662.51	165.77	2240.	16324.	4.534	1.00	0.946
Hg-203	1115.28	278.99	1261.	2010.	0.558	4.05	1.080
SN-113	1565.10	391.47	1654.	8465.	2.351	1.54	1.160
CS-137	2645.32	661.54	1387.	14400.	4.000	1.04	1.386
Y-898	3591.55	898.05	1566.	7995.	2.221	1.72	1.507
Co-1173	4692.98	1173.29	715.	14575.	4.049	0.97	1.748
Co-1332	5330.55	1332.58	357.	12862.	3.573	0.97	1.906
Y-1836	7345.94	1835.95	53.	4416.	1.227	1.57	2.026

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
AM-241		9.5675E+02				1.58E+05	
			59.54	9.568E+02	(	5.540E+00	4.45E-01 3.57E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	1.8094E+04					4.63E+02	
		88.03	1.809E+04	(	8.370E+01	4.17E-01	3.61E+00 G
CO-57	4.9122E+02					2.72E+02	
		122.06	4.912E+02	(	4.282E+00	7.06E-01	8.56E+01 G
Ce-139	1.1068E+03					1.38E+02	
		165.85	1.107E+03	(	1.514E+01	9.95E-01	7.99E+01 G
Hg-203	1.4752E+04					4.66E+01	
		279.17	1.475E+04	(	1.235E+03	4.05E+00	8.15E+01 G
SN-113	2.3626E+03					1.15E+02	
		391.69	2.363E+03	(	5.366E+01	1.54E+00	6.40E+01 G
CS-137	3.7313E+02					1.10E+04	
		661.66	3.731E+02	(	4.567E+00	1.04E+00	8.52E+01 G
Y-898	4.0391E+03					1.07E+02	
		898.02	4.039E+03	(	9.453E+01	1.72E+00	9.37E+01 G
Co-1173	6.2742E+02					1.93E+03	
		1173.24	6.274E+02	(	5.481E+00	9.69E-01	9.99E+01 G
Co-1332	6.2462E+02					1.93E+03	
		1332.50	6.246E+02	(	4.407E+00	9.75E-01	1.00E+02 G
Y-1836	4.1702E+03					1.07E+02	
		1836.01	4.170E+03	(	3.470E+01	1.57E+00	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction

} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
AM-241	9.5494E+02	9.5675E+02	4.454E-01%	5.54E+00
CD-109	9.4759E+03	1.8094E+04	4.174E-01%	8.37E+01
CO-57	1.6337E+02	4.9122E+02	7.059E-01%	4.28E+00
Ce-139	1.2588E+02	1.1068E+03	9.954E-01%	1.51E+01
Hg-203	2.4103E+01	1.4752E+04	4.053E+00%	1.23E+03
SN-113	1.7551E+02	2.3626E+03	1.541E+00%	5.37E+01
CS-137	3.6310E+02	3.7313E+02	1.041E+00%	4.57E+00
Y-898	2.4393E+02	4.0391E+03	1.722E+00%	9.45E+01
Co-1173	5.3711E+02	6.2742E+02	9.688E-01%	5.48E+00
Co-1332	5.3471E+02	6.2462E+02	9.747E-01%	4.41E+00
Y-1836	2.5185E+02	4.1702E+03	1.573E+00%	3.47E+01

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.3 keV) 1.285E+04 Bq/Sample
Total Decayed Activity (37.6 to 1999.3 keV) 4.7597492E+04 Bq/Sample

2nd Source Verification

Detector:	Ge7
Geometry:	25mL solid
Reference date	1/1/2011
Source:	83814-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	56.25
lab ID# of cal standard	6669

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2090	76	0.359	211	217.55	103.0
Cs-137	1877	68	0.851	80	80.272	100.3
Co-60	3626	132	0.99974	132	130.26	99.0
Co-60	3627	132	0.999856	132	130.19	98.9

Reviewed By: Jody Watson

Date: 3/7/2012

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:59:23 AM Page 1
TestAmerica Spectrum name: 7_Solid25mL2nd_20120401.An1

Sample description
7_Solid25mL_83814-334_2ndsource_030712

Spectrum Filename: C:\User\SPC\Det7\7_Solid25mL2nd_20120401.An1

Acquisition information
Start time: 3/7/2012 8:19:38 PM
Live time: 7200
Real time: 7338
Dead time: 1.89 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Soil_25ml.Clb
7_25mLSoil_90099_030712

Energy Calibration
Created: 3/28/2012 8:56:59 AM
Zero offset: 0.100 keV
Gain: 0.250 keV/channel
Quadratic: 4.928E-09 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 8:57:12 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.53 %
Log(Eff): 7.199650E-01 + (-3.527641E-01*Log(E)) +
(-4.778753E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.27 %
Log(Eff): -1.235982E+01 + (4.659795E+00*Log(E)) +
(-5.277660E-01*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix & Pb.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.59keV)
Stop channel: 8000 (2000.11keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:59:23 AM Page 2
TestAmerica Spectrum name: 7_Solid25mL2nd_20120401.An1
Page 1

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2011 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2012-02-26_0327.PBC 2/26/2012 3:27:47 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0366

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.86	1472.	9.87	0.90	8.906E-02				
46.62	77395.	0.40	0.81	1.056E-01	46.54	4.250	2.483E+03	Pb210
49.63	56.	224.18	0.82	1.095E-01				
59.58	66264.	0.47	0.83	1.188E-01	59.54	35.700	2.175E+02	AM241
81.63	134.	69.10	0.44	1.257E-01				
88.03	49549.	0.55	0.87	1.254E-01	88.03	3.610	2.901E+03	CD109
121.98	14879.	1.03	0.92	1.160E-01	122.06	85.600	6.254E+01	CO57
136.36	1855.	4.45	0.98	1.101E-01				
148.63	70.	63.26	0.34	1.048E-01				
165.76	5818.	1.85	1.00	9.732E-02	165.85	79.900	9.139E+01	Ce139
199.22	284.	18.44	1.15	8.314E-02				
214.06	40.	73.65	0.54	7.814E-02				
238.69	259.	22.70	0.97	7.107E-02				
255.27	222.	26.87	0.88	6.700E-02				
279.13	206.	25.81	0.89	6.189E-02	279.17	81.500	3.463E+02	Hg203
323.46	73.	71.15	0.27	5.422E-02				
391.74	2759.	3.51	1.15	4.551E-02	391.69	64.000	1.768E+02	SN113
661.67	13267.	1.05	1.42	2.768E-02	661.66	85.210	8.027E+01	CS137
736.66	30.	70.44	0.36	2.492E-02				
869.35	26.	85.64	0.35	2.115E-02				
898.07	2280.	3.37	1.74	2.047E-02	898.02	93.700	2.729E+02	Y898
911.09	71.	59.34	0.55	2.018E-02				
925.78	65.	56.00	0.48	1.986E-02				
1095.33	158.	34.19	0.73	1.674E-02				
1107.15	136.	34.11	0.42	1.656E-02				
1153.08	63.	36.05	0.67	1.588E-02				
1173.26	12517.	0.98	1.95	1.560E-02	1173.24	99.900	1.303E+02	Co1173
1332.51	10976.	1.03	1.96	1.368E-02	1332.50	99.982	1.302E+02	Co1332
1836.06	1269.	3.35	2.57	9.752E-03	1836.01	99.200	3.011E+02	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
147.04	36.86	6199.	1472.	1.653E+04	9.87	0.895	- s
197.99	49.59	7562.	1019.	9.309E+03	15.50	1.241	- sM
326.16	81.63	3165.	134.	1.066E+03	69.10	0.439	- s

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
545.10	136.36	1355.	1855.	1.685E+04	4.45	0.975	-
594.19	148.63	746.	70.	6.633E+02	63.26	0.344	- s
796.58	199.22	865.	284.	3.412E+03	18.44	1.150	-
855.97	214.06	414.	40.	5.119E+02	73.65	0.544	- c
954.50	238.69	959.	259.	3.644E+03	22.70	0.975	-
1020.83	255.27	958.	222.	3.321E+03	26.87	0.878	- s
1293.59	323.46	750.	73.	1.346E+03	71.15	0.272	- s
2946.52	736.66	183.	30.	1.217E+03	70.44	0.362	- sc
3477.29	869.35	207.	26.	1.245E+03	85.64	0.345	- sc
3644.24	911.09	506.	71.	3.502E+03	59.34	0.552	- s
3703.01	925.78	420.	65.	3.274E+03	56.00	0.481	- s
4381.24	1095.33	552.	158.	9.437E+03	34.19	0.730	- s
4428.49	1107.15	452.	136.	8.242E+03	34.11	0.418	- s
4612.23	1153.08	143.	63.	3.966E+03	36.05	0.669	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.98	46.59	12611.	80307.	11.154	0.44	0.834
AM-241	237.94	59.58	7974.	66264.	9.203	0.47	0.831
CD-109	351.78	88.03	5488.	49549.	6.882	0.55	0.868
CO-57	487.61	121.98	2148.	14879.	2.067	1.03	0.920
Ce-139	662.74	165.76	1446.	5818.	0.808	1.85	0.997
Hg-203	1116.28	279.13	789.	206.	0.029	25.81	0.886
SN-113	1566.74	391.74	1244.	2759.	0.383	3.51	1.154
CS-137	2646.57	661.67	971.	13267.	1.843	1.05	1.419
Y-898	3592.18	898.07	748.	2280.	0.317	3.37	1.737
Co-1173	4692.94	1173.26	416.	12517.	1.738	0.98	1.948
Co-1332	5329.92	1332.51	210.	10976.	1.524	1.03	1.964
Y-1836	7343.93	1836.06	54.	1269.	0.176	3.35	2.570

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
Pb-210	N	2.5785E+03				8.15E+03	
			46.54	2.579E+03	(P	1.689E+01 4.42E-01 4.25E+00	G
AM-241		2.1755E+02				1.58E+05	
			59.54	2.175E+02	(	1.375E+00 4.73E-01 3.57E+01	G
CD-109		2.9015E+03				4.63E+02	
			88.03	2.901E+03	(	2.037E+01 5.50E-01 3.61E+00	G
CO-57		6.2544E+01				2.72E+02	
			122.06	6.254E+01	(	9.192E-01 1.03E+00 8.56E+01	G
Ce-139		9.1389E+01				1.38E+02	
			165.85	9.139E+01	(	2.826E+00 1.85E+00 7.99E+01	G
Hg-203		3.4626E+02				4.66E+01	
			279.17	3.463E+02	(	2.242E+02 2.58E+01 8.15E+01	G
SN-113		1.7679E+02				1.15E+02	
			391.69	1.768E+02	(	1.070E+01 3.51E+00 6.40E+01	G
CS-137		8.0272E+01				1.10E+04	
			661.66	8.027E+01	(	8.948E-01 1.05E+00 8.52E+01	G
Y-898		2.7291E+02				1.07E+02	
			898.02	2.729E+02	(	1.557E+01 3.37E+00 9.37E+01	G
Co-1173		1.3026E+02				1.93E+03	
			1173.24	1.303E+02	(	1.017E+00 9.83E-01 9.99E+01	G
Co-1332		1.3019E+02				1.93E+03	
			1332.50	1.302E+02	(	8.331E-01 1.03E+00 1.00E+02	G
Y-1836		3.0110E+02				1.07E+02	
			1836.01	3.011E+02	(	8.768E+00 3.35E+00 9.92E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.

P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma MDA Bq/Sample
Pb-210	2.4856E+03	2.5785E+03	4.426E-01%	1.69E+01
AM-241	2.1714E+02	2.1755E+02	4.728E-01%	1.38E+00
CD-109	1.5202E+03	2.9015E+03	5.499E-01%	2.04E+01
CO-57	2.0816E+01	6.2544E+01	1.030E+00%	9.19E-01
Ce-139	1.0409E+01	9.1389E+01	1.851E+00%	2.83E+00
Hg-203	5.6817E-01	3.4626E+02	2.581E+01%	2.24E+02
SN-113	1.3156E+01	1.7679E+02	3.512E+00%	1.07E+01
CS-137	7.8116E+01	8.0272E+01	1.050E+00%	8.95E-01
Y-898	1.6512E+01	2.7291E+02	3.366E+00%	1.56E+01
Co-1173	1.1152E+02	1.3026E+02	9.834E-01%	1.02E+00
Co-1332	1.1146E+02	1.3019E+02	1.029E+00%	8.33E-01
Y-1836	1.8218E+01	3.0110E+02	3.352E+00%	8.77E+00

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:59:23 AM Page 6
TestAmerica Spectrum name: 7_Solid25mL2nd_20120401.An1

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.1 keV) 4.604E+03 Bq/Sample
Total Decayed Activity (37.6 to 2000.1 keV) 7.2892856E+03 Bq/Sample

2nd Source Verification

Detector: Ge 7

Geometry: 25 mL D=1

Reference date 1/1/2011

Source: 83925-334

Standard volume g / vial 5.29152

Standard volume transferred in g / geometry 0.5067

lab ID# of cal standard 6673

Isotope	Certified Activity gammas/sec	Geometry Activity	Abundance	Activity Bq/sample	Count Results	%recovery
Am-241	3254	312	0.359	**867.9**	929.11	107.0
Cs-137	3106	297	0.851	**349.5**	373.86	107.0
Co-60	6000	575	0.99974	**574.7**	607.64	105.7
Co-60	6003	575	0.99986	**574.9**	612.65	106.6

Reviewed By: Jody Watson

Date: 4/12/2012

ORTEC g v - i (3263) Env32 G53W4.25 4/23/2012 2:07:40 PM Page 1
TestAmerica Spectrum name: 7_25mLD=12nd_20120604.An1

Sample description
7_25mLD=12nd_85520-334_041212

Spectrum Filename: C:\User\SPC\Det7\7_25mLD=12nd_20120604.An1

Acquisition information
Start time: 4/12/2012 7:52:15 PM
Live time: 3600
Real time: 3803
Dead time: 5.33 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Liquid_D=1 25ml.Clb
7_25mld=1_90101_032612

Energy Calibration
Created: 3/28/2012 9:22:02 AM
Zero offset: 0.129 keV
Gain: 0.250 keV/channel
Quadratic: 5.398E-09 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 9:22:15 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.82 %
Log(Eff): -7.206837E-02 + (-5.220592E-02*Log(E)) + (-7.214522E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.58 %
Log(Eff): -1.343090E+01 + (5.323811E+00*Log(E)) + (-6.125181E-01*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.62keV)
Stop channel: 8000 (1999.96keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (3263) Env32 G53W4.25 4/23/2012 2:07:40 PM Page 2
TestAmerica Spectrum name: 7_25mLD=12nd_20120604.An1
Page 1

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2011 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2012-04-01_0533.PBC 4/1/2012 5:33:35 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0588

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.43	1825.	6.75	0.87	1.098E-01				
37.89	5397.	2.56	0.88	1.138E-01				
43.56	579.	22.56	0.83	1.271E-01				
49.44	3458.	6.01	1.42	1.375E-01				
59.57	177550.	0.28	0.86	1.490E-01	59.54	35.700	9.291E+02	AM241
66.59	892.	19.13	0.37	1.532E-01				
73.20	116.	97.62	0.91	1.550E-01				
74.91	77.	163.63	0.91	1.552E-01				
77.89	392.	32.50	0.91	1.552E-01				
88.02	167199.	0.28	0.91	1.536E-01	88.03	3.610	1.687E+04	CD109
121.98	60039.	0.49	0.96	1.365E-01	122.06	85.600	4.701E+02	CO57
136.38	7130.	2.12	0.93	1.273E-01				
165.75	31388.	0.70	1.00	1.085E-01	165.85	79.900	1.061E+03	Ce139
171.73	111.	60.36	0.33	1.053E-01				
199.04	2428.	5.86	1.23	9.348E-02				
203.59	614.	18.07	1.25	9.177E-02				
223.07	107.	45.30	0.41	8.510E-02				
228.40	200.	41.38	0.44	8.344E-02				
255.06	796.	12.01	1.30	7.601E-02				
279.13	2902.	4.58	1.08	7.035E-02	279.17	81.500	1.463E+04	Hg203
310.45	155.	43.52	0.64	6.412E-02				
364.80	27.	195.79	0.00	5.553E-02				
382.44	121.	40.24	0.99	5.320E-02				
391.70	16380.	1.13	1.22	5.205E-02	391.69	64.000	2.280E+03	SN113
516.34	54.	64.42	0.42	4.022E-02				
532.72	133.	44.32	0.84	3.904E-02				
639.13	47.	71.55	0.30	3.271E-02				
656.28	102.	46.64	1.46	3.187E-02				
661.61	34790.	0.57	1.47	3.161E-02	661.66	85.210	3.696E+02	CS137
677.55	78.	54.05	0.55	3.087E-02				
740.13	188.	37.66	0.52	2.826E-02				

807.52	233.	41.90	0.56	2.588E-02				
843.71	91.	43.48	0.56	2.475E-02				
897.94	14497.	1.26	1.69	2.321E-02	898.02	93.700	3.867E+03	Y898
908.26	205.	47.83	0.54	2.294E-02				
1030.51	100.	44.14	0.28	2.010E-02				
1058.41	202.	40.11	0.75	1.955E-02				
1173.09	32348.	0.63	1.86	1.752E-02	1173.24	99.900	6.076E+02	Co1173
1300.50	65.	41.07	0.37	1.567E-02				
1332.33	28445.	0.65	2.00	1.527E-02	1332.50	99.982	6.126E+02	Co1332
1636.57	70.	40.15	0.48	1.216E-02				
1835.79	7962.	1.24	2.36	1.068E-02	1836.01	99.200	4.359E+03	Y1836
1880.34	22.	48.10	0.72	1.040E-02				

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
145.22	36.38	6680.	1825.	1.662E+04	6.75	0.874	-	D
151.09	37.85	6856.	5397.	4.742E+04	2.56	0.876	-	D
173.76	43.56	5202.	579.	4.555E+03	22.56	0.834	-	s
197.28	49.44	12523.	3458.	2.514E+04	6.01	1.421	-	s

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
265.91	66.59	8458.	892.	5.820E+03	19.13	0.373	-	s
291.50	73.04	6174.	225.	1.452E+03	49.82	0.910	-	D
299.20	74.96	7848.	77.	4.946E+02	163.63	0.912	-	c
310.48	77.73	8244.	629.	4.050E+03	26.00	0.806	-	s
545.12	136.38	3778.	7130.	5.602E+04	2.12	0.935	-	
686.57	171.73	1652.	111.	1.058E+03	60.36	0.332	-	s
795.85	199.04	4110.	2428.	2.597E+04	5.86	1.226	-	
814.04	203.59	3195.	614.	6.694E+03	18.07	1.250	-	s
891.97	223.07	1121.	107.	1.257E+03	45.30	0.409	-	s
913.31	228.40	2216.	200.	2.397E+03	41.38	0.436	-	s
1019.98	255.06	2382.	796.	1.047E+04	12.01	1.299	-	
1241.57	310.45	1551.	155.	2.417E+03	43.52	0.643	-	s
1459.00	364.80	1107.	27.	4.862E+02	195.79	0.000	-	sc
1529.59	382.44	964.	121.	2.274E+03	40.24	0.988	-	s
2065.27	516.34	578.	54.	1.343E+03	64.42	0.418	-	sc
2130.80	532.72	1114.	133.	3.407E+03	44.32	0.839	-	s
2556.52	639.13	542.	47.	1.437E+03	71.55	0.300	-	sc
2625.00	656.25	642.	59.	1.862E+03	64.17	0.436	-	sM
2710.21	677.55	735.	78.	2.537E+03	54.05	0.555	-	s
2960.57	740.13	1261.	188.	6.657E+03	37.66	0.518	-	s
3230.17	807.52	1800.	233.	9.003E+03	41.90	0.560	-	s
3374.95	843.71	632.	91.	3.677E+03	43.48	0.563	-	s
3633.16	908.26	2009.	205.	8.923E+03	47.83	0.541	-	s
4122.21	1030.51	688.	100.	4.958E+03	44.14	0.276	-	s
4233.81	1058.41	1414.	202.	1.034E+04	40.11	0.747	-	s
5202.24	1300.50	185.	65.	4.147E+03	41.07	0.366	-	s
6546.50	1636.57	180.	70.	5.756E+03	40.15	0.479	-	s
7521.56	1880.34	30.	22.	2.116E+03	48.10	0.721	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.84	59.57	15206.	177550.	49.319	0.28	0.856
CD-109	351.64	88.02	10997.	167199.	46.444	0.28	0.909
CO-57	487.52	121.98	5647.	60039.	16.678	0.49	0.964
Ce-139	662.64	165.75	3801.	31388.	8.719	0.70	1.001
Hg-203	1116.25	279.13	3172.	2902.	0.806	4.58	1.075
SN-113	1566.62	391.70	3337.	16380.	4.550	1.13	1.218

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-137	2646.31	661.57	2470.	35196.	9.777	0.63	1.481
Y-898	3591.88	897.94	3048.	14497.	4.027	1.26	1.691
Co-1173	4692.57	1173.09	1348.	32348.	8.986	0.63	1.856
Co-1332	5329.54	1332.33	750.	28445.	7.901	0.65	2.003
Y-1836	7343.31	1835.78	216.	7984.	2.218	1.25	2.356

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Peak Code	Peak MDA Value Bq/Sample	COMMENTS
AM-241		9.2911E+02				1.58E+05	
			59.54	9.291E+02	(	3.021E+00 2.76E-01 3.57E+01	G
CD-109		1.6871E+04				4.63E+02	
			88.03	1.687E+04	(	4.958E+01 2.78E-01 3.61E+00	G
CO-57		4.7012E+02				2.72E+02	
			122.06	4.701E+02	(	2.763E+00 4.90E-01 8.56E+01	G
Ce-139		1.0611E+03				1.38E+02	
			165.85	1.061E+03	(	9.804E+00 7.02E-01 7.99E+01	G
Hg-203		1.4630E+04				4.66E+01	
			279.17	1.463E+04	(	1.337E+03 4.58E+00 8.15E+01	G
SN-113		2.2795E+03				1.15E+02	
			391.69	2.280E+03	(	3.784E+01 1.13E+00 6.40E+01	G
CS-137		3.7386E+02				1.10E+04	
			661.66	3.739E+02	(	2.489E+00 6.28E-01 8.52E+01	G
Y-898		3.8673E+03				1.07E+02	
			898.02	3.867E+03	(	6.936E+01 1.26E+00 9.37E+01	G
Co-1173		6.0764E+02				1.93E+03	
			1173.24	6.076E+02	(	3.264E+00 6.30E-01 9.99E+01	G

Co-1332 6.1265E+02 1.93E+03
1332.50 6.126E+02 (2.807E+00 6.45E-01 1.00E+02 G

Y-1836 4.3709E+03 1.07E+02
1836.01 4.371E+03 (3.898E+01 1.25E+00 9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
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= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

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T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
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M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
AM-241	9.2720E+02	9.2911E+02	2.764E-01%	3.02E+00
CD-109	8.3754E+03	1.6871E+04	2.784E-01%	4.96E+01
CO-57	1.4275E+02	4.7012E+02	4.895E-01%	2.76E+00
Ce-139	1.0083E+02	1.0611E+03	7.016E-01%	9.80E+00
Hg-203	1.4062E+01	1.4630E+04	4.584E+00%	1.34E+03
SN-113	1.3658E+02	2.2795E+03	1.129E+00%	3.78E+01
CS-137	3.6299E+02	3.7386E+02	6.275E-01%	2.49E+00

7_25mLD=12nd_20120604

Y-898	1.8518E+02	3.8673E+03	1.259E+00%	6.94E+01
Co-1173	5.1353E+02	6.0764E+02	6.302E-01%	3.26E+00
Co-1332	5.1776E+02	6.1265E+02	6.453E-01%	2.81E+00

Y-1836	2.0930E+02	4.3709E+03	1.248E+00%	3.90E+01

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

S U M M A R Y

Total Activity (77.6 to 2000.0 keV) 1.149E+04 Bq/Sample
Total Decayed Activity (77.6 to 2000.0 keV) 4.6073586E+04 Bq/Sample

2nd Source Verification

Detector:	Ge 12
Geometry:	25mL D=1
Reference date	1/1/2010
Source:	81593-334
Standard volume g / vial	5.31128
Standard volume transferred in g / geometry	0.5096
lab ID# of cal standard	Rad10-0042

Isotope	Certified Activity gammas/sec	Geometry Activity	Abundance	Activity Bq/sample	Count Results	%recovery
Am-241	3474	333	0.359	**928.5**	968.4	104.3
Cs-137	3289	316	0.851	**370.8**	384.55	103.7
Co-60	6166	592	0.99974	**591.8**	588.21	99.4
Co-60	6169	592	0.99986	**592.0**	601.63	101.6

Reviewed By: Jody Watson

Date: 9/6/2011

ORTEC g v - i (3263) Env32 G53W4.25 9/7/2011 8:23:34 AM
TestAmerica, Inc Spectrum name: 12_25mLD=12nd_20111928.An1

Sample description
12_25mLD=12nd_81593-334_090611

Spectrum Filename: C:\User\SPC\Det12\12_25mLD=12nd_20111928.An1

Acquisition information
Start time: 9/6/2011 7:27:31 AM
Live time: 3600
Real time: 3766
Dead time: 4.40 %
Detector ID: 12

Detector system
Ge12 SN/10034336

Calibration
Filename: 12_Liquid_D=1 25ml.Clb
Ge12_25mLd=1Cal_85520-334_090111

Energy Calibration
Created: 9/2/2011 6:53:12 AM
Zero offset: 0.025 keV
Gain: 0.250 keV/channel
Quadratic: -3.733E-08 keV/channel^2

Efficiency Calibration
Created: 9/2/2011 7:07:23 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 2.02 %
Log(Eff): -6.442716E-01 + (-8.678082E-03*Log(E)) +
(-6.444773E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.33 %
Log(Eff): -1.236768E+01 + (4.728110E+00*Log(E)) +
(-5.423915E-01*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.55keV)
Stop channel: 8000 (1999.18keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error:	1.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2011-08-29_0027.PBC 8/29/2011 12:27:29 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 10 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 0.0611

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.41	1530.	6.47	0.89	9.242E-02				
37.86	1162.	9.24	0.89	9.539E-02				
43.68	944.	14.89	1.56	1.057E-01				
49.55	3158.	6.97	1.42	1.135E-01				
59.56	151412.	0.30	0.87	1.220E-01	59.54	35.700	9.684E+02	AM241
66.32	103.	75.06	0.13	1.251E-01				
81.70	91.	92.39	0.93	1.268E-01				
83.46	9.	972.50	0.93	1.267E-01				
88.03	84896.	0.38	0.90	1.260E-01	88.03	3.610	1.299E+04	CD109
122.05	21792.	0.81	0.95	1.140E-01	122.06	85.600	2.961E+02	CO57
136.47	2742.	3.23	0.94	1.073E-01				
165.85	5468.	2.15	1.02	9.327E-02	165.85	79.900	4.463E+02	Ce139
199.11	340.	23.99	0.87	8.239E-02				
278.80	78.	87.41	1.11	6.475E-02	279.17	81.500	HL>Cutoff	Hg203
334.14	68.	60.97	0.71	5.662E-02				
391.50	2536.	4.17	1.14	5.014E-02	391.69	64.000	8.804E+02	SN113
496.05	101.	47.58	0.52	4.155E-02				
529.79	41.	74.42	0.42	3.939E-02				
544.94	64.	45.67	0.74	3.849E-02				
661.57	37156.	0.58	1.46	3.274E-02	661.66	85.210	3.846E+02	CS137
897.89	1912.	5.71	1.49	2.514E-02	898.02	93.700	1.213E+03	Y898
946.97	47.	95.26	0.41	2.398E-02				
1173.08	33502.	0.65	1.89	1.975E-02	1173.24	99.900	5.882E+02	Co1173
1332.35	30474.	0.62	1.95	1.755E-02	1332.50	99.982	6.016E+02	Co1332
1459.80	102.	24.65	0.39	1.610E-02				
1520.49	41.	33.41	0.42	1.549E-02				
1647.33	24.	36.44	0.53	1.435E-02				
1835.76	1181.	3.88	2.56	1.291E-02	1836.01	99.200	1.377E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
145.44	36.35	4132.	1536.	1.856E-04	6.47	0.885	-	D

151.24	37.81	5191.	1162.	1.219E+04	9.24	0.886	-	D
174.51	43.68	5382.	944.	8.936E+03	14.89	1.565	-	s
197.95	49.55	12942.	3158.	2.784E+04	6.97	1.420	-	s

ORTEC g v - i (3263) Env32 G53W4.25 9/7/2011 8:23:34 AM
TestAmerica, Inc Spectrum name: 12_25mLD=12nd_20111928.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
264.97	66.32	2501.	103.	8.205E+02	75.06	0.129	- sc
326.48	81.66	3475.	91.	7.160E+02	92.39	0.927	- sc
333.48	83.41	3603.	9.	6.895E+01	972.50	0.928	- sc
545.39	136.47	1538.	2742.	2.556E+04	3.23	0.944	-
795.81	199.11	1798.	340.	4.121E+03	23.99	0.866	-
1335.70	334.14	715.	68.	1.207E+03	60.97	0.713	- s
1983.15	496.05	785.	101.	2.439E+03	47.58	0.518	- s
2118.08	529.79	418.	41.	1.049E+03	74.42	0.422	- sc
2178.68	544.94	369.	64.	1.672E+03	45.67	0.745	- s
3786.99	946.97	783.	47.	1.960E+03	95.26	0.414	- sc
5839.70	1459.80	74.	102.	6.335E+03	24.65	0.393	- s
6082.71	1520.49	40.	41.	2.647E+03	33.41	0.425	- s
6590.62	1647.33	21.	24.	1.673E+03	36.44	0.525	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.97	59.56	12410.	151412.	42.059	0.30	0.874
CD-109	351.75	88.03	5469.	84896.	23.582	0.38	0.905
CO-57	487.76	122.05	2302.	21792.	6.053	0.81	0.950
Ce-139	662.87	165.85	1992.	5468.	1.519	2.15	1.023
Hg-203	1114.43	278.80	2278.	78.	0.022	87.41	1.106s
SN-113	1565.04	391.50	2000.	2536.	0.704	4.17	1.143
CS-137	2645.18	661.57	1764.	37156.	10.321	0.58	1.458
Y-898	3590.61	897.89	1881.	1912.	0.531	5.71	1.489
Co-1173	4691.90	1173.08	1670.	33502.	9.306	0.65	1.889
Co-1332	5329.44	1332.35	704.	30474.	8.465	0.62	1.954
Y-1836	7345.34	1835.76	110.	1181.	0.328	3.88	2.556

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
AM-241		9.6840E+02				1.58E+05	
			59.54	9.684E+02	(	3.338E+00 2.98E-01 3.57E+01	G
CD-109		1.2987E+04				4.63E+02	
			88.03	1.299E+04	(	5.313E+01 3.85E-01 3.61E+00	G
CO-57		2.9607E+02				2.72E+02	
			122.06	2.961E+02	(	3.075E+00 8.13E-01 8.56E+01	G
Ce-139		4.4626E+02				1.38E+02	
			165.85	4.463E+02	(	1.719E+01 2.15E+00 7.99E+01	G
Hg-203		4.0990E-01				4.66E+01	
			279.17	4.099E-01	(	1.185E+00 8.74E+01 8.15E+01	G
SN-113		8.8038E+02				1.15E+02	
			391.69	8.804E+02	(	7.329E+01 4.17E+00 6.40E+01	G
CS-137		3.8455E+02				1.10E+04	
			661.66	3.846E+02	(	2.054E+00 5.84E-01 8.52E+01	G
Y-898		1.2131E+03				1.07E+02	
			898.02	1.213E+03	(	1.299E+02 5.71E+00 9.37E+01	G
Co-1173		5.8821E+02				1.93E+03	
			1173.24	5.882E+02	(	3.391E+00 6.48E-01 9.99E+01	G
Co-1332		6.0163E+02				1.93E+03	
			1332.50	6.016E+02	(	2.494E+00 6.23E-01 1.00E+02	G
Y-1836		1.3774E+03				1.07E+02	
			1836.01	1.377E+03	(	6.016E+01 3.88E+00 9.92E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide

failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- - - -

ORTEC g v - i (3263) Env32 G53W4.25 9/7/2011 8:23:34 AM
TestAmerica, Inc Spectrum name: 12_25mLD=12nd_20111928.An1

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (87.8 to 1999.2 keV) 7.627E+03 Bq/Sample
Total Decayed Activity (87.8 to 1999.2 keV) 1.9742869E+04 Bq/Sample

Analyzed by: _____
admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica, Inc

2nd Source Verification

Detector: Ge17

Geometry: 25mL solid

Reference date 1/1/2011

Source: 83814-334

Standard volume g / vial 1550

Standard volume transferred in g / geometry 56.25

lab ID# of cal standard 6669

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2090	76	0.359	211	219.29	103.8
Cs-137	1877	68	0.851	80	81.57	101.9
Co-60	3626	132	0.99974	132	130.2	98.9
Co-60	3627	132	0.999856	132	132.43	100.6

Reviewed By: Megan McAfee

Date: 4/17/2012

ORTEC g v - i (3263) Env32 G53W4.25 4/17/2012 9:59:56 AM Page 1
TestAmerica, Inc. Spectrum name: 17_25mLSolid2nd_20120320.An1

Sample description
17_25mLSolid2nd_83814-334_041212

Spectrum Filename: C:\User\SPC\Det17\17_25mLSolid2nd_20120320.An1

Acquisition information
Start time: 4/12/2012 7:55:45 PM
Live time: 7200
Real time: 7254
Dead time: 0.74 %
Detector ID: 17

Detector system
Ge17 SN/11080671

Calibration
Filename: 17_Soil_25ml.Clb
17_25mlSoil_90099_032712

Energy Calibration
Created: 4/3/2012 7:52:59 AM
Zero offset: 0.206 keV
Gain: 0.250 keV/channel
Quadratic: -2.424E-08 keV/channel^2

Efficiency Calibration
Created: 4/3/2012 7:53:15 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.37 %
Log(Eff): 1.993817E-01 + (-3.634387E-01*Log(E)) + (-3.575305E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.22 %
Log(Eff): -1.059921E+01 + (3.730142E+00*Log(E)) + (-4.231490E-01*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix & Pb.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.72keV)
Stop channel: 8000 (1999.42keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (3263) Env32 G53W4.25 4/17/2012 9:59:56 AM Page 2
TestAmerica, Inc. Spectrum name: 17_25mLSolid2nd_20120320.An1
Page 1

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2011 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	17_2012-04-01_0328.PBC 4/1/2012 3:28:52 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0669

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.94	1378.	9.67	0.78	7.077E-02				
40.49	156.	71.14	0.57	7.502E-02				
46.67	61982.	0.50	0.76	8.098E-02	46.54	4.250	2.600E+03	Pb210
49.88	962.	15.23	1.14	8.344E-02				
59.65	49903.	0.56	0.75	8.876E-02	59.54	35.700	2.193E+02	AM241
77.14	180.	51.38	0.73	9.252E-02				
88.12	35017.	0.64	0.82	9.247E-02	88.03	3.610	2.935E+03	CD109
122.04	10374.	1.25	0.84	8.670E-02	122.06	85.600	6.394E+01	CO57
136.43	1284.	5.01	0.93	8.308E-02				
144.00	38.	84.51	0.52	8.107E-02				
165.78	3824.	2.43	0.94	7.518E-02	165.85	79.900	9.345E+01	Ce139
183.79	30.	111.53	0.92	6.942E-02				
185.66	125.	32.43	0.92	6.891E-02				
238.42	292.	20.08	0.92	5.719E-02				
278.99	72.	61.22	1.01	5.072E-02	279.17	81.500	PBC<MDA	Hg203
366.09	26.	103.43	0.40	4.110E-02				
391.69	1907.	3.99	1.10	3.897E-02	391.69	64.000	1.772E+02	SN113
459.39	39.	66.32	0.67	3.432E-02				
468.72	56.	46.06	0.71	3.378E-02				
661.71	12389.	1.02	1.33	2.550E-02	661.66	85.210	8.157E+01	CS137
786.50	52.	41.32	0.73	2.207E-02				
898.16	1906.	4.41	1.54	1.973E-02	898.02	93.700	2.990E+02	Y898
1173.30	12414.	0.97	1.72	1.568E-02	1173.24	99.900	1.302E+02	Co1173
1332.56	11307.	0.98	1.84	1.403E-02	1332.50	99.982	1.324E+02	Co1332
1643.96	16.	36.80	0.70	1.165E-02				
1836.05	1038.	3.39	2.03	1.055E-02	1836.01	99.200	2.876E+02	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide

146.88	36.94	5172.	1378.	1.948E+04	9.67	0.783	-	s
161.07	40.49	5235.	156.	2.084E+03	71.14	0.575	-	sc
198.64	49.88	6476.	962.	1.153E+04	15.23	1.142	-	s

ORTEC g v - i (3263) Env32 G53W4.25 4/17/2012 9:59:56 AM Page 3
TestAmerica, Inc. Spectrum name: 17_25mLSolid2nd_20120320.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
307.62	77.14	2961.	180.	1.947E+03	51.38	0.735	-	s
544.70	136.43	952.	1284.	1.546E+04	5.01	0.928	-	
574.99	144.00	467.	38.	4.729E+02	84.51	0.523	-	c
734.12	183.83	551.	30.	4.344E+02	111.53	0.919	-	c
741.57	185.69	757.	125.	1.811E+03	32.43	0.921	-	D
952.59	238.42	902.	292.	5.115E+03	20.08	0.921	-	
1463.19	366.09	307.	26.	6.407E+02	103.43	0.404	-	c
1836.35	459.39	288.	39.	1.131E+03	66.32	0.674	-	c
1873.67	468.72	285.	56.	1.668E+03	46.06	0.708	-	s
3144.93	786.50	160.	52.	2.333E+03	41.32	0.732	-	s
6576.69	1643.96	8.	16.	1.373E+03	36.80	0.699	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.78	46.67	10351.	61831.	8.588	0.50	0.758
AM-241	237.68	59.65	6888.	49903.	6.931	0.56	0.754
CD-109	351.52	88.12	3819.	35017.	4.863	0.64	0.816
CO-57	487.17	122.04	1644.	10374.	1.441	1.25	0.841
Ce-139	662.07	165.78	1197.	3824.	0.531	2.43	0.939
Hg-203	1114.82	278.99	922.	72.	0.010	61.22	1.009
SN-113	1565.56	391.69	861.	1907.	0.265	3.99	1.095
CS-137	2645.68	661.71	639.	12389.	1.721	1.02	1.327
Y-898	3591.71	898.16	816.	1906.	0.265	4.41	1.538
Co-1173	4692.74	1173.30	348.	12414.	1.724	0.97	1.722
Co-1332	5330.15	1332.56	120.	11307.	1.570	0.98	1.842
Y-1836	7345.82	1836.05	23.	1038.	0.144	3.39	2.028

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

ORTEC g v - i (3263) Env32 G53W4.25 4/17/2012 9:59:56 AM Page 4
TestAmerica, Inc. Spectrum name: 17_25mLSolid2nd_20120320.An1

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity Bq/Sample	Peak Energy keV	Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS

Pb-210	N	2.5999E+03					8.15E+03		
			46.54	2.600E+03	(P	2.005E+01	5.04E-01	4.25E+00	G
AM-241		2.1929E+02					1.58E+05		
			59.54	2.193E+02	(	1.711E+00	5.58E-01	3.57E+01	G
CD-109		2.9346E+03					4.63E+02		
			88.03	2.935E+03	(	2.436E+01	6.44E-01	3.61E+00	G
CO-57		6.3943E+01					2.72E+02		
			122.06	6.394E+01	(	1.181E+00	1.25E+00	8.56E+01	G
Ce-139		9.3451E+01					1.38E+02		
			165.85	9.345E+01	(	4.006E+00	2.43E+00	7.99E+01	G
Hg-203		2.5000E+02					4.66E+01		
			279.17	2.500E+02	?(	5.043E+02	6.12E+01	8.15E+01	G
SN-113		1.7725E+02					1.15E+02		
			391.69	1.772E+02	(	1.296E+01	3.99E+00	6.40E+01	G
CS-137		8.1570E+01					1.10E+04		
			661.66	8.157E+01	(	7.934E-01	1.02E+00	8.52E+01	G
Y-898		2.9898E+02					1.07E+02		
			898.02	2.990E+02	(	2.131E+01	4.41E+00	9.37E+01	G
Co-1173		1.3020E+02					1.93E+03		
			1173.24	1.302E+02	(	9.402E-01	9.68E-01	9.99E+01	G
Co-1332		1.3243E+02					1.93E+03		
			1332.50	1.324E+02	(	6.296E-01	9.78E-01	1.00E+02	G
Y-1836		2.8760E+02					1.07E+02		
			1836.01	2.876E+02	(	6.943E+00	3.39E+00	9.92E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went
negative during deconvolution.
? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide
failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the
library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation

Peak Codes:
G - Gamma Ray
X - X-Ray

```
  I - Fission Product                 P - Positron Decay
  N - Naturally Occurring Isotope     S - Single-Escape
  P - Photon Reaction                 D - Double-Escape
  C - Charged Particle Reaction       K - Key Line
  M - No MDA Calculation              A - Not in Average
  R - Coincidence Corrected           C - Coincidence Peak
  H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


*************** D I S C A R D E D  I S O T O P E  P E A K S ***************
Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
           Energy   Counts     Counts     Cts/Sec  1 Sigma %
_____________________________________________________________________________
  P - Peakbackground subtraction

*****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
         Time of Count  Time Corrected  Uncertainty  1 Sigma
Nuclide     Activity       Activity       Counting                    MDA
               Bq/Sample     Bq/Sample                                  Bq/Sample

_____________________________________________________________________________
Pb-210       2.4986E+03    2.5999E+03    5.055E-01%                 2.00E+01
AM-241       2.1884E+02    2.1929E+02    5.577E-01%                 1.71E+00
CD-109       1.4568E+03    2.9346E+03    6.445E-01%                 2.44E+01
CO-57        1.9416E+01    6.3943E+01    1.255E+00%                 1.18E+00
Ce-139       8.8798E+00    9.3451E+01    2.427E+00%                 4.01E+00
Hg-203 #A    2.4028E-01    2.5000E+02    6.122E+01%                 5.04E+02
SN-113       1.0620E+01    1.7725E+02    3.987E+00%                 1.30E+01
CS-137       7.9199E+01    8.1570E+01    1.018E+00%                 7.93E-01
Y-898        1.4316E+01    2.9898E+02    4.413E+00%                 2.13E+01
Co-1173      1.1004E+02    1.3020E+02    9.681E-01%                 9.40E-01
Co-1332      1.1192E+02    1.3243E+02    9.779E-01%                 6.30E-01
Y-1836       1.3771E+01    2.8760E+02    3.389E+00%                 6.94E+00
```

ORTEC g v - i (3263) Env32 G53W4.25 4/17/2012 9:59:56 AM Page 6
TestAmerica, Inc. Spectrum name: 17_25mLSolid2nd_20120320.An1

```
  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
----------------------------   S U M M A R Y   ----------------------------
Total Activity (  238.3 to  1999.4 keV)     4.543E+03  Bq/Sample
Total Decayed Activity (  238.3 to  1999.4 keV) 7.2692256E+03  Bq/Sample
```

Annual Calibration Verifications

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector # 4**
SpectrumID: 4_20130227011_EffVerif
Analysis Description: ACVTop-91774;Tuna Can 2006
Calibration: 4_Soil_TunaCan_90099_033012
Detector: Ge 4 SN/181

Verification Date: 2013-02-27 16:17
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.48E+02	0.3%
Cs-137	661.66	400	3.83E+02	4.3%
Co-1332	1332.5	777	7.45E+02	4.1%

Comments:

Perform ____KM 2/27/13_____ Reviev ___RM 2/27/13_____

C:\User\CRpt\4_20130227011_EffVerif.xls

Sample Description: ACVTop-91774;Tuna Can 2006
Detector: Ge 4 SN/181
Source Date: 10/1/2006 11:00
Acquired: 2/27/2013 16:17:24
Analyzed: 3/4/2013 09:45

Analyst: Jody Watson

Efficiency: 4_Soil_TunaCan_90099_033012
Library: DET_EfficiencyVerification.lib

Nuclide	Activity uCi/Source	Uncertainty %
AM-241	4.478E+02	0.56
CS-137	3.829E+02	0.86
Co-1332	7.452E+02	1.09
Total	1.576E+03	

TestAmerica Spectrum name: 4_20130227011_EffVerif.An1

Sample description
ACVTop-91774;Tuna Can 2006

Spectrum Filename: C:\User\SPC\Det4\4_20130227011_EffVerif.An1

Acquisition information
Start time: 2/27/2013 4:17:24 PM
Live time: 7200
Real time: 7253
Dead time: 0.72 %
Detector ID: 4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_Soil_TunaCan.Clb
4_Soil_TunaCan_90099_033012

Energy Calibration
Created: 2/28/2012 2:55:17 PM
Zero offset: 0.091 keV
Gain: 0.250 keV/channel
Quadratic: -2.917E-08 keV/channel^2

Efficiency Calibration
Created: 4/2/2012 1:19:41 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.78 %
Log(Eff): -3.983609E-01 + (-5.746278E-01*Log(E)) + (-2.046438E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.80 %
Log(Eff): -2.546791E+01 + (9.285295E+00*Log(E)) + (-9.904428E-01*Log(E)^2)

Library Files
Main analysis library: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (1999.44keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.

       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                          Status          Comments
       Decay correct to date:         YES       10/1/2006 11:00:00 AM
       Decay during acquisition:      YES
       Decay during collection:       NO
       True coincidence correction:   NO
       Peaked background correction:  NO
       Absorption (Internal):         NO
       Geometry correction:           NO
       Random summing:                NO


total peaks alloc.    3 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.1108

*****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
 Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
 Energy                             Factor    Energy   Ratio    uCi/Sour
_____________________________________________________________________________
   46.55    47124.   0.63   0.76  1.208E-02
   59.59    54866.   0.56   0.76  1.721E-02    59.54 100.000  4.478E+02 AM241
   88.12     3315.   2.53   0.84  2.354E-02
  661.43    16127.   0.86   1.34  6.783E-03   661.66 100.000  3.829E+02 CS137
 1173.07     9616.   1.14   1.61  4.163E-03
 1332.31     8608.   1.09   1.83  3.728E-03  1332.50 100.000  7.452E+02 Co1332


************ U N I D E N T I F I E D    P E A K    S U M M A R Y ************
  Peak Centroid  Background Net Area  Efficiency  Uncert   FWHM  Suspected
Channel   Energy   Counts     Counts   * Area    1 Sigma %  keV   Nuclide
_____________________________________________________________________________
  185.74    46.55     11672.     47124. 3.900E+06    0.63   0.759  -
  351.92    88.08      1814.      3335. 1.417E+05    2.50   0.839  -       D
 4691.64  1173.07       330.      9616. 2.310E+06    1.14   1.611  -

  s - Peak fails shape tests.
  D - Peak area deconvoluted.
  L - Peak written from unknown list.
  C - Area < Critical level.

------------------------------------------------------------
This section based on library: DET_EfficiencyVerification.lib
```

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.85	59.59	10017.	54866.	7.620	0.56	0.763
CS-137	2644.55	661.43	602.	16127.	2.240	0.86	1.344
Co-1332	5328.94	1332.31	36.	8608.	1.196	1.09	1.834

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/Source	Peak Energy keV	Peak Activity uCi/Source	Code	MDA Value uCi/Source	COMMENTS
AM-241		4.4779E+02				1.58E+05	
			59.54	4.478E+02	(	3.829E+00 5.62E-01	1.00E+02 G
CS-137		3.8291E+02				1.10E+04	
			661.66	3.829E+02	(	2.780E+00 8.62E-01	1.00E+02 G
Co-1332		7.4516E+02				1.93E+03	
			1332.50	7.452E+02	(	2.655E+00 1.09E+00	1.00E+02 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity uCi/Source	Time Corrected Activity uCi/Source	Uncertainty 1 Sigma Counting	MDA
AM-241	4.4322E+02	4.4779E+02	5.616E-01%	3.83E+00
CS-137	3.3031E+02	3.8291E+02	8.623E-01%	2.78E+00
Co-1332	3.2075E+02	7.4516E+02	1.093E+00%	2.65E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (92.9 to 1999.4 keV) 1.094E+03 uCi/Source
Total Decayed Activity (92.9 to 1999.4 keV) 1.5758633E+03 uCi/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector # 7**
SpectrumID: 7_20140128004_EffVerif
Analysis Description: ACVTOP-259586;TunaCan2006
Calibration: 7_TunaCan_90099_032712
Detector: Ge 7 SN/154

Verification Date: 2014-01-28 18:43
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.25E+02	5.2%
Cs-137	661.66	400	3.78E+02	5.6%
Co-1332	1332.5	777	7.28E+02	6.2%

Comments:

Perform Jody Watson Reviev 1/28/2014

C:\User\CRpt\7_20140128004_EffVerif.xls

Sample Description: ACVTOP-259586;TunaCan2006
Detector: Ge 7 SN/154
Source Date: 10/1/2006 11:00
Acquired: 1/28/2014 18:43:13
Analyzed: 1/28/2014 20:45

Analyst: Jody Watson

Efficiency: 7_TunaCan_90099_032712
Library: DET_EfficiencyVerification.lib

Nuclide	Activity GPS/Source	Uncertainty %
AM-241	4.255E+02	0.39
CS-137	3.777E+02	0.59
Co-1332	7.285E+02	0.82
Total	1.532E+03	

TestAmerica Spectrum name: 7_20140128004_EffVerif.An1

Sample description
ACVTOP-259586;TunaCan2006

Spectrum Filename: C:\User\SPC\Det7\7_20140128004_EffVerif.An1

Acquisition information
Start time:	1/28/2014 6:43:13 PM
Live time:	7200
Real time:	7330
Dead time:	1.77 %
Detector ID:	7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Soil_TunaCan.Clb
7_TunaCan_90099_032712

Energy Calibration
Created:	2/23/2012 8:40:56 AM
Zero offset:	0.117 keV
Gain:	0.250 keV/channel
Quadratic:	3.508E-09 keV/channel^2

Efficiency Calibration
Created:	3/16/2012 11:45:14 AM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 0.87 %
Log(Eff):	6.716580E-01 + (-6.166540E-01*Log(E)) + (-2.065917E-02*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 1.48 %
Log(Eff):	-2.689695E+01 + (1.019544E+01*Log(E)) + (-1.081671E+00*Log(E)^2)

Library Files
Main analysis library:	DET_EfficiencyVerification.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (2000.12keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method

```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.

       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                          Status          Comments
       Decay correct to date:         YES       10/1/2006 11:00:00 AM
       Decay during acquisition:      YES
       Decay during collection:       NO
       True coincidence correction:   NO
       Peaked background correction:  NO
       Absorption (Internal):         NO
       Geometry correction:           NO
       Random summing:                NO


total peaks alloc.    3 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0148
```

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. GPS/Sour	Nuc
36.68	1330.	9.67	1.05	1.489E-02				
46.60	80032.	0.43	0.84	2.484E-02				
59.54	112070.	0.39	0.88	3.701E-02	59.54	100.000	4.255E+02	AM241
88.01	3908.	2.64	0.88	5.327E-02				
661.64	34273.	0.59	1.49	1.492E-02	661.66	100.000	3.777E+02	CS137
1173.20	17374.	0.85	1.92	8.929E-03				
1332.45	15910.	0.82	2.01	7.951E-03	1332.50	100.000	7.285E+02	Co1332

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
146.25	36.68	5068.	1330.	8.929E+04	9.67	1.047	-	s
185.76	46.55	21357.	85177.	3.429E+06	0.47	0.876	-	
351.61	87.98	3362.	3908.	7.336E+04	2.64	0.881	-	D
4692.54	1173.20	614.	17374.	1.946E+06	0.85	1.923	-	

```
  s - Peak fails shape tests.
  D - Peak area deconvoluted.
  L - Peak written from unknown list.
  C - Area < Critical level.

------------------------------------------------------------
This section based on library: DET_EfficiencyVerification.lib
```

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.70	59.54	19241.	112070.	15.565	0.39	0.882
CS-137	2646.28	661.64	1145.	34273.	4.760	0.59	1.489
Co-1332	5329.51	1332.45	128.	15910.	2.210	0.82	2.010

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity GPS/Source	Peak Energy keV	Peak Activity GPS/Source	Code	MDA Value GPS/Source	COMMENTS
AM-241		4.2547E+02				1.58E+05	
			59.54	4.255E+02	(	2.464E+00 3.91E-01 1.00E+02 G	
CS-137		3.7766E+02				1.10E+04	
			661.66	3.777E+02	(	1.767E+00 5.92E-01 1.00E+02 G	
Co-1332		7.2849E+02				1.93E+03	
			1332.50	7.285E+02	(	2.533E+00 8.19E-01 1.00E+02 G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity GPS/Source	Time Corrected Activity GPS/Source	Uncertainty 1 Sigma Counting	MDA
AM-241	4.2051E+02	4.2547E+02	3.912E-01%	2.46E+00
CS-137	3.1896E+02	3.7766E+02	5.918E-01%	1.77E+00
Co-1332	2.7793E+02	7.2849E+02	8.193E-01%	2.53E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (98.9 to 2000.1 keV) 1.017E+03 GPS/Source
Total Decayed Activity (98.9 to 2000.1 keV) 1.5316135E+03 GPS/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector #12**
SpectrumID: 12_20140128004_EffVerif
Analysis Description: ACVTop-259586;TunaCan2006
Calibration: 12_TunaCanCal_90099_100212
Detector: Ge12 S/N10034336

Verification Date: 2014-01-28 14:18
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.47E+02	0.4%
Cs-137	661.66	400	3.94E+02	1.6%
Co-1332	1332.5	777	7.55E+02	2.8%

Comments:

Perform Jody Watson Revie 1/28/2014

C:\User\CRpt\12_20140128004_EffVerif.xls

Sample Description: ACVTop-259586;TunaCan2006
Detector: Ge12 S/N10034336
Source Date: 10/1/2006 11:00
Acquired: 1/28/2014 14:18:05
Analyzed: 1/28/2014 16:18

Analyst: Jody Watson

Efficiency: 12_TunaCanCal_90099_100212
Library: DET_EfficiencyVerification.lib

Nuclide	Activity GPS/Source	Uncertainty %
AM-241	4.471E+02	0.42
CS-137	3.935E+02	0.58
Co-1332	7.554E+02	0.77
Total	1.596E+03	

TestAmerica, Inc Spectrum name: 12_20140128004_EffVerif.An1

Sample description
ACVTop-259586;TunaCan2006

Spectrum Filename: C:\User\SPC\Det12\12_20140128004_EffVerif.An1

Acquisition information
Start time:	1/28/2014 2:18:05 PM
Live time:	7200
Real time:	7246
Dead time:	0.63 %
Detector ID:	12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_Soil_TunaCan.Clb
12_TunaCanCal_90099_100212

Energy Calibration
Created:	2/28/2012 1:26:42 PM
Zero offset:	0.049 keV
Gain:	0.250 keV/channel
Quadratic:	-3.945E-08 keV/channel^2

Efficiency Calibration
Created:	10/4/2012 9:05:44 AM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 0.70 %
Log(Eff):	-7.827468E-01 + (-3.001271E-01*Log(E)) + (-3.369562E-02*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 0.96 %
Log(Eff):	-2.288409E+01 + (8.352717E+00*Log(E)) + (-8.812368E-01*Log(E)^2)

Library Files
Main analysis library:	DET_EfficiencyVerification.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.58keV)
Stop channel:	8000 (1999.36keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 3 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0087

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. GPS/Sour	Nuc
36.55	1480.	9.57	0.89	1.444E-02				
46.52	77370.	0.54	1.12	2.228E-02				
59.52	99318.	0.42	1.11	3.121E-02	59.54	100.000	4.471E+02	AM241
87.99	3561.	4.10	1.18	4.277E-02				
661.67	37598.	0.58	1.62	1.571E-02	661.66	100.000	3.935E+02	CS137
1173.21	20770.	0.79	1.92	1.018E-02				
1332.49	19132.	0.77	2.06	9.220E-03	1332.50	100.000	7.554E+02	Co1332

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
145.89	36.55	5572.	1480.	1.025E+05	9.57	0.886	-	s
185.74	46.52	24066.	77370.	3.473E+06	0.54	1.118	-	s
351.46	87.99	4624.	3561.	8.326E+04	4.10	1.175	-	s
4691.80	1173.21	827.	20770.	2.040E+06	0.79	1.915	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EfficiencyVerification.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.67	59.52	17591.	99318.	13.794	0.42	1.110s
CS-137	2645.17	661.67	1535.	37598.	5.222	0.58	1.616
Co-1332	5329.33	1332.49	294.	19132.	2.657	0.77	2.055

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity GPS/Source	Peak Energy keV	Peak Activity GPS/Source	Peak Code	Peak MDA Value GPS/Source	COMMENTS
AM-241		4.4707E+02				1.58E+05	
			59.54	4.471E+02	*(	2.794E+00 4.18E-01 1.00E+02	G
CS-137		3.9351E+02				1.10E+04	
			661.66	3.935E+02	(	1.939E+00 5.75E-01 1.00E+02	G
Co-1332		7.5535E+02				1.93E+03	
			1332.50	7.554E+02	(	3.261E+00 7.65E-01 1.00E+02	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity GPS/Source	Time Corrected Activity GPS/Source	Uncertainty 1 Sigma Counting	MDA
AM-241 #	4.4186E+02	4.4707E+02	4.183E-01%	2.79E+00
CS-137	3.3236E+02	3.9351E+02	5.754E-01%	1.94E+00
Co-1332	2.8820E+02	7.5535E+02	7.652E-01%	3.26E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.4 keV) 1.062E+03 GPS/Source
Total Decayed Activity (37.6 to 1999.4 keV) 1.5959352E+03 GPS/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector #17**
SpectrumID: 17_20140123005_EffVerif
Analysis Description: ACVTop-259586;TunaCan2006
Calibration: 17_TunaCan_90099_032612
Detector: Ge17 SN/11080671

Verification Date: 2014-01-23 11:17
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.37E+02	2.6%
Cs-137	661.66	400	3.87E+02	3.3%
Co-1332	1332.5	777	7.33E+02	5.6%

Comments:

Perform Jody Watson Revie 1/23/2014

C:\User\CRpt\17_20140123005_EffVerif.xls

Sample Description: ACVTop-259586;TunaCan2006
Detector: Ge17 SN/11080671
Source Date: 10/1/2006 11:00
Acquired: 1/23/2014 11:17:37
Analyzed: 1/23/2014 13:18

Analyst: JustinL

Efficiency: 17_TunaCan_90099_032612
Library: DET_EfficiencyVerification.lib

Nuclide	Activity GPS/Source	Uncertainty %
AM-241	4.371E+02	0.43
CS-137	3.868E+02	0.60
Co-1332	7.334E+02	0.79
Total	1.557E+03	

TestAmerica, Inc. Spectrum name: 17_20140123005_EffVerif.An1

Sample description
ACVTop-259586;TunaCan2006

Spectrum Filename: C:\User\SPC\Det17\17_20140123005_EffVerif.An1

Acquisition information
Start time: 1/23/2014 11:17:37 AM
Live time: 7200
Real time: 7248
Dead time: 0.66 %
Detector ID: 17

Detector system
Ge17 SN/11080671

Calibration
Filename: 17_Soil_TunaCan.Clb
17_TunaCan_90099_032612

Energy Calibration
Created: 2/29/2012 10:33:23 AM
Zero offset: 0.108 keV
Gain: 0.250 keV/channel
Quadratic: -2.584E-08 keV/channel^2

Efficiency Calibration
Created: 4/12/2012 9:28:42 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.91 %
Log(Eff): -5.264190E-01 + (-4.024164E-01*Log(E)) + (-2.604461E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.00 %
Log(Eff): -2.343889E+01 + (8.582715E+00*Log(E)) + (-9.075430E-01*Log(E)^2)

Library Files
Main analysis library: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.63keV)
Stop channel: 8000 (1999.54keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 3 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0187

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. GPS/Sour	Nuc
46.59	73432.	0.50	0.76	2.104E-02				
59.58	91985.	0.43	0.76	2.959E-02	59.54	100.000	4.371E+02	AM241
88.06	3451.	4.45	0.83	4.060E-02				
661.65	33946.	0.60	1.33	1.443E-02	661.66	100.000	3.868E+02	CS137
1173.26	19157.	0.83	1.72	9.359E-03				
1332.50	17118.	0.79	1.86	8.481E-03	1332.50	100.000	7.334E+02	Co1332

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
185.85	46.59	17888.	73432.	3.489E+06	0.50	0.760	-	
351.64	88.06	4826.	3451.	8.500E+04	4.45	0.825	-	s
4692.35	1173.26	773.	19157.	2.047E+06	0.83	1.724	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EfficiencyVerification.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.75	59.58	15258.	91985.	12.776	0.43	0.764
CS-137	2645.46	661.65	1213.	33946.	4.715	0.60	1.331
Co-1332	5329.63	1332.50	157.	17118.	2.377	0.79	1.865

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity GPS/Source	Peak Energy keV	Peak Activity GPS/Source	Code	MDA Value GPS/Source	COMMENTS
AM-241		4.3712E+02				1.58E+05	
			59.54	4.371E+02	(	2.748E+00 4.25E-01 1.00E+02 G	
CS-137		3.8679E+02				1.10E+04	
			661.66	3.868E+02	(	1.880E+00 5.95E-01 1.00E+02 G	
Co-1332		7.3337E+02				1.93E+03	
			1332.50	7.334E+02	(	2.619E+00 7.91E-01 1.00E+02 G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity GPS/Source	Time Corrected Activity GPS/Source	Uncertainty 1 Sigma Counting	MDA
AM-241	4.3203E+02	4.3712E+02	4.253E-01%	2.75E+00
CS-137	3.2679E+02	3.8679E+02	5.952E-01%	1.88E+00
Co-1332	2.8033E+02	7.3337E+02	7.913E-01%	2.62E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 1.039E+03 GPS/Source
Total Decayed Activity (37.6 to 1999.5 keV) 1.5572817E+03 GPS/Source

Monthly Backgrounds

Test America
St. Louis
Background Check

Spectrum: 4_20140809001_BGLong
Acquired: 8/9/2014 9:24:49 AM
Detector: Ge 4 SN/181
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.32	1.20	1.24	1.29	1.39	1.43	PASS

Analyst: Jody Watson Reviewer:

TestAmerica Spectrum name: 4_20140809001_BGLong.An1

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det4\4_20140809001_BGLong.An1

Acquisition information
Start time:	8/9/2014 9:24:49 AM
Live time:	43200
Real time:	43239
Dead time:	0.09 %
Detector ID:	4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_QC.Clb
4_QA-D_Rad11-0018_032612

Energy Calibration
Created:	2/28/2012 2:55:17 PM
Zero offset:	0.091 keV
Gain:	0.250 keV/channel
Quadratic:	-2.917E-08 keV/channel^2

Efficiency Calibration
Created:	3/27/2012 7:34:55 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (1999.44keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 15 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1088

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.58	416.	10.77	0.70	3.536E-02	46.54	4.250	6.420E+00	PB210
63.33	305.	10.13	0.73	4.646E-02	63.29	3.810	3.989E+00	TH234
75.02	90.	27.29	0.83	5.418E-02				
77.09	102.	25.34	0.83	5.555E-02				
92.63	437.	10.08	0.97	6.309E-02	92.59	5.584	2.874E+00	TH234
					93.35	5.561	2.884E+00	AC228
185.56	229.	14.67	0.78	5.803E-02	185.72	54.000	1.695E-01	U235
					185.99	3.280	2.791E+00	Ra226
238.36	158.	21.35	0.84	5.340E-02	238.63	43.300	1.583E-01	PB212
351.35	111.	25.40	1.13	4.343E-02	351.93	37.600	1.574E-01	PB214
510.56	710.	6.41	1.50	2.895E-02				
609.23	71.	26.63	1.32	1.983E-02	609.31	46.090	1.790E-01	BI214
					610.30	5.750	1.441E+00	RU103
1461.06	80.	22.84	1.01	7.834E-03	1460.83	10.670	2.202E+00	K40
1764.25	53.	13.74	0.34	7.826E-03	1764.49	15.400	1.018E+00	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
307.67	77.05	248.	105.	1.884E+03	26.46	0.941	-	M
2041.11	510.56	256.	710.	2.453E+04	6.41	1.503	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.86	46.58	416.	416.	0.010	10.77	0.703
TH-234	252.81	63.33	229.	305.	0.007	10.13	0.731
TH-234	369.93	92.63	411.	437.	0.010	10.08	0.970
Ra-226	741.50	185.56	271.	229.	0.005	14.67	0.781s
PB-212	952.60	238.36	280.	158.	0.004	21.35	0.842
PB-214	1404.41	351.35	171.	111.	0.003	25.40	1.134s
BI-214	2435.76	609.23	77.	71.	0.002	26.63	1.322s
K-40	5844.31	1461.06	38.	80.	0.002	22.84	1.006s
BI-214	7058.14	1764.25	0.	53.	0.001	13.74	0.337s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Peak Code	Peak MDA Value DPS	COMMENTS
K-40	N	2.2017E+00				4.66E+11	
			1460.83	2.202E+00	(	8.758E-01 2.28E+01 1.07E+01	G
PB-210	N	6.4200E+00				8.14E+03	
			46.54	6.420E+00	(	1.508E+00 1.08E+01 4.25E+00	G
PB-212	N	1.5826E-01				6.98E+02	
			238.63	1.583E-01	(	8.082E-02 2.14E+01 4.33E+01	G
			300.03	0.000E+00	%	8.163E-01 1.07E+02 3.28E+00	GA
PB-214	N	1.5735E-01				5.84E+05	
			351.93	1.574E-01	&(	9.023E-02 2.54E+01 3.76E+01	G
			295.09	0.000E+00	%	1.700E-01 4.48E+01 1.93E+01	G
			242.00	0.000E+00	%	3.229E-01 2.78E+02 7.43E+00	GA
BI-214	N	1.7901E-01				5.84E+05	
			609.31	1.790E-01	(	1.107E-01 2.66E+01 4.61E+01	G
			1120.29	0.000E+00		1.245E-01 0.00E+00 1.51E+01	G
			1764.49	1.018E+00	+	1.416E-01 1.37E+01 1.54E+01	G
TH-234	N	3.9888E+00				1.63E+12	
			63.29	3.989E+00	(	9.585E-01 1.01E+01 3.81E+00	G
			92.59	2.874E+00	-	6.383E-01 1.01E+01 5.58E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ra-226	2.7909E+00					5.84E+05	
		185.99	2.791E+00	@(	9.660E-01	1.47E+01	3.28E+00 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Activity DPS	Time of Count Uncertainty Counting 1 Sigma	MDA
BE-7	<	3.6818E-01		
NA-22	<	7.9904E-02		
K-40		2.2017E+00	2.2842E+01%	8.758E-01
Sc-46	<	9.2423E-02		

CR-51	<	2.8745E-01			
MN-54	<	3.6471E-02			
FE-59	<	1.6757E-01			
Co-56	<	8.1418E-02			
CO-57	<	2.9116E-02			
CO-58	<	7.2815E-02			
CO-60	<	1.1285E-01			
ZN-65	<	1.6722E-01			
NB-94	<	3.1456E-02			
ZR-95	<	1.3172E-01			
NB-95	<	8.8599E-02			
RU-103	<	1.7503E-02			
RH-106	<	5.5123E-01			
AG-108M	<	2.9605E-02			
AG-110M	<	4.8030E-02			
SN-113	<	5.6826E-02			
SB-124	<	5.6577E-02			
SB-125	<	9.6516E-02			
I-131	<	4.0774E-02			
BA-133	<	4.8367E-02			
CS-134	<	7.1103E-02			
CS-137	<	1.1274E-01			
CE-139	<	2.3100E-02			
Ba-140	<	1.0990E-01			
La-140	<	9.1352E-02			
CE-141	<	5.4068E-02			
CE-144	<	2.4384E-01			
PM-144	<	8.5831E-02			
EU-152	<	1.3327E-01			
EU-154	<	4.8725E-01			
EU-155	<	8.1523E-02			
HF-181	<	4.8148E-02			
Ta-182	<	1.0329E-01			
Hg-203	<	1.7717E-02			
TL-208	<	8.1560E-02			
pm-146	<	2.2754E-01			
y-88	<	3.8222E-02			
PB-210		6.4200E+00	1.0772E+01%		1.508E+00
PB-212		1.5826E-01	2.1351E+01%		8.082E-02
PB-214	#	1.5735E-01	2.5402E+01%		9.023E-02
BI-207	<	4.8047E-02			
BI-212	<	1.3734E+00			
BI-214	#	1.7901E-01	2.6633E+01%		1.107E-01
BI-210M	<	6.4937E-02			
RA-224	<	8.8018E-01			
AC-228	<	3.6523E-01			
TH-227	<	1.7635E-01			
TH-229	<	6.3861E-01			
TH-234		3.9888E+00	1.0133E+01%		9.585E-01

PA-231	<	9.2603E-01			
PA-233	<	9.7329E-02			
PA-234	<	1.6028E-01			
PA-234M	<	1.0959E+01			
Ra-226	#	2.7909E+00	1.4668E+01%		9.660E-01
U-235	<	2.4442E-01			
AM-241	<	9.3124E-02			
Np-237	<	1.2236E-01			

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

S U M M A R Y

Total Activity (37.6 to 1999.4 keV) 1.590E+01 DPS

Test America
St. Louis
Background Check

Spectrum: 7_20140809001_BGLong
Acquired: 8/9/2014 9:24:34 AM
Detector: Ge 7 SN/154
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.29	1.40	1.45	PASS

Analyst: Jody Watson Reviewer:

TestAmerica Spectrum name: 7_20140809001_BGLong.An1

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det7\7_20140809001_BGLong.An1

Acquisition information
Start time:	8/9/2014 9:24:34 AM
Live time:	43200
Real time:	43899
Dead time:	1.59 %
Detector ID:	7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_QC.Clb
Ge7_QC

Energy Calibration
Created:	2/23/2012 8:40:56 AM
Zero offset:	0.117 keV
Gain:	0.250 keV/channel
Quadratic:	3.508E-09 keV/channel^2

Efficiency Calibration
Created:	1/6/2011 8:06:10 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (2000.12keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 19 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.2745

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.59	428.	8.84	0.99	8.125E-02	46.54	4.250	2.871E+00	PB210
63.30	481.	9.20	0.81	1.229E-01	63.29	3.810	2.379E+00	TH234
74.69	94.	27.76	0.87	1.513E-01				
77.19	143.	18.50	0.87	1.575E-01				
92.61	614.	7.39	1.10	1.861E-01	92.59	5.584	1.369E+00	TH234
					93.35	5.561	1.372E+00	AC228
143.32	116.	24.13	0.59	1.842E-01	143.79	10.960	1.330E-01	U235
185.60	304.	12.55	0.93	1.634E-01	185.72	54.000	7.980E-02	U235
					185.99	3.280	1.315E+00	Ra226
238.73	236.	17.86	1.10	1.417E-01	238.63	43.300	8.904E-02	PB212
511.03	822.	6.34	2.39	6.487E-02	511.86	20.000	1.469E+00	RH106
608.79	119.	22.99	0.57	5.309E-02	609.31	46.090	1.129E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
298.32	74.69	298.	115.	7.603E+02	27.62	0.998	-	s
308.31	77.19	260.	164.	1.039E+03	18.34	1.226	-	s
2043.81	511.03	315.	822.	1.267E+04	6.34	2.388	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.92	46.59	316.	428.	0.010	8.84	0.987s
TH-234	252.77	63.30	369.	481.	0.011	9.20	0.811s
TH-234	370.00	92.61	395.	614.	0.014	7.39	1.100s
U-235	572.88	143.32	210.	116.	0.003	24.13	0.591s
U-235	742.49	185.72	288.	287.	0.007	9.14	0.934D
PB-212	954.54	238.73	330.	236.	0.005	17.86	1.099
BI-214	2434.86	608.79	136.	119.	0.003	22.99	0.567s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	Peak MDA Value DPS		COMMENTS
PB-210	N	2.8715E+00				8.14E+03		
			46.54	2.871E+00	*(	5.747E-01	8.84E+00 4.25E+00	G
PB-212	N	8.9039E-02				6.98E+02		
			238.63	8.904E-02	(	3.296E-02	1.79E+01 4.33E+01	G
			300.03	0.000E+00		4.460E-02	0.00E+00 3.28E+00	GA
BI-214	N	1.1289E-01				5.84E+05		
			609.31	1.129E-01	(	5.391E-02	2.30E+01 4.61E+01	G
			1120.29	0.000E+00	%	1.302E-01	1.70E+02 1.51E+01	G
			1764.49	0.000E+00	%	1.826E-01	1.56E+02 1.54E+01	G
TH-234	N	2.3788E+00				1.63E+12		
			63.29	2.379E+00	@(	4.561E-01	9.20E+00 3.81E+00	G
			92.59	1.369E+00	-	2.123E-01	7.39E+00 5.58E+00	G
U-235	N	1.3301E-01				2.57E+11		
			185.72	7.521E-02	}	2.147E-02	9.14E+00 5.40E+01	GA
			143.79	1.330E-01	(	8.069E-02	2.41E+01 1.10E+01	G
			205.33	0.000E+00		2.193E-02	0.00E+00 5.01E+00	G
			163.38	0.000E+00		1.943E-02	0.00E+00 5.08E+00	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.

? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide
failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the
library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	< 1.1071E-01		
NA-22	< 2.3428E-02		
K-40	< 5.1511E-01		
Sc-46	< 2.1311E-02		
CR-51	< 1.7656E-01		
MN-54	< 2.8213E-02		
FE-59	< 4.6546E-02		
Co-56	< 3.1076E-02		
CO-57	< 1.0668E-02		
CO-58	< 1.2629E-02		
CO-60	< 1.9788E-02		
ZN-65	< 6.5142E-02		
NB-94	< 2.3772E-02		
ZR-95	< 1.4773E-02		

NB-95	<	2.1768E-02		
RU-103	<	9.7729E-03		
RH-106	<	2.5053E-01		
AG-108M	<	2.5278E-02		
AG-110M	<	3.2069E-02		
SN-113	<	1.9549E-02		
SB-124	<	1.0066E-02		
SB-125	<	3.4388E-02		
I-131	<	9.1223E-03		
BA-133	<	1.3237E-02		
CS-134	<	2.1064E-02		
CS-137	<	2.9150E-02		
CE-139	<	8.9403E-03		
Ba-140	<	8.4592E-02		
La-140	<	3.3302E-02		
CE-141	<	1.3183E-02		
CE-144	<	4.7081E-02		
PM-144	<	2.2320E-02		
EU-152	<	4.7084E-02		
EU-154	<	1.5613E-01		
EU-155	<	4.4960E-02		
HF-181	<	1.8892E-02		
Ta-182	<	1.1617E-01		
Hg-203	<	6.8764E-03		
TL-208	<	3.0031E-02		
pm-146	<	9.5455E-02		
y-88	<	3.3609E-02		
PB-210	#	2.8715E+00	8.8404E+00%	5.747E-01
PB-212		8.9039E-02	1.7857E+01%	3.296E-02
PB-214	<	4.0719E-02		
BI-207	<	2.0191E-02		
BI-212	<	2.4886E-01		
BI-214	#	1.1289E-01	2.2987E+01%	5.391E-02
BI-210M	<	2.6125E-02		
RA-224	<	2.9988E-01		
AC-228	<	1.4644E-01		
TH-227	<	4.2900E-02		
TH-229	<	1.1498E-01		
TH-234	#	2.3788E+00	9.1971E+00%	4.561E-01
PA-231	<	4.3015E-01		
PA-233	<	3.5590E-02		
PA-234	<	5.2899E-02		
PA-234M	<	4.3615E+00		
Ra-226	<	4.6367E-01		
U-235		1.3301E-01	2.4132E+01%	8.069E-02
AM-241	<	5.0352E-02		
Np-237	<	7.3847E-02		

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (205.1 to 2000.1 keV)   5.585E+00 DPS

Test America
St. Louis
Background Check

Spectrum: 7_20140905005_BGLong
Acquired: 9/5/2014 5:58:08 PM
Detector: Ge 7 SN/154
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.27	1.40	1.45	PASS

Analyst: Curtis Carey Reviewer:

TestAmerica Spectrum name: 7_20140905005_BGLong.An1

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det7\7_20140905005_BGLong.An1

Acquisition information
Start time:	9/5/2014 5:58:08 PM
Live time:	43200
Real time:	43910
Dead time:	1.62 %
Detector ID:	7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_QC.Clb
Ge7_QC

Energy Calibration
Created:	2/23/2012 8:40:56 AM
Zero offset:	0.117 keV
Gain:	0.250 keV/channel
Quadratic:	3.508E-09 keV/channel^2

Efficiency Calibration
Created:	1/6/2011 8:06:10 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (2000.12keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 17 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0637

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.59	378.	10.78	1.09	8.125E-02	46.54	4.250	2.541E+00	PB210
63.32	506.	8.53	1.44	1.229E-01	63.29	3.810	2.502E+00	TH234
92.70	692.	7.05	1.45	1.861E-01	92.59	5.584	1.541E+00	TH234
					93.35	5.561	1.545E+00	AC228
185.87	317.	13.51	1.40	1.632E-01	185.72	54.000	8.321E-02	U235
					185.99	3.280	1.371E+00	Ra226
609.22	102.	24.56	0.56	5.309E-02	609.31	46.090	9.602E-02	BI214
1460.63	102.	16.33	1.10	1.997E-02	1460.83	10.670	1.112E+00	K40

No unknown peaks passed sensitivity test.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.91	46.59	368.	378.	0.009	10.78	1.089s
TH-234	252.84	63.32	354.	506.	0.012	8.53	1.438s
TH-234	370.37	92.70	405.	692.	0.016	7.05	1.446s
Ra-226	742.81	185.80	364.	290.	0.007	14.67	1.363s
BI-214	2436.60	609.22	116.	102.	0.002	24.56	0.556s
K-40	5842.21	1460.63	25.	102.	0.002	16.33	1.100s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Peak Code	MDA Value DPS		COMMENTS
K-40	N	1.1119E+00				4.66E+11		
			1460.83	1.112E+00	?(	2.809E-01	1.63E+01	1.07E+01 G
PB-210	N	2.5414E+00				8.14E+03		
			46.54	2.541E+00	*(	6.180E-01	1.08E+01	4.25E+00 G
BI-214	N	9.6020E-02				5.84E+05		
			609.31	9.602E-02	(	4.994E-02	2.46E+01	4.61E+01 G
			1120.29	0.000E+00	%	2.073E-01	5.13E+01	1.51E+01 G
			1764.49	0.000E+00	%	2.084E-01	1.47E+02	1.54E+01 G
TH-234	N	2.5016E+00				1.63E+12		
			63.29	2.502E+00	*(	4.471E-01	8.53E+00	3.81E+00 G
			92.59	1.541E+00	-	2.151E-01	7.05E+00	5.58E+00 G
Ra-226		1.2534E+00				5.84E+05		
			185.99	1.253E+00	*(	3.963E-01	1.47E+01	3.28E+00 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape

C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	<	1.7375E-01		
NA-22	<	4.3456E-02		
K-40	#	1.1119E+00	1.6326E+01%	2.809E-01
Sc-46	<	3.0938E-02		
CR-51	<	1.4159E-01		
MN-54	<	1.4150E-02		
FE-59	<	3.5495E-02		
Co-56	<	1.7005E-02		
CO-57	<	5.4704E-03		
CO-58	<	1.4432E-02		
CO-60	<	1.3105E-02		
ZN-65	<	5.5710E-02		
NB-94	<	1.0096E-02		
ZR-95	<	1.7457E-02		
NB-95	<	3.1504E-02		
RU-103	<	1.7185E-02		
RH-106	<	2.6933E-01		
AG-108M	<	1.6941E-02		
AG-110M	<	3.7637E-02		
SN-113	<	3.3239E-02		
SB-124	<	1.6568E-02		
SB-125	<	5.5501E-02		
I-131	<	1.2909E-02		
BA-133	<	2.4163E-02		
CS-134	<	2.2901E-02		
CS-137	<	3.3454E-02		
CE-139	<	9.3333E-03		
Ba-140	<	9.9489E-02		
La-140	<	3.5108E-02		
CE-141	<	1.2756E-02		
CE-144	<	8.4200E-02		
PM-144	<	2.7879E-02		
EU-152	<	4.8954E-02		

EU-154	<	2.5025E-01			
EU-155	<	3.9240E-02			
HF-181	<	9.9073E-03			
Ta-182	<	7.6079E-02			
Hg-203	<	1.4085E-02			
TL-208	<	3.4134E-02			
pm-146	<	5.8844E-02			
y-88	<	1.4266E-02			
PB-210	#	2.5414E+00	1.0780E+01%		6.180E-01
PB-212	<	3.4932E-02			
PB-214	<	5.4941E-02			
BI-207	<	2.8761E-02			
BI-212	<	2.7519E-01			
BI-214		9.6020E-02	2.4557E+01%		4.994E-02
BI-210M	<	2.1727E-02			
RA-224	<	2.6515E-01			
AC-228	<	1.2834E-01			
TH-227	<	8.1748E-02			
TH-229	<	1.9390E-01			
TH-234	#	2.5016E+00	8.5340E+00%		4.471E-01
PA-231	<	4.3015E-01			
PA-233	<	1.7873E-02			
PA-234	<	3.0920E-02			
PA-234M	<	3.9452E+00			
Ra-226	#	1.2534E+00	1.4667E+01%		3.963E-01
U-235	<	9.1147E-02			
AM-241	<	4.7696E-02			
Np-237	<	6.9131E-02			

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.1 keV) 7.504E+00 DPS

Test America
St. Louis
Background Check

Spectrum: 12_20140905007_BGLong
Acquired: 9/5/2014 5:50:49 PM
Detector: Ge12 S/N10034336
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.16	1.95	2.02	2.09	2.29	2.36	PASS

Analyst: Curtis Carey Reviewer:

TestAmerica, Inc Spectrum name: 12_20140905007_BGLong.An1

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det12\12_20140905007_BGLong.An1

Acquisition information
Start time: 9/5/2014 5:50:49 PM
Live time: 43200
Real time: 43312
Dead time: 0.26 %
Detector ID: 12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_QC.Clb
12_QC-H_83725-334_060211

Energy Calibration
Created: 2/28/2012 1:26:42 PM
Zero offset: 0.049 keV
Gain: 0.250 keV/channel
Quadratic: -3.945E-08 keV/channel^2

Efficiency Calibration
Created: 6/3/2011 6:41:14 AM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.58keV)
Stop channel: 8000 (1999.36keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 29 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1746

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.53	730.	8.82	0.95	6.296E-02	46.54	4.250	6.312E+00	PB210
63.25	548.	10.21	1.18	8.562E-02	63.29	3.810	3.886E+00	TH234
74.89	194.	20.21	0.92	1.014E-01				
77.52	180.	20.11	0.92	1.049E-01				
92.64	774.	7.47	1.41	1.198E-01	92.59	5.584	2.679E+00	TH234
					93.35	5.561	2.688E+00	AC228
143.97	173.	28.63	0.83	1.177E-01	143.79	10.960	3.104E-01	U235
185.65	488.	10.40	1.38	1.068E-01	185.72	54.000	1.960E-01	U235
					185.99	3.280	3.228E+00	Ra226
238.60	312.	13.98	1.02	9.395E-02	238.63	43.300	1.777E-01	PB212
294.99	145.	29.46	0.91	8.029E-02	295.09	19.300	2.167E-01	PB214
351.88	261.	15.50	1.13	6.652E-02	351.93	37.600	2.413E-01	PB214
510.84	1206.	5.07	2.16	4.821E-02	511.86	20.000	2.900E+00	RH106
568.83	88.	27.26	0.33	4.393E-02	569.70	97.740	4.718E-02	BI207
					569.47	8.200	5.621E-01	PA234
583.60	181.	18.72	1.16	4.291E-02	583.02	84.500	1.152E-01	TL208
609.77	267.	15.98	0.97	4.101E-02	609.31	46.090	3.263E-01	BI214
					610.30	5.750	2.620E+00	RU103
661.89	105.	22.80	0.61	3.723E-02	661.66	85.210	7.661E-02	CS137
1120.15	120.	19.96	2.34	2.185E-02	1120.29	15.100	8.396E-01	BI214
					1120.55	99.987	1.268E-01	Sc46
					1121.30	34.900	3.636E-01	Ta182
1460.47	136.	15.30	0.39	1.768E-02	1460.83	10.670	1.669E+00	K40
1763.97	82.	20.15	1.07	1.522E-02	1764.49	15.400	8.149E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
299.02	74.87	640.	214.	2.111E+03	21.59	1.141	-	s
309.53	77.50	574.	189.	1.799E+03	23.72	0.926	-	s
2041.95	510.84	448.	1206.	2.502E+04	5.07	2.157	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.75	46.53	820.	730.	0.017	8.82	0.949s
TH-234	252.57	63.25	704.	548.	0.013	10.21	1.183s
TH-234	370.06	92.64	672.	774.	0.018	7.47	1.409s
U-235	575.21	143.97	595.	173.	0.004	28.63	0.833s
U-235	742.09	185.72	619.	376.	0.009	9.94	1.022D
PB-212	953.46	238.60	435.	312.	0.007	13.98	1.020s
PB-214	1178.90	294.99	420.	145.	0.003	29.46	0.907s
PB-214	1406.36	351.88	329.	261.	0.006	15.50	1.125s
BI-207	2273.84	568.83	138.	88.	0.002	27.26	0.333s
TL-208	2332.94	583.60	199.	181.	0.004	18.72	1.160s
BI-214	2437.22	609.68	292.	253.	0.006	16.56	0.969s
CS-137	2646.02	661.89	117.	105.	0.002	22.80	0.606s
BI-214	4479.43	1120.15	77.	120.	0.003	19.96	2.344s
K-40	5841.69	1460.47	54.	136.	0.003	15.30	0.388s
BI-214	7057.05	1763.97	38.	82.	0.002	20.15	1.072s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS		COMMENTS
K-40	N	1.6692E+00				4.66E+11		
			1460.83	1.669E+00	(	4.536E-01	1.53E+01 1.07E+01	G
CS-137	I	7.6610E-02				1.10E+04		
			661.66	7.661E-02	*(	3.875E-02	2.28E+01 8.52E+01	G
TL-208	N	1.1522E-01				6.98E+02		
			583.02	1.152E-01	*(	4.369E-02	1.87E+01 8.45E+01	G
			277.28	0.000E+00		3.197E-02	0.00E+00 6.31E+00	G
			860.56	0.000E+00		4.958E-02	0.00E+00 1.24E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak MDA	Comments
PB-210	N	6.3123E+00				8.14E+03	
			46.54	6.312E+00	(	1.178E+00 8.82E+00 4.25E+00	G
PB-212	N	1.7775E-01				6.98E+02	
			238.63	1.777E-01	(	5.683E-02 1.40E+01 4.33E+01	G
			300.03	0.000E+00		6.578E-02 0.00E+00 3.28E+00	GA
PB-214	N	2.3294E-01				5.84E+05	
			351.93	2.413E-01	*(	8.079E-02 1.55E+01 3.76E+01	G
			295.09	2.167E-01	*(	1.467E-01 2.95E+01 1.93E+01	G
			242.00	0.000E+00	%	2.613E-01 3.35E+01 7.43E+00	GA
BI-207	C	4.7178E-02				1.18E+04	
			569.70	4.718E-02	&(	3.092E-02 2.73E+01 9.77E+01	G
			1063.66	0.000E+00	%	3.947E-02 3.35E+01 7.45E+01	G
BI-214	N	3.1000E-01				5.84E+05	
			609.31	3.100E-01	*(	1.007E-01 1.66E+01 4.61E+01	G
			1120.29	8.396E-01	+	3.065E-01 2.00E+01 1.51E+01	G
			1764.49	8.149E-01	+	3.086E-01 2.01E+01 1.54E+01	G
TH-234	N	3.8860E+00				1.63E+12	
			63.29	3.886E+00	*(	8.960E-01 1.02E+01 3.81E+00	G
			92.59	2.679E+00	-	4.271E-01 7.47E+00 5.58E+00	G
U-235	N	3.1039E-01				2.57E+11	
			185.72	1.511E-01	}	4.764E-02 9.94E+00 5.40E+01	GA
			143.79	3.104E-01	*(	2.088E-01 2.86E+01 1.10E+01	G
			205.33	0.000E+00		3.338E-02 0.00E+00 5.01E+00	G
			163.38	0.000E+00	%	3.515E-01 2.05E+02 5.08E+00	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went
    negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide
    failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the
    library energy centroid for positive identification.
P - Peakbackground subtraction

} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	<	3.3710E-01		
NA-22	<	3.3021E-02		
K-40		1.6692E+00	1.5300E+01%	4.536E-01
Sc-46	<	5.1889E-02		
CR-51	<	1.6935E-01		
MN-54	<	1.5610E-02		
FE-59	<	4.9613E-02		
Co-56	<	3.5817E-02		
CO-57	<	2.0698E-02		
CO-58	<	1.5581E-02		
CO-60	<	6.2708E-02		
ZN-65	<	3.6384E-02		
NB-94	<	1.8347E-02		
ZR-95	<	9.0092E-02		
NB-95	<	3.2490E-02		
RU-103	<	2.9832E-02		
RH-106	<	2.2369E-01		
AG-108M	<	2.8517E-02		
AG-110M	<	4.5079E-02		
SN-113	<	4.9596E-02		
SB-124	<	4.2497E-02		
SB-125	<	9.9152E-02		
I-131	<	2.1909E-02		
BA-133	<	3.4039E-02		
CS-134	<	4.0345E-02		

CS-137 #	7.6610E-02	2.2798E+01%		3.875E-02
CE-139 <	2.0845E-02			
Ba-140 <	1.5015E-01			
La-140 <	5.0219E-02			
CE-141 <	4.4297E-02			
CE-144 <	1.0082E-01			
PM-144 <	4.1612E-02			
EU-152 <	4.4288E-02			
EU-154 <	1.5649E-01			
EU-155 <	9.9905E-02			
HF-181 <	4.4746E-02			
Ta-182 <	1.9229E-01			
Hg-203 <	1.8516E-02			
TL-208 #	1.1522E-01	1.8722E+01%		4.369E-02
pm-146 <	1.1001E-01			
y-88 <	5.1654E-02			
PB-210 #	6.3123E+00	8.8238E+00%		1.178E+00
PB-212 #	1.7775E-01	1.3978E+01%		5.683E-02
PB-214 #	2.3294E-01	1.5502E+01%		8.079E-02
BI-207 #	4.7178E-02	2.7255E+01%		3.092E-02
BI-212 <	5.6588E-01			
BI-214 #	3.1000E-01	1.6561E+01%		1.007E-01
BI-210M <	5.7756E-02			
RA-224 <	6.5000E-01			
AC-228 <	2.4383E-01			
TH-227 <	1.1704E-01			
TH-229 <	4.9895E-01			
TH-234 #	3.8860E+00	1.0208E+01%		8.960E-01
PA-231 <	5.7639E-01			
PA-233 <	7.6301E-02			
PA-234 <	1.1266E-01			
PA-234M <	5.3429E+00			
Ra-226 <	8.4327E-01			
U-235	3.1039E-01	2.8634E+01%		2.088E-01
AM-241 <	9.1181E-02			
Np-237 <	1.6609E-01			

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (205.2 to 1999.4 keV) 1.314E+01 DPS

Test America
St. Louis
Background Check

Spectrum: 17_20140809001_BGLong
Acquired: 8/9/2014 9:24:01 AM
Detector: Ge17 SN/11080671
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.47	2.30	2.35	2.35	2.58	2.63	PASS

Analyst: Jody Watson Reviewer:

Run Logs

Gamma Spectroscopy Run Log

Detector: GV4

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/05/12 21:42		IC 160-12292/1		12292			JLW
03/08/12 03:13		ICV 160-12292/2		12292			JLW
02/27/13 16:17		ACVTOP 160-38300/1		38300			JLW
08/09/14 09:24		ICB 160-136893/1		136893			RTM
08/13/14 00:02		CCV 160-137825/1		137825			
08/13/14 00:22		CCV 160-137825/2		137825			
08/13/14 00:43		CCB 160-137825/3		137825			RTM
08/13/14 01:34		CCV 160-137825/4		137825			
08/13/14 01:54		CCV 160-137825/5		137825			RTM
08/13/14 08:59	60	ZZZZZ		137825			
08/13/14 11:15	30	ZZZZZ		137825			
08/13/14 14:47	30	ZZZZZ		137825			
08/13/14 18:36	120	MB 160-137389/1-A		137825	137389	GA-01-R	RTM
08/13/14 20:43	120	LCS 160-137389/2-A		137825	137389	GA-01-R	RTM
08/14/14 00:01		CCB 160-138111/1		138111			RTM
08/14/14 00:43		CCV 160-138111/2		138111			
08/14/14 01:04		CCV 160-138111/3		138111			RTM
08/14/14 01:40	120	ZZZZZ		138111			
08/14/14 09:26	30	ZZZZZ		138111			
08/14/14 10:12	30	ZZZZZ		138111			
08/14/14 10:56	30	ZZZZZ		138111			
08/14/14 11:41	30	ZZZZZ		138111			
08/14/14 12:52	30	ZZZZZ		138111			
08/14/14 13:35	120	680-102199-2	SD-279-01	138111	137389	GA-01-R	RTM
08/14/14 16:25	120	680-102199-9	SD-277-02	138111	137389	GA-01-R	RTM
08/14/14 18:45	30	ZZZZZ		138111			
08/14/14 19:22	30	ZZZZZ		138111			
08/14/14 20:14	30	ZZZZZ		138111			
08/14/14 20:52	30	ZZZZZ		138111			
08/14/14 21:33	30	ZZZZZ		138111			
08/27/14 00:01		CCB 160-140477/1		140477			SMP
08/27/14 00:49		CCV 160-140477/2		140477			
08/27/14 01:10		CCV 160-140477/3		140477			SMP
08/27/14 10:16	120	680-102199-7	SD-277-SS	140477	137389	GA-01-R	SMP
08/27/14 13:30	60	ZZZZZ		140477			
08/27/14 21:00	60	ZZZZZ		140477			
09/02/14 00:02		CCB 160-141130/1		141130			EMN
09/02/14 00:47		CCV 160-141130/2		141130			
09/02/14 01:08		CCV 160-141130/3		141130			EMN
09/02/14 02:04	30	ZZZZZ		141130			
09/02/14 02:56	30	ZZZZZ		141130			
09/02/14 09:53	120	MB 160-137115/1-A		141130	137115	GA-01-R	EMN
09/02/14 12:02	120	680-102199-1	SD-279-SS	141130	137115	GA-01-R	EMN
09/02/14 14:33	120	680-102199-2	SD-279-01	141130	137115	GA-01-R	EMN
09/02/14 17:48	120	680-102199-7	SD-277-SS	141130	137115	GA-01-R	EMN
09/02/14 19:51	30	ZZZZZ		141130			
09/02/14 20:27	30	ZZZZZ		141130			
09/02/14 21:00	30	ZZZZZ		141130			
09/02/14 21:42	30	ZZZZZ		141130			
09/03/14 00:01		CCB 160-141691/1		141691			SMP
09/03/14 01:29		CCV 160-141691/2		141691			
09/03/14 01:50		CCV 160-141691/3		141691			SMP
09/03/14 02:21	45	ZZZZZ		141691			
09/03/14 09:10	120	680-102199-8	SD-277-01	141691	137115	GA-01-R	SMP

Gamma Spectroscopy Run Log

Detector: GV4 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
09/03/14 12:51	30	ZZZZZ		141691			
09/03/14 13:53	30	ZZZZZ		141691			
09/03/14 14:42	30	ZZZZZ		141691			
09/03/14 15:27	45	ZZZZZ		141691			
09/03/14 16:55	45	ZZZZZ		141691			
09/03/14 18:44	30	ZZZZZ		141691			
09/03/14 19:42	30	ZZZZZ		141691			
09/03/14 20:41	30	ZZZZZ		141691			
09/03/14 21:21	30	ZZZZZ		141691			
09/03/14 22:00	30	ZZZZZ		141691			

Detector: GV7

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/07/12 11:02		IC 160-12300/1		12300			JLW
03/07/12 20:19		ICV 160-12300/2		12300			JLW
03/26/12 11:32		IC 160-12301/1		12301			JLW
04/12/12 19:52		ICV 160-12301/2		12301			JLW
01/28/14 18:43		ACVTOP 160-101797/1		101797			JLW
08/09/14 09:24		ICB 160-136895/1		136895			RTM
08/14/14 00:01		CCV 160-138050/1		138050			
08/14/14 00:43		CCV 160-138050/2		138050			
08/14/14 01:04		CCV 160-138050/3		138050			RTM
08/14/14 01:28		CCB 160-138050/4		138050			RTM
08/14/14 08:49		ZZZZZ		138050			
08/14/14 09:07	120	ZZZZZ		138050			
08/14/14 11:18	60	ZZZZZ		138050			
08/14/14 12:55	30	ZZZZZ		138050			
08/14/14 13:36	120	ZZZZZ		138050			
08/14/14 16:25	120	680-102199-8	SD-277-01	138050	137389	GA-01-R	RTM
08/14/14 18:46	30	ZZZZZ		138050			
08/14/14 19:23	30	ZZZZZ		138050			
08/14/14 20:12	30	ZZZZZ		138050			
08/14/14 20:52	30	ZZZZZ		138050			
08/14/14 21:34	30	ZZZZZ		138050			
09/02/14 00:02		CCV 160-141135/1		141135			
09/02/14 00:24		CCV 160-141135/2		141135			EMN
09/02/14 00:49		CCB 160-141135/3		141135			EMN
09/02/14 02:05	30	ZZZZZ		141135			
09/02/14 02:55	120	ZZZZZ		141135			
09/02/14 09:38	120	ZZZZZ		141135			
09/02/14 12:02	120	LCS 160-137115/2-A		141135	137115	GA-01-R	EMN
09/02/14 14:34	120	680-102199-1 DU	SD-279-SS DU	141135	137115	GA-01-R	EMN
09/02/14 17:11	120	ZZZZZ		141135			
09/02/14 19:24	30	ZZZZZ		141135			
09/02/14 20:27	30	ZZZZZ		141135			
09/02/14 21:00	30	ZZZZZ		141135			
09/02/14 21:43	30	ZZZZZ		141135			
09/02/14 22:28	60	ZZZZZ		141135			
09/03/14 00:02		CCV 160-141692/1		141692			
09/03/14 00:23		CCV 160-141692/2		141692			SMP
09/03/14 00:47		CCB 160-141692/3		141692			SMP
09/03/14 02:15	60	ZZZZZ		141692			

Gamma Spectroscopy Run Log

Detector: GV7 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
09/03/14 08:13		ZZZZZ		141692			
09/03/14 09:11	120	680-102199-9	SD-277-02	141692	137115	GA-01-R	SMP
09/03/14 13:06	30	ZZZZZ		141692			
09/03/14 13:56	30	ZZZZZ		141692			
09/03/14 15:28	45	ZZZZZ		141692			
09/03/14 16:56	45	ZZZZZ		141692			
09/03/14 18:48	45	ZZZZZ		141692			
09/03/14 19:43	45	ZZZZZ		141692			
09/03/14 20:41	30	ZZZZZ		141692			
09/03/14 21:21	30	ZZZZZ		141692			
09/03/14 22:00	45	ZZZZZ		141692			
09/05/14 17:58		ICB 160-142451/1		142451			JLW
09/09/14 06:50		CCB 160-142798/1		142798			SMP
09/09/14 08:45		CCV 160-142798/2		142798			
09/09/14 09:07		CCV 160-142798/3		142798			SMP
09/09/14 10:56	30	ZZZZZ		142798			
09/09/14 11:54	120	680-102199-1 DU	SD-279-SS DU	142798	137389	GA-01-R	SMP
09/09/14 14:21	30	ZZZZZ		142798			
09/09/14 15:13	30	ZZZZZ		142798			
09/09/14 15:54	30	ZZZZZ		142798			
09/09/14 17:04	30	ZZZZZ		142798			
09/09/14 17:46	30	ZZZZZ		142798			
09/09/14 19:05	60	ZZZZZ		142798			
09/09/14 21:09	60	ZZZZZ		142798			
09/09/14 22:14	30	ZZZZZ		142798			
09/10/14 00:01		CCV 160-143246/1		143246			
09/10/14 00:23		CCV 160-143246/2		143246			SMP
09/10/14 00:43		CCB 160-143246/3		143246			SMP
09/10/14 02:06	120	ZZZZZ		143246			
09/10/14 06:18	30	ZZZZZ		143246			
09/10/14 07:01	30	ZZZZZ		143246			
09/10/14 08:13		ZZZZZ		143246			
09/10/14 08:40	30	ZZZZZ		143246			
09/10/14 09:42	30	ZZZZZ		143246			
09/10/14 10:29	30	ZZZZZ		143246			
09/10/14 11:12	30	ZZZZZ		143246			
09/10/14 11:54	30	ZZZZZ		143246			
09/10/14 14:15		ZZZZZ		143246			
09/10/14 16:14	90	ZZZZZ		143246			
09/10/14 19:03	30	ZZZZZ		143246			
09/10/14 19:41	60	ZZZZZ		143246			
09/10/14 20:45	120	680-102199-3	SD-279-02	143246	137389	GA-01-R	SMP
09/10/14 22:49	60	ZZZZZ		143246			

Detector: GV12

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
09/01/11 19:20		IC 160-45527/1		45527			JLW
09/06/11 07:27		ICV 160-45527/2		45527			JLW
01/28/14 14:18		ACVTOP 160-101795/1		101795			JLW
09/05/14 17:50		ICB 160-142440/1		142440			JLW
09/08/14 07:37		CCB 160-142436/1		142436			EMN
09/08/14 08:15		CCV 160-142436/2		142436			

Gamma Spectroscopy Run Log

Detector: GV12 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
09/08/14 08:36		CCV 160-142436/3		142436			EMN
09/08/14 10:42	60	ZZZZZ		142436			
09/08/14 12:05	120	ZZZZZ		142436			
09/08/14 14:16	30	ZZZZZ		142436			
09/08/14 14:48	30	ZZZZZ		142436			
09/08/14 15:29		ZZZZZ		142436			
09/08/14 16:07		ZZZZZ		142436			
09/08/14 17:17	30	ZZZZZ		142436			
09/08/14 18:04	120	680-102199-1	SD-279-SS	142436	137389	GA-01-R	EMN

Detector: GV17

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/27/12 15:45		IC 160-12388/1		12388			JLW
04/12/12 19:55		ICV 160-12388/2		12388			JLW
01/23/14 11:17		ACVTOP 160-100896/1		100896			JLW
08/09/14 09:24		ICB 160-136901/1		136901			RTM
09/02/14 00:05		CCV 160-141148/1		141148			
09/02/14 00:26		CCV 160-141148/2		141148			EMN
09/02/14 00:46		CCB 160-141148/3		141148			EMN
09/02/14 02:16	120	ZZZZZ		141148			
09/02/14 11:53	120	ZZZZZ		141148			
09/02/14 15:06	120	680-102199-3	SD-279-02	141148	137115	GA-01-R	EMN
09/02/14 17:41	60	ZZZZZ		141148			
09/02/14 19:36	30	ZZZZZ		141148			
09/02/14 20:24	30	ZZZZZ		141148			
09/02/14 20:56	30	ZZZZZ		141148			
09/02/14 21:40	60	ZZZZZ		141148			

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: S. Gamon	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.46
Client Contact: Mike Martin	Phone: (703)341-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page 1 of 4
Company: Tetra Tech, Inc.		Analysis Requested		Job #: 680-102199
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
City: Germantown	TAT Requested (days): Standard			
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			
Email: Michael.Martin@tetratech.com	WO #:			Other:
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	X	N	N		
SD-279-SS	6/9/14	1540	C	Solid				X				
SD-279-01		1545	C	Solid				X				
SD-279-02		1550	C	Solid				X				
SD-279-03		1555	C	Solid				X				Hold Pending analysis SS to 02
SD-278-SS		1740	C	Solid				X				
SD-278-01		1745	C	Solid				X				
SD-277-SS		1810	C	Solid				X				
SD-277-01		1815	C	Solid				X				
SD-277-02		1820	C	Solid				X				
SD-277-03	↓	1825	C	Solid				X				Hold Pending analysis SS to 02
SD-219-SS	6/10/14	0920	C	Solid				X				

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month): ☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	6-10-14 / 1625	TT		6/10/14 1645	TestAmerica
Relinquished by:	Date/Time: 6/10/14 1735	Company TestAmerica	Received by: Jeff Clark	Date/Time: 6-11-14 0930	Company TA STL
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: △ Yes △ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: S. Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.1
Client Contact: Mike Martin	Phone:	E-Mail: jerry.lanier@testamericainc.com		Page: Page 2 of 4
Company: Tetra Tech, Inc.				Job #: 680-102199
Address: 20251 Century Blvd Suite 200	Due Date Requested:			
City: Germantown	TAT Requested (days): Standard			
State, Zip: MD, 20874	PO #: Purchase Order not required			
Phone:	WO #:			
Email: Michael.Martin@tetratech.com	Project #: 68012942			
Project Name: Sediments	SSOW#:			
Site:				

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2SO3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - Di Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of Containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-219-01	6/10/14	0922	C	Solid				X				
SD-219-02	6/10/14	0925	C	Solid				X				
SD-219-03	6/10/14	0928	C	Solid				X				[redacted]
SD-218-SS		1010	C	Solid				X				
SD-218-01		1012	C	Solid				X				
SD-218-02		1014	C	Solid				X				
SD-203-SS		1140	C	Solid				X				
SD-203-01		1145	C	Solid				X				
SD-203-02		1150	C	Solid				X				
SD-203-03		1155	C	Solid				X				Hold pending analysis SS 6/10/14
SD-202-SS		1220	C	Solid				X				

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Date/Time	Company	Received by:	Date/Time	Company
Relinquished by:	6-10-14 / 1625	TT		6/10/14 / 1645	TestAmerica
Relinquished by:	6/10/14 / 1735	TestAmerica		10-11-14 0930	TA STL
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: S. Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.5
Client Contact: Mike Martin	Phone:	E-Mail: jerry.lanier@testamericainc.com		Page: Page 3 of 4
Company: Tetra Tech, Inc.		Analysis Requested		Job #: 680-102199
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes:
City: Germantown	TAT Requested (days):			A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			
Email: Mlchael.Martin@tetratech.com	WO #:			Other:
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/226	Total Number of containers	Special Instructions/Note:
		Preservation Code:					N	N	N	N		
SD-202-01	6/10/14	1225	C	Solid				X				
SD-202-02		1230	C	Solid				X				
SD-195-55		1330	C	Solid				X				
SD-196-55		1400	C	Solid								
SD-196-01		1405	C	Solid								
SD-196-02		1410	C	Solid								
SD-196-03		1415	C	Solid								Hold pending analysis SS to 02
SD-220-55		1440		Solid								
SD-220-01		1442		Solid								
SD-220-02		1444		Solid								
SD-DUP-01		0000	C	Solid				X				

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	6-10-14 / 1625	TT		6/10/14 / 1695	TestAmerica
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	6/10/14 / 1735	TestAmerica		6-11-14 0930	TA STL
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.2
Client Contact: Mike Martin	Phone:	E-Mail: jerry.lanier@testamericainc.com		Page: Page 4 of 4
Company: Tetra Tech, Inc.		Analysis Requested		Job #: 680-102199

Address: 20251 Century Blvd Suite 200	Due Date Requested:
City: Germantown	TAT Requested (days):
State, Zip: MD, 20874	
Phone:	PO #: Purchase Order not required
Email: Michael.Martin@tetratech.com	WO #:
Project Name: Sediments	Project #: 68012942
Site:	SSOW#:

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2SO3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
		Preservation Code:					N	N	N	N		
SD-220-03	6/10/14	1496	C	Solid				X				Hold pending analysis SS to 02
SD-201-SS		1510	C	Solid				X				
SD-201-01		1515	C	Solid				X				
SD-201-02		1520	C	Solid				X				
SD-201-03		1525	C	Solid				X				Hold pending analysis SS to 02
SD-200-SS		1550	C	Solid				X				
SD-200-01		1555	C	Solid				X				
SD-200-02		1600	C	Solid				X				
SD-200-03		1605	C	Solid				X				
				Solid								
				Solid								

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	6-10-14 / 1625			6/10/14 / 1645	TestAmerica
Relinquished by:	Date/Time: 6/10/14 / 1735	Company TestAmerica	Received by: Gil Clarke	Date/Time: 6-11-14 0930	Company TA STL
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING



ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

TestAmerica Job ID: 680-102327-1
TestAmerica Sample Delivery Group: 680102327-1
Client Project/Site: Sediments
Revision: 1

For:
Tetra Tech, Inc.
20251 Century Blvd
Suite 200
Germantown, Maryland 20874

Attn: Mike Martin

Jerry Lanier

Authorized for release by:
9/12/2014 5:26:32 PM

Jerry Lanier, Project Manager I
(912)354-7858 e.3410
jerry.lanier@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Cover Page 1
Table of Contents 2
Case Narrative 3
Sample Summary 4
Method Summary 5
Definitions/Glossary 6
Client Sample Results 7
Tracer Carrier Summary 16
QC Sample Results 17
QC Association Summary 20
Lab Chronicle 22
Chain of Custody 29
Receipt Checklists 33
Clean Canister Certification 35
    Certification Summary 35

Job ID: 680-102327-1

Laboratory: TestAmerica Savannah

Narrative

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Sediments

Report Number: 680-102327-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 06/12/2014; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 2.6 C.

The final report was revised to correct sample IDs102327-30, -31, and -32 from 027-xx to 207-xx.

ISOTOPIC THORIUM

Samples SD-198-SS (680-102327-1), SD-198-01 (680-102327-2), SD-198-02 (680-102327-3), SD-197-SS (680-102327-5), SD-197-01 (680-102327-6), SD-197-02 (680-102327-7), SD-199-SS (680-102327-9), SD-199-01 (680-102327-10), SD-199-02 (680-102327-11), SD-DUP-02 (680-102327-13), SD-208-SS (680-102327-15), SD-208-01 (680-102327-16), SD-208-02 (680-102327-17), SD-209-01 (680-102327-18), SD-209-02 (680-102327-19), SD-209-03 (680-102327-20), SD-204-SS (680-102327-21), SD-204-01 (680-102327-22), SD-204-02 (680-102327-23), SD-221-SS (680-102327-24), SD-221-01 (680-102327-25), SD-221-02 (680-102327-26), SD-210-SS (680-102327-27), SD-210-01 (680-102327-28), SD-210-02 (680-102327-29), SD-207-SS (680-102327-30), SD-207-01 (680-102327-31), SD-207-02 (680-102327-32), SD-205-SS (680-102327-34), SD-205-01 (680-102327-35), SD-205-02 (680-102327-36) and SD-205-03 (680-102327-37) were analyzed for Isotopic Thorium in accordance with A01R_Th. The samples were leached on 06/16/2014, prepared on 06/18/2014, 07/01/2014 and 07/02/2014 and analyzed on 07/01/2014 and 07/07/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

RADIUM-226 AND OTHER GAMMA EMITTERS (GS)

Sample SD-005W-01 (680-102327-14) was analyzed for Radium-226 and other gamma emitters (GS) in accordance with approved methodologies. The samples were leached on 06/16/2014, prepared on 06/25/2014 and analyzed on 07/16/2014.

Insufficient sample was provided for the following sample to fill a geometry (e.g. tuna can) calibrated for Ra-226 analysis by gamma spectroscopy: SD-005W-01 (680-102327-14). The use of a different geometry could potentially bias the results low due to the loss of radon into the headspace of the container. The sample was put into 100mL d=1 geometry.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-1
SDG: 680102327-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-102327-1	SD-198-SS	Solid	06/11/14 07:55	06/12/14 09:40
680-102327-2	SD-198-01	Solid	06/11/14 08:00	06/12/14 09:40
680-102327-3	SD-198-02	Solid	06/11/14 08:05	06/12/14 09:40
680-102327-5	SD-197-SS	Solid	06/11/14 10:30	06/12/14 09:40
680-102327-6	SD-197-01	Solid	06/11/14 10:35	06/12/14 09:40
680-102327-7	SD-197-02	Solid	06/11/14 10:40	06/12/14 09:40
680-102327-9	SD-199-SS	Solid	06/11/14 11:10	06/12/14 09:40
680-102327-10	SD-199-01	Solid	06/11/14 11:15	06/12/14 09:40
680-102327-11	SD-199-02	Solid	06/11/14 11:20	06/12/14 09:40
680-102327-13	SD-DUP-02	Solid	06/11/14 00:00	06/12/14 09:40
680-102327-14	SD-005W-01	Solid	06/11/14 12:00	06/12/14 09:40
680-102327-15	SD-208-SS	Solid	06/11/14 12:00	06/12/14 09:40
680-102327-16	SD-208-01	Solid	06/11/14 12:05	06/12/14 09:40
680-102327-17	SD-208-02	Solid	06/11/14 12:10	06/12/14 09:40
680-102327-18	SD-209-01	Solid	06/11/14 14:00	06/12/14 09:40
680-102327-19	SD-209-02	Solid	06/11/14 14:05	06/12/14 09:40
680-102327-20	SD-209-03	Solid	06/11/14 14:10	06/12/14 09:40
680-102327-21	SD-204-SS	Solid	06/11/14 12:20	06/12/14 09:40
680-102327-22	SD-204-01	Solid	06/11/14 12:25	06/12/14 09:40
680-102327-23	SD-204-02	Solid	06/11/14 12:30	06/12/14 09:40
680-102327-24	SD-221-SS	Solid	06/11/14 13:20	06/12/14 09:40
680-102327-25	SD-221-01	Solid	06/11/14 13:25	06/12/14 09:40
680-102327-26	SD-221-02	Solid	06/11/14 13:30	06/12/14 09:40
680-102327-27	SD-210-SS	Solid	06/11/14 14:35	06/12/14 09:40
680-102327-28	SD-210-01	Solid	06/11/14 14:40	06/12/14 09:40
680-102327-29	SD-210-02	Solid	06/11/14 14:45	06/12/14 09:40
680-102327-30	SD-207-SS	Solid	06/11/14 14:48	06/12/14 09:40
680-102327-31	SD-207-01	Solid	06/11/14 14:50	06/12/14 09:40
680-102327-32	SD-207-02	Solid	06/11/14 14:55	06/12/14 09:40
680-102327-34	SD-205-SS	Solid	06/11/14 15:25	06/12/14 09:40
680-102327-35	SD-205-01	Solid	06/11/14 15:30	06/12/14 09:40
680-102327-36	SD-205-02	Solid	06/11/14 15:35	06/12/14 09:40
680-102327-37	SD-205-03	Solid	06/11/14 15:40	06/12/14 09:40

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-1
SDG: 680102327-1

Method	Method Description	Protocol	Laboratory
A-01-R	Isotopic Thorium (Alpha Spectrometry)	DOE	TAL SL
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client Sample ID: SD-198-SS

Lab Sample ID: 680-102327-1

Date Collected: 06/11/14 07:55
Matrix: Solid
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Thorium-228	1.30		1.00	0.152	pCi/g		06/18/14 13:57	07/01/14 12:21	1
Thorium-230	1.45		1.00	0.0957	pCi/g		06/18/14 13:57	07/01/14 12:21	1
Thorium-232	1.45		1.00	0.0762	pCi/g		06/18/14 13:57	07/01/14 12:21	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*53.4*		*30 - 110*	*06/18/14 13:57*	*07/01/14 12:21*	*1*

Client Sample ID: SD-198-01

Lab Sample ID: 680-102327-2

Date Collected: 06/11/14 08:00
Matrix: Solid
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Thorium-228	1.19		1.00	0.160	pCi/g		06/18/14 13:57	07/01/14 12:21	1
Thorium-230	1.01		1.00	0.123	pCi/g		06/18/14 13:57	07/01/14 12:21	1
Thorium-232	1.16		1.00	0.116	pCi/g		06/18/14 13:57	07/01/14 12:21	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*49.1*		*30 - 110*	*06/18/14 13:57*	*07/01/14 12:21*	*1*

Client Sample ID: SD-198-02

Lab Sample ID: 680-102327-3

Date Collected: 06/11/14 08:05
Matrix: Solid
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Thorium-228	1.13		1.00	0.153	pCi/g		06/18/14 13:57	07/01/14 12:21	1
Thorium-230	1.01		1.00	0.103	pCi/g		06/18/14 13:57	07/01/14 12:21	1
Thorium-232	0.999		1.00	0.0855	pCi/g		06/18/14 13:57	07/01/14 12:21	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*64.8*		*30 - 110*	*06/18/14 13:57*	*07/01/14 12:21*	*1*

Client Sample ID: SD-197-SS

Lab Sample ID: 680-102327-5

Date Collected: 06/11/14 10:30
Matrix: Solid
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Thorium-228	1.15		1.00	0.140	pCi/g		06/18/14 13:57	07/01/14 12:21	1
Thorium-230	1.09		1.00	0.103	pCi/g		06/18/14 13:57	07/01/14 12:21	1
Thorium-232	1.07		1.00	0.0687	pCi/g		06/18/14 13:57	07/01/14 12:21	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*64.1*		*30 - 110*	*06/18/14 13:57*	*07/01/14 12:21*	*1*

Client Sample ID: SD-197-01

Lab Sample ID: 680-102327-6

Date Collected: 06/11/14 10:35

Matrix: Solid

Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Thorium-228	1.20		1.00	0.191	pCi/g		06/18/14 13:57	07/01/14 12:21	1
Thorium-230	0.997		1.00	0.110	pCi/g		06/18/14 13:57	07/01/14 12:21	1
Thorium-232	1.41		1.00	0.0997	pCi/g		06/18/14 13:57	07/01/14 12:21	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*49.9*		*30 - 110*	*06/18/14 13:57*	*07/01/14 12:21*	*1*

Client Sample ID: SD-197-02

Lab Sample ID: 680-102327-7

Date Collected: 06/11/14 10:40

Matrix: Solid

Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Thorium-228	0.834		1.00	0.127	pCi/g		06/18/14 13:57	07/01/14 12:21	1
Thorium-230	0.750		1.00	0.0672	pCi/g		06/18/14 13:57	07/01/14 12:21	1
Thorium-232	1.03		1.00	0.0835	pCi/g		06/18/14 13:57	07/01/14 12:21	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*65.8*		*30 - 110*	*06/18/14 13:57*	*07/01/14 12:21*	*1*

Client Sample ID: SD-199-SS

Lab Sample ID: 680-102327-9

Date Collected: 06/11/14 11:10

Matrix: Solid

Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Thorium-228	1.08		1.00	0.146	pCi/g		06/18/14 13:57	07/01/14 12:21	1
Thorium-230	1.35		1.00	0.0869	pCi/g		06/18/14 13:57	07/01/14 12:21	1
Thorium-232	1.19		1.00	0.0928	pCi/g		06/18/14 13:57	07/01/14 12:21	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*60.7*		*30 - 110*	*06/18/14 13:57*	*07/01/14 12:21*	*1*

Client Sample ID: SD-199-01

Lab Sample ID: 680-102327-10

Date Collected: 06/11/14 11:15

Matrix: Solid

Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Thorium-228	1.27		1.00	0.137	pCi/g		06/18/14 13:57	07/01/14 12:21	1
Thorium-230	1.05		1.00	0.0929	pCi/g		06/18/14 13:57	07/01/14 12:21	1
Thorium-232	1.39		1.00	0.0925	pCi/g		06/18/14 13:57	07/01/14 12:21	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*58.8*		*30 - 110*	*06/18/14 13:57*	*07/01/14 12:21*	*1*

Client Sample ID: SD-199-02

Lab Sample ID: 680-102327-11

Date Collected: 06/11/14 11:20
Matrix: Solid
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Thorium-228	1.08		1.00	0.104	pCi/g		06/18/14 13:57	07/01/14 12:21	1
Thorium-230	0.660		1.00	0.0887	pCi/g		06/18/14 13:57	07/01/14 12:21	1
Thorium-232	0.965		1.00	0.0773	pCi/g		06/18/14 13:57	07/01/14 12:21	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*57.2*		*30 - 110*	*06/18/14 13:57*	*07/01/14 12:21*	*1*

Client Sample ID: SD-DUP-02

Lab Sample ID: 680-102327-13

Date Collected: 06/11/14 00:00
Matrix: Solid
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Thorium-228	0.695		1.00	0.140	pCi/g		06/18/14 13:57	07/01/14 12:21	1
Thorium-230	0.775		1.00	0.0831	pCi/g		06/18/14 13:57	07/01/14 12:21	1
Thorium-232	1.08		1.00	0.0827	pCi/g		06/18/14 13:57	07/01/14 12:21	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*66.8*		*30 - 110*	*06/18/14 13:57*	*07/01/14 12:21*	*1*

Client Sample ID: SD-005W-01

Lab Sample ID: 680-102327-14

Date Collected: 06/11/14 12:00
Matrix: Solid
Date Received: 06/12/14 09:40

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Radium-226	0.921		1.00	0.225	pCi/g		06/25/14 12:41	07/16/14 01:35	1
Radium-228	1.43			0.237	pCi/g		06/25/14 12:41	07/16/14 01:35	1
Thorium-232	1.43			0.237	pCi/g		06/25/14 12:41	07/16/14 01:35	1
Uranium-235	0.0963	U		0.630	pCi/g		06/25/14 12:41	07/16/14 01:35	1
Uranium-238	1.69	U		1.76	pCi/g		06/25/14 12:41	07/16/14 01:35	1

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Ac-228	1.43			0.237	pCi/g		06/25/14 12:41	07/16/14 01:35	1
Bi-214	0.921			0.225	pCi/g		06/25/14 12:41	07/16/14 01:35	1
K-40	12.9			1.19	pCi/g		06/25/14 12:41	07/16/14 01:35	1
Pb-212	1.25			0.206	pCi/g		06/25/14 12:41	07/16/14 01:35	1
Pb-214	0.836			0.218	pCi/g		06/25/14 12:41	07/16/14 01:35	1
Tl-208	0.370			0.109	pCi/g		06/25/14 12:41	07/16/14 01:35	1

Client Sample ID: SD-208-SS

Lab Sample ID: 680-102327-15

Date Collected: 06/11/14 12:00
Matrix: Solid
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Thorium-228	0.188		1.00	0.0831	pCi/g		07/01/14 13:01	07/07/14 18:12	1
Thorium-230	0.349		1.00	0.0675	pCi/g		07/01/14 13:01	07/07/14 18:12	1
Thorium-232	0.257		1.00	0.0492	pCi/g		07/01/14 13:01	07/07/14 18:12	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*85.1*		*30 - 110*	*07/01/14 13:01*	*07/07/14 18:12*	*1*

Client Sample ID: SD-208-01

Lab Sample ID: 680-102327-16

Date Collected: 06/11/14 12:05

Matrix: Solid

Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Thorium-228	0.692		1.00	0.0834	pCi/g		06/18/14 13:57	07/01/14 12:22	1
Thorium-230	0.719		1.00	0.0513	pCi/g		06/18/14 13:57	07/01/14 12:22	1
Thorium-232	0.762		1.00	0.0336	pCi/g		06/18/14 13:57	07/01/14 12:22	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*84.0*		*30 - 110*	*06/18/14 13:57*	*07/01/14 12:22*	*1*

Client Sample ID: SD-208-02

Lab Sample ID: 680-102327-17

Date Collected: 06/11/14 12:10

Matrix: Solid

Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Thorium-228	0.834		1.00	0.107	pCi/g		06/18/14 13:57	07/01/14 12:22	1
Thorium-230	0.717		1.00	0.0528	pCi/g		06/18/14 13:57	07/01/14 12:22	1
Thorium-232	1.02		1.00	0.0346	pCi/g		06/18/14 13:57	07/01/14 12:22	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*81.7*		*30 - 110*	*06/18/14 13:57*	*07/01/14 12:22*	*1*

Client Sample ID: SD-209-01

Lab Sample ID: 680-102327-18

Date Collected: 06/11/14 14:00

Matrix: Solid

Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Thorium-228	0.730		1.00	0.0856	pCi/g		06/18/14 13:57	07/01/14 12:22	1
Thorium-230	0.424		1.00	0.0480	pCi/g		06/18/14 13:57	07/01/14 12:22	1
Thorium-232	0.399		1.00	0.0507	pCi/g		06/18/14 13:57	07/01/14 12:22	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*84.0*		*30 - 110*	*06/18/14 13:57*	*07/01/14 12:22*	*1*

Client Sample ID: SD-209-02

Lab Sample ID: 680-102327-19

Date Collected: 06/11/14 14:05

Matrix: Solid

Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Thorium-228	0.378		1.00	0.0995	pCi/g		06/18/14 13:57	07/01/14 12:22	1
Thorium-230	0.365		1.00	0.0601	pCi/g		06/18/14 13:57	07/01/14 12:22	1
Thorium-232	0.493		1.00	0.0490	pCi/g		06/18/14 13:57	07/01/14 12:22	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*82.0*		*30 - 110*	*06/18/14 13:57*	*07/01/14 12:22*	*1*

Client Sample ID: SD-209-03

Date Collected: 06/11/14 14:10
Date Received: 06/12/14 09:40

Lab Sample ID: 680-102327-20

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Thorium-228	0.425		1.00	0.119	pCi/g		06/18/14 13:57	07/01/14 12:22	1
Thorium-230	0.499		1.00	0.0601	pCi/g		06/18/14 13:57	07/01/14 12:22	1
Thorium-232	0.508		1.00	0.0683	pCi/g		06/18/14 13:57	07/01/14 12:22	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*72.6*		*30 - 110*	*06/18/14 13:57*	*07/01/14 12:22*	*1*

Client Sample ID: SD-204-SS

Date Collected: 06/11/14 12:20
Date Received: 06/12/14 09:40

Lab Sample ID: 680-102327-21

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Thorium-228	0.356		1.00	0.126	pCi/g		06/18/14 13:57	07/01/14 12:22	1
Thorium-230	0.412		1.00	0.0411	pCi/g		06/18/14 13:57	07/01/14 12:22	1
Thorium-232	0.377		1.00	0.0709	pCi/g		06/18/14 13:57	07/01/14 12:22	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*69.5*		*30 - 110*	*06/18/14 13:57*	*07/01/14 12:22*	*1*

Client Sample ID: SD-204-01

Date Collected: 06/11/14 12:25
Date Received: 06/12/14 09:40

Lab Sample ID: 680-102327-22

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Thorium-228	1.22		1.00	0.0870	pCi/g		06/18/14 13:57	07/01/14 12:22	1
Thorium-230	0.885		1.00	0.0697	pCi/g		06/18/14 13:57	07/01/14 12:22	1
Thorium-232	1.03		1.00	0.0791	pCi/g		06/18/14 13:57	07/01/14 12:22	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*62.3*		*30 - 110*	*06/18/14 13:57*	*07/01/14 12:22*	*1*

Client Sample ID: SD-204-02

Date Collected: 06/11/14 12:30
Date Received: 06/12/14 09:40

Lab Sample ID: 680-102327-23

Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Thorium-228	0.920		1.00	0.0354	pCi/g		06/18/14 13:57	07/01/14 12:22	1
Thorium-230	0.755		1.00	0.0354	pCi/g		06/18/14 13:57	07/01/14 12:22	1
Thorium-232	0.655		1.00	0.0534	pCi/g		06/18/14 13:57	07/01/14 12:22	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*80.3*		*30 - 110*	*06/18/14 13:57*	*07/01/14 12:22*	*1*

Client Sample ID: SD-221-SS

Lab Sample ID: 680-102327-24

Date Collected: 06/11/14 13:20
Matrix: Solid
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Thorium-228	0.446		1.00	0.0819	pCi/g		07/02/14 15:22	07/07/14 18:12	1
Thorium-230	0.434		1.00	0.0599	pCi/g		07/02/14 15:22	07/07/14 18:12	1
Thorium-232	0.407		1.00	0.0596	pCi/g		07/02/14 15:22	07/07/14 18:12	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*85.0*		*30 - 110*	*07/02/14 15:22*	*07/07/14 18:12*	*1*

Client Sample ID: SD-221-01

Lab Sample ID: 680-102327-25

Date Collected: 06/11/14 13:25
Matrix: Solid
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Thorium-228	0.458		1.00	0.105	pCi/g		06/18/14 13:59	07/01/14 12:28	1
Thorium-230	0.556		1.00	0.0830	pCi/g		06/18/14 13:59	07/01/14 12:28	1
Thorium-232	0.559		1.00	0.0723	pCi/g		06/18/14 13:59	07/01/14 12:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*87.9*		*30 - 110*	*06/18/14 13:59*	*07/01/14 12:28*	*1*

Client Sample ID: SD-221-02

Lab Sample ID: 680-102327-26

Date Collected: 06/11/14 13:30
Matrix: Solid
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Thorium-228	0.697		1.00	0.0482	pCi/g		06/18/14 13:59	07/01/14 12:28	1
Thorium-230	0.687		1.00	0.0482	pCi/g		06/18/14 13:59	07/01/14 12:28	1
Thorium-232	0.677		1.00	0.0644	pCi/g		06/18/14 13:59	07/01/14 12:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*88.2*		*30 - 110*	*06/18/14 13:59*	*07/01/14 12:28*	*1*

Client Sample ID: SD-210-SS

Lab Sample ID: 680-102327-27

Date Collected: 06/11/14 14:35
Matrix: Solid
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Thorium-228	0.274		1.00	0.0942	pCi/g		06/18/14 13:59	07/01/14 12:28	1
Thorium-230	0.406		1.00	0.0476	pCi/g		06/18/14 13:59	07/01/14 12:28	1
Thorium-232	0.219		1.00	0.0673	pCi/g		06/18/14 13:59	07/01/14 12:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*91.8*		*30 - 110*	*06/18/14 13:59*	*07/01/14 12:28*	*1*

Client Sample ID: SD-210-01

Lab Sample ID: 680-102327-28

Date Collected: 06/11/14 14:40
Matrix: Solid
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Thorium-228	0.551		1.00	0.0930	pCi/g		06/18/14 13:59	07/01/14 12:28	1
Thorium-230	0.563		1.00	0.0505	pCi/g		06/18/14 13:59	07/01/14 12:28	1
Thorium-232	0.605		1.00	0.0502	pCi/g		06/18/14 13:59	07/01/14 12:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*86.0*		*30 - 110*	*06/18/14 13:59*	*07/01/14 12:28*	*1*

Client Sample ID: SD-210-02

Lab Sample ID: 680-102327-29

Date Collected: 06/11/14 14:45
Matrix: Solid
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Thorium-228	0.579		1.00	0.103	pCi/g		06/18/14 13:59	07/01/14 12:28	1
Thorium-230	0.506		1.00	0.0682	pCi/g		06/18/14 13:59	07/01/14 12:28	1
Thorium-232	0.571		1.00	0.0835	pCi/g		06/18/14 13:59	07/01/14 12:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*85.4*		*30 - 110*	*06/18/14 13:59*	*07/01/14 12:28*	*1*

Client Sample ID: SD-207-SS

Lab Sample ID: 680-102327-30

Date Collected: 06/11/14 14:48
Matrix: Solid
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Thorium-228	0.753		1.00	0.0429	pCi/g		06/18/14 13:59	07/01/14 12:28	1
Thorium-230	0.633		1.00	0.0283	pCi/g		06/18/14 13:59	07/01/14 12:28	1
Thorium-232	0.629		1.00	0.0282	pCi/g		06/18/14 13:59	07/01/14 12:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*105*		*30 - 110*	*06/18/14 13:59*	*07/01/14 12:28*	*1*

Client Sample ID: SD-207-01

Lab Sample ID: 680-102327-31

Date Collected: 06/11/14 14:50
Matrix: Solid
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Thorium-228	1.18		1.00	0.0545	pCi/g		06/18/14 13:59	07/01/14 12:28	1
Thorium-230	0.796		1.00	0.0478	pCi/g		06/18/14 13:59	07/01/14 12:28	1
Thorium-232	1.16		1.00	0.0476	pCi/g		06/18/14 13:59	07/01/14 12:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.1*		*30 - 110*	*06/18/14 13:59*	*07/01/14 12:28*	*1*

Client Sample ID: SD-207-02

Lab Sample ID: 680-102327-32

Date Collected: 06/11/14 14:55
Matrix: Solid
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Thorium-228	1.14		1.00	0.0768	pCi/g		06/18/14 13:59	07/01/14 12:28	1
Thorium-230	0.999		1.00	0.0645	pCi/g		06/18/14 13:59	07/01/14 12:28	1
Thorium-232	1.22		1.00	0.0513	pCi/g		06/18/14 13:59	07/01/14 12:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*83.8*		*30 - 110*	*06/18/14 13:59*	*07/01/14 12:28*	*1*

Client Sample ID: SD-205-SS

Lab Sample ID: 680-102327-34

Date Collected: 06/11/14 15:25
Matrix: Solid
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Thorium-228	0.641		1.00	0.0663	pCi/g		06/18/14 13:59	07/01/14 12:28	1
Thorium-230	0.505		1.00	0.101	pCi/g		06/18/14 13:59	07/01/14 12:28	1
Thorium-232	0.484		1.00	0.0660	pCi/g		06/18/14 13:59	07/01/14 12:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*41.4*		*30 - 110*	*06/18/14 13:59*	*07/01/14 12:28*	*1*

Client Sample ID: SD-205-01

Lab Sample ID: 680-102327-35

Date Collected: 06/11/14 15:30
Matrix: Solid
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Thorium-228	0.929		1.00	0.0471	pCi/g		06/18/14 13:59	07/01/14 12:28	1
Thorium-230	0.977		1.00	0.0632	pCi/g		06/18/14 13:59	07/01/14 12:28	1
Thorium-232	1.03		1.00	0.0469	pCi/g		06/18/14 13:59	07/01/14 12:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*93.2*		*30 - 110*	*06/18/14 13:59*	*07/01/14 12:28*	*1*

Client Sample ID: SD-205-02

Lab Sample ID: 680-102327-36

Date Collected: 06/11/14 15:35
Matrix: Solid
Date Received: 06/12/14 09:40

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Thorium-228	1.17		1.00	0.0575	pCi/g		06/18/14 13:59	07/01/14 12:28	1
Thorium-230	0.931		1.00	0.0572	pCi/g		06/18/14 13:59	07/01/14 12:28	1
Thorium-232	1.23		1.00	0.0730	pCi/g		06/18/14 13:59	07/01/14 12:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*87.8*		*30 - 110*	*06/18/14 13:59*	*07/01/14 12:28*	*1*

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-1
SDG: 680102327-1

Client Sample ID: SD-205-03
Date Collected: 06/11/14 15:40
Date Received: 06/12/14 09:40

Lab Sample ID: 680-102327-37
Matrix: Solid

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Thorium-228	0.616		1.00	0.0766	pCi/g		06/18/14 13:59	07/01/14 12:28	1
Thorium-230	0.570		1.00	0.0539	pCi/g		06/18/14 13:59	07/01/14 12:28	1
Thorium-232	0.644		1.00	0.0612	pCi/g		06/18/14 13:59	07/01/14 12:28	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*88.1*		*30 - 110*	*06/18/14 13:59*	*07/01/14 12:28*	*1*

Tracer/Carrier Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-1
SDG: 680102327-1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)						
		Th-229						
Lab Sample ID	Client Sample ID	(30-110)						
680-102327-1	SD-198-SS	53.4						
680-102327-1 DU	SD-198-SS	58.7						
680-102327-2	SD-198-01	49.1						
680-102327-3	SD-198-02	64.8						
680-102327-5	SD-197-SS	64.1						
680-102327-6	SD-197-01	49.9						
680-102327-7	SD-197-02	65.8						
680-102327-9	SD-199-SS	60.7						
680-102327-10	SD-199-01	58.8						
680-102327-11	SD-199-02	57.2						
680-102327-13	SD-DUP-02	66.8						
680-102327-15	SD-208-SS	85.1						
680-102327-15 DU	SD-208-SS	86.4						
680-102327-16	SD-208-01	84.0						
680-102327-17	SD-208-02	81.7						
680-102327-18	SD-209-01	84.0						
680-102327-19	SD-209-02	82.0						
680-102327-20	SD-209-03	72.6						
680-102327-21	SD-204-SS	69.5						
680-102327-22	SD-204-01	62.3						
680-102327-23	SD-204-02	80.3						
680-102327-24	SD-221-SS	85.0						
680-102327-25	SD-221-01	87.9						
680-102327-25 DU	SD-221-01	89.1						
680-102327-26	SD-221-02	88.2						
680-102327-27	SD-210-SS	91.8						
680-102327-28	SD-210-01	86.0						
680-102327-29	SD-210-02	85.4						
680-102327-30	SD-207-SS	105						
680-102327-31	SD-207-01	89.1						
680-102327-32	SD-207-02	83.8						
680-102327-34	SD-205-SS	41.4						
680-102327-35	SD-205-01	93.2						
680-102327-36	SD-205-02	87.8						
680-102327-37	SD-205-03	88.1						
LCS 160-127446/2-A	Lab Control Sample	69.9						
LCS 160-127449/2-A	Lab Control Sample	88.4						
LCS 160-129166/2-A	Lab Control Sample	94.2						
MB 160-127446/1-A	Method Blank	75.7						
MB 160-127449/1-A	Method Blank	90.9						
MB 160-129166/1-A	Method Blank	89.3						

Tracer/Carrier Legend

Th-229 = Thorium-229

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Lab Sample ID: MB 160-127446/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 129245 — **Prep Batch: 127446**

Analyte	MB Result	MB Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Thorium-228	0.003137	U	1.00	0.0766	pCi/g		06/18/14 13:57	07/01/14 12:22	1
Thorium-230	0.05768	U	1.00	0.0652	pCi/g		06/18/14 13:57	07/01/14 12:22	1
Thorium-232	0.005310	U	1.00	0.0375	pCi/g		06/18/14 13:57	07/01/14 12:22	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*75.7*		*30 - 110*	*06/18/14 13:57*	*07/01/14 12:22*	*1*

Lab Sample ID: LCS 160-127446/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 129247 — **Prep Batch: 127446**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	MDC	Unit	%Rec	%Rec. Limits
Thorium-230	24.5	23.69		2.56	0.126	pCi/g	97	81 - 118

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*69.9*		*30 - 110*

Lab Sample ID: 680-102327-1 DU — **Client Sample ID: SD-198-SS**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 129302 — **Prep Batch: 127446**

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	MDC	Unit	RER	RER Limit
Thorium-228	1.30		1.450		0.336	0.141	pCi/g	0.23	1
Thorium-230	1.45		1.296		0.315	0.130	pCi/g	0.24	1
Thorium-232	1.45		1.132		0.289	0.0927	pCi/g	0.51	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Thorium-229	*58.7*		*30 - 110*

Lab Sample ID: MB 160-127449/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 129248 — **Prep Batch: 127449**

Analyte	MB Result	MB Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Thorium-228	-0.005780	U	1.00	0.0585	pCi/g		06/18/14 13:59	07/01/14 12:29	1
Thorium-230	0.1804		1.00	0.0466	pCi/g		06/18/14 13:59	07/01/14 12:29	1
Thorium-232	0.01023	U	1.00	0.0307	pCi/g		06/18/14 13:59	07/01/14 12:29	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*90.9*		*30 - 110*	*06/18/14 13:59*	*07/01/14 12:29*	*1*

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry) (Continued)

Lab Sample ID: LCS 160-127449/2-A
Matrix: Solid
Analysis Batch: 129249

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 127449

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)		MDC	Unit	%Rec	%Rec. Limits		
Thorium-230			24.5	25.70		2.62		0.0645	pCi/g	105	81 - 118		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*88.4*		*30 - 110*

Lab Sample ID: 680-102327-25 DU
Matrix: Solid
Analysis Batch: 129325

Client Sample ID: SD-221-01
Prep Type: Total/NA
Prep Batch: 127449

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)		MDC	Unit			RER	RER Limit
Thorium-228	0.458			0.3048		0.116		0.0535	pCi/g			0.57	1
Thorium-230	0.556			0.4511		0.142		0.0469	pCi/g			0.34	1
Thorium-232	0.559			0.4162		0.136		0.0532	pCi/g			0.47	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Thorium-229	*89.1*		*30 - 110*

Lab Sample ID: MB 160-129166/1-A
Matrix: Solid
Analysis Batch: 129973

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 129166

Analyte	MB Result	MB Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Thorium-228	0.02400	U	1.00	0.0651	pCi/g		07/01/14 13:01	07/07/14 18:12	1
Thorium-230	0.1247		1.00	0.0554	pCi/g		07/01/14 13:01	07/07/14 18:12	1
Thorium-232	0.008627	U	1.00	0.0483	pCi/g		07/01/14 13:01	07/07/14 18:12	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.3*		*30 - 110*	*07/01/14 13:01*	*07/07/14 18:12*	*1*

Lab Sample ID: LCS 160-129166/2-A
Matrix: Solid
Analysis Batch: 129974

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 129166

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)		MDC	Unit	%Rec	%Rec. Limits		
Thorium-230			24.5	24.17		2.48		0.130	pCi/g	99	81 - 118		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*94.2*		*30 - 110*

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry) (Continued)

Lab Sample ID: 680-102327-15 DU
Matrix: Solid
Analysis Batch: 129976

Client Sample ID: SD-208-SS
Prep Type: Total/NA
Prep Batch: 129166

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)		MDC	Unit			RER	RER Limit
Thorium-228	0.188			0.4124		0.148		0.113	pCi/g			0.92	1
Thorium-230	0.349			0.4287		0.144		0.0633	pCi/g			0.29	1
Thorium-232	0.257			0.3474		0.129		0.0630	pCi/g			0.38	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Thorium-229	*86.4*		*30 - 110*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-128622/1-A
Matrix: Solid
Analysis Batch: 131682

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 128622

Analyte	MB Result	MB Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Radium-226	0.03852	U	1.00	0.129	pCi/g		06/25/14 12:41	07/16/14 02:12	1
Radium-228	-0.008469	U		0.224	pCi/g		06/25/14 12:41	07/16/14 02:12	1
Thorium-232	-0.008469	U		0.224	pCi/g		06/25/14 12:41	07/16/14 02:12	1
Uranium-235	0.0000	U		0.320	pCi/g		06/25/14 12:41	07/16/14 02:12	1
Uranium-238	-0.2907	U		1.09	pCi/g		06/25/14 12:41	07/16/14 02:12	1

Analyte	MB Result	MB Qualifier	RL	MDC	Unit	D	Prepared	Analyzed	Dil Fac
Other Detected Radionuclide	None				pCi/g		06/25/14 12:41	07/16/14 02:12	1

Lab Sample ID: LCS 160-128622/2-A
Matrix: Solid
Analysis Batch: 131933

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 128622

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)		MDC	Unit	%Rec	%Rec. Limits		
Americium-241			97.4	101.0		10.7		1.50	pCi/g	104	87 - 116		
Cesium-137			31.0	30.57		3.34		0.389	pCi/g	99	87 - 120		
Cobalt-60			22.0	22.05		2.33		0.0869	pCi/g	100	87 - 115		

Rad

Leach Batch: 127010

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102327-1	SD-198-SS	Total/NA	Solid	Dry and Grind	
680-102327-1 DU	SD-198-SS	Total/NA	Solid	Dry and Grind	
680-102327-2	SD-198-01	Total/NA	Solid	Dry and Grind	
680-102327-3	SD-198-02	Total/NA	Solid	Dry and Grind	
680-102327-5	SD-197-SS	Total/NA	Solid	Dry and Grind	
680-102327-6	SD-197-01	Total/NA	Solid	Dry and Grind	
680-102327-7	SD-197-02	Total/NA	Solid	Dry and Grind	
680-102327-9	SD-199-SS	Total/NA	Solid	Dry and Grind	
680-102327-10	SD-199-01	Total/NA	Solid	Dry and Grind	
680-102327-11	SD-199-02	Total/NA	Solid	Dry and Grind	
680-102327-13	SD-DUP-02	Total/NA	Solid	Dry and Grind	
680-102327-14	SD-005W-01	Total/NA	Solid	Dry and Grind	
680-102327-15	SD-208-SS	Total/NA	Solid	Dry and Grind	
680-102327-15 DU	SD-208-SS	Total/NA	Solid	Dry and Grind	
680-102327-16	SD-208-01	Total/NA	Solid	Dry and Grind	
680-102327-17	SD-208-02	Total/NA	Solid	Dry and Grind	
680-102327-18	SD-209-01	Total/NA	Solid	Dry and Grind	
680-102327-19	SD-209-02	Total/NA	Solid	Dry and Grind	
680-102327-20	SD-209-03	Total/NA	Solid	Dry and Grind	
680-102327-21	SD-204-SS	Total/NA	Solid	Dry and Grind	
680-102327-22	SD-204-01	Total/NA	Solid	Dry and Grind	
680-102327-23	SD-204-02	Total/NA	Solid	Dry and Grind	
680-102327-24	SD-221-SS	Total/NA	Solid	Dry and Grind	
680-102327-25	SD-221-01	Total/NA	Solid	Dry and Grind	
680-102327-25 DU	SD-221-01	Total/NA	Solid	Dry and Grind	
680-102327-26	SD-221-02	Total/NA	Solid	Dry and Grind	
680-102327-27	SD-210-SS	Total/NA	Solid	Dry and Grind	
680-102327-28	SD-210-01	Total/NA	Solid	Dry and Grind	
680-102327-29	SD-210-02	Total/NA	Solid	Dry and Grind	
680-102327-30	SD-207-SS	Total/NA	Solid	Dry and Grind	
680-102327-31	SD-207-01	Total/NA	Solid	Dry and Grind	
680-102327-32	SD-207-02	Total/NA	Solid	Dry and Grind	
680-102327-34	SD-205-SS	Total/NA	Solid	Dry and Grind	
680-102327-35	SD-205-01	Total/NA	Solid	Dry and Grind	
680-102327-36	SD-205-02	Total/NA	Solid	Dry and Grind	
680-102327-37	SD-205-03	Total/NA	Solid	Dry and Grind	

Prep Batch: 127446

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102327-1	SD-198-SS	Total/NA	Solid	ExtChrom	127010
680-102327-1 DU	SD-198-SS	Total/NA	Solid	ExtChrom	127010
680-102327-2	SD-198-01	Total/NA	Solid	ExtChrom	127010
680-102327-3	SD-198-02	Total/NA	Solid	ExtChrom	127010
680-102327-5	SD-197-SS	Total/NA	Solid	ExtChrom	127010
680-102327-6	SD-197-01	Total/NA	Solid	ExtChrom	127010
680-102327-7	SD-197-02	Total/NA	Solid	ExtChrom	127010
680-102327-9	SD-199-SS	Total/NA	Solid	ExtChrom	127010
680-102327-10	SD-199-01	Total/NA	Solid	ExtChrom	127010
680-102327-11	SD-199-02	Total/NA	Solid	ExtChrom	127010
680-102327-13	SD-DUP-02	Total/NA	Solid	ExtChrom	127010
680-102327-16	SD-208-01	Total/NA	Solid	ExtChrom	127010

Rad (Continued)

Prep Batch: 127446 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102327-17	SD-208-02	Total/NA	Solid	ExtChrom	127010
680-102327-18	SD-209-01	Total/NA	Solid	ExtChrom	127010
680-102327-19	SD-209-02	Total/NA	Solid	ExtChrom	127010
680-102327-20	SD-209-03	Total/NA	Solid	ExtChrom	127010
680-102327-21	SD-204-SS	Total/NA	Solid	ExtChrom	127010
680-102327-22	SD-204-01	Total/NA	Solid	ExtChrom	127010
680-102327-23	SD-204-02	Total/NA	Solid	ExtChrom	127010
LCS 160-127446/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-127446/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Prep Batch: 127449

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102327-25	SD-221-01	Total/NA	Solid	ExtChrom	127010
680-102327-25 DU	SD-221-01	Total/NA	Solid	ExtChrom	127010
680-102327-26	SD-221-02	Total/NA	Solid	ExtChrom	127010
680-102327-27	SD-210-SS	Total/NA	Solid	ExtChrom	127010
680-102327-28	SD-210-01	Total/NA	Solid	ExtChrom	127010
680-102327-29	SD-210-02	Total/NA	Solid	ExtChrom	127010
680-102327-30	SD-207-SS	Total/NA	Solid	ExtChrom	127010
680-102327-31	SD-207-01	Total/NA	Solid	ExtChrom	127010
680-102327-32	SD-207-02	Total/NA	Solid	ExtChrom	127010
680-102327-34	SD-205-SS	Total/NA	Solid	ExtChrom	127010
680-102327-35	SD-205-01	Total/NA	Solid	ExtChrom	127010
680-102327-36	SD-205-02	Total/NA	Solid	ExtChrom	127010
680-102327-37	SD-205-03	Total/NA	Solid	ExtChrom	127010
LCS 160-127449/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-127449/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Prep Batch: 128622

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102327-14	SD-005W-01	Total/NA	Solid	Fill_Geo-21	127010
LCS 160-128622/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-128622/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

Prep Batch: 129166

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102327-15	SD-208-SS	Total/NA	Solid	ExtChrom	127010
680-102327-15 DU	SD-208-SS	Total/NA	Solid	ExtChrom	127010
680-102327-24	SD-221-SS	Total/NA	Solid	ExtChrom	127010
LCS 160-129166/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-129166/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Client Sample ID: SD-198-SS

Lab Sample ID: 680-102327-1

Date Collected: 06/11/14 07:55

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			1.0021 g	1.0 mL	127446	06/18/14 13:57	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	1.0021 g		129301	07/01/14 12:21	MLK	TAL SL

Instrument ID: ALPHAVISION

Client Sample ID: SD-198-01

Lab Sample ID: 680-102327-2

Date Collected: 06/11/14 08:00

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			1.0040 g	1.0 mL	127446	06/18/14 13:57	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	1.0040 g		129303	07/01/14 12:21	MLK	TAL SL

Instrument ID: ALPHAVISION

Client Sample ID: SD-198-02

Lab Sample ID: 680-102327-3

Date Collected: 06/11/14 08:05

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			0.9970 g	1.0 mL	127446	06/18/14 13:57	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	0.9970 g		129304	07/01/14 12:21	MLK	TAL SL

Instrument ID: ALPHAVISION

Client Sample ID: SD-197-SS

Lab Sample ID: 680-102327-5

Date Collected: 06/11/14 10:30

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			0.9980 g	1.0 mL	127446	06/18/14 13:57	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	0.9980 g		129305	07/01/14 12:21	MLK	TAL SL

Instrument ID: ALPHAVISION

Client Sample ID: SD-197-01

Lab Sample ID: 680-102327-6

Date Collected: 06/11/14 10:35

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			0.9982 g	1.0 mL	127446	06/18/14 13:57	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	0.9982 g		129306	07/01/14 12:21	MLK	TAL SL

Instrument ID: ALPHAVISION

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-1
SDG: 680102327-1

Client Sample ID: SD-197-02

Lab Sample ID: 680-102327-7

Date Collected: 06/11/14 10:40
Matrix: Solid
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			1.0048 g	1.0 mL	127446	06/18/14 13:57	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	1.0048 g		129307	07/01/14 12:21	MLK	TAL SL

Instrument ID: ALPHAVISION

Client Sample ID: SD-199-SS

Lab Sample ID: 680-102327-9

Date Collected: 06/11/14 11:10
Matrix: Solid
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			0.9996 g	1.0 mL	127446	06/18/14 13:57	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	0.9996 g		129308	07/01/14 12:21	MLK	TAL SL

Instrument ID: ALPHAVISION

Client Sample ID: SD-199-01

Lab Sample ID: 680-102327-10

Date Collected: 06/11/14 11:15
Matrix: Solid
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			1.0017 g	1.0 mL	127446	06/18/14 13:57	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	1.0017 g		129310	07/01/14 12:21	MLK	TAL SL

Instrument ID: ALPHAVISION

Client Sample ID: SD-199-02

Lab Sample ID: 680-102327-11

Date Collected: 06/11/14 11:20
Matrix: Solid
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			1.0034 g	1.0 mL	127446	06/18/14 13:57	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	1.0034 g		129311	07/01/14 12:21	MLK	TAL SL

Instrument ID: ALPHAVISION

Client Sample ID: SD-DUP-02

Lab Sample ID: 680-102327-13

Date Collected: 06/11/14 00:00
Matrix: Solid
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			0.9977 g	1.0 mL	127446	06/18/14 13:57	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	0.9977 g		129312	07/01/14 12:21	MLK	TAL SL

Instrument ID: ALPHAVISION

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-1
SDG: 680102327-1

Client Sample ID: SD-005W-01

Lab Sample ID: 680-102327-14

Date Collected: 06/11/14 12:00
Matrix: Solid
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	Fill_Geo-21			111.5 g	1.0 g	128622	06/25/14 12:41	JDP	TAL SL
Total/NA	Analysis	GA-01-R		1	111.5 g		131681	07/16/14 01:35	JLW	TAL SL

Instrument ID: GAMMAVISION

Client Sample ID: SD-208-SS

Lab Sample ID: 680-102327-15

Date Collected: 06/11/14 12:00
Matrix: Solid
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			1.0026 g	1.0 mL	129166	07/01/14 13:01	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	1.0026 g		129975	07/07/14 18:12	MLK	TAL SL

Instrument ID: ALPHAVISION

Client Sample ID: SD-208-01

Lab Sample ID: 680-102327-16

Date Collected: 06/11/14 12:05
Matrix: Solid
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			1.0040 g	1.0 mL	127446	06/18/14 13:57	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	1.0040 g		129314	07/01/14 12:22	MLK	TAL SL

Instrument ID: ALPHAVISION

Client Sample ID: SD-208-02

Lab Sample ID: 680-102327-17

Date Collected: 06/11/14 12:10
Matrix: Solid
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			1.0045 g	1.0 mL	127446	06/18/14 13:57	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	1.0045 g		129315	07/01/14 12:22	MLK	TAL SL

Instrument ID: ALPHAVISION

Client Sample ID: SD-209-01

Lab Sample ID: 680-102327-18

Date Collected: 06/11/14 14:00
Matrix: Solid
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			0.9996 g	1.0 mL	127446	06/18/14 13:57	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	0.9996 g		129316	07/01/14 12:22	MLK	TAL SL

Instrument ID: ALPHAVISION

Client Sample ID: SD-209-02

Lab Sample ID: 680-102327-19

Date Collected: 06/11/14 14:05
Matrix: Solid
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			0.9977 g	1.0 mL	127446	06/18/14 13:57	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	0.9977 g		129317	07/01/14 12:22	MLK	TAL SL

Instrument ID: ALPHAVISION

Client Sample ID: SD-209-03

Lab Sample ID: 680-102327-20

Date Collected: 06/11/14 14:10
Matrix: Solid
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			0.9976 g	1.0 mL	127446	06/18/14 13:57	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	0.9976 g		129318	07/01/14 12:22	MLK	TAL SL

Instrument ID: ALPHAVISION

Client Sample ID: SD-204-SS

Lab Sample ID: 680-102327-21

Date Collected: 06/11/14 12:20
Matrix: Solid
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			0.9991 g	1.0 mL	127446	06/18/14 13:57	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	0.9991 g		129319	07/01/14 12:22	MLK	TAL SL

Instrument ID: ALPHAVISION

Client Sample ID: SD-204-01

Lab Sample ID: 680-102327-22

Date Collected: 06/11/14 12:25
Matrix: Solid
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			0.9994 g	1.0 mL	127446	06/18/14 13:57	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	0.9994 g		129321	07/01/14 12:22	MLK	TAL SL

Instrument ID: ALPHAVISION

Client Sample ID: SD-204-02

Lab Sample ID: 680-102327-23

Date Collected: 06/11/14 12:30
Matrix: Solid
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			0.9974 g	1.0 mL	127446	06/18/14 13:57	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	0.9974 g		129322	07/01/14 12:22	MLK	TAL SL

Instrument ID: ALPHAVISION

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-1
SDG: 680102327-1

Client Sample ID: SD-221-SS
Date Collected: 06/11/14 13:20
Date Received: 06/12/14 09:40

Lab Sample ID: 680-102327-24
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			1.0061 g	1.0 mL	129166	07/02/14 15:22	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	1.0061 g		129977	07/07/14 18:12	MLK	TAL SL

Instrument ID: ALPHAVISION

Client Sample ID: SD-221-01
Date Collected: 06/11/14 13:25
Date Received: 06/12/14 09:40

Lab Sample ID: 680-102327-25
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			1.0004 g	1.0 mL	127449	06/18/14 13:59	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	1.0004 g		129324	07/01/14 12:28	MLK	TAL SL

Instrument ID: ALPHAVISION

Client Sample ID: SD-221-02
Date Collected: 06/11/14 13:30
Date Received: 06/12/14 09:40

Lab Sample ID: 680-102327-26
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			1.0000 g	1.0 mL	127449	06/18/14 13:59	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	1.0000 g		129326	07/01/14 12:28	MLK	TAL SL

Instrument ID: ALPHAVISION

Client Sample ID: SD-210-SS
Date Collected: 06/11/14 14:35
Date Received: 06/12/14 09:40

Lab Sample ID: 680-102327-27
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			1.0007 g	1.0 mL	127449	06/18/14 13:59	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	1.0007 g		129327	07/01/14 12:28	MLK	TAL SL

Instrument ID: ALPHAVISION

Client Sample ID: SD-210-01
Date Collected: 06/11/14 14:40
Date Received: 06/12/14 09:40

Lab Sample ID: 680-102327-28
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			1.0002 g	1.0 mL	127449	06/18/14 13:59	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	1.0002 g		129328	07/01/14 12:28	MLK	TAL SL

Instrument ID: ALPHAVISION

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-1
SDG: 680102327-1

Client Sample ID: SD-210-02

Lab Sample ID: 680-102327-29

Date Collected: 06/11/14 14:45
Matrix: Solid
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			1.0015 g	1.0 mL	127449	06/18/14 13:59	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	1.0015 g		129329	07/01/14 12:28	MLK	TAL SL

Instrument ID: ALPHAVISION

Client Sample ID: SD-207-SS

Lab Sample ID: 680-102327-30

Date Collected: 06/11/14 14:48
Matrix: Solid
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			1.0011 g	1.0 mL	127449	06/18/14 13:59	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	1.0011 g		129330	07/01/14 12:28	MLK	TAL SL

Instrument ID: ALPHAVISION

Client Sample ID: SD-207-01

Lab Sample ID: 680-102327-31

Date Collected: 06/11/14 14:50
Matrix: Solid
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			1.0026 g	1.0 mL	127449	06/18/14 13:59	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	1.0026 g		129226	07/01/14 12:28	MLK	TAL SL

Instrument ID: ALPHAVISION

Client Sample ID: SD-207-02

Lab Sample ID: 680-102327-32

Date Collected: 06/11/14 14:55
Matrix: Solid
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			0.9968 g	1.0 mL	127449	06/18/14 13:59	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	0.9968 g		129227	07/01/14 12:28	MLK	TAL SL

Instrument ID: ALPHAVISION

Client Sample ID: SD-205-SS

Lab Sample ID: 680-102327-34

Date Collected: 06/11/14 15:25
Matrix: Solid
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			0.9981 g	1.0 mL	127449	06/18/14 13:59	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	0.9981 g		129228	07/01/14 12:28	MLK	TAL SL

Instrument ID: ALPHAVISION

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-1
SDG: 680102327-1

Client Sample ID: SD-205-01

Lab Sample ID: 680-102327-35

Date Collected: 06/11/14 15:30
Matrix: Solid
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			0.9998 g	1.0 mL	127449	06/18/14 13:59	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	0.9998 g		129229	07/01/14 12:28	MLK	TAL SL

Instrument ID: ALPHAVISION

Client Sample ID: SD-205-02

Lab Sample ID: 680-102327-36

Date Collected: 06/11/14 15:35
Matrix: Solid
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			0.9997 g	1.0 mL	127449	06/18/14 13:59	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	0.9997 g		129230	07/01/14 12:28	MLK	TAL SL

Instrument ID: ALPHAVISION

Client Sample ID: SD-205-03

Lab Sample ID: 680-102327-37

Date Collected: 06/11/14 15:40
Matrix: Solid
Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	127010	06/16/14 15:30	MFM	TAL SL
Total/NA	Prep	ExtChrom			1.0009 g	1.0 mL	127449	06/18/14 13:59	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	1.0009 g		129231	07/01/14 12:28	MLK	TAL SL

Instrument ID: ALPHAVISION

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: S. Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.7
Client Contact: Mike Martin	Phone: (703) 342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page 1 of 9
Company: Tetra Tech, Inc.		Analysis Requested		Job #: 680-102327
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
City: Germantown	TAT Requested (days):			
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			Other:
Email: Michael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (HOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-198-SS	6/11/14	0755	C	Solid				X				
SD-198-01		0800	C	Solid				X				
SD-198-02		0805	C	Solid				X				
SD-198-03		0810	C	Solid				X				Hold Pending analysis of SS to 02
SD-197-SS		1030	C	Solid				X				
SD-197-01		1035	C	Solid				X				
SD-197-02		1040	C	Solid				X				
SD-197-03		1045	C	Solid				X				Hold Pending analysis of SS to 02
SD-199-SS		1110	C	Solid				X				
SD-199-01		1115	C	Solid				X				
SD-199-02		1120	C	Solid				X				

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month): ☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6/11/14 - 1600	TT		6/11/14 1600	TestAmerica
2		6/11/14 1730	TestAmerica		6-12-14 0940	TA SR
3						

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.3
Client Contact: Mike Martin	Phone:	E-Mail: jerry.lanier@testamericainc.com		Page: Page 2 of 4
Company: Tetra Tech, Inc.				Job #: 680-102327
Address: 20251 Century Blvd Suite 200	Due Date Requested:			
City: Germantown	TAT Requested (days):			
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			
Email: Michael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Analysis Requested

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-199-03	6/11/14	1125	C	Solid				X				H&H pending analysis of SS to 02
SD-DUP02		0000		Solid				X				
SD-005W-01		1200	C	Solid					X			
SD-208-SS		1206	C	Solid				X				
SD-208-01		1205	C	Solid				X				
SD-208-02		1210	C	Solid				X				
SD-209-01		1400	C	Solid				X				
SD-209-02		1405	C	Solid				X				
SD-209-03		1410	C	Solid				X				
SD-204-SS		1220	C	Solid				X				
SD-204-01		0225	C	Solid				X				

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2SO3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6-11-14 / 1600	TT		6/11/14 / 1600	TestAmerica
2		6/11/14 / 16-30 1730	TestAmerica		6-12-14 0940	TA STL
3		Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: △ Yes △ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Gemeran	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.4
Client Contact: Mike Martin	Phone: (703)342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~4 of 5~~ 3 of 4
Company: Tetra Tech, Inc.		Analysis Requested		Job #: 680-102327
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes:
City: Germantown	TAT Requested (days):			A - HCL, M - Hexane; B - NaOH, N - None; C - Zn Acetate, O - AsNaO2; D - Nitric Acid, P - Na2O4S; E - NaHSO4, Q - Na2SO3; F - MeOH, R - Na2S2SO3; G - Amchlor, S - H2SO4; H - Ascorbic Acid, T - TSP Dodecahydrate; I - Ice, U - Acetone; J - DI Water, V - MCAA; K - EDTA, W - ph 4-5; L - EDA, Z - other (specify)
State, Zip: MD, 20874	PO #: Purchase Order not required			Other:
Phone:	WO #:			
Email: MIchael.Martin@tetratech.com	Project #: 68012942			
Project Name: Sediments	SSOW#:			
Site:				

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-204-02	6/11/14	1230	C	Solid				X				
SD-221-SS		1320	C	Solid				X				
SD-221-01		1325	C	Solid				X				
SD-221-02		1330	C	Solid				X				
SD-210-SS		1435	C	Solid				X				
SD-210-01		1440	C	Solid				X				
SD-210-02		1445	C	Solid				X				
SD-207-SS		1448	C	Solid				X				
SD-207-01		1450	C	Solid				X				
SD-207-02		1455	C	Solid				X				
SD-207-03	↓	1500	C	Solid				X				Hold Pending Analysis of SS to 02

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6-11-14 1600	TT		6/11/14 1668	TestAmerica
2	Relinquished by:	Date/Time: 6/11/14 1630 1730	TestAmerica	Received by:	Date/Time: 6-12-14 0940	Company TASR
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

9/12/2014

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.12
Client Contact: Mike Martin	Phone: (703) 342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page 12 of 26 ~ 4 of 4
Company: Tetra Tech, Inc.		Analysis Requested		Job #: 680-102327
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes:
City: Germantown	TAT Requested (days):			A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; G - Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA; M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2SO3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - ph 4-5; Z - other (specify)
State, Zip: MD, 20874	PO #: Purchase Order not required			Other:
Phone:	WO #:			
Email: Michael.Martin@tetratech.com	Project #: 68012942			
Project Name: Sediments	SSOW#:			
Site:				

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-205-S5	6/11/14	1525	C	Solid				X				
SD-205-01		1530	C	Solid				X				
SD-205-02		1535	C	Solid				X				
SD-205-03		1540	C	Solid				X				
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6-11-14 1600	TT		6/11/14 1600	TestAmerica
2		6/11/14 1730	TestAmerica		6-12-14 0940	TAST
3		Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

9/12/2014

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-102327-1
SDG Number: 680102327-1

Login Number: 102327
List Number: 1
Creator: Daughtry, Beth A

List Source: TestAmerica Savannah

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-102327-1
SDG Number: 680102327-1

Login Number: 102327
List Number: 2
Creator: Daniels, Brian J

List Source: TestAmerica St. Louis
List Creation: 06/13/14 03:50 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	True	

Certification Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-1
SDG: 680102327-1

Laboratory: TestAmerica Savannah

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Maryland	State Program	3	250	12-31-14

Laboratory: TestAmerica St. Louis

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska	State Program	10	MO00054	06-30-15
California	NELAP	9	2886	03-31-15
Connecticut	State Program	1	PH-0241	03-31-15
Florida	NELAP	4	E87689	06-30-15
Illinois	NELAP	5	200023	11-30-14
Iowa	State Program	7	373	12-01-14
Kansas	NELAP	7	E-10236	10-31-14 *
Kentucky (DW)	State Program	4	90125	12-31-14
L-A-B	DoD ELAP		L2305	01-10-16
Louisiana	NELAP	6	04080	06-30-15
Maryland	State Program	3	310	09-30-15
Missouri	State Program	7	780	06-30-14 *
Nevada	State Program	9	MO000542013-1	07-31-14 *
New Jersey	NELAP	2	MO002	06-30-15
New Mexico	State Program	6		06-30-10 *
New York	NELAP	2	11616	03-31-15
North Dakota	State Program	8	R207	06-30-14 *
NRC	NRC		24-24817-01	12-31-22
Oklahoma	State Program	6	9997	08-31-15
Pennsylvania	NELAP	3	68-00540	02-28-15
South Carolina	State Program	4	85002001	06-30-14 *
Texas	NELAP	6	T104704193-13-6	07-31-15
USDA	Federal		P330-07-00122	01-09-17
USEPA Reg V SDWA	Federal	1	WG-15J	08-30-14
Utah	NELAP	8	MO000542013-5	07-31-15
Virginia	NELAP	3	460230	06-14-15
Washington	State Program	10	C592	08-30-15
West Virginia DEP	State Program	3	381	12-31-14 *

* Certification renewal pending - certification considered valid.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 680-102327-3

SDG Number: 680102327-1

Job Description: Sediments

For:
Tetra Tech, Inc.
20251 Century Blvd
Suite 200
Germantown, MD 20874

Attention: Mike Martin



Approved for release.
Jerry A Lanier
Project Manager I
9/12/2014 2:09 PM

Jerry A Lanier, Project Manager I
5102 LaRoche Avenue, Savannah, GA, 31404
(912)354-7858 e.3410
jerry.lanier@testamericainc.com
09/12/2014
Revision: 1

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

Savannah Certifications and ID #s: A2LA: 0399.01; AL: 41450; ARDEQ: 88-0692; ARDOH; AZ: AZ0741; CA: 03217CA; CO; CT: PH0161; DE; FL: E87052; GA: 803; Guam; HI; IL: 200022; IN: C-GA-02; IA: 353; KS: E-10322; KY EPPC: 90084; KY UST; LA DEQ: 30690; LA DHH: LA080008; ME: 2008022; MD: 250; MA: M-GA006; MI: 9925; MS; NFESC: 249; NV: GA00006; NJ: GA769; NM; NY: 10842; NC DWQ: 269; NC DHHS: 13701; PA: 68-00474; PR: GA00006; RI: LAO00244; SC: 98001001; TN: TN0296; TX: T104704185; USEPA: GA00006; VT: VT-87052; VA: 00302; WA; WV DEP: 094; WV DHHR: 9950 C; WI DNR: 999819810; WY/EPAR8: 8TMS-Q

Table of Contents

Cover Title Page 1

Data Summaries 4

- Definitions 4
- Case Narrative 5
- Client Sample Results 8
- Default Detection Limits 30
- QC Sample Results 31
- QC Association 40
- Chronicle 47
- Certification Summary 62
- Method Summary 63
- Sample Summary 64
- Reagent Traceability 65
  - COAs 81

Inorganic Sample Data 105

- Metals Data 105
  - Met Cover Page 106
  - Met Sample Data 107
  - Met QC Data 143
    - Met ICV/CCV 143
    - Met CRQL 162
    - Met Blanks 164
    - Met ICSA/ICSAB 184
    - Met MS/MSD/PDS 189
    - Met LCS/LCSD 197
    - Met Serial Dilution 203

Table of Contents

Met MDL 207

Met Linear Ranges 210

Met Preparation Log 211

Met Analysis Run Log 216

Met ICP/MS Int Stds 233

Met Raw Data 240

Met Prep Data 651

Subcontracted Data 657

Shipping and Receiving Documents 658

Client Chain of Custody 659

Sample Receipt Checklist 664

Qualifiers

Metals

Qualifier	Qualifier Description
^	ICV,CCV,ICB,CCB, ISA, ISB, CRI, CRA, DLCK or MRL standard: Instrument related QC exceeds the control limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
B	Compound was found in the blank and sample.
F2	MS/MSD RPD exceeds control limits
F1	MS and/or MSD Recovery exceeds the control limits
V	Serial Dilution exceeds the control limits

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.
F	MS/MSD Recovery and/or RPD exceeds the control limits
F1	MS and/or MSD Recovery exceeds the control limits

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Sediments

Report Number: 680-102327-3

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 06/12/2014 and 06/13/2014; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 2.6 and 3.1 C.

A revised report was necessary to correct the final volume that was used to calculate the Uranium data.

TOTAL URANIUM

Samples SD-198-SS (680-102327-1), SD-DUP-03 (680-102370-1), SD-198-01 (680-102327-2), SD-206-SS (680-102370-2), SD-198-02 (680-102327-3), SD-206-01 (680-102370-3), SD-206-02 (680-102370-4), SD-197-SS (680-102327-5), SD-197-01 (680-102327-6), SD-005E-01 (680-102370-6), SD-197-02 (680-102327-7), SD-199-SS (680-102327-9), SD-199-01 (680-102327-10), SD-199-02 (680-102327-11), SD-DUP-02 (680-102327-13), SD-005W-01 (680-102327-14), SD-208-SS (680-102327-15), SD-208-01 (680-102327-16), SD-208-02 (680-102327-17), SD-209-01 (680-102327-18), SD-209-02 (680-102327-19), SD-204-SS (680-102327-21), SD-204-01 (680-102327-22), SD-204-02 (680-102327-23), SD-221-SS (680-102327-24), SD-221-01 (680-102327-25), SD-221-02 (680-102327-26), SD-210-SS (680-102327-27), SD-210-01 (680-102327-28), SD-210-02 (680-102327-29), SD-207-SS (680-102327-30), SD-207-01 (680-102327-31), SD-207-02 (680-102327-32), SD-205-SS (680-102327-34), SD-205-01 (680-102327-35) and SD-205-02 (680-102327-36) were analyzed for Total Uranium in accordance with EPA SW-846 6020A. The samples were analyzed on 08/13/2014, 08/14/2014, 08/20/2014 and 08/25/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM

Samples SD-198-SS (680-102327-1), SD-DUP-03 (680-102370-1), SD-198-01 (680-102327-2), SD-206-SS (680-102370-2), SD-198-02 (680-102327-3), SD-206-01 (680-102370-3), SD-206-02 (680-102370-4), SD-197-SS (680-102327-5), SD-197-01 (680-102327-6), SD-005E-01 (680-102370-6), SD-197-02 (680-102327-7), SD-199-SS (680-102327-9), SD-199-01 (680-102327-10), SD-199-02 (680-102327-11), SD-DUP-02 (680-102327-13), SD-005W-01 (680-102327-14), SD-208-SS (680-102327-15), SD-208-01 (680-102327-16), SD-208-02 (680-102327-17), SD-209-01 (680-102327-18), SD-209-02 (680-102327-19), SD-204-SS (680-102327-21), SD-204-01 (680-102327-22), SD-204-02 (680-102327-23), SD-221-SS (680-102327-24), SD-221-01 (680-102327-25), SD-221-02 (680-102327-26), SD-210-SS (680-102327-27), SD-210-01 (680-102327-28), SD-210-02 (680-102327-29), SD-207-SS (680-102327-30), SD-207-01 (680-102327-31), SD-207-02 (680-102327-32), SD-205-SS (680-102327-34), SD-205-01 (680-102327-35) and SD-205-02 (680-102327-36) were analyzed for Isotopic Uranium in accordance with EPA SW-846 6020A. The samples were prepared on 08/13/2014, 08/14/2014, 08/20/2014 and 08/25/2014 and analyzed on 08/21/2014, 08/22/2014, 08/25/2014 and 08/26/2014.

The ICB and CCB contained uranium 233 above the reporting limit (RL). All reported samples associated with these QC were ND for this analyte; therefore, re-analysis of samples was not performed. (CCB 160-139817/100), (CCB 160-139817/103), (CCB 160-139817/16), (CCB 160-139817/28), (CCB 160-139817/40), (CCB 160-139817/52), (CCB 160-139817/64), (CCB 160-139817/76), (CCB 160-139817/88), (ICB 160-139817/10)

The initial calibration verification (ICV) result was above the upper control limit for uranium 235. Sample results were below the reporting limit, and have been reported as qualified data. (ICV 160-140258/9)

The continuing calibration verification (CCV) recovered above the upper control limit for uranium 233. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The following samples are impacted: (CCV 160-139817/102), (CCV 160-139817/87), (CCV 160-139817/99).

The LLC was above upper QC limits for uranium 233. Associated samples which are below the reporting limit for the contaminant do not require re-analysis. Original results are reported. (CRI 160-139817/12), (CRI 160-140258/12)

The serial dilution performed for the following sample(s) was outside control limits for uranium 238, indicating a matrix interference: (680-102327-24 SD)

Due to the high concentration of uranium 238, the matrix spike / matrix spike duplicate (MS/MSD) could not be evaluated for accuracy and

precision. The associated laboratory control sample (LCS) met acceptance criteria. (680-102327-1 MS), (680-102327-1 MSD)

U-235 exceeded the recovery criteria low for the MS of sample SD-221-SSMS (680-102327-24) in batch 160-140258.

For the MSD of sample SD-221-SSMSD (680-102327-24) in batch 160-140258, U-235 exceeded the recovery criteria low. U-238 exceeded the recovery criteria high. Also, U-238 exceeded the RPD limit.

Refer to the QC report for details.

The presence of the '4' qualifier indicates analytes where the concentration in the unspiked sample exceeded four times the spiking amount.

Refer to the QC report for details.

Samples SD-198-SS (680-102327-1)[5X], SD-DUP-03 (680-102327-1)[5X], SD-198-01 (680-102327-2)[5X], SD-206-SS (680-102327-2)[5X], SD-198-02 (680-102327-3)[5X], SD-206-01 (680-102327-3)[5X], SD-206-02 (680-102327-4)[5X], SD-197-SS (680-102327-5)[5X], SD-197-01 (680-102327-6)[5X], SD-005E-01 (680-102327-6)[5X], SD-197-02 (680-102327-7)[5X], SD-199-SS (680-102327-9)[5X], SD-199-01 (680-102327-10)[5X], SD-199-02 (680-102327-11)[5X], SD-DUP-02 (680-102327-13)[5X], SD-005W-01 (680-102327-14)[5X], SD-208-SS (680-102327-15)[5X], SD-208-01 (680-102327-16)[5X], SD-208-02 (680-102327-17)[5X], SD-209-01 (680-102327-18)[5X], SD-209-02 (680-102327-19)[5X], SD-204-SS (680-102327-21)[5X], SD-204-01 (680-102327-22)[5X], SD-204-02 (680-102327-23)[5X], SD-221-SS (680-102327-24)[5X], SD-221-01 (680-102327-25)[5X], SD-221-02 (680-102327-26)[5X], SD-210-SS (680-102327-27)[5X], SD-210-01 (680-102327-28)[5X], SD-210-02 (680-102327-29)[5X], SD-207-SS (680-102327-30)[5X], SD-207-01 (680-102327-31)[5X], SD-207-02 (680-102327-32)[5X], SD-205-SS (680-102327-34)[5X], SD-205-01 (680-102327-35)[5X] and SD-205-02 (680-102327-36)[5X] required dilution prior to analysis. The samples were high in salts. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM PERCENTAGE

Samples SD-198-SS (680-102327-1), SD-DUP-03 (680-102370-1), SD-198-01 (680-102327-2), SD-206-SS (680-102370-2), SD-198-02 (680-102327-3), SD-206-01 (680-102370-3), SD-206-02 (680-102370-4), SD-197-SS (680-102327-5), SD-197-01 (680-102327-6), SD-005E-01 (680-102370-6), SD-197-02 (680-102327-7), SD-199-SS (680-102327-9), SD-199-01 (680-102327-10), SD-199-02 (680-102327-11), SD-DUP-02 (680-102327-13), SD-005W-01 (680-102327-14), SD-208-SS (680-102327-15), SD-208-01 (680-102327-16), SD-208-02 (680-102327-17), SD-209-01 (680-102327-18), SD-209-02 (680-102327-19), SD-204-SS (680-102327-21), SD-204-01 (680-102327-22), SD-204-02 (680-102327-23), SD-221-SS (680-102327-24), SD-221-01 (680-102327-25), SD-221-02 (680-102327-26), SD-210-SS (680-102327-27), SD-210-01 (680-102327-28), SD-210-02 (680-102327-29), SD-207-SS (680-102327-30), SD-207-01 (680-102327-31), SD-207-02 (680-102327-32), SD-205-SS (680-102327-34), SD-205-01 (680-102327-35) and SD-205-02 (680-102327-36) were analyzed for Isotopic Uranium Percentage in accordance with EPA SW-846 6020A. The samples were analyzed on 08/13/2014, 08/14/2014, 08/20/2014 and 08/25/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM ACTIVITY

Samples SD-198-SS (680-102327-1), SD-DUP-03 (680-102370-1), SD-198-01 (680-102327-2), SD-206-SS (680-102370-2), SD-198-02 (680-102327-3), SD-206-01 (680-102370-3), SD-206-02 (680-102370-4), SD-197-SS (680-102327-5), SD-197-01 (680-102327-6), SD-005E-01 (680-102370-6), SD-197-02 (680-102327-7), SD-199-SS (680-102327-9), SD-199-01 (680-102327-10), SD-199-02 (680-102327-11), SD-DUP-02 (680-102327-13), SD-005W-01 (680-102327-14), SD-208-SS (680-102327-15), SD-208-01 (680-102327-16), SD-208-02 (680-102327-17), SD-209-01 (680-102327-18), SD-209-02 (680-102327-19), SD-204-SS (680-102327-21), SD-204-01 (680-102327-22), SD-204-02 (680-102327-23), SD-221-SS (680-102327-24), SD-221-01 (680-102327-25), SD-221-02 (680-102327-26), SD-210-SS (680-102327-27), SD-210-01 (680-102327-28), SD-210-02 (680-102327-29), SD-207-SS (680-102327-30), SD-207-01 (680-102327-31), SD-207-02 (680-102327-32), SD-205-SS (680-102327-34), SD-205-01 (680-102327-35) and SD-205-02 (680-102327-36) were analyzed for Isotopic Uranium Activity in accordance with EPA SW-846 6020A. The samples were prepared on 08/13/2014, 08/14/2014, 08/20/2014 and 08/25/2014 and analyzed on 08/21/2014, 08/22/2014, 08/25/2014 and 08/26/2014.

U-238 was detected in method blank MB 160-137845/1-A, and method blank MB 160-139821/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged.

The Relative Error Ration (RER) and Duplicate Error Ration (DER) recoveries were outside control limits for uranium 234, 235 and 238. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

The Duplicate Error Ration (DER) was outside control limits for uranium 234 and 235. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits. (680-102327-1 MSD)

U-238 exceeded the recovery criteria high for the MSD of sample SD-221-SSMSD (680-102327-24) in batch 160-140259.

Refer to the QC report for details.

Samples SD-198-SS (680-102327-1)[5X], SD-DUP-03 (680-102327-1)[5X], SD-198-01 (680-102327-2)[5X], SD-206-SS (680-102327-2)[5X], SD-198-02 (680-102327-3)[5X], SD-206-01 (680-102327-3)[5X], SD-206-02 (680-102327-4)[5X], SD-197-SS (680-102327-5)[5X], SD-197-01 (680-102327-6)[5X], SD-005E-01 (680-102327-6)[5X], SD-197-02 (680-102327-7)[5X], SD-199-SS (680-102327-9)[5X], SD-199-01 (680-102327-10)[5X], SD-199-02 (680-102327-11)[5X], SD-DUP-02 (680-102327-13)[5X], SD-005W-01 (680-102327-14)[5X], SD-208-SS (680-102327-15)[5X], SD-208-01 (680-102327-16)[5X], SD-208-02 (680-102327-17)[5X], SD-209-01 (680-102327-18)[5X], SD-209-02 (680-102327-19)[5X], SD-204-SS (680-102327-21)[5X], SD-204-01 (680-102327-22)[5X], SD-204-02 (680-102327-23)[5X], SD-221-SS (680-102327-24)[5X], SD-221-01 (680-102327-25)[5X], SD-221-02 (680-102327-26)[5X], SD-210-SS (680-102327-27)[5X], SD-210-01 (680-102327-28)[5X], SD-210-02 (680-102327-29)[5X], SD-207-SS (680-102327-30)[5X], SD-207-01 (680-102327-31)[5X], SD-207-02 (680-102327-32)[5X], SD-205-SS (680-102327-34)[5X], SD-205-01 (680-102327-35)[5X] and SD-205-02 (680-102327-36)[5X] required dilution prior to analysis. The samples were high in salts. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Client Sample ID: SD-198-SS

Lab Sample ID: 680-102327-1

Date Collected: 06/11/14 07:55

Matrix: Solid

Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0033	mg/Kg		08/20/14 09:25	08/22/14 17:03	5
U-234	ND		0.011	0.00066	mg/Kg		08/20/14 09:25	08/21/14 22:16	5
U-235	**0.022**		0.011	0.0045	mg/Kg		08/20/14 09:25	08/21/14 22:16	5
U-236	ND		0.011	0.00088	mg/Kg		08/20/14 09:25	08/21/14 22:16	5
U-238	**3.1**		0.011	0.00066	mg/Kg		08/20/14 09:25	08/25/14 17:59	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**3.1**		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-7.63	U	0.440	0.829	106	31.9	pCi/g	08/20/14 09:25	08/22/14 17:03	5
U-234	1.35	U	0.278	0.304	68.7	4.12	pCi/g	08/20/14 09:25	08/21/14 22:16	5
U-235	**0.0468**		0.00223	0.00485	0.0238	0.00971	pCi/g	08/20/14 09:25	08/21/14 22:16	5
U-236	0.000457	U	0.000238	0.000242	0.714	0.0572	pCi/g	08/20/14 09:25	08/21/14 22:16	5
U-238	**1.03**		0.00227	0.0951	0.00371	0.000223	pCi/g	08/20/14 09:25	08/25/14 17:59	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.705**						%		08/20/14 09:25	1

Client Sample ID: SD-198-01

Lab Sample ID: 680-102327-2

Date Collected: 06/11/14 08:00

Matrix: Solid

Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0033	mg/Kg		08/20/14 09:25	08/22/14 17:31	5
U-234	ND		0.011	0.00065	mg/Kg		08/20/14 09:25	08/21/14 22:44	5
U-235	**0.021**		0.011	0.0044	mg/Kg		08/20/14 09:25	08/21/14 22:44	5
U-236	ND		0.011	0.00087	mg/Kg		08/20/14 09:25	08/21/14 22:44	5
U-238	**2.4**		0.011	0.00065	mg/Kg		08/20/14 09:25	08/25/14 18:27	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**2.4**		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-7.89	U	0.399	0.828	105	31.4	pCi/g	08/20/14 09:25	08/22/14 17:31	5
U-234	0.901	U	0.194	0.211	67.6	4.06	pCi/g	08/20/14 09:25	08/21/14 22:44	5
U-235	**0.0443**		0.00410	0.00578	0.0235	0.00956	pCi/g	08/20/14 09:25	08/21/14 22:44	5
U-236	0.000534	U	0.000700	0.000702	0.703	0.0563	pCi/g	08/20/14 09:25	08/21/14 22:44	5
U-238	**0.816**		0.0147	0.0765	0.00365	0.000220	pCi/g	08/20/14 09:25	08/25/14 18:27	5

Client Sample ID: SD-198-01

Lab Sample ID: 680-102327-2

Date Collected: 06/11/14 08:00

Matrix: Solid

Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.867						%		08/20/14 09:25	1

Client Sample ID: SD-198-02

Lab Sample ID: 680-102327-3

Date Collected: 06/11/14 08:05

Matrix: Solid

Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0034	mg/Kg		08/20/14 09:25	08/22/14 17:35	5
U-234	ND		0.011	0.00068	mg/Kg		08/20/14 09:25	08/21/14 22:49	5
U-235	0.016		0.011	0.0046	mg/Kg		08/20/14 09:25	08/21/14 22:49	5
U-236	ND		0.011	0.00090	mg/Kg		08/20/14 09:25	08/21/14 22:49	5
U-238	1.9		0.011	0.00068	mg/Kg		08/20/14 09:25	08/25/14 18:32	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.9		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-8.26	U	0.236	0.796	109	32.7	pCi/g	08/20/14 09:25	08/22/14 17:35	5
U-234	0.956	U	0.579	0.586	70.3	4.22	pCi/g	08/20/14 09:25	08/21/14 22:49	5
U-235	0.0339		0.00421	0.00524	0.0244	0.00994	pCi/g	08/20/14 09:25	08/21/14 22:49	5
U-236	-0.00158	U	0.00156	0.00157	0.731	0.0585	pCi/g	08/20/14 09:25	08/21/14 22:49	5
U-238	0.640		0.0114	0.0599	0.00380	0.000228	pCi/g	08/20/14 09:25	08/25/14 18:32	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.835						%		08/20/14 09:25	1

Client Sample ID: SD-197-SS

Lab Sample ID: 680-102327-5

Date Collected: 06/11/14 10:30

Matrix: Solid

Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0036	mg/Kg		08/20/14 09:25	08/22/14 17:40	5
U-234	ND		0.012	0.00072	mg/Kg		08/20/14 09:25	08/21/14 22:54	5
U-235	0.020		0.012	0.0049	mg/Kg		08/20/14 09:25	08/21/14 22:54	5
U-236	ND		0.012	0.00096	mg/Kg		08/20/14 09:25	08/21/14 22:54	5
U-238	2.8		0.012	0.00072	mg/Kg		08/20/14 09:25	08/25/14 18:37	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.8		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Client Sample ID: SD-197-SS

Lab Sample ID: 680-102327-5

Date Collected: 06/11/14 10:30

Matrix: Solid

Date Received: 06/12/14 09:40

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-8.59	U	0.353	0.865	116	34.7	pCi/g	08/20/14 09:25	08/22/14 17:40	5
U-234	0.987	U	0.323	0.335	74.6	4.48	pCi/g	08/20/14 09:25	08/21/14 22:54	5
U-235	**0.0431**		0.00290	0.00492	0.0259	0.0105	pCi/g	08/20/14 09:25	08/21/14 22:54	5
U-236	0.0000310	U	0.000503	0.000503	0.775	0.0621	pCi/g	08/20/14 09:25	08/21/14 22:54	5
U-238	**0.949**		0.0149	0.0886	0.00403	0.000242	pCi/g	08/20/14 09:25	08/25/14 18:37	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.709**						%		08/20/14 09:25	1

Client Sample ID: SD-197-01

Lab Sample ID: 680-102327-6

Date Collected: 06/11/14 10:35

Matrix: Solid

Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0034	mg/Kg		08/20/14 09:25	08/22/14 17:45	5
U-234	ND		0.011	0.00067	mg/Kg		08/20/14 09:25	08/21/14 22:58	5
U-235	**0.022**		0.011	0.0046	mg/Kg		08/20/14 09:25	08/21/14 22:58	5
U-236	ND		0.011	0.00090	mg/Kg		08/20/14 09:25	08/21/14 22:58	5
U-238	**2.9**		0.011	0.00067	mg/Kg		08/20/14 09:25	08/25/14 18:41	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**2.9**		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-8.23	U	0.336	0.829	108	32.4	pCi/g	08/20/14 09:25	08/22/14 17:45	5
U-234	1.17	U	0.166	0.198	69.8	4.19	pCi/g	08/20/14 09:25	08/21/14 22:58	5
U-235	**0.0483**		0.00226	0.00498	0.0242	0.00987	pCi/g	08/20/14 09:25	08/21/14 22:58	5
U-236	-0.000696	U	0.00141	0.00141	0.725	0.0581	pCi/g	08/20/14 09:25	08/21/14 22:58	5
U-238	**0.986**		0.0139	0.0918	0.00377	0.000226	pCi/g	08/20/14 09:25	08/25/14 18:41	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.753**						%		08/20/14 09:25	1

Client Sample ID: SD-197-02

Lab Sample ID: 680-102327-7

Date Collected: 06/11/14 10:40

Matrix: Solid

Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0032	mg/Kg		08/20/14 09:25	08/22/14 17:49	5
U-234	ND		0.011	0.00064	mg/Kg		08/20/14 09:25	08/21/14 23:03	5
U-235	**0.012**		0.011	0.0043	mg/Kg		08/20/14 09:25	08/21/14 23:03	5
U-236	ND		0.011	0.00085	mg/Kg		08/20/14 09:25	08/21/14 23:03	5
U-238	**1.4**		0.011	0.00064	mg/Kg		08/20/14 09:25	08/25/14 18:46	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**1.4**		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-7.50	U	0.673	0.964	102	30.6	pCi/g	08/20/14 09:25	08/22/14 17:49	5
U-234	0.461	U	0.482	0.484	65.9	3.96	pCi/g	08/20/14 09:25	08/21/14 23:03	5
U-235	**0.0251**		0.00151	0.00276	0.0229	0.00932	pCi/g	08/20/14 09:25	08/21/14 23:03	5
U-236	0.000301	U	0.00159	0.00159	0.685	0.0549	pCi/g	08/20/14 09:25	08/21/14 23:03	5
U-238	**0.472**		0.0195	0.0476	0.00356	0.000214	pCi/g	08/20/14 09:25	08/25/14 18:46	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.850**						%		08/20/14 09:25	1

Client Sample ID: SD-199-SS

Lab Sample ID: 680-102327-9

Date Collected: 06/11/14 11:10

Matrix: Solid

Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0033	mg/Kg		08/20/14 09:25	08/22/14 17:54	5
U-234	ND		0.011	0.00067	mg/Kg		08/20/14 09:25	08/21/14 23:08	5
U-235	**0.022**		0.011	0.0045	mg/Kg		08/20/14 09:25	08/21/14 23:08	5
U-236	ND		0.011	0.00089	mg/Kg		08/20/14 09:25	08/21/14 23:08	5
U-238	**2.8**		0.011	0.00067	mg/Kg		08/20/14 09:25	08/25/14 18:51	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**2.8**		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-7.87	U	0.200	0.751	107	32.1	pCi/g	08/20/14 09:25	08/22/14 17:54	5
U-234	0.953	U	0.544	0.551	69.1	4.14	pCi/g	08/20/14 09:25	08/21/14 23:08	5
U-235	**0.0480**		0.00364	0.00572	0.0240	0.00977	pCi/g	08/20/14 09:25	08/21/14 23:08	5
U-236	-0.000546	U	0.00135	0.00135	0.718	0.0575	pCi/g	08/20/14 09:25	08/21/14 23:08	5
U-238	**0.928**		0.0184	0.0874	0.00373	0.000224	pCi/g	08/20/14 09:25	08/25/14 18:51	5

Client Sample ID: SD-199-SS

Lab Sample ID: 680-102327-9

Date Collected: 06/11/14 11:10

Matrix: Solid

Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.780						%		08/20/14 09:25	1

Client Sample ID: SD-199-01

Lab Sample ID: 680-102327-10

Date Collected: 06/11/14 11:15

Matrix: Solid

Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0032	mg/Kg		08/20/14 09:25	08/22/14 17:59	5
U-234	ND		0.011	0.00063	mg/Kg		08/20/14 09:25	08/21/14 23:12	5
U-235	0.027		0.011	0.0043	mg/Kg		08/20/14 09:25	08/21/14 23:12	5
U-236	ND		0.011	0.00084	mg/Kg		08/20/14 09:25	08/21/14 23:12	5
U-238	2.5		0.011	0.00063	mg/Kg		08/20/14 09:25	08/25/14 18:55	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.5		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-7.54	U	0.388	0.794	102	30.5	pCi/g	08/20/14 09:25	08/22/14 17:59	5
U-234	1.46	U	0.582	0.597	65.7	3.94	pCi/g	08/20/14 09:25	08/21/14 23:12	5
U-235	0.0583		0.00555	0.00772	0.0228	0.00929	pCi/g	08/20/14 09:25	08/21/14 23:12	5
U-236	0.000573	U	0.000778	0.000780	0.682	0.0547	pCi/g	08/20/14 09:25	08/21/14 23:12	5
U-238	0.856		0.0242	0.0824	0.00355	0.000213	pCi/g	08/20/14 09:25	08/25/14 18:55	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	1.07						%		08/20/14 09:25	1

Client Sample ID: SD-199-02

Lab Sample ID: 680-102327-11

Date Collected: 06/11/14 11:20

Matrix: Solid

Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0034	mg/Kg		08/20/14 09:25	08/22/14 18:03	5
U-234	ND		0.011	0.00069	mg/Kg		08/20/14 09:25	08/21/14 23:26	5
U-235	0.023		0.011	0.0047	mg/Kg		08/20/14 09:25	08/21/14 23:26	5
U-236	ND		0.011	0.00092	mg/Kg		08/20/14 09:25	08/21/14 23:26	5
U-238	2.7		0.011	0.00069	mg/Kg		08/20/14 09:25	08/25/14 19:00	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.7		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Client Sample ID: SD-199-02

Lab Sample ID: 680-102327-11

Date Collected: 06/11/14 11:20

Matrix: Solid

Date Received: 06/12/14 09:40

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-8.58	U	0.183	0.810	110	33.1	pCi/g	08/20/14 09:25	08/22/14 18:03	5
U-234	1.22	U	0.108	0.156	71.3	4.28	pCi/g	08/20/14 09:25	08/21/14 23:26	5
U-235	**0.0489**		0.00583	0.00736	0.0248	0.0101	pCi/g	08/20/14 09:25	08/21/14 23:26	5
U-236	-0.00104	U	0.000605	0.000612	0.741	0.0594	pCi/g	08/20/14 09:25	08/21/14 23:26	5
U-238	**0.908**		0.0325	0.0896	0.00385	0.000232	pCi/g	08/20/14 09:25	08/25/14 19:00	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.845**						%		08/20/14 09:25	1

Client Sample ID: SD-DUP-02

Lab Sample ID: 680-102327-13

Date Collected: 06/11/14 00:00

Matrix: Solid

Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0034	mg/Kg		08/20/14 09:25	08/22/14 18:17	5
U-234	ND		0.011	0.00067	mg/Kg		08/20/14 09:25	08/21/14 23:31	5
U-235	**0.019**		0.011	0.0045	mg/Kg		08/20/14 09:25	08/21/14 23:31	5
U-236	ND		0.011	0.00090	mg/Kg		08/20/14 09:25	08/21/14 23:31	5
U-238	**2.5**		0.011	0.00067	mg/Kg		08/20/14 09:25	08/25/14 19:14	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**2.5**		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-8.23	U	0.321	0.822	108	32.4	pCi/g	08/20/14 09:25	08/22/14 18:17	5
U-234	0.914	U	0.526	0.533	69.7	4.18	pCi/g	08/20/14 09:25	08/21/14 23:31	5
U-235	**0.0411**		0.00378	0.00535	0.0242	0.00986	pCi/g	08/20/14 09:25	08/21/14 23:31	5
U-236	-0.00156	U	0.00146	0.00147	0.724	0.0580	pCi/g	08/20/14 09:25	08/21/14 23:31	5
U-238	**0.847**		0.0184	0.0801	0.00376	0.000226	pCi/g	08/20/14 09:25	08/25/14 19:14	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.754**						%		08/20/14 09:25	1

Client Sample ID: SD-005W-01

Lab Sample ID: 680-102327-14

Date Collected: 06/11/14 12:00

Matrix: Solid

Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0036	mg/Kg		08/20/14 09:25	08/22/14 18:22	5
U-234	ND		0.012	0.00072	mg/Kg		08/20/14 09:25	08/21/14 23:36	5
U-235	**0.018**		0.012	0.0049	mg/Kg		08/20/14 09:25	08/21/14 23:36	5
U-236	ND		0.012	0.00096	mg/Kg		08/20/14 09:25	08/21/14 23:36	5
U-238	**2.6**		0.012	0.00072	mg/Kg		08/20/14 09:25	08/25/14 19:19	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**2.6**		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-8.88	U	0.376	0.899	116	34.7	pCi/g	08/20/14 09:25	08/22/14 18:22	5
U-234	1.03	U	0.324	0.338	74.7	4.48	pCi/g	08/20/14 09:25	08/21/14 23:36	5
U-235	**0.0399**		0.00205	0.00420	0.0259	0.0106	pCi/g	08/20/14 09:25	08/21/14 23:36	5
U-236	-0.00149	U	0.00225	0.00225	0.777	0.0622	pCi/g	08/20/14 09:25	08/21/14 23:36	5
U-238	**0.870**		0.0101	0.0806	0.00404	0.000243	pCi/g	08/20/14 09:25	08/25/14 19:19	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.688**						%		08/20/14 09:25	1

Client Sample ID: SD-208-SS

Lab Sample ID: 680-102327-15

Date Collected: 06/11/14 12:00

Matrix: Solid

Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0033	mg/Kg		08/20/14 09:25	08/22/14 18:27	5
U-234	ND		0.011	0.00066	mg/Kg		08/20/14 09:25	08/21/14 23:40	5
U-235	**0.0094**	**J**	0.011	0.0045	mg/Kg		08/20/14 09:25	08/21/14 23:40	5
U-236	ND		0.011	0.00088	mg/Kg		08/20/14 09:25	08/21/14 23:40	5
U-238	**1.3**		0.011	0.00066	mg/Kg		08/20/14 09:25	08/25/14 19:23	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**1.3**		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-8.12	U	0.372	0.835	106	31.8	pCi/g	08/20/14 09:25	08/22/14 18:27	5
U-234	0.444	U	0.136	0.142	68.5	4.11	pCi/g	08/20/14 09:25	08/21/14 23:40	5
U-235	**0.0202**		0.0000425	0.00186	0.0238	0.00970	pCi/g	08/20/14 09:25	08/21/14 23:40	5
U-236	-0.00105	U	0.000213	0.000234	0.712	0.0571	pCi/g	08/20/14 09:25	08/21/14 23:40	5
U-238	**0.432**		0.00312	0.0399	0.00370	0.000223	pCi/g	08/20/14 09:25	08/25/14 19:23	5

Client Sample ID: SD-208-SS

Lab Sample ID: 680-102327-15

Date Collected: 06/11/14 12:00

Matrix: Solid

Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.718						%		08/20/14 09:25	1

Client Sample ID: SD-208-01

Lab Sample ID: 680-102327-16

Date Collected: 06/11/14 12:05

Matrix: Solid

Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0032	mg/Kg		08/20/14 09:25	08/22/14 18:31	5
U-234	ND		0.011	0.00063	mg/Kg		08/20/14 09:25	08/21/14 23:45	5
U-235	0.0054	J	0.011	0.0043	mg/Kg		08/20/14 09:25	08/21/14 23:45	5
U-236	ND		0.011	0.00085	mg/Kg		08/20/14 09:25	08/21/14 23:45	5
U-238	0.76		0.011	0.00063	mg/Kg		08/20/14 09:25	08/25/14 19:28	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.77		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-7.83	U	0.510	0.882	102	30.6	pCi/g	08/20/14 09:25	08/22/14 18:31	5
U-234	0.221	U	0.142	0.143	65.8	3.95	pCi/g	08/20/14 09:25	08/21/14 23:45	5
U-235	0.0118		0.000336	0.00113	0.0228	0.00930	pCi/g	08/20/14 09:25	08/21/14 23:45	5
U-236	0.000219	U	0.00162	0.00162	0.684	0.0548	pCi/g	08/20/14 09:25	08/21/14 23:45	5
U-238	0.256		0.00726	0.0247	0.00355	0.000214	pCi/g	08/20/14 09:25	08/25/14 19:28	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.706						%		08/20/14 09:25	1

Client Sample ID: SD-208-02

Lab Sample ID: 680-102327-17

Date Collected: 06/11/14 12:10

Matrix: Solid

Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0032	mg/Kg		08/20/14 09:25	08/22/14 18:36	5
U-234	ND		0.011	0.00064	mg/Kg		08/20/14 09:25	08/21/14 23:50	5
U-235	ND		0.011	0.0043	mg/Kg		08/20/14 09:25	08/21/14 23:50	5
U-236	ND		0.011	0.00085	mg/Kg		08/20/14 09:25	08/21/14 23:50	5
U-238	0.56		0.011	0.00064	mg/Kg		08/20/14 09:25	08/25/14 19:33	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.56		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Client Sample ID: SD-208-02

Date Collected: 06/11/14 12:10
Date Received: 06/12/14 09:40

Lab Sample ID: 680-102327-17

Matrix: Solid

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-7.66	U	0.616	0.936	102	30.7	pCi/g	08/20/14 09:25	08/22/14 18:36	5
U-234	0.151	U	0.138	0.139	66.1	3.96	pCi/g	08/20/14 09:25	08/21/14 23:50	5
U-235	0.00775	U	0.000778	0.00106	0.0229	0.00934	pCi/g	08/20/14 09:25	08/21/14 23:50	5
U-236	-0.00124	U	0.00148	0.00148	0.687	0.0550	pCi/g	08/20/14 09:25	08/21/14 23:50	5
U-238	**0.190**		0.00279	0.0177	0.00357	0.000214	pCi/g	08/20/14 09:25	08/25/14 19:33	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.000**						%		08/20/14 09:25	1

Client Sample ID: SD-209-01

Date Collected: 06/11/14 14:00
Date Received: 06/12/14 09:40

Lab Sample ID: 680-102327-18

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0035	mg/Kg		08/20/14 09:25	08/22/14 18:41	5
U-234	ND		0.012	0.00070	mg/Kg		08/20/14 09:25	08/21/14 23:54	5
U-235	ND		0.012	0.0047	mg/Kg		08/20/14 09:25	08/21/14 23:54	5
U-236	ND		0.012	0.00093	mg/Kg		08/20/14 09:25	08/21/14 23:54	5
U-238	**0.46**		0.012	0.00070	mg/Kg		08/20/14 09:25	08/25/14 19:37	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**0.46**		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-8.74	U	0.778	1.12	112	33.6	pCi/g	08/20/14 09:25	08/22/14 18:41	5
U-234	-0.0260	U	0.0794	0.0794	72.2	4.34	pCi/g	08/20/14 09:25	08/21/14 23:54	5
U-235	0.00567	U	0.000466	0.000699	0.0251	0.0102	pCi/g	08/20/14 09:25	08/21/14 23:54	5
U-236	-0.00117	U	0.00157	0.00157	0.751	0.0601	pCi/g	08/20/14 09:25	08/21/14 23:54	5
U-238	**0.155**		0.0107	0.0178	0.00390	0.000235	pCi/g	08/20/14 09:25	08/25/14 19:37	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.000**						%		08/20/14 09:25	1

Client Sample ID: SD-209-02

Lab Sample ID: 680-102327-19

Date Collected: 06/11/14 14:05

Matrix: Solid

Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0033	mg/Kg		08/20/14 09:25	08/22/14 18:45	5
U-234	ND		0.011	0.00065	mg/Kg		08/20/14 09:25	08/21/14 23:59	5
U-235	ND		0.011	0.0044	mg/Kg		08/20/14 09:25	08/21/14 23:59	5
U-236	ND		0.011	0.00087	mg/Kg		08/20/14 09:25	08/21/14 23:59	5
U-238	**0.38**		0.011	0.00065	mg/Kg		08/20/14 09:25	08/25/14 19:42	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**0.38**		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-8.17	U	0.282	0.803	105	31.5	pCi/g	08/20/14 09:25	08/22/14 18:45	5
U-234	0.0244	U	0.201	0.201	67.8	4.07	pCi/g	08/20/14 09:25	08/21/14 23:59	5
U-235	0.00498	U	0.000259	0.000526	0.0235	0.00959	pCi/g	08/20/14 09:25	08/21/14 23:59	5
U-236	-0.000507	U	0.000736	0.000738	0.704	0.0564	pCi/g	08/20/14 09:25	08/21/14 23:59	5
U-238	**0.127**		0.00534	0.0128	0.00366	0.000220	pCi/g	08/20/14 09:25	08/25/14 19:42	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.000**						%		08/20/14 09:25	1

Client Sample ID: SD-204-SS

Lab Sample ID: 680-102327-21

Date Collected: 06/11/14 12:20

Matrix: Solid

Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0037	mg/Kg		08/20/14 09:25	08/22/14 18:50	5
U-234	ND		0.012	0.00074	mg/Kg		08/20/14 09:25	08/22/14 00:04	5
U-235	**0.0063**	**J**	0.012	0.0050	mg/Kg		08/20/14 09:25	08/22/14 00:04	5
U-236	ND		0.012	0.00098	mg/Kg		08/20/14 09:25	08/22/14 00:04	5
U-238	**0.85**		0.012	0.00074	mg/Kg		08/20/14 09:25	08/25/14 19:47	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**0.86**		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-9.06	U	0.192	0.855	118	35.5	pCi/g	08/20/14 09:25	08/22/14 18:50	5
U-234	0.128	U	0.206	0.206	76.4	4.58	pCi/g	08/20/14 09:25	08/22/14 00:04	5
U-235	**0.0136**		0.00127	0.00178	0.0265	0.0108	pCi/g	08/20/14 09:25	08/22/14 00:04	5
U-236	-0.000667	U	0.00253	0.00253	0.794	0.0636	pCi/g	08/20/14 09:25	08/22/14 00:04	5
U-238	**0.287**		0.0135	0.0296	0.00413	0.000248	pCi/g	08/20/14 09:25	08/25/14 19:47	5

Client Sample ID: SD-204-SS

Lab Sample ID: 680-102327-21

Date Collected: 06/11/14 12:20

Matrix: Solid

Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.736						%		08/20/14 09:25	1

Client Sample ID: SD-204-01

Lab Sample ID: 680-102327-22

Date Collected: 06/11/14 12:25

Matrix: Solid

Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0033	mg/Kg		08/20/14 09:25	08/22/14 18:55	5
U-234	ND		0.011	0.00067	mg/Kg		08/20/14 09:25	08/22/14 00:08	5
U-235	0.0085	J	0.011	0.0045	mg/Kg		08/20/14 09:25	08/22/14 00:08	5
U-236	ND		0.011	0.00089	mg/Kg		08/20/14 09:25	08/22/14 00:08	5
U-238	1.3		0.011	0.00067	mg/Kg		08/20/14 09:25	08/25/14 19:51	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.3		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-8.11	U	0.250	0.787	107	32.2	pCi/g	08/20/14 09:25	08/22/14 18:55	5
U-234	0.224	U	0.382	0.382	69.2	4.15	pCi/g	08/20/14 09:25	08/22/14 00:08	5
U-235	0.0184		0.000680	0.00183	0.0240	0.00979	pCi/g	08/20/14 09:25	08/22/14 00:08	5
U-236	-0.000662	U	0.00122	0.00122	0.720	0.0576	pCi/g	08/20/14 09:25	08/22/14 00:08	5
U-238	0.423		0.0134	0.0411	0.00374	0.000225	pCi/g	08/20/14 09:25	08/25/14 19:51	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.650						%		08/20/14 09:25	1

Client Sample ID: SD-204-02

Lab Sample ID: 680-102327-23

Date Collected: 06/11/14 12:30

Matrix: Solid

Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0035	mg/Kg		08/20/14 09:25	08/22/14 18:59	5
U-234	ND		0.012	0.00069	mg/Kg		08/20/14 09:25	08/22/14 00:22	5
U-235	ND		0.012	0.0047	mg/Kg		08/20/14 09:25	08/22/14 00:22	5
U-236	ND		0.012	0.00092	mg/Kg		08/20/14 09:25	08/22/14 00:22	5
U-238	0.59		0.012	0.00069	mg/Kg		08/20/14 09:25	08/25/14 19:56	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.59		0.0050	0.00030	mg/Kg			08/20/14 09:25	1

Client Sample ID: SD-204-02

Date Collected: 06/11/14 12:30
Date Received: 06/12/14 09:40

Lab Sample ID: 680-102327-23

Matrix: Solid

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-8.27	U	0.495	0.907	111	33.3	pCi/g	08/20/14 09:25	08/22/14 18:59	5
U-234	0.212	U	0.269	0.269	71.7	4.30	pCi/g	08/20/14 09:25	08/22/14 00:22	5
U-235	0.00882	U	0.000255	0.000851	0.0249	0.0101	pCi/g	08/20/14 09:25	08/22/14 00:22	5
U-236	0.000358	U	0.00147	0.00147	0.745	0.0597	pCi/g	08/20/14 09:25	08/22/14 00:22	5
U-238	**0.199**		0.00540	0.0191	0.00387	0.000233	pCi/g	08/20/14 09:25	08/25/14 19:56	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.000**						%		08/20/14 09:25	1

Client Sample ID: SD-221-SS

Date Collected: 06/11/14 13:20
Date Received: 06/12/14 09:40

Lab Sample ID: 680-102327-24

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0037	mg/Kg		08/25/14 07:53	08/26/14 15:56	5
U-234	ND		0.012	0.00075	mg/Kg		08/25/14 07:53	08/26/14 15:56	5
U-235	**0.0076**	**J ^**	0.012	0.0050	mg/Kg		08/25/14 07:53	08/26/14 15:56	5
U-236	ND		0.012	0.00099	mg/Kg		08/25/14 07:53	08/26/14 15:56	5
U-238	**0.68**	**B**	0.012	0.00075	mg/Kg		08/25/14 07:53	08/26/14 15:56	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**0.69**		0.0050	0.00030	mg/Kg			08/25/14 07:53	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-36.6	U	0.282	3.38	120	35.9	pCi/g	08/25/14 07:53	08/26/14 15:56	5
U-234	0.591	U F	0.247	0.253	77.3	4.64	pCi/g	08/25/14 07:53	08/26/14 15:56	5
U-235	**0.0165**	**F**	0.00215	0.00264	0.0268	0.0109	pCi/g	08/25/14 07:53	08/26/14 15:56	5
U-236	0.00135	U	0.00103	0.00103	0.803	0.0644	pCi/g	08/25/14 07:53	08/26/14 15:56	5
U-238	**0.228**	**F**	0.0149	0.0257	0.00418	0.000251	pCi/g	08/25/14 07:53	08/26/14 15:56	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**1.11**						%		08/25/14 07:53	1

Client Sample ID: SD-221-01

Lab Sample ID: 680-102327-25

Date Collected: 06/11/14 13:25

Matrix: Solid

Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0033	mg/Kg		08/13/14 10:17	08/22/14 19:23	5
U-234	ND		0.011	0.00066	mg/Kg		08/13/14 10:17	08/22/14 00:36	5
U-235	**0.0056**	**J**	0.011	0.0044	mg/Kg		08/13/14 10:17	08/22/14 00:36	5
U-236	ND		0.011	0.00088	mg/Kg		08/13/14 10:17	08/22/14 00:36	5
U-238	**0.47**		0.011	0.00066	mg/Kg		08/13/14 10:17	08/22/14 00:36	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**0.48**		0.0050	0.00030	mg/Kg			08/13/14 10:17	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-7.92	U	0.481	0.873	106	31.7	pCi/g	08/13/14 10:17	08/22/14 19:23	5
U-234	0.303	U	0.558	0.559	68.1	4.09	pCi/g	08/13/14 10:17	08/22/14 00:36	5
U-235	**0.0122**		0.00294	0.00315	0.0237	0.00964	pCi/g	08/13/14 10:17	08/22/14 00:36	5
U-236	0.00218	U	0.000891	0.000913	0.708	0.0567	pCi/g	08/13/14 10:17	08/22/14 00:36	5
U-238	**0.157**		0.00405	0.0150	0.00368	0.000221	pCi/g	08/13/14 10:17	08/22/14 00:36	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**1.18**						%		08/13/14 10:17	1

Client Sample ID: SD-221-02

Lab Sample ID: 680-102327-26

Date Collected: 06/11/14 13:30

Matrix: Solid

Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0033	mg/Kg		08/13/14 10:17	08/22/14 19:41	5
U-234	ND		0.011	0.00067	mg/Kg		08/13/14 10:17	08/22/14 00:55	5
U-235	ND		0.011	0.0045	mg/Kg		08/13/14 10:17	08/22/14 00:55	5
U-236	ND		0.011	0.00089	mg/Kg		08/13/14 10:17	08/22/14 00:55	5
U-238	**0.56**		0.011	0.00067	mg/Kg		08/13/14 10:17	08/22/14 00:55	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**0.56**		0.0050	0.00030	mg/Kg			08/13/14 10:17	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-8.54	U	0.399	0.881	107	32.2	pCi/g	08/13/14 10:17	08/22/14 19:41	5
U-234	-0.0443	U	0.324	0.324	69.3	4.16	pCi/g	08/13/14 10:17	08/22/14 00:55	5
U-235	0.00777	U	0.000293	0.000773	0.0241	0.00980	pCi/g	08/13/14 10:17	08/22/14 00:55	5
U-236	-0.000979	U	0.00197	0.00197	0.720	0.0577	pCi/g	08/13/14 10:17	08/22/14 00:55	5
U-238	**0.188**		0.0179	0.0249	0.00374	0.000225	pCi/g	08/13/14 10:17	08/22/14 00:55	5

Client Sample ID: SD-221-02

Lab Sample ID: 680-102327-26

Date Collected: 06/11/14 13:30

Matrix: Solid

Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.000						%		08/13/14 10:17	1

Client Sample ID: SD-210-SS

Lab Sample ID: 680-102327-27

Date Collected: 06/11/14 14:35

Matrix: Solid

Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0037	mg/Kg		08/13/14 10:17	08/22/14 19:46	5
U-234	ND		0.012	0.00073	mg/Kg		08/13/14 10:17	08/22/14 01:00	5
U-235	0.018		0.012	0.0050	mg/Kg		08/13/14 10:17	08/22/14 01:00	5
U-236	ND		0.012	0.00098	mg/Kg		08/13/14 10:17	08/22/14 01:00	5
U-238	2.0		0.012	0.00073	mg/Kg		08/13/14 10:17	08/22/14 01:00	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.0		0.0050	0.00030	mg/Kg			08/13/14 10:17	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-9.32	U	0.324	0.916	118	35.3	pCi/g	08/13/14 10:17	08/22/14 19:46	5
U-234	0.845	U	0.0229	0.0810	76.0	4.56	pCi/g	08/13/14 10:17	08/22/14 01:00	5
U-235	0.0379		0.00197	0.00401	0.0264	0.0107	pCi/g	08/13/14 10:17	08/22/14 01:00	5
U-236	0.000221	U	0.000912	0.000912	0.790	0.0633	pCi/g	08/13/14 10:17	08/22/14 01:00	5
U-238	0.686		0.0174	0.0654	0.00410	0.000247	pCi/g	08/13/14 10:17	08/22/14 01:00	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.892						%		08/13/14 10:17	1

Client Sample ID: SD-210-01

Lab Sample ID: 680-102327-28

Date Collected: 06/11/14 14:40

Matrix: Solid

Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0035	mg/Kg		08/13/14 10:17	08/22/14 19:51	5
U-234	ND		0.012	0.00070	mg/Kg		08/13/14 10:17	08/22/14 01:04	5
U-235	ND		0.012	0.0048	mg/Kg		08/13/14 10:17	08/22/14 01:04	5
U-236	ND		0.012	0.00094	mg/Kg		08/13/14 10:17	08/22/14 01:04	5
U-238	0.60		0.012	0.00070	mg/Kg		08/13/14 10:17	08/22/14 01:04	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.60		0.0050	0.00030	mg/Kg			08/13/14 10:17	1

Client Sample ID: SD-210-01

Date Collected: 06/11/14 14:40
Date Received: 06/12/14 09:40

Lab Sample ID: 680-102327-28

Matrix: Solid

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-8.86	U	0.198	0.839	113	33.9	pCi/g	08/13/14 10:17	08/22/14 19:51	5
U-234	0.0672	U	0.0977	0.0979	73.1	4.38	pCi/g	08/13/14 10:17	08/22/14 01:04	5
U-235	0.00793	U	0.000591	0.000939	0.0254	0.0103	pCi/g	08/13/14 10:17	08/22/14 01:04	5
U-236	-0.00118	U	0.000781	0.000789	0.759	0.0608	pCi/g	08/13/14 10:17	08/22/14 01:04	5
U-238	**0.201**		0.0146	0.0235	0.00395	0.000237	pCi/g	08/13/14 10:17	08/22/14 01:04	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.000**						%		08/13/14 10:17	1

Client Sample ID: SD-210-02

Date Collected: 06/11/14 14:45
Date Received: 06/12/14 09:40

Lab Sample ID: 680-102327-29

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0032	mg/Kg		08/13/14 10:17	08/22/14 19:55	5
U-234	ND		0.011	0.00065	mg/Kg		08/13/14 10:17	08/22/14 01:18	5
U-235	ND		0.011	0.0044	mg/Kg		08/13/14 10:17	08/22/14 01:18	5
U-236	ND		0.011	0.00086	mg/Kg		08/13/14 10:17	08/22/14 01:18	5
U-238	**0.58**		0.011	0.00065	mg/Kg		08/13/14 10:17	08/22/14 01:18	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**0.58**		0.0050	0.00030	mg/Kg			08/13/14 10:17	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-7.94	U	0.463	0.865	104	31.1	pCi/g	08/13/14 10:17	08/22/14 19:55	5
U-234	0.107	U	0.168	0.169	67.0	4.02	pCi/g	08/13/14 10:17	08/22/14 01:18	5
U-235	0.00811	U	0.000628	0.000975	0.0233	0.00947	pCi/g	08/13/14 10:17	08/22/14 01:18	5
U-236	-0.000445	U	0.00162	0.00162	0.696	0.0557	pCi/g	08/13/14 10:17	08/22/14 01:18	5
U-238	**0.194**		0.00729	0.0193	0.00362	0.000217	pCi/g	08/13/14 10:17	08/22/14 01:18	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.000**						%		08/13/14 10:17	1

Client Sample ID: SD-207-SS

Lab Sample ID: 680-102327-30

Date Collected: 06/11/14 14:48

Matrix: Solid

Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0033	mg/Kg		08/13/14 10:17	08/22/14 20:09	5
U-234	ND		0.011	0.00065	mg/Kg		08/13/14 10:17	08/22/14 01:23	5
U-235	**0.023**		0.011	0.0044	mg/Kg		08/13/14 10:17	08/22/14 01:23	5
U-236	ND		0.011	0.00087	mg/Kg		08/13/14 10:17	08/22/14 01:23	5
U-238	**2.9**		0.011	0.00065	mg/Kg		08/13/14 10:17	08/22/14 01:23	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**2.9**		0.0050	0.00030	mg/Kg			08/13/14 10:17	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-7.82	U	0.475	0.862	105	31.5	pCi/g	08/13/14 10:17	08/22/14 20:09	5
U-234	0.899	U	0.702	0.707	67.9	4.07	pCi/g	08/13/14 10:17	08/22/14 01:23	5
U-235	**0.0487**		0.00138	0.00469	0.0236	0.00960	pCi/g	08/13/14 10:17	08/22/14 01:23	5
U-236	-0.000564	U	0.00163	0.00163	0.705	0.0565	pCi/g	08/13/14 10:17	08/22/14 01:23	5
U-238	**0.960**		0.0139	0.0894	0.00367	0.000220	pCi/g	08/13/14 10:17	08/22/14 01:23	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.787**						%		08/13/14 10:17	1

Client Sample ID: SD-207-01

Lab Sample ID: 680-102327-31

Date Collected: 06/11/14 14:50

Matrix: Solid

Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.010	0.0031	mg/Kg		08/20/14 10:02	08/22/14 20:33	5
U-234	ND		0.010	0.00063	mg/Kg		08/20/14 10:02	08/22/14 01:46	5
U-235	**0.052**		0.010	0.0043	mg/Kg		08/20/14 10:02	08/22/14 01:46	5
U-236	ND		0.010	0.00084	mg/Kg		08/20/14 10:02	08/22/14 01:46	5
U-238	**2.4**		0.010	0.00063	mg/Kg		08/20/14 10:02	08/22/14 01:46	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**2.5**		0.0050	0.00030	mg/Kg			08/20/14 10:02	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-7.67	U	0.294	0.765	101	30.3	pCi/g	08/20/14 10:02	08/22/14 20:33	5
U-234	3.35	U	0.441	0.538	65.2	3.91	pCi/g	08/20/14 10:02	08/22/14 01:46	5
U-235	**0.112**		0.00195	0.0105	0.0227	0.00922	pCi/g	08/20/14 10:02	08/22/14 01:46	5
U-236	0.00737	U	0.00423	0.00429	0.678	0.0543	pCi/g	08/20/14 10:02	08/22/14 01:46	5
U-238	**0.804**		0.0339	0.0814	0.00352	0.000212	pCi/g	08/20/14 10:02	08/22/14 01:46	5

Client Sample ID: SD-207-01

Lab Sample ID: 680-102327-31

Date Collected: 06/11/14 14:50

Matrix: Solid

Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	2.12						%		08/20/14 10:02	1

Client Sample ID: SD-207-02

Lab Sample ID: 680-102327-32

Date Collected: 06/11/14 14:55

Matrix: Solid

Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0032	mg/Kg		08/20/14 10:02	08/22/14 20:51	5
U-234	ND		0.011	0.00064	mg/Kg		08/20/14 10:02	08/22/14 02:14	5
U-235	0.014		0.011	0.0043	mg/Kg		08/20/14 10:02	08/22/14 02:14	5
U-236	ND		0.011	0.00085	mg/Kg		08/20/14 10:02	08/22/14 02:14	5
U-238	1.9		0.011	0.00064	mg/Kg		08/20/14 10:02	08/22/14 02:14	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.9		0.0050	0.00030	mg/Kg			08/20/14 10:02	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-7.82	U	0.205	0.748	102	30.6	pCi/g	08/20/14 10:02	08/22/14 20:51	5
U-234	0.774	U	0.248	0.258	65.9	3.95	pCi/g	08/20/14 10:02	08/22/14 02:14	5
U-235	0.0310		0.000428	0.00289	0.0229	0.00931	pCi/g	08/20/14 10:02	08/22/14 02:14	5
U-236	-0.000986	U	0.000438	0.000447	0.684	0.0548	pCi/g	08/20/14 10:02	08/22/14 02:14	5
U-238	0.645		0.0169	0.0617	0.00356	0.000214	pCi/g	08/20/14 10:02	08/22/14 02:14	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.731						%		08/20/14 10:02	1

Client Sample ID: SD-205-SS

Lab Sample ID: 680-102327-34

Date Collected: 06/11/14 15:25

Matrix: Solid

Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0035	mg/Kg		08/13/14 10:18	08/22/14 20:14	5
U-234	ND		0.012	0.00070	mg/Kg		08/13/14 10:18	08/22/14 01:28	5
U-235	0.010	J	0.012	0.0047	mg/Kg		08/13/14 10:18	08/22/14 01:28	5
U-236	ND		0.012	0.00093	mg/Kg		08/13/14 10:18	08/22/14 01:28	5
U-238	1.4		0.012	0.00070	mg/Kg		08/13/14 10:18	08/22/14 01:28	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.4		0.0050	0.00030	mg/Kg			08/13/14 10:18	1

Client Sample ID: SD-205-SS

Lab Sample ID: 680-102327-34

Date Collected: 06/11/14 15:25

Matrix: Solid

Date Received: 06/12/14 09:40

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-8.80	U	0.311	0.867	112	33.7	pCi/g	08/13/14 10:18	08/22/14 20:14	5
U-234	0.275	U	0.137	0.139	72.5	4.35	pCi/g	08/13/14 10:18	08/22/14 01:28	5
U-235	**0.0224**		0.00100	0.00229	0.0252	0.0103	pCi/g	08/13/14 10:18	08/22/14 01:28	5
U-236	-0.000995	U	0.000222	0.000240	0.754	0.0604	pCi/g	08/13/14 10:18	08/22/14 01:28	5
U-238	**0.460**		0.0125	0.0441	0.00392	0.000235	pCi/g	08/13/14 10:18	08/22/14 01:28	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.709**						%		08/13/14 10:18	1

Client Sample ID: SD-205-01

Lab Sample ID: 680-102327-35

Date Collected: 06/11/14 15:30

Matrix: Solid

Date Received: 06/12/14 09:40

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0034	mg/Kg		08/20/14 10:02	08/22/14 21:05	5
U-234	ND		0.011	0.00068	mg/Kg		08/20/14 10:02	08/22/14 02:19	5
U-235	**0.041**		0.011	0.0046	mg/Kg		08/20/14 10:02	08/22/14 02:19	5
U-236	ND		0.011	0.00091	mg/Kg		08/20/14 10:02	08/22/14 02:19	5
U-238	**2.8**		0.011	0.00068	mg/Kg		08/20/14 10:02	08/22/14 02:19	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**2.8**		0.0050	0.00030	mg/Kg			08/20/14 10:02	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-8.52	U	0.456	0.907	110	32.9	pCi/g	08/20/14 10:02	08/22/14 21:05	5
U-234	2.69	U	0.584	0.634	70.7	4.24	pCi/g	08/20/14 10:02	08/22/14 02:19	5
U-235	**0.0884**		0.00767	0.0112	0.0246	0.0100	pCi/g	08/20/14 10:02	08/22/14 02:19	5
U-236	0.00220	U	0.00411	0.00411	0.735	0.0589	pCi/g	08/20/14 10:02	08/22/14 02:19	5
U-238	**0.934**		0.0787	0.117	0.00382	0.000230	pCi/g	08/20/14 10:02	08/22/14 02:19	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**1.44**						%		08/20/14 10:02	1

Client Sample ID: SD-205-02

Date Collected: 06/11/14 15:35
Date Received: 06/12/14 09:40

Lab Sample ID: 680-102327-36

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0035	mg/Kg		08/13/14 10:18	08/22/14 20:19	5
U-234	ND		0.012	0.00070	mg/Kg		08/13/14 10:18	08/22/14 01:32	5
U-235	**0.010**	**J**	0.012	0.0047	mg/Kg		08/13/14 10:18	08/22/14 01:32	5
U-236	ND		0.012	0.00094	mg/Kg		08/13/14 10:18	08/22/14 01:32	5
U-238	**1.4**		0.012	0.00070	mg/Kg		08/13/14 10:18	08/22/14 01:32	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**1.4**		0.0050	0.00030	mg/Kg			08/13/14 10:18	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-8.47	U	0.773	1.10	113	33.8	pCi/g	08/13/14 10:18	08/22/14 20:19	5
U-234	0.434	U	0.184	0.188	72.8	4.37	pCi/g	08/13/14 10:18	08/22/14 01:32	5
U-235	**0.0219**		0.000615	0.00210	0.0253	0.0103	pCi/g	08/13/14 10:18	08/22/14 01:32	5
U-236	-0.000877	U	0.00326	0.00326	0.756	0.0606	pCi/g	08/13/14 10:18	08/22/14 01:32	5
U-238	**0.484**		0.00480	0.0448	0.00393	0.000236	pCi/g	08/13/14 10:18	08/22/14 01:32	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.709**						%		08/13/14 10:18	1

Client Sample ID: SD-DUP-03

Date Collected: 06/12/14 00:00
Date Received: 06/13/14 09:30

Lab Sample ID: 680-102370-1

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0035	mg/Kg		08/14/14 09:01	08/22/14 15:34	5
U-234	ND		0.012	0.00071	mg/Kg		08/14/14 09:01	08/21/14 19:21	5
U-235	ND		0.012	0.0048	mg/Kg		08/14/14 09:01	08/21/14 19:21	5
U-236	ND		0.012	0.00094	mg/Kg		08/14/14 09:01	08/21/14 19:21	5
U-238	**0.52**	**B**	0.012	0.00071	mg/Kg		08/14/14 09:01	08/21/14 19:21	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**0.52**		0.0050	0.00030	mg/Kg			08/14/14 09:01	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-7.98	U	0.427	0.849	113	34.0	pCi/g	08/14/14 09:01	08/22/14 15:34	5
U-234	0.451	U	0.190	0.194	73.2	4.39	pCi/g	08/14/14 09:01	08/21/14 19:21	5
U-235	0.00776	U	0.000480	0.000861	0.0254	0.0103	pCi/g	08/14/14 09:01	08/21/14 19:21	5
U-236	0.000456	U	0.00189	0.00189	0.760	0.0609	pCi/g	08/14/14 09:01	08/21/14 19:21	5
U-238	**0.174**	**F**	0.0147	0.0217	0.00395	0.000237	pCi/g	08/14/14 09:01	08/21/14 19:21	5

Client Sample ID: SD-DUP-03

Lab Sample ID: 680-102370-1

Date Collected: 06/12/14 00:00

Matrix: Solid

Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.000						%		08/14/14 09:01	1

Client Sample ID: SD-206-SS

Lab Sample ID: 680-102370-2

Date Collected: 06/12/14 08:10

Matrix: Solid

Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0032	mg/Kg		08/14/14 09:01	08/22/14 15:38	5
U-234	ND		0.011	0.00064	mg/Kg		08/14/14 09:01	08/21/14 19:26	5
U-235	0.025		0.011	0.0043	mg/Kg		08/14/14 09:01	08/21/14 19:26	5
U-236	ND		0.011	0.00085	mg/Kg		08/14/14 09:01	08/21/14 19:26	5
U-238	3.1	B	0.011	0.00064	mg/Kg		08/14/14 09:01	08/21/14 19:26	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.1		0.0050	0.00030	mg/Kg			08/14/14 09:01	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	10.3	U	54.8	54.8	103	30.9	pCi/g	08/14/14 09:01	08/22/14 15:38	5
U-234	1.49	U	0.177	0.224	66.5	3.99	pCi/g	08/14/14 09:01	08/21/14 19:26	5
U-235	0.0550		0.00208	0.00547	0.0231	0.00940	pCi/g	08/14/14 09:01	08/21/14 19:26	5
U-236	0.000746	U	0.00156	0.00156	0.691	0.0553	pCi/g	08/14/14 09:01	08/21/14 19:26	5
U-238	1.05	F	0.0339	0.102	0.00359	0.000216	pCi/g	08/14/14 09:01	08/21/14 19:26	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.800						%		08/14/14 09:01	1

Client Sample ID: SD-206-01

Lab Sample ID: 680-102370-3

Date Collected: 06/12/14 08:15

Matrix: Solid

Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0033	mg/Kg		08/14/14 09:01	08/22/14 15:43	5
U-234	ND		0.011	0.00065	mg/Kg		08/14/14 09:01	08/21/14 19:31	5
U-235	0.020		0.011	0.0044	mg/Kg		08/14/14 09:01	08/21/14 19:31	5
U-236	ND		0.011	0.00087	mg/Kg		08/14/14 09:01	08/21/14 19:31	5
U-238	2.4	B	0.011	0.00065	mg/Kg		08/14/14 09:01	08/21/14 19:31	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.4		0.0050	0.00030	mg/Kg			08/14/14 09:01	1

Client Sample ID: SD-206-01

Date Collected: 06/12/14 08:15
Date Received: 06/13/14 09:30

Lab Sample ID: 680-102370-3

Matrix: Solid

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-7.01	U	0.313	0.717	105	31.5	pCi/g	08/14/14 09:01	08/22/14 15:43	5
U-234	1.06	U	0.235	0.255	67.8	4.07	pCi/g	08/14/14 09:01	08/21/14 19:31	5
U-235	**0.0438**		0.000854	0.00412	0.0235	0.00958	pCi/g	08/14/14 09:01	08/21/14 19:31	5
U-236	0.000761	U	0.00222	0.00222	0.704	0.0564	pCi/g	08/14/14 09:01	08/21/14 19:31	5
U-238	**0.792**	**F**	0.00686	0.0732	0.00366	0.000220	pCi/g	08/14/14 09:01	08/21/14 19:31	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.826**						%		08/14/14 09:01	1

Client Sample ID: SD-206-02

Date Collected: 06/12/14 08:20
Date Received: 06/13/14 09:30

Lab Sample ID: 680-102370-4

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0035	mg/Kg		08/14/14 09:01	08/22/14 15:48	5
U-234	**0.00091**	**J**	0.012	0.00069	mg/Kg		08/14/14 09:01	08/21/14 19:35	5
U-235	**0.087**		0.012	0.0047	mg/Kg		08/14/14 09:01	08/21/14 19:35	5
U-236	ND		0.012	0.00092	mg/Kg		08/14/14 09:01	08/21/14 19:35	5
U-238	**3.0**	**B**	0.012	0.00069	mg/Kg		08/14/14 09:01	08/21/14 19:35	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**3.1**		0.0050	0.00030	mg/Kg			08/14/14 09:01	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-7.06	U	0.557	0.856	111	33.4	pCi/g	08/14/14 09:01	08/22/14 15:48	5
U-234	**5.69**		0.529	0.744	71.8	4.31	pCi/g	08/14/14 09:01	08/21/14 19:35	5
U-235	**0.187**		0.00922	0.0195	0.0249	0.0102	pCi/g	08/14/14 09:01	08/21/14 19:35	5
U-236	0.00970	U	0.00611	0.00618	0.746	0.0598	pCi/g	08/14/14 09:01	08/21/14 19:35	5
U-238	**0.994**	**F**	0.0648	0.112	0.00388	0.000233	pCi/g	08/14/14 09:01	08/21/14 19:35	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**2.82**						%		08/14/14 09:01	1

Client Sample ID: SD-005E-01

Date Collected: 06/12/14 08:30
Date Received: 06/13/14 09:30

Lab Sample ID: 680-102370-6

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0035	mg/Kg		08/14/14 09:01	08/22/14 15:52	5
U-234	ND		0.012	0.00069	mg/Kg		08/14/14 09:01	08/21/14 19:40	5
U-235	**0.0067**	**J**	0.012	0.0047	mg/Kg		08/14/14 09:01	08/21/14 19:40	5
U-236	ND		0.012	0.00092	mg/Kg		08/14/14 09:01	08/21/14 19:40	5
U-238	**0.90**	**B**	0.012	0.00069	mg/Kg		08/14/14 09:01	08/21/14 19:40	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**0.91**		0.0050	0.00030	mg/Kg			08/14/14 09:01	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-8.00	U	0.261	0.781	111	33.3	pCi/g	08/14/14 09:01	08/22/14 15:52	5
U-234	0.510	U	0.430	0.432	71.7	4.30	pCi/g	08/14/14 09:01	08/21/14 19:40	5
U-235	**0.0146**		0.00210	0.00249	0.0249	0.0101	pCi/g	08/14/14 09:01	08/21/14 19:40	5
U-236	-0.000238	U	0.00191	0.00191	0.745	0.0597	pCi/g	08/14/14 09:01	08/21/14 19:40	5
U-238	**0.302**	**F**	0.0264	0.0383	0.00387	0.000233	pCi/g	08/14/14 09:01	08/21/14 19:40	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.739**						%		08/14/14 09:01	1

Default Detection Limits

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-3
SDG: 680102327-1

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	RL	MDL	Units	Method
U-233	0.0050	0.0015	mg/Kg	6020A
U-234	0.0050	0.00030	mg/Kg	6020A
U-235	0.0050	0.0020	mg/Kg	6020A
U-236	0.0050	0.00040	mg/Kg	6020A
U-238	0.0050	0.00030	mg/Kg	6020A

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	RL	MDL	Units	Method
Total Uranium	0.0050	0.00030	mg/Kg	6020A

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Lab Sample ID: MB 160-137774/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139525 — **Prep Batch: 137774**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-234	ND		0.0048	0.00029	mg/Kg		08/13/14 10:17	08/22/14 00:27	2
U-235	ND		0.0048	0.0020	mg/Kg		08/13/14 10:17	08/22/14 00:27	2
U-236	ND		0.0048	0.00039	mg/Kg		08/13/14 10:17	08/22/14 00:27	2
U-238	ND		0.0048	0.00029	mg/Kg		08/13/14 10:17	08/22/14 00:27	2

Lab Sample ID: MB 160-137774/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139817 — **Prep Batch: 137774**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.0048	0.0014	mg/Kg		08/13/14 10:17	08/22/14 19:13	2

Lab Sample ID: LCS 160-137774/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139525 — **Prep Batch: 137774**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
U-234	0.00744	0.00791		mg/Kg		106	80 - 120
U-235	0.436	0.469		mg/Kg		107	80 - 120
U-238	0.452	0.485		mg/Kg		107	80 - 120

Lab Sample ID: 680-102327-25 MS — **Client Sample ID: SD-221-01**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139525 — **Prep Batch: 137774**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
U-234	ND		0.00706	0.00678	J	mg/Kg		96	75 - 125
U-235	0.0056	J	0.414	0.411		mg/Kg		98	75 - 125
U-238	0.47		0.429	0.888		mg/Kg		98	75 - 125

Lab Sample ID: 680-102327-25 MSD — **Client Sample ID: SD-221-01**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139525 — **Prep Batch: 137774**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
U-234	ND		0.00807	0.00812	J	mg/Kg		101	75 - 125	18	20
U-235	0.0056	J	0.473	0.485		mg/Kg		101	75 - 125	17	20
U-238	0.47		0.491	0.948		mg/Kg		98	75 - 125	6	20

Lab Sample ID: MB 160-137845/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139525 — **Prep Batch: 137845**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-234	ND		0.0049	0.00029	mg/Kg		08/14/14 09:01	08/21/14 18:11	2
U-235	ND		0.0049	0.0020	mg/Kg		08/14/14 09:01	08/21/14 18:11	2
U-236	ND		0.0049	0.00039	mg/Kg		08/14/14 09:01	08/21/14 18:11	2
U-238	0.00308	J	0.0049	0.00029	mg/Kg		08/14/14 09:01	08/21/14 18:11	2

Method: 6020A - Metals (ICP/MS), Isotopic Uranium (Continued)

Lab Sample ID: MB 160-137845/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139817 — **Prep Batch: 137845**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.0049	0.0015	mg/Kg		08/14/14 09:01	08/22/14 14:33	2

Lab Sample ID: LCS 160-137845/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139525 — **Prep Batch: 137845**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
U-234	0.00694	0.00733		mg/Kg		106	80 - 120
U-235	0.407	0.439		mg/Kg		108	80 - 120
U-238	0.422	0.449		mg/Kg		106	80 - 120

Lab Sample ID: MB 160-139022/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139525 — **Prep Batch: 139022**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-234	ND		0.0042	0.00025	mg/Kg		08/20/14 09:25	08/21/14 22:07	2
U-235	ND		0.0042	0.0017	mg/Kg		08/20/14 09:25	08/21/14 22:07	2
U-236	ND		0.0042	0.00034	mg/Kg		08/20/14 09:25	08/21/14 22:07	2

Lab Sample ID: MB 160-139022/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139817 — **Prep Batch: 139022**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.0042	0.0013	mg/Kg		08/20/14 09:25	08/22/14 16:53	2

Lab Sample ID: MB 160-139022/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 140203 — **Prep Batch: 139022**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-238	ND		0.0042	0.00025	mg/Kg		08/20/14 09:25	08/25/14 17:50	2

Lab Sample ID: LCS 160-139022/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139525 — **Prep Batch: 139022**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
U-234	0.00789	0.00796		mg/Kg		101	80 - 120
U-235	0.463	0.477		mg/Kg		103	80 - 120

Lab Sample ID: LCS 160-139022/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 140203 — **Prep Batch: 139022**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
U-238	0.480	0.548		mg/Kg		114	80 - 120

Method: 6020A - Metals (ICP/MS), Isotopic Uranium (Continued)

Lab Sample ID: 680-102327-1 MS — **Client Sample ID: SD-198-SS**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139525 — **Prep Batch: 139022**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
U-234	ND		0.00732	0.00716	J	mg/Kg		98	75 - 125
U-235	0.022		0.429	0.438		mg/Kg		97	75 - 125

Lab Sample ID: 680-102327-1 MS — **Client Sample ID: SD-198-SS**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 140203 — **Prep Batch: 139022**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
U-238	3.1		0.445	3.51	4	mg/Kg		98	75 - 125

Lab Sample ID: 680-102327-1 MSD — **Client Sample ID: SD-198-SS**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139525 — **Prep Batch: 139022**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
U-234	ND		0.00792	0.00845	J	mg/Kg		107	75 - 125	17	20
U-235	0.022		0.464	0.517		mg/Kg		107	75 - 125	17	20

Lab Sample ID: 680-102327-1 MSD — **Client Sample ID: SD-198-SS**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 140203 — **Prep Batch: 139022**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
U-238	3.1		0.481	3.71	4	mg/Kg		133	75 - 125	6	20

Lab Sample ID: MB 160-139028/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139525 — **Prep Batch: 139028**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-234	ND		0.0044	0.00026	mg/Kg		08/20/14 10:02	08/22/14 01:37	2
U-235	ND		0.0044	0.0018	mg/Kg		08/20/14 10:02	08/22/14 01:37	2
U-236	ND		0.0044	0.00035	mg/Kg		08/20/14 10:02	08/22/14 01:37	2
U-238	ND		0.0044	0.00026	mg/Kg		08/20/14 10:02	08/22/14 01:37	2

Lab Sample ID: MB 160-139028/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139817 — **Prep Batch: 139028**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.0044	0.0013	mg/Kg		08/20/14 10:02	08/22/14 20:23	2

Lab Sample ID: LCS 160-139028/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139525 — **Prep Batch: 139028**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
U-234	0.00739	0.00752		mg/Kg		102	80 - 120
U-235	0.433	0.442		mg/Kg		102	80 - 120

Method: 6020A - Metals (ICP/MS), Isotopic Uranium (Continued)

Lab Sample ID: LCS 160-139028/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139525 — **Prep Batch: 139028**

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
U-238			0.449	0.451		mg/Kg		101	80 - 120		

Lab Sample ID: 680-102327-31 MS — **Client Sample ID: SD-207-01**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139525 — **Prep Batch: 139028**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
U-234	ND		0.00721	0.00790	J	mg/Kg		110	75 - 125		
U-235	0.052		0.423	0.489		mg/Kg		103	75 - 125		
U-238	2.4		0.439	2.90	4	mg/Kg		114	75 - 125		

Lab Sample ID: 680-102327-31 MSD — **Client Sample ID: SD-207-01**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139525 — **Prep Batch: 139028**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
U-234	ND		0.00762	0.00824	J	mg/Kg		108	75 - 125	4	20
U-235	0.052		0.447	0.509		mg/Kg		102	75 - 125	4	20
U-238	2.4		0.463	2.96	4	mg/Kg		123	75 - 125	2	20

Lab Sample ID: MB 160-139821/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 140258 — **Prep Batch: 139821**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.0044	0.0013	mg/Kg		08/25/14 07:53	08/26/14 15:46	2
U-234	ND		0.0044	0.00026	mg/Kg		08/25/14 07:53	08/26/14 15:46	2
U-235	ND	^	0.0044	0.0018	mg/Kg		08/25/14 07:53	08/26/14 15:46	2
U-236	ND		0.0044	0.00035	mg/Kg		08/25/14 07:53	08/26/14 15:46	2
U-238	0.000968	J	0.0044	0.00026	mg/Kg		08/25/14 07:53	08/26/14 15:46	2

Lab Sample ID: LCS 160-139821/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 140258 — **Prep Batch: 139821**

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
U-234			0.00811	0.00835		mg/Kg		103	80 - 120		
U-235			0.476	0.506	^	mg/Kg		106	80 - 120		
U-238			0.493	0.526		mg/Kg		107	80 - 120		

Lab Sample ID: 680-102327-24 MS — **Client Sample ID: SD-221-SS**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 140258 — **Prep Batch: 139821**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
U-234	ND		0.00735	0.00703	J	mg/Kg		96	75 - 125		
U-235	0.0076	J ^	0.431	0.423	^	mg/Kg		96	75 - 125		
U-238	0.68	B	0.447	1.04		mg/Kg		80	75 - 125		

Method: 6020A - Metals (ICP/MS), Isotopic Uranium (Continued)

Lab Sample ID: 680-102327-24 MSD — **Client Sample ID: SD-221-SS**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 140258 — **Prep Batch: 139821**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
U-234	ND		0.00823	0.00908	J F2	mg/Kg		110	75 - 125	25	20
U-235	0.0076	J ^	0.483	0.557	^ F2	mg/Kg		114	75 - 125	27	20
U-238	0.68	B	0.500	1.39	F1 F2	mg/Kg		143	75 - 125	29	20

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Lab Sample ID: MB 160-137774/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139526 — **Prep Batch: 137774**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-234	-0.03598	U	0.125	0.125	30.0	1.80	pCi/g	08/13/14 10:17	08/22/14 00:27	2
U-235	-0.0006744	U	0.000122	0.000137	0.0104	0.00424	pCi/g	08/13/14 10:17	08/22/14 00:27	2
U-236	-0.00007479	U	0.000639	0.000639	0.312	0.0250	pCi/g	08/13/14 10:17	08/22/14 00:27	2
U-238	-0.0006976	U	0.000136	0.000150	0.00162	0.0000973	pCi/g	08/13/14 10:17	08/22/14 00:27	2

Lab Sample ID: MB 160-137774/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139819 — **Prep Batch: 137774**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-3.726	U	0.241	0.419	46.4	13.9	pCi/g	08/13/14 10:17	08/22/14 19:13	2

Lab Sample ID: LCS 160-137774/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139526 — **Prep Batch: 137774**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
U-235	0.943	1.013		0.100	0.00972	0.00396	pCi/g	107	80 - 120
U-238	0.152	0.1630		0.0157	0.00151	0.0000909	pCi/g	107	80 - 120

Lab Sample ID: 680-102327-25 MS — **Client Sample ID: SD-221-01**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139526 — **Prep Batch: 137774**

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
U-235	0.0122		0.894	0.8883		0.0838	0.0231	0.00939	pCi/g	98	75 - 125
U-238	0.157		0.144	0.2986		0.0278	0.00359	0.000216	pCi/g	98	75 - 125

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity) (Continued)

Lab Sample ID: 680-102327-25 MSD — **Client Sample ID: SD-221-01**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139526 — **Prep Batch: 137774**

Analyte	Sample Result	Sample Qual	Spike Added	MSD Result	MSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
U-235	0.0122		1.02	1.048		0.107	0.0264	0.0107	pCi/g	101	75 - 125	0.84	1
U-238	0.157		0.165	0.3186		0.0340	0.00410	0.000246	pCi/g	98	75 - 125	0.32	1

Lab Sample ID: MB 160-137845/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139526 — **Prep Batch: 137845**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-234	0.02665	U	0.0911	0.0912	30.3	1.82	pCi/g	08/14/14 09:01	08/21/14 18:11	2
U-235	-0.00007868	U	0.0000224	0.0000236	0.0105	0.00428	pCi/g	08/14/14 09:01	08/21/14 18:11	2
U-236	-0.0002266	U	0.000756	0.000756	0.315	0.0252	pCi/g	08/14/14 09:01	08/21/14 18:11	2
U-238	0.001035		0.0000756	0.000122	0.00164	0.0000983	pCi/g	08/14/14 09:01	08/21/14 18:11	2

Lab Sample ID: MB 160-137845/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139819 — **Prep Batch: 137845**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	2.788	U	10.2	10.2	46.9	14.1	pCi/g	08/14/14 09:01	08/22/14 14:33	2

Lab Sample ID: LCS 160-137845/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139526 — **Prep Batch: 137845**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
U-235	0.879	0.9487		0.0961	0.00907	0.00369	pCi/g	108	80 - 120
U-238	0.142	0.1510		0.0152	0.00141	0.0000848	pCi/g	106	80 - 120

Lab Sample ID: MB 160-139022/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139526 — **Prep Batch: 139022**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-234	-0.07475	U	0.00587	0.00904	26.3	1.58	pCi/g	08/20/14 09:25	08/21/14 22:07	2
U-235	-0.0005956	U	0.0000622	0.0000829	0.00914	0.00372	pCi/g	08/20/14 09:25	08/21/14 22:07	2
U-236	-0.0003064	U	0.00114	0.00114	0.274	0.0219	pCi/g	08/20/14 09:25	08/21/14 22:07	2

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity) (Continued)

Lab Sample ID: MB 160-139022/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139819 — **Prep Batch: 139022**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-3.121	U	0.206	0.353	40.8	12.2	pCi/g	08/20/14 09:25	08/22/14 16:53	2

Lab Sample ID: MB 160-139022/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 140204 — **Prep Batch: 139022**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-238	-0.0004142	U	0.0000568	0.0000684	0.00142	0.0000854	pCi/g	08/20/14 09:25	08/25/14 17:50	2

Lab Sample ID: LCS 160-139022/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139526 — **Prep Batch: 139022**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-235			1.00	1.030		0.102	0.0103	0.00420	pCi/g	103	80 - 120		

Lab Sample ID: LCS 160-139022/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 140204 — **Prep Batch: 139022**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-238			0.161	0.1843		0.0209	0.00160	0.0000964	pCi/g	114	80 - 120		

Lab Sample ID: 680-102327-1 MS — **Client Sample ID: SD-198-SS**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139526 — **Prep Batch: 139022**

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-235	0.0468		0.928	0.9461		0.0909	0.0239	0.00974	pCi/g	97	75 - 125		

Lab Sample ID: 680-102327-1 MS — **Client Sample ID: SD-198-SS**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 140204 — **Prep Batch: 139022**

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-238	1.03		0.150	1.179		0.109	0.00372	0.000224	pCi/g	98	75 - 125		

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity) (Continued)

Lab Sample ID: 680-102327-1 MSD — **Client Sample ID: SD-198-SS**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139526 — **Prep Batch: 139022**

Analyte	Sample Result	Sample Qual	Spike Added	MSD Result	MSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
U-235	0.0468		1.00	1.117		0.103	0.0259	0.0105	pCi/g	107	75 - 125	0.88	1

Lab Sample ID: 680-102327-1 MSD — **Client Sample ID: SD-198-SS**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 140204 — **Prep Batch: 139022**

Analyte	Sample Result	Sample Qual	Spike Added	MSD Result	MSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
U-238	1.03		0.162	1.248		0.115	0.00402	0.000242	pCi/g	133	75 - 125	0.31	1

Lab Sample ID: MB 160-139028/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139526 — **Prep Batch: 139028**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-234	-0.04661	U	0.0706	0.0708	27.1	1.63	pCi/g	08/20/14 10:02	08/22/14 01:37	2
U-235	-0.0006197	U	0.000163	0.000173	0.00941	0.00383	pCi/g	08/20/14 10:02	08/22/14 01:37	2
U-236	-0.0003831	U	0.000896	0.000897	0.282	0.0226	pCi/g	08/20/14 10:02	08/22/14 01:37	2
U-238	-0.0006737	U	0.000167	0.000178	0.00146	0.000088 0	pCi/g	08/20/14 10:02	08/22/14 01:37	2

Lab Sample ID: MB 160-139028/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139819 — **Prep Batch: 139028**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-3.363	U	0.131	0.336	42.0	12.6	pCi/g	08/20/14 10:02	08/22/14 20:23	2

Lab Sample ID: LCS 160-139028/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139526 — **Prep Batch: 139028**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-235			0.936	0.9562		0.0991	0.00965	0.00393	pCi/g	102	80 - 120		
U-238			0.151	0.1517		0.0144	0.00150	0.000090 2	pCi/g	101	80 - 120		

Lab Sample ID: 680-102327-31 MS — **Client Sample ID: SD-207-01**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139526 — **Prep Batch: 139028**

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-235	0.112		0.914	1.057		0.0977	0.0236	0.00960	pCi/g	103	75 - 125		
U-238	0.804		0.147	0.9731		0.0895	0.00367	0.000220	pCi/g	114	75 - 125		

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity) (Continued)

Lab Sample ID: 680-102327-31 MSD — **Client Sample ID: SD-207-01**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139526 — **Prep Batch: 139028**

Analyte	Sample Result	Sample Qual	Spike Added	MSD Result	MSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
U-235	0.112		0.965	1.099		0.101	0.0249	0.0101	pCi/g	102	75 - 125	0.21	1
U-238	0.804		0.156	0.9963		0.0940	0.00387	0.000233	pCi/g	123	75 - 125	0.13	1

Lab Sample ID: MB 160-139821/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 140259 — **Prep Batch: 139821**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-12.22	U	0.384	1.19	42.3	12.7	pCi/g	08/25/14 07:53	08/26/14 15:46	2
U-234	-0.02511	U	0.135	0.135	27.3	1.64	pCi/g	08/25/14 07:53	08/26/14 15:46	2
U-235	-0.00006824	U	0.0000622	0.0000626	0.00948	0.00386	pCi/g	08/25/14 07:53	08/26/14 15:46	2
U-236	-0.0001135	U	0.000600	0.000600	0.284	0.0227	pCi/g	08/25/14 07:53	08/26/14 15:46	2
U-238	0.0003254		0.0000231	0.0000378	0.00147	0.0000886	pCi/g	08/25/14 07:53	08/26/14 15:46	2

Lab Sample ID: LCS 160-139821/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 140259 — **Prep Batch: 139821**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
U-235	1.03	1.093		0.113	0.0106	0.00432	pCi/g	106	80 - 120
U-238	0.166	0.1767		0.0195	0.00165	0.0000991	pCi/g	107	80 - 120

Lab Sample ID: 680-102327-24 MS — **Client Sample ID: SD-221-SS**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 140259 — **Prep Batch: 139821**

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
U-235	0.0165	F	0.931	0.9152		0.0938	0.0240	0.00978	pCi/g	96	75 - 125
U-238	0.228	F	0.150	0.3486		0.0374	0.00374	0.000224	pCi/g	80	75 - 125

Lab Sample ID: 680-102327-24 MSD — **Client Sample ID: SD-221-SS**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 140259 — **Prep Batch: 139821**

Analyte	Sample Result	Sample Qual	Spike Added	MSD Result	MSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
U-235	0.0165	F	1.04	1.204	F	0.121	0.0269	0.0110	pCi/g	114	75 - 125	1.34	1
U-238	0.228	F	0.168	0.4678	F1 F	0.0455	0.00418	0.000251	pCi/g	143	75 - 125	1.44	1

Metals

Prep Batch: 137774

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102327-25	SD-221-01	Total/NA	Solid	3050B	
680-102327-25 MS	SD-221-01	Total/NA	Solid	3050B	
680-102327-25 MSD	SD-221-01	Total/NA	Solid	3050B	
680-102327-25 SD	SD-221-01	Total/NA	Solid	3050B	
680-102327-26	SD-221-02	Total/NA	Solid	3050B	
680-102327-27	SD-210-SS	Total/NA	Solid	3050B	
680-102327-28	SD-210-01	Total/NA	Solid	3050B	
680-102327-29	SD-210-02	Total/NA	Solid	3050B	
680-102327-30	SD-207-SS	Total/NA	Solid	3050B	
680-102327-34	SD-205-SS	Total/NA	Solid	3050B	
680-102327-36	SD-205-02	Total/NA	Solid	3050B	
LCS 160-137774/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 160-137774/1-A	Method Blank	Total/NA	Solid	3050B	

Prep Batch: 137845

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102370-1	SD-DUP-03	Total/NA	Solid	3050B	
680-102370-2	SD-206-SS	Total/NA	Solid	3050B	
680-102370-3	SD-206-01	Total/NA	Solid	3050B	
680-102370-4	SD-206-02	Total/NA	Solid	3050B	
680-102370-6	SD-005E-01	Total/NA	Solid	3050B	
LCS 160-137845/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 160-137845/1-A	Method Blank	Total/NA	Solid	3050B	

Prep Batch: 139022

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102327-1	SD-198-SS	Total/NA	Solid	3050B	
680-102327-1 MS	SD-198-SS	Total/NA	Solid	3050B	
680-102327-1 MSD	SD-198-SS	Total/NA	Solid	3050B	
680-102327-1 SD	SD-198-SS	Total/NA	Solid	3050B	
680-102327-2	SD-198-01	Total/NA	Solid	3050B	
680-102327-3	SD-198-02	Total/NA	Solid	3050B	
680-102327-5	SD-197-SS	Total/NA	Solid	3050B	
680-102327-6	SD-197-01	Total/NA	Solid	3050B	
680-102327-7	SD-197-02	Total/NA	Solid	3050B	
680-102327-9	SD-199-SS	Total/NA	Solid	3050B	
680-102327-10	SD-199-01	Total/NA	Solid	3050B	
680-102327-11	SD-199-02	Total/NA	Solid	3050B	
680-102327-13	SD-DUP-02	Total/NA	Solid	3050B	
680-102327-14	SD-005W-01	Total/NA	Solid	3050B	
680-102327-15	SD-208-SS	Total/NA	Solid	3050B	
680-102327-16	SD-208-01	Total/NA	Solid	3050B	
680-102327-17	SD-208-02	Total/NA	Solid	3050B	
680-102327-18	SD-209-01	Total/NA	Solid	3050B	
680-102327-19	SD-209-02	Total/NA	Solid	3050B	
680-102327-21	SD-204-SS	Total/NA	Solid	3050B	
680-102327-22	SD-204-01	Total/NA	Solid	3050B	
680-102327-23	SD-204-02	Total/NA	Solid	3050B	
LCS 160-139022/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 160-139022/1-A	Method Blank	Total/NA	Solid	3050B	

Metals (Continued)

Prep Batch: 139028

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102327-31	SD-207-01	Total/NA	Solid	3050B	
680-102327-31 MS	SD-207-01	Total/NA	Solid	3050B	
680-102327-31 MSD	SD-207-01	Total/NA	Solid	3050B	
680-102327-31 SD	SD-207-01	Total/NA	Solid	3050B	
680-102327-32	SD-207-02	Total/NA	Solid	3050B	
680-102327-35	SD-205-01	Total/NA	Solid	3050B	
LCS 160-139028/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 160-139028/1-A	Method Blank	Total/NA	Solid	3050B	

Analysis Batch: 139525

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102327-1	SD-198-SS	Total/NA	Solid	6020A	139022
680-102327-1 MS	SD-198-SS	Total/NA	Solid	6020A	139022
680-102327-1 MSD	SD-198-SS	Total/NA	Solid	6020A	139022
680-102327-1 SD	SD-198-SS	Total/NA	Solid	6020A	139022
680-102327-2	SD-198-01	Total/NA	Solid	6020A	139022
680-102327-3	SD-198-02	Total/NA	Solid	6020A	139022
680-102327-5	SD-197-SS	Total/NA	Solid	6020A	139022
680-102327-6	SD-197-01	Total/NA	Solid	6020A	139022
680-102327-7	SD-197-02	Total/NA	Solid	6020A	139022
680-102327-9	SD-199-SS	Total/NA	Solid	6020A	139022
680-102327-10	SD-199-01	Total/NA	Solid	6020A	139022
680-102327-11	SD-199-02	Total/NA	Solid	6020A	139022
680-102327-13	SD-DUP-02	Total/NA	Solid	6020A	139022
680-102327-14	SD-005W-01	Total/NA	Solid	6020A	139022
680-102327-15	SD-208-SS	Total/NA	Solid	6020A	139022
680-102327-16	SD-208-01	Total/NA	Solid	6020A	139022
680-102327-17	SD-208-02	Total/NA	Solid	6020A	139022
680-102327-18	SD-209-01	Total/NA	Solid	6020A	139022
680-102327-19	SD-209-02	Total/NA	Solid	6020A	139022
680-102327-21	SD-204-SS	Total/NA	Solid	6020A	139022
680-102327-22	SD-204-01	Total/NA	Solid	6020A	139022
680-102327-23	SD-204-02	Total/NA	Solid	6020A	139022
680-102327-25	SD-221-01	Total/NA	Solid	6020A	137774
680-102327-25 MS	SD-221-01	Total/NA	Solid	6020A	137774
680-102327-25 MSD	SD-221-01	Total/NA	Solid	6020A	137774
680-102327-25 SD	SD-221-01	Total/NA	Solid	6020A	137774
680-102327-26	SD-221-02	Total/NA	Solid	6020A	137774
680-102327-27	SD-210-SS	Total/NA	Solid	6020A	137774
680-102327-28	SD-210-01	Total/NA	Solid	6020A	137774
680-102327-29	SD-210-02	Total/NA	Solid	6020A	137774
680-102327-30	SD-207-SS	Total/NA	Solid	6020A	137774
680-102327-31	SD-207-01	Total/NA	Solid	6020A	139028
680-102327-31 MS	SD-207-01	Total/NA	Solid	6020A	139028
680-102327-31 MSD	SD-207-01	Total/NA	Solid	6020A	139028
680-102327-31 SD	SD-207-01	Total/NA	Solid	6020A	139028
680-102327-32	SD-207-02	Total/NA	Solid	6020A	139028
680-102327-34	SD-205-SS	Total/NA	Solid	6020A	137774
680-102327-35	SD-205-01	Total/NA	Solid	6020A	139028
680-102327-36	SD-205-02	Total/NA	Solid	6020A	137774
680-102370-1	SD-DUP-03	Total/NA	Solid	6020A	137845

Metals (Continued)

Analysis Batch: 139525 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102370-2	SD-206-SS	Total/NA	Solid	6020A	137845
680-102370-3	SD-206-01	Total/NA	Solid	6020A	137845
680-102370-4	SD-206-02	Total/NA	Solid	6020A	137845
680-102370-6	SD-005E-01	Total/NA	Solid	6020A	137845
CRI 160-139525/11	DL		Solid	6020A	
CRI 160-139525/12	DL		Solid	6020A	
CRI 160-139525/70	DL		Solid	6020A	
CRI 160-139525/71	DL		Solid	6020A	
ICSA 160-139525/13	ICS		Solid	6020A	
ICSA 160-139525/72	ICS		Solid	6020A	
ICSAB 160-139525/14	ICS		Solid	6020A	
ICSAB 160-139525/73	ICS		Solid	6020A	
LCS 160-137774/2-A	Lab Control Sample	Total/NA	Solid	6020A	137774
LCS 160-137845/2-A	Lab Control Sample	Total/NA	Solid	6020A	137845
LCS 160-139022/2-A	Lab Control Sample	Total/NA	Solid	6020A	139022
LCS 160-139028/2-A	Lab Control Sample	Total/NA	Solid	6020A	139028
MB 160-137774/1-A	Method Blank	Total/NA	Solid	6020A	137774
MB 160-137845/1-A	Method Blank	Total/NA	Solid	6020A	137845
MB 160-139022/1-A	Method Blank	Total/NA	Solid	6020A	139022
MB 160-139028/1-A	Method Blank	Total/NA	Solid	6020A	139028

Analysis Batch: 139817

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102327-1	SD-198-SS	Total/NA	Solid	6020A	139022
680-102327-1 SD	SD-198-SS	Total/NA	Solid	6020A	139022
680-102327-2	SD-198-01	Total/NA	Solid	6020A	139022
680-102327-3	SD-198-02	Total/NA	Solid	6020A	139022
680-102327-5	SD-197-SS	Total/NA	Solid	6020A	139022
680-102327-6	SD-197-01	Total/NA	Solid	6020A	139022
680-102327-7	SD-197-02	Total/NA	Solid	6020A	139022
680-102327-9	SD-199-SS	Total/NA	Solid	6020A	139022
680-102327-10	SD-199-01	Total/NA	Solid	6020A	139022
680-102327-11	SD-199-02	Total/NA	Solid	6020A	139022
680-102327-13	SD-DUP-02	Total/NA	Solid	6020A	139022
680-102327-14	SD-005W-01	Total/NA	Solid	6020A	139022
680-102327-15	SD-208-SS	Total/NA	Solid	6020A	139022
680-102327-16	SD-208-01	Total/NA	Solid	6020A	139022
680-102327-17	SD-208-02	Total/NA	Solid	6020A	139022
680-102327-18	SD-209-01	Total/NA	Solid	6020A	139022
680-102327-19	SD-209-02	Total/NA	Solid	6020A	139022
680-102327-21	SD-204-SS	Total/NA	Solid	6020A	139022
680-102327-22	SD-204-01	Total/NA	Solid	6020A	139022
680-102327-23	SD-204-02	Total/NA	Solid	6020A	139022
680-102327-25	SD-221-01	Total/NA	Solid	6020A	137774
680-102327-25 SD	SD-221-01	Total/NA	Solid	6020A	137774
680-102327-26	SD-221-02	Total/NA	Solid	6020A	137774
680-102327-27	SD-210-SS	Total/NA	Solid	6020A	137774
680-102327-28	SD-210-01	Total/NA	Solid	6020A	137774
680-102327-29	SD-210-02	Total/NA	Solid	6020A	137774
680-102327-30	SD-207-SS	Total/NA	Solid	6020A	137774
680-102327-31	SD-207-01	Total/NA	Solid	6020A	139028

Metals (Continued)

Analysis Batch: 139817 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102327-31 SD	SD-207-01	Total/NA	Solid	6020A	139028
680-102327-32	SD-207-02	Total/NA	Solid	6020A	139028
680-102327-34	SD-205-SS	Total/NA	Solid	6020A	137774
680-102327-35	SD-205-01	Total/NA	Solid	6020A	139028
680-102327-36	SD-205-02	Total/NA	Solid	6020A	137774
680-102370-1	SD-DUP-03	Total/NA	Solid	6020A	137845
680-102370-2	SD-206-SS	Total/NA	Solid	6020A	137845
680-102370-3	SD-206-01	Total/NA	Solid	6020A	137845
680-102370-4	SD-206-02	Total/NA	Solid	6020A	137845
680-102370-6	SD-005E-01	Total/NA	Solid	6020A	137845
CRI 160-139817/12	DL		Solid	6020A	
ICSA 160-139817/13	ICS		Solid	6020A	
ICSAB 160-139817/14	ICS		Solid	6020A	
MB 160-137774/1-A	Method Blank	Total/NA	Solid	6020A	137774
MB 160-137845/1-A	Method Blank	Total/NA	Solid	6020A	137845
MB 160-139022/1-A	Method Blank	Total/NA	Solid	6020A	139022
MB 160-139028/1-A	Method Blank	Total/NA	Solid	6020A	139028

Prep Batch: 139821

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102327-24	SD-221-SS	Total/NA	Solid	3050B	
680-102327-24 MS	SD-221-SS	Total/NA	Solid	3050B	
680-102327-24 MSD	SD-221-SS	Total/NA	Solid	3050B	
680-102327-24 SD	SD-221-SS	Total/NA	Solid	3050B	
LCS 160-139821/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 160-139821/1-A	Method Blank	Total/NA	Solid	3050B	

Analysis Batch: 140041

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102370-1	SD-DUP-03	Total/NA	Solid	6020A	
680-102370-2	SD-206-SS	Total/NA	Solid	6020A	
680-102370-3	SD-206-01	Total/NA	Solid	6020A	
680-102370-4	SD-206-02	Total/NA	Solid	6020A	
680-102370-6	SD-005E-01	Total/NA	Solid	6020A	

Analysis Batch: 140043

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102327-25	SD-221-01	Total/NA	Solid	6020A	
680-102327-26	SD-221-02	Total/NA	Solid	6020A	
680-102327-27	SD-210-SS	Total/NA	Solid	6020A	
680-102327-28	SD-210-01	Total/NA	Solid	6020A	
680-102327-29	SD-210-02	Total/NA	Solid	6020A	
680-102327-30	SD-207-SS	Total/NA	Solid	6020A	
680-102327-34	SD-205-SS	Total/NA	Solid	6020A	
680-102327-36	SD-205-02	Total/NA	Solid	6020A	

Analysis Batch: 140044

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102327-31	SD-207-01	Total/NA	Solid	6020A	
680-102327-32	SD-207-02	Total/NA	Solid	6020A	
680-102327-35	SD-205-01	Total/NA	Solid	6020A	

Metals (Continued)

Analysis Batch: 140203

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102327-1	SD-198-SS	Total/NA	Solid	6020A	139022
680-102327-1 MS	SD-198-SS	Total/NA	Solid	6020A	139022
680-102327-1 MSD	SD-198-SS	Total/NA	Solid	6020A	139022
680-102327-1 SD	SD-198-SS	Total/NA	Solid	6020A	139022
680-102327-2	SD-198-01	Total/NA	Solid	6020A	139022
680-102327-3	SD-198-02	Total/NA	Solid	6020A	139022
680-102327-5	SD-197-SS	Total/NA	Solid	6020A	139022
680-102327-6	SD-197-01	Total/NA	Solid	6020A	139022
680-102327-7	SD-197-02	Total/NA	Solid	6020A	139022
680-102327-9	SD-199-SS	Total/NA	Solid	6020A	139022
680-102327-10	SD-199-01	Total/NA	Solid	6020A	139022
680-102327-11	SD-199-02	Total/NA	Solid	6020A	139022
680-102327-13	SD-DUP-02	Total/NA	Solid	6020A	139022
680-102327-14	SD-005W-01	Total/NA	Solid	6020A	139022
680-102327-15	SD-208-SS	Total/NA	Solid	6020A	139022
680-102327-16	SD-208-01	Total/NA	Solid	6020A	139022
680-102327-17	SD-208-02	Total/NA	Solid	6020A	139022
680-102327-18	SD-209-01	Total/NA	Solid	6020A	139022
680-102327-19	SD-209-02	Total/NA	Solid	6020A	139022
680-102327-21	SD-204-SS	Total/NA	Solid	6020A	139022
680-102327-22	SD-204-01	Total/NA	Solid	6020A	139022
680-102327-23	SD-204-02	Total/NA	Solid	6020A	139022
CRI 160-140203/21	DL		Solid	6020A	
ICSA 160-140203/23	ICS		Solid	6020A	
ICSAB 160-140203/24	ICS		Solid	6020A	
LCS 160-139022/2-A	Lab Control Sample	Total/NA	Solid	6020A	139022
MB 160-139022/1-A	Method Blank	Total/NA	Solid	6020A	139022

Analysis Batch: 140242

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102327-1	SD-198-SS	Total/NA	Solid	6020A	
680-102327-2	SD-198-01	Total/NA	Solid	6020A	
680-102327-3	SD-198-02	Total/NA	Solid	6020A	
680-102327-5	SD-197-SS	Total/NA	Solid	6020A	
680-102327-6	SD-197-01	Total/NA	Solid	6020A	
680-102327-7	SD-197-02	Total/NA	Solid	6020A	
680-102327-9	SD-199-SS	Total/NA	Solid	6020A	
680-102327-10	SD-199-01	Total/NA	Solid	6020A	
680-102327-11	SD-199-02	Total/NA	Solid	6020A	
680-102327-13	SD-DUP-02	Total/NA	Solid	6020A	
680-102327-14	SD-005W-01	Total/NA	Solid	6020A	
680-102327-15	SD-208-SS	Total/NA	Solid	6020A	
680-102327-16	SD-208-01	Total/NA	Solid	6020A	
680-102327-17	SD-208-02	Total/NA	Solid	6020A	
680-102327-18	SD-209-01	Total/NA	Solid	6020A	
680-102327-19	SD-209-02	Total/NA	Solid	6020A	
680-102327-21	SD-204-SS	Total/NA	Solid	6020A	
680-102327-22	SD-204-01	Total/NA	Solid	6020A	
680-102327-23	SD-204-02	Total/NA	Solid	6020A	

Metals (Continued)

Analysis Batch: 140258

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102327-24	SD-221-SS	Total/NA	Solid	6020A	139821
680-102327-24 MS	SD-221-SS	Total/NA	Solid	6020A	139821
680-102327-24 MSD	SD-221-SS	Total/NA	Solid	6020A	139821
680-102327-24 SD	SD-221-SS	Total/NA	Solid	6020A	139821
CRI 160-140258/11	DL		Solid	6020A	
CRI 160-140258/12	DL		Solid	6020A	
ICSA 160-140258/13	ICS		Solid	6020A	
ICSAB 160-140258/14	ICS		Solid	6020A	
LCS 160-139821/2-A	Lab Control Sample	Total/NA	Solid	6020A	139821
MB 160-139821/1-A	Method Blank	Total/NA	Solid	6020A	139821

Analysis Batch: 140274

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102327-24	SD-221-SS	Total/NA	Solid	6020A	

Rad

Prep Batch: 137774

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102327-25	SD-221-01	Total/NA	Solid	3050B	
680-102327-25 MS	SD-221-01	Total/NA	Solid	3050B	
680-102327-25 MSD	SD-221-01	Total/NA	Solid	3050B	
680-102327-25 SD	SD-221-01	Total/NA	Solid	3050B	
680-102327-26	SD-221-02	Total/NA	Solid	3050B	
680-102327-27	SD-210-SS	Total/NA	Solid	3050B	
680-102327-28	SD-210-01	Total/NA	Solid	3050B	
680-102327-29	SD-210-02	Total/NA	Solid	3050B	
680-102327-30	SD-207-SS	Total/NA	Solid	3050B	
680-102327-34	SD-205-SS	Total/NA	Solid	3050B	
680-102327-36	SD-205-02	Total/NA	Solid	3050B	
LCS 160-137774/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 160-137774/1-A	Method Blank	Total/NA	Solid	3050B	

Prep Batch: 137845

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102370-1	SD-DUP-03	Total/NA	Solid	3050B	
680-102370-2	SD-206-SS	Total/NA	Solid	3050B	
680-102370-3	SD-206-01	Total/NA	Solid	3050B	
680-102370-4	SD-206-02	Total/NA	Solid	3050B	
680-102370-6	SD-005E-01	Total/NA	Solid	3050B	
LCS 160-137845/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 160-137845/1-A	Method Blank	Total/NA	Solid	3050B	

Prep Batch: 139022

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102327-1	SD-198-SS	Total/NA	Solid	3050B	
680-102327-1 MS	SD-198-SS	Total/NA	Solid	3050B	
680-102327-1 MSD	SD-198-SS	Total/NA	Solid	3050B	
680-102327-1 SD	SD-198-SS	Total/NA	Solid	3050B	
680-102327-2	SD-198-01	Total/NA	Solid	3050B	

Rad (Continued)

Prep Batch: 139022 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102327-3	SD-198-02	Total/NA	Solid	3050B	
680-102327-5	SD-197-SS	Total/NA	Solid	3050B	
680-102327-6	SD-197-01	Total/NA	Solid	3050B	
680-102327-7	SD-197-02	Total/NA	Solid	3050B	
680-102327-9	SD-199-SS	Total/NA	Solid	3050B	
680-102327-10	SD-199-01	Total/NA	Solid	3050B	
680-102327-11	SD-199-02	Total/NA	Solid	3050B	
680-102327-13	SD-DUP-02	Total/NA	Solid	3050B	
680-102327-14	SD-005W-01	Total/NA	Solid	3050B	
680-102327-15	SD-208-SS	Total/NA	Solid	3050B	
680-102327-16	SD-208-01	Total/NA	Solid	3050B	
680-102327-17	SD-208-02	Total/NA	Solid	3050B	
680-102327-18	SD-209-01	Total/NA	Solid	3050B	
680-102327-19	SD-209-02	Total/NA	Solid	3050B	
680-102327-21	SD-204-SS	Total/NA	Solid	3050B	
680-102327-22	SD-204-01	Total/NA	Solid	3050B	
680-102327-23	SD-204-02	Total/NA	Solid	3050B	
LCS 160-139022/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 160-139022/1-A	Method Blank	Total/NA	Solid	3050B	

Prep Batch: 139028

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102327-31	SD-207-01	Total/NA	Solid	3050B	
680-102327-31 MS	SD-207-01	Total/NA	Solid	3050B	
680-102327-31 MSD	SD-207-01	Total/NA	Solid	3050B	
680-102327-31 SD	SD-207-01	Total/NA	Solid	3050B	
680-102327-32	SD-207-02	Total/NA	Solid	3050B	
680-102327-35	SD-205-01	Total/NA	Solid	3050B	
LCS 160-139028/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 160-139028/1-A	Method Blank	Total/NA	Solid	3050B	

Prep Batch: 139821

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102327-24	SD-221-SS	Total/NA	Solid	3050B	
680-102327-24 MS	SD-221-SS	Total/NA	Solid	3050B	
680-102327-24 MSD	SD-221-SS	Total/NA	Solid	3050B	
680-102327-24 SD	SD-221-SS	Total/NA	Solid	3050B	
LCS 160-139821/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 160-139821/1-A	Method Blank	Total/NA	Solid	3050B	

Client Sample ID: SD-198-SS

Lab Sample ID: 680-102327-1

Date Collected: 06/11/14 07:55

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/21/14 22:16	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	139817	08/22/14 17:03	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	140203	08/25/14 17:59	MTS	TAL SL
Total/NA	Analysis	6020A		1	140242	08/20/14 09:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	140241	08/20/14 09:25	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139526	08/21/14 22:16	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139819	08/22/14 17:03	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	140204	08/25/14 17:59	KLE	TAL SL

Client Sample ID: SD-198-01

Lab Sample ID: 680-102327-2

Date Collected: 06/11/14 08:00

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/21/14 22:44	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	139817	08/22/14 17:31	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	140203	08/25/14 18:27	MTS	TAL SL
Total/NA	Analysis	6020A		1	140242	08/20/14 09:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	140241	08/20/14 09:25	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139526	08/21/14 22:44	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139819	08/22/14 17:31	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	140204	08/25/14 18:27	KLE	TAL SL

Client Sample ID: SD-198-02

Lab Sample ID: 680-102327-3

Date Collected: 06/11/14 08:05

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/21/14 22:49	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL

Client Sample ID: SD-198-02

Lab Sample ID: 680-102327-3

Date Collected: 06/11/14 08:05

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	6020A		5	139817	08/22/14 17:35	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	140203	08/25/14 18:32	MTS	TAL SL
Total/NA	Analysis	6020A		1	140242	08/20/14 09:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	140241	08/20/14 09:25	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139526	08/21/14 22:49	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139819	08/22/14 17:35	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	140204	08/25/14 18:32	KLE	TAL SL

Client Sample ID: SD-197-SS

Lab Sample ID: 680-102327-5

Date Collected: 06/11/14 10:30

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/21/14 22:54	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	139817	08/22/14 17:40	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	140203	08/25/14 18:37	MTS	TAL SL
Total/NA	Analysis	6020A		1	140242	08/20/14 09:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	140241	08/20/14 09:25	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139526	08/21/14 22:54	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139819	08/22/14 17:40	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	140204	08/25/14 18:37	KLE	TAL SL

Client Sample ID: SD-197-01

Lab Sample ID: 680-102327-6

Date Collected: 06/11/14 10:35

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/21/14 22:58	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	139817	08/22/14 17:45	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	140203	08/25/14 18:41	MTS	TAL SL

Client Sample ID: SD-197-01

Lab Sample ID: 680-102327-6

Date Collected: 06/11/14 10:35

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	6020A		1	140242	08/20/14 09:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	140241	08/20/14 09:25	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139526	08/21/14 22:58	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139819	08/22/14 17:45	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	140204	08/25/14 18:41	KLE	TAL SL

Client Sample ID: SD-197-02

Lab Sample ID: 680-102327-7

Date Collected: 06/11/14 10:40

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/21/14 23:03	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	139817	08/22/14 17:49	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	140203	08/25/14 18:46	MTS	TAL SL
Total/NA	Analysis	6020A		1	140242	08/20/14 09:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	140241	08/20/14 09:25	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139526	08/21/14 23:03	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139819	08/22/14 17:49	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	140204	08/25/14 18:46	KLE	TAL SL

Client Sample ID: SD-199-SS

Lab Sample ID: 680-102327-9

Date Collected: 06/11/14 11:10

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/21/14 23:08	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	139817	08/22/14 17:54	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	140203	08/25/14 18:51	MTS	TAL SL
Total/NA	Analysis	6020A		1	140242	08/20/14 09:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	140241	08/20/14 09:25	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL

Client Sample ID: SD-199-SS

Lab Sample ID: 680-102327-9

Date Collected: 06/11/14 11:10

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	6020A Activity		5	139526	08/21/14 23:08	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139819	08/22/14 17:54	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	140204	08/25/14 18:51	KLE	TAL SL

Client Sample ID: SD-199-01

Lab Sample ID: 680-102327-10

Date Collected: 06/11/14 11:15

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/21/14 23:12	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	139817	08/22/14 17:59	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	140203	08/25/14 18:55	MTS	TAL SL
Total/NA	Analysis	6020A		1	140242	08/20/14 09:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	140241	08/20/14 09:25	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139526	08/21/14 23:12	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139819	08/22/14 17:59	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	140204	08/25/14 18:55	KLE	TAL SL

Client Sample ID: SD-199-02

Lab Sample ID: 680-102327-11

Date Collected: 06/11/14 11:20

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/21/14 23:26	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	139817	08/22/14 18:03	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	140203	08/25/14 19:00	MTS	TAL SL
Total/NA	Analysis	6020A		1	140242	08/20/14 09:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	140241	08/20/14 09:25	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139526	08/21/14 23:26	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139819	08/22/14 18:03	KLE	TAL SL

Client Sample ID: SD-199-02

Lab Sample ID: 680-102327-11

Date Collected: 06/11/14 11:20

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	140204	08/25/14 19:00	KLE	TAL SL

Client Sample ID: SD-DUP-02

Lab Sample ID: 680-102327-13

Date Collected: 06/11/14 00:00

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/21/14 23:31	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	139817	08/22/14 18:17	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	140203	08/25/14 19:14	MTS	TAL SL
Total/NA	Analysis	6020A		1	140242	08/20/14 09:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	140241	08/20/14 09:25	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139526	08/21/14 23:31	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139819	08/22/14 18:17	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	140204	08/25/14 19:14	KLE	TAL SL

Client Sample ID: SD-005W-01

Lab Sample ID: 680-102327-14

Date Collected: 06/11/14 12:00

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/21/14 23:36	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	139817	08/22/14 18:22	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	140203	08/25/14 19:19	MTS	TAL SL
Total/NA	Analysis	6020A		1	140242	08/20/14 09:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	140241	08/20/14 09:25	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139526	08/21/14 23:36	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139819	08/22/14 18:22	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	140204	08/25/14 19:19	KLE	TAL SL

Client Sample ID: SD-208-SS

Lab Sample ID: 680-102327-15

Date Collected: 06/11/14 12:00

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/21/14 23:40	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	139817	08/22/14 18:27	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	140203	08/25/14 19:23	MTS	TAL SL
Total/NA	Analysis	6020A		1	140242	08/20/14 09:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	140241	08/20/14 09:25	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139526	08/21/14 23:40	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139819	08/22/14 18:27	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	140204	08/25/14 19:23	KLE	TAL SL

Client Sample ID: SD-208-01

Lab Sample ID: 680-102327-16

Date Collected: 06/11/14 12:05

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/21/14 23:45	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	139817	08/22/14 18:31	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	140203	08/25/14 19:28	MTS	TAL SL
Total/NA	Analysis	6020A		1	140242	08/20/14 09:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	140241	08/20/14 09:25	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139526	08/21/14 23:45	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139819	08/22/14 18:31	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	140204	08/25/14 19:28	KLE	TAL SL

Client Sample ID: SD-208-02

Lab Sample ID: 680-102327-17

Date Collected: 06/11/14 12:10

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/21/14 23:50	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL

Client Sample ID: SD-208-02

Lab Sample ID: 680-102327-17

Date Collected: 06/11/14 12:10

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	6020A		5	139817	08/22/14 18:36	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	140203	08/25/14 19:33	MTS	TAL SL
Total/NA	Analysis	6020A		1	140242	08/20/14 09:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	140241	08/20/14 09:25	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139526	08/21/14 23:50	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139819	08/22/14 18:36	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	140204	08/25/14 19:33	KLE	TAL SL

Client Sample ID: SD-209-01

Lab Sample ID: 680-102327-18

Date Collected: 06/11/14 14:00

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/21/14 23:54	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	139817	08/22/14 18:41	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	140203	08/25/14 19:37	MTS	TAL SL
Total/NA	Analysis	6020A		1	140242	08/20/14 09:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	140241	08/20/14 09:25	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139526	08/21/14 23:54	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139819	08/22/14 18:41	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	140204	08/25/14 19:37	KLE	TAL SL

Client Sample ID: SD-209-02

Lab Sample ID: 680-102327-19

Date Collected: 06/11/14 14:05

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/21/14 23:59	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	139817	08/22/14 18:45	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	140203	08/25/14 19:42	MTS	TAL SL

Client Sample ID: SD-209-02

Lab Sample ID: 680-102327-19

Date Collected: 06/11/14 14:05

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	6020A		1	140242	08/20/14 09:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	140241	08/20/14 09:25	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139526	08/21/14 23:59	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139819	08/22/14 18:45	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	140204	08/25/14 19:42	KLE	TAL SL

Client Sample ID: SD-204-SS

Lab Sample ID: 680-102327-21

Date Collected: 06/11/14 12:20

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/22/14 00:04	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	139817	08/22/14 18:50	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	140203	08/25/14 19:47	MTS	TAL SL
Total/NA	Analysis	6020A		1	140242	08/20/14 09:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	140241	08/20/14 09:25	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139526	08/22/14 00:04	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139819	08/22/14 18:50	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	140204	08/25/14 19:47	KLE	TAL SL

Client Sample ID: SD-204-01

Lab Sample ID: 680-102327-22

Date Collected: 06/11/14 12:25

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/22/14 00:08	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	139817	08/22/14 18:55	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	140203	08/25/14 19:51	MTS	TAL SL
Total/NA	Analysis	6020A		1	140242	08/20/14 09:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	140241	08/20/14 09:25	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL

Client Sample ID: SD-204-01

Lab Sample ID: 680-102327-22

Date Collected: 06/11/14 12:25

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	6020A Activity		5	139526	08/22/14 00:08	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139819	08/22/14 18:55	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	140204	08/25/14 19:51	KLE	TAL SL

Client Sample ID: SD-204-02

Lab Sample ID: 680-102327-23

Date Collected: 06/11/14 12:30

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/22/14 00:22	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	139817	08/22/14 18:59	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	140203	08/25/14 19:56	MTS	TAL SL
Total/NA	Analysis	6020A		1	140242	08/20/14 09:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	140241	08/20/14 09:25	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139526	08/22/14 00:22	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139819	08/22/14 18:59	KLE	TAL SL
Total/NA	Prep	3050B			139022	08/20/14 09:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	140204	08/25/14 19:56	KLE	TAL SL

Client Sample ID: SD-221-SS

Lab Sample ID: 680-102327-24

Date Collected: 06/11/14 13:20

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139821	08/25/14 07:53	MTS	TAL SL
Total/NA	Analysis	6020A		5	140258	08/26/14 15:56	KLE	TAL SL
Total/NA	Analysis	6020A		1	140274	08/25/14 07:53	KLE	TAL SL
Total/NA	Analysis	6020A		1	140273	08/25/14 07:53	KLE	TAL SL
Total/NA	Prep	3050B			139821	08/25/14 07:53	MTS	TAL SL
Total/NA	Analysis	6020A Activity		5	140259	08/26/14 15:56	KLE	TAL SL

Client Sample ID: SD-221-01

Lab Sample ID: 680-102327-25

Date Collected: 06/11/14 13:25

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137774	08/13/14 10:17	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/22/14 00:36	KLE	TAL SL
Total/NA	Prep	3050B			137774	08/13/14 10:17	SMD	TAL SL
Total/NA	Analysis	6020A		5	139817	08/22/14 19:23	KLE	TAL SL
Total/NA	Analysis	6020A		1	140043	08/13/14 10:17	KLE	TAL SL
Total/NA	Analysis	6020A		1	140038	08/13/14 10:17	KLE	TAL SL
Total/NA	Prep	3050B			137774	08/13/14 10:17	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139526	08/22/14 00:36	KLE	TAL SL
Total/NA	Prep	3050B			137774	08/13/14 10:17	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139819	08/22/14 19:23	KLE	TAL SL

Client Sample ID: SD-221-02

Lab Sample ID: 680-102327-26

Date Collected: 06/11/14 13:30

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137774	08/13/14 10:17	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/22/14 00:55	KLE	TAL SL
Total/NA	Prep	3050B			137774	08/13/14 10:17	SMD	TAL SL
Total/NA	Analysis	6020A		5	139817	08/22/14 19:41	KLE	TAL SL
Total/NA	Analysis	6020A		1	140043	08/13/14 10:17	KLE	TAL SL
Total/NA	Analysis	6020A		1	140038	08/13/14 10:17	KLE	TAL SL
Total/NA	Prep	3050B			137774	08/13/14 10:17	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139526	08/22/14 00:55	KLE	TAL SL
Total/NA	Prep	3050B			137774	08/13/14 10:17	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139819	08/22/14 19:41	KLE	TAL SL

Client Sample ID: SD-210-SS

Lab Sample ID: 680-102327-27

Date Collected: 06/11/14 14:35

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137774	08/13/14 10:17	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/22/14 01:00	KLE	TAL SL
Total/NA	Prep	3050B			137774	08/13/14 10:17	SMD	TAL SL
Total/NA	Analysis	6020A		5	139817	08/22/14 19:46	KLE	TAL SL
Total/NA	Analysis	6020A		1	140043	08/13/14 10:17	KLE	TAL SL
Total/NA	Analysis	6020A		1	140038	08/13/14 10:17	KLE	TAL SL
Total/NA	Prep	3050B			137774	08/13/14 10:17	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139526	08/22/14 01:00	KLE	TAL SL
Total/NA	Prep	3050B			137774	08/13/14 10:17	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139819	08/22/14 19:46	KLE	TAL SL

Client Sample ID: SD-210-01

Lab Sample ID: 680-102327-28

Date Collected: 06/11/14 14:40

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137774	08/13/14 10:17	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/22/14 01:04	KLE	TAL SL
Total/NA	Prep	3050B			137774	08/13/14 10:17	SMD	TAL SL
Total/NA	Analysis	6020A		5	139817	08/22/14 19:51	KLE	TAL SL
Total/NA	Analysis	6020A		1	140043	08/13/14 10:17	KLE	TAL SL
Total/NA	Analysis	6020A		1	140038	08/13/14 10:17	KLE	TAL SL
Total/NA	Prep	3050B			137774	08/13/14 10:17	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139526	08/22/14 01:04	KLE	TAL SL
Total/NA	Prep	3050B			137774	08/13/14 10:17	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139819	08/22/14 19:51	KLE	TAL SL

Client Sample ID: SD-210-02

Lab Sample ID: 680-102327-29

Date Collected: 06/11/14 14:45

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137774	08/13/14 10:17	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/22/14 01:18	KLE	TAL SL
Total/NA	Prep	3050B			137774	08/13/14 10:17	SMD	TAL SL
Total/NA	Analysis	6020A		5	139817	08/22/14 19:55	KLE	TAL SL
Total/NA	Analysis	6020A		1	140043	08/13/14 10:17	KLE	TAL SL
Total/NA	Analysis	6020A		1	140038	08/13/14 10:17	KLE	TAL SL
Total/NA	Prep	3050B			137774	08/13/14 10:17	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139526	08/22/14 01:18	KLE	TAL SL
Total/NA	Prep	3050B			137774	08/13/14 10:17	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139819	08/22/14 19:55	KLE	TAL SL

Client Sample ID: SD-207-SS

Lab Sample ID: 680-102327-30

Date Collected: 06/11/14 14:48

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137774	08/13/14 10:17	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/22/14 01:23	KLE	TAL SL
Total/NA	Prep	3050B			137774	08/13/14 10:17	SMD	TAL SL
Total/NA	Analysis	6020A		5	139817	08/22/14 20:09	KLE	TAL SL
Total/NA	Analysis	6020A		1	140043	08/13/14 10:17	KLE	TAL SL
Total/NA	Analysis	6020A		1	140038	08/13/14 10:17	KLE	TAL SL
Total/NA	Prep	3050B			137774	08/13/14 10:17	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139526	08/22/14 01:23	KLE	TAL SL
Total/NA	Prep	3050B			137774	08/13/14 10:17	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139819	08/22/14 20:09	KLE	TAL SL

Client Sample ID: SD-207-01

Lab Sample ID: 680-102327-31

Date Collected: 06/11/14 14:50

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139028	08/20/14 10:02	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/22/14 01:46	KLE	TAL SL
Total/NA	Prep	3050B			139028	08/20/14 10:02	SMD	TAL SL
Total/NA	Analysis	6020A		5	139817	08/22/14 20:33	KLE	TAL SL
Total/NA	Analysis	6020A		1	140044	08/20/14 10:02	KLE	TAL SL
Total/NA	Analysis	6020A		1	140039	08/20/14 10:02	KLE	TAL SL
Total/NA	Prep	3050B			139028	08/20/14 10:02	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139526	08/22/14 01:46	KLE	TAL SL
Total/NA	Prep	3050B			139028	08/20/14 10:02	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139819	08/22/14 20:33	KLE	TAL SL

Client Sample ID: SD-207-02

Lab Sample ID: 680-102327-32

Date Collected: 06/11/14 14:55

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139028	08/20/14 10:02	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/22/14 02:14	KLE	TAL SL
Total/NA	Prep	3050B			139028	08/20/14 10:02	SMD	TAL SL
Total/NA	Analysis	6020A		5	139817	08/22/14 20:51	KLE	TAL SL
Total/NA	Analysis	6020A		1	140044	08/20/14 10:02	KLE	TAL SL
Total/NA	Analysis	6020A		1	140039	08/20/14 10:02	KLE	TAL SL
Total/NA	Prep	3050B			139028	08/20/14 10:02	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139526	08/22/14 02:14	KLE	TAL SL
Total/NA	Prep	3050B			139028	08/20/14 10:02	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139819	08/22/14 20:51	KLE	TAL SL

Client Sample ID: SD-205-SS

Lab Sample ID: 680-102327-34

Date Collected: 06/11/14 15:25

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137774	08/13/14 10:18	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/22/14 01:28	KLE	TAL SL
Total/NA	Prep	3050B			137774	08/13/14 10:18	SMD	TAL SL
Total/NA	Analysis	6020A		5	139817	08/22/14 20:14	KLE	TAL SL
Total/NA	Analysis	6020A		1	140043	08/13/14 10:18	KLE	TAL SL
Total/NA	Analysis	6020A		1	140038	08/13/14 10:18	KLE	TAL SL
Total/NA	Prep	3050B			137774	08/13/14 10:18	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139526	08/22/14 01:28	KLE	TAL SL
Total/NA	Prep	3050B			137774	08/13/14 10:18	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139819	08/22/14 20:14	KLE	TAL SL

Client Sample ID: SD-205-01

Lab Sample ID: 680-102327-35

Date Collected: 06/11/14 15:30

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139028	08/20/14 10:02	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/22/14 02:19	KLE	TAL SL
Total/NA	Prep	3050B			139028	08/20/14 10:02	SMD	TAL SL
Total/NA	Analysis	6020A		5	139817	08/22/14 21:05	KLE	TAL SL
Total/NA	Analysis	6020A		1	140044	08/20/14 10:02	KLE	TAL SL
Total/NA	Analysis	6020A		1	140039	08/20/14 10:02	KLE	TAL SL
Total/NA	Prep	3050B			139028	08/20/14 10:02	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139526	08/22/14 02:19	KLE	TAL SL
Total/NA	Prep	3050B			139028	08/20/14 10:02	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139819	08/22/14 21:05	KLE	TAL SL

Client Sample ID: SD-205-02

Lab Sample ID: 680-102327-36

Date Collected: 06/11/14 15:35

Matrix: Solid

Date Received: 06/12/14 09:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137774	08/13/14 10:18	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/22/14 01:32	KLE	TAL SL
Total/NA	Prep	3050B			137774	08/13/14 10:18	SMD	TAL SL
Total/NA	Analysis	6020A		5	139817	08/22/14 20:19	KLE	TAL SL
Total/NA	Analysis	6020A		1	140043	08/13/14 10:18	KLE	TAL SL
Total/NA	Analysis	6020A		1	140038	08/13/14 10:18	KLE	TAL SL
Total/NA	Prep	3050B			137774	08/13/14 10:18	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139526	08/22/14 01:32	KLE	TAL SL
Total/NA	Prep	3050B			137774	08/13/14 10:18	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139819	08/22/14 20:19	KLE	TAL SL

Client Sample ID: SD-DUP-03

Lab Sample ID: 680-102370-1

Date Collected: 06/12/14 00:00

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137845	08/14/14 09:01	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/21/14 19:21	KLE	TAL SL
Total/NA	Prep	3050B			137845	08/14/14 09:01	SMD	TAL SL
Total/NA	Analysis	6020A		5	139817	08/22/14 15:34	KLE	TAL SL
Total/NA	Analysis	6020A		1	140041	08/14/14 09:01	KLE	TAL SL
Total/NA	Analysis	6020A		1	140036	08/14/14 09:01	KLE	TAL SL
Total/NA	Prep	3050B			137845	08/14/14 09:01	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139526	08/21/14 19:21	KLE	TAL SL
Total/NA	Prep	3050B			137845	08/14/14 09:01	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139819	08/22/14 15:34	KLE	TAL SL

Client Sample ID: SD-206-SS

Lab Sample ID: 680-102370-2

Date Collected: 06/12/14 08:10

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137845	08/14/14 09:01	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/21/14 19:26	KLE	TAL SL
Total/NA	Prep	3050B			137845	08/14/14 09:01	SMD	TAL SL
Total/NA	Analysis	6020A		5	139817	08/22/14 15:38	KLE	TAL SL
Total/NA	Analysis	6020A		1	140041	08/14/14 09:01	KLE	TAL SL
Total/NA	Analysis	6020A		1	140036	08/14/14 09:01	KLE	TAL SL
Total/NA	Prep	3050B			137845	08/14/14 09:01	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139526	08/21/14 19:26	KLE	TAL SL
Total/NA	Prep	3050B			137845	08/14/14 09:01	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139819	08/22/14 15:38	KLE	TAL SL

Client Sample ID: SD-206-01

Lab Sample ID: 680-102370-3

Date Collected: 06/12/14 08:15

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137845	08/14/14 09:01	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/21/14 19:31	KLE	TAL SL
Total/NA	Prep	3050B			137845	08/14/14 09:01	SMD	TAL SL
Total/NA	Analysis	6020A		5	139817	08/22/14 15:43	KLE	TAL SL
Total/NA	Analysis	6020A		1	140041	08/14/14 09:01	KLE	TAL SL
Total/NA	Analysis	6020A		1	140036	08/14/14 09:01	KLE	TAL SL
Total/NA	Prep	3050B			137845	08/14/14 09:01	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139526	08/21/14 19:31	KLE	TAL SL
Total/NA	Prep	3050B			137845	08/14/14 09:01	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139819	08/22/14 15:43	KLE	TAL SL

Client Sample ID: SD-206-02

Lab Sample ID: 680-102370-4

Date Collected: 06/12/14 08:20

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137845	08/14/14 09:01	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/21/14 19:35	KLE	TAL SL
Total/NA	Prep	3050B			137845	08/14/14 09:01	SMD	TAL SL
Total/NA	Analysis	6020A		5	139817	08/22/14 15:48	KLE	TAL SL
Total/NA	Analysis	6020A		1	140041	08/14/14 09:01	KLE	TAL SL
Total/NA	Analysis	6020A		1	140036	08/14/14 09:01	KLE	TAL SL
Total/NA	Prep	3050B			137845	08/14/14 09:01	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139526	08/21/14 19:35	KLE	TAL SL
Total/NA	Prep	3050B			137845	08/14/14 09:01	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139819	08/22/14 15:48	KLE	TAL SL

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-3
SDG: 680102327-1

Client Sample ID: SD-005E-01
Date Collected: 06/12/14 08:30
Date Received: 06/13/14 09:30

Lab Sample ID: 680-102370-6
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137845	08/14/14 09:01	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/21/14 19:40	KLE	TAL SL
Total/NA	Prep	3050B			137845	08/14/14 09:01	SMD	TAL SL
Total/NA	Analysis	6020A		5	139817	08/22/14 15:52	KLE	TAL SL
Total/NA	Analysis	6020A		1	140041	08/14/14 09:01	KLE	TAL SL
Total/NA	Analysis	6020A		1	140036	08/14/14 09:01	KLE	TAL SL
Total/NA	Prep	3050B			137845	08/14/14 09:01	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139526	08/21/14 19:40	KLE	TAL SL
Total/NA	Prep	3050B			137845	08/14/14 09:01	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139819	08/22/14 15:52	KLE	TAL SL

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Certification Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-3
SDG: 680102327-1

Laboratory: TestAmerica Savannah

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Maryland	State Program	3	250	12-31-14

Laboratory: TestAmerica St. Louis

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska	State Program	10	MO00054	06-30-15
California	NELAP	9	2886	03-31-15
Connecticut	State Program	1	PH-0241	03-31-15
Florida	NELAP	4	E87689	06-30-15
Illinois	NELAP	5	200023	11-30-14
Iowa	State Program	7	373	12-01-14
Kansas	NELAP	7	E-10236	10-31-14 *
Kentucky (DW)	State Program	4	90125	12-31-14
L-A-B	DoD ELAP		L2305	01-10-16
Louisiana	NELAP	6	04080	06-30-15
Maryland	State Program	3	310	09-30-15
Missouri	State Program	7	780	06-30-14 *
Nevada	State Program	9	MO000542013-1	07-31-14 *
New Jersey	NELAP	2	MO002	06-30-15
New Mexico	State Program	6		06-30-10 *
New York	NELAP	2	11616	03-31-15
North Dakota	State Program	8	R207	06-30-14 *
NRC	NRC		24-24817-01	12-31-22
Oklahoma	State Program	6	9997	08-31-15
Pennsylvania	NELAP	3	68-00540	02-28-15
South Carolina	State Program	4	85002001	06-30-14 *
Texas	NELAP	6	T104704193-13-6	07-31-15
USDA	Federal		P330-07-00122	01-09-17
USEPA Reg V SDWA	Federal	1	WG-15J	08-30-14
Utah	NELAP	8	MO000542013-5	07-31-15
Virginia	NELAP	3	460230	06-14-15
Washington	State Program	10	C592	08-30-15
West Virginia DEP	State Program	3	381	12-31-14 *

* Certification renewal pending - certification considered valid.

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-3
SDG: 680102327-1

Method	Method Description	Protocol	Laboratory
6020A	Metals (ICP/MS), Isotopic Uranium	SW846	TAL SL
6020A	Metals (ICP/MS), Total Uranium	SW846	TAL SL
6020A	Metals (ICP/MS), Isotopic Uranium Percentage	SW846	TAL SL
6020A Activity	Metals (ICP/MS), Isotopic Uranium (Activity)	SW846	TAL SL

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-3
SDG: 680102327-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-102327-1	SD-198-SS	Solid	06/11/14 07:55	06/12/14 09:40
680-102327-2	SD-198-01	Solid	06/11/14 08:00	06/12/14 09:40
680-102327-3	SD-198-02	Solid	06/11/14 08:05	06/12/14 09:40
680-102327-5	SD-197-SS	Solid	06/11/14 10:30	06/12/14 09:40
680-102327-6	SD-197-01	Solid	06/11/14 10:35	06/12/14 09:40
680-102327-7	SD-197-02	Solid	06/11/14 10:40	06/12/14 09:40
680-102327-9	SD-199-SS	Solid	06/11/14 11:10	06/12/14 09:40
680-102327-10	SD-199-01	Solid	06/11/14 11:15	06/12/14 09:40
680-102327-11	SD-199-02	Solid	06/11/14 11:20	06/12/14 09:40
680-102327-13	SD-DUP-02	Solid	06/11/14 00:00	06/12/14 09:40
680-102327-14	SD-005W-01	Solid	06/11/14 12:00	06/12/14 09:40
680-102327-15	SD-208-SS	Solid	06/11/14 12:00	06/12/14 09:40
680-102327-16	SD-208-01	Solid	06/11/14 12:05	06/12/14 09:40
680-102327-17	SD-208-02	Solid	06/11/14 12:10	06/12/14 09:40
680-102327-18	SD-209-01	Solid	06/11/14 14:00	06/12/14 09:40
680-102327-19	SD-209-02	Solid	06/11/14 14:05	06/12/14 09:40
680-102327-21	SD-204-SS	Solid	06/11/14 12:20	06/12/14 09:40
680-102327-22	SD-204-01	Solid	06/11/14 12:25	06/12/14 09:40
680-102327-23	SD-204-02	Solid	06/11/14 12:30	06/12/14 09:40
680-102327-24	SD-221-SS	Solid	06/11/14 13:20	06/12/14 09:40
680-102327-25	SD-221-01	Solid	06/11/14 13:25	06/12/14 09:40
680-102327-26	SD-221-02	Solid	06/11/14 13:30	06/12/14 09:40
680-102327-27	SD-210-SS	Solid	06/11/14 14:35	06/12/14 09:40
680-102327-28	SD-210-01	Solid	06/11/14 14:40	06/12/14 09:40
680-102327-29	SD-210-02	Solid	06/11/14 14:45	06/12/14 09:40
680-102327-30	SD-207-SS	Solid	06/11/14 14:48	06/12/14 09:40
680-102327-31	SD-207-01	Solid	06/11/14 14:50	06/12/14 09:40
680-102327-32	SD-207-02	Solid	06/11/14 14:55	06/12/14 09:40
680-102327-34	SD-205-SS	Solid	06/11/14 15:25	06/12/14 09:40
680-102327-35	SD-205-01	Solid	06/11/14 15:30	06/12/14 09:40
680-102327-36	SD-205-02	Solid	06/11/14 15:35	06/12/14 09:40
680-102370-1	SD-DUP-03	Solid	06/12/14 00:00	06/13/14 09:30
680-102370-2	SD-206-SS	Solid	06/12/14 08:10	06/13/14 09:30
680-102370-3	SD-206-01	Solid	06/12/14 08:15	06/13/14 09:30
680-102370-4	SD-206-02	Solid	06/12/14 08:20	06/13/14 09:30
680-102370-6	SD-005E-01	Solid	06/12/14 08:30	06/13/14 09:30

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
ISOU Cal 1_00019	08/25/14	08/18/14	2%HCL 2%HNO3, Lot 376565	50 mL	ISOU Cal Low_00006	0.25 mL	U-233	0.000515225 ug/L
							U-236	0.000889887 ug/L
							U-234	0.000826729 ug/L
							U-235	0.0484747 ug/L
							U-238	0.0502596 ug/L
							Total Uranium	0.05 ug/L
.ISOU Cal Low_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU Cal Int_00006	1 mL	U-233	0.103045 ug/L
							U-236	0.177977 ug/L
							U-234	0.165346 ug/L
							U-235	9.69494 ug/L
							U-238	10.0519 ug/L
							Total Uranium	10 ug/L
..ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
...ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
....ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
...ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
....ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
...ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
....ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
...STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
ISOU Cal 1_00020	09/01/14	08/25/14	2%HCL 2%HNO3, Lot 422375	50 mL	ISOU Cal Low_00006	0.25 mL	U-233	0.000515225 ug/L
							U-236	0.000889887 ug/L

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							U-234	0.000826729 ug/L
							U-235	0.0484747 ug/L
							U-238	0.0502596 ug/L
							Total Uranium	0.05 ug/L
.ISOU Cal Low_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU Cal Int_00006	1 mL	U-233	0.103045 ug/L
							U-236	0.177977 ug/L
							U-234	0.165346 ug/L
							U-235	9.69494 ug/L
							U-238	10.0519 ug/L
							Total Uranium	10 ug/L
..ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
...ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
....ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
...ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
....ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
...ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
....ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
...STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
ISOU Cal 2_00020	08/25/14	08/18/14	2% Nitric Acid, Lot 376565	50 mL	ISOU Cal Int_00006	0.15 mL	U-233	0.0309135 ug/L
							U-236	0.0533932 ug/L
							U-234	0.0496037 ug/L
							U-235	2.90848 ug/L
							U-238	3.01557 ug/L

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Total Uranium	3 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
ISOU Cal 2_00021	09/01/14	08/25/14	2% Nitric Acid, Lot 422375	50 mL	ISOU Cal Int_00006	0.15 mL	U-233	0.0309135 ug/L
							U-236	0.0533932 ug/L
							U-234	0.0496037 ug/L
							U-235	2.90848 ug/L
							U-238	3.01557 ug/L
							Total Uranium	3 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
ISOU Cal 3_00019	08/25/14	08/18/14	2% Nitric Acid, Lot 376565	100 mL	ISOU Cal Int_00006	0.5 mL	U-233	0.0515225 ug/L
							U-236	0.0889887 ug/L
							U-234	0.0826729 ug/L
							U-235	4.84747 ug/L
							U-238	5.02596 ug/L
							Total Uranium	5 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
ISOU Cal 3_00020	09/01/14	08/25/14	2% Nitric Acid, Lot 422375	100 mL	ISOU Cal Int_00006	0.5 mL	U-233	0.0515225 ug/L
							U-236	0.0889887 ug/L
							U-234	0.0826729 ug/L
							U-235	4.84747 ug/L
							U-238	5.02596 ug/L
							Total Uranium	5 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
ISOU Cal 4_00019	08/25/14	08/18/14	2% Nitric Acid, Lot 376565	50 mL	ISOU Cal Int_00006	0.5 mL	U-233	0.103045 ug/L
							U-236	0.177977 ug/L
							U-234	0.165346 ug/L
							U-235	9.69494 ug/L
							U-238	10.0519 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		U-238	1000 ug/mL
ISOU Cal 4_00020	09/01/14	08/25/14	2% Nitric Acid, Lot 422375	50 mL	ISOU Cal Int_00006	0.5 mL	U-233	0.103045 ug/L
							U-236	0.177977 ug/L
							U-234	0.165346 ug/L
							U-235	9.69494 ug/L
							U-238	10.0519 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		U-238	1000 ug/mL
ISOU Cal 5_00019	08/25/14	08/18/14	2% Nitric Acid, Lot 376565	50 mL	ISOU Cal Int_00006	1.5 mL	U-233	0.309135 ug/L
							U-236	0.533932 ug/L
							U-234	0.496037 ug/L
							U-235	29.0848 ug/L
							U-238	30.1557 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		U-238	1000 ug/mL
ISOU Cal 5_00020	09/01/14	08/25/14	2% Nitric Acid, Lot 422375	50 mL	ISOU Cal Int_00006	1.5 mL	U-233	0.309135 ug/L
							U-236	0.533932 ug/L
							U-234	0.496037 ug/L
							U-235	29.0848 ug/L
							U-238	30.1557 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	U-238	1005.19 ug/L

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		U-238	1000 ug/mL
ISOU ICSAB_00020	08/25/14	08/18/14	2% Nitric Acid, Lot 376565	50 mL	ISOU Cal Int_00006	0.25 mL	U-233	0.0515225 ug/L
							U-236	0.0889887 ug/L
							U-234	0.0826729 ug/L
							U-235	4.84747 ug/L
							U-238	5.02596 ug/L
							Total Uranium	5 ug/L
					MS ICSA_00014	2.5 mL	Al	50000 ug/L
							Ca	50000 ug/L
							Chlorine	500000 ug/L
							Fe	50000 ug/L
							K	50000 ug/L
							Mg	50000 ug/L
							Mo	1000 ug/L
							Na	50000 ug/L
							P	50000 ug/L
							Sulfur	50000 ug/L
							Ti	1000 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
.MS ICSA_00014	07/01/15	Inorganic Ventures, Lot G2-MEB476152MCA			(Purchased Reagent)		Al	1000 ug/mL
							Ca	1000 ug/mL
							Chlorine	10000 ug/mL
							Fe	1000 ug/mL
							K	1000 ug/mL
							Mg	1000 ug/mL
							Mo	20 ug/mL
							Na	1000 ug/mL
							P	1000 ug/mL
							Sulfur	1000 ug/mL
							Ti	20 ug/mL
ISOU ICSAB_00021	09/01/14	08/25/14	2% Nitric Acid, Lot 422375	50 mL	ISOU Cal Int_00006	0.25 mL	U-233	0.0515225 ug/L
							U-236	0.0889887 ug/L
							U-234	0.0826729 ug/L
							U-235	4.84747 ug/L
							U-238	5.02596 ug/L
							Total Uranium	5 ug/L
					MS ICSA_00014	2.5 mL	Al	50000 ug/L
							Ca	50000 ug/L
							Chlorine	500000 ug/L
							Fe	50000 ug/L
							K	50000 ug/L
							Mg	50000 ug/L
							Mo	1000 ug/L
							Na	50000 ug/L
							P	50000 ug/L
							Sulfur	50000 ug/L
							Ti	1000 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
.MS ICSA_00014	07/01/15	Inorganic Ventures, Lot G2-MEB476152MCA			(Purchased Reagent)		Al	1000 ug/mL
							Ca	1000 ug/mL
							Chlorine	10000 ug/mL
							Fe	1000 ug/mL
							K	1000 ug/mL
							Mg	1000 ug/mL
							Mo	20 ug/mL
							Na	1000 ug/mL
							P	1000 ug/mL
							Sulfur	1000 ug/mL
							Ti	20 ug/mL
ISOU ICV(3)_00018	08/14/14	08/18/14	2% Nitric Acid, Lot 365730	50 mL	ISOU QC Low_00004	0.25 mL	U-234	0.000417422 ug/L
							U-235	0.000528391 ug/L
							U-238	0.0488908 ug/L
							U-233	0.223475 ug/L
							U-236	0.0000372865 ug/L
.ISOU QC Low_00004	11/01/14	08/18/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU QC Int_00005	1 mL	U-234	0.0834844 ug/L
							U-235	0.105678 ug/L
							U-238	9.77816 ug/L

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							U-233	44.695 ug/L
							U-236	0.00745731 ug/L
..ISOU QC Int_00005	11/01/14	05/14/14	2%HCL 2%HNO3, Lot 355914	100 mL	ISOU UNAT_00002	1 mL	U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-238	977.816 ug/L
					ISOU-I 233 QC_00005	10 mL	U-233	4469.5 ug/L
							U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-236	0.745731 ug/L
							U-238	977.816 ug/L
...ISOU UNAT_00002	11/13/14	11/11/13	1M HNO3, Lot n/a	200 mL	ISOU U parent_00001	20 mL	U-234	5.10149 ug/L
							U-235	701.888 ug/L
							U-238	96754.7 ug/L
....ISOU U parent_00001	08/01/47	05/03/13	1M HNO3, Lot n/a	200 mL	ISOU ampule_00001	19.2509 g	U-234	51.0149 ug/L
							U-235	7018.88 ug/L
							U-238	967547 ug/L
.....ISOU ampule_00001	03/30/58	New Brunswick Lab, Lot CRM 145			(Purchased Reagent)		U-234	0.53 ug/g
							U-235	72.92 ug/g
							U-238	10052 ug/g
...ISOU-I 233 QC_00005	12/20/14	12/20/13	2%HCL 2% HNO3, Lot 250193	100 mL	ISOU-C 233 QC_00005	9.3263 g	U-233	44695 ug/L
							U-234	82.9742 ug/L
							U-235	35.4894 ug/L
							U-236	7.45731 ug/L
							U-238	102.695 ug/L
....ISOU-C 233 QC_00005	12/20/18	New Brunswick Laboratory, Lot CRM 111-A			(Purchased Reagent)		U-233	479.236 ug/g
							U-234	0.88968 ug/g
							U-235	0.38053 ug/g
							U-236	0.07996 ug/g
							U-238	1.10114 ug/g
ISOU ICV(3)_00019	09/01/14	08/25/14	2% Nitric Acid, Lot 422375	50 mL	ISOU QC Low_00004	0.25 mL	U-234	0.000417422 ug/L
							U-235	0.000528391 ug/L
							U-238	0.0488908 ug/L
							U-233	0.223475 ug/L
							U-236	0.0000372865 ug/L
.ISOU QC Low_00004	11/01/14	08/18/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU QC Int_00005	1 mL	U-234	0.0834844 ug/L
							U-235	0.105678 ug/L
							U-238	9.77816 ug/L
							U-233	44.695 ug/L
							U-236	0.00745731 ug/L

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..ISOU QC Int_00005	11/01/14	05/14/14	2%HCL 2%HNO3, Lot 355914	100 mL	ISOU UNAT_00002	1 mL	U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-238	977.816 ug/L
					ISOU-I 233 QC_00005	10 mL	U-233	4469.5 ug/L
							U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-236	0.745731 ug/L
							U-238	977.816 ug/L
...ISOU UNAT_00002	11/13/14	11/11/13	1M HNO3, Lot n/a	200 mL	ISOU U parent_00001	20 mL	U-234	5.10149 ug/L
							U-235	701.888 ug/L
							U-238	96754.7 ug/L
....ISOU U parent_00001	08/01/47	05/03/13	1M HNO3, Lot n/a	200 mL	ISOU ampule_00001	19.2509 g	U-234	51.0149 ug/L
							U-235	7018.88 ug/L
							U-238	967547 ug/L
.....ISOU ampule_00001	03/30/58	New Brunswick Lab, Lot CRM 145			(Purchased Reagent)		U-234	0.53 ug/g
							U-235	72.92 ug/g
							U-238	10052 ug/g
...ISOU-I 233 QC_00005	12/20/14	12/20/13	2%HCL 2% HNO3, Lot 250193	100 mL	ISOU-C 233 QC_00005	9.3263 g	U-233	44695 ug/L
							U-234	82.9742 ug/L
							U-235	35.4894 ug/L
							U-236	7.45731 ug/L
							U-238	102.695 ug/L
....ISOU-C 233 QC_00005	12/20/18	New Brunswick Laboratory, Lot CRM 111-A			(Purchased Reagent)		U-233	479.236 ug/g
							U-234	0.88968 ug/g
							U-235	0.38053 ug/g
							U-236	0.07996 ug/g
							U-238	1.10114 ug/g
ISOU ICV(4,8)_00018	08/25/14	08/18/14	2% Nitric Acid, Lot 376565	50 mL	ISOU QC Int_00005	0.5 mL	U-234	0.0834844 ug/L
							U-235	0.105678 ug/L
							U-238	9.77816 ug/L
							U-233	44.695 ug/L
							U-236	0.00745731 ug/L
.ISOU QC Int_00005	11/01/14	05/14/14	2%HCL 2%HNO3, Lot 355914	100 mL	ISOU UNAT_00002	1 mL	U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-238	977.816 ug/L
					ISOU-I 233 QC_00005	10 mL	U-233	4469.5 ug/L
							U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-236	0.745731 ug/L
							U-238	977.816 ug/L
..ISOU UNAT_00002	11/13/14	11/11/13	1M HNO3, Lot n/a	200 mL	ISOU U parent_00001	20 mL	U-234	5.10149 ug/L
							U-235	701.888 ug/L

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							U-238	96754.7 ug/L
...ISOU U parent_00001	08/01/47	05/03/13	1M HNO3, Lot n/a	200 mL	ISOU ampule_00001	19.2509 g	U-234	51.0149 ug/L
							U-235	7018.88 ug/L
							U-238	967547 ug/L
....ISOU ampule_00001	03/30/58	New Brunswick Lab, Lot CRM 145			(Purchased Reagent)		U-234	0.53 ug/g
							U-235	72.92 ug/g
							U-238	10052 ug/g
..ISOU-I 233 QC_00005	12/20/14	12/20/13	2%HCL 2% HNO3, Lot 250193	100 mL	ISOU-C 233 QC_00005	9.3263 g	U-233	44695 ug/L
							U-234	82.9742 ug/L
							U-235	35.4894 ug/L
							U-236	7.45731 ug/L
							U-238	102.695 ug/L
...ISOU-C 233 QC_00005	12/20/18	New Brunswick Laboratory, Lot CRM 111-A			(Purchased Reagent)		U-233	479.236 ug/g
							U-234	0.88968 ug/g
							U-235	0.38053 ug/g
							U-236	0.07996 ug/g
							U-238	1.10114 ug/g
ISOU ICV(4,8)_00019	09/01/14	08/25/14	2% Nitric Acid, Lot 422375	50 mL	ISOU QC Int_00005	0.5 mL	U-234	0.0834844 ug/L
							U-235	0.105678 ug/L
							U-238	9.77816 ug/L
							U-233	44.695 ug/L
							U-236	0.00745731 ug/L
.ISOU QC Int_00005	11/01/14	05/14/14	2%HCL 2%HNO3, Lot 355914	100 mL	ISOU UNAT_00002	1 mL	U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-238	977.816 ug/L
					ISOU-I 233 QC_00005	10 mL	U-233	4469.5 ug/L
							U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-236	0.745731 ug/L
							U-238	977.816 ug/L
..ISOU UNAT_00002	11/13/14	11/11/13	1M HNO3, Lot n/a	200 mL	ISOU U parent_00001	20 mL	U-234	5.10149 ug/L
							U-235	701.888 ug/L
							U-238	96754.7 ug/L
...ISOU U parent_00001	08/01/47	05/03/13	1M HNO3, Lot n/a	200 mL	ISOU ampule_00001	19.2509 g	U-234	51.0149 ug/L
							U-235	7018.88 ug/L
							U-238	967547 ug/L
....ISOU ampule_00001	03/30/58	New Brunswick Lab, Lot CRM 145			(Purchased Reagent)		U-234	0.53 ug/g
							U-235	72.92 ug/g
							U-238	10052 ug/g
..ISOU-I 233 QC_00005	12/20/14	12/20/13	2%HCL 2% HNO3, Lot 250193	100 mL	ISOU-C 233 QC_00005	9.3263 g	U-233	44695 ug/L
							U-234	82.9742 ug/L

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							U-235	35.4894 ug/L
							U-236	7.45731 ug/L
							U-238	102.695 ug/L
...ISOU-C 233 QC_00005	12/20/18	New Brunswick Laboratory, Lot CRM 111-A			(Purchased Reagent)		U-233	479.236 ug/g
							U-234	0.88968 ug/g
							U-235	0.38053 ug/g
							U-236	0.07996 ug/g
							U-238	1.10114 ug/g
ISOU ICV(5,6)_00020	08/25/14	08/18/14	2% Nitric Acid, Lot 376565	50 mL	ISOU QC Int_00005	5 mL	U-234	0.834844 ug/L
							U-235	1.05678 ug/L
							U-238	97.7816 ug/L
							U-233	446.95 ug/L
							U-236	0.0745731 ug/L
.ISOU QC Int_00005	11/01/14	05/14/14	2%HCL 2%HNO3, Lot 355914	100 mL	ISOU UNAT_00002	1 mL	U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-238	977.816 ug/L
					ISOU-I 233 QC_00005	10 mL	U-233	4469.5 ug/L
							U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-236	0.745731 ug/L
							U-238	977.816 ug/L
..ISOU UNAT_00002	11/13/14	11/11/13	1M HNO3, Lot n/a	200 mL	ISOU U parent_00001	20 mL	U-234	5.10149 ug/L
							U-235	701.888 ug/L
							U-238	96754.7 ug/L
...ISOU U parent_00001	08/01/47	05/03/13	1M HNO3, Lot n/a	200 mL	ISOU ampule_00001	19.2509 g	U-234	51.0149 ug/L
							U-235	7018.88 ug/L
							U-238	967547 ug/L
....ISOU ampule_00001	03/30/58	New Brunswick Lab, Lot CRM 145			(Purchased Reagent)		U-234	0.53 ug/g
							U-235	72.92 ug/g
							U-238	10052 ug/g
..ISOU-I 233 QC_00005	12/20/14	12/20/13	2%HCL 2% HNO3, Lot 250193	100 mL	ISOU-C 233 QC_00005	9.3263 g	U-233	44695 ug/L
							U-234	82.9742 ug/L
							U-235	35.4894 ug/L
							U-236	7.45731 ug/L
							U-238	102.695 ug/L
...ISOU-C 233 QC_00005	12/20/18	New Brunswick Laboratory, Lot CRM 111-A			(Purchased Reagent)		U-233	479.236 ug/g
							U-234	0.88968 ug/g
							U-235	0.38053 ug/g
							U-236	0.07996 ug/g
							U-238	1.10114 ug/g
ISOU ICV(5,6)_00021	09/01/14	08/25/14	2% Nitric Acid, Lot 422375	50 mL	ISOU QC Int_00005	5 mL	U-234	0.834844 ug/L
							U-235	1.05678 ug/L

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							U-238	97.7816 ug/L
							U-233	446.95 ug/L
							U-236	0.0745731 ug/L
.ISOU QC Int_00005	11/01/14	05/14/14	2%HCL 2%HNO3, Lot 355914	100 mL	ISOU UNAT_00002	1 mL	U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-238	977.816 ug/L
					ISOU-I 233 QC_00005	10 mL	U-233	4469.5 ug/L
							U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-236	0.745731 ug/L
							U-238	977.816 ug/L
..ISOU UNAT_00002	11/13/14	11/11/13	1M HNO3, Lot n/a	200 mL	ISOU U parent_00001	20 mL	U-234	5.10149 ug/L
							U-235	701.888 ug/L
							U-238	96754.7 ug/L
...ISOU U parent_00001	08/01/47	05/03/13	1M HNO3, Lot n/a	200 mL	ISOU ampule_00001	19.2509 g	U-234	51.0149 ug/L
							U-235	7018.88 ug/L
							U-238	967547 ug/L
....ISOU ampule_00001	03/30/58	New Brunswick Lab, Lot CRM 145			(Purchased Reagent)		U-234	0.53 ug/g
							U-235	72.92 ug/g
							U-238	10052 ug/g
..ISOU-I 233 QC_00005	12/20/14	12/20/13	2%HCL 2% HNO3, Lot 250193	100 mL	ISOU-C 233 QC_00005	9.3263 g	U-233	44695 ug/L
							U-234	82.9742 ug/L
							U-235	35.4894 ug/L
							U-236	7.45731 ug/L
							U-238	102.695 ug/L
...ISOU-C 233 QC_00005	12/20/18	New Brunswick Laboratory, Lot CRM 111-A			(Purchased Reagent)		U-233	479.236 ug/g
							U-234	0.88968 ug/g
							U-235	0.38053 ug/g
							U-236	0.07996 ug/g
							U-238	1.10114 ug/g
ISOU Prep Spk_00002	12/01/14	07/09/14	2%HCL 2%HNO3, Lot 397367	100 mL	ISOU-I 233CAL_00002	1 mL	U-233	947.058 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
.ISOU-I 233CAL_00002	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00006	5.1938 g	U-233	94705.8 ug/L
..ISOU-C 233CAL_00006	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1823.44 ug/g
.ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
.ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
..ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
.STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL

Reagent

ISOU ampule_00001

New Brunswick Laboratory
U.S. Department of Energy

Certificate of Analysis

CRM 145

228405
ID ISOU ampule_00001
Exp:03/30/58 Prpd:KLE Opn:05/03/13
UNAT Ampoule

Uranyl (Normal) Nitrate Assay and Isotopic Solution

Uranium Mass Fraction: **0.0101356 g U/g solution ± 0.0000011 g U/g solution**
[10.1356 mg U/g solution ± 0.0011 mg U/g solution]

	$^{234}U/^{238}U$	$^{235}U/^{238}U$
Atom Ratio:	0.000052841	0.0072543
Atom Ratio Uncertainty:	0.000000082	0.0000040

	^{234}U	^{235}U	^{238}U
Atom Percent:	0.0052458	0.72017	99.27458
Atom Percent Uncertainty:	0.0000081	0.00039	0.00039
Weight Percent:	0.0051579	0.71114	99.28370
Weight Percent Uncertainty:	0.0000080	0.00038	0.00038

Relative Atomic Weight: 238.028918
Relative Atomic Weight Uncertainty: 0.000012

Note: ^{233}U and ^{236}U were not detected. The detection limit of uranium ratios for the technique used is 5×10^{-9}.

This Certified Reference Material (CRM) is a uranium concentration and isotopic solution standard intended for use in calibration of and/or quality control for uranium analysis methods. Each unit of CRM 145 consists of approximately 20-mL of uranyl nitrate solution in 1M nitric acid, contained in a sealed glass ampoule.

NOTE: The vial should be handled under proper radiologically-controlled conditions at all times.

The certified uranium content value is based on the mass of high-purity metal dissolved and diluted to a known solution mass. The stated uranium concentration was calculated as the prepared value and verified experimentally by the NBL-modified Davies and Gray titration. The certified uranium isotopic composition and atomic weight is based upon measurements performed on multiple samples by two different measurement techniques on a Thermal Ionization Mass Spectrometer (TIMS), calibrated using CRM U030-A as primary comparator and CRM 129-A as a quality control sample. The isotopic values are shared with CRM 112-A, uranium (normal) metal standard which was the source of uranium used to produce the solutions.

RAD13-0018
UNAT Spike
marrss
None
Prep/Opened: 5/3/2013
Exp(1): 5/10/2014
Exp(2): 5/10/2014

All uncertainties for the certified values are expressed as expanded uncertainties (U) where $U = k*u_c$, where u_c is the

September 30, 2010
Argonne, Illinois

www.nbl.doe.gov
Page 1 of 2

Jon Neuhoff, Director
New Brunswick Laboratory

(Revision of Certificate dated March 30, 2008)

127971
ID: UNAT_00008
Exp: 05/10/14 Prpd: SB Crt: 05/03/13
UNAT spike

combined standard uncertainty and the coverage factor k = 2. Uncertainties were determined according to the JCGM 100:2008 *Guide to the Expression of Uncertainty in Measurement*. The coverage factor of 2 was chosen to provide an approximate 95% level of confidence. The input quantities associated with the uranium content included uncertainties due to weighing, CRM 112-A purity, and buoyancy factors. The input quantities associated with the uranium isotopic composition included uncertainties from the certified value for CRM U030-A, measurement precision, and background corrections associated with the analytical techniques.

The CRM was produced by dissolving uranium metal in a single batch and container, with extensive mixing of the resultant solution followed by dispensation into individual bottles. Subsequent measurements of a random sampling of the total lot produced did not indicate any inhomogeneity in uranium concentration or isotopic composition. The minimum sample sizes taken from packaged units and measured were 30 mg U by titration and 1 µg U by TIMS. The NBL makes no recommendation as to the minimum sample size to be used to ensure concentration or isotopic homogeneity.

Users are cautioned that once the vial is opened, the uranium concentration and/or isotopic composition of the material may be affected by evaporative losses or environmental contamination. User's should take appropriate precautions to safeguard the material before, during and after use to ensure valid certificate values.

Recommended Procedure for Ampoule Handling and Dispensing of Solution

1. The ampoule contains a strongly acidic solution of uranium. Appropriate precautions should be taken.

2. Before opening the ampoule, ensure that any dried uranium or condensed liquid in the neck or body of the ampoule is re-dissolved into solution. This can be accomplished by inverting the ampoule repeatedly.

3. The glass ampoules are scored at the neck for ease of opening. However, glass burrs and fragments pose a cut hazard to anyone opening the ampoules. Appropriate precautions should be taken.

4. Lightly moisten the scored line on the neck with distilled water to help ensure a clean break at the score.

5. Because of the narrow neck of the ampoule it may be difficult or impossible to pour the solution out. Here is one possible method:

    a. Obtain approximately 12-cm length of plastic capillary tubing (e.g. i.d. 0f 0.1", o.d. of 0.16").
    b. Insert one end of the capillary tubing fully into the ampoule
    c. Fold the remaining length of tubing along the outside of the ampoule, ensuring that the tube is not crimped and will allow the free flow of air through the tube and into the ampoule.
    d. Holding the ampoule and tubing in one hand, and a beaker or dispensing bottle in another, invert the ampoule over the container allowing the solution to drain into it.
    e. The capillary tubing allows air to flow into the ampoule, eliminating the "airlock" created by the narrow neck of the open ampoule.

6. The user should be wary of evaporative losses once the ampoule is opened, and prevent uranium contamination of the sample. It is recommended that the entire solution be accurately weighed and aliquanted as soon as possible after opening the sample. Precautions should be taken (clean glass/plastic ware, air filtration, etc) to prevent uranium contamination of the CRM with subsequent perturbation of the isotopic composition.

Reagent

ISOU-C 233 QC_00005

New Brunswick Laboratory
U.S. Department of Energy

Certificate of Analysis
CRM 111-A
Uranium-233 in Nitrate Form
Uranium Spike Assay and Isotopic Solution Standard

280627
ID ISOU-C 233 QC_00005
Exp 12/20/18 Prpd:KLE Opn:12/20/13
233 QC

Uranium Concentration : 2.06684 ± 0.00052 μmoles U/gram solution

	U-233	U-234	U-235	U-236	U-238
Atom Percent:	**99.4911**	**0.1847**	**0.0790**	**0.0166**	**0.2286**
Uncertainty:	**0.0006**	**0.0002**	**0.0002**	**0.0002**	**0.0004**

Relative Atomic Weight : 233.055

This Certified Reference Material (CRM) is intended for use as a spike in the analysis of uranium materials by isotope dilution mass spectrometry (IDMS). Each unit of CRM 111-A consists of approximately 5 milligrams of uranium dissolved in 10 grams of 0.8 N HNO_3. This solution is contained in a sealed glass ampoule.

NOTE: *The ampoule should be handled under proper radiologically-controlled conditions at all times.*

The indicated uncertainties for the certified values are 95% confidence intervals for the means. The uncertainty assigned to the uranium assay includes components due to analytical variation. The uncertainties assigned to the isotopic abundance values include random measurement variations and a component based on the uncertainties associated with the determination of the mass discrimination correction factors.

The uranium elemental concentration was determined by the NBL-modified Davies-Gray titrimetric method [Reference: A. R. Eberle, M. W. Lerner, C. G. Goldbeck, and C. J. Rodden, NBL-252 (1970), pp. 1-25] using NBL CRM 112-A (uranium (normal) metal assay standard) as a control to verify the measurement system. The uranium isotopic composition was determined by thermal ionization mass spectrometry using NBL CRM 111 (U-233 spike) to demonstrate compatibility. The uranium assay value obtained by chemical analysis was verified by IDMS using NBL CRM 115 (uranium (depleted) metal assay standard) and NBL CRM 135 (U-235 spike) as spikes. For both the isotopic abundance and the IDMS assay measurements, mass discrimination correction factors were established using NBL CRM U500 and were applied to the calculations. The total impurity content was less than 1600 μg/g U as determined by inductively-coupled plasma atomic emission spectrometry on a subsample of the master

March 30, 2008
Argonne, Illinois

www.nbl.doe.gov

Jon Neuhoff, Director
New Brunswick Laboratory

(Editorial revision of Certificate dated January 18, 1990)

solution. Iron is the dominant impurity at 1330 μg/g U. Calcium, zinc, sodium, and magnesium were also found at 90, 50,50, and 10 μg/g U respectively. These impurity values are provided for information only; the impurity values are not certified.

The starting material from which this CRM was prepared was supplied by Argonne National Laboratory (ANL). Preparation and packaging of CRM 111-A were carried out by V. E. Connolly, M. I. Spaletto, F. P. Orlowicz, and F. E. Jones, NBL. Titrimetric assay measurements were performed by M. I. Spaletto, NBL; IDMS assay measurements were performed by V. E. Connolly, NBL; isotopic abundance measurements were performed by M. A. Legel and F. E. Jones, NBL; impurity measurements were performed by E. A. Huff and associates, ANL; statistical assessment of the data for certification was performed by M. D. Soriano, NBL. Project technical direction was provided by V. E. Connolly, NBL; overall technical direction and coordination of the preparation, certification, and issuance of this CRM was provided by N. M. Trahey, NBL.

RECOMMENDED PROCEDURE FOR USING CRM 111-A

The package is designed to prepare a solution having a known concentration of uranium on a weight basis. Once prepared, it is suggested that all the solution be immediately distributed as subportions for later use as individual spikes. After the spike has been added to a sample and isotopic equilibrium has been assured, a chemical separation should be performed to remove isobaric isotopes before mass spectrometric analysis.

Shake the ampoule vigorously before opening to homogenize contents. Secure in an upright position and allow solution trapped in the ampoule tip to drain back into the reservoir. Wrap the ampoule in a small cloth or towel, and break off the tip at the pre-scored line. Discard the tip, transfer the solution to a tared container, and proceed to distribute it as weighed portions into suitable containers for use as spikes.

If a more dilute solution is desired, transfer the solution to a larger tared container, weigh, dilute and weigh again, mix vigorously, and distribute all the solution as weighed portions.

Reagent

ISOU-C 233CAL_00006

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404-352-8677
Fax 404-352-2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

95301
U-233 5 mL Liquid in Flame Sealed Vial

280632
ID ISOU-C 233CAL_00006
Exp 12/19/18 Prpd KLE Opn 12/19/13
233 CAL

Customer: TestAmerica - St. Louis
P.O. No.: 2548635, Item 1 Product Code: 8055

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide calibration and purity were checked by germanium gamma-ray spectrometry, liquid scintillation counting, and/or alpha spectrometry, as applicable. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty* , % Type u_A	u_B	U	Reference Date (12:00 PM EST)
U-233	5.815E+07	3.705E+03	0.1	0.6	1.2	12/12/2013

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: U-232 4.811 Bq; U-234 4.450 Bq; α-impurities<0.001%; γ-impurities<0.1%.
5.23229 g 1M HNO3 solution. Carrier free.
Original material calibrated by New Brunswick Laboratory as CRM 111-A.

Source Prepared by: K. Eardley, Radiochemist

QC Approved: J.D. McCorvey, Counting Room Manager Date: 12 Dec 13

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

ISOU-C 233CAL_00007

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

95301
U-233 5 mL Liquid in Flame Sealed Vial

288644
ID ISOU-C 233CAL_00007
Exp 12/19/18 Prpd KLE Opn 12/19/13
233 CAL

Customer: TestAmerica - St. Louis
P.O. No.: 2548635, Item 1 Product Code: 8055

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide calibration and purity were checked by germanium gamma-ray spectrometry, liquid scintillation counting, and/or alpha spectrometry, as applicable. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty* , % Type u_A	u_B	U	Reference Date (12:00 PM EST)
U-233	5.815E+07	3.705E+03	0.1	0.6	1.2	12/12/2013

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: U-232 4.811 Bq; U-234 4.450 Bq; α-impurities<0.001%; γ-impurities<0.1%.
5.23229 g 1M HNO3 solution. Carrier free.
Original material calibrated by New Brunswick Laboratory as CRM 111-A.

Source Prepared by: K. Eardley, Radiochemist

QC Approved: J.D. McCorvey, Counting Room Manager Date: 12 Dec 13

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355
Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

ISOU-C 236_00002

Eckert & Ziegler
Isotope Products

24937 Avenue Tibbitts
Valencia, California 91355

Tel 661•309•1010
Fax 661•257•8303

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

Radionuclide:	U-236	**Customer:**	TEST AMERICA
Half-life:	(2.342 ± 0.003)E+07 years	**P.O. No.:**	2380469
Catalog No.:	7336	**Reference Date:**	15-Oct-10 12:00 PST
Source No.:	1480-21	**Contained Radioactivity: (Total alpha)**	0.01017 µCi 376.3 Bq

Physical Description:

A. Mass of solution:	5.01498 g in 5 mL V-Vial
B. Chemical form:	$UO_2(NO_3)_2$ in 0.1M HNO_3
C. Carrier content:	None
D. Density:	1.0016 g/mL @ 20°C

MT02535-10
ISOU U-236 QC CONC
elyk
.1M HN03
Prep/Opened: 10/5/2010
Exp(1): 10/5/2020
Exp(2): 10/5/2020

281584
ID ISOU-C 236_00002
Exp 10/05/15 Prpd KLE Opn 10/05/10
236 CAL

Radioimpurities:

See Technical Data Sheet

Radionuclide Concentration: 0.002028 µCi/g, 75.04 Bq/g

Method of Calibration:

This source was prepared from a weighed aliquot of solution whose activity in µCi/g was determined using a liquid scintillation counter.

Uncertainty of Measurement:

A. Type A (random) uncertainty:	± 0.9 %
B. Type B (systematic) uncertainty:	± 3.0 %
C. Uncertainty in aliquot weighing:	± 0.4 %
D. Total uncertainty at the 99% confidence level:	± 3.2 %

Notes:

- See reverse side for leak test(s) performed on this source.
- EZIP participates in a NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (as in NRC Regulatory Guide 4.15).
- Nuclear data was taken from "Table of Radioactive Isotopes", edited by Virginia Shirley, 1986.
- This solution has a working life of 5 years.

Daniel James Van Dalsem
Quality Control

21-Sep-10
Date

EZIP Ref. No.: 1480-21

Reagent

ISOU-C Enrich_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

95302

279791
ID: ISOU-C Enrich_00001
Exp:10/16/18 Prpd:KLE Opn:12/19/13
U enriched (234 and 235)

U-Enriched (97%) 5 mL Liquid in Flame Sealed Vial

Customer: Test America - St. Louis
P.O. No.: 2547082, Item 1 Product Code: 8235

This standard radionuclide source was prepared using an aliquot measured gravimetrically from a master radionuclide solution. The master radionuclide solution was prepared by dissolution of Uranium Oxide in 2.5M nitric acid. Total activity was calibrated by liquid scintillation counting. Atomic mass and weight percentages were certified by New Brunswick Laboratory. Radionuclide purity and calibration were checked by liquid scintillation counting and gamma-ray spectrometry. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July, 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date 12-December-2013 12:00 PM EST

Isotope	Activity (Bq)	Half-Life, Days	Uncertainty Type*, (%) u_A	u_B	U
U-234	3.924 E+04	8.967 E+07	1.9	0.9	4.2
U-235	7.991 E+02	2.571 E+11	1.9	0.9	4.2
U-236	3.653 E+01	8.554 E+09	1.9	0.9	4.2
U-238	6.653 E-01	1.632 E+12	1.9	0.9	4.2

***Uncertainty:** U – Relative expanded uncertainty, k=2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: α-impurities (other than decay products)< 0.1%; β-impurities(other than decay products)<0.1%; γ-impurities (other than decay products)<0.1%.
5.20568 grams of 1M HNO_3 solution with Uranium 1.97 mg/g.
Original material certified by New Brunswick Laboratory as CRM U970.

Source Prepared By: _____
R. Ormsby, Radiochemist

QA Approved: _____ 12 DEC 13
J.D. McCorvey, Counting Room Manager

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

MS ICSA_00014

INORGANIC VENTURES
300 Technology Drive
Christiansburg, VA 24073 USA
inorganicventures.com

CERTIFICATE OF ANALYSIS

1.0 **INORGANIC VENTURES** is an ISO Guide 34 "General Requirements for the Competence of Reference Material Producers" and ISO 9001 registered manufacturer. Our manufacturing laboratory is accredited to ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories."

ACCREDITED Testing Laboratory Certificate 883.01

ACCREDITED Reference Material Producer Certificate 883.02

2.0 **DESCRIPTION OF CRM**

Stock Solution

Catalog No.: 6020ICS-0A

Lot Number: **G2-MEB476152MCA**

Matrix: 1.4% HNO3(v/v)

397615
ID: MS ICSA_00014
Exp:07/01/15 Prpd:CCB Opn:07/03/14
ICSA

10,000 µg/mL ea:
Chloride,

2,000 µg/mL ea:
C,

1,000 µg/mL ea:
Al, Ca, Fe, K, Mg, Na, P, S,

20 µg/mL ea:
Mo, Ti

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

ELEMENT	CERTIFIED VALUE	ELEMENT	CERTIFIED VALUE	ELEMENT	CERTIFIED VALUE
Aluminum, Al	1,002 ± 6 µg/mL	Calcium, Ca	1,002 ± 6 µg/mL	Carbon, C	2,004 ± 13 µg/mL
Chloride, Chloride	10,020.0 ± 50.0 µg/mL	Iron, Fe	1,002 ± 7 µg/mL	Magnesium, Mg	1,002 ± 4 µg/mL
Molybdenum, Mo	20.04 ± 0.14 µg/mL	Phosphorus, P	1,002 ± 7 µg/mL	Potassium, K	1,002 ± 4 µg/mL
Sodium, Na	1,002 ± 7 µg/mL	Sulfur, S	1,002 ± 5 µg/mL	Titanium, Ti	20.04 ± 0.13 µg/mL

Certified Density: 1.034 g/mL (measured at 20 ± 1° C)

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

$$\text{Certified Value } (\bar{x}) = \frac{\Sigma x_i}{n}$$

$$\text{Uncertainty } (\pm) = 2\,[\,\Sigma(s_i)^2\,]^{1/2}$$

$(\bar{x})$ = mean

x_i = individual results

n = number of measurements

2 = the coverage factor.

$[\,\Sigma(s_i)^2\,]^{1/2}$ = The square root of the sum of the squares of the most common errors (where 's' stands for the standard deviation) from instrumental measurement, density, NIST SRM uncertainty, weighing, dilution to volume, homogeneity, long term stability and short term stability.

4.0 TRACEBILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

· "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)
· This product is Traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRMs are available, the term 'in-house std.' is specified.
- The Calculated Value is a value calculated from the weight of a starting material that has been certified directly vs. a NIST SRM/RM. See section 4.2 for balance traceability.

4.1 ASSAY INFORMATION

ELEMENT	METHOD	NIST SRM#	SRM LOT#
Al	ICP Assay	3101a	060502
Al	EDTA	928	928
C	Gravimetric		See Sec. 4.2
Ca	ICP Assay	3109a	050825
Ca	EDTA	928	928
Chloride	Acidimetric	84L	84L
Fe	ICP Assay	3126a	051031
Fe	EDTA	928	928
K	Gravimetric		See Sec. 4.2
K	ICP Assay	3141a	051220
Mg	ICP Assay	3131a	050302
Mg	EDTA	928	928
Mo	Calculated		See Sec. 4.2
Mo	ICP Assay	3134	891307
Na	Gravimetric		See Sec. 4.2
Na	ICP Assay	3152a	010728
P	ICP Assay	3139a	060717
P	Acidimetric	84L	84L
S	Acidimetric	84k	84k
Ti	ICP Assay	3162a	060808

4.2 BALANCE CALIBRATION - All analytical balances are calibrated yearly by an accredited calibration laboratory and are traceable to a class E 2 analytical weight set with NIST Traceability. All balances are checked daily using an in-house procedure. The weights used for testing are annually compared to master weights and are traceable to the National Institute of Standards and Technology (NIST).

4.3 THERMOMETER CALIBRATION - All thermometers are NIST traceable through thermometers that are calibrated by an A2LA accredited calibration laboratory.

4.4 GLASSWARE CALIBRATION - An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM's.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP-MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

s	Al		M	Dy	< 0.000100	O	Li	0.002000	M	Pr	< 0.000100	M	Te	< 0.012007
M	Sb	< 0.000600	M	Er	< 0.000100	M	Lu	< 0.000100	M	Re	< 0.000100	M	Tb	< 0.000100
O	As	< 0.020000	M	Eu	< 0.000100	s	Mg		M	Rh	< 0.000100	M	Tl	< 0.000100
O	Ba	< 0.000200	M	Gd	< 0.000100	O	Mn	0.003000	M	Rb	< 0.020012	M	Th	< 0.000100
O	Be	< 0.000090	M	Ga	< 0.001001	O	Hg	< 0.005000	M	Ru	< 0.000100	M	Tm	< 0.000100
M	Bi	< 0.005003	O	Ge	< 0.015000	s	Mo		M	Sm	< 0.000100	M	Sn	< 0.003002
O	B	< 0.005000	M	Au	< 0.001001	M	Nd	< 0.000100	O	Sc	< 0.000700	s	Ti	
O	Cd	0.003400	M	Hf	< 0.002001	O	Ni	< 0.002000	M	Se	< 0.050029	O	W	< 0.007000
s	Ca		M	Ho	< 0.000100	M	Nb	< 0.002001	n	Si		M	U	< 0.000100
M	Ce	< 0.000500	M	In	< 0.001001	n	Os		M	Ag	< 0.001001	O	V	< 0.004000
M	Cs	< 0.001001	M	Ir	< 0.000100	M	Pd	< 0.003002	s	Na		M	Yb	< 0.000100
O	Cr	< 0.010000	s	Fe		s	P		O	Sr	0.005000	M	Y	< 0.000100
M	Co	< 0.001001	M	La	< 0.000200	M	Pt	< 0.000100	s	S		M	Zn	0.016610
O	Cu	< 0.020000	M	Pb	0.002001	s	K		M	Ta	< 0.001001	M	Zr	< 0.004002

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
HPLC, IC, TLC, ISE, IR, NMR, UV/VIS, MS, Capillary Electrophoresis, Potentiometry, Wet Chemistry and Voltammetry
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact Technical Staff

This CRM was manufactured using 18 megohm doubly deionized water that has been filtered through a 0.2 micron filter.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep **Tightly** sealed when not in use. Store and use at 20 ± 4°C. **Do Not** pipette from the container. **Do Not** return portions removed from pipetting to container.

Element Specific Information - For specific information regarding any element: Contact technical staff.

Uranium Note: If uranium is present in this standard, it is natural abundance unless specified in Section 3.0.

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Safety Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous.

Inorganic Ventures homogeneity data indicate that the end user should take a minimum sample size of 0.2mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration
- SAI Global File Number 010105

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration"
- Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 "General Requirements for the Competence of Reference Material Producers"
- Reference Materials Production - Accredited A2LA Certificate Number 883.02

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission
- Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission
- Reporting Defects and Non-Compliance

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies of chemically-stable solutions performed at the manufacturer's facility show a CRM shelf-life of twenty one months for solutions packaged in 125-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life. Manufacturer concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

11.3 Chemical Stability - Studies have been conducted on this or similar CRMs and it has been demonstrated that this CRM is chemically stable for a period of not less than two years provided the "Storage & Handling" conditions are followed that are described in section 7.0.

Certification Date: July 12, 2013

Expiration Date: EXPIRES 1[illegible]2015

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By: Zach Saunders
Product Documentation Technician

Zachary Saunders

Certificate Approved By: Allyson Guilliams
Quality Control Supervisor

Allyson Guilliams

Certifying Officer: Paul Gaines
PhD., Senior Technical Director

Paul R Gaines

Reagent

STD U_00005

INORGANIC™ VENTURES
[illegible] Drive
[illegible] VA 24073 [illegible]
[illegible]ventures.com

CERTIFICATE OF ANALYSIS

260559
ID STD U_00005
Exp 12/01/14 Prpd:REV Opn:12/02/13
U 1000PPM

1.0 **INORGANIC VENTURES** is an ISO Guide 34 "General Requirements for the Competence of Reference Material Producers" and ISO 9001 registered manufacturer. Our manufacturing laboratory is accredited to ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories."

ACCREDITED Testing Laboratory Certificate 883.01

ACCREDITED Reference Material Producer Certificate 883.02

2.0 DESCRIPTION OF CRM — 1000 µg/mL Uranium in 2% (v/v) HNO3

Catalog Number:	CGU1-1, CGU1-2, and CGU1-5
Lot Number:	**F2-U01098**
Starting Material:	UO2(NO3)2.6H2O
Starting Material Purity (%):	99.9979
Starting Material Lot No:	1627
Matrix:	2% (v/v) HNO3

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 1,003 ± 6 µg/mL - weighted mean

Certified Density: 1.010 g/mL (measured at 20 ± 1°C)

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

Certified Value $(\bar{x}) = \frac{\Sigma x_i}{n}$

$(\bar{x})$ = mean
x_i = individual results
n = number of measurements

Uncertainty $(\pm) = 2\,[\,\Sigma(s_i)^2\,]^{1/2}$

2 = the coverage factor.
$[\,\Sigma(s_i)^2\,]^{1/2}$ = The square root of the sum of the squares of the most common errors (where 's' stands for the standard deviation) from instrumental measurement, density, NIST SRM uncertainty, weighing, dilution to volume, homogeneity, long term stability and short term stability.

Certified Abundance: The 235U in this standard is depleted. The Certified abundances in Atom % are as follows:

IV's Certified Abundance

Isotope	Atom%
Uranium 238U	99.6 ± 0.1
235U	0.42 ± 0.05

4.0 TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

· "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

· This product is Traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRMs are available, the term 'in-house std.' is specified.

- The Calculated Value is a value calculated from the weight of a starting material that has been certified directly vs. a NIST SRM/RM. See section 4.2 for balance traceability.

4.1 **Assay Method #1** **1,003 ± 4 µg/mL**
ICP Assay NIST SRM 3164 Lot Number: 080521

Assay Method #2 **1,002 ± 3 µg/mL**
Calculated NIST SRM Lot Number: See Sec. 4.2

4.2 **BALANCE CALIBRATION -** All analytical balances are calibrated yearly by an accredited calibration laboratory and are traceable to a class E 2 analytical weight set with NIST Traceability. All balances are checked daily using an in-house procedure. The weights used for testing are annually compared to master weights and are traceable to the National Institute of Standards and Technology (NIST).

4.3 **THERMOMETER CALIBRATION -** All thermometers are NIST traceable through thermometers that are calibrated by an A2LA accredited calibration laboratory.

4.4 **GLASSWARE CALIBRATION -** An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM's.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

CRM's solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O Al < 0.050000	M Dy < 0.015093	M Li < 0.025154	M Pr < 0.000755	M Te < 0.075463
M Sb < 0.001258	M Er < 0.012577	M Lu < 0.001006	M Re < 0.002515	M Tb < 0.000755
M As < 0.025154	M Eu < 0.007546	M Mg < 0.075463	M Rh < 0.002515	M Tl < 0.002515
M Ba < 0.025154	M Gd < 0.002515	M Mn < 0.010062	M Rb < 0.002515	M Th < 0.002515
M Be < 0.001258	M Ga < 0.002515	i Hg	M Ru < 0.005031	M Tm < 0.001006
M Bi < 0.001006	M Ge < 0.015093	M Mo < 0.005031	M Sm < 0.002515	O Sn < 0.100000
M B < 0.176080	M Au < 0.007546	M Nd < 0.005031	M Sc < 0.025154	M Ti < 0.125772
M Cd < 0.007546	M Hf < 0.005031	M Ni < 0.020123	M Se < 0.020123	M W < 0.025154
O Ca 0.003976	M Ho < 0.001258	M Nb < 0.001258	i Si	s U
M Ce < 0.012577	M In < 0.025154	n Os	M Ag < 0.005031	M V < 0.005031
M Cs < 0.000755	M Ir < 0.012577	M Pd < 0.012577	O Na 0.039757	M Yb < 0.002515
M Cr < 0.012577	M Fe < 0.503087	i P	M Sr < 0.001258	M Y < 0.100617
M Co < 0.007546	M La < 0.001258	M Pt < 0.005031	i S	M Zn < 0.025154
M Cu < 0.015093	M Pb < 0.007546	i K	M Ta < 0.017608	M Zr < 0.012577

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
HPLC, IC, TLC, ISE, IR, NMR, UV/VIS, MS, Capillary Eletrophoresis, Potentiometry, Wet Chemistry and Voltammetry
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact Technical Staff

This CRM was manufactured using 18 megohm deionized water that has been filtered through a 0.2 micron filter.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 238.0289; +6 ; 8; UO_2^{2+}(uranyl)

Chemical Compatibility - Soluble in HCl and HNO_3. Avoid H_3PO_4. H_2SO_4 and HF matrices should not be a problem depending upon [U]. Although the UO_2^{2+} ion is distinctly basic, any U^{+4} will precipitate in basic media. UO_2^{2+}salts are generally soluble in water and UO_2^{2+} is stable with most metals and inorganic anions. The uranyl phosphate is insoluble in water. UF_4 and UF_6 are water soluble.

Stability - 2-100 ppb levels stable for months in 1% HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 2-5% HNO_3 / LDPE container.

U Containing Samples (Preparation and Solution) - Metal (Dissolves rapidly in HCl and HNO_3); Oxide (Soluble in HNO_3); Ores (Digest for 1-2 hours with 1 gram of ore to 30 mL 1:1 HNO_3. Silica insolubles are removed by filtration after bringing the sample to fumes with conc. H_2SO_4.)

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Type	Interferences (underlined indicates severe)
ICP-OES 385.958 nm	0.3 / 0.01 µg/mL	1	ion	Th, Fe
ICP-OES 367.007 nm	0.3 / 0.02 µg/mL	1	ion	Th, Ce
ICP-OES 263.553 nm	0.3 / 0.01 µg/mL	1	ion	Ce, Ir, Th, Rh, W, Zr, Ta, Ti, V, Hf, Fe, Re, Ru
ICP-MS 238 amu	2 ppt	n/a	M+	206Pb16O2

Uranium Note: If uranium is present in this standard, it is natural abundance unless specified in Section 3.0.

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Safety Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to an in house procedure and is guaranteed to be homogeneous. Inorganic Ventures homogeneity data indicate that the end user should take a minimum sample size of 0.2mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration
- SAI Global File Number 010105

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration"
- Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 "General Requirements for the Competence of Reference Material Producers"
- Reference Materials Production - Accredited A2LA Certificate Number 883.02

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission
- Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission
- Reporting Defects and Non-Compliance

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability.

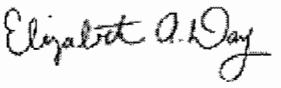
11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life. Manufacturer concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

11.3 Chemical Stability - Studies have been conducted on this or similar CRMs and it has been demonstrated that this CRM is chemically stable for a period of not less than two years provided the "Storage & Handling" conditions are followed that are described in section 7.0.

Certification Date: September 07, 2012

Expiration Date: 01 Dec 2014

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	Stephan Blaakman Manufacturing Tech	
Certificate Approved By:	Elizabeth Day Quality Assurance Specialist	
Certifying Officer:	Paul Gaines PhD., Senior Technical Director	

METALS

COVER PAGE
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102327-3

SDG No.: 680102327-1

Project: Sediments

Client Sample ID	Lab Sample ID
SD-198-SS	680-102327-1
SD-198-01	680-102327-2
SD-198-02	680-102327-3
SD-197-SS	680-102327-5
SD-197-01	680-102327-6
SD-197-02	680-102327-7
SD-199-SS	680-102327-9
SD-199-01	680-102327-10
SD-199-02	680-102327-11
SD-DUP-02	680-102327-13
SD-005W-01	680-102327-14
SD-208-SS	680-102327-15
SD-208-01	680-102327-16
SD-208-02	680-102327-17
SD-209-01	680-102327-18
SD-209-02	680-102327-19
SD-204-SS	680-102327-21
SD-204-01	680-102327-22
SD-204-02	680-102327-23
SD-221-SS	680-102327-24
SD-221-01	680-102327-25
SD-221-02	680-102327-26
SD-210-SS	680-102327-27
SD-210-01	680-102327-28
SD-210-02	680-102327-29
SD-207-SS	680-102327-30
SD-207-01	680-102327-31
SD-207-02	680-102327-32
SD-205-SS	680-102327-34
SD-205-01	680-102327-35
SD-205-02	680-102327-36
SD-DUP-03	680-102370-1
SD-206-SS	680-102370-2
SD-206-01	680-102370-3
SD-206-02	680-102370-4
SD-005E-01	680-102370-6

Comments:

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-198-SS
Lab Sample ID: 680-102327-1
Lab Name: TestAmerica St. Louis
Job No.: 680-102327-3
SDG ID.: 680102327-1
Matrix: Solid
Date Sampled: 06/11/2014 07:55
Reporting Basis: WET
Date Received: 06/12/2014 09:40

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0033	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.011	0.00066	mg/Kg			5	6020A
15117-96-1	U-235	0.022	0.011	0.0045	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00088	mg/Kg			5	6020A
7440-61-1	U-238	3.1	0.011	0.00066	mg/Kg			5	6020A
7440-61-1	Total Uranium	3.1	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-198-01 Lab Sample ID: 680-102327-2

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG ID.: 680102327-1

Matrix: Solid Date Sampled: 06/11/2014 08:00

Reporting Basis: WET Date Received: 06/12/2014 09:40

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0033	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.011	0.00065	mg/Kg			5	6020A
15117-96-1	U-235	0.021	0.011	0.0044	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00087	mg/Kg			5	6020A
7440-61-1	U-238	2.4	0.011	0.00065	mg/Kg			5	6020A
7440-61-1	Total Uranium	2.4	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-198-02 Lab Sample ID: 680-102327-3

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG ID.: 680102327-1

Matrix: Solid Date Sampled: 06/11/2014 08:05

Reporting Basis: WET Date Received: 06/12/2014 09:40

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0034	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.011	0.00068	mg/Kg			5	6020A
15117-96-1	U-235	0.016	0.011	0.0046	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00090	mg/Kg			5	6020A
7440-61-1	U-238	1.9	0.011	0.00068	mg/Kg			5	6020A
7440-61-1	Total Uranium	1.9	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-197-SS
Lab Sample ID: 680-102327-5
Lab Name: TestAmerica St. Louis
Job No.: 680-102327-3
SDG ID.: 680102327-1
Matrix: Solid
Date Sampled: 06/11/2014 10:30
Reporting Basis: WET
Date Received: 06/12/2014 09:40

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0036	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.012	0.00072	mg/Kg			5	6020A
15117-96-1	U-235	0.020	0.012	0.0049	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00096	mg/Kg			5	6020A
7440-61-1	U-238	2.8	0.012	0.00072	mg/Kg			5	6020A
7440-61-1	Total Uranium	2.8	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-197-01 Lab Sample ID: 680-102327-6

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG ID.: 680102327-1

Matrix: Solid Date Sampled: 06/11/2014 10:35

Reporting Basis: WET Date Received: 06/12/2014 09:40

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0034	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.011	0.00067	mg/Kg			5	6020A
15117-96-1	U-235	0.022	0.011	0.0046	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00090	mg/Kg			5	6020A
7440-61-1	U-238	2.9	0.011	0.00067	mg/Kg			5	6020A
7440-61-1	Total Uranium	2.9	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-197-02 Lab Sample ID: 680-102327-7

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG ID.: 680102327-1

Matrix: Solid Date Sampled: 06/11/2014 10:40

Reporting Basis: WET Date Received: 06/12/2014 09:40

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0032	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.011	0.00064	mg/Kg			5	6020A
15117-96-1	U-235	0.012	0.011	0.0043	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00085	mg/Kg			5	6020A
7440-61-1	U-238	1.4	0.011	0.00064	mg/Kg			5	6020A
7440-61-1	Total Uranium	1.4	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-199-SS
Lab Sample ID: 680-102327-9
Lab Name: TestAmerica St. Louis
Job No.: 680-102327-3
SDG ID.: 680102327-1
Matrix: Solid
Date Sampled: 06/11/2014 11:10
Reporting Basis: WET
Date Received: 06/12/2014 09:40

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0033	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.011	0.00067	mg/Kg			5	6020A
15117-96-1	U-235	0.022	0.011	0.0045	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00089	mg/Kg			5	6020A
7440-61-1	U-238	2.8	0.011	0.00067	mg/Kg			5	6020A
7440-61-1	Total Uranium	2.8	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-199-01 Lab Sample ID: 680-102327-10

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG ID.: 680102327-1

Matrix: Solid Date Sampled: 06/11/2014 11:15

Reporting Basis: WET Date Received: 06/12/2014 09:40

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0032	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.011	0.00063	mg/Kg			5	6020A
15117-96-1	U-235	0.027	0.011	0.0043	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00084	mg/Kg			5	6020A
7440-61-1	U-238	2.5	0.011	0.00063	mg/Kg			5	6020A
7440-61-1	Total Uranium	2.5	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-199-02 Lab Sample ID: 680-102327-11

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG ID.: 680102327-1

Matrix: Solid Date Sampled: 06/11/2014 11:20

Reporting Basis: WET Date Received: 06/12/2014 09:40

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0034	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.011	0.00069	mg/Kg			5	6020A
15117-96-1	U-235	0.023	0.011	0.0047	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00092	mg/Kg			5	6020A
7440-61-1	U-238	2.7	0.011	0.00069	mg/Kg			5	6020A
7440-61-1	Total Uranium	2.7	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-DUP-02 Lab Sample ID: 680-102327-13

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG ID.: 680102327-1

Matrix: Solid Date Sampled: 06/11/2014 00:00

Reporting Basis: WET Date Received: 06/12/2014 09:40

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0034	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.011	0.00067	mg/Kg			5	6020A
15117-96-1	U-235	0.019	0.011	0.0045	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00090	mg/Kg			5	6020A
7440-61-1	U-238	2.5	0.011	0.00067	mg/Kg			5	6020A
7440-61-1	Total Uranium	2.5	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-005W-01 Lab Sample ID: 680-102327-14

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG ID.: 680102327-1

Matrix: Solid Date Sampled: 06/11/2014 12:00

Reporting Basis: WET Date Received: 06/12/2014 09:40

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0036	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.012	0.00072	mg/Kg			5	6020A
15117-96-1	U-235	0.018	0.012	0.0049	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00096	mg/Kg			5	6020A
7440-61-1	U-238	2.6	0.012	0.00072	mg/Kg			5	6020A
7440-61-1	Total Uranium	2.6	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-208-SS
Lab Sample ID: 680-102327-15
Lab Name: TestAmerica St. Louis
Job No.: 680-102327-3
SDG ID.: 680102327-1
Matrix: Solid
Date Sampled: 06/11/2014 12:00
Reporting Basis: WET
Date Received: 06/12/2014 09:40

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0033	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.011	0.00066	mg/Kg			5	6020A
15117-96-1	U-235	0.0094	0.011	0.0045	mg/Kg	J		5	6020A
13982-70-2	U-236	ND	0.011	0.00088	mg/Kg			5	6020A
7440-61-1	U-238	1.3	0.011	0.00066	mg/Kg			5	6020A
7440-61-1	Total Uranium	1.3	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-208-01 Lab Sample ID: 680-102327-16

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG ID.: 680102327-1

Matrix: Solid Date Sampled: 06/11/2014 12:05

Reporting Basis: WET Date Received: 06/12/2014 09:40

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0032	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.011	0.00063	mg/Kg			5	6020A
15117-96-1	U-235	0.0054	0.011	0.0043	mg/Kg	J		5	6020A
13982-70-2	U-236	ND	0.011	0.00085	mg/Kg			5	6020A
7440-61-1	U-238	0.76	0.011	0.00063	mg/Kg			5	6020A
7440-61-1	Total Uranium	0.77	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-208-02 Lab Sample ID: 680-102327-17

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG ID.: 680102327-1

Matrix: Solid Date Sampled: 06/11/2014 12:10

Reporting Basis: WET Date Received: 06/12/2014 09:40

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0032	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.011	0.00064	mg/Kg			5	6020A
15117-96-1	U-235	ND	0.011	0.0043	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00085	mg/Kg			5	6020A
7440-61-1	U-238	0.56	0.011	0.00064	mg/Kg			5	6020A
7440-61-1	Total Uranium	0.56	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-209-01 Lab Sample ID: 680-102327-18

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG ID.: 680102327-1

Matrix: Solid Date Sampled: 06/11/2014 14:00

Reporting Basis: WET Date Received: 06/12/2014 09:40

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0035	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.012	0.00070	mg/Kg			5	6020A
15117-96-1	U-235	ND	0.012	0.0047	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00093	mg/Kg			5	6020A
7440-61-1	U-238	0.46	0.012	0.00070	mg/Kg			5	6020A
7440-61-1	Total Uranium	0.46	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-209-02 Lab Sample ID: 680-102327-19

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG ID.: 680102327-1

Matrix: Solid Date Sampled: 06/11/2014 14:05

Reporting Basis: WET Date Received: 06/12/2014 09:40

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0033	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.011	0.00065	mg/Kg			5	6020A
15117-96-1	U-235	ND	0.011	0.0044	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00087	mg/Kg			5	6020A
7440-61-1	U-238	0.38	0.011	0.00065	mg/Kg			5	6020A
7440-61-1	Total Uranium	0.38	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-204-SS
Lab Sample ID: 680-102327-21
Lab Name: TestAmerica St. Louis
Job No.: 680-102327-3
SDG ID.: 680102327-1
Matrix: Solid
Date Sampled: 06/11/2014 12:20
Reporting Basis: WET
Date Received: 06/12/2014 09:40

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0037	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.012	0.00074	mg/Kg			5	6020A
15117-96-1	U-235	0.0063	0.012	0.0050	mg/Kg	J		5	6020A
13982-70-2	U-236	ND	0.012	0.00098	mg/Kg			5	6020A
7440-61-1	U-238	0.85	0.012	0.00074	mg/Kg			5	6020A
7440-61-1	Total Uranium	0.86	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-204-01 Lab Sample ID: 680-102327-22

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG ID.: 680102327-1

Matrix: Solid Date Sampled: 06/11/2014 12:25

Reporting Basis: WET Date Received: 06/12/2014 09:40

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0033	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.011	0.00067	mg/Kg			5	6020A
15117-96-1	U-235	0.0085	0.011	0.0045	mg/Kg	J		5	6020A
13982-70-2	U-236	ND	0.011	0.00089	mg/Kg			5	6020A
7440-61-1	U-238	1.3	0.011	0.00067	mg/Kg			5	6020A
7440-61-1	Total Uranium	1.3	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-204-02 Lab Sample ID: 680-102327-23

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG ID.: 680102327-1

Matrix: Solid Date Sampled: 06/11/2014 12:30

Reporting Basis: WET Date Received: 06/12/2014 09:40

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0035	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.012	0.00069	mg/Kg			5	6020A
15117-96-1	U-235	ND	0.012	0.0047	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00092	mg/Kg			5	6020A
7440-61-1	U-238	0.59	0.012	0.00069	mg/Kg			5	6020A
7440-61-1	Total Uranium	0.59	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-221-SS
Lab Sample ID: 680-102327-24
Lab Name: TestAmerica St. Louis
Job No.: 680-102327-3
SDG ID.: 680102327-1
Matrix: Solid
Date Sampled: 06/11/2014 13:20
Reporting Basis: WET
Date Received: 06/12/2014 09:40

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0037	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.012	0.00075	mg/Kg			5	6020A
15117-96-1	U-235	0.0076	0.012	0.0050	mg/Kg	J	^	5	6020A
13982-70-2	U-236	ND	0.012	0.00099	mg/Kg			5	6020A
7440-61-1	U-238	0.68	0.012	0.00075	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	0.69	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-221-01 Lab Sample ID: 680-102327-25

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG ID.: 680102327-1

Matrix: Solid Date Sampled: 06/11/2014 13:25

Reporting Basis: WET Date Received: 06/12/2014 09:40

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0033	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.011	0.00066	mg/Kg			5	6020A
15117-96-1	U-235	0.0056	0.011	0.0044	mg/Kg	J		5	6020A
13982-70-2	U-236	ND	0.011	0.00088	mg/Kg			5	6020A
7440-61-1	U-238	0.47	0.011	0.00066	mg/Kg			5	6020A
7440-61-1	Total Uranium	0.48	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-221-02 Lab Sample ID: 680-102327-26

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG ID.: 680102327-1

Matrix: Solid Date Sampled: 06/11/2014 13:30

Reporting Basis: WET Date Received: 06/12/2014 09:40

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0033	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.011	0.00067	mg/Kg			5	6020A
15117-96-1	U-235	ND	0.011	0.0045	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00089	mg/Kg			5	6020A
7440-61-1	U-238	0.56	0.011	0.00067	mg/Kg			5	6020A
7440-61-1	Total Uranium	0.56	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-210-SS
Lab Sample ID: 680-102327-27
Lab Name: TestAmerica St. Louis
Job No.: 680-102327-3
SDG ID.: 680102327-1
Matrix: Solid
Date Sampled: 06/11/2014 14:35
Reporting Basis: WET
Date Received: 06/12/2014 09:40

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0037	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.012	0.00073	mg/Kg			5	6020A
15117-96-1	U-235	0.018	0.012	0.0050	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00098	mg/Kg			5	6020A
7440-61-1	U-238	2.0	0.012	0.00073	mg/Kg			5	6020A
7440-61-1	Total Uranium	2.0	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-210-01 Lab Sample ID: 680-102327-28

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG ID.: 680102327-1

Matrix: Solid Date Sampled: 06/11/2014 14:40

Reporting Basis: WET Date Received: 06/12/2014 09:40

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0035	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.012	0.00070	mg/Kg			5	6020A
15117-96-1	U-235	ND	0.012	0.0048	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00094	mg/Kg			5	6020A
7440-61-1	U-238	0.60	0.012	0.00070	mg/Kg			5	6020A
7440-61-1	Total Uranium	0.60	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-210-02 Lab Sample ID: 680-102327-29

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG ID.: 680102327-1

Matrix: Solid Date Sampled: 06/11/2014 14:45

Reporting Basis: WET Date Received: 06/12/2014 09:40

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0032	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.011	0.00065	mg/Kg			5	6020A
15117-96-1	U-235	ND	0.011	0.0044	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00086	mg/Kg			5	6020A
7440-61-1	U-238	0.58	0.011	0.00065	mg/Kg			5	6020A
7440-61-1	Total Uranium	0.58	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-207-SS
Lab Sample ID: 680-102327-30
Lab Name: TestAmerica St. Louis
Job No.: 680-102327-3
SDG ID.: 680102327-1
Matrix: Solid
Date Sampled: 06/11/2014 14:48
Reporting Basis: WET
Date Received: 06/12/2014 09:40

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0033	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.011	0.00065	mg/Kg			5	6020A
15117-96-1	U-235	0.023	0.011	0.0044	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00087	mg/Kg			5	6020A
7440-61-1	U-238	2.9	0.011	0.00065	mg/Kg			5	6020A
7440-61-1	Total Uranium	2.9	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-207-01 Lab Sample ID: 680-102327-31

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG ID.: 680102327-1

Matrix: Solid Date Sampled: 06/11/2014 14:50

Reporting Basis: WET Date Received: 06/12/2014 09:40

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.010	0.0031	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.010	0.00063	mg/Kg			5	6020A
15117-96-1	U-235	0.052	0.010	0.0043	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.010	0.00084	mg/Kg			5	6020A
7440-61-1	U-238	2.4	0.010	0.00063	mg/Kg			5	6020A
7440-61-1	Total Uranium	2.5	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-207-02 | Lab Sample ID: 680-102327-32

Lab Name: TestAmerica St. Louis | Job No.: 680-102327-3

SDG ID.: 680102327-1

Matrix: Solid | Date Sampled: 06/11/2014 14:55

Reporting Basis: WET | Date Received: 06/12/2014 09:40

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0032	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.011	0.00064	mg/Kg			5	6020A
15117-96-1	U-235	0.014	0.011	0.0043	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00085	mg/Kg			5	6020A
7440-61-1	U-238	1.9	0.011	0.00064	mg/Kg			5	6020A
7440-61-1	Total Uranium	1.9	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-205-SS
Lab Sample ID: 680-102327-34
Lab Name: TestAmerica St. Louis
Job No.: 680-102327-3
SDG ID.: 680102327-1
Matrix: Solid
Date Sampled: 06/11/2014 15:25
Reporting Basis: WET
Date Received: 06/12/2014 09:40

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0035	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.012	0.00070	mg/Kg			5	6020A
15117-96-1	U-235	0.010	0.012	0.0047	mg/Kg	J		5	6020A
13982-70-2	U-236	ND	0.012	0.00093	mg/Kg			5	6020A
7440-61-1	U-238	1.4	0.012	0.00070	mg/Kg			5	6020A
7440-61-1	Total Uranium	1.4	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-205-01 Lab Sample ID: 680-102327-35

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG ID.: 680102327-1

Matrix: Solid Date Sampled: 06/11/2014 15:30

Reporting Basis: WET Date Received: 06/12/2014 09:40

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0034	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.011	0.00068	mg/Kg			5	6020A
15117-96-1	U-235	0.041	0.011	0.0046	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00091	mg/Kg			5	6020A
7440-61-1	U-238	2.8	0.011	0.00068	mg/Kg			5	6020A
7440-61-1	Total Uranium	2.8	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-205-02 Lab Sample ID: 680-102327-36

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG ID.: 680102327-1

Matrix: Solid Date Sampled: 06/11/2014 15:35

Reporting Basis: WET Date Received: 06/12/2014 09:40

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0035	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.012	0.00070	mg/Kg			5	6020A
15117-96-1	U-235	0.010	0.012	0.0047	mg/Kg	J		5	6020A
13982-70-2	U-236	ND	0.012	0.00094	mg/Kg			5	6020A
7440-61-1	U-238	1.4	0.012	0.00070	mg/Kg			5	6020A
7440-61-1	Total Uranium	1.4	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-DUP-03 Lab Sample ID: 680-102370-1

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG ID.: 680102327-1

Matrix: Solid Date Sampled: 06/12/2014 00:00

Reporting Basis: WET Date Received: 06/13/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0035	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.012	0.00071	mg/Kg			5	6020A
15117-96-1	U-235	ND	0.012	0.0048	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00094	mg/Kg			5	6020A
7440-61-1	U-238	0.52	0.012	0.00071	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	0.52	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-206-SS
Lab Sample ID: 680-102370-2
Lab Name: TestAmerica St. Louis
Job No.: 680-102327-3
SDG ID.: 680102327-1
Matrix: Solid
Date Sampled: 06/12/2014 08:10
Reporting Basis: WET
Date Received: 06/13/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0032	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.011	0.00064	mg/Kg			5	6020A
15117-96-1	U-235	0.025	0.011	0.0043	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00085	mg/Kg			5	6020A
7440-61-1	U-238	3.1	0.011	0.00064	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	3.1	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-206-01 Lab Sample ID: 680-102370-3

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG ID.: 680102327-1

Matrix: Solid Date Sampled: 06/12/2014 08:15

Reporting Basis: WET Date Received: 06/13/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0033	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.011	0.00065	mg/Kg			5	6020A
15117-96-1	U-235	0.020	0.011	0.0044	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00087	mg/Kg			5	6020A
7440-61-1	U-238	2.4	0.011	0.00065	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	2.4	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-206-02 Lab Sample ID: 680-102370-4

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG ID.: 680102327-1

Matrix: Solid Date Sampled: 06/12/2014 08:20

Reporting Basis: WET Date Received: 06/13/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0035	mg/Kg		^	5	6020A
13966-29-5	U-234	0.00091	0.012	0.00069	mg/Kg	J		5	6020A
15117-96-1	U-235	0.087	0.012	0.0047	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00092	mg/Kg			5	6020A
7440-61-1	U-238	3.0	0.012	0.00069	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	3.1	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-005E-01 Lab Sample ID: 680-102370-6

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG ID.: 680102327-1

Matrix: Solid Date Sampled: 06/12/2014 08:30

Reporting Basis: WET Date Received: 06/13/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0035	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.012	0.00069	mg/Kg			5	6020A
15117-96-1	U-235	0.0067	0.012	0.0047	mg/Kg	J		5	6020A
13982-70-2	U-236	ND	0.012	0.00092	mg/Kg			5	6020A
7440-61-1	U-238	0.90	0.012	0.00069	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	0.91	0.0050	0.00030	mg/Kg			1	6020A

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(4,8)_00018 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	ICV 160-139525/8 08/21/2014 16:47				CCV 160-139525/15 08/21/2014 17:20				CCV 160-139525/27 08/21/2014 18:16			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0900		0.0835	108	0.0852		0.0827	103	0.0873		0.0827	106
U-238	10.1		9.78	104	5.30		5.03	105	5.41		5.03	108

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(4,8)_00018 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	CCV 160-139525/39 08/21/2014 19:12				CCV 160-139525/51 08/21/2014 20:08				ICV 160-139525/67 08/21/2014 21:25			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0792		0.0827	96	0.0839		0.0827	102	0.0906		0.0835	108
U-238	4.96		5.03	99	5.23		5.03	104	10.1		9.78	103

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(4,8)_00018 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	CCV 160-139525/74 08/21/2014 21:58				CCV 160-139525/79 08/21/2014 22:21				CCV 160-139525/91 08/21/2014 23:17			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0829		0.0827	100	0.0867		0.0827	105	0.0910		0.0827	110
U-238	5.07		5.03	101	5.27		5.03	105				

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(4,8)_00018 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	CCV 160-139525/103 08/22/2014 00:13				CCV 160-139525/115 08/22/2014 01:09				CCV 160-139525/127 08/22/2014 02:05			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0884		0.0827	107	0.0866		0.0827	105	0.0870		0.0827	105
U-238	5.43		5.03	108	5.37		5.03	107	5.32		5.03	106

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(4,8)_00018 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	CCV 160-139525/131 08/22/2014 02:24											
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0896		0.0827	108								
U-238	5.46		5.03	109								

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(5,6)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	ICV 160-139525/9 08/21/2014 16:52				CCV 160-139525/15 08/21/2014 17:20				CCV 160-139525/27 08/21/2014 18:16			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	1.16		1.06	109	5.11		4.85	105	5.19		4.85	107
U-236	0.0704		0.0746	94	0.0909		0.0890	102	0.0933		0.0890	105

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(5,6)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	CCV 160-139525/39 08/21/2014 19:12				CCV 160-139525/51 08/21/2014 20:08				ICV 160-139525/68 08/21/2014 21:29			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	4.75		4.85	98	5.05		4.85	104	1.13		1.06	107
U-236	0.0855		0.0890	96	0.0906		0.0890	102	0.0691		0.0746	93

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(5,6)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	CCV 160-139525/74 08/21/2014 21:58				CCV 160-139525/79 08/21/2014 22:21				CCV 160-139525/91 08/21/2014 23:17			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	4.90		4.85	101	5.08		4.85	105	5.33		4.85	110
U-236	0.0875		0.0890	98	0.0913		0.0890	103	0.0961		0.0890	108

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(5,6)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	CCV 160-139525/103 08/22/2014 00:13				CCV 160-139525/115 08/22/2014 01:09				CCV 160-139525/127 08/22/2014 02:05			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	5.24		4.85	108	5.17		4.85	107	5.12		4.85	106
U-236	0.0943		0.0890	106	0.0939		0.0890	105	0.0927		0.0890	104

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(5,6)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	CCV 160-139525/131 08/22/2014 02:24											
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	5.32		4.85	110								
U-236	0.0961		0.0890	108								

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(3)_00018 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	ICV 160-139817/7 08/22/2014 13:46				CCV 160-139817/15 08/22/2014 14:24				CCV 160-139817/27 08/22/2014 15:20			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.229		0.223	102	0.0552		0.0515	107	0.0533		0.0515	103

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(3)_00018 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	CCV 160-139817/39 08/22/2014 16:16				CCV 160-139817/51 08/22/2014 17:12				CCV 160-139817/63 08/22/2014 18:08			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.0535		0.0515	104	0.0550		0.0515	107	0.0567		0.0515	110

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(3)_00018 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	CCV 160-139817/75 08/22/2014 19:04				CCV 160-139817/87 08/22/2014 20:00				CCV 160-139817/99 08/22/2014 20:56			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.0562		0.0515	109	0.0570		0.0515	111	0.0576		0.0515	112

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(3)_00018 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	CCV 160-139817/102 08/22/2014 21:10											
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.0584		0.0515	113								

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(4,8)_00019 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00020

Analyte	ICV 160-140203/18 08/25/2014 16:40				CCV 160-140203/25 08/25/2014 17:13				CCV 160-140203/37 08/25/2014 18:09			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-238	10.1		9.78	103	5.44		5.03	108	5.32		5.03	106

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(4,8)_00019 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00020

Analyte	CCV 160-140203/49 08/25/2014 19:05				CCV 160-140203/61 08/25/2014 20:01							
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-238	5.41		5.03	108	5.48		5.03	109				

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(3)_00019 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00020

Analyte	ICV 160-140258/7 08/26/2014 15:00				CCV 160-140258/15 08/26/2014 15:37				CCV 160-140258/23 08/26/2014 16:14			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.227		0.223	102	0.0485	J	0.0515	94	0.0483	J	0.0515	94

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(4,8)_00019 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00020

Analyte	ICV 160-140258/8 08/26/2014 15:04				CCV 160-140258/15 08/26/2014 15:37				CCV 160-140258/23 08/26/2014 16:14			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0887		0.0835	106	0.0855		0.0827	103	0.0880		0.0827	106
U-238	9.99		9.78	102	5.33		5.03	106	5.53		5.03	110

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICV Source: ISOU ICV(5,6)_00021 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00020

Analyte	ICV 160-140258/9 08/26/2014 15:09				CCV 160-140258/15 08/26/2014 15:37				CCV 160-140258/23 08/26/2014 16:14			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	1.17		1.06	111	5.13		4.85	106	5.28		4.85	109
U-236	0.0716		0.0746	96	0.0910		0.0890	102	0.0948		0.0890	107

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2B-IN
CRQL CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Method: 6020A Instrument ID: ICPMS6100

Lab Sample ID: CRI 160-139525/11 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 1_00019

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-235	0.0485	0.0508		105	70-130
U-238	0.0503	0.0541		108	70-130

Lab Sample ID: CRI 160-139525/12 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 2_00020

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-234	0.0496	0.0520		105	70-130
U-236	0.0534	0.0553		104	70-130

Lab Sample ID: CRI 160-139525/70 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 1_00019

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-235	0.0485	0.0488	J	101	70-130
U-238	0.0503	0.0519		103	70-130

Lab Sample ID: CRI 160-139525/71 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 2_00020

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-234	0.0496	0.0506		102	70-130
U-236	0.0534	0.0540		101	70-130

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IIB-IN

2B-IN
CRQL CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Method: 6020A Instrument ID: ICPMS6100

Lab Sample ID: CRI 160-139817/12 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 2_00020

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-233	0.0309	0.0517	^	167	70-130

Lab Sample ID: CRI 160-140203/21 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 1_00020

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-238	0.0503	0.0477	J	95	70-130

Lab Sample ID: CRI 160-140258/11 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 1_00020

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-235	0.0485	0.0475	J	98	70-130
U-238	0.0503	0.0541		108	70-130

Lab Sample ID: CRI 160-140258/12 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 2_00021

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-233	0.0309	0.0421	J ^	136	70-130
U-234	0.0496	0.0499	J	101	70-130
U-236	0.0534	0.0541		101	70-130

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IIB-IN

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: ug/L

Analyte	RL	ICB 160-139525/10 08/21/2014 16:56		CCB 160-139525/16 08/21/2014 17:25		CCB 160-139525/28 08/21/2014 18:21		CCB 160-139525/40 08/21/2014 19:17	
		Found	C	Found	C	Found	C	Found	C
U-234	0.050	ND		ND		ND		ND	
U-235	0.050	ND		ND		ND		ND	
U-236	0.050	ND		ND		ND		ND	
U-238	0.050	0.0166	J	ND		ND		ND	

Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: ug/L

Analyte	RL	CCB 160-139525/52 08/21/2014 20:13		ICB 160-139525/69 08/21/2014 21:34		CCB 160-139525/75 08/21/2014 22:02		CCB 160-139525/80 08/21/2014 22:26	
		Found	C	Found	C	Found	C	Found	C
U-234	0.050	ND		ND		ND		ND	
U-235	0.050	ND		ND		ND		ND	
U-236	0.050	ND		ND		ND		ND	
U-238	0.050	ND		0.0207	J	ND		ND	

Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: ug/L

Analyte	RL	CCB 160-139525/92 08/21/2014 23:22		CCB 160-139525/104 08/22/2014 00:18		CCB 160-139525/116 08/22/2014 01:14		CCB 160-139525/128 08/22/2014 02:10	
		Found	C	Found	C	Found	C	Found	C
U-234	0.050	ND		ND		ND		ND	
U-235	0.050	ND		0.00475	J	0.0140	J	0.00781	J
U-236	0.050	ND		ND		ND		ND	
U-238	0.050			ND		0.0164	J	0.0115	J

Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: ug/L

Analyte	RL	CCB 160-139525/132 08/22/2014 02:28							
		Found	C	Found	C	Found	C	Found	C
U-234	0.050	ND							
U-235	0.050	0.00568	J						
U-236	0.050	ND							
U-238	0.050	0.00821	J						

Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: ug/L

Analyte	RL	ICB 160-139817/10 08/22/2014 14:00		CCB 160-139817/16 08/22/2014 14:28		CCB 160-139817/28 08/22/2014 15:24		CCB 160-139817/40 08/22/2014 16:20	
		Found	C	Found	C	Found	C	Found	C
U-233	0.050	0.153		0.104		0.0881		0.0883	

Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: ug/L

Analyte	RL	CCB 160-139817/52 08/22/2014 17:17		CCB 160-139817/64 08/22/2014 18:13		CCB 160-139817/76 08/22/2014 19:09		CCB 160-139817/88 08/22/2014 20:05	
		Found	C	Found	C	Found	C	Found	C
U-233	0.050	0.0897		0.0928		0.0928		0.0922	

Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: ug/L

Analyte	RL	CCB 160-139817/100 08/22/2014 21:01		CCB 160-139817/103 08/22/2014 21:15					
		Found	C	Found	C	Found	C	Found	C
U-233	0.050	0.0933		0.0936					

Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: ug/L

Analyte	RL	ICB 160-140203/20 08/25/2014 16:49		CCB 160-140203/26 08/25/2014 17:17		CCB 160-140203/38 08/25/2014 18:13		CCB 160-140203/50 08/25/2014 19:09	
		Found	C	Found	C	Found	C	Found	C
U-238	0.050	0.0246	J	ND		ND		ND	

Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: ug/L

Analyte	RL	CCB 160-140203/62 08/25/2014 20:05							
		Found	C	Found	C	Found	C	Found	C
U-238	0.050	ND							

Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: ug/L

Analyte	RL	ICB 160-140258/10 08/26/2014 15:14		CCB 160-140258/16 08/26/2014 15:42		CCB 160-140258/24 08/26/2014 16:19			
		Found	C	Found	C	Found	C	Found	C
U-233	0.050	0.118		0.0183	J	0.0176	J		
U-234	0.050	ND		ND		ND			
U-235	0.050	ND		ND		ND			
U-236	0.050	ND		ND		ND			
U-238	0.050	0.0240	J	ND		ND			

Italicized analytes were not requested for this sequence.

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-137845/1-A

Instrument Code: ICPMS6100 Batch No.: 139525

CAS No.	Analyte	Concentration	C	Q	Method
13966-29-5	U-234	ND			6020A_U
15117-96-1	U-235	ND			6020A_U
13982-70-2	U-236	ND			6020A_U
7440-61-1	U-238	0.00308	J		6020A_U

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-139022/1-A

Instrument Code: ICPMS6100 Batch No.: 139525

CAS No.	Analyte	Concentration	C	Q	Method
13966-29-5	U-234	ND			6020A_U
15117-96-1	U-235	ND			6020A_U
13982-70-2	U-236	ND			6020A_U

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-137774/1-A

Instrument Code: ICPMS6100 Batch No.: 139525

CAS No.	Analyte	Concentration	C	Q	Method
13966-29-5	U-234	ND			6020A_U
15117-96-1	U-235	ND			6020A_U
13982-70-2	U-236	ND			6020A_U
7440-61-1	U-238	ND			6020A_U

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-139028/1-A

Instrument Code: ICPMS6100 Batch No.: 139525

CAS No.	Analyte	Concentration	C	Q	Method
13966-29-5	U-234	ND			6020A_U
15117-96-1	U-235	ND			6020A_U
13982-70-2	U-236	ND			6020A_U
7440-61-1	U-238	ND			6020A_U

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-137774/1-A

Instrument Code: ICPMS6100 Batch No.: 139817

CAS No.	Analyte	Concentration	C	Q	Method
13968-55-3	U-233	ND		^	6020A_U

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-137845/1-A

Instrument Code: ICPMS6100 Batch No.: 139817

CAS No.	Analyte	Concentration	C	Q	Method
13968-55-3	U-233	ND		^	6020A_U

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-139022/1-A

Instrument Code: ICPMS6100 Batch No.: 139817

CAS No.	Analyte	Concentration	C	Q	Method
13968-55-3	U-233	ND		^	6020A_U

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-139028/1-A

Instrument Code: ICPMS6100 Batch No.: 139817

CAS No.	Analyte	Concentration	C	Q	Method
13968-55-3	U-233	ND		^	6020A_U

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-139022/1-A

Instrument Code: ICPMS6100 Batch No.: 140203

CAS No.	Analyte	Concentration	C	Q	Method
7440-61-1	U-238	ND			6020A_U

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-139821/1-A

Instrument Code: ICPMS6100 Batch No.: 140258

CAS No.	Analyte	Concentration	C	Q	Method
13968-55-3	U-233	ND		^	6020A_U
13966-29-5	U-234	ND			6020A_U
15117-96-1	U-235	ND		^	6020A_U
13982-70-2	U-236	ND			6020A_U
7440-61-1	U-238	0.000968	J		6020A_U

4A-IN
INTERFERENCE CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Lab Sample ID: ICSAB 160-139525/14 Instrument ID: ICPMS6100

Lab File ID: 082114m2.rep ICS Source: ISOU ICSAB_00020

Concentration Units: ug/L

Analyte	True Solution AB	Found Solution AB	Percent Recovery
U-234	**0.0827**	**0.0890**	**108**
U-235	**4.85**	**5.32**	**110**
U-236	**0.0890**	**0.0952**	**107**
U-238	**5.03**	**5.51**	**110**

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IVA-IN

4A-IN
INTERFERENCE CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Lab Sample ID: ICSAB 160-139525/73 Instrument ID: ICPMS6100

Lab File ID: 082114m2.rep ICS Source: ISOU ICSAB_00020

Concentration Units: ug/L

Analyte	True Solution AB	Found Solution AB	Percent Recovery
U-234	**0.0827**	**0.0871**	**105**
U-235	**4.85**	**5.15**	**106**
U-236	**0.0890**	**0.0934**	**105**
U-238	**5.03**	**5.32**	**106**

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IVA-IN

4A-IN
INTERFERENCE CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Lab Sample ID: ICSAB 160-139817/14 Instrument ID: ICPMS6100

Lab File ID: 082214m2.rep ICS Source: ISOU ICSAB_00020

Concentration Units: ug/L

Analyte	True Solution AB	Found Solution AB	Percent Recovery
U-233	**0.0515**	**0.0587**	**114**

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IVA-IN

4A-IN
INTERFERENCE CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Lab Sample ID: ICSAB 160-140203/24 Instrument ID: ICPMS6100

Lab File ID: 082514m3.rep ICS Source: ISOU ICSAB_00021

Concentration Units: ug/L

Analyte	True Solution AB	Found Solution AB	Percent Recovery
U-238	**5.03**	**5.47**	**109**

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IVA-IN

4A-IN
INTERFERENCE CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Lab Sample ID: ICSAB 160-140258/14 Instrument ID: ICPMS6100

Lab File ID: 082614M1.rep ICS Source: ISOU ICSAB_00021

Concentration Units: ug/L

Analyte	True Solution AB	Found Solution AB	Percent Recovery
U-233	**0.0515**	**0.0488**	**95**
U-234	**0.0827**	**0.0854**	**103**
U-235	**4.85**	**5.08**	**105**
U-236	**0.0890**	**0.0916**	**103**
U-238	**5.03**	**5.29**	**105**

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IVA-IN

5A-IN
MATRIX SPIKE SAMPLE RECOVERY
METALS

Client ID: SD-198-SS MS
Lab ID: 680-102327-1 MS
Lab Name: TestAmerica St. Louis
Job No.: 680-102327-3
SDG No.: 680102327-1
Matrix: Solid
Concentration Units: mg/Kg
% Solids:

Analyte	SSR	C	Sample Result (SR)	C	Spike Added (SA)	%R	Control Limit %R	Q	Method
U-234	0.00716	J	ND		0.00732	98	75-125		6020A
U-235	0.438		0.022		0.429	97	75-125		6020A
U-238	3.51		3.1		0.445	98	75-125	4	6020A

SSR = Spiked Sample Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VA - IN

5A-IN
MATRIX SPIKE SAMPLE RECOVERY
METALS

Client ID: SD-221-SS MS
Lab ID: 680-102327-24 MS
Lab Name: TestAmerica St. Louis
Job No.: 680-102327-3
SDG No.: 680102327-1
Matrix: Solid
Concentration Units: mg/Kg
% Solids:

Analyte	SSR	C	Sample Result (SR)	C	Spike Added (SA)	%R	Control Limit %R	Q	Method
U-234	0.00703	J	ND		0.00735	96	75-125		6020A
U-235	0.423		0.0076	J	0.431	96	75-125	^	6020A
U-238	1.04		0.68		0.447	80	75-125		6020A

SSR = Spiked Sample Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VA - IN

5A-IN
MATRIX SPIKE SAMPLE RECOVERY
METALS

Client ID: SD-221-01 MS
Lab ID: 680-102327-25 MS
Lab Name: TestAmerica St. Louis
Job No.: 680-102327-3
SDG No.: 680102327-1
Matrix: Solid
Concentration Units: mg/Kg
% Solids:

Analyte	SSR	C	Sample Result (SR)	C	Spike Added (SA)	%R	Control Limit %R	Q	Method
U-234	0.00678	J	ND		0.00706	96	75-125		6020A
U-235	0.411		0.0056	J	0.414	98	75-125		6020A
U-238	0.888		0.47		0.429	98	75-125		6020A

SSR = Spiked Sample Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VA - IN

5A-IN
MATRIX SPIKE SAMPLE RECOVERY
METALS

Client ID: SD-207-01 MS
Lab ID: 680-102327-31 MS
Lab Name: TestAmerica St. Louis
Job No.: 680-102327-3
SDG No.: 680102327-1
Matrix: Solid
Concentration Units: mg/Kg
% Solids:

Analyte	SSR	C	Sample Result (SR)	C	Spike Added (SA)	%R	Control Limit %R	Q	Method
U-234	0.00790	J	ND		0.00721	110	75-125		6020A
U-235	0.489		0.052		0.423	103	75-125		6020A
U-238	2.90		2.4		0.439	114	75-125	4	6020A

SSR = Spiked Sample Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VA - IN

5A-IN
MATRIX SPIKE DUPLICATE SAMPLE RECOVERY
METALS

Client ID: SD-198-SS MSD
Lab ID: 680-102327-1 MSD
Lab Name: TestAmerica St. Louis
Job No.: 680-102327-3
SDG No.: 680102327-1
Matrix: Solid
Concentration Units: mg/Kg
% Solids:

Analyte	(SDR)	C	Spike Added (SA)	%R	Control Limit %R	RPD	RPD Limit	Q	Method
U-234	0.00845	J	0.00792	107	75-125	17	20		6020A
U-235	0.517		0.464	107	75-125	17	20		6020A
U-238	3.71		0.481	133	75-125	6	20	4	6020A

SDR = Sample Duplicate Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VD - IN

5A-IN
MATRIX SPIKE DUPLICATE SAMPLE RECOVERY
METALS

Client ID: SD-221-SS MSD
Lab ID: 680-102327-24 MSD
Lab Name: TestAmerica St. Louis
Job No.: 680-102327-3
SDG No.: 680102327-1
Matrix: Solid
Concentration Units: mg/Kg
% Solids:

Analyte	(SDR)	C	Spike Added (SA)	%R	Control Limit %R	RPD	RPD Limit	Q	Method
U-234	0.00908	J	0.00823	110	75-125	25	20	F2	6020A
U-235	0.557		0.483	114	75-125	27	20	^ F2	6020A
U-238	1.39		0.500	143	75-125	29	20	F1 F2	6020A

SDR = Sample Duplicate Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VD - IN

5A-IN
MATRIX SPIKE DUPLICATE SAMPLE RECOVERY
METALS

Client ID: SD-221-01 MSD
Lab ID: 680-102327-25 MSD
Lab Name: TestAmerica St. Louis
Job No.: 680-102327-3
SDG No.: 680102327-1
Matrix: Solid
Concentration Units: mg/Kg
% Solids:

Analyte	(SDR)	C	Spike Added (SA)	%R	Control Limit %R	RPD	RPD Limit	Q	Method
U-234	0.00812	J	0.00807	101	75-125	18	20		6020A
U-235	0.485		0.473	101	75-125	17	20		6020A
U-238	0.948		0.491	98	75-125	6	20		6020A

SDR = Sample Duplicate Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VD - IN

5A-IN
MATRIX SPIKE DUPLICATE SAMPLE RECOVERY
METALS

Client ID: SD-207-01 MSD
Lab ID: 680-102327-31 MSD
Lab Name: TestAmerica St. Louis
Job No.: 680-102327-3
SDG No.: 680102327-1
Matrix: Solid
Concentration Units: mg/Kg
% Solids:

Analyte	(SDR)	C	Spike Added (SA)	%R	Control Limit %R	RPD	RPD Limit	Q	Method
U-234	0.00824	J	0.00762	108	75-125	4	20		6020A
U-235	0.509		0.447	102	75-125	4	20		6020A
U-238	2.96		0.463	123	75-125	2	20	4	6020A

SDR = Sample Duplicate Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VD - IN

7A-IN
LAB CONTROL SAMPLE
METALS

Lab ID: LCS 160-137845/2-A

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

Sample Matrix: Solid LCS Source: ISOU Prep Spk_00002

Analyte	Solid(mg/Kg)							
	True	Found	C	%R	Limits		Q	Method
U-234	0.00694	0.00733		106	80	120		6020A
U-235	0.407	0.439		108	80	120		6020A
U-238	0.422	0.449		106	80	120		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

7A-IN
LAB CONTROL SAMPLE
METALS

Lab ID: LCS 160-139022/2-A

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

Sample Matrix: Solid LCS Source: ISOU Prep Spk_00002

Analyte	Solid(mg/Kg)							
	True	Found	C	%R	Limits		Q	Method
U-234	0.00789	0.00796		101	80	120		6020A
U-235	0.463	0.477		103	80	120		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

7A-IN
LAB CONTROL SAMPLE
METALS

Lab ID: LCS 160-137774/2-A

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

Sample Matrix: Solid LCS Source: ISOU Prep Spk_00002

Analyte	Solid(mg/Kg)							
	True	Found	C	%R	Limits		Q	Method
U-234	0.00744	0.00791		106	80	120		6020A
U-235	0.436	0.469		107	80	120		6020A
U-238	0.452	0.485		107	80	120		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

7A-IN
LAB CONTROL SAMPLE
METALS

Lab ID: LCS 160-139028/2-A

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

Sample Matrix: Solid LCS Source: ISOU Prep Spk_00002

Analyte	Solid(mg/Kg)							
	True	Found	C	%R	Limits		Q	Method
U-234	0.00739	0.00752		102	80	120		6020A
U-235	0.433	0.442		102	80	120		6020A
U-238	0.449	0.451		101	80	120		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

7A-IN
LAB CONTROL SAMPLE
METALS

Lab ID: LCS 160-139022/2-A

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

Sample Matrix: Solid LCS Source: ISOU Prep Spk_00002

Analyte	Solid(mg/Kg)							
	True	Found	C	%R	Limits		Q	Method
U-238	0.480	0.548		114	80	120		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

7A-IN
LAB CONTROL SAMPLE
METALS

Lab ID: LCS 160-139821/2-A

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

Sample Matrix: Solid LCS Source: ISOU Prep Spk_00002

Analyte	Solid(mg/Kg)							
	True	Found	C	%R	Limits		Q	Method
U-234	0.00811	0.00835		103	80	120		6020A
U-235	0.476	0.506		106	80	120	^	6020A
U-238	0.493	0.526		107	80	120		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

8-IN
ICP-AES AND ICP-MS SERIAL DILUTIONS
METALS

Lab ID: 680-102327-1

SDG No: 680102327-1

Lab Name: TestAmerica St. Louis Job No: 680-102327-3

Matrix: Solid Concentration Units: mg/Kg

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Method
U-233	ND		ND		NC	^	6020A
U-234	ND		ND		NC		6020A
U-235	0.022		ND		NC		6020A
U-236	ND		ND		NC		6020A
U-238	3.1		3.02		1.8		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIII-IN

8-IN
ICP-AES AND ICP-MS SERIAL DILUTIONS
METALS

Lab ID: 680-102327-24

SDG No: 680102327-1

Lab Name: TestAmerica St. Louis Job No: 680-102327-3

Matrix: Solid Concentration Units: mg/Kg

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Method
U-233	ND		ND		NC	^	6020A
U-234	ND		ND		NC		6020A
U-235	0.0076	J	ND		NC	^	6020A
U-236	ND		ND		NC		6020A
U-238	0.68		0.604		11	V	6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIII-IN

8-IN
ICP-AES AND ICP-MS SERIAL DILUTIONS
METALS

Lab ID: 680-102327-25

SDG No: 680102327-1

Lab Name: TestAmerica St. Louis Job No: 680-102327-3

Matrix: Solid Concentration Units: mg/Kg

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Method
U-233	ND		ND		NC	^	6020A
U-234	ND		ND		NC		6020A
U-235	0.0056	J	ND		NC		6020A
U-236	ND		ND		NC		6020A
U-238	0.47		0.475		1.5		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIII-IN

8-IN
ICP-AES AND ICP-MS SERIAL DILUTIONS
METALS

Lab ID: 680-102327-31

SDG No: 680102327-1

Lab Name: TestAmerica St. Louis Job No: 680-102327-3

Matrix: Solid Concentration Units: mg/Kg

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Method
U-233	ND		ND		NC	^	6020A
U-234	ND		ND		NC		6020A
U-235	0.052		0.0496	J	NC		6020A
U-236	ND		ND		NC		6020A
U-238	2.4		2.43		1.3		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIII-IN

9-IN
DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102327-3

SDG Number: 680102327-1

Matrix: Solid Instrument ID: ICPMS6100

Method: 6020A MDL Date: 08/05/2013 10:01

Prep Method: 3050B

Analyte	Wavelength/ Mass	RL (mg/Kg)	MDL (mg/Kg)
U-233	233	0.005	0.0015
U-234	234	0.005	0.0003
U-235	235	0.005	0.00203
U-236	236	0.005	0.0004
U-238	238	0.005	0.0003

9-IN
CALIBRATION BLANK DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102327-3

SDG Number: 680102327-1

Matrix: Solid Instrument ID: ICPMS6100

Method: 6020A XMDL Date: 07/18/2014 15:08

Analyte	Wavelength/ Mass	XRL (ug/L)	XMDL (ug/L)
U-233	233	0.05	0.0066
U-234	234	0.05	0.0021
U-235	235	0.05	0.0034
U-236	236	0.05	0.0015
U-238	238	0.05	0.0082

9-IN
DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102327-3

SDG Number: 680102327-1

Matrix: Solid Instrument ID: NOEQUIP

Method: 6020A MDL Date: 06/12/2013 14:02

Analyte	Wavelength/ Mass	RL (mg/Kg)	MDL (mg/Kg)
Total Uranium		0.005	0.0003

11-IN
LINEAR RANGES
METALS

Lab Name: TestAmerica St. Louis Job No: 680-102327-3

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Date: 02/14/2012 11:04

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	Method
U-233		2000	6020A
U-234		2000	6020A
U-235		2000	6020A
U-236		2000	6020A
U-238		2000	6020A

12-IN
PREPARATION LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Prep Method: 3050B

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight (g)	Initial Volume	Final Volume (mL)
MB 160-137774/1-A	08/13/2014 10:17	137774	0.5188		50
LCS 160-137774/2-A	08/13/2014 10:17	137774	0.5556		50
680-102327-25	08/13/2014 10:17	137774	0.5707		50
680-102327-25 MS	08/13/2014 10:17	137774	0.5856		50
680-102327-25 MSD	08/13/2014 10:17	137774	0.5123		50
680-102327-26	08/13/2014 10:17	137774	0.5613		50
680-102327-27	08/13/2014 10:17	137774	0.5118		50
680-102327-28	08/13/2014 10:17	137774	0.5323		50
680-102327-29	08/13/2014 10:17	137774	0.5808		50
680-102327-30	08/13/2014 10:17	137774	0.5730		50
680-102327-34	08/13/2014 10:18	137774	0.5364		50
680-102327-36	08/13/2014 10:18	137774	0.5345		50

12-IN
PREPARATION LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Prep Method: 3050B

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight (g)	Initial Volume	Final Volume (mL)
MB 160-137845/1-A	08/14/2014 09:01	137845	0.5136		50
LCS 160-137845/2-A	08/14/2014 09:01	137845	0.5956		50
680-102370-1	08/14/2014 09:01	137845	0.5316		50
680-102370-2	08/14/2014 09:01	137845	0.5852		50
680-102370-3	08/14/2014 09:01	137845	0.5739		50
680-102370-4	08/14/2014 09:01	137845	0.5417		50
680-102370-6	08/14/2014 09:01	137845	0.5426		50

12-IN
PREPARATION LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Prep Method: 3050B

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight (g)	Initial Volume	Final Volume (mL)
MB 160-139022/1-A	08/20/2014 09:25	139022	0.5910		50
LCS 160-139022/2-A	08/20/2014 09:25	139022	0.5236		50
680-102327-1	08/20/2014 09:25	139022	0.5664		50
680-102327-1 MS	08/20/2014 09:25	139022	0.5647		50
680-102327-1 MSD	08/20/2014 09:25	139022	0.5220		50
680-102327-2	08/20/2014 09:25	139022	0.5751		50
680-102327-3	08/20/2014 09:25	139022	0.5531		50
680-102327-5	08/20/2014 09:25	139022	0.5214		50
680-102327-6	08/20/2014 09:25	139022	0.5574		50
680-102327-7	08/20/2014 09:25	139022	0.5900		50
680-102327-9	08/20/2014 09:25	139022	0.5631		50
680-102327-10	08/20/2014 09:25	139022	0.5923		50
680-102327-11	08/20/2014 09:25	139022	0.5453		50
680-102327-13	08/20/2014 09:25	139022	0.5580		50
680-102327-14	08/20/2014 09:25	139022	0.5205		50
680-102327-15	08/20/2014 09:25	139022	0.5673		50
680-102327-16	08/20/2014 09:25	139022	0.5912		50
680-102327-17	08/20/2014 09:25	139022	0.5887		50
680-102327-18	08/20/2014 09:25	139022	0.5383		50
680-102327-19	08/20/2014 09:25	139022	0.5738		50
680-102327-21	08/20/2014 09:25	139022	0.5092		50
680-102327-22	08/20/2014 09:25	139022	0.5617		50
680-102327-23	08/20/2014 09:25	139022	0.5424		50

12-IN
PREPARATION LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Prep Method: 3050B

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight (g)	Initial Volume	Final Volume (mL)
MB 160-139028/1-A	08/20/2014 10:02	139028	0.5740		50
LCS 160-139028/2-A	08/20/2014 10:02	139028	0.5597		50
680-102327-31	08/20/2014 10:02	139028	0.5963		50
680-102327-31 MS	08/20/2014 10:02	139028	0.5730		50
680-102327-31 MSD	08/20/2014 10:02	139028	0.5427		50
680-102327-32	08/20/2014 10:02	139028	0.5905		50
680-102327-35	08/20/2014 10:02	139028	.5500		50

12-IN
PREPARATION LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Prep Method: 3050B

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight (g)	Initial Volume	Final Volume (mL)
MB 160-139821/1-A	08/25/2014 07:53	139821	0.5700		50
LCS 160-139821/2-A	08/25/2014 07:53	139821	0.5096		50
680-102327-24	08/25/2014 07:53	139821	0.5031		50
680-102327-24 MS	08/25/2014 07:53	139821	0.5624		50
680-102327-24 MSD	08/25/2014 07:53	139821	0.5022		50

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/21/2014 16:12 End Date: 08/22/2014 02:28

Lab Sample Id	D/F	Type	Time	Analytes																										
				U-234	U-235	U-236	U-238																							
ICIS 160-139525/1			16:12	X	X	X	X																							
IC 160-139525/2	1		16:19	X	X	X	X																							
IC 160-139525/3	1		16:24	X	X	X	X																							
IC 160-139525/4	1		16:28	X	X	X	X																							
IC 160-139525/5	1		16:33	X	X	X	X																							
IC 160-139525/6	1		16:38	X	X	X	X																							
ICV 160-139525/7			16:42																											
ICV 160-139525/8	1		16:47	X			X																							
ICV 160-139525/9	1		16:52		X	X																								
ICB 160-139525/10	1		16:56	X	X	X	X																							
CRI 160-139525/11	1		17:01		X		X																							
CRI 160-139525/12	1		17:06	X		X																								
ICSA 160-139525/13	1		17:10	X	X	X	X																							
ICSAB 160-139525/14	1		17:15	X	X	X	X																							
CCV 160-139525/15	1		17:20	X	X	X	X																							
CCB 160-139525/16	1		17:25	X	X	X	X																							
ZZZZZZ			17:29																											
ZZZZZZ			17:34																											
ZZZZZZ			17:38																											
ZZZZZZ			17:43																											
ZZZZZZ			17:48																											
ZZZZZZ			17:52																											
ZZZZZZ			17:57																											
ZZZZZZ			18:02																											
ZZZZZZ			18:07																											
MB 160-137845/1-A	2	T	18:11	X	X	X	X																							
CCV 160-139525/27	1		18:16	X	X	X	X																							
CCB 160-139525/28	1		18:21	X	X	X	X																							
LCS 160-137845/2-A	2	T	18:25	X	X		X																							
ZZZZZZ			18:30																											
ZZZZZZ			18:35																											
ZZZZZZ			18:39																											
ZZZZZZ			18:44																											
ZZZZZZ			18:49																											
ZZZZZZ			18:53																											
ZZZZZZ			18:58																											
ZZZZZZ			19:03																											
ZZZZZZ			19:07																											
CCV 160-139525/39	1		19:12	X	X	X	X																							

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/21/2014 16:12 End Date: 08/22/2014 02:28

Lab Sample Id	D/F	Type	Time	Analytes																										
				U-234	U-235	U-236	U-238																							
CCB 160-139525/40	1		19:17	X	X	X	X																							
680-102370-1	5	T	19:21	X	X	X	X																							
680-102370-2	5	T	19:26	X	X	X	X																							
680-102370-3	5	T	19:31	X	X	X	X																							
680-102370-4	5	T	19:35	X	X	X	X																							
680-102370-6	5	T	19:40	X	X	X	X																							
ZZZZZZ			19:45																											
ZZZZZZ			19:49																											
ZZZZZZ			19:54																											
ZZZZZZ			19:59																											
ZZZZZZ			20:03																											
CCV 160-139525/51	1		20:08	X	X	X	X																							
CCB 160-139525/52	1		20:13	X	X	X	X																							
ZZZZZZ			20:17																											
ZZZZZZ			20:22																											
ZZZZZZ			20:27																											
ZZZZZZ			20:31																											
ZZZZZZ			20:36																											
CCV 160-139525/58			20:41																											
CCB 160-139525/59			20:45																											
ICIS 160-139525/60			20:50	X	X	X	X																							
IC 160-139525/61	1		20:57	X	X	X	X																							
IC 160-139525/62	1		21:01	X	X	X	X																							
IC 160-139525/63	1		21:06	X	X	X	X																							
IC 160-139525/64	1		21:11	X	X	X	X																							
IC 160-139525/65	1		21:15	X	X	X	X																							
ICV 160-139525/66			21:20																											
ICV 160-139525/67	1		21:25	X			X																							
ICV 160-139525/68	1		21:29		X	X																								
ICB 160-139525/69	1		21:34	X	X	X	X																							
CRI 160-139525/70	1		21:39		X		X																							
CRI 160-139525/71	1		21:43	X		X																								
ICSA 160-139525/72	1		21:48	X	X	X	X																							
ICSAB 160-139525/73	1		21:53	X	X	X	X																							
CCV 160-139525/74	1		21:58	X	X	X	X																							
CCB 160-139525/75	1		22:02	X	X	X	X																							
MB 160-139022/1-A	2	T	22:07	X	X	X																								
LCS 160-139022/2-A	2	T	22:12	X	X																									
680-102327-1	5	T	22:16	X	X	X																								

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/21/2014 16:12 End Date: 08/22/2014 02:28

Lab Sample Id	D/F	Type	Time	Analytes																											
				U-234	U-235	U-236	U-238																								
CCV 160-139525/79	1		22:21	X	X	X	X																								
CCB 160-139525/80	1		22:26	X	X	X	X																								
680-102327-1 SD	25	T	22:30	X	X	X																									
680-102327-1 MS	5	T	22:35	X	X																										
680-102327-1 MSD	5	T	22:40	X	X																										
680-102327-2	5	T	22:44	X	X	X																									
680-102327-3	5	T	22:49	X	X	X																									
680-102327-5	5	T	22:54	X	X	X																									
680-102327-6	5	T	22:58	X	X	X																									
680-102327-7	5	T	23:03	X	X	X																									
680-102327-9	5	T	23:08	X	X	X																									
680-102327-10	5	T	23:12	X	X	X																									
CCV 160-139525/91	1		23:17	X	X	X																									
CCB 160-139525/92	1		23:22	X	X	X																									
680-102327-11	5	T	23:26	X	X	X																									
680-102327-13	5	T	23:31	X	X	X																									
680-102327-14	5	T	23:36	X	X	X																									
680-102327-15	5	T	23:40	X	X	X																									
680-102327-16	5	T	23:45	X	X	X																									
680-102327-17	5	T	23:50	X	X	X																									
680-102327-18	5	T	23:54	X	X	X																									
680-102327-19	5	T	23:59	X	X	X																									
680-102327-21	5	T	00:04	X	X	X																									
680-102327-22	5	T	00:08	X	X	X																									
CCV 160-139525/103	1		00:13	X	X	X	X																								
CCB 160-139525/104	1		00:18	X	X	X	X																								
680-102327-23	5	T	00:22	X	X	X																									
MB 160-137774/1-A	2	T	00:27	X	X	X	X																								
LCS 160-137774/2-A	2	T	00:32	X	X		X																								
680-102327-25	5	T	00:36	X	X	X	X																								
680-102327-25 SD	25	T	00:41	X	X	X	X																								
680-102327-25 MS	5	T	00:46	X	X		X																								
680-102327-25 MSD	5	T	00:50	X	X		X																								
680-102327-26	5	T	00:55	X	X	X	X																								
680-102327-27	5	T	01:00	X	X	X	X																								
680-102327-28	5	T	01:04	X	X	X	X																								
CCV 160-139525/115	1		01:09	X	X	X	X																								
CCB 160-139525/116	1		01:14	X	X	X	X																								
680-102327-29	5	T	01:18	X	X	X	X																								

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/21/2014 16:12 End Date: 08/22/2014 02:28

Lab Sample Id	D/F	Type	Time	Analytes																									
				U-234	U-235	U-236	U-238																						
680-102327-30	5	T	01:23	X	X	X	X																						
680-102327-34	5	T	01:28	X	X	X	X																						
680-102327-36	5	T	01:32	X	X	X	X																						
MB 160-139028/1-A	2	T	01:37	X	X	X	X																						
LCS 160-139028/2-A	2	T	01:42	X	X		X																						
680-102327-31	5	T	01:46	X	X	X	X																						
680-102327-31 SD	25	T	01:51	X	X	X	X																						
680-102327-31 MS	5	T	01:56	X	X		X																						
680-102327-31 MSD	5	T	02:00	X	X		X																						
CCV 160-139525/127	1		02:05	X	X	X	X																						
CCB 160-139525/128	1		02:10	X	X	X	X																						
680-102327-32	5	T	02:14	X	X	X	X																						
680-102327-35	5	T	02:19	X	X	X	X																						
CCV 160-139525/131	1		02:24	X	X	X	X																						
CCB 160-139525/132	1		02:28	X	X	X	X																						

Prep Types:
T = Total/NA

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/22/2014 13:16 End Date: 08/22/2014 21:15

Lab Sample Id	D/F	Type	Time	Analytes																								
				U-233																								
ICIS 160-139817/1			13:16	X																								
IC 160-139817/2	1		13:23	X																								
IC 160-139817/3	1		13:28	X																								
IC 160-139817/4	1		13:32	X																								
IC 160-139817/5	1		13:37	X																								
IC 160-139817/6	1		13:42	X																								
ICV 160-139817/7	1		13:46	X																								
ICV 160-139817/8			13:51																									
ICV 160-139817/9			13:56																									
ICB 160-139817/10	1		14:00	X																								
CRI 160-139817/11			14:05																									
CRI 160-139817/12	1		14:10	X																								
ICSA 160-139817/13	1		14:14	X																								
ICSAB 160-139817/14	1		14:19	X																								
CCV 160-139817/15	1		14:24	X																								
CCB 160-139817/16	1		14:28	X																								
MB 160-137845/1-A	2	T	14:33	X																								
ZZZZZZ			14:38																									
ZZZZZZ			14:42																									
ZZZZZZ			14:47																									
ZZZZZZ			14:52																									
ZZZZZZ			14:56																									
ZZZZZZ			15:01																									
ZZZZZZ			15:06																									
ZZZZZZ			15:10																									
ZZZZZZ			15:15																									
CCV 160-139817/27	1		15:20	X																								
CCB 160-139817/28	1		15:24	X																								
ZZZZZZ			15:29																									
680-102370-1	5	T	15:34	X																								
680-102370-2	5	T	15:38	X																								
680-102370-3	5	T	15:43	X																								
680-102370-4	5	T	15:48	X																								
680-102370-6	5	T	15:52	X																								
ZZZZZZ			15:57																									
ZZZZZZ			16:02																									
ZZZZZZ			16:06																									
ZZZZZZ			16:11																									
CCV 160-139817/39	1		16:16	X																								

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/22/2014 13:16 End Date: 08/22/2014 21:15

Lab Sample Id	D/F	Type	Time	Analytes																								
				U-233																								
CCB 160-139817/40	1		16:20	X																								
ZZZZZZ			16:25																									
ZZZZZZ			16:30																									
ZZZZZZ			16:34																									
ZZZZZZ			16:39																									
ZZZZZZ			16:44																									
ZZZZZZ			16:49																									
MB 160-139022/1-A	2	T	16:53	X																								
ZZZZZZ			16:58																									
680-102327-1	5	T	17:03	X																								
680-102327-1 SD	25	T	17:07	X																								
CCV 160-139817/51	1		17:12	X																								
CCB 160-139817/52	1		17:17	X																								
ZZZZZZ			17:21																									
ZZZZZZ			17:26																									
680-102327-2	5	T	17:31	X																								
680-102327-3	5	T	17:35	X																								
680-102327-5	5	T	17:40	X																								
680-102327-6	5	T	17:45	X																								
680-102327-7	5	T	17:49	X																								
680-102327-9	5	T	17:54	X																								
680-102327-10	5	T	17:59	X																								
680-102327-11	5	T	18:03	X																								
CCV 160-139817/63	1		18:08	X																								
CCB 160-139817/64	1		18:13	X																								
680-102327-13	5	T	18:17	X																								
680-102327-14	5	T	18:22	X																								
680-102327-15	5	T	18:27	X																								
680-102327-16	5	T	18:31	X																								
680-102327-17	5	T	18:36	X																								
680-102327-18	5	T	18:41	X																								
680-102327-19	5	T	18:45	X																								
680-102327-21	5	T	18:50	X																								
680-102327-22	5	T	18:55	X																								
680-102327-23	5	T	18:59	X																								
CCV 160-139817/75	1		19:04	X																								
CCB 160-139817/76	1		19:09	X																								
MB 160-137774/1-A	2	T	19:13	X																								
ZZZZZZ			19:18																									

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/22/2014 13:16 End Date: 08/22/2014 21:15

Lab Sample Id	D/F	Type	Time	Analytes																								
				U-233																								
680-102327-25	5	T	19:23	X																								
680-102327-25 SD	25	T	19:27	X																								
ZZZZZZ			19:32																									
ZZZZZZ			19:37																									
680-102327-26	5	T	19:41	X																								
680-102327-27	5	T	19:46	X																								
680-102327-28	5	T	19:51	X																								
680-102327-29	5	T	19:55	X																								
CCV 160-139817/87	1		20:00	X																								
CCB 160-139817/88	1		20:05	X																								
680-102327-30	5	T	20:09	X																								
680-102327-34	5	T	20:14	X																								
680-102327-36	5	T	20:19	X																								
MB 160-139028/1-A	2	T	20:23	X																								
ZZZZZZ			20:28																									
680-102327-31	5	T	20:33	X																								
680-102327-31 SD	25	T	20:37	X																								
ZZZZZZ			20:42																									
ZZZZZZ			20:47																									
680-102327-32	5	T	20:51	X																								
CCV 160-139817/99	1		20:56	X																								
CCB 160-139817/100	1		21:01	X																								
680-102327-35	5	T	21:05	X																								
CCV 160-139817/102	1		21:10	X																								
CCB 160-139817/103	1		21:15	X																								

Prep Types:
T = Total/NA

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/25/2014 15:14 End Date: 08/26/2014 01:32

Lab Sample Id	D/F	Type	Time	Analytes																								
				U-238																								
ZZZZZZ			15:14																									
ZZZZZZ			15:20																									
ZZZZZZ			15:25																									
ZZZZZZ			15:30																									
ZZZZZZ			15:34																									
ZZZZZZ			15:39																									
ZZZZZZ			15:44																									
ZZZZZZ			15:48																									
ZZZZZZ			15:53																									
ZZZZZZ			16:00																									
ICIS 160-140203/11			16:05	X																								
IC 160-140203/12	1		16:12	X																								
IC 160-140203/13	1		16:16	X																								
IC 160-140203/14	1		16:21	X																								
IC 160-140203/15	1		16:26	X																								
IC 160-140203/16	1		16:30	X																								
ICV 160-140203/17			16:35																									
ICV 160-140203/18	1		16:40	X																								
ICV 160-140203/19			16:44																									
ICB 160-140203/20	1		16:49	X																								
CRI 160-140203/21	1		16:54	X																								
CRI 160-140203/22			16:59																									
ICSA 160-140203/23	1		17:03	X																								
ICSAB 160-140203/24	1		17:08	X																								
CCV 160-140203/25	1		17:13	X																								
CCB 160-140203/26	1		17:17	X																								
ZZZZZZ			17:22																									
ZZZZZZ			17:27																									
ZZZZZZ			17:31																									
ZZZZZZ			17:36																									
ZZZZZZ			17:41																									
ZZZZZZ			17:45																									
MB 160-139022/1-A	2	T	17:50	X																								
LCS 160-139022/2-A	2	T	17:55	X																								
680-102327-1	5	T	17:59	X																								
680-102327-1 SD	25	T	18:04	X																								
CCV 160-140203/37	1		18:09	X																								
CCB 160-140203/38	1		18:13	X																								
680-102327-1 MS	5	T	18:18	X																								

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/25/2014 15:14 End Date: 08/26/2014 01:32

Lab Sample Id	D/F	Type	Time	Analytes																								
				U-238																								
680-102327-1 MSD	5	T	18:23	X																								
680-102327-2	5	T	18:27	X																								
680-102327-3	5	T	18:32	X																								
680-102327-5	5	T	18:37	X																								
680-102327-6	5	T	18:41	X																								
680-102327-7	5	T	18:46	X																								
680-102327-9	5	T	18:51	X																								
680-102327-10	5	T	18:55	X																								
680-102327-11	5	T	19:00	X																								
CCV 160-140203/49	1		19:05	X																								
CCB 160-140203/50	1		19:09	X																								
680-102327-13	5	T	19:14	X																								
680-102327-14	5	T	19:19	X																								
680-102327-15	5	T	19:23	X																								
680-102327-16	5	T	19:28	X																								
680-102327-17	5	T	19:33	X																								
680-102327-18	5	T	19:37	X																								
680-102327-19	5	T	19:42	X																								
680-102327-21	5	T	19:47	X																								
680-102327-22	5	T	19:51	X																								
680-102327-23	5	T	19:56	X																								
CCV 160-140203/61	1		20:01	X																								
CCB 160-140203/62	1		20:05	X																								
ZZZZZZ			20:10																									
ZZZZZZ			20:15																									
ZZZZZZ			20:19																									
ZZZZZZ			20:24																									
ZZZZZZ			20:29																									
ZZZZZZ			20:33																									
ZZZZZZ			20:38																									
ZZZZZZ			20:43																									
ZZZZZZ			20:47																									
ZZZZZZ			20:52																									
CCV 160-140203/73			20:57																									
CCB 160-140203/74			21:01																									
ZZZZZZ			21:06																									
ZZZZZZ			21:11																									
ZZZZZZ			21:15																									
ZZZZZZ			21:20																									

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/25/2014 15:14 End Date: 08/26/2014 01:32

Lab Sample Id	D/F	Type	Time	Analytes																								
				U-238																								
ZZZZZZ			21:25																									
ZZZZZZ			21:29																									
ZZZZZZ			21:34																									
ZZZZZZ			21:39																									
ZZZZZZ			21:43																									
ZZZZZZ			21:48																									
CCV 160-140203/85			21:53																									
CCB 160-140203/86			21:57																									
ZZZZZZ			22:02																									
ZZZZZZ			22:07																									
ZZZZZZ			22:11																									
ZZZZZZ			22:16																									
ZZZZZZ			22:21																									
ZZZZZZ			22:25																									
ZZZZZZ			22:30																									
ZZZZZZ			22:35																									
ZZZZZZ			22:39																									
ZZZZZZ			22:44																									
CCV 160-140203/97			22:49																									
CCB 160-140203/98			22:53																									
ZZZZZZ			22:58																									
ZZZZZZ			23:03																									
ZZZZZZ			23:07																									
ZZZZZZ			23:12																									
ZZZZZZ			23:17																									
ZZZZZZ			23:21																									
ZZZZZZ			23:26																									
ZZZZZZ			23:31																									
ZZZZZZ			23:35																									
ZZZZZZ			23:40																									
CCV 160-140203/109			23:45																									
CCB 160-140203/110			23:50																									
ZZZZZZ			23:54																									
ZZZZZZ			23:59																									
ZZZZZZ			00:04																									
ZZZZZZ			00:08																									
ZZZZZZ			00:13																									
ZZZZZZ			00:18																									
ZZZZZZ			00:22																									

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/25/2014 15:14 End Date: 08/26/2014 01:32

Lab Sample Id	D/F	Type	Time	Analytes																								
				U-238																								
ZZZZZZ			00:27																									
ZZZZZZ			00:32																									
ZZZZZZ			00:36																									
CCV 160-140203/121			00:41																									
CCB 160-140203/122			00:46																									
ZZZZZZ			00:50																									
ZZZZZZ			00:55																									
ZZZZZZ			01:00																									
ZZZZZZ			01:04																									
ZZZZZZ			01:09																									
ZZZZZZ			01:14																									
ZZZZZZ			01:18																									
ZZZZZZ			01:23																									
CCV 160-140203/131			01:28																									
CCB 160-140203/132			01:32																									

Prep Types:
T = Total/NA

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/26/2014 14:30 End Date: 08/26/2014 16:19

Lab Sample Id	D/F	Type	Time	Analytes																										
				U-233	U-234	U-235	U-236	U-238																						
ICIS 160-140258/1			14:30	X	X	X	X	X																						
IC 160-140258/2	1		14:36	X	X	X	X	X																						
IC 160-140258/3	1		14:41	X	X	X	X	X																						
IC 160-140258/4	1		14:46	X	X	X	X	X																						
IC 160-140258/5	1		14:50	X	X	X	X	X																						
IC 160-140258/6	1		14:55	X	X	X	X	X																						
ICV 160-140258/7	1		15:00	X																										
ICV 160-140258/8	1		15:04		X			X																						
ICV 160-140258/9	1		15:09			X	X																							
ICB 160-140258/10	1		15:14	X	X	X	X	X																						
CRI 160-140258/11	1		15:18			X		X																						
CRI 160-140258/12	1		15:23	X	X		X																							
ICSA 160-140258/13	1		15:28	X	X	X	X	X																						
ICSAB 160-140258/14	1		15:32	X	X	X	X	X																						
CCV 160-140258/15	1		15:37	X	X	X	X	X																						
CCB 160-140258/16	1		15:42	X	X	X	X	X																						
MB 160-139821/1-A	2	T	15:46	X	X	X	X	X																						
LCS 160-139821/2-A	2	T	15:51		X	X		X																						
680-102327-24	5	T	15:56	X	X	X	X	X																						
680-102327-24 SD	25	T	16:00	X	X	X	X	X																						
680-102327-24 MS	5	T	16:05		X	X		X																						
680-102327-24 MSD	5	T	16:10		X	X		X																						
CCV 160-140258/23	1		16:14	X	X	X	X	X																						
CCB 160-140258/24	1		16:19	X	X	X	X	X																						

Prep Types:
T = Total/NA

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Instrument ID: NOEQUIP Analysis Method: 6020A

Start Date: 08/13/2014 10:17 End Date: 08/13/2014 10:18

Lab Sample Id	D/F	Type	Time	Analytes																								
				U																								
680-102327-25	1	T	10:17	X																								
680-102327-26	1	T	10:17	X																								
680-102327-27	1	T	10:17	X																								
680-102327-28	1	T	10:17	X																								
680-102327-29	1	T	10:17	X																								
680-102327-30	1	T	10:17	X																								
ZZZZZZ			10:17																									
ZZZZZZ			10:18																									
680-102327-34	1	T	10:18	X																								
ZZZZZZ			10:18																									
680-102327-36	1	T	10:18	X																								

Prep Types:
T = Total/NA

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Instrument ID: NOEQUIP Analysis Method: 6020A

Start Date: 08/14/2014 09:01 End Date: 08/14/2014 09:01

Lab Sample Id	D/F	Type	Time	Analytes																								
				U																								
ZZZZZZ			09:01																									
ZZZZZZ			09:01																									
ZZZZZZ			09:01																									
ZZZZZZ			09:01																									
ZZZZZZ			09:01																									
ZZZZZZ			09:01																									
680-102370-1	1	T	09:01	X																								
680-102370-2	1	T	09:01	X																								
680-102370-3	1	T	09:01	X																								
680-102370-4	1	T	09:01	X																								
680-102370-6	1	T	09:01	X																								

Prep Types:
T = Total/NA

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Instrument ID: NOEQUIP Analysis Method: 6020A

Start Date: 08/20/2014 09:25 End Date: 08/20/2014 09:25

Lab Sample Id	D/F	Type	Time	Analytes																								
				U																								
680-102327-1	1	T	09:25	X																								
680-102327-2	1	T	09:25	X																								
680-102327-3	1	T	09:25	X																								
680-102327-5	1	T	09:25	X																								
680-102327-6	1	T	09:25	X																								
680-102327-7	1	T	09:25	X																								
680-102327-9	1	T	09:25	X																								
680-102327-10	1	T	09:25	X																								
680-102327-11	1	T	09:25	X																								
680-102327-13	1	T	09:25	X																								
680-102327-14	1	T	09:25	X																								
680-102327-15	1	T	09:25	X																								
680-102327-16	1	T	09:25	X																								
680-102327-17	1	T	09:25	X																								
680-102327-18	1	T	09:25	X																								
680-102327-19	1	T	09:25	X																								
680-102327-21	1	T	09:25	X																								
680-102327-22	1	T	09:25	X																								
680-102327-23	1	T	09:25	X																								
ZZZZZZ			09:25																									

Prep Types:
T = Total/NA

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Instrument ID: NOEQUIP Analysis Method: 6020A

Start Date: 08/20/2014 10:02 End Date: 08/20/2014 10:02

Lab Sample Id	D/F	Type	Time	Analytes																								
				U																								
680-102327-31	1	T	10:02	X																								
680-102327-32	1	T	10:02	X																								
680-102327-35	1	T	10:02	X																								

Prep Types:
T = Total/NA

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Instrument ID: NOEQUIP Analysis Method: 6020A

Start Date: 08/25/2014 07:53 End Date: 08/25/2014 07:53

Lab Sample Id	D/F	Type	Time	Analytes																								
				U																								
680-102327-24	1	T	07:53	X																								

Prep Types:
T = Total/NA

FORM XIII-IN

15-IN
ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICP-MS Instrument ID: ICPMS6100 Start Date: 08/21/2014 End Date: 08/22/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
IC 160-139525/2	16:19										
IC 160-139525/3	16:24										
IC 160-139525/4	16:28										
IC 160-139525/5	16:33										
IC 160-139525/6	16:38										
ICV 160-139525/8	16:47	96									
ICV 160-139525/9	16:52	94									
ICB 160-139525/10	16:56	96									
CRI 160-139525/11	17:01	96									
CRI 160-139525/12	17:06	96									
ICSA 160-139525/13	17:10	87									
ICSAB 160-139525/14	17:15	87									
CCV 160-139525/15	17:20	96									
CCB 160-139525/16	17:25	95									
MB 160-137845/1-A	18:11	96									
CCV 160-139525/27	18:16	92									
CCB 160-139525/28	18:21	91									
LCS 160-137845/2-A	18:25	94									
CCV 160-139525/39	19:12	92									
CCB 160-139525/40	19:17	91									
680-102370-1	19:21	92									
680-102370-2	19:26	86									
680-102370-3	19:31	86									
680-102370-4	19:35	87									
680-102370-6	19:40	91									
CCV 160-139525/51	20:08	87									
CCB 160-139525/52	20:13	89									
IC 160-139525/61	20:57										
IC 160-139525/62	21:01										
IC 160-139525/63	21:06										
IC 160-139525/64	21:11										
IC 160-139525/65	21:15										
ICV 160-139525/67	21:25	99									
ICV 160-139525/68	21:29	99									
ICB 160-139525/69	21:34	100									
CRI 160-139525/70	21:39	99									
CRI 160-139525/71	21:43	98									
ICSA 160-139525/72	21:48	97									
ICSAB 160-139525/73	21:53	97									
CCV 160-139525/74	21:58	104									
CCB 160-139525/75	22:02	101									
MB 160-139022/1-A	22:07	108									

15-IN
ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICP-MS Instrument ID: ICPMS6100 Start Date: 08/21/2014 End Date: 08/22/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
LCS 160-139022/2-A	22:12	107									
680-102327-1	22:16	97									
CCV 160-139525/79	22:21	100									
CCB 160-139525/80	22:26	100									
680-102327-1 SD	22:30	101									
680-102327-1 MS	22:35	95									
680-102327-1 MSD	22:40	96									
680-102327-2	22:44	95									
680-102327-3	22:49	100									
680-102327-5	22:54	97									
680-102327-6	22:58	96									
680-102327-7	23:03	100									
680-102327-9	23:08	93									
680-102327-10	23:12	99									
CCV 160-139525/91	23:17	97									
CCB 160-139525/92	23:22	96									
680-102327-11	23:26	96									
680-102327-13	23:31	95									
680-102327-14	23:36	95									
680-102327-15	23:40	90									
680-102327-16	23:45	100									
680-102327-17	23:50	100									
680-102327-18	23:54	105									
680-102327-19	23:59	100									
680-102327-21	00:04	96									
680-102327-22	00:08	101									
CCV 160-139525/103	00:13	97									
CCB 160-139525/104	00:18	94									
680-102327-23	00:22	96									
MB 160-137774/1-A	00:27	98									
LCS 160-137774/2-A	00:32	99									
680-102327-25	00:36	105									
680-102327-25 SD	00:41	100									
680-102327-25 MS	00:46	106									
680-102327-25 MSD	00:50	107									
680-102327-26	00:55	105									
680-102327-27	01:00	91									
680-102327-28	01:04	100									
CCV 160-139525/115	01:09	98									
CCB 160-139525/116	01:14	99									
680-102327-29	01:18	101									
680-102327-30	01:23	98									

15-IN
ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICP-MS Instrument ID: ICPMS6100 Start Date: 08/21/2014 End Date: 08/22/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
680-102327-34	01:28	98									
680-102327-36	01:32	100									
MB 160-139028/1-A	01:37	105									
LCS 160-139028/2-A	01:42	105									
680-102327-31	01:46	96									
680-102327-31 SD	01:51	99									
680-102327-31 MS	01:56	97									
680-102327-31 MSD	02:00	97									
CCV 160-139525/127	02:05	99									
CCB 160-139525/128	02:10	97									
680-102327-32	02:14	96									
680-102327-35	02:19	96									
CCV 160-139525/131	02:24	97									
CCB 160-139525/132	02:28	97									

15-IN
ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICP-MS Instrument ID: ICPMS6100 Start Date: 08/22/2014 End Date: 08/22/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
IC 160-139817/2	13:23										
IC 160-139817/3	13:28										
IC 160-139817/4	13:32										
IC 160-139817/5	13:37										
IC 160-139817/6	13:42										
ICV 160-139817/7	13:46	98									
ICB 160-139817/10	14:00	99									
CRI 160-139817/12	14:10	99									
ICSA 160-139817/13	14:14	96									
ICSAB 160-139817/14	14:19	96									
CCV 160-139817/15	14:24	104									
CCB 160-139817/16	14:28	104									
MB 160-137845/1-A	14:33	107									
CCV 160-139817/27	15:20	102									
CCB 160-139817/28	15:24	101									
680-102370-1	15:34	103									
680-102370-2	15:38	95									
680-102370-3	15:43	94									
680-102370-4	15:48	96									
680-102370-6	15:52	102									
CCV 160-139817/39	16:16	98									
CCB 160-139817/40	16:20	98									
MB 160-139022/1-A	16:53	101									
680-102327-1	17:03	95									
680-102327-1 SD	17:07	97									
CCV 160-139817/51	17:12	96									
CCB 160-139817/52	17:17	97									
680-102327-2	17:31	93									
680-102327-3	17:35	96									
680-102327-5	17:40	93									
680-102327-6	17:45	94									
680-102327-7	17:49	97									
680-102327-9	17:54	92									
680-102327-10	17:59	95									
680-102327-11	18:03	93									
CCV 160-139817/63	18:08	95									
CCB 160-139817/64	18:13	95									
680-102327-13	18:17	93									
680-102327-14	18:22	93									
680-102327-15	18:27	89									
680-102327-16	18:31	98									
680-102327-17	18:36	97									

15-IN
ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICP-MS Instrument ID: ICPMS6100 Start Date: 08/22/2014 End Date: 08/22/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
680-102327-18	18:41	101									
680-102327-19	18:45	96									
680-102327-21	18:50	93									
680-102327-22	18:55	96									
680-102327-23	18:59	94									
CCV 160-139817/75	19:04	93									
CCB 160-139817/76	19:09	91									
MB 160-137774/1-A	19:13	95									
680-102327-25	19:23	98									
680-102327-25 SD	19:27	94									
680-102327-26	19:41	96									
680-102327-27	19:46	87									
680-102327-28	19:51	97									
680-102327-29	19:55	96									
CCV 160-139817/87	20:00	93									
CCB 160-139817/88	20:05	93									
680-102327-30	20:09	93									
680-102327-34	20:14	91									
680-102327-36	20:19	92									
MB 160-139028/1-A	20:23	97									
680-102327-31	20:33	92									
680-102327-31 SD	20:37	94									
680-102327-32	20:51	90									
CCV 160-139817/99	20:56	91									
CCB 160-139817/100	21:01	91									
680-102327-35	21:05	91									
CCV 160-139817/102	21:10	90									
CCB 160-139817/103	21:15	90									

15-IN
ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICP-MS Instrument ID: ICPMS6100 Start Date: 08/25/2014 End Date: 08/25/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
IC 160-140203/12	16:12										
IC 160-140203/13	16:16										
IC 160-140203/14	16:21										
IC 160-140203/15	16:26										
IC 160-140203/16	16:30										
ICV 160-140203/18	16:40	99									
ICB 160-140203/20	16:49	100									
CRI 160-140203/21	16:54	99									
ICSA 160-140203/23	17:03	94									
ICSAB 160-140203/24	17:08	92									
CCV 160-140203/25	17:13	101									
CCB 160-140203/26	17:17	102									
MB 160-139022/1-A	17:50	106									
LCS 160-139022/2-A	17:55	105									
680-102327-1	17:59	94									
680-102327-1 SD	18:04	97									
CCV 160-140203/37	18:09	99									
CCB 160-140203/38	18:13	96									
680-102327-1 MS	18:18	92									
680-102327-1 MSD	18:23	93									
680-102327-2	18:27	90									
680-102327-3	18:32	95									
680-102327-5	18:37	91									
680-102327-6	18:41	92									
680-102327-7	18:46	96									
680-102327-9	18:51	88									
680-102327-10	18:55	91									
680-102327-11	19:00	91									
CCV 160-140203/49	19:05	95									
CCB 160-140203/50	19:09	94									
680-102327-13	19:14	90									
680-102327-14	19:19	91									
680-102327-15	19:23	87									
680-102327-16	19:28	96									
680-102327-17	19:33	97									
680-102327-18	19:37	101									
680-102327-19	19:42	98									
680-102327-21	19:47	94									
680-102327-22	19:51	96									
680-102327-23	19:56	96									
CCV 160-140203/61	20:01	95									
CCB 160-140203/62	20:05	95									

15-IN
ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

ICP-MS Instrument ID: ICPMS6100 Start Date: 08/26/2014 End Date: 08/26/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
IC 160-140258/2	14:36										
IC 160-140258/3	14:41										
IC 160-140258/4	14:46										
IC 160-140258/5	14:50										
IC 160-140258/6	14:55										
ICV 160-140258/7	15:00	100									
ICV 160-140258/8	15:04	99									
ICV 160-140258/9	15:09	96									
ICB 160-140258/10	15:14	98									
CRI 160-140258/11	15:18	99									
CRI 160-140258/12	15:23	98									
ICSA 160-140258/13	15:28	91									
ICSAB 160-140258/14	15:32	90									
CCV 160-140258/15	15:37	97									
CCB 160-140258/16	15:42	97									
MB 160-139821/1-A	15:46	102									
LCS 160-139821/2-A	15:51	102									
680-102327-24	15:56	87									
680-102327-24 SD	16:00	96									
680-102327-24 MS	16:05	86									
680-102327-24 MSD	16:10	84									
CCV 160-140258/23	16:14	96									
CCB 160-140258/24	16:19	96									

KE 8/22/14

082114M2

A Batch 139525 139526

Sample/Batch Report

TA ST. LOUIS - PERKIN ELMER ELAN 6100 - METHOD 6020 / 200.8 QUANTITATIVE ANALYSIS REPORT

User Name: stlmetals
Computer Name: SLICP03
Sample File: D:\Elandata\Sample\SW846 TEMP1.sam
Report Date/Time: Thursday, August 21, 2014 16:11:36
Method File: d:\Elandata\Method\DAILY EPA.mth
Tuning File: d:\Elandata\Tuning\EPA TUNING.tun
Optimization File: d:\Elandata\Optimize\EPA2008.dac
Calibration File:
Calibration Type: External Calibration
Number of Replicates: 6
Number of Readings: 1
Number of Sweeps: 60
Dual Detector Mode: Pulse

ICB 233P

A/S Loc.	Batch ID	Sample ID	Description	Aliquot Vol.	Diluted Vol.
11	138784	429764	2		
12		429765	2		
13		680-102600-A-6-K	5		
14		680-102600-A-6-K SD	25		
15		680-102600-A-6-L MS	5		
16		680-102600-A-6-M MS	5		
17		680-102600-A-7-G	5		
18		680-102600-A-8-G	5		
19		680-102600-A-9-G	5		
20	137845	426404	2		
21	CCV	426405	2		
22	CCB	160-7878-C-1-C	10		
23		160-7878-C-1-C SD	50		
24		160-7878-C-1-D MS	10		
25		160-7878-C-1-E MSD	10		
26		160-7878-D-2-C	10		
27		160-7878-B-3-A	10		
28		160-7878-C-4-C	10		
29		160-7878-A-5-A	10		
30	CCV (233P)	160-7878-B-6-A	5000		
31	CCB	680-102370-A-1-D	5		
32		680-102370-A-2-C	5		
33		680-102370-A-3-C	5		
34		680-102370-A-4-C	5		
35		680-102370-A-6-D	5		
36	138746	429618	2		
37		429626	2		
38		160-7944-C-4-B	50		
39		160-7944-C-4-B SD	250		
40	CCV	160-7944-C-4-C MS	50		
41	CCB	160-7944-C-4-D MSD	50		
42		160-7944-C-5-B	100		
43		160-7944-C-6-B	50		
44		160-7944-C-7-B	200		
45		160-7944-A-8-C	200		
10		CCV (233P)	200		
1		CCB	200		
46	139022	430546	2		
47		430547	2		
48	CCV	680-102327-A-1-H	5		
49	CCB	680-102327-A-1-H SD	25		

All

All except 233

Recal (ICB 233P)(CCV-233P)

All except 233, 238

50		680-102327-A-1-I MS	5	
51		680-102327-A-1-J MSD	5	
52		680-102327-A-2-E	5	
53		680-102327-A-3-E	5	
54		680-102327-A-5-D	5	
55		680-102327-A-6-D	5	
56		680-102327-A-7-D	5	
57		680-102327-A-9-D	5	
58	CCV (8?)	680-102327-A-10-D	5	
59	CCB	680-102327-A-11-D	5	
60		680-102327-A-13-D	5	
61		680-102327-A-14-D	5	
62		680-102327-A-15-F	5	
63		680-102327-A-16-D	5	
64		680-102327-A-17-D	5	
65		680-102327-A-18-D	5	
66		680-102327-A-19-D	5	
67		680-102327-A-21-D	5	
68	CCV	680-102327-A-22-D	5	
69	CCB	680-102327-A-23-D	5	
70	137774	425544	2	
71		425545	2	
72		680-102327-A-25-D	5	
73		680-102327-A-25-D SD	25	
74		680-102327-A-25-E MS	5	
75		680-102327-A-25-F MS	5	
76		680-102327-A-26-C	5	
77		680-102327-A-27-C	5	
78	CCV	680-102327-A-28-C	5	
79	CCB	680-102327-A-29-C	5	
80		680-102327-A-30-C	5	
81		680-102327-A-34-C	5	
82		680-102327-A-36-C	5	
83	139028	430572	2	
84		430573	2	
85		680-102327-A-31-D	5	
86		680-102327-A-31-D SD	25	
87		680-102327-A-31-E MS	5	
88	CCV	680-102327-A-31-F MS	5	
89	CCB	680-102327-A-32-D	5	
90		680-102327-A-35-D	5	
	CCV CCB			

All except 233, 238

All except 233

Quantitative Analysis Calibration Report

File Name: 082114M2.cal
File Path: D:\Elandata\System
Calibration Type: External Calibration

Analyte	Mass	Curve Type	Slope	Intercept	Corr. Coeff.
Ho (IS)	164.930	Linear Thru Zero	0.000000	0.00	0.000000
U	233.000	Linear Thru Zero	0.048686	0.00	0.999740
U	234.041	Linear Thru Zero	0.037599	0.00	0.999998
U	235.044	Linear Thru Zero	0.034951	0.00	0.999977
U	236.000	Linear Thru Zero	0.053958	0.00	0.999998
U	238.050	Linear Thru Zero	0.031168	0.00	0.999988

Quantitative Analysis Calibration Report

File Name: 082114M2-2.cal
File Path: D:\Elandata\System
Calibration Type: External Calibration

Analyte	Mass	Curve Type	Slope	Intercept	Corr. Coeff.
Ho (IS)	164.930	Linear Thru Zero	0.000000	0.00	0.000000
U	233.000	Linear Thru Zero	0.045664	0.00	0.998338
U	234.041	Linear Thru Zero	0.036687	0.00	0.999999
U	235.044	Linear Thru Zero	0.034480	0.00	0.999996
U	236.000	Linear Thru Zero	0.053136	0.00	0.999986
U	238.050	Linear Thru Zero	0.030830	0.00	0.999994

Instrument Tuning Report

File Name: EPA TUNING.tun
File Path: d:\Elandata\Tuning
Sample ID: Sample
Sample Date/Time: Thursday, August 21, 2014 15:07:19

Analyte	Exact Mass	Meas. Mass	Mass DAC	Res. DAC	Meas. Pk. Width	Custom Res.
Li	7.016	7.025	1570	2065	0.653	
Mg	23.985	23.979	5688	2080	0.678	
Rh	102.905	102.879	24919	2080	0.687	
Ce	139.905	139.929	33931	2120	0.665	
Pb	207.977	207.977	50415	2310	0.643	

Replicates: 6

Daily Performance Report

Sample ID: Sample
Sample Date/Time: Thursday, August 21, 2014 15:29:59
Sample Description:
Method File: d:\Elandata\Method\DAILY EPA.mth
Dataset File: d:\Elandata\Dataset\daily3\Sample.139
Tuning File: d:\Elandata\Tuning\EPA TUNING.tun
Optimization File: d:\Elandata\Optimize\EPA2008.dac
Dual Detector Mode: Pulse

Acq. Dead Time(ns): 35
Current Dead Time (ns): 35

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Net Intens. SD	Net Intens. RSD
	Li	7.0	2851.7	2851.674	78.557	2.8
	Mg	24.0	14862.6	14862.562	173.709	1.2
	Rh	102.9	231924.9	231924.862	2077.601	0.9
	Pb	208.0	221302.9	221302.936	1850.540	0.8
⎡>	Ba	137.9	279582.9	279582.929	1975.147	0.7
⎣	Ba++	69.0	1959.4	0.007	0.000	1.7
⎡>	Ce	139.9	341912.6	341912.622	1696.191	0.5
⎣	CeO	155.9	9041.0	0.026	0.000	1.5
	Bkgd	220.0	4.8	4.833	1.696	35.1

Current Optimization File Data

Current Value	Description
0.97	Nebulizer Gas Flow
5.75	Lens Voltage
1400.00	ICP RF Power
-2156.25	Analog Stage Voltage
1200.00	Pulse Stage Voltage
70.00	Discriminator Threshold
-6.00	AC Rod Offset
60.00	Service DAC 1
0.00	Quadrupole Rod Offset

Current Autolens Data

Analyte	Mass	Num of Pts	DAC Value	Maximum Intensity
Be	9	33	7.0	2666.6
Mg	24	33	5.3	25568.9
Co	59	33	5.8	81517.2
Rh	103	33	6.3	296833.8
In	115	33	6.3	399106.5
Ba	138	33	6.8	389084.3
Ce	140	33	6.5	482116.6
Pb	208	33	8.3	345811.4

QUANTITATIVE ANALYSIS REPORT

Sample ID: Blank

Sample Date/Time: Thursday, August 21, 2014 16:12:48
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082114M2\Blank.001

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			805590.911	ug/L	
	233	**U**			264.336	ug/L	
	234	**U**			4.533	ug/L	
	235	**U**			19.067	ug/L	
	236	**U**			5.400	ug/L	
	238	**U**			285.403	ug/L	

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 1

Sample Date/Time: Thursday, August 21, 2014 16:19:28
Autosampler Position: 191
Dataset File: D:\Elandata\Dataset\082114M2\Standard 1.002

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			799719.741	ug/L	805590.911
	233	**U**			24.733	ug/L	264.336
	234	**U**			29.733	ug/L	4.533
	235	**U**	**0.048500**	1.307	1406.869	ug/L	19.067
	236	**U**			43.267	ug/L	5.400
	238	**U**	**0.050300**	1.544	1484.144	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 2
Sample Date/Time: Thursday, August 21, 2014 16:24:09
Autosampler Position: 192
Dataset File: D:\Elandata\Dataset\082114M2\Standard 2.003

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			786994.153	ug/L	805590.911
	233	**U**			1219.519	ug/L	264.336
	234	**U**	**0.049600**	1.104	1459.075	ug/L	4.533
	235	**U**	**2.900552**	1.883	81695.922	ug/L	19.067
	236	**U**	**0.053400**	1.516	2262.246	ug/L	5.400
	238	**U**	**3.161473**	1.510	74558.990	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 3
Sample Date/Time: Thursday, August 21, 2014 16:28:50
Autosampler Position: 193
Dataset File: D:\Elandata\Dataset\082114M2\Standard 3.004

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			796715.705	ug/L	805590.911
	233	**U**	**0.051500**	2.299	2010.742	ug/L	264.336
	234	**U**	**0.082697**	1.333	2459.479	ug/L	4.533
	235	**U**	**4.760723**	2.050	135705.918	ug/L	19.067
	236	**U**	**0.088197**	2.520	3776.433	ug/L	5.400
	238	**U**	**5.253911**	1.300	125245.676	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 4
Sample Date/Time: Thursday, August 21, 2014 16:33:31
Autosampler Position: 194
Dataset File: D:\Elandata\Dataset\082114M2\Standard 4.005

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			780165.805	ug/L	805590.911
	233	**U**	**0.104971**	2.425	4036.637	ug/L	264.336
	234	**U**	**0.165487**	2.565	4873.298	ug/L	4.533
	235	**U**	**9.694899**	2.440	269549.931	ug/L	19.067
	236	**U**	**0.178150**	3.395	7532.186	ug/L	5.400
	238	**U**	**10.051814**	2.241	248129.544	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 5
Sample Date/Time: Thursday, August 21, 2014 16:38:12
Autosampler Position: 195
Dataset File: D:\Elandata\Dataset\082114M2\Standard 5.006

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			781968.211	ug/L	805590.911
	233	**U**	**0.311283**	1.209	12101.731	ug/L	264.336
	234	**U**	**0.495759**	2.148	14568.165	ug/L	4.533
	235	**U**	**29.018366**	2.153	792469.921	ug/L	19.067
	236	**U**	**0.533576**	2.040	22501.393	ug/L	5.400
	238	**U**	**30.105377**	1.783	733505.061	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 1

Sample Date/Time: Thursday, August 21, 2014 16:42:53
Autosampler Position: 196
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 1.007

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			769114.681	ug/L	805590.911
	233	**U**	**0.232364**	2.410	8945.269	ug/L	264.336
	234	**U**	**0.000707**	14.537	24.667	ug/L	4.533
	235	**U**	**0.011756**	3.921	333.737	ug/L	19.067
	236	**U**	**0.000235**	13.271	14.867	ug/L	5.400
	238	**U**	**0.052965**	3.661	1540.350	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.472**	
	U	233		**103.966**
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 2
Sample Date/Time: Thursday, August 21, 2014 16:47:34
Autosampler Position: 197
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 2.008

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			774039.605	ug/L	805590.911
	233	**U**	**44.902625**	2.407	1690693.595	ug/L	264.336
	234	**U**	**0.089960**	2.545	2619.774	ug/L	4.533
	235	**U**	**0.116916**	0.993	3180.021	ug/L	19.067
	236	**U**	**0.007027**	2.436	298.403	ug/L	5.400
	238	**U**	**10.126660**	1.695	244436.413	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.083**	
	U	233		
	U	234		**107.737**
	U	235		
	U	236		
	U	238		**103.564**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 3

Sample Date/Time: Thursday, August 21, 2014 16:52:15
Autosampler Position: 198
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 3.009

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			760022.105	ug/L	805590.911
	233	**U**	**458.645191**	1.523	16961842.802	ug/L	264.336
	234	**U**	**0.907707**	2.029	25924.319	ug/L	4.533
	235	**U**	**1.156582**	1.032	30729.658	ug/L	19.067
	236	**U**	**0.070448**	2.026	2892.093	ug/L	5.400
	238	**U**	**98.736065**	1.609	2337825.658	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.343**	
	U	233		
	U	234		
	U	235		**109.442**
	U	236		**94.435**
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 4

Sample Date/Time: Thursday, August 21, 2014 16:56:55
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 4.010

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			772536.969	ug/L	805590.911
	233	**U**	**0.082909**	7.508	3363.129	ug/L	264.336
	234	**U**	**0.000227**	48.563	10.800	ug/L	4.533
	235	**U**	**0.000699**	17.066	37.067	ug/L	19.067
	236	**U**	**0.000006**	447.217	5.400	ug/L	5.400
	238	**U**	**0.016630**	6.655	673.016	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.897**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 5

Sample Date/Time: Thursday, August 21, 2014 17:01:35
Autosampler Position: 191
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 5.011

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			772575.194	ug/L	805590.911
	233	**U**	**0.011233**	20.221	673.149	ug/L	264.336
	234	**U**	**0.000893**	9.860	30.200	ug/L	4.533
	235	**U**	**0.050843**	0.571	1390.868	ug/L	19.067
	236	**U**	**0.000838**	5.042	40.133	ug/L	5.400
	238	**U**	**0.054126**	5.337	1574.287	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.902**	
	U	233		
	U	234		
	U	235		**104.831**
	U	236		
	U	238		**107.606**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Thursday, August 21, 2014 17:06:16
Autosampler Position: 192
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 6.012

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			770262.057	ug/L	805590.911
	233	**U**	**0.031038**	4.607	1414.403	ug/L	264.336
	234	**U**	**0.052007**	2.838	1508.880	ug/L	4.533
	235	**U**	**3.096640**	2.861	83283.597	ug/L	19.067
	236	**U**	**0.055279**	2.975	2299.985	ug/L	5.400
	238	**U**	**3.193397**	2.219	76866.750	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.615**	
	U	233		**100.445**
	U	234		**104.853**
	U	235		
	U	236		**103.518**
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7
Sample Date/Time: Thursday, August 21, 2014 17:10:57
Autosampler Position: 199
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 7.013

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			699830.426	ug/L	805590.911
	233	**U**	**-0.003008**	20.403	126.334	ug/L	264.336
	234	**U**	**0.000108**	33.469	6.800	ug/L	4.533
	235	**U**	**0.001107**	22.485	43.400	ug/L	19.067
	236	**U**	**0.000030**	99.392	5.800	ug/L	5.400
	238	**U**	**-0.007927**	8.278	74.534	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**86.872**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 8

Sample Date/Time: Thursday, August 21, 2014 17:15:38
Autosampler Position: 200
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 8.014

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			702709.923	ug/L	805590.911
	233	**U**	**0.051601**	0.986	1995.540	ug/L	264.336
	234	**U**	**0.089005**	2.215	2353.861	ug/L	4.533
	235	**U**	**5.322425**	1.608	130657.630	ug/L	19.067
	236	**U**	**0.095208**	1.949	3613.258	ug/L	5.400
	238	**U**	**5.509541**	0.967	120875.842	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**87.229**	
	U	233		**100.196**
	U	234		**107.624**
	U	235		**109.797**
	U	236		**106.975**
	U	238		**109.623**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Thursday, August 21, 2014 17:20:19
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 9.015

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			776975.064	ug/L	805590.911
	233	**U**	**0.048116**	1.657	2074.084	ug/L	264.336
	234	**U**	**0.085194**	1.582	2492.218	ug/L	4.533
	235	**U**	**5.110572**	1.216	138746.993	ug/L	19.067
	236	**U**	**0.090925**	2.047	3814.643	ug/L	5.400
	238	**U**	**5.302016**	1.181	128623.982	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.448**	
	U	233		**93.429**
	U	234		**103.016**
	U	235		**105.427**
	U	236		**102.163**
	U	238		**105.494**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 21, 2014 17:25:00
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 10.016

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			764401.390	ug/L	805590.911
	233	**U**	**0.007025**	5.879	511.876	ug/L	264.336
	234	**U**	**0.000124**	54.792	7.867	ug/L	4.533
	235	**U**	**0.002996**	17.581	97.600	ug/L	19.067
	236	**U**	**0.000080**	30.707	8.400	ug/L	5.400
	238	**U**	**0.003058**	16.587	343.204	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.887**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 429764

Sample Date/Time: Thursday, August 21, 2014 17:29:39
Autosampler Position: 11
Dataset File: D:\Elandata\Dataset\082114M2\429764.017

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			784888.735	ug/L	805590.911
	233	**U**	**-0.006271**	0.537	17.933	ug/L	264.336
	234	**U**	**0.000014**	445.062	4.800	ug/L	4.533
	235	**U**	**-0.000164**	3.704	14.067	ug/L	19.067
	236	**U**	**-0.000017**	42.154	4.533	ug/L	5.400
	238	**U**	**-0.000806**	33.915	258.136	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.430**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 429765

Sample Date/Time: Thursday, August 21, 2014 17:34:19
Autosampler Position: 12
Dataset File: D:\Elandata\Dataset\082114M2\429765.018

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			809688.942	ug/L	805590.911
	233	**U**	**-0.003862**	5.950	113.134	ug/L	264.336
	234	**U**	**0.040334**	3.149	1231.186	ug/L	4.533
	235	**U**	**2.449435**	2.079	69288.352	ug/L	19.067
	236	**U**	**0.043503**	3.438	1904.194	ug/L	5.400
	238	**U**	**2.523656**	1.985	63931.108	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.509**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102600-A-6-K
Sample Date/Time: Thursday, August 21, 2014 17:38:59
Autosampler Position: 13
Dataset File: D:\Elandata\Dataset\082114M2\680-102600-A-6-K.019

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			739714.512	ug/L	805590.911
	233	**U**	**-0.006264**	0.502	17.133	ug/L	264.336
	234	**U**	**0.000441**	23.625	16.400	ug/L	4.533
	235	**U**	**0.039197**	1.916	1031.171	ug/L	19.067
	236	**U**	**0.000021**	159.670	5.800	ug/L	5.400
	238	**U**	**5.251044**	0.479	121323.117	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.823**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102600-A-6-K SD

Sample Date/Time: Thursday, August 21, 2014 17:43:39

Autosampler Position: 14

Dataset File: D:\Elandata\Dataset\082114M2\680-102600-A-6-K SD.020

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			789103.811	ug/L	805590.911
	233	**U**	**-0.006489**	0.574	9.667	ug/L	264.336
	234	**U**	**0.000080**	102.809	6.800	ug/L	4.533
	235	**U**	**0.007125**	2.406	215.002	ug/L	19.067
	236	**U**	**-0.000008**	51.405	4.933	ug/L	5.400
	238	**U**	**0.987923**	0.447	24573.421	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.953**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102600-A-6-L MS

Sample Date/Time: Thursday, August 21, 2014 17:48:19

Autosampler Position: 15

Dataset File: D:\Elandata\Dataset\082114M2\680-102600-A-6-L MS.021

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			749397.458	ug/L	805590.911
	233	**U**	**-0.005360**	2.410	50.267	ug/L	264.336
	234	**U**	**0.015009**	1.122	427.206	ug/L	4.533
	235	**U**	**0.925071**	0.235	24248.441	ug/L	19.067
	236	**U**	**0.015604**	2.018	636.148	ug/L	5.400
	238	**U**	**6.149397**	0.612	143895.851	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.025**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102600-A-6-M MSD

Sample Date/Time: Thursday, August 21, 2014 17:52:59

Autosampler Position: 16

Dataset File: D:\Elandata\Dataset\082114M2\680-102600-A-6-M MSD.022

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			741764.807	ug/L	805590.911
	233	**U**	**-0.005377**	0.885	49.200	ug/L	264.336
	234	**U**	**0.015541**	3.728	437.873	ug/L	4.533
	235	**U**	**0.956983**	0.609	24825.357	ug/L	19.067
	236	**U**	**0.016318**	0.561	658.149	ug/L	5.400
	238	**U**	**6.511849**	0.705	150800.723	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.077**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102600-A-7-G

Sample Date/Time: Thursday, August 21, 2014 17:57:39

Autosampler Position: 17

Dataset File: D:\Elandata\Dataset\082114M2\680-102600-A-7-G.023

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			743228.973	ug/L	805590.911
	233	**U**	**-0.006348**	0.862	14.200	ug/L	264.336
	234	**U**	**0.000364**	23.359	14.400	ug/L	4.533
	235	**U**	**0.033564**	6.244	888.161	ug/L	19.067
	236	**U**	**-0.000001**	1881.622	4.933	ug/L	5.400
	238	**U**	**4.666489**	6.223	108207.292	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.259**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102600-A-8-G

Sample Date/Time: Thursday, August 21, 2014 18:02:19

Autosampler Position: 18

Dataset File: D:\Elandata\Dataset\082114M2\680-102600-A-8-G.024

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			740467.709	ug/L	805590.911
	233	**U**	**-0.006368**	1.532	13.400	ug/L	264.336
	234	**U**	**0.000381**	19.121	14.733	ug/L	4.533
	235	**U**	**0.042143**	3.883	1107.176	ug/L	19.067
	236	**U**	**-0.000006**	393.809	4.733	ug/L	5.400
	238	**U**	**5.595425**	3.007	129304.718	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.916**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102600-A-9-G

Sample Date/Time: Thursday, August 21, 2014 18:07:00

Autosampler Position: 19

Dataset File: D:\Elandata\Dataset\082114M2\680-102600-A-9-G.025

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			730690.237	ug/L	805590.911
	233	**U**	**-0.006378**	0.081	12.867	ug/L	264.336
	234	**U**	**0.000497**	20.837	17.733	ug/L	4.533
	235	**U**	**0.053282**	0.968	1377.933	ug/L	19.067
	236	**U**	**0.000019**	98.748	5.667	ug/L	5.400
	238	**U**	**7.132346**	1.496	162653.066	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.702**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 426404

Sample Date/Time: Thursday, August 21, 2014 18:11:40
Autosampler Position: 20
Dataset File: D:\Elandata\Dataset\082114M2\426404.026

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			771909.141	ug/L	805590.911
	233	**U**	**-0.006554**	0.581	6.933	ug/L	264.336
	234	**U**	**0.000022**	170.962	4.933	ug/L	4.533
	235	**U**	**-0.000187**	14.252	13.200	ug/L	19.067
	236	**U**	**-0.000018**	166.677	4.467	ug/L	5.400
	238	**U**	**0.015809**	3.655	653.682	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.819**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9

Sample Date/Time: Thursday, August 21, 2014 18:16:21

Autosampler Position: 10

Dataset File: D:\Elandata\Dataset\082114M2\QC Std 9.027

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			743341.786	ug/L	805590.911
	233	**U**	**0.049173**	3.208	2021.343	ug/L	264.336
	234	**U**	**0.087269**	3.196	2440.275	ug/L	4.533
	235	**U**	**5.192420**	3.064	134760.499	ug/L	19.067
	236	**U**	**0.093303**	1.615	3744.958	ug/L	5.400
	238	**U**	**5.406657**	2.750	125394.686	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.273**	
	U	233		**95.482**
	U	234		**105.525**
	U	235		**107.115**
	U	236		**104.835**
	U	238		**107.576**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 21, 2014 18:21:02

Autosampler Position: 1

Dataset File: D:\Elandata\Dataset\082114M2\QC Std 10.028

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			735689.202	ug/L	805590.911
	233	**U**	**0.009881**	4.173	594.946	ug/L	264.336
	234	**U**	**0.000099**	79.258	6.800	ug/L	4.533
	235	**U**	**0.002658**	42.400	84.600	ug/L	19.067
	236	**U**	**0.000070**	96.373	7.600	ug/L	5.400
	238	**U**	**0.004074**	40.669	352.538	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.323**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 426405

Sample Date/Time: Thursday, August 21, 2014 18:25:42
Autosampler Position: 21
Dataset File: D:\Elandata\Dataset\082114M2\426405.029

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			760242.607	ug/L	805590.911
	233	**U**	**-0.003800**	3.898	108.600	ug/L	264.336
	234	**U**	**0.043685**	2.581	1251.722	ug/L	4.533
	235	**U**	**2.614801**	2.116	69438.454	ug/L	19.067
	236	**U**	**0.047046**	1.230	1934.598	ug/L	5.400
	238	**U**	**2.676231**	2.057	63633.026	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.371**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7878-C-1-C
Sample Date/Time: Thursday, August 21, 2014 18:30:23
Autosampler Position: 22
Dataset File: D:\Elandata\Dataset\082114M2\160-7878-C-1-C.030

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			740903.731	ug/L	805590.911
	233	**U**	**-0.006526**	0.326	7.733	ug/L	264.336
	234	**U**	**0.002388**	5.425	70.600	ug/L	4.533
	235	**U**	**0.334031**	2.777	8658.025	ug/L	19.067
	236	**U**	**0.000576**	7.655	27.933	ug/L	5.400
	238	**U**	**41.457689**	2.361	956727.634	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.970**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7878-C-1-C SD

Sample Date/Time: Thursday, August 21, 2014 18:35:03

Autosampler Position: 23

Dataset File: D:\Elandata\Dataset\082114M2\160-7878-C-1-C SD.031

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			734603.329	ug/L	805590.911
	233	**U**	**-0.006549**	0.420	6.800	ug/L	264.336
	234	**U**	**0.000540**	18.797	19.067	ug/L	4.533
	235	**U**	**0.064037**	1.775	1660.563	ug/L	19.067
	236	**U**	**0.000133**	9.401	10.200	ug/L	5.400
	238	**U**	**8.208632**	2.112	188069.461	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.188**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7878-C-1-D MS

Sample Date/Time: Thursday, August 21, 2014 18:39:43

Autosampler Position: 24

Dataset File: D:\Elandata\Dataset\082114M2\160-7878-C-1-D MS.032

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			732402.154	ug/L	805590.911
	233	**U**	**-0.005991**	1.111	26.667	ug/L	264.336
	234	**U**	**0.010606**	3.515	296.203	ug/L	4.533
	235	**U**	**0.870539**	1.079	22297.617	ug/L	19.067
	236	**U**	**0.009308**	5.074	372.138	ug/L	5.400
	238	**U**	**50.482171**	0.825	1152472.014	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.915**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7878-C-1-E MSD

Sample Date/Time: Thursday, August 21, 2014 18:44:22

Autosampler Position: 25

Dataset File: D:\Elandata\Dataset\082114M2\160-7878-C-1-E MSD.033

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			742688.190	ug/L	805590.911
	233	**U**	**-0.006070**	1.663	24.333	ug/L	264.336
	234	**U**	**0.009944**	4.184	281.536	ug/L	4.533
	235	**U**	**0.741999**	0.790	19274.139	ug/L	19.067
	236	**U**	**0.009000**	1.606	365.471	ug/L	5.400
	238	**U**	**35.063109**	1.371	811606.916	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.192**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7878-D-2-C

Sample Date/Time: Thursday, August 21, 2014 18:49:02

Autosampler Position: 26

Dataset File: D:\Elandata\Dataset\082114M2\160-7878-D-2-C.034

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			742180.009	ug/L	805590.911
	233	**U**	**-0.006526**	0.558	7.733	ug/L	264.336
	234	**U**	**0.001969**	2.565	59.067	ug/L	4.533
	235	**U**	**0.289501**	3.231	7519.246	ug/L	19.067
	236	**U**	**0.000569**	10.673	27.667	ug/L	5.400
	238	**U**	**36.268200**	3.192	838299.631	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.129**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7878-B-3-A
Sample Date/Time: Thursday, August 21, 2014 18:53:42
Autosampler Position: 27
Dataset File: D:\Elandata\Dataset\082114M2\160-7878-B-3-A.035

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			748637.747	ug/L	805590.911
	233	**U**	**-0.006525**	0.597	7.800	ug/L	264.336
	234	**U**	**0.002066**	8.645	62.200	ug/L	4.533
	235	**U**	**0.305198**	2.985	7995.971	ug/L	19.067
	236	**U**	**0.000512**	17.204	25.733	ug/L	5.400
	238	**U**	**37.565818**	2.065	876245.505	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.930**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7878-C-4-C

Sample Date/Time: Thursday, August 21, 2014 18:58:22

Autosampler Position: 28

Dataset File: D:\Elandata\Dataset\082114M2\160-7878-C-4-C.036

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			752902.951	ug/L	805590.911
	233	**U**	**-0.006465**	0.833	10.133	ug/L	264.336
	234	**U**	**0.001205**	9.898	38.267	ug/L	4.533
	235	**U**	**0.163738**	5.633	4319.253	ug/L	19.067
	236	**U**	**0.000296**	8.075	17.067	ug/L	5.400
	238	**U**	**22.072370**	4.725	517481.908	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.460**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7878-A-5-A

Sample Date/Time: Thursday, August 21, 2014 19:03:02

Autosampler Position: 29

Dataset File: D:\Elandata\Dataset\082114M2\160-7878-A-5-A.037

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			746958.281	ug/L	805590.911
	233	**U**	**-0.006584**	0.367	5.667	ug/L	264.336
	234	**U**	**0.000100**	9.102	7.000	ug/L	4.533
	235	**U**	**0.015642**	4.470	425.473	ug/L	19.067
	236	**U**	**0.000033**	41.335	6.333	ug/L	5.400
	238	**U**	**2.674987**	3.312	62469.927	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.722**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7878-B-6-A

Sample Date/Time: Thursday, August 21, 2014 19:07:42

Autosampler Position: 30

Dataset File: D:\Elandata\Dataset\082114M2\160-7878-B-6-A.038

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			752236.724	ug/L	805590.911
	233	**U**	**-0.006531**	0.412	7.600	ug/L	264.336
	234	**U**	**0.000083**	47.747	6.533	ug/L	4.533
	235	**U**	**0.009632**	3.430	270.736	ug/L	19.067
	236	**U**	**0.000015**	161.881	5.600	ug/L	5.400
	238	**U**	**1.542627**	1.970	36406.783	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.377**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Thursday, August 21, 2014 19:12:23
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 9.039

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			737096.242	ug/L	805590.911
	233	**U**	**0.044301**	2.109	1830.384	ug/L	264.336
	234	**U**	**0.079178**	3.148	2195.702	ug/L	4.533
	235	**U**	**4.745510**	2.205	122162.984	ug/L	19.067
	236	**U**	**0.085503**	2.583	3402.539	ug/L	5.400
	238	**U**	**4.956761**	2.300	114030.480	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.498**	
	U	233		**86.022**
	U	234		**95.741**
	U	235		**97.896**
	U	236		**96.071**
	U	238		**98.624**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 21, 2014 19:17:04
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 10.040

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			733211.852	ug/L	805590.911
	233	**U**	**0.009169**	5.154	567.278	ug/L	264.336
	234	**U**	**0.000115**	35.515	7.267	ug/L	4.533
	235	**U**	**0.002610**	31.148	83.467	ug/L	19.067
	236	**U**	**0.000071**	78.742	7.733	ug/L	5.400
	238	**U**	**0.003725**	37.275	343.737	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.015**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-1-D

Sample Date/Time: Thursday, August 21, 2014 19:21:44

Autosampler Position: 31

Dataset File: D:\Elandata\Dataset\082114M2\680-102370-A-1-D.041

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			740918.084	ug/L	805590.911
	233	**U**	**-0.006484**	0.229	9.200	ug/L	264.336
	234	**U**	**0.000154**	21.063	8.467	ug/L	4.533
	235	**U**	**0.007640**	3.090	215.202	ug/L	19.067
	236	**U**	**0.000015**	207.504	5.533	ug/L	5.400
	238	**U**	**1.097833**	4.249	25585.760	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.972**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-2-C

Sample Date/Time: Thursday, August 21, 2014 19:26:24

Autosampler Position: 32

Dataset File: D:\Elandata\Dataset\082114M2\680-102370-A-2-C.042

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			691987.165	ug/L	805590.911
	233	**U**	**-0.006475**	0.491	8.933	ug/L	264.336
	234	**U**	**0.000562**	5.925	18.533	ug/L	4.533
	235	**U**	**0.059528**	1.892	1455.874	ug/L	19.067
	236	**U**	**0.000027**	104.636	5.667	ug/L	5.400
	238	**U**	**7.315554**	1.614	158006.902	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**85.898**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-3-C
Sample Date/Time: Thursday, August 21, 2014 19:31:05
Autosampler Position: 33
Dataset File: D:\Elandata\Dataset\082114M2\680-102370-A-3-C.043

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			694145.522	ug/L	805590.911
	233	**U**	**-0.006376**	1.292	12.267	ug/L	264.336
	234	**U**	**0.000392**	11.068	14.133	ug/L	4.533
	235	**U**	**0.046534**	0.975	1145.313	ug/L	19.067
	236	**U**	**0.000027**	145.646	5.667	ug/L	5.400
	238	**U**	**5.412007**	0.433	117328.804	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**86.166**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-4-C
Sample Date/Time: Thursday, August 21, 2014 19:35:46
Autosampler Position: 34
Dataset File: D:\Elandata\Dataset\082114M2\680-102370-A-4-C.044

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			699174.046	ug/L	805590.911
	233	**U**	**-0.006412**	0.727	11.133	ug/L	264.336
	234	**U**	**0.001981**	4.653	56.000	ug/L	4.533
	235	**U**	**0.187818**	2.461	4604.342	ug/L	19.067
	236	**U**	**0.000325**	31.499	16.933	ug/L	5.400
	238	**U**	**6.409741**	3.259	139849.937	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**86.790**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-6-D

Sample Date/Time: Thursday, August 21, 2014 19:40:26

Autosampler Position: 35

Dataset File: D:\Elandata\Dataset\082114M2\680-102370-A-6-D.045

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			735474.118	ug/L	805590.911
	233	**U**	**-0.006492**	0.106	8.867	ug/L	264.336
	234	**U**	**0.000178**	42.127	9.000	ug/L	4.533
	235	**U**	**0.014614**	7.226	392.139	ug/L	19.067
	236	**U**	**-0.000008**	400.828	4.600	ug/L	5.400
	238	**U**	**1.947637**	4.375	44840.268	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.296**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 429618

Sample Date/Time: Thursday, August 21, 2014 19:45:05
Autosampler Position: 36
Dataset File: D:\Elandata\Dataset\082114M2\429618.046

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			742272.994	ug/L	805590.911
	233	**U**	**-0.006576**	0.416	5.867	ug/L	264.336
	234	**U**	**0.000027**	164.817	4.933	ug/L	4.533
	235	**U**	**-0.000445**	9.400	6.000	ug/L	19.067
	236	**U**	**0.000015**	186.508	5.533	ug/L	5.400
	238	**U**	**-0.006270**	3.255	117.867	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.140**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 429626

Sample Date/Time: Thursday, August 21, 2014 19:49:45
Autosampler Position: 37
Dataset File: D:\Elandata\Dataset\082114M2\429626.047

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			738955.603	ug/L	805590.911
	233	**U**	**-0.003873**	4.321	103.067	ug/L	264.336
	234	**U**	**0.042935**	0.544	1196.850	ug/L	4.533
	235	**U**	**2.575145**	1.036	66502.720	ug/L	19.067
	236	**U**	**0.046217**	1.148	1847.386	ug/L	5.400
	238	**U**	**2.648367**	1.626	61222.044	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.728**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7944-C-4-B

Sample Date/Time: Thursday, August 21, 2014 19:54:25

Autosampler Position: 38

Dataset File: D:\Elandata\Dataset\082114M2\160-7944-C-4-B.048

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			701258.981	ug/L	805590.911
	233	**U**	**-0.006549**	0.791	6.467	ug/L	264.336
	234	**U**	**0.003181**	8.942	87.734	ug/L	4.533
	235	**U**	**0.419483**	2.056	10290.641	ug/L	19.067
	236	**U**	**0.002346**	1.921	93.400	ug/L	5.400
	238	**U**	**55.301838**	2.306	1208003.967	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**87.049**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7944-C-4-B SD

Sample Date/Time: Thursday, August 21, 2014 19:59:05

Autosampler Position: 39

Dataset File: D:\Elandata\Dataset\082114M2\160-7944-C-4-B SD.049

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			701343.592	ug/L	805590.911
	233	**U**	**-0.006571**	0.631	5.800	ug/L	264.336
	234	**U**	**0.000663**	15.773	21.333	ug/L	4.533
	235	**U**	**0.081084**	2.840	2002.007	ug/L	19.067
	236	**U**	**0.000448**	15.638	21.600	ug/L	5.400
	238	**U**	**11.132370**	1.880	243405.082	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**87.060**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7944-C-4-C MS

Sample Date/Time: Thursday, August 21, 2014 20:03:44
Autosampler Position: 40
Dataset File: D:\Elandata\Dataset\082114M2\160-7944-C-4-C MS.050

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			699609.150	ug/L	805590.911
	233	**U**	**-0.006465**	0.600	9.333	ug/L	264.336
	234	**U**	**0.004910**	4.270	132.934	ug/L	4.533
	235	**U**	**0.565035**	1.901	13823.226	ug/L	19.067
	236	**U**	**0.004180**	4.637	162.668	ug/L	5.400
	238	**U**	**64.049567**	1.914	1395843.113	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**86.844**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Thursday, August 21, 2014 20:08:25
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 9.051

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			702594.418	ug/L	805590.911
	233	**U**	**0.047482**	3.329	1852.854	ug/L	264.336
	234	**U**	**0.083949**	2.880	2219.372	ug/L	4.533
	235	**U**	**5.045220**	1.551	123844.971	ug/L	19.067
	236	**U**	**0.090569**	1.351	3436.747	ug/L	5.400
	238	**U**	**5.228564**	1.683	114680.828	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**87.215**	
	U	233		**92.197**
	U	234		**101.510**
	U	235		**104.079**
	U	236		**101.763**
	U	238		**104.032**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 21, 2014 20:13:05

Autosampler Position: 1

Dataset File: D:\Elandata\Dataset\082114M2\QC Std 10.052

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			714434.820	ug/L	805590.911
	233	**U**	**0.009450**	2.572	562.811	ug/L	264.336
	234	**U**	**0.000171**	41.309	8.600	ug/L	4.533
	235	**U**	**0.002146**	27.042	69.934	ug/L	19.067
	236	**U**	**0.000050**	57.106	6.667	ug/L	5.400
	238	**U**	**0.007641**	19.743	422.073	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.685**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7944-C-4-D MSD

Sample Date/Time: Thursday, August 21, 2014 20:17:45

Autosampler Position: 41

Dataset File: D:\Elandata\Dataset\082114M2\160-7944-C-4-D MSD.053

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			700825.693	ug/L	805590.911
	233	**U**	**-0.006456**	0.737	9.667	ug/L	264.336
	234	**U**	**0.004899**	4.645	132.801	ug/L	4.533
	235	**U**	**0.549555**	2.057	13466.884	ug/L	19.067
	236	**U**	**0.004145**	0.765	161.401	ug/L	5.400
	238	**U**	**60.639698**	2.351	1323603.086	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**86.995**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7944-C-5-B

Sample Date/Time: Thursday, August 21, 2014 20:22:26
Autosampler Position: 42
Dataset File: D:\Elandata\Dataset\082114M2\160-7944-C-5-B.054

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			701980.585	ug/L	805590.911
	233	**U**	**-0.006536**	0.274	6.933	ug/L	264.336
	234	**U**	**0.002694**	5.873	75.067	ug/L	4.533
	235	**U**	**0.352982**	2.558	8668.032	ug/L	19.067
	236	**U**	**0.001892**	10.275	76.067	ug/L	5.400
	238	**U**	**47.456228**	2.471	1037474.007	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**87.139**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7944-C-6-B

Sample Date/Time: Thursday, August 21, 2014 20:27:06

Autosampler Position: 43

Dataset File: D:\Elandata\Dataset\082114M2\160-7944-C-6-B.055

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			706432.628	ug/L	805590.911
	233	**U**	**-0.006586**	0.127	5.267	ug/L	264.336
	234	**U**	**0.003092**	8.919	85.867	ug/L	4.533
	235	**U**	**0.390435**	1.918	9649.328	ug/L	19.067
	236	**U**	**0.002207**	1.630	88.934	ug/L	5.400
	238	**U**	**51.937040**	1.868	1142975.269	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**87.691**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7944-C-7-B

Sample Date/Time: Thursday, August 21, 2014 20:31:46

Autosampler Position: 44

Dataset File: D:\Elandata\Dataset\082114M2\160-7944-C-7-B.056

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			707500.883	ug/L	805590.911
	233	**U**	**-0.006577**	0.186	5.600	ug/L	264.336
	234	**U**	**0.002427**	4.869	68.533	ug/L	4.533
	235	**U**	**0.316212**	2.605	7827.680	ug/L	19.067
	236	**U**	**0.001695**	2.197	69.467	ug/L	5.400
	238	**U**	**40.583609**	2.537	894221.863	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**87.824**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7944-A-8-C

Sample Date/Time: Thursday, August 21, 2014 20:36:27

Autosampler Position: 45

Dataset File: D:\Elandata\Dataset\082114M2\160-7944-A-8-C.057

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			696091.770	ug/L	805590.911
	233	**U**	**-0.006579**	0.281	5.467	ug/L	264.336
	234	**U**	**0.002433**	6.738	67.667	ug/L	4.533
	235	**U**	**0.322164**	2.247	7847.157	ug/L	19.067
	236	**U**	**0.001896**	5.209	75.734	ug/L	5.400
	238	**U**	**40.981462**	2.439	888511.411	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**86.408**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: CCV

Sample Date/Time: Thursday, August 21, 2014 20:41:08
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082114M2\CCV.058

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			692559.477	ug/L	805590.911
	233	**U**	**0.046087**	4.037	1778.311	ug/L	264.336
	234	**U**	**0.082427**	2.517	2147.828	ug/L	4.533
	235	**U**	**4.956349**	2.643	119843.956	ug/L	19.067
	236	**U**	**0.088736**	2.640	3316.652	ug/L	5.400
	238	**U**	**5.178400**	2.640	111895.031	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**85.969**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: CCB

Sample Date/Time: Thursday, August 21, 2014 20:45:48
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082114M2\CCB.059

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			698621.330	ug/L	805590.911
	233	**U**	**0.009302**	1.107	545.477	ug/L	264.336
	234	**U**	**0.000163**	20.144	8.200	ug/L	4.533
	235	**U**	**0.002834**	22.033	85.134	ug/L	19.067
	236	**U**	**0.000077**	27.912	7.600	ug/L	5.400
	238	**U**	**0.007921**	21.008	418.539	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**86.722**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Blank

Sample Date/Time: Thursday, August 21, 2014 20:50:28
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082114M2\Blank.060

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			707940.340	ug/L	
	233	**U**			556.744	ug/L	
	234	**U**			6.933	ug/L	
	235	**U**			49.467	ug/L	
	236	**U**			6.267	ug/L	
	238	**U**			342.737	ug/L	

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 1

Sample Date/Time: Thursday, August 21, 2014 20:57:08
Autosampler Position: 191
Dataset File: D:\Elandata\Dataset\082114M2\Standard 1.061

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			713409.693	ug/L	707940.340
	233	**U**			266.336	ug/L	556.744
	234	**U**			29.800	ug/L	6.933
	235	**U**	**0.048500**	1.984	1226.186	ug/L	49.467
	236	**U**			37.333	ug/L	6.267
	238	**U**	**0.050300**	5.808	1368.399	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 2
Sample Date/Time: Thursday, August 21, 2014 21:01:49
Autosampler Position: 192
Dataset File: D:\Elandata\Dataset\082114M2\Standard 2.062

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			700158.935	ug/L	707940.340
	233	**U**			1160.914	ug/L	556.744
	234	**U**	**0.049600**	2.384	1291.458	ug/L	6.933
	235	**U**	**3.035034**	1.729	72298.334	ug/L	49.467
	236	**U**	**0.053400**	1.998	2010.608	ug/L	6.267
	238	**U**	**3.348089**	1.788	67273.899	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 3
Sample Date/Time: Thursday, August 21, 2014 21:06:30
Autosampler Position: 193
Dataset File: D:\Elandata\Dataset\082114M2\Standard 3.063

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			706458.527	ug/L	707940.340
	233	**U**	**0.051500**	0.632	1782.511	ug/L	556.744
	234	**U**	**0.082749**	1.335	2170.498	ug/L	6.933
	235	**U**	**4.950057**	1.618	118977.435	ug/L	49.467
	236	**U**	**0.087001**	1.371	3302.049	ug/L	6.267
	238	**U**	**5.447177**	1.499	110255.606	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 4
Sample Date/Time: Thursday, August 21, 2014 21:11:11
Autosampler Position: 194
Dataset File: D:\Elandata\Dataset\082114M2\Standard 4.064

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			716258.771	ug/L	707940.340
	233	**U**	**0.106504**	1.782	3539.373	ug/L	556.744
	234	**U**	**0.165114**	1.981	4328.257	ug/L	6.933
	235	**U**	**9.694901**	1.853	237214.528	ug/L	49.467
	236	**U**	**0.177625**	2.134	6669.559	ug/L	6.267
	238	**U**	**10.051816**	1.817	219899.486	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 5

Sample Date/Time: Thursday, August 21, 2014 21:15:52
Autosampler Position: 195
Dataset File: D:\Elandata\Dataset\082114M2\Standard 5.065

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			702315.726	ug/L	707940.340
	233	**U**	**0.315322**	2.060	10657.112	ug/L	556.744
	234	**U**	**0.496192**	2.693	12778.384	ug/L	6.933
	235	**U**	**29.112851**	1.519	704617.520	ug/L	49.467
	236	**U**	**0.534769**	1.586	19950.206	ug/L	6.267
	238	**U**	**30.189414**	2.468	653369.606	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 1

Sample Date/Time: Thursday, August 21, 2014 21:20:33
Autosampler Position: 196
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 1.066

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			700083.091	ug/L	707940.340
	233	**U**	**0.232165**	3.148	7964.021	ug/L	556.744
	234	**U**	**0.000619**	11.722	22.800	ug/L	6.933
	235	**U**	**0.014302**	6.523	393.339	ug/L	49.467
	236	**U**	**0.000311**	10.656	17.733	ug/L	6.267
	238	**U**	**0.052060**	2.085	1461.875	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.890**	
	U	233		**103.877**
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 2

Sample Date/Time: Thursday, August 21, 2014 21:25:14
Autosampler Position: 197
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 2.067

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			702351.498	ug/L	707940.340
	233	**U**	**47.154602**	2.241	1511483.685	ug/L	556.744
	234	**U**	**0.090572**	2.180	2338.458	ug/L	6.933
	235	**U**	**0.115046**	2.735	2832.415	ug/L	49.467
	236	**U**	**0.007015**	3.456	267.669	ug/L	6.267
	238	**U**	**10.113441**	2.706	219078.431	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.211**	
	U	233		
	U	234		**108.470**
	U	235		
	U	236		
	U	238		**103.428**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 3

Sample Date/Time: Thursday, August 21, 2014 21:29:55
Autosampler Position: 198
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 3.068

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			702215.440	ug/L	707940.340
	233	**U**	**470.632565**	1.752	15081637.667	ug/L	556.744
	234	**U**	**0.899765**	1.234	23176.212	ug/L	6.933
	235	**U**	**1.134320**	1.316	27503.694	ug/L	49.467
	236	**U**	**0.069100**	3.290	2581.300	ug/L	6.267
	238	**U**	**94.962648**	0.409	2055912.436	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.191**	
	U	233		
	U	234		
	U	235		**107.335**
	U	236		**92.628**
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 4

Sample Date/Time: Thursday, August 21, 2014 21:34:36
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 4.069

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			708867.009	ug/L	707940.340
	233	**U**	**0.110430**	37.411	4079.142	ug/L	556.744
	234	**U**	**0.000178**	24.513	11.533	ug/L	6.933
	235	**U**	**0.000096**	185.633	51.733	ug/L	49.467
	236	**U**	**0.000001**	4196.675	6.333	ug/L	6.267
	238	**U**	**0.020715**	38.035	789.089	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.131**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 5

Sample Date/Time: Thursday, August 21, 2014 21:39:16
Autosampler Position: 191
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 5.070

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			700724.137	ug/L	707940.340
	233	**U**	**0.015699**	59.978	1041.239	ug/L	556.744
	234	**U**	**0.000942**	3.870	31.067	ug/L	6.933
	235	**U**	**0.048770**	1.456	1226.919	ug/L	49.467
	236	**U**	**0.000877**	4.864	38.800	ug/L	6.267
	238	**U**	**0.051936**	6.312	1458.408	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.981**	
	U	233		
	U	234		
	U	235		**100.557**
	U	236		
	U	238		**103.252**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Thursday, August 21, 2014 21:43:57
Autosampler Position: 192
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 6.071

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			695836.660	ug/L	707940.340
	233	**U**	**0.031646**	13.591	1547.684	ug/L	556.744
	234	**U**	**0.050606**	2.309	1297.526	ug/L	6.933
	235	**U**	**2.998226**	2.332	71917.646	ug/L	49.467
	236	**U**	**0.053968**	4.210	1998.140	ug/L	6.267
	238	**U**	**3.115317**	2.392	67103.331	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.290**	
	U	233		**102.413**
	U	234		**102.027**
	U	235		
	U	236		**101.063**
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7
Sample Date/Time: Thursday, August 21, 2014 21:48:38
Autosampler Position: 199
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 7.072

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			685732.753	ug/L	707940.340
	233	**U**	**-0.011059**	12.310	191.401	ug/L	556.744
	234	**U**	**-0.000032**	240.563	5.867	ug/L	6.933
	235	**U**	**-0.000658**	53.658	32.067	ug/L	49.467
	236	**U**	**-0.000006**	717.873	5.800	ug/L	6.267
	238	**U**	**-0.012321**	1.129	71.400	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.863**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 8

Sample Date/Time: Thursday, August 21, 2014 21:53:19
Autosampler Position: 200
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 8.073

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			689130.697	ug/L	707940.340
	233	**U**	**0.044670**	5.068	1944.932	ug/L	556.744
	234	**U**	**0.087145**	1.341	2209.505	ug/L	6.933
	235	**U**	**5.148747**	1.327	122328.516	ug/L	49.467
	236	**U**	**0.093374**	2.571	3421.877	ug/L	6.267
	238	**U**	**5.322061**	1.483	113347.181	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.343**	
	U	233		**86.737**
	U	234		**105.375**
	U	235		**106.214**
	U	236		**104.915**
	U	238		**105.893**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Thursday, August 21, 2014 21:58:00
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 9.074

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			737572.048	ug/L	707940.340
	233	**U**	**0.038147**	2.177	1864.122	ug/L	556.744
	234	**U**	**0.082914**	0.995	2250.044	ug/L	6.933
	235	**U**	**4.895794**	1.997	124469.390	ug/L	49.467
	236	**U**	**0.087500**	2.660	3432.613	ug/L	6.267
	238	**U**	**5.066100**	1.744	115484.806	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**104.186**	
	U	233		**74.072**
	U	234		**100.259**
	U	235		**100.996**
	U	236		**98.314**
	U	238		**100.800**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 21, 2014 22:02:40
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 10.075

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			716029.337	ug/L	707940.340
	233	**U**	**0.009475**	8.137	873.960	ug/L	556.744
	234	**U**	**0.000043**	40.286	8.133	ug/L	6.933
	235	**U**	**0.000686**	41.794	66.667	ug/L	49.467
	236	**U**	**0.000032**	86.421	7.533	ug/L	6.267
	238	**U**	**0.001301**	60.788	374.672	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.143**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 430546

Sample Date/Time: Thursday, August 21, 2014 22:07:20
Autosampler Position: 46
Dataset File: D:\Elandata\Dataset\082114M2\430546.076

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			760820.949	ug/L	707940.340
	233	**U**	**-0.016809**	0.187	14.400	ug/L	556.744
	234	**U**	**-0.000071**	3.928	5.467	ug/L	6.933
	235	**U**	**-0.001629**	5.219	10.467	ug/L	49.467
	236	**U**	**-0.000028**	185.654	5.533	ug/L	6.267
	238	**U**	**-0.008924**	3.120	158.801	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**107.470**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 430547
Sample Date/Time: Thursday, August 21, 2014 22:12:00
Autosampler Position: 47
Dataset File: D:\Elandata\Dataset\082114M2\430547.077

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			755132.342	ug/L	707940.340
	233	**U**	**-0.013835**	0.920	116.667	ug/L	556.744
	234	**U**	**0.041684**	0.656	1161.914	ug/L	6.933
	235	**U**	**2.495041**	1.796	64971.103	ug/L	49.467
	236	**U**	**0.045716**	1.834	1839.985	ug/L	6.267
	238	**U**	**2.546329**	1.356	59615.434	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**106.666**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-1-H

Sample Date/Time: Thursday, August 21, 2014 22:16:40
Autosampler Position: 48
Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-1-H.078

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			686225.943	ug/L	707940.340
	233	**U**	**-0.016665**	0.411	17.467	ug/L	556.744
	234	**U**	**0.000490**	10.335	19.067	ug/L	6.933
	235	**U**	**0.049100**	2.376	1209.918	ug/L	49.467
	236	**U**	**0.000016**	26.036	6.667	ug/L	6.267
	238	**U**	**6.647149**	1.280	140967.388	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.933**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9

Sample Date/Time: Thursday, August 21, 2014 22:21:20
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 9.079

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			706181.322	ug/L	707940.340
	233	**U**	**0.040580**	1.688	1863.255	ug/L	556.744
	234	**U**	**0.086736**	1.554	2252.911	ug/L	6.933
	235	**U**	**5.081658**	2.064	123691.699	ug/L	49.467
	236	**U**	**0.091325**	1.354	3431.479	ug/L	6.267
	238	**U**	**5.272888**	2.227	115047.890	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.752**	
	U	233		**78.796**
	U	234		**104.880**
	U	235		**104.830**
	U	236		**102.612**
	U	238		**104.914**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 21, 2014 22:26:01

Autosampler Position: 1

Dataset File: D:\Elandata\Dataset\082114M2\QC Std 10.080

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			706480.370	ug/L	707940.340
	233	**U**	**0.010538**	6.447	894.628	ug/L	556.744
	234	**U**	**-0.000017**	125.041	6.467	ug/L	6.933
	235	**U**	**0.001342**	36.162	81.600	ug/L	49.467
	236	**U**	**0.000018**	143.536	6.933	ug/L	6.267
	238	**U**	**0.002158**	15.054	388.805	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.794**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-1-H SD

Sample Date/Time: Thursday, August 21, 2014 22:30:40

Autosampler Position: 49

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-1-H SD.081

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			714237.117	ug/L	707940.340
	233	**U**	**-0.016934**	0.063	9.400	ug/L	556.744
	234	**U**	**0.000056**	118.734	8.400	ug/L	6.933
	235	**U**	**0.008434**	2.688	257.469	ug/L	49.467
	236	**U**	**-0.000010**	306.758	5.933	ug/L	6.267
	238	**U**	**1.249743**	2.196	27842.997	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.889**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-1-I MS

Sample Date/Time: Thursday, August 21, 2014 22:35:20

Autosampler Position: 50

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-1-I MS.082

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			675204.134	ug/L	707940.340
	233	**U**	**-0.015842**	0.250	42.533	ug/L	556.744
	234	**U**	**0.016163**	1.342	407.072	ug/L	6.933
	235	**U**	**0.988904**	1.381	23070.355	ug/L	49.467
	236	**U**	**0.016910**	2.887	612.413	ug/L	6.267
	238	**U**	**7.366823**	1.313	153674.081	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.376**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-1-J MSD

Sample Date/Time: Thursday, August 21, 2014 22:40:00

Autosampler Position: 51

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-1-J MSD.083

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			678790.441	ug/L	707940.340
	233	**U**	**-0.015633**	0.587	49.267	ug/L	556.744
	234	**U**	**0.017652**	2.316	446.140	ug/L	6.933
	235	**U**	**1.079056**	0.544	25300.126	ug/L	49.467
	236	**U**	**0.018758**	2.561	682.283	ug/L	6.267
	238	**U**	**7.522022**	0.776	157748.564	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.882**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-2-E

Sample Date/Time: Thursday, August 21, 2014 22:44:40
Autosampler Position: 52
Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-2-E.084

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			668837.783	ug/L	707940.340
	233	**U**	**-0.016820**	0.200	12.267	ug/L	556.744
	234	**U**	**0.000333**	10.764	14.733	ug/L	6.933
	235	**U**	**0.047174**	4.622	1134.245	ug/L	49.467
	236	**U**	**0.000019**	65.531	6.600	ug/L	6.267
	238	**U**	**6.354383**	1.869	131336.592	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.477**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-3-E

Sample Date/Time: Thursday, August 21, 2014 22:49:20

Autosampler Position: 53

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-3-E.085

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			705657.280	ug/L	707940.340
	233	**U**	**-0.016816**	0.189	13.067	ug/L	556.744
	234	**U**	**0.000340**	30.289	15.733	ug/L	6.933
	235	**U**	**0.034704**	6.204	892.695	ug/L	49.467
	236	**U**	**-0.000054**	49.417	4.200	ug/L	6.267
	238	**U**	**4.839174**	4.223	105536.180	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.678**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-5-D
Sample Date/Time: Thursday, August 21, 2014 22:54:01
Autosampler Position: 54
Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-5-D.086

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			687586.757	ug/L	707940.340
	233	**U**	**-0.016835**	0.556	12.133	ug/L	556.744
	234	**U**	**0.000331**	16.347	15.067	ug/L	6.933
	235	**U**	**0.041621**	3.365	1034.437	ug/L	49.467
	236	**U**	**0.000001**	810.568	6.133	ug/L	6.267
	238	**U**	**5.820750**	1.670	123688.721	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.125**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-6-D

Sample Date/Time: Thursday, August 21, 2014 22:58:41

Autosampler Position: 55

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-6-D.087

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			681289.181	ug/L	707940.340
	233	**U**	**-0.016856**	0.414	11.400	ug/L	556.744
	234	**U**	**0.000421**	7.074	17.200	ug/L	6.933
	235	**U**	**0.049807**	2.344	1217.185	ug/L	49.467
	236	**U**	**-0.000024**	101.125	5.133	ug/L	6.267
	238	**U**	**6.671979**	1.054	140445.618	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.235**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-7-D

Sample Date/Time: Thursday, August 21, 2014 23:03:22

Autosampler Position: 56

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-7-D.088

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			710459.916	ug/L	707940.340
	233	**U**	**-0.016789**	0.572	14.000	ug/L	556.744
	234	**U**	**0.000175**	52.267	11.467	ug/L	6.933
	235	**U**	**0.027462**	3.005	721.885	ug/L	49.467
	236	**U**	**0.000011**	263.963	6.733	ug/L	6.267
	238	**U**	**4.000502**	4.017	87871.488	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.356**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-9-D

Sample Date/Time: Thursday, August 21, 2014 23:08:02

Autosampler Position: 57

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-9-D.089

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			661296.151	ug/L	707940.340
	233	**U**	**-0.016863**	0.279	10.867	ug/L	556.744
	234	**U**	**0.000345**	28.564	14.867	ug/L	6.933
	235	**U**	**0.050067**	3.787	1187.183	ug/L	49.467
	236	**U**	**-0.000019**	123.294	5.200	ug/L	6.267
	238	**U**	**6.887238**	2.758	140679.910	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.411**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-10-D

Sample Date/Time: Thursday, August 21, 2014 23:12:43

Autosampler Position: 58

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-10-D.090

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			697292.398	ug/L	707940.340
	233	**U**	**-0.016790**	0.423	13.733	ug/L	556.744
	234	**U**	**0.000557**	19.897	21.067	ug/L	6.933
	235	**U**	**0.063885**	4.766	1583.288	ug/L	49.467
	236	**U**	**0.000021**	67.903	6.933	ug/L	6.267
	238	**U**	**7.609034**	4.626	163769.538	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.496**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Thursday, August 21, 2014 23:17:24
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 9.091

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			688136.303	ug/L	707940.340
	233	**U**	**0.043010**	2.699	1891.459	ug/L	556.744
	234	**U**	**0.091029**	2.659	2302.652	ug/L	6.933
	235	**U**	**5.327077**	2.329	126334.700	ug/L	49.467
	236	**U**	**0.096088**	1.650	3517.367	ug/L	6.267
	238	**U**	**5.556848**	1.657	118151.975	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.203**	
	U	233		**83.514**
	U	234		**110.071**
	U	235		**109.893**
	U	236		**107.964**
	U	238		**110.564**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q
U	234	Q
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 21, 2014 23:22:05

Autosampler Position: 1

Dataset File: D:\Elandata\Dataset\082114M2\QC Std 10.092

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			678138.604	ug/L	707940.340
	233	**U**	**0.013036**	3.273	936.431	ug/L	556.744
	234	**U**	**0.000086**	69.262	8.733	ug/L	6.933
	235	**U**	**0.001283**	36.402	76.934	ug/L	49.467
	236	**U**	**0.000071**	30.565	8.533	ug/L	6.267
	238	**U**	**0.004222**	16.103	416.073	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.790**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-11-D

Sample Date/Time: Thursday, August 21, 2014 23:26:44

Autosampler Position: 59

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-11-D.093

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			678367.670	ug/L	707940.340
	233	**U**	**-0.016861**	0.437	11.133	ug/L	556.744
	234	**U**	**0.000427**	4.430	17.267	ug/L	6.933
	235	**U**	**0.049344**	5.959	1199.917	ug/L	49.467
	236	**U**	**-0.000035**	29.142	4.733	ug/L	6.267
	238	**U**	**6.895049**	5.318	144338.307	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.823**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-13-D

Sample Date/Time: Thursday, August 21, 2014 23:31:24

Autosampler Position: 60

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-13-D.094

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			669014.025	ug/L	707940.340
	233	**U**	**-0.016901**	0.139	9.800	ug/L	556.744
	234	**U**	**0.000328**	28.766	14.667	ug/L	6.933
	235	**U**	**0.042466**	4.599	1025.103	ug/L	49.467
	236	**U**	**-0.000054**	46.763	4.000	ug/L	6.267
	238	**U**	**5.845249**	4.457	120738.233	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.501**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-14-D
Sample Date/Time: Thursday, August 21, 2014 23:36:03
Autosampler Position: 61
Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-14-D.095

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			671759.629	ug/L	707940.340
	233	**U**	**-0.016870**	0.243	10.800	ug/L	556.744
	234	**U**	**0.000346**	15.686	15.133	ug/L	6.933
	235	**U**	**0.038424**	2.569	936.297	ug/L	49.467
	236	**U**	**-0.000048**	75.343	4.200	ug/L	6.267
	238	**U**	**5.300552**	1.987	110033.086	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.889**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-15-F

Sample Date/Time: Thursday, August 21, 2014 23:40:43

Autosampler Position: 62

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-15-F.096

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			636718.423	ug/L	707940.340
	233	**U**	**-0.016993**	0.007	6.667	ug/L	556.744
	234	**U**	**0.000162**	15.268	10.000	ug/L	6.933
	235	**U**	**0.021241**	0.105	510.809	ug/L	49.467
	236	**U**	**-0.000037**	10.086	4.400	ug/L	6.267
	238	**U**	**2.960285**	2.816	58381.790	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.940**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-16-D
Sample Date/Time: Thursday, August 21, 2014 23:45:23
Autosampler Position: 63
Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-16-D.097

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			709624.835	ug/L	707940.340
	233	**U**	**-0.016917**	0.113	9.867	ug/L	556.744
	234	**U**	**0.000084**	32.017	9.133	ug/L	6.933
	235	**U**	**0.012860**	1.429	364.138	ug/L	49.467
	236	**U**	**0.000008**	370.552	6.600	ug/L	6.267
	238	**U**	**1.938617**	3.241	42720.587	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.238**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-17-D

Sample Date/Time: Thursday, August 21, 2014 23:50:02

Autosampler Position: 64

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-17-D.098

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			705019.460	ug/L	707940.340
	233	**U**	**-0.016900**	0.271	10.400	ug/L	556.744
	234	**U**	**0.000057**	45.936	8.400	ug/L	6.933
	235	**U**	**0.008445**	5.017	254.469	ug/L	49.467
	236	**U**	**-0.000045**	59.846	4.600	ug/L	6.267
	238	**U**	**1.366137**	1.871	30017.856	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.587**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-18-D

Sample Date/Time: Thursday, August 21, 2014 23:54:42

Autosampler Position: 65

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-18-D.099

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			742322.409	ug/L	707940.340
	233	**U**	**-0.016949**	0.125	9.267	ug/L	556.744
	234	**U**	**-0.000009**	152.652	7.000	ug/L	6.933
	235	**U**	**0.005648**	4.110	196.468	ug/L	49.467
	236	**U**	**-0.000039**	67.052	5.000	ug/L	6.267
	238	**U**	**0.989201**	2.516	22977.542	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**104.857**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-19-D

Sample Date/Time: Thursday, August 21, 2014 23:59:23

Autosampler Position: 66

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-19-D.100

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			705202.819	ug/L	707940.340
	233	**U**	**-0.016964**	0.584	8.200	ug/L	556.744
	234	**U**	**0.000009**	412.282	7.133	ug/L	6.933
	235	**U**	**0.005289**	2.600	177.868	ug/L	49.467
	236	**U**	**-0.000018**	72.597	5.600	ug/L	6.267
	238	**U**	**0.925886**	2.063	20459.046	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.613**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-21-D

Sample Date/Time: Friday, August 22, 2014 00:04:02
Autosampler Position: 67
Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-21-D.101

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			678757.199	ug/L	707940.340
	233	**U**	**-0.017007**	0.074	6.667	ug/L	556.744
	234	**U**	**0.000042**	80.262	7.667	ug/L	6.933
	235	**U**	**0.012851**	4.645	347.804	ug/L	49.467
	236	**U**	**-0.000021**	189.868	5.200	ug/L	6.267
	238	**U**	**1.860448**	3.171	39226.923	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.878**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-22-D
Sample Date/Time: Friday, August 22, 2014 00:08:42
Autosampler Position: 68
Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-22-D.102

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			716936.927	ug/L	707940.340
	233	**U**	**-0.016905**	0.234	10.400	ug/L	556.744
	234	**U**	**0.000081**	85.058	9.200	ug/L	6.933
	235	**U**	**0.019155**	1.845	523.410	ug/L	49.467
	236	**U**	**-0.000023**	92.134	5.467	ug/L	6.267
	238	**U**	**2.782001**	0.643	61828.656	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.271**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Friday, August 22, 2014 00:13:23
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 9.103

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			686569.846	ug/L	707940.340
	233	**U**	**0.041331**	2.125	1834.585	ug/L	556.744
	234	**U**	**0.088408**	3.051	2230.708	ug/L	6.933
	235	**U**	**5.244255**	2.152	124082.518	ug/L	49.467
	236	**U**	**0.094321**	2.196	3444.416	ug/L	6.267
	238	**U**	**5.425269**	2.530	115049.774	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.981**	
	U	233		**80.255**
	U	234		**106.902**
	U	235		**108.185**
	U	236		**105.979**
	U	238		**107.946**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Friday, August 22, 2014 00:18:04
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 10.104

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			666246.257	ug/L	707940.340
	233	**U**	**0.014664**	7.148	968.833	ug/L	556.744
	234	**U**	**0.000106**	11.222	9.133	ug/L	6.933
	235	**U**	**0.004751**	36.603	156.868	ug/L	49.467
	236	**U**	**0.000074**	51.956	8.533	ug/L	6.267
	238	**U**	**0.007498**	21.425	477.075	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.111**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-23-D

Sample Date/Time: Friday, August 22, 2014 00:22:44
Autosampler Position: 69
Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-23-D.105

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			680838.482	ug/L	707940.340
	233	**U**	**-0.016869**	0.262	10.933	ug/L	556.744
	234	**U**	**0.000074**	63.274	8.533	ug/L	6.933
	235	**U**	**0.008858**	1.444	255.602	ug/L	49.467
	236	**U**	**0.000012**	205.208	6.467	ug/L	6.267
	238	**U**	**1.373630**	2.211	29141.575	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.172**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 425544

Sample Date/Time: Friday, August 22, 2014 00:27:24
Autosampler Position: 70
Dataset File: D:\Elandata\Dataset\082114M2\425544.106

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			695743.270	ug/L	707940.340
	233	**U**	**-0.017005**	0.393	6.800	ug/L	556.744
	234	**U**	**-0.000030**	174.186	6.000	ug/L	6.933
	235	**U**	**-0.001619**	9.016	9.600	ug/L	49.467
	236	**U**	**-0.000006**	427.209	5.933	ug/L	6.267
	238	**U**	**-0.010768**	9.721	104.800	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.277**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 425545

Sample Date/Time: Friday, August 22, 2014 00:32:05
Autosampler Position: 71
Dataset File: D:\Elandata\Dataset\082114M2\425545.107

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			702729.918	ug/L	707940.340
	233	**U**	**-0.014122**	0.947	99.334	ug/L	556.744
	234	**U**	**0.043974**	1.958	1139.779	ug/L	6.933
	235	**U**	**2.603654**	1.844	63091.889	ug/L	49.467
	236	**U**	**0.047010**	1.404	1760.842	ug/L	6.267
	238	**U**	**2.694182**	1.400	58679.220	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.264**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-25-D

Sample Date/Time: Friday, August 22, 2014 00:36:45

Autosampler Position: 72

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-25-D.108

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			746209.654	ug/L	707940.340
	233	**U**	**-0.016919**	0.304	10.267	ug/L	556.744
	234	**U**	**0.000111**	92.201	10.267	ug/L	6.933
	235	**U**	**0.012859**	12.078	382.072	ug/L	49.467
	236	**U**	**0.000077**	20.416	9.667	ug/L	6.267
	238	**U**	**1.068924**	1.286	24941.514	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**105.406**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-25-D SD

Sample Date/Time: Friday, August 22, 2014 00:41:24

Autosampler Position: 73

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-25-D SD.109

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			704605.998	ug/L	707940.340
	233	**U**	**-0.017014**	0.258	6.667	ug/L	556.744
	234	**U**	**-0.000057**	44.990	5.400	ug/L	6.933
	235	**U**	**0.000768**	22.260	67.733	ug/L	49.467
	236	**U**	**-0.000003**	2250.071	6.133	ug/L	6.267
	238	**U**	**0.216999**	1.164	5052.961	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.529**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-25-E MS

Sample Date/Time: Friday, August 22, 2014 00:46:04
Autosampler Position: 74
Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-25-E MS.110

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			750580.893	ug/L	707940.340
	233	**U**	**-0.015859**	0.677	46.667	ug/L	556.744
	234	**U**	**0.015879**	0.632	444.540	ug/L	6.933
	235	**U**	**0.962833**	1.040	24968.768	ug/L	49.467
	236	**U**	**0.017282**	2.910	696.484	ug/L	6.267
	238	**U**	**2.080874**	0.663	48512.019	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**106.023**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-25-F MSD

Sample Date/Time: Friday, August 22, 2014 00:50:44

Autosampler Position: 75

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-25-F MSD.111

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			754895.660	ug/L	707940.340
	233	**U**	**-0.015910**	0.140	45.267	ug/L	556.744
	234	**U**	**0.016634**	4.250	467.408	ug/L	6.933
	235	**U**	**0.994051**	2.167	25907.486	ug/L	49.467
	236	**U**	**0.017864**	5.040	722.685	ug/L	6.267
	238	**U**	**1.942351**	2.704	45528.802	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**106.633**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-26-C
Sample Date/Time: Friday, August 22, 2014 00:55:24
Autosampler Position: 76
Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-26-C.112

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			741926.999	ug/L	707940.340
	233	**U**	**-0.016934**	0.197	9.733	ug/L	556.744
	234	**U**	**-0.000016**	365.074	6.800	ug/L	6.933
	235	**U**	**0.008077**	1.882	258.536	ug/L	49.467
	236	**U**	**-0.000034**	100.530	5.200	ug/L	6.267
	238	**U**	**1.258545**	4.748	29107.232	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**104.801**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-27-C

Sample Date/Time: Friday, August 22, 2014 01:00:04

Autosampler Position: 77

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-27-C.113

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			643505.811	ug/L	707940.340
	233	**U**	**-0.016961**	0.107	7.667	ug/L	556.744
	234	**U**	**0.000278**	1.354	12.867	ug/L	6.933
	235	**U**	**0.035921**	2.603	841.758	ug/L	49.467
	236	**U**	**0.000007**	206.278	5.933	ug/L	6.267
	238	**U**	**4.175884**	1.267	83153.881	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.898**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-28-C
Sample Date/Time: Friday, August 22, 2014 01:04:45
Autosampler Position: 78
Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-28-C.114

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			708262.217	ug/L	707940.340
	233	**U**	**-0.016978**	0.297	7.933	ug/L	556.744
	234	**U**	**0.000023**	72.652	7.533	ug/L	6.933
	235	**U**	**0.007814**	3.729	240.135	ug/L	49.467
	236	**U**	**-0.000039**	32.973	4.800	ug/L	6.267
	238	**U**	**1.272168**	3.626	28082.854	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.045**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Friday, August 22, 2014 01:09:25
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 9.115

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			691307.973	ug/L	707940.340
	233	**U**	**0.040606**	4.862	1822.916	ug/L	556.744
	234	**U**	**0.086601**	2.621	2200.836	ug/L	6.933
	235	**U**	**5.170876**	2.526	123174.237	ug/L	49.467
	236	**U**	**0.093879**	2.732	3450.750	ug/L	6.267
	238	**U**	**5.369702**	2.257	114673.586	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.651**	
	U	233		**78.846**
	U	234		**104.717**
	U	235		**106.671**
	U	236		**105.482**
	U	238		**106.841**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Friday, August 22, 2014 01:14:06
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 10.116

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			698669.103	ug/L	707940.340
	233	**U**	**0.013819**	1.807	989.968	ug/L	556.744
	234	**U**	**0.000252**	79.928	13.067	ug/L	6.933
	235	**U**	**0.013987**	59.444	376.339	ug/L	49.467
	236	**U**	**0.000267**	45.914	15.867	ug/L	6.267
	238	**U**	**0.016441**	62.491	682.017	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.690**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-29-C

Sample Date/Time: Friday, August 22, 2014 01:18:46
Autosampler Position: 79
Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-29-C.117

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			717958.154	ug/L	707940.340
	233	**U**	**-0.016985**	0.245	7.733	ug/L	556.744
	234	**U**	**0.000040**	78.603	8.067	ug/L	6.933
	235	**U**	**0.008719**	3.872	266.136	ug/L	49.467
	236	**U**	**-0.000016**	182.132	5.733	ug/L	6.267
	238	**U**	**1.340324**	1.881	29998.279	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.415**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-30-C
Sample Date/Time: Friday, August 22, 2014 01:23:27
Autosampler Position: 80
Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-30-C.118

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			695665.587	ug/L	707940.340
	233	**U**	**-0.016946**	0.491	8.733	ug/L	556.744
	234	**U**	**0.000331**	39.056	15.200	ug/L	6.933
	235	**U**	**0.051615**	1.418	1286.991	ug/L	49.467
	236	**U**	**-0.000020**	144.140	5.400	ug/L	6.267
	238	**U**	**6.543627**	0.723	140660.880	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.266**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-34-C
Sample Date/Time: Friday, August 22, 2014 01:28:07
Autosampler Position: 81
Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-34-C.119

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			692128.117	ug/L	707940.340
	233	**U**	**-0.016991**	0.374	7.267	ug/L	556.744
	234	**U**	**0.000095**	24.795	9.200	ug/L	6.933
	235	**U**	**0.022226**	2.244	578.478	ug/L	49.467
	236	**U**	**-0.000033**	11.154	4.933	ug/L	6.267
	238	**U**	**2.934912**	1.361	62945.799	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.766**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-36-C
Sample Date/Time: Friday, August 22, 2014 01:32:48
Autosampler Position: 82
Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-36-C.120

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			705658.281	ug/L	707940.340
	233	**U**	**-0.016881**	0.389	10.933	ug/L	556.744
	234	**U**	**0.000149**	21.173	10.800	ug/L	6.933
	235	**U**	**0.021640**	1.405	575.678	ug/L	49.467
	236	**U**	**-0.000029**	185.681	5.133	ug/L	6.267
	238	**U**	**3.079154**	0.496	67335.368	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.678**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 430572
Sample Date/Time: Friday, August 22, 2014 01:37:28
Autosampler Position: 83
Dataset File: D:\Elandata\Dataset\082114M2\430572.121

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			745750.904	ug/L	707940.340
	233	**U**	**-0.017048**	0.210	5.933	ug/L	556.744
	234	**U**	**-0.000043**	75.766	6.133	ug/L	6.933
	235	**U**	**-0.001646**	13.176	9.600	ug/L	49.467
	236	**U**	**-0.000034**	117.008	5.200	ug/L	6.267
	238	**U**	**-0.011506**	12.378	95.267	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**105.341**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 430573
Sample Date/Time: Friday, August 22, 2014 01:42:08
Autosampler Position: 84
Dataset File: D:\Elandata\Dataset\082114M2\430573.122

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			740670.700	ug/L	707940.340
	233	**U**	**-0.014337**	1.069	97.400	ug/L	556.744
	234	**U**	**0.042113**	2.732	1150.380	ug/L	6.933
	235	**U**	**2.476627**	2.388	63244.394	ug/L	49.467
	236	**U**	**0.044175**	2.215	1743.773	ug/L	6.267
	238	**U**	**2.526845**	1.099	58035.672	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**104.623**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-31-D

Sample Date/Time: Friday, August 22, 2014 01:46:48

Autosampler Position: 85

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-31-D.123

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			682077.986	ug/L	707940.340
	233	**U**	**-0.016894**	0.265	10.200	ug/L	556.744
	234	**U**	**0.001285**	6.582	38.867	ug/L	6.933
	235	**U**	**0.123627**	0.872	2955.239	ug/L	49.467
	236	**U**	**0.000272**	28.701	15.867	ug/L	6.267
	238	**U**	**5.708249**	2.110	120391.459	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.347**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-31-D SD

Sample Date/Time: Friday, August 22, 2014 01:51:28

Autosampler Position: 86

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-31-D SD.124

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			697215.953	ug/L	707940.340
	233	**U**	**-0.017006**	0.060	6.867	ug/L	556.744
	234	**U**	**0.000222**	38.950	12.600	ug/L	6.933
	235	**U**	**0.023656**	3.413	616.813	ug/L	49.467
	236	**U**	**0.000017**	97.237	6.800	ug/L	6.267
	238	**U**	**1.156936**	2.140	25185.670	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.485**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-31-E MS

Sample Date/Time: Friday, August 22, 2014 01:56:08

Autosampler Position: 87

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-31-E MS.125

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			687806.923	ug/L	707940.340
	233	**U**	**-0.015756**	1.104	46.133	ug/L	556.744
	234	**U**	**0.018108**	2.075	463.608	ug/L	6.933
	235	**U**	**1.121086**	0.424	26635.285	ug/L	49.467
	236	**U**	**0.018601**	1.991	685.683	ug/L	6.267
	238	**U**	**6.635647**	0.093	141041.309	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.156**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-31-F MSD

Sample Date/Time: Friday, August 22, 2014 02:00:48

Autosampler Position: 88

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-31-F MSD.126

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			687109.451	ug/L	707940.340
	233	**U**	**-0.015773**	0.903	45.400	ug/L	556.744
	234	**U**	**0.017895**	1.939	457.674	ug/L	6.933
	235	**U**	**1.104087**	0.343	26205.758	ug/L	49.467
	236	**U**	**0.018621**	1.713	685.816	ug/L	6.267
	238	**U**	**6.434770**	1.048	136620.275	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.058**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Friday, August 22, 2014 02:05:29
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 9.127

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			699511.731	ug/L	707940.340
	233	**U**	**0.040717**	4.013	1848.520	ug/L	556.744
	234	**U**	**0.086972**	2.549	2236.642	ug/L	6.933
	235	**U**	**5.123825**	3.237	123461.569	ug/L	49.467
	236	**U**	**0.092730**	2.045	3449.950	ug/L	6.267
	238	**U**	**5.323742**	2.691	115019.075	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.809**	
	U	233		**79.061**
	U	234		**105.166**
	U	235		**105.700**
	U	236		**104.191**
	U	238		**105.926**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10
Sample Date/Time: Friday, August 22, 2014 02:10:09
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 10.128

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			687288.004	ug/L	707940.340
	233	**U**	**0.014559**	6.910	996.101	ug/L	556.744
	234	**U**	**0.000141**	28.040	10.267	ug/L	6.933
	235	**U**	**0.007813**	22.201	231.535	ug/L	49.467
	236	**U**	**0.000138**	23.424	11.133	ug/L	6.267
	238	**U**	**0.011536**	29.423	574.145	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.083**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-32-D
Sample Date/Time: Friday, August 22, 2014 02:14:48
Autosampler Position: 89
Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-32-D.129

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			675770.383	ug/L	707940.340
	233	**U**	**-0.016936**	0.097	8.800	ug/L	556.744
	234	**U**	**0.000294**	15.989	13.933	ug/L	6.933
	235	**U**	**0.033912**	0.689	837.358	ug/L	49.467
	236	**U**	**-0.000036**	22.197	4.667	ug/L	6.267
	238	**U**	**4.535803**	1.311	94800.111	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.456**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-35-D

Sample Date/Time: Friday, August 22, 2014 02:19:29

Autosampler Position: 90

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-35-D.130

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			676090.402	ug/L	707940.340
	233	**U**	**-0.016889**	0.198	10.267	ug/L	556.744
	234	**U**	**0.000952**	10.843	30.200	ug/L	6.933
	235	**U**	**0.089959**	4.341	2142.494	ug/L	49.467
	236	**U**	**0.000075**	93.180	8.733	ug/L	6.267
	238	**U**	**6.113858**	4.213	127654.681	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.501**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Friday, August 22, 2014 02:24:10
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 9.131

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			687032.039	ug/L	707940.340
	233	**U**	**0.042539**	5.294	1872.056	ug/L	556.744
	234	**U**	**0.089590**	2.510	2262.646	ug/L	6.933
	235	**U**	**5.317942**	2.042	125923.053	ug/L	49.467
	236	**U**	**0.096082**	3.060	3509.765	ug/L	6.267
	238	**U**	**5.461885**	2.140	115924.241	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.047**	
	U	233		**82.600**
	U	234		**108.331**
	U	235		**109.705**
	U	236		**107.957**
	U	238		**108.675**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Friday, August 22, 2014 02:28:50
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 10.132

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			687964.518	ug/L	707940.340
	233	**U**	**0.015476**	5.708	1027.570	ug/L	556.744
	234	**U**	**0.000144**	69.605	10.267	ug/L	6.933
	235	**U**	**0.005680**	17.990	182.001	ug/L	49.467
	236	**U**	**0.000141**	30.030	11.200	ug/L	6.267
	238	**U**	**0.008213**	16.675	505.942	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.178**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

KE 8/25/14
082214M2

A Batch
139817
139819

Sample/Batch Report

TA ST. LOUIS - PERKIN ELMER ELAN 6100 - METHOD 6020 / 200.8 QUANTITATIVE ANALYSIS REPORT

User Name: stlmetals
Computer Name: SLICP03
Sample File: D:\Elandata\Sample\SW846 TEMP1.sam
Report Date/Time: Monday, August 25, 2014 07:29:48
Method File: d:\Elandata\Method\2014 isou.mth
Tuning File: d:\Elandata\Tuning\epa tuning.tun
Optimization File: d:\Elandata\Optimize\epa2008.dac
Calibration File:
Calibration Type: External Calibration
Number of Replicates: 3
Number of Readings: 1
Number of Sweeps: 100
Dual Detector Mode: Dual

ICB # 233
LLC # 233
CCB # 233

A/S Loc.	Batch ID	Sample ID	Description	Aliquot Vol.	Diluted Vol.
20	137845	426404	2		
21	KE 8/25/14	~~426405~~	2		
22		160-7878-C-1-C	10		
23		160-7878-C-1-C SD	50		
24		~~160-7878-C-1-D MS~~	10		
25	KE 8/25/14	~~160-7878-C-1-E MSD~~	10		
26		160-7878-D-2-C	10		
27		160-7878-B-3-A	10		
28		160-7878-C-4-C	10		
29	CCV	160-7878-A-5-A	10		
30	CCB (2339)	160-7878-B-6-A	100		
31		680-102370-A-1-D	5		
32		680-102370-A-2-C	5		
33		680-102370-A-3-C	5		
34		680-102370-A-4-C	5		
35		680-102370-A-6-D	5		
36	138746	429618	2		
37	KE 8/25/14	~~429626~~	2		
38		160-7944-C-4-B	50		
39	CCV	160-7944-C-4-B SD	250		
40	CCB (2339)	~~160-7944-C-4-C MS~~	50		
41		~~160-7944-C-4-D MSD~~	50		
42	KE 8/25/14	160-7944-C-5-B	100		
43		160-7944-C-6-B	50		
44		160-7944-C-7-B	200		
45		160-7944-A-8-C	200		
46	139022	430546	2		
47	KE 8/25/14	~~430547~~	2		
48		680-102327-A-1-H	5		
49	CCV	680-102327-A-1-H SD	25		
50	CCB (2339)	~~680-102327-A-1-I MS~~	5		
51		~~680-102327-A-1-J MSD~~	5		
52	KE 8/25/14	680-102327-A-2-E	5		
53		680-102327-A-3-E	5		
54		680-102327-A-5-D	5		
55		680-102327-A-6-D	5		
56		680-102327-A-7-D	5		
57		680-102327-A-9-D	5		
58		680-102327-A-10-D	5		
59	CCV	680-102327-A-11-D	5		
60	CCB (2339)	680-102327-A-13-D	5		

U-233

61		680-102327-A-14-D	5	
62		680-102327-A-15-F	5	
63		680-102327-A-16-D	5	
64		680-102327-A-17-D	5	
65		680-102327-A-18-D	5	
66		680-102327-A-19-D	5	
67		680-102327-A-21-D	5	
68	CCV	680-102327-A-22-D	5	
69	CCB (2339)	680-102327-A-23-D	5	
70	137774	425544	2	
71	KE 8/25/14	~~425545~~	2	
72		680-102327-A-25-D	5	
73		680-102327-A-25-D	SD25	
74		~~680-102327-A-25-E~~	MS5	
75	KE 8/25/14	~~680-102327-A-25-F~~	MS5	
76		680-102327-A-26-C	5	
77		680-102327-A-27-C	5	
78		680-102327-A-28-C	5	
79	CCV (2339)	680-102327-A-29-C	5	
80	CCB (2339)	680-102327-A-30-C	5	
81		680-102327-A-34-C	5	
82		680-102327-A-36-C	5	
83	139028	430572	2	
84	KE 8/25/14	~~430573~~	2	
85		680-102327-A-31-D	5	
86		680-102327-A-31-D	SD25	
87		~~680-102327-A-31-E~~	MS5	
88	KE 8/25/14	~~680-102327-A-31-F~~	MS5	
89	CCV (2339)	680-102327-A-32-D	5	
90	CCB (2339)	680-102327-A-35-D	5	

- U-233

* LCS/MS/MSD are not reported for U-233

Quantitative Analysis Calibration Report

File Name: 082214M2.cal
File Path: D:\Elandata\System
Calibration Type: External Calibration

Analyte	Mass	Curve Type	Slope	Intercept	Corr. Coeff.
Ho (IS)	164.930	Linear Thru Zero	0.000000	0.00	0.000000
U	233.000	Linear Thru Zero	0.046692	0.00	0.999926
U	234.041	Linear Thru Zero	0.035333	0.00	0.999992
U	235.044	Linear Thru Zero	0.032810	0.00	0.999999
U	236.000	Linear Thru Zero	0.050196	0.00	0.999997
U	238.050	Linear Thru Zero	0.028900	0.00	0.999995

Instrument Tuning Report

File Name: EPA TUNING.tun
File Path: d:\Elandata\Tuning
Sample ID: Sample
Sample Date/Time: Friday, August 22, 2014 09:02:09

Analyte	Exact Mass	Meas. Mass	Mass DAC	Res. DAC	Meas. Pk. Width	Custom Res.
Li	7.016	7.025	1570	2065	0.643	
Mg	23.985	23.979	5688	2080	0.687	
Rh	102.905	102.879	24919	2080	0.689	
Ce	139.905	139.929	33931	2120	0.668	
Pb	207.977	207.977	50415	2310	0.650	

Replicates: 6

Daily Performance Report

Sample ID: Sample
Sample Date/Time: Friday, August 22, 2014 09:24:56
Sample Description:
Method File: d:\Elandata\Method\DAILY EPA.mth
Dataset File: d:\Elandata\Dataset\daily3\Sample.140
Tuning File: d:\Elandata\Tuning\EPA TUNING.tun
Optimization File: d:\Elandata\Optimize\EPA2008.dac
Dual Detector Mode: Pulse

Acq. Dead Time(ns): 35
Current Dead Time (ns): 35

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Net Intens. SD	Net Intens. RSD
	Li	7.0	1673.2	1673.209	88.035	5.3
	Mg	24.0	11584.0	11583.974	225.554	1.9
	Rh	102.9	185422.2	185422.236	1776.007	1.0
	Pb	208.0	170025.4	170025.432	1441.968	0.8
⌈>	Ba	137.9	221178.5	221178.531	1494.497	0.7
⌊	Ba++	69.0	1687.0	0.008	0.000	1.8
⌈>	Ce	139.9	272132.6	272132.619	1952.329	0.7
⌊	CeO	155.9	6353.4	0.023	0.000	1.4
	Bkgd	220.0	5.1	5.111	1.259	24.6

Current Optimization File Data

Current Value	Description
0.97	Nebulizer Gas Flow
5.75	Lens Voltage
1400.00	ICP RF Power
-2156.25	Analog Stage Voltage
1200.00	Pulse Stage Voltage
70.00	Discriminator Threshold
-6.00	AC Rod Offset
60.00	Service DAC 1
0.00	Quadrupole Rod Offset

Current Autolens Data

Analyte	Mass	Num of Pts	DAC Value	Maximum Intensity
Be	9	33	6.3	1866.1
Mg	24	33	5.0	19495.3
Co	59	33	5.3	68159.2
Rh	103	33	6.0	243349.2
In	115	33	6.0	327776.0
Ba	138	33	6.3	319506.8
Ce	140	33	6.3	395842.9
Pb	208	33	8.8	251367.9

QUANTITATIVE ANALYSIS REPORT

Sample ID: Blank

Sample Date/Time: Friday, August 22, 2014 13:16:43
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082214M2\Blank.001

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			750864.488	ug/L	
	233	**U**			76.734	ug/L	
	234	**U**			7.200	ug/L	
	235	**U**			19.333	ug/L	
	236	**U**			8.667	ug/L	
	238	**U**			44.267	ug/L	

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 1
Sample Date/Time: Friday, August 22, 2014 13:23:23
Autosampler Position: 191
Dataset File: D:\Elandata\Dataset\082214M2\Standard 1.002

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			742147.587	ug/L	750864.488
	233	**U**			28.533	ug/L	76.734
	234	**U**			24.667	ug/L	7.200
	235	**U**	**0.048500**	2.986	1213.718	ug/L	19.333
	236	**U**			46.067	ug/L	8.667
	238	**U**	**0.050300**	2.806	1287.858	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 2
Sample Date/Time: Friday, August 22, 2014 13:28:04
Autosampler Position: 192
Dataset File: D:\Elandata\Dataset\082214M2\Standard 2.003

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			744883.483	ug/L	750864.488
	233	**U**			1086.308	ug/L	76.734
	234	**U**	**0.049600**	1.259	1293.725	ug/L	7.200
	235	**U**	**2.934926**	1.858	72626.193	ug/L	19.333
	236	**U**	**0.053400**	2.067	2023.477	ug/L	8.667
	238	**U**	**2.685838**	1.981	66756.433	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 3
Sample Date/Time: Friday, August 22, 2014 13:32:45
Autosampler Position: 193
Dataset File: D:\Elandata\Dataset\082214M2\Standard 3.004

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			739195.859	ug/L	750864.488
	233	**U**	**0.051500**	2.469	1783.045	ug/L	76.734
	234	**U**	**0.083158**	1.834	2146.762	ug/L	7.200
	235	**U**	**4.811222**	2.287	118110.322	ug/L	19.333
	236	**U**	**0.087719**	2.836	3292.780	ug/L	8.667
	238	**U**	**4.409312**	2.436	108705.902	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 4
Sample Date/Time: Friday, August 22, 2014 13:37:26
Autosampler Position: 194
Dataset File: D:\Elandata\Dataset\082214M2\Standard 4.005

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			736835.693	ug/L	750864.488
	233	**U**	**0.103160**	1.611	3507.164	ug/L	76.734
	234	**U**	**0.165341**	1.988	4258.502	ug/L	7.200
	235	**U**	**9.694898**	2.532	234952.444	ug/L	19.333
	236	**U**	**0.177747**	2.986	6536.630	ug/L	8.667
	238	**U**	**10.051764**	2.077	215856.493	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 5
Sample Date/Time: Friday, August 22, 2014 13:42:07
Autosampler Position: 195
Dataset File: D:\Elandata\Dataset\082214M2\Standard 5.006

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			736702.280	ug/L	750864.488
	233	**U**	**0.310491**	2.322	10745.978	ug/L	76.734
	234	**U**	**0.496693**	1.180	12929.725	ug/L	7.200
	235	**U**	**29.073835**	2.005	702198.421	ug/L	19.333
	236	**U**	**0.534276**	1.944	19751.195	ug/L	8.667
	238	**U**	**30.124948**	1.601	641016.056	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 1

Sample Date/Time: Friday, August 22, 2014 13:46:48
Autosampler Position: 196
Dataset File: D:\Elandata\Dataset\082214M2\QC Std 1.007

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			737593.697	ug/L	750864.488
	233	**U**	**0.228776**	2.397	7946.479	ug/L	76.734
	234	**U**	**0.000906**	19.455	30.533	ug/L	7.200
	235	**U**	**0.030596**	38.470	748.087	ug/L	19.333
	236	**U**	**0.000631**	61.340	31.267	ug/L	8.667
	238	**U**	**0.080807**	16.135	1754.775	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.233**	
	U	233		**102.360**
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 2
Sample Date/Time: Friday, August 22, 2014 13:51:29
Autosampler Position: 197
Dataset File: D:\Elandata\Dataset\082214M2\QC Std 2.008

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			733146.767	ug/L	750864.488
	233	**U**	**43.926594**	2.043	1502670.552	ug/L	76.734
	234	**U**	**0.088435**	2.708	2296.185	ug/L	7.200
	235	**U**	**0.115479**	2.515	2794.340	ug/L	19.333
	236	**U**	**0.006840**	2.910	259.936	ug/L	8.667
	238	**U**	**10.069312**	1.965	213241.755	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.640**	
	U	233		
	U	234		**105.911**
	U	235		
	U	236		
	U	238		**102.977**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 3

Sample Date/Time: Friday, August 22, 2014 13:56:10
Autosampler Position: 198
Dataset File: D:\Elandata\Dataset\082214M2\QC Std 3.009

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			737583.223	ug/L	750864.488
	233	**U**	**432.732852**	1.729	14893083.552	ug/L	76.734
	234	**U**	**0.884300**	1.959	23034.247	ug/L	7.200
	235	**U**	**1.140622**	2.089	27598.333	ug/L	19.333
	236	**U**	**0.069996**	2.086	2597.836	ug/L	8.667
	238	**U**	**95.656626**	1.610	2037706.923	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.231**	
	U	233		
	U	234		
	U	235		**107.932**
	U	236		**93.828**
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 4
Sample Date/Time: Friday, August 22, 2014 14:00:50
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082214M2\QC Std 4.010

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			740965.296	ug/L	750864.488
	233	**U**	**0.153119**	121.137	5098.040	ug/L	76.734
	234	**U**	**0.000272**	139.740	13.800	ug/L	7.200
	235	**U**	**0.001357**	126.282	50.267	ug/L	19.333
	236	**U**	**0.000033**	231.154	9.667	ug/L	8.667
	238	**U**	**0.033896**	123.118	731.301	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.682**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 5
Sample Date/Time: Friday, August 22, 2014 14:05:30
Autosampler Position: 191
Dataset File: D:\Elandata\Dataset\082214M2\QC Std 5.011

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			736185.879	ug/L	750864.488
	233	**U**	**0.042485**	48.077	1504.354	ug/L	76.734
	234	**U**	**0.000873**	12.193	29.667	ug/L	7.200
	235	**U**	**0.049457**	4.864	1211.051	ug/L	19.333
	236	**U**	**0.000989**	10.346	44.867	ug/L	8.667
	238	**U**	**0.069476**	8.886	1515.614	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.045**	
	U	233		
	U	234		
	U	235		**101.974**
	U	236		
	U	238		**138.123**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6
Sample Date/Time: Friday, August 22, 2014 14:10:12
Autosampler Position: 192
Dataset File: D:\Elandata\Dataset\082214M2\QC Std 6.012

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			743734.162	ug/L	750864.488
	233	**U**	**0.051658**	15.848	1858.188	ug/L	76.734
	234	**U**	**0.049422**	2.797	1304.393	ug/L	7.200
	235	**U**	**3.002409**	2.514	73206.007	ug/L	19.333
	236	**U**	**0.053686**	2.325	2011.008	ug/L	8.667
	238	**U**	**3.165498**	1.912	68031.027	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.050**	
	U	233		**167.178**
	U	234		**99.641**
	U	235		
	U	236		**100.535**
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7
Sample Date/Time: Friday, August 22, 2014 14:14:52
Autosampler Position: 199
Dataset File: D:\Elandata\Dataset\082214M2\QC Std 7.013

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			724157.039	ug/L	750864.488
	233	**U**	**0.018785**	106.204	675.424	ug/L	76.734
	234	**U**	**0.000020**	507.368	7.333	ug/L	7.200
	235	**U**	**0.002871**	82.376	84.000	ug/L	19.333
	236	**U**	**0.000025**	160.536	9.200	ug/L	8.667
	238	**U**	**0.007344**	98.735	188.735	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.443**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 8
Sample Date/Time: Friday, August 22, 2014 14:19:33
Autosampler Position: 200
Dataset File: D:\Elandata\Dataset\082214M2\QC Std 8.014

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			721156.900	ug/L	750864.488
	233	**U**	**0.058682**	7.286	2043.546	ug/L	76.734
	234	**U**	**0.087206**	1.883	2227.107	ug/L	7.200
	235	**U**	**5.195996**	2.653	122818.372	ug/L	19.333
	236	**U**	**0.093970**	1.993	3407.074	ug/L	8.667
	238	**U**	**5.441860**	1.744	113371.291	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.044**	
	U	233		**113.946**
	U	234		**105.448**
	U	235		**107.189**
	U	236		**105.584**
	U	238		**108.276**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Friday, August 22, 2014 14:24:14
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082214M2\QC Std 9.015

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			778637.161	ug/L	750864.488
	233	**U**	**0.055185**	3.349	2083.752	ug/L	76.734
	234	**U**	**0.084411**	3.754	2326.723	ug/L	7.200
	235	**U**	**5.056094**	2.664	129066.182	ug/L	19.333
	236	**U**	**0.092148**	2.455	3607.522	ug/L	8.667
	238	**U**	**5.283224**	1.927	118851.888	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**103.699**	
	U	233		**107.156**
	U	234		**102.068**
	U	235		**104.303**
	U	236		**103.537**
	U	238		**105.120**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Friday, August 22, 2014 14:28:54
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082214M2\QC Std 10.016

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			781150.774	ug/L	750864.488
	233	**U**	**0.104246**	12.179	3865.658	ug/L	76.734
	234	**U**	**0.000201**	23.748	13.000	ug/L	7.200
	235	**U**	**0.003009**	80.755	94.734	ug/L	19.333
	236	**U**	**-0.000041**	202.401	7.267	ug/L	8.667
	238	**U**	**0.025587**	19.774	619.014	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**104.034**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: 426404

Sample Date/Time: Friday, August 22, 2014 14:33:34
Autosampler Position: 20
Dataset File: D:\Elandata\Dataset\082214M2\426404.017

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			802282.333	ug/L	750864.488
	233	**U**	**0.001486**	183.409	133.667	ug/L	76.734
	234	**U**	**-0.000033**	175.966	6.733	ug/L	7.200
	235	**U**	**0.000456**	126.305	32.067	ug/L	19.333
	236	**U**	**-0.000075**	60.692	6.200	ug/L	8.667
	238	**U**	**0.026705**	8.787	664.349	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**106.848**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 426405

Sample Date/Time: Friday, August 22, 2014 14:38:15
Autosampler Position: 21
Dataset File: D:\Elandata\Dataset\082214M2\426405.018

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			793129.718	ug/L	750864.488
	233	**U**	**0.001761**	27.337	145.534	ug/L	76.734
	234	**U**	**0.041113**	2.209	1158.647	ug/L	7.200
	235	**U**	**2.473830**	2.276	64333.242	ug/L	19.333
	236	**U**	**0.044900**	2.482	1794.846	ug/L	8.667
	238	**U**	**2.568242**	2.290	58860.099	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**105.629**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7878-C-1-C

Sample Date/Time: Friday, August 22, 2014 14:42:56

Autosampler Position: 22

Dataset File: D:\Elandata\Dataset\082214M2\160-7878-C-1-C.019

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			764717.823	ug/L	750864.488
	233	**U**	**0.006016**	92.018	284.670	ug/L	76.734
	234	**U**	**0.002247**	7.448	67.867	ug/L	7.200
	235	**U**	**0.339692**	2.792	8532.616	ug/L	19.333
	236	**U**	**0.000678**	23.794	34.600	ug/L	8.667
	238	**U**	**41.865708**	1.517	924791.896	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.845**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7878-C-1-C SD

Sample Date/Time: Friday, August 22, 2014 14:47:37

Autosampler Position: 23

Dataset File: D:\Elandata\Dataset\082214M2\160-7878-C-1-C SD.020

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			765174.476	ug/L	750864.488
	233	**U**	**-0.001268**	1.937	32.867	ug/L	76.734
	234	**U**	**0.000363**	13.109	17.133	ug/L	7.200
	235	**U**	**0.067251**	3.108	1706.502	ug/L	19.333
	236	**U**	**0.000039**	57.361	10.333	ug/L	8.667
	238	**U**	**8.610769**	1.937	190335.354	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.906**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7878-C-1-D MS

Sample Date/Time: Friday, August 22, 2014 14:52:16
Autosampler Position: 24
Dataset File: D:\Elandata\Dataset\082214M2\160-7878-C-1-D MS.021

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			762570.688	ug/L	750864.488
	233	**U**	**0.005493**	174.192	260.805	ug/L	76.734
	234	**U**	**0.011167**	2.281	307.937	ug/L	7.200
	235	**U**	**0.928960**	1.557	23248.191	ug/L	19.333
	236	**U**	**0.010320**	2.927	403.606	ug/L	8.667
	238	**U**	**53.980603**	1.373	1189100.379	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.559**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7878-C-1-E MSD

Sample Date/Time: Friday, August 22, 2014 14:56:56

Autosampler Position: 25

Dataset File: D:\Elandata\Dataset\082214M2\160-7878-C-1-E MSD.022

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			757571.970	ug/L	750864.488
	233	**U**	**-0.001003**	11.449	41.867	ug/L	76.734
	234	**U**	**0.010188**	6.000	279.869	ug/L	7.200
	235	**U**	**0.793598**	1.007	19739.245	ug/L	19.333
	236	**U**	**0.009867**	1.467	384.139	ug/L	8.667
	238	**U**	**37.763554**	0.750	826627.312	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.893**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7878-D-2-C
Sample Date/Time: Friday, August 22, 2014 15:01:36
Autosampler Position: 26
Dataset File: D:\Elandata\Dataset\082214M2\160-7878-D-2-C.023

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			757803.882	ug/L	750864.488
	233	**U**	**-0.001760**	5.950	15.067	ug/L	76.734
	234	**U**	**0.001589**	4.055	49.867	ug/L	7.200
	235	**U**	**0.275689**	2.171	6868.919	ug/L	19.333
	236	**U**	**0.000416**	5.332	24.533	ug/L	8.667
	238	**U**	**34.587036**	1.140	757251.369	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.924**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7878-B-3-A
Sample Date/Time: Friday, August 22, 2014 15:06:16
Autosampler Position: 27
Dataset File: D:\Elandata\Dataset\082214M2\160-7878-B-3-A.024

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			768408.751	ug/L	750864.488
	233	**U**	**0.002658**	232.938	166.402	ug/L	76.734
	234	**U**	**0.001992**	10.170	61.267	ug/L	7.200
	235	**U**	**0.303614**	2.598	7667.458	ug/L	19.333
	236	**U**	**0.000457**	9.755	26.467	ug/L	8.667
	238	**U**	**37.256337**	1.544	826977.508	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**102.337**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7878-C-4-C
Sample Date/Time: Friday, August 22, 2014 15:10:56
Autosampler Position: 28
Dataset File: D:\Elandata\Dataset\082214M2\160-7878-C-4-C.025

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			754388.836	ug/L	750864.488
	233	**U**	**-0.001602**	1.385	20.667	ug/L	76.734
	234	**U**	**0.000910**	7.299	31.467	ug/L	7.200
	235	**U**	**0.146046**	2.458	3631.195	ug/L	19.333
	236	**U**	**0.000200**	22.435	16.333	ug/L	8.667
	238	**U**	**20.016324**	3.008	435991.412	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.469**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7878-A-5-A

Sample Date/Time: Friday, August 22, 2014 15:15:36

Autosampler Position: 29

Dataset File: D:\Elandata\Dataset\082214M2\160-7878-A-5-A.026

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			757772.190	ug/L	750864.488
	233	**U**	**-0.001774**	6.956	14.533	ug/L	76.734
	234	**U**	**0.000030**	151.168	8.067	ug/L	7.200
	235	**U**	**0.014873**	6.461	388.405	ug/L	19.333
	236	**U**	**-0.000046**	30.261	7.000	ug/L	8.667
	238	**U**	**2.647723**	2.760	57969.244	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.920**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Friday, August 22, 2014 15:20:17
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082214M2\QC Std 9.027

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			764598.193	ug/L	750864.488
	233	**U**	**0.053312**	2.832	1979.004	ug/L	76.734
	234	**U**	**0.084840**	3.189	2295.985	ug/L	7.200
	235	**U**	**5.061500**	3.195	126809.040	ug/L	19.333
	236	**U**	**0.092109**	2.794	3539.439	ug/L	8.667
	238	**U**	**5.322031**	2.402	117517.425	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.829**	
	U	233		**103.519**
	U	234		**102.588**
	U	235		**104.415**
	U	236		**103.493**
	U	238		**105.892**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Friday, August 22, 2014 15:24:57
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082214M2\QC Std 10.028

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			759899.277	ug/L	750864.488
	233	**U**	**0.088144**	2.372	3202.493	ug/L	76.734
	234	**U**	**0.000154**	52.530	11.333	ug/L	7.200
	235	**U**	**0.003700**	48.877	110.134	ug/L	19.333
	236	**U**	**0.000004**	1000.164	8.867	ug/L	8.667
	238	**U**	**0.026587**	18.868	624.547	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.203**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7878-B-6-A

Sample Date/Time: Friday, August 22, 2014 15:29:37

Autosampler Position: 30

Dataset File: D:\Elandata\Dataset\082214M2\160-7878-B-6-A.029

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			762660.707	ug/L	750864.488
	233	**U**	**-0.001655**	7.696	18.800	ug/L	76.734
	234	**U**	**0.004243**	5.555	121.667	ug/L	7.200
	235	**U**	**0.666478**	2.163	16681.279	ug/L	19.333
	236	**U**	**0.000364**	1.963	22.733	ug/L	8.667
	238	**U**	**96.953028**	1.450	2135659.241	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.571**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-1-D

Sample Date/Time: Friday, August 22, 2014 15:34:18

Autosampler Position: 31

Dataset File: D:\Elandata\Dataset\082214M2\680-102370-A-1-D.030

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			772562.300	ug/L	750864.488
	233	**U**	**-0.001761**	2.676	15.400	ug/L	76.734
	234	**U**	**0.000013**	616.962	7.733	ug/L	7.200
	235	**U**	**0.007629**	6.168	212.935	ug/L	19.333
	236	**U**	**-0.000070**	55.825	6.200	ug/L	8.667
	238	**U**	**1.072836**	5.510	23961.882	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**102.890**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-2-C

Sample Date/Time: Friday, August 22, 2014 15:38:58

Autosampler Position: 32

Dataset File: D:\Elandata\Dataset\082214M2\680-102370-A-2-C.031

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			711626.154	ug/L	750864.488
	233	**U**	**0.002500**	266.288	152.202	ug/L	76.734
	234	**U**	**0.000468**	15.099	18.600	ug/L	7.200
	235	**U**	**0.054660**	1.240	1294.325	ug/L	19.333
	236	**U**	**-0.000038**	22.230	6.867	ug/L	8.667
	238	**U**	**6.746141**	0.135	138783.598	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.774**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-3-C
Sample Date/Time: Friday, August 22, 2014 15:43:39
Autosampler Position: 33
Dataset File: D:\Elandata\Dataset\082214M2\680-102370-A-3-C.032

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			708834.739	ug/L	750864.488
	233	**U**	**-0.001670**	2.234	17.133	ug/L	76.734
	234	**U**	**0.000279**	33.356	13.733	ug/L	7.200
	235	**U**	**0.042302**	2.539	1002.569	ug/L	19.333
	236	**U**	**-0.000054**	85.025	6.267	ug/L	8.667
	238	**U**	**5.075762**	0.668	104027.961	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.402**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-4-C

Sample Date/Time: Friday, August 22, 2014 15:48:19

Autosampler Position: 34

Dataset File: D:\Elandata\Dataset\082214M2\680-102370-A-4-C.033

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			721965.514	ug/L	750864.488
	233	**U**	**-0.001587**	3.949	20.267	ug/L	76.734
	234	**U**	**0.001381**	11.218	42.133	ug/L	7.200
	235	**U**	**0.137849**	2.208	3282.110	ug/L	19.333
	236	**U**	**0.000086**	49.847	11.400	ug/L	8.667
	238	**U**	**4.712541**	2.474	98310.015	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.151**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-6-D

Sample Date/Time: Friday, August 22, 2014 15:52:59

Autosampler Position: 35

Dataset File: D:\Elandata\Dataset\082214M2\680-102370-A-6-D.034

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			765015.445	ug/L	750864.488
	233	**U**	**-0.001801**	1.633	13.867	ug/L	76.734
	234	**U**	**0.000027**	167.506	8.067	ug/L	7.200
	235	**U**	**0.012672**	2.489	337.537	ug/L	19.333
	236	**U**	**-0.000098**	15.830	5.067	ug/L	8.667
	238	**U**	**1.727884**	1.995	38226.165	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.885**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 429618

Sample Date/Time: Friday, August 22, 2014 15:57:39
Autosampler Position: 36
Dataset File: D:\Elandata\Dataset\082214M2\429618.035

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			756227.259	ug/L	750864.488
	233	**U**	**-0.001933**	1.600	9.000	ug/L	76.734
	234	**U**	**-0.000072**	11.240	5.333	ug/L	7.200
	235	**U**	**-0.000497**	1.275	7.133	ug/L	19.333
	236	**U**	**-0.000107**	15.313	4.667	ug/L	8.667
	238	**U**	**0.004227**	6.912	136.801	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.714**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 429626

Sample Date/Time: Friday, August 22, 2014 16:02:19
Autosampler Position: 37
Dataset File: D:\Elandata\Dataset\082214M2\429626.036

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			753332.248	ug/L	750864.488
	233	**U**	**0.000721**	25.929	102.067	ug/L	76.734
	234	**U**	**0.045021**	3.385	1203.851	ug/L	7.200
	235	**U**	**2.659296**	3.340	65658.387	ug/L	19.333
	236	**U**	**0.048169**	2.076	1828.917	ug/L	8.667
	238	**U**	**2.767232**	3.062	60213.668	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.329**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7944-C-4-B

Sample Date/Time: Friday, August 22, 2014 16:06:59
Autosampler Position: 38
Dataset File: D:\Elandata\Dataset\082214M2\160-7944-C-4-B.037

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			740757.826	ug/L	750864.488
	233	**U**	**-0.001858**	4.011	11.333	ug/L	76.734
	234	**U**	**0.003108**	1.716	88.400	ug/L	7.200
	235	**U**	**0.422256**	1.682	10274.833	ug/L	19.333
	236	**U**	**0.002098**	2.075	86.600	ug/L	8.667
	238	**U**	**56.109237**	1.907	1200267.322	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.654**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7944-C-4-B SD

Sample Date/Time: Friday, August 22, 2014 16:11:38

Autosampler Position: 39

Dataset File: D:\Elandata\Dataset\082214M2\160-7944-C-4-B SD.038

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			734990.176	ug/L	750864.488
	233	**U**	**-0.001918**	3.417	9.200	ug/L	76.734
	234	**U**	**0.000543**	24.598	21.200	ug/L	7.200
	235	**U**	**0.082422**	2.354	2004.407	ug/L	19.333
	236	**U**	**0.000417**	12.515	23.800	ug/L	8.667
	238	**U**	**11.513922**	2.267	244378.001	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.886**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Friday, August 22, 2014 16:16:18
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082214M2\QC Std 9.039

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			732400.334	ug/L	750864.488
	233	**U**	**0.053549**	2.575	1904.660	ug/L	76.734
	234	**U**	**0.085887**	2.475	2227.307	ug/L	7.200
	235	**U**	**5.142945**	2.671	123464.321	ug/L	19.333
	236	**U**	**0.094044**	3.000	3462.020	ug/L	8.667
	238	**U**	**5.424359**	2.065	114759.687	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.541**	
	U	233		**103.979**
	U	234		**103.854**
	U	235		**106.095**
	U	236		**105.668**
	U	238		**107.928**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Friday, August 22, 2014 16:20:59
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082214M2\QC Std 10.040

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			734456.506	ug/L	750864.488
	233	**U**	**0.088314**	2.527	3100.603	ug/L	76.734
	234	**U**	**0.000124**	58.715	10.333	ug/L	7.200
	235	**U**	**0.004456**	4.957	126.067	ug/L	19.333
	236	**U**	**-0.000015**	162.672	7.933	ug/L	8.667
	238	**U**	**0.026668**	2.414	609.146	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.815**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7944-C-4-C MS

Sample Date/Time: Friday, August 22, 2014 16:25:38
Autosampler Position: 40
Dataset File: D:\Elandata\Dataset\082214M2\160-7944-C-4-C MS.041

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			739416.154	ug/L	750864.488
	233	**U**	**-0.001846**	3.761	11.733	ug/L	76.734
	234	**U**	**0.005051**	5.513	138.734	ug/L	7.200
	235	**U**	**0.569427**	2.398	13818.755	ug/L	19.333
	236	**U**	**0.004475**	1.813	174.668	ug/L	8.667
	238	**U**	**64.918828**	2.506	1385785.495	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.475**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7944-C-4-D MSD

Sample Date/Time: Friday, August 22, 2014 16:30:19
Autosampler Position: 41
Dataset File: D:\Elandata\Dataset\082214M2\160-7944-C-4-D MSD.042

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			740176.677	ug/L	750864.488
	233	**U**	**-0.001862**	1.486	11.267	ug/L	76.734
	234	**U**	**0.004851**	5.971	134.067	ug/L	7.200
	235	**U**	**0.555637**	2.043	13503.856	ug/L	19.333
	236	**U**	**0.004339**	1.312	169.668	ug/L	8.667
	238	**U**	**62.052264**	1.313	1326750.639	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.577**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7944-C-5-B

Sample Date/Time: Friday, August 22, 2014 16:34:59
Autosampler Position: 42
Dataset File: D:\Elandata\Dataset\082214M2\160-7944-C-5-B.043

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			732504.457	ug/L	750864.488
	233	**U**	**-0.001975**	1.682	7.267	ug/L	76.734
	234	**U**	**0.002833**	8.028	80.400	ug/L	7.200
	235	**U**	**0.363587**	1.979	8750.016	ug/L	19.333
	236	**U**	**0.001933**	4.539	79.667	ug/L	8.667
	238	**U**	**49.094559**	2.075	1038460.180	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.555**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7944-C-6-B

Sample Date/Time: Friday, August 22, 2014 16:39:40
Autosampler Position: 43
Dataset File: D:\Elandata\Dataset\082214M2\160-7944-C-6-B.044

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			730608.999	ug/L	750864.488
	233	**U**	**-0.002007**	0.349	6.200	ug/L	76.734
	234	**U**	**0.003065**	6.011	86.000	ug/L	7.200
	235	**U**	**0.401839**	2.558	9641.324	ug/L	19.333
	236	**U**	**0.002223**	2.077	89.934	ug/L	8.667
	238	**U**	**54.184989**	2.060	1143137.239	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.302**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7944-C-7-B

Sample Date/Time: Friday, August 22, 2014 16:44:20
Autosampler Position: 44
Dataset File: D:\Elandata\Dataset\082214M2\160-7944-C-7-B.045

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			739410.245	ug/L	750864.488
	233	**U**	**-0.001989**	3.199	6.800	ug/L	76.734
	234	**U**	**0.002249**	8.306	65.667	ug/L	7.200
	235	**U**	**0.324520**	2.319	7885.177	ug/L	19.333
	236	**U**	**0.001681**	6.341	71.067	ug/L	8.667
	238	**U**	**42.264742**	1.688	902644.132	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.475**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7944-A-8-C

Sample Date/Time: Friday, August 22, 2014 16:49:01

Autosampler Position: 45

Dataset File: D:\Elandata\Dataset\082214M2\160-7944-A-8-C.046

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			734385.809	ug/L	750864.488
	233	**U**	**-0.002003**	1.244	6.400	ug/L	76.734
	234	**U**	**0.002320**	7.244	67.067	ug/L	7.200
	235	**U**	**0.323722**	1.746	7813.540	ug/L	19.333
	236	**U**	**0.001744**	1.797	72.734	ug/L	8.667
	238	**U**	**41.939534**	2.256	889368.032	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.805**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 430546

Sample Date/Time: Friday, August 22, 2014 16:53:41
Autosampler Position: 46
Dataset File: D:\Elandata\Dataset\082214M2\430546.047

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			761726.338	ug/L	750864.488
	233	**U**	**-0.001914**	3.296	9.733	ug/L	76.734
	234	**U**	**-0.000070**	69.933	5.400	ug/L	7.200
	235	**U**	**-0.000076**	65.617	17.667	ug/L	19.333
	236	**U**	**-0.000093**	21.260	5.200	ug/L	8.667
	238	**U**	**0.008620**	14.415	233.469	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.447**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 430547
Sample Date/Time: Friday, August 22, 2014 16:58:21
Autosampler Position: 47
Dataset File: D:\Elandata\Dataset\082214M2\430547.048

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			755863.092	ug/L	750864.488
	233	**U**	**0.000772**	15.297	104.334	ug/L	76.734
	234	**U**	**0.042404**	3.001	1138.512	ug/L	7.200
	235	**U**	**2.527635**	1.173	62681.676	ug/L	19.333
	236	**U**	**0.046137**	2.296	1757.975	ug/L	8.667
	238	**U**	**2.633211**	1.048	57552.623	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.666**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-1-H

Sample Date/Time: Friday, August 22, 2014 17:03:01
Autosampler Position: 48
Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-1-H.049

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			716140.701	ug/L	750864.488
	233	**U**	**-0.001794**	2.885	13.200	ug/L	76.734
	234	**U**	**0.000378**	16.150	16.467	ug/L	7.200
	235	**U**	**0.050418**	1.418	1203.384	ug/L	19.333
	236	**U**	**-0.000058**	31.869	6.200	ug/L	8.667
	238	**U**	**6.722392**	1.094	139177.513	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.375**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-1-H SD

Sample Date/Time: Friday, August 22, 2014 17:07:41

Autosampler Position: 49

Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-1-H SD.050

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			727163.693	ug/L	750864.488
	233	**U**	**-0.001983**	3.293	6.933	ug/L	76.734
	234	**U**	**0.000080**	37.614	9.000	ug/L	7.200
	235	**U**	**0.009562**	6.951	246.535	ug/L	19.333
	236	**U**	**-0.000096**	44.561	4.933	ug/L	8.667
	238	**U**	**1.306980**	1.563	27496.785	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.844**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Friday, August 22, 2014 17:12:21
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082214M2\QC Std 9.051

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			723527.604	ug/L	750864.488
	233	**U**	**0.054983**	2.998	1929.931	ug/L	76.734
	234	**U**	**0.086154**	2.725	2207.037	ug/L	7.200
	235	**U**	**5.139422**	2.185	121915.399	ug/L	19.333
	236	**U**	**0.094513**	2.078	3438.214	ug/L	8.667
	238	**U**	**5.409542**	2.349	113051.862	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.359**	
	U	233		**106.764**
	U	234		**104.177**
	U	235		**106.022**
	U	236		**106.194**
	U	238		**107.633**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10
Sample Date/Time: Friday, August 22, 2014 17:17:02
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082214M2\QC Std 10.052

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			725893.862	ug/L	750864.488
	233	**U**	**0.089664**	2.520	3110.006	ug/L	76.734
	234	**U**	**0.000245**	14.712	13.200	ug/L	7.200
	235	**U**	**0.004821**	4.031	133.667	ug/L	19.333
	236	**U**	**0.000038**	198.114	9.667	ug/L	8.667
	238	**U**	**0.026437**	1.482	597.079	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.674**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-1-I MS

Sample Date/Time: Friday, August 22, 2014 17:21:41
Autosampler Position: 50
Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-1-I MS.053

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			701531.274	ug/L	750864.488
	233	**U**	**-0.000817**	18.862	45.000	ug/L	76.734
	234	**U**	**0.015332**	0.441	386.739	ug/L	7.200
	235	**U**	**0.971396**	1.168	22374.043	ug/L	19.333
	236	**U**	**0.016676**	0.825	595.279	ug/L	8.667
	238	**U**	**7.268708**	0.651	147407.011	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.430**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-1-J MSD

Sample Date/Time: Friday, August 22, 2014 17:26:21

Autosampler Position: 51

Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-1-J MSD.054

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			699571.570	ug/L	750864.488
	233	**U**	**-0.000794**	5.782	45.533	ug/L	76.734
	234	**U**	**0.017055**	0.740	428.206	ug/L	7.200
	235	**U**	**1.064428**	1.405	24443.297	ug/L	19.333
	236	**U**	**0.018314**	2.870	651.082	ug/L	8.667
	238	**U**	**7.462786**	1.410	150885.311	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.169**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-2-E

Sample Date/Time: Friday, August 22, 2014 17:31:01
Autosampler Position: 52
Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-2-E.055

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			698163.527	ug/L	750864.488
	233	**U**	**-0.001883**	2.532	10.000	ug/L	76.734
	234	**U**	**0.000208**	19.069	11.800	ug/L	7.200
	235	**U**	**0.040868**	1.730	953.832	ug/L	19.333
	236	**U**	**-0.000053**	31.834	6.200	ug/L	8.667
	238	**U**	**5.361543**	1.859	108185.198	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.981**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-3-E
Sample Date/Time: Friday, August 22, 2014 17:35:41
Autosampler Position: 53
Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-3-E.056

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			722285.933	ug/L	750864.488
	233	**U**	**-0.001896**	1.429	9.867	ug/L	76.734
	234	**U**	**0.000161**	45.118	11.000	ug/L	7.200
	235	**U**	**0.030419**	3.034	738.952	ug/L	19.333
	236	**U**	**-0.000069**	38.421	5.867	ug/L	8.667
	238	**U**	**4.242591**	1.778	88565.284	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.194**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-5-D

Sample Date/Time: Friday, August 22, 2014 17:40:22
Autosampler Position: 54
Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-5-D.057

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			698057.678	ug/L	750864.488
	233	**U**	**-0.001859**	2.055	10.733	ug/L	76.734
	234	**U**	**0.000279**	28.757	13.600	ug/L	7.200
	235	**U**	**0.040615**	1.424	948.098	ug/L	19.333
	236	**U**	**-0.000093**	23.322	4.800	ug/L	8.667
	238	**U**	**5.522281**	0.594	111443.781	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.967**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-6-D

Sample Date/Time: Friday, August 22, 2014 17:45:02
Autosampler Position: 55
Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-6-D.058

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			703115.075	ug/L	750864.488
	233	**U**	**-0.001905**	2.042	9.333	ug/L	76.734
	234	**U**	**0.000257**	29.125	13.133	ug/L	7.200
	235	**U**	**0.044877**	0.054	1053.372	ug/L	19.333
	236	**U**	**-0.000083**	40.178	5.200	ug/L	8.667
	238	**U**	**6.122063**	0.995	124422.195	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.641**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-7-D

Sample Date/Time: Friday, August 22, 2014 17:49:43

Autosampler Position: 56

Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-7-D.059

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			728673.162	ug/L	750864.488
	233	**U**	**-0.001836**	4.491	11.933	ug/L	76.734
	234	**U**	**0.000160**	43.000	11.067	ug/L	7.200
	235	**U**	**0.025289**	2.201	623.014	ug/L	19.333
	236	**U**	**-0.000095**	16.097	4.933	ug/L	8.667
	238	**U**	**3.437909**	2.026	72403.599	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.045**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-9-D

Sample Date/Time: Friday, August 22, 2014 17:54:23

Autosampler Position: 57

Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-9-D.060

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			688238.762	ug/L	750864.488
	233	**U**	**-0.001840**	1.268	11.200	ug/L	76.734
	234	**U**	**0.000364**	27.846	15.400	ug/L	7.200
	235	**U**	**0.043784**	0.709	1006.369	ug/L	19.333
	236	**U**	**-0.000056**	30.020	6.000	ug/L	8.667
	238	**U**	**6.137915**	1.011	122099.137	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.660**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-10-D

Sample Date/Time: Friday, August 22, 2014 17:59:04

Autosampler Position: 58

Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-10-D.061

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			716083.460	ug/L	750864.488
	233	**U**	**-0.001853**	2.573	11.200	ug/L	76.734
	234	**U**	**0.000381**	13.884	16.533	ug/L	7.200
	235	**U**	**0.050760**	1.171	1210.718	ug/L	19.333
	236	**U**	**-0.000089**	18.394	5.067	ug/L	8.667
	238	**U**	**5.992786**	2.209	124001.741	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.368**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-11-D
Sample Date/Time: Friday, August 22, 2014 18:03:44
Autosampler Position: 59
Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-11-D.062

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			701565.553	ug/L	750864.488
	233	**U**	**-0.001942**	1.064	8.067	ug/L	76.734
	234	**U**	**0.000265**	27.942	13.267	ug/L	7.200
	235	**U**	**0.043360**	3.054	1015.436	ug/L	19.333
	236	**U**	**-0.000082**	33.512	5.200	ug/L	8.667
	238	**U**	**5.894300**	2.798	119451.757	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.434**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Friday, August 22, 2014 18:08:25
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082214M2\QC Std 9.063

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			711693.015	ug/L	750864.488
	233	**U**	**0.056702**	3.426	1954.734	ug/L	76.734
	234	**U**	**0.091350**	1.466	2302.786	ug/L	7.200
	235	**U**	**5.525669**	2.251	128935.384	ug/L	19.333
	236	**U**	**0.099351**	1.227	3555.776	ug/L	8.667
	238	**U**	**5.772751**	1.674	118701.938	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.783**	
	U	233		**110.102**
	U	234		**110.459**
	U	235		**113.990**
	U	236		**111.630**
	U	238		**114.860**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q
U	234	Q
U	235	Q
U	236	Q
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Friday, August 22, 2014 18:13:08
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082214M2\QC Std 10.064

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			709501.840	ug/L	750864.488
	233	**U**	**0.092809**	0.361	3147.081	ug/L	76.734
	234	**U**	**0.000279**	42.722	13.667	ug/L	7.200
	235	**U**	**0.005375**	7.803	143.534	ug/L	19.333
	236	**U**	**0.000034**	67.921	9.400	ug/L	8.667
	238	**U**	**0.027990**	4.558	614.747	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.491**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-13-D

Sample Date/Time: Friday, August 22, 2014 18:17:47

Autosampler Position: 60

Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-13-D.065

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			696677.292	ug/L	750864.488
	233	**U**	**-0.001907**	1.947	9.200	ug/L	76.734
	234	**U**	**0.000301**	34.111	14.067	ug/L	7.200
	235	**U**	**0.037535**	2.100	875.694	ug/L	19.333
	236	**U**	**-0.000062**	33.328	5.867	ug/L	8.667
	238	**U**	**5.184085**	1.169	104387.841	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.783**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-14-D

Sample Date/Time: Friday, August 22, 2014 18:22:27

Autosampler Position: 61

Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-14-D.066

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			696182.377	ug/L	750864.488
	233	**U**	**-0.001919**	2.114	8.800	ug/L	76.734
	234	**U**	**0.000269**	20.754	13.267	ug/L	7.200
	235	**U**	**0.037137**	2.144	865.693	ug/L	19.333
	236	**U**	**-0.000052**	27.759	6.200	ug/L	8.667
	238	**U**	**5.039752**	1.356	101401.706	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.717**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-15-F

Sample Date/Time: Friday, August 22, 2014 18:27:06
Autosampler Position: 62
Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-15-F.067

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			671415.052	ug/L	750864.488
	233	**U**	**-0.001913**	2.288	8.600	ug/L	76.734
	234	**U**	**0.000103**	49.616	8.867	ug/L	7.200
	235	**U**	**0.021323**	2.702	486.742	ug/L	19.333
	236	**U**	**-0.000064**	35.300	5.600	ug/L	8.667
	238	**U**	**2.798106**	1.402	54316.096	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.419**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-16-D
Sample Date/Time: Friday, August 22, 2014 18:31:46
Autosampler Position: 63
Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-16-D.068

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			737526.381	ug/L	750864.488
	233	**U**	**-0.001922**	3.253	9.133	ug/L	76.734
	234	**U**	**0.000065**	64.113	8.733	ug/L	7.200
	235	**U**	**0.012716**	1.815	326.604	ug/L	19.333
	236	**U**	**-0.000072**	45.422	5.867	ug/L	8.667
	238	**U**	**1.786778**	0.740	38121.957	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.224**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-17-D

Sample Date/Time: Friday, August 22, 2014 18:36:26

Autosampler Position: 64

Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-17-D.069

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			730479.060	ug/L	750864.488
	233	**U**	**-0.001872**	4.019	10.733	ug/L	76.734
	234	**U**	**0.000037**	80.945	7.933	ug/L	7.200
	235	**U**	**0.008981**	2.693	234.202	ug/L	19.333
	236	**U**	**-0.000101**	6.283	4.733	ug/L	8.667
	238	**U**	**1.281881**	2.010	27094.300	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.285**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-18-D
Sample Date/Time: Friday, August 22, 2014 18:41:06
Autosampler Position: 65
Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-18-D.070

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			757903.741	ug/L	750864.488
	233	**U**	**-0.001952**	4.455	8.267	ug/L	76.734
	234	**U**	**0.000010**	272.002	7.533	ug/L	7.200
	235	**U**	**0.006638**	2.274	184.535	ug/L	19.333
	236	**U**	**-0.000092**	34.916	5.267	ug/L	8.667
	238	**U**	**0.985207**	0.888	21618.765	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.937**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-19-D

Sample Date/Time: Friday, August 22, 2014 18:45:47

Autosampler Position: 66

Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-19-D.071

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			724145.023	ug/L	750864.488
	233	**U**	**-0.001945**	1.728	8.267	ug/L	76.734
	234	**U**	**0.000020**	138.731	7.467	ug/L	7.200
	235	**U**	**0.005891**	7.209	158.334	ug/L	19.333
	236	**U**	**-0.000085**	29.742	5.267	ug/L	8.667
	238	**U**	**0.850453**	0.968	17837.272	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.442**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-21-D

Sample Date/Time: Friday, August 22, 2014 18:50:27

Autosampler Position: 67

Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-21-D.072

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			698282.796	ug/L	750864.488
	233	**U**	**-0.001915**	1.057	8.933	ug/L	76.734
	234	**U**	**0.000083**	77.281	8.733	ug/L	7.200
	235	**U**	**0.012671**	6.522	307.937	ug/L	19.333
	236	**U**	**-0.000050**	148.490	6.333	ug/L	8.667
	238	**U**	**1.674392**	1.448	33816.744	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.997**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-22-D
Sample Date/Time: Friday, August 22, 2014 18:55:08
Autosampler Position: 68
Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-22-D.073

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			718168.133	ug/L	750864.488
	233	**U**	**-0.001891**	1.541	10.000	ug/L	76.734
	234	**U**	**0.000139**	45.232	10.467	ug/L	7.200
	235	**U**	**0.019890**	0.829	487.075	ug/L	19.333
	236	**U**	**-0.000093**	14.805	4.933	ug/L	8.667
	238	**U**	**2.728915**	1.008	56665.111	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.646**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-23-D
Sample Date/Time: Friday, August 22, 2014 18:59:48
Autosampler Position: 69
Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-23-D.074

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			706186.602	ug/L	750864.488
	233	**U**	**-0.001861**	2.992	10.733	ug/L	76.734
	234	**U**	**0.000065**	30.983	8.400	ug/L	7.200
	235	**U**	**0.011039**	3.268	273.936	ug/L	19.333
	236	**U**	**-0.000069**	32.413	5.667	ug/L	8.667
	238	**U**	**1.310396**	1.145	26775.917	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.050**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Friday, August 22, 2014 19:04:29
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082214M2\QC Std 9.075

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			696009.816	ug/L	750864.488
	233	**U**	**0.056193**	2.406	1896.126	ug/L	76.734
	234	**U**	**0.089491**	1.135	2206.504	ug/L	7.200
	235	**U**	**5.410003**	1.835	123481.581	ug/L	19.333
	236	**U**	**0.098914**	2.091	3461.153	ug/L	8.667
	238	**U**	**5.698156**	1.838	114580.905	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.694**	
	U	233		**109.113**
	U	234		**108.211**
	U	235		**111.604**
	U	236		**111.139**
	U	238		**113.376**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	235	Q
U	236	Q
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Friday, August 22, 2014 19:09:10
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082214M2\QC Std 10.076

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			685638.325	ug/L	750864.488
	233	**U**	**0.092755**	1.772	3037.523	ug/L	76.734
	234	**U**	**0.000193**	49.706	11.200	ug/L	7.200
	235	**U**	**0.005821**	5.974	148.601	ug/L	19.333
	236	**U**	**0.000023**	137.978	8.733	ug/L	8.667
	238	**U**	**0.028559**	0.424	606.413	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.313**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: 425544

Sample Date/Time: Friday, August 22, 2014 19:13:50
Autosampler Position: 70
Dataset File: D:\Elandata\Dataset\082214M2\425544.077

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			711113.741	ug/L	750864.488
	233	**U**	**-0.002006**	3.231	6.000	ug/L	76.734
	234	**U**	**-0.000061**	29.489	5.267	ug/L	7.200
	235	**U**	**0.000114**	47.456	20.933	ug/L	19.333
	236	**U**	**-0.000098**	37.104	4.667	ug/L	8.667
	238	**U**	**0.004220**	8.781	128.334	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.706**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 425545

Sample Date/Time: Friday, August 22, 2014 19:18:30
Autosampler Position: 71
Dataset File: D:\Elandata\Dataset\082214M2\425545.078

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			706024.714	ug/L	750864.488
	233	**U**	**0.000880**	20.340	100.934	ug/L	76.734
	234	**U**	**0.043678**	2.838	1095.375	ug/L	7.200
	235	**U**	**2.626224**	2.135	60802.522	ug/L	19.333
	236	**U**	**0.047389**	2.975	1685.633	ug/L	8.667
	238	**U**	**2.780705**	2.498	56723.354	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.028**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-25-D

Sample Date/Time: Friday, August 22, 2014 19:23:10

Autosampler Position: 72

Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-25-D.079

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			736192.192	ug/L	750864.488
	233	**U**	**-0.001876**	3.038	10.667	ug/L	76.734
	234	**U**	**0.000088**	52.153	9.400	ug/L	7.200
	235	**U**	**0.010333**	3.763	268.203	ug/L	19.333
	236	**U**	**-0.000054**	42.653	6.533	ug/L	8.667
	238	**U**	**1.155991**	0.967	24629.913	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.046**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-25-D SD

Sample Date/Time: Friday, August 22, 2014 19:27:50
Autosampler Position: 73
Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-25-D SD.080

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			704548.321	ug/L	750864.488
	233	**U**	**-0.002028**	1.277	5.267	ug/L	76.734
	234	**U**	**-0.000014**	229.216	6.400	ug/L	7.200
	235	**U**	**0.001654**	12.415	56.400	ug/L	19.333
	236	**U**	**-0.000070**	15.738	5.667	ug/L	8.667
	238	**U**	**0.242932**	1.532	4984.871	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.832**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-25-E MS

Sample Date/Time: Friday, August 22, 2014 19:32:30

Autosampler Position: 74

Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-25-E MS.081

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			758098.173	ug/L	750864.488
	233	**U**	**-0.000964**	10.107	43.267	ug/L	76.734
	234	**U**	**0.016520**	1.173	449.940	ug/L	7.200
	235	**U**	**0.998816**	1.058	24862.585	ug/L	19.333
	236	**U**	**0.017780**	1.628	685.083	ug/L	8.667
	238	**U**	**2.197550**	1.389	48181.893	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.963**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-25-F MSD

Sample Date/Time: Friday, August 22, 2014 19:37:09

Autosampler Position: 75

Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-25-F MSD.082

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			743679.224	ug/L	750864.488
	233	**U**	**-0.000925**	10.905	43.933	ug/L	76.734
	234	**U**	**0.016955**	2.157	452.407	ug/L	7.200
	235	**U**	**1.027396**	1.667	25073.536	ug/L	19.333
	236	**U**	**0.018589**	3.067	701.951	ug/L	8.667
	238	**U**	**2.065892**	1.483	44427.923	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.043**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-26-C
Sample Date/Time: Friday, August 22, 2014 19:41:49
Autosampler Position: 76
Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-26-C.083

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			723283.168	ug/L	750864.488
	233	**U**	**-0.001990**	2.335	6.667	ug/L	76.734
	234	**U**	**-0.000032**	122.155	6.133	ug/L	7.200
	235	**U**	**0.007790**	5.394	203.135	ug/L	19.333
	236	**U**	**-0.000083**	33.591	5.333	ug/L	8.667
	238	**U**	**1.062550**	3.508	22227.821	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.327**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-27-C
Sample Date/Time: Friday, August 22, 2014 19:46:30
Autosampler Position: 77
Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-27-C.084

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			651151.249	ug/L	750864.488
	233	**U**	**-0.001980**	1.736	6.333	ug/L	76.734
	234	**U**	**0.000221**	2.741	11.333	ug/L	7.200
	235	**U**	**0.033309**	2.158	728.485	ug/L	19.333
	236	**U**	**-0.000067**	18.562	5.333	ug/L	8.667
	238	**U**	**3.846312**	1.959	72418.849	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**86.720**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-28-C
Sample Date/Time: Friday, August 22, 2014 19:51:10
Autosampler Position: 78
Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-28-C.085

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			724237.138	ug/L	750864.488
	233	**U**	**-0.001958**	1.115	7.800	ug/L	76.734
	234	**U**	**-0.000003**	194.637	6.867	ug/L	7.200
	235	**U**	**0.007541**	3.734	197.601	ug/L	19.333
	236	**U**	**-0.000080**	43.451	5.467	ug/L	8.667
	238	**U**	**1.137094**	2.892	23815.315	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.454**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-29-C
Sample Date/Time: Friday, August 22, 2014 19:55:50
Autosampler Position: 79
Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-29-C.086

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			723633.468	ug/L	750864.488
	233	**U**	**-0.001915**	2.912	9.200	ug/L	76.734
	234	**U**	**0.000065**	87.209	8.600	ug/L	7.200
	235	**U**	**0.011572**	4.829	293.336	ug/L	19.333
	236	**U**	**-0.000047**	72.274	6.667	ug/L	8.667
	238	**U**	**1.363678**	1.652	28547.448	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.373**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Friday, August 22, 2014 20:00:31
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082214M2\QC Std 9.087

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			698095.194	ug/L	750864.488
	233	**U**	**0.057014**	1.367	1928.797	ug/L	76.734
	234	**U**	**0.089834**	2.001	2220.839	ug/L	7.200
	235	**U**	**5.418106**	1.523	124045.468	ug/L	19.333
	236	**U**	**0.097910**	1.822	3438.415	ug/L	8.667
	238	**U**	**5.723691**	1.484	115458.978	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.972**	
	U	233		**110.707**
	U	234		**108.626**
	U	235		**111.771**
	U	236		**110.012**
	U	238		**113.884**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q
U	235	Q
U	236	Q
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Friday, August 22, 2014 20:05:12
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082214M2\QC Std 10.088

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			699771.303	ug/L	750864.488
	233	**U**	**0.092179**	3.552	3078.865	ug/L	76.734
	234	**U**	**0.000187**	44.998	11.267	ug/L	7.200
	235	**U**	**0.005031**	12.801	133.001	ug/L	19.333
	236	**U**	**0.000003**	1222.067	8.133	ug/L	8.667
	238	**U**	**0.027312**	3.978	592.679	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.195**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-30-C
Sample Date/Time: Friday, August 22, 2014 20:09:52
Autosampler Position: 80
Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-30-C.089

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			699118.783	ug/L	750864.488
	233	**U**	**-0.001861**	3.035	10.667	ug/L	76.734
	234	**U**	**0.000388**	26.702	16.267	ug/L	7.200
	235	**U**	**0.051524**	1.238	1200.050	ug/L	19.333
	236	**U**	**-0.000048**	8.766	6.400	ug/L	8.667
	238	**U**	**6.453377**	1.075	130441.249	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.109**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-34-C
Sample Date/Time: Friday, August 22, 2014 20:14:32
Autosampler Position: 81
Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-34-C.090

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			681593.954	ug/L	750864.488
	233	**U**	**-0.001959**	1.767	7.333	ug/L	76.734
	234	**U**	**0.000122**	51.216	9.467	ug/L	7.200
	235	**U**	**0.024252**	2.374	559.678	ug/L	19.333
	236	**U**	**-0.000043**	33.360	6.400	ug/L	8.667
	238	**U**	**3.108086**	0.316	61262.124	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.775**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-36-C
Sample Date/Time: Friday, August 22, 2014 20:19:12
Autosampler Position: 82
Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-36-C.091

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			690468.467	ug/L	750864.488
	233	**U**	**-0.001879**	4.562	10.000	ug/L	76.734
	234	**U**	**0.000133**	74.327	9.800	ug/L	7.200
	235	**U**	**0.021627**	1.010	507.609	ug/L	19.333
	236	**U**	**-0.000090**	25.043	4.867	ug/L	8.667
	238	**U**	**2.977898**	0.522	59462.830	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.956**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 430572
Sample Date/Time: Friday, August 22, 2014 20:23:53
Autosampler Position: 83
Dataset File: D:\Elandata\Dataset\082214M2\430572.092

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			727910.089	ug/L	750864.488
	233	**U**	**-0.002003**	1.944	6.267	ug/L	76.734
	234	**U**	**-0.000061**	117.858	5.333	ug/L	7.200
	235	**U**	**-0.000384**	22.727	9.667	ug/L	19.333
	236	**U**	**-0.000089**	22.810	5.133	ug/L	8.667
	238	**U**	**0.005722**	1.875	163.201	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.943**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 430573
Sample Date/Time: Friday, August 22, 2014 20:28:33
Autosampler Position: 84
Dataset File: D:\Elandata\Dataset\082214M2\430573.093

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			722739.510	ug/L	750864.488
	233	**U**	**0.000787**	7.376	100.334	ug/L	76.734
	234	**U**	**0.043897**	1.543	1127.245	ug/L	7.200
	235	**U**	**2.661710**	2.016	63088.468	ug/L	19.333
	236	**U**	**0.048228**	2.492	1756.441	ug/L	8.667
	238	**U**	**2.767535**	2.229	57799.991	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.254**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-31-D

Sample Date/Time: Friday, August 22, 2014 20:33:13

Autosampler Position: 85

Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-31-D.094

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			689184.065	ug/L	750864.488
	233	**U**	**-0.001899**	1.919	9.333	ug/L	76.734
	234	**U**	**0.001213**	12.683	36.133	ug/L	7.200
	235	**U**	**0.126934**	0.612	2887.759	ug/L	19.333
	236	**U**	**0.000179**	26.130	14.133	ug/L	8.667
	238	**U**	**6.073045**	0.625	121004.345	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.785**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-31-D SD

Sample Date/Time: Friday, August 22, 2014 20:37:53

Autosampler Position: 86

Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-31-D SD.095

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			707585.874	ug/L	750864.488
	233	**U**	**-0.002014**	1.515	5.800	ug/L	76.734
	234	**U**	**0.000194**	25.728	11.667	ug/L	7.200
	235	**U**	**0.025428**	0.468	608.613	ug/L	19.333
	236	**U**	**-0.000087**	8.677	5.067	ug/L	8.667
	238	**U**	**1.234505**	1.575	25272.556	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.236**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-31-E MS

Sample Date/Time: Friday, August 22, 2014 20:42:32
Autosampler Position: 87
Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-31-E MS.096

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			679795.886	ug/L	750864.488
	233	**U**	**-0.000705**	9.363	47.067	ug/L	76.734
	234	**U**	**0.019785**	2.729	481.608	ug/L	7.200
	235	**U**	**1.201729**	0.817	26817.219	ug/L	19.333
	236	**U**	**0.019868**	2.787	685.750	ug/L	8.667
	238	**U**	**7.227796**	1.065	142015.868	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.535**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-31-F MSD

Sample Date/Time: Friday, August 22, 2014 20:47:12

Autosampler Position: 88

Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-31-F MSD.097

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			685206.941	ug/L	750864.488
	233	**U**	**-0.000750**	16.308	45.933	ug/L	76.734
	234	**U**	**0.018978**	3.720	465.608	ug/L	7.200
	235	**U**	**1.188866**	1.403	26738.146	ug/L	19.333
	236	**U**	**0.019777**	1.177	687.950	ug/L	8.667
	238	**U**	**7.002025**	0.830	138671.303	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.256**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-32-D
Sample Date/Time: Friday, August 22, 2014 20:51:53
Autosampler Position: 89
Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-32-D.098

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			677484.655	ug/L	750864.488
	233	**U**	**-0.001916**	1.309	8.600	ug/L	76.734
	234	**U**	**0.000348**	30.256	14.800	ug/L	7.200
	235	**U**	**0.036481**	1.246	828.157	ug/L	19.333
	236	**U**	**-0.000017**	133.151	7.267	ug/L	8.667
	238	**U**	**4.496323**	1.256	88085.712	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.227**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Friday, August 22, 2014 20:56:33
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082214M2\QC Std 9.099

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			682825.412	ug/L	750864.488
	233	**U**	**0.057621**	2.751	1904.860	ug/L	76.734
	234	**U**	**0.091878**	2.471	2220.906	ug/L	7.200
	235	**U**	**5.549775**	2.507	124221.435	ug/L	19.333
	236	**U**	**0.101149**	2.936	3470.555	ug/L	8.667
	238	**U**	**5.872520**	1.367	115861.728	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.939**	
	U	233		**111.885**
	U	234		**111.098**
	U	235		**114.487**
	U	236		**113.651**
	U	238		**116.845**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q
U	234	Q
U	235	Q
U	236	Q
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10
Sample Date/Time: Friday, August 22, 2014 21:01:14
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082214M2\QC Std 10.100

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			681131.115	ug/L	750864.488
	233	**U**	**0.093309**	1.414	3035.523	ug/L	76.734
	234	**U**	**0.000184**	25.664	11.000	ug/L	7.200
	235	**U**	**0.005649**	7.427	144.201	ug/L	19.333
	236	**U**	**0.000099**	34.934	11.267	ug/L	8.667
	238	**U**	**0.029649**	0.433	623.814	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.713**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-35-D

Sample Date/Time: Friday, August 22, 2014 21:05:54

Autosampler Position: 90

Dataset File: D:\Elandata\Dataset\082214M2\680-102327-A-35-D.101

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			682773.695	ug/L	750864.488
	233	**U**	**-0.001945**	2.678	7.733	ug/L	76.734
	234	**U**	**0.000612**	3.983	21.333	ug/L	7.200
	235	**U**	**0.073068**	2.116	1653.496	ug/L	19.333
	236	**U**	**0.000016**	155.013	8.400	ug/L	8.667
	238	**U**	**4.969257**	2.068	98037.494	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.932**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Friday, August 22, 2014 21:10:35
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082214M2\QC Std 9.102

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			678846.875	ug/L	750864.488
	233	**U**	**0.058356**	1.303	1918.262	ug/L	76.734
	234	**U**	**0.092642**	2.203	2227.040	ug/L	7.200
	235	**U**	**5.545085**	1.015	123483.835	ug/L	19.333
	236	**U**	**0.100974**	1.586	3446.749	ug/L	8.667
	238	**U**	**5.835969**	1.002	114495.717	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.409**	
	U	233		**113.312**
	U	234		**112.022**
	U	235		**114.391**
	U	236		**113.454**
	U	238		**116.118**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q
U	234	Q
U	235	Q
U	236	Q
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Friday, August 22, 2014 21:15:15
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082214M2\QC Std 10.103

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			672116.163	ug/L	750864.488
	233	**U**	**0.093614**	2.435	3003.449	ug/L	76.734
	234	**U**	**0.000213**	50.327	11.400	ug/L	7.200
	235	**U**	**0.005402**	2.240	136.467	ug/L	19.333
	236	**U**	**0.000086**	26.071	10.667	ug/L	8.667
	238	**U**	**0.028321**	1.114	589.479	ug/L	44.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.512**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q
U	238	Q

KE 8/26/14
File: 0825143

A Batch
140203
140204

Sample/Batch Report

TA ST. LOUIS - PERKIN ELMER ELAN 6100 - METHOD 6020 / 200.8 QUANTITATIVE ANALYSIS REPORT

User Name: stlmetals
Computer Name: SLICP03
Sample File: D:\Elandata\Sample\SW846 TEMP1.sam
Report Date/Time: Tuesday, August 26, 2014 12:04:26
Method File: d:\Elandata\Method\2014 isou.mth
Tuning File: d:\Elandata\Tuning\epa tuning.tun
Optimization File: d:\Elandata\Optimize\epa2008.dac
Calibration File:
Calibration Type: External Calibration
Number of Replicates: 3
Number of Readings: 1
Number of Sweeps: 100
Dual Detector Mode: Dual

Calibration U-233 failed

A/S Loc.	Batch ID	Sample ID	Description	Aliquot Vol.	Diluted Vol.
11	139821	434264	2		
12		434265	2		
13		680-102327-A-24-E	5		
14		680-102327-A-24-E SD	25		
15		680-102327-A-24-F MS	5		
16		680-102327-A-24-G MS	5		
17	139022	430546	2		
18		430547	2		
19		680-102327-A-1-H	5		
20	CCV	680-102327-A-1-H SD	25		
21	CCB	680-102327-A-1-I MS	5		
22		680-102327-A-1-J MSD	5		
23		680-102327-A-2-E	5		
24		680-102327-A-3-E	5		
25		680-102327-A-5-D	5		
26		680-102327-A-6-D	5		
27		680-102327-A-7-D	5		
28		680-102327-A-9-D	5		
29		680-102327-A-10-D	5		
30	CCV	680-102327-A-11-D	5		
31	CCB	680-102327-A-13-D	5		
32		680-102327-A-14-D	5		
33		680-102327-A-15-F	5		
34		680-102327-A-16-D	5		
35		680-102327-A-17-D	5		
36		680-102327-A-18-D	5		
37		680-102327-A-19-D	5		
38		680-102327-A-21-D	5		
39	CCV	680-102327-A-22-D	5		
40	CCB	680-102327-A-23-D	5		
41	139040	430685	2		
42		430686	2		
43		680-102370-A-7-D	5		
44		680-102370-A-8-C	5		
45		680-102370-A-9-C	5		
46		680-102370-A-10-C	5		
47		680-102370-A-11-C	5		
48		680-102370-A-12-C	5		
49		680-102370-A-13-C	5		
50		680-102370-A-14-C	5		
51		680-102370-A-15-C	5		

U-238

KE 8/26/14

52		680-102370-A-16-C	5
53		680-102370-A-17-C	5
54		680-102370-A-18-C	5
55		680-102370-A-19-C	5
56		680-102370-A-20-C	5
57		680-102370-A-22-C	5
58		680-102370-A-23-G	5
59		680-102370-A-23-G SD	25
60		680-102370-A-23-H MS	5
61		680-102370-A-23-I MSD	5
62		680-102370-A-24-C	5
63		680-102370-A-25-C	5
64	139047	430790	2
65		430791	2
66		680-102370-A-26-C	5
67		680-102370-A-26-C SD	25
68		680-102370-A-26-D MS	5
69		680-102370-A-26-E MS	5
70		680-102370-A-28-C	5
71		680-102370-A-29-C	5
72		680-102370-A-30-C	5
73		680-102370-A-31-C	5
74		680-102370-A-33-D	5
75		680-102370-A-34-C	5
76	139348	431772	2
77		431773	2
78		680-102577-A-1-D	5
79		680-102577-A-2-C	5
80		680-102431-A-1-C	5
81		680-102431-A-2-C	5
82		680-102431-A-3-C	5
83		680-102431-A-4-C	5
84		680-102431-A-5-G	5
85		680-102431-A-5-G SD	25
86		680-102431-A-5-H MS	5
87		680-102431-A-5-I MSD	5
88		680-102431-A-7-C	5
89		680-102431-A-8-C	5
90		680-102431-A-8-D MS	5
91		680-102431-A-8-E MSD	5
92		680-102431-A-9-C	5
93		680-102431-A-11-C	5
94		680-102431-A-12-C	5
95		680-102431-A-13-C	5
96		680-102431-A-15-C	5
97		680-102431-A-16-C	5
98		680-102431-A-17-C	5

KL 8/26/14

Quantitative Analysis Calibration Report

File Name: 082514M3.cal
File Path: D:\Elandata\System
Calibration Type: External Calibration

Analyte	Mass	Curve Type	Slope	Intercept	Corr. Coeff.
Ho (IS)	164.930	Linear Thru Zero	0.000000	0.00	0.000000
U	233.000	Linear Thru Zero	0.044234	0.00	0.993943
U	234.041	Linear Thru Zero	0.037909	0.00	0.999981
U	235.044	Linear Thru Zero	0.034895	0.00	0.999998
U	236.000	Linear Thru Zero	0.055267	0.00	0.999990
U	238.050	Linear Thru Zero	0.030898	0.00	0.999999

QUANTITATIVE ANALYSIS REPORT

Sample ID: Blank

Sample Date/Time: Monday, August 25, 2014 15:14:03
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082514M3\Blank.001

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			803948.064	ug/L	
	233	**U**			1016.636	ug/L	
	234	**U**			6.400	ug/L	
	235	**U**			45.733	ug/L	
	236	**U**			6.600	ug/L	
	238	**U**			321.737	ug/L	

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 1
Sample Date/Time: Monday, August 25, 2014 15:20:43
Autosampler Position: 191
Dataset File: D:\Elandata\Dataset\082514M3\Standard 1.002

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			813759.363	ug/L	803948.064
	233	**U**			25.533	ug/L	1016.636
	234	**U**			31.667	ug/L	6.400
	235	**U**	**0.048500**	2.830	1411.736	ug/L	45.733
	236	**U**			48.067	ug/L	6.600
	238	**U**	**0.050300**	2.435	1284.658	ug/L	321.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 2
Sample Date/Time: Monday, August 25, 2014 15:25:24
Autosampler Position: 192
Dataset File: D:\Elandata\Dataset\082514M3\Standard 2.003

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			804982.317	ug/L	803948.064
	233	**U**			1252.455	ug/L	1016.636
	234	**U**	**0.049600**	4.305	1500.145	ug/L	6.400
	235	**U**	**2.970176**	2.481	82789.546	ug/L	45.733
	236	**U**	**0.053400**	1.965	2330.457	ug/L	6.600
	238	**U**	**3.966699**	1.692	75151.859	ug/L	321.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 3
Sample Date/Time: Monday, August 25, 2014 15:30:05
Autosampler Position: 193
Dataset File: D:\Elandata\Dataset\082514M3\Standard 3.004

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			797365.025	ug/L	803948.064
	233	**U**	**0.051500**	1.389	2079.552	ug/L	1016.636
	234	**U**	**0.082673**	1.942	2474.281	ug/L	6.400
	235	**U**	**4.950579**	2.288	136641.812	ug/L	45.733
	236	**U**	**0.089378**	3.320	3856.187	ug/L	6.600
	238	**U**	**6.619404**	2.865	123934.562	ug/L	321.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 4
Sample Date/Time: Monday, August 25, 2014 15:34:46
Autosampler Position: 194
Dataset File: D:\Elandata\Dataset\082514M3\Standard 4.005

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			799407.550	ug/L	803948.064
	233	**U**	**0.109642**	3.583	4089.519	ug/L	1016.636
	234	**U**	**0.164965**	3.441	4832.351	ug/L	6.400
	235	**U**	**9.694899**	2.283	267566.036	ug/L	45.733
	236	**U**	**0.177864**	2.681	7625.770	ug/L	6.600
	238	**U**	**10.051856**	1.493	242853.474	ug/L	321.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 5
Sample Date/Time: Monday, August 25, 2014 15:39:27
Autosampler Position: 195
Dataset File: D:\Elandata\Dataset\082514M3\Standard 5.006

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			795262.154	ug/L	803948.064
	233	**U**	**0.318913**	3.148	12557.121	ug/L	1016.636
	234	**U**	**0.497682**	3.363	14906.845	ug/L	6.400
	235	**U**	**29.118428**	2.921	807535.106	ug/L	45.733
	236	**U**	**0.535475**	2.274	23395.362	ug/L	6.600
	238	**U**	**30.190452**	2.179	732413.314	ug/L	321.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 1

Sample Date/Time: Monday, August 25, 2014 15:44:08
Autosampler Position: 196
Dataset File: D:\Elandata\Dataset\082514M3\QC Std 1.007

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			791816.016	ug/L	803948.064
	233	**U**	**0.228375**	3.239	9237.254	ug/L	1016.636
	234	**U**	**0.000681**	10.792	26.533	ug/L	6.400
	235	**U**	**0.008577**	29.875	279.269	ug/L	45.733
	236	**U**	**0.000192**	36.063	14.800	ug/L	6.600
	238	**U**	**0.048177**	7.583	1477.476	ug/L	321.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.491**	
	U	233		**102.181**
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 2

Sample Date/Time: Monday, August 25, 2014 15:48:49
Autosampler Position: 197
Dataset File: D:\Elandata\Dataset\082514M3\QC Std 2.008

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			791800.570	ug/L	803948.064
	233	**U**	**47.618613**	1.915	1719364.466	ug/L	1016.636
	234	**U**	**0.088054**	3.345	2632.109	ug/L	6.400
	235	**U**	**0.111816**	2.282	3133.744	ug/L	45.733
	236	**U**	**0.006861**	2.902	304.870	ug/L	6.600
	238	**U**	**9.930843**	1.798	240144.864	ug/L	321.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.489**	
	U	233		
	U	234		**105.453**
	U	235		
	U	236		
	U	238		**101.561**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 3

Sample Date/Time: Monday, August 25, 2014 15:53:30
Autosampler Position: 198
Dataset File: D:\Elandata\Dataset\082514M3\QC Std 3.009

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			798492.137	ug/L	803948.064
	233	**U**	**484.208877**	1.757	17620976.721	ug/L	1016.636
	234	**U**	**0.902158**	2.793	27131.764	ug/L	6.400
	235	**U**	**1.140814**	2.296	31817.100	ug/L	45.733
	236	**U**	**0.069792**	1.619	3068.463	ug/L	6.600
	238	**U**	**95.363086**	2.264	2322022.828	ug/L	321.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.321**	
	U	233		
	U	234		
	U	235		**107.950**
	U	236		**93.555**
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Monday, August 25, 2014 16:00:41
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082514M3\QC Std 9.010

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			798614.125	ug/L	803948.064
	233	**U**	**0.076338**	20.279	3767.099	ug/L	1016.636
	234	**U**	**0.082196**	3.560	2477.548	ug/L	6.400
	235	**U**	**4.909650**	2.373	136806.499	ug/L	45.733
	236	**U**	**0.088767**	2.501	3900.333	ug/L	6.600
	238	**U**	**5.107621**	2.340	124691.236	ug/L	321.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.337**	
	U	233		**148.229**
	U	234		**99.390**
	U	235		**101.282**
	U	236		**99.738**
	U	238		**101.626**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: Blank

Sample Date/Time: Monday, August 25, 2014 16:05:33
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082514M3\Blank.011

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			790430.887	ug/L	
	233	**U**			1319.194	ug/L	
	234	**U**			7.867	ug/L	
	235	**U**			70.000	ug/L	
	236	**U**			8.200	ug/L	
	238	**U**			378.205	ug/L	

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 1

Sample Date/Time: Monday, August 25, 2014 16:12:12
Autosampler Position: 191
Dataset File: D:\Elandata\Dataset\082514M3\Standard 1.012

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			795158.412	ug/L	790430.887
	233	**U**			399.539	ug/L	1319.194
	234	**U**			29.533	ug/L	7.867
	235	**U**	**0.048500**	2.357	1401.402	ug/L	70.000
	236	**U**			45.467	ug/L	8.200
	238	**U**	**0.050300**	3.072	1314.861	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 2
Sample Date/Time: Monday, August 25, 2014 16:16:53
Autosampler Position: 192
Dataset File: D:\Elandata\Dataset\082514M3\Standard 2.013

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			785661.593	ug/L	790430.887
	233	**U**			1382.867	ug/L	1319.194
	234	**U**	**0.049600**	3.190	1504.879	ug/L	7.867
	235	**U**	**3.042075**	2.401	82488.542	ug/L	70.000
	236	**U**	**0.053400**	1.531	2325.389	ug/L	8.200
	238	**U**	**4.094890**	1.854	75536.613	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 3
Sample Date/Time: Monday, August 25, 2014 16:21:34
Autosampler Position: 193
Dataset File: D:\Elandata\Dataset\082514M3\Standard 3.014

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			777101.505	ug/L	790430.887
	233	**U**	**0.051500**	5.010	2145.828	ug/L	1319.194
	234	**U**	**0.082478**	3.190	2469.880	ug/L	7.867
	235	**U**	**5.132794**	2.356	137618.763	ug/L	70.000
	236	**U**	**0.089683**	0.992	3858.389	ug/L	8.200
	238	**U**	**6.840450**	2.664	124511.886	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 4
Sample Date/Time: Monday, August 25, 2014 16:26:15
Autosampler Position: 194
Dataset File: D:\Elandata\Dataset\082514M3\Standard 4.015

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			789546.306	ug/L	790430.887
	233	**U**	**0.111724**	3.392	4148.470	ug/L	1319.194
	234	**U**	**0.164843**	2.230	4860.094	ug/L	7.867
	235	**U**	**9.694904**	2.720	268375.266	ug/L	70.000
	236	**U**	**0.177800**	2.061	7663.592	ug/L	8.200
	238	**U**	**10.051861**	2.360	244610.555	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 5
Sample Date/Time: Monday, August 25, 2014 16:30:56
Autosampler Position: 195
Dataset File: D:\Elandata\Dataset\082514M3\Standard 5.016

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			790646.698	ug/L	790430.887
	233	**U**	**0.320832**	2.921	12526.095	ug/L	1319.194
	234	**U**	**0.496933**	2.794	14884.491	ug/L	7.867
	235	**U**	**29.066264**	3.057	800946.632	ug/L	70.000
	236	**U**	**0.534700**	2.425	23348.553	ug/L	8.200
	238	**U**	**30.165306**	2.807	736424.635	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 1

Sample Date/Time: Monday, August 25, 2014 16:35:37
Autosampler Position: 196
Dataset File: D:\Elandata\Dataset\082514M3\QC Std 1.017

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			782906.227	ug/L	790430.887
	233	**U**	**0.233022**	3.434	9363.871	ug/L	1319.194
	234	**U**	**0.000595**	5.685	25.400	ug/L	7.867
	235	**U**	**0.009776**	17.245	334.337	ug/L	70.000
	236	**U**	**0.000215**	35.469	17.267	ug/L	8.200
	238	**U**	**0.047754**	6.711	1526.282	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.048**	
	U	233		**104.261**
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 2

Sample Date/Time: Monday, August 25, 2014 16:40:18
Autosampler Position: 197
Dataset File: D:\Elandata\Dataset\082514M3\QC Std 2.018

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			779952.059	ug/L	790430.887
	233	**U**	**50.322847**	0.869	1736921.143	ug/L	1319.194
	234	**U**	**0.089603**	0.314	2656.781	ug/L	7.867
	235	**U**	**0.115020**	3.122	3196.625	ug/L	70.000
	236	**U**	**0.006988**	1.893	309.137	ug/L	8.200
	238	**U**	**10.080140**	0.971	243214.692	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.674**	
	U	233		
	U	234		**107.309**
	U	235		
	U	236		
	U	238		**103.088**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 3

Sample Date/Time: Monday, August 25, 2014 16:44:59
Autosampler Position: 198
Dataset File: D:\Elandata\Dataset\082514M3\QC Std 3.019

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			783368.092	ug/L	790430.887
	233	**U**	**504.455717**	3.247	17459805.469	ug/L	1319.194
	234	**U**	**0.903854**	3.594	26813.020	ug/L	7.867
	235	**U**	**1.153001**	2.979	31550.959	ug/L	70.000
	236	**U**	**0.069402**	3.425	3009.050	ug/L	8.200
	238	**U**	**95.646730**	2.851	2313024.717	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.106**	
	U	233		
	U	234		
	U	235		**109.103**
	U	236		**93.032**
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 4

Sample Date/Time: Monday, August 25, 2014 16:49:39
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082514M3\QC Std 4.020

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			786346.489	ug/L	790430.887
	233	**U**	**0.129616**	16.617	5793.780	ug/L	1319.194
	234	**U**	**0.000180**	37.945	13.133	ug/L	7.867
	235	**U**	**-0.000302**	68.212	61.133	ug/L	70.000
	236	**U**	**-0.000010**	215.928	7.733	ug/L	8.200
	238	**U**	**0.024569**	19.395	969.100	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.483**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 5

Sample Date/Time: Monday, August 25, 2014 16:54:19
Autosampler Position: 191
Dataset File: D:\Elandata\Dataset\082514M3\QC Std 5.021

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			778900.780	ug/L	790430.887
	233	**U**	**0.009075**	160.407	1593.626	ug/L	1319.194
	234	**U**	**0.000854**	11.546	32.867	ug/L	7.867
	235	**U**	**0.049982**	2.345	1426.271	ug/L	70.000
	236	**U**	**0.000890**	4.775	46.333	ug/L	8.200
	238	**U**	**0.047662**	9.878	1515.414	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.541**	
	U	233		
	U	234		
	U	235		**103.056**
	U	236		
	U	238		**94.755**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Monday, August 25, 2014 16:59:00
Autosampler Position: 192
Dataset File: D:\Elandata\Dataset\082514M3\QC Std 6.022

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			794462.534	ug/L	790430.887
	233	**U**	**0.014116**	32.582	1814.982	ug/L	1319.194
	234	**U**	**0.050564**	1.627	1530.749	ug/L	7.867
	235	**U**	**3.049331**	1.444	84557.900	ug/L	70.000
	236	**U**	**0.054327**	2.140	2391.400	ug/L	8.200
	238	**U**	**3.133410**	1.769	77247.052	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.510**	
	U	233		**45.684**
	U	234		**101.943**
	U	235		
	U	236		**101.735**
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Monday, August 25, 2014 17:03:41
Autosampler Position: 199
Dataset File: D:\Elandata\Dataset\082514M3\QC Std 7.023

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			739296.233	ug/L	790430.887
	233	**U**	**-0.030773**	7.288	224.335	ug/L	1319.194
	234	**U**	**-0.000057**	51.569	5.733	ug/L	7.867
	235	**U**	**-0.001483**	18.096	26.933	ug/L	70.000
	236	**U**	**-0.000061**	27.090	5.133	ug/L	8.200
	238	**U**	**-0.012219**	6.194	73.867	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.531**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 8

Sample Date/Time: Monday, August 25, 2014 17:08:22
Autosampler Position: 200
Dataset File: D:\Elandata\Dataset\082514M3\QC Std 8.024

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			728023.690	ug/L	790430.887
	233	**U**	**0.027994**	9.451	2112.956	ug/L	1319.194
	234	**U**	**0.088223**	1.440	2440.742	ug/L	7.867
	235	**U**	**5.325915**	2.356	135232.277	ug/L	70.000
	236	**U**	**0.095053**	2.373	3828.313	ug/L	8.200
	238	**U**	**5.471292**	2.394	123301.546	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.105**	
	U	233		**54.357**
	U	234		**106.678**
	U	235		**109.869**
	U	236		**106.801**
	U	238		**108.862**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Monday, August 25, 2014 17:13:04
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082514M3\QC Std 9.025

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			800583.542	ug/L	790430.887
	233	**U**	**0.027513**	11.256	2305.853	ug/L	1319.194
	234	**U**	**0.088026**	2.144	2677.184	ug/L	7.867
	235	**U**	**5.273215**	2.064	147259.006	ug/L	70.000
	236	**U**	**0.094346**	1.421	4180.346	ug/L	8.200
	238	**U**	**5.435069**	1.941	134719.053	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.284**	
	U	233		**53.423**
	U	234		**106.440**
	U	235		**108.782**
	U	236		**106.006**
	U	238		**108.141**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Monday, August 25, 2014 17:17:44
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082514M3\QC Std 10.026

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			802124.576	ug/L	790430.887
	233	**U**	**0.004907**	45.666	1509.813	ug/L	1319.194
	234	**U**	**-0.000013**	527.884	7.533	ug/L	7.867
	235	**U**	**0.000574**	50.155	86.800	ug/L	70.000
	236	**U**	**-0.000023**	112.269	7.267	ug/L	8.200
	238	**U**	**0.001787**	61.040	427.140	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.479**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 434264

Sample Date/Time: Monday, August 25, 2014 17:22:23
Autosampler Position: 11
Dataset File: D:\Elandata\Dataset\082514M3\434264.027

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			834815.180	ug/L	790430.887
	233	**U**	**-0.037079**	0.178	24.000	ug/L	1319.194
	234	**U**	**-0.000103**	12.966	5.067	ug/L	7.867
	235	**U**	**-0.002117**	1.990	12.267	ug/L	70.000
	236	**U**	**-0.000082**	21.908	4.867	ug/L	8.200
	238	**U**	**-0.003478**	22.841	309.003	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**105.615**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 434265

Sample Date/Time: Monday, August 25, 2014 17:27:03
Autosampler Position: 12
Dataset File: D:\Elandata\Dataset\082514M3\434265.028

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			842591.575	ug/L	790430.887
	233	**U**	**-0.034116**	0.303	134.867	ug/L	1319.194
	234	**U**	**0.043439**	1.800	1394.802	ug/L	7.867
	235	**U**	**2.627553**	2.340	77251.306	ug/L	70.000
	236	**U**	**0.047289**	3.039	2207.971	ug/L	8.200
	238	**U**	**2.678066**	2.573	70048.256	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**106.599**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-24-E

Sample Date/Time: Monday, August 25, 2014 17:31:43

Autosampler Position: 13

Dataset File: D:\Elandata\Dataset\082514M3\680-102327-A-24-E.029

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			773265.814	ug/L	790430.887
	233	**U**	**-0.037146**	0.218	20.000	ug/L	1319.194
	234	**U**	**0.000032**	107.062	8.600	ug/L	7.867
	235	**U**	**0.012471**	2.563	404.872	ug/L	70.000
	236	**U**	**-0.000065**	65.110	5.200	ug/L	8.200
	238	**U**	**1.255686**	1.309	30369.667	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.828**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-24-E SD

Sample Date/Time: Monday, August 25, 2014 17:36:23

Autosampler Position: 14

Dataset File: D:\Elandata\Dataset\082514M3\680-102327-A-24-E SD.030

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			809823.041	ug/L	790430.887
	233	**U**	**-0.037327**	0.088	14.467	ug/L	1319.194
	234	**U**	**-0.000093**	76.670	5.133	ug/L	7.867
	235	**U**	**0.000412**	44.268	83.334	ug/L	70.000
	236	**U**	**-0.000068**	35.040	5.333	ug/L	8.200
	238	**U**	**0.231315**	2.239	6170.934	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**102.453**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-24-F MS

Sample Date/Time: Monday, August 25, 2014 17:41:03

Autosampler Position: 15

Dataset File: D:\Elandata\Dataset\082514M3\680-102327-A-24-F MS.031

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			756386.199	ug/L	790430.887
	233	**U**	**-0.036227**	0.083	50.267	ug/L	1319.194
	234	**U**	**0.015484**	2.438	451.340	ug/L	7.867
	235	**U**	**0.927511**	0.840	24548.955	ug/L	70.000
	236	**U**	**0.016522**	0.987	698.417	ug/L	8.200
	238	**U**	**2.233346**	0.773	52555.139	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.693**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-24-G MSD

Sample Date/Time: Monday, August 25, 2014 17:45:43

Autosampler Position: 16

Dataset File: D:\Elandata\Dataset\082514M3\680-102327-A-24-G MSD.032

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			747449.435	ug/L	790430.887
	233	**U**	**-0.036107**	0.450	53.667	ug/L	1319.194
	234	**U**	**0.017918**	2.129	515.276	ug/L	7.867
	235	**U**	**1.084978**	2.330	28369.033	ug/L	70.000
	236	**U**	**0.018771**	2.684	783.155	ug/L	8.200
	238	**U**	**2.649812**	1.184	61555.319	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.562**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 430546

Sample Date/Time: Monday, August 25, 2014 17:50:23
Autosampler Position: 17
Dataset File: D:\Elandata\Dataset\082514M3\430546.033

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			834034.785	ug/L	790430.887
	233	**U**	**-0.037424**	0.185	11.200	ug/L	1319.194
	234	**U**	**-0.000095**	34.501	5.333	ug/L	7.867
	235	**U**	**-0.002116**	0.636	12.267	ug/L	70.000
	236	**U**	**-0.000085**	67.454	4.800	ug/L	8.200
	238	**U**	**-0.007283**	6.861	210.935	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**105.516**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 430547
Sample Date/Time: Monday, August 25, 2014 17:55:04
Autosampler Position: 18
Dataset File: D:\Elandata\Dataset\082514M3\430547.034

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			831359.831	ug/L	790430.887
	233	**U**	**-0.034183**	0.291	130.334	ug/L	1319.194
	234	**U**	**0.046922**	2.204	1485.744	ug/L	7.867
	235	**U**	**2.818996**	1.797	81797.347	ug/L	70.000
	236	**U**	**0.050163**	3.193	2310.520	ug/L	8.200
	238	**U**	**2.870385**	3.329	74032.303	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**105.178**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-1-H

Sample Date/Time: Monday, August 25, 2014 17:59:44
Autosampler Position: 19
Dataset File: D:\Elandata\Dataset\082514M3\680-102327-A-1-H.035

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			740547.015	ug/L	790430.887
	233	**U**	**-0.037260**	0.107	15.400	ug/L	1319.194
	234	**U**	**0.000341**	14.826	16.933	ug/L	7.867
	235	**U**	**0.050972**	0.700	1382.667	ug/L	70.000
	236	**U**	**-0.000039**	26.897	6.067	ug/L	8.200
	238	**U**	**6.962361**	0.110	159666.181	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.689**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-1-H SD

Sample Date/Time: Monday, August 25, 2014 18:04:25

Autosampler Position: 20

Dataset File: D:\Elandata\Dataset\082514M3\680-102327-A-1-H SD.036

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			765608.766	ug/L	790430.887
	233	**U**	**-0.037403**	0.177	11.000	ug/L	1319.194
	234	**U**	**-0.000007**	188.593	7.400	ug/L	7.867
	235	**U**	**0.008272**	5.572	288.470	ug/L	70.000
	236	**U**	**-0.000056**	76.213	5.533	ug/L	8.200
	238	**U**	**1.367921**	2.429	32701.878	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.860**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Monday, August 25, 2014 18:09:05
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082514M3\QC Std 9.037

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			782232.581	ug/L	790430.887
	233	**U**	**0.024422**	5.569	2148.562	ug/L	1319.194
	234	**U**	**0.085505**	2.164	2541.426	ug/L	7.867
	235	**U**	**5.166837**	1.781	141004.961	ug/L	70.000
	236	**U**	**0.093220**	1.888	4035.304	ug/L	8.200
	238	**U**	**5.321282**	1.587	128903.709	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.963**	
	U	233		**47.421**
	U	234		**103.392**
	U	235		**106.588**
	U	236		**104.741**
	U	238		**105.877**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Monday, August 25, 2014 18:13:46
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082514M3\QC Std 10.038

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			757490.583	ug/L	790430.887
	233	**U**	**0.005466**	18.018	1446.007	ug/L	1319.194
	234	**U**	**0.000008**	341.868	7.733	ug/L	7.867
	235	**U**	**0.000574**	75.068	81.800	ug/L	70.000
	236	**U**	**-0.000004**	420.954	7.733	ug/L	8.200
	238	**U**	**0.002286**	25.212	415.406	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.833**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-1-I MS

Sample Date/Time: Monday, August 25, 2014 18:18:26

Autosampler Position: 21

Dataset File: D:\Elandata\Dataset\082514M3\680-102327-A-1-I MS.039

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			728743.952	ug/L	790430.887
	233	**U**	**-0.036014**	0.144	55.333	ug/L	1319.194
	234	**U**	**0.017568**	3.817	492.342	ug/L	7.867
	235	**U**	**1.075696**	0.644	27417.827	ug/L	70.000
	236	**U**	**0.018345**	1.737	746.620	ug/L	8.200
	238	**U**	**7.926859**	0.418	178830.975	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.196**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-1-J MSD

Sample Date/Time: Monday, August 25, 2014 18:23:07

Autosampler Position: 22

Dataset File: D:\Elandata\Dataset\082514M3\680-102327-A-1-J MSD.040

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			732070.507	ug/L	790430.887
	233	**U**	**-0.036054**	0.041	54.267	ug/L	1319.194
	234	**U**	**0.018223**	3.396	512.876	ug/L	7.867
	235	**U**	**1.107401**	0.509	28353.648	ug/L	70.000
	236	**U**	**0.019113**	1.215	780.821	ug/L	8.200
	238	**U**	**7.751995**	0.329	175694.165	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.617**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-2-E

Sample Date/Time: Monday, August 25, 2014 18:27:47
Autosampler Position: 23
Dataset File: D:\Elandata\Dataset\082514M3\680-102327-A-2-E.041

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			714216.305	ug/L	790430.887
	233	**U**	**-0.037270**	0.035	14.533	ug/L	1319.194
	234	**U**	**0.000353**	20.342	16.667	ug/L	7.867
	235	**U**	**0.041922**	1.641	1108.043	ug/L	70.000
	236	**U**	**-0.000055**	43.506	5.267	ug/L	8.200
	238	**U**	**5.584155**	0.903	123575.950	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.358**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-3-E

Sample Date/Time: Monday, August 25, 2014 18:32:27
Autosampler Position: 24
Dataset File: D:\Elandata\Dataset\082514M3\680-102327-A-3-E.042

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			748289.193	ug/L	790430.887
	233	**U**	**-0.037255**	0.108	15.733	ug/L	1319.194
	234	**U**	**0.000208**	35.013	13.333	ug/L	7.867
	235	**U**	**0.029329**	2.441	831.691	ug/L	70.000
	236	**U**	**-0.000033**	86.245	6.400	ug/L	8.200
	238	**U**	**4.209650**	0.894	97669.422	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.669**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-5-D

Sample Date/Time: Monday, August 25, 2014 18:37:06

Autosampler Position: 25

Dataset File: D:\Elandata\Dataset\082514M3\680-102327-A-5-D.043

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			718796.388	ug/L	790430.887
	233	**U**	**-0.037299**	0.103	13.733	ug/L	1319.194
	234	**U**	**0.000295**	16.691	15.200	ug/L	7.867
	235	**U**	**0.040959**	0.775	1090.908	ug/L	70.000
	236	**U**	**-0.000050**	42.427	5.467	ug/L	8.200
	238	**U**	**5.889786**	0.783	131150.047	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.937**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-6-D

Sample Date/Time: Monday, August 25, 2014 18:41:46
Autosampler Position: 26
Dataset File: D:\Elandata\Dataset\082514M3\680-102327-A-6-D.044

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			725494.484	ug/L	790430.887
	233	**U**	**-0.037199**	0.125	17.067	ug/L	1319.194
	234	**U**	**0.000417**	10.271	18.667	ug/L	7.867
	235	**U**	**0.047178**	2.352	1258.922	ug/L	70.000
	236	**U**	**-0.000035**	40.023	6.133	ug/L	8.200
	238	**U**	**6.540463**	0.703	146958.812	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.785**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-7-D

Sample Date/Time: Monday, August 25, 2014 18:46:26

Autosampler Position: 27

Dataset File: D:\Elandata\Dataset\082514M3\680-102327-A-7-D.045

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			761072.199	ug/L	790430.887
	233	**U**	**-0.037294**	0.119	14.667	ug/L	1319.194
	234	**U**	**0.000131**	55.350	11.333	ug/L	7.867
	235	**U**	**0.022465**	2.572	664.415	ug/L	70.000
	236	**U**	**-0.000083**	11.065	4.400	ug/L	8.200
	238	**U**	**3.313385**	2.066	78310.387	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.286**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-9-D

Sample Date/Time: Monday, August 25, 2014 18:51:06

Autosampler Position: 28

Dataset File: D:\Elandata\Dataset\082514M3\680-102327-A-9-D.046

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			696626.290	ug/L	790430.887
	233	**U**	**-0.037312**	0.256	12.867	ug/L	1319.194
	234	**U**	**0.000303**	17.902	14.933	ug/L	7.867
	235	**U**	**0.044221**	2.056	1136.579	ug/L	70.000
	236	**U**	**-0.000072**	19.889	4.467	ug/L	8.200
	238	**U**	**6.219778**	0.993	134199.111	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.132**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-10-D

Sample Date/Time: Monday, August 25, 2014 18:55:46

Autosampler Position: 29

Dataset File: D:\Elandata\Dataset\082514M3\680-102327-A-10-D.047

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			719921.610	ug/L	790430.887
	233	**U**	**-0.037345**	0.099	12.267	ug/L	1319.194
	234	**U**	**0.000414**	7.572	18.467	ug/L	7.867
	235	**U**	**0.049175**	0.936	1299.259	ug/L	70.000
	236	**U**	**-0.000011**	405.975	7.000	ug/L	8.200
	238	**U**	**6.034776**	1.411	134566.406	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.080**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-11-D

Sample Date/Time: Monday, August 25, 2014 19:00:26

Autosampler Position: 30

Dataset File: D:\Elandata\Dataset\082514M3\680-102327-A-11-D.048

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			719546.902	ug/L	790430.887
	233	**U**	**-0.037387**	0.190	10.867	ug/L	1319.194
	234	**U**	**0.000303**	13.838	15.400	ug/L	7.867
	235	**U**	**0.040987**	2.786	1092.242	ug/L	70.000
	236	**U**	**-0.000082**	34.823	4.200	ug/L	8.200
	238	**U**	**5.891107**	1.791	131260.779	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.032**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Monday, August 25, 2014 19:05:07
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082514M3\QC Std 9.049

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			751699.441	ug/L	790430.887
	233	**U**	**0.024573**	5.195	2070.150	ug/L	1319.194
	234	**U**	**0.086550**	1.980	2472.014	ug/L	7.867
	235	**U**	**5.224520**	2.162	136993.965	ug/L	70.000
	236	**U**	**0.093294**	1.908	3880.794	ug/L	8.200
	238	**U**	**5.410948**	2.628	125905.475	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.100**	
	U	233		**47.715**
	U	234		**104.656**
	U	235		**107.778**
	U	236		**104.825**
	U	238		**107.661**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Monday, August 25, 2014 19:09:47

Autosampler Position: 1

Dataset File: D:\Elandata\Dataset\082514M3\QC Std 10.050

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			741192.397	ug/L	790430.887
	233	**U**	**0.005484**	10.768	1416.470	ug/L	1319.194
	234	**U**	**0.000073**	100.227	9.333	ug/L	7.867
	235	**U**	**0.000987**	40.410	90.734	ug/L	70.000
	236	**U**	**-0.000010**	363.744	7.200	ug/L	8.200
	238	**U**	**0.002920**	47.674	420.140	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.771**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-13-D
Sample Date/Time: Monday, August 25, 2014 19:14:27
Autosampler Position: 31
Dataset File: D:\Elandata\Dataset\082514M3\680-102327-A-13-D.051

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			708913.736	ug/L	790430.887
	233	**U**	**-0.037311**	0.026	13.133	ug/L	1319.194
	234	**U**	**0.000249**	37.857	13.800	ug/L	7.867
	235	**U**	**0.039805**	1.274	1047.238	ug/L	70.000
	236	**U**	**-0.000062**	58.126	4.933	ug/L	8.200
	238	**U**	**5.626187**	1.084	123549.892	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.687**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-14-D
Sample Date/Time: Monday, August 25, 2014 19:19:08
Autosampler Position: 32
Dataset File: D:\Elandata\Dataset\082514M3\680-102327-A-14-D.052

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			720518.599	ug/L	790430.887
	233	**U**	**-0.037327**	0.115	12.867	ug/L	1319.194
	234	**U**	**0.000249**	23.409	13.933	ug/L	7.867
	235	**U**	**0.039253**	2.947	1050.172	ug/L	70.000
	236	**U**	**-0.000044**	59.471	5.733	ug/L	8.200
	238	**U**	**5.386876**	0.578	120266.996	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.155**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-15-F

Sample Date/Time: Monday, August 25, 2014 19:23:48

Autosampler Position: 33

Dataset File: D:\Elandata\Dataset\082514M3\680-102327-A-15-F.053

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			690939.354	ug/L	790430.887
	233	**U**	**-0.037480**	0.068	7.667	ug/L	1319.194
	234	**U**	**0.000109**	9.712	9.733	ug/L	7.867
	235	**U**	**0.020584**	1.581	557.611	ug/L	70.000
	236	**U**	**-0.000058**	65.232	4.933	ug/L	8.200
	238	**U**	**2.918273**	0.361	62628.886	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**87.413**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-16-D

Sample Date/Time: Monday, August 25, 2014 19:28:29

Autosampler Position: 34

Dataset File: D:\Elandata\Dataset\082514M3\680-102327-A-16-D.054

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			757824.063	ug/L	790430.887
	233	**U**	**-0.037374**	0.134	11.933	ug/L	1319.194
	234	**U**	**0.000077**	67.998	9.733	ug/L	7.867
	235	**U**	**0.011127**	2.282	361.205	ug/L	70.000
	236	**U**	**-0.000057**	14.095	5.467	ug/L	8.200
	238	**U**	**1.802230**	1.417	42550.515	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.875**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-17-D
Sample Date/Time: Monday, August 25, 2014 19:33:09
Autosampler Position: 35
Dataset File: D:\Elandata\Dataset\082514M3\680-102327-A-17-D.055

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			763757.226	ug/L	790430.887
	233	**U**	**-0.037321**	0.047	13.800	ug/L	1319.194
	234	**U**	**0.000012**	154.423	7.933	ug/L	7.867
	235	**U**	**0.007731**	4.396	273.669	ug/L	70.000
	236	**U**	**-0.000070**	47.307	4.933	ug/L	8.200
	238	**U**	**1.327944**	0.736	31695.567	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.625**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-18-D

Sample Date/Time: Monday, August 25, 2014 19:37:49

Autosampler Position: 36

Dataset File: D:\Elandata\Dataset\082514M3\680-102327-A-18-D.056

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			801525.532	ug/L	790430.887
	233	**U**	**-0.037409**	0.152	11.333	ug/L	1319.194
	234	**U**	**-0.000003**	2696.288	7.800	ug/L	7.867
	235	**U**	**0.004930**	3.141	208.802	ug/L	70.000
	236	**U**	**-0.000069**	28.366	5.267	ug/L	8.200
	238	**U**	**0.993721**	3.445	24962.197	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.404**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-19-D

Sample Date/Time: Monday, August 25, 2014 19:42:28

Autosampler Position: 37

Dataset File: D:\Elandata\Dataset\082514M3\680-102327-A-19-D.057

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			773158.960	ug/L	790430.887
	233	**U**	**-0.037424**	0.176	10.467	ug/L	1319.194
	234	**U**	**-0.000013**	189.981	7.333	ug/L	7.867
	235	**U**	**0.004437**	3.644	188.068	ug/L	70.000
	236	**U**	**-0.000072**	65.466	4.933	ug/L	8.200
	238	**U**	**0.865218**	2.106	21028.202	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.815**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-21-D

Sample Date/Time: Monday, August 25, 2014 19:47:08

Autosampler Position: 38

Dataset File: D:\Elandata\Dataset\082514M3\680-102327-A-21-D.058

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			740388.976	ug/L	790430.887
	233	**U**	**-0.037483**	0.066	8.067	ug/L	1319.194
	234	**U**	**-0.000003**	1822.820	7.333	ug/L	7.867
	235	**U**	**0.011212**	3.776	354.938	ug/L	70.000
	236	**U**	**-0.000085**	12.304	4.200	ug/L	8.200
	238	**U**	**1.737299**	2.361	40071.469	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.669**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-22-D

Sample Date/Time: Monday, August 25, 2014 19:51:48

Autosampler Position: 39

Dataset File: D:\Elandata\Dataset\082514M3\680-102327-A-22-D.059

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			756175.730	ug/L	790430.887
	233	**U**	**-0.037340**	0.165	13.000	ug/L	1319.194
	234	**U**	**0.000177**	7.747	12.600	ug/L	7.867
	235	**U**	**0.018713**	0.602	560.811	ug/L	70.000
	236	**U**	**-0.000068**	25.883	5.000	ug/L	8.200
	238	**U**	**2.824434**	1.587	66325.540	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.666**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-23-D
Sample Date/Time: Monday, August 25, 2014 19:56:28
Autosampler Position: 40
Dataset File: D:\Elandata\Dataset\082514M3\680-102327-A-23-D.060

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			758119.586	ug/L	790430.887
	233	**U**	**-0.037337**	0.093	13.200	ug/L	1319.194
	234	**U**	**0.000026**	189.868	8.267	ug/L	7.867
	235	**U**	**0.007291**	0.326	260.002	ug/L	70.000
	236	**U**	**-0.000070**	20.039	4.933	ug/L	8.200
	238	**U**	**1.286374**	1.355	30482.845	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.912**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Monday, August 25, 2014 20:01:09
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082514M3\QC Std 9.061

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			750934.952	ug/L	790430.887
	233	**U**	**0.025926**	4.375	2113.090	ug/L	1319.194
	234	**U**	**0.088936**	2.545	2537.292	ug/L	7.867
	235	**U**	**5.300379**	2.867	138790.125	ug/L	70.000
	236	**U**	**0.095425**	2.654	3963.684	ug/L	8.200
	238	**U**	**5.481073**	1.485	127454.284	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.003**	
	U	233		**50.342**
	U	234		**107.541**
	U	235		**109.343**
	U	236		**107.219**
	U	238		**109.057**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Monday, August 25, 2014 20:05:49
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082514M3\QC Std 10.062

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			752258.976	ug/L	790430.887
	233	**U**	**0.004104**	25.534	1391.135	ug/L	1319.194
	234	**U**	**0.000047**	36.389	8.800	ug/L	7.867
	235	**U**	**0.001103**	36.599	95.134	ug/L	70.000
	236	**U**	**0.000012**	466.090	8.400	ug/L	8.200
	238	**U**	**0.002841**	42.344	424.940	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.171**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 430685

Sample Date/Time: Monday, August 25, 2014 20:10:28
Autosampler Position: 41
Dataset File: D:\Elandata\Dataset\082514M3\430685.063

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			762734.465	ug/L	790430.887
	233	**U**	**-0.037551**	0.074	6.000	ug/L	1319.194
	234	**U**	**-0.000079**	55.165	5.267	ug/L	7.867
	235	**U**	**-0.002244**	1.752	7.867	ug/L	70.000
	236	**U**	**-0.000027**	60.226	6.800	ug/L	8.200
	238	**U**	**-0.012592**	2.162	67.933	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.496**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 430686
Sample Date/Time: Monday, August 25, 2014 20:15:09
Autosampler Position: 42
Dataset File: D:\Elandata\Dataset\082514M3\430686.064

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			778415.615	ug/L	790430.887
	233	**U**	**-0.034327**	0.354	117.000	ug/L	1319.194
	234	**U**	**0.043076**	2.788	1277.390	ug/L	7.867
	235	**U**	**2.612243**	2.730	70948.729	ug/L	70.000
	236	**U**	**0.047025**	2.551	2029.011	ug/L	8.200
	238	**U**	**2.691627**	2.590	65039.798	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.480**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-7-D

Sample Date/Time: Monday, August 25, 2014 20:19:49

Autosampler Position: 43

Dataset File: D:\Elandata\Dataset\082514M3\680-102370-A-7-D.065

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			779913.285	ug/L	790430.887
	233	**U**	**-0.037375**	0.142	12.200	ug/L	1319.194
	234	**U**	**-0.000045**	66.253	6.400	ug/L	7.867
	235	**U**	**0.004012**	6.392	178.001	ug/L	70.000
	236	**U**	**-0.000083**	27.182	4.467	ug/L	8.200
	238	**U**	**0.825590**	1.977	20254.297	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.669**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-8-C

Sample Date/Time: Monday, August 25, 2014 20:24:30

Autosampler Position: 44

Dataset File: D:\Elandata\Dataset\082514M3\680-102370-A-8-C.066

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			718314.242	ug/L	790430.887
	233	**U**	**-0.037498**	0.083	7.400	ug/L	1319.194
	234	**U**	**-0.000025**	156.249	6.467	ug/L	7.867
	235	**U**	**0.006270**	4.729	220.802	ug/L	70.000
	236	**U**	**-0.000056**	41.779	5.200	ug/L	8.200
	238	**U**	**1.136005**	0.402	25556.583	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.876**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-9-C
Sample Date/Time: Monday, August 25, 2014 20:29:10
Autosampler Position: 45
Dataset File: D:\Elandata\Dataset\082514M3\680-102370-A-9-C.067

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			672341.011	ug/L	790430.887
	233	**U**	**-0.037363**	0.062	10.933	ug/L	1319.194
	234	**U**	**0.000091**	82.824	9.000	ug/L	7.867
	235	**U**	**0.014498**	4.403	399.539	ug/L	70.000
	236	**U**	**0.000015**	274.946	7.533	ug/L	8.200
	238	**U**	**2.288008**	3.152	47839.050	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**85.060**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-10-C

Sample Date/Time: Monday, August 25, 2014 20:33:51

Autosampler Position: 46

Dataset File: D:\Elandata\Dataset\082514M3\680-102370-A-10-C.068

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			773688.321	ug/L	790430.887
	233	**U**	**-0.037436**	0.164	10.000	ug/L	1319.194
	234	**U**	**0.000056**	26.117	9.333	ug/L	7.867
	235	**U**	**0.010076**	4.248	340.404	ug/L	70.000
	236	**U**	**-0.000049**	111.699	5.867	ug/L	8.200
	238	**U**	**1.697170**	1.139	40931.531	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.882**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-11-C
Sample Date/Time: Monday, August 25, 2014 20:38:31
Autosampler Position: 47
Dataset File: D:\Elandata\Dataset\082514M3\680-102370-A-11-C.069

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			776484.509	ug/L	790430.887
	233	**U**	**-0.037413**	0.118	10.933	ug/L	1319.194
	234	**U**	**-0.000026**	190.212	6.933	ug/L	7.867
	235	**U**	**0.007330**	0.913	267.403	ug/L	70.000
	236	**U**	**-0.000057**	42.113	5.600	ug/L	8.200
	238	**U**	**1.286567**	1.843	31222.231	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.236**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-12-C
Sample Date/Time: Monday, August 25, 2014 20:43:11
Autosampler Position: 48
Dataset File: D:\Elandata\Dataset\082514M3\680-102370-A-12-C.070

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			794511.993	ug/L	790430.887
	233	**U**	**-0.037345**	0.091	13.533	ug/L	1319.194
	234	**U**	**0.000060**	81.177	9.667	ug/L	7.867
	235	**U**	**0.014874**	2.153	482.475	ug/L	70.000
	236	**U**	**-0.000075**	27.374	4.933	ug/L	8.200
	238	**U**	**2.304138**	0.926	56936.129	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.516**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-13-C
Sample Date/Time: Monday, August 25, 2014 20:47:50
Autosampler Position: 49
Dataset File: D:\Elandata\Dataset\082514M3\680-102370-A-13-C.071

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			804368.189	ug/L	790430.887
	233	**U**	**-0.037369**	0.063	12.867	ug/L	1319.194
	234	**U**	**0.000103**	37.648	11.133	ug/L	7.867
	235	**U**	**0.015480**	2.873	505.342	ug/L	70.000
	236	**U**	**-0.000071**	3.355	5.200	ug/L	8.200
	238	**U**	**2.394801**	2.035	59865.386	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.763**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-14-C
Sample Date/Time: Monday, August 25, 2014 20:52:30
Autosampler Position: 50
Dataset File: D:\Elandata\Dataset\082514M3\680-102370-A-14-C.072

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			765781.318	ug/L	790430.887
	233	**U**	**-0.037402**	0.180	11.067	ug/L	1319.194
	234	**U**	**0.000045**	102.430	8.933	ug/L	7.867
	235	**U**	**0.012301**	5.441	396.005	ug/L	70.000
	236	**U**	**-0.000072**	29.007	4.867	ug/L	8.200
	238	**U**	**1.976284**	2.839	47088.896	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.882**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Monday, August 25, 2014 20:57:11
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082514M3\QC Std 9.073

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			747964.101	ug/L	790430.887
	233	**U**	**0.028433**	5.149	2187.034	ug/L	1319.194
	234	**U**	**0.091218**	1.291	2592.502	ug/L	7.867
	235	**U**	**5.488545**	1.954	143206.457	ug/L	70.000
	236	**U**	**0.099111**	0.405	4104.124	ug/L	8.200
	238	**U**	**5.722587**	2.146	132502.776	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.627**	
	U	233		**55.209**
	U	234		**110.300**
	U	235		**113.224**
	U	236		**111.361**
	U	238		**113.862**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q
U	234	Q
U	235	Q
U	236	Q
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Monday, August 25, 2014 21:01:51
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082514M3\QC Std 10.074

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			741863.862	ug/L	790430.887
	233	**U**	**0.006347**	15.352	1445.007	ug/L	1319.194
	234	**U**	**0.000063**	82.808	9.200	ug/L	7.867
	235	**U**	**0.001591**	40.584	106.134	ug/L	70.000
	236	**U**	**0.000023**	71.407	8.600	ug/L	8.200
	238	**U**	**0.003508**	31.012	434.273	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.856**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-15-C
Sample Date/Time: Monday, August 25, 2014 21:06:31
Autosampler Position: 51
Dataset File: D:\Elandata\Dataset\082514M3\680-102370-A-15-C.075

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			764273.386	ug/L	790430.887
	233	**U**	**-0.037400**	0.089	11.200	ug/L	1319.194
	234	**U**	**0.000105**	39.095	10.600	ug/L	7.867
	235	**U**	**0.016550**	1.793	508.742	ug/L	70.000
	236	**U**	**-0.000055**	33.278	5.600	ug/L	8.200
	238	**U**	**2.489171**	1.998	59100.994	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.691**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-16-C

Sample Date/Time: Monday, August 25, 2014 21:11:11

Autosampler Position: 52

Dataset File: D:\Elandata\Dataset\082514M3\680-102370-A-16-C.076

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			783775.690	ug/L	790430.887
	233	**U**	**-0.037453**	0.154	9.667	ug/L	1319.194
	234	**U**	**0.000051**	139.859	9.267	ug/L	7.867
	235	**U**	**0.011922**	3.401	395.205	ug/L	70.000
	236	**U**	**-0.000088**	12.015	4.333	ug/L	8.200
	238	**U**	**1.901256**	1.574	46400.804	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.158**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-17-C
Sample Date/Time: Monday, August 25, 2014 21:15:51
Autosampler Position: 53
Dataset File: D:\Elandata\Dataset\082514M3\680-102370-A-17-C.077

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			763609.262	ug/L	790430.887
	233	**U**	**-0.037417**	0.082	10.533	ug/L	1319.194
	234	**U**	**0.000015**	284.631	8.067	ug/L	7.867
	235	**U**	**0.004767**	4.345	194.735	ug/L	70.000
	236	**U**	**-0.000074**	64.405	4.800	ug/L	8.200
	238	**U**	**0.910000**	2.463	21822.325	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.607**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-18-C
Sample Date/Time: Monday, August 25, 2014 21:20:32
Autosampler Position: 54
Dataset File: D:\Elandata\Dataset\082514M3\680-102370-A-18-C.078

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			723784.937	ug/L	790430.887
	233	**U**	**-0.037472**	0.044	8.267	ug/L	1319.194
	234	**U**	**0.000151**	44.882	11.333	ug/L	7.867
	235	**U**	**0.024585**	0.980	685.016	ug/L	70.000
	236	**U**	**-0.000091**	25.655	3.867	ug/L	8.200
	238	**U**	**3.579273**	0.638	80383.585	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.568**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-19-C
Sample Date/Time: Monday, August 25, 2014 21:25:12
Autosampler Position: 55
Dataset File: D:\Elandata\Dataset\082514M3\680-102370-A-19-C.079

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			710063.663	ug/L	790430.887
	233	**U**	**-0.037495**	0.059	7.400	ug/L	1319.194
	234	**U**	**0.000081**	45.808	9.267	ug/L	7.867
	235	**U**	**0.018965**	2.447	532.610	ug/L	70.000
	236	**U**	**-0.000052**	24.819	5.333	ug/L	8.200
	238	**U**	**2.620709**	0.802	57832.093	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.832**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-20-C
Sample Date/Time: Monday, August 25, 2014 21:29:52
Autosampler Position: 56
Dataset File: D:\Elandata\Dataset\082514M3\680-102370-A-20-C.080

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			706771.293	ug/L	790430.887
	233	**U**	**-0.037438**	0.043	9.133	ug/L	1319.194
	234	**U**	**0.000047**	133.243	8.267	ug/L	7.867
	235	**U**	**0.015690**	3.553	449.607	ug/L	70.000
	236	**U**	**-0.000056**	41.311	5.133	ug/L	8.200
	238	**U**	**2.388676**	0.860	52502.836	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.416**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-22-C
Sample Date/Time: Monday, August 25, 2014 21:34:33
Autosampler Position: 57
Dataset File: D:\Elandata\Dataset\082514M3\680-102370-A-22-C.081

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			716405.335	ug/L	790430.887
	233	**U**	**-0.037419**	0.047	9.867	ug/L	1319.194
	234	**U**	**0.000216**	24.045	13.000	ug/L	7.867
	235	**U**	**0.036212**	1.956	968.833	ug/L	70.000
	236	**U**	**-0.000081**	58.164	4.200	ug/L	8.200
	238	**U**	**5.132711**	0.853	113948.557	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.635**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-23-G

Sample Date/Time: Monday, August 25, 2014 21:39:14

Autosampler Position: 58

Dataset File: D:\Elandata\Dataset\082514M3\680-102370-A-23-G.082

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			732908.187	ug/L	790430.887
	233	**U**	**-0.037403**	0.071	10.600	ug/L	1319.194
	234	**U**	**0.000205**	13.836	13.000	ug/L	7.867
	235	**U**	**0.036810**	1.379	1006.569	ug/L	70.000
	236	**U**	**-0.000066**	62.587	4.933	ug/L	8.200
	238	**U**	**5.100113**	0.328	115851.652	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.723**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-23-G SD

Sample Date/Time: Monday, August 25, 2014 21:43:54

Autosampler Position: 59

Dataset File: D:\Elandata\Dataset\082514M3\680-102370-A-23-G SD.083

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			746098.683	ug/L	790430.887
	233	**U**	**-0.037546**	0.084	6.067	ug/L	1319.194
	234	**U**	**-0.000036**	41.635	6.400	ug/L	7.867
	235	**U**	**0.005492**	5.443	208.868	ug/L	70.000
	236	**U**	**-0.000032**	97.637	6.400	ug/L	8.200
	238	**U**	**1.019355**	1.211	23847.372	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.391**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-23-H MS

Sample Date/Time: Monday, August 25, 2014 21:48:33

Autosampler Position: 60

Dataset File: D:\Elandata\Dataset\082514M3\680-102370-A-23-H MS.084

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			710798.183	ug/L	790430.887
	233	**U**	**-0.036102**	0.409	51.200	ug/L	1319.194
	234	**U**	**0.018172**	0.531	496.742	ug/L	7.867
	235	**U**	**1.134664**	0.543	28207.561	ug/L	70.000
	236	**U**	**0.019300**	1.028	765.621	ug/L	8.200
	238	**U**	**6.974541**	0.988	153531.878	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.925**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Monday, August 25, 2014 21:53:14
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082514M3\QC Std 9.085

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			729332.030	ug/L	790430.887
	233	**U**	**0.025508**	3.887	2039.746	ug/L	1319.194
	234	**U**	**0.086283**	1.776	2391.200	ug/L	7.867
	235	**U**	**5.250490**	2.187	133570.074	ug/L	70.000
	236	**U**	**0.094821**	2.067	3826.380	ug/L	8.200
	238	**U**	**5.452902**	2.306	123113.630	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.270**	
	U	233		**49.530**
	U	234		**104.333**
	U	235		**108.313**
	U	236		**106.540**
	U	238		**108.496**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Monday, August 25, 2014 21:57:54
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082514M3\QC Std 10.086

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			732178.683	ug/L	790430.887
	233	**U**	**0.004481**	21.448	1365.799	ug/L	1319.194
	234	**U**	**0.000017**	189.371	7.733	ug/L	7.867
	235	**U**	**0.001242**	52.390	95.867	ug/L	70.000
	236	**U**	**0.000015**	369.412	8.133	ug/L	8.200
	238	**U**	**0.003581**	48.712	429.673	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.630**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-23-I MSD

Sample Date/Time: Monday, August 25, 2014 22:02:34

Autosampler Position: 61

Dataset File: D:\Elandata\Dataset\082514M3\680-102370-A-23-I MSD.087

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			712763.494	ug/L	790430.887
	233	**U**	**-0.035960**	0.297	55.800	ug/L	1319.194
	234	**U**	**0.018748**	6.244	513.743	ug/L	7.867
	235	**U**	**1.127613**	2.659	28112.727	ug/L	70.000
	236	**U**	**0.019141**	1.745	761.287	ug/L	8.200
	238	**U**	**6.343235**	2.028	140042.996	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.174**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-24-C
Sample Date/Time: Monday, August 25, 2014 22:07:15
Autosampler Position: 62
Dataset File: D:\Elandata\Dataset\082514M3\680-102370-A-24-C.088

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			702136.770	ug/L	790430.887
	233	**U**	**-0.037373**	0.148	11.067	ug/L	1319.194
	234	**U**	**0.000374**	27.568	16.933	ug/L	7.867
	235	**U**	**0.051254**	1.087	1317.794	ug/L	70.000
	236	**U**	**-0.000013**	209.002	6.800	ug/L	8.200
	238	**U**	**6.571905**	0.554	142904.497	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.830**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-25-C

Sample Date/Time: Monday, August 25, 2014 22:11:55

Autosampler Position: 63

Dataset File: D:\Elandata\Dataset\082514M3\680-102370-A-25-C.089

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			727325.667	ug/L	790430.887
	233	**U**	**-0.037403**	0.061	10.533	ug/L	1319.194
	234	**U**	**0.000276**	6.420	14.867	ug/L	7.867
	235	**U**	**0.038347**	1.957	1037.504	ug/L	70.000
	236	**U**	**-0.000033**	126.784	6.200	ug/L	8.200
	238	**U**	**5.380232**	0.644	121245.485	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.016**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 430790
Sample Date/Time: Monday, August 25, 2014 22:16:35
Autosampler Position: 64
Dataset File: D:\Elandata\Dataset\082514M3\430790.090

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			777533.128	ug/L	790430.887
	233	**U**	**-0.037577**	0.107	5.200	ug/L	1319.194
	234	**U**	**-0.000102**	60.167	4.800	ug/L	7.867
	235	**U**	**-0.002320**	1.788	5.933	ug/L	70.000
	236	**U**	**-0.000069**	28.363	5.133	ug/L	8.200
	238	**U**	**-0.011694**	2.311	90.934	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.368**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 430791
Sample Date/Time: Monday, August 25, 2014 22:21:15
Autosampler Position: 65
Dataset File: D:\Elandata\Dataset\082514M3\430791.091

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			770164.006	ug/L	790430.887
	233	**U**	**-0.034294**	0.427	116.867	ug/L	1319.194
	234	**U**	**0.044143**	4.378	1294.059	ug/L	7.867
	235	**U**	**2.645530**	3.247	71064.993	ug/L	70.000
	236	**U**	**0.047704**	4.686	2034.345	ug/L	8.200
	238	**U**	**2.713241**	2.681	64858.524	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.436**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-26-C
Sample Date/Time: Monday, August 25, 2014 22:25:55
Autosampler Position: 66
Dataset File: D:\Elandata\Dataset\082514M3\680-102370-A-26-C.092

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			730811.671	ug/L	790430.887
	233	**U**	**-0.037416**	0.074	10.133	ug/L	1319.194
	234	**U**	**0.000193**	36.280	12.667	ug/L	7.867
	235	**U**	**0.029992**	1.107	829.624	ug/L	70.000
	236	**U**	**-0.000057**	28.517	5.267	ug/L	8.200
	238	**U**	**4.329425**	0.935	98127.663	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.457**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-26-C SD

Sample Date/Time: Monday, August 25, 2014 22:30:35

Autosampler Position: 67

Dataset File: D:\Elandata\Dataset\082514M3\680-102370-A-26-C SD.093

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			760054.897	ug/L	790430.887
	233	**U**	**-0.037591**	0.060	4.667	ug/L	1319.194
	234	**U**	**-0.000009**	637.229	7.267	ug/L	7.867
	235	**U**	**0.004401**	4.113	184.201	ug/L	70.000
	236	**U**	**-0.000075**	16.187	4.733	ug/L	8.200
	238	**U**	**0.849526**	1.684	20308.376	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.157**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-26-D MS

Sample Date/Time: Monday, August 25, 2014 22:35:16
Autosampler Position: 68
Dataset File: D:\Elandata\Dataset\082514M3\680-102370-A-26-D MS.094

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			721600.001	ug/L	790430.887
	233	**U**	**-0.036060**	0.319	53.333	ug/L	1319.194
	234	**U**	**0.019381**	2.088	537.143	ug/L	7.867
	235	**U**	**1.179387**	0.407	29760.725	ug/L	70.000
	236	**U**	**0.020617**	2.298	829.291	ug/L	8.200
	238	**U**	**6.019958**	0.662	134567.555	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.292**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-26-E MSD

Sample Date/Time: Monday, August 25, 2014 22:39:56

Autosampler Position: 69

Dataset File: D:\Elandata\Dataset\082514M3\680-102370-A-26-E MSD.095

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			739601.991	ug/L	790430.887
	233	**U**	**-0.036090**	0.239	53.600	ug/L	1319.194
	234	**U**	**0.017976**	3.305	511.009	ug/L	7.867
	235	**U**	**1.108676**	1.533	28669.679	ug/L	70.000
	236	**U**	**0.019104**	1.428	788.355	ug/L	8.200
	238	**U**	**5.490071**	1.246	125781.791	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.569**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-28-C
Sample Date/Time: Monday, August 25, 2014 22:44:37
Autosampler Position: 70
Dataset File: D:\Elandata\Dataset\082514M3\680-102370-A-28-C.096

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			729916.519	ug/L	790430.887
	233	**U**	**-0.037419**	0.069	10.067	ug/L	1319.194
	234	**U**	**0.000195**	5.762	12.667	ug/L	7.867
	235	**U**	**0.035618**	2.084	971.433	ug/L	70.000
	236	**U**	**-0.000092**	12.706	3.867	ug/L	8.200
	238	**U**	**5.035733**	0.703	113906.763	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.344**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Monday, August 25, 2014 22:49:18
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082514M3\QC Std 9.097

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			764578.519	ug/L	790430.887
	233	**U**	**0.029705**	5.830	2278.182	ug/L	1319.194
	234	**U**	**0.094606**	2.053	2747.198	ug/L	7.867
	235	**U**	**5.645183**	2.646	150505.797	ug/L	70.000
	236	**U**	**0.101169**	3.194	4276.907	ug/L	8.200
	238	**U**	**5.867831**	2.848	138813.699	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.729**	
	U	233		**57.680**
	U	234		**114.397**
	U	235		**116.456**
	U	236		**113.673**
	U	238		**116.752**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q
U	234	Q
U	235	Q
U	236	Q
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Monday, August 25, 2014 22:53:59
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082514M3\QC Std 10.098

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			759656.887	ug/L	790430.887
	233	**U**	**0.007589**	14.820	1521.414	ug/L	1319.194
	234	**U**	**0.000005**	740.635	7.733	ug/L	7.867
	235	**U**	**0.002507**	40.042	132.667	ug/L	70.000
	236	**U**	**0.000044**	71.040	9.667	ug/L	8.200
	238	**U**	**0.005434**	17.104	490.142	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.107**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-29-C
Sample Date/Time: Monday, August 25, 2014 22:58:38
Autosampler Position: 71
Dataset File: D:\Elandata\Dataset\082514M3\680-102370-A-29-C.099

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			728775.428	ug/L	790430.887
	233	**U**	**-0.037397**	0.052	10.733	ug/L	1319.194
	234	**U**	**0.000282**	29.501	15.067	ug/L	7.867
	235	**U**	**0.041968**	2.406	1131.445	ug/L	70.000
	236	**U**	**-0.000074**	33.277	4.600	ug/L	8.200
	238	**U**	**5.846353**	0.975	131982.125	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.200**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-30-C
Sample Date/Time: Monday, August 25, 2014 23:03:18
Autosampler Position: 72
Dataset File: D:\Elandata\Dataset\082514M3\680-102370-A-30-C.100

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			727690.252	ug/L	790430.887
	233	**U**	**-0.037343**	0.028	12.467	ug/L	1319.194
	234	**U**	**0.000291**	5.336	15.267	ug/L	7.867
	235	**U**	**0.043841**	0.410	1177.649	ug/L	70.000
	236	**U**	**-0.000065**	39.162	4.933	ug/L	8.200
	238	**U**	**5.857678**	0.532	132041.721	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.062**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-31-C
Sample Date/Time: Monday, August 25, 2014 23:07:58
Autosampler Position: 73
Dataset File: D:\Elandata\Dataset\082514M3\680-102370-A-31-C.101

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			726224.604	ug/L	790430.887
	233	**U**	**-0.037351**	0.096	12.200	ug/L	1319.194
	234	**U**	**0.000208**	6.699	12.933	ug/L	7.867
	235	**U**	**0.031640**	1.400	865.893	ug/L	70.000
	236	**U**	**-0.000057**	97.741	5.200	ug/L	8.200
	238	**U**	**4.604943**	1.366	103660.004	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.877**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-33-D
Sample Date/Time: Monday, August 25, 2014 23:12:38
Autosampler Position: 74
Dataset File: D:\Elandata\Dataset\082514M3\680-102370-A-33-D.102

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			776981.167	ug/L	790430.887
	233	**U**	**-0.037437**	0.101	10.067	ug/L	1319.194
	234	**U**	**0.000090**	30.917	10.400	ug/L	7.867
	235	**U**	**0.018065**	3.388	558.344	ug/L	70.000
	236	**U**	**-0.000096**	18.828	3.933	ug/L	8.200
	238	**U**	**2.767110**	1.341	66774.634	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.298**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-34-C
Sample Date/Time: Monday, August 25, 2014 23:17:18
Autosampler Position: 75
Dataset File: D:\Elandata\Dataset\082514M3\680-102370-A-34-C.103

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			727830.829	ug/L	790430.887
	233	**U**	**-0.037382**	0.113	11.200	ug/L	1319.194
	234	**U**	**0.000228**	0.791	13.533	ug/L	7.867
	235	**U**	**0.036022**	1.688	979.100	ug/L	70.000
	236	**U**	**-0.000077**	14.206	4.467	ug/L	8.200
	238	**U**	**5.028220**	1.247	113437.428	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.080**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 431772

Sample Date/Time: Monday, August 25, 2014 23:21:58
Autosampler Position: 76
Dataset File: D:\Elandata\Dataset\082514M3\431772.104

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			783806.005	ug/L	790430.887
	233	**U**	**-0.037581**	0.064	5.200	ug/L	1319.194
	234	**U**	**-0.000110**	13.423	4.533	ug/L	7.867
	235	**U**	**-0.002289**	0.654	6.800	ug/L	70.000
	236	**U**	**-0.000051**	66.841	5.867	ug/L	8.200
	238	**U**	**-0.011370**	1.648	99.534	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.162**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 431773

Sample Date/Time: Monday, August 25, 2014 23:26:38
Autosampler Position: 77
Dataset File: D:\Elandata\Dataset\082514M3\431773.105

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			792825.960	ug/L	790430.887
	233	**U**	**-0.034276**	0.429	121.067	ug/L	1319.194
	234	**U**	**0.044660**	1.169	1349.531	ug/L	7.867
	235	**U**	**2.770239**	1.938	76656.544	ug/L	70.000
	236	**U**	**0.049313**	1.637	2167.831	ug/L	8.200
	238	**U**	**2.850780**	2.027	70160.033	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.303**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102577-A-1-D

Sample Date/Time: Monday, August 25, 2014 23:31:18

Autosampler Position: 78

Dataset File: D:\Elandata\Dataset\082514M3\680-102577-A-1-D.106

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			769684.230	ug/L	790430.887
	233	**U**	**-0.037387**	0.192	11.600	ug/L	1319.194
	234	**U**	**0.000210**	29.348	13.800	ug/L	7.867
	235	**U**	**0.031525**	3.265	914.429	ug/L	70.000
	236	**U**	**-0.000075**	15.039	4.800	ug/L	8.200
	238	**U**	**3.889377**	2.299	92797.761	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.375**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102577-A-2-C
Sample Date/Time: Monday, August 25, 2014 23:35:59
Autosampler Position: 79
Dataset File: D:\Elandata\Dataset\082514M3\680-102577-A-2-C.107

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			735764.518	ug/L	790430.887
	233	**U**	**-0.037372**	0.180	11.600	ug/L	1319.194
	234	**U**	**0.000444**	15.127	19.667	ug/L	7.867
	235	**U**	**0.055672**	3.351	1493.411	ug/L	70.000
	236	**U**	**-0.000039**	83.770	6.000	ug/L	8.200
	238	**U**	**7.674412**	2.100	174736.528	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.084**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-1-C

Sample Date/Time: Monday, August 25, 2014 23:40:39

Autosampler Position: 80

Dataset File: D:\Elandata\Dataset\082514M3\680-102431-A-1-C.108

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			768475.704	ug/L	790430.887
	233	**U**	**-0.037431**	0.196	10.133	ug/L	1319.194
	234	**U**	**0.000023**	19.618	8.333	ug/L	7.867
	235	**U**	**0.013856**	3.778	439.207	ug/L	70.000
	236	**U**	**-0.000059**	66.190	5.400	ug/L	8.200
	238	**U**	**2.149512**	2.423	51366.037	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.222**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Monday, August 25, 2014 23:45:20
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082514M3\QC Std 9.109

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			735129.759	ug/L	790430.887
	233	**U**	**0.027543**	0.544	2122.358	ug/L	1319.194
	234	**U**	**0.090787**	0.727	2536.692	ug/L	7.867
	235	**U**	**5.507017**	1.708	141244.331	ug/L	70.000
	236	**U**	**0.098960**	2.629	4024.300	ug/L	8.200
	238	**U**	**5.733270**	1.857	130488.206	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.004**	
	U	233		**53.481**
	U	234		**109.779**
	U	235		**113.605**
	U	236		**111.191**
	U	238		**114.074**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q
U	235	Q
U	236	Q
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Monday, August 25, 2014 23:50:01
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082514M3\QC Std 10.110

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			726508.012	ug/L	790430.887
	233	**U**	**0.006583**	10.954	1423.071	ug/L	1319.194
	234	**U**	**0.000112**	87.439	10.200	ug/L	7.867
	235	**U**	**0.001753**	42.493	107.934	ug/L	70.000
	236	**U**	**-0.000004**	624.880	7.333	ug/L	8.200
	238	**U**	**0.005124**	28.800	461.207	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.913**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-2-C
Sample Date/Time: Monday, August 25, 2014 23:54:41
Autosampler Position: 81
Dataset File: D:\Elandata\Dataset\082514M3\680-102431-A-2-C.111

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			750583.204	ug/L	790430.887
	233	**U**	**-0.037417**	0.192	10.333	ug/L	1319.194
	234	**U**	**0.000037**	145.780	8.467	ug/L	7.867
	235	**U**	**0.013856**	3.444	428.940	ug/L	70.000
	236	**U**	**-0.000070**	16.052	4.867	ug/L	8.200
	238	**U**	**2.207670**	2.003	51522.157	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.959**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-3-C
Sample Date/Time: Monday, August 25, 2014 23:59:21
Autosampler Position: 82
Dataset File: D:\Elandata\Dataset\082514M3\680-102431-A-3-C.112

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			675908.199	ug/L	790430.887
	233	**U**	**-0.037537**	0.136	5.733	ug/L	1319.194
	234	**U**	**0.000071**	214.798	8.600	ug/L	7.867
	235	**U**	**0.011786**	1.022	337.804	ug/L	70.000
	236	**U**	**-0.000061**	28.168	4.733	ug/L	8.200
	238	**U**	**1.889489**	0.477	39788.800	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**85.511**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-4-C
Sample Date/Time: Tuesday, August 26, 2014 00:04:02
Autosampler Position: 83
Dataset File: D:\Elandata\Dataset\082514M3\680-102431-A-4-C.113

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			724719.977	ug/L	790430.887
	233	**U**	**-0.037490**	0.103	7.667	ug/L	1319.194
	234	**U**	**-0.000014**	347.760	6.867	ug/L	7.867
	235	**U**	**0.011689**	2.163	359.805	ug/L	70.000
	236	**U**	**-0.000064**	43.572	4.933	ug/L	8.200
	238	**U**	**1.793506**	0.755	40508.894	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.687**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-5-G

Sample Date/Time: Tuesday, August 26, 2014 00:08:41

Autosampler Position: 84

Dataset File: D:\Elandata\Dataset\082514M3\680-102431-A-5-G.114

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			730314.035	ug/L	790430.887
	233	**U**	**-0.037462**	0.038	8.667	ug/L	1319.194
	234	**U**	**0.000037**	130.575	8.267	ug/L	7.867
	235	**U**	**0.012976**	1.473	395.405	ug/L	70.000
	236	**U**	**-0.000059**	56.901	5.200	ug/L	8.200
	238	**U**	**1.986830**	0.586	45177.777	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.394**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-5-G SD

Sample Date/Time: Tuesday, August 26, 2014 00:13:21

Autosampler Position: 85

Dataset File: D:\Elandata\Dataset\082514M3\680-102431-A-5-G SD.115

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			765932.750	ug/L	790430.887
	233	**U**	**-0.037579**	0.120	5.133	ug/L	1319.194
	234	**U**	**-0.000067**	47.475	5.667	ug/L	7.867
	235	**U**	**0.000581**	17.938	83.267	ug/L	70.000
	236	**U**	**-0.000095**	59.618	3.867	ug/L	8.200
	238	**U**	**0.379943**	2.900	9349.193	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.901**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-5-H MS

Sample Date/Time: Tuesday, August 26, 2014 00:18:01

Autosampler Position: 86

Dataset File: D:\Elandata\Dataset\082514M3\680-102431-A-5-H MS.116

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			735936.963	ug/L	790430.887
	233	**U**	**-0.036128**	0.440	52.133	ug/L	1319.194
	234	**U**	**0.018391**	3.743	520.076	ug/L	7.867
	235	**U**	**1.109868**	2.126	28553.720	ug/L	70.000
	236	**U**	**0.019673**	2.576	807.356	ug/L	8.200
	238	**U**	**3.128190**	1.435	71460.856	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.106**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-5-I MSD

Sample Date/Time: Tuesday, August 26, 2014 00:22:41

Autosampler Position: 87

Dataset File: D:\Elandata\Dataset\082514M3\680-102431-A-5-I MSD.117

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			732626.093	ug/L	790430.887
	233	**U**	**-0.036213**	0.272	49.133	ug/L	1319.194
	234	**U**	**0.017992**	2.553	506.809	ug/L	7.867
	235	**U**	**1.110103**	0.996	28439.695	ug/L	70.000
	236	**U**	**0.019821**	1.227	810.223	ug/L	8.200
	238	**U**	**3.140963**	0.762	71441.420	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.687**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-7-C

Sample Date/Time: Tuesday, August 26, 2014 00:27:21

Autosampler Position: 88

Dataset File: D:\Elandata\Dataset\082514M3\680-102431-A-7-C.118

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			714363.769	ug/L	790430.887
	233	**U**	**-0.037432**	0.120	9.400	ug/L	1319.194
	234	**U**	**0.000187**	39.985	12.200	ug/L	7.867
	235	**U**	**0.028185**	1.508	765.821	ug/L	70.000
	236	**U**	**-0.000069**	28.255	4.667	ug/L	8.200
	238	**U**	**4.116385**	1.239	91185.416	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.376**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-8-C
Sample Date/Time: Tuesday, August 26, 2014 00:32:01
Autosampler Position: 89
Dataset File: D:\Elandata\Dataset\082514M3\680-102431-A-8-C.119

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			735380.004	ug/L	790430.887
	233	**U**	**-0.037437**	0.066	9.533	ug/L	1319.194
	234	**U**	**0.000252**	35.705	14.333	ug/L	7.867
	235	**U**	**0.037319**	1.650	1022.503	ug/L	70.000
	236	**U**	**-0.000068**	35.700	4.867	ug/L	8.200
	238	**U**	**5.020736**	1.678	114394.279	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.035**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-8-D MS

Sample Date/Time: Tuesday, August 26, 2014 00:36:42
Autosampler Position: 90
Dataset File: D:\Elandata\Dataset\082514M3\680-102431-A-8-D MS.120

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			723406.018	ug/L	790430.887
	233	**U**	**-0.036047**	0.103	53.867	ug/L	1319.194
	234	**U**	**0.019151**	1.123	532.277	ug/L	7.867
	235	**U**	**1.175318**	0.713	29729.451	ug/L	70.000
	236	**U**	**0.020287**	1.821	818.357	ug/L	8.200
	238	**U**	**6.940195**	0.383	155463.152	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.520**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Tuesday, August 26, 2014 00:41:22
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082514M3\QC Std 9.121

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			764368.982	ug/L	790430.887
	233	**U**	**0.027704**	5.805	2210.104	ug/L	1319.194
	234	**U**	**0.091208**	2.310	2647.912	ug/L	7.867
	235	**U**	**5.509093**	2.852	146833.535	ug/L	70.000
	236	**U**	**0.098947**	2.958	4182.813	ug/L	8.200
	238	**U**	**5.709357**	1.884	135100.980	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.703**	
	U	233		**53.795**
	U	234		**110.288**
	U	235		**113.648**
	U	236		**111.177**
	U	238		**113.599**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q
U	234	Q
U	235	Q
U	236	Q
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Tuesday, August 26, 2014 00:46:03
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082514M3\QC Std 10.122

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			746269.724	ug/L	790430.887
	233	**U**	**0.007388**	11.264	1488.278	ug/L	1319.194
	234	**U**	**0.000065**	100.983	9.267	ug/L	7.867
	235	**U**	**0.002203**	27.063	122.867	ug/L	70.000
	236	**U**	**0.000027**	128.122	8.800	ug/L	8.200
	238	**U**	**0.004889**	14.994	469.341	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.413**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-8-E MSD

Sample Date/Time: Tuesday, August 26, 2014 00:50:43

Autosampler Position: 91

Dataset File: D:\Elandata\Dataset\082514M3\680-102431-A-8-E MSD.123

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			719350.539	ug/L	790430.887
	233	**U**	**-0.036081**	0.038	52.467	ug/L	1319.194
	234	**U**	**0.017605**	2.704	486.942	ug/L	7.867
	235	**U**	**1.111083**	0.335	27954.148	ug/L	70.000
	236	**U**	**0.018891**	0.789	758.420	ug/L	8.200
	238	**U**	**6.543952**	1.303	145792.213	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.007**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-9-C

Sample Date/Time: Tuesday, August 26, 2014 00:55:23

Autosampler Position: 92

Dataset File: D:\Elandata\Dataset\082514M3\680-102431-A-9-C.124

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			712807.838	ug/L	790430.887
	233	**U**	**-0.037385**	0.107	10.867	ug/L	1319.194
	234	**U**	**0.000196**	33.937	12.400	ug/L	7.867
	235	**U**	**0.032821**	1.809	879.294	ug/L	70.000
	236	**U**	**-0.000066**	27.920	4.800	ug/L	8.200
	238	**U**	**4.200014**	0.669	92836.358	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.180**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-11-C
Sample Date/Time: Tuesday, August 26, 2014 01:00:04
Autosampler Position: 93
Dataset File: D:\Elandata\Dataset\082514M3\680-102431-A-11-C.125

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			728005.299	ug/L	790430.887
	233	**U**	**-0.037392**	0.052	10.867	ug/L	1319.194
	234	**U**	**0.000230**	41.055	13.533	ug/L	7.867
	235	**U**	**0.036871**	1.251	1000.902	ug/L	70.000
	236	**U**	**-0.000051**	62.156	5.467	ug/L	8.200
	238	**U**	**5.237082**	1.307	118121.380	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.102**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-12-C

Sample Date/Time: Tuesday, August 26, 2014 01:04:45

Autosampler Position: 94

Dataset File: D:\Elandata\Dataset\082514M3\680-102431-A-12-C.126

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			733455.749	ug/L	790430.887
	233	**U**	**-0.037336**	0.124	12.800	ug/L	1319.194
	234	**U**	**0.000297**	11.524	15.533	ug/L	7.867
	235	**U**	**0.038064**	0.366	1039.238	ug/L	70.000
	236	**U**	**-0.000062**	27.360	5.067	ug/L	8.200
	238	**U**	**5.334672**	0.926	121221.514	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.792**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-13-C
Sample Date/Time: Tuesday, August 26, 2014 01:09:25
Autosampler Position: 95
Dataset File: D:\Elandata\Dataset\082514M3\680-102431-A-13-C.127

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			728533.562	ug/L	790430.887
	233	**U**	**-0.037412**	0.240	10.200	ug/L	1319.194
	234	**U**	**0.000149**	32.294	11.333	ug/L	7.867
	235	**U**	**0.022812**	3.364	643.948	ug/L	70.000
	236	**U**	**-0.000087**	24.491	4.067	ug/L	8.200
	238	**U**	**3.255035**	0.870	73608.744	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.169**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-15-C
Sample Date/Time: Tuesday, August 26, 2014 01:14:04
Autosampler Position: 96
Dataset File: D:\Elandata\Dataset\082514M3\680-102431-A-15-C.128

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			720330.544	ug/L	790430.887
	233	**U**	**-0.037422**	0.134	9.800	ug/L	1319.194
	234	**U**	**0.000351**	13.027	16.733	ug/L	7.867
	235	**U**	**0.038783**	0.491	1038.704	ug/L	70.000
	236	**U**	**-0.000038**	90.459	5.933	ug/L	8.200
	238	**U**	**5.452687**	1.046	121685.880	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.131**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-16-C

Sample Date/Time: Tuesday, August 26, 2014 01:18:44

Autosampler Position: 97

Dataset File: D:\Elandata\Dataset\082514M3\680-102431-A-16-C.129

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			720579.074	ug/L	790430.887
	233	**U**	**-0.037307**	0.121	13.467	ug/L	1319.194
	234	**U**	**0.000220**	33.530	13.200	ug/L	7.867
	235	**U**	**0.038363**	2.955	1028.037	ug/L	70.000
	236	**U**	**-0.000062**	10.122	5.000	ug/L	8.200
	238	**U**	**5.259666**	0.446	117440.675	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.163**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-17-C
Sample Date/Time: Tuesday, August 26, 2014 01:23:24
Autosampler Position: 98
Dataset File: D:\Elandata\Dataset\082514M3\680-102431-A-17-C.130

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			717155.169	ug/L	790430.887
	233	**U**	**-0.037378**	0.128	11.133	ug/L	1319.194
	234	**U**	**0.000223**	19.304	13.200	ug/L	7.867
	235	**U**	**0.036565**	2.876	978.167	ug/L	70.000
	236	**U**	**-0.000077**	15.604	4.400	ug/L	8.200
	238	**U**	**4.573057**	0.691	101659.630	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.730**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Tuesday, August 26, 2014 01:28:05
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082514M3\QC Std 9.131

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			743266.818	ug/L	790430.887
	233	**U**	**0.029490**	3.073	2208.904	ug/L	1319.194
	234	**U**	**0.092519**	1.318	2613.373	ug/L	7.867
	235	**U**	**5.537937**	2.129	143581.419	ug/L	70.000
	236	**U**	**0.099227**	3.082	4079.783	ug/L	8.200
	238	**U**	**5.813651**	2.233	133753.930	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.033**	
	U	233		**57.263**
	U	234		**111.873**
	U	235		**114.243**
	U	236		**111.491**
	U	238		**115.674**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q
U	234	Q
U	235	Q
U	236	Q
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Tuesday, August 26, 2014 01:32:46
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082514M3\QC Std 10.132

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			732007.117	ug/L	790430.887
	233	**U**	**0.007256**	14.073	1455.274	ug/L	1319.194
	234	**U**	**0.000063**	89.583	9.000	ug/L	7.867
	235	**U**	**0.002220**	28.566	120.867	ug/L	70.000
	236	**U**	**0.000009**	388.298	7.933	ug/L	8.200
	238	**U**	**0.005105**	27.516	464.408	ug/L	378.205

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.609**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

Instrument Tuning Report

File Name: EPA TUNING.tun
File Path: d:\Elandata\Tuning
Sample ID: Sample
Sample Date/Time: Monday, August 25, 2014 08:46:58

Analyte	Exact Mass	Meas. Mass	Mass DAC	Res. DAC	Meas. Pk. Width	Custom Res.
Li	7.016	7.025	1570	2065	0.653	
Mg	23.985	23.979	5688	2080	0.684	
Rh	102.905	102.879	24919	2080	0.687	
Ce	139.905	139.929	33931	2120	0.667	
Pb	207.977	207.977	50415	2310	0.654	

Replicates: 6

Daily Performance Report

Sample ID: Sample
Sample Date/Time: Monday, August 25, 2014 09:08:22
Sample Description:
Method File: d:\Elandata\Method\DAILY EPA.mth
Dataset File: d:\Elandata\Dataset\daily3\Sample.141
Tuning File: d:\Elandata\Tuning\EPA TUNING.tun
Optimization File: d:\Elandata\Optimize\EPA2008.dac
Dual Detector Mode: Pulse

Acq. Dead Time(ns): 35
Current Dead Time (ns): 35

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Net Intens. SD	Net Intens. RSD
	Li	7.0	1980.3	1980.304	77.201	3.9
	Mg	24.0	12742.5	12742.460	280.288	2.2
	Rh	102.9	209698.6	209698.624	3351.483	1.6
	Pb	208.0	185675.6	185675.554	2291.693	1.2
⌈>	Ba	137.9	253599.5	253599.486	2480.852	1.0
⌊	Ba++	69.0	1846.1	0.007	0.000	1.2
⌈>	Ce	139.9	309089.4	309089.403	4336.145	1.4
⌊	CeO	155.9	7625.2	0.025	0.001	2.5
	Bkgd	220.0	5.6	5.556	1.109	20.0

Current Optimization File Data

Current Value	Description
0.97	Nebulizer Gas Flow
5.75	Lens Voltage
1400.00	ICP RF Power
-2156.25	Analog Stage Voltage
1200.00	Pulse Stage Voltage
70.00	Discriminator Threshold
-6.00	AC Rod Offset
60.00	Service DAC 1
0.00	Quadrupole Rod Offset

Current Autolens Data

Analyte	Mass	Num of Pts	DAC Value	Maximum Intensity
Be	9	33	6.5	1938.1
Mg	24	33	4.8	21116.6
Co	59	33	5.0	76051.9
Rh	103	33	6.0	276842.7
In	115	33	6.3	369084.7
Ba	138	33	6.3	366858.4
Ce	140	33	6.0	447062.2
Pb	208	33	7.8	289298.2

KE 8/26/14
File: 082514M3

A Batch
140258
140259

Sample/Batch Report

TA ST. LOUIS - PERKIN ELMER ELAN 6100 - METHOD 6020 / 200.8 QUANTITATIVE ANALYSIS REPORT

User Name: stlmetals
Computer Name: SLICP03
Sample File: D:\Elandata\Sample\SW846 TEMP.sam
Report Date/Time: Tuesday, August 26, 2014 16:54:33
Method File: d:\Elandata\Method\2014 isou.mth
Tuning File: d:\Elandata\Tuning\epa tuning.tun
Optimization File: d:\Elandata\Optimize\epa2008.dac
Calibration File:
Calibration Type: External Calibration
Number of Replicates: 3
Number of Readings: 1
Number of Sweeps: 100
Dual Detector Mode: Dual

ICV - 2354
ICB - 2334
LLC - 2334

A/S Loc.	Batch ID	Sample ID	Description	Aliquot Vol.	Diluted Vol.
11	139821	434264	2		
12		434265	2		
13		680-102327-A-24-E	5		
14		680-102327-A-24-E SD	25		
15		680-102327-A-24-F MS	5		
16		680-102327-A-24-G MS	5		

- All

Quantitative Analysis Calibration Report

File Name: 082614M1.cal
File Path: D:\Elandata\System
Calibration Type: External Calibration

Analyte	Mass	Curve Type	Slope	Intercept	Corr. Coeff.
Ho (IS)	164.930	Linear Thru Zero	0.000000	0.00	0.000000
U	233.000	Linear Thru Zero	0.050095	0.00	0.999596
U	234.041	Linear Thru Zero	0.038624	0.00	0.999999
U	235.044	Linear Thru Zero	0.035700	0.00	1.000000
U	236.000	Linear Thru Zero	0.055787	0.00	0.999994
U	238.050	Linear Thru Zero	0.030895	0.00	1.000000

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 8
Sample Date/Time: Tuesday, August 26, 2014 15:32:52
Autosampler Position: 200
Dataset File: D:\Elandata\Dataset\082614M1\QC Std 8.014

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			626251.744	ug/L	692710.545
	233	**U**	**0.048846**	3.168	1788.712	ug/L	285.470
	234	**U**	**0.085436**	1.960	2071.750	ug/L	7.533
	235	**U**	**5.079816**	1.556	113519.246	ug/L	22.667
	236	**U**	**0.091555**	1.931	3202.826	ug/L	7.467
	238	**U**	**5.292060**	1.941	102441.869	ug/L	141.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.406**	
	U	233		**94.847**
	U	234		**103.308**
	U	235		**104.792**
	U	236		**102.871**
	U	238		**105.296**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Tuesday, August 26, 2014 16:14:54
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082614M1\QC Std 9.023

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			665712.689	ug/L	692710.545
	233	**U**	**0.048264**	3.208	1881.791	ug/L	285.470
	234	**U**	**0.088038**	3.540	2267.647	ug/L	7.533
	235	**U**	**5.278604**	2.801	125327.232	ug/L	22.667
	236	**U**	**0.094788**	3.318	3522.635	ug/L	7.467
	238	**U**	**5.529007**	2.613	113737.007	ug/L	141.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.103**	
	U	233		**93.717**
	U	234		**106.455**
	U	235		**108.893**
	U	236		**106.504**
	U	238		**110.010**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-24-G MSD

Sample Date/Time: Tuesday, August 26, 2014 16:10:13

Autosampler Position: 16

Dataset File: D:\Elandata\Dataset\082614M1\680-102327-A-24-G MSD.022

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			583780.015	ug/L	692710.545
	233	**U**	**-0.006631**	2.097	46.667	ug/L	285.470
	234	**U**	**0.018242**	3.691	417.673	ug/L	7.533
	235	**U**	**1.118772**	1.997	23334.111	ug/L	22.667
	236	**U**	**0.019904**	2.891	654.482	ug/L	7.467
	238	**U**	**2.796041**	1.585	50546.809	ug/L	141.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**84.275**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-24-F MS

Sample Date/Time: Tuesday, August 26, 2014 16:05:33

Autosampler Position: 15

Dataset File: D:\Elandata\Dataset\082614M1\680-102327-A-24-F MS.021

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			598562.799	ug/L	692710.545
	233	**U**	**-0.006786**	2.022	43.200	ug/L	285.470
	234	**U**	**0.015817**	3.494	372.072	ug/L	7.533
	235	**U**	**0.952701**	2.254	20376.327	ug/L	22.667
	236	**U**	**0.016915**	3.323	571.078	ug/L	7.467
	238	**U**	**2.333378**	2.763	43268.457	ug/L	141.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**86.409**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-24-E SD

Sample Date/Time: Tuesday, August 26, 2014 16:00:53

Autosampler Position: 14

Dataset File: D:\Elandata\Dataset\082614M1\680-102327-A-24-E SD.020

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			667686.949	ug/L	692710.545
	233	**U**	**-0.007850**	0.394	12.600	ug/L	285.470
	234	**U**	**0.000043**	109.960	8.333	ug/L	7.533
	235	**U**	**0.002285**	7.483	76.200	ug/L	22.667
	236	**U**	**-0.000033**	80.540	6.000	ug/L	7.467
	238	**U**	**0.243221**	2.118	5149.929	ug/L	141.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.388**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 434265
Sample Date/Time: Tuesday, August 26, 2014 15:51:33
Autosampler Position: 12
Dataset File: D:\Elandata\Dataset\082614M1\434265.018

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			706655.577	ug/L	692710.545
	233	**U**	**-0.004794**	1.986	121.401	ug/L	285.470
	234	**U**	**0.042534**	3.531	1167.448	ug/L	7.533
	235	**U**	**2.577701**	2.319	64985.404	ug/L	22.667
	236	**U**	**0.045902**	3.381	1814.449	ug/L	7.467
	238	**U**	**2.678990**	3.059	58553.196	ug/L	141.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**102.013**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 434264
Sample Date/Time: Tuesday, August 26, 2014 15:46:53
Autosampler Position: 11
Dataset File: D:\Elandata\Dataset\082614M1\434264.017

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			708277.407	ug/L	692710.545
	233	**U**	**-0.007226**	1.571	35.333	ug/L	285.470
	234	**U**	**-0.000023**	269.247	7.000	ug/L	7.533
	235	**U**	**-0.000180**	45.604	18.533	ug/L	22.667
	236	**U**	**-0.000010**	264.382	7.267	ug/L	7.467
	238	**U**	**0.005519**	3.544	265.202	ug/L	141.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**102.247**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Tuesday, August 26, 2014 15:37:33
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082614M1\QC Std 9.015

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			668727.079	ug/L	692710.545
	233	**U**	**0.048509**	3.869	1897.726	ug/L	285.470
	234	**U**	**0.085537**	3.642	2212.838	ug/L	7.533
	235	**U**	**5.126300**	2.909	122236.558	ug/L	22.667
	236	**U**	**0.090974**	2.420	3397.405	ug/L	7.467
	238	**U**	**5.331213**	2.682	110144.282	ug/L	141.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.538**	
	U	233		**94.193**
	U	234		**103.430**
	U	235		**105.751**
	U	236		**102.218**
	U	238		**106.075**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7
Sample Date/Time: Tuesday, August 26, 2014 15:28:11
Autosampler Position: 199
Dataset File: D:\Elandata\Dataset\082614M1\QC Std 7.013

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			627515.832	ug/L	692710.545
	233	**U**	**-0.002564**	60.642	175.801	ug/L	285.470
	234	**U**	**-0.000009**	193.027	6.600	ug/L	7.533
	235	**U**	**0.000019**	496.855	20.867	ug/L	22.667
	236	**U**	**0.000000**	51437.021	6.800	ug/L	7.467
	238	**U**	**-0.003606**	14.447	57.600	ug/L	141.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.588**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6
Sample Date/Time: Tuesday, August 26, 2014 15:23:30
Autosampler Position: 192
Dataset File: D:\Elandata\Dataset\082614M1\QC Std 6.012

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			677103.510	ug/L	692710.545
	233	**U**	**0.042057**	16.164	1695.568	ug/L	285.470
	234	**U**	**0.049908**	2.486	1311.194	ug/L	7.533
	235	**U**	**3.010445**	2.389	72715.550	ug/L	22.667
	236	**U**	**0.054077**	2.213	2048.480	ug/L	7.467
	238	**U**	**3.111619**	2.722	65154.465	ug/L	141.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.747**	
	U	233		**136.108**
	U	234		**100.620**
	U	235		
	U	236		**101.267**
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 4

Sample Date/Time: Tuesday, August 26, 2014 15:14:10

Autosampler Position: 1

Dataset File: D:\Elandata\Dataset\082614M1\QC Std 4.010

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			680209.394	ug/L	692710.545
	233	**U**	**0.117921**	4.279	4292.245	ug/L	285.470
	234	**U**	**0.000249**	24.510	13.867	ug/L	7.533
	235	**U**	**0.000319**	28.547	30.067	ug/L	22.667
	236	**U**	**0.000011**	377.034	7.667	ug/L	7.467
	238	**U**	**0.024049**	7.016	642.681	ug/L	141.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.195**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 3
Sample Date/Time: Tuesday, August 26, 2014 15:09:30
Autosampler Position: 198
Dataset File: D:\Elandata\Dataset\082614M1\QC Std 3.009

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			663052.382	ug/L	692710.545
	233	**U**	**0.064875**	3.696	2426.391	ug/L	285.470
	234	**U**	**0.927132**	0.342	23749.269	ug/L	7.533
	235	**U**	**1.172907**	0.034	27785.213	ug/L	22.667
	236	**U**	**0.071639**	1.276	2657.714	ug/L	7.467
	238	**U**	**33.035701**	172.630	652037.862	ug/L	141.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.719**	
	U	233		
	U	234		
	U	235		**110.987**
	U	236		**96.031**
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	235	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 1
Sample Date/Time: Tuesday, August 26, 2014 15:00:08
Autosampler Position: 196
Dataset File: D:\Elandata\Dataset\082614M1\QC Std 1.007

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			691386.357	ug/L	692710.545
	233	**U**	**0.227358**	2.944	8149.526	ug/L	285.470
	234	**U**	**0.000513**	2.219	21.200	ug/L	7.533
	235	**U**	**0.008846**	22.344	239.335	ug/L	22.667
	236	**U**	**0.000177**	24.312	14.200	ug/L	7.467
	238	**U**	**0.053599**	3.200	1284.324	ug/L	141.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.809**	
	U	233		**101.726**
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 4
Sample Date/Time: Tuesday, August 26, 2014 14:50:46
Autosampler Position: 194
Dataset File: D:\Elandata\Dataset\082614M1\Standard 4.005

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			683685.037	ug/L	692710.545
	233	**U**	**0.104963**	4.500	3623.326	ug/L	285.470
	234	**U**	**0.165493**	3.072	4357.865	ug/L	7.533
	235	**U**	**9.694903**	2.217	236577.293	ug/L	22.667
	236	**U**	**0.177978**	1.873	6725.052	ug/L	7.467
	238	**U**	**10.051820**	1.832	212206.500	ug/L	141.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 3
Sample Date/Time: Tuesday, August 26, 2014 14:46:05
Autosampler Position: 193
Dataset File: D:\Elandata\Dataset\082614M1\Standard 3.004

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			688424.270	ug/L	692710.545
	233	**U**	**0.051500**	1.634	1810.848	ug/L	285.470
	234	**U**	**0.081898**	2.399	2148.295	ug/L	7.533
	235	**U**	**4.846442**	1.827	117484.968	ug/L	22.667
	236	**U**	**0.087849**	0.608	3353.594	ug/L	7.467
	238	**U**	**5.419406**	1.291	106031.410	ug/L	141.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 2
Sample Date/Time: Tuesday, August 26, 2014 14:41:24
Autosampler Position: 192
Dataset File: D:\Elandata\Dataset\082614M1\Standard 2.003

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			686980.297	ug/L	692710.545
	233	**U**			1087.441	ug/L	285.470
	234	**U**	**0.049600**	2.705	1300.859	ug/L	7.533
	235	**U**	**2.949445**	2.886	71308.722	ug/L	22.667
	236	**U**	**0.053400**	2.562	2034.545	ug/L	7.467
	238	**U**	**3.311755**	2.764	64657.289	ug/L	141.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Tuesday, August 26, 2014 16:19:34

Autosampler Position: 1

Dataset File: D:\Elandata\Dataset\082614M1\QC Std 10.024

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			661481.115	ug/L	692710.545
	233	**U**	**0.017557**	4.838	853.292	ug/L	285.470
	234	**U**	**0.000064**	58.704	8.800	ug/L	7.533
	235	**U**	**0.000799**	23.196	40.400	ug/L	22.667
	236	**U**	**0.000042**	117.443	8.667	ug/L	7.467
	238	**U**	**0.003769**	12.253	212.135	ug/L	141.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.492**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-24-E

Sample Date/Time: Tuesday, August 26, 2014 15:56:13

Autosampler Position: 13

Dataset File: D:\Elandata\Dataset\082614M1\680-102327-A-24-E.019

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			599447.425	ug/L	692710.545
	233	**U**	**-0.007638**	0.385	17.667	ug/L	285.470
	234	**U**	**0.000191**	20.907	10.933	ug/L	7.533
	235	**U**	**0.015389**	6.515	348.871	ug/L	22.667
	236	**U**	**0.000042**	38.017	7.867	ug/L	7.467
	238	**U**	**1.364809**	3.258	25395.698	ug/L	141.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**86.536**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Tuesday, August 26, 2014 15:42:14

Autosampler Position: 1

Dataset File: D:\Elandata\Dataset\082614M1\QC Std 10.016

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			669724.933	ug/L	692710.545
	233	**U**	**0.018286**	8.973	887.628	ug/L	285.470
	234	**U**	**0.000106**	41.394	10.000	ug/L	7.533
	235	**U**	**0.001164**	1.646	49.733	ug/L	22.667
	236	**U**	**0.000031**	116.129	8.333	ug/L	7.467
	238	**U**	**0.004318**	11.587	225.535	ug/L	141.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.682**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 5

Sample Date/Time: Tuesday, August 26, 2014 15:18:49

Autosampler Position: 191

Dataset File: D:\Elandata\Dataset\082614M1\QC Std 5.011

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			687317.229	ug/L	692710.545
	233	**U**	**0.035033**	26.019	1478.278	ug/L	285.470
	234	**U**	**0.000871**	13.840	30.467	ug/L	7.533
	235	**U**	**0.047468**	2.620	1186.049	ug/L	22.667
	236	**U**	**0.000843**	14.108	39.600	ug/L	7.467
	238	**U**	**0.054057**	6.149	1285.324	ug/L	141.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.221**	
	U	233		
	U	234		
	U	235		**97.872**
	U	236		
	U	238		**107.470**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 2
Sample Date/Time: Tuesday, August 26, 2014 15:04:49
Autosampler Position: 197
Dataset File: D:\Elandata\Dataset\082614M1\QC Std 2.008

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			683445.122	ug/L	692710.545
	233	**U**	**45.400753**	2.615	1553033.577	ug/L	285.470
	234	**U**	**0.088747**	3.885	2346.526	ug/L	7.533
	235	**U**	**0.114789**	2.431	2820.279	ug/L	22.667
	236	**U**	**0.006941**	5.680	271.403	ug/L	7.467
	238	**U**	**9.985677**	2.837	210749.767	ug/L	141.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.662**	
	U	233		
	U	234		**106.284**
	U	235		
	U	236		
	U	238		**102.122**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 5
Sample Date/Time: Tuesday, August 26, 2014 14:55:27
Autosampler Position: 195
Dataset File: D:\Elandata\Dataset\082614M1\Standard 5.006

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			683828.873	ug/L	692710.545
	233	**U**	**0.312047**	2.699	10959.273	ug/L	285.470
	234	**U**	**0.496192**	2.391	13100.946	ug/L	7.533
	235	**U**	**29.082752**	2.281	709327.738	ug/L	22.667
	236	**U**	**0.534526**	2.300	20378.675	ug/L	7.467
	238	**U**	**30.156755**	2.907	636471.327	ug/L	141.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 1
Sample Date/Time: Tuesday, August 26, 2014 14:36:43
Autosampler Position: 191
Dataset File: D:\Elandata\Dataset\082614M1\Standard 1.002

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			684666.554	ug/L	692710.545
	233	**U**			28.133	ug/L	285.470
	234	**U**			27.667	ug/L	7.533
	235	**U**	**0.048500**	2.442	1191.050	ug/L	22.667
	236	**U**			44.133	ug/L	7.467
	238	**U**	**0.050300**	0.314	1117.577	ug/L	141.267

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Blank

Sample Date/Time: Tuesday, August 26, 2014 14:30:03
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082614M1\Blank.001

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			692710.545	ug/L	
	233	**U**			285.470	ug/L	
	234	**U**			7.533	ug/L	
	235	**U**			22.667	ug/L	
	236	**U**			7.467	ug/L	
	238	**U**			141.267	ug/L	

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

Daily Performance Report

Sample ID: Sample
Sample Date/Time: Tuesday, August 26, 2014 14:08:10
Sample Description:
Method File: d:\Elandata\Method\DAILY EPA.mth
Dataset File: d:\Elandata\Dataset\daily3\Sample.143
Tuning File: d:\Elandata\Tuning\EPA TUNING.tun
Optimization File: d:\Elandata\Optimize\EPA2008.dac
Dual Detector Mode: Pulse
Acq. Dead Time(ns): 35
Current Dead Time (ns): 35

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Net Intens. SD	Net Intens. RSD
	Li	7.0	3524.7	3524.658	162.775	4.6
	Mg	24.0	14183.7	14183.707	308.830	2.2
	Rh	102.9	231051.3	231051.318	3988.853	1.7
	Pb	208.0	194876.5	194876.518	1964.209	1.0
⎡>	Ba	137.9	251576.4	251576.392	3237.579	1.3
⎣	Ba++	69.0	1727.9	0.007	0.000	2.1
⎡>	Ce	139.9	308998.6	308998.604	3701.710	1.2
⎣	CeO	155.9	8695.0	0.028	0.001	1.8
	Bkgd	220.0	8.3	8.333	2.000	24.0

Current Optimization File Data

Current Value	Description
0.97	Nebulizer Gas Flow
5.75	Lens Voltage
1400.00	ICP RF Power
-2109.38	Analog Stage Voltage
1200.00	Pulse Stage Voltage
70.00	Discriminator Threshold
-6.00	AC Rod Offset
60.00	Service DAC 1
0.00	Quadrupole Rod Offset

Current Autolens Data

Analyte	Mass	Num of Pts	DAC Value	Maximum Intensity
Be	9	33	6.5	2347.5
Mg	24	33	5.0	25249.3
Co	59	33	5.5	87738.9
Rh	103	33	6.3	323446.6
In	115	33	6.0	421544.1
Ba	138	33	6.3	370532.1
Ce	140	33	6.3	457780.4
Pb	208	33	8.0	313265.5

Instrument Tuning Report

File Name: EPA TUNING.tun
File Path: d:\Elandata\Tuning
Sample ID: Sample
Sample Date/Time: Tuesday, August 26, 2014 13:18:02

Analyte	Exact Mass	Meas. Mass	Mass DAC	Res. DAC	Meas. Pk. Width	Custom Res.
Li	7.016	7.025	1570	2065	0.672	
Mg	23.985	23.979	5688	2080	0.682	
Rh	102.905	102.879	24919	2080	0.699	
Ce	139.905	139.929	33931	2120	0.687	
Pb	207.977	207.977	50415	2310	0.683	

Replicates: 6

METALS BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Batch Number: 137774 Batch Start Date: 08/13/14 10:16 Batch Analyst: Davis, Shanika M

Batch Method: 3050B Batch End Date: 08/14/14 12:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	FinalAmount	ISOU Prep Spk 00002			
MB 160-137774/1		3050B, 6020A		0.5188 g	50 mL				
LCS 160-137774/2		3050B, 6020A		0.5556 g	50 mL	0.25 mL			
680-102327-A-25	SD-221-01	3050B, 6020A	T	0.5707 g	50 mL				
680-102327-A-25 MS	SD-221-01	3050B, 6020A	T	0.5856 g	50 mL	0.25 mL			
680-102327-A-25 MSD	SD-221-01	3050B, 6020A	T	0.5123 g	50 mL	0.25 mL			
680-102327-A-26	SD-221-02	3050B, 6020A	T	0.5613 g	50 mL				
680-102327-A-27	SD-210-SS	3050B, 6020A	T	0.5118 g	50 mL				
680-102327-A-28	SD-210-01	3050B, 6020A	T	0.5323 g	50 mL				
680-102327-A-29	SD-210-02	3050B, 6020A	T	0.5808 g	50 mL				
680-102327-A-30	SD-207-SS	3050B, 6020A	T	0.5730 g	50 mL				
680-102327-A-34	SD-205-SS	3050B, 6020A	T	0.5364 g	50 mL				
680-102327-A-36	SD-205-02	3050B, 6020A	T	0.5345 g	50 mL				

Batch Notes	
Balance ID	27150548
Hydrogen peroxide lot number	408031
Lot # of hydrochloric acid	422962
Lot # of Nitric Acid	422893
Hot Block ID number	HOTBLOCK1
Oven, Bath or Block Temperature 1	94.0 Degrees C
Pipette ID	M-PREP-2
ID number of the thermometer	111815886
Digestion Tube/Cup Lot #	191064

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

METALS BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Batch Number: 137845 Batch Start Date: 08/14/14 09:00 Batch Analyst: Davis, Shanika M

Batch Method: 3050B Batch End Date: 08/15/14 14:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	FinalAmount	ISOU Prep Spk 00002			
MB 160-137845/1		3050B, 6020A		0.5136 g	50 mL				
LCS 160-137845/2		3050B, 6020A		0.5956 g	50 mL	0.25 mL			
680-102370-A-1	SD-DUP-03	3050B, 6020A	T	0.5316 g	50 mL				
680-102370-A-2	SD-206-SS	3050B, 6020A	T	0.5852 g	50 mL				
680-102370-A-3	SD-206-01	3050B, 6020A	T	0.5739 g	50 mL				
680-102370-A-4	SD-206-02	3050B, 6020A	T	0.5417 g	50 mL				
680-102370-A-6	SD-005E-01	3050B, 6020A	T	0.5426 g	50 mL				

Batch Notes	
Balance ID	27150548
Hydrogen peroxide lot number	408031
Lot # of hydrochloric acid	422962
Lot # of Nitric Acid	422893
Hot Block ID number	HOTBLOCK1
Oven, Bath or Block Temperature 1	94.0 Degrees C
Pipette ID	M-PREP-2
ID number of the thermometer	111815886
Digestion Tube/Cup Lot #	191064

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

METALS BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Batch Number: 139022 Batch Start Date: 08/20/14 09:25 Batch Analyst: Davis, Shanika M

Batch Method: 3050B Batch End Date: 08/21/14 09:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	FinalAmount	ISOU Prep Spk 00002			
MB 160-139022/1		3050B, 6020A		0.5910 g	50 mL				
LCS 160-139022/2		3050B, 6020A		0.5236 g	50 mL	0.25 mL			
680-102327-A-1	SD-198-SS	3050B, 6020A	T	0.5664 g	50 mL				
680-102327-A-1 MS	SD-198-SS	3050B, 6020A	T	0.5647 g	50 mL	0.25 mL			
680-102327-A-1 MSD	SD-198-SS	3050B, 6020A	T	0.5220 g	50 mL	0.25 mL			
680-102327-A-2	SD-198-01	3050B, 6020A	T	0.5751 g	50 mL				
680-102327-A-3	SD-198-02	3050B, 6020A	T	0.5531 g	50 mL				
680-102327-A-5	SD-197-SS	3050B, 6020A	T	0.5214 g	50 mL				
680-102327-A-6	SD-197-01	3050B, 6020A	T	0.5574 g	50 mL				
680-102327-A-7	SD-197-02	3050B, 6020A	T	0.5900 g	50 mL				
680-102327-A-9	SD-199-SS	3050B, 6020A	T	0.5631 g	50 mL				
680-102327-A-10	SD-199-01	3050B, 6020A	T	0.5923 g	50 mL				
680-102327-A-11	SD-199-02	3050B, 6020A	T	0.5453 g	50 mL				
680-102327-A-13	SD-DUP-02	3050B, 6020A	T	0.5580 g	50 mL				
680-102327-A-14	SD-005W-01	3050B, 6020A	T	0.5205 g	50 mL				
680-102327-A-15	SD-208-SS	3050B, 6020A	T	0.5673 g	50 mL				
680-102327-A-16	SD-208-01	3050B, 6020A	T	0.5912 g	50 mL				
680-102327-A-17	SD-208-02	3050B, 6020A	T	0.5887 g	50 mL				
680-102327-A-18	SD-209-01	3050B, 6020A	T	0.5383 g	50 mL				
680-102327-A-19	SD-209-02	3050B, 6020A	T	0.5738 g	50 mL				
680-102327-A-21	SD-204-SS	3050B, 6020A	T	0.5092 g	50 mL				
680-102327-A-22	SD-204-01	3050B, 6020A	T	0.5617 g	50 mL				
680-102327-A-23	SD-204-02	3050B, 6020A	T	0.5424 g	50 mL				

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

METALS BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Batch Number: 139022 Batch Start Date: 08/20/14 09:25 Batch Analyst: Davis, Shanika M

Batch Method: 3050B Batch End Date: 08/21/14 09:00

Batch Notes	
Balance ID	27150548
Hydrogen peroxide lot number	408031
Lot # of hydrochloric acid	422962
Lot # of Nitric Acid	422893
Hot Block ID number	HOTBLOCK1
Oven, Bath or Block Temperature 1	94.0 Degrees C
Pipette ID	M-PREP-2
ID number of the thermometer	111815886
Digestion Tube/Cup Lot #	191064

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

METALS BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Batch Number: 139028 Batch Start Date: 08/20/14 10:02 Batch Analyst: Davis, Shanika M

Batch Method: 3050B Batch End Date: 08/21/14 09:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	FinalAmount	ISOU Prep Spk 00002			
MB 160-139028/1		3050B, 6020A		0.5740 g	50 mL				
LCS 160-139028/2		3050B, 6020A		0.5597 g	50 mL	0.25 mL			
680-102327-A-31	SD-207-01	3050B, 6020A	T	0.5963 g	50 mL				
680-102327-A-31 MS	SD-207-01	3050B, 6020A	T	0.5730 g	50 mL	0.25 mL			
680-102327-A-31 MSD	SD-207-01	3050B, 6020A	T	0.5427 g	50 mL	0.25 mL			
680-102327-A-32	SD-207-02	3050B, 6020A	T	0.5905 g	50 mL				
680-102327-A-35	SD-205-01	3050B, 6020A	T	.5500 g	50 mL				

Batch Notes	
Balance ID	27150548
Hydrogen peroxide lot number	408031
Lot # of hydrochloric acid	422962
Lot # of Nitric Acid	422893
Hot Block ID number	HOTBLOCK1
Oven, Bath or Block Temperature 1	94.0 Degrees C
Pipette ID	M-PREP-2
ID number of the thermometer	111815886
Digestion Tube/Cup Lot #	191064

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

METALS BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102327-3

SDG No.: 680102327-1

Batch Number: 139821 Batch Start Date: 08/25/14 07:53 Batch Analyst: Souris, Matthew T

Batch Method: 3050B Batch End Date: 08/25/14 11:36

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	FinalAmount	ISOU Prep Spk 00002			
MB 160-139821/1		3050B, 6020A		0.5700 g	50 mL				
LCS 160-139821/2		3050B, 6020A		0.5096 g	50 mL	0.25 mL			
680-102327-A-24	SD-221-SS	3050B, 6020A	T	0.5031 g	50 mL				
680-102327-A-24 MS	SD-221-SS	3050B, 6020A	T	0.5624 g	50 mL	0.25 mL			
680-102327-A-24 MSD	SD-221-SS	3050B, 6020A	T	0.5022 g	50 mL	0.25 mL			

Batch Notes	
Balance ID	27150548
Hydrogen peroxide lot number	408031
Lot # of hydrochloric acid	422962
Lot # of Nitric Acid	422893
Hot Block ID number	HOTBLOCK1
Oven, Bath or Block Temperature 1	92.2 Degrees C
Pipette ID	M-PREP-2
ID number of the thermometer	111815886
Digestion Tube/Cup Lot #	191064

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

Subcontract Data

Shipping and Receiving Documents

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: S. Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.7
Client Contact: Mike Martin	Phone: (703) 342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page 1 of 4
Company: Tetra Tech, Inc.		Analysis Requested		Job #: 680-102327
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
City: Germantown	TAT Requested (days):			
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			Other:
Email: Michael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=wastestoil, BT=Tissue, A=Air)	Preservation Code:	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (HOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
								N	N	N	N		
SD-198-SS	6/11/14	0755	C	Solid					X				
SD-198-01		0800	C	Solid					X				
SD-198-02		0805	C	Solid					X				
SD-198-03		0810	C	Solid					X				Hold Pending analysis of SS to 02
SD-197-SS		1030	C	Solid					X				
SD-197-01		1035	C	Solid					X				
SD-197-02		1040	C	Solid					X				
SD-197-03		1045	C	Solid					X				Hold Pending analysis of SS to 02
SD-199-SS		1110	C	Solid					X				
SD-199-01		1115	C	Solid					X				
SD-199-02		1120	C	Solid					X				

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6/11/14 1600	TT		6/11/14 1600	TestAmerica
2		6/11/14 1730	TestAmerica		6-12-14 0840	TA SR
3						

Custody Seals Intact: △ Yes △ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.3
Client Contact: Mike Martin	Phone:	E-Mail: jerry.lanier@testamericainc.com		Page: Page 2 of 4
Company: Tetra Tech, Inc.		Analysis Requested		Job #: 680-102327
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
City: Germantown	TAT Requested (days):			
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			Other:
Email: MIchael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MDC) Radium-228/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-199-03	6/11/14	1125	C	Solid				X				Hold pending analysis of SS in 02
SD-DUP02		0000		Solid				X				
SD-005W-01		1200	C	Solid						X		
SD-208-SS		1206	C	Solid				X				
SD-208-01		1205	C	Solid				X				
SD-208-02		1210	C	Solid				X				
SD-209-01		1400	C	Solid				X				
SD-209-02		1405	C	Solid				X				
SD-209-03		1410	C	Solid				X				
SD-204-SS		1220	C	Solid				X				
SD-204-01		1225	C	Solid				X				

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6-11-14 / 1600	TT		6/11/14 / 1600	TestAmerica
2		6/11/14 / 16:30	TestAmerica		6-12-14 0440	TA STL
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: △ Yes △ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.4
Client Contact: Mike Martin	Phone: (703)342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~4 of 45~~ 3 of 4
Company: Tetra Tech, Inc.				Job #: 680-102327
Address: 20251 Century Blvd Suite 200	Due Date Requested:			
City: Germantown	TAT Requested (days):			
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			
Email: MIchael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; G - Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA; M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2SO3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - ph 4-5; Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-204-02	6/11/14	1230	C	Solid				X				
SD-221-SS		1320	C	Solid				X				
SD-221-01		1325	C	Solid				X				
SD-221-02		1330	C	Solid				X				
SD-210-SS		1435	C	Solid				X				
SD-210-01		1440	C	Solid				X				
SD-210-02		1445	C	Solid				X				
SD-207-SS		1448	C	Solid				X				
SD-207-01		1450	C	Solid				X				
SD-207-02		1455	C	Solid				X				
SD-217-03	↓	1500	C	Solid				X				Hold Pending Analysis of SS to 02

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6-11-14 1600	TT		6/11/14 1668	TestAmerica
2		6/11/14 1630 ~~1730~~	TestAmerica		6-12-14 0940	TASR
3		Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: △ Yes △ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

R4D

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.12
Client Contact: Mike Martin	Phone: (703) 342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page 12 Page 4 of 4
Company: Tetra Tech, Inc.			Analysis Requested	Job #: 680-102327
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes:
City: Germantown	TAT Requested (days):			A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			Other:
Email: Michael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	AA01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
		Preservation Code:					N	N	N	N		
SD-205-SS	6/11/14	1525	C	Solid				X				
SD-205-01		1530	C	Solid				X				
SD-205-02		1535	C	Solid				X				
SD-205-03		1540	C	Solid				X				
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month): ☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6-11-14 / 1640	TT		6/11/14 / 1600	TestAmerica
2		6/11/14 / 1730	BV		6-12-14 0940	TASTL
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: △ Yes △ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

02 RAD

Cur165

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: S. Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.13
Client Contact: Mike Martin	Phone: (703)342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~13 of 18~~ 1 of 4
Company: Tetra Tech, Inc.			Analysis Requested	Job #: 680-102370
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes:
City: Germantown	TAT Requested (days): Standard			A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
State, Zip: MD, 20874	PO #: Purchase Order not required			
Phone:	WO #:			Other:
Email: Michael.Martin@tetratech.com	Project #: 68012942			
Project Name: Sediments	SSOW#:			
Site: Dark Head Cove				

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=wastoil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
		Preservation Code:					N	N	N	N		
SD-DUP03	6/12/14	0000	C	Solid				X				
SD-206-S5		0810	C	Solid				X				
SD-206-01		0815	C	Solid				X				
SD-206-02		0820	C	Solid				X				
SD-206-03		0825	C	Solid				X				
SD-005E-01		0830	C	Solid				[redacted]		X		
~~SD-222-S5~~ SD-215-S5		0850	C	Solid				X				
SD-222-S5		0905	C	Solid				X				
SD-222-01		0910	C	Solid				X				
SD-222-02		0915	C	Solid				X				
SD-222-03		1920	C	Solid				X				[redacted]

HBS pending analysis of S5 to 02

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6-12-14 / 1600	TT		6/12/14 / 1600	TestAmerica
2		6/12/14 / 1735	TestAmerica		6-13-14 / 0930	TTS
3						

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-102327-3
SDG Number: 680102327-1

Login Number: 102327
List Number: 1
Creator: Daughtry, Beth A

List Source: TestAmerica Savannah

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-102327-3
SDG Number: 680102327-1

Login Number: 102327
List Number: 2
Creator: Daniels, Brian J

List Source: TestAmerica St. Louis
List Creation: 06/13/14 03:50 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	True	

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-102327-3
SDG Number: 680102327-1

Login Number: 102370
List Number: 1
Creator: Daughtry, Beth A

List Source: TestAmerica Savannah

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-102327-3
SDG Number: 680102327-1

Login Number: 102370
List Number: 2
Creator: Daniels, Brian J

List Source: TestAmerica St. Louis
List Creation: 06/16/14 12:53 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	3.1
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 680-102327-4

SDG Number: 680102327-1

Job Description: Sediments

For:
Tetra Tech, Inc.
20251 Century Blvd
Suite 200
Germantown, MD 20874

Attention: Mike Martin



Approved for release.
Jerry A Lanier
Project Manager I
9/19/2014 4:05 PM

Jerry A Lanier, Project Manager I
5102 LaRoche Avenue, Savannah, GA, 31404
(912)354-7858 e.3410
jerry.lanier@testamericainc.com
09/19/2014

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

Savannah Certifications and ID #s: A2LA: 0399.01; AL: 41450; ARDEQ: 88-0692; ARDOH; AZ: AZ0741; CA: 03217CA; CO; CT: PH0161; DE; FL: E87052; GA: 803; Guam; HI; IL: 200022; IN: C-GA-02; IA: 353; KS: E-10322; KY EPPC: 90084; KY UST; LA DEQ: 30690; LA DHH: LA080008; ME: 2008022; MD: 250; MA: M-GA006; MI: 9925; MS; NFESC: 249; NV: GA00006; NJ: GA769; NM; NY: 10842; NC DWQ: 269; NC DHHS: 13701; PA: 68-00474; PR: GA00006; RI: LAO00244; SC: 98001001; TN: TN0296; TX: T104704185; USEPA: GA00006; VT: VT-87052; VA: 00302; WA; WV DEP: 094; WV DHHR: 9950 C; WI DNR: 999819810; WY/EPAR8: 8TMS-Q

Table of Contents

Cover Title Page 1

Data Summaries 4

Definitions 4

Case Narrative 5

Client Sample Results 6

Default Detection Limits 7

Tracer/Carrier Summary 8

QC Sample Results 9

QC Association 10

Chronicle 11

Certification Summary 12

Method Summary 13

Sample Summary 14

Reagent Traceability 15

COAs 16

Inorganic Sample Data 28

Metals Data 28

Met Cover Page 29

Met Sample Data 30

Met QC Data 31

Met ICV/CCV 31

Met CRQL 33

Met Blanks 34

Met MS/MSD/PDS 36

Met LCS/LCSD 38

Met MDL 39

Table of Contents

Met Linear Ranges 41

Met Preparation Log 42

Met Analysis Run Log 43

Met ICP/MS Int Stds 48

Met Raw Data 49

Met Prep Data 250

Shipping and Receiving Documents 251

Client Chain of Custody 251

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Sediments

Report Number: 680-102327-4

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 06/12/2014; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 2.6 C.

METALS BY ICPMS

Sample SD-207-01 (680-102327-31) was analyzed for Metals by ICPMS in accordance with EPA SW-846 6020A. The samples were prepared on 09/12/2014 and analyzed on 09/17/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-4
SDG: 680102327-1

Client Sample ID: SD-207-01
Date Collected: 06/11/14 14:50
Date Received: 06/12/14 09:40

Lab Sample ID: 680-102327-31
Matrix: Solid

Method: 6020A - Metals (ICP/MS), Tc-99

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tc-99	ND		0.000055	0.000016	mg/Kg		09/12/14 13:53	09/17/14 15:24	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Re	*91*		*30 - 110*	*09/12/14 13:53*	*09/17/14 15:24*	*1*

Default Detection Limits

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-4
SDG: 680102327-1

Method: 6020A - Metals (ICP/MS), Tc-99

Analyte	RL	MDL	Units	Method
Tc-99	0.000050	0.000015	mg/Kg	6020A

Tracer/Carrier Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-4
SDG: 680102327-1

Method: 6020A - Metals (ICP/MS), Tc-99

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
		Re
Lab Sample ID	Client Sample ID	(30-110)
680-102327-31	SD-207-01	91
680-102327-31 MS	SD-207-01	87
680-102327-31 MSD	SD-207-01	88
LCS 160-143794/2-A	Lab Control Sample	101
MB 160-143794/1-A	Method Blank	100

Tracer/Carrier Legend

Re = Re

Method: 6020A - Metals (ICP/MS), Tc-99

Lab Sample ID: MB 160-143794/1-A
Matrix: Solid
Analysis Batch: 144626

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 143794

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tc-99	ND		0.000049	0.000015	mg/Kg		09/12/14 13:53	09/17/14 15:16	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Re	*100*		*30 - 110*	*09/12/14 13:53*	*09/17/14 15:16*	*1*

Lab Sample ID: LCS 160-143794/2-A
Matrix: Solid
Analysis Batch: 144626

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 143794

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Tc-99	0.00238	0.00240		mg/Kg		101	80 - 120

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Re	*101*		*30 - 110*

Lab Sample ID: 680-102327-31 MS
Matrix: Solid
Analysis Batch: 144626

Client Sample ID: SD-207-01
Prep Type: Total/NA
Prep Batch: 143794

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Tc-99	ND		0.00235	0.00185		mg/Kg		79	75 - 125

Carrier	*MS %Yield*	*MS Qualifier*	*Limits*
Re	*87*		*30 - 110*

Lab Sample ID: 680-102327-31 MSD
Matrix: Solid
Analysis Batch: 144626

Client Sample ID: SD-207-01
Prep Type: Total/NA
Prep Batch: 143794

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Tc-99	ND		0.00237	0.00190		mg/Kg		80	75 - 125	3	30

Carrier	*MSD %Yield*	*MSD Qualifier*	*Limits*
Re	*88*		*30 - 110*

Metals

Prep Batch: 143794

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102327-31	SD-207-01	Total/NA	Solid	None	
680-102327-31 MS	SD-207-01	Total/NA	Solid	None	
680-102327-31 MSD	SD-207-01	Total/NA	Solid	None	
LCS 160-143794/2-A	Lab Control Sample	Total/NA	Solid	None	
MB 160-143794/1-A	Method Blank	Total/NA	Solid	None	

Analysis Batch: 144626

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102327-31	SD-207-01	Total/NA	Solid	6020A	143794
680-102327-31 MS	SD-207-01	Total/NA	Solid	6020A	143794
680-102327-31 MSD	SD-207-01	Total/NA	Solid	6020A	143794
CRI 160-144626/7	DL		Solid	6020A	
LCS 160-143794/2-A	Lab Control Sample	Total/NA	Solid	6020A	143794
MB 160-143794/1-A	Method Blank	Total/NA	Solid	6020A	143794

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-4
SDG: 680102327-1

Client Sample ID: SD-207-01
Date Collected: 06/11/14 14:50
Date Received: 06/12/14 09:40

Lab Sample ID: 680-102327-31
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			143794	09/12/14 13:53	MFM	TAL SL
Total/NA	Analysis	6020A		1	144626	09/17/14 15:24	MTS	TAL SL

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Certification Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-4
SDG: 680102327-1

Laboratory: TestAmerica Savannah

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Maryland	State Program	3	250	12-31-14

Laboratory: TestAmerica St. Louis

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska	State Program	10	MO00054	06-30-15
California	NELAP	9	2886	03-31-15
Connecticut	State Program	1	PH-0241	03-31-15
Florida	NELAP	4	E87689	06-30-15
Illinois	NELAP	5	200023	11-30-14
Iowa	State Program	7	373	12-01-14
Kansas	NELAP	7	E-10236	10-31-14 *
Kentucky (DW)	State Program	4	90125	12-31-14
L-A-B	DoD ELAP		L2305	01-10-16
Louisiana	NELAP	6	04080	06-30-15
Maryland	State Program	3	310	09-30-15
Missouri	State Program	7	780	06-30-14 *
Nevada	State Program	9	MO000542013-1	07-31-15
New Jersey	NELAP	2	MO002	06-30-15
New Mexico	State Program	6		06-30-10 *
New York	NELAP	2	11616	03-31-15
North Dakota	State Program	8	R207	06-30-14 *
NRC	NRC		24-24817-01	12-31-22
Oklahoma	State Program	6	9997	08-31-15
Pennsylvania	NELAP	3	68-00540	02-28-15
South Carolina	State Program	4	85002001	06-30-14 *
Texas	NELAP	6	T104704193-13-6	07-31-15
USDA	Federal		P330-07-00122	01-09-17
Utah	NELAP	8	MO000542013-5	07-31-15
Virginia	NELAP	3	460230	06-14-15
Washington	State Program	10	C592	08-30-15
West Virginia DEP	State Program	3	381	12-31-14 *

* Certification renewal pending - certification considered valid.

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-4
SDG: 680102327-1

Method	Method Description	Protocol	Laboratory
6020A	Metals (ICP/MS), Tc-99	SW846	TAL SL

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102327-4
SDG: 680102327-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-102327-31	SD-207-01	Solid	06/11/14 14:50	06/12/14 09:40

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102327-4

SDG No.: 680102327-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
TC99 CAL1/LLC_00043	09/24/14	09/17/14	2% HCL 2% HN03, Lot 442634	50 mL	TC99 RE CAL_00010	0.5 mL	Re	100 ug/L
					TC99-I CAL LL_00027	0.1 mL	Tc-99	0.004916 ug/L
.TC99 RE CAL_00010	12/01/14	08/27/14	2% HCL 2% HN03, Lot 432742	200 mL	STD RE_00006	2 mL	Re	10000 ug/L
..STD RE_00006	12/01/14	INORGANIC VENTURES, Lot f2-re-01082			(Purchased Reagent)		Re	1000 ug/mL
.TC99-I CAL LL_00027	10/17/14	09/17/14	2% HCL 2% HN03, Lot 442634	50 mL	TC99-I CAL_00020	1 mL	Tc-99	2.458 ug/L
..TC99-I CAL_00020	01/15/15	07/15/14	2% HCL 2% HN03, Lot 397367	50 mL	TC99-C CAL_00005	0.5 mL	Tc-99	122.9 ug/L
...TC99-C CAL_00005	01/14/24	Eckert & Ziegler Isotope Products, Lot 1595-47			(Purchased Reagent)		Tc-99	12.29 ug/mL
TC99 CAL2/CCV_00040	09/24/14	09/17/14	2% HCL 2% HN03, Lot 442634	100 mL	TC99 RE CAL_00010	5 mL	Re	500 ug/L
					TC99-I CAL_00020	0.25 mL	Tc-99	0.30725 ug/L
.TC99 RE CAL_00010	12/01/14	08/27/14	2% HCL 2% HN03, Lot 432742	200 mL	STD RE_00006	2 mL	Re	10000 ug/L
..STD RE_00006	12/01/14	INORGANIC VENTURES, Lot f2-re-01082			(Purchased Reagent)		Re	1000 ug/mL
.TC99-I CAL_00020	01/15/15	07/15/14	2% HCL 2% HN03, Lot 397367	50 mL	TC99-C CAL_00005	0.5 mL	Tc-99	122.9 ug/L
..TC99-C CAL_00005	01/14/24	Eckert & Ziegler Isotope Products, Lot 1595-47			(Purchased Reagent)		Tc-99	12.29 ug/mL
TC99 CAL3_00079	09/24/14	09/17/14	2% HCL 2% HN03, Lot 442634	50 mL	TC99 RE CAL_00010	5 mL	Re	1000 ug/L
					TC99-I CAL_00020	0.25 mL	Tc-99	0.6145 ug/L
.TC99 RE CAL_00010	12/01/14	08/27/14	2% HCL 2% HN03, Lot 432742	200 mL	STD RE_00006	2 mL	Re	10000 ug/L
..STD RE_00006	12/01/14	INORGANIC VENTURES, Lot f2-re-01082			(Purchased Reagent)		Re	1000 ug/mL
.TC99-I CAL_00020	01/15/15	07/15/14	2% HCL 2% HN03, Lot 397367	50 mL	TC99-C CAL_00005	0.5 mL	Tc-99	122.9 ug/L
..TC99-C CAL_00005	01/14/24	Eckert & Ziegler Isotope Products, Lot 1595-47			(Purchased Reagent)		Tc-99	12.29 ug/mL
TC99 ICV_00082	09/24/14	09/17/14	2% HCL 2% HN03, Lot 442634	50 mL	TC99 RE QC_00008	2.5 mL	Re	500 ug/L
					TC99-I QC_00008	0.125 mL	Tc-99	0.29205 ug/L
.TC99 RE QC_00008	10/31/14	01/31/14	2% HCL 2% HN03, Lot 205277	100 mL	STD RE_00006	1 mL	Re	10000 ug/L
..STD RE_00006	12/01/14	INORGANIC VENTURES, Lot f2-re-01082			(Purchased Reagent)		Re	1000 ug/mL
.TC99-I QC_00008	01/15/15	07/15/14	2% HCL 2% HN03, Lot 284374	50 mL	TC99-C QC_00001	0.5 mL	Tc-99	116.82 ug/L
..TC99-C QC_00001	11/08/20	Eckert & Ziegler Analytics, Lot 83550-334			(Purchased Reagent)		Tc-99	11.682 ug/mL
TC99 RE TRACE_00019	12/01/14	09/04/14	2% HCL 2% HNO3, Lot 410823	1000 mL	STD RE_00007	50 mL	Re	50 mg/L
.STD RE_00007	07/01/15	INORGANIC VENTURES, Lot f2-re-01085			(Purchased Reagent)		Re	1000 ug/mL
TC99-PREP_00004	10/26/14	04/28/14	2% HCL 2% HN03, Lot 346320	100 mL	TC99-C CAL_00004	1 mL	Tc-99	120 ug/L
.TC99-C CAL_00004	06/05/22	Eckert & Ziegler Isotope Products, Lot 1578-50			(Purchased Reagent)		Tc-99	12 ug/mL

Reagent

STD RE_00006

INORGANIC VENTURES
300 Technology Drive
Christiansburg, VA 24073 - USA
inorganicventures.com

CERTIFICATE OF ANALYSIS

260529
ID: STD RE_00006
Exp:12/01/14 Prpd:REV Opn:12/02/13
RE 100OPPM

1.0 **INORGANIC VENTURES** is an ISO Guide 34 "General Requirements for the Competence of Reference Material Producers" and ISO 9001 registered manufacturer. Our manufacturing laboratory is accredited to ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories."

ACCREDITED Testing Laboratory Certificate 883.01
ACCREDITED Reference Material Producer Certificate 883.02

2.0 DESCRIPTION OF CRM **1000 µg/mL Rhenium in 3% (v/v) HNO3**

Catalog Number:	CGRE1-1, CGRE1-2, and CGRE1-5
Lot Number:	**F2-RE01082**
Starting Material:	Re powder
Starting Material Purity (%):	99.9992
Starting Material Lot No:	1644
Matrix:	3% (v/v) HNO3

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 1,003 ± 5 µg/mL - weighted mean

Certified Density: 1.015 g/mL (measured at 20 ± 1°C)

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

Certified Value $(\bar{x}) = \frac{\Sigma x_i}{n}$ ($\bar{x}$) = mean

x_i = individual results

n = number of measurements

Uncertainty $(\pm) = 2 [\Sigma(s_i)^2]^{½}$ 2 = the coverage factor.

$[\Sigma(s_i)^2]^{½}$ = The square root of the sum of the squares of the most common errors (where 's' stands for the standard deviation) from instrumental measurement, density, NIST SRM uncertainty, weighing, dilution to volume, homogeneity, long term stability and short term stability.

4.0 TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

· "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

· This product is Traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRMs are available, the term 'in-house std.' is specified.

- The Calculated Value is a value calculated from the weight of a starting material that has been certified directly vs. a NIST SRM/RM. See section 4.2 for balance traceability.

4.1 **Assay Method #1** **1,001 ± 3 µg/mL**
ICP Assay NIST SRM 3143 Lot Number: 010816

Assay Method #2 **1,004 ± 3 µg/mL**
Calculated NIST SRM Lot Number: See Sec. 4.2

4.2 **BALANCE CALIBRATION -** All analytical balances are calibrated yearly by an accredited calibration laboratory and are traceable to a class E 2 analytical weight set with NIST Traceability. All balances are checked daily using an in-house procedure. The weights used for testing are annually compared to master weights and are traceable to the National Institute of Standards and Technology (NIST).

4.3 **THERMOMETER CALIBRATION -** All thermometers are NIST traceable through thermometers that are calibrated by an A2LA accredited calibration laboratory.

4.4 **GLASSWARE CALIBRATION -** An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM's.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

CRM's solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O Al < 0.006000	M Dy < 0.006036	O Li < 0.000030	M Pr < 0.000302	M Te < 0.030179
M Sb < 0.000503	M Er < 0.005030	M Lu < 0.000402	s Re	M Tb < 0.000302
M As < 0.010060	M Eu < 0.003018	O Mg < 0.100000	M Rh < 0.001006	M Tl < 0.001006
M Ba < 0.010060	M Gd < 0.001006	M Mn < 0.004024	M Rb < 0.001006	M Th < 0.001006
O Be < 0.000020	M Ga < 0.001006	i Hg	M Ru < 0.002012	M Tm < 0.000402
M Bi 0.000230	M Ge < 0.006036	M Mo < 0.002012	M Sm < 0.001006	M Sn < 0.005030
O B < 0.070000	M Au < 0.003018	M Nd < 0.002012	M Sc < 0.010060	M Ti < 0.050298
M Cd < 0.003018	M Hf < 0.002012	i Ni	M Se < 0.008048	M W < 0.010060
O Ca 0.000696	M Ho < 0.000503	M Nb < 0.000503	i Si	M U < 0.002012
M Ce < 0.005030	M In < 0.010060	n Os	M Ag < 0.002012	M V < 0.002012
M Cs 0.002500	M Ir < 0.005030	M Pd < 0.005030	O Na < 0.000100	M Yb < 0.001006
M Cr < 0.005030	i Fe	i P	M Sr < 0.000503	M Y < 0.040238
M Co < 0.003018	M La < 0.000503	M Pt < 0.002012	i S	M Zn 0.000400
M Cu 0.000200	M Pb < 0.003018	O K 0.002386	M Ta < 0.007042	M Zr < 0.005030

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
HPLC, IC, TLC, ISE, IR, NMR, UV/VIS, MS, Capillary Eletrophoresis, Potentiometry, Wet Chemistry and Voltammetry
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact Technical Staff

This CRM was manufactured using 18 megohm doubly deionized water that has been filtered through a 0.2 micron filter.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 186.207; +7; *4,6,7,8,9*; ReO41-

Chemical Compatibility - Stable in HCl, HNO3, H2SO4 ,HF, H3PO4 . Stable with most metals and inorganic anions in acidic media. Mixing higher levels of ReO41- with Ag+, Hg22+, K+, NH4+, Cs+, Rb+, or Tl+ will give the corresponding salt (solubilities are 1-12 g/L).

Stability - 2-100 ppb levels stable for months in 1% HNO3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 1-5% HNO3 / LDPE container.

Re Containing Samples (Preparation and Solution) - Metal (Soluble in HNO3); Oxides / Ores (Fuse in Pt0 with Na2CO3). Organic Matrix (All modes of acid attack invite the danger of loss of some volatile perrhenic acid. The use of a reflux condenser should be considered when a wet acid digestion is used such as a nitric / perchloric or sulfuric / peroxide digestion. The preferred approach is to ash the sample in Pt0 mixed with Na2CO3 starting the ash at 450EC and then increasing the temperature if necessary to 900EC to effect a fusion of accompanying alumino-silicates, etc.)

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Type	Interferences (underlined indicates severe)
ICP-OES 221.426 nm	0.006 / 0.0006 µg/mL	1	ion	Fe, Os Mo, Ta
ICP-OES 227.525 nm	0.006 / 0.0006 µg/mL	1	ion	Ru, Co, Ca
ICP-MS 187 amu	5 ppt	n/a	M+	171Yb16O, 187Os

Uranium Note: If uranium is present in this standard, it is natural abundance unless specified in Section 3.0.

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Safety Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to an in house procedure and is guaranteed to be homogeneous. Inorganic Ventures homogeneity data indicate that the end user should take a minimum sample size of 0.2mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration
- SAI Global File Number 010105

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration"
- Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 "General Requirements for the Competence of Reference Material Producers"
- Reference Materials Production - Accredited A2LA Certificate Number 883.02

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission
- Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission
- Reporting Defects and Non-Compliance

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life. Manufacturer concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

11.3 Chemical Stability - Studies have been conducted on this or similar CRMs and it has been demonstrated that this CRM is chemically stable for a period of not less than two years provided the "Storage & Handling" conditions are followed that are described in section 7.0.

Certification Date: June 18, 2012

Expiration Date:

01/2014

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	Stephan Blaakman Product Documentation Technician	
Certificate Approved By:	Brian Alexander PhD., Technical Process Director	
Certifying Officer:	Paul Gaines PhD., Senior Technical Director	

Reagent

STD RE_00007

INORGANIC VENTURES™

CERTIFICATE OF ANALYSIS

429123
ID: STD RE_00007
Exp:07/01/15 Prpd:REV Opn:08/18/14
RE 100OPPM

1.0 **INORGANIC VENTURES** is an ISO Guide 34 "General Requirements for the Competence of Reference Material Producers" and ISO 9001 registered manufacturer. Our manufacturing laboratory is accredited to ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories."

ACCREDITED Testing Laboratory Certificate 883.01

ACCREDITED Reference Material Producer Certificate 883.02

2.0 DESCRIPTION OF CRM **1000 µg/mL Rhenium in 3% (v/v) HNO3**

Catalog Number:	CGRE1-1, CGRE1-2, and CGRE1-5
Lot Number:	**G2-RE01085**
Starting Material:	Re powder
Starting Material Purity (%):	99.9982
Starting Material Lot No:	1708 and 1827
Matrix:	3% (v/v) HNO3

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 1,004 ± 2 µg/mL weighted mean

Certified Density: 1.015 g/mL (measured at 20 ± 1°C)

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence interval using a coverage factor of k = 2.

Characterization of CRM by two independent methods

Certified Value, X_{CRM}, where two methods of characterization are used, is the weighted mean of the two results = $[(w_a)(X_a) + (w_b)(X_b)]$

X_a is the mean of Assay Method A with standard uncertainty $U_{char\ a}$.

X_b is the mean of Assay Method B with standard uncertainty $U_{char\ b}$.

w_a and w_b = The weighting factors for each method calculated using the inverse square of the variance:

$$w_a = (1/U_{char\ a})^2 / ((1/U_{char\ a})^2 + (1/U_{char\ b})^2);$$

$$w_b = (1/U_{char\ b})^2 / ((1/U_{char\ a})^2 + (1/U_{char\ b})^2)$$

CRM Expanded Uncertainty (±) = $U_{CRM} = k\ (U^2_{char\ a\&b} + u^2_{bb} + u^2_{lts} + u^2_{sts})^{1/2}$

$U_{char\ a\&b} = [(w_a)^2 (U_{char\ a})^2 + (w_b)^2 (U_{char\ b})^2]^{0.5}$; $U_{char\ a}$ and $U_{char\ b}$ are the square root of the sum of the squares of the errors from characterization which include instrumental measurement, density, NIST SRM uncertainty, weighing, and volume; **k**, coverage factor = 2 in all cases at Inorganic Ventures; u_{bb} = bottle to bottle homogeneity standard uncertainty; u_{lts} = long term stability standard uncertainty (storage); u_{sts} = short term stability standard uncertainty (transportation).

Characterization of CRM by one method

Certified Value, X_{CRM}, where one method of characterization is used, is the mean of individual results:

X_a = Mean X_a is the mean of Assay Method A with standard uncertainty $U_{char\ a}$.

CRM Expanded Uncertainty (±) = $U_{CRM} = k\ (U^2_{char\ a} + u^2_{bb} + u^2_{lts} + u^2_{sts})^{1/2}$

$U_{char\ a}$ is the square root of the sum of the squares of the errors from characterization which include instrumental measurement, density, NIST SRM uncertainty, weighing, and volume; **k**, coverage factor = 2 in all cases at Inorganic Ventures; u_{bb} = bottle to bottle homogeneity standard uncertainty; u_{lts} = long term stability standard uncertainty (storage); u_{sts} = short term stability standard uncertainty (transportation).

4.0 TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

· "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

· This product is Traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRMs are available, the term 'in-house std.' is specified.

- The Calculated Value is a value calculated from the weight of a starting material that has been certified directly vs. a NIST SRM/RM. See section 4.2 for balance traceability.

4.1 **Assay Method #1** **1,005 ± 3 µg/mL**
ICP Assay NIST SRM 3143 Lot Number: 010816

Assay Method #2 **1,003 ± 3 µg/mL**
· Calculated NIST SRM Lot Number: See Sec. 4.2

4.2 **BALANCE CALIBRATION** - All analytical balances are calibrated yearly by an accredited calibration laboratory and are traceable to a class E 2 analytical weight set with NIST Traceability. All balances are checked daily using an in-house procedure. The weights used for testing are annually compared to master weights and are traceable to the National Institute of Standards and Technology (NIST).

4.3 **THERMOMETER CALIBRATION** - All thermometers are NIST traceable through thermometers that are calibrated by an A2LA accredited calibration laboratory.

4.4 **GLASSWARE CALIBRATION** - An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM's.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

CRM's solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O	Al	< 0.007000	M	Dy	< 0.000100	O	Li	< 0.000060	M	Pr	< 0.000100	M	Te	< 0.009999
M	Sb	< 0.005999	M	Er	< 0.000100	M	Lu	< 0.000100	s	Re		M	Tb	< 0.000100
M	As	< 0.003000	M	Eu	< 0.000100	O	Mg	< 0.030000	M	Rh	< 0.000100	M	Tl	0.003013
O	Ba	< 0.000400	M	Gd	< 0.000100	M	Mn	< 0.004000	M	Rb	< 0.004999	M	Th	< 0.001000
M	Be	< 0.000500	M	Ga	< 0.000100	i	Hg		M	Ru	< 0.000200	M	Tm	< 0.000100
M	Bi	< 0.004999	M	Ge	< 0.000500	M	Mo	< 0.019998	M	Sm	< 0.000100	M	Sn	< 0.004999
M	B	0.003877	M	Au	< 0.000100	M	Nd	< 0.000100	M	Sc	< 0.000300	M	Ti	< 0.002000
M	Cd	< 0.000800	M	Hf	< 0.002000	M	Ni	< 0.029997	M	Se	< 0.001000	M	W	< 0.019998
O	Ca	0.001004	M	Ho	< 0.000100	M	Nb	< 0.001000	i	Si		M	U	< 0.001000
M	Ce	< 0.000100	M	In	< 0.001000	n	Os		M	Ag	< 0.002000	M	V	< 0.000200
M	Cs	0.002069	M	Ir	< 0.000100	M	Pd	< 0.000500	O	Na	0.004520	M	Yb	< 0.000100
M	Cr	< 0.009999	i	Fe		i	P		M	Sr	< 0.000100	M	Y	< 0.000100
M	Co	< 0.003000	M	La	< 0.001000	M	Pt	< 0.000300	i	S		M	Zn	0.000522
M	Cu	< 0.004999	M	Pb	0.000402	O	K	0.003716	M	Ta	< 0.002000	M	Zr	< 0.001000

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
HPLC, IC, TLC, ISE, IR, NMR, UV/VIS, MS, Capillary Eletrophoresis, Potentiometry, Wet Chemistry and Voltammetry
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact Technical Staff

This CRM was manufactured using 18 megohm doubly deionized water that has been filtered through a 0.2 micron filter.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 186.207; +7; *4,6,7,8,9*; ReO41-

Chemical Compatibility - Stable in HCl, HNO3, H2SO4 ,HF, H3PO4 . Stable with most metals and inorganic anions in acidic media. Mixing higher levels of ReO41- with Ag+, Hg22+, K+, NH4+, Cs+, Rb+, or Tl+ will give the corresponding salt (solubilities are 1-12 g/L).

Stability - 2-100 ppb levels stable for months in 1% HNO3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 1-5% HNO3 / LDPE container.

Re Containing Samples (Preparation and Solution) - Metal (Soluble in HNO3); Oxides / Ores (Fuse in Pt0 with Na2CO3). Organic Matrix (All modes of acid attack invite the danger of loss of some volatile perrhenic acid. The use of a reflux condenser should be considered when a wet acid digestion is used such as a nitric / perchloric or sulfuric / peroxide digestion. The preferred approach is to ash the sample in Pt0 mixed with Na2CO3 starting the ash at 450EC and then increasing the temperature if necessary to 900EC to effect a fusion of accompanying alumino-silicates, etc.)

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Type	Interferences (underlined indicates severe)
ICP-OES 221.426 nm	0.006 / 0.0006 µg/mL	1	ion	Fe, Os Mo, Ta
ICP-OES 227.525 nm	0.006 / 0.0006 µg/mL	1	ion	Ru, Co, Ca
ICP-MS 187 amu	5 ppt	n/a	M+	171Yb16O, 187Os

Uranium Note: If uranium is present in this standard, it is natural abundance unless specified in Section 3.0.

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Safety Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to an in house procedure and is guaranteed to be homogeneous. Inorganic Ventures homogeneity data indicate that the end user should take a minimum sample size of 0.2mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration
- SAI Global File Number 010105

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration"
- Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 "General Requirements for the Competence of Reference Material Producers"
- Reference Materials Production - Accredited A2LA Certificate Number 883.02

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission
- Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission
- Reporting Defects and Non-Compliance

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life. Manufacturer concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

11.3 Chemical Stability - Studies have been conducted on this or similar CRMs and it has been demonstrated that this CRM is chemically stable for a period of not less than two years provided the "Storage & Handling" conditions are followed that are described in section 7.0.

Certification Date: November 25, 2013

Expiration Date: 01 2015

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	Zach Saunders Product Documentation Technician	
Certificate Approved By:	Brian Alexander PhD., Technical Process Director	
Certifying Officer:	Paul Gaines PhD., Senior Technical Director	

Reagent

TC99-C QC_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

28119
ID: TC99-C QC_00001
TC99 QC CONC

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

MT02755-10
TC99 QC (1uCi)
elyk
None
Prep/Opened: 11/8/2010
Exp(1): 11/8/2020
Exp(2): 11/8/2020

83550-334

Tc-99 5 mL Liquid in Flame Sealed Vial

Customer: TestAmerica St. Louis
P.O. No.: 2387681, Item 1

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty* , % Type u_A	u_B	U	Reference Date (12:00 PM EST)
Tc-99	7.710E+07	3.707E+04	0.3	1.3	2.7	10/29/2010

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: γ-impurities <0.1%. 5.00792 g 0.001M NaOH solution, carrier free.

Source Prepared by: _____
Z. Dimitrova, Radiochemist

QA Approved: _____ Date: 11/3/10
J. D. McCorvey, QA Manager Alternate

ACCREDITED SOURCE CALIBRATION LABORATORY
HEALTH PHYSICS SOCIETY
FOUNDED 1956

ANA Form005 Rev. --

Single Isotope Certificate, Rev 1 9/28/2009

METALS

COVER PAGE
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102327-4

SDG No.: 680102327-1

Project: Sediments

Client Sample ID	Lab Sample ID
SD-207-01	680-102327-31

Comments:

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-207-01 Lab Sample ID: 680-102327-31

Lab Name: TestAmerica St. Louis Job No.: 680-102327-4

SDG ID.: 680102327-1

Matrix: Solid Date Sampled: 06/11/2014 14:50

Reporting Basis: WET Date Received: 06/12/2014 09:40

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
14133-76-7	Tc-99	ND	0.000055	0.000016	mg/Kg			1	6020A
7440-15-5	Re	4.5			mg/Kg			1	6020A

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-4

SDG No.: 680102327-1

ICV Source: TC99 ICV_00082 Concentration Units: ug/L

CCV Source: TC99 CAL2/CCV_00040

Analyte	ICV 160-144626/5 09/17/2014 06:52				CCV 160-144626/128 09/17/2014 14:49				CCV 160-144626/140 09/17/2014 15:35			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
Re	500		500	100	536		500	107	534		500	107
Tc-99	0.283		0.292	97	0.280		0.307	91	0.283		0.307	92

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-4

SDG No.: 680102327-1

ICV Source: TC99 ICV_00082 Concentration Units: ug/L

CCV Source: TC99 CAL2/CCV_00040

Analyte	CCV 160-144626/152 09/17/2014 16:22											
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
Re	516		500	103								
Tc-99	0.284		0.307	92								

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2B-IN
CRQL CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-4

SDG No.: 680102327-1

Method: 6020A Instrument ID: ICPMS6100

Lab Sample ID: CRI 160-144626/7 Concentration Units: ug/L

CRQL Check Standard Source: TC99 CAL1/LLC_00043

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
Tc-99	0.00492	0.00424	J	86	70-130
Re	100	112		112	30-110

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IIB-IN

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-4

SDG No.: 680102327-1

Concentration Units: ug/L

Analyte	RL	ICB 160-144626/6 09/17/2014 06:55		CCB 160-144626/129 09/17/2014 14:53		CCB 160-144626/141 09/17/2014 15:39		CCB 160-144626/153 09/17/2014 16:26	
		Found	C	Found	C	Found	C	Found	C
Re		0.142		0.788		0.809		0.555	
Tc-99	0.0050	ND		ND		ND		ND	

Italicized analytes were not requested for this sequence.

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-4

SDG No.: 680102327-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-143794/1-A

Instrument Code: ICPMS6100 Batch No.: 144626

CAS No.	Analyte	Concentration	C	Q	Method
14133-76-7	Tc-99	ND			6020A_TC99
7440-15-5	Re	4.89			6020A_TC99

5A-IN
MATRIX SPIKE SAMPLE RECOVERY
METALS

Client ID: SD-207-01 MS
Lab ID: 680-102327-31 MS
Lab Name: TestAmerica St. Louis
Job No.: 680-102327-4
SDG No.: 680102327-1
Matrix: Solid
Concentration Units: mg/Kg
% Solids:

Analyte	SSR	C	Sample Result (SR)	C	Spike Added (SA)	%R	Control Limit %R	Q	Method
Tc-99	0.00185		ND		0.00235	79	75-125		6020A
Re	4.26		4.5		4.89	87	30-110		6020A

SSR = Spiked Sample Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VA - IN

5A-IN
MATRIX SPIKE DUPLICATE SAMPLE RECOVERY
METALS

Client ID: SD-207-01 MSD
Lab ID: 680-102327-31 MSD
Lab Name: TestAmerica St. Louis
Job No.: 680-102327-4
SDG No.: 680102327-1
Matrix: Solid
Concentration Units: mg/Kg
% Solids:

Analyte	(SDR)	C	Spike Added (SA)	%R	Control Limit %R	RPD	RPD Limit	Q	Method
Tc-99	0.00190		0.00237	80	75-125	3	30		6020A
Re	4.36		4.93	88	30-110				6020A

SDR = Sample Duplicate Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VD - IN

7A-IN
LAB CONTROL SAMPLE
METALS

Lab ID: LCS 160-143794/2-A

Lab Name: TestAmerica St. Louis Job No.: 680-102327-4

Sample Matrix: Solid LCS Source: TC99-PREP_00004

Analyte	Solid(mg/Kg)							
	True	Found	C	%R	Limits		Q	Method
Tc-99	0.00238	0.00240		101	80	120		6020A
Re	4.97	5.00		101	30	110		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

9-IN
DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102327-4

SDG Number: 680102327-1

Matrix: Solid Instrument ID: ICPMS6100

Method: 6020A MDL Date: 08/07/2012 16:02

Prep Method: None

Analyte	Wavelength/ Mass	RL (mg/Kg)	MDL (mg/Kg)
Re			
Tc-99	99	0.00005	0.000015

9-IN
CALIBRATION BLANK DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102327-4

SDG Number: 680102327-1

Matrix: Solid Instrument ID: ICPMS6100

Method: 6020A XMDL Date: 08/24/2012 17:05

Analyte	Wavelength/ Mass	XRL (ug/L)	XMDL (ug/L)
Re			
Tc-99	99	0.005	0.001

11-IN
LINEAR RANGES
METALS

Lab Name: TestAmerica St. Louis Job No: 680-102327-4

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Date: 02/14/2012 11:04

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	Method
Tc-99		2000	6020A
Re		2000	6020A

12-IN
PREPARATION LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-4

SDG No.: 680102327-1

Prep Method: None

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight (g)	Initial Volume	Final Volume (mL)
MB 160-143794/1-A	09/12/2014 13:53	143794	5.1140		50
LCS 160-143794/2-A	09/12/2014 13:53	143794	5.0344		50
680-102327-31	09/12/2014 13:53	143794	5.0147		50
680-102327-31 MS	09/12/2014 13:53	143794	5.1144		50
680-102327-31 MSD	09/12/2014 13:53	143794	5.0674		50

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-4

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/17/2014 06:36 End Date: 09/17/2014 17:40

Lab Sample Id	D/F	Type	Time	Analytes																										
				Re	Tc-99																									
ICIS 160-144626/1	1		06:36	X	X																									
IC 160-144626/2	1		06:40	X	X																									
IC 160-144626/3	1		06:44	X	X																									
IC 160-144626/4	1		06:48	X	X																									
ICV 160-144626/5	1		06:52	X	X																									
ICB 160-144626/6	1		06:55	X	X																									
CRI 160-144626/7	1		06:59	X	X																									
CCV 160-144626/8			07:03																											
CCB 160-144626/9			07:07																											
ZZZZZZ			07:11																											
ZZZZZZ			07:15																											
ZZZZZZ			07:19																											
ZZZZZZ			07:23																											
ZZZZZZ			07:27																											
ZZZZZZ			07:30																											
ZZZZZZ			07:34																											
ZZZZZZ			07:38																											
ZZZZZZ			07:42																											
ZZZZZZ			07:46																											
CCV 160-144626/20			07:50																											
CCB 160-144626/21			07:54																											
ZZZZZZ			07:57																											
ZZZZZZ			08:01																											
ZZZZZZ			08:05																											
ZZZZZZ			08:09																											
ZZZZZZ			08:13																											
ZZZZZZ			08:17																											
ZZZZZZ			08:21																											
ZZZZZZ			08:25																											
ZZZZZZ			08:28																											
ZZZZZZ			08:32																											
CCV 160-144626/32			08:36																											
CCB 160-144626/33			08:40																											
ZZZZZZ			08:44																											
ZZZZZZ			08:48																											
ZZZZZZ			08:52																											
ZZZZZZ			08:56																											
ZZZZZZ			08:59																											
ZZZZZZ			09:03																											

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-4

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/17/2014 06:36 End Date: 09/17/2014 17:40

Lab Sample Id	D/F	Type	Time	Analytes																										
				Re	Tc-99																									
ZZZZZZ			09:07																											
ZZZZZZ			09:11																											
ZZZZZZ			09:15																											
ZZZZZZ			09:19																											
CCV 160-144626/44			09:23																											
CCB 160-144626/45			09:27																											
ZZZZZZ			09:30																											
ZZZZZZ			09:34																											
ZZZZZZ			09:38																											
ZZZZZZ			09:42																											
ZZZZZZ			09:46																											
ZZZZZZ			09:50																											
ZZZZZZ			09:54																											
ZZZZZZ			09:58																											
ZZZZZZ			10:01																											
ZZZZZZ			10:05																											
CCV 160-144626/56			10:09																											
CCB 160-144626/57			10:13																											
ZZZZZZ			10:17																											
ZZZZZZ			10:21																											
ZZZZZZ			10:25																											
ZZZZZZ			10:28																											
ZZZZZZ			10:32																											
ZZZZZZ			10:36																											
ZZZZZZ			10:40																											
ZZZZZZ			10:44																											
ZZZZZZ			10:48																											
ZZZZZZ			10:52																											
CCV 160-144626/68			10:56																											
CCB 160-144626/69			10:59																											
ZZZZZZ			11:03																											
ZZZZZZ			11:07																											
ZZZZZZ			11:11																											
ZZZZZZ			11:15																											
ZZZZZZ			11:19																											
ZZZZZZ			11:23																											
ZZZZZZ			11:27																											
ZZZZZZ			11:30																											
ZZZZZZ			11:34																											

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-4

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/17/2014 06:36 End Date: 09/17/2014 17:40

Lab Sample Id	D/F	Type	Time	Analytes																										
				Re	Tc-99																									
ZZZZZZ			11:38																											
CCV 160-144626/80			11:42																											
CCB 160-144626/81			11:46																											
ZZZZZZ			11:50																											
ZZZZZZ			11:54																											
ZZZZZZ			11:58																											
ZZZZZZ			12:01																											
ZZZZZZ			12:05																											
ZZZZZZ			12:09																											
ZZZZZZ			12:13																											
ZZZZZZ			12:17																											
ZZZZZZ			12:21																											
ZZZZZZ			12:25																											
CCV 160-144626/92			12:29																											
CCB 160-144626/93			12:32																											
ZZZZZZ			12:36																											
ZZZZZZ			12:40																											
ZZZZZZ			12:45																											
ZZZZZZ			12:49																											
ZZZZZZ			12:53																											
ZZZZZZ			12:57																											
ZZZZZZ			13:01																											
ZZZZZZ			13:04																											
ZZZZZZ			13:08																											
ZZZZZZ			13:12																											
CCV 160-144626/104			13:16																											
CCB 160-144626/105			13:20																											
ZZZZZZ			13:24																											
ZZZZZZ			13:28																											
ZZZZZZ			13:32																											
ZZZZZZ			13:35																											
ZZZZZZ			13:39																											
ZZZZZZ			13:43																											
ZZZZZZ			13:47																											
ZZZZZZ			13:51																											
ZZZZZZ			13:55																											
ZZZZZZ			13:59																											
CCV 160-144626/116			14:02																											
CCB 160-144626/117			14:06																											

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-4

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/17/2014 06:36 End Date: 09/17/2014 17:40

Lab Sample Id	D/F	Type	Time	Analytes																										
				Re	Tc-99																									
ZZZZZZ			14:10																											
ZZZZZZ			14:14																											
ZZZZZZ			14:18																											
ZZZZZZ			14:22																											
ZZZZZZ			14:26																											
ZZZZZZ			14:30																											
ZZZZZZ			14:33																											
ZZZZZZ			14:37																											
ZZZZZZ			14:41																											
ZZZZZZ			14:45																											
CCV 160-144626/128	1		14:49	X	X																									
CCB 160-144626/129	1		14:53	X	X																									
ZZZZZZ			14:57																											
ZZZZZZ			15:01																											
ZZZZZZ			15:04																											
ZZZZZZ			15:08																											
ZZZZZZ			15:12																											
MB 160-143794/1-A	1	T	15:16	X	X																									
LCS 160-143794/2-A	1	T	15:20	X	X																									
680-102327-31	1	T	15:24	X	X																									
680-102327-31 MS	1	T	15:28	X	X																									
680-102327-31 MSD	1	T	15:32	X	X																									
CCV 160-144626/140	1		15:35	X	X																									
CCB 160-144626/141	1		15:39	X	X																									
ZZZZZZ			15:43																											
ZZZZZZ			15:47																											
ZZZZZZ			15:51																											
ZZZZZZ			15:55																											
ZZZZZZ			15:59																											
ZZZZZZ			16:03																											
ZZZZZZ			16:06																											
ZZZZZZ			16:10																											
ZZZZZZ			16:14																											
ZZZZZZ			16:18																											
CCV 160-144626/152	1		16:22	X	X																									
CCB 160-144626/153	1		16:26	X	X																									
ZZZZZZ			16:30																											
ZZZZZZ			16:34																											
ZZZZZZ			16:37																											

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-4

SDG No.: 680102327-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/17/2014 06:36 End Date: 09/17/2014 17:40

Lab Sample Id	D/F	Type	Time	Analytes																									
				Re	Tc-99																								
ZZZZZZ			16:41																										
ZZZZZZ			16:45																										
ZZZZZZ			16:49																										
ZZZZZZ			16:53																										
ZZZZZZ			16:57																										
ZZZZZZ			17:01																										
ZZZZZZ			17:05																										
CCV 160-144626/164			17:08																										
CCB 160-144626/165			17:12																										
ZZZZZZ			17:16																										
ZZZZZZ			17:20																										
ZZZZZZ			17:24																										
ZZZZZZ			17:28																										
ZZZZZZ			17:32																										
CCV 160-144626/171			17:36																										
CCB 160-144626/172			17:40																										

Prep Types:
T = Total/NA

FORM XIII-IN

15-IN
ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102327-4

SDG No.: 680102327-1

ICP-MS Instrument ID: ICPMS6100 Start Date: 09/17/2014 End Date: 09/17/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element In-115	Q	Element	Q	Element	Q	Element	Q	Element	Q
ICIS 160-144626/1	06:36										
IC 160-144626/2	06:40										
IC 160-144626/3	06:44										
IC 160-144626/4	06:48										
ICV 160-144626/5	06:52	102									
ICB 160-144626/6	06:55	102									
CRI 160-144626/7	06:59	102									
CCV 160-144626/128	14:49	96									
CCB 160-144626/129	14:53	95									
MB 160-143794/1-A	15:16	111									
LCS 160-143794/2-A	15:20	108									
680-102327-31	15:24	108									
680-102327-31 MS	15:28	109									
680-102327-31 MSD	15:32	108									
CCV 160-144626/140	15:35	92									
CCB 160-144626/141	15:39	91									
CCV 160-144626/152	16:22	92									
CCB 160-144626/153	16:26	92									

Sample/Batch Report

TA ST. LOUIS - PERKIN ELMER ELAN 6100 - METHOD 6020 / 200.8 QUANTITATIVE ANALYSIS REPORT

User Name: stlmetals
Computer Name: SLICP03
Sample File: D:\Elandata\Sample\SW846 TEMP.sam
Report Date/Time: Wednesday, September 17, 2014 17:42:48
Method File: d:\Elandata\Method\2013_tc99_fast isou.mth
Tuning File: d:\Elandata\Tuning\epa tuning.tun
Optimization File: d:\Elandata\Optimize\epa2008.dac
Calibration File:
Calibration Type: External Calibration
Number of Replicates: 3
Number of Readings: 1
Number of Sweeps: 50
Dual Detector Mode: Dual

MTS 9/17/14
File: 091714M1
Act. Batch: 144626
Conc. Batch: 144627

A/S Loc.	Batch ID	Sample ID	Description	Aliquot Vol.	Diluted Vol.
11	142390	444649			
12		444650			
13		160-8231-A-1-A			
14		160-8231-A-1-B MS			
15		160-8231-A-1-C MSD			
16		160-8231-A-2-A			
17		160-8231-A-3-A			
18		160-8231-A-4-A			
19		160-8231-A-5-A			
20		160-8231-A-6-A			
21		160-8231-A-7-A			
22		160-8231-A-8-A			
23		160-8231-A-9-A			
24		160-8231-A-10-A			
25		160-8231-A-11-A			
26		160-8231-A-12-A			
27		160-8231-A-13-A			
28		160-8231-A-14-A			
29		160-8231-A-15-A			
30		160-8231-A-16-A			
31		160-8231-A-17-A			
32		160-8231-A-18-A			
33		160-8231-A-19-A			
34		160-8231-A-20-A			
35	142455	445202			
36		445203			
37		160-8229-A-1-E			
38		160-8229-A-1-F MS			
39		160-8229-A-1-G MSD			
40		160-8229-A-2-D			
41		160-8229-A-3-D			
42		160-8229-A-4-D			
43		160-8229-A-5-D			
44		160-8229-A-6-D			
45		160-8229-A-7-D			
46		160-8229-A-8-D			
47		160-8229-A-9-D			
48		160-8229-A-10-D			
49		160-8229-A-11-D			
50		160-8229-A-12-D			
51		160-8229-A-13-D			

All

52		160-8229-A-14-D
53		160-8229-A-15-D
54		160-8229-A-16-D
55		160-8229-A-17-D
56		160-8229-A-18-E
57		160-8229-A-19-D
58		160-8229-A-20-D
59	142456	445187
60		445188
61		160-8229-A-21-D
62		160-8229-A-21-E MS
63		160-8229-A-21-F MSD
64		160-8229-A-22-D
65		160-8229-A-23-D
66		160-8229-A-24-D
67		160-8229-A-25-D
68		160-8229-A-26-D
69		160-8229-A-27-D
70		160-8229-A-28-D
71		160-8229-A-29-D
72		160-8229-A-30-D
73		160-8229-A-31-D
74	142541	445734
75		445735
76		160-8251-A-1-A
77		160-8251-A-1-B MS
78		160-8251-A-1-C MSD
79		160-8251-A-2-A
80		160-8251-A-3-A
81		160-8251-A-4-A
82		160-8251-A-5-A
83		160-8251-A-6-A
84		160-8251-A-7-A
85		160-8251-A-8-A
86		160-8251-A-9-A
87		160-8251-A-10-A
88		160-8251-A-11-A
89		160-8251-A-12-A
90		160-8251-A-13-A
91		160-8251-A-14-A
92		160-8251-A-15-A
93		160-8251-A-16-A
94		160-8251-A-17-A
95		160-8251-A-18-A
96	143625	449355
97		449356
98		160-8324-A-1-A
99		160-8324-A-1-B MS
100		160-8324-A-1-C MSD
101		160-8324-A-2-A
102		160-8324-A-3-A
103		160-8324-A-4-A
104		160-8324-A-5-A
105		160-8324-A-6-A
106		160-8324-A-7-A
107		160-8324-A-8-A
108		160-8324-A-9-A
109		160-8324-A-10-A
110		160-8324-A-11-A
111		160-8324-A-12-A

All

112		160-8324-A-13-A
113		160-8324-A-14-A
114		160-8297-A-1-C
115		160-8297-A-2-C
116	143794	449750
117		449751
118		680-102327-A-31-J
119		680-102327-A-31-K MS
120		680-102327-A-31-L MSD
121		680-102380-A-17-E
122	143869	450488
123		450489
124		160-8344-A-1-A
125		160-8344-A-1-B MS
126		160-8344-A-1-C MSD
127		160-8344-A-2-A
128		160-8344-A-3-A
129		160-8344-A-4-A
130		160-8344-A-5-A
131		160-8344-A-6-A
132		160-8344-A-7-A
133		160-8344-A-8-A
134		160-8344-A-9-A
135		160-8344-A-10-A
136		160-8344-A-11-A
137		160-8344-A-12-A
138		160-8344-A-13-A
139		160-8344-A-14-A
140		160-8344-A-15-A
141		160-8344-A-16-A
142		160-8344-A-17-A
143		160-8344-A-18-A
144		160-8344-A-19-A
145		160-8344-A-20-A
146	142870	446894
147		446895
148		160-8271-A-1-A
149		160-8271-A-1-B MS
150		160-8271-A-1-C MSD
151		160-8271-A-2-A
152		160-8271-A-3-A
153		160-8271-A-4-A
154		160-8271-A-5-A
155		160-8271-A-6-A
156		160-8271-A-7-A
157		160-8271-A-8-A
158		160-8271-A-9-A
159		160-8271-A-10-A
160		160-8271-A-11-A
161		160-8271-A-12-A
162		160-8271-A-13-A
163		160-8271-A-14-A
164		160-8271-A-15-A

All

Quantitative Analysis Calibration Report

File Name: 091714M1.cal
File Path: D:\Elandata\System
Calibration Type: External Calibration

Analyte	Mass	Curve Type	Slope	Intercept	Corr. Coeff.
Tc	99.000	Linear Thru Zero	0.045971	0.00	0.999999
In-115 (IS)	114.904	Linear Thru Zero	0.000000	0.00	0.000000
Re	186.956	Linear Thru Zero	0.024262	0.00	0.999965

Instrument Tuning Report

File Name: EPA TUNING.tun
File Path: d:\Elandata\Tuning
Sample ID: Sample
Sample Date/Time: Wednesday, September 17, 2014 06:01:10

Analyte	Exact Mass	Meas. Mass	Mass DAC	Res. DAC	Meas. Pk. Width	Custom Res.
Li	7.016	7.025	1570	2065	0.637	
Mg	23.985	23.979	5688	2080	0.688	
Rh	102.905	102.879	24919	2080	0.693	
Ce	139.905	139.929	33931	2120	0.671	
Pb	207.977	207.977	50415	2310	0.658	

Replicates: 6

Daily Performance Report

Sample ID: Sample
Sample Date/Time: Wednesday, September 17, 2014 06:27:28
Sample Description:
Method File: d:\Elandata\Method\DAILY EPA.mth
Dataset File: d:\Elandata\Dataset\daily4\Sample.010
Tuning File: d:\Elandata\Tuning\EPA TUNING.tun
Optimization File: d:\Elandata\Optimize\EPA2008.dac
Dual Detector Mode: Pulse
Acq. Dead Time(ns): 35
Current Dead Time (ns): 35

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Net Intens. SD	Net Intens. RSD
	Li	7.0	2130.8	2130.770	122.495	5.7
	Mg	24.0	14223.0	14223.026	409.210	2.9
	Rh	102.9	205109.5	205109.533	3259.085	1.6
	Pb	208.0	178712.3	178712.251	1092.213	0.6
⌈>	Ba	137.9	235021.3	235021.348	2783.997	1.2
⌊	Ba++	69.0	1750.4	0.007	0.000	2.4
⌈>	Ce	139.9	289918.8	289918.797	3946.433	1.4
⌊	CeO	155.9	7258.1	0.025	0.000	1.8
	Bkgd	220.0	5.9	5.944	1.389	23.4

Current Optimization File Data

Current Value	Description
0.92	Nebulizer Gas Flow
5.75	Lens Voltage
1200.00	ICP RF Power
-2109.38	Analog Stage Voltage
1200.00	Pulse Stage Voltage
70.00	Discriminator Threshold
-6.00	AC Rod Offset
60.00	Service DAC 1
0.00	Quadrupole Rod Offset

Current Autolens Data

Analyte	Mass	Num of Pts	DAC Value	Maximum Intensity
Be	9	33	6.8	2115.2
Mg	24	33	5.5	22975.5
Co	59	33	5.5	77730.2
Rh	103	33	6.5	277022.5
In	115	33	6.3	358221.0
Ba	138	33	6.3	344770.4
Ce	140	33	6.5	439367.2
Pb	208	33	8.8	294177.7

QUANTITATIVE ANALYSIS REPORT

Sample ID: Blank

Sample Date/Time: Wednesday, September 17, 2014 06:36:36
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\091714M1\Blank.001

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**			1.920	ug/L	
| >	115	**In-115 (IS)**			426757.728	ug/L	
⌊	187	**Re**			388.864	ug/L	

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115		
⌊	**Re**	187		

QC Out Of Limits

Analyte	Mass	Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 1
Sample Date/Time: Wednesday, September 17, 2014 06:40:28
Autosampler Position: 191
Dataset File: D:\Elandata\Dataset\091714M1\Standard 1.002

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.004673**	13.304	90.492	ug/L	1.920
| >	115	**In-115 (IS)**			440884.216	ug/L	426757.728
⌊	187	**Re**	**100.000000**	2.747	1166989.560	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115		
⌊	**Re**	187		

QC Out Of Limits

Analyte	Mass	Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 2
Sample Date/Time: Wednesday, September 17, 2014 06:44:21
Autosampler Position: 2
Dataset File: D:\Elandata\Dataset\091714M1\Standard 2.003

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.292056**	0.519	5755.462	ug/L	1.920
| >	115	**In-115 (IS)**			427465.405	ug/L	426757.728
⌊	187	**Re**	**498.258929**	2.743	5185245.460	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115		
⌊	**Re**	187		

QC Out Of Limits

Analyte	Mass	Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 3

Sample Date/Time: Wednesday, September 17, 2014 06:48:14
Autosampler Position: 193
Dataset File: D:\Elandata\Dataset\091714M1\Standard 3.004

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.583725**	1.686	11682.398	ug/L	1.920
>	115	**In-115 (IS)**			434976.167	ug/L	426757.728
⌊	187	**Re**	**998.735444**	2.411	10526299.141	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
>	**In-115 (IS**	115		
⌊	**Re**	187		

QC Out Of Limits

Analyte	Mass	Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 1

Sample Date/Time: Wednesday, September 17, 2014 06:52:07
Autosampler Position: 194
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 1.005

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.283471**	0.986	5679.702	ug/L	1.920
>	115	**In-115 (IS)**			435681.754	ug/L	426757.728
⌊	187	**Re**	**500.274780**	1.801	5284174.606	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**97.063**
>	**In-115 (IS**	115	**102.091**	
⌊	**Re**	187		**100.055**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 2

Sample Date/Time: Wednesday, September 17, 2014 06:55:59
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 2.006

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000230**	71.656	6.652	ug/L	1.920
| >	115	**In-115 (IS)**			436613.240	ug/L	426757.728
⌊	187	**Re**	**0.142046**	33.635	1926.306	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**0.023**
| >	**In-115 (IS**	115	**102.309**	
⌊	**Re**	187		**1.420**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 3

Sample Date/Time: Wednesday, September 17, 2014 06:59:52
Autosampler Position: 191
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 3.007

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.004753**	5.829	96.789	ug/L	1.920
>	115	**In-115 (IS)**			434027.189	ug/L	426757.728
⌊	187	**Re**	**112.198469**	1.769	1180796.783	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**101.717**
>	**In-115 (IS**	115	**101.703**	
⌊	**Re**	187		**112.198**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Wednesday, September 17, 2014 07:03:44
Autosampler Position: 2
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 6.008

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.297112**	2.276	5893.552	ug/L	1.920
>	115	**In-115 (IS)**			431327.368	ug/L	426757.728
⌊	187	**Re**	**507.677637**	2.253	5307459.426	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**101.733**
>	**In-115 (IS**	115	**101.071**	
⌊	**Re**	187		**101.536**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Wednesday, September 17, 2014 07:07:36
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 7.009

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000200**	52.663	6.024	ug/L	1.920
| >	115	**In-115 (IS)**			435155.579	ug/L	426757.728
⌊	187	**Re**	**0.199049**	14.562	2515.956	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**0.020**
| >	**In-115 (IS**	115	**101.968**	
⌊	**Re**	187		**1.990**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 444649

Sample Date/Time: Wednesday, September 17, 2014 07:11:32

Autosampler Position: 11

Dataset File: D:\Elandata\Dataset\091714M1\444649.010

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000451**	69.967	12.453	ug/L	1.920
| >	115	**In-115 (IS)**			495005.490	ug/L	426757.728
⌊	187	**Re**	**502.941502**	2.546	6031823.107	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**115.992**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 444650

Sample Date/Time: Wednesday, September 17, 2014 07:15:23

Autosampler Position: 12

Dataset File: D:\Elandata\Dataset\091714M1\444650.011

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.237619**	2.312	5567.480	ug/L	1.920
>	115	**In-115 (IS)**			509957.150	ug/L	426757.728
⌊	187	**Re**	**488.827723**	3.524	6036298.487	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
>	**In-115 (IS**	115	**119.496**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-1-A

Sample Date/Time: Wednesday, September 17, 2014 07:19:15
Autosampler Position: 13
Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-1-A.012

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.005593**	4.538	135.053	ug/L	1.920
| >	115	**In-115 (IS)**			515167.592	ug/L	426757.728
⌊	187	**Re**	**466.359108**	2.503	5821281.096	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**120.717**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-1-B MS

Sample Date/Time: Wednesday, September 17, 2014 07:23:07
Autosampler Position: 14
Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-1-B MS.013

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.241863**	2.303	5579.554	ug/L	1.920
| >	115	**In-115 (IS)**			501172.369	ug/L	426757.728
⌊	187	**Re**	**481.070765**	2.746	5841860.170	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**117.437**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-1-C MSD

Sample Date/Time: Wednesday, September 17, 2014 07:27:00

Autosampler Position: 15

Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-1-C MSD.014

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.232932**	2.089	5369.138	ug/L	1.920
| >	115	**In-115 (IS)**			501393.460	ug/L	426757.728
⌊	187	**Re**	**479.322531**	3.604	5819284.233	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**117.489**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-2-A

Sample Date/Time: Wednesday, September 17, 2014 07:30:52
Autosampler Position: 16
Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-2-A.015

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.025346**	3.147	595.699	ug/L	1.920
| >	115	**In-115 (IS)**			509019.160	ug/L	426757.728
⌊	187	**Re**	**472.113498**	1.885	5826145.623	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**119.276**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-3-A

Sample Date/Time: Wednesday, September 17, 2014 07:34:45

Autosampler Position: 17

Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-3-A.016

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.062892**	1.936	1482.563	ug/L	1.920
>	115	**In-115 (IS)**			511809.174	ug/L	426757.728
⌊	187	**Re**	**470.205936**	1.863	5833090.552	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
>	**In-115 (IS**	115	**119.930**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-4-A

Sample Date/Time: Wednesday, September 17, 2014 07:38:37

Autosampler Position: 18

Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-4-A.017

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.024720**	2.954	575.964	ug/L	1.920
| >	115	**In-115 (IS)**			504787.018	ug/L	426757.728
⌊	187	**Re**	**479.155054**	3.285	5857540.159	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**118.284**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-5-A

Sample Date/Time: Wednesday, September 17, 2014 07:42:30
Autosampler Position: 19
Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-5-A.018

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.062600**	1.371	1455.691	ug/L	1.920
| >	115	**In-115 (IS)**			505255.132	ug/L	426757.728
⌊	187	**Re**	**464.454859**	3.144	5683223.301	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**118.394**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-6-A

Sample Date/Time: Wednesday, September 17, 2014 07:46:23
Autosampler Position: 20
Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-6-A.019

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.080410**	1.604	1887.612	ug/L	1.920
| >	115	**In-115 (IS)**			509873.730	ug/L	426757.728
⌊	187	**Re**	**467.355263**	2.353	5775558.378	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**119.476**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Wednesday, September 17, 2014 07:50:15
Autosampler Position: 2
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 6.020

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.299479**	0.506	6034.942	ug/L	1.920
| >	115	**In-115 (IS)**			438190.075	ug/L	426757.728
⌊	187	**Re**	**518.130620**	1.629	5504150.105	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**102.544**
| >	**In-115 (IS**	115	**102.679**	
⌊	**Re**	187		**103.626**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Wednesday, September 17, 2014 07:54:07
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 7.021

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000104**	48.827	4.082	ug/L	1.920
| >	115	**In-115 (IS)**			437377.901	ug/L	426757.728
⌊	187	**Re**	**0.262548**	6.792	3179.535	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**0.010**
| >	**In-115 (IS**	115	**102.489**	
⌊	**Re**	187		**2.625**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-7-A

Sample Date/Time: Wednesday, September 17, 2014 07:57:59
Autosampler Position: 21
Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-7-A.022

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.085420**	1.092	1955.622	ug/L	1.920
| >	115	**In-115 (IS)**			497562.039	ug/L	426757.728
⌊	187	**Re**	**475.133076**	1.111	5733472.064	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**116.591**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-8-A

Sample Date/Time: Wednesday, September 17, 2014 08:01:53
Autosampler Position: 22
Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-8-A.023

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.076921**	1.552	1799.033	ug/L	1.920
| >	115	**In-115 (IS)**			507685.399	ug/L	426757.728
⌊	187	**Re**	**472.422153**	2.891	5810684.002	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**118.963**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-9-A

Sample Date/Time: Wednesday, September 17, 2014 08:05:45
Autosampler Position: 23
Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-9-A.024

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.090484**	1.037	2153.718	ug/L	1.920
| >	115	**In-115 (IS)**			516922.111	ug/L	426757.728
⌊	187	**Re**	**465.698607**	2.455	5831970.234	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**121.128**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-10-A

Sample Date/Time: Wednesday, September 17, 2014 08:09:37

Autosampler Position: 24

Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-10-A.025

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.231083**	0.908	5315.550	ug/L	1.920
| >	115	**In-115 (IS)**			499997.647	ug/L	426757.728
⌊	187	**Re**	**481.241691**	2.395	5830664.159	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**117.162**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-11-A

Sample Date/Time: Wednesday, September 17, 2014 08:13:29

Autosampler Position: 25

Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-11-A.026

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.014348**	3.920	335.884	ug/L	1.920
>	115	**In-115 (IS)**			504657.763	ug/L	426757.728
⌊	187	**Re**	**463.105657**	2.826	5661770.587	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
>	**In-115 (IS**	115	**118.254**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-12-A

Sample Date/Time: Wednesday, September 17, 2014 08:17:21

Autosampler Position: 26

Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-12-A.027

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.029429**	2.510	677.171	ug/L	1.920
| >	115	**In-115 (IS)**			499022.890	ug/L	426757.728
⌊	187	**Re**	**483.098079**	2.557	5841357.821	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**116.934**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-13-A

Sample Date/Time: Wednesday, September 17, 2014 08:21:13

Autosampler Position: 27

Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-13-A.028

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.019740**	3.387	459.428	ug/L	1.920
| >	115	**In-115 (IS)**			504669.517	ug/L	426757.728
⌊	187	**Re**	**472.088454**	2.860	5771979.018	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**118.257**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-14-A
Sample Date/Time: Wednesday, September 17, 2014 08:25:05
Autosampler Position: 28
Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-14-A.029

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.022717**	5.900	537.029	ug/L	1.920
| >	115	**In-115 (IS)**			511276.637	ug/L	426757.728
⌊	187	**Re**	**468.904927**	2.589	5809364.501	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**119.805**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-15-A

Sample Date/Time: Wednesday, September 17, 2014 08:28:58

Autosampler Position: 29

Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-15-A.030

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.043355**	0.344	1017.760	ug/L	1.920
| >	115	**In-115 (IS)**			509404.175	ug/L	426757.728
⌊	187	**Re**	**466.186079**	2.710	5752820.510	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**119.366**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-16-A
Sample Date/Time: Wednesday, September 17, 2014 08:32:51
Autosampler Position: 30
Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-16-A.031

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.039375**	2.884	907.783	ug/L	1.920
| >	115	**In-115 (IS)**			499628.641	ug/L	426757.728
⌊	187	**Re**	**472.116533**	1.225	5720112.788	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**117.075**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Wednesday, September 17, 2014 08:36:43
Autosampler Position: 2
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 6.032

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.297451**	1.348	5986.181	ug/L	1.920
>	115	**In-115 (IS)**			437354.774	ug/L	426757.728
⌊	187	**Re**	**517.705179**	2.580	5486039.213	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**101.849**
>	**In-115 (IS**	115	**102.483**	
⌊	**Re**	187		**103.541**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Wednesday, September 17, 2014 08:40:35
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 7.033

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000343**	41.483	8.782	ug/L	1.920
| >	115	**In-115 (IS)**			439323.999	ug/L	426757.728
⌊	187	**Re**	**0.393826**	11.539	4573.085	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**0.034**
| >	**In-115 (IS**	115	**102.945**	
⌊	**Re**	187		**3.938**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-17-A

Sample Date/Time: Wednesday, September 17, 2014 08:44:27

Autosampler Position: 31

Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-17-A.034

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.068246**	0.793	1578.605	ug/L	1.920
| >	115	**In-115 (IS)**			502650.623	ug/L	426757.728
⌊	187	**Re**	**467.410677**	1.728	5695642.114	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**117.784**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-18-A

Sample Date/Time: Wednesday, September 17, 2014 08:48:20
Autosampler Position: 32
Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-18-A.035

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.152991**	3.296	3529.555	ug/L	1.920
| >	115	**In-115 (IS)**			500653.026	ug/L	426757.728
⌊	187	**Re**	**465.338458**	2.740	5644405.658	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**117.316**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-19-A

Sample Date/Time: Wednesday, September 17, 2014 08:52:13
Autosampler Position: 33
Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-19-A.036

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.086558**	2.519	2018.298	ug/L	1.920
| >	115	**In-115 (IS)**			505960.642	ug/L	426757.728
⌊	187	**Re**	**468.685675**	2.204	5747055.319	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**118.559**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-20-A

Sample Date/Time: Wednesday, September 17, 2014 08:56:06

Autosampler Position: 34

Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-20-A.037

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.207527**	2.218	4799.131	ug/L	1.920
| >	115	**In-115 (IS)**			502409.171	ug/L	426757.728
⌊	187	**Re**	**477.139882**	0.996	5814010.833	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**117.727**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 445202

Sample Date/Time: Wednesday, September 17, 2014 08:59:58
Autosampler Position: 35
Dataset File: D:\Elandata\Dataset\091714M1\445202.038

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000211**	21.438	7.018	ug/L	1.920
>	115	**In-115 (IS)**			491422.413	ug/L	426757.728
⌊	187	**Re**	**495.290294**	2.507	5897352.087	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
>	**In-115 (IS**	115	**115.153**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 445203

Sample Date/Time: Wednesday, September 17, 2014 09:03:50
Autosampler Position: 36
Dataset File: D:\Elandata\Dataset\091714M1\445203.039

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.242151**	2.595	5508.621	ug/L	1.920
| >	115	**In-115 (IS)**			493962.177	ug/L	426757.728
⌊	187	**Re**	**501.219546**	2.315	6000302.354	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**115.748**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-1-E

Sample Date/Time: Wednesday, September 17, 2014 09:07:42
Autosampler Position: 37
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-1-E.040

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000098**	77.785	4.655	ug/L	1.920
| >	115	**In-115 (IS)**			506180.594	ug/L	426757.728
⌊	187	**Re**	**466.626930**	3.502	5719152.783	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**118.611**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-1-F MS

Sample Date/Time: Wednesday, September 17, 2014 09:11:34
Autosampler Position: 38
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-1-F MS.041

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.223797**	1.076	5144.015	ug/L	1.920
| >	115	**In-115 (IS)**			499688.091	ug/L	426757.728
⌊	187	**Re**	**458.309084**	2.649	5548566.748	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**117.089**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-1-G MSD

Sample Date/Time: Wednesday, September 17, 2014 09:15:25

Autosampler Position: 39

Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-1-G MSD.042

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.215488**	1.584	4967.587	ug/L	1.920
| >	115	**In-115 (IS)**			501308.659	ug/L	426757.728
⌊	187	**Re**	**454.626275**	2.352	5522641.746	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**117.469**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-2-D

Sample Date/Time: Wednesday, September 17, 2014 09:19:17
Autosampler Position: 40
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-2-D.043

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000213**	80.867	6.983	ug/L	1.920
| >	115	**In-115 (IS)**			498332.489	ug/L	426757.728
⌊	187	**Re**	**467.677342**	2.295	5650454.434	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**116.772**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Wednesday, September 17, 2014 09:23:10
Autosampler Position: 2
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 6.044

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.297397**	1.527	5922.760	ug/L	1.920
| >	115	**In-115 (IS)**			432808.711	ug/L	426757.728
⌊	187	**Re**	**509.622913**	1.540	5347446.539	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**101.831**
| >	**In-115 (IS**	115	**101.418**	
⌊	**Re**	187		**101.925**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Wednesday, September 17, 2014 09:27:02
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 7.045

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000329**	29.640	8.286	ug/L	1.920
| >	115	**In-115 (IS)**			425086.081	ug/L	426757.728
⌊	187	**Re**	**0.408728**	5.864	4588.317	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**0.033**
| >	**In-115 (IS**	115	**99.608**	
⌊	**Re**	187		**4.087**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-3-D

Sample Date/Time: Wednesday, September 17, 2014 09:30:54
Autosampler Position: 41
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-3-D.046

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000133**	45.292	5.222	ug/L	1.920
| >	115	**In-115 (IS)**			488267.719	ug/L	426757.728
⌊	187	**Re**	**469.811878**	0.947	5563074.428	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**114.413**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-4-D

Sample Date/Time: Wednesday, September 17, 2014 09:34:46
Autosampler Position: 42
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-4-D.047

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000143**	129.120	5.356	ug/L	1.920
| >	115	**In-115 (IS)**			505462.694	ug/L	426757.728
⌊	187	**Re**	**463.720134**	3.301	5676901.129	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**118.443**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-5-D

Sample Date/Time: Wednesday, September 17, 2014 09:38:39
Autosampler Position: 43
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-5-D.048

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000159**	56.041	5.751	ug/L	1.920
| >	115	**In-115 (IS)**			497354.346	ug/L	426757.728
⌊	187	**Re**	**467.000593**	2.375	5628232.169	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**116.543**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-6-D

Sample Date/Time: Wednesday, September 17, 2014 09:42:32
Autosampler Position: 44
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-6-D.049

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000071**	37.655	3.825	ug/L	1.920
| >	115	**In-115 (IS)**			493636.960	ug/L	426757.728
⌊	187	**Re**	**463.652958**	0.980	5551605.285	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**115.671**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-7-D

Sample Date/Time: Wednesday, September 17, 2014 09:46:24
Autosampler Position: 45
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-7-D.050

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000100**	104.266	4.623	ug/L	1.920
\>	115	**In-115 (IS)**			506935.167	ug/L	426757.728
⌊	187	**Re**	**462.532146**	2.663	5681802.881	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
\>	**In-115 (IS**	115	**118.788**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-8-D

Sample Date/Time: Wednesday, September 17, 2014 09:50:17

Autosampler Position: 46

Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-8-D.051

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000047**	223.453	3.253	ug/L	1.920
| >	115	**In-115 (IS)**			495885.782	ug/L	426757.728
⌊	187	**Re**	**478.377656**	2.764	5746633.683	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**116.198**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-9-D

Sample Date/Time: Wednesday, September 17, 2014 09:54:10
Autosampler Position: 47
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-9-D.052

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000135**	33.741	5.451	ug/L	1.920
| >	115	**In-115 (IS)**			507744.533	ug/L	426757.728
⌊	187	**Re**	**464.377705**	3.926	5707388.035	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**118.977**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-10-D

Sample Date/Time: Wednesday, September 17, 2014 09:58:02
Autosampler Position: 48
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-10-D.053

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**-0.000022**	177.180	1.693	ug/L	1.920
| >	115	**In-115 (IS)**			487874.451	ug/L	426757.728
⌊	187	**Re**	**458.535047**	1.236	5426517.619	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**114.321**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-11-D

Sample Date/Time: Wednesday, September 17, 2014 10:01:54
Autosampler Position: 49
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-11-D.054

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000025**	566.550	2.554	ug/L	1.920
| >	115	**In-115 (IS)**			483757.773	ug/L	426757.728
⌊	187	**Re**	**477.550927**	1.893	5599422.866	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**113.357**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-12-D

Sample Date/Time: Wednesday, September 17, 2014 10:05:46

Autosampler Position: 50

Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-12-D.055

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**-0.000014**	688.304	1.955	ug/L	1.920
| >	115	**In-115 (IS)**			514860.036	ug/L	426757.728
⌊	187	**Re**	**454.573949**	4.184	5665494.339	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**120.645**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Wednesday, September 17, 2014 10:09:38
Autosampler Position: 2
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 6.056

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.300255**	1.516	5838.690	ug/L	1.920
| >	115	**In-115 (IS)**			422655.746	ug/L	426757.728
⌊	187	**Re**	**520.893448**	2.838	5334059.137	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**102.809**
| >	**In-115 (IS**	115	**99.039**	
⌊	**Re**	187		**104.179**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Wednesday, September 17, 2014 10:13:30
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 7.057

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000393**	31.668	9.487	ug/L	1.920
| >	115	**In-115 (IS)**			424663.273	ug/L	426757.728
⌊	187	**Re**	**0.469283**	9.868	5212.884	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**0.039**
| >	**In-115 (IS**	115	**99.509**	
⌊	**Re**	187		**4.693**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-13-D

Sample Date/Time: Wednesday, September 17, 2014 10:17:22

Autosampler Position: 51

Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-13-D.058

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000087**	232.438	3.923	ug/L	1.920
| >	115	**In-115 (IS)**			489555.797	ug/L	426757.728
⌊	187	**Re**	**471.006381**	2.190	5587084.448	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**114.715**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-14-D

Sample Date/Time: Wednesday, September 17, 2014 10:21:14
Autosampler Position: 52
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-14-D.059

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000118**	111.357	4.818	ug/L	1.920
| >	115	**In-115 (IS)**			500774.910	ug/L	426757.728
⌊	187	**Re**	**458.675625**	1.383	5569183.128	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**117.344**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-15-D

Sample Date/Time: Wednesday, September 17, 2014 10:25:06
Autosampler Position: 53
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-15-D.060

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**-0.000023**	203.511	1.687	ug/L	1.920
| >	115	**In-115 (IS)**			498164.079	ug/L	426757.728
⌊	187	**Re**	**463.006126**	2.579	5588968.506	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**116.732**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-16-D

Sample Date/Time: Wednesday, September 17, 2014 10:28:59

Autosampler Position: 54

Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-16-D.061

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000135**	160.232	5.283	ug/L	1.920
| >	115	**In-115 (IS)**			486260.208	ug/L	426757.728
⌊	187	**Re**	**471.661794**	2.546	5557582.952	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**113.943**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-17-D

Sample Date/Time: Wednesday, September 17, 2014 10:32:52
Autosampler Position: 55
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-17-D.062

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000107**	59.479	4.649	ug/L	1.920
| >	115	**In-115 (IS)**			490010.608	ug/L	426757.728
⌊	187	**Re**	**467.884858**	1.537	5558857.626	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**114.822**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-18-E

Sample Date/Time: Wednesday, September 17, 2014 10:36:45
Autosampler Position: 56
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-18-E.063

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000072**	59.749	3.916	ug/L	1.920
| >	115	**In-115 (IS)**			494195.029	ug/L	426757.728
⌊	187	**Re**	**480.766755**	3.340	5753932.098	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**115.802**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-19-D

Sample Date/Time: Wednesday, September 17, 2014 10:40:37

Autosampler Position: 57

Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-19-D.064

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000105**	143.628	4.483	ug/L	1.920
| >	115	**In-115 (IS)**			492780.413	ug/L	426757.728
⌊	187	**Re**	**465.416699**	3.540	5553948.682	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**115.471**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-20-D

Sample Date/Time: Wednesday, September 17, 2014 10:44:30

Autosampler Position: 58

Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-20-D.065

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000084**	128.628	4.186	ug/L	1.920
| >	115	**In-115 (IS)**			488089.807	ug/L	426757.728
⌊	187	**Re**	**477.242723**	2.489	5645542.254	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**114.372**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 445187

Sample Date/Time: Wednesday, September 17, 2014 10:48:23

Autosampler Position: 59

Dataset File: D:\Elandata\Dataset\091714M1\445187.066

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000058**	266.617	3.354	ug/L	1.920
\>	115	**In-115 (IS)**			491256.517	ug/L	426757.728
⌊	187	**Re**	**496.313564**	2.033	5910781.463	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
\>	**In-115 (IS**	115	**115.114**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 445188

Sample Date/Time: Wednesday, September 17, 2014 10:52:15
Autosampler Position: 60
Dataset File: D:\Elandata\Dataset\091714M1\445188.067

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.237256**	1.641	5447.632	ug/L	1.920
>	115	**In-115 (IS)**			498783.066	ug/L	426757.728
⌊	187	**Re**	**490.475734**	2.736	5926396.313	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
>	**In-115 (IS**	115	**116.877**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Wednesday, September 17, 2014 10:56:07

Autosampler Position: 2

Dataset File: D:\Elandata\Dataset\091714M1\QC Std 6.068

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.290529**	0.499	5770.095	ug/L	1.920
| >	115	**In-115 (IS)**			431993.259	ug/L	426757.728
⌊	187	**Re**	**507.252955**	2.927	5307981.211	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**99.479**
| >	**In-115 (IS**	115	**101.227**	
⌊	**Re**	187		**101.451**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Wednesday, September 17, 2014 10:59:58
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 7.069

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000255**	63.932	6.851	ug/L	1.920
| >	115	**In-115 (IS)**			413674.025	ug/L	426757.728
⌊	187	**Re**	**0.505386**	6.826	5427.356	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**0.025**
| >	**In-115 (IS**	115	**96.934**	
⌊	**Re**	187		**5.054**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-21-D

Sample Date/Time: Wednesday, September 17, 2014 11:03:51

Autosampler Position: 61

Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-21-D.070

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000207**	90.887	7.018	ug/L	1.920
| >	115	**In-115 (IS)**			485516.900	ug/L	426757.728
⌊	187	**Re**	**467.626675**	2.273	5502120.713	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**113.769**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-21-E MS

Sample Date/Time: Wednesday, September 17, 2014 11:07:43
Autosampler Position: 62
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-21-E MS.071

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.227387**	0.986	5148.887	ug/L	1.920
\>	115	**In-115 (IS)**			492094.509	ug/L	426757.728
⌊	187	**Re**	**470.845514**	3.387	5611143.383	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
\>	**In-115 (IS**	115	**115.310**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-21-F MSD

Sample Date/Time: Wednesday, September 17, 2014 11:11:35

Autosampler Position: 63

Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-21-F MSD.072

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.225017**	1.850	5083.598	ug/L	1.920
\>	115	**In-115 (IS)**			490707.304	ug/L	426757.728
⌊	187	**Re**	**470.563070**	2.378	5595278.857	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
\>	**In-115 (IS**	115	**114.985**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-22-D

Sample Date/Time: Wednesday, September 17, 2014 11:15:26

Autosampler Position: 64

Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-22-D.073

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000118**	124.945	4.651	ug/L	1.920
| >	115	**In-115 (IS)**			475188.248	ug/L	426757.728
⌊	187	**Re**	**470.854421**	2.333	5422578.551	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**111.348**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-23-D

Sample Date/Time: Wednesday, September 17, 2014 11:19:19

Autosampler Position: 65

Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-23-D.074

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000123**	43.788	5.017	ug/L	1.920
| >	115	**In-115 (IS)**			487209.476	ug/L	426757.728
⌊	187	**Re**	**462.249964**	1.951	5458653.541	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**114.165**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-24-D

Sample Date/Time: Wednesday, September 17, 2014 11:23:11

Autosampler Position: 66

Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-24-D.075

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000106**	214.532	4.284	ug/L	1.920
| >	115	**In-115 (IS)**			482671.682	ug/L	426757.728
⌊	187	**Re**	**468.732004**	2.851	5481935.256	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**113.102**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-25-D

Sample Date/Time: Wednesday, September 17, 2014 11:27:04
Autosampler Position: 67
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-25-D.076

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000098**	57.515	4.384	ug/L	1.920
| >	115	**In-115 (IS)**			479830.641	ug/L	426757.728
⌊	187	**Re**	**482.197843**	3.573	5602583.362	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**112.436**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-26-D

Sample Date/Time: Wednesday, September 17, 2014 11:30:57

Autosampler Position: 68

Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-26-D.077

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000127**	48.048	5.051	ug/L	1.920
| >	115	**In-115 (IS)**			480367.258	ug/L	426757.728
⌊	187	**Re**	**469.788594**	2.158	5468877.700	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**112.562**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-27-D

Sample Date/Time: Wednesday, September 17, 2014 11:34:50

Autosampler Position: 69

Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-27-D.078

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000029**	296.748	2.752	ug/L	1.920
| >	115	**In-115 (IS)**			480701.960	ug/L	426757.728
⌊	187	**Re**	**472.924432**	2.243	5508976.331	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**112.640**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-28-D

Sample Date/Time: Wednesday, September 17, 2014 11:38:43

Autosampler Position: 70

Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-28-D.079

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000083**	91.504	3.921	ug/L	1.920
| >	115	**In-115 (IS)**			471389.011	ug/L	426757.728
⌊	187	**Re**	**481.033134**	2.932	5493441.810	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**110.458**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Wednesday, September 17, 2014 11:42:35
Autosampler Position: 2
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 6.080

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.294348**	1.155	5614.361	ug/L	1.920
| >	115	**In-115 (IS)**			414819.803	ug/L	426757.728
⌊	187	**Re**	**514.594126**	2.858	5171082.246	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**100.787**
| >	**In-115 (IS**	115	**97.203**	
⌊	**Re**	187		**102.919**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Wednesday, September 17, 2014 11:46:27

Autosampler Position: 1

Dataset File: D:\Elandata\Dataset\091714M1\QC Std 7.081

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000360**	63.865	8.689	ug/L	1.920
| >	115	**In-115 (IS)**			412402.974	ug/L	426757.728
⌊	187	**Re**	**0.534350**	5.735	5703.345	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**0.036**
| >	**In-115 (IS**	115	**96.636**	
⌊	**Re**	187		**5.343**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-29-D

Sample Date/Time: Wednesday, September 17, 2014 11:50:19

Autosampler Position: 71

Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-29-D.082

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000200**	26.286	6.525	ug/L	1.920
| >	115	**In-115 (IS)**			478616.698	ug/L	426757.728
⌊	187	**Re**	**479.627216**	2.204	5563208.459	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**112.152**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-30-D

Sample Date/Time: Wednesday, September 17, 2014 11:54:11

Autosampler Position: 72

Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-30-D.083

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000057**	372.547	3.158	ug/L	1.920
| >	115	**In-115 (IS)**			477852.351	ug/L	426757.728
⌊	187	**Re**	**466.095586**	2.151	5398234.334	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**111.973**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-31-D

Sample Date/Time: Wednesday, September 17, 2014 11:58:03

Autosampler Position: 73

Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-31-D.084

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000108**	51.720	4.451	ug/L	1.920
| >	115	**In-115 (IS)**			477678.313	ug/L	426757.728
⌊	187	**Re**	**483.587483**	2.984	5594475.105	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**111.932**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 445734

Sample Date/Time: Wednesday, September 17, 2014 12:01:55
Autosampler Position: 74
Dataset File: D:\Elandata\Dataset\091714M1\445734.085

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000156**	80.090	5.487	ug/L	1.920
| >	115	**In-115 (IS)**			473310.253	ug/L	426757.728
⌊	187	**Re**	**506.841688**	3.821	5807999.270	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**110.908**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 445735

Sample Date/Time: Wednesday, September 17, 2014 12:05:47
Autosampler Position: 75
Dataset File: D:\Elandata\Dataset\091714M1\445735.086

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.240023**	1.428	5256.960	ug/L	1.920
\>	115	**In-115 (IS)**			475855.137	ug/L	426757.728
⌊	187	**Re**	**499.025830**	1.818	5755903.834	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
\>	**In-115 (IS**	115	**111.505**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-1-A

Sample Date/Time: Wednesday, September 17, 2014 12:09:40
Autosampler Position: 76
Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-1-A.087

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.165578**	1.279	3601.342	ug/L	1.920
| >	115	**In-115 (IS)**			472883.707	ug/L	426757.728
⌊	187	**Re**	**477.390890**	3.290	5467100.783	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**110.808**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-1-B MS

Sample Date/Time: Wednesday, September 17, 2014 12:13:32
Autosampler Position: 77
Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-1-B MS.088

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.392725**	0.976	8577.807	ug/L	1.920
| >	115	**In-115 (IS)**			474926.360	ug/L	426757.728
⌊	187	**Re**	**495.238230**	3.127	5696453.454	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**111.287**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-1-C MSD

Sample Date/Time: Wednesday, September 17, 2014 12:17:25

Autosampler Position: 78

Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-1-C MSD.089

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.381518**	0.534	8286.540	ug/L	1.920
| >	115	**In-115 (IS)**			472240.021	ug/L	426757.728
⌊	187	**Re**	**489.564059**	3.548	5598643.087	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**110.658**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-2-A

Sample Date/Time: Wednesday, September 17, 2014 12:21:17

Autosampler Position: 79

Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-2-A.090

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.307800**	1.676	6697.165	ug/L	1.920
| >	115	**In-115 (IS)**			472815.002	ug/L	426757.728
⌊	187	**Re**	**487.887104**	2.469	5589460.124	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**110.792**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-3-A

Sample Date/Time: Wednesday, September 17, 2014 12:25:10

Autosampler Position: 80

Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-3-A.091

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.081541**	0.839	1783.129	ug/L	1.920
| >	115	**In-115 (IS)**			475288.974	ug/L	426757.728
⌊	187	**Re**	**493.498298**	4.096	5676275.546	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**111.372**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Wednesday, September 17, 2014 12:29:02

Autosampler Position: 2

Dataset File: D:\Elandata\Dataset\091714M1\QC Std 6.092

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.292556**	2.621	5541.768	ug/L	1.920
| >	115	**In-115 (IS)**			411451.743	ug/L	426757.728
⌊	187	**Re**	**516.065641**	1.714	5148189.690	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**100.173**
| >	**In-115 (IS**	115	**96.413**	
⌊	**Re**	187		**103.213**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Wednesday, September 17, 2014 12:32:54
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 7.093

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000411**	22.034	9.553	ug/L	1.920
| >	115	**In-115 (IS)**			406949.643	ug/L	426757.728
⌊	187	**Re**	**0.512382**	2.559	5436.821	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**0.041**
| >	**In-115 (IS**	115	**95.358**	
⌊	**Re**	187		**5.124**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-4-A

Sample Date/Time: Wednesday, September 17, 2014 12:36:47

Autosampler Position: 81

Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-4-A.094

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.106218**	3.427	2278.470	ug/L	1.920
| >	115	**In-115 (IS)**			465393.528	ug/L	426757.728
⌊	187	**Re**	**495.297651**	1.704	5588136.112	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**109.053**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-5-A

Sample Date/Time: Wednesday, September 17, 2014 12:40:40

Autosampler Position: 82

Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-5-A.095

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.239916**	0.442	5225.085	ug/L	1.920
| >	115	**In-115 (IS)**			473440.120	ug/L	426757.728
⌊	187	**Re**	**482.759200**	2.587	5537544.634	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**110.939**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-6-A

Sample Date/Time: Wednesday, September 17, 2014 12:45:33
Autosampler Position: 83
Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-6-A.096

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.158250**	1.226	3396.492	ug/L	1.920
| >	115	**In-115 (IS)**			466483.510	ug/L	426757.728
⌊	187	**Re**	**497.045812**	2.240	5618664.768	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**109.309**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-7-A

Sample Date/Time: Wednesday, September 17, 2014 12:49:25

Autosampler Position: 84

Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-7-A.097

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.205320**	2.032	4469.457	ug/L	1.920
| >	115	**In-115 (IS)**			472751.159	ug/L	426757.728
⌊	187	**Re**	**502.709545**	2.399	5758546.949	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**110.777**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-8-A

Sample Date/Time: Wednesday, September 17, 2014 12:53:17
Autosampler Position: 85
Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-8-A.098

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.157868**	0.968	3412.300	ug/L	1.920
| >	115	**In-115 (IS)**			469743.022	ug/L	426757.728
⌊	187	**Re**	**492.841570**	2.425	5609297.891	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**110.073**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-9-A

Sample Date/Time: Wednesday, September 17, 2014 12:57:09
Autosampler Position: 86
Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-9-A.099

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.061489**	0.206	1332.145	ug/L	1.920
| >	115	**In-115 (IS)**			470575.482	ug/L	426757.728
⌊	187	**Re**	**495.178963**	2.167	5647167.668	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**110.268**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-10-A

Sample Date/Time: Wednesday, September 17, 2014 13:01:02

Autosampler Position: 87

Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-10-A.100

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.112729**	2.120	2467.066	ug/L	1.920
| >	115	**In-115 (IS)**			476145.547	ug/L	426757.728
⌊	187	**Re**	**478.600929**	2.319	5522010.299	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**111.573**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-11-A

Sample Date/Time: Wednesday, September 17, 2014 13:04:54
Autosampler Position: 88
Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-11-A.101

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.125591**	1.528	2673.704	ug/L	1.920
| >	115	**In-115 (IS)**			462517.949	ug/L	426757.728
⌊	187	**Re**	**497.313038**	2.376	5574236.053	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**108.380**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-12-A
Sample Date/Time: Wednesday, September 17, 2014 13:08:46
Autosampler Position: 89
Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-12-A.102

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.026072**	4.525	563.729	ug/L	1.920
| >	115	**In-115 (IS)**			468083.207	ug/L	426757.728
⌊	187	**Re**	**477.844136**	2.601	5419357.335	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**109.684**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-13-A

Sample Date/Time: Wednesday, September 17, 2014 13:12:39

Autosampler Position: 90

Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-13-A.103

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.078146**	2.554	1690.120	ug/L	1.920
| >	115	**In-115 (IS)**			470242.461	ug/L	426757.728
⌊	187	**Re**	**471.935828**	3.642	5373166.521	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**110.190**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Wednesday, September 17, 2014 13:16:30
Autosampler Position: 2
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 6.104

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌜	99	**Tc**	**0.295054**	2.121	5590.820	ug/L	1.920
>	115	**In-115 (IS)**			411598.841	ug/L	426757.728
⌞	187	**Re**	**524.608897**	0.529	5237819.286	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌜	**Tc**	99		**101.028**
>	**In-115 (IS**	115	**96.448**	
⌞	**Re**	187		**104.922**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Wednesday, September 17, 2014 13:20:22
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 7.105

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000370**	26.648	8.787	ug/L	1.920
| >	115	**In-115 (IS)**			411010.545	ug/L	426757.728
⌊	187	**Re**	**0.624385**	7.819	6572.744	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**0.037**
| >	**In-115 (IS**	115	**96.310**	
⌊	**Re**	187		**6.244**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-14-A

Sample Date/Time: Wednesday, September 17, 2014 13:24:14
Autosampler Position: 91
Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-14-A.106

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.052742**	3.776	1144.565	ug/L	1.920
| >	115	**In-115 (IS)**			470302.832	ug/L	426757.728
⌊	187	**Re**	**483.708937**	1.873	5515286.577	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**110.204**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-15-A
Sample Date/Time: Wednesday, September 17, 2014 13:28:07
Autosampler Position: 92
Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-15-A.107

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.150609**	0.579	3191.079	ug/L	1.920
| >	115	**In-115 (IS)**			460686.706	ug/L	426757.728
⌊	187	**Re**	**485.741935**	3.598	5417244.443	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**107.950**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-16-A
Sample Date/Time: Wednesday, September 17, 2014 13:32:00
Autosampler Position: 93
Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-16-A.108

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.012463**	4.827	264.950	ug/L	1.920
| >	115	**In-115 (IS)**			458910.056	ug/L	426757.728
⌊	187	**Re**	**489.077831**	3.661	5433998.807	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**107.534**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-17-A

Sample Date/Time: Wednesday, September 17, 2014 13:35:53
Autosampler Position: 94
Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-17-A.109

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.009041**	7.432	201.989	ug/L	1.920
| >	115	**In-115 (IS)**			478993.138	ug/L	426757.728
⌊	187	**Re**	**472.406164**	2.542	5481558.036	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**112.240**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-18-A

Sample Date/Time: Wednesday, September 17, 2014 13:39:46
Autosampler Position: 95
Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-18-A.110

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.006878**	3.841	155.384	ug/L	1.920
| >	115	**In-115 (IS)**			483844.761	ug/L	426757.728
⌊	187	**Re**	**464.862101**	2.750	5447818.763	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**113.377**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 449355

Sample Date/Time: Wednesday, September 17, 2014 13:43:38
Autosampler Position: 96
Dataset File: D:\Elandata\Dataset\091714M1\449355.111

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000278**	81.962	8.188	ug/L	1.920
| >	115	**In-115 (IS)**			477015.454	ug/L	426757.728
⌊	187	**Re**	**492.643626**	3.017	5691110.205	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**111.777**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 449356

Sample Date/Time: Wednesday, September 17, 2014 13:47:30
Autosampler Position: 97
Dataset File: D:\Elandata\Dataset\091714M1\449356.112

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.244703**	0.809	5268.226	ug/L	1.920
| >	115	**In-115 (IS)**			467995.795	ug/L	426757.728
⌊	187	**Re**	**503.543610**	2.666	5709352.117	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**109.663**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8324-A-1-A

Sample Date/Time: Wednesday, September 17, 2014 13:51:22
Autosampler Position: 98
Dataset File: D:\Elandata\Dataset\091714M1\160-8324-A-1-A.113

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.003950**	7.005	87.118	ug/L	1.920
| >	115	**In-115 (IS)**			466460.988	ug/L	426757.728
⌊	187	**Re**	**524.612096**	2.446	5929427.287	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**109.303**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8324-A-1-B MS

Sample Date/Time: Wednesday, September 17, 2014 13:55:15
Autosampler Position: 99
Dataset File: D:\Elandata\Dataset\091714M1\160-8324-A-1-B MS.114

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.227189**	0.852	4865.524	ug/L	1.920
| >	115	**In-115 (IS)**			465435.231	ug/L	426757.728
⌊	187	**Re**	**471.801751**	2.494	5320428.096	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**109.063**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8324-A-1-C MSD

Sample Date/Time: Wednesday, September 17, 2014 13:59:07

Autosampler Position: 100

Dataset File: D:\Elandata\Dataset\091714M1\160-8324-A-1-C MSD.115

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.222784**	0.646	4940.679	ug/L	1.920
\>	115	**In-115 (IS)**			482079.965	ug/L	426757.728
⌊	187	**Re**	**463.361441**	3.098	5410128.695	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
\>	**In-115 (IS**	115	**112.963**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Wednesday, September 17, 2014 14:02:59
Autosampler Position: 2
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 6.116

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.299944**	0.051	5654.416	ug/L	1.920
>	115	**In-115 (IS)**			409947.365	ug/L	426757.728
⌊	187	**Re**	**527.630856**	1.909	5242960.208	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**102.703**
>	**In-115 (IS**	115	**96.061**	
⌊	**Re**	187		**105.526**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Wednesday, September 17, 2014 14:06:51
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 7.117

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000419**	20.395	9.619	ug/L	1.920
| >	115	**In-115 (IS)**			408610.512	ug/L	426757.728
⌊	187	**Re**	**0.650339**	7.575	6792.917	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**0.042**
| >	**In-115 (IS**	115	**95.748**	
⌊	**Re**	187		**6.503**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8324-A-2-A

Sample Date/Time: Wednesday, September 17, 2014 14:10:43
Autosampler Position: 101
Dataset File: D:\Elandata\Dataset\091714M1\160-8324-A-2-A.118

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000988**	21.294	23.187	ug/L	1.920
| >	115	**In-115 (IS)**			466049.697	ug/L	426757.728
⌊	187	**Re**	**475.356814**	2.792	5367461.109	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**109.207**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8324-A-3-A

Sample Date/Time: Wednesday, September 17, 2014 14:14:36
Autosampler Position: 102
Dataset File: D:\Elandata\Dataset\091714M1\160-8324-A-3-A.119

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000410**	4.873	10.922	ug/L	1.920
| >	115	**In-115 (IS)**			468011.651	ug/L	426757.728
⌊	187	**Re**	**465.084057**	3.240	5271516.743	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**109.667**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8324-A-4-A

Sample Date/Time: Wednesday, September 17, 2014 14:18:28
Autosampler Position: 103
Dataset File: D:\Elandata\Dataset\091714M1\160-8324-A-4-A.120

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000441**	37.907	11.253	ug/L	1.920
| >	115	**In-115 (IS)**			461376.000	ug/L	426757.728
⌊	187	**Re**	**481.470104**	3.713	5378040.307	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**108.112**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8324-A-5-A

Sample Date/Time: Wednesday, September 17, 2014 14:22:21
Autosampler Position: 104
Dataset File: D:\Elandata\Dataset\091714M1\160-8324-A-5-A.121

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.002729**	9.786	61.684	ug/L	1.920
| >	115	**In-115 (IS)**			472292.280	ug/L	426757.728
⌊	187	**Re**	**492.728611**	2.959	5637720.727	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**110.670**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8324-A-6-A

Sample Date/Time: Wednesday, September 17, 2014 14:26:14
Autosampler Position: 105
Dataset File: D:\Elandata\Dataset\091714M1\160-8324-A-6-A.122

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.001644**	2.167	37.619	ug/L	1.920
| >	115	**In-115 (IS)**			469370.571	ug/L	426757.728
⌊	187	**Re**	**481.625889**	3.000	5476797.187	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**109.985**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8324-A-7-A

Sample Date/Time: Wednesday, September 17, 2014 14:30:07
Autosampler Position: 106
Dataset File: D:\Elandata\Dataset\091714M1\160-8324-A-7-A.123

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000276**	23.664	8.154	ug/L	1.920
| >	115	**In-115 (IS)**			470514.366	ug/L	426757.728
⌊	187	**Re**	**468.957937**	2.776	5345616.144	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**110.253**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8324-A-8-A

Sample Date/Time: Wednesday, September 17, 2014 14:33:59
Autosampler Position: 107
Dataset File: D:\Elandata\Dataset\091714M1\160-8324-A-8-A.124

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000924**	16.607	22.082	ug/L	1.920
| >	115	**In-115 (IS)**			472750.954	ug/L	426757.728
⌊	187	**Re**	**463.194037**	2.821	5305019.515	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**110.777**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8324-A-9-A

Sample Date/Time: Wednesday, September 17, 2014 14:37:52
Autosampler Position: 108
Dataset File: D:\Elandata\Dataset\091714M1\160-8324-A-9-A.125

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000212**	85.687	6.421	ug/L	1.920
| >	115	**In-115 (IS)**			465811.129	ug/L	426757.728
⌊	187	**Re**	**481.379024**	2.376	5433312.517	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**109.151**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8324-A-10-A

Sample Date/Time: Wednesday, September 17, 2014 14:41:44
Autosampler Position: 109
Dataset File: D:\Elandata\Dataset\091714M1\160-8324-A-10-A.126

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000284**	76.973	8.287	ug/L	1.920
| >	115	**In-115 (IS)**			461986.774	ug/L	426757.728
⌊	187	**Re**	**486.354348**	3.078	5442059.741	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**108.255**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8324-A-11-A

Sample Date/Time: Wednesday, September 17, 2014 14:45:37
Autosampler Position: 110
Dataset File: D:\Elandata\Dataset\091714M1\160-8324-A-11-A.127

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.001975**	4.294	44.320	ug/L	1.920
| >	115	**In-115 (IS)**			465457.736	ug/L	426757.728
⌊	187	**Re**	**481.174588**	3.360	5424051.174	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**109.068**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Wednesday, September 17, 2014 14:49:29
Autosampler Position: 2
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 6.128

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.300049**	0.505	5651.842	ug/L	1.920
| >	115	**In-115 (IS)**			409553.087	ug/L	426757.728
⌊	187	**Re**	**535.682839**	2.193	5317081.816	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**102.739**
| >	**In-115 (IS**	115	**95.969**	
⌊	**Re**	187		**107.137**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Wednesday, September 17, 2014 14:53:21
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 7.129

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000389**	32.757	9.020	ug/L	1.920
| >	115	**In-115 (IS)**			405377.509	ug/L	426757.728
⌊	187	**Re**	**0.788364**	7.939	8093.273	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**0.039**
| >	**In-115 (IS**	115	**94.990**	
⌊	**Re**	187		**7.884**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8324-A-12-A

Sample Date/Time: Wednesday, September 17, 2014 14:57:13
Autosampler Position: 111
Dataset File: D:\Elandata\Dataset\091714M1\160-8324-A-12-A.130

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000862**	22.802	20.154	ug/L	1.920
| >	115	**In-115 (IS)**			461403.104	ug/L	426757.728
⌊	187	**Re**	**477.209097**	1.954	5336724.818	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**108.118**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8324-A-13-A

Sample Date/Time: Wednesday, September 17, 2014 15:01:05
Autosampler Position: 112
Dataset File: D:\Elandata\Dataset\091714M1\160-8324-A-13-A.131

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000386**	25.115	10.385	ug/L	1.920
| >	115	**In-115 (IS)**			466475.544	ug/L	426757.728
⌊	187	**Re**	**464.840742**	3.596	5250439.804	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**109.307**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8324-A-14-A

Sample Date/Time: Wednesday, September 17, 2014 15:04:58
Autosampler Position: 113
Dataset File: D:\Elandata\Dataset\091714M1\160-8324-A-14-A.132

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000373**	29.653	10.185	ug/L	1.920
| >	115	**In-115 (IS)**			466475.476	ug/L	426757.728
⌊	187	**Re**	**474.317486**	1.742	5363328.801	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**109.307**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8297-A-1-C

Sample Date/Time: Wednesday, September 17, 2014 15:08:50
Autosampler Position: 114
Dataset File: D:\Elandata\Dataset\091714M1\160-8297-A-1-C.133

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.014624**	4.789	308.355	ug/L	1.920
| >	115	**In-115 (IS)**			456795.037	ug/L	426757.728
⌊	187	**Re**	**428.250024**	3.234	4737243.809	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**107.038**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8297-A-2-C

Sample Date/Time: Wednesday, September 17, 2014 15:12:43
Autosampler Position: 115
Dataset File: D:\Elandata\Dataset\091714M1\160-8297-A-2-C.134

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.036631**	4.747	797.877	ug/L	1.920
| >	115	**In-115 (IS)**			471323.789	ug/L	426757.728
⌊	187	**Re**	**470.367703**	2.732	5370774.541	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**110.443**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 449750

Sample Date/Time: Wednesday, September 17, 2014 15:16:35
Autosampler Position: 116
Dataset File: D:\Elandata\Dataset\091714M1\449750.135

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000046**	209.667	3.051	ug/L	1.920
>	115	**In-115 (IS)**			472455.592	ug/L	426757.728
⌊	187	**Re**	**500.482161**	1.685	5731488.057	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
>	**In-115 (IS**	115	**110.708**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 449751

Sample Date/Time: Wednesday, September 17, 2014 15:20:28
Autosampler Position: 117
Dataset File: D:\Elandata\Dataset\091714M1\449751.136

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.243842**	1.150	5186.868	ug/L	1.920
>	115	**In-115 (IS)**			462312.691	ug/L	426757.728
⌊	187	**Re**	**503.805394**	2.095	5645127.635	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
>	**In-115 (IS**	115	**108.331**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-31-J

Sample Date/Time: Wednesday, September 17, 2014 15:24:21

Autosampler Position: 118

Dataset File: D:\Elandata\Dataset\091714M1\680-102327-A-31-J.137

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000195**	107.067	5.984	ug/L	1.920
| >	115	**In-115 (IS)**			459634.883	ug/L	426757.728
⌊	187	**Re**	**454.431017**	2.414	5061622.537	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**107.704**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-31-K MS

Sample Date/Time: Wednesday, September 17, 2014 15:28:14
Autosampler Position: 119
Dataset File: D:\Elandata\Dataset\091714M1\680-102327-A-31-K MS.138

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.164614**	0.379	3530.331	ug/L	1.920
| >	115	**In-115 (IS)**			466153.678	ug/L	426757.728
⌊	187	**Re**	**435.823017**	3.572	4919753.722	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**109.231**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-31-L MSD

Sample Date/Time: Wednesday, September 17, 2014 15:32:06
Autosampler Position: 120
Dataset File: D:\Elandata\Dataset\091714M1\680-102327-A-31-L MSD.139

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.169930**	2.065	3612.384	ug/L	1.920
| >	115	**In-115 (IS)**			461607.322	ug/L	426757.728
⌊	187	**Re**	**441.476489**	2.811	4936901.863	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**108.166**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Wednesday, September 17, 2014 15:35:58
Autosampler Position: 2
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 6.140

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.302300**	2.282	5469.576	ug/L	1.920
| >	115	**In-115 (IS)**			393014.512	ug/L	426757.728
⌊	187	**Re**	**534.168413**	1.568	5091060.327	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**103.510**
| >	**In-115 (IS**	115	**92.093**	
⌊	**Re**	187		**106.834**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Wednesday, September 17, 2014 15:39:50
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 7.141

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000476**	33.897	10.087	ug/L	1.920
| >	115	**In-115 (IS)**			387205.114	ug/L	426757.728
⌊	187	**Re**	**0.809369**	9.605	7914.200	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**0.048**
| >	**In-115 (IS**	115	**90.732**	
⌊	**Re**	187		**8.094**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-17-E

Sample Date/Time: Wednesday, September 17, 2014 15:43:42
Autosampler Position: 121
Dataset File: D:\Elandata\Dataset\091714M1\680-102380-A-17-E.142

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000425**	18.819	11.052	ug/L	1.920
| >	115	**In-115 (IS)**			463129.902	ug/L	426757.728
⌊	187	**Re**	**440.678163**	1.943	4946787.262	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**108.523**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 450488

Sample Date/Time: Wednesday, September 17, 2014 15:47:35
Autosampler Position: 122
Dataset File: D:\Elandata\Dataset\091714M1\450488.143

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000264**	18.752	7.748	ug/L	1.920
| >	115	**In-115 (IS)**			462043.584	ug/L	426757.728
⌊	187	**Re**	**512.471413**	2.051	5738229.782	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**108.268**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 450489

Sample Date/Time: Wednesday, September 17, 2014 15:51:27
Autosampler Position: 123
Dataset File: D:\Elandata\Dataset\091714M1\450489.144

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.248659**	1.445	5227.814	ug/L	1.920
>	115	**In-115 (IS)**			456870.393	ug/L	426757.728
⌊	187	**Re**	**517.464769**	1.967	5729809.338	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
>	**In-115 (IS**	115	**107.056**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-1-A

Sample Date/Time: Wednesday, September 17, 2014 15:55:20
Autosampler Position: 124
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-1-A.145

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.001263**	13.573	28.753	ug/L	1.920
| >	115	**In-115 (IS)**			457929.696	ug/L	426757.728
⌊	187	**Re**	**497.747116**	4.092	5517285.296	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**107.304**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-1-B MS

Sample Date/Time: Wednesday, September 17, 2014 15:59:12
Autosampler Position: 125
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-1-B MS.146

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.243959**	1.136	5092.570	ug/L	1.920
| >	115	**In-115 (IS)**			453595.792	ug/L	426757.728
⌊	187	**Re**	**503.588841**	2.579	5533917.728	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**106.289**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-1-C MSD

Sample Date/Time: Wednesday, September 17, 2014 16:03:05

Autosampler Position: 126

Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-1-C MSD.147

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.246076**	1.145	5165.527	ug/L	1.920
| >	115	**In-115 (IS)**			456197.654	ug/L	426757.728
⌊	187	**Re**	**506.901311**	2.817	5601763.318	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**106.899**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-2-A

Sample Date/Time: Wednesday, September 17, 2014 16:06:57
Autosampler Position: 127
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-2-A.148

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.006096**	5.793	132.214	ug/L	1.920
| >	115	**In-115 (IS)**			465500.721	ug/L	426757.728
⌊	187	**Re**	**483.522765**	1.905	5458684.942	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**109.078**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-3-A

Sample Date/Time: Wednesday, September 17, 2014 16:10:50
Autosampler Position: 128
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-3-A.149

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.001904**	9.129	42.919	ug/L	1.920
| >	115	**In-115 (IS)**			467838.226	ug/L	426757.728
⌊	187	**Re**	**484.034775**	2.542	5486627.703	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**109.626**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-4-A

Sample Date/Time: Wednesday, September 17, 2014 16:14:43
Autosampler Position: 129
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-4-A.150

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.002209**	17.116	49.852	ug/L	1.920
| >	115	**In-115 (IS)**			466440.269	ug/L	426757.728
⌊	187	**Re**	**490.132459**	3.262	5537324.689	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**109.299**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-5-A

Sample Date/Time: Wednesday, September 17, 2014 16:18:36
Autosampler Position: 130
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-5-A.151

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.006904**	1.957	152.020	ug/L	1.920
| >	115	**In-115 (IS)**			472050.692	ug/L	426757.728
⌊	187	**Re**	**484.042911**	1.957	5538657.801	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**110.613**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Wednesday, September 17, 2014 16:22:28
Autosampler Position: 2
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 6.152

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.293342**	1.469	5315.248	ug/L	1.920
>	115	**In-115 (IS)**			393734.872	ug/L	426757.728
⌊	187	**Re**	**516.397378**	1.625	4929456.295	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**100.442**
>	**In-115 (IS**	115	**92.262**	
⌊	**Re**	187		**103.279**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Wednesday, September 17, 2014 16:26:20
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 7.153

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000443**	27.903	9.820	ug/L	1.920
| >	115	**In-115 (IS)**			390374.375	ug/L	426757.728
⌊	187	**Re**	**0.555348**	1.787	5610.883	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**0.044**
| >	**In-115 (IS**	115	**91.474**	
⌊	**Re**	187		**5.553**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-6-A

Sample Date/Time: Wednesday, September 17, 2014 16:30:12
Autosampler Position: 131
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-6-A.154

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.008211**	3.379	173.882	ug/L	1.920
| >	115	**In-115 (IS)**			456096.504	ug/L	426757.728
⌊	187	**Re**	**491.200601**	3.066	5425844.516	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**106.875**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-7-A

Sample Date/Time: Wednesday, September 17, 2014 16:34:05
Autosampler Position: 132
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-7-A.155

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000759**	10.172	17.817	ug/L	1.920
| >	115	**In-115 (IS)**			454370.068	ug/L	426757.728
⌊	187	**Re**	**496.857625**	3.556	5468375.483	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**106.470**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-8-A

Sample Date/Time: Wednesday, September 17, 2014 16:37:58
Autosampler Position: 133
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-8-A.156

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.002200**	2.551	48.423	ug/L	1.920
| >	115	**In-115 (IS)**			457792.859	ug/L	426757.728
⌊	187	**Re**	**503.590940**	3.888	5579995.512	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**107.272**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-9-A

Sample Date/Time: Wednesday, September 17, 2014 16:41:50
Autosampler Position: 134
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-9-A.157

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.002057**	2.925	45.351	ug/L	1.920
| >	115	**In-115 (IS)**			457998.151	ug/L	426757.728
⌊	187	**Re**	**474.792205**	2.880	5268036.790	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**107.320**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-10-A

Sample Date/Time: Wednesday, September 17, 2014 16:45:43
Autosampler Position: 135
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-10-A.158

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.003454**	6.010	74.320	ug/L	1.920
| >	115	**In-115 (IS)**			455518.662	ug/L	426757.728
⌊	187	**Re**	**488.129180**	2.018	5390010.128	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**106.739**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-11-A

Sample Date/Time: Wednesday, September 17, 2014 16:49:36
Autosampler Position: 136
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-11-A.159

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.005740**	2.357	120.582	ug/L	1.920
| >	115	**In-115 (IS)**			449451.139	ug/L	426757.728
⌊	187	**Re**	**506.831253**	2.310	5520234.669	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**105.318**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-12-A

Sample Date/Time: Wednesday, September 17, 2014 16:53:29
Autosampler Position: 137
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-12-A.160

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.003193**	7.814	69.520	ug/L	1.920
| >	115	**In-115 (IS)**			461478.372	ug/L	426757.728
⌊	187	**Re**	**501.053590**	1.588	5605645.579	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**108.136**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-13-A

Sample Date/Time: Wednesday, September 17, 2014 16:57:21

Autosampler Position: 138

Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-13-A.161

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.001562**	1.779	34.716	ug/L	1.920
| >	115	**In-115 (IS)**			455452.857	ug/L	426757.728
⌊	187	**Re**	**508.937038**	2.746	5615422.763	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**106.724**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-14-A

Sample Date/Time: Wednesday, September 17, 2014 17:01:14
Autosampler Position: 139
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-14-A.162

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.002651**	5.826	57.055	ug/L	1.920
| >	115	**In-115 (IS)**			452027.105	ug/L	426757.728
⌊	187	**Re**	**501.586767**	3.708	5487771.688	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**105.921**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-15-A

Sample Date/Time: Wednesday, September 17, 2014 17:05:07
Autosampler Position: 140
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-15-A.163

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.001591**	10.115	35.349	ug/L	1.920
| >	115	**In-115 (IS)**			457780.878	ug/L	426757.728
⌊	187	**Re**	**499.852924**	4.095	5538228.271	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**107.269**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Wednesday, September 17, 2014 17:08:59
Autosampler Position: 2
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 6.164

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.297567**	0.866	5324.253	ug/L	1.920
>	115	**In-115 (IS)**			389105.826	ug/L	426757.728
⌊	187	**Re**	**531.260698**	2.375	5009023.504	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**101.889**
>	**In-115 (IS**	115	**91.177**	
⌊	**Re**	187		**106.252**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Wednesday, September 17, 2014 17:12:51
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 7.165

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000509**	6.117	10.916	ug/L	1.920
>	115	**In-115 (IS)**			390776.740	ug/L	426757.728
⌊	187	**Re**	**0.525637**	2.261	5333.443	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**0.051**
>	**In-115 (IS**	115	**91.569**	
⌊	**Re**	187		**5.256**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-16-A

Sample Date/Time: Wednesday, September 17, 2014 17:16:42
Autosampler Position: 141
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-16-A.166

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.005412**	5.452	112.786	ug/L	1.920
| >	115	**In-115 (IS)**			446641.543	ug/L	426757.728
⌊	187	**Re**	**492.152553**	2.751	5325190.165	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**104.659**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-17-A

Sample Date/Time: Wednesday, September 17, 2014 17:20:35

Autosampler Position: 142

Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-17-A.167

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.004914**	9.486	105.652	ug/L	1.920
| >	115	**In-115 (IS)**			457123.189	ug/L	426757.728
⌊	187	**Re**	**475.623039**	3.071	5265886.739	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**107.115**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-18-A

Sample Date/Time: Wednesday, September 17, 2014 17:24:28
Autosampler Position: 143
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-18-A.168

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.055126**	1.954	1153.668	ug/L	1.920
| >	115	**In-115 (IS)**			454137.659	ug/L	426757.728
⌊	187	**Re**	**498.138260**	3.449	5478140.475	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**106.416**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-19-A

Sample Date/Time: Wednesday, September 17, 2014 17:28:21
Autosampler Position: 144
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-19-A.169

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.003319**	20.164	73.520	ug/L	1.920
| >	115	**In-115 (IS)**			463904.202	ug/L	426757.728
⌊	187	**Re**	**470.266371**	1.776	5290118.350	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**108.704**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-20-A

Sample Date/Time: Wednesday, September 17, 2014 17:32:14
Autosampler Position: 145
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-20-A.170

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.002978**	3.860	63.684	ug/L	1.920
| >	115	**In-115 (IS)**			449411.381	ug/L	426757.728
⌊	187	**Re**	**499.554348**	2.619	5439312.246	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**105.308**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Wednesday, September 17, 2014 17:36:05
Autosampler Position: 2
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 6.171

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.298863**	2.459	5284.873	ug/L	1.920
| >	115	**In-115 (IS)**			384211.535	ug/L	426757.728
⌊	187	**Re**	**528.502096**	1.602	4922732.772	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**102.333**
| >	**In-115 (IS**	115	**90.030**	
⌊	**Re**	187		**105.700**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Wednesday, September 17, 2014 17:40:40
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 7.172

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000370**	23.769	8.451	ug/L	1.920
| >	115	**In-115 (IS)**			391489.848	ug/L	426757.728
⌊	187	**Re**	**0.440900**	6.388	4531.779	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**0.037**
| >	**In-115 (IS**	115	**91.736**	
⌊	**Re**	187		**4.409**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 446894

Sample Date/Time: Wednesday, September 17, 2014 17:44:37
Autosampler Position: 146
Dataset File: D:\Elandata\Dataset\091714M1\446894.173

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000237**	61.169	7.052	ug/L	1.920
>	115	**In-115 (IS)**			457216.334	ug/L	426757.728
⌊	187	**Re**	**513.027760**	2.488	5683299.477	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
>	**In-115 (IS**	115	**107.137**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 446895

Sample Date/Time: Wednesday, September 17, 2014 17:48:30
Autosampler Position: 147
Dataset File: D:\Elandata\Dataset\091714M1\446895.174

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.246160**	0.957	5111.109	ug/L	1.920
\>	115	**In-115 (IS)**			451354.605	ug/L	426757.728
⌊	187	**Re**	**520.837125**	2.409	5696010.697	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
\>	**In-115 (IS**	115	**105.764**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8271-A-1-A

Sample Date/Time: Wednesday, September 17, 2014 17:52:23
Autosampler Position: 148
Dataset File: D:\Elandata\Dataset\091714M1\160-8271-A-1-A.175

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.049795**	1.065	1014.285	ug/L	1.920
| >	115	**In-115 (IS)**			442178.781	ug/L	426757.728
⌊	187	**Re**	**500.616890**	3.099	5361765.873	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**103.614**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8271-A-1-B MS

Sample Date/Time: Wednesday, September 17, 2014 17:56:15
Autosampler Position: 149
Dataset File: D:\Elandata\Dataset\091714M1\160-8271-A-1-B MS.176

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.345179**	1.918	6941.221	ug/L	1.920
| >	115	**In-115 (IS)**			436820.752	ug/L	426757.728
⌊	187	**Re**	**503.367805**	2.761	5327103.768	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**102.358**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8271-A-1-C MSD

Sample Date/Time: Wednesday, September 17, 2014 18:00:08
Autosampler Position: 150
Dataset File: D:\Elandata\Dataset\091714M1\160-8271-A-1-C MSD.177

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.267518**	1.666	5417.650	ug/L	1.920
\>	115	**In-115 (IS)**			440085.691	ug/L	426757.728
⌊	187	**Re**	**505.593624**	2.242	5392652.036	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
\>	**In-115 (IS**	115	**103.123**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8271-A-2-A

Sample Date/Time: Wednesday, September 17, 2014 18:04:01
Autosampler Position: 151
Dataset File: D:\Elandata\Dataset\091714M1\160-8271-A-2-A.178

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.051240**	0.684	1062.893	ug/L	1.920
| >	115	**In-115 (IS)**			450546.419	ug/L	426757.728
⌊	187	**Re**	**486.446001**	3.482	5306746.205	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**105.574**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8271-A-3-A

Sample Date/Time: Wednesday, September 17, 2014 18:07:54
Autosampler Position: 152
Dataset File: D:\Elandata\Dataset\091714M1\160-8271-A-3-A.179

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.010698**	7.539	225.523	ug/L	1.920
| >	115	**In-115 (IS)**			452889.845	ug/L	426757.728
⌊	187	**Re**	**500.165105**	3.667	5485052.583	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**106.123**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8271-A-4-A

Sample Date/Time: Wednesday, September 17, 2014 18:11:46
Autosampler Position: 153
Dataset File: D:\Elandata\Dataset\091714M1\160-8271-A-4-A.180

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.043624**	0.427	912.383	ug/L	1.920
| >	115	**In-115 (IS)**			453862.788	ug/L	426757.728
⌊	187	**Re**	**496.447199**	1.521	5462720.471	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**106.351**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8271-A-5-A

Sample Date/Time: Wednesday, September 17, 2014 18:15:39
Autosampler Position: 154
Dataset File: D:\Elandata\Dataset\091714M1\160-8271-A-5-A.181

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.067597**	3.215	1381.621	ug/L	1.920
>	115	**In-115 (IS)**			443235.359	ug/L	426757.728
⌊	187	**Re**	**507.707094**	2.241	5453815.600	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
>	**In-115 (IS**	115	**103.861**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8271-A-6-A

Sample Date/Time: Wednesday, September 17, 2014 18:19:32
Autosampler Position: 155
Dataset File: D:\Elandata\Dataset\091714M1\160-8271-A-6-A.182

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.103466**	1.059	2091.671	ug/L	1.920
| >	115	**In-115 (IS)**			439354.039	ug/L	426757.728
⌊	187	**Re**	**510.187751**	2.913	5429872.695	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**102.952**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Wednesday, September 17, 2014 18:23:25
Autosampler Position: 2
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 6.183

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.293030**	2.867	5176.964	ug/L	1.920
>	115	**In-115 (IS)**			383712.098	ug/L	426757.728
⌊	187	**Re**	**526.478085**	1.943	4901014.091	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**100.336**
>	**In-115 (IS**	115	**89.913**	
⌊	**Re**	187		**105.296**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Wednesday, September 17, 2014 18:27:16
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 7.184

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000519**	35.262	10.750	ug/L	1.920
| >	115	**In-115 (IS)**			376877.690	ug/L	426757.728
⌊	187	**Re**	**0.526314**	1.719	5161.026	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**0.052**
| >	**In-115 (IS**	115	**88.312**	
⌊	**Re**	187		**5.263**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8271-A-7-A

Sample Date/Time: Wednesday, September 17, 2014 18:31:09
Autosampler Position: 156
Dataset File: D:\Elandata\Dataset\091714M1\160-8271-A-7-A.185

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.064145**	0.891	1304.610	ug/L	1.920
| >	115	**In-115 (IS)**			441955.141	ug/L	426757.728
⌊	187	**Re**	**500.976371**	3.790	5360112.016	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**103.561**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8271-A-8-A

Sample Date/Time: Wednesday, September 17, 2014 18:35:01
Autosampler Position: 157
Dataset File: D:\Elandata\Dataset\091714M1\160-8271-A-8-A.186

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.052166**	1.909	1059.224	ug/L	1.920
| >	115	**In-115 (IS)**			441201.315	ug/L	426757.728
⌊	187	**Re**	**503.713685**	2.440	5385136.700	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**103.384**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8271-A-9-A

Sample Date/Time: Wednesday, September 17, 2014 18:38:54
Autosampler Position: 158
Dataset File: D:\Elandata\Dataset\091714M1\160-8271-A-9-A.187

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.042319**	1.055	869.577	ug/L	1.920
\>	115	**In-115 (IS)**			445909.604	ug/L	426757.728
⌊	187	**Re**	**490.102255**	2.931	5294493.966	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
\>	**In-115 (IS**	115	**104.488**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8271-A-10-A

Sample Date/Time: Wednesday, September 17, 2014 18:42:47
Autosampler Position: 159
Dataset File: D:\Elandata\Dataset\091714M1\160-8271-A-10-A.188

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.078120**	1.935	1614.711	ug/L	1.920
>	115	**In-115 (IS)**			448752.970	ug/L	426757.728
⌊	187	**Re**	**490.990088**	2.262	5339861.235	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
>	**In-115 (IS**	115	**105.154**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8271-A-11-A

Sample Date/Time: Wednesday, September 17, 2014 18:46:40
Autosampler Position: 160
Dataset File: D:\Elandata\Dataset\091714M1\160-8271-A-11-A.189

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.036954**	2.957	755.069	ug/L	1.920
| >	115	**In-115 (IS)**			442581.068	ug/L	426757.728
⌊	187	**Re**	**492.314841**	2.943	5277558.209	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**103.708**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8271-A-12-A

Sample Date/Time: Wednesday, September 17, 2014 18:50:33

Autosampler Position: 161

Dataset File: D:\Elandata\Dataset\091714M1\160-8271-A-12-A.190

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.062821**	0.841	1260.948	ug/L	1.920
| >	115	**In-115 (IS)**			436161.652	ug/L	426757.728
⌊	187	**Re**	**512.855633**	3.067	5417499.943	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**102.204**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8271-A-13-A

Sample Date/Time: Wednesday, September 17, 2014 18:54:26
Autosampler Position: 162
Dataset File: D:\Elandata\Dataset\091714M1\160-8271-A-13-A.191

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.020680**	2.426	424.090	ug/L	1.920
| >	115	**In-115 (IS)**			444135.416	ug/L	426757.728
⌊	187	**Re**	**494.460983**	4.073	5317377.341	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**104.072**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8271-A-14-A

Sample Date/Time: Wednesday, September 17, 2014 18:58:18

Autosampler Position: 163

Dataset File: D:\Elandata\Dataset\091714M1\160-8271-A-14-A.192

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.064313**	1.025	1306.644	ug/L	1.920
| >	115	**In-115 (IS)**			441026.281	ug/L	426757.728
⌊	187	**Re**	**504.000881**	2.779	5385047.350	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**103.343**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8271-A-15-A

Sample Date/Time: Wednesday, September 17, 2014 19:02:11
Autosampler Position: 164
Dataset File: D:\Elandata\Dataset\091714M1\160-8271-A-15-A.193

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.093222**	3.209	1905.211	ug/L	1.920
| >	115	**In-115 (IS)**			443613.502	ug/L	426757.728
⌊	187	**Re**	**497.327600**	1.735	5348057.382	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**103.950**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Wednesday, September 17, 2014 19:06:04
Autosampler Position: 2
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 6.194

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.297586**	0.333	5257.799	ug/L	1.920
>	115	**In-115 (IS)**			384273.483	ug/L	426757.728
⌊	187	**Re**	**538.346169**	2.351	5013112.550	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**101.896**
>	**In-115 (IS**	115	**90.045**	
⌊	**Re**	187		**107.669**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Wednesday, September 17, 2014 19:09:55
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 7.195

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000371**	25.507	8.156	ug/L	1.920
| >	115	**In-115 (IS)**			376993.645	ug/L	426757.728
⌊	187	**Re**	**0.624003**	7.018	6077.308	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**0.037**
| >	**In-115 (IS**	115	**88.339**	
⌊	**Re**	187		**6.240**

QC Out Of Limits

Analyte Mass Out of Limits Message

METALS BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102327-4

SDG No.: 680102327-1

Batch Number: 143794 Batch Start Date: 09/12/14 13:53 Batch Analyst: Minier, Mark F

Batch Method: None Batch End Date: 09/15/14 14:30

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	FinalAmount	TC99 RE TRACE 00019	TC99-PREP 00004		
MB 160-143794/1		None, 6020A		5.1140 g	50 mL	0.5 mL			
LCS 160-143794/2		None, 6020A		5.0344 g	50 mL	0.5 mL	0.1 mL		
680-102327-A-31	SD-207-01	None, 6020A	T	5.0147 g	50 mL	0.5 mL			
680-102327-A-31 MS	SD-207-01	None, 6020A	T	5.1144 g	50 mL	0.5 mL	0.1 mL		
680-102327-A-31 MSD	SD-207-01	None, 6020A	T	5.0674 g	50 mL	0.5 mL	0.1 mL		

Batch Notes	
Balance ID	27050421
Person's name who witnessed reagent drop	JWM
Analyst who added reagent	MFM
SOP Number	ST-RC-0125

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: S. Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.7
Client Contact: Mike Martin	Phone: (703) 342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page 1 of 4
Company: Tetra Tech, Inc.		Analysis Requested		Job #: 680-102327
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
City: Germantown	TAT Requested (days):			
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			Other:
Email: Michael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=wastestoil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (HOD) Radium-226/228	Total Number of Containers	Special Instructions/Note:
		Preservation Code:					N	N	N	N		
SD-198-SS	6/11/14	0755	C	Solid				X				
SD-198-01		0800	C	Solid				X				
SD-198-02		0805	C	Solid				X				
SD-198-03		0810	C	Solid				X				Hold Pending analysis of SS to 02
SD-197-SS		1030	C	Solid				X				
SD-197-01		1035	C	Solid				X				
SD-197-02		1040	C	Solid				X				
SD-197-03		1045	C	Solid				X				Hold Pending analysis of SS to 02
SD-199-SS		1110	C	Solid				X				
SD-199-01		1115	C	Solid				X				
SD-199-02		1120	C	Solid				X				

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6/11/14 1600	TT		6/11/14 1600	TestAmerica
2		6/11/14 1730	TestAmerica		6-12-14 0840	TA SR
3						

Custody Seals Intact: △ Yes △ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler:	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.3
Client Contact: Mike Martin	Phone:	E-Mail: jerry.lanier@testamericainc.com		Page: Page 246 2 of 4
Company: Tetra Tech, Inc.		Analysis Requested		Job #: 680-102327
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes:
City: Germantown	TAT Requested (days):			A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
State, Zip: MD, 20874	PO #: Purchase Order not required			
Phone:	WO #:			Other:
Email: MIchael.Martin@tetratech.com	Project #: 68012942			
Project Name: Sediments	SSOW#:			
Site:				

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MDC) Radium-228/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-199-03	6/11/14	1125	C	Solid				X				Hold pending analysis of SS in 02
SD-DUP02		0000		Solid				X				
SD-005W-01		1200	C	Solid						X		
SD-208-SS		1206	C	Solid				X				
SD-208-01		1205	C	Solid				X				
SD-208-02		1210	C	Solid				X				
SD-209-01		1400	C	Solid				X				
SD-209-02		1405	C	Solid				X				
SD-209-03		1410	C	Solid				X				
SD-204-SS		1220	C	Solid				X				
SD-204-01		1225	C	Solid				X				

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6-11-14 / 1600	TL		6/11/14 / 1600	TestAmerica
2		6/11/14 / 16:30 1730	TestAmerica		6-12-14 0440	TA STL
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: △ Yes △ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.4
Client Contact: Mike Martin	Phone: (703)342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~4 of 45~~ 3 of 4
Company: Tetra Tech, Inc.				Job #: 680-102327
Address: 20251 Century Blvd Suite 200	Due Date Requested:			
City: Germantown	TAT Requested (days):			
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			
Email: MIchael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; G - Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA; M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2SO3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - ph 4-5; Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
		Preservation Code:					N	N	N	N		
SD-204-02	6/11/14	1230	C	Solid				X				
SD-221-SS		1320	C	Solid				X				
SD-221-01		1325	C	Solid				X				
SD-221-02		1330	C	Solid				X				
SD-210-SS		1435	C	Solid				X				
SD-210-01		1440	C	Solid				X				
SD-210-02		1445	C	Solid				X				
SD-207-SS		1448	C	Solid				X				
SD-207-01		1450	C	Solid				X				
SD-207-02		1455	C	Solid				X				
SD-217-03	↓	1500	C	Solid				X				Hold Pending Analysis of SS to 02

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6-11-14 1600	TT		6/11/14 1668	TestAmerica
2		6/11/14 1630 1730	TestAmerica		6-12-14 0940	TASL
3		Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: △ Yes △ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.12
Client Contact: Mike Martin	Phone: (703) 342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page 12 of 16 ~ 4 of 4
Company: Tetra Tech, Inc.		Analysis Requested		Job #: 680-102327
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes:
City: Germantown	TAT Requested (days):			A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; G - Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA; M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2SO3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - ph 4-5; Z - other (specify)
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			Other:
Email: Michael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	AA01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
		Preservation Code:			N	N	N	N	N	N		
SD-205-SS	6/11/14	1525	C	Solid				X				
SD-205-01		1530	C	Solid				X				
SD-205-02		1535	C	Solid				X				
SD-205-03		1540	C	Solid				X				
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month): ☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	[signature]	6-11-14 / 1640	TT	[signature]	6/11/14 / 1600	TestAmerica
2	[signature]	6/11/14 / 1730	BV	[signature]	6-12-14 0940	TAST
3						

Custody Seals Intact: △ Yes △ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 680-102370-1

SDG Number: 680-102370-1

Job Description: Sediments

For:
Tetra Tech, Inc.
20251 Century Blvd
Suite 200
Germantown, MD 20874

Attention: Mike Martin



Approved for release.
Jerry A Lanier
Project Manager I
7/24/2014 11:15 AM

Jerry A Lanier, Project Manager I
5102 LaRoche Avenue, Savannah, GA, 31404
(912)354-7858 e.3410
jerry.lanier@testamericainc.com
07/24/2014

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

Savannah Certifications and ID #s: A2LA: 0399.01; AL: 41450; ARDEQ: 88-0692; ARDOH; AZ: AZ0741; CA: 03217CA; CO; CT: PH0161; DE; FL: E87052; GA: 803; Guam; HI; IL: 200022; IN: C-GA-02; IA: 353; KS: E-10322; KY EPPC: 90084; KY UST; LA DEQ: 30690; LA DHH: LA080008; ME: 2008022; MD: 250; MA: M-GA006; MI: 9925; MS; NFESC: 249; NV: GA00006; NJ: GA769; NM; NY: 10842; NC DWQ: 269; NC DHHS: 13701; PA: 68-00474; PR: GA00006; RI: LAO00244; SC: 98001001; TN: TN0296; TX: T104704185; USEPA: GA00006; VT: VT-87052; VA: 00302; WA; WV DEP: 094; WV DHHR: 9950 C; WI DNR: 999819810; WY/EPAR8: 8TMS-Q

Table of Contents

Cover Title Page 1

Data Summaries 4

Definitions 4

Case Narrative 5

Detection Summary 6

Client Sample Results 9

Tracer/Carrier Summary 19

QC Sample Results 20

QC Association 23

Chronicle 25

Certification Summary 32

Method Summary 33

Sample Summary 34

Reagent Traceability 35

COAs 39

Radiochemistry Raw Data 172

Alpha Spectroscopy 172

Method A-01-R Th 173

Daily Checks 252

Initial Calibrations 291

Monthly Calibration Verifications 368

Monthly Backgrounds 404

Run Logs 475

Gamma Spectroscopy 483

Method GA-01-R Ra-226 484

Daily Checks 547

Table of Contents

Initial Calibrations 592

Initial Calibration Verifications 621

Annual Calibration Verifications 646

Monthly Backgrounds 671

Run Logs 701

Shipping and Receiving Documents 704

Client Chain of Custody 704

Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Sediments

Report Number: 680-102370-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 06/13/2014; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 3.1 C.

ISOTOPIC THORIUM

Samples SD-DUP-03 (680-102370-1), SD-206-SS (680-102370-2), SD-206-01 (680-102370-3), SD-206-02 (680-102370-4), SD-215-SS (680-102370-7), SD-222-SS (680-102370-8), SD-222-01 (680-102370-9), SD-222-02 (680-102370-10), SD-222-03 (680-102370-11), SD-211-SS (680-102370-12), SD-211-01 (680-102370-13), SD-211-02 (680-102370-14), SD-216-SS (680-102370-15), SD-216-01 (680-102370-16), SD-216-02 (680-102370-17), SD-217-SS (680-102370-18), SD-217-01 (680-102370-19), SD-217-02 (680-102370-20), SD-214-SS (680-102370-22), SD-214-01 (680-102370-23), SD-212-SS (680-102370-24), SD-212-01 (680-102370-25), SD-212-02 (680-102370-26), SD-DUP-04 (680-102370-28), SD-213-SS (680-102370-29), SD-213-01 (680-102370-30), SD-213-02 (680-102370-31), SD-214-02 (680-102370-34) and SD-214-03 (680-102370-35) were analyzed for Isotopic Thorium in accordance with A01R_Th. The samples were leached on 06/17/2014, prepared on 06/23/2014 and analyzed on 07/01/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

RADIUM-226 AND OTHER GAMMA EMITTERS (GS)

Samples SD-005E-01 (680-102370-6) and SD-008-01 (680-102370-33) were analyzed for Radium-226 and other gamma emitters (GS) in accordance with approved methodologies. The samples were leached on 06/17/2014, prepared on 06/25/2014 and analyzed on 07/16/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102370-1
SDG: 680-102370-1

Client Sample ID: SD-DUP-03 — **Lab Sample ID: 680-102370-1**

No Detections.

Client Sample ID: SD-206-SS — **Lab Sample ID: 680-102370-2**

No Detections.

Client Sample ID: SD-206-01 — **Lab Sample ID: 680-102370-3**

No Detections.

Client Sample ID: SD-206-02 — **Lab Sample ID: 680-102370-4**

No Detections.

Client Sample ID: SD-005E-01 — **Lab Sample ID: 680-102370-6**

No Detections.

Client Sample ID: SD-215-SS — **Lab Sample ID: 680-102370-7**

No Detections.

Client Sample ID: SD-222-SS — **Lab Sample ID: 680-102370-8**

No Detections.

Client Sample ID: SD-222-01 — **Lab Sample ID: 680-102370-9**

No Detections.

Client Sample ID: SD-222-02 — **Lab Sample ID: 680-102370-10**

No Detections.

Client Sample ID: SD-222-03 — **Lab Sample ID: 680-102370-11**

No Detections.

Client Sample ID: SD-211-SS — **Lab Sample ID: 680-102370-12**

No Detections.

Client Sample ID: SD-211-01 — **Lab Sample ID: 680-102370-13**

No Detections.

Client Sample ID: SD-211-02 — **Lab Sample ID: 680-102370-14**

No Detections.

Client Sample ID: SD-216-SS — **Lab Sample ID: 680-102370-15**

No Detections.

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102370-1
SDG: 680-102370-1

Client Sample ID: SD-216-01 — **Lab Sample ID: 680-102370-16**

No Detections.

Client Sample ID: SD-216-02 — **Lab Sample ID: 680-102370-17**

No Detections.

Client Sample ID: SD-217-SS — **Lab Sample ID: 680-102370-18**

No Detections.

Client Sample ID: SD-217-01 — **Lab Sample ID: 680-102370-19**

No Detections.

Client Sample ID: SD-217-02 — **Lab Sample ID: 680-102370-20**

No Detections.

Client Sample ID: SD-214-SS — **Lab Sample ID: 680-102370-22**

No Detections.

Client Sample ID: SD-214-01 — **Lab Sample ID: 680-102370-23**

No Detections.

Client Sample ID: SD-212-SS — **Lab Sample ID: 680-102370-24**

No Detections.

Client Sample ID: SD-212-01 — **Lab Sample ID: 680-102370-25**

No Detections.

Client Sample ID: SD-212-02 — **Lab Sample ID: 680-102370-26**

No Detections.

Client Sample ID: SD-DUP-04 — **Lab Sample ID: 680-102370-28**

No Detections.

Client Sample ID: SD-213-SS — **Lab Sample ID: 680-102370-29**

No Detections.

Client Sample ID: SD-213-01 — **Lab Sample ID: 680-102370-30**

No Detections.

Client Sample ID: SD-213-02 — **Lab Sample ID: 680-102370-31**

No Detections.

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102370-1
SDG: 680-102370-1

Client Sample ID: SD-008-01 — **Lab Sample ID: 680-102370-33**

No Detections.

Client Sample ID: SD-214-02 — **Lab Sample ID: 680-102370-34**

No Detections.

Client Sample ID: SD-214-03 — **Lab Sample ID: 680-102370-35**

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: SD-DUP-03

Lab Sample ID: 680-102370-1

Date Collected: 06/12/14 00:00
Matrix: Solid
Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.613		0.180	0.187	1.00	0.129	pCi/g	06/23/14 15:01	07/01/14 12:32	1
Thorium-230	0.682		0.182	0.191	1.00	0.0773	pCi/g	06/23/14 15:01	07/01/14 12:32	1
Thorium-232	0.657		0.178	0.187	1.00	0.0726	pCi/g	06/23/14 15:01	07/01/14 12:32	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	79.6		30 - 110	06/23/14 15:01	07/01/14 12:32	1

Client Sample ID: SD-206-SS

Lab Sample ID: 680-102370-2

Date Collected: 06/12/14 08:10
Matrix: Solid
Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.03		0.219	0.236	1.00	0.0843	pCi/g	06/23/14 15:01	07/01/14 12:32	1
Thorium-230	0.873		0.202	0.215	1.00	0.0811	pCi/g	06/23/14 15:01	07/01/14 12:32	1
Thorium-232	0.993		0.213	0.229	1.00	0.0646	pCi/g	06/23/14 15:01	07/01/14 12:32	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	83.2		30 - 110	06/23/14 15:01	07/01/14 12:32	1

Client Sample ID: SD-206-01

Lab Sample ID: 680-102370-3

Date Collected: 06/12/14 08:15
Matrix: Solid
Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.27		0.245	0.267	1.00	0.105	pCi/g	06/23/14 15:01	07/01/14 12:32	1
Thorium-230	1.04		0.220	0.237	1.00	0.0779	pCi/g	06/23/14 15:01	07/01/14 12:32	1
Thorium-232	1.24		0.238	0.260	1.00	0.0553	pCi/g	06/23/14 15:01	07/01/14 12:32	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	84.2		30 - 110	06/23/14 15:01	07/01/14 12:32	1

Client Sample ID: SD-206-02

Lab Sample ID: 680-102370-4

Date Collected: 06/12/14 08:20
Matrix: Solid
Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.09		0.229	0.247	1.00	0.0845	pCi/g	06/23/14 15:01	07/01/14 12:32	1
Thorium-230	0.809		0.198	0.209	1.00	0.0769	pCi/g	06/23/14 15:01	07/01/14 12:32	1
Thorium-232	1.14		0.234	0.253	1.00	0.0766	pCi/g	06/23/14 15:01	07/01/14 12:32	1

Client Sample ID: SD-206-02

Lab Sample ID: 680-102370-4

Date Collected: 06/12/14 08:20

Matrix: Solid

Date Received: 06/13/14 09:30

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*78.9*		*30 - 110*	*06/23/14 15:01*	*07/01/14 12:32*	*1*

Client Sample ID: SD-005E-01

Lab Sample ID: 680-102370-6

Date Collected: 06/12/14 08:30

Matrix: Solid

Date Received: 06/13/14 09:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	**0.465**		0.114	0.123	1.00	0.0938	pCi/g	06/25/14 12:41	07/16/14 01:34	1
Radium-228	**0.507**		0.162	0.170		0.123	pCi/g	06/25/14 12:41	07/16/14 01:34	1
Thorium-232	**0.507**		0.162	0.170		0.123	pCi/g	06/25/14 12:41	07/16/14 01:34	1
Uranium-235	0.149	U	0.186	0.187		0.303	pCi/g	06/25/14 12:41	07/16/14 01:34	1
Uranium-238	0.845	U	0.895	0.899		1.46	pCi/g	06/25/14 12:41	07/16/14 01:34	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Ac-228	*0.507*		*0.162*	*0.170*		*0.123*	*pCi/g*	*06/25/14 12:41*	*07/16/14 01:34*	*1*
Bi-214	*0.465*		*0.114*	*0.123*		*0.0938*	*pCi/g*	*06/25/14 12:41*	*07/16/14 01:34*	*1*
K-40	*4.89*		*0.912*	*1.04*		*0.660*	*pCi/g*	*06/25/14 12:41*	*07/16/14 01:34*	*1*
Pb-212	*0.480*		*0.117*	*0.132*		*0.111*	*pCi/g*	*06/25/14 12:41*	*07/16/14 01:34*	*1*
Pb-214	*0.543*		*0.102*	*0.116*		*0.0981*	*pCi/g*	*06/25/14 12:41*	*07/16/14 01:34*	*1*
Tl-208	*0.189*		*0.0557*	*0.0590*		*0.0446*	*pCi/g*	*06/25/14 12:41*	*07/16/14 01:34*	*1*

Client Sample ID: SD-215-SS

Lab Sample ID: 680-102370-7

Date Collected: 06/12/14 08:50

Matrix: Solid

Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.898**		0.214	0.227	1.00	0.0890	pCi/g	06/23/14 15:01	07/01/14 12:32	1
Thorium-230	**0.499**		0.159	0.164	1.00	0.0570	pCi/g	06/23/14 15:01	07/01/14 12:32	1
Thorium-232	**1.01**		0.225	0.240	1.00	0.0648	pCi/g	06/23/14 15:01	07/01/14 12:32	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*76.6*		*30 - 110*	*06/23/14 15:01*	*07/01/14 12:32*	*1*

Client Sample ID: SD-222-SS

Lab Sample ID: 680-102370-8

Date Collected: 06/12/14 09:05

Matrix: Solid

Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.297**		0.120	0.122	1.00	0.0782	pCi/g	06/23/14 15:01	07/01/14 12:32	1
Thorium-230	**0.429**		0.144	0.149	1.00	0.0881	pCi/g	06/23/14 15:01	07/01/14 12:32	1
Thorium-232	**0.363**		0.130	0.133	1.00	0.0558	pCi/g	06/23/14 15:01	07/01/14 12:32	1

Client Sample ID: SD-222-SS

Lab Sample ID: 680-102370-8

Date Collected: 06/12/14 09:05

Matrix: Solid

Date Received: 06/13/14 09:30

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*82.5*		*30 - 110*	*06/23/14 15:01*	*07/01/14 12:32*	*1*

Client Sample ID: SD-222-01

Lab Sample ID: 680-102370-9

Date Collected: 06/12/14 09:10

Matrix: Solid

Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.639		0.164	0.172	1.00	0.0667	pCi/g	06/23/14 15:01	07/01/14 12:32	1
Thorium-230	0.689		0.169	0.178	1.00	0.0469	pCi/g	06/23/14 15:01	07/01/14 12:32	1
Thorium-232	0.487		0.141	0.147	1.00	0.0308	pCi/g	06/23/14 15:01	07/01/14 12:32	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.0*		*30 - 110*	*06/23/14 15:01*	*07/01/14 12:32*	*1*

Client Sample ID: SD-222-02

Lab Sample ID: 680-102370-10

Date Collected: 06/12/14 09:15

Matrix: Solid

Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.421		0.140	0.145	1.00	0.102	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-230	0.436		0.138	0.143	1.00	0.0687	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-232	0.338		0.121	0.124	1.00	0.0601	pCi/g	06/23/14 15:01	07/01/14 12:33	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.3*		*30 - 110*	*06/23/14 15:01*	*07/01/14 12:33*	*1*

Client Sample ID: SD-222-03

Lab Sample ID: 680-102370-11

Date Collected: 06/12/14 19:20

Matrix: Solid

Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.767		0.193	0.203	1.00	0.102	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-230	0.495		0.152	0.157	1.00	0.0529	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-232	0.647		0.173	0.181	1.00	0.0524	pCi/g	06/23/14 15:01	07/01/14 12:33	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*81.8*		*30 - 110*	*06/23/14 15:01*	*07/01/14 12:33*	*1*

Client Sample ID: SD-211-SS

Lab Sample ID: 680-102370-12

Date Collected: 06/12/14 10:00

Matrix: Solid

Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.20		0.262	0.281	1.00	0.100	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-230	1.21		0.262	0.281	1.00	0.0734	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-232	1.41		0.282	0.306	1.00	0.0422	pCi/g	06/23/14 15:01	07/01/14 12:33	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*67.3*		*30 - 110*	*06/23/14 15:01*	*07/01/14 12:33*	*1*

Client Sample ID: SD-211-01

Lab Sample ID: 680-102370-13

Date Collected: 06/12/14 10:05

Matrix: Solid

Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.31		0.266	0.288	1.00	0.129	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-230	0.882		0.216	0.228	1.00	0.0879	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-232	1.18		0.247	0.266	1.00	0.0522	pCi/g	06/23/14 15:01	07/01/14 12:33	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*76.4*		*30 - 110*	*06/23/14 15:01*	*07/01/14 12:33*	*1*

Client Sample ID: SD-211-02

Lab Sample ID: 680-102370-14

Date Collected: 06/12/14 10:10

Matrix: Solid

Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.08		0.223	0.241	1.00	0.0892	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-230	0.928		0.205	0.220	1.00	0.0641	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-232	0.984		0.210	0.226	1.00	0.0510	pCi/g	06/23/14 15:01	07/01/14 12:33	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*80.3*		*30 - 110*	*06/23/14 15:01*	*07/01/14 12:33*	*1*

Client Sample ID: SD-216-SS

Lab Sample ID: 680-102370-15

Date Collected: 06/12/14 10:20

Matrix: Solid

Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.01		0.253	0.267	1.00	0.151	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-230	0.820		0.221	0.231	1.00	0.0765	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-232	0.903		0.231	0.243	1.00	0.0762	pCi/g	06/23/14 15:01	07/01/14 12:33	1

Client Sample ID: SD-216-SS

Lab Sample ID: 680-102370-15

Date Collected: 06/12/14 10:20

Matrix: Solid

Date Received: 06/13/14 09:30

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	62.6		30 - 110	06/23/14 15:01	07/01/14 12:33	1

Client Sample ID: SD-216-01

Lab Sample ID: 680-102370-16

Date Collected: 06/12/14 10:25

Matrix: Solid

Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.946		0.218	0.232	1.00	0.110	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-230	0.895		0.209	0.222	1.00	0.0852	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-232	0.956		0.214	0.229	1.00	0.0619	pCi/g	06/23/14 15:01	07/01/14 12:33	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	80.6		30 - 110	06/23/14 15:01	07/01/14 12:33	1

Client Sample ID: SD-216-02

Lab Sample ID: 680-102370-17

Date Collected: 06/12/14 10:30

Matrix: Solid

Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.690		0.176	0.185	1.00	0.0835	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-230	0.583		0.160	0.168	1.00	0.0620	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-232	0.688		0.174	0.183	1.00	0.0637	pCi/g	06/23/14 15:01	07/01/14 12:33	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	84.1		30 - 110	06/23/14 15:01	07/01/14 12:33	1

Client Sample ID: SD-217-SS

Lab Sample ID: 680-102370-18

Date Collected: 06/12/14 12:20

Matrix: Solid

Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.437		0.219	0.222	1.00	0.184	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-230	0.657		0.259	0.265	1.00	0.141	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-232	0.371		0.192	0.194	1.00	0.0742	pCi/g	06/23/14 15:01	07/01/14 12:33	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	38.1		30 - 110	06/23/14 15:01	07/01/14 12:33	1

Client Sample ID: SD-217-01

Lab Sample ID: 680-102370-19

Date Collected: 06/12/14 12:25

Matrix: Solid

Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.431		0.138	0.143	1.00	0.0787	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-230	0.360		0.124	0.128	1.00	0.0485	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-232	0.370		0.125	0.129	1.00	0.0318	pCi/g	06/23/14 15:01	07/01/14 12:33	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*92.6*		*30 - 110*	*06/23/14 15:01*	*07/01/14 12:33*	*1*

Client Sample ID: SD-217-02

Lab Sample ID: 680-102370-20

Date Collected: 06/12/14 12:30

Matrix: Solid

Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.767		0.190	0.201	1.00	0.0903	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-230	0.551		0.160	0.167	1.00	0.0697	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-232	0.665		0.175	0.183	1.00	0.0622	pCi/g	06/23/14 15:01	07/01/14 12:33	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*83.1*		*30 - 110*	*06/23/14 15:01*	*07/01/14 12:33*	*1*

Client Sample ID: SD-214-SS

Lab Sample ID: 680-102370-22

Date Collected: 06/12/14 13:10

Matrix: Solid

Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.855		0.221	0.233	1.00	0.112	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-230	0.948		0.230	0.243	1.00	0.0715	pCi/g	06/23/14 15:01	07/01/14 12:33	1
Thorium-232	1.04		0.240	0.255	1.00	0.0626	pCi/g	06/23/14 15:01	07/01/14 12:33	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*67.9*		*30 - 110*	*06/23/14 15:01*	*07/01/14 12:33*	*1*

Client Sample ID: SD-214-01

Lab Sample ID: 680-102370-23

Date Collected: 06/12/14 13:15

Matrix: Solid

Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.986		0.218	0.233	1.00	0.0975	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-230	0.865		0.205	0.218	1.00	0.104	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-232	1.09		0.228	0.246	1.00	0.102	pCi/g	06/23/14 15:05	07/01/14 12:26	1

Client Sample ID: SD-214-01

Lab Sample ID: 680-102370-23

Date Collected: 06/12/14 13:15

Matrix: Solid

Date Received: 06/13/14 09:30

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	82.1		30 - 110	06/23/14 15:05	07/01/14 12:26	1

Client Sample ID: SD-212-SS

Lab Sample ID: 680-102370-24

Date Collected: 06/12/14 14:10

Matrix: Solid

Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.964		0.214	0.229	1.00	0.112	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-230	0.923		0.208	0.222	1.00	0.0973	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-232	1.03		0.217	0.234	1.00	0.0766	pCi/g	06/23/14 15:05	07/01/14 12:26	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	86.1		30 - 110	06/23/14 15:05	07/01/14 12:26	1

Client Sample ID: SD-212-01

Lab Sample ID: 680-102370-25

Date Collected: 06/12/14 14:15

Matrix: Solid

Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.24		0.260	0.280	1.00	0.118	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-230	1.00		0.231	0.246	1.00	0.0866	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-232	1.12		0.246	0.263	1.00	0.100	pCi/g	06/23/14 15:05	07/01/14 12:26	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	74.2		30 - 110	06/23/14 15:05	07/01/14 12:26	1

Client Sample ID: SD-212-02

Lab Sample ID: 680-102370-26

Date Collected: 06/12/14 14:20

Matrix: Solid

Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.10		0.220	0.239	1.00	0.103	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-230	1.17		0.222	0.243	1.00	0.0504	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-232	1.01		0.208	0.225	1.00	0.0776	pCi/g	06/23/14 15:05	07/01/14 12:26	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	87.9		30 - 110	06/23/14 15:05	07/01/14 12:26	1

Client Sample ID: SD-DUP-04

Lab Sample ID: 680-102370-28

Date Collected: 06/12/14 00:00
Matrix: Solid
Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.06		0.218	0.235	1.00	0.0678	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-230	1.04		0.216	0.233	1.00	0.0715	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-232	1.26		0.236	0.258	1.00	0.0571	pCi/g	06/23/14 15:05	07/01/14 12:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*83.9*		*30 - 110*	*06/23/14 15:05*	*07/01/14 12:26*	*1*

Client Sample ID: SD-213-SS

Lab Sample ID: 680-102370-29

Date Collected: 06/12/14 14:30
Matrix: Solid
Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.10		0.235	0.253	1.00	0.111	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-230	1.26		0.248	0.270	1.00	0.0688	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-232	1.23		0.244	0.265	1.00	0.0361	pCi/g	06/23/14 15:05	07/01/14 12:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*80.3*		*30 - 110*	*06/23/14 15:05*	*07/01/14 12:26*	*1*

Client Sample ID: SD-213-01

Lab Sample ID: 680-102370-30

Date Collected: 06/12/14 14:35
Matrix: Solid
Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.998		0.208	0.224	1.00	0.0956	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-230	0.979		0.203	0.219	1.00	0.0673	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-232	1.17		0.222	0.243	1.00	0.0738	pCi/g	06/23/14 15:05	07/01/14 12:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.7*		*30 - 110*	*06/23/14 15:05*	*07/01/14 12:26*	*1*

Client Sample ID: SD-213-02

Lab Sample ID: 680-102370-31

Date Collected: 06/12/14 14:40
Matrix: Solid
Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.14		0.239	0.257	1.00	0.0938	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-230	1.15		0.237	0.256	1.00	0.0557	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-232	1.18		0.241	0.261	1.00	0.0899	pCi/g	06/23/14 15:05	07/01/14 12:26	1

Client Sample ID: SD-213-02

Lab Sample ID: 680-102370-31

Date Collected: 06/12/14 14:40

Matrix: Solid

Date Received: 06/13/14 09:30

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*78.8*		*30 - 110*	*06/23/14 15:05*	*07/01/14 12:26*	*1*

Client Sample ID: SD-008-01

Lab Sample ID: 680-102370-33

Date Collected: 06/12/14 14:50

Matrix: Solid

Date Received: 06/13/14 09:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	**0.732**		0.209	0.222	1.00	0.202	pCi/g	06/25/14 12:41	07/16/14 01:35	1
Radium-228	**0.895**		0.210	0.229		0.152	pCi/g	06/25/14 12:41	07/16/14 01:35	1
Thorium-232	**0.895**		0.210	0.229		0.152	pCi/g	06/25/14 12:41	07/16/14 01:35	1
Uranium-235	0.209	U	0.270	0.271		0.474	pCi/g	06/25/14 12:41	07/16/14 01:35	1
Uranium-238	0.592	U	0.739	0.741		2.17	pCi/g	06/25/14 12:41	07/16/14 01:35	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Ac-228	*0.895*		*0.210*	*0.229*		*0.152*	*pCi/g*	*06/25/14 12:41*	*07/16/14 01:35*	*1*
Bi-214	*0.732*		*0.209*	*0.222*		*0.202*	*pCi/g*	*06/25/14 12:41*	*07/16/14 01:35*	*1*
K-40	*6.71*		*1.63*	*1.77*		*1.45*	*pCi/g*	*06/25/14 12:41*	*07/16/14 01:35*	*1*
Pb-212	*0.920*		*0.153*	*0.194*		*0.127*	*pCi/g*	*06/25/14 12:41*	*07/16/14 01:35*	*1*
Pb-214	*0.820*		*0.172*	*0.192*		*0.182*	*pCi/g*	*06/25/14 12:41*	*07/16/14 01:35*	*1*
Tl-208	*0.260*		*0.0823*	*0.0866*		*0.0788*	*pCi/g*	*06/25/14 12:41*	*07/16/14 01:35*	*1*

Client Sample ID: SD-214-02

Lab Sample ID: 680-102370-34

Date Collected: 06/12/14 13:20

Matrix: Solid

Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**1.22**		0.231	0.253	1.00	0.0851	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-230	**1.24**		0.231	0.253	1.00	0.0323	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-232	**1.15**		0.224	0.244	1.00	0.0859	pCi/g	06/23/14 15:05	07/01/14 12:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.8*		*30 - 110*	*06/23/14 15:05*	*07/01/14 12:26*	*1*

Client Sample ID: SD-214-03

Lab Sample ID: 680-102370-35

Date Collected: 06/12/14 13:25

Matrix: Solid

Date Received: 06/13/14 09:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.865**		0.198	0.211	1.00	0.0684	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-230	**0.433**		0.140	0.145	1.00	0.0582	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-232	**0.856**		0.196	0.209	1.00	0.0508	pCi/g	06/23/14 15:05	07/01/14 12:26	1

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102370-1
SDG: 680-102370-1

Client Sample ID: SD-214-03
Date Collected: 06/12/14 13:25
Date Received: 06/13/14 09:30

Lab Sample ID: 680-102370-35
Matrix: Solid

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	84.8		30 - 110	06/23/14 15:05	07/01/14 12:26	1

Tracer/Carrier Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102370-1
SDG: 680-102370-1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	Th-229 (30-110)
680-102370-1	SD-DUP-03	79.6
680-102370-1 DU	SD-DUP-03	83.8
680-102370-2	SD-206-SS	83.2
680-102370-3	SD-206-01	84.2
680-102370-4	SD-206-02	78.9
680-102370-7	SD-215-SS	76.6
680-102370-8	SD-222-SS	82.5
680-102370-9	SD-222-01	89.0
680-102370-10	SD-222-02	89.3
680-102370-11	SD-222-03	81.8
680-102370-12	SD-211-SS	67.3
680-102370-13	SD-211-01	76.4
680-102370-14	SD-211-02	80.3
680-102370-15	SD-216-SS	62.6
680-102370-16	SD-216-01	80.6
680-102370-17	SD-216-02	84.1
680-102370-18	SD-217-SS	38.1
680-102370-19	SD-217-01	92.6
680-102370-20	SD-217-02	83.1
680-102370-22	SD-214-SS	67.9
680-102370-23	SD-214-01	82.1
680-102370-23 MS	SD-214-01	84.0
680-102370-23MSD	SD-214-01	88.5
680-102370-24	SD-212-SS	86.1
680-102370-25	SD-212-01	74.2
680-102370-26	SD-212-02	87.9
680-102370-28	SD-DUP-04	83.9
680-102370-29	SD-213-SS	80.3
680-102370-30	SD-213-01	89.7
680-102370-31	SD-213-02	78.8
680-102370-34	SD-214-02	89.8
680-102370-35	SD-214-03	84.8
LCS 160-128227/2-A	Lab Control Sample	71.2
LCS 160-128228/2-A	Lab Control Sample	94.3
MB 160-128227/1-A	Method Blank	93.9
MB 160-128228/1-A	Method Blank	91.7

Tracer/Carrier Legend

Th-229 = Thorium-229

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Lab Sample ID: MB 160-128227/1-A
Matrix: Solid
Analysis Batch: 129243

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 128227

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.0006459	U	0.0224	0.0224	1.00	0.0669	pCi/g	06/23/14 15:01	07/01/14 12:32	1
Thorium-230	0.1034		0.0654	0.0660	1.00	0.0310	pCi/g	06/23/14 15:01	07/01/14 12:32	1
Thorium-232	0.0000	U	0.00386	0.00386	1.00	0.0309	pCi/g	06/23/14 15:01	07/01/14 12:32	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*93.9*		*30 - 110*	*06/23/14 15:01*	*07/01/14 12:32*	*1*

Lab Sample ID: LCS 160-128227/2-A
Matrix: Solid
Analysis Batch: 129244

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 128227

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Thorium-230			24.5	24.83		2.66	1.00	0.156	pCi/g	101	81 - 118		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*71.2*		*30 - 110*

Lab Sample ID: 680-102370-1 DU
Matrix: Solid
Analysis Batch: 129279

Client Sample ID: SD-DUP-03
Prep Type: Total/NA
Prep Batch: 128227

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Thorium-228	0.613			0.7360		0.198	1.00	0.101	pCi/g			0.32	1
Thorium-230	0.682			0.6714		0.185	1.00	0.0594	pCi/g			0.03	1
Thorium-232	0.657			0.6923		0.187	1.00	0.0518	pCi/g			0.09	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Thorium-229	*83.8*		*30 - 110*

Lab Sample ID: MB 160-128228/1-A
Matrix: Solid
Analysis Batch: 129241

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 128228

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.006508	U	0.0215	0.0216	1.00	0.0541	pCi/g	06/23/14 15:05	07/01/14 12:25	1
Thorium-230	0.1211		0.0724	0.0731	1.00	0.0541	pCi/g	06/23/14 15:05	07/01/14 12:25	1
Thorium-232	0.0000	U	0.00389	0.00389	1.00	0.0311	pCi/g	06/23/14 15:05	07/01/14 12:25	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*91.7*		*30 - 110*	*06/23/14 15:05*	*07/01/14 12:25*	*1*

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry) (Continued)

Lab Sample ID: LCS 160-128228/2-A
Matrix: Solid
Analysis Batch: 129242

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 128228

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Thorium-230			24.5	20.69		2.16	1.00	0.0591	pCi/g	84	81 - 118		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*94.3*		*30 - 110*

Lab Sample ID: 680-102370-23 MS
Matrix: Solid
Analysis Batch: 129269

Client Sample ID: SD-214-01
Prep Type: Total/NA
Prep Batch: 128228

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Thorium-230	0.865		4.33	5.842		0.716	1.00	0.125	pCi/g	115	76 - 115		

Tracer	*MS %Yield*	*MS Qualifier*	*Limits*
Thorium-229	*84.0*		*30 - 110*

Lab Sample ID: 680-102370-23MSD
Matrix: Solid
Analysis Batch: 129774

Client Sample ID: SD-214-01
Prep Type: Total/NA
Prep Batch: 128228

Analyte	Sample Result	Sample Qual	Spike Added	MSD Result	MSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Thorium-230	5.89		4.31	5.550		0.679	1.00	0.106	pCi/g	109	76 - 115	0.21	1

Tracer	*MSD %Yield*	*MSD Qualifier*	*Limits*
Thorium-229	*88.5*		*30 - 110*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-128622/1-A
Matrix: Solid
Analysis Batch: 131682

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 128622

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.03852	U	0.0771	0.0773	1.00	0.129	pCi/g	06/25/14 12:41	07/16/14 02:12	1
Radium-228	-0.008469	U	0.0505	0.0505		0.224	pCi/g	06/25/14 12:41	07/16/14 02:12	1
Thorium-232	-0.008469	U	0.0505	0.0505		0.224	pCi/g	06/25/14 12:41	07/16/14 02:12	1
Uranium-235	0.0000	U	0.0699	0.0699		0.320	pCi/g	06/25/14 12:41	07/16/14 02:12	1
Uranium-238	-0.2907	U	0.636	0.636		1.09	pCi/g	06/25/14 12:41	07/16/14 02:12	1

Other Detected Radionuclides	*MB Result*	*MB Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*06/25/14 12:41*	*07/16/14 02:12*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: LCS 160-128622/2-A
Matrix: Solid
Analysis Batch: 131933

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 128622

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Americium-241			97.4	101.0		10.7		1.50	pCi/g	104	87 - 116		
Cesium-137			31.0	30.57		3.34		0.389	pCi/g	99	87 - 120		
Cobalt-60			22.0	22.05		2.33		0.0869	pCi/g	100	87 - 115		

Lab Sample ID: 680-102370-6 DU
Matrix: Solid
Analysis Batch: 131938

Client Sample ID: SD-005E-01
Prep Type: Total/NA
Prep Batch: 128622

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Radium-226	0.465			0.5591		0.162	1.00	0.118	pCi/g			0.33	1
Radium-228	0.507			0.4101		0.151		0.276	pCi/g			0.30	1
Thorium-232	0.507			0.4101		0.151		0.276	pCi/g			0.30	1
Uranium-235	0.149	U		0.06926	U	0.209		0.400	pCi/g			0.20	1
Uranium-238	0.845	U		1.230	U	0.590		1.51	pCi/g			0.26	1

Rad

Leach Batch: 127216

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102370-1	SD-DUP-03	Total/NA	Solid	Dry and Grind	
680-102370-1 DU	SD-DUP-03	Total/NA	Solid	Dry and Grind	
680-102370-2	SD-206-SS	Total/NA	Solid	Dry and Grind	
680-102370-3	SD-206-01	Total/NA	Solid	Dry and Grind	
680-102370-4	SD-206-02	Total/NA	Solid	Dry and Grind	
680-102370-6	SD-005E-01	Total/NA	Solid	Dry and Grind	
680-102370-6 DU	SD-005E-01	Total/NA	Solid	Dry and Grind	
680-102370-7	SD-215-SS	Total/NA	Solid	Dry and Grind	
680-102370-8	SD-222-SS	Total/NA	Solid	Dry and Grind	
680-102370-9	SD-222-01	Total/NA	Solid	Dry and Grind	
680-102370-10	SD-222-02	Total/NA	Solid	Dry and Grind	
680-102370-11	SD-222-03	Total/NA	Solid	Dry and Grind	
680-102370-12	SD-211-SS	Total/NA	Solid	Dry and Grind	
680-102370-13	SD-211-01	Total/NA	Solid	Dry and Grind	
680-102370-14	SD-211-02	Total/NA	Solid	Dry and Grind	
680-102370-15	SD-216-SS	Total/NA	Solid	Dry and Grind	
680-102370-16	SD-216-01	Total/NA	Solid	Dry and Grind	
680-102370-17	SD-216-02	Total/NA	Solid	Dry and Grind	
680-102370-18	SD-217-SS	Total/NA	Solid	Dry and Grind	
680-102370-19	SD-217-01	Total/NA	Solid	Dry and Grind	
680-102370-20	SD-217-02	Total/NA	Solid	Dry and Grind	
680-102370-22	SD-214-SS	Total/NA	Solid	Dry and Grind	
680-102370-23	SD-214-01	Total/NA	Solid	Dry and Grind	
680-102370-23 MS	SD-214-01	Total/NA	Solid	Dry and Grind	
680-102370-23MSD	SD-214-01	Total/NA	Solid	Dry and Grind	
680-102370-24	SD-212-SS	Total/NA	Solid	Dry and Grind	
680-102370-25	SD-212-01	Total/NA	Solid	Dry and Grind	
680-102370-26	SD-212-02	Total/NA	Solid	Dry and Grind	
680-102370-28	SD-DUP-04	Total/NA	Solid	Dry and Grind	
680-102370-29	SD-213-SS	Total/NA	Solid	Dry and Grind	
680-102370-30	SD-213-01	Total/NA	Solid	Dry and Grind	
680-102370-31	SD-213-02	Total/NA	Solid	Dry and Grind	
680-102370-33	SD-008-01	Total/NA	Solid	Dry and Grind	
680-102370-34	SD-214-02	Total/NA	Solid	Dry and Grind	
680-102370-35	SD-214-03	Total/NA	Solid	Dry and Grind	

Prep Batch: 128227

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102370-1	SD-DUP-03	Total/NA	Solid	ExtChrom	127216
680-102370-1 DU	SD-DUP-03	Total/NA	Solid	ExtChrom	127216
680-102370-2	SD-206-SS	Total/NA	Solid	ExtChrom	127216
680-102370-3	SD-206-01	Total/NA	Solid	ExtChrom	127216
680-102370-4	SD-206-02	Total/NA	Solid	ExtChrom	127216
680-102370-7	SD-215-SS	Total/NA	Solid	ExtChrom	127216
680-102370-8	SD-222-SS	Total/NA	Solid	ExtChrom	127216
680-102370-9	SD-222-01	Total/NA	Solid	ExtChrom	127216
680-102370-10	SD-222-02	Total/NA	Solid	ExtChrom	127216
680-102370-11	SD-222-03	Total/NA	Solid	ExtChrom	127216
680-102370-12	SD-211-SS	Total/NA	Solid	ExtChrom	127216
680-102370-13	SD-211-01	Total/NA	Solid	ExtChrom	127216
680-102370-14	SD-211-02	Total/NA	Solid	ExtChrom	127216

Rad (Continued)

Prep Batch: 128227 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102370-15	SD-216-SS	Total/NA	Solid	ExtChrom	127216
680-102370-16	SD-216-01	Total/NA	Solid	ExtChrom	127216
680-102370-17	SD-216-02	Total/NA	Solid	ExtChrom	127216
680-102370-18	SD-217-SS	Total/NA	Solid	ExtChrom	127216
680-102370-19	SD-217-01	Total/NA	Solid	ExtChrom	127216
680-102370-20	SD-217-02	Total/NA	Solid	ExtChrom	127216
680-102370-22	SD-214-SS	Total/NA	Solid	ExtChrom	127216
LCS 160-128227/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-128227/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Prep Batch: 128228

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102370-23	SD-214-01	Total/NA	Solid	ExtChrom	127216
680-102370-23 MS	SD-214-01	Total/NA	Solid	ExtChrom	127216
680-102370-23MSD	SD-214-01	Total/NA	Solid	ExtChrom	127216
680-102370-24	SD-212-SS	Total/NA	Solid	ExtChrom	127216
680-102370-25	SD-212-01	Total/NA	Solid	ExtChrom	127216
680-102370-26	SD-212-02	Total/NA	Solid	ExtChrom	127216
680-102370-28	SD-DUP-04	Total/NA	Solid	ExtChrom	127216
680-102370-29	SD-213-SS	Total/NA	Solid	ExtChrom	127216
680-102370-30	SD-213-01	Total/NA	Solid	ExtChrom	127216
680-102370-31	SD-213-02	Total/NA	Solid	ExtChrom	127216
680-102370-34	SD-214-02	Total/NA	Solid	ExtChrom	127216
680-102370-35	SD-214-03	Total/NA	Solid	ExtChrom	127216
LCS 160-128228/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-128228/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Prep Batch: 128622

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102370-6	SD-005E-01	Total/NA	Solid	Fill_Geo-21	127216
680-102370-6 DU	SD-005E-01	Total/NA	Solid	Fill_Geo-21	127216
680-102370-33	SD-008-01	Total/NA	Solid	Fill_Geo-21	127216
LCS 160-128622/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-128622/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

Client Sample ID: SD-DUP-03
Lab Sample ID: 680-102370-1

Date Collected: 06/12/14 00:00
Matrix: Solid
Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127216	06/17/14 13:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			128227	06/23/14 15:01	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129268	07/01/14 12:32	MLK	TAL SL

Client Sample ID: SD-206-SS
Lab Sample ID: 680-102370-2

Date Collected: 06/12/14 08:10
Matrix: Solid
Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127216	06/17/14 13:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			128227	06/23/14 15:01	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129280	07/01/14 12:32	MLK	TAL SL

Client Sample ID: SD-206-01
Lab Sample ID: 680-102370-3

Date Collected: 06/12/14 08:15
Matrix: Solid
Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127216	06/17/14 13:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			128227	06/23/14 15:01	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129281	07/01/14 12:32	MLK	TAL SL

Client Sample ID: SD-206-02
Lab Sample ID: 680-102370-4

Date Collected: 06/12/14 08:20
Matrix: Solid
Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127216	06/17/14 13:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			128227	06/23/14 15:01	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129282	07/01/14 12:32	MLK	TAL SL

Client Sample ID: SD-005E-01
Lab Sample ID: 680-102370-6

Date Collected: 06/12/14 08:30
Matrix: Solid
Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127216	06/17/14 13:28	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			128622	06/25/14 12:41	JDP	TAL SL
Total/NA	Analysis	GA-01-R		1	131682	07/16/14 01:34	JLW	TAL SL

Client Sample ID: SD-215-SS
Lab Sample ID: 680-102370-7

Date Collected: 06/12/14 08:50
Matrix: Solid
Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127216	06/17/14 13:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			128227	06/23/14 15:01	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129283	07/01/14 12:32	MLK	TAL SL

Client Sample ID: SD-222-SS
Lab Sample ID: 680-102370-8

Date Collected: 06/12/14 09:05
Matrix: Solid
Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127216	06/17/14 13:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			128227	06/23/14 15:01	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129285	07/01/14 12:32	MLK	TAL SL

Client Sample ID: SD-222-01
Lab Sample ID: 680-102370-9

Date Collected: 06/12/14 09:10
Matrix: Solid
Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127216	06/17/14 13:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			128227	06/23/14 15:01	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129286	07/01/14 12:32	MLK	TAL SL

Client Sample ID: SD-222-02
Lab Sample ID: 680-102370-10

Date Collected: 06/12/14 09:15
Matrix: Solid
Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127216	06/17/14 13:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			128227	06/23/14 15:01	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129288	07/01/14 12:33	MLK	TAL SL

Client Sample ID: SD-222-03
Lab Sample ID: 680-102370-11

Date Collected: 06/12/14 19:20
Matrix: Solid
Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127216	06/17/14 13:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			128227	06/23/14 15:01	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129289	07/01/14 12:33	MLK	TAL SL

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102370-1
SDG: 680-102370-1

Client Sample ID: SD-211-SS
Lab Sample ID: 680-102370-12
Date Collected: 06/12/14 10:00
Matrix: Solid
Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127216	06/17/14 13:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			128227	06/23/14 15:01	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129290	07/01/14 12:33	MLK	TAL SL

Client Sample ID: SD-211-01
Lab Sample ID: 680-102370-13
Date Collected: 06/12/14 10:05
Matrix: Solid
Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127216	06/17/14 13:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			128227	06/23/14 15:01	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129291	07/01/14 12:33	MLK	TAL SL

Client Sample ID: SD-211-02
Lab Sample ID: 680-102370-14
Date Collected: 06/12/14 10:10
Matrix: Solid
Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127216	06/17/14 13:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			128227	06/23/14 15:01	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129292	07/01/14 12:33	MLK	TAL SL

Client Sample ID: SD-216-SS
Lab Sample ID: 680-102370-15
Date Collected: 06/12/14 10:20
Matrix: Solid
Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127216	06/17/14 13:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			128227	06/23/14 15:01	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129293	07/01/14 12:33	MLK	TAL SL

Client Sample ID: SD-216-01
Lab Sample ID: 680-102370-16
Date Collected: 06/12/14 10:25
Matrix: Solid
Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127216	06/17/14 13:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			128227	06/23/14 15:01	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129294	07/01/14 12:33	MLK	TAL SL

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102370-1
SDG: 680-102370-1

Client Sample ID: SD-216-02

Lab Sample ID: 680-102370-17

Date Collected: 06/12/14 10:30

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127216	06/17/14 13:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			128227	06/23/14 15:01	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129295	07/01/14 12:33	MLK	TAL SL

Client Sample ID: SD-217-SS

Lab Sample ID: 680-102370-18

Date Collected: 06/12/14 12:20

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127216	06/17/14 13:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			128227	06/23/14 15:01	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129296	07/01/14 12:33	MLK	TAL SL

Client Sample ID: SD-217-01

Lab Sample ID: 680-102370-19

Date Collected: 06/12/14 12:25

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127216	06/17/14 13:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			128227	06/23/14 15:01	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129297	07/01/14 12:33	MLK	TAL SL

Client Sample ID: SD-217-02

Lab Sample ID: 680-102370-20

Date Collected: 06/12/14 12:30

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127216	06/17/14 13:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			128227	06/23/14 15:01	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129299	07/01/14 12:33	MLK	TAL SL

Client Sample ID: SD-214-SS

Lab Sample ID: 680-102370-22

Date Collected: 06/12/14 13:10

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127216	06/17/14 13:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			128227	06/23/14 15:01	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129300	07/01/14 12:33	MLK	TAL SL

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102370-1
SDG: 680-102370-1

Client Sample ID: SD-214-01

Lab Sample ID: 680-102370-23

Date Collected: 06/12/14 13:15

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127216	06/17/14 13:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			128228	06/23/14 15:05	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129224	07/01/14 12:26	MLK	TAL SL

Client Sample ID: SD-212-SS

Lab Sample ID: 680-102370-24

Date Collected: 06/12/14 14:10

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127216	06/17/14 13:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			128228	06/23/14 15:05	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129287	07/01/14 12:26	MLK	TAL SL

Client Sample ID: SD-212-01

Lab Sample ID: 680-102370-25

Date Collected: 06/12/14 14:15

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127216	06/17/14 13:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			128228	06/23/14 15:05	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129298	07/01/14 12:26	MLK	TAL SL

Client Sample ID: SD-212-02

Lab Sample ID: 680-102370-26

Date Collected: 06/12/14 14:20

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127216	06/17/14 13:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			128228	06/23/14 15:05	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129309	07/01/14 12:26	MLK	TAL SL

Client Sample ID: SD-DUP-04

Lab Sample ID: 680-102370-28

Date Collected: 06/12/14 00:00

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127216	06/17/14 13:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			128228	06/23/14 15:05	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129320	07/01/14 12:26	MLK	TAL SL

Client Sample ID: SD-213-SS
Lab Sample ID: 680-102370-29

Date Collected: 06/12/14 14:30
Matrix: Solid
Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127216	06/17/14 13:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			128228	06/23/14 15:05	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129225	07/01/14 12:26	MLK	TAL SL

Client Sample ID: SD-213-01
Lab Sample ID: 680-102370-30

Date Collected: 06/12/14 14:35
Matrix: Solid
Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127216	06/17/14 13:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			128228	06/23/14 15:05	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129236	07/01/14 12:26	MLK	TAL SL

Client Sample ID: SD-213-02
Lab Sample ID: 680-102370-31

Date Collected: 06/12/14 14:40
Matrix: Solid
Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127216	06/17/14 13:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			128228	06/23/14 15:05	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129246	07/01/14 12:26	MLK	TAL SL

Client Sample ID: SD-008-01
Lab Sample ID: 680-102370-33

Date Collected: 06/12/14 14:50
Matrix: Solid
Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127216	06/17/14 13:28	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			128622	06/25/14 12:41	JDP	TAL SL
Total/NA	Analysis	GA-01-R		1	131968	07/16/14 01:35	JLW	TAL SL

Client Sample ID: SD-214-02
Lab Sample ID: 680-102370-34

Date Collected: 06/12/14 13:20
Matrix: Solid
Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127216	06/17/14 13:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			128228	06/23/14 15:05	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129257	07/01/14 12:26	MLK	TAL SL

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102370-1
SDG: 680-102370-1

Client Sample ID: SD-214-03
Date Collected: 06/12/14 13:25
Date Received: 06/13/14 09:30

Lab Sample ID: 680-102370-35
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127216	06/17/14 13:28	DRO	TAL SL
Total/NA	Prep	ExtChrom			128228	06/23/14 15:05	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129259	07/01/14 12:26	MLK	TAL SL

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Certification Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102370-1
SDG: 680-102370-1

Laboratory: TestAmerica Savannah

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Maryland	State Program	3	250	12-31-14

Laboratory: TestAmerica St. Louis

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska	State Program	10	MO00054	06-30-15
California	NELAP	9	09266CA	03-31-15
Connecticut	State Program	1	PH-0241	03-31-15
Florida	NELAP	4	E87689	06-30-14 *
Illinois	NELAP	5	200023	11-30-14
Iowa	State Program	7	373	12-01-14
Kansas	NELAP	7	E-10236	10-31-14
Kentucky (DW)	State Program	4	90125	12-31-14
L-A-B	DoD ELAP		L2305	01-10-16
Louisiana	NELAP	6	04080	06-30-15
Maryland	State Program	3	310	09-30-14 *
Missouri	State Program	7	780	06-30-14 *
Nevada	State Program	9	MO000542013-1	07-31-14 *
New Jersey	NELAP	2	MO002	06-30-15
New Mexico	State Program	6		06-30-10 *
New York	NELAP	2	11616	03-31-15
North Dakota	State Program	8	R207	06-30-14 *
NRC	NRC		24-24817-01	12-31-22
Oklahoma	State Program	6	2013-049	08-31-14 *
Pennsylvania	NELAP	3	68-00540	02-28-15
South Carolina	State Program	4	85002001	06-30-14 *
Texas	NELAP	6	T104704193-13-6	07-31-14 *
USDA	Federal		P330-07-00122	01-09-17
USEPA Reg V SDWA	Federal	1	WG-15J	08-30-14
Utah	NELAP	8	MO000542013-5	07-31-14 *
Virginia	NELAP	3	2236	06-14-14 *
Washington	State Program	10	C592	08-30-14
West Virginia DEP	State Program	3	381	08-30-14

* Certification renewal pending - certification considered valid.

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102370-1
SDG: 680-102370-1

Method	Method Description	Protocol	Laboratory
A-01-R	Isotopic Thorium (Alpha Spectrometry)	DOE	TAL SL
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102370-1
SDG: 680-102370-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-102370-1	SD-DUP-03	Solid	06/12/14 00:00	06/13/14 09:30
680-102370-2	SD-206-SS	Solid	06/12/14 08:10	06/13/14 09:30
680-102370-3	SD-206-01	Solid	06/12/14 08:15	06/13/14 09:30
680-102370-4	SD-206-02	Solid	06/12/14 08:20	06/13/14 09:30
680-102370-6	SD-005E-01	Solid	06/12/14 08:30	06/13/14 09:30
680-102370-7	SD-215-SS	Solid	06/12/14 08:50	06/13/14 09:30
680-102370-8	SD-222-SS	Solid	06/12/14 09:05	06/13/14 09:30
680-102370-9	SD-222-01	Solid	06/12/14 09:10	06/13/14 09:30
680-102370-10	SD-222-02	Solid	06/12/14 09:15	06/13/14 09:30
680-102370-11	SD-222-03	Solid	06/12/14 19:20	06/13/14 09:30
680-102370-12	SD-211-SS	Solid	06/12/14 10:00	06/13/14 09:30
680-102370-13	SD-211-01	Solid	06/12/14 10:05	06/13/14 09:30
680-102370-14	SD-211-02	Solid	06/12/14 10:10	06/13/14 09:30
680-102370-15	SD-216-SS	Solid	06/12/14 10:20	06/13/14 09:30
680-102370-16	SD-216-01	Solid	06/12/14 10:25	06/13/14 09:30
680-102370-17	SD-216-02	Solid	06/12/14 10:30	06/13/14 09:30
680-102370-18	SD-217-SS	Solid	06/12/14 12:20	06/13/14 09:30
680-102370-19	SD-217-01	Solid	06/12/14 12:25	06/13/14 09:30
680-102370-20	SD-217-02	Solid	06/12/14 12:30	06/13/14 09:30
680-102370-22	SD-214-SS	Solid	06/12/14 13:10	06/13/14 09:30
680-102370-23	SD-214-01	Solid	06/12/14 13:15	06/13/14 09:30
680-102370-24	SD-212-SS	Solid	06/12/14 14:10	06/13/14 09:30
680-102370-25	SD-212-01	Solid	06/12/14 14:15	06/13/14 09:30
680-102370-26	SD-212-02	Solid	06/12/14 14:20	06/13/14 09:30
680-102370-28	SD-DUP-04	Solid	06/12/14 00:00	06/13/14 09:30
680-102370-29	SD-213-SS	Solid	06/12/14 14:30	06/13/14 09:30
680-102370-30	SD-213-01	Solid	06/12/14 14:35	06/13/14 09:30
680-102370-31	SD-213-02	Solid	06/12/14 14:40	06/13/14 09:30
680-102370-33	SD-008-01	Solid	06/12/14 14:50	06/13/14 09:30
680-102370-34	SD-214-02	Solid	06/12/14 13:20	06/13/14 09:30
680-102370-35	SD-214-03	Solid	06/12/14 13:25	06/13/14 09:30

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102370-1

SDG No.: 680-102370-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
82232-334_00001	06/03/60		Eckert & Ziegler, Lot 82232-334		(Purchased Reagent)		Americium-241	7.281 Bq
							Pu-239	7.137 Bq
							Thorium-230	7.63 Bq
82233-334_00001	06/03/60		Eckert & Zigler, Lot 82233-334		(Purchased Reagent)		Americium-241	5.114 Bq
							Pu-239	6.064 Bq
							Thorium-230	4.95 Bq
82234-334_00001	06/02/60		Eckert & Zigler, Lot 82234-334		(Purchased Reagent)		Americium-241	5.652 Bq
							Pu-239	5.936 Bq
							Thorium-230	5.685 Bq
82235-334_00001	06/04/60		Eckert & Ziegler, Lot 82235-334		(Purchased Reagent)		Americium-241	7.466 Bq
							Pu-239	6.897 Bq
							Thorium-230	7.167 Bq
82236-334_00001	06/02/60		Eckert & Ziegler, Lot 82236-334		(Purchased Reagent)		Americium-241	6.891 Bq
							Pu-239	6.664 Bq
							Thorium-230	7.107 Bq
82237-334_00003	06/01/60		Eckert & Ziegler, Lot 82237-334		(Purchased Reagent)		Americium-241	5.608 Bq
							Pu-239	6.424 Bq
							Thorium-230	5.856 Bq
82240-334_00001	06/08/60		Eckert & Ziegler, Lot 82240-334		(Purchased Reagent)		Americium-241	8.298 Bq
							Pu-239	7.163 Bq
							Thorium-230	6.304 Bq
82241-334_00001	06/08/60		Eckert & Ziegler, Lot 82241-334		(Purchased Reagent)		Americium-241	6.638 Bq
							Pu-239	6.797 Bq
							Thorium-230	6.629 Bq
82242-334_00001	06/08/60		Eckert & Ziegler, Lot 82242-334		(Purchased Reagent)		Americium-241	7.145 Bq
							Pu-239	6.414 Bq
							Thorium-230	6.583 Bq
82243-334_00001	06/09/60		Eckert & Ziegler, Lot 82243-334		(Purchased Reagent)		Americium-241	6.39 Bq
							Pu-239	5.979 Bq
							Thorium-230	5.856 Bq
82244-334_00001	06/09/60		Eckert & Zigler, Lot 82244-334		(Purchased Reagent)		Americium-241	6.897 Bq
							Pu-239	6.717 Bq
							Thorium-230	7.352 Bq
82245-334_00001	06/09/60		Eckert & Ziegler, Lot 82245-334		(Purchased Reagent)		Americium-241	5.528 Bq
							Pu-239	5.437 Bq
							Thorium-230	6.727 Bq
82246-334_00001	06/09/60		Eckert & Ziegler, Lot 82246-334		(Purchased Reagent)		Americium-241	6.002 Bq
							Pu-239	5.353 Bq
							Thorium-230	5.57 Bq
82247-334_00001	06/10/60		Eckert & Ziegler, Lot 82247-334		(Purchased Reagent)		Americium-241	6.291 Bq
							Pu-239	5.746 Bq
							Thorium-230	6.251 Bq
Source D_00001	04/01/59	02/23/11	water, Lot 79670-334	0.9781 g	Gamma Ampuole_00001	0.9781 g	Americium-241	9442.9 Bq

Lab Name: TestAmerica St. Louis Job No.: 680-102370-1

SDG No.: 680-102370-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
.Gamma Ampuole_00001	04/07/59		Analytics, Lot 79670-334		(Purchased Reagent)		Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
Source E_00001	04/01/59	02/23/11	water, Lot 79670-334	1.0205 g	Gamma Ampuole_00001	1.0205 g	Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
.Gamma Ampuole_00001	04/07/59		Analytics, Lot 79670-334		(Purchased Reagent)		Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
Source F_00001	01/01/61	02/23/11	water, Lot 83725-334	10 mL	Gamma Ampuole_00003	2.0327 mL	Americium-241	1846.42 Bq
							Cd-109	26819.3 Bq
							Ce-139	890.424 Bq
							Cesium-137	743.562 Bq
							Co-57	580.6 Bq
							Cobalt-60	1222.38 Bq
							Hg-203	1926.02 Bq
							Sn-113	1576.93 Bq
							Y-88	2572.87 Bq
.Gamma Ampuole_00003	01/19/61		Analytics, Lot 83725-334		(Purchased Reagent)		Americium-241	9083.6 Bq
							Cd-109	131939 Bq

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102370-1

SDG No.: 680-102370-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Ce-139	4380.5 Bq
							Cesium-137	3658 Bq
							Co-57	2856.3 Bq
							Cobalt-60	6013.6 Bq
							Hg-203	9475.2 Bq
							Sn-113	7757.8 Bq
							Y-88	12657.4 Bq
Th-229_00012	12/26/14	12/23/13	0.1M HNO3, Lot L0022	500 mL	Th-229_00004	15 mL	Thorium-229	67.9293 dpm/mL
.Th-229_00004	07/14/60	01/26/11	0.1M HNO3, Lot 0	100 mL	Th-229_00002	5.0613 g	Thorium-229	2264.31 dpm/mL
..Th-229_00002	07/14/60	Eckert & Ziegler, Lot 82832-334			(Purchased Reagent)		Thorium-229	745.63 Bq/g
Th-230_00023	01/28/15	02/04/13	1M HNO3, Lot 0	200 mL	Th-230_00006	4 mL	Thorium-230	47.9403 dpm/mL
.Th-230_00006	04/11/61	06/24/11	1M HNO3, Lot 0	100 mL	Th-230_00002	5.0878 g	Thorium-230	2397.01 dpm/mL
..Th-230_00002	04/11/61	Eckert & Ziegler, Lot 84460-334			(Purchased Reagent)		Thorium-230	785.217 Bq/g
TRM-2_00001	03/20/50	DOE, Lot TRM-2			(Purchased Reagent)		Pb-210	22.1 pCi/g
							Radium-226	25.4 pCi/g
							Thorium-230	24.5 pCi/g
							U-234	6.2 pCi/g
							Uranium-238	6 pCi/g
Tuna Can LCS_00002	01/22/14	Analytics, Lot 74139-334			(Purchased Reagent)		Americium-241	219 dpm/g
							Cesium-137	82.3 dpm/g
							Cobalt-60	136 dpm/g
Tuna Can LCS_00003	10/31/14	Analytics, Lot 74139-334			(Purchased Reagent)		Americium-241	219 dpm/g
							Cesium-137	82.3 dpm/g
							Cobalt-60	136 dpm/g
Tuna Can_00002	02/03/15	Eckert & Ziegler, Lot 81427-334			(Purchased Reagent)		Americium-241	1164 Bq
							Cd-109	16063 Bq
							Ce-139	546 Bq
							Cesium-137	465 Bq
							Co-57	357 Bq
							Cobalt-60	742 Bq
							Hg-203	1208 Bq
							Pb-210	15186 Bq
							Sn-113	943 Bq
							Y-88	1571 Bq
Tuna Can_00003	02/09/17	Eckert & Ziegler, Lot 90099			(Purchased Reagent)		Americium-241	1164 Bq
							Cd-109	16373 Bq
							Ce-139	549 Bq
							Cesium-137	467 Bq
							Co-57	362 Bq
							Cobalt-60	735 Bq
							Hg-203	1171 Bq
							Pb-210	14936 Bq

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102370-1

SDG No.: 680-102370-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Sn-113	967 Bq
							Y-88	1590 Bq
Tuna Can_00006	03/01/16	Eckert & Ziegler, Lot 83814-334			(Purchased Reagent)		Americium-241	1195 Bq
							Cd-109	16353 Bq
							Ce-139	543 Bq
							Cesium-137	453 Bq
							Co-57	354 Bq
							Cobalt-60	745 Bq
							Hg-203	1175 Bq
							Pb-210	14606 Bq
							Sn-113	961 Bq
							Y-88	1568 Bq

Reagent

82232-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82232-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 3-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	7.630E+00	4420-4800	7.540E+04	0.7	1.1	2.6
Pu-239	7.137E+00	4950-5240	2.410E+04	0.7	1.1	2.6
Am-241	7.281E+00	5280-5600	4.326E+02	0.7	1.1	2.6
Total Activity	2.210E+01	3000-8000		0.4	1.1	2.3

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82233-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82233-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 3-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	4.950E+00	4420-4800	7.540E+04	0.8	1.1	2.7
Pu-239	6.064E+00	4950-5240	2.410E+04	0.7	1.1	2.6
Am-241	5.114E+00	5280-5600	4.326E+02	0.8	1.1	2.7
Total Activity	1.616E+01	3000-8000		0.1	1.1	2.2

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82234-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82234-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 2-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	5.685E+00	4420-4800	7.540E+04	0.9	1.1	2.8
Pu-239	5.936E+00	4950-5240	2.410E+04	0.9	1.1	2.8
Am-241	5.652E+00	5280-5600	4.326E+02	0.9	1.1	2.8
Total Activity	1.732E+01	3000-8000		0.5	1.1	2.4

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82235-334_00001

Eckert & Ziegler
Analytics

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www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82235-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 4-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	7.167E+00	4420-4800	7.540E+04	0.8	1.1	2.7
Pu-239	6.897E+00	4950-5240	2.410E+04	0.8	1.1	2.7
Am-241	7.466E+00	5280-5600	4.326E+02	0.8	1.1	2.7
Total Activity	2.161E+01	3000-8000		0.5	1.1	2.4

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1958

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82236-334_00001

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Analytics

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www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82236-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 2-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	7.107E+00	4420-4800	7.540E+04	0.7	1.1	2.6
Pu-239	6.664E+00	4950-5240	2.410E+04	0.8	1.1	2.7
Am-241	6.891E+00	5280-5600	4.326E+02	0.7	1.1	2.6
Total Activity	2.071E+01	3000-8000		0.4	1.1	2.3

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.46 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82237-334_00003

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Analytics

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CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82237-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 1-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	5.856E+00	4420-4800	7.540E+04	1.0	1.1	3.0
Pu-239	6.424E+00	4950-5240	2.410E+04	0.9	1.1	2.8
Am-241	5.608E+00	5280-5600	4.326E+02	1.0	1.1	3.0
Total Activity	1.793E+01	3000-8000		0.6	1.1	2.5

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1958

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82240-334_00001

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www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82240-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 8-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	6.304E+00	4420-4800	7.540E+04	0.9	1.1	2.8
Pu-239	7.163E+00	4950-5240	2.410E+04	0.8	1.1	2.7
Am-241	8.298E+00	5280-5600	4.326E+02	0.8	1.1	2.7
Total Activity	2.182E+01	3000-8000		0.5	1.1	2.4

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82241-334_00001

Eckert & Ziegler
Analytics

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Atlanta, Georgia 30318
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www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82241-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 8-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	6.629E+00	4420-4800	7.540E+04	0.8	1.1	2.7
Pu-239	6.797E+00	4950-5240	2.410E+04	0.8	1.1	2.7
Am-241	6.638E+00	5280-5600	4.326E+02	0.8	1.1	2.7
Total Activity	2.011E+01	3000-8000		0.4	1.1	2.3

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82242-334_00001

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Analytics

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www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82242-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 8-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	6.583E+00	4420-4800	7.540E+04	0.9	1.1	2.8
Pu-239	6.414E+00	4950-5240	2.410E+04	0.9	1.1	2.8
Am-241	7.145E+00	5280-5600	4.326E+02	0.9	1.1	2.8
Total Activity	2.018E+01	3000-8000		0.6	1.1	2.5

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY
HEALTH PHYSICS SOCIETY
FOUNDED 1958

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82243-334_00001

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CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82243-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 9-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	5.856E+00	4420-4800	7.540E+04	0.8	1.1	2.7
Pu-239	5.979E+00	4950-5240	2.410E+04	0.8	1.1	2.7
Am-241	6.390E+00	5280-5600	4.326E+02	0.8	1.1	2.7
Total Activity	1.827E+01	3000-8000		0.3	1.1	2.3

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY
HEALTH PHYSICS SOCIETY
FOUNDED 1966

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82244-334_00001

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Analytics

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www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82244-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 9-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	7.352E+00	4420-4800	7.540E+04	0.8	1.1	2.7
Pu-239	6.717E+00	4950-5240	2.410E+04	0.9	1.1	2.8
Am-241	6.897E+00	5280-5600	4.326E+02	0.9	1.1	2.8
Total Activity	2.101E+01	3000-8000		0.6	1.1	2.5

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY
HEALTH PHYSICS SOCIETY
FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82245-334_00001

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www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82245-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 9-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	6.727E+00	4420-4800	7.540E+04	1.0	1.1	3.0
Pu-239	5.437E+00	4950-5240	2.410E+04	1.1	1.1	3.1
Am-241	5.528E+00	5280-5600	4.326E+02	1.1	1.1	3.1
Total Activity	1.773E+01	3000-8000		0.8	1.1	2.7

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82246-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82246-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 9-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	5.570E+00	4420-4800	7.540E+04	1.0	1.1	3.0
Pu-239	5.353E+00	4950-5240	2.410E+04	1.0	1.1	3.0
Am-241	6.002E+00	5280-5600	4.326E+02	1.0	1.1	3.0
Total Activity	1.696E+01	3000-8000		0.7	1.1	2.6

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY
HEALTH PHYSICS SOCIETY
FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06.24.2010
E. A. Taskaev, QA Manager Alternate

Reagent

82247-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82247-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 10-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	6.251E+00	4420-4800	7.540E+04	0.9	1.1	2.8
Pu-239	5.746E+00	4950-5240	2.410E+04	0.9	1.1	2.8
Am-241	6.291E+00	5280-5600	4.326E+02	0.9	1.1	2.8
Total Activity	1.832E+01	3000-8000		0.6	1.1	2.5

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY
HEALTH PHYSICS SOCIETY
FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

Gamma Ampuole_00001

Eckert & Ziegler
Analytics

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Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

Customer: TestAmerica St. Louis
P.O. No.: 2303925, Item 1
Calibration Date: 01-Apr-2009 12:00 EST **Grams of Master Source:** 0.028371

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	157860	———	3.390E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	462.60	1.691E+05	4.798E+03	0.4	1.7	3.5	HPGe
Co-57	122.1	271.79	8.904E+04	2.526E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	137.6	1.256E+05	3.563E+03	0.4	1.1	2.3	HPGe
Hg-203	279.2	46.61	2.788E+05	7.910E+03	0.3	1.1	2.3	HPGe
Sn-113	391.7	115.1	1.725E+05	4.894E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	10983	1.120E+05	3.178E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	106.6	4.205E+05	1.193E+04	0.8	1.1	2.7	HPGe
Co-60	1173.2	1925.4	2.184E+05	6.196E+03	0.7	1.1	2.6	HPGe
Co-60	1332.5	1925.4	2.185E+05	6.199E+03	0.7	1.1	2.6	HPGe
Y-88	1836.1	106.6	4.444E+05	1.261E+04	0.7	1.1	2.6	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
5.31740 grams 4M HCl solution with approximately 30 microg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the calibration date.

Source Prepared by: for
W. Mao, Radiochemist

QA Approved: Date: 5-13-09
D. M. Montgomery, QA Manager

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Gamma Ampuole_00003

Eckert & Ziegler
Analytics

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Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

83725-334

5 mL Liquid in Flame Sealed Vial

Customer: Test America St. Louis/Earth City, MO
P.O. No.: 2397508, Item 1
Reference Date: 01-Jan-2011 12:00 PM EST **Grams of Master Source:** 0.028066

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	1.580E+05	———	3.261E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	4.626E+02	1.697E+05	4.763E+03	0.8	1.7	3.8	HPGe
Co-57	122.1	2.718E+02	8.711E+04	2.445E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	1.376E+02	1.247E+05	3.500E+03	0.5	1.1	2.4	HPGe
Hg-203	279.2	4.661E+01	2.753E+05	7.727E+03	0.4	1.1	2.3	HPGe
Sn-113	391.7	1.151E+02	1.769E+05	4.965E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	1.098E+04	1.109E+05	3.113E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	1.066E+02	4.224E+05	1.186E+04	0.5	1.1	2.4	HPGe
Co-60	1173.2	1.925E+03	2.142E+05	6.012E+03	0.6	1.1	2.5	HPGe
Co-60	1332.5	1.925E+03	2.143E+05	6.015E+03	0.6	1.1	2.5	HPGe
Y-88	1836.1	1.066E+02	4.472E+05	1.255E+04	0.5	1.1	2.4	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Comments:
5.30203 grams 4M HCl solution with approximately 30 µg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the reference date.

Source Prepared by: M I Taskaeva
M. I. Taskaeva, Radiochemist

QA Approved: _____ Date: 13 JAN 11
J. D. McCorvey, QA Manager Alternate

Reagent

Source D_00001

Eckert & Ziegler
Analytics

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Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

Customer: TestAmerica St. Louis
P.O. No.: 2303925, Item 1
Calibration Date: 01-Apr-2009 12:00 EST **Grams of Master Source:** 0.028371

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	157860	———	3.390E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	462.60	1.691E+05	4.798E+03	0.4	1.7	3.5	HPGe
Co-57	122.1	271.79	8.904E+04	2.526E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	137.6	1.256E+05	3.563E+03	0.4	1.1	2.3	HPGe
Hg-203	279.2	46.61	2.788E+05	7.910E+03	0.3	1.1	2.3	HPGe
Sn-113	391.7	115.1	1.725E+05	4.894E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	10983	1.120E+05	3.178E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	106.6	4.205E+05	1.193E+04	0.8	1.1	2.7	HPGe
Co-60	1173.2	1925.4	2.184E+05	6.196E+03	0.7	1.1	2.6	HPGe
Co-60	1332.5	1925.4	2.185E+05	6.199E+03	0.7	1.1	2.6	HPGe
Y-88	1836.1	106.6	4.444E+05	1.261E+04	0.7	1.1	2.6	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
5.31740 grams 4M HCl solution with approximately 30 microg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the calibration date.

Source Prepared by: _____ for
W. Mao, Radiochemist

QA Approved: _____ Date: 5-13-09
D. M. Montgomery, QA Manager

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Source E_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

Customer: TestAmerica St. Louis
P.O. No.: 2303925, Item 1
Calibration Date: 01-Apr-2009 12:00 EST **Grams of Master Source:** 0.028371

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	157860	———	3.390E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	462.60	1.691E+05	4.798E+03	0.4	1.7	3.5	HPGe
Co-57	122.1	271.79	8.904E+04	2.526E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	137.6	1.256E+05	3.563E+03	0.4	1.1	2.3	HPGe
Hg-203	279.2	46.61	2.788E+05	7.910E+03	0.3	1.1	2.3	HPGe
Sn-113	391.7	115.1	1.725E+05	4.894E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	10983	1.120E+05	3.178E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	106.6	4.205E+05	1.193E+04	0.8	1.1	2.7	HPGe
Co-60	1173.2	1925.4	2.184E+05	6.196E+03	0.7	1.1	2.6	HPGe
Co-60	1332.5	1925.4	2.185E+05	6.199E+03	0.7	1.1	2.6	HPGe
Y-88	1836.1	106.6	4.444E+05	1.261E+04	0.7	1.1	2.6	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
5.31740 grams 4M HCl solution with approximately 30 microg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the calibration date.

Source Prepared by: _____ for
W. Mao, Radiochemist

QA Approved: _____ Date: 5-13-09
D. M. Montgomery, QA Manager

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Source F_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

83725-334

5 mL Liquid in Flame Sealed Vial

Customer: Test America St. Louis/Earth City, MO
P.O. No.: 2397508, Item 1
Reference Date: 01-Jan-2011 12:00 PM EST **Grams of Master Source:** 0.028066

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	1.580E+05	———	3.261E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	4.626E+02	1.697E+05	4.763E+03	0.8	1.7	3.8	HPGe
Co-57	122.1	2.718E+02	8.711E+04	2.445E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	1.376E+02	1.247E+05	3.500E+03	0.5	1.1	2.4	HPGe
Hg-203	279.2	4.661E+01	2.753E+05	7.727E+03	0.4	1.1	2.3	HPGe
Sn-113	391.7	1.151E+02	1.769E+05	4.965E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	1.098E+04	1.109E+05	3.113E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	1.066E+02	4.224E+05	1.186E+04	0.5	1.1	2.4	HPGe
Co-60	1173.2	1.925E+03	2.142E+05	6.012E+03	0.6	1.1	2.5	HPGe
Co-60	1332.5	1.925E+03	2.143E+05	6.015E+03	0.6	1.1	2.5	HPGe
Y-88	1836.1	1.066E+02	4.472E+05	1.255E+04	0.5	1.1	2.4	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Comments:
5.30203 grams 4M HCl solution with approximately 30 µg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the reference date.

Source Prepared by: MTaskaeva
M. I. Taskaeva, Radiochemist

QA Approved: _____ Date: 13 JAN 11
J. D. McCorvey, QA Manager Alternate

Reagent

Th-229_00002

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82832-334

5 mL Liquid in Flame Sealed Vial

Customer: Test America/Earth City, MO
P.O. No.: 2370431, Item 1

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty*, % Type u_A	u_B	U	Reference Date (12:00 PM EST)
Th-229	2.681E+06	3.813E+03	0.3	1.0	2.1	07/14/2010

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: Th-228 - 1.25 Bq, Th-230 - 23.7 Bq, Th-232 - 1.5 Bq. 5.11380 grams 0.5M HNO3 solution.

Source Prepared by: _____
W. Mao, Radiochemist

QA Approved: _____ Date: 7/21/10
J. D. McCorvey, QA Manager Alternate

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1956

ANA Form005 Rev. —

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Th-229_00012

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Th-229-00012

Reagent ID: Th-229_00012

Description:	Th-229 Tracer	Expiration Date:	12/26/2014
No. of Bottles:	1	Laboratory:	TestAmerica St. Louis
Storage Location:	RAD Actinide STDs	Prepared By:	Bramblett, Megan L
Reagent Volume:	500.000 mL	Solvent:	0.1M HNO3
Creation Date:	12/23/2013	Solvent Lot:	L0022
Container(s):	282329		
Comment:			

282329
ID: Th-229_00012
Exp: 12/26/14 Prpd: MLM Crt: 12/23/13
Th-229 Tracer

Reagent Analyte Information

Analyte	Source ID	Source Exp. Date	Source Conc.	Source Conc. Units	Final Conc.	Final Conc. Units
Th-229	Th-229_00004	07/14/2060	2264.31000	dpm/mL	67.92931	dpm/mL

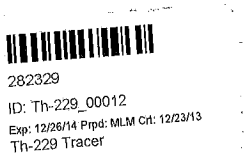
Source Reagents

Reagent	Description	Type	Expiration	Vendor	Vendor Lot #	Vendor Cat Lot #	Volume Used	Volume Units
Th-229_00004	Th-229 Parent		07/14/60				15.00000	mL

St. Louis Radiological Standard Reverification Form

Standard ID Number: Th-229_00012
True Value = 67.90686 DPM/L or g
Date Analyzed: 12/26/2013

Radionuclide: Th-229



Replicates

#1	69.113	DPM/L or g
#2	66.755	DPM/L or g
#3	68.034	DPM/L or g

Mean = 67.96733

1 sigma = 1.180413

1.96 sigma = 2.313609

True Value minus 5% = 64.51152 (True Value - 5%)
True Value plus 5% = 71.3022 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? Yes **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? Yes **(Acceptance Criteria)**

Standard Reverification Acceptable? Yes

Note: Criteria for reverification of radiological standards is taken from the DOE QSAS and LANL Statements of Work

Reviewed By/Date: RTM 12/30/2013

SOP Reference: STL-QA-0002, Current Revision

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:30:35AM 12/30/2013

Sample

Sample Name: Verification-1
SampleType: Sample
Sample Collection Date:

Spectrum #1 Analysis #1
Sample Volume : 0.1000mL
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: Th-229_0012
AnalysisID: 592567

Analyst: 60040

Tracer

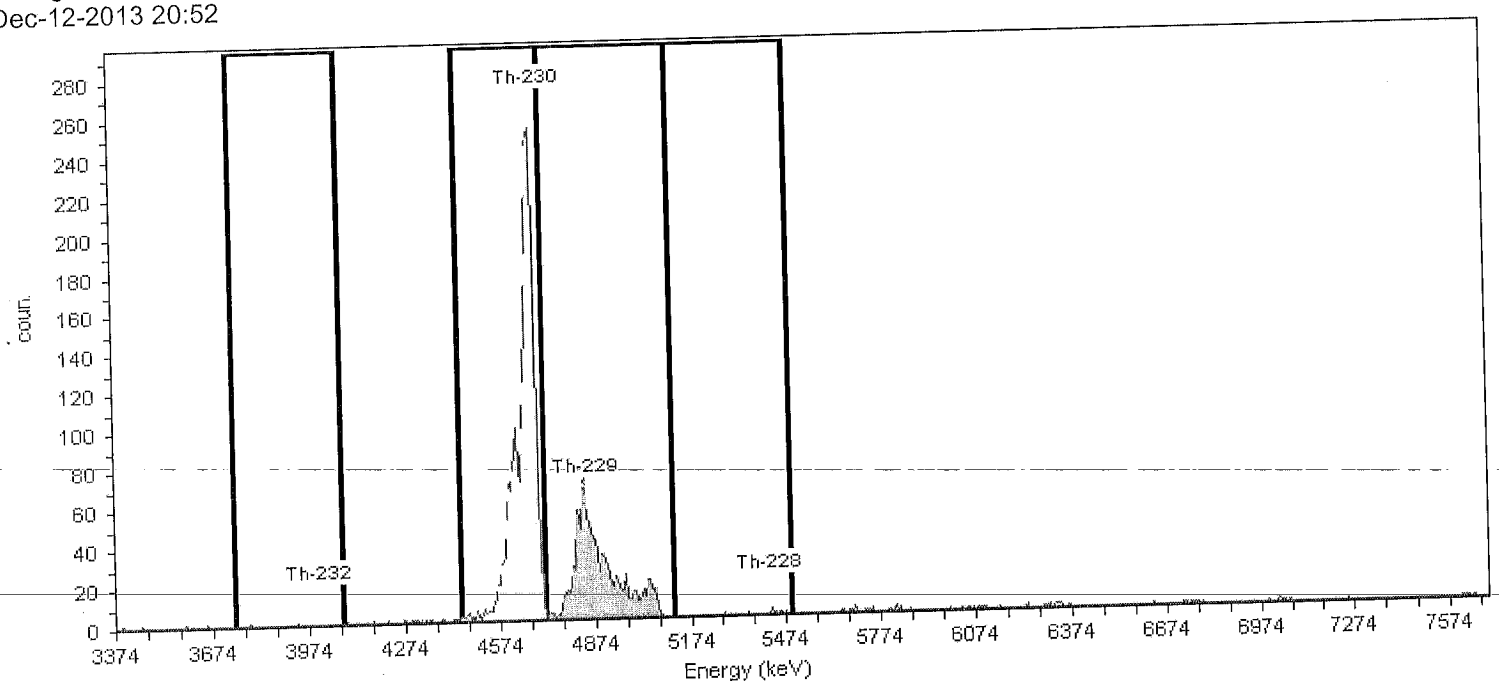
Tracer Name: Th-230_00017
Tracer Activity: 47.94 DPM/mL x (Vol.)0.30 mL = 14.38 DPM
Tracer Ref. Date: 4/11/2011 11:00:10AM

Tracer Nuclide: Th-230
Tracer Recovery: 90.73%

Acquisition

Detector: AV44
Serial Number: 50-051JJ1
Acquisition Start Date: 12/26/2013 4:26:11PM
Live Time: 600.00 min.
Real Time: 600.01 min.
Background Date: 12/12/2013 8:52:36PM
Background Info: Sample: ICB;AV44; Det: AV44; Spectrum #1; Dec-12-2013 20:52

Calibration Name: IC-9795;AV44-20130515
Calibration Date: 5/15/2013 9:25:41PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.64% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th-230_Tracer
Decay Correction: 12/26/2013 4:24:41PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	61.6	100.2	2	0.6250	1.38	0.095	DPM/mL
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	31.6	99.7	2079	0.0000	2079.38	130.481	DPM/mL
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	84.3	99.8	1004	3.7500	1000.25	69.113	DPM/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	36.0	99.8	8	7.5000	0.50	0.035	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:31:26AM 12/30/2013

Sample

Sample Name: Verification-2
SampleType: Sample
:
Sample Collection Date:

Spectrum #1 Analysis #1
Sample Volume : 0.1000mL
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: Th-229_0012
AnalysisID: 592570

Analyst: 60040

Tracer

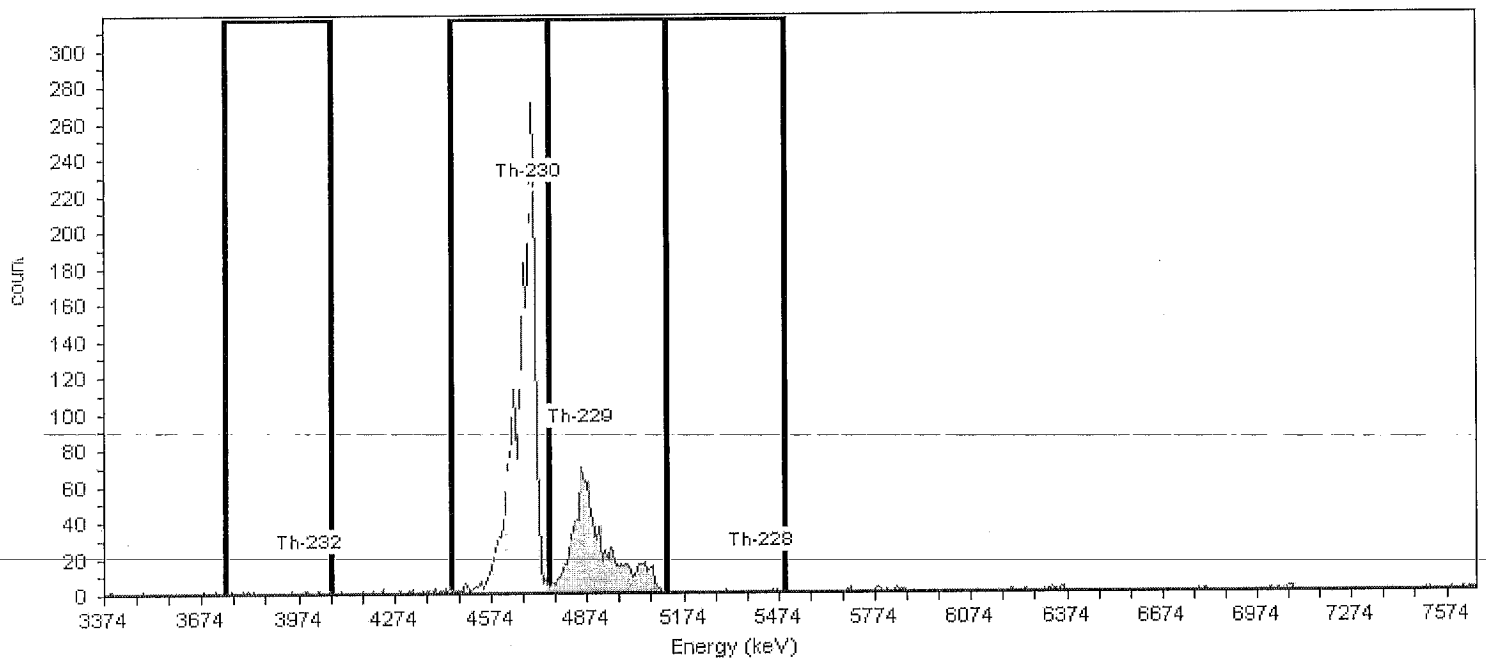
Tracer Name: Th-230_00017
Tracer Activity: 47.94 DPM/mL x (Vol.)0.30 mL = 14.38 DPM
Tracer Ref. Date: 4/11/2011 11:00:10AM

Tracer Nuclide: Th-230
Tracer Recovery: 95.22%

Acquisition

Detector: AV45
Serial Number: 48-158FF2
Acquisition Start Date: 12/26/2013 4:26:13PM
Live Time: 600.00 min.
Real Time: 600.01 min.
Background Date: 12/12/2013 8:52:38PM
Background Info: Sample: ICB;AV45; Det: AV45; Spectrum #1; Dec-12-2013 20:52

Calibration Name: IC-9817;AV45-20130515
Calibration Date: 5/15/2013 9:25:55PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.68% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th-230_Tracer
Decay Correction: 12/26/2013 4:24:41PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	37.3	100.2	7	0.0000	7.46	0.488	DPM/mL
Th-230	4688.0	4,687.5	0.5	4448.3	4754.1	64.3	99.7	2186	0.6250	2185.38	136.944	DPM/mL
Th-229	4848.0	4,845.3	2.7	4754.1	5119.5	79.8	99.8	1016	0.6250	1015.38	66.755	DPM/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	24.9	99.8	3	5.6250	-2.63	-0.173	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:32:04AM 12/30/2013

Sample

Sample Name: Verification-3
SampleType: Sample
:
Sample Collection Date:

Spectrum #1 Analysis #1
Sample Volume : 0.1000mL
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: Th-229_0012
AnalysisID: 592571

Analyst: 60040

Tracer

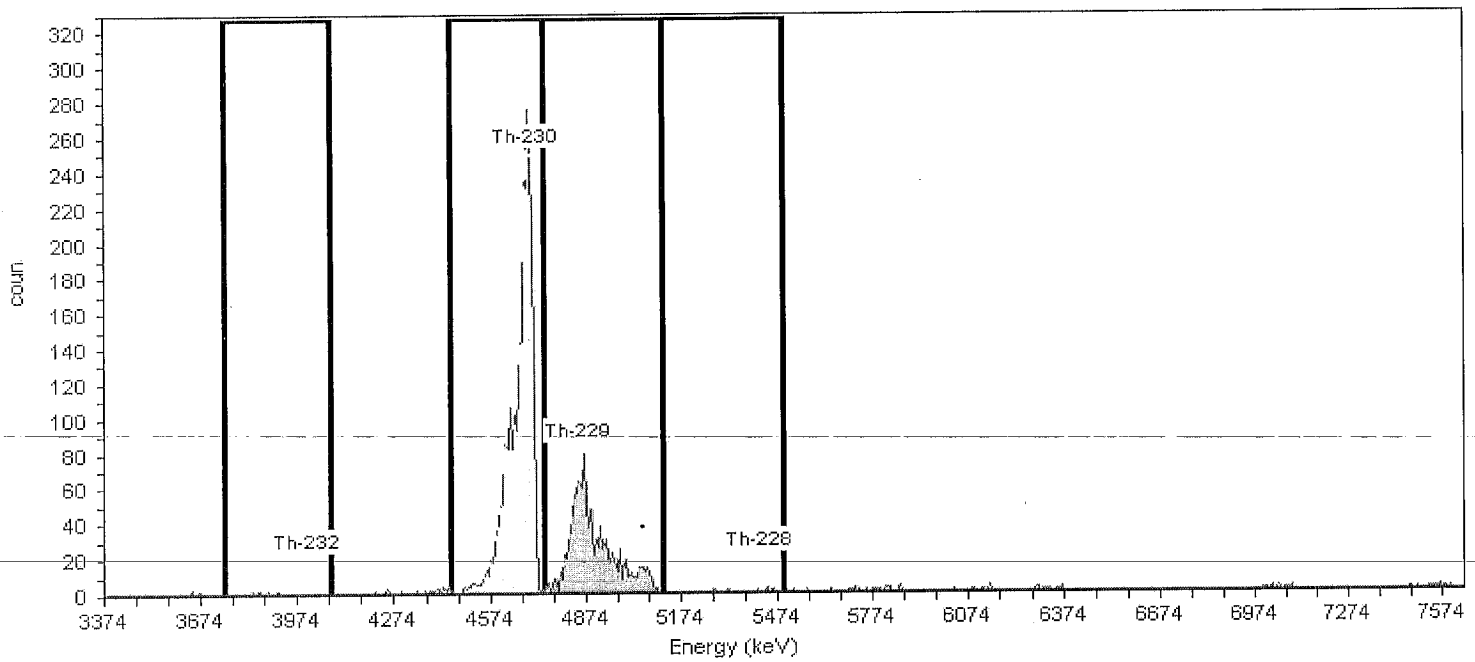
Tracer Name: Th-230_00017
Tracer Activity: 47.94 DPM/mL x (Vol.)0.30 mL = 14.38 DPM
Tracer Ref. Date: 4/11/2011 11:00:10AM

Tracer Nuclide: Th-230
Tracer Recovery: 93.94%

Acquisition

Detector: AV46
Serial Number: 49-202GG2
Acquisition Start Date: 12/26/2013 4:26:15PM
Live Time: 600.00 min.
Real Time: 600.01 min.
Background Date: 12/12/2013 8:52:40PM
Background Info: Sample: ICB;AV46; Det: AV46; Spectrum #1; Dec-12-2013 20:52

Calibration Name: IC-9884;AV46-20130515a
Calibration Date: 5/16/2013 12:12:59AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 27.46% +/- 0.39% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th-230_Tracer
Decay Correction: 12/26/2013 4:24:41PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	95.0	100.2	5	0.6250	4.38	0.282	DPM/mL
Th-230	4688.0	4,687.5	0.5	4448.3	4739.1	36.4	99.7	2219	0.0000	2219.00	135.103	DPM/mL
Th-229	4848.0	4,845.3	2.7	4739.1	5119.5	78.0	99.8	1052	1.2500	1050.75	68.034	DPM/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	15.7	99.8	7	4.3750	2.63	0.170	DPM/mL

Decay Correction

Thorium-229								
Initial Activity:	67.929	dpm						
Reference Date:	7/14/2010							
Current Date:	12/26/2013		(or date at which you wish to determine activity)					
Elapsed Time:	1261	days						
Half Life:	2680935	days	64342440					
Exponential Term:	0.999674026							
Corrected Activity:	67.90685689	dpm	30.58867427	pCi				

Lm 12/30/13

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Actinide Prep

Batch No. : —

Balance ID : —

Note: If a section below is not used, marked the N/A box and initial & date next to the N/A. i.e. Mark the N/A box if a tracer is not added to the sample(s) then initial and date next to the N/A

No.	Sample Number	Aliquot (g / mL)	MS	Initials
44 1	Verification 1	0.1		
45 2	1 2 3	1		
46 3	1 2 3	1		
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				

Tracer ☐ N/A

Initials / Date

Isotope : Th-230

Std Sol'n No. : Th-230.00017

Vol (mL) : 0.3

Ref Activity (dpm/mL) : 47.94 dpm/mL

Act Ref Date : 4-11-11

Samples Spiked and Traced By: MB 12/23/13 (Initials / Date)

Verification Signature & Date: [signature] 12/23/13 (Initials / Date)

LCS Standard ☐ N/A

Initials / Date

Isotope : Th-229

Std Sol'n ID. : Th-229-00012

Vol (mL) : 0.1

Ref Activity (dpm/mL) : 47.929 dpm/mL — corrected activity 67.9086

Act Ref Date : 7-14-10

SOP's applied in preparing these samples. Mark box to left for all that apply:

☐	ST-RC-0003 Rev.	☐	ST-RC-0040 Rev.	☐	ST-RC-0110 Rev.
☐	ST-RC-0004 Rev.	☐	ST-RC-0041 Rev.	☐	ST-RC-0120 Rev.
☐	ST-RC-0014 Rev.	☐	ST-RC-0050 Rev.	☐	ST-RC-0232 Rev.
☐	ST-RC-0020 Rev.	☐	ST-RC-0090 Rev.	☐	ST-RC-0238 Rev.
☐	ST-RC-0021 Rev.	☑	ST-RC-0100 Rev.	☐	ST-RC-0240 Rev.
				☐	ST-RC-0241 Rev.
				☑	ST-RC-0242 Rev.
				☐	ST-RC-5016 Rev.
				☐	
				☐	

Isotope(s)

αβ ☐	Iso Pu ☐	Tc-99 ☐	Iso Cm ☐
Iso Am ☐	Ra ☐	Iso Th ☑	Pu-241 ☐
KPA ☐	Sr ☐	Iso U ☐	Th-229 ☐
Np ☐	TAR ☐	C-14 ☑	Cl-36 ☐

Count Time		Matrix	
Long Count	☐	Soil	☐
Short Count	☐	H_2O	☐

Prepared By : MB

Date : 12/23/13

Reviewed by: _____

Date: _____

Sequential Thorium, Plutonium and Uranium via TEVA/UTEVA ST-RC-0242

Batch: Th229 Verification

All rinses should flow at 1 mL/minute (only 3M HNO_3 may be done at 3 mL/minute)

*only necessary when analyzing for *Pu*

TEVA lot: TE512BM

UTEVA lot: _____

11.5.2 Stack TEVA on top of UTEVA cartridge

11.5.3 5mL 3M HNO_3 — COMPLETED ☐

*11.5.4 To samples, add 1mL ascorbic acid solution Place in hot water bath for 5 minutes — COMPLETED ☐

*11.5.5 To samples, add 1mL $NaNO_2$ solution Place in hot water bath for 5 minutes — COMPLETED ☐

*11.5.6 Cold water bath until samples reach room temperature

11.5.7 Load sample

11.5.8 20mL 3M HNO_3 — COMPLETED ☐

11.59 Split cartridges: TEVA / UTEVA

TEVA

11.5.10-11.5.11 Elute *Th* into clean tube using 20mL 9M HCl — COMPLETED ☐

11.5.12 5mL 6M HCl into *Th* tube — COMPLETED ☐

11.5.16 Elute *Pu* into clean tube with 20mL 1M HCl + 0.250 mL $TiCl_3$ — COMPLETED ☐ — COMPLETED ☐

UTEVA

11.5.19 5mL 3M HNO_3 — COMPLETED ☐

11.5.20 5mL 9M HCl — COMPLETED ☐

11.5.21 20mL 5M HCl / 0.05M oxalic — COMPLETED ☐

11.5.22-11.5.23 Elute *U* into clean tube with 15mL 1M HCl — COMPLETED ☐

Reagent

Th-230_00002

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

84460-334
5 mL Liquid in Flame Sealed Vial

Customer: Test America/Earth City, MO
P.O. No.: 2414204, Item 1

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995,'"Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty* , % Type u_A	u_B	U	Reference Date (12:00 PM EST)
Th-230	2.753E+07	4.016E+03	0.1	0.9	1.8	04/11/2011

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: γ-impurities < 0.1 %, α-impurities < 0.01 %. 5.11451 grams 0.5M HNO3 solution.

Source Prepared by: _____
W. Mao, Radiochemist

QA Approved: _____ Date: 4/11/11
J. D. McCorvey, QA Manager Alternate

ACCREDITED SOURCE CALIBRATION LABORATORY · HEALTH PHYSICS SOCIETY · FOUNDED 1956

Corporate Office
24937 Avenue Tibbitts · Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd · Atlanta, Georgia 30318

Reagent

Th-230_00023

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Th - 230_ 00023

Reagent ID: Th-230_00023

		Expiration Date:	01/28/2015
Description:	Th-230 Spike	Laboratory:	TestAmerica St. Louis
No. of Bottles:	1	Prepared By:	Bernsen, Sarah C
Storage Location:	RAD Actinide STDs	Solvent:	1M HNO3
Reagent Volume:	200.000 mL	Solvent Lot:	0
Creation Date:	02/04/2013		
Container(s):	304693		
Comment:	Rad13-0003 Re-certified from Th-230_00017		

Reagent Analyte Information

Analyte	Source ID	Source Exp. Date	Source Conc.	Source Conc. Units	Final Conc.	Final Conc. Units
Th-230	Th-230_00006	04/11/2061	2397.01400	dpm/mL	47.94028	dpm/mL

Source Reagents

Reagent	Description	Type	Expiration	Vendor	Vendor Lot #	Vendor Cat Lot #	Volume Used	Volume Units
Th-230_00006	Th-230 Parent		04/11/61				4.00000	mL

St. Louis Radiological Standard Reverification Form

Standard ID Number: Th-230_00017
True Value = 47.94 DPM/L or g
Date Analyzed: 1/28/2014

Radionuclide: Th-230

	Replicates	
#1	49.462	DPM/L or g
#2	48.579	DPM/L or g
#3	49.802	DPM/L or g

Mean = 49.281

1 sigma = 0.631271

1.96 sigma = 1.237291

True Value minus 5% = 45.543 (True Value - 5%)
True Value plus 5% = 50.337 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? **Yes** **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? **Yes** **(Acceptance Criteria)**

Standard Reverification Acceptable? **Yes**

Note: Criteria for reverification of radiological standards is taken from the DOE QSAS and LANL Statements of Work

Reviewed By/Date: RTM 1/29/2014

SOP Reference: STL-QA-0002, Current Revision

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Th-230 Verification

Aliquot Only

Batch No. : —

Balance ID : —

Note: If a section below is not used, marked the N/A box and initial & date next to the N/A.
i.e. Mark the N/A box if a tracer is not added to the sample(s) then initial and date next to the N/A

No.	Sample Number	Aliquot (g / mL)	Crucible ID	Dilution
1	verification-1	0.3	112	960 min.
2	2	1	113	
3	3		114	
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				

Tracer ☐ N/A

Initials / Date

Isotope : Th-229
Std Sol'n No. : Th-229-00012
Vol (mL) : 0.1
Ref Activity (dpm/mL) : 67.929
Act Ref Date : 07-14-2010

Samples Spiked and Traced By: SLB 1/28/14
Initials / Date

Verification Signature & Date: NB 1/28/14
Initials / Date

LCS Standard ☐ N/A

Initials / Date

Isotope : Th-230
Std Sol'n ID. : Th-230-00017
Vol (mL) : 0.3
Ref Activity (dpm/mL) : 47.94
Act Ref Date : 04-11-2011

SOP's applied in preparing these samples. Mark box to left for all that apply:

☐	ST-RC-0003 Rev.	☐	ST-RC-0040 Rev.	☐	ST-RC-0110 Rev.		
☐	ST-RC-0004 Rev.	☐	ST-RC-0041 Rev.	☐	ST-RC-0120 Rev.		
☐	ST-RC-0014 Rev.	☐	ST-RC-0050 Rev.	☐	ST-RC-0232 Rev.		
☐	ST-RC-0020 Rev.	☐	ST-RC-0090 Rev.	☐	ST-RC-0238 Rev.		
☐	ST-RC-0021 Rev.	☑	ST-RC-0100 Rev.	☐	ST-RC-0240 Rev.		
				☐	ST-RC-0241 Rev.		
				☑	ST-RC-0242 Rev.		
				☐	ST-RC-5016 Rev.		
				☐			
				☐			

Isotope(s)

αβ ☐	Iso Pu ☐	Tc-99 ☐	Iso Cm ☐
Iso Am ☐	Ra ☐	Iso Th ☑	Pu-241 ☐
KPA ☐	Sr ☐	Iso U ☐	Th-229 ☐
Np ☐	TAR ☐	C-14 ☐	Cl-36 ☐

Count Time	Matrix
Long Count ☐	Soil ☐
Short Count ☐	H_2O ☐

Prepared By : SLB
Date : 1/28/14

Reviewed by: _____
Date: _____

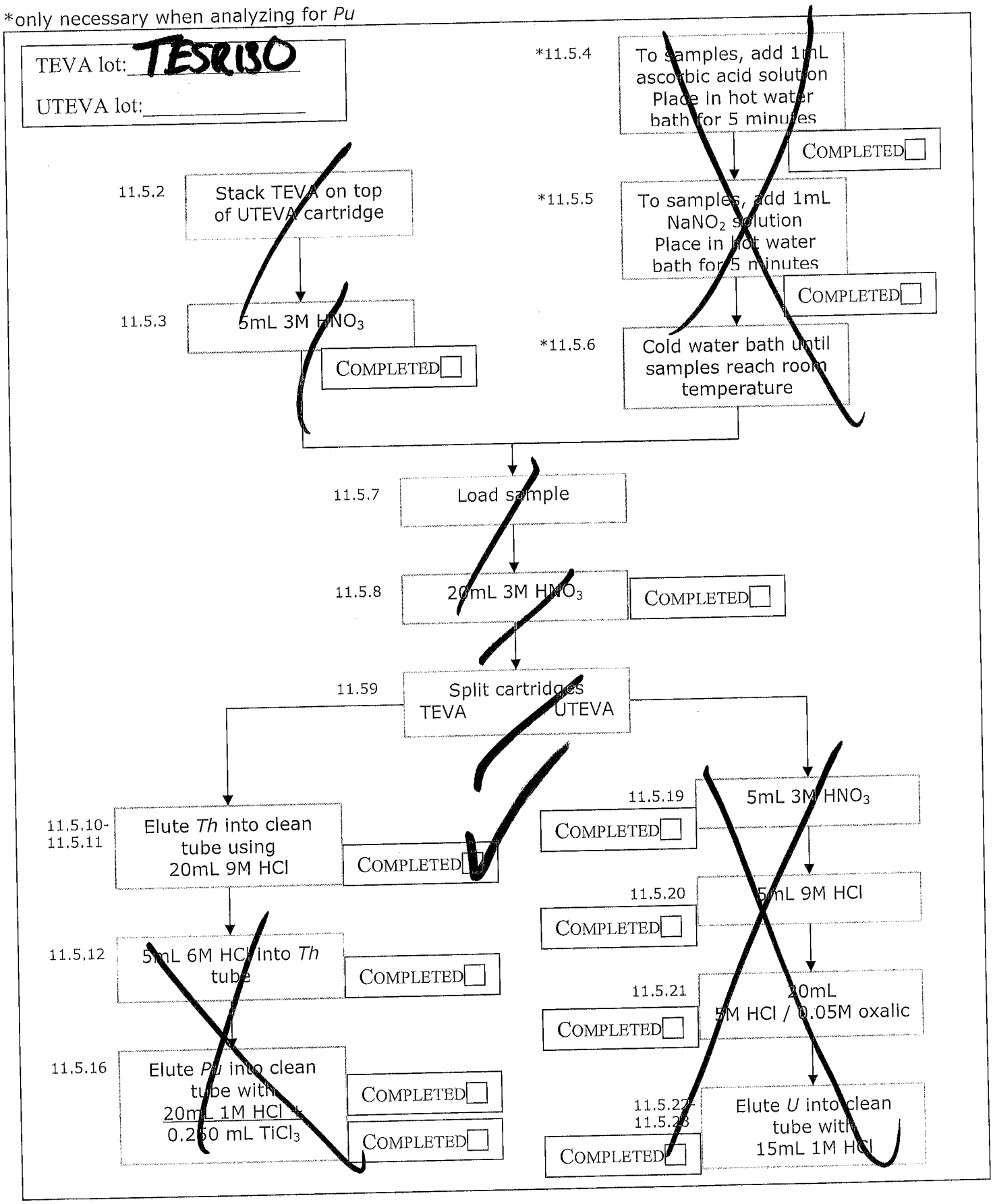
\\Slsvr01\RAD\MasterForms\RAD-0045 Rev(3)

Sequential Thorium, Plutonium and Uranium via TEVA/UTEVA ST-RC-0242

Batch:_____

All rinses should flow at 1 mL/minute (only 3M HNO_3 may be done at 3 mL/minute)

*only necessary when analyzing for *Pu*



Form: RAD-0063, Revised 09/18/13

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:19:33PM 1/29/2014

Sample

Sample Name: Verification 1
SampleType: Sample
:
Sample Collection Date:

Spectrum #1 Analysis #1
Sample Volume : 0.3000mL
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: Th-230_00017_Re-Verify
AnalysisID: 597024

Analyst: 60040

Tracer

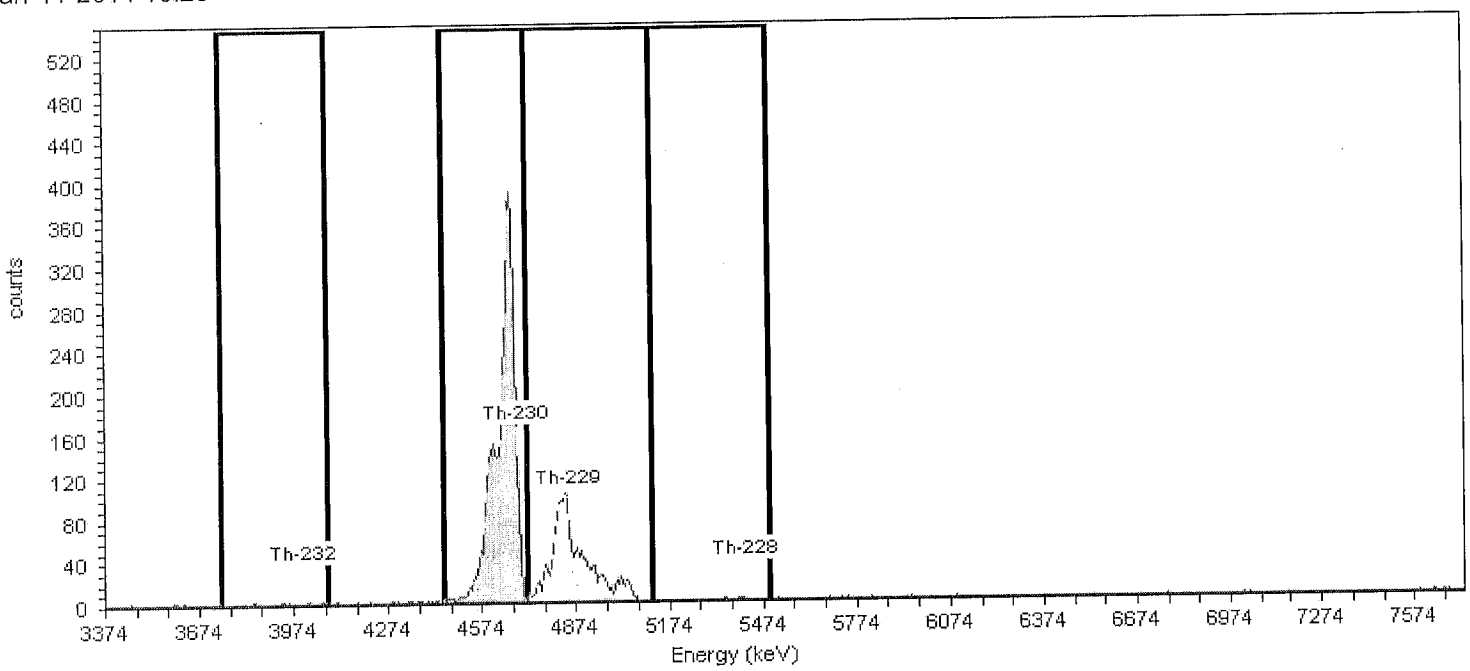
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.10 mL = 6.79 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 88.83%

Acquisition

Detector: AV112
Serial Number: 49-037G7
Acquisition Start Date: 1/28/2014 7:31:48PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Background Date: 1/11/2014 4:25:27PM
Background Info: Sample: ICB;AV112; Det: AV112; Spectrum #1; Jan-11-2014 16:25

Calibration Name: IC-8876;AV112-20130514
Calibration Date: 5/14/2013 8:47:13PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.87% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 1/28/2014 7:30:15PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	.0	100.2	6	0.0000	6.46	0.094	DPM/mL
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	20.4	99.7	3391	2.0000	3389.32	49.462	DPM/mL
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	74.0	99.6	1552	2.0000	1550.25	20.113	DPM/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	44.4	99.8	4	2.0000	2.00	0.029	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:19:42PM 1/29/2014

Sample

Sample Name: Verification 2
SampleType: Sample
:
Sample Collection Date:

Spectrum #1 Analysis #1
Sample Volume : 0.3000mL
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: Th-230_00017_Re-Verify
AnalysisID: 597025

Analyst: 60040

Tracer

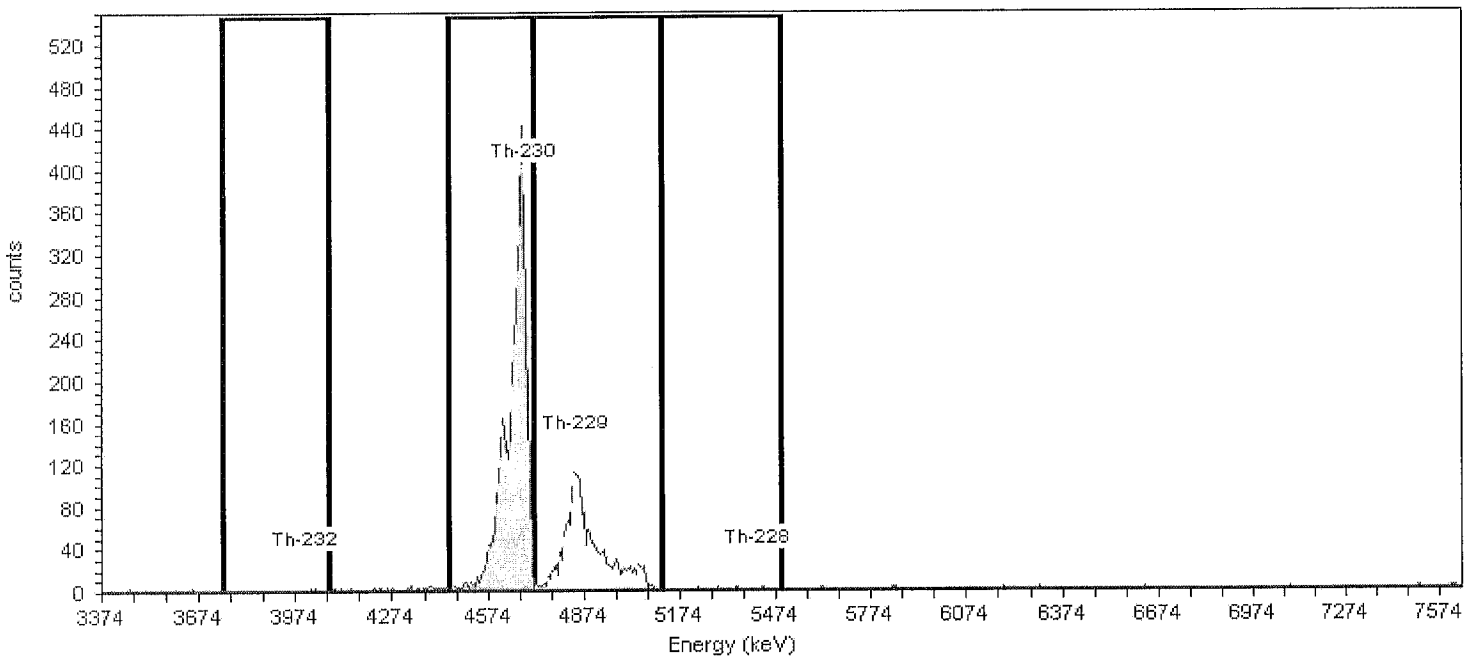
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.10 mL = 6.79 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 92.22%

Acquisition

Detector: AV113
Serial Number: 49-037X5
Acquisition Start Date: 1/28/2014 7:31:50PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Background Date: 1/11/2014 4:25:29PM
Background Info: Sample: ICB;AV113; Det: AV113; Spectrum #1; Jan-11-2014 16:25

Calibration Name: IC-8877;AV113-20130514
Calibration Date: 5/14/2013 8:47:28PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.66% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 1/28/2014 7:30:15PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	10.5	100.2	2	2.0000	0.00	0.000	DPM/mL
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	30.5	99.7	3429	0.0000	3429.40	48.579	DPM/mL
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	72.2	99.6	1598	1.0000	1597.09	20.881	DPM/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	163.8	99.8	4	3.0000	1.00	0.014	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:19:51PM 1/29/2014

Sample

Sample Name: Verification 3
SampleType: Sample
:
Sample Collection Date:

Spectrum #1 Analysis #1
Sample Volume : 0.3000mL
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: Th-230_00017_Re-Verify
AnalysisID: 597026

Analyst: 60040

Tracer

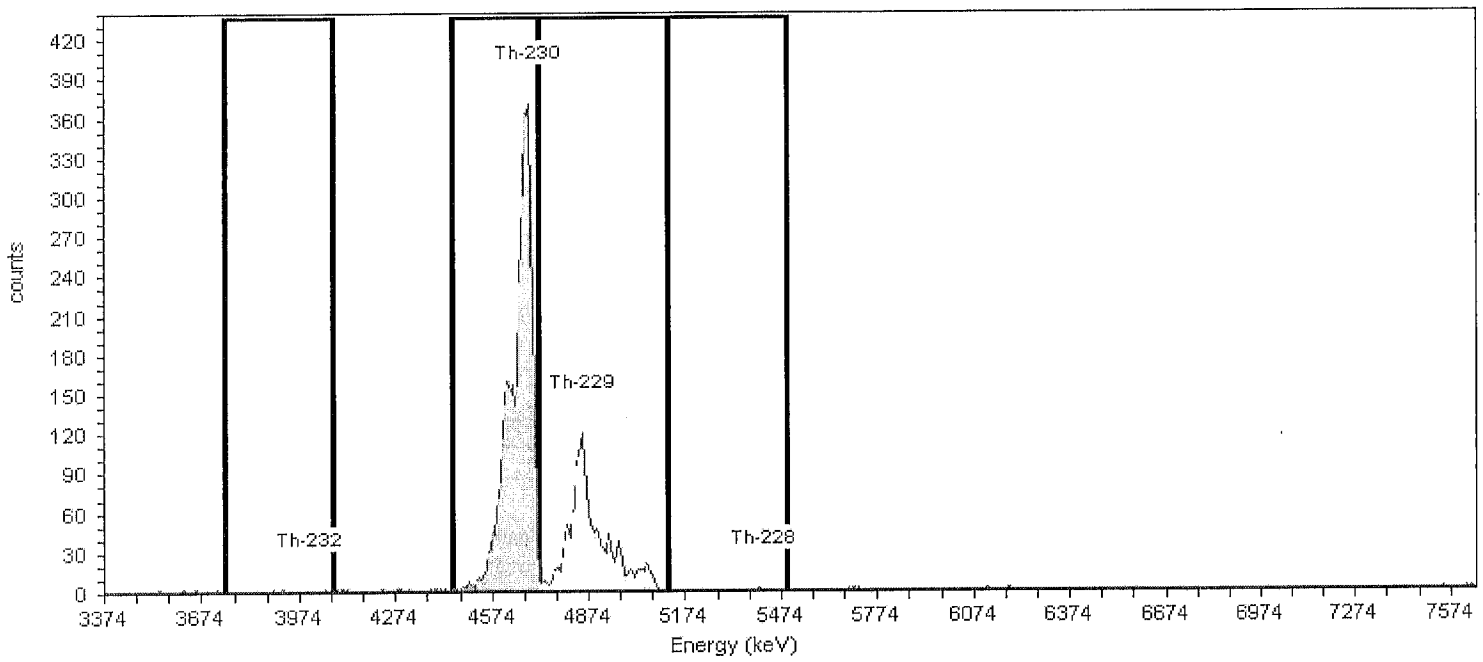
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.10 mL = 6.79 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 92.05%

Acquisition

Detector: AV114
Serial Number: 49-037E7
Acquisition Start Date: 1/28/2014 7:31:52PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Background Date: 1/11/2014 4:25:31PM
Background Info: Sample: ICB;AV114; Det: AV114; Spectrum #1; Jan-11-2014 16:25

Calibration Name: IC-9520;AV114-20130514
Calibration Date: 5/14/2013 8:47:43PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.73% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 1/28/2014 7:30:15PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	10.7	100.2	3	0.4250	2.57	0.036	DPM/mL
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	33.9	99.7	3518	0.0000	3517.66	49.802	DPM/mL
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	72.2	99.6	1598	0.0000	1597.97	20.842	DPM/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	44.5	99.8	1	1.0000	0.00	0.000	DPM/mL

Reagent

TRM-2_00001

Perry, Doug E

From: Salmi, Douglas R
Sent: March 20, 2000 10:48 AM
To: Perry, Doug E; Puissant, Pamela M
Subject: FW: SRMs for radiochemistry LCSs

Pam, Doug
FYI

-----Original Message-----
From: Minteer@aol.com [mailto:Minteer@aol.com]
Sent: March 20, 2000 10:36 AM
To: drsalmi@sandia.gov
Cc: dbourne@doeal.gov; GLDechant@aol.com; crandallb@quanterra.com
Subject: SRMs for radiochemistry LCSs

Doug:

As we discussed by telephone, please send approximately 500 grams each of PEM-1, TRM-2, and NBHD to STL St. Louis. These are to be used by STL as laboratory control samples. As with our other laboratories, STL will be asked to provide summaries of the data obtained in quarterly progress reports. This is not to assess their proficiency, but rather to help us develop interlaboratory acceptance criteria. The known values (given below) for PEM and TRM are good because the samples are well characterized. The known values for NBHD result from a single analysis and hence should be taken as estimates. All the values below are in pCi/g.

PEM-1:

Parameter	Result	Std. Dev.
Pu-238	8.03	0.37
Pu-239	41.0	3.0
Am-241	32.5	1.1
Cs-137	73.5	0.9
U-234	5.99	0.2
U-235	0.27	0.04
U-238	18.1	0.5

TRM-2

Parameter	Result	Uncertainty
U-238	6.0	+/- 4.0
U-234	6.2	+/- 4.0
Th-230	24.5	+/- 0.6
Ra-226	25.4	+/- 0.9
Pb-210	22.1	+/- 1.2

NBHD

Parameter	Result	Uncertainty
Am-241	1.47	+/- 0.28
Ra-226	67.3	+/- 5.5
U-234	174	none available
U-235	8.7	"
U-238	212	"
Cs-137	52.1	+/- 4.6
Pb-210	78.3	+/- 2.4
Pu-239/40	4.7	+/- 0.63
Pu-238	0.3	+/- 0.11
Th-230	83.4	+/- 6.5

Reagent

Tuna Can LCS_00002

Rec'd : 12-26-06

ANALYTICS
An Isotope Products Laboratories Company

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

74139-334
1.0 Liter Sand in 1 Liter Wide Mouth HDPE "S" Bottle

Customer: Severn Trent Laboratories/Earth City, MO
P.O. No.: 2169577, Item 1
Calibration Date: 01-Oct-2006 12:00 EST **Grams of Master Source:** 0.01552

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty , % Type u_A	u_B	U	Calibration Method
Pb-210	46.5	8145.9	———	3079.8	0.33	1.46	2.99	4π LS
Am-241	59.5	157860	———	2034.3	0.33	1.46	2.99	4π LS
Cd-109	88.0	462.60	189000	2933.5	0.57	1.70	3.59	HPGe
Co-57	122.1	271.79	94570	1467.8	0.34	1.30	2.69	HPGe
Ce-139	165.9	137.6	133800	2076.7	0.35	1.10	2.31	HPGe
Hg-203	279.2	46.61	295300	4583	0.40	1.10	2.34	HPGe
Sn-113	391.7	115.1	185600	2880.7	0.42	1.10	2.35	HPGe
Cs-137	661.7	10983	116700	1811.3	0.70	1.20	2.78	HPGe
Y-88	898.0	106.60	455400	7068	0.50	1.10	2.42	HPGe
Co-60	1173.2	1925.4	226900	3522	0.60	1.10	2.51	HPGe
Co-60	1332.5	1925.4	227000	3523	0.90	1.10	2.84	HPGe
Y-88	1836.1	106.6	481200	7469	0.90	1.10	2.84	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
1550 grams of sand. NOTE: Homogeneity was checked by the addition of Tc-99 tracer to the solution used to spike the sand. Ten 10-gram aliquots were removed after mixing and counted to measure the Tc-99. The standard deviation for the 10 measurements was 1.3% with a range of 4.8%. This demonstrates reasonable homogeneity for this source material down to a 10-gram aliquot.
This standard will expire one year after the calibration date.

Source Prepared by: M. I. Taskaeva, Radiochemist

QA Approved: for D. M. Montgomery, QA Manager Date: 12-21-06

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Gamma LCS per Geometry

Geometry: Tuna Can
Reference date 10/1/2006
Calibration Standard: 74139-334
Standard volume g / vial 1550
volume transferred in g / geometry 341.9

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	dpm/g
Am-241	2034.3	449	0.359	219.35
Cs-137	1811.3	400	0.851	82.39
Co-60	3523	777	0.999856	136.39

Reviewed By: Chris Hough

Date: 3/15/2013

Reagent

Tuna Can LCS_00003

Rec'd : 12-26-06

ANALYTICS
An Isotope Products Laboratories Company

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

74139-334
1.0 Liter Sand in 1 Liter Wide Mouth HDPE "S" Bottle

Customer: Severn Trent Laboratories/Earth City, MO
P.O. No.: 2169577, Item 1
Calibration Date: 01-Oct-2006 12:00 EST **Grams of Master Source:** 0.01552

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Pb-210	46.5	8145.9	———	3079.8	0.33	1.46	2.99	4π LS
Am-241	59.5	157860	———	2034.3	0.33	1.46	2.99	4π LS
Cd-109	88.0	462.60	189000	2933.5	0.57	1.70	3.59	HPGe
Co-57	122.1	271.79	94570	1467.8	0.34	1.30	2.69	HPGe
Ce-139	165.9	137.6	133800	2076.7	0.35	1.10	2.31	HPGe
Hg-203	279.2	46.61	295300	4583	0.40	1.10	2.34	HPGe
Sn-113	391.7	115.1	185600	2880.7	0.42	1.10	2.35	HPGe
Cs-137	661.7	10983	116700	1811.3	0.70	1.20	2.78	HPGe
Y-88	898.0	106.60	455400	7068	0.50	1.10	2.42	HPGe
Co-60	1173.2	1925.4	226900	3522	0.60	1.10	2.51	HPGe
Co-60	1332.5	1925.4	227000	3523	0.90	1.10	2.84	HPGe
Y-88	1836.1	106.6	481200	7469	0.90	1.10	2.84	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
1550 grams of sand. NOTE: Homogeneity was checked by the addition of Tc-99 tracer to the solution used to spike the sand. Ten 10-gram aliquots were removed after mixing and counted to measure the Tc-99. The standard deviation for the 10 measurements was 1.3% with a range of 4.8%. This demonstrates reasonable homogeneity for this source material down to a 10-gram aliquot.
This standard will expire one year after the calibration date.

Source Prepared by: M Taskaeva
M. I. Taskaeva, Radiochemist

QA Approved: for
D. M. Montgomery, QA Manager

Date: 12-21-06

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd Atlanta, Georgia 30318

ANALYTICS
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www.analyticsinc.com

ANALYSIS OF UNCERTAINTY FOR MIXED GAMMA STANDARDS
BATCH 127
CALIBRATION DATE: October 1, 2006 12:00 EST

Isotope	Energy (keV)	Calibration Method[1]	Statistics[2]	Calibration[2]	Peak Fitting[2]	Geometry[2]	Impurities[2]	Weighing	Combined Standard Uncertainty	Relative Expanded Uncertinty (k=2)
Cd-109	88	HPGe	0.16	1.1	0.88	0.8	0	0.2	1.64	3.3
Co-57	122	HPGe	0.23	1.1	0.71	0.7	0	0.2	1.52	3.0
Ce-139	166	HPGe	0.17	1.0	0.58	0.7	0	0.2	1.38	2.8
Hg-203	279	HPGe	0.11	1.1	0.34	0.7	0	0.2	1.37	2.7
Sn-113	392	HPGe	0.21	1.0	0.35	0.7	0	0.2	1.30	2.6
Cs-137	662	HPGe	0.36	1.1	0.60	0.7	0	0.2	1.49	3.0
Y-88	898	HPGe	0.19	1.0	0.33	0.7	0	0.2	1.29	2.6
Co-60	1173	HPGe	0.31	.97	0.45	0.7	0	0.2	1.33	2.7
Co-60	1332	HPGe	0.33	.93	0.48	0.7	0	0.2	1.32	2.6
Y-88	1836	HPGe	0.24	1.0	0.35	0.7	0	0.2	1.31	2.6

Optional Additional Isotopes

Pb-210	46.5	4π LS	0.33	1.1	0	0.9	0.30	0.2	1.50	3.0
Am-241	59.5	4π LS	0.33	1.1	0	0.9	0.30	0.2	1.50	3.0
Sr-85	514	IC	0.30	1.1	0	0.7	0.17	0.2	1.36	2.7
Cs-134	605	IC	0.30	1.0	0	0.8	0.17	0.2	1.34	2.7
Cs-134	796	IC	0.30	1.0	0	0.8	0.17	0.2	1.34	2.7
Mn-54	835	IC	0.30	1.0	0	0.8	0.17	0.2	1.34	2.7
Zn-65	1116	IC	0.30	1.0	0	0.8	0.17	0.2	1.34	2.7

[1]Calibration Methods:

4π LS (4 pi Liquid Scintillation Counting)
HPGe (High Purity Germanium Gamma Ray Spectrometer)
IC (Gamma Ray Ionization Chamber)

[2]As Percent (%)from counting data

No interfering gamma emitting impurities were detected during calibration. Depending on the resolution and energy dispersion (keV/channel) of the measuring system, the following spectral conflicts may occur: (1) between the 88 keV gamma-ray and the X-rays emitted in the decay of Hg-203, (2) between the 1333 keV gamma-ray and the 1325 keV single escape peak from the 1836 keV gamma-ray.

St. Louis Radiological Standard Reverification Form

Standard ID Number: Tuna Can LCS_00003 (259586)
True Value = 1249.94 Bq/Sample
Date Analyzed: 10/31/2013

Radionuclide: Am-241

	Replicates	
#1	1215	Bq/Sample
#2	1264	Bq/Sample
#3	1267	Bq/Sample

Mean = 1248.667

1 sigma = 29.19475

1.96 sigma = 57.22171

True Value minus 5% = 1187.443 (True Value - 5%)
True Value plus 5% = 1312.437 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? Yes **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? Yes **(Acceptance Criteria)**

Standard Reverification Acceptable? Yes

Note: Criteria for reverification of radiological standards is taken from the DOE QSAS and LANL Statements of Work

Reviewed By/Date: Jody Watson 12/1/13

SOP Reference: STL-QA-0002, Current Revision

St. Louis Radiological Standard Reverification Form

Standard ID Number: Tuna Can LCS_00003 (259586)
True Value = 469.49 Bq/Sample
Date Analyzed: 10/31/2013

Radionuclide: Cs-137

	Replicates	
#1	451.6	Bq/Sample
#2	477.4	Bq/Sample
#3	455.6	Bq/Sample

Mean = 461.5333

1 sigma = 13.88572

1.96 sigma = 27.21602

True Value minus 5% = 446.0155 (True Value - 5%)
True Value plus 5% = 492.9645 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? Yes **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? Yes **(Acceptance Criteria)**

Standard Reverification Acceptable? Yes

Note: Criteria for reverification of radiological standards is taken from the DOE QSAS and LANL Statements of Work

Reviewed By/Date: Jody Watson 12/1/14

SOP Reference: STL-QA-0002, Current Revision

St. Louis Radiological Standard Reverification Form

Standard ID Number: Tuna Can LCS_00003 (259586)
True Value = 777 Bq/Sample
Date Analyzed: 10/31/2013

Radionuclide: Co-60

	Replicates	
#1	724.3	Bq/Sample
#2	774.1	Bq/Sample
#3	770	Bq/Sample

Mean = 756.1333

1 sigma = 27.64459

1.96 sigma = 54.1834

True Value minus 5% = 738.15 (True Value - 5%)
True Value plus 5% = 815.85 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? Yes **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? Yes **(Acceptance Criteria)**

Standard Reverification Acceptable? Yes

Note: Criteria for reverification of radiological standards is taken from the DOE QSAS and LANL Statements of Work

Reviewed By/Date: Jody Watson 12/1/14

SOP Reference: STL-QA-0002, Current Revision

Gamma LCS per Geometry - Tuna Can

Reagent ID: Tuna Can LCS_00003
Container: 259586
Reference date 10/1/2006
Calibration Standard: 74139-334
Standard volume: 1550 g/vial
Standard volume transferred: 341.9 g/geometry

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	dpm/g	Bq/sample
Am-241	2034.3	448.7	0.359	219.35	1249.94
Cs-137	1811.3	399.5	0.851	82.39	469.49
Co-60	3522	776.9	0.999856	136.36	777.00

Reviewed By: Jody Watson

Date: 12/1/2013

SOP Reference: ST-RD-0102, Current Rev **Form:** RAD-0080 **Revised:** 11/27/2013

Test America St. Louis Spectrum ID: 9_Gamma_20130915

Sample Description: 77739_Gamma_LCS 160-77739~2-A
Detector: Ge9 S/N100228730
Batch ID: 77739
Work Order Number: Gamma
Lot Number: LCS 160-77739~2-A

Decay to Time: 10/1/2006 12:00 Live Time: 1800 sec
Acquisition Time: 10/31/2013 08:28:21 Real Time: 1810 sec
Analysis Time: 11/11/2013 19:50 Dead Time: 0.57 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 9_Soil_TunaCan.Clb
Efficiency Cal Desc: 9_Soil_TunaCan_90099_050312
Efficiency Cal Date: 6/14/2012 10:19
Energy Cal Date: 3/1/2012 13:57
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 9_2013-10-05_0100.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
K-40	5.305E-01	769.5	4.082E+00	4.082E+00	1.578E+01
CO-60	7.243E+02	1.0	7.254E+00	3.708E+01	3.977E+00
CS-134	7.235E+00	93.6	6.774E+00	6.784E+00	2.680E+01
CS-137	4.516E+02	1.0	4.733E+00	2.396E+01	3.540E+00
EU-152	6.293E+00	42.6	2.678E+00	2.698E+00	1.271E+01
EU-154	4.025E+00	75.0	3.020E+00	3.027E+00	5.177E+01
EU-155	5.881E+00	110.2	6.478E+00	6.486E+00	2.150E+01
TL-208	3.059E+01	64.6	1.977E+01	1.984E+01	3.918E+01
PB-210	1.442E+04	0.9	1.325E+02	8.572E+02	2.204E+02
PB-212	5.630E+01	36.7	2.065E+01	2.097E+01	6.722E+01
PB-214	5.714E+00	34.9	1.996E+00	2.018E+00	6.384E+00
BI-212	9.580E+01	152.1	1.457E+02	1.458E+02	4.895E+02
BI-214	7.078E+00	34.4	2.432E+00	2.460E+00	4.992E+00
AC-228	1.477E+01	57.1	8.428E+00	8.462E+00	3.552E+01
Pa-234	5.684E+00	65.7	3.737E+00	3.748E+00	9.406E+00
TH-234	-2.970E+02	9.4	2.787E+01	3.191E+01	8.608E+01
PA-234M	9.991E+01	80.0	7.990E+01	8.006E+01	4.336E+02
U-235	-4.791E+00	104.0	4.982E+00	4.988E+00	1.653E+01
AM-241	1.215E+03	0.8	9.198E+00	6.370E+01	1.316E+01
Total	1.715E+04				

Analyst: Jody Watson

TestAmerica, Inc Spectrum name: 9_Gamma_20130915.An1

Sample description
77739_Gamma_LCS 160-77739~2-A

Spectrum Filename: C:\User\SPC\Det9\9_Gamma_20130915.An1

Acquisition information
Start time: 10/31/2013 8:28:21 AM
Live time: 1800
Real time: 1810
Dead time: 0.57 %
Detector ID: 9

Detector system
Ge9 S/N100228730

Calibration
Filename: 9_Soil_TunaCan.Clb
9_Soil_TunaCan_90099_050312

Energy Calibration
Created: 3/1/2012 1:57:17 PM
Zero offset: 0.074 keV
Gain: 0.250 keV/channel
Quadratic: -2.269E-08 keV/channel^2

Efficiency Calibration
Created: 6/14/2012 10:19:51 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.30 %
Log(Eff): -8.079856E-01 + (-2.367265E-01*Log(E)) + (-3.950640E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.42 %
Log(Eff): -2.387916E+01 + (8.875647E+00*Log(E)) + (-9.401100E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.59keV)
Stop channel: 8000 (1999.34keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	9_2013-10-05_0100.PBC 10/5/2013 1:00:21 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 35 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 134.9778

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.60	401.	16.10	1.13	1.639E-02				
46.55	22813.	0.92	0.93	2.578E-02	46.54	4.250	1.442E+04	PB210
59.57	28391.	0.76	0.93	3.661E-02	59.54	35.900	1.215E+03	AM241
77.08	140.	39.21	0.98	4.675E-02				
88.08	1206.	7.29	1.06	5.052E-02				
93.88	58.	87.63	1.04	5.171E-02	93.35	5.561	PBC<MDA	AC228
					93.35	5.810	1.069E+01	U235
					92.59	5.584	1.115E+01	TH234
					93.35	5.810	1.069E+01	U235
					93.35	5.561	2.622E+01	AC228
93.88	58.	87.63	1.04	5.171E-02	93.35	5.561	PBC<MDA	AC228
					93.35	5.810	1.069E+01	U235
105.44	44.	110.15	1.05	5.318E-02	105.31	21.200	PBC<MDA	EU155
					105.31	21.200	5.881E+00	EU155
122.44	45.	108.81	1.07	5.305E-02	121.78	28.580	PBC<MDA	EU152
					121.78	28.580	2.352E+00	EU152
131.16	35.	137.33	1.08	5.216E-02	131.29	18.000	PBC<MDA	Pa234
161.84	5.	850.44	1.11	4.676E-02	163.38	5.080	PBC<MDA	U235
					163.38	5.080	1.068E+00	U235
191.89	75.	47.73	0.55	4.310E-02				
199.99	66.	64.08	0.38	4.195E-02				
238.40	138.	27.30	0.91	3.734E-02	238.63	43.300	6.216E+01	PB212
242.14	11.	403.77	1.18	3.697E-02	242.00	7.430	PBC<MDA	PB214
276.94	34.	114.35	1.21	3.372E-02	277.28	6.310	PBC<MDA	TL208
283.56	5.	702.33	1.22	3.315E-02	284.30	6.140	HL>Cutoff	I131
294.85	92.	54.23	0.49	3.232E-02	295.09	19.300	PBC<MDA	PB214
300.38	48.	84.68	1.24	3.195E-02	300.03	3.280	PBC<MDA	PB212
338.25	45.	84.62	1.27	2.940E-02	338.32	12.010	PBC<MDA	AC228

					338.32	12.010	1.661E+01 AC228
344.89	28.	130.46	1.27	2.905E-02	344.29	26.500	PBC<MDA EU152
					344.29	26.500	2.923E+00 EU152
351.72	86.	44.07	1.28	2.860E-02	351.93	37.600	PBC<MDA PB214
367.42	39.	64.82	0.53	2.775E-02			
519.92	99.	37.67	0.41	2.164E-02			
562.86	22.	127.02	1.47	2.040E-02	563.24	8.350	PBC<MDA CS134
570.13	20.	136.61	1.47	2.024E-02	569.32	15.380	PBC<MDA CS134

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					569.47	8.200	6.589E+00	Pa234
570.13	20.	136.24	1.47	2.024E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	6.607E+00	Pa234
583.13	40.	60.64	1.48	1.989E-02	583.02	84.500	PBC<MDA	TL208
609.58	105.	31.70	0.98	1.925E-02	609.31	46.090	6.578E+00	BI214
661.61	10643.	1.05	1.45	1.810E-02	661.66	85.210	4.516E+02	CS137
712.89	39.	39.12	0.70	1.711E-02				
727.11	17.	152.13	1.60	1.686E-02	727.17	7.550	PBC<MDA	BI212
766.71	33.	79.97	1.63	1.620E-02	766.41	0.294	PBC<MDA	PA234M
					766.41	0.294	3.867E+02	PA234M
779.17	59.	42.55	1.64	1.600E-02	778.92	12.940	PBC<MDA	EU152
					778.92	12.940	2.273E+01	EU152
797.04	6.	290.73	1.66	1.565E-02	801.95	8.690	PBC<MDA	CS134
860.47	19.	137.44	1.71	1.482E-02	860.56	12.420	PBC<MDA	TL208
883.68	19.	133.89	1.72	1.456E-02	880.53	6.000	PBC<MDA	Pa234
					883.24	9.600	7.529E+00	Pa234
910.66	44.	76.62	1.75	1.418E-02	911.07	29.000	PBC<MDA	AC228
					911.07	29.000	1.400E+01	AC228
943.80	24.	117.47	1.77	1.377E-02	946.02	13.400	PBC<MDA	Pa234
964.12	14.	228.97	1.79	1.357E-02	964.11	14.605	PBC<MDA	EU152
					964.11	14.605	5.560E+00	EU152
996.48	16.	177.62	1.81	1.323E-02	996.33	10.600	PBC<MDA	EU154
					996.33	10.600	1.149E+01	EU154
1121.05	28.	81.71	1.90	1.206E-02	1120.29	15.100	PBC<MDA	BI214
1173.15	5976.	1.44	1.98	1.163E-02	1173.24	99.900	7.254E+02	CO60
1272.28	11.	75.03	2.01	1.088E-02	1274.54	35.190	PBC<MDA	EU154
					1274.54	35.190	2.924E+00	EU154
1332.36	5385.	1.39	2.00	1.050E-02	1332.50	99.980	7.231E+02	CO60
1460.86	1.	76.97	2.13	9.749E-03	1460.83	10.670	PBC<MDA	K40
1764.37	7.	64.03	2.31	8.350E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
146.03	36.60	1187.	401.	2.444E+04	16.10	1.125	-	
307.92	77.08	958.	140.	2.995E+03	39.21	0.976	-	s
351.89	88.08	1452.	1215.	2.405E+04	5.28	1.055	-	
767.05	191.89	448.	75.	1.732E+03	47.73	0.547	-	s
799.44	199.99	552.	66.	1.585E+03	64.08	0.381	-	s
1469.05	367.42	225.	39.	1.407E+03	56.65	0.534	-	sM
2079.05	519.92	287.	99.	4.576E+03	37.67	0.415	-	sM
2850.97	712.89	70.	39.	2.299E+03	39.12	0.697	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.85	46.55	5511.	22813.	12.674	0.92	0.933
AM-241	237.89	59.57	4281.	28391.	15.773	0.76	0.933
TH-234	245.32	61.42	2410.	-799.	-0.444	9.38	1.014s
TH-234	365.80	91.55	1239.	-50.	-0.028	101.12	1.042s
AC-228	372.98	93.35	1253.	58.	0.032	87.63	1.043D
U-235	372.98	93.35	1253.	58.	0.032	87.63	1.043D
EU-155	421.32	105.44	1171.	44.	0.025	110.15	1.054s
EU-152	489.29	122.44	1159.	45.	0.025	108.81	1.070s
Pa-234	524.18	131.16	1124.	35.	0.019	137.33	1.079s
U-235	574.13	143.65	1203.	-48.	-0.026	103.98	1.091s
U-235	646.89	161.84	752.	5.	0.003	850.44	1.109s
U-235	821.22	205.44	1091.	-13.	-0.007	349.16	1.148s
PB-212	953.27	238.46	993.	125.	0.070	36.68	1.179
PB-214	968.00	242.14	1005.	11.	0.006	403.77	1.182
TL-208	1107.16	276.94	791.	34.	0.019	114.35	1.214
I-131	1133.66	283.56	738.	5.	0.003	702.33	1.221
PB-214	1178.79	294.85	573.	92.	0.051	54.23	0.490s
PB-212	1200.93	300.38	789.	48.	0.026	84.68	1.235
AC-228	1352.39	338.25	701.	45.	0.025	84.62	1.270s
EU-152	1378.94	344.89	662.	28.	0.016	130.46	1.275s
PB-214	1406.26	351.72	669.	86.	0.048	44.07	1.282
I-131	1455.88	364.13	713.	-34.	-0.019	113.88	1.293
BE-7	1909.01	477.42	744.	-6.	-0.003	644.25	1.392s
CS-134	2250.78	562.86	388.	22.	0.012	127.02	1.466s
CS-134	2279.86	570.13	352.	20.	0.011	136.61	1.471s
Pa-234	2279.88	570.13	352.	20.	0.011	136.24	1.471
TL-208	2331.87	583.13	356.	40.	0.022	60.64	1.482s
CS-134	2410.14	602.69	309.	-17.	-0.010	144.66	1.500s
BI-214	2437.68	609.58	271.	105.	0.058	31.70	0.982s
CS-137	2645.82	661.61	300.	10643.	5.913	1.05	1.452
BI-212	2907.87	727.11	318.	17.	0.009	152.13	1.601s
PA-234M	3066.30	766.71	335.	33.	0.018	79.97	1.633s
EU-152	3116.13	779.17	285.	59.	0.033	42.55	1.643s
CS-134	3187.66	797.04	169.	6.	0.004	290.73	1.661s
TL-208	3441.43	860.47	347.	19.	0.011	137.44	1.707
Pa-234	3534.30	883.68	311.	19.	0.010	133.89	1.722
AC-228	3642.26	910.66	550.	44.	0.025	76.62	1.746s
Pa-234	3774.84	943.80	378.	24.	0.013	117.47	1.772
EU-152	3856.15	964.12	492.	14.	0.008	228.97	1.786s
AC-228	3874.97	968.82	503.	-12.	-0.007	261.56	1.790s
EU-154	3985.65	996.48	415.	16.	0.009	177.62	1.810s
BI-214	4484.12	1121.05	307.	28.	0.016	81.71	1.901
CO-60	4692.63	1173.15	172.	5976.	3.320	1.44	1.975
EU-154	5089.34	1272.28	31.	11.	0.006	75.03	2.008s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	5329.81	1332.36	33.	5385.	2.991	1.39	1.997
K-40	5844.14	1460.86	33.	1.	0.001	76.97	2.131
BI-214	7059.18	1764.37	18.	7.	0.004	64.03	2.314s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	Peak MDA Value Bq/Sample		COMMENTS
BE-7	C	-1.3766E+00				5.31E+01		
			477.60	-1.377E+00	&(	2.979E+01	6.44E+02 1.05E+01 G	
K-40	N	5.3052E-01				4.66E+11		
			1460.83	5.305E-01	(P	1.578E+01	7.70E+01 1.07E+01 G	
CO-60	F	7.2427E+02				1.93E+03		
			1332.50	7.231E+02	(	3.977E+00	1.39E+00 1.00E+02 G	
			1173.24	7.254E+02	(	7.748E+00	1.44E+00 9.99E+01 G	
I-131	I	-6.5562E-01				8.02E+00		
			364.48	-8.173E-01	(	3.098E+00	1.14E+02 8.17E+01 G	
			284.30	1.496E+00	(	3.530E+01	7.02E+02 6.14E+00 G	
			636.97	-6.785E-01	%	3.837E+01	1.67E+03 7.17E+00 G	
CS-134	I	7.2349E+00				7.54E+02		
			604.71	-5.518E+00	?(	2.680E+01	1.45E+02 9.76E+01 G	
			795.87	5.593E-02	%	3.854E+01	2.03E+04 8.55E+01 G	
			569.32	3.786E+01	?(	1.733E+02	1.37E+02 1.54E+01 G	
			801.95	2.811E+01	&(	2.787E+02	2.91E+02 8.69E+00 G	
			563.24	7.820E+01	?(	3.322E+02	1.27E+02 8.35E+00 G	
CS-137	I	4.5157E+02				1.10E+04		
			661.66	4.516E+02	(	3.540E+00	1.05E+00 8.52E+01 G	
EU-152	F	6.2931E+00				4.94E+03		
			344.29	2.923E+00	(	1.271E+01	1.30E+02 2.65E+01 G	
			121.78	2.352E+00	&(	8.497E+00	1.09E+02 2.86E+01 G	
			778.92	2.273E+01	(	3.138E+01	4.25E+01 1.29E+01 G	
			964.11	5.560E+00	?(	4.275E+01	2.29E+02 1.46E+01 G	
			1112.07	3.764E-02	&	4.286E+01	3.35E+04 1.36E+01 G	
			1408.00	2.382E-01	%	9.762E+00	1.12E+03 2.10E+01 G	

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	I	4.0247E+00					3.14E+03	
			873.23	7.271E-01	&(	5.177E+01	2.10E+03	1.23E+01 G
			123.10	6.921E-02	&	7.391E+00	3.19E+03	4.08E+01 G
			1274.54	2.924E+00	?(	7.338E+00	7.50E+01	3.52E+01 G
			723.36	4.766E-01	%	2.324E+01	1.43E+03	2.02E+01 G
			1004.77	4.567E-01	%	3.539E+01	2.28E+03	1.80E+01 G
			996.33	1.149E+01	(	6.852E+01	1.78E+02	1.06E+01 G
EU-155	I	5.8806E+00					1.81E+03	
			105.31	5.881E+00	(	2.150E+01	1.10E+02	2.12E+01 G
			86.54	-3.761E-01	%	1.959E+01	1.56E+03	3.07E+01 G
TL-208	N	3.0591E+01					6.98E+02	
			583.02	1.750E+01	?(P	3.918E+01	6.06E+01	8.45E+01 G
			277.28	1.153E+02	(P	4.564E+02	1.14E+02	6.31E+00 G
			860.56	7.666E+01	(	3.531E+02	1.37E+02	1.24E+01 G
PB-210	N	1.4424E+04					8.14E+03	
			46.54	1.442E+04	(	2.204E+02	9.19E-01	4.25E+00 G
PB-212	N	5.6299E+01					6.98E+02	
			238.63	5.630E+01	?(	6.722E+01	3.67E+01	4.33E+01 G
			300.03	3.298E+02	+	9.255E+02	8.47E+01	3.28E+00 G
PB-214	N	5.7137E+00					5.84E+05	
			351.93	4.435E+00	?(	6.384E+00	4.41E+01	3.76E+01 G
			295.09	8.205E+00	(	1.021E+01	5.42E+01	1.93E+01 G
			242.00	2.259E+00	-	3.053E+01	4.04E+02	7.43E+00 G
BI-212	N	9.5804E+01					6.98E+02	
			727.17	9.580E+01	&(	4.895E+02	1.52E+02	7.55E+00 G
			785.42	5.436E+01	&	2.991E+03	1.62E+03	1.28E+00 G
BI-214	N	7.0777E+00					5.84E+05	
			609.31	6.578E+00	(P	4.992E+00	3.17E+01	4.61E+01 G
			1120.29	8.602E+00	(P	2.581E+01	8.17E+01	1.51E+01 G
			1764.49	3.099E+00	- P	9.807E+00	6.40E+01	1.54E+01 G
AC-228	N	1.4766E+01					2.10E+03	
			911.07	1.400E+01	?(	3.552E+01	7.66E+01	2.90E+01 G
			968.97	-6.746E+00	-	5.930E+01	2.62E+02	1.75E+01 G
			338.32	1.661E+01	(	4.660E+01	8.46E+01	1.20E+01 G
								Energy duplication
			93.35	2.622E+01	&	7.608E+01	8.76E+01	5.56E+00 XA
Pa-234	N	5.6844E+00					1.63E+12	
			131.29	2.059E+00	?(	9.406E+00	1.37E+02	1.80E+01 G
			569.47	6.607E+00	(	3.016E+01	1.36E+02	8.20E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		946.02	7.154E+00	(	2.808E+01	1.17E+02	1.34E+01 G
		883.24	0.000E+00	-	4.308E+01	1.00E+03	9.60E+00 G
		880.53	1.202E+01	(	5.396E+01	1.34E+02	6.00E+00 G
TH-234 N	-2.9703E+02					1.63E+12	
		63.29-2.970E+02		(	8.608E+01	9.38E+00	3.81E+00 G
		92.59-9.593E+00		&	3.217E+01	1.01E+02	5.58E+00 G
PA-234M N	9.9914E+01					1.63E+12	
		1001.00-8.049E-01		%(	4.336E+02	1.58E+04	8.37E-01 G
		766.41	3.867E+02	&(	1.026E+03	8.00E+01	2.94E-01 G
U-235 N	-4.7913E+00					2.57E+11	
		143.79-4.791E+00		?(	1.653E+01	1.04E+02	1.10E+01 G
		205.33-3.609E+00		&	4.212E+01	3.49E+02	5.01E+00 G
		163.38	1.068E+00	+	3.053E+01	8.50E+02	5.08E+00 G
							Energy duplication
		93.35	1.069E+01	&	3.101E+01	8.76E+01	5.81E+00 X
AM-241 T	1.2145E+03					1.58E+05	
		59.54	1.215E+03	(	1.316E+01	7.57E-01	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average

R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
TH-234	61.42	2410.	-799.	-0.444	9.38	-2.970E+02
TH-234	91.55	1239.	-50.	-0.028	101.12	-9.593E+00
AC-228	93.35	1253.	58.	0.032	87.63	2.622E+01
U-235	93.35	1253.	58.	0.032	87.63	1.069E+01
EU-155	105.44	1171.	44.	0.025	110.15	5.881E+00
EU-152	122.44	1159.	45.	0.025	108.81	2.352E+00
U-235	143.65	1203.	-48.	-0.026	103.98	-4.791E+00
U-235	161.84	752.	5.	0.003	850.44	1.068E+00
U-235	205.44	1091.	-13.	-0.007	349.16	-3.609E+00
AC-228	338.25	701.	45.	0.025	84.62	1.661E+01
EU-152	344.89	662.	28.	0.016	130.46	2.923E+00
BE-7	477.42	744.	-6.	-0.003	644.25	0.000E+00
CS-134	562.86	388.	22.	0.012	127.02	7.820E+01
CS-134	570.13	352.	20.	0.011	136.61	3.786E+01
CS-134	602.69	309.	-17.	-0.010	144.66	-5.518E+00
PA-234M	766.71	335.	33.	0.018	79.97	3.867E+02
EU-152	779.17	285.	59.	0.033	42.55	2.273E+01
CS-134	797.04	169.	6.	0.004	290.73	2.811E+01
AC-228	910.66	550.	44.	0.025	76.62	1.400E+01
EU-152	964.12	492.	14.	0.008	228.97	5.560E+00
AC-228	968.82	503.	-12.	-0.007	261.56	-6.746E+00
EU-154	996.48	415.	16.	0.009	177.62	1.149E+01
EU-154	1272.28	31.	11.	0.006	75.03	2.924E+00

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting		MDA Bq/Sample
BE-7	#A	-1.3766E+00	>12 Halflives	6.4425E+02%	2.9788E+01	
K-40	A	5.3052E-01	5.3052E-01	7.695E+02%		1.58E+01
CO-60		2.8537E+02	7.2427E+02	1.001E+00%		3.98E+00
I-131	A	-6.5562E-01	>12 Halflives	1.1388E+02%	3.0977E+00	
CS-134	#A	6.7120E-01	7.2349E+00	9.362E+01%		2.68E+01
CS-137		3.8340E+02	4.5157E+02	1.048E+00%		3.54E+00
EU-152	#A	4.3789E+00	6.2931E+00	4.255E+01%		1.27E+01
EU-154	#A	2.2731E+00	4.0247E+00	7.503E+01%		5.18E+01
EU-155	#A	2.1856E+00	5.8806E+00	1.102E+02%		2.15E+01
TL-208	A	2.3406E+00	3.0591E+01	6.464E+01%		3.92E+01
PB-210		1.1574E+04	1.4424E+04	9.188E-01%		2.20E+02
PB-212	A	4.3076E+00	5.6299E+01	3.668E+01%		6.72E+01

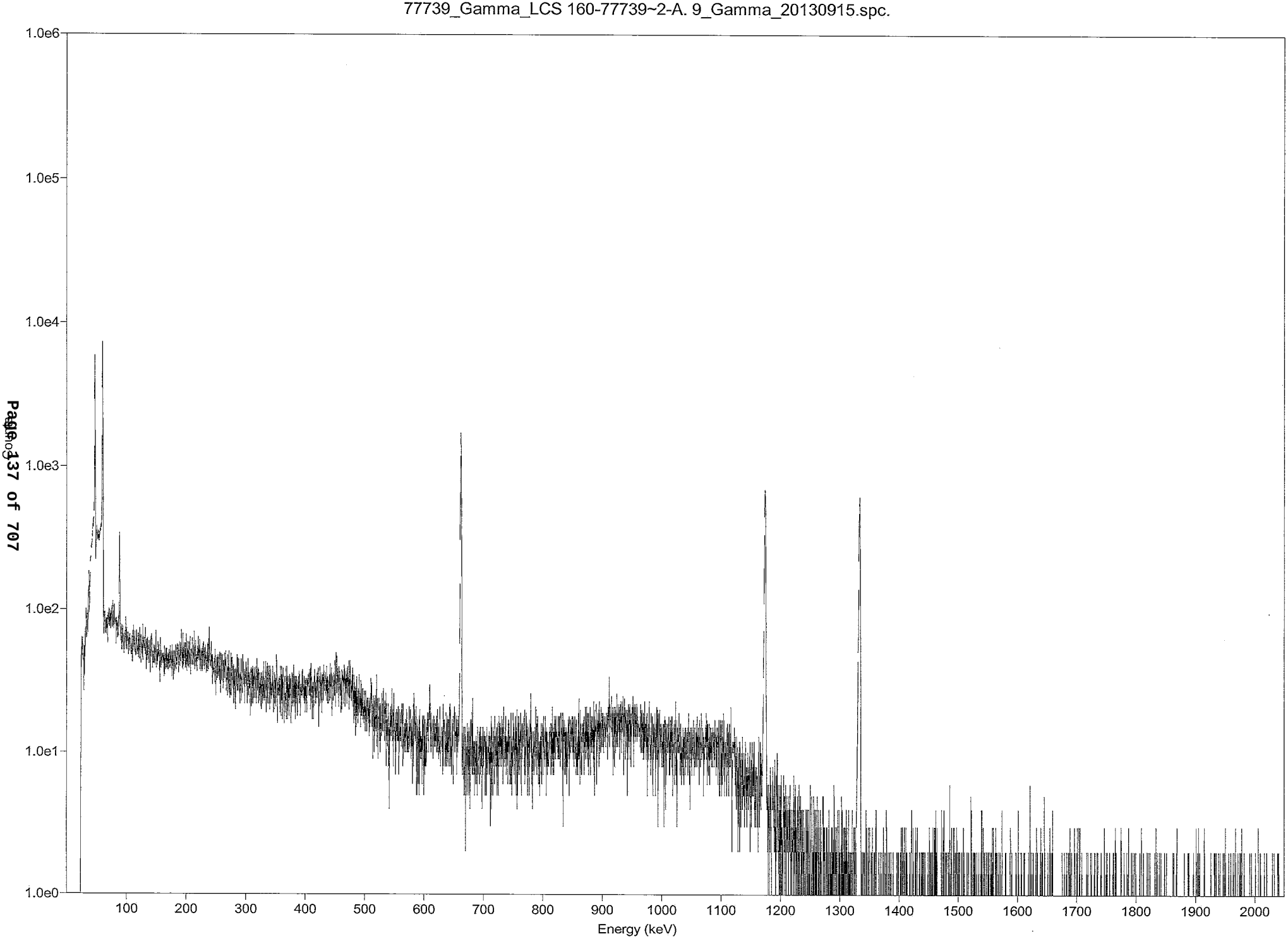
PB-214	A	5.6962E+00	5.7137E+00	3.494E+01%	6.38E+00
BI-212	#A	7.3301E+00	9.5804E+01	1.521E+02%	4.89E+02
BI-214		7.0561E+00	7.0777E+00	3.436E+01%	4.99E+00
AC-228	#A	6.2874E+00	1.4766E+01	5.708E+01%	3.55E+01
Pa-234	A	5.6844E+00	5.6844E+00	6.574E+01%	9.41E+00
TH-234	#A	-2.9703E+02	-2.9703E+02	9.384E+00%	8.61E+01
PA-234M	#A	9.9914E+01	9.9914E+01	7.997E+01%	4.34E+02
U-235	#A	-4.7913E+00	-4.7913E+00	1.040E+02%	1.65E+01
AM-241		1.2008E+03	1.2145E+03	7.573E-01%	1.32E+01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.3 keV) 1.346E+04 Bq/Sample
Total Decayed Activity (37.6 to 1999.3 keV) 1.6883195E+04 Bq/Sample

The library has energies which are not separable.


77739_Gamma_LCS 160-77739~2-A. 9_Gamma_20130915.spc.
1.0e6
1.0e5
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Log
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)

Test America St. Louis Spectrum ID: 11_Gamma_20131574

Sample Description: 77739_Gamma_LCS 160-77739~2-A
Detector: Ge11 S/N09363993
Batch ID: 77739
Work Order Number: Gamma
Lot Number: LCS 160-77739~2-A

Decay to Time: 10/1/2006 12:00 Live Time: 1800 sec
Acquisition Time: 10/31/2013 09:57:50 Real Time: 1893 sec
Analysis Time: 11/11/2013 19:53 Dead Time: 4.93 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 11_Soil_TunaCan.Clb
Efficiency Cal Desc: Ge11_TunaCanCal_90099_032912
Efficiency Cal Date: 4/2/2012 17:29
Energy Cal Date: 2/28/2012 13:09
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 11_2013-10-05_0101.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
K-40	-3.130E+00	551.4	1.726E+01	1.726E+01	1.982E+01
CO-60	7.741E+02	1.0	7.995E+00	3.968E+01	3.551E+00
CS-134	5.627E+00	57.9	3.259E+00	3.273E+00	3.600E+01
CS-137	4.774E+02	1.1	5.441E+00	2.542E+01	4.209E+00
EU-152	2.514E+00	70.6	1.774E+00	1.779E+00	1.482E+01
EU-154	2.899E+00	99.0	2.868E+00	2.872E+00	6.079E+01
EU-155	-4.263E-01	1708.0	7.281E+00	7.281E+00	2.440E+01
TL-208	4.864E+01	31.0	1.507E+01	1.528E+01	3.485E+01
PB-210	1.502E+04	1.0	1.504E+02	8.949E+02	2.572E+02
PB-212	9.754E+01	22.9	2.231E+01	2.319E+01	5.738E+01
PB-214	8.604E+00	23.5	2.021E+00	2.070E+00	5.061E+00
BI-212	3.977E+02	48.0	1.908E+02	1.919E+02	5.097E+02
BI-214	2.554E+00	72.7	1.857E+00	1.862E+00	6.709E+00
AC-228	2.142E+01	41.5	8.893E+00	8.960E+00	3.627E+01
Pa-234	3.857E+00	167.3	6.451E+00	6.454E+00	7.418E+00
TH-234	-8.093E+01	34.3	2.773E+01	2.805E+01	7.226E+01
PA-234M	2.658E+01	103.4	2.749E+01	2.752E+01	5.227E+02
U-235	4.288E+00	110.2	4.726E+00	4.731E+00	1.716E+01
AM-241	1.264E+03	0.8	1.065E+01	6.644E+01	1.590E+01
Total	1.816E+04				

Analyst: Jody Watson

TestAmerica, Inc Spectrum name: 11_Gamma_20131574.An1

Sample description
77739_Gamma_LCS 160-77739~2-A

Spectrum Filename: C:\User\SPC\Det11\11_Gamma_20131574.An1

Acquisition information
Start time: 10/31/2013 9:57:50 AM
Live time: 1800
Real time: 1893
Dead time: 4.93 %
Detector ID: 11

Detector system
Ge11 S/N09363993

Calibration
Filename: 11_Soil_TunaCan.Clb
Ge11_TunaCanCal_90099_032912

Energy Calibration
Created: 2/28/2012 1:09:34 PM
Zero offset: 0.055 keV
Gain: 0.250 keV/channel
Quadratic: -2.946E-08 keV/channel^2

Efficiency Calibration
Created: 4/2/2012 5:29:36 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.14 %
Log(Eff): -6.858644E-01 + (-3.337421E-01*Log(E)) + (-3.199860E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.72 %
Log(Eff): -2.393599E+01 + (8.833910E+00*Log(E)) + (-9.364157E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.58keV)
Stop channel: 8000 (1999.47keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	11_2013-10-05_0101.PBC 10/5/2013 1:01:56 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 20 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 46.5155

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.68	379.	16.28	1.05	1.405E-02				
40.49	133.	55.66	1.66	1.711E-02				
46.62	19658.	0.86	0.90	2.193E-02	46.54	4.250	1.460E+04	PB210
49.77	415.	28.03	0.60	2.434E-02				
55.95	145.	50.29	0.62	2.870E-02				
59.56	25028.	0.84	0.88	3.101E-02	59.54	35.900	1.264E+03	AM241
77.07	147.	27.49	0.93	3.947E-02				
79.28	92.	44.04	0.93	4.022E-02				
88.07	1082.	8.02	0.97	4.263E-02				
93.79	56.	88.49	0.94	4.362E-02	93.35	5.561	PBC<MDA	AC228
					93.35	5.810	1.224E+01	U235
					93.35	5.561	3.003E+01	AC228
93.79	56.	88.49	0.94	4.362E-02	93.35	5.561	PBC<MDA	AC228
					93.35	5.810	1.224E+01	U235
122.18	61.	70.58	0.97	4.466E-02	121.78	28.580	PBC<MDA	EU152
143.95	39.	110.20	0.99	4.238E-02	143.79	10.960	PBC<MDA	U235
205.37	11.	379.21	1.05	3.439E-02	205.33	5.010	PBC<MDA	U235
238.51	197.	20.94	0.80	3.106E-02	238.63	43.300	9.754E+01	PB212
					242.00	7.430	4.711E+01	PB214
276.63	35.	99.46	1.11	2.800E-02	277.28	6.310	PBC<MDA	TL208
283.85	38.	97.31	1.12	2.752E-02	284.30	6.140	HL>Cutoff	I131
295.03	118.	34.12	0.33	2.681E-02	295.09	19.300	1.273E+01	PB214
338.09	43.	83.18	1.17	2.436E-02	338.32	12.010	PBC<MDA	AC228
					338.32	12.010	1.900E+01	AC228
351.83	104.	27.31	1.27	2.369E-02	351.93	37.600	6.484E+00	PB214
430.82	38.	58.13	0.50	2.050E-02				
582.88	93.	29.40	0.81	1.643E-02	583.02	84.500	4.864E+01	TL208
609.24	36.	53.14	1.41	1.610E-02	609.31	46.090	PBC<MDA	BI214

					609.31	46.090	PBC<MDA BI214
661.78	9292.	1.14	1.38	1.495E-02	661.66	85.210	4.774E+02 CS137
727.09	28.	78.07	1.51	1.392E-02	727.17	7.550	PBC<MDA BI212
766.55	21.	103.43	1.54	1.338E-02	766.41	0.294	PBC<MDA PA234M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
777.51	11.	209.97	1.55	1.322E-02	778.92	12.940	PBC<MDA	EU152
783.74	37.	55.82	1.56	1.313E-02	785.42	1.280	PBC<MDA	BI212
794.26	21.	97.99	1.57	1.300E-02	795.87	85.530	PBC<MDA	CS134
					795.87	85.530	1.118E+01	CS134
803.02	24.	97.75	1.57	1.293E-02	801.95	8.690	PBC<MDA	CS134
					801.95	8.690	1.296E+02	CS134
809.12	83.	35.39	0.57	1.284E-02				
881.76	16.	167.27	1.64	1.203E-02	880.53	6.000	PBC<MDA	Pa234
					880.53	6.000	1.263E+01	Pa234
911.09	50.	56.96	1.66	1.172E-02	911.07	29.000	PBC<MDA	AC228
					911.07	29.000	1.937E+01	AC228
946.06	15.	197.34	1.69	1.139E-02	946.02	13.400	PBC<MDA	Pa234
					946.02	13.400	5.589E+00	Pa234
964.47	6.	552.78	1.71	1.122E-02	964.11	14.605	PBC<MDA	EU152
969.64	40.	73.12	1.71	1.118E-02	968.97	17.460	PBC<MDA	AC228
					968.97	17.460	2.650E+01	AC228
995.59	5.	472.23	1.73	1.094E-02	996.33	10.600	PBC<MDA	EU154
					996.33	10.600	4.659E+00	EU154
1005.86	25.	98.95	1.74	1.087E-02	1004.77	18.010	PBC<MDA	EU154
					1004.77	18.010	1.238E+01	EU154
1111.78	13.	217.05	1.83	1.004E-02	1112.07	13.644	PBC<MDA	EU152
1120.17	-3.	815.86	1.83	9.985E-03	1120.29	15.100	PBC<MDA	BI214
					1120.29	15.100	PBC<MDA	BI214
1173.37	5261.	1.46	1.87	9.629E-03	1173.24	99.900	7.711E+02	CO60
1332.61	4798.	1.46	2.01	8.708E-03	1332.50	99.980	7.771E+02	CO60
1408.05	2.	375.29	2.06	8.334E-03	1408.00	21.005	PBC<MDA	EU152
1461.51	-5.	196.71	2.10	8.093E-03	1460.83	10.670	PBC<MDA	K40
1764.74	4.	76.03	2.34	6.950E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
146.42	36.68	1142.	379.	2.697E+04	16.28	1.053	-	s
161.64	40.49	2139.	133.	7.772E+03	55.66	1.663	-	s
198.72	49.77	3929.	415.	1.703E+04	28.03	0.596	-	sM
223.43	55.95	2399.	145.	5.063E+03	50.29	0.624	-	sM
307.85	76.98	749.	144.	3.650E+03	28.13	0.929	-	D
316.66	79.18	776.	92.	2.284E+03	44.14	0.931	-	D
351.83	88.07	1541.	1188.	2.786E+04	5.50	0.967	-	M
1722.30	430.82	189.	38.	1.838E+03	58.13	0.499	-	sM
3235.39	809.12	156.	83.	6.465E+03	35.39	0.565	-	sM

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.97	46.58	5420.	20194.	11.219	1.00	0.891
AM-241	237.87	59.56	4487.	25028.	13.905	0.84	0.879
TH-234	245.79	61.54	1206.	-184.	-0.102	30.79	0.916s
EU-155	344.35	86.20	1723.	-110.	-0.061	54.41	0.938s
TH-234	380.25	95.17	736.	-49.	-0.027	217.31	0.943s
AC-228	372.95	93.35	1192.	56.	0.031	88.49	0.944D
U-235	372.95	93.35	1192.	56.	0.031	88.49	0.944D
EU-152	488.19	122.18	902.	61.	0.034	70.58	0.970
Pa-234	515.00	128.88	487.	-5.	-0.003	614.61	0.979s
U-235	575.24	143.95	913.	39.	0.022	110.20	0.990
U-235	653.29	163.47	852.	-24.	-0.013	174.70	1.008s
U-235	820.79	205.37	802.	11.	0.006	379.21	1.047s
PB-212	953.29	238.51	493.	181.	0.100	20.94	0.805s
TL-208	1105.71	276.63	601.	35.	0.020	99.46	1.112
I-131	1134.60	283.85	649.	38.	0.021	97.31	1.118s
PB-214	1179.31	295.03	449.	118.	0.066	34.12	0.326s
AC-228	1351.48	338.09	606.	43.	0.024	83.18	1.167s
EU-152	1375.50	344.10	616.	-11.	-0.006	332.03	1.172s
PB-214	1406.43	351.83	281.	104.	0.058	27.31	1.272
I-131	1459.85	365.19	588.	-9.	-0.005	397.04	1.190s
CS-134	2276.28	569.34	325.	-6.	-0.003	443.16	1.371s
TL-208	2330.42	582.88	188.	93.	0.052	29.40	0.812s
CS-134	2420.48	605.39	382.	-27.	-0.015	105.10	1.401s
BI-214	2435.87	609.24	337.	36.	0.020	53.14	1.405
I-131	2546.22	636.83	346.	-21.	-0.011	129.62	1.429s
CS-137	2645.99	661.78	289.	9292.	5.162	1.14	1.383
BI-212	2907.26	727.09	233.	28.	0.016	78.07	1.507s
PA-234M	3065.10	766.55	231.	21.	0.012	103.43	1.540s
EU-152	3108.94	777.51	242.	11.	0.006	209.97	1.551
BI-212	3133.87	783.74	191.	37.	0.020	55.82	1.556s
CS-134	3175.96	794.26	196.	21.	0.012	97.99	1.565s
CS-134	3210.97	803.02	270.	24.	0.014	97.75	1.570s
EU-154	3489.14	872.55	366.	-19.	-0.011	144.57	1.630s
Pa-234	3525.99	881.76	369.	16.	0.009	167.27	1.637s
AC-228	3643.32	911.09	388.	50.	0.028	56.96	1.662s
Pa-234	3783.25	946.06	451.	15.	0.009	197.34	1.691s
EU-152	3856.91	964.47	471.	6.	0.003	552.78	1.706
AC-228	3877.61	969.64	400.	40.	0.022	73.12	1.710s
EU-154	3981.42	995.59	334.	5.	0.003	472.23	1.733s
PA-234M	3998.45	999.85	318.	-11.	-0.006	222.98	1.737s
EU-154	4022.53	1005.86	285.	25.	0.014	98.95	1.740s
EU-152	4446.33	1111.78	362.	13.	0.007	217.05	1.828
CO-60	4692.81	1173.37	99.	5261.	2.923	1.46	1.869
EU-154	5088.59	1272.27	32.	-3.	-0.002	240.74	1.958s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	5330.12	1332.61	17.	4798.	2.666	1.46	2.011
EU-152	5632.05	1408.05	23.	2.	0.001	375.29	2.064s
K-40	5846.05	1461.51	36.	-5.	-0.003	196.71	2.105s
BI-214	7060.05	1764.74	19.	4.	0.002	76.03	2.336s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample		Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	5.0838E-01					5.31E+01		
			477.60	5.084E-01	%(		3.156E+01	1.84E+03	1.05E+01 G
K-40	N	-3.1300E+00					4.66E+11		
			1460.83	-3.130E+00	?(P		1.982E+01	1.97E+02	1.07E+01 G
CO-60	F	7.7409E+02					1.93E+03		
			1332.50	7.771E+02	(		3.551E+00	1.46E+00	1.00E+02 G
			1173.24	7.711E+02	(		7.193E+00	1.46E+00	9.99E+01 G
I-131	I	6.2628E-01					8.02E+00		
			364.48	-2.551E-01	?(		3.405E+00	3.97E+02	8.17E+01 G
			284.30	1.235E+01	&(		3.994E+01	9.73E+01	6.14E+00 G
			636.97	-1.037E+01	+		4.501E+01	1.30E+02	7.17E+00 G
CS-134	I	5.6266E+00					7.54E+02		
			604.71	-1.027E+01	?(		3.600E+01	1.05E+02	9.76E+01 G
			795.87	1.118E+01	&(		3.663E+01	9.80E+01	8.55E+01 G
			569.32	-1.345E+01	+		2.019E+02	4.43E+02	1.54E+01 G
			801.95	1.296E+02	(		4.227E+02	9.78E+01	8.69E+00 G
			563.24	8.247E+00	&		3.713E+02	1.33E+03	8.35E+00 G
CS-137	I	4.7736E+02					1.10E+04		
			661.66	4.774E+02	(		4.209E+00	1.14E+00	8.52E+01 G
EU-152	F	2.5135E+00					4.94E+03		
			344.29	-1.329E+00	?(		1.482E+01	3.32E+02	2.65E+01 G
			121.78	3.826E+00	(		8.921E+00	7.06E+01	2.86E+01 G
			778.92	4.945E+00	(		3.511E+01	2.10E+02	1.29E+01 G
			964.11	2.713E+00	(		5.060E+01	5.53E+02	1.46E+01 G
			1112.07	7.290E+00	(		5.327E+01	2.17E+02	1.36E+01 G
			1408.00	8.363E-01	&(		1.138E+01	3.75E+02	2.10E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	I	2.8987E+00					3.14E+03	
			873.23-1.254E+01	?(		6.079E+01	1.45E+02	1.23E+01 G
			123.10-1.484E-01	&		7.938E+00	1.59E+03	4.08E+01 G
			1274.54-1.049E+00	+		8.950E+00	2.41E+02	3.52E+01 G
			723.36 0.000E+00	+		3.157E+01	1.00E+03	2.02E+01 G
			1004.77 1.238E+01	?(		4.090E+01	9.90E+01	1.80E+01 G
			996.33 4.659E+00	?(		7.449E+01	4.72E+02	1.06E+01 G
EU-155	I	-4.2626E-01					1.81E+03	
			105.31-4.263E-01	%(		2.440E+01	1.71E+03	2.12E+01 G
			86.54-1.262E+01	+		2.258E+01	5.44E+01	3.07E+01 G
TL-208	N	4.8643E+01					6.98E+02	
			583.02 4.864E+01	(P		3.485E+01	2.94E+01	8.45E+01 G
			277.28 1.453E+02	+		4.806E+02	9.95E+01	6.31E+00 G
			860.56 1.003E+01	%		4.122E+02	1.21E+03	1.24E+01 G
PB-210	N	1.5023E+04					8.14E+03	
			46.54 1.502E+04	(P		2.572E+02	1.00E+00	4.25E+00 G
PB-212	N	9.7541E+01					6.98E+02	
			238.63 9.754E+01	(P		5.738E+01	2.09E+01	4.33E+01 G
			300.03-3.442E+00	%		9.786E+02	8.43E+03	3.28E+00 G
PB-214	N	8.6039E+00					5.84E+05	
			351.93 6.484E+00	(P		5.061E+00	2.73E+01	3.76E+01 G
			295.09 1.273E+01	(P		1.092E+01	3.41E+01	1.93E+01 G
			242.00-1.846E-01	& P		2.604E+01	9.18E+02	7.43E+00 G
BI-212	N	3.9766E+02					6.98E+02	
			727.17 1.966E+02	?(		5.097E+02	7.81E+01	7.55E+00 G
			785.42 1.584E+03	&(		2.899E+03	5.58E+01	1.28E+00 G
BI-214	N	2.5543E+00					5.84E+05	
			609.31 2.760E+00	(P		6.709E+00	5.31E+01	4.61E+01 G
			1120.29-9.480E-01	% P		2.996E+01	8.16E+02	1.51E+01 G
			1764.49 1.937E+00	&(P		1.185E+01	7.60E+01	1.54E+01 G
AC-228	N	2.1423E+01					2.10E+03	
			911.07 1.937E+01	?(		3.627E+01	5.70E+01	2.90E+01 G
			968.97 2.650E+01	&(		6.414E+01	7.31E+01	1.75E+01 G
			338.32 1.900E+01	(		5.238E+01	8.32E+01	1.20E+01 G
							Energy duplication	
			93.35 3.003E+01	*		8.802E+01	8.85E+01	5.56E+00 XA
Pa-234	N	3.8567E+00					1.63E+12	
			131.29-3.578E-01	&(		7.418E+00	6.15E+02	1.80E+01 G
			569.47 4.218E-01	%		3.150E+01	2.19E+03	8.20E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		946.02	5.589E+00	&(	3.703E+01	1.97E+02	1.34E+01 G
		883.24	1.525E-01	%	4.471E+01	8.64E+03	9.60E+00 G
		880.53	1.263E+01	&(	7.094E+01	1.67E+02	6.00E+00 G
TH-234	N -8.0934E+01					1.63E+12	
		63.29-8.093E+01		?(P	7.226E+01	3.08E+01	3.81E+00 G
		92.59-1.124E+01		& P	2.953E+01	2.17E+02	5.58E+00 G
PA-234M	N 2.6576E+01					1.63E+12	
		1001.00-6.951E+01		&(	5.227E+02	2.23E+02	8.37E-01 G
		766.41	3.001E+02	&(	1.038E+03	1.03E+02	2.94E-01 G
U-235	N 4.2884E+00					2.57E+11	
		143.79	4.687E+00	?(	1.716E+01	1.10E+02	1.10E+01 G
		205.33	3.417E+00	?(	4.342E+01	3.79E+02	5.01E+00 G
		163.38-6.618E+00		+	3.859E+01	1.75E+02	5.08E+00 G
							Energy duplication
		93.35	1.224E+01	*	3.587E+01	8.85E+01	5.81E+00 X
AM-241	T 1.2637E+03					1.58E+05	
		59.54	1.264E+03	(	1.590E+01	8.43E-01	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average

R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-234	61.54	1206.	-184.	-0.102	30.79	-8.093E+01	P
EU-155	86.20	1723.	-110.	-0.061	54.41	-1.262E+01	
TH-234	95.17	736.	-49.	-0.027	217.31	-1.124E+01	P
AC-228	93.35	1192.	56.	0.031	88.49	3.003E+01	
U-235	93.35	1192.	56.	0.031	88.49	1.224E+01	
Pa-234	128.88	487.	-5.	-0.003	614.61	-3.578E-01	
U-235	143.95	913.	39.	0.022	110.20	4.687E+00	
U-235	163.47	852.	-24.	-0.013	174.70	-6.618E+00	
U-235	205.37	802.	11.	0.006	379.21	3.417E+00	
I-131	283.85	649.	38.	0.021	97.31	0.000E+00	
AC-228	338.09	606.	43.	0.024	83.18	1.900E+01	
I-131	365.19	588.	-9.	-0.005	397.04	0.000E+00	
CS-134	569.34	325.	-6.	-0.003	443.16	-1.345E+01	
CS-134	605.39	382.	-27.	-0.015	105.10	-1.027E+01	
BI-214	609.24	337.	36.	0.020	53.14	2.760E+00	P
I-131	636.83	346.	-21.	-0.011	129.62	0.000E+00	
BI-212	727.09	233.	28.	0.016	78.07	1.966E+02	
PA-234M	766.55	231.	21.	0.012	103.43	3.001E+02	
BI-212	783.74	191.	37.	0.020	55.82	1.584E+03	
CS-134	794.26	196.	21.	0.012	97.99	1.118E+01	
CS-134	803.02	270.	24.	0.014	97.75	1.296E+02	
EU-154	872.55	366.	-19.	-0.011	144.57	-1.254E+01	
Pa-234	881.76	369.	16.	0.009	167.27	1.263E+01	
AC-228	911.09	388.	50.	0.028	56.96	1.937E+01	
Pa-234	946.06	451.	15.	0.009	197.34	5.589E+00	
AC-228	969.64	400.	40.	0.022	73.12	2.650E+01	
EU-154	995.59	334.	5.	0.003	472.23	4.659E+00	
PA-234M	999.85	318.	-11.	-0.006	222.98	-6.951E+01	
EU-154	1005.86	285.	25.	0.014	98.95	1.238E+01	
EU-154	1272.27	32.	-3.	-0.002	240.74	-1.049E+00	
K-40	1461.51	36.	-5.	-0.003	196.71	-3.130E+00	P
BI-214	1764.74	19.	4.	0.002	76.03	1.937E+00	P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

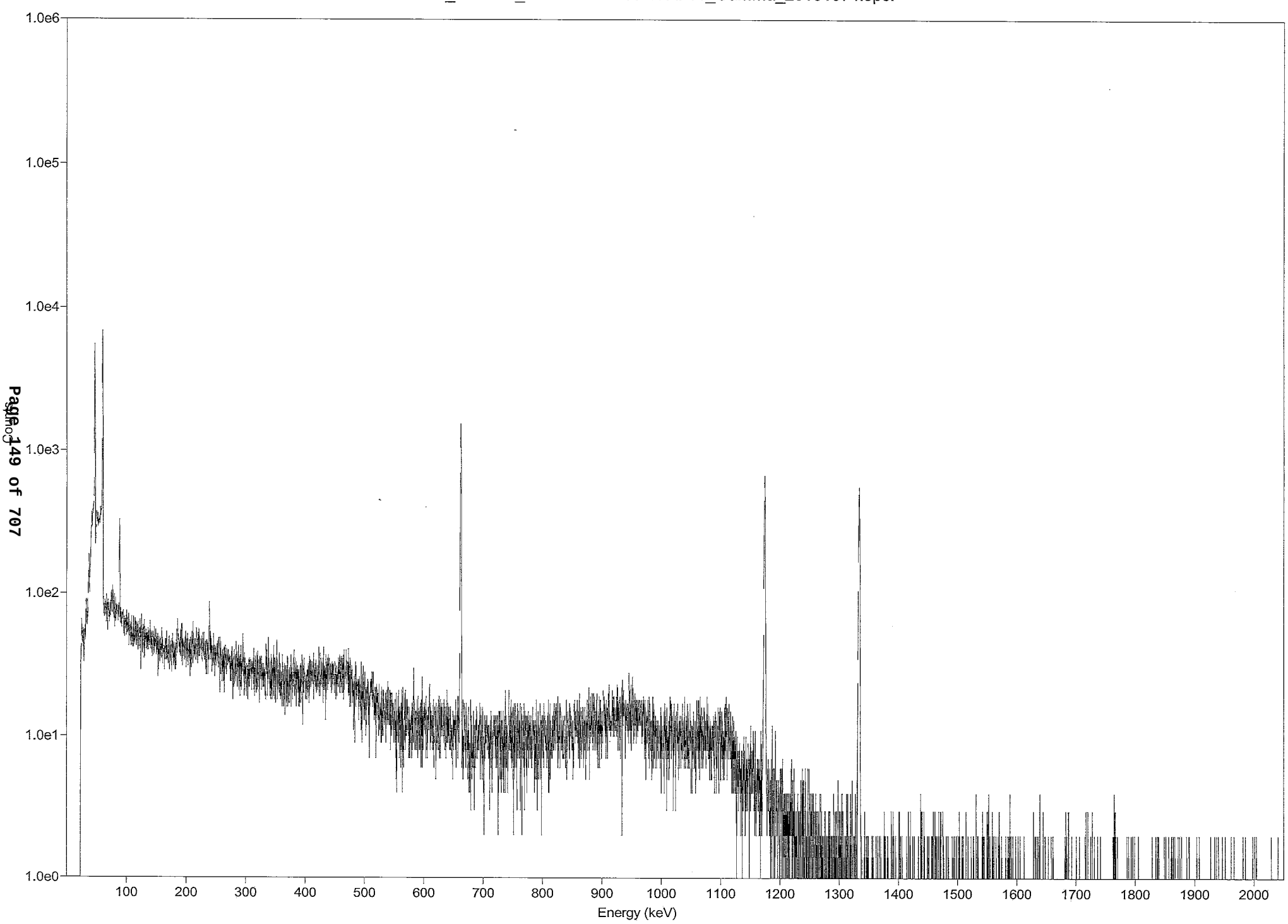
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting		MDA Bq/Sample
BE-7	A	5.0838E-01	>12 Halflives	1.8406E+03%	3.1560E+01	
K-40	#A	-3.1300E+00	-3.1300E+00	5.514E+02%		1.98E+01
CO-60		3.0499E+02	7.7409E+02	1.033E+00%		3.55E+00
I-131	#A	6.2628E-01	>12 Halflives	9.7311E+01%	3.4047E+00	
CS-134	#A	5.2196E-01	5.6266E+00	5.793E+01%		3.60E+01
CS-137		4.0529E+02	4.7736E+02	1.140E+00%		4.21E+00
EU-152	A	1.7489E+00	2.5135E+00	7.058E+01%		1.48E+01
EU-154	#A	1.6371E+00	2.8987E+00	9.895E+01%		6.08E+01
EU-155	#A	-1.5842E-01	-4.2626E-01	1.708E+03%		2.44E+01
TL-208		3.7216E+00	4.8643E+01	3.099E+01%		3.48E+01
PB-210		1.2054E+04	1.5023E+04	1.001E+00%		2.57E+02
PB-212		7.4625E+00	9.7541E+01	2.288E+01%		5.74E+01
PB-214		8.5775E+00	8.6039E+00	2.349E+01%		5.06E+00
BI-212	#A	3.0424E+01	3.9766E+02	4.799E+01%		5.10E+02
BI-214	#A	2.5465E+00	2.5543E+00	7.270E+01%		6.71E+00
AC-228	#A	9.1217E+00	2.1423E+01	4.151E+01%		3.63E+01
Pa-234	#A	3.8567E+00	3.8567E+00	1.673E+02%		7.42E+00
TH-234	#A	-8.0934E+01	-8.0934E+01	3.426E+01%		7.23E+01
PA-234M	#A	2.6576E+01	2.6576E+01	1.034E+02%		5.23E+02
U-235	#A	4.2884E+00	4.2884E+00	1.102E+02%		1.72E+01
AM-241		1.2494E+03	1.2637E+03	8.426E-01%		1.59E+01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

S U M M A R Y

Total Activity (87.9 to 1999.5 keV) 1.403E+04 Bq/Sample
Total Decayed Activity (87.9 to 1999.5 keV) 1.7692848E+04 Bq/Sample

The library has energies which are not separable.


77739_Gamma_LCS 160-77739~2-A. 11_Gamma_20131574.spc.
1.0e6
1.0e5
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Counts
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)

Sample Description: 77739_Gamma_LCS 160-77739~2-A
Detector: Ge15 SN/11012216
Batch ID: 77739
Work Order Number: Gamma
Lot Number: LCS 160-77739~2-A

Decay to Time: 10/1/2006 12:00 Live Time: 1800 sec
Acquisition Time: 10/31/2013 10:54:41 Real Time: 1807 sec
Analysis Time: 11/11/2013 12:28 Dead Time: 0.38 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 15_Soil_TunaCan.Clb
Efficiency Cal Desc: 15_TunaCan_90099_032212
Efficiency Cal Date: 3/22/2012 13:03
Energy Cal Date: 2/28/2012 16:29
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 15_2013-10-05_0052.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
K-40	3.365E+00	147.9	4.978E+00	4.980E+00	1.890E+01
CO-60	7.700E+02	1.2	9.559E+00	3.982E+01	5.695E+00
CS-134	5.179E+00	73.9	3.829E+00	3.839E+00	3.939E+01
CS-137	4.556E+02	1.3	6.088E+00	2.447E+01	5.061E+00
EU-152	4.086E+00	106.8	4.362E+00	4.367E+00	1.678E+01
EU-154	1.345E+01	155.0	2.084E+01	2.085E+01	7.011E+01
EU-155	1.419E+00	123.9	1.757E+00	1.759E+00	2.813E+01
TL-208	4.567E+01	43.4	1.980E+01	1.994E+01	5.254E+01
PB-210	1.493E+04	1.1	1.619E+02	8.917E+02	2.762E+02
PB-212	1.324E+02	21.1	2.790E+01	2.919E+01	6.645E+01
PB-214	6.175E+00	39.3	2.429E+00	2.450E+00	8.077E+00
BI-212	4.218E+02	59.0	2.489E+02	2.499E+02	5.958E+02
BI-214	6.688E+00	33.6	2.247E+00	2.274E+00	5.883E+00
AC-228	1.495E+01	55.3	8.263E+00	8.298E+00	4.572E+01
Pa-234	3.895E+00	85.0	3.312E+00	3.318E+00	1.110E+01
TH-234	-3.768E+02	9.8	3.708E+01	4.199E+01	1.088E+02
PA-234M	1.072E+02	159.5	1.710E+02	1.710E+02	5.770E+02
U-235	5.110E+00	111.1	5.678E+00	5.684E+00	1.888E+01
AM-241	1.267E+03	0.9	1.133E+01	6.673E+01	1.689E+01
Total	1.820E+04				

Analyst: Jody Watson

TestAmerica, Inc. Spectrum name: 15_Gamma_20131338.An1

Sample description
77739_Gamma_LCS 160-77739~2-A

Spectrum Filename: C:\User\SPC\Det15\15_Gamma_20131338.An1

Acquisition information

Start time:	10/31/2013 10:54:41 AM
Live time:	1800
Real time:	1807
Dead time:	0.38 %
Detector ID:	15

Detector system
Ge15 SN/11012216

Calibration

Filename:	15_Soil_TunaCan.Clb

15_TunaCan_90099_032212

Energy Calibration

Created:	2/28/2012 4:29:17 PM
Zero offset:	0.044 keV
Gain:	0.250 keV/channel
Quadratic:	-3.267E-08 keV/channel^2

Efficiency Calibration

Created:	3/22/2012 1:03:01 PM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 1.00 %
Log(Eff):	-6.894897E-01 + (-3.290613E-01*Log(E)) + (-3.875629E-02*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 1.13 %
Log(Eff):	-2.362677E+01 + (8.666669E+00*Log(E)) + (-9.214638E-01*Log(E)^2)

Library Files

Main analysis library:	Client_Routine Short Rev1.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.57keV)
Stop channel:	8000 (1999.52keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	15_2013-10-05_0052.PBC 10/5/2013 12:52:55 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 22 cutoff: 5.00E+01%

Energy Calibration
Normalized diff: 0.0729

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
40.83	107.	69.92	0.27	1.564E-02				
46.57	16947.	0.93	0.95	1.956E-02	46.54	4.250	1.409E+04	PB210
49.39	13.	607.24	0.95	2.141E-02				
59.56	22159.	0.89	0.99	2.738E-02	59.54	35.900	1.267E+03	AM241
77.46	120.	41.83	0.82	3.462E-02				
84.09	32.	123.88	0.98	3.679E-02	86.54	30.700	PBC<MDA	EU155
88.11	901.	7.82	1.12	3.707E-02				
92.79	98.	44.60	0.51	3.778E-02	92.59	5.584	PBC<MDA	TH234
					92.59	5.584	1.948E+01	TH234
93.24	5.	773.45	0.99	3.785E-02	93.35	5.561	PBC<MDA	AC228
					93.35	5.810	1.178E+00	U235
112.41	97.	39.62	0.77	3.882E-02				
121.38	35.	121.43	1.02	3.848E-02	121.78	28.580	PBC<MDA	EU152
					121.78	28.580	2.539E+00	EU152
124.36	78.	43.12	0.45	3.831E-02				
131.26	48.	85.04	1.02	3.775E-02	131.29	18.000	PBC<MDA	Pa234
					131.29	18.000	3.938E+00	Pa234
143.74	37.	111.11	1.04	3.639E-02	143.79	10.960	PBC<MDA	U235
					143.79	10.960	5.110E+00	U235
181.54	53.	54.86	0.41	3.176E-02				
185.96	61.	51.19	0.62	3.120E-02				
228.17	43.	62.64	0.30	2.681E-02				
233.55	23.	89.52	0.49	2.634E-02				
238.59	205.	19.87	1.43	2.592E-02	238.63	43.300	1.324E+02	PB212
243.73	4.	848.75	1.12	2.565E-02	242.00	7.430	PBC<MDA	PB214
					242.00	7.430	1.143E+00	PB214
246.53	44.	71.15	0.34	2.529E-02				
277.43	21.	164.07	1.15	2.513E-02	277.28	6.310	PBC<MDA	TL208

					277.28	6.310	PBC<MDA	TL208
289.99	45.	62.18	0.31	2.235E-02				
295.38	45.	74.52	1.17	2.205E-02	295.09	19.300	PBC<MDA	PB214
					295.09	19.300	5.882E+00	PB214
338.60	50.	55.28	0.30	1.983E-02	338.32	12.010	PBC<MDA	AC228
344.74	4.	742.34	1.21	1.956E-02	344.29	26.500	PBC<MDA	EU152
					344.29	26.500	6.704E-01	EU152
351.99	82.	39.34	1.22	1.923E-02	351.93	37.600	PBC<MDA	PB214
					351.93	37.600	6.325E+00	PB214
362.41	3.	994.26	1.23	1.871E-02	364.48	81.700	HL>Cutoff	I131
					364.48	81.700	HL>Cutoff	I131
434.37	25.	69.79	0.47	1.628E-02				
540.45	22.	51.83	0.32	1.364E-02				
563.18	29.	73.94	1.39	1.319E-02	563.24	8.350	PBC<MDA	CS134
					563.24	8.350	1.594E+02	CS134
583.36	55.	38.89	1.41	1.282E-02	583.02	84.500	PBC<MDA	TL208
					583.02	84.500	PBC<MDA	TL208
609.27	82.	30.58	0.70	1.236E-02	609.31	46.090	7.344E+00	BI214
637.24	36.	60.77	1.45	1.192E-02	636.97	7.170	HL>Cutoff	I131
					636.97	7.170	HL>Cutoff	I131
661.74	6850.	1.34	1.48	1.154E-02	661.66	85.210	4.556E+02	CS137

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
726.85	34.	59.01	1.52	1.067E-02	727.17	7.550	PBC<MDA	BI212
775.52	2.	756.00	1.56	1.007E-02	778.92	12.940	PBC<MDA	EU152
					778.92	12.940	1.462E+00	EU152
785.23	19.	107.79	1.57	9.998E-03	785.42	1.280	PBC<MDA	BI212
860.96	12.	207.24	1.62	9.252E-03	860.56	12.420	PBC<MDA	TL208
					860.56	12.420	7.432E+01	TL208
872.69	15.	154.96	1.63	9.137E-03	873.23	12.270	PBC<MDA	EU154
					873.23	12.270	1.345E+01	EU154
880.64	6.	446.96	1.64	9.072E-03	880.53	6.000	PBC<MDA	Pa234
					883.24	9.600	3.612E+00	Pa234
					880.53	6.000	5.764E+00	Pa234
881.05	4.	542.69	1.64	9.048E-03	880.53	6.000	PBC<MDA	Pa234
					883.24	9.600	2.646E+00	Pa234
					883.24	9.600	2.646E+00	Pa234
910.94	42.	55.81	0.50	8.812E-03	911.07	29.000	2.145E+01	AC228
969.54	11.	233.14	1.70	8.357E-03	968.97	17.460	PBC<MDA	AC228
998.60	13.	159.52	1.72	8.125E-03	1001.00	0.837	PBC<MDA	PA234M
1043.81	22.	49.44	0.50	7.836E-03				
1113.40	21.	106.75	1.80	7.416E-03	1112.07	13.644	PBC<MDA	EU152
					1112.07	13.644	1.645E+01	EU152
1120.71	3.	324.01	1.80	7.368E-03	1120.29	15.100	PBC<MDA	BI214
1173.35	3847.	1.77	1.69	7.076E-03	1173.24	99.900	7.674E+02	CO60
1274.60	4.	168.52	1.90	6.579E-03	1274.54	35.190	PBC<MDA	EU154
					1274.54	35.190	1.833E+00	EU154
1332.66	3465.	1.74	1.93	6.324E-03	1332.50	99.980	7.726E+02	CO60
1461.86	4.	71.29	2.02	5.828E-03	1460.83	10.670	PBC<MDA	K40
1764.84	6.	62.35	2.18	4.916E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
163.02	40.83	2072.	107.	6.861E+03	69.92	0.275 -	s
197.05	49.34	2432.	256.	1.197E+04	32.03	0.813 -	M
309.42	77.46	800.	120.	3.466E+03	41.83	0.818 -	s
352.00	88.11	1017.	901.	2.430E+04	6.01	1.125 -	s
370.26	92.79	564.	97.	2.580E+03	35.89	0.989 -	D
449.15	112.41	460.	97.	2.499E+03	39.62	0.767 -	
496.92	124.36	413.	96.	2.498E+03	31.71	0.446 -	s
725.46	181.54	293.	53.	1.658E+03	54.86	0.413 -	s
743.15	185.96	347.	61.	1.966E+03	51.19	0.620 -	s
911.90	228.17	273.	43.	1.604E+03	62.64	0.301 -	s
933.42	233.55	188.	23.	8.795E+02	89.52	0.493 -	sc
985.29	246.53	312.	44.	1.740E+03	71.15	0.344 -	sM
1159.03	289.99	246.	45.	2.014E+03	62.18	0.308 -	sM
1736.34	434.37	127.	25.	1.526E+03	69.79	0.469 -	sc
2160.53	540.45	54.	22.	1.613E+03	51.83	0.320 -	s
4174.07	1043.81	40.	22.	2.871E+03	49.44	0.500 -	sM

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.77	46.52	4987.	17937.	9.965	1.08	0.948
AM-241	237.90	59.56	3943.	22159.	12.310	0.89	0.989
TH-234	245.27	61.41	2137.	-756.	-0.420	9.58	0.962s
EU-155	335.93	84.09	763.	32.	0.018	123.88	0.983s
TH-234	370.20	92.66	1149.	52.	0.029	63.10	0.989s
AC-228	372.95	93.35	648.	5.	0.003	773.45	0.989D
U-235	372.95	93.35	981.	89.	0.049	50.97	0.989D
EU-155	421.17	105.41	1063.	-14.	-0.008	319.41	1.000s
EU-152	485.01	121.38	884.	35.	0.019	121.43	1.015s
EU-154	491.96	123.12	1007.	-29.	-0.016	154.75	1.017s
Pa-234	524.49	131.26	815.	48.	0.027	85.04	1.024s
U-235	574.37	143.74	812.	37.	0.020	111.11	1.036s
U-235	652.91	163.39	727.	-19.	-0.010	203.98	1.053s
PB-212	953.55	238.59	460.	205.	0.114	19.87	1.430s
PB-214	974.11	243.73	548.	4.	0.002	848.75	1.123s
TL-208	1108.85	277.43	600.	21.	0.012	164.07	1.154s
I-131	1131.84	283.18	485.	-11.	-0.006	281.74	1.160s
PB-214	1180.60	295.38	538.	45.	0.025	74.52	1.170
AC-228	1353.39	338.60	238.	50.	0.028	55.28	0.297s
EU-152	1377.94	344.74	520.	4.	0.002	742.34	1.212s
PB-214	1406.93	351.99	480.	82.	0.046	39.34	1.219
I-131	1448.61	362.41	377.	3.	0.002	994.26	1.229s
BE-7	1908.87	477.52	536.	-7.	-0.004	497.88	1.324s
CS-134	2251.43	563.18	220.	29.	0.016	73.94	1.394s
CS-134	2276.67	569.49	238.	-18.	-0.010	122.24	1.399s
Pa-234	2276.53	569.45	236.	-17.	-0.010	127.24	1.399s
TL-208	2332.17	583.36	264.	55.	0.031	38.89	1.410
CS-134	2417.07	604.59	274.	-16.	-0.009	146.27	1.427s
BI-214	2435.76	609.27	152.	75.	0.042	30.58	0.701s
I-131	2547.65	637.24	223.	36.	0.020	60.77	1.452s
CS-137	2645.63	661.74	248.	6850.	3.806	1.34	1.481
EU-154	2890.98	723.08	251.	-25.	-0.014	92.05	1.519s
BI-212	2906.06	726.85	185.	34.	0.019	59.01	1.522s
EU-152	3100.71	775.52	162.	2.	0.001	756.00	1.561s
BI-212	3139.57	785.23	208.	19.	0.011	107.79	1.566s
TL-208	3442.52	860.96	291.	12.	0.007	207.24	1.622s
EU-154	3489.45	872.69	274.	15.	0.009	154.96	1.631s
Pa-234	3521.25	880.64	316.	6.	0.003	446.96	1.636s
Pa-234	3522.88	881.05	250.	4.	0.002	542.69	1.638s
AC-228	3643.08	911.09	347.	25.	0.014	106.08	1.658s
Pa-234	3767.65	942.23	214.	-2.	-0.001	998.44	1.683s
AC-228	3876.90	969.54	319.	11.	0.006	233.14	1.699
EU-154	3986.82	997.01	298.	-15.	-0.008	169.19	1.718s
PA-234M	3993.17	998.60	212.	13.	0.007	159.52	1.722s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	4452.54	1113.40	237.	21.	0.012	106.75	1.797s
BI-214	4481.79	1120.71	179.	3.	0.002	324.01	1.803
CO-60	4692.45	1173.35	117.	3847.	2.137	1.77	1.694
EU-154	5097.64	1274.60	24.	4.	0.002	168.52	1.902s
CO-60	5330.02	1332.66	24.	3465.	1.925	1.74	1.926
K-40	5847.16	1461.86	16.	4.	0.002	71.29	2.015s
BI-214	7060.16	1764.84	15.	6.	0.004	62.35	2.180s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	Peak MDA Value Bq/Sample		COMMENTS
BE-7	C	-2.3099E+00				5.31E+01		
			477.60	-2.310E+00	&(	3.873E+01	4.98E+02	1.05E+01 G
K-40	N	3.3645E+00				4.66E+11		
			1460.83	3.365E+00	&(P	1.890E+01	7.13E+01	1.07E+01 G
CO-60	F	7.7002E+02				1.93E+03		
			1332.50	7.726E+02	(	5.695E+00	1.74E+00	1.00E+02 G
			1173.24	7.674E+02	(	1.058E+01	1.77E+00	9.99E+01 G
I-131	I	1.9868E+00				8.02E+00		
			364.48	1.005E-01	&(	3.386E+00	9.94E+02	8.17E+01 G
			284.30	-4.432E+00	+	4.199E+01	2.82E+02	6.14E+00 G
			636.97	2.348E+01	(	4.698E+01	6.08E+01	7.17E+00 G
CS-134	I	5.1785E+00				7.54E+02		
			604.71	-8.013E+00	?(	3.939E+01	1.46E+02	9.76E+01 G
			795.87	2.035E-01	%	5.332E+01	7.67E+03	8.55E+01 G
			569.32	-5.420E+01	+	2.223E+02	1.22E+02	1.54E+01 G
			801.95	-5.550E+00	&	5.174E+02	2.73E+03	8.69E+00 G
			563.24	1.594E+02	&(	3.908E+02	7.39E+01	8.35E+00 G
CS-137	I	4.5561E+02				1.10E+04		
			661.66	4.556E+02	(	5.061E+00	1.34E+00	8.52E+01 G
EU-152	F	4.0858E+00				4.94E+03		
			344.29	6.704E-01	&(	1.678E+01	7.42E+02	2.65E+01 G
			121.78	2.539E+00	*(	1.026E+01	1.21E+02	2.86E+01 G
			778.92	1.462E+00	?(	3.795E+01	7.56E+02	1.29E+01 G
			964.11	1.838E-01	&	5.194E+01	8.29E+03	1.46E+01 G
			1112.07	1.645E+01	&(	5.876E+01	1.07E+02	1.36E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1408.00	-9.699E-03 %		1.274E+01	3.45E+04	2.10E+01 G
EU-154	I	1.3449E+01					3.14E+03	
			873.23	1.345E+01 &(		7.011E+01	1.55E+02	1.23E+01 G
			123.10	-1.835E+00 -		9.460E+00	1.55E+02	4.08E+01 G
			1274.54	1.833E+00 -		1.090E+01	1.69E+02	3.52E+01 G
			723.36	-1.133E+01 +		3.476E+01	9.20E+01	2.02E+01 G
			1004.77	-4.802E-01 &		5.487E+01	3.35E+03	1.80E+01 G
			996.33	-1.660E+01 &		9.452E+01	1.69E+02	1.06E+01 G
EU-155	I	1.4186E+00					1.81E+03	
			105.31	-2.635E+00 ?(		2.813E+01	3.19E+02	2.12E+01 G
			86.54	4.218E+00 ?(		1.740E+01	1.24E+02	3.07E+01 G
TL-208	N	4.5666E+01					6.98E+02	
			583.02	3.712E+01 ?(P		5.254E+01	3.89E+01	8.45E+01 G
			277.28	1.037E+02 &(P		5.816E+02	1.64E+02	6.31E+00 G
			860.56	7.432E+01 ?(		5.196E+02	2.07E+02	1.24E+01 G
PB-210	N	1.4933E+04					8.14E+03	
			46.54	1.493E+04 (P		2.762E+02	1.08E+00	4.25E+00 G
PB-212	N	1.3244E+02					6.98E+02	
			238.63	1.324E+02 (P		6.645E+01	1.99E+01	4.33E+01 G
			300.03	-5.919E+00 %		1.025E+03	5.11E+03	3.28E+00 G
PB-214	N	6.1745E+00					5.84E+05	
			351.93	6.325E+00 (		8.077E+00	3.93E+01	3.76E+01 G
			295.09	5.882E+00 ?(		1.450E+01	7.45E+01	1.93E+01 G
			242.00	1.143E+00 -		3.269E+01	8.49E+02	7.43E+00 G
BI-212	N	4.2178E+02					6.98E+02	
			727.17	3.071E+02 (		5.958E+02	5.90E+01	7.55E+00 G
			785.42	1.098E+03 (		3.967E+03	1.08E+02	1.28E+00 G
BI-214	N	6.6878E+00					5.84E+05	
			609.31	7.344E+00 (P		5.883E+00	3.06E+01	4.61E+01 G
			1120.29	1.624E+00 - P		3.260E+01	3.24E+02	1.51E+01 G
			1764.49	4.725E+00 ?(P		1.524E+01	6.23E+01	1.54E+01 G
AC-228	N	1.4948E+01					2.10E+03	
			911.07	1.291E+01 ?(		4.572E+01	1.06E+02	2.90E+01 G
			968.97	9.765E+00 (		7.681E+01	2.33E+02	1.75E+01 G
			338.32	2.739E+01 (		4.087E+01	5.53E+01	1.20E+01 G
								Energy duplication
			93.35	2.891E+00 -		7.523E+01	7.73E+02	5.56E+00 XA

Nuclide		Ave activity	Energy		Activity	Code	Peak	MDA	Comments
Pa-234	N	3.8949E+00						1.63E+12	
			131.29	3.938E+00		&(	1.110E+01	8.50E+01	1.80E+01 G
			569.47	-9.005E+00		+	3.848E+01	1.27E+02	8.20E+00 G
			946.02	-1.010E+00		-	3.446E+01	9.98E+02	1.34E+01 G
			883.24	2.646E+00		?(	4.886E+01	5.43E+02	9.60E+00 G
			880.53	5.764E+00		&(	8.727E+01	4.47E+02	6.00E+00 G
TH-234	N	-3.7684E+02						1.63E+12	
			63.29	-3.768E+02		?(P	1.088E+02	9.58E+00	3.81E+00 G
			92.59	1.379E+01		+ P	4.233E+01	6.31E+01	5.58E+00 G
PA-234M	N	1.0717E+02						1.63E+12	
			1001.00	1.072E+02		?(	5.770E+02	1.60E+02	8.37E-01 G
			766.41	1.437E+01		%	1.209E+03	2.45E+03	2.94E-01 G
U-235	N	5.1103E+00						2.57E+11	
			143.79	5.110E+00		(	1.888E+01	1.11E+02	1.10E+01 G
			205.33	1.168E+00		&	5.126E+01	1.31E+03	5.01E+00 G
			163.38	-6.110E+00		+	4.168E+01	2.04E+02	5.08E+00 G
									Energy duplication
			93.35	2.244E+01		&	3.756E+01	5.10E+01	5.81E+00 X
AM-241	T	1.2671E+03						1.58E+05	
			59.54	1.267E+03		(	1.689E+01	8.94E-01	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-234	61.41	2137.	-756.	-0.420	9.58	-3.768E+02	P
EU-155	84.09	763.	32.	0.018	123.88	4.218E+00	
TH-234	92.66	1149.	52.	0.029	63.10	1.379E+01	P
U-235	93.35	981.	89.	0.049	50.97	2.244E+01	
EU-155	105.41	1063.	-14.	-0.008	319.41	-2.635E+00	
EU-152	121.38	884.	35.	0.019	121.43	2.539E+00	
EU-154	123.12	1007.	-29.	-0.016	154.75	-1.835E+00	
Pa-234	131.26	815.	48.	0.027	85.04	3.938E+00	
U-235	143.74	812.	37.	0.020	111.11	5.110E+00	
U-235	163.39	727.	-19.	-0.010	203.98	-6.110E+00	
PB-214	243.73	548.	4.	0.002	848.75	1.143E+00	
TL-208	277.43	600.	21.	0.012	164.07	1.037E+02	P
I-131	283.18	485.	-11.	-0.006	281.74	0.000E+00	
PB-214	295.38	538.	45.	0.025	74.52	5.882E+00	
EU-152	344.74	520.	4.	0.002	742.34	6.704E-01	
PB-214	351.99	480.	82.	0.046	39.34	6.325E+00	
I-131	362.41	377.	3.	0.002	994.26	0.000E+00	
BE-7	477.52	536.	-7.	-0.004	497.88	0.000E+00	
CS-134	563.18	220.	29.	0.016	73.94	1.594E+02	
CS-134	569.49	238.	-18.	-0.010	122.24	-5.420E+01	
Pa-234	569.45	236.	-17.	-0.010	127.24	-9.005E+00	
TL-208	583.36	264.	55.	0.031	38.89	3.712E+01	P
CS-134	604.59	274.	-16.	-0.009	146.27	-8.013E+00	
I-131	637.24	223.	36.	0.020	60.77	0.000E+00	
EU-154	723.08	251.	-25.	-0.014	92.05	-1.133E+01	
BI-212	726.85	185.	34.	0.019	59.01	3.071E+02	
EU-152	775.52	162.	2.	0.001	756.00	1.462E+00	
BI-212	785.23	208.	19.	0.011	107.79	1.098E+03	
TL-208	860.96	291.	12.	0.007	207.24	7.432E+01	
EU-154	872.69	274.	15.	0.009	154.96	1.345E+01	
Pa-234	880.64	316.	6.	0.003	446.96	5.764E+00	
Pa-234	881.05	250.	4.	0.002	542.69	2.646E+00	
Pa-234	942.23	214.	-2.	-0.001	998.44	-1.010E+00	
EU-154	997.01	298.	-15.	-0.008	169.19	-1.660E+01	
PA-234M	998.60	212.	13.	0.007	159.52	1.072E+02	
EU-152	1113.40	237.	21.	0.012	106.75	1.645E+01	
EU-154	1274.60	24.	4.	0.002	168.52	1.833E+00	
K-40	1461.86	16.	4.	0.002	71.29	3.365E+00	P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting		MDA Bq/Sample
BE-7	#A	-2.3099E+00	>12 Halflives	4.9788E+02%	3.8727E+01	
K-40	#A	3.3645E+00	3.3645E+00	1.479E+02%		1.89E+01
CO-60		3.0338E+02	7.7002E+02	1.241E+00%		5.69E+00
I-131	#A	1.9868E+00	>12 Halflives	6.0769E+01%	3.3861E+00	
CS-134	#A	4.8037E-01	5.1785E+00	7.394E+01%		3.94E+01
CS-137		3.8683E+02	4.5561E+02	1.336E+00%		5.06E+00
EU-152	#A	2.8429E+00	4.0858E+00	1.068E+02%		1.68E+01
EU-154	#A	7.5957E+00	1.3449E+01	1.550E+02%		7.01E+01
EU-155	#A	5.2723E-01	1.4186E+00	1.239E+02%		2.81E+01
TL-208	#A	3.4936E+00	4.5666E+01	4.336E+01%		5.25E+01
PB-210		1.1982E+04	1.4933E+04	1.084E+00%		2.76E+02
PB-212	#	1.0132E+01	1.3244E+02	2.107E+01%		6.64E+01
PB-214	#A	6.1556E+00	6.1745E+00	3.934E+01%		8.08E+00
BI-212	#A	3.2268E+01	4.2178E+02	5.901E+01%		5.96E+02
BI-214		6.6673E+00	6.6878E+00	3.360E+01%		5.88E+00
AC-228	A	6.3644E+00	1.4948E+01	5.528E+01%		4.57E+01
Pa-234	#A	3.8949E+00	3.8949E+00	8.504E+01%		1.11E+01
TH-234	#A	-3.7684E+02	-3.7684E+02	9.841E+00%		1.09E+02
PA-234M	#A	1.0717E+02	1.0717E+02	1.595E+02%		5.77E+02
U-235	#A	5.1103E+00	5.1103E+00	1.111E+02%		1.89E+01
AM-241		1.2528E+03	1.2671E+03	8.940E-01%		1.69E+01

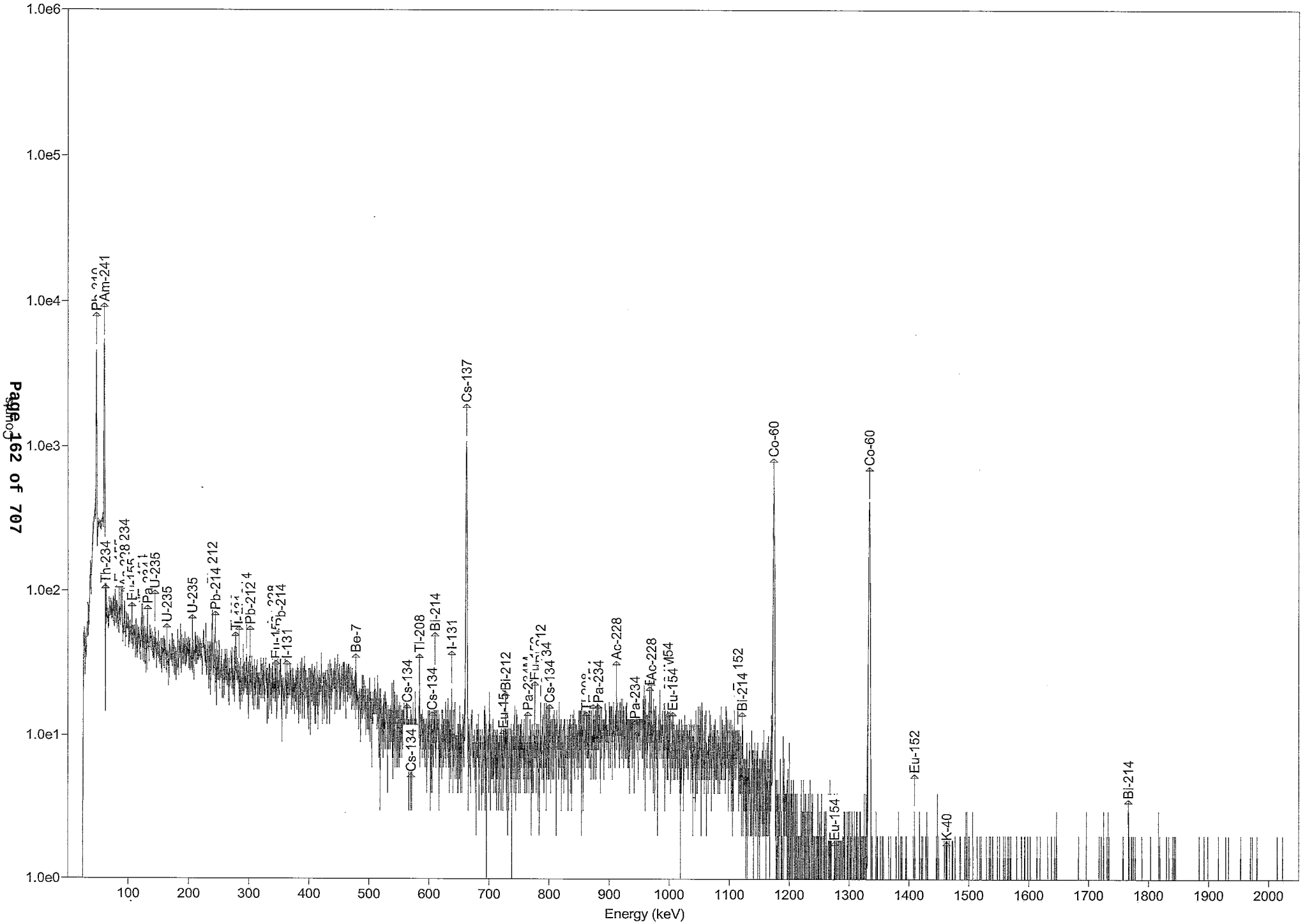
- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (112.4 to 1999.5 keV) 1.394E+04 Bq/Sample
Total Decayed Activity (112.4 to 1999.5 keV) 1.7565109E+04 Bq/Sample

The library has energies which are not separable.

77739_Gamma_LCS 160-77739~2-A. 15_Gamma_20131338.spc.



Reagent

Tuna Can_00002

Rec'd 2/3/10

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

81427-334

1.0 Liter Sand in 1 Liter HDPE Silgan Jar

Customer: TestAmerica/St. Louis, MO
P.O. No.: 2339090, Item 1
Reference Date: 01-Jan-2010 12:00 PM EST **Grams of Master Source:** 0.017570

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Pb-210	46.5	8.120E+03	———	3.141E+03	0.1	2.1	4.1	4π LS
Am-241	59.5	1.580E+05	———	2.034E+03	0.1	1.7	3.5	4π LS
Cd-109	88.0	4.626E+02	1.606E+05	2.822E+03	0.4	2.3	4.7	HPGe
Co-57	122.1	2.718E+02	8.471E+04	1.488E+03	0.5	2.0	4.1	HPGe
Ce-139	165.9	1.376E+02	1.209E+05	2.124E+03	0.4	1.9	3.9	HPGe
Hg-203	279.2	4.661E+01	2.726E+05	4.790E+03	0.4	1.9	3.9	HPGe
Sn-113	391.7	1.151E+02	1.672E+05	2.938E+03	0.5	1.9	3.9	HPGe
Cs-137	661.7	1.098E+04	1.096E+05	1.926E+03	0.6	1.9	4.0	HPGe
Y-88	898.0	1.066E+02	4.077E+05	7.163E+03	0.4	1.9	3.9	HPGe
Co-60	1173.2	1.925E+03	2.055E+05	3.611E+03	0.5	1.9	3.9	HPGe
Co-60	1332.5	1.925E+03	2.056E+05	3.612E+03	0.7	1.9	4.0	HPGe
Y-88	1836.1	1.066E+02	4.308E+05	7.569E+03	0.5	1.9	3.9	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1956

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd Atlanta, Georgia 30318

Comments:
1550 grams of sand.
This standard will expire one year after the reference date.

Source Prepared by: _____
W. Mao, Radiochemist

QA Approved: _____ Date: 2/1/10
J. D. McCorvey, QA Manager Alternate

Reagent

Tuna Can_00003

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

90099
1.0 Liter Sand in 1 Liter Wide Mouth HDPE Silgan Jar

Customer: TestAmerica St. Louis / Earth City, MO
P.O. No.: 2454150, Item 1
Reference Date: 01-Jan-2012 12:00 PM EST **Grams of Master Source:** 0.017180

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Additional radionuclides were added gravimetrically from solutions calibrated by gamma-ray spectrometry, ionization chamber, or liquid scintillation counting. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty* , % Type u_A	u_B	U	Calibration Method*
Pb-210	46.5	8.109E+03	———	3.094E+03	0.1	2.1	4.1	4π LS
Am-241	59.5	1.580E+05	———	2.037E+03	0.1	1.7	3.5	4π LS
Cd-109	88.0	4.626E+02	1.677E+05	2.881E+03	0.5	2.3	4.7	HPGe
Co-57	122.1	2.718E+02	8.795E+04	1.511E+03	0.4	2.0	4.1	HPGe
Ce-139	165.9	1.376E+02	1.245E+05	2.139E+03	0.4	1.9	3.9	HPGe
Hg-203	279.2	4.661E+01	2.707E+05	4.651E+03	0.3	1.9	3.8	HPGe
Sn-113	391.7	1.151E+02	1.755E+05	3.015E+03	0.4	1.9	3.9	HPGe
Cs-137	661.7	1.098E+04	1.128E+05	1.938E+03	0.7	1.9	4.0	HPGe
Y-88	898.0	1.066E+02	4.228E+05	7.264E+03	0.5	1.9	3.9	HPGe
Co-60	1173.2	1.925E+03	2.084E+05	3.580E+03	0.6	1.9	4.0	HPGe
Co-60	1332.5	1.925E+03	2.084E+05	3.581E+03	0.7	1.9	4.0	HPGe
Y-88	1836.1	1.066E+02	4.476E+05	7.690E+03	0.7	1.9	4.0	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Corporate Office

Comments:
1550 grams of sand. Homogenous down to 10 grams aliquot.
This standard will expire one year after the reference date.

Source Prepared by: _____
Z. Dimitrova, Radiochemist

QA Approved: _____ Date: 30 JAN 12
J.D. McCorvey, Counting Room Manager

Reagent

Tuna Can_00006

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

83814-334

1.0 Liter Sand in 1 Liter Wide Mouth HDPE Silgan Jar

Customer: Test America St. Louis
P.O. No.: 2395112, Item 1
Reference Date: 01-Jan-2011 12:00 PM EST **Grams of Master Source:** 0.016927

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Pb-210	46.5	8.120E+03	———	3.021E+03	0.1	2.1	4.1	4π LS
Am-241	59.5	1.580E+05	———	2.090E+03	0.1	1.7	3.5	4π LS
Cd-109	88.0	4.626E+02	1.697E+05	2.873E+03	0.8	2.3	4.9	HPGe
Co-57	122.1	2.718E+02	8.711E+04	1.475E+03	0.5	2.0	4.1	HPGe
Ce-139	165.9	1.376E+02	1.247E+05	2.111E+03	0.5	1.9	3.9	HPGe
Hg-203	279.2	4.661E+01	2.753E+05	4.660E+03	0.4	1.9	3.9	HPGe
Sn-113	391.7	1.151E+02	1.769E+05	2.994E+03	0.5	1.9	3.9	HPGe
Cs-137	661.7	1.098E+04	1.109E+05	1.877E+03	0.7	1.9	4.0	HPGe
Y-88	898.0	1.066E+02	4.224E+05	7.150E+03	0.5	1.9	3.9	HPGe
Co-60	1173.2	1.925E+03	2.142E+05	3.626E+03	0.6	1.9	4.0	HPGe
Co-60	1332.5	1.925E+03	2.143E+05	3.627E+03	0.6	1.9	4.0	HPGe
Y-88	1836.1	1.066E+02	4.472E+05	7.570E+03	0.5	1.9	3.9	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Comments:
1550 grams of sand. Homogeneous down to 10 gram aliquot.
This standard will expire one year after the reference date.

Source Prepared by: _____
Z. Dimitrova, Radiochemist

QA Approved: _____ Date: 2/11/11
J. D. McCorvey, QA Manager Alternate

ALPHA SPECTROSCOPY

Method A-01-R Th

Isotopic Thorium (Alpha Spectrometry) by Method A-01-R

Prep Batch: 128227

, Extraction Chromatography Resin Actinide

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128227

Lab ID: MB 160-128227/1-A
Client ID:
Sigma: 2
Analyzed: 07/01/14 12:32
Detector: AV117
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.0006459	0.0224	0.0224	U	pCi/g	1.00	0.0669	129243
Thorium-230	0.1034	0.0654	0.0660		pCi/g	1.00	0.0310	129243
Thorium-232	0.0000	0.00386	0.00386	U	pCi/g	1.00	0.0309	129243

Tracer	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.743	0.473	0.675		pCi/g	0.0593	6.12	93.9	30 - 110

Lab ID: LCS 160-128227/2-A
Client ID:
Sigma: 2
Analyzed: 07/01/14 12:32
Detector: AV118
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	24.83	1.65	2.66		pCi/g	1.00	0.156	129244

Tracer	LCS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	8.765	0.828	1.11		pCi/g	0.0587	12.3	71.2	30 - 110

Lab ID: 680-102370-1
Client ID: SD-DUP-03
Sigma: 2
Analyzed: 07/01/14 12:32
Detector: AV24
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.613	0.180	0.187		pCi/g	1.00	0.129	129268
Thorium-230	0.682	0.182	0.191		pCi/g	1.00	0.0773	129268
Thorium-232	0.657	0.178	0.187		pCi/g	1.00	0.0726	129268

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.87	0.431	0.594		pCi/g	0.0647	6.12	79.6	30 - 110

Lab ID: 680-102370-1 DU
Client ID: SD-DUP-03
Sigma: 2
Analyzed: 07/01/14 12:32
Detector: AV51
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.7360	0.188	0.198		pCi/g	1.00	0.101	129279
Thorium-230	0.6714	0.176	0.185		pCi/g	1.00	0.0594	129279
Thorium-232	0.6923	0.178	0.187		pCi/g	1.00	0.0518	129279

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128227

Lab ID: 680-102370-1 DU
Client ID: SD-DUP-03
Sigma: 2
Analyzed: 07/01/14 12:32
Detector: AV51
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Tracer	DU Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.135	0.444	0.619		pCi/g	0.0545	6.13	83.8	30 - 110

Lab ID: 680-102370-2
Client ID: SD-206-SS
Sigma: 2
Analyzed: 07/01/14 12:32
Detector: AV53
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.03	0.219	0.236		pCi/g	1.00	0.0843	129280
Thorium-230	0.873	0.202	0.215		pCi/g	1.00	0.0811	129280
Thorium-232	0.993	0.213	0.229		pCi/g	1.00	0.0646	129280

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.07	0.439	0.611		pCi/g	0.0580	6.09	83.2	30 - 110

Lab ID: 680-102370-3
Client ID: SD-206-01
Sigma: 2
Analyzed: 07/01/14 12:32
Detector: AV54
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.27	0.245	0.267		pCi/g	1.00	0.105	129281
Thorium-230	1.04	0.220	0.237		pCi/g	1.00	0.0779	129281
Thorium-232	1.24	0.238	0.260		pCi/g	1.00	0.0553	129281

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.16	0.447	0.622		pCi/g	0.0625	6.12	84.2	30 - 110

Lab ID: 680-102370-4
Client ID: SD-206-02
Sigma: 2
Analyzed: 07/01/14 12:32
Detector: AV55
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.09	0.229	0.247		pCi/g	1.00	0.0845	129282
Thorium-230	0.809	0.198	0.209		pCi/g	1.00	0.0769	129282
Thorium-232	1.14	0.234	0.253		pCi/g	1.00	0.0766	129282

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.83	0.426	0.588		pCi/g	0.0487	6.12	78.9	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128227

Lab ID: 680-102370-7 | Analyzed: 07/01/14 12:32 | Decay Corrected: No
Client ID: SD-215-SS | Detector: AV56 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.898	0.214	0.227		pCi/g	1.00	0.0890	129283
Thorium-230	0.499	0.159	0.164		pCi/g	1.00	0.0570	129283
Thorium-232	1.01	0.225	0.240		pCi/g	1.00	0.0648	129283

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.67	0.424	0.577		pCi/g	0.0546	6.10	76.6	30 - 110

Lab ID: 680-102370-8 | Analyzed: 07/01/14 12:32 | Decay Corrected: No
Client ID: SD-222-SS | Detector: AV58 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.297	0.120	0.122		pCi/g	1.00	0.0782	129285
Thorium-230	0.429	0.144	0.149		pCi/g	1.00	0.0881	129285
Thorium-232	0.363	0.130	0.133		pCi/g	1.00	0.0558	129285

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.06	0.438	0.611		pCi/g	0.0541	6.14	82.5	30 - 110

Lab ID: 680-102370-9 | Analyzed: 07/01/14 12:32 | Decay Corrected: No
Client ID: SD-222-01 | Detector: AV59 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.639	0.164	0.172		pCi/g	1.00	0.0667	129286
Thorium-230	0.689	0.169	0.178		pCi/g	1.00	0.0469	129286
Thorium-232	0.487	0.141	0.147		pCi/g	1.00	0.0308	129286

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.46	0.448	0.641		pCi/g	0.0275	6.14	89.0	30 - 110

Lab ID: 680-102370-10 | Analyzed: 07/01/14 12:33 | Decay Corrected: No
Client ID: SD-222-02 | Detector: AV60 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.421	0.140	0.145		pCi/g	1.00	0.102	129288
Thorium-230	0.436	0.138	0.143		pCi/g	1.00	0.0687	129288

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128227

Lab ID: 680-102370-10 | Analyzed: 07/01/14 12:33 | Decay Corrected: No
Client ID: SD-222-02 | Detector: AV60 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-232	0.338	0.121	0.124		pCi/g	1.00	0.0601	129288

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.44	0.454	0.644		pCi/g	0.0432	6.09	89.3	30 - 110

Lab ID: 680-102370-11 | Analyzed: 07/01/14 12:33 | Decay Corrected: No
Client ID: SD-222-03 | Detector: AV61 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.767	0.193	0.203		pCi/g	1.00	0.102	129289
Thorium-230	0.495	0.152	0.157		pCi/g	1.00	0.0529	129289
Thorium-232	0.647	0.173	0.181		pCi/g	1.00	0.0524	129289

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.99	0.435	0.604		pCi/g	0.0579	6.10	81.8	30 - 110

Lab ID: 680-102370-12 | Analyzed: 07/01/14 12:33 | Decay Corrected: No
Client ID: SD-211-SS | Detector: AV62 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.20	0.262	0.281		pCi/g	1.00	0.100	129290
Thorium-230	1.21	0.262	0.281		pCi/g	1.00	0.0734	129290
Thorium-232	1.41	0.282	0.306		pCi/g	1.00	0.0422	129290

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.11	0.397	0.526		pCi/g	0.0436	6.11	67.3	30 - 110

Lab ID: 680-102370-13 | Analyzed: 07/01/14 12:33 | Decay Corrected: No
Client ID: SD-211-01 | Detector: AV63 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.31	0.266	0.288		pCi/g	1.00	0.129	129291
Thorium-230	0.882	0.216	0.228		pCi/g	1.00	0.0879	129291
Thorium-232	1.18	0.247	0.266		pCi/g	1.00	0.0522	129291

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128227

Lab ID: 680-102370-13 | Analyzed: 07/01/14 12:33 | Decay Corrected: No
Client ID: SD-211-01 | Detector: AV63 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.69	0.431	0.584		pCi/g	0.0639	6.14	76.4	30 - 110

Lab ID: 680-102370-14 | Analyzed: 07/01/14 12:33 | Decay Corrected: No
Client ID: SD-211-02 | Detector: AV64 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.08	0.223	0.241		pCi/g	1.00	0.0892	129292
Thorium-230	0.928	0.205	0.220		pCi/g	1.00	0.0641	129292
Thorium-232	0.984	0.210	0.226		pCi/g	1.00	0.0510	129292

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.92	0.422	0.591		pCi/g	0.0586	6.12	80.3	30 - 110

Lab ID: 680-102370-15 | Analyzed: 07/01/14 12:33 | Decay Corrected: No
Client ID: SD-216-SS | Detector: AV65 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.01	0.253	0.267		pCi/g	1.00	0.151	129293
Thorium-230	0.820	0.221	0.231		pCi/g	1.00	0.0765	129293
Thorium-232	0.903	0.231	0.243		pCi/g	1.00	0.0762	129293

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	3.81	0.375	0.493		pCi/g	0.0525	6.10	62.6	30 - 110

Lab ID: 680-102370-16 | Analyzed: 07/01/14 12:33 | Decay Corrected: No
Client ID: SD-216-01 | Detector: AV66 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.946	0.218	0.232		pCi/g	1.00	0.110	129294
Thorium-230	0.895	0.209	0.222		pCi/g	1.00	0.0852	129294
Thorium-232	0.956	0.214	0.229		pCi/g	1.00	0.0619	129294

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.92	0.437	0.602		pCi/g	0.0764	6.11	80.6	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128227

Lab ID: 680-102370-17 | Analyzed: 07/01/14 12:33 | Decay Corrected: No
Client ID: SD-216-02 | Detector: AV67 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.690	0.176	0.185		pCi/g	1.00	0.0835	129295
Thorium-230	0.583	0.160	0.168		pCi/g	1.00	0.0620	129295
Thorium-232	0.688	0.174	0.183		pCi/g	1.00	0.0637	129295

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.14	0.434	0.612		pCi/g	0.0418	6.11	84.1	30 - 110

Lab ID: 680-102370-18 | Analyzed: 07/01/14 12:33 | Decay Corrected: No
Client ID: SD-217-SS | Detector: AV68 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.437	0.219	0.222		pCi/g	1.00	0.184	129296
Thorium-230	0.657	0.259	0.265		pCi/g	1.00	0.141	129296
Thorium-232	0.371	0.192	0.194		pCi/g	1.00	0.0742	129296

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	2.33	0.297	0.356		pCi/g	0.0431	6.12	38.1	30 - 110

Lab ID: 680-102370-19 | Analyzed: 07/01/14 12:33 | Decay Corrected: No
Client ID: SD-217-01 | Detector: AV69 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.431	0.138	0.143		pCi/g	1.00	0.0787	129297
Thorium-230	0.360	0.124	0.128		pCi/g	1.00	0.0485	129297
Thorium-232	0.370	0.125	0.129		pCi/g	1.00	0.0318	129297

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.69	0.474	0.673		pCi/g	0.0513	6.15	92.6	30 - 110

Lab ID: 680-102370-20 | Analyzed: 07/01/14 12:33 | Decay Corrected: No
Client ID: SD-217-02 | Detector: AV70 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.767	0.190	0.201		pCi/g	1.00	0.0903	129299
Thorium-230	0.551	0.160	0.167		pCi/g	1.00	0.0697	129299

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128227

Lab ID: 680-102370-20
Client ID: SD-217-02
Sigma: 2
Analyzed: 07/01/14 12:33
Detector: AV70
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-232	0.665	0.175	0.183		pCi/g	1.00	0.0622	129299

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.10	0.440	0.614		pCi/g	0.0432	6.14	83.1	30 - 110

Lab ID: 680-102370-22
Client ID: SD-214-SS
Sigma: 2
Analyzed: 07/01/14 12:33
Detector: AV71
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.855	0.221	0.233		pCi/g	1.00	0.112	129300
Thorium-230	0.948	0.230	0.243		pCi/g	1.00	0.0715	129300
Thorium-232	1.04	0.240	0.255		pCi/g	1.00	0.0626	129300

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.15	0.395	0.527		pCi/g	0.0637	6.12	67.9	30 - 110

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-128227/1-A	Thorium-228			0.0006459	U	pCi/g							
MB 160-128227/1-A	Thorium-230			0.1034		pCi/g							
MB 160-128227/1-A	Thorium-232			0.0000	U	pCi/g							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-128227/2-A	Thorium-230		24.5	24.83		pCi/g	101	81 - 118					

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
680-102370-1	Thorium-228	0.613		0.7360		pCi/g			18	0.32	0.91	1	
680-102370-1	Thorium-230	0.682		0.6714		pCi/g			2	0.03	0.08	1	
680-102370-1	Thorium-232	0.657		0.6923		pCi/g			5	0.09	0.27	1	

Glossary:

Ts = Count Duration, Sample

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102370-1

SDG No.: 680-102370-1

Batch Number: 128227 Batch Start Date: 06/23/14 15:01 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/01/14 09:26

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-128227/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-128227/2		ExtChrom, A-01-R		0.4968 g	0.2 mL	0.4968 g			
680-102370-A-1-A	SD-DUP-03	ExtChrom, A-01-R	T	0.9994 g	0.2 mL				
680-102370-A-1-A DU	SD-DUP-03	ExtChrom, A-01-R	T	0.9980 g	0.2 mL				
680-102370-A-2-A	SD-206-SS	ExtChrom, A-01-R	T	1.0045 g	0.2 mL				
680-102370-A-3-A	SD-206-01	ExtChrom, A-01-R	T	0.9994 g	0.2 mL				
680-102370-A-4-A	SD-206-02	ExtChrom, A-01-R	T	0.9992 g	0.2 mL				
680-102370-A-7-A	SD-215-SS	ExtChrom, A-01-R	T	1.0030 g	0.2 mL				
680-102370-A-8-A	SD-222-SS	ExtChrom, A-01-R	T	.9970 g	0.2 mL				
680-102370-A-9-A	SD-222-01	ExtChrom, A-01-R	T	.9969 g	0.2 mL				
680-102370-A-10-A	SD-222-02	ExtChrom, A-01-R	T	1.0048 g	0.2 mL				
680-102370-A-11-A	SD-222-03	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				
680-102370-A-12-A	SD-211-SS	ExtChrom, A-01-R	T	1.0023 g	0.2 mL				
680-102370-A-13-A	SD-211-01	ExtChrom, A-01-R	T	0.9969 g	0.2 mL				
680-102370-A-14-A	SD-211-02	ExtChrom, A-01-R	T	0.9997 g	0.2 mL				
680-102370-A-15-A	SD-216-SS	ExtChrom, A-01-R	T	1.0038 g	0.2 mL				
680-102370-A-16-A	SD-216-01	ExtChrom, A-01-R	T	1.0023 g	0.2 mL				
680-102370-A-17-A	SD-216-02	ExtChrom, A-01-R	T	1.0015 g	0.2 mL				
680-102370-A-18-A	SD-217-SS	ExtChrom, A-01-R	T	1.0005 g	0.2 mL				
680-102370-A-19-A	SD-217-01	ExtChrom, A-01-R	T	0.9956 g	0.2 mL				
680-102370-A-20-A	SD-217-02	ExtChrom, A-01-R	T	0.9975 g	0.2 mL				

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102370-1

SDG No.: 680-102370-1

Batch Number: 128227 Batch Start Date: 06/23/14 15:01 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/01/14 09:26

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
680-102370-A-22-A	SD-214-SS	ExtChrom, A-01-R	T	0.9997 g	0.2 mL				

Batch Notes	
Balance ID	27050421
Column Analyst	scb
Column Date	6/27/14
CoPrecipitation Analyst	scb
CoPrecipitation Date	7/1/14
Person's name who witnessed reagent drop	nmn per scb
Analyst who added reagent	scb
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102370-1

SDG No.: 680-102370-1

Batch Number: 128228 Batch Start Date: 06/23/14 15:05 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/01/14 09:24

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	Th-230 00023	TRM-2 00001		
MB 160-128228/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-128228/2		ExtChrom, A-01-R		0.4997 g	0.2 mL		0.4997 g		
680-102370-A-23 -A	SD-214-01	ExtChrom, A-01-R	T	0.9992 g	0.2 mL				
680-102370-A-23 -B MS	SD-214-01	ExtChrom, A-01-R	T	0.9980 g	0.2 mL	0.2 mL			
680-102370-A-23 -C MSD	SD-214-01	ExtChrom, A-01-R	T	1.0011 g	0.2 mL	0.2 mL			
680-102370-A-24 -A	SD-212-SS	ExtChrom, A-01-R	T	0.9960 g	0.2 mL				
680-102370-A-25 -A	SD-212-01	ExtChrom, A-01-R	T	0.9964 g	0.2 mL				
680-102370-A-26 -A	SD-212-02	ExtChrom, A-01-R	T	1.0000 g	0.2 mL				
680-102370-A-28 -A	SD-DUP-04	ExtChrom, A-01-R	T	1.0015 g	0.2 mL				
680-102370-A-29 -A	SD-213-SS	ExtChrom, A-01-R	T	1.0000 g	0.2 mL				
680-102370-A-30 -A	SD-213-01	ExtChrom, A-01-R	T	1.0010 g	0.2 mL				
680-102370-A-31 -A	SD-213-02	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				
680-102370-A-34 -A	SD-214-02	ExtChrom, A-01-R	T	0.9996 g	0.2 mL				
680-102370-A-35 -A	SD-214-03	ExtChrom, A-01-R	T	1.0033 g	0.2 mL				

Batch Notes	
Balance ID	27050421
Column Analyst	scb
Column Date	6/27/14
CoPrecipitation Analyst	scb
CoPrecipitation Date	7/1/14
Person's name who witnessed reagent drop	nmn per scb
Analyst who added reagent	scb
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102370-1

SDG No.: 680-102370-1

Batch Number: 128228 Batch Start Date: 06/23/14 15:05 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/01/14 09:24

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:34:59PM 7/1/2014

Sample

Sample Name: MB 160-128227/1-A
SampleType: Blank
: MB 160-128227/1-A
Sample Collection Date: 6/24/2014 11:07:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0000g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128227
AnalysisID: 613688

Analyst: 60040

Tracer

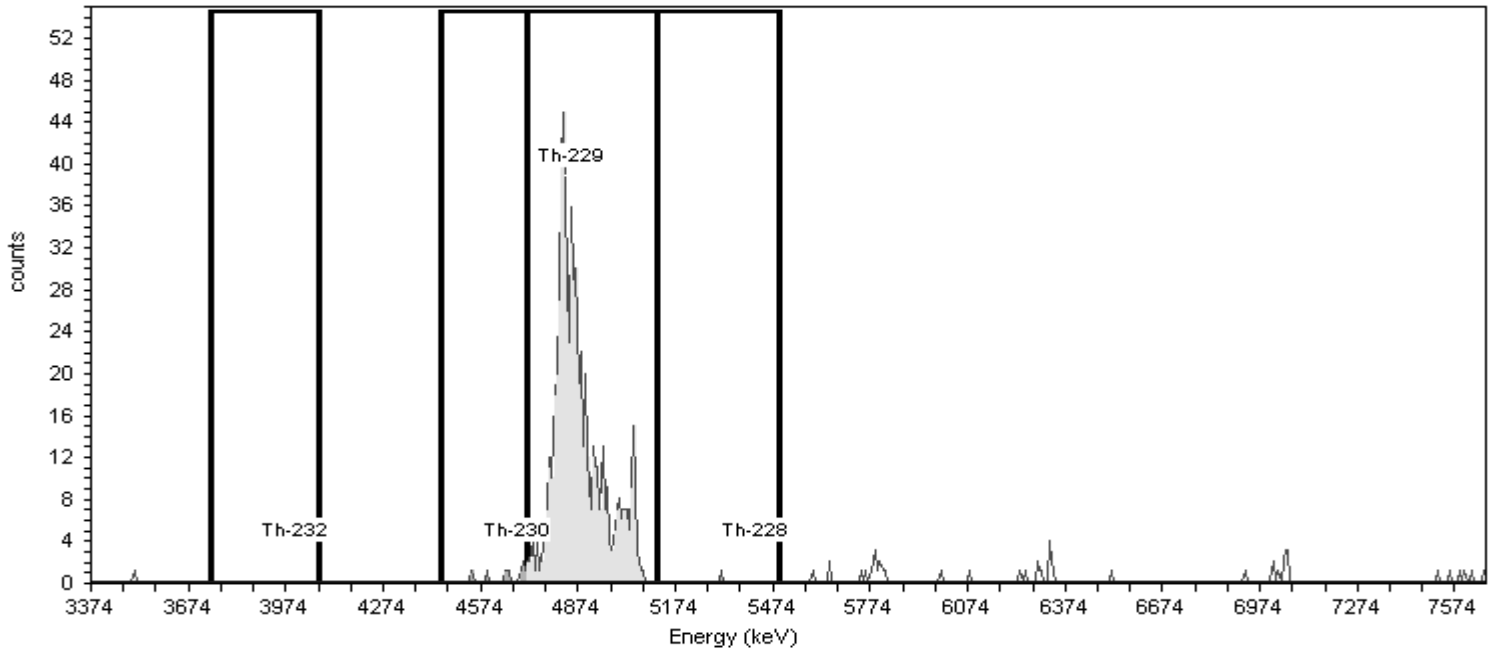
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 93.87%

Acquisition

Detector: AV117
Serial Number: 49-037X4
Acquisition Start Date: 7/1/2014 12:32:41PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:09:55PM
Background Info: Sample: ICB;AV117; Det: AV117; Spectrum #1; Jun-18-2014 19:09

Calibration Name: IC-9793;AV117-20140430
Calibration Date: 5/1/2014 1:17:04PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.86% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:28:50PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	.0	100.2	0	0.0000	0.00	0.000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	18.2	99.7	10	0.0000	10.00	0.103	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	89.2	99.6	592	0.7500	591.25	5.745	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	44.5	99.8	1	0.9375	0.06	0.001	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:35:06PM 7/1/2014

Sample

Sample Name: LCS 160-128227/2-A
SampleType: Control
: LCS 160-128227/2-A
Sample Collection Date: 6/24/2014 11:07:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.4968g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128227
AnalysisID: 613689

Analyst: 60040

Tracer

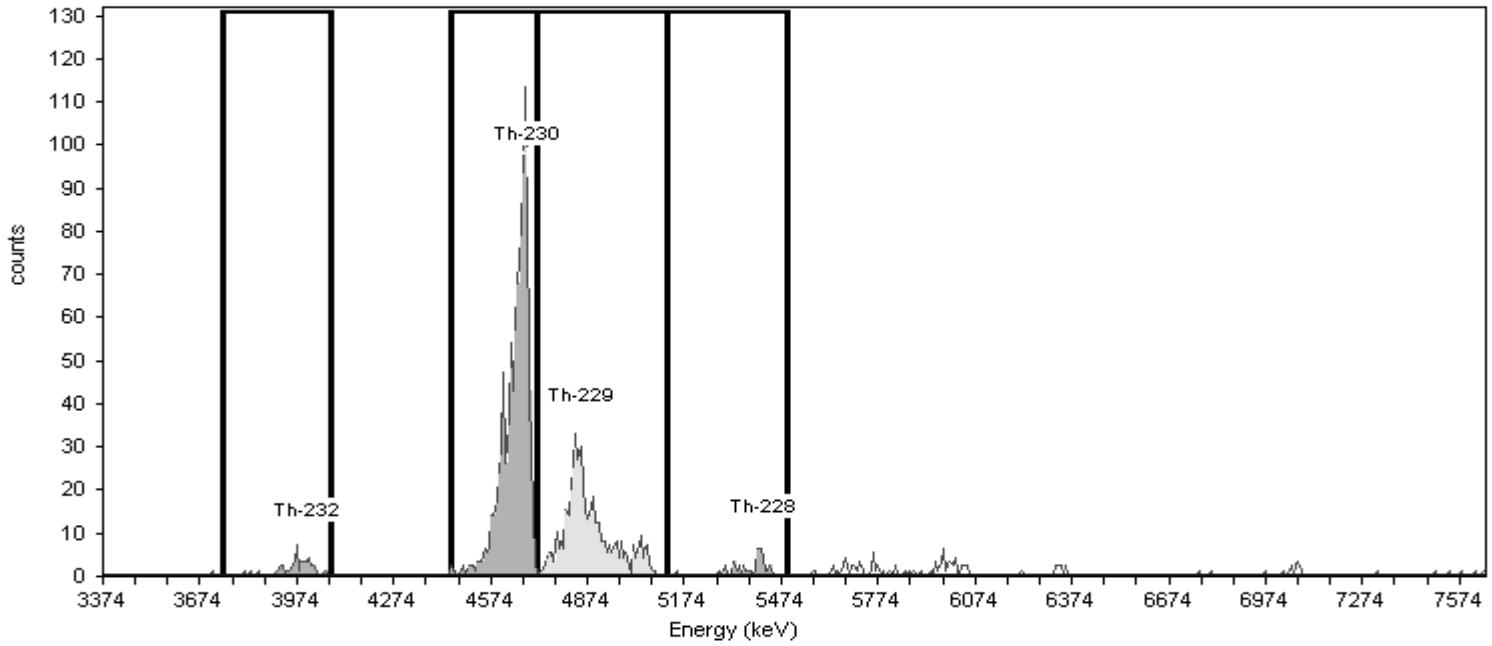
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 71.18%

Acquisition

Detector: AV118
Serial Number: 49-037F4
Acquisition Start Date: 7/1/2014 12:32:42PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:09:56PM
Background Info: Sample: ICB;AV118; Det: AV118; Spectrum #1; Jun-18-2014 19:09

Calibration Name: IC-9794;AV118-20140430
Calibration Date: 5/1/2014 1:17:10PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.84% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:28:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	77.9	100.2	42	0.0000	42.00	1.148	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	27.6	99.7	904	0.5625	903.79	24.830	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	75.9	99.6	448	0.0000	447.97	8.768	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	49.4	99.8	36	0.1875	35.81	0.983	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:32:42PM 7/1/2014

Sample

Sample Name: 680-102370-A-1-B
SampleType: Sample
: 680-102370-A-1-B
Sample Collection Date: 6/12/2014 12:00:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9994g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128227
AnalysisID: 613668

Analyst: 60040

Tracer

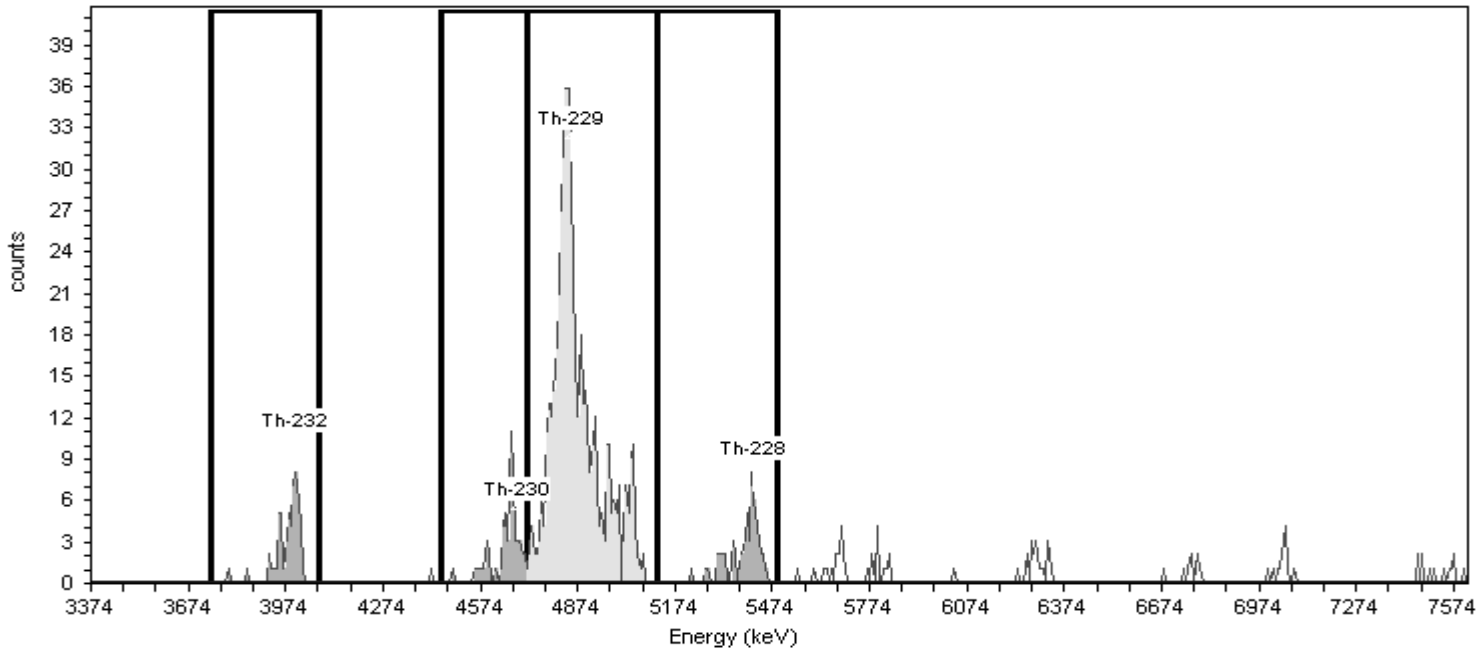
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 79.56%

Acquisition

Detector: AV24
Serial Number: 47-137Q4
Acquisition Start Date: 7/1/2014 12:32:14PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:51PM
Background Info: Sample: ICB;AV24; Det: AV24; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9793;AV24-20140505
Calibration Date: 5/5/2014 10:09:41PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.42% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:28:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	59.8	100.2	56	0.7500	55.25	0.657	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	16.5	99.7	58	0.9375	57.09	0.682	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	73.0	99.6	513	1.1250	511.91	4.872	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	67.1	99.8	56	4.7037	51.30	0.613	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:33:13PM 7/1/2014

Sample

Sample Name: 680-102370-A-1-C DU
SampleType: Sample
: 680-102370-A-1-C DU
Sample Collection Date: 6/12/2014 12:00:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9980g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128227
AnalysisID: 613669

Analyst: 60040

Tracer

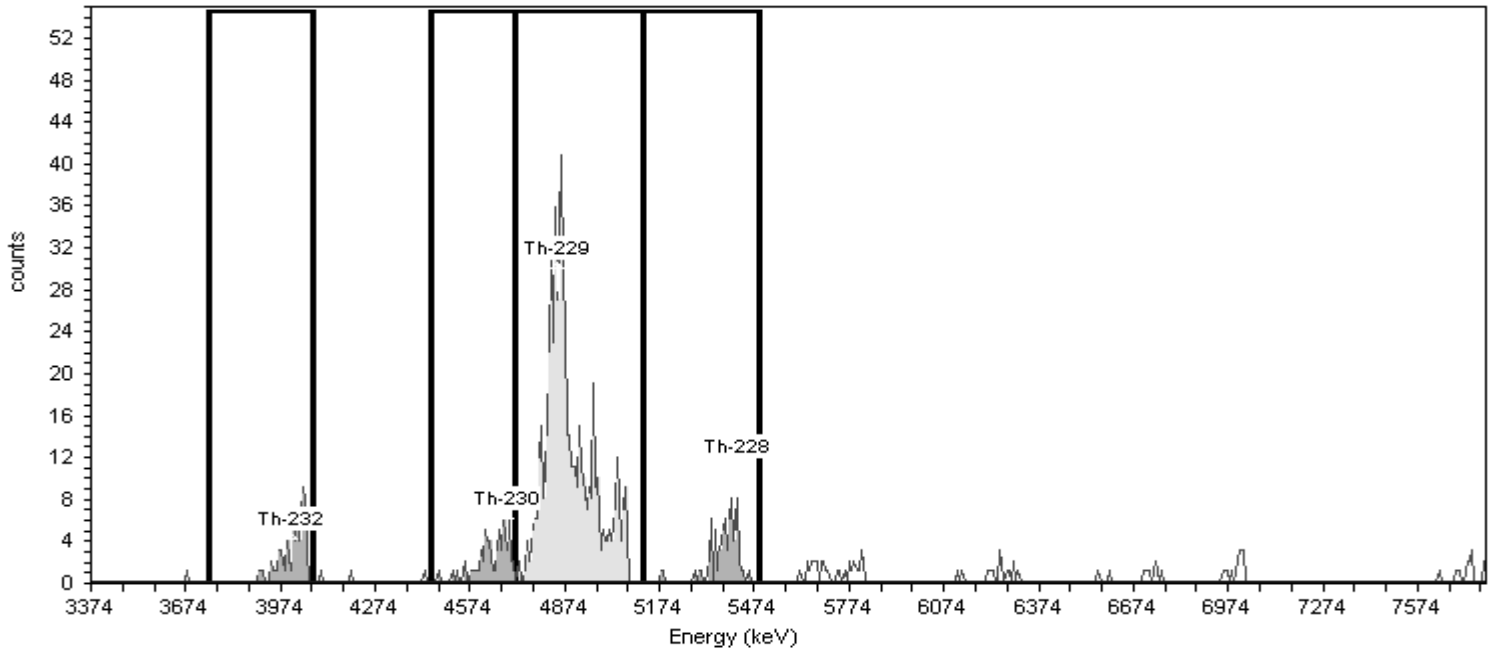
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 83.77%

Acquisition

Detector: AV51
Serial Number: 48-109I1
Acquisition Start Date: 7/1/2014 12:32:47PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/19/2014 12:17:43AM
Background Info: Sample: ICB;AV51; Det: AV51; Spectrum #1; Jun-19-2014 00:17

Calibration Name: IC-8875;AV51-20140504
Calibration Date: 5/5/2014 6:52:53PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.24% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:28:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	25.3	100.2	61	0.1875	60.81	0.692	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	32.7	99.7	59	0.3750	58.69	0.671	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	73.4	99.6	536	0.5625	535.50	5.137	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	78.8	99.8	67	2.6250	64.38	0.736	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:33:18PM 7/1/2014

Sample

Sample Name: 680-102370-A-2-B
SampleType: Sample
: 680-102370-A-2-B
Sample Collection Date: 6/12/2014 8:10:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0045g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128227
AnalysisID: 613670

Analyst: 60040

Tracer

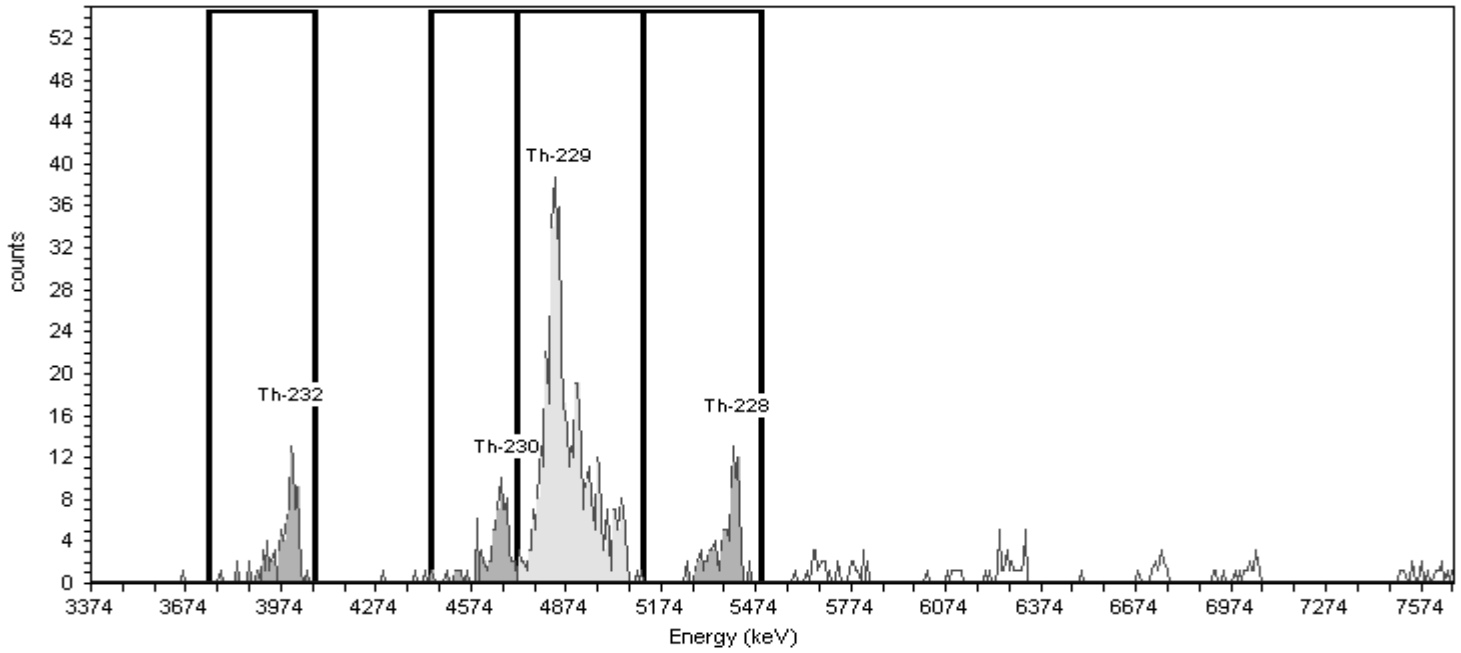
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 83.19%

Acquisition

Detector: AV53
Serial Number: 50-051A6
Acquisition Start Date: 7/1/2014 12:32:50PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/19/2014 12:17:59AM
Background Info: Sample: ICB;AV53; Det: AV53; Spectrum #1;
Jun-19-2014 00:17

Calibration Name: IC-8877;AV53-20140504
Calibration Date: 5/5/2014 6:53:06PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.32% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:28:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	55.5	100.2	88	0.5625	87.44	0.993	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	29.6	99.7	78	1.3125	76.47	0.873	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	66.6	99.6	534	0.7500	533.41	5.068	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	48.6	99.8	92	1.5000	90.56	1.033	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:33:24PM 7/1/2014

Sample

Sample Name: 680-102370-A-3-B
SampleType: Sample
: 680-102370-A-3-B
Sample Collection Date: 6/12/2014 8:15:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9994g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128227
AnalysisID: 613671

Analyst: 60040

Tracer

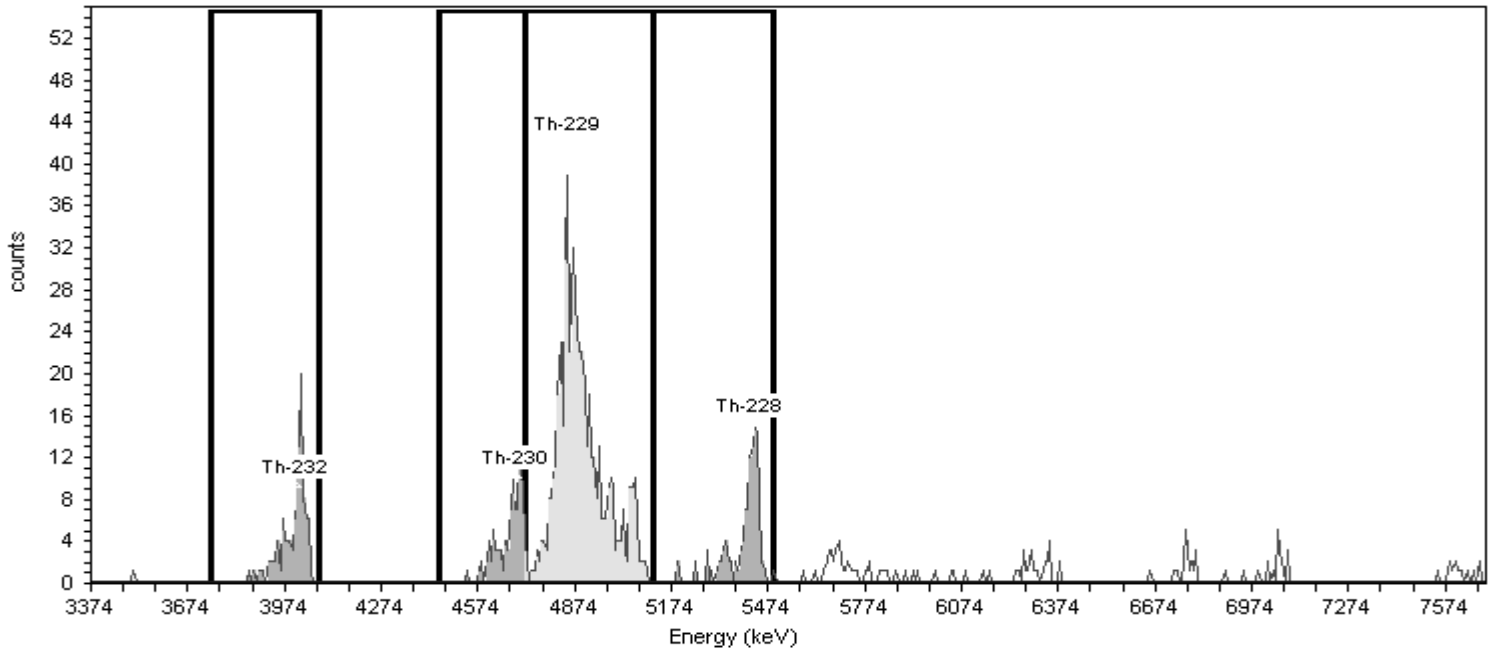
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 84.87%

Acquisition

Detector: AV54
Serial Number: 48-046II6
Acquisition Start Date: 7/1/2014 12:32:52PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/19/2014 12:18:06AM
Background Info: Sample: ICB;AV54; Det: AV54; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-9520;AV54-20140504
Calibration Date: 5/5/2014 6:53:13PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.02% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:28:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	40.5	100.2	109	0.2672	108.73	1.230	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	59.2	99.7	90	1.1250	88.81	1.010	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	101.4	99.6	539	0.9375	538.00	5.197	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	46.6	99.8	114	2.9838	110.93	1.261	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:09:00AM 7/2/2014

Sample

Sample Name: 680-102370-A-3-B
SampleType: Sample
: 680-102370-A-3-B
Sample Collection Date: 6/12/2014 8:15:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9994g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128227
AnalysisID: 613773

Analyst: 60040

Tracer

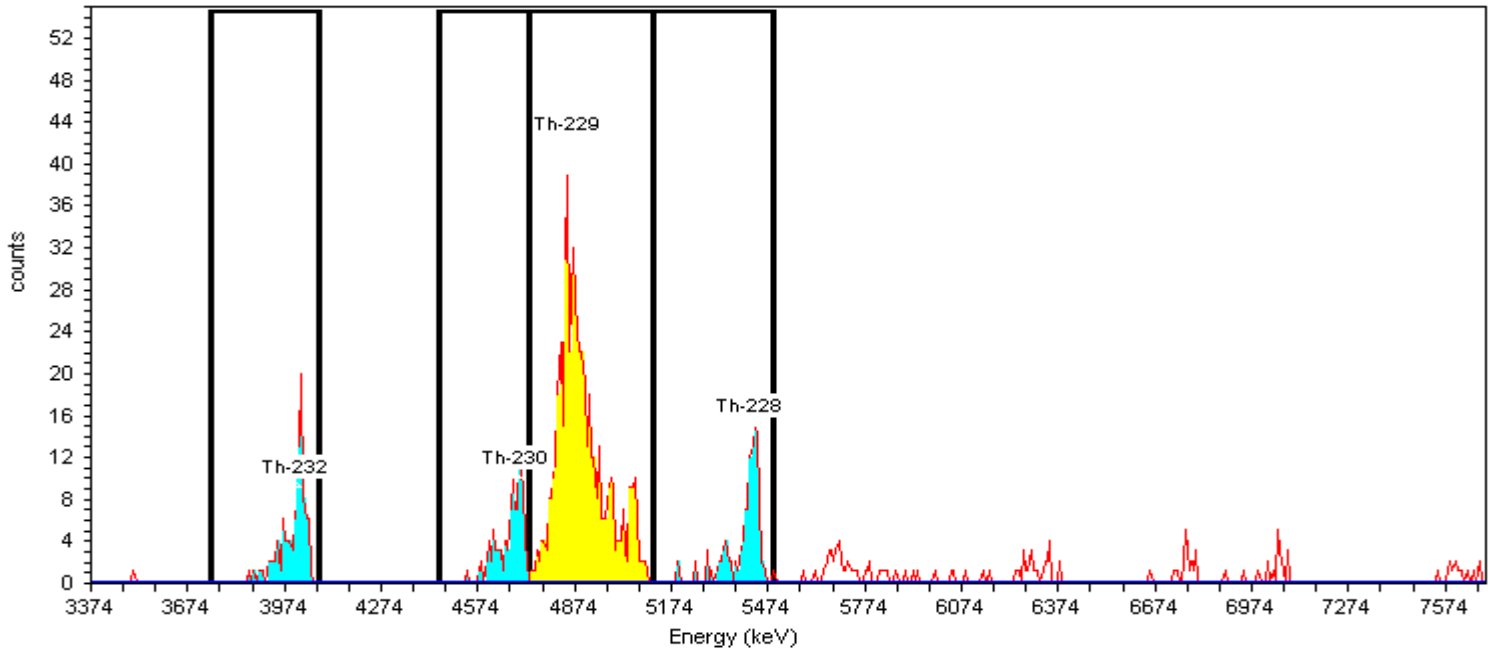
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 84.25%

Acquisition

Detector: AV54
Serial Number: 48-046II6
Acquisition Start Date: 7/1/2014 12:32:52PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/19/2014 12:18:06AM
Background Info: Sample: ICB;AV54; Det: AV54; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-9520;AV54-20140504
Calibration Date: 5/5/2014 6:53:13PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.02% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:28:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/2/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	40.5	100.2	109	0.2672	108.73	1.239	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4731.7	27.2	99.7	92	1.1250	90.88	1.041	pCi/g
Th-229	4848.0	4,845.3	2.7	4731.7	5119.5	101.4	99.6	535	0.9375	534.06	5.159	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	46.6	99.8	114	2.9838	110.93	1.270	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:33:30PM 7/1/2014

Sample

Sample Name: 680-102370-A-4-B
SampleType: Sample
: 680-102370-A-4-B
Sample Collection Date: 6/12/2014 8:20:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9992g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128227
AnalysisID: 613672

Analyst: 60040

Tracer

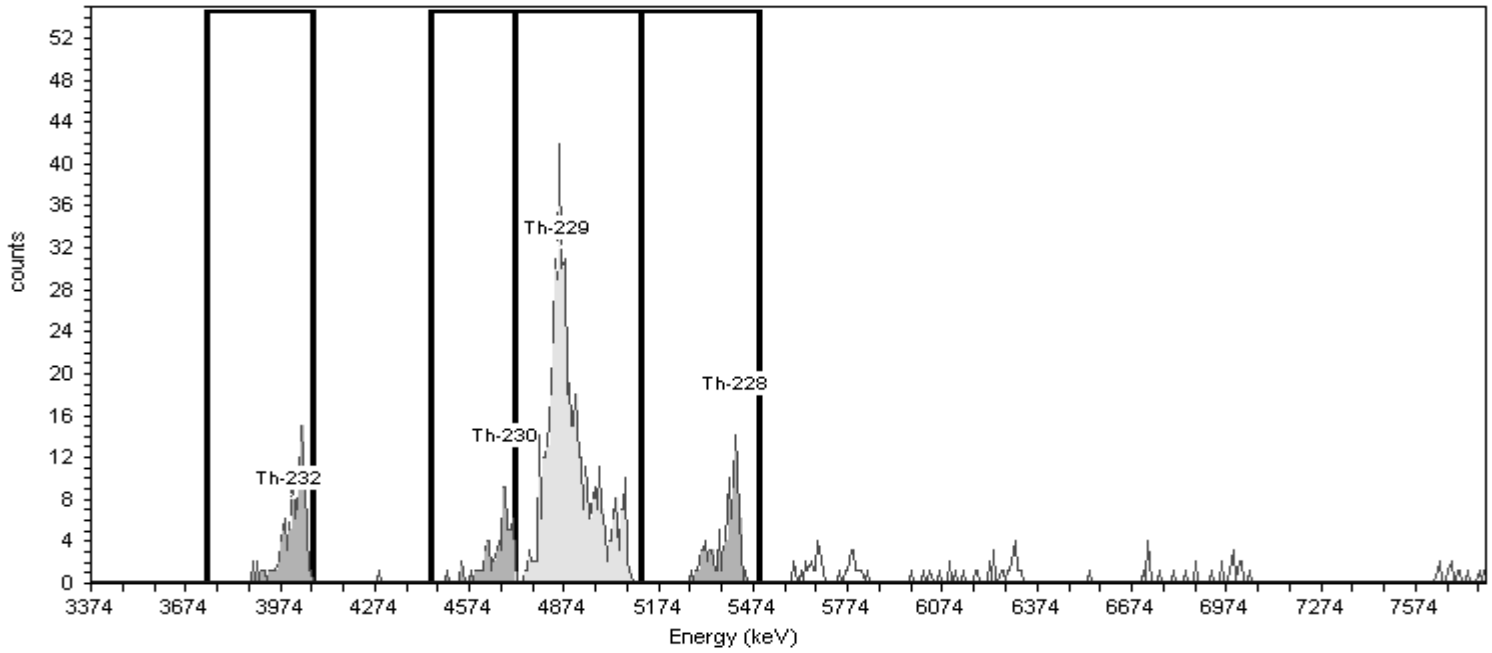
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 79.15%

Acquisition

Detector: AV55
Serial Number: 50-051C2
Acquisition Start Date: 7/1/2014 12:32:53PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/19/2014 12:18:11AM
Background Info: Sample: ICB;AV55; Det: AV55; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-7107;AV55-20140507
Calibration Date: 5/7/2014 10:48:56PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.79% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:28:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	25.7	100.2	97	0.9375	96.52	1.138	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	60.4	99.7	69	0.9375	68.00	0.806	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	72.8	99.6	517	0.3750	516.56	4.847	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	49.1	99.8	93	1.3125	91.69	1.085	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:09:48AM 7/2/2014

Sample

Sample Name: 680-102370-A-4-B
SampleType: Sample
: 680-102370-A-4-B
Sample Collection Date: 6/12/2014 8:20:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9992g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128227
AnalysisID: 613774

Analyst: 60040

Tracer

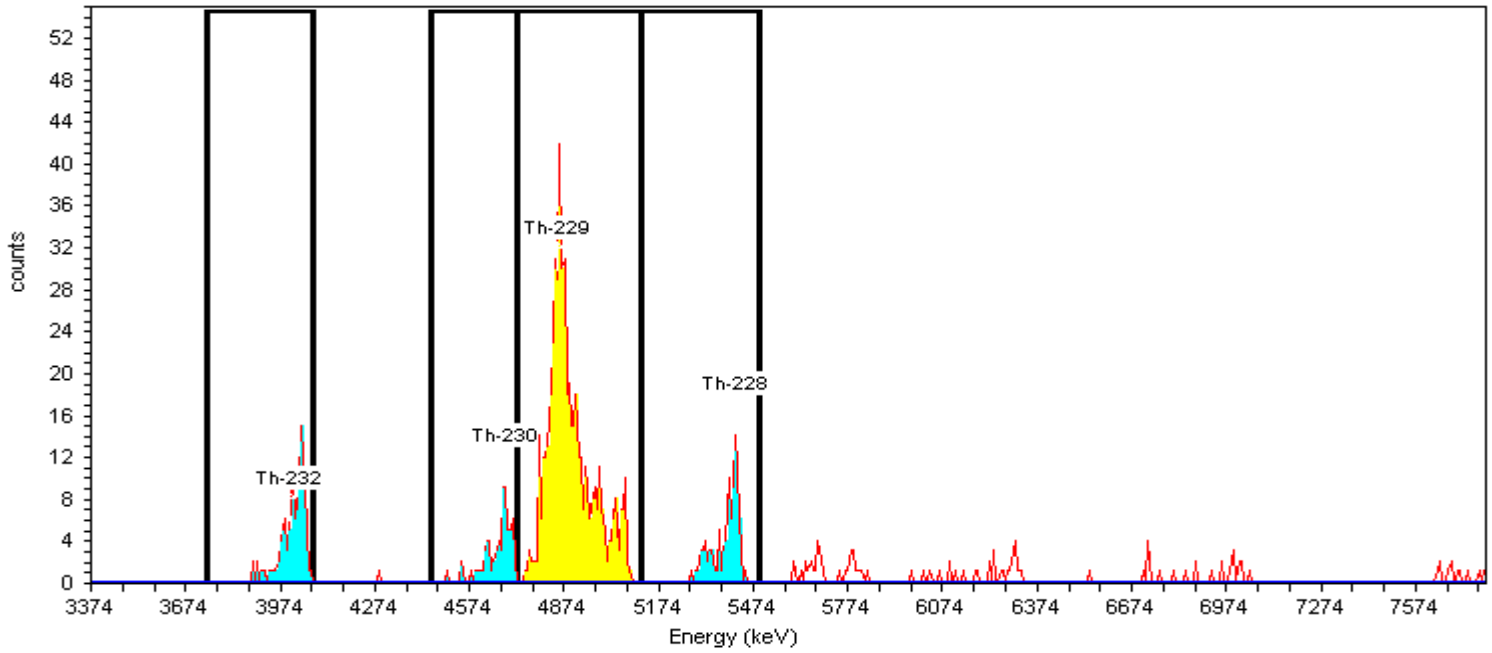
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 78.85%

Acquisition

Detector: AV55
Serial Number: 50-051C2
Acquisition Start Date: 7/1/2014 12:32:53PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/19/2014 12:18:11AM
Background Info: Sample: ICB;AV55; Det: AV55; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-7107;AV55-20140507
Calibration Date: 5/7/2014 10:48:56PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.79% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:28:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/2/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	25.7	100.2	97	0.9375	96.52	1.142	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4724.2	31.8	99.7	69	0.9375	68.06	0.809	pCi/g
Th-229	4848.0	4,845.3	2.7	4724.2	5119.5	72.8	99.6	515	0.3750	514.63	4.829	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	49.1	99.8	93	1.3125	91.69	1.090	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:33:35PM 7/1/2014

Sample

Sample Name: 680-102370-A-7-B
SampleType: Sample
: 680-102370-A-7-B
Sample Collection Date: 6/12/2014 8:50:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0030g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128227
AnalysisID: 613673

Analyst: 60040

Tracer

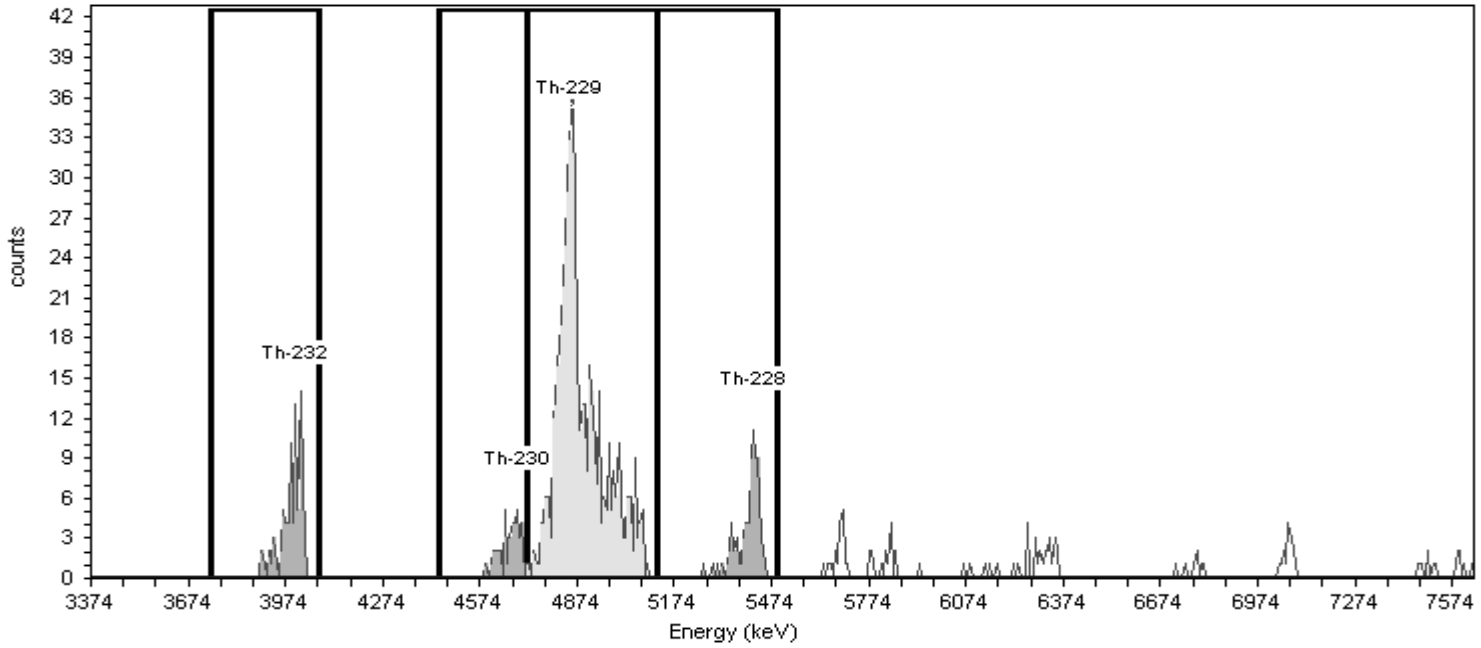
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 76.55%

Acquisition

Detector: AV56
Serial Number: 52-059EE5
Acquisition Start Date: 7/1/2014 12:32:55PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/19/2014 12:18:17AM
Background Info: Sample: ICB;AV56; Det: AV56; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-9792;AV56-20140504
Calibration Date: 5/5/2014 6:53:34PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.09% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:28:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	63.4	100.2	81	0.3750	80.63	1.005	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	37.8	99.7	40	0.1875	39.81	0.499	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	70.1	99.6	487	0.5625	486.44	4.671	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	55.1	99.8	73	1.3125	71.69	0.898	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:33:41PM 7/1/2014

Sample

Sample Name: 680-102370-A-8-B
SampleType: Sample
: 680-102370-A-8-B
Sample Collection Date: 6/12/2014 9:05:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9970g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128227
AnalysisID: 613674

Analyst: 60040

Tracer

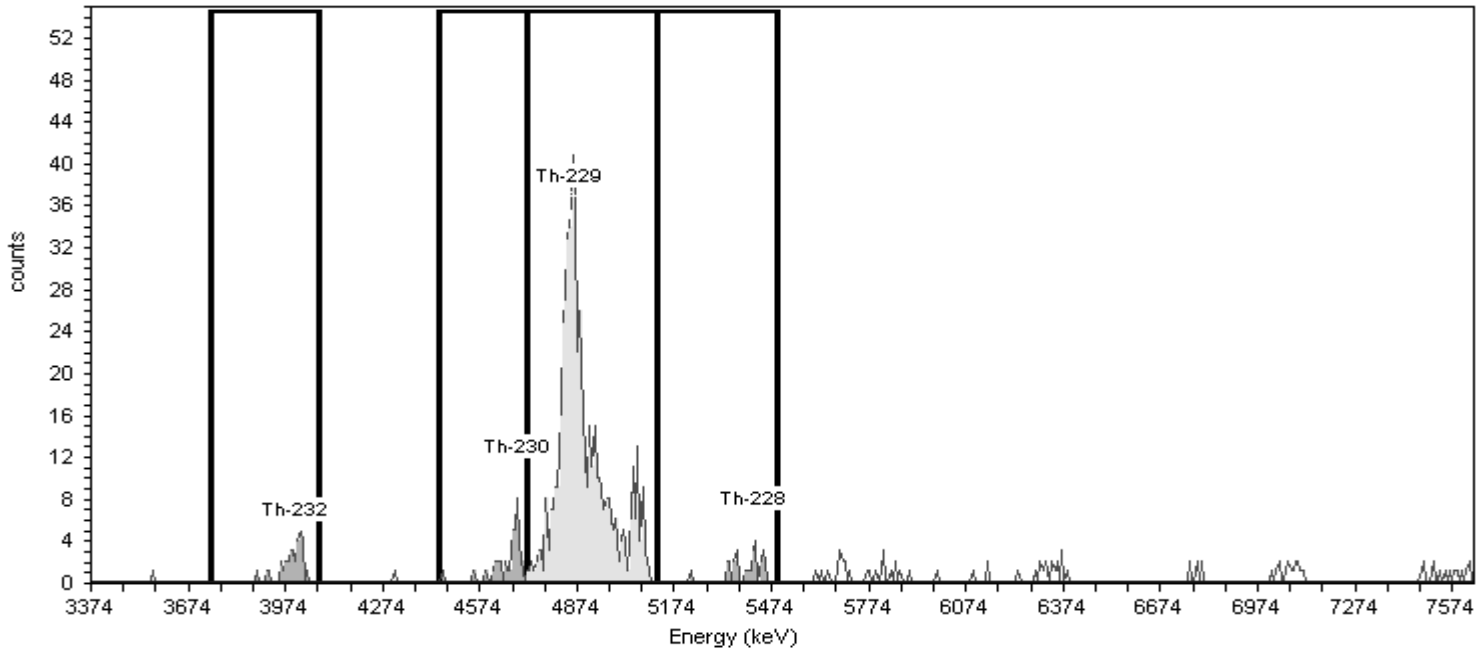
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 82.46%

Acquisition

Detector: AV58
Serial Number: 52-102 C5
Acquisition Start Date: 7/1/2014 12:32:58PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/19/2014 12:18:31AM
Background Info: Sample: ICB;AV58; Det: AV58; Spectrum #1;
Jun-19-2014 00:18

Calibration Name: IC-9794;AV58-20140504
Calibration Date: 5/5/2014 6:53:46PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.56% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:28:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	69.1	100.2	32	0.2735	31.73	0.363	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	28.4	99.7	39	1.6933	37.31	0.429	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	66.3	99.6	534	0.5683	533.43	5.061	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	31.2	99.8	27	1.1250	25.88	0.297	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:33:52PM 7/1/2014

Sample

Sample Name: 680-102370-A-9-B
SampleType: Sample
: 680-102370-A-9-B
Sample Collection Date: 6/12/2014 9:10:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9969g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128227
AnalysisID: 613676

Analyst: 60040

Tracer

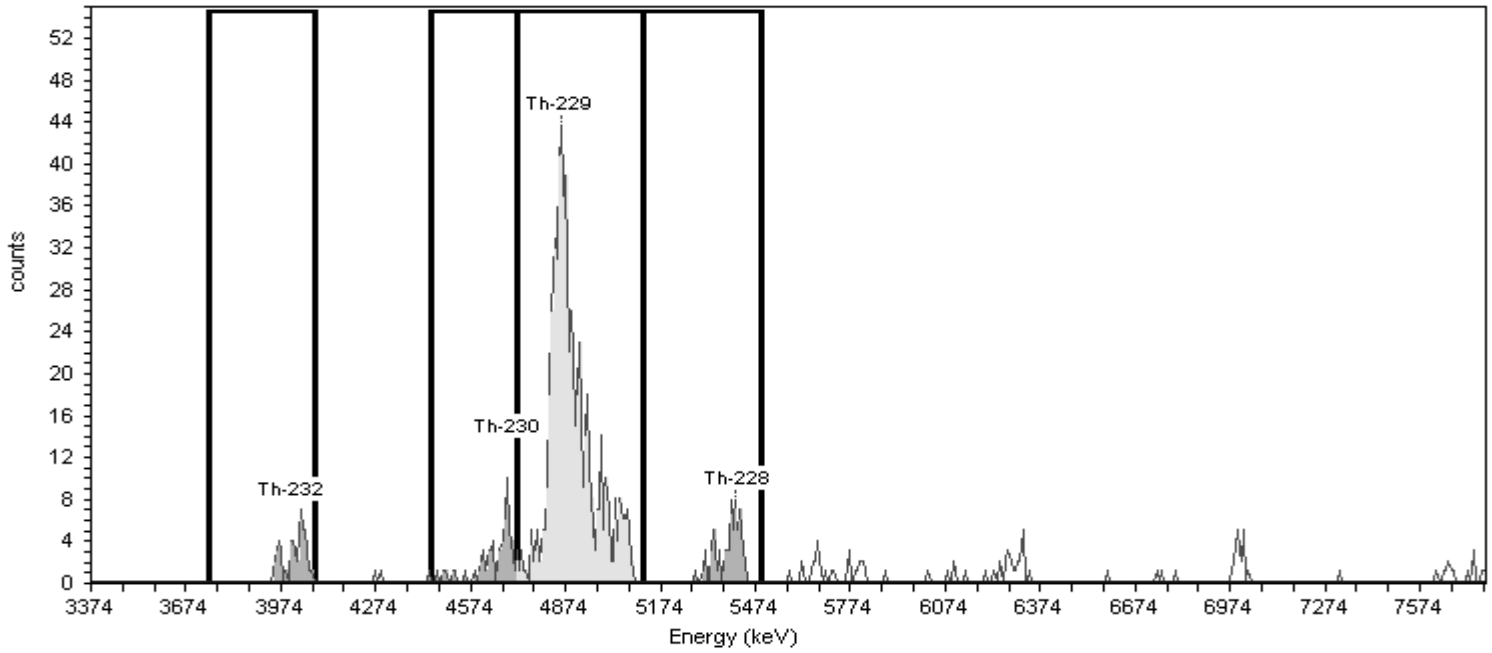
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 90.19%

Acquisition

Detector: AV59
Serial Number: 49-155M7
Acquisition Start Date: 7/1/2014 12:32:59PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:32AM
Background Info: Sample: ICB;AV59; Det: AV59; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-9795;AV59-20140504
Calibration Date: 5/5/2014 6:53:53PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.44% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:28:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	28.6	100.2	47	0.0000	47.46	0.480	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	29.6	99.7	61	0.1875	61.06	0.621	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	75.8	99.6	603	0.0000	602.94	5.537	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	49.5	99.8	63	0.9375	62.06	0.631	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:10:33AM 7/2/2014

Sample

Sample Name: 680-102370-A-9-B
SampleType: Sample
: 680-102370-A-9-B
Sample Collection Date: 6/12/2014 9:10:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9969g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128227
AnalysisID: 613775

Analyst: 60040

Tracer

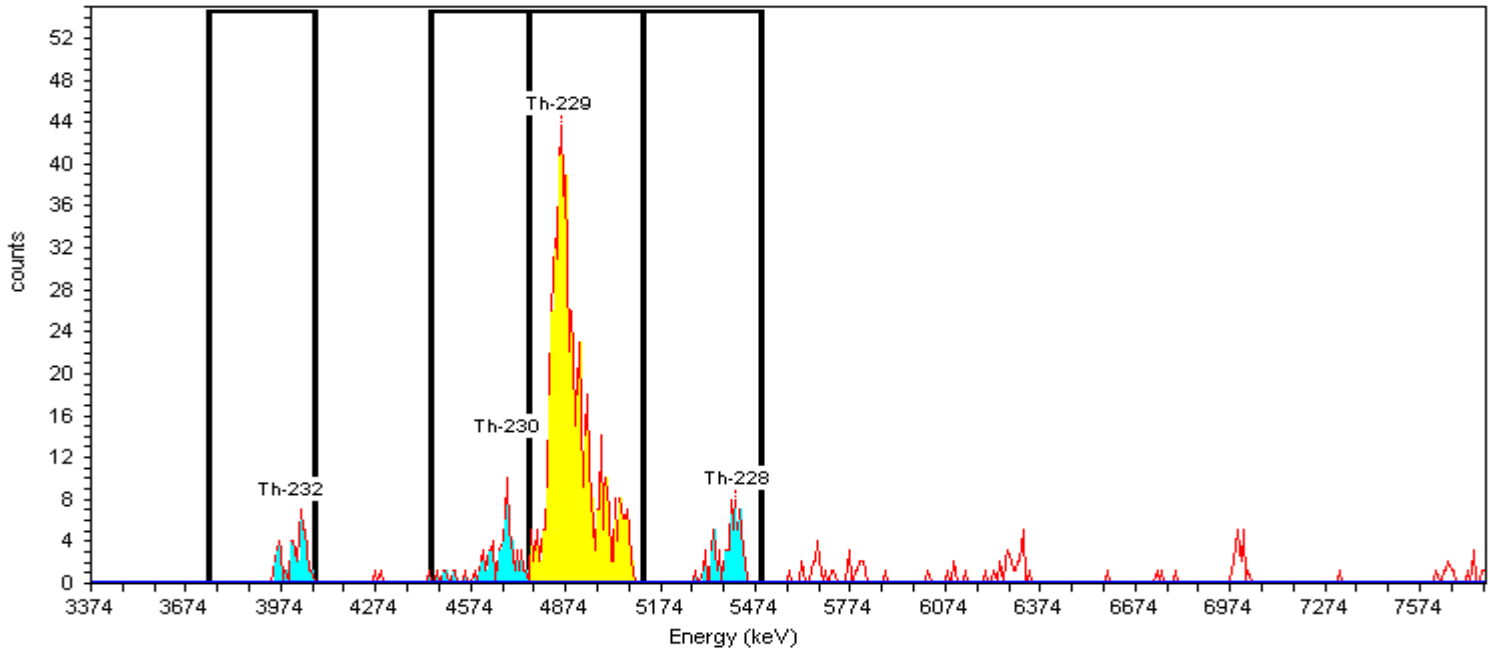
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 89.01%

Acquisition

Detector: AV59
Serial Number: 49-155M7
Acquisition Start Date: 7/1/2014 12:32:59PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:32AM
Background Info: Sample: ICB;AV59; Det: AV59; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-9795;AV59-20140504
Calibration Date: 5/5/2014 6:53:53PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 27.44% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:28:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/2/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	28.6	100.2	47	0.0000	47.46	0.487	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4754.1	64.6	99.7	67	0.1875	66.81	0.689	pCi/g
Th-229	4848.0	4,845.3	2.7	4754.1	5119.5	75.8	99.6	595	0.0000	595.00	5.464	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	49.5	99.8	63	0.9375	62.06	0.639	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:33:46PM 7/1/2014

Sample

Sample Name: 680-102370-A-10-B
SampleType: Sample
: 680-102370-A-10-B
Sample Collection Date: 6/12/2014 9:15:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0048g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128227
AnalysisID: 613675

Analyst: 60040

Tracer

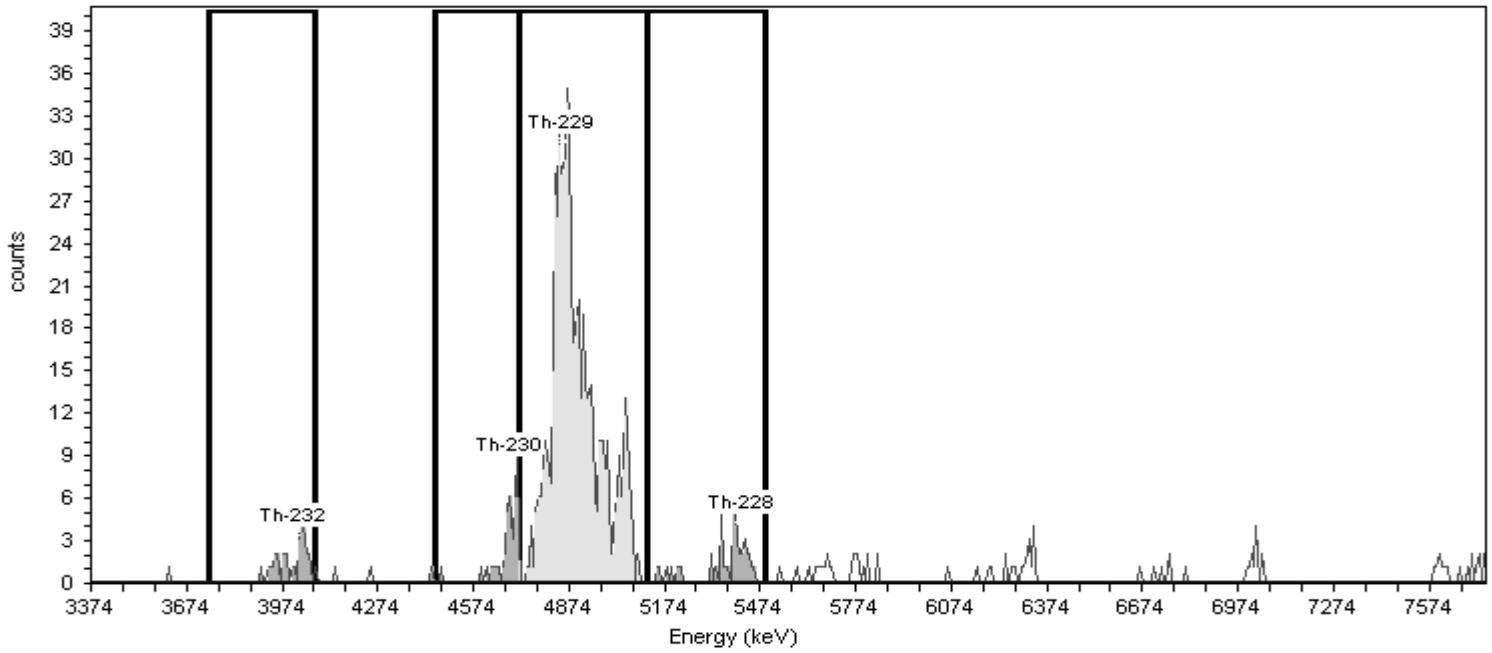
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 89.76%

Acquisition

Detector: AV60
Serial Number: 49-027117
Acquisition Start Date: 7/1/2014 12:33:02PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:33AM
Background Info: Sample: ICB;AV60; Det: AV60; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-9817;AV60-20140504
Calibration Date: 5/5/2014 6:53:59PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.33% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:28:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	26.3	100.2	33	0.5625	31.98	0.336	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	18.6	99.7	42	0.9375	41.28	0.436	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	84.6	99.6	576	0.1755	575.73	5.467	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	95.8	99.8	43	3.3630	39.64	0.419	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:47:29AM 7/2/2014

Sample

Sample Name: 680-102370-A-10-B
SampleType: Sample
: 680-102370-A-10-B
Sample Collection Date: 6/12/2014 9:15:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0048g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128227
AnalysisID: 613766

Analyst: 60040

Tracer

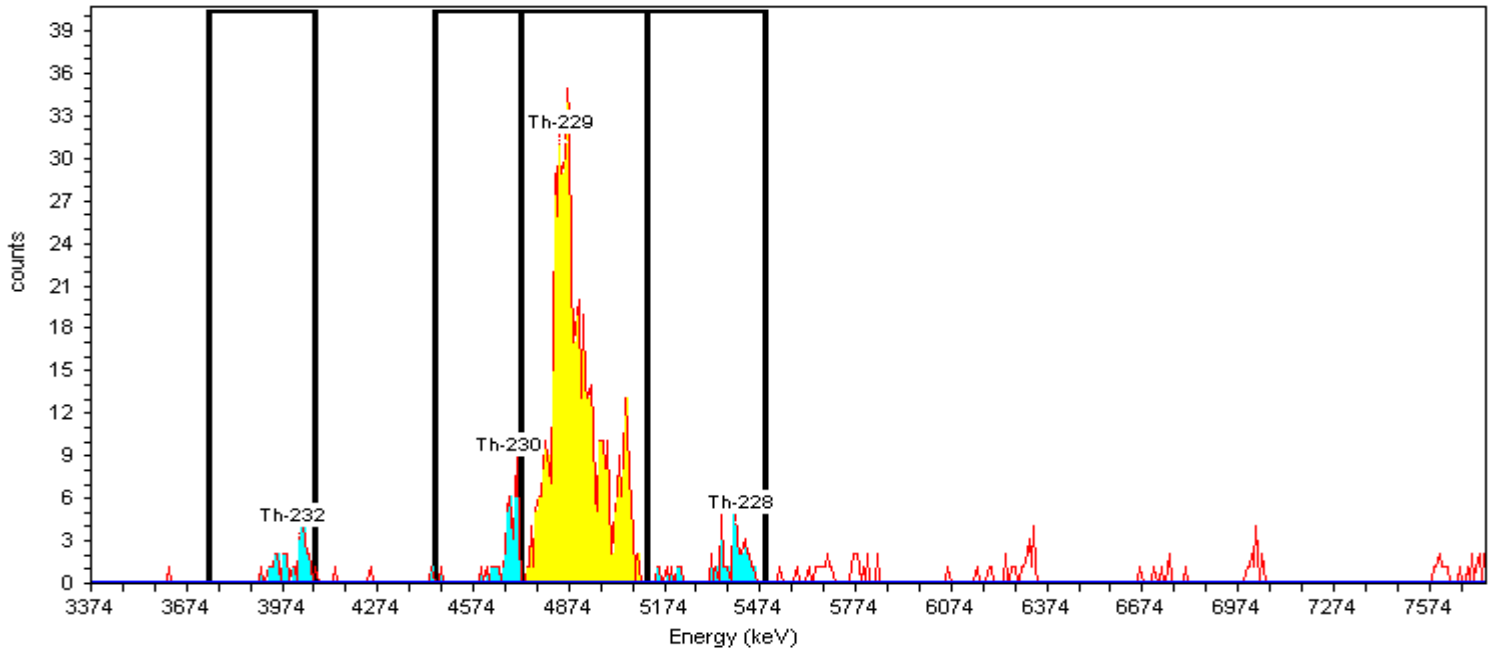
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 89.31%

Acquisition

Detector: AV60
Serial Number: 49-027117
Acquisition Start Date: 7/1/2014 12:33:02PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:33AM
Background Info: Sample: ICB;AV60; Det: AV60; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-9817;AV60-20140504
Calibration Date: 5/5/2014 6:53:59PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.33% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:28:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/2/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	26.3	100.2	33	0.5625	31.98	0.338	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4724.2	33.8	99.7	42	0.9375	41.06	0.436	pCi/g
Th-229	4848.0	4,845.3	2.7	4724.2	5119.5	84.6	99.6	573	0.1875	572.81	5.439	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	95.8	99.8	43	3.3630	39.64	0.421	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:33:57PM 7/1/2014

Sample

Sample Name: 680-102370-A-11-B
SampleType: Sample
: 680-102370-A-11-B
Sample Collection Date: 6/12/2014 7:20:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0029g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128227
AnalysisID: 613677

Analyst: 60040

Tracer

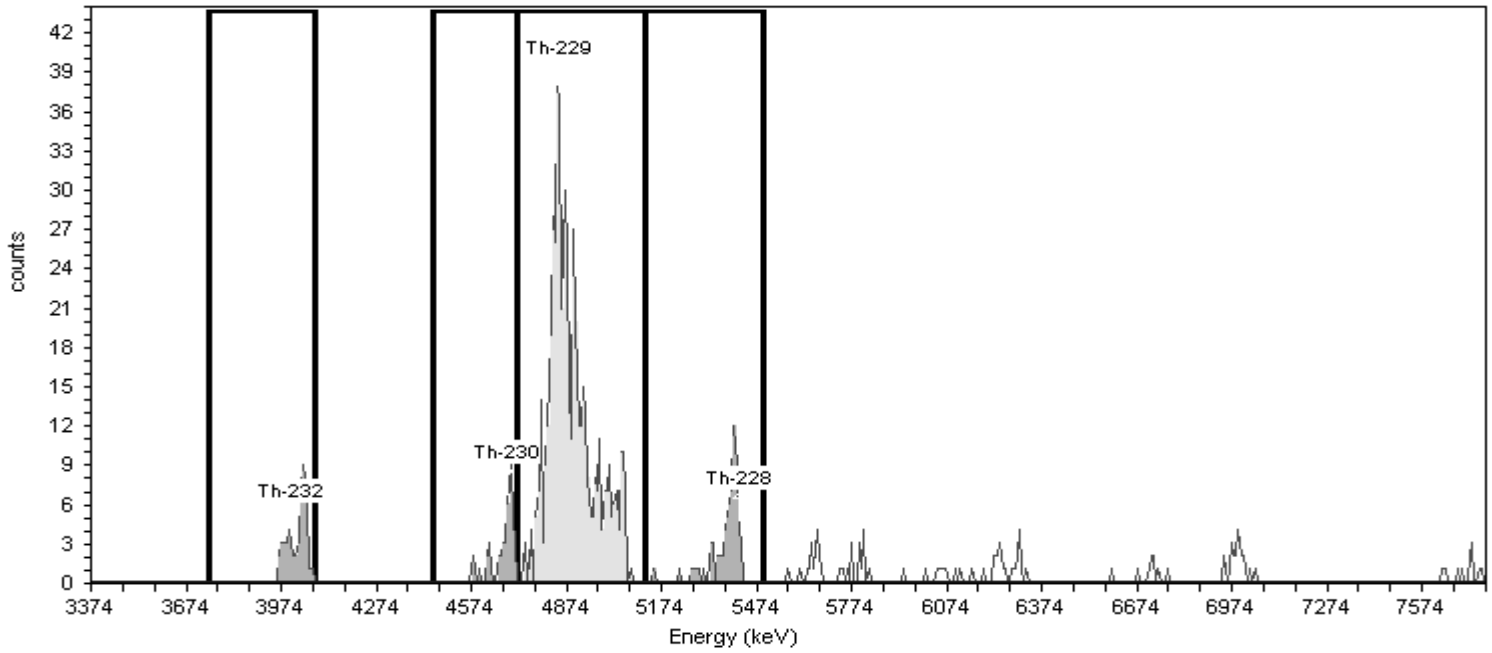
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 81.79%

Acquisition

Detector: AV61
Serial Number: 5-051JJ3
Acquisition Start Date: 7/1/2014 12:33:04PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:33AM
Background Info: Sample: ICB;AV61; Det: AV61; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-9884;AV61-20140504
Calibration Date: 5/5/2014 6:54:06PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.46% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:28:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	30.0	100.2	56	0.1875	56.27	0.647	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	26.4	99.7	43	0.1933	42.81	0.495	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	86.2	99.6	528	0.7558	527.24	4.991	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	49.5	99.8	69	2.6250	66.38	0.767	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:34:03PM 7/1/2014

Sample

Sample Name: 680-102370-A-12-B
SampleType: Sample
: 680-102370-A-12-B
Sample Collection Date: 6/12/2014 10:00:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0023g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128227
AnalysisID: 613678

Analyst: 60040

Tracer

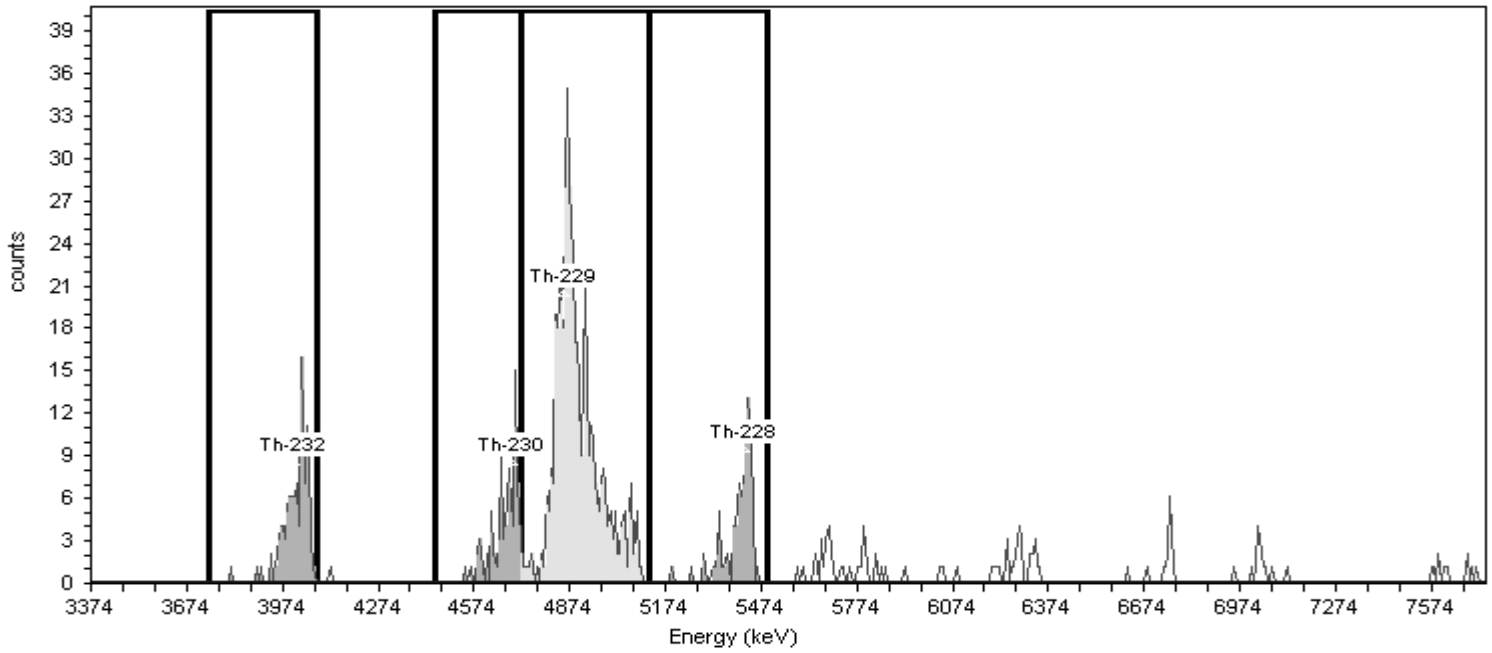
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 68.08%

Acquisition

Detector: AV62
Serial Number: 52-060FF2
Acquisition Start Date: 7/1/2014 12:33:06PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:34AM
Background Info: Sample: ICB;AV62; Det: AV62; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-9885;AV62-20140504
Calibration Date: 5/5/2014 6:54:13PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.34% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:28:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	31.0	100.2	100	0.0000	100.46	1.396	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	37.1	99.7	80	0.3750	79.56	1.111	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	87.4	99.6	437	0.1875	436.75	4.157	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	50.2	99.8	86	1.3125	84.69	1.182	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:02:39AM 7/2/2014

Sample

Sample Name: 680-102370-A-12-B
SampleType: Sample
: 680-102370-A-12-B
Sample Collection Date: 6/12/2014 10:00:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0023g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128227
AnalysisID: 613767

Analyst: 60040

Tracer

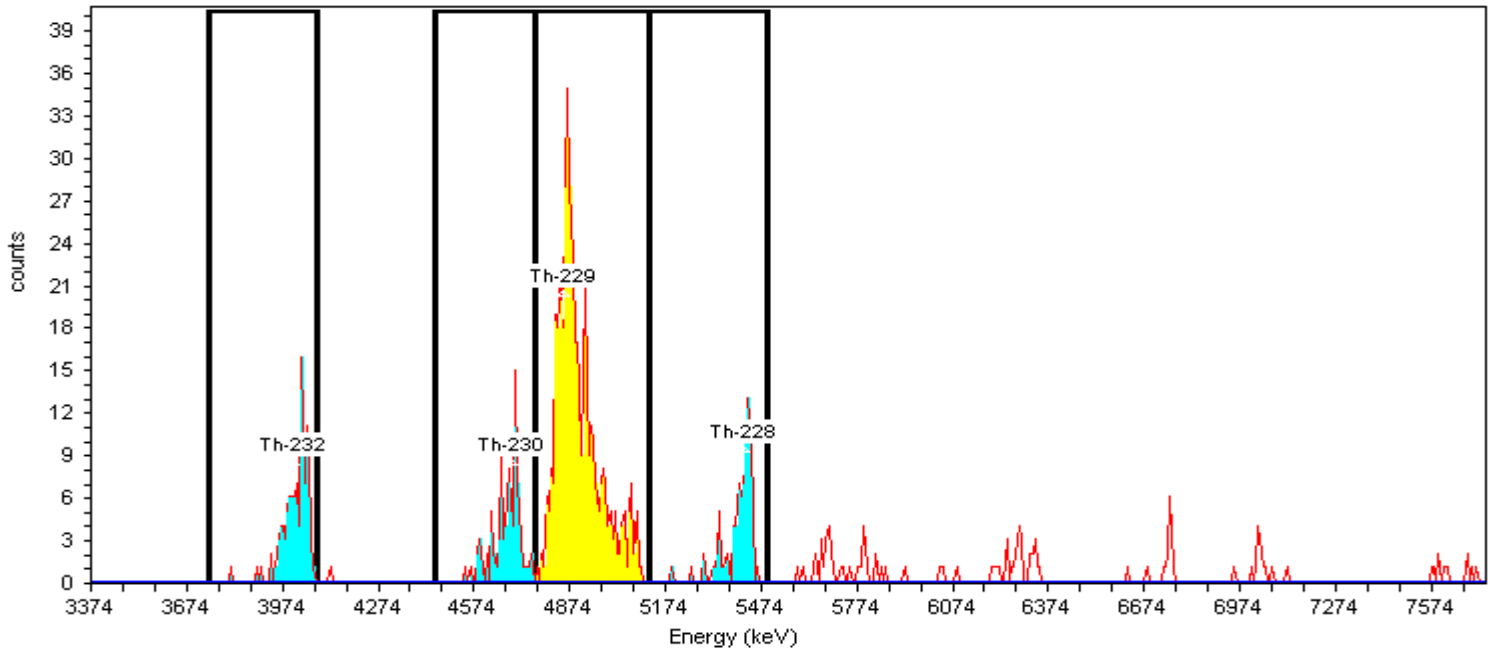
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 67.26%

Acquisition

Detector: AV62
Serial Number: 52-060FF2
Acquisition Start Date: 7/1/2014 12:33:06PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:34AM
Background Info: Sample: ICB;AV62; Det: AV62; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-9885;AV62-20140504
Calibration Date: 5/5/2014 6:54:13PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.34% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:28:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/2/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	31.0	100.2	100	0.0000	100.46	1.413	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4761.5	78.1	99.7	86	0.3750	85.63	1.210	pCi/g
Th-229	4848.0	4,845.3	2.7	4761.5	5119.5	87.4	99.0	429	0.1875	428.81	4.107	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	50.2	99.8	86	1.3125	84.69	1.196	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:34:08PM 7/1/2014

Sample

Sample Name: 680-102370-A-13-B
SampleType: Sample
: 680-102370-A-13-B
Sample Collection Date: 6/12/2014 10:05:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9969g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128227
AnalysisID: 613679

Analyst: 60040

Tracer

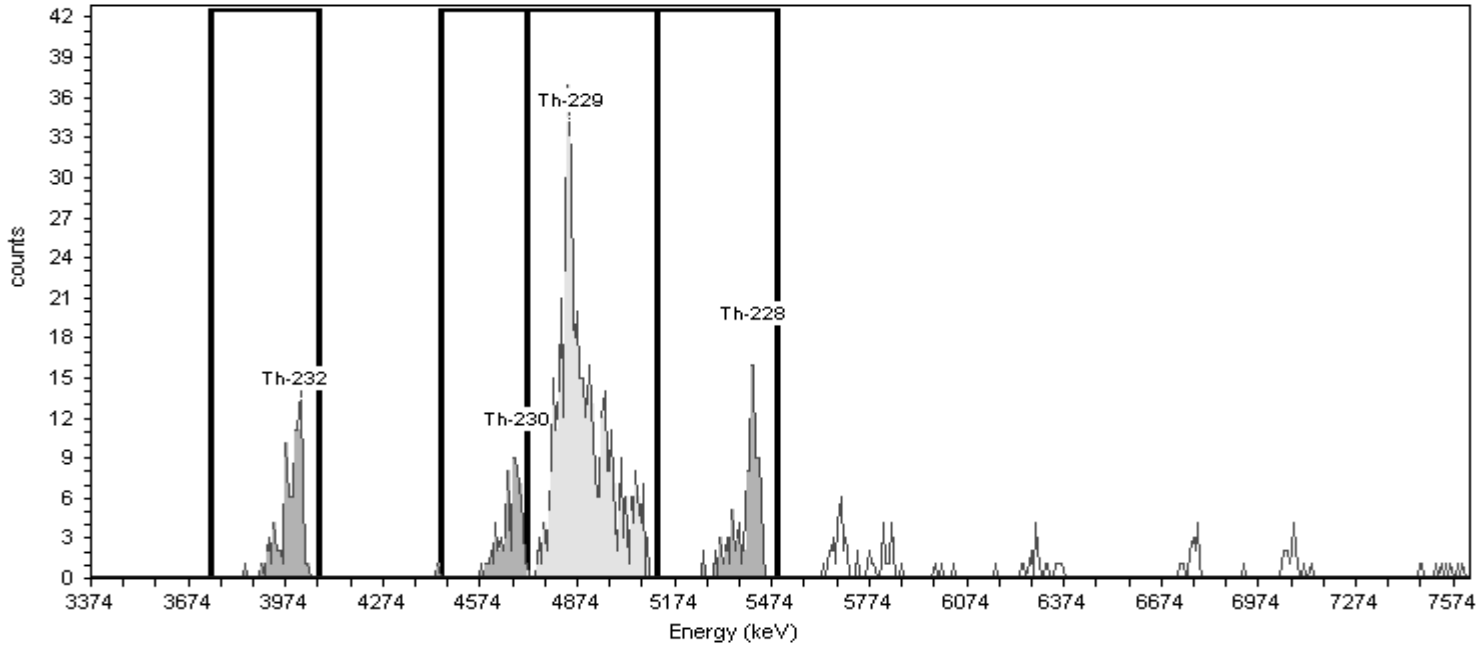
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 76.37%

Acquisition

Detector: AV63
Serial Number: 47-029ff2
Acquisition Start Date: 7/1/2014 12:33:08PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:35AM
Background Info: Sample: ICB;AV63; Det: AV63; Spectrum #1;
Jun-19-2014 00:18

Calibration Name: IC-9886;AV63-20140504
Calibration Date: 5/5/2014 6:54:19PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.48% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:28:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	57.8	100.2	92	0.0860	91.91	1.183	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	33.9	99.7	69	1.1192	68.16	0.882	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	94.4	99.6	475	0.9317	474.04	4.688	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	49.2	99.8	105	3.7500	101.25	1.309	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:34:14PM 7/1/2014

Sample

Sample Name: 680-102370-A-14-B
SampleType: Sample
: 680-102370-A-14-B
Sample Collection Date: 6/12/2014 10:10:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9997g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128227
AnalysisID: 613680

Analyst: 60040

Tracer

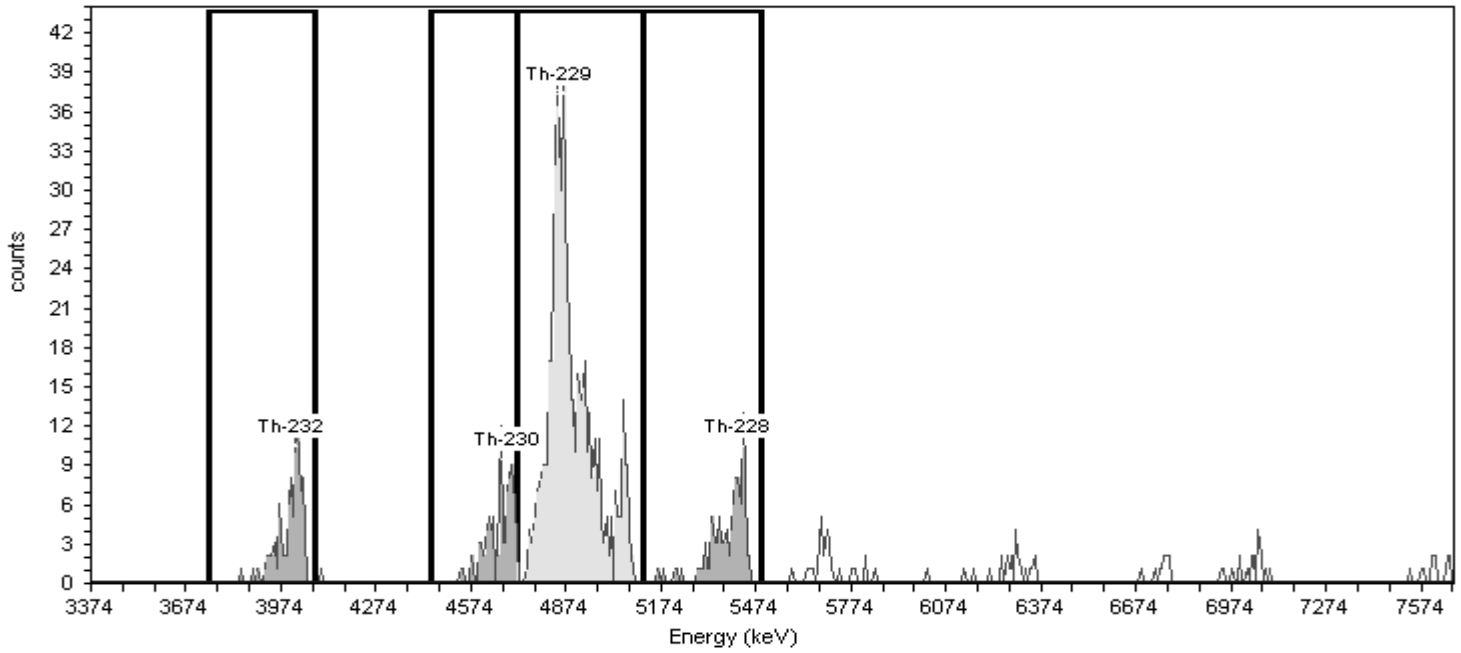
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 80.81%

Acquisition

Detector: AV64
Serial Number: 47-029ee4
Acquisition Start Date: 7/1/2014 12:33:10PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:36AM
Background Info: Sample: ICB;AV64; Det: AV64; Spectrum #1;
Jun-19-2014 00:18

Calibration Name: IC-7107;AV64-20140504a
Calibration Date: 5/4/2014 8:44:03PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.75% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:28:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	37.5	100.2	88	0.1875	87.81	0.978	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	32.5	99.7	83	0.5625	82.34	0.922	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	67.4	99.6	547	0.7620	546.15	4.947	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	58.0	99.8	98	1.8870	96.11	1.076	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:03:51AM 7/2/2014

Sample

Sample Name: 680-102370-A-14-B
SampleType: Sample
: 680-102370-A-14-B
Sample Collection Date: 6/12/2014 10:10:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9997g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128227
AnalysisID: 613768

Analyst: 60040

Tracer

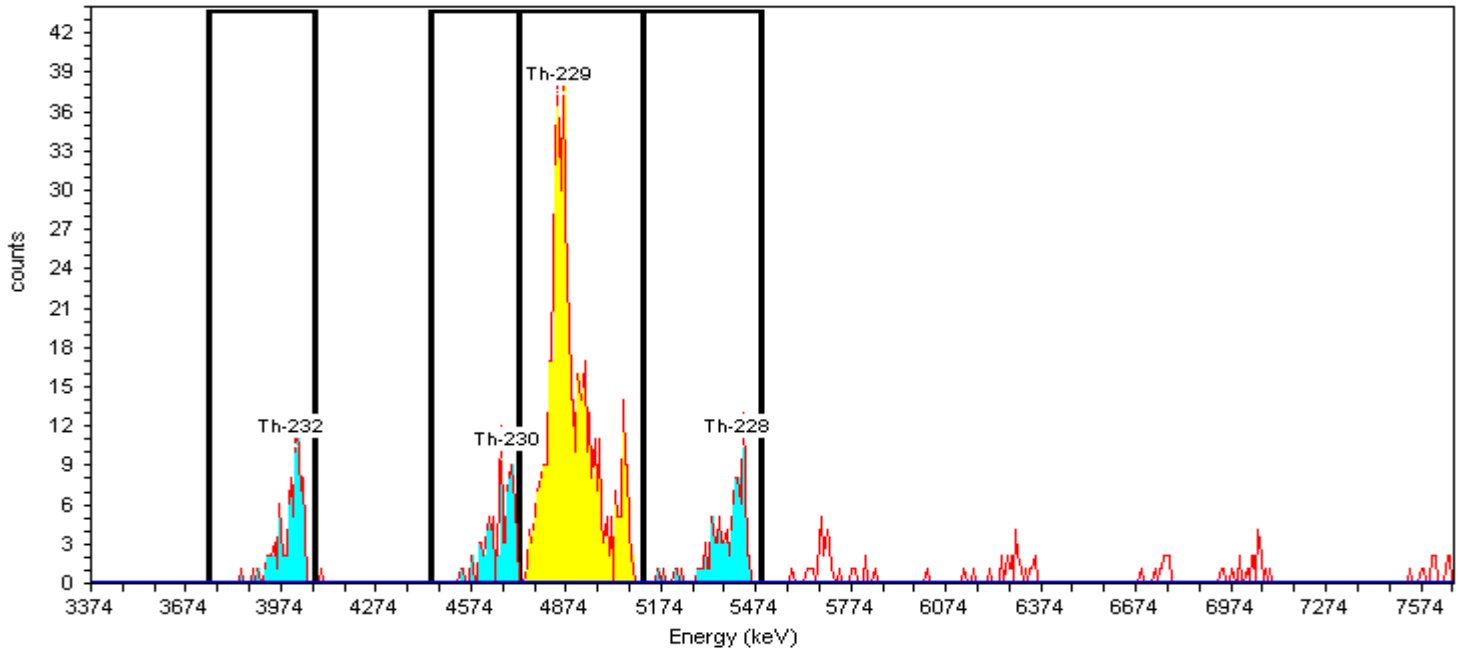
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 80.35%

Acquisition

Detector: AV64
Serial Number: 47-029ee4
Acquisition Start Date: 7/1/2014 12:33:10PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:36AM
Background Info: Sample: ICB;AV64; Det: AV64; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-7107;AV64-20140504a
Calibration Date: 5/4/2014 8:44:03PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 27.75% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:28:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/2/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	37.5	100.2	88	0.1875	87.81	0.984	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4724.2	32.8	99.7	83	0.5625	82.44	0.928	pCi/g
Th-229	4848.0	4,845.3	2.7	4724.2	5119.5	67.4	99.6	544	0.9375	543.06	4.919	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	58.0	99.8	98	1.8870	96.11	1.082	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:34:19PM 7/1/2014

Sample

Sample Name: 680-102370-A-15-B
SampleType: Sample
: 680-102370-A-15-B
Sample Collection Date: 6/12/2014 10:20:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0038g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128227
AnalysisID: 613681

Analyst: 60040

Tracer

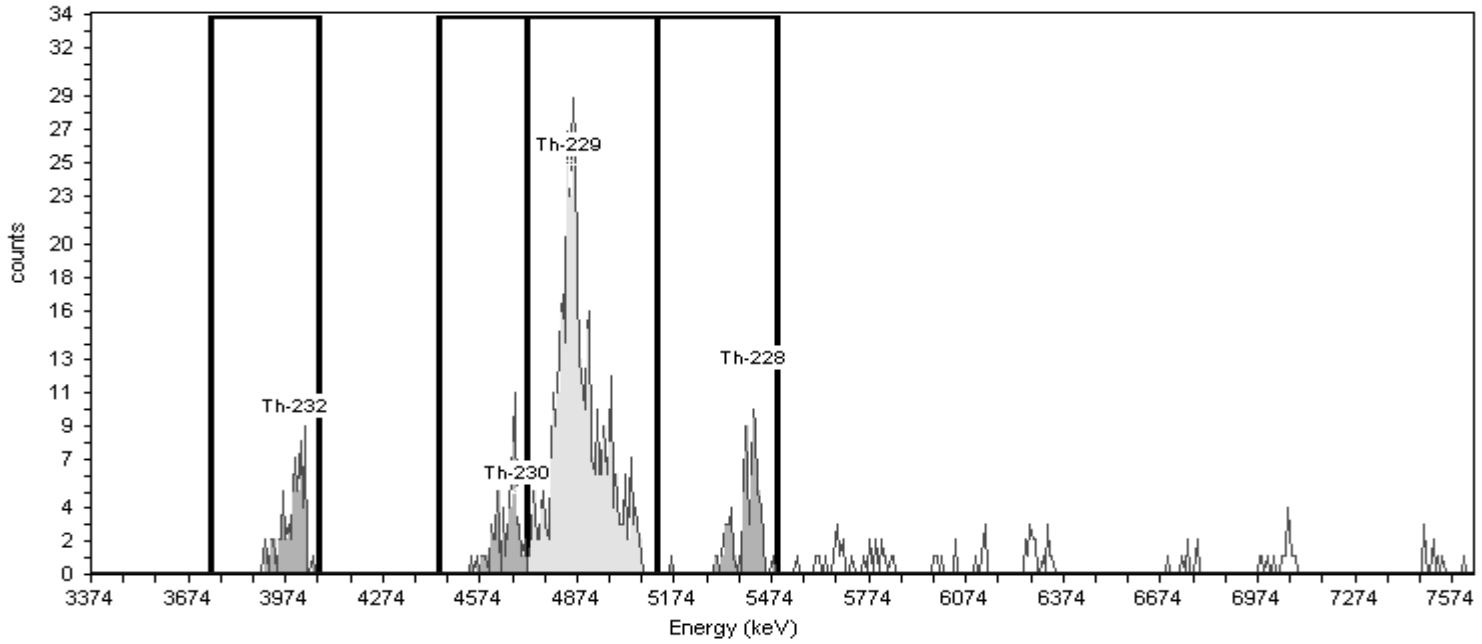
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 62.56%

Acquisition

Detector: AV65
Serial Number: 44-049JJ1
Acquisition Start Date: 7/1/2014 12:33:11PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 7:57:24PM
Background Info: Sample: ICB;AV65; Det: AV65; Spectrum #1; Jun-19-2014 19:57

Calibration Name: IC-8874;AV65-20140504
Calibration Date: 5/4/2014 8:43:55PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.13% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:28:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	25.4	100.2	62	0.3750	61.63	0.903	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	18.3	99.7	56	0.3750	55.66	0.820	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	80.6	99.6	414	0.5625	413.47	3.814	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	58.7	99.8	73	4.1250	68.88	1.014	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:34:25PM 7/1/2014

Sample

Sample Name: 680-102370-A-16-B
SampleType: Sample
: 680-102370-A-16-B
Sample Collection Date: 6/12/2014 10:25:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0023g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128227
AnalysisID: 613682

Analyst: 60040

Tracer

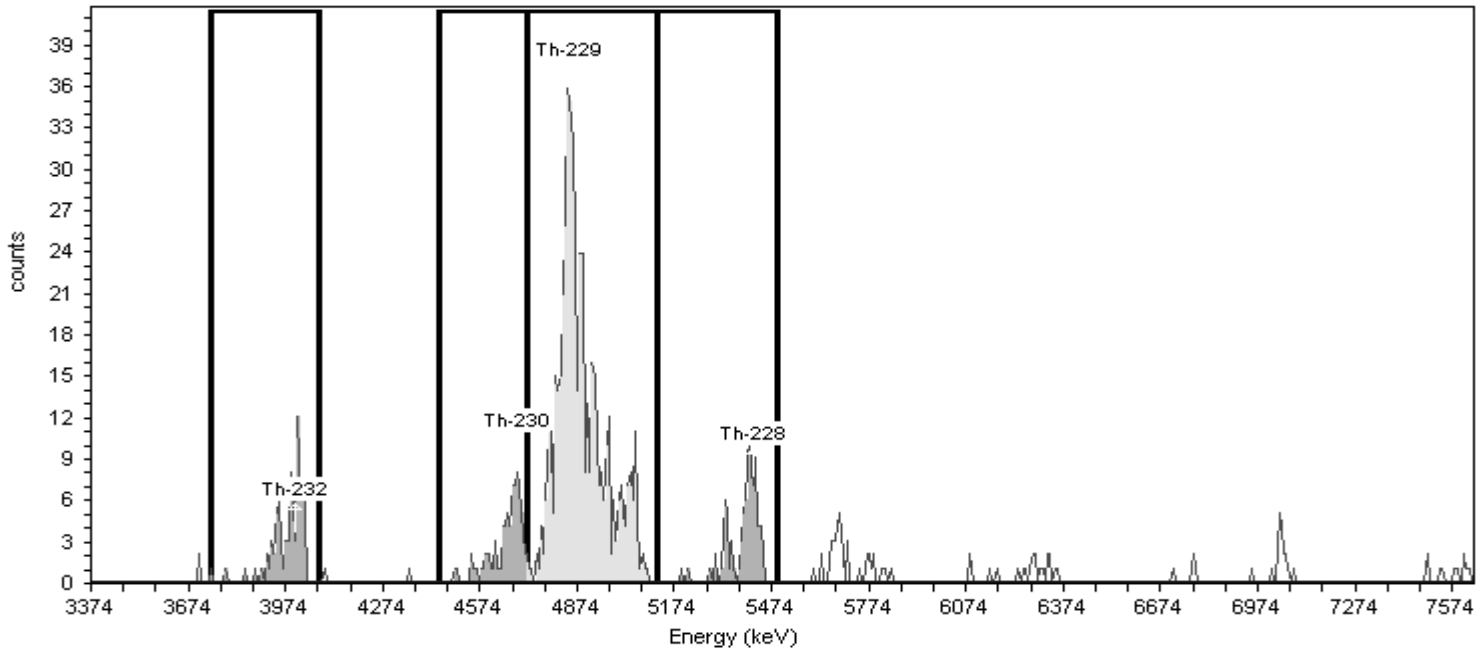
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 81.11%

Acquisition

Detector: AV66
Serial Number: 48-158EE2
Acquisition Start Date: 7/1/2014 12:33:14PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:38AM
Background Info: Sample: ICB;AV66; Det: AV66; Spectrum #1;
Jun-19-2014 00:18

Calibration Name: IC-8875;AV66-20140504
Calibration Date: 5/4/2014 8:44:10PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.93% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:28:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	51.7	100.2	81	0.3750	80.20	0.950	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	38.1	99.7	74	1.1308	72.84	0.867	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	74.0	99.6	514	1.7053	512.26	4.952	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.0	99.8	82	3.0120	78.99	0.940	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:04:47AM 7/2/2014

Sample

Sample Name: 680-102370-A-16-B
SampleType: Sample
: 680-102370-A-16-B
Sample Collection Date: 6/12/2014 10:25:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0023g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128227
AnalysisID: 613769

Analyst: 60040

Tracer

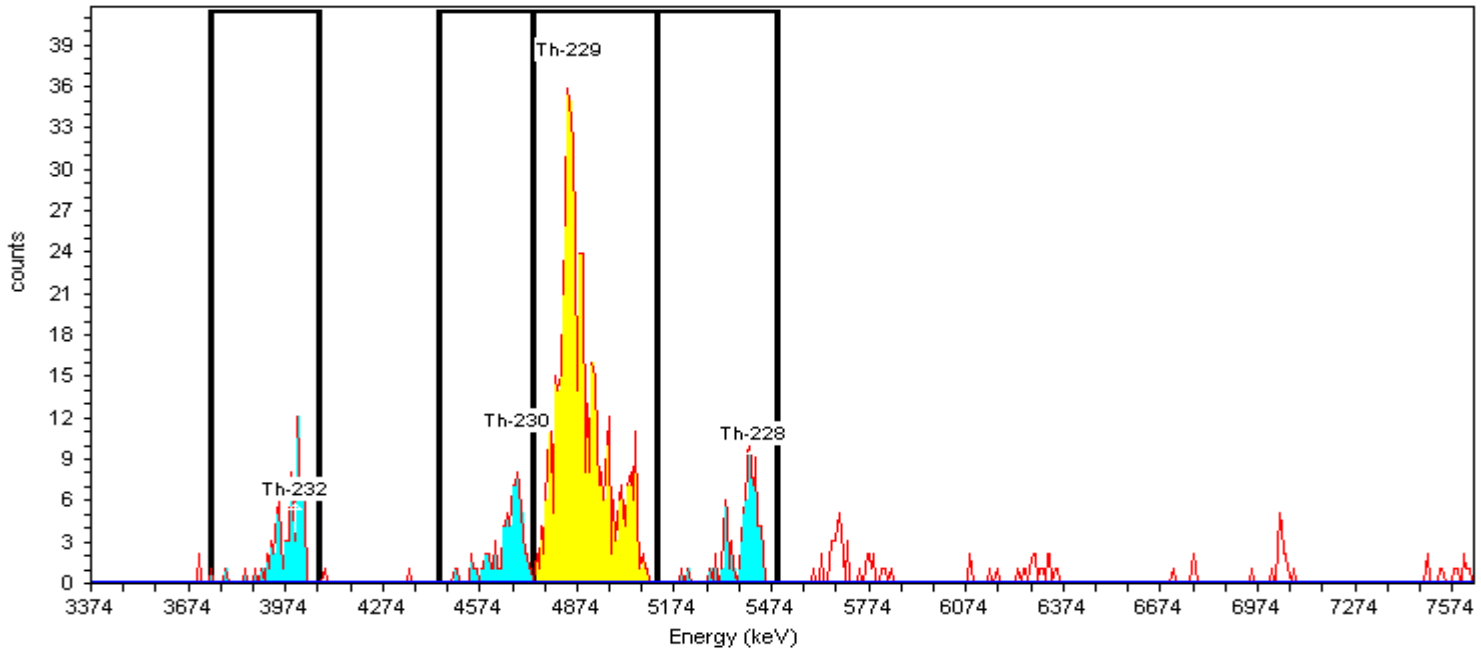
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 80.61%

Acquisition

Detector: AV66
Serial Number: 48-158EE2
Acquisition Start Date: 7/1/2014 12:33:14PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:38AM
Background Info: Sample: ICB;AV66; Det: AV66; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-8875;AV66-20140504
Calibration Date: 5/4/2014 8:44:10PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.93% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:28:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/2/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	51.7	100.2	81	0.3750	80.20	0.956	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4739.1	50.1	99.7	76	1.3125	74.69	0.895	pCi/g
Th-229	4848.0	4,845.3	2.7	4739.1	5119.5	74.0	99.6	511	1.8750	509.13	4.922	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.0	99.8	82	3.0120	78.99	0.946	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:34:42PM 7/1/2014

Sample

Sample Name: 680-102370-A-17-B
SampleType: Sample
: 680-102370-A-17-B
Sample Collection Date: 6/12/2014 10:30:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0015g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128227
AnalysisID: 613685

Analyst: 60040

Tracer

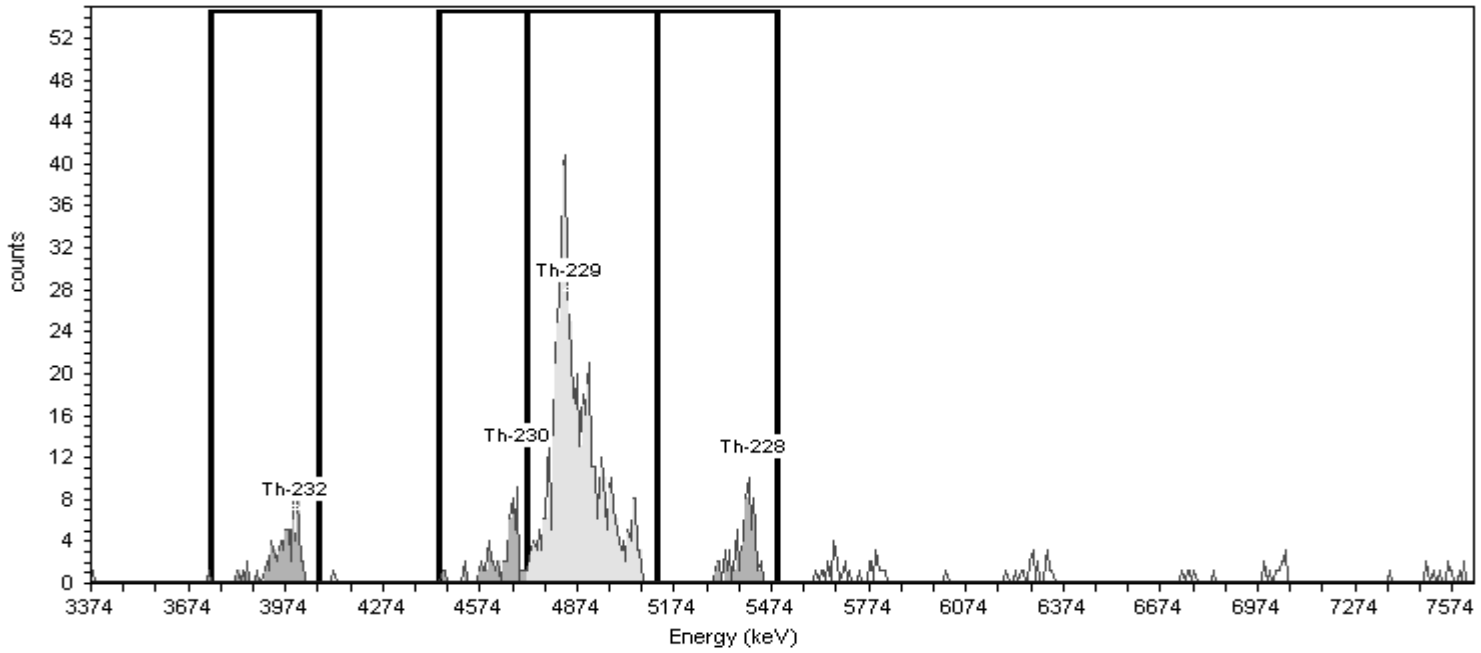
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 83.51%

Acquisition

Detector: AV67
Serial Number: 52-102 D7
Acquisition Start Date: 7/1/2014 12:33:16PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:39AM
Background Info: Sample: ICB;AV67; Det: AV67; Spectrum #1;
Jun-19-2014 00:18

Calibration Name: IC-8876;AV67-20140504
Calibration Date: 5/4/2014 8:44:15PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.32% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:28:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	89.4	100.2	64	0.6422	63.36	0.692	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	25.5	99.7	57	0.5625	56.47	0.620	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	66.4	99.6	556	0.1875	555.84	5.103	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	53.3	99.8	65	1.6875	63.31	0.695	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:05:56AM 7/2/2014

Sample

Sample Name: 680-102370-A-17-B
SampleType: Sample
: 680-102370-A-17-B
Sample Collection Date: 6/12/2014 10:30:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0015g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128227
AnalysisID: 613770

Analyst: 60040

Tracer

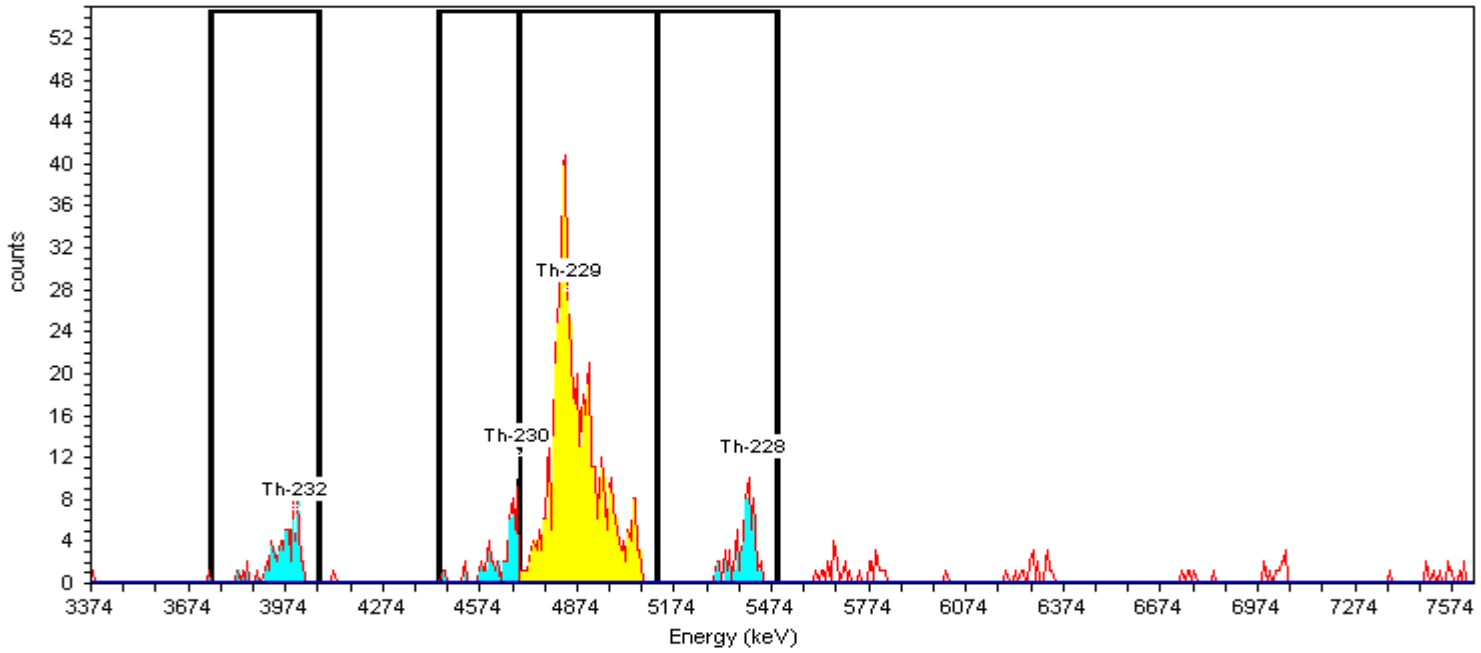
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 84.11%

Acquisition

Detector: AV67
Serial Number: 52-102 D7
Acquisition Start Date: 7/1/2014 12:33:16PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:39AM
Background Info: Sample: ICB;AV67; Det: AV67; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-8876;AV67-20140504
Calibration Date: 5/4/2014 8:44:15PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 27.32% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:28:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/2/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	89.4	100.2	64	0.6422	63.36	0.688	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4694.4	32.2	99.7	54	0.5625	53.44	0.583	pCi/g
Th-229	4848.0	4,845.3	2.7	4694.4	5119.5	66.4	99.6	560	0.1875	559.81	5.139	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	53.3	99.8	65	1.6875	63.31	0.690	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:34:31PM 7/1/2014

Sample

Sample Name: 680-102370-A-18-B
SampleType: Sample
: 680-102370-A-18-B
Sample Collection Date: 6/12/2014 12:20:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0005g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128227
AnalysisID: 613683

Analyst: 60040

Tracer

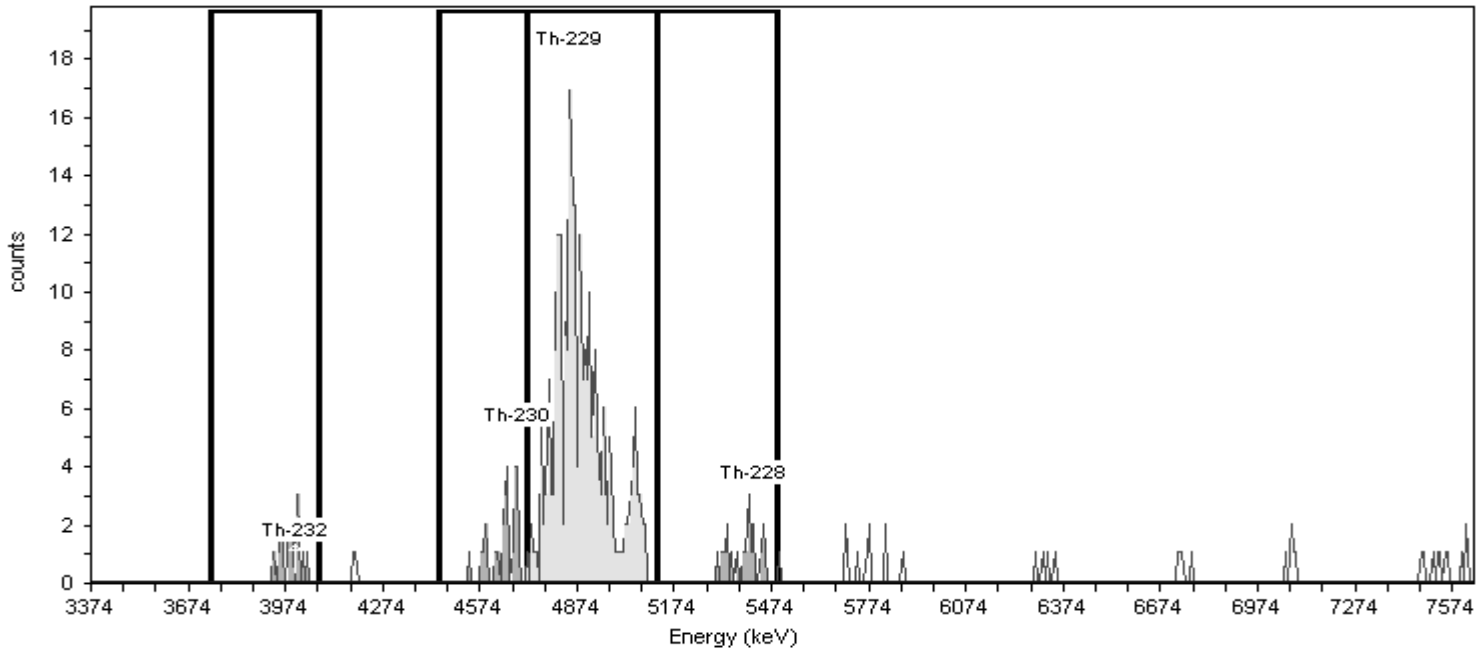
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 38.10%

Acquisition

Detector: AV68
Serial Number: 48-45884
Acquisition Start Date: 7/1/2014 12:33:17PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:40AM
Background Info: Sample: ICB;AV68; Det: AV68; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-8877;AV68-20140504
Calibration Date: 5/4/2014 8:44:22PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.49% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:28:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	77.4	100.2	15	0.0000	15.00	0.371	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	23.0	99.7	27	0.5625	26.41	0.657	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	138.8	99.6	246	0.1875	245.78	2.330	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	13.8	99.8	19	1.5000	17.59	0.437	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:34:36PM 7/1/2014

Sample

Sample Name: 680-102370-A-19-B
SampleType: Sample
: 680-102370-A-19-B
Sample Collection Date: 6/12/2014 12:25:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9956g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128227
AnalysisID: 613684

Analyst: 60040

Tracer

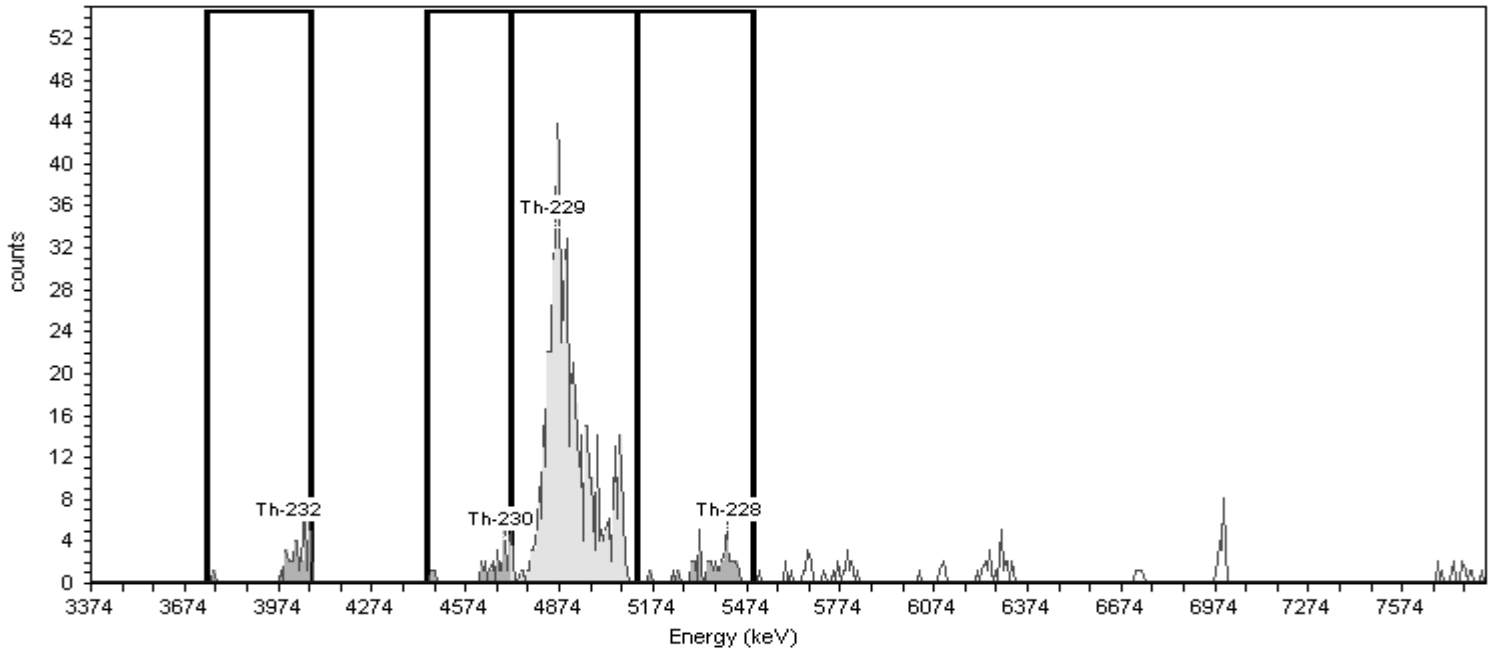
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 93.37%

Acquisition

Detector: AV69
Serial Number: 49-155DD5
Acquisition Start Date: 7/1/2014 12:33:19PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:42AM
Background Info: Sample: ICB;AV69; Det: AV69; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-9520;AV69-20140504
Calibration Date: 5/4/2014 8:44:28PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.57% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:28:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	.0	100.2	35	0.0000	34.92	0.367	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	12.5	99.7	32	0.1875	31.72	0.335	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	81.7	99.6	582	0.3750	581.53	5.739	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	135.4	99.8	42	1.5000	40.50	0.427	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:06:56AM 7/2/2014

Sample

Sample Name: 680-102370-A-19-B
SampleType: Sample
: 680-102370-A-19-B
Sample Collection Date: 6/12/2014 12:25:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9956g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128227
AnalysisID: 613771

Analyst: 60040

Tracer

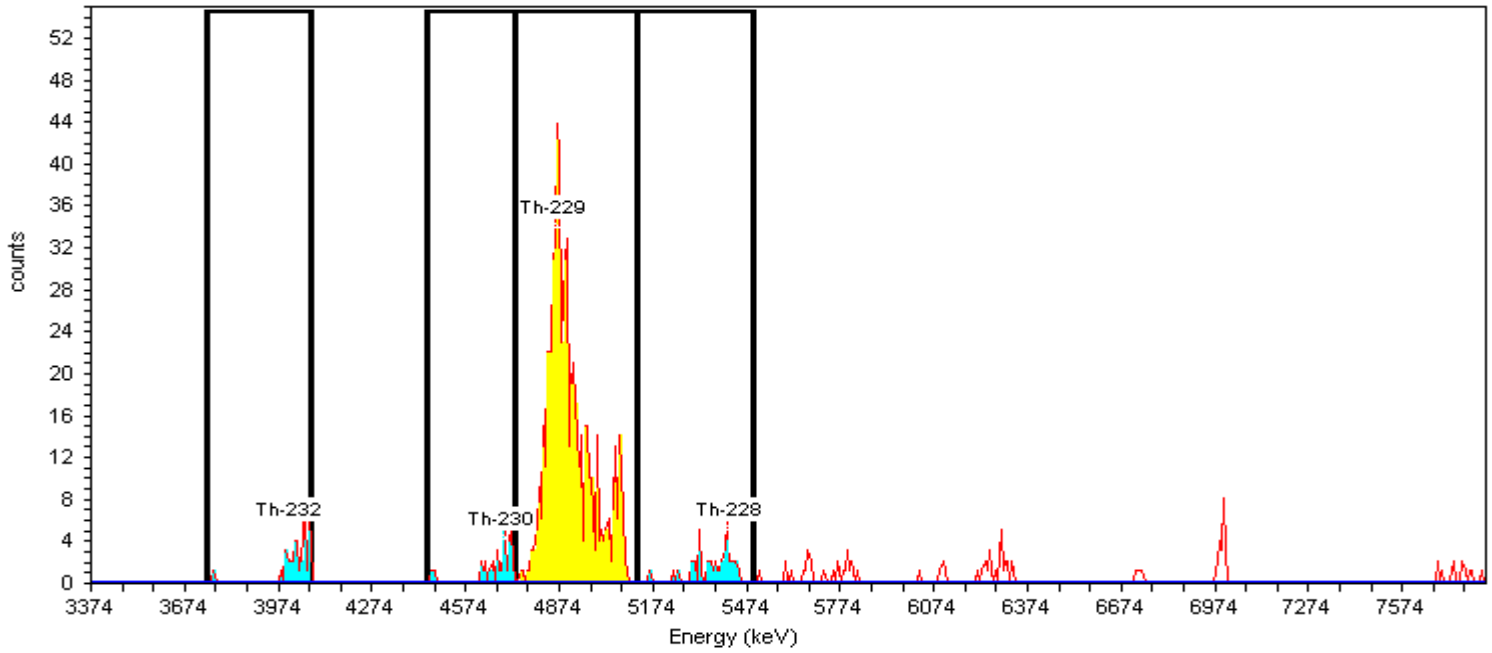
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 92.58%

Acquisition

Detector: AV69
Serial Number: 49-155DD5
Acquisition Start Date: 7/1/2014 12:33:19PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:42AM
Background Info: Sample: ICB;AV69; Det: AV69; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-9520;AV69-20140504
Calibration Date: 5/4/2014 8:44:28PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.57% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:28:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/2/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	.0	100.2	35	0.0000	34.92	0.370	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4731.7	12.4	99.7	34	0.1875	33.81	0.360	pCi/g
Th-229	4848.0	4,845.3	2.7	4731.7	5119.5	81.7	99.6	577	0.3750	576.63	5.691	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	135.4	99.8	42	1.5000	40.50	0.431	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:34:47PM 7/1/2014

Sample

Sample Name: 680-102370-A-20-B
SampleType: Sample
: 680-102370-A-20-B
Sample Collection Date: 6/12/2014 12:30:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9975g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128227
AnalysisID: 613686

Analyst: 60040

Tracer

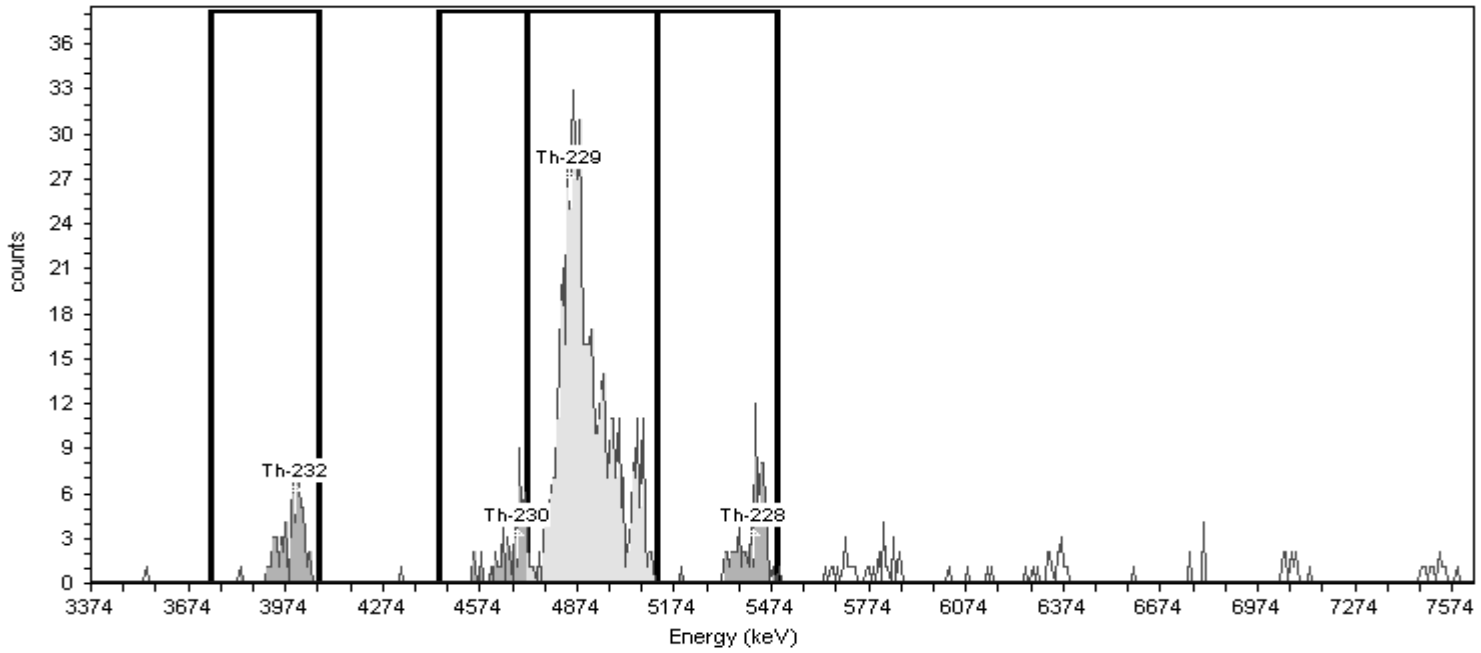
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 83.86%

Acquisition

Detector: AV70
Serial Number: 48-158FF1
Acquisition Start Date: 7/1/2014 12:33:21PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:44AM
Background Info: Sample: ICB;AV70; Det: AV70; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-8876;AV70-20140507
Calibration Date: 5/7/2014 10:49:02PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.52% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:28:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	61.1	100.2	59	0.4765	58.52	0.659	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	51.2	99.7	46	0.7500	45.19	0.511	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	89.8	99.6	542	0.1875	541.75	5.145	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	30.1	99.8	69	1.8750	67.21	0.760	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:07:58AM 7/2/2014

Sample

Sample Name: 680-102370-A-20-B
SampleType: Sample
: 680-102370-A-20-B
Sample Collection Date: 6/12/2014 12:30:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9975g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128227
AnalysisID: 613772

Analyst: 60040

Tracer

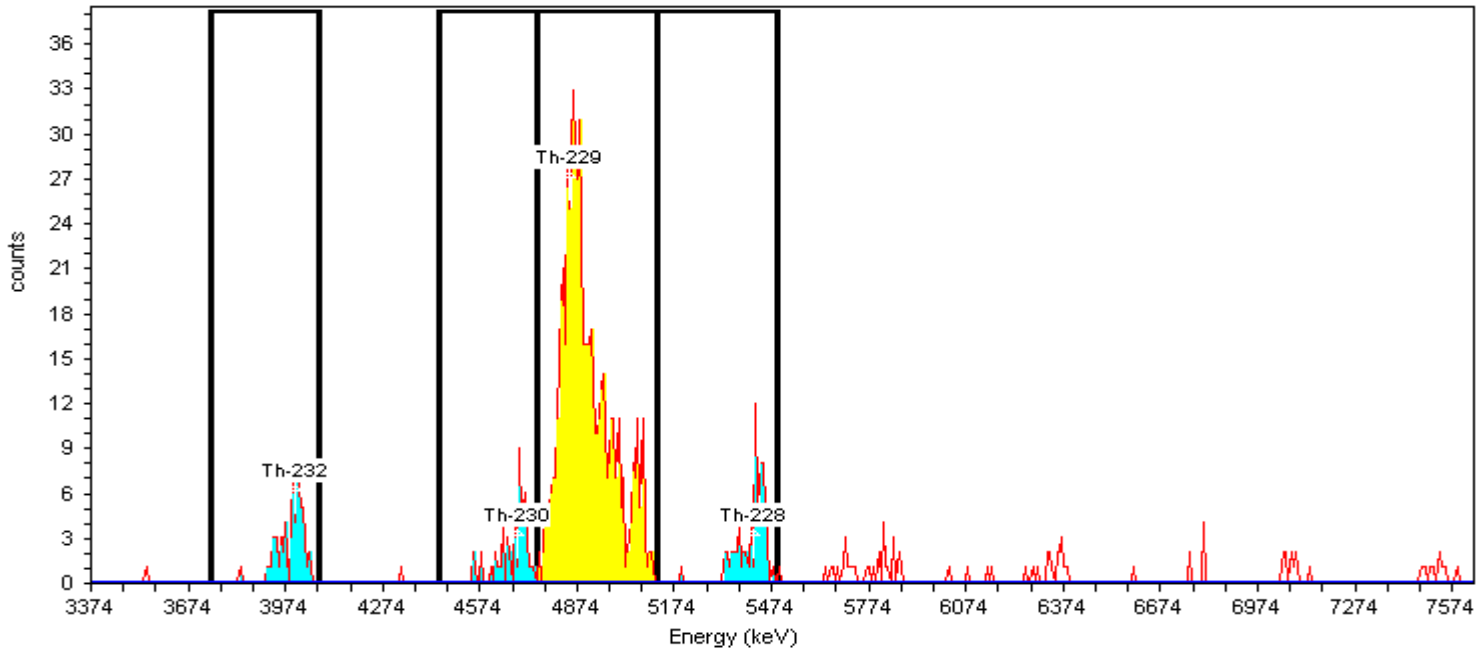
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 83.09%

Acquisition

Detector: AV70
Serial Number: 48-158FF1
Acquisition Start Date: 7/1/2014 12:33:21PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:44AM
Background Info: Sample: ICB;AV70; Det: AV70; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-8876;AV70-20140507
Calibration Date: 5/7/2014 10:49:02PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.52% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:28:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/2/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	61.1	100.2	59	0.4765	58.52	0.665	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4746.6	15.8	99.7	49	0.7500	48.25	0.551	pCi/g
Th-229	4848.0	4,845.3	2.7	4746.6	5119.5	89.8	99.6	537	0.1875	536.81	5.098	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	30.1	99.8	69	1.8750	67.21	0.767	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:34:53PM 7/1/2014

Sample

Sample Name: 680-102370-A-22-B
SampleType: Sample
: 680-102370-A-22-B
Sample Collection Date: 6/12/2014 1:10:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9997g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128227
AnalysisID: 613687

Analyst: 60040

Tracer

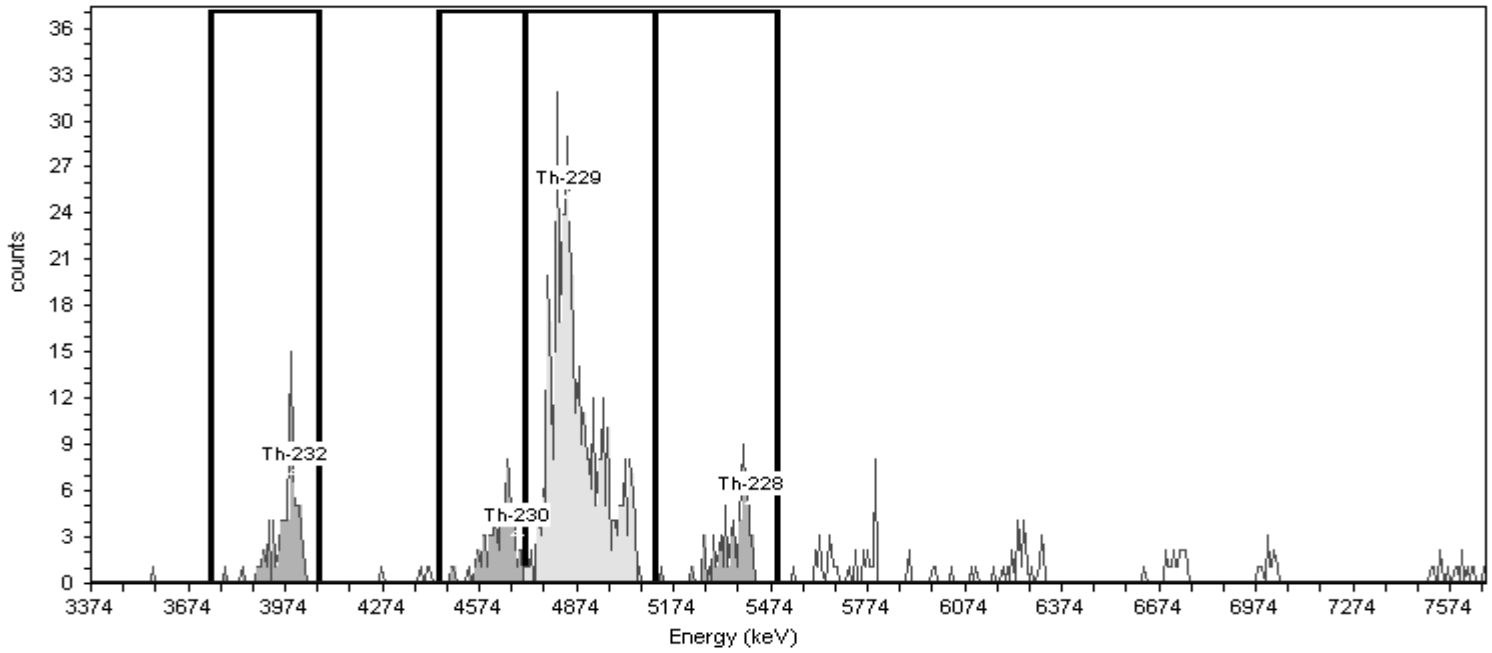
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 67.87%

Acquisition

Detector: AV71
Serial Number: 48-158EE6
Acquisition Start Date: 7/1/2014 12:33:23PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:46AM
Background Info: Sample: ICB;AV71; Det: AV71; Spectrum #1;
Jun-19-2014 00:18

Calibration Name: IC-9792;AV71-20140504
Calibration Date: 5/4/2014 8:44:50PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.79% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:28:49PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	57.0	100.2	76	0.1875	75.81	1.042	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	39.8	99.7	69	0.3692	68.63	0.948	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	87.7	99.6	444	1.1192	442.88	4.155	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	55.8	99.8	64	2.0625	61.94	0.855	pCi/g

Prep Batch: 128228

, Extraction Chromatography Resin Actinide

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128228

Lab ID: MB 160-128228/1-A
Client ID:
Sigma: 2
Analyzed: 07/01/14 12:25
Detector: AV115
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.006508	0.0215	0.0216	U	pCi/g	1.00	0.0541	129241
Thorium-230	0.1211	0.0724	0.0731		pCi/g	1.00	0.0541	129241
Thorium-232	0.0000	0.00389	0.00389	U	pCi/g	1.00	0.0311	129241

Tracer	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.611	0.463	0.661		pCi/g	0.0435	6.12	91.7	30 - 110

Lab ID: LCS 160-128228/2-A
Client ID:
Sigma: 2
Analyzed: 07/01/14 12:25
Detector: AV116
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	20.69	1.28	2.16		pCi/g	1.00	0.0591	129242

Tracer	LCS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	11.54	0.926	1.34		pCi/g	0.0557	12.2	94.3	30 - 110

Lab ID: 680-102370-23
Client ID: SD-214-01
Sigma: 2
Analyzed: 07/01/14 12:26
Detector: AV1
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.986	0.218	0.233		pCi/g	1.00	0.0975	129224
Thorium-230	0.865	0.205	0.218		pCi/g	1.00	0.104	129224
Thorium-232	1.09	0.228	0.246		pCi/g	1.00	0.102	129224

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.02	0.438	0.609		pCi/g	0.0497	6.12	82.1	30 - 110

Lab ID: 680-102370-23 MS
Client ID: SD-214-01
Sigma: 2
Analyzed: 07/01/14 12:26
Detector: AV3
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	MS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	5.842	0.521	0.716		pCi/g	1.00	0.125	129269

Tracer	MS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.148	0.446	0.621		pCi/g	0.0656	6.13	84.0	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128228

Lab ID: 680-102370-23MSD
Client ID: SD-214-01
Sigma: 2
Analyzed: 07/03/14 17:15
Detector: AV3
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	MSD Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	5.550	0.493	0.679		pCi/g	1.00	0.106	129774

Tracer	MSD Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.408	0.457	0.644		pCi/g	0.0806	6.11	88.5	30 - 110

Lab ID: 680-102370-24
Client ID: SD-212-SS
Sigma: 2
Analyzed: 07/01/14 12:26
Detector: AV6
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.964	0.214	0.229		pCi/g	1.00	0.112	129287
Thorium-230	0.923	0.208	0.222		pCi/g	1.00	0.0973	129287
Thorium-232	1.03	0.217	0.234		pCi/g	1.00	0.0766	129287

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.29	0.454	0.635		pCi/g	0.0692	6.14	86.1	30 - 110

Lab ID: 680-102370-25
Client ID: SD-212-01
Sigma: 2
Analyzed: 07/01/14 12:26
Detector: AV7
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.24	0.260	0.280		pCi/g	1.00	0.118	129298
Thorium-230	1.00	0.231	0.246		pCi/g	1.00	0.0866	129298
Thorium-232	1.12	0.246	0.263		pCi/g	1.00	0.100	129298

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.55	0.422	0.570		pCi/g	0.0594	6.14	74.2	30 - 110

Lab ID: 680-102370-26
Client ID: SD-212-02
Sigma: 2
Analyzed: 07/01/14 12:26
Detector: AV8
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.10	0.220	0.239		pCi/g	1.00	0.103	129309
Thorium-230	1.17	0.222	0.243		pCi/g	1.00	0.0504	129309
Thorium-232	1.01	0.208	0.225		pCi/g	1.00	0.0776	129309

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128228

Lab ID: 680-102370-26 | Analyzed: 07/01/14 12:26 | Decay Corrected: No
Client ID: SD-212-02 | Detector: AV8 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.38	0.448	0.636		pCi/g	0.0734	6.12	87.9	30 - 110

Lab ID: 680-102370-28 | Analyzed: 07/01/14 12:26 | Decay Corrected: No
Client ID: SD-DUP-04 | Detector: AV9 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.06	0.218	0.235		pCi/g	1.00	0.0678	129320
Thorium-230	1.04	0.216	0.233		pCi/g	1.00	0.0715	129320
Thorium-232	1.26	0.236	0.258		pCi/g	1.00	0.0571	129320

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.12	0.436	0.613		pCi/g	0.0482	6.11	83.9	30 - 110

Lab ID: 680-102370-29 | Analyzed: 07/01/14 12:26 | Decay Corrected: No
Client ID: SD-213-SS | Detector: AV10 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.10	0.235	0.253		pCi/g	1.00	0.111	129225
Thorium-230	1.26	0.248	0.270		pCi/g	1.00	0.0688	129225
Thorium-232	1.23	0.244	0.265		pCi/g	1.00	0.0361	129225

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.91	0.438	0.602		pCi/g	0.0744	6.12	80.3	30 - 110

Lab ID: 680-102370-30 | Analyzed: 07/01/14 12:26 | Decay Corrected: No
Client ID: SD-213-01 | Detector: AV11 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.998	0.208	0.224		pCi/g	1.00	0.0956	129236
Thorium-230	0.979	0.203	0.219		pCi/g	1.00	0.0673	129236
Thorium-232	1.17	0.222	0.243		pCi/g	1.00	0.0738	129236

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.48	0.453	0.646		pCi/g	0.0604	6.11	89.7	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128228

Lab ID: 680-102370-31 | Analyzed: 07/01/14 12:26 | Decay Corrected: No
Client ID: SD-213-02 | Detector: AV12 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.14	0.239	0.257		pCi/g	1.00	0.0938	129246
Thorium-230	1.15	0.237	0.256		pCi/g	1.00	0.0557	129246
Thorium-232	1.18	0.241	0.261		pCi/g	1.00	0.0899	129246

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.81	0.431	0.591		pCi/g	0.0504	6.10	78.8	30 - 110

Lab ID: 680-102370-34 | Analyzed: 07/01/14 12:26 | Decay Corrected: No
Client ID: SD-214-02 | Detector: AV13 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.22	0.231	0.253		pCi/g	1.00	0.0851	129257
Thorium-230	1.24	0.231	0.253		pCi/g	1.00	0.0323	129257
Thorium-232	1.15	0.224	0.244		pCi/g	1.00	0.0859	129257

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.50	0.461	0.653		pCi/g	0.0550	6.12	89.8	30 - 110

Lab ID: 680-102370-35 | Analyzed: 07/01/14 12:26 | Decay Corrected: No
Client ID: SD-214-03 | Detector: AV14 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.865	0.198	0.211		pCi/g	1.00	0.0684	129259
Thorium-230	0.433	0.140	0.145		pCi/g	1.00	0.0582	129259
Thorium-232	0.856	0.196	0.209		pCi/g	1.00	0.0508	129259

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.17	0.444	0.621		pCi/g	0.0646	6.10	84.8	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128228

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-128228/1-A	Thorium-228			0.006508	U	pCi/g							
MB 160-128228/1-A	Thorium-230			0.1211		pCi/g							
MB 160-128228/1-A	Thorium-232			0.0000	U	pCi/g							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-128228/2-A	Thorium-230		24.5	20.69		pCi/g	84	81 - 118					

Matrix Spike ID:	Analyte	Parent Result	Spike Added	MS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
680-102370-23	Thorium-230	0.865	4.33	5.842		pCi/g	115	76 - 115	5				

Matrix Spike Duplicate ID:	Analyte	Parent Result	Spike Added	MSD Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
680-102370-23MSD	Thorium-230	5.89	4.31	5.550		pCi/g	109	76 - 115	5	0.21	0.59	1	

Glossary:

Ts = Count Duration, Sample

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102370-1

SDG No.: 680-102370-1

Batch Number: 128227 Batch Start Date: 06/23/14 15:01 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/01/14 09:26

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-128227/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-128227/2		ExtChrom, A-01-R		0.4968 g	0.2 mL	0.4968 g			
680-102370-A-1-A	SD-DUP-03	ExtChrom, A-01-R	T	0.9994 g	0.2 mL				
680-102370-A-1-A DU	SD-DUP-03	ExtChrom, A-01-R	T	0.9980 g	0.2 mL				
680-102370-A-2-A	SD-206-SS	ExtChrom, A-01-R	T	1.0045 g	0.2 mL				
680-102370-A-3-A	SD-206-01	ExtChrom, A-01-R	T	0.9994 g	0.2 mL				
680-102370-A-4-A	SD-206-02	ExtChrom, A-01-R	T	0.9992 g	0.2 mL				
680-102370-A-7-A	SD-215-SS	ExtChrom, A-01-R	T	1.0030 g	0.2 mL				
680-102370-A-8-A	SD-222-SS	ExtChrom, A-01-R	T	.9970 g	0.2 mL				
680-102370-A-9-A	SD-222-01	ExtChrom, A-01-R	T	.9969 g	0.2 mL				
680-102370-A-10-A	SD-222-02	ExtChrom, A-01-R	T	1.0048 g	0.2 mL				
680-102370-A-11-A	SD-222-03	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				
680-102370-A-12-A	SD-211-SS	ExtChrom, A-01-R	T	1.0023 g	0.2 mL				
680-102370-A-13-A	SD-211-01	ExtChrom, A-01-R	T	0.9969 g	0.2 mL				
680-102370-A-14-A	SD-211-02	ExtChrom, A-01-R	T	0.9997 g	0.2 mL				
680-102370-A-15-A	SD-216-SS	ExtChrom, A-01-R	T	1.0038 g	0.2 mL				
680-102370-A-16-A	SD-216-01	ExtChrom, A-01-R	T	1.0023 g	0.2 mL				
680-102370-A-17-A	SD-216-02	ExtChrom, A-01-R	T	1.0015 g	0.2 mL				
680-102370-A-18-A	SD-217-SS	ExtChrom, A-01-R	T	1.0005 g	0.2 mL				
680-102370-A-19-A	SD-217-01	ExtChrom, A-01-R	T	0.9956 g	0.2 mL				
680-102370-A-20-A	SD-217-02	ExtChrom, A-01-R	T	0.9975 g	0.2 mL				

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102370-1

SDG No.: 680-102370-1

Batch Number: 128227 Batch Start Date: 06/23/14 15:01 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/01/14 09:26

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
680-102370-A-22-A	SD-214-SS	ExtChrom, A-01-R	T	0.9997 g	0.2 mL				

Batch Notes	
Balance ID	27050421
Column Analyst	scb
Column Date	6/27/14
CoPrecipitation Analyst	scb
CoPrecipitation Date	7/1/14
Person's name who witnessed reagent drop	nmn per scb
Analyst who added reagent	scb
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102370-1

SDG No.: 680-102370-1

Batch Number: 128228 Batch Start Date: 06/23/14 15:05 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/01/14 09:24

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	Th-230 00023	TRM-2 00001		
MB 160-128228/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-128228/2		ExtChrom, A-01-R		0.4997 g	0.2 mL		0.4997 g		
680-102370-A-23 -A	SD-214-01	ExtChrom, A-01-R	T	0.9992 g	0.2 mL				
680-102370-A-23 -B MS	SD-214-01	ExtChrom, A-01-R	T	0.9980 g	0.2 mL	0.2 mL			
680-102370-A-23 -C MSD	SD-214-01	ExtChrom, A-01-R	T	1.0011 g	0.2 mL	0.2 mL			
680-102370-A-24 -A	SD-212-SS	ExtChrom, A-01-R	T	0.9960 g	0.2 mL				
680-102370-A-25 -A	SD-212-01	ExtChrom, A-01-R	T	0.9964 g	0.2 mL				
680-102370-A-26 -A	SD-212-02	ExtChrom, A-01-R	T	1.0000 g	0.2 mL				
680-102370-A-28 -A	SD-DUP-04	ExtChrom, A-01-R	T	1.0015 g	0.2 mL				
680-102370-A-29 -A	SD-213-SS	ExtChrom, A-01-R	T	1.0000 g	0.2 mL				
680-102370-A-30 -A	SD-213-01	ExtChrom, A-01-R	T	1.0010 g	0.2 mL				
680-102370-A-31 -A	SD-213-02	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				
680-102370-A-34 -A	SD-214-02	ExtChrom, A-01-R	T	0.9996 g	0.2 mL				
680-102370-A-35 -A	SD-214-03	ExtChrom, A-01-R	T	1.0033 g	0.2 mL				

Batch Notes	
Balance ID	27050421
Column Analyst	scb
Column Date	6/27/14
CoPrecipitation Analyst	scb
CoPrecipitation Date	7/1/14
Person's name who witnessed reagent drop	nmn per scb
Analyst who added reagent	scb
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102370-1

SDG No.: 680-102370-1

Batch Number: 128228 Batch Start Date: 06/23/14 15:05 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/01/14 09:24

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:26:32PM 7/1/2014

Sample

Sample Name: MB 160-128228/1-A
SampleType: Blank
: MB 160-128228/1-A
Sample Collection Date: 6/24/2014 11:10:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0000g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128228
AnalysisID: 613631

Analyst: 60040

Tracer

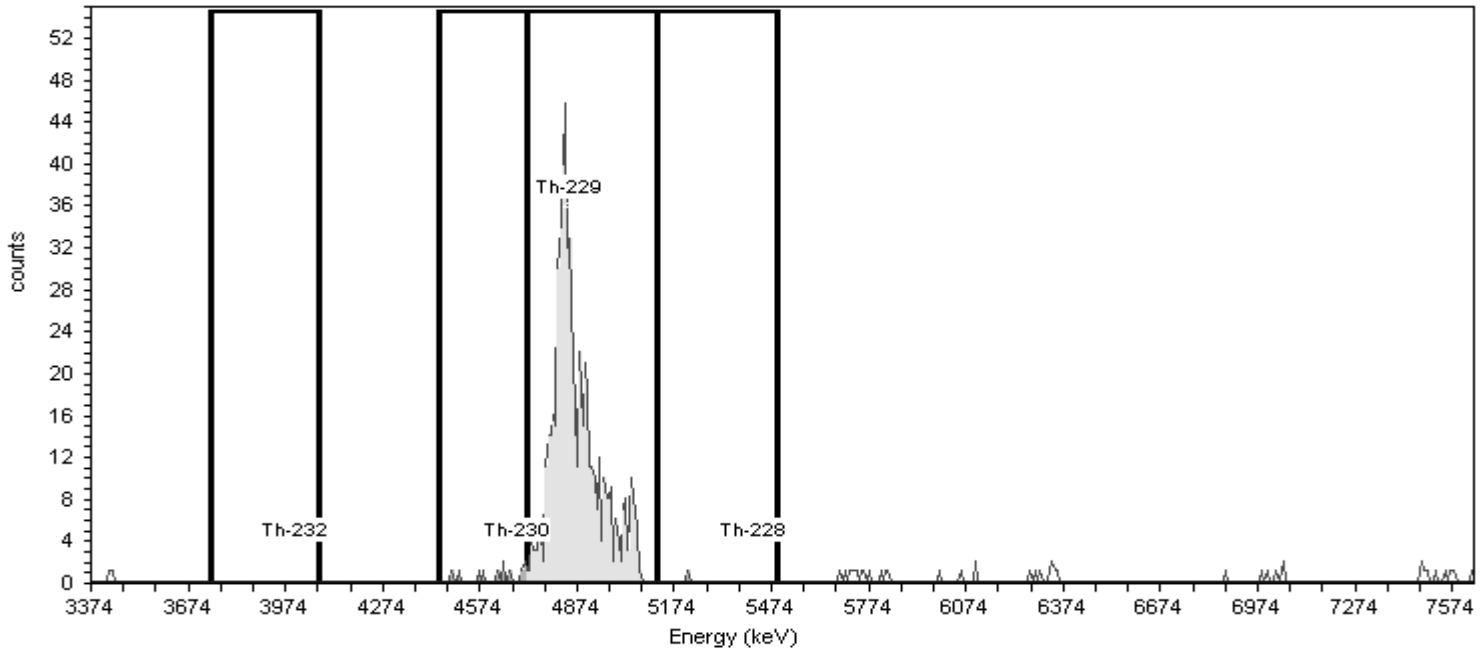
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 91.73%

Acquisition

Detector: AV115
Serial Number: 49-037E4
Acquisition Start Date: 7/1/2014 12:25:44PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:09:52PM
Background Info: Sample: ICB;AV115; Det: AV115; Spectrum #1; Jun-18-2014 19:09

Calibration Name: IC-9817;AV115-20140507
Calibration Date: 5/7/2014 10:49:29PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.26% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:22:09PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	.0	100.2	0	0.0000	0.00	0.000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	.0	99.7	12	0.3750	11.63	0.121	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	67.0	99.6	587	0.1875	586.81	5.614	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	44.5	99.8	1	0.3750	0.63	0.007	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:26:42PM 7/1/2014

Sample

Sample Name: LCS 160-128228/2-A
SampleType: Control
: LCS 160-128228/2-A
Sample Collection Date: 6/24/2014 11:10:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.4997g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128228
AnalysisID: 613632

Analyst: 60040

Tracer

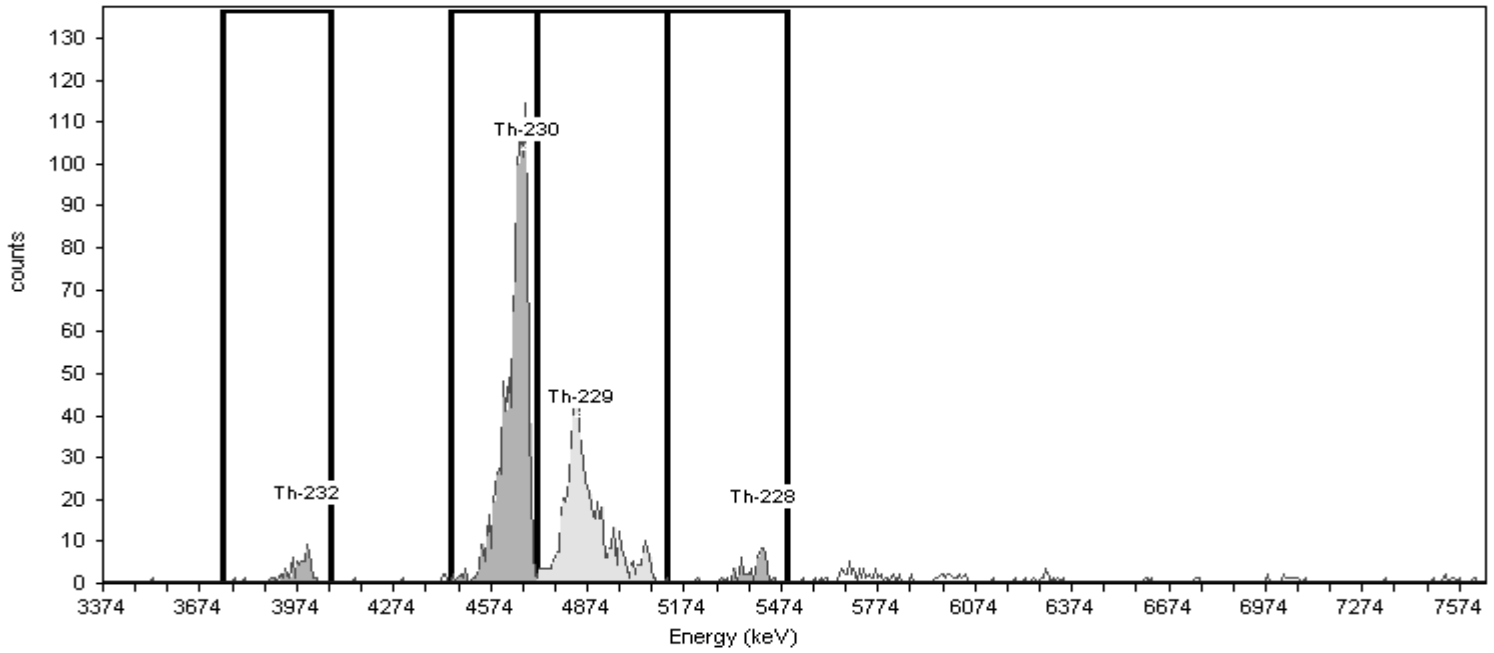
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 94.26%

Acquisition

Detector: AV116
Serial Number: 49-034G1
Acquisition Start Date: 7/1/2014 12:25:50PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:09:53PM
Background Info: Sample: ICB;AV116; Det: AV116; Spectrum #1; Jun-18-2014 19:09

Calibration Name: IC-9792;AV116-20140430
Calibration Date: 5/1/2014 1:16:57PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.04% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:22:07PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	61.4	100.2	62	0.0860	61.91	1.214	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	27.4	99.7	1050	0.0000	1050.06	20.690	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	74.0	99.6	621	0.0000	621.00	11.544	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	85.4	99.8	60	0.5625	59.37	1.169	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:26:48PM 7/1/2014

Sample

Sample Name: 680-102370-A-23-D
SampleType: Sample
: 680-102370-A-23-D
Sample Collection Date: 6/12/2014 1:15:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9992g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128228
AnalysisID: 613633

Analyst: 60040

Tracer

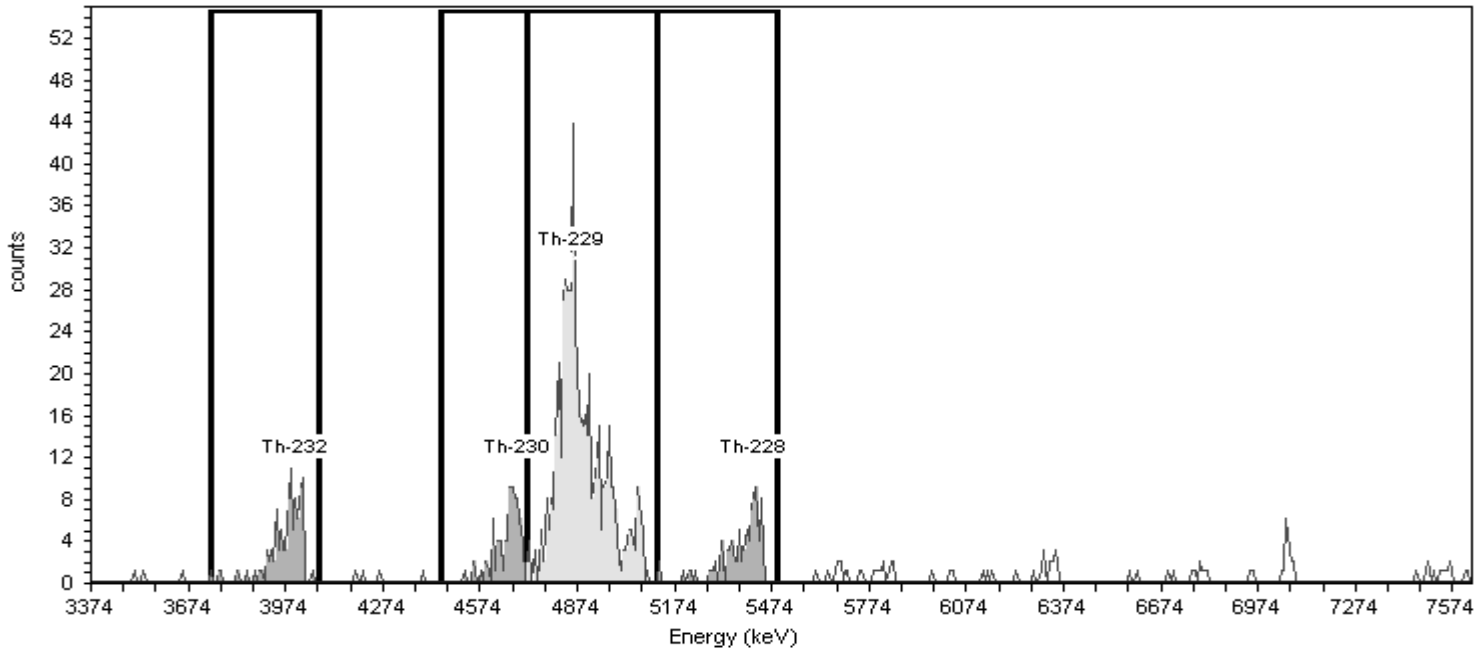
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 82.06%

Acquisition

Detector: AV1
Serial Number: 49-188 AA4
Acquisition Start Date: 7/1/2014 12:26:11PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:10:34PM
Background Info: Sample: ICB;AV1; Det: AV1; Spectrum #1; Jun-18-2014 19:10

Calibration Name: IC-7107;AV1-20140505
Calibration Date: 5/6/2014 5:38:14PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.30% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:22:07PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	72.7	100.2	97	2.6250	93.95	1.088	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	33.9	99.7	77	2.7405	74.32	0.865	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	80.4	99.6	526	0.3750	525.69	5.026	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	62.7	99.8	87	2.2500	84.75	0.986	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:26:54PM 7/1/2014

Sample

Sample Name: 680-102370-A-23-E MS
SampleType: Sample
: 680-102370-A-23-E MS
Sample Collection Date: 6/12/2014 1:15:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9980g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128228
AnalysisID: 613634

Analyst: 60040

Tracer

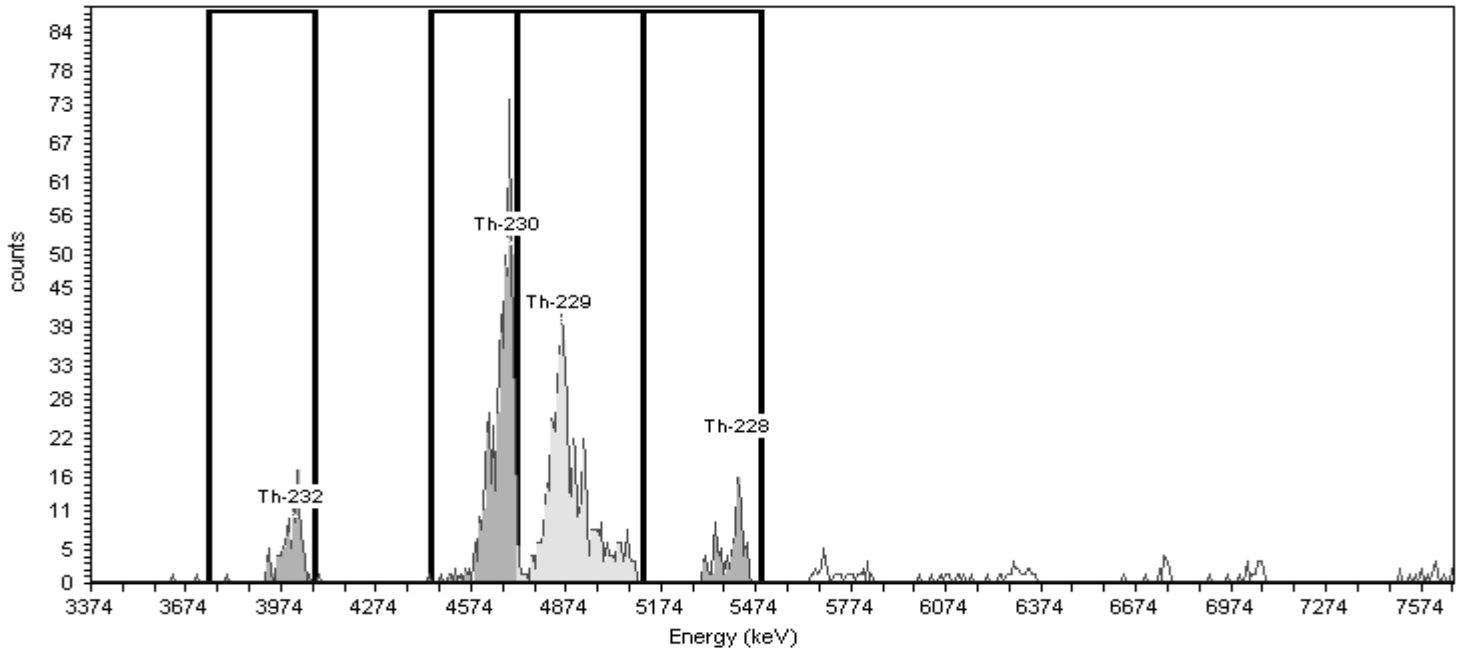
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 85.52%

Acquisition

Detector: AV3
Serial Number: 49-202 FF7
Acquisition Start Date: 7/1/2014 12:26:18PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:10:38PM
Background Info: Sample: ICB;AV3; Det: AV3; Spectrum #1; Jun-18-2014 19:10

Calibration Name: IC-8875;AV3-20140505
Calibration Date: 5/6/2014 5:38:33PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.09% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:22:07PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	50.9	100.2	103	0.7500	102.25	1.147	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	36.9	99.7	508	3.5683	504.58	5.687	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	68.6	99.6	546	2.2558	543.59	5.244	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	59.4	99.8	102	0.5625	101.44	1.143	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:13:27AM 7/2/2014

Sample

Sample Name: 680-102370-A-23-E MS
SampleType: Sample
: 680-102370-A-23-E MS
Sample Collection Date: 6/12/2014 1:15:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9980g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128228
AnalysisID: 613777

Analyst: 60040

Tracer

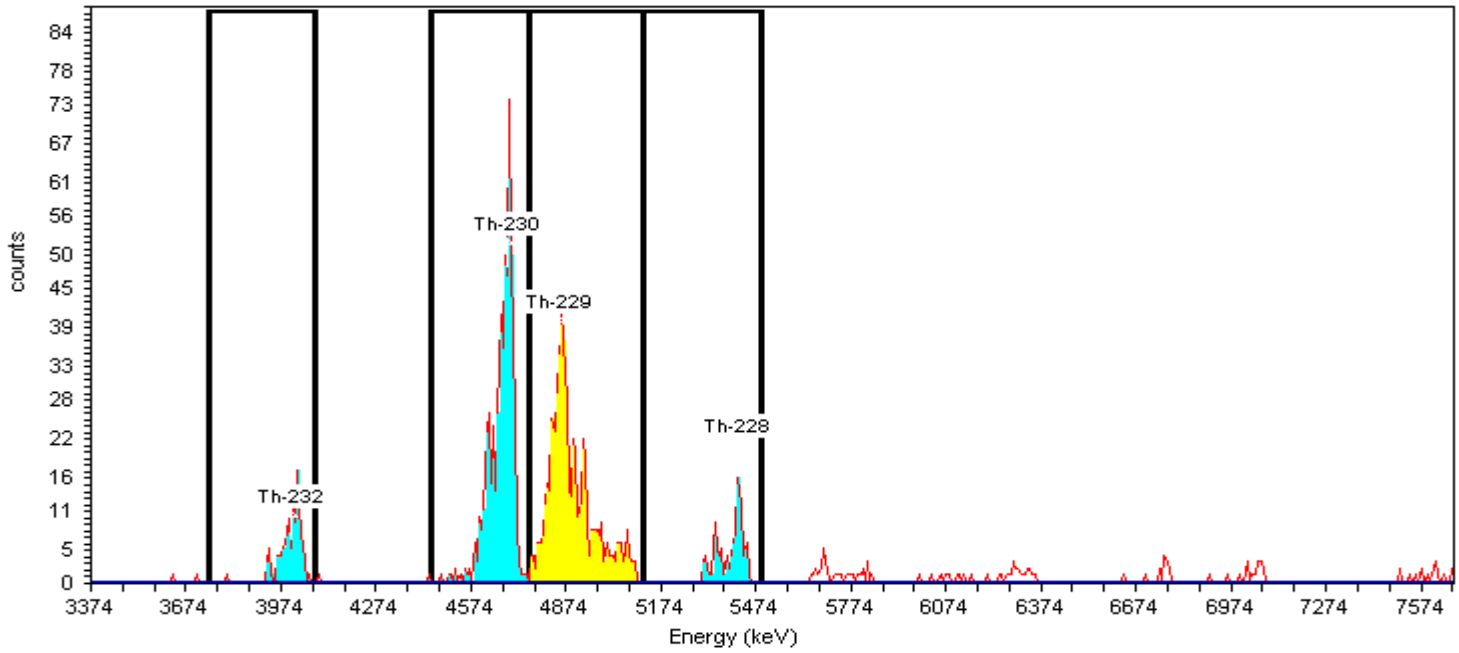
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 83.99%

Acquisition

Detector: AV3
Serial Number: 49-202 FF7
Acquisition Start Date: 7/1/2014 12:26:18PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:10:38PM
Background Info: Sample: ICB;AV3; Det: AV3; Spectrum #1; Jun-18-2014 19:10

Calibration Name: IC-8875;AV3-20140505
Calibration Date: 5/6/2014 5:38:33PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.09% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:22:07PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/2/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	50.9	100.2	103	0.7500	102.25	1.168	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4754.1	58.5	99.7	514	4.8750	509.13	5.842	pCi/g
Th-229	4848.0	4,845.3	2.7	4754.1	5119.5	68.6	99.6	535	1.1250	533.88	5.150	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	59.4	99.8	102	0.5625	101.44	1.163	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:15:50PM 7/3/2014

Sample

Sample Name: 680-102370-A-23-F MSD
SampleType: Sample
: 680-102370-A-23-F MSD
Sample Collection Date: 6/12/2014 1:15:00PM

Spectrum #2 Analysis #1
Sample Weight : 1.0011g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128228
AnalysisID: 614188

Analyst: 60040

Tracer

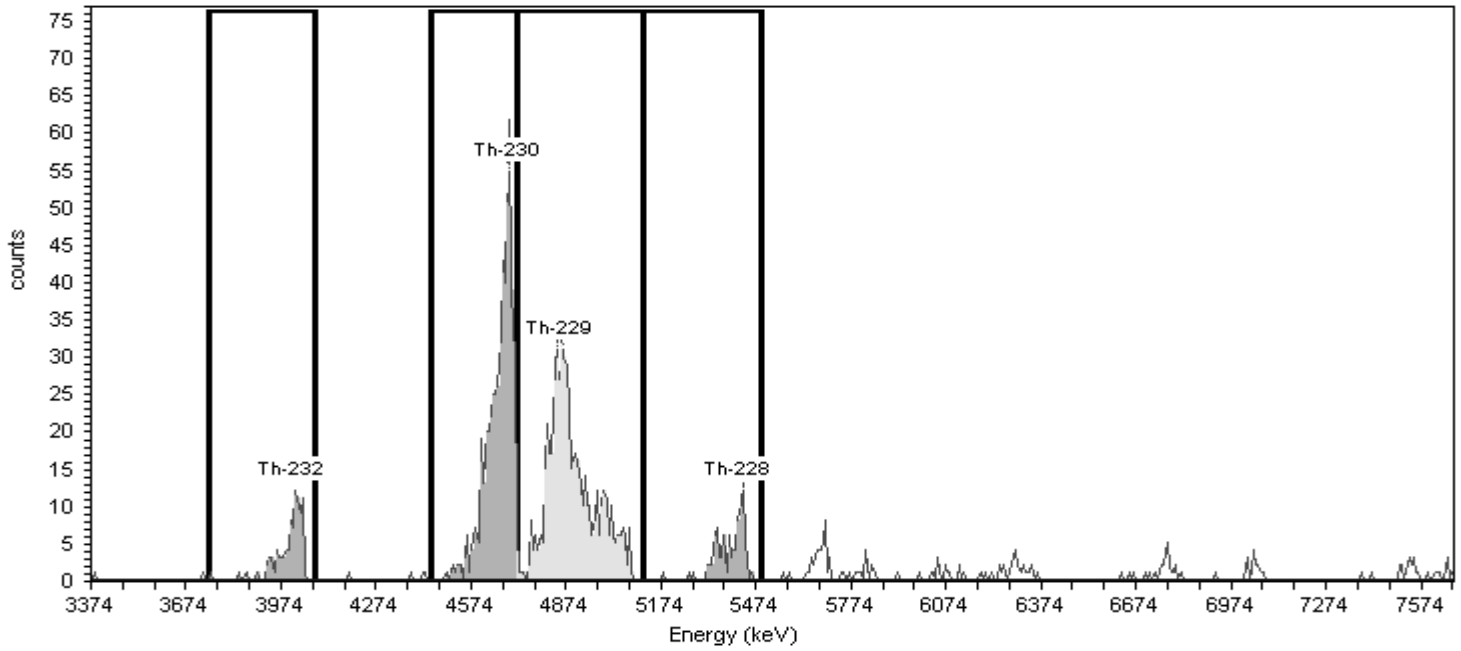
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 88.50%

Acquisition

Detector: AV3
Serial Number: 49-202 FF7
Acquisition Start Date: 7/3/2014 5:15:49PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/18/2014 7:10:38PM
Background Info: Sample: ICB;AV3; Det: AV3; Spectrum #1;
Jun-18-2014 19:10

Calibration Name: IC-8875;AV3-20140505
Calibration Date: 5/6/2014 5:38:33PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.09% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:22:07PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	31.1	100.2	92	0.7500	91.68	0.990	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	41.2	99.7	515	3.5683	511.25	5.550	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	87.2	99.6	565	2.2558	562.56	5.410	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	111.8	99.8	92	0.5625	91.44	0.994	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:58:20AM 7/7/2014

Sample

Sample Name: 680-102370-A-23-F MSD
SampleType: Sample
: 680-102370-A-23-F MSD
Sample Collection Date: 6/12/2014 1:15:00PM

Spectrum #2 Analysis #1
Sample Weight : 1.0011g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128228
AnalysisID: 614316

Analyst: 60040

Tracer

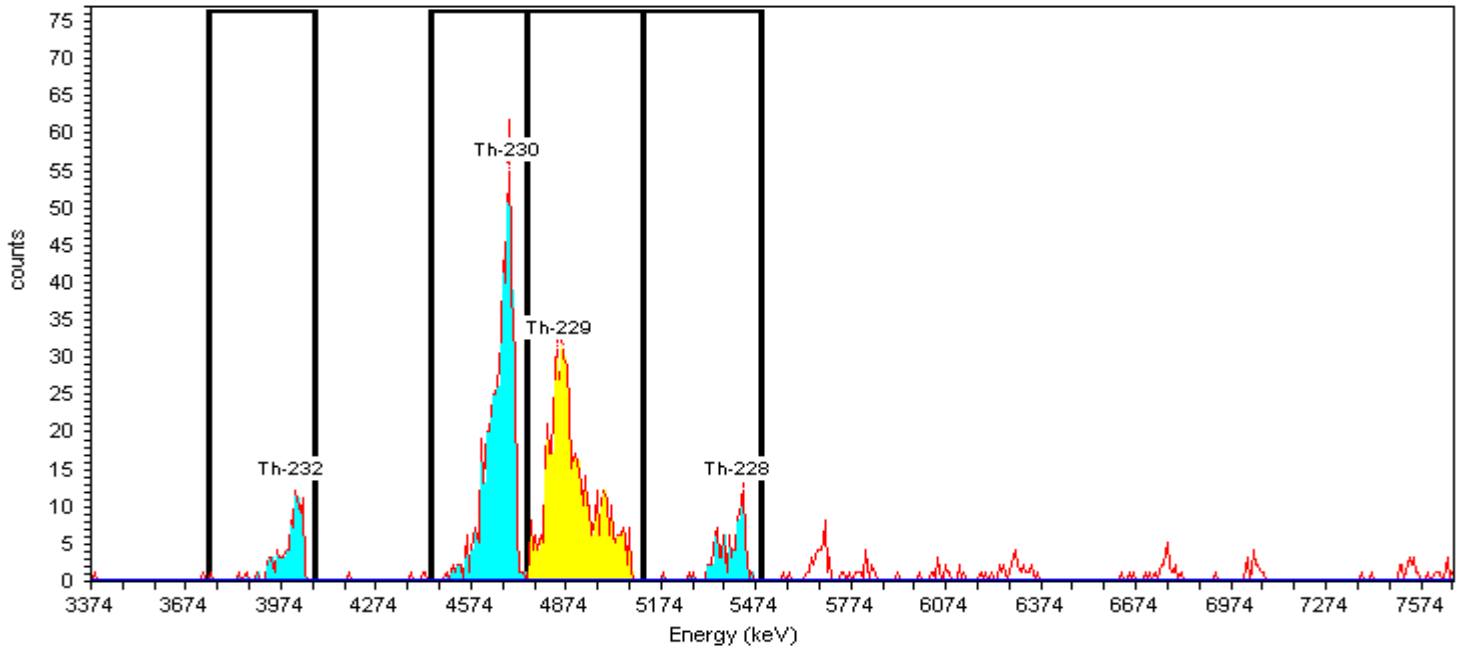
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 87.24%

Acquisition

Detector: AV3
Serial Number: 49-202 FF7
Acquisition Start Date: 7/3/2014 5:15:49PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/18/2014 7:10:38PM
Background Info: Sample: ICB;AV3; Det: AV3; Spectrum #1;
Jun-18-2014 19:10

Calibration Name: IC-8875;AV3-20140505
Calibration Date: 5/6/2014 5:38:33PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.09% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:22:07PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/7/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	31.1	100.2	92	0.7500	91.68	1.005	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4746.6	57.8	99.7	518	4.8750	513.13	5.652	pCi/g
Th-229	4848.0	4,845.3	2.7	4746.6	5119.5	87.2	99.6	556	1.5000	554.50	5.333	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	111.8	99.8	92	0.5625	91.44	1.009	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:27:11PM 7/1/2014

Sample

Sample Name: 680-102370-A-24-B
SampleType: Sample
: 680-102370-A-24-B
Sample Collection Date: 6/12/2014 2:10:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9960g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128228
AnalysisID: 613636

Analyst: 60040

Tracer

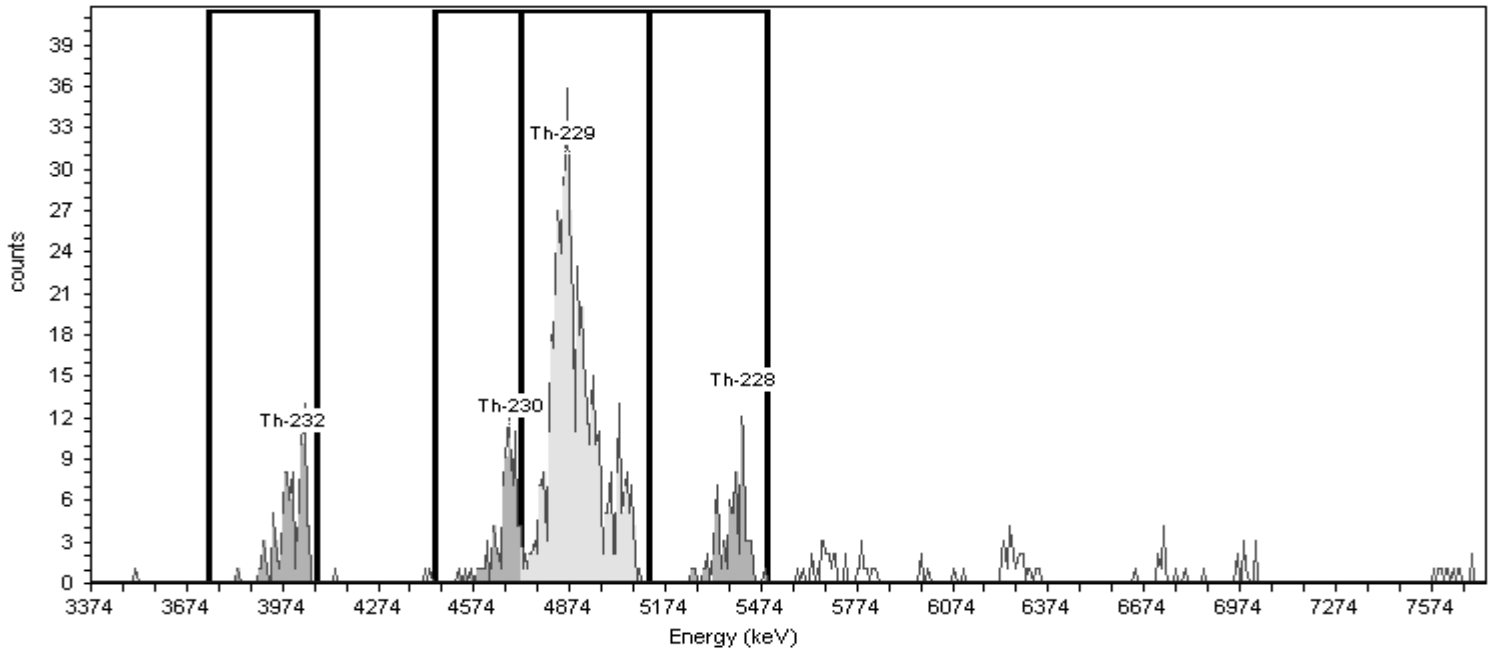
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 86.52%

Acquisition

Detector: AV6
Serial Number: 47-27FF2
Acquisition Start Date: 7/1/2014 12:26:35PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:18PM
Background Info: Sample: ICB;AV6; Det: AV6; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9520;AV6-20140505
Calibration Date: 5/6/2014 5:38:46PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.89% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:22:07PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	19.2	100.2	93	1.1250	91.88	1.029	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	40.0	99.7	83	2.2500	80.66	0.908	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	109.7	99.6	547	1.3125	545.59	5.316	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	57.3	99.8	89	3.7500	85.25	0.959	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:14:40AM 7/2/2014

Sample

Sample Name: 680-102370-A-24-B
SampleType: Sample
: 680-102370-A-24-B
Sample Collection Date: 6/12/2014 2:10:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9960g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128228
AnalysisID: 613778

Analyst: 60040

Tracer

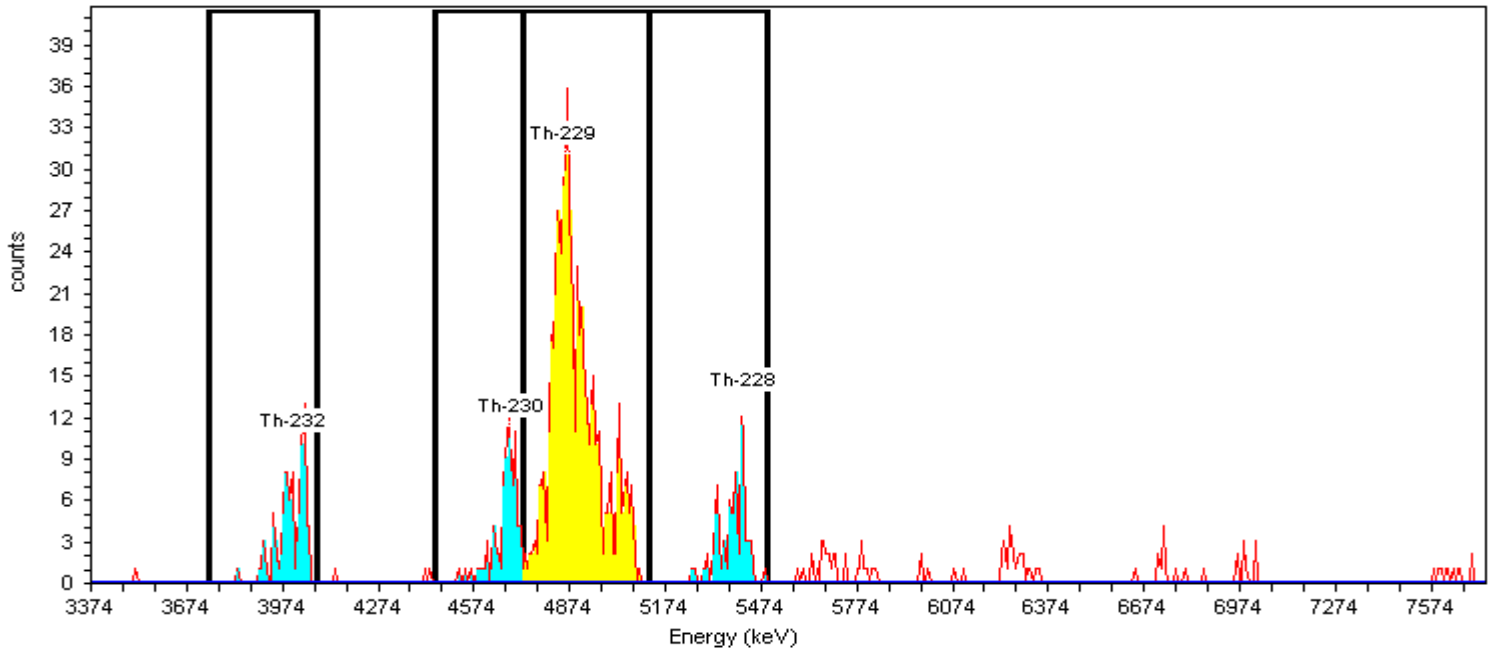
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 86.06%

Acquisition

Detector: AV6
Serial Number: 47-27FF2
Acquisition Start Date: 7/1/2014 12:26:35PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:18PM
Background Info: Sample: ICB;AV6; Det: AV6; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9520;AV6-20140505
Calibration Date: 5/6/2014 5:38:46PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.89% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:22:07PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/2/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	19.2	100.2	93	1.1250	91.88	1.034	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4724.2	30.1	99.7	84	2.4375	81.56	0.923	pCi/g
Th-229	4848.0	4,845.3	2.7	4724.2	5119.5	109.7	99.6	544	1.3125	542.69	5.288	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	57.3	99.8	89	3.7500	85.25	0.964	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:27:23PM 7/1/2014

Sample

Sample Name: 680-102370-A-25-B
SampleType: Sample
: 680-102370-A-25-B
Sample Collection Date: 6/12/2014 2:15:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9964g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128228
AnalysisID: 613637

Analyst: 60040

Tracer

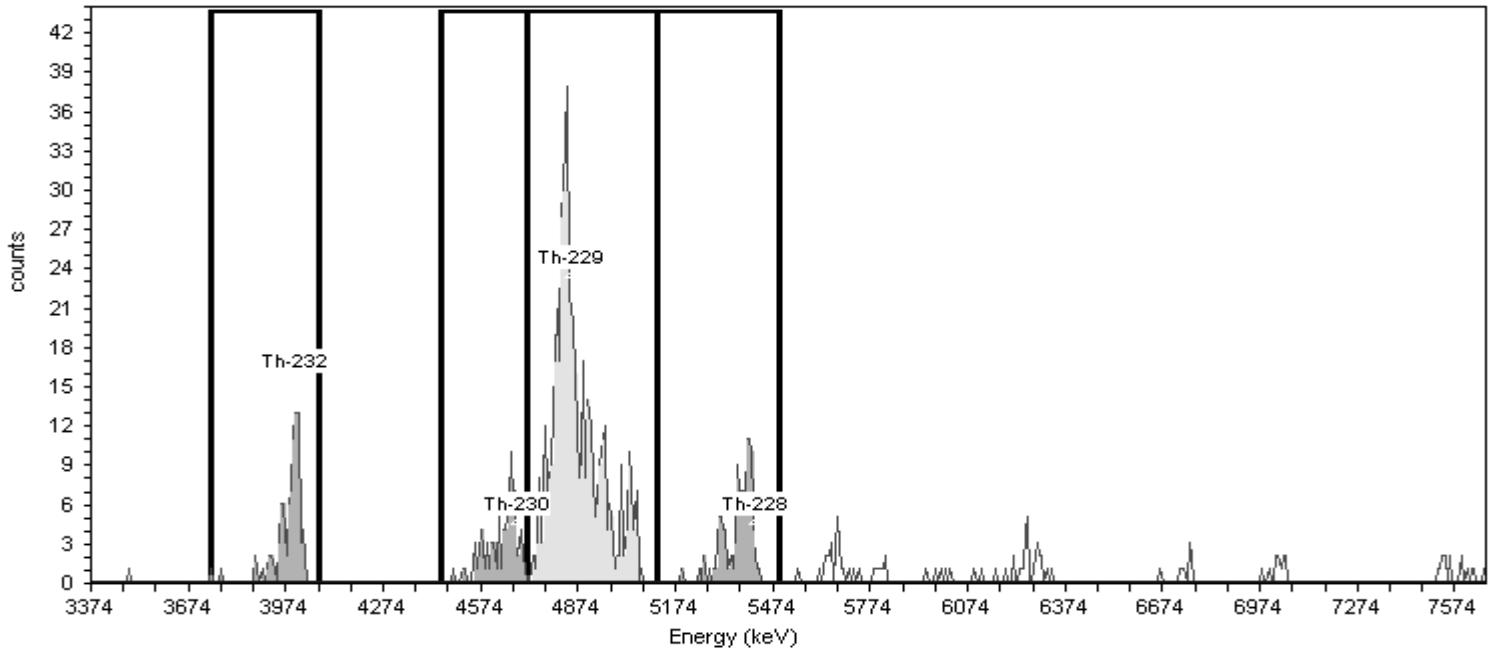
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 74.18%

Acquisition

Detector: AV7
Serial Number: 48-158EE5
Acquisition Start Date: 7/1/2014 12:26:36PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:20PM
Background Info: Sample: ICB;AV7; Det: AV7; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-8877;AV7-20140507
Calibration Date: 5/7/2014 10:48:48PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.80% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:22:07PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	56.3	100.2	88	1.6875	85.89	1.125	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	20.3	99.7	77	0.9953	76.00	1.000	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	68.6	99.6	467	0.7380	466.26	4.556	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	54.5	99.8	97	2.7843	94.22	1.239	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:27:29PM 7/1/2014

Sample

Sample Name: 680-102370-A-26-B
SampleType: Sample
: 680-102370-A-26-B
Sample Collection Date: 6/12/2014 2:20:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0000g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128228
AnalysisID: 613638

Analyst: 60040

Tracer

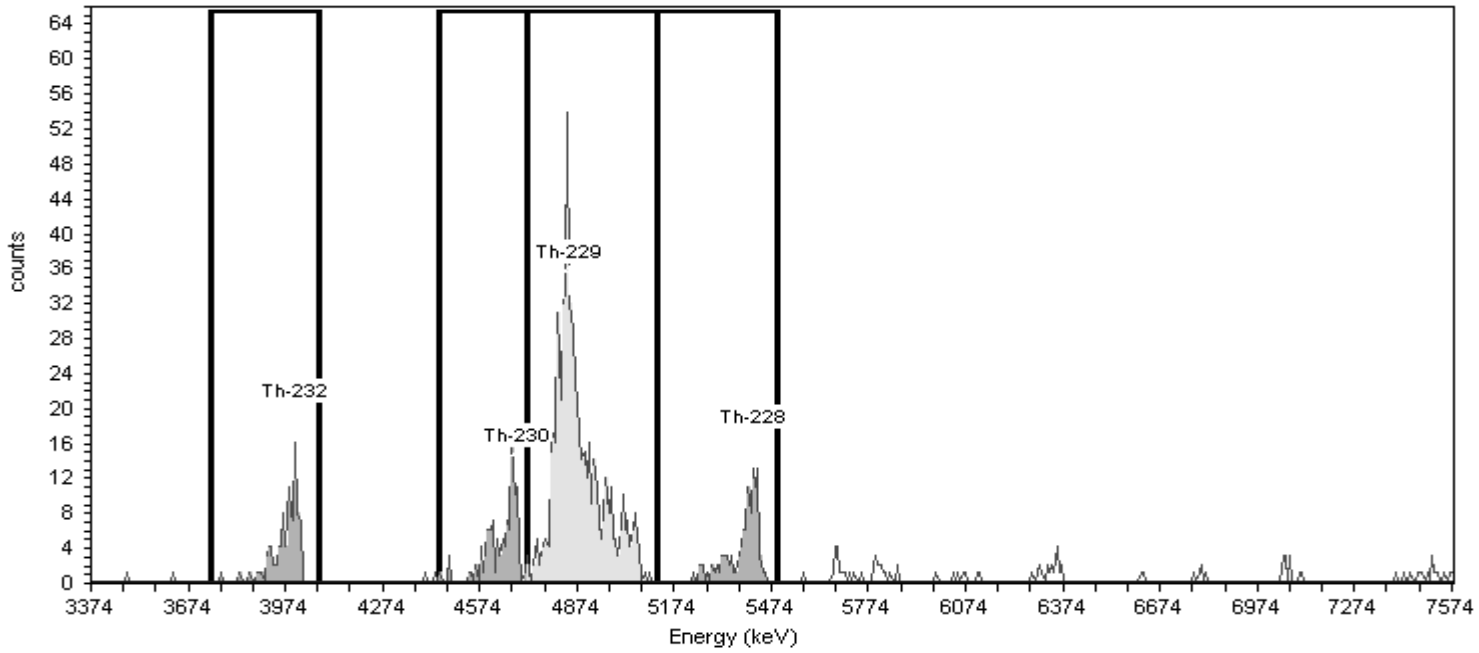
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 87.87%

Acquisition

Detector: AV8
Serial Number: 41-137Q6
Acquisition Start Date: 7/1/2014 12:26:37PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:22PM
Background Info: Sample: ICB;AV8; Det: AV8; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9792;AV8-20140505
Calibration Date: 5/6/2014 5:38:58PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.05% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:22:07PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	54.2	100.2	98	1.5000	96.50	1.014	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	25.7	99.7	111	0.2453	110.38	1.166	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	70.6	99.6	581	1.8750	579.06	5.377	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	54.4	99.8	108	3.5625	104.44	1.102	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:27:34PM 7/1/2014

Sample

Sample Name: 680-102370-A-28-B
SampleType: Sample
: 680-102370-A-28-B
Sample Collection Date: 6/12/2014 12:00:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0015g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128228
AnalysisID: 613639

Analyst: 60040

Tracer

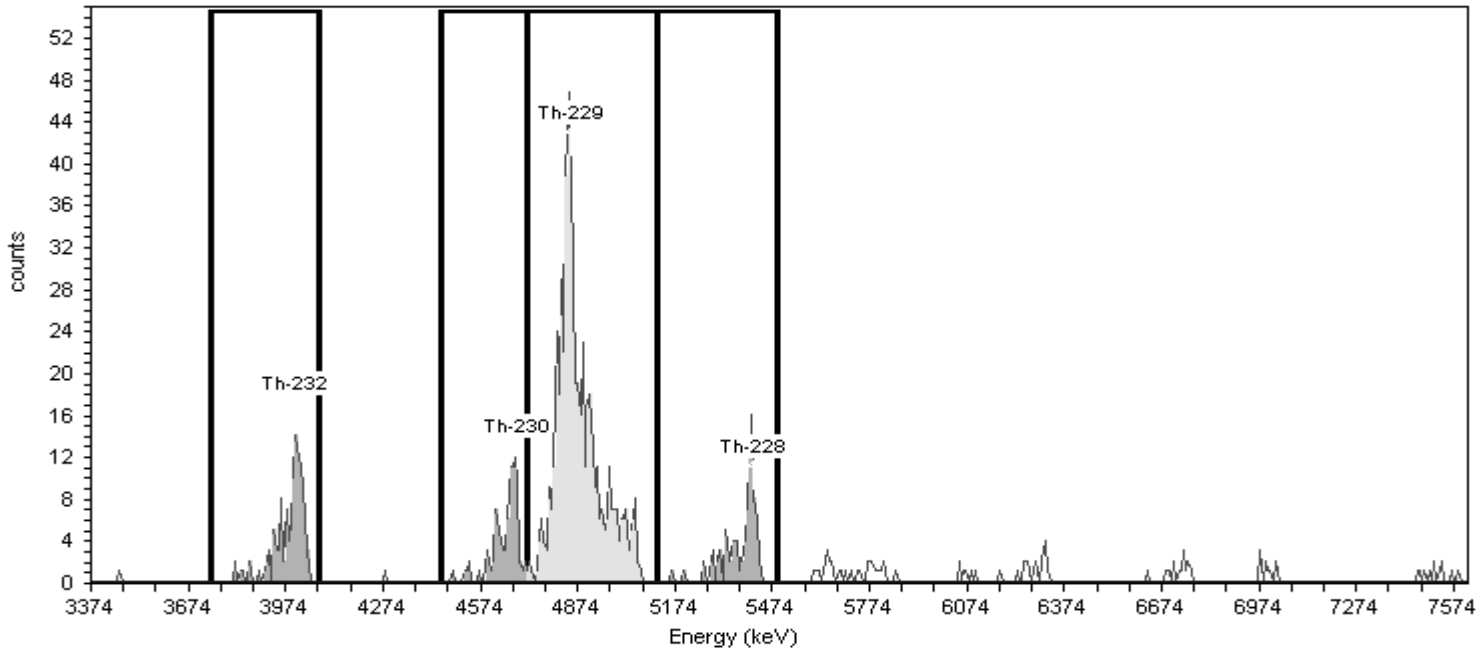
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 84.20%

Acquisition

Detector: AV9
Serial Number: 51-082V5
Acquisition Start Date: 7/1/2014 12:26:38PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:24PM
Background Info: Sample: ICB;AV9; Det: AV9; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9793;AV9-20140505
Calibration Date: 5/6/2014 5:39:04PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.04% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:22:07PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	61.9	100.2	115	0.3750	114.63	1.255	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	25.0	99.7	92	0.9375	91.09	1.003	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	69.6	99.6	555	0.3750	554.66	5.145	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	48.3	99.8	97	0.7662	96.23	1.059	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:15:32AM 7/2/2014

Sample

Sample Name: 680-102370-A-28-B
SampleType: Sample
: 680-102370-A-28-B
Sample Collection Date: 6/12/2014 12:00:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0015g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128228
AnalysisID: 613779

Analyst: 60040

Tracer

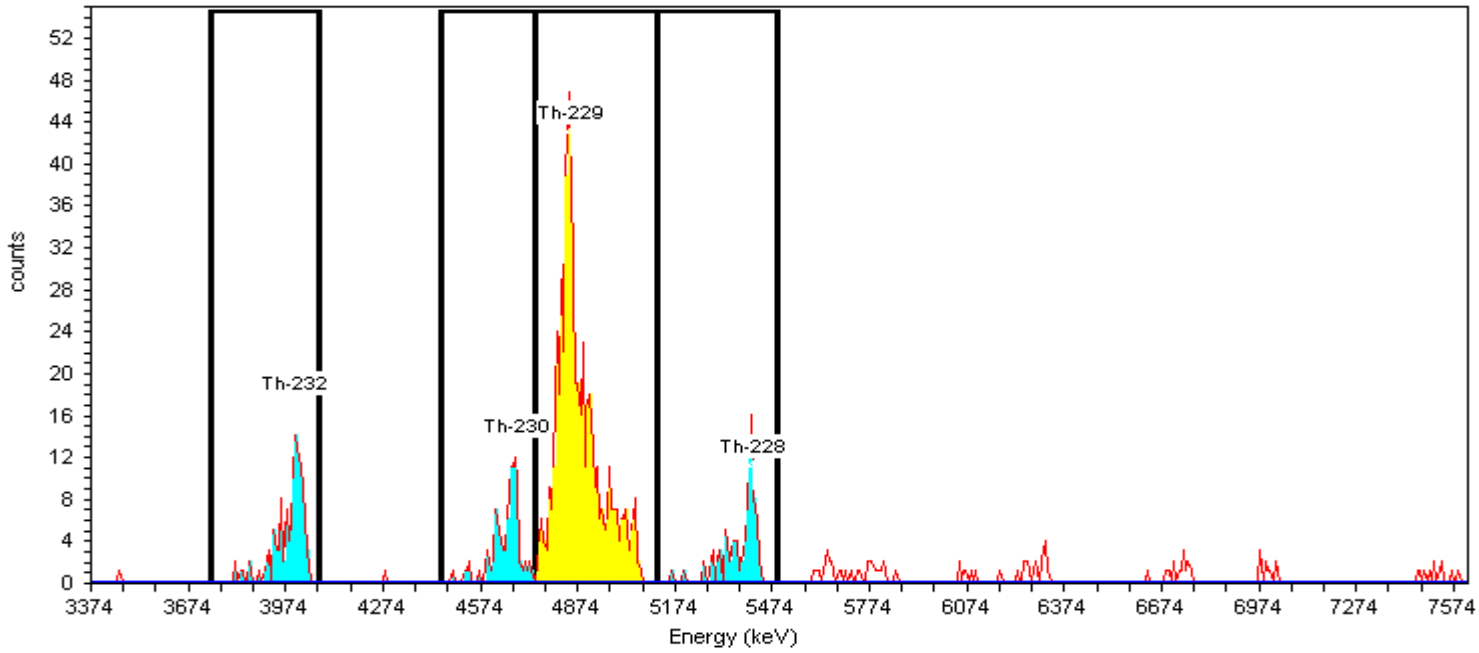
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 83.89%

Acquisition

Detector: AV9
Serial Number: 51-082V5
Acquisition Start Date: 7/1/2014 12:26:38PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:24PM
Background Info: Sample: ICB;AV9; Det: AV9; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9793;AV9-20140505
Calibration Date: 5/6/2014 5:39:04PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 27.04% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:22:07PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/2/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	61.9	100.2	115	0.3750	114.63	1.260	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4739.1	58.2	99.7	95	0.9375	94.06	1.039	pCi/g
Th-229	4848.0	4,845.3	2.7	4739.1	5119.5	69.6	99.6	553	0.3750	552.63	5.126	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	48.3	99.8	97	0.7662	96.23	1.062	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:27:45PM 7/1/2014

Sample

Sample Name: 680-102370-A-29-B
SampleType: Sample
: 680-102370-A-29-B
Sample Collection Date: 6/12/2014 2:30:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0000g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128228
AnalysisID: 613641

Analyst: 60040

Tracer

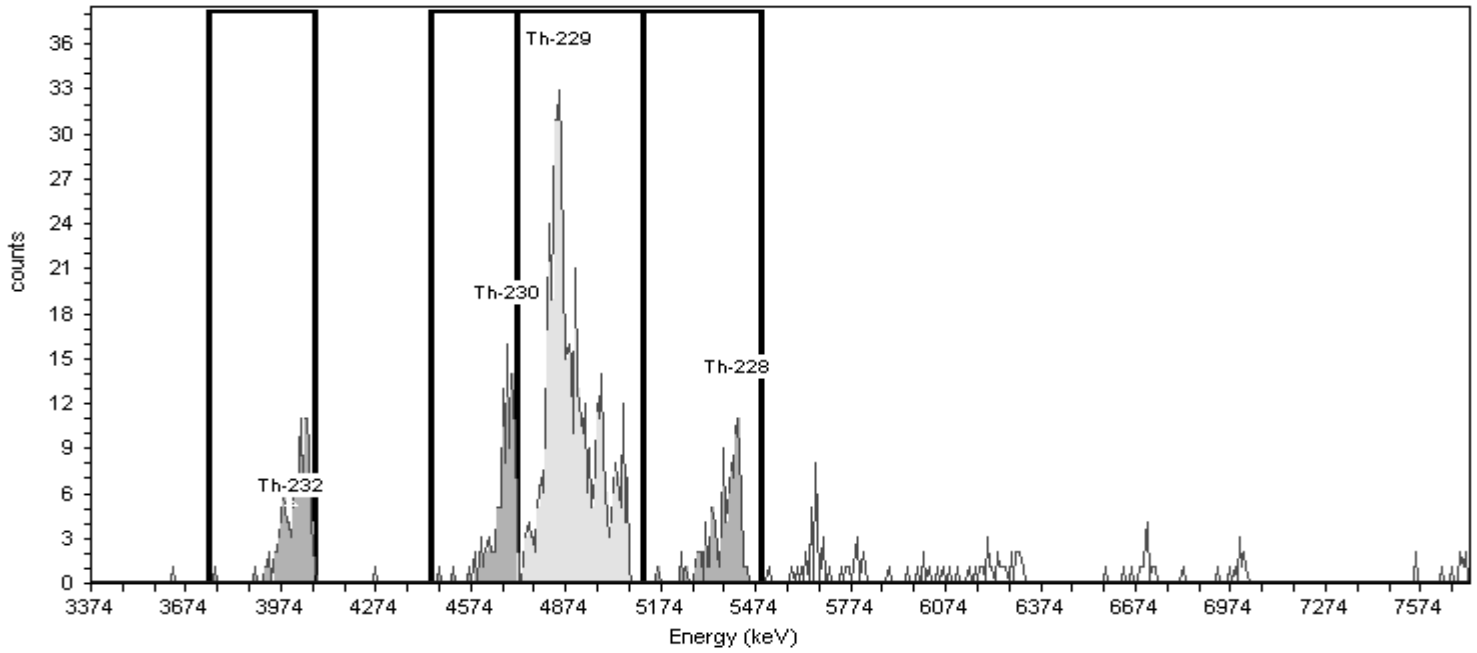
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 80.89%

Acquisition

Detector: AV10
Serial Number: 49-155N2
Acquisition Start Date: 7/1/2014 12:26:39PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:26PM
Background Info: Sample: ICB;AV10; Det: AV10; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9794;AV10-20140505
Calibration Date: 5/6/2014 5:39:10PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.84% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:22:07PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	40.1	100.2	102	0.0000	102.38	1.223	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	57.7	99.7	105	0.5625	104.31	1.253	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	74.9	99.6	511	1.6875	509.19	4.950	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	58.0	99.8	94	3.0000	91.00	1.092	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:16:49AM 7/2/2014

Sample

Sample Name: 680-102370-A-29-B
SampleType: Sample
: 680-102370-A-29-B
Sample Collection Date: 6/12/2014 2:30:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0000g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128228
AnalysisID: 613780

Analyst: 60040

Tracer

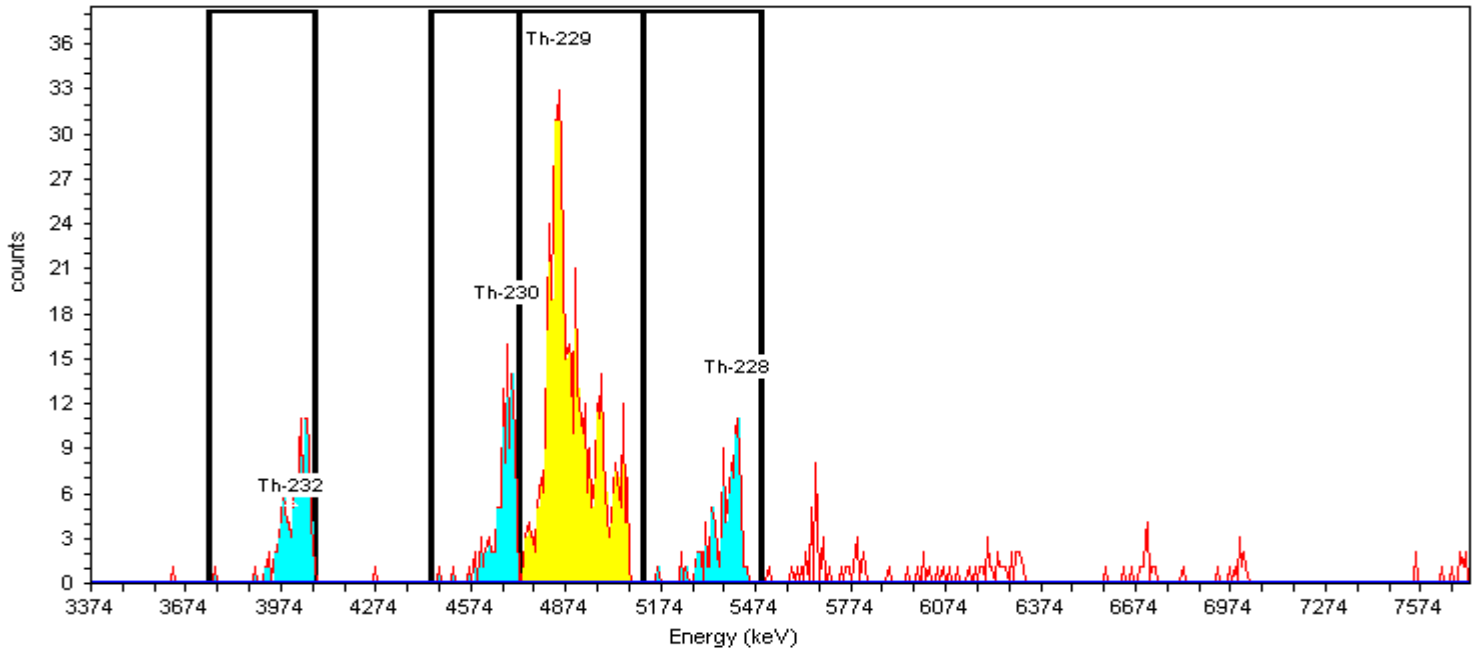
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 80.28%

Acquisition

Detector: AV10
Serial Number: 49-155N2
Acquisition Start Date: 7/1/2014 12:26:39PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:26PM
Background Info: Sample: ICB;AV10; Det: AV10; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9794;AV10-20140505
Calibration Date: 5/6/2014 5:39:10PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.84% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:22:07PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/2/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	40.1	100.2	102	0.0000	102.38	1.233	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4724.2	32.3	99.7	105	0.5625	104.44	1.264	pCi/g
Th-229	4848.0	4,845.3	2.7	4724.2	5119.5	74.9	99.6	507	1.6875	505.31	4.913	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	58.0	99.8	94	3.0000	91.00	1.100	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:27:40PM 7/1/2014

Sample

Sample Name: 680-102370-A-30-B
SampleType: Sample
: 680-102370-A-30-B
Sample Collection Date: 6/12/2014 2:35:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0010g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128228
AnalysisID: 613640

Analyst: 60040

Tracer

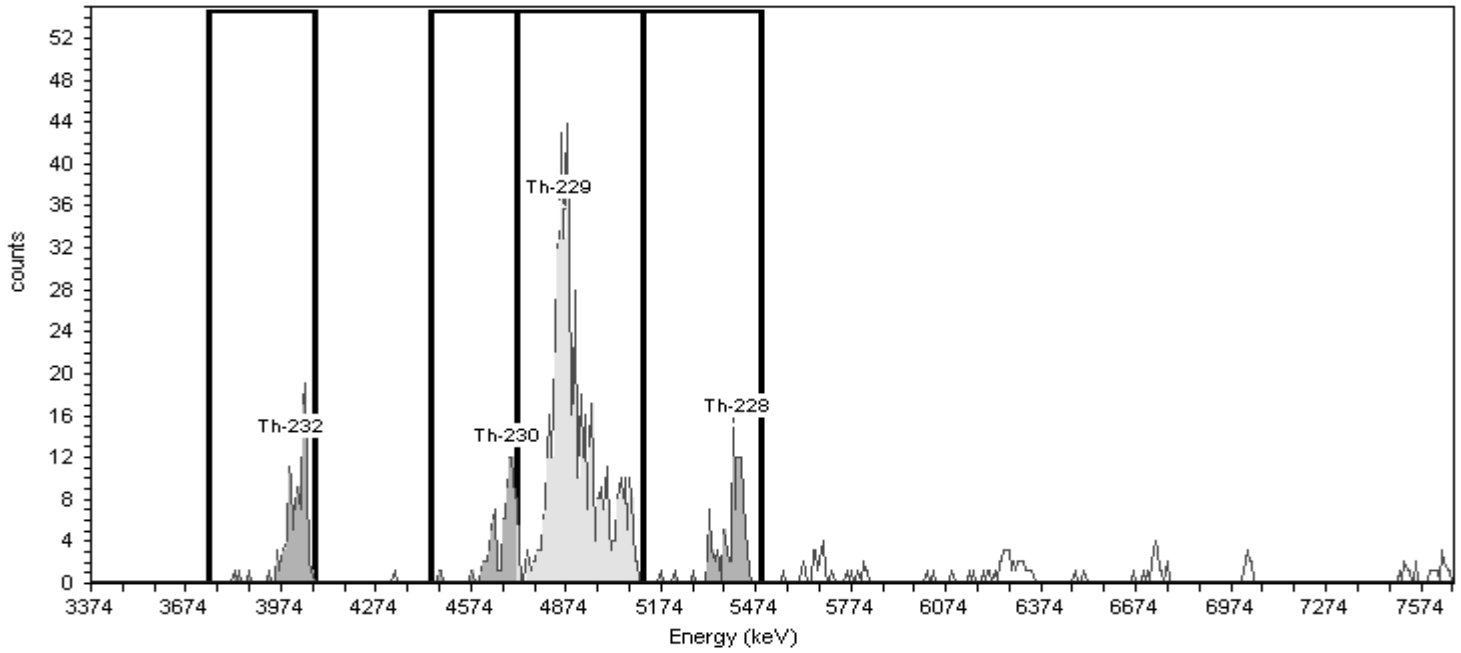
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 90.86%

Acquisition

Detector: AV11
Serial Number: 49-155dd2
Acquisition Start Date: 7/1/2014 12:26:39PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:27PM
Background Info: Sample: ICB;AV11; Det: AV11; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9795;AV11-20140505
Calibration Date: 5/6/2014 5:39:16PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.88% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:22:07PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	26.0	100.2	114	1.3280	113.13	1.156	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	40.7	99.7	92	0.7558	91.09	0.935	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	75.6	99.6	596	0.9433	594.90	5.555	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	49.0	99.8	99	2.9838	96.02	0.985	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:17:53AM 7/2/2014

Sample

Sample Name: 680-102370-A-30-B
SampleType: Sample
: 680-102370-A-30-B
Sample Collection Date: 6/12/2014 2:35:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0010g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128228
AnalysisID: 613781

Analyst: 60040

Tracer

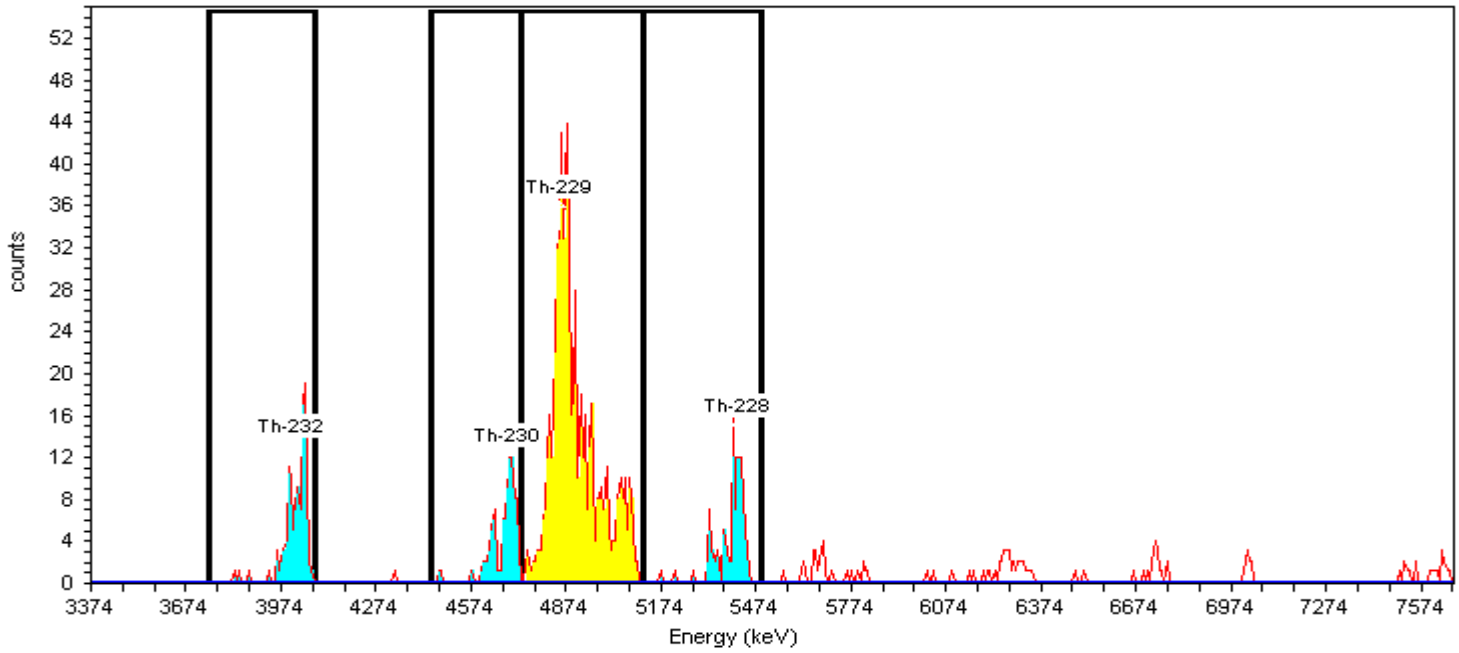
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 89.66%

Acquisition

Detector: AV11
Serial Number: 49-155dd2
Acquisition Start Date: 7/1/2014 12:26:39PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:27PM
Background Info: Sample: ICB;AV11; Det: AV11; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9795;AV11-20140505
Calibration Date: 5/6/2014 5:39:16PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.88% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:22:07PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/2/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	26.0	100.2	114	1.3280	113.13	1.171	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4731.7	30.4	99.7	95	0.9375	94.06	0.979	pCi/g
Th-229	4848.0	4,845.3	2.7	4731.7	5119.5	75.6	99.6	588	0.9375	587.06	5.481	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	49.0	99.8	99	2.9838	96.02	0.998	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:27:51PM 7/1/2014

Sample

Sample Name: 680-102370-A-31-B
SampleType: Sample
: 680-102370-A-31-B
Sample Collection Date: 6/12/2014 2:40:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0029g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128228
AnalysisID: 613642

Analyst: 60040

Tracer

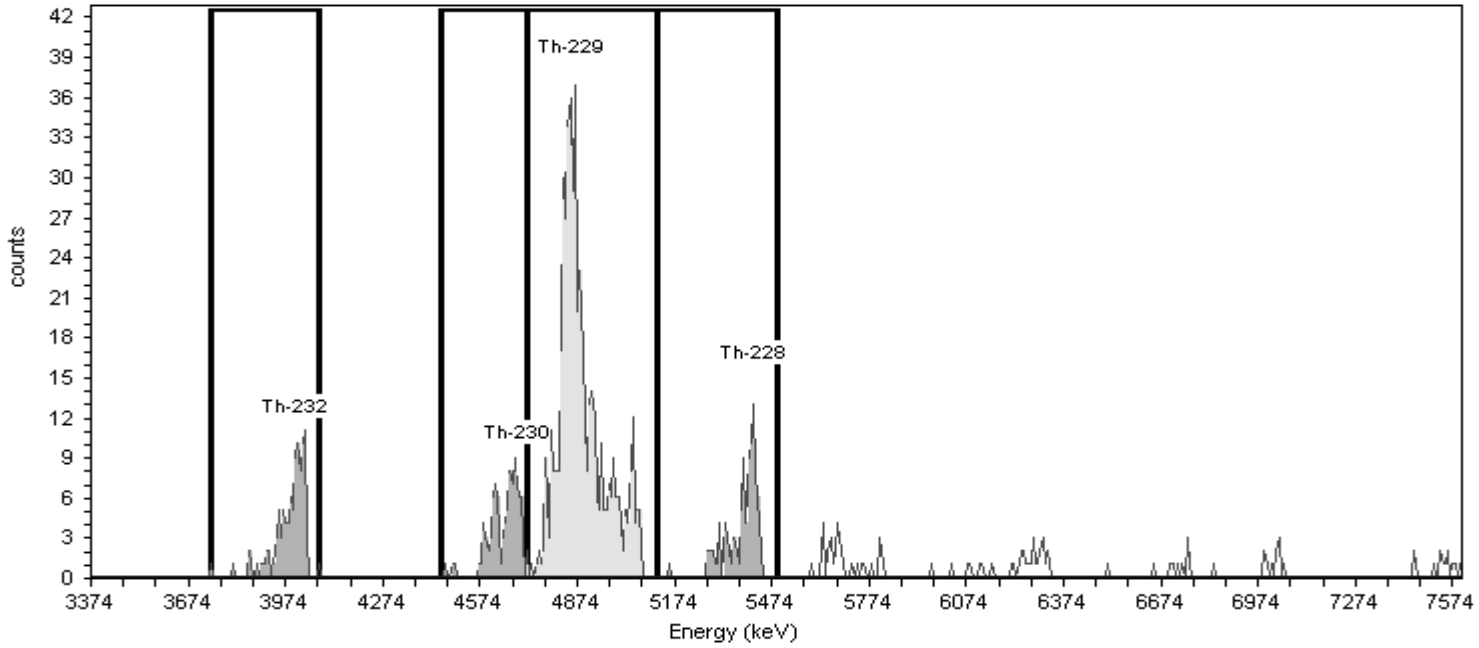
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 78.82%

Acquisition

Detector: AV12
Serial Number: 51-082B7
Acquisition Start Date: 7/1/2014 12:26:40PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:29PM
Background Info: Sample: ICB;AV12; Det: AV12; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9817;AV12-20140505
Calibration Date: 5/6/2014 5:39:22PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.97% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:22:07PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	31.5	100.2	98	1.5000	96.62	1.176	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	37.0	99.7	94	0.1875	93.75	1.146	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	69.9	99.6	499	0.3870	498.55	4.810	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	52.7	99.8	95	1.6995	93.30	1.140	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:27:57PM 7/1/2014

Sample

Sample Name: 680-102370-A-34-B
SampleType: Sample
: 680-102370-A-34-B
Sample Collection Date: 6/12/2014 1:20:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9996g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128228
AnalysisID: 613643

Analyst: 60040

Tracer

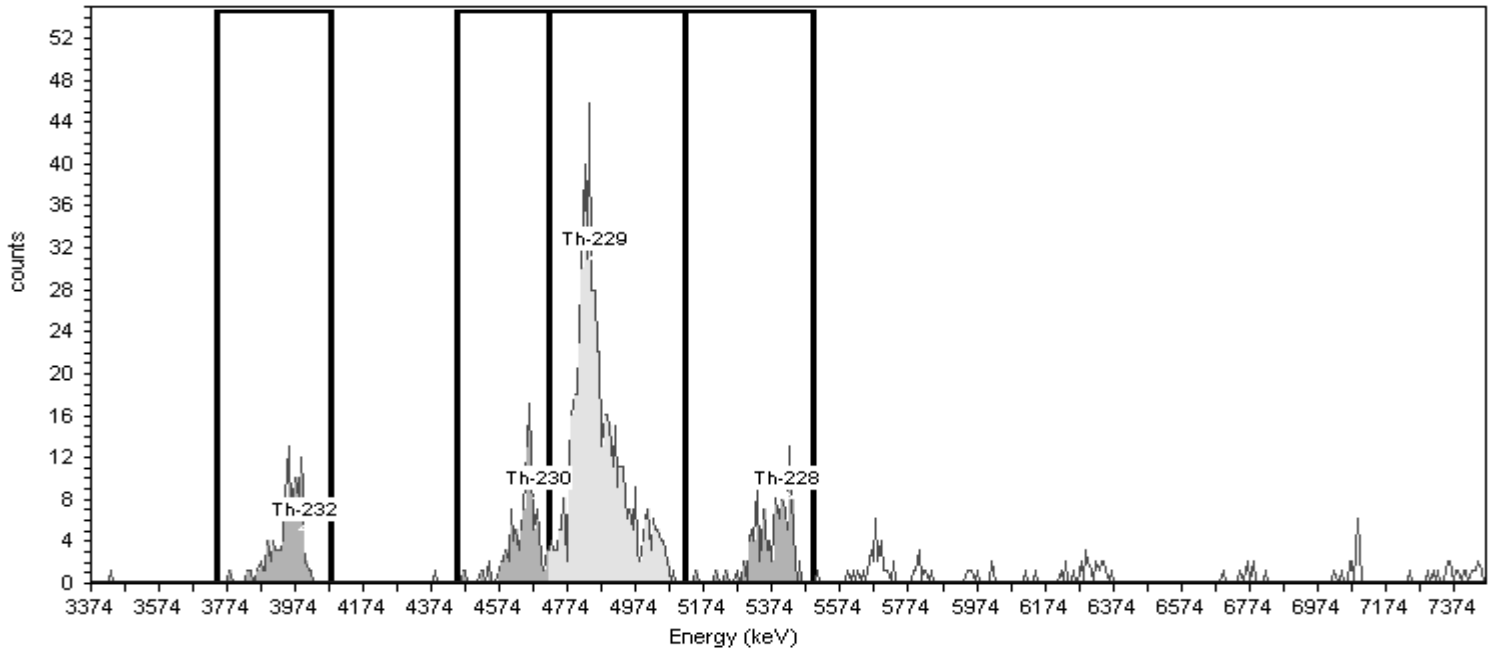
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 89.79%

Acquisition

Detector: AV13
Serial Number: 49-155M7
Acquisition Start Date: 7/1/2014 12:26:41PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:30PM
Background Info: Sample: ICB;AV13; Det: AV13; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9884;AV13-20140505
Calibration Date: 5/6/2014 5:39:28PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.99% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:22:07PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	69.8	100.2	109	1.9610	107.04	1.146	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	56.1	99.7	115	0.0000	115.03	1.238	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	77.2	99.6	569	0.5625	568.47	5.497	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	123.9	99.8	115	1.8750	113.13	1.216	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:28:03PM 7/1/2014

Sample

Sample Name: 680-102370-A-35-B
SampleType: Sample
: 680-102370-A-35-B
Sample Collection Date: 6/12/2014 1:25:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0033g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128228
AnalysisID: 613644

Analyst: 60040

Tracer

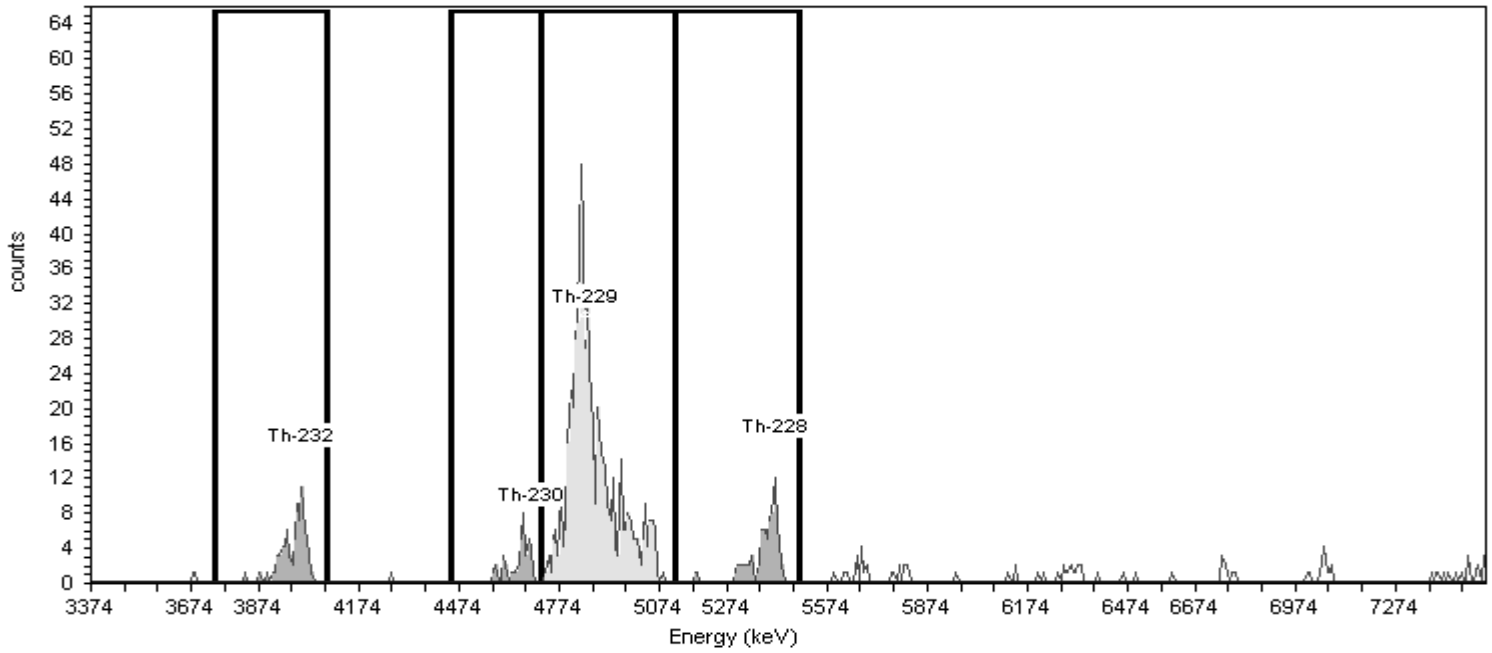
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 84.76%

Acquisition

Detector: AV14
Serial Number: 50-060W4
Acquisition Start Date: 7/1/2014 12:26:42PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:33PM
Background Info: Sample: ICB;AV14; Det: AV14; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9885;AV14-20140505
Calibration Date: 5/6/2014 5:39:36PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.34% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:22:07PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	66.7	100.2	77	0.1875	76.81	0.856	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	26.8	99.7	39	0.3750	38.63	0.433	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	67.6	99.6	545	1.1250	543.88	5.170	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	52.8	99.8	78	0.7500	77.25	0.865	pCi/g

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102370-1

SDG No.: 680-102370-1

Batch Number: 128227 Batch Start Date: 06/23/14 15:01 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/01/14 09:26

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-128227/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-128227/2		ExtChrom, A-01-R		0.4968 g	0.2 mL	0.4968 g			
680-102370-A-1-A	SD-DUP-03	ExtChrom, A-01-R	T	0.9994 g	0.2 mL				
680-102370-A-1-A DU	SD-DUP-03	ExtChrom, A-01-R	T	0.9980 g	0.2 mL				
680-102370-A-2-A	SD-206-SS	ExtChrom, A-01-R	T	1.0045 g	0.2 mL				
680-102370-A-3-A	SD-206-01	ExtChrom, A-01-R	T	0.9994 g	0.2 mL				
680-102370-A-4-A	SD-206-02	ExtChrom, A-01-R	T	0.9992 g	0.2 mL				
680-102370-A-7-A	SD-215-SS	ExtChrom, A-01-R	T	1.0030 g	0.2 mL				
680-102370-A-8-A	SD-222-SS	ExtChrom, A-01-R	T	.9970 g	0.2 mL				
680-102370-A-9-A	SD-222-01	ExtChrom, A-01-R	T	.9969 g	0.2 mL				
680-102370-A-10-A	SD-222-02	ExtChrom, A-01-R	T	1.0048 g	0.2 mL				
680-102370-A-11-A	SD-222-03	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				
680-102370-A-12-A	SD-211-SS	ExtChrom, A-01-R	T	1.0023 g	0.2 mL				
680-102370-A-13-A	SD-211-01	ExtChrom, A-01-R	T	0.9969 g	0.2 mL				
680-102370-A-14-A	SD-211-02	ExtChrom, A-01-R	T	0.9997 g	0.2 mL				
680-102370-A-15-A	SD-216-SS	ExtChrom, A-01-R	T	1.0038 g	0.2 mL				
680-102370-A-16-A	SD-216-01	ExtChrom, A-01-R	T	1.0023 g	0.2 mL				
680-102370-A-17-A	SD-216-02	ExtChrom, A-01-R	T	1.0015 g	0.2 mL				
680-102370-A-18-A	SD-217-SS	ExtChrom, A-01-R	T	1.0005 g	0.2 mL				
680-102370-A-19-A	SD-217-01	ExtChrom, A-01-R	T	0.9956 g	0.2 mL				
680-102370-A-20-A	SD-217-02	ExtChrom, A-01-R	T	0.9975 g	0.2 mL				

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102370-1

SDG No.: 680-102370-1

Batch Number: 128227 Batch Start Date: 06/23/14 15:01 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/01/14 09:26

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
680-102370-A-22-A	SD-214-SS	ExtChrom, A-01-R	T	0.9997 g	0.2 mL				

Batch Notes	
Balance ID	27050421
Column Analyst	scb
Column Date	6/27/14
CoPrecipitation Analyst	scb
CoPrecipitation Date	7/1/14
Person's name who witnessed reagent drop	nmn per scb
Analyst who added reagent	scb
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102370-1

SDG No.: 680-102370-1

Batch Number: 128228 Batch Start Date: 06/23/14 15:05 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/01/14 09:24

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	Th-230 00023	TRM-2 00001		
MB 160-128228/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-128228/2		ExtChrom, A-01-R		0.4997 g	0.2 mL		0.4997 g		
680-102370-A-23 -A	SD-214-01	ExtChrom, A-01-R	T	0.9992 g	0.2 mL				
680-102370-A-23 -B MS	SD-214-01	ExtChrom, A-01-R	T	0.9980 g	0.2 mL	0.2 mL			
680-102370-A-23 -C MSD	SD-214-01	ExtChrom, A-01-R	T	1.0011 g	0.2 mL	0.2 mL			
680-102370-A-24 -A	SD-212-SS	ExtChrom, A-01-R	T	0.9960 g	0.2 mL				
680-102370-A-25 -A	SD-212-01	ExtChrom, A-01-R	T	0.9964 g	0.2 mL				
680-102370-A-26 -A	SD-212-02	ExtChrom, A-01-R	T	1.0000 g	0.2 mL				
680-102370-A-28 -A	SD-DUP-04	ExtChrom, A-01-R	T	1.0015 g	0.2 mL				
680-102370-A-29 -A	SD-213-SS	ExtChrom, A-01-R	T	1.0000 g	0.2 mL				
680-102370-A-30 -A	SD-213-01	ExtChrom, A-01-R	T	1.0010 g	0.2 mL				
680-102370-A-31 -A	SD-213-02	ExtChrom, A-01-R	T	1.0029 g	0.2 mL				
680-102370-A-34 -A	SD-214-02	ExtChrom, A-01-R	T	0.9996 g	0.2 mL				
680-102370-A-35 -A	SD-214-03	ExtChrom, A-01-R	T	1.0033 g	0.2 mL				

Batch Notes	
Balance ID	27050421
Column Analyst	scb
Column Date	6/27/14
CoPrecipitation Analyst	scb
CoPrecipitation Date	7/1/14
Person's name who witnessed reagent drop	nmn per scb
Analyst who added reagent	scb
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102370-1

SDG No.: 680-102370-1

Batch Number: 128228 Batch Start Date: 06/23/14 15:05 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/01/14 09:24

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

Daily Checks

Alpha Spectroscopy Daily Pulser Check

Analysis Date: 07/01/14

		Gross Counts			FWHM (keV)			Pulser Center			Energy (keV)		
Detector	**Analysis Date**	**Result**	**Criteria**	**P/F**	**Result**	**Criteria**	**P/F**	**Result**	**Criteria**	**P/F**	**Result**	**Criteria**	**P/F**
AV1	07/01/14 01:00	7273	6814.5 - 7531.8	Pass	12.7	10 - 20	Pass	223.0	216.9 - 226.9	Pass	5030	4982.0 - 5062.0	Pass
AV3	07/01/14 01:00	7370	6995.6 - 7732.0	Pass	11.9	10 - 20	Pass	227.0	221.0 - 231.0	Pass	5060	5012.2 - 5092.2	Pass
AV6	07/01/14 01:00	7444	7050.8 - 7793.0	Pass	14.2	10 - 20	Pass	217.0	212.0 - 222.0	Pass	4985	4944.9 - 5024.9	Pass
AV7	07/01/14 01:00	7348	7003.5 - 7740.8	Pass	17.3	10 - 20	Pass	228.2	222.0 - 232.0	Pass	5068	5020.1 - 5100.1	Pass
AV8	07/01/14 01:00	7433	7052.4 - 7794.7	Pass	15.1	10 - 20	Pass	220.9	216.0 - 226.0	Pass	5014	4975.1 - 5055.1	Pass
AV9	07/01/14 01:00	7541	7187.8 - 7944.4	Pass	12.8	10 - 20	Pass	221.0	216.0 - 226.0	Pass	5015	4975.3 - 5055.3	Pass
AV10	07/01/14 01:00	7523	7323.5 - 8094.4	Pass	12.3	10 - 20	Pass	224.0	216.0 - 226.0	Pass	5038	4974.9 - 5054.9	Pass
AV11	07/01/14 01:00	7716	7322.5 - 8093.3	Pass	13.3	10 - 20	Pass	226.0	221.1 - 231.1	Pass	5052	5012.8 - 5092.8	Pass
AV12	07/01/14 01:00	7595	7265.8 - 8030.6	Pass	11.6	10 - 20	Pass	221.0	214.9 - 224.9	Pass	5015	4967.1 - 5047.1	Pass
AV13	07/01/14 01:52	7507	7244.9 - 8007.5	Pass	17.0	10 - 20	Pass	222.9	219.1 - 229.1	Pass	5029	4998.3 - 5078.3	Pass
AV14	07/01/14 01:00	7585	7236.1 - 7997.8	Pass	11.9	10 - 20	Pass	224.0	219.0 - 229.0	Pass	5037	4997.5 - 5077.5	Pass
AV24	07/01/14 01:00	7657	7259.6 - 8023.8	Pass	15.6	10 - 20	Pass	218.1	212.9 - 222.9	Pass	4994	4952.1 - 5032.1	Pass
AV51	07/01/14 01:09	7281	6922.8 - 7651.5	Pass	16.5	10 - 20	Pass	222.1	217.1 - 227.1	Pass	5023	4983.5 - 5063.5	Pass
AV53	07/01/14 01:09	7263	6906.6 - 7633.6	Pass	11.1	10 - 20	Pass	222.0	217.0 - 227.0	Pass	5023	4982.6 - 5062.6	Pass
AV54	07/01/14 01:09	7274	6918.5 - 7646.8	Pass	15.6	10 - 20	Pass	225.8	222.1 - 232.1	Pass	5051	5020.5 - 5100.5	Pass
AV55	07/01/14 01:09	7263	6899.4 - 7625.7	Pass	11.5	10 - 20	Pass	225.0	220.0 - 230.0	Pass	5045	5004.9 - 5084.9	Pass
AV56	07/01/14 01:09	7008	6868.1 - 7591.0	Pass	13.1	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	5004.9 - 5069.9	Pass
AV58	07/01/14 01:09	6979	6766.5 - 7478.7	Pass	13.0	10 - 20	Pass	225.9	219.0 - 229.0	Pass	5052	4997.2 - 5077.2	Pass
AV59	07/01/14 01:09	7256	6885.8 - 7610.6	Pass	18.3	10 - 20	Pass	222.9	217.9 - 227.9	Pass	5029	4989.1 - 5069.1	Pass
AV60	07/01/14 01:09	7230	6867.8 - 7590.7	Pass	15.8	10 - 20	Pass	220.9	216.2 - 226.2	Pass	5014	4976.7 - 5056.7	Pass
AV61	07/01/14 01:09	7197	6682.3 - 7385.7	Pass	17.1	10 - 20	Pass	222.9	219.0 - 229.0	Pass	5030	4997.8 - 5077.8	Pass
AV62	07/01/14 01:09	7250	6875.3 - 7599.0	Pass	18.7	10 - 20	Pass	221.9	217.1 - 227.1	Pass	5022	4983.0 - 5063.0	Pass
AV63	07/01/14 01:09	7247	6829.2 - 7548.0	Pass	13.4	10 - 20	Pass	223.0	217.9 - 227.9	Pass	5030	4989.3 - 5069.3	Pass
AV64	07/01/14 01:09	7242	6847.3 - 7568.1	Pass	14.0	10 - 20	Pass	225.0	219.4 - 229.4	Pass	5045	5000.4 - 5080.4	Pass
AV65	07/01/14 01:09	7230	6864.5 - 7587.1	Pass	15.8	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	4989.7 - 5069.7	Pass
AV66	07/01/14 01:09	7230	6865.2 - 7587.8	Pass	15.4	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	4989.9 - 5069.9	Pass
AV67	07/01/14 01:09	7250	6893.5 - 7619.1	Pass	13.0	10 - 20	Pass	228.0	221.9 - 231.9	Pass	5067	5019.4 - 5099.4	Pass
AV68	07/01/14 01:09	7455	7080.3 - 7825.6	Pass	19.2	10 - 20	Pass	223.9	219.0 - 229.0	Pass	5036	4997.3 - 5077.3	Pass
AV69	07/01/14 01:09	7219	6915.8 - 7643.8	Pass	12.5	10 - 20	Pass	221.0	216.0 - 226.0	Pass	5015	4975.3 - 5055.3	Pass
AV70	07/01/14 01:10	7452	7073.8 - 7818.4	Pass	14.4	10 - 20	Pass	220.1	214.1 - 224.1	Pass	5008	4960.7 - 5040.7	Pass
AV71	07/01/14 01:10	7449	7076.2 - 7821.0	Pass	13.7	10 - 20	Pass	219.0	214.0 - 224.0	Pass	5000	4960.3 - 5040.3	Pass
AV115	07/01/14 01:38	7691	7254.6 - 8018.2	Pass	13.4	10 - 20	Pass	222.0	216.9 - 226.9	Pass	5022	4982.2 - 5062.2	Pass
AV116	07/01/14 01:38	7688	7295.5 - 8063.4	Pass	13.9	10 - 20	Pass	221.0	216.0 - 226.0	Pass	5015	4975.1 - 5055.1	Pass
AV117	07/01/14 01:38	7682	7268.9 - 8034.0	Pass	14.2	10 - 20	Pass	223.1	217.1 - 227.1	Pass	5031	4983.2 - 5063.2	Pass
AV118	07/01/14 01:38	7682	7290.8 - 8058.2	Pass	13.8	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	4990.2 - 5070.2	Pass

Alpha Spectroscopy Daily Pulser Check

Analysis Date: 07/03/14

		Gross Counts			FWHM (keV)			Pulser Center			Energy (keV)		
Detector	**Analysis Date**	**Result**	**Criteria**	**P/F**	**Result**	**Criteria**	**P/F**	**Result**	**Criteria**	**P/F**	**Result**	**Criteria**	**P/F**
AV3	07/03/14 15:56	7349	6995.6 - 7732.0	Pass	12.1	10 - 20	Pass	227.0	221.0 - 231.0	Pass	5060	5012.2 - 5092.2	Pass

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:04:40AM 7/1/2014

Sample

Sample Name: Pulser;AV1 Spectrum #7 Analysis #1
Comment:

Batch

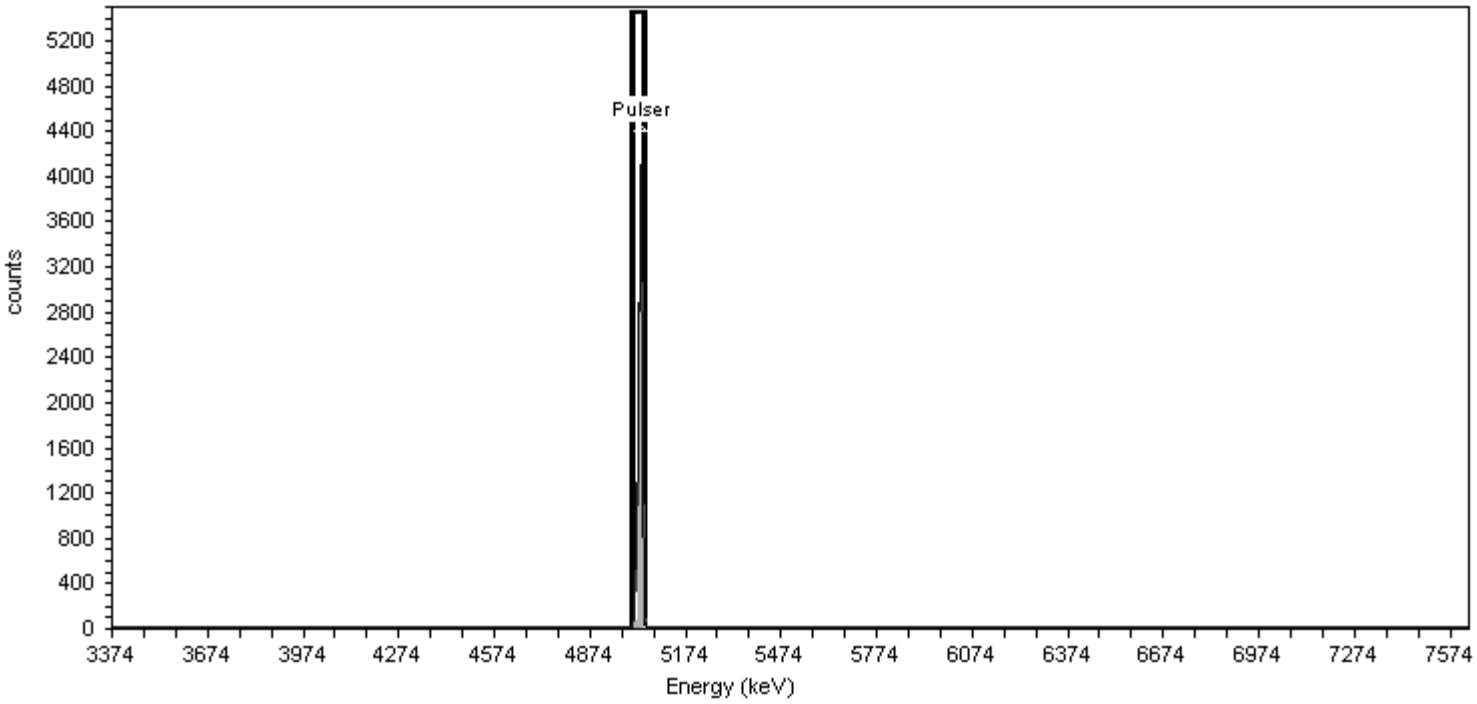
Batch Name: June2014a Analyst: 60040
Description:

Acquisition

Detector: AV1 , SN: 49-188 AA4
Acquisition Start Date: 7/1/2014 1:00:12AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-7107;AV1-20140505
Calibration Date: 5/6/2014 5:38:14PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.30% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5029.786	5008.160	5051.413	12.71	7,473.24	7,273.09

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:04:46AM 7/1/2014

Sample

Sample Name: Pulser;AV3 Spectrum #7 Analysis #1
Comment:

Batch

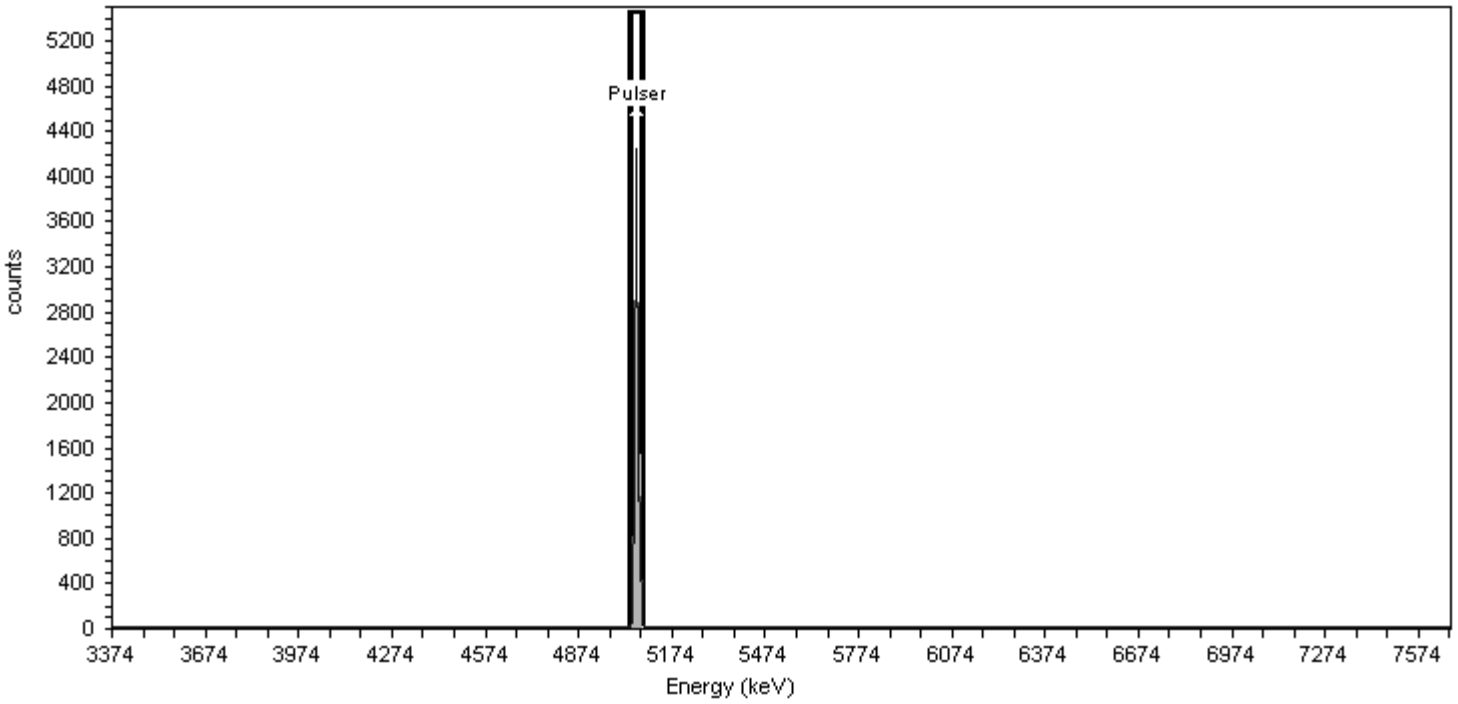
Batch Name: June2014a Analyst: 60040
Description:

Acquisition

Detector: AV3 , SN: 49-202 FF7
Acquisition Start Date: 7/1/2014 1:00:16AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-8875;AV3-20140505
Calibration Date: 5/6/2014 5:38:33PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.09% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5059.850	5039.561	5080.139	11.92	7,253.10	7,369.52

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:00:28PM 7/3/2014

Sample

Sample Name: Pulser;AV3
Comment:

Spectrum #10 Analysis #1

Batch

Batch Name: June2014a
Description:

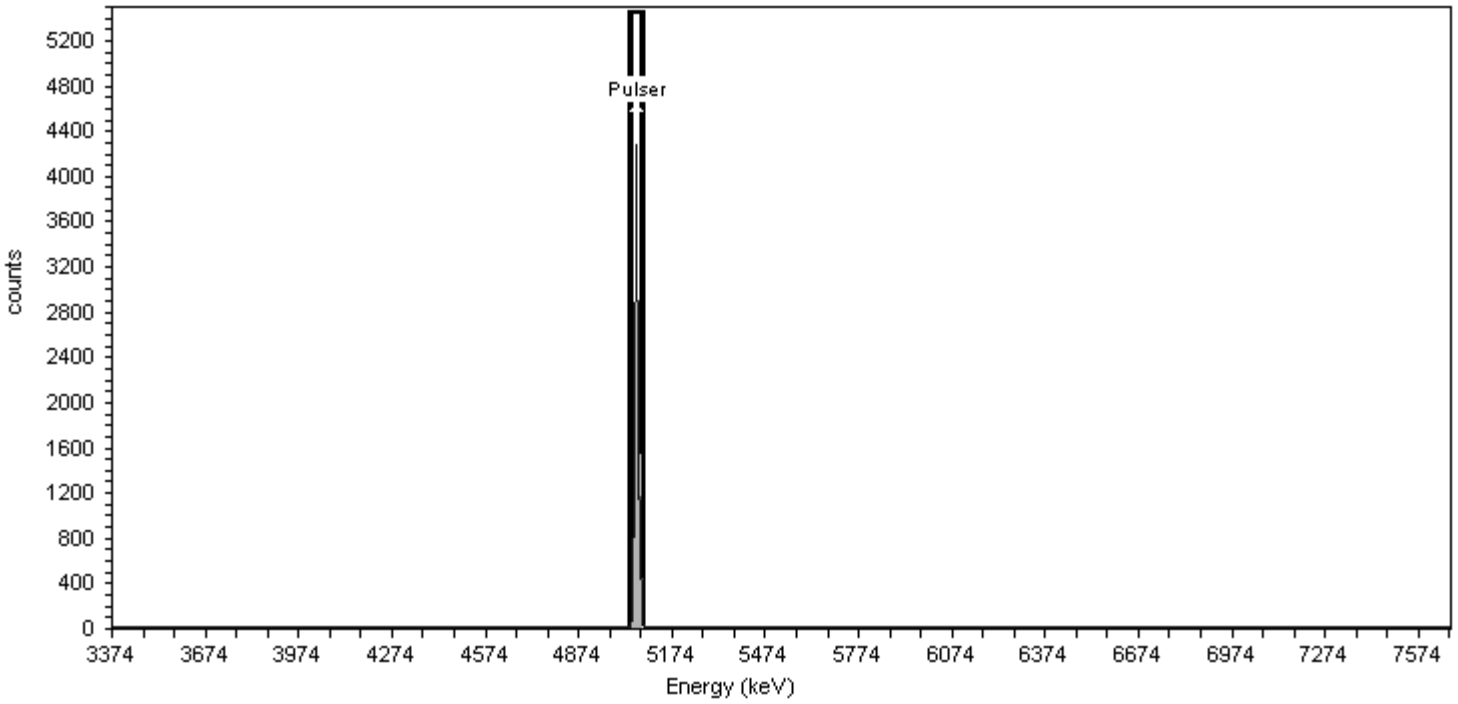
Analyst: 60040

Acquisition

Detector: AV3 , SN: 49-202 FF7
Acquisition Start Date: 7/3/2014 3:56:01PM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-8875;AV3-20140505
Calibration Date: 5/6/2014 5:38:33PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.09% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5059.836	5039.296	5080.376	12.07	7,410.05	7,348.67

TestAmerica
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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:04:51AM 7/1/2014

Sample

Sample Name: Pulser;AV6
Comment:

Spectrum #7 Analysis #1

Batch

Batch Name: June2014a
Description:

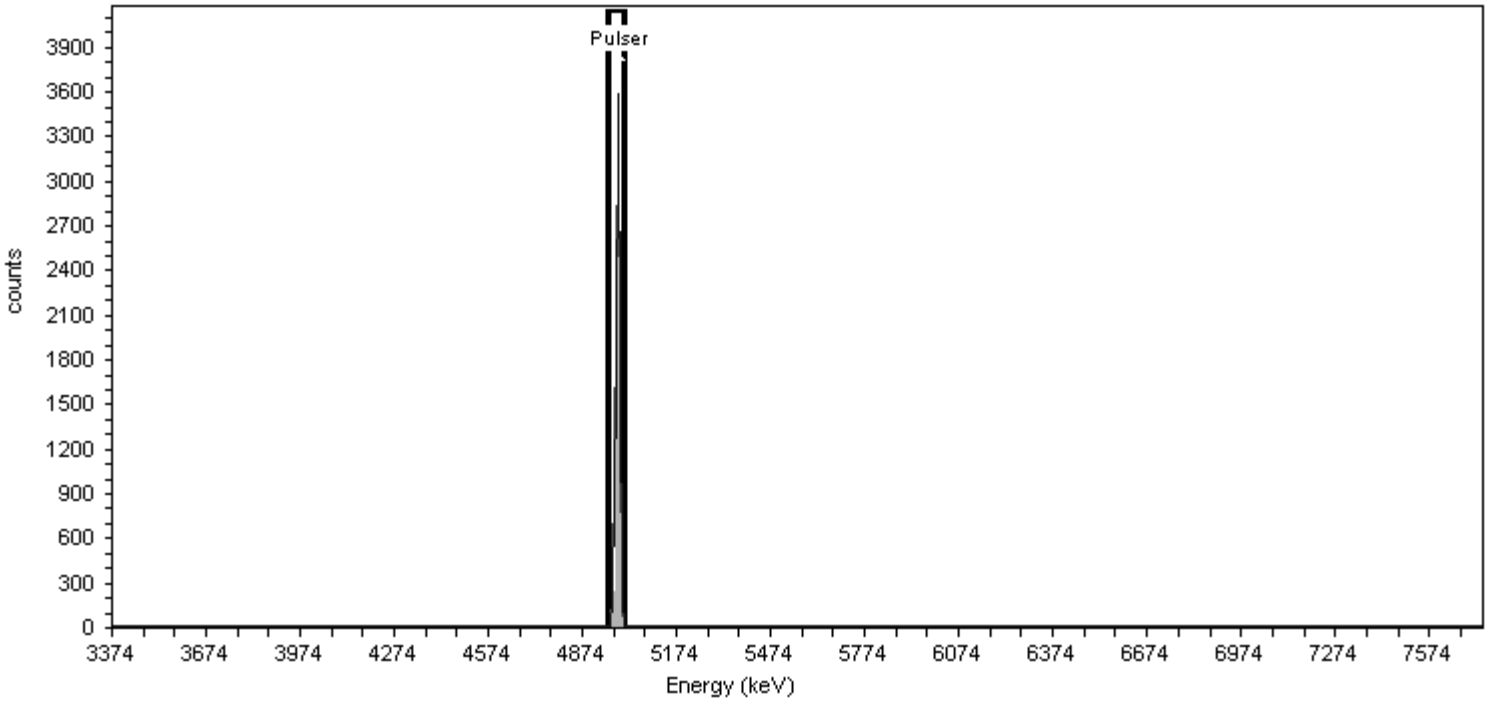
Analyst: 60040

Acquisition

Detector: AV6 , SN: 47-27FF2
Acquisition Start Date: 7/1/2014 1:00:20AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-9520;AV6-20140505
Calibration Date: 5/6/2014 5:38:46PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.89% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	4985.440	4961.196	5009.684	14.24	7,320.59	7,444.38

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:05:02AM 7/1/2014

Sample

Sample Name: Pulser;AV7 Spectrum #7 Analysis #1
Comment:

Batch

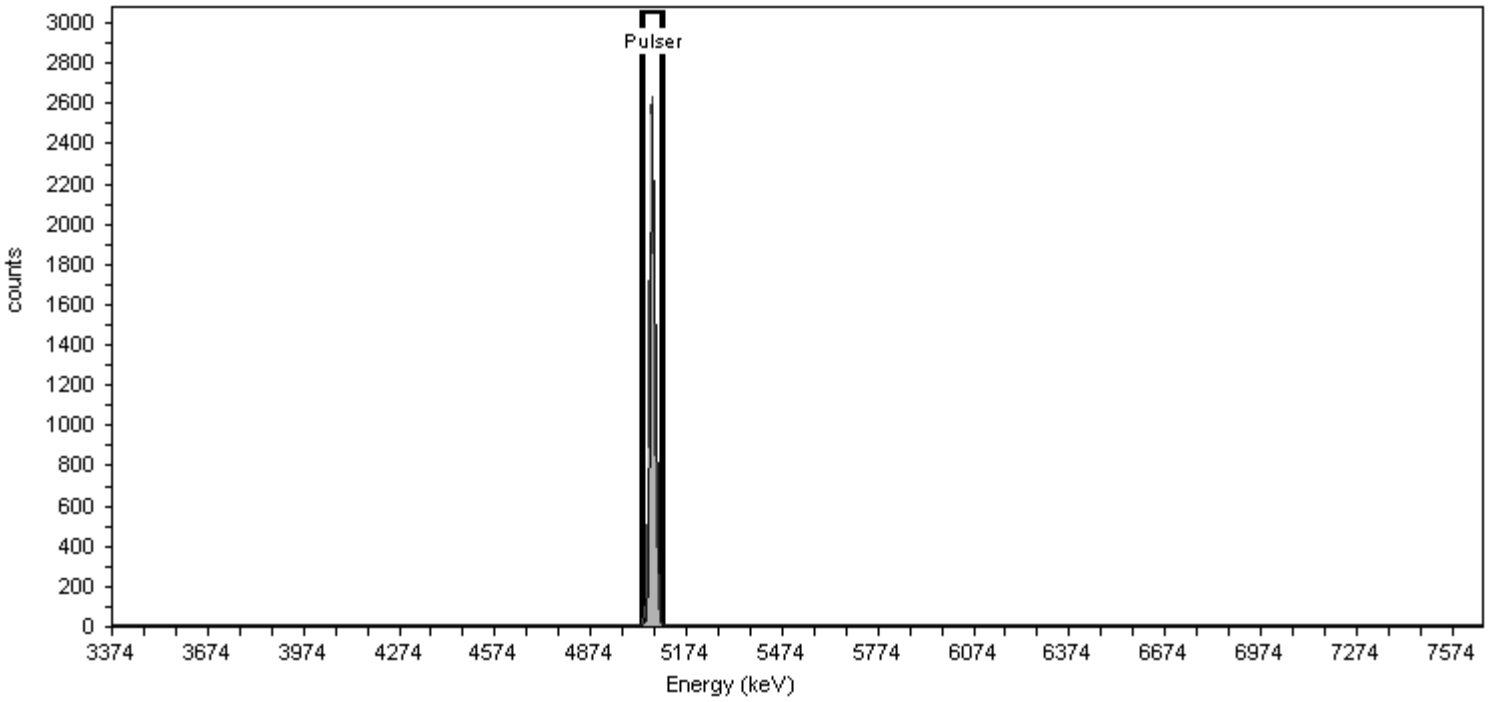
Batch Name: June2014a Analyst: 60040
Description:

Acquisition

Detector: AV7 , SN: 48-158EE5
Acquisition Start Date: 7/1/2014 1:00:21AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-8877;AV7-20140507
Calibration Date: 5/7/2014 10:48:48PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.80% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5068.499	5038.983	5098.014	17.34	6,541.72	7,348.30

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:05:08AM 7/1/2014

Sample

Sample Name: Pulser;AV8 Spectrum #7 Analysis #1
Comment:

Batch

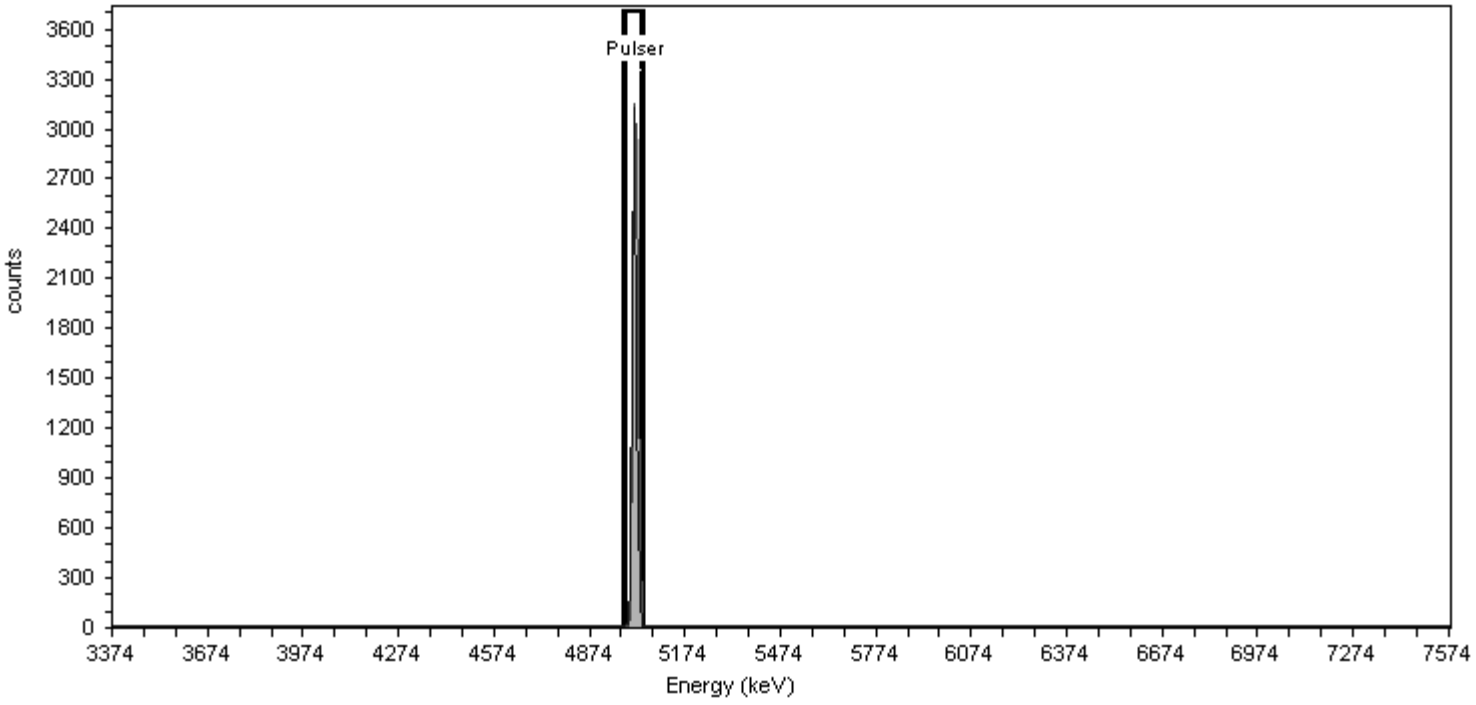
Batch Name: June2014a Analyst: 60040
Description:

Acquisition

Detector: AV8 , SN: 41-137Q6
Acquisition Start Date: 7/1/2014 1:00:23AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-9792;AV8-20140505
Calibration Date: 5/6/2014 5:38:58PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.05% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5014.167	4988.436	5039.898	15.12	6,831.49	7,433.17

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:05:13AM 7/1/2014

Sample

Sample Name: Pulser;AV9 Spectrum #7 Analysis #1
Comment:

Batch

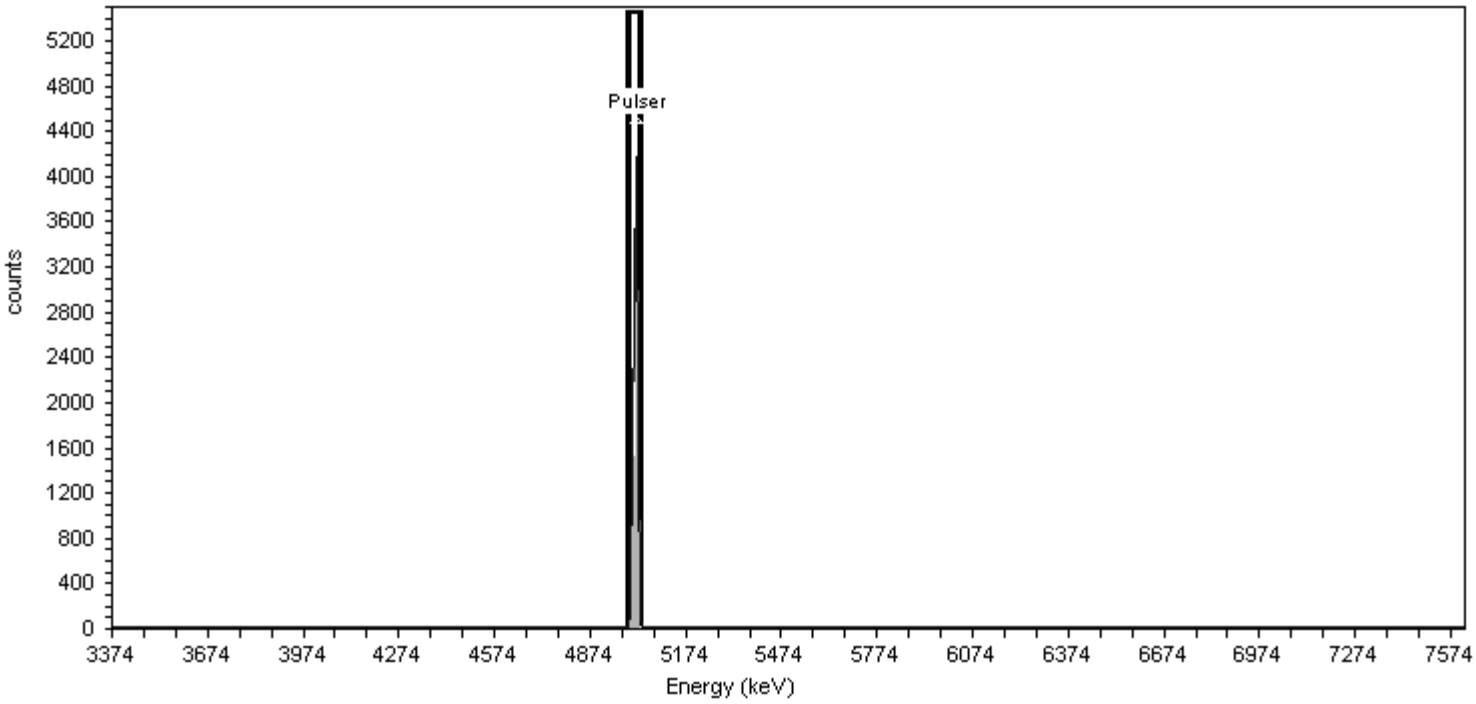
Batch Name: June2014a Analyst: 60040
Description:

Acquisition

Detector: AV9 , SN: 51-082V5
Acquisition Start Date: 7/1/2014 1:00:25AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9793;AV9-20140505
Calibration Date: 5/6/2014 5:39:04PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.04% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5014.995	4993.237	5036.752	12.78	7,657.48	7,541.36

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:05:19AM 7/1/2014

Sample

Sample Name: Pulser;AV10
Comment:

Spectrum #8 Analysis #1

Batch

Batch Name: June2014a
Description:

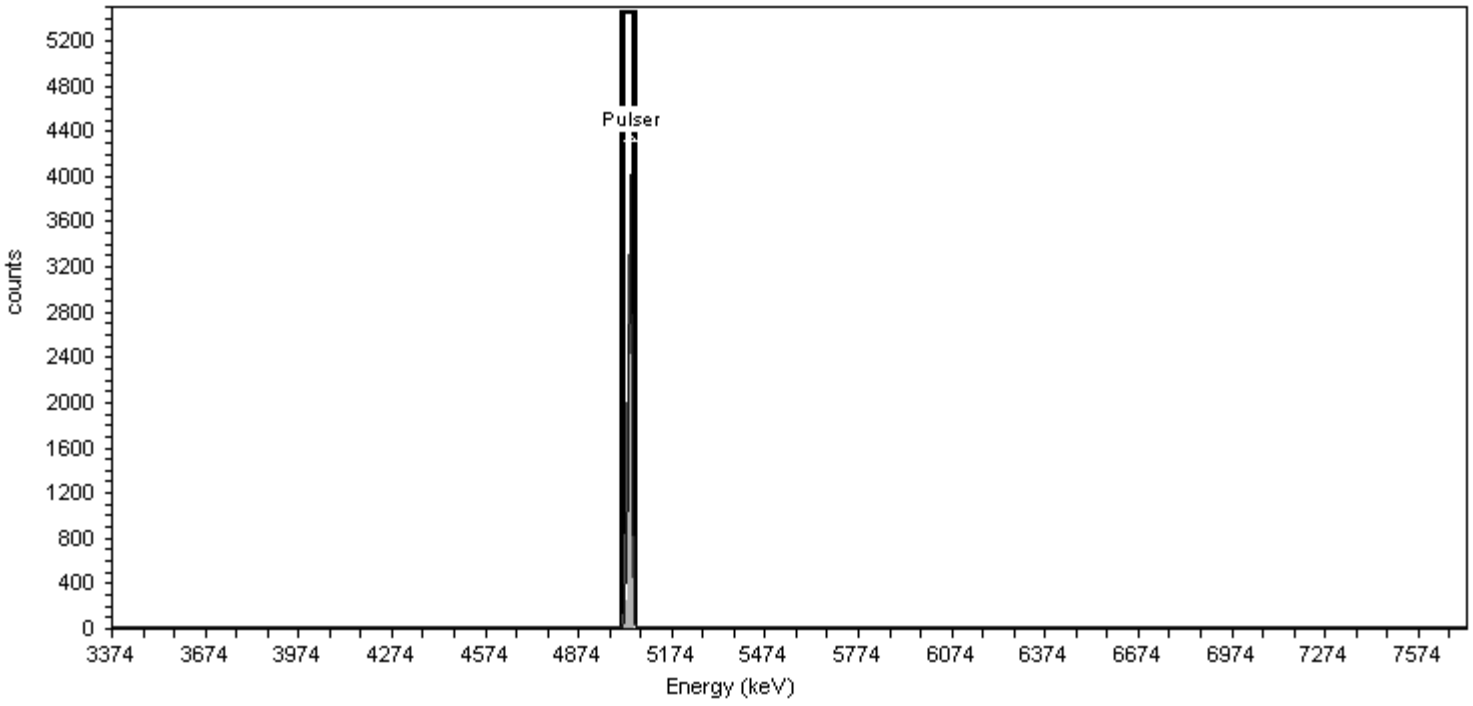
Analyst: 60040

Acquisition

Detector: AV10 , SN: 49-155N2
Acquisition Start Date: 7/1/2014 1:00:27AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9794;AV10-20140505
Calibration Date: 5/6/2014 5:39:10PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.84% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5037.714	5016.797	5058.632	12.29	7,066.63	7,522.66

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:05:24AM 7/1/2014

Sample

Sample Name: Pulser;AV11
Comment:

Spectrum #7 Analysis #1

Batch

Batch Name: June2014a
Description:

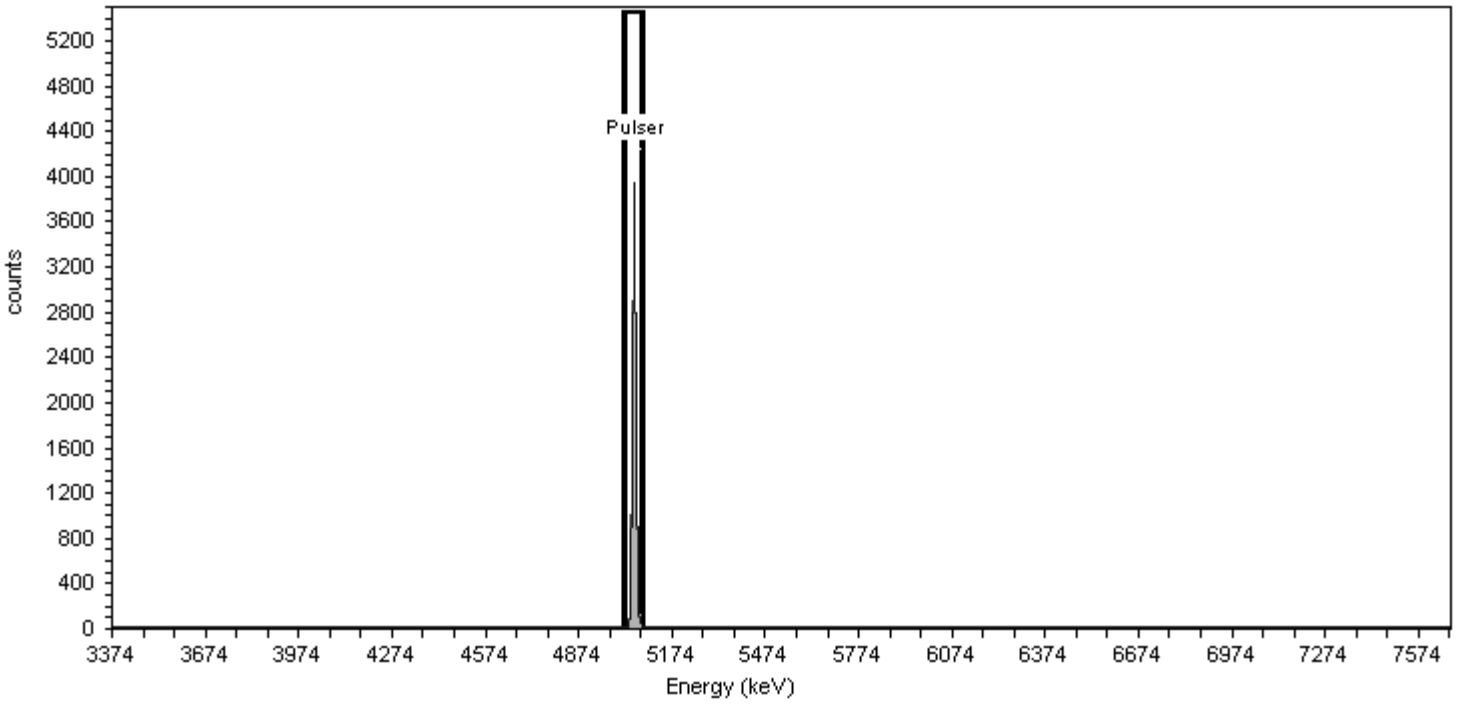
Analyst: 60040

Acquisition

Detector: AV11 , SN: 49-155dd2
Acquisition Start Date: 7/1/2014 1:00:29AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9795;AV11-20140505
Calibration Date: 5/6/2014 5:39:16PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.88% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5052.402	5029.771	5075.034	13.30	7,508.57	7,715.92

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:06:03AM 7/1/2014

Sample

Sample Name: Pulser;AV12
Comment:

Spectrum #7 Analysis #1

Batch

Batch Name: June2014a
Description:

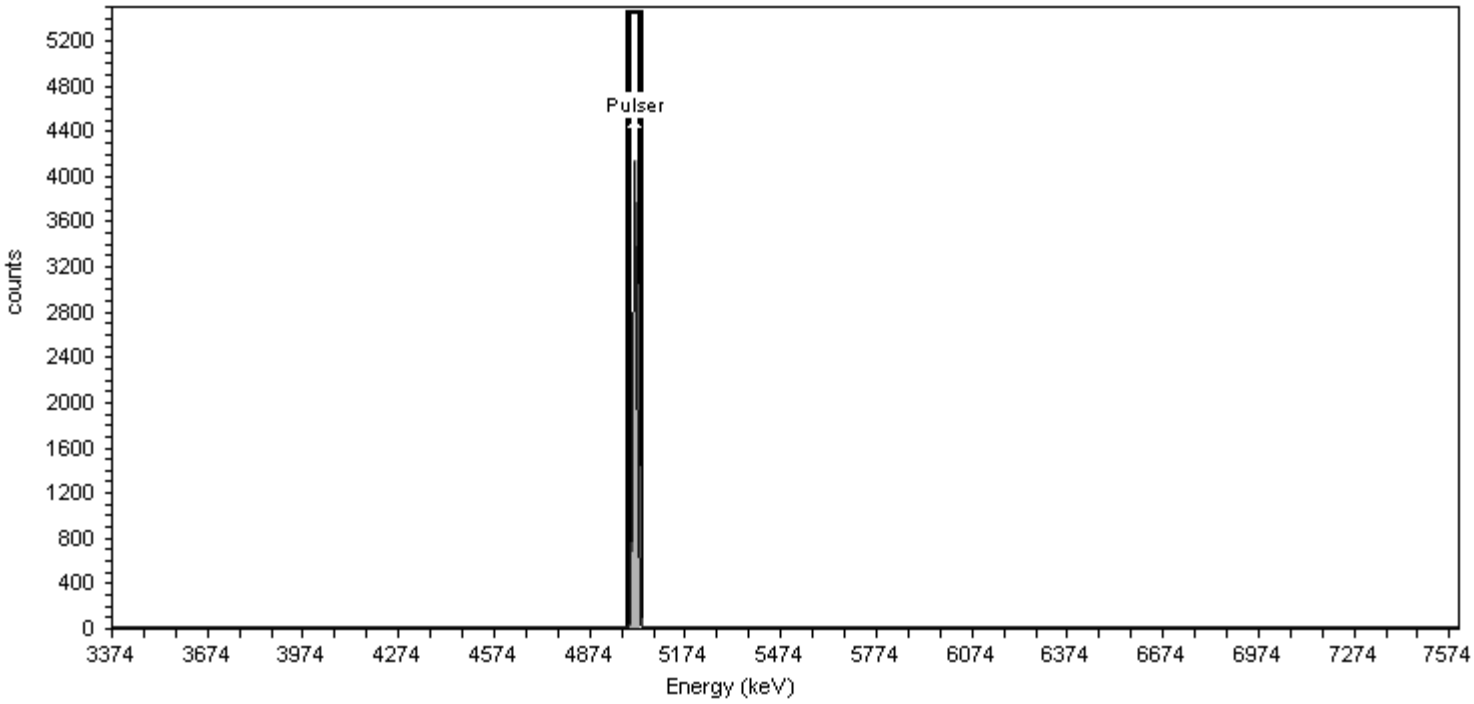
Analyst: 60040

Acquisition

Detector: AV12 , SN: 51-082B7
Acquisition Start Date: 7/1/2014 1:00:30AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9817;AV12-20140505
Calibration Date: 5/6/2014 5:39:22PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.97% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5014.748	4995.027	5034.468	11.59	6,870.91	7,594.93

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:53:47AM 7/1/2014

Sample

Sample Name: Pulser;AV13 Spectrum #9 Analysis #1
Comment:

Batch

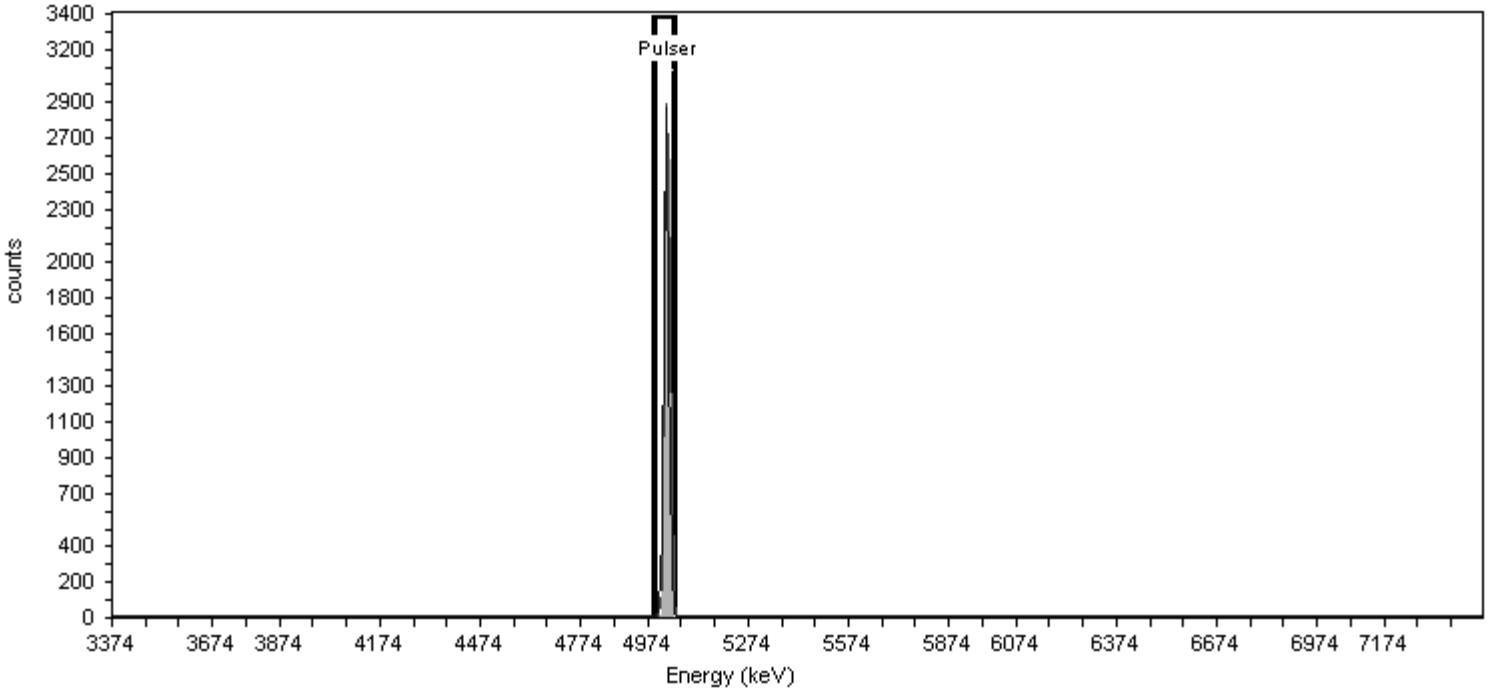
Batch Name: June2014a Analyst: 60040
Description:

Acquisition

Detector: AV13 , SN: 49-155M7
Acquisition Start Date: 7/1/2014 1:52:42AM
Live Time: 1.00 min.
Real Time: 1.00 min.
Calibration Name: IC-9884;AV13-20140505
Calibration Date: 5/6/2014 5:39:28PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.99% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5029.078	5000.097	5058.059	17.03	7,073.32	7,506.57

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:05:36AM 7/1/2014

Sample

Sample Name: Pulser;AV14
Comment:

Spectrum #7 Analysis #1

Batch

Batch Name: June2014a
Description:

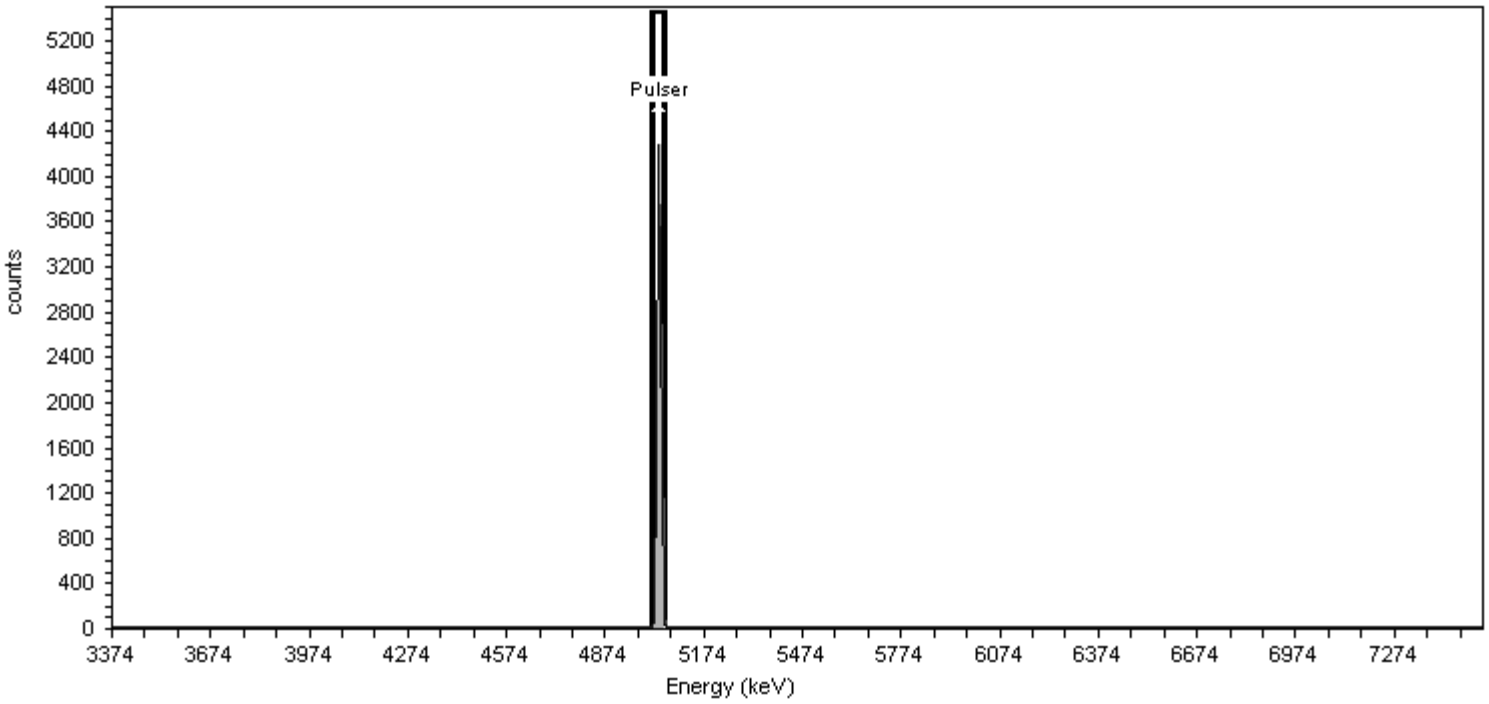
Analyst: 60040

Acquisition

Detector: AV14 , SN: 50-060W4
Acquisition Start Date: 7/1/2014 1:00:34AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9885;AV14-20140505
Calibration Date: 5/6/2014 5:39:36PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.34% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5037.305	5016.988	5057.622	11.94	7,326.17	7,585.35

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:04:35AM 7/1/2014

Sample

Sample Name: Pulser;AV24 Spectrum #7 Analysis #1
Comment:

Batch

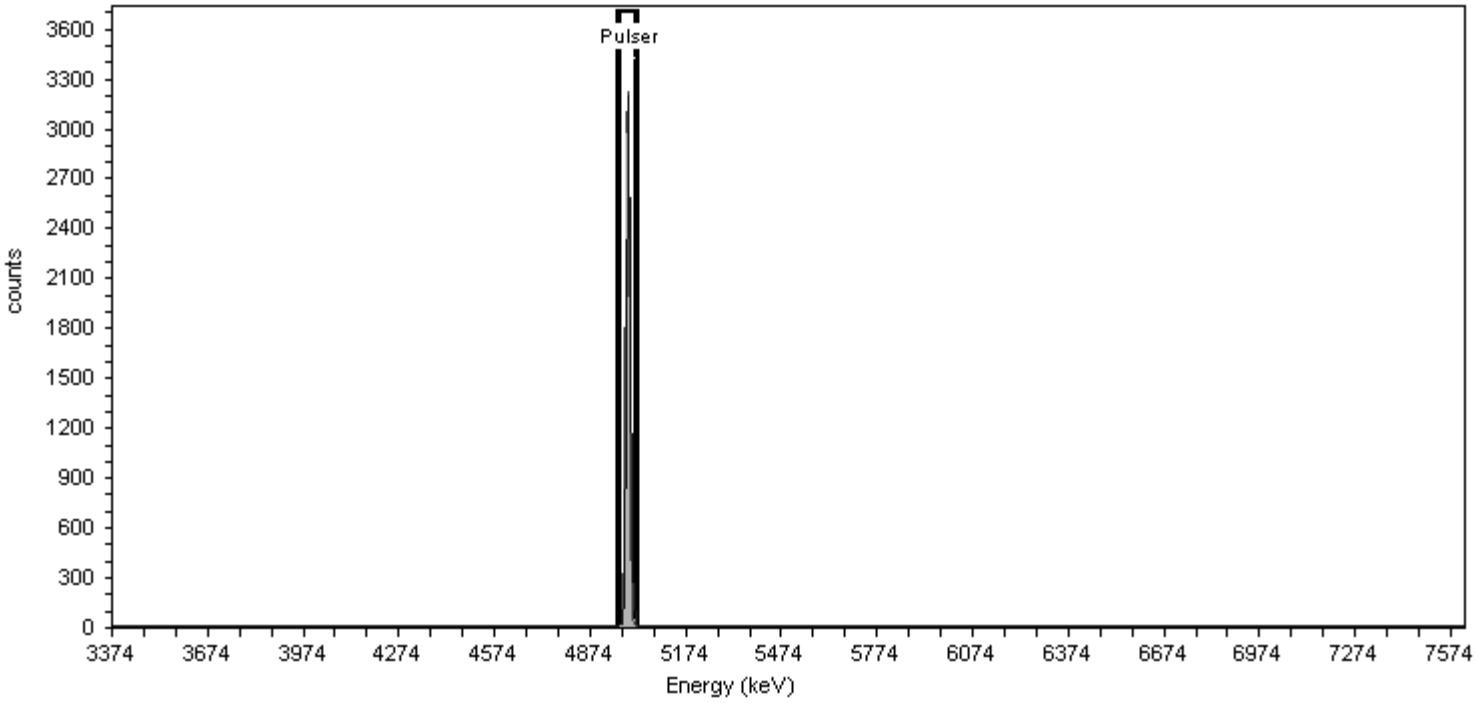
Batch Name: June2014a Analyst: 60040
Description:

Acquisition

Detector: AV24 , SN: 47-137Q4
Acquisition Start Date: 7/1/2014 1:00:50AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9793;AV24-20140505
Calibration Date: 5/5/2014 10:09:41PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.42% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	4993.588	4967.071	5020.105	15.58	7,209.41	7,656.78

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:13:54AM 7/1/2014

Sample

Sample Name: Pulser;AV51 Spectrum #7 Analysis #1
Comment:

Batch

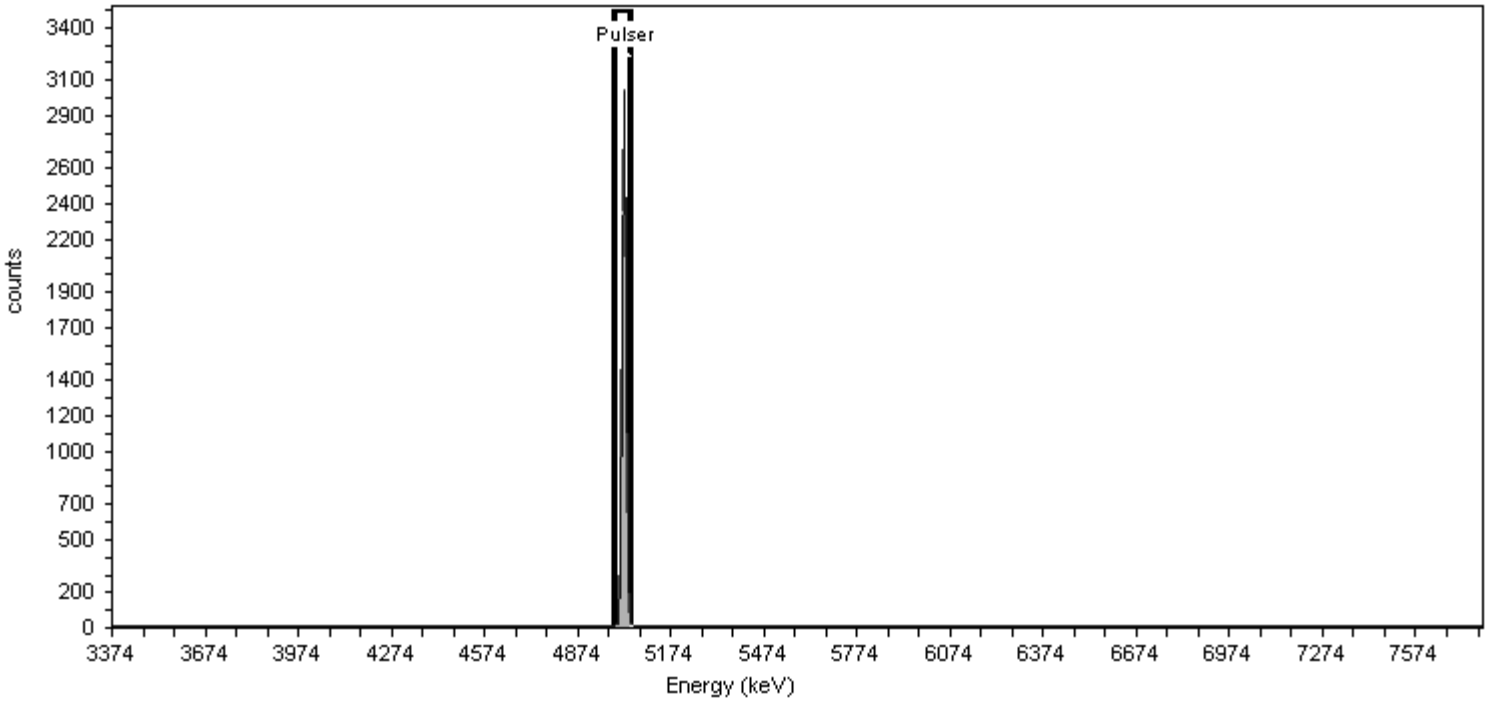
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV51 , SN: 48-109I1
Acquisition Start Date: 7/1/2014 1:09:33AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8875;AV51-20140504
Calibration Date: 5/5/2014 6:52:53PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.24% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5022.955	4994.843	5051.066	16.52	7,201.28	7,280.52

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:14:00AM 7/1/2014

Sample

Sample Name: Pulser;AV53 Spectrum #7 Analysis #1
Comment:

Batch

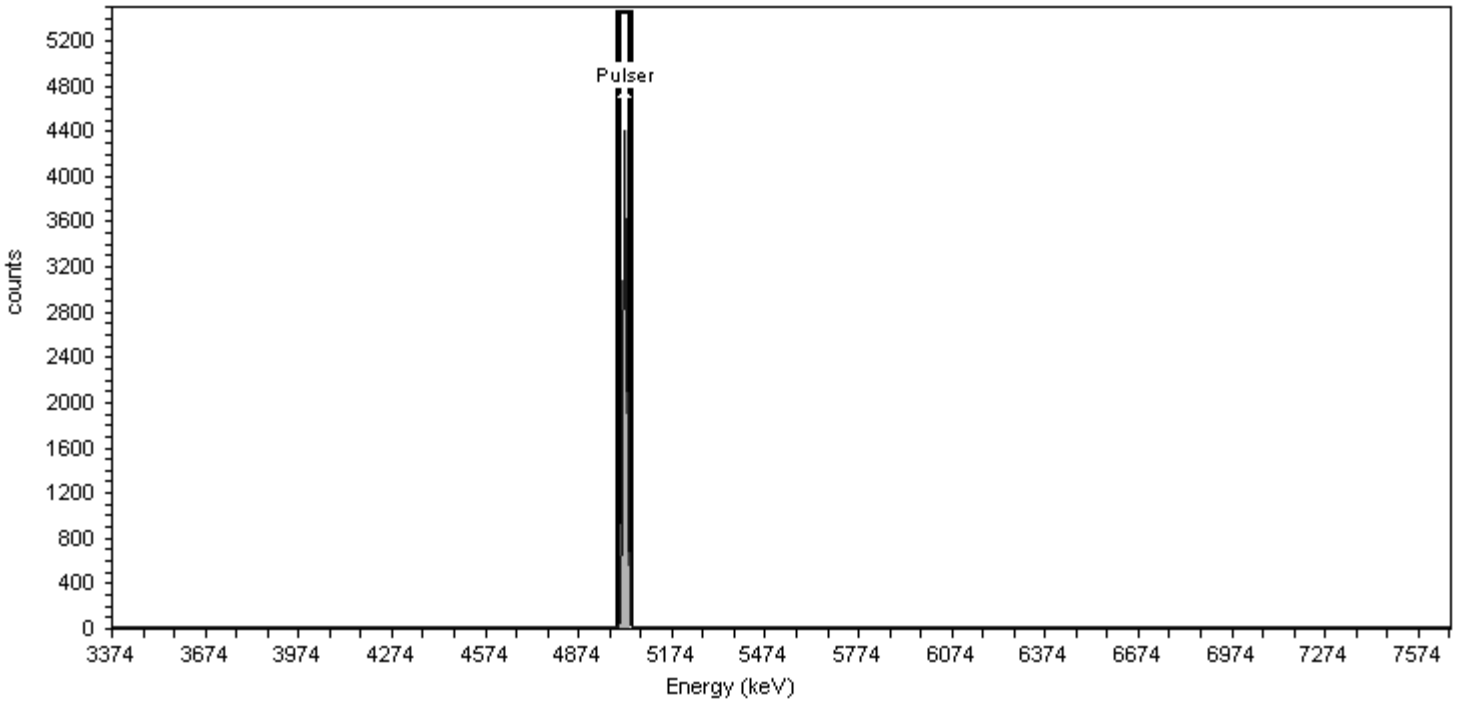
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV53 , SN: 50-051A6
Acquisition Start Date: 7/1/2014 1:09:40AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8877;AV53-20140504
Calibration Date: 5/5/2014 6:53:06PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.32% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5022.639	5003.782	5041.495	11.08	6,988.21	7,263.42

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:14:05AM 7/1/2014

Sample

Sample Name: Pulser;AV54 Spectrum #7 Analysis #1
Comment:

Batch

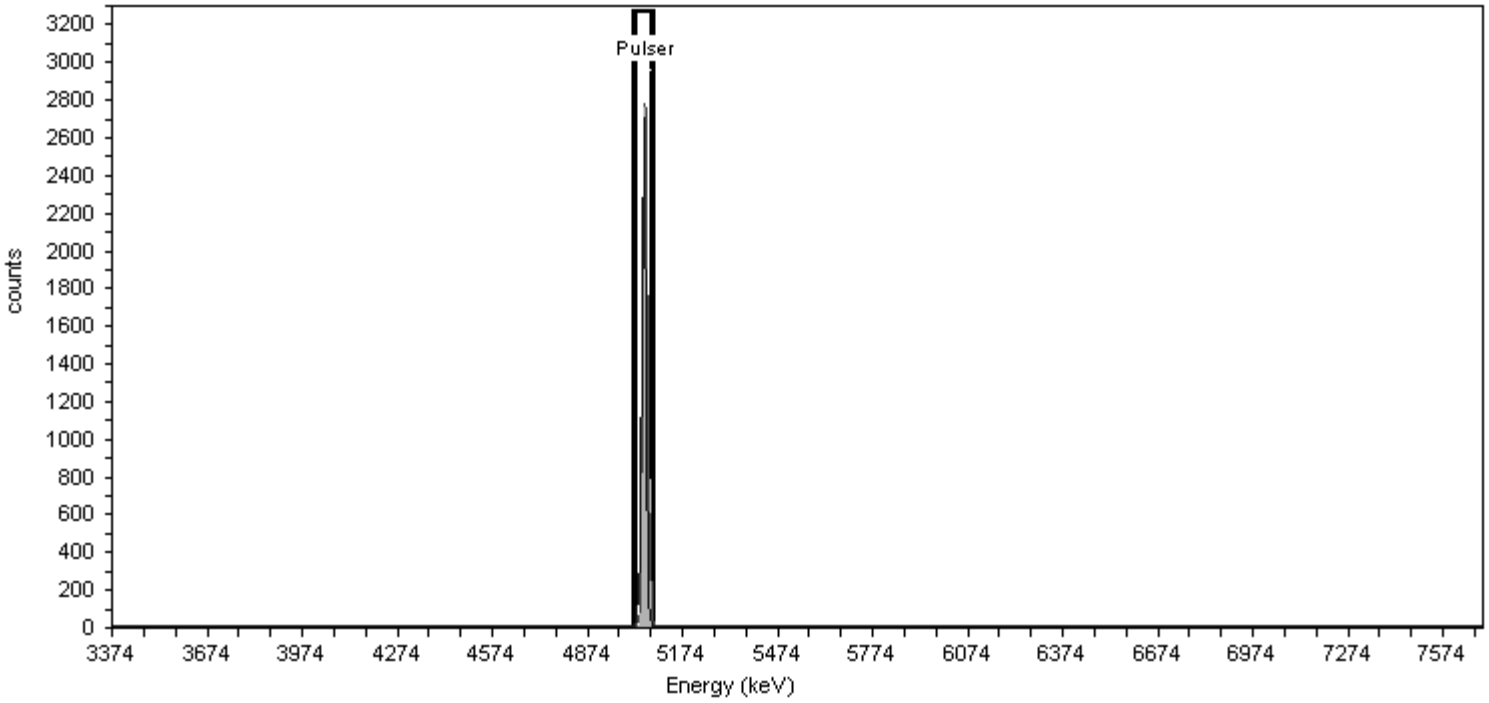
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV54 , SN: 48-046II6
Acquisition Start Date: 7/1/2014 1:09:40AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9520;AV54-20140504
Calibration Date: 5/5/2014 6:53:13PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.02% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5050.840	5024.306	5077.373	15.59	6,204.04	7,274.04

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:14:13AM 7/1/2014

Sample

Sample Name: Pulser;AV55 Spectrum #7 Analysis #1
Comment:

Batch

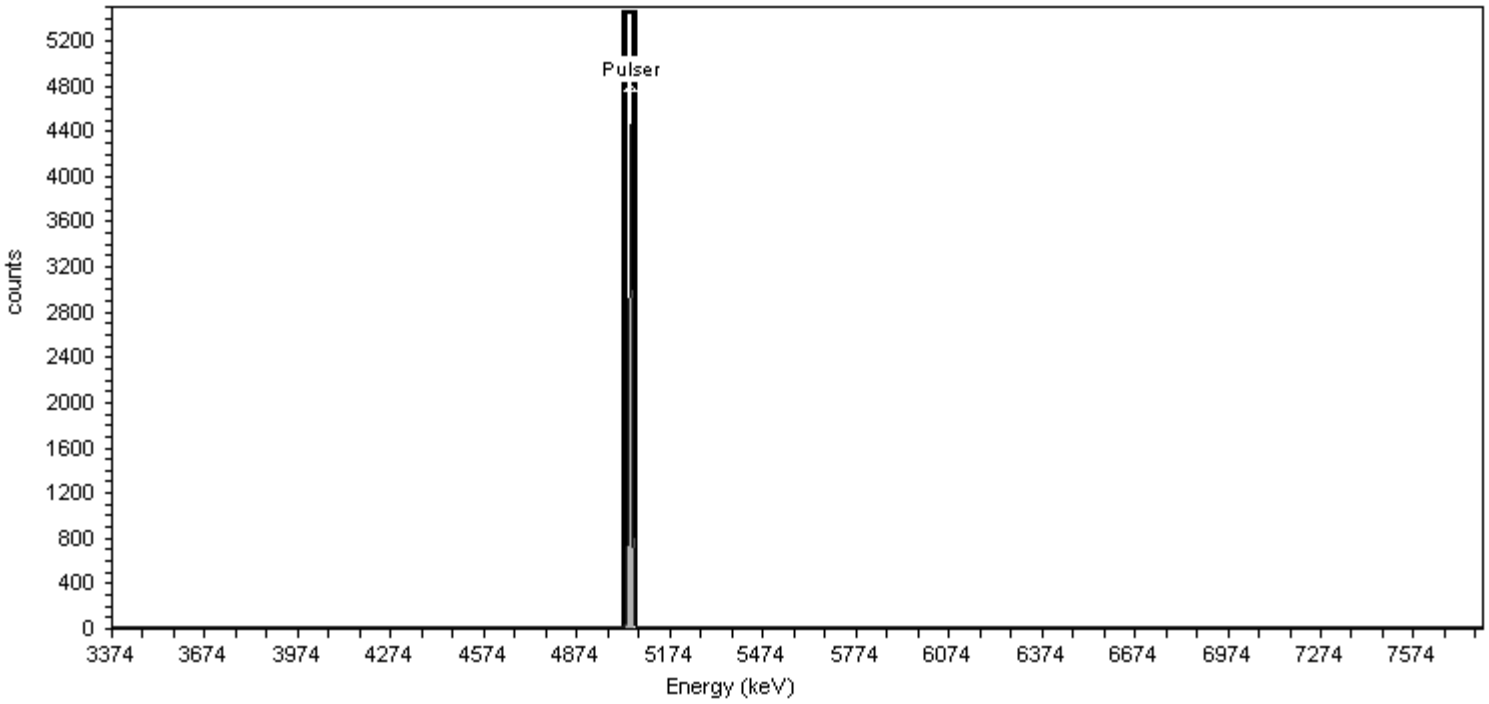
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV55 , SN: 50-051C2
Acquisition Start Date: 7/1/2014 1:09:41AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-7107;AV55-20140507
Calibration Date: 5/7/2014 10:48:56PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.79% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5044.901	5025.352	5064.451	11.49	7,328.67	7,262.82

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:14:22AM 7/1/2014

Sample

Sample Name: Pulser;AV56 Spectrum #7 Analysis #1
Comment:

Batch

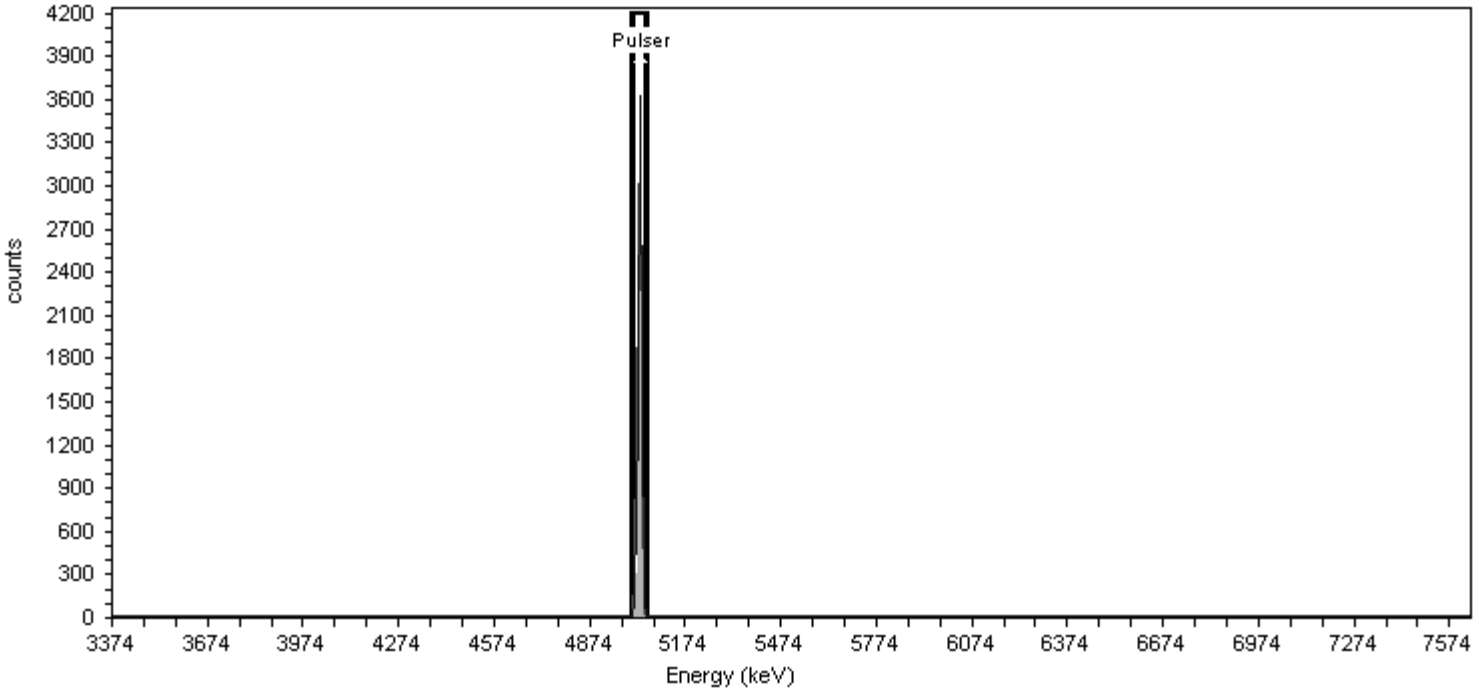
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV56 , SN: 52-059EE5
Acquisition Start Date: 7/1/2014 1:09:42AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9792;AV56-20140504
Calibration Date: 5/5/2014 6:53:34PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.09% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5030.218	5007.906	5052.529	13.11	6,821.48	7,008.46

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:14:33AM 7/1/2014

Sample

Sample Name: Pulser;AV58
Comment:

Spectrum #7 Analysis #1

Batch

Batch Name: June2014b
Description:

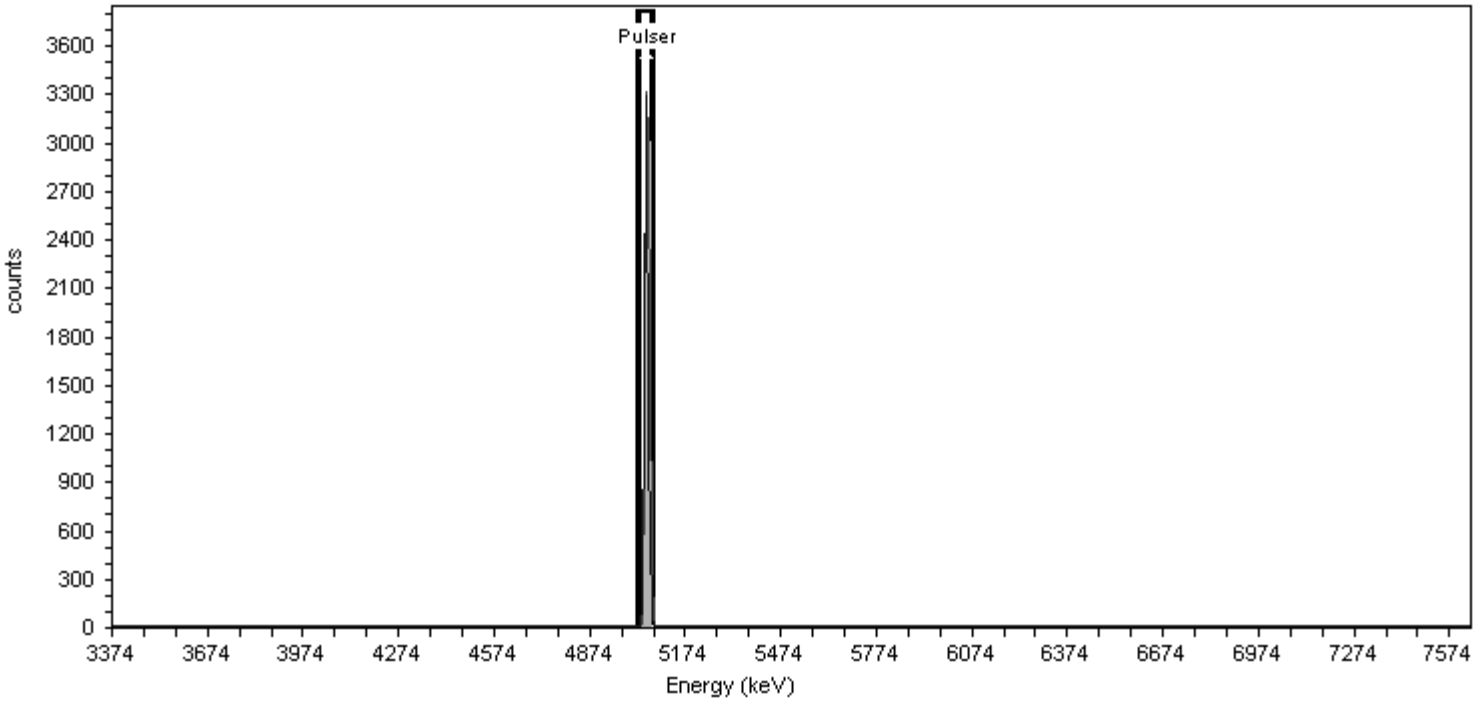
Analyst: 60040

Acquisition

Detector: AV58 , SN: 52-102 C5
Acquisition Start Date: 7/1/2014 1:09:44AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9794;AV58-20140504
Calibration Date: 5/5/2014 6:53:46PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.56% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5051.639	5029.547	5073.731	12.98	6,173.46	6,978.60

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:14:38AM 7/1/2014

Sample

Sample Name: Pulser;AV59
Comment:

Spectrum #8 Analysis #1

Batch

Batch Name: June2014b
Description:

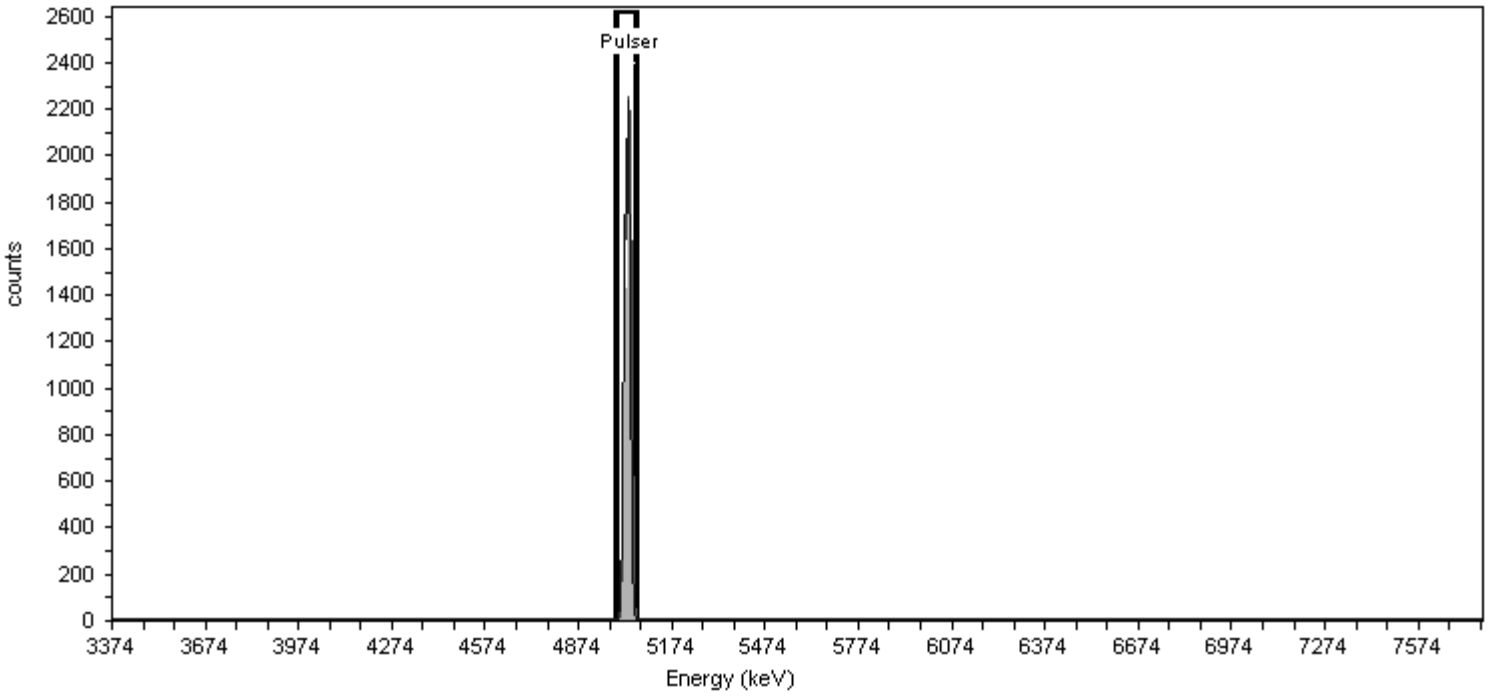
Analyst: 60040

Acquisition

Detector: AV59 , SN: 49-155M7
Acquisition Start Date: 7/1/2014 1:09:45AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9795;AV59-20140504
Calibration Date: 5/5/2014 6:53:53PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.44% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5029.056	4997.948	5060.165	18.28	5,912.09	7,255.86

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:14:44AM 7/1/2014

Sample

Sample Name: Pulser;AV60
Comment:

Spectrum #7 Analysis #1

Batch

Batch Name: June2014b
Description:

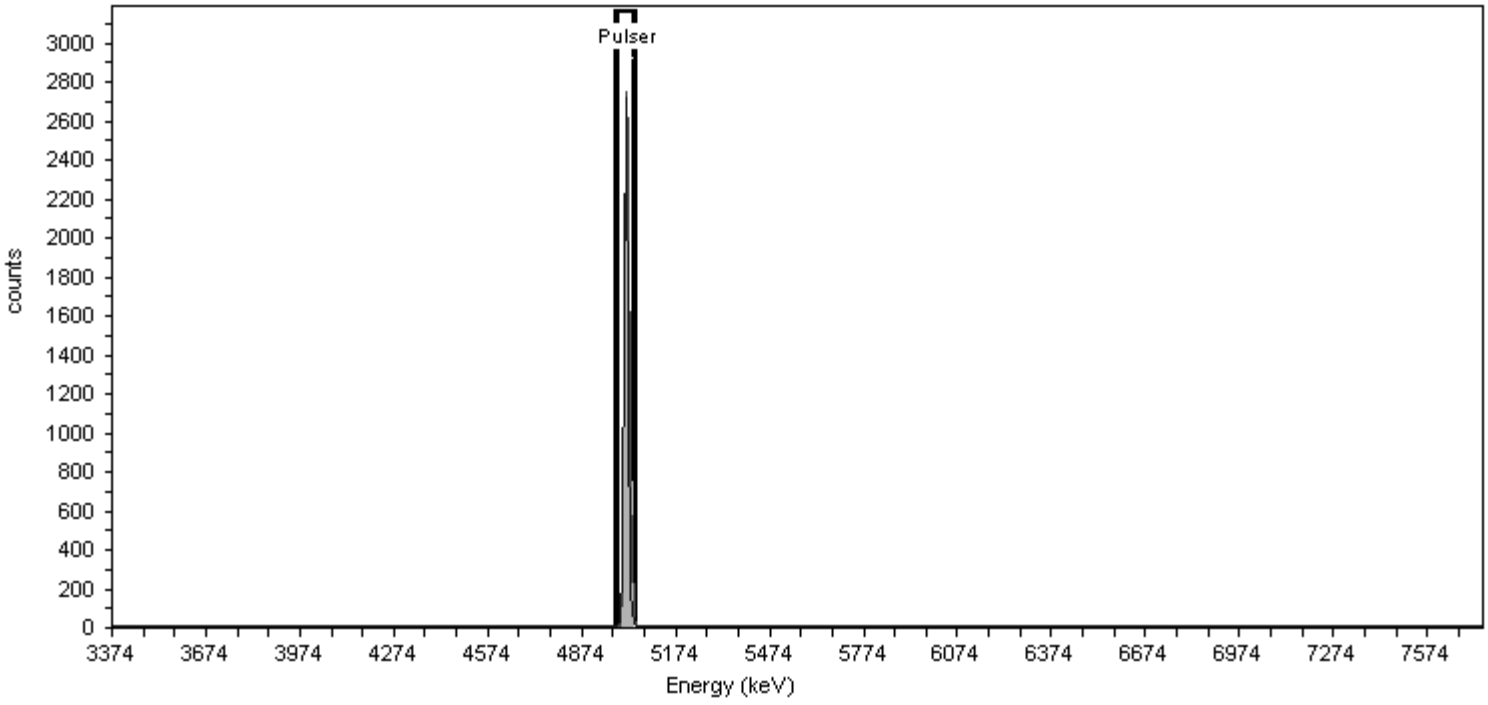
Analyst: 60040

Acquisition

Detector: AV60 , SN: 49-027117
Acquisition Start Date: 7/1/2014 1:09:46AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9817;AV60-20140504
Calibration Date: 5/5/2014 6:53:59PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.33% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5014.094	4987.129	5041.058	15.84	6,234.53	7,229.99

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:14:49AM 7/1/2014

Sample

Sample Name: Pulser;AV61
Comment:

Spectrum #7 Analysis #1

Batch

Batch Name: June2014b
Description:

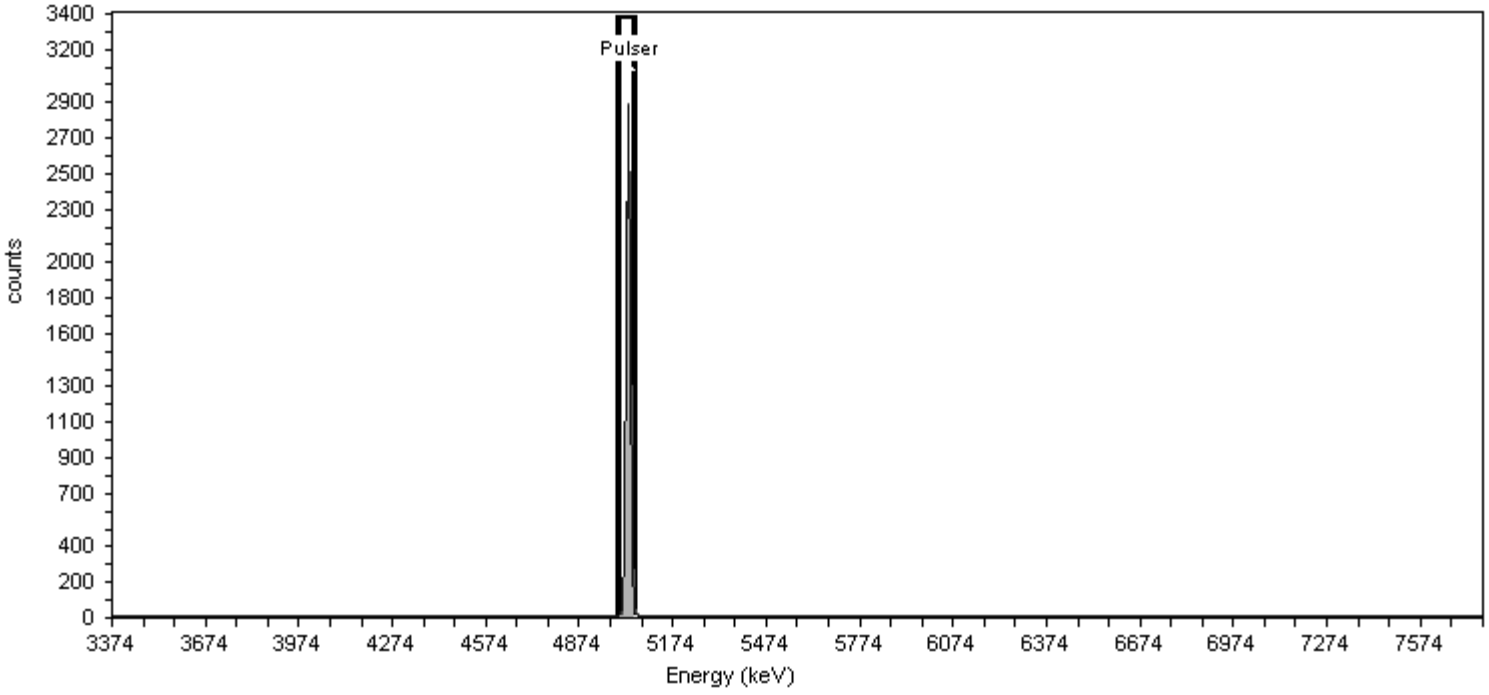
Analyst: 60040

Acquisition

Detector: AV61 , SN: 5-051JJ3
Acquisition Start Date: 7/1/2014 1:09:47AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9884;AV61-20140504
Calibration Date: 5/5/2014 6:54:06PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.46% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5029.601	5000.560	5058.642	17.06	7,070.89	7,197.37

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TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:14:55AM 7/1/2014

Sample

Sample Name: Pulser;AV62
Comment:

Spectrum #7 Analysis #1

Batch

Batch Name: June2014b
Description:

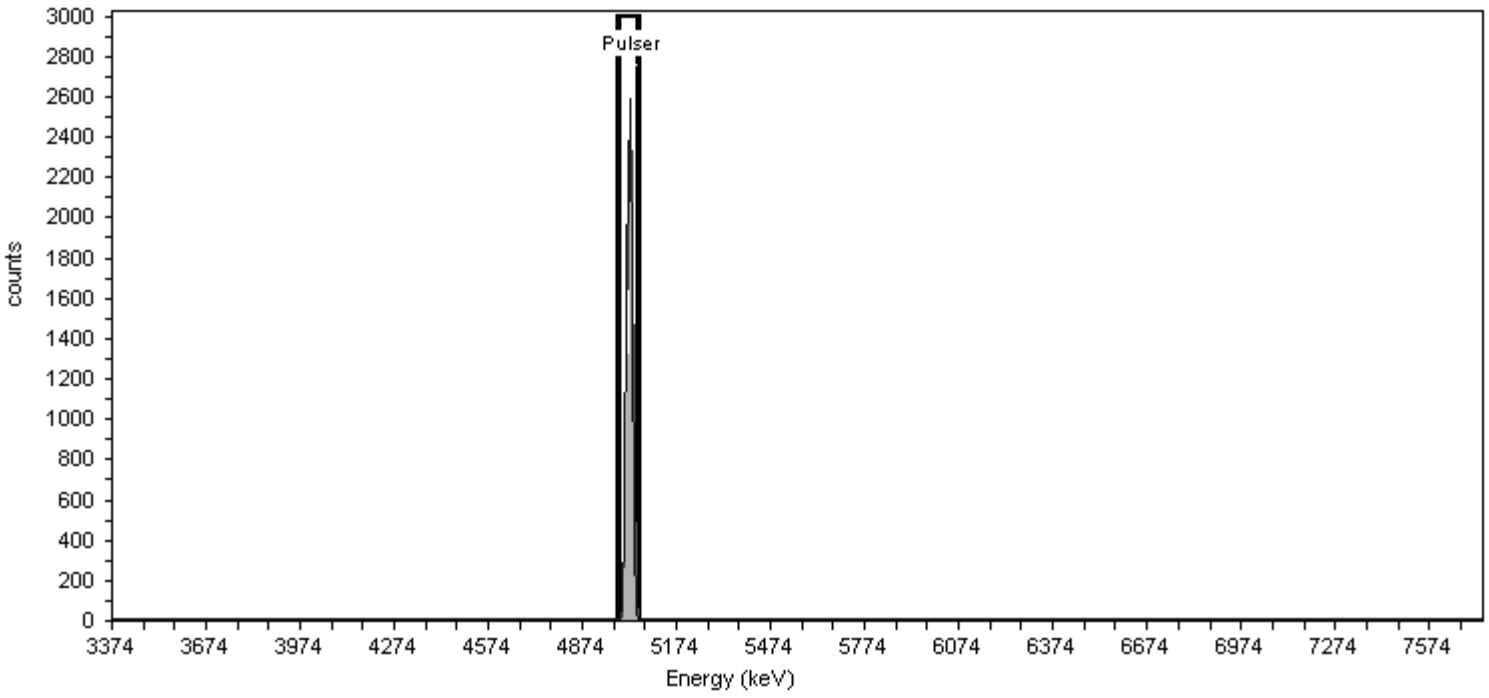
Analyst: 60040

Acquisition

Detector: AV62 , SN: 52-060FF2
Acquisition Start Date: 7/1/2014 1:09:48AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9885;AV62-20140504
Calibration Date: 5/5/2014 6:54:13PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.34% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5022.045	4990.182	5053.909	18.72	6,955.01	7,249.58

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:15:00AM 7/1/2014

Sample

Sample Name: Pulser;AV63 Spectrum #7 Analysis #1
Comment:

Batch

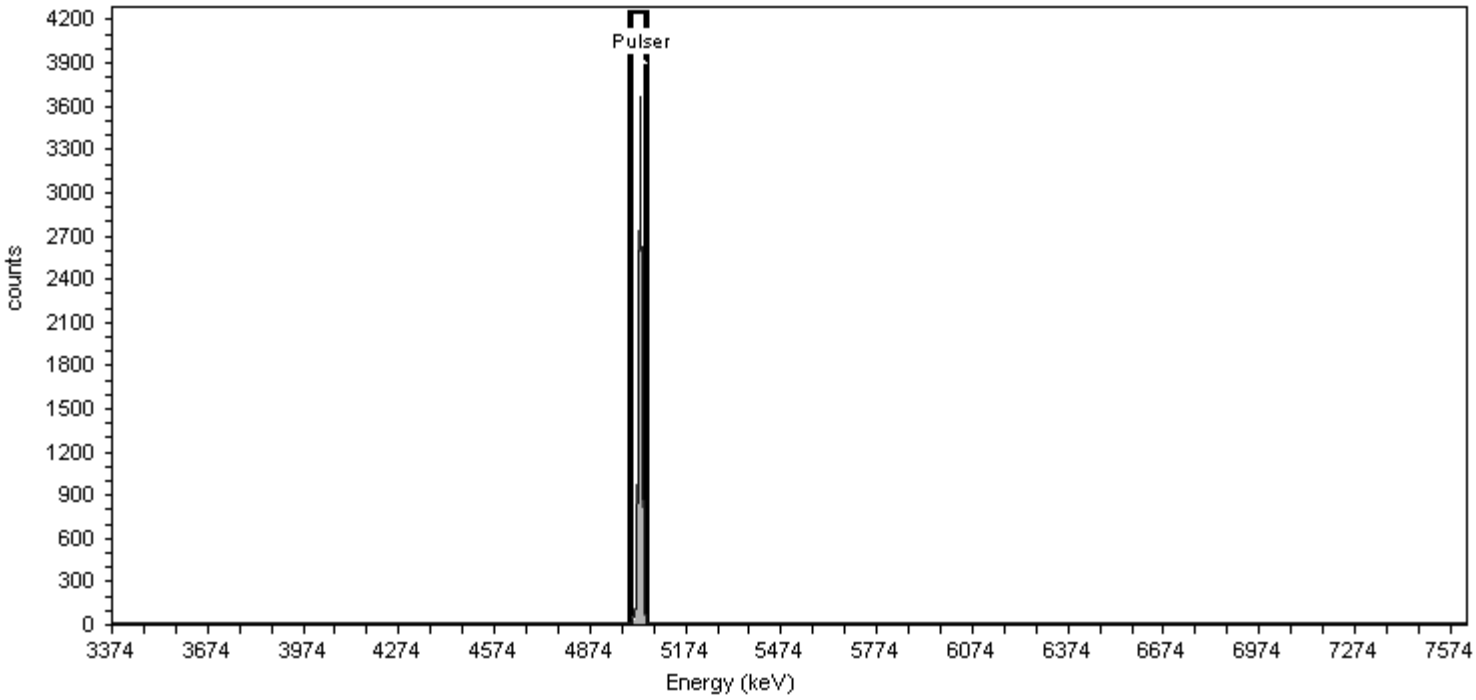
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV63 , SN: 47-029ff2
Acquisition Start Date: 7/1/2014 1:09:50AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9886;AV63-20140504
Calibration Date: 5/5/2014 6:54:19PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.48% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5030.059	5007.253	5052.864	13.40	7,052.95	7,246.59

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:15:05AM 7/1/2014

Sample

Sample Name: Pulser;AV64
Comment:

Spectrum #7 Analysis #1

Batch

Batch Name: June2014b
Description:

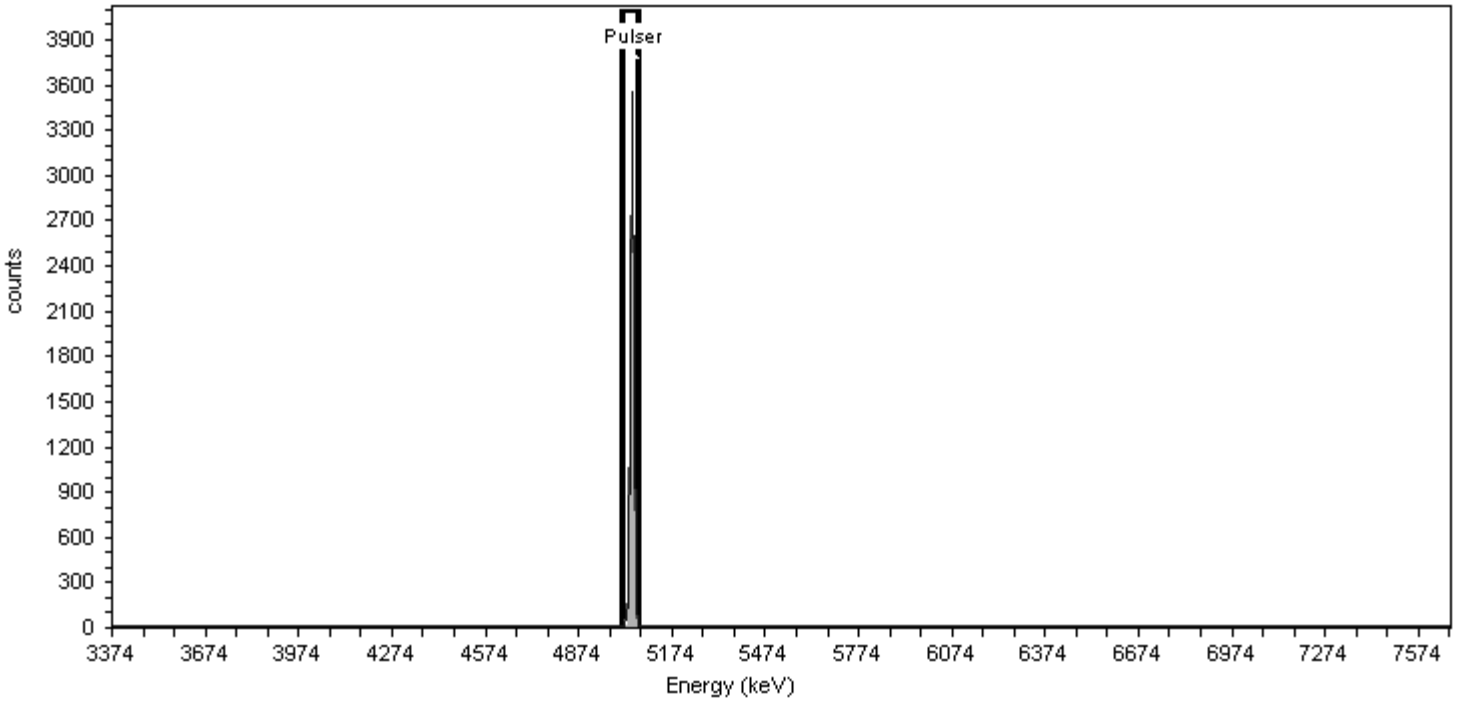
Analyst: 60040

Acquisition

Detector: AV64 , SN: 47-029ee4
Acquisition Start Date: 7/1/2014 1:09:51AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-7107;AV64-20140504a
Calibration Date: 5/4/2014 8:44:03PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.75% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5045.025	5021.185	5068.866	14.01	7,136.83	7,242.49

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:15:11AM 7/1/2014

Sample

Sample Name: Pulser;AV65 Spectrum #7 Analysis #1
Comment:

Batch

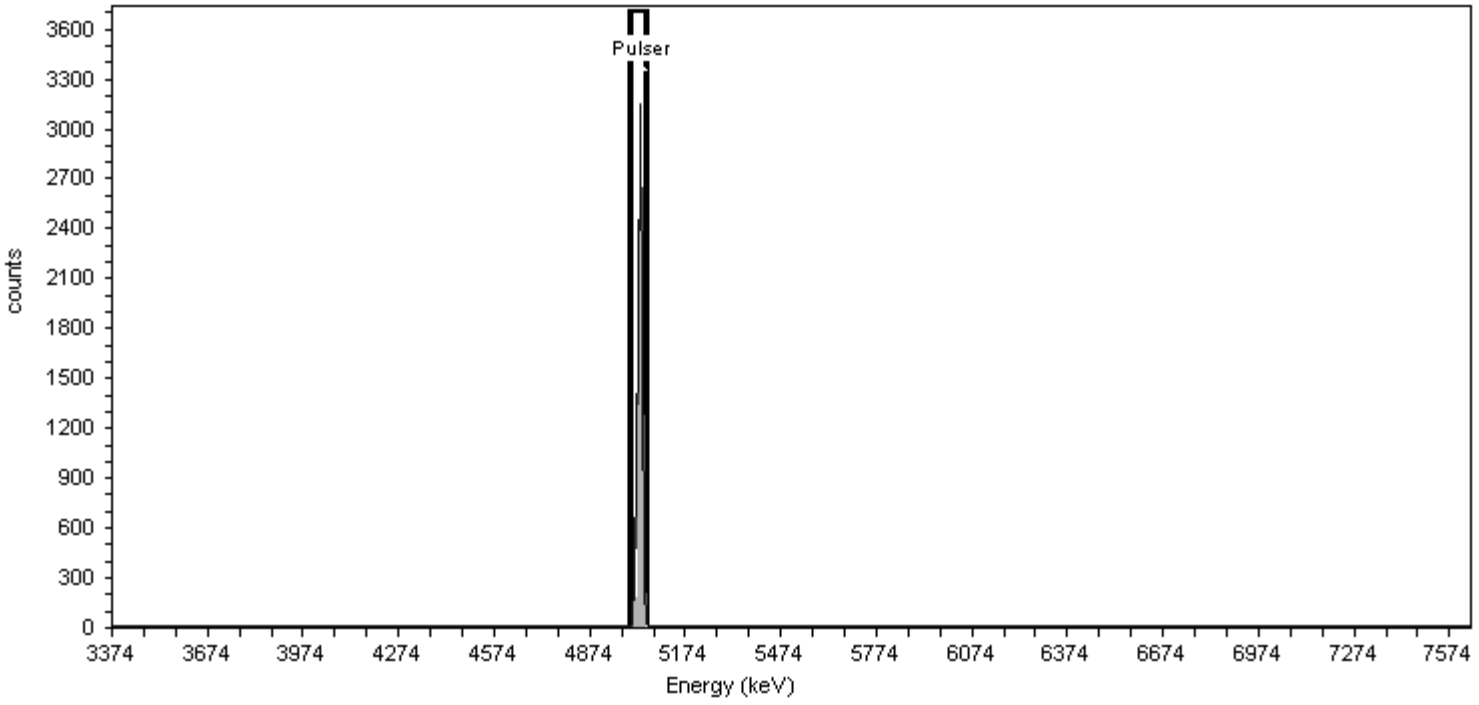
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV65 , SN: 44-049JJ1
Acquisition Start Date: 7/1/2014 1:09:52AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8874;AV65-20140504
Calibration Date: 5/4/2014 8:43:55PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.13% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5029.713	5002.797	5056.630	15.81	7,130.21	7,229.54

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:15:16AM 7/1/2014

Sample

Sample Name: Pulser;AV66
Comment:

Spectrum #7 Analysis #1

Batch

Batch Name: June2014b
Description:

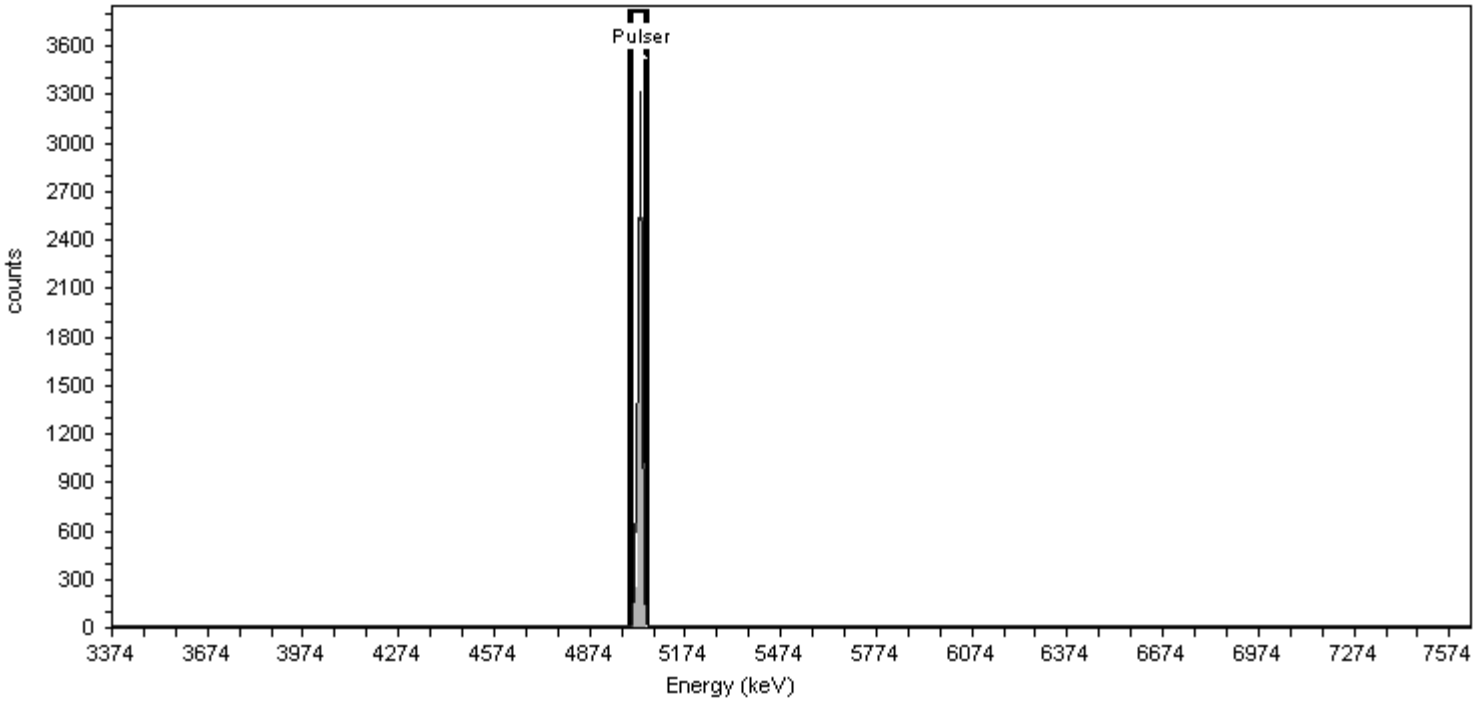
Analyst: 60040

Acquisition

Detector: AV66 , SN: 48-158EE2
Acquisition Start Date: 7/1/2014 1:09:54AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8875;AV66-20140504
Calibration Date: 5/4/2014 8:44:10PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.93% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5029.927	5003.693	5056.162	15.41	7,330.96	7,230.22

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:15:21AM 7/1/2014

Sample

Sample Name: Pulser;AV67 Spectrum #7 Analysis #1
Comment:

Batch

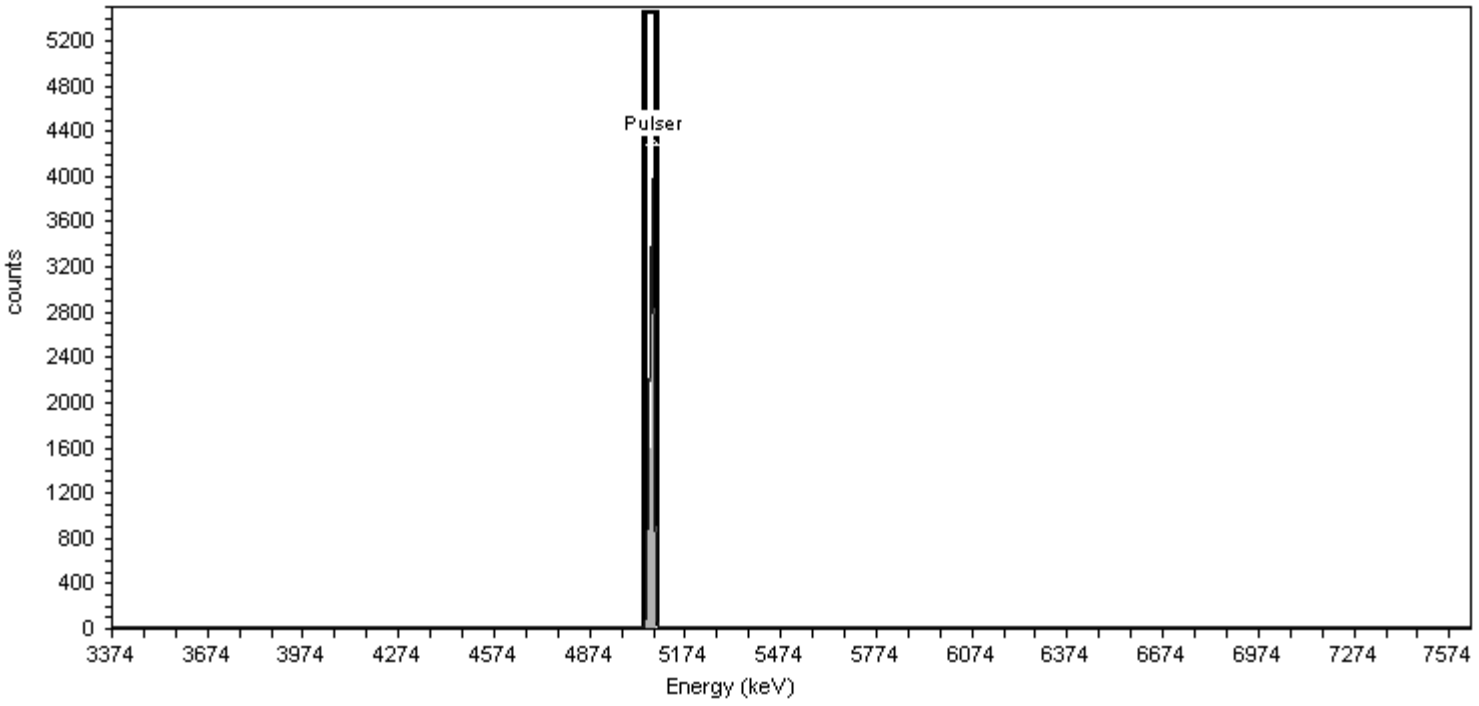
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV67 , SN: 52-102 D7
Acquisition Start Date: 7/1/2014 1:09:55AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8876;AV67-20140504
Calibration Date: 5/4/2014 8:44:15PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.32% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5067.243	5045.042	5089.443	13.04	7,423.49	7,249.97

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Alpha-Spectroscopy Pulser Report

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1:15:27AM 7/1/2014

Sample

Sample Name: Pulser;AV68
Comment:

Spectrum #9 Analysis #1

Batch

Batch Name: June2014b
Description:

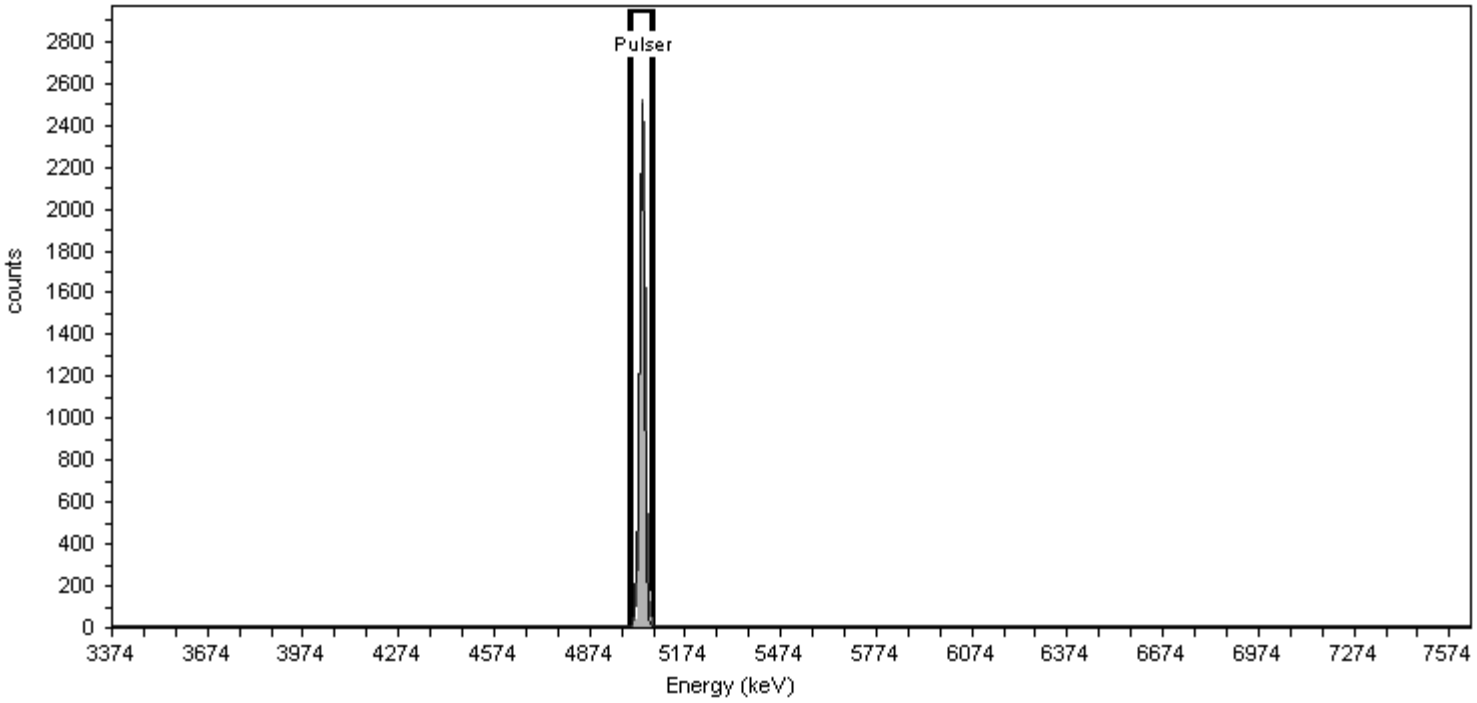
Analyst: 60040

Acquisition

Detector: AV68 , SN: 48-45884
Acquisition Start Date: 7/1/2014 1:09:57AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8877;AV68-20140504
Calibration Date: 5/4/2014 8:44:22PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.49% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5036.487	5003.786	5069.188	19.21	6,934.54	7,455.43

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:15:32AM 7/1/2014

Sample

Sample Name: Pulser;AV69
Comment:

Spectrum #7 Analysis #1

Batch

Batch Name: June2014b
Description:

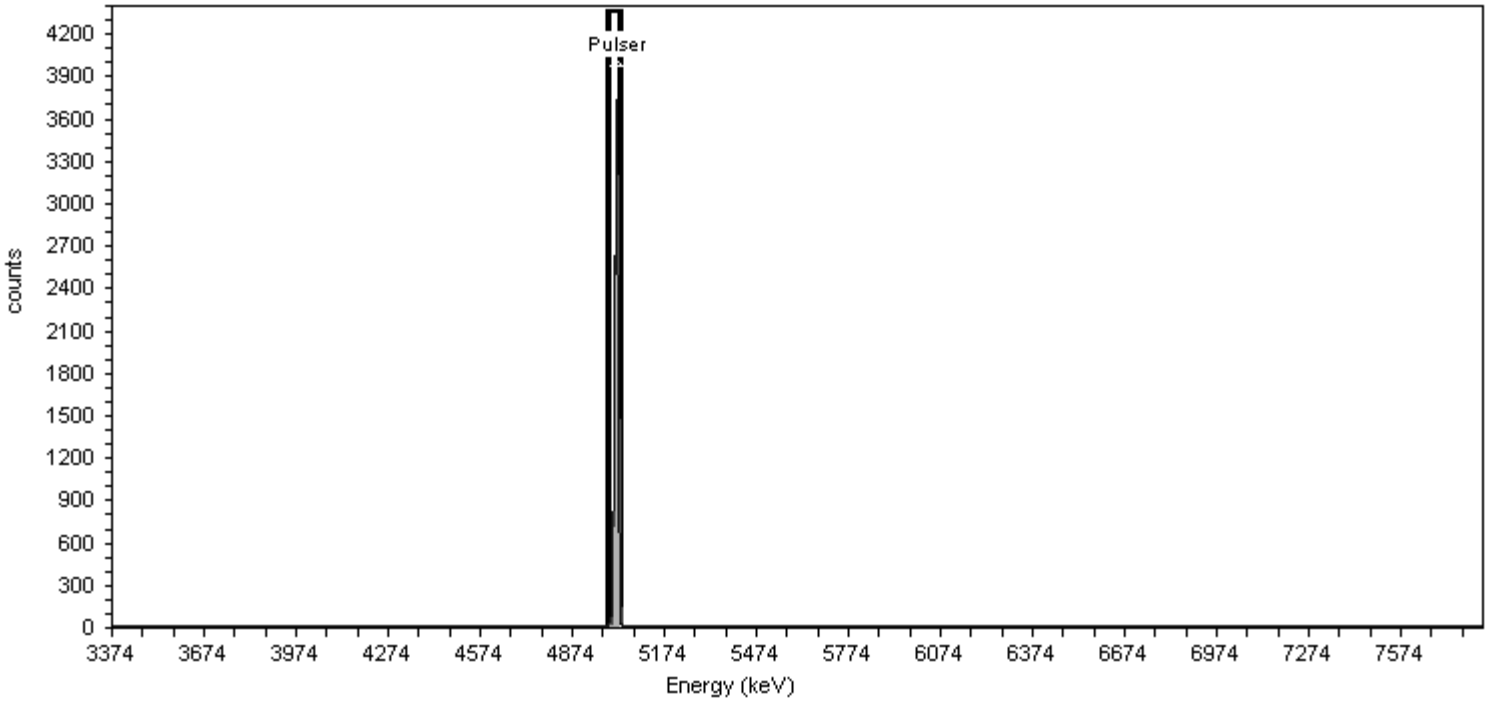
Analyst: 60040

Acquisition

Detector: AV69 , SN: 49-155DD5
Acquisition Start Date: 7/1/2014 1:09:58AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9520;AV69-20140504
Calibration Date: 5/4/2014 8:44:28PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.57% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5014.716	4993.452	5035.980	12.49	6,703.13	7,218.80

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:15:37AM 7/1/2014

Sample

Sample Name: Pulser;AV70
Comment:

Spectrum #8 Analysis #1

Batch

Batch Name: June2014b
Description:

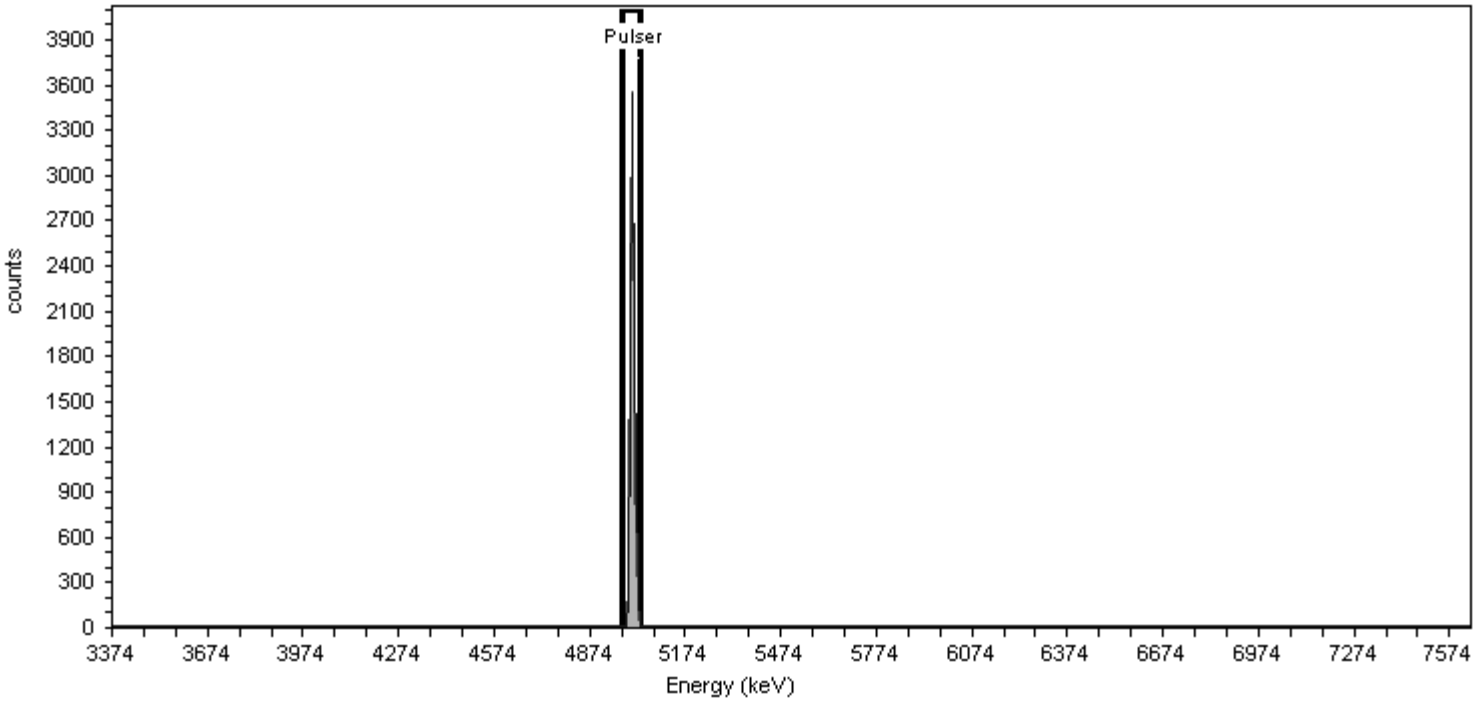
Analyst: 60040

Acquisition

Detector: AV70 , SN: 48-158FF1
Acquisition Start Date: 7/1/2014 1:10:00AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8876;AV70-20140507
Calibration Date: 5/7/2014 10:49:02PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.52% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5008.011	4983.581	5032.442	14.35	7,315.40	7,451.66

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:15:43AM 7/1/2014

Sample

Sample Name: Pulser;AV71 Spectrum #8 Analysis #1
Comment:

Batch

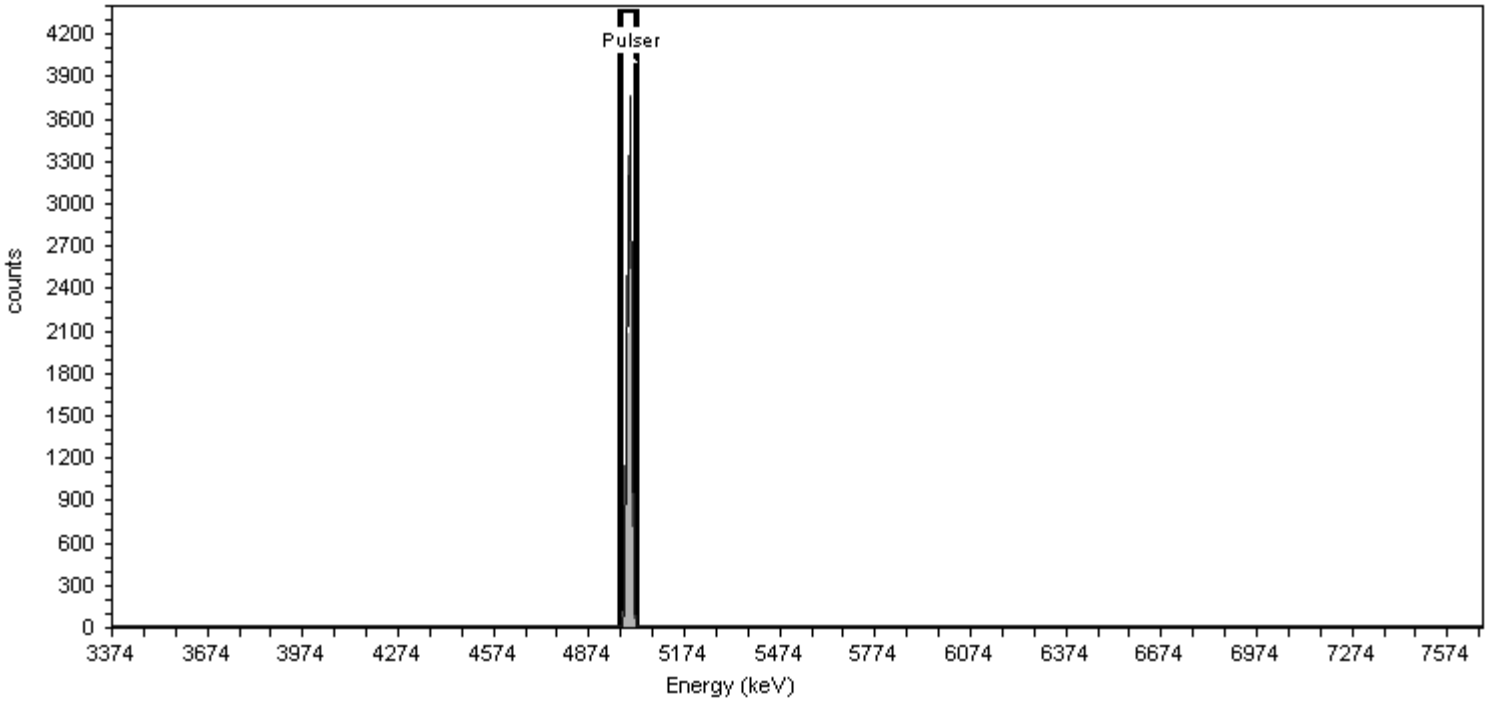
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV71 , SN: 48-158EE6
Acquisition Start Date: 7/1/2014 1:10:01AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9792;AV71-20140504
Calibration Date: 5/4/2014 8:44:50PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.79% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5000.363	4977.055	5023.671	13.69	7,378.83	7,449.05

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:44:11AM 7/1/2014

Sample

Sample Name: Pulser;AV115
Comment:

Spectrum #7 Analysis #1

Batch

Batch Name: June2014d
Description:

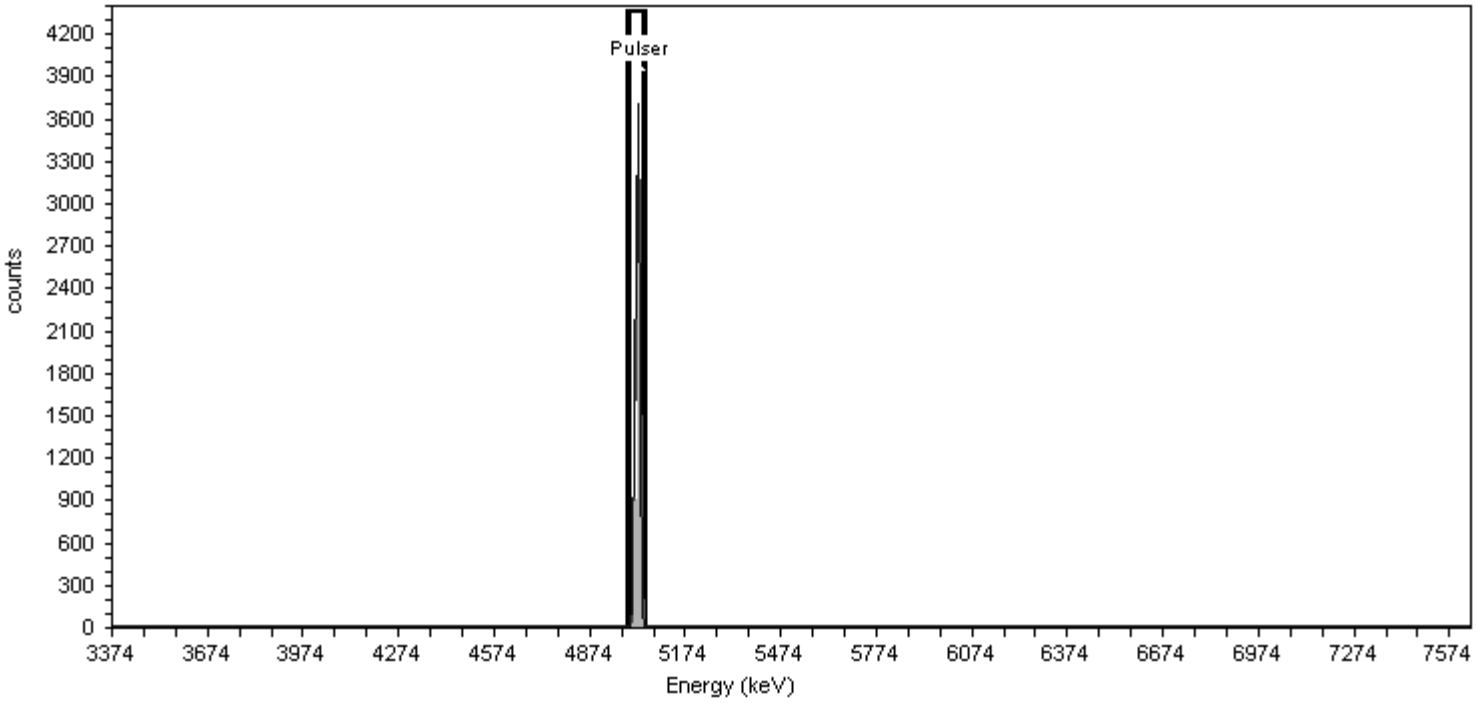
Analyst: 60040

Acquisition

Detector: AV115 , SN: 49-037E4
Acquisition Start Date: 7/1/2014 1:38:12AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9817;AV115-20140507
Calibration Date: 5/7/2014 10:49:29PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.26% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5022.238	4999.510	5044.966	13.35	7,109.25	7,690.89

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:44:16AM 7/1/2014

Sample

Sample Name: Pulser;AV116
Comment:

Spectrum #7 Analysis #1

Batch

Batch Name: June2014d
Description:

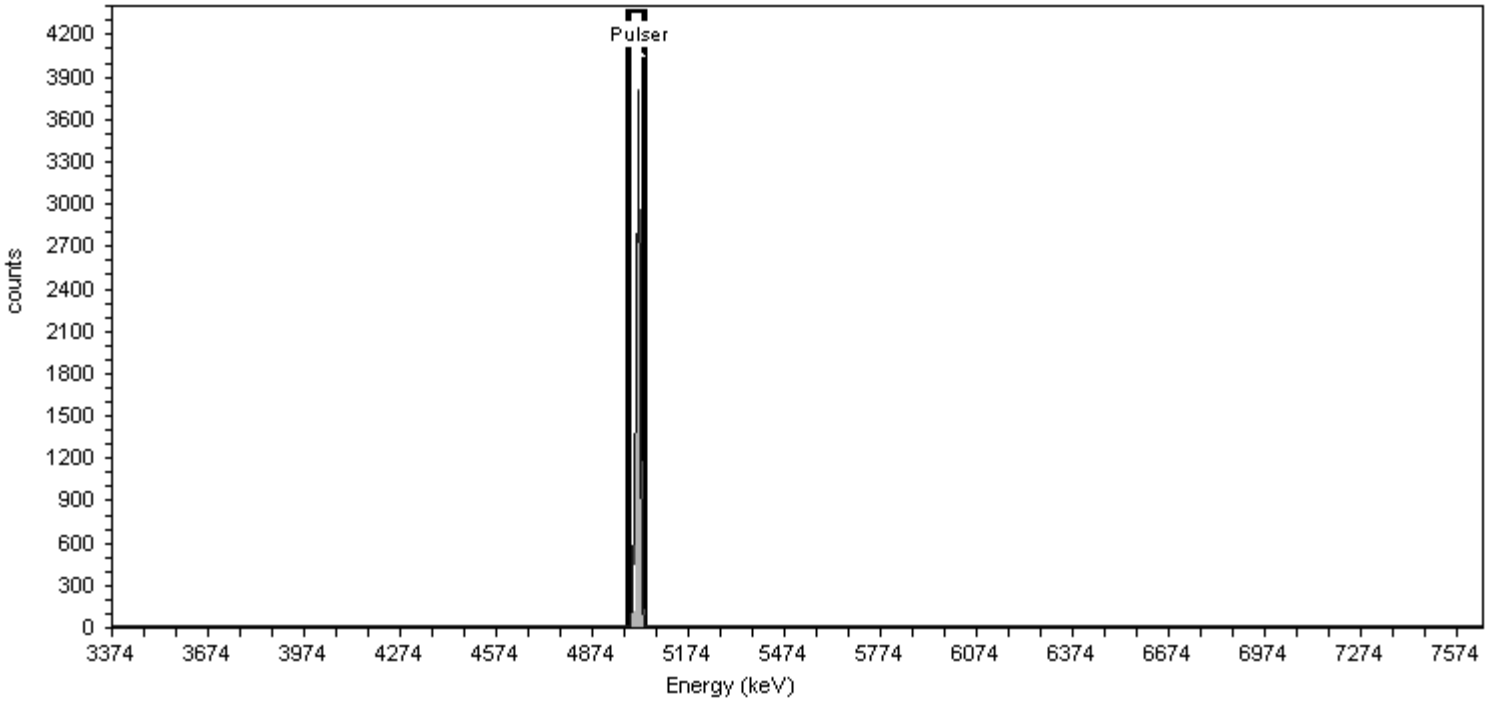
Analyst: 60040

Acquisition

Detector: AV116 , SN: 49-034G1
Acquisition Start Date: 7/1/2014 1:38:14AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9792;AV116-20140430
Calibration Date: 5/1/2014 1:16:57PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.04% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5014.917	4991.200	5038.633	13.93	7,597.87	7,688.48

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:44:22AM 7/1/2014

Sample

Sample Name: Pulser;AV117
Comment:

Spectrum #7 Analysis #1

Batch

Batch Name: June2014d
Description:

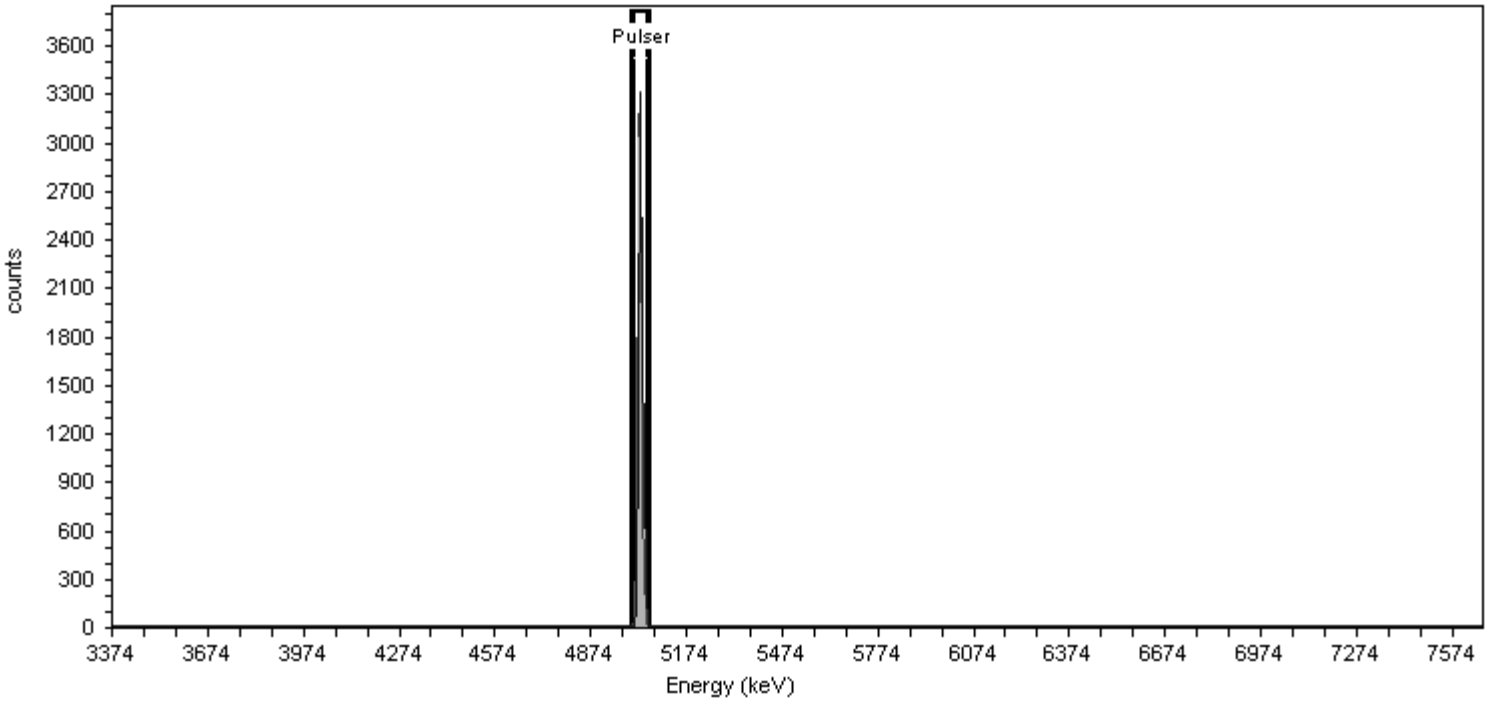
Analyst: 60040

Acquisition

Detector: AV117 , SN: 49-037X4
Acquisition Start Date: 7/1/2014 1:38:15AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9793;AV117-20140430
Calibration Date: 5/1/2014 1:17:04PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.86% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5030.686	5006.564	5054.807	14.17	6,752.66	7,682.19

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:44:28AM 7/1/2014

Sample

Sample Name: Pulser;AV118
Comment:

Spectrum #7 Analysis #1

Batch

Batch Name: June2014d
Description:

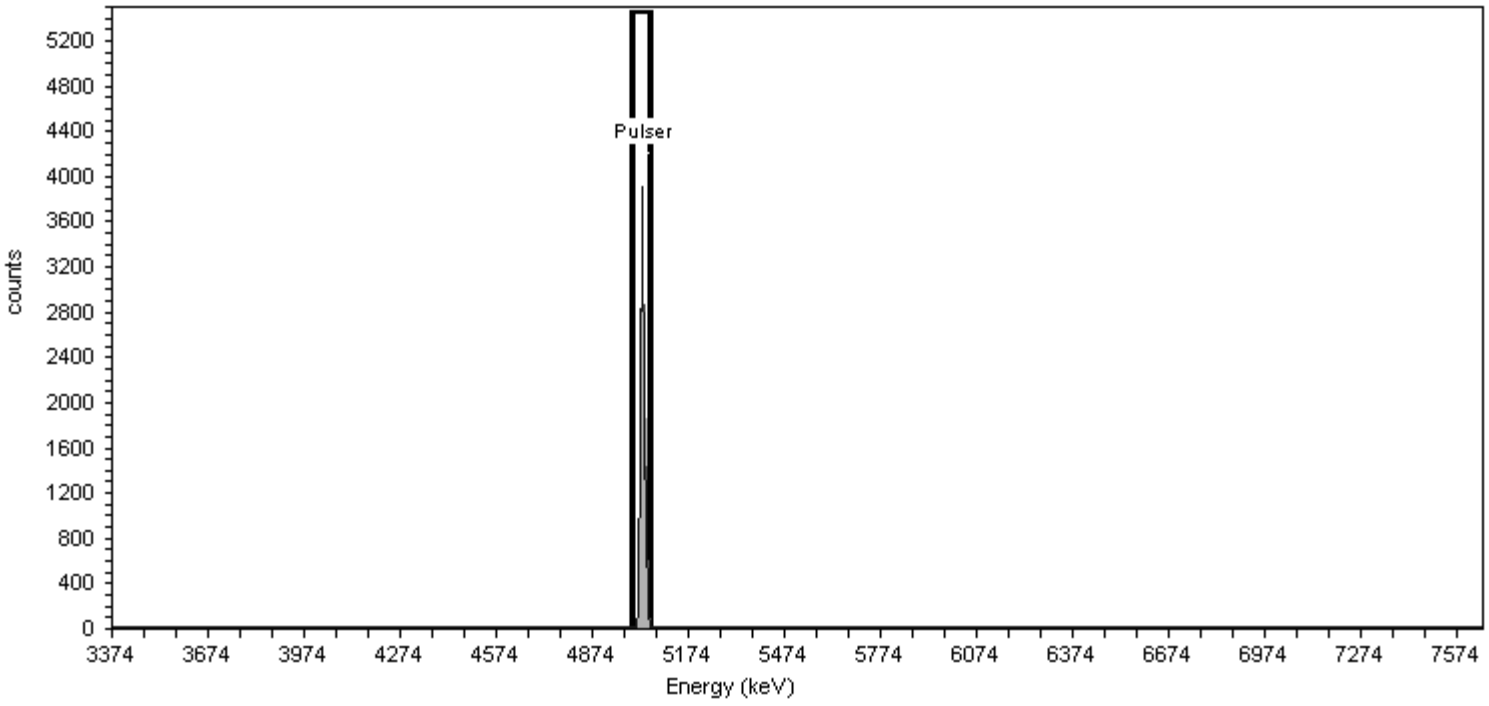
Analyst: 60040

Acquisition

Detector: AV118 , SN: 49-037F4
Acquisition Start Date: 7/1/2014 1:38:18AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9794;AV118-20140430
Calibration Date: 5/1/2014 1:17:10PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.84% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5029.921	5006.498	5053.344	13.76	7,716.27	7,682.44

Initial Calibrations

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:38:19PM 5/6/2014

Calibration

Sample Name: IC-7107;AV1-20140505
Description:
Detector: AV1

Calibration Date: 5/6/2014 5:38:14PM
Analyst: 60040

Source Info

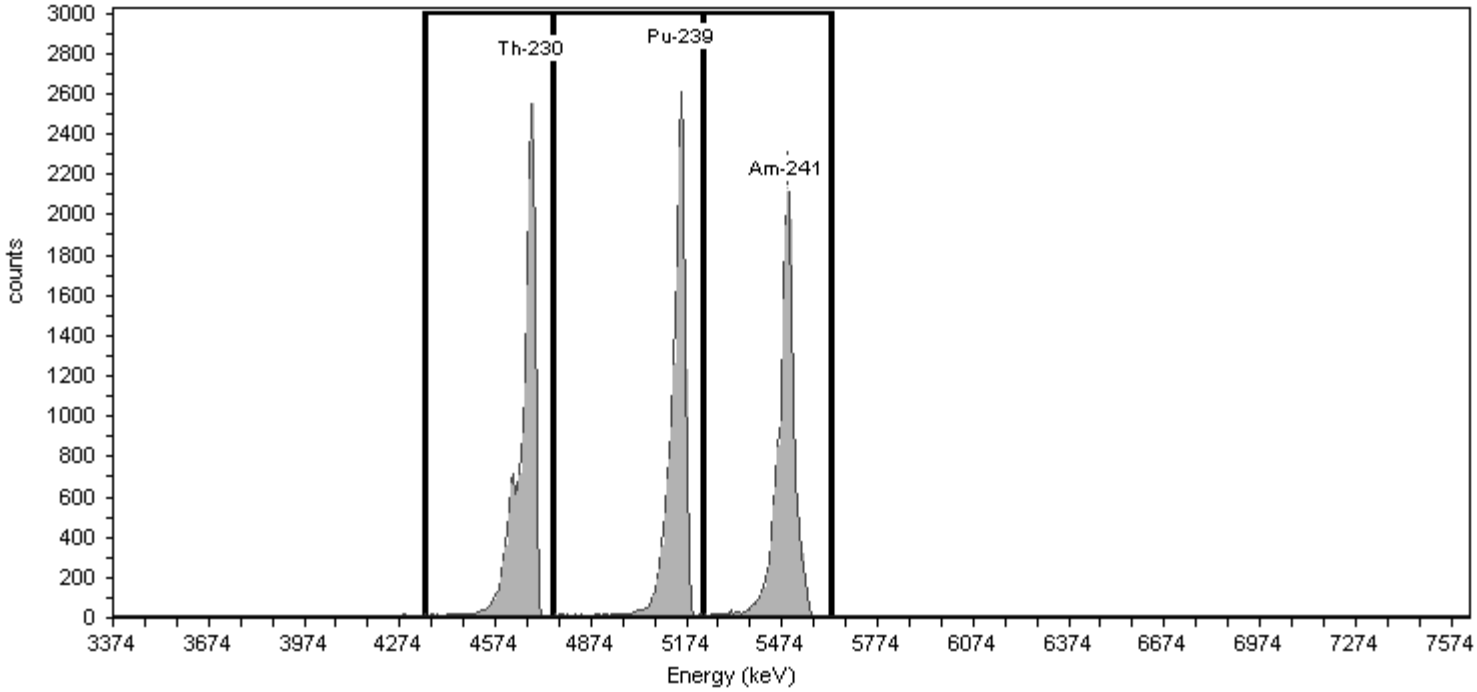
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV1 , SN: 49-188 AA4
Acquisition Start Date: 5/5/2014 10:25:57PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 26.30% +/- 0.30% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	16,453.00	117.52
Pu-239	240	5.16	186	249	16,264.00	116.17
Am-241	284	5.49	249	303	15,950.00	113.93

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:38:36PM 5/6/2014

Calibration

Sample Name: IC-8875;AV3-20140505
Description:
Detector: AV3

Calibration Date: 5/6/2014 5:38:33PM
Analyst: 60040

Source Info

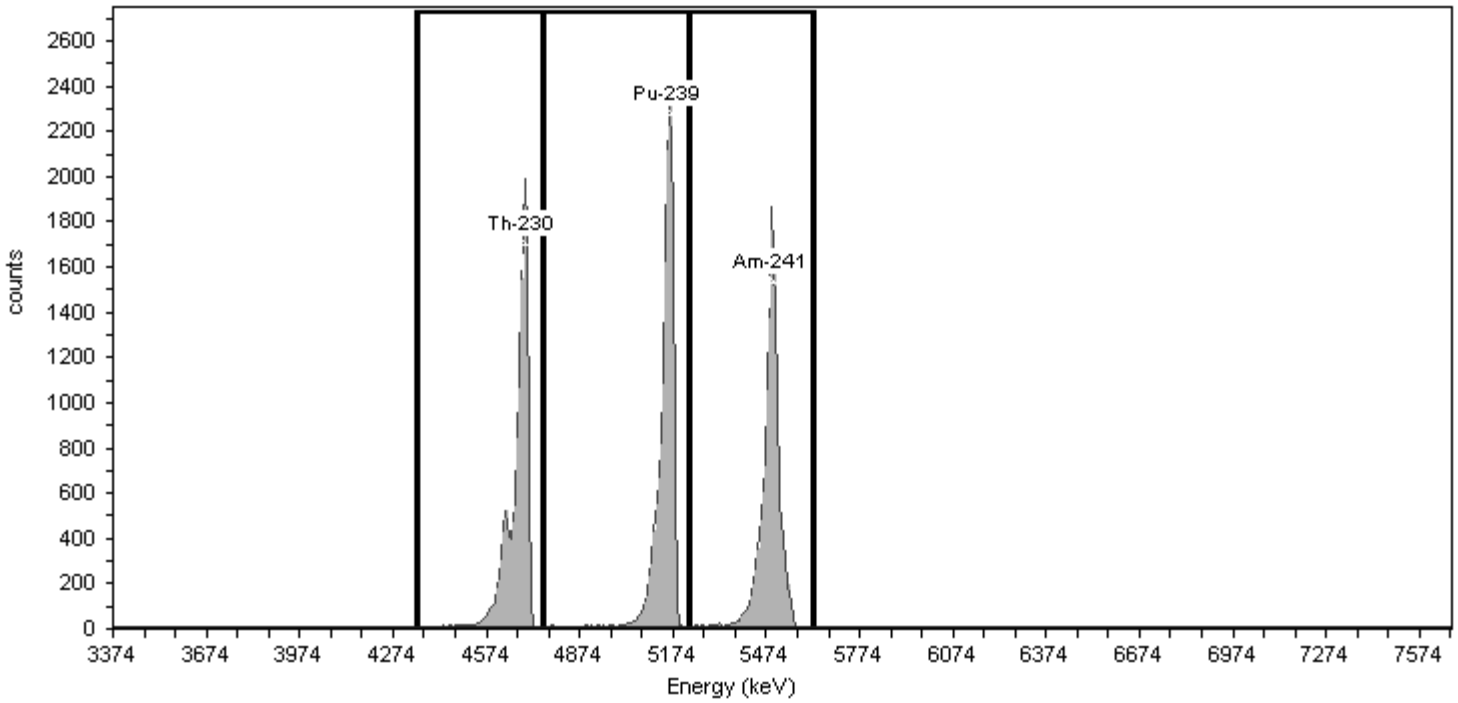
Certificate ID: 82234-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV3 , SN: 49-202 FF7
Acquisition Start Date: 5/5/2014 10:26:30PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 26.09% +/- 0.36% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	12,013.00	85.81
Pu-239	240	5.16	186	249	13,501.00	96.44
Am-241	284	5.49	249	303	12,324.00	88.03

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:38:50PM 5/6/2014

Calibration

Sample Name: IC-9520;AV6-20140505
Description:
Detector: AV6

Calibration Date: 5/6/2014 5:38:46PM
Analyst: 60040

Source Info

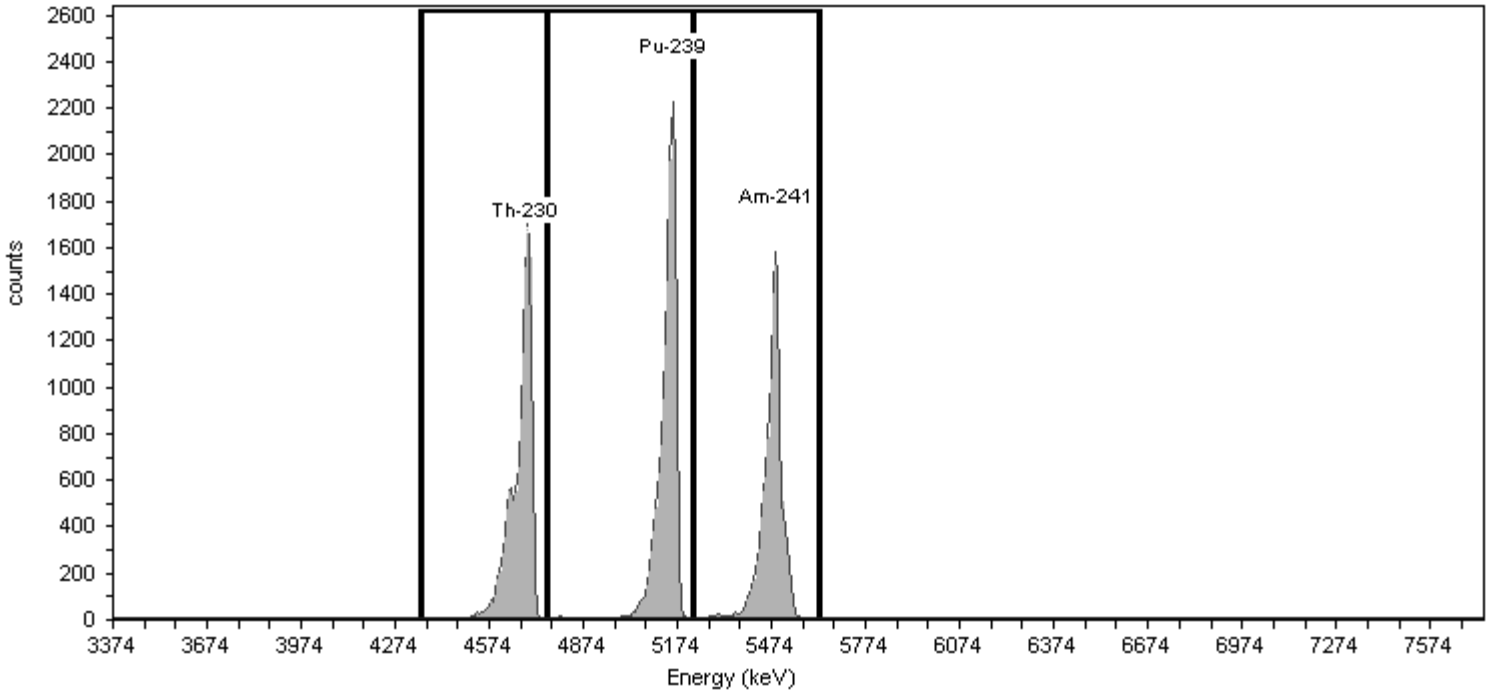
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV6 , SN: 47-27FF2
Acquisition Start Date: 5/5/2014 10:26:50PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 25.89% +/- 0.36% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	12,675.00	90.54
Pu-239	240	5.16	186	249	14,396.00	102.83
Am-241	284	5.49	249	303	11,748.00	83.91

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:48:53PM 5/7/2014

Calibration

Sample Name: IC-8877;AV7-20140507
Description:
Detector: AV7

Calibration Date: 5/7/2014 10:48:48PM
Analyst: 60040

Source Info

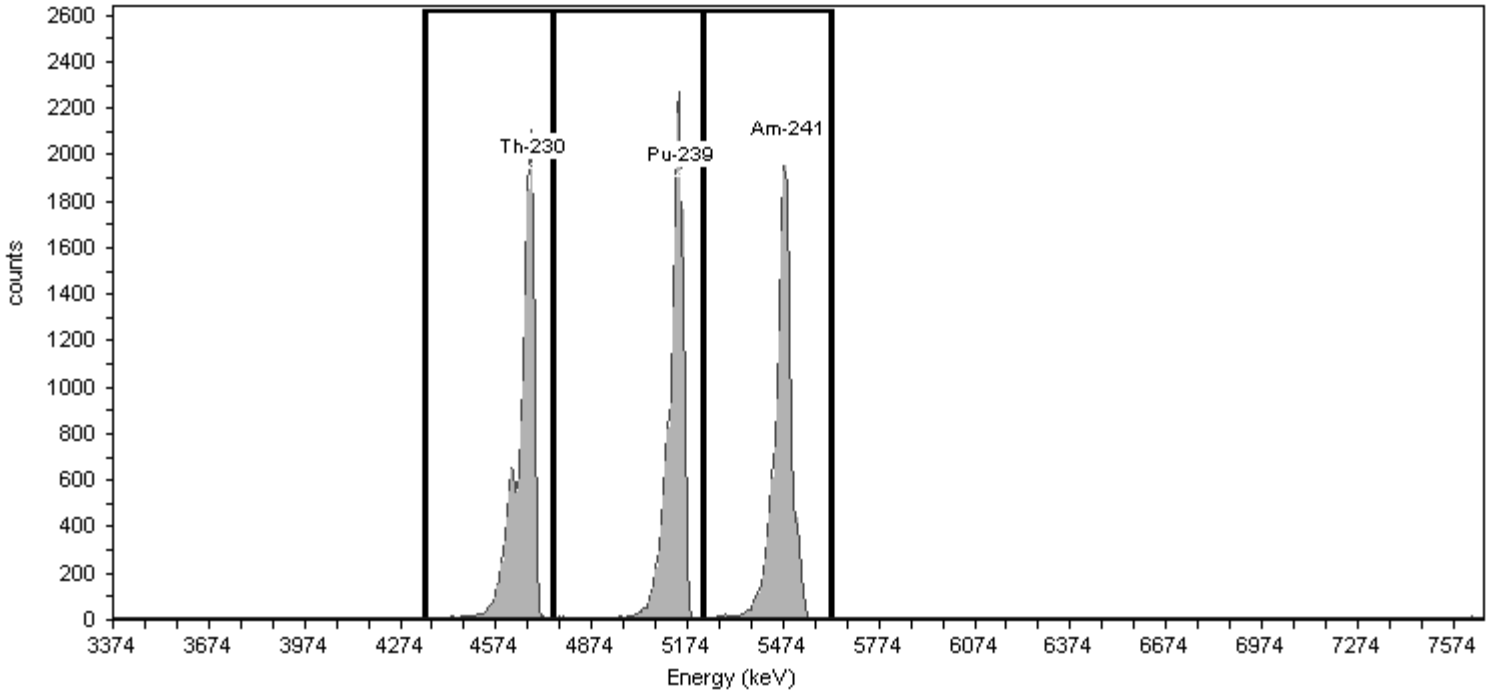
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV7 , SN: 48-158EE5
Acquisition Start Date: 5/7/2014 7:51:09PM
Live Time: 140.00 min.
Real Time: 140.02 min.
Efficiency: 25.80% +/- 0.31% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	15,068.00	107.63
Pu-239	240	5.16	186	249	15,043.00	107.45
Am-241	284	5.49	249	303	14,672.00	104.80

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:39:02PM 5/6/2014

Calibration

Sample Name: IC-9792;AV8-20140505
Description:
Detector: AV8

Calibration Date: 5/6/2014 5:38:58PM
Analyst: 60040

Source Info

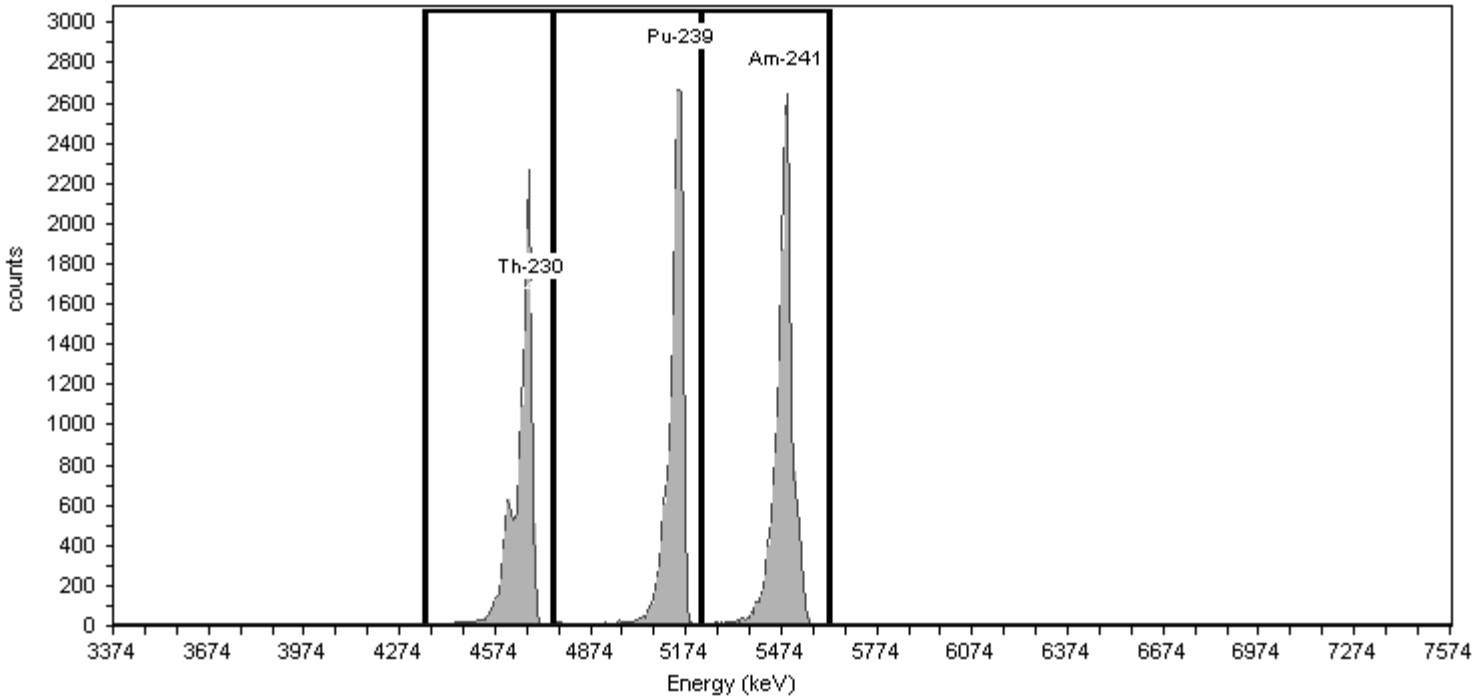
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV8 , SN: 41-137Q6
Acquisition Start Date: 5/5/2014 10:27:18PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 27.05% +/- 0.31% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,298.00	102.13
Pu-239	240	5.16	186	249	16,486.00	117.76
Am-241	284	5.49	249	303	18,583.00	132.74

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:39:08PM 5/6/2014

Calibration

Sample Name: IC-9793;AV9-20140505
Description:
Detector: AV9

Calibration Date: 5/6/2014 5:39:04PM
Analyst: 60040

Source Info

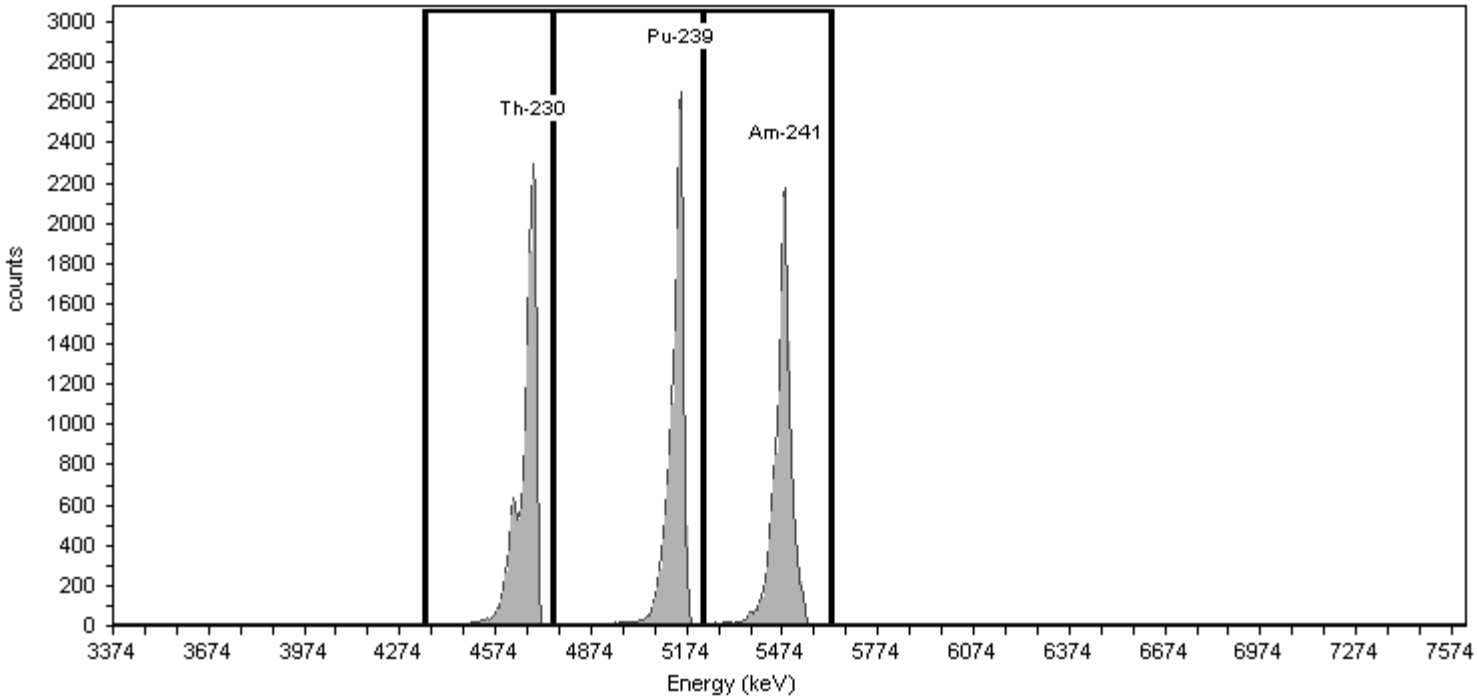
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV9 , SN: 51-082V5
Acquisition Start Date: 5/5/2014 10:27:25PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 27.04% +/- 0.33% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,917.00	106.55
Pu-239	240	5.16	186	249	15,566.00	111.19
Am-241	284	5.49	249	303	15,020.00	107.29

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:39:13PM 5/6/2014

Calibration

Sample Name: IC-9794;AV10-20140505
Description:
Detector: AV10

Calibration Date: 5/6/2014 5:39:10PM
Analyst: 60040

Source Info

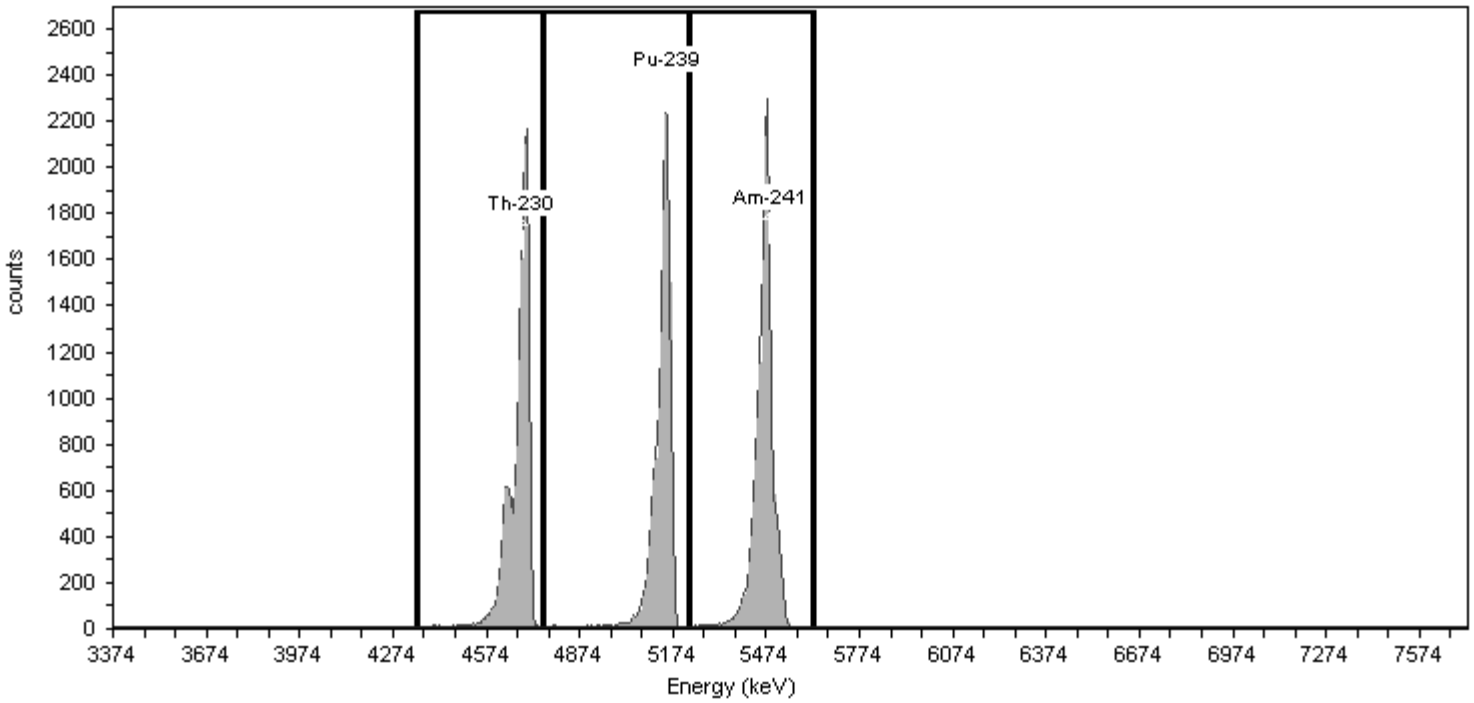
Certificate ID: 82242-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV10 , SN: 49-155N2
Acquisition Start Date: 5/5/2014 10:27:48PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 25.84% +/- 0.32% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,216.00	101.54
Pu-239	240	5.16	186	249	13,923.00	99.45
Am-241	284	5.49	249	303	15,497.00	110.69

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:39:19PM 5/6/2014

Calibration

Sample Name: IC-9795;AV11-20140505
Description:
Detector: AV11

Calibration Date: 5/6/2014 5:39:16PM
Analyst: 60040

Source Info

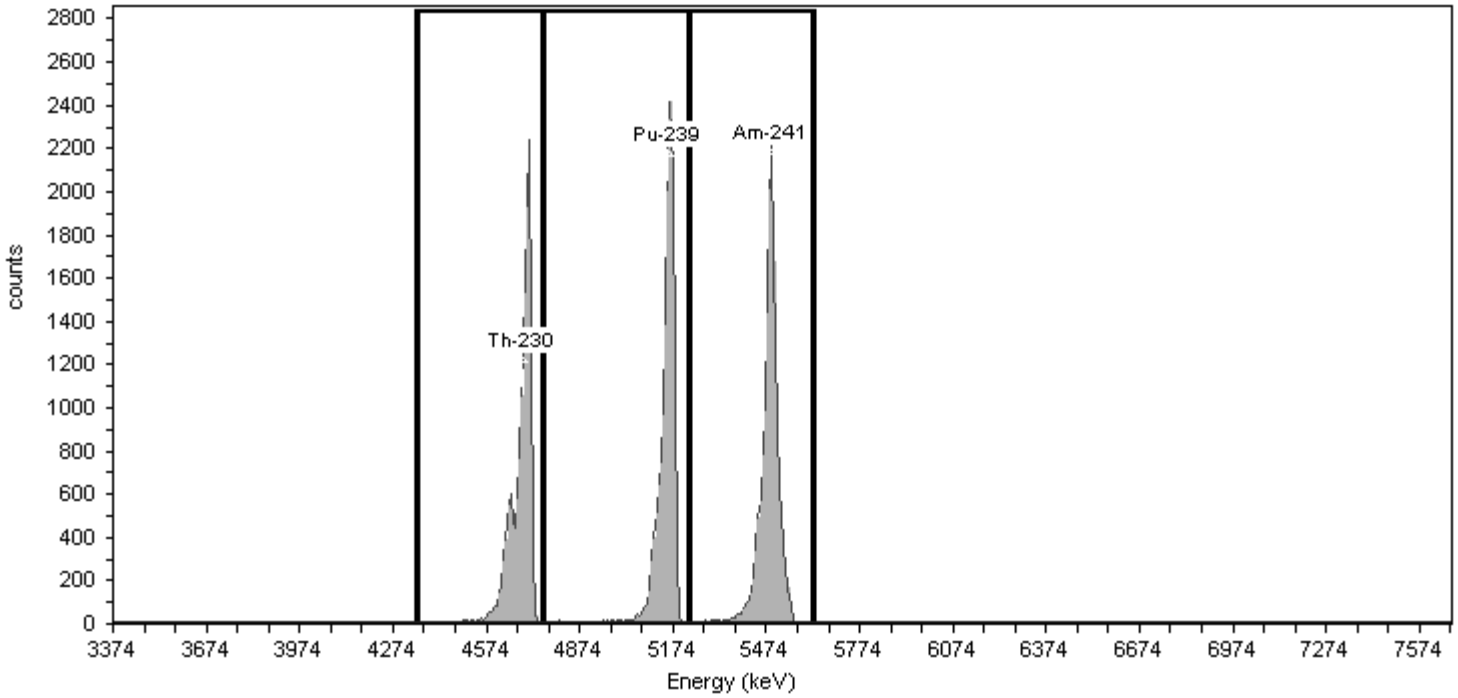
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV11 , SN: 49-155dd2
Acquisition Start Date: 5/5/2014 10:27:49PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 26.88% +/- 0.35% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	13,230.00	94.50
Pu-239	240	5.16	186	249	13,518.00	96.56
Am-241	284	5.49	249	303	14,326.00	102.33

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:39:25PM 5/6/2014

Calibration

Sample Name: IC-9817;AV12-20140505
Description:
Detector: AV12

Calibration Date: 5/6/2014 5:39:22PM
Analyst: 60040

Source Info

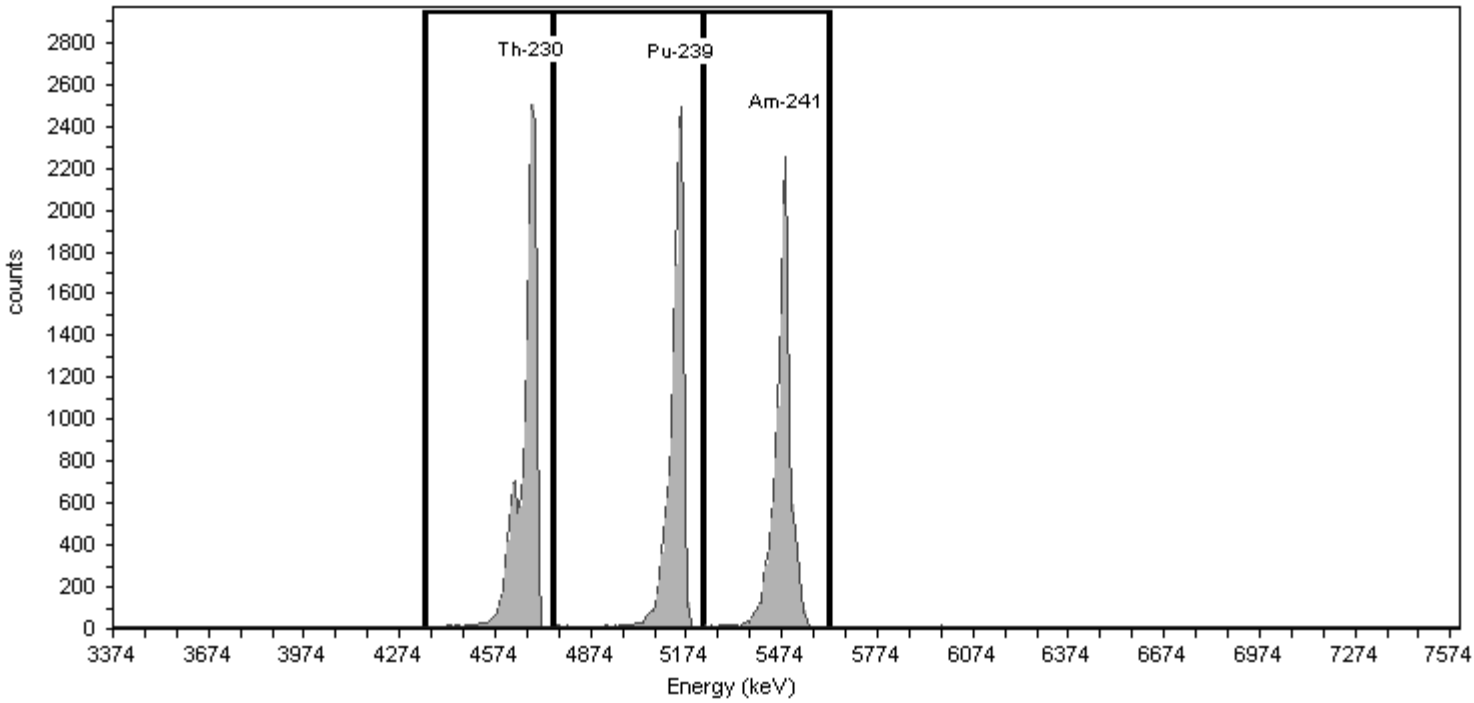
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV12 , SN: 51-082B7
Acquisition Start Date: 5/5/2014 10:28:07PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 25.97% +/- 0.31% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	16,108.00	115.06
Pu-239	240	5.16	186	249	14,620.00	104.43
Am-241	284	5.49	249	303	14,921.00	106.58

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:39:31PM 5/6/2014

Calibration

Sample Name: IC-9884;AV13-20140505
Description:
Detector: AV13

Calibration Date: 5/6/2014 5:39:28PM
Analyst: 60040

Source Info

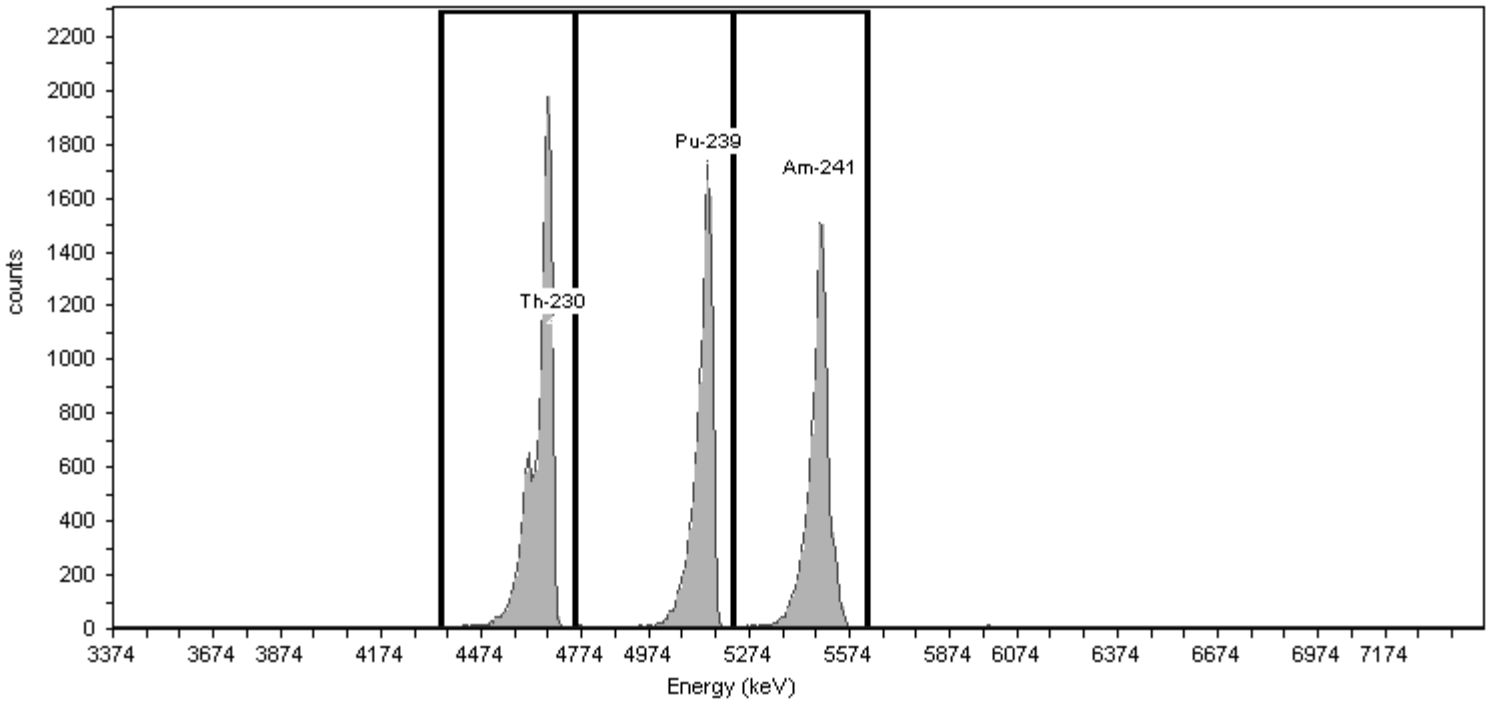
Certificate ID: 82245-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV13 , SN: 49-155M7
Acquisition Start Date: 5/5/2014 10:28:26PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 25.99% +/- 0.37% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,614.00	104.39
Pu-239	240	5.16	186	249	11,970.00	85.50
Am-241	284	5.49	249	303	11,995.00	85.68

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:39:39PM 5/6/2014

Calibration

Sample Name: IC-9885;AV14-20140505
Description:
Detector: AV14

Calibration Date: 5/6/2014 5:39:36PM
Analyst: 60040

Source Info

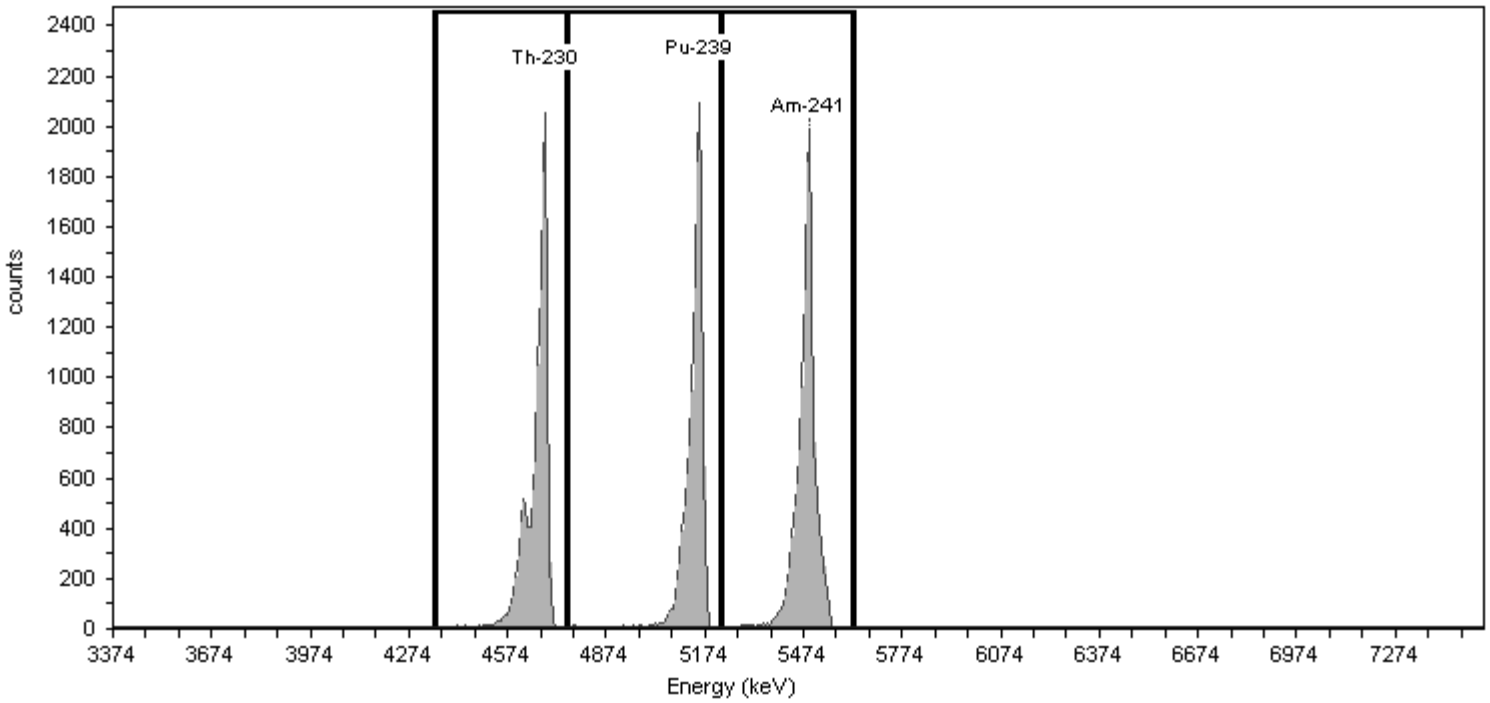
Certificate ID: 82246-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV14 , SN: 50-060W4
Acquisition Start Date: 5/5/2014 10:28:28PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 26.34% +/- 0.38% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	12,270.00	87.64
Pu-239	240	5.16	186	249	11,900.00	85.00
Am-241	284	5.49	249	303	13,210.00	94.36

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:09:45PM 5/5/2014

Calibration

Sample Name: IC-9793;AV24-20140505
Description:
Detector: AV24

Calibration Date: 5/5/2014 10:09:41PM
Analyst: 60040

Source Info

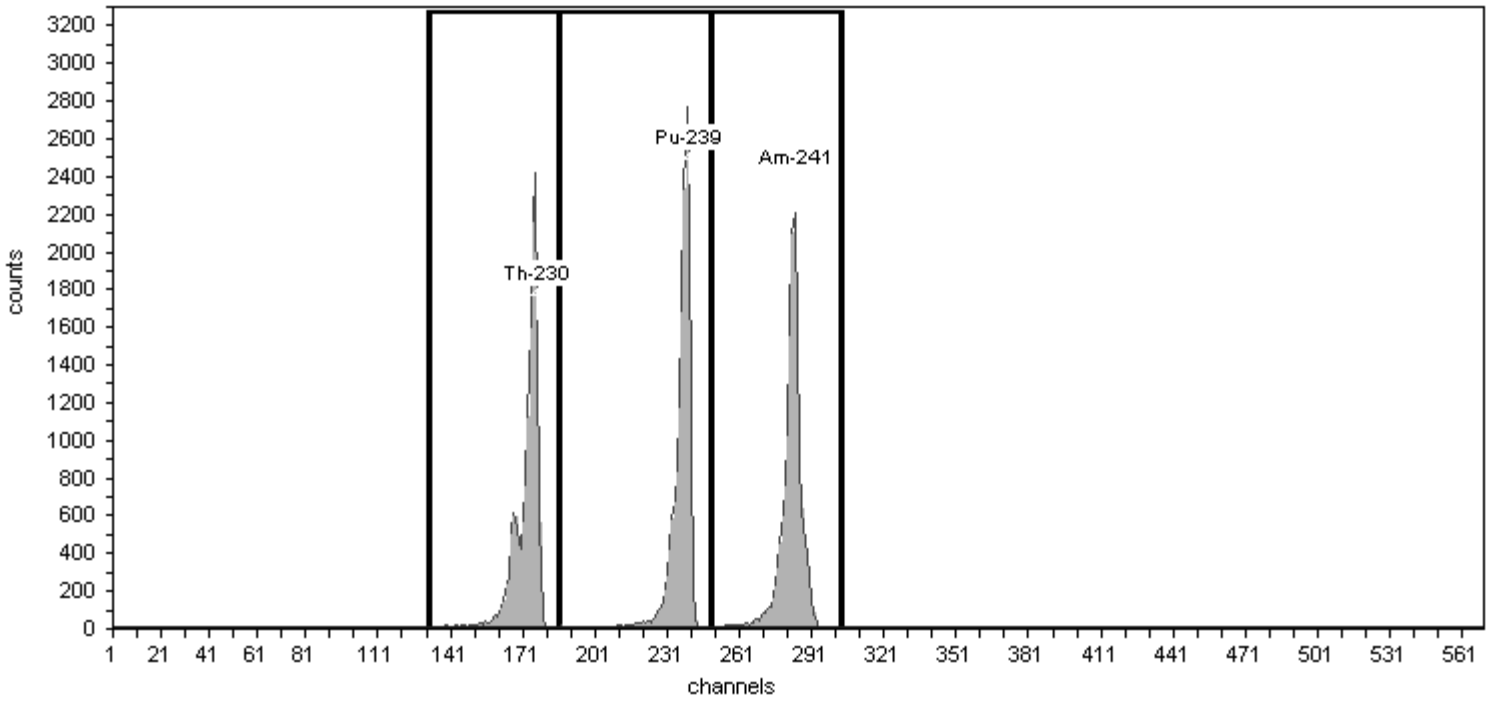
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV24 , SN: 47-137Q4
Acquisition Start Date: 5/5/2014 7:29:33PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 26.42% +/- 0.32% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,605.00	104.32
Pu-239	240	5.16	186	249	15,233.00	108.81
Am-241	284	5.49	249	303	14,607.00	104.34

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:52:57PM 5/5/2014

Calibration

Sample Name: IC-8875;AV51-20140504
Description:
Detector: AV51

Calibration Date: 5/5/2014 6:52:53PM
Analyst: 60040

Source Info

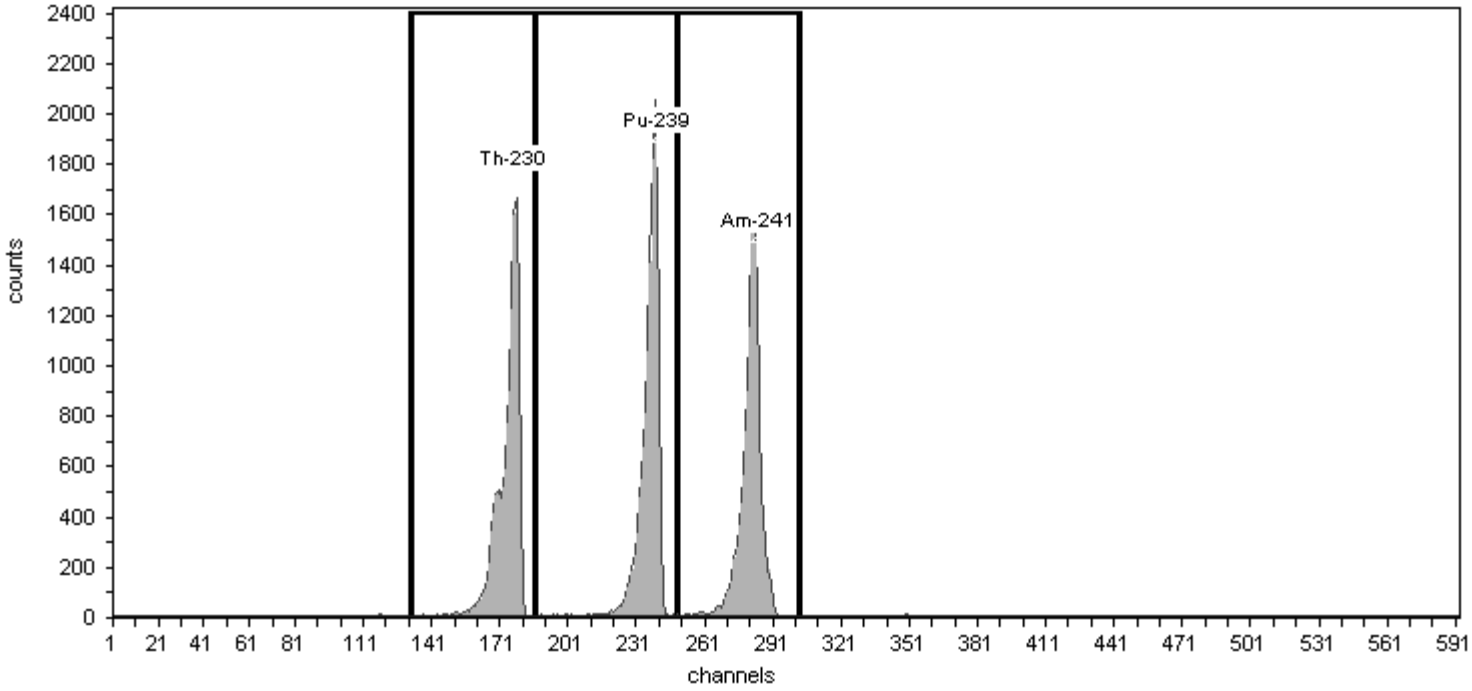
Certificate ID: 82234-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV51 , SN: 48-109I1
Acquisition Start Date: 5/4/2014 9:03:44PM
Live Time: 140.00 min.
Real Time: 140.12 min.
Efficiency: 26.24% +/- 0.36% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	12,176.00	86.97
Pu-239	240	5.16	186	249	13,518.00	96.56
Am-241	284	5.49	249	303	12,347.00	88.19

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:53:10PM 5/5/2014

Calibration

Sample Name: IC-8877;AV53-20140504
Description:
Detector: AV53

Calibration Date: 5/5/2014 6:53:06PM
Analyst: 60040

Source Info

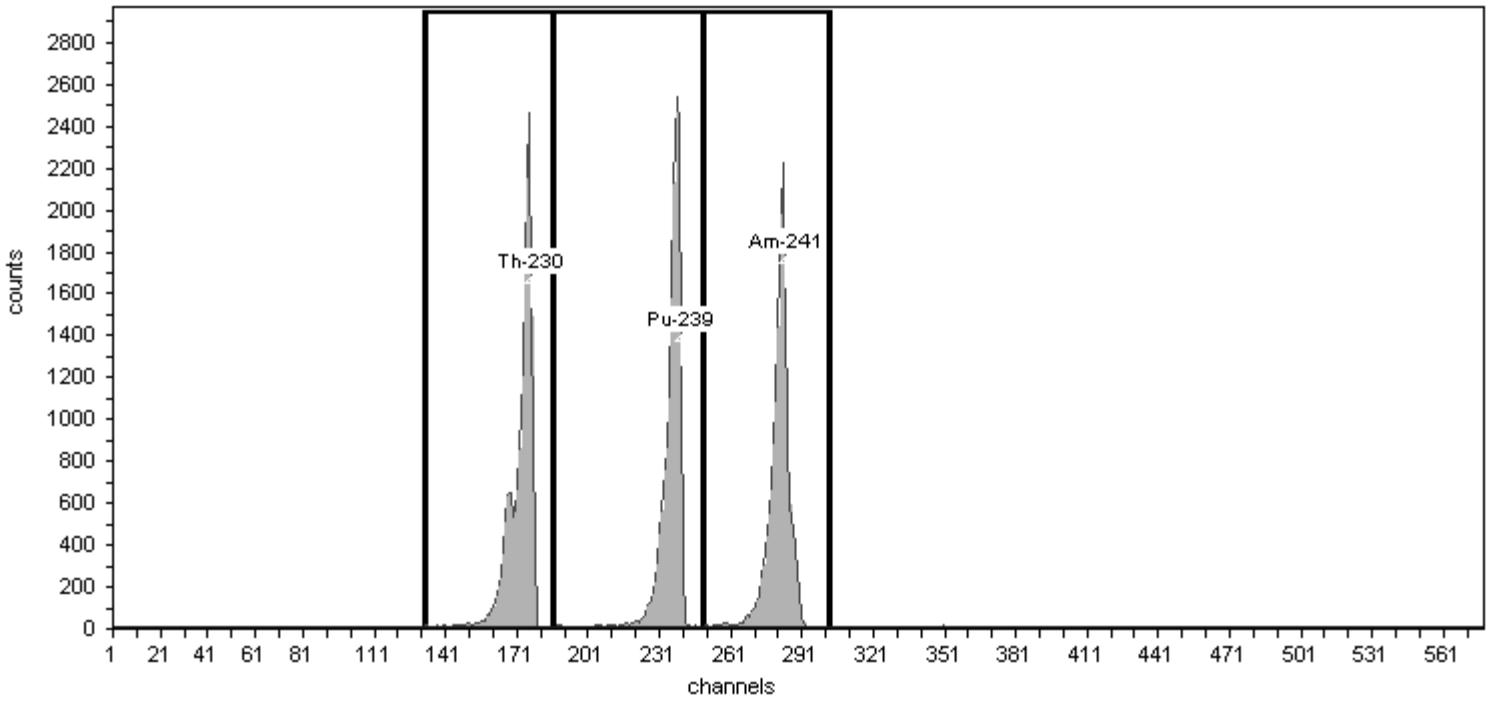
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV53 , SN: 50-051A6
Acquisition Start Date: 5/4/2014 9:04:11PM
Live Time: 140.00 min.
Real Time: 140.12 min.
Efficiency: 26.32% +/- 0.31% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	15,332.00	109.51
Pu-239	240	5.16	186	249	15,251.00	108.94
Am-241	284	5.49	249	303	15,087.00	107.76

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:53:17PM 5/5/2014

Calibration

Sample Name: IC-9520;AV54-20140504
Description:
Detector: AV54

Calibration Date: 5/5/2014 6:53:13PM
Analyst: 60040

Source Info

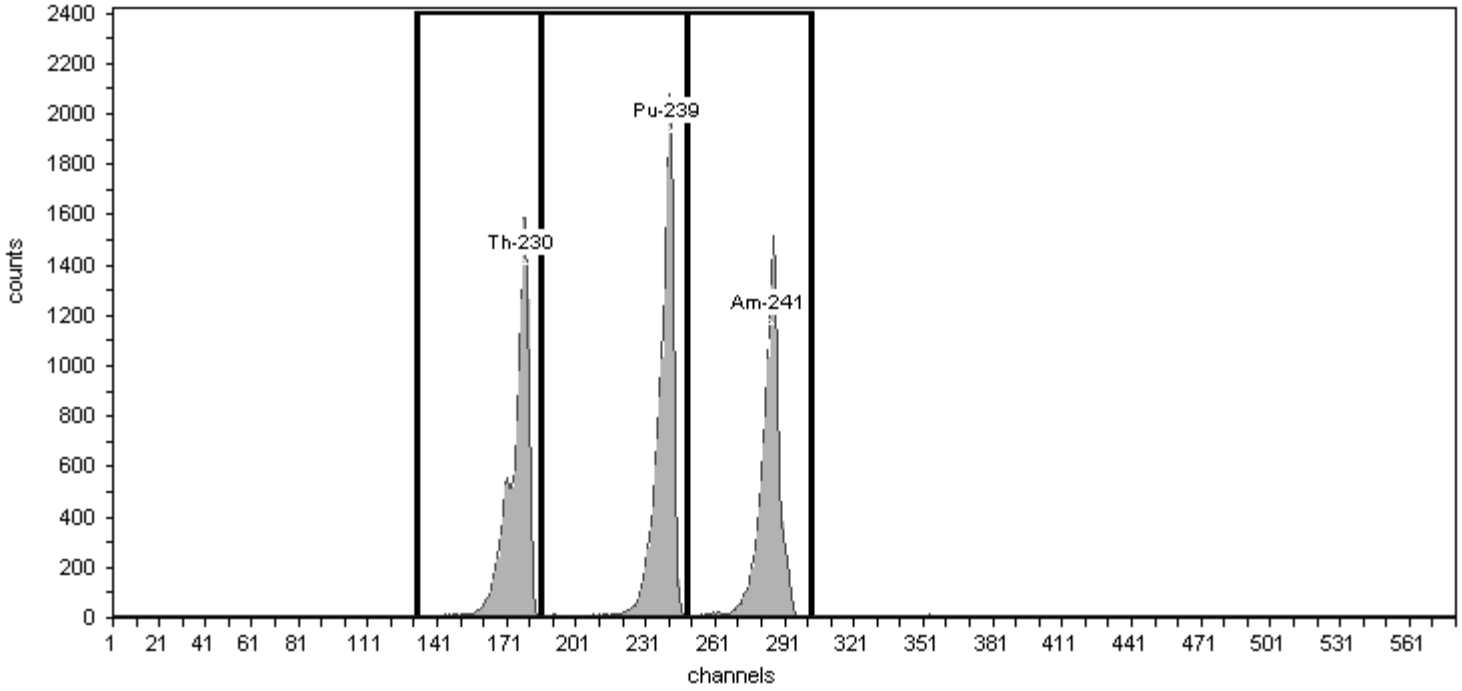
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV54 , SN: 48-046II6
Acquisition Start Date: 5/4/2014 9:04:26PM
Live Time: 140.00 min.
Real Time: 140.12 min.
Efficiency: 26.02% +/- 0.36% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	12,557.00	89.69
Pu-239	240	5.16	186	249	14,649.00	104.64
Am-241	284	5.49	249	303	11,824.00	84.46

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:48:59PM 5/7/2014

Calibration

Sample Name: IC-7107;AV55-20140507
Description:
Detector: AV55

Calibration Date: 5/7/2014 10:48:56PM
Analyst: 60040

Source Info

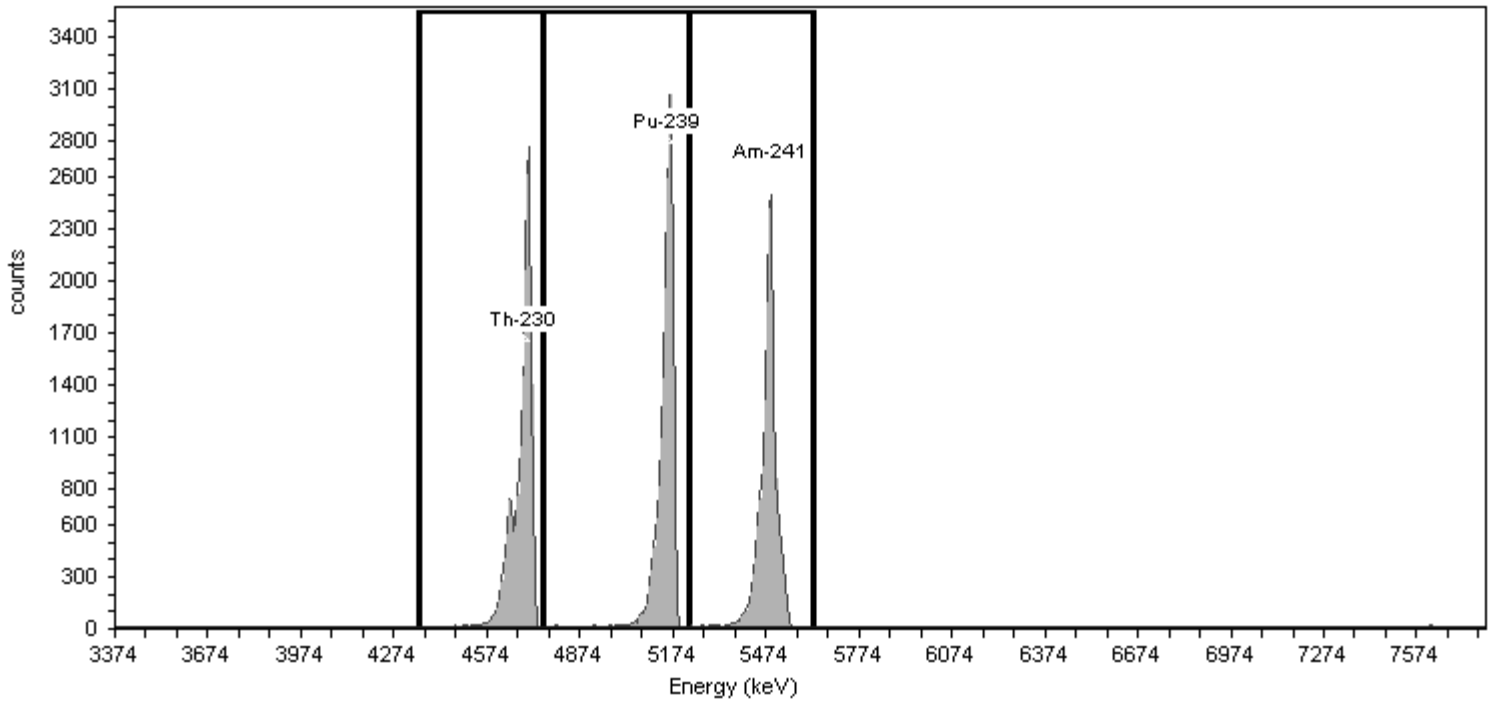
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV55 , SN: 50-051C2
Acquisition Start Date: 5/7/2014 7:51:23PM
Live Time: 140.00 min.
Real Time: 140.02 min.
Efficiency: 26.79% +/- 0.30% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	16,945.00	121.04
Pu-239	240	5.16	186	249	16,514.00	117.96
Am-241	284	5.49	249	303	16,110.00	115.07

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:53:38PM 5/5/2014

Calibration

Sample Name: IC-9792;AV56-20140504
Description:
Detector: AV56

Calibration Date: 5/5/2014 6:53:34PM
Analyst: 60040

Source Info

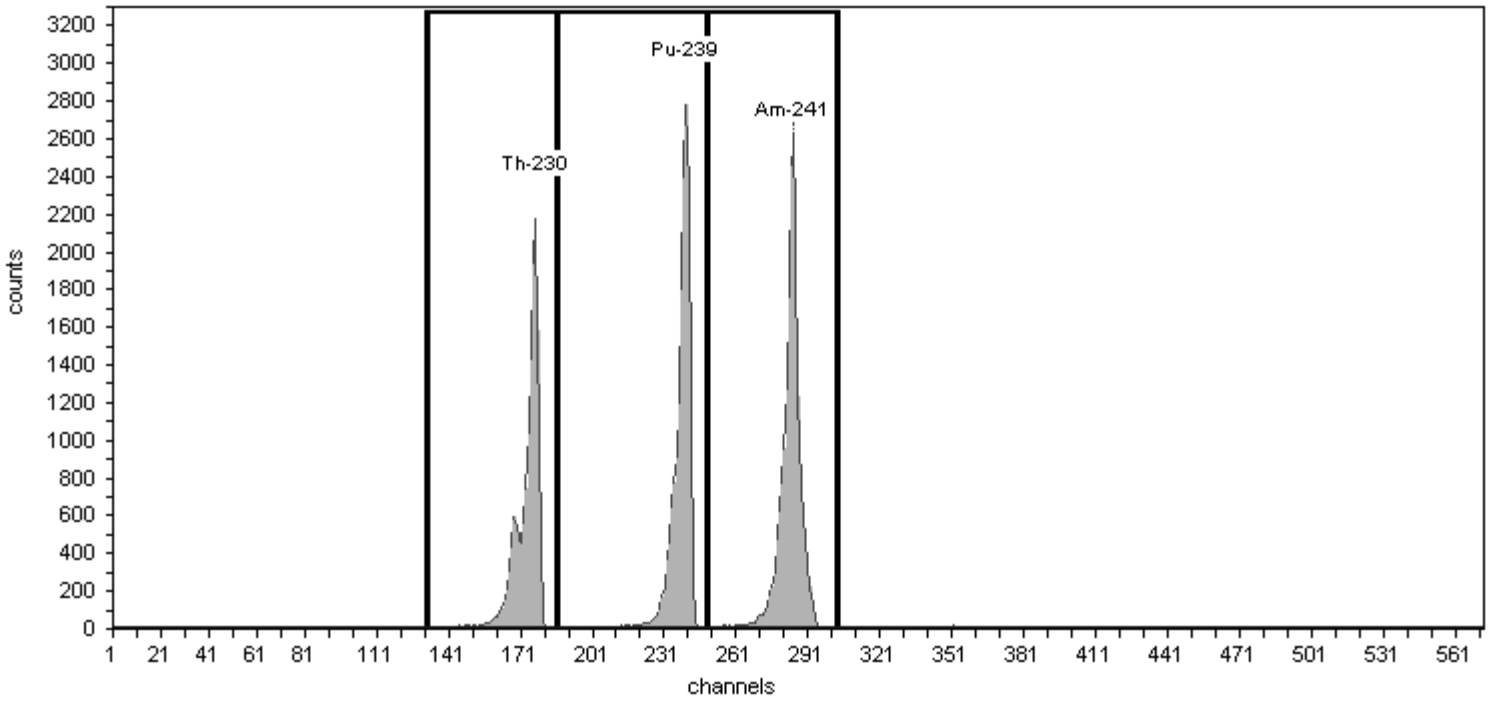
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV56 , SN: 52-059EE5
Acquisition Start Date: 5/4/2014 9:04:54PM
Live Time: 140.00 min.
Real Time: 140.12 min.
Efficiency: 26.09% +/- 0.30% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	13,567.00	96.91
Pu-239	240	5.16	186	249	15,909.00	113.64
Am-241	284	5.49	249	303	18,104.00	129.31

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:53:50PM 5/5/2014

Calibration

Sample Name: IC-9794;AV58-20140504
Description:
Detector: AV58

Calibration Date: 5/5/2014 6:53:46PM
Analyst: 60040

Source Info

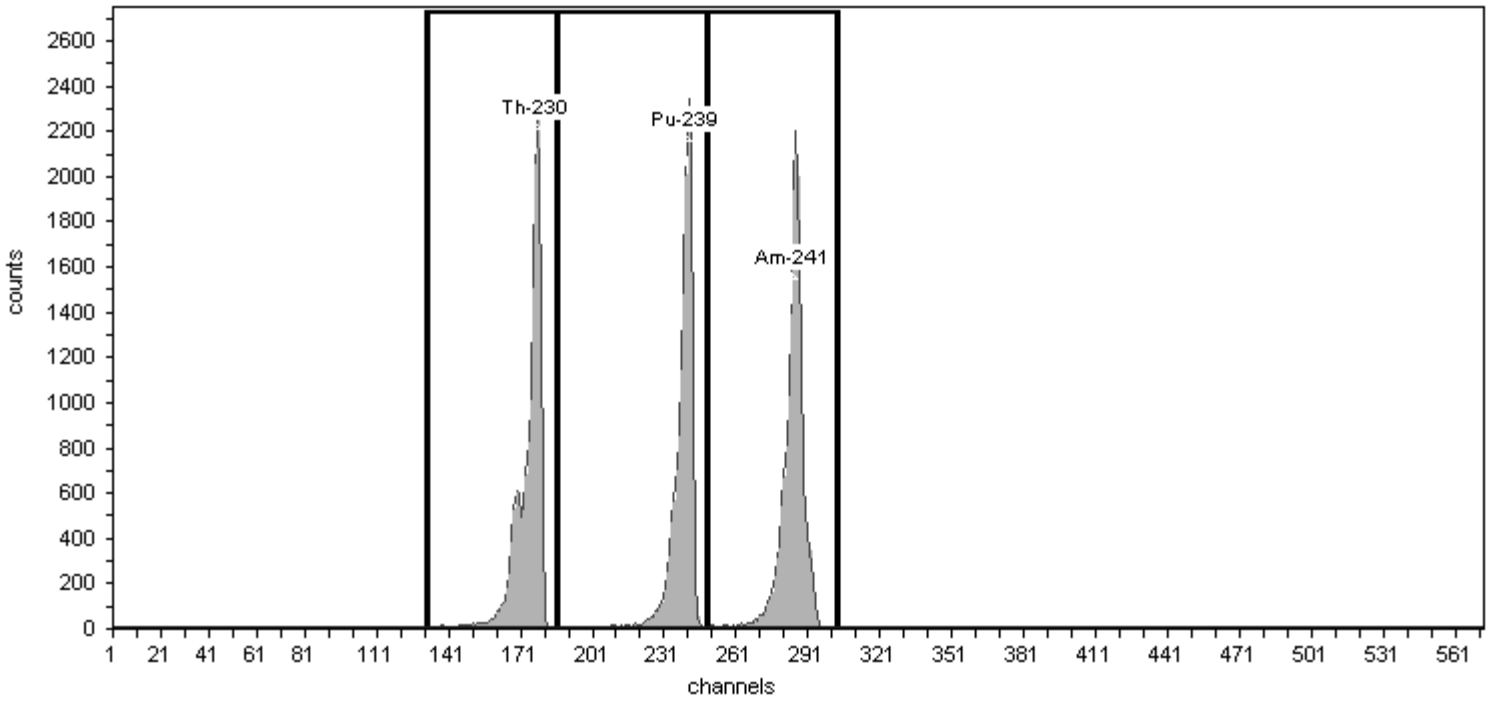
Certificate ID: 82242-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV58 , SN: 52-102 C5
Acquisition Start Date: 5/4/2014 9:05:25PM
Live Time: 140.00 min.
Real Time: 140.12 min.
Efficiency: 26.56% +/- 0.33% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,633.00	104.52
Pu-239	240	5.16	186	249	14,396.00	102.83
Am-241	284	5.49	249	303	15,822.00	113.01

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:53:56PM 5/5/2014

Calibration

Sample Name: IC-9795;AV59-20140504
Description:
Detector: AV59

Calibration Date: 5/5/2014 6:53:53PM
Analyst: 60040

Source Info

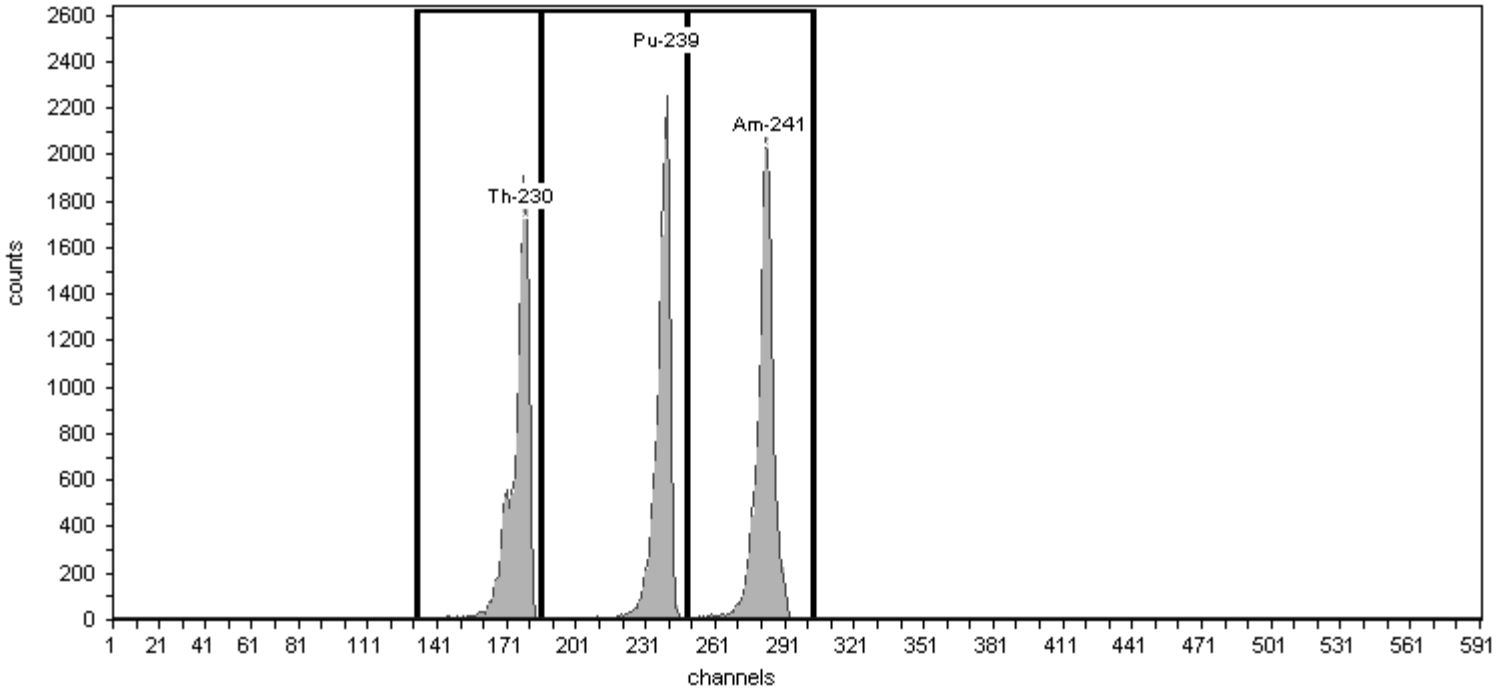
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV59 , SN: 49-155M7
Acquisition Start Date: 5/4/2014 9:05:42PM
Live Time: 140.00 min.
Real Time: 140.07 min.
Efficiency: 27.44% +/- 0.36% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	13,530.00	96.64
Pu-239	240	5.16	186	249	13,591.00	97.08
Am-241	284	5.49	249	303	14,815.00	105.82

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:54:03PM 5/5/2014

Calibration

Sample Name: IC-9817;AV60-20140504
Description:
Detector: AV60

Calibration Date: 5/5/2014 6:53:59PM
Analyst: 60040

Source Info

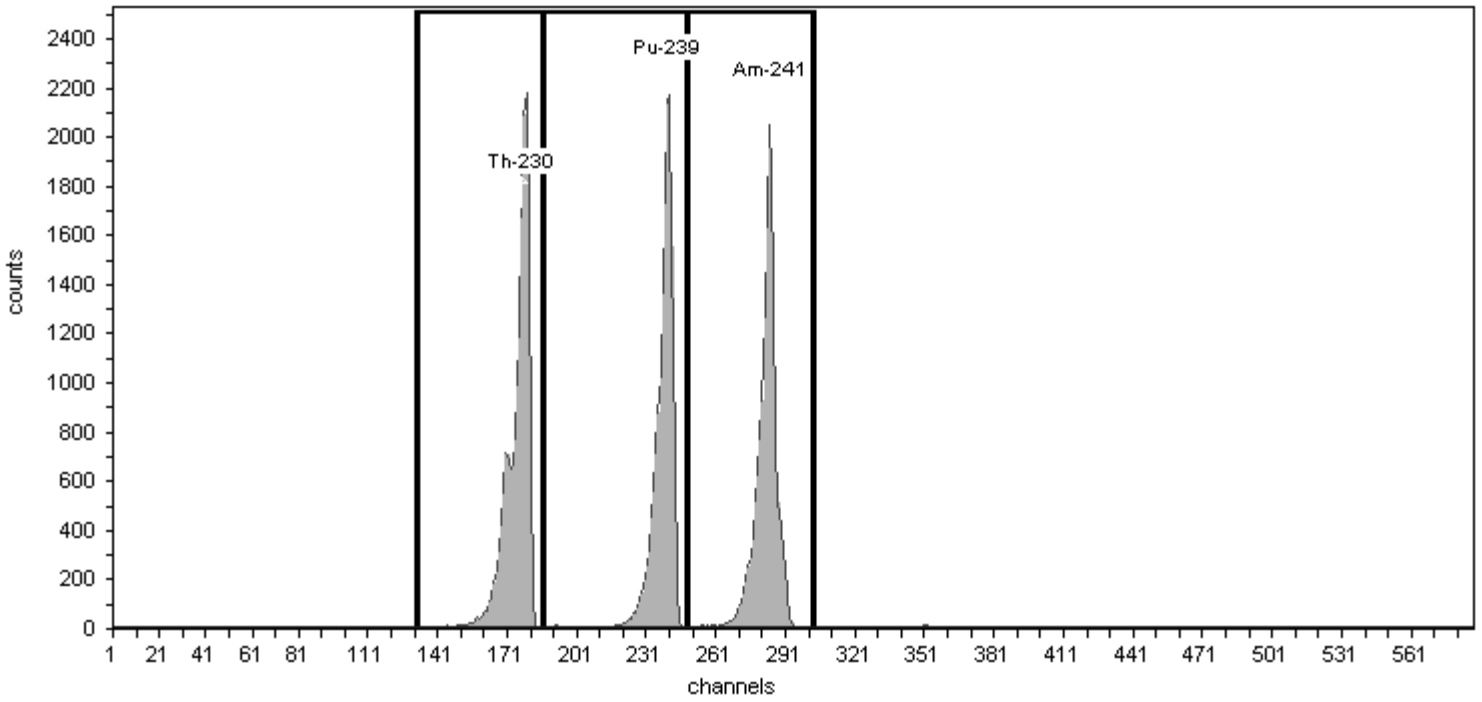
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV60 , SN: 49-027117
Acquisition Start Date: 5/4/2014 9:06:02PM
Live Time: 140.00 min.
Real Time: 140.07 min.
Efficiency: 26.33% +/- 0.32% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	16,279.00	116.28
Pu-239	240	5.16	186	249	14,858.00	106.13
Am-241	284	5.49	249	303	15,157.00	108.26

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:54:10PM 5/5/2014

Calibration

Sample Name: IC-9884;AV61-20140504
Description:
Detector: AV61

Calibration Date: 5/5/2014 6:54:06PM
Analyst: 60040

Source Info

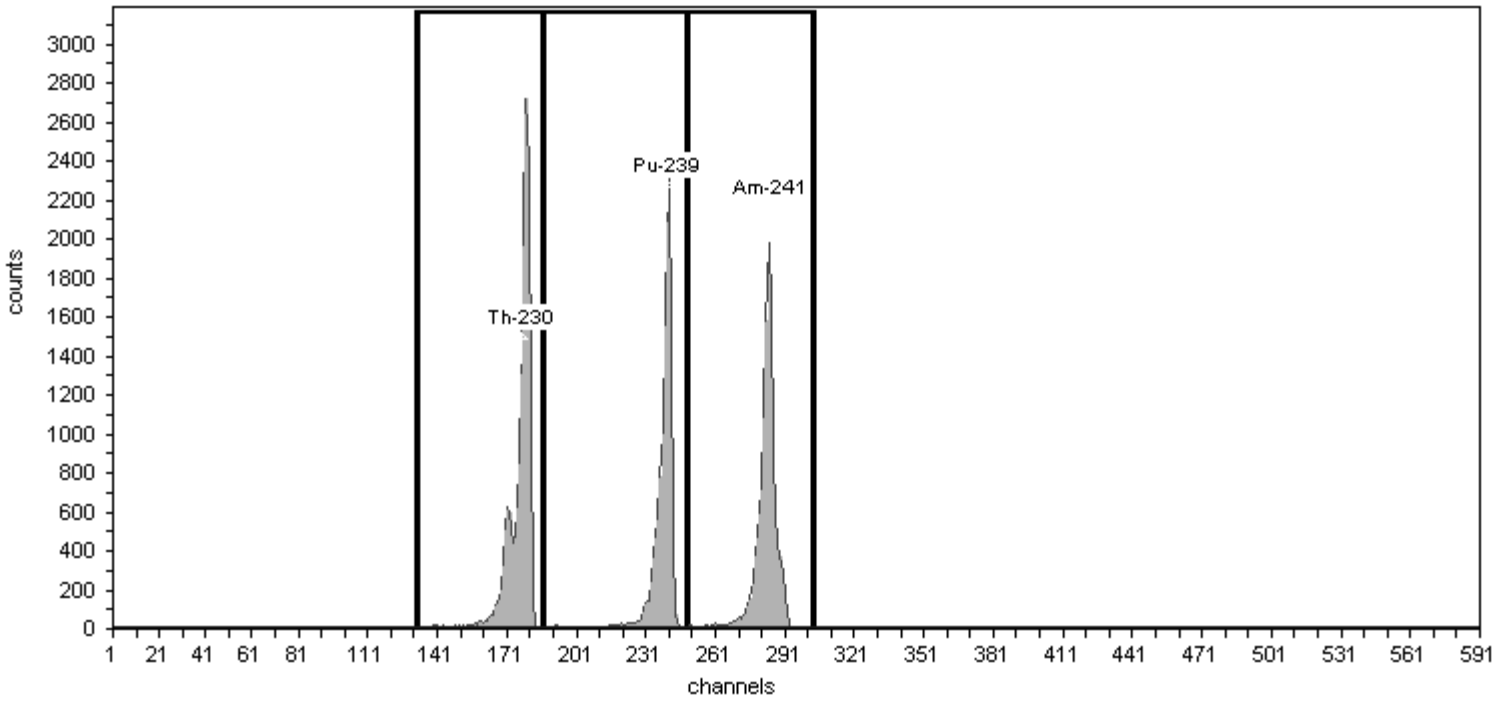
Certificate ID: 82245-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV61 , SN: 5-051JJ3
Acquisition Start Date: 5/4/2014 9:06:04PM
Live Time: 140.00 min.
Real Time: 140.07 min.
Efficiency: 26.46% +/- 0.38% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,902.00	106.44
Pu-239	240	5.16	186	249	12,091.00	86.36
Am-241	284	5.49	249	303	12,283.00	87.74

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:54:16PM 5/5/2014

Calibration

Sample Name: IC-9885;AV62-20140504
Description:
Detector: AV62

Calibration Date: 5/5/2014 6:54:13PM
Analyst: 60040

Source Info

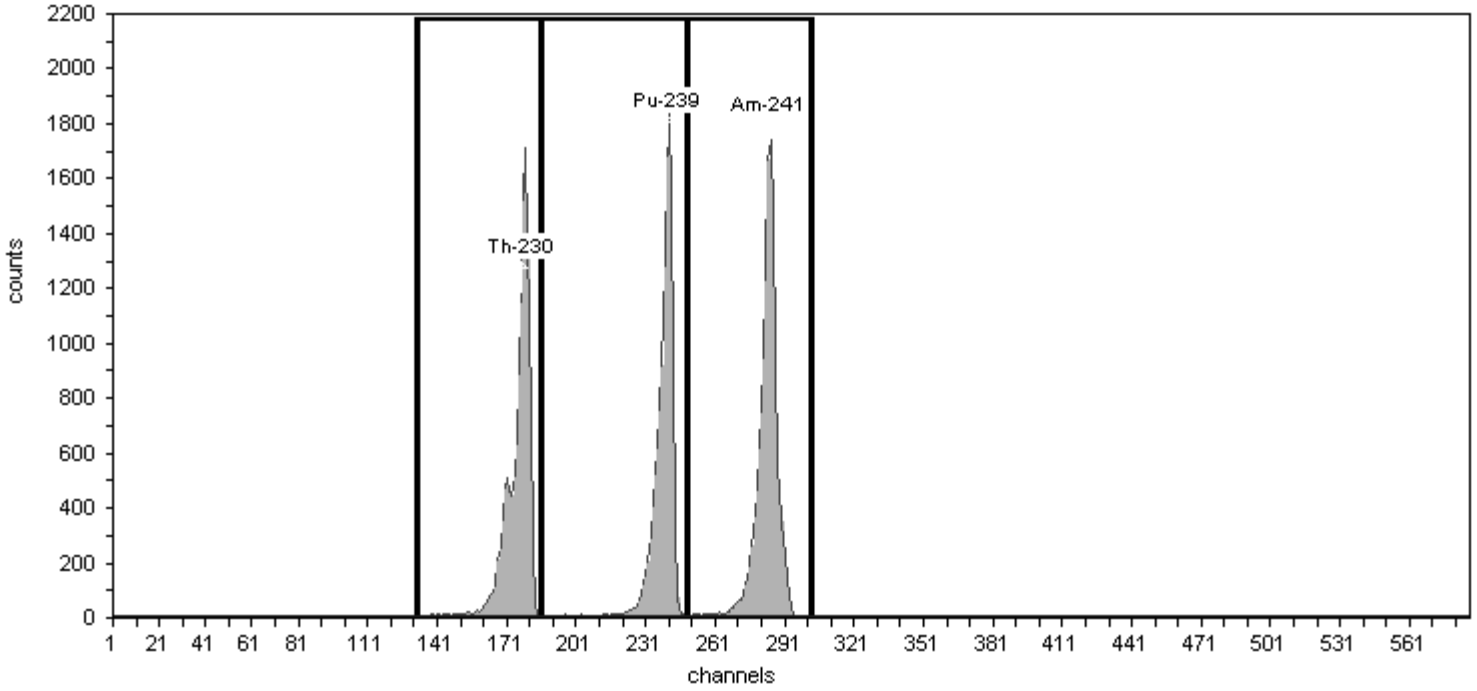
Certificate ID: 82246-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV62 , SN: 52-060FF2
Acquisition Start Date: 5/4/2014 9:06:28PM
Live Time: 140.00 min.
Real Time: 140.07 min.
Efficiency: 26.34% +/- 0.38% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	12,181.00	87.01
Pu-239	240	5.16	186	249	12,037.00	85.98
Am-241	284	5.49	249	303	13,168.00	94.06

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:54:23PM 5/5/2014

Calibration

Sample Name: IC-9886;AV63-20140504
Description:
Detector: AV63

Calibration Date: 5/5/2014 6:54:19PM
Analyst: 60040

Source Info

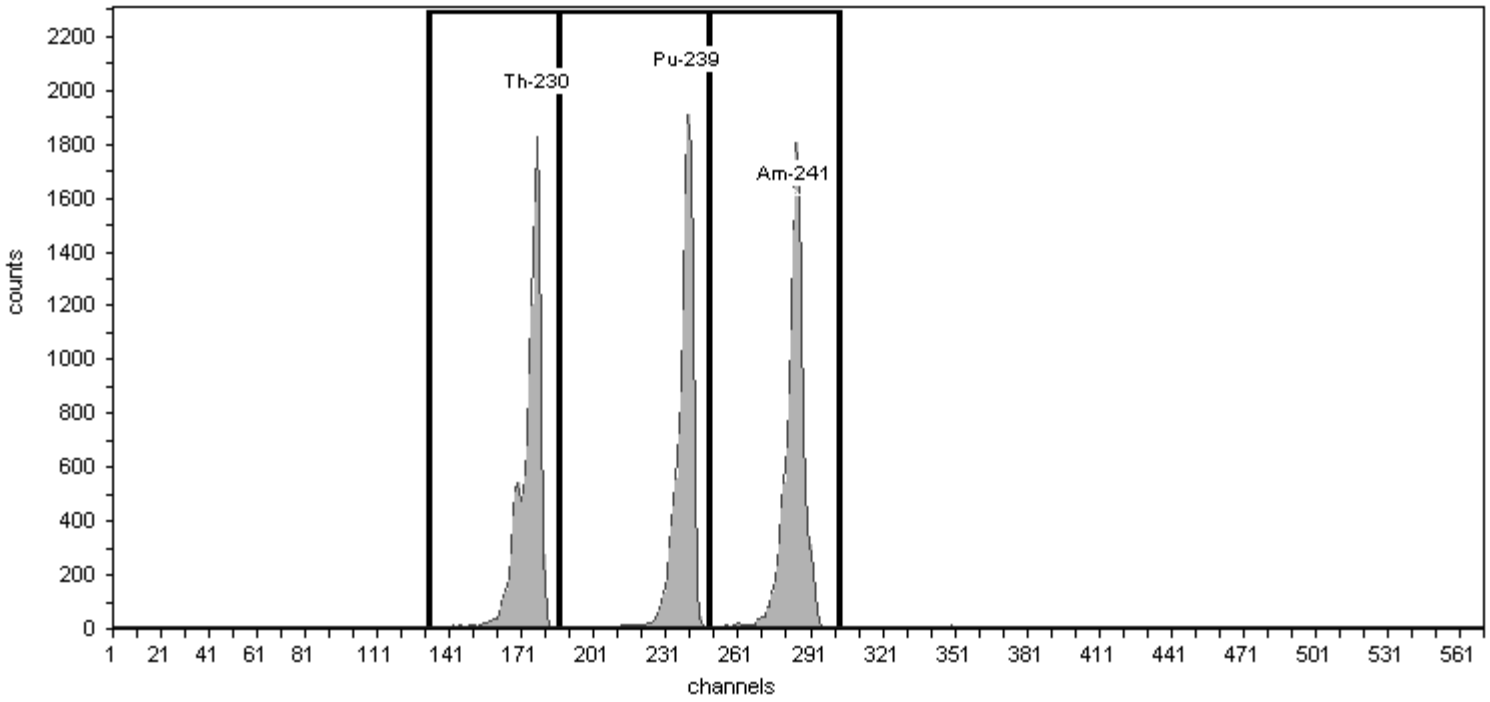
Certificate ID: 82247-334
Prepared by: Analytics

Certification Date: 6/10/2010 12:00:00PM
Description:

Acquisition

Detector: AV63 , SN: 47-029ff2
Acquisition Start Date: 5/4/2014 9:06:30PM
Live Time: 140.00 min.
Real Time: 140.07 min.
Efficiency: 25.48% +/- 0.34% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	13,102.00	93.59
Pu-239	240	5.16	186	249	12,548.00	89.63
Am-241	284	5.49	249	303	13,448.00	96.06

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:44:07PM 5/4/2014

Calibration

Sample Name: IC-7107;AV64-20140504a
Description:
Detector: AV64

Calibration Date: 5/4/2014 8:44:03PM
Analyst: 60040

Source Info

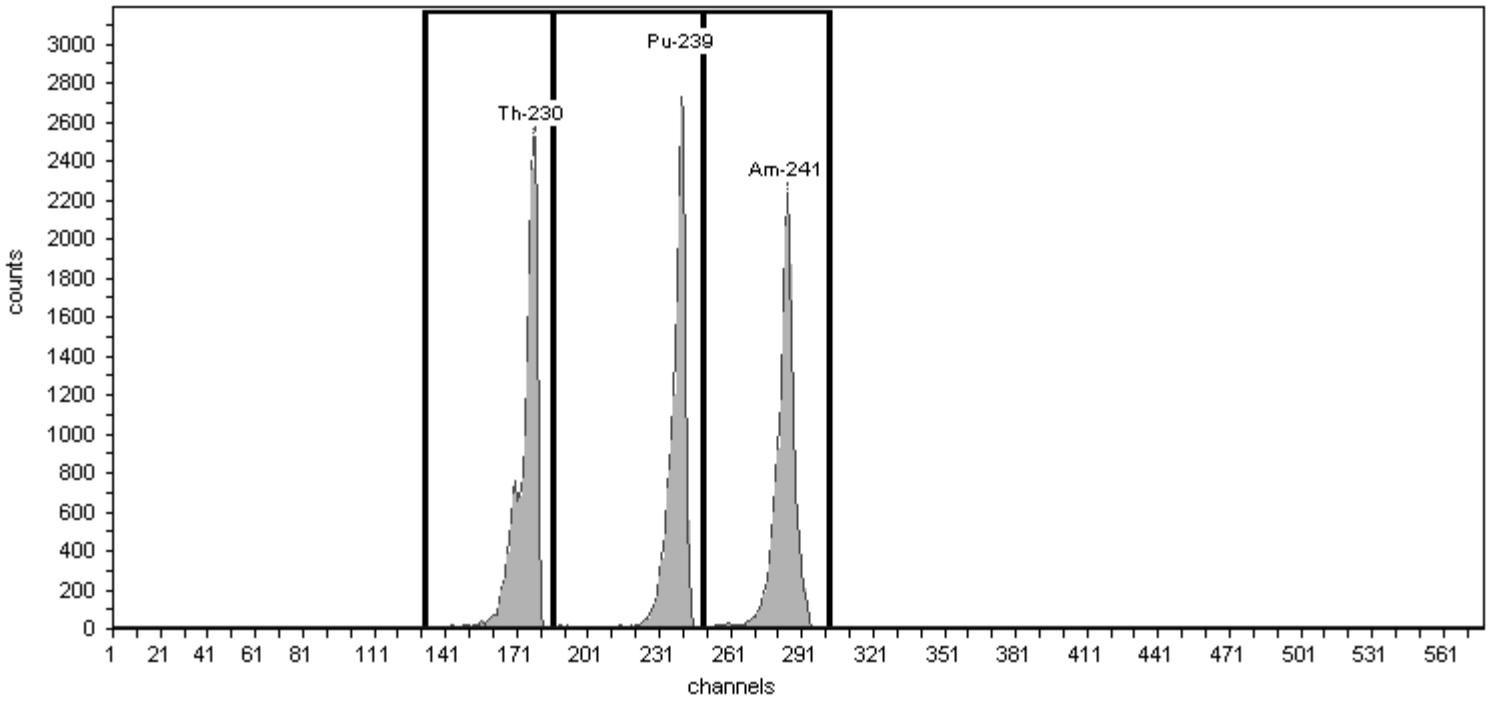
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV64 , SN: 47-029ee4
Acquisition Start Date: 5/4/2014 5:47:46PM
Live Time: 140.00 min.
Real Time: 140.04 min.
Efficiency: 27.75% +/- 0.31% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	17,513.00	125.09
Pu-239	240	5.16	186	249	17,121.00	122.29
Am-241	284	5.49	249	303	16,702.00	119.30

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:44:00PM 5/4/2014

Calibration

Sample Name: IC-8874;AV65-20140504
Description:
Detector: AV65

Calibration Date: 5/4/2014 8:43:55PM
Analyst: 60040

Source Info

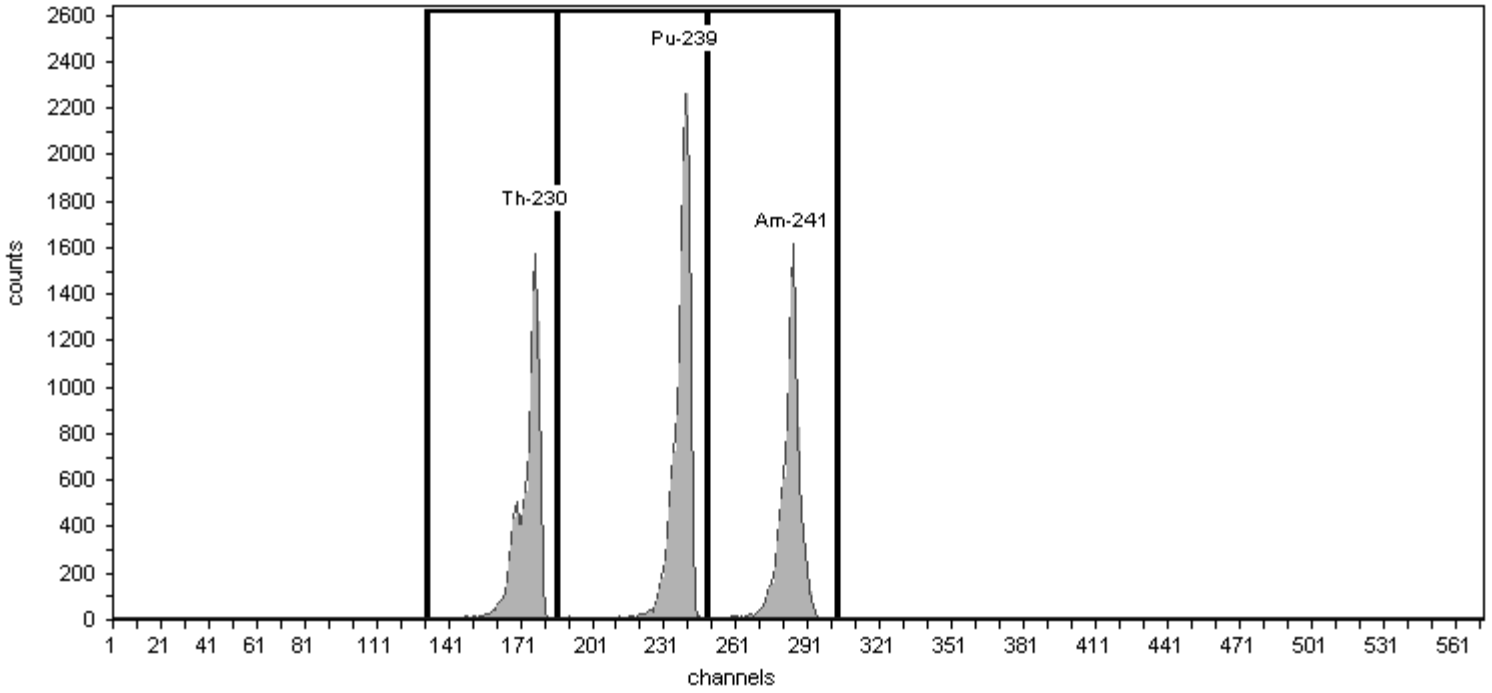
Certificate ID: 82233-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV65 , SN: 44-049JJ1
Acquisition Start Date: 5/4/2014 5:47:20PM
Live Time: 140.00 min.
Real Time: 140.04 min.
Efficiency: 27.13% +/- 0.38% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	10,885.00	77.75
Pu-239	240	5.16	186	249	14,355.00	102.54
Am-241	284	5.49	249	303	11,446.00	81.76

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:44:13PM 5/4/2014

Calibration

Sample Name: IC-8875;AV66-20140504
Description:
Detector: AV66

Calibration Date: 5/4/2014 8:44:10PM
Analyst: 60040

Source Info

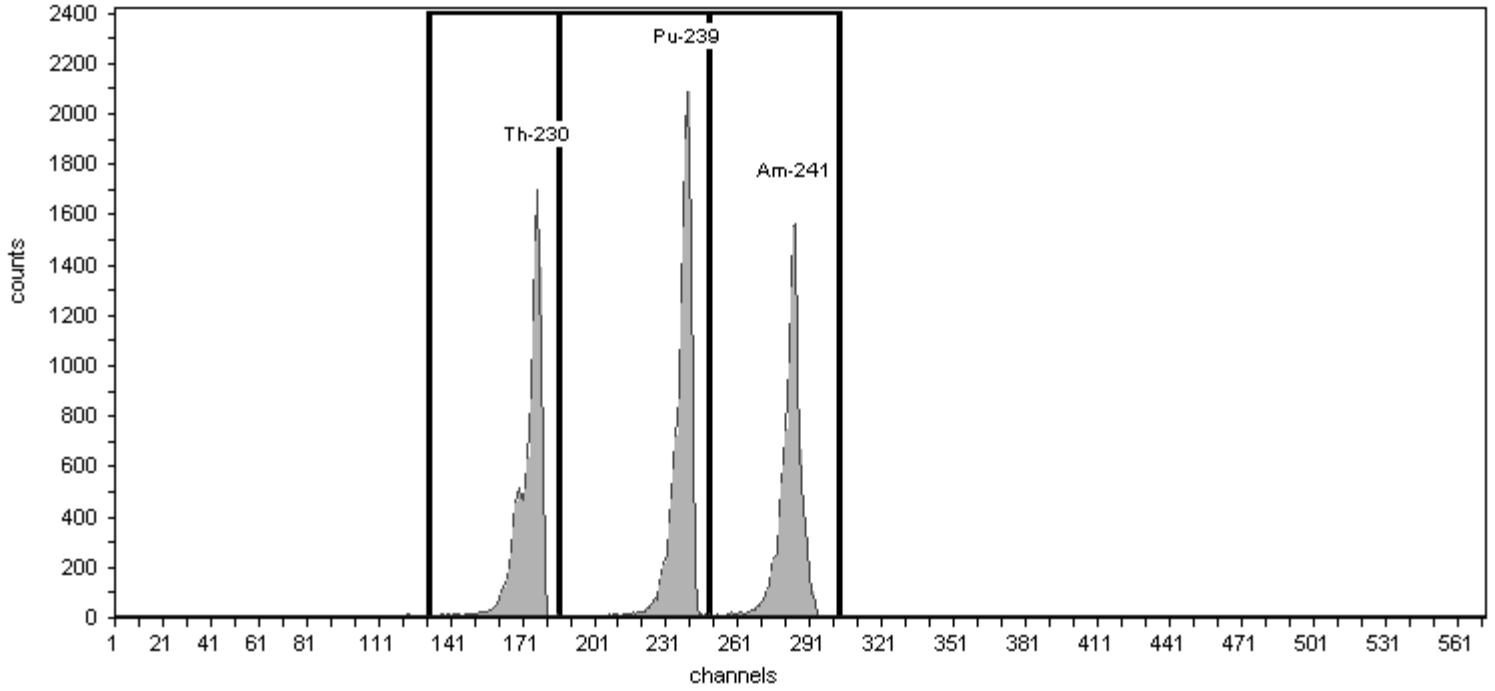
Certificate ID: 82234-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV66 , SN: 48-158EE2
Acquisition Start Date: 5/4/2014 5:47:59PM
Live Time: 140.00 min.
Real Time: 140.04 min.
Efficiency: 25.93% +/- 0.36% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	12,034.00	85.96
Pu-239	240	5.16	186	249	13,485.00	96.32
Am-241	284	5.49	249	303	12,078.00	86.27

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:44:19PM 5/4/2014

Calibration

Sample Name: IC-8876;AV67-20140504
Description:
Detector: AV67

Calibration Date: 5/4/2014 8:44:15PM
Analyst: 60040

Source Info

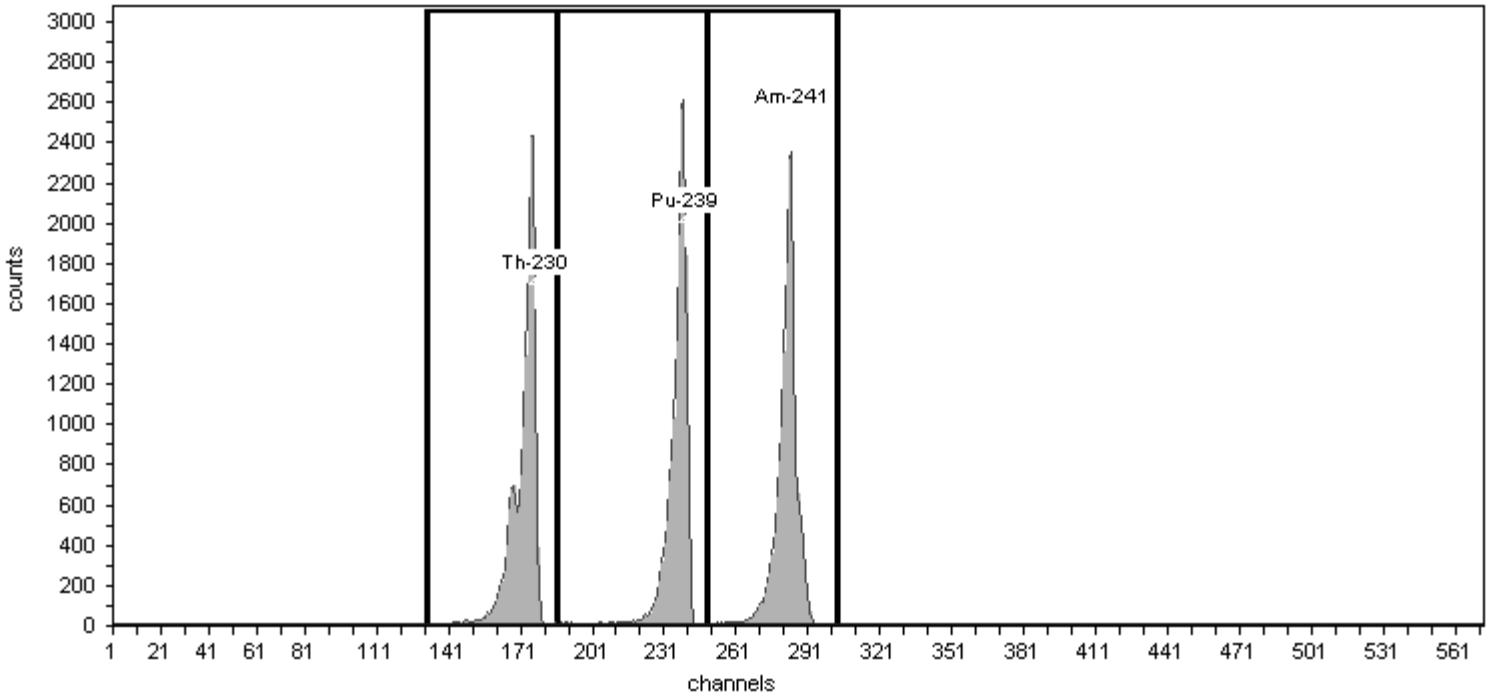
Certificate ID: 82235-334
Prepared by: Analytics

Certification Date: 6/4/2010 12:00:00PM
Description:

Acquisition

Detector: AV67 , SN: 52-102 D7
Acquisition Start Date: 5/4/2014 5:48:10PM
Live Time: 140.00 min.
Real Time: 140.12 min.
Efficiency: 27.32% +/- 0.32% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	16,552.00	118.23
Pu-239	240	5.16	186	249	16,093.00	114.95
Am-241	284	5.49	249	303	16,706.00	119.33

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:44:25PM 5/4/2014

Calibration

Sample Name: IC-8877;AV68-20140504
Description:
Detector: AV68

Calibration Date: 5/4/2014 8:44:22PM
Analyst: 60040

Source Info

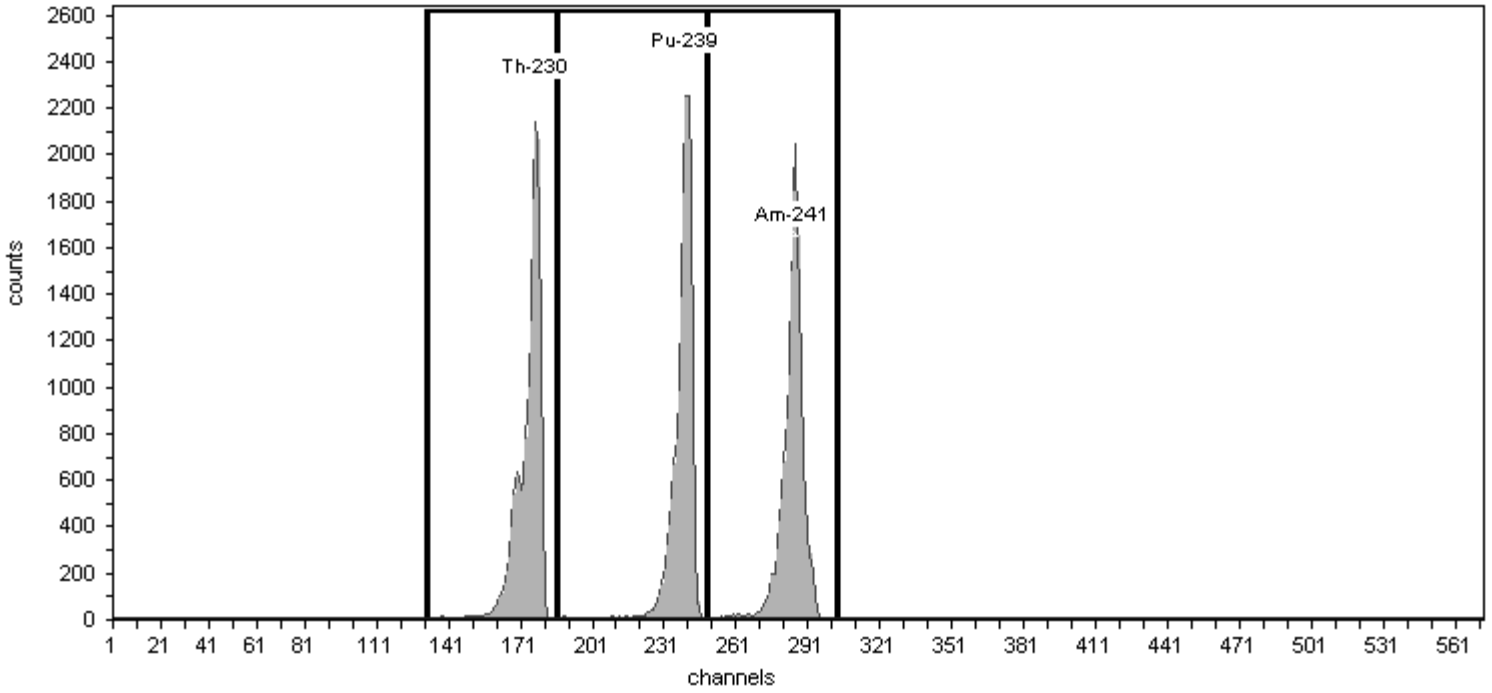
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV68 , SN: 48-45884
Acquisition Start Date: 5/4/2014 5:48:38PM
Live Time: 140.00 min.
Real Time: 140.12 min.
Efficiency: 26.49% +/- 0.31% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	15,401.00	110.01
Pu-239	240	5.16	186	249	15,531.00	110.94
Am-241	284	5.49	249	303	15,053.00	107.52

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:44:31PM 5/4/2014

Calibration

Sample Name: IC-9520;AV69-20140504
Description:
Detector: AV69

Calibration Date: 5/4/2014 8:44:28PM
Analyst: 60040

Source Info

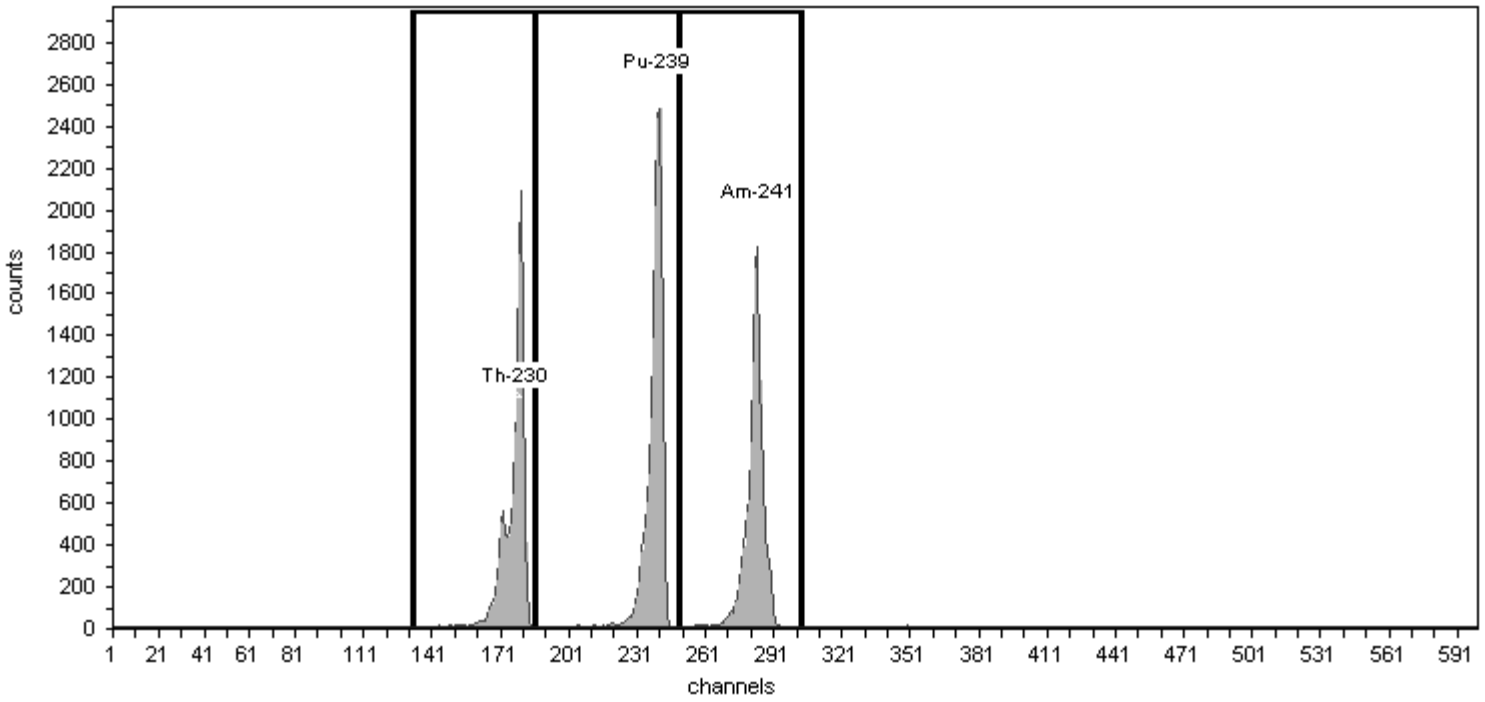
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV69 , SN: 49-155DD5
Acquisition Start Date: 5/4/2014 5:48:48PM
Live Time: 140.00 min.
Real Time: 140.12 min.
Efficiency: 25.57% +/- 0.36% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	12,251.00	87.51
Pu-239	240	5.16	186	249	14,290.00	102.07
Am-241	284	5.49	249	303	11,803.00	84.31

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:49:05PM 5/7/2014

Calibration

Sample Name: IC-8876;AV70-20140507
Description:
Detector: AV70

Calibration Date: 5/7/2014 10:49:02PM
Analyst: 60040

Source Info

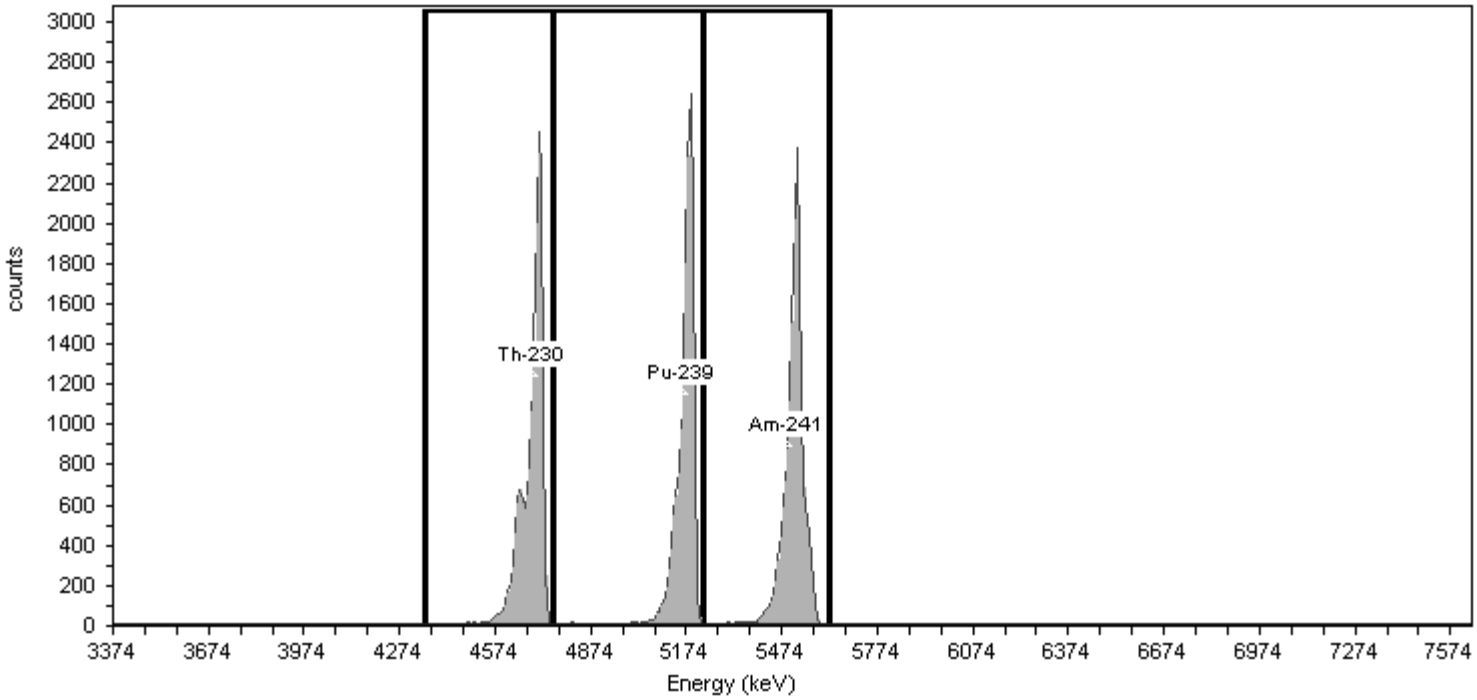
Certificate ID: 82235-334
Prepared by: Analytics

Certification Date: 6/4/2010 12:00:00PM
Description:

Acquisition

Detector: AV70 , SN: 48-158FF1
Acquisition Start Date: 5/7/2014 7:51:43PM
Live Time: 140.00 min.
Real Time: 140.02 min.
Efficiency: 26.52% +/- 0.31% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	16,123.00	115.16
Pu-239	240	5.16	186	249	15,598.00	111.41
Am-241	284	5.49	249	303	16,182.00	115.59

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:44:53PM 5/4/2014

Calibration

Sample Name: IC-9792;AV71-20140504
Description:
Detector: AV71

Calibration Date: 5/4/2014 8:44:50PM
Analyst: 60040

Source Info

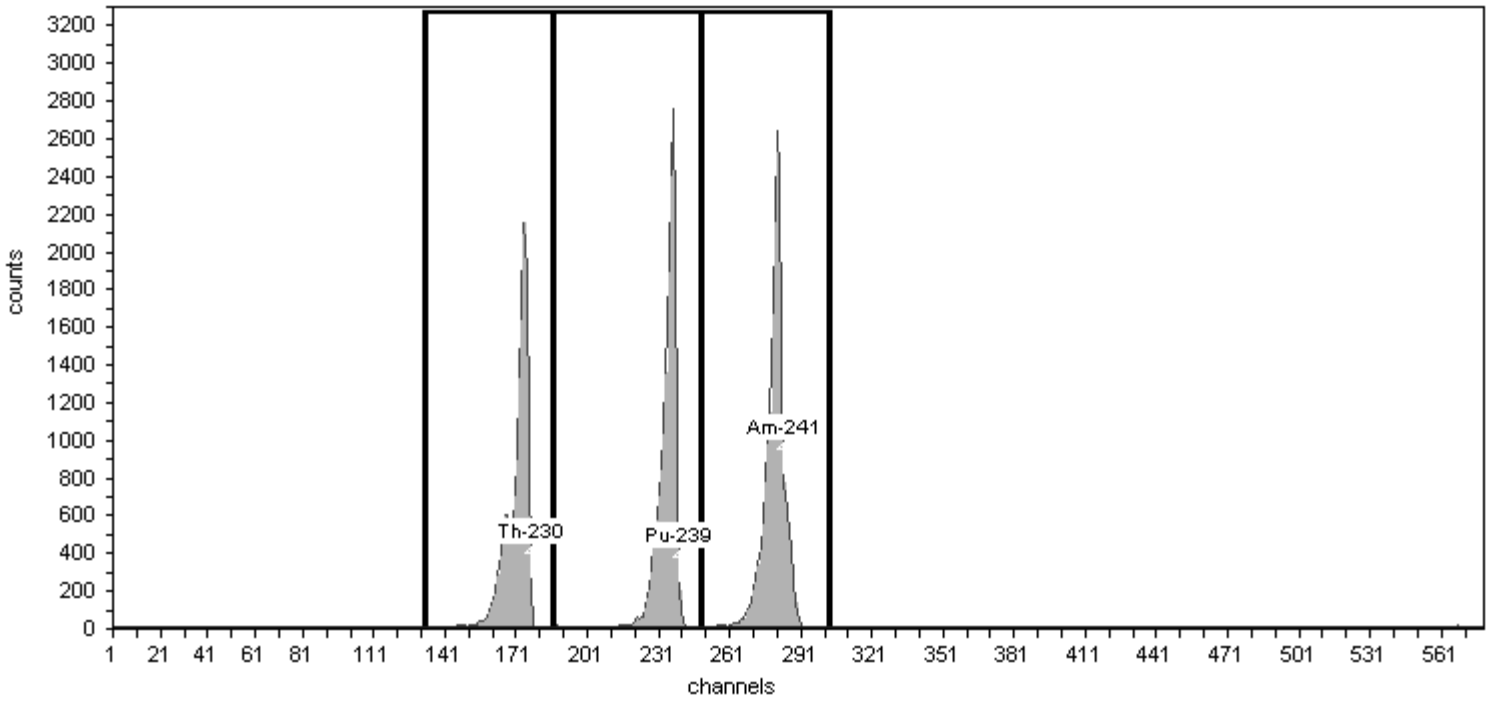
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV71 , SN: 48-158EE6
Acquisition Start Date: 5/4/2014 5:49:23PM
Live Time: 140.00 min.
Real Time: 140.12 min.
Efficiency: 26.79% +/- 0.31% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,141.00	101.01
Pu-239	240	5.16	186	249	16,373.00	116.95
Am-241	284	5.49	249	303	18,374.00	131.24

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:49:32PM 5/7/2014

Calibration

Sample Name: IC-9817;AV115-20140507
Description:
Detector: AV115

Calibration Date: 5/7/2014 10:49:29PM
Analyst: 60040

Source Info

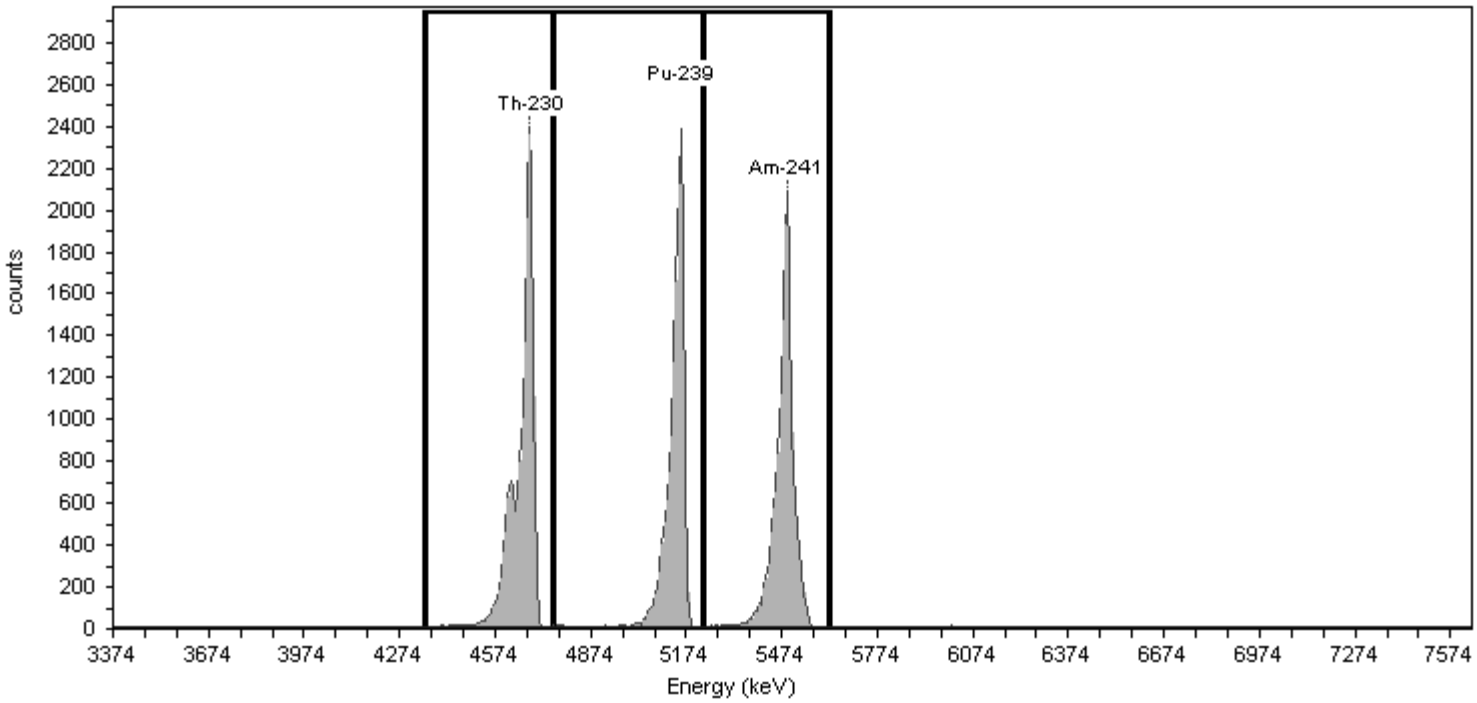
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV115 , SN: 49-037E4
Acquisition Start Date: 5/7/2014 7:52:44PM
Live Time: 140.00 min.
Real Time: 140.01 min.
Efficiency: 26.26% +/- 0.32% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	16,343.00	116.74
Pu-239	240	5.16	186	249	14,636.00	104.54
Am-241	284	5.49	249	303	15,191.00	108.51

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:17:01PM 5/1/2014

Calibration

Sample Name: IC-9792;AV116-20140430
Description:
Detector: AV116

Calibration Date: 5/1/2014 1:16:57PM
Analyst: 60040

Source Info

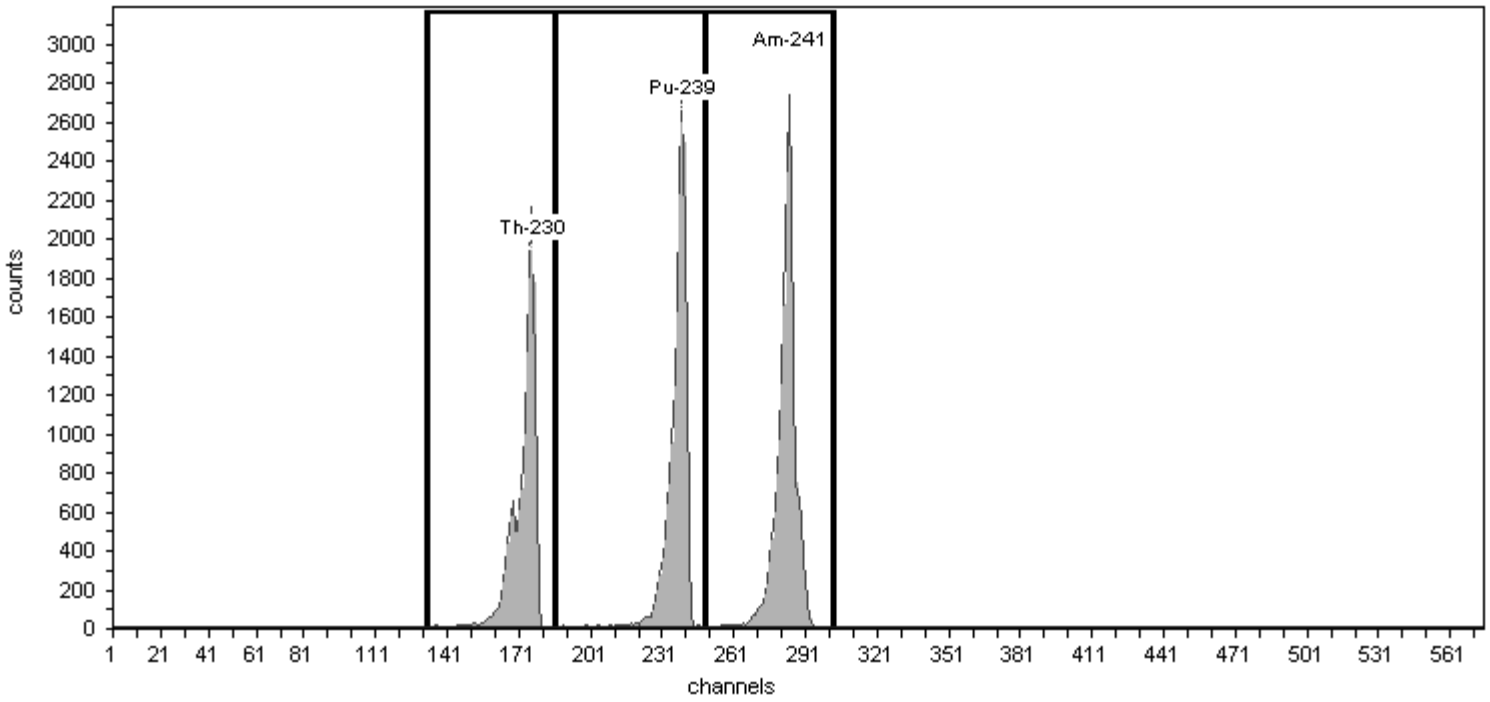
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV116 , SN: 49-034G1
Acquisition Start Date: 4/30/2014 10:55:12PM
Live Time: 140.00 min.
Real Time: 140.11 min.
Efficiency: 27.04% +/- 0.31% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,312.00	102.23
Pu-239	240	5.16	186	249	16,478.00	117.70
Am-241	284	5.49	249	303	18,564.00	132.60

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:17:07PM 5/1/2014

Calibration

Sample Name: IC-9793;AV117-20140430
Description:
Detector: AV117

Calibration Date: 5/1/2014 1:17:04PM
Analyst: 60040

Source Info

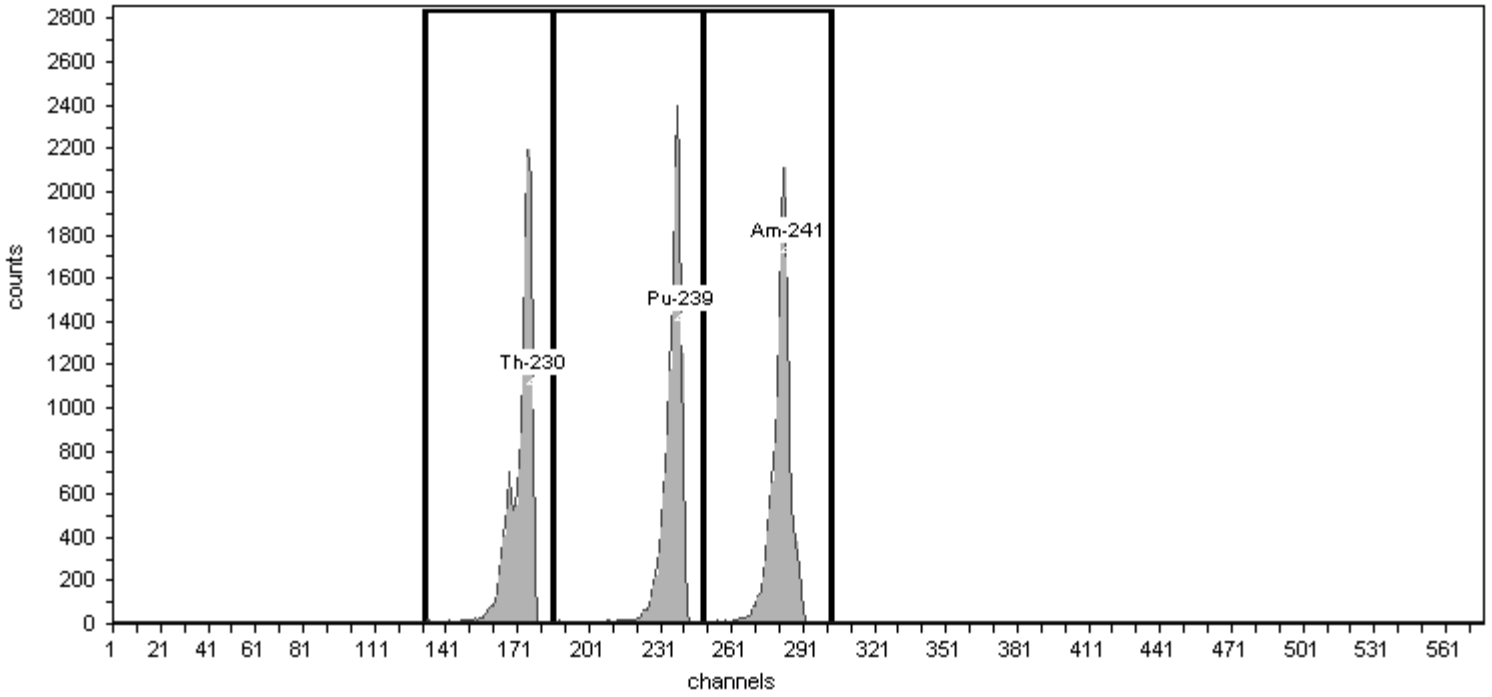
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV117 , SN: 49-037X4
Acquisition Start Date: 4/30/2014 10:55:33PM
Live Time: 140.00 min.
Real Time: 140.11 min.
Efficiency: 25.86% +/- 0.32% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,455.00	103.25
Pu-239	240	5.16	186	249	14,768.00	105.49
Am-241	284	5.49	249	303	14,281.00	102.01

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:17:13PM 5/1/2014

Calibration

Sample Name: IC-9794;AV118-20140430
Description:
Detector: AV118

Calibration Date: 5/1/2014 1:17:10PM
Analyst: 60040

Source Info

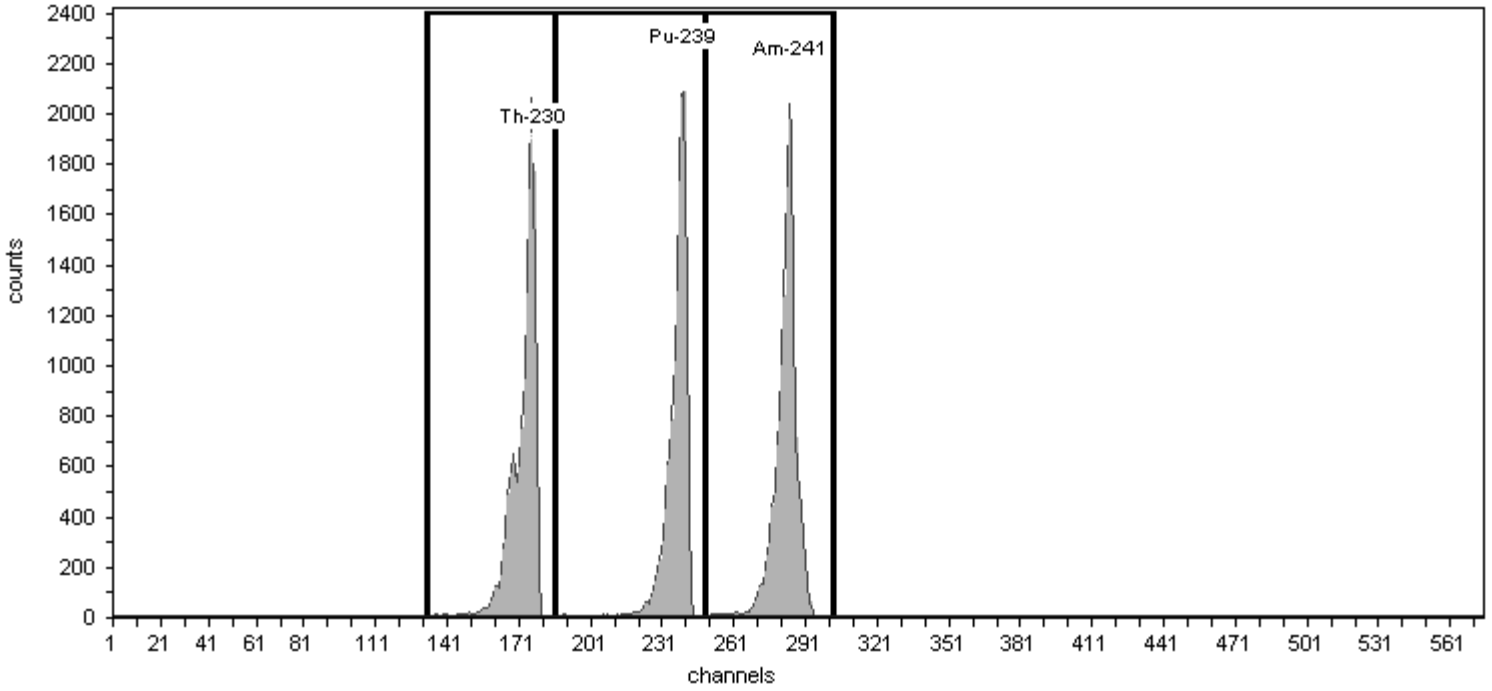
Certificate ID: 82242-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV118 , SN: 49-037F4
Acquisition Start Date: 4/30/2014 10:55:46PM
Live Time: 140.00 min.
Real Time: 140.11 min.
Efficiency: 25.84% +/- 0.32% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,395.00	102.82
Pu-239	240	5.16	186	249	13,871.00	99.08
Am-241	284	5.49	249	303	15,367.00	109.76

Initial Calibration Verifications

Alpha Spectroscopy Calibration Summary

Detector: AV1

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120511/1	05/05/14 22:25	82232-334_00001	0.2630	0.20-0.32		
ICV 160-120846/1	05/07/14 23:01	82247-334_00001	0.2524	0.20-0.32	96.0	95-105
CCV 160-127859/1	06/19/14 16:43	82232-334_00001	0.2642	0.20-0.32	100.4	95-105

Detector: AV3

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120519/1	05/05/14 22:26	82234-334_00001	0.2609	0.20-0.32		
ICV 160-120855/1	05/07/14 23:02	82233-334_00001	0.2696	0.20-0.32	103.3	95-105
CCV 160-127913/1	06/19/14 16:44	82234-334_00001	0.2566	0.20-0.32	98.3	95-105

Detector: AV6

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120521/1	05/05/14 22:26	82237-334_00003	0.2589	0.20-0.32		
ICV 160-120857/1	05/07/14 23:03	82236-334_00001	0.2622	0.20-0.32	101.3	95-105
CCV 160-127932/1	06/19/14 18:06	82237-334_00003	0.2606	0.20-0.32	100.7	95-105

Detector: AV7

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120843/1	05/07/14 19:51	82236-334_00001	0.2580	0.20-0.32		
ICV 160-120858/1	05/07/14 23:03	82237-334_00003	0.2546	0.20-0.32	98.6	95-105
CCV 160-127943/1	06/19/14 16:44	82236-334_00001	0.2549	0.20-0.32	98.8	95-105

Detector: AV8

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120523/1	05/05/14 22:27	82240-334_00001	0.2705	0.20-0.32		
ICV 160-121084/1	05/08/14 00:14	82234-334_00001	0.2639	0.20-0.32	97.6	95-105
CCV 160-127954/1	06/19/14 18:06	82240-334_00001	0.2668	0.20-0.32	98.6	95-105

Detector: AV9

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120524/1	05/05/14 22:27	82241-334_00001	0.2704	0.20-0.32		
ICV 160-120859/1	05/07/14 23:03	82240-334_00001	0.2666	0.20-0.32	98.6	95-105
CCV 160-127962/1	06/19/14 18:06	82241-334_00001	0.2701	0.20-0.32	99.9	95-105

Detector: AV10

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120512/1	05/05/14 22:27	82242-334_00001	0.2584	0.20-0.32		
ICV 160-120847/1	05/07/14 23:03	82241-334_00001	0.2593	0.20-0.32	100.3	95-105
CCV 160-127860/1	06/19/14 18:06	82242-334_00001	0.2552	0.20-0.32	98.7	95-105

Detector: AV11

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120513/1	05/05/14 22:27	82243-334_00001	0.2688	0.20-0.32		
ICV 160-120848/1	05/07/14 23:04	82242-334_00001	0.2598	0.20-0.32	96.6	95-105
CCV 160-127871/1	06/19/14 18:07	82243-334_00001	0.2647	0.20-0.32	98.5	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV12

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120514/1	05/05/14 22:28	82244-334_00001	0.2597	0.20-0.32		
ICV 160-120849/1	05/07/14 23:04	82243-334_00001	0.2688	0.20-0.32	103.5	95-105
CCV 160-127881/1	06/19/14 18:07	82244-334_00001	0.2583	0.20-0.32	99.5	95-105

Detector: AV13

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120515/1	05/05/14 22:28	82245-334_00001	0.2599	0.20-0.32		
ICV 160-120850/1	05/07/14 23:04	82244-334_00001	0.2556	0.20-0.32	98.4	95-105
CCV 160-127892/1	06/19/14 19:45	82245-334_00001	0.2566	0.20-0.32	98.7	95-105

Detector: AV14

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120516/1	05/05/14 22:28	82246-334_00001	0.2634	0.20-0.32		
ICV 160-120851/1	05/07/14 23:04	82245-334_00001	0.2665	0.20-0.32	101.2	95-105
CCV 160-127902/1	06/19/14 18:08	82246-334_00001	0.2615	0.20-0.32	99.3	95-105

Detector: AV24

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120405/1	05/05/14 19:29	82241-334_00001	0.2642	0.20-0.32		
ICV 160-121076/1	05/08/14 00:16	82240-334_00001	0.2662	0.20-0.32	100.8	95-105
CCV 160-127912/1	06/19/14 19:45	82241-334_00001	0.2644	0.20-0.32	100.1	95-105

Detector: AV51

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120273/1	05/04/14 21:03	82234-334_00001	0.2624	0.20-0.32		
ICV 160-121366/1	05/08/14 17:17	82233-334_00001	0.2693	0.20-0.32	102.6	95-105
CCV 160-127991/1	06/22/14 20:07	82234-334_00001	0.2581	0.20-0.32	98.4	95-105

Detector: AV53

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120275/1	05/04/14 21:04	82236-334_00001	0.2632	0.20-0.32		
ICV 160-121082/1	05/08/14 00:18	82235-334_00001	0.2648	0.20-0.32	100.6	95-105
CCV 160-127992/1	06/22/14 18:53	82236-334_00001	0.2651	0.20-0.32	100.7	95-105

Detector: AV54

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120276/1	05/04/14 21:04	82237-334_00003	0.2602	0.20-0.32		
ICV 160-121368/1	05/08/14 14:34	82236-334_00001	0.2609	0.20-0.32	100.3	95-105
CCV 160-127993/1	06/22/14 18:53	82237-334_00003	0.2628	0.20-0.32	101.0	95-105

Detector: AV55

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120842/1	05/07/14 19:51	82232-334_00001	0.2679	0.20-0.32		
ICV 160-121083/1	05/08/14 00:19	82237-334_00003	0.2569	0.20-0.32	95.9	95-105
CCV 160-127994/1	06/22/14 20:08	82232-334_00001	0.2683	0.20-0.32	100.2	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV56

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120278/1	05/04/14 21:04	82240-334_00001	0.2609	0.20-0.32		
ICV 160-121369/1	05/08/14 17:18	82247-334_00001	0.2519	0.20-0.32	96.5	95-105
CCV 160-127995/1	06/22/14 18:53	82240-334_00001	0.2626	0.20-0.32	100.7	95-105

Detector: AV58

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120280/1	05/04/14 21:05	82242-334_00001	0.2656	0.20-0.32		
ICV 160-121371/1	05/08/14 14:35	82241-334_00001	0.2710	0.20-0.32	102.0	95-105
CCV 160-127997/1	06/22/14 18:53	82242-334_00001	0.2631	0.20-0.32	99.1	95-105

Detector: AV59

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120281/1	05/04/14 21:05	82243-334_00001	0.2744	0.20-0.32		
ICV 160-121372/1	05/08/14 14:36	82242-334_00001	0.2677	0.20-0.32	97.5	95-105
CCV 160-127998/1	06/22/14 20:09	82243-334_00001	0.2720	0.20-0.32	99.1	95-105

Detector: AV60

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120282/1	05/04/14 21:06	82244-334_00001	0.2633	0.20-0.32		
ICV 160-121373/1	05/08/14 17:21	82243-334_00001	0.2725	0.20-0.32	103.5	95-105
CCV 160-127999/1	06/22/14 21:17	82244-334_00001	0.2629	0.20-0.32	99.8	95-105

Detector: AV61

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120283/1	05/04/14 21:06	82245-334_00001	0.2646	0.20-0.32		
ICV 160-121374/1	05/08/14 14:36	82244-334_00001	0.2581	0.20-0.32	97.5	95-105
CCV 160-128018/1	06/22/14 22:21	82245-334_00001	0.2622	0.20-0.32	99.1	95-105

Detector: AV62

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120284/1	05/04/14 21:06	82246-334_00001	0.2634	0.20-0.32		
ICV 160-121375/1	05/08/14 14:36	82245-334_00001	0.2622	0.20-0.32	99.6	95-105
CCV 160-128000/1	06/22/14 20:09	82246-334_00001	0.2650	0.20-0.32	100.6	95-105

Detector: AV63

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120285/1	05/04/14 21:06	82247-334_00001	0.2548	0.20-0.32		
ICV 160-121376/1	05/08/14 14:36	82246-334_00001	0.2601	0.20-0.32	102.1	95-105
CCV 160-128001/1	06/22/14 21:18	82247-334_00001	0.2557	0.20-0.32	100.3	95-105

Detector: AV64

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120041/1	05/04/14 17:47	82232-334_00001	0.2775	0.20-0.32		
ICV 160-121389/1	05/11/14 19:31	82247-334_00001	0.2666	0.20-0.32	96.1	95-105
CCV 160-128002/1	06/22/14 21:18	82232-334_00001	0.2776	0.20-0.32	100.0	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV65

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120042/1	05/04/14 17:47	82233-334_00001	0.2713	0.20-0.32		
ICV 160-121377/1	05/08/14 17:18	82232-334_00001	0.2712	0.20-0.32	99.9	95-105
CCV 160-128003/1	06/22/14 20:09	82233-334_00001	0.2695	0.20-0.32	99.3	95-105

Detector: AV66

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120043/1	05/04/14 17:47	82234-334_00001	0.2593	0.20-0.32		
ICV 160-121390/1	05/11/14 19:32	82233-334_00001	0.2667	0.20-0.32	102.9	95-105
CCV 160-128004/1	06/22/14 21:18	82234-334_00001	0.2570	0.20-0.32	99.1	95-105

Detector: AV67

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120044/1	05/04/14 17:48	82235-334_00001	0.2732	0.20-0.32		
ICV 160-121391/1	05/11/14 19:32	82234-334_00001	0.2702	0.20-0.32	98.9	95-105
CCV 160-128005/1	06/22/14 18:54	82235-334_00001	0.2782	0.20-0.32	101.8	95-105

Detector: AV68

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120045/1	05/04/14 17:48	82236-334_00001	0.2649	0.20-0.32		
ICV 160-121378/1	05/08/14 14:36	82235-334_00001	0.2630	0.20-0.32	99.3	95-105
CCV 160-128006/1	06/22/14 20:09	82236-334_00001	0.2631	0.20-0.32	99.3	95-105

Detector: AV69

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120046/1	05/04/14 17:48	82237-334_00003	0.2557	0.20-0.32		
ICV 160-121379/1	05/08/14 17:19	82236-334_00001	0.2646	0.20-0.32	103.5	95-105
CCV 160-128007/1	06/22/14 20:09	82237-334_00003	0.2594	0.20-0.32	101.5	95-105

Detector: AV70

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120844/1	05/07/14 19:51	82235-334_00001	0.2652	0.20-0.32		
ICV 160-121380/1	05/08/14 14:36	82237-334_00003	0.2579	0.20-0.32	97.2	95-105
CCV 160-128008/1	06/22/14 20:10	82235-334_00001	0.2569	0.20-0.32	96.9	95-105

Detector: AV71

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120048/1	05/04/14 17:49	82240-334_00001	0.2679	0.20-0.32		
ICV 160-121381/1	05/08/14 17:19	82244-334_00001	0.2589	0.20-0.32	96.6	95-105
CCV 160-128009/1	06/22/14 20:10	82240-334_00001	0.2683	0.20-0.32	100.1	95-105

Detector: AV115

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120840/1	05/07/14 19:52	82244-334_00001	0.2626	0.20-0.32		
ICV 160-121418/1	05/11/14 20:54	82237-334_00003	0.2672	0.20-0.32	101.8	95-105
CCV 160-127876/1	06/19/14 15:10	82244-334_00001	0.2651	0.20-0.32	100.9	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV116

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-119675/1	04/30/14 22:55	82240-334_00001	0.2704	0.20-0.32		
ICV 160-121419/1	05/11/14 22:06	82245-334_00001	0.2603	0.20-0.32	96.2	95-105
CCV 160-127877/1	06/19/14 15:10	82240-334_00001	0.2694	0.20-0.32	99.6	95-105

Detector: AV117

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-119676/1	04/30/14 22:55	82241-334_00001	0.2586	0.20-0.32		
ICV 160-121420/1	05/11/14 22:06	82240-334_00001	0.2603	0.20-0.32	100.7	95-105
CCV 160-127878/1	06/19/14 15:10	82241-334_00001	0.2593	0.20-0.32	100.3	95-105

Detector: AV118

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-119677/1	04/30/14 22:55	82242-334_00001	0.2584	0.20-0.32		
ICV 160-121421/1	05/11/14 23:19	82241-334_00001	0.2655	0.20-0.32	102.8	95-105
CCV 160-127879/1	06/19/14 15:10	82242-334_00001	0.2593	0.20-0.32	100.3	95-105

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:05:34AM 5/8/2014

Calibration

Sample Name: ICV-9886;AV1-20140507
Description:
Detector: AV1

Calibration Date: 5/8/2014 12:05:29AM
Analyst: 60040

Source Info

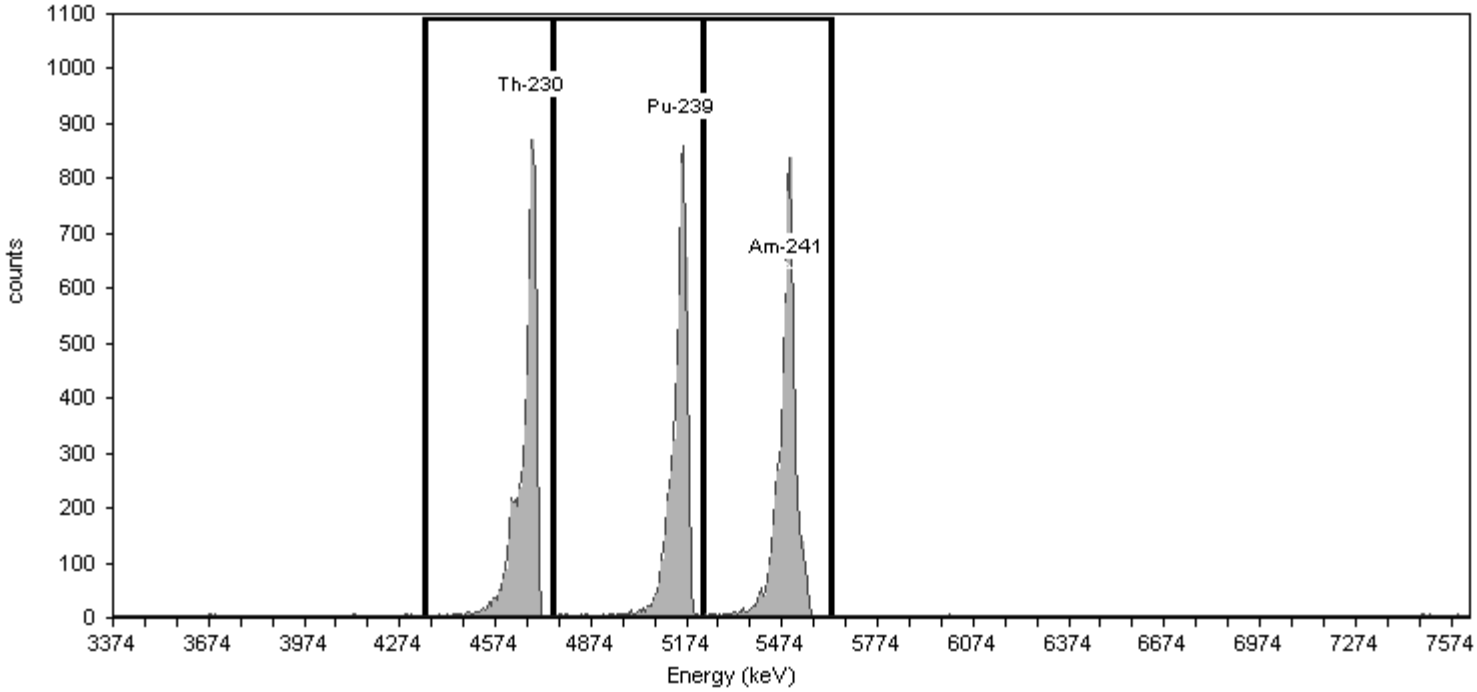
Certificate ID: 82247-334
Prepared by: Analytics

Certification Date: 6/10/2010 12:00:00PM
Description:

Acquisition

Detector: AV1 , SN: 49-188 AA4
Acquisition Start Date: 5/7/2014 11:01:59PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 25.24% +/- 0.45% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,533.00	92.22
Pu-239	240	5.16	186	249	5,365.00	89.42
Am-241	284	5.49	249	303	5,699.00	94.98

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:05:47AM 5/8/2014

Calibration

Sample Name: ICV-8874;AV3-20140507
Description:
Detector: AV3

Calibration Date: 5/8/2014 12:05:44AM
Analyst: 60040

Source Info

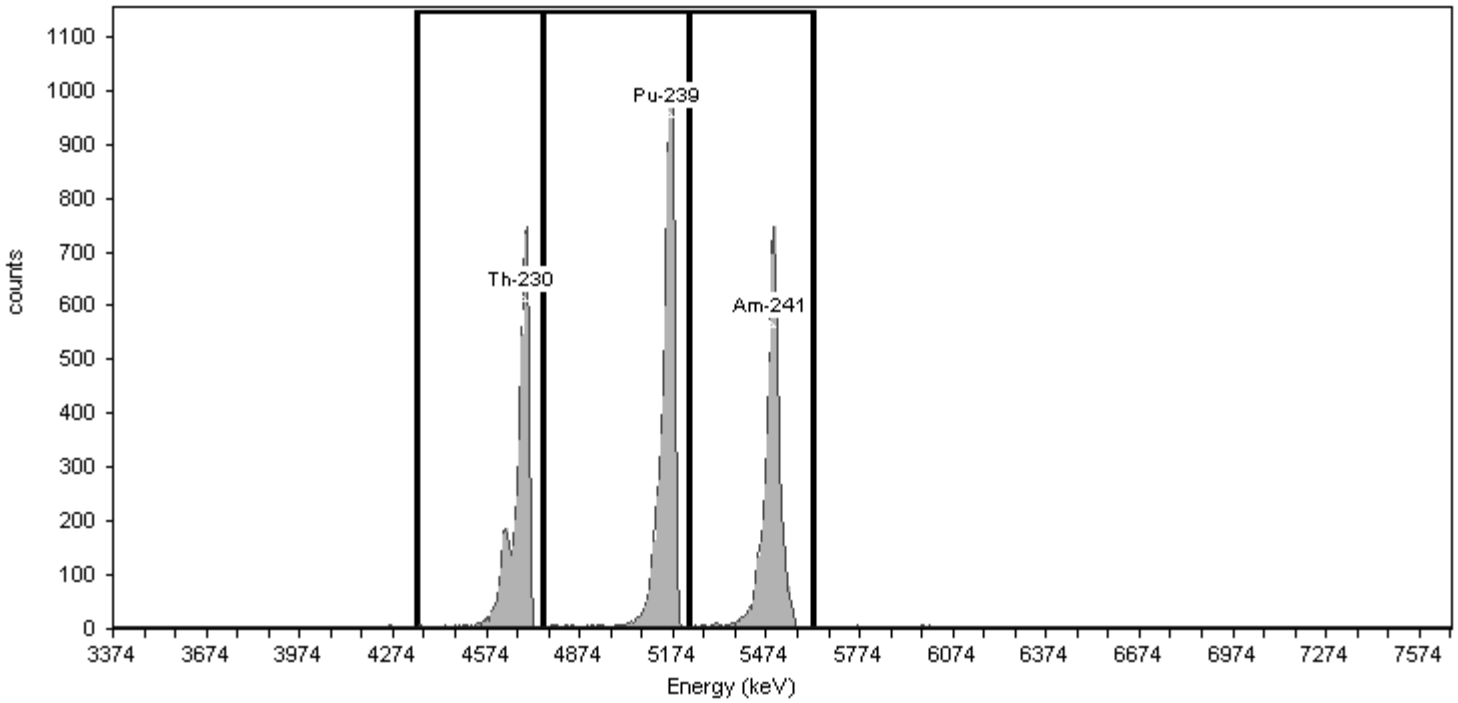
Certificate ID: 82233-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV3 , SN: 49-202 FF7
Acquisition Start Date: 5/7/2014 11:02:35PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 26.96% +/- 0.50% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	4,614.00	76.90
Pu-239	240	5.16	186	249	6,057.00	100.95
Am-241	284	5.49	249	303	4,958.00	82.63

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:00AM 5/8/2014

Calibration

Sample Name: ICV-8877;AV6-20140507
Description:
Detector: AV6

Calibration Date: 5/8/2014 12:05:56AM
Analyst: 60040

Source Info

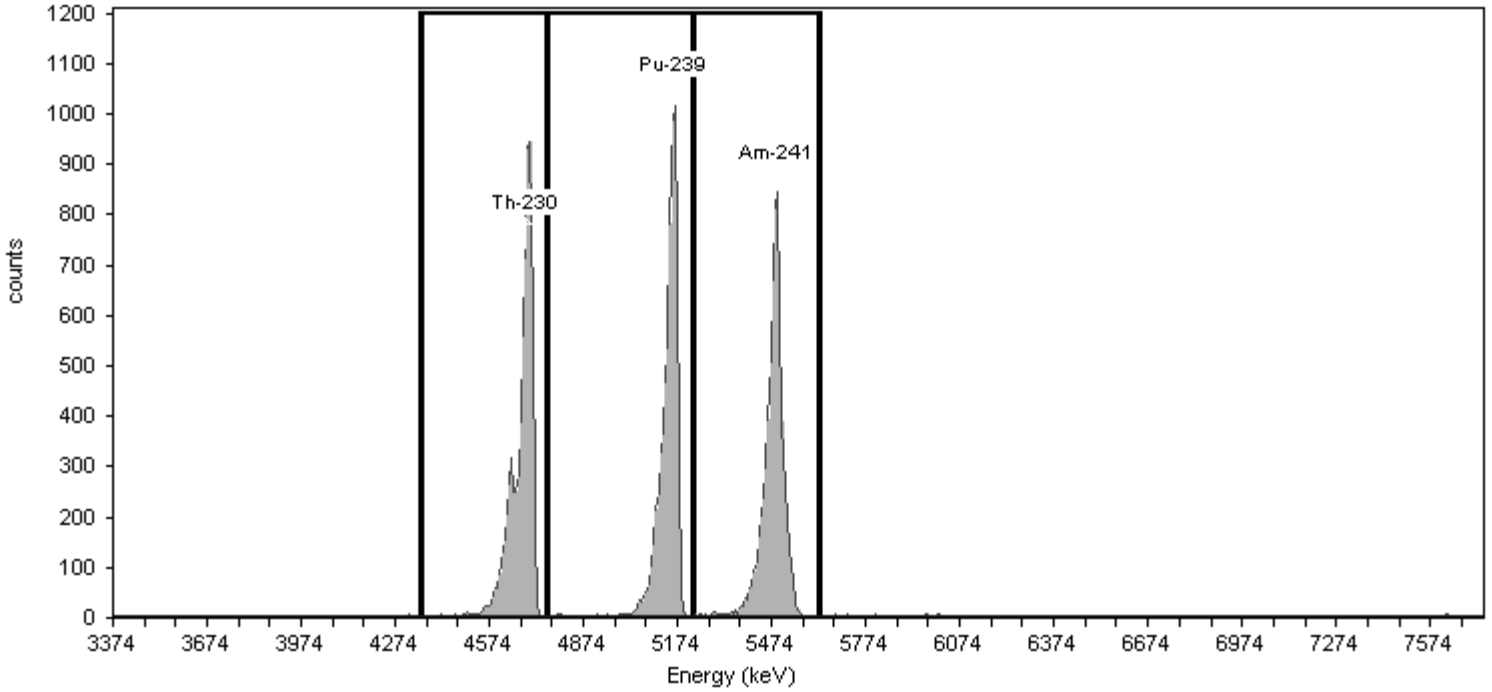
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV6 , SN: 47-27FF2
Acquisition Start Date: 5/7/2014 11:03:21PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 26.22% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,553.00	109.22
Pu-239	240	5.16	186	249	6,552.00	109.20
Am-241	284	5.49	249	303	6,392.00	106.53

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:07AM 5/8/2014

Calibration

Sample Name: ICV-9520;AV7-20140507
Description:
Detector: AV7

Calibration Date: 5/8/2014 12:06:03AM
Analyst: 60040

Source Info

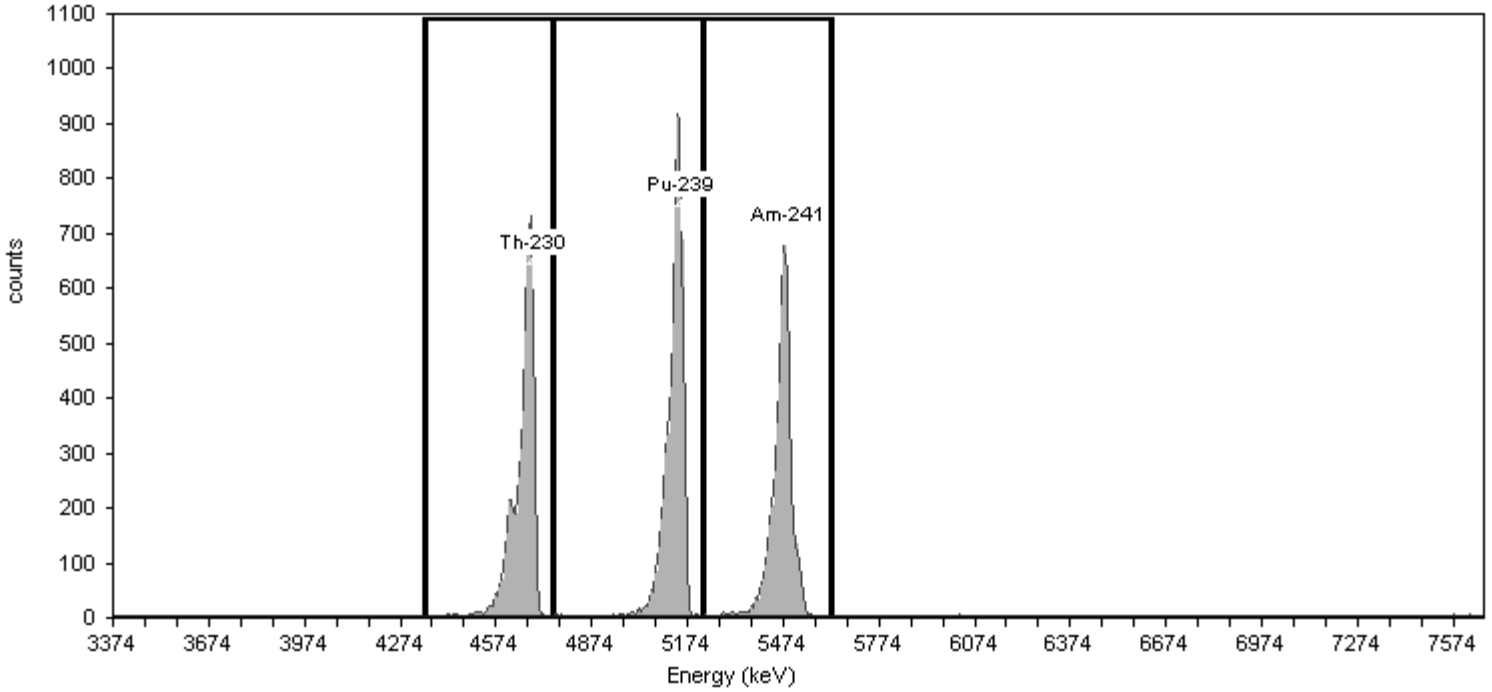
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV7 , SN: 48-158EE5
Acquisition Start Date: 5/7/2014 11:03:39PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 25.46% +/- 0.46% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,227.00	87.12
Pu-239	240	5.16	186	249	6,154.00	102.57
Am-241	284	5.49	249	303	4,991.00	83.18

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:19:28PM 5/8/2014

Calibration

Sample Name: ICV-8875;AV8-20140507
Description:
Detector: AV8

Calibration Date: 5/8/2014 2:19:23PM
Analyst: 60040

Source Info

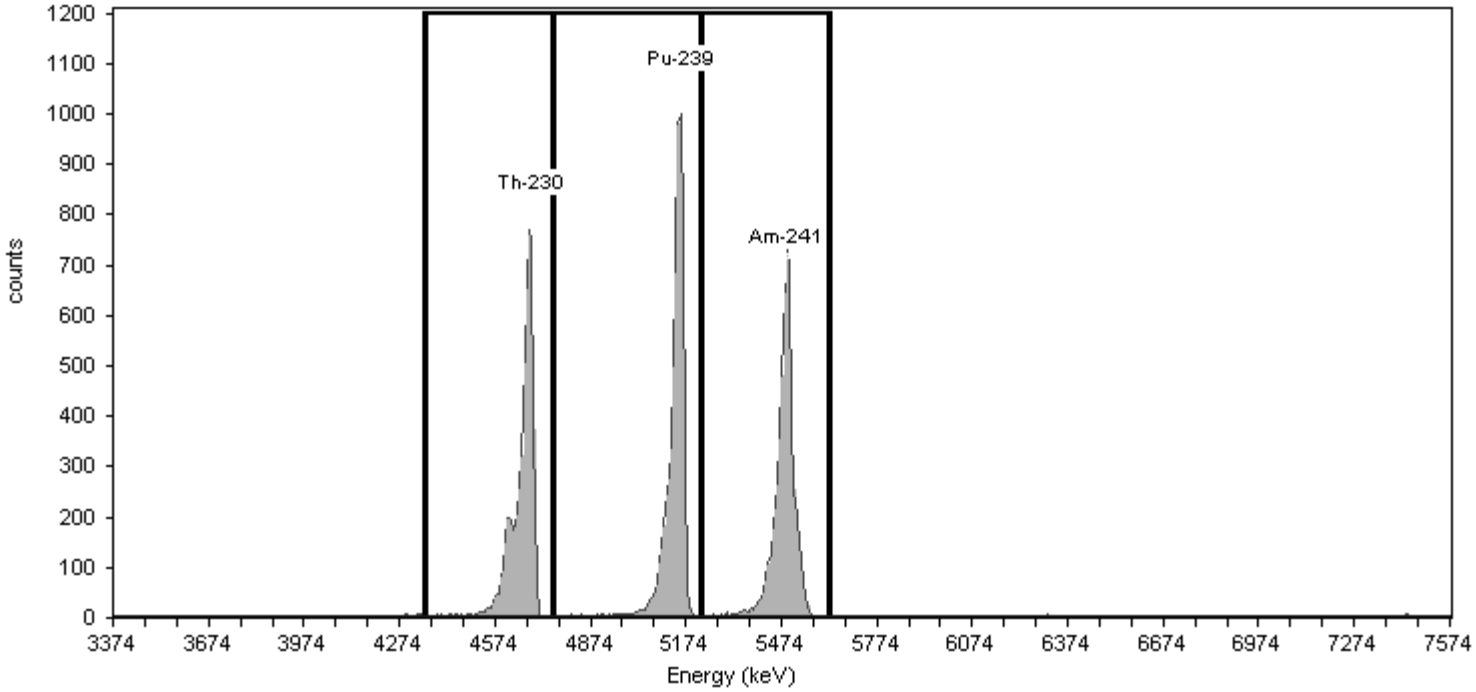
Certificate ID: 82234-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV8 , SN: 41-137Q6
Acquisition Start Date: 5/8/2014 12:14:03AM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.39% +/- 0.48% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,189.00	86.48
Pu-239	240	5.16	186	249	5,888.00	98.13
Am-241	284	5.49	249	303	5,329.00	88.82

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:13AM 5/8/2014

Calibration

Sample Name: ICV-9792;AV9-20140507
Description:
Detector: AV9

Calibration Date: 5/8/2014 12:06:10AM
Analyst: 60040

Source Info

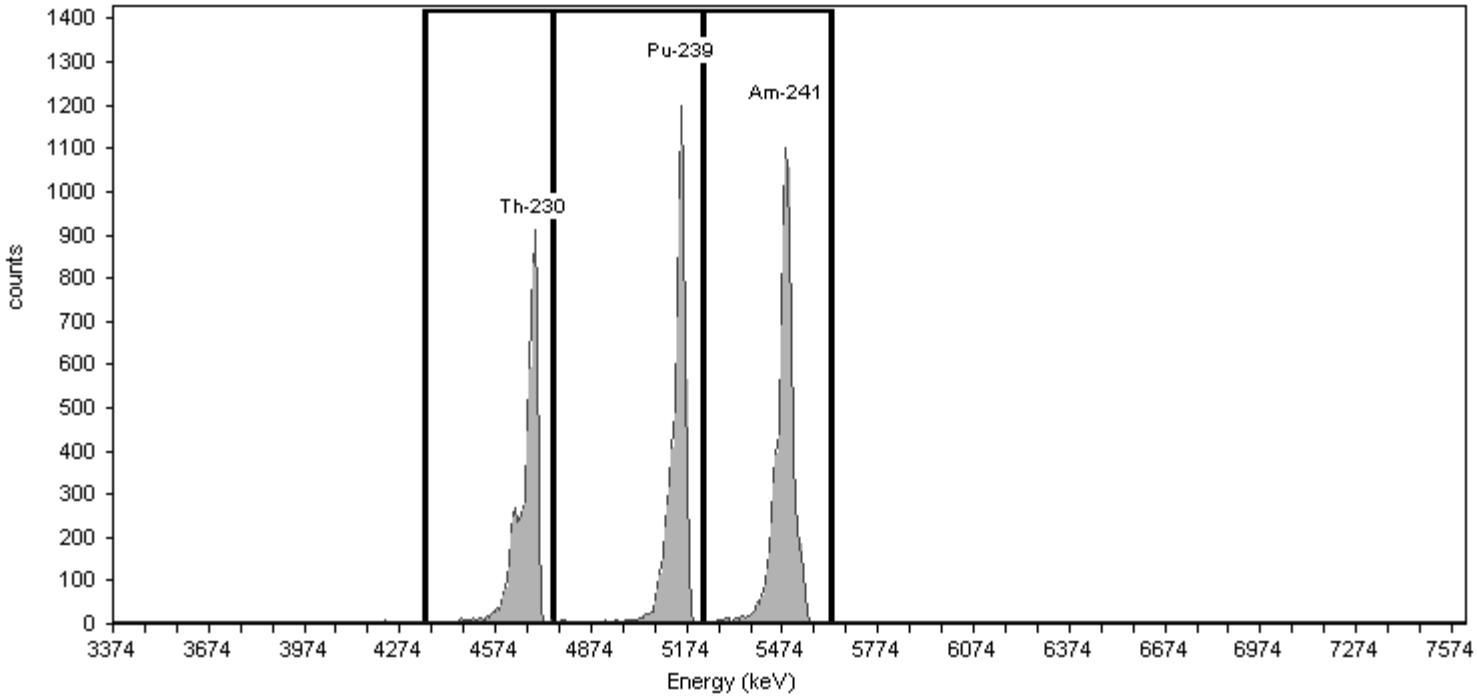
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV9 , SN: 51-082V5
Acquisition Start Date: 5/7/2014 11:03:40PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 26.66% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,053.00	100.88
Pu-239	240	5.16	186	249	6,939.00	115.65
Am-241	284	5.49	249	303	7,853.00	130.88

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:20AM 5/8/2014

Calibration

Sample Name: ICV-9793;AV10-20140507
Description:
Detector: AV10

Calibration Date: 5/8/2014 12:06:16AM
Analyst: 60040

Source Info

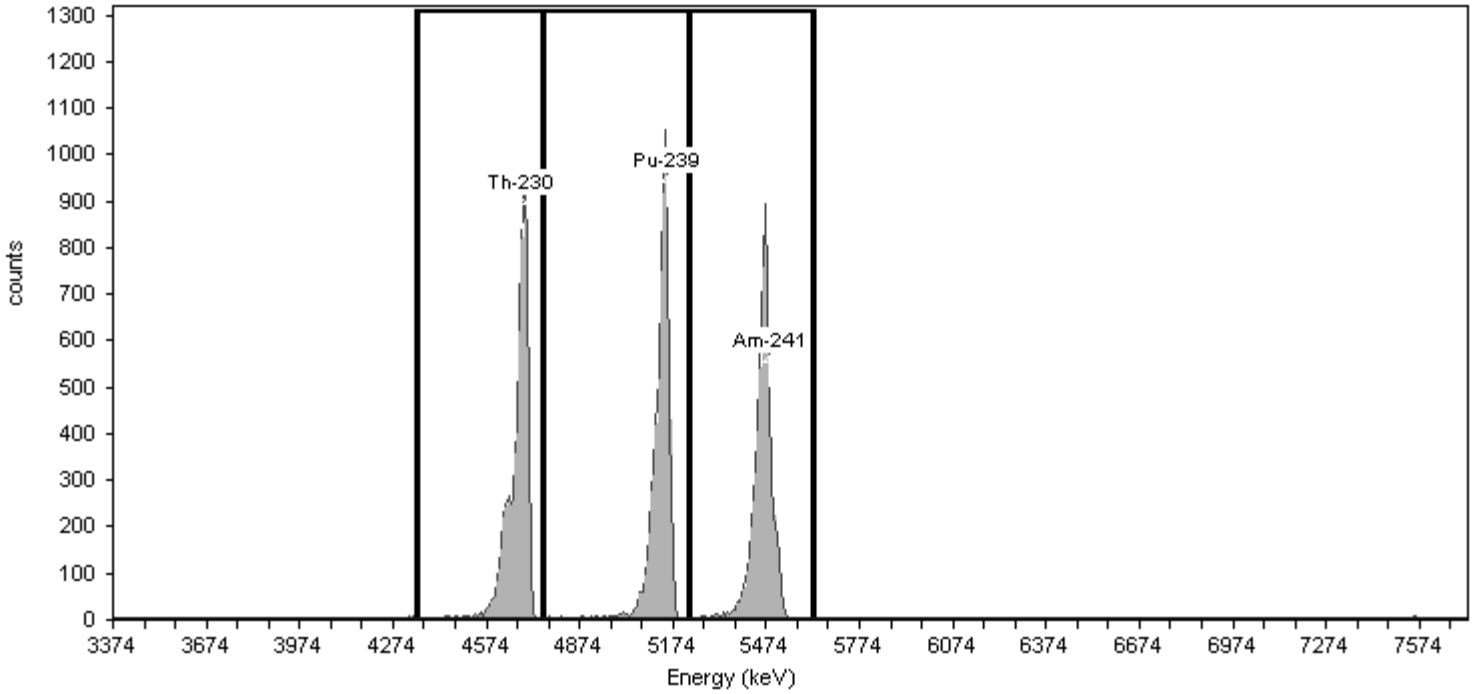
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV10 , SN: 49-155N2
Acquisition Start Date: 5/7/2014 11:03:59PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 25.93% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,246.00	104.10
Pu-239	240	5.16	186	249	6,407.00	106.78
Am-241	284	5.49	249	303	6,047.00	100.78

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:26AM 5/8/2014

Calibration

Sample Name: ICV-9794;AV11-20140507
Description:
Detector: AV11

Calibration Date: 5/8/2014 12:06:22AM
Analyst: 60040

Source Info

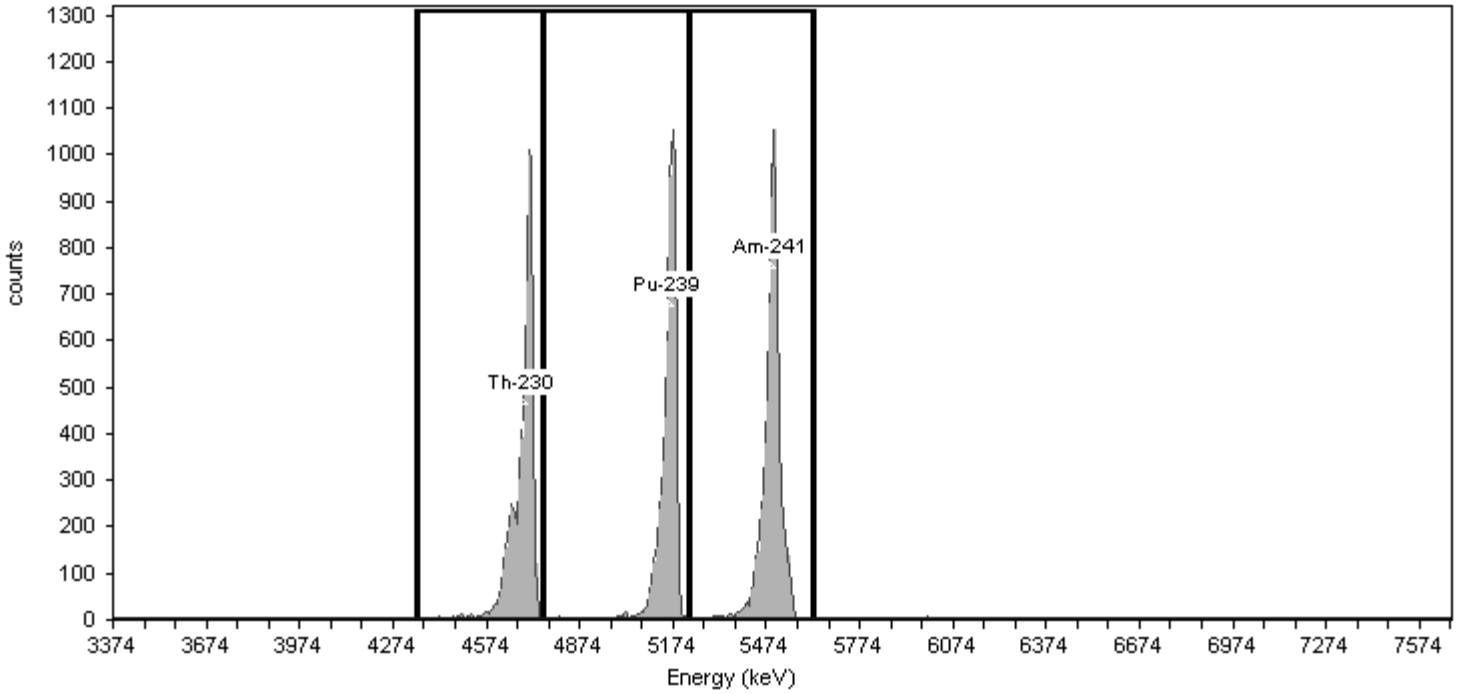
Certificate ID: 82242-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV11 , SN: 49-155dd2
Acquisition Start Date: 5/7/2014 11:04:13PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 25.98% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,238.00	103.97
Pu-239	240	5.16	186	249	5,922.00	98.70
Am-241	284	5.49	249	303	6,644.00	110.73

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:32AM 5/8/2014

Calibration

Sample Name: ICV-9795;AV12-20140507
Description:
Detector: AV12

Calibration Date: 5/8/2014 12:06:29AM
Analyst: 60040

Source Info

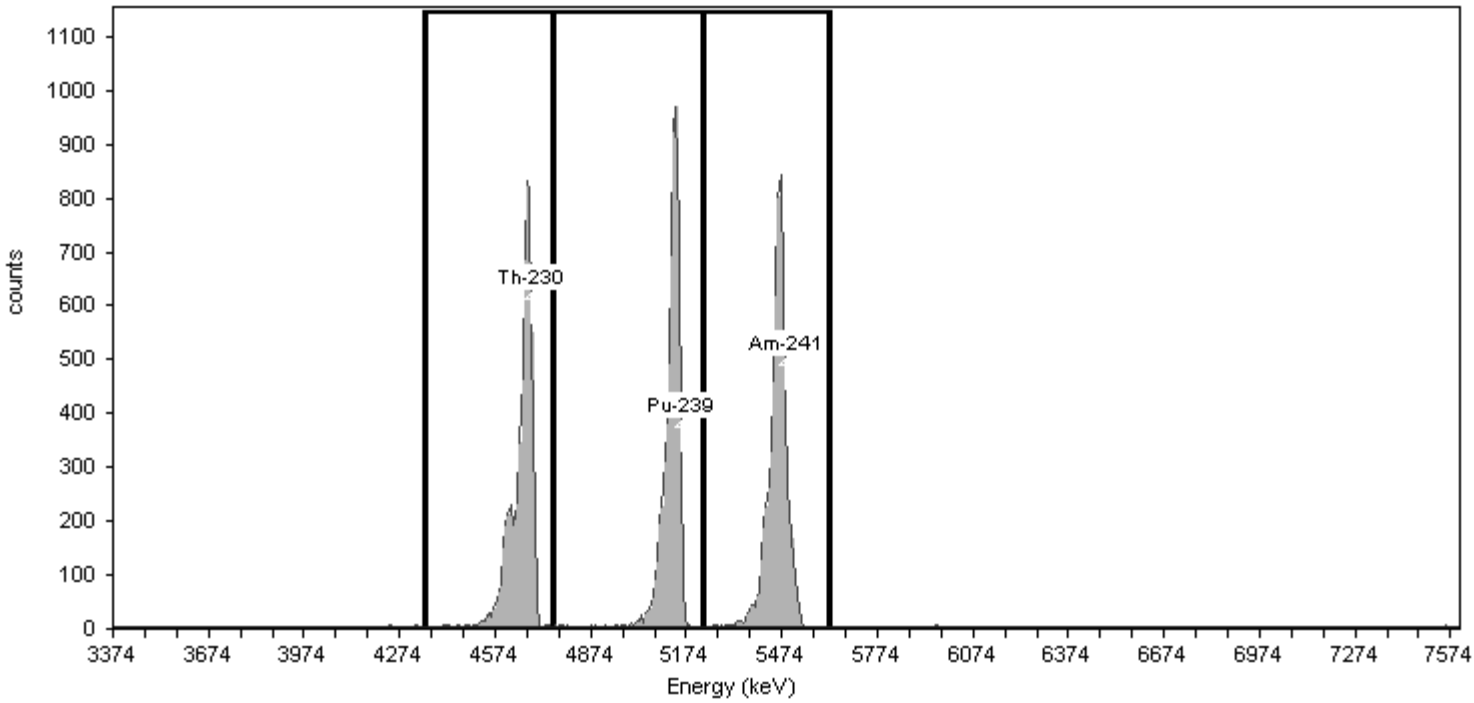
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV12 , SN: 51-082B7
Acquisition Start Date: 5/7/2014 11:04:29PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 26.88% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,706.00	95.10
Pu-239	240	5.16	186	249	5,810.00	96.83
Am-241	284	5.49	249	303	6,092.00	101.53

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:38AM 5/8/2014

Calibration

Sample Name: ICV-9817;AV13-20140507
Description:
Detector: AV13

Calibration Date: 5/8/2014 12:06:35AM
Analyst: 60040

Source Info

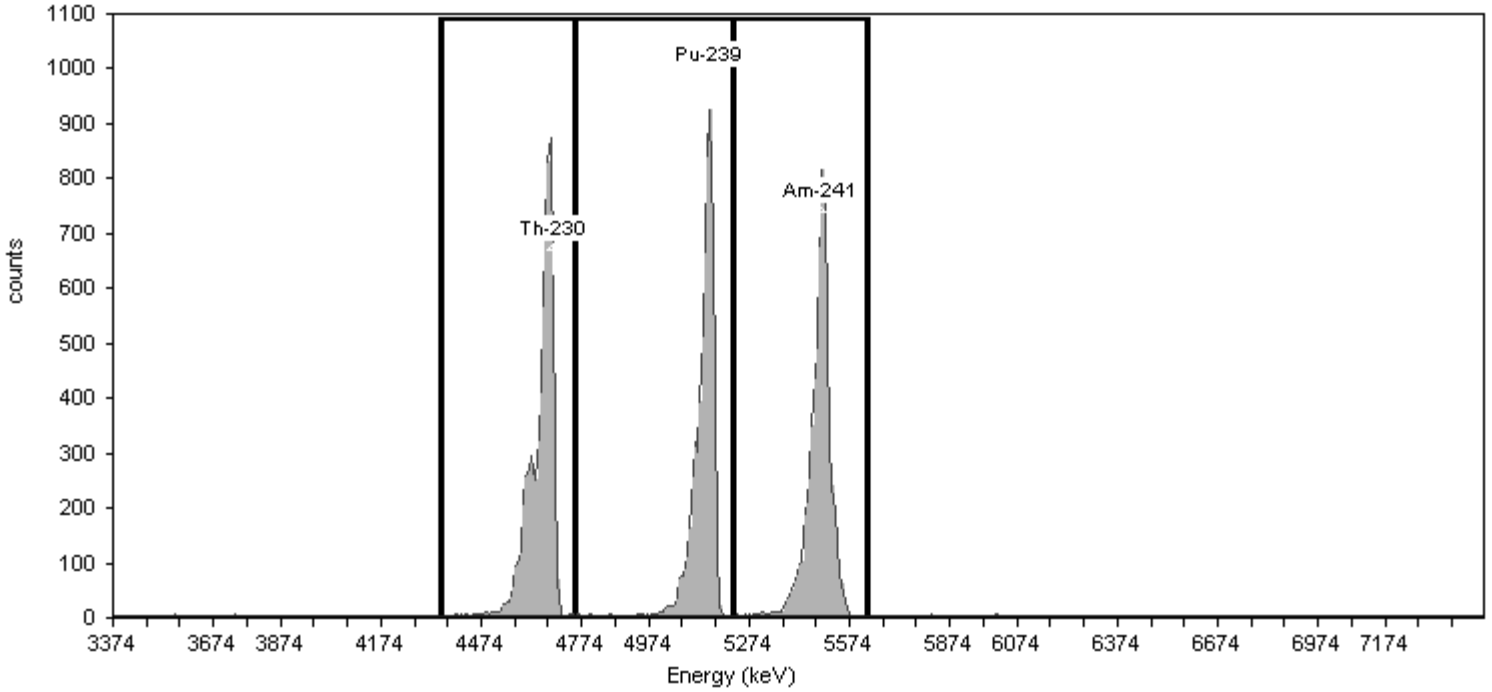
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV13 , SN: 49-155M7
Acquisition Start Date: 5/7/2014 11:04:39PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 25.56% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,777.00	112.95
Pu-239	240	5.16	186	249	6,153.00	102.55
Am-241	284	5.49	249	303	6,331.00	105.52

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:44AM 5/8/2014

Calibration

Sample Name: ICV-9884;AV14-20140507
Description:
Detector: AV14

Calibration Date: 5/8/2014 12:06:41AM
Analyst: 60040

Source Info

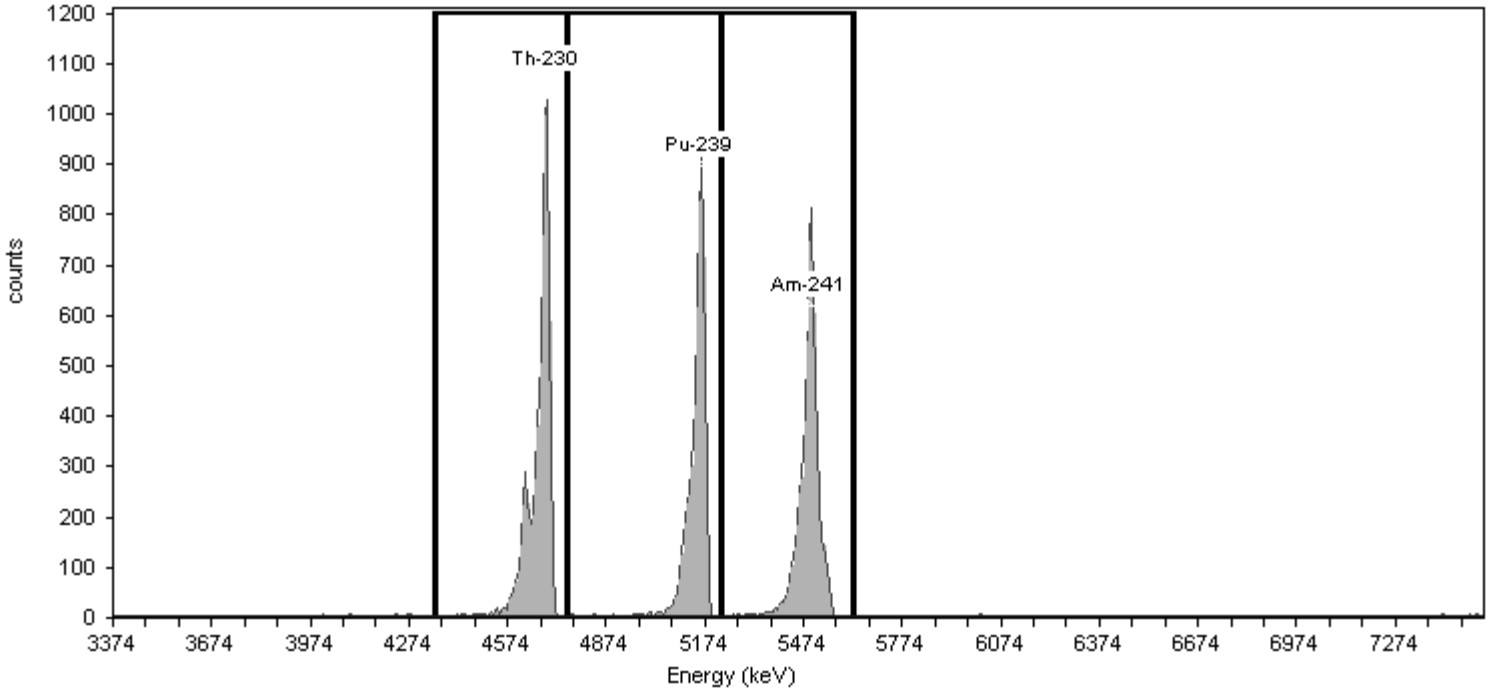
Certificate ID: 82245-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV14 , SN: 50-060W4
Acquisition Start Date: 5/7/2014 11:04:56PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 26.65% +/- 0.49% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,320.00	105.33
Pu-239	240	5.16	186	249	5,234.00	87.23
Am-241	284	5.49	249	303	5,413.00	90.22

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:20:02PM 5/8/2014

Calibration

Sample Name: ICV-9792;AV24-20140507
Description:
Detector: AV24

Calibration Date: 5/8/2014 2:19:58PM
Analyst: 60040

Source Info

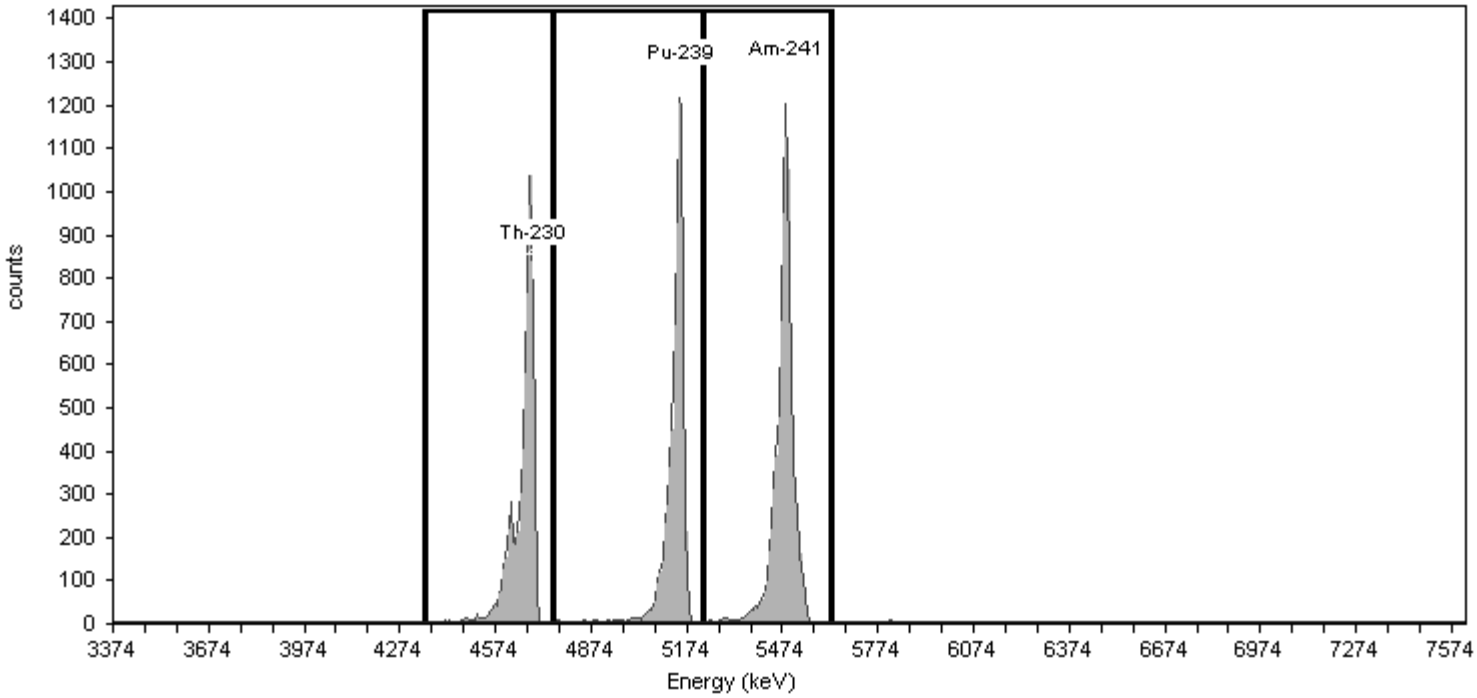
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV24 , SN: 47-137Q4
Acquisition Start Date: 5/8/2014 12:16:41AM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 26.62% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,034.00	100.57
Pu-239	240	5.16	186	249	6,927.00	115.45
Am-241	284	5.49	249	303	7,852.00	130.87

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:24:12PM 5/11/2014

Calibration

Sample Name: ICV-8874;AV51-20140508
Description:
Detector: AV51

Calibration Date: 5/11/2014 7:11:36PM
Analyst: 60040

Source Info

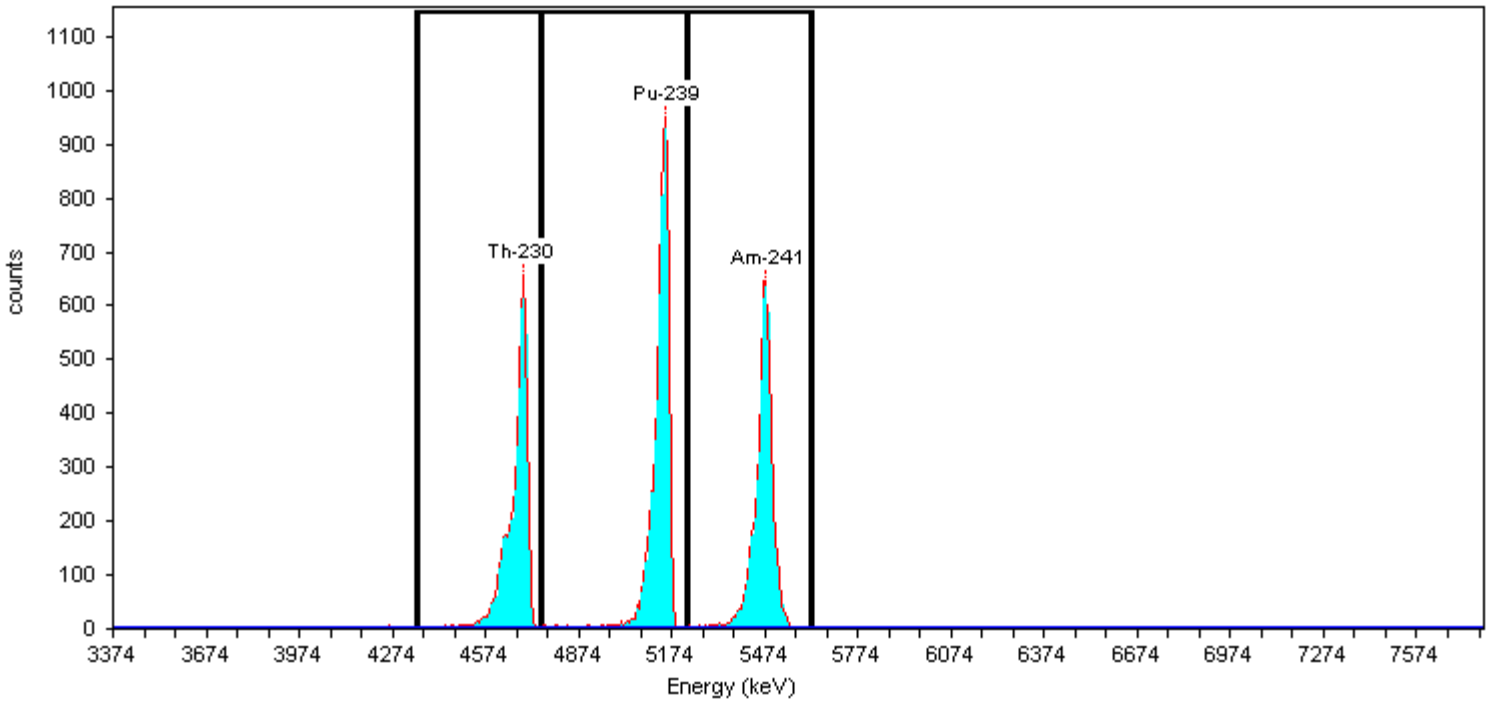
Certificate ID: 82233-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV51 , SN: 48-109I1
Acquisition Start Date: 5/8/2014 5:17:28PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.93% +/- 0.50% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	4,588.00	76.47
Pu-239	240	5.16	186	249	6,104.00	101.73
Am-241	284	5.49	249	303	4,927.00	82.12

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:21:00PM 5/8/2014

Calibration

Sample Name: ICV-8876;AV53-20140507
Description:
Detector: AV53

Calibration Date: 5/8/2014 2:20:55PM
Analyst: 60040

Source Info

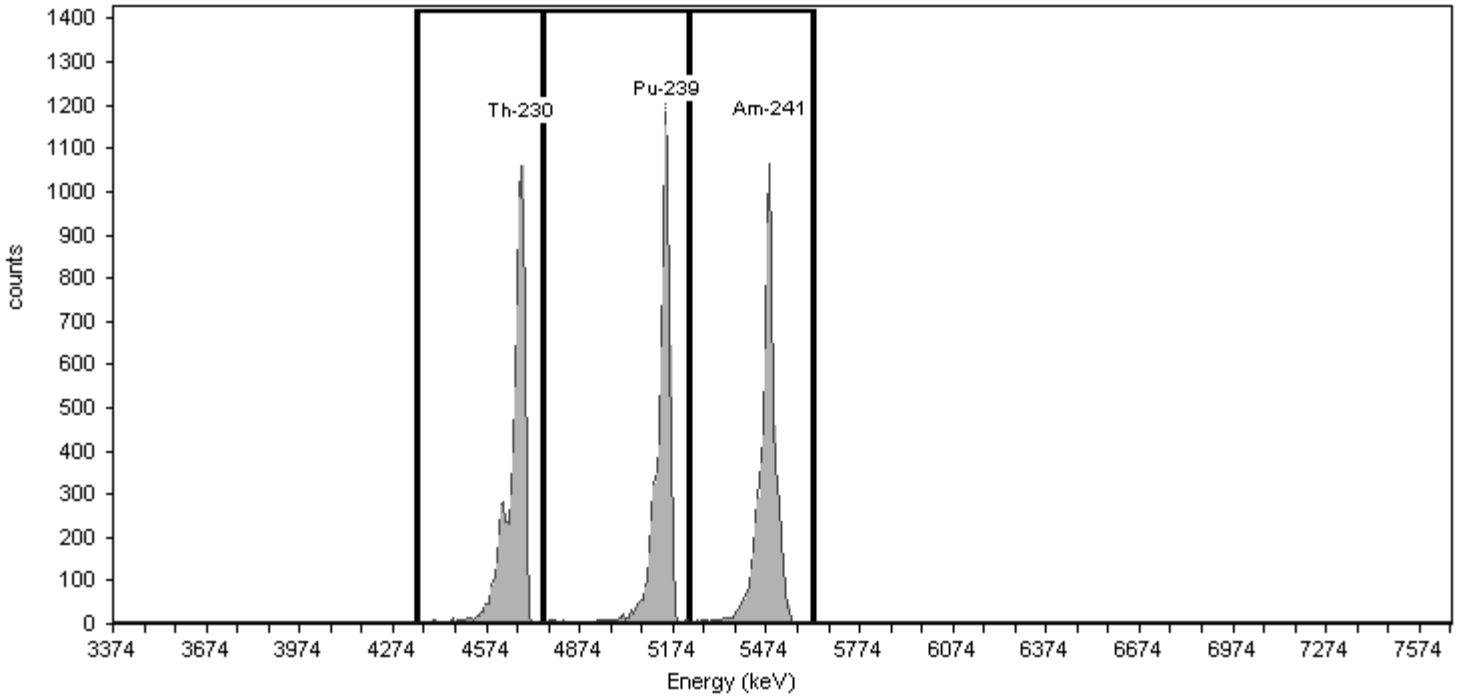
Certificate ID: 82235-334
Prepared by: Analytics

Certification Date: 6/4/2010 12:00:00PM
Description:

Acquisition

Detector: AV53 , SN: 50-051A6
Acquisition Start Date: 5/8/2014 12:18:30AM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.48% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,832.00	113.87
Pu-239	240	5.16	186	249	6,635.00	110.58
Am-241	284	5.49	249	303	7,020.00	117.00

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:56:47PM 5/8/2014

Calibration

Sample Name: ICV-8877;AV54-050814
Description:
Detector: AV54

Calibration Date: 5/8/2014 4:56:44PM
Analyst: 60040

Source Info

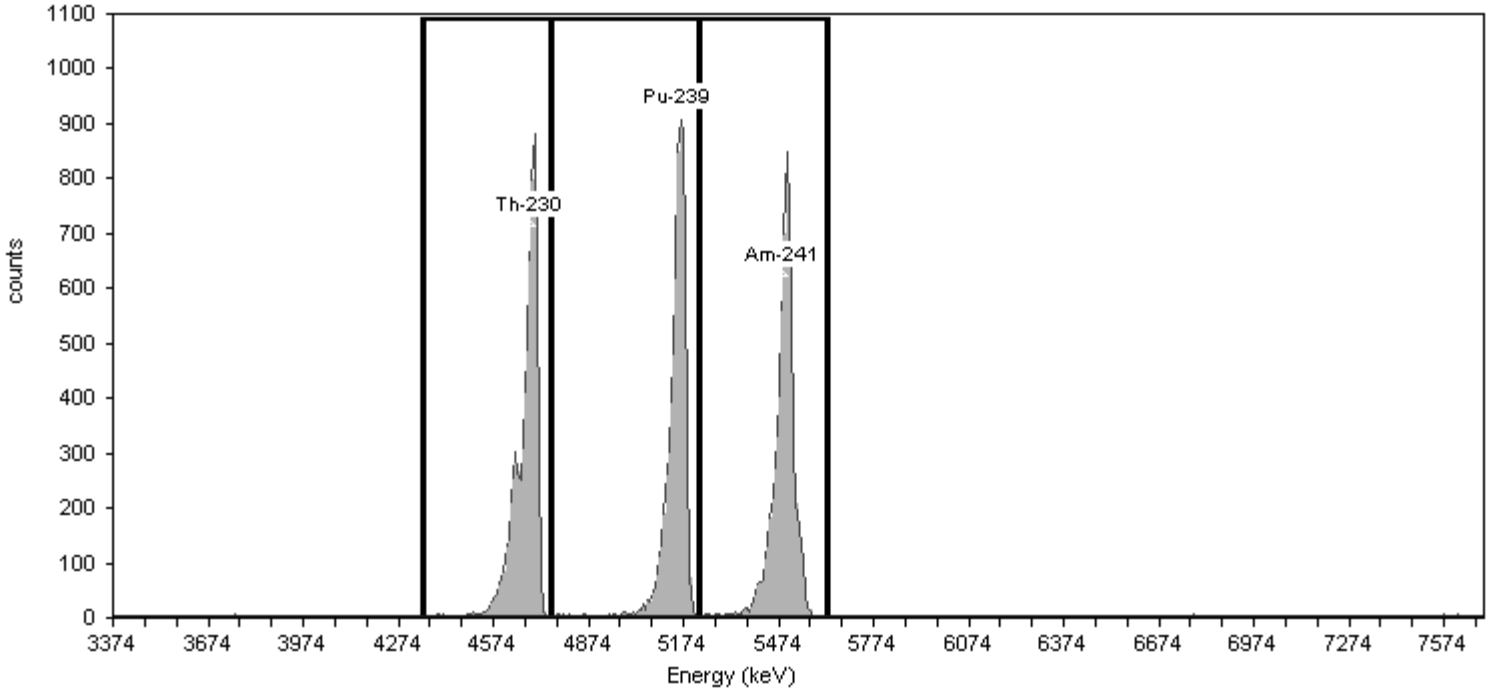
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV54 , SN: 48-046II6
Acquisition Start Date: 5/8/2014 2:34:44PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.09% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,474.00	107.90
Pu-239	240	5.16	186	249	6,518.00	108.63
Am-241	284	5.49	249	303	6,409.00	106.82

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:21:05PM 5/8/2014

Calibration

Sample Name: ICV-9520;AV55-20140507
Description:
Detector: AV55

Calibration Date: 5/8/2014 2:21:02PM
Analyst: 60040

Source Info

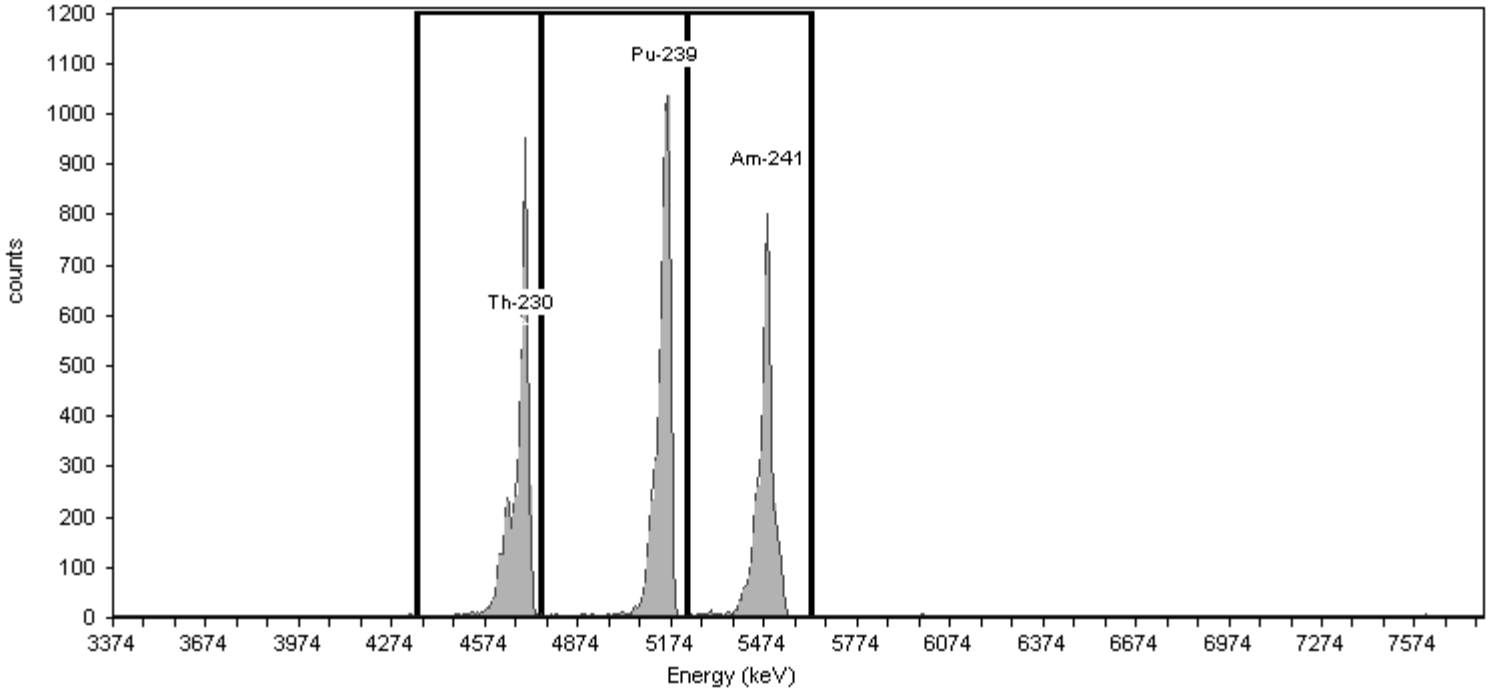
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV55 , SN: 50-051C2
Acquisition Start Date: 5/8/2014 12:19:12AM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 25.69% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,273.00	87.88
Pu-239	240	5.16	186	249	6,108.00	101.80
Am-241	284	5.49	249	303	5,136.00	85.60

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:24:33PM 5/11/2014

Calibration

Sample Name: ICV-9886;AV56-20140508
Description:
Detector: AV56

Calibration Date: 5/11/2014 7:11:51PM
Analyst: 60040

Source Info

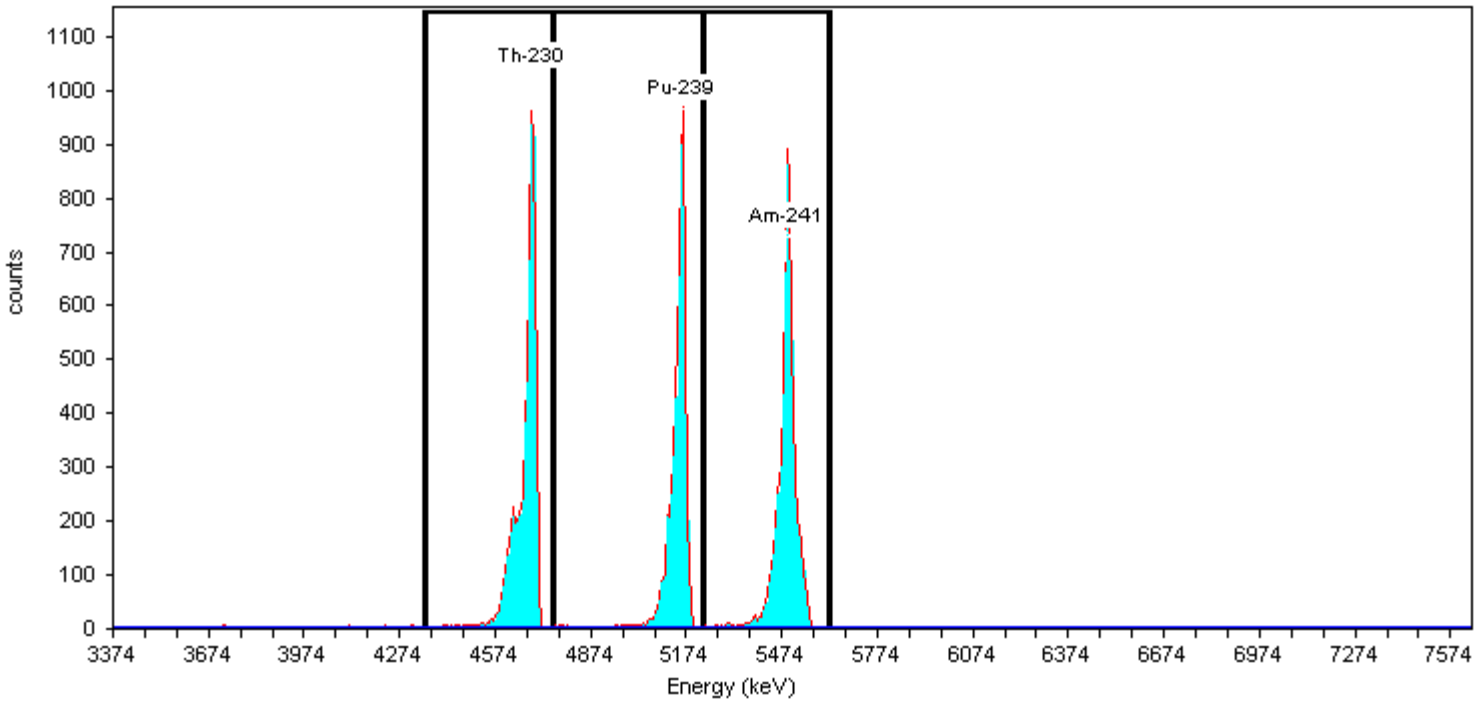
Certificate ID: 82247-334
Prepared by: Analytics

Certification Date: 6/10/2010 12:00:00PM
Description:

Acquisition

Detector: AV56 , SN: 52-059EE5
Acquisition Start Date: 5/8/2014 5:18:05PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 25.19% +/- 0.45% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,679.00	94.65
Pu-239	240	5.16	186	249	5,201.00	86.68
Am-241	284	5.49	249	303	5,671.00	94.52

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:56:59PM 5/8/2014

Calibration

Sample Name: ICV-9793;AV58-050814
Description:
Detector: AV58

Calibration Date: 5/8/2014 4:56:56PM
Analyst: 60040

Source Info

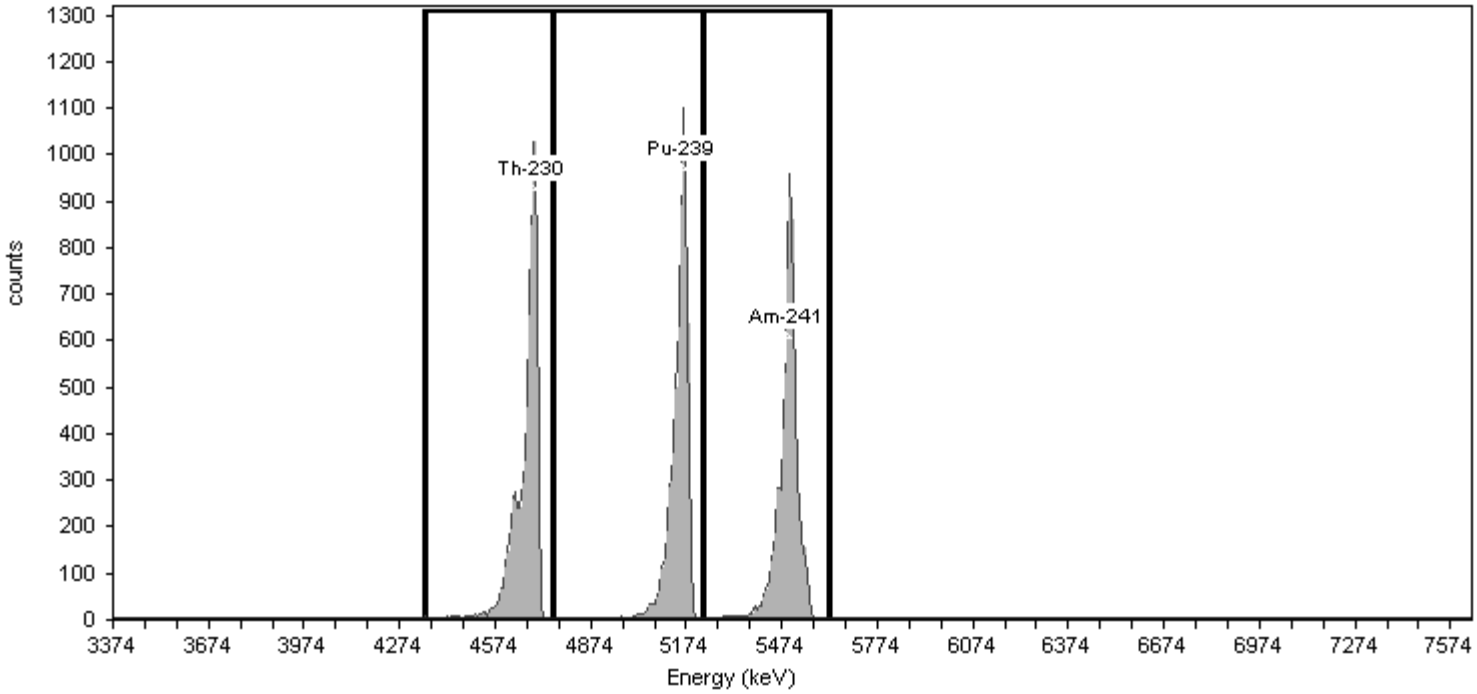
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV58 , SN: 52-102 C5
Acquisition Start Date: 5/8/2014 2:35:18PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 27.10% +/- 0.44% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,559.00	109.32
Pu-239	240	5.16	186	249	6,569.00	109.48
Am-241	284	5.49	249	303	6,413.00	106.88

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:57:08PM 5/8/2014

Calibration

Sample Name: ICV-9794;AV59-050814
Description:
Detector: AV59

Calibration Date: 5/8/2014 4:57:05PM
Analyst: 60040

Source Info

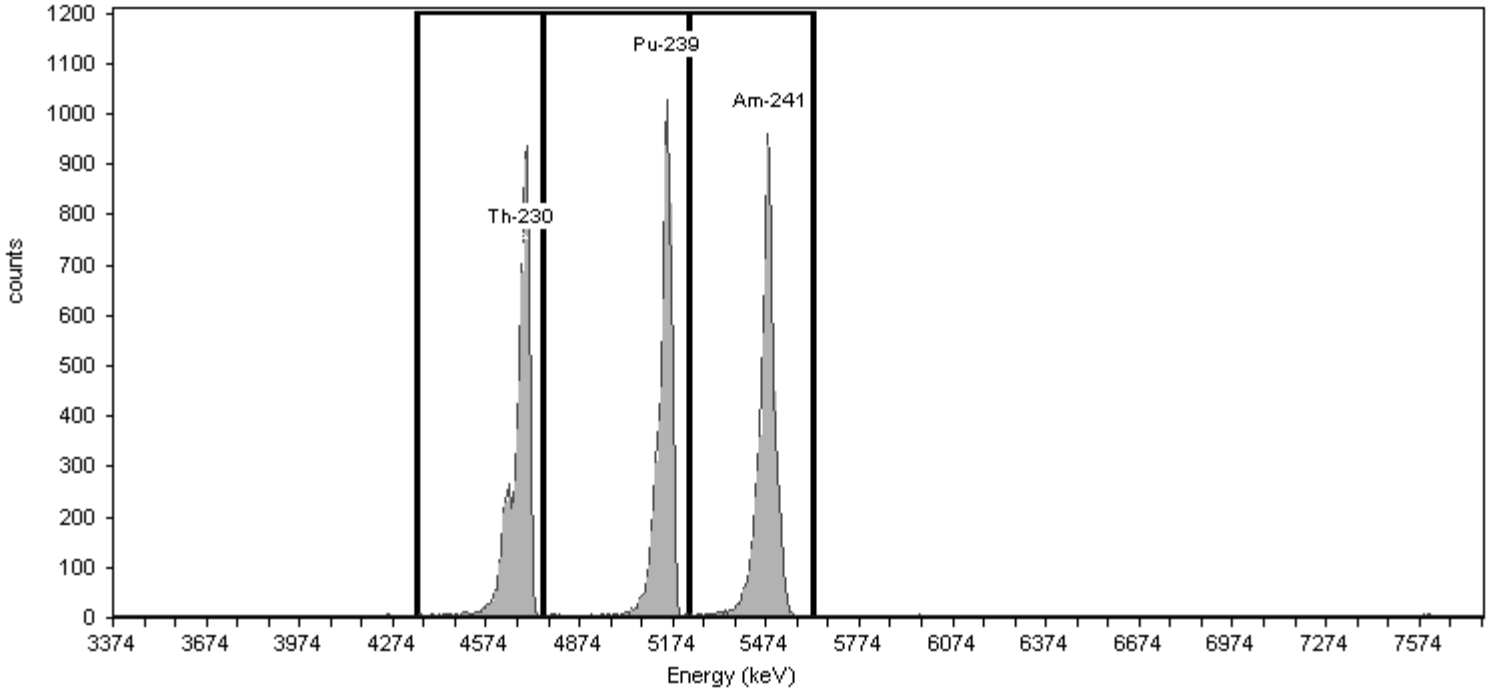
Certificate ID: 82242-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV59 , SN: 49-155M7
Acquisition Start Date: 5/8/2014 2:36:11PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.77% +/- 0.44% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,424.00	107.07
Pu-239	240	5.16	186	249	6,120.00	102.00
Am-241	284	5.49	249	303	6,829.00	113.82

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:24:44PM 5/11/2014

Calibration

Sample Name: ICV-9795;AV60-20140508
Description:
Detector: AV60

Calibration Date: 5/11/2014 7:13:44PM
Analyst: 60040

Source Info

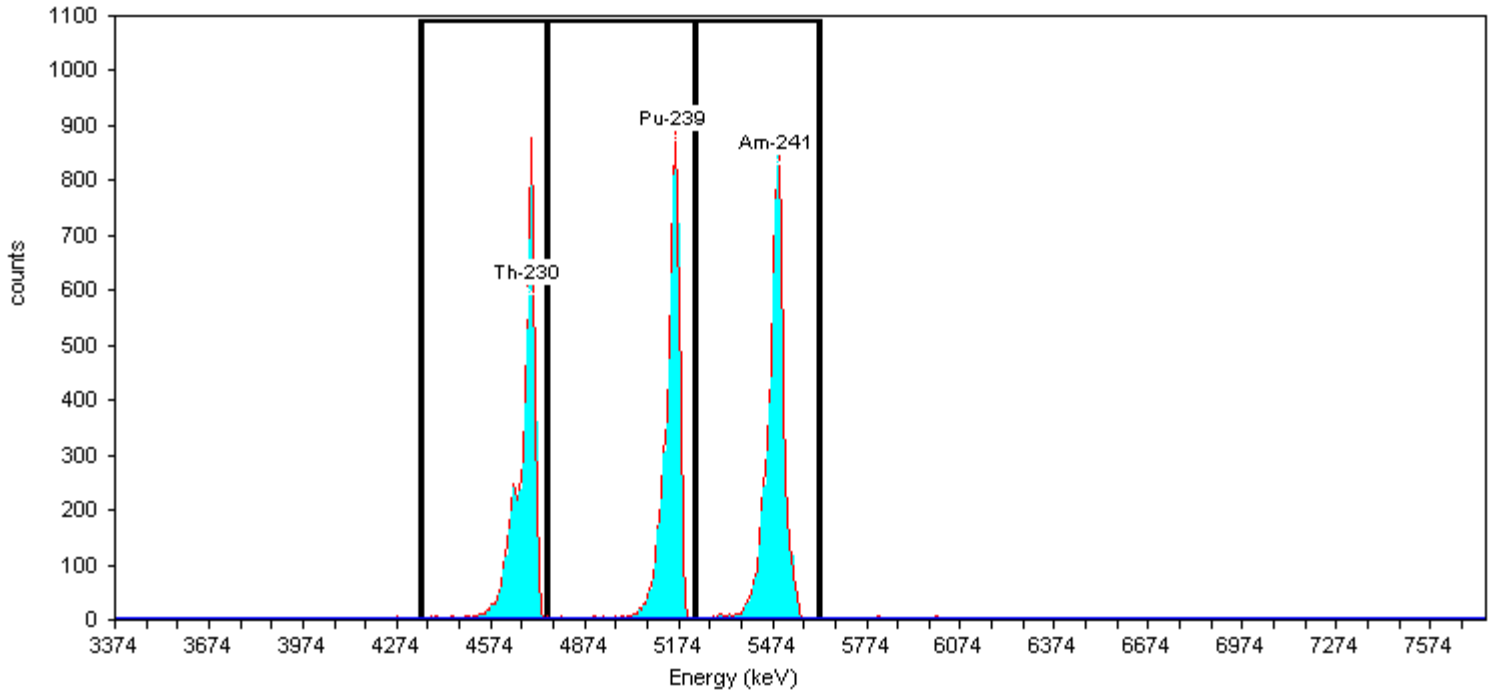
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV60 , SN: 49-027117
Acquisition Start Date: 5/8/2014 5:21:42PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 27.25% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,727.00	95.45
Pu-239	240	5.16	186	249	5,760.00	96.00
Am-241	284	5.49	249	303	6,362.00	106.03

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:57:49PM 5/8/2014

Calibration

Sample Name: ICV-9817;AV61-050814
Description:
Detector: AV61

Calibration Date: 5/8/2014 4:57:46PM
Analyst: 60040

Source Info

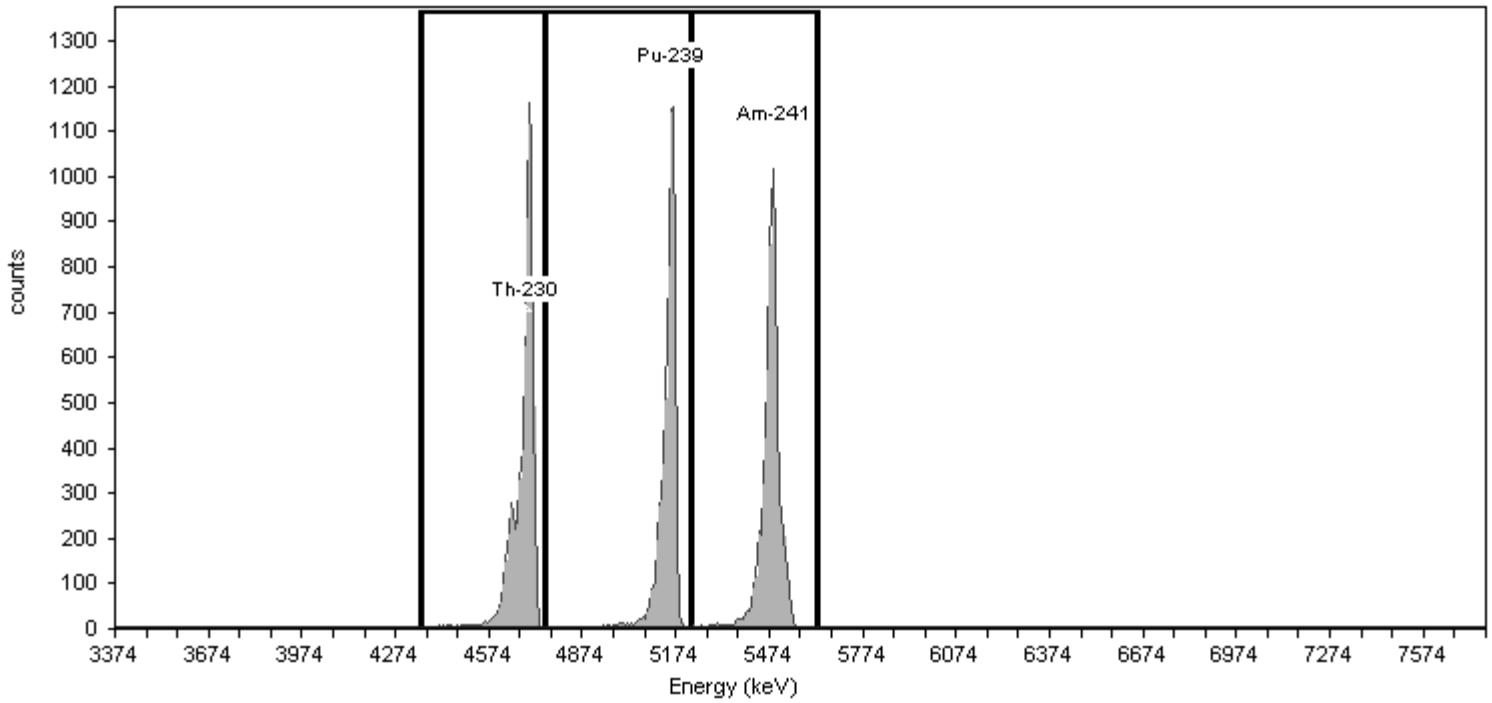
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV61 , SN: 5-051JJ3
Acquisition Start Date: 5/8/2014 2:36:18PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 25.81% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,807.00	113.45
Pu-239	240	5.16	186	249	6,203.00	103.38
Am-241	284	5.49	249	303	6,437.00	107.28

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:57:55PM 5/8/2014

Calibration

Sample Name: ICV-9884;AV62-050814
Description:
Detector: AV62

Calibration Date: 5/8/2014 4:57:52PM
Analyst: 60040

Source Info

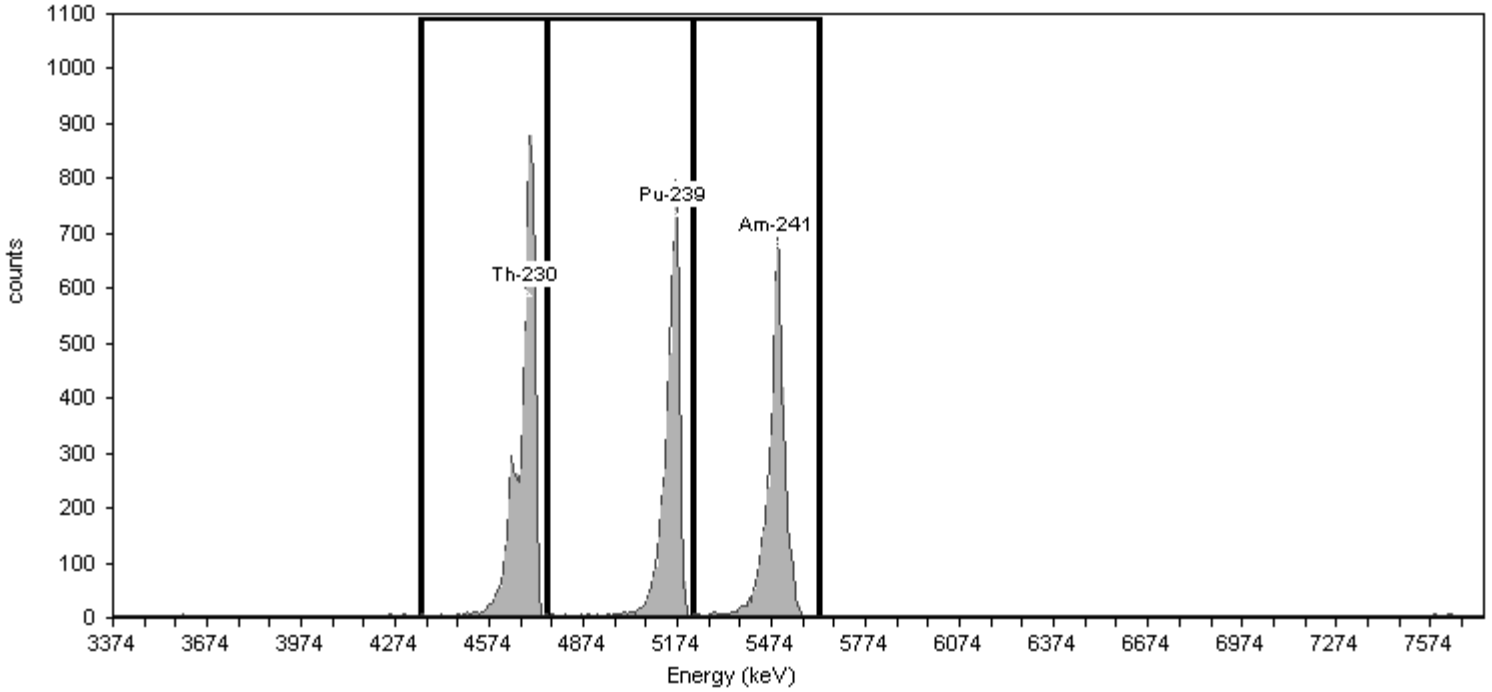
Certificate ID: 82245-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV62 , SN: 52-060FF2
Acquisition Start Date: 5/8/2014 2:36:19PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.22% +/- 0.48% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,368.00	106.13
Pu-239	240	5.16	186	249	5,206.00	86.77
Am-241	284	5.49	249	303	5,104.00	85.07

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:58:01PM 5/8/2014

Calibration

Sample Name: ICV-9885;AV63-050814
Description:
Detector: AV63

Calibration Date: 5/8/2014 4:57:58PM
Analyst: 60040

Source Info

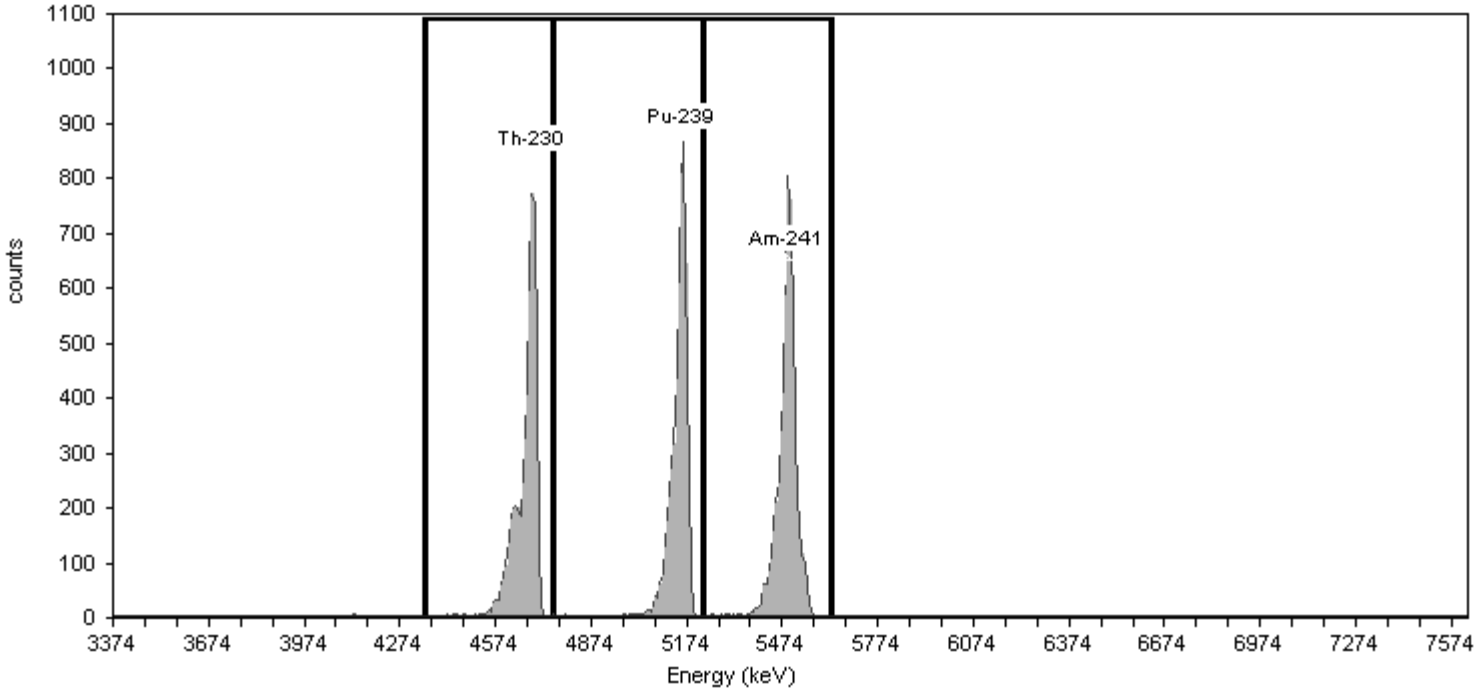
Certificate ID: 82246-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV63 , SN: 47-029ff2
Acquisition Start Date: 5/8/2014 2:36:20PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.01% +/- 0.49% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,165.00	86.08
Pu-239	240	5.16	186	249	5,120.00	85.33
Am-241	284	5.49	249	303	5,539.00	92.32

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:38:14PM 5/11/2014

Calibration

Sample Name: ICV-9886;AV64-20140511
Description:
Detector: AV64

Calibration Date: 5/11/2014 8:38:09PM
Analyst: 60040

Source Info

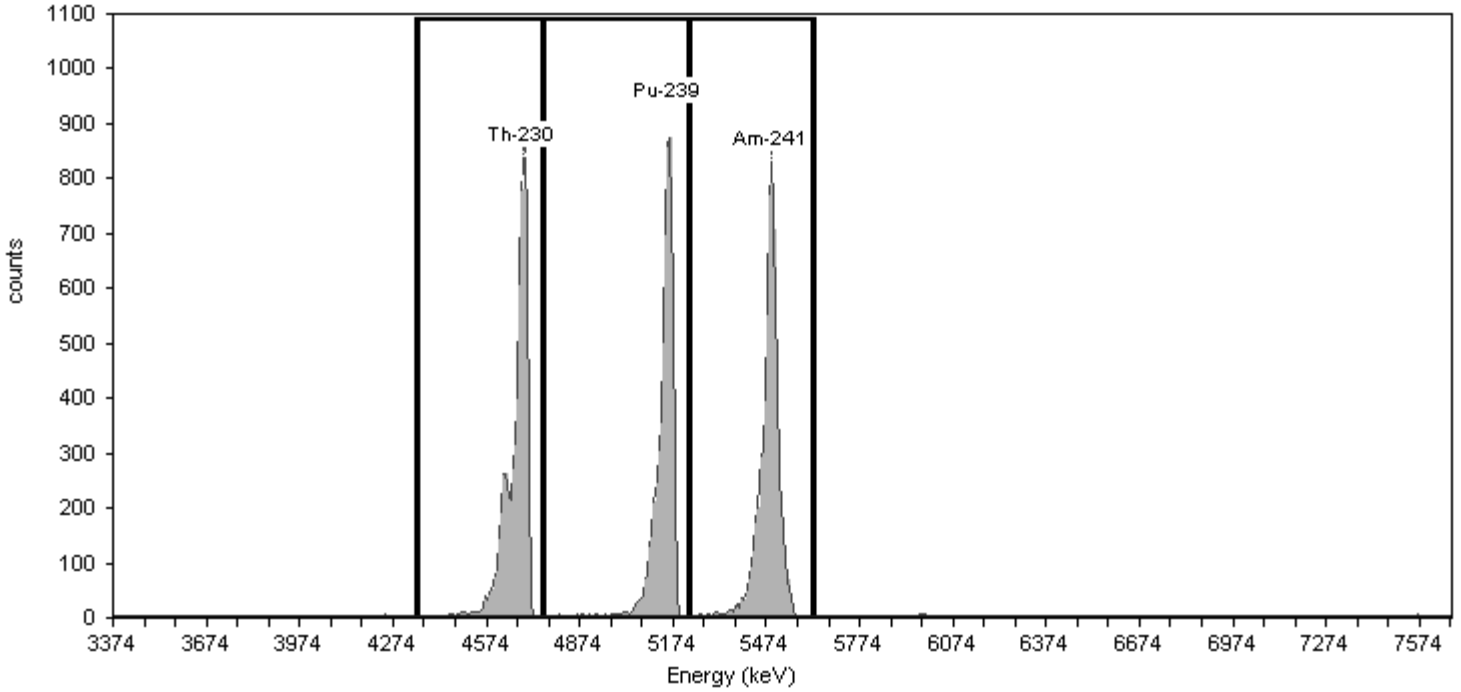
Certificate ID: 82247-334
Prepared by: Analytics

Certification Date: 6/10/2010 12:00:00PM
Description:

Acquisition

Detector: AV64 , SN: 47-029ee4
Acquisition Start Date: 5/11/2014 7:31:26PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.66% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,933.00	98.88
Pu-239	240	5.16	186	249	5,541.00	92.35
Am-241	284	5.49	249	303	6,049.00	100.82

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:24:54PM 5/11/2014

Calibration

Sample Name: ICV-7107;AV65-20140508
Description:
Detector: AV65

Calibration Date: 5/11/2014 7:11:57PM
Analyst: 60040

Source Info

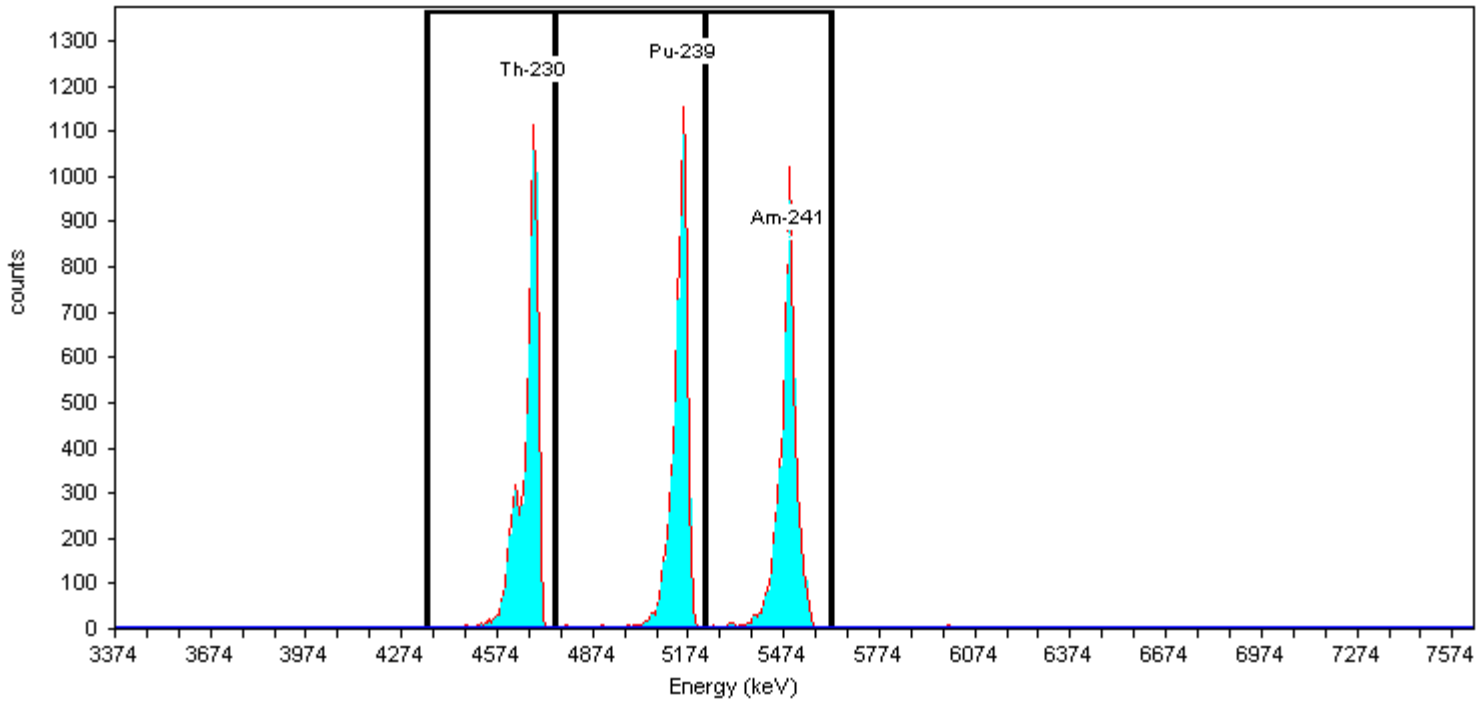
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV65 , SN: 44-049JJ1
Acquisition Start Date: 5/8/2014 5:18:33PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 27.12% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	7,390.00	123.17
Pu-239	240	5.16	186	249	7,136.00	118.93
Am-241	284	5.49	249	303	6,971.00	116.18

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:38:22PM 5/11/2014

Calibration

Sample Name: ICV-8874;AV66-20140511
Description:
Detector: AV66

Calibration Date: 5/11/2014 8:38:19PM
Analyst: 60040

Source Info

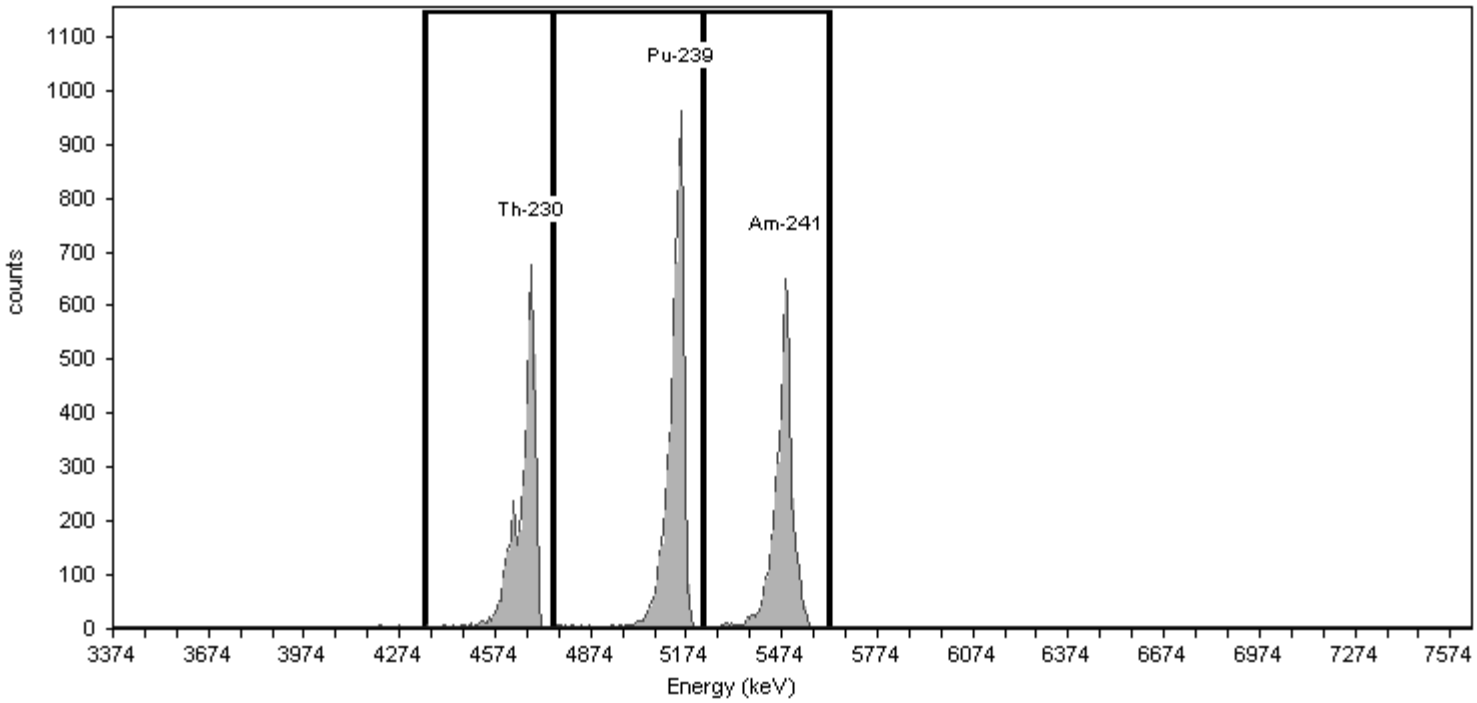
Certificate ID: 82233-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV66 , SN: 48-158EE2
Acquisition Start Date: 5/11/2014 7:32:00PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.67% +/- 0.50% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	4,596.00	76.60
Pu-239	240	5.16	186	249	6,078.00	101.30
Am-241	284	5.49	249	303	4,792.00	79.87

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:38:28PM 5/11/2014

Calibration

Sample Name: ICV-8875;AV67-20140511
Description:
Detector: AV67

Calibration Date: 5/11/2014 8:38:25PM
Analyst: 60040

Source Info

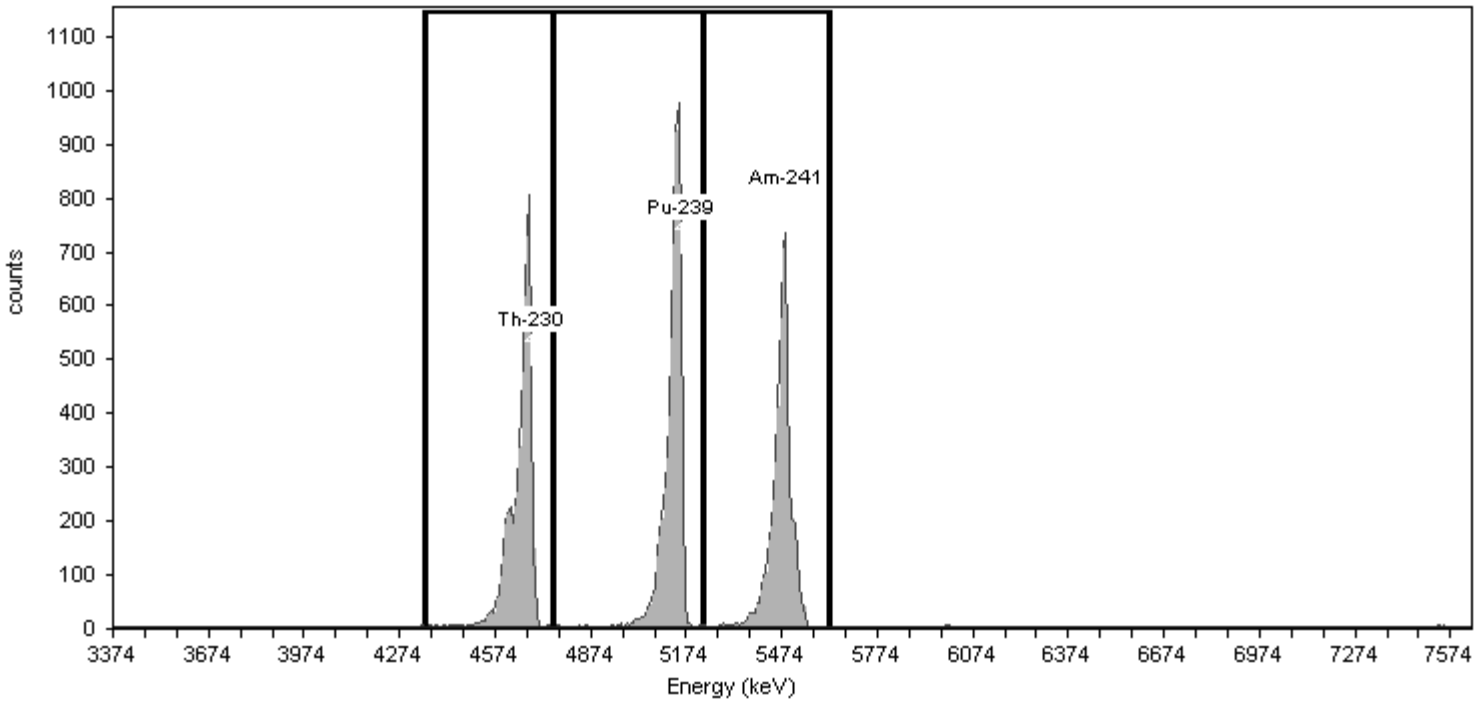
Certificate ID: 82234-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV67 , SN: 52-102 D7
Acquisition Start Date: 5/11/2014 7:32:06PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 27.02% +/- 0.49% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,466.00	91.10
Pu-239	240	5.16	186	249	6,008.00	100.13
Am-241	284	5.49	249	303	5,315.00	88.58

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:58:07PM 5/8/2014

Calibration

Sample Name: ICV-8876;AV68-050814
Description:
Detector: AV68

Calibration Date: 5/8/2014 4:58:04PM
Analyst: 60040

Source Info

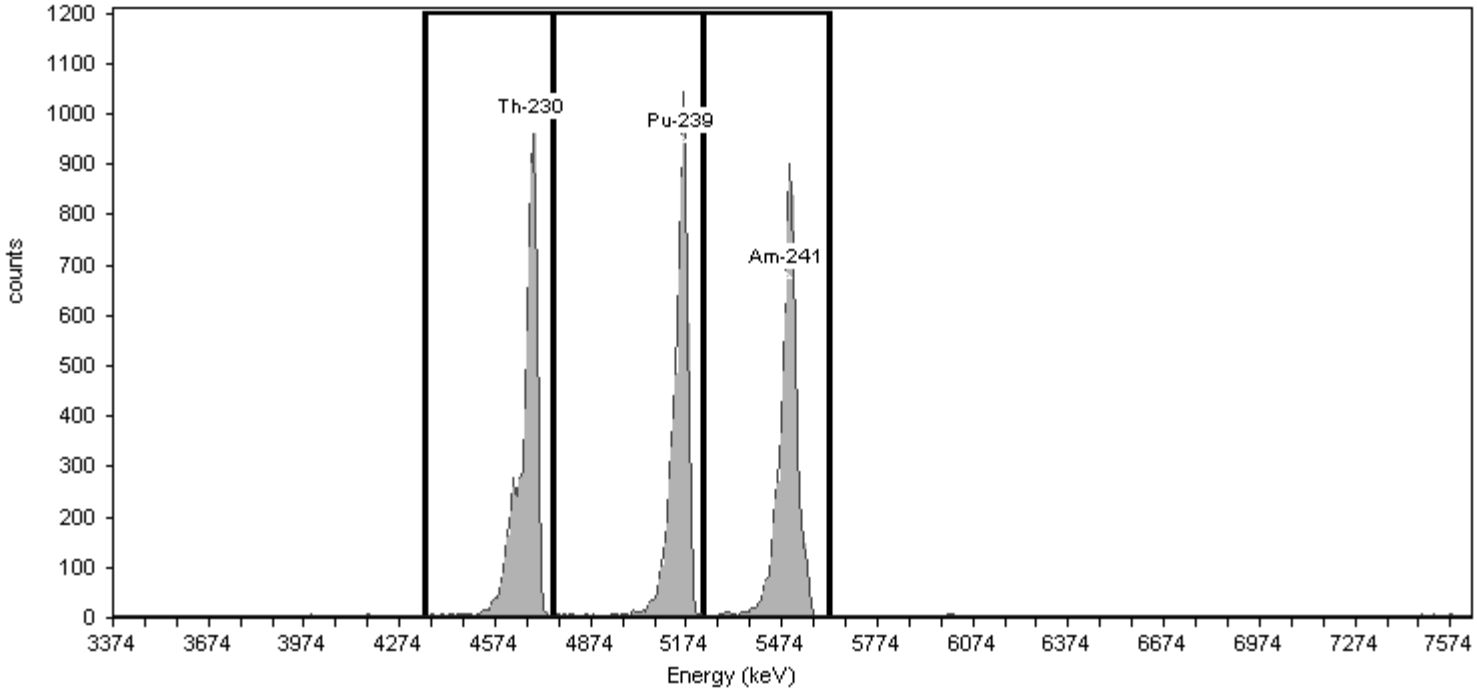
Certificate ID: 82235-334
Prepared by: Analytics

Certification Date: 6/4/2010 12:00:00PM
Description:

Acquisition

Detector: AV68 , SN: 48-45884
Acquisition Start Date: 5/8/2014 2:36:56PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.30% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,823.00	113.72
Pu-239	240	5.16	186	249	6,682.00	111.37
Am-241	284	5.49	249	303	6,857.00	114.28

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:25:07PM 5/11/2014

Calibration

Sample Name: ICV-8877;AV69-20140508
Description:
Detector: AV69

Calibration Date: 5/11/2014 7:12:03PM
Analyst: 60040

Source Info

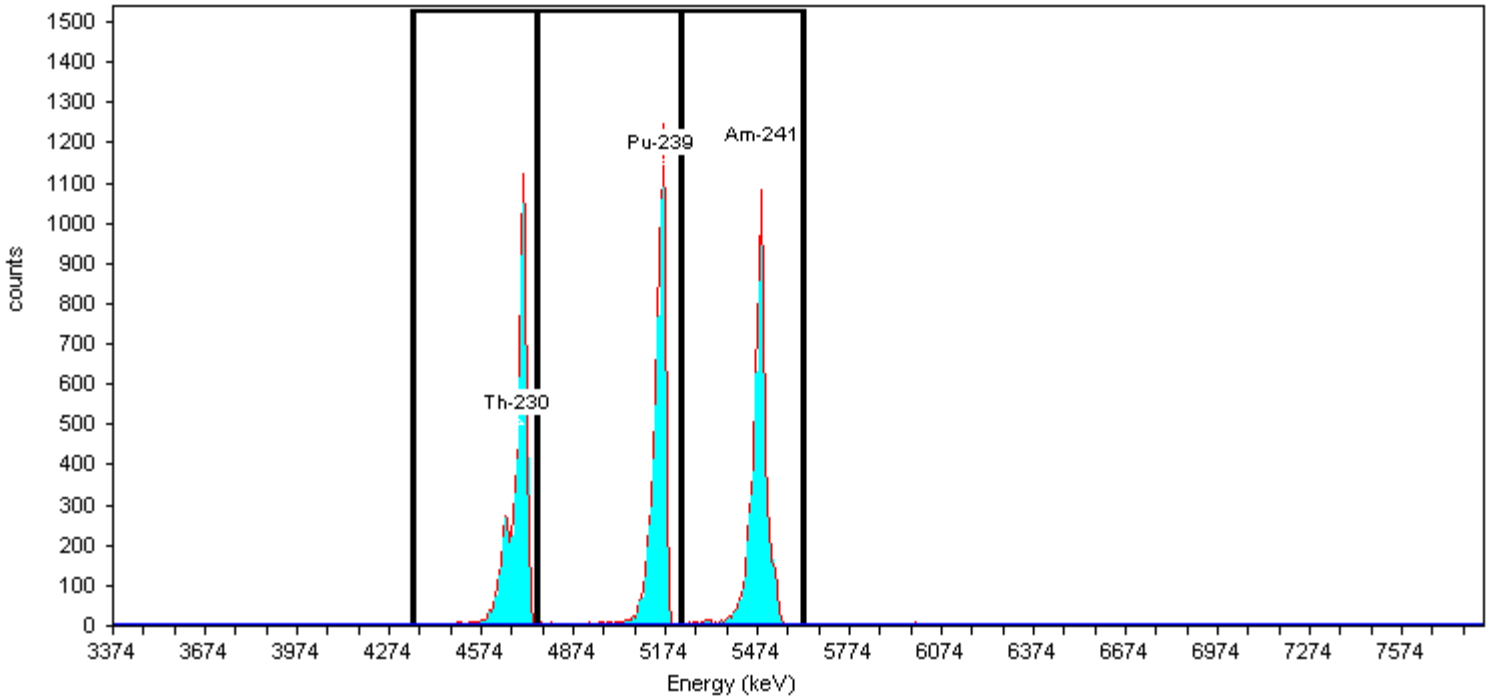
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV69 , SN: 49-155DD5
Acquisition Start Date: 5/8/2014 5:19:00PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 26.46% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,600.00	110.00
Pu-239	240	5.16	186	249	6,559.00	109.32
Am-241	284	5.49	249	303	6,509.00	108.48

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:58:13PM 5/8/2014

Calibration

Sample Name: ICV-9520;AV70-050814
Description:
Detector: AV70

Calibration Date: 5/8/2014 4:58:10PM
Analyst: 60040

Source Info

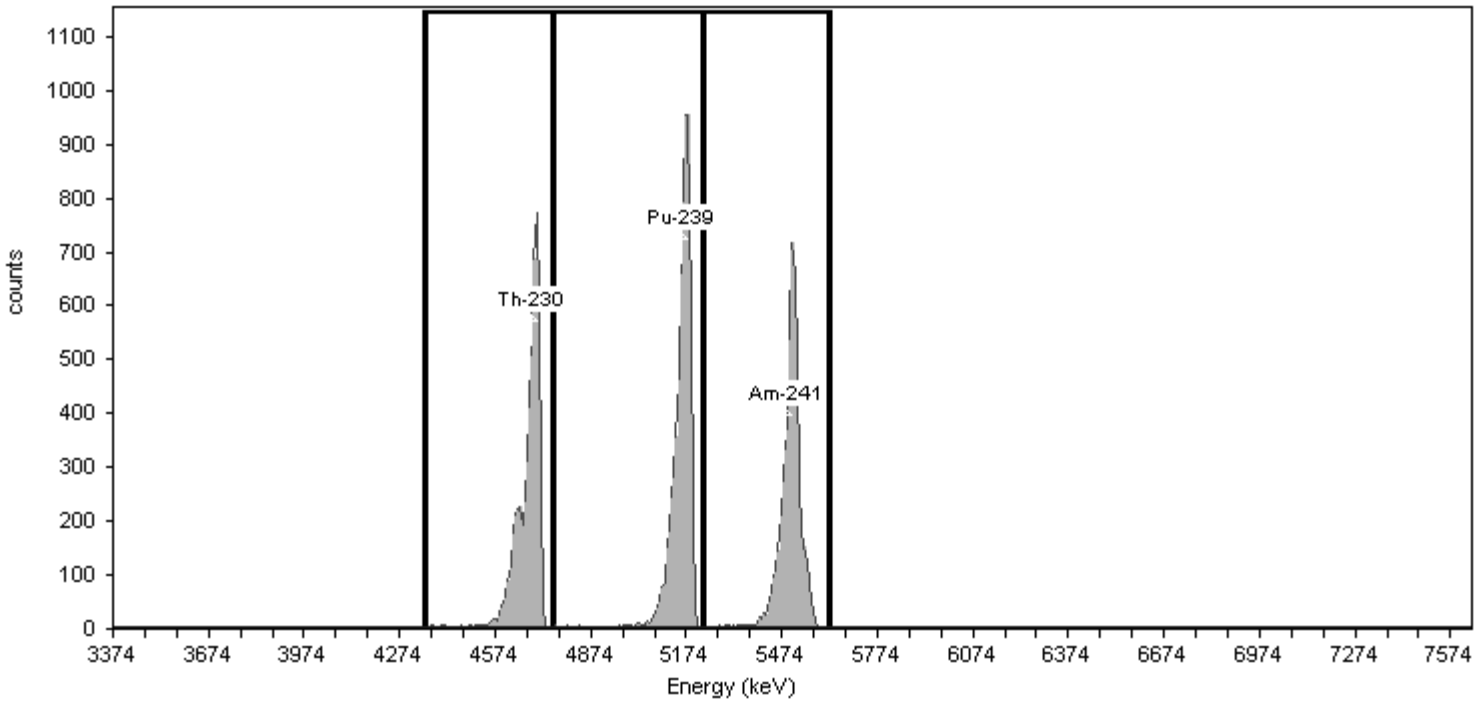
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV70 , SN: 48-158FF1
Acquisition Start Date: 5/8/2014 2:36:57PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 25.79% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,282.00	88.03
Pu-239	240	5.16	186	249	6,228.00	103.80
Am-241	284	5.49	249	303	5,074.00	84.57

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:25:16PM 5/11/2014

Calibration

Sample Name: ICV-9817;AV71-20140508
Description:
Detector: AV71

Calibration Date: 5/11/2014 7:12:09PM
Analyst: 60040

Source Info

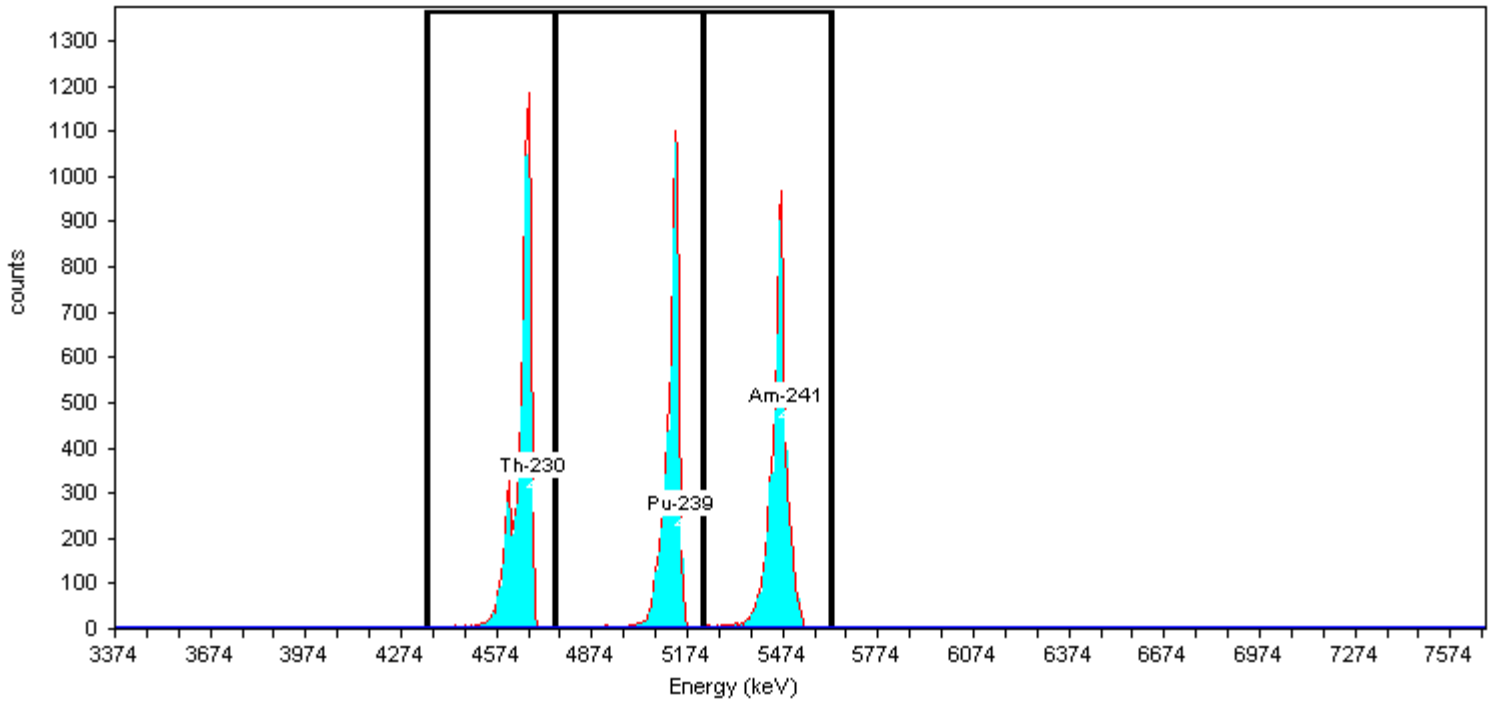
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV71 , SN: 48-158EE6
Acquisition Start Date: 5/8/2014 5:19:14PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 25.89% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,882.00	114.70
Pu-239	240	5.16	186	249	6,232.00	103.87
Am-241	284	5.49	249	303	6,392.00	106.53

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:54:55PM 5/11/2014

Calibration

Sample Name: ICV-9520;AV115-20140511
Description:
Detector: AV115

Calibration Date: 5/11/2014 9:54:52PM
Analyst: 60040

Source Info

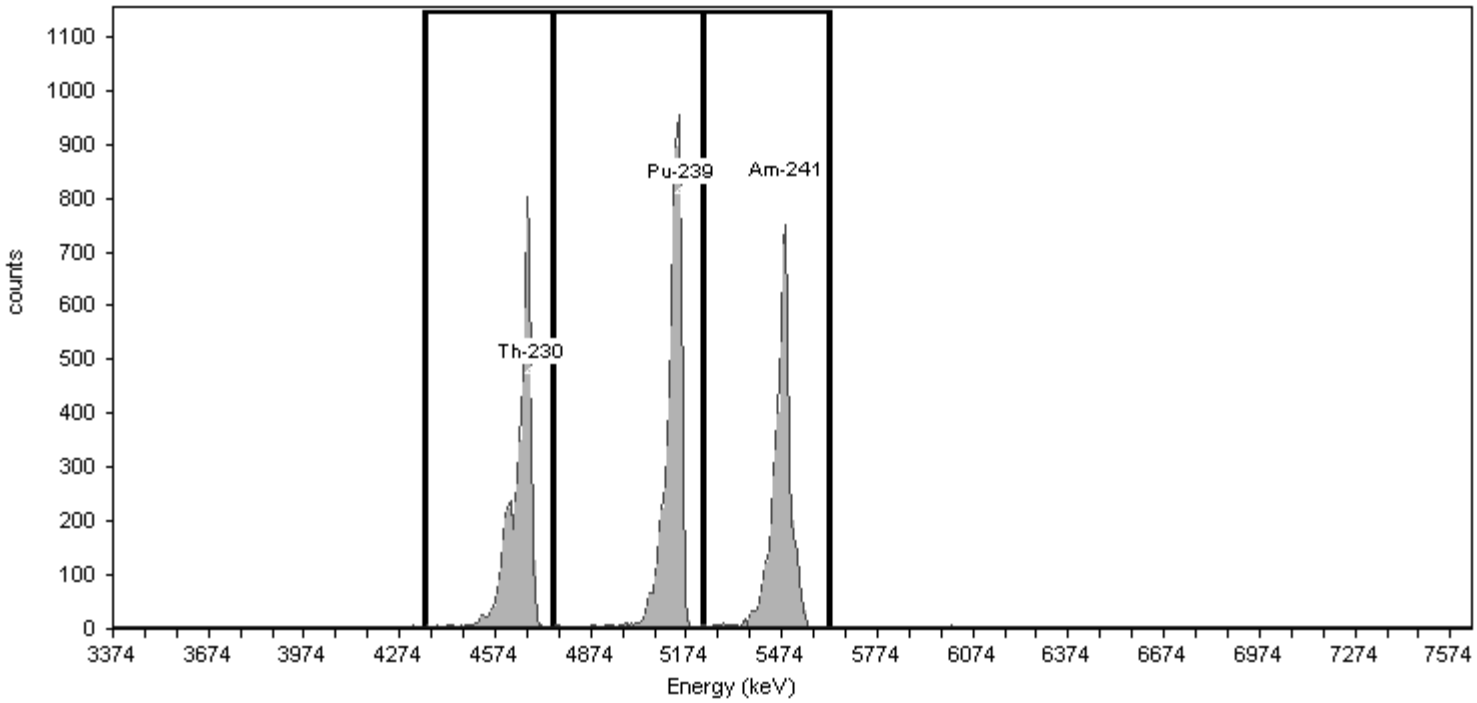
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV115 , SN: 49-037E4
Acquisition Start Date: 5/11/2014 8:54:45PM
Live Time: 60.00 min.
Real Time: 60.54 min.
Efficiency: 26.72% +/- 0.48% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,492.00	91.53
Pu-239	240	5.16	186	249	6,274.00	104.57
Am-241	284	5.49	249	303	5,418.00	90.30

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:09:36PM 5/11/2014

Calibration

Sample Name: ICV-9884;AV116-20140511
Description:
Detector: AV116

Calibration Date: 5/11/2014 11:09:33PM
Analyst: 60040

Source Info

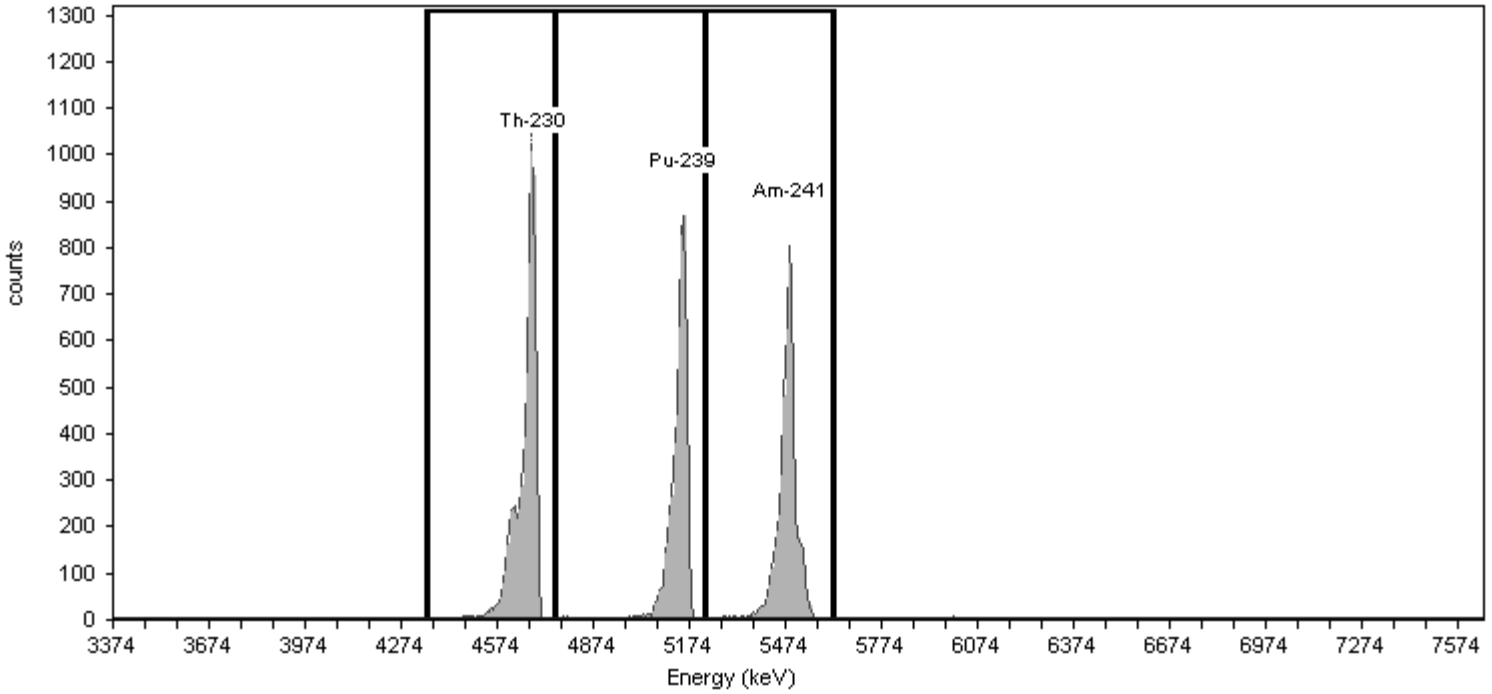
Certificate ID: 82245-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV116 , SN: 49-034G1
Acquisition Start Date: 5/11/2014 10:06:08PM
Live Time: 60.00 min.
Real Time: 60.06 min.
Efficiency: 26.03% +/- 0.48% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,269.00	104.48
Pu-239	240	5.16	186	249	5,050.00	84.17
Am-241	284	5.49	249	303	5,237.00	87.28

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:09:42PM 5/11/2014

Calibration

Sample Name: ICV-9792;AV117-20140511
Description:
Detector: AV117

Calibration Date: 5/11/2014 11:09:39PM
Analyst: 60040

Source Info

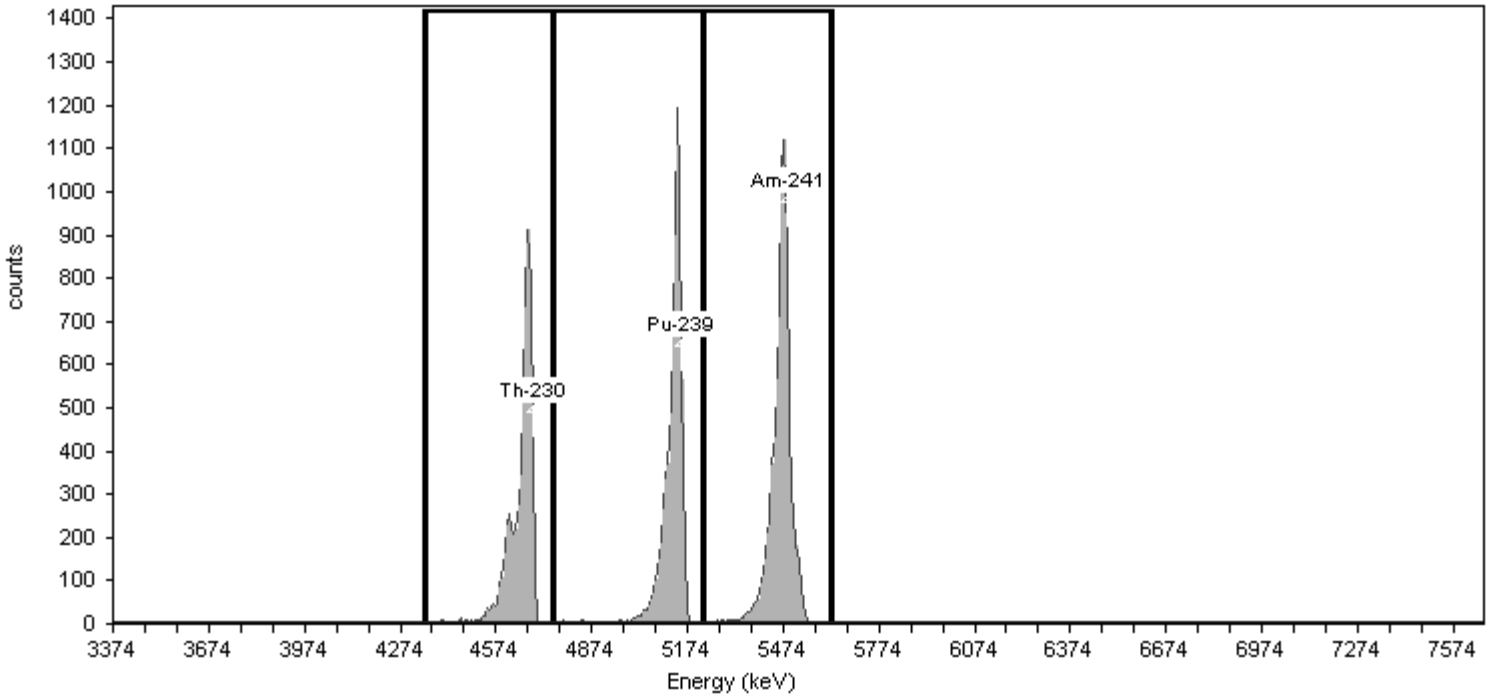
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV117 , SN: 49-037X4
Acquisition Start Date: 5/11/2014 10:06:18PM
Live Time: 60.00 min.
Real Time: 60.06 min.
Efficiency: 26.03% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,860.00	97.67
Pu-239	240	5.16	186	249	6,784.00	113.07
Am-241	284	5.49	249	303	7,709.00	128.48

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:50:08AM 5/12/2014

Calibration

Sample Name: ICV-9793;AV118-20140511
Description:
Detector: AV118

Calibration Date: 5/12/2014 12:50:05AM
Analyst: 60040

Source Info

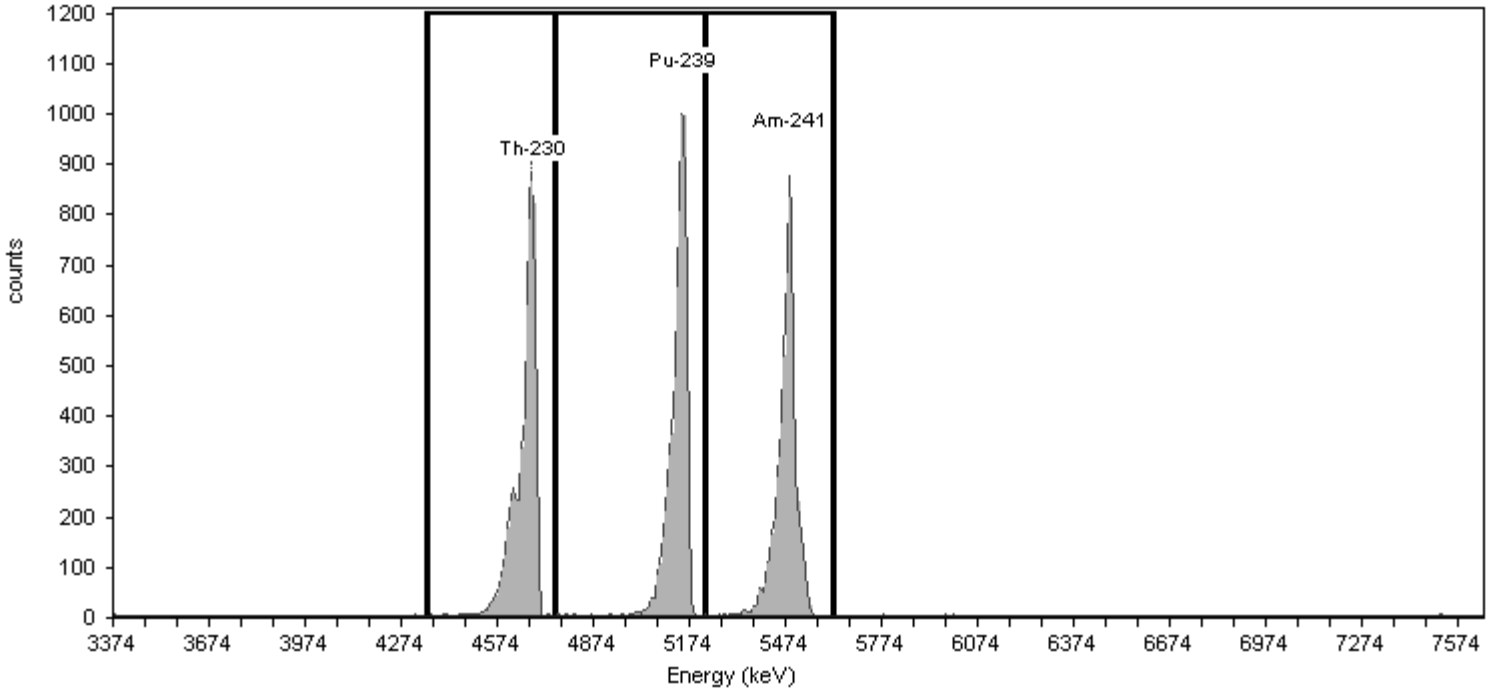
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV118 , SN: 49-037F4
Acquisition Start Date: 5/11/2014 11:19:52PM
Live Time: 60.00 min.
Real Time: 61.98 min.
Efficiency: 26.55% +/- 0.44% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,293.00	104.88
Pu-239	240	5.16	186	249	6,621.00	110.35
Am-241	284	5.49	249	303	6,232.00	103.87

Monthly Calibration Verifications

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:48:33PM 6/19/2014

Calibration

Sample Name: CCV-7107;AV1-20140619
Description:
Detector: AV1

Calibration Date: 6/19/2014 5:48:30PM
Analyst: 60040

Source Info

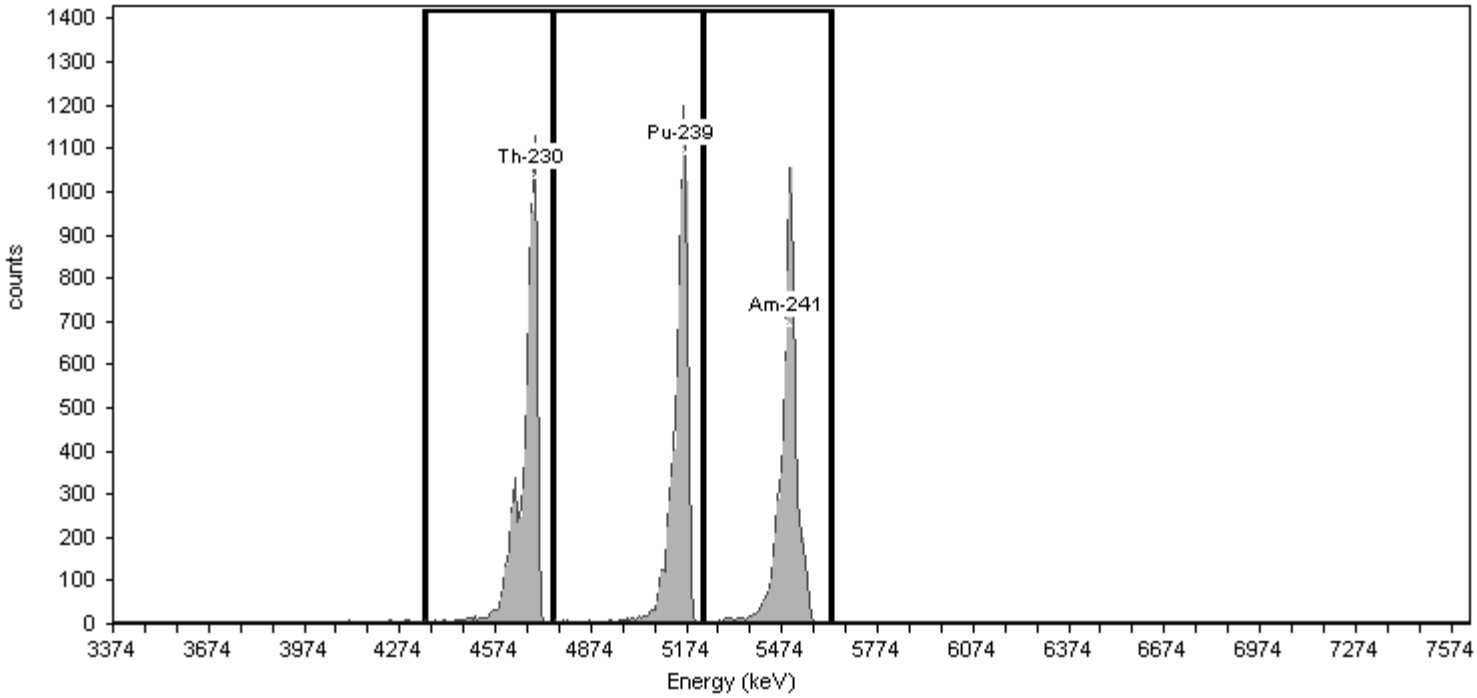
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV1 , SN: 49-188 AA4
Acquisition Start Date: 6/19/2014 4:43:51PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 26.42% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	7,150.00	119.17
Pu-239	240	5.16	186	249	7,011.00	116.85
Am-241	284	5.49	249	303	6,783.00	113.05

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:48:39PM 6/19/2014

Calibration

Sample Name: CCV-8875;AV3-20140619
Description:
Detector: AV3

Calibration Date: 6/19/2014 5:48:36PM
Analyst: 60040

Source Info

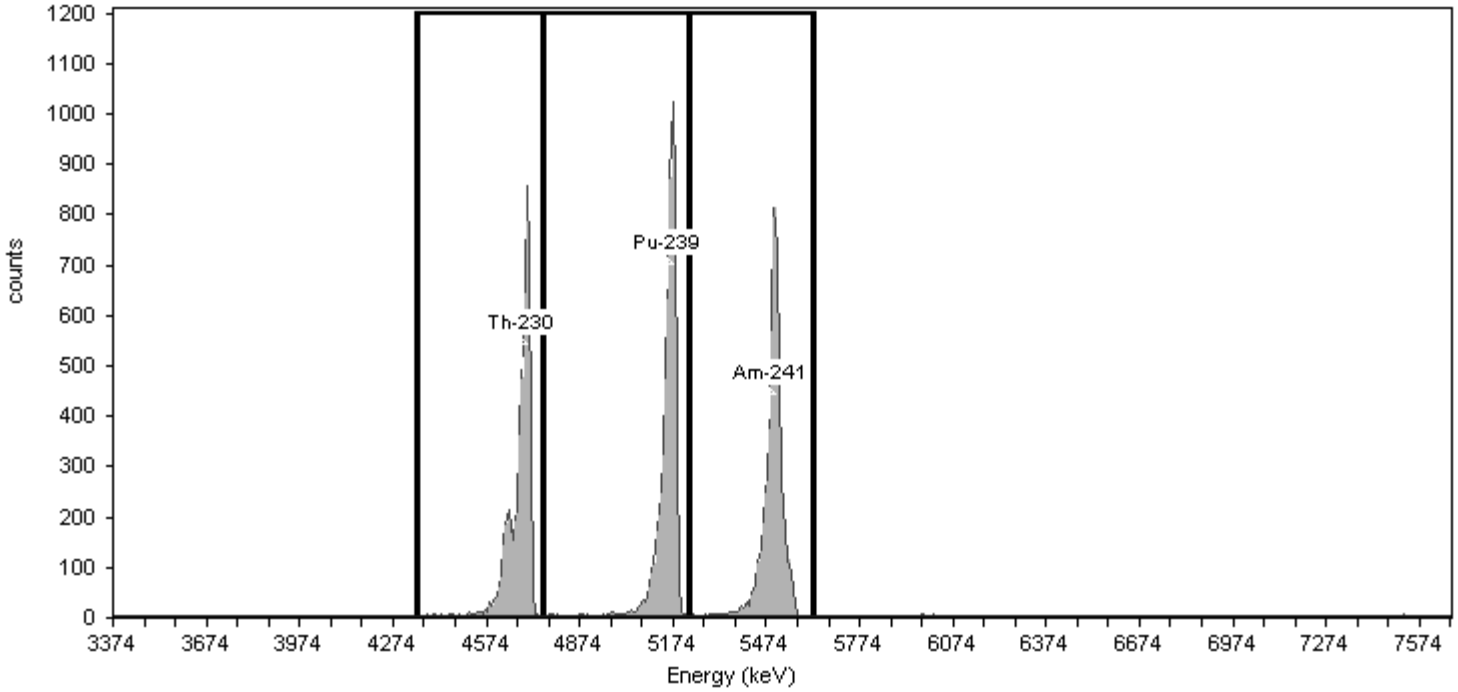
Certificate ID: 82234-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV3 , SN: 49-202 FF7
Acquisition Start Date: 6/19/2014 4:44:05PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 25.66% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,062.00	84.37
Pu-239	240	5.16	186	249	5,704.00	95.07
Am-241	284	5.49	249	303	5,177.00	86.28

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:34:49PM 6/19/2014

Calibration

Sample Name: CCV-9520;AV6-20140619
Description:
Detector: AV6

Calibration Date: 6/19/2014 7:34:43PM
Analyst: 60040

Source Info

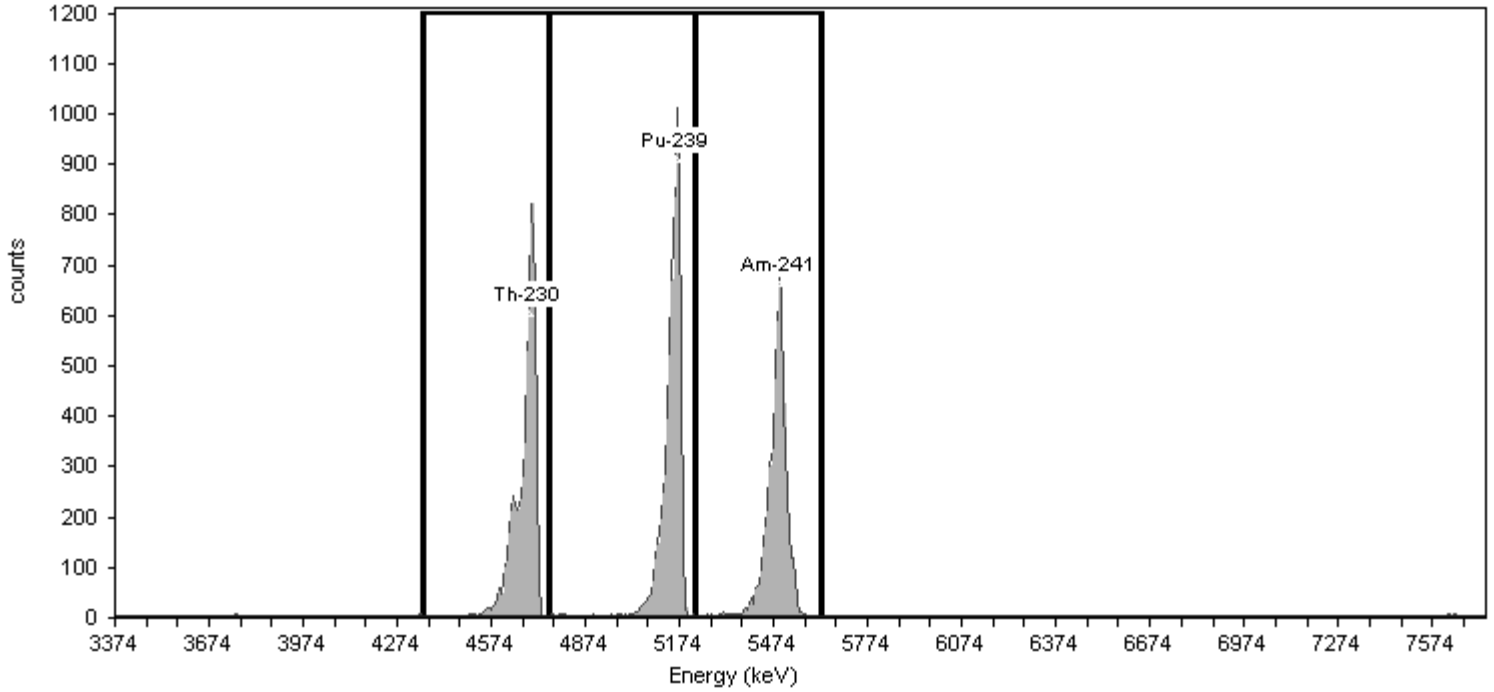
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV6 , SN: 47-27FF2
Acquisition Start Date: 6/19/2014 6:06:10PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.06% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,375.00	89.58
Pu-239	240	5.16	186	249	6,255.00	104.25
Am-241	284	5.49	249	303	5,126.00	85.43

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:48:52PM 6/19/2014

Calibration

Sample Name: CCV-8877;AV7-20140619
Description:
Detector: AV7

Calibration Date: 6/19/2014 5:48:49PM
Analyst: 60040

Source Info

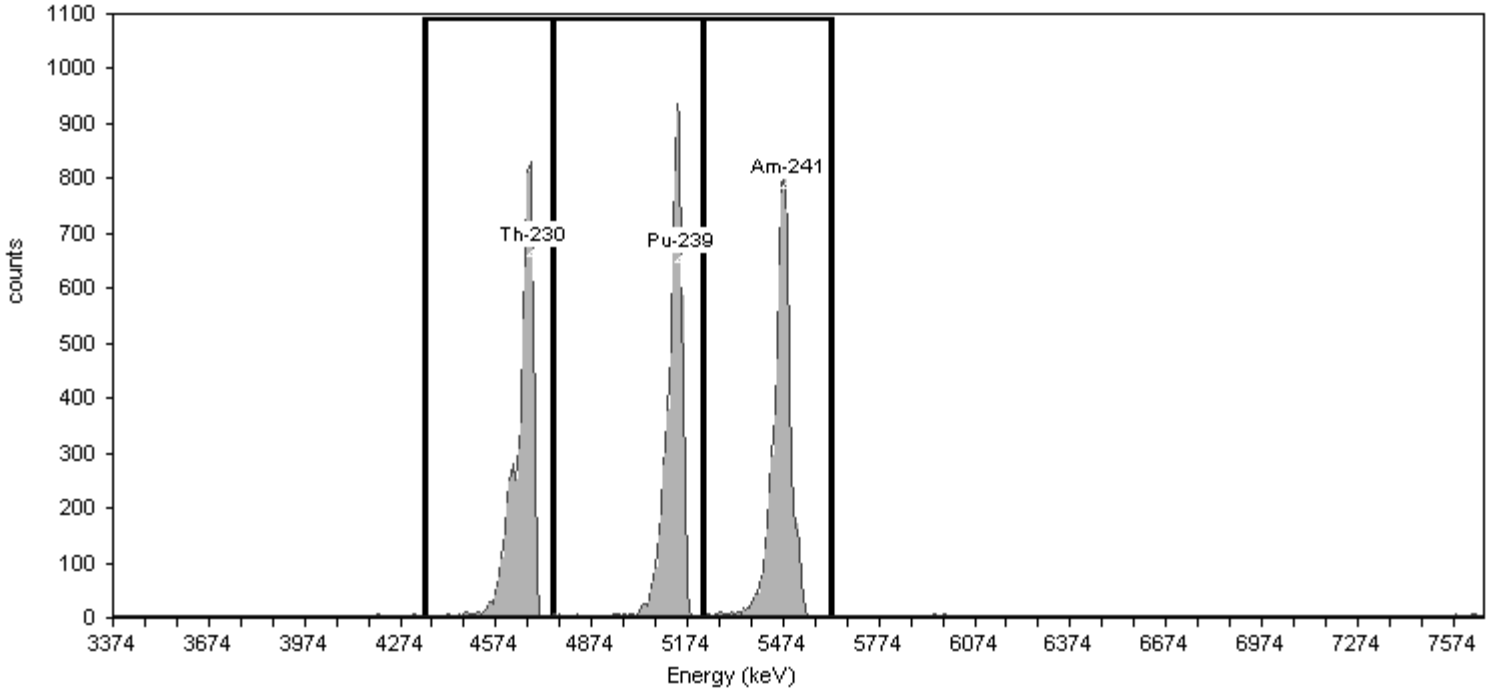
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV7 , SN: 48-158EE5
Acquisition Start Date: 6/19/2014 4:44:29PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 25.49% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,271.00	104.52
Pu-239	240	5.16	186	249	6,395.00	106.58
Am-241	284	5.49	249	303	6,298.00	104.97

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:35:00PM 6/19/2014

Calibration

Sample Name: CCV-9792;AV8-20140619
Description:
Detector: AV8

Calibration Date: 6/19/2014 7:34:56PM
Analyst: 60040

Source Info

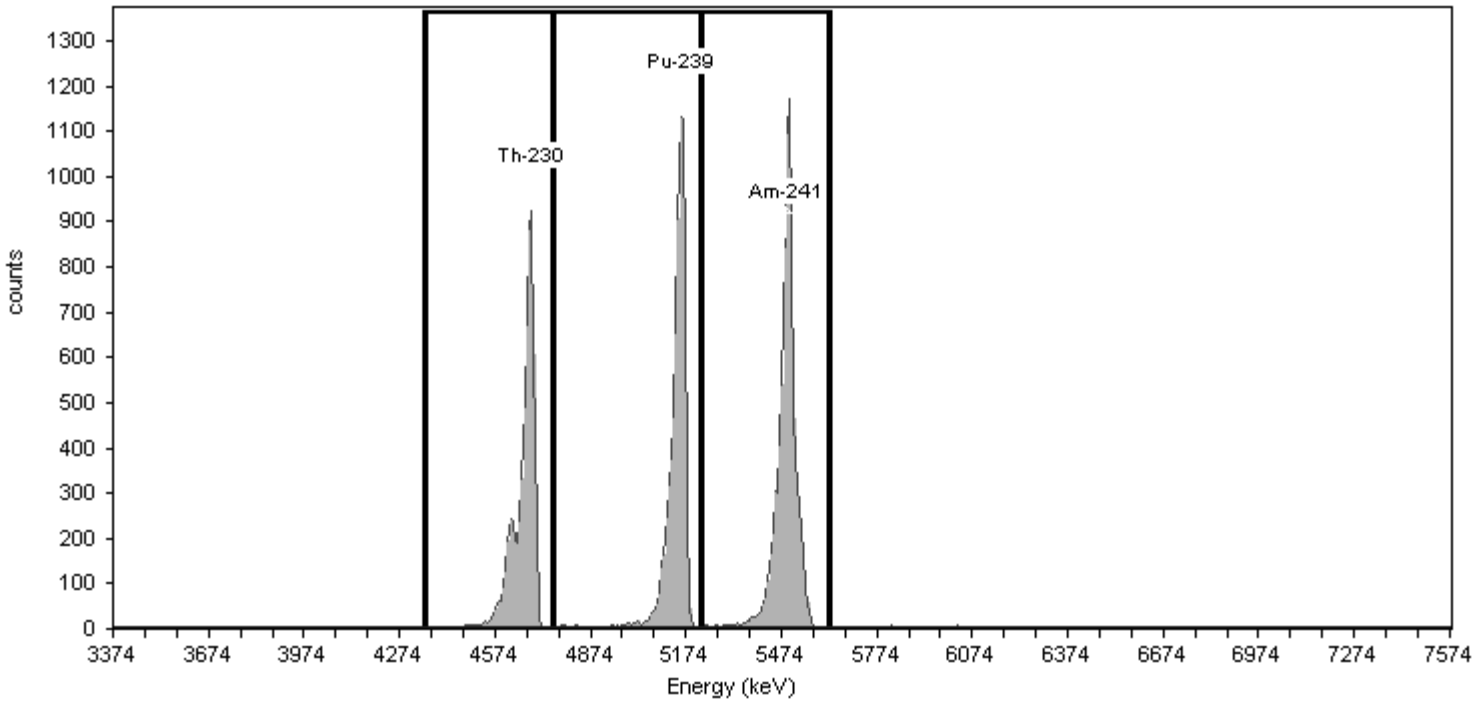
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV8 , SN: 41-137Q6
Acquisition Start Date: 6/19/2014 6:06:25PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.68% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,944.00	99.07
Pu-239	240	5.16	186	249	6,972.00	116.20
Am-241	284	5.49	249	303	7,944.00	132.40

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:35:06PM 6/19/2014

Calibration

Sample Name: CCV-9793;AV9-20140619
Description:
Detector: AV9

Calibration Date: 6/19/2014 7:35:02PM
Analyst: 60040

Source Info

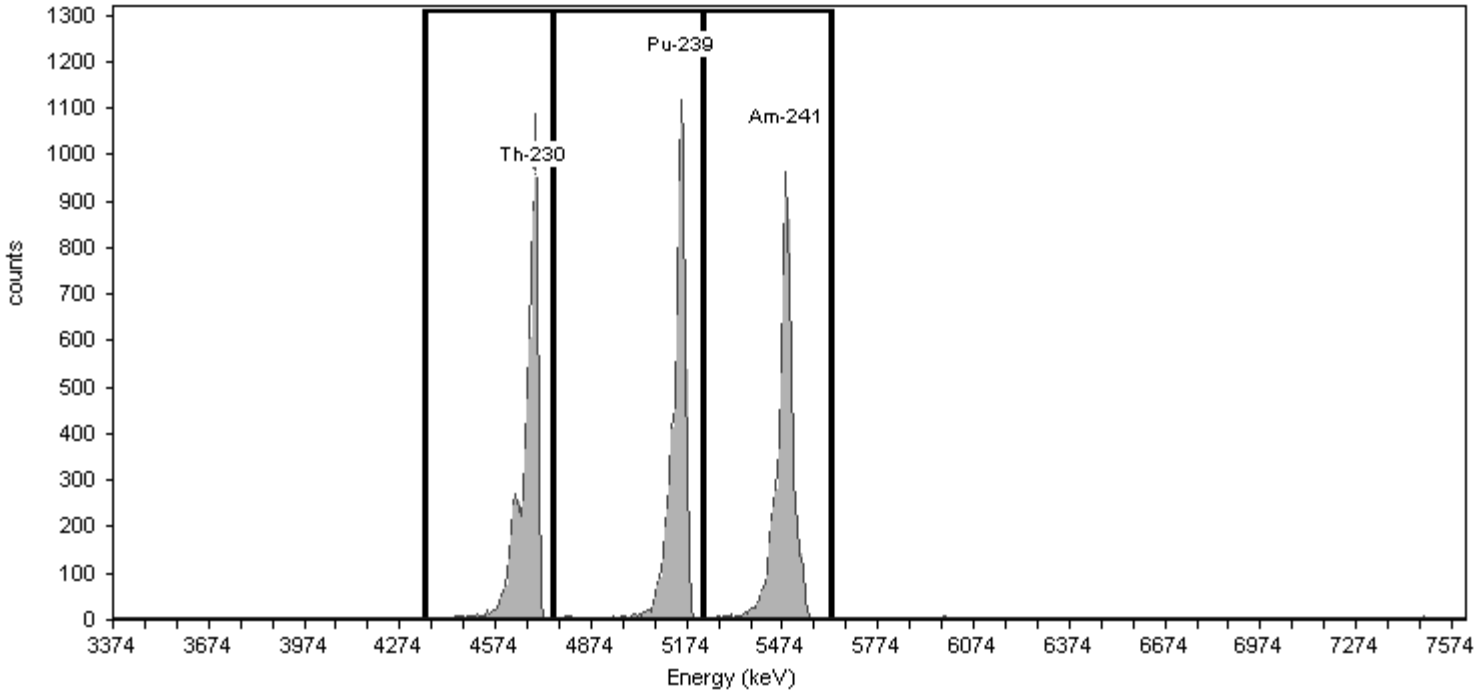
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV9 , SN: 51-082V5
Acquisition Start Date: 6/19/2014 6:06:37PM
Live Time: 60.00 min.
Real Time: 60.36 min.
Efficiency: 27.01% +/- 0.44% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,506.00	108.43
Pu-239	240	5.16	186	249	6,521.00	108.68
Am-241	284	5.49	249	303	6,451.00	107.52

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:35:13PM 6/19/2014

Calibration

Sample Name: CCV-9794;AV10-20140619
Description:
Detector: AV10

Calibration Date: 6/19/2014 7:35:09PM
Analyst: 60040

Source Info

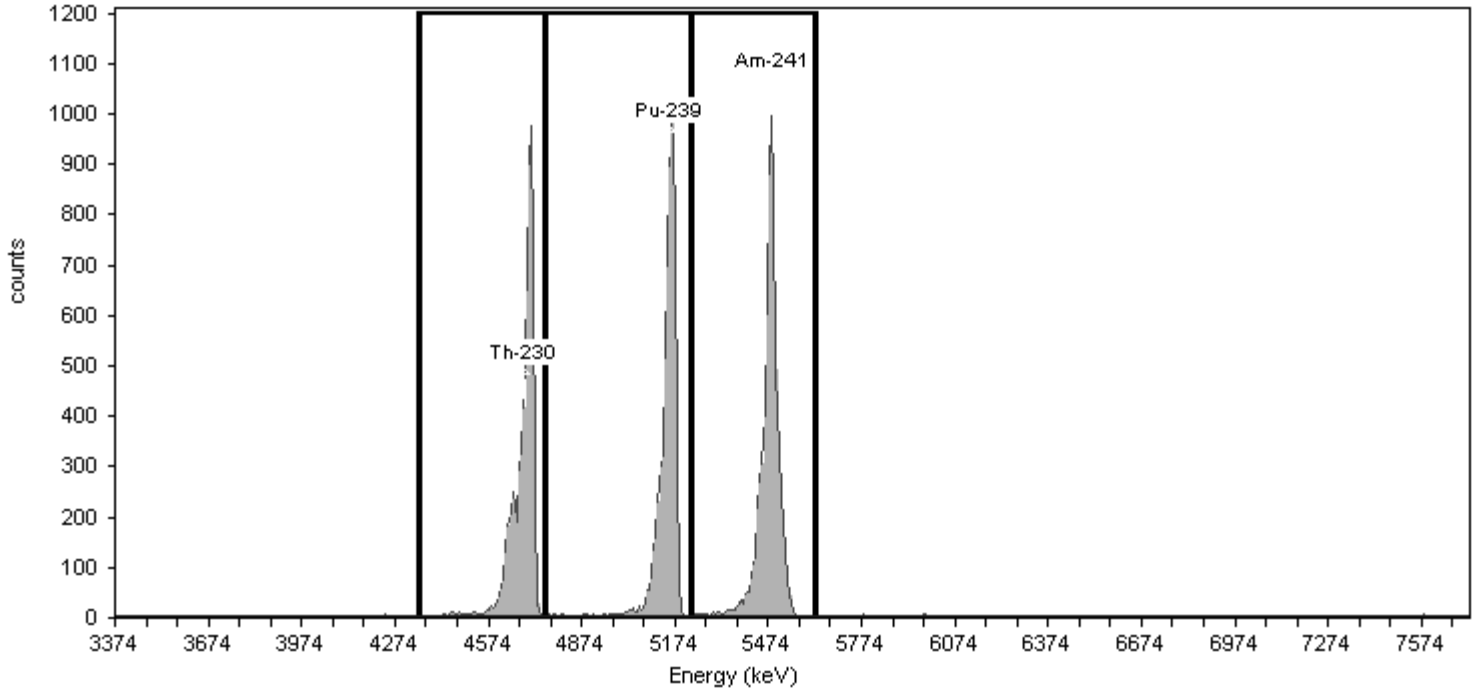
Certificate ID: 82242-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV10 , SN: 49-155N2
Acquisition Start Date: 6/19/2014 6:06:52PM
Live Time: 60.00 min.
Real Time: 60.36 min.
Efficiency: 25.52% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,044.00	100.73
Pu-239	240	5.16	186	249	5,811.00	96.85
Am-241	284	5.49	249	303	6,611.00	110.18

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:35:19PM 6/19/2014

Calibration

Sample Name: CCV-9795;AV11-20140619
Description:
Detector: AV11

Calibration Date: 6/19/2014 7:35:16PM
Analyst: 60040

Source Info

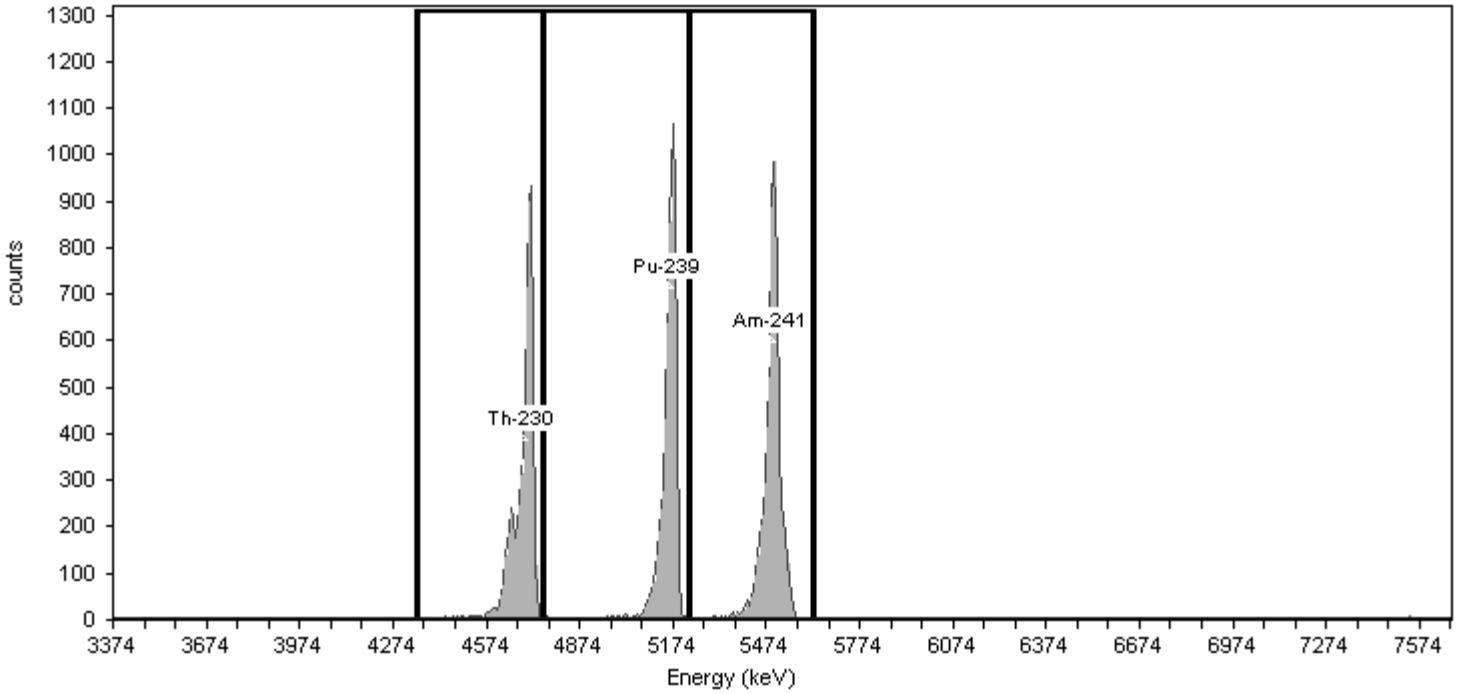
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV11 , SN: 49-155dd2
Acquisition Start Date: 6/19/2014 6:07:01PM
Live Time: 60.00 min.
Real Time: 60.36 min.
Efficiency: 26.47% +/- 0.46% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,658.00	94.30
Pu-239	240	5.16	186	249	5,667.00	94.45
Am-241	284	5.49	249	303	6,008.00	100.13

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:35:25PM 6/19/2014

Calibration

Sample Name: CCV-9817;AV12-20140619
Description:
Detector: AV12

Calibration Date: 6/19/2014 7:35:21PM
Analyst: 60040

Source Info

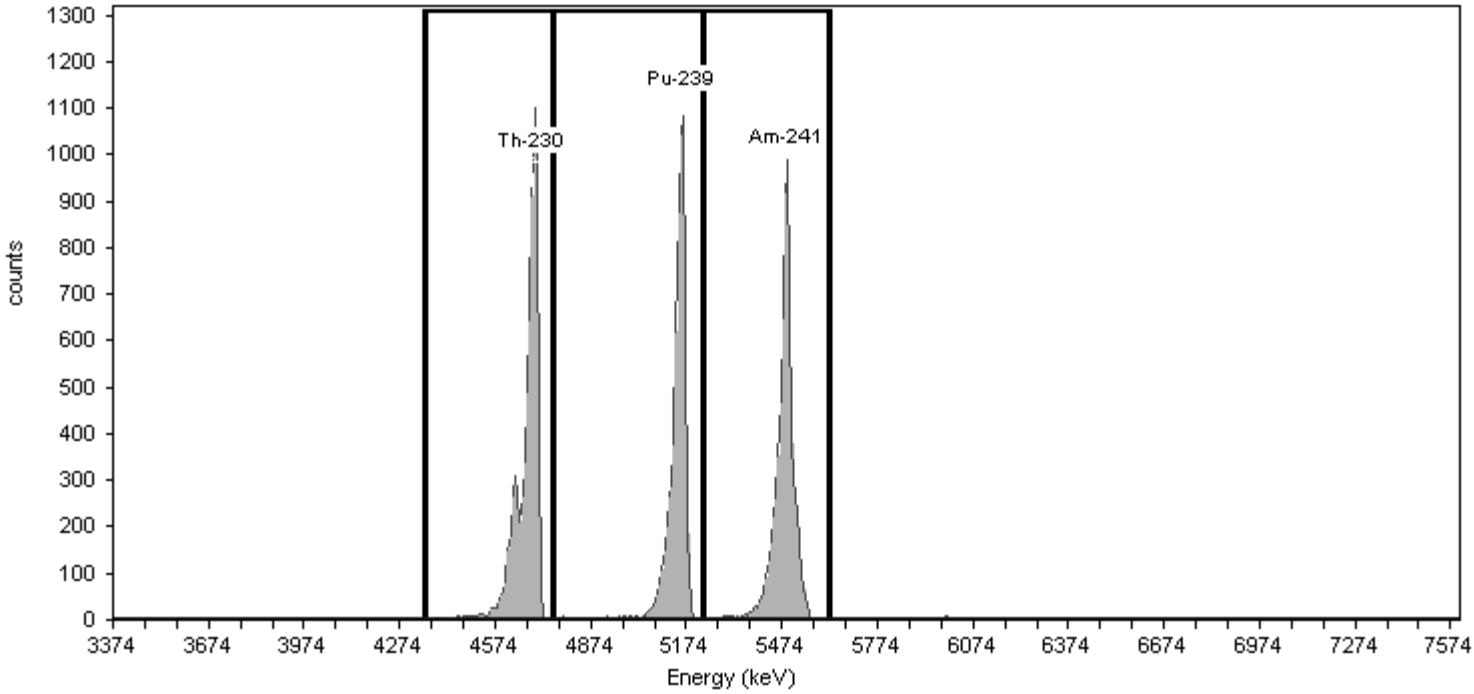
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV12 , SN: 51-082B7
Acquisition Start Date: 6/19/2014 6:07:13PM
Live Time: 60.00 min.
Real Time: 60.36 min.
Efficiency: 25.83% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,873.00	114.55
Pu-239	240	5.16	186	249	6,157.00	102.62
Am-241	284	5.49	249	303	6,435.00	107.25

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:19:56PM 6/22/2014

Calibration

Sample Name: CCV-9884;AV13-20140619a
Description:
Detector: AV13

Calibration Date: 6/22/2014 5:19:48PM
Analyst: 60040

Source Info

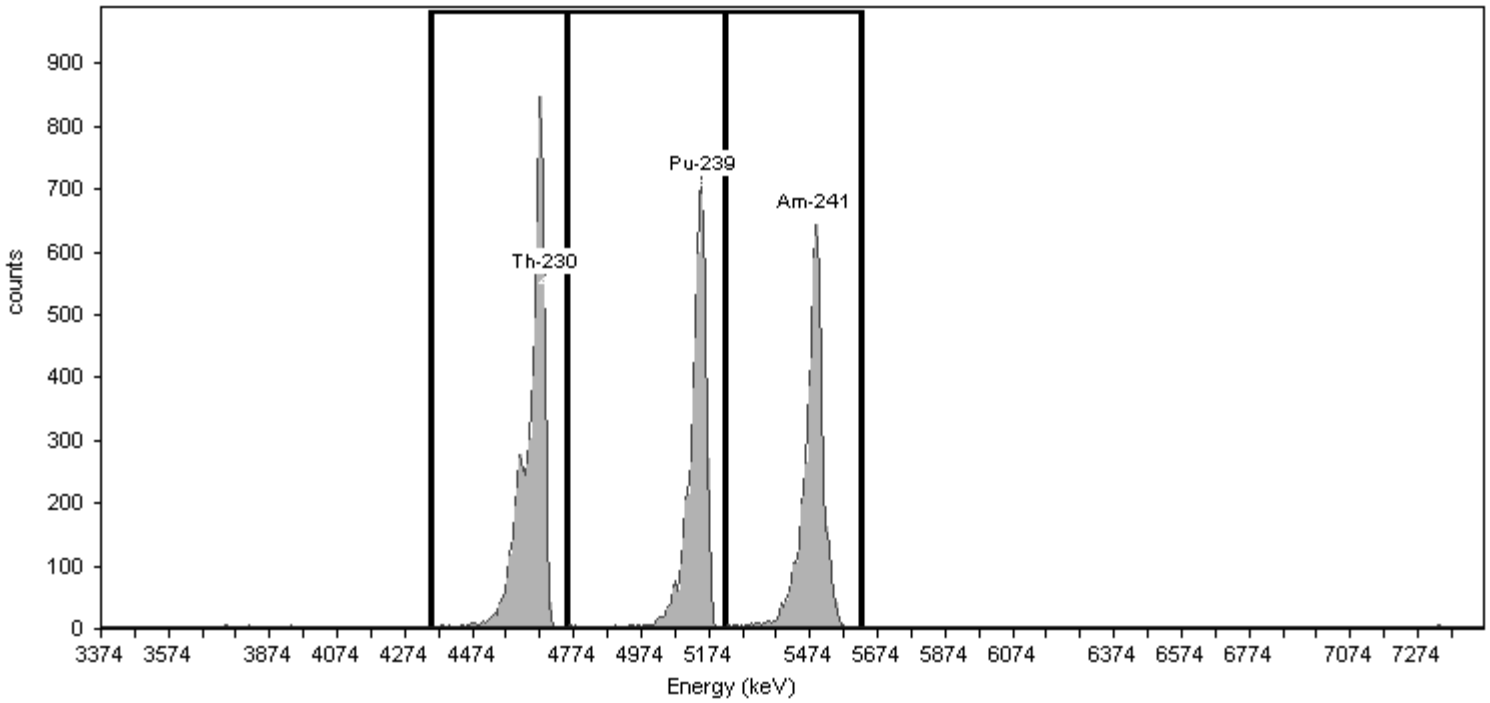
Certificate ID: 82245-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV13 , SN: 49-155M7
Acquisition Start Date: 6/19/2014 7:45:11PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 25.66% +/- 0.48% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,201.00	103.35
Pu-239	240	5.16	186	249	5,023.00	83.72
Am-241	284	5.49	249	303	5,096.00	84.93

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:35:46PM 6/19/2014

Calibration

Sample Name: CCV-9885;AV14-20140619
Description:
Detector: AV14

Calibration Date: 6/19/2014 7:35:43PM
Analyst: 60040

Source Info

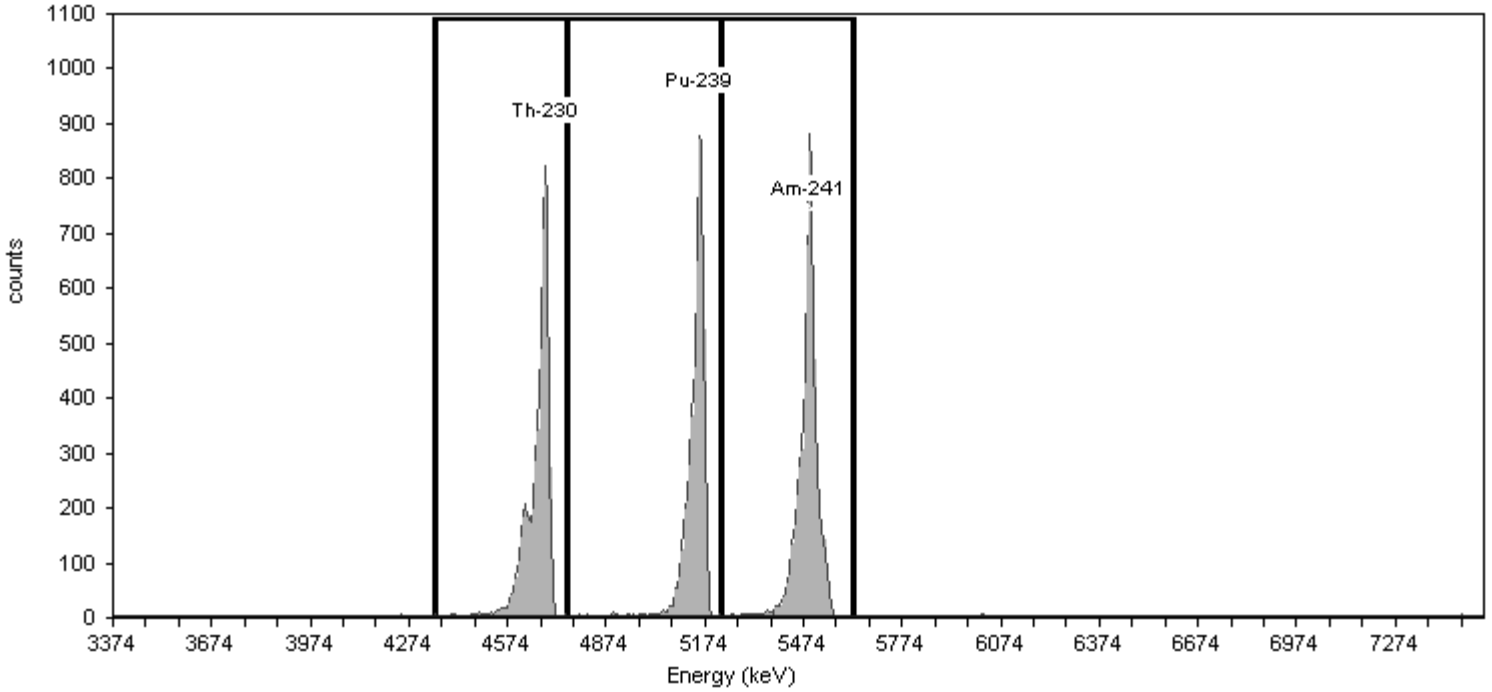
Certificate ID: 82246-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV14 , SN: 50-060W4
Acquisition Start Date: 6/19/2014 6:08:37PM
Live Time: 60.00 min.
Real Time: 60.36 min.
Efficiency: 26.15% +/- 0.49% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,216.00	86.93
Pu-239	240	5.16	186	249	5,025.00	83.75
Am-241	284	5.49	249	303	5,658.00	94.30

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:20:24PM 6/22/2014

Calibration

Sample Name: CCV-9793;AV24-20140619
Description:
Detector: AV24

Calibration Date: 6/22/2014 5:20:21PM
Analyst: 60040

Source Info

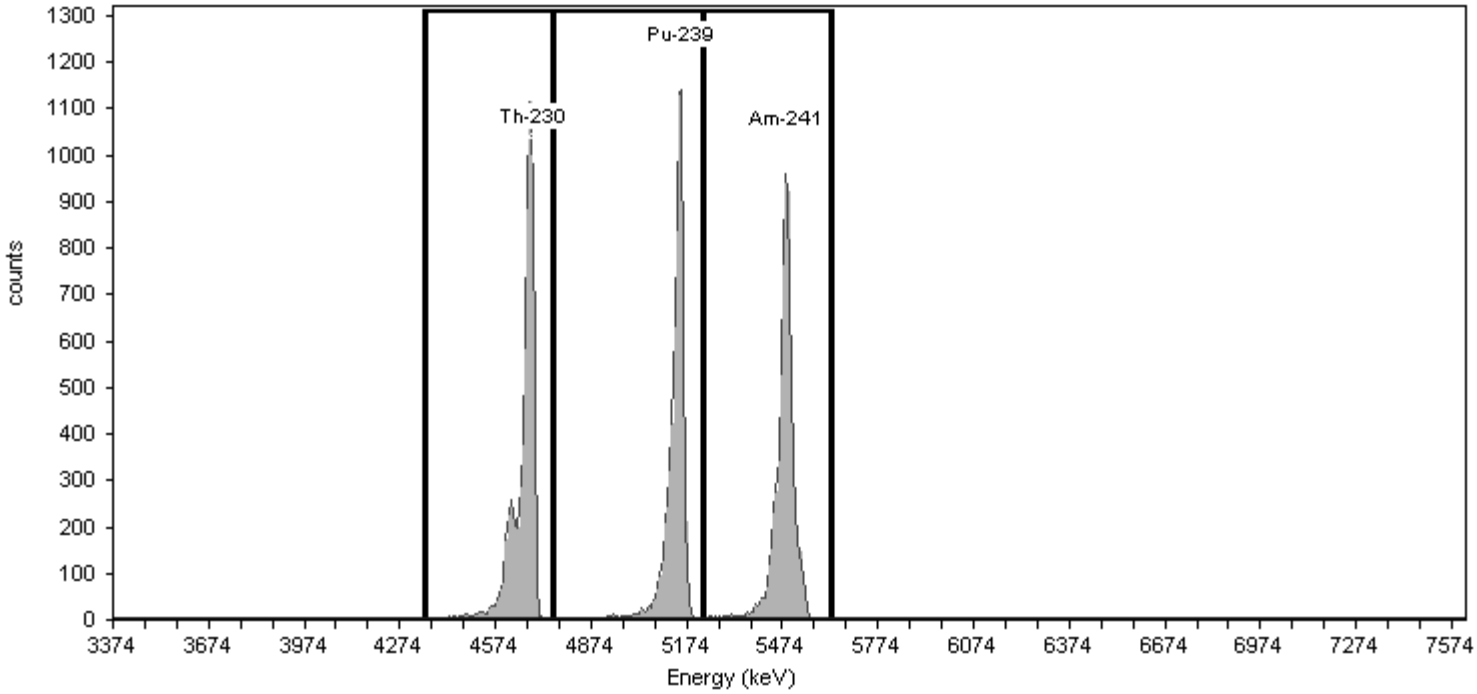
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV24 , SN: 47-137Q4
Acquisition Start Date: 6/19/2014 7:45:49PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.44% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,455.00	107.58
Pu-239	240	5.16	186	249	6,412.00	106.87
Am-241	284	5.49	249	303	6,203.00	103.38

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:10:56PM 6/22/2014

Calibration

Sample Name: CCV-8875;AV51-20140622
Description:
Detector: AV51

Calibration Date: 6/22/2014 9:10:53PM
Analyst: 60040

Source Info

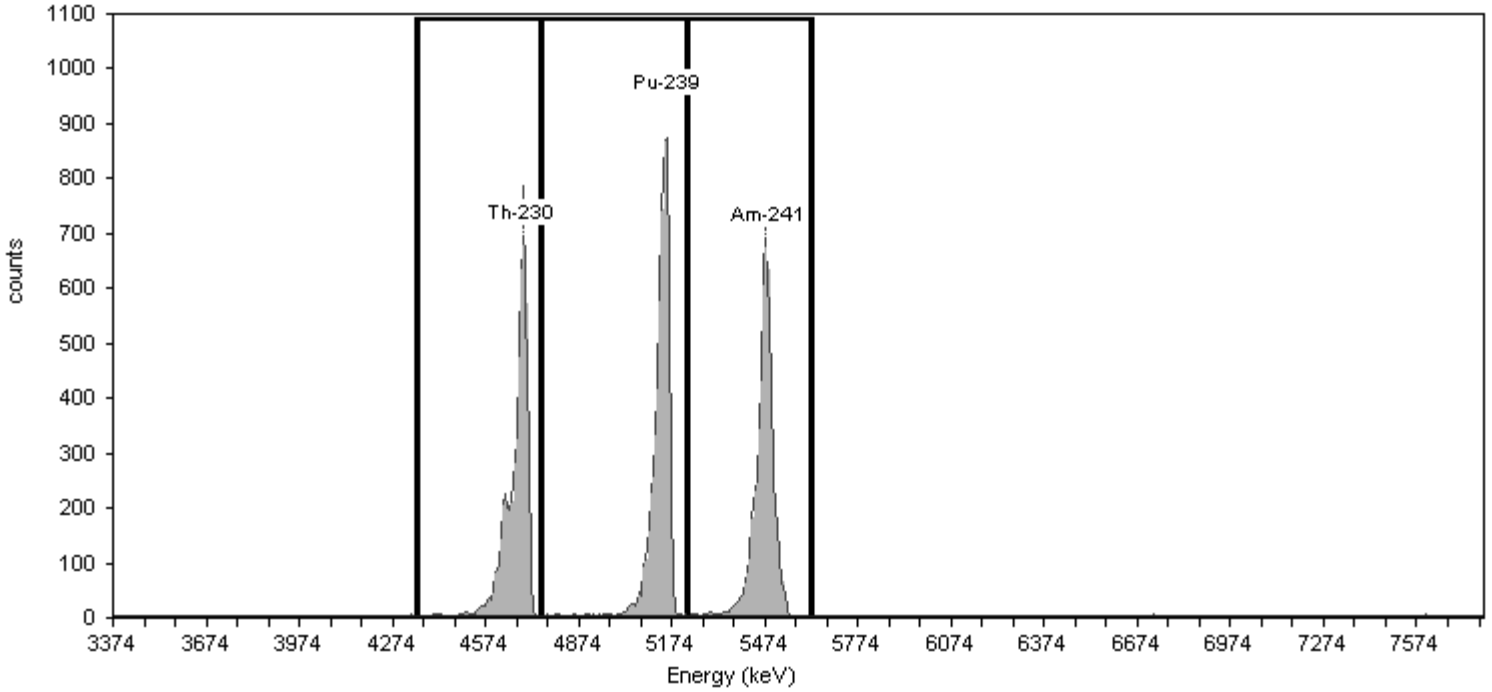
Certificate ID: 82234-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV51 , SN: 48-109I1
Acquisition Start Date: 6/22/2014 8:07:54PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 25.81% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,075.00	84.58
Pu-239	240	5.16	186	249	5,812.00	96.87
Am-241	284	5.49	249	303	5,164.00	86.07

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:57:27PM 6/22/2014

Calibration

Sample Name: CCV-8877;AV53-20140622
Description:
Detector: AV53

Calibration Date: 6/22/2014 7:57:23PM
Analyst: 60040

Source Info

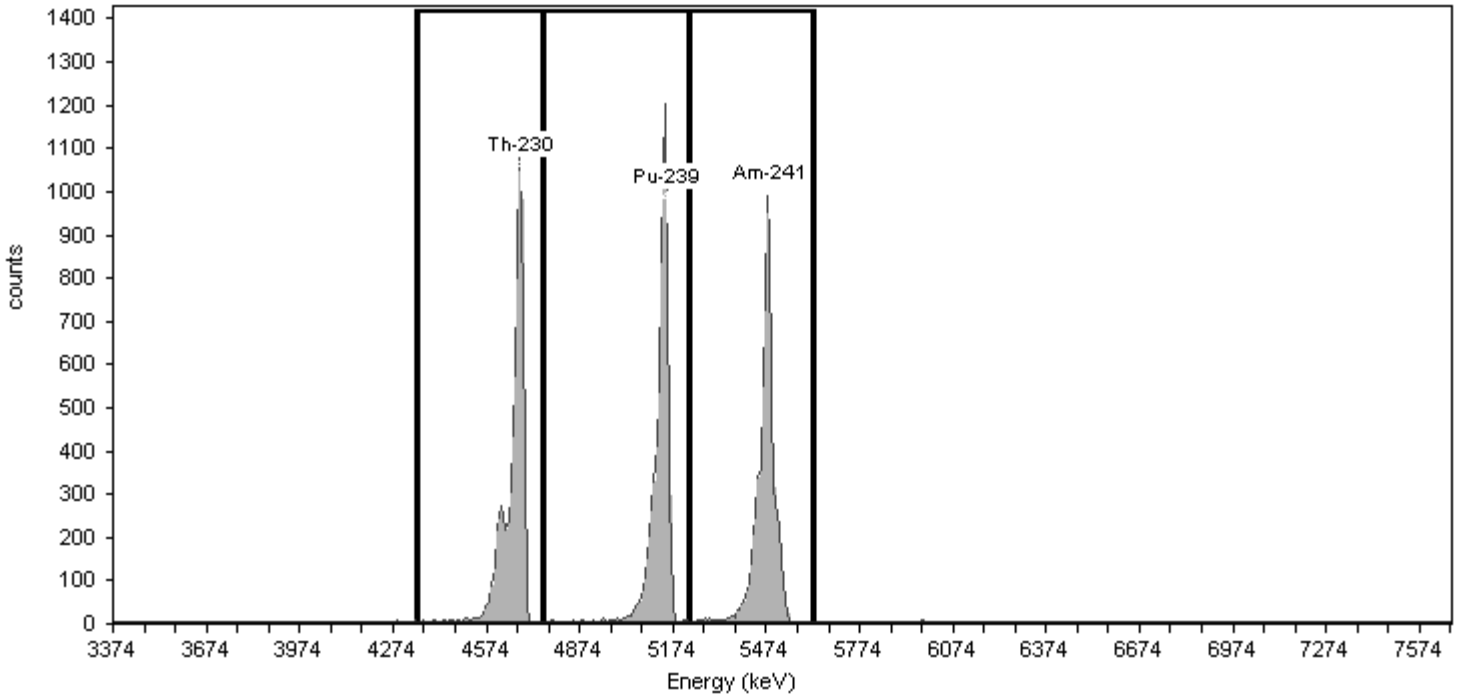
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV53 , SN: 50-051A6
Acquisition Start Date: 6/22/2014 6:53:01PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 26.51% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,536.00	108.93
Pu-239	240	5.16	186	249	6,690.00	111.50
Am-241	284	5.49	249	303	6,495.00	108.25

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:57:33PM 6/22/2014

Calibration

Sample Name: CCV-9520;AV54-20140622
Description:
Detector: AV54

Calibration Date: 6/22/2014 7:57:29PM
Analyst: 60040

Source Info

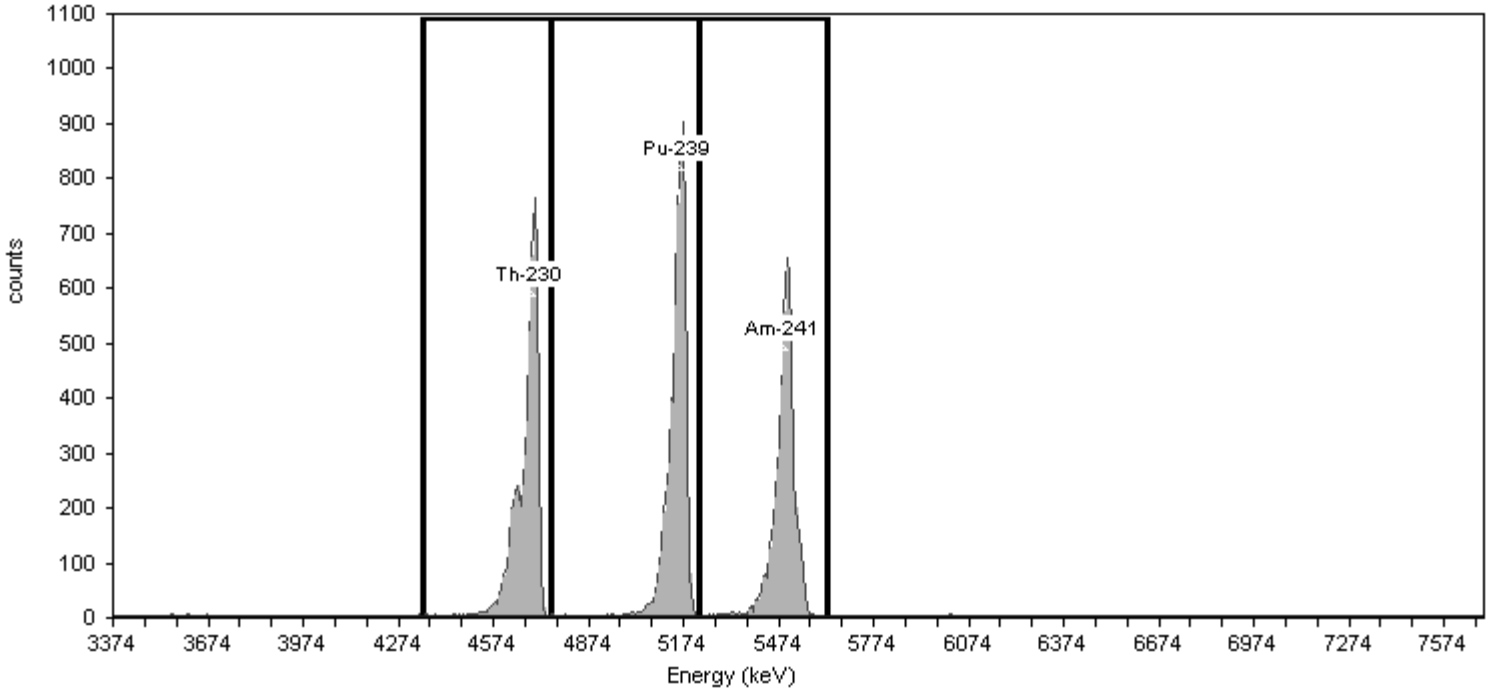
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV54 , SN: 48-046II6
Acquisition Start Date: 6/22/2014 6:53:11PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 26.28% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,514.00	91.90
Pu-239	240	5.16	186	249	6,221.00	103.68
Am-241	284	5.49	249	303	5,158.00	85.97

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:11:02PM 6/22/2014

Calibration

Sample Name: CCV-7107;AV55-20140622
Description:
Detector: AV55

Calibration Date: 6/22/2014 9:10:59PM
Analyst: 60040

Source Info

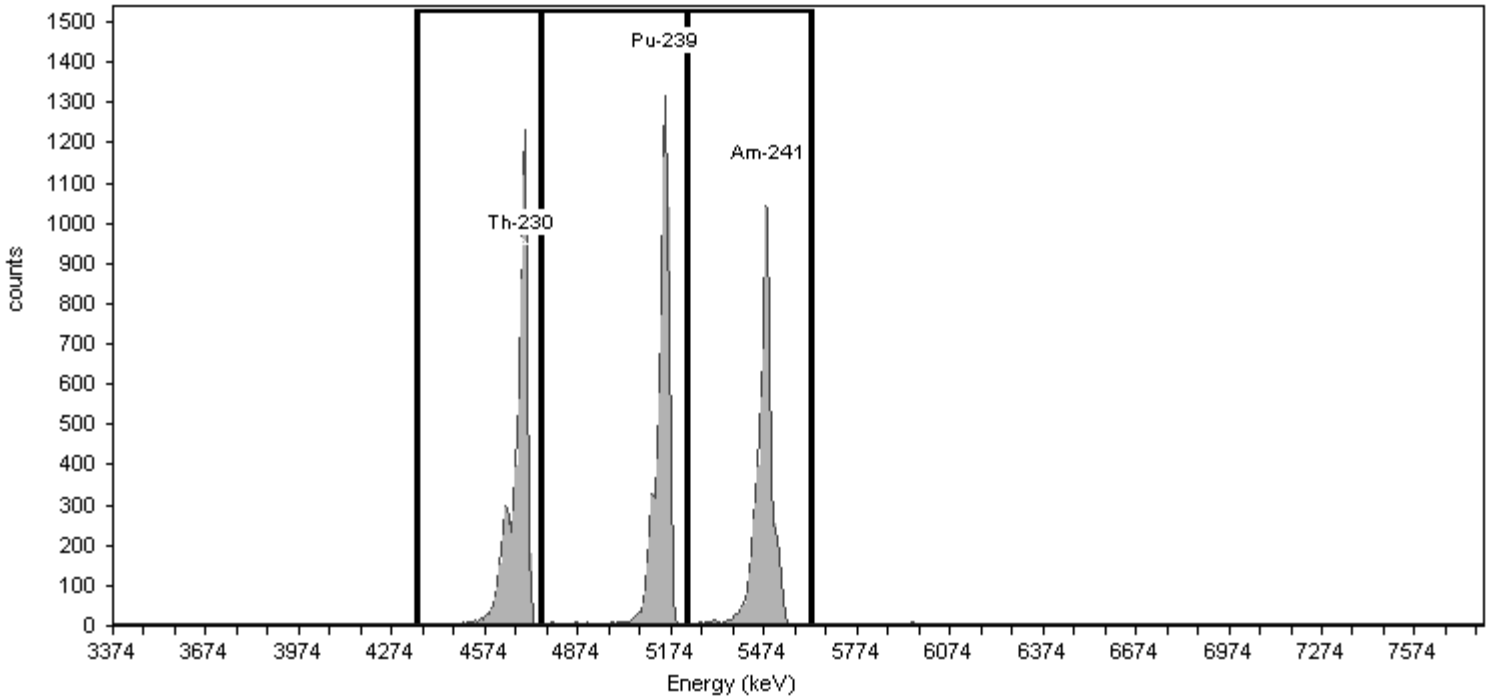
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV55 , SN: 50-051C2
Acquisition Start Date: 6/22/2014 8:08:07PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.83% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	7,262.00	121.03
Pu-239	240	5.16	186	249	7,151.00	119.18
Am-241	284	5.49	249	303	6,866.00	114.43

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:57:39PM 6/22/2014

Calibration

Sample Name: CCV-9792;AV56-20140622
Description:
Detector: AV56

Calibration Date: 6/22/2014 7:57:36PM
Analyst: 60040

Source Info

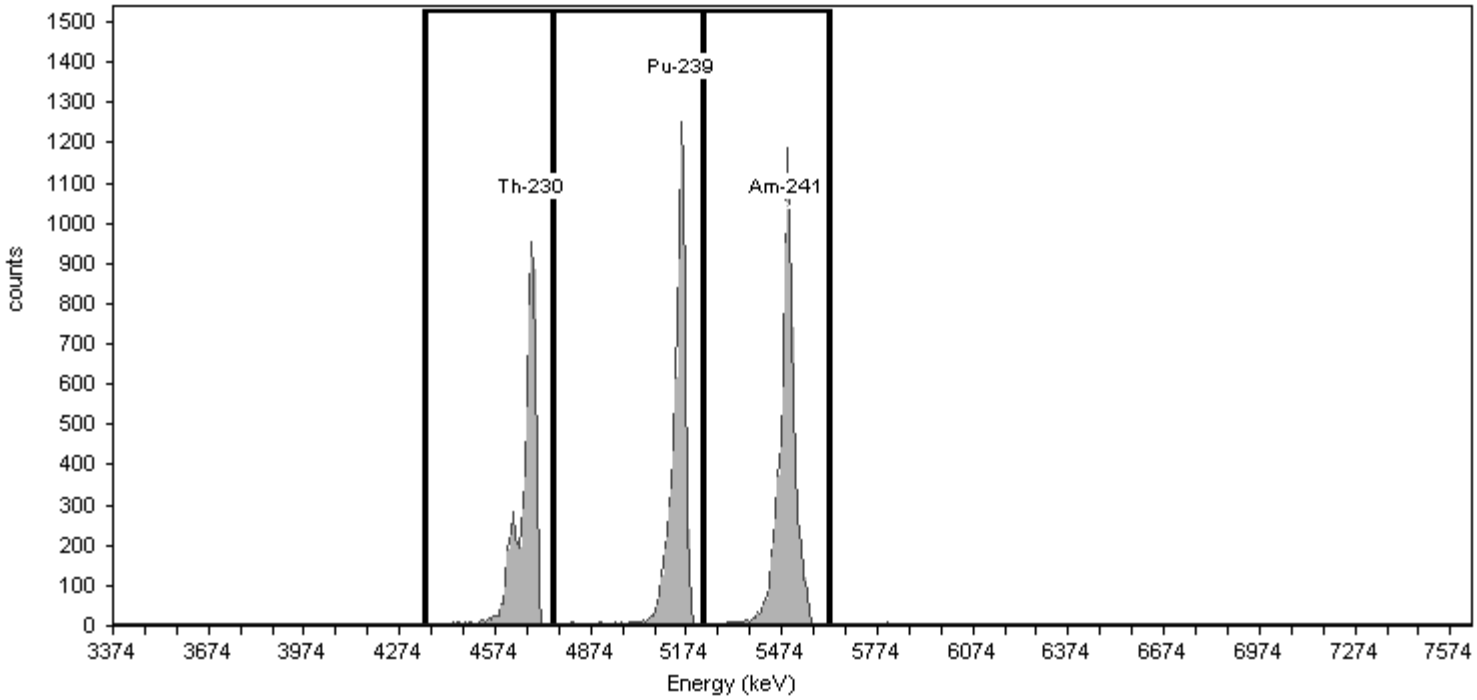
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV56 , SN: 52-059EE5
Acquisition Start Date: 6/22/2014 6:53:29PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 26.26% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,964.00	99.40
Pu-239	240	5.16	186	249	6,853.00	114.22
Am-241	284	5.49	249	303	7,721.00	128.68

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:57:52PM 6/22/2014

Calibration

Sample Name: CCV-9794;AV58-20140622
Description:
Detector: AV58

Calibration Date: 6/22/2014 7:57:48PM
Analyst: 60040

Source Info

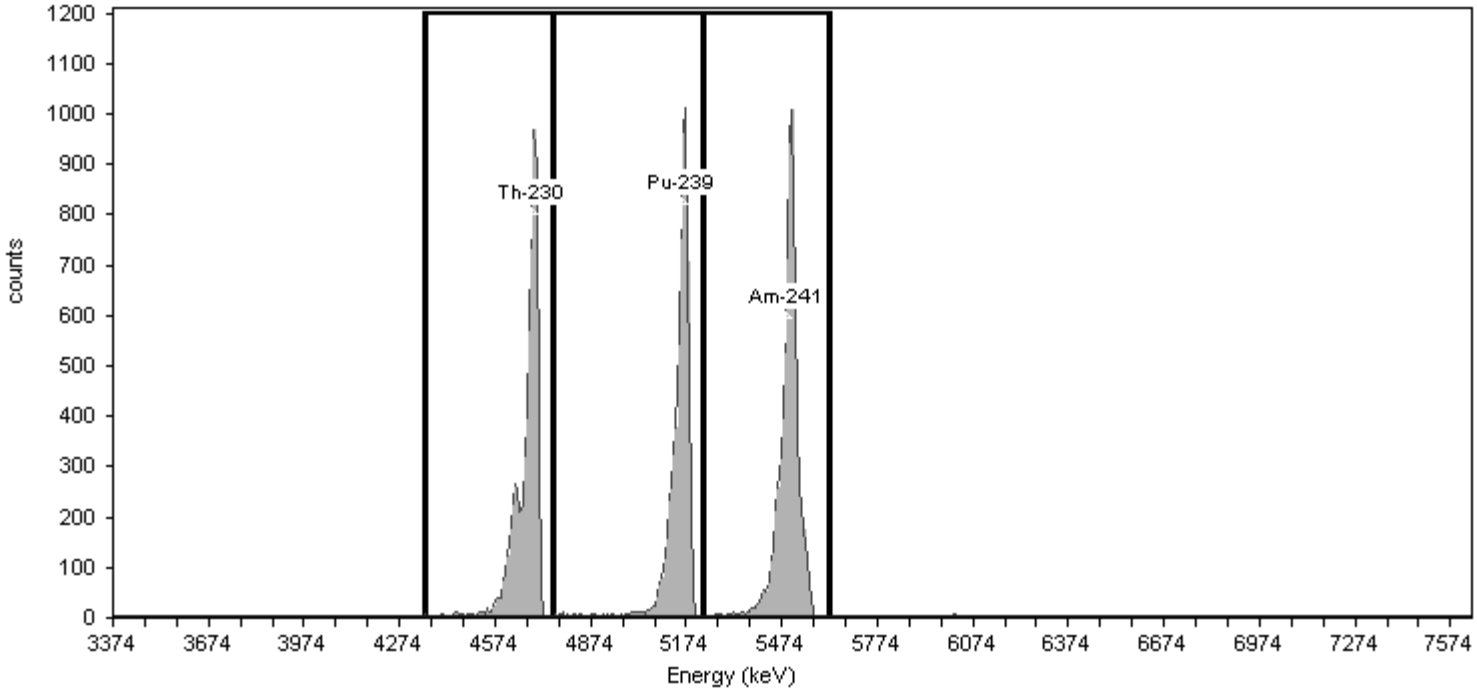
Certificate ID: 82242-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV58 , SN: 52-102 C5
Acquisition Start Date: 6/22/2014 6:53:50PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 26.31% +/- 0.44% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,121.00	102.02
Pu-239	240	5.16	186	249	6,054.00	100.90
Am-241	284	5.49	249	303	6,868.00	114.47

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:11:08PM 6/22/2014

Calibration

Sample Name: CCV-9795;AV59-20140622a
Description:
Detector: AV59

Calibration Date: 6/22/2014 9:11:04PM
Analyst: 60040

Source Info

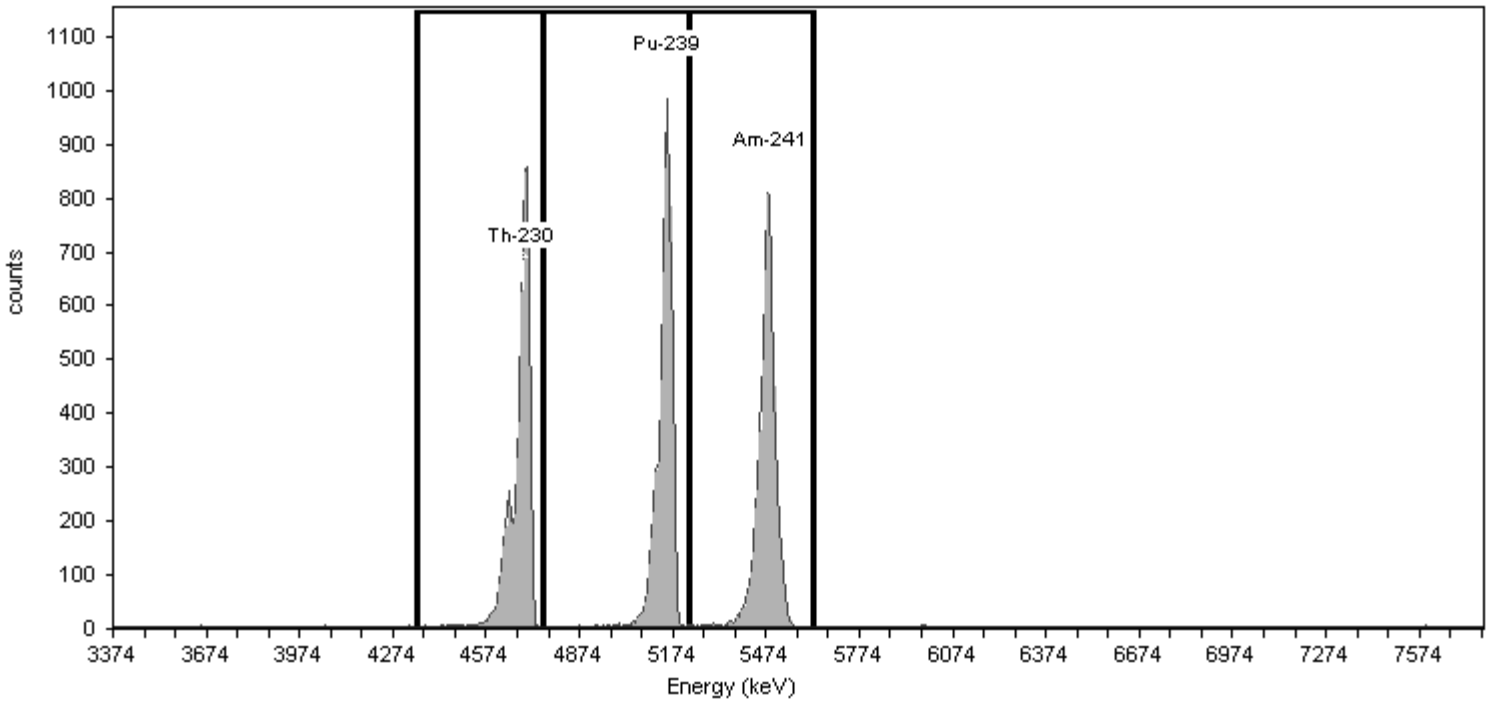
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV59 , SN: 49-155M7
Acquisition Start Date: 6/22/2014 8:09:03PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 27.20% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,730.00	95.50
Pu-239	240	5.16	186	249	5,948.00	99.13
Am-241	284	5.49	249	303	6,135.00	102.25

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:18:32PM 6/22/2014

Calibration

Sample Name: CCV-9817;AV60-20140622
Description:
Detector: AV60

Calibration Date: 6/22/2014 10:18:27PM
Analyst: 60040

Source Info

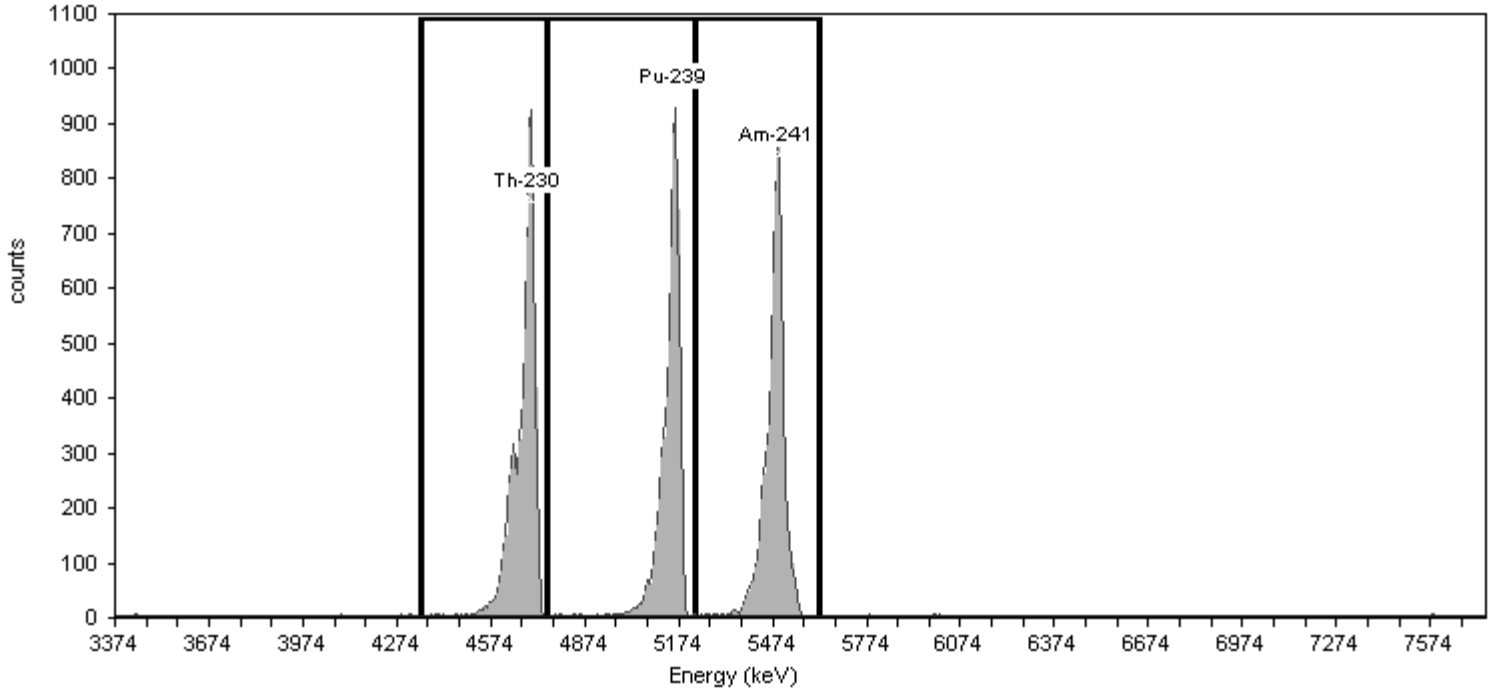
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV60 , SN: 49-027117
Acquisition Start Date: 6/22/2014 9:17:54PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.29% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	7,080.00	118.00
Pu-239	240	5.16	186	249	6,306.00	105.10
Am-241	284	5.49	249	303	6,421.00	107.02

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:22:15PM 6/22/2014

Calibration

Sample Name: CCV-9884;AV61-20140622
Description:
Detector: AV61

Calibration Date: 6/22/2014 11:22:10PM
Analyst: 60040

Source Info

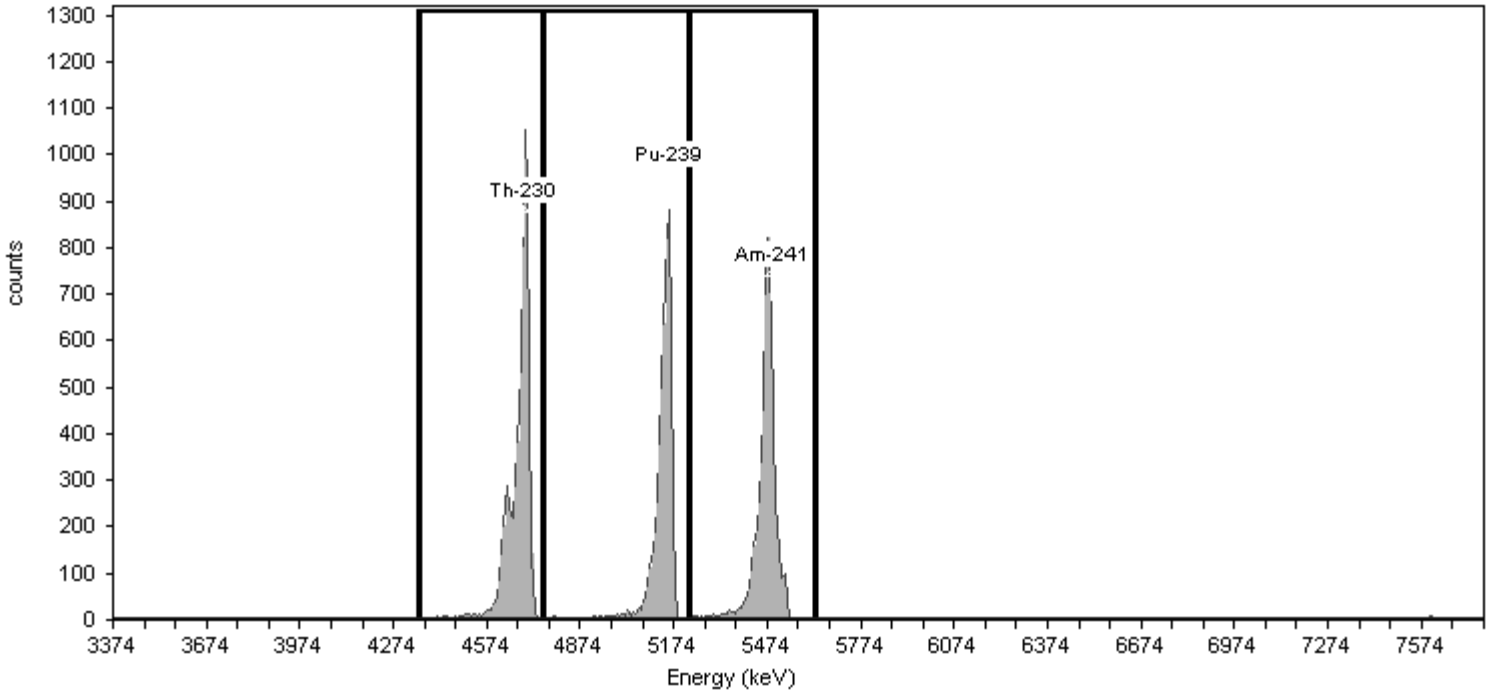
Certificate ID: 82245-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV61 , SN: 5-051JJ3
Acquisition Start Date: 6/22/2014 10:21:45PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.22% +/- 0.48% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,287.00	104.78
Pu-239	240	5.16	186	249	5,130.00	85.50
Am-241	284	5.49	249	303	5,261.00	87.68

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:11:16PM 6/22/2014

Calibration

Sample Name: CCV-9885;AV62-20140622
Description:
Detector: AV62

Calibration Date: 6/22/2014 9:11:13PM
Analyst: 60040

Source Info

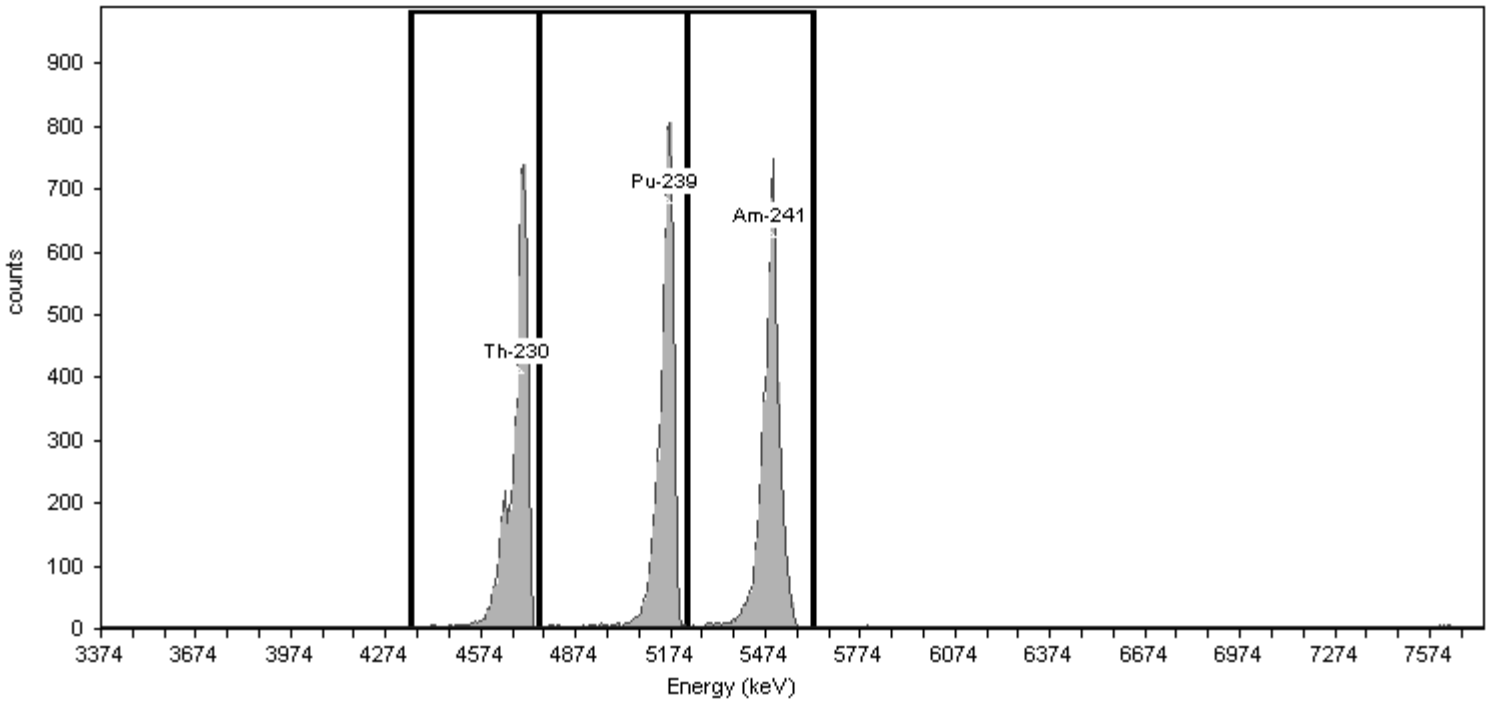
Certificate ID: 82246-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV62 , SN: 52-060FF2
Acquisition Start Date: 6/22/2014 8:09:10PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.50% +/- 0.50% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,284.00	88.07
Pu-239	240	5.16	186	249	5,185.00	86.42
Am-241	284	5.49	249	303	5,651.00	94.18

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:18:43PM 6/22/2014

Calibration

Sample Name: CCV-9886;AV63-20140622
Description:
Detector: AV63

Calibration Date: 6/22/2014 10:18:39PM
Analyst: 60040

Source Info

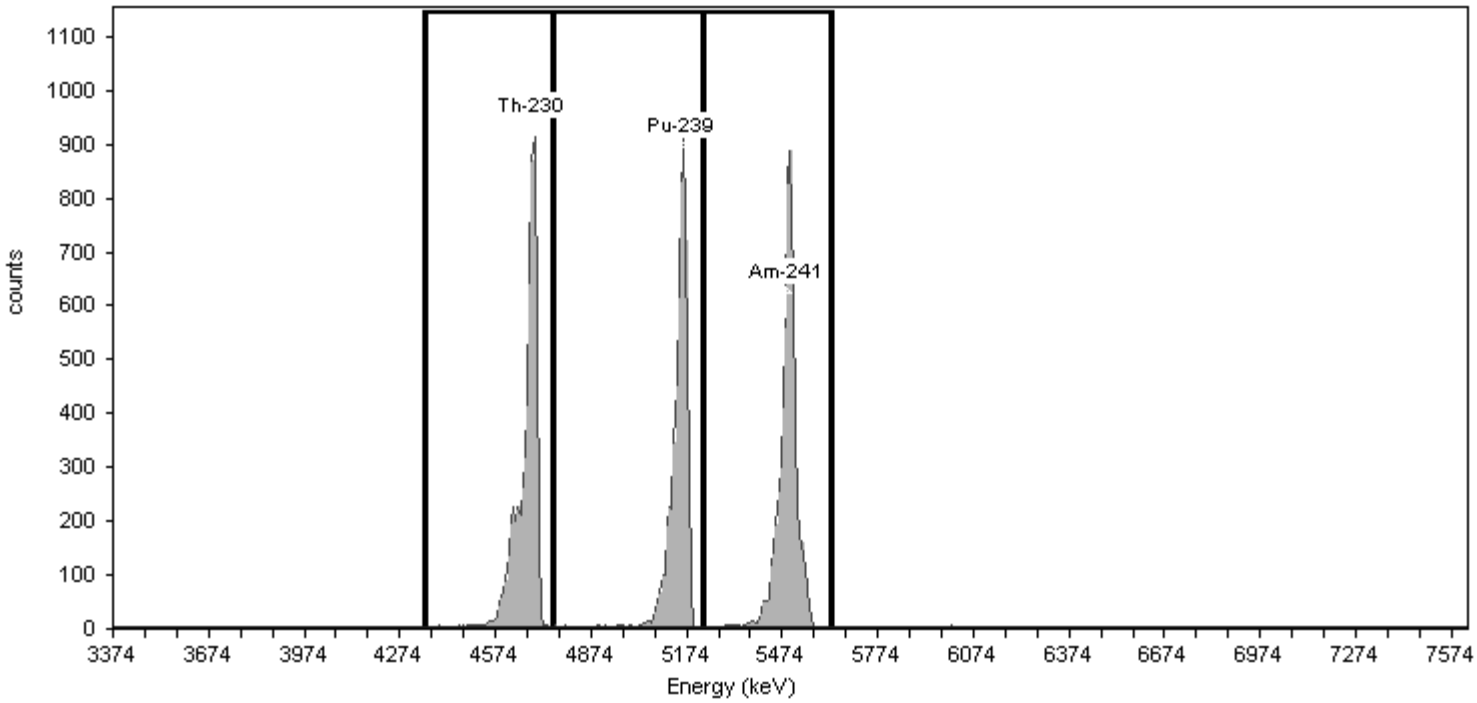
Certificate ID: 82247-334
Prepared by: Analytics

Certification Date: 6/10/2010 12:00:00PM
Description:

Acquisition

Detector: AV63 , SN: 47-029ff2
Acquisition Start Date: 6/22/2014 9:18:07PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 25.57% +/- 0.45% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,695.00	94.92
Pu-239	240	5.16	186	249	5,354.00	89.23
Am-241	284	5.49	249	303	5,757.00	95.95

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:18:51PM 6/22/2014

Calibration

Sample Name: CCV-7107;AV64-20140622
Description:
Detector: AV64

Calibration Date: 6/22/2014 10:18:48PM
Analyst: 60040

Source Info

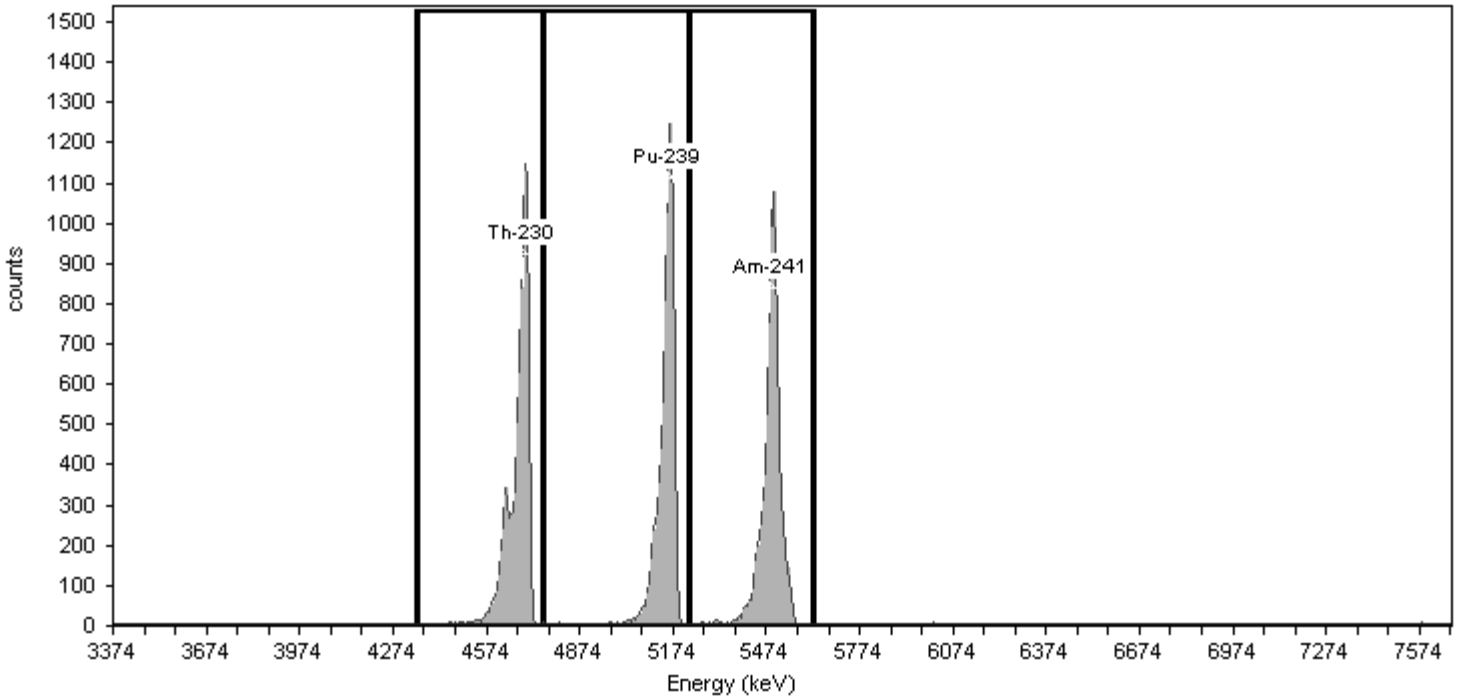
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV64 , SN: 47-029ee4
Acquisition Start Date: 6/22/2014 9:18:17PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 27.76% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	7,489.00	124.82
Pu-239	240	5.16	186	249	7,273.00	121.22
Am-241	284	5.49	249	303	7,239.00	120.65

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:11:24PM 6/22/2014

Calibration

Sample Name: CCV-8874;AV65-20140622
Description:
Detector: AV65

Calibration Date: 6/22/2014 9:11:20PM
Analyst: 60040

Source Info

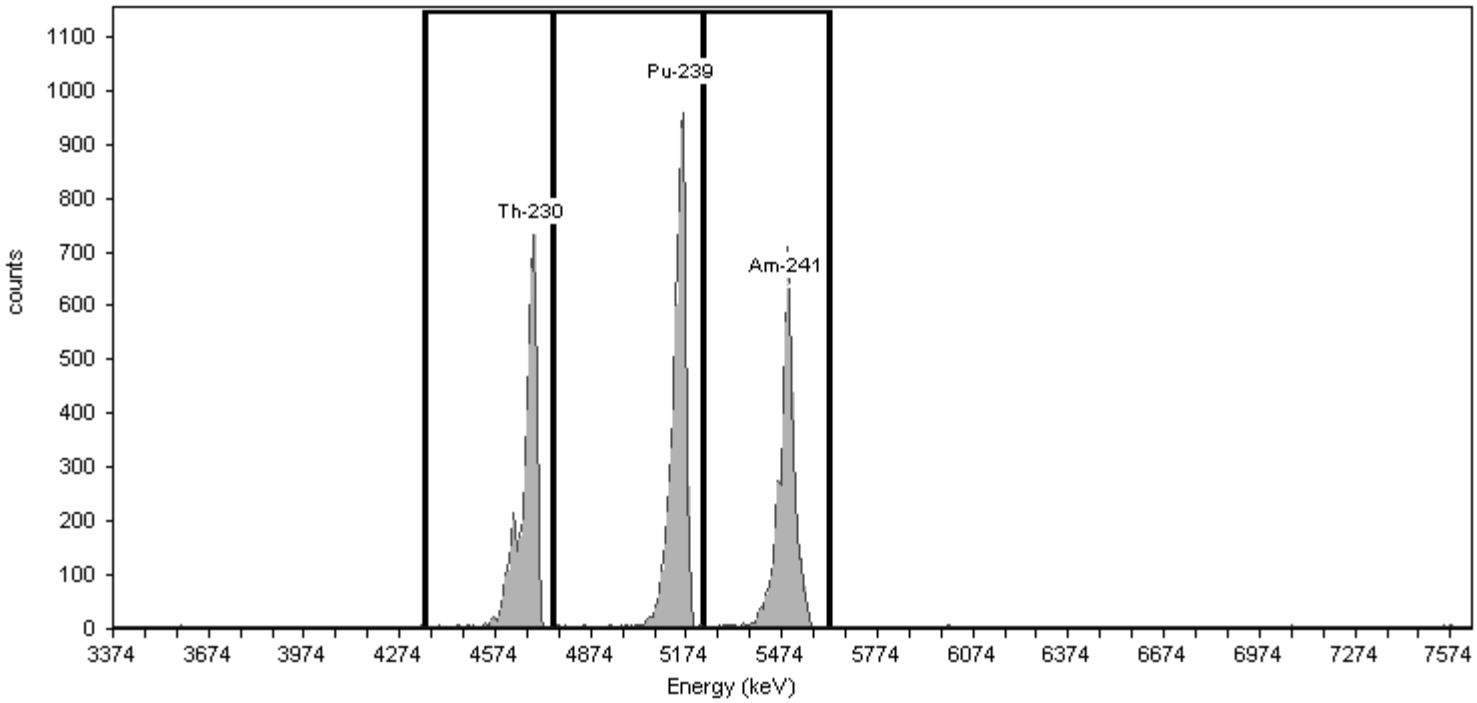
Certificate ID: 82233-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV65 , SN: 44-049JJ1
Acquisition Start Date: 6/22/2014 8:09:47PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.95% +/- 0.50% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	4,739.00	78.98
Pu-239	240	5.16	186	249	6,042.00	100.70
Am-241	284	5.49	249	303	4,836.00	80.60

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:18:57PM 6/22/2014

Calibration

Sample Name: CCV-8875;AV66-20140622
Description:
Detector: AV66

Calibration Date: 6/22/2014 10:18:53PM
Analyst: 60040

Source Info

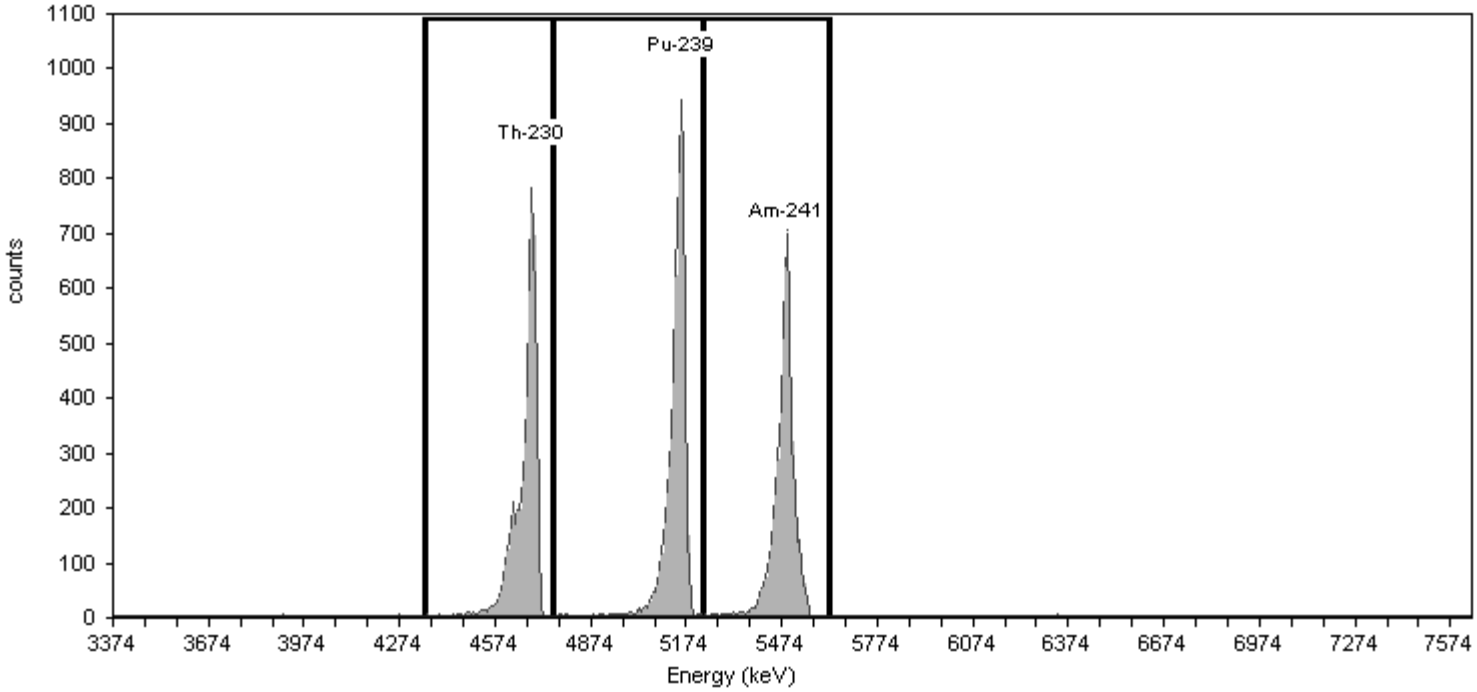
Certificate ID: 82234-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV66 , SN: 48-158EE2
Acquisition Start Date: 6/22/2014 9:18:27PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 25.70% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,101.00	85.02
Pu-239	240	5.16	186	249	5,821.00	97.02
Am-241	284	5.49	249	303	5,063.00	84.38

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:58:15PM 6/22/2014

Calibration

Sample Name: CCV-8876;AV67-20140622
Description:
Detector: AV67

Calibration Date: 6/22/2014 7:58:11PM
Analyst: 60040

Source Info

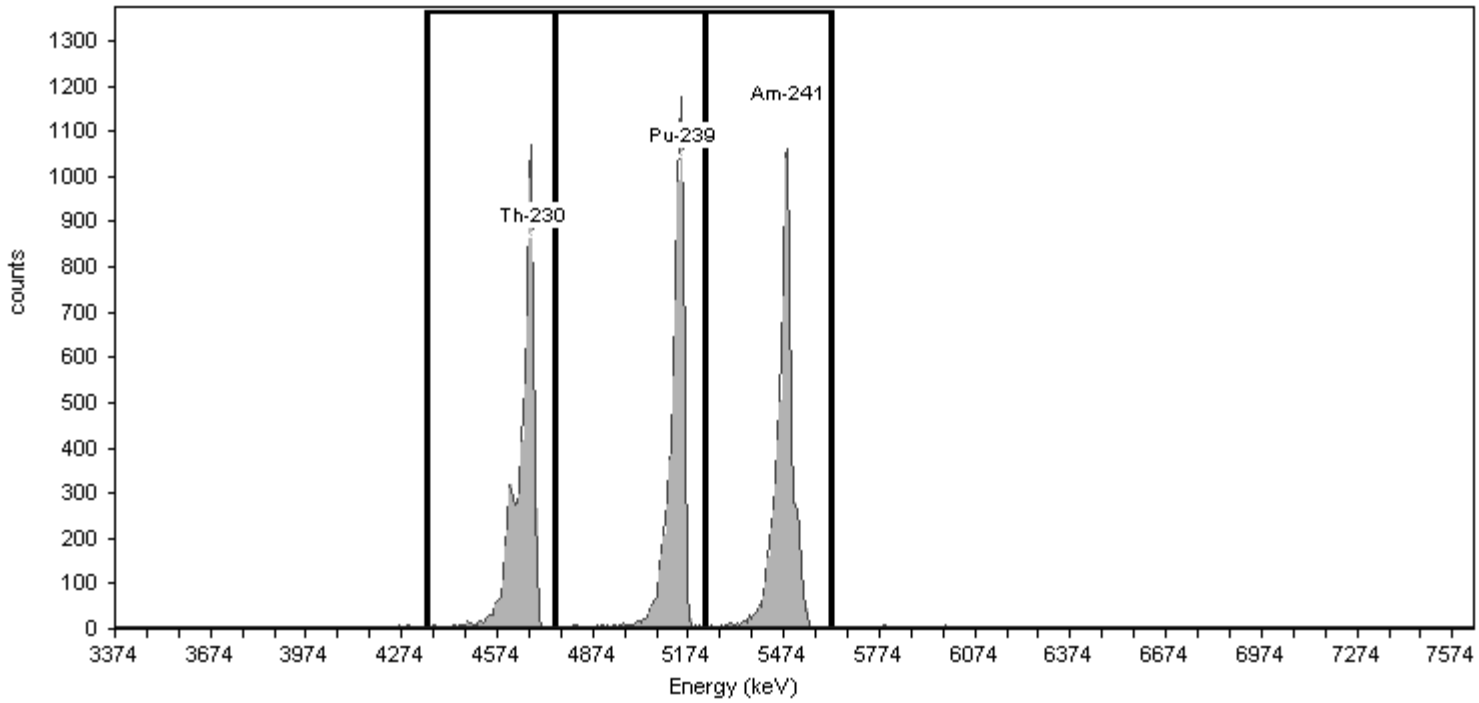
Certificate ID: 82235-334
Prepared by: Analytics

Certification Date: 6/4/2010 12:00:00PM
Description:

Acquisition

Detector: AV67 , SN: 52-102 D7
Acquisition Start Date: 6/22/2014 6:54:26PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 27.82% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	7,161.00	119.35
Pu-239	240	5.16	186	249	6,928.00	115.47
Am-241	284	5.49	249	303	7,431.00	123.85

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:11:30PM 6/22/2014

Calibration

Sample Name: CCV-8877;AV68-20140622
Description:
Detector: AV68

Calibration Date: 6/22/2014 9:11:26PM
Analyst: 60040

Source Info

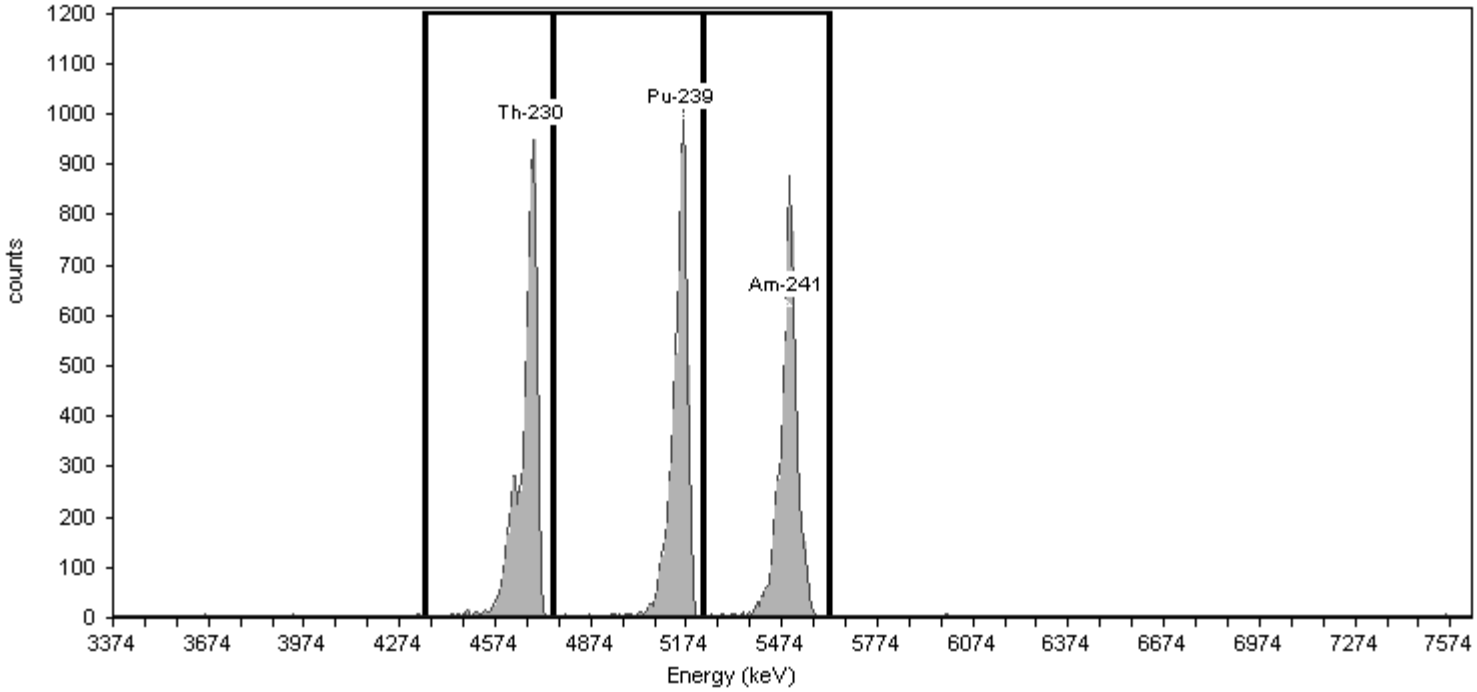
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV68 , SN: 48-45884
Acquisition Start Date: 6/22/2014 8:09:47PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 26.31% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,695.00	111.58
Pu-239	240	5.16	186	249	6,525.00	108.75
Am-241	284	5.49	249	303	6,331.00	105.52

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:11:36PM 6/22/2014

Calibration

Sample Name: CCV-9520;AV69-20140622
Description:
Detector: AV69

Calibration Date: 6/22/2014 9:11:33PM
Analyst: 60040

Source Info

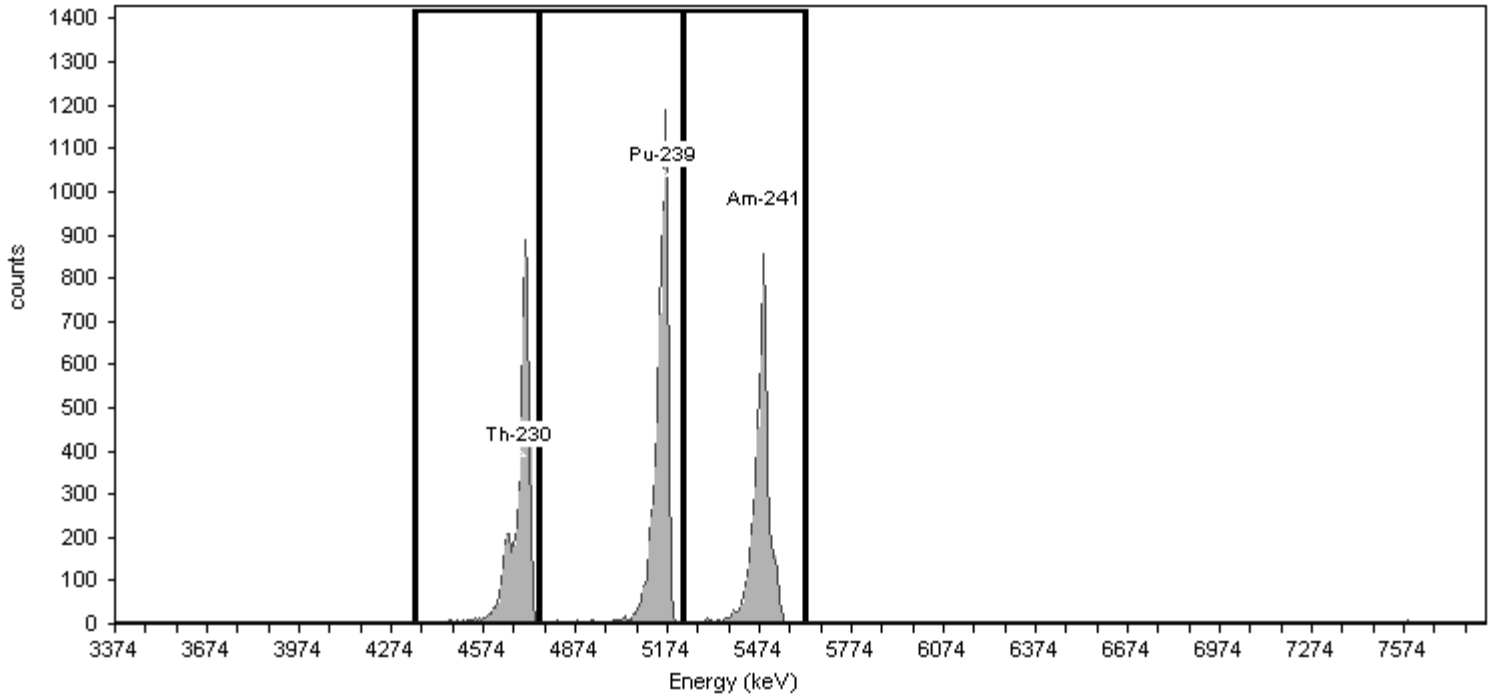
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV69 , SN: 49-155DD5
Acquisition Start Date: 6/22/2014 8:09:59PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 25.94% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,260.00	87.67
Pu-239	240	5.16	186	249	6,329.00	105.48
Am-241	284	5.49	249	303	5,104.00	85.07

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:11:42PM 6/22/2014

Calibration

Sample Name: CCV-8876;AV70-20140622
Description:
Detector: AV70

Calibration Date: 6/22/2014 9:11:39PM
Analyst: 60040

Source Info

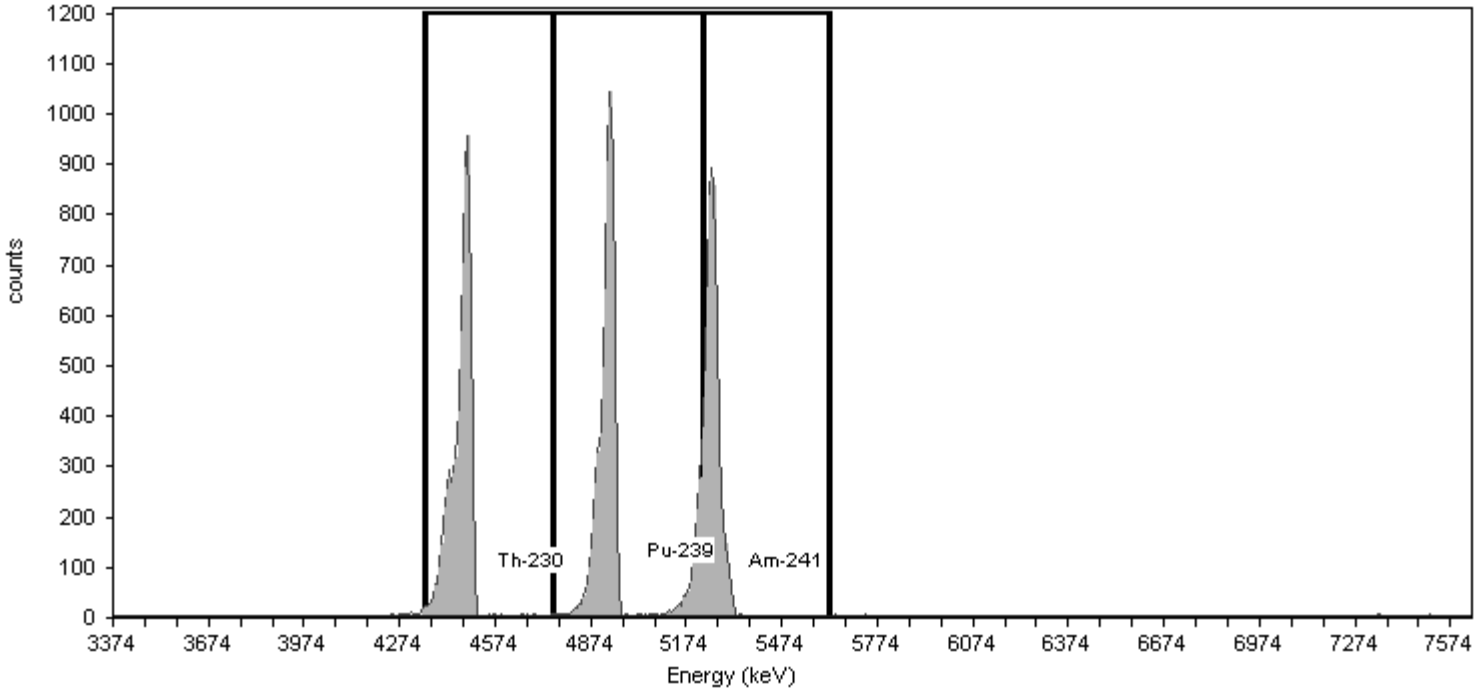
Certificate ID: 82235-334
Prepared by: Analytics

Certification Date: 6/4/2010 12:00:00PM
Description:

Acquisition

Detector: AV70 , SN: 48-158FF1
Acquisition Start Date: 6/22/2014 8:10:17PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 25.69% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,709.00	111.82
Pu-239	240	5.16	186	249	7,937.00	132.28
Am-241	284	5.49	249	303	5,836.00	97.27

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:11:48PM 6/22/2014

Calibration

Sample Name: CCV-9792;AV71-20140622
Description:
Detector: AV71

Calibration Date: 6/22/2014 9:11:45PM
Analyst: 60040

Source Info

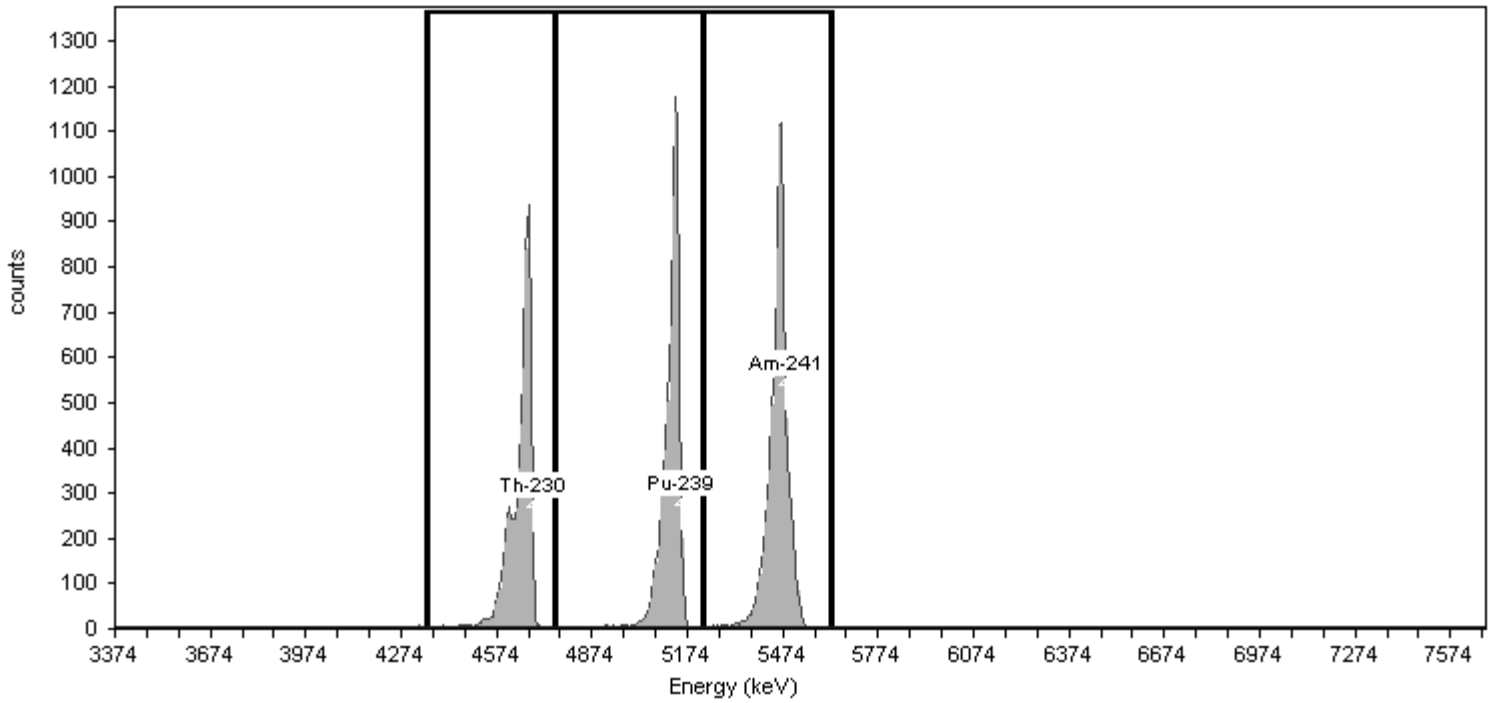
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV71 , SN: 48-158EE6
Acquisition Start Date: 6/22/2014 8:10:19PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 26.83% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,950.00	99.17
Pu-239	240	5.16	186	249	7,014.00	116.90
Am-241	284	5.49	249	303	8,009.00	133.48

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:30:53PM 6/19/2014

Calibration

Sample Name: CCV-9817;AV115-20140619
Description:
Detector: AV115

Calibration Date: 6/19/2014 4:30:50PM
Analyst: 60040

Source Info

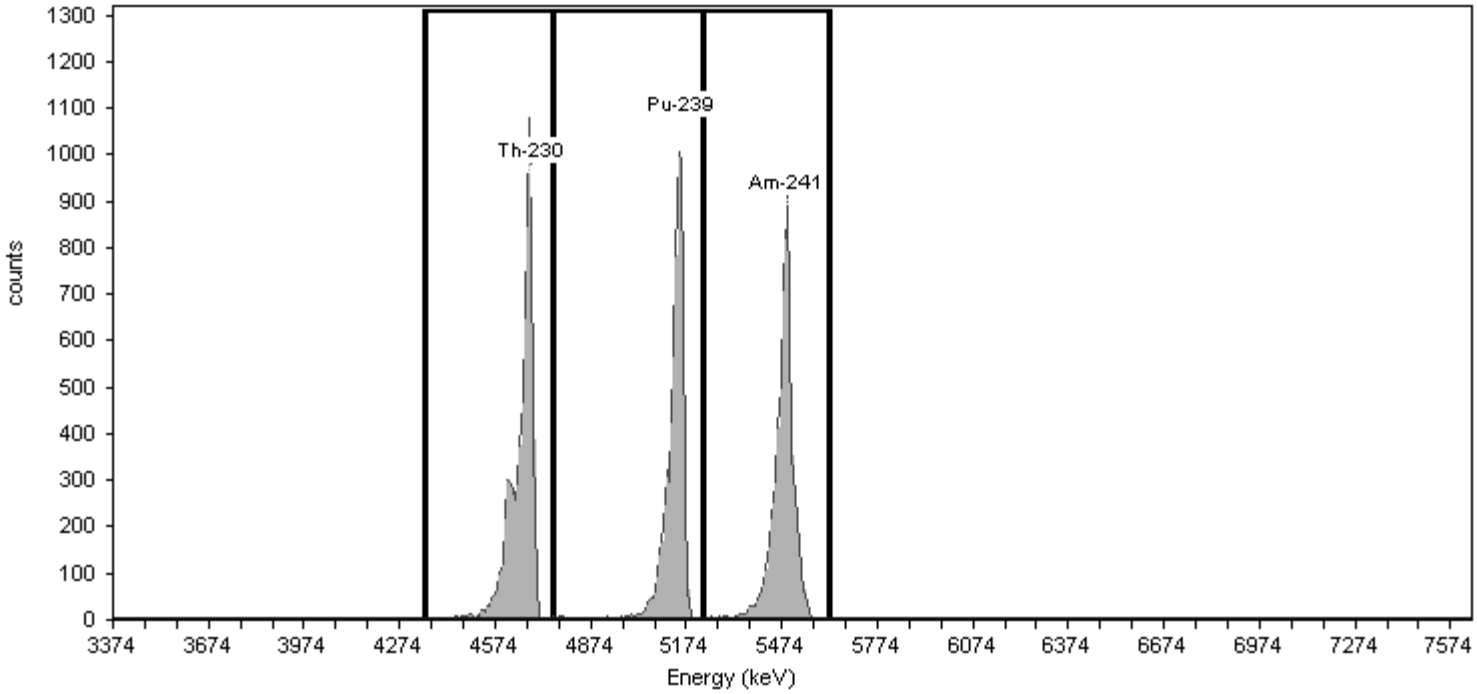
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV115 , SN: 49-037E4
Acquisition Start Date: 6/19/2014 3:10:46PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 26.51% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	7,018.00	116.97
Pu-239	240	5.16	186	249	6,339.00	105.65
Am-241	284	5.49	249	303	6,617.00	110.28

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:30:59PM 6/19/2014

Calibration

Sample Name: CCV-9792;AV116-20140619
Description:
Detector: AV116

Calibration Date: 6/19/2014 4:30:56PM
Analyst: 60040

Source Info

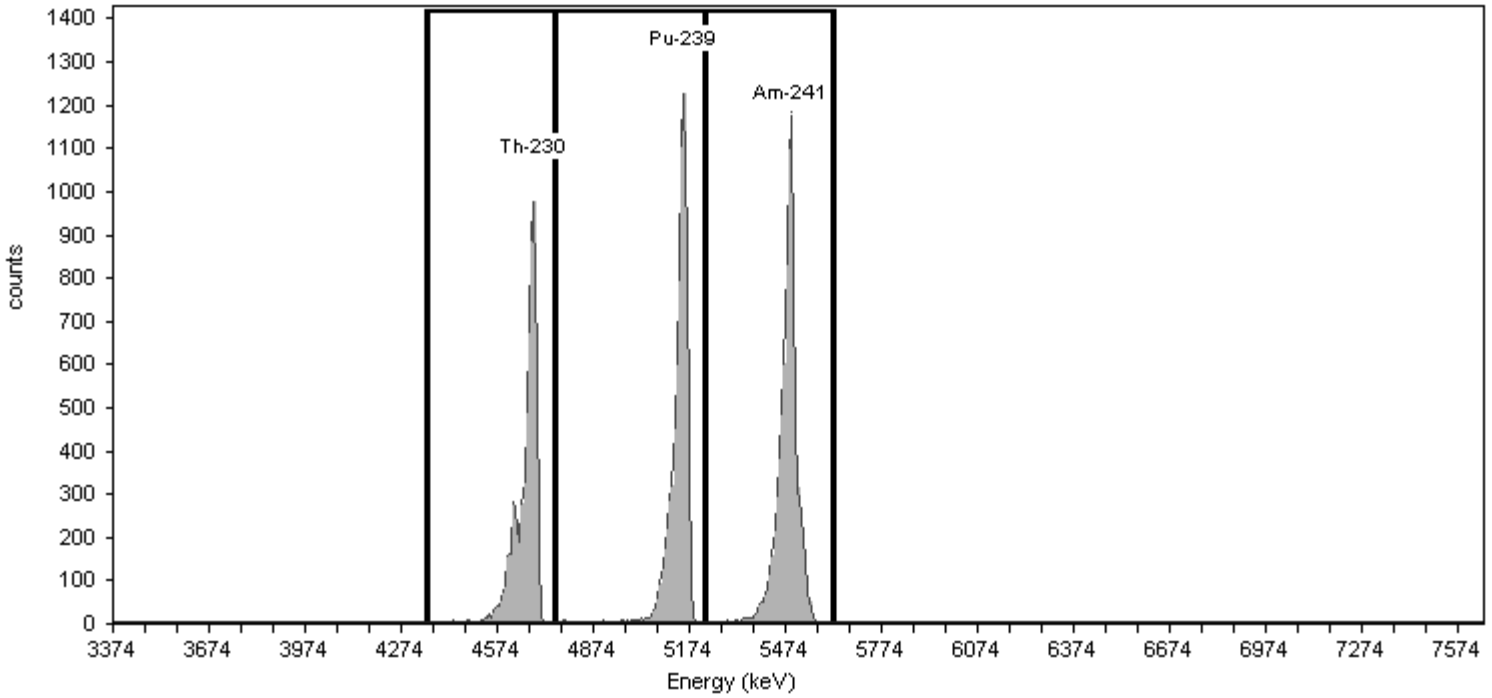
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV116 , SN: 49-034G1
Acquisition Start Date: 6/19/2014 3:10:47PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 26.94% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,046.00	100.77
Pu-239	240	5.16	186	249	6,986.00	116.43
Am-241	284	5.49	249	303	8,031.00	133.85

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:31:05PM 6/19/2014

Calibration

Sample Name: CCV-9793;AV117-20140619
Description:
Detector: AV117

Calibration Date: 6/19/2014 4:31:02PM
Analyst: 60040

Source Info

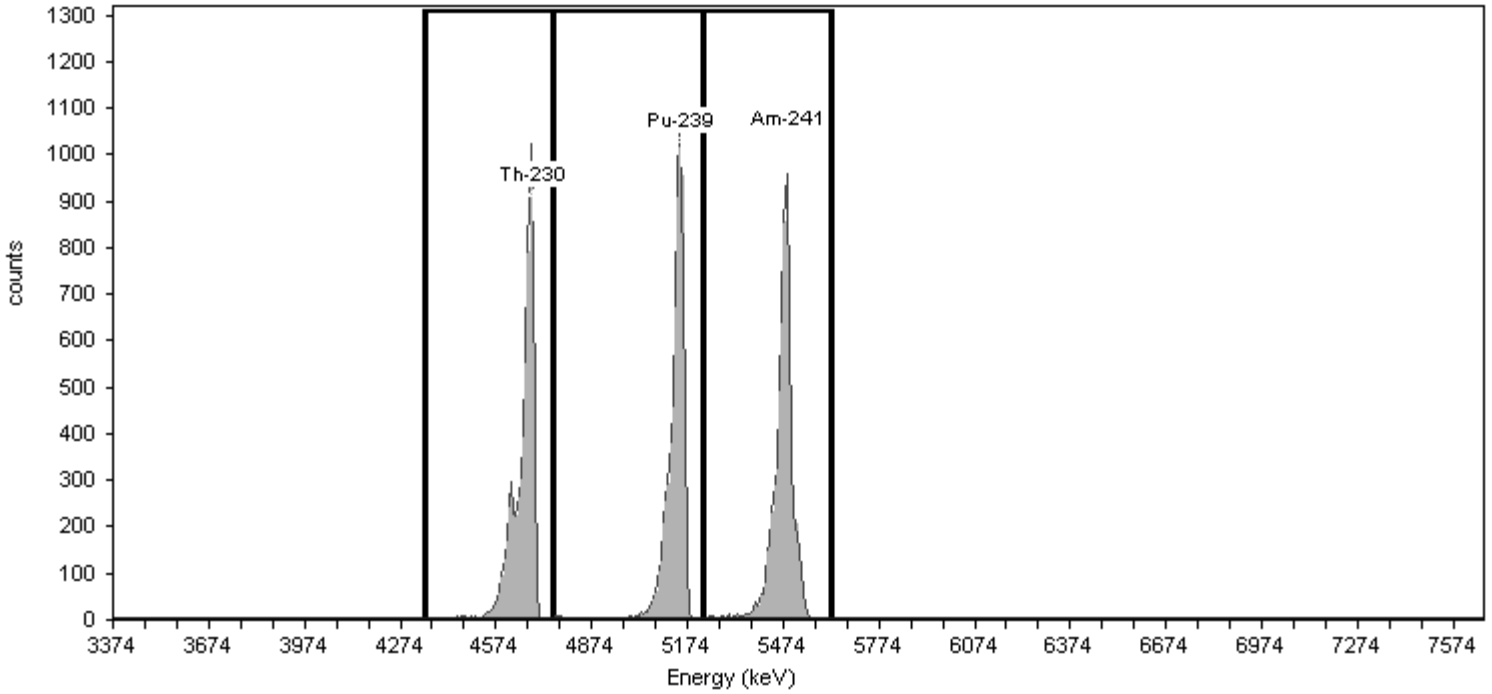
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV117 , SN: 49-037X4
Acquisition Start Date: 6/19/2014 3:10:49PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 25.93% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,190.00	103.17
Pu-239	240	5.16	186	249	6,282.00	104.70
Am-241	284	5.49	249	303	6,226.00	103.77

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:31:10PM 6/19/2014

Calibration

Sample Name: CCV-9794;AV118-20140619
Description:
Detector: AV118

Calibration Date: 6/19/2014 4:31:07PM
Analyst: 60040

Source Info

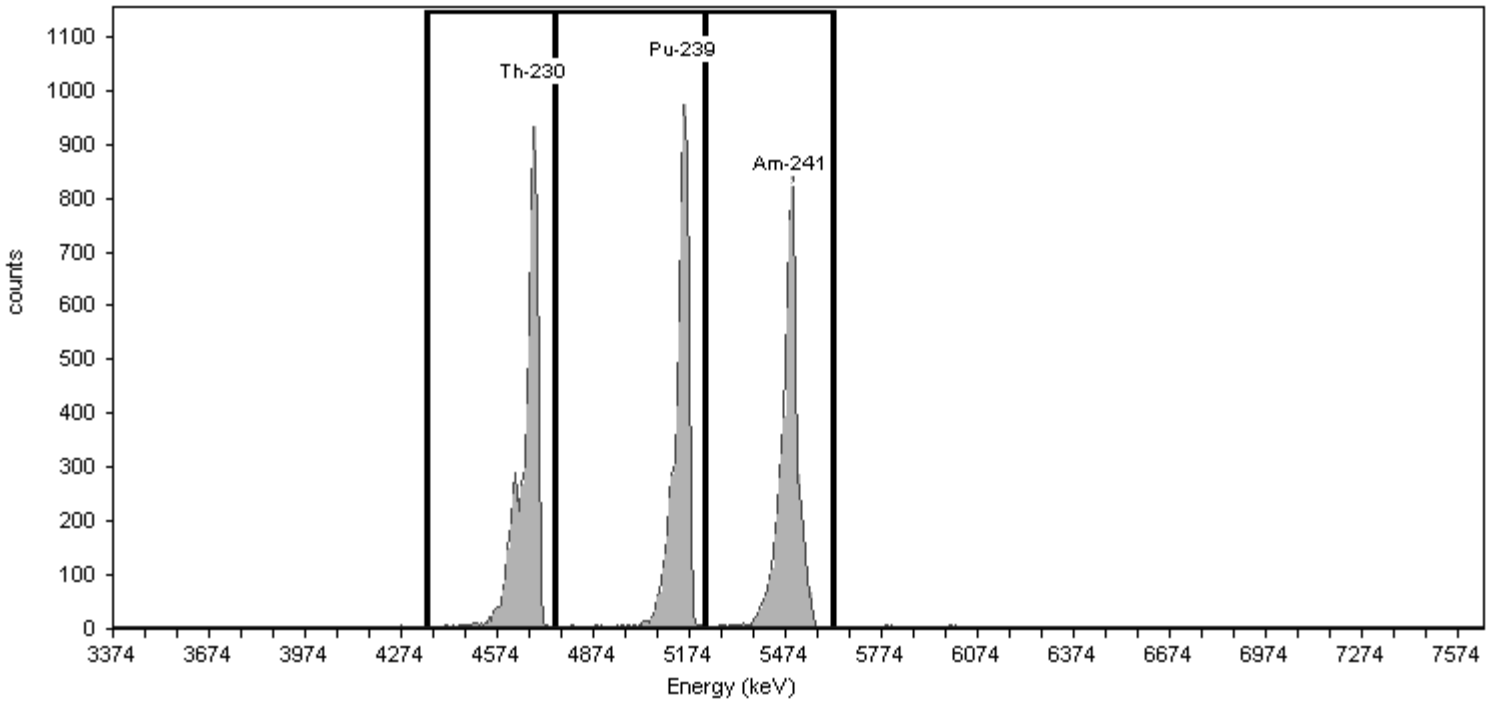
Certificate ID: 82242-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV118 , SN: 49-037F4
Acquisition Start Date: 6/19/2014 3:10:52PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 25.93% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,247.00	104.12
Pu-239	240	5.16	186	249	5,969.00	99.48
Am-241	284	5.49	249	303	6,551.00	109.18

Monthly Backgrounds

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:13:02AM 6/19/2014

Sample

Sample Name: ICB;AV1
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

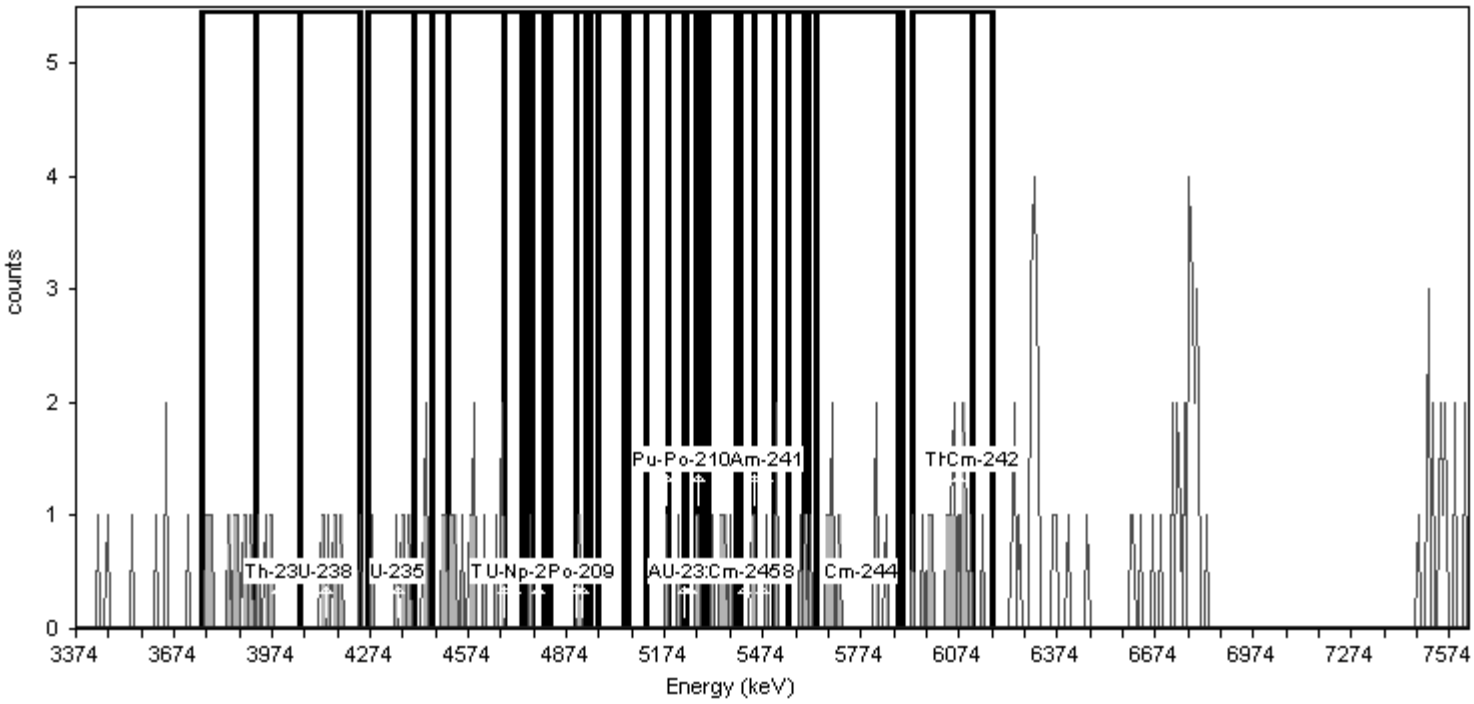
Analyst: 60040

Acquisition

Detector: AV1 , SN: 49-188 AA4
Acquisition Start Date: 6/18/2014 7:10:34PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-7107;AV1-20140505
Calibration Date: 5/6/2014 5:38:14PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.30% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 155.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	14.00	1.458E-002	4.034E-003
U-238	4.14	3.92	4.24	11.00	1.146E-002	3.608E-003
U-235	4.36	4.26	4.46	8.00	8.333E-003	3.125E-003
Th-230	4.68	4.40	4.75	17.00	1.771E-002	4.419E-003
U-234	4.71	4.51	4.82	13.00	1.354E-002	3.898E-003
Pu-242	4.90	4.68	4.95	2.00	2.083E-003	1.804E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	9.00	9.375E-003	3.294E-003
Th-228	5.45	5.19	5.51	11.00	1.146E-002	3.608E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	12.00	1.250E-002	3.756E-003
Am-241	5.48	5.30	5.60	12.00	1.250E-002	3.756E-003
Cm-245	5.42	5.40	5.45	2.00	2.083E-003	1.804E-003
Pu-236	5.76	5.61	5.89	9.00	9.375E-003	3.294E-003
Cm-244	5.78	5.64	5.90	8.00	8.333E-003	3.125E-003
Th-227	6.07	5.93	6.18	15.00	1.563E-002	4.167E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:13:14AM 6/19/2014

Sample

Sample Name: ICB;AV3
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

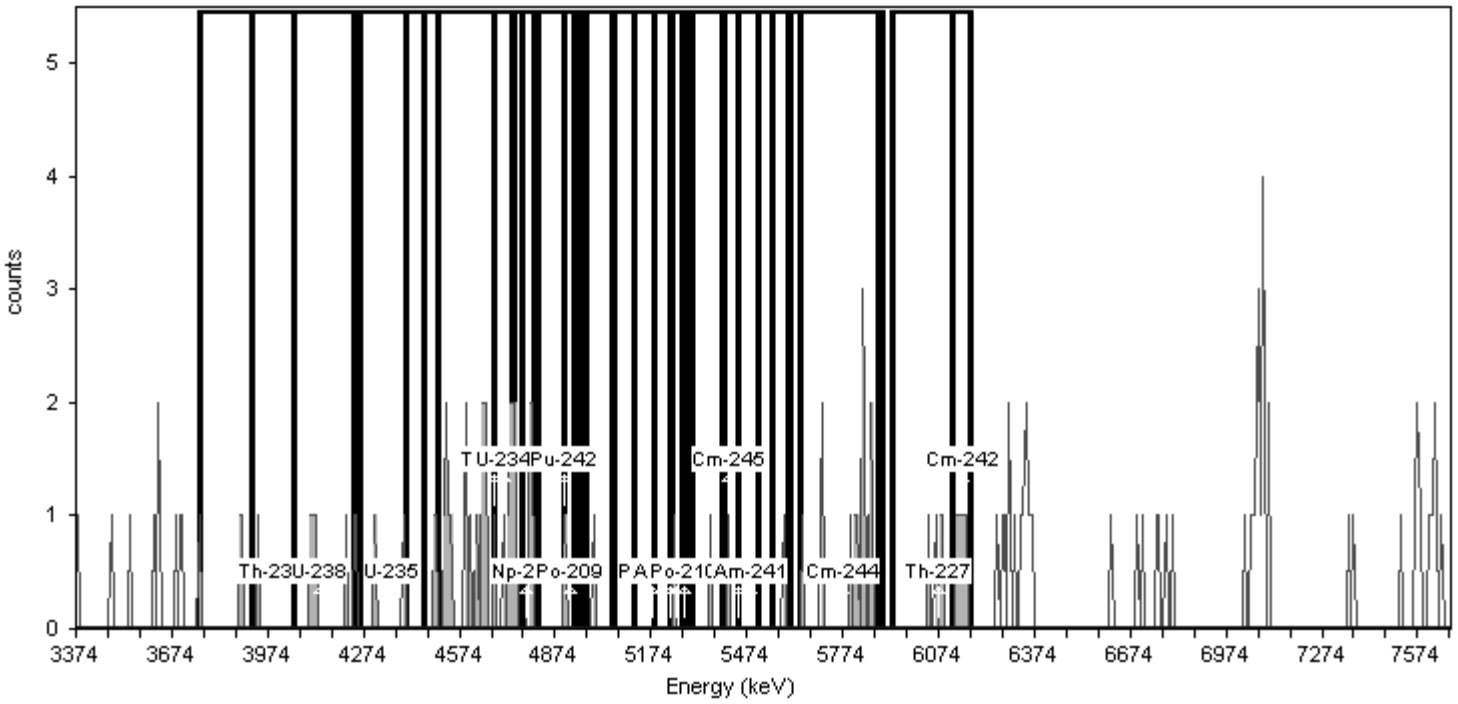
Analyst: 60040

Acquisition

Detector: AV3 , SN: 49-202 FF7
Acquisition Start Date: 6/18/2014 7:10:38PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-8875;AV3-20140505
Calibration Date: 5/6/2014 5:38:33PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.09% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 127.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	4.00	4.167E-003	2.329E-003
U-238	4.14	3.92	4.24	6.00	6.250E-003	2.756E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	26.00	2.708E-002	5.413E-003
U-234	4.71	4.51	4.82	28.00	2.917E-002	5.610E-003
Pu-242	4.90	4.68	4.95	14.00	1.458E-002	4.034E-003
Th-229	4.86	4.74	5.12	10.00	1.042E-002	3.455E-003
Np-237	4.78	4.77	4.81	4.00	4.167E-003	2.329E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	1.00	1.042E-003	1.473E-003
U-232	5.25	5.06	5.40	2.00	2.083E-003	1.804E-003
Th-228	5.45	5.19	5.51	3.00	3.125E-003	2.083E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	2.00	2.083E-003	1.804E-003
Am-241	5.48	5.30	5.60	3.00	3.125E-003	2.083E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	13.00	1.354E-002	3.898E-003
Cm-244	5.78	5.64	5.90	13.00	1.354E-002	3.898E-003
Th-227	6.07	5.93	6.18	9.00	9.375E-003	3.294E-003
Cm-242	6.15	6.12	6.18	5.00	5.208E-003	2.552E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:13:25AM 6/19/2014

Sample

Sample Name: ICB;AV6
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

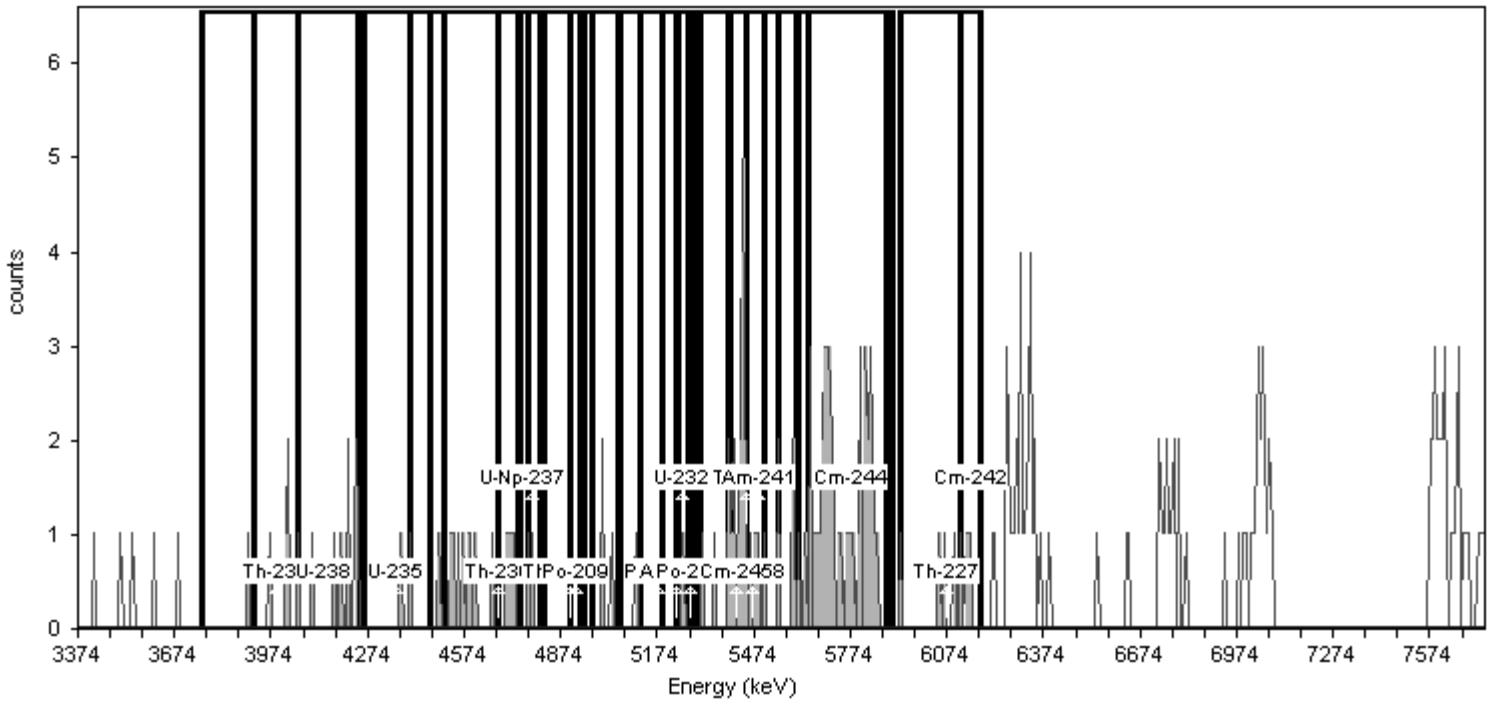
Analyst: 60040

Acquisition

Detector: AV6 , SN: 47-27FF2
Acquisition Start Date: 6/18/2014 7:08:18PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9520;AV6-20140505
Calibration Date: 5/6/2014 5:38:46PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.89% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 213.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	6.00	6.250E-003	2.756E-003
U-238	4.14	3.92	4.24	13.00	1.354E-002	3.898E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	14.00	1.458E-002	4.034E-003
U-234	4.71	4.51	4.82	14.00	1.458E-002	4.034E-003
Pu-242	4.90	4.68	4.95	6.00	6.250E-003	2.756E-003
Th-229	4.86	4.74	5.12	6.00	6.250E-003	2.756E-003
Np-237	4.78	4.77	4.81	2.00	2.083E-003	1.804E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	7.00	7.292E-003	2.946E-003
Th-228	5.45	5.19	5.51	21.00	2.187E-002	4.886E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	22.00	2.292E-002	4.996E-003
Am-241	5.48	5.30	5.60	24.00	2.500E-002	5.208E-003
Cm-245	5.42	5.40	5.45	14.00	1.458E-002	4.034E-003
Pu-236	5.76	5.61	5.89	44.00	4.583E-002	6.988E-003
Cm-244	5.78	5.64	5.90	42.00	4.375E-002	6.831E-003
Th-227	6.07	5.93	6.18	8.00	8.333E-003	3.125E-003
Cm-242	6.15	6.12	6.18	4.00	4.167E-003	2.329E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:13:31AM 6/19/2014

Sample

Sample Name: ICB;AV7
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

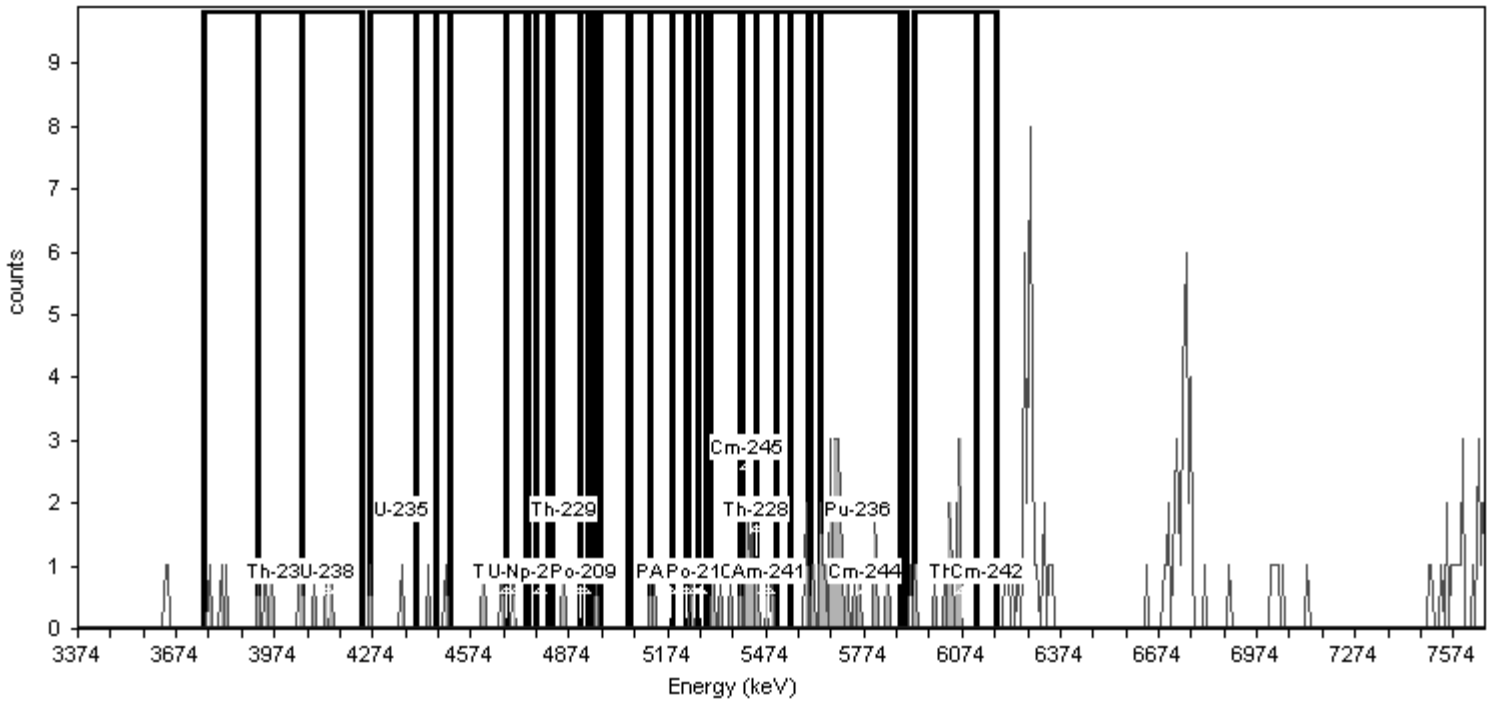
Analyst: 60040

Acquisition

Detector: AV7 , SN: 48-158EE5
Acquisition Start Date: 6/18/2014 7:08:20PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-8877;AV7-20140507
Calibration Date: 5/7/2014 10:48:48PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.80% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 167.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	9.00	9.375E-003	3.294E-003
U-238	4.14	3.92	4.24	9.00	9.375E-003	3.294E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	4.00	4.167E-003	2.329E-003
Pu-242	4.90	4.68	4.95	3.00	3.125E-003	2.083E-003
Th-229	4.86	4.74	5.12	4.00	4.167E-003	2.329E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	7.00	7.292E-003	2.946E-003
Th-228	5.45	5.19	5.51	13.00	1.354E-002	3.898E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	12.00	1.250E-002	3.756E-003
Am-241	5.48	5.30	5.60	14.00	1.458E-002	4.034E-003
Cm-245	5.42	5.40	5.45	7.00	7.292E-003	2.946E-003
Pu-236	5.76	5.61	5.89	26.00	2.708E-002	5.413E-003
Cm-244	5.78	5.64	5.90	25.00	2.604E-002	5.311E-003
Th-227	6.07	5.93	6.18	10.00	1.042E-002	3.455E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:13:36AM 6/19/2014

Sample

Sample Name: ICB;AV8
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

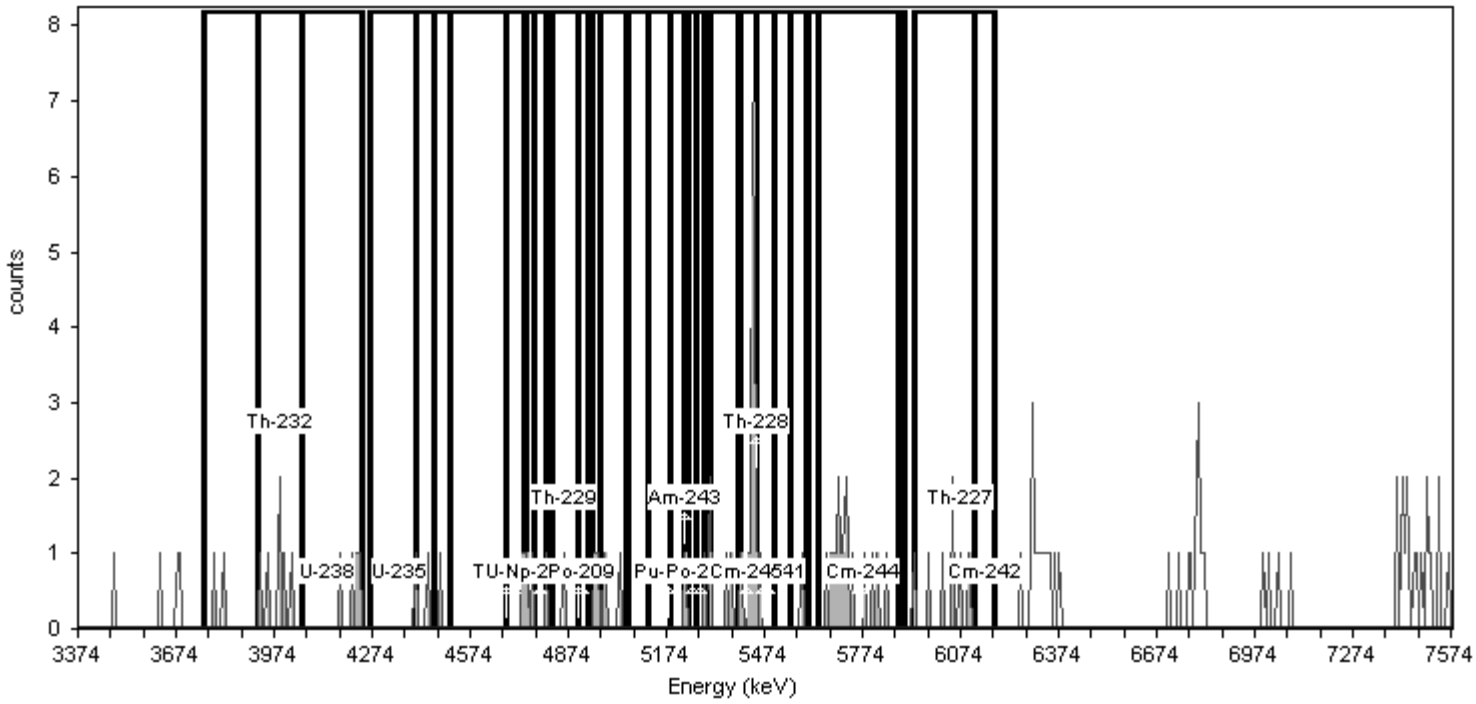
Analyst: 60040

Acquisition

Detector: AV8 , SN: 41-137Q6
Acquisition Start Date: 6/18/2014 7:08:22PM
Live Time: 960.01 min.
Real Time: 960.03 min.
Calibration Name: IC-9792;AV8-20140505
Calibration Date: 5/6/2014 5:38:58PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.05% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 119.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	8.00	8.333E-003	3.125E-003
U-238	4.14	3.92	4.24	10.00	1.042E-002	3.455E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	5.00	5.208E-003	2.552E-003
Pu-242	4.90	4.68	4.95	6.00	6.250E-003	2.756E-003
Th-229	4.86	4.74	5.12	9.00	9.375E-003	3.294E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	7.00	7.292E-003	2.946E-003
Th-228	5.45	5.19	5.51	19.00	1.979E-002	4.658E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	18.00	1.875E-002	4.540E-003
Am-241	5.48	5.30	5.60	18.00	1.875E-002	4.540E-003
Cm-245	5.42	5.40	5.45	12.00	1.250E-002	3.756E-003
Pu-236	5.76	5.61	5.89	16.00	1.667E-002	4.295E-003
Cm-244	5.78	5.64	5.90	16.00	1.667E-002	4.295E-003
Th-227	6.07	5.93	6.18	7.00	7.292E-003	2.946E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:26:28AM 6/19/2014

Sample

Sample Name: ICB;AV9
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

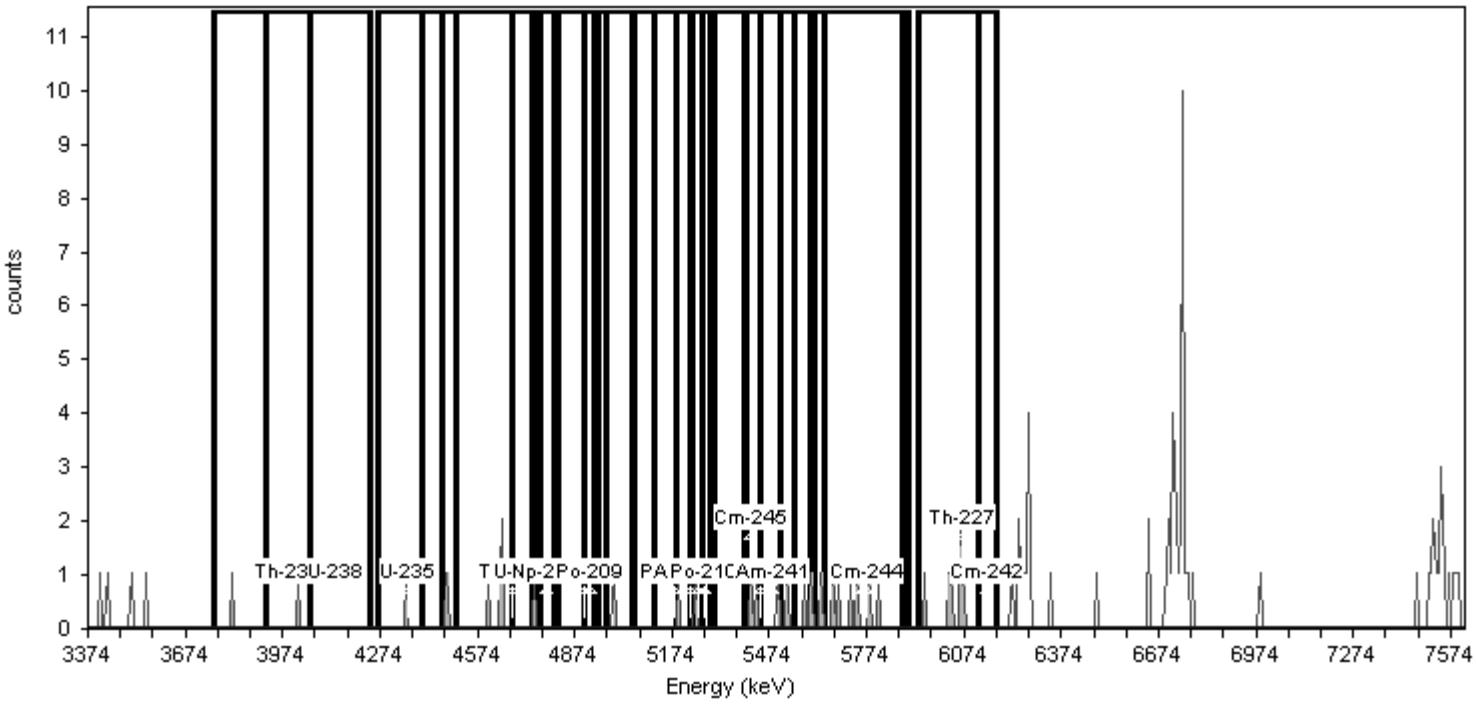
Analyst: 60040

Acquisition

Detector: AV9 , SN: 51-082V5
Acquisition Start Date: 6/18/2014 7:08:24PM
Live Time: 960.00 min.
Real Time: 970.50 min.
Calibration Name: IC-9793;AV9-20140505
Calibration Date: 5/6/2014 5:39:04PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.04% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 93.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	5.00	5.208E-003	2.552E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	2.00	2.083E-003	1.804E-003
Th-228	5.45	5.19	5.51	5.00	5.208E-003	2.552E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	4.00	4.167E-003	2.329E-003
Am-241	5.48	5.30	5.60	6.00	6.250E-003	2.756E-003
Cm-245	5.42	5.40	5.45	2.00	2.083E-003	1.804E-003
Pu-236	5.76	5.61	5.89	7.00	7.292E-003	2.946E-003
Cm-244	5.78	5.64	5.90	6.00	6.250E-003	2.756E-003
Th-227	6.07	5.93	6.18	6.00	6.250E-003	2.756E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:26:33AM 6/19/2014

Sample

Sample Name: ICB;AV10
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

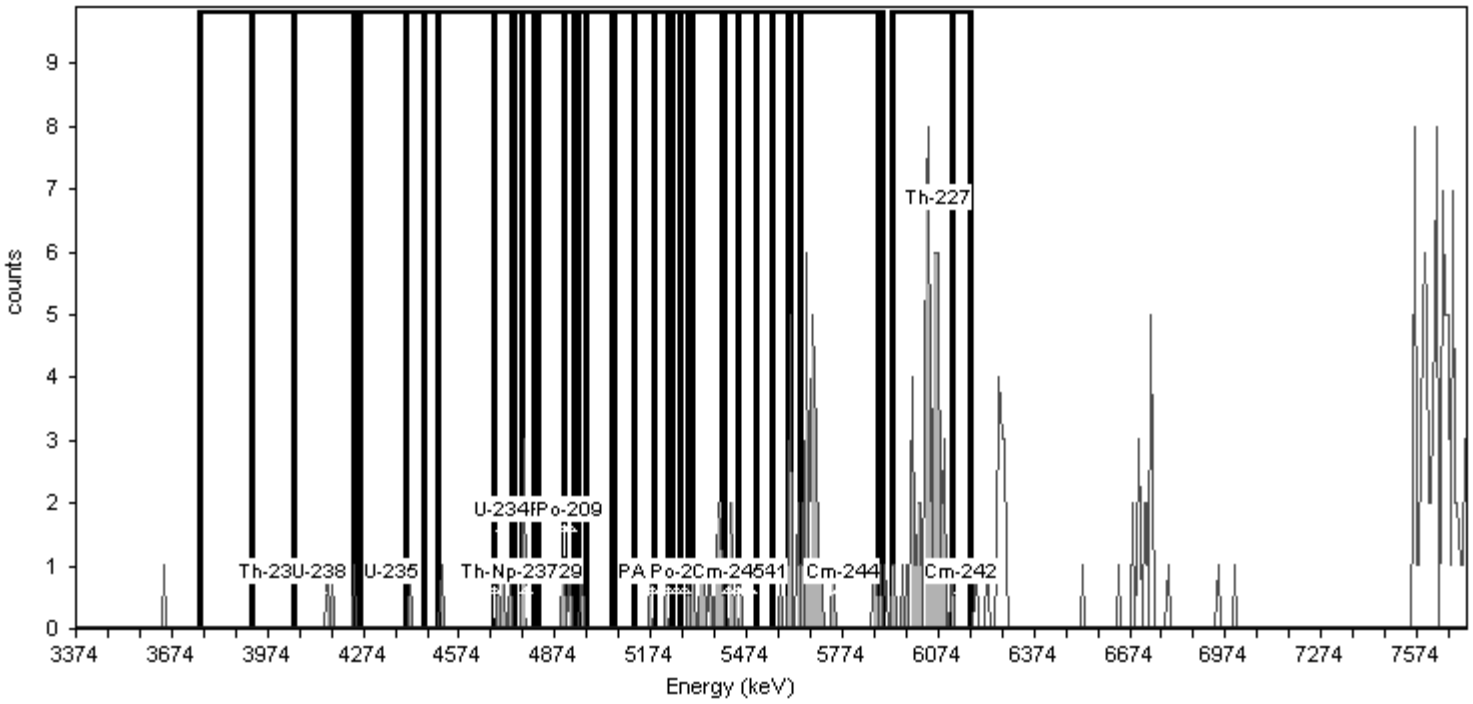
Acquisition

Detector: AV10 , SN: 49-155N2
Acquisition Start Date: 6/18/2014 7:08:26PM
Live Time: 960.00 min.
Real Time: 970.50 min.
Calibration Name: IC-9794;AV10-20140505
Calibration Date: 5/6/2014 5:39:10PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.84% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 237.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	5.00	5.208E-003	2.552E-003
U-234	4.71	4.51	4.82	8.00	8.333E-003	3.125E-003
Pu-242	4.90	4.68	4.95	10.00	1.042E-002	3.455E-003
Th-229	4.86	4.74	5.12	8.00	8.333E-003	3.125E-003
Np-237	4.78	4.77	4.81	4.00	4.167E-003	2.329E-003
Po-209	4.92	4.90	4.93	2.00	2.083E-003	1.804E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	12.00	1.250E-002	3.756E-003
Th-228	5.45	5.19	5.51	15.00	1.563E-002	4.167E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	14.00	1.458E-002	4.034E-003
Am-241	5.48	5.30	5.60	15.00	1.563E-002	4.167E-003
Cm-245	5.42	5.40	5.45	4.00	4.167E-003	2.329E-003
Pu-236	5.76	5.61	5.89	33.00	3.437E-002	6.074E-003
Cm-244	5.78	5.64	5.90	27.00	2.813E-002	5.512E-003
Th-227	6.07	5.93	6.18	52.00	5.417E-002	7.583E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:26:39AM 6/19/2014

Sample

Sample Name: ICB;AV11
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

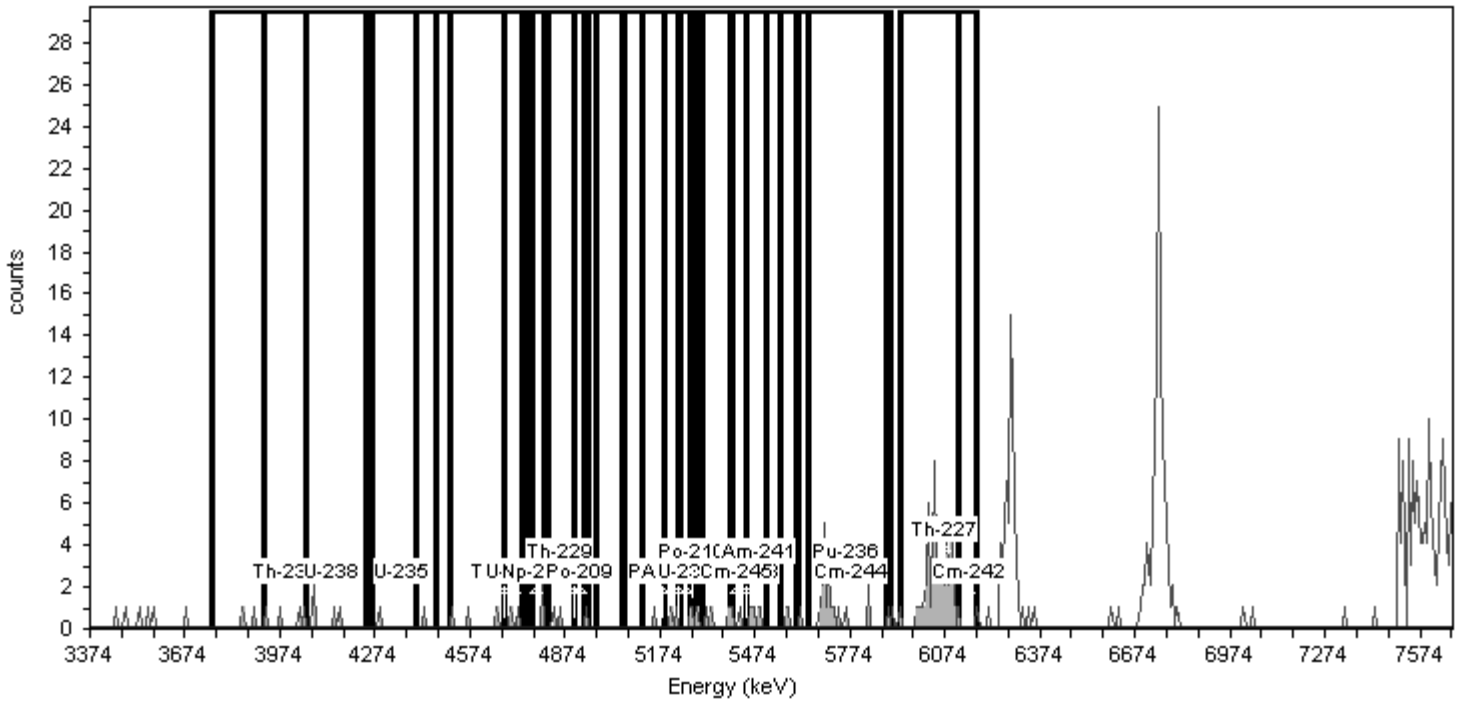
Analyst: 60040

Acquisition

Detector: AV11 , SN: 49-155dd2
Acquisition Start Date: 6/18/2014 7:08:27PM
Live Time: 960.00 min.
Real Time: 970.50 min.
Calibration Name: IC-9795;AV11-20140505
Calibration Date: 5/6/2014 5:39:16PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.88% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 403.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	6.00	6.250E-003	2.756E-003
U-238	4.14	3.92	4.24	8.00	8.333E-003	3.125E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	7.00	7.292E-003	2.946E-003
Pu-242	4.90	4.68	4.95	7.00	7.292E-003	2.946E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	2.00	2.083E-003	1.804E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	6.00	6.250E-003	2.756E-003
U-232	5.25	5.06	5.40	11.00	1.146E-002	3.608E-003
Th-228	5.45	5.19	5.51	15.00	1.563E-002	4.167E-003
Po-210	5.28	5.23	5.29	3.00	3.125E-003	2.083E-003
Pu-238	5.47	5.27	5.55	13.00	1.354E-002	3.898E-003
Am-241	5.48	5.30	5.60	12.00	1.250E-002	3.756E-003
Cm-245	5.42	5.40	5.45	3.00	3.125E-003	2.083E-003
Pu-236	5.76	5.61	5.89	19.00	1.979E-002	4.658E-003
Cm-244	5.78	5.64	5.90	19.00	1.979E-002	4.658E-003
Th-227	6.07	5.93	6.18	52.00	5.417E-002	7.583E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:26:44AM 6/19/2014

Sample

Sample Name: ICB;AV12
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

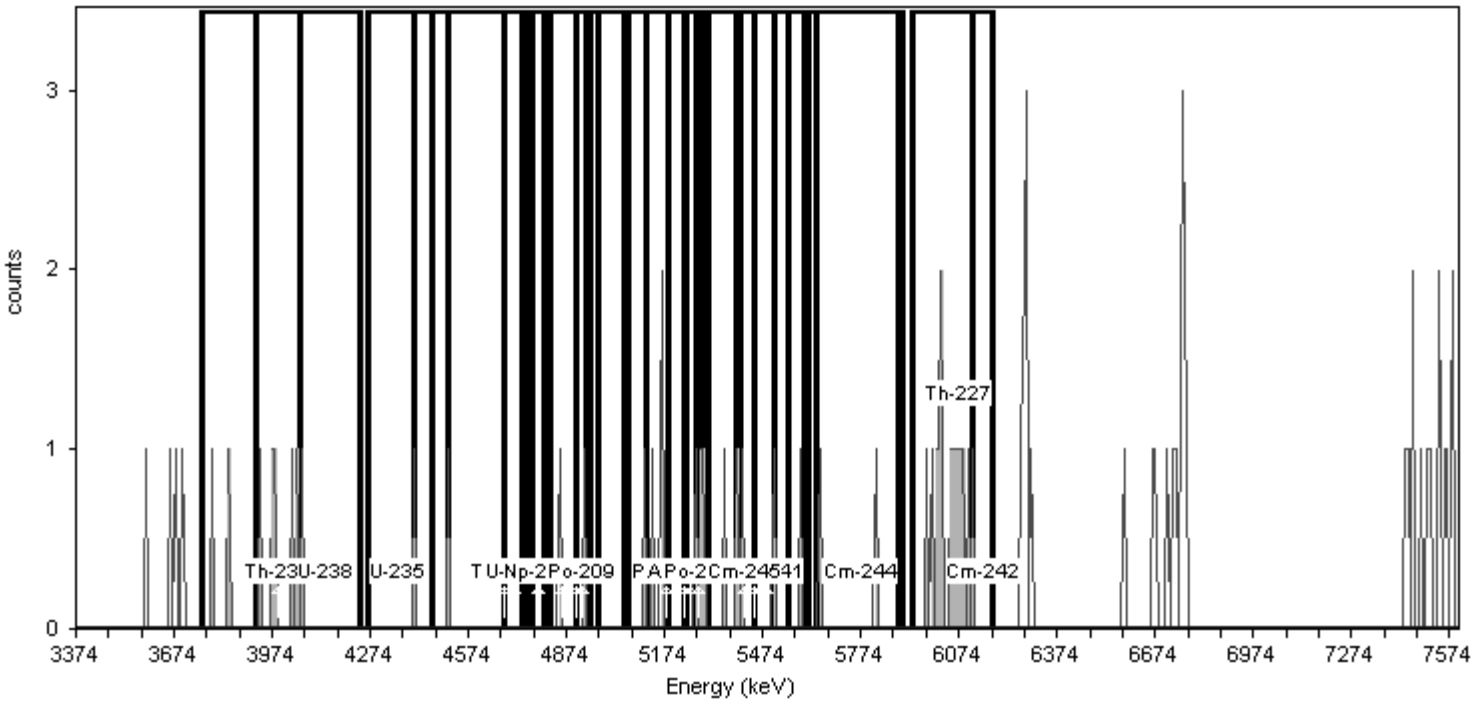
Acquisition

Detector: AV12 , SN: 51-082B7
Acquisition Start Date: 6/18/2014 7:08:29PM
Live Time: 960.00 min.
Real Time: 970.50 min.
Calibration Name: IC-9817;AV12-20140505
Calibration Date: 5/6/2014 5:39:22PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.97% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 77.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	7.00	7.292E-003	2.946E-003
U-238	4.14	3.92	4.24	6.00	6.250E-003	2.756E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	2.00	2.083E-003	1.804E-003
U-234	4.71	4.51	4.82	1.00	1.042E-003	1.473E-003
Pu-242	4.90	4.68	4.95	2.00	2.083E-003	1.804E-003
Th-229	4.86	4.74	5.12	3.00	3.125E-003	2.083E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	7.00	7.292E-003	2.946E-003
U-232	5.25	5.06	5.40	9.00	9.375E-003	3.294E-003
Th-228	5.45	5.19	5.51	7.00	7.292E-003	2.946E-003
Po-210	5.28	5.23	5.29	3.00	3.125E-003	2.083E-003
Pu-238	5.47	5.27	5.55	7.00	7.292E-003	2.946E-003
Am-241	5.48	5.30	5.60	5.00	5.208E-003	2.552E-003
Cm-245	5.42	5.40	5.45	2.00	2.083E-003	1.804E-003
Pu-236	5.76	5.61	5.89	2.00	2.083E-003	1.804E-003
Cm-244	5.78	5.64	5.90	2.00	2.083E-003	1.804E-003
Th-227	6.07	5.93	6.18	14.00	1.458E-002	4.034E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:26:50AM 6/19/2014

Sample

Sample Name: ICB;AV13
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

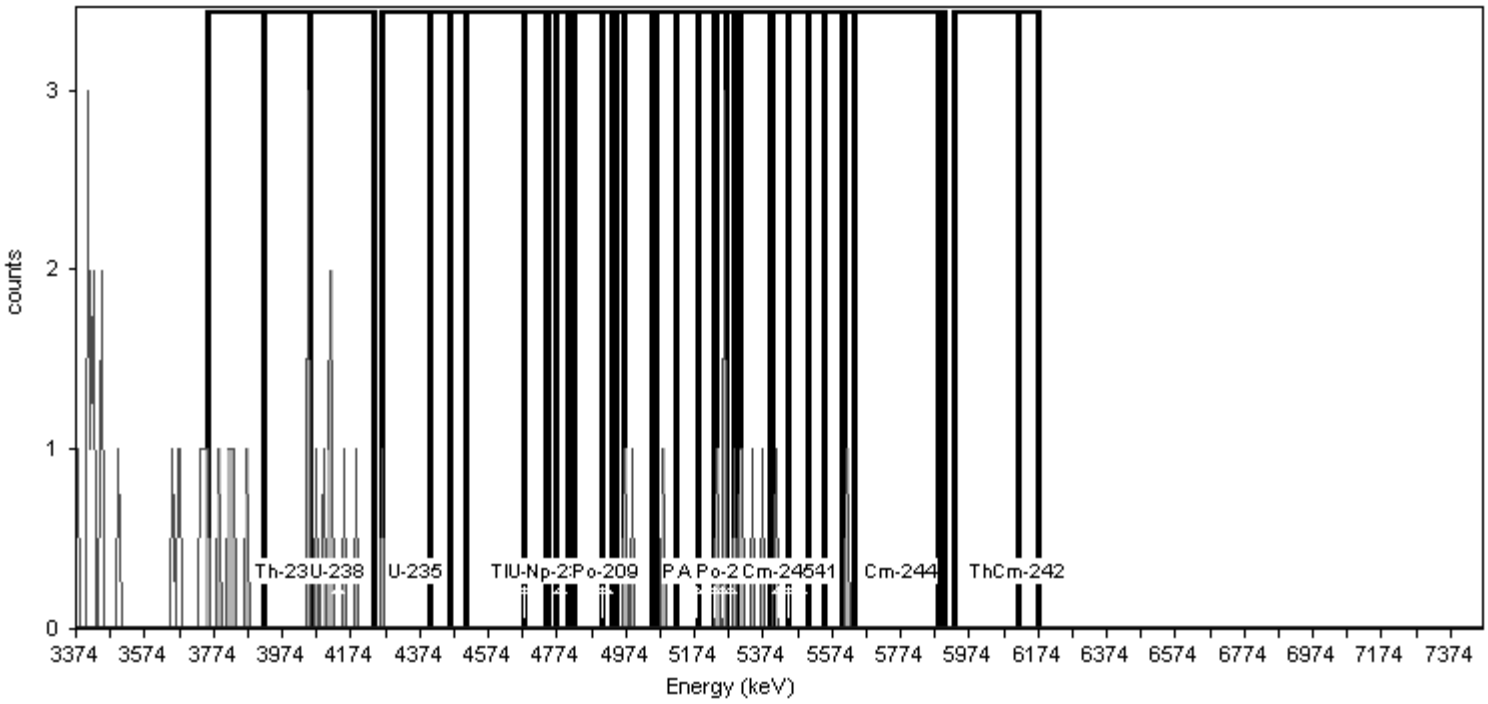
Analyst: 60040

Acquisition

Detector: AV13 , SN: 49-155M7
Acquisition Start Date: 6/18/2014 7:08:30PM
Live Time: 960.00 min.
Real Time: 970.52 min.
Calibration Name: IC-9884;AV13-20140505
Calibration Date: 5/6/2014 5:39:28PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.99% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 47.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	9.00	9.375E-003	3.294E-003
U-238	4.14	3.92	4.24	10.00	1.042E-002	3.455E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	0.00	0.000E+000	1.473E-003
U-234	4.71	4.51	4.82	0.00	0.000E+000	1.473E-003
Pu-242	4.90	4.68	4.95	0.00	0.000E+000	1.473E-003
Th-229	4.86	4.74	5.12	3.00	3.125E-003	2.083E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	7.00	7.292E-003	2.946E-003
U-232	5.25	5.06	5.40	10.00	1.042E-002	3.455E-003
Th-228	5.45	5.19	5.51	10.00	1.042E-002	3.455E-003
Po-210	5.28	5.23	5.29	5.00	5.208E-003	2.552E-003
Pu-238	5.47	5.27	5.55	6.00	6.250E-003	2.756E-003
Am-241	5.48	5.30	5.60	5.00	5.208E-003	2.552E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	1.00	1.042E-003	1.473E-003
Cm-244	5.78	5.64	5.90	0.00	0.000E+000	1.473E-003
Th-227	6.07	5.93	6.18	0.00	0.000E+000	1.473E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:26:57AM 6/19/2014

Sample

Sample Name: ICB;AV14
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

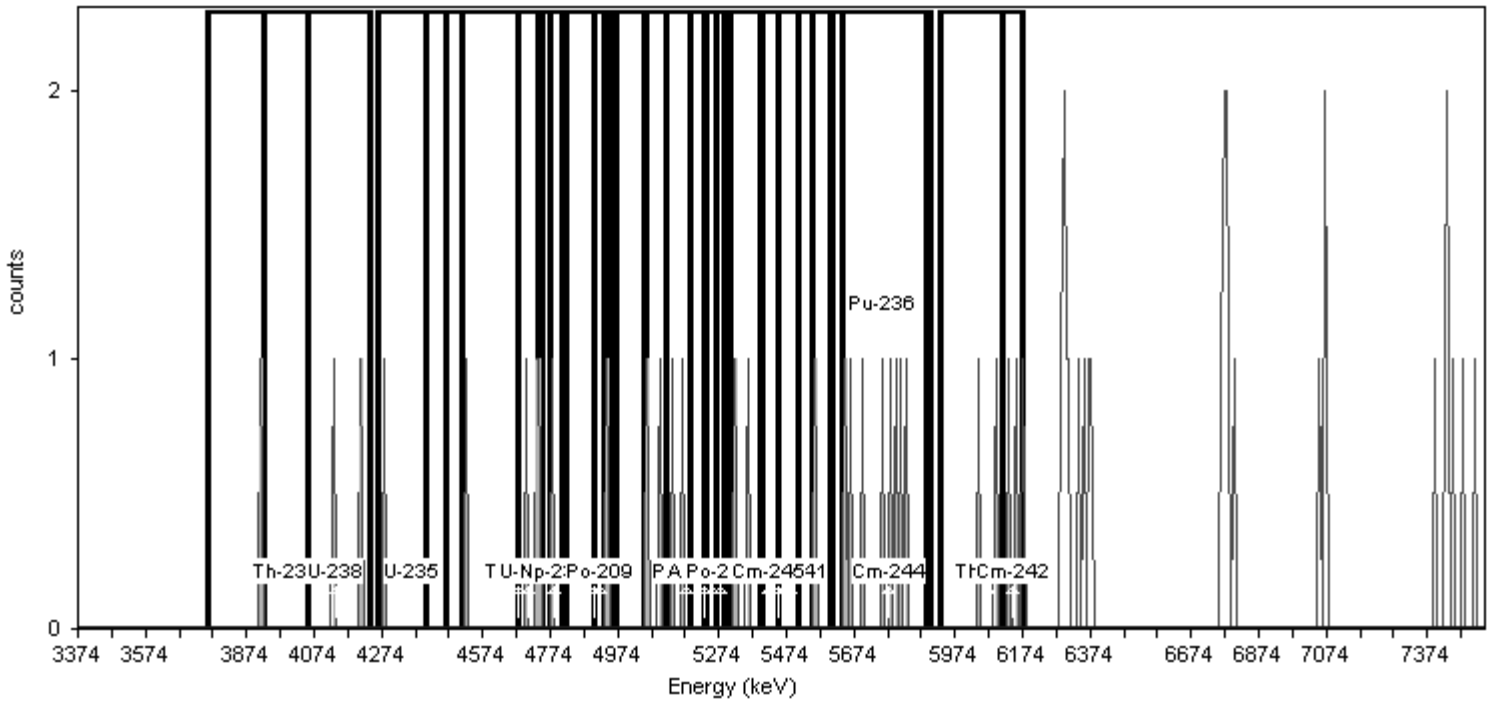
Acquisition

Detector: AV14 , SN: 50-060W4
Acquisition Start Date: 6/18/2014 7:08:33PM
Live Time: 960.00 min.
Real Time: 970.48 min.
Calibration Name: IC-9885;AV14-20140505
Calibration Date: 5/6/2014 5:39:36PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.34% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 57.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	4.00	4.167E-003	2.329E-003
U-234	4.71	4.51	4.82	5.00	5.208E-003	2.552E-003
Pu-242	4.90	4.68	4.95	5.00	5.208E-003	2.552E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	6.00	6.250E-003	2.756E-003
Th-228	5.45	5.19	5.51	2.00	2.083E-003	1.804E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	2.00	2.083E-003	1.804E-003
Am-241	5.48	5.30	5.60	3.00	3.125E-003	2.083E-003
Cm-245	5.42	5.40	5.45	0.00	0.000E+000	1.473E-003
Pu-236	5.76	5.61	5.89	8.00	8.333E-003	3.125E-003
Cm-244	5.78	5.64	5.90	8.00	8.333E-003	3.125E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:14:27AM 6/19/2014

Sample

Sample Name: ICB;AV24
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

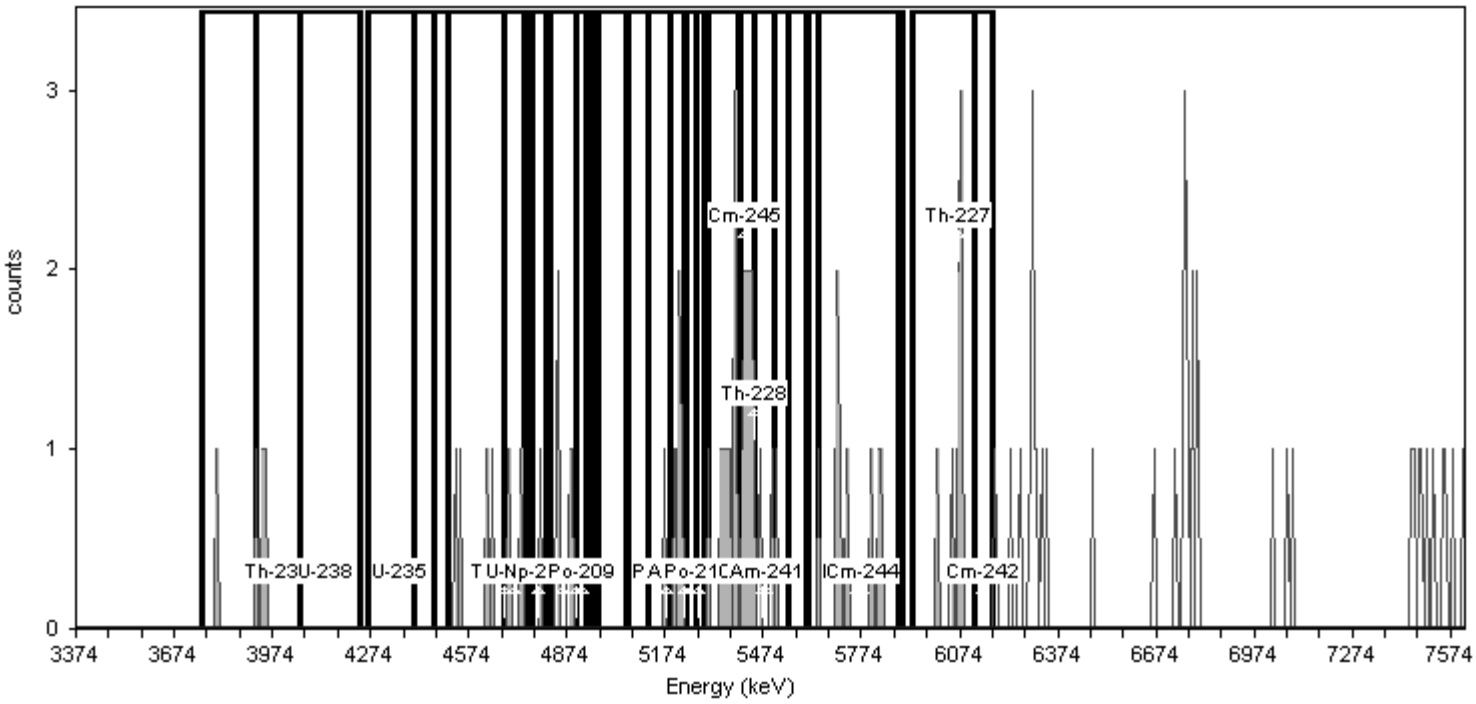
Acquisition

Detector: AV24 , SN: 47-137Q4
Acquisition Start Date: 6/18/2014 7:08:51PM
Live Time: 960.00 min.
Real Time: 960.05 min.
Calibration Name: IC-9793;AV24-20140505
Calibration Date: 5/5/2014 10:09:41PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.42% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 93.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	4.00	4.167E-003	2.329E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	7.00	7.292E-003	2.946E-003
Pu-242	4.90	4.68	4.95	7.00	7.292E-003	2.946E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	5.00	5.208E-003	2.552E-003
Am-243	5.23	5.05	5.31	6.00	6.250E-003	2.756E-003
U-232	5.25	5.06	5.40	14.00	1.458E-002	4.034E-003
Th-228	5.45	5.19	5.51	25.00	2.604E-002	5.311E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	22.00	2.292E-002	4.996E-003
Am-241	5.48	5.30	5.60	22.00	2.292E-002	4.996E-003
Cm-245	5.42	5.40	5.45	10.00	1.042E-002	3.455E-003
Pu-236	5.76	5.61	5.89	8.00	8.333E-003	3.125E-003
Cm-244	5.78	5.64	5.90	8.00	8.333E-003	3.125E-003
Th-227	6.07	5.93	6.18	7.00	7.292E-003	2.946E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:33:48PM 6/19/2014

Sample

Sample Name: ICB;AV51
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

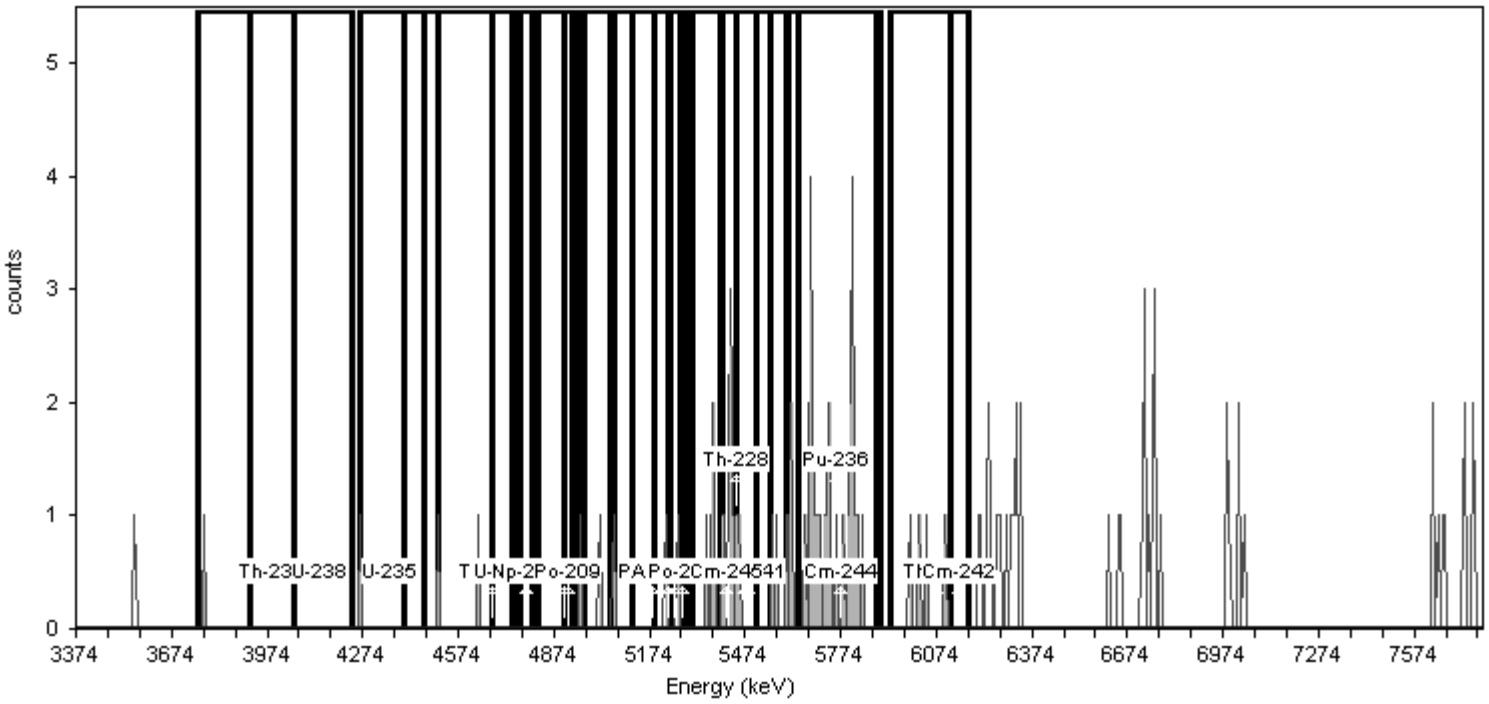
Acquisition

Detector: AV51 , SN: 48-109I1
Acquisition Start Date: 6/19/2014 12:17:43AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-8875;AV51-20140504
Calibration Date: 5/5/2014 6:52:53PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.24% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 98.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	0.00	0.000E+000	1.473E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	2.00	2.083E-003	1.804E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	0.00	0.000E+000	1.473E-003
Th-229	4.86	4.74	5.12	3.00	3.125E-003	2.083E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	7.00	7.292E-003	2.946E-003
Th-228	5.45	5.19	5.51	14.00	1.458E-002	4.034E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	12.00	1.250E-002	3.756E-003
Am-241	5.48	5.30	5.60	15.00	1.563E-002	4.167E-003
Cm-245	5.42	5.40	5.45	8.00	8.333E-003	3.125E-003
Pu-236	5.76	5.61	5.89	28.00	2.917E-002	5.610E-003
Cm-244	5.78	5.64	5.90	26.00	2.708E-002	5.413E-003
Th-227	6.07	5.93	6.18	4.00	4.167E-003	2.329E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:33:59PM 6/19/2014

Sample

Sample Name: ICB;AV53
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

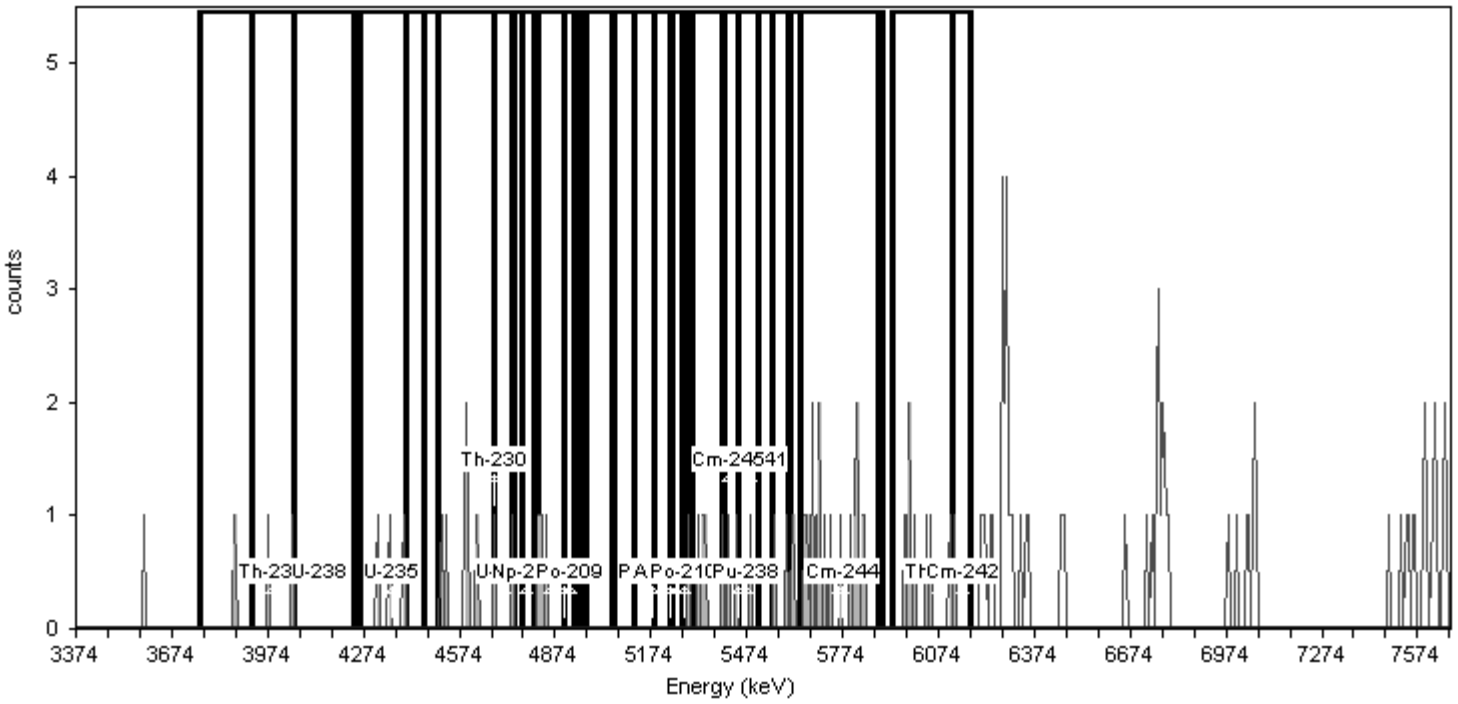
Acquisition

Detector: AV53 , SN: 50-051A6
Acquisition Start Date: 6/19/2014 12:17:59AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-8877;AV53-20140504
Calibration Date: 5/5/2014 6:53:06PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.32% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 111.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	3.00	3.125E-003	2.083E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.68	4.40	4.75	8.00	8.333E-003	3.125E-003
U-234	4.71	4.51	4.82	9.00	9.375E-003	3.294E-003
Pu-242	4.90	4.68	4.95	5.00	5.208E-003	2.552E-003
Th-229	4.86	4.74	5.12	4.00	4.167E-003	2.329E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	0.00	0.000E+000	1.473E-003
Am-243	5.23	5.05	5.31	1.00	1.042E-003	1.473E-003
U-232	5.25	5.06	5.40	5.00	5.208E-003	2.552E-003
Th-228	5.45	5.19	5.51	8.00	8.333E-003	3.125E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	8.00	8.333E-003	3.125E-003
Am-241	5.48	5.30	5.60	9.00	9.375E-003	3.294E-003
Cm-245	5.42	5.40	5.45	3.00	3.125E-003	2.083E-003
Pu-236	5.76	5.61	5.89	16.00	1.667E-002	4.295E-003
Cm-244	5.78	5.64	5.90	15.00	1.563E-002	4.167E-003
Th-227	6.07	5.93	6.18	8.00	8.333E-003	3.125E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:05PM 6/19/2014

Sample

Sample Name: ICB;AV54
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

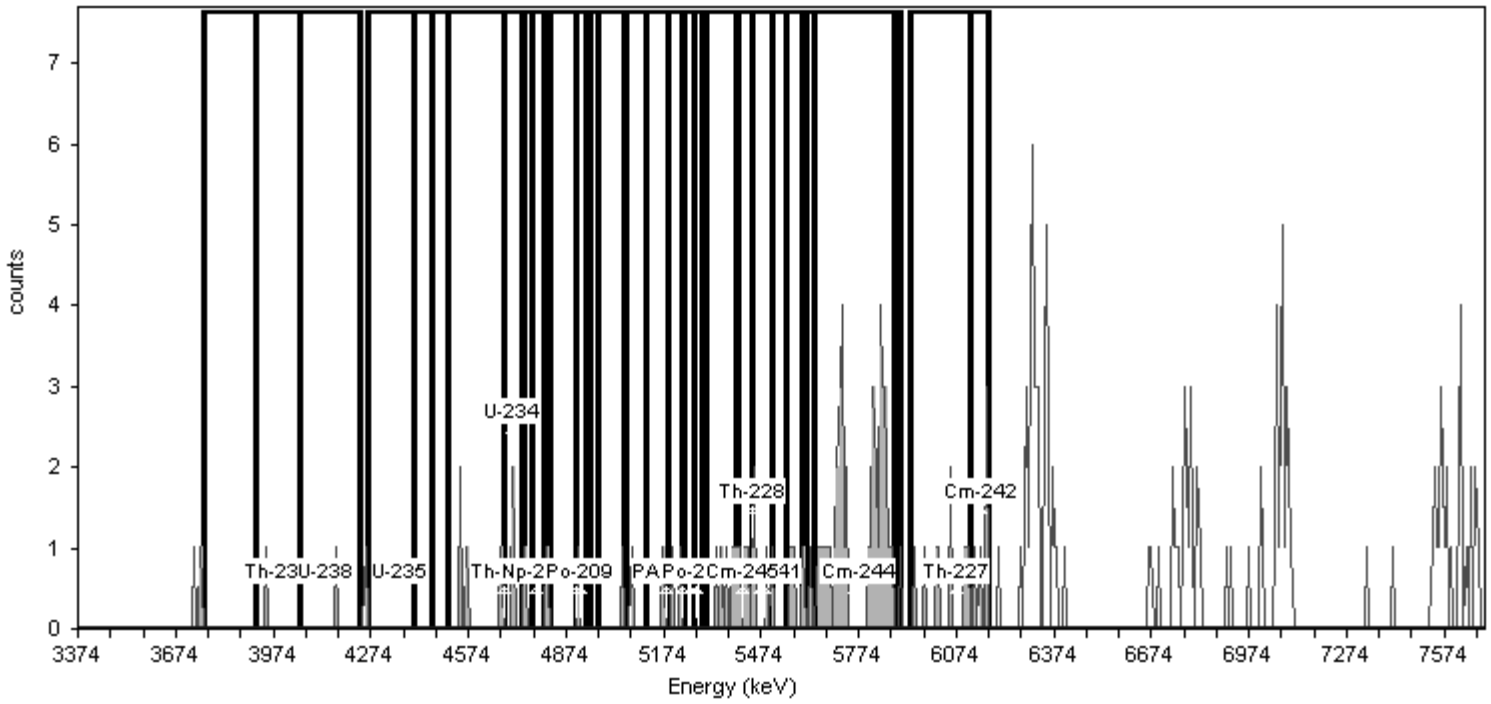
Analyst: 60040

Acquisition

Detector: AV54 , SN: 48-046II6
Acquisition Start Date: 6/19/2014 12:18:06AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9520;AV54-20140504
Calibration Date: 5/5/2014 6:53:13PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.02% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 195.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	7.00	7.292E-003	2.946E-003
U-234	4.71	4.51	4.82	8.00	8.333E-003	3.125E-003
Pu-242	4.90	4.68	4.95	5.00	5.208E-003	2.552E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	5.00	5.208E-003	2.552E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	10.00	1.042E-002	3.455E-003
Th-228	5.45	5.19	5.51	16.00	1.667E-002	4.295E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	14.00	1.458E-002	4.034E-003
Am-241	5.48	5.30	5.60	17.00	1.771E-002	4.419E-003
Cm-245	5.42	5.40	5.45	6.00	6.250E-003	2.756E-003
Pu-236	5.76	5.61	5.89	41.00	4.271E-002	6.751E-003
Cm-244	5.78	5.64	5.90	41.00	4.271E-002	6.751E-003
Th-227	6.07	5.93	6.18	13.00	1.354E-002	3.898E-003
Cm-242	6.15	6.12	6.18	5.00	5.208E-003	2.552E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:10PM 6/19/2014

Sample

Sample Name: ICB;AV55
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

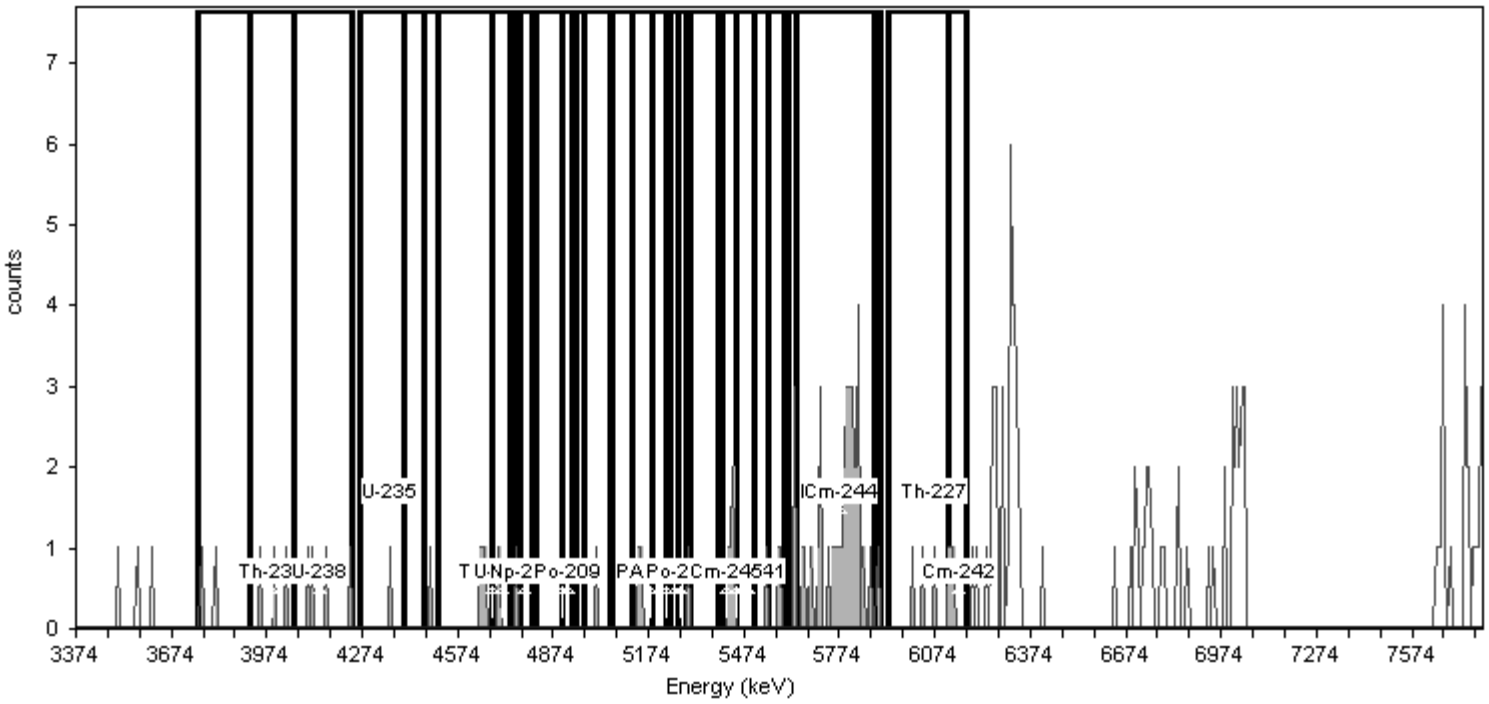
Analyst: 60040

Acquisition

Detector: AV55 , SN: 50-051C2
Acquisition Start Date: 6/19/2014 12:18:11AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-7107;AV55-20140507
Calibration Date: 5/7/2014 10:48:56PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.79% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 168.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	5.00	5.208E-003	2.552E-003
U-238	4.14	3.92	4.24	7.00	7.292E-003	2.946E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	5.00	5.208E-003	2.552E-003
U-234	4.71	4.51	4.82	5.00	5.208E-003	2.552E-003
Pu-242	4.90	4.68	4.95	2.00	2.083E-003	1.804E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	3.00	3.125E-003	2.083E-003
Th-228	5.45	5.19	5.51	5.00	5.208E-003	2.552E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	6.00	6.250E-003	2.756E-003
Am-241	5.48	5.30	5.60	8.00	8.333E-003	3.125E-003
Cm-245	5.42	5.40	5.45	4.00	4.167E-003	2.329E-003
Pu-236	5.76	5.61	5.89	37.00	3.854E-002	6.421E-003
Cm-244	5.78	5.64	5.90	35.00	3.646E-002	6.250E-003
Th-227	6.07	5.93	6.18	6.00	6.250E-003	2.756E-003
Cm-242	6.15	6.12	6.18	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:16PM 6/19/2014

Sample

Sample Name: ICB;AV56
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

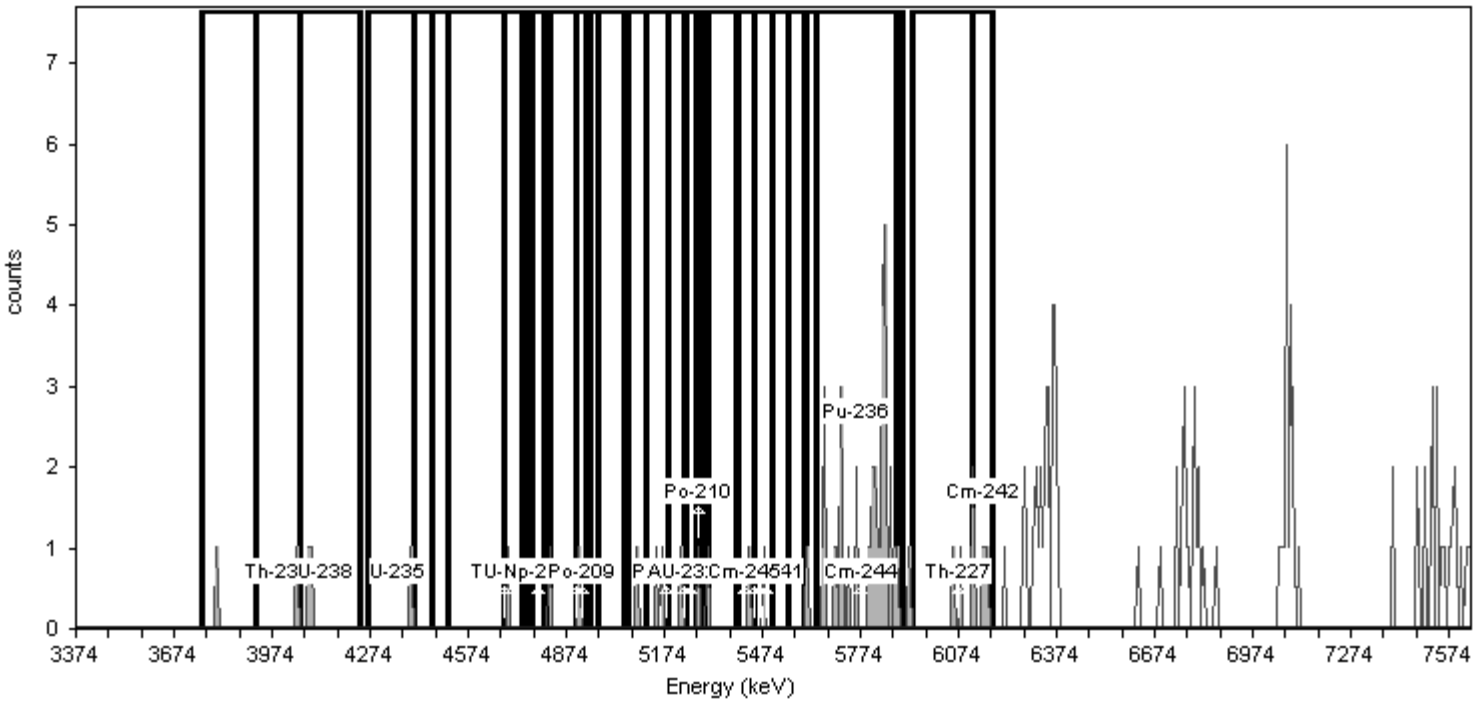
Analyst: 60040

Acquisition

Detector: AV56 , SN: 52-059EE5
Acquisition Start Date: 6/19/2014 12:18:17AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9792;AV56-20140504
Calibration Date: 5/5/2014 6:53:34PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.09% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 143.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	1.00	1.042E-003	1.473E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	3.00	3.125E-003	2.083E-003
Th-229	4.86	4.74	5.12	3.00	3.125E-003	2.083E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	6.00	6.250E-003	2.756E-003
U-232	5.25	5.06	5.40	6.00	6.250E-003	2.756E-003
Th-228	5.45	5.19	5.51	5.00	5.208E-003	2.552E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	4.00	4.167E-003	2.329E-003
Am-241	5.48	5.30	5.60	3.00	3.125E-003	2.083E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	34.00	3.542E-002	6.163E-003
Cm-244	5.78	5.64	5.90	33.00	3.437E-002	6.074E-003
Th-227	6.07	5.93	6.18	8.00	8.333E-003	3.125E-003
Cm-242	6.15	6.12	6.18	6.00	6.250E-003	2.756E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:28PM 6/19/2014

Sample

Sample Name: ICB;AV58
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

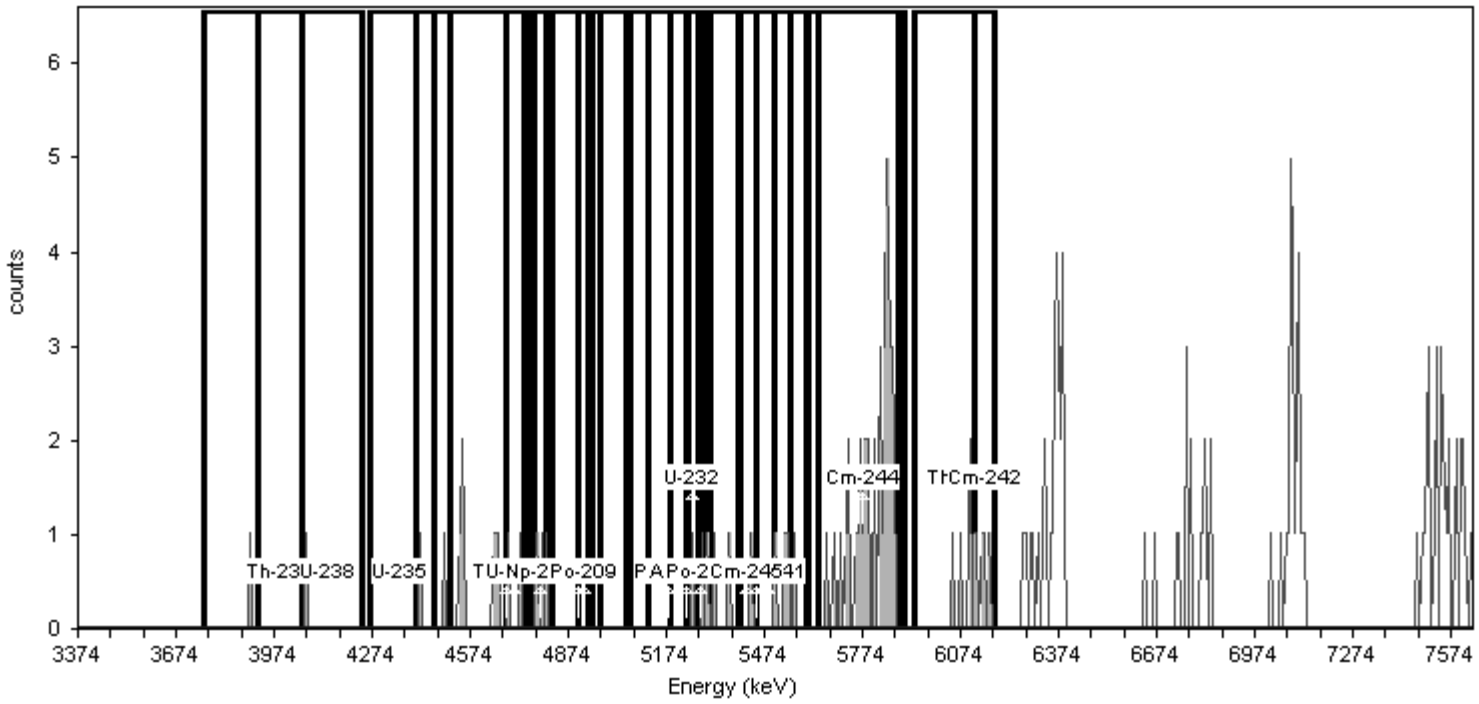
Analyst: 60040

Acquisition

Detector: AV58 , SN: 52-102 C5
Acquisition Start Date: 6/19/2014 12:18:31AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9794;AV58-20140504
Calibration Date: 5/5/2014 6:53:46PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.56% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 160.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	11.00	1.146E-002	3.608E-003
U-234	4.71	4.51	4.82	12.00	1.250E-002	3.756E-003
Pu-242	4.90	4.68	4.95	5.00	5.208E-003	2.552E-003
Th-229	4.86	4.74	5.12	3.00	3.125E-003	2.083E-003
Np-237	4.78	4.77	4.81	3.00	3.125E-003	2.083E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	0.00	0.000E+000	1.473E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	5.00	5.208E-003	2.552E-003
Th-228	5.45	5.19	5.51	7.00	7.292E-003	2.946E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	8.00	8.333E-003	3.125E-003
Am-241	5.48	5.30	5.60	8.00	8.333E-003	3.125E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	37.00	3.854E-002	6.421E-003
Cm-244	5.78	5.64	5.90	37.00	3.854E-002	6.421E-003
Th-227	6.07	5.93	6.18	9.00	9.375E-003	3.294E-003
Cm-242	6.15	6.12	6.18	5.00	5.208E-003	2.552E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:33PM 6/19/2014

Sample

Sample Name: ICB;AV59
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

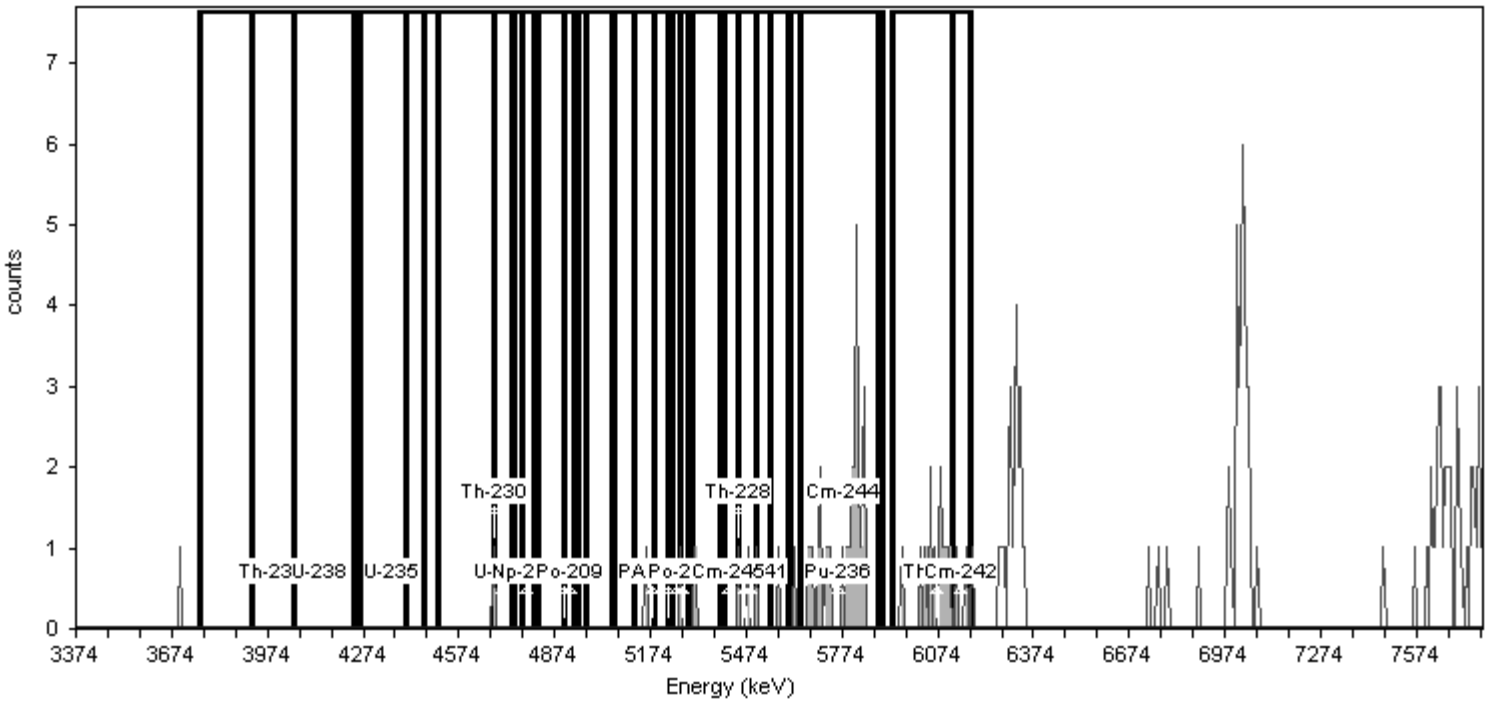
Acquisition

Detector: AV59 , SN: 49-155M7
Acquisition Start Date: 6/19/2014 12:18:32AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9795;AV59-20140504
Calibration Date: 5/5/2014 6:53:53PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.44% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 141.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	0.00	0.000E+000	1.473E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	1.00	1.042E-003	1.473E-003
U-234	4.71	4.51	4.82	1.00	1.042E-003	1.473E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	0.00	0.000E+000	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	3.00	3.125E-003	2.083E-003
Th-228	5.45	5.19	5.51	5.00	5.208E-003	2.552E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	5.00	5.208E-003	2.552E-003
Am-241	5.48	5.30	5.60	5.00	5.208E-003	2.552E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	27.00	2.813E-002	5.512E-003
Cm-244	5.78	5.64	5.90	26.00	2.708E-002	5.413E-003
Th-227	6.07	5.93	6.18	14.00	1.458E-002	4.034E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:39PM 6/19/2014

Sample

Sample Name: ICB;AV60
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

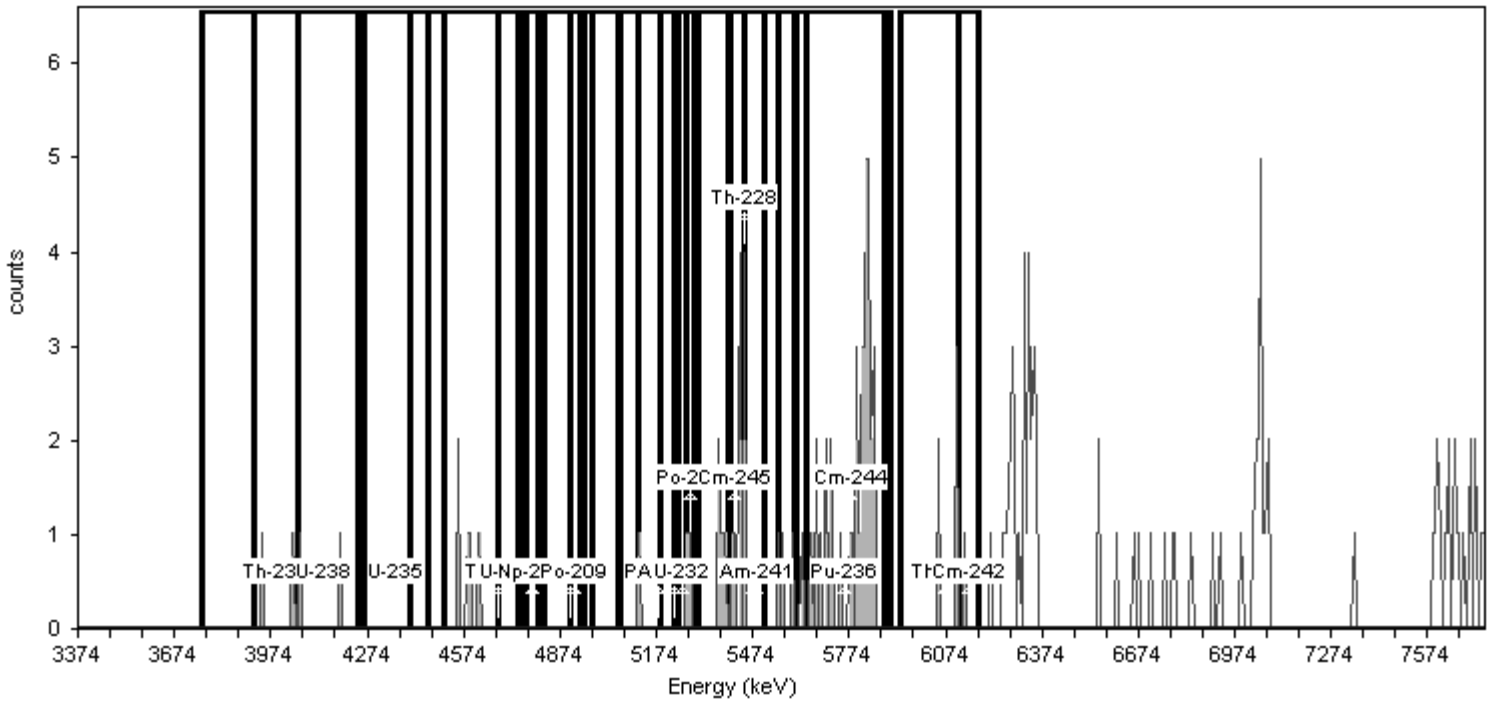
Acquisition

Detector: AV60 , SN: 49-027117
Acquisition Start Date: 6/19/2014 12:18:33AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9817;AV60-20140504
Calibration Date: 5/5/2014 6:53:59PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.33% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 151.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	4.00	4.167E-003	2.329E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	5.00	5.208E-003	2.552E-003
U-234	4.71	4.51	4.82	5.00	5.208E-003	2.552E-003
Pu-242	4.90	4.68	4.95	0.00	0.000E+000	1.473E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	8.00	8.333E-003	3.125E-003
Th-228	5.45	5.19	5.51	17.00	1.771E-002	4.419E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	18.00	1.875E-002	4.541E-003
Am-241	5.48	5.30	5.60	18.00	1.875E-002	4.541E-003
Cm-245	5.42	5.40	5.45	10.00	1.042E-002	3.455E-003
Pu-236	5.76	5.61	5.89	38.00	3.958E-002	6.505E-003
Cm-244	5.78	5.64	5.90	37.00	3.854E-002	6.421E-003
Th-227	6.07	5.93	6.18	6.00	6.250E-003	2.756E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:44PM 6/19/2014

Sample

Sample Name: ICB;AV61
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

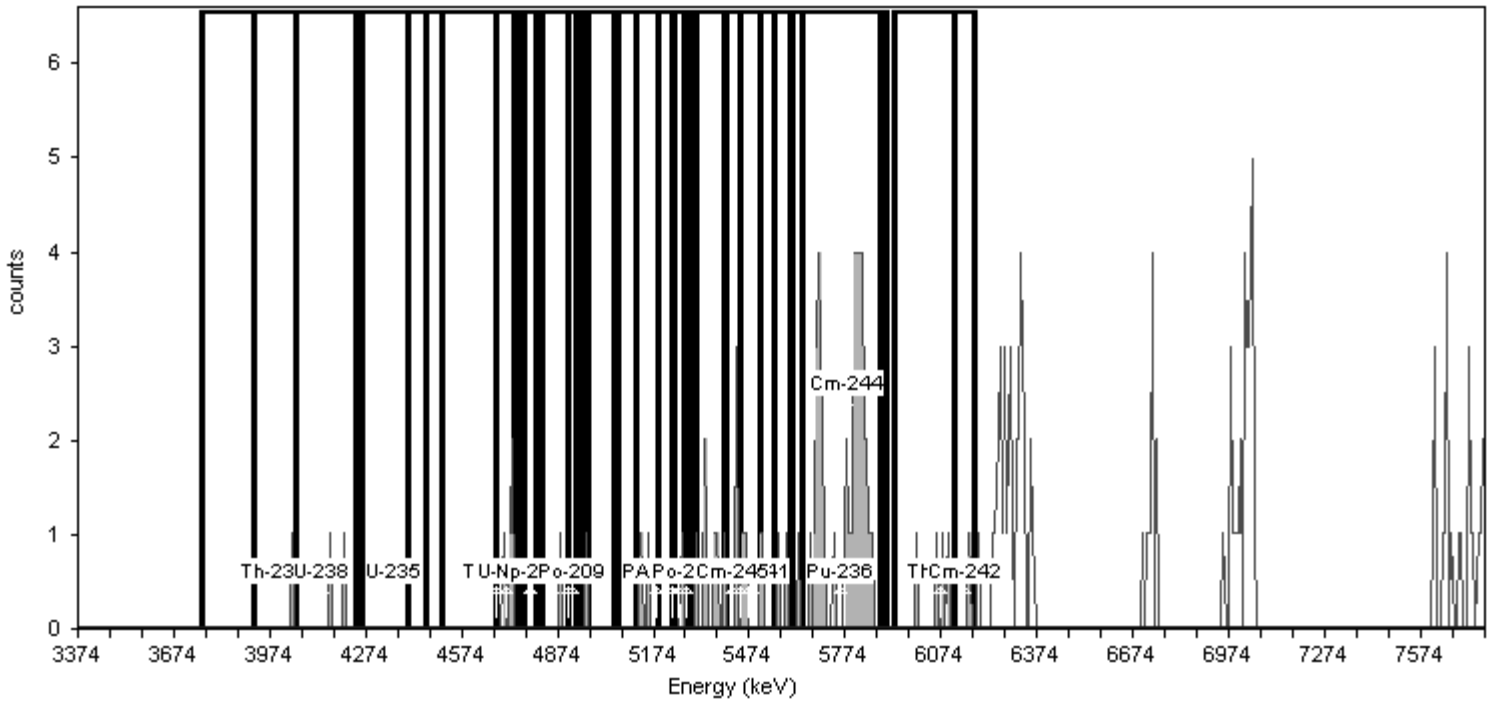
Analyst: 60040

Acquisition

Detector: AV61 , SN: 5-051JJ3
Acquisition Start Date: 6/19/2014 12:18:33AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9884;AV61-20140504
Calibration Date: 5/5/2014 6:54:06PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.46% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 159.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	4.00	4.167E-003	2.329E-003
U-234	4.71	4.51	4.82	4.00	4.167E-003	2.329E-003
Pu-242	4.90	4.68	4.95	5.00	5.208E-003	2.552E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	9.00	9.375E-003	3.294E-003
Th-228	5.45	5.19	5.51	13.00	1.354E-002	3.898E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	13.00	1.354E-002	3.898E-003
Am-241	5.48	5.30	5.60	15.00	1.563E-002	4.167E-003
Cm-245	5.42	5.40	5.45	4.00	4.167E-003	2.329E-003
Pu-236	5.76	5.61	5.89	41.00	4.271E-002	6.751E-003
Cm-244	5.78	5.64	5.90	40.00	4.167E-002	6.670E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:50PM 6/19/2014

Sample

Sample Name: ICB;AV62
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

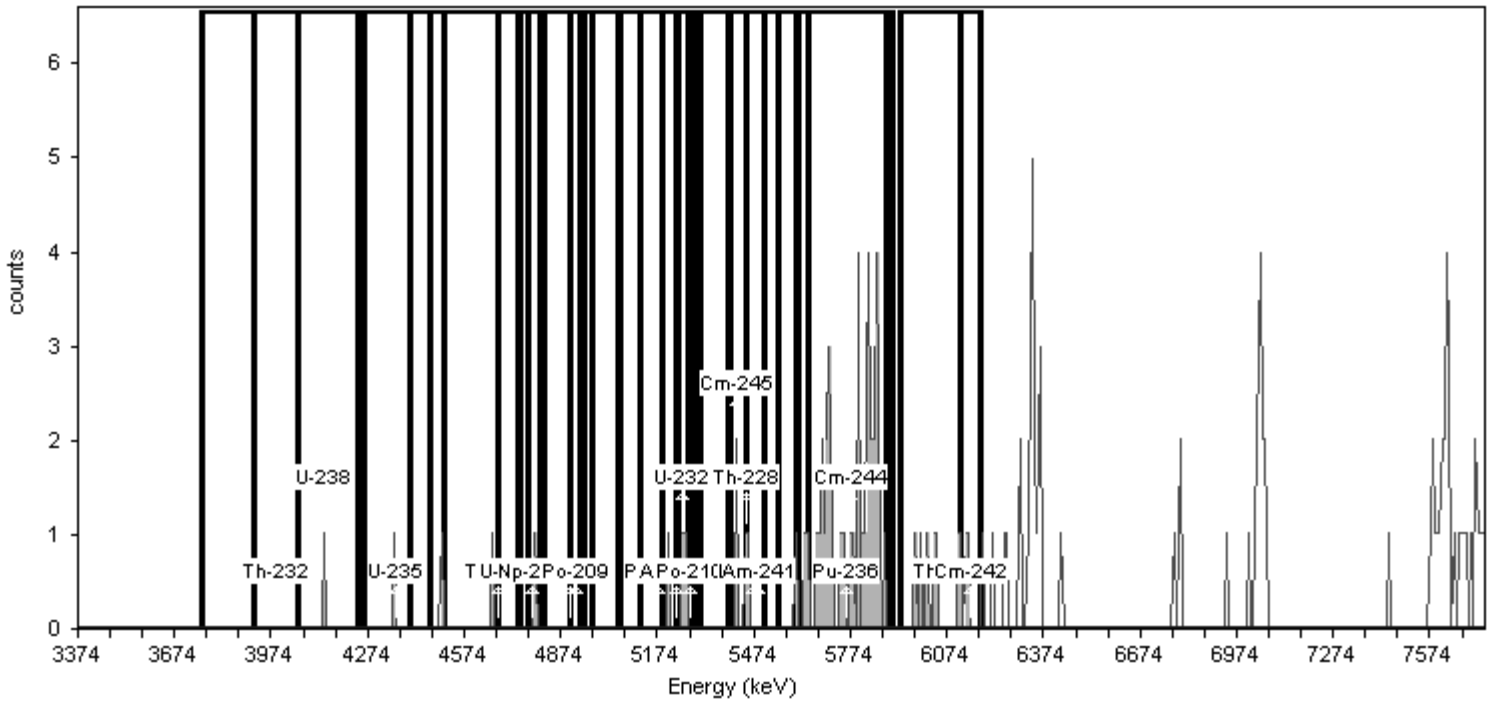
Analyst: 60040

Acquisition

Detector: AV62 , SN: 52-060FF2
Acquisition Start Date: 6/19/2014 12:18:34AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9885;AV62-20140504
Calibration Date: 5/5/2014 6:54:13PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.34% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 132.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	2.00	2.083E-003	1.804E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	3.00	3.125E-003	2.083E-003
Th-228	5.45	5.19	5.51	7.00	7.292E-003	2.946E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	4.00	4.167E-003	2.329E-003
Am-241	5.48	5.30	5.60	5.00	5.208E-003	2.552E-003
Cm-245	5.42	5.40	5.45	3.00	3.125E-003	2.083E-003
Pu-236	5.76	5.61	5.89	39.00	4.062E-002	6.588E-003
Cm-244	5.78	5.64	5.90	38.00	3.958E-002	6.505E-003
Th-227	6.07	5.93	6.18	9.00	9.375E-003	3.294E-003
Cm-242	6.15	6.12	6.18	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:56PM 6/19/2014

Sample

Sample Name: ICB;AV63
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

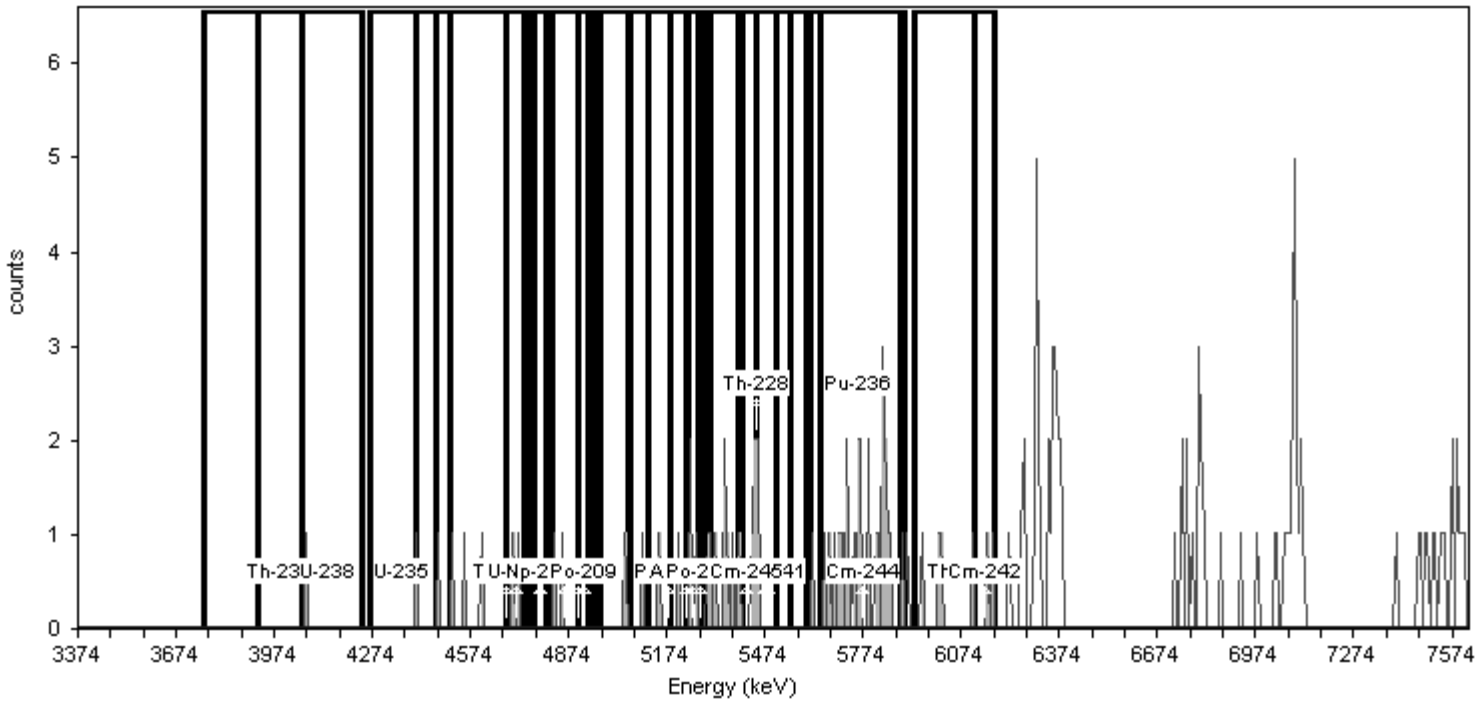
Analyst: 60040

Acquisition

Detector: AV63 , SN: 47-029ff2
Acquisition Start Date: 6/19/2014 12:18:35AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9886;AV63-20140504
Calibration Date: 5/5/2014 6:54:19PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.48% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 141.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	7.00	7.292E-003	2.946E-003
U-234	4.71	4.51	4.82	5.00	5.208E-003	2.552E-003
Pu-242	4.90	4.68	4.95	4.00	4.167E-003	2.329E-003
Th-229	4.86	4.74	5.12	4.00	4.167E-003	2.329E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	8.00	8.333E-003	3.125E-003
U-232	5.25	5.06	5.40	14.00	1.458E-002	4.034E-003
Th-228	5.45	5.19	5.51	19.00	1.979E-002	4.658E-003
Po-210	5.28	5.23	5.29	3.00	3.125E-003	2.083E-003
Pu-238	5.47	5.27	5.55	15.00	1.563E-002	4.167E-003
Am-241	5.48	5.30	5.60	15.00	1.563E-002	4.167E-003
Cm-245	5.42	5.40	5.45	6.00	6.250E-003	2.756E-003
Pu-236	5.76	5.61	5.89	25.00	2.604E-002	5.311E-003
Cm-244	5.78	5.64	5.90	25.00	2.604E-002	5.311E-003
Th-227	6.07	5.93	6.18	6.00	6.250E-003	2.756E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:35:01PM 6/19/2014

Sample

Sample Name: ICB;AV64
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

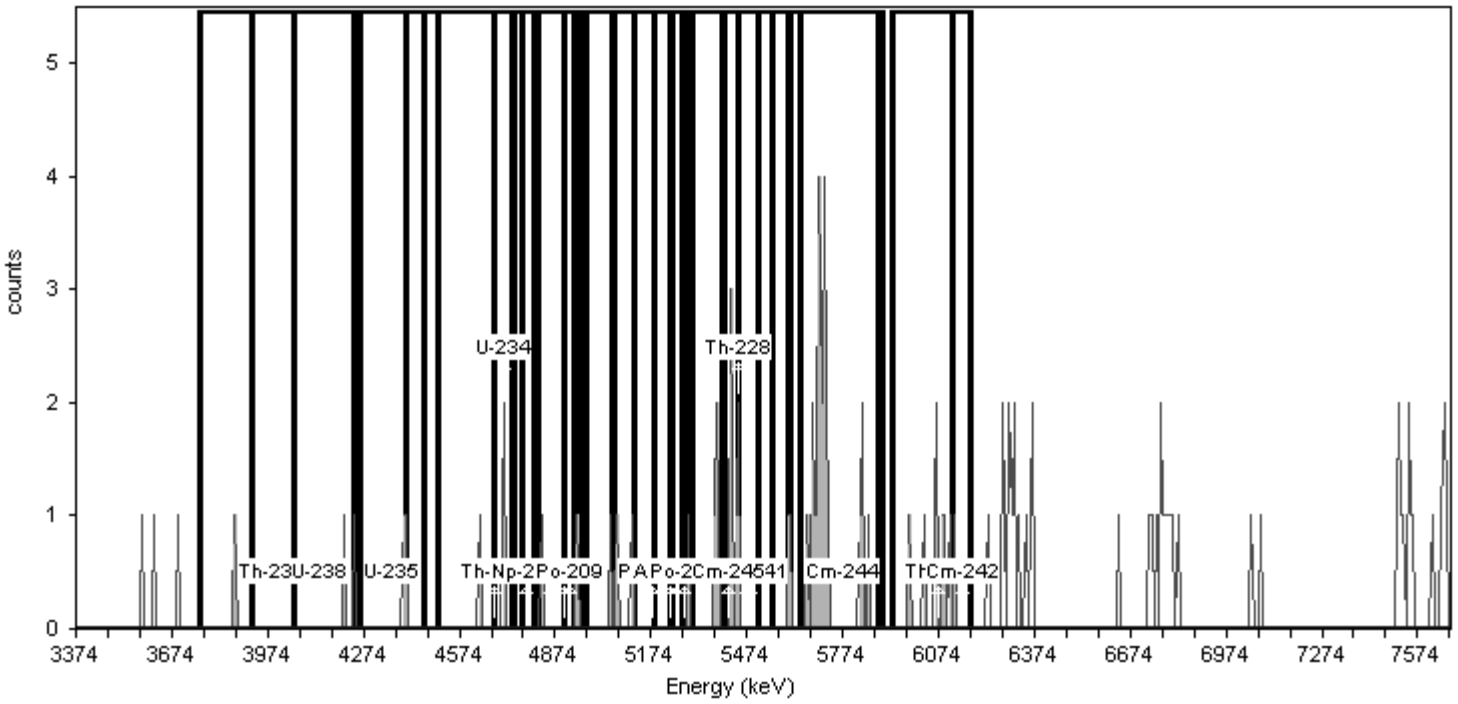
Analyst: 60040

Acquisition

Detector: AV64 , SN: 47-029ee4
Acquisition Start Date: 6/19/2014 12:18:36AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-7107;AV64-20140504a
Calibration Date: 5/4/2014 8:44:03PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.75% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 100.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	4.00	4.167E-003	2.329E-003
U-234	4.71	4.51	4.82	3.00	3.125E-003	2.083E-003
Pu-242	4.90	4.68	4.95	4.00	4.167E-003	2.329E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	6.00	6.250E-003	2.756E-003
Th-228	5.45	5.19	5.51	10.00	1.042E-002	3.455E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	10.00	1.042E-002	3.455E-003
Am-241	5.48	5.30	5.60	10.00	1.042E-002	3.455E-003
Cm-245	5.42	5.40	5.45	6.00	6.250E-003	2.756E-003
Pu-236	5.76	5.61	5.89	23.00	2.396E-002	5.103E-003
Cm-244	5.78	5.64	5.90	22.00	2.292E-002	4.996E-003
Th-227	6.07	5.93	6.18	8.00	8.333E-003	3.125E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:22:41PM 6/22/2014

Sample

Sample Name: ICB;AV65
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014c
Description:

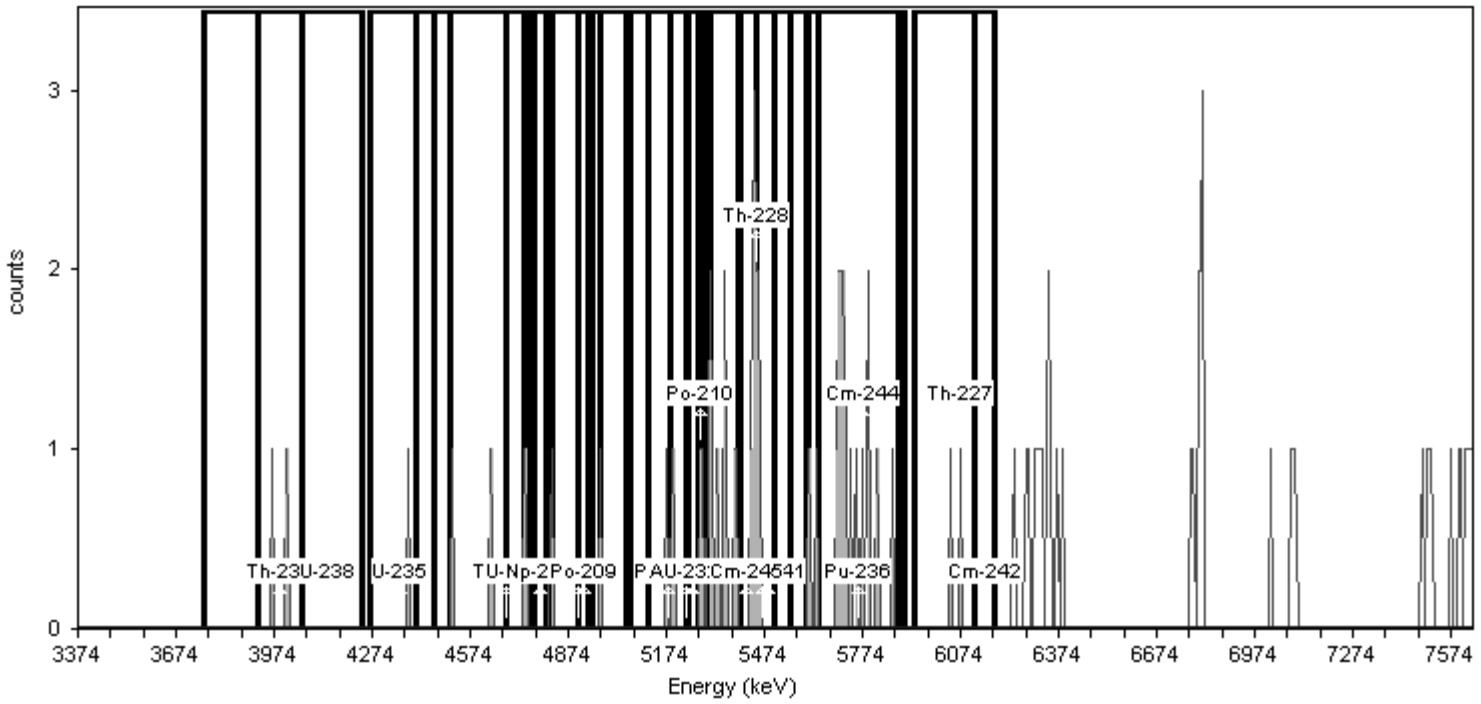
Analyst: 60040

Acquisition

Detector: AV65 , SN: 44-049JJ1
Acquisition Start Date: 6/19/2014 7:57:24PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8874;AV65-20140504
Calibration Date: 5/4/2014 8:43:55PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.13% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 84.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	3.00	3.125E-003	2.083E-003
U-234	4.71	4.51	4.82	4.00	4.167E-003	2.329E-003
Pu-242	4.90	4.68	4.95	2.00	2.083E-003	1.804E-003
Th-229	4.86	4.74	5.12	3.00	3.125E-003	2.083E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	6.00	6.250E-003	2.756E-003
U-232	5.25	5.06	5.40	13.00	1.354E-002	3.898E-003
Th-228	5.45	5.19	5.51	21.00	2.187E-002	4.886E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	20.00	2.083E-002	4.774E-003
Am-241	5.48	5.30	5.60	18.00	1.875E-002	4.541E-003
Cm-245	5.42	5.40	5.45	6.00	6.250E-003	2.756E-003
Pu-236	5.76	5.61	5.89	17.00	1.771E-002	4.419E-003
Cm-244	5.78	5.64	5.90	15.00	1.563E-002	4.167E-003
Th-227	6.07	5.93	6.18	2.00	2.083E-003	1.804E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:35:12PM 6/19/2014

Sample

Sample Name: ICB;AV66
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

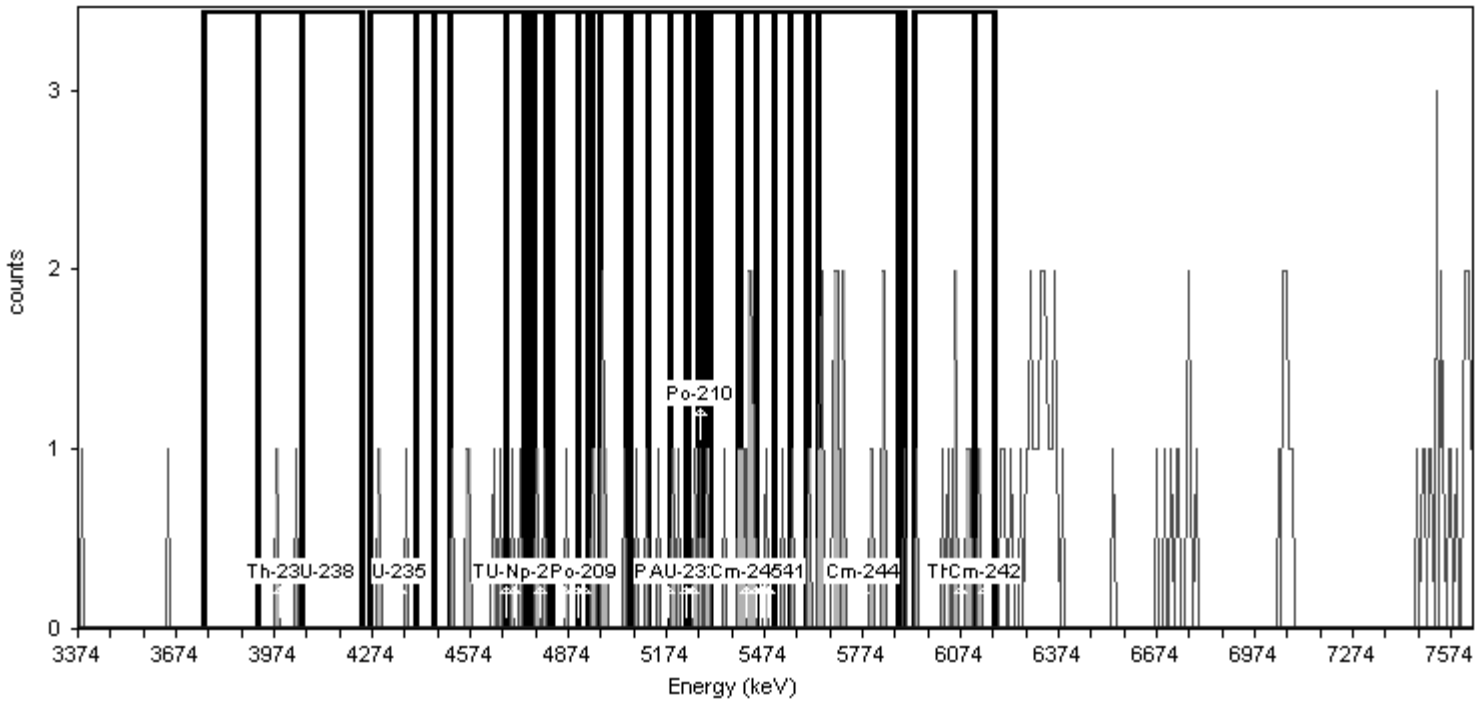
Analyst: 60040

Acquisition

Detector: AV66 , SN: 48-158EE2
Acquisition Start Date: 6/19/2014 12:18:38AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-8875;AV66-20140504
Calibration Date: 5/4/2014 8:44:10PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.93% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 131.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	7.00	7.292E-003	2.946E-003
U-234	4.71	4.51	4.82	9.00	9.375E-003	3.294E-003
Pu-242	4.90	4.68	4.95	6.00	6.250E-003	2.756E-003
Th-229	4.86	4.74	5.12	10.00	1.042E-002	3.455E-003
Np-237	4.78	4.77	4.81	2.00	2.083E-003	1.804E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	9.00	9.375E-003	3.294E-003
Am-243	5.23	5.05	5.31	8.00	8.333E-003	3.125E-003
U-232	5.25	5.06	5.40	11.00	1.146E-002	3.608E-003
Th-228	5.45	5.19	5.51	15.00	1.563E-002	4.167E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	13.00	1.354E-002	3.898E-003
Am-241	5.48	5.30	5.60	13.00	1.354E-002	3.898E-003
Cm-245	5.42	5.40	5.45	8.00	8.333E-003	3.125E-003
Pu-236	5.76	5.61	5.89	18.00	1.875E-002	4.541E-003
Cm-244	5.78	5.64	5.90	18.00	1.875E-002	4.541E-003
Th-227	6.07	5.93	6.18	8.00	8.333E-003	3.125E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:35:18PM 6/19/2014

Sample

Sample Name: ICB;AV67
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

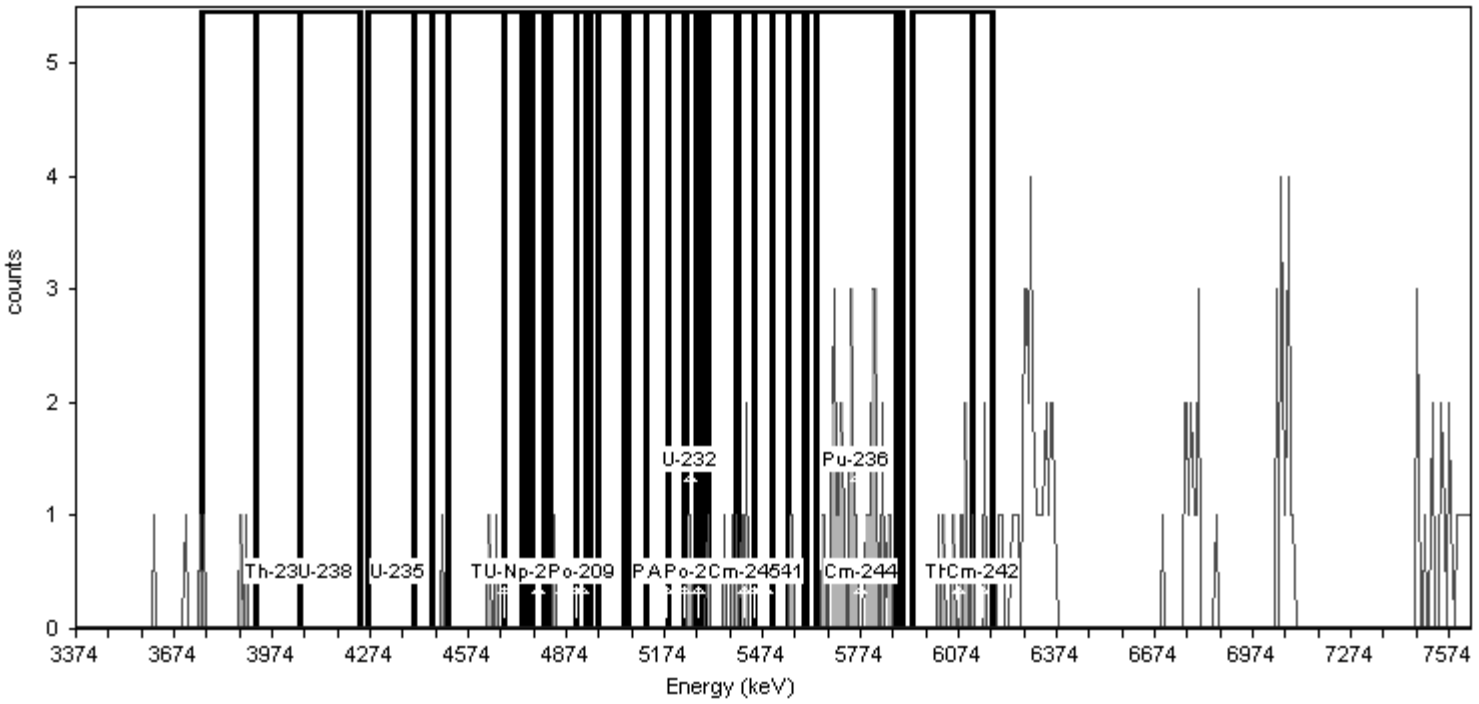
Analyst: 60040

Acquisition

Detector: AV67 , SN: 52-102 D7
Acquisition Start Date: 6/19/2014 12:18:39AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-8876;AV67-20140504
Calibration Date: 5/4/2014 8:44:15PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.32% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 140.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	3.00	3.125E-003	2.083E-003
U-238	4.14	3.92	4.24	0.00	0.000E+000	1.473E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	3.00	3.125E-003	2.083E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	0.00	0.000E+000	1.473E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	6.00	6.250E-003	2.756E-003
Th-228	5.45	5.19	5.51	9.00	9.375E-003	3.294E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	7.00	7.292E-003	2.946E-003
Am-241	5.48	5.30	5.60	9.00	9.375E-003	3.294E-003
Cm-245	5.42	5.40	5.45	4.00	4.167E-003	2.329E-003
Pu-236	5.76	5.61	5.89	30.00	3.125E-002	5.800E-003
Cm-244	5.78	5.64	5.90	30.00	3.125E-002	5.800E-003
Th-227	6.07	5.93	6.18	9.00	9.375E-003	3.294E-003
Cm-242	6.15	6.12	6.18	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:35:24PM 6/19/2014

Sample

Sample Name: ICB;AV68
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

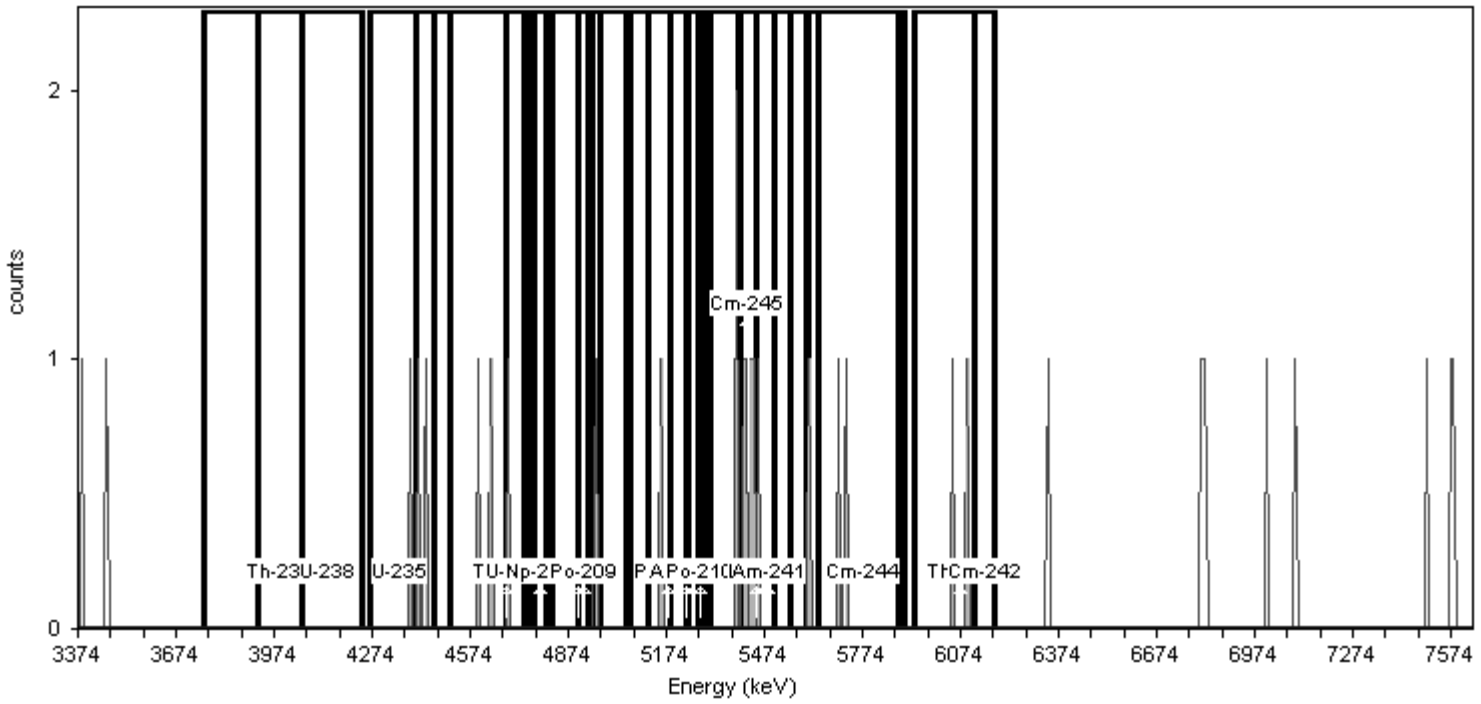
Acquisition

Detector: AV68 , SN: 48-45884
Acquisition Start Date: 6/19/2014 12:18:40AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-8877;AV68-20140504
Calibration Date: 5/4/2014 8:44:22PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.49% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 31.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	0.00	0.000E+000	1.473E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.68	4.40	4.75	5.00	5.208E-003	2.552E-003
U-234	4.71	4.51	4.82	3.00	3.125E-003	2.083E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	1.00	1.042E-003	1.473E-003
U-232	5.25	5.06	5.40	3.00	3.125E-003	2.083E-003
Th-228	5.45	5.19	5.51	7.00	7.292E-003	2.946E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	7.00	7.292E-003	2.946E-003
Am-241	5.48	5.30	5.60	7.00	7.292E-003	2.946E-003
Cm-245	5.42	5.40	5.45	4.00	4.167E-003	2.329E-003
Pu-236	5.76	5.61	5.89	3.00	3.125E-003	2.083E-003
Cm-244	5.78	5.64	5.90	2.00	2.083E-003	1.804E-003
Th-227	6.07	5.93	6.18	2.00	2.083E-003	1.804E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:35:30PM 6/19/2014

Sample

Sample Name: ICB;AV69
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

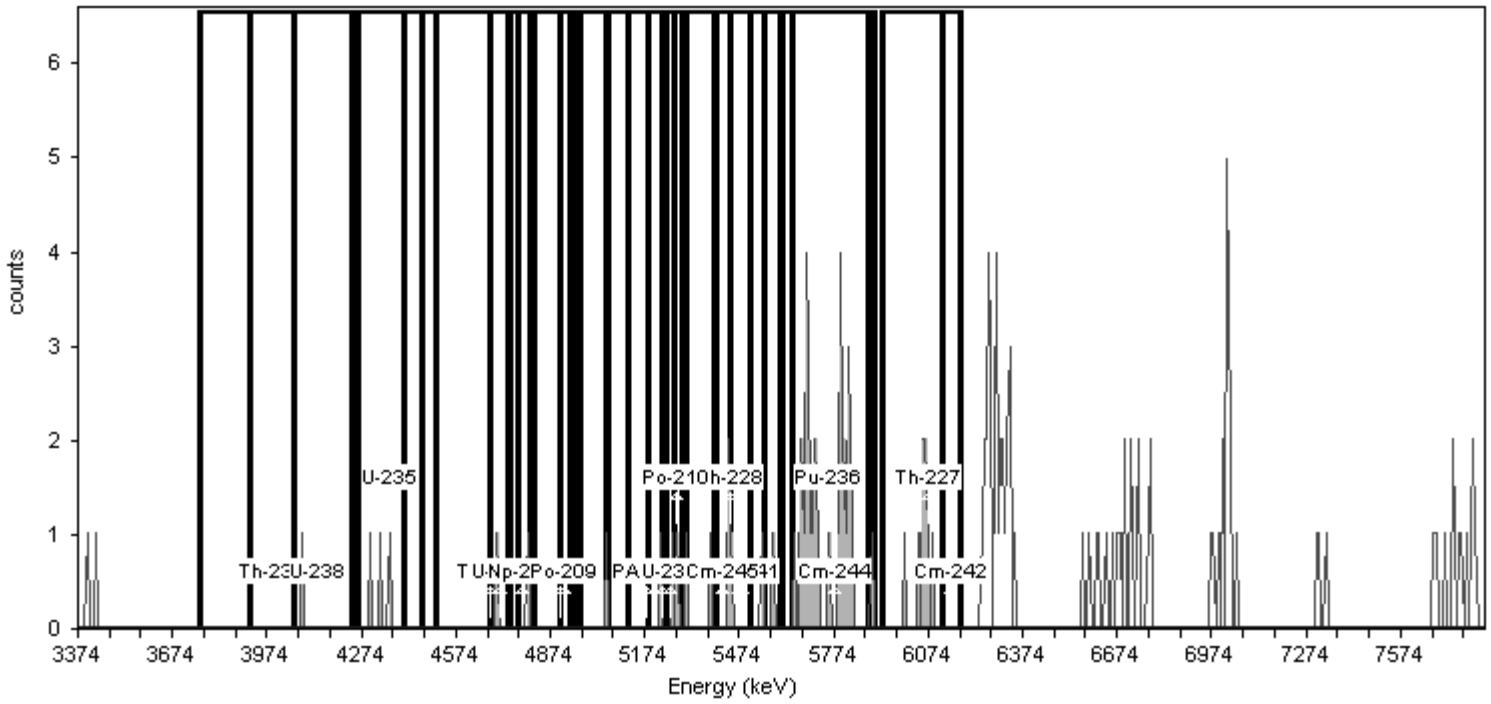
Acquisition

Detector: AV69 , SN: 49-155DD5
Acquisition Start Date: 6/19/2014 12:18:42AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9520;AV69-20140504
Calibration Date: 5/4/2014 8:44:28PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.57% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 134.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.68	4.40	4.75	1.00	1.042E-003	1.473E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	2.00	2.083E-003	1.804E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	5.00	5.208E-003	2.552E-003
U-232	5.25	5.06	5.40	5.00	5.208E-003	2.552E-003
Th-228	5.45	5.19	5.51	8.00	8.333E-003	3.125E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	7.00	7.292E-003	2.946E-003
Am-241	5.48	5.30	5.60	7.00	7.292E-003	2.946E-003
Cm-245	5.42	5.40	5.45	3.00	3.125E-003	2.083E-003
Pu-236	5.76	5.61	5.89	31.00	3.229E-002	5.893E-003
Cm-244	5.78	5.64	5.90	32.00	3.333E-002	5.984E-003
Th-227	6.07	5.93	6.18	8.00	8.333E-003	3.125E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:35:35PM 6/19/2014

Sample

Sample Name: ICB;AV70
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

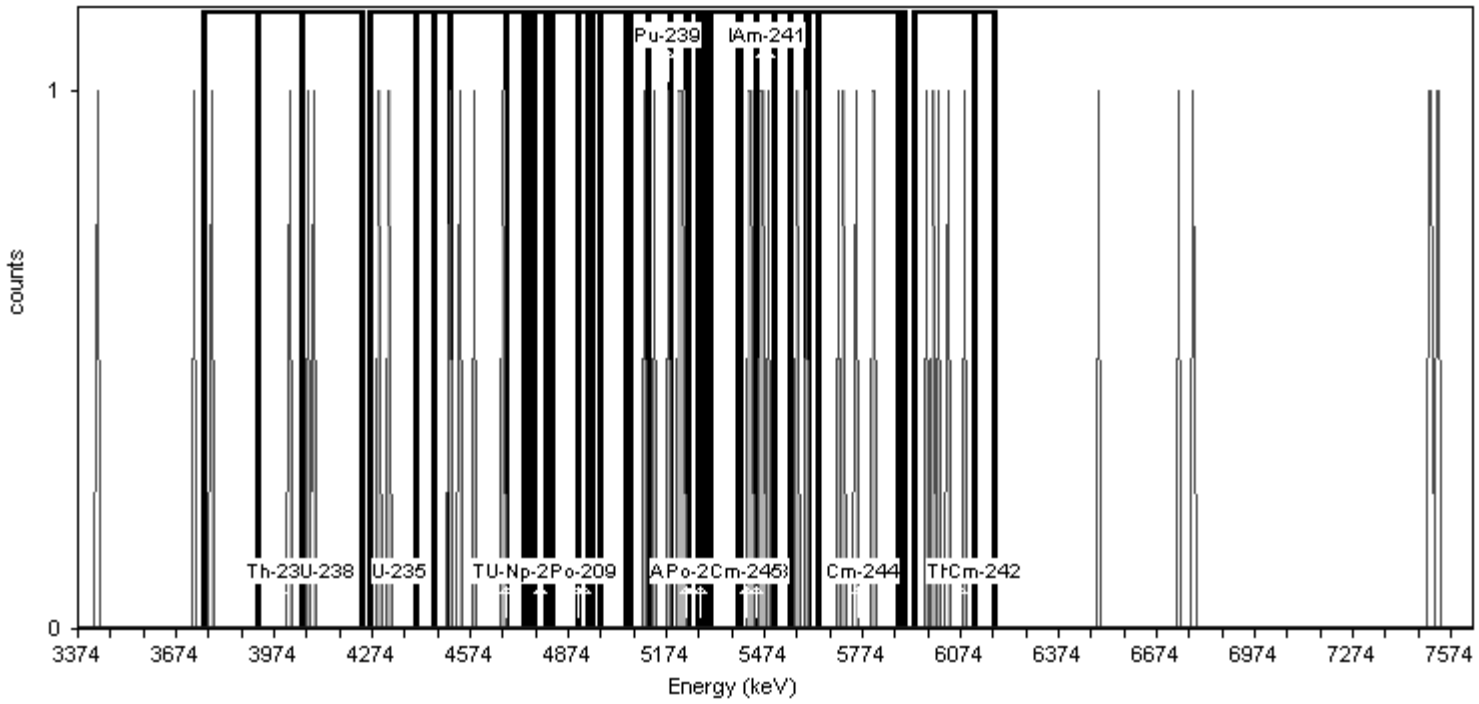
Analyst: 60040

Acquisition

Detector: AV70 , SN: 48-158FF1
Acquisition Start Date: 6/19/2014 12:18:44AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-8876;AV70-20140507
Calibration Date: 5/7/2014 10:49:02PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.52% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 42.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	4.00	4.167E-003	2.329E-003
U-234	4.71	4.51	4.82	4.00	4.167E-003	2.329E-003
Pu-242	4.90	4.68	4.95	0.00	0.000E+000	1.473E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	6.00	6.250E-003	2.756E-003
Am-243	5.23	5.05	5.31	6.00	6.250E-003	2.756E-003
U-232	5.25	5.06	5.40	6.00	6.250E-003	2.756E-003
Th-228	5.45	5.19	5.51	8.00	8.333E-003	3.125E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	5.00	5.208E-003	2.552E-003
Am-241	5.48	5.30	5.60	7.00	7.292E-003	2.946E-003
Cm-245	5.42	5.40	5.45	2.00	2.083E-003	1.804E-003
Pu-236	5.76	5.61	5.89	5.00	5.208E-003	2.552E-003
Cm-244	5.78	5.64	5.90	5.00	5.208E-003	2.552E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:35:41PM 6/19/2014

Sample

Sample Name: ICB;AV71
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

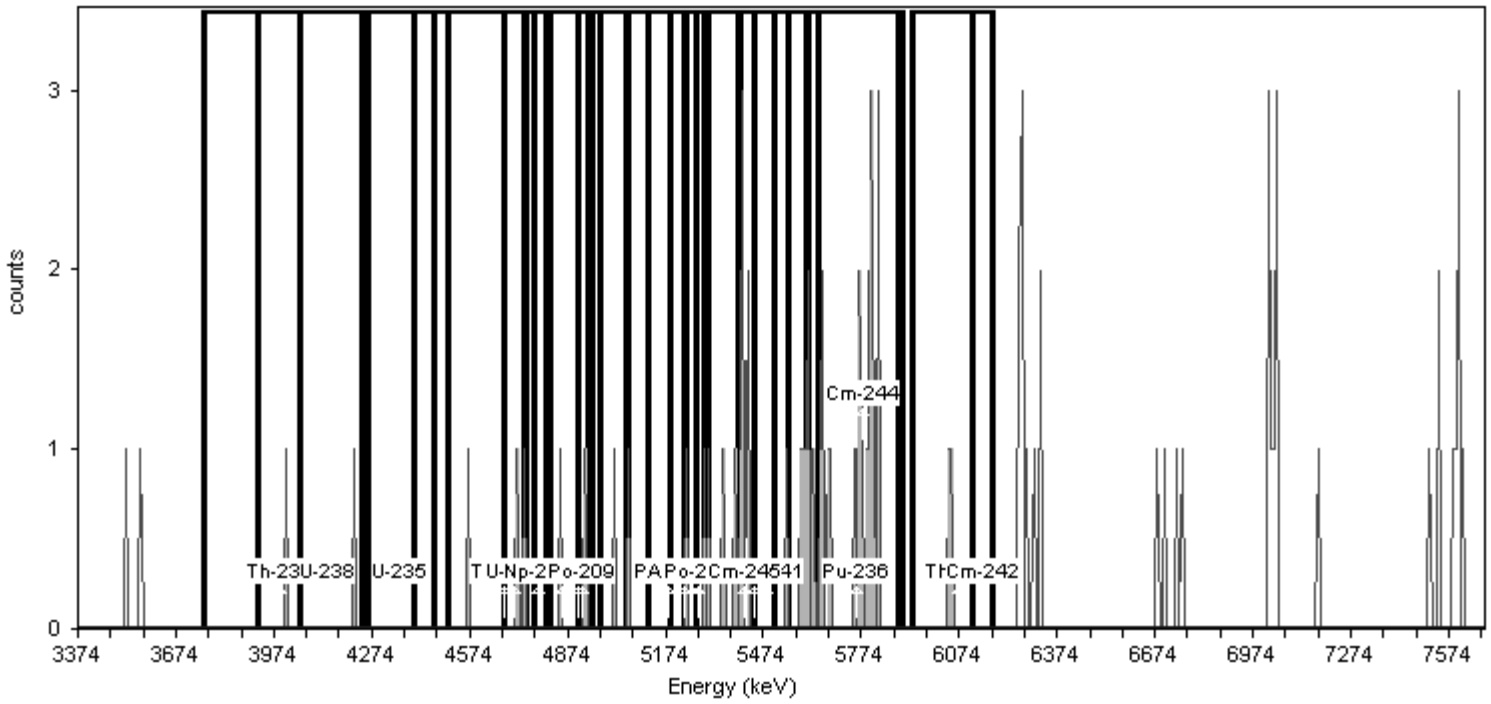
Analyst: 60040

Acquisition

Detector: AV71 , SN: 48-158EE6
Acquisition Start Date: 6/19/2014 12:18:46AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9792;AV71-20140504
Calibration Date: 5/4/2014 8:44:50PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.79% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 80.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	3.00	3.125E-003	2.083E-003
U-234	4.71	4.51	4.82	3.00	3.125E-003	2.083E-003
Pu-242	4.90	4.68	4.95	4.00	4.167E-003	2.329E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	7.00	7.292E-003	2.946E-003
Th-228	5.45	5.19	5.51	11.00	1.146E-002	3.608E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	11.00	1.146E-002	3.608E-003
Am-241	5.48	5.30	5.60	13.00	1.354E-002	3.898E-003
Cm-245	5.42	5.40	5.45	6.00	6.250E-003	2.756E-003
Pu-236	5.76	5.61	5.89	21.00	2.187E-002	4.886E-003
Cm-244	5.78	5.64	5.90	18.00	1.875E-002	4.541E-003
Th-227	6.07	5.93	6.18	2.00	2.083E-003	1.804E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:24:09AM 6/19/2014

Sample

Sample Name: ICB;AV115
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

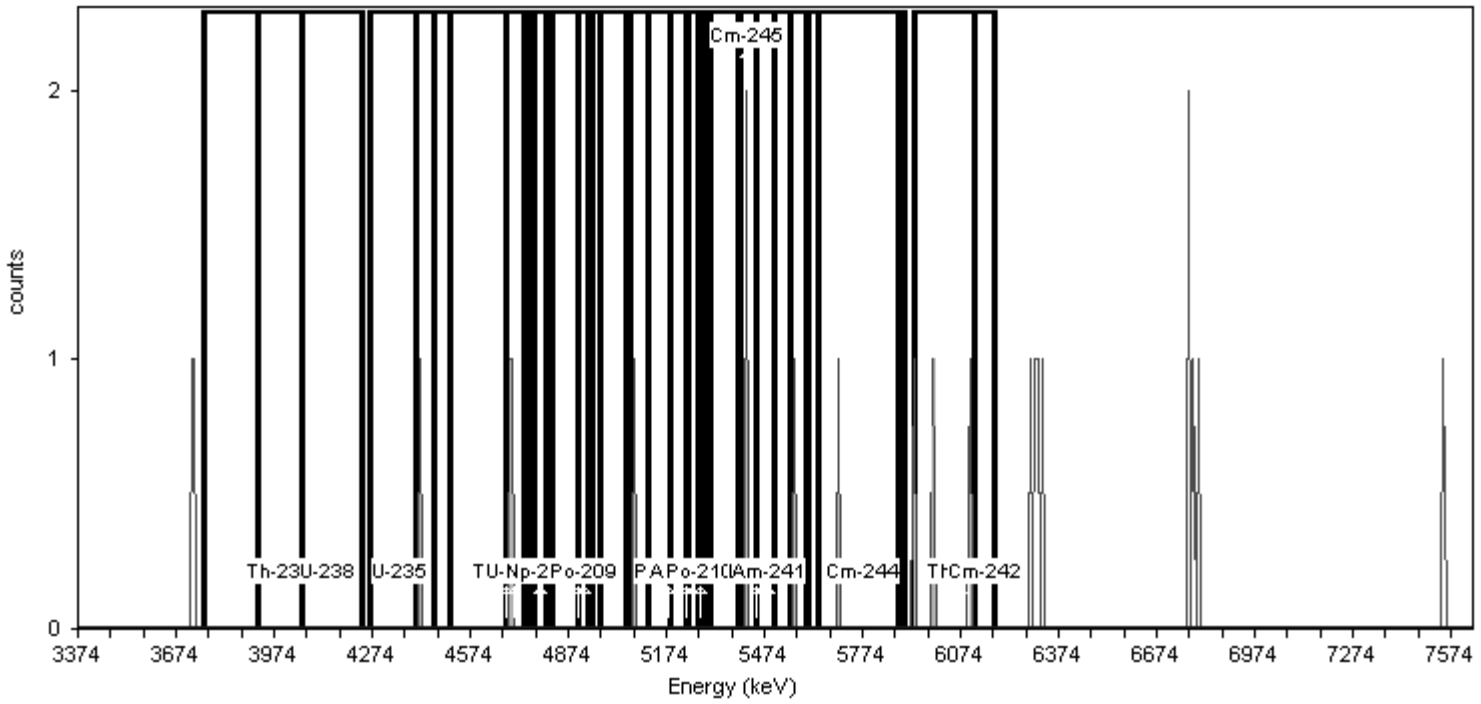
Analyst: 60040

Acquisition

Detector: AV115 , SN: 49-037E4
Acquisition Start Date: 6/18/2014 7:09:52PM
Live Time: 960.00 min.
Real Time: 960.03 min.
Calibration Name: IC-9817;AV115-20140507
Calibration Date: 5/7/2014 10:49:29PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.26% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 22.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	0.00	0.000E+000	1.473E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	3.00	3.125E-003	2.083E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	2.00	2.083E-003	1.804E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	1.00	1.042E-003	1.473E-003
U-232	5.25	5.06	5.40	1.00	1.042E-003	1.473E-003
Th-228	5.45	5.19	5.51	2.00	2.083E-003	1.804E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	2.00	2.083E-003	1.804E-003
Am-241	5.48	5.30	5.60	3.00	3.125E-003	2.083E-003
Cm-245	5.42	5.40	5.45	2.00	2.083E-003	1.804E-003
Pu-236	5.76	5.61	5.89	1.00	1.042E-003	1.473E-003
Cm-244	5.78	5.64	5.90	1.00	1.042E-003	1.473E-003
Th-227	6.07	5.93	6.18	3.00	3.125E-003	2.083E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:24:14AM 6/19/2014

Sample

Sample Name: ICB;AV116
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

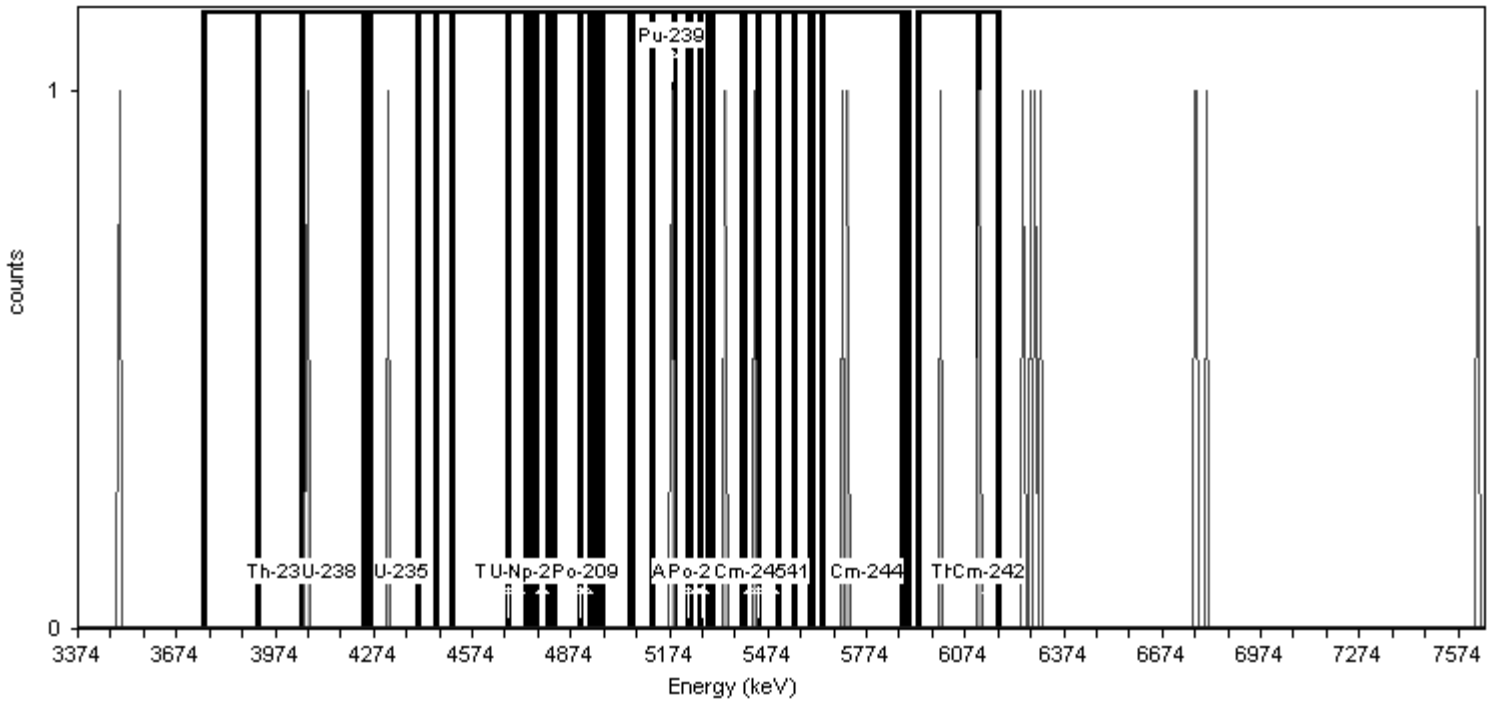
Acquisition

Detector: AV116 , SN: 49-034G1
Acquisition Start Date: 6/18/2014 7:09:53PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9792;AV116-20140430
Calibration Date: 5/1/2014 1:16:57PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.04% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 18.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	0.00	0.000E+000	1.473E-003
U-234	4.71	4.51	4.82	0.00	0.000E+000	1.473E-003
Pu-242	4.90	4.68	4.95	0.00	0.000E+000	1.473E-003
Th-229	4.86	4.74	5.12	0.00	0.000E+000	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	1.00	1.042E-003	1.473E-003
U-232	5.25	5.06	5.40	2.00	2.083E-003	1.804E-003
Th-228	5.45	5.19	5.51	2.00	2.083E-003	1.804E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	2.00	2.083E-003	1.804E-003
Am-241	5.48	5.30	5.60	2.00	2.083E-003	1.804E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	2.00	2.083E-003	1.804E-003
Cm-244	5.78	5.64	5.90	2.00	2.083E-003	1.804E-003
Th-227	6.07	5.93	6.18	2.00	2.083E-003	1.804E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:24:20AM 6/19/2014

Sample

Sample Name: ICB;AV117
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

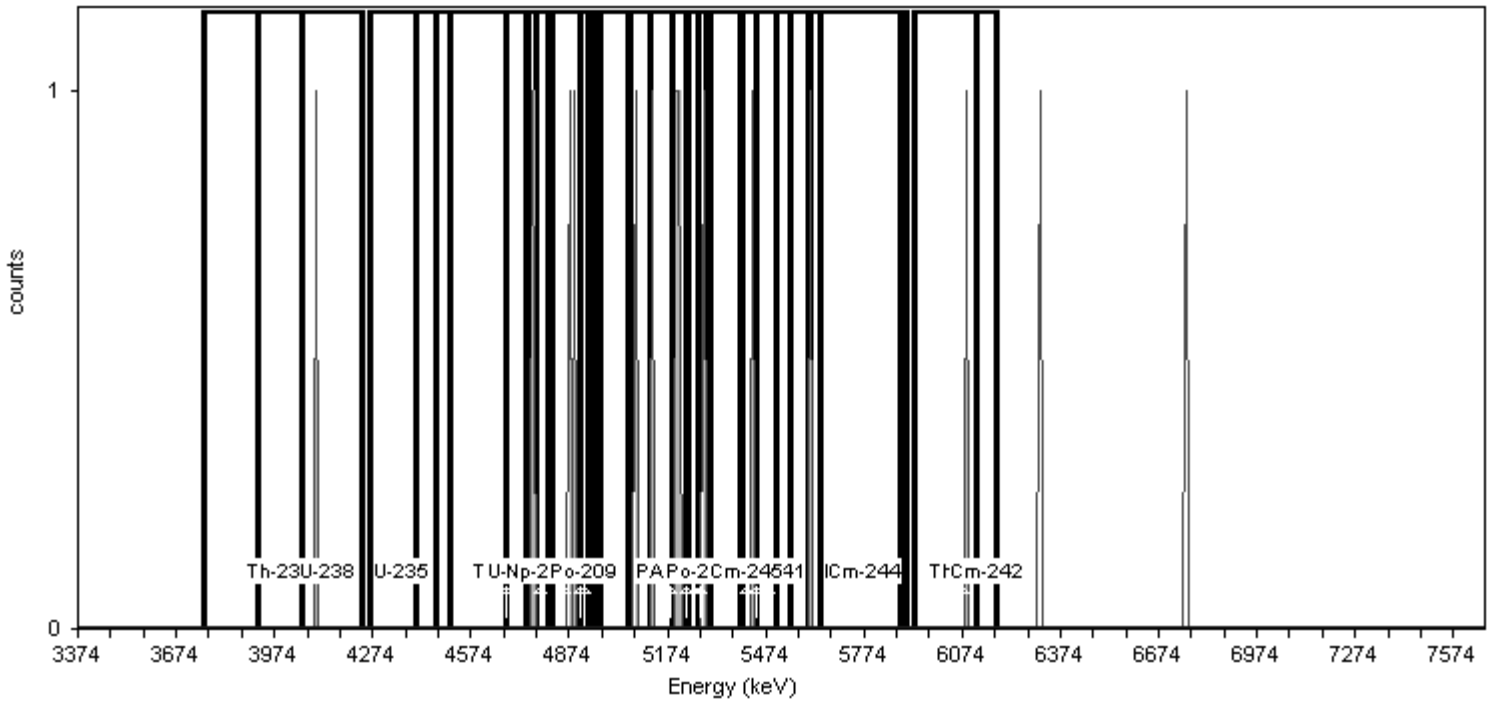
Acquisition

Detector: AV117 , SN: 49-037X4
Acquisition Start Date: 6/18/2014 7:09:55PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9793;AV117-20140430
Calibration Date: 5/1/2014 1:17:04PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.86% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 14.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	0.00	0.000E+000	1.473E-003
U-234	4.71	4.51	4.82	1.00	1.042E-003	1.473E-003
Pu-242	4.90	4.68	4.95	3.00	3.125E-003	2.083E-003
Th-229	4.86	4.74	5.12	4.00	4.167E-003	2.329E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	5.00	5.208E-003	2.552E-003
U-232	5.25	5.06	5.40	5.00	5.208E-003	2.552E-003
Th-228	5.45	5.19	5.51	4.00	4.167E-003	2.329E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	2.00	2.083E-003	1.804E-003
Am-241	5.48	5.30	5.60	1.00	1.042E-003	1.473E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	1.00	1.042E-003	1.473E-003
Cm-244	5.78	5.64	5.90	0.00	0.000E+000	1.473E-003
Th-227	6.07	5.93	6.18	1.00	1.042E-003	1.473E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:24:25AM 6/19/2014

Sample

Sample Name: ICB;AV118
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

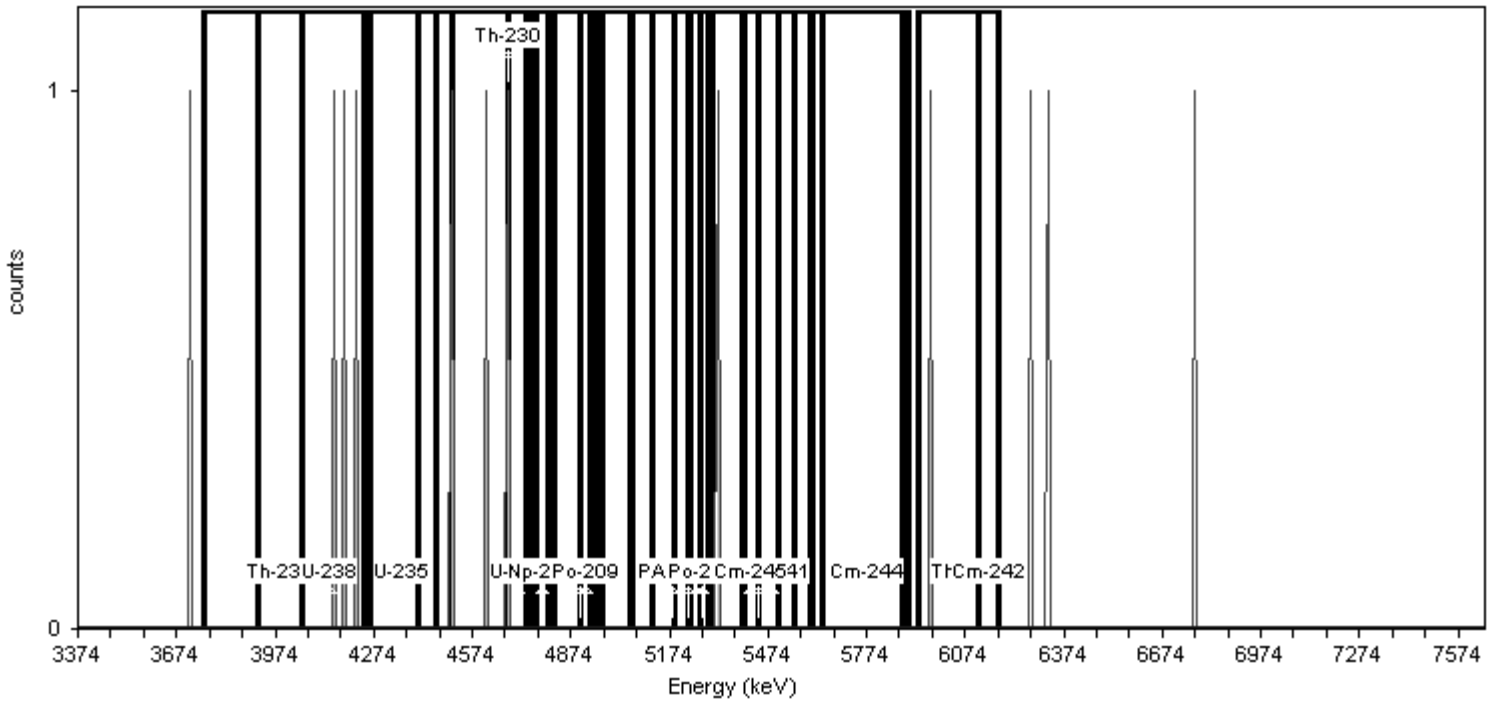
Analyst: 60040

Acquisition

Detector: AV118 , SN: 49-037F4
Acquisition Start Date: 6/18/2014 7:09:56PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9794;AV118-20140430
Calibration Date: 5/1/2014 1:17:10PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.84% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 12.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	3.00	3.125E-003	2.083E-003
U-234	4.71	4.51	4.82	3.00	3.125E-003	2.083E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	0.00	0.000E+000	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	0.00	0.000E+000	1.473E-003
Am-243	5.23	5.05	5.31	0.00	0.000E+000	1.473E-003
U-232	5.25	5.06	5.40	1.00	1.042E-003	1.473E-003
Th-228	5.45	5.19	5.51	1.00	1.042E-003	1.473E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	1.00	1.042E-003	1.473E-003
Am-241	5.48	5.30	5.60	1.00	1.042E-003	1.473E-003
Cm-245	5.42	5.40	5.45	0.00	0.000E+000	1.473E-003
Pu-236	5.76	5.61	5.89	0.00	0.000E+000	1.473E-003
Cm-244	5.78	5.64	5.90	0.00	0.000E+000	1.473E-003
Th-227	6.07	5.93	6.18	1.00	1.042E-003	1.473E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

Run Logs

Alpha Spectroscopy Run Log

Detector: AV1

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:25	140	IC 160-120511/1		120511			PS
05/07/14 23:01	60	ICV 160-120846/1		120846			PS
06/18/14 19:10	960	ICB 160-127775/1		127775			PS
06/19/14 16:43	60	CCV 160-127859/1		127859			PS
07/01/14 01:00	1	PULSER 160-129224/1		129224			MLK
07/01/14 12:26	180	680-102370-23	SD-214-01	129224	128228	A-01-R	MLK

Detector: AV3

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:26	140	IC 160-120519/1		120519			PS
05/07/14 23:02	60	ICV 160-120855/1		120855			PS
06/18/14 19:10	960	ICB 160-127828/1		127828			PS
06/19/14 16:44	60	CCV 160-127913/1		127913			PS
07/01/14 01:00	1	PULSER 160-129269/1		129269			MLK
07/01/14 12:26	180	680-102370-23 MS	SD-214-01 MS	129269	128228	A-01-R	MLK
07/03/14 15:56	1	PULSER 160-129774/1		129774			MLK
07/03/14 17:15	180	680-102370-23MSD	SD-214-01 MSD	129774	128228	A-01-R	MLK

Detector: AV6

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:26	140	IC 160-120521/1		120521			PS
05/07/14 23:03	60	ICV 160-120857/1		120857			PS
06/18/14 19:08	960	ICB 160-127830/1		127830			PS
06/19/14 18:06	60	CCV 160-127932/1		127932			PS
07/01/14 01:00	1	PULSER 160-129287/1		129287			MLK
07/01/14 12:26	180	680-102370-24	SD-212-SS	129287	128228	A-01-R	MLK

Detector: AV7

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/07/14 19:51	140	IC 160-120843/1		120843			PS
05/07/14 23:03	60	ICV 160-120858/1		120858			PS
06/18/14 19:08	960	ICB 160-127831/1		127831			PS
06/19/14 16:44	60	CCV 160-127943/1		127943			PS
07/01/14 01:00	1	PULSER 160-129298/1		129298			MLK
07/01/14 12:26	180	680-102370-25	SD-212-01	129298	128228	A-01-R	MLK

Detector: AV8

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:27	140	IC 160-120523/1		120523			PS
05/08/14 00:14	60	ICV 160-121084/1		121084			PS
06/18/14 19:08	960	ICB 160-127837/1		127837			PS
06/19/14 18:06	60	CCV 160-127954/1		127954			PS
07/01/14 01:00	1	PULSER 160-129309/1		129309			MLK
07/01/14 12:26	180	680-102370-26	SD-212-02	129309	128228	A-01-R	MLK

Alpha Spectroscopy Run Log

Detector: AV9

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:27	140	IC 160-120524/1		120524			PS
05/07/14 23:03	60	ICV 160-120859/1		120859			PS
06/18/14 19:08	960	ICB 160-127848/1		127848			PS
06/19/14 18:06	60	CCV 160-127962/1		127962			PS
07/01/14 01:00	1	PULSER 160-129320/1		129320			MLK
07/01/14 12:26	180	680-102370-28	SD-DUP-04	129320	128228	A-01-R	MLK

Detector: AV10

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:27	140	IC 160-120512/1		120512			PS
05/07/14 23:03	60	ICV 160-120847/1		120847			PS
06/18/14 19:08	960	ICB 160-127776/1		127776			PS
06/19/14 18:06	60	CCV 160-127860/1		127860			PS
07/01/14 01:00	1	PULSER 160-129225/1		129225			MLK
07/01/14 12:26	180	680-102370-29	SD-213-SS	129225	128228	A-01-R	MLK

Detector: AV11

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:27	140	IC 160-120513/1		120513			PS
05/07/14 23:04	60	ICV 160-120848/1		120848			PS
06/18/14 19:08	960	ICB 160-127786/1		127786			PS
06/19/14 18:07	60	CCV 160-127871/1		127871			PS
07/01/14 01:00	1	PULSER 160-129236/1		129236			MLK
07/01/14 12:26	180	680-102370-30	SD-213-01	129236	128228	A-01-R	MLK

Detector: AV12

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:28	140	IC 160-120514/1		120514			PS
05/07/14 23:04	60	ICV 160-120849/1		120849			PS
06/18/14 19:08	960	ICB 160-127796/1		127796			PS
06/19/14 18:07	60	CCV 160-127881/1		127881			PS
07/01/14 01:00	1	PULSER 160-129246/1		129246			MLK
07/01/14 12:26	180	680-102370-31	SD-213-02	129246	128228	A-01-R	MLK

Detector: AV13

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:28	140	IC 160-120515/1		120515			PS
05/07/14 23:04	60	ICV 160-120850/1		120850			PS
06/18/14 19:08	960	ICB 160-127807/1		127807			PS
06/19/14 19:45	60	CCV 160-127892/1		127892			PS
07/01/14 01:00	1	PULSER 160-129257/1		129257			
07/01/14 01:52	1	PULSER 160-129257/2		129257			MLK
07/01/14 12:26	180	680-102370-34	SD-214-02	129257	128228	A-01-R	MLK

Detector: AV14

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:28	140	IC 160-120516/1		120516			PS

Alpha Spectroscopy Run Log

Detector: AV14 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/07/14 23:04	60	ICV 160-120851/1		120851			PS
06/18/14 19:08	960	ICB 160-127817/1		127817			PS
06/19/14 18:08	60	CCV 160-127902/1		127902			PS
07/01/14 01:00	1	PULSER 160-129259/1		129259			MLK
07/01/14 12:26	180	680-102370-35	SD-214-03	129259	128228	A-01-R	MLK

Detector: AV24

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:29	140	IC 160-120405/1		120405			PS
05/08/14 00:16	60	ICV 160-121076/1		121076			PS
06/18/14 19:08	960	ICB 160-127827/1		127827			PS
06/19/14 19:45	60	CCV 160-127912/1		127912			PS
07/01/14 01:00	1	PULSER 160-129268/1		129268			MLK
07/01/14 12:32	180	680-102370-1	SD-DUP-03	129268	128227	A-01-R	MLK

Detector: AV51

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:03	140	IC 160-120273/1		120273			PS
05/08/14 17:17	60	ICV 160-121366/1		121366			PS
06/19/14 00:17	960	ICB 160-127923/1		127923			PS
06/22/14 20:07	60	CCV 160-127991/1		127991			PS
07/01/14 01:09	1	PULSER 160-129279/1		129279			MLK
07/01/14 12:32	180	680-102370-1 DU	SD-DUP-03 DU	129279	128227	A-01-R	MLK
07/01/14 17:47	600	ZZZZZ		129279			

Detector: AV53

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:04	140	IC 160-120275/1		120275			PS
05/08/14 00:18	60	ICV 160-121082/1		121082			PS
06/19/14 00:17	960	ICB 160-127925/1		127925			PS
06/22/14 18:53	60	CCV 160-127992/1		127992			PS
07/01/14 01:09	1	PULSER 160-129280/1		129280			MLK
07/01/14 12:32	180	680-102370-2	SD-206-SS	129280	128227	A-01-R	MLK
07/01/14 17:47	600	ZZZZZ		129280			

Detector: AV54

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:04	140	IC 160-120276/1		120276			PS
05/08/14 14:34	60	ICV 160-121368/1		121368			PS
06/19/14 00:18	960	ICB 160-127926/1		127926			PS
06/22/14 18:53	60	CCV 160-127993/1		127993			PS
07/01/14 01:09	1	PULSER 160-129281/1		129281			MLK
07/01/14 12:32	180	680-102370-3	SD-206-01	129281	128227	A-01-R	MLK
07/01/14 17:47	600	ZZZZZ		129281			

Alpha Spectroscopy Run Log

Detector: AV55

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/07/14 19:51	140	IC 160-120842/1		120842			PS
05/08/14 00:19	60	ICV 160-121083/1		121083			PS
06/19/14 00:18	960	ICB 160-127927/1		127927			PS
06/22/14 20:08	60	CCV 160-127994/1		127994			PS
07/01/14 01:09	1	PULSER 160-129282/1		129282			MLK
07/01/14 12:32	180	680-102370-4	SD-206-02	129282	128227	A-01-R	MLK
07/01/14 17:47	600	ZZZZZ		129282			

Detector: AV56

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:04	140	IC 160-120278/1		120278			PS
05/08/14 17:18	60	ICV 160-121369/1		121369			PS
06/19/14 00:18	960	ICB 160-127928/1		127928			PS
06/22/14 18:53	60	CCV 160-127995/1		127995			PS
07/01/14 01:09	1	PULSER 160-129283/1		129283			MLK
07/01/14 12:32	180	680-102370-7	SD-215-SS	129283	128227	A-01-R	MLK
07/01/14 17:47	600	ZZZZZ		129283			

Detector: AV58

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:05	140	IC 160-120280/1		120280			PS
05/08/14 14:35	60	ICV 160-121371/1		121371			PS
06/19/14 00:18	960	ICB 160-127930/1		127930			PS
06/22/14 18:53	60	CCV 160-127997/1		127997			PS
07/01/14 01:09	1	PULSER 160-129285/1		129285			MLK
07/01/14 12:32	180	680-102370-8	SD-222-SS	129285	128227	A-01-R	MLK
07/01/14 17:47	600	ZZZZZ		129285			

Detector: AV59

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:05	140	IC 160-120281/1		120281			PS
05/08/14 14:36	60	ICV 160-121372/1		121372			PS
06/19/14 00:18	960	ICB 160-127931/1		127931			PS
06/22/14 20:09	60	CCV 160-127998/1		127998			PS
07/01/14 01:09	1	PULSER 160-129286/1		129286			MLK
07/01/14 12:32	180	680-102370-9	SD-222-01	129286	128227	A-01-R	MLK
07/01/14 17:47	600	ZZZZZ		129286			

Detector: AV60

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:06	140	IC 160-120282/1		120282			PS
05/08/14 17:21	60	ICV 160-121373/1		121373			PS
06/19/14 00:18	960	ICB 160-127933/1		127933			PS
06/22/14 21:17	60	CCV 160-127999/1		127999			PS
07/01/14 01:09	1	PULSER 160-129288/1		129288			MLK
07/01/14 12:33	180	680-102370-10	SD-222-02	129288	128227	A-01-R	MLK
07/01/14 17:47	600	ZZZZZ		129288			

Alpha Spectroscopy Run Log

Detector: AV61

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:06	140	IC 160-120283/1		120283			PS
05/08/14 14:36	60	ICV 160-121374/1		121374			PS
06/19/14 00:18	960	ICB 160-127934/1		127934			PS
06/22/14 22:21	60	CCV 160-128018/1		128018			PS
07/01/14 01:09	1	PULSER 160-129289/1		129289			MLK
07/01/14 12:33	180	680-102370-11	SD-222-03	129289	128227	A-01-R	MLK
07/01/14 17:47	600	ZZZZZ		129289			

Detector: AV62

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:06	140	IC 160-120284/1		120284			PS
05/08/14 14:36	60	ICV 160-121375/1		121375			PS
06/19/14 00:18	960	ICB 160-127935/1		127935			PS
06/22/14 20:09	60	CCV 160-128000/1		128000			PS
07/01/14 01:09	1	PULSER 160-129290/1		129290			MLK
07/01/14 12:33	180	680-102370-12	SD-211-SS	129290	128227	A-01-R	MLK
07/01/14 17:47	600	ZZZZZ		129290			

Detector: AV63

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:06	140	IC 160-120285/1		120285			PS
05/08/14 14:36	60	ICV 160-121376/1		121376			PS
06/19/14 00:18	960	ICB 160-127936/1		127936			PS
06/22/14 21:18	60	CCV 160-128001/1		128001			PS
07/01/14 01:09	1	PULSER 160-129291/1		129291			MLK
07/01/14 12:33	180	680-102370-13	SD-211-01	129291	128227	A-01-R	MLK
07/01/14 17:47	600	ZZZZZ		129291			

Detector: AV64

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 17:47	140	IC 160-120041/1		120041			PS
05/11/14 19:31	60	ICV 160-121389/1		121389			PS
06/19/14 00:18	960	ICB 160-127937/1		127937			PS
06/22/14 21:18	60	CCV 160-128002/1		128002			PS
07/01/14 01:09	1	PULSER 160-129292/1		129292			MLK
07/01/14 12:33	180	680-102370-14	SD-211-02	129292	128227	A-01-R	MLK
07/01/14 17:48	600	ZZZZZ		129292			

Detector: AV65

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 17:47	140	IC 160-120042/1		120042			PS
05/08/14 17:18	60	ICV 160-121377/1		121377			PS
06/19/14 00:18	960	ICB 160-127938/1		127938			
06/19/14 19:57	960	ICB 160-127938/2		127938			PS
06/22/14 20:09	60	CCV 160-128003/1		128003			PS
07/01/14 01:09	1	PULSER 160-129293/1		129293			MLK
07/01/14 12:33	180	680-102370-15	SD-216-SS	129293	128227	A-01-R	MLK
07/01/14 17:49	600	ZZZZZ		129293			

Alpha Spectroscopy Run Log

Detector: AV66

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 17:47	140	IC 160-120043/1		120043			PS
05/11/14 19:32	60	ICV 160-121390/1		121390			PS
06/19/14 00:18	960	ICB 160-127939/1		127939			PS
06/22/14 21:18	60	CCV 160-128004/1		128004			PS
07/01/14 01:09	1	PULSER 160-129294/1		129294			MLK
07/01/14 12:33	180	680-102370-16	SD-216-01	129294	128227	A-01-R	MLK
07/01/14 17:49	600	ZZZZZ		129294			

Detector: AV67

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 17:48	140	IC 160-120044/1		120044			PS
05/11/14 19:32	60	ICV 160-121391/1		121391			PS
06/19/14 00:18	960	ICB 160-127940/1		127940			PS
06/22/14 18:54	60	CCV 160-128005/1		128005			PS
07/01/14 01:09	1	PULSER 160-129295/1		129295			MLK
07/01/14 12:33	180	680-102370-17	SD-216-02	129295	128227	A-01-R	MLK
07/01/14 17:49	600	ZZZZZ		129295			

Detector: AV68

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 17:48	140	IC 160-120045/1		120045			PS
05/08/14 14:36	60	ICV 160-121378/1		121378			PS
06/19/14 00:18	960	ICB 160-127941/1		127941			PS
06/22/14 20:09	60	CCV 160-128006/1		128006			PS
07/01/14 01:09	1	PULSER 160-129296/1		129296			MLK
07/01/14 12:33	180	680-102370-18	SD-217-SS	129296	128227	A-01-R	MLK
07/01/14 17:49	600	ZZZZZ		129296			

Detector: AV69

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 17:48	140	IC 160-120046/1		120046			PS
05/08/14 17:19	60	ICV 160-121379/1		121379			PS
06/19/14 00:18	960	ICB 160-127942/1		127942			PS
06/22/14 20:09	60	CCV 160-128007/1		128007			PS
07/01/14 01:09	1	PULSER 160-129297/1		129297			MLK
07/01/14 12:33	180	680-102370-19	SD-217-01	129297	128227	A-01-R	MLK
07/01/14 17:49	600	ZZZZZ		129297			

Detector: AV70

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/07/14 19:51	140	IC 160-120844/1		120844			PS
05/08/14 14:36	60	ICV 160-121380/1		121380			PS
06/19/14 00:18	960	ICB 160-127944/1		127944			PS
06/22/14 20:10	60	CCV 160-128008/1		128008			PS
07/01/14 01:10	1	PULSER 160-129299/1		129299			MLK
07/01/14 12:33	180	680-102370-20	SD-217-02	129299	128227	A-01-R	MLK
07/01/14 17:49	600	ZZZZZ		129299			

Alpha Spectroscopy Run Log

Detector: AV71

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 17:49	140	IC 160-120048/1		120048			PS
05/08/14 17:19	60	ICV 160-121381/1		121381			PS
06/19/14 00:18	960	ICB 160-127945/1		127945			PS
06/22/14 20:10	60	CCV 160-128009/1		128009			PS
07/01/14 01:10	1	PULSER 160-129300/1		129300			MLK
07/01/14 12:33	180	680-102370-22	SD-214-SS	129300	128227	A-01-R	MLK
07/01/14 17:49	600	ZZZZZ		129300			

Detector: AV115

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/07/14 19:52	140	IC 160-120840/1		120840			PS
05/11/14 20:54	60	ICV 160-121418/1		121418			PS
06/18/14 19:09	960	ICB 160-127791/1		127791			PS
06/19/14 15:10	60	CCV 160-127876/1		127876			PS
07/01/14 01:38	1	PULSER 160-129241/1		129241			MLK
07/01/14 12:25	180	MB 160-128228/1-A		129241	128228	A-01-R	MLK

Detector: AV116

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
04/30/14 22:55	140	IC 160-119675/1		119675			PS
05/11/14 22:06	60	ICV 160-121419/1		121419			PS
06/18/14 19:09	960	ICB 160-127792/1		127792			PS
06/19/14 15:10	60	CCV 160-127877/1		127877			PS
07/01/14 01:38	1	PULSER 160-129242/1		129242			MLK
07/01/14 12:25	180	LCS 160-128228/2-A		129242	128228	A-01-R	MLK

Detector: AV117

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
04/30/14 22:55	140	IC 160-119676/1		119676			PS
05/11/14 22:06	60	ICV 160-121420/1		121420			PS
06/18/14 19:09	960	ICB 160-127793/1		127793			PS
06/19/14 15:10	60	CCV 160-127878/1		127878			PS
07/01/14 01:38	1	PULSER 160-129243/1		129243			MLK
07/01/14 12:32	180	MB 160-128227/1-A		129243	128227	A-01-R	MLK

Detector: AV118

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
04/30/14 22:55	140	IC 160-119677/1		119677			PS
05/11/14 23:19	60	ICV 160-121421/1		121421			PS
06/18/14 19:09	960	ICB 160-127794/1		127794			PS
06/19/14 15:10	60	CCV 160-127879/1		127879			PS
07/01/14 01:38	1	PULSER 160-129244/1		129244			MLK
07/01/14 12:32	180	LCS 160-128227/2-A		129244	128227	A-01-R	MLK

GAMMA SPECTROSCOPY

Method GA-01-R
Ra-226

Radium-226 & Other Gamma Emitters (GS) by Method GA-01-R

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102370-1

SDG No.: 680-102370-1

Batch Number: 128622 Batch Start Date: 06/25/14 12:41 Batch Analyst: Price, Justin D

Batch Method: Fill_Geo-21 Batch End Date: 06/25/14 13:10

Lab Sample ID	Client Sample ID	Method Chain	Basis	TareWeight	GrossWeight	InitialAmount	IngDecDate1	IngDecDate3	Geometry
MB 160-128622/1		Fill_Geo-21, GA-01-R				291.18 g	6/25/14	7/16/14	Tuna Can
LCS 160-128622/2		Fill_Geo-21, GA-01-R				341.9 g	6/25/14	7/16/14	Tuna Can
680-102370-A-6-A	SD-005E-01	Fill_Geo-21, GA-01-R	T	46.8 g	410.5 g	363.7 g	6/25/14	7/16/14	Tuna Can
680-102370-A-6-A DU	SD-005E-01	Fill_Geo-21, GA-01-R	T	46.8 g	410.5 g	363.7 g	6/25/14	7/16/14	Tuna Can
680-102370-A-33-A	SD-008-01	Fill_Geo-21, GA-01-R	T	46.1 g	293.0 g	246.9 g	6/25/14	7/16/14	Tuna Can

Lab Sample ID	Client Sample ID	Method Chain	Basis	Tuna Can LCS 00003					
MB 160-128622/1		Fill_Geo-21, GA-01-R							
LCS 160-128622/2		Fill_Geo-21, GA-01-R		# g					
680-102370-A-6-A	SD-005E-01	Fill_Geo-21, GA-01-R	T						
680-102370-A-6-A DU	SD-005E-01	Fill_Geo-21, GA-01-R	T						
680-102370-A-33-A	SD-008-01	Fill_Geo-21, GA-01-R	T						

Batch Notes	
Balance ID	1121432711
SOP Number	ST-RC-0003; ST-RC-0025

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102370-1

SDG No.: 680-102370-1

Batch Number: 128622 Batch Start Date: 06/25/14 12:41 Batch Analyst: Price, Justin D

Batch Method: Fill_Geo-21 Batch End Date: 06/25/14 13:10

Lab Sample ID	Client Sample ID	Method Chain	Basis	TareWeight	GrossWeight	InitialAmount	IngDecDate1	IngDecDate3	Geometry
MB 160-128622/1		Fill_Geo-21, GA-01-R				291.18 g	6/25/14	7/16/14	Tuna Can
LCS 160-128622/2		Fill_Geo-21, GA-01-R				341.9 g	6/25/14	7/16/14	Tuna Can
680-102370-A-6-A	SD-005E-01	Fill_Geo-21, GA-01-R	T	46.8 g	410.5 g	363.7 g	6/25/14	7/16/14	Tuna Can
680-102370-A-6-A DU	SD-005E-01	Fill_Geo-21, GA-01-R	T	46.8 g	410.5 g	363.7 g	6/25/14	7/16/14	Tuna Can
680-102370-A-33-A	SD-008-01	Fill_Geo-21, GA-01-R	T	46.1 g	293.0 g	246.9 g	6/25/14	7/16/14	Tuna Can

Lab Sample ID	Client Sample ID	Method Chain	Basis	Tuna Can LCS 00003					
MB 160-128622/1		Fill_Geo-21, GA-01-R							
LCS 160-128622/2		Fill_Geo-21, GA-01-R		# g					
680-102370-A-6-A	SD-005E-01	Fill_Geo-21, GA-01-R	T						
680-102370-A-6-A DU	SD-005E-01	Fill_Geo-21, GA-01-R	T						
680-102370-A-33-A	SD-008-01	Fill_Geo-21, GA-01-R	T						

Batch Notes	
Balance ID	1121432711
SOP Number	ST-RC-0003; ST-RC-0025

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

Prep Batch: 128622

Fill Geometry, 21-Day In-Growth

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 128622

Lab ID: MB 160-128622/1-A | Analyzed: 07/16/14 02:12 | Ts: 30 | Sigma: 2
Client ID: | Detector: GV9 | Decay Corrected: No

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.03852	0.0771	0.0773	U	pCi/g	1.00	0.129	131682
Radium-228	-0.008469	0.0505	0.0505	U	pCi/g		0.224	131682
Thorium-232	-0.008469	0.0505	0.0505	U	pCi/g		0.224	131682
Uranium-235	0.0000	0.0699	0.0699	U	pCi/g		0.320	131682
Uranium-238	-0.2907	0.636	0.636	U	pCi/g		1.09	131682

Other Detected Radionuclides	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Other Detected Radionuclide	None				pCi/g	

Lab ID: LCS 160-128622/2-A | Analyzed: 07/16/14 02:10 | Ts: 30 | Sigma: 2
Client ID: | Detector: GV4 | Decay Corrected: No

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Americium-241	101.0	2.07	10.7		pCi/g		1.50	131933
Cesium-137	30.57	1.03	3.34		pCi/g		0.389	131933
Cobalt-60	22.05	0.727	2.33		pCi/g		0.0869	131933

Lab ID: 680-102370-6 | Analyzed: 07/16/14 01:34 | Ts: 30 | Sigma: 2
Client ID: SD-005E-01 | Detector: GV9 | Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.465	0.114	0.123		pCi/g	1.00	0.0938	131682
Radium-228	0.507	0.162	0.170		pCi/g		0.123	131682
Thorium-232	0.507	0.162	0.170		pCi/g		0.123	131682
Uranium-235	0.149	0.186	0.187	U	pCi/g		0.303	131682
Uranium-238	0.845	0.895	0.899	U	pCi/g		1.46	131682

Other Detected Radionuclides	Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Ac-228	0.507	0.162	0.170		pCi/g	0.123
Bi-214	0.465	0.114	0.123		pCi/g	0.0938
K-40	4.89	0.912	1.04		pCi/g	0.660
Pb-212	0.480	0.117	0.132		pCi/g	0.111
Pb-214	0.543	0.102	0.116		pCi/g	0.0981
Tl-208	0.189	0.0557	0.0590		pCi/g	0.0446

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 128622

Lab ID: 680-102370-6 DU | Analyzed: 07/16/14 02:11 | Ts: 30 | Sigma: 2
Client ID: SD-005E-01 | Detector: GV8 | Decay Corrected: No

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.5591	0.152	0.162		pCi/g	1.00	0.118	131938
Radium-228	0.4101	0.145	0.151		pCi/g		0.276	131938
Thorium-232	0.4101	0.145	0.151		pCi/g		0.276	131938
Uranium-235	0.06926	0.209	0.209	U	pCi/g		0.400	131938
Uranium-238	1.230	0.576	0.590	U	pCi/g		1.51	131938

Other Detected Radionuclides	DU Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Ac-228	0.4101	0.145	0.151		pCi/g	0.276
Bi-214	0.5591	0.152	0.162		pCi/g	0.118
K-40	3.142	0.914	0.969		pCi/g	0.671
Pb-212	0.5481	0.120	0.139		pCi/g	0.112
Pb-214	0.4858	0.123	0.133		pCi/g	0.115
Tl-208	0.2092	0.0610	0.0648		pCi/g	0.0376

Lab ID: 680-102370-33 | Analyzed: 07/16/14 01:35 | Ts: 30 | Sigma: 2
Client ID: SD-008-01 | Detector: GV14 | Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.732	0.209	0.222		pCi/g	1.00	0.202	131968
Radium-228	0.895	0.210	0.229		pCi/g		0.152	131968
Thorium-232	0.895	0.210	0.229		pCi/g		0.152	131968
Uranium-235	0.209	0.270	0.271	U	pCi/g		0.474	131968
Uranium-238	0.592	0.739	0.741	U	pCi/g		2.17	131968

Other Detected Radionuclides	Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Ac-228	0.895	0.210	0.229		pCi/g	0.152
Bi-214	0.732	0.209	0.222		pCi/g	0.202
K-40	6.71	1.63	1.77		pCi/g	1.45
Pb-212	0.920	0.153	0.194		pCi/g	0.127
Pb-214	0.820	0.172	0.192		pCi/g	0.182
Tl-208	0.260	0.0823	0.0866		pCi/g	0.0788

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 128622

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-128622/1-A	Radium-226			0.03852	U	pCi/g							
MB 160-128622/1-A	Radium-228			-0.008469	U	pCi/g							
MB 160-128622/1-A	Thorium-232			-0.008469	U	pCi/g							
MB 160-128622/1-A	Uranium-235			0.0000	U	pCi/g							
MB 160-128622/1-A	Uranium-238			-0.2907	U	pCi/g							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-128622/2-A	Americium-241		97.4	101.0		pCi/g	104	87 - 116					
LCS 160-128622/2-A	Cesium-137		31.0	30.57		pCi/g	99	87 - 120					
LCS 160-128622/2-A	Cobalt-60		22.0	22.05		pCi/g	100	87 - 115					

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
680-102370-6	Radium-226	0.465		0.5591		pCi/g			18	0.33	0.92	1	
680-102370-6	Radium-228	0.507		0.4101		pCi/g			21	0.30	0.86	1	
680-102370-6	Thorium-232	0.507		0.4101		pCi/g			21	0.30	0.86	1	
680-102370-6	Uranium-235	0.149		0.06926	U	pCi/g			73	0.20	0.57	1	
680-102370-6	Uranium-238	0.845		1.230	U	pCi/g			37	0.26	0.71	1	

Glossary:

Ts = Count Duration, Sample

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102370-1

SDG No.: 680-102370-1

Batch Number: 128622 Batch Start Date: 06/25/14 12:41 Batch Analyst: Price, Justin D

Batch Method: Fill_Geo-21 Batch End Date: 06/25/14 13:10

Lab Sample ID	Client Sample ID	Method Chain	Basis	TareWeight	GrossWeight	InitialAmount	IngDecDate1	IngDecDate3	Geometry
MB 160-128622/1		Fill_Geo-21, GA-01-R				291.18 g	6/25/14	7/16/14	Tuna Can
LCS 160-128622/2		Fill_Geo-21, GA-01-R				341.9 g	6/25/14	7/16/14	Tuna Can
680-102370-A-6-A	SD-005E-01	Fill_Geo-21, GA-01-R	T	46.8 g	410.5 g	363.7 g	6/25/14	7/16/14	Tuna Can
680-102370-A-6-A DU	SD-005E-01	Fill_Geo-21, GA-01-R	T	46.8 g	410.5 g	363.7 g	6/25/14	7/16/14	Tuna Can
680-102370-A-33-A	SD-008-01	Fill_Geo-21, GA-01-R	T	46.1 g	293.0 g	246.9 g	6/25/14	7/16/14	Tuna Can

Lab Sample ID	Client Sample ID	Method Chain	Basis	Tuna Can LCS 00003					
MB 160-128622/1		Fill_Geo-21, GA-01-R							
LCS 160-128622/2		Fill_Geo-21, GA-01-R		# g					
680-102370-A-6-A	SD-005E-01	Fill_Geo-21, GA-01-R	T						
680-102370-A-6-A DU	SD-005E-01	Fill_Geo-21, GA-01-R	T						
680-102370-A-33-A	SD-008-01	Fill_Geo-21, GA-01-R	T						

Batch Notes	
Balance ID	1121432711
SOP Number	ST-RC-0003; ST-RC-0025

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

Test America St. Louis Spectrum ID: 9_Gamma_20141398

Sample Description: 128622_Gamma_MB 160-128622~1-A
Detector: Ge9 S/N100228730
Batch ID: 128622
Work Order Number: Gamma
Lot Number: MB 160-128622~1-A

Decay to Time: 7/16/2014 02:11 Live Time: 1800 sec
Acquisition Time: 7/16/2014 02:12:07 Real Time: 1802 sec
Analysis Time: 7/16/2014 02:42 Dead Time: 0.11 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 9_Soil_TunaCan.Clb
Efficiency Cal Desc: 9_Soil_TunaCan_90099_050312
Efficiency Cal Date: 6/14/2012 10:19
Energy Cal Date: 3/1/2012 13:57
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 9_2014-07-12_0308.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	0.000E+00	1000.0	5.621E-01	5.621E-01	3.071E+00
K-40	-2.621E+00	281.1	7.367E+00	7.368E+00	1.106E+01
CO-60	-1.307E-01	168.9	2.207E-01	2.208E-01	8.171E-01
I-131	-1.043E-02	155.3	1.619E-02	1.620E-02	5.273E-01
CS-134	-2.637E-02	81.1	2.138E-02	2.142E-02	7.298E-01
CS-137	-9.797E-02	193.9	1.899E-01	1.900E-01	6.921E-01
EU-152	9.659E-02	189.4	1.830E-01	1.831E-01	1.463E+00
EU-154	0.000E+00	447.2	4.369E-01	4.370E-01	2.277E+00
EU-155	1.736E-01	168.4	2.922E-01	2.923E-01	1.047E+00
TL-208	2.055E-01	98.6	2.027E-01	2.029E-01	5.429E-01
PB-210	1.610E+00	205.2	3.303E+00	3.305E+00	1.184E+01
PB-212	3.640E-01	76.7	2.792E-01	2.802E-01	7.691E-01
PB-214	1.916E-01	171.6	3.287E-01	3.289E-01	1.260E+00
BI-212	2.809E-01	610.7	1.715E+00	1.716E+00	6.717E+00
BI-214	4.150E-01	100.1	4.156E-01	4.161E-01	1.395E+00
AC-228	-9.124E-02	298.3	2.722E-01	2.722E-01	2.414E+00
Pa-234	3.588E-01	130.3	4.676E-01	4.680E-01	1.330E+00
TH-234	-3.132E+00	109.3	3.424E+00	3.428E+00	1.171E+01
PA-234M	1.206E+01	152.1	1.833E+01	1.834E+01	6.833E+01
U-235	0.000E+00	1000.0	3.764E-01	3.764E-01	3.452E+00
AM-241	-2.370E-01	138.4	3.279E-01	3.281E-01	1.143E+00
Total	1.575E+01				

Analyst: Siobhan Perry

TestAmerica, Inc Spectrum name: 9_Gamma_20141398.An1

Sample description
128622_Gamma_MB 160-128622~1-A

Spectrum Filename: C:\User\SPC\Det9\9_Gamma_20141398.An1

Acquisition information
Start time: 7/16/2014 2:12:07 AM
Live time: 1800
Real time: 1802
Dead time: 0.11 %
Detector ID: 9

Detector system
Ge9 S/N100228730

Calibration
Filename: 9_Soil_TunaCan.Clb
9_Soil_TunaCan_90099_050312

Energy Calibration
Created: 3/1/2012 1:57:17 PM
Zero offset: 0.074 keV
Gain: 0.250 keV/channel
Quadratic: -2.269E-08 keV/channel^2

Efficiency Calibration
Created: 6/14/2012 10:19:51 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.30 %
Log(Eff): -8.079856E-01 + (-2.367265E-01*Log(E)) +
(-3.950640E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.42 %
Log(Eff): -2.387916E+01 + (8.875647E+00*Log(E)) +
(-9.401100E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.59keV)
Stop channel: 8000 (1999.34keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	7/16/2014 2:11:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	9_2014-07-12_0308.PBC 7/12/2014 3:08:04 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 3 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 1.0000

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.65	3.	205.20	1.00	2.577E-02	46.54	4.250	PBC<MDA	PB210
106.84	4.	168.35	1.05	5.318E-02	105.31	21.200	PBC<MDA	EU155
122.14	4.	189.44	1.07	5.305E-02	121.78	28.580	PBC<MDA	EU152
132.69	1.	997.30	1.08	5.216E-02	131.29	18.000	PBC<MDA	Pa234
238.69	6.	103.04	1.18	3.732E-02	238.63	43.300	PBC<MDA	PB212
277.21	3.	174.61	1.21	3.372E-02	277.28	6.310	PBC<MDA	TL208
285.01	3.	210.78	1.22	3.315E-02	284.30	6.140	PBC<MDA	I131
294.25	-3.	228.49	1.23	3.232E-02	295.09	19.300	PBC<MDA	PB214
299.22	4.	113.66	1.24	3.195E-02	300.03	3.280	PBC<MDA	PB212
336.99	1.	501.94	1.27	2.940E-02	338.32	12.010	PBC<MDA	AC228
351.79	4.	62.08	1.28	2.860E-02	351.93	37.600	PBC<MDA	PB214
510.91	50.	17.18	0.66	2.191E-02				
563.64	5.	98.99	1.47	2.040E-02	563.24	8.350	PBC<MDA	CS134
569.90	1.	319.92	1.47	2.024E-02	569.47	8.200	PBC<MDA	Pa234
583.16	5.	98.64	1.48	1.989E-02	583.02	84.500	PBC<MDA	TL208
609.47	5.	54.71	1.50	1.925E-02	609.31	46.090	PBC<MDA	BI214
727.35	1.	610.72	1.60	1.686E-02	727.17	7.550	PBC<MDA	BI212
880.53	2.	130.34	1.72	1.456E-02	880.53	6.000	PBC<MDA	Pa234
883.24	1.	295.82	1.72	1.453E-02	883.24	9.600	PBC<MDA	Pa234
1000.28	2.	152.07	1.81	1.318E-02	1001.00	0.837	PBC<MDA	PA234M
1111.59	1.	452.72	1.89	1.213E-02	1112.07	13.644	PBC<MDA	EU152
1120.20	2.	61.62	1.90	1.206E-02	1120.29	15.100	PBC<MDA	BI214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1461.21	-5.	99.77	2.13	9.749E-03	1460.83	10.670	PBC<MDA	K40

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
2042.98	510.91	4.	50.	2.267E+03	17.18	0.656	-	sM

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.24	46.65	20.	3.	0.002	205.20	0.998s
AM-241	237.28	59.41	27.	-6.	-0.003	138.36	1.010s
TH-234	257.97	64.59	38.	-8.	-0.005	109.33	1.014s
EU-155	346.14	86.64	26.	-4.	-0.002	209.95	1.036s
TH-234	360.83	90.31	11.	-1.	0.000	796.24	1.042s
EU-155	426.94	106.84	16.	4.	0.002	168.35	1.054s
EU-152	488.11	122.14	22.	4.	0.002	189.44	1.070s
Pa-234	530.30	132.69	18.	1.	0.000	997.30	1.079s
U-235	819.95	205.12	24.	-4.	-0.002	186.40	1.148s
PB-212	954.20	238.69	18.	6.	0.003	103.04	1.179s
TL-208	1108.26	277.21	14.	3.	0.002	174.61	1.214s
I-131	1139.43	285.01	13.	3.	0.001	210.78	1.221s
PB-214	1176.42	294.25	29.	-3.	-0.002	228.49	1.231s
PB-212	1196.28	299.22	10.	4.	0.002	113.66	1.235s
AC-228	1347.35	336.99	14.	1.	0.001	501.94	1.270s
PB-214	1406.53	351.79	22.	4.	0.002	62.08	1.282s
I-131	1459.03	364.91	17.	-3.	-0.001	228.22	1.293s
CS-134	2253.92	563.64	9.	5.	0.003	98.99	1.466s
CS-134	2273.60	568.56	11.	-1.	0.000	573.78	1.471s
Pa-234	2278.95	569.90	8.	1.	0.001	319.92	1.471
TL-208	2331.99	583.16	9.	5.	0.003	98.64	1.482s
CS-134	2422.32	605.74	23.	-6.	-0.003	128.44	1.500s
BI-214	2437.23	609.47	18.	5.	0.003	54.71	1.504s
CS-137	2645.15	661.44	13.	-3.	-0.002	193.88	1.548s
BI-212	2908.84	727.35	7.	1.	0.000	610.72	1.601s
TL-208	3437.15	859.40	13.	-2.	-0.001	220.84	1.707s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Pa-234	3521.69	880.53	2.	2.	0.001	130.34	1.722D
Pa-234	3532.53	883.24	3.	1.	0.001	295.82	1.724D
AC-228	3643.55	910.99	11.	-1.	-0.001	322.55	1.746s
PA-234M	4000.85	1000.28	5.	2.	0.001	152.07	1.814s
EU-152	4446.27	1111.59	6.	1.	0.000	452.72	1.895s
BI-214	4480.73	1120.20	8.	2.	0.001	61.62	1.901s
CO-60	5338.44	1334.52	7.	-2.	-0.001	168.88	2.048s
K-40	5845.53	1461.21	15.	-5.	-0.003	99.77	2.131s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Peak Code	Peak MDA Value Bq/Sample	COMMENTS
K-40	N	-2.6210E+00				4.66E+11	
			1460.83	-2.621E+00	?(P	1.106E+01	9.98E+01 1.07E+01 G
CO-60	F	-1.3070E-01				1.93E+03	
			1332.50	-1.307E-01	?(	8.171E-01	1.69E+02 1.00E+02 G
			1173.24	0.000E+00	+	1.253E+00	1.00E+03 9.99E+01 G
I-131	I	-1.0425E-02				8.02E+00	
			364.48	-6.372E-02	?(	5.273E-01	2.28E+02 8.17E+01 G
			284.30	6.988E-01	?(	5.375E+00	2.11E+02 6.14E+00 G
			636.97	0.000E+00	+	8.455E+00	1.00E+03 7.17E+00 G
CS-134	I	-2.6370E-02				7.54E+02	
			604.71	-1.628E-01	?(	7.298E-01	1.28E+02 9.76E+01 G
			795.87	0.000E+00	+	3.042E-01	1.00E+03 8.55E+01 G
			569.32	-1.456E-01	+	3.184E+00	5.74E+02 1.54E+01 G
			801.95	0.000E+00	+	3.012E+00	1.00E+03 8.69E+00 G
			563.24	1.568E+00	?(	5.425E+00	9.90E+01 8.35E+00 G
CS-137	I	-9.7967E-02				1.10E+04	
			661.66	-9.797E-02	?(	6.921E-01	1.94E+02 8.52E+01 G
EU-152	F	9.6592E-02				4.94E+03	
			344.29	-2.543E-02	%(	1.463E+00	1.52E+03 2.65E+01 G
			121.78	1.325E-01	&(	8.936E-01	1.89E+02 2.86E+01 G
			778.92	0.000E+00	-	5.825E+00	1.00E+03 1.29E+01 G
			964.11	0.000E+00	-	4.925E+00	1.00E+03 1.46E+01 G
			1112.07	2.585E-01	?(	4.641E+00	4.53E+02 1.36E+01 G
			1408.00	0.000E+00	-	1.941E+00	1.00E+03 2.10E+01 G

Nuclide		Ave activity	Energy		Activity	Code	Peak	MDA	Comments
EU-155	I	1.7356E-01						1.81E+03	
			105.31	1.736E-01	&(	1.047E+00	1.68E+02	2.12E+01	G
			86.54	-1.276E-01	+	9.516E-01	2.10E+02	3.07E+01	G
TL-208	N	2.0545E-01						6.98E+02	
			583.02	1.575E-01	&(	5.429E-01	9.86E+01	8.45E+01	G
			277.28	8.478E-01	?(	5.333E+00	1.75E+02	6.31E+00	G
			860.56	-7.254E-01	+	5.866E+00	2.21E+02	1.24E+01	G
PB-210	N	1.6098E+00						8.14E+03	
			46.54	1.610E+00	?(	1.184E+01	2.05E+02	4.25E+00	G
PB-212	N	3.6397E-01						6.98E+02	
			238.63	2.159E-01	(	7.691E-01	1.03E+02	4.33E+01	G
			300.03	2.318E+00	?(	9.314E+00	1.14E+02	3.28E+00	G
PB-214	N	1.9159E-01						5.84E+05	
			351.93	1.916E-01	(P	1.260E+00	6.21E+01	3.76E+01	G
			295.09	-2.854E-01	& P	2.474E+00	2.28E+02	1.93E+01	G
			242.00	-2.804E-01	% P	4.926E+00	1.10E+03	7.43E+00	G
BI-212	N	2.8090E-01						6.98E+02	
			727.17	2.809E-01	?(	6.717E+00	6.11E+02	7.55E+00	G
			785.42	0.000E+00	-	2.012E+01	1.00E+03	1.28E+00	G
BI-214	N	4.1503E-01						5.84E+05	
			609.31	3.180E-01	?(P	1.395E+00	5.47E+01	4.61E+01	G
			1120.29	7.111E-01	?(P	4.848E+00	6.16E+01	1.51E+01	G
			1764.49	-1.884E+00	% P	5.375E+00	1.00E+03	1.54E+01	G
AC-228	N	-9.1242E-02						2.10E+03	
			911.07	-1.993E-01	?(	2.414E+00	3.23E+02	2.90E+01	G
			968.97	0.000E+00	+	6.622E+00	1.00E+03	1.75E+01	G
			338.32	1.697E-01	?(	3.180E+00	5.02E+02	1.20E+01	G
								Energy duplication	
			93.35	0.000E+00	+	5.773E+00	1.00E+03	5.56E+00	XA
Pa-234	N	3.5878E-01						1.63E+12	
			131.29	3.588E-02	?(	1.330E+00	9.97E+02	1.80E+01	G
			569.47	4.480E-01	(	5.454E+00	3.20E+02	8.20E+00	G
			946.02	0.000E+00	-	2.219E+00	1.00E+03	1.34E+01	G
			883.24	3.588E-01	(	4.348E+00	2.96E+02	9.60E+00	G
			880.53	1.205E+00	(	6.022E+00	1.30E+02	6.00E+00	G
TH-234	N	-3.1317E+00						1.63E+12	
			63.29	-3.132E+00	&(	1.171E+01	1.09E+02	3.81E+00	G
			92.59	-1.177E-01	+	3.570E+00	7.96E+02	5.58E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234M	N 1.2057E+01				1.63E+12		
		1001.00	1.206E+01	?(	6.833E+01	1.52E+02	8.37E-01 G
		766.41	0.000E+00	-	8.599E+01	1.00E+03	2.94E-01 G
AM-241	T -2.3698E-01				1.58E+05		
		59.54	-2.370E-01	?(	1.143E+00	1.38E+02	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
PB-210	46.65	20.	3.	0.002	205.20	1.610E+00
AM-241	59.41	27.	-6.	-0.003	138.36	-2.370E-01
TH-234	64.59	38.	-8.	-0.005	109.33	-3.132E+00
EU-155	86.64	26.	-4.	-0.002	209.95	-1.276E-01
TH-234	90.31	11.	-1.	0.000	796.24	-1.177E-01
EU-155	106.84	16.	4.	0.002	168.35	1.736E-01
EU-152	122.14	22.	4.	0.002	189.44	1.325E-01
U-235	205.12	24.	-4.	-0.002	186.40	-1.037E+00

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
PB-212	238.69	18.	6.	0.003	103.04	2.159E-01		
TL-208	277.21	14.	3.	0.002	174.61	8.478E-01		
I-131	285.01	13.	3.	0.001	210.78	6.988E-01		
PB-214	294.25	29.	-3.	-0.002	228.49	-2.854E-01		P
PB-212	299.22	10.	4.	0.002	113.66	2.318E+00		
AC-228	336.99	14.	1.	0.001	501.94	1.697E-01		
PB-214	351.79	22.	4.	0.002	62.08	1.916E-01		P
I-131	364.91	17.	-3.	-0.001	228.22	-6.372E-02		
CS-134	563.64	9.	5.	0.003	98.99	1.568E+00		
CS-134	568.56	11.	-1.	0.000	573.78	-1.456E-01		
TL-208	583.16	9.	5.	0.003	98.64	1.575E-01		
CS-134	605.74	23.	-6.	-0.003	128.44	-1.628E-01		
CS-137	661.44	13.	-3.	-0.002	193.88	-9.797E-02		
BI-212	727.35	7.	1.	0.000	610.72	2.809E-01		
TL-208	859.40	13.	-2.	-0.001	220.84	-7.254E-01		
AC-228	910.99	11.	-1.	-0.001	322.55	-1.993E-01		
PA-234M	1000.28	5.	2.	0.001	152.07	1.206E+01		
EU-152	1111.59	6.	1.	0.000	452.72	2.585E-01		
CO-60	1334.52	7.	-2.	-0.001	168.88	-1.307E-01		
K-40	1461.21	15.	-5.	-0.003	99.77	-2.621E+00		P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.07E+00
K-40	#A	-2.6210E+00	-2.6210E+00	2.811E+02%	1.11E+01
CO-60	#A	-1.3070E-01	-1.3070E-01	1.689E+02%	8.17E-01
I-131	#A	-1.0424E-02	-1.0425E-02	1.553E+02%	5.27E-01
CS-134	#A	-2.6370E-02	-2.6370E-02	8.108E+01%	7.30E-01
CS-137	#A	-9.7967E-02	-9.7967E-02	1.939E+02%	6.92E-01
EU-152	#A	9.6592E-02	9.6592E-02	1.894E+02%	1.46E+00
EU-154	#A	0.0000E+00	0.0000E+00	4.472E+02%	2.28E+00
EU-155	#A	1.7356E-01	1.7356E-01	1.684E+02%	1.05E+00
TL-208	#A	2.0545E-01	2.0545E-01	9.864E+01%	5.43E-01
PB-210	#A	1.6098E+00	1.6098E+00	2.052E+02%	1.18E+01
PB-212	#A	3.6397E-01	3.6397E-01	7.671E+01%	7.69E-01
PB-214	#A	1.9159E-01	1.9159E-01	1.716E+02%	1.26E+00
BI-212	#A	2.8090E-01	2.8090E-01	6.107E+02%	6.72E+00
BI-214	#A	4.1503E-01	4.1503E-01	1.001E+02%	1.39E+00
AC-228	#A	-9.1242E-02	-9.1242E-02	2.983E+02%	2.41E+00
Pa-234	A	3.5878E-01	3.5878E-01	1.303E+02%	1.33E+00
TH-234	#A	-3.1317E+00	-3.1317E+00	1.093E+02%	1.17E+01
PA-234M	#A	1.2057E+01	1.2057E+01	1.521E+02%	6.83E+01
U-235	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.45E+00

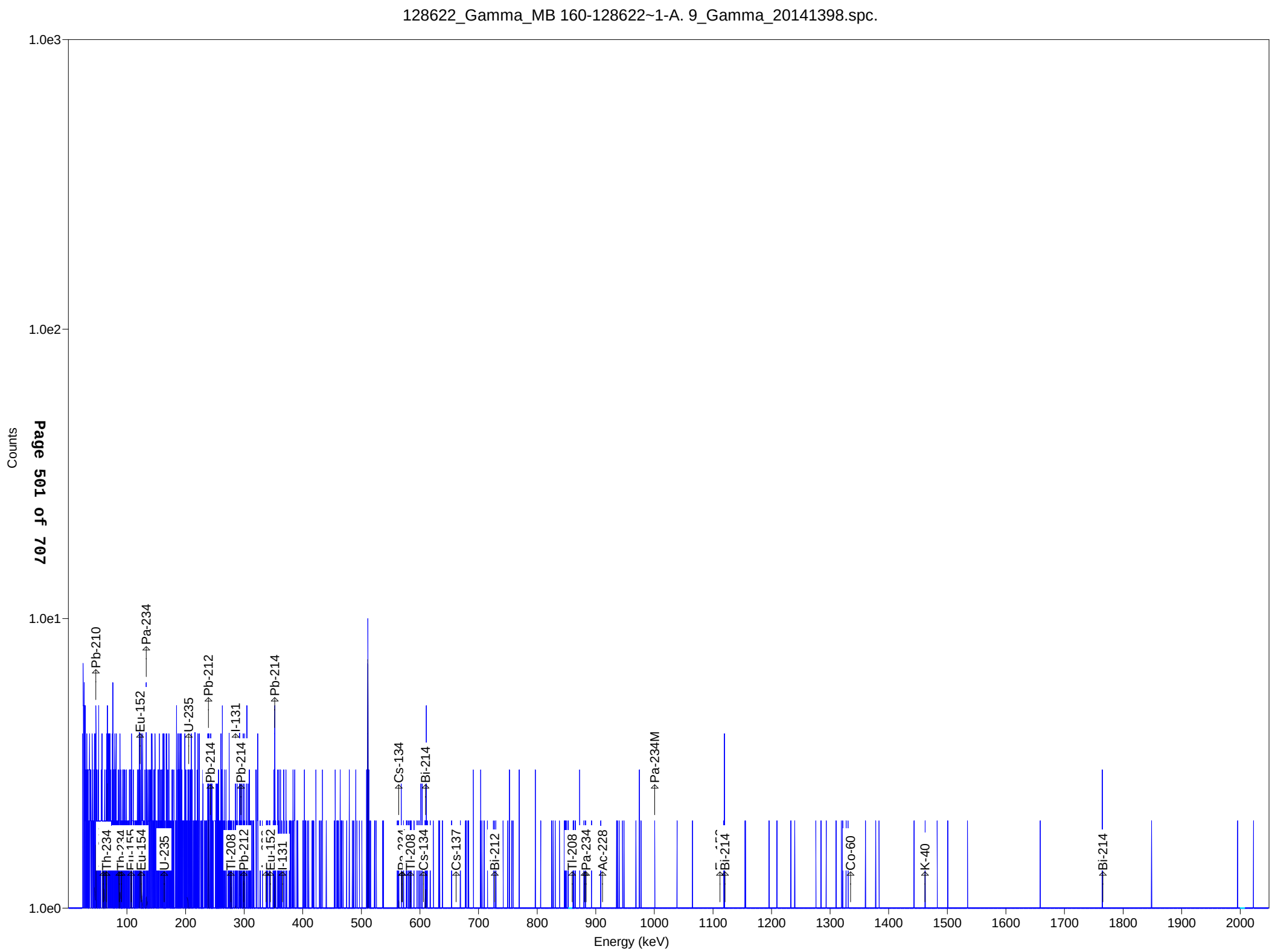
AM-241 #A -2.3698E-01 -2.3698E-01 1.384E+02% 1.14E+00

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (945.8 to 1999.3 keV) 0.000E+00 Bq/Sample
Total Decayed Activity (945.8 to 1999.3 keV) 0.0000000E+00 Bq/Sample

The library has energies which are not separable.


128622_Gamma_MB 160-128622~1-A. 9_Gamma_20141398.spc.
Counts
1.0e3
1.0e2
1.0e1
1.0e0
Energy (keV)
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Pb-210
Pa-234
Eu-152
U-235
Pb-212
Pb-214
I-131
Pb-214
Cs-134
Bi-214
Pa-234M
Th-234
Th-234
Eu-155
Eu-154
U-235
Tl-208
Pb-212
Eu-152
I-131
Cs-134
Tl-208
Cs-137
Bi-212
Tl-208
Pa-234
Ac-228
Bi-214
Co-60
K-40
Bi-214

Test America St. Louis Spectrum ID: 4_Gamma_20141258

Sample Description: 128622_Gamma_LCS 160-128622~2-A
Detector: Ge 4 SN/181
Batch ID: 128622
Work Order Number: Gamma
Lot Number: LCS 160-128622~2-A

Decay to Time: 7/16/2014 02:10 Live Time: 1800 sec
Acquisition Time: 7/16/2014 02:10:45 Real Time: 1812 sec
Analysis Time: 7/16/2014 02:41 Dead Time: 0.66 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 4_Soil_TunaCan.Clb
Efficiency Cal Desc: 4_Soil_TunaCan_90099_033012
Efficiency Cal Date: 4/2/2012 13:19
Energy Cal Date: 2/28/2012 14:55
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 4_2014-07-12_0325.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	1.234E+01	112.0	1.382E+01	1.383E+01	4.626E+01
K-40	-1.400E+00	705.4	9.877E+00	9.877E+00	2.659E+01
CO-60	2.789E+02	1.7	4.601E+00	1.474E+01	1.099E+00
I-131	1.725E+00	128.9	2.224E+00	2.226E+00	4.934E+00
CS-134	1.486E+00	61.5	9.139E-01	9.172E-01	4.544E+00
CS-137	3.867E+02	1.7	6.533E+00	2.115E+01	4.917E+00
EU-152	7.549E+00	39.5	2.982E+00	3.008E+00	1.487E+01
EU-154	2.883E+00	52.9	1.524E+00	1.531E+00	5.552E+01
EU-155	2.272E+00	149.2	3.391E+00	3.393E+00	1.135E+01
TL-208	5.579E+00	45.3	2.525E+00	2.542E+00	4.672E+00
PB-210	1.217E+04	1.3	1.534E+02	7.307E+02	2.636E+02
PB-212	1.110E+01	24.8	2.755E+00	2.847E+00	6.557E+00
PB-214	8.333E+00	42.8	3.563E+00	3.589E+00	9.761E+00
BI-212	1.468E+01	112.9	1.658E+01	1.660E+01	5.608E+01
BI-214	7.693E+00	47.5	3.652E+00	3.674E+00	8.744E+00
AC-228	9.230E+00	62.6	5.776E+00	5.795E+00	2.381E+01
Pa-234	1.486E+01	61.9	9.194E+00	9.226E+00	1.338E+01
TH-234	-1.463E+01	924.0	1.352E+02	1.352E+02	7.198E+01
PA-234M	1.120E+02	52.0	5.819E+01	5.846E+01	7.825E+02
U-235	1.042E+01	83.4	8.694E+00	8.710E+00	2.271E+01
AM-241	1.278E+03	1.0	1.311E+01	6.761E+01	1.901E+01
Total	1.433E+04				

Analyst: Siobhan Perry

TestAmerica Spectrum name: 4_Gamma_20141258.An1

Sample description
128622_Gamma_LCS 160-128622~2-A

Spectrum Filename: C:\User\SPC\Det4\4_Gamma_20141258.An1

Acquisition information
Start time: 7/16/2014 2:10:45 AM
Live time: 1800
Real time: 1812
Dead time: 0.66 %
Detector ID: 4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_Soil_TunaCan.Clb
4_Soil_TunaCan_90099_033012

Energy Calibration
Created: 2/28/2012 2:55:17 PM
Zero offset: 0.091 keV
Gain: 0.250 keV/channel
Quadratic: -2.917E-08 keV/channel^2

Efficiency Calibration
Created: 4/2/2012 1:19:41 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.78 %
Log(Eff): -3.983609E-01 + (-5.746278E-01*Log(E)) +
(-2.046438E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.80 %
Log(Eff): -2.546791E+01 + (9.285295E+00*Log(E)) +
(-9.904428E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (1999.44keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	7/16/2014 2:10:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	4_2014-07-12_0325.PBC 7/12/2014 3:25:48 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 20 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0621

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.46	193.	25.58	0.88	7.557E-03				
46.59	11190.	1.13	0.80	1.208E-02	46.54	4.250	1.209E+04	PB210
49.45	49.	127.75	0.80	1.331E-02				
59.60	14198.	1.03	0.77	1.721E-02	59.54	35.900	1.278E+03	AM241
88.12	377.	11.66	0.78	2.354E-02				
92.59	-15.	793.83	0.84	2.397E-02	92.59	5.584	PBC<MDA	TH234
					92.59	5.584	PBC<MDA	TH234
					93.35	5.810	PBC<MDA	U235
					93.35	5.561	PBC<MDA	AC228
105.10	21.	149.25	0.85	2.456E-02	105.31	21.200	PBC<MDA	EU155
129.10	30.	52.93	0.23	2.386E-02				
143.96	37.	83.40	0.89	2.273E-02	143.79	10.960	PBC<MDA	U235
					143.79	10.960	8.207E+00	U235
163.61	11.	266.82	0.91	2.083E-02	163.38	5.080	PBC<MDA	U235
					163.38	5.080	5.944E+00	U235
205.13	51.	45.18	0.55	1.764E-02	205.33	5.010	3.208E+01	U235
					205.33	5.010	3.208E+01	U235
238.49	135.	23.88	0.84	1.564E-02	238.63	43.300	1.110E+01	PB212
243.12	20.	133.65	0.98	1.547E-02	242.00	7.430	PBC<MDA	PB214
277.12	19.	135.07	1.01	1.387E-02	277.28	6.310	PBC<MDA	TL208
284.27	14.	184.63	1.02	1.359E-02	284.30	6.140	PBC<MDA	I131
295.06	55.	42.76	0.70	1.319E-02	295.09	19.300	PBC<MDA	PB214
338.31	38.	62.58	1.07	1.181E-02	338.32	12.010	PBC<MDA	AC228
					338.32	12.010	1.489E+01	AC228
351.55	48.	48.35	1.08	1.143E-02	351.93	37.600	PBC<MDA	PB214
364.73	19.	128.91	1.09	1.111E-02	364.48	81.700	PBC<MDA	I131
476.66	21.	111.99	1.19	8.899E-03	477.60	10.520	PBC<MDA	BE7
568.98	14.	110.43	1.27	7.690E-03	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.240E+01	Pa234
					569.32	15.380	6.610E+00	CS134
					569.47	8.200	1.240E+01	Pa234
582.95	28.	58.88	1.28	7.539E-03	583.02	84.500	PBC<MDA	TL208
608.71	25.	64.53	1.30	7.504E-03	609.31	46.090	PBC<MDA	BI214
636.97	2.	971.14	1.33	7.001E-03	636.97	7.170	PBC<MDA	I131

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
661.47	4022.	1.69	1.34	6.783E-03	661.66	85.210	3.867E+02	CS137
723.27	21.	60.21	1.40	6.290E-03	723.36	20.220	PBC<MDA	EU154
					723.36	20.220	9.321E+00	EU154
729.84	12.	112.93	1.40	6.262E-03	727.17	7.550	PBC<MDA	BI212
767.85	27.	51.97	1.44	5.990E-03	766.41	0.294	PBC<MDA	PA234M
779.30	3.	570.49	1.45	5.909E-03	778.92	12.940	PBC<MDA	EU152
					778.92	12.940	1.995E+00	EU152
795.22	15.	108.62	1.46	5.802E-03	795.87	85.530	PBC<MDA	CS134
					795.87	85.530	1.638E+00	CS134
801.27	15.	97.87	1.47	5.765E-03	801.95	8.690	PBC<MDA	CS134
					801.95	8.690	1.676E+01	CS134
857.89	29.	45.27	1.52	5.429E-03	860.56	12.420	PBC<MDA	TL208
879.34	27.	61.89	1.53	5.324E-03	880.53	6.000	PBC<MDA	Pa234
					880.53	6.000	4.734E+01	Pa234
910.97	24.	79.81	1.56	5.172E-03	911.07	29.000	PBC<MDA	AC228
					911.07	29.000	8.967E+00	AC228
945.09	24.	79.81	1.59	5.008E-03	946.02	13.400	PBC<MDA	Pa234
					946.02	13.400	2.020E+01	Pa234
963.57	11.	181.91	1.60	4.927E-03	964.11	14.605	PBC<MDA	EU152
					964.11	14.605	8.202E+00	EU152
968.46	9.	211.33	1.60	4.906E-03	968.97	17.460	PBC<MDA	AC228
					968.97	17.460	5.770E+00	AC228
998.73	25.	54.39	1.63	4.791E-03	996.33	10.600	PBC<MDA	EU154
					996.33	10.600	2.745E+01	EU154
1008.05	24.	58.38	1.63	4.756E-03	1004.77	18.010	PBC<MDA	EU154
					1004.77	18.010	1.531E+01	EU154
1108.68	31.	39.50	1.72	4.359E-03	1112.07	13.644	PBC<MDA	EU152
					1112.07	13.644	2.886E+01	EU152
1113.54	16.	44.07	0.50	4.354E-03				
1120.47	22.	69.66	1.73	4.331E-03	1120.29	15.100	PBC<MDA	BI214
1173.16	2064.	2.37	1.70	4.162E-03	1173.24	99.900	2.757E+02	CO60
1332.39	1892.	2.30	1.84	3.728E-03	1332.50	99.980	2.821E+02	CO60
1459.51	-1.	138.98	1.99	3.441E-03	1460.83	10.670	PBC<MDA	K40

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
145.38	36.46	748.	193.	2.554E+04	25.58	0.879	-	s
197.18	49.41	2054.	252.	1.894E+04	32.62	0.798	-	sM
351.93	88.12	542.	427.	1.814E+04	9.10	0.780	-	
515.74	129.10	118.	30.	1.243E+03	55.01	0.234	-	s
819.73	205.13	211.	20.	1.115E+03	106.94	0.550	-	sc
4453.41	1113.54	15.	16.	3.637E+03	44.07	0.495	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.75	46.56	2670.	11239.	6.244	1.26	0.757
AM-241	237.90	59.60	2002.	14198.	7.888	1.03	0.765
TH-234	243.62	61.03	358.	-18.	-0.010	533.31	0.816s
EU-155	346.16	86.68	897.	-56.	-0.031	76.24	0.837s
EU-155	419.80	105.10	494.	21.	0.012	149.25	0.854s
U-235	575.17	143.96	453.	37.	0.020	83.40	0.890s
U-235	653.74	163.61	451.	11.	0.006	266.82	0.908s
U-235	820.46	205.31	385.	32.	0.018	89.88	0.946s
PB-212	953.10	238.49	275.	135.	0.075	23.88	0.841s
PB-214	971.65	243.12	345.	20.	0.011	133.65	0.979
TL-208	1107.57	277.12	304.	19.	0.010	135.07	1.011s
I-131	1136.19	284.27	310.	14.	0.008	184.63	1.018s
PB-214	1179.33	295.06	166.	55.	0.031	42.76	0.698s
PB-212	1198.78	299.93	306.	-8.	-0.004	317.11	1.032
AC-228	1352.26	338.31	264.	38.	0.021	62.58	1.066
EU-152	1378.08	344.77	294.	-6.	-0.003	409.83	1.071s
PB-214	1405.19	351.55	244.	48.	0.027	48.35	1.078
I-131	1457.91	364.73	279.	19.	0.010	128.91	1.089s
BE-7	1905.52	476.66	261.	21.	0.012	111.99	1.189s
CS-134	2274.78	568.98	114.	14.	0.008	110.43	1.269s
TL-208	2330.66	582.95	119.	28.	0.015	58.88	1.281s
CS-134	2417.50	604.66	143.	-10.	-0.006	164.24	1.300s
BI-214	2433.67	608.71	115.	25.	0.014	64.53	1.304s
I-131	2546.74	636.97	166.	2.	0.001	971.14	1.327s
CS-137	2644.71	661.47	108.	4022.	2.234	1.69	1.338
EU-154	2891.91	723.27	72.	21.	0.012	60.21	1.401s
BI-212	2918.19	729.84	93.	12.	0.007	112.93	1.404s
PA-234M	3070.27	767.85	88.	27.	0.015	51.97	1.437s
EU-152	3116.09	779.30	121.	3.	0.002	570.49	1.448s
CS-134	3179.75	795.22	119.	15.	0.008	108.62	1.462s
CS-134	3203.97	801.27	102.	15.	0.008	97.87	1.467s
TL-208	3430.48	857.89	72.	29.	0.016	45.27	1.516s
EU-154	3492.28	873.34	183.	-22.	-0.012	90.68	1.526s
Pa-234	3516.29	879.34	128.	27.	0.015	61.89	1.532s
Pa-234	3522.39	880.86	142.	-9.	-0.005	195.91	1.534s
AC-228	3642.84	910.97	175.	24.	0.013	79.81	1.557s
Pa-234	3779.34	945.09	177.	24.	0.014	79.81	1.586s
EU-152	3853.31	963.57	181.	11.	0.006	181.91	1.601s
AC-228	3872.86	968.46	172.	9.	0.005	211.33	1.605s
EU-154	3993.99	998.73	81.	25.	0.014	54.39	1.627s
PA-234M	4003.37	1001.08	132.	-11.	-0.006	150.82	1.631s
EU-154	4031.27	1008.05	83.	24.	0.013	58.38	1.634s
EU-152	4433.94	1108.68	59.	31.	0.017	39.50	1.720s
BI-214	4481.15	1120.47	106.	22.	0.012	69.66	1.727s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	4691.98	1173.16	50.	2064.	1.146	2.37	1.697
EU-154	5092.64	1273.27	18.	-5.	-0.003	130.43	1.848s
CO-60	5329.26	1332.39	0.	1892.	1.051	2.30	1.842
EU-152	5631.14	1407.81	10.	-3.	-0.001	178.72	1.950s
K-40	5838.10	1459.51	10.	-1.	-0.001	138.98	1.991s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	Peak MDA Value Bq/Sample	Peak COMMENTS
BE-7	C	1.2339E+01				5.31E+01	
			477.60	1.234E+01	?(	4.626E+01 1.12E+02	1.05E+01 G
K-40	N	-1.4002E+00				4.66E+11	
			1460.83	-1.400E+00	&(P	2.659E+01 1.39E+02	1.07E+01 G
CO-60	F	2.7888E+02				1.93E+03	
			1332.50	2.821E+02	(	1.099E+00 2.30E+00	1.00E+02 G
			1173.24	2.757E+02	(	4.743E+00 2.37E+00	9.99E+01 G
I-131	I	1.7252E+00				8.02E+00	
			364.48	1.141E+00	*(	4.934E+00 1.29E+02	8.17E+01 G
			284.30	9.077E+00	?(	5.643E+01 1.85E+02	6.14E+00 G
			636.97	2.085E+00	&(	6.953E+01 9.71E+02	7.17E+00 G
CS-134	I	1.4856E+00				7.54E+02	
			604.71	-8.152E-01	?(	4.544E+00 1.64E+02	9.76E+01 G
			795.87	1.638E+00	&(	5.995E+00 1.09E+02	8.55E+01 G
			569.32	6.610E+00	?(	2.461E+01 1.10E+02	1.54E+01 G
			801.95	1.676E+01	?(	5.516E+01 9.79E+01	8.69E+00 G
			563.24	0.000E+00	-	5.126E+01 1.00E+03	8.35E+00 G
CS-137	I	3.8672E+02				1.10E+04	
			661.66	3.867E+02	(	4.917E+00 1.69E+00	8.52E+01 G
EU-152	F	7.5494E+00				4.94E+03	
			344.29	-1.070E+00	?(	1.487E+01 4.10E+02	2.65E+01 G
			121.78	9.788E-03	%	8.773E+00 2.65E+04	2.86E+01 G
			778.92	1.995E+00	?(	3.926E+01 5.70E+02	1.29E+01 G
			964.11	8.202E+00	&(	5.055E+01 1.82E+02	1.46E+01 G
			1112.07	2.886E+01	?(	3.598E+01 3.95E+01	1.36E+01 G
			1408.00	-1.950E+00	+	1.279E+01 1.79E+02	2.10E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	I	2.8828E+00					3.14E+03	
			873.23	-1.834E+01	?(	5.552E+01	9.07E+01	1.23E+01 G
			123.10	0.000E+00	+	6.166E+00	1.00E+03	4.08E+01 G
			1274.54	-2.011E+00	+	9.217E+00	1.30E+02	3.52E+01 G
			723.36	9.321E+00	+	1.844E+01	6.02E+01	2.02E+01 G
			1004.77	1.531E+01	+	2.932E+01	5.84E+01	1.80E+01 G
			996.33	2.745E+01	?(	4.872E+01	5.44E+01	1.06E+01 G
EU-155	I	2.2722E+00					1.81E+03	
			105.31	2.272E+00	?(	1.135E+01	1.49E+02	2.12E+01 G
			86.54	-4.371E+00	+	1.102E+01	7.62E+01	3.07E+01 G
TL-208	N	5.5787E+00					6.98E+02	
			583.02	2.416E+00	(	4.672E+00	5.89E+01	8.45E+01 G
			277.28	1.177E+01	(	5.333E+01	1.35E+02	6.31E+00 G
			860.56	2.395E+01	&(	3.482E+01	4.53E+01	1.24E+01 G
PB-210	N	1.2166E+04					8.14E+03	
			46.54	1.217E+04	(P	2.636E+02	1.26E+00	4.25E+00 G
PB-212	N	1.1104E+01					6.98E+02	
			238.63	1.110E+01	*(P	6.557E+00	2.39E+01	4.33E+01 G
			300.03	-1.022E+01	-	1.097E+02	3.17E+02	3.28E+00 G
PB-214	N	8.3327E+00					5.84E+05	
			351.93	6.190E+00	?(	9.761E+00	4.84E+01	3.76E+01 G
			295.09	1.200E+01	(	1.370E+01	4.28E+01	1.93E+01 G
			242.00	9.642E+00	&(	4.317E+01	1.34E+02	7.43E+00 G
BI-212	N	1.4684E+01					6.98E+02	
			727.17	1.468E+01	&(	5.608E+01	1.13E+02	7.55E+00 G
			785.42	8.182E+00	%	3.937E+02	1.39E+03	1.28E+00 G
BI-214	N	7.6925E+00					5.84E+05	
			609.31	4.105E+00	(	8.744E+00	6.45E+01	4.61E+01 G
			1120.29	1.864E+01	?(	4.304E+01	6.97E+01	1.51E+01 G
			1764.49	0.000E+00	-	9.119E+00	1.00E+03	1.54E+01 G
AC-228	N	9.2297E+00					2.10E+03	
			911.07	8.967E+00	?(	2.381E+01	7.98E+01	2.90E+01 G
			968.97	5.770E+00	&(	4.143E+01	2.11E+02	1.75E+01 G
			338.32	1.489E+01	(	3.072E+01	6.26E+01	1.20E+01 G
							Energy duplication	
			93.35	0.000E+00	-	4.937E+01	1.00E+03	5.56E+00 XA
Pa-234	N	1.4855E+01					1.63E+12	
			131.29	4.512E-02	&(	1.338E+01	8.76E+03	1.80E+01 G
			569.47	8.993E-02	%	4.853E+01	1.56E+04	8.20E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			946.02	2.020E+01	&(	5.364E+01	7.98E+01	1.34E+01 G
			883.24	-9.528E+00	&	6.354E+01	1.96E+02	9.60E+00 G
			880.53	4.734E+01	&(	9.651E+01	6.19E+01	6.00E+00 G
TH-234	N	-1.4632E+01						1.63E+12
			63.29	-1.463E+01	?(P	7.198E+01	5.33E+02	3.81E+00 G
			92.59	-6.310E+00	% P	5.367E+01	7.94E+02	5.58E+00 G
PA-234M	N	1.1197E+02						1.63E+12
			1001.00	-1.529E+02	?(	7.825E+02	1.51E+02	8.37E-01 G
			766.41	8.662E+02	?(	1.465E+03	5.20E+01	2.94E-01 G
U-235	N	1.0424E+01						2.57E+11
			143.79	8.207E+00	(	2.271E+01	8.34E+01	1.10E+01 G
			205.33	1.982E+01	?(	5.923E+01	8.99E+01	5.01E+00 G
			163.38	5.944E+00	(	5.336E+01	2.67E+02	5.08E+00 G
								Energy duplication
			93.35	0.000E+00	-	4.725E+01	1.00E+03	5.81E+00 X
AM-241	T	1.2781E+03						1.58E+05
			59.54	1.278E+03	(	1.901E+01	1.03E+00	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average

R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-234	61.03	358.	-18.	-0.010	533.31	-1.463E+01	P
EU-155	86.68	897.	-56.	-0.031	76.24	-4.371E+00	
EU-155	105.10	494.	21.	0.012	149.25	2.272E+00	
U-235	143.96	453.	37.	0.020	83.40	8.207E+00	
U-235	163.61	451.	11.	0.006	266.82	5.944E+00	
U-235	205.31	385.	32.	0.018	89.88	1.982E+01	
TL-208	277.12	304.	19.	0.010	135.07	1.177E+01	
I-131	284.27	310.	14.	0.008	184.63	9.077E+00	
AC-228	338.31	264.	38.	0.021	62.58	1.489E+01	
EU-152	344.77	294.	-6.	-0.003	409.83	-1.070E+00	
I-131	364.73	279.	19.	0.010	128.91	1.141E+00	
BE-7	476.66	261.	21.	0.012	111.99	1.234E+01	
CS-134	568.98	114.	14.	0.008	110.43	6.610E+00	
TL-208	582.95	119.	28.	0.015	58.88	2.416E+00	
CS-134	604.66	143.	-10.	-0.006	164.24	-8.152E-01	
BI-214	608.71	115.	25.	0.014	64.53	4.105E+00	
I-131	636.97	166.	2.	0.001	971.14	2.085E+00	
EU-154	723.27	72.	21.	0.012	60.21	9.321E+00	
BI-212	729.84	93.	12.	0.007	112.93	1.468E+01	
EU-152	779.30	121.	3.	0.002	570.49	1.995E+00	
CS-134	795.22	119.	15.	0.008	108.62	1.638E+00	
CS-134	801.27	102.	15.	0.008	97.87	1.676E+01	
TL-208	857.89	72.	29.	0.016	45.27	2.395E+01	
EU-154	873.34	183.	-22.	-0.012	90.68	-1.834E+01	
Pa-234	879.34	128.	27.	0.015	61.89	4.734E+01	
Pa-234	880.86	142.	-9.	-0.005	195.91	-9.528E+00	
AC-228	910.97	175.	24.	0.013	79.81	8.967E+00	
Pa-234	945.09	177.	24.	0.014	79.81	2.020E+01	
EU-152	963.57	181.	11.	0.006	181.91	8.202E+00	
AC-228	968.46	172.	9.	0.005	211.33	5.770E+00	
EU-154	998.73	81.	25.	0.014	54.39	2.745E+01	
EU-154	1008.05	83.	24.	0.013	58.38	1.531E+01	
EU-152	1108.68	59.	31.	0.017	39.50	2.886E+01	
BI-214	1120.47	106.	22.	0.012	69.66	1.864E+01	
EU-154	1273.27	18.	-5.	-0.003	130.43	-2.011E+00	
EU-152	1407.81	10.	-3.	-0.001	178.72	-1.950E+00	
K-40	1459.51	10.	-1.	-0.001	138.98	-1.400E+00	P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

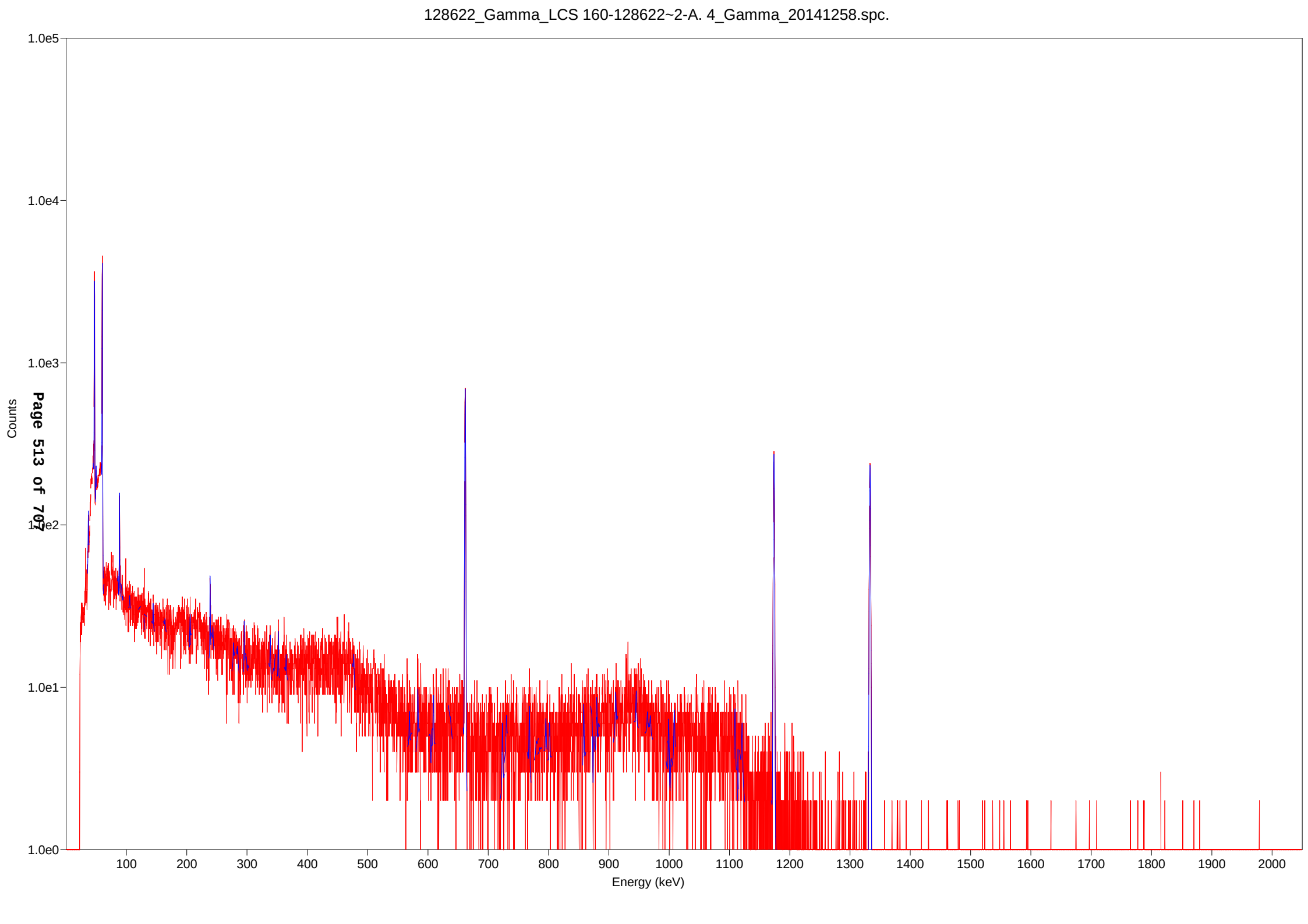
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	1.2339E+01	1.2339E+01	1.120E+02%	4.63E+01
K-40	#A	-1.4002E+00	-1.4002E+00	7.054E+02%	2.66E+01
CO-60		2.7888E+02	2.7888E+02	1.650E+00%	1.10E+00
I-131	#A	1.7251E+00	1.7252E+00	1.289E+02%	4.93E+00
CS-134	#A	1.4856E+00	1.4856E+00	6.152E+01%	4.54E+00
CS-137		3.8672E+02	3.8672E+02	1.689E+00%	4.92E+00
EU-152	#A	7.5494E+00	7.5494E+00	3.950E+01%	1.49E+01
EU-154	#A	2.8828E+00	2.8828E+00	5.287E+01%	5.55E+01
EU-155	#A	2.2722E+00	2.2722E+00	1.492E+02%	1.13E+01
TL-208	#	5.5787E+00	5.5787E+00	4.527E+01%	4.67E+00
PB-210		1.2166E+04	1.2166E+04	1.261E+00%	2.64E+02
PB-212	#	1.1104E+01	1.1104E+01	2.481E+01%	6.56E+00
PB-214	A	8.3327E+00	8.3327E+00	4.276E+01%	9.76E+00
BI-212	#A	1.4684E+01	1.4684E+01	1.129E+02%	5.61E+01
BI-214	#A	7.6925E+00	7.6925E+00	4.748E+01%	8.74E+00
AC-228	#A	9.2297E+00	9.2297E+00	6.258E+01%	2.38E+01
Pa-234	#C	1.4855E+01	1.4855E+01	6.189E+01%	1.34E+01
TH-234	#A	-1.4632E+01	-1.4632E+01	9.240E+02%	7.20E+01
PA-234M	#A	1.1197E+02	1.1197E+02	5.197E+01%	7.82E+02
U-235	#A	1.0424E+01	1.0424E+01	8.340E+01%	2.27E+01
AM-241		1.2781E+03	1.2781E+03	1.026E+00%	1.90E+01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.4 keV) 1.413E+04 Bq/Sample
Total Decayed Activity (37.6 to 1999.4 keV) 1.4129415E+04 Bq/Sample

The library has energies which are not separable.


128622_Gamma_LCS 160-128622~2-A. 4_Gamma_20141258.spc.
1.0e5
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Counts
Page 513 of 707
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)

Test America St. Louis Spectrum ID: 9_Gamma_20141397

Sample Description: 128622_Gamma_680-102370-A-6-B
Detector: Ge9 S/N100228730
Batch ID: 128622
Work Order Number: Gamma
Lot Number: 680-102370-A-6-B

Decay to Time: 7/16/2014 01:34 Live Time: 1800 sec
Acquisition Time: 7/16/2014 01:34:53 Real Time: 1802 sec
Analysis Time: 7/16/2014 02:05 Dead Time: 0.13 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 9_Soil_TunaCan.Clb
Efficiency Cal Desc: 9_Soil_TunaCan_90099_050312
Efficiency Cal Date: 6/14/2012 10:19
Energy Cal Date: 3/1/2012 13:57
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 9_2014-07-12_0308.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-1.172E-01	1233.0	1.445E+00	1.445E+00	5.352E+00
K-40	6.574E+01	9.3	6.136E+00	6.998E+00	8.879E+00
CO-60	-1.256E-01	191.4	2.405E-01	2.406E-01	8.890E-01
I-131	2.774E-01	107.9	2.993E-01	2.997E-01	6.707E-01
CS-134	2.169E-01	86.6	1.879E-01	1.882E-01	2.541E+00
CS-137	1.097E-01	231.4	2.537E-01	2.538E-01	9.076E-01
EU-152	-3.926E-02	102.5	4.025E-02	4.030E-02	2.177E+00
EU-154	1.355E+00	119.4	1.618E+00	1.619E+00	5.722E+00
EU-155	5.777E-01	107.5	6.210E-01	6.218E-01	2.103E+00
TL-208	2.546E+00	14.7	3.745E-01	3.971E-01	6.005E-01
PB-210	1.353E+01	39.3	5.315E+00	5.374E+00	1.418E+01
PB-212	6.454E+00	12.2	7.868E-01	8.907E-01	1.499E+00
PB-214	7.313E+00	9.3	6.833E-01	7.818E-01	1.320E+00
BI-212	4.804E+00	70.7	3.394E+00	3.403E+00	1.052E+01
BI-214	6.262E+00	12.2	7.637E-01	8.301E-01	1.262E+00
AC-228	6.829E+00	15.9	1.088E+00	1.143E+00	1.651E+00
Pa-234	9.037E-01	70.4	6.361E-01	6.378E-01	2.303E+00
TH-234	1.138E+01	52.9	6.021E+00	6.050E+00	1.965E+01
PA-234M	1.657E+01	146.1	2.421E+01	2.422E+01	8.751E+01
U-235	2.007E+00	62.4	1.252E+00	1.256E+00	4.081E+00
AM-241	-3.491E-01	186.8	6.522E-01	6.524E-01	2.226E+00
Total	1.469E+02				

Analyst: Siobhan Perry

TestAmerica, Inc Spectrum name: 9_Gamma_20141397.An1

Sample description
128622_Gamma_680-102370-A-6-B

Spectrum Filename: C:\User\SPC\Det9\9_Gamma_20141397.An1

Acquisition information
Start time: 7/16/2014 1:34:53 AM
Live time: 1800
Real time: 1802
Dead time: 0.13 %
Detector ID: 9

Detector system
Ge9 S/N100228730

Calibration
Filename: 9_Soil_TunaCan.Clb
9_Soil_TunaCan_90099_050312

Energy Calibration
Created: 3/1/2012 1:57:17 PM
Zero offset: 0.074 keV
Gain: 0.250 keV/channel
Quadratic: -2.269E-08 keV/channel^2

Efficiency Calibration
Created: 6/14/2012 10:19:51 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.30 %
Log(Eff): -8.079856E-01 + (-2.367265E-01*Log(E)) + (-3.950640E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.42 %
Log(Eff): -2.387916E+01 + (8.875647E+00*Log(E)) + (-9.401100E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.59keV)
Stop channel: 8000 (1999.34keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	7/16/2014 1:34:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	9_2014-07-12_0308.PBC 7/12/2014 3:08:04 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 13 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1521

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.36	27.	39.29	0.77	2.577E-02	46.54	4.250	PBC<MDA	PB210
63.22	31.	52.93	1.01	3.921E-02	63.29	3.810	PBC<MDA	TH234
					63.29	3.810	1.138E+01	TH234
74.80	106.	15.64	1.03	4.571E-02				
77.15	132.	13.53	1.03	4.676E-02				
87.36	68.	24.64	0.99	5.032E-02	86.54	30.700	2.468E+00	EU155
92.57	28.	57.69	1.04	5.156E-02	92.59	5.584	PBC<MDA	TH234
					92.59	5.584	5.346E+00	TH234
93.18	68.	28.21	0.60	5.171E-02	93.35	5.561	1.314E+01	AC228
93.81	21.	74.80	1.04	5.171E-02	93.35	5.810	PBC<MDA	U235
105.30	12.	107.50	1.05	5.318E-02	105.31	21.200	PBC<MDA	EU155
					105.31	21.200	5.776E-01	EU155
123.25	5.	224.56	1.07	5.296E-02	123.10	40.790	PBC<MDA	EU154
133.01	17.	70.39	1.08	5.216E-02	131.29	18.000	PBC<MDA	Pa234
143.75	20.	62.37	1.09	5.039E-02	143.79	10.960	PBC<MDA	U235
163.60	2.	686.24	1.11	4.676E-02	163.38	5.080	PBC<MDA	U235
205.30	8.	132.21	1.15	4.123E-02	205.33	5.010	PBC<MDA	U235
238.38	190.	12.19	1.43	3.735E-02	238.63	43.300	6.532E+00	PB212
241.60	27.	55.99	0.77	3.697E-02	242.00	7.430	PBC<MDA	PB214
277.12	17.	56.76	1.21	3.372E-02	277.28	6.310	PBC<MDA	TL208
284.61	8.	107.92	1.22	3.315E-02	284.30	6.140	PBC<MDA	I131
295.01	80.	14.39	0.74	3.232E-02	295.09	19.300	6.569E+00	PB214
300.28	10.	87.18	1.24	3.195E-02	300.03	3.280	PBC<MDA	PB212
338.13	64.	16.54	0.48	2.941E-02	338.32	12.010	1.007E+01	AC228
351.69	156.	9.84	1.26	2.862E-02	351.93	37.600	7.695E+00	PB214
364.88	1.	791.01	1.29	2.791E-02	364.48	81.700	PBC<MDA	I131
569.33	2.	464.45	1.47	2.024E-02	569.47	8.200	PBC<MDA	Pa234
572.12	2.	326.28	1.47	2.024E-02				

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
582.82	77.	14.71	0.83	1.989E-02	583.02	84.500	2.546E+00	TL208
609.34	106.	11.54	0.89	1.925E-02	609.31	46.090	6.262E+00	BI214
636.61	4.	146.43	1.53	1.862E-02	636.97	7.170	PBC<MDA	I131
661.55	3.	231.38	1.55	1.810E-02	661.66	85.210	PBC<MDA	CS137
727.40	10.	70.65	1.60	1.686E-02	727.17	7.550	PBC<MDA	BI212
785.43	2.	226.63	1.65	1.590E-02	785.42	1.280	PBC<MDA	BI212
795.43	4.	112.07	1.66	1.574E-02	795.87	85.530	PBC<MDA	CS134
804.14	7.	86.60	1.66	1.565E-02	801.95	8.690	PBC<MDA	CS134
860.78	1.	493.63	1.71	1.482E-02	860.56	12.420	PBC<MDA	TL208
875.49	4.	119.39	1.72	1.465E-02	873.23	12.270	PBC<MDA	EU154
883.14	3.	163.50	1.72	1.453E-02	883.24	9.600	PBC<MDA	Pa234
911.29	55.	15.94	1.24	1.418E-02	911.07	29.000	7.407E+00	AC228
968.73	25.	28.08	1.79	1.352E-02	968.97	17.460	5.868E+00	AC228
1001.23	3.	146.08	1.81	1.318E-02	1001.00	0.837	PBC<MDA	PA234M
1120.47	8.	51.16	1.90	1.206E-02	1120.29	15.100	PBC<MDA	BI214
1407.49	2.	171.00	2.10	1.004E-02	1408.00	21.005	PBC<MDA	EU152
1460.71	132.	8.70	0.83	9.749E-03	1460.83	10.670	6.574E+01	K40
1764.44	8.	38.83	2.31	8.350E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
298.82	74.76	83.	106.	2.309E+03	15.64	1.025	-	D
308.22	77.11	93.	132.	2.818E+03	13.53	1.027	-	D
349.01	87.36	84.	94.	1.861E+03	17.27	0.987	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.07	46.36	29.	27.	0.015	39.29	0.772
AM-241	236.69	59.27	115.	-8.	-0.005	186.84	1.010s
TH-234	252.49	63.22	116.	31.	0.017	52.93	1.014s
EU-155	341.57	85.49	150.	-35.	-0.019	52.71	1.036s
TH-234	369.86	92.57	114.	28.	0.015	57.69	1.042s
AC-228	372.98	93.35	75.	68.	0.038	28.21	0.605D
U-235	372.98	93.35	118.	21.	0.012	74.80	1.043D
EU-155	420.75	105.30	74.	12.	0.007	107.50	1.054s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-154	492.53	123.25	63.	5.	0.003	224.56	1.071s
Pa-234	531.60	133.01	60.	17.	0.009	70.39	1.079s
U-235	574.53	143.75	66.	20.	0.011	62.37	1.091
U-235	653.90	163.60	60.	2.	0.001	686.24	1.109s
U-235	820.68	205.30	47.	8.	0.004	132.21	1.148s
PB-212	952.96	238.38	77.	190.	0.106	12.19	1.427s
PB-214	965.83	241.60	66.	27.	0.015	55.99	0.770s
TL-208	1107.90	277.12	37.	17.	0.009	56.76	1.214
I-131	1137.86	284.61	35.	8.	0.005	107.92	1.221s
PB-214	1179.45	295.01	21.	74.	0.041	14.39	0.742s
PB-212	1200.54	300.28	35.	10.	0.006	87.18	1.235s
AC-228	1351.92	338.13	12.	64.	0.036	16.54	0.482s
EU-152	1374.75	343.84	35.	-8.	-0.004	113.14	1.275s
PB-214	1406.16	351.69	24.	149.	0.083	9.84	1.265s
I-131	1458.91	364.88	28.	1.	0.001	791.01	1.293s
CS-134	2287.84	572.12	17.	2.	0.001	326.28	1.471s
Pa-234	2276.66	569.33	25.	2.	0.001	464.45	1.471s
TL-208	2330.64	582.82	11.	77.	0.043	14.71	0.834s
BI-214	2436.72	609.34	14.	100.	0.056	11.54	0.888s
I-131	2545.83	636.61	12.	4.	0.002	146.43	1.527s
CS-137	2645.57	661.55	23.	3.	0.002	231.38	1.548s
EU-154	2895.56	724.03	34.	-3.	-0.002	262.74	1.598s
BI-212	2909.03	727.40	21.	10.	0.006	70.65	1.601s
PA-234M	3058.54	764.77	24.	-4.	-0.002	162.96	1.633s
EU-152	3114.77	778.83	20.	-3.	-0.002	192.95	1.643s
BI-212	3141.18	785.43	14.	2.	0.001	226.63	1.648s
CS-134	3181.22	795.43	10.	4.	0.002	112.07	1.656s
CS-134	3216.03	804.14	14.	7.	0.004	86.60	1.661s
TL-208	3442.66	860.78	22.	1.	0.001	493.63	1.707s
EU-154	3501.54	875.49	12.	4.	0.002	119.39	1.717s
Pa-234	3518.51	879.74	15.	-3.	-0.002	206.68	1.722s
Pa-234	3532.14	883.14	9.	3.	0.002	163.50	1.724s
AC-228	3644.76	911.29	4.	55.	0.030	15.94	1.242s
Pa-234	3784.02	946.09	19.	-3.	-0.002	225.72	1.772s
EU-152	3865.96	966.57	34.	-10.	-0.005	91.80	1.786s
AC-228	3874.61	968.73	12.	25.	0.014	28.08	1.790s
EU-154	3983.85	996.03	17.	-3.	-0.002	202.14	1.810s
PA-234M	4004.66	1001.23	10.	3.	0.002	146.08	1.814s
EU-152	4459.50	1114.90	13.	-3.	-0.002	155.45	1.895s
BI-214	4481.81	1120.47	17.	8.	0.005	51.16	1.901s
CO-60	4694.92	1173.73	16.	-3.	-0.002	178.63	1.938s
CO-60	5330.60	1332.56	9.	-2.	-0.001	191.44	2.048s
EU-152	5630.54	1407.49	7.	2.	0.001	171.00	2.097s
K-40	5843.55	1460.71	9.	123.	0.068	8.70	0.834s
BI-214	7059.45	1764.44	10.	8.	0.005	38.83	2.314s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	Peak MDA Value Bq/Sample	COMMENTS
BE-7	C	-1.1717E-01				5.31E+01	
			477.60	-1.172E-01	%(	5.352E+00 1.23E+03	1.05E+01 G
K-40	N	6.5738E+01				4.66E+11	
			1460.83	6.574E+01	(P	8.879E+00 8.70E+00	1.07E+01 G
CO-60	F	-1.2564E-01				1.93E+03	
			1332.50	-1.256E-01	?(	8.890E-01 1.91E+02	1.00E+02 G
			1173.24	-1.596E-01	+	1.024E+00 1.79E+02	9.99E+01 G
I-131	I	2.7736E-01				8.02E+00	
			364.48	2.340E-02	&(	6.707E-01 7.91E+02	8.17E+01 G
			284.30	2.249E+00	?(	8.310E+00 1.08E+02	6.14E+00 G
			636.97	1.482E+00	&(	7.796E+00 1.46E+02	7.17E+00 G
CS-134	I	2.1692E-01				7.54E+02	
			604.71	0.000E+00	?(	2.541E+00 1.00E+03	9.76E+01 G
			795.87	1.817E-01	&(	7.191E-01 1.12E+02	8.55E+01 G
			569.32	3.271E-01	?(	3.909E+00 3.26E+02	1.54E+01 G
			801.95	2.806E+00	?(	8.294E+00 8.66E+01	8.69E+00 G
			563.24	1.970E-02	%	7.678E+00 1.05E+04	8.35E+00 G
CS-137	I	1.0965E-01				1.10E+04	
			661.66	1.097E-01	?(	9.076E-01 2.31E+02	8.52E+01 G
EU-152	F	-3.9263E-02				4.94E+03	
			344.29	-5.604E-01	?(	2.177E+00 1.13E+02	2.65E+01 G
			121.78	1.063E-02	&	1.325E+00 3.50E+03	2.86E+01 G
			778.92	-9.118E-01	+	6.290E+00 1.93E+02	1.29E+01 G
			964.11	-2.707E+00	+	8.430E+00 9.18E+01	1.46E+01 G
			1112.07	-1.156E+00	+	6.463E+00 1.55E+02	1.36E+01 G
			1408.00	6.181E-01	?(	3.933E+00 1.71E+02	2.10E+01 G
EU-154	I	1.3549E+00				3.14E+03	
			873.23	1.355E+00	?(	5.722E+00 1.19E+02	1.23E+01 G
			123.10	1.314E-01	&	1.023E+00 2.25E+02	4.08E+01 G
			1274.54	5.710E-02	&	2.348E+00 1.05E+03	3.52E+01 G
			723.36	-5.189E-01	-	4.829E+00 2.63E+02	2.02E+01 G
			1004.77	0.000E+00	-	4.200E+00 1.00E+03	1.80E+01 G
			996.33	-1.188E+00	+	8.659E+00 2.02E+02	1.06E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	5.7765E-01					1.81E+03	
			105.31	5.776E-01	?(	2.103E+00	1.08E+02	2.12E+01 G
			86.54	-1.252E+00	+	2.157E+00	5.27E+01	3.07E+01 G
TL-208	N	2.5456E+00					6.98E+02	
			583.02	2.546E+00	(	6.005E-01	1.47E+01	8.45E+01 G
			277.28	4.373E+00	+	8.090E+00	5.68E+01	6.31E+00 G
			860.56	4.097E-01	-	7.380E+00	4.94E+02	1.24E+01 G
PB-210	N	1.3529E+01					8.14E+03	
			46.54	1.353E+01	(	1.418E+01	3.93E+01	4.25E+00 G
PB-212	N	6.4537E+00					6.98E+02	
			238.63	6.532E+00	(	1.499E+00	1.22E+01	4.33E+01 G
			300.03	5.417E+00	?(	1.596E+01	8.72E+01	3.28E+00 G
PB-214	N	7.3129E+00					5.84E+05	
			351.93	7.695E+00	*(P	1.320E+00	9.84E+00	3.76E+01 G
			295.09	6.569E+00	(P	2.155E+00	1.44E+01	1.93E+01 G
			242.00	5.469E+00	- P	8.202E+00	5.60E+01	7.43E+00 G
BI-212	N	4.8041E+00					6.98E+02	
			727.17	4.473E+00	&(	1.052E+01	7.07E+01	7.55E+00 G
			785.42	6.758E+00	&(	5.584E+01	2.27E+02	1.28E+00 G
BI-214	N	6.2616E+00					5.84E+05	
			609.31	6.262E+00	(P	1.262E+00	1.15E+01	4.61E+01 G
			1120.29	2.575E+00	- P	6.767E+00	5.12E+01	1.51E+01 G
			1764.49	3.562E+00	- P	7.550E+00	3.88E+01	1.54E+01 G
AC-228	N	6.8289E+00					2.10E+03	
			911.07	7.407E+00	(	1.651E+00	1.59E+01	2.90E+01 G
			968.97	5.868E+00	?(	4.444E+00	2.81E+01	1.75E+01 G
			338.32	1.007E+01	+	2.966E+00	1.65E+01	1.20E+01 G
							Energy duplication	
			93.35	1.314E+01	+	8.321E+00	2.82E+01	5.56E+00 XA
Pa-234	N	9.0374E-01					1.63E+12	
			131.29	9.857E-01	?(	2.303E+00	7.04E+01	1.80E+01 G
			569.47	5.151E-01	?(	8.671E+00	4.64E+02	8.20E+00 G
			946.02	-8.464E-01	-	6.887E+00	2.26E+02	1.34E+01 G
			883.24	1.082E+00	?(	6.493E+00	1.64E+02	9.60E+00 G
			880.53	-1.780E+00	-	1.333E+01	2.07E+02	6.00E+00 G
TH-234	N	1.1375E+01					1.63E+12	
			63.29	1.138E+01	(	1.965E+01	5.29E+01	3.81E+00 G
			92.59	5.346E+00	-	1.012E+01	5.77E+01	5.58E+00 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

PA-234M  N   1.6571E+01                                      1.63E+12
                         1001.00 1.657E+01 &(  8.751E+01 1.46E+02 8.37E-01 G
                          766.41-5.233E+01 +   3.006E+02 1.63E+02 2.94E-01 G

U-235    N   2.0071E+00                                      2.57E+11
                          143.79 1.987E+00 ?(  4.081E+00 6.24E+01 1.10E+01 G
                          205.33 2.052E+00 ?(  9.326E+00 1.32E+02 5.01E+00 G
                          163.38 3.772E-01 -   9.107E+00 6.86E+02 5.08E+00 G
                                                          Energy duplication
                           93.35 3.968E+00 *   9.866E+00 7.48E+01 5.81E+00 X

AM-241   T  -3.4907E-01                                      1.58E+05
                           59.54-3.491E-01 ?(  2.226E+00 1.87E+02 3.59E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
AM-241	59.27	115.	-8.	-0.005	186.84	-3.491E-01
TH-234	63.22	116.	31.	0.017	52.93	1.138E+01
EU-155	85.49	150.	-35.	-0.019	52.71	-1.252E+00
TH-234	92.57	114.	28.	0.015	57.69	5.346E+00
U-235	93.35	118.	21.	0.012	74.80	3.968E+00
EU-155	105.30	74.	12.	0.007	107.50	5.776E-01
EU-154	123.25	63.	5.	0.003	224.56	1.314E-01
Pa-234	133.01	60.	17.	0.009	70.39	9.857E-01
U-235	143.75	66.	20.	0.011	62.37	1.987E+00
U-235	163.60	60.	2.	0.001	686.24	3.772E-01
U-235	205.30	47.	8.	0.004	132.21	2.052E+00
I-131	284.61	35.	8.	0.005	107.92	2.249E+00
EU-152	343.84	35.	-8.	-0.004	113.14	-5.604E-01
I-131	364.88	28.	1.	0.001	791.01	2.340E-02
CS-134	572.12	17.	2.	0.001	326.28	3.271E-01
Pa-234	569.33	25.	2.	0.001	464.45	5.151E-01
I-131	636.61	12.	4.	0.002	146.43	1.482E+00
CS-137	661.55	23.	3.	0.002	231.38	1.097E-01
EU-154	724.03	34.	-3.	-0.002	262.74	-5.189E-01
BI-212	727.40	21.	10.	0.006	70.65	4.473E+00
PA-234M	764.77	24.	-4.	-0.002	162.96	-5.233E+01
EU-152	778.83	20.	-3.	-0.002	192.95	-9.118E-01
BI-212	785.43	14.	2.	0.001	226.63	6.758E+00
CS-134	795.43	10.	4.	0.002	112.07	1.817E-01
CS-134	804.14	14.	7.	0.004	86.60	2.806E+00
EU-154	875.49	12.	4.	0.002	119.39	1.355E+00
Pa-234	879.74	15.	-3.	-0.002	206.68	-1.780E+00
Pa-234	883.14	9.	3.	0.002	163.50	1.082E+00
Pa-234	946.09	19.	-3.	-0.002	225.72	-8.464E-01
EU-152	966.57	34.	-10.	-0.005	91.80	-2.707E+00
EU-154	996.03	17.	-3.	-0.002	202.14	-1.188E+00
PA-234M	1001.23	10.	3.	0.002	146.08	1.657E+01
EU-152	1114.90	13.	-3.	-0.002	155.45	-1.156E+00
CO-60	1173.73	16.	-3.	-0.002	178.63	-1.596E-01
CO-60	1332.56	9.	-2.	-0.001	191.44	-1.256E-01
EU-152	1407.49	7.	2.	0.001	171.00	6.181E-01

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

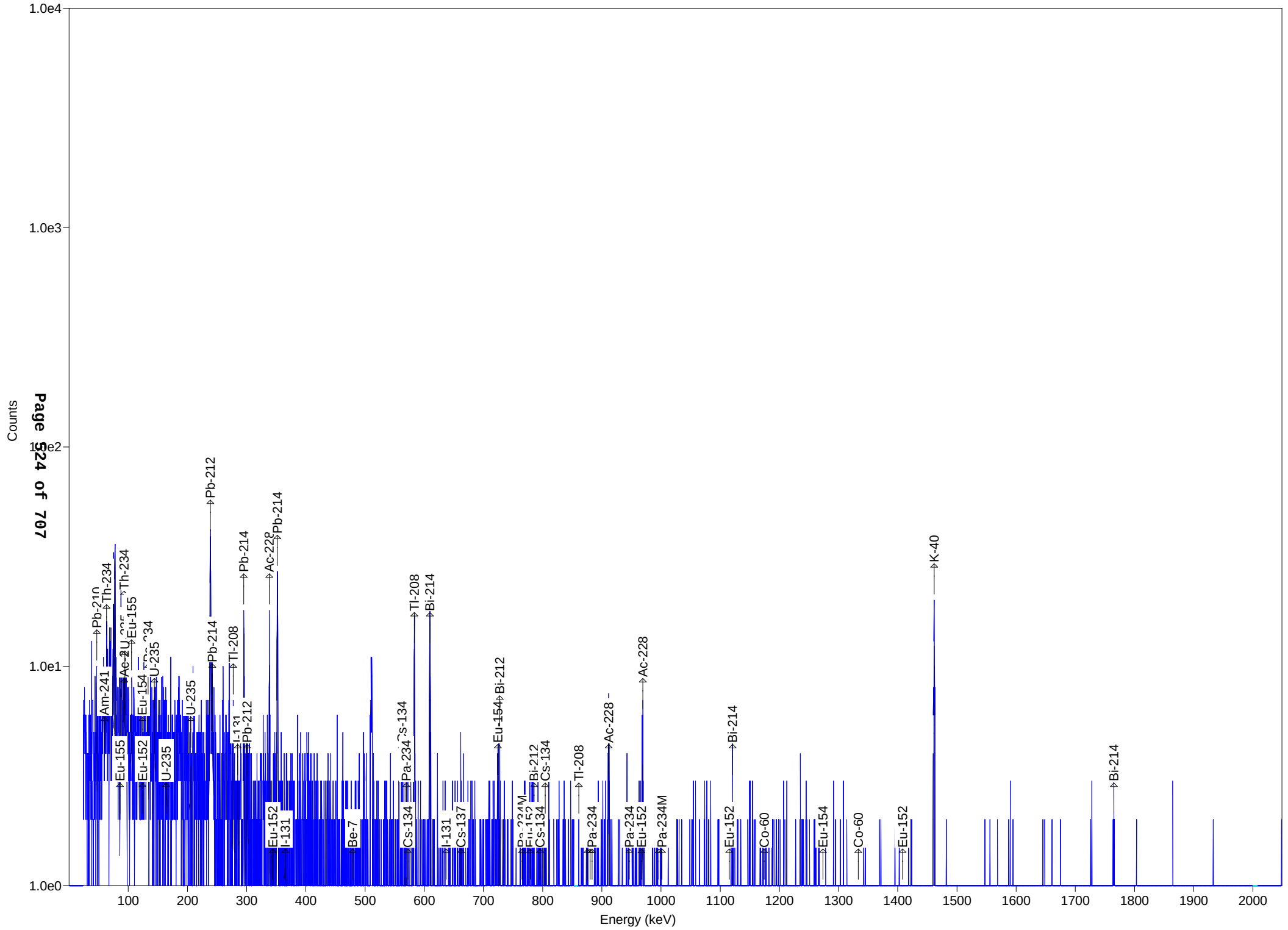
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	-1.1717E-01	-1.1717E-01	1.233E+03%	5.35E+00
K-40		6.5738E+01	6.5738E+01	9.334E+00%	8.88E+00
CO-60	#A	-1.2564E-01	-1.2564E-01	1.914E+02%	8.89E-01
I-131	#A	2.7735E-01	2.7736E-01	1.079E+02%	6.71E-01
CS-134	#A	2.1692E-01	2.1692E-01	8.660E+01%	2.54E+00
CS-137	#A	1.0965E-01	1.0965E-01	2.314E+02%	9.08E-01
EU-152	#A	-3.9263E-02	-3.9263E-02	1.025E+02%	2.18E+00
EU-154	#A	1.3549E+00	1.3549E+00	1.194E+02%	5.72E+00
EU-155	#A	5.7765E-01	5.7765E-01	1.075E+02%	2.10E+00
TL-208		2.5456E+00	2.5456E+00	1.471E+01%	6.01E-01
PB-210	A	1.3529E+01	1.3529E+01	3.929E+01%	1.42E+01
PB-212		6.4537E+00	6.4537E+00	1.219E+01%	1.50E+00
PB-214		7.3129E+00	7.3129E+00	9.343E+00%	1.32E+00
BI-212	#A	4.8041E+00	4.8041E+00	7.065E+01%	1.05E+01
BI-214		6.2616E+00	6.2616E+00	1.220E+01%	1.26E+00
AC-228		6.8289E+00	6.8289E+00	1.594E+01%	1.65E+00
Pa-234	#A	9.0374E-01	9.0374E-01	7.039E+01%	2.30E+00
TH-234	#A	1.1375E+01	1.1375E+01	5.293E+01%	1.97E+01
PA-234M	#A	1.6571E+01	1.6571E+01	1.461E+02%	8.75E+01
U-235	#A	2.0071E+00	2.0071E+00	6.237E+01%	4.08E+00
AM-241	#A	-3.4907E-01	-3.4907E-01	1.868E+02%	2.23E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (87.4 to 1999.3 keV) 1.087E+02 Bq/Sample
Total Decayed Activity (87.4 to 1999.3 keV) 1.0866911E+02 Bq/Sample

The library has energies which are not separable.


128622_Gamma_680-102370-A-6-B. 9_Gamma_20141397.spc.
Counts
Energy (keV)
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Pb-210
Th-234
Am-241
Eu-155
Th-234
Eu-155
Eu-154
U-235
U-235
Eu-152
U-235
Pb-212
Pb-214
Tl-208
I-131
Pb-212
Pb-214
Ac-228
Eu-152
I-131
Be-7
Tl-208
Bi-214
Cs-134
Pa-234
Cs-134
I-131
Cs-137
Eu-154
Bi-212
Bi-212
Cs-134
Tl-208
Pa-234
Ac-228
Pa-234
Eu-152
Ac-228
Pa-234M
Bi-214
Eu-152
Co-60
Eu-154
Co-60
Eu-152
K-40
Bi-214

Test America St. Louis Spectrum ID: 8_Gamma_20140369

Sample Description: 128622_Gamma_680-102370-A-6-C DU
Detector: Ge 8 SN/174
Batch ID: 128622
Work Order Number: Gamma
Lot Number: 680-102370-A-6-C DU

Decay to Time: 7/16/2014 02:10 Live Time: 1800 sec
Acquisition Time: 7/16/2014 02:11:10 Real Time: 1855 sec
Analysis Time: 7/16/2014 02:42 Dead Time: 2.96 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 8_Soil_TunaCan.Clb
Efficiency Cal Desc: 8_Soil_TunaCan_90099_032712
Efficiency Cal Date: 3/28/2012 10:35
Energy Cal Date: 2/28/2012 10:34
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 8_2014-07-12_0348.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	2.682E-01	681.3	1.827E+00	1.827E+00	6.844E+00
K-40	4.228E+01	14.5	6.148E+00	6.518E+00	9.034E+00
CO-60	-1.026E-01	635.5	6.520E-01	6.520E-01	1.699E+00
I-131	-1.087E-02	2056.0	2.235E-01	2.235E-01	8.274E-01
CS-134	1.872E-03	111.1	2.080E-03	2.082E-03	1.090E+00
CS-137	1.341E-01	255.8	3.429E-01	3.430E-01	1.334E+00
EU-152	1.667E-01	375.6	6.261E-01	6.262E-01	2.294E+00
EU-154	2.617E-01	97.4	2.550E-01	2.554E-01	8.785E+00
EU-155	8.720E-01	84.5	7.372E-01	7.387E-01	2.473E+00
TL-208	2.816E+00	14.6	4.106E-01	4.358E-01	5.054E-01
PB-210	6.156E+00	142.8	8.789E+00	8.797E+00	2.997E+01
PB-212	7.376E+00	10.9	8.057E-01	9.364E-01	1.509E+00
PB-214	6.537E+00	12.7	8.307E-01	8.974E-01	1.543E+00
BI-212	5.720E+00	62.0	3.547E+00	3.560E+00	1.157E+01
BI-214	7.524E+00	13.6	1.020E+00	1.093E+00	1.591E+00
AC-228	5.518E+00	17.7	9.750E-01	1.015E+00	3.711E+00
Pa-234	2.107E-01	223.0	4.699E-01	4.701E-01	3.006E+00
TH-234	1.655E+01	23.4	3.878E+00	3.973E+00	2.038E+01
PA-234M	1.403E+01	252.2	3.538E+01	3.539E+01	1.428E+02
U-235	9.320E-01	151.0	1.407E+00	1.408E+00	5.379E+00
AM-241	8.104E-01	94.3	7.645E-01	7.656E-01	2.644E+00
Total	1.182E+02				

Analyst: Siobhan Perry

TestAmerica Spectrum name: 8_Gamma_20140369.An1

Sample description
128622_Gamma_680-102370-A-6-C DU

Spectrum Filename: C:\User\SPC\Det8\8_Gamma_20140369.An1

Acquisition information
Start time: 7/16/2014 2:11:10 AM
Live time: 1800
Real time: 1855
Dead time: 2.96 %
Detector ID: 8

Detector system
Ge 8 SN/174

Calibration
Filename: 8_Soil_TunaCan.Clb
8_Soil_TunaCan_90099_032712

Energy Calibration
Created: 2/28/2012 10:34:41 AM
Zero offset: 0.052 keV
Gain: 0.250 keV/channel
Quadratic: 5.282E-10 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 10:35:20 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.39 %
Log(Eff): -1.098764E-01 + (-4.958544E-01*Log(E)) + (-2.572270E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.71 %
Log(Eff): -2.525301E+01 + (9.398253E+00*Log(E)) + (-1.000034E+00*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.55keV)
Stop channel: 8000 (1999.96keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	7/16/2014 2:10:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	8_2014-07-12_0348.PBC 7/12/2014 3:48:07 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 17 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0712

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.55	9.	142.78	1.01	2.005E-02	46.54	4.250	PBC<MDA	PB210
60.64	15.	52.95	1.02	2.881E-02	59.54	35.900	PBC<MDA	AM241
63.53	25.	27.80	1.09	3.093E-02	63.29	3.810	PBC<MDA	TH234
74.80	95.	15.75	1.03	3.617E-02				
77.20	120.	12.65	1.04	3.702E-02				
92.97	132.	14.34	1.20	4.077E-02	92.59	5.584	1.969E+01	TH234
					93.35	5.810	3.084E+01	U235
					93.35	5.561	3.222E+01	AC228
					93.35	5.810	3.084E+01	U235
105.48	14.	84.54	1.06	4.185E-02	105.31	21.200	PBC<MDA	EU155
					105.31	21.200	8.720E-01	EU155
123.04	12.	97.44	1.07	4.138E-02	123.10	40.790	PBC<MDA	EU154
143.74	5.	99.62	1.09	3.899E-02	143.79	10.960	PBC<MDA	U235
					143.79	10.960	PBC<MDA	U235
164.10	5.	90.54	1.10	3.580E-02	163.38	5.080	PBC<MDA	U235
					163.38	5.080	PBC<MDA	U235
238.57	165.	10.44	0.86	2.745E-02	238.63	43.300	7.376E+00	PB212
241.86	55.	20.04	0.35	2.714E-02	242.00	7.430	1.503E+01	PB214
295.21	37.	24.68	1.20	2.324E-02	295.09	19.300	4.603E+00	PB214
299.75	5.	179.50	1.20	2.294E-02	300.03	3.280	PBC<MDA	PB212
338.27	37.	23.42	0.86	2.085E-02	338.32	12.010	8.281E+00	AC228
344.88	2.	375.62	1.24	2.057E-02	344.29	26.500	PBC<MDA	EU152
351.92	96.	11.77	0.60	2.021E-02	351.93	37.600	6.537E+00	PB214
475.83	1.	681.26	1.33	1.580E-02	477.60	10.520	PBC<MDA	BE7
562.59	4.	116.72	1.39	1.381E-02	563.24	8.350	PBC<MDA	CS134
570.14	2.	223.02	1.40	1.369E-02	569.47	8.200	PBC<MDA	Pa234
583.16	55.	14.58	1.10	1.342E-02	583.02	84.500	2.710E+00	TL208

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
609.31	78.	12.95	0.99	1.294E-02	609.31	46.090	6.936E+00	BI214
661.38	2.	69.06	1.46	1.209E-02	661.66	85.210	PBC<MDA	CS137
727.26	9.	62.02	1.50	1.118E-02	727.17	7.550	PBC<MDA	BI212
767.50	-3.	928.01	1.53	1.070E-02	766.41	0.294	PBC<MDA	PA234M
860.82	8.	48.84	1.59	9.703E-03	860.56	12.420	PBC<MDA	TL208
911.43	21.	31.31	1.62	9.247E-03	911.07	29.000	4.287E+00	AC228
968.89	16.	35.78	1.65	8.776E-03	968.97	17.460	PBC<MDA	AC228
1000.62	2.	83.17	1.67	8.537E-03	1001.00	0.837	PBC<MDA	PA234M
1119.78	10.	41.28	1.74	7.754E-03	1120.29	15.100	PBC<MDA	BI214
1332.21	-1.	124.87	1.86	6.678E-03	1332.50	99.980	PBC<MDA	CO60
1460.54	50.	13.74	0.79	6.165E-03	1460.83	10.670	4.228E+01	K40
1764.22	13.	31.71	2.07	5.226E-03	1764.49	15.400	9.285E+00	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
299.03	74.80	63.	95.	2.613E+03	15.75	1.034	-	D
308.61	77.20	55.	120.	3.228E+03	12.65	1.036	-	D

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.02	46.55	86.	9.	0.005	142.78	1.012s
AM-241	242.37	60.64	100.	15.	0.008	52.95	1.022s
TH-234	253.91	63.53	76.	25.	0.014	27.80	1.092
EU-155	351.76	87.99	104.	-2.	-0.001	655.22	1.043s
TH-234	371.70	92.97	112.	81.	0.045	14.34	1.198s
U-235	373.21	93.35	97.	108.	0.060	16.13	1.049D
AC-228	373.21	93.35	97.	108.	0.060	16.13	1.049D
EU-155	421.74	105.48	62.	14.	0.008	84.54	1.058
EU-152	486.74	121.73	75.	-4.	-0.002	290.93	1.071s
EU-154	491.98	123.04	60.	12.	0.007	97.44	1.072s
Pa-234	525.83	131.50	62.	-3.	-0.001	441.13	1.078s
U-235	574.80	143.74	69.	5.	0.003	99.62	1.087
U-235	656.23	164.10	46.	5.	0.003	90.54	1.102s
U-235	819.45	204.90	58.	-12.	-0.007	155.59	1.134s
PB-212	954.15	238.57	40.	158.	0.088	10.44	0.858s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-214	967.30	241.86	21.	55.	0.030	20.04	0.347s
PB-214	1180.70	295.21	33.	37.	0.021	24.68	1.201
PB-212	1198.87	299.75	33.	5.	0.003	179.50	1.205s
AC-228	1352.97	338.27	11.	37.	0.021	23.42	0.864s
EU-152	1379.40	344.88	18.	2.	0.001	375.62	1.237s
PB-214	1407.55	351.92	16.	89.	0.050	11.77	0.604s
BE-7	1903.21	475.83	15.	1.	0.000	681.26	1.332s
CS-134	2250.29	562.59	9.	4.	0.002	116.72	1.391s
Pa-234	2280.47	570.14	11.	2.	0.001	223.02	1.395s
TL-208	2332.55	583.16	3.	55.	0.031	14.58	1.096
CS-134	2415.66	603.93	23.	-4.	-0.002	189.12	1.419s
BI-214	2437.18	609.31	10.	74.	0.041	12.95	0.988s
I-131	2551.77	637.96	21.	-2.	-0.001	269.92	1.441s
CS-137	2645.47	661.38	22.	2.	0.001	69.06	1.457s
EU-154	2897.47	724.38	22.	-6.	-0.004	109.90	1.498s
BI-212	2909.00	727.26	10.	9.	0.005	62.02	1.500s
CS-134	3171.52	792.89	11.	-3.	-0.002	151.53	1.544s
TL-208	3443.26	860.82	3.	8.	0.004	48.84	1.585s
Pa-234	3520.64	880.16	13.	-3.	-0.002	192.61	1.598s
Pa-234	3538.57	884.65	13.	-1.	-0.001	482.03	1.599s
AC-228	3645.71	911.43	11.	21.	0.011	31.31	1.616s
Pa-234	3783.52	945.88	11.	-2.	-0.001	247.18	1.638s
EU-152	3852.75	963.19	17.	-1.	-0.001	642.67	1.649s
AC-228	3875.54	968.89	8.	16.	0.009	35.78	1.652s
PA-234M	4002.47	1000.62	11.	2.	0.001	83.17	1.671s
EU-154	4012.39	1003.10	18.	-6.	-0.003	112.53	1.673s
BI-214	4479.14	1119.78	4.	10.	0.006	41.28	1.740s
CO-60	5328.88	1332.21	14.	-1.	-0.001	124.87	1.857s
K-40	5842.23	1460.54	3.	50.	0.028	13.74	0.792s
BI-214	7056.98	1764.22	2.	13.	0.007	31.71	2.067s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	2.6818E-01				5.31E+01		
			477.60	2.682E-01	?(	6.844E+00	6.81E+02 1.05E+01	G
K-40	N	4.2280E+01				4.66E+11		
			1460.83	4.228E+01	?(P	9.034E+00	1.37E+01 1.07E+01	G

Nuclide		Ave activity	Energy		Activity	Code	Peak	MDA	Comments
CO-60	F	-1.0259E-01						1.93E+03	
			1332.50	-1.026E-01	?(P	1.699E+00	1.25E+02	1.00E+02	G
			1173.24	-4.420E-01	& P	2.451E+00	1.00E+03	9.99E+01	G
I-131	I	-1.0869E-02						8.02E+00	
			364.48	-1.087E-02	%(	8.274E-01	2.06E+03	8.17E+01	G
			284.30	0.000E+00	+	1.348E+01	1.00E+03	6.14E+00	G
			636.97	-1.543E+00	+	1.502E+01	2.70E+02	7.17E+00	G
CS-134	I	1.8718E-03						7.54E+02	
			604.71	-1.622E-01	?(	1.090E+00	1.89E+02	9.76E+01	G
			795.87	-2.037E-01	+	1.116E+00	1.52E+02	8.55E+01	G
			569.32	0.000E+00	+	4.565E+00	1.00E+03	1.54E+01	G
			801.95	0.000E+00	+	9.779E+00	1.00E+03	8.69E+00	G
			563.24	1.920E+00	?(	7.974E+00	1.17E+02	8.35E+00	G
CS-137	I	1.3405E-01						1.10E+04	
			661.66	1.341E-01	?(P	1.334E+00	6.91E+01	8.52E+01	G
EU-152	F	1.6669E-01						4.94E+03	
			344.29	1.667E-01	&(	2.294E+00	3.76E+02	2.65E+01	G
			121.78	-1.995E-01	&	2.013E+00	2.91E+02	2.86E+01	G
			778.92	0.000E+00	&	6.318E+00	1.00E+03	1.29E+01	G
			964.11	-4.008E-01	+	9.546E+00	6.43E+02	1.46E+01	G
			1112.07	0.000E+00	-	3.846E+00	1.00E+03	1.36E+01	G
			1408.00	0.000E+00	-	3.062E+00	1.00E+03	2.10E+01	G
EU-154	I	2.6174E-01						3.14E+03	
			873.23	-1.535E-01	%(	8.785E+00	1.49E+03	1.23E+01	G
			123.10	3.867E-01	?(	1.274E+00	9.74E+01	4.08E+01	G
			1274.54	0.000E+00	-	4.555E+00	1.00E+03	3.52E+01	G
			723.36	-1.588E+00	+	6.034E+00	1.10E+02	2.02E+01	G
			1004.77	-2.066E+00	+	8.093E+00	1.13E+02	1.80E+01	G
			996.33	0.000E+00	-	1.734E+01	1.00E+03	1.06E+01	G
EU-155	I	8.7201E-01						1.81E+03	
			105.31	8.720E-01	?(	2.473E+00	8.45E+01	2.12E+01	G
			86.54	-1.012E-01	&	2.298E+00	6.55E+02	3.07E+01	G
TL-208	N	2.8155E+00						6.98E+02	
			583.02	2.710E+00	(	5.054E-01	1.46E+01	8.45E+01	G
			277.28	0.000E+00	-	1.326E+01	1.00E+03	6.31E+00	G
			860.56	3.532E+00	&(	5.075E+00	4.88E+01	1.24E+01	G
PB-210	N	6.1558E+00						8.14E+03	
			46.54	6.156E+00	?(	2.997E+01	1.43E+02	4.25E+00	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	7.3761E+00					6.98E+02	
			238.63	7.376E+00	(P	1.509E+00	1.04E+01	4.33E+01 G
			300.03	3.450E+00	-	2.172E+01	1.80E+02	3.28E+00 G
PB-214	N	6.5370E+00					5.84E+05	
			351.93	6.537E+00	(P	1.543E+00	1.18E+01	3.76E+01 G
			295.09	4.603E+00	- P	3.636E+00	2.47E+01	1.93E+01 G
			242.00	1.503E+01	+ P	6.691E+00	2.00E+01	7.43E+00 G
BI-212	N	5.7195E+00					6.98E+02	
			727.17	5.720E+00	&(	1.157E+01	6.20E+01	7.55E+00 G
			785.42	-4.432E-02	%	8.061E+01	4.75E+04	1.28E+00 G
BI-214	N	7.5241E+00					5.84E+05	
			609.31	6.936E+00	(P	1.591E+00	1.29E+01	4.61E+01 G
			1120.29	4.948E+00	-	5.736E+00	4.13E+01	1.51E+01 G
			1764.49	9.285E+00	?(	6.823E+00	3.17E+01	1.54E+01 G
AC-228	N	5.5182E+00					2.10E+03	
			911.07	4.287E+00	?(	3.711E+00	3.13E+01	2.90E+01 G
			968.97	5.663E+00	?(	5.704E+00	3.58E+01	1.75E+01 G
			338.32	8.281E+00	(	3.977E+00	2.34E+01	1.20E+01 G
							Energy duplication	
			93.35	2.637E+01	+	1.191E+01	1.61E+01	5.56E+00 XA
Pa-234	N	2.1072E-01					1.63E+12	
			131.29	-1.946E-01	&(	3.006E+00	4.41E+02	1.80E+01 G
			569.47	1.100E+00	?(	9.054E+00	2.23E+02	8.20E+00 G
			946.02	-9.024E-01	+	8.289E+00	2.47E+02	1.34E+01 G
			883.24	-6.598E-01	+	1.192E+01	4.82E+02	9.60E+00 G
			880.53	-2.676E+00	+	1.877E+01	1.93E+02	6.00E+00 G
TH-234	N	1.6548E+01					1.63E+12	
			63.29	1.194E+01	(P	2.038E+01	2.78E+01	3.81E+00 G
			92.59	1.969E+01	*(P	1.274E+01	1.43E+01	5.58E+00 G
PA-234M	N	1.4030E+01					1.63E+12	
			1001.00	1.403E+01	?(P	1.428E+02	8.32E+01	8.37E-01 G
			766.41	-5.826E+01	% P	3.830E+02	9.28E+02	2.94E-01 G
U-235	N	9.3199E-01					2.57E+11	
			143.79	6.378E-01	?(P	5.379E+00	9.96E+01	1.10E+01 G
			205.33	-4.320E+00	+ P	1.371E+01	1.56E+02	5.01E+00 G
			163.38	1.567E+00	?(P	1.047E+01	9.05E+01	5.08E+00 G
							Energy duplication	
			93.35	2.524E+01	*	1.140E+01	1.61E+01	5.81E+00 X

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AM-241	T 8.1038E-01					1.58E+05	
		59.54	8.104E-01	&(P	2.644E+00	5.29E+01	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.55	86.	9.	0.005	142.78	6.156E+00	
AM-241	60.64	100.	15.	0.008	52.95	8.104E-01	P
EU-155	87.99	104.	-2.	-0.001	655.22	-1.012E-01	
U-235	93.35	97.	108.	0.060	16.13	2.524E+01	
EU-155	105.48	62.	14.	0.008	84.54	8.720E-01	
EU-152	121.73	75.	-4.	-0.002	290.93	-1.995E-01	
EU-154	123.04	60.	12.	0.007	97.44	3.867E-01	
Pa-234	131.50	62.	-3.	-0.001	441.13	-1.946E-01	
U-235	143.74	69.	5.	0.003	99.62	6.378E-01	P
U-235	164.10	46.	5.	0.003	90.54	1.567E+00	P
U-235	204.90	58.	-12.	-0.007	155.59	-4.320E+00	P
EU-152	344.88	18.	2.	0.001	375.62	1.667E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
BE-7	475.83	15.	1.	0.000	681.26	2.682E-01		
CS-134	562.59	9.	4.	0.002	116.72	1.920E+00		
Pa-234	570.14	11.	2.	0.001	223.02	1.100E+00		
CS-134	603.93	23.	-4.	-0.002	189.12	-1.622E-01		
I-131	637.96	21.	-2.	-0.001	269.92	-1.543E+00		
EU-154	724.38	22.	-6.	-0.004	109.90	-1.588E+00		
BI-212	727.26	10.	9.	0.005	62.02	5.720E+00		
CS-134	792.89	11.	-3.	-0.002	151.53	-2.037E-01		
Pa-234	880.16	13.	-3.	-0.002	192.61	-2.676E+00		
Pa-234	884.65	13.	-1.	-0.001	482.03	-6.598E-01		
Pa-234	945.88	11.	-2.	-0.001	247.18	-9.024E-01		
EU-152	963.19	17.	-1.	-0.001	642.67	-4.008E-01		
PA-234M	1000.62	11.	2.	0.001	83.17	1.403E+01	P	
EU-154	1003.10	18.	-6.	-0.003	112.53	-2.066E+00		
CO-60	1332.21	14.	-1.	-0.001	124.87	-1.026E-01	P	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

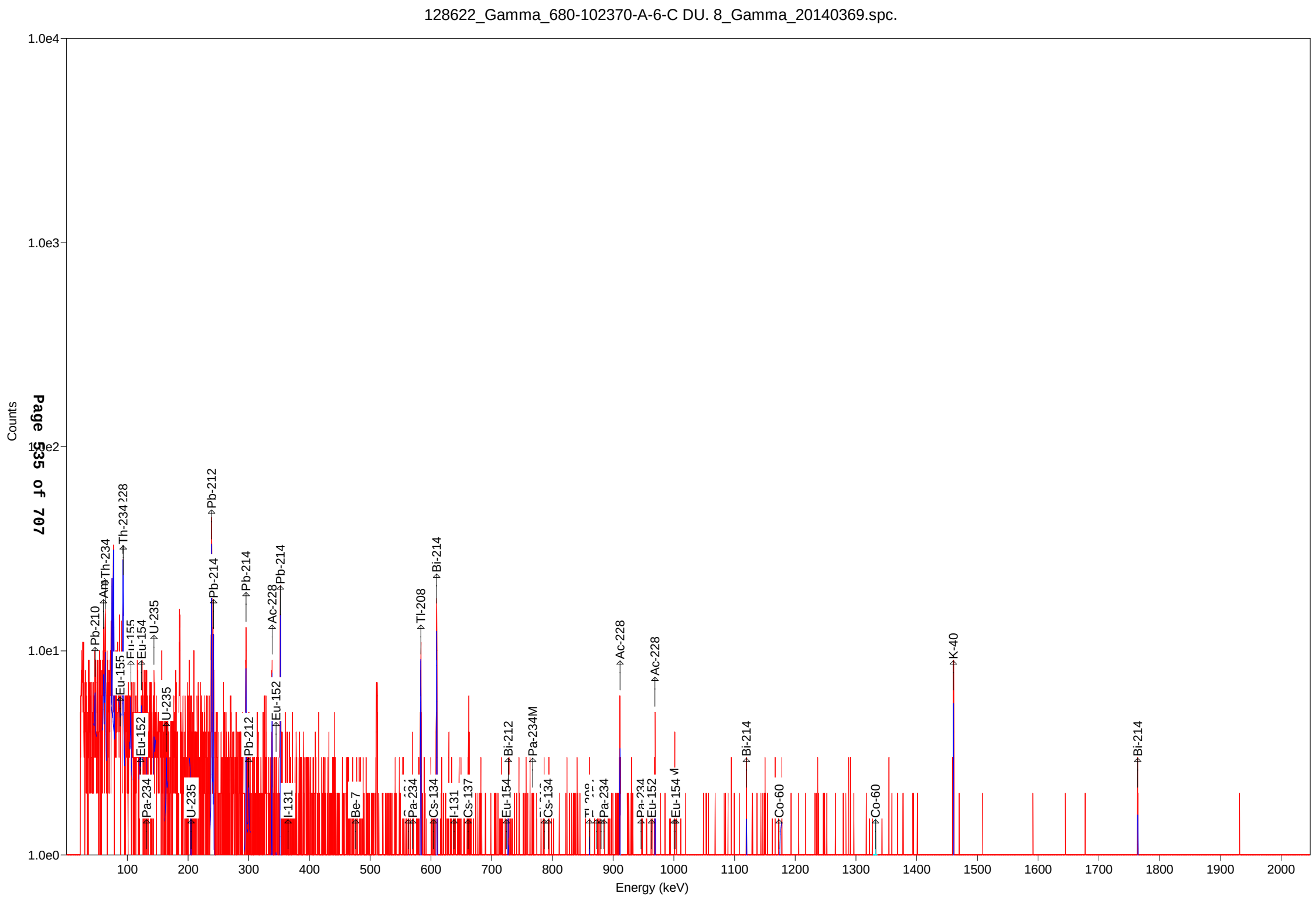
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	2.6818E-01	2.6818E-01	6.813E+02%	6.84E+00
K-40	#	4.2280E+01	4.2280E+01	1.454E+01%	9.03E+00
CO-60	#A	-1.0259E-01	-1.0259E-01	6.355E+02%	1.70E+00
I-131	#A	-1.0869E-02	-1.0869E-02	2.056E+03%	8.27E-01
CS-134	#A	1.8718E-03	1.8718E-03	1.111E+02%	1.09E+00
CS-137	#A	1.3405E-01	1.3405E-01	2.558E+02%	1.33E+00
EU-152	#A	1.6669E-01	1.6669E-01	3.756E+02%	2.29E+00
EU-154	#A	2.6174E-01	2.6174E-01	9.744E+01%	8.79E+00
EU-155	#A	8.7201E-01	8.7201E-01	8.454E+01%	2.47E+00
TL-208		2.8154E+00	2.8155E+00	1.458E+01%	5.05E-01
PB-210	#A	6.1558E+00	6.1558E+00	1.428E+02%	3.00E+01
PB-212		7.3761E+00	7.3761E+00	1.092E+01%	1.51E+00
PB-214		6.5370E+00	6.5370E+00	1.271E+01%	1.54E+00
BI-212	#A	5.7195E+00	5.7195E+00	6.202E+01%	1.16E+01
BI-214		7.5241E+00	7.5241E+00	1.356E+01%	1.59E+00
AC-228		5.5182E+00	5.5182E+00	1.767E+01%	3.71E+00
Pa-234	#A	2.1072E-01	2.1072E-01	2.230E+02%	3.01E+00
TH-234	A	1.6548E+01	1.6548E+01	2.343E+01%	2.04E+01
PA-234M	#A	1.4030E+01	1.4030E+01	2.522E+02%	1.43E+02
U-235	#A	9.3199E-01	9.3199E-01	1.510E+02%	5.38E+00
AM-241	#A	8.1038E-01	8.1038E-01	9.433E+01%	2.64E+00

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

--------------------------- S U M M A R Y ---------------------------

Total Activity (92.5 to 2000.0 keV)   8.860E+01 Bq/Sample
Total Decayed Activity (92.5 to 2000.0 keV) 8.8598495E+01 Bq/Sample

The library has energies which are not separable.


128622_Gamma_680-102370-A-6-C DU. 8_Gamma_20140369.spc.
Counts
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Energy (keV)
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Pb-210
Am
Th-234
Th-234
Eu-155
Eu-155
Eu-154
U-235
Eu-152
U-235
Pa-234
U-235
Pb-212
Pb-214
Pb-214
Pb-212
Ac-228
Pb-214
Eu-152
I-131
Be-7
Pa-234
Cs-134
Tl-208
I-131
Cs-137
Bi-214
Eu-154
Bi-212
Pa-234M
Cs-134
Pa-234
Ac-228
Pa-234
Eu-152
Ac-228
Eu-154
Bi-214
Co-60
Co-60
K-40
Bi-214

Test America St. Louis Spectrum ID: 14_Gamma_20141505

Sample Description: 128622_Gamma_680-102370-A-33-C
Detector: Ge14 SN/11080670
Batch ID: 128622
Work Order Number: Gamma
Lot Number: 680-102370-A-33-C

Decay to Time: 7/16/2014 01:35 Live Time: 1800 sec
Acquisition Time: 7/16/2014 01:35:11 Real Time: 1808 sec
Analysis Time: 7/16/2014 02:05 Dead Time: 0.44 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 14_Soil_TunaCan.Clb
Efficiency Cal Desc: 14_TunaCan_90099_042312
Efficiency Cal Date: 4/23/2012 11:29
Energy Cal Date: 2/28/2012 10:48
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 14_2014-07-12_0310.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-3.251E-01	626.6	2.037E+00	2.037E+00	7.470E+00
K-40	6.128E+01	12.2	7.460E+00	8.092E+00	1.322E+01
CO-60	-2.917E-01	139.0	4.055E-01	4.058E-01	1.447E+00
I-131	-3.985E-02	423.4	1.687E-01	1.688E-01	6.307E-01
CS-134	7.939E-02	141.2	1.121E-01	1.122E-01	1.027E+00
CS-137	5.081E-01	59.9	3.043E-01	3.054E-01	9.897E-01
EU-152	-9.314E-02	98.2	9.147E-02	9.160E-02	2.787E+00
EU-154	3.074E-02	847.6	2.605E-01	2.606E-01	7.567E+00
EU-155	1.323E+00	34.6	4.579E-01	4.636E-01	2.143E+00
TL-208	2.372E+00	15.9	3.758E-01	3.954E-01	7.196E-01
PB-210	1.724E+01	50.2	8.662E+00	8.721E+00	2.517E+01
PB-212	8.403E+00	8.3	6.975E-01	8.843E-01	1.159E+00
PB-214	7.491E+00	10.5	7.864E-01	8.775E-01	1.664E+00
BI-212	1.036E+01	40.8	4.231E+00	4.266E+00	1.128E+01
BI-214	6.689E+00	14.3	9.543E-01	1.016E+00	1.842E+00
AC-228	8.175E+00	11.7	9.588E-01	1.046E+00	1.393E+00
Pa-234	5.671E-01	146.6	8.312E-01	8.317E-01	2.883E+00
TH-234	5.410E+00	62.4	3.374E+00	3.386E+00	1.979E+01
PA-234M	0.000E+00	707.1	7.069E+00	7.069E+00	5.210E+01
U-235	1.907E+00	64.7	1.233E+00	1.237E+00	4.332E+00
AM-241	8.951E-02	659.2	5.901E-01	5.901E-01	2.069E+00
Total	1.319E+02				

Analyst: Siobhan Perry

TestAmerica, Inc. Spectrum name: 14_Gamma_20141505.An1

Sample description
128622_Gamma_680-102370-A-33-C

Spectrum Filename: C:\User\SPC\Det14\14_Gamma_20141505.An1

Acquisition information
Start time: 7/16/2014 1:35:11 AM
Live time: 1800
Real time: 1808
Dead time: 0.44 %
Detector ID: 14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_Soil_TunaCan.Clb
14_TunaCan_90099_042312

Energy Calibration
Created: 2/28/2012 10:48:23 AM
Zero offset: 0.130 keV
Gain: 0.250 keV/channel
Quadratic: -2.050E-08 keV/channel^2

Efficiency Calibration
Created: 4/23/2012 11:29:47 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.02 %
Log(Eff): 2.101260E-01 + (-5.951973E-01*Log(E)) +
(-1.605331E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -2.391492E+01 + (8.828985E+00*Log(E)) +
(-9.371496E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.64keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	7/16/2014 1:35:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	14_2014-07-12_0310.PBC 7/12/2014 3:10:18 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 18 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0813

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.66	29.	29.26	0.40	2.171E-02	46.54	4.250	PBC<MDA	PB210
59.78	2.	659.23	0.76	3.065E-02	59.54	35.900	PBC<MDA	AM241
63.24	34.	42.73	0.63	3.278E-02	63.29	3.810	PBC<MDA	TH234
74.76	97.	15.55	0.78	3.811E-02				
77.17	122.	12.39	0.78	3.898E-02				
87.40	32.	44.11	0.79	4.164E-02	86.54	30.700	PBC<MDA	EU155
					86.54	30.700	1.383E+00	EU155
92.38	22.	29.31	0.80	4.279E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.810	PBC<MDA	U235
92.87	56.	24.41	0.80	4.291E-02	93.35	5.810	1.253E+01	U235
					93.35	5.561	1.310E+01	AC228
93.14	44.	35.01	0.80	4.291E-02	93.35	5.810	PBC<MDA	U235
					93.35	5.561	1.018E+01	AC228
105.57	21.	53.35	0.81	4.403E-02	105.31	21.200	PBC<MDA	EU155
					105.31	21.200	1.237E+00	EU155
144.17	8.	126.01	0.85	4.148E-02	143.79	10.960	PBC<MDA	U235
					143.79	10.960	1.003E+00	U235
163.37	9.	111.41	0.87	3.841E-02	163.38	5.080	PBC<MDA	U235
					163.38	5.080	2.676E+00	U235
205.65	9.	96.70	0.91	3.290E-02	205.33	5.010	PBC<MDA	U235
					205.33	5.010	3.105E+00	U235
238.63	200.	7.97	0.95	2.931E-02	238.63	43.300	8.404E+00	PB212
241.80	53.	22.40	0.47	2.900E-02	242.00	7.430	1.367E+01	PB214
277.29	32.	22.42	0.94	2.610E-02	277.28	6.310	1.096E+01	TL208
295.00	66.	17.03	0.89	2.487E-02	295.09	19.300	7.698E+00	PB214
299.85	12.	51.12	0.93	2.455E-02	300.03	3.280	PBC<MDA	PB212
338.39	39.	18.57	0.88	2.235E-02	338.32	12.010	8.036E+00	AC228
351.91	108.	12.28	1.35	2.167E-02	351.93	37.600	7.386E+00	PB214
569.18	4.	146.56	1.26	1.481E-02	569.32	15.380	PBC<MDA	CS134

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					569.47	8.200	1.880E+00	Pa234
569.32	4.	153.87	1.26	1.481E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.835E+00	Pa234
583.25	51.	14.30	1.19	1.453E-02	583.02	84.500	2.306E+00	TL208
609.57	78.	12.87	1.40	1.403E-02	609.31	46.090	6.689E+00	BI214
661.38	10.	59.88	1.34	1.313E-02	661.66	85.210	PBC<MDA	CS137
727.64	15.	40.83	1.40	1.217E-02	727.17	7.550	PBC<MDA	BI212
785.77	5.	131.99	1.45	1.144E-02	785.42	1.280	PBC<MDA	BI212
795.10	2.	256.49	1.46	1.131E-02	795.87	85.530	PBC<MDA	CS134
860.90	7.	72.21	1.51	1.062E-02	860.56	12.420	PBC<MDA	TL208
911.36	43.	15.25	1.19	1.014E-02	911.07	29.000	8.125E+00	AC228
946.08	1.	355.62	1.58	9.832E-03	946.02	13.400	PBC<MDA	Pa234
969.10	25.	25.70	1.60	9.642E-03	968.97	17.460	8.352E+00	AC228
1004.77	0.	947.16	1.63	9.360E-03	1004.77	18.010	PBC<MDA	EU154
1111.18	3.	167.05	1.71	8.614E-03	1112.07	13.644	PBC<MDA	EU152
					1112.07	13.644	1.259E+00	EU152
1120.23	30.	18.26	0.42	8.562E-03	1120.29	15.100	1.273E+01	BI214
1460.86	81.	11.62	1.96	6.879E-03	1460.83	10.670	6.128E+01	K40
1763.88	4.	61.30	2.14	5.878E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
298.47	74.77	62.	101.	2.659E+03	16.09	0.452	-	s
308.12	77.18	63.	127.	3.262E+03	14.20	0.583	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.06	46.66	70.	29.	0.016	29.26	0.402s
AM-241	238.53	59.78	67.	2.	0.001	659.23	0.761s
TH-234	252.36	63.24	81.	13.	0.007	42.73	0.632
EU-155	348.96	87.40	83.	32.	0.018	44.11	0.790s
TH-234	369.72	92.59	102.	22.	0.012	29.31	0.796D
U-235	372.76	93.35	66.	56.	0.031	24.41	0.797D
AC-228	372.76	93.35	95.	44.	0.024	35.01	0.796D
EU-155	421.65	105.57	51.	21.	0.012	53.35	0.809s
EU-152	486.10	121.69	46.	-2.	-0.001	504.82	0.826s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	575.99	144.17	49.	8.	0.005	126.01	0.849s
U-235	652.79	163.37	50.	9.	0.005	111.41	0.869s
U-235	821.83	205.65	35.	9.	0.005	96.70	0.911s
PB-212	953.76	238.63	26.	192.	0.107	7.97	0.949
PB-214	966.43	241.80	24.	53.	0.029	22.40	0.472s
TL-208	1108.35	277.29	6.	32.	0.018	22.42	0.945
I-131	1140.31	285.28	32.	-6.	-0.004	130.19	0.990s
PB-214	1179.19	295.00	20.	66.	0.037	17.03	0.894
PB-212	1198.59	299.85	12.	12.	0.007	51.12	0.932
AC-228	1352.71	338.39	3.	39.	0.022	18.57	0.880
EU-152	1372.33	343.29	33.	-8.	-0.005	103.29	1.049s
PB-214	1406.79	351.91	22.	108.	0.060	12.28	1.350s
I-131	1448.55	362.35	13.	-1.	-0.001	423.39	1.069s
BE-7	1909.08	477.49	21.	-1.	-0.001	626.63	1.176s
CS-134	2251.57	563.11	17.	-2.	-0.001	243.82	1.255s
CS-134	2276.39	569.32	17.	4.	0.002	153.87	1.260
Pa-234	2275.83	569.18	16.	4.	0.002	146.56	1.261s
TL-208	2332.09	583.25	8.	51.	0.028	14.30	1.194
CS-134	2424.80	606.42	24.	-2.	-0.001	300.12	1.292s
BI-214	2437.40	609.57	16.	78.	0.043	12.87	1.402s
CS-137	2644.65	661.38	14.	10.	0.006	59.88	1.343s
BI-212	2909.73	727.64	12.	15.	0.008	40.83	1.400s
EU-152	3109.92	777.68	18.	-4.	-0.002	170.10	1.444s
BI-212	3142.28	785.77	16.	5.	0.003	131.99	1.450s
CS-134	3179.61	795.10	13.	2.	0.001	256.49	1.459s
CS-134	3206.69	801.87	17.	-2.	-0.001	257.09	1.464s
TL-208	3442.85	860.90	9.	7.	0.004	72.21	1.513s
Pa-234	3519.02	879.94	12.	-2.	-0.001	238.65	1.529s
AC-228	3644.74	911.36	0.	43.	0.024	15.25	1.187s
Pa-234	3783.65	946.08	10.	1.	0.001	355.62	1.582s
EU-152	3854.36	963.75	14.	-3.	-0.002	202.79	1.597s
AC-228	3875.76	969.10	9.	25.	0.014	25.70	1.601s
EU-154	4018.50	1004.77	9.	0.	0.000	947.16	1.629s
EU-152	4444.25	1111.18	9.	3.	0.001	167.05	1.712s
BI-214	4480.50	1120.23	0.	30.	0.016	18.26	0.417s
CO-60	5325.60	1331.41	13.	-4.	-0.002	139.04	1.871s
K-40	5843.68	1460.86	10.	81.	0.045	11.62	1.958s
BI-214	7056.60	1763.88	8.	4.	0.002	61.30	2.145s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-3.2507E-01				5.31E+01	
			477.60	-3.251E-01	?(	7.470E+00 6.27E+02 1.05E+01	G
K-40	N	6.1282E+01				4.66E+11	
			1460.83	6.128E+01	(P	1.322E+01 1.16E+01 1.07E+01	G
CO-60	F	-2.9167E-01				1.93E+03	
			1332.50	-2.917E-01	?(	1.447E+00 1.39E+02 1.00E+02	G
			1173.24	0.000E+00	+	1.720E+00 1.00E+03 9.99E+01	G
I-131	I	-3.9854E-02				8.02E+00	
			364.48	-3.985E-02	?(	6.307E-01 4.23E+02 8.17E+01	G
			284.30	-2.267E+00	+	1.022E+01 1.30E+02 6.14E+00	G
			636.97	0.000E+00	+	1.113E+01 1.00E+03 7.17E+00	G
CS-134	I	7.9386E-02				7.54E+02	
			604.71	-9.504E-02	?(	1.027E+00 3.00E+02 9.76E+01	G
			795.87	1.169E-01	?(	1.106E+00 2.56E+02 8.55E+01	G
			569.32	9.779E-01	(	5.351E+00 1.54E+02 1.54E+01	G
			801.95	-1.315E+00	+	1.231E+01 2.57E+02 8.69E+00	G
			563.24	-1.098E+00	+	9.720E+00 2.44E+02 8.35E+00	G
CS-137	I	5.0812E-01				1.10E+04	
			661.66	5.081E-01	?(	9.897E-01 5.99E+01 8.52E+01	G
EU-152	F	-9.3143E-02				4.94E+03	
			344.29	-7.892E-01	?(	2.787E+00 1.03E+02 2.65E+01	G
			121.78	-8.486E-02	+	1.517E+00 5.05E+02 2.86E+01	G
			778.92	-1.367E+00	+	8.303E+00 1.70E+02 1.29E+01	G
			964.11	-1.087E+00	+	7.999E+00 2.03E+02 1.46E+01	G
			1112.07	1.259E+00	&(	7.727E+00 1.67E+02 1.36E+01	G
			1408.00	0.000E+00	+	7.934E+00 1.00E+03 2.10E+01	G
EU-154	I	3.0739E-02				3.14E+03	
			873.23	-1.392E-01	%(	7.567E+00 1.41E+03 1.23E+01	G
			123.10	-9.996E-03	%	1.094E+00 3.07E+03 4.08E+01	G
			1274.54	8.872E-02	%	3.739E+00 1.10E+03 3.52E+01	G
			723.36	0.000E+00	+	1.242E+01 1.00E+03 2.02E+01	G
			1004.77	1.465E-01	?(	5.408E+00 9.47E+02 1.80E+01	G
			996.33	1.251E-01	%	8.641E+00 1.74E+03 1.06E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	1.3231E+00					1.81E+03	
			105.31	1.237E+00	(	2.143E+00	5.33E+01	2.12E+01 G
			86.54	1.383E+00	*(	1.958E+00	4.41E+01	3.07E+01 G
TL-208	N	2.3715E+00					6.98E+02	
			583.02	2.306E+00	(P	7.196E-01	1.43E+01	8.45E+01 G
			277.28	1.096E+01	+	4.922E+00	2.24E+01	6.31E+00 G
			860.56	2.817E+00	?(P	6.923E+00	7.22E+01	1.24E+01 G
PB-210	N	1.7244E+01					8.14E+03	
			46.54	1.724E+01	(P	2.517E+01	2.93E+01	4.25E+00 G
PB-212	N	8.4033E+00					6.98E+02	
			238.63	8.404E+00	(P	1.159E+00	7.97E+00	4.33E+01 G
			300.03	8.395E+00	(P	1.293E+01	5.11E+01	3.28E+00 G
PB-214	N	7.4914E+00					5.84E+05	
			351.93	7.386E+00	(	1.664E+00	1.23E+01	3.76E+01 G
			295.09	7.698E+00	(	2.696E+00	1.70E+01	1.93E+01 G
			242.00	1.367E+01	+	6.585E+00	2.24E+01	7.43E+00 G
BI-212	N	1.0363E+01					6.98E+02	
			727.17	9.202E+00	?(	1.128E+01	4.08E+01	7.55E+00 G
			785.42	1.721E+01	?(	8.024E+01	1.32E+02	1.28E+00 G
BI-214	N	6.6887E+00					5.84E+05	
			609.31	6.689E+00	@(P	1.842E+00	1.29E+01	4.61E+01 G
			1120.29	1.273E+01	+ P	3.167E+00	1.83E+01	1.51E+01 G
			1764.49	2.677E+00	- P	9.753E+00	6.13E+01	1.54E+01 G
AC-228	N	8.1745E+00					2.10E+03	
			911.07	8.125E+00	(	1.393E+00	1.52E+01	2.90E+01 G
			968.97	8.352E+00	?(	5.378E+00	2.57E+01	1.75E+01 G
			338.32	8.036E+00	(	2.277E+00	1.86E+01	1.20E+01 G
							Energy duplication	
			93.35	1.018E+01		1.122E+01	3.50E+01	5.56E+00 XA
Pa-234	N	5.6713E-01					1.63E+12	
			131.29	-2.292E-02	%(	2.883E+00	3.56E+03	1.80E+01 G
			569.47	1.880E+00	?(	9.788E+00	1.47E+02	8.20E+00 G
			946.02	5.565E-01	&(	7.466E+00	3.56E+02	1.34E+01 G
			883.24	1.003E-01	%	9.688E+00	2.49E+03	9.60E+00 G
			880.53	-1.884E+00	+	1.659E+01	2.39E+02	6.00E+00 G
TH-234	N	5.4096E+00					1.63E+12	
			63.29	5.997E+00	(P	1.979E+01	4.27E+01	3.81E+00 G
			92.59	5.009E+00	(P	1.160E+01	2.93E+01	5.58E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
U-235	N 1.9070E+00					2.57E+11	
		143.79	1.003E+00	(	4.332E+00	1.26E+02	1.10E+01 G
		205.33	3.105E+00	&(	1.022E+01	9.67E+01	5.01E+00 G
		163.38	2.676E+00	?(	1.016E+01	1.11E+02	5.08E+00 G
							Energy duplication
		93.35	1.253E+01	&	9.046E+00	2.44E+01	5.81E+00 X
AM-241	T 8.9511E-02					1.58E+05	
		59.54	8.951E-02	?(	2.069E+00	6.59E+02	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
AM-241	59.78	67.	2.	0.001	659.23	8.951E-02
EU-155	87.40	83.	32.	0.018	44.11	1.383E+00
U-235	93.35	66.	56.	0.031	24.41	1.253E+01
EU-155	105.57	51.	21.	0.012	53.35	1.237E+00
EU-152	121.69	46.	-2.	-0.001	504.82	-8.486E-02
U-235	144.17	49.	8.	0.005	126.01	1.003E+00

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
U-235	163.37	50.	9.	0.005	111.41	2.676E+00		
U-235	205.65	35.	9.	0.005	96.70	3.105E+00		
I-131	285.28	32.	-6.	-0.004	130.19	-2.267E+00		
EU-152	343.29	33.	-8.	-0.005	103.29	-7.892E-01		
I-131	362.35	13.	-1.	-0.001	423.39	-3.985E-02		
BE-7	477.49	21.	-1.	-0.001	626.63	-3.251E-01		
Pa-234	569.18	16.	4.	0.002	146.56	1.880E+00		
CS-137	661.38	14.	10.	0.006	59.88	5.081E-01		
EU-152	777.68	18.	-4.	-0.002	170.10	-1.367E+00		
Pa-234	879.94	12.	-2.	-0.001	238.65	-1.884E+00		
Pa-234	946.08	10.	1.	0.001	355.62	5.565E-01		
EU-152	963.75	14.	-3.	-0.002	202.79	-1.087E+00		
EU-154	1004.77	9.	0.	0.000	947.16	1.465E-01		
EU-152	1111.18	9.	3.	0.001	167.05	1.259E+00		
CO-60	1331.41	13.	-4.	-0.002	139.04	-2.917E-01		
K-40	1460.86	10.	81.	0.045	11.62	6.128E+01	P	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

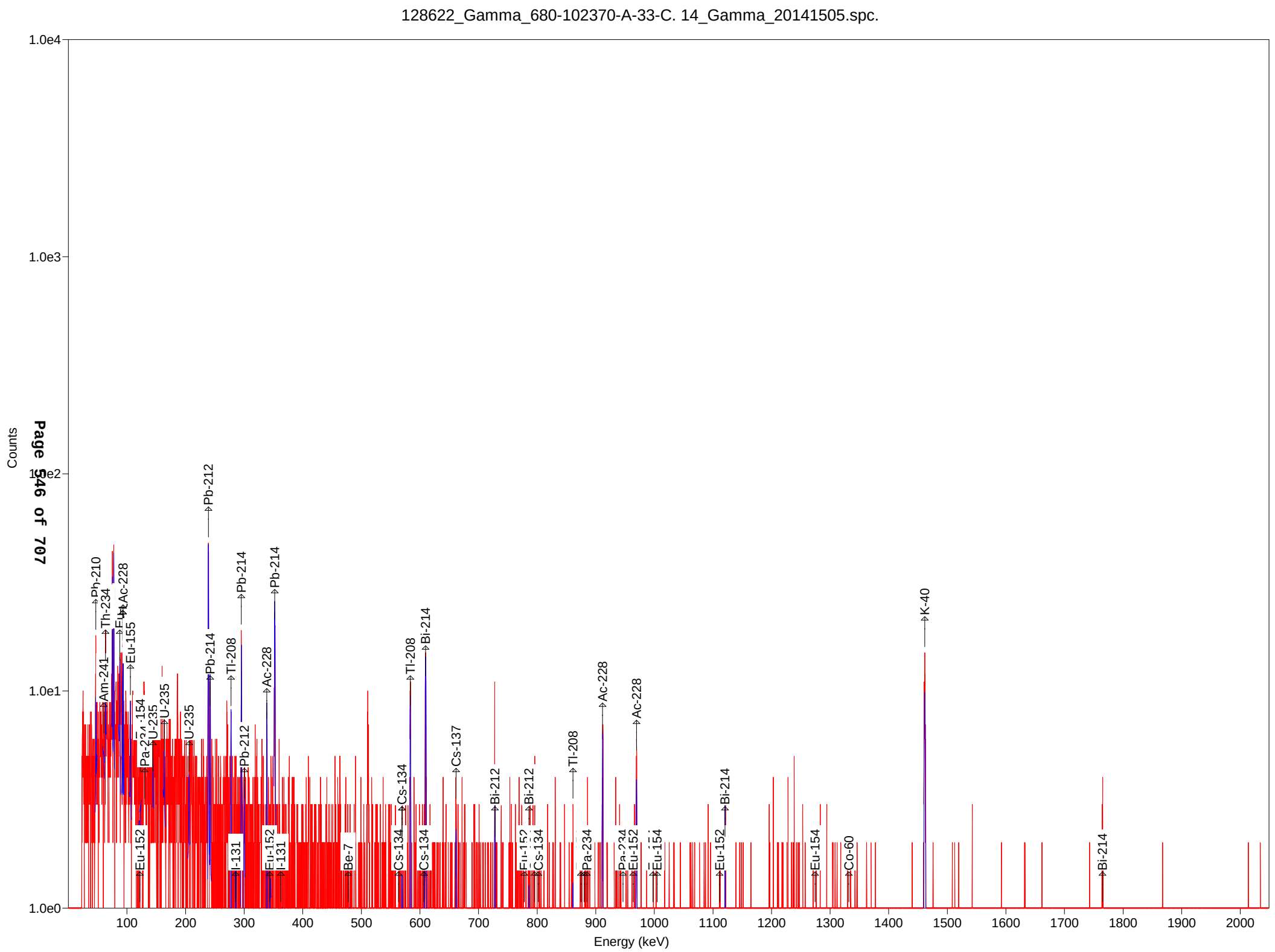
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty (1 Sigma) Counting	MDA Bq/Sample
BE-7	#A	-3.2507E-01	-3.2507E-01	6.266E+02%	7.47E+00
K-40	#	6.1282E+01	6.1282E+01	1.217E+01%	1.32E+01
CO-60	#A	-2.9167E-01	-2.9167E-01	1.390E+02%	1.45E+00
I-131	#A	-3.9854E-02	-3.9854E-02	4.234E+02%	6.31E-01
CS-134	A	7.9386E-02	7.9386E-02	1.412E+02%	1.03E+00
CS-137	#A	5.0812E-01	5.0812E-01	5.988E+01%	9.90E-01
EU-152	#A	-9.3143E-02	-9.3143E-02	9.820E+01%	2.79E+00
EU-154	#A	3.0739E-02	3.0739E-02	8.476E+02%	7.57E+00
EU-155	#A	1.3231E+00	1.3231E+00	3.461E+01%	2.14E+00
TL-208		2.3715E+00	2.3715E+00	1.585E+01%	7.20E-01
PB-210	#A	1.7244E+01	1.7244E+01	5.023E+01%	2.52E+01
PB-212		8.4033E+00	8.4033E+00	8.301E+00%	1.16E+00
PB-214		7.4914E+00	7.4914E+00	1.050E+01%	1.66E+00
BI-212	#A	1.0363E+01	1.0363E+01	4.083E+01%	1.13E+01
BI-214		6.6887E+00	6.6887E+00	1.427E+01%	1.84E+00
AC-228		8.1745E+00	8.1745E+00	1.173E+01%	1.39E+00
Pa-234	#A	5.6713E-01	5.6713E-01	1.466E+02%	2.88E+00
TH-234	A	5.4096E+00	5.4096E+00	6.237E+01%	1.98E+01
PA-234M	#A	0.0000E+00	0.0000E+00	7.071E+02%	5.21E+01
U-235	#A	1.9070E+00	1.9070E+00	6.467E+01%	4.33E+00
AM-241	#A	8.9511E-02	8.9511E-02	6.592E+02%	2.07E+00

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (238.4 to 1999.5 keV) 6.074E+01 Bq/Sample
Total Decayed Activity (238.4 to 1999.5 keV) 6.0735680E+01 Bq/Sample

The library has energies which are not separable.


128622_Gamma_680-102370-A-33-C. 14_Gamma_20141505.spc.
Counts
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Energy (keV)
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Pb-210
Th-234
Am-241
Ac-228
Eu-155
Pa-234
U-235
U-235
U-235
Eu-152
Pb-212
Pb-214
Tl-208
Pb-212
Ac-228
Pb-214
I-131
Eu-152
I-131
Be-7
Cs-134
Cs-134
Tl-208
Bi-214
Cs-134
Cs-137
Bi-212
Tl-208
Bi-212
Cs-134
Pa-234
Ac-228
Pa-234
Eu-152
Ac-228
Eu-154
Bi-214
Eu-152
Eu-154
Co-60
K-40
Bi-214

Daily Checks

Test America
St. Louis
Background Check

Spectrum: 4_20140716001_BG
Acquired: 7/16/2014 12:01:00 AM
Detector: Ge 4 SN/181
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.32	1.20	1.24	1.29	1.39	1.43	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

TestAmerica Spectrum name: 4_20140716001_BG.An1

Sample description
Background Contamination Check

Spectrum Filename: C:\User\SPC\Det4\4_20140716001_BG.An1

Acquisition information
Start time:	7/16/2014 12:01:00 AM
Live time:	1800
Real time:	1802
Dead time:	0.09 %
Detector ID:	4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_QC.Clb
4_QA-D_Rad11-0018_032612

Energy Calibration
Created:	2/28/2012 2:55:17 PM
Zero offset:	0.091 keV
Gain:	0.250 keV/channel
Quadratic:	-2.917E-08 keV/channel^2

Efficiency Calibration
Created:	3/27/2012 7:34:55 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (1999.44keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 1 cutoff: 5.00E+01%

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc

No unknown peaks passed sensitivity test.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS	COMMENTS

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.

- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- - - -

SB-124	<	2.0391E-01
SB-125	<	4.7699E-01
I-131	<	1.4941E-01
BA-133	<	1.9332E-01
CS-134	<	2.0710E-01
CS-137	<	3.2058E-01
CE-139	<	8.5752E-02
Ba-140	<	1.1292E+00
La-140	<	5.4812E-01
CE-141	<	1.3678E-01
CE-144	<	1.4880E+00
PM-144	<	3.6516E-01
EU-152	<	3.5036E-01
EU-154	<	3.0996E+00
EU-155	<	3.8188E-01
HF-181	<	1.6099E-01
Ta-182	<	1.2935E+00
Hg-203	<	2.0591E-01
TL-208	<	3.8786E-01
pm-146	<	9.0667E-01
y-88	<	4.2545E-01
PB-210	<	9.2702E+00
PB-212	<	4.9901E-01
PB-214	<	5.1167E-01
BI-207	<	3.4182E-01
BI-212	<	3.9639E+00
BI-214	<	6.5545E-01
BI-210M	<	3.8020E-01
RA-224	<	2.3703E+00
AC-228	<	1.3842E+00
TH-227	<	1.3389E+00
TH-229	<	2.0482E+00
TH-234	<	7.8695E+00
PA-231	<	2.9771E+00
PA-233	<	5.2251E-01
PA-234	<	4.5043E-01
PA-234M	<	6.3527E+01
Ra-226	<	4.8746E+00
U-235	<	1.1494E+00
AM-241	<	6.3968E-01
Np-237	<	9.0098E-01

  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

TestAmerica Spectrum name: 4_20140716001_BG.An1

--- S U M M A R Y ---

Total Activity (37.6 to 1999.4 keV) 0.000E+00 DPS

Test America
St. Louis
Quality Control Check

Spectrum: 4_20140716002_QCAsLeft
Acquired: 7/16/2014 1:04:38 AM
Detector: Ge 4 SN/181
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.54	59.22	59.29	59.62	59.79	59.86	PASS
FWHM	0.77	0.00	0.00	0.78	1.87	1.97	PASS
ActivityDiff	650.60	-5.00	-4.00	-1.07	4.00	5.00	PASS
QA-662							
FWHM	1.34	0.00	0.00	1.24	3.04	3.14	PASS
ActivityDiff	609.90	-5.00	-4.00	-3.07	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.30	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.40	1333.01	1333.26	PASS
FWHM	1.84	0.00	0.00	1.89	4.04	4.14	PASS
ActivityDiff	1189.70	-5.00	-4.00	-2.84	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

TestAmerica Spectrum name: 4_20140716002_QCAsLeft.An1

Sample description
Quality control Check (QC Source 'D') Post Stabilization

Spectrum Filename: C:\User\SPC\Det4\4_20140716002_QCAsLeft.An1

Acquisition information
Start time:	7/16/2014 1:04:38 AM
Live time:	1000
Real time:	1018
Dead time:	1.72 %
Detector ID:	4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_QC.Clb
4_QA-D_Rad11-0018_032612

Energy Calibration
Created:	2/28/2012 2:55:17 PM
Zero offset:	0.091 keV
Gain:	0.250 keV/channel
Quadratic:	-2.917E-08 keV/channel^2

Efficiency Calibration
Created:	3/27/2012 7:34:55 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_QC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (1999.44keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	1.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	4/1/2009 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 5 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0930

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. GPS	Nuc
59.62	28655.	0.66	0.78	4.400E-02	59.54	100.000	6.576E+02	QA60
88.13	3333.	2.13	0.82	6.283E-02	88.03	100.000	9.587E+02	QA88
661.47	8341.	1.24	1.24	1.501E-02	661.66	100.000	6.286E+02	QA662
1173.14	5334.	1.46	1.78	8.791E-03	1173.23	100.000	1.217E+03	QA1173
1332.40	4783.	1.45	1.89	7.838E-03	1332.51	100.000	1.223E+03	QA1332

No unknown peaks passed sensitivity test.

This section based on library: DET_QC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
QA-60	237.97	59.62	1728.	28655.	28.655	0.66	0.779
QA-88	351.97	88.13	445.	3333.	3.333	2.13	0.819
QA-662	2644.73	661.47	352.	8341.	8.341	1.24	1.239
QA-1173	4691.90	1173.14	114.	5334.	5.334	1.46	1.782
QA-1332	5329.31	1332.40	6.	4783.	4.783	1.45	1.887

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Nuclide Code	Average Activity GPS	Peak Energy keV	Peak Activity GPS	Peak Code	Peak MDA Value GPS			COMMENTS
QA-60		6.5757E+02					1.58E+05		
			59.54	6.576E+02	(	4.507E+00	6.58E-01	1.00E+02	G
QA-88		9.5865E+02					4.63E+02		
			88.03	9.587E+02	(	2.905E+01	2.13E+00	1.00E+02	G
QA-662		6.2863E+02					1.10E+04		
			661.66	6.286E+02	(	6.793E+00	1.24E+00	1.00E+02	G
QA-1173		1.2166E+03					1.92E+03		
			1173.23	1.217E+03	(	1.195E+01	1.46E+00	1.00E+02	G
QA-1332		1.2235E+03					1.92E+03		
			1332.51	1.223E+03	(	3.693E+00	1.45E+00	1.00E+02	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average

R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity GPS	Time Corrected Activity GPS	Uncertainty 1 Sigma Counting	MDA
QA-60		6.5202E+02	6.5757E+02	6.581E-01%	4.51E+00
QA-88		5.3056E+01	9.5865E+02	2.130E+00%	2.90E+01
QA-122	<	1.6486E+00	2.2723E+02		
QA-166			>12 Halflives		
QA-279			>12 Halflives		
QA-392			>12 Halflives		
QA-514			>12 Halflives		
QA-662		5.5648E+02	6.2863E+02	1.236E+00%	6.79E+00
QA-898			>12 Halflives		
QA-1173		6.0681E+02	1.2166E+03	1.456E+00%	1.19E+01
QA-1332		6.1026E+02	1.2235E+03	1.453E+00%	3.69E+00
QA-1836			>12 Halflives		

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.4 keV) 2.479E+03 GPS
Total Decayed Activity (37.6 to 1999.4 keV) 4.6848950E+03 GPS

Test America
St. Louis
Quality Control Check

Spectrum: 8_20140716001_QCAsLeft
Acquired: 7/16/2014 12:22:49 AM
Detector: Ge 8 SN/174
  Quality Control Evaluation Criteria:
  1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
  2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.00	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.55	59.79	60.04	PASS
FWHM	1.10	0.00	0.00	0.85	2.20	2.30	PASS
ActivityDiff	650.60	-5.00	-4.00	-3.14	4.00	5.00	PASS
QA-662							
FWHM	1.53	0.00	0.00	1.34	3.23	3.33	PASS
ActivityDiff	609.90	-5.00	-4.00	-1.70	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.60	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.39	1333.01	1333.26	PASS
FWHM	1.90	0.00	0.00	1.70	4.10	4.20	PASS
ActivityDiff	1189.70	-5.00	-4.00	-2.24	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

TestAmerica Spectrum name: 8_20140716001_QCAsLeft.An1

Sample description
Quality control Check (QC Source 'D') Post Stabilization

Spectrum Filename: C:\User\SPC\Det8\8_20140716001_QCAsLeft.An1

Acquisition information
Start time:	7/16/2014 12:22:49 AM
Live time:	1000
Real time:	1041
Dead time:	3.91 %
Detector ID:	8

Detector system
Ge 8 SN/174

Calibration
Filename: 8_QC.Clb
Ge8_QC

Energy Calibration
Created:	2/28/2012 10:34:41 AM
Zero offset:	0.052 keV
Gain:	0.250 keV/channel
Quadratic:	5.282E-10 keV/channel^2

Efficiency Calibration
Created:	1/6/2011 8:07:20 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_QC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.55keV)
Stop channel:	8000 (1999.96keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	1.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

TestAmerica Spectrum name: 8_20140716001_QCAsLeft.An1

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	4/1/2009 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 6 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0372

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. GPS	Nuc
59.55	57831.	0.46	0.85	8.693E-02	59.54	100.000	6.710E+02	QA60
88.05	6714.	1.62	0.85	1.289E-01	88.03	100.000	9.409E+02	QA88
661.58	18308.	0.79	1.34	3.335E-02	661.66	100.000	6.203E+02	QA662
1173.16	10946.	1.03	1.65	1.834E-02	1173.23	100.000	1.197E+03	QA1173
1332.39	9933.	1.02	1.70	1.637E-02	1332.51	100.000	1.216E+03	QA1332

No unknown peaks passed sensitivity test.

This section based on library: DET_QC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
QA-60	238.02	59.55	2831.	57831.	57.831	0.46	0.847
QA-88	352.00	88.05	1085.	6714.	6.714	1.62	0.850
QA-662	2646.24	661.58	475.	18308.	18.308	0.79	1.335
QA-1173	4692.69	1173.16	267.	10946.	10.946	1.03	1.652
QA-1332	5329.62	1332.39	66.	9933.	9.933	1.02	1.704

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity GPS	Peak Energy keV	Peak Activity GPS		Peak Code	MDA Value GPS			COMMENTS
QA-60		6.7104E+02					1.58E+05			
			59.54	6.710E+02	(	2.908E+00	4.56E-01	1.00E+02	G	
QA-88		9.4087E+02					4.63E+02			
			88.03	9.409E+02	(	2.189E+01	1.62E+00	1.00E+02	G	
QA-662		6.2029E+02					1.10E+04			
			661.66	6.203E+02	(	3.533E+00	7.95E-01	1.00E+02	G	
QA-1173		1.1968E+03					1.92E+03			
			1173.23	1.197E+03	(	8.616E+00	1.03E+00	1.00E+02	G	
QA-1332		1.2163E+03					1.92E+03			
			1332.51	1.216E+03	(	4.967E+00	1.02E+00	1.00E+02	G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average

R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity GPS	Time Corrected Activity GPS	Uncertainty 1 Sigma Counting	MDA
QA-60		6.6537E+02	6.7104E+02	4.563E-01%	2.91E+00
QA-88		5.2074E+01	9.4087E+02	1.617E+00%	2.19E+01
QA-122	<	1.0469E+00	1.4429E+02		
QA-166		>12 Halflives			
QA-279		>12 Halflives			
QA-392		>12 Halflives			
QA-514		>12 Halflives			
QA-662		5.4910E+02	6.2029E+02	7.945E-01%	3.53E+00
QA-898		>12 Halflives			
QA-1173		5.9696E+02	1.1968E+03	1.027E+00%	8.62E+00
QA-1332		6.0666E+02	1.2163E+03	1.025E+00%	4.97E+00
QA-1836		>12 Halflives			

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.5 to 2000.0 keV) 2.470E+03 GPS
Total Decayed Activity (37.5 to 2000.0 keV) 4.6452510E+03 GPS

Test America
St. Louis
Background Check

Spectrum: 8_20140716002_BG
Acquired: 7/16/2014 12:44:20 AM
Detector: Ge 8 SN/174
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.56	1.39	1.45	1.57	1.68	1.74	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

TestAmerica Spectrum name: 8_20140716002_BG.An1

Sample description
Background Contamination Check

Spectrum Filename: C:\User\SPC\Det8\8_20140716002_BG.An1

Acquisition information

Start time:	7/16/2014 12:44:20 AM
Live time:	1800
Real time:	1855
Dead time:	2.95 %
Detector ID:	8

Detector system
Ge 8 SN/174

Calibration

Filename:	8_QC.Clb

Ge8_QC

Energy Calibration

Created:	2/28/2012 10:34:41 AM
Zero offset:	0.052 keV
Gain:	0.250 keV/channel
Quadratic:	5.282E-10 keV/channel^2

Efficiency Calibration

Created:	1/6/2011 8:07:20 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files

Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.55keV)
Stop channel:	8000 (1999.96keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

TestAmerica Spectrum name: 8_20140716002_BG.An1

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 8 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0237

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
63.22	32.	25.77	0.45	9.234E-02	63.29	3.810	5.048E+00	TH234
92.57	49.	19.04	0.86	1.295E-01	92.59	5.584	3.790E+00	TH234

No unknown peaks passed sensitivity test.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
TH-234	252.67	63.22	9.	32.	0.018	25.77	0.446s
TH-234	370.07	92.57	12.	49.	0.027	19.04	0.864

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS	COMMENTS
TH-234	N	4.3001E+00				1.63E+12	
			63.29	5.048E+00	?(	2.633E+00	2.58E+01 3.81E+00 G
			92.59	3.790E+00	(	1.431E+00	1.90E+01 5.58E+00 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went
negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide
failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the
library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Activity	Time of Count Uncertainty 1 Sigma Counting	MDA
	DPS		
BE-7	<	8.1169E-01	
NA-22	<	2.3975E-01	
K-40	<	3.1390E+00	
Sc-46	<	1.7150E-01	
CR-51	<	7.0018E-01	
MN-54	<	1.5666E-01	
FE-59	<	3.6732E-01	
Co-56	<	1.5976E-01	
CO-57	<	3.5904E-02	
CO-58	<	1.5167E-01	

CO-60	<	2.5012E-01		
ZN-65	<	4.1663E-01		
NB-94	<	1.9338E-01		
ZR-95	<	2.5582E-01		
NB-95	<	1.4143E-01		
RU-103	<	9.7065E-02		
RH-106	<	1.1298E+00		
AG-108M	<	8.8015E-02		
AG-110M	<	2.3406E-01		
SN-113	<	1.1681E-01		
SB-124	<	1.0960E-01		
SB-125	<	7.2861E-01		
I-131	<	1.6451E-01		
BA-133	<	2.2067E-01		
CS-134	<	1.3979E-01		
CS-137	<	2.5675E-01		
CE-139	<	4.4109E-02		
Ba-140	<	7.4450E-01		
La-140	<	2.9747E-01		
CE-141	<	8.6362E-02		
CE-144	<	8.0763E-01		
PM-144	<	1.2968E-01		
EU-152	<	4.0685E-01		
EU-154	<	1.3595E+00		
EU-155	<	3.4871E-01		
HF-181	<	1.9037E-01		
Ta-182	<	6.0743E-01		
Hg-203	<	7.4310E-02		
TL-208	<	3.2409E-01		
pm-146	<	4.0429E-01		
y-88	<	2.3451E-01		
PB-210	<	2.7254E+00		
PB-212	<	2.4181E-01		
PB-214	<	4.3962E-01		
BI-207	<	1.9755E-01		
BI-212	<	1.7712E+00		
BI-214	<	4.8346E-01		
BI-210M	<	2.0839E-01		
RA-224	<	1.5258E+00		
AC-228	<	6.0681E-01		
TH-227	<	7.3908E-01		
TH-229	<	2.1907E+00		
TH-234		4.3001E+00	1.6020E+01%	2.633E+00
PA-231	<	1.8001E+00		
PA-233	<	1.4880E-01		
PA-234	<	4.7967E-01		
PA-234M	<	4.3449E+01		
Ra-226	<	3.6032E+00		
U-235	<	5.9278E-01		

AM-241 < 4.2849E-01
Np-237 < 2.4678E-01
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

S U M M A R Y

Total Activity (37.5 to 2000.0 keV) 4.300E+00 DPS

Test America
St. Louis
Quality Control Check

Spectrum: 9_20140716001_QCAsLeft
Acquired: 7/16/2014 12:23:04 AM
Detector: Ge9 S/N100228730
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.80	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.57	59.79	60.04	PASS
FWHM	1.08	0.00	0.00	0.96	2.18	2.28	PASS
ActivityDiff	649.44	-5.00	-4.00	-1.36	4.00	5.00	PASS
QA-662							
FWHM	1.62	0.00	0.00	1.55	3.32	3.42	PASS
ActivityDiff	607.56	-5.00	-4.00	0.73	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.80	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.36	1333.01	1333.26	PASS
FWHM	2.12	0.00	0.00	2.01	4.32	4.42	PASS
ActivityDiff	1191.31	-5.00	-4.00	-1.76	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

TestAmerica, Inc Spectrum name: 9_20140716001_QCAsLeft.An1

Sample description
Quality control Check (QC Source 'E') Post Stabilization

Spectrum Filename: C:\User\SPC\Det9\9_20140716001_QCAsLeft.An1

Acquisition information
Start time:	7/16/2014 12:23:04 AM
Live time:	1000
Real time:	1014
Dead time:	1.34 %
Detector ID:	9

Detector system
Ge9 S/N100228730

Calibration
Filename: 9_QC.Clb
9_QC-E_79670-334_060211

Energy Calibration
Created:	3/1/2012 1:57:17 PM
Zero offset:	0.074 keV
Gain:	0.250 keV/channel
Quadratic:	-2.269E-08 keV/channel^2

Efficiency Calibration
Created:	6/3/2011 12:03:10 PM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_QC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.59keV)
Stop channel:	8000 (1999.34keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	1.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

TestAmerica, Inc Spectrum name: 9_20140716001_QCAsLeft.An1

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	4/1/2009 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 6 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0412

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. GPS	Nuc
59.57	64746.	0.44	0.96	9.924E-02	59.54	100.000	6.583E+02	QA60
88.06	8110.	1.42	1.01	1.545E-01	88.03	100.000	9.486E+02	QA88
122.04	648.	9.65	0.92	1.635E-01	122.06	100.000	5.464E+02	QA122
661.63	25372.	0.65	1.55	4.753E-02	661.66	100.000	6.031E+02	QA662
1173.12	16017.	0.87	1.87	2.680E-02	1173.23	100.000	1.198E+03	QA1173
1332.36	14605.	0.86	2.01	2.415E-02	1332.51	100.000	1.212E+03	QA1332

No unknown peaks passed sensitivity test.

This section based on library: DET_QC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
QA-60	237.89	59.57	3244.	64746.	64.745	0.44	0.960
QA-88	351.82	88.06	1104.	8110.	8.110	1.42	1.011
QA-122	487.72	122.04	816.	648.	0.648	9.65	0.924
QA-662	2646.03	661.66	713.	25372.	25.372	0.65	1.548D
QA-1173	4692.48	1173.12	444.	16017.	16.017	0.87	1.872
QA-1332	5329.81	1332.36	133.	14605.	14.605	0.86	2.009

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Nuclide Code	Average Activity GPS	Peak Energy keV	Peak Activity GPS	Peak Code	MDA Value GPS	COMMENTS
QA-60		6.5829E+02				1.58E+05	
			59.54	6.583E+02 (	2.726E+00	4.35E-01 1.00E+02	G
QA-88		9.4859E+02				4.63E+02	
			88.03	9.486E+02 (	1.842E+01	1.42E+00 1.00E+02	G
QA-122		5.4636E+02				2.72E+02	
			122.06	5.464E+02 (	1.145E+02	9.65E+00 1.00E+02	G
QA-662		6.0313E+02				1.10E+04	
			661.66	6.031E+02 (	3.022E+00	6.45E-01 1.00E+02	G
QA-1173		1.1984E+03				1.92E+03	
			1173.23	1.198E+03 (	7.551E+00	8.72E-01 1.00E+02	G
QA-1332		1.2123E+03				1.92E+03	
			1332.51	1.212E+03 (	4.686E+00	8.57E-01 1.00E+02	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape

C - Charged Particle Reaction K - Key Line
M - No MDA Calculation A - Not in Average
R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity GPS	Time Corrected Activity GPS	Uncertainty 1 Sigma Counting	MDA
QA-60	6.5273E+02	6.5829E+02	4.351E-01%	2.73E+00
QA-88	5.2502E+01	9.4859E+02	1.420E+00%	1.84E+01
QA-122	3.9643E+00	5.4636E+02	9.652E+00%	1.15E+02
QA-166	>12 Halflives			
QA-279	>12 Halflives			
QA-392	>12 Halflives			
QA-514	>12 Halflives			
QA-662	5.3391E+02	6.0313E+02	6.452E-01%	3.02E+00
QA-898	>12 Halflives			
QA-1173	5.9776E+02	1.1984E+03	8.718E-01%	7.55E+00
QA-1332	6.0471E+02	1.2123E+03	8.571E-01%	4.69E+00
QA-1836	>12 Halflives			

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (854.6 to 1999.3 keV) 2.446E+03 GPS
Total Decayed Activity (854.6 to 1999.3 keV) 5.1671260E+03 GPS

Test America
St. Louis
Background Check

Spectrum: 9_20140716002_BG
Acquired: 7/16/2014 12:45:20 AM
Detector: Ge9 S/N100228730
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.89	1.53	1.65	1.82	2.14	2.26	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

TestAmerica, Inc Spectrum name: 9_20140716002_BG.An1

Sample description
Background Contamination Check

Spectrum Filename: C:\User\SPC\Det9\9_20140716002_BG.An1

Acquisition information
Start time:	7/16/2014 12:45:20 AM
Live time:	1800
Real time:	1802
Dead time:	0.11 %
Detector ID:	9

Detector system
Ge9 S/N100228730

Calibration
Filename: 9_QC.Clb
9_QC-E_79670-334_060211

Energy Calibration
Created:	3/1/2012 1:57:17 PM
Zero offset:	0.074 keV
Gain:	0.250 keV/channel
Quadratic:	-2.269E-08 keV/channel^2

Efficiency Calibration
Created:	6/3/2011 12:03:10 PM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.59keV)
Stop channel:	8000 (1999.34keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

```
       Half lives decay limit:    12.000
       Activity range factor:      2.000
       Min. step backg. energy     0.000
       Multiplet shift channel     2.000

 Corrections                          Status          Comments
       Decay correct to date:          NO
       Decay during acquisition:       NO
       Decay during collection:        NO
       True coincidence correction:    NO
       Peaked background correction:   NO
       Absorption (Internal):          NO
       Geometry correction:            NO
       Random summing:                 NO


 total peaks alloc.    0 cutoff: 5.00E+01%

 *****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
  Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
  Energy                             Factor    Energy   Ratio    DPS
 ____________________________________________________________________________
 No unknown peaks passed sensitivity test.

------------------------------------------------------------
 This section based on library: DET_Long Background PBC.lib


 ************** I D E N T I F I E D   P E A K    S U M M A R Y **************
 Nuclide  Peak    Centroid  Background  Net Area   Intensity   Uncert  FWHM
          Channel Energy    Counts      Counts     Cts/Sec  1 Sigma %  keV
 ____________________________________________________________________________

 *****   S U M M A R Y   O F   L I B R A R Y   P E A K   U S A G E   *****
- Nuclide -  Average     ------------- Peak --------------
Name   Code  Activity     Energy   Activity Code MDA Value
             DPS           keV     DPS           DPS            COMMENTS
 ____________________________________________________________________________
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
```

- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- - - -

SB-124	<	7.8302E-02
SB-125	<	4.0258E-01
I-131	<	6.0847E-02
BA-133	<	9.7857E-02
CS-134	<	1.1571E-01
CS-137	<	2.1801E-01
CE-139	<	7.5542E-02
Ba-140	<	2.8194E-01
La-140	<	1.8998E-01
CE-141	<	1.7979E-01
CE-144	<	2.9311E-01
PM-144	<	9.1722E-02
EU-152	<	1.7388E-01
EU-154	<	1.9511E+00
EU-155	<	2.4781E-01
HF-181	<	1.5996E-01
Ta-182	<	4.2511E-01
Hg-203	<	4.5778E-02
TL-208	<	8.7907E-02
pm-146	<	2.8974E-01
y-88	<	1.7759E-01
PB-210	<	1.3025E+00
PB-212	<	2.3479E-01
PB-214	<	3.7492E-01
BI-207	<	1.2122E-01
BI-212	<	1.2625E+00
BI-214	<	3.9994E-01
BI-210M	<	1.3755E-01
RA-224	<	2.0923E+00
AC-228	<	4.5769E-01
TH-227	<	3.3957E-01
TH-229	<	8.5486E-01
TH-234	<	1.4766E+00
PA-231	<	2.0339E+00
PA-233	<	1.1460E-01
PA-234	<	1.7959E-01
PA-234M	<	1.6606E+01
Ra-226	<	2.9769E+00
U-235	<	2.4113E-01
AM-241	<	3.0443E-01
Np-237	<	4.4485E-01

  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

TestAmerica, Inc Spectrum name: 9_20140716002_BG.An1

---------- S U M M A R Y ----------

Total Activity (	37.6 to	1999.3 keV)	0.000E+00 DPS

Test America
St. Louis
Background Check

Spectrum: 14_20140716001_BG
Acquired: 7/16/2014 12:02:19 AM
Detector: Ge14 SN/11080670
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.91	1.75	1.80	1.82	2.01	2.06	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

TestAmerica, Inc. Spectrum name: 14_20140716001_BG.An1

Sample description
Background Contamination Check

Spectrum Filename: C:\User\SPC\Det14\14_20140716001_BG.An1

Acquisition information
Start time: 7/16/2014 12:02:19 AM
Live time: 1800
Real time: 1808
Dead time: 0.43 %
Detector ID: 14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_QC.Clb
14_QC_79670-334_SOURCE E_042211

Energy Calibration
Created: 2/28/2012 10:48:23 AM
Zero offset: 0.130 keV
Gain: 0.250 keV/channel
Quadratic: -2.050E-08 keV/channel^2

Efficiency Calibration
Created: 5/1/2011 8:43:09 AM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.64keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

```
       Half lives decay limit:    12.000
       Activity range factor:      2.000
       Min. step backg. energy     0.000
       Multiplet shift channel     2.000

Corrections                          Status          Comments
       Decay correct to date:         NO
       Decay during acquisition:      NO
       Decay during collection:       NO
       True coincidence correction:   NO
       Peaked background correction:  NO
       Absorption (Internal):         NO
       Geometry correction:           NO
       Random summing:                NO


total peaks alloc.    6 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       1.0000

*****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
 Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
 Energy                             Factor    Energy   Ratio    DPS
_____________________________________________________________________________
   46.54       34.  26.42   0.46  6.121E-02    46.54   4.250  7.261E+00 PB210
  185.94       26.  22.82   0.54  1.071E-01   185.72  54.000    PBC<MDA U235
                                              185.99   3.280  4.165E+00 Ra226
No unknown peaks passed sensitivity test.

-------------------------------------------------------------
This section based on library: DET_Long Background PBC.lib


************** I D E N T I F I E D   P E A K   S U M M A R Y **************
Nuclide  Peak    Centroid  Background  Net Area   Intensity   Uncert  FWHM
         Channel Energy    Counts      Counts     Cts/Sec  1 Sigma %  keV
_____________________________________________________________________________
PB-210    185.57    46.54        14.        34.     0.019    26.42   0.456s
Ra-226    743.01   185.94         3.        26.     0.015    22.82   0.542s

  s - Peak fails shape tests.
  D - Peak area deconvoluted.
  A   Derived peak area.
```

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Peak Code	MDA Value DPS	COMMENTS
PB-210	N	7.2609E+00				8.14E+03	
			46.54	7.261E+00	?(	4.302E+00 2.64E+01	4.25E+00 G
Ra-226		4.1645E+00				5.84E+05	
			185.99	4.165E+00	(	1.632E+00 2.28E+01	3.28E+00 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Activity DPS	Time of Count Uncertainty Counting 1 Sigma	MDA
BE-7	<	8.0709E-01		
NA-22	<	2.3647E-01		
K-40	<	4.0218E+00		
Sc-46	<	1.5940E-01		
CR-51	<	5.6077E-01		
MN-54	<	1.8891E-01		
FE-59	<	3.5360E-01		
Co-56	<	1.9155E-01		
CO-57	<	1.0201E-01		
CO-58	<	3.4689E-01		
CO-60	<	2.4748E-01		
ZN-65	<	4.0267E-01		
NB-94	<	1.3319E-01		
ZR-95	<	2.5275E-01		
NB-95	<	1.3924E-01		
RU-103	<	1.7229E-01		
RH-106	<	1.1449E+00		
AG-108M	<	1.2751E-01		
AG-110M	<	2.1809E-01		
SN-113	<	1.6866E-01		
SB-124	<	1.1071E-01		
SB-125	<	5.9748E-01		
I-131	<	1.1765E-01		
BA-133	<	1.0239E-01		
CS-134	<	2.1452E-01		
CS-137	<	1.4715E-01		
CE-139	<	1.0816E-01		
Ba-140	<	3.8881E-01		
La-140	<	2.9504E-01		
CE-141	<	2.0321E-01		
CE-144	<	6.2265E-01		
PM-144	<	2.5093E-01		
EU-152	<	3.7428E-01		
EU-154	<	1.2746E+00		
EU-155	<	3.0186E-01		
HF-181	<	1.0629E-01		
Ta-182	<	5.8794E-01		
Hg-203	<	6.0042E-02		
TL-208	<	3.4722E-01		
pm-146	<	4.0090E-01		
y-88	<	1.7189E-01		
PB-210	#	7.2609E+00	2.6416E+01%	4.302E+00
PB-212	<	3.2884E-01		

PB-214	<	2.4334E-01			
BI-207	<	1.5156E-01			
BI-212	<	1.7694E+00			
BI-214	<	4.2680E-01			
BI-210M	<	9.4052E-02			
RA-224	<	2.5337E+00			
AC-228	<	9.1814E-01			
TH-227	<	7.1835E-01			
TH-229	<	8.8444E-01			
TH-234	<	4.7494E+00			
PA-231	<	1.8267E+00			
PA-233	<	2.6845E-01			
PA-234	<	4.7847E-01			
PA-234M	<	2.1361E+01			
Ra-226	#	4.1645E+00	2.2820E+01%		1.632E+00
U-235	<	3.9886E-01			
AM-241	<	4.4559E-01			
Np-237	<	7.8243E-01			

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

S U M M A R Y

Total Activity (37.6 to 1999.5 keV) 1.143E+01 DPS

Test America
St. Louis
Quality Control Check

Spectrum: 14_20140716002_QCAsLeft
Acquired: 7/16/2014 1:06:02 AM
Detector: Ge14 SN/11080670
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.80	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.61	59.79	60.04	PASS
FWHM	0.76	0.00	0.00	0.79	1.86	1.96	PASS
ActivityDiff	671.90	-5.00	-4.00	1.36	4.00	5.00	PASS
QA-662							
FWHM	1.35	0.00	0.00	1.41	3.05	3.15	PASS
ActivityDiff	628.85	-5.00	-4.00	0.56	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.20	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.57	1333.01	1333.26	PASS
FWHM	1.91	0.00	0.00	1.84	4.11	4.21	PASS
ActivityDiff	1224.59	-5.00	-4.00	-1.43	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

TestAmerica, Inc. Spectrum name: 14_20140716002_QCAsLeft.An1

Sample description
Quality control Check (QC Source 'E') Post Stabilization

Spectrum Filename: C:\User\SPC\Det14\14_20140716002_QCAsLeft.An1

Acquisition information
Start time:	7/16/2014 1:06:02 AM
Live time:	1000
Real time:	1014
Dead time:	1.42 %
Detector ID:	14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_QC.Clb
14_QC_79670-334_SOURCE E_042211

Energy Calibration
Created:	2/28/2012 10:48:23 AM
Zero offset:	0.130 keV
Gain:	0.250 keV/channel
Quadratic:	-2.050E-08 keV/channel^2

Efficiency Calibration
Created:	5/1/2011 8:43:09 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_QC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.64keV)
Stop channel:	8000 (1999.52keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	1.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

```
       Half lives decay limit:    12.000
       Activity range factor:      2.000
       Min. step backg. energy     0.000
       Multiplet shift channel     2.000

Corrections                          Status          Comments
       Decay correct to date:         YES       4/1/2009 12:00:00 PM
       Decay during acquisition:      YES
       Decay during collection:       NO
       True coincidence correction:   NO
       Peaked background correction:  NO
       Absorption (Internal):         NO
       Geometry correction:           NO
       Random summing:                NO


total peaks alloc.    6 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0548

*****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
 Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
 Energy                             Factor    Energy   Ratio    GPS
_____________________________________________________________________________
   59.61    52549.   0.48   0.79  8.006E-02    59.54 100.000  6.628E+02 QA60
   87.99     6395.   1.51   0.82  1.210E-01    88.03 100.000  9.546E+02 QA88
  661.74    18077.   0.79   1.40  3.265E-02   661.66 100.000  6.254E+02 QA662
 1173.31    11494.   1.03   1.74  1.868E-02  1173.23 100.000  1.233E+03 QA1173
 1332.57    10252.   1.01   1.84  1.655E-02  1332.51 100.000  1.242E+03 QA1332
No unknown peaks passed sensitivity test.

-------------------------------------------------------------
This section based on library: DET_QC.lib


************** I D E N T I F I E D   P E A K   S U M M A R Y **************
Nuclide  Peak    Centroid  Background  Net Area   Intensity   Uncert  FWHM
         Channel Energy    Counts      Counts     Cts/Sec  1 Sigma %  keV
_____________________________________________________________________________
QA-60     237.84    59.61      2899.     52549.    52.549     0.48   0.788
QA-88     351.34    87.99       808.      6395.     6.395     1.51   0.815
QA-662   2646.08   661.74       403.     18077.    18.077     0.79   1.405
QA-1173  4692.89  1173.31       329.     11494.    11.494     1.03   1.743
QA-1332  5330.22  1332.57        56.     10252.    10.252     1.01   1.844

  s - Peak fails shape tests.
  D - Peak area deconvoluted.
  A   Derived peak area.
```

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Nuclide Code	Average Activity GPS	Peak Energy keV	Peak Activity GPS		Peak Code	MDA Value GPS			COMMENTS
QA-60		6.6278E+02					1.58E+05			
			59.54	6.628E+02	(	3.199E+00	4.78E-01	1.00E+02	G	
QA-88		9.5455E+02					4.63E+02			
			88.03	9.546E+02	(	2.018E+01	1.51E+00	1.00E+02	G	
QA-662		6.2535E+02					1.10E+04			
			661.66	6.254E+02	(	3.330E+00	7.87E-01	1.00E+02	G	
QA-1173		1.2334E+03					1.92E+03			
			1173.23	1.233E+03	(	9.366E+00	1.03E+00	1.00E+02	G	
QA-1332		1.2421E+03					1.92E+03			
			1332.51	1.242E+03	(	4.553E+00	1.01E+00	1.00E+02	G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average

R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity GPS	Time Corrected Activity GPS	Uncertainty 1 Sigma Counting	MDA
QA-60		6.5719E+02	6.6278E+02	4.783E-01%	3.20E+00
QA-88		5.2829E+01	9.5455E+02	1.513E+00%	2.02E+01
QA-122	<	1.0524E+00	1.4505E+02		
QA-166			>12 Halflives		
QA-279			>12 Halflives		
QA-392			>12 Halflives		
QA-514			>12 Halflives		
QA-662		5.5358E+02	6.2535E+02	7.867E-01%	3.33E+00
QA-898			>12 Halflives		
QA-1173		6.1521E+02	1.2334E+03	1.026E+00%	9.37E+00
QA-1332		6.1953E+02	1.2421E+03	1.009E+00%	4.55E+00
QA-1836			>12 Halflives		

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 2.498E+03 GPS
Total Decayed Activity (37.6 to 1999.5 keV) 4.7181680E+03 GPS

Initial Calibrations

Gamma Verification per Geometry

Detector:	Ge4
Geometry:	Tunacan
Reference date	1/1/2012
Calibration Standard:	90099
Standard volume g / vial	1550
Standard volume transferred in g / geometry	317.8
lab ID# of cal standard	6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14534	97.4
Am-241	2037	418	0.3590	1163	1211.4	104.1
Cd-109	2881	591	0.0361	16363	16123	98.5
Co-57	1511	310	0.8560	362	353.51	97.7
Ce-139	2139	439	0.7990	549	541.9	98.7
Hg-203	4651	954	0.8146	1171	1197.5	102.3
Sn-113	3015	618	0.6400	966	965.83	100.0
Cs-137	1938	397	0.8510	467	464.8	99.5
Y-88	7264	1489	0.9370	1589	1568.4	98.7
Co-60	3580	734	0.9997	734	732.09	99.7
Co-60	3581	734	0.9999	734	730.52	99.5
Y-88	7690	1577	0.9920	1589	1608.9	101.2

Reviewed By: Jody Watson

Date: 4/2/2012

Calibration Data from file: 4_Soil_TunaCan.Clb
Energy Calibration Date: 4/2/2012 Time: 1:19:28 PM
Efficiency Calibration Date: 4/2/2012 Time: 1:19:41 PM

Calibration Description:
4_Soil_TunaCan_90099_033012

Energy Calibration Fit
Energy = 0.0841 +0.250111*Channel -2.82165e-008*Channel**2
FWHM (ch) = 2.9699 +0.000905*Channel -1.12861e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta	
185.86	46.54	46.57	-0.06%	0.77	0.78	-2.05%	*
237.99	59.54	59.61	-0.11%	0.77	0.80	-2.87%	*
352.07	88.03	88.14	-0.12%	0.80	0.82	-3.00%	*
487.89	122.06	122.10	-0.04%	0.85	0.85	-0.79%	
662.68	165.85	165.81	0.02%	0.92	0.89	2.85%	
1115.49	279.17	279.05	0.04%	1.04	0.99	4.71%	*
1565.30	391.69	391.51	0.04%	1.10	1.09	0.87%	
2645.59	661.66	661.58	0.01%	1.34	1.32	1.45%	
3591.88	898.02	898.09	-0.01%	1.50	1.52	-1.26%	*
4693.38	1173.24	1173.33	-0.01%	1.74	1.74	0.11%	
5330.90	1332.50	1332.60	-0.01%	1.83	1.87	-2.11%	*
7346.21	1836.01	1835.93	0.00%	2.27	2.25	0.88%	*

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.7786 %
Ln(Eff) = -0.3984 -0.574628*Ln(Eng) -0.0204644*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 0.8003 %
Ln(Eff) = -25.4679 +9.285295*Ln(Eng) -0.990443*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	1.1765E-002	1.2076E-002	-2.64%
59.54	1.7788E-002	1.7193E-002	3.35%
88.03	2.3178E-002	2.3534E-002	-1.53%
122.06	2.3675E-002	2.4250E-002	-2.43%
165.85	========== Knee ==========		
165.85	2.0578E-002	2.0860E-002	-1.37%
279.17	1.4119E-002	1.3792E-002	2.32%
391.69	1.0481E-002	1.0476E-002	0.05%
661.66	6.7648E-003	6.7809E-003	-0.24%
898.02	5.1688E-003	5.2356E-003	-1.29%
1173.24	4.1471E-003	4.1620E-003	-0.36%
1332.50	3.7091E-003	3.7274E-003	-0.49%
1836.01	2.8499E-003	2.8152E-003	1.22%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

```
     ORTEC g v - i (1087) Env32  G53W4.25  4/2/2012 2:16:12 PM
TestAmerica                      Spectrum name: 4_TunaCan_20120147.An1

Sample description
     4_TunaCan_90099_033012


Spectrum Filename: C:\User\Cal\Spectra\Det4\4_TunaCan_20120147.An1

Acquisition information
       Start time:                 3/30/2012 1:58:17 PM
       Live time:               7200
       Real time:               7338
       Dead time:                  1.88 %
       Detector ID:                   4

Detector system
     Ge 4 SN/181


Calibration
       Filename:                   4_Soil_TunaCan.Clb
     4_Soil_TunaCan_90099_033012


       Energy Calibration
            Created:               4/2/2012 1:19:28 PM
            Zero offset:           0.084 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -2.822E-08 keV/channel^2

       Efficiency Calibration
            Created:               4/2/2012 1:19:41 PM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   0.78 %
            Log(Eff):             -3.983609E-01 + (-5.746278E-01*Log(E) ) +
                                   ( -2.046438E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   0.80 %
            Log(Eff):             -2.546791E+01 + ( 9.285295E+00*Log(E) ) +
                                   ( -9.904428E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.60keV )
       Stop channel:            8000 (  1999.16keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (1087) Env32 G53W4.25 4/2/2012 2:16:12 PM
TestAmerica Spectrum name: 4_TunaCan_20120147.An1

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0727

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.57	53301.	0.71	0.77	1.209E-02	46.54	4.250	1.453E+04	Pb210
59.61	53514.	0.70	0.77	1.722E-02	59.54	35.700	1.211E+03	AM241
72.99	2672.	6.56	0.81	2.103E-02				
88.14	86292.	0.46	0.80	2.355E-02	88.03	3.610	1.612E+04	CD109
122.10	42094.	0.74	0.85	2.425E-02	122.06	85.600	3.535E+02	CO57
136.52	5015.	4.27	0.87	2.334E-02				
165.81	41514.	0.70	0.92	2.058E-02	165.85	79.900	5.419E+02	Ce139
254.94	1501.	9.38	0.88	1.484E-02				
279.05	25767.	0.82	1.04	1.380E-02	279.17	81.500	1.198E+03	Hg203
391.51	27259.	0.80	1.10	1.048E-02	391.69	64.000	9.658E+02	SN113
661.58	19228.	1.08	1.34	6.782E-03	661.66	85.210	4.648E+02	CS137
898.08	31032.	0.70	1.50	5.235E-03	898.02	93.700	1.568E+03	Y898
1173.32	21224.	0.86	1.74	4.162E-03	1173.24	99.900	7.321E+02	Co1173
1332.60	18983.	0.84	1.83	3.727E-03	1332.50	99.982	7.305E+02	Co1332
1835.92	18122.	0.77	2.27	2.815E-03	1836.01	99.200	1.609E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
291.55	73.00	15410.	2435.	1.158E+05	9.06	0.811	-	D
545.54	136.52	10631.	5015.	2.149E+05	4.27	0.869	-	
1019.10	254.94	4774.	1501.	1.012E+05	9.38	0.884	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.86	46.57	22518.	53301.	7.403	0.71	0.769
AM-241	237.99	59.61	21765.	53514.	7.432	0.70	0.774
CD-109	352.07	88.14	19168.	86292.	11.985	0.46	0.798
CO-57	487.89	122.10	12939.	42094.	5.846	0.74	0.846
Ce-139	662.68	165.81	9873.	41514.	5.766	0.70	0.918
Hg-203	1115.49	279.05	4611.	25767.	3.579	0.82	1.041
SN-113	1565.30	391.51	4016.	27259.	3.786	0.80	1.099
CS-137	2645.59	661.58	4040.	19228.	2.671	1.08	1.341
Y-898	3591.86	898.08	2594.	31032.	4.310	0.70	1.500
Co-1173	4693.36	1173.32	1627.	21224.	2.948	0.86	1.745
Co-1332	5330.90	1332.60	968.	18983.	2.636	0.84	1.828
Y-1836	7346.17	1835.92	184.	18122.	2.517	0.77	2.271

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq		COMMENTS
Pb-210	N	1.4534E+04				8.15E+03		
			46.54	1.453E+04	(	1.914E+02	7.10E-01	4.25E+00 G
AM-241		1.2114E+03				1.58E+05		
			59.54	1.211E+03	(	1.562E+01	7.01E-01	3.57E+01 G
CD-109		1.6123E+04				4.63E+02		
			88.03	1.612E+04	(	1.210E+02	4.63E-01	3.61E+00 G
CO-57		3.5351E+02				2.72E+02		
			122.06	3.535E+02	(	4.474E+00	7.36E-01	8.56E+01 G

ORTEC g v - i (1087) Env32 G53W4.25 4/2/2012 2:16:12 PM
TestAmerica Spectrum name: 4_TunaCan_20120147.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ce-139	5.4190E+02					1.38E+02	
		165.85	5.419E+02	(	6.080E+00	6.99E-01	7.99E+01 G
Hg-203	1.1975E+03					4.66E+01	
		279.17	1.198E+03	(	1.483E+01	8.16E-01	8.15E+01 G
SN-113	9.6583E+02					1.15E+02	
		391.69	9.658E+02	(	1.056E+01	7.98E-01	6.40E+01 G
CS-137	4.6480E+02					1.10E+04	
		661.66	4.648E+02	(	7.225E+00	1.08E+00	8.52E+01 G
Y-898	1.5684E+03					1.07E+02	
		898.02	1.568E+03	(	1.213E+01	6.99E-01	9.37E+01 G
Co-1173	7.3209E+02					1.93E+03	
		1173.24	7.321E+02	(	6.576E+00	8.65E-01	9.99E+01 G
Co-1332	7.3052E+02					1.93E+03	
		1332.50	7.305E+02	(	5.685E+00	8.43E-01	1.00E+02 G
Y-1836	1.6089E+03					1.07E+02	
		1836.01	1.609E+03	(	5.860E+00	7.72E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

ORTEC g v - i (1087) Env32 G53W4.25 4/2/2012 2:16:12 PM
TestAmerica Spectrum name: 4_TunaCan_20120147.An1

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
Pb-210	1.4424E+04	1.4534E+04	7.104E-01%	1.91E+02
AM-241	1.2109E+03	1.2114E+03	7.006E-01%	1.56E+01
CD-109	1.4107E+04	1.6123E+04	4.632E-01%	1.21E+02
CO-57	2.8164E+02	3.5351E+02	7.361E-01%	4.47E+00
Ce-139	3.4594E+02	5.4190E+02	6.994E-01%	6.08E+00
Hg-203	3.1837E+02	1.1975E+03	8.160E-01%	1.48E+01
SN-113	5.6466E+02	9.6583E+02	7.982E-01%	1.06E+01
CS-137	4.6220E+02	4.6480E+02	1.084E+00%	7.23E+00
Y-898	8.7856E+02	1.5684E+03	6.988E-01%	1.21E+01
Co-1173	7.0897E+02	7.3209E+02	8.649E-01%	6.58E+00
Co-1332	7.0745E+02	7.3052E+02	8.429E-01%	5.68E+00
Y-1836	9.0125E+02	1.6089E+03	7.719E-01%	5.86E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.2 keV) 3.491E+04 Bq
Total Decayed Activity (37.6 to 1999.2 keV) 4.0031488E+04 Bq

Analyzed by: _____
Admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica

Gamma Verification per Geometry

Detector:	Ge8
Geometry:	Tunacan
Reference date	1/1/2012
Calibration Standard:	90099
Standard volume g / vial	1550
Standard volume transferred in g / geometry	317.8
lab ID# of cal standard	6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14960	100.2
Am-241	2037	418	0.3590	1163	1240.5	106.6
Cd-109	2881	591	0.0361	16363	16066	98.2
Co-57	1511	310	0.8560	362	345.12	95.4
Ce-139	2139	439	0.7990	549	536.34	97.7
Hg-203	4651	954	0.8146	1171	1218.2	104.1
Sn-113	3015	618	0.6400	966	967.15	100.1
Cs-137	1938	397	0.8510	467	465.86	99.8
Y-88	7264	1489	0.9370	1589	1552.1	97.6
Co-60	3580	734	0.9997	734	724.48	98.7
Co-60	3581	734	0.9999	734	729.98	99.4
Y-88	7690	1577	0.9920	1589	1627.2	102.4

Reviewed By: Jody Watson

Date: 3/28/2012

Calibration Data from file: 8_Soil_TunaCan.Clb
Energy Calibration Date: 3/28/2012 Time: 10:35:07 AM
Efficiency Calibration Date: 3/28/2012 Time: 10:35:20 AM

Calibration Description:
8_Soil_TunaCan_90099_032712

Energy Calibration Fit
Energy = 0.0505 +0.250025*Channel +8.06699e-010*Channel**2
FWHM (ch) = 3.6351 +0.000832*Channel -2.49195e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.74	46.54	46.49	0.11%	0.94	0.95	-0.61%
237.86	59.54	59.52	0.03%	0.95	0.96	-1.36%
351.89	88.03	88.03	-0.00%	0.97	0.98	-1.63%
488.04	122.06	122.07	-0.01%	1.01	1.01	0.12%
663.26	165.85	165.88	-0.02%	1.07	1.04	2.17%
1116.59	279.17	279.23	-0.02%	1.15	1.13	1.73%
1566.40	391.69	391.69	-0.00%	1.22	1.22	0.24%
2645.92	661.66	661.60	0.01%	1.39	1.42	-1.95%
3591.62	898.02	898.05	-0.00%	1.61	1.58	2.16%
4692.17	1173.24	1173.23	0.00%	1.74	1.75	-0.61%
5329.14	1332.50	1332.49	0.00%	1.82	1.84	-1.05%
7342.97	1836.01	1836.02	-0.00%	2.11	2.10	0.42%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.3942 %
Ln(Eff) = -0.1099 -0.495854*Ln(Eng) -0.0257227*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.7131 %
Ln(Eff) = -25.2530 +9.398253*Ln(Eng) -1.00003*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	1.9170E-002	2.0055E-002	-4.62%
59.54	3.0526E-002	2.8813E-002	5.61%
88.03	3.9175E-002	3.9918E-002	-1.90%
122.06	3.9509E-002	4.1457E-002	-4.93%
165.85	========== Knee ==========		
165.85	3.5429E-002	3.6291E-002	-2.43%
279.17	2.5270E-002	2.4275E-002	3.94%
391.69	1.8582E-002	1.8550E-002	0.17%
661.66	1.2089E-002	1.2090E-002	-0.01%
898.02	9.1435E-003	9.3604E-003	-2.37%
1173.24	7.3487E-003	7.4527E-003	-1.42%
1332.50	6.6398E-003	6.6776E-003	-0.57%
1836.01	5.1654E-003	5.0457E-003	2.32%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

```
     ORTEC g v - i (1087) Env32  G53W4.25  3/28/2012 10:36:01 AM
TestAmerica                      Spectrum name: 8_TunaCan_20120676.An1

Sample description
     8_TunaCan_90099_032712


Spectrum Filename: C:\User\SPC\Det8\8_TunaCan_20120676.An1

Acquisition information
       Start time:                 3/27/2012 10:58:29 AM
       Live time:                3600
       Real time:                3655
       Dead time:                   1.49 %
       Detector ID:                    8

Detector system
     Ge 8 SN/174


Calibration
       Filename:                   8_Soil_TunaCan.Clb
     8_Soil_TunaCan_90099_032712


       Energy Calibration
            Created:               3/28/2012 10:35:07 AM
            Zero offset:           0.050 keV
            Gain:                  0.250 keV/channel
            Quadratic:             8.067E-10 keV/channel^2

       Efficiency Calibration
            Created:               3/28/2012 10:35:20 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.39 %
            Log(Eff):             -1.098764E-01 + (-4.958544E-01*Log(E) ) +
                                   ( -2.572270E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.71 %
            Log(Eff):             -2.525301E+01 + ( 9.398253E+00*Log(E) ) +
                                   ( -1.000034E+00*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.55keV )
       Stop channel:            8000 (  2000.30keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 0.0205

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.54	43426.	0.60	0.95	2.002E-02	46.54	4.250	1.426E+04	Pb210
59.52	45918.	0.77	0.95	2.880E-02	59.54	35.700	1.240E+03	AM241
72.86	2434.	6.68	0.97	3.542E-02				
88.03	73269.	0.53	0.97	3.992E-02	88.03	3.610	1.607E+04	CD109
122.07	35407.	0.77	1.01	4.146E-02	122.06	85.600	3.451E+02	CO57
136.51	4312.	4.44	1.06	3.999E-02				
165.88	36308.	0.76	1.07	3.629E-02	165.85	79.900	5.363E+02	Ce139
279.23	24162.	0.88	1.15	2.427E-02	279.17	81.500	1.218E+03	Hg203
391.69	24625.	0.77	1.22	1.855E-02	391.69	64.000	9.671E+02	SN113
661.60	17184.	1.10	1.39	1.209E-02	661.66	85.210	4.659E+02	CS137
898.05	28015.	0.71	1.61	9.360E-03	898.02	93.700	1.552E+03	Y898
1173.23	18826.	0.79	1.74	7.453E-03	1173.24	99.900	7.245E+02	Co1173
1332.49	17010.	0.84	1.82	6.678E-03	1332.50	99.982	7.300E+02	Co1332
1836.02	16762.	0.79	2.11	5.046E-03	1836.01	99.200	1.627E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
291.19	72.85	12003.	2434.	6.872E+04	6.68	0.969	-	D
545.78	136.51	8432.	4312.	1.078E+05	4.44	1.059	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.74	46.49	17505.	45568.	12.658	0.76	0.942
AM-241	237.86	59.52	18397.	45918.	12.755	0.77	0.945
CD-109	351.89	88.03	17370.	73269.	20.353	0.53	0.966
CO-57	488.04	122.07	9639.	35407.	9.835	0.77	1.010
Ce-139	663.26	165.88	8356.	36308.	10.085	0.76	1.067
Hg-203	1116.59	279.23	4382.	24162.	6.712	0.88	1.153
SN-113	1566.40	391.69	2677.	24625.	6.840	0.77	1.223
CS-137	2645.92	661.60	3145.	17184.	4.773	1.10	1.389
Y-898	3591.62	898.05	1881.	28015.	7.782	0.71	1.611
Co-1173	4692.17	1173.23	650.	18826.	5.229	0.79	1.738
Co-1332	5329.14	1332.49	576.	17010.	4.725	0.84	1.822
Y-1836	7342.97	1836.02	111.	16762.	4.656	0.79	2.110

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq		Peak Code	MDA Value Bq		COMMENTS
Pb-210	N	1.4960E+04					8.15E+03		
			46.54	1.496E+04	(	2.033E+02	7.55E-01	4.25E+00	G
AM-241		1.2405E+03					1.58E+05		
			59.54	1.240E+03	(	1.715E+01	7.72E-01	3.57E+01	G
CD-109		1.6066E+04					4.63E+02		
			88.03	1.607E+04	(	1.353E+02	5.26E-01	3.61E+00	G
CO-57		3.4512E+02					2.72E+02		
			122.06	3.451E+02	(	4.486E+00	7.68E-01	8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 10:36:01 AM
TestAmerica Spectrum name: 8_TunaCan_20120676.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ce-139	5.3634E+02					1.38E+02	
		165.85	5.363E+02	(	6.333E+00	7.56E-01	7.99E+01 G
Hg-203	1.2182E+03					4.66E+01	
		279.17	1.218E+03	(	1.569E+01	8.81E-01	8.15E+01 G
SN-113	9.6715E+02					1.15E+02	
		391.69	9.671E+02	(	9.575E+00	7.73E-01	6.40E+01 G
CS-137	4.6586E+02					1.10E+04	
		661.66	4.659E+02	(	7.158E+00	1.10E+00	8.52E+01 G
Y-898	1.5521E+03					1.07E+02	
		898.02	1.552E+03	(	1.135E+01	7.10E-01	9.37E+01 G
Co-1173	7.2448E+02					1.93E+03	
		1173.24	7.245E+02	(	4.676E+00	7.93E-01	9.99E+01 G
Co-1332	7.2998E+02					1.93E+03	
		1332.50	7.300E+02	(	4.916E+00	8.45E-01	1.00E+02 G
Y-1836	1.6272E+03					1.07E+02	
		1836.01	1.627E+03	(	5.029E+00	7.91E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 10:36:01 AM
TestAmerica Spectrum name: 8_TunaCan_20120676.An1

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
Pb-210	1.4851E+04	1.4960E+04	7.555E-01%	2.03E+02
AM-241	1.2400E+03	1.2405E+03	7.719E-01%	1.71E+01
CD-109	1.4124E+04	1.6066E+04	5.260E-01%	1.35E+02
CO-57	2.7715E+02	3.4512E+02	7.681E-01%	4.49E+00
Ce-139	3.4782E+02	5.3634E+02	7.558E-01%	6.33E+00
Hg-203	3.3925E+02	1.2182E+03	8.812E-01%	1.57E+01
SN-113	5.7617E+02	9.6715E+02	7.729E-01%	9.58E+00
CS-137	4.6334E+02	4.6586E+02	1.105E+00%	7.16E+00
Y-898	8.8728E+02	1.5521E+03	7.104E-01%	1.13E+01
Co-1173	7.0239E+02	7.2448E+02	7.931E-01%	4.68E+00
Co-1332	7.0772E+02	7.2998E+02	8.450E-01%	4.92E+00
Y-1836	9.3024E+02	1.6272E+03	7.905E-01%	5.03E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (82.3 to 2000.3 keV) 3.545E+04 Bq
Total Decayed Activity (82.3 to 2000.3 keV) 4.0432598E+04 Bq

Analyzed by: _____
Admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica

Gamma Verification per Geometry

Detector: Ge9

Geometry: Tunacan

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 317.8

lab ID# of cal standard 6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14240	95.4
Am-241	2037	418	0.3590	1163	1244.5	107.0
Cd-109	2881	591	0.0361	16363	15902	97.2
Co-57	1511	310	0.8560	362	347.48	96.0
Ce-139	2139	439	0.7990	549	535.87	97.6
Hg-203	4651	954	0.8146	1171	1216.7	103.9
Sn-113	3015	618	0.6400	966	970.65	100.5
Cs-137	1938	397	0.8510	467	466.58	99.9
Y-88	7264	1489	0.9370	1589	1552.5	97.7
Co-60	3580	734	0.9997	734	727.12	99.0
Co-60	3581	734	0.9999	734	719.75	98.0
Y-88	7690	1577	0.9920	1589	1638.8	103.1

Reviewed By: Jody Watson

Date: 6/14/2012

Calibration Data from file: 9_Soil_TunaCan.Clb
Energy Calibration Date: 6/14/2012 Time: 10:19:40 AM
Efficiency Calibration Date: 6/14/2012 Time: 10:19:51 AM

Calibration Description:
9_Soil_TunaCan_90099_050312

Energy Calibration Fit
Energy = 0.0875 +0.250109*Channel -2.0385e-008*Channel**2
FWHM (ch) = 4.1690 +0.000934*Channel -2.36522e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.85	46.54	46.57	-0.06%	1.07	1.09	-1.37%
237.85	59.54	59.58	-0.06%	1.08	1.10	-1.96%
351.79	88.03	88.07	-0.05%	1.12	1.12	-0.18%
487.79	122.06	122.08	-0.02%	1.14	1.16	-1.17%
662.64	165.85	165.81	0.02%	1.23	1.19	2.51%
1115.53	279.17	279.07	0.04%	1.30	1.30	0.44%
1565.74	391.69	391.64	0.01%	1.43	1.39	2.81%
2645.81	661.66	661.69	-0.00%	1.60	1.62	-0.83%
3591.21	898.02	898.02	0.00%	1.80	1.80	-0.02%
4692.44	1173.24	1173.26	-0.00%	2.01	2.01	0.18%
5329.80	1332.50	1332.54	-0.00%	2.09	2.12	-1.38%
7344.77	1836.01	1835.98	0.00%	2.45	2.44	0.55%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.3038 %
Ln(Eff) = -0.8080 -0.236727*Ln(Eng) -0.0395064*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.4241 %
Ln(Eff) = -23.8792 +8.875647*Ln(Eng) -0.94011*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	2.4596E-002	2.5767E-002	-4.76%
59.54	3.8891E-002	3.6589E-002	5.92%
88.03	4.9059E-002	5.0504E-002	-2.95%
122.06	5.0886E-002	5.3031E-002	-4.22%
165.85	========== Knee ==========		
165.85	4.6197E-002	4.7361E-002	-2.52%
279.17	3.4900E-002	3.3566E-002	3.82%
391.69	2.6668E-002	2.6526E-002	0.53%
661.66	1.8125E-002	1.8099E-002	0.14%
898.02	1.4012E-002	1.4341E-002	-2.34%
1173.24	1.1507E-002	1.1627E-002	-1.05%
1332.50	1.0296E-002	1.0501E-002	-2.00%
1836.01	8.3305E-003	8.0796E-003	3.01%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

```
     ORTEC g v - i (1087) Env32  G53W4.25  6/14/2012 10:20:07 AM
TestAmerica, Inc                Spectrum name: 9_TunaCan_20120147.An1

Sample description
     9_TunaCan_90099_050312


Spectrum Filename: C:\User\SPC\Det9\9_TunaCan_20120147.An1

Acquisition information
       Start time:                5/3/2012 1:37:42 PM
       Live time:               3600
       Real time:               3661
       Dead time:                 1.65 %
       Detector ID:                  9

Detector system
     Ge 9 SN/100113


Calibration
       Filename:                  9_Soil_TunaCan.Clb
     9_Soil_TunaCan_90099_050312


       Energy Calibration
            Created:              6/14/2012 10:19:40 AM
            Zero offset:          0.088 keV
            Gain:                 0.250 keV/channel
            Quadratic:           -2.039E-08 keV/channel^2

       Efficiency Calibration
            Created:              6/14/2012 10:19:51 AM
            Knee Energy:        165.85 keV
            Above the Knee:       Quadratic        Uncertainty =   1.30 %
            Log(Eff):            -8.079856E-01 + (-2.367265E-01*Log(E) ) +
                                  ( -3.950640E-02*Log(E)^2 )
            Below the Knee:       Quadratic        Uncertainty =   1.42 %
            Log(Eff):            -2.387916E+01 + ( 8.875647E+00*Log(E) ) +
                                  ( -9.401100E-01*Log(E)^2 )

Library Files
       Main analysis library:     DET_EnergyStandardMix & Pb.Lib
       Library Match Width:       0.500
       Peak stripping:            Library based

Analysis parameters
       Analysis engine:           Env32   G53W4.25
       Start channel:           150 (    37.60keV )
       Stop channel:           8000 (  1999.66keV )
       Peak rejection level:     10.000%
       Peak search sensitivity:   3
       Sample Size:               1.0000E+00
       Activity scaling factor:   1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                  1.0000E+00
       Detection limit method:    Reg. Guide 4.16 Method
```

ORTEC g v - i (1087) Env32 G53W4.25 6/14/2012 10:20:07 AM
TestAmerica, Inc Spectrum name: 9_TunaCan_20120147.An1

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0265

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.57	55553.	0.67	1.07	2.579E-02	46.54	4.250	1.424E+04	Pb210
59.56	58492.	0.66	1.08	3.660E-02	59.54	35.700	1.245E+03	AM241
88.07	86792.	0.48	1.12	5.052E-02	88.03	3.610	1.590E+04	CD109
122.08	41484.	0.73	1.14	5.303E-02	122.06	85.600	3.475E+02	CO57
136.48	5266.	4.55	1.22	5.150E-02				
165.81	39272.	0.74	1.23	4.626E-02	165.85	79.900	5.359E+02	Ce139
279.06	19221.	1.24	1.30	3.358E-02	279.17	81.500	1.217E+03	Hg203
391.64	28263.	0.86	1.43	2.653E-02	391.69	64.000	9.707E+02	SN113
661.69	25703.	0.90	1.61	1.810E-02	661.66	85.210	4.666E+02	CS137
898.02	33728.	0.69	1.80	1.434E-02	898.02	93.700	1.552E+03	Y898
1173.24	29087.	0.72	2.01	1.163E-02	1173.24	99.900	7.271E+02	Co1173
1332.54	26026.	0.70	2.09	1.050E-02	1332.50	99.982	7.198E+02	Co1332
1835.94	21237.	0.73	2.46	8.080E-03	1836.01	99.200	1.639E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
545.34	136.48	10776.	5266.	1.023E+05	4.55	1.225	-

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.85	46.57	18837.	55553.	15.431	0.67	1.071
AM-241	237.79	59.56	19448.	58492.	16.248	0.66	1.078
CD-109	351.79	88.07	19261.	86792.	24.109	0.48	1.122
CO-57	487.79	122.08	11232.	41484.	11.523	0.73	1.142
Ce-139	662.64	165.81	9084.	39272.	10.909	0.74	1.225
Hg-203	1115.51	279.06	6250.	19221.	5.339	1.24	1.302
SN-113	1565.73	391.64	4864.	28263.	7.851	0.86	1.434
CS-137	2645.81	661.69	4037.	25703.	7.140	0.90	1.605
Y-898	3591.21	898.02	2958.	33728.	9.369	0.69	1.803
Co-1173	4692.36	1173.24	1710.	29087.	8.080	0.72	2.014
Co-1332	5329.80	1332.54	1048.	26026.	7.229	0.70	2.088
Y-1836	7344.62	1835.94	304.	21237.	5.899	0.73	2.457

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq		COMMENTS
Pb-210	N	1.4240E+04				8.15E+03		
			46.54	1.424E+04	(	1.646E+02	6.67E-01 4.25E+00 G	
AM-241		1.2445E+03				1.58E+05		
			59.54	1.245E+03	(	1.388E+01	6.60E-01 3.57E+01 G	
CD-109		1.5902E+04				4.63E+02		
			88.03	1.590E+04	(	1.190E+02	4.84E-01 3.61E+00 G	
CO-57		3.4748E+02				2.72E+02		
			122.06	3.475E+02	(	4.159E+00	7.31E-01 8.56E+01 G	

ORTEC g v - i (1087) Env32 G53W4.25 6/14/2012 10:20:07 AM
TestAmerica, Inc Spectrum name: 9_TunaCan_20120147.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA		Comments
Ce-139	5.3587E+02						1.38E+02	
		165.85	5.359E+02	(	6.097E+00	7.41E-01	7.99E+01	G
Hg-203	1.2167E+03						4.66E+01	
		279.17	1.217E+03	(	2.349E+01	1.24E+00	8.15E+01	G
SN-113	9.7065E+02						1.15E+02	
		391.69	9.707E+02	(	1.125E+01	8.60E-01	6.40E+01	G
CS-137	4.6658E+02						1.10E+04	
		661.66	4.666E+02	(	5.424E+00	8.98E-01	8.52E+01	G
Y-898	1.5525E+03						1.07E+02	
		898.02	1.552E+03	(	1.179E+01	6.92E-01	9.37E+01	G
Co-1173	7.2712E+02						1.93E+03	
		1173.24	7.271E+02	(	4.884E+00	7.20E-01	9.99E+01	G
Co-1332	7.1975E+02						1.93E+03	
		1332.50	7.198E+02	(	4.248E+00	6.98E-01	1.00E+02	G
Y-1836	1.6388E+03						1.07E+02	
		1836.01	1.639E+03	(	6.479E+00	7.29E-01	9.92E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
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S - Single-Escape

ORTEC g v - i (1087) Env32 G53W4.25 6/14/2012 10:20:07 AM
TestAmerica, Inc Spectrum name: 9_TunaCan_20120147.An1

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
Pb-210	1.4091E+04	1.4240E+04	6.667E-01%	1.65E+02
AM-241	1.2439E+03	1.2445E+03	6.605E-01%	1.39E+01
CD-109	1.3223E+04	1.5902E+04	4.843E-01%	1.19E+02
CO-57	2.5385E+02	3.4748E+02	7.313E-01%	4.16E+00
Ce-139	2.8828E+02	5.3587E+02	7.410E-01%	6.10E+00
Hg-203	1.9517E+02	1.2167E+03	1.239E+00%	2.35E+01
SN-113	4.6244E+02	9.7065E+02	8.599E-01%	1.13E+01
CS-137	4.6297E+02	4.6658E+02	8.981E-01%	5.42E+00
Y-898	6.9723E+02	1.5525E+03	6.917E-01%	1.18E+01
Co-1173	6.9559E+02	7.2712E+02	7.204E-01%	4.88E+00
Co-1332	6.8854E+02	7.1975E+02	6.982E-01%	4.25E+00
Y-1836	7.3602E+02	1.6388E+03	7.291E-01%	6.48E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.7 keV) 3.304E+04 Bq
Total Decayed Activity (37.6 to 1999.7 keV) 3.9561668E+04 Bq

Analyzed by: _____
admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica, Inc

Gamma Verification per Geometry

Detector: Ge14

Geometry: Tunacan

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 317.8

lab ID# of cal standard 6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14422	96.6
Am-241	2037	418	0.3590	1163	1222.5	105.1
Cd-109	2881	591	0.0361	16363	16145	98.7
Co-57	1511	310	0.8560	362	349.28	96.5
Ce-139	2139	439	0.7990	549	538.52	98.1
Hg-203	4651	954	0.8146	1171	1205.9	103.0
Sn-113	3015	618	0.6400	966	971.36	100.6
Cs-137	1938	397	0.8510	467	465.65	99.7
Y-88	7264	1489	0.9370	1589	1570	98.8
Co-60	3580	734	0.9997	734	724.16	98.6
Co-60	3581	734	0.9999	734	720.6	98.1
Y-88	7690	1577	0.9920	1589	1634	102.8

Reviewed By: Jody Watson

Date: 4/23/2012

Calibration Data from file: 14_Soil_TunaCan.Clb
Energy Calibration Date: 4/23/2012 Time: 11:29:29 AM
Efficiency Calibration Date: 4/23/2012 Time: 11:29:47 AM

Calibration Description:
14_TunaCan_90099_042312

Energy Calibration Fit
Energy = 0.1578 +0.250077*Channel -1.95882e-008*Channel**2
FWHM (ch) = 2.7879 +0.000947*Channel -1.45727e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
186.01	46.54	46.67	-0.29%	0.73	0.74	-2.18%
237.82	59.54	59.63	-0.15%	0.74	0.75	-1.99%
351.26	88.03	88.00	0.04%	0.78	0.78	-0.25%
487.04	122.06	121.95	0.09%	0.82	0.81	0.58%
662.28	165.85	165.77	0.05%	0.86	0.85	1.23%
1115.71	279.17	279.15	0.01%	0.98	0.96	2.15%
1565.69	391.69	391.65	0.01%	1.09	1.06	2.42%
2645.83	661.66	661.68	-0.00%	1.30	1.30	0.28%
3591.53	898.02	898.06	-0.00%	1.42	1.50	-5.87%
4692.63	1173.24	1173.24	-0.00%	1.76	1.73	2.11%
5329.97	1332.50	1332.50	-0.00%	1.88	1.86	1.08%
7345.32	1836.01	1836.00	0.00%	2.23	2.24	-0.37%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.0212 %
Ln(Eff) = 0.2101 -0.595197*Ln(Eng) -0.0160533*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.2797 %
Ln(Eff) = -23.9149 +8.828985*Ln(Eng) -0.93715*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	2.0990E-002	2.1711E-002	-3.44%
59.54	3.2006E-002	3.0654E-002	4.23%
88.03	4.1381E-002	4.1960E-002	-1.40%
122.06	4.2230E-002	4.3784E-002	-3.68%
165.85	========== Knee ==========		
165.85	3.7957E-002	3.8722E-002	-2.02%
279.17	2.6754E-002	2.5963E-002	2.96%
391.69	2.0047E-002	1.9926E-002	0.60%
661.66	1.3125E-002	1.3132E-002	-0.05%
898.02	1.0136E-002	1.0258E-002	-1.20%
1173.24	8.1251E-003	8.2437E-003	-1.46%
1332.50	7.2859E-003	7.4227E-003	-1.88%
1836.01	5.8454E-003	5.6863E-003	2.72%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

ORTEC g v - i (1087) Env32 G53W4.25 7/6/2012 11:13:09 AM Page 1
TestAmerica, Inc. Spectrum name: 14_TunaCan_20120385.An1

Sample description
17_TunaCan_90099_032612

Spectrum Filename: C:\User\Cal\Spectra\Det14\14_TunaCan_20120385.An1

Acquisition information
Start time: 4/23/2012 9:56:44 AM
Live time: 3600
Real time: 3665
Dead time: 1.77 %
Detector ID: 14

Detector system
Ge17 SN/11080671

Calibration
Filename: 14_Soil_TunaCan.Clb
14_TunaCan_90099_042312

Energy Calibration
Created: 4/23/2012 11:29:29 AM
Zero offset: 0.158 keV
Gain: 0.250 keV/channel
Quadratic: -1.959E-08 keV/channel^2

Efficiency Calibration
Created: 4/23/2012 11:29:47 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.02 %
Log(Eff): 2.101260E-01 + (-5.951973E-01*Log(E)) + (-1.605331E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -2.391492E+01 + (8.828985E+00*Log(E)) + (-9.371496E-01*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix & Pb.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.67keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0575

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.67	47449.	0.64	0.73	2.181E-02	46.54	4.250	1.442E+04	Pb210
59.63	48139.	0.67	0.74	3.071E-02	59.54	35.700	1.223E+03	AM241
72.88	1815.	8.13	0.77	3.737E-02				
88.00	74331.	0.47	0.79	4.195E-02	88.03	3.610	1.614E+04	CD109
121.95	35331.	0.76	0.82	4.379E-02	122.06	85.600	3.493E+02	CO57
136.39	4314.	3.84	0.82	4.244E-02				
165.77	33960.	0.70	0.89	3.800E-02	165.85	79.900	5.385E+02	Ce139
279.15	17136.	1.05	1.00	2.596E-02	279.17	81.500	1.206E+03	Hg203
391.65	22586.	0.85	1.13	1.993E-02	391.69	64.000	9.714E+02	SN113
661.68	18625.	0.92	1.36	1.313E-02	661.66	85.210	4.657E+02	CS137
898.06	26064.	0.74	1.56	1.026E-02	898.02	93.700	1.570E+03	Y898
1173.24	20614.	0.80	1.76	8.244E-03	1173.24	99.900	7.242E+02	Co1173
1332.50	18485.	0.81	1.88	7.423E-03	1332.50	99.982	7.206E+02	Co1332
1835.98	15919.	0.83	2.23	5.686E-03	1836.01	99.200	1.634E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
290.81	72.88	9094.	1708.	4.569E+04	9.16	0.857	-
544.77	136.39	6618.	4314.	1.017E+05	3.84	0.819	-

ORTEC g v - i (1087) Env32 G53W4.25 7/6/2012 11:13:09 AM Page 3
TestAmerica, Inc. Spectrum name: 14_TunaCan_20120385.An1

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	186.01	46.67	13580.	47449.	13.180	0.64	0.728
AM-241	237.82	59.63	14856.	48139.	13.372	0.67	0.736
CD-109	351.26	88.00	13424.	74331.	20.647	0.47	0.793
CO-57	487.04	121.95	9138.	35331.	9.814	0.76	0.820
Ce-139	662.28	165.77	5743.	33960.	9.433	0.70	0.887
Hg-203	1115.71	279.15	3658.	17136.	4.760	1.05	0.998
SN-113	1565.69	391.65	3032.	22586.	6.274	0.85	1.125
CS-137	2645.83	661.68	2231.	18625.	5.174	0.92	1.364
Y-898	3591.53	898.06	1967.	26064.	7.240	0.74	1.562
Co-1173	4692.63	1173.24	1001.	20614.	5.726	0.80	1.765
Co-1332	5329.97	1332.50	650.	18485.	5.135	0.81	1.875
Y-1836	7345.28	1835.98	147.	15919.	4.422	0.83	2.232

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq	COMMENTS
Pb-210	N	1.4422E+04				8.15E+03	
			46.54	1.442E+04	(	1.659E+02 6.42E-01 4.25E+00	G
AM-241		1.2225E+03				1.58E+05	
			59.54	1.223E+03	(	1.449E+01 6.65E-01 3.57E+01	G
CD-109		1.6145E+04				4.63E+02	
			88.03	1.614E+04	(	1.179E+02 4.73E-01 3.61E+00	G
CO-57		3.4928E+02				2.72E+02	
			122.06	3.493E+02	(	4.431E+00 7.59E-01 8.56E+01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
Ce-139	5.3852E+02				1.38E+02	
		165.85	5.385E+02	(	5.643E+00 6.97E-01 7.99E+01	G
Hg-203	1.2059E+03				4.66E+01	
		279.17	1.206E+03	(	2.002E+01 1.05E+00 8.15E+01	G
SN-113	9.7136E+02				1.15E+02	
		391.69	9.714E+02	(	1.115E+01 8.54E-01 6.40E+01	G
CS-137	4.6565E+02				1.10E+04	
		661.66	4.657E+02	(	5.571E+00 9.21E-01 8.52E+01	G
Y-898	1.5700E+03				1.07E+02	

898.02 1.570E+03 (1.261E+01 7.43E-01 9.37E+01 G

Co-1173 7.2416E+02 1.93E+03
1173.24 7.242E+02 (5.275E+00 7.99E-01 9.99E+01 G

Co-1332 7.206OE+02 1.93E+03
1332.50 7.206E+02 (4.737E+00 8.09E-01 1.00E+02 G

Y-1836 1.6340E+03 1.07E+02
1836.01 1.634E+03 (6.084E+00 8.27E-01 9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
Pb-210	1.4284E+04	1.4422E+04	6.417E-01%	1.66E+02
AM-241	1.2219E+03	1.2225E+03	6.654E-01%	1.45E+01
CD-109	1.3631E+04	1.6145E+04	4.729E-01%	1.18E+02

CO-57	2.6186E+02	3.4928E+02	7.589E-01%	4.43E+00
Ce-139	3.0490E+02	5.3852E+02	6.967E-01%	5.64E+00
Hg-203	2.2495E+02	1.2059E+03	1.050E+00%	2.00E+01
SN-113	4.9196E+02	9.7136E+02	8.544E-01%	1.12E+01
CS-137	4.6235E+02	4.6565E+02	9.207E-01%	5.57E+00
Y-898	7.5323E+02	1.5700E+03	7.434E-01%	1.26E+01
Co-1173	6.9530E+02	7.2416E+02	7.989E-01%	5.27E+00
Co-1332	6.9188E+02	7.2060E+02	8.094E-01%	4.74E+00
Y-1836	7.8390E+02	1.6340E+03	8.273E-01%	6.08E+00

  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.7 to 1999.5 keV) 3.381E+04 Bq
Total Decayed Activity (37.7 to 1999.5 keV) 3.9968746E+04 Bq

Initial Calibration Verifications

2nd Source Verification

Detector: Ge4

Geometry: Tunacan

Reference date 1/1/2010

Source: 81427-334

Standard volume g / vial 1550

Standard volume transferred in g / geometry 318.5

lab ID# of cal standard Tuna Can_00002

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1179.4	101.3
Cs-137	1926	396	0.851	465	435.81	93.7
Co-60	3611	742	0.99974	742	706.01	95.1
Co-60	3612	742	0.999856	742	707.18	95.3

Reviewed By: Megan McAfee

Date: 4/5/2012

ORTEC g v - i (3263) Env32 G53W4.25 4/3/2012 8:08:30 AM Page 1
TestAmerica Spectrum name: 4_TunaCan2nd_20120155.An1

Sample description
4_TunaCan2nd_Rad11_040212

Spectrum Filename: C:\User\SPC\Det4\4_TunaCan2nd_20120155.An1

Acquisition information
Start time: 4/2/2012 4:50:30 PM
Live time: 7200
Real time: 7269
Dead time: 0.95 %
Detector ID: 4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_Soil_TunaCan.Clb
4_Soil_TunaCan_90099_033012

Energy Calibration
Created: 4/2/2012 1:19:28 PM
Zero offset: 0.084 keV
Gain: 0.250 keV/channel
Quadratic: -2.822E-08 keV/channel^2

Efficiency Calibration
Created: 4/2/2012 1:19:41 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.78 %
Log(Eff): -3.983609E-01 + (-5.746278E-01*Log(E)) + (-2.046438E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.80 %
Log(Eff): -2.546791E+01 + (9.285295E+00*Log(E)) + (-9.904428E-01*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix & Pb.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.60keV)
Stop channel: 8000 (1999.16keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	4_2012-04-01_0505.PBC 4/1/2012 5:05:33 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0600

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.42	806.	13.21	0.80	7.538E-03				
46.54	50484.	0.61	0.75	1.208E-02	46.54	4.250	1.463E+04	Pb210
49.71	736.	21.48	1.02	1.343E-02				
59.58	51934.	0.60	0.77	1.721E-02	59.54	35.700	1.179E+03	AM241
63.49	155.	63.51	0.54	1.848E-02				
88.11	27333.	0.79	0.79	2.354E-02	88.03	3.610	1.532E+04	CD109
122.09	6277.	1.96	0.86	2.425E-02	122.06	85.600	3.419E+02	CO57
134.27	52.	97.34	0.86	2.351E-02				
136.47	659.	9.66	0.87	2.334E-02				
148.82	69.	86.21	0.36	2.228E-02				
158.85	43.	92.59	0.33	2.130E-02				
165.81	1043.	6.61	0.81	2.058E-02	165.85	79.900	5.464E+02	Ce139
238.49	236.	22.32	0.96	1.565E-02				
241.88	116.	42.88	0.96	1.547E-02				
313.38	122.	47.39	0.75	1.256E-02				
344.70	47.	65.34	0.49	1.163E-02				
351.68	160.	27.20	0.66	1.144E-02				
391.67	434.	16.95	1.10	1.048E-02	391.69	64.000	1.272E+03	SN113
419.11	117.	48.70	0.60	9.911E-03				
473.76	122.	50.01	0.45	8.958E-03				
537.00	45.	87.01	0.37	8.074E-03				
592.99	36.	69.91	0.40	7.433E-03				
620.80	59.	58.25	0.37	7.153E-03				
661.57	17213.	0.84	1.29	6.782E-03	661.66	85.210	4.358E+02	CS137
860.29	61.	44.90	0.75	5.431E-03				
898.19	323.	17.33	1.63	5.236E-03	898.02	93.700	1.920E+03	Y898
935.59	77.	51.48	0.57	5.056E-03				
1173.33	15720.	0.87	1.73	4.162E-03	1173.24	99.900	7.060E+02	Co1173
1332.63	14113.	0.86	1.81	3.727E-03	1332.50	99.982	7.072E+02	Co1332
1835.84	135.	10.17	1.24	2.815E-03	1836.01	99.200	1.406E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
145.26	36.42	3510.	806.	1.069E+05	13.21	0.797	- s
198.40	49.71	8086.	736.	5.481E+04	21.48	1.022	- s
253.51	63.49	3351.	155.	8.368E+03	63.51	0.538	- s
536.51	134.26	898.	64.	2.722E+03	67.39	0.281	- sc

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
545.30	136.46	2079.	727.	3.115E+04	12.04	0.949	- s
594.74	148.82	1288.	69.	3.082E+03	86.21	0.363	- sc
634.84	158.85	771.	43.	2.019E+03	92.59	0.329	- sc
953.28	238.48	1188.	206.	1.316E+04	29.01	1.147	-
966.87	241.88	864.	60.	3.878E+03	75.94	0.463	- c
1252.81	313.38	1023.	122.	9.737E+03	47.39	0.746	- s
1378.05	344.70	448.	47.	4.042E+03	65.34	0.489	- sc
1405.98	351.68	650.	160.	1.399E+04	27.20	0.659	- s
1675.68	419.11	933.	117.	1.177E+04	48.70	0.600	- s
1894.25	473.76	1038.	122.	1.367E+04	50.01	0.454	- s
2147.23	537.00	496.	45.	5.573E+03	87.01	0.368	- sc
2371.22	592.99	256.	36.	4.843E+03	69.91	0.402	- sc
2482.47	620.80	374.	59.	8.248E+03	58.25	0.372	- s
3440.64	860.29	299.	61.	1.129E+04	44.90	0.752	- s
3741.93	935.59	530.	77.	1.526E+04	51.48	0.570	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.75	46.54	12490.	50416.	7.002	0.61	0.755
AM-241	237.88	59.58	11109.	51934.	7.213	0.60	0.767
CD-109	351.97	88.11	5395.	27333.	3.796	0.79	0.790
CO-57	487.82	122.09	2530.	6277.	0.872	1.96	0.855
Ce-139	662.66	165.81	1311.	1043.	0.145	6.61	0.812
SN-113	1565.91	391.67	1245.	434.	0.060	16.95	1.102s
CS-137	2645.56	661.57	829.	17213.	2.391	0.84	1.295
Y-898	3592.29	898.19	734.	323.	0.045	17.33	1.625
Co-1173	4693.38	1173.33	470.	15720.	2.183	0.87	1.726
Co-1332	5331.03	1332.63	76.	14113.	1.960	0.86	1.814
Y-1836	7345.88	1835.84	9.	135.	0.019	10.17	1.237s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
Pb-210	N	1.4632E+04				8.15E+03	
			46.54	1.463E+04	(P	1.519E+02 6.07E-01 4.25E+00	G
AM-241		1.1794E+03				1.58E+05	
			59.54	1.179E+03	(	1.122E+01 5.98E-01 3.57E+01	G
CD-109		1.5319E+04				4.63E+02	
			88.03	1.532E+04	(	1.933E+02 7.94E-01 3.61E+00	G
CO-57		3.4190E+02				2.72E+02	
			122.06	3.419E+02	(	1.291E+01 1.96E+00 8.56E+01	G
Ce-139		5.4636E+02				1.38E+02	
			165.85	5.464E+02	(	8.978E+01 6.61E+00 7.99E+01	G
Hg-203		-4.3324E-04				4.66E+01	
			279.17	-4.332E-04	%(	2.541E+00 1.76E+05 8.15E+01	G
SN-113		1.2718E+03				1.15E+02	
			391.69	1.272E+03	(	4.898E+02 1.70E+01 6.40E+01	G
CS-137		4.3581E+02				1.10E+04	
			661.66	4.358E+02	(	3.465E+00 8.43E-01 8.52E+01	G
Y-898		1.9202E+03				1.07E+02	
			898.02	1.920E+03	(	7.662E+02 1.73E+01 9.37E+01	G
Co-1173		7.0601E+02				1.93E+03	
			1173.24	7.060E+02	(	4.661E+00 8.74E-01 9.99E+01	G
Co-1332		7.0718E+02				1.93E+03	
			1332.50	7.072E+02	(	2.171E+00 8.58E-01 1.00E+02	G
Y-1836		1.4056E+03				1.07E+02	
			1836.01	1.406E+03	(	1.769E+02 1.02E+01 9.92E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the

library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting		MDA Bq/Sample
Pb-210	1.3643E+04	1.4632E+04	6.080E-01%		1.52E+02
AM-241	1.1752E+03	1.1794E+03	5.977E-01%		1.12E+01
CD-109	4.4685E+03	1.5319E+04	7.941E-01%		1.93E+02
CO-57	4.1998E+01	3.4190E+02	1.960E+00%		1.29E+01
Ce-139	8.6929E+00	5.4636E+02	6.612E+00%		8.98E+01
Hg-203 #A	-4.3324E-04	>12 Halflives	1.7564E+05%	2.5409E+00	
SN-113 #	8.9902E+00	1.2718E+03	1.695E+01%		4.90E+02
CS-137	4.1377E+02	4.3581E+02	8.435E-01%		3.46E+00
Y-898	9.1492E+00	1.9202E+03	1.733E+01%		7.66E+02
Co-1173	5.2510E+02	7.0601E+02	8.735E-01%		4.66E+00
Co-1332	5.2597E+02	7.0718E+02	8.582E-01%		2.17E+00
Y-1836	6.6974E+00	1.4056E+03	1.017E+01%		1.77E+02

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.2 keV) 2.083E+04 Bq/Sample
Total Decayed Activity (37.6 to 1999.2 keV) 3.8465293E+04 Bq/Sample

2nd Source Verification

Detector: Ge8

Geometry: Tunacan

Reference date 1/1/2010

Source: 81427-334

Standard volume g / vial 1550

Standard volume transferred in g / geometry 318.5

lab ID# of cal standard 6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1175.4	101.0
Cs-137	1926	396	0.851	465	446.61	96.0
Co-60	3611	742	0.99974	742	697.22	93.9
Co-60	3612	742	0.999856	742	691.92	93.2

Reviewed By: Jody Watson

Date: 3/29/2012

ORTEC g v - i (3263) Env32 G53W4.25 3/29/2012 7:45:38 AM Page 1
TestAmerica Spectrum name: 8_TunaCan2nd_20120697.An1

Sample description
8_TunaCan_81427-334_2ndsource_032912

Spectrum Filename: C:\User\SPC\Det8\8_TunaCan2nd_20120697.An1

Acquisition information
Start time: 3/29/2012 1:58:04 AM
Live time: 3600
Real time: 3622
Dead time: 0.61 %
Detector ID: 8

Detector system
Ge 8 SN/174

Calibration
Filename: 8_Soil_TunaCan.Clb
8_Soil_TunaCan_90099_032712

Energy Calibration
Created: 3/28/2012 10:35:07 AM
Zero offset: 0.050 keV
Gain: 0.250 keV/channel
Quadratic: 8.067E-10 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 10:35:20 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.39 %
Log(Eff): -1.098764E-01 + (-4.958544E-01*Log(E)) + (-2.572270E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.71 %
Log(Eff): -2.525301E+01 + (9.398253E+00*Log(E)) + (-1.000034E+00*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix & Pb.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.55keV)
Stop channel: 8000 (2000.30keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (3263) Env32 G53W4.25 3/29/2012 7:45:38 AM Page 2
TestAmerica Spectrum name: 8_TunaCan2nd_20120697.An1
Page 1

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	8_2012-03-02_0402.PBC 3/2/2012 4:02:11 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 27.9595

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.61	594.	17.47	1.15	1.254E-02				
46.53	38495.	0.62	0.95	2.001E-02	46.54	4.250	1.345E+04	Pb210
49.81	542.	25.92	1.04	2.243E-02				
59.48	43371.	0.71	0.98	2.878E-02	59.54	35.700	1.175E+03	AM241
84.86	327.	26.82	0.98	3.922E-02				
88.03	22911.	0.76	0.98	3.992E-02	88.03	3.610	1.504E+04	CD109
122.06	5318.	2.55	1.03	4.146E-02	122.06	85.600	3.349E+02	CO57
136.54	691.	14.03	0.89	3.998E-02				
165.93	1033.	8.62	1.19	3.628E-02	165.85	79.900	6.077E+02	Ce139
177.05	71.	70.08	0.69	3.453E-02				
185.74	128.	40.98	0.85	3.329E-02				
227.93	52.	65.04	0.45	2.844E-02				
270.79	87.	50.41	0.41	2.486E-02				
278.94	44.	131.33	1.13	2.428E-02	279.17	81.500	HL>Cutoff	Hg203
302.52	63.	54.81	0.69	2.279E-02				
370.09	35.	84.23	0.41	1.941E-02				
391.61	316.	17.91	0.81	1.855E-02	391.69	64.000	1.016E+03	SN113
409.22	93.	50.95	0.41	1.791E-02				
428.24	88.	46.51	0.39	1.726E-02				
564.57	72.	45.26	0.57	1.378E-02				
591.73	73.	42.60	0.61	1.326E-02				
661.62	15734.	0.88	1.38	1.209E-02	661.66	85.210	4.466E+02	CS137
720.39	41.	72.89	0.46	1.126E-02				
831.73	36.	50.61	0.44	9.986E-03				
897.91	396.	17.93	1.52	9.360E-03	898.02	93.700	2.554E+03	Y898
1092.31	69.	44.41	0.50	7.924E-03				
1173.30	13922.	0.92	1.73	7.452E-03	1173.24	99.900	6.972E+02	Co1173
1332.56	12390.	0.92	1.75	6.677E-03	1332.50	99.982	6.919E+02	Co1332
1836.18	152.	9.00	1.63	5.046E-03	1836.01	99.200	1.724E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
146.23	36.61	3218.	594.	4.742E+04	17.47	1.147	- s
199.01	49.81	6400.	542.	2.416E+04	25.92	1.039	- sM
339.16	84.85	3491.	236.	6.026E+03	42.58	0.697	- sM

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
545.91	136.54	2178.	691.	1.728E+04	14.03	0.888	-
707.94	177.05	893.	71.	2.046E+03	70.08	0.693	- sM
742.68	185.74	978.	128.	3.835E+03	40.98	0.847	- sM
911.43	227.93	546.	52.	1.829E+03	65.04	0.445	- sc
1082.86	270.79	683.	87.	3.486E+03	50.41	0.413	- sM
1209.76	302.52	484.	63.	2.765E+03	54.81	0.692	- s
1480.00	370.09	385.	35.	1.803E+03	84.23	0.412	- sc
1636.49	409.22	685.	93.	5.212E+03	50.95	0.407	- s
1712.56	428.24	565.	88.	5.117E+03	46.51	0.393	- s
2257.86	564.57	330.	72.	5.224E+03	45.26	0.565	- s
2366.45	591.73	298.	73.	5.505E+03	42.60	0.613	- s
2881.06	720.39	284.	41.	3.640E+03	72.89	0.464	- s
3326.37	831.73	148.	36.	3.605E+03	50.61	0.439	- s
4368.55	1092.31	290.	69.	8.708E+03	44.41	0.495	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.71	46.48	12173.	40702.	11.306	0.74	0.992
AM-241	237.70	59.48	10649.	43371.	12.047	0.71	0.984
CD-109	351.85	88.02	4506.	23196.	6.443	0.88	1.056
CO-57	487.99	122.06	2908.	5318.	1.477	2.55	1.026
Ce-139	663.47	165.93	1722.	1033.	0.287	8.62	1.189s
Hg-203	1115.46	278.94	1642.	44.	0.012	131.33	1.133
SN-113	1566.07	391.61	822.	316.	0.088	17.91	0.806s
CS-137	2646.01	661.62	665.	15731.	4.370	0.88	1.379
Y-898	3591.03	897.91	871.	396.	0.110	17.93	1.524
Co-1173	4692.46	1173.30	374.	13922.	3.867	0.92	1.726
Co-1332	5329.42	1332.56	82.	12390.	3.442	0.92	1.753
Y-1836	7343.62	1836.18	6.	152.	0.042	9.00	1.626s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
Pb-210	N	1.4221E+04				8.15E+03		
			46.54	1.422E+04	(	1.806E+02	7.43E-01 4.25E+00	G
AM-241		1.1754E+03				1.58E+05		
			59.54	1.175E+03	(	1.311E+01	7.10E-01 3.57E+01	G
CD-109		1.5223E+04				4.63E+02		
			88.03	1.522E+04	(	2.071E+02	8.83E-01 3.61E+00	G
CO-57		3.3494E+02				2.72E+02		
			122.06	3.349E+02	(	1.600E+01	2.55E+00 8.56E+01	G
Ce-139		6.0766E+02				1.38E+02		
			165.85	6.077E+02	*(	1.153E+02	8.62E+00 7.99E+01	G
Hg-203		6.1671E-01				4.66E+01		
			279.17	6.167E-01	(	2.689E+00	1.31E+02 8.15E+01	G
SN-113		1.0157E+03				1.15E+02		
			391.69	1.016E+03	(	4.390E+02	1.79E+01 6.40E+01	G
CS-137		4.4661E+02				1.10E+04		
			661.66	4.466E+02	(P	3.489E+00	8.85E-01 8.52E+01	G
Y-898		2.5543E+03				1.07E+02		
			898.02	2.554E+03	(	9.046E+02	1.79E+01 9.37E+01	G
Co-1173		6.9722E+02				1.93E+03		
			1173.24	6.972E+02	(	4.649E+00	9.19E-01 9.99E+01	G
Co-1332		6.9192E+02				1.93E+03		
			1332.50	6.919E+02	(	2.515E+00	9.18E-01 1.00E+02	G
Y-1836		1.7236E+03				1.07E+02		
			1836.01	1.724E+03	(	1.542E+02	9.00E+00 9.92E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.

P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting		MDA Bq/Sample
Pb-210	1.3265E+04	1.4221E+04	7.429E-01%		1.81E+02
AM-241	1.1712E+03	1.1754E+03	7.101E-01%		1.31E+01
CD-109	4.4713E+03	1.5223E+04	8.832E-01%		2.07E+02
CO-57	4.1631E+01	3.3494E+02	2.551E+00%		1.60E+01
Ce-139 #	9.8959E+00	6.0766E+02	8.616E+00%		1.15E+02
Hg-203 A	6.1671E-01	>12 Halflives	1.3133E+02%	2.6892E+00	
SN-113	7.3819E+00	1.0157E+03	1.791E+01%		4.39E+02
CS-137	4.2415E+02	4.4661E+02	8.848E-01%		3.49E+00
Y-898	1.2542E+01	2.5543E+03	1.793E+01%		9.05E+02
Co-1173	5.1942E+02	6.9722E+02	9.185E-01%		4.65E+00
Co-1332	5.1548E+02	6.9192E+02	9.176E-01%		2.52E+00
Y-1836	8.4633E+00	1.7236E+03	8.997E+00%		1.54E+02

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

S U M M A R Y

Total Activity (	37.6 to	2000.3 keV)	2.045E+04 Bq/Sample
Total Decayed Activity (	37.6 to	2000.3 keV)	3.8690848E+04 Bq/Sample

2nd Source Verification

Detector: Ge9

Geometry: Tunacan

Reference date 1/1/2010

Source: 81427-334

Standard volume g / vial 1550

Standard volume transferred in g / geometry 318.5

lab ID# of cal standard 6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1169.4	100.4
Cs-137	1926	396	0.851	465	444.52	95.6
Co-60	3611	742	0.99974	742	687.72	92.7
Co-60	3612	742	0.999856	742	692.56	93.3

Reviewed By: Jody Watson

Date: 6/14/2012

ORTEC g v - i (3263) Env32 G53W4.25 6/14/2012 1:20:45 PM Page 1
TestAmerica, Inc Spectrum name: 9_TunaCan_20120371.An1

Sample description
9_TunaCan_90099_061412

Spectrum Filename: C:\User\SPC\Det9\9_TunaCan_20120371.An1

Acquisition information
Start time: 6/14/2012 10:54:15 AM
Live time: 3600
Real time: 3629
Dead time: 0.81 %
Detector ID: 9

Detector system
Ge 9 SN/100113

Calibration
Filename: 9_Soil_TunaCan.Clb
9_Soil_TunaCan_90099_050312

Energy Calibration
Created: 6/14/2012 10:19:40 AM
Zero offset: 0.088 keV
Gain: 0.250 keV/channel
Quadratic: -2.039E-08 keV/channel^2

Efficiency Calibration
Created: 6/14/2012 10:19:51 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.30 %
Log(Eff): -8.079856E-01 + (-2.367265E-01*Log(E)) + (-3.950640E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.42 %
Log(Eff): -2.387916E+01 + (8.875647E+00*Log(E)) + (-9.401100E-01*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix & Pb.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.60keV)
Stop channel: 8000 (1999.66keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (3263) Env32 G53W4.25 6/14/2012 1:20:45 PM Page 2
TestAmerica, Inc Spectrum name: 9_TunaCan_20120371.An1
Page 1

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	9_2012-05-27_0502.PBC 5/27/2012 5:02:59 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0390

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.54	860.	12.66	1.34	1.634E-02				
46.62	48876.	0.54	1.09	2.580E-02	46.54	4.250	1.338E+04	Pb210
50.03	116.	122.12	1.09	2.886E-02				
59.57	54776.	0.62	1.11	3.661E-02	59.54	35.700	1.169E+03	AM241
63.90	47.	193.18	0.35	3.962E-02				
88.09	26880.	0.87	1.14	5.052E-02	88.03	3.610	1.566E+04	CD109
122.10	5522.	2.86	1.15	5.303E-02	122.06	85.600	3.312E+02	CO57
136.38	729.	11.64	1.25	5.151E-02				
165.67	814.	10.74	1.30	4.629E-02	165.85	79.900	5.417E+02	Ce139
295.46	252.	33.13	0.56	3.229E-02				
316.16	66.	75.82	0.25	3.082E-02				
356.41	45.	97.50	1.36	2.835E-02				
358.68	42.	110.02	1.37	2.822E-02				
379.76	37.	75.05	0.46	2.711E-02				
391.75	310.	24.80	1.08	2.652E-02	391.69	64.000	1.113E+03	SN113
454.98	83.	53.05	0.37	2.383E-02				
568.66	103.	37.41	0.47	2.026E-02				
626.42	84.	49.00	0.45	1.885E-02				
661.66	23324.	0.76	1.61	1.810E-02	661.66	85.210	4.445E+02	CS137
821.54	239.	27.43	0.39	1.536E-02				
876.16	66.	52.19	0.61	1.462E-02				
898.25	346.	23.61	1.52	1.434E-02	898.02	93.700	2.406E+03	Y898
937.90	34.	79.64	0.44	1.387E-02				
1071.41	38.	61.01	0.57	1.249E-02				
1085.31	68.	35.74	1.00	1.237E-02				
1098.64	14.	140.33	0.47	1.225E-02				
1173.23	20836.	0.81	2.05	1.163E-02	1173.24	99.900	6.877E+02	Co1173
1332.49	18966.	0.75	2.11	1.050E-02	1332.50	99.982	6.926E+02	Co1332
1835.90	150.	10.23	1.72	8.080E-03	1836.01	99.200	1.745E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
145.76	36.54	3297.	860.	5.262E+04	12.66	1.336	- s
199.48	49.98	8660.	956.	3.313E+04	18.50	0.958	- sM
255.13	63.90	2893.	47.	1.186E+03	193.18	0.347	- sc
544.97	136.38	1941.	729.	1.415E+04	11.64	1.247	-

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
1181.07	295.46	1550.	252.	7.804E+03	33.13	0.562	- s
1263.87	316.16	856.	66.	2.136E+03	75.82	0.245	- sc
1424.84	356.47	930.	45.	1.579E+03	97.50	1.363	- sc
1433.89	358.73	1025.	42.	1.473E+03	110.02	1.365	- sc
1518.22	379.76	367.	37.	1.365E+03	75.05	0.460	- sc
1819.03	454.98	702.	83.	3.496E+03	53.05	0.375	- s
2273.73	568.66	433.	103.	5.068E+03	37.41	0.468	- s
2504.73	626.42	460.	84.	4.455E+03	49.00	0.451	- s
3285.25	821.54	812.	239.	1.556E+04	27.43	0.391	- s
3503.76	876.16	400.	66.	4.538E+03	52.19	0.608	- s
3750.76	937.90	332.	34.	2.488E+03	79.64	0.436	- sc
4284.91	1071.41	226.	38.	3.015E+03	61.01	0.571	- s
4340.51	1085.31	224.	68.	5.498E+03	35.74	1.000	- s
4393.86	1098.64	186.	14.	1.143E+03	140.33	0.472	- sc

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.86	46.57	13300.	51041.	14.178	0.65	1.116
AM-241	237.82	59.57	11784.	54776.	15.216	0.62	1.111
CD-109	351.87	88.09	5995.	26880.	7.467	0.87	1.137
CO-57	487.85	122.10	3767.	5522.	1.534	2.86	1.155
Ce-139	662.09	165.67	1864.	814.	0.226	10.74	1.299
Hg-203	1120.44	280.29	2362.	-52.	-0.014	133.84	1.296s
SN-113	1565.85	391.67	1962.	266.	0.074	24.38	1.393
CS-137	2645.72	661.66	1258.	23324.	6.479	0.76	1.614
Y-898	3592.12	898.25	1148.	346.	0.096	23.61	1.524s
Co-1173	4692.30	1173.23	840.	20836.	5.788	0.81	2.049
Co-1332	5329.58	1332.49	131.	18966.	5.268	0.75	2.109
Y-1836	7344.43	1835.90	14.	150.	0.042	10.23	1.719s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample		Peak Code	MDA Value Bq/Sample		COMMENTS
Pb-210	N	1.3971E+04					8.15E+03		
			46.54	1.397E+04	(	1.478E+02	6.46E-01	4.25E+00	G
AM-241		1.1694E+03					1.58E+05		
			59.54	1.169E+03	(	1.086E+01	6.16E-01	3.57E+01	G
CD-109		1.5657E+04					4.63E+02		
			88.03	1.566E+04	(	2.117E+02	8.71E-01	3.61E+00	G
CO-57		3.3118E+02					2.72E+02		
			122.06	3.312E+02	(	1.731E+01	2.86E+00	8.56E+01	G
Ce-139		5.4173E+02					1.38E+02		
			165.85	5.417E+02	(	1.357E+02	1.07E+01	7.99E+01	G
Hg-203		-5.2429E-01					4.66E+01		
			279.17	-5.243E-01	?(	2.327E+00	1.34E+02	8.15E+01	G
SN-113		9.5260E+02					1.15E+02		
			391.69	9.526E+02	?(	7.503E+02	2.44E+01	6.40E+01	G
CS-137		4.4452E+02					1.10E+04		
			661.66	4.445E+02	(	3.202E+00	7.63E-01	8.52E+01	G
Y-898		2.4057E+03					1.07E+02		
			898.02	2.406E+03	@(	1.118E+03	2.36E+01	9.37E+01	G
Co-1173		6.8772E+02					1.93E+03		
			1173.24	6.877E+02	(	4.547E+00	8.09E-01	9.99E+01	G
Co-1332		6.9256E+02					1.93E+03		
			1332.50	6.926E+02	(	2.044E+00	7.49E-01	1.00E+02	G
Y-1836		1.7452E+03					1.07E+02		
			1836.01	1.745E+03	(	2.388E+02	1.02E+01	9.92E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the

library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
Hg-203	280.29	2362.	-52.	-0.014	133.84	0.000E+00

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting		MDA Bq/Sample
Pb-210	1.2947E+04	1.3971E+04	6.459E-01%		1.48E+02
AM-241	1.1648E+03	1.1694E+03	6.156E-01%		1.09E+01
CD-109	4.0954E+03	1.5657E+04	8.713E-01%		2.12E+02
CO-57	3.3792E+01	3.3118E+02	2.862E+00%		1.73E+01
Ce-139	5.9752E+00	5.4173E+02	1.074E+01%		1.36E+02
Hg-203 #A	-5.2429E-01	>12 Halflives	1.3384E+02%	2.3272E+00	
SN-113 #	4.3447E+00	9.5260E+02	2.438E+01%		7.50E+02
CS-137	4.2011E+02	4.4452E+02	7.635E-01%		3.20E+00
Y-898 #	7.1422E+00	2.4057E+03	2.361E+01%		1.12E+03
Co-1173	4.9827E+02	6.8772E+02	8.087E-01%		4.55E+00
Co-1332	5.0178E+02	6.9256E+02	7.487E-01%		2.04E+00
Y-1836	5.1813E+00	1.7452E+03	1.023E+01%		2.39E+02

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (379.7 to 1999.7 keV)	1.968E+04	Bq/Sample
Total Decayed Activity (379.7 to 1999.7 keV)	3.8598309E+04	Bq/Sample

2nd Source Verification

Detector: Ge14

Geometry: Tunacan

Reference date 1/1/2010

Source: 81427-334

Standard volume g / vial 1550

Standard volume transferred in g / geometry 318.5

lab ID# of cal standard 6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1140.8	98.0
Cs-137	1926	396	0.851	465	447.55	96.2
Co-60	3611	742	0.99974	742	690.01	93.0
Co-60	3612	742	0.999856	742	699.61	94.2

Reviewed By: Jody Watson

Date: 4/24/2012

ORTEC g v - i (3263) Env32 G53W4.25 7/6/2012 9:20:28 AM Page 1
TestAmerica, Inc. Spectrum name: 14_TunaCan2nd_20120390.An1

Sample description
14_TunaCan2nd_rad10_042412

Spectrum Filename: C:\User\SPC\Det14\14_TunaCan2nd_20120390.An1

Acquisition information
Start time: 4/24/2012 8:12:45 AM
Live time: 3600
Real time: 3635
Dead time: 0.95 %
Detector ID: 14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_Soil_TunaCan.Clb
14_TunaCan_90099_042312

Energy Calibration
Created: 4/23/2012 11:29:29 AM
Zero offset: 0.158 keV
Gain: 0.250 keV/channel
Quadratic: -1.959E-08 keV/channel^2

Efficiency Calibration
Created: 4/23/2012 11:29:47 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.02 %
Log(Eff): 2.101260E-01 + (-5.951973E-01*Log(E)) + (-1.605331E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -2.391492E+01 + (8.828985E+00*Log(E)) + (-9.371496E-01*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix & Pb.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.67keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (3263) Env32 G53W4.25 7/6/2012 9:20:28 AM Page 2
TestAmerica, Inc. Spectrum name: 14_TunaCan2nd_20120390.An1
Page 1

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	14_2012-04-01_0328.PBC 4/1/2012 3:28:19 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0804

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.65	636.	14.35	0.68	1.394E-02				
46.70	42844.	0.65	0.73	2.183E-02	46.54	4.250	1.384E+04	Pb210
49.57	579.	23.20	1.08	2.397E-02				
59.66	44776.	0.62	0.73	3.072E-02	59.54	35.700	1.141E+03	AM241
88.02	24143.	0.88	0.79	4.196E-02	88.03	3.610	1.568E+04	CD109
121.97	5150.	2.07	0.81	4.379E-02	122.06	85.600	3.284E+02	CO57
136.39	594.	12.74	0.84	4.244E-02				
165.76	922.	8.50	0.93	3.800E-02	165.85	79.900	5.802E+02	Ce139
238.43	269.	23.37	0.71	2.933E-02				
315.48	114.	42.70	0.42	2.361E-02				
327.51	51.	61.93	0.45	2.293E-02				
351.90	216.	23.90	0.91	2.167E-02				
364.95	52.	64.29	0.48	2.106E-02				
374.52	129.	45.68	0.49	2.064E-02				
391.67	297.	17.91	1.16	1.993E-02	391.69	64.000	1.044E+03	SN113
510.55	153.	33.44	0.60	1.616E-02				
661.74	16713.	0.81	1.30	1.313E-02	661.66	85.210	4.376E+02	CS137
665.93	55.	47.01	1.30	1.306E-02				
682.98	51.	73.33	0.31	1.280E-02				
802.77	123.	33.88	0.65	1.124E-02				
897.96	328.	20.32	1.77	1.026E-02	898.02	93.700	2.290E+03	Y898
978.13	53.	59.31	0.31	9.568E-03				
1173.32	15097.	0.91	1.81	8.243E-03	1173.24	99.900	6.900E+02	Co1173
1332.58	13794.	0.88	1.91	7.422E-03	1332.50	99.982	6.996E+02	Co1332
1836.21	153.	8.94	1.16	5.686E-03	1836.01	99.200	1.816E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide

145.93	36.65	2712.	636.	4.559E+04	14.35	0.681	-	s
197.59	49.57	6158.	579.	2.414E+04	23.20	1.078	-	s
544.79	136.39	1623.	594.	1.400E+04	12.74	0.836	-	
952.87	238.43	1166.	269.	9.182E+03	23.37	0.709	-	

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
1261.02	315.48	752.	114.	4.829E+03	42.70	0.415	- s
1309.15	327.51	440.	51.	2.232E+03	61.93	0.449	- s
1406.69	351.90	776.	216.	9.981E+03	23.90	0.914	-
1458.89	364.95	463.	52.	2.484E+03	64.29	0.475	- s
1497.18	374.52	912.	129.	6.250E+03	45.68	0.487	- s
2041.26	510.55	669.	153.	9.449E+03	33.44	0.603	- s
2662.75	665.91	160.	40.	3.074E+03	48.94	0.586	- sM
2731.03	682.98	385.	51.	3.984E+03	73.33	0.306	- s
3210.25	802.77	443.	123.	1.098E+04	33.88	0.654	- s
3911.87	978.13	330.	53.	5.539E+03	59.31	0.307	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	186.10	46.70	10276.	42803.	11.890	0.65	0.733
AM-241	237.93	59.66	8589.	44776.	12.438	0.62	0.733
CD-109	351.36	88.02	4956.	24143.	6.706	0.88	0.785
CO-57	487.12	121.97	1860.	5150.	1.431	2.07	0.805
Ce-139	662.24	165.76	1490.	922.	0.256	8.50	0.930s
Hg-203	1114.33	278.80	1377.	-40.	-0.011	133.76	0.957s
SN-113	1565.78	391.67	802.	297.	0.083	17.91	1.165
CS-137	2645.99	661.72	749.	17094.	4.748	0.86	1.367
Y-898	3591.10	897.96	851.	328.	0.091	20.32	1.769s
Co-1173	4692.93	1173.32	513.	15097.	4.194	0.91	1.810
Co-1332	5330.26	1332.58	105.	13794.	3.832	0.88	1.907
Y-1836	7346.17	1836.21	5.	153.	0.042	8.94	1.165s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS

```
Pb-210    N   1.3845E+04                                          8.15E+03
                          46.54 1.384E+04  (P 1.537E+02 6.55E-01 4.25E+00 G

AM-241        1.1408E+03                                          1.58E+05
                          59.54 1.141E+03  (  1.107E+01 6.17E-01 3.57E+01 G

CD-109        1.5678E+04                                          4.63E+02
                          88.03 1.568E+04  (  2.148E+02 8.77E-01 3.61E+00 G

CO-57         3.2838E+02                                          2.72E+02
                         122.06 3.284E+02  (  1.299E+01 2.07E+00 8.56E+01 G

Ce-139        5.8018E+02                                          1.38E+02
                         165.85 5.802E+02 *(  1.149E+02 8.50E+00 7.99E+01 G

Hg-203       -5.1862E-01                                          4.66E+01
                         279.17-5.186E-01 ?(  2.305E+00 1.34E+02 8.15E+01 G

SN-113        1.0438E+03                                          1.15E+02
                         391.69 1.044E+03  (  4.727E+02 1.79E+01 6.40E+01 G

CS-137        4.4755E+02                                          1.10E+04
                         661.66 4.475E+02  (  3.410E+00 8.57E-01 8.52E+01 G

Y-898         2.2899E+03                                          1.07E+02
                         898.02 2.290E+03 *(  9.680E+02 2.03E+01 9.37E+01 G

Co-1173       6.9001E+02                                          1.93E+03
                        1173.24 6.900E+02  (  4.948E+00 9.10E-01 9.99E+01 G

Co-1332       6.9961E+02                                          1.93E+03
                        1332.50 6.996E+02  (  2.559E+00 8.77E-01 1.00E+02 G

Y-1836        1.8162E+03                                          1.07E+02
                        1836.01 1.816E+03  (  1.603E+02 8.94E+00 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
```



```
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
                                       Page 4
```

I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
Hg-203	278.80	1377.	-40.	-0.011	133.76	0.000E+00

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
Pb-210	1.2885E+04	1.3845E+04	6.553E-01%	1.54E+02
AM-241	1.1366E+03	1.1408E+03	6.168E-01%	1.11E+01
CD-109	4.4274E+03	1.5678E+04	8.766E-01%	2.15E+02
CO-57	3.8172E+01	3.2838E+02	2.068E+00%	1.30E+01
Ce-139 #	8.2779E+00	5.8018E+02	8.497E+00%	1.15E+02
Hg-203 #A	-5.1862E-01	>12 Halflives	1.3376E+02%	2.3053E+00
SN-113	6.4765E+00	1.0438E+03	1.791E+01%	4.73E+02
CS-137	4.2434E+02	4.4755E+02	8.571E-01%	3.41E+00
Y-898 #	9.4790E+00	2.2899E+03	2.032E+01%	9.68E+02
Co-1173	5.0921E+02	6.9001E+02	9.096E-01%	4.95E+00
Co-1332	5.1630E+02	6.9961E+02	8.770E-01%	2.56E+00
Y-1836	7.5179E+00	1.8162E+03	8.944E+00%	1.60E+02

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.7 to 1999.5 keV) 1.997E+04 Bq/Sample
Total Decayed Activity (37.7 to 1999.5 keV) 3.8559289E+04 Bq/Sample

Annual Calibration Verifications

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector # 4**
SpectrumID: 4_20130227011_EffVerif
Analysis Description: ACVTop-91774;Tuna Can 2006
Calibration: 4_Soil_TunaCan_90099_033012
Detector: Ge 4 SN/181

Verification Date: 2013-02-27 16:17
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.48E+02	0.3%
Cs-137	661.66	400	3.83E+02	4.3%
Co-1332	1332.5	777	7.45E+02	4.1%

Comments:

Perform ____KM 2/27/13_____ Reviev ___RM 2/27/13_____

C:\User\CRpt\4_20130227011_EffVerif.xls

Sample Description: ACVTop-91774;Tuna Can 2006
Detector: Ge 4 SN/181
Source Date: 10/1/2006 11:00
Acquired: 2/27/2013 16:17:24
Analyzed: 3/4/2013 09:45

Analyst: Jody Watson

Efficiency: 4_Soil_TunaCan_90099_033012
Library: DET_EfficiencyVerification.lib

Nuclide	Activity uCi/Source	Uncertainty %
AM-241	4.478E+02	0.56
CS-137	3.829E+02	0.86
Co-1332	7.452E+02	1.09
Total	1.576E+03	

TestAmerica Spectrum name: 4_20130227011_EffVerif.An1

Sample description
ACVTop-91774;Tuna Can 2006

Spectrum Filename: C:\User\SPC\Det4\4_20130227011_EffVerif.An1

Acquisition information
Start time: 2/27/2013 4:17:24 PM
Live time: 7200
Real time: 7253
Dead time: 0.72 %
Detector ID: 4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_Soil_TunaCan.Clb
4_Soil_TunaCan_90099_033012

Energy Calibration
Created: 2/28/2012 2:55:17 PM
Zero offset: 0.091 keV
Gain: 0.250 keV/channel
Quadratic: -2.917E-08 keV/channel^2

Efficiency Calibration
Created: 4/2/2012 1:19:41 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.78 %
Log(Eff): -3.983609E-01 + (-5.746278E-01*Log(E)) + (-2.046438E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.80 %
Log(Eff): -2.546791E+01 + (9.285295E+00*Log(E)) + (-9.904428E-01*Log(E)^2)

Library Files
Main analysis library: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (1999.44keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.

       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                          Status          Comments
       Decay correct to date:         YES       10/1/2006 11:00:00 AM
       Decay during acquisition:      YES
       Decay during collection:       NO
       True coincidence correction:   NO
       Peaked background correction:  NO
       Absorption (Internal):         NO
       Geometry correction:           NO
       Random summing:                NO


total peaks alloc.    3 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.1108
```

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. uCi/Sour	Nuc
46.55	47124.	0.63	0.76	1.208E-02				
59.59	54866.	0.56	0.76	1.721E-02	59.54	100.000	4.478E+02	AM241
88.12	3315.	2.53	0.84	2.354E-02				
661.43	16127.	0.86	1.34	6.783E-03	661.66	100.000	3.829E+02	CS137
1173.07	9616.	1.14	1.61	4.163E-03				
1332.31	8608.	1.09	1.83	3.728E-03	1332.50	100.000	7.452E+02	Co1332

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
185.74	46.55	11672.	47124.	3.900E+06	0.63	0.759	-	
351.92	88.08	1814.	3335.	1.417E+05	2.50	0.839	-	D
4691.64	1173.07	330.	9616.	2.310E+06	1.14	1.611	-	

```
  s - Peak fails shape tests.
  D - Peak area deconvoluted.
  L - Peak written from unknown list.
  C - Area < Critical level.

------------------------------------------------------------
This section based on library: DET_EfficiencyVerification.lib
```

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.85	59.59	10017.	54866.	7.620	0.56	0.763
CS-137	2644.55	661.43	602.	16127.	2.240	0.86	1.344
Co-1332	5328.94	1332.31	36.	8608.	1.196	1.09	1.834

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/Source	Peak Energy keV	Peak Activity uCi/Source	Code	MDA Value uCi/Source	COMMENTS
AM-241		4.4779E+02				1.58E+05	
			59.54	4.478E+02	(	3.829E+00 5.62E-01	1.00E+02 G
CS-137		3.8291E+02				1.10E+04	
			661.66	3.829E+02	(	2.780E+00 8.62E-01	1.00E+02 G
Co-1332		7.4516E+02				1.93E+03	
			1332.50	7.452E+02	(	2.655E+00 1.09E+00	1.00E+02 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity uCi/Source	Time Corrected Activity uCi/Source	Uncertainty 1 Sigma Counting	MDA
AM-241	4.4322E+02	4.4779E+02	5.616E-01%	3.83E+00
CS-137	3.3031E+02	3.8291E+02	8.623E-01%	2.78E+00
Co-1332	3.2075E+02	7.4516E+02	1.093E+00%	2.65E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (92.9 to 1999.4 keV) 1.094E+03 uCi/Source
Total Decayed Activity (92.9 to 1999.4 keV) 1.5758633E+03 uCi/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector # 8**
SpectrumID: 8_20140610003_EffVerif
Analysis Description: ACVTop-259586;TunaCan2006
Calibration: 8_Soil_TunaCan_90099_032712
Detector: Ge 8 SN/174

Verification Date: 2014-06-10 05:54
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.70E+02	-4.7%
Cs-137	661.66	400	3.95E+02	1.3%
Co-1332	1332.5	777	7.55E+02	2.8%

Comments:

Perform __Jody Watson 6/10/14_____ Reviev _Elizabeth Hoerchler 06/10/14_____

C:\User\CRpt\8_20140610003_EffVerif.xls

Sample Description: ACVTop-259586;TunaCan2006
Detector: Ge 8 SN/174
Source Date: 10/1/2006 11:00
Acquired: 6/10/2014 05:54:59
Analyzed: 6/10/2014 07:59

Analyst: Jody Watson

Efficiency: 8_Soil_TunaCan_90099_032712
Library: DET_EfficiencyVerification.lib

Nuclide	Activity GPS/Source	Uncertainty %
AM-241	4.701E+02	0.43
CS-137	3.948E+02	0.65
Co-1332	7.554E+02	0.88
Total	1.620E+03	

TestAmerica Spectrum name: 8_20140610003_EffVerif.An1

Sample description
ACVTop-259586;TunaCan2006

Spectrum Filename: C:\User\SPC\Det8\8_20140610003_EffVerif.An1

Acquisition information
Start time: 6/10/2014 5:54:59 AM
Live time: 7200
Real time: 7438
Dead time: 3.20 %
Detector ID: 8

Detector system
Ge 8 SN/174

Calibration
Filename: 8_Soil_TunaCan.Clb
8_Soil_TunaCan_90099_032712

Energy Calibration
Created: 2/28/2012 10:34:41 AM
Zero offset: 0.052 keV
Gain: 0.250 keV/channel
Quadratic: 5.282E-10 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 10:35:20 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.39 %
Log(Eff): -1.098764E-01 + (-4.958544E-01*Log(E)) + (-2.572270E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.71 %
Log(Eff): -2.525301E+01 + (9.398253E+00*Log(E)) + (-1.000034E+00*Log(E)^2)

Library Files
Main analysis library: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.55keV)
Stop channel: 8000 (1999.96keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.

       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                          Status          Comments
       Decay correct to date:         YES       10/1/2006 11:00:00 AM
       Decay during acquisition:      YES
       Decay during collection:       NO
       True coincidence correction:   NO
       Peaked background correction:  NO
       Absorption (Internal):         NO
       Geometry correction:           NO
       Random summing:                NO


total peaks alloc.    3 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0646

*****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
 Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
 Energy                             Factor    Energy   Ratio    GPS/Sour
_____________________________________________________________________________
   46.48    74388.   0.54   1.12  2.001E-02
   59.48    96326.   0.43   1.10  2.878E-02    59.54 100.000  4.701E+02 AM241
   87.98     2894.   5.50   1.13  3.991E-02
  661.55    28787.   0.65   1.51  1.209E-02   661.66 100.000  3.948E+02 CS137
 1173.15    14711.   0.88   1.84  7.453E-03
 1332.39    13210.   0.88   1.91  6.678E-03  1332.50 100.000  7.554E+02 Co1332


************ U N I D E N T I F I E D    P E A K    S U M M A R Y ************
  Peak Centroid  Background Net Area  Efficiency  Uncert   FWHM  Suspected
Channel   Energy   Counts     Counts   * Area    1 Sigma %  keV   Nuclide
_____________________________________________________________________________
  185.72    46.48     21350.     74388. 3.718E+06    0.54   1.116  -
  351.74    87.98      4980.      2894. 7.250E+04    5.50   1.130  -      s
 4692.64  1173.15       355.     14711. 1.974E+06    0.88   1.837  -

  s - Peak fails shape tests.
  D - Peak area deconvoluted.
  L - Peak written from unknown list.
  C - Area < Critical level.

------------------------------------------------------------
This section based on library: DET_EfficiencyVerification.lib
```

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.73	59.48	16488.	96326.	13.379	0.43	1.102
CS-137	2646.15	661.55	986.	28787.	3.998	0.65	1.513
Co-1332	5329.60	1332.39	62.	13210.	1.835	0.88	1.913

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity GPS/Source	Peak Energy keV	Peak Activity GPS/Source	Code	MDA Value GPS/Source	COMMENTS
AM-241		4.7008E+02				1.58E+05	
			59.54	4.701E+02	(	2.933E+00 4.29E-01	1.00E+02 G
CS-137		3.9484E+02				1.10E+04	
			661.66	3.948E+02	(	2.044E+00 6.53E-01	1.00E+02 G
Co-1332		7.5537E+02				1.93E+03	
			1332.50	7.554E+02	(	2.247E+00 8.84E-01	1.00E+02 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity GPS/Source	Time Corrected Activity GPS/Source	Uncertainty 1 Sigma Counting	MDA
AM-241	4.6432E+02	4.7008E+02	4.287E-01%	2.93E+00
CS-137	3.3070E+02	3.9484E+02	6.532E-01%	2.04E+00
Co-1332	2.7477E+02	7.5537E+02	8.845E-01%	2.25E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.5 to 2000.0 keV) 1.070E+03 GPS/Source
Total Decayed Activity (37.5 to 2000.0 keV) 1.6202783E+03 GPS/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector # 9**
SpectrumID: 9_20140127006_EffVerif
Analysis Description: ACVTop-259586;TunaCan2006
Calibration: 9_Soil_TunaCan_90099_050312
Detector: Ge9 S/N100228730

Verification Date: 2014-01-27 09:57
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.36E+02	2.9%
Cs-137	661.66	400	3.87E+02	3.2%
Co-1332	1332.5	777	7.44E+02	4.3%

Comments:

Perform Justin D Lockhart / Jody Watson Revie 1/27/2014

C:\User\CRpt\9_20140127006_EffVerif.xls

Sample Description: ACVTop-259586;TunaCan2006
Detector: Ge9 S/N100228730
Source Date: 10/1/2006 11:00
Acquired: 1/27/2014 09:57:52
Analyzed: 1/27/2014 11:58

Analyst: Jody Watson

Efficiency: 9_Soil_TunaCan_90099_050312
Library: DET_EfficiencyVerification.lib

Nuclide	Activity GPS/Source	Uncertainty %
AM-241	4.359E+02	0.40
CS-137	3.870E+02	0.53
Co-1332	7.440E+02	0.70
Total	1.567E+03	

TestAmerica, Inc Spectrum name: 9_20140127006_EffVerif.An1

Sample description
ACVTop-259586;TunaCan2006

Spectrum Filename: C:\User\SPC\Det9\9_20140127006_EffVerif.An1

Acquisition information
Start time: 1/27/2014 9:57:52 AM
Live time: 7200
Real time: 7243
Dead time: 0.59 %
Detector ID: 9

Detector system
Ge9 S/N100228730

Calibration
Filename: 9_Soil_TunaCan.Clb
9_Soil_TunaCan_90099_050312

Energy Calibration
Created: 3/1/2012 1:57:17 PM
Zero offset: 0.074 keV
Gain: 0.250 keV/channel
Quadratic: -2.269E-08 keV/channel^2

Efficiency Calibration
Created: 6/14/2012 10:19:51 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.30 %
Log(Eff): -8.079856E-01 + (-2.367265E-01*Log(E)) + (-3.950640E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.42 %
Log(Eff): -2.387916E+01 + (8.875647E+00*Log(E)) + (-9.401100E-01*Log(E)^2)

Library Files
Main analysis library: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.59keV)
Stop channel: 8000 (1999.34keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 3 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0279

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. GPS/Sour	Nuc
36.52	1513.	9.40	0.98	1.632E-02				
46.61	90228.	0.40	1.00	2.579E-02				
59.58	113489.	0.40	0.95	3.662E-02	59.54	100.000	4.359E+02	AM241
88.11	4431.	4.23	1.01	5.052E-02				
661.70	42601.	0.53	1.51	1.810E-02	661.66	100.000	3.870E+02	CS137
1173.28	23445.	0.73	1.93	1.163E-02				
1332.55	21471.	0.70	2.03	1.050E-02	1332.50	100.000	7.439E+02	Co1332

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
145.74	36.52	5612.	1513.	9.270E+04	9.40	0.982	-
185.90	46.56	22509.	90806.	3.521E+06	0.47	0.935	-
352.02	88.11	6367.	4431.	8.770E+04	4.23	1.012	-
4693.14	1173.28	793.	23445.	2.016E+06	0.73	1.926	-

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EfficiencyVerification.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.93	59.58	20068.	113489.	15.762	0.40	0.945
CS-137	2646.19	661.70	1349.	42601.	5.917	0.53	1.513
Co-1332	5330.56	1332.55	140.	21471.	2.982	0.70	2.033

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity GPS/Source	Peak Energy keV	Peak Activity GPS/Source	Code	MDA Value GPS/Source	COMMENTS
AM-241		4.3588E+02				1.58E+05	
			59.54	4.359E+02	(	2.546E+00 4.01E-01	1.00E+02 G
CS-137		3.8704E+02				1.10E+04	
			661.66	3.870E+02	(	1.580E+00 5.31E-01	1.00E+02 G
Co-1332		7.4395E+02				1.93E+03	
			1332.50	7.439E+02	(	2.004E+00 7.00E-01	1.00E+02 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity GPS/Source	Time Corrected Activity GPS/Source	Uncertainty 1 Sigma Counting	MDA
AM-241	4.3079E+02	4.3588E+02	4.010E-01%	2.55E+00
CS-137	3.2692E+02	3.8704E+02	5.309E-01%	1.58E+00
Co-1332	2.8397E+02	7.4395E+02	7.000E-01%	2.00E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.3 keV) 1.042E+03 GPS/Source
Total Decayed Activity (37.6 to 1999.3 keV) 1.5668657E+03 GPS/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector #14**
SpectrumID: 14_20140124005_EffVerif
Analysis Description: ACVTop-259586;TunaCan2006
Calibration: 14_TunaCan_90099_042312
Detector: Ge14 SN/11080670

Verification Date: 2014-01-24 08:37
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.50E+02	-0.3%
Cs-137	661.66	400	3.96E+02	1.0%
Co-1332	1332.5	777	7.52E+02	3.3%

Comments:

Perform Jody Watson Revie 1/24/2014

C:\User\CRpt\14_20140124005_EffVerif.xls

Sample Description: ACVTop-259586;TunaCan2006
Detector: Ge14 SN/11080670
Source Date: 10/1/2006 11:00
Acquired: 1/24/2014 08:37:03
Analyzed: 1/24/2014 10:38

Analyst: Jody Watson

Efficiency: 14_TunaCan_90099_042312
Library: DET_EfficiencyVerification.lib

Nuclide	Activity GPS/Source	Uncertainty %
AM-241	4.504E+02	0.41
CS-137	3.959E+02	0.61
Co-1332	7.517E+02	0.83
Total	1.598E+03	

TestAmerica, Inc. Spectrum name: 14_20140124005_EffVerif.An1

Sample description
ACVTop-259586;TunaCan2006

Spectrum Filename: C:\User\SPC\Det14\14_20140124005_EffVerif.An1

Acquisition information
Start time: 1/24/2014 8:37:03 AM
Live time: 7200
Real time: 7252
Dead time: 0.72 %
Detector ID: 14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_Soil_TunaCan.Clb
14_TunaCan_90099_042312

Energy Calibration
Created: 2/28/2012 10:48:23 AM
Zero offset: 0.130 keV
Gain: 0.250 keV/channel
Quadratic: -2.050E-08 keV/channel^2

Efficiency Calibration
Created: 4/23/2012 11:29:47 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.02 %
Log(Eff): 2.101260E-01 + (-5.951973E-01*Log(E)) +
(-1.605331E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -2.391492E+01 + (8.828985E+00*Log(E)) +
(-9.371496E-01*Log(E)^2)

Library Files
Main analysis library: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.64keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 3 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0538

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. GPS/Sour	Nuc
36.71	1330.	9.37	0.74	1.399E-02				
46.66	77034.	0.50	0.77	2.180E-02				
59.60	98253.	0.41	0.78	3.069E-02	59.54	100.000	4.504E+02	AM241
87.91	3613.	3.51	0.89	4.194E-02				
661.71	31623.	0.61	1.37	1.313E-02	661.66	100.000	3.959E+02	CS137
1173.29	17093.	0.83	1.70	8.243E-03				
1332.57	15352.	0.83	1.88	7.422E-03	1332.50	100.000	7.517E+02	Co1332

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
146.27	36.71	4728.	1330.	9.509E+04	9.37	0.737	-	s
186.05	46.66	19645.	77034.	3.534E+06	0.50	0.771	-	
351.01	87.91	3738.	3613.	8.616E+04	3.51	0.888	-	s
4692.81	1173.29	462.	17093.	2.074E+06	0.83	1.704	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EfficiencyVerification.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.82	59.60	15728.	98253.	13.646	0.41	0.779
CS-137	2645.98	661.71	958.	31623.	4.392	0.61	1.366
Co-1332	5330.24	1332.57	122.	15352.	2.132	0.83	1.879

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity GPS/Source	Peak Energy keV	Peak Activity GPS/Source	Code	MDA Value GPS/Source	COMMENTS
AM-241		4.5043E+02				1.58E+05	
			59.54	4.504E+02	(	2.692E+00 4.05E-01	1.00E+02 G
CS-137		3.9589E+02				1.10E+04	
			661.66	3.959E+02	(	1.839E+00 6.06E-01	1.00E+02 G
Co-1332		7.5170E+02				1.93E+03	
			1332.50	7.517E+02	(	2.658E+00 8.29E-01	1.00E+02 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity GPS/Source	Time Corrected Activity GPS/Source	Uncertainty 1 Sigma Counting	MDA
AM-241	4.4518E+02	4.5043E+02	4.053E-01%	2.69E+00
CS-137	3.3446E+02	3.9589E+02	6.060E-01%	1.84E+00
Co-1332	2.8725E+02	7.5170E+02	8.288E-01%	2.66E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 1.067E+03 GPS/Source
Total Decayed Activity (37.6 to 1999.5 keV) 1.5980186E+03 GPS/Source

Monthly Backgrounds

Test America
St. Louis
Background Check

Spectrum: 4_20140711008_BGLong
Acquired: 7/11/2014 3:24:18 PM
Detector: Ge 4 SN/181
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.32	1.20	1.24	1.27	1.39	1.43	PASS

Analyst: Micha Korrinhizer Reviewer:

TestAmerica Spectrum name: 4_20140711008_BGLong.An1

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det4\4_20140711008_BGLong.An1

Acquisition information
Start time:	7/11/2014 3:24:18 PM
Live time:	43200
Real time:	43249
Dead time:	0.11 %
Detector ID:	4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_QC.Clb
4_QA-D_Rad11-0018_032612

Energy Calibration
Created:	2/28/2012 2:55:17 PM
Zero offset:	0.091 keV
Gain:	0.250 keV/channel
Quadratic:	-2.917E-08 keV/channel^2

Efficiency Calibration
Created:	3/27/2012 7:34:55 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (1999.44keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

TestAmerica Spectrum name: 4_20140711008_BGLong.An1

Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 0.0378

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.66	461.	9.14	0.81	3.541E-02	46.54	4.250	7.101E+00	PB210
63.32	325.	9.78	0.96	4.645E-02	63.29	3.810	4.253E+00	TH234
74.90	126.	19.42	0.83	5.411E-02				
77.12	100.	25.29	0.83	5.559E-02				
92.62	480.	7.80	1.05	6.309E-02	92.59	5.584	3.152E+00	TH234
					93.35	5.561	3.163E+00	AC228
185.62	256.	14.28	1.10	5.802E-02	185.72	54.000	1.888E-01	U235
					185.99	3.280	3.109E+00	Ra226
238.49	127.	23.74	0.93	5.338E-02	238.63	43.300	1.272E-01	PB212
1460.45	90.	17.95	0.62	7.834E-03	1460.83	10.670	2.506E+00	K40

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
299.00	74.88	250.	140.	2.587E+03	20.29	1.054	-	s
307.91	77.11	210.	98.	1.763E+03	25.47	0.392	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.16	46.66	357.	461.	0.011	9.14	0.813s
TH-234	252.76	63.32	242.	325.	0.008	9.78	0.957
TH-234	369.92	92.62	290.	480.	0.011	7.80	1.050s
Ra-226	741.74	185.62	280.	256.	0.006	14.28	1.103s
PB-212	953.12	238.49	247.	127.	0.003	23.74	0.929
K-40	5841.85	1460.45	32.	90.	0.002	17.95	0.621s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	Peak MDA Value DPS		COMMENTS
K-40	N	2.5063E+00				4.66E+11		
			1460.83	2.506E+00	(	7.994E-01	1.79E+01 1.07E+01	G
PB-210	N	7.1008E+00				8.14E+03		
			46.54	7.101E+00	@(	1.400E+00	9.14E+00 4.25E+00	G
PB-212	N	1.2721E-01				6.98E+02		
			238.63	1.272E-01	?(	7.607E-02	2.37E+01 4.33E+01	G
			300.03	0.000E+00		1.084E-01	0.00E+00 3.28E+00	GA
TH-234	N	4.2527E+00				1.63E+12		
			63.29	4.253E+00	(	9.840E-01	9.78E+00 3.81E+00	G
			92.59	3.152E+00	-	5.396E-01	7.80E+00 5.58E+00	G
Ra-226		3.1093E+00				5.84E+05		
			185.99	3.109E+00	@(	9.828E-01	1.43E+01 3.28E+00	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.

- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- - - -

SB-124	<	5.0570E-02			
SB-125	<	1.2064E-01			
I-131	<	2.4091E-02			
BA-133	<	4.7653E-02			
CS-134	<	5.1669E-02			
CS-137	<	1.0661E-01			
CE-139	<	2.7270E-02			
Ba-140	<	7.8561E-02			
La-140	<	2.8820E-02			
CE-141	<	5.8617E-02			
CE-144	<	2.5980E-01			
PM-144	<	1.0295E-01			
EU-152	<	8.1484E-02			
EU-154	<	4.9476E-01			
EU-155	<	1.2289E-01			
HF-181	<	5.2472E-02			
Ta-182	<	2.5344E-01			
Hg-203	<	3.8859E-02			
TL-208	<	6.3492E-02			
pm-146	<	1.9581E-01			
y-88	<	4.9930E-02			
PB-210	#	7.1008E+00	9.1350E+00%		1.400E+00
PB-212	#	1.2721E-01	2.3742E+01%		7.607E-02
PB-214	<	7.1210E-02			
BI-207	<	5.4420E-02			
BI-212	<	1.0292E+00			
BI-214	<	1.6077E-01			
BI-210M	<	5.7143E-02			
RA-224	<	4.1210E-01			
AC-228	<	2.9410E-01			
TH-227	<	2.4489E-01			
TH-229	<	3.4771E-01			
TH-234		4.2527E+00	9.7818E+00%		9.840E-01
PA-231	<	8.3775E-01			
PA-233	<	8.7202E-02			
PA-234	<	1.5739E-01			
PA-234M	<	6.8492E+00			
Ra-226	#	3.1093E+00	1.4278E+01%		9.828E-01
U-235	<	2.8961E-01			
AM-241	<	1.2181E-01			
Np-237	<	1.2542E-01			

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.

```
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
----------------------------   S U M M A R Y   ----------------------------
Total Activity (   37.6 to  1999.4 keV)     1.710E+01  DPS
```

Test America
St. Louis
Background Check

Spectrum: 8_20140711008_BGLong
Acquired: 7/11/2014 3:25:42 PM
Detector: Ge 8 SN/174
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.56	1.39	1.45	1.59	1.68	1.74	PASS

Analyst: Micha Korrinhizer Reviewer: Siobhan Perry

TestAmerica Spectrum name: 8_20140711008_BGLong.An1

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det8\8_20140711008_BGLong.An1

Acquisition information
Start time:	7/11/2014 3:25:42 PM
Live time:	43200
Real time:	44520
Dead time:	2.96 %
Detector ID:	8

Detector system
Ge 8 SN/174

Calibration
Filename: 8_QC.Clb
Ge8_QC

Energy Calibration
Created:	2/28/2012 10:34:41 AM
Zero offset:	0.052 keV
Gain:	0.250 keV/channel
Quadratic:	5.282E-10 keV/channel^2

Efficiency Calibration
Created:	1/6/2011 8:07:20 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.55keV)
Stop channel:	8000 (1999.96keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 26 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0709

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
59.52	266.	12.73	1.02	8.694E-02	59.54	35.900	1.970E-01	AM241
63.29	612.	6.18	1.03	9.251E-02	63.29	3.810	4.021E+00	TH234
92.56	1226.	4.31	1.03	1.295E-01	92.59	5.584	3.925E+00	TH234
					93.35	5.561	3.938E+00	AC228
143.72	163.	27.26	0.86	1.248E-01	143.79	10.960	2.759E-01	U235
185.77	641.	7.00	0.82	1.108E-01	185.72	54.000	2.479E-01	U235
					185.99	3.280	4.084E+00	Ra226
205.47	125.	29.62	1.15	1.054E-01	205.33	5.010	5.485E-01	U235
238.62	174.	21.06	0.87	9.639E-02	238.63	43.300	9.632E-02	PB212
352.19	170.	21.19	0.46	6.551E-02	351.93	37.600	1.598E-01	PB214
510.87	709.	6.67	1.90	4.531E-02	511.86	20.000	1.814E+00	RH106
596.34	60.	29.93	0.52	3.853E-02				
609.20	84.	28.33	0.82	3.750E-02	609.31	46.090	1.132E-01	BI214
661.57	161.	12.55	1.63	3.334E-02	661.66	85.210	1.315E-01	CS137
766.76	92.	25.50	1.28	2.899E-02	766.41	0.294	2.508E+01	PA234M
1001.00	88.	25.02	0.54	2.158E-02	1001.00	0.837	1.128E+01	PA234M
1173.26	142.	15.86	0.51	1.834E-02	1173.24	99.900	1.796E-01	CO60
1332.53	121.	14.34	1.39	1.637E-02	1332.50	99.980	1.711E-01	CO60
1460.54	70.	17.33	0.82	1.543E-02	1460.83	10.670	9.914E-01	K40

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
2043.39	510.87	255.	709.	1.565E+04	6.67	1.898	- s
2385.28	596.34	75.	60.	1.557E+03	29.93	0.519	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	238.05	59.56	560.	283.	0.007	18.39	0.880
TH-234	253.14	63.33	459.	616.	0.014	8.04	0.908
TH-234	370.06	92.56	469.	1226.	0.028	4.31	1.034
U-235	574.70	143.72	453.	163.	0.004	27.26	0.858s
U-235	742.72	185.72	373.	696.	0.016	5.05	0.818D
U-235	821.71	205.47	326.	125.	0.003	29.62	1.155
PB-212	954.32	238.62	317.	174.	0.004	21.06	0.872s
PB-214	1408.62	352.19	234.	170.	0.004	21.19	0.462s
BI-214	2436.72	609.20	128.	84.	0.002	28.33	0.820s
CS-137	2646.22	661.57	75.	161.	0.004	12.55	1.629
PA-234M	3067.01	766.76	87.	92.	0.002	25.50	1.282s
PA-234M	4004.02	1001.00	70.	88.	0.002	25.02	0.545s
CO-60	4693.08	1173.26	63.	142.	0.003	15.86	0.507s
CO-60	5330.16	1332.53	36.	121.	0.003	14.34	1.386s
K-40	5842.24	1460.54	18.	70.	0.002	17.33	0.823s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS		COMMENTS
K-40	N	9.9145E-01					4.66E+11	
			1460.83	9.914E-01	(	3.123E-01	1.73E+01 1.07E+01	G
CO-60	F	1.7537E-01					1.93E+03	
			1332.50	1.711E-01	?(	4.337E-02	1.43E+01 1.00E+02	G
			1173.24	1.796E-01	(	5.010E-02	1.59E+01 9.99E+01	G
CS-137	I	1.3145E-01					1.10E+04	
			661.66	1.315E-01	(	3.502E-02	1.26E+01 8.52E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	9.6322E-02					6.98E+02	
			238.63	9.632E-02	?(	4.755E-02	2.11E+01	4.33E+01 G
			300.03	0.000E+00		6.527E-02	0.00E+00	3.28E+00 GA
PB-214	N	1.5975E-01					5.84E+05	
			351.93	1.598E-01	*(	6.944E-02	2.12E+01	3.76E+01 G
			295.09	0.000E+00	%	1.117E-01	4.11E+01	1.93E+01 G
			242.00	0.000E+00	%	2.061E-01	6.34E+01	7.43E+00 GA
BI-214	N	1.1318E-01					5.84E+05	
			609.31	1.132E-01	?(	7.411E-02	2.83E+01	4.61E+01 G
			1120.29	0.000E+00		5.844E-02	0.00E+00	1.51E+01 G
			1764.49	0.000E+00		8.401E-02	0.00E+00	1.54E+01 G
TH-234	N	3.9748E+00					1.63E+12	
			63.29	4.049E+00	(	6.740E-01	8.04E+00	3.81E+00 G
			92.59	3.925E+00	(	3.317E-01	4.31E+00	5.58E+00 G
PA-234M	N	1.1279E+01					1.63E+12	
			1001.00	1.128E+01	?(	5.345E+00	2.50E+01	8.37E-01 G
			766.41	2.508E+01	+	1.252E+01	2.55E+01	2.94E-01 G
U-235	N	3.6143E-01					2.57E+11	
			185.72	2.693E-01	}	3.589E-02	5.05E+00	5.40E+01 GA
			143.79	2.759E-01	@(	1.725E-01	2.73E+01	1.10E+01 G
			205.33	5.485E-01	(	3.805E-01	2.96E+01	5.01E+00 G
			163.38	0.000E+00	%	3.716E-01	3.12E+01	5.08E+00 G
AM-241	T	2.0996E-01					1.58E+05	
			59.54	2.100E-01	?(	8.383E-02	1.84E+01	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction

} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	<	1.1043E-01		
NA-22	<	1.7797E-02		
K-40	#	9.9145E-01	1.7329E+01%	3.123E-01
Sc-46	<	4.1757E-02		
CR-51	<	2.0625E-01		
MN-54	<	2.7843E-02		
FE-59	<	4.5528E-02		
Co-56	<	3.0367E-02		
CO-57	<	1.6714E-02		
CO-58	<	3.3276E-02		
CO-60		1.7537E-01	1.0692E+01%	4.337E-02
ZN-65	<	6.5492E-02		
NB-94	<	1.5056E-02		
ZR-95	<	3.8723E-02		
NB-95	<	4.4269E-02		
RU-103	<	3.1636E-02		
RH-106	<	3.3372E-01		
AG-108M	<	3.5270E-02		
AG-110M	<	2.6658E-02		
SN-113	<	4.7020E-02		
SB-124	<	3.3963E-02		
SB-125	<	7.7062E-02		
I-131	<	2.3205E-02		
BA-133	<	3.7945E-02		
CS-134	<	3.3535E-02		

CS-137		1.3145E-01	1.2554E+01%	3.502E-02
CE-139	<	1.3083E-02		
Ba-140	<	8.7184E-02		
La-140	<	4.6761E-02		
CE-141	<	3.9135E-02		
CE-144	<	8.2901E-02		
PM-144	<	4.1977E-02		
EU-152	<	3.4177E-02		
EU-154	<	3.0057E-01		
EU-155	<	7.3395E-02		
HF-181	<	2.9788E-02		
Ta-182	<	1.1785E-01		
Hg-203	<	2.7458E-02		
TL-208	<	4.4903E-02		
pm-146	<	3.9876E-02		
y-88	<	5.5805E-02		
PB-210	<	6.6855E-01		
PB-212	#	9.6322E-02	2.1056E+01%	4.755E-02
PB-214	#	1.5975E-01	2.1191E+01%	6.944E-02
BI-207	<	3.0702E-02		
BI-212	<	5.6529E-01		
BI-214	#	1.1318E-01	2.8334E+01%	7.411E-02
BI-210M	<	4.1023E-02		
RA-224	<	2.5553E-01		
AC-228	<	2.1151E-01		
TH-227	<	1.4221E-01		
TH-229	<	3.4854E-01		
TH-234		3.9748E+00	4.3078E+00%	6.740E-01
PA-231	<	8.9168E-01		
PA-233	<	3.0820E-02		
PA-234	<	1.1228E-01		
PA-234M	#	1.1279E+01	2.5017E+01%	5.345E+00
Ra-226	<	9.4348E-01		
U-235		3.6143E-01	2.0128E+01%	1.725E-01
AM-241	#	2.0996E-01	1.8394E+01%	8.383E-02
Np-237	<	7.5886E-02		

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (205.3 to 2000.0 keV) 1.749E+01 DPS

Test America
St. Louis
Background Check

Spectrum: 9_20140711008_BGLong
Acquired: 7/11/2014 3:06:40 PM
Detector: Ge9 S/N100228730
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.89	1.53	1.65	1.78	2.14	2.26	PASS

Analyst: Micha Korrinhizer Reviewer:

TestAmerica, Inc Spectrum name: 9_20140711008_BGLong.An1

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det9\9_20140711008_BGLong.An1

Acquisition information
Start time: 7/11/2014 3:06:40 PM
Live time: 43200
Real time: 43240
Dead time: 0.09 %
Detector ID: 9

Detector system
Ge9 S/N100228730

Calibration
Filename: 9_QC.Clb
9_QC-E_79670-334_060211

Energy Calibration
Created: 3/1/2012 1:57:17 PM
Zero offset: 0.074 keV
Gain: 0.250 keV/channel
Quadratic: -2.269E-08 keV/channel^2

Efficiency Calibration
Created: 6/3/2011 12:03:10 PM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.59keV)
Stop channel: 8000 (1999.34keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 14 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0532

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
295.40	150.	25.14	0.83	1.047E-01	295.09	19.300	1.719E-01	PB214
351.86	157.	24.03	1.26	8.640E-02	351.93	37.600	1.119E-01	PB214
511.04	1141.	5.69	2.52	6.208E-02	511.86	20.000	2.130E+00	RH106
609.49	136.	26.27	0.86	5.256E-02	609.31	46.090	1.302E-01	BI214
					610.30	5.750	1.046E+00	RU103
1119.94	92.	25.50	1.38	2.761E-02	1120.29	15.100	5.126E-01	BI214
					1120.55	99.987	7.742E-02	Sc46
					1121.30	34.900	2.219E-01	Ta182
1460.83	214.	12.02	2.20	2.339E-02	1460.83	10.670	1.985E+00	K40
1764.50	105.	17.85	1.33	2.159E-02	1764.49	15.400	7.285E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
2043.52	511.04	449.	1141.	1.838E+04	5.69	2.520	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-214	1180.99	295.40	318.	150.	0.003	25.14	0.831s
PB-214	1406.82	351.86	304.	157.	0.004	24.03	1.261
BI-214	2437.35	609.49	246.	136.	0.003	26.27	0.859s
BI-214	4479.70	1119.94	87.	92.	0.002	25.50	1.381s
K-40	5844.03	1460.83	56.	214.	0.005	12.02	2.198
BI-214	7059.68	1764.50	29.	105.	0.002	17.85	1.332s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS		COMMENTS
K-40	N	1.9847E+00				4.66E+11		
			1460.83	1.985E+00	(	3.485E-01	1.20E+01 1.07E+01	G
PB-214	N	1.3222E-01				5.84E+05		
			351.93	1.119E-01	?(	5.983E-02	2.40E+01 3.76E+01	G
			295.09	1.719E-01	*(	9.831E-02	2.51E+01 1.93E+01	G
			242.00	0.000E+00	&	2.182E-01	6.69E+01 7.43E+00	GA
BI-214	N	1.3022E-01				5.84E+05		
			609.31	1.302E-01	?(	7.235E-02	2.63E+01 4.61E+01	G
			1120.29	5.126E-01	+	2.559E-01	2.55E+01 1.51E+01	G
			1764.49	7.285E-01	+	1.945E-01	1.79E+01 1.54E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went
    negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide
    failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the
    library energy centroid for positive identification.

P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	< 2.1977E-01		
NA-22	< 4.3272E-02		
K-40	1.9847E+00	1.2023E+01%	3.485E-01
Sc-46	< 2.3263E-02		
CR-51	< 2.3362E-01		
MN-54	< 4.3497E-02		
FE-59	< 6.5095E-02		
Co-56	< 2.9872E-02		
CO-57	< 1.2687E-02		
CO-58	< 2.6995E-02		
CO-60	< 4.8154E-02		
ZN-65	< 7.0714E-02		
NB-94	< 2.9990E-02		
ZR-95	< 2.5011E-02		
NB-95	< 1.2951E-02		
RU-103	< 1.6741E-02		
RH-106	< 3.0840E-01		
AG-108M	< 1.0697E-02		
AG-110M	< 1.7375E-02		
SN-113	< 1.4878E-02		
SB-124	< 2.0770E-02		
SB-125	< 8.8111E-02		
I-131	< 1.1321E-02		
BA-133	< 2.5275E-02		

CS-134	<	3.0683E-02			
CS-137	<	2.5376E-02			
CE-139	<	1.7049E-02			
Ba-140	<	1.1524E-01			
La-140	<	3.2942E-02			
CE-141	<	2.7115E-02			
CE-144	<	1.2063E-01			
PM-144	<	3.5665E-02			
EU-152	<	4.9827E-02			
EU-154	<	2.7563E-01			
EU-155	<	5.9980E-02			
HF-181	<	1.2129E-02			
Ta-182	<	7.0850E-02			
Hg-203	<	2.7831E-02			
TL-208	<	3.7818E-02			
pm-146	<	8.0005E-02			
y-88	<	5.5628E-02			
PB-210	<	7.5114E-01			
PB-212	<	4.5701E-02			
PB-214	#	1.3222E-01	1.7389E+01%		5.983E-02
BI-207	<	3.3524E-02			
BI-212	<	3.9564E-01			
BI-214		1.3022E-01	2.6271E+01%		7.235E-02
BI-210M	<	3.3904E-02			
RA-224	<	4.2197E-01			
AC-228	<	1.6653E-01			
TH-227	<	1.2874E-01			
TH-229	<	1.6901E-01			
TH-234	<	5.8830E-01			
PA-231	<	7.2493E-01			
PA-233	<	3.7224E-02			
PA-234	<	6.7554E-02			
PA-234M	<	4.9866E+00			
Ra-226	<	5.9429E-01			
U-235	<	1.4688E-01			
AM-241	<	6.8478E-02			
Np-237	<	9.5567E-02			

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

TestAmerica, Inc Spectrum name: 9_20140711008_BGLong.An1

---------- S U M M A R Y ----------

Total Activity (	37.6 to	1999.3 keV)	2.247E+00 DPS

Test America
St. Louis
Background Check

Spectrum: 14_20140711008_BGLong
Acquired: 7/11/2014 3:06:49 PM
Detector: Ge14 SN/11080670
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.91	1.75	1.80	1.81	2.01	2.06	PASS

Analyst: Micha Korrinhizer Reviewer: Siobhan Perry

TestAmerica, Inc. Spectrum name: 14_20140711008_BGLong.An1

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det14\14_20140711008_BGLong.An1

Acquisition information
Start time: 7/11/2014 3:06:49 PM
Live time: 43200
Real time: 43395
Dead time: 0.45 %
Detector ID: 14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_QC.Clb
14_QC_79670-334_SOURCE E_042211

Energy Calibration
Created: 2/28/2012 10:48:23 AM
Zero offset: 0.130 keV
Gain: 0.250 keV/channel
Quadratic: -2.050E-08 keV/channel^2

Efficiency Calibration
Created: 5/1/2011 8:43:09 AM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.64keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 21 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.2048

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.74	493.	10.80	0.99	6.150E-02	46.54	4.250	4.384E+00	PB210
63.39	446.	11.51	1.02	8.551E-02	63.29	3.810	3.174E+00	TH234
72.95	110.	26.62	0.78	9.935E-02				
74.97	215.	16.11	0.78	1.023E-01				
77.17	137.	23.17	0.78	1.054E-01				
84.74	193.	22.53	0.97	1.163E-01				
92.68	640.	8.63	1.06	1.215E-01	92.59	5.584	2.185E+00	TH234
					93.35	5.561	2.193E+00	AC228
185.77	326.	14.19	0.92	1.072E-01	185.72	54.000	1.303E-01	U235
					185.99	3.280	2.146E+00	Ra226
198.22	105.	28.02	0.55	1.040E-01				
238.74	192.	20.78	1.14	9.386E-02	238.63	43.300	1.093E-01	PB212
352.21	199.	17.72	1.12	6.540E-02	351.93	37.600	1.870E-01	PB214
583.29	132.	20.18	0.99	3.931E-02	583.02	84.500	9.235E-02	TL208
609.05	204.	14.32	0.80	3.710E-02	609.31	46.090	2.756E-01	BI214
694.89	73.	29.95	0.57	3.164E-02				
1461.42	93.	19.60	1.67	1.557E-02	1460.83	10.670	1.295E+00	K40
1764.99	61.	21.71	0.60	1.327E-02	1764.49	15.400	6.872E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
299.42	75.01	470.	182.	1.780E+03	20.82	0.591	-	
308.20	77.20	417.	139.	1.321E+03	25.38	0.930	-	
338.32	84.74	535.	193.	1.658E+03	22.53	0.972	-	s
792.15	198.22	283.	105.	1.006E+03	28.02	0.550	-	sM
1407.97	352.21	250.	199.	3.040E+03	17.72	1.123	-	s
2778.72	694.89	109.	73.	2.297E+03	29.95	0.573	-	sM

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.38	46.74	637.	493.	0.011	10.80	0.986s
TH-234	253.17	63.44	666.	480.	0.011	11.47	1.053s
TH-234	370.07	92.68	659.	640.	0.015	8.63	1.061s
Ra-226	742.35	185.77	493.	326.	0.008	14.19	0.917
PB-212	954.20	238.74	400.	192.	0.004	20.78	1.140s
TL-208	2332.26	583.29	130.	132.	0.003	20.18	0.995
BI-214	2435.33	609.05	144.	204.	0.005	14.32	0.797s
K-40	5845.91	1461.42	35.	93.	0.002	19.60	1.666
BI-214	7061.07	1764.99	19.	61.	0.001	21.71	0.599s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	Peak MDA Value DPS		COMMENTS
K-40	N	1.2955E+00				4.66E+11		
			1460.83	1.295E+00	(	4.218E-01	1.96E+01 1.07E+01	G
TL-208	N	9.2346E-02				6.98E+02		
			583.02	9.235E-02	(	3.885E-02	2.02E+01 8.45E+01	G
			277.28	0.000E+00		3.211E-02	0.00E+00 6.31E+00	G
			860.56	0.000E+00	%	1.682E-01	2.93E+02 1.24E+01	G
PB-210	N	4.3838E+00				8.14E+03		
			46.54	4.384E+00	(	1.071E+00	1.08E+01 4.25E+00	G
PB-212	N	1.0932E-01				6.98E+02		
			238.63	1.093E-01	(	5.461E-02	2.08E+01 4.33E+01	G
			300.03	0.000E+00	&	5.723E-01	1.06E+02 3.28E+00	GA
BI-214	N	2.7562E-01				5.84E+05		
			609.31	2.756E-01	@(	7.928E-02	1.43E+01 4.61E+01	G
			1120.29	0.000E+00	&	2.166E-01	1.02E+02 1.51E+01	G
			1764.49	6.872E-01	+	2.628E-01	2.17E+01 1.54E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-234	N	3.4174E+00					1.63E+12	
			63.29	3.417E+00	*(	8.751E-01	1.15E+01	3.81E+00 G
			92.59	2.185E+00	-	4.174E-01	8.63E+00	5.58E+00 G
Ra-226		2.1460E+00					5.84E+05	
			185.99	2.146E+00	(	6.999E-01	1.42E+01	3.28E+00 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Activity DPS	Time of Count Uncertainty 1 Sigma Counting	MDA
BE-7	<	3.0700E-01		
NA-22	<	1.7554E-02		
K-40		1.2955E+00	1.9597E+01%	4.218E-01
Sc-46	<	2.3016E-02		
CR-51	<	2.1909E-01		
MN-54	<	3.8442E-02		
FE-59	<	3.3365E-02		
Co-56	<	3.1440E-02		
CO-57	<	1.8319E-02		
CO-58	<	3.8048E-02		
CO-60	<	6.4953E-02		
ZN-65	<	1.0455E-01		
NB-94	<	3.1188E-02		
ZR-95	<	7.3393E-02		
NB-95	<	2.9338E-02		
RU-103	<	2.8922E-02		
RH-106	<	1.5243E-01		
AG-108M	<	3.4455E-02		
AG-110M	<	2.1511E-02		
SN-113	<	4.0546E-02		
SB-124	<	3.0863E-02		
SB-125	<	1.0036E-01		
I-131	<	2.3855E-02		
BA-133	<	3.7153E-02		
CS-134	<	3.7590E-02		
CS-137	<	5.4698E-02		
CE-139	<	1.9619E-02		
Ba-140	<	1.4262E-01		
La-140	<	4.8492E-02		
CE-141	<	2.6748E-02		
CE-144	<	1.1519E-01		
PM-144	<	4.8542E-02		
EU-152	<	6.1770E-02		
EU-154	<	4.0091E-01		
EU-155	<	9.0048E-02		
HF-181	<	3.1919E-02		
Ta-182	<	1.5349E-01		
Hg-203	<	2.9481E-02		
TL-208		9.2346E-02	2.0184E+01%	3.885E-02
pm-146	<	7.0388E-02		
y-88	<	5.0344E-02		
PB-210		4.3838E+00	1.0797E+01%	1.071E+00
PB-212		1.0932E-01	2.0781E+01%	5.461E-02

PB-214	<	9.5409E-02			
BI-207	<	4.2713E-02			
BI-212	<	4.6605E-01			
BI-214		2.7562E-01	1.4320E+01%		7.928E-02
BI-210M	<	3.7091E-02			
RA-224	<	3.3915E-01			
AC-228	<	1.6822E-01			
TH-227	<	9.1900E-02			
TH-229	<	5.0674E-01			
TH-234	#	3.4174E+00	1.1469E+01%		8.751E-01
PA-231	<	5.9536E-01			
PA-233	<	6.3551E-02			
PA-234	<	1.1015E-01			
PA-234M	<	6.4921E+00			
Ra-226		2.1460E+00	1.4187E+01%		6.999E-01
U-235	<	1.7304E-01			
AM-241	<	7.6241E-02			
Np-237	<	9.9044E-02			

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

--- S U M M A R Y ---

Total Activity (37.6 to 1999.5 keV) 1.172E+01 DPS

Run Logs

Gamma Spectroscopy Run Log

Detector: GV4

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/30/12 13:58		IC 160-11761/1		11761			JLW
04/02/12 16:50		ICV 160-11761/2		11761			JLW
02/27/13 16:17		ACVTOP 160-38300/1		38300			JLW
07/11/14 15:24		ICB 160-130904/1		130904			JLW
07/16/14 00:01		CCB 160-131933/1		131933			JLW
07/16/14 00:43		CCV 160-131933/2		131933			
07/16/14 01:04		CCV 160-131933/3		131933			JLW
07/16/14 01:37	30	ZZZZZ		131933			
07/16/14 02:10	30	LCS 160-128622/2-A		131933	128622	GA-01-R	JLW
07/16/14 07:34	30	ZZZZZ		131933			
07/16/14 08:18	30	ZZZZZ		131933			
07/16/14 09:29	30	ZZZZZ		131933			
07/16/14 10:18	30	ZZZZZ		131933			
07/16/14 12:14	30	ZZZZZ		131933			
07/16/14 17:30	60	ZZZZZ		131933			
07/16/14 18:47	60	ZZZZZ		131933			
07/16/14 20:05	30	ZZZZZ		131933			
07/16/14 21:02	30	ZZZZZ		131933			
07/16/14 21:57	30	ZZZZZ		131933			
07/16/14 22:47	30	ZZZZZ		131933			
07/16/14 23:18	30	ZZZZZ		131933			

Detector: GV8

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/27/12 10:58		IC 160-12311/1		12311			JLW
03/29/12 01:58		ICV 160-12311/2		12311			JLW
06/10/14 05:54		ACVTOP 160-126217/1		126217			JLW
07/11/14 15:25		ICB 160-130902/1		130902			JLW
07/16/14 00:01		CCV 160-131938/1		131938			
07/16/14 00:22		CCV 160-131938/2		131938			JLW
07/16/14 00:44		CCB 160-131938/3		131938			JLW
07/16/14 01:38	30	ZZZZZ		131938			
07/16/14 02:11	30	680-102370-6 DU	SD-005E-01 DU	131938	128622	GA-01-R	JLW
07/16/14 07:35	30	ZZZZZ		131938			
07/16/14 08:19	30	ZZZZZ		131938			
07/16/14 09:30	30	ZZZZZ		131938			
07/16/14 10:21	30	ZZZZZ		131938			
07/16/14 11:21	120	ZZZZZ		131938			
07/16/14 17:32	60	ZZZZZ		131938			
07/16/14 18:50	30	ZZZZZ		131938			
07/16/14 19:30	30	ZZZZZ		131938			
07/16/14 20:14	30	ZZZZZ		131938			
07/16/14 21:04	30	ZZZZZ		131938			
07/16/14 21:59	30	ZZZZZ		131938			
07/16/14 22:48	30	ZZZZZ		131938			

Detector: GV9

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/03/12 13:37		IC 160-12326/1		12326			JLW
06/14/12 10:54		ICV 160-12326/2		12326			JLW
01/27/14 09:57		ACVTOP 160-101591/1		101591			JLW

Gamma Spectroscopy Run Log

Detector: GV9 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
07/11/14 15:06		ICB 160-130891/1		130891			JLW
07/16/14 00:02		CCV 160-131682/1		131682			
07/16/14 00:23		CCV 160-131682/2		131682			JLW
07/16/14 00:45		CCB 160-131682/3		131682			JLW
07/16/14 01:34	30	680-102370-6	SD-005E-01	131682	128622	GA-01-R	JLW
07/16/14 02:12	30	MB 160-128622/1-A		131682	128622	GA-01-R	JLW
07/16/14 07:32	30	ZZZZZ		131682			
07/16/14 08:15	30	ZZZZZ		131682			
07/16/14 09:30	30	ZZZZZ		131682			
07/16/14 10:15	30	ZZZZZ		131682			
07/16/14 11:10	30	ZZZZZ		131682			
07/16/14 12:09	30	ZZZZZ		131682			
07/16/14 17:35	60	ZZZZZ		131682			
07/16/14 18:45	60	ZZZZZ		131682			
07/16/14 20:06	30	ZZZZZ		131682			
07/16/14 21:54	30	ZZZZZ		131682			
07/16/14 22:49	30	ZZZZZ		131682			

Detector: GV14

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
04/23/12 09:56		IC 160-12359/1		12359			JLW
04/24/12 08:12		ICV 160-12359/2		12359			JLW
01/24/14 08:37		ACVTOP 160-101066/1		101066			JLW
07/11/14 15:06		ICB 160-130894/1		130894			JLW
07/16/14 00:02		CCB 160-131968/1		131968			JLW
07/16/14 00:45		CCV 160-131968/2		131968			
07/16/14 01:06		CCV 160-131968/3		131968			JLW
07/16/14 01:35	30	680-102370-33	SD-008-01	131968	128622	GA-01-R	JLW
07/16/14 02:12	30	ZZZZZ		131968			
07/16/14 07:33	30	ZZZZZ		131968			
07/16/14 08:15	30	ZZZZZ		131968			
07/16/14 09:31	30	ZZZZZ		131968			
07/16/14 10:16	30	ZZZZZ		131968			
07/16/14 11:12	30	ZZZZZ		131968			
07/16/14 12:10	30	ZZZZZ		131968			
07/16/14 17:37	60	ZZZZZ		131968			
07/16/14 18:52	30	ZZZZZ		131968			
07/16/14 19:32	30	ZZZZZ		131968			
07/16/14 20:08	60	ZZZZZ		131968			
07/16/14 22:00	30	ZZZZZ		131968			
07/16/14 22:50	30	ZZZZZ		131968			

02 RAD

Cur165

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: S. Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.13
Client Contact: Mike Martin	Phone: (703)342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~13 of 18~~ 1 of 4
Company: Tetra Tech, Inc.			Analysis Requested	Job #: 680-102370
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes:
City: Germantown	TAT Requested (days): Standard			A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			Other:
Email: Michael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site: Dark Head Cove	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6010 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:		N	N			N	N		
SD-DUP03	6/12/14	0000	C	Solid				X				
SD-206-S5		0810	C	Solid				X				
SD-206-01		0815	C	Solid				X				
SD-206-02		0820	C	Solid				X				
SD-206-03		0825	C	Solid				X				H2S pending analysis of S5 to 02
SD-005E-01		0830	C	Solid				[redacted]		X		
~~SD-222-S5~~ SD-215-S5		0850	C	Solid				X				
SD-222-S5		0905	C	Solid				X				
SD-222-01		0910	C	Solid				X				
SD-222-02		0915	C	Solid				X				
SD-222-03		1920	C	Solid				X				[redacted]

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	6-12-14 / 1600	Tt		6/12/14 / 1600	TestAmerica
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	6/12/14 / 1735	TestAmerica		6-13-14 / 0930	TTS
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.10
Client Contact: Mike Martin	Phone: (703) 341-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~46~~ 2 of 4
Company: Tetra Tech, Inc.				Job #: 680-102370
Address: 20251 Century Blvd Suite 200	Due Date Requested:			
City: Germantown	TAT Requested (days): Standard			
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			
Email: MIchael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2SO3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	8020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
		Preservation Code:					N	A	N	A		
SD-211-55	6/12/14	1000	C	Solid				X				
SD-211-01		1005	C	Solid				X				
SD-211-02		1010	C	Solid				X				
SD-216-55		~~1020~~ 1020	C	Solid				X				
SD-216-01		~~1025~~ 1025	C	Solid				X				
SD-216-02		1030	C	Solid				X				
SD-217-55		1220	C	Solid				X				
SD-217-01		1225	C	Solid				X				
SD-217-02		1230	C	Solid				X				
SD-217-03		1235	C	Solid				X				Hold pending analysis of 55 to 02
SD-214-55	↓	1310	C	Solid				X				

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Date/Time:	Company		Date/Time:	Company
Relinquished by:	6-12-14 / 1600	TT	Received by:	6/12/14 1600	TA
Relinquished by:	6/12/14 1735	TA	Received by:	6/13/14 0930	TASTBuffalo
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Gorman	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.15
Client Contact: Mike Martin	Phone: (703)542-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~45 of 48~~ 3 of 4
Company: Tetra Tech, Inc.				Job #: 680-102370
Address: 20251 Century Blvd Suite 200	Due Date Requested:	Analysis Requested		Preservation Codes:
City: Germantown	TAT Requested (days): Standard			A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			Other:
Email: Michael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	8020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-214-01	6/12/14	1315	C	Solid				X				MS/MSD
SD-212-55		1410	C	Solid				X				
SD-212-01		1415	C	Solid				X				
SD-212-02		1420	C	Solid				X				
SD-212-03		1425	C	Solid				X				Hold pending analysis of SS to 02
SD-DUP04		0000	C	Solid				X				
SD-213-55		1430	C	Solid				X				
SD-213-01		1435	C	Solid				X				
SD-213-02		1440	C	Solid				X				
SD-213-03		1445	C	Solid				X				Hold pending analysis of SS to 02
SD-008-01		1450	C	Solid						X		

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	6-12-14 / 1600	TT		6/12/14 / 1600	TA
Relinquished by:	Date/Time: 6/12/14 / 1735	Company TA	Received by:	Date/Time: 6/13/14 / 0930	Company TASHOLLIS
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Green	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.18
Client Contact: Mike Martin	Phone: (703)742-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page 18 of 18 4 of 4
Company: Tetra Tech, Inc.				Job #: 680-102370
Address: 20251 Century Blvd Suite 200	Due Date Requested:	Analysis Requested		
City: Germantown	TAT Requested (days):			
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			
Email: MIchael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=wastefoil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-228/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-214-02	6/12/14	1320		Solid				X				
SD-214-03	6/12/14	1325		Solid				X				
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:
Relinquished by:	Date/Time:	Company	Received by: Date/Time: 6/12/14 1600 Company TT
Relinquished by:	Date/Time: 6/12/14 1935	Company TT	Received by: Date/Time: 6/13/14 0930 Company TAS Knoxville
Relinquished by:	Date/Time:	Company	Received by: Date/Time: Company

Custody Seals Intact: △ Yes △ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 680-102370-4

SDG Number: 680-102370-4

Job Description: Sediments

For:
Tetra Tech, Inc.
20251 Century Blvd
Suite 200
Germantown, MD 20874

Attention: Mike Martin



Approved for release.
Jerry A Lanier
Project Manager I
9/12/2014 5:35 PM

Jerry A Lanier, Project Manager I
5102 LaRoche Avenue, Savannah, GA, 31404
(912)354-7858 e.3410
jerry.lanier@testamericainc.com

09/12/2014
Revision: 1

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

Savannah Certifications and ID #s: A2LA: 0399.01; AL: 41450; ARDEQ: 88-0692; ARDOH; AZ: AZ0741; CA: 03217CA; CO; CT: PH0161; DE; FL: E87052; GA: 803; Guam; HI; IL: 200022; IN: C-GA-02; IA: 353; KS: E-10322; KY EPPC: 90084; KY UST; LA DEQ: 30690; LA DHH: LA080008; ME: 2008022; MD: 250; MA: M-GA006; MI: 9925; MS; NFESC: 249; NV: GA00006; NJ: GA769; NM; NY: 10842; NC DWQ: 269; NC DHHS: 13701; PA: 68-00474; PR: GA00006; RI: LAO00244; SC: 98001001; TN: TN0296; TX: T104704185; USEPA: GA00006; VT: VT-87052; VA: 00302; WA; WV DEP: 094; WV DHHR: 9950 C; WI DNR: 999819810; WY/EPAR8: 8TMS-Q

Table of Contents

Cover Title Page 1

Data Summaries 4

Definitions 4

Case Narrative 5

Client Sample Results 7

Default Detection Limits 22

QC Sample Results 23

QC Association 27

Chronicle 30

Certification Summary 37

Method Summary 38

Sample Summary 39

Reagent Traceability 40

COAs 48

Inorganic Sample Data 72

Metals Data 72

Met Cover Page 73

Met Sample Data 74

Met QC Data 99

Met ICV/CCV 99

Met CRQL 105

Met Blanks 106

Met ICSA/ICSAB 110

Met MS/MSD/PDS 111

Met LCS/LCSD 115

Met Serial Dilution 117

Table of Contents

Met MDL 119

Met Linear Ranges 122

Met Preparation Log 123

Met Analysis Run Log 125

Met ICP/MS Int Stds 130

Met Raw Data 132

Met Prep Data 224

Subcontracted Data 227

Shipping and Receiving Documents 228

Client Chain of Custody 229

Sample Receipt Checklist 233

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Sediments

Report Number: 680-102370-4

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 06/13/2014; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 3.1 C.

A revised report was necessary to correct the final volume that was used to calculate the Uranium data.

TOTAL URANIUM

Samples SD-215-SS (680-102370-7), SD-222-SS (680-102370-8), SD-222-01 (680-102370-9), SD-222-02 (680-102370-10), SD-222-03 (680-102370-11), SD-211-SS (680-102370-12), SD-211-01 (680-102370-13), SD-211-02 (680-102370-14), SD-216-SS (680-102370-15), SD-216-01 (680-102370-16), SD-216-02 (680-102370-17), SD-217-SS (680-102370-18), SD-217-01 (680-102370-19), SD-217-02 (680-102370-20), SD-214-SS (680-102370-22), SD-214-01 (680-102370-23), SD-212-SS (680-102370-24), SD-212-01 (680-102370-25), SD-212-02 (680-102370-26), SD-DUP-04 (680-102370-28), SD-213-SS (680-102370-29), SD-213-01 (680-102370-30), SD-213-02 (680-102370-31), SD-008-01 (680-102370-33) and SD-214-02 (680-102370-34) were analyzed for Total Uranium in accordance with EPA SW-846 6020A. The samples were analyzed on 09/04/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM

Samples SD-215-SS (680-102370-7), SD-222-SS (680-102370-8), SD-222-01 (680-102370-9), SD-222-02 (680-102370-10), SD-222-03 (680-102370-11), SD-211-SS (680-102370-12), SD-211-01 (680-102370-13), SD-211-02 (680-102370-14), SD-216-SS (680-102370-15), SD-216-01 (680-102370-16), SD-216-02 (680-102370-17), SD-217-SS (680-102370-18), SD-217-01 (680-102370-19), SD-217-02 (680-102370-20), SD-214-SS (680-102370-22), SD-214-01 (680-102370-23), SD-212-SS (680-102370-24), SD-212-01 (680-102370-25), SD-212-02 (680-102370-26), SD-DUP-04 (680-102370-28), SD-213-SS (680-102370-29), SD-213-01 (680-102370-30), SD-213-02 (680-102370-31), SD-008-01 (680-102370-33) and SD-214-02 (680-102370-34) were analyzed for Isotopic Uranium in accordance with EPA SW-846 6020A. The samples were prepared on 08/20/2014 and analyzed on 09/02/2014.

The instrument blank (ICB) contained uranium 233 greater than the reporting limit (RL). All associated samples were non-detect, showing there was no high bias. The data have been qualified and reported. (ICB 160-141597/10)

U-238 exceeded the recovery criteria high for the MS/MSD of sample SD-214-01 (680-102370-23) in batch 160-141597.

Refer to the QC report for details.

The presence of the '4' qualifier indicates analytes where the concentration in the unspiked sample exceeded four times the spiking amount.

Refer to the QC report for details.

Samples SD-215-SS (680-102370-7)[5X], SD-222-SS (680-102370-8)[5X], SD-222-01 (680-102370-9)[5X], SD-222-02 (680-102370-10)[5X], SD-222-03 (680-102370-11)[5X], SD-211-SS (680-102370-12)[5X], SD-211-01 (680-102370-13)[5X], SD-211-02 (680-102370-14)[5X], SD-216-SS (680-102370-15)[5X], SD-216-01 (680-102370-16)[5X], SD-216-02 (680-102370-17)[5X], SD-217-SS (680-102370-18)[5X], SD-217-01 (680-102370-19)[5X], SD-217-02 (680-102370-20)[5X], SD-214-SS (680-102370-22)[5X], SD-214-01 (680-102370-23)[5X], SD-212-SS (680-102370-24)[5X], SD-212-01 (680-102370-25)[5X], SD-212-02 (680-102370-26)[5X], SD-DUP-04 (680-102370-28)[5X], SD-213-SS (680-102370-29)[5X], SD-213-01 (680-102370-30)[5X], SD-213-02 (680-102370-31)[5X], SD-008-01 (680-102370-33)[5X] and SD-214-02 (680-102370-34)[5X] required dilution prior to analysis. Samples were high in salts. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM PERCENTAGE

Samples SD-215-SS (680-102370-7), SD-222-SS (680-102370-8), SD-222-01 (680-102370-9), SD-222-02 (680-102370-10), SD-222-03

(680-102370-11), SD-211-SS (680-102370-12), SD-211-01 (680-102370-13), SD-211-02 (680-102370-14), SD-216-SS (680-102370-15), SD-216-01 (680-102370-16), SD-216-02 (680-102370-17), SD-217-SS (680-102370-18), SD-217-01 (680-102370-19), SD-217-02 (680-102370-20), SD-214-SS (680-102370-22), SD-214-01 (680-102370-23), SD-212-SS (680-102370-24), SD-212-01 (680-102370-25), SD-212-02 (680-102370-26), SD-DUP-04 (680-102370-28), SD-213-SS (680-102370-29), SD-213-01 (680-102370-30), SD-213-02 (680-102370-31), SD-008-01 (680-102370-33) and SD-214-02 (680-102370-34) were analyzed for Isotopic Uranium Percentage in accordance with EPA SW-846 6020A. The samples were analyzed on 09/04/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM ACTIVITY

Samples SD-215-SS (680-102370-7), SD-222-SS (680-102370-8), SD-222-01 (680-102370-9), SD-222-02 (680-102370-10), SD-222-03 (680-102370-11), SD-211-SS (680-102370-12), SD-211-01 (680-102370-13), SD-211-02 (680-102370-14), SD-216-SS (680-102370-15), SD-216-01 (680-102370-16), SD-216-02 (680-102370-17), SD-217-SS (680-102370-18), SD-217-01 (680-102370-19), SD-217-02 (680-102370-20), SD-214-SS (680-102370-22), SD-214-01 (680-102370-23), SD-212-SS (680-102370-24), SD-212-01 (680-102370-25), SD-212-02 (680-102370-26), SD-DUP-04 (680-102370-28), SD-213-SS (680-102370-29), SD-213-01 (680-102370-30), SD-213-02 (680-102370-31), SD-008-01 (680-102370-33) and SD-214-02 (680-102370-34) were analyzed for Isotopic Uranium Activity in accordance with EPA SW-846 6020A. The samples were prepared on 08/20/2014 and analyzed on 09/02/2014.

Samples SD-215-SS (680-102370-7)[5X], SD-222-SS (680-102370-8)[5X], SD-222-01 (680-102370-9)[5X], SD-222-02 (680-102370-10)[5X], SD-222-03 (680-102370-11)[5X], SD-211-SS (680-102370-12)[5X], SD-211-01 (680-102370-13)[5X], SD-211-02 (680-102370-14)[5X], SD-216-SS (680-102370-15)[5X], SD-216-01 (680-102370-16)[5X], SD-216-02 (680-102370-17)[5X], SD-217-SS (680-102370-18)[5X], SD-217-01 (680-102370-19)[5X], SD-217-02 (680-102370-20)[5X], SD-214-SS (680-102370-22)[5X], SD-214-01 (680-102370-23)[5X], SD-212-SS (680-102370-24)[5X], SD-212-01 (680-102370-25)[5X], SD-212-02 (680-102370-26)[5X], SD-DUP-04 (680-102370-28)[5X], SD-213-SS (680-102370-29)[5X], SD-213-01 (680-102370-30)[5X], SD-213-02 (680-102370-31)[5X], SD-008-01 (680-102370-33)[5X] and SD-214-02 (680-102370-34)[5X] required dilution prior to analysis. Samples were high in salts. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Client Sample ID: SD-215-SS

Lab Sample ID: 680-102370-7

Date Collected: 06/12/14 08:50

Matrix: Solid

Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/20/14 11:20	09/02/14 19:41	5
U-234	ND		0.012	0.00072	mg/Kg		08/20/14 11:20	09/02/14 19:41	5
U-235	ND		0.012	0.0049	mg/Kg		08/20/14 11:20	09/02/14 19:41	5
U-236	ND		0.012	0.00096	mg/Kg		08/20/14 11:20	09/02/14 19:41	5
U-238	**0.35**		0.012	0.00072	mg/Kg		08/20/14 11:20	09/02/14 19:41	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**0.35**		0.0050	0.00030	mg/Kg			09/04/14 13:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-21.7	U	0.870	2.18	116	34.7	pCi/g	08/20/14 11:20	09/02/14 19:41	5
U-234	0.242	U	0.260	0.261	74.6	4.48	pCi/g	08/20/14 11:20	09/02/14 19:41	5
U-235	0.00525	U	0.000559	0.000738	0.0259	0.0106	pCi/g	08/20/14 11:20	09/02/14 19:41	5
U-236	-0.000807	U	0.000644	0.000649	0.776	0.0621	pCi/g	08/20/14 11:20	09/02/14 19:41	5
U-238	**0.117**		0.00519	0.0120	0.00403	0.000242	pCi/g	08/20/14 11:20	09/02/14 19:41	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.000**						%		09/04/14 13:21	1

Client Sample ID: SD-222-SS

Lab Sample ID: 680-102370-8

Date Collected: 06/12/14 09:05

Matrix: Solid

Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/20/14 11:20	09/02/14 19:46	5
U-234	ND		0.012	0.00072	mg/Kg		08/20/14 11:20	09/02/14 19:46	5
U-235	ND		0.012	0.0049	mg/Kg		08/20/14 11:20	09/02/14 19:46	5
U-236	ND		0.012	0.00096	mg/Kg		08/20/14 11:20	09/02/14 19:46	5
U-238	**0.47**		0.012	0.00072	mg/Kg		08/20/14 11:20	09/02/14 19:46	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**0.47**		0.0050	0.00030	mg/Kg			09/04/14 13:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-22.0	U	0.209	2.03	116	34.8	pCi/g	08/20/14 11:20	09/02/14 19:46	5
U-234	0.348	U	0.0366	0.0486	75.0	4.50	pCi/g	08/20/14 11:20	09/02/14 19:46	5
U-235	0.00680	U	0.000536	0.000823	0.0260	0.0106	pCi/g	08/20/14 11:20	09/02/14 19:46	5
U-236	-0.000437	U	0.00239	0.00239	0.780	0.0624	pCi/g	08/20/14 11:20	09/02/14 19:46	5
U-238	**0.156**		0.00703	0.0160	0.00405	0.000243	pCi/g	08/20/14 11:20	09/02/14 19:46	5

Client Sample ID: SD-222-SS

Lab Sample ID: 680-102370-8

Date Collected: 06/12/14 09:05

Matrix: Solid

Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.000						%		09/04/14 13:21	1

Client Sample ID: SD-222-01

Lab Sample ID: 680-102370-9

Date Collected: 06/12/14 09:10

Matrix: Solid

Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/20/14 11:20	09/02/14 19:51	5
U-234	ND		0.012	0.00072	mg/Kg		08/20/14 11:20	09/02/14 19:51	5
U-235	0.0068	J	0.012	0.0049	mg/Kg		08/20/14 11:20	09/02/14 19:51	5
U-236	ND		0.012	0.00097	mg/Kg		08/20/14 11:20	09/02/14 19:51	5
U-238	0.96		0.012	0.00072	mg/Kg		08/20/14 11:20	09/02/14 19:51	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.97		0.0050	0.00030	mg/Kg			09/04/14 13:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-21.9	U	0.538	2.09	116	34.9	pCi/g	08/20/14 11:20	09/02/14 19:51	5
U-234	0.631	U	0.196	0.204	75.1	4.51	pCi/g	08/20/14 11:20	09/02/14 19:51	5
U-235	0.0147		0.000881	0.00161	0.0261	0.0106	pCi/g	08/20/14 11:20	09/02/14 19:51	5
U-236	0.000375	U	0.000760	0.000761	0.781	0.0625	pCi/g	08/20/14 11:20	09/02/14 19:51	5
U-238	0.324		0.0261	0.0396	0.00406	0.000244	pCi/g	08/20/14 11:20	09/02/14 19:51	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.703						%		09/04/14 13:21	1

Client Sample ID: SD-222-02

Lab Sample ID: 680-102370-10

Date Collected: 06/12/14 09:15

Matrix: Solid

Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0033	mg/Kg		08/20/14 11:20	09/02/14 19:55	5
U-234	ND		0.011	0.00066	mg/Kg		08/20/14 11:20	09/02/14 19:55	5
U-235	ND		0.011	0.0045	mg/Kg		08/20/14 11:20	09/02/14 19:55	5
U-236	ND		0.011	0.00088	mg/Kg		08/20/14 11:20	09/02/14 19:55	5
U-238	0.61		0.011	0.00066	mg/Kg		08/20/14 11:20	09/02/14 19:55	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.61		0.0050	0.00030	mg/Kg			09/04/14 13:19	1

Client Sample ID: SD-222-02

Date Collected: 06/12/14 09:15
Date Received: 06/13/14 09:30

Lab Sample ID: 680-102370-10

Matrix: Solid

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-20.3	U	0.367	1.91	106	31.9	pCi/g	08/20/14 11:20	09/02/14 19:55	5
U-234	0.390	U	0.401	0.403	68.6	4.12	pCi/g	08/20/14 11:20	09/02/14 19:55	5
U-235	0.00933	U	0.000696	0.00110	0.0238	0.00971	pCi/g	08/20/14 11:20	09/02/14 19:55	5
U-236	-0.000514	U	0.00152	0.00152	0.713	0.0571	pCi/g	08/20/14 11:20	09/02/14 19:55	5
U-238	**0.206**		0.00279	0.0191	0.00371	0.000223	pCi/g	08/20/14 11:20	09/02/14 19:55	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.000**						%		09/04/14 13:21	1

Client Sample ID: SD-222-03

Date Collected: 06/12/14 19:20
Date Received: 06/13/14 09:30

Lab Sample ID: 680-102370-11

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0037	mg/Kg		08/20/14 11:20	09/02/14 20:00	5
U-234	ND		0.012	0.00074	mg/Kg		08/20/14 11:20	09/02/14 20:00	5
U-235	ND		0.012	0.0050	mg/Kg		08/20/14 11:20	09/02/14 20:00	5
U-236	ND		0.012	0.00099	mg/Kg		08/20/14 11:20	09/02/14 20:00	5
U-238	**0.52**		0.012	0.00074	mg/Kg		08/20/14 11:20	09/02/14 20:00	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**0.52**		0.0050	0.00030	mg/Kg			09/04/14 13:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-22.8	U	0.223	2.11	119	35.7	pCi/g	08/20/14 11:20	09/02/14 20:00	5
U-234	0.206	U	0.162	0.163	76.8	4.61	pCi/g	08/20/14 11:20	09/02/14 20:00	5
U-235	0.00749	U	0.000422	0.000808	0.0267	0.0109	pCi/g	08/20/14 11:20	09/02/14 20:00	5
U-236	-0.00156	U	0.000913	0.000924	0.798	0.0639	pCi/g	08/20/14 11:20	09/02/14 20:00	5
U-238	**0.174**		0.00898	0.0183	0.00415	0.000249	pCi/g	08/20/14 11:20	09/02/14 20:00	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.000**						%		09/04/14 13:21	1

Client Sample ID: SD-211-SS

Lab Sample ID: 680-102370-12

Date Collected: 06/12/14 10:00

Matrix: Solid

Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/20/14 11:20	09/02/14 20:05	5
U-234	ND		0.012	0.00072	mg/Kg		08/20/14 11:20	09/02/14 20:05	5
U-235	**0.0062**	**J**	0.012	0.0049	mg/Kg		08/20/14 11:20	09/02/14 20:05	5
U-236	ND		0.012	0.00096	mg/Kg		08/20/14 11:20	09/02/14 20:05	5
U-238	**0.90**		0.012	0.00072	mg/Kg		08/20/14 11:20	09/02/14 20:05	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**0.91**		0.0050	0.00030	mg/Kg			09/04/14 13:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-22.2	U	0.248	2.05	116	34.8	pCi/g	08/20/14 11:20	09/02/14 20:05	5
U-234	0.287	U	0.0484	0.0551	74.8	4.49	pCi/g	08/20/14 11:20	09/02/14 20:05	5
U-235	**0.0135**		0.000580	0.00137	0.0260	0.0106	pCi/g	08/20/14 11:20	09/02/14 20:05	5
U-236	-0.00202	U	0.00216	0.00216	0.778	0.0623	pCi/g	08/20/14 11:20	09/02/14 20:05	5
U-238	**0.301**		0.0116	0.0300	0.00404	0.000243	pCi/g	08/20/14 11:20	09/02/14 20:05	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.684**						%		09/04/14 13:21	1

Client Sample ID: SD-211-01

Lab Sample ID: 680-102370-13

Date Collected: 06/12/14 10:05

Matrix: Solid

Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0034	mg/Kg		08/20/14 11:20	09/02/14 20:09	5
U-234	ND		0.011	0.00068	mg/Kg		08/20/14 11:20	09/02/14 20:09	5
U-235	**0.0062**	**J**	0.011	0.0046	mg/Kg		08/20/14 11:20	09/02/14 20:09	5
U-236	ND		0.011	0.00091	mg/Kg		08/20/14 11:20	09/02/14 20:09	5
U-238	**0.87**		0.011	0.00068	mg/Kg		08/20/14 11:20	09/02/14 20:09	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**0.88**		0.0050	0.00030	mg/Kg			09/04/14 13:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-20.9	U	0.360	1.95	110	32.9	pCi/g	08/20/14 11:20	09/02/14 20:09	5
U-234	0.306	U	0.297	0.299	70.7	4.25	pCi/g	08/20/14 11:20	09/02/14 20:09	5
U-235	**0.0134**		0.000289	0.00126	0.0246	0.0100	pCi/g	08/20/14 11:20	09/02/14 20:09	5
U-236	-0.00112	U	0.000577	0.000586	0.735	0.0589	pCi/g	08/20/14 11:20	09/02/14 20:09	5
U-238	**0.292**		0.0127	0.0297	0.00382	0.000230	pCi/g	08/20/14 11:20	09/02/14 20:09	5

Client Sample ID: SD-211-01

Lab Sample ID: 680-102370-13

Date Collected: 06/12/14 10:05

Matrix: Solid

Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.708						%		09/04/14 13:21	1

Client Sample ID: SD-211-02

Lab Sample ID: 680-102370-14

Date Collected: 06/12/14 10:10

Matrix: Solid

Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/20/14 11:20	09/02/14 20:14	5
U-234	ND		0.012	0.00071	mg/Kg		08/20/14 11:20	09/02/14 20:14	5
U-235	0.0055	J	0.012	0.0048	mg/Kg		08/20/14 11:20	09/02/14 20:14	5
U-236	ND		0.012	0.00095	mg/Kg		08/20/14 11:20	09/02/14 20:14	5
U-238	0.77		0.012	0.00071	mg/Kg		08/20/14 11:20	09/02/14 20:14	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.78		0.0050	0.00030	mg/Kg			09/04/14 13:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-22.0	U	0.769	2.17	115	34.4	pCi/g	08/20/14 11:20	09/02/14 20:14	5
U-234	0.530	U	0.400	0.403	74.0	4.44	pCi/g	08/20/14 11:20	09/02/14 20:14	5
U-235	0.0118		0.00129	0.00169	0.0257	0.0105	pCi/g	08/20/14 11:20	09/02/14 20:14	5
U-236	-0.00126	U	0.000963	0.000970	0.770	0.0616	pCi/g	08/20/14 11:20	09/02/14 20:14	5
U-238	0.258		0.0173	0.0294	0.00400	0.000240	pCi/g	08/20/14 11:20	09/02/14 20:14	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.709						%		09/04/14 13:21	1

Client Sample ID: SD-216-SS

Lab Sample ID: 680-102370-15

Date Collected: 06/12/14 10:20

Matrix: Solid

Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/20/14 11:20	09/02/14 20:28	5
U-234	ND		0.012	0.00071	mg/Kg		08/20/14 11:20	09/02/14 20:28	5
U-235	0.0072	J	0.012	0.0048	mg/Kg		08/20/14 11:20	09/02/14 20:28	5
U-236	ND		0.012	0.00095	mg/Kg		08/20/14 11:20	09/02/14 20:28	5
U-238	0.99		0.012	0.00071	mg/Kg		08/20/14 11:20	09/02/14 20:28	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.0		0.0050	0.00030	mg/Kg			09/04/14 13:19	1

Client Sample ID: SD-216-SS

Lab Sample ID: 680-102370-15

Date Collected: 06/12/14 10:20

Matrix: Solid

Date Received: 06/13/14 09:30

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-22.1	U	0.508	2.09	114	34.3	pCi/g	08/20/14 11:20	09/02/14 20:28	5
U-234	0.514	U	0.405	0.408	73.8	4.43	pCi/g	08/20/14 11:20	09/02/14 20:28	5
U-235	**0.0157**		0.000689	0.00160	0.0256	0.0104	pCi/g	08/20/14 11:20	09/02/14 20:28	5
U-236	-0.000583	U	0.00144	0.00144	0.767	0.0615	pCi/g	08/20/14 11:20	09/02/14 20:28	5
U-238	**0.333**		0.0101	0.0323	0.00399	0.000240	pCi/g	08/20/14 11:20	09/02/14 20:28	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.722**						%		09/04/14 13:21	1

Client Sample ID: SD-216-01

Lab Sample ID: 680-102370-16

Date Collected: 06/12/14 10:25

Matrix: Solid

Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0034	mg/Kg		08/20/14 11:20	09/02/14 20:33	5
U-234	ND		0.011	0.00068	mg/Kg		08/20/14 11:20	09/02/14 20:33	5
U-235	**0.0052**	**J**	0.011	0.0046	mg/Kg		08/20/14 11:20	09/02/14 20:33	5
U-236	ND		0.011	0.00090	mg/Kg		08/20/14 11:20	09/02/14 20:33	5
U-238	**0.72**		0.011	0.00068	mg/Kg		08/20/14 11:20	09/02/14 20:33	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**0.73**		0.0050	0.00030	mg/Kg			09/04/14 13:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-21.0	U	0.182	1.94	109	32.6	pCi/g	08/20/14 11:20	09/02/14 20:33	5
U-234	0.320	U	0.175	0.178	70.1	4.21	pCi/g	08/20/14 11:20	09/02/14 20:33	5
U-235	**0.0112**		0.000722	0.00126	0.0243	0.00991	pCi/g	08/20/14 11:20	09/02/14 20:33	5
U-236	-0.00125	U	0.000416	0.000432	0.728	0.0583	pCi/g	08/20/14 11:20	09/02/14 20:33	5
U-238	**0.242**		0.0114	0.0250	0.00379	0.000228	pCi/g	08/20/14 11:20	09/02/14 20:33	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.717**						%		09/04/14 13:21	1

Client Sample ID: SD-216-02

Date Collected: 06/12/14 10:30
Date Received: 06/13/14 09:30

Lab Sample ID: 680-102370-17

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0034	mg/Kg		08/20/14 11:20	09/02/14 20:37	5
U-234	ND		0.011	0.00068	mg/Kg		08/20/14 11:20	09/02/14 20:37	5
U-235	ND		0.011	0.0046	mg/Kg		08/20/14 11:20	09/02/14 20:37	5
U-236	ND		0.011	0.00091	mg/Kg		08/20/14 11:20	09/02/14 20:37	5
U-238	**0.35**		0.011	0.00068	mg/Kg		08/20/14 11:20	09/02/14 20:37	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**0.35**		0.0050	0.00030	mg/Kg			09/04/14 13:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-21.1	U	0.321	1.96	109	32.8	pCi/g	08/20/14 11:20	09/02/14 20:37	5
U-234	0.158	U	0.173	0.174	70.6	4.24	pCi/g	08/20/14 11:20	09/02/14 20:37	5
U-235	0.00498	U	0.000394	0.000605	0.0245	0.00999	pCi/g	08/20/14 11:20	09/02/14 20:37	5
U-236	-0.000646	U	0.00136	0.00136	0.734	0.0588	pCi/g	08/20/14 11:20	09/02/14 20:37	5
U-238	**0.118**		0.00246	0.0111	0.00382	0.000229	pCi/g	08/20/14 11:20	09/02/14 20:37	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.000**						%		09/04/14 13:21	1

Client Sample ID: SD-217-SS

Date Collected: 06/12/14 12:20
Date Received: 06/13/14 09:30

Lab Sample ID: 680-102370-18

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0034	mg/Kg		08/20/14 11:20	09/02/14 20:42	5
U-234	ND		0.011	0.00068	mg/Kg		08/20/14 11:20	09/02/14 20:42	5
U-235	**0.0097**	**J**	0.011	0.0046	mg/Kg		08/20/14 11:20	09/02/14 20:42	5
U-236	ND		0.011	0.00090	mg/Kg		08/20/14 11:20	09/02/14 20:42	5
U-238	**1.3**		0.011	0.00068	mg/Kg		08/20/14 11:20	09/02/14 20:42	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**1.3**		0.0050	0.00030	mg/Kg			09/04/14 13:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-21.1	U	0.108	1.95	109	32.6	pCi/g	08/20/14 11:20	09/02/14 20:42	5
U-234	0.662	U	0.266	0.273	70.1	4.21	pCi/g	08/20/14 11:20	09/02/14 20:42	5
U-235	**0.0209**		0.000505	0.00199	0.0243	0.00992	pCi/g	08/20/14 11:20	09/02/14 20:42	5
U-236	-0.000816	U	0.00145	0.00145	0.729	0.0584	pCi/g	08/20/14 11:20	09/02/14 20:42	5
U-238	**0.441**		0.0131	0.0426	0.00379	0.000228	pCi/g	08/20/14 11:20	09/02/14 20:42	5

Client Sample ID: SD-217-SS

Lab Sample ID: 680-102370-18

Date Collected: 06/12/14 12:20

Matrix: Solid

Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.741						%		09/04/14 13:21	1

Client Sample ID: SD-217-01

Lab Sample ID: 680-102370-19

Date Collected: 06/12/14 12:25

Matrix: Solid

Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0033	mg/Kg		08/20/14 11:20	09/02/14 20:47	5
U-234	ND		0.011	0.00065	mg/Kg		08/20/14 11:20	09/02/14 20:47	5
U-235	0.0074	J	0.011	0.0044	mg/Kg		08/20/14 11:20	09/02/14 20:47	5
U-236	ND		0.011	0.00087	mg/Kg		08/20/14 11:20	09/02/14 20:47	5
U-238	0.94		0.011	0.00065	mg/Kg		08/20/14 11:20	09/02/14 20:47	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.95		0.0050	0.00030	mg/Kg			09/04/14 13:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-20.6	U	0.175	1.90	105	31.5	pCi/g	08/20/14 11:20	09/02/14 20:47	5
U-234	0.388	U	0.207	0.210	67.9	4.07	pCi/g	08/20/14 11:20	09/02/14 20:47	5
U-235	0.0160		0.000265	0.00150	0.0236	0.00960	pCi/g	08/20/14 11:20	09/02/14 20:47	5
U-236	-0.000987	U	0.000902	0.000906	0.705	0.0565	pCi/g	08/20/14 11:20	09/02/14 20:47	5
U-238	0.315		0.00311	0.0292	0.00367	0.000220	pCi/g	08/20/14 11:20	09/02/14 20:47	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.781						%		09/04/14 13:21	1

Client Sample ID: SD-217-02

Lab Sample ID: 680-102370-20

Date Collected: 06/12/14 12:30

Matrix: Solid

Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/20/14 11:20	09/02/14 20:51	5
U-234	ND		0.012	0.00071	mg/Kg		08/20/14 11:20	09/02/14 20:51	5
U-235	0.0067	J	0.012	0.0048	mg/Kg		08/20/14 11:20	09/02/14 20:51	5
U-236	ND		0.012	0.00095	mg/Kg		08/20/14 11:20	09/02/14 20:51	5
U-238	0.92		0.012	0.00071	mg/Kg		08/20/14 11:20	09/02/14 20:51	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.93		0.0050	0.00030	mg/Kg			09/04/14 13:19	1

Client Sample ID: SD-217-02

Date Collected: 06/12/14 12:30
Date Received: 06/13/14 09:30

Lab Sample ID: 680-102370-20

Matrix: Solid

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-22.1	U	0.193	2.04	114	34.3	pCi/g	08/20/14 11:20	09/02/14 20:51	5
U-234	0.466	U	0.184	0.189	73.8	4.43	pCi/g	08/20/14 11:20	09/02/14 20:51	5
U-235	**0.0144**		0.000512	0.00142	0.0256	0.0104	pCi/g	08/20/14 11:20	09/02/14 20:51	5
U-236	-0.000613	U	0.00189	0.00189	0.767	0.0614	pCi/g	08/20/14 11:20	09/02/14 20:51	5
U-238	**0.310**		0.00700	0.0293	0.00399	0.000240	pCi/g	08/20/14 11:20	09/02/14 20:51	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.723**						%		09/04/14 13:21	1

Client Sample ID: SD-214-SS

Date Collected: 06/12/14 13:10
Date Received: 06/13/14 09:30

Lab Sample ID: 680-102370-22

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0037	mg/Kg		08/20/14 11:20	09/02/14 20:56	5
U-234	ND		0.012	0.00074	mg/Kg		08/20/14 11:20	09/02/14 20:56	5
U-235	**0.015**		0.012	0.0050	mg/Kg		08/20/14 11:20	09/02/14 20:56	5
U-236	ND		0.012	0.00099	mg/Kg		08/20/14 11:20	09/02/14 20:56	5
U-238	**2.1**		0.012	0.00074	mg/Kg		08/20/14 11:20	09/02/14 20:56	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**2.1**		0.0050	0.00030	mg/Kg			09/04/14 13:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-23.0	U	0.0864	2.12	119	35.8	pCi/g	08/20/14 11:20	09/02/14 20:56	5
U-234	0.943	U	0.0937	0.128	77.0	4.62	pCi/g	08/20/14 11:20	09/02/14 20:56	5
U-235	**0.0328**		0.000777	0.00311	0.0268	0.0109	pCi/g	08/20/14 11:20	09/02/14 20:56	5
U-236	-0.00112	U	0.00155	0.00155	0.801	0.0641	pCi/g	08/20/14 11:20	09/02/14 20:56	5
U-238	**0.695**		0.00998	0.0647	0.00416	0.000250	pCi/g	08/20/14 11:20	09/02/14 20:56	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.709**						%		09/04/14 13:21	1

Client Sample ID: SD-214-01

Lab Sample ID: 680-102370-23

Date Collected: 06/12/14 13:15

Matrix: Solid

Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0035	mg/Kg		08/20/14 11:20	09/02/14 21:01	5
U-234	ND		0.012	0.00069	mg/Kg		08/20/14 11:20	09/02/14 21:01	5
U-235	**0.018**		0.012	0.0047	mg/Kg		08/20/14 11:20	09/02/14 21:01	5
U-236	ND		0.012	0.00092	mg/Kg		08/20/14 11:20	09/02/14 21:01	5
U-238	**2.4**		0.012	0.00069	mg/Kg		08/20/14 11:20	09/02/14 21:01	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**2.4**		0.0050	0.00030	mg/Kg			09/04/14 13:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-21.5	U	0.321	2.00	111	33.3	pCi/g	08/20/14 11:20	09/02/14 21:01	5
U-234	1.02	U	0.268	0.284	71.6	4.30	pCi/g	08/20/14 11:20	09/02/14 21:01	5
U-235	**0.0389**		0.00201	0.00411	0.0249	0.0101	pCi/g	08/20/14 11:20	09/02/14 21:01	5
U-236	-0.00176	U	0.00162	0.00163	0.744	0.0596	pCi/g	08/20/14 11:20	09/02/14 21:01	5
U-238	**0.801**		0.0162	0.0755	0.00387	0.000232	pCi/g	08/20/14 11:20	09/02/14 21:01	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.744**						%		09/04/14 13:21	1

Client Sample ID: SD-212-SS

Lab Sample ID: 680-102370-24

Date Collected: 06/12/14 14:10

Matrix: Solid

Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0033	mg/Kg		08/20/14 11:20	09/02/14 21:29	5
U-234	ND		0.011	0.00065	mg/Kg		08/20/14 11:20	09/02/14 21:29	5
U-235	**0.018**		0.011	0.0044	mg/Kg		08/20/14 11:20	09/02/14 21:29	5
U-236	ND		0.011	0.00087	mg/Kg		08/20/14 11:20	09/02/14 21:29	5
U-238	**2.3**		0.011	0.00065	mg/Kg		08/20/14 11:20	09/02/14 21:29	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**2.3**		0.0050	0.00030	mg/Kg			09/04/14 13:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-20.3	U	0.119	1.87	105	31.5	pCi/g	08/20/14 11:20	09/02/14 21:29	5
U-234	0.964	U	0.241	0.257	67.7	4.06	pCi/g	08/20/14 11:20	09/02/14 21:29	5
U-235	**0.0390**		0.000826	0.00368	0.0235	0.00958	pCi/g	08/20/14 11:20	09/02/14 21:29	5
U-236	-0.000507	U	0.00114	0.00114	0.704	0.0564	pCi/g	08/20/14 11:20	09/02/14 21:29	5
U-238	**0.757**		0.0213	0.0728	0.00366	0.000220	pCi/g	08/20/14 11:20	09/02/14 21:29	5

Client Sample ID: SD-212-SS

Lab Sample ID: 680-102370-24

Date Collected: 06/12/14 14:10

Matrix: Solid

Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.777						%		09/04/14 13:21	1

Client Sample ID: SD-212-01

Lab Sample ID: 680-102370-25

Date Collected: 06/12/14 14:15

Matrix: Solid

Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0033	mg/Kg		08/20/14 11:20	09/02/14 21:33	5
U-234	ND		0.011	0.00066	mg/Kg		08/20/14 11:20	09/02/14 21:33	5
U-235	0.014		0.011	0.0045	mg/Kg		08/20/14 11:20	09/02/14 21:33	5
U-236	ND		0.011	0.00088	mg/Kg		08/20/14 11:20	09/02/14 21:33	5
U-238	2.0		0.011	0.00066	mg/Kg		08/20/14 11:20	09/02/14 21:33	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.0		0.0050	0.00030	mg/Kg			09/04/14 13:19	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-20.8	U	0.514	1.98	106	31.8	pCi/g	08/20/14 11:20	09/02/14 21:33	5
U-234	0.940	U	0.229	0.245	68.5	4.11	pCi/g	08/20/14 11:20	09/02/14 21:33	5
U-235	0.0312		0.000446	0.00291	0.0238	0.00970	pCi/g	08/20/14 11:20	09/02/14 21:33	5
U-236	-0.000912	U	0.000152	0.000174	0.712	0.0571	pCi/g	08/20/14 11:20	09/02/14 21:33	5
U-238	0.657		0.0117	0.0616	0.00370	0.000223	pCi/g	08/20/14 11:20	09/02/14 21:33	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.695						%		09/04/14 13:21	1

Client Sample ID: SD-212-02

Lab Sample ID: 680-102370-26

Date Collected: 06/12/14 14:20

Matrix: Solid

Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0035	mg/Kg		08/20/14 12:10	09/02/14 21:48	5
U-234	ND		0.012	0.00070	mg/Kg		08/20/14 12:10	09/02/14 21:48	5
U-235	0.015		0.012	0.0047	mg/Kg		08/20/14 12:10	09/02/14 21:48	5
U-236	ND		0.012	0.00093	mg/Kg		08/20/14 12:10	09/02/14 21:48	5
U-238	2.0		0.012	0.00070	mg/Kg		08/20/14 12:10	09/02/14 21:48	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.0		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Client Sample ID: SD-212-02

Lab Sample ID: 680-102370-26

Date Collected: 06/12/14 14:20

Matrix: Solid

Date Received: 06/13/14 09:30

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-21.7	U	0.175	2.00	112	33.6	pCi/g	08/20/14 12:10	09/02/14 21:48	5
U-234	0.919	U	0.255	0.268	72.2	4.33	pCi/g	08/20/14 12:10	09/02/14 21:48	5
U-235	**0.0327**		0.000542	0.00306	0.0251	0.0102	pCi/g	08/20/14 12:10	09/02/14 21:48	5
U-236	-0.0000901	U	0.000350	0.000350	0.751	0.0601	pCi/g	08/20/14 12:10	09/02/14 21:48	5
U-238	**0.679**		0.0236	0.0668	0.00390	0.000234	pCi/g	08/20/14 12:10	09/02/14 21:48	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.744**						%		09/04/14 13:22	1

Client Sample ID: SD-DUP-04

Lab Sample ID: 680-102370-28

Date Collected: 06/12/14 00:00

Matrix: Solid

Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0033	mg/Kg		08/20/14 12:10	09/02/14 22:06	5
U-234	ND		0.011	0.00067	mg/Kg		08/20/14 12:10	09/02/14 22:06	5
U-235	**0.013**		0.011	0.0045	mg/Kg		08/20/14 12:10	09/02/14 22:06	5
U-236	ND		0.011	0.00089	mg/Kg		08/20/14 12:10	09/02/14 22:06	5
U-238	**1.8**		0.011	0.00067	mg/Kg		08/20/14 12:10	09/02/14 22:06	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**1.8**		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-20.7	U	0.626	2.01	107	32.2	pCi/g	08/20/14 12:10	09/02/14 22:06	5
U-234	0.788	U	0.342	0.350	69.4	4.16	pCi/g	08/20/14 12:10	09/02/14 22:06	5
U-235	**0.0291**		0.00165	0.00314	0.0241	0.00981	pCi/g	08/20/14 12:10	09/02/14 22:06	5
U-236	-0.00162	U	0.00106	0.00107	0.721	0.0578	pCi/g	08/20/14 12:10	09/02/14 22:06	5
U-238	**0.615**		0.0177	0.0593	0.00375	0.000225	pCi/g	08/20/14 12:10	09/02/14 22:06	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.717**						%		09/04/14 13:22	1

Client Sample ID: SD-213-SS

Lab Sample ID: 680-102370-29

Date Collected: 06/12/14 14:30

Matrix: Solid

Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/20/14 12:10	09/02/14 22:20	5
U-234	ND		0.012	0.00071	mg/Kg		08/20/14 12:10	09/02/14 22:20	5
U-235	**0.017**		0.012	0.0048	mg/Kg		08/20/14 12:10	09/02/14 22:20	5
U-236	ND		0.012	0.00095	mg/Kg		08/20/14 12:10	09/02/14 22:20	5
U-238	**2.3**		0.012	0.00071	mg/Kg		08/20/14 12:10	09/02/14 22:20	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**2.3**		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-22.2	U	0.291	2.07	115	34.4	pCi/g	08/20/14 12:10	09/02/14 22:20	5
U-234	0.952	U	0.242	0.257	74.1	4.45	pCi/g	08/20/14 12:10	09/02/14 22:20	5
U-235	**0.0359**		0.00100	0.00345	0.0257	0.0105	pCi/g	08/20/14 12:10	09/02/14 22:20	5
U-236	-0.00142	U	0.000104	0.000167	0.770	0.0617	pCi/g	08/20/14 12:10	09/02/14 22:20	5
U-238	**0.758**		0.0106	0.0705	0.00400	0.000241	pCi/g	08/20/14 12:10	09/02/14 22:20	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.734**						%		09/04/14 13:22	1

Client Sample ID: SD-213-01

Lab Sample ID: 680-102370-30

Date Collected: 06/12/14 14:35

Matrix: Solid

Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0032	mg/Kg		08/20/14 12:10	09/02/14 22:25	5
U-234	ND		0.011	0.00063	mg/Kg		08/20/14 12:10	09/02/14 22:25	5
U-235	**0.016**		0.011	0.0043	mg/Kg		08/20/14 12:10	09/02/14 22:25	5
U-236	ND		0.011	0.00084	mg/Kg		08/20/14 12:10	09/02/14 22:25	5
U-238	**2.1**		0.011	0.00063	mg/Kg		08/20/14 12:10	09/02/14 22:25	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**2.1**		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-19.6	U	0.276	1.83	102	30.5	pCi/g	08/20/14 12:10	09/02/14 22:25	5
U-234	0.867	U	0.100	0.128	65.7	3.94	pCi/g	08/20/14 12:10	09/02/14 22:25	5
U-235	**0.0352**		0.000778	0.00333	0.0228	0.00929	pCi/g	08/20/14 12:10	09/02/14 22:25	5
U-236	-0.00117	U	0.000427	0.000440	0.683	0.0547	pCi/g	08/20/14 12:10	09/02/14 22:25	5
U-238	**0.720**		0.0168	0.0684	0.00355	0.000213	pCi/g	08/20/14 12:10	09/02/14 22:25	5

Client Sample ID: SD-213-01

Lab Sample ID: 680-102370-30

Date Collected: 06/12/14 14:35

Matrix: Solid

Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.756						%		09/04/14 13:22	1

Client Sample ID: SD-213-02

Lab Sample ID: 680-102370-31

Date Collected: 06/12/14 14:40

Matrix: Solid

Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/20/14 12:10	09/02/14 22:30	5
U-234	ND		0.012	0.00071	mg/Kg		08/20/14 12:10	09/02/14 22:30	5
U-235	0.013		0.012	0.0048	mg/Kg		08/20/14 12:10	09/02/14 22:30	5
U-236	ND		0.012	0.00095	mg/Kg		08/20/14 12:10	09/02/14 22:30	5
U-238	1.8		0.012	0.00071	mg/Kg		08/20/14 12:10	09/02/14 22:30	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.8		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-22.1	U	0.178	2.04	114	34.3	pCi/g	08/20/14 12:10	09/02/14 22:30	5
U-234	0.717	U	0.223	0.232	73.8	4.43	pCi/g	08/20/14 12:10	09/02/14 22:30	5
U-235	0.0283		0.0000356	0.00260	0.0256	0.0104	pCi/g	08/20/14 12:10	09/02/14 22:30	5
U-236	-0.000368	U	0.00393	0.00393	0.767	0.0614	pCi/g	08/20/14 12:10	09/02/14 22:30	5
U-238	0.615		0.00167	0.0566	0.00399	0.000240	pCi/g	08/20/14 12:10	09/02/14 22:30	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.717						%		09/04/14 13:22	1

Client Sample ID: SD-008-01

Lab Sample ID: 680-102370-33

Date Collected: 06/12/14 14:50

Matrix: Solid

Date Received: 06/13/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0033	mg/Kg		08/20/14 12:10	09/02/14 22:34	5
U-234	ND		0.011	0.00066	mg/Kg		08/20/14 12:10	09/02/14 22:34	5
U-235	0.0075	J	0.011	0.0044	mg/Kg		08/20/14 12:10	09/02/14 22:34	5
U-236	ND		0.011	0.00088	mg/Kg		08/20/14 12:10	09/02/14 22:34	5
U-238	1.0		0.011	0.00066	mg/Kg		08/20/14 12:10	09/02/14 22:34	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.0		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Client Sample ID: SD-008-01

Date Collected: 06/12/14 14:50
Date Received: 06/13/14 09:30

Lab Sample ID: 680-102370-33

Matrix: Solid

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-20.7	U	0.344	1.94	105	31.6	pCi/g	08/20/14 12:10	09/02/14 22:34	5
U-234	0.270	U	0.131	0.133	68.1	4.09	pCi/g	08/20/14 12:10	09/02/14 22:34	5
U-235	**0.0162**		0.000872	0.00173	0.0237	0.00963	pCi/g	08/20/14 12:10	09/02/14 22:34	5
U-236	-0.000255	U	0.00130	0.00130	0.708	0.0567	pCi/g	08/20/14 12:10	09/02/14 22:34	5
U-238	**0.343**		0.00954	0.0329	0.00368	0.000221	pCi/g	08/20/14 12:10	09/02/14 22:34	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.744**						%		09/04/14 13:22	1

Client Sample ID: SD-214-02

Date Collected: 06/12/14 13:20
Date Received: 06/13/14 09:30

Lab Sample ID: 680-102370-34

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0033	mg/Kg		08/20/14 12:10	09/02/14 22:39	5
U-234	ND		0.011	0.00065	mg/Kg		08/20/14 12:10	09/02/14 22:39	5
U-235	**0.013**		0.011	0.0044	mg/Kg		08/20/14 12:10	09/02/14 22:39	5
U-236	ND		0.011	0.00087	mg/Kg		08/20/14 12:10	09/02/14 22:39	5
U-238	**1.8**		0.011	0.00065	mg/Kg		08/20/14 12:10	09/02/14 22:39	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**1.8**		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-20.4	U	0.334	1.90	105	31.4	pCi/g	08/20/14 12:10	09/02/14 22:39	5
U-234	0.737	U	0.383	0.389	67.5	4.05	pCi/g	08/20/14 12:10	09/02/14 22:39	5
U-235	**0.0291**		0.000886	0.00282	0.0234	0.00955	pCi/g	08/20/14 12:10	09/02/14 22:39	5
U-236	-0.000954	U	0.00180	0.00180	0.702	0.0562	pCi/g	08/20/14 12:10	09/02/14 22:39	5
U-238	**0.601**		0.00522	0.0555	0.00365	0.000219	pCi/g	08/20/14 12:10	09/02/14 22:39	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.717**						%		09/04/14 13:22	1

Default Detection Limits

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102370-4
SDG: 680-102370-4

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	RL	MDL	Units	Method
U-233	0.0050	0.0015	mg/Kg	6020A
U-234	0.0050	0.00030	mg/Kg	6020A
U-235	0.0050	0.0020	mg/Kg	6020A
U-236	0.0050	0.00040	mg/Kg	6020A
U-238	0.0050	0.00030	mg/Kg	6020A

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	RL	MDL	Units	Method
Total Uranium	0.0050	0.00030	mg/Kg	6020A

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Lab Sample ID: MB 160-139040/1-A
Matrix: Solid
Analysis Batch: 141597

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 139040

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.0045	0.0014	mg/Kg		08/20/14 11:20	09/02/14 19:32	2
U-234	ND		0.0045	0.00027	mg/Kg		08/20/14 11:20	09/02/14 19:32	2
U-235	ND		0.0045	0.0018	mg/Kg		08/20/14 11:20	09/02/14 19:32	2
U-236	ND		0.0045	0.00036	mg/Kg		08/20/14 11:20	09/02/14 19:32	2
U-238	ND		0.0045	0.00027	mg/Kg		08/20/14 11:20	09/02/14 19:32	2

Lab Sample ID: LCS 160-139040/2-A
Matrix: Solid
Analysis Batch: 141597

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 139040

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
U-234	0.00756	0.00824		mg/Kg		109	80 - 120
U-235	0.444	0.496		mg/Kg		112	80 - 120
U-238	0.460	0.511		mg/Kg		111	80 - 120

Lab Sample ID: 680-102370-23 MS
Matrix: Solid
Analysis Batch: 141597

Client Sample ID: SD-214-01
Prep Type: Total/NA
Prep Batch: 139040

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
U-234	ND		0.00698	0.00767	J	mg/Kg		110	75 - 125
U-235	0.018		0.409	0.480		mg/Kg		113	75 - 125
U-238	2.4		0.425	2.95	4	mg/Kg		132	75 - 125

Lab Sample ID: 680-102370-23 MSD
Matrix: Solid
Analysis Batch: 141597

Client Sample ID: SD-214-01
Prep Type: Total/NA
Prep Batch: 139040

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
U-234	ND		0.00744	0.00876	J	mg/Kg		118	75 - 125	13	20
U-235	0.018		0.436	0.525		mg/Kg		116	75 - 125	9	20
U-238	2.4		0.453	2.97	4	mg/Kg		130	75 - 125	1	20

Lab Sample ID: MB 160-139047/1-A
Matrix: Solid
Analysis Batch: 141597

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 139047

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.0044	0.0013	mg/Kg		08/20/14 12:10	09/02/14 21:38	2
U-234	ND		0.0044	0.00027	mg/Kg		08/20/14 12:10	09/02/14 21:38	2
U-235	ND		0.0044	0.0018	mg/Kg		08/20/14 12:10	09/02/14 21:38	2
U-236	ND		0.0044	0.00035	mg/Kg		08/20/14 12:10	09/02/14 21:38	2
U-238	ND		0.0044	0.00027	mg/Kg		08/20/14 12:10	09/02/14 21:38	2

Method: 6020A - Metals (ICP/MS), Isotopic Uranium (Continued)

Lab Sample ID: LCS 160-139047/2-A
Matrix: Solid
Analysis Batch: 141597

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 139047

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
U-234			0.00782	0.00830		mg/Kg		106	80 - 120		
U-235			0.459	0.500		mg/Kg		109	80 - 120		
U-238			0.476	0.519		mg/Kg		109	80 - 120		

Lab Sample ID: 680-102370-26 MS
Matrix: Solid
Analysis Batch: 141597

Client Sample ID: SD-212-02
Prep Type: Total/NA
Prep Batch: 139047

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
U-234	ND		0.00702	0.00792	J	mg/Kg		113	75 - 125		
U-235	0.015		0.412	0.483		mg/Kg		114	75 - 125		
U-238	2.0		0.427	2.48	4	mg/Kg		109	75 - 125		

Lab Sample ID: 680-102370-26 MSD
Matrix: Solid
Analysis Batch: 141597

Client Sample ID: SD-212-02
Prep Type: Total/NA
Prep Batch: 139047

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
U-234	ND		0.00811	0.00832	J	mg/Kg		103	75 - 125	5	20
U-235	0.015		0.475	0.514		mg/Kg		105	75 - 125	6	20
U-238	2.0		0.493	2.58	4	mg/Kg		113	75 - 125	4	20

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Lab Sample ID: MB 160-139040/1-A
Matrix: Solid
Analysis Batch: 141598

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 139040

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-7.866	U	0.275	0.774	43.5	13.0	pCi/g	08/20/14 11:20	09/02/14 19:32	2
U-234	0.02134	U	0.0673	0.0673	28.1	1.68	pCi/g	08/20/14 11:20	09/02/14 19:32	2
U-235	-0.0000503 1	U	0.0000158	0.0000165	0.00975	0.00397	pCi/g	08/20/14 11:20	09/02/14 19:32	2
U-236	-0.0004202	U	0.000158	0.000163	0.292	0.0234	pCi/g	08/20/14 11:20	09/02/14 19:32	2
U-238	-0.0003858	U	0.0000249	0.0000434	0.00152	0.000091 1	pCi/g	08/20/14 11:20	09/02/14 19:32	2

Lab Sample ID: LCS 160-139040/2-A
Matrix: Solid
Analysis Batch: 141598

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 139040

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-235			0.958	1.072		0.108	0.00989	0.00403	pCi/g	112	80 - 120		
U-238			0.155	0.1717		0.0166	0.00154	0.000092 4	pCi/g	111	80 - 120		

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity) (Continued)

Lab Sample ID: 680-102370-23 MS — **Client Sample ID: SD-214-01**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 141598 — **Prep Batch: 139040**

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-235	0.0389		0.885	1.037		0.0959	0.0228	0.00929	pCi/g	113	75 - 125		
U-238	0.801		0.143	0.9901		0.0935	0.00355	0.000213	pCi/g	132	75 - 125		

Lab Sample ID: 680-102370-23 MSD — **Client Sample ID: SD-214-01**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 141598 — **Prep Batch: 139040**

Analyte	Sample Result	Sample Qual	Spike Added	MSD Result	MSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
U-235	0.0389		0.943	1.134		0.105	0.0243	0.00990	pCi/g	116	75 - 125	0.48	1
U-238	0.801		0.152	0.9992		0.0935	0.00378	0.000227	pCi/g	130	75 - 125	0.05	1

Lab Sample ID: MB 160-139047/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 141598 — **Prep Batch: 139047**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-8.439	U	0.129	0.787	42.6	12.8	pCi/g	08/20/14 12:10	09/02/14 21:38	2
U-234	0.01652	U	0.142	0.142	27.5	1.65	pCi/g	08/20/14 12:10	09/02/14 21:38	2
U-235	-0.0001358	U	0.0000738	0.0000748	0.00956	0.00389	pCi/g	08/20/14 12:10	09/02/14 21:38	2
U-236	-0.0002861	U	0.000225	0.000227	0.286	0.0229	pCi/g	08/20/14 12:10	09/02/14 21:38	2
U-238	-0.0004338	U	0.0000121	0.0000417	0.00149	0.0000894	pCi/g	08/20/14 12:10	09/02/14 21:38	2

Lab Sample ID: LCS 160-139047/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 141598 — **Prep Batch: 139047**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-235			0.991	1.081		0.108	0.0102	0.00416	pCi/g	109	80 - 120		
U-238			0.160	0.1744		0.0170	0.00159	0.0000956	pCi/g	109	80 - 120		

Lab Sample ID: 680-102370-26 MS — **Client Sample ID: SD-212-02**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 141598 — **Prep Batch: 139047**

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-235	0.0327		0.889	1.044		0.0982	0.0229	0.00934	pCi/g	114	75 - 125		
U-238	0.679		0.143	0.8344		0.0790	0.00357	0.000214	pCi/g	109	75 - 125		

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity) (Continued)

Lab Sample ID: 680-102370-26 MSD
Matrix: Solid
Analysis Batch: 141598

Client Sample ID: SD-212-02
Prep Type: Total/NA
Prep Batch: 139047

Analyte	Sample Result	Sample Qual	Spike Added	MSD Result	MSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
U-235	0.0327		1.03	1.111		0.103	0.0265	0.0108	pCi/g	105	75 - 125	0.33	1
U-238	0.679		0.166	0.8665		0.0808	0.00412	0.000248	pCi/g	113	75 - 125	0.20	1

Metals

Prep Batch: 139040

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102370-7	SD-215-SS	Total/NA	Solid	3050B	
680-102370-8	SD-222-SS	Total/NA	Solid	3050B	
680-102370-9	SD-222-01	Total/NA	Solid	3050B	
680-102370-10	SD-222-02	Total/NA	Solid	3050B	
680-102370-11	SD-222-03	Total/NA	Solid	3050B	
680-102370-12	SD-211-SS	Total/NA	Solid	3050B	
680-102370-13	SD-211-01	Total/NA	Solid	3050B	
680-102370-14	SD-211-02	Total/NA	Solid	3050B	
680-102370-15	SD-216-SS	Total/NA	Solid	3050B	
680-102370-16	SD-216-01	Total/NA	Solid	3050B	
680-102370-17	SD-216-02	Total/NA	Solid	3050B	
680-102370-18	SD-217-SS	Total/NA	Solid	3050B	
680-102370-19	SD-217-01	Total/NA	Solid	3050B	
680-102370-20	SD-217-02	Total/NA	Solid	3050B	
680-102370-22	SD-214-SS	Total/NA	Solid	3050B	
680-102370-23	SD-214-01	Total/NA	Solid	3050B	
680-102370-23 MS	SD-214-01	Total/NA	Solid	3050B	
680-102370-23 MSD	SD-214-01	Total/NA	Solid	3050B	
680-102370-23 SD	SD-214-01	Total/NA	Solid	3050B	
680-102370-24	SD-212-SS	Total/NA	Solid	3050B	
680-102370-25	SD-212-01	Total/NA	Solid	3050B	
LCS 160-139040/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 160-139040/1-A	Method Blank	Total/NA	Solid	3050B	

Prep Batch: 139047

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102370-26	SD-212-02	Total/NA	Solid	3050B	
680-102370-26 MS	SD-212-02	Total/NA	Solid	3050B	
680-102370-26 MSD	SD-212-02	Total/NA	Solid	3050B	
680-102370-26 SD	SD-212-02	Total/NA	Solid	3050B	
680-102370-28	SD-DUP-04	Total/NA	Solid	3050B	
680-102370-29	SD-213-SS	Total/NA	Solid	3050B	
680-102370-30	SD-213-01	Total/NA	Solid	3050B	
680-102370-31	SD-213-02	Total/NA	Solid	3050B	
680-102370-33	SD-008-01	Total/NA	Solid	3050B	
680-102370-34	SD-214-02	Total/NA	Solid	3050B	
LCS 160-139047/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 160-139047/1-A	Method Blank	Total/NA	Solid	3050B	

Analysis Batch: 141597

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102370-7	SD-215-SS	Total/NA	Solid	6020A	139040
680-102370-8	SD-222-SS	Total/NA	Solid	6020A	139040
680-102370-9	SD-222-01	Total/NA	Solid	6020A	139040
680-102370-10	SD-222-02	Total/NA	Solid	6020A	139040
680-102370-11	SD-222-03	Total/NA	Solid	6020A	139040
680-102370-12	SD-211-SS	Total/NA	Solid	6020A	139040
680-102370-13	SD-211-01	Total/NA	Solid	6020A	139040
680-102370-14	SD-211-02	Total/NA	Solid	6020A	139040
680-102370-15	SD-216-SS	Total/NA	Solid	6020A	139040
680-102370-16	SD-216-01	Total/NA	Solid	6020A	139040

Metals (Continued)

Analysis Batch: 141597 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102370-17	SD-216-02	Total/NA	Solid	6020A	139040
680-102370-18	SD-217-SS	Total/NA	Solid	6020A	139040
680-102370-19	SD-217-01	Total/NA	Solid	6020A	139040
680-102370-20	SD-217-02	Total/NA	Solid	6020A	139040
680-102370-22	SD-214-SS	Total/NA	Solid	6020A	139040
680-102370-23	SD-214-01	Total/NA	Solid	6020A	139040
680-102370-23 MS	SD-214-01	Total/NA	Solid	6020A	139040
680-102370-23 MSD	SD-214-01	Total/NA	Solid	6020A	139040
680-102370-23 SD	SD-214-01	Total/NA	Solid	6020A	139040
680-102370-24	SD-212-SS	Total/NA	Solid	6020A	139040
680-102370-25	SD-212-01	Total/NA	Solid	6020A	139040
680-102370-26	SD-212-02	Total/NA	Solid	6020A	139047
680-102370-26 MS	SD-212-02	Total/NA	Solid	6020A	139047
680-102370-26 MSD	SD-212-02	Total/NA	Solid	6020A	139047
680-102370-26 SD	SD-212-02	Total/NA	Solid	6020A	139047
680-102370-28	SD-DUP-04	Total/NA	Solid	6020A	139047
680-102370-29	SD-213-SS	Total/NA	Solid	6020A	139047
680-102370-30	SD-213-01	Total/NA	Solid	6020A	139047
680-102370-31	SD-213-02	Total/NA	Solid	6020A	139047
680-102370-33	SD-008-01	Total/NA	Solid	6020A	139047
680-102370-34	SD-214-02	Total/NA	Solid	6020A	139047
CRI 160-141597/11	DL		Solid	6020A	
CRI 160-141597/12	DL		Solid	6020A	
ICSA 160-141597/13	ICS		Solid	6020A	
ICSAB 160-141597/14	ICS		Solid	6020A	
LCS 160-139040/2-A	Lab Control Sample	Total/NA	Solid	6020A	139040
LCS 160-139047/2-A	Lab Control Sample	Total/NA	Solid	6020A	139047
MB 160-139040/1-A	Method Blank	Total/NA	Solid	6020A	139040
MB 160-139047/1-A	Method Blank	Total/NA	Solid	6020A	139047

Analysis Batch: 142108

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102370-7	SD-215-SS	Total/NA	Solid	6020A	
680-102370-8	SD-222-SS	Total/NA	Solid	6020A	
680-102370-9	SD-222-01	Total/NA	Solid	6020A	
680-102370-10	SD-222-02	Total/NA	Solid	6020A	
680-102370-11	SD-222-03	Total/NA	Solid	6020A	
680-102370-12	SD-211-SS	Total/NA	Solid	6020A	
680-102370-13	SD-211-01	Total/NA	Solid	6020A	
680-102370-14	SD-211-02	Total/NA	Solid	6020A	
680-102370-15	SD-216-SS	Total/NA	Solid	6020A	
680-102370-16	SD-216-01	Total/NA	Solid	6020A	
680-102370-17	SD-216-02	Total/NA	Solid	6020A	
680-102370-18	SD-217-SS	Total/NA	Solid	6020A	
680-102370-19	SD-217-01	Total/NA	Solid	6020A	
680-102370-20	SD-217-02	Total/NA	Solid	6020A	
680-102370-22	SD-214-SS	Total/NA	Solid	6020A	
680-102370-23	SD-214-01	Total/NA	Solid	6020A	
680-102370-24	SD-212-SS	Total/NA	Solid	6020A	
680-102370-25	SD-212-01	Total/NA	Solid	6020A	

Metals (Continued)

Analysis Batch: 142109

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102370-26	SD-212-02	Total/NA	Solid	6020A	
680-102370-28	SD-DUP-04	Total/NA	Solid	6020A	
680-102370-29	SD-213-SS	Total/NA	Solid	6020A	
680-102370-30	SD-213-01	Total/NA	Solid	6020A	
680-102370-31	SD-213-02	Total/NA	Solid	6020A	
680-102370-33	SD-008-01	Total/NA	Solid	6020A	
680-102370-34	SD-214-02	Total/NA	Solid	6020A	

Rad

Prep Batch: 139040

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102370-7	SD-215-SS	Total/NA	Solid	3050B	
680-102370-8	SD-222-SS	Total/NA	Solid	3050B	
680-102370-9	SD-222-01	Total/NA	Solid	3050B	
680-102370-10	SD-222-02	Total/NA	Solid	3050B	
680-102370-11	SD-222-03	Total/NA	Solid	3050B	
680-102370-12	SD-211-SS	Total/NA	Solid	3050B	
680-102370-13	SD-211-01	Total/NA	Solid	3050B	
680-102370-14	SD-211-02	Total/NA	Solid	3050B	
680-102370-15	SD-216-SS	Total/NA	Solid	3050B	
680-102370-16	SD-216-01	Total/NA	Solid	3050B	
680-102370-17	SD-216-02	Total/NA	Solid	3050B	
680-102370-18	SD-217-SS	Total/NA	Solid	3050B	
680-102370-19	SD-217-01	Total/NA	Solid	3050B	
680-102370-20	SD-217-02	Total/NA	Solid	3050B	
680-102370-22	SD-214-SS	Total/NA	Solid	3050B	
680-102370-23	SD-214-01	Total/NA	Solid	3050B	
680-102370-23 MS	SD-214-01	Total/NA	Solid	3050B	
680-102370-23 MSD	SD-214-01	Total/NA	Solid	3050B	
680-102370-23 SD	SD-214-01	Total/NA	Solid	3050B	
680-102370-24	SD-212-SS	Total/NA	Solid	3050B	
680-102370-25	SD-212-01	Total/NA	Solid	3050B	
LCS 160-139040/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 160-139040/1-A	Method Blank	Total/NA	Solid	3050B	

Prep Batch: 139047

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102370-26	SD-212-02	Total/NA	Solid	3050B	
680-102370-26 MS	SD-212-02	Total/NA	Solid	3050B	
680-102370-26 MSD	SD-212-02	Total/NA	Solid	3050B	
680-102370-26 SD	SD-212-02	Total/NA	Solid	3050B	
680-102370-28	SD-DUP-04	Total/NA	Solid	3050B	
680-102370-29	SD-213-SS	Total/NA	Solid	3050B	
680-102370-30	SD-213-01	Total/NA	Solid	3050B	
680-102370-31	SD-213-02	Total/NA	Solid	3050B	
680-102370-33	SD-008-01	Total/NA	Solid	3050B	
680-102370-34	SD-214-02	Total/NA	Solid	3050B	
LCS 160-139047/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 160-139047/1-A	Method Blank	Total/NA	Solid	3050B	

Client Sample ID: SD-215-SS

Lab Sample ID: 680-102370-7

Date Collected: 06/12/14 08:50

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139040	08/20/14 11:20	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/02/14 19:41	KLE	TAL SL
Total/NA	Analysis	6020A		1	142108	09/04/14 13:19	KLE	TAL SL
Total/NA	Analysis	6020A		1	142111	09/04/14 13:21	KLE	TAL SL
Total/NA	Prep	3050B			139040	08/20/14 11:20	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/02/14 19:41	KLE	TAL SL

Client Sample ID: SD-222-SS

Lab Sample ID: 680-102370-8

Date Collected: 06/12/14 09:05

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139040	08/20/14 11:20	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/02/14 19:46	KLE	TAL SL
Total/NA	Analysis	6020A		1	142108	09/04/14 13:19	KLE	TAL SL
Total/NA	Analysis	6020A		1	142111	09/04/14 13:21	KLE	TAL SL
Total/NA	Prep	3050B			139040	08/20/14 11:20	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/02/14 19:46	KLE	TAL SL

Client Sample ID: SD-222-01

Lab Sample ID: 680-102370-9

Date Collected: 06/12/14 09:10

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139040	08/20/14 11:20	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/02/14 19:51	KLE	TAL SL
Total/NA	Analysis	6020A		1	142108	09/04/14 13:19	KLE	TAL SL
Total/NA	Analysis	6020A		1	142111	09/04/14 13:21	KLE	TAL SL
Total/NA	Prep	3050B			139040	08/20/14 11:20	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/02/14 19:51	KLE	TAL SL

Client Sample ID: SD-222-02

Lab Sample ID: 680-102370-10

Date Collected: 06/12/14 09:15

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139040	08/20/14 11:20	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/02/14 19:55	KLE	TAL SL
Total/NA	Analysis	6020A		1	142108	09/04/14 13:19	KLE	TAL SL
Total/NA	Analysis	6020A		1	142111	09/04/14 13:21	KLE	TAL SL
Total/NA	Prep	3050B			139040	08/20/14 11:20	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/02/14 19:55	KLE	TAL SL

Client Sample ID: SD-222-03

Lab Sample ID: 680-102370-11

Date Collected: 06/12/14 19:20

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139040	08/20/14 11:20	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/02/14 20:00	KLE	TAL SL
Total/NA	Analysis	6020A		1	142108	09/04/14 13:19	KLE	TAL SL
Total/NA	Analysis	6020A		1	142111	09/04/14 13:21	KLE	TAL SL
Total/NA	Prep	3050B			139040	08/20/14 11:20	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/02/14 20:00	KLE	TAL SL

Client Sample ID: SD-211-SS

Lab Sample ID: 680-102370-12

Date Collected: 06/12/14 10:00

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139040	08/20/14 11:20	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/02/14 20:05	KLE	TAL SL
Total/NA	Analysis	6020A		1	142108	09/04/14 13:19	KLE	TAL SL
Total/NA	Analysis	6020A		1	142111	09/04/14 13:21	KLE	TAL SL
Total/NA	Prep	3050B			139040	08/20/14 11:20	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/02/14 20:05	KLE	TAL SL

Client Sample ID: SD-211-01

Lab Sample ID: 680-102370-13

Date Collected: 06/12/14 10:05

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139040	08/20/14 11:20	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/02/14 20:09	KLE	TAL SL
Total/NA	Analysis	6020A		1	142108	09/04/14 13:19	KLE	TAL SL
Total/NA	Analysis	6020A		1	142111	09/04/14 13:21	KLE	TAL SL
Total/NA	Prep	3050B			139040	08/20/14 11:20	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/02/14 20:09	KLE	TAL SL

Client Sample ID: SD-211-02

Lab Sample ID: 680-102370-14

Date Collected: 06/12/14 10:10

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139040	08/20/14 11:20	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/02/14 20:14	KLE	TAL SL
Total/NA	Analysis	6020A		1	142108	09/04/14 13:19	KLE	TAL SL
Total/NA	Analysis	6020A		1	142111	09/04/14 13:21	KLE	TAL SL
Total/NA	Prep	3050B			139040	08/20/14 11:20	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/02/14 20:14	KLE	TAL SL

Client Sample ID: SD-216-SS

Lab Sample ID: 680-102370-15

Date Collected: 06/12/14 10:20

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139040	08/20/14 11:20	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/02/14 20:28	KLE	TAL SL
Total/NA	Analysis	6020A		1	142108	09/04/14 13:19	KLE	TAL SL
Total/NA	Analysis	6020A		1	142111	09/04/14 13:21	KLE	TAL SL
Total/NA	Prep	3050B			139040	08/20/14 11:20	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/02/14 20:28	KLE	TAL SL

Client Sample ID: SD-216-01

Lab Sample ID: 680-102370-16

Date Collected: 06/12/14 10:25

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139040	08/20/14 11:20	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/02/14 20:33	KLE	TAL SL
Total/NA	Analysis	6020A		1	142108	09/04/14 13:19	KLE	TAL SL
Total/NA	Analysis	6020A		1	142111	09/04/14 13:21	KLE	TAL SL
Total/NA	Prep	3050B			139040	08/20/14 11:20	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/02/14 20:33	KLE	TAL SL

Client Sample ID: SD-216-02

Lab Sample ID: 680-102370-17

Date Collected: 06/12/14 10:30

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139040	08/20/14 11:20	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/02/14 20:37	KLE	TAL SL
Total/NA	Analysis	6020A		1	142108	09/04/14 13:19	KLE	TAL SL
Total/NA	Analysis	6020A		1	142111	09/04/14 13:21	KLE	TAL SL
Total/NA	Prep	3050B			139040	08/20/14 11:20	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/02/14 20:37	KLE	TAL SL

Client Sample ID: SD-217-SS

Lab Sample ID: 680-102370-18

Date Collected: 06/12/14 12:20

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139040	08/20/14 11:20	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/02/14 20:42	KLE	TAL SL
Total/NA	Analysis	6020A		1	142108	09/04/14 13:19	KLE	TAL SL
Total/NA	Analysis	6020A		1	142111	09/04/14 13:21	KLE	TAL SL
Total/NA	Prep	3050B			139040	08/20/14 11:20	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/02/14 20:42	KLE	TAL SL

Client Sample ID: SD-217-01

Lab Sample ID: 680-102370-19

Date Collected: 06/12/14 12:25

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139040	08/20/14 11:20	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/02/14 20:47	KLE	TAL SL
Total/NA	Analysis	6020A		1	142108	09/04/14 13:19	KLE	TAL SL
Total/NA	Analysis	6020A		1	142111	09/04/14 13:21	KLE	TAL SL
Total/NA	Prep	3050B			139040	08/20/14 11:20	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/02/14 20:47	KLE	TAL SL

Client Sample ID: SD-217-02

Lab Sample ID: 680-102370-20

Date Collected: 06/12/14 12:30

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139040	08/20/14 11:20	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/02/14 20:51	KLE	TAL SL
Total/NA	Analysis	6020A		1	142108	09/04/14 13:19	KLE	TAL SL
Total/NA	Analysis	6020A		1	142111	09/04/14 13:21	KLE	TAL SL
Total/NA	Prep	3050B			139040	08/20/14 11:20	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/02/14 20:51	KLE	TAL SL

Client Sample ID: SD-214-SS

Lab Sample ID: 680-102370-22

Date Collected: 06/12/14 13:10

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139040	08/20/14 11:20	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/02/14 20:56	KLE	TAL SL
Total/NA	Analysis	6020A		1	142108	09/04/14 13:19	KLE	TAL SL
Total/NA	Analysis	6020A		1	142111	09/04/14 13:21	KLE	TAL SL
Total/NA	Prep	3050B			139040	08/20/14 11:20	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/02/14 20:56	KLE	TAL SL

Client Sample ID: SD-214-01

Lab Sample ID: 680-102370-23

Date Collected: 06/12/14 13:15

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139040	08/20/14 11:20	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/02/14 21:01	KLE	TAL SL
Total/NA	Analysis	6020A		1	142108	09/04/14 13:19	KLE	TAL SL
Total/NA	Analysis	6020A		1	142111	09/04/14 13:21	KLE	TAL SL
Total/NA	Prep	3050B			139040	08/20/14 11:20	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/02/14 21:01	KLE	TAL SL

Client Sample ID: SD-212-SS

Lab Sample ID: 680-102370-24

Date Collected: 06/12/14 14:10

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139040	08/20/14 11:20	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/02/14 21:29	KLE	TAL SL
Total/NA	Analysis	6020A		1	142108	09/04/14 13:19	KLE	TAL SL
Total/NA	Analysis	6020A		1	142111	09/04/14 13:21	KLE	TAL SL
Total/NA	Prep	3050B			139040	08/20/14 11:20	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/02/14 21:29	KLE	TAL SL

Client Sample ID: SD-212-01

Lab Sample ID: 680-102370-25

Date Collected: 06/12/14 14:15

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139040	08/20/14 11:20	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/02/14 21:33	KLE	TAL SL
Total/NA	Analysis	6020A		1	142108	09/04/14 13:19	KLE	TAL SL
Total/NA	Analysis	6020A		1	142111	09/04/14 13:21	KLE	TAL SL
Total/NA	Prep	3050B			139040	08/20/14 11:20	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/02/14 21:33	KLE	TAL SL

Client Sample ID: SD-212-02

Lab Sample ID: 680-102370-26

Date Collected: 06/12/14 14:20

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139047	08/20/14 12:10	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/02/14 21:48	KLE	TAL SL
Total/NA	Analysis	6020A		1	142109	09/04/14 13:20	KLE	TAL SL
Total/NA	Analysis	6020A		1	142112	09/04/14 13:22	KLE	TAL SL
Total/NA	Prep	3050B			139047	08/20/14 12:10	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/02/14 21:48	KLE	TAL SL

Client Sample ID: SD-DUP-04

Lab Sample ID: 680-102370-28

Date Collected: 06/12/14 00:00

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139047	08/20/14 12:10	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/02/14 22:06	KLE	TAL SL
Total/NA	Analysis	6020A		1	142109	09/04/14 13:20	KLE	TAL SL
Total/NA	Analysis	6020A		1	142112	09/04/14 13:22	KLE	TAL SL
Total/NA	Prep	3050B			139047	08/20/14 12:10	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/02/14 22:06	KLE	TAL SL

Client Sample ID: SD-213-SS

Lab Sample ID: 680-102370-29

Date Collected: 06/12/14 14:30

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139047	08/20/14 12:10	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/02/14 22:20	KLE	TAL SL
Total/NA	Analysis	6020A		1	142109	09/04/14 13:20	KLE	TAL SL
Total/NA	Analysis	6020A		1	142112	09/04/14 13:22	KLE	TAL SL
Total/NA	Prep	3050B			139047	08/20/14 12:10	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/02/14 22:20	KLE	TAL SL

Client Sample ID: SD-213-01

Lab Sample ID: 680-102370-30

Date Collected: 06/12/14 14:35

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139047	08/20/14 12:10	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/02/14 22:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	142109	09/04/14 13:20	KLE	TAL SL
Total/NA	Analysis	6020A		1	142112	09/04/14 13:22	KLE	TAL SL
Total/NA	Prep	3050B			139047	08/20/14 12:10	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/02/14 22:25	KLE	TAL SL

Client Sample ID: SD-213-02

Lab Sample ID: 680-102370-31

Date Collected: 06/12/14 14:40

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139047	08/20/14 12:10	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/02/14 22:30	KLE	TAL SL
Total/NA	Analysis	6020A		1	142109	09/04/14 13:20	KLE	TAL SL
Total/NA	Analysis	6020A		1	142112	09/04/14 13:22	KLE	TAL SL
Total/NA	Prep	3050B			139047	08/20/14 12:10	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/02/14 22:30	KLE	TAL SL

Client Sample ID: SD-008-01

Lab Sample ID: 680-102370-33

Date Collected: 06/12/14 14:50

Matrix: Solid

Date Received: 06/13/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139047	08/20/14 12:10	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/02/14 22:34	KLE	TAL SL
Total/NA	Analysis	6020A		1	142109	09/04/14 13:20	KLE	TAL SL
Total/NA	Analysis	6020A		1	142112	09/04/14 13:22	KLE	TAL SL
Total/NA	Prep	3050B			139047	08/20/14 12:10	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/02/14 22:34	KLE	TAL SL

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102370-4
SDG: 680-102370-4

Client Sample ID: SD-214-02
Date Collected: 06/12/14 13:20
Date Received: 06/13/14 09:30

Lab Sample ID: 680-102370-34
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139047	08/20/14 12:10	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/02/14 22:39	KLE	TAL SL
Total/NA	Analysis	6020A		1	142109	09/04/14 13:20	KLE	TAL SL
Total/NA	Analysis	6020A		1	142112	09/04/14 13:22	KLE	TAL SL
Total/NA	Prep	3050B			139047	08/20/14 12:10	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/02/14 22:39	KLE	TAL SL

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Certification Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102370-4
SDG: 680-102370-4

Laboratory: TestAmerica Savannah

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Maryland	State Program	3	250	12-31-14

Laboratory: TestAmerica St. Louis

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska	State Program	10	MO00054	06-30-15
California	NELAP	9	2886	03-31-15
Connecticut	State Program	1	PH-0241	03-31-15
Florida	NELAP	4	E87689	06-30-15
Illinois	NELAP	5	200023	11-30-14
Iowa	State Program	7	373	12-01-14
Kansas	NELAP	7	E-10236	10-31-14 *
Kentucky (DW)	State Program	4	90125	12-31-14
L-A-B	DoD ELAP		L2305	01-10-16
Louisiana	NELAP	6	04080	06-30-15
Maryland	State Program	3	310	09-30-15
Missouri	State Program	7	780	06-30-14 *
Nevada	State Program	9	MO000542013-1	07-31-14 *
New Jersey	NELAP	2	MO002	06-30-15
New Mexico	State Program	6		06-30-10 *
New York	NELAP	2	11616	03-31-15
North Dakota	State Program	8	R207	06-30-14 *
NRC	NRC		24-24817-01	12-31-22
Oklahoma	State Program	6	9997	08-31-15
Pennsylvania	NELAP	3	68-00540	02-28-15
South Carolina	State Program	4	85002001	06-30-14 *
Texas	NELAP	6	T104704193-13-6	07-31-15
USDA	Federal		P330-07-00122	01-09-17
Utah	NELAP	8	MO000542013-5	07-31-15
Virginia	NELAP	3	460230	06-14-15
Washington	State Program	10	C592	08-30-15
West Virginia DEP	State Program	3	381	12-31-14 *

* Certification renewal pending - certification considered valid.

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102370-4
SDG: 680-102370-4

Method	Method Description	Protocol	Laboratory
6020A	Metals (ICP/MS), Isotopic Uranium	SW846	TAL SL
6020A	Metals (ICP/MS), Total Uranium	SW846	TAL SL
6020A	Metals (ICP/MS), Isotopic Uranium Percentage	SW846	TAL SL
6020A Activity	Metals (ICP/MS), Isotopic Uranium (Activity)	SW846	TAL SL

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102370-4
SDG: 680-102370-4

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-102370-7	SD-215-SS	Solid	06/12/14 08:50	06/13/14 09:30
680-102370-8	SD-222-SS	Solid	06/12/14 09:05	06/13/14 09:30
680-102370-9	SD-222-01	Solid	06/12/14 09:10	06/13/14 09:30
680-102370-10	SD-222-02	Solid	06/12/14 09:15	06/13/14 09:30
680-102370-11	SD-222-03	Solid	06/12/14 19:20	06/13/14 09:30
680-102370-12	SD-211-SS	Solid	06/12/14 10:00	06/13/14 09:30
680-102370-13	SD-211-01	Solid	06/12/14 10:05	06/13/14 09:30
680-102370-14	SD-211-02	Solid	06/12/14 10:10	06/13/14 09:30
680-102370-15	SD-216-SS	Solid	06/12/14 10:20	06/13/14 09:30
680-102370-16	SD-216-01	Solid	06/12/14 10:25	06/13/14 09:30
680-102370-17	SD-216-02	Solid	06/12/14 10:30	06/13/14 09:30
680-102370-18	SD-217-SS	Solid	06/12/14 12:20	06/13/14 09:30
680-102370-19	SD-217-01	Solid	06/12/14 12:25	06/13/14 09:30
680-102370-20	SD-217-02	Solid	06/12/14 12:30	06/13/14 09:30
680-102370-22	SD-214-SS	Solid	06/12/14 13:10	06/13/14 09:30
680-102370-23	SD-214-01	Solid	06/12/14 13:15	06/13/14 09:30
680-102370-24	SD-212-SS	Solid	06/12/14 14:10	06/13/14 09:30
680-102370-25	SD-212-01	Solid	06/12/14 14:15	06/13/14 09:30
680-102370-26	SD-212-02	Solid	06/12/14 14:20	06/13/14 09:30
680-102370-28	SD-DUP-04	Solid	06/12/14 00:00	06/13/14 09:30
680-102370-29	SD-213-SS	Solid	06/12/14 14:30	06/13/14 09:30
680-102370-30	SD-213-01	Solid	06/12/14 14:35	06/13/14 09:30
680-102370-31	SD-213-02	Solid	06/12/14 14:40	06/13/14 09:30
680-102370-33	SD-008-01	Solid	06/12/14 14:50	06/13/14 09:30
680-102370-34	SD-214-02	Solid	06/12/14 13:20	06/13/14 09:30

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
ISOU Cal 1_00021	09/05/14	08/29/14	2%HCL 2%HNO3, Lot 422375	50 mL	ISOU Cal Low_00006	0.25 mL	U-233	0.000515225 ug/L
							U-236	0.000889887 ug/L
							U-234	0.000826729 ug/L
							U-235	0.0484747 ug/L
							U-238	0.0502596 ug/L
							Total Uranium	0.05 ug/L
.ISOU Cal Low_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU Cal Int_00006	1 mL	U-233	0.103045 ug/L
							U-236	0.177977 ug/L
							U-234	0.165346 ug/L
							U-235	9.69494 ug/L
							U-238	10.0519 ug/L
							Total Uranium	10 ug/L
..ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
...ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
....ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
...ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
....ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
...ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
....ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
...STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
ISOU Cal 2_00022	09/05/14	08/29/14	2% Nitric Acid, Lot 422375	50 mL	ISOU Cal Int_00006	0.15 mL	U-233	0.0309135 ug/L
							U-236	0.0533932 ug/L

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							U-234	0.0496037 ug/L
							U-235	2.90848 ug/L
							U-238	3.01557 ug/L
							Total Uranium	3 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
ISOU Cal 3_00021	09/05/14	08/29/14	2% Nitric Acid, Lot 422375	100 mL	ISOU Cal Int_00006	0.5 mL	U-233	0.0515225 ug/L
							U-236	0.0889887 ug/L
							U-234	0.0826729 ug/L
							U-235	4.84747 ug/L
							U-238	5.02596 ug/L
							Total Uranium	5 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
ISOU Cal 4_00021	09/05/14	08/29/14	2% Nitric Acid, Lot 422375	50 mL	ISOU Cal Int_00006	0.5 mL	U-233	0.103045 ug/L
							U-236	0.177977 ug/L
							U-234	0.165346 ug/L
							U-235	9.69494 ug/L
							U-238	10.0519 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		U-238	1000 ug/mL
ISOU Cal 5_00021	09/05/14	08/29/14	2% Nitric Acid, Lot 422375	50 mL	ISOU Cal Int_00006	1.5 mL	U-233	0.309135 ug/L
							U-236	0.533932 ug/L
							U-234	0.496037 ug/L
							U-235	29.0848 ug/L
							U-238	30.1557 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		U-238	1000 ug/mL
ISOU ICSAB_00022	09/05/14	08/29/14	2% Nitric Acid, Lot 422375	50 mL	ISOU Cal Int_00006	0.25 mL	U-233	0.0515225 ug/L
							U-236	0.0889887 ug/L
							U-234	0.0826729 ug/L
							U-235	4.84747 ug/L
							U-238	5.02596 ug/L
							Total Uranium	5 ug/L
					MS ICSA_00014	2.5 mL	Al	50000 ug/L
							Ca	50000 ug/L
							Chlorine	500000 ug/L
							Fe	50000 ug/L
							K	50000 ug/L
							Mg	50000 ug/L
							Mo	1000 ug/L

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Na	50000 ug/L
							P	50000 ug/L
							Sulfur	50000 ug/L
							Ti	1000 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
.MS ICSA_00014	07/01/15	Inorganic Ventures, Lot G2-MEB476152MCA			(Purchased Reagent)		Al	1000 ug/mL
							Ca	1000 ug/mL
							Chlorine	10000 ug/mL
							Fe	1000 ug/mL
							K	1000 ug/mL
							Mg	1000 ug/mL
							Mo	20 ug/mL
							Na	1000 ug/mL
							P	1000 ug/mL
							Sulfur	1000 ug/mL
							Ti	20 ug/mL
ISOU ICV(3)_00020	09/05/14	08/29/14	2% Nitric Acid, Lot 422375	50 mL	ISOU QC Low_00004	0.25 mL	U-234	0.000417422 ug/L
							U-235	0.000528391 ug/L
							U-238	0.0488908 ug/L

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							U-233	0.223475 ug/L
							U-236	0.0000372865 ug/L
.ISOU QC Low_00004	11/01/14	08/18/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU QC Int_00005	1 mL	U-234	0.0834844 ug/L
							U-235	0.105678 ug/L
							U-238	9.77816 ug/L
							U-233	44.695 ug/L
							U-236	0.00745731 ug/L
..ISOU QC Int_00005	11/01/14	05/14/14	2%HCL 2%HNO3, Lot 355914	100 mL	ISOU UNAT_00002	1 mL	U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-238	977.816 ug/L
					ISOU-I 233 QC_00005	10 mL	U-233	4469.5 ug/L
							U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-236	0.745731 ug/L
							U-238	977.816 ug/L
...ISOU UNAT_00002	11/13/14	11/11/13	1M HNO3, Lot n/a	200 mL	ISOU U parent_00001	20 mL	U-234	5.10149 ug/L
							U-235	701.888 ug/L
							U-238	96754.7 ug/L
....ISOU U parent_00001	08/01/47	05/03/13	1M HNO3, Lot n/a	200 mL	ISOU ampule_00001	19.2509 g	U-234	51.0149 ug/L
							U-235	7018.88 ug/L
							U-238	967547 ug/L
.....ISOU ampule_00001	03/30/58	New Brunswick Lab, Lot CRM 145			(Purchased Reagent)		U-234	0.53 ug/g
							U-235	72.92 ug/g
							U-238	10052 ug/g
...ISOU-I 233 QC_00005	12/20/14	12/20/13	2%HCL 2% HNO3, Lot 250193	100 mL	ISOU-C 233 QC_00005	9.3263 g	U-233	44695 ug/L
							U-234	82.9742 ug/L
							U-235	35.4894 ug/L
							U-236	7.45731 ug/L
							U-238	102.695 ug/L
....ISOU-C 233 QC_00005	12/20/18	New Brunswick Laboratory, Lot CRM 111-A			(Purchased Reagent)		U-233	479.236 ug/g
							U-234	0.88968 ug/g
							U-235	0.38053 ug/g
							U-236	0.07996 ug/g
							U-238	1.10114 ug/g
ISOU ICV(4,8)_00020	09/05/14	08/29/14	2% Nitric Acid, Lot 422375	50 mL	ISOU QC Int_00005	0.5 mL	U-234	0.0834844 ug/L
							U-235	0.105678 ug/L
							U-238	9.77816 ug/L
							U-233	44.695 ug/L
							U-236	0.00745731 ug/L
.ISOU QC Int_00005	11/01/14	05/14/14	2%HCL 2%HNO3, Lot 355914	100 mL	ISOU UNAT_00002	1 mL	U-234	8.34844 ug/L

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							U-235	10.5678 ug/L
							U-238	977.816 ug/L
					ISOU-I 233 QC_00005	10 mL	U-233	4469.5 ug/L
							U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-236	0.745731 ug/L
							U-238	977.816 ug/L
..ISOU UNAT_00002	11/13/14	11/11/13	1M HNO3, Lot n/a	200 mL	ISOU U parent_00001	20 mL	U-234	5.10149 ug/L
							U-235	701.888 ug/L
							U-238	96754.7 ug/L
...ISOU U parent_00001	08/01/47	05/03/13	1M HNO3, Lot n/a	200 mL	ISOU ampule_00001	19.2509 g	U-234	51.0149 ug/L
							U-235	7018.88 ug/L
							U-238	967547 ug/L
....ISOU ampule_00001	03/30/58	New Brunswick Lab, Lot CRM 145			(Purchased Reagent)		U-234	0.53 ug/g
							U-235	72.92 ug/g
							U-238	10052 ug/g
..ISOU-I 233 QC_00005	12/20/14	12/20/13	2%HCL 2% HNO3, Lot 250193	100 mL	ISOU-C 233 QC_00005	9.3263 g	U-233	44695 ug/L
							U-234	82.9742 ug/L
							U-235	35.4894 ug/L
							U-236	7.45731 ug/L
							U-238	102.695 ug/L
...ISOU-C 233 QC_00005	12/20/18	New Brunswick Laboratory, Lot CRM 111-A			(Purchased Reagent)		U-233	479.236 ug/g
							U-234	0.88968 ug/g
							U-235	0.38053 ug/g
							U-236	0.07996 ug/g
							U-238	1.10114 ug/g
ISOU ICV(5,6)_00022	09/05/14	08/29/14	2% Nitric Acid, Lot 422375	50 mL	ISOU QC Int_00005	5 mL	U-234	0.834844 ug/L
							U-235	1.05678 ug/L
							U-238	97.7816 ug/L
							U-233	446.95 ug/L
							U-236	0.0745731 ug/L
.ISOU QC Int_00005	11/01/14	05/14/14	2%HCL 2%HNO3, Lot 355914	100 mL	ISOU UNAT_00002	1 mL	U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-238	977.816 ug/L
					ISOU-I 233 QC_00005	10 mL	U-233	4469.5 ug/L
							U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-236	0.745731 ug/L
							U-238	977.816 ug/L
..ISOU UNAT_00002	11/13/14	11/11/13	1M HNO3, Lot n/a	200 mL	ISOU U parent_00001	20 mL	U-234	5.10149 ug/L
							U-235	701.888 ug/L
							U-238	96754.7 ug/L

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
...ISOU U parent_00001	08/01/47	05/03/13	1M HNO3, Lot n/a	200 mL	ISOU ampule_00001	19.2509 g	U-234	51.0149 ug/L
							U-235	7018.88 ug/L
							U-238	967547 ug/L
....ISOU ampule_00001	03/30/58	New Brunswick Lab, Lot CRM 145			(Purchased Reagent)		U-234	0.53 ug/g
							U-235	72.92 ug/g
							U-238	10052 ug/g
..ISOU-I 233 QC_00005	12/20/14	12/20/13	2%HCL 2% HNO3, Lot 250193	100 mL	ISOU-C 233 QC_00005	9.3263 g	U-233	44695 ug/L
							U-234	82.9742 ug/L
							U-235	35.4894 ug/L
							U-236	7.45731 ug/L
							U-238	102.695 ug/L
...ISOU-C 233 QC_00005	12/20/18	New Brunswick Laboratory, Lot CRM 111-A			(Purchased Reagent)		U-233	479.236 ug/g
							U-234	0.88968 ug/g
							U-235	0.38053 ug/g
							U-236	0.07996 ug/g
							U-238	1.10114 ug/g
ISOU Prep Spk_00002	12/01/14	07/09/14	2%HCL 2%HNO3, Lot 397367	100 mL	ISOU-I 233CAL_00002	1 mL	U-233	947.058 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
.ISOU-I 233CAL_00002	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00006	5.1938 g	U-233	94705.8 ug/L
..ISOU-C 233CAL_00006	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1823.44 ug/g
.ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
..ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
.ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
..ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
.STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL

Reagent

ISOU ampule_00001

New Brunswick Laboratory
U.S. Department of Energy

Certificate of Analysis

CRM 145

Uranyl (Normal) Nitrate Assay and Isotopic Solution

228405
ID ISOU ampule_00001
Exp:03/30/58 Prpd:KLE Opn:05/03/13
UNAT Ampoule

Uranium Mass Fraction: 0.0101356 g U/g solution ± 0.0000011 g U/g solution
[10.1356 mg U/g solution ± 0.0011 mg U/g solution]

	$^{234}U/^{238}U$	$^{235}U/^{238}U$
Atom Ratio:	0.000052841	0.0072543
Atom Ratio Uncertainty:	0.000000082	0.0000040

	^{234}U	^{235}U	^{238}U
Atom Percent:	0.0052458	0.72017	99.27458
Atom Percent Uncertainty:	0.0000081	0.00039	0.00039
Weight Percent:	0.0051579	0.71114	99.28370
Weight Percent Uncertainty:	0.0000080	0.00038	0.00038

Relative Atomic Weight: 238.028918
Relative Atomic Weight Uncertainty: 0.000012

Note: ^{233}U and ^{236}U were not detected. The detection limit of uranium ratios for the technique used is 5×10^{-9}.

This Certified Reference Material (CRM) is a uranium concentration and isotopic solution standard intended for use in calibration of and/or quality control for uranium analysis methods. Each unit of CRM 145 consists of approximately 20-mL of uranyl nitrate solution in 1M nitric acid, contained in a sealed glass ampoule.

NOTE: The vial should be handled under proper radiologically-controlled conditions at all times.

The certified uranium content value is based on the mass of high-purity metal dissolved and diluted to a known solution mass. The stated uranium concentration was calculated as the prepared value and verified experimentally by the NBL-modified Davies and Gray titration. The certified uranium isotopic composition and atomic weight is based upon measurements performed on multiple samples by two different measurement techniques on a Thermal Ionization Mass Spectrometer (TIMS), calibrated using CRM U030-A as primary comparator and CRM 129-A as a quality control sample. The isotopic values are shared with CRM 112-A, uranium (normal) metal standard which was the source of uranium used to produce the solutions.

RAD13-0018
UNAT Spike
marrss
None
Prep/Opened: 5/3/2013
Exp(1): 5/10/2014
Exp(2): 5/10/2014

All uncertainties for the certified values are expressed as expanded uncertainties (U) where $U = k*u_c$, where u_c is the

September 30, 2010
Argonne, Illinois

www.nbl.doe.gov
Page 1 of 2

Jon Neuhoff, Director
New Brunswick Laboratory

(Revision of Certificate dated March 30, 2008)

127971
ID: UNAT_00008
Exp: 05/10/14 Prpd: SB Crt: 05/03/13
UNAT spike

combined standard uncertainty and the coverage factor k = 2. Uncertainties were determined according to the JCGM 100:2008 *Guide to the Expression of Uncertainty in Measurement*. The coverage factor of 2 was chosen to provide an approximate 95% level of confidence. The input quantities associated with the uranium content included uncertainties due to weighing, CRM 112-A purity, and buoyancy factors. The input quantities associated with the uranium isotopic composition included uncertainties from the certified value for CRM U030-A, measurement precision, and background corrections associated with the analytical techniques.

The CRM was produced by dissolving uranium metal in a single batch and container, with extensive mixing of the resultant solution followed by dispensation into individual bottles. Subsequent measurements of a random sampling of the total lot produced did not indicate any inhomogeneity in uranium concentration or isotopic composition. The minimum sample sizes taken from packaged units and measured were 30 mg U by titration and 1 µg U by TIMS. The NBL makes no recommendation as to the minimum sample size to be used to ensure concentration or isotopic homogeneity.

Users are cautioned that once the vial is opened, the uranium concentration and/or isotopic composition of the material may be affected by evaporative losses or environmental contamination. User's should take appropriate precautions to safeguard the material before, during and after use to ensure valid certificate values.

Recommended Procedure for Ampoule Handling and Dispensing of Solution

1. The ampoule contains a strongly acidic solution of uranium. Appropriate precautions should be taken.

2. Before opening the ampoule, ensure that any dried uranium or condensed liquid in the neck or body of the ampoule is re-dissolved into solution. This can be accomplished by inverting the ampoule repeatedly.

3. The glass ampoules are scored at the neck for ease of opening. However, glass burrs and fragments pose a cut hazard to anyone opening the ampoules. Appropriate precautions should be taken.

4. Lightly moisten the scored line on the neck with distilled water to help ensure a clean break at the score.

5. Because of the narrow neck of the ampoule it may be difficult or impossible to pour the solution out. Here is one possible method:

    a. Obtain approximately 12-cm length of plastic capillary tubing (e.g. i.d. 0f 0.1", o.d. of 0.16").
    b. Insert one end of the capillary tubing fully into the ampoule
    c. Fold the remaining length of tubing along the outside of the ampoule, ensuring that the tube is not crimped and will allow the free flow of air through the tube and into the ampoule.
    d. Holding the ampoule and tubing in one hand, and a beaker or dispensing bottle in another, invert the ampoule over the container allowing the solution to drain into it.
    e. The capillary tubing allows air to flow into the ampoule, eliminating the "airlock" created by the narrow neck of the open ampoule.

6. The user should be wary of evaporative losses once the ampoule is opened, and prevent uranium contamination of the sample. It is recommended that the entire solution be accurately weighed and aliquanted as soon as possible after opening the sample. Precautions should be taken (clean glass/plastic ware, air filtration, etc) to prevent uranium contamination of the CRM with subsequent perturbation of the isotopic composition.

Reagent

ISOU-C 233 QC_00005

New Brunswick Laboratory
U.S. Department of Energy

Certificate of Analysis
CRM 111-A
Uranium-233 in Nitrate Form
Uranium Spike Assay and Isotopic Solution Standard

280627
ID ISOU-C 233 QC_00005
Exp 12/20/18 Prpd:KLE Opn:12/20/13
233 QC

Uranium Concentration : 2.06684 ± 0.00052 μmoles U/gram solution

	U-233	U-234	U-235	U-236	U-238
Atom Percent:	**99.4911**	**0.1847**	**0.0790**	**0.0166**	**0.2286**
Uncertainty:	**0.0006**	**0.0002**	**0.0002**	**0.0002**	**0.0004**

Relative Atomic Weight : 233.055

This Certified Reference Material (CRM) is intended for use as a spike in the analysis of uranium materials by isotope dilution mass spectrometry (IDMS). Each unit of CRM 111-A consists of approximately 5 milligrams of uranium dissolved in 10 grams of 0.8 N HNO_3. This solution is contained in a sealed glass ampoule.

NOTE: *The ampoule should be handled under proper radiologically-controlled conditions at all times.*

The indicated uncertainties for the certified values are 95% confidence intervals for the means. The uncertainty assigned to the uranium assay includes components due to analytical variation. The uncertainties assigned to the isotopic abundance values include random measurement variations and a component based on the uncertainties associated with the determination of the mass discrimination correction factors.

The uranium elemental concentration was determined by the NBL-modified Davies-Gray titrimetric method [Reference: A. R. Eberle, M. W. Lerner, C. G. Goldbeck, and C. J. Rodden, NBL-252 (1970), pp. 1-25] using NBL CRM 112-A (uranium (normal) metal assay standard) as a control to verify the measurement system. The uranium isotopic composition was determined by thermal ionization mass spectrometry using NBL CRM 111 (U-233 spike) to demonstrate compatibility. The uranium assay value obtained by chemical analysis was verified by IDMS using NBL CRM 115 (uranium (depleted) metal assay standard) and NBL CRM 135 (U-235 spike) as spikes. For both the isotopic abundance and the IDMS assay measurements, mass discrimination correction factors were established using NBL CRM U500 and were applied to the calculations. The total impurity content was less than 1600 μg/g U as determined by inductively-coupled plasma atomic emission spectrometry on a subsample of the master

March 30, 2008
Argonne, Illinois

Jon Neuhoff, Director
New Brunswick Laboratory

(Editorial revision of Certificate dated January 18, 1990)

solution. Iron is the dominant impurity at 1330 μg/g U. Calcium, zinc, sodium, and magnesium were also found at 90, 50,50, and 10 μg/g U respectively. These impurity values are provided for information only; the impurity values are not certified.

The starting material from which this CRM was prepared was supplied by Argonne National Laboratory (ANL). Preparation and packaging of CRM 111-A were carried out by V. E. Connolly, M. I. Spaletto, F. P. Orlowicz, and F. E. Jones, NBL. Titrimetric assay measurements were performed by M. I. Spaletto, NBL; IDMS assay measurements were performed by V. E. Connolly, NBL; isotopic abundance measurements were performed by M. A. Legel and F. E. Jones, NBL; impurity measurements were performed by E. A. Huff and associates, ANL; statistical assessment of the data for certification was performed by M. D. Soriano, NBL. Project technical direction was provided by V. E. Connolly, NBL; overall technical direction and coordination of the preparation, certification, and issuance of this CRM was provided by N. M. Trahey, NBL.

RECOMMENDED PROCEDURE FOR USING CRM 111-A

The package is designed to prepare a solution having a known concentration of uranium on a weight basis. Once prepared, it is suggested that all the solution be immediately distributed as subportions for later use as individual spikes. After the spike has been added to a sample and isotopic equilibrium has been assured, a chemical separation should be performed to remove isobaric isotopes before mass spectrometric analysis.

Shake the ampoule vigorously before opening to homogenize contents. Secure in an upright position and allow solution trapped in the ampoule tip to drain back into the reservoir. Wrap the ampoule in a small cloth or towel, and break off the tip at the pre-scored line. Discard the tip, transfer the solution to a tared container, and proceed to distribute it as weighed portions into suitable containers for use as spikes.

If a more dilute solution is desired, transfer the solution to a larger tared container, weigh, dilute and weigh again, mix vigorously, and distribute all the solution as weighed portions.

Reagent

ISOU-C 233CAL_00006

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404-352-8677
Fax 404-352-2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

95301
U-233 5 mL Liquid in Flame Sealed Vial

280632
ID ISOU-C 233CAL_00006
Exp 12/19/18 Prpd KLE Opn 12/19/13
233 CAL

Customer: TestAmerica - St. Louis
P.O. No.: 2548635, Item 1 Product Code: 8055

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide calibration and purity were checked by germanium gamma-ray spectrometry, liquid scintillation counting, and/or alpha spectrometry, as applicable. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty* , % Type u_A	u_B	U	Reference Date (12:00 PM EST)
U-233	5.815E+07	3.705E+03	0.1	0.6	1.2	12/12/2013

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: U-232 4.811 Bq; U-234 4.450 Bq; α-impurities<0.001%; γ-impurities<0.1%.
5.23229 g 1M HNO3 solution. Carrier free.
Original material calibrated by New Brunswick Laboratory as CRM 111-A.

Source Prepared by: K. Eardley, Radiochemist

QC Approved: J.D. McCorvey, Counting Room Manager Date: 12 Dec 13

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

ISOU-C 233CAL_00007

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

95301
U-233 5 mL Liquid in Flame Sealed Vial

288644
ID ISOU-C 233CAL_00007
Exp 12/19/18 Prpd KLE Opn 12/19/13
233 CAL

Customer: TestAmerica - St. Louis
P.O. No.: 2548635, Item 1 Product Code: 8055

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide calibration and purity were checked by germanium gamma-ray spectrometry, liquid scintillation counting, and/or alpha spectrometry, as applicable. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty* , % Type u_A	u_B	U	Reference Date (12:00 PM EST)
U-233	5.815E+07	3.705E+03	0.1	0.6	1.2	12/12/2013

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: U-232 4.811 Bq; U-234 4.450 Bq; α-impurities<0.001%; γ-impurities<0.1%.
5.23229 g 1M HNO3 solution. Carrier free.
Original material calibrated by New Brunswick Laboratory as CRM 111-A.

Source Prepared by: K. Eardley, Radiochemist

QC Approved: J.D. McCorvey, Counting Room Manager Date: 12 Dec 13

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355
Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

ISOU-C 236_00002

Eckert & Ziegler
Isotope Products

24937 Avenue Tibbitts
Valencia, California 91355

Tel 661•309•1010
Fax 661•257•8303

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

Radionuclide:	U-236	**Customer:**	TEST AMERICA
Half-life:	(2.342 ± 0.003)E+07 years	**P.O. No.:**	2380469
Catalog No.:	7336	**Reference Date:**	15-Oct-10 12:00 PST
Source No.:	1480-21	**Contained Radioactivity: (Total alpha)**	0.01017 µCi 376.3 Bq

Physical Description:

A.	Mass of solution:	5.01498 g in 5 mL V-Vial
B.	Chemical form:	$UO_2(NO_3)_2$ in 0.1M HNO_3
C.	Carrier content:	None
D.	Density:	1.0016 g/mL @ 20°C

MT02535-10
ISOU U-236 QC CONC
elyk
.1M HN03
Prep/Opened: 10/5/2010
Exp(1): 10/5/2020
Exp(2): 10/5/2020

281584
ID ISOU-C 236_00002
Exp 10/05/15 Prpd KLE Opn 10/05/10
236 CAL

Radioimpurities:

See Technical Data Sheet

Radionuclide Concentration: 0.002028 µCi/g, 75.04 Bq/g

Method of Calibration:

This source was prepared from a weighed aliquot of solution whose activity in µCi/g was determined using a liquid scintillation counter.

Uncertainty of Measurement:

A.	Type A (random) uncertainty:	± 0.9 %
B.	Type B (systematic) uncertainty:	± 3.0 %
C.	Uncertainty in aliquot weighing:	± 0.4 %
D.	Total uncertainty at the 99% confidence level:	± 3.2 %

Notes:

- See reverse side for leak test(s) performed on this source.
- EZIP participates in a NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (as in NRC Regulatory Guide 4.15).
- Nuclear data was taken from "Table of Radioactive Isotopes", edited by Virginia Shirley, 1986.
- This solution has a working life of 5 years.

Daniel James Van Dalsem
Quality Control

21-Sep-10
Date

EZIP Ref. No.: 1480-21

Reagent

ISOU-C Enrich_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

95302

U-Enriched (97%) 5 mL Liquid in Flame Sealed Vial

279791
ID: ISOU-C Enrich_00001
Exp:10/16/18 Prpd KLE Opn 12/19/13
U enriched (234 and 235)

Customer: Test America - St. Louis
P.O. No.: 2547082, Item 1 Product Code: 8235

This standard radionuclide source was prepared using an aliquot measured gravimetrically from a master radionuclide solution. The master radionuclide solution was prepared by dissolution of Uranium Oxide in 2.5M nitric acid. Total activity was calibrated by liquid scintillation counting. Atomic mass and weight percentages were certified by New Brunswick Laboratory. Radionuclide purity and calibration were checked by liquid scintillation counting and gamma-ray spectrometry. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July, 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date 12-December-2013 12:00 PM EST

Isotope	Activity (Bq)	Half-Life, Days	Uncertainty Type*, (%) u_A	u_B	U
U-234	3.924 E+04	8.967 E+07	1.9	0.9	4.2
U-235	7.991 E+02	2.571 E+11	1.9	0.9	4.2
U-236	3.653 E+01	8.554 E+09	1.9	0.9	4.2
U-238	6.653 E-01	1.632 E+12	1.9	0.9	4.2

***Uncertainty:** U – Relative expanded uncertainty, k=2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: α-impurities (other than decay products)< 0.1%; β-impurities(other than decay products)<0.1%; γ-impurities (other than decay products)<0.1%.
5.20568 grams of 1M HNO_3 solution with Uranium 1.97 mg/g.
Original material certified by New Brunswick Laboratory as CRM U970.

Source Prepared By: _____
R. Ormsby, Radiochemist

QA Approved: _____ 12 DEC 13
J.D. McCorvey, Counting Room Manager

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

MS ICSA_00014

INORGANIC VENTURES
CERTIFICATE OF ANALYSIS
300 Technology Drive
Christiansburg, VA 24073 USA
inorganicventures.com

1.0 **INORGANIC VENTURES** is an ISO Guide 34 "General Requirements for the Competence of Reference Material Producers" and ISO 9001 registered manufacturer. Our manufacturing laboratory is accredited to ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories."

ACCREDITED Testing Laboratory Certificate 883.01

ACCREDITED Reference Material Producer Certificate 883.02

2.0 **DESCRIPTION OF CRM**

	Stock Solution
Catalog No.:	6020ICS-0A
Lot Number:	**G2-MEB476152MCA**
Matrix:	1.4% HNO3(v/v)

397615
ID: MS ICSA_00014
Exp:07/01/15 Prpd:CCB Opn:07/03/14
ICSA

10,000 µg/mL ea:
Chloride,

2,000 µg/mL ea:
C,

1,000 µg/mL ea:
Al, Ca, Fe, K, Mg, Na, P, S,

20 µg/mL ea:
Mo, Ti

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

ELEMENT	CERTIFIED VALUE	ELEMENT	CERTIFIED VALUE	ELEMENT	CERTIFIED VALUE
Aluminum, Al	1,002 ± 6 µg/mL	Calcium, Ca	1,002 ± 6 µg/mL	Carbon, C	2,004 ± 13 µg/mL
Chloride, Chloride	10,020.0 ± 50.0 µg/mL	Iron, Fe	1,002 ± 7 µg/mL	Magnesium, Mg	1,002 ± 4 µg/mL
Molybdenum, Mo	20.04 ± 0.14 µg/mL	Phosphorus, P	1,002 ± 7 µg/mL	Potassium, K	1,002 ± 4 µg/mL
Sodium, Na	1,002 ± 7 µg/mL	Sulfur, S	1,002 ± 5 µg/mL	Titanium, Ti	20.04 ± 0.13 µg/mL

Certified Density: 1.034 g/mL (measured at 20 ± 1° C)

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

$$\text{Certified Value } (\bar{x}) = \frac{\Sigma x_i}{n}$$

$$\text{Uncertainty } (\pm) = 2\,[\,\Sigma(s_i)^2\,]^{1/2}$$

($\bar{x}$) = mean
x_i = individual results
n = number of measurements
2 = the coverage factor.
$[\,\Sigma(s_i)^2\,]^{1/2}$ = The square root of the sum of the squares of the most common errors (where 's' stands for the standard deviation) from instrumental measurement, density, NIST SRM uncertainty, weighing, dilution to volume, homogeneity, long term stability and short term stability.

4.0 TRACEBILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

· "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)
· This product is Traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRMs are available, the term 'in-house std.' is specified.
- The Calculated Value is a value calculated from the weight of a starting material that has been certified directly vs. a NIST SRM/RM. See section 4.2 for balance traceability.

4.1 ASSAY INFORMATION

ELEMENT	METHOD	NIST SRM#	SRM LOT#
Al	ICP Assay	3101a	060502
Al	EDTA	928	928
C	Gravimetric		See Sec. 4.2
Ca	ICP Assay	3109a	050825
Ca	EDTA	928	928
Chloride	Acidimetric	84L	84L
Fe	ICP Assay	3126a	051031
Fe	EDTA	928	928
K	Gravimetric		See Sec. 4.2
K	ICP Assay	3141a	051220
Mg	ICP Assay	3131a	050302
Mg	EDTA	928	928
Mo	Calculated		See Sec. 4.2
Mo	ICP Assay	3134	891307
Na	Gravimetric		See Sec. 4.2
Na	ICP Assay	3152a	010728
P	ICP Assay	3139a	060717
P	Acidimetric	84L	84L
S	Acidimetric	84k	84k
Ti	ICP Assay	3162a	060808

4.2 BALANCE CALIBRATION - All analytical balances are calibrated yearly by an accredited calibration laboratory and are traceable to a class E 2 analytical weight set with NIST Traceability. All balances are checked daily using an in-house procedure. The weights used for testing are annually compared to master weights and are traceable to the National Institute of Standards and Technology (NIST).

4.3 THERMOMETER CALIBRATION - All thermometers are NIST traceable through thermometers that are calibrated by an A2LA accredited calibration laboratory.

4.4 GLASSWARE CALIBRATION - An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM's.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP-MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

s	Al		M	Dy	< 0.000100	O	Li	0.002000	M	Pr	< 0.000100	M	Te	< 0.012007
M	Sb	< 0.000600	M	Er	< 0.000100	M	Lu	< 0.000100	M	Re	< 0.000100	M	Tb	< 0.000100
O	As	< 0.020000	M	Eu	< 0.000100	s	Mg		M	Rh	< 0.000100	M	Tl	< 0.000100
O	Ba	< 0.000200	M	Gd	< 0.000100	O	Mn	0.003000	M	Rb	< 0.020012	M	Th	< 0.000100
O	Be	< 0.000090	M	Ga	< 0.001001	O	Hg	< 0.005000	M	Ru	< 0.000100	M	Tm	< 0.000100
M	Bi	< 0.005003	O	Ge	< 0.015000	s	Mo		M	Sm	< 0.000100	M	Sn	< 0.003002
O	B	< 0.005000	M	Au	< 0.001001	M	Nd	< 0.000100	O	Sc	< 0.000700	s	Ti	
O	Cd	0.003400	M	Hf	< 0.002001	O	Ni	< 0.002000	M	Se	< 0.050029	O	W	< 0.007000
s	Ca		M	Ho	< 0.000100	M	Nb	< 0.002001	n	Si		M	U	< 0.000100
M	Ce	< 0.000500	M	In	< 0.001001	n	Os		M	Ag	< 0.001001	O	V	< 0.004000
M	Cs	< 0.001001	M	Ir	< 0.000100	M	Pd	< 0.003002	s	Na		M	Yb	< 0.000100
O	Cr	< 0.010000	s	Fe		s	P		O	Sr	0.005000	M	Y	< 0.000100
M	Co	< 0.001001	M	La	< 0.000200	M	Pt	< 0.000100	s	S		M	Zn	0.016610
O	Cu	< 0.020000	M	Pb	0.002001	s	K		M	Ta	< 0.001001	M	Zr	< 0.004002

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
HPLC, IC, TLC, ISE, IR, NMR, UV/VIS, MS, Capillary Electrophoresis, Potentiometry, Wet Chemistry and Voltammetry
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact Technical Staff

This CRM was manufactured using 18 megohm doubly deionized water that has been filtered through a 0.2 micron filter.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep **Tightly** sealed when not in use. Store and use at 20 ± 4°C. **Do Not** pipette from the container. **Do Not** return portions removed from pipetting to container.

Element Specific Information - For specific information regarding any element: Contact technical staff.

Uranium Note: If uranium is present in this standard, it is natural abundance unless specified in Section 3.0.

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Safety Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous.

Inorganic Ventures homogeneity data indicate that the end user should take a minimum sample size of 0.2mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration
- SAI Global File Number 010105

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration"
- Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 "General Requirements for the Competence of Reference Material Producers"
- Reference Materials Production - Accredited A2LA Certificate Number 883.02

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission
- Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission
- Reporting Defects and Non-Compliance

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies of chemically-stable solutions performed at the manufacturer's facility show a CRM shelf-life of twenty one months for solutions packaged in 125-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life. Manufacturer concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

11.3 Chemical Stability - Studies have been conducted on this or similar CRMs and it has been demonstrated that this CRM is chemically stable for a period of not less than two years provided the "Storage & Handling" conditions are followed that are described in section 7.0.

Certification Date: July 12, 2013

Expiration Date: EXPIRES 1[illegible]2015

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By: Zach Saunders
Product Documentation Technician

Zachary Saunders

Certificate Approved By: Allyson Guilliams
Quality Control Supervisor

Allyson Guilliams

Certifying Officer: Paul Gaines
PhD., Senior Technical Director

Paul R Gaines

Reagent

STD U_00005

INORGANIC VENTURES™
CERTIFICATE OF ANALYSIS
[illegible] Drive
[illegible] VA 24073-[illegible]
[illegible]@inorganicventures.com

260559
ID STD U_00005
Exp 12/01/14 Prpd:REV Opn:12/02/13
U 1000PPM

1.0 **INORGANIC VENTURES** is an ISO Guide 34 "General Requirements for the Competence of Reference Material Producers" and ISO 9001 registered manufacturer. Our manufacturing laboratory is accredited to ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories."

ACCREDITED Testing Laboratory Certificate 883.01
ACCREDITED Reference Material Producer Certificate 883.02

2.0 DESCRIPTION OF CRM **1000 µg/mL Uranium in 2% (v/v) HNO3**

Catalog Number:	CGU1-1, CGU1-2, and CGU1-5
Lot Number:	**F2-U01098**
Starting Material:	UO2(NO3)2.6H2O
Starting Material Purity (%):	99.9979
Starting Material Lot No:	1627
Matrix:	2% (v/v) HNO3

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 1,003 ± 6 µg/mL - weighted mean

Certified Density: 1.010 g/mL (measured at 20 ± 1°C)

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

Certified Value $(\bar{x}) = \frac{\Sigma x_i}{n}$

($\bar{x}$) = mean
x_i = individual results
n = number of measurements

Uncertainty (±) = $2\ [\ \Sigma(s_i)^2\ ]^{½}$

2 = the coverage factor.
$[\ \Sigma(s_i)^2\ ]^{½}$ = The square root of the sum of the squares of the most common errors (where 's' stands for the standard deviation) from instrumental measurement, density, NIST SRM uncertainty, weighing, dilution to volume, homogeneity, long term stability and short term stability.

Certified Abundance: The 235U in this standard is depleted. The Certified abundances in Atom % are as follows:

IV's Certified Abundance

Isotope	Atom%
Uranium 238U	99.6 ± 0.1
235U	0.42 ± 0.05

4.0 TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

· "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

· This product is Traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRMs are available, the term 'in-house std.' is specified.

- The Calculated Value is a value calculated from the weight of a starting material that has been certified directly vs. a NIST SRM/RM. See section 4.2 for balance traceability.

4.1 **Assay Method #1** **1,003 ± 4 µg/mL**
ICP Assay NIST SRM 3164 Lot Number: 080521

Assay Method #2 **1,002 ± 3 µg/mL**
Calculated NIST SRM Lot Number: See Sec. 4.2

4.2 **BALANCE CALIBRATION -** All analytical balances are calibrated yearly by an accredited calibration laboratory and are traceable to a class E 2 analytical weight set with NIST Traceability. All balances are checked daily using an in-house procedure. The weights used for testing are annually compared to master weights and are traceable to the National Institute of Standards and Technology (NIST).

4.3 **THERMOMETER CALIBRATION -** All thermometers are NIST traceable through thermometers that are calibrated by an A2LA accredited calibration laboratory.

4.4 **GLASSWARE CALIBRATION -** An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM's.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

CRM's solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O Al < 0.050000	M Dy < 0.015093	M Li < 0.025154	M Pr < 0.000755	M Te < 0.075463
M Sb < 0.001258	M Er < 0.012577	M Lu < 0.001006	M Re < 0.002515	M Tb < 0.000755
M As < 0.025154	M Eu < 0.007546	M Mg < 0.075463	M Rh < 0.002515	M Tl < 0.002515
M Ba < 0.025154	M Gd < 0.002515	M Mn < 0.010062	M Rb < 0.002515	M Th < 0.002515
M Be < 0.001258	M Ga < 0.002515	i Hg	M Ru < 0.005031	M Tm < 0.001006
M Bi < 0.001006	M Ge < 0.015093	M Mo < 0.005031	M Sm < 0.002515	O Sn < 0.100000
M B < 0.176080	M Au < 0.007546	M Nd < 0.005031	M Sc < 0.025154	M Ti < 0.125772
M Cd < 0.007546	M Hf < 0.005031	M Ni < 0.020123	M Se < 0.020123	M W < 0.025154
O Ca 0.003976	M Ho < 0.001258	M Nb < 0.001258	i Si	s U
M Ce < 0.012577	M In < 0.025154	n Os	M Ag < 0.005031	M V < 0.005031
M Cs < 0.000755	M Ir < 0.012577	M Pd < 0.012577	O Na 0.039757	M Yb < 0.002515
M Cr < 0.012577	M Fe < 0.503087	i P	M Sr < 0.001258	M Y < 0.100617
M Co < 0.007546	M La < 0.001258	M Pt < 0.005031	i S	M Zn < 0.025154
M Cu < 0.015093	M Pb < 0.007546	i K	M Ta < 0.017608	M Zr < 0.012577

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
HPLC, IC, TLC, ISE, IR, NMR, UV/VIS, MS, Capillary Eletrophoresis, Potentiometry, Wet Chemistry and Voltammetry
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact Technical Staff

This CRM was manufactured using 18 megohm-cm deionized water that has been filtered through a 0.2 micron filter.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 238.0289; +6 ; 8; UO_2^{2+}(uranyl)

Chemical Compatibility - Soluble in HCl and HNO_3. Avoid H_3PO_4. H_2SO_4 and HF matrices should not be a problem depending upon [U]. Although the UO_2^{2+} ion is distinctly basic, any U^{+4} will precipitate in basic media. UO_2^{2+}salts are generally soluble in water and UO_2^{2+} is stable with most metals and inorganic anions. The uranyl phosphate is insoluble in water. UF_4 and UF_6 are water soluble.

Stability - 2-100 ppb levels stable for months in 1% HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 2-5% HNO_3 / LDPE container.

U Containing Samples (Preparation and Solution) - Metal (Dissolves rapidly in HCl and HNO_3); Oxide (Soluble in HNO_3); Ores (Digest for 1-2 hours with 1 gram of ore to 30 mL 1:1 HNO_3. Silica insolubles are removed by filtration after bringing the sample to fumes with conc. H_2SO_4.)

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Type	Interferences (underlined indicates severe)
ICP-OES 385.958 nm	0.3 / 0.01 µg/mL	1	ion	Th, Fe
ICP-OES 367.007 nm	0.3 / 0.02 µg/mL	1	ion	Th, Ce
ICP-OES 263.553 nm	0.3 / 0.01 µg/mL	1	ion	Ce, Ir, Th, Rh, W, Zr, Ta, Ti, V, Hf, Fe, Re, Ru
ICP-MS 238 amu	2 ppt	n/a	M+	206Pb16O2

Uranium Note: If uranium is present in this standard, it is natural abundance unless specified in Section 3.0.

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Safety Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to an in house procedure and is guaranteed to be homogeneous. Inorganic Ventures homogeneity data indicate that the end user should take a minimum sample size of 0.2mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration
- SAI Global File Number 010105

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration"
- Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 "General Requirements for the Competence of Reference Material Producers"
- Reference Materials Production - Accredited A2LA Certificate Number 883.02

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission
- Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission
- Reporting Defects and Non-Compliance

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life. Manufacturer concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

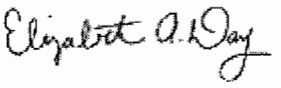
11.3 Chemical Stability - Studies have been conducted on this or similar CRMs and it has been demonstrated that this CRM is chemically stable for a period of not less than two years provided the "Storage & Handling" conditions are followed that are described in section 7.0.

Certification Date: September 07, 2012

Expiration Date:

01 Dec 2014

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	Stephan Blaakman Manufacturing Tech	
Certificate Approved By:	Elizabeth Day Quality Assurance Specialist	
Certifying Officer:	Paul Gaines PhD., Senior Technical Director	

METALS

COVER PAGE
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102370-4

SDG No.: 680-102370-4

Project: Sediments

Client Sample ID	Lab Sample ID
SD-215-SS	680-102370-7
SD-222-SS	680-102370-8
SD-222-01	680-102370-9
SD-222-02	680-102370-10
SD-222-03	680-102370-11
SD-211-SS	680-102370-12
SD-211-01	680-102370-13
SD-211-02	680-102370-14
SD-216-SS	680-102370-15
SD-216-01	680-102370-16
SD-216-02	680-102370-17
SD-217-SS	680-102370-18
SD-217-01	680-102370-19
SD-217-02	680-102370-20
SD-214-SS	680-102370-22
SD-214-01	680-102370-23
SD-212-SS	680-102370-24
SD-212-01	680-102370-25
SD-212-02	680-102370-26
SD-DUP-04	680-102370-28
SD-213-SS	680-102370-29
SD-213-01	680-102370-30
SD-213-02	680-102370-31
SD-008-01	680-102370-33
SD-214-02	680-102370-34

Comments:

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-215-SS
Lab Sample ID: 680-102370-7
Lab Name: TestAmerica St. Louis
Job No.: 680-102370-4
SDG ID.: 680-102370-4
Matrix: Solid
Date Sampled: 06/12/2014 08:50
Reporting Basis: WET
Date Received: 06/13/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0036	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00072	mg/Kg			5	6020A
15117-96-1	U-235	ND	0.012	0.0049	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00096	mg/Kg			5	6020A
7440-61-1	U-238	0.35	0.012	0.00072	mg/Kg			5	6020A
7440-61-1	Total Uranium	0.35	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-222-SS
Lab Sample ID: 680-102370-8
Lab Name: TestAmerica St. Louis
Job No.: 680-102370-4
SDG ID.: 680-102370-4
Matrix: Solid
Date Sampled: 06/12/2014 09:05
Reporting Basis: WET
Date Received: 06/13/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0036	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00072	mg/Kg			5	6020A
15117-96-1	U-235	ND	0.012	0.0049	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00096	mg/Kg			5	6020A
7440-61-1	U-238	0.47	0.012	0.00072	mg/Kg			5	6020A
7440-61-1	Total Uranium	0.47	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-222-01 Lab Sample ID: 680-102370-9

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG ID.: 680-102370-4

Matrix: Solid Date Sampled: 06/12/2014 09:10

Reporting Basis: WET Date Received: 06/13/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0036	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00072	mg/Kg			5	6020A
15117-96-1	U-235	0.0068	0.012	0.0049	mg/Kg	J		5	6020A
13982-70-2	U-236	ND	0.012	0.00097	mg/Kg			5	6020A
7440-61-1	U-238	0.96	0.012	0.00072	mg/Kg			5	6020A
7440-61-1	Total Uranium	0.97	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-222-02 Lab Sample ID: 680-102370-10

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG ID.: 680-102370-4

Matrix: Solid Date Sampled: 06/12/2014 09:15

Reporting Basis: WET Date Received: 06/13/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0033	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00066	mg/Kg			5	6020A
15117-96-1	U-235	ND	0.011	0.0045	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00088	mg/Kg			5	6020A
7440-61-1	U-238	0.61	0.011	0.00066	mg/Kg			5	6020A
7440-61-1	Total Uranium	0.61	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-222-03 Lab Sample ID: 680-102370-11

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG ID.: 680-102370-4

Matrix: Solid Date Sampled: 06/12/2014 19:20

Reporting Basis: WET Date Received: 06/13/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0037	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00074	mg/Kg			5	6020A
15117-96-1	U-235	ND	0.012	0.0050	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00099	mg/Kg			5	6020A
7440-61-1	U-238	0.52	0.012	0.00074	mg/Kg			5	6020A
7440-61-1	Total Uranium	0.52	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-211-SS
Lab Sample ID: 680-102370-12
Lab Name: TestAmerica St. Louis
Job No.: 680-102370-4
SDG ID.: 680-102370-4
Matrix: Solid
Date Sampled: 06/12/2014 10:00
Reporting Basis: WET
Date Received: 06/13/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0036	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00072	mg/Kg			5	6020A
15117-96-1	U-235	0.0062	0.012	0.0049	mg/Kg	J		5	6020A
13982-70-2	U-236	ND	0.012	0.00096	mg/Kg			5	6020A
7440-61-1	U-238	0.90	0.012	0.00072	mg/Kg			5	6020A
7440-61-1	Total Uranium	0.91	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-211-01 Lab Sample ID: 680-102370-13

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG ID.: 680-102370-4

Matrix: Solid Date Sampled: 06/12/2014 10:05

Reporting Basis: WET Date Received: 06/13/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0034	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00068	mg/Kg			5	6020A
15117-96-1	U-235	0.0062	0.011	0.0046	mg/Kg	J		5	6020A
13982-70-2	U-236	ND	0.011	0.00091	mg/Kg			5	6020A
7440-61-1	U-238	0.87	0.011	0.00068	mg/Kg			5	6020A
7440-61-1	Total Uranium	0.88	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-211-02 Lab Sample ID: 680-102370-14

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG ID.: 680-102370-4

Matrix: Solid Date Sampled: 06/12/2014 10:10

Reporting Basis: WET Date Received: 06/13/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0036	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00071	mg/Kg			5	6020A
15117-96-1	U-235	0.0055	0.012	0.0048	mg/Kg	J		5	6020A
13982-70-2	U-236	ND	0.012	0.00095	mg/Kg			5	6020A
7440-61-1	U-238	0.77	0.012	0.00071	mg/Kg			5	6020A
7440-61-1	Total Uranium	0.78	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-216-SS
Lab Sample ID: 680-102370-15
Lab Name: TestAmerica St. Louis
Job No.: 680-102370-4
SDG ID.: 680-102370-4
Matrix: Solid
Date Sampled: 06/12/2014 10:20
Reporting Basis: WET
Date Received: 06/13/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0036	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00071	mg/Kg			5	6020A
15117-96-1	U-235	0.0072	0.012	0.0048	mg/Kg	J		5	6020A
13982-70-2	U-236	ND	0.012	0.00095	mg/Kg			5	6020A
7440-61-1	U-238	0.99	0.012	0.00071	mg/Kg			5	6020A
7440-61-1	Total Uranium	1.0	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-216-01 Lab Sample ID: 680-102370-16

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG ID.: 680-102370-4

Matrix: Solid Date Sampled: 06/12/2014 10:25

Reporting Basis: WET Date Received: 06/13/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0034	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00068	mg/Kg			5	6020A
15117-96-1	U-235	0.0052	0.011	0.0046	mg/Kg	J		5	6020A
13982-70-2	U-236	ND	0.011	0.00090	mg/Kg			5	6020A
7440-61-1	U-238	0.72	0.011	0.00068	mg/Kg			5	6020A
7440-61-1	Total Uranium	0.73	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-216-02 Lab Sample ID: 680-102370-17

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG ID.: 680-102370-4

Matrix: Solid Date Sampled: 06/12/2014 10:30

Reporting Basis: WET Date Received: 06/13/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0034	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00068	mg/Kg			5	6020A
15117-96-1	U-235	ND	0.011	0.0046	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00091	mg/Kg			5	6020A
7440-61-1	U-238	0.35	0.011	0.00068	mg/Kg			5	6020A
7440-61-1	Total Uranium	0.35	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-217-SS
Lab Sample ID: 680-102370-18
Lab Name: TestAmerica St. Louis
Job No.: 680-102370-4
SDG ID.: 680-102370-4
Matrix: Solid
Date Sampled: 06/12/2014 12:20
Reporting Basis: WET
Date Received: 06/13/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0034	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00068	mg/Kg			5	6020A
15117-96-1	U-235	0.0097	0.011	0.0046	mg/Kg	J		5	6020A
13982-70-2	U-236	ND	0.011	0.00090	mg/Kg			5	6020A
7440-61-1	U-238	1.3	0.011	0.00068	mg/Kg			5	6020A
7440-61-1	Total Uranium	1.3	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-217-01 Lab Sample ID: 680-102370-19

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG ID.: 680-102370-4

Matrix: Solid Date Sampled: 06/12/2014 12:25

Reporting Basis: WET Date Received: 06/13/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0033	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00065	mg/Kg			5	6020A
15117-96-1	U-235	0.0074	0.011	0.0044	mg/Kg	J		5	6020A
13982-70-2	U-236	ND	0.011	0.00087	mg/Kg			5	6020A
7440-61-1	U-238	0.94	0.011	0.00065	mg/Kg			5	6020A
7440-61-1	Total Uranium	0.95	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-217-02 Lab Sample ID: 680-102370-20

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG ID.: 680-102370-4

Matrix: Solid Date Sampled: 06/12/2014 12:30

Reporting Basis: WET Date Received: 06/13/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0036	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00071	mg/Kg			5	6020A
15117-96-1	U-235	0.0067	0.012	0.0048	mg/Kg	J		5	6020A
13982-70-2	U-236	ND	0.012	0.00095	mg/Kg			5	6020A
7440-61-1	U-238	0.92	0.012	0.00071	mg/Kg			5	6020A
7440-61-1	Total Uranium	0.93	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-214-SS
Lab Sample ID: 680-102370-22
Lab Name: TestAmerica St. Louis
Job No.: 680-102370-4
SDG ID.: 680-102370-4
Matrix: Solid
Date Sampled: 06/12/2014 13:10
Reporting Basis: WET
Date Received: 06/13/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0037	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00074	mg/Kg			5	6020A
15117-96-1	U-235	0.015	0.012	0.0050	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00099	mg/Kg			5	6020A
7440-61-1	U-238	2.1	0.012	0.00074	mg/Kg			5	6020A
7440-61-1	Total Uranium	2.1	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-214-01 Lab Sample ID: 680-102370-23

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG ID.: 680-102370-4

Matrix: Solid Date Sampled: 06/12/2014 13:15

Reporting Basis: WET Date Received: 06/13/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0035	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00069	mg/Kg			5	6020A
15117-96-1	U-235	0.018	0.012	0.0047	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00092	mg/Kg			5	6020A
7440-61-1	U-238	2.4	0.012	0.00069	mg/Kg			5	6020A
7440-61-1	Total Uranium	2.4	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-212-SS
Lab Sample ID: 680-102370-24
Lab Name: TestAmerica St. Louis
Job No.: 680-102370-4
SDG ID.: 680-102370-4
Matrix: Solid
Date Sampled: 06/12/2014 14:10
Reporting Basis: WET
Date Received: 06/13/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0033	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00065	mg/Kg			5	6020A
15117-96-1	U-235	0.018	0.011	0.0044	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00087	mg/Kg			5	6020A
7440-61-1	U-238	2.3	0.011	0.00065	mg/Kg			5	6020A
7440-61-1	Total Uranium	2.3	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-212-01 Lab Sample ID: 680-102370-25

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG ID.: 680-102370-4

Matrix: Solid Date Sampled: 06/12/2014 14:15

Reporting Basis: WET Date Received: 06/13/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0033	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00066	mg/Kg			5	6020A
15117-96-1	U-235	0.014	0.011	0.0045	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00088	mg/Kg			5	6020A
7440-61-1	U-238	2.0	0.011	0.00066	mg/Kg			5	6020A
7440-61-1	Total Uranium	2.0	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-212-02 | Lab Sample ID: 680-102370-26

Lab Name: TestAmerica St. Louis | Job No.: 680-102370-4

SDG ID.: 680-102370-4

Matrix: Solid | Date Sampled: 06/12/2014 14:20

Reporting Basis: WET | Date Received: 06/13/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0035	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00070	mg/Kg			5	6020A
15117-96-1	U-235	0.015	0.012	0.0047	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00093	mg/Kg			5	6020A
7440-61-1	U-238	2.0	0.012	0.00070	mg/Kg			5	6020A
7440-61-1	Total Uranium	2.0	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-DUP-04 Lab Sample ID: 680-102370-28

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG ID.: 680-102370-4

Matrix: Solid Date Sampled: 06/12/2014 00:00

Reporting Basis: WET Date Received: 06/13/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0033	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00067	mg/Kg			5	6020A
15117-96-1	U-235	0.013	0.011	0.0045	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00089	mg/Kg			5	6020A
7440-61-1	U-238	1.8	0.011	0.00067	mg/Kg			5	6020A
7440-61-1	Total Uranium	1.8	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-213-SS
Lab Sample ID: 680-102370-29
Lab Name: TestAmerica St. Louis
Job No.: 680-102370-4
SDG ID.: 680-102370-4
Matrix: Solid
Date Sampled: 06/12/2014 14:30
Reporting Basis: WET
Date Received: 06/13/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0036	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00071	mg/Kg			5	6020A
15117-96-1	U-235	0.017	0.012	0.0048	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00095	mg/Kg			5	6020A
7440-61-1	U-238	2.3	0.012	0.00071	mg/Kg			5	6020A
7440-61-1	Total Uranium	2.3	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-213-01 Lab Sample ID: 680-102370-30

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG ID.: 680-102370-4

Matrix: Solid Date Sampled: 06/12/2014 14:35

Reporting Basis: WET Date Received: 06/13/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0032	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00063	mg/Kg			5	6020A
15117-96-1	U-235	0.016	0.011	0.0043	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00084	mg/Kg			5	6020A
7440-61-1	U-238	2.1	0.011	0.00063	mg/Kg			5	6020A
7440-61-1	Total Uranium	2.1	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-213-02 Lab Sample ID: 680-102370-31

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG ID.: 680-102370-4

Matrix: Solid Date Sampled: 06/12/2014 14:40

Reporting Basis: WET Date Received: 06/13/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0036	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00071	mg/Kg			5	6020A
15117-96-1	U-235	0.013	0.012	0.0048	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00095	mg/Kg			5	6020A
7440-61-1	U-238	1.8	0.012	0.00071	mg/Kg			5	6020A
7440-61-1	Total Uranium	1.8	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-008-01 Lab Sample ID: 680-102370-33

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG ID.: 680-102370-4

Matrix: Solid Date Sampled: 06/12/2014 14:50

Reporting Basis: WET Date Received: 06/13/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0033	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00066	mg/Kg			5	6020A
15117-96-1	U-235	0.0075	0.011	0.0044	mg/Kg	J		5	6020A
13982-70-2	U-236	ND	0.011	0.00088	mg/Kg			5	6020A
7440-61-1	U-238	1.0	0.011	0.00066	mg/Kg			5	6020A
7440-61-1	Total Uranium	1.0	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-214-02 Lab Sample ID: 680-102370-34

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG ID.: 680-102370-4

Matrix: Solid Date Sampled: 06/12/2014 13:20

Reporting Basis: WET Date Received: 06/13/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0033	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00065	mg/Kg			5	6020A
15117-96-1	U-235	0.013	0.011	0.0044	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00087	mg/Kg			5	6020A
7440-61-1	U-238	1.8	0.011	0.00065	mg/Kg			5	6020A
7440-61-1	Total Uranium	1.8	0.0050	0.00030	mg/Kg			1	6020A

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

ICV Source: ISOU ICV(3)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00021

Analyte	ICV 160-141597/7 09/02/2014 18:45				CCV 160-141597/15 09/02/2014 19:23				CCV 160-141597/27 09/02/2014 20:19			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.226		0.223	101	0.0511		0.0515	99	0.0507		0.0515	98

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

ICV Source: ISOU ICV(3)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00021

Analyte	CCV 160-141597/39 09/02/2014 21:15				CCV 160-141597/51 09/02/2014 22:11				CCV 160-141597/63 09/02/2014 23:07			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.0492	J	0.0515	95	0.0493	J	0.0515	96	0.0508		0.0515	99

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

ICV Source: ISOU ICV(4,8)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00021

Analyte	ICV 160-141597/8 09/02/2014 18:50				CCV 160-141597/15 09/02/2014 19:23				CCV 160-141597/27 09/02/2014 20:19			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0892		0.0835	107	0.0867		0.0827	105	0.0876		0.0827	106
U-238	10.1		9.78	103	5.40		5.03	107	5.51		5.03	110

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

ICV Source: ISOU ICV(4,8)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00021

Analyte	CCV 160-141597/39 09/02/2014 21:15				CCV 160-141597/51 09/02/2014 22:11				CCV 160-141597/63 09/02/2014 23:07			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0847		0.0827	102	0.0871		0.0827	105	0.0874		0.0827	106
U-238	5.32		5.03	106	5.50		5.03	109	5.49		5.03	109

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

ICV Source: ISOU ICV(5,6)_00022 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00021

Analyte	ICV 160-141597/9 09/02/2014 18:55				CCV 160-141597/15 09/02/2014 19:23				CCV 160-141597/27 09/02/2014 20:19			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	1.16		1.06	109	5.23		4.85	108	5.28		4.85	109
U-236	0.0702		0.0746	94	0.0931		0.0890	105	0.0948		0.0890	107

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

ICV Source: ISOU ICV(5,6)_00022 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00021

Analyte	CCV 160-141597/39 09/02/2014 21:15				CCV 160-141597/51 09/02/2014 22:11				CCV 160-141597/63 09/02/2014 23:07			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	5.08		4.85	105	5.27		4.85	109	5.25		4.85	108
U-236	0.0910		0.0890	102	0.0933		0.0890	105	0.0945		0.0890	106

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2B-IN
CRQL CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

Method: 6020A Instrument ID: ICPMS6100

Lab Sample ID: CRI 160-141597/11 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 1_00021

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-235	0.0485	0.0499	J	103	70-130
U-238	0.0503	0.0496	J	99	70-130

Lab Sample ID: CRI 160-141597/12 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 2_00022

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-233	0.0309	0.0363	J	117	70-130
U-234	0.0496	0.0495	J	100	70-130
U-236	0.0534	0.0529		99	70-130

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IIB-IN

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

Concentration Units: ug/L

Analyte	RL	ICB 160-141597/10 09/02/2014 18:59		CCB 160-141597/16 09/02/2014 19:27		CCB 160-141597/28 09/02/2014 20:23		CCB 160-141597/40 09/02/2014 21:19	
		Found	C	Found	C	Found	C	Found	C
U-233	0.050	0.0345	J	0.0140	J	0.0142	J	0.0139	J
U-234	0.050	ND		ND		ND		ND	
U-235	0.050	ND		ND		ND		ND	
U-236	0.050	ND		ND		ND		ND	
U-238	0.050	ND		ND		ND		ND	

Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

Concentration Units: ug/L

Analyte	RL	CCB 160-141597/52 09/02/2014 22:16		CCB 160-141597/64 09/02/2014 23:12					
		Found	C	Found	C	Found	C	Found	C
U-233	0.050	0.0146	J	0.0150	J				
U-234	0.050	ND		ND					
U-235	0.050	ND		ND					
U-236	0.050	ND		ND					
U-238	0.050	ND		ND					

Italicized analytes were not requested for this sequence.

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

Concentration Units: mg/Kg Lab Sample ID: MB 160-139040/1-A

Instrument Code: ICPMS6100 Batch No.: 141597

CAS No.	Analyte	Concentration	C	Q	Method
13968-55-3	U-233	ND			6020A_U
13966-29-5	U-234	ND			6020A_U
15117-96-1	U-235	ND			6020A_U
13982-70-2	U-236	ND			6020A_U
7440-61-1	U-238	ND			6020A_U

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

Concentration Units: mg/Kg Lab Sample ID: MB 160-139047/1-A

Instrument Code: ICPMS6100 Batch No.: 141597

CAS No.	Analyte	Concentration	C	Q	Method
13968-55-3	U-233	ND			6020A_U
13966-29-5	U-234	ND			6020A_U
15117-96-1	U-235	ND			6020A_U
13982-70-2	U-236	ND			6020A_U
7440-61-1	U-238	ND			6020A_U

4A-IN
INTERFERENCE CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

Lab Sample ID: ICSAB 160-141597/14 Instrument ID: ICPMS6100

Lab File ID: 090214M2.rep ICS Source: ISOU ICSAB_00022

Concentration Units: ug/L

Analyte	True Solution AB	Found Solution AB	Percent Recovery
U-233	**0.0515**	**0.0537**	**104**
U-234	**0.0827**	**0.0910**	**110**
U-235	**4.85**	**5.47**	**113**
U-236	**0.0890**	**0.0975**	**110**
U-238	**5.03**	**5.69**	**113**

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IVA-IN

5A-IN
MATRIX SPIKE SAMPLE RECOVERY
METALS

Client ID: SD-214-01 MS
Lab ID: 680-102370-23 MS
Lab Name: TestAmerica St. Louis
Job No.: 680-102370-4
SDG No.: 680-102370-4
Matrix: Solid
Concentration Units: mg/Kg
% Solids:

Analyte	SSR	C	Sample Result (SR)	C	Spike Added (SA)	%R	Control Limit %R	Q	Method
U-234	0.00767	J	ND		0.00698	110	75-125		6020A
U-235	0.480		0.018		0.409	113	75-125		6020A
U-238	2.95		2.4		0.425	132	75-125	4	6020A

SSR = Spiked Sample Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VA - IN

5A-IN
MATRIX SPIKE SAMPLE RECOVERY
METALS

Client ID: SD-212-02 MS
Lab ID: 680-102370-26 MS
Lab Name: TestAmerica St. Louis
Job No.: 680-102370-4
SDG No.: 680-102370-4
Matrix: Solid
Concentration Units: mg/Kg
% Solids:

Analyte	SSR	C	Sample Result (SR)	C	Spike Added (SA)	%R	Control Limit %R	Q	Method
U-234	0.00792	J	ND		0.00702	113	75-125		6020A
U-235	0.483		0.015		0.412	114	75-125		6020A
U-238	2.48		2.0		0.427	109	75-125	4	6020A

SSR = Spiked Sample Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VA - IN

5A-IN
MATRIX SPIKE DUPLICATE SAMPLE RECOVERY
METALS

Client ID: SD-214-01 MSD
Lab ID: 680-102370-23 MSD
Lab Name: TestAmerica St. Louis
Job No.: 680-102370-4
SDG No.: 680-102370-4
Matrix: Solid
Concentration Units: mg/Kg
% Solids:

Analyte	(SDR)	C	Spike Added (SA)	%R	Control Limit %R	RPD	RPD Limit	Q	Method
U-234	0.00876	J	0.00744	118	75-125	13	20		6020A
U-235	0.525		0.436	116	75-125	9	20		6020A
U-238	2.97		0.453	130	75-125	1	20	4	6020A

SDR = Sample Duplicate Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VD - IN

5A-IN
MATRIX SPIKE DUPLICATE SAMPLE RECOVERY
METALS

Client ID: SD-212-02 MSD
Lab ID: 680-102370-26 MSD
Lab Name: TestAmerica St. Louis
Job No.: 680-102370-4
SDG No.: 680-102370-4
Matrix: Solid
Concentration Units: mg/Kg
% Solids:

Analyte	(SDR)	C	Spike Added (SA)	%R	Control Limit %R	RPD	RPD Limit	Q	Method
U-234	0.00832	J	0.00811	103	75-125	5	20		6020A
U-235	0.514		0.475	105	75-125	6	20		6020A
U-238	2.58		0.493	113	75-125	4	20	4	6020A

SDR = Sample Duplicate Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VD - IN

7A-IN
LAB CONTROL SAMPLE
METALS

Lab ID: LCS 160-139040/2-A

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

Sample Matrix: Solid LCS Source: ISOU Prep Spk_00002

Analyte	Solid(mg/Kg)							
	True	Found	C	%R	Limits		Q	Method
U-234	0.00756	0.00824		109	80	120		6020A
U-235	0.444	0.496		112	80	120		6020A
U-238	0.460	0.511		111	80	120		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

7A-IN
LAB CONTROL SAMPLE
METALS

Lab ID: LCS 160-139047/2-A

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

Sample Matrix: Solid LCS Source: ISOU Prep Spk_00002

Analyte	Solid(mg/Kg)							
	True	Found	C	%R	Limits		Q	Method
U-234	0.00782	0.00830		106	80	120		6020A
U-235	0.459	0.500		109	80	120		6020A
U-238	0.476	0.519		109	80	120		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

8-IN
ICP-AES AND ICP-MS SERIAL DILUTIONS
METALS

Lab ID: 680-102370-23

SDG No: 680-102370-4

Lab Name: TestAmerica St. Louis Job No: 680-102370-4

Matrix: Solid Concentration Units: mg/Kg

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Method
U-233	ND		ND		NC		6020A
U-234	ND		ND		NC		6020A
U-235	0.018		ND		NC		6020A
U-236	ND		ND		NC		6020A
U-238	2.4		2.34		1.9		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIII-IN

8-IN
ICP-AES AND ICP-MS SERIAL DILUTIONS
METALS

Lab ID: 680-102370-26

SDG No: 680-102370-4

Lab Name: TestAmerica St. Louis Job No: 680-102370-4

Matrix: Solid Concentration Units: mg/Kg

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Method
U-233	ND		ND		NC		6020A
U-234	ND		ND		NC		6020A
U-235	0.015		ND		NC		6020A
U-236	ND		ND		NC		6020A
U-238	2.0		1.97		2.6		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIII-IN

9-IN
DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102370-4

SDG Number: 680-102370-4

Matrix: Solid Instrument ID: ICPMS6100

Method: 6020A MDL Date: 08/05/2013 10:01

Prep Method: 3050B

Analyte	Wavelength/ Mass	RL (mg/Kg)	MDL (mg/Kg)
U-233	233	0.005	0.0015
U-234	234	0.005	0.0003
U-235	235	0.005	0.00203
U-236	236	0.005	0.0004
U-238	238	0.005	0.0003

9-IN
CALIBRATION BLANK DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102370-4

SDG Number: 680-102370-4

Matrix: Solid Instrument ID: ICPMS6100

Method: 6020A XMDL Date: 07/18/2014 15:08

Analyte	Wavelength/ Mass	XRL (ug/L)	XMDL (ug/L)
U-233	233	0.05	0.0066
U-234	234	0.05	0.0021
U-235	235	0.05	0.0034
U-236	236	0.05	0.0015
U-238	238	0.05	0.0082

9-IN
DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102370-4

SDG Number: 680-102370-4

Matrix: Solid Instrument ID: NOEQUIP

Method: 6020A MDL Date: 06/12/2013 14:02

Analyte	Wavelength/ Mass	RL (mg/Kg)	MDL (mg/Kg)
Total Uranium		0.005	0.0003

11-IN
LINEAR RANGES
METALS

Lab Name: TestAmerica St. Louis Job No: 680-102370-4

SDG No.: 680-102370-4

Instrument ID: ICPMS6100 Date: 02/14/2012 11:04

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	Method
U-233		2000	6020A
U-234		2000	6020A
U-235		2000	6020A
U-236		2000	6020A
U-238		2000	6020A

12-IN
PREPARATION LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

Prep Method: 3050B

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight (g)	Initial Volume	Final Volume (mL)
MB 160-139040/1-A	08/20/2014 11:20	139040	0.5541		50
LCS 160-139040/2-A	08/20/2014 11:20	139040	0.5465		50
680-102370-7	08/20/2014 11:20	139040	0.5210		50
680-102370-8	08/20/2014 11:20	139040	0.5185		50
680-102370-9	08/20/2014 11:20	139040	0.5177		50
680-102370-10	08/20/2014 11:20	139040	0.5667		50
680-102370-11	08/20/2014 11:20	139040	0.5064		50
680-102370-12	08/20/2014 11:20	139040	0.5197		50
680-102370-13	08/20/2014 11:20	139040	0.5497		50
680-102370-14	08/20/2014 11:20	139040	0.5252		50
680-102370-15	08/20/2014 11:20	139040	0.5268		50
680-102370-16	08/20/2014 11:20	139040	0.5549		50
680-102370-17	08/20/2014 11:20	139040	0.5505		50
680-102370-18	08/20/2014 11:20	139040	0.5547		50
680-102370-19	08/20/2014 11:20	139040	0.5731		50
680-102370-20	08/20/2014 11:20	139040	0.5271		50
680-102370-22	08/20/2014 11:20	139040	0.5049		50
680-102370-23	08/20/2014 11:20	139040	0.5432		50
680-102370-23 MS	08/20/2014 11:20	139040	0.5919		50
680-102370-23 MSD	08/20/2014 11:20	139040	0.5553		50
680-102370-24	08/20/2014 11:20	139040	0.5744		50
680-102370-25	08/20/2014 11:20	139040	0.5673		50

12-IN
PREPARATION LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

Prep Method: 3050B

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight (g)	Initial Volume	Final Volume (mL)
MB 160-139047/1-A	08/20/2014 12:10	139047	0.5651		50
LCS 160-139047/2-A	08/20/2014 12:10	139047	0.5283		50
680-102370-26	08/20/2014 12:10	139047	0.5385		50
680-102370-26 MS	08/20/2014 12:10	139047	0.5889		50
680-102370-26 MSD	08/20/2014 12:10	139047	0.5099		50
680-102370-28	08/20/2014 12:10	139047	0.5605		50
680-102370-29	08/20/2014 12:10	139047	0.5246		50
680-102370-30	08/20/2014 12:10	139047	0.5922		50
680-102370-31	08/20/2014 12:10	139047	0.5270		50
680-102370-33	08/20/2014 12:10	139047	0.5710		50
680-102370-34	08/20/2014 12:10	139047	0.5760		50

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/02/2014 18:15 End Date: 09/03/2014 00:54

Lab Sample Id	D/F	Type	Time	Analytes																										
				U-233	U-234	U-235	U-236	U-238																						
ICIS 160-141597/1			18:15	X	X	X	X	X																						
IC 160-141597/2	1		18:22	X	X	X	X	X																						
IC 160-141597/3	1		18:27	X	X	X	X	X																						
IC 160-141597/4	1		18:31	X	X	X	X	X																						
IC 160-141597/5	1		18:36	X	X	X	X	X																						
IC 160-141597/6	1		18:41	X	X	X	X	X																						
ICV 160-141597/7	1		18:45	X																										
ICV 160-141597/8	1		18:50		X			X																						
ICV 160-141597/9	1		18:55			X	X																							
ICB 160-141597/10	1		18:59	X	X	X	X	X																						
CRI 160-141597/11	1		19:04			X		X																						
CRI 160-141597/12	1		19:09	X	X		X																							
ICSA 160-141597/13	1		19:13	X	X	X	X	X																						
ICSAB 160-141597/14	1		19:18	X	X	X	X	X																						
CCV 160-141597/15	1		19:23	X	X	X	X	X																						
CCB 160-141597/16	1		19:27	X	X	X	X	X																						
MB 160-139040/1-A	2	T	19:32	X	X	X	X	X																						
LCS 160-139040/2-A	2	T	19:37		X	X		X																						
680-102370-7	5	T	19:41	X	X	X	X	X																						
680-102370-8	5	T	19:46	X	X	X	X	X																						
680-102370-9	5	T	19:51	X	X	X	X	X																						
680-102370-10	5	T	19:55	X	X	X	X	X																						
680-102370-11	5	T	20:00	X	X	X	X	X																						
680-102370-12	5	T	20:05	X	X	X	X	X																						
680-102370-13	5	T	20:09	X	X	X	X	X																						
680-102370-14	5	T	20:14	X	X	X	X	X																						
CCV 160-141597/27	1		20:19	X	X	X	X	X																						
CCB 160-141597/28	1		20:23	X	X	X	X	X																						
680-102370-15	5	T	20:28	X	X	X	X	X																						
680-102370-16	5	T	20:33	X	X	X	X	X																						
680-102370-17	5	T	20:37	X	X	X	X	X																						
680-102370-18	5	T	20:42	X	X	X	X	X																						
680-102370-19	5	T	20:47	X	X	X	X	X																						
680-102370-20	5	T	20:51	X	X	X	X	X																						
680-102370-22	5	T	20:56	X	X	X	X	X																						
680-102370-23	5	T	21:01	X	X	X	X	X																						
680-102370-23 SD	25	T	21:05	X	X	X	X	X																						
680-102370-23 MS	5	T	21:10		X	X		X																						
CCV 160-141597/39	1		21:15	X	X	X	X	X																						

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/02/2014 18:15 End Date: 09/03/2014 00:54

Lab Sample Id	D/F	Type	Time	Analytes																										
				U-233	U-234	U-235	U-236	U-238																						
CCB 160-141597/40	1		21:19	X	X	X	X	X																						
680-102370-23 MSD	5	T	21:24		X	X		X																						
680-102370-24	5	T	21:29	X	X	X	X	X																						
680-102370-25	5	T	21:33	X	X	X	X	X																						
MB 160-139047/1-A	2	T	21:38	X	X	X	X	X																						
LCS 160-139047/2-A	2	T	21:43		X	X		X																						
680-102370-26	5	T	21:48	X	X	X	X	X																						
680-102370-26 SD	25	T	21:52	X	X	X	X	X																						
680-102370-26 MS	5	T	21:57		X	X		X																						
680-102370-26 MSD	5	T	22:01		X	X		X																						
680-102370-28	5	T	22:06	X	X	X	X	X																						
CCV 160-141597/51	1		22:11	X	X	X	X	X																						
CCB 160-141597/52	1		22:16	X	X	X	X	X																						
680-102370-29	5	T	22:20	X	X	X	X	X																						
680-102370-30	5	T	22:25	X	X	X	X	X																						
680-102370-31	5	T	22:30	X	X	X	X	X																						
680-102370-33	5	T	22:34	X	X	X	X	X																						
680-102370-34	5	T	22:39	X	X	X	X	X																						
ZZZZZZ			22:44																											
ZZZZZZ			22:48																											
ZZZZZZ			22:53																											
ZZZZZZ			22:58																											
ZZZZZZ			23:02																											
CCV 160-141597/63	1		23:07	X	X	X	X	X																						
CCB 160-141597/64	1		23:12	X	X	X	X	X																						
ZZZZZZ			23:16																											
ZZZZZZ			23:21																											
ZZZZZZ			23:26																											
ZZZZZZ			23:30																											
ZZZZZZ			23:35																											
ZZZZZZ			23:40																											
ZZZZZZ			23:44																											
ZZZZZZ			23:49																											
ZZZZZZ			23:54																											
ZZZZZZ			23:58																											
CCV 160-141597/75			00:03																											
CCB 160-141597/76			00:08																											
ZZZZZZ			00:12																											
ZZZZZZ			00:17																											

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/02/2014 18:15 End Date: 09/03/2014 00:54

Lab Sample Id	D/F	Type	Time	Analytes																									
				U-233	U-234	U-235	U-236	U-238																					
ZZZZZZ			00:22																										
ZZZZZZ			00:26																										
ZZZZZZ			00:31																										
ZZZZZZ			00:36																										
ZZZZZZ			00:40																										
ZZZZZZ			00:45																										
CCV 160-141597/85			00:50																										
CCB 160-141597/86			00:54																										

Prep Types:
T = Total/NA

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

Instrument ID: NOEQUIP Analysis Method: 6020A

Start Date: 09/04/2014 13:19 End Date: 09/04/2014 13:19

Lab Sample Id	D/F	Type	Time	Analytes																								
				U																								
680-102370-7	1	T	13:19	X																								
ZZZZZZ			13:19																									
ZZZZZZ			13:19																									
680-102370-8	1	T	13:19	X																								
680-102370-9	1	T	13:19	X																								
680-102370-10	1	T	13:19	X																								
680-102370-11	1	T	13:19	X																								
680-102370-12	1	T	13:19	X																								
680-102370-13	1	T	13:19	X																								
680-102370-14	1	T	13:19	X																								
680-102370-15	1	T	13:19	X																								
680-102370-16	1	T	13:19	X																								
680-102370-17	1	T	13:19	X																								
680-102370-18	1	T	13:19	X																								
680-102370-19	1	T	13:19	X																								
680-102370-20	1	T	13:19	X																								
680-102370-22	1	T	13:19	X																								
680-102370-23	1	T	13:19	X																								
680-102370-24	1	T	13:19	X																								
680-102370-25	1	T	13:19	X																								

Prep Types:
T = Total/NA

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

Instrument ID: NOEQUIP Analysis Method: 6020A

Start Date: 09/04/2014 13:20 End Date: 09/04/2014 13:20

Lab Sample Id	D/F	Type	Time	Analytes																								
				U																								
680-102370-26	1	T	13:20	X																								
680-102370-28	1	T	13:20	X																								
680-102370-29	1	T	13:20	X																								
680-102370-30	1	T	13:20	X																								
680-102370-31	1	T	13:20	X																								
680-102370-33	1	T	13:20	X																								
680-102370-34	1	T	13:20	X																								

Prep Types:
T = Total/NA

FORM XIII-IN

15-IN
ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

ICP-MS Instrument ID: ICPMS6100 Start Date: 09/02/2014 End Date: 09/02/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
IC 160-141597/2	18:22										
IC 160-141597/3	18:27										
IC 160-141597/4	18:31										
IC 160-141597/5	18:36										
IC 160-141597/6	18:41										
ICV 160-141597/7	18:45	101									
ICV 160-141597/8	18:50	101									
ICV 160-141597/9	18:55	99									
ICB 160-141597/10	18:59	98									
CRI 160-141597/11	19:04	100									
CRI 160-141597/12	19:09	100									
ICSA 160-141597/13	19:13	90									
ICSAB 160-141597/14	19:18	89									
CCV 160-141597/15	19:23	99									
CCB 160-141597/16	19:27	100									
MB 160-139040/1-A	19:32	102									
LCS 160-139040/2-A	19:37	102									
680-102370-7	19:41	100									
680-102370-8	19:46	90									
680-102370-9	19:51	79									
680-102370-10	19:55	95									
680-102370-11	20:00	99									
680-102370-12	20:05	101									
680-102370-13	20:09	101									
680-102370-14	20:14	99									
CCV 160-141597/27	20:19	96									
CCB 160-141597/28	20:23	95									
680-102370-15	20:28	98									
680-102370-16	20:33	98									
680-102370-17	20:37	97									
680-102370-18	20:42	91									
680-102370-19	20:47	92									
680-102370-20	20:51	90									
680-102370-22	20:56	90									
680-102370-23	21:01	92									
680-102370-23 SD	21:05	96									
680-102370-23 MS	21:10	90									
CCV 160-141597/39	21:15	97									
CCB 160-141597/40	21:19	96									
680-102370-23 MSD	21:24	89									
680-102370-24	21:29	89									
680-102370-25	21:33	91									

FORM XV - IN

15-IN
ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

ICP-MS Instrument ID: ICPMS6100 Start Date: 09/02/2014 End Date: 09/02/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
MB 160-139047/1-A	21:38	98									
LCS 160-139047/2-A	21:43	98									
680-102370-26	21:48	90									
680-102370-26 SD	21:52	94									
680-102370-26 MS	21:57	88									
680-102370-26 MSD	22:01	88									
680-102370-28	22:06	87									
CCV 160-141597/51	22:11	94									
CCB 160-141597/52	22:16	92									
680-102370-29	22:20	90									
680-102370-30	22:25	87									
680-102370-31	22:30	87									
680-102370-33	22:34	93									
680-102370-34	22:39	88									
CCV 160-141597/63	23:07	92									
CCB 160-141597/64	23:12	90									

KE 9/3/14

File: 090214M2

A Batch
141597
141598

Sample/Batch Report

TA ST. LOUIS - PERKIN ELMER ELAN 6100 - METHOD 6020 / 200.8 QUANTITATIVE ANALYSIS REPORT

User Name: stlmetals
Computer Name: SLICP03
Sample File: D:\Elandata\Sample\SW846 TEMP1.sam
Report Date/Time: Wednesday, September 03, 2014 09:34:49
Method File: d:\Elandata\Method\2014 isou.mth
Tuning File: d:\Elandata\Tuning\epa tuning.tun
Optimization File: d:\Elandata\Optimize\epa2008.dac
Calibration File:
Calibration Type: External Calibration
Number of Replicates: 3
Number of Readings: 1
Number of Sweeps: 100
Dual Detector Mode: Dual

A/S Loc.	Batch ID	Sample ID	Description	Aliquot Vol.	Diluted Vol.
11	139040	430685	2		
12		430686	2		
13		680-102370-A-7-D	5		
14		680-102370-A-8-C	5		
15		680-102370-A-9-C	5		
16		680-102370-A-10-C	5		
17		680-102370-A-11-C	5		
18		680-102370-A-12-C	5		
19		680-102370-A-13-C	5		
20	CCV	680-102370-A-14-C	5		
21	CCB	680-102370-A-15-C	5		
22		680-102370-A-16-C	5		
23		680-102370-A-17-C	5		
24		680-102370-A-18-C	5		
25		680-102370-A-19-C	5		
26		680-102370-A-20-C	5		
27		680-102370-A-22-C	5		
28		680-102370-A-23-G	5		
29		680-102370-A-23-G	SD25		
30	CCV	680-102370-A-23-H	MS5		
31	CCB	680-102370-A-23-I	MSD5		
32		680-102370-A-24-C	5		
33		680-102370-A-25-C	5		
34	139047	430790	2		
35		430791	2		
36		680-102370-A-26-C	5		
37		680-102370-A-26-C	SD25		
38		680-102370-A-26-D	MS5		
39		680-102370-A-26-E	MS5		
40	CCV	680-102370-A-28-C	5		
41	CCB	680-102370-A-29-C	5		
42		680-102370-A-30-C	5		
43		680-102370-A-31-C	5		
44		680-102370-A-33-D	5		
45		680-102370-A-34-C	5		
46	139348	431772	2		
47		431773	2		
48		680-102577-A-1-D	5		
49		680-102577-A-2-C	5		
50	CCV	680-102431-A-1-C	5		
51	CCB	680-102431-A-2-C	5		

All

52		680-102431-A-3-C	5
53		680-102431-A-4-C	5
54		680-102431-A-5-G	5
55		680-102431-A-5-G SD	25
56		680-102431-A-5-H MS	5
57		680-102431-A-5-I MSD	5
58		680-102431-A-7-C	5
59		680-102431-A-8-C	5
60	ccv	680-102431-A-8-D MS	5
61	ccv	680-102431-A-8-E MSD	5
62		680-102431-A-9-C	5
63		680-102431-A-11-C	5
64		680-102431-A-12-C	5
65		680-102431-A-13-C	5
66		680-102431-A-15-C	5
67		680-102431-A-16-C	5
68		680-102431-A-17-C	5

- All

ccv
ccv

Quantitative Analysis Calibration Report

File Name: 090214M2.cal
File Path: D:\Elandata\System
Calibration Type: External Calibration

Analyte	Mass	Curve Type	Slope	Intercept	Corr. Coeff.
Ho (IS)	164.930	Linear Thru Zero	0.000000	0.00	0.000000
U	233.000	Linear Thru Zero	0.047454	0.00	0.999971
U	234.041	Linear Thru Zero	0.036480	0.00	0.999974
U	235.044	Linear Thru Zero	0.033872	0.00	0.999922
U	236.000	Linear Thru Zero	0.052600	0.00	0.999967
U	238.050	Linear Thru Zero	0.030132	0.00	0.999932

Instrument Tuning Report

File Name: EPA TUNING.tun
File Path: d:\Elandata\Tuning
Sample ID: Sample
Sample Date/Time: Tuesday, September 02, 2014 17:30:16

Analyte	Exact Mass	Meas. Mass	Mass DAC	Res. DAC	Meas. Pk. Width	Custom Res.
Li	7.016	7.025	1570	2065	0.643	
Mg	23.985	23.979	5688	2080	0.678	
Rh	102.905	102.879	24919	2080	0.693	
Ce	139.905	139.929	33931	2120	0.673	
Pb	207.977	207.977	50415	2310	0.664	

Replicates: 6

Daily Performance Report

Sample ID: Sample
Sample Date/Time: Tuesday, September 02, 2014 17:48:47
Sample Description:
Method File: d:\Elandata\Method\DAILY EPA.mth
Dataset File: d:\Elandata\Dataset\daily3\Sample.157
Tuning File: d:\Elandata\Tuning\EPA TUNING.tun
Optimization File: d:\Elandata\Optimize\EPA2008.dac
Dual Detector Mode: Pulse
Acq. Dead Time(ns): 35
Current Dead Time (ns): 35

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Net Intens. SD	Net Intens. RSD
	Li	7.0	5059.0	5059.008	181.710	3.6
	Mg	24.0	22040.4	22040.437	314.060	1.4
	Rh	102.9	308814.2	308814.162	3879.016	1.3
	Pb	208.0	284822.2	284822.242	2758.220	1.0
⎡>	Ba	137.9	344587.0	344587.031	5003.107	1.5
⎣	Ba++	69.0	2836.1	0.008	0.000	1.4
⎡>	Ce	139.9	422424.4	422424.369	4644.459	1.1
⎣	CeO	155.9	14719.5	0.035	0.000	1.2
	Bkgd	220.0	6.1	6.056	1.237	20.4

Current Optimization File Data

Current Value	Description
1.00	Nebulizer Gas Flow
5.75	Lens Voltage
1600.00	ICP RF Power
-2109.38	Analog Stage Voltage
1200.00	Pulse Stage Voltage
70.00	Discriminator Threshold
-6.00	AC Rod Offset
60.00	Service DAC 1
0.00	Quadrupole Rod Offset

Current Autolens Data

Analyte	Mass	Num of Pts	DAC Value	Maximum Intensity
Be	9	33	5.8	3790.5
Mg	24	33	5.3	38794.6
Co	59	33	6.0	120968.0
Rh	103	33	6.0	410955.8
In	115	33	6.3	535549.1
Ba	138	33	6.5	493063.2
Ce	140	33	6.8	606693.1
Pb	208	33	8.5	437779.2

Daily Performance Report

Sample ID: Sample
Sample Date/Time: Tuesday, September 02, 2014 17:53:20
Sample Description:
Method File: d:\Elandata\Method\DAILY EPA.mth
Dataset File: d:\Elandata\Dataset\daily3\Sample.158
Tuning File: d:\Elandata\Tuning\EPA TUNING.tun
Optimization File: d:\Elandata\Optimize\EPA2008.dac
Dual Detector Mode: Pulse
Acq. Dead Time(ns): 35
Current Dead Time (ns): 35

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Net Intens. SD	Net Intens. RSD
	Li	7.0	3595.6	3595.564	144.770	4.0
	Mg	24.0	18044.1	18044.114	354.293	2.0
	Rh	102.9	261860.2	261860.165	1846.488	0.7
	Pb	208.0	230123.3	230123.304	767.346	0.3
⌈>	Ba	137.9	289067.4	289067.370	2191.660	0.8
⌊	Ba++	69.0	2378.0	0.008	0.000	1.7
⌈>	Ce	139.9	357557.6	357557.556	2688.005	0.8
⌊	CeO	155.9	10215.4	0.029	0.001	1.9
	Bkgd	220.0	6.8	6.778	1.917	28.3

Current Optimization File Data

Current Value	Description
0.98	Nebulizer Gas Flow
5.75	Lens Voltage
1600.00	ICP RF Power
-2109.38	Analog Stage Voltage
1200.00	Pulse Stage Voltage
70.00	Discriminator Threshold
-6.00	AC Rod Offset
60.00	Service DAC 1
0.00	Quadrupole Rod Offset

Current Autolens Data

Analyte	Mass	Num of Pts	DAC Value	Maximum Intensity
Be	9	33	5.8	3790.5
Mg	24	33	5.3	38794.6
Co	59	33	6.0	120968.0
Rh	103	33	6.0	410955.8
In	115	33	6.3	535549.1
Ba	138	33	6.5	493063.2
Ce	140	33	6.8	606693.1
Pb	208	33	8.5	437779.2

QUANTITATIVE ANALYSIS REPORT

Sample ID: Blank

Sample Date/Time: Tuesday, September 02, 2014 18:15:40
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\090214M2\Blank.001

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			871479.031	ug/L	
	233	**U**			213.002	ug/L	
	234	**U**			6.800	ug/L	
	235	**U**			30.600	ug/L	
	236	**U**			8.600	ug/L	
	238	**U**			260.536	ug/L	

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 1
Sample Date/Time: Tuesday, September 02, 2014 18:22:20
Autosampler Position: 191
Dataset File: D:\Elandata\Dataset\090214M2\Standard 1.002

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			877833.654	ug/L	871479.031
	233	**U**			28.000	ug/L	213.002
	234	**U**			31.800	ug/L	6.800
	235	**U**	**0.048500**	2.265	1514.680	ug/L	30.600
	236	**U**			54.000	ug/L	8.600
	238	**U**	**0.050300**	4.463	1417.070	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 2
Sample Date/Time: Tuesday, September 02, 2014 18:27:01
Autosampler Position: 192
Dataset File: D:\Elandata\Dataset\090214M2\Standard 2.003

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			877238.558	ug/L	871479.031
	233	**U**			1360.198	ug/L	213.002
	234	**U**	**0.049600**	3.938	1622.225	ug/L	6.800
	235	**U**	**2.923211**	2.834	89362.979	ug/L	30.600
	236	**U**	**0.053400**	2.939	2501.486	ug/L	8.600
	238	**U**	**3.552753**	2.583	81802.223	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 3
Sample Date/Time: Tuesday, September 02, 2014 18:31:42
Autosampler Position: 193
Dataset File: D:\Elandata\Dataset\090214M2\Standard 3.004

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			878969.266	ug/L	871479.031
	233	**U**	**0.051500**	3.204	2261.046	ug/L	213.002
	234	**U**	**0.082594**	1.962	2704.656	ug/L	6.800
	235	**U**	**4.885157**	2.687	149649.968	ug/L	30.600
	236	**U**	**0.088787**	3.446	4161.540	ug/L	8.600
	238	**U**	**5.926777**	2.502	136576.296	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 4
Sample Date/Time: Tuesday, September 02, 2014 18:36:23
Autosampler Position: 194
Dataset File: D:\Elandata\Dataset\090214M2\Standard 4.005

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			874096.866	ug/L	871479.031
	233	**U**	**0.103854**	3.090	4458.563	ug/L	213.002
	234	**U**	**0.165318**	1.316	5385.483	ug/L	6.800
	235	**U**	**9.694902**	1.010	297740.953	ug/L	30.600
	236	**U**	**0.178156**	1.054	8385.998	ug/L	8.600
	238	**U**	**10.051840**	1.064	274170.864	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 5
Sample Date/Time: Tuesday, September 02, 2014 18:41:04
Autosampler Position: 195
Dataset File: D:\Elandata\Dataset\090214M2\Standard 5.006

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			879848.746	ug/L	871479.031
	233	**U**	**0.309687**	2.826	13129.570	ug/L	213.002
	234	**U**	**0.494758**	3.061	15867.683	ug/L	6.800
	235	**U**	**28.963445**	3.050	862044.495	ug/L	30.600
	236	**U**	**0.532412**	2.717	24619.484	ug/L	8.600
	238	**U**	**30.038201**	2.681	795705.300	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 1

Sample Date/Time: Tuesday, September 02, 2014 18:45:45
Autosampler Position: 196
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 1.007

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			879143.222	ug/L	871479.031
	233	**U**	**0.226050**	1.842	9638.788	ug/L	213.002
	234	**U**	**0.000564**	18.077	24.867	ug/L	6.800
	235	**U**	**0.009009**	25.139	296.603	ug/L	30.600
	236	**U**	**0.000110**	33.711	13.733	ug/L	8.600
	238	**U**	**0.049227**	6.059	1563.952	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.879**	
	U	233		**101.141**
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 2

Sample Date/Time: Tuesday, September 02, 2014 18:50:26
Autosampler Position: 197
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 2.008

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			880894.558	ug/L	871479.031
	233	**U**	**44.140322**	2.338	1843768.974	ug/L	213.002
	234	**U**	**0.089186**	2.633	2870.088	ug/L	6.800
	235	**U**	**0.114889**	1.914	3456.752	ug/L	30.600
	236	**U**	**0.006645**	7.040	315.870	ug/L	8.600
	238	**U**	**10.088659**	1.697	267879.812	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.080**	
	U	233		
	U	234		**106.810**
	U	235		
	U	236		
	U	238		**103.175**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 3

Sample Date/Time: Tuesday, September 02, 2014 18:55:07
Autosampler Position: 198
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 3.009

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			865018.137	ug/L	871479.031
	233	**U**	**429.199578**	2.214	17607424.649	ug/L	213.002
	234	**U**	**0.905791**	1.987	28578.732	ug/L	6.800
	235	**U**	**1.155253**	2.556	33854.708	ug/L	30.600
	236	**U**	**0.070183**	3.171	3198.492	ug/L	8.600
	238	**U**	**92.852103**	2.535	2418505.251	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.259**	
	U	233		
	U	234		
	U	235		**109.316**
	U	236		**94.079**
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 4

Sample Date/Time: Tuesday, September 02, 2014 18:59:48
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 4.010

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			856444.036	ug/L	871479.031
	233	**U**	**0.034502**	19.267	1619.761	ug/L	213.002
	234	**U**	**0.000064**	68.738	8.667	ug/L	6.800
	235	**U**	**-0.000066**	33.294	28.133	ug/L	30.600
	236	**U**	**0.000008**	344.367	8.867	ug/L	8.600
	238	**U**	**0.005071**	29.359	388.072	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.275**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 5

Sample Date/Time: Tuesday, September 02, 2014 19:04:28
Autosampler Position: 191
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 5.011

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			870074.027	ug/L	871479.031
	233	**U**	**0.028036**	20.106	1361.399	ug/L	213.002
	234	**U**	**0.000909**	2.655	35.600	ug/L	6.800
	235	**U**	**0.049860**	3.603	1497.812	ug/L	30.600
	236	**U**	**0.000812**	9.513	45.667	ug/L	8.600
	238	**U**	**0.049613**	4.931	1558.218	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.839**	
	U	233		
	U	234		
	U	235		**102.805**
	U	236		
	U	238		**98.634**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Tuesday, September 02, 2014 19:09:09
Autosampler Position: 192
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 6.012

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			875095.293	ug/L	871479.031
	233	**U**	**0.036297**	7.050	1717.170	ug/L	213.002
	234	**U**	**0.049549**	0.836	1588.288	ug/L	6.800
	235	**U**	**2.983820**	1.664	88417.674	ug/L	30.600
	236	**U**	**0.052886**	2.219	2440.942	ug/L	8.600
	238	**U**	**3.092020**	1.905	81738.491	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.415**	
	U	233		**117.466**
	U	234		**99.897**
	U	235		
	U	236		**99.037**
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Tuesday, September 02, 2014 19:13:50
Autosampler Position: 199
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 7.013

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			783490.929	ug/L	871479.031
	233	**U**	**-0.001390**	32.984	139.401	ug/L	213.002
	234	**U**	**0.000058**	81.838	7.800	ug/L	6.800
	235	**U**	**-0.000035**	303.887	26.467	ug/L	30.600
	236	**U**	**-0.000018**	186.985	6.933	ug/L	8.600
	238	**U**	**-0.007232**	6.121	63.667	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.904**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 8

Sample Date/Time: Tuesday, September 02, 2014 19:18:30
Autosampler Position: 200
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 8.014

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			772882.876	ug/L	871479.031
	233	**U**	**0.053663**	3.730	2153.696	ug/L	213.002
	234	**U**	**0.090990**	2.499	2568.498	ug/L	6.800
	235	**U**	**5.469291**	2.340	143066.628	ug/L	30.600
	236	**U**	**0.097483**	3.218	3965.351	ug/L	8.600
	238	**U**	**5.691618**	2.953	132603.032	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.686**	
	U	233		**104.201**
	U	234		**110.024**
	U	235		**112.827**
	U	236		**109.531**
	U	238		**113.246**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9

Sample Date/Time: Tuesday, September 02, 2014 19:23:11

Autosampler Position: 10

Dataset File: D:\Elandata\Dataset\090214M2\QC Std 9.015

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			858402.021	ug/L	871479.031
	233	**U**	**0.051075**	2.463	2288.450	ug/L	213.002
	234	**U**	**0.086737**	3.321	2718.992	ug/L	6.800
	235	**U**	**5.234835**	2.651	152061.441	ug/L	30.600
	236	**U**	**0.093078**	2.113	4207.220	ug/L	8.600
	238	**U**	**5.395863**	2.499	139672.487	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.499**	
	U	233		**99.174**
	U	234		**104.882**
	U	235		**107.990**
	U	236		**104.582**
	U	238		**107.361**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Tuesday, September 02, 2014 19:27:51
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 10.016

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			870055.449	ug/L	871479.031
	233	**U**	**0.014028**	2.291	791.955	ug/L	213.002
	234	**U**	**0.000100**	52.127	9.933	ug/L	6.800
	235	**U**	**0.000737**	27.688	52.467	ug/L	30.600
	236	**U**	**-0.000016**	240.514	7.800	ug/L	8.600
	238	**U**	**0.000987**	24.598	286.070	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.837**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 430685

Sample Date/Time: Tuesday, September 02, 2014 19:32:31
Autosampler Position: 11
Dataset File: D:\Elandata\Dataset\090214M2\430685.017

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			884794.789	ug/L	871479.031
	233	**U**	**-0.004523**	1.748	26.200	ug/L	213.002
	234	**U**	**0.000019**	157.744	7.467	ug/L	6.800
	235	**U**	**-0.000129**	15.715	27.200	ug/L	30.600
	236	**U**	**-0.000036**	18.789	7.067	ug/L	8.600
	238	**U**	**-0.006361**	3.227	94.867	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.528**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 430686

Sample Date/Time: Tuesday, September 02, 2014 19:37:11
Autosampler Position: 12
Dataset File: D:\Elandata\Dataset\090214M2\430686.018

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			884397.139	ug/L	871479.031
	233	**U**	**-0.001754**	4.447	142.401	ug/L	213.002
	234	**U**	**0.045024**	2.597	1458.008	ug/L	6.800
	235	**U**	**2.710722**	2.066	81166.280	ug/L	30.600
	236	**U**	**0.048862**	1.472	2280.382	ug/L	8.600
	238	**U**	**2.791975**	1.524	74620.203	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.482**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-7-D
Sample Date/Time: Tuesday, September 02, 2014 19:41:50
Autosampler Position: 13
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-7-D.019

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			872992.022	ug/L	871479.031
	233	**U**	**-0.004693**	2.005	18.800	ug/L	213.002
	234	**U**	**0.000081**	53.747	9.333	ug/L	6.800
	235	**U**	**0.005060**	5.324	180.201	ug/L	30.600
	236	**U**	**-0.000026**	39.937	7.400	ug/L	8.600
	238	**U**	**0.728456**	2.209	19406.589	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.174**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-8-C
Sample Date/Time: Tuesday, September 02, 2014 19:46:30
Autosampler Position: 14
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-8-C.020

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			786792.304	ug/L	871479.031
	233	**U**	**-0.004734**	0.475	15.533	ug/L	213.002
	234	**U**	**0.000116**	5.255	9.467	ug/L	6.800
	235	**U**	**0.006522**	3.942	201.468	ug/L	30.600
	236	**U**	**-0.000014**	273.330	7.200	ug/L	8.600
	238	**U**	**0.965476**	2.246	23124.910	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.282**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-9-C
Sample Date/Time: Tuesday, September 02, 2014 19:51:10
Autosampler Position: 15
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-9-C.021

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			690710.506	ug/L	871479.031
	233	**U**	**-0.004717**	1.226	14.200	ug/L	213.002
	234	**U**	**0.000210**	15.527	10.667	ug/L	6.800
	235	**U**	**0.014069**	3.001	353.271	ug/L	30.600
	236	**U**	**0.000012**	101.427	7.267	ug/L	8.600
	238	**U**	**1.998207**	4.018	41772.268	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**79.257**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-10-C
Sample Date/Time: Tuesday, September 02, 2014 19:55:51
Autosampler Position: 16
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-10-C.022

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			825992.061	ug/L	871479.031
	233	**U**	**-0.004781**	0.904	14.467	ug/L	213.002
	234	**U**	**0.000142**	51.481	10.733	ug/L	6.800
	235	**U**	**0.009785**	3.728	302.603	ug/L	30.600
	236	**U**	**-0.000018**	147.541	7.400	ug/L	8.600
	238	**U**	**1.388266**	0.677	34800.823	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.780**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-11-C
Sample Date/Time: Tuesday, September 02, 2014 20:00:31
Autosampler Position: 17
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-11-C.023

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			859340.493	ug/L	871479.031
	233	**U**	**-0.004789**	0.490	14.733	ug/L	213.002
	234	**U**	**0.000067**	39.404	8.800	ug/L	6.800
	235	**U**	**0.007017**	2.820	234.269	ug/L	30.600
	236	**U**	**-0.000049**	29.169	6.267	ug/L	8.600
	238	**U**	**1.047836**	2.583	27365.131	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.607**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-12-C
Sample Date/Time: Tuesday, September 02, 2014 20:05:11
Autosampler Position: 18
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-12-C.024

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			877904.012	ug/L	871479.031
	233	**U**	**-0.004782**	0.559	15.333	ug/L	213.002
	234	**U**	**0.000096**	8.415	9.933	ug/L	6.800
	235	**U**	**0.012980**	2.149	416.739	ug/L	30.600
	236	**U**	**-0.000065**	53.307	5.600	ug/L	8.600
	238	**U**	**1.861696**	1.935	49483.280	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.737**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-13-C
Sample Date/Time: Tuesday, September 02, 2014 20:09:52
Autosampler Position: 19
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-13-C.025

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			880656.659	ug/L	871479.031
	233	**U**	**-0.004765**	0.863	16.067	ug/L	213.002
	234	**U**	**0.000108**	48.643	10.267	ug/L	6.800
	235	**U**	**0.013619**	1.081	437.007	ug/L	30.600
	236	**U**	**-0.000038**	25.816	6.933	ug/L	8.600
	238	**U**	**1.908307**	2.178	50858.727	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.053**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-14-C

Sample Date/Time: Tuesday, September 02, 2014 20:14:32

Autosampler Position: 20

Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-14-C.026

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			860742.165	ug/L	871479.031
	233	**U**	**-0.004802**	1.745	14.267	ug/L	213.002
	234	**U**	**0.000179**	37.687	12.400	ug/L	6.800
	235	**U**	**0.011478**	5.458	364.138	ug/L	30.600
	236	**U**	**-0.000041**	38.157	6.667	ug/L	8.600
	238	**U**	**1.615032**	3.357	42089.342	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.768**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9

Sample Date/Time: Tuesday, September 02, 2014 20:19:13

Autosampler Position: 10

Dataset File: D:\Elandata\Dataset\090214M2\QC Std 9.027

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			832417.542	ug/L	871479.031
	233	**U**	**0.050707**	5.151	2202.570	ug/L	213.002
	234	**U**	**0.087627**	4.504	2662.315	ug/L	6.800
	235	**U**	**5.280731**	3.511	148696.805	ug/L	30.600
	236	**U**	**0.094781**	2.424	4153.938	ug/L	8.600
	238	**U**	**5.514783**	3.724	138352.945	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.518**	
	U	233		**98.460**
	U	234		**105.957**
	U	235		**108.937**
	U	236		**106.495**
	U	238		**109.727**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Tuesday, September 02, 2014 20:23:54
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 10.028

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			830497.718	ug/L	871479.031
	233	**U**	**0.014176**	3.240	760.954	ug/L	213.002
	234	**U**	**0.000098**	30.113	9.467	ug/L	6.800
	235	**U**	**0.000512**	17.322	43.600	ug/L	30.600
	236	**U**	**-0.000014**	161.109	7.600	ug/L	8.600
	238	**U**	**0.001323**	40.411	280.936	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.297**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-15-C
Sample Date/Time: Tuesday, September 02, 2014 20:28:34
Autosampler Position: 21
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-15-C.029

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			854135.867	ug/L	871479.031
	233	**U**	**-0.004822**	1.153	13.267	ug/L	213.002
	234	**U**	**0.000174**	39.427	12.067	ug/L	6.800
	235	**U**	**0.015262**	2.202	471.208	ug/L	30.600
	236	**U**	**-0.000019**	123.602	7.533	ug/L	8.600
	238	**U**	**2.088738**	1.523	53985.983	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.010**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-16-C
Sample Date/Time: Tuesday, September 02, 2014 20:33:15
Autosampler Position: 22
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-16-C.030

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			854467.388	ug/L	871479.031
	233	**U**	**-0.004840**	0.434	12.600	ug/L	213.002
	234	**U**	**0.000114**	27.426	10.200	ug/L	6.800
	235	**U**	**0.011487**	3.229	362.138	ug/L	30.600
	236	**U**	**-0.000043**	16.612	6.467	ug/L	8.600
	238	**U**	**1.597980**	2.349	41364.170	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.048**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-17-C
Sample Date/Time: Tuesday, September 02, 2014 20:37:55
Autosampler Position: 23
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-17-C.031

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			843325.434	ug/L	871479.031
	233	**U**	**-0.004815**	0.762	13.400	ug/L	213.002
	234	**U**	**0.000056**	54.787	8.333	ug/L	6.800
	235	**U**	**0.005078**	3.953	174.734	ug/L	30.600
	236	**U**	**-0.000022**	105.186	7.333	ug/L	8.600
	238	**U**	**0.770295**	1.046	19820.624	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.769**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-18-C
Sample Date/Time: Tuesday, September 02, 2014 20:42:35
Autosampler Position: 24
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-18-C.032

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			792676.250	ug/L	871479.031
	233	**U**	**-0.004869**	0.256	10.600	ug/L	213.002
	234	**U**	**0.000236**	20.073	13.000	ug/L	6.800
	235	**U**	**0.021428**	1.211	603.146	ug/L	30.600
	236	**U**	**-0.000028**	88.563	6.667	ug/L	8.600
	238	**U**	**2.909892**	1.488	69741.486	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.958**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-19-C
Sample Date/Time: Tuesday, September 02, 2014 20:47:14
Autosampler Position: 25
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-19-C.033

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			797506.105	ug/L	871479.031
	233	**U**	**-0.004892**	0.426	9.800	ug/L	213.002
	234	**U**	**0.000143**	26.644	10.400	ug/L	6.800
	235	**U**	**0.017006**	0.826	487.408	ug/L	30.600
	236	**U**	**-0.000035**	45.662	6.400	ug/L	8.600
	238	**U**	**2.149986**	0.493	51905.786	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.512**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-20-C
Sample Date/Time: Tuesday, September 02, 2014 20:51:54
Autosampler Position: 26
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-20-C.034

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			779599.854	ug/L	871479.031
	233	**U**	**-0.004833**	0.438	11.733	ug/L	213.002
	234	**U**	**0.000158**	19.718	10.600	ug/L	6.800
	235	**U**	**0.014079**	1.775	399.139	ug/L	30.600
	236	**U**	**-0.000020**	154.270	6.867	ug/L	8.600
	238	**U**	**1.941961**	1.130	45853.513	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.457**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-22-C
Sample Date/Time: Tuesday, September 02, 2014 20:56:34
Autosampler Position: 27
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-22-C.035

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			786566.331	ug/L	871479.031
	233	**U**	**-0.004815**	0.188	12.533	ug/L	213.002
	234	**U**	**0.000306**	4.971	14.933	ug/L	6.800
	235	**U**	**0.030624**	1.185	843.425	ug/L	30.600
	236	**U**	**-0.000035**	69.048	6.333	ug/L	8.600
	238	**U**	**4.176876**	0.718	99225.594	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.256**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-23-G

Sample Date/Time: Tuesday, September 02, 2014 21:01:14

Autosampler Position: 28

Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-23-G.036

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			797224.450	ug/L	871479.031
	233	**U**	**-0.004837**	0.749	11.867	ug/L	213.002
	234	**U**	**0.000357**	13.092	16.600	ug/L	6.800
	235	**U**	**0.039126**	2.582	1084.441	ug/L	30.600
	236	**U**	**-0.000059**	46.248	5.400	ug/L	8.600
	238	**U**	**5.180147**	1.012	124673.420	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.479**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-23-G SD

Sample Date/Time: Tuesday, September 02, 2014 21:05:54

Autosampler Position: 29

Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-23-G SD.037

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			835975.654	ug/L	871479.031
	233	**U**	**-0.004888**	0.135	10.400	ug/L	213.002
	234	**U**	**0.000051**	56.356	8.067	ug/L	6.800
	235	**U**	**0.007009**	3.830	227.935	ug/L	30.600
	236	**U**	**-0.000062**	78.163	5.533	ug/L	8.600
	238	**U**	**1.016736**	1.639	25847.047	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.926**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-23-H MS

Sample Date/Time: Tuesday, September 02, 2014 21:10:35
Autosampler Position: 30
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-23-H MS.038

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			779979.583	ug/L	871479.031
	233	**U**	**-0.003678**	1.795	54.467	ug/L	213.002
	234	**U**	**0.018158**	1.492	522.676	ug/L	6.800
	235	**U**	**1.135961**	0.496	30037.015	ug/L	30.600
	236	**U**	**0.019268**	2.041	798.022	ug/L	8.600
	238	**U**	**6.974903**	1.056	164156.370	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.501**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9

Sample Date/Time: Tuesday, September 02, 2014 21:15:18
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 9.039

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			843936.985	ug/L	871479.031
	233	**U**	**0.049177**	2.135	2175.366	ug/L	213.002
	234	**U**	**0.084676**	1.183	2612.372	ug/L	6.800
	235	**U**	**5.080323**	1.294	145193.821	ug/L	30.600
	236	**U**	**0.090976**	1.327	4044.907	ug/L	8.600
	238	**U**	**5.321035**	1.516	135488.742	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.840**	
	U	233		**95.489**
	U	234		**102.390**
	U	235		**104.803**
	U	236		**102.220**
	U	238		**105.872**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Tuesday, September 02, 2014 21:19:58
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 10.040

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			836605.960	ug/L	871479.031
	233	**U**	**0.013896**	0.775	756.287	ug/L	213.002
	234	**U**	**0.000076**	62.848	8.800	ug/L	6.800
	235	**U**	**0.000557**	23.776	45.000	ug/L	30.600
	236	**U**	**0.000015**	233.686	8.867	ug/L	8.600
	238	**U**	**0.000956**	45.161	273.936	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.998**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-23-I MSD

Sample Date/Time: Tuesday, September 02, 2014 21:24:38

Autosampler Position: 31

Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-23-I MSD.041

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			777371.136	ug/L	871479.031
	233	**U**	**-0.003571**	1.797	58.267	ug/L	213.002
	234	**U**	**0.019463**	1.567	557.944	ug/L	6.800
	235	**U**	**1.165653**	0.556	30717.400	ug/L	30.600
	236	**U**	**0.019675**	2.536	812.023	ug/L	8.600
	238	**U**	**6.603466**	0.842	154905.741	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.201**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-24-C

Sample Date/Time: Tuesday, September 02, 2014 21:29:19

Autosampler Position: 32

Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-24-C.042

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			775377.460	ug/L	871479.031
	233	**U**	**-0.004837**	0.294	11.533	ug/L	213.002
	234	**U**	**0.000356**	12.497	16.133	ug/L	6.800
	235	**U**	**0.041422**	1.060	1115.044	ug/L	30.600
	236	**U**	**-0.000018**	112.466	6.933	ug/L	8.600
	238	**U**	**5.172267**	1.406	121067.701	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.973**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-25-C
Sample Date/Time: Tuesday, September 02, 2014 21:33:59
Autosampler Position: 33
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-25-C.043

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			790799.841	ug/L	871479.031
	233	**U**	**-0.004890**	1.238	9.733	ug/L	213.002
	234	**U**	**0.000343**	12.158	16.067	ug/L	6.800
	235	**U**	**0.032770**	0.714	905.429	ug/L	30.600
	236	**U**	**-0.000032**	8.340	6.467	ug/L	8.600
	238	**U**	**4.436906**	0.892	105962.566	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.742**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 430790

Sample Date/Time: Tuesday, September 02, 2014 21:38:40
Autosampler Position: 34
Dataset File: D:\Elandata\Dataset\090214M2\430790.044

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			857058.240	ug/L	871479.031
	233	**U**	**-0.004949**	0.766	8.200	ug/L	213.002
	234	**U**	**0.000015**	430.907	7.200	ug/L	6.800
	235	**U**	**-0.000355**	27.166	19.867	ug/L	30.600
	236	**U**	**-0.000025**	39.337	7.333	ug/L	8.600
	238	**U**	**-0.007293**	1.396	67.800	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.345**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 430791
Sample Date/Time: Tuesday, September 02, 2014 21:43:20
Autosampler Position: 35
Dataset File: D:\Elandata\Dataset\090214M2\430791.045

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			851901.021	ug/L	871479.031
	233	**U**	**-0.002147**	2.305	121.401	ug/L	213.002
	234	**U**	**0.043846**	2.130	1368.199	ug/L	6.800
	235	**U**	**2.642822**	1.942	76232.728	ug/L	30.600
	236	**U**	**0.046903**	1.298	2109.289	ug/L	8.600
	238	**U**	**2.741272**	1.651	70577.981	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.753**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-26-C
Sample Date/Time: Tuesday, September 02, 2014 21:48:00
Autosampler Position: 36
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-26-C.046

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			783418.642	ug/L	871479.031
	233	**U**	**-0.004847**	0.403	11.267	ug/L	213.002
	234	**U**	**0.000318**	13.868	15.200	ug/L	6.800
	235	**U**	**0.032605**	0.828	892.628	ug/L	30.600
	236	**U**	**-0.000003**	194.360	7.600	ug/L	8.600
	238	**U**	**4.349762**	1.741	102917.667	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.895**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-26-C SD

Sample Date/Time: Tuesday, September 02, 2014 21:52:39

Autosampler Position: 37

Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-26-C SD.047

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			818968.518	ug/L	871479.031
	233	**U**	**-0.004965**	0.406	7.200	ug/L	213.002
	234	**U**	**0.000083**	78.075	8.800	ug/L	6.800
	235	**U**	**0.005754**	2.080	188.401	ug/L	30.600
	236	**U**	**-0.000025**	40.043	7.000	ug/L	8.600
	238	**U**	**0.847213**	2.082	21137.303	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.975**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-26-D MS

Sample Date/Time: Tuesday, September 02, 2014 21:57:19

Autosampler Position: 38

Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-26-D MS.048

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			762820.028	ug/L	871479.031
	233	**U**	**-0.003581**	1.532	56.800	ug/L	213.002
	234	**U**	**0.018656**	1.454	525.010	ug/L	6.800
	235	**U**	**1.138036**	0.979	29429.627	ug/L	30.600
	236	**U**	**0.019667**	0.624	796.689	ug/L	8.600
	238	**U**	**5.848231**	1.127	134664.691	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**87.532**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-26-E MSD

Sample Date/Time: Tuesday, September 02, 2014 22:01:59

Autosampler Position: 39

Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-26-E MSD.049

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			768514.920	ug/L	871479.031
	233	**U**	**-0.003744**	2.729	51.200	ug/L	213.002
	234	**U**	**0.016976**	1.292	482.075	ug/L	6.800
	235	**U**	**1.048521**	0.532	27323.998	ug/L	30.600
	236	**U**	**0.018193**	2.460	743.019	ug/L	8.600
	238	**U**	**5.258573**	0.771	122011.020	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.185**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-28-C
Sample Date/Time: Tuesday, September 02, 2014 22:06:39
Autosampler Position: 40
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-28-C.050

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			758602.723	ug/L	871479.031
	233	**U**	**-0.004817**	1.513	12.000	ug/L	213.002
	234	**U**	**0.000284**	21.699	13.800	ug/L	6.800
	235	**U**	**0.030151**	2.837	801.089	ug/L	30.600
	236	**U**	**-0.000056**	32.737	5.267	ug/L	8.600
	238	**U**	**4.099648**	1.444	93918.472	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**87.048**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9

Sample Date/Time: Tuesday, September 02, 2014 22:11:20

Autosampler Position: 10

Dataset File: D:\Elandata\Dataset\090214M2\QC Std 9.051

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			816860.468	ug/L	871479.031
	233	**U**	**0.049340**	2.105	2110.756	ug/L	213.002
	234	**U**	**0.087122**	0.987	2601.571	ug/L	6.800
	235	**U**	**5.268790**	1.918	145696.009	ug/L	30.600
	236	**U**	**0.093305**	2.479	4013.431	ug/L	8.600
	238	**U**	**5.503374**	2.017	135595.839	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.733**	
	U	233		**95.806**
	U	234		**105.347**
	U	235		**108.691**
	U	236		**104.837**
	U	238		**109.500**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Tuesday, September 02, 2014 22:16:00
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 10.052

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			804815.232	ug/L	871479.031
	233	**U**	**0.014614**	1.613	754.753	ug/L	213.002
	234	**U**	**0.000076**	149.492	8.400	ug/L	6.800
	235	**U**	**0.000914**	12.383	53.200	ug/L	30.600
	236	**U**	**0.000010**	425.542	8.333	ug/L	8.600
	238	**U**	**0.001937**	26.661	287.070	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.350**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-29-C
Sample Date/Time: Tuesday, September 02, 2014 22:20:40
Autosampler Position: 41
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-29-C.053

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			780115.866	ug/L	871479.031
	233	**U**	**-0.004840**	0.654	11.533	ug/L	213.002
	234	**U**	**0.000321**	12.720	15.200	ug/L	6.800
	235	**U**	**0.034888**	1.398	949.232	ug/L	30.600
	236	**U**	**-0.000046**	3.680	5.800	ug/L	8.600
	238	**U**	**4.732945**	0.700	111493.794	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.516**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-30-C
Sample Date/Time: Tuesday, September 02, 2014 22:25:20
Autosampler Position: 42
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-30-C.054

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			755728.685	ug/L	871479.031
	233	**U**	**-0.004821**	0.703	11.800	ug/L	213.002
	234	**U**	**0.000330**	5.776	15.000	ug/L	6.800
	235	**U**	**0.038576**	1.105	1014.103	ug/L	30.600
	236	**U**	**-0.000043**	18.186	5.733	ug/L	8.600
	238	**U**	**5.074654**	1.170	115790.761	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**86.718**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-31-C
Sample Date/Time: Tuesday, September 02, 2014 22:30:01
Autosampler Position: 43
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-31-C.055

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			756793.765	ug/L	871479.031
	233	**U**	**-0.004840**	0.403	11.133	ug/L	213.002
	234	**U**	**0.000243**	15.513	12.600	ug/L	6.800
	235	**U**	**0.027562**	0.063	733.085	ug/L	30.600
	236	**U**	**-0.000012**	533.316	7.000	ug/L	8.600
	238	**U**	**3.854799**	0.136	88132.702	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**86.840**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-33-D
Sample Date/Time: Tuesday, September 02, 2014 22:34:41
Autosampler Position: 44
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-33-D.056

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			806534.241	ug/L	871479.031
	233	**U**	**-0.004915**	0.829	9.067	ug/L	213.002
	234	**U**	**0.000099**	24.243	9.200	ug/L	6.800
	235	**U**	**0.017154**	2.687	496.742	ug/L	30.600
	236	**U**	**-0.000009**	255.388	7.533	ug/L	8.600
	238	**U**	**2.329200**	1.391	56821.419	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.548**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-34-C
Sample Date/Time: Tuesday, September 02, 2014 22:39:22
Autosampler Position: 45
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-34-C.057

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			769563.723	ug/L	871479.031
	233	**U**	**-0.004870**	0.820	10.267	ug/L	213.002
	234	**U**	**0.000273**	26.004	13.667	ug/L	6.800
	235	**U**	**0.031050**	1.522	836.625	ug/L	30.600
	236	**U**	**-0.000034**	94.269	6.200	ug/L	8.600
	238	**U**	**4.119544**	0.434	95756.502	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.305**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 431772

Sample Date/Time: Tuesday, September 02, 2014 22:44:03
Autosampler Position: 46
Dataset File: D:\Elandata\Dataset\090214M2\431772.058

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			834675.626	ug/L	871479.031
	233	**U**	**-0.004957**	0.338	7.667	ug/L	213.002
	234	**U**	**-0.000013**	74.979	6.133	ug/L	6.800
	235	**U**	**-0.000715**	2.813	9.067	ug/L	30.600
	236	**U**	**-0.000068**	13.248	5.267	ug/L	8.600
	238	**U**	**-0.005050**	6.541	122.334	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.777**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 431773

Sample Date/Time: Tuesday, September 02, 2014 22:48:43
Autosampler Position: 47
Dataset File: D:\Elandata\Dataset\090214M2\431773.059

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			831417.512	ug/L	871479.031
	233	**U**	**-0.002060**	5.863	121.734	ug/L	213.002
	234	**U**	**0.044486**	2.390	1354.398	ug/L	6.800
	235	**U**	**2.673403**	1.920	75254.895	ug/L	30.600
	236	**U**	**0.047592**	1.834	2088.086	ug/L	8.600
	238	**U**	**2.761716**	1.765	69385.272	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.403**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102577-A-1-D

Sample Date/Time: Tuesday, September 02, 2014 22:53:22

Autosampler Position: 48

Dataset File: D:\Elandata\Dataset\090214M2\680-102577-A-1-D.060

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			816888.361	ug/L	871479.031
	233	**U**	**-0.004858**	1.075	11.333	ug/L	213.002
	234	**U**	**0.000229**	31.353	13.133	ug/L	6.800
	235	**U**	**0.026249**	1.622	754.887	ug/L	30.600
	236	**U**	**-0.000004**	270.612	7.867	ug/L	8.600
	238	**U**	**3.083787**	1.629	76115.962	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.736**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102577-A-2-C

Sample Date/Time: Tuesday, September 02, 2014 22:58:02

Autosampler Position: 49

Dataset File: D:\Elandata\Dataset\090214M2\680-102577-A-2-C.061

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			814257.313	ug/L	871479.031
	233	**U**	**-0.004842**	0.384	11.933	ug/L	213.002
	234	**U**	**0.000350**	44.945	16.600	ug/L	6.800
	235	**U**	**0.042802**	2.029	1208.451	ug/L	30.600
	236	**U**	**-0.000041**	84.426	6.333	ug/L	8.600
	238	**U**	**5.762728**	1.129	141585.289	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.434**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-1-C

Sample Date/Time: Tuesday, September 02, 2014 23:02:42

Autosampler Position: 50

Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-1-C.062

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			851946.988	ug/L	871479.031
	233	**U**	**-0.004842**	0.429	12.467	ug/L	213.002
	234	**U**	**0.000068**	70.928	8.800	ug/L	6.800
	235	**U**	**0.011728**	3.564	367.938	ug/L	30.600
	236	**U**	**-0.000052**	14.664	6.067	ug/L	8.600
	238	**U**	**1.671683**	0.977	43160.732	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.759**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9

Sample Date/Time: Tuesday, September 02, 2014 23:07:22

Autosampler Position: 10

Dataset File: D:\Elandata\Dataset\090214M2\QC Std 9.063

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			804741.390	ug/L	871479.031
	233	**U**	**0.050782**	4.114	2132.226	ug/L	213.002
	234	**U**	**0.087438**	3.879	2568.498	ug/L	6.800
	235	**U**	**5.251190**	3.226	142945.438	ug/L	30.600
	236	**U**	**0.094525**	4.094	4001.628	ug/L	8.600
	238	**U**	**5.486435**	3.043	133088.260	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.342**	
	U	233		**98.606**
	U	234		**105.729**
	U	235		**108.328**
	U	236		**106.208**
	U	238		**109.163**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Tuesday, September 02, 2014 23:12:03
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 10.064

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			785094.506	ug/L	871479.031
	233	**U**	**0.015027**	3.313	751.020	ug/L	213.002
	234	**U**	**0.000090**	37.557	8.667	ug/L	6.800
	235	**U**	**0.000797**	12.938	48.667	ug/L	30.600
	236	**U**	**0.000017**	128.736	8.400	ug/L	8.600
	238	**U**	**0.001910**	18.492	279.536	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.088**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-2-C

Sample Date/Time: Tuesday, September 02, 2014 23:16:42

Autosampler Position: 51

Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-2-C.065

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			800738.130	ug/L	871479.031
	233	**U**	**-0.004852**	0.520	11.333	ug/L	213.002
	234	**U**	**0.000151**	38.507	10.667	ug/L	6.800
	235	**U**	**0.013661**	5.052	397.939	ug/L	30.600
	236	**U**	**-0.000041**	67.228	6.133	ug/L	8.600
	238	**U**	**1.898983**	3.349	46001.258	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.883**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-3-C
Sample Date/Time: Tuesday, September 02, 2014 23:21:22
Autosampler Position: 52
Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-3-C.066

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			738188.649	ug/L	871479.031
	233	**U**	**-0.004903**	1.310	8.600	ug/L	213.002
	234	**U**	**0.000087**	71.325	8.067	ug/L	6.800
	235	**U**	**0.011153**	0.717	304.737	ug/L	30.600
	236	**U**	**-0.000040**	20.606	5.733	ug/L	8.600
	238	**U**	**1.576122**	1.439	35280.631	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**84.705**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-4-C

Sample Date/Time: Tuesday, September 02, 2014 23:26:02

Autosampler Position: 53

Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-4-C.067

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			754935.939	ug/L	871479.031
	233	**U**	**-0.004887**	0.508	9.467	ug/L	213.002
	234	**U**	**0.000120**	14.923	9.200	ug/L	6.800
	235	**U**	**0.010646**	3.391	298.670	ug/L	30.600
	236	**U**	**-0.000022**	179.327	6.600	ug/L	8.600
	238	**U**	**1.478326**	0.691	33853.018	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**86.627**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-5-G

Sample Date/Time: Tuesday, September 02, 2014 23:30:42

Autosampler Position: 54

Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-5-G.068

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			779566.511	ug/L	871479.031
	233	**U**	**-0.004920**	0.607	8.533	ug/L	213.002
	234	**U**	**0.000155**	26.692	10.467	ug/L	6.800
	235	**U**	**0.015047**	1.967	424.606	ug/L	30.600
	236	**U**	**-0.000052**	58.934	5.533	ug/L	8.600
	238	**U**	**2.034493**	2.826	48009.278	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.453**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-5-G SD

Sample Date/Time: Tuesday, September 02, 2014 23:35:23

Autosampler Position: 55

Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-5-G SD.069

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			827685.891	ug/L	871479.031
	233	**U**	**-0.004941**	0.438	8.200	ug/L	213.002
	234	**U**	**0.000019**	294.532	7.000	ug/L	6.800
	235	**U**	**0.002390**	8.188	95.934	ug/L	30.600
	236	**U**	**-0.000036**	82.098	6.533	ug/L	8.600
	238	**U**	**0.392506**	2.502	10027.920	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.975**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-5-H MS

Sample Date/Time: Tuesday, September 02, 2014 23:40:03

Autosampler Position: 56

Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-5-H MS.070

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			773979.757	ug/L	871479.031
	233	**U**	**-0.003702**	4.222	53.200	ug/L	213.002
	234	**U**	**0.018728**	0.665	534.877	ug/L	6.800
	235	**U**	**1.130946**	1.109	29674.800	ug/L	30.600
	236	**U**	**0.019813**	0.158	814.223	ug/L	8.600
	238	**U**	**3.207127**	0.562	75020.908	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.812**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-5-I MSD

Sample Date/Time: Tuesday, September 02, 2014 23:44:44

Autosampler Position: 57

Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-5-I MSD.071

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			754517.149	ug/L	871479.031
	233	**U**	**-0.003926**	1.819	43.800	ug/L	213.002
	234	**U**	**0.015153**	1.328	422.940	ug/L	6.800
	235	**U**	**0.896120**	2.362	22910.765	ug/L	30.600
	236	**U**	**0.015602**	3.236	626.080	ug/L	8.600
	238	**U**	**2.556198**	2.318	58297.764	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**86.579**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-7-C
Sample Date/Time: Tuesday, September 02, 2014 23:49:25
Autosampler Position: 58
Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-7-C.072

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			752647.796	ug/L	871479.031
	233	**U**	**-0.004885**	0.257	9.467	ug/L	213.002
	234	**U**	**0.000243**	18.869	12.533	ug/L	6.800
	235	**U**	**0.024106**	4.877	640.348	ug/L	30.600
	236	**U**	**-0.000026**	117.689	6.400	ug/L	8.600
	238	**U**	**3.334732**	2.511	75796.742	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**86.364**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-8-C
Sample Date/Time: Tuesday, September 02, 2014 23:54:05
Autosampler Position: 59
Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-8-C.073

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			791853.969	ug/L	871479.031
	233	**U**	**-0.004867**	1.247	10.600	ug/L	213.002
	234	**U**	**0.000259**	15.739	13.667	ug/L	6.800
	235	**U**	**0.031509**	2.328	872.560	ug/L	30.600
	236	**U**	**-0.000043**	88.679	6.000	ug/L	8.600
	238	**U**	**4.063575**	0.646	97190.465	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.863**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-8-D MS

Sample Date/Time: Tuesday, September 02, 2014 23:58:44

Autosampler Position: 60

Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-8-D MS.074

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			778384.426	ug/L	871479.031
	233	**U**	**-0.003897**	1.788	46.333	ug/L	213.002
	234	**U**	**0.014574**	3.176	419.806	ug/L	6.800
	235	**U**	**0.884814**	0.687	23354.482	ug/L	30.600
	236	**U**	**0.015171**	0.842	628.747	ug/L	8.600
	238	**U**	**5.268332**	1.265	123780.473	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.318**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9

Sample Date/Time: Wednesday, September 03, 2014 00:03:25

Autosampler Position: 10

Dataset File: D:\Elandata\Dataset\090214M2\QC Std 9.075

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			810031.312	ug/L	871479.031
	233	**U**	**0.050953**	4.255	2152.296	ug/L	213.002
	234	**U**	**0.088483**	3.176	2616.773	ug/L	6.800
	235	**U**	**5.319555**	5.145	145594.461	ug/L	30.600
	236	**U**	**0.094590**	4.905	4028.035	ug/L	8.600
	238	**U**	**5.528168**	4.110	134888.353	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.949**	
	U	233		**98.938**
	U	234		**106.993**
	U	235		**109.738**
	U	236		**106.281**
	U	238		**109.994**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Wednesday, September 03, 2014 00:08:05
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 10.076

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			810222.869	ug/L	871479.031
	233	**U**	**0.014083**	6.804	738.086	ug/L	213.002
	234	**U**	**0.000038**	104.250	7.467	ug/L	6.800
	235	**U**	**0.001174**	13.756	60.600	ug/L	30.600
	236	**U**	**0.000017**	210.940	8.667	ug/L	8.600
	238	**U**	**0.001801**	22.778	285.803	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.971**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-8-E MSD

Sample Date/Time: Wednesday, September 03, 2014 00:12:45

Autosampler Position: 61

Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-8-E MSD.077

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			772848.782	ug/L	871479.031
	233	**U**	**-0.003853**	3.640	47.533	ug/L	213.002
	234	**U**	**0.013991**	1.205	400.472	ug/L	6.800
	235	**U**	**0.838307**	0.842	21970.957	ug/L	30.600
	236	**U**	**0.014090**	0.696	580.478	ug/L	8.600
	238	**U**	**5.003829**	0.900	116769.368	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.682**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-9-C
Sample Date/Time: Wednesday, September 03, 2014 00:17:25
Autosampler Position: 62
Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-9-C.078

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			756524.108	ug/L	871479.031
	233	**U**	**-0.004862**	1.088	10.333	ug/L	213.002
	234	**U**	**0.000291**	7.413	13.933	ug/L	6.800
	235	**U**	**0.027085**	2.062	720.818	ug/L	30.600
	236	**U**	**-0.000021**	159.629	6.600	ug/L	8.600
	238	**U**	**3.373340**	0.977	77128.700	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**86.809**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-11-C
Sample Date/Time: Wednesday, September 03, 2014 00:22:05
Autosampler Position: 63
Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-11-C.079

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			771873.717	ug/L	871479.031
	233	**U**	**-0.004887**	1.065	9.600	ug/L	213.002
	234	**U**	**0.000298**	3.988	14.400	ug/L	6.800
	235	**U**	**0.030142**	2.325	815.223	ug/L	30.600
	236	**U**	**-0.000038**	33.536	6.067	ug/L	8.600
	238	**U**	**4.130252**	0.773	96288.297	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.571**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-12-C
Sample Date/Time: Wednesday, September 03, 2014 00:26:45
Autosampler Position: 64
Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-12-C.080

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			772060.846	ug/L	871479.031
	233	**U**	**-0.004812**	0.321	12.400	ug/L	213.002
	234	**U**	**0.000316**	10.824	14.933	ug/L	6.800
	235	**U**	**0.032082**	2.045	865.893	ug/L	30.600
	236	**U**	**-0.000052**	51.076	5.467	ug/L	8.600
	238	**U**	**4.337591**	0.896	101121.520	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.592**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-13-C

Sample Date/Time: Wednesday, September 03, 2014 00:31:25

Autosampler Position: 65

Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-13-C.081

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			770022.626	ug/L	871479.031
	233	**U**	**-0.004810**	0.566	12.400	ug/L	213.002
	234	**U**	**0.000207**	47.279	11.733	ug/L	6.800
	235	**U**	**0.020596**	4.338	563.611	ug/L	30.600
	236	**U**	**-0.000032**	51.810	6.267	ug/L	8.600
	238	**U**	**2.775066**	1.837	64584.904	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.358**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-15-C
Sample Date/Time: Wednesday, September 03, 2014 00:36:05
Autosampler Position: 66
Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-15-C.082

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			764370.876	ug/L	871479.031
	233	**U**	**-0.004849**	0.506	10.933	ug/L	213.002
	234	**U**	**0.000322**	16.247	14.933	ug/L	6.800
	235	**U**	**0.032224**	0.319	861.093	ug/L	30.600
	236	**U**	**-0.000045**	54.873	5.733	ug/L	8.600
	238	**U**	**4.354307**	0.975	100493.521	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**87.710**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-16-C
Sample Date/Time: Wednesday, September 03, 2014 00:40:46
Autosampler Position: 67
Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-16-C.083

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			779166.392	ug/L	871479.031
	233	**U**	**-0.004824**	0.282	12.067	ug/L	213.002
	234	**U**	**0.000313**	9.353	15.000	ug/L	6.800
	235	**U**	**0.031310**	1.137	853.492	ug/L	30.600
	236	**U**	**-0.000018**	186.007	6.933	ug/L	8.600
	238	**U**	**4.228677**	1.270	99495.167	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.407**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-17-C
Sample Date/Time: Wednesday, September 03, 2014 00:45:26
Autosampler Position: 68
Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-17-C.084

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			773193.773	ug/L	871479.031
	233	**U**	**-0.004825**	0.361	11.933	ug/L	213.002
	234	**U**	**0.000235**	16.901	12.667	ug/L	6.800
	235	**U**	**0.028551**	0.716	774.888	ug/L	30.600
	236	**U**	**-0.000023**	232.333	6.667	ug/L	8.600
	238	**U**	**3.487272**	1.453	81492.322	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.722**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9

Sample Date/Time: Wednesday, September 03, 2014 00:50:07

Autosampler Position: 10

Dataset File: D:\Elandata\Dataset\090214M2\QC Std 9.085

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			810880.675	ug/L	871479.031
	233	**U**	**0.050600**	2.469	2143.694	ug/L	213.002
	234	**U**	**0.088389**	1.580	2619.574	ug/L	6.800
	235	**U**	**5.262554**	2.079	144468.125	ug/L	30.600
	236	**U**	**0.094169**	0.907	4023.301	ug/L	8.600
	238	**U**	**5.469910**	2.298	133786.161	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.046**	
	U	233		**98.253**
	U	234		**106.879**
	U	235		**108.562**
	U	236		**105.808**
	U	238		**108.834**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Wednesday, September 03, 2014 00:54:48
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 10.086

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			798529.659	ug/L	871479.031
	233	**U**	**0.013884**	4.008	720.418	ug/L	213.002
	234	**U**	**0.000029**	25.276	7.067	ug/L	6.800
	235	**U**	**0.001596**	18.265	70.867	ug/L	30.600
	236	**U**	**0.000027**	159.194	9.000	ug/L	8.600
	238	**U**	**0.002700**	20.258	303.270	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.629**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

METALS BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

Batch Number: 139040 Batch Start Date: 08/20/14 11:20 Batch Analyst: Davis, Shanika M

Batch Method: 3050B Batch End Date: 08/21/14 09:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	FinalAmount	ISOU Prep Spk 00002			
MB 160-139040/1		3050B, 6020A		0.5541 g	50 mL				
LCS 160-139040/2		3050B, 6020A		0.5465 g	50 mL	0.25 mL			
680-102370-A-7	SD-215-SS	3050B, 6020A	T	0.5210 g	50 mL				
680-102370-A-8	SD-222-SS	3050B, 6020A	T	0.5185 g	50 mL				
680-102370-A-9	SD-222-01	3050B, 6020A	T	0.5177 g	50 mL				
680-102370-A-10	SD-222-02	3050B, 6020A	T	0.5667 g	50 mL				
680-102370-A-11	SD-222-03	3050B, 6020A	T	0.5064 g	50 mL				
680-102370-A-12	SD-211-SS	3050B, 6020A	T	0.5197 g	50 mL				
680-102370-A-13	SD-211-01	3050B, 6020A	T	0.5497 g	50 mL				
680-102370-A-14	SD-211-02	3050B, 6020A	T	0.5252 g	50 mL				
680-102370-A-15	SD-216-SS	3050B, 6020A	T	0.5268 g	50 mL				
680-102370-A-16	SD-216-01	3050B, 6020A	T	0.5549 g	50 mL				
680-102370-A-17	SD-216-02	3050B, 6020A	T	0.5505 g	50 mL				
680-102370-A-18	SD-217-SS	3050B, 6020A	T	0.5547 g	50 mL				
680-102370-A-19	SD-217-01	3050B, 6020A	T	0.5731 g	50 mL				
680-102370-A-20	SD-217-02	3050B, 6020A	T	0.5271 g	50 mL				
680-102370-A-22	SD-214-SS	3050B, 6020A	T	0.5049 g	50 mL				
680-102370-A-23	SD-214-01	3050B, 6020A	T	0.5432 g	50 mL				
680-102370-A-23 MS	SD-214-01	3050B, 6020A	T	0.5919 g	50 mL	0.25 mL			
680-102370-A-23 MSD	SD-214-01	3050B, 6020A	T	0.5553 g	50 mL	0.25 mL			
680-102370-A-24	SD-212-SS	3050B, 6020A	T	0.5744 g	50 mL				
680-102370-A-25	SD-212-01	3050B, 6020A	T	0.5673 g	50 mL				

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

METALS BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

Batch Number: 139040 Batch Start Date: 08/20/14 11:20 Batch Analyst: Davis, Shanika M

Batch Method: 3050B Batch End Date: 08/21/14 09:00

Batch Notes	
Balance ID	27150548
Hydrogen peroxide lot number	408031
Lot # of hydrochloric acid	422962
Lot # of Nitric Acid	422893
Hot Block ID number	HOTBLOCK1
Oven, Bath or Block Temperature 1	94.0 Degrees C
Pipette ID	M-PREP-2
ID number of the thermometer	111815886
Digestion Tube/Cup Lot #	191064

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

METALS BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102370-4

SDG No.: 680-102370-4

Batch Number: 139047 Batch Start Date: 08/20/14 12:10 Batch Analyst: Davis, Shanika M

Batch Method: 3050B Batch End Date: 08/21/14 09:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	FinalAmount	ISOU Prep Spk 00002			
MB 160-139047/1		3050B, 6020A		0.5651 g	50 mL				
LCS 160-139047/2		3050B, 6020A		0.5283 g	50 mL	0.25 mL			
680-102370-A-26	SD-212-02	3050B, 6020A	T	0.5385 g	50 mL				
680-102370-A-26 MS	SD-212-02	3050B, 6020A	T	0.5889 g	50 mL	0.25 mL			
680-102370-A-26 MSD	SD-212-02	3050B, 6020A	T	0.5099 g	50 mL	0.25 mL			
680-102370-A-28	SD-DUP-04	3050B, 6020A	T	0.5605 g	50 mL				
680-102370-A-29	SD-213-SS	3050B, 6020A	T	0.5246 g	50 mL				
680-102370-A-30	SD-213-01	3050B, 6020A	T	0.5922 g	50 mL				
680-102370-A-31	SD-213-02	3050B, 6020A	T	0.5270 g	50 mL				
680-102370-A-33	SD-008-01	3050B, 6020A	T	0.5710 g	50 mL				
680-102370-A-34	SD-214-02	3050B, 6020A	T	0.5760 g	50 mL				

Batch Notes	
Balance ID	27150548
Hydrogen peroxide lot number	408031
Lot # of hydrochloric acid	422962
Lot # of Nitric Acid	422893
Hot Block ID number	HOTBLOCK1
Oven, Bath or Block Temperature 1	94.0 Degrees C
Pipette ID	M-PREP-2
ID number of the thermometer	111815886
Digestion Tube/Cup Lot #	191064

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

Subcontract Data

Shipping and Receiving Documents

02 RAD

Cur165

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: S. Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.13
Client Contact: Mike Martin	Phone: (703)342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~13 of 18~~ 1 of 4
Company: Tetra Tech, Inc.			Analysis Requested	Job #: 680-102370
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes:
City: Germantown	TAT Requested (days): Standard			A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			Other:
Email: Michael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site: Dark Head Cove	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	660 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-DUP03	6/12/14	0000	C	Solid				X				
SD-206-S5		0810	C	Solid				X				
SD-206-01		0815	C	Solid				X				
SD-206-02		0820	C	Solid				X				
SD-206-03		0825	C	Solid				X				H2S porosity analysis of S5 to 02
SD-005E-01		0830	C	Solid				[redacted]		X		
~~SD-222-S5~~ SD-215-S5		0850	C	Solid				X				
SD-222-S5		0905	C	Solid				X				
SD-222-01		0910	C	Solid				X				
SD-222-02		0915	C	Solid				X				
SD-222-03		1920	C	Solid				X				[redacted]

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6-12-14 / 1600	Tt		6/12/14 / 1600	TestAmerica
2		6/12/14 / 1735	TestAmerica		6-13-14 / 0930	TTS
3		Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: △ Yes △ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.10
Client Contact: Mike Martin	Phone: (703) 341-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~46~~ 2 of 4
Company: Tetra Tech, Inc.				Job #: 680-102370
Address: 20251 Century Blvd Suite 200	Due Date Requested:			
City: Germantown	TAT Requested (days): Standard			
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			
Email: MIchael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2SO3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	8020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
		Preservation Code:					N	A	N	A		
SD-211-55	6/12/14	1000	C	Solid				X				
SD-211-01		1005	C	Solid				X				
SD-211-02		1010	C	Solid				X				
SD-216-55		~~1020~~ 1020	C	Solid				X				
SD-216-01		~~1025~~ 1025	C	Solid				X				
SD-216-02		1030	C	Solid				X				
SD-217-55		1220	C	Solid				X				
SD-217-01		1225	C	Solid				X				
SD-217-02		1230	C	Solid				X				
SD-217-03		1235	C	Solid				X				Hold pending analysis of 55 to 02
SD-214-55	↓	1310	C	Solid				X				

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Date/Time:	Company		Date/Time:	Company
Relinquished by:	6-12-14 / 1600	TT	Received by:	6/12/14 / 1600	TA
Relinquished by:	6/12/14 / 1735	TA	Received by:	6/13/14 0930	TASTBuffalo
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: △ Yes △ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.15
Client Contact: Mike Martin	Phone: (703) 342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~45 of 49~~ 3 of 4
Company: Tetra Tech, Inc.				Job #: 680-102370
Address: 20251 Century Blvd Suite 200	Due Date Requested:			
City: Germantown	TAT Requested (days): Standard			
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			
Email: Michael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2SO3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-214-01 /	6/12/14	1315	C	Solid				X				MS/MSD
SD-212-SS /		1410	C	Solid				X				
SD-212-01 /		1415	C	Solid				X				
SD-212-02 /		1420	C	Solid				X				
SD-212-03 /		1425	C	Solid				X				Hold pending analysis of SS to 02
SD-DUP04 /		0000	C	Solid				X				
SD-213-SS /		1430	C	Solid				X				
SD-213-01 /		1435	C	Solid				X				
SD-213-02 /		1440	C	Solid				X				
SD-213-03 /		1445	C	Solid				X				Hold pending analysis of SS to 02
SD-008-01 /		1450	C	Solid						X		

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by: | Date: | Time: | Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
[signature]	6-12-14 / 1600	TA	[signature]	6/12/14 / 1600	TA
[signature]	6/12/14 / 1735	TA	[signature]	6/13/14 / 0930	TA Stouis

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Green	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.18
Client Contact: Mike Martin	Phone: (703)742-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page 18 of 18 → 4 of 4
Company: Tetra Tech, Inc.				Job #: 680-102370
Address: 20251 Century Blvd Suite 200	Due Date Requested:			
City: Germantown	TAT Requested (days):			
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			
Email: MIchael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2SO3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=wasteoil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-228/228	Total Number of containers	Special Instructions/Note:
	Preservation Code:						N	N	N	N		
SD-214-02	6/12/14	1320		Solid				X				
SD-214-03	6/12/14	1325		Solid				X				
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								

Possible Hazard Identification

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6/12/14 1935	TT		6/12/14 1600	TT
2					6/13/14 0930	TAS Knoxville
3						

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-102370-4
SDG Number: 680-102370-4

Login Number: 102370
List Number: 1
Creator: Daughtry, Beth A

List Source: TestAmerica Savannah

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-102370-4
SDG Number: 680-102370-4

Login Number: 102370
List Number: 2
Creator: Daniels, Brian J

List Source: TestAmerica St. Louis
List Creation: 06/16/14 12:53 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	3.1
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 680-102380-1

SDG Number: 680102380-1

Job Description: Sediments

For:
Tetra Tech, Inc.
20251 Century Blvd
Suite 200
Germantown, MD 20874

Attention: Mike Martin



Approved for release.
Jerry A Lanier
Project Manager I
7/24/2014 11:22 AM

Jerry A Lanier, Project Manager I
5102 LaRoche Avenue, Savannah, GA, 31404
(912)354-7858 e.3410
jerry.lanier@testamericainc.com
07/24/2014

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

Savannah Certifications and ID #s: A2LA: 0399.01; AL: 41450; ARDEQ: 88-0692; ARDOH; AZ: AZ0741; CA: 03217CA; CO; CT: PH0161; DE; FL: E87052; GA: 803; Guam; HI; IL: 200022; IN: C-GA-02; IA: 353; KS: E-10322; KY EPPC: 90084; KY UST; LA DEQ: 30690; LA DHH: LA080008; ME: 2008022; MD: 250; MA: M-GA006; MI: 9925; MS; NFESC: 249; NV: GA00006; NJ: GA769; NM; NY: 10842; NC DWQ: 269; NC DHHS: 13701; PA: 68-00474; PR: GA00006; RI: LAO00244; SC: 98001001; TN: TN0296; TX: T104704185; USEPA: GA00006; VT: VT-87052; VA: 00302; WA; WV DEP: 094; WV DHHR: 9950 C; WI DNR: 999819810; WY/EPAR8: 8TMS-Q

Table of Contents

Cover Title Page 1

Data Summaries 3

- Definitions 3
- Case Narrative 4
- Detection Summary 5
- Client Sample Results 8
- Tracer/Carrier Summary 17
- QC Sample Results 18
- QC Association 20
- Chronicle 22
- Certification Summary 28
- Method Summary 29
- Sample Summary 30
- Reagent Traceability 31
  - COAs 33

Radiochemistry Raw Data 88

- Alpha Spectroscopy 88
  - Method A-01-R Th 89
  - Daily Checks 170
  - Initial Calibrations 214
  - Monthly Calibration Verifications 278
  - Monthly Backgrounds 308
  - Run Logs 367

Shipping and Receiving Documents 375

- Client Chain of Custody 375

Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Sediments

Report Number: 680-102380-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 06/14/2014; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 1.8 C.

ISOTOPIC THORIUM

Samples SD-224-SS (680-102380-1), SD-224-01 (680-102380-2), SD-224-02 (680-102380-3), SD-223-SS (680-102380-5), SD-223-01 (680-102380-6), SD-223-02 (680-102380-7), SD-226-SS (680-102380-8), SD-226-01 (680-102380-9), SD-226-02 (680-102380-10), SD-225-SS (680-102380-12), SD-225-01 (680-102380-13), SD-225-02 (680-102380-14), SD-228-SS (680-102380-16), SD-228-01 (680-102380-17), SD-228-02 (680-102380-18), SD-234-SS (680-102380-20), SD-234-01 (680-102380-21), SD-235-SS (680-102380-22), SD-23501 (680-102380-23), SD-235-02 (680-102380-24), SD-236-SS (680-102380-26), SD-236-01 (680-102380-27), SD-236-02 (680-102380-28), SD-237-SS (680-102380-29), SD-237-01 (680-102380-30), SD-237-02 (680-102380-31), SD-DUP05 (680-102380-33), SD-227-SS (680-102380-34), SD-227-01 (680-102380-35) and SD-227-02 (680-102380-36) were analyzed for Isotopic Thorium in accordance with A01R_Th. The samples were leached on 06/18/2014, prepared on 06/23/2014 and 06/24/2014 and analyzed on 07/01/2014 and 07/02/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102380-1
SDG: 680102380-1

Client Sample ID: SD-224-SS — **Lab Sample ID: 680-102380-1**

No Detections.

Client Sample ID: SD-224-01 — **Lab Sample ID: 680-102380-2**

No Detections.

Client Sample ID: SD-224-02 — **Lab Sample ID: 680-102380-3**

No Detections.

Client Sample ID: SD-223-SS — **Lab Sample ID: 680-102380-5**

No Detections.

Client Sample ID: SD-223-01 — **Lab Sample ID: 680-102380-6**

No Detections.

Client Sample ID: SD-223-02 — **Lab Sample ID: 680-102380-7**

No Detections.

Client Sample ID: SD-226-SS — **Lab Sample ID: 680-102380-8**

No Detections.

Client Sample ID: SD-226-01 — **Lab Sample ID: 680-102380-9**

No Detections.

Client Sample ID: SD-226-02 — **Lab Sample ID: 680-102380-10**

No Detections.

Client Sample ID: SD-225-SS — **Lab Sample ID: 680-102380-12**

No Detections.

Client Sample ID: SD-225-01 — **Lab Sample ID: 680-102380-13**

No Detections.

Client Sample ID: SD-225-02 — **Lab Sample ID: 680-102380-14**

No Detections.

Client Sample ID: SD-228-SS — **Lab Sample ID: 680-102380-16**

No Detections.

Client Sample ID: SD-228-01 — **Lab Sample ID: 680-102380-17**

No Detections.

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102380-1
SDG: 680102380-1

Client Sample ID: SD-228-02 — **Lab Sample ID: 680-102380-18**

No Detections.

Client Sample ID: SD-234-SS — **Lab Sample ID: 680-102380-20**

No Detections.

Client Sample ID: SD-234-01 — **Lab Sample ID: 680-102380-21**

No Detections.

Client Sample ID: SD-235-SS — **Lab Sample ID: 680-102380-22**

No Detections.

Client Sample ID: SD-23501 — **Lab Sample ID: 680-102380-23**

No Detections.

Client Sample ID: SD-235-02 — **Lab Sample ID: 680-102380-24**

No Detections.

Client Sample ID: SD-236-SS — **Lab Sample ID: 680-102380-26**

No Detections.

Client Sample ID: SD-236-01 — **Lab Sample ID: 680-102380-27**

No Detections.

Client Sample ID: SD-236-02 — **Lab Sample ID: 680-102380-28**

No Detections.

Client Sample ID: SD-237-SS — **Lab Sample ID: 680-102380-29**

No Detections.

Client Sample ID: SD-237-01 — **Lab Sample ID: 680-102380-30**

No Detections.

Client Sample ID: SD-237-02 — **Lab Sample ID: 680-102380-31**

No Detections.

Client Sample ID: SD-DUP05 — **Lab Sample ID: 680-102380-33**

No Detections.

Client Sample ID: SD-227-SS — **Lab Sample ID: 680-102380-34**

No Detections.

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102380-1
SDG: 680102380-1

Client Sample ID: SD-227-01 — Lab Sample ID: 680-102380-35

No Detections.

Client Sample ID: SD-227-02 — Lab Sample ID: 680-102380-36

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: SD-224-SS

Lab Sample ID: 680-102380-1

Date Collected: 06/13/14 08:20

Matrix: Solid

Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.01		0.220	0.235	1.00	0.106	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-230	1.00		0.216	0.232	1.00	0.0716	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-232	1.35		0.248	0.273	1.00	0.0520	pCi/g	06/23/14 15:05	07/01/14 12:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*85.0*		*30 - 110*	*06/23/14 15:05*	*07/01/14 12:26*	*1*

Client Sample ID: SD-224-01

Lab Sample ID: 680-102380-2

Date Collected: 06/13/14 08:25

Matrix: Solid

Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.22		0.239	0.260	1.00	0.0881	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-230	1.00		0.216	0.232	1.00	0.0716	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-232	1.43		0.256	0.283	1.00	0.0521	pCi/g	06/23/14 15:05	07/01/14 12:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*80.5*		*30 - 110*	*06/23/14 15:05*	*07/01/14 12:26*	*1*

Client Sample ID: SD-224-02

Lab Sample ID: 680-102380-3

Date Collected: 06/13/14 08:30

Matrix: Solid

Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.800		0.202	0.213	1.00	0.121	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-230	0.817		0.198	0.210	1.00	0.0679	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-232	0.777		0.193	0.204	1.00	0.0676	pCi/g	06/23/14 15:05	07/01/14 12:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*80.9*		*30 - 110*	*06/23/14 15:05*	*07/01/14 12:26*	*1*

Client Sample ID: SD-223-SS

Lab Sample ID: 680-102380-5

Date Collected: 06/13/14 08:40

Matrix: Solid

Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.27		0.254	0.275	1.00	0.0887	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-230	1.28		0.254	0.275	1.00	0.0649	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-232	1.14		0.238	0.257	1.00	0.0707	pCi/g	06/23/14 15:05	07/01/14 12:26	1

Client Sample ID: SD-223-SS

Lab Sample ID: 680-102380-5

Date Collected: 06/13/14 08:40

Matrix: Solid

Date Received: 06/14/14 08:30

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	79.0		30 - 110	06/23/14 15:05	07/01/14 12:26	1

Client Sample ID: SD-223-01

Lab Sample ID: 680-102380-6

Date Collected: 06/13/14 08:45

Matrix: Solid

Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.17		0.246	0.265	1.00	0.0786	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-230	0.744		0.199	0.209	1.00	0.105	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-232	1.24		0.252	0.273	1.00	0.0664	pCi/g	06/23/14 15:05	07/01/14 12:26	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	77.3		30 - 110	06/23/14 15:05	07/01/14 12:26	1

Client Sample ID: SD-223-02

Lab Sample ID: 680-102380-7

Date Collected: 06/13/14 08:50

Matrix: Solid

Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.54		0.291	0.319	1.00	0.123	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-230	1.04		0.238	0.254	1.00	0.0991	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-232	1.36		0.272	0.295	1.00	0.0984	pCi/g	06/23/14 15:05	07/01/14 12:26	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	73.5		30 - 110	06/23/14 15:05	07/01/14 12:26	1

Client Sample ID: SD-226-SS

Lab Sample ID: 680-102380-8

Date Collected: 06/13/14 08:55

Matrix: Solid

Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.01		0.218	0.234	1.00	0.0929	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-230	1.15		0.231	0.250	1.00	0.0697	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-232	1.28		0.241	0.264	1.00	0.0590	pCi/g	06/23/14 15:05	07/01/14 12:26	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	86.7		30 - 110	06/23/14 15:05	07/01/14 12:26	1

Client Sample ID: SD-226-01

Lab Sample ID: 680-102380-9

Date Collected: 06/13/14 09:00

Matrix: Solid

Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.21		0.238	0.259	1.00	0.0909	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-230	0.979		0.214	0.229	1.00	0.0745	pCi/g	06/23/14 15:05	07/01/14 12:26	1
Thorium-232	1.36		0.250	0.275	1.00	0.0595	pCi/g	06/23/14 15:05	07/01/14 12:26	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*83.9*		*30 - 110*	*06/23/14 15:05*	*07/01/14 12:26*	*1*

Client Sample ID: SD-226-02

Lab Sample ID: 680-102380-10

Date Collected: 06/13/14 09:05

Matrix: Solid

Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.23		0.232	0.254	1.00	0.105	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	1.03		0.212	0.229	1.00	0.0910	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	1.05		0.212	0.230	1.00	0.0717	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*91.2*		*30 - 110*	*06/24/14 14:58*	*07/02/14 18:02*	*1*

Client Sample ID: SD-225-SS

Lab Sample ID: 680-102380-12

Date Collected: 06/13/14 09:15

Matrix: Solid

Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.34		0.266	0.289	1.00	0.124	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	1.45		0.272	0.298	1.00	0.0607	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	1.39		0.267	0.291	1.00	0.0935	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*73.0*		*30 - 110*	*06/24/14 14:58*	*07/02/14 18:02*	*1*

Client Sample ID: SD-225-01

Lab Sample ID: 680-102380-13

Date Collected: 06/13/14 09:20

Matrix: Solid

Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.32		0.246	0.270	1.00	0.0702	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	1.35		0.250	0.274	1.00	0.0740	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	1.33		0.246	0.270	1.00	0.0591	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Client Sample ID: SD-225-01

Lab Sample ID: 680-102380-13

Date Collected: 06/13/14 09:20

Matrix: Solid

Date Received: 06/14/14 08:30

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	81.5		30 - 110	06/24/14 14:58	07/02/14 18:02	1

Client Sample ID: SD-225-02

Lab Sample ID: 680-102380-14

Date Collected: 06/13/14 09:25

Matrix: Solid

Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.904		0.204	0.218	1.00	0.102	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	0.952		0.206	0.221	1.00	0.0674	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	0.906		0.199	0.213	1.00	0.0329	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	88.1		30 - 110	06/24/14 14:58	07/02/14 18:02	1

Client Sample ID: SD-228-SS

Lab Sample ID: 680-102380-16

Date Collected: 06/13/14 10:05

Matrix: Solid

Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.32		0.249	0.273	1.00	0.105	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	1.08		0.223	0.241	1.00	0.0741	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	1.40		0.254	0.280	1.00	0.0813	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	81.7		30 - 110	06/24/14 14:58	07/02/14 18:02	1

Client Sample ID: SD-228-01

Lab Sample ID: 680-102380-17

Date Collected: 06/13/14 10:10

Matrix: Solid

Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.29		0.244	0.267	1.00	0.0873	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	1.40		0.252	0.278	1.00	0.0518	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	1.36		0.250	0.275	1.00	0.0837	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	84.5		30 - 110	06/24/14 14:58	07/02/14 18:02	1

Client Sample ID: SD-228-02

Lab Sample ID: 680-102380-18

Date Collected: 06/13/14 10:15

Matrix: Solid

Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.06		0.229	0.246	1.00	0.0955	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	0.797		0.196	0.207	1.00	0.0362	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	1.12		0.235	0.253	1.00	0.0964	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*80.3*		*30 - 110*	*06/24/14 14:58*	*07/02/14 18:02*	*1*

Client Sample ID: SD-234-SS

Lab Sample ID: 680-102380-20

Date Collected: 06/13/14 10:30

Matrix: Solid

Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.765		0.184	0.195	1.00	0.0665	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	0.835		0.191	0.204	1.00	0.0566	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	0.778		0.184	0.195	1.00	0.0493	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*87.1*		*30 - 110*	*06/24/14 14:58*	*07/02/14 18:02*	*1*

Client Sample ID: SD-234-01

Lab Sample ID: 680-102380-21

Date Collected: 06/13/14 10:35

Matrix: Solid

Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.05		0.221	0.238	1.00	0.103	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	0.685		0.176	0.186	1.00	0.0698	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	0.928		0.204	0.218	1.00	0.0507	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*87.8*		*30 - 110*	*06/24/14 14:58*	*07/02/14 18:02*	*1*

Client Sample ID: SD-235-SS

Lab Sample ID: 680-102380-22

Date Collected: 06/13/14 11:00

Matrix: Solid

Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.913		0.208	0.221	1.00	0.0882	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	0.729		0.185	0.195	1.00	0.0704	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	0.904		0.204	0.218	1.00	0.0522	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Client Sample ID: SD-235-SS

Lab Sample ID: 680-102380-22

Date Collected: 06/13/14 11:00

Matrix: Solid

Date Received: 06/14/14 08:30

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	80.4		30 - 110	06/24/14 14:58	07/02/14 18:02	1

Client Sample ID: SD-23501

Lab Sample ID: 680-102380-23

Date Collected: 06/13/14 11:05

Matrix: Solid

Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.16		0.231	0.251	1.00	0.111	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	0.894		0.199	0.213	1.00	0.0624	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	1.32		0.240	0.264	1.00	0.0621	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	87.8		30 - 110	06/24/14 14:58	07/02/14 18:02	1

Client Sample ID: SD-235-02

Lab Sample ID: 680-102380-24

Date Collected: 06/13/14 11:10

Matrix: Solid

Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.08		0.213	0.231	1.00	0.0733	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	1.04		0.208	0.225	1.00	0.0536	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	1.12		0.215	0.235	1.00	0.0534	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	95.6		30 - 110	06/24/14 14:58	07/02/14 18:02	1

Client Sample ID: SD-236-SS

Lab Sample ID: 680-102380-26

Date Collected: 06/13/14 12:05

Matrix: Solid

Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.335		0.113	0.116	1.00	0.0567	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	0.271		0.104	0.106	1.00	0.0708	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	0.208		0.0883	0.0900	1.00	0.0479	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	107		30 - 110	06/24/14 14:58	07/02/14 18:02	1

Client Sample ID: SD-236-01

Lab Sample ID: 680-102380-27

Date Collected: 06/13/14 12:10

Matrix: Solid

Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.562		0.163	0.170	1.00	0.101	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	0.447		0.143	0.148	1.00	0.0817	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	0.389		0.134	0.138	1.00	0.0811	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*89.3*		*30 - 110*	*06/24/14 14:58*	*07/02/14 18:02*	*1*

Client Sample ID: SD-236-02

Lab Sample ID: 680-102380-28

Date Collected: 06/13/14 12:15

Matrix: Solid

Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.555		0.159	0.166	1.00	0.0888	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	0.582		0.161	0.168	1.00	0.0666	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	0.658		0.170	0.178	1.00	0.0564	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*90.4*		*30 - 110*	*06/24/14 14:58*	*07/02/14 18:02*	*1*

Client Sample ID: SD-237-SS

Lab Sample ID: 680-102380-29

Date Collected: 06/13/14 12:30

Matrix: Solid

Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.09		0.251	0.268	1.00	0.111	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	1.04		0.243	0.258	1.00	0.0908	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	0.944		0.230	0.244	1.00	0.0725	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*69.0*		*30 - 110*	*06/24/14 14:58*	*07/02/14 18:02*	*1*

Client Sample ID: SD-237-01

Lab Sample ID: 680-102380-30

Date Collected: 06/13/14 12:35

Matrix: Solid

Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.55		0.281	0.310	1.00	0.131	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	1.11		0.234	0.252	1.00	0.0790	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	1.51		0.272	0.300	1.00	0.0741	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Client Sample ID: SD-237-01

Lab Sample ID: 680-102380-30

Date Collected: 06/13/14 12:35

Matrix: Solid

Date Received: 06/14/14 08:30

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	78.1		30 - 110	06/24/14 14:58	07/02/14 18:02	1

Client Sample ID: SD-237-02

Lab Sample ID: 680-102380-31

Date Collected: 06/13/14 12:40

Matrix: Solid

Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.27		0.226	0.250	1.00	0.0759	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	0.986		0.198	0.215	1.00	0.0577	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	1.39		0.234	0.262	1.00	0.0512	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	98.1		30 - 110	06/24/14 14:58	07/02/14 18:02	1

Client Sample ID: SD-DUP05

Lab Sample ID: 680-102380-33

Date Collected: 06/13/14 00:00

Matrix: Solid

Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.14		0.220	0.240	1.00	0.0947	pCi/g	06/24/14 14:58	07/02/14 18:03	1
Thorium-230	1.11		0.214	0.233	1.00	0.0468	pCi/g	06/24/14 14:58	07/02/14 18:03	1
Thorium-232	1.14		0.216	0.237	1.00	0.0307	pCi/g	06/24/14 14:58	07/02/14 18:03	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	92.5		30 - 110	06/24/14 14:58	07/02/14 18:03	1

Client Sample ID: SD-227-SS

Lab Sample ID: 680-102380-34

Date Collected: 06/13/14 13:10

Matrix: Solid

Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.31		0.251	0.274	1.00	0.0986	pCi/g	06/24/14 14:58	07/02/14 18:03	1
Thorium-230	0.978		0.215	0.230	1.00	0.0537	pCi/g	06/24/14 14:58	07/02/14 18:03	1
Thorium-232	1.39		0.256	0.282	1.00	0.0668	pCi/g	06/24/14 14:58	07/02/14 18:03	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	81.5		30 - 110	06/24/14 14:58	07/02/14 18:03	1

Client Sample ID: SD-227-01

Lab Sample ID: 680-102380-35

Date Collected: 06/13/14 13:15

Matrix: Solid

Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.54		0.281	0.309	1.00	0.102	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-230	1.35		0.264	0.287	1.00	0.111	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-232	1.27		0.252	0.274	1.00	0.0710	pCi/g	06/24/14 15:13	07/02/14 18:11	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*74.3*		*30 - 110*	*06/24/14 15:13*	*07/02/14 18:11*	*1*

Client Sample ID: SD-227-02

Lab Sample ID: 680-102380-36

Date Collected: 06/13/14 13:20

Matrix: Solid

Date Received: 06/14/14 08:30

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.895		0.204	0.217	1.00	0.0981	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-230	0.753		0.184	0.194	1.00	0.0579	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-232	0.963		0.207	0.222	1.00	0.0505	pCi/g	06/24/14 15:13	07/02/14 18:11	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*86.1*		*30 - 110*	*06/24/14 15:13*	*07/02/14 18:11*	*1*

Tracer/Carrier Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102380-1
SDG: 680102380-1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)							
		Th-229							
Lab Sample ID	Client Sample ID	(30-110)							
680-102380-1	SD-224-SS	85.0							
680-102380-2	SD-224-01	80.5							
680-102380-3	SD-224-02	80.9							
680-102380-5	SD-223-SS	79.0							
680-102380-6	SD-223-01	77.3							
680-102380-7	SD-223-02	73.5							
680-102380-8	SD-226-SS	86.7							
680-102380-9	SD-226-01	83.9							
680-102380-10	SD-226-02	91.2							
680-102380-10 DU	SD-226-02	84.0							
680-102380-12	SD-225-SS	73.0							
680-102380-13	SD-225-01	81.5							
680-102380-14	SD-225-02	88.1							
680-102380-16	SD-228-SS	81.7							
680-102380-17	SD-228-01	84.5							
680-102380-18	SD-228-02	80.3							
680-102380-20	SD-234-SS	87.1							
680-102380-21	SD-234-01	87.8							
680-102380-22	SD-235-SS	80.4							
680-102380-23	SD-23501	87.8							
680-102380-24	SD-235-02	95.6							
680-102380-26	SD-236-SS	107							
680-102380-27	SD-236-01	89.3							
680-102380-28	SD-236-02	90.4							
680-102380-29	SD-237-SS	69.0							
680-102380-30	SD-237-01	78.1							
680-102380-31	SD-237-02	98.1							
680-102380-33	SD-DUP05	92.5							
680-102380-34	SD-227-SS	81.5							
680-102380-35	SD-227-01	74.3							
680-102380-36	SD-227-02	86.1							
LCS 160-128228/2-A	Lab Control Sample	94.3							
LCS 160-128412/2-A	Lab Control Sample	102							
LCS 160-128417/2-A	Lab Control Sample	85.3							
MB 160-128228/1-A	Method Blank	91.7							
MB 160-128412/1-A	Method Blank	94.5							
MB 160-128417/1-A	Method Blank	92.2							

Tracer/Carrier Legend

Th-229 = Thorium-229

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Lab Sample ID: MB 160-128228/1-A
Matrix: Solid
Analysis Batch: 129241

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 128228

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.006508	U	0.0215	0.0216	1.00	0.0541	pCi/g	06/23/14 15:05	07/01/14 12:25	1
Thorium-230	0.1211		0.0724	0.0731	1.00	0.0541	pCi/g	06/23/14 15:05	07/01/14 12:25	1
Thorium-232	0.0000	U	0.00389	0.00389	1.00	0.0311	pCi/g	06/23/14 15:05	07/01/14 12:25	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*91.7*		*30 - 110*	*06/23/14 15:05*	*07/01/14 12:25*	*1*

Lab Sample ID: LCS 160-128228/2-A
Matrix: Solid
Analysis Batch: 129242

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 128228

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Thorium-230			24.5	20.69		2.16	1.00	0.0591	pCi/g	84	81 - 118		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*94.3*		*30 - 110*

Lab Sample ID: MB 160-128412/1-A
Matrix: Solid
Analysis Batch: 129494

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 128412

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	-0.005722	U	0.00661	0.00662	1.00	0.0579	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-230	0.07533	U	0.0694	0.0697	1.00	0.0995	pCi/g	06/24/14 14:58	07/02/14 18:02	1
Thorium-232	0.002532	U	0.0216	0.0216	1.00	0.0618	pCi/g	06/24/14 14:58	07/02/14 18:02	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*94.5*		*30 - 110*	*06/24/14 14:58*	*07/02/14 18:02*	*1*

Lab Sample ID: LCS 160-128412/2-A
Matrix: Solid
Analysis Batch: 129495

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 128412

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Thorium-230			24.5	22.92		2.33	1.00	0.129	pCi/g	94	81 - 118		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*102*		*30 - 110*

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry) (Continued)

Lab Sample ID: 680-102380-10 DU
Matrix: Solid
Analysis Batch: 129523

Client Sample ID: SD-226-02
Prep Type: Total/NA
Prep Batch: 128412

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Thorium-228	1.23			1.054		0.242	1.00	0.104	pCi/g			0.35	1
Thorium-230	1.03			1.025		0.235	1.00	0.0761	pCi/g			0.02	1
Thorium-232	1.05			1.541		0.298	1.00	0.0881	pCi/g			0.93	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Thorium-229	*84.0*		*30 - 110*

Lab Sample ID: MB 160-128417/1-A
Matrix: Solid
Analysis Batch: 129499

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 128417

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	-0.009679	U	0.00858	0.00862	1.00	0.0660	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-230	0.03903	U	0.0410	0.0411	1.00	0.0462	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-232	0.008210	U	0.0206	0.0206	1.00	0.0460	pCi/g	06/24/14 15:13	07/02/14 18:11	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*92.2*		*30 - 110*	*06/24/14 15:13*	*07/02/14 18:11*	*1*

Lab Sample ID: LCS 160-128417/2-A
Matrix: Solid
Analysis Batch: 129502

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 128417

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Thorium-230			24.5	25.66		2.63	1.00	0.170	pCi/g	105	81 - 118		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*85.3*		*30 - 110*

Rad

Leach Batch: 127441

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102380-1	SD-224-SS	Total/NA	Solid	Dry and Grind	
680-102380-2	SD-224-01	Total/NA	Solid	Dry and Grind	
680-102380-3	SD-224-02	Total/NA	Solid	Dry and Grind	
680-102380-5	SD-223-SS	Total/NA	Solid	Dry and Grind	
680-102380-6	SD-223-01	Total/NA	Solid	Dry and Grind	
680-102380-7	SD-223-02	Total/NA	Solid	Dry and Grind	
680-102380-8	SD-226-SS	Total/NA	Solid	Dry and Grind	
680-102380-9	SD-226-01	Total/NA	Solid	Dry and Grind	
680-102380-10	SD-226-02	Total/NA	Solid	Dry and Grind	
680-102380-10 DU	SD-226-02	Total/NA	Solid	Dry and Grind	
680-102380-12	SD-225-SS	Total/NA	Solid	Dry and Grind	
680-102380-13	SD-225-01	Total/NA	Solid	Dry and Grind	
680-102380-14	SD-225-02	Total/NA	Solid	Dry and Grind	
680-102380-16	SD-228-SS	Total/NA	Solid	Dry and Grind	
680-102380-17	SD-228-01	Total/NA	Solid	Dry and Grind	
680-102380-18	SD-228-02	Total/NA	Solid	Dry and Grind	
680-102380-20	SD-234-SS	Total/NA	Solid	Dry and Grind	
680-102380-21	SD-234-01	Total/NA	Solid	Dry and Grind	
680-102380-22	SD-235-SS	Total/NA	Solid	Dry and Grind	
680-102380-23	SD-23501	Total/NA	Solid	Dry and Grind	
680-102380-24	SD-235-02	Total/NA	Solid	Dry and Grind	
680-102380-26	SD-236-SS	Total/NA	Solid	Dry and Grind	
680-102380-27	SD-236-01	Total/NA	Solid	Dry and Grind	
680-102380-28	SD-236-02	Total/NA	Solid	Dry and Grind	
680-102380-29	SD-237-SS	Total/NA	Solid	Dry and Grind	
680-102380-30	SD-237-01	Total/NA	Solid	Dry and Grind	
680-102380-31	SD-237-02	Total/NA	Solid	Dry and Grind	
680-102380-33	SD-DUP05	Total/NA	Solid	Dry and Grind	
680-102380-34	SD-227-SS	Total/NA	Solid	Dry and Grind	
680-102380-35	SD-227-01	Total/NA	Solid	Dry and Grind	
680-102380-36	SD-227-02	Total/NA	Solid	Dry and Grind	

Prep Batch: 128228

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102380-1	SD-224-SS	Total/NA	Solid	ExtChrom	127441
680-102380-2	SD-224-01	Total/NA	Solid	ExtChrom	127441
680-102380-3	SD-224-02	Total/NA	Solid	ExtChrom	127441
680-102380-5	SD-223-SS	Total/NA	Solid	ExtChrom	127441
680-102380-6	SD-223-01	Total/NA	Solid	ExtChrom	127441
680-102380-7	SD-223-02	Total/NA	Solid	ExtChrom	127441
680-102380-8	SD-226-SS	Total/NA	Solid	ExtChrom	127441
680-102380-9	SD-226-01	Total/NA	Solid	ExtChrom	127441
LCS 160-128228/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-128228/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Prep Batch: 128412

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102380-10	SD-226-02	Total/NA	Solid	ExtChrom	127441
680-102380-10 DU	SD-226-02	Total/NA	Solid	ExtChrom	127441
680-102380-12	SD-225-SS	Total/NA	Solid	ExtChrom	127441
680-102380-13	SD-225-01	Total/NA	Solid	ExtChrom	127441

Rad (Continued)

Prep Batch: 128412 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102380-14	SD-225-02	Total/NA	Solid	ExtChrom	127441
680-102380-16	SD-228-SS	Total/NA	Solid	ExtChrom	127441
680-102380-17	SD-228-01	Total/NA	Solid	ExtChrom	127441
680-102380-18	SD-228-02	Total/NA	Solid	ExtChrom	127441
680-102380-20	SD-234-SS	Total/NA	Solid	ExtChrom	127441
680-102380-21	SD-234-01	Total/NA	Solid	ExtChrom	127441
680-102380-22	SD-235-SS	Total/NA	Solid	ExtChrom	127441
680-102380-23	SD-23501	Total/NA	Solid	ExtChrom	127441
680-102380-24	SD-235-02	Total/NA	Solid	ExtChrom	127441
680-102380-26	SD-236-SS	Total/NA	Solid	ExtChrom	127441
680-102380-27	SD-236-01	Total/NA	Solid	ExtChrom	127441
680-102380-28	SD-236-02	Total/NA	Solid	ExtChrom	127441
680-102380-29	SD-237-SS	Total/NA	Solid	ExtChrom	127441
680-102380-30	SD-237-01	Total/NA	Solid	ExtChrom	127441
680-102380-31	SD-237-02	Total/NA	Solid	ExtChrom	127441
680-102380-33	SD-DUP05	Total/NA	Solid	ExtChrom	127441
680-102380-34	SD-227-SS	Total/NA	Solid	ExtChrom	127441
LCS 160-128412/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-128412/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Prep Batch: 128417

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102380-35	SD-227-01	Total/NA	Solid	ExtChrom	127441
680-102380-36	SD-227-02	Total/NA	Solid	ExtChrom	127441
LCS 160-128417/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-128417/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102380-1
SDG: 680102380-1

Client Sample ID: SD-224-SS
Lab Sample ID: 680-102380-1

Date Collected: 06/13/14 08:20
Matrix: Solid
Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127441	06/18/14 13:19	DRO	TAL SL
Total/NA	Prep	ExtChrom			128228	06/23/14 15:05	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129260	07/01/14 12:26	MLK	TAL SL

Client Sample ID: SD-224-01
Lab Sample ID: 680-102380-2

Date Collected: 06/13/14 08:25
Matrix: Solid
Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127441	06/18/14 13:19	DRO	TAL SL
Total/NA	Prep	ExtChrom			128228	06/23/14 15:05	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129261	07/01/14 12:26	MLK	TAL SL

Client Sample ID: SD-224-02
Lab Sample ID: 680-102380-3

Date Collected: 06/13/14 08:30
Matrix: Solid
Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127441	06/18/14 13:19	DRO	TAL SL
Total/NA	Prep	ExtChrom			128228	06/23/14 15:05	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129262	07/01/14 12:26	MLK	TAL SL

Client Sample ID: SD-223-SS
Lab Sample ID: 680-102380-5

Date Collected: 06/13/14 08:40
Matrix: Solid
Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127441	06/18/14 13:19	DRO	TAL SL
Total/NA	Prep	ExtChrom			128228	06/23/14 15:05	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129263	07/01/14 12:26	MLK	TAL SL

Client Sample ID: SD-223-01
Lab Sample ID: 680-102380-6

Date Collected: 06/13/14 08:45
Matrix: Solid
Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127441	06/18/14 13:19	DRO	TAL SL
Total/NA	Prep	ExtChrom			128228	06/23/14 15:05	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129264	07/01/14 12:26	MLK	TAL SL

Client Sample ID: SD-223-02

Lab Sample ID: 680-102380-7

Date Collected: 06/13/14 08:50

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127441	06/18/14 13:19	DRO	TAL SL
Total/NA	Prep	ExtChrom			128228	06/23/14 15:05	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129265	07/01/14 12:26	MLK	TAL SL

Client Sample ID: SD-226-SS

Lab Sample ID: 680-102380-8

Date Collected: 06/13/14 08:55

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127441	06/18/14 13:19	DRO	TAL SL
Total/NA	Prep	ExtChrom			128228	06/23/14 15:05	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129266	07/01/14 12:26	MLK	TAL SL

Client Sample ID: SD-226-01

Lab Sample ID: 680-102380-9

Date Collected: 06/13/14 09:00

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127441	06/18/14 13:19	DRO	TAL SL
Total/NA	Prep	ExtChrom			128228	06/23/14 15:05	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129267	07/01/14 12:26	MLK	TAL SL

Client Sample ID: SD-226-02

Lab Sample ID: 680-102380-10

Date Collected: 06/13/14 09:05

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127441	06/18/14 13:19	DRO	TAL SL
Total/NA	Prep	ExtChrom			128412	06/24/14 14:58	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129512	07/02/14 18:02	MLK	TAL SL

Client Sample ID: SD-225-SS

Lab Sample ID: 680-102380-12

Date Collected: 06/13/14 09:15

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127441	06/18/14 13:19	DRO	TAL SL
Total/NA	Prep	ExtChrom			128412	06/24/14 14:58	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129534	07/02/14 18:02	MLK	TAL SL

Client Sample ID: SD-225-01

Lab Sample ID: 680-102380-13

Date Collected: 06/13/14 09:20

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127441	06/18/14 13:19	DRO	TAL SL
Total/NA	Prep	ExtChrom			128412	06/24/14 14:58	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129545	07/02/14 18:02	MLK	TAL SL

Client Sample ID: SD-225-02

Lab Sample ID: 680-102380-14

Date Collected: 06/13/14 09:25

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127441	06/18/14 13:19	DRO	TAL SL
Total/NA	Prep	ExtChrom			128412	06/24/14 14:58	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129466	07/02/14 18:02	MLK	TAL SL

Client Sample ID: SD-228-SS

Lab Sample ID: 680-102380-16

Date Collected: 06/13/14 10:05

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127441	06/18/14 13:19	DRO	TAL SL
Total/NA	Prep	ExtChrom			128412	06/24/14 14:58	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129477	07/02/14 18:02	MLK	TAL SL

Client Sample ID: SD-228-01

Lab Sample ID: 680-102380-17

Date Collected: 06/13/14 10:10

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127441	06/18/14 13:19	DRO	TAL SL
Total/NA	Prep	ExtChrom			128412	06/24/14 14:58	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129482	07/02/14 18:02	MLK	TAL SL

Client Sample ID: SD-228-02

Lab Sample ID: 680-102380-18

Date Collected: 06/13/14 10:15

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127441	06/18/14 13:19	DRO	TAL SL
Total/NA	Prep	ExtChrom			128412	06/24/14 14:58	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129483	07/02/14 18:02	MLK	TAL SL

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102380-1
SDG: 680102380-1

Client Sample ID: SD-234-SS
Lab Sample ID: 680-102380-20
Date Collected: 06/13/14 10:30
Matrix: Solid
Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127441	06/18/14 13:19	DRO	TAL SL
Total/NA	Prep	ExtChrom			128412	06/24/14 14:58	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129484	07/02/14 18:02	MLK	TAL SL

Client Sample ID: SD-234-01
Lab Sample ID: 680-102380-21
Date Collected: 06/13/14 10:35
Matrix: Solid
Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127441	06/18/14 13:19	DRO	TAL SL
Total/NA	Prep	ExtChrom			128412	06/24/14 14:58	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129485	07/02/14 18:02	MLK	TAL SL

Client Sample ID: SD-235-SS
Lab Sample ID: 680-102380-22
Date Collected: 06/13/14 11:00
Matrix: Solid
Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127441	06/18/14 13:19	DRO	TAL SL
Total/NA	Prep	ExtChrom			128412	06/24/14 14:58	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129486	07/02/14 18:02	MLK	TAL SL

Client Sample ID: SD-23501
Lab Sample ID: 680-102380-23
Date Collected: 06/13/14 11:05
Matrix: Solid
Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127441	06/18/14 13:19	DRO	TAL SL
Total/NA	Prep	ExtChrom			128412	06/24/14 14:58	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129487	07/02/14 18:02	MLK	TAL SL

Client Sample ID: SD-235-02
Lab Sample ID: 680-102380-24
Date Collected: 06/13/14 11:10
Matrix: Solid
Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127441	06/18/14 13:19	DRO	TAL SL
Total/NA	Prep	ExtChrom			128412	06/24/14 14:58	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129488	07/02/14 18:02	MLK	TAL SL

Client Sample ID: SD-236-SS
Lab Sample ID: 680-102380-26

Date Collected: 06/13/14 12:05
Matrix: Solid
Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127441	06/18/14 13:19	DRO	TAL SL
Total/NA	Prep	ExtChrom			128412	06/24/14 14:58	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129489	07/02/14 18:02	MLK	TAL SL

Client Sample ID: SD-236-01
Lab Sample ID: 680-102380-27

Date Collected: 06/13/14 12:10
Matrix: Solid
Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127441	06/18/14 13:19	DRO	TAL SL
Total/NA	Prep	ExtChrom			128412	06/24/14 14:58	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129490	07/02/14 18:02	MLK	TAL SL

Client Sample ID: SD-236-02
Lab Sample ID: 680-102380-28

Date Collected: 06/13/14 12:15
Matrix: Solid
Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127441	06/18/14 13:19	DRO	TAL SL
Total/NA	Prep	ExtChrom			128412	06/24/14 14:58	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129491	07/02/14 18:02	MLK	TAL SL

Client Sample ID: SD-237-SS
Lab Sample ID: 680-102380-29

Date Collected: 06/13/14 12:30
Matrix: Solid
Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127441	06/18/14 13:19	DRO	TAL SL
Total/NA	Prep	ExtChrom			128412	06/24/14 14:58	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129492	07/02/14 18:02	MLK	TAL SL

Client Sample ID: SD-237-01
Lab Sample ID: 680-102380-30

Date Collected: 06/13/14 12:35
Matrix: Solid
Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127441	06/18/14 13:19	DRO	TAL SL
Total/NA	Prep	ExtChrom			128412	06/24/14 14:58	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129493	07/02/14 18:02	MLK	TAL SL

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102380-1
SDG: 680102380-1

Client Sample ID: SD-237-02

Lab Sample ID: 680-102380-31

Date Collected: 06/13/14 12:40

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127441	06/18/14 13:19	DRO	TAL SL
Total/NA	Prep	ExtChrom			128412	06/24/14 14:58	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129496	07/02/14 18:02	MLK	TAL SL

Client Sample ID: SD-DUP05

Lab Sample ID: 680-102380-33

Date Collected: 06/13/14 00:00

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127441	06/18/14 13:19	DRO	TAL SL
Total/NA	Prep	ExtChrom			128412	06/24/14 14:58	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129497	07/02/14 18:03	MLK	TAL SL

Client Sample ID: SD-227-SS

Lab Sample ID: 680-102380-34

Date Collected: 06/13/14 13:10

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127441	06/18/14 13:19	DRO	TAL SL
Total/NA	Prep	ExtChrom			128412	06/24/14 14:58	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129498	07/02/14 18:03	MLK	TAL SL

Client Sample ID: SD-227-01

Lab Sample ID: 680-102380-35

Date Collected: 06/13/14 13:15

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127441	06/18/14 13:19	DRO	TAL SL
Total/NA	Prep	ExtChrom			128417	06/24/14 15:13	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129503	07/02/14 18:11	MLK	TAL SL

Client Sample ID: SD-227-02

Lab Sample ID: 680-102380-36

Date Collected: 06/13/14 13:20

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127441	06/18/14 13:19	DRO	TAL SL
Total/NA	Prep	ExtChrom			128417	06/24/14 15:13	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129504	07/02/14 18:11	MLK	TAL SL

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Certification Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102380-1
SDG: 680102380-1

Laboratory: TestAmerica Savannah

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Maryland	State Program	3	250	12-31-14

Laboratory: TestAmerica St. Louis

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska	State Program	10	MO00054	06-30-15
California	NELAP	9	09266CA	03-31-15
Connecticut	State Program	1	PH-0241	03-31-15
Florida	NELAP	4	E87689	06-30-14 *
Illinois	NELAP	5	200023	11-30-14
Iowa	State Program	7	373	12-01-14
Kansas	NELAP	7	E-10236	10-31-14
Kentucky (DW)	State Program	4	90125	12-31-14
L-A-B	DoD ELAP		L2305	01-10-16
Louisiana	NELAP	6	04080	06-30-15
Maryland	State Program	3	310	09-30-14 *
Missouri	State Program	7	780	06-30-14 *
Nevada	State Program	9	MO000542013-1	07-31-14 *
New Jersey	NELAP	2	MO002	06-30-15
New Mexico	State Program	6		06-30-10 *
New York	NELAP	2	11616	03-31-15
North Dakota	State Program	8	R207	06-30-14 *
NRC	NRC		24-24817-01	12-31-22
Oklahoma	State Program	6	2013-049	08-31-14 *
Pennsylvania	NELAP	3	68-00540	02-28-15
South Carolina	State Program	4	85002001	06-30-14 *
Texas	NELAP	6	T104704193-13-6	07-31-14 *
USDA	Federal		P330-07-00122	01-09-17
USEPA Reg V SDWA	Federal	1	WG-15J	08-30-14
Utah	NELAP	8	MO000542013-5	07-31-14 *
Virginia	NELAP	3	2236	06-14-14 *
Washington	State Program	10	C592	08-30-14
West Virginia DEP	State Program	3	381	08-30-14

* Certification renewal pending - certification considered valid.

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102380-1
SDG: 680102380-1

Method	Method Description	Protocol	Laboratory
A-01-R	Isotopic Thorium (Alpha Spectrometry)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102380-1
SDG: 680102380-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-102380-1	SD-224-SS	Solid	06/13/14 08:20	06/14/14 08:30
680-102380-2	SD-224-01	Solid	06/13/14 08:25	06/14/14 08:30
680-102380-3	SD-224-02	Solid	06/13/14 08:30	06/14/14 08:30
680-102380-5	SD-223-SS	Solid	06/13/14 08:40	06/14/14 08:30
680-102380-6	SD-223-01	Solid	06/13/14 08:45	06/14/14 08:30
680-102380-7	SD-223-02	Solid	06/13/14 08:50	06/14/14 08:30
680-102380-8	SD-226-SS	Solid	06/13/14 08:55	06/14/14 08:30
680-102380-9	SD-226-01	Solid	06/13/14 09:00	06/14/14 08:30
680-102380-10	SD-226-02	Solid	06/13/14 09:05	06/14/14 08:30
680-102380-12	SD-225-SS	Solid	06/13/14 09:15	06/14/14 08:30
680-102380-13	SD-225-01	Solid	06/13/14 09:20	06/14/14 08:30
680-102380-14	SD-225-02	Solid	06/13/14 09:25	06/14/14 08:30
680-102380-16	SD-228-SS	Solid	06/13/14 10:05	06/14/14 08:30
680-102380-17	SD-228-01	Solid	06/13/14 10:10	06/14/14 08:30
680-102380-18	SD-228-02	Solid	06/13/14 10:15	06/14/14 08:30
680-102380-20	SD-234-SS	Solid	06/13/14 10:30	06/14/14 08:30
680-102380-21	SD-234-01	Solid	06/13/14 10:35	06/14/14 08:30
680-102380-22	SD-235-SS	Solid	06/13/14 11:00	06/14/14 08:30
680-102380-23	SD-23501	Solid	06/13/14 11:05	06/14/14 08:30
680-102380-24	SD-235-02	Solid	06/13/14 11:10	06/14/14 08:30
680-102380-26	SD-236-SS	Solid	06/13/14 12:05	06/14/14 08:30
680-102380-27	SD-236-01	Solid	06/13/14 12:10	06/14/14 08:30
680-102380-28	SD-236-02	Solid	06/13/14 12:15	06/14/14 08:30
680-102380-29	SD-237-SS	Solid	06/13/14 12:30	06/14/14 08:30
680-102380-30	SD-237-01	Solid	06/13/14 12:35	06/14/14 08:30
680-102380-31	SD-237-02	Solid	06/13/14 12:40	06/14/14 08:30
680-102380-33	SD-DUP05	Solid	06/13/14 00:00	06/14/14 08:30
680-102380-34	SD-227-SS	Solid	06/13/14 13:10	06/14/14 08:30
680-102380-35	SD-227-01	Solid	06/13/14 13:15	06/14/14 08:30
680-102380-36	SD-227-02	Solid	06/13/14 13:20	06/14/14 08:30

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102380-1

SDG No.: 680102380-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
82232-334_00001	06/03/60		Eckert & Ziegler, Lot 82232-334		(Purchased Reagent)		Am-241	7.281 Bq
							Pu-239	7.137 Bq
							Thorium-230	7.63 Bq
82233-334_00001	06/03/60		Eckert & Zigler, Lot 82233-334		(Purchased Reagent)		Am-241	5.114 Bq
							Pu-239	6.064 Bq
							Thorium-230	4.95 Bq
82234-334_00001	06/02/60		Eckert & Zigler, Lot 82234-334		(Purchased Reagent)		Am-241	5.652 Bq
							Pu-239	5.936 Bq
							Thorium-230	5.685 Bq
82235-334_00001	06/04/60		Eckert & Ziegler, Lot 82235-334		(Purchased Reagent)		Am-241	7.466 Bq
							Pu-239	6.897 Bq
							Thorium-230	7.167 Bq
82236-334_00001	06/02/60		Eckert & Ziegler, Lot 82236-334		(Purchased Reagent)		Am-241	6.891 Bq
							Pu-239	6.664 Bq
							Thorium-230	7.107 Bq
82237-334_00003	06/01/60		Eckert & Ziegler, Lot 82237-334		(Purchased Reagent)		Am-241	5.608 Bq
							Pu-239	6.424 Bq
							Thorium-230	5.856 Bq
82240-334_00001	06/08/60		Eckert & Ziegler, Lot 82240-334		(Purchased Reagent)		Am-241	8.298 Bq
							Pu-239	7.163 Bq
							Thorium-230	6.304 Bq
82241-334_00001	06/08/60		Eckert & Ziegler, Lot 82241-334		(Purchased Reagent)		Am-241	6.638 Bq
							Pu-239	6.797 Bq
							Pulser	
							Thorium-230	6.629 Bq
							U	
82242-334_00001	06/08/60		Eckert & Ziegler, Lot 82242-334		(Purchased Reagent)		Am-241	7.145 Bq
							Pu-239	6.414 Bq
							Pulser	
							Thorium-230	6.583 Bq
							U	
82243-334_00001	06/09/60		Eckert & Ziegler, Lot 82243-334		(Purchased Reagent)		Am-241	6.39 Bq
							Pu-239	5.979 Bq
							Pulser	
							Thorium-230	5.856 Bq
							U	
82244-334_00001	06/09/60		Eckert & Zigler, Lot 82244-334		(Purchased Reagent)		Am-241	6.897 Bq
							Pu-239	6.717 Bq
							Pulser	
							Thorium-230	7.352 Bq
							U	
82245-334_00001	06/09/60		Eckert & Ziegler, Lot 82245-334		(Purchased Reagent)		Am-241	5.528 Bq
							Pu-239	5.437 Bq
							Thorium-230	6.727 Bq

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102380-1

SDG No.: 680102380-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
82246-334_00001	06/09/60	Eckert & Ziegler, Lot 82246-334			(Purchased Reagent)		Am-241	6.002 Bq
							Pu-239	5.353 Bq
							Thorium-230	5.57 Bq
82247-334_00001	06/10/60	Eckert & Ziegler, Lot 82247-334			(Purchased Reagent)		Am-241	6.291 Bq
							Pu-239	5.746 Bq
							Thorium-230	6.251 Bq
Th-229_00012	12/26/14	12/23/13	0.1M HNO3, Lot L0022	500 mL	Th-229_00004	15 mL	Thorium-229	67.9293 dpm/mL
.Th-229_00004	07/14/60	01/26/11	0.1M HNO3, Lot 0	100 mL	Th-229_00002	5.0613 g	Thorium-229	2264.31 dpm/mL
..Th-229_00002	07/14/60	Eckert & Ziegler, Lot 82832-334			(Purchased Reagent)		Thorium-229	745.63 Bq/g
TRM-2_00001	03/20/50	DOE, Lot TRM-2			(Purchased Reagent)		Pb-210	22.1 pCi/g
							Ra-226	25.4 pCi/g
							Thorium-230	24.5 pCi/g
							U-234	6.2 pCi/g
							U-238	6 pCi/g

Reagent

82232-334_00001

Eckert & Ziegler
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www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82232-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 3-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	7.630E+00	4420-4800	7.540E+04	0.7	1.1	2.6
Pu-239	7.137E+00	4950-5240	2.410E+04	0.7	1.1	2.6
Am-241	7.281E+00	5280-5600	4.326E+02	0.7	1.1	2.6
Total Activity	2.210E+01	3000-8000		0.4	1.1	2.3

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY
HEALTH PHYSICS SOCIETY
FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82233-334_00001

Eckert & Ziegler
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CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82233-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 3-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	4.950E+00	4420-4800	7.540E+04	0.8	1.1	2.7
Pu-239	6.064E+00	4950-5240	2.410E+04	0.7	1.1	2.6
Am-241	5.114E+00	5280-5600	4.326E+02	0.8	1.1	2.7
Total Activity	1.616E+01	3000-8000		0.1	1.1	2.2

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82234-334_00001

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CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82234-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 2-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	5.685E+00	4420-4800	7.540E+04	0.9	1.1	2.8
Pu-239	5.936E+00	4950-5240	2.410E+04	0.9	1.1	2.8
Am-241	5.652E+00	5280-5600	4.326E+02	0.9	1.1	2.8
Total Activity	1.732E+01	3000-8000		0.5	1.1	2.4

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82235-334_00001

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CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82235-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 4-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	7.167E+00	4420-4800	7.540E+04	0.8	1.1	2.7
Pu-239	6.897E+00	4950-5240	2.410E+04	0.8	1.1	2.7
Am-241	7.466E+00	5280-5600	4.326E+02	0.8	1.1	2.7
Total Activity	2.161E+01	3000-8000		0.5	1.1	2.4

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

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ACCREDITED SOURCE CALIBRATION LABORATORY
HEALTH PHYSICS SOCIETY
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Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82236-334_00001

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CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82236-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 2-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	7.107E+00	4420-4800	7.540E+04	0.7	1.1	2.6
Pu-239	6.664E+00	4950-5240	2.410E+04	0.8	1.1	2.7
Am-241	6.891E+00	5280-5600	4.326E+02	0.7	1.1	2.6
Total Activity	2.071E+01	3000-8000		0.4	1.1	2.3

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.46 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82237-334_00003

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CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82237-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 1-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	5.856E+00	4420-4800	7.540E+04	1.0	1.1	3.0
Pu-239	6.424E+00	4950-5240	2.410E+04	0.9	1.1	2.8
Am-241	5.608E+00	5280-5600	4.326E+02	1.0	1.1	3.0
Total Activity	1.793E+01	3000-8000		0.6	1.1	2.5

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82240-334_00001

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CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82240-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 8-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	6.304E+00	4420-4800	7.540E+04	0.9	1.1	2.8
Pu-239	7.163E+00	4950-5240	2.410E+04	0.8	1.1	2.7
Am-241	8.298E+00	5280-5600	4.326E+02	0.8	1.1	2.7
Total Activity	2.182E+01	3000-8000		0.5	1.1	2.4

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82241-334_00001

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Analytics

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CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82241-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 8-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	6.629E+00	4420-4800	7.540E+04	0.8	1.1	2.7
Pu-239	6.797E+00	4950-5240	2.410E+04	0.8	1.1	2.7
Am-241	6.638E+00	5280-5600	4.326E+02	0.8	1.1	2.7
Total Activity	2.011E+01	3000-8000		0.4	1.1	2.3

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82242-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82242-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 8-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	6.583E+00	4420-4800	7.540E+04	0.9	1.1	2.8
Pu-239	6.414E+00	4950-5240	2.410E+04	0.9	1.1	2.8
Am-241	7.145E+00	5280-5600	4.326E+02	0.9	1.1	2.8
Total Activity	2.018E+01	3000-8000		0.6	1.1	2.5

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1958

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82243-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82243-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 9-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	5.856E+00	4420-4800	7.540E+04	0.8	1.1	2.7
Pu-239	5.979E+00	4950-5240	2.410E+04	0.8	1.1	2.7
Am-241	6.390E+00	5280-5600	4.326E+02	0.8	1.1	2.7
Total Activity	1.827E+01	3000-8000		0.3	1.1	2.3

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY
HEALTH PHYSICS SOCIETY
FOUNDED 1966

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82244-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82244-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 9-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	7.352E+00	4420-4800	7.540E+04	0.8	1.1	2.7
Pu-239	6.717E+00	4950-5240	2.410E+04	0.9	1.1	2.8
Am-241	6.897E+00	5280-5600	4.326E+02	0.9	1.1	2.8
Total Activity	2.101E+01	3000-8000		0.6	1.1	2.5

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY
HEALTH PHYSICS SOCIETY
FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82245-334_00001

Eckert & Ziegler
Analytics

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www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82245-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 9-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	6.727E+00	4420-4800	7.540E+04	1.0	1.1	3.0
Pu-239	5.437E+00	4950-5240	2.410E+04	1.1	1.1	3.1
Am-241	5.528E+00	5280-5600	4.326E+02	1.1	1.1	3.1
Total Activity	1.773E+01	3000-8000		0.8	1.1	2.7

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82246-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82246-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 9-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	5.570E+00	4420-4800	7.540E+04	1.0	1.1	3.0
Pu-239	5.353E+00	4950-5240	2.410E+04	1.0	1.1	3.0
Am-241	6.002E+00	5280-5600	4.326E+02	1.0	1.1	3.0
Total Activity	1.696E+01	3000-8000		0.7	1.1	2.6

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY
HEALTH PHYSICS SOCIETY
FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06.24.2010
E. A. Taskaev, QA Manager Alternate

Reagent

82247-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
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www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82247-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 10-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	6.251E+00	4420-4800	7.540E+04	0.9	1.1	2.8
Pu-239	5.746E+00	4950-5240	2.410E+04	0.9	1.1	2.8
Am-241	6.291E+00	5280-5600	4.326E+02	0.9	1.1	2.8
Total Activity	1.832E+01	3000-8000		0.6	1.1	2.5

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY
HEALTH PHYSICS SOCIETY
FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

Th-229_00002

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

82832-334
5 mL Liquid in Flame Sealed Vial

Customer: Test America/Earth City, MO
P.O. No.: 2370431, Item 1

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty*, % Type u_A	u_B	U	Reference Date (12:00 PM EST)
Th-229	2.681E+06	3.813E+03	0.3	1.0	2.1	07/14/2010

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: Th-228 - 1.25 Bq, Th-230 - 23.7 Bq, Th-232 - 1.5 Bq. 5.11380 grams 0.5M HNO3 solution.

Source Prepared by: _____
W. Mao, Radiochemist

QA Approved: _____ Date: 7/21/10
J. D. McCorvey, QA Manager Alternate

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1956

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Th-229_00012

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Th-229-00012

Reagent ID: Th-229_00012

Description:	Th-229 Tracer	Expiration Date:	12/26/2014
No. of Bottles:	1	Laboratory:	TestAmerica St. Louis
Storage Location:	RAD Actinide STDs	Prepared By:	Bramblett, Megan L
Reagent Volume:	500.000 mL	Solvent:	0.1M HNO3
Creation Date:	12/23/2013	Solvent Lot:	L0022
Container(s):	282329		
Comment:			

282329
ID: Th-229_00012
Exp: 12/26/14 Prpd: MLM Crt: 12/23/13
Th-229 Tracer

Reagent Analyte Information

Analyte	Source ID	Source Exp. Date	Source Conc.	Source Conc. Units	Final Conc.	Final Conc. Units
Th-229	Th-229_00004	07/14/2060	2264.31000	dpm/mL	67.92931	dpm/mL

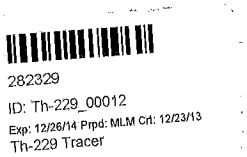
Source Reagents

Reagent	Description	Type	Expiration	Vendor	Vendor Lot #	Vendor Cat Lot #	Volume Used	Volume Units
Th-229_00004	Th-229 Parent		07/14/60				15.00000	mL

St. Louis Radiological Standard Reverification Form

Standard ID Number: Th-229_00012
True Value = 67.90686 DPM/L or g
Date Analyzed: 12/26/2013

Radionuclide: Th-229



Replicates		
#1	69.113	DPM/L or g
#2	66.755	DPM/L or g
#3	68.034	DPM/L or g

Mean = 67.96733

1 sigma = 1.180413

1.96 sigma = 2.313609

True Value minus 5% = 64.51152 (True Value - 5%)
True Value plus 5% = 71.3022 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? Yes **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? Yes **(Acceptance Criteria)**

Standard Reverification Acceptable? Yes

Note: Criteria for reverification of radiological standards is taken from the DOE QSAS and LANL Statements of Work

Reviewed By/Date: RTM 12/30/2013

SOP Reference: STL-QA-0002, Current Revision

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:30:35AM 12/30/2013

Sample

Sample Name: Verification-1
SampleType: Sample
:
Sample Collection Date:

Spectrum #1 Analysis #1
Sample Volume : 0.1000mL
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: Th-229_0012
AnalysisID: 592567

Analyst: 60040

Tracer

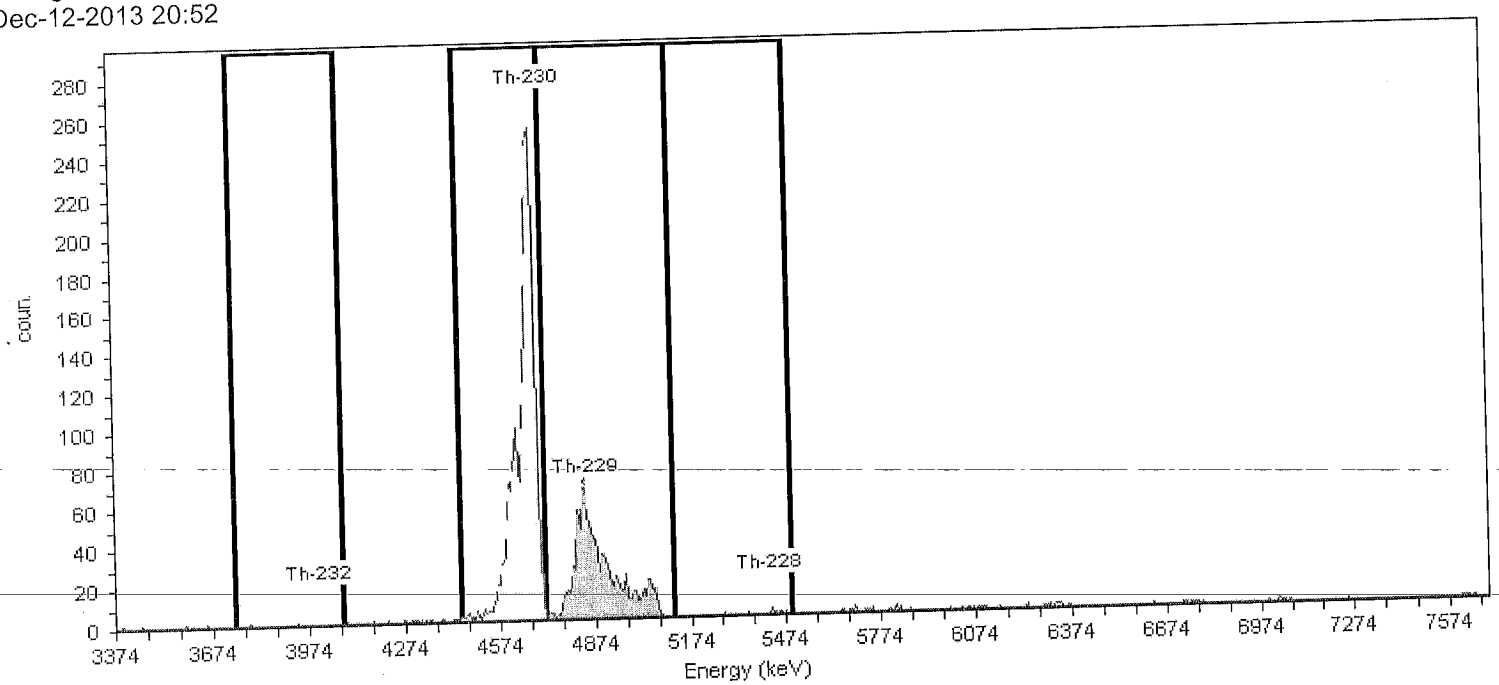
Tracer Name: Th-230_00017
Tracer Activity: 47.94 DPM/mL x (Vol.)0.30 mL = 14.38 DPM
Tracer Ref. Date: 4/11/2011 11:00:10AM

Tracer Nuclide: Th-230
Tracer Recovery: 90.73%

Acquisition

Detector: AV44
Serial Number: 50-051JJ1
Acquisition Start Date: 12/26/2013 4:26:11PM
Live Time: 600.00 min.
Real Time: 600.01 min.
Background Date: 12/12/2013 8:52:36PM
Background Info: Sample: ICB;AV44; Det: AV44; Spectrum #1; Dec-12-2013 20:52

Calibration Name: IC-9795;AV44-20130515
Calibration Date: 5/15/2013 9:25:41PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.64% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th-230_Tracer
Decay Correction: 12/26/2013 4:24:41PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	61.6	100.2	2	0.6250	1.38	0.095	DPM/mL
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	31.6	99.7	2079	0.0000	2079.38	130.481	DPM/mL
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	84.3	99.8	1004	3.7500	1000.25	69.113	DPM/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	36.0	99.8	8	7.5000	0.50	0.035	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:31:26AM 12/30/2013

Sample

Sample Name: Verification-2
SampleType: Sample
:
Sample Collection Date:

Spectrum #1 Analysis #1
Sample Volume : 0.1000mL
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: Th-229_0012
AnalysisID: 592570

Analyst: 60040

Tracer

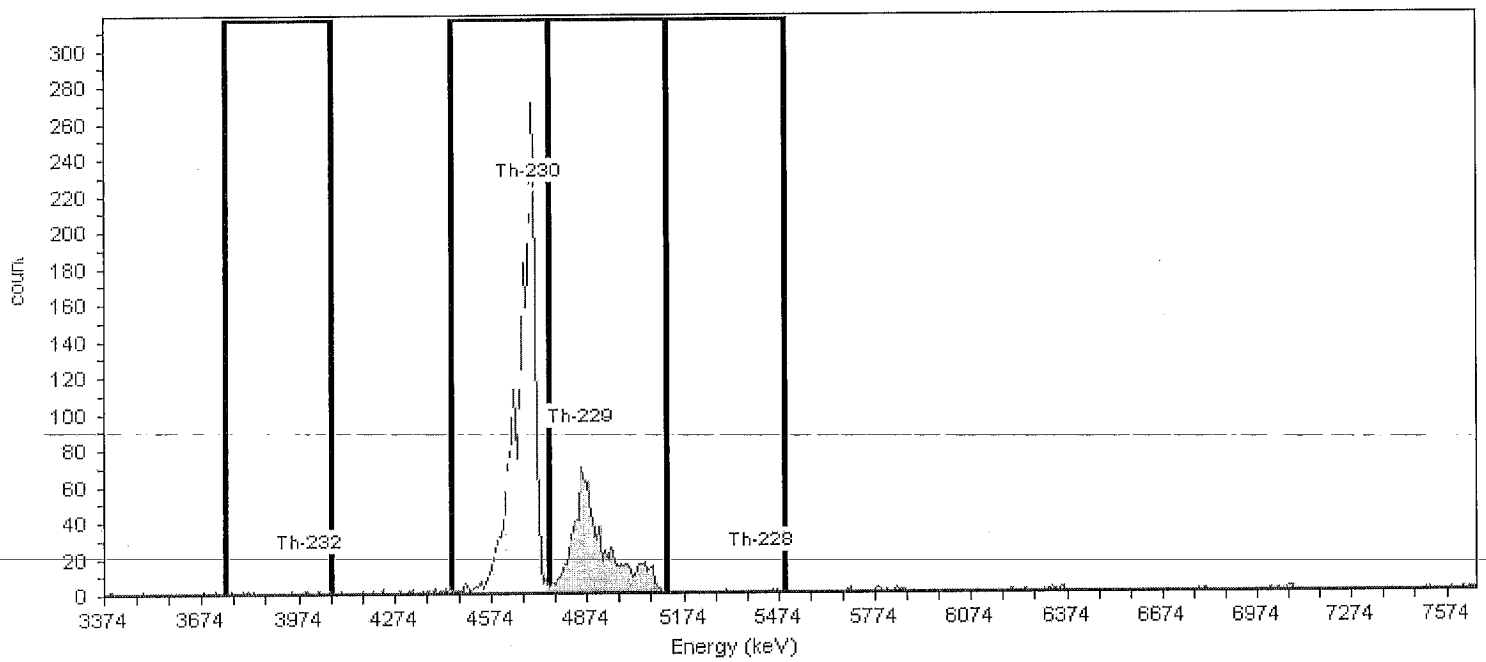
Tracer Name: Th-230_00017
Tracer Activity: 47.94 DPM/mL x (Vol.)0.30 mL = 14.38 DPM
Tracer Ref. Date: 4/11/2011 11:00:10AM

Tracer Nuclide: Th-230
Tracer Recovery: 95.22%

Acquisition

Detector: AV45
Serial Number: 48-158FF2
Acquisition Start Date: 12/26/2013 4:26:13PM
Live Time: 600.00 min.
Real Time: 600.01 min.
Background Date: 12/12/2013 8:52:38PM
Background Info: Sample: ICB;AV45; Det: AV45; Spectrum #1; Dec-12-2013 20:52

Calibration Name: IC-9817;AV45-20130515
Calibration Date: 5/15/2013 9:25:55PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.68% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th-230_Tracer
Decay Correction: 12/26/2013 4:24:41PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	37.3	100.2	7	0.0000	7.46	0.488	DPM/mL
Th-230	4688.0	4,687.5	0.5	4448.3	4754.1	64.3	99.7	2186	0.6250	2185.38	136.944	DPM/mL
Th-229	4848.0	4,845.3	2.7	4754.1	5119.5	79.8	99.8	1016	0.6250	1015.38	66.755	DPM/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	24.9	99.8	3	5.6250	-2.63	-0.173	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:32:04AM 12/30/2013

Sample

Sample Name: Verification-3
SampleType: Sample
:
Sample Collection Date:

Spectrum #1 Analysis #1
Sample Volume : 0.1000mL
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: Th-229_0012
AnalysisID: 592571

Analyst: 60040

Tracer

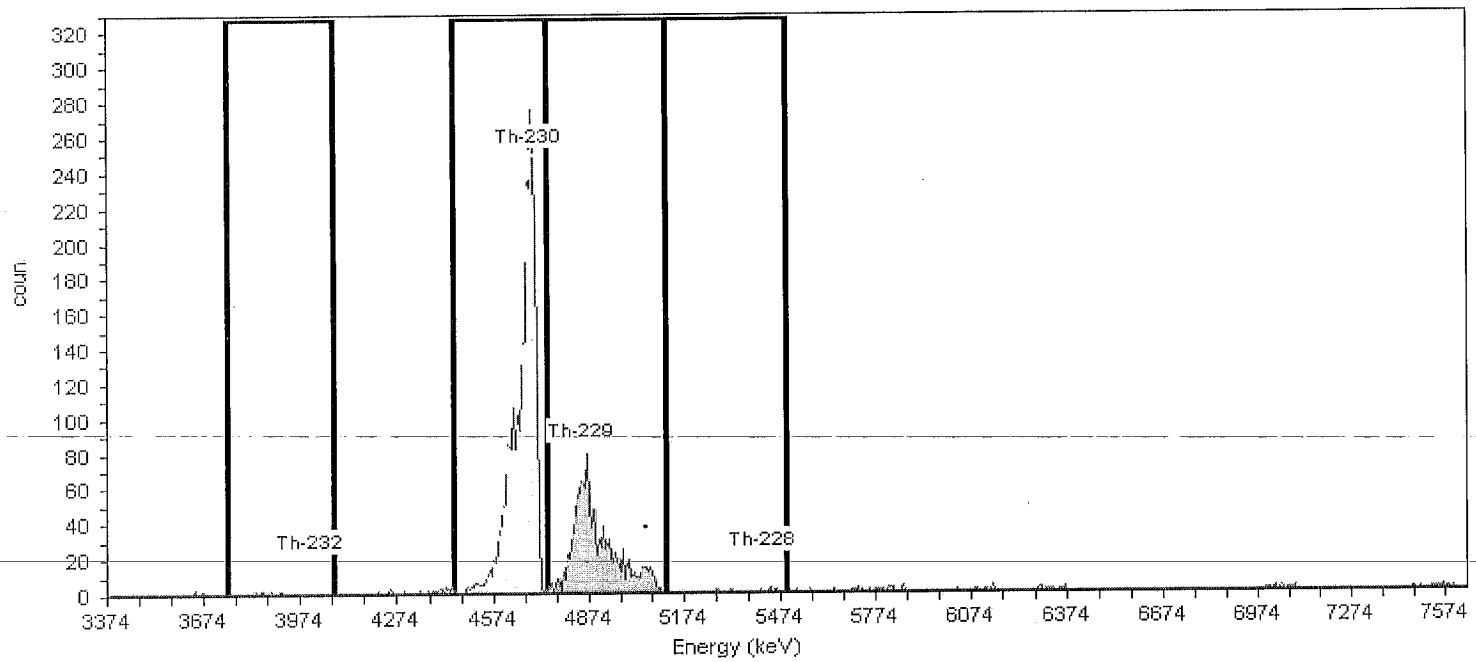
Tracer Name: Th-230_00017
Tracer Activity: 47.94 DPM/mL x (Vol.)0.30 mL = 14.38 DPM
Tracer Ref. Date: 4/11/2011 11:00:10AM

Tracer Nuclide: Th-230
Tracer Recovery: 93.94%

Acquisition

Detector: AV46
Serial Number: 49-202GG2
Acquisition Start Date: 12/26/2013 4:26:15PM
Live Time: 600.00 min.
Real Time: 600.01 min.
Background Date: 12/12/2013 8:52:40PM
Background Info: Sample: ICB;AV46; Det: AV46; Spectrum #1; Dec-12-2013 20:52

Calibration Name: IC-9884;AV46-20130515a
Calibration Date: 5/16/2013 12:12:59AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 27.46% +/- 0.39% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th-230_Tracer
Decay Correction: 12/26/2013 4:24:41PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	95.0	100.2	5	0.6250	4.38	0.282	DPM/mL
Th-230	4688.0	4,687.5	0.5	4448.3	4739.1	36.4	99.7	2219	0.0000	2219.00	135.103	DPM/mL
Th-229	4848.0	4,845.3	2.7	4739.1	5119.5	78.0	99.8	1052	1.2500	1050.75	68.034	DPM/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	15.7	99.8	7	4.3750	2.63	0.170	DPM/mL

Decay Correction

Thorium-229								
Initial Activity:	67.929	dpm						
Reference Date:	7/14/2010							
Current Date:	12/26/2013		(or date at which you wish to determine activity)					
Elapsed Time:	1261	days						
Half Life:	2680935	days	64342440					
Exponential Term:	0.999674026							
Corrected Activity:	67.90685689	dpm	30.58867427	pCi				

Lm 12/30/13

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Actinide Prep

Batch No. : —

Balance ID : —

Note: If a section below is not used, marked the N/A box and initial & date next to the N/A. i.e. Mark the N/A box if a tracer is not added to the sample(s) then initial and date next to the N/A

No.	Sample Number	Aliquot (g / mL)	MS	Initials
44 1	Verification 1	0.1		
45 2	1 2	1		
46 3	1 3	1		
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				

Tracer ☐ N/A

Initials / Date

Isotope : Th-230

Std Sol'n No. : Th-230.0007

Vol (mL) : 0.3

Ref Activity (dpm/mL) : 47.94 dpm/mL

Act Ref Date : 4-11-11

Samples Spiked and Traced By: MB 12/23/13 (Initials / Date)

Verification Signature & Date: [signature] 12/23/13 (Initials / Date)

LCS Standard ☐ N/A

Initials / Date

Isotope : Th-229

Std Sol'n ID. : Th-229-0002

Vol (mL) : 0.1

Ref Activity (dpm/mL) : 47.929 dpm/mL — corrected activity 67.9086

Act Ref Date : 7-14-10

SOP's applied in preparing these samples. Mark box to left for all that apply:

☐	ST-RC-0003 Rev.	☐	ST-RC-0040 Rev.	☐	ST-RC-0110 Rev.
☐	ST-RC-0004 Rev.	☐	ST-RC-0041 Rev.	☐	ST-RC-0120 Rev.
☐	ST-RC-0014 Rev.	☐	ST-RC-0050 Rev.	☐	ST-RC-0232 Rev.
☐	ST-RC-0020 Rev.	☐	ST-RC-0090 Rev.	☐	ST-RC-0238 Rev.
☐	ST-RC-0021 Rev.	☑	ST-RC-0100 Rev.	☐	ST-RC-0240 Rev.
				☐	ST-RC-0241 Rev.
				☑	ST-RC-0242 Rev.
				☐	ST-RC-5016 Rev.
				☐	
				☐	

Isotope(s)

αβ ☐	Iso Pu ☐	Tc-99 ☐	Iso Cm ☐
Iso Am ☐	Ra ☐	Iso Th ☑	Pu-241 ☐
KPA ☐	Sr ☐	Iso U ☐	Th-229 ☐
Np ☐	TAR ☐	C-14 ☑	Cl-36 ☐

Count Time		Matrix	
Long Count	☐	Soil	☐
Short Count	☐	H_2O	☐

Prepared By : MB

Date : 12/23/13

Reviewed by: _____

Date: _____

Sequential Thorium, Plutonium and Uranium via TEVA/UTEVA ST-RC-0242

Batch: Th229 Verification

All rinses should flow at 1 mL/minute (only 3M HNO_3 may be done at 3 mL/minute)

*only necessary when analyzing for *Pu*

TEVA lot: TE512BM

UTEVA lot: _____

11.5.2 Stack TEVA on top of UTEVA cartridge

11.5.3 5mL 3M HNO_3 — COMPLETED ☐

*11.5.4 To samples, add 1mL ascorbic acid solution Place in hot water bath for 5 minutes — COMPLETED ☐

*11.5.5 To samples, add 1mL $NaNO_2$ solution Place in hot water bath for 5 minutes — COMPLETED ☐

*11.5.6 Cold water bath until samples reach room temperature

11.5.7 Load sample

11.5.8 20mL 3M HNO_3 — COMPLETED ☐

11.59 Split cartridges: TEVA / UTEVA

TEVA

11.5.10-11.5.11 Elute *Th* into clean tube using 20mL 9M HCl — COMPLETED ☐

11.5.12 5mL 6M HCl into *Th* tube — COMPLETED ☐

11.5.16 Elute *Pu* into clean tube with 20mL 1M HCl + 0.250 mL $TiCl_3$ — COMPLETED ☐ — COMPLETED ☐

UTEVA

11.5.19 5mL 3M HNO_3 — COMPLETED ☐

11.5.20 5mL 9M HCl — COMPLETED ☐

11.5.21 20mL 5M HCl / 0.05M oxalic — COMPLETED ☐

11.5.22-11.5.23 Elute *U* into clean tube with 15mL 1M HCl — COMPLETED ☐

Reagent

TRM-2_00001

Perry, Doug E

From: Salmi, Douglas R
Sent: March 20, 2000 10:48 AM
To: Perry, Doug E; Puissant, Pamela M
Subject: FW: SRMs for radiochemistry LCSs

Pam, Doug
FYI

-----Original Message-----
From: Minteer@aol.com [mailto:Minteer@aol.com]
Sent: March 20, 2000 10:36 AM
To: drsalmi@sandia.gov
Cc: dbourne@doeal.gov; GLDechant@aol.com; crandallb@quanterra.com
Subject: SRMs for radiochemistry LCSs

Doug:

As we discussed by telephone, please send approximately 500 grams each of PEM-1, TRM-2, and NBHD to STL St. Louis. These are to be used by STL as laboratory control samples. As with our other laboratories, STL will be asked to provide summaries of the data obtained in quarterly progress reports. This is not to assess their proficiency, but rather to help us develop interlaboratory acceptance criteria. The known values (given below) for PEM and TRM are good because the samples are well characterized. The known values for NBHD result from a single analysis and hence should be taken as estimates. All the values below are in pCi/g.

PEM-1:

Parameter	Result	Std. Dev.
Pu-238	8.03	0.37
Pu-239	41.0	3.0
Am-241	32.5	1.1
Cs-137	73.5	0.9
U-234	5.99	0.2
U-235	0.27	0.04
U-238	18.1	0.5

TRM-2

Parameter	Result	Uncertainty
U-238	6.0	+/- 4.0
U-234	6.2	+/- 4.0
Th-230	24.5	+/- 0.6
Ra-226	25.4	+/- 0.9
Pb-210	22.1	+/- 1.2

NBHD

Parameter	Result	Uncertainty
Am-241	1.47	+/- 0.28
Ra-226	67.3	+/- 5.5
U-234	174	none available
U-235	8.7	"
U-238	212	"
Cs-137	52.1	+/- 4.6
Pb-210	78.3	+/- 2.4
Pu-239/40	4.7	+/- 0.63
Pu-238	0.3	+/- 0.11
Th-230	83.4	+/- 6.5

ALPHA SPECTROSCOPY

Method A-01-R Th

Isotopic Thorium (Alpha Spectrometry) by Method A-01-R

Prep Batch: 128228

, Extraction Chromatography Resin Actinide

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128228

Lab ID: MB 160-128228/1-A
Client ID:
Sigma: 2
Analyzed: 07/01/14 12:25
Detector: AV115
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.006508	0.0215	0.0216	U	pCi/g	1.00	0.0541	129241
Thorium-230	0.1211	0.0724	0.0731		pCi/g	1.00	0.0541	129241
Thorium-232	0.0000	0.00389	0.00389	U	pCi/g	1.00	0.0311	129241

Tracer	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.611	0.463	0.661		pCi/g	0.0435	6.12	91.7	30 - 110

Lab ID: LCS 160-128228/2-A
Client ID:
Sigma: 2
Analyzed: 07/01/14 12:25
Detector: AV116
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	20.69	1.28	2.16		pCi/g	1.00	0.0591	129242

Tracer	LCS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	11.54	0.926	1.34		pCi/g	0.0557	12.2	94.3	30 - 110

Lab ID: 680-102380-1
Client ID: SD-224-SS
Sigma: 2
Analyzed: 07/01/14 12:26
Detector: AV15
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.01	0.220	0.235		pCi/g	1.00	0.106	129260
Thorium-230	1.00	0.216	0.232		pCi/g	1.00	0.0716	129260
Thorium-232	1.35	0.248	0.273		pCi/g	1.00	0.0520	129260

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.19	0.451	0.627		pCi/g	0.0695	6.10	85.0	30 - 110

Lab ID: 680-102380-2
Client ID: SD-224-01
Sigma: 2
Analyzed: 07/01/14 12:26
Detector: AV16
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.22	0.239	0.260		pCi/g	1.00	0.0881	129261
Thorium-230	1.00	0.216	0.232		pCi/g	1.00	0.0716	129261
Thorium-232	1.43	0.256	0.283		pCi/g	1.00	0.0521	129261

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128228

Lab ID: 680-102380-2 | Analyzed: 07/01/14 12:26 | Decay Corrected: No
Client ID: SD-224-01 | Detector: AV16 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.93	0.428	0.596		pCi/g	0.0422	6.13	80.5	30 - 110

Lab ID: 680-102380-3 | Analyzed: 07/01/14 12:26 | Decay Corrected: No
Client ID: SD-224-02 | Detector: AV17 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.800	0.202	0.213		pCi/g	1.00	0.121	129262
Thorium-230	0.817	0.198	0.210		pCi/g	1.00	0.0679	129262
Thorium-232	0.777	0.193	0.204		pCi/g	1.00	0.0676	129262

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.96	0.438	0.605		pCi/g	0.0502	6.14	80.9	30 - 110

Lab ID: 680-102380-5 | Analyzed: 07/01/14 12:26 | Decay Corrected: No
Client ID: SD-223-SS | Detector: AV18 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.27	0.254	0.275		pCi/g	1.00	0.0887	129263
Thorium-230	1.28	0.254	0.275		pCi/g	1.00	0.0649	129263
Thorium-232	1.14	0.238	0.257		pCi/g	1.00	0.0707	129263

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.84	0.437	0.597		pCi/g	0.0296	6.12	79.0	30 - 110

Lab ID: 680-102380-6 | Analyzed: 07/01/14 12:26 | Decay Corrected: No
Client ID: SD-223-01 | Detector: AV19 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.17	0.246	0.265		pCi/g	1.00	0.0786	129264
Thorium-230	0.744	0.199	0.209		pCi/g	1.00	0.105	129264
Thorium-232	1.24	0.252	0.273		pCi/g	1.00	0.0664	129264

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.74	0.435	0.590		pCi/g	0.0760	6.13	77.3	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128228

Lab ID: 680-102380-7
Client ID: SD-223-02
Sigma: 2
Analyzed: 07/01/14 12:26
Detector: AV20
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.54	0.291	0.319		pCi/g	1.00	0.123	129265
Thorium-230	1.04	0.238	0.254		pCi/g	1.00	0.0991	129265
Thorium-232	1.36	0.272	0.295		pCi/g	1.00	0.0984	129265

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.50	0.422	0.567		pCi/g	0.0701	6.13	73.5	30 - 110

Lab ID: 680-102380-8
Client ID: SD-226-SS
Sigma: 2
Analyzed: 07/01/14 12:26
Detector: AV21
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.01	0.218	0.234		pCi/g	1.00	0.0929	129266
Thorium-230	1.15	0.231	0.250		pCi/g	1.00	0.0697	129266
Thorium-232	1.28	0.241	0.264		pCi/g	1.00	0.0590	129266

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.32	0.459	0.641		pCi/g	0.0514	6.14	86.7	30 - 110

Lab ID: 680-102380-9
Client ID: SD-226-01
Sigma: 2
Analyzed: 07/01/14 12:26
Detector: AV23
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.21	0.238	0.259		pCi/g	1.00	0.0909	129267
Thorium-230	0.979	0.214	0.229		pCi/g	1.00	0.0745	129267
Thorium-232	1.36	0.250	0.275		pCi/g	1.00	0.0595	129267

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.12	0.445	0.619		pCi/g	0.0687	6.10	83.9	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128228

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-128228/1-A	Thorium-228			0.006508	U	pCi/g							
MB 160-128228/1-A	Thorium-230			0.1211		pCi/g							
MB 160-128228/1-A	Thorium-232			0.0000	U	pCi/g							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-128228/2-A	Thorium-230		24.5	20.69		pCi/g	84	81 - 118					

Glossary:

Ts = Count Duration, Sample

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102380-1

SDG No.: 680102380-1

Batch Number: 128228 Batch Start Date: 06/23/14 15:05 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/01/14 09:24

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-128228/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-128228/2		ExtChrom, A-01-R		0.4997 g	0.2 mL	0.4997 g			
680-102380-A-1-A	SD-224-SS	ExtChrom, A-01-R	T	1.0032 g	0.2 mL				
680-102380-A-2-A	SD-224-01	ExtChrom, A-01-R	T	0.9990 g	0.2 mL				
680-102380-A-3-A	SD-224-02	ExtChrom, A-01-R	T	0.9975 g	0.2 mL				
680-102380-A-5-A	SD-223-SS	ExtChrom, A-01-R	T	0.9993 g	0.2 mL				
680-102380-A-6-A	SD-223-01	ExtChrom, A-01-R	T	0.9980 g	0.2 mL				
680-102380-A-7-A	SD-223-02	ExtChrom, A-01-R	T	0.9983 g	0.2 mL				
680-102380-A-8-A	SD-226-SS	ExtChrom, A-01-R	T	0.9969 g	0.2 mL				
680-102380-A-9-A	SD-226-01	ExtChrom, A-01-R	T	1.0033 g	0.2 mL				

Batch Notes	
Balance ID	27050421
Column Analyst	scb
Column Date	6/27/14
CoPrecipitation Analyst	scb
CoPrecipitation Date	7/1/14
Person's name who witnessed reagent drop	nmn per scb
Analyst who added reagent	scb
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102380-1

SDG No.: 680102380-1

Batch Number: 128412 Batch Start Date: 06/24/14 14:58 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/02/14 14:52

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-128412/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-128412/2		ExtChrom, A-01-R		0.5018 g	0.2 mL	0.5018 g			
680-102380-A-10 -A	SD-226-02	ExtChrom, A-01-R	T	1.0046 g	0.2 mL				
680-102380-A-10 -A DU	SD-226-02	ExtChrom, A-01-R	T	1.0010 g	0.2 mL				
680-102380-A-12 -A	SD-225-SS	ExtChrom, A-01-R	T	0.9992 g	0.2 mL				
680-102380-A-13 -A	SD-225-01	ExtChrom, A-01-R	T	0.9962 g	0.2 mL				
680-102380-A-14 -A	SD-225-02	ExtChrom, A-01-R	T	0.9993 g	0.2 mL				
680-102380-A-16 -A	SD-228-SS	ExtChrom, A-01-R	T	0.9982 g	0.2 mL				
680-102380-A-17 -A	SD-228-01	ExtChrom, A-01-R	T	1.0048 g	0.2 mL				
680-102380-A-18 -A	SD-228-02	ExtChrom, A-01-R	T	0.9957 g	0.2 mL				
680-102380-A-20 -A	SD-234-SS	ExtChrom, A-01-R	T	1.0043 g	0.2 mL				
680-102380-A-21 -A	SD-234-01	ExtChrom, A-01-R	T	0.9975 g	0.2 mL				
680-102380-A-22 -A	SD-235-SS	ExtChrom, A-01-R	T	.9991 g	0.2 mL				
680-102380-A-23 -A	SD-23501	ExtChrom, A-01-R	T	0.9992 g	0.2 mL				
680-102380-A-24 -A	SD-235-02	ExtChrom, A-01-R	T	0.9987 g	0.2 mL				
680-102380-A-26 -A	SD-236-SS	ExtChrom, A-01-R	T	0.9988 g	0.2 mL				
680-102380-A-27 -A	SD-236-01	ExtChrom, A-01-R	T	0.9978 g	0.2 mL				
680-102380-A-28 -A	SD-236-02	ExtChrom, A-01-R	T	1.0000 g	0.2 mL				
680-102380-A-29 -A	SD-237-SS	ExtChrom, A-01-R	T	1.0007 g	0.2 mL				
680-102380-A-30 -A	SD-237-01	ExtChrom, A-01-R	T	0.9969 g	0.2 mL				
680-102380-A-31 -A	SD-237-02	ExtChrom, A-01-R	T	1.0027 g	0.2 mL				

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102380-1

SDG No.: 680102380-1

Batch Number: 128412 Batch Start Date: 06/24/14 14:58 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/02/14 14:52

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
680-102380-A-33-A	SD-DUP05	ExtChrom, A-01-R	T	1.0026 g	0.2 mL				
680-102380-A-34-A	SD-227-SS	ExtChrom, A-01-R	T	1.0005 g	0.2 mL				

Batch Notes	
Balance ID	27050421
Column Analyst	nmn per scb
Column Date	7/2/14
CoPrecipitation Analyst	scb
CoPrecipitation Date	7/2/14
Person's name who witnessed reagent drop	nmn per scb
Analyst who added reagent	scb
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102380-1

SDG No.: 680102380-1

Batch Number: 128417 Batch Start Date: 06/24/14 15:13 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/02/14 14:51

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-128417/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-128417/2		ExtChrom, A-01-R		0.4999 g	0.2 mL	0.4999 g			
680-102380-A-35 -A	SD-227-01	ExtChrom, A-01-R	T	1.0005 g	0.2 mL				
680-102380-A-36 -A	SD-227-02	ExtChrom, A-01-R	T	0.9967 g	0.2 mL				

Batch Notes	
Balance ID	27050421
Column Analyst	nmn per scb
Column Date	7/2/14
CoPrecipitation Analyst	scb
CoPrecipitation Date	7/2/14
Person's name who witnessed reagent drop	nmn per scb
Analyst who added reagent	scb
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:26:32PM 7/1/2014

Sample

Sample Name: MB 160-128228/1-A
SampleType: Blank
: MB 160-128228/1-A
Sample Collection Date: 6/24/2014 11:10:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0000g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128228
AnalysisID: 613631

Analyst: 60040

Tracer

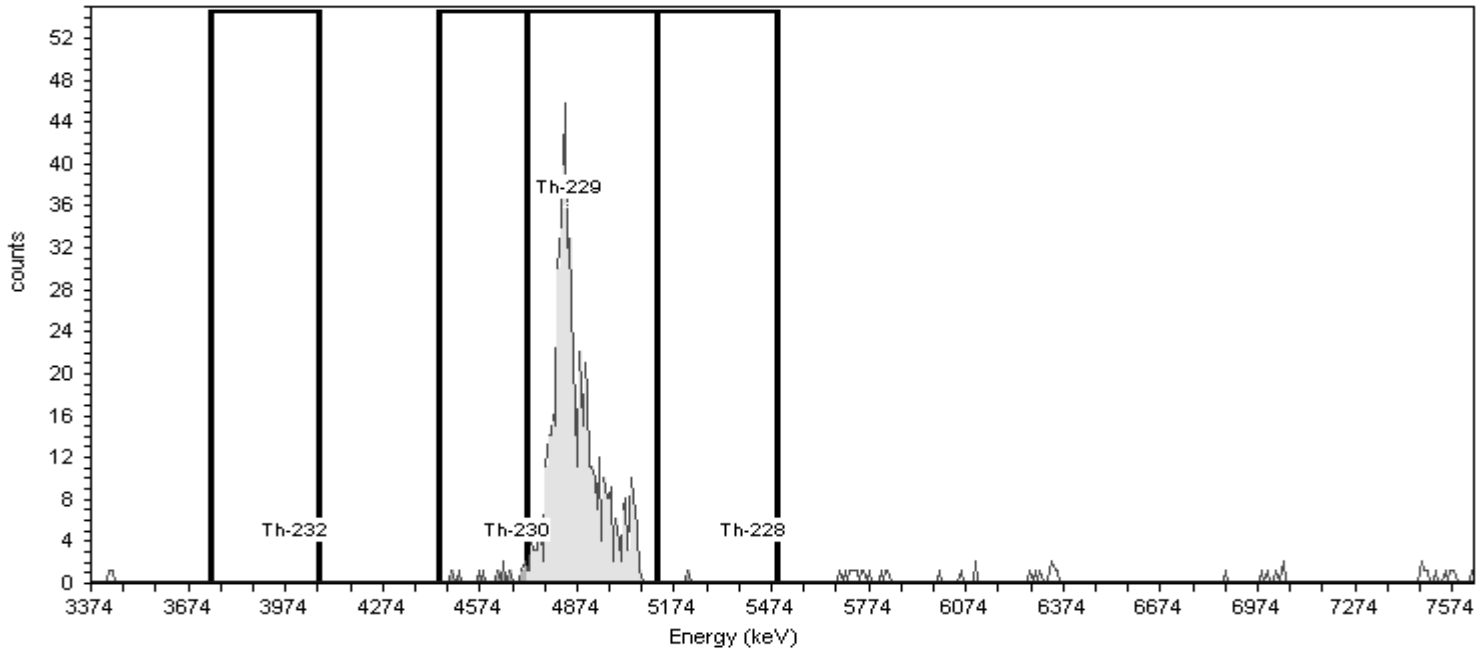
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 91.73%

Acquisition

Detector: AV115
Serial Number: 49-037E4
Acquisition Start Date: 7/1/2014 12:25:44PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:09:52PM
Background Info: Sample: ICB;AV115; Det: AV115; Spectrum #1; Jun-18-2014 19:09

Calibration Name: IC-9817;AV115-20140507
Calibration Date: 5/7/2014 10:49:29PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.26% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:22:09PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	.0	100.2	0	0.0000	0.00	0.000	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	.0	99.7	12	0.3750	11.63	0.121	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	67.0	99.6	587	0.1875	586.81	5.614	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	44.5	99.8	1	0.3750	0.63	0.007	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:26:42PM 7/1/2014

Sample

Sample Name: LCS 160-128228/2-A
SampleType: Control
: LCS 160-128228/2-A
Sample Collection Date: 6/24/2014 11:10:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.4997g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128228
AnalysisID: 613632

Analyst: 60040

Tracer

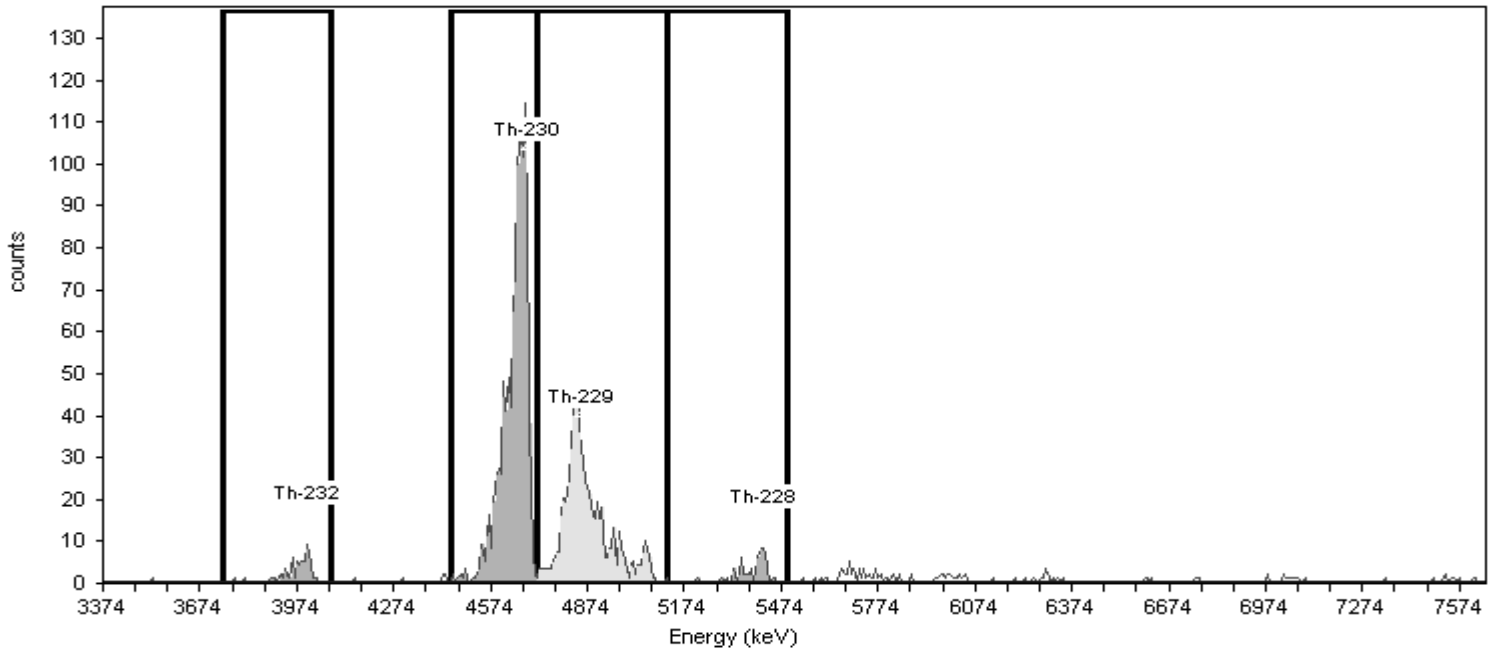
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 94.26%

Acquisition

Detector: AV116
Serial Number: 49-034G1
Acquisition Start Date: 7/1/2014 12:25:50PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:09:53PM
Background Info: Sample: ICB;AV116; Det: AV116; Spectrum #1; Jun-18-2014 19:09

Calibration Name: IC-9792;AV116-20140430
Calibration Date: 5/1/2014 1:16:57PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.04% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:22:07PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	61.4	100.2	62	0.0860	61.91	1.214	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	27.4	99.7	1050	0.0000	1050.06	20.690	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	74.0	99.6	621	0.0000	621.00	11.544	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	85.4	99.8	60	0.5625	59.37	1.169	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:28:09PM 7/1/2014

Sample

Sample Name: 680-102380-A-1-B
SampleType: Sample
: 680-102380-A-1-B
Sample Collection Date: 6/13/2014 8:20:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0032g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128228
AnalysisID: 613645

Analyst: 60040

Tracer

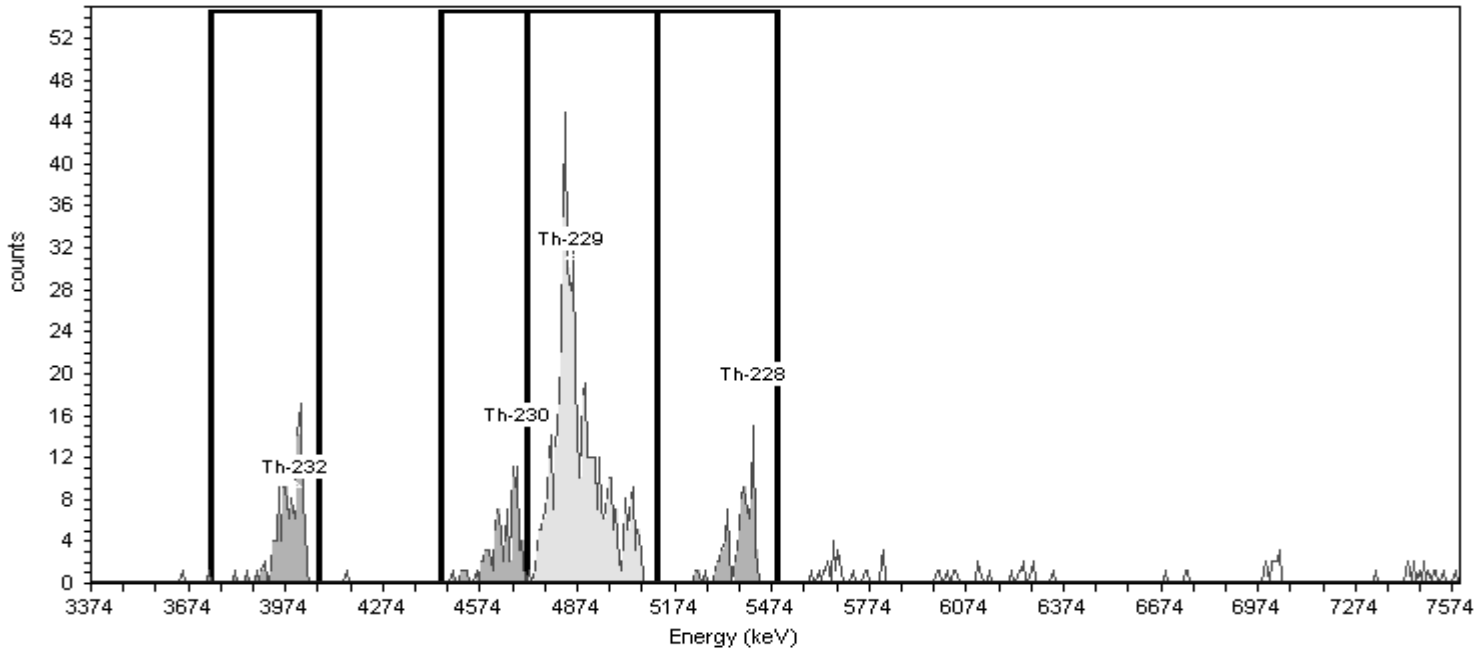
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 85.03%

Acquisition

Detector: AV15
Serial Number: 41-172C5
Acquisition Start Date: 7/1/2014 12:26:44PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:35PM
Background Info: Sample: ICB;AV15; Det: AV15; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9886;AV15-20140505
Calibration Date: 5/6/2014 5:39:42PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.62% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:22:07PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	86.3	100.2	118	0.1875	117.81	1.346	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	27.7	99.7	88	0.8136	87.22	1.002	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	67.8	99.6	532	1.3183	530.71	5.187	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	54.3	99.8	91	3.0000	88.00	1.010	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:28:14PM 7/1/2014

Sample

Sample Name: 680-102380-A-2-B
SampleType: Sample
: 680-102380-A-2-B
Sample Collection Date: 6/13/2014 8:25:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9990g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128228
AnalysisID: 613646

Analyst: 60040

Tracer

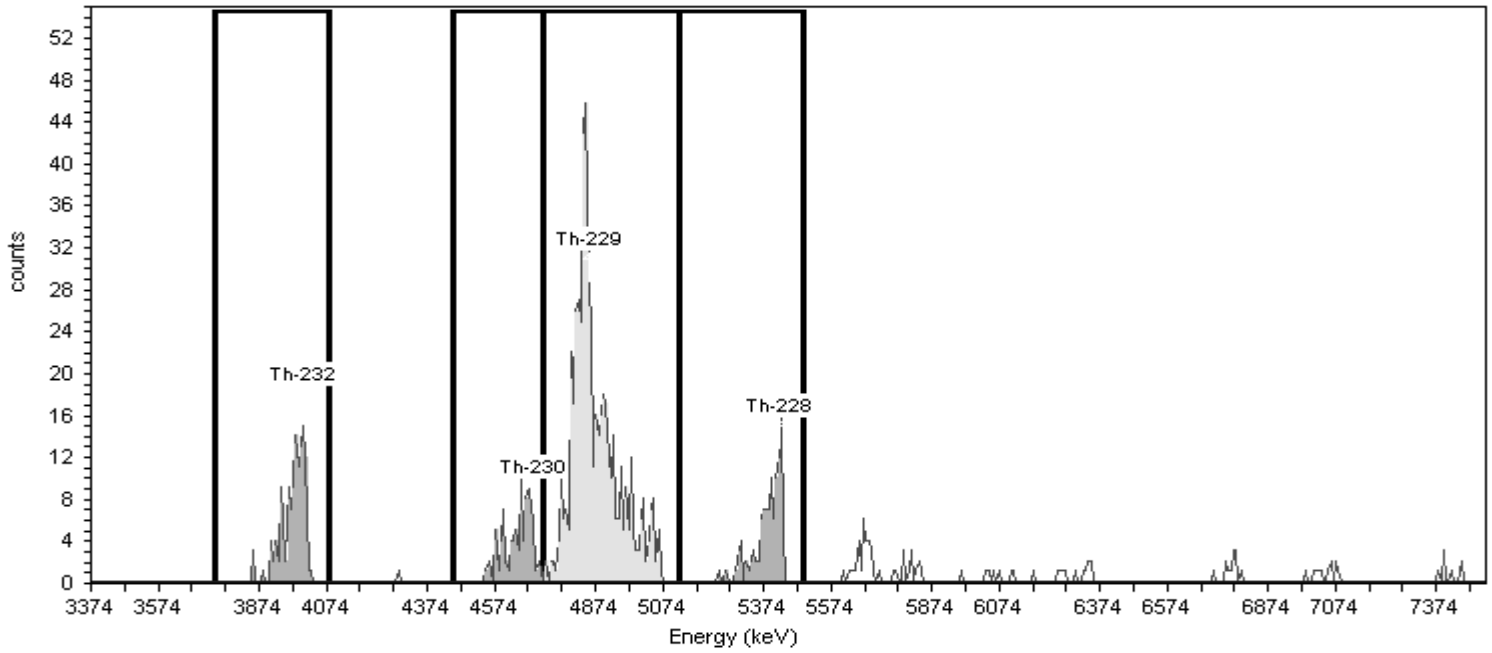
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 80.54%

Acquisition

Detector: AV16
Serial Number: 51-082B6
Acquisition Start Date: 7/1/2014 12:26:46PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:37PM
Background Info: Sample: ICB;AV16; Det: AV16; Spectrum #1;
Jun-18-2014 19:08

Calibration Name: IC-7107;AV16-20140505
Calibration Date: 5/5/2014 10:08:41PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.11% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:22:07PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	61.9	100.2	125	0.1875	124.81	1.429	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	24.5	99.7	88	0.8078	87.25	1.004	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	65.3	99.6	532	0.1875	531.87	4.934	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	70.5	99.8	108	1.6875	106.31	1.223	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:28:20PM 7/1/2014

Sample

Sample Name: 680-102380-A-3-B
SampleType: Sample
: 680-102380-A-3-B
Sample Collection Date: 6/13/2014 8:30:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9975g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128228
AnalysisID: 613647

Analyst: 60040

Tracer

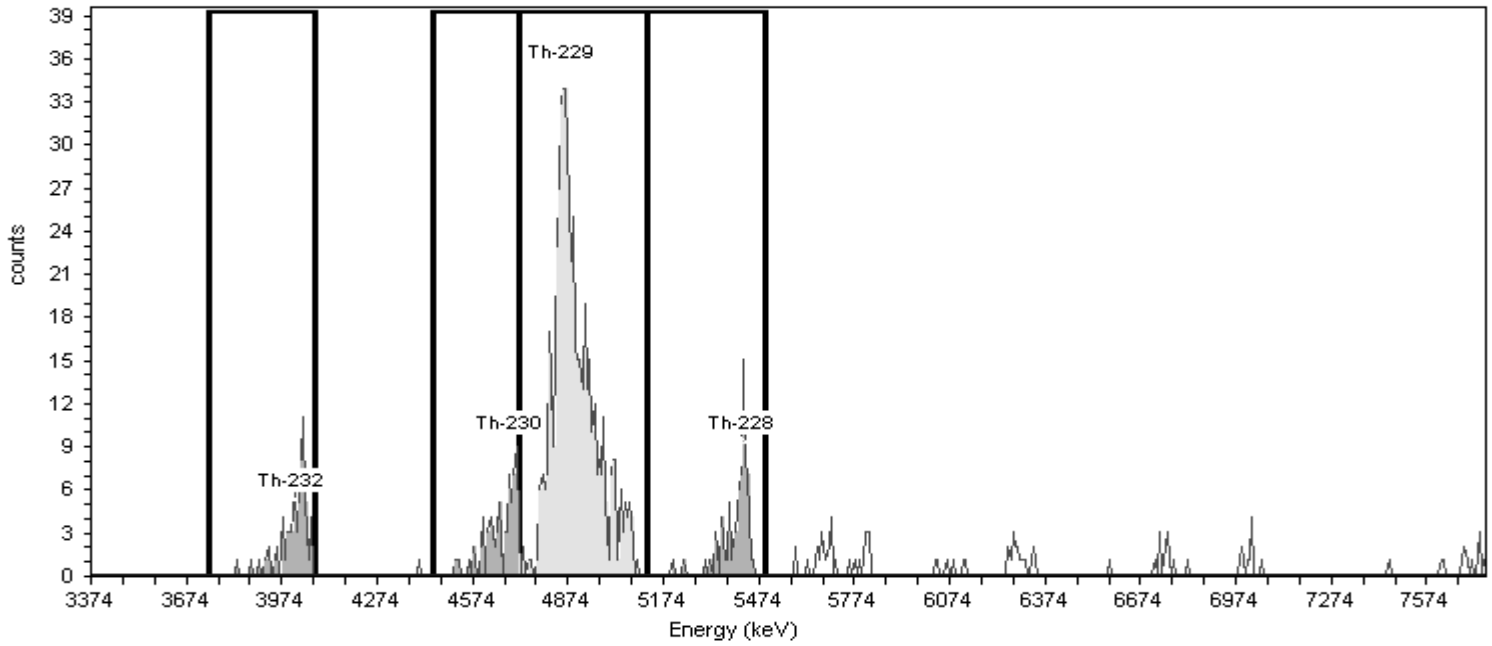
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 81.35%

Acquisition

Detector: AV17
Serial Number: 50-051C4
Acquisition Start Date: 7/1/2014 12:26:46PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:39PM
Background Info: Sample: ICB;AV17; Det: AV17; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-8874;AV17-20140505
Calibration Date: 5/5/2014 10:08:49PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.07% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:22:07PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	21.3	100.2	66	0.5625	65.44	0.773	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	9.4	99.7	69	0.5625	68.34	0.811	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	78.6	99.6	517	0.3750	516.53	4.991	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	50.8	99.8	71	3.9375	67.06	0.795	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:19:24AM 7/2/2014

Sample

Sample Name: 680-102380-A-3-B
SampleType: Sample
: 680-102380-A-3-B
Sample Collection Date: 6/13/2014 8:30:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9975g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128228
AnalysisID: 613782

Analyst: 60040

Tracer

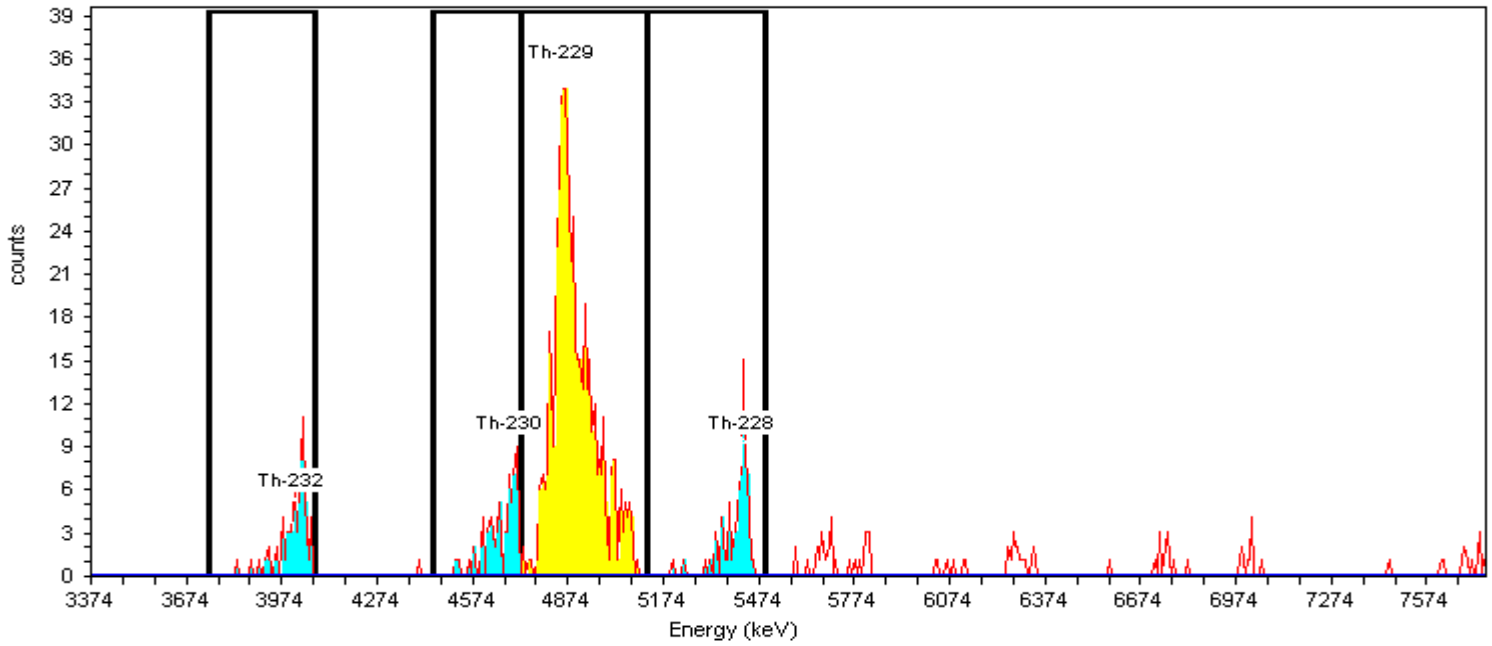
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 80.90%

Acquisition

Detector: AV17
Serial Number: 50-051C4
Acquisition Start Date: 7/1/2014 12:26:46PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:39PM
Background Info: Sample: ICB;AV17; Det: AV17; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-8874;AV17-20140505
Calibration Date: 5/5/2014 10:08:49PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.07% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:22:07PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/2/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	21.3	100.2	66	0.5625	65.44	0.777	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4724.2	33.3	99.7	69	0.5625	68.44	0.817	pCi/g
Th-229	4848.0	4,845.3	2.7	4724.2	5119.5	78.6	99.6	514	0.3750	513.63	4.963	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	50.8	99.8	71	3.9375	67.06	0.800	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:28:25PM 7/1/2014

Sample

Sample Name: 680-102380-A-5-B
SampleType: Sample
: 680-102380-A-5-B
Sample Collection Date: 6/13/2014 8:40:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9993g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128228
AnalysisID: 613648

Analyst: 60040

Tracer

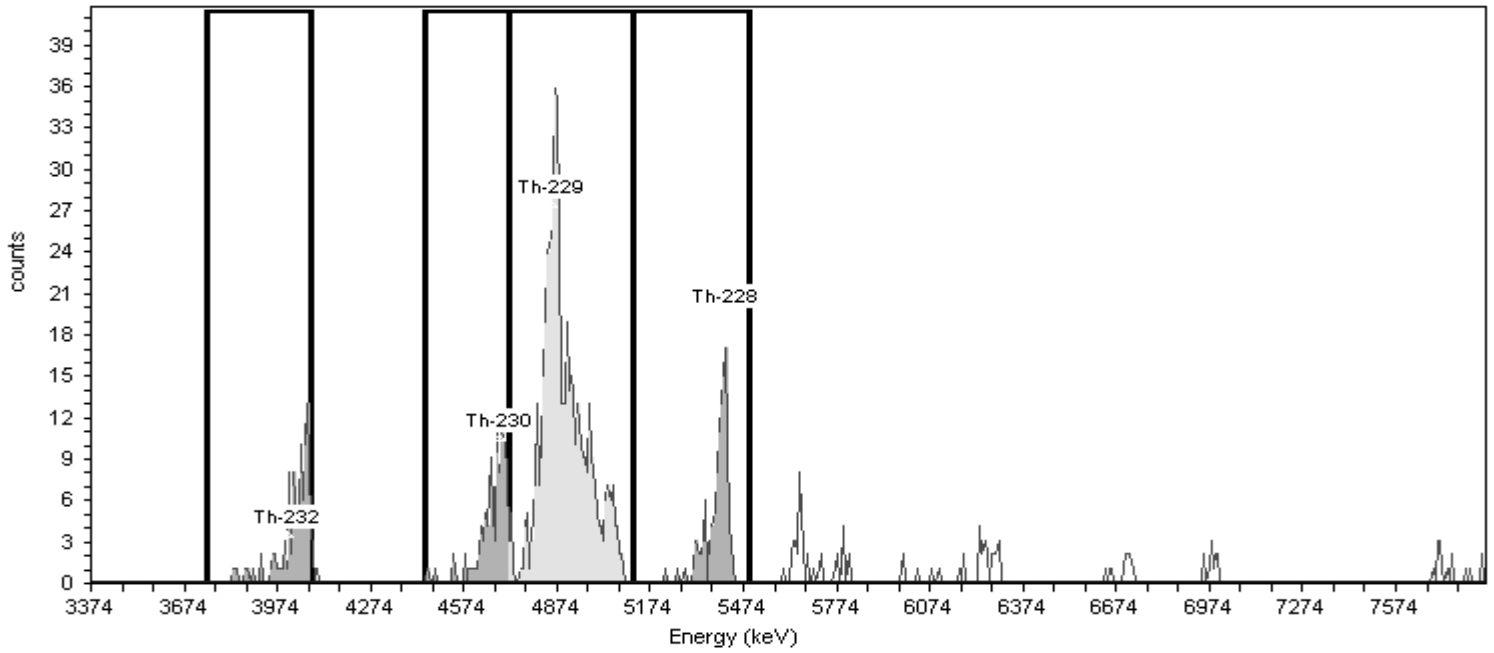
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 79.65%

Acquisition

Detector: AV18
Serial Number: 51-082C5
Acquisition Start Date: 7/1/2014 12:26:48PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:41PM
Background Info: Sample: ICB;AV18; Det: AV18; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-8875;AV18-20140505
Calibration Date: 5/5/2014 10:09:08PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.46% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:22:07PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	6.4	100.2	80	0.3750	79.75	0.983	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	48.0	99.7	97	0.3750	96.69	1.197	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	71.6	99.6	494	0.0000	494.06	4.878	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	47.4	99.8	103	1.3125	101.69	1.259	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:20:37AM 7/2/2014

Sample

Sample Name: 680-102380-A-5-B
SampleType: Sample
: 680-102380-A-5-B
Sample Collection Date: 6/13/2014 8:40:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9993g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128228
AnalysisID: 613784

Analyst: 60040

Tracer

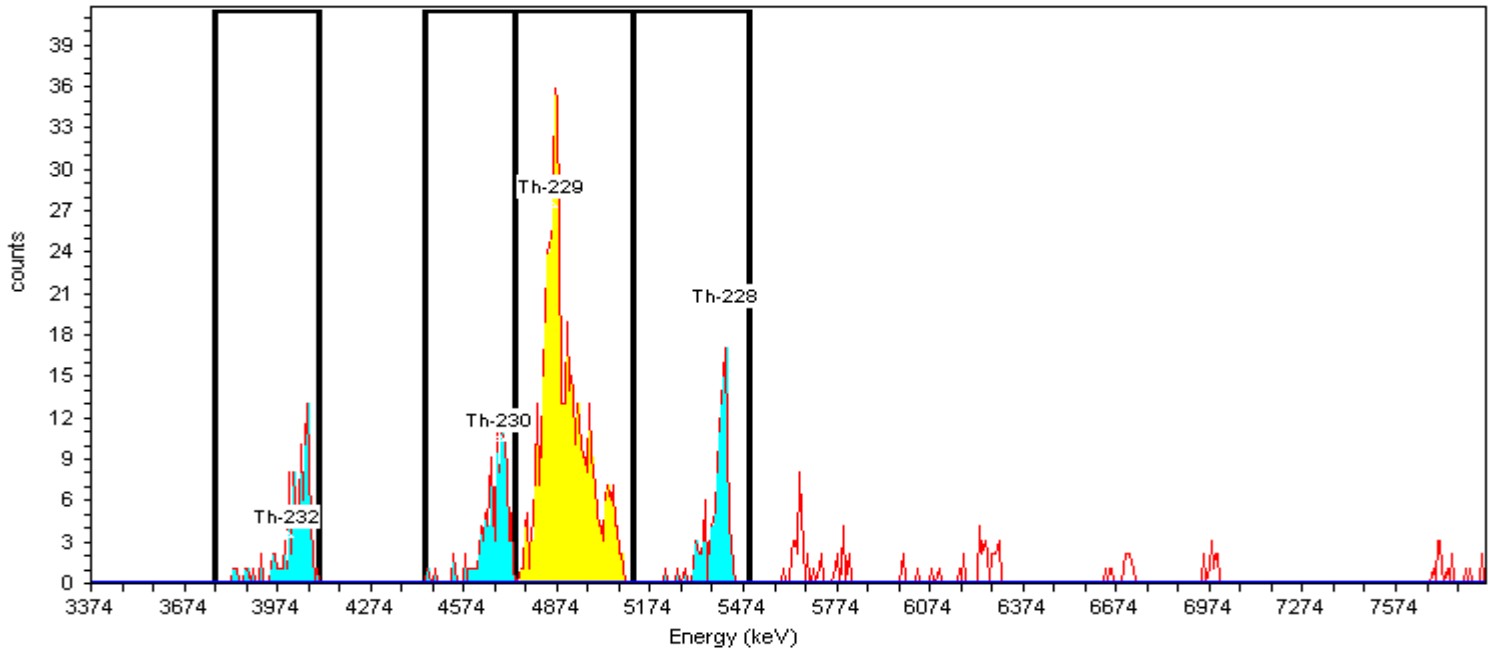
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 79.00%

Acquisition

Detector: AV18
Serial Number: 51-082C5
Acquisition Start Date: 7/1/2014 12:26:48PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:41PM
Background Info: Sample: ICB;AV18; Det: AV18; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-8875;AV18-20140505
Calibration Date: 5/5/2014 10:09:08PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.46% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:22:07PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/2/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3769.7	4105.3	13.3	100.2	92	0.5625	91.44	1.136	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4739.1	19.6	99.7	103	0.3750	102.63	1.281	pCi/g
Th-229	4848.0	4,845.3	2.7	4739.1	5119.5	71.6	99.6	490	0.0000	490.00	4.838	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	47.4	99.8	103	1.3125	101.69	1.269	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:28:31PM 7/1/2014

Sample

Sample Name: 680-102380-A-6-B
SampleType: Sample
: 680-102380-A-6-B
Sample Collection Date: 6/13/2014 8:45:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9980g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128228
AnalysisID: 613649

Analyst: 60040

Tracer

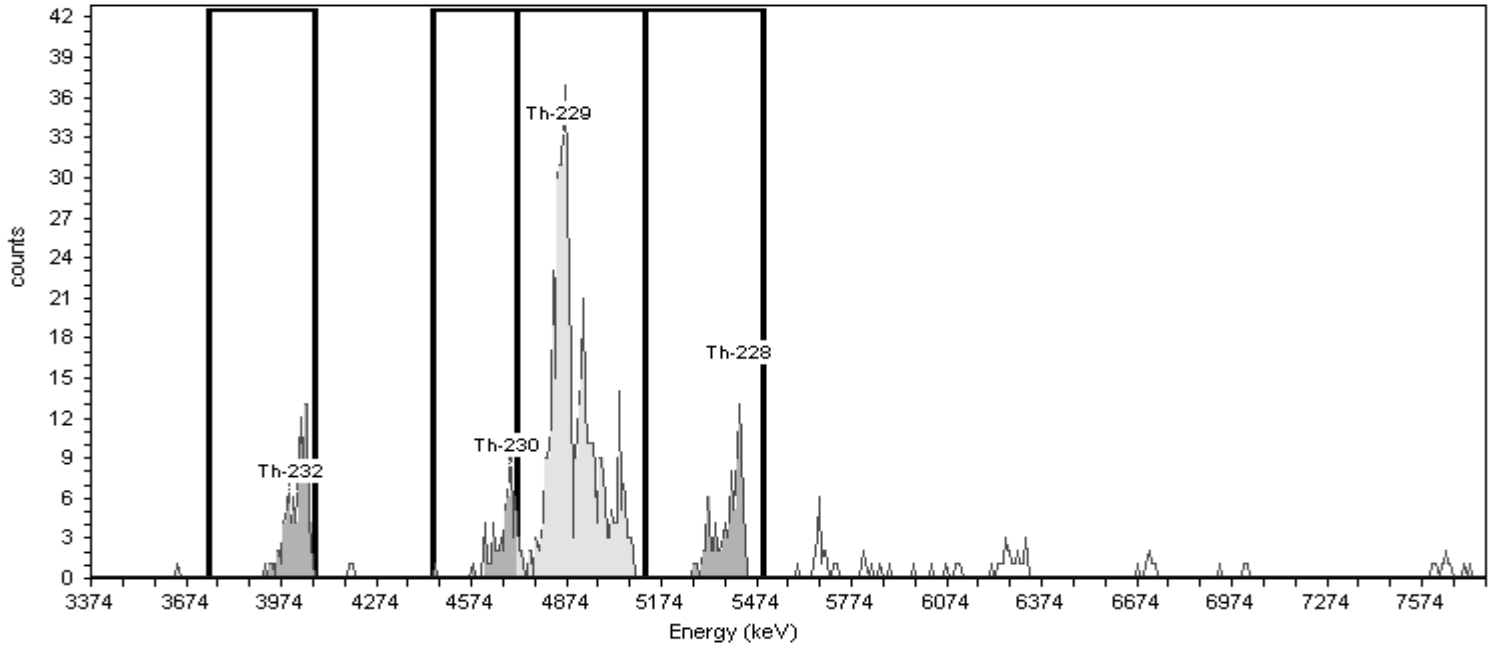
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 78.30%

Acquisition

Detector: AV19
Serial Number: 50-025FF5
Acquisition Start Date: 7/1/2014 12:26:50PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:42PM
Background Info: Sample: ICB;AV19; Det: AV19; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-8876;AV19-20140505
Calibration Date: 5/5/2014 10:09:02PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.34% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:22:07PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	33.8	100.2	97	0.3750	97.08	1.225	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	40.3	99.7	56	1.6817	54.26	0.688	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	61.7	99.6	485	1.6937	483.24	4.801	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	52.9	99.8	92	0.7620	91.24	1.156	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:21:15AM 7/2/2014

Sample

Sample Name: 680-102380-A-6-B
SampleType: Sample
: 680-102380-A-6-B
Sample Collection Date: 6/13/2014 8:45:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9980g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128228
AnalysisID: 613785

Analyst: 60040

Tracer

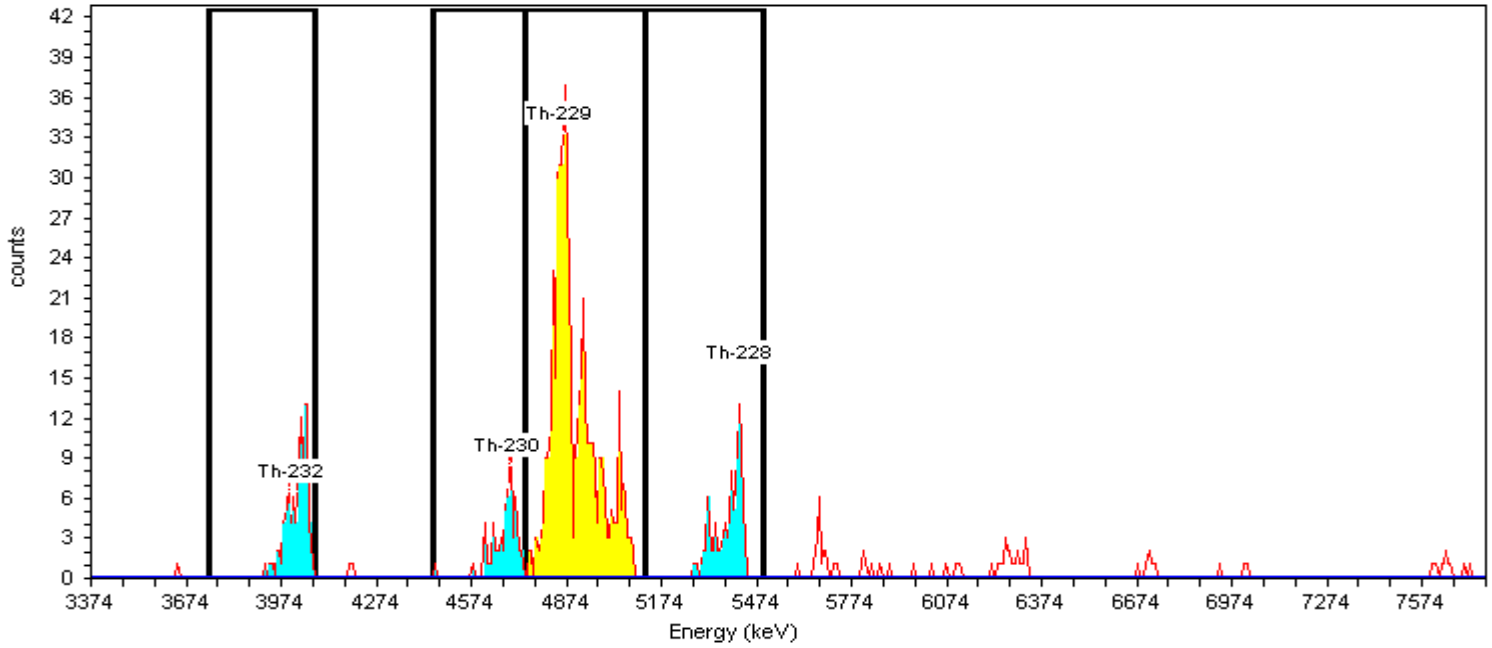
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 77.33%

Acquisition

Detector: AV19
Serial Number: 50-025FF5
Acquisition Start Date: 7/1/2014 12:26:50PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:42PM
Background Info: Sample: ICB;AV19; Det: AV19; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-8876;AV19-20140505
Calibration Date: 5/5/2014 10:09:02PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.34% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:22:07PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/2/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	33.8	100.2	97	0.3750	97.08	1.240	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4739.1	34.7	99.7	60	2.0625	57.94	0.744	pCi/g
Th-229	4848.0	4,845.3	2.7	4739.1	5119.5	61.7	99.6	479	1.6875	477.31	4.742	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	52.9	99.8	92	0.7620	91.24	1.170	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:28:37PM 7/1/2014

Sample

Sample Name: 680-102380-A-7-B
SampleType: Sample
: 680-102380-A-7-B
Sample Collection Date: 6/13/2014 8:50:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9983g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128228
AnalysisID: 613650

Analyst: 60040

Tracer

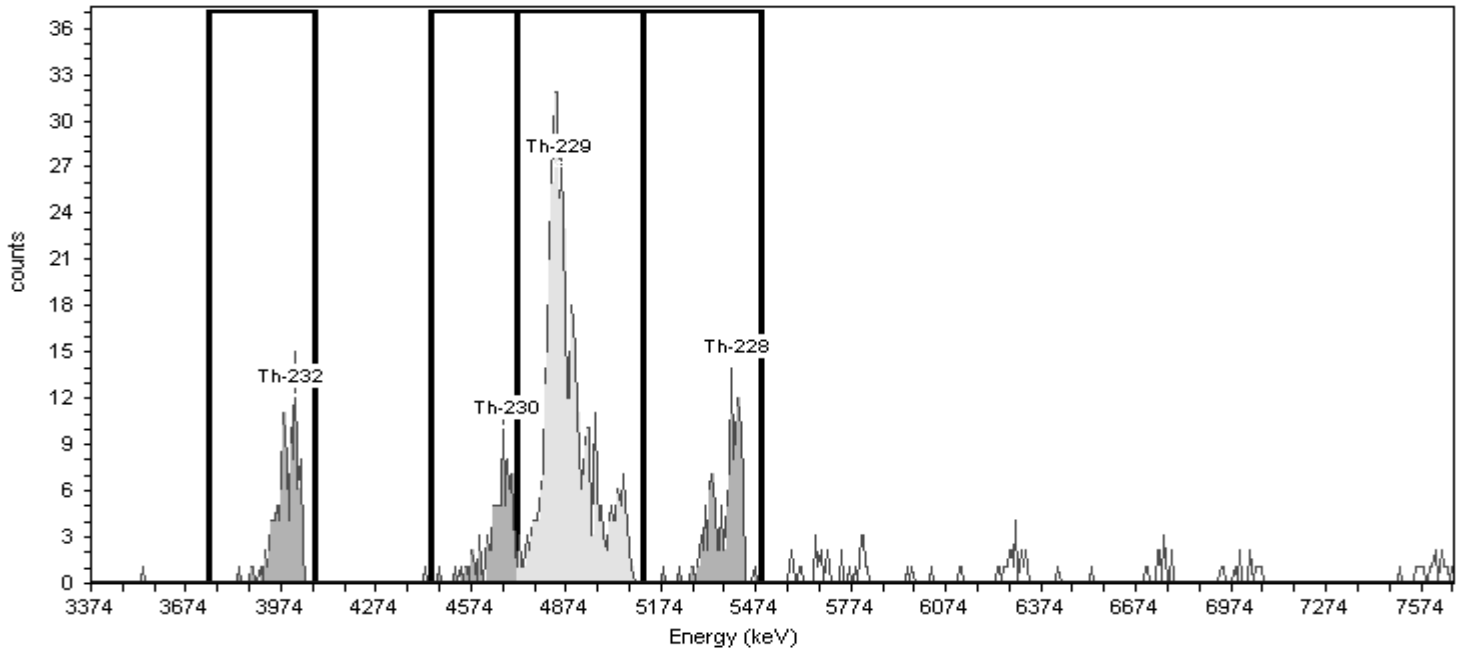
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 73.52%

Acquisition

Detector: AV20
Serial Number: 48-121A7
Acquisition Start Date: 7/1/2014 12:26:51PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:45PM
Background Info: Sample: ICB;AV20; Det: AV20; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-8877;AV20-20140505
Calibration Date: 5/5/2014 10:09:21PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.56% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:22:07PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	54.8	100.2	104	1.5000	102.50	1.365	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	39.1	99.7	79	1.5116	77.55	1.038	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	79.7	99.6	459	1.3241	457.74	4.507	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.5	99.8	118	3.0000	115.00	1.538	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:28:42PM 7/1/2014

Sample

Sample Name: 680-102380-A-8-B
SampleType: Sample
: 680-102380-A-8-B
Sample Collection Date: 6/13/2014 8:55:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9969g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128228
AnalysisID: 613651

Analyst: 60040

Tracer

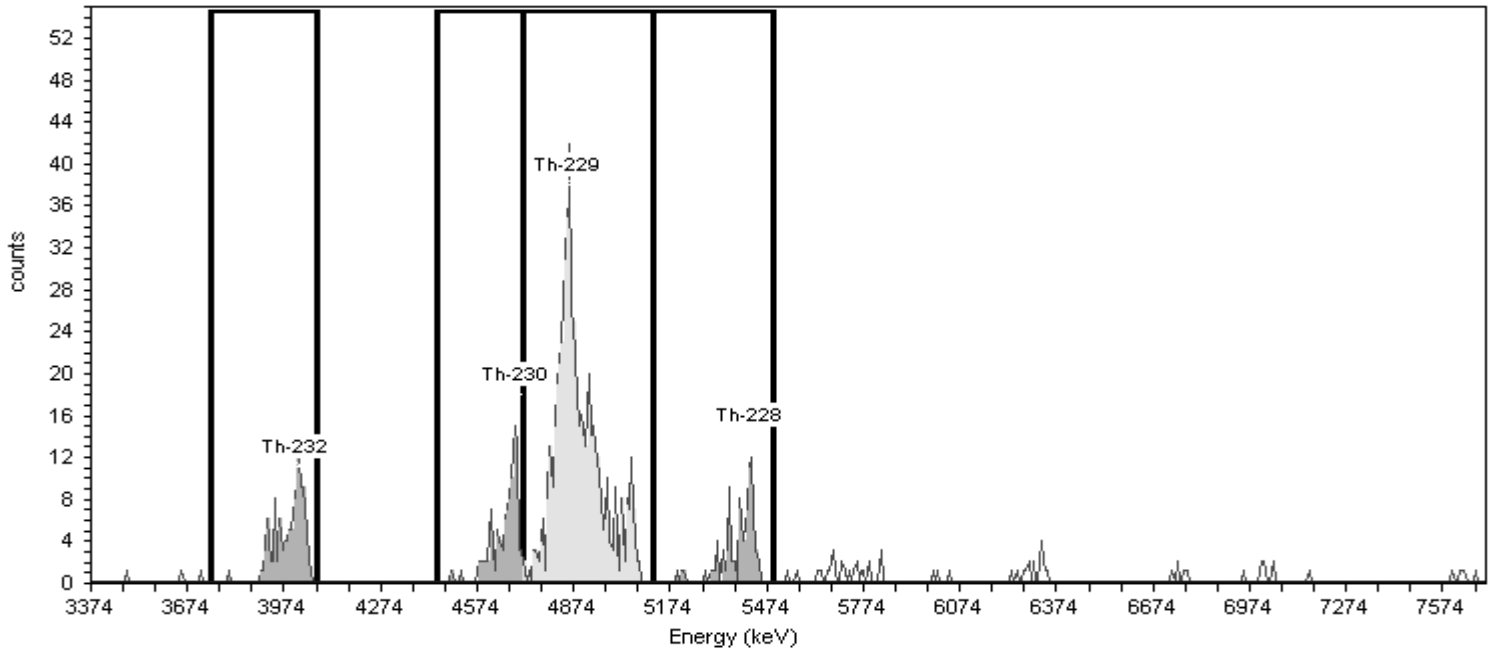
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 86.71%

Acquisition

Detector: AV21
Serial Number: 48-102BB6
Acquisition Start Date: 7/1/2014 12:26:53PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:46PM
Background Info: Sample: ICB;AV21; Det: AV21; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9520;AV21-20140505
Calibration Date: 5/5/2014 10:09:29PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.45% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:22:07PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	40.9	100.2	113	0.3750	112.63	1.279	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	30.9	99.7	102	0.7500	101.19	1.154	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	73.3	99.6	538	0.3750	537.56	5.323	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	55.6	99.8	91	2.0625	88.94	1.014	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:28:48PM 7/1/2014

Sample

Sample Name: 680-102380-A-9-B
SampleType: Sample
: 680-102380-A-9-B
Sample Collection Date: 6/13/2014 9:00:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0033g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128228
AnalysisID: 613652

Analyst: 60040

Tracer

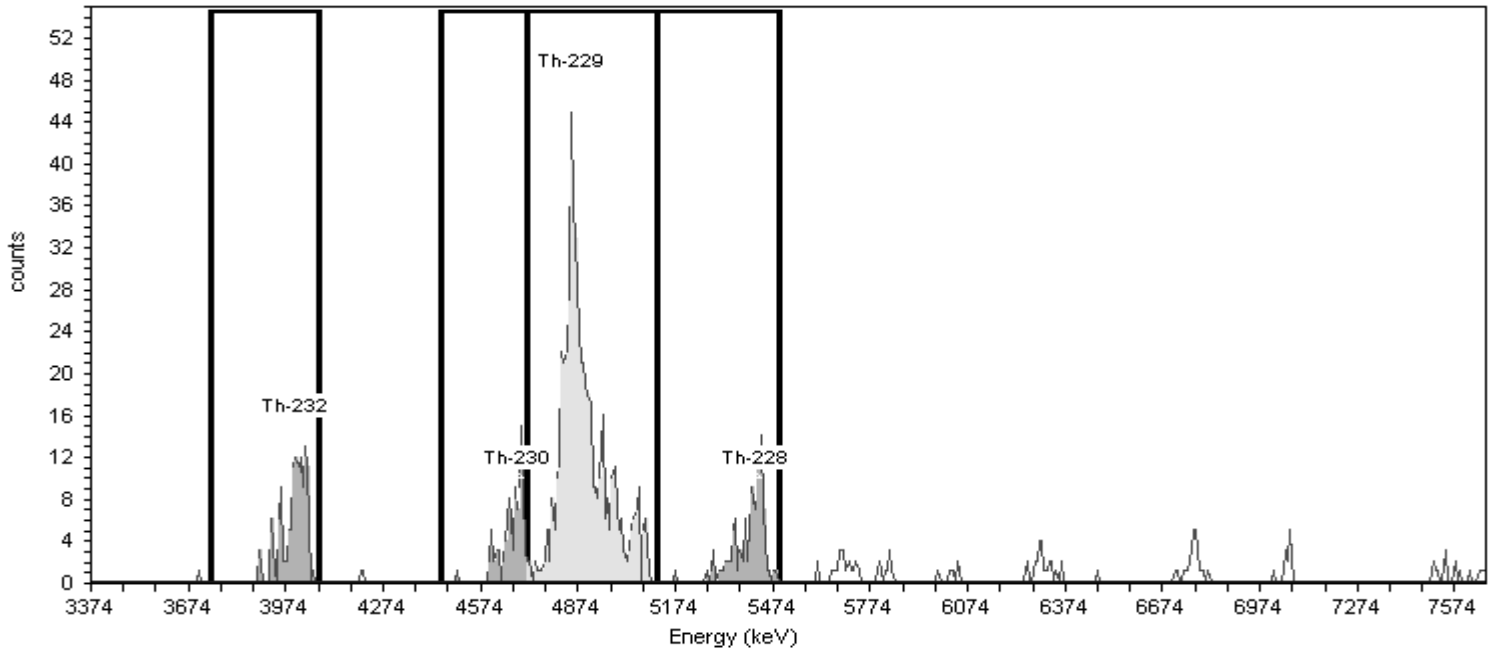
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 84.23%

Acquisition

Detector: AV23
Serial Number: 48-158FF3
Acquisition Start Date: 7/1/2014 12:26:55PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:49PM
Background Info: Sample: ICB;AV23; Det: AV23; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9792;AV23-20140505
Calibration Date: 5/5/2014 10:09:35PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.91% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:22:07PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	35.9	100.2	119	0.3750	118.63	1.353	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	31.0	99.7	84	0.9375	83.06	0.952	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	80.1	99.6	533	1.3125	531.69	5.138	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	45.0	99.8	107	1.8750	105.13	1.204	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:21:56AM 7/2/2014

Sample

Sample Name: 680-102380-A-9-B
SampleType: Sample
: 680-102380-A-9-B
Sample Collection Date: 6/13/2014 9:00:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0033g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128228
AnalysisID: 613786

Analyst: 60040

Tracer

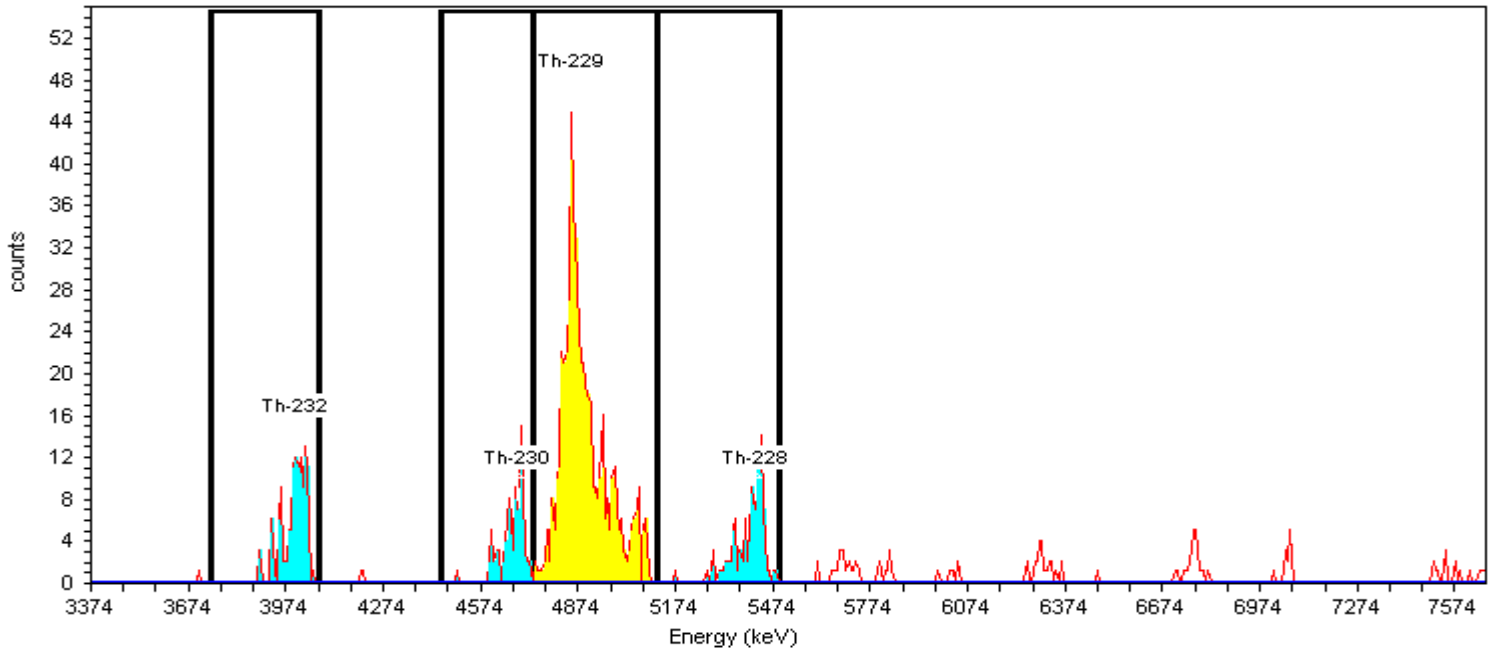
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 83.92%

Acquisition

Detector: AV23
Serial Number: 48-158FF3
Acquisition Start Date: 7/1/2014 12:26:55PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:49PM
Background Info: Sample: ICB;AV23; Det: AV23; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9792;AV23-20140505
Calibration Date: 5/5/2014 10:09:35PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.91% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/1/2014 12:22:07PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/2/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	35.9	100.2	119	0.3750	118.63	1.358	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4731.7	17.0	99.7	86	0.9375	85.06	0.979	pCi/g
Th-229	4848.0	4,845.3	2.7	4731.7	5119.5	80.1	99.6	531	1.3125	529.69	5.119	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	45.0	99.8	107	1.8750	105.13	1.209	pCi/g

Prep Batch: 128412

, Extraction Chromatography Resin Actinide

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128412

Lab ID: MB 160-128412/1-A
Client ID:
Sigma: 2
Analyzed: 07/02/14 18:02
Detector: AV3
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	-0.005722	0.00661	0.00662	U	pCi/g	1.00	0.0579	129494
Thorium-230	0.07533	0.0694	0.0697	U	pCi/g	1.00	0.0995	129494
Thorium-232	0.002532	0.0216	0.0216	U	pCi/g	1.00	0.0618	129494

Tracer	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.781	0.473	0.678		pCi/g	0.0807	6.12	94.5	30 - 110

Lab ID: LCS 160-128412/2-A
Client ID:
Sigma: 2
Analyzed: 07/02/14 18:02
Detector: AV4
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	22.92	1.32	2.33		pCi/g	1.00	0.129	129495

Tracer	LCS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	12.49	0.985	1.44		pCi/g	0.118	12.2	102	30 - 110

Lab ID: 680-102380-10
Client ID: SD-226-02
Sigma: 2
Analyzed: 07/02/14 18:02
Detector: AV6
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.23	0.232	0.254		pCi/g	1.00	0.105	129512
Thorium-230	1.03	0.212	0.229		pCi/g	1.00	0.0910	129512
Thorium-232	1.05	0.212	0.230		pCi/g	1.00	0.0717	129512

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.55	0.464	0.658		pCi/g	0.0657	6.09	91.2	30 - 110

Lab ID: 680-102380-10 DU
Client ID: SD-226-02
Sigma: 2
Analyzed: 07/02/14 18:02
Detector: AV7
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.054	0.225	0.242		pCi/g	1.00	0.104	129523
Thorium-230	1.025	0.219	0.235		pCi/g	1.00	0.0761	129523
Thorium-232	1.541	0.268	0.298		pCi/g	1.00	0.0881	129523

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128412

Lab ID: 680-102380-10 DU
Client ID: SD-226-02
Sigma: 2
Analyzed: 07/02/14 18:02
Detector: AV7
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Tracer	DU Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.135	0.447	0.621		pCi/g	0.0591	6.11	84.0	30 - 110

Lab ID: 680-102380-12
Client ID: SD-225-SS
Sigma: 2
Analyzed: 07/02/14 18:02
Detector: AV8
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.34	0.266	0.289		pCi/g	1.00	0.124	129534
Thorium-230	1.45	0.272	0.298		pCi/g	1.00	0.0607	129534
Thorium-232	1.39	0.267	0.291		pCi/g	1.00	0.0935	129534

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.47	0.409	0.555		pCi/g	0.0735	6.12	73.0	30 - 110

Lab ID: 680-102380-13
Client ID: SD-225-01
Sigma: 2
Analyzed: 07/02/14 18:02
Detector: AV9
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.32	0.246	0.270		pCi/g	1.00	0.0702	129545
Thorium-230	1.35	0.250	0.274		pCi/g	1.00	0.0740	129545
Thorium-232	1.33	0.246	0.270		pCi/g	1.00	0.0591	129545

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.00	0.432	0.603		pCi/g	0.0484	6.14	81.5	30 - 110

Lab ID: 680-102380-14
Client ID: SD-225-02
Sigma: 2
Analyzed: 07/02/14 18:02
Detector: AV10
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.904	0.204	0.218		pCi/g	1.00	0.102	129466
Thorium-230	0.952	0.206	0.221		pCi/g	1.00	0.0674	129466
Thorium-232	0.906	0.199	0.213		pCi/g	1.00	0.0329	129466

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.39	0.459	0.645		pCi/g	0.0745	6.12	88.1	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128412

Lab ID: 680-102380-16 | Analyzed: 07/02/14 18:02 | Decay Corrected: No
Client ID: SD-228-SS | Detector: AV11 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.32	0.249	0.273		pCi/g	1.00	0.105	129477
Thorium-230	1.08	0.223	0.241		pCi/g	1.00	0.0741	129477
Thorium-232	1.40	0.254	0.280		pCi/g	1.00	0.0813	129477

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.01	0.433	0.604		pCi/g	0.0637	6.13	81.7	30 - 110

Lab ID: 680-102380-17 | Analyzed: 07/02/14 18:02 | Decay Corrected: No
Client ID: SD-228-01 | Detector: AV12 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.29	0.244	0.267		pCi/g	1.00	0.0873	129482
Thorium-230	1.40	0.252	0.278		pCi/g	1.00	0.0518	129482
Thorium-232	1.36	0.250	0.275		pCi/g	1.00	0.0837	129482

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.15	0.445	0.621		pCi/g	0.0503	6.09	84.5	30 - 110

Lab ID: 680-102380-18 | Analyzed: 07/02/14 18:02 | Decay Corrected: No
Client ID: SD-228-02 | Detector: AV13 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.06	0.229	0.246		pCi/g	1.00	0.0955	129483
Thorium-230	0.797	0.196	0.207		pCi/g	1.00	0.0362	129483
Thorium-232	1.12	0.235	0.253		pCi/g	1.00	0.0964	129483

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.93	0.438	0.603		pCi/g	0.0552	6.15	80.3	30 - 110

Lab ID: 680-102380-20 | Analyzed: 07/02/14 18:02 | Decay Corrected: No
Client ID: SD-234-SS | Detector: AV14 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.765	0.184	0.195		pCi/g	1.00	0.0665	129484
Thorium-230	0.835	0.191	0.204		pCi/g	1.00	0.0566	129484

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128412

Lab ID: 680-102380-20 | Analyzed: 07/02/14 18:02 | Decay Corrected: No
Client ID: SD-234-SS | Detector: AV14 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-232	0.778	0.184	0.195		pCi/g	1.00	0.0493	129484

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.31	0.449	0.633		pCi/g	0.0646	6.09	87.1	30 - 110

Lab ID: 680-102380-21 | Analyzed: 07/02/14 18:02 | Decay Corrected: No
Client ID: SD-234-01 | Detector: AV15 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.05	0.221	0.238		pCi/g	1.00	0.103	129485
Thorium-230	0.685	0.176	0.186		pCi/g	1.00	0.0698	129485
Thorium-232	0.928	0.204	0.218		pCi/g	1.00	0.0507	129485

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.38	0.461	0.645		pCi/g	0.0699	6.14	87.8	30 - 110

Lab ID: 680-102380-22 | Analyzed: 07/02/14 18:02 | Decay Corrected: No
Client ID: SD-235-SS | Detector: AV16 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.913	0.208	0.221		pCi/g	1.00	0.0882	129486
Thorium-230	0.729	0.185	0.195		pCi/g	1.00	0.0704	129486
Thorium-232	0.904	0.204	0.218		pCi/g	1.00	0.0522	129486

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.92	0.427	0.595		pCi/g	0.0422	6.13	80.4	30 - 110

Lab ID: 680-102380-23 | Analyzed: 07/02/14 18:02 | Decay Corrected: No
Client ID: SD-23501 | Detector: AV17 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.16	0.231	0.251		pCi/g	1.00	0.111	129487
Thorium-230	0.894	0.199	0.213		pCi/g	1.00	0.0624	129487
Thorium-232	1.32	0.240	0.264		pCi/g	1.00	0.0621	129487

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128412

Lab ID: 680-102380-23
Client ID: SD-23501
Sigma: 2
Analyzed: 07/02/14 18:02
Detector: AV17
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.38	0.456	0.642		pCi/g	0.0501	6.12	87.8	30 - 110

Lab ID: 680-102380-24
Client ID: SD-235-02
Sigma: 2
Analyzed: 07/02/14 18:02
Detector: AV18
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.08	0.213	0.231		pCi/g	1.00	0.0733	129488
Thorium-230	1.04	0.208	0.225		pCi/g	1.00	0.0536	129488
Thorium-232	1.12	0.215	0.235		pCi/g	1.00	0.0534	129488

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.86	0.481	0.688		pCi/g	0.0296	6.13	95.6	30 - 110

Lab ID: 680-102380-26
Client ID: SD-236-SS
Sigma: 2
Analyzed: 07/02/14 18:02
Detector: AV19
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.335	0.113	0.116		pCi/g	1.00	0.0567	129489
Thorium-230	0.271	0.104	0.106		pCi/g	1.00	0.0708	129489
Thorium-232	0.208	0.0883	0.0900		pCi/g	1.00	0.0479	129489

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	6.56	0.511	0.752		pCi/g	0.0761	6.13	107	30 - 110

Lab ID: 680-102380-27
Client ID: SD-236-01
Sigma: 2
Analyzed: 07/02/14 18:02
Detector: AV20
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.562	0.163	0.170		pCi/g	1.00	0.101	129490
Thorium-230	0.447	0.143	0.148		pCi/g	1.00	0.0817	129490
Thorium-232	0.389	0.134	0.138		pCi/g	1.00	0.0811	129490

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.47	0.465	0.654		pCi/g	0.0702	6.13	89.3	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128412

Lab ID: 680-102380-28 | Analyzed: 07/02/14 18:02 | Decay Corrected: No
Client ID: SD-236-02 | Detector: AV21 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.555	0.159	0.166		pCi/g	1.00	0.0888	129491
Thorium-230	0.582	0.161	0.168		pCi/g	1.00	0.0666	129491
Thorium-232	0.658	0.170	0.178		pCi/g	1.00	0.0564	129491

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.53	0.468	0.659		pCi/g	0.0513	6.12	90.4	30 - 110

Lab ID: 680-102380-29 | Analyzed: 07/02/14 18:02 | Decay Corrected: No
Client ID: SD-237-SS | Detector: AV23 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.09	0.251	0.268		pCi/g	1.00	0.111	129492
Thorium-230	1.04	0.243	0.258		pCi/g	1.00	0.0908	129492
Thorium-232	0.944	0.230	0.244		pCi/g	1.00	0.0725	129492

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.22	0.405	0.538		pCi/g	0.0688	6.12	69.0	30 - 110

Lab ID: 680-102380-30 | Analyzed: 07/02/14 18:02 | Decay Corrected: No
Client ID: SD-237-01 | Detector: AV24 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.55	0.281	0.310		pCi/g	1.00	0.131	129493
Thorium-230	1.11	0.234	0.252		pCi/g	1.00	0.0790	129493
Thorium-232	1.51	0.272	0.300		pCi/g	1.00	0.0741	129493

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.79	0.428	0.588		pCi/g	0.0678	6.14	78.1	30 - 110

Lab ID: 680-102380-31 | Analyzed: 07/02/14 18:02 | Decay Corrected: No
Client ID: SD-237-02 | Detector: AV43 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.27	0.226	0.250		pCi/g	1.00	0.0759	129496
Thorium-230	0.986	0.198	0.215		pCi/g	1.00	0.0577	129496

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128412

Lab ID: 680-102380-31
Client ID: SD-237-02
Sigma: 2
Analyzed: 07/02/14 18:02
Detector: AV43
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-232	1.39	0.234	0.262		pCi/g	1.00	0.0512	129496

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.99	0.483	0.697		pCi/g	0.0630	6.10	98.1	30 - 110

Lab ID: 680-102380-33
Client ID: SD-DUP05
Sigma: 2
Analyzed: 07/02/14 18:03
Detector: AV44
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.14	0.220	0.240		pCi/g	1.00	0.0947	129497
Thorium-230	1.11	0.214	0.233		pCi/g	1.00	0.0468	129497
Thorium-232	1.14	0.216	0.237		pCi/g	1.00	0.0307	129497

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.64	0.464	0.663		pCi/g	0.0433	6.10	92.5	30 - 110

Lab ID: 680-102380-34
Client ID: SD-227-SS
Sigma: 2
Analyzed: 07/02/14 18:03
Detector: AV45
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.31	0.251	0.274		pCi/g	1.00	0.0986	129498
Thorium-230	0.978	0.215	0.230		pCi/g	1.00	0.0537	129498
Thorium-232	1.39	0.256	0.282		pCi/g	1.00	0.0668	129498

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.99	0.438	0.606		pCi/g	0.0500	6.12	81.5	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128412

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-128412/1-A	Thorium-228			-0.005722	U	pCi/g							
MB 160-128412/1-A	Thorium-230			0.07533	U	pCi/g							
MB 160-128412/1-A	Thorium-232			0.002532	U	pCi/g							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-128412/2-A	Thorium-230		24.5	22.92		pCi/g	94	81 - 118					

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
680-102380-10	Thorium-228	1.23		1.054		pCi/g			15	0.35	1.00	1	
680-102380-10	Thorium-230	1.03		1.025		pCi/g			0.8	0.02	0.05	1	
680-102380-10	Thorium-232	1.05		1.541		pCi/g			38	0.93	2.60	1	

Glossary:

Ts = Count Duration, Sample

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102380-1

SDG No.: 680102380-1

Batch Number: 128228 Batch Start Date: 06/23/14 15:05 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/01/14 09:24

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-128228/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-128228/2		ExtChrom, A-01-R		0.4997 g	0.2 mL	0.4997 g			
680-102380-A-1-A	SD-224-SS	ExtChrom, A-01-R	T	1.0032 g	0.2 mL				
680-102380-A-2-A	SD-224-01	ExtChrom, A-01-R	T	0.9990 g	0.2 mL				
680-102380-A-3-A	SD-224-02	ExtChrom, A-01-R	T	0.9975 g	0.2 mL				
680-102380-A-5-A	SD-223-SS	ExtChrom, A-01-R	T	0.9993 g	0.2 mL				
680-102380-A-6-A	SD-223-01	ExtChrom, A-01-R	T	0.9980 g	0.2 mL				
680-102380-A-7-A	SD-223-02	ExtChrom, A-01-R	T	0.9983 g	0.2 mL				
680-102380-A-8-A	SD-226-SS	ExtChrom, A-01-R	T	0.9969 g	0.2 mL				
680-102380-A-9-A	SD-226-01	ExtChrom, A-01-R	T	1.0033 g	0.2 mL				

Batch Notes	
Balance ID	27050421
Column Analyst	scb
Column Date	6/27/14
CoPrecipitation Analyst	scb
CoPrecipitation Date	7/1/14
Person's name who witnessed reagent drop	nmn per scb
Analyst who added reagent	scb
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102380-1

SDG No.: 680102380-1

Batch Number: 128412 Batch Start Date: 06/24/14 14:58 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/02/14 14:52

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-128412/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-128412/2		ExtChrom, A-01-R		0.5018 g	0.2 mL	0.5018 g			
680-102380-A-10 -A	SD-226-02	ExtChrom, A-01-R	T	1.0046 g	0.2 mL				
680-102380-A-10 -A DU	SD-226-02	ExtChrom, A-01-R	T	1.0010 g	0.2 mL				
680-102380-A-12 -A	SD-225-SS	ExtChrom, A-01-R	T	0.9992 g	0.2 mL				
680-102380-A-13 -A	SD-225-01	ExtChrom, A-01-R	T	0.9962 g	0.2 mL				
680-102380-A-14 -A	SD-225-02	ExtChrom, A-01-R	T	0.9993 g	0.2 mL				
680-102380-A-16 -A	SD-228-SS	ExtChrom, A-01-R	T	0.9982 g	0.2 mL				
680-102380-A-17 -A	SD-228-01	ExtChrom, A-01-R	T	1.0048 g	0.2 mL				
680-102380-A-18 -A	SD-228-02	ExtChrom, A-01-R	T	0.9957 g	0.2 mL				
680-102380-A-20 -A	SD-234-SS	ExtChrom, A-01-R	T	1.0043 g	0.2 mL				
680-102380-A-21 -A	SD-234-01	ExtChrom, A-01-R	T	0.9975 g	0.2 mL				
680-102380-A-22 -A	SD-235-SS	ExtChrom, A-01-R	T	.9991 g	0.2 mL				
680-102380-A-23 -A	SD-23501	ExtChrom, A-01-R	T	0.9992 g	0.2 mL				
680-102380-A-24 -A	SD-235-02	ExtChrom, A-01-R	T	0.9987 g	0.2 mL				
680-102380-A-26 -A	SD-236-SS	ExtChrom, A-01-R	T	0.9988 g	0.2 mL				
680-102380-A-27 -A	SD-236-01	ExtChrom, A-01-R	T	0.9978 g	0.2 mL				
680-102380-A-28 -A	SD-236-02	ExtChrom, A-01-R	T	1.0000 g	0.2 mL				
680-102380-A-29 -A	SD-237-SS	ExtChrom, A-01-R	T	1.0007 g	0.2 mL				
680-102380-A-30 -A	SD-237-01	ExtChrom, A-01-R	T	0.9969 g	0.2 mL				
680-102380-A-31 -A	SD-237-02	ExtChrom, A-01-R	T	1.0027 g	0.2 mL				

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102380-1

SDG No.: 680102380-1

Batch Number: 128412 Batch Start Date: 06/24/14 14:58 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/02/14 14:52

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
680-102380-A-33-A	SD-DUP05	ExtChrom, A-01-R	T	1.0026 g	0.2 mL				
680-102380-A-34-A	SD-227-SS	ExtChrom, A-01-R	T	1.0005 g	0.2 mL				

Batch Notes	
Balance ID	27050421
Column Analyst	nmn per scb
Column Date	7/2/14
CoPrecipitation Analyst	scb
CoPrecipitation Date	7/2/14
Person's name who witnessed reagent drop	nmn per scb
Analyst who added reagent	scb
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102380-1

SDG No.: 680102380-1

Batch Number: 128417 Batch Start Date: 06/24/14 15:13 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/02/14 14:51

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-128417/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-128417/2		ExtChrom, A-01-R		0.4999 g	0.2 mL	0.4999 g			
680-102380-A-35 -A	SD-227-01	ExtChrom, A-01-R	T	1.0005 g	0.2 mL				
680-102380-A-36 -A	SD-227-02	ExtChrom, A-01-R	T	0.9967 g	0.2 mL				

Batch Notes	
Balance ID	27050421
Column Analyst	nmn per scb
Column Date	7/2/14
CoPrecipitation Analyst	scb
CoPrecipitation Date	7/2/14
Person's name who witnessed reagent drop	nmn per scb
Analyst who added reagent	scb
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:04:45PM 7/2/2014

Sample

Sample Name: MB 160-128412/1-A
SampleType: Blank
: MB 160-128412/1-A
Sample Collection Date: 6/25/2014 9:57:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0000g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128412
AnalysisID: 613927

Analyst: 60040

Tracer

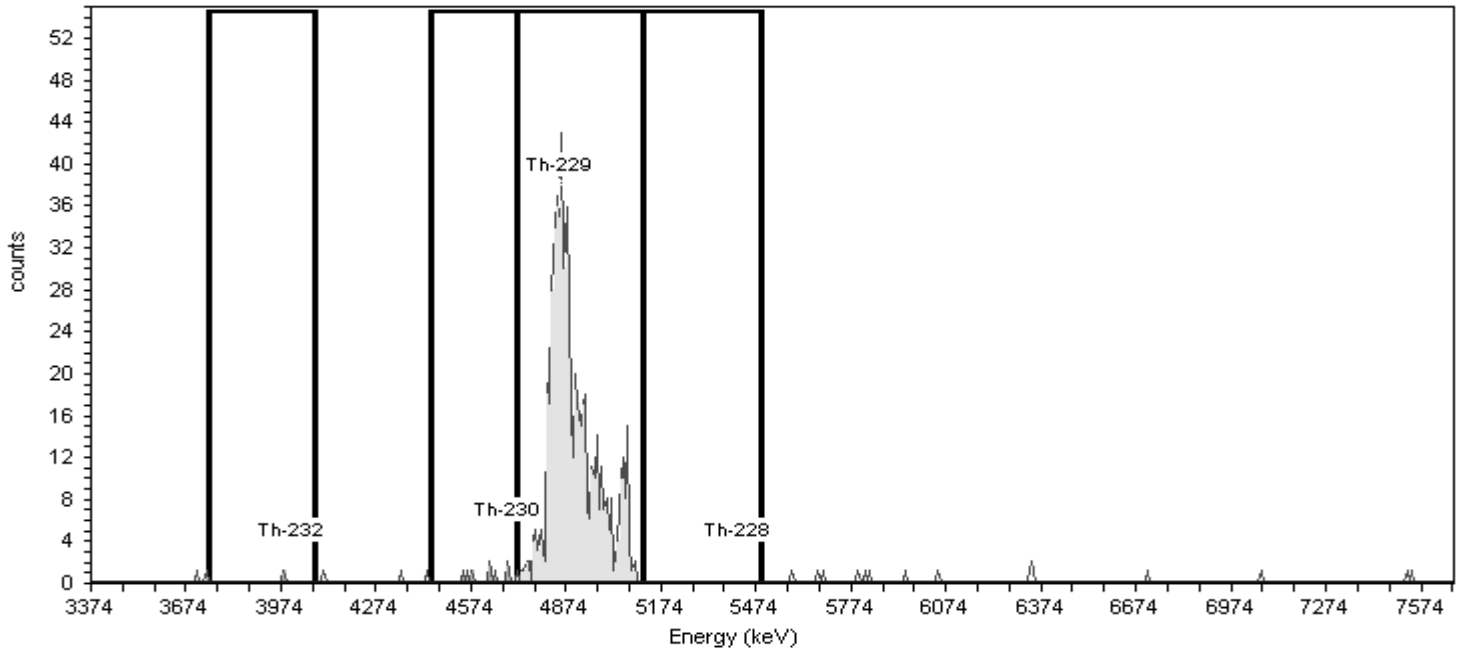
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 94.51%

Acquisition

Detector: AV3
Serial Number: 49-202 FF7
Acquisition Start Date: 7/2/2014 6:02:33PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:10:38PM
Background Info: Sample: ICB;AV3; Det: AV3; Spectrum #1; Jun-18-2014 19:10

Calibration Name: IC-8875;AV3-20140505
Calibration Date: 5/6/2014 5:38:33PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.09% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 5:59:22PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	44.5	100.2	1	0.7500	0.25	0.003	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	14.7	99.7	11	3.5683	7.40	0.075	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	71.6	99.6	603	2.2558	600.71	5.784	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	.0	99.8	0	0.5625	-0.56	-0.006	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:05:08PM 7/2/2014

Sample

Sample Name: LCS 160-128412/2-A
SampleType: Control
: LCS 160-128412/2-A
Sample Collection Date: 6/25/2014 9:57:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.5018g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128412
AnalysisID: 613928

Analyst: 60040

Tracer

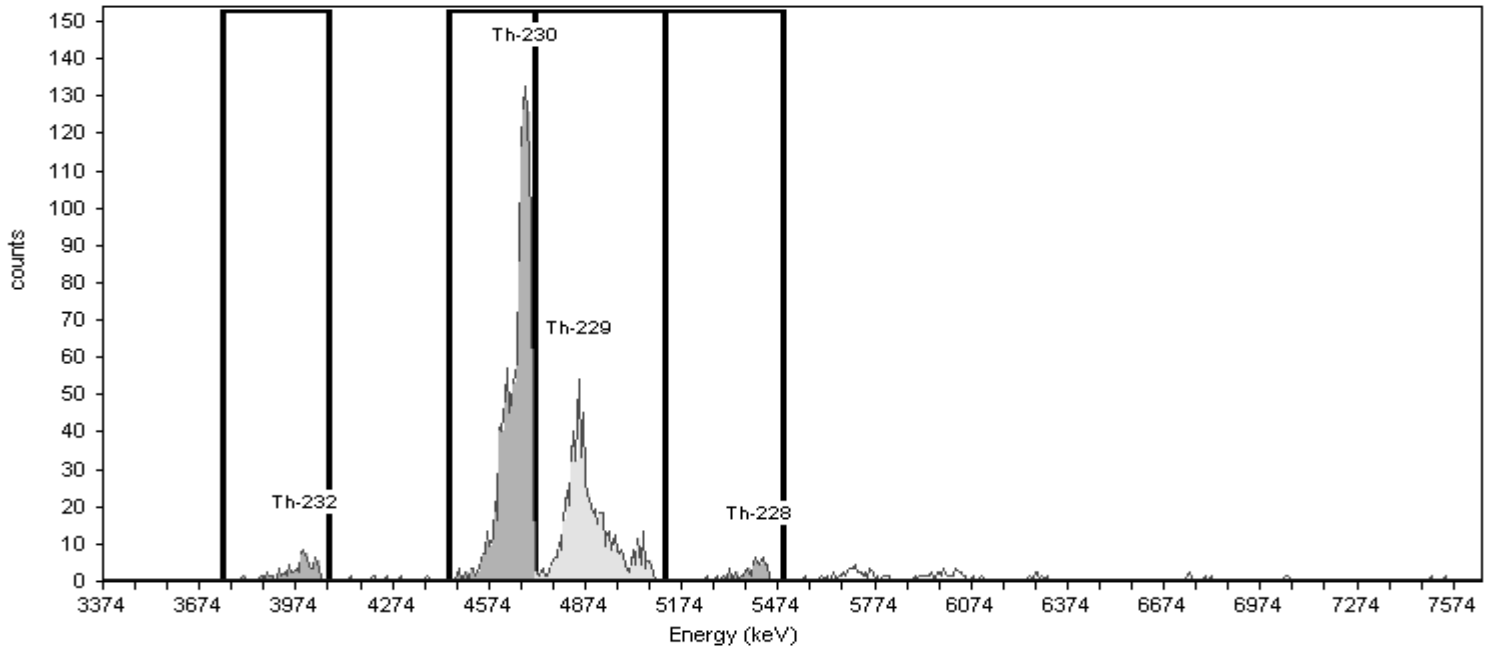
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 102.84%

Acquisition

Detector: AV4
Serial Number: 46-033Q4
Acquisition Start Date: 7/2/2014 6:02:35PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:10:40PM
Background Info: Sample: ICB;AV4; Det: AV4; Spectrum #1; Jun-18-2014 19:10

Calibration Name: IC-8876;AV4-20140505
Calibration Date: 5/6/2014 5:38:40PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.82% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 5:59:21PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	62.3	100.2	71	0.1875	70.81	1.327	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	38.1	99.7	1210	1.1134	1208.86	22.771	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	74.3	99.6	648	1.1134	646.86	12.542	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	65.9	99.8	51	2.2500	48.75	0.918	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:28:53AM 7/3/2014

Sample

Sample Name: LCS 160-128412/2-A
SampleType: Control
: LCS 160-128412/2-A
Sample Collection Date: 6/25/2014 9:57:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.5018g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128412
AnalysisID: 614022

Analyst: 60040

Tracer

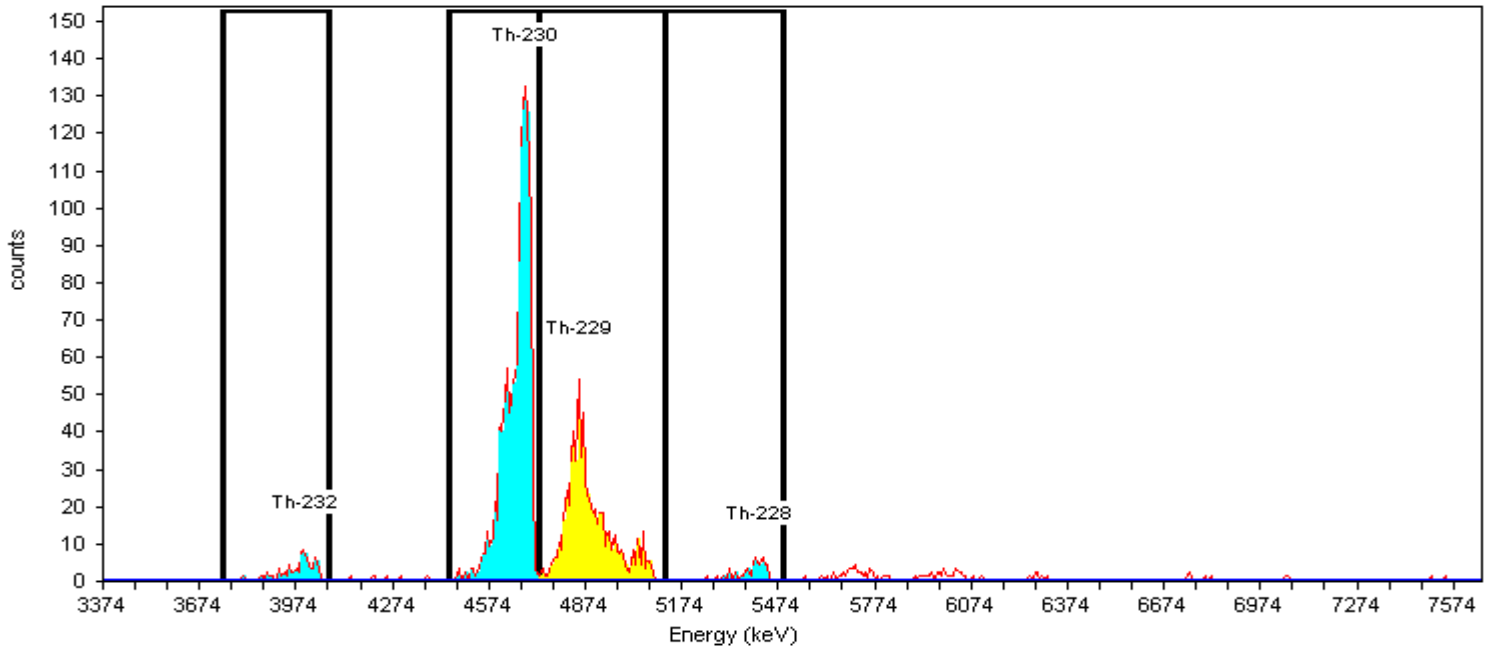
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 102.43%

Acquisition

Detector: AV4
Serial Number: 46-033Q4
Acquisition Start Date: 7/2/2014 6:02:35PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:10:40PM
Background Info: Sample: ICB;AV4; Det: AV4; Spectrum #1; Jun-18-2014 19:10

Calibration Name: IC-8876;AV4-20140505
Calibration Date: 5/6/2014 5:38:40PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.82% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 5:59:21PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/3/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	62.3	100.2	71	0.1875	70.81	1.333	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4731.7	32.0	99.7	1213	1.1250	1211.88	22.920	pCi/g
Th-229	4848.0	4,845.3	2.7	4731.7	5119.5	74.3	99.6	645	0.7500	644.25	12.492	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	65.9	99.8	51	2.2500	48.75	0.921	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:05:13PM 7/2/2014

Sample

Sample Name: 680-102380-A-10-B
SampleType: Sample
: 680-102380-A-10-B
Sample Collection Date: 6/13/2014 9:05:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0046g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128412
AnalysisID: 613929

Analyst: 60040

Tracer

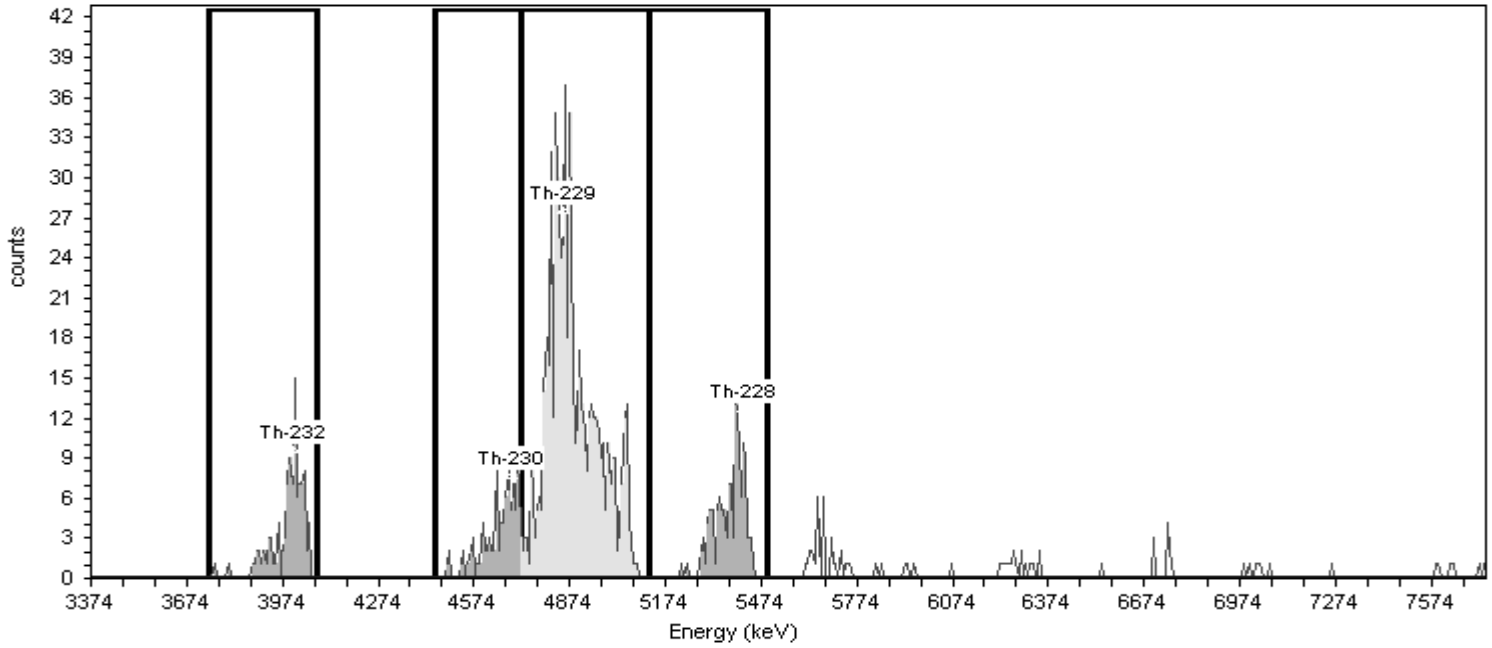
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 92.71%

Acquisition

Detector: AV6
Serial Number: 47-27FF2
Acquisition Start Date: 7/2/2014 6:02:21PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:18PM
Background Info: Sample: ICB;AV6; Det: AV6; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9520;AV6-20140505
Calibration Date: 5/6/2014 5:38:46PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.89% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 5:59:21PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	50.2	100.2	101	1.1250	99.88	1.035	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	33.4	99.7	91	2.2500	88.69	0.923	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	94.6	99.6	586	1.3125	584.63	5.648	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	84.0	99.8	120	3.7500	116.25	1.209	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:15:53AM 7/3/2014

Sample

Sample Name: 680-102380-A-10-B
SampleType: Sample
: 680-102380-A-10-B
Sample Collection Date: 6/13/2014 9:05:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0046g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128412
AnalysisID: 614013

Analyst: 60040

Tracer

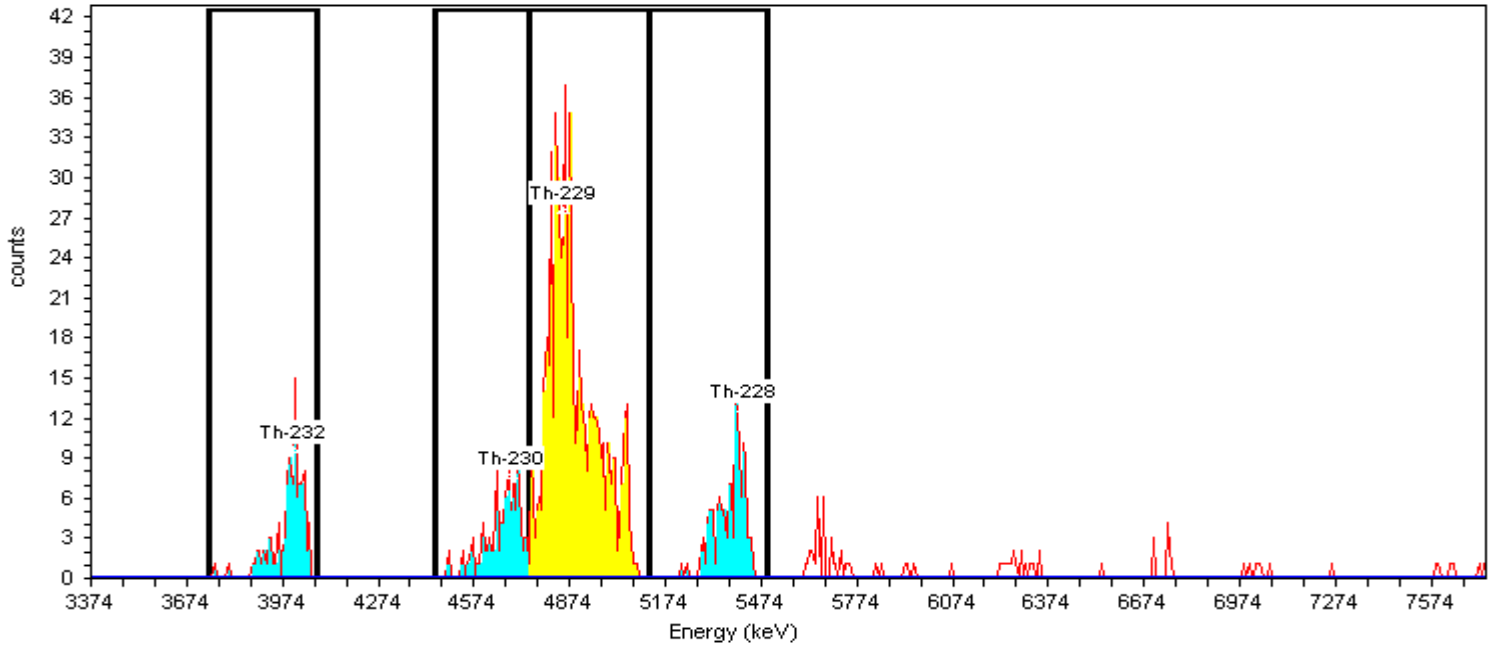
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 91.16%

Acquisition

Detector: AV6
Serial Number: 47-27FF2
Acquisition Start Date: 7/2/2014 6:02:21PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:18PM
Background Info: Sample: ICB;AV6; Det: AV6; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9520;AV6-20140505
Calibration Date: 5/6/2014 5:38:46PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.89% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 5:59:21PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/3/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	50.2	100.2	101	1.1250	99.88	1.052	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4746.6	15.9	99.7	100	2.4375	97.56	1.033	pCi/g
Th-229	4848.0	4,845.3	2.7	4746.6	5119.5	94.6	99.6	576	1.1250	574.88	5.553	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	84.0	99.8	120	3.7500	116.25	1.230	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:05:19PM 7/2/2014

Sample

Sample Name: 680-102380-A-10-C DU
SampleType: Sample
: 680-102380-A-10-C DU
Sample Collection Date: 6/13/2014 9:05:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0010g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128412
AnalysisID: 613930

Analyst: 60040

Tracer

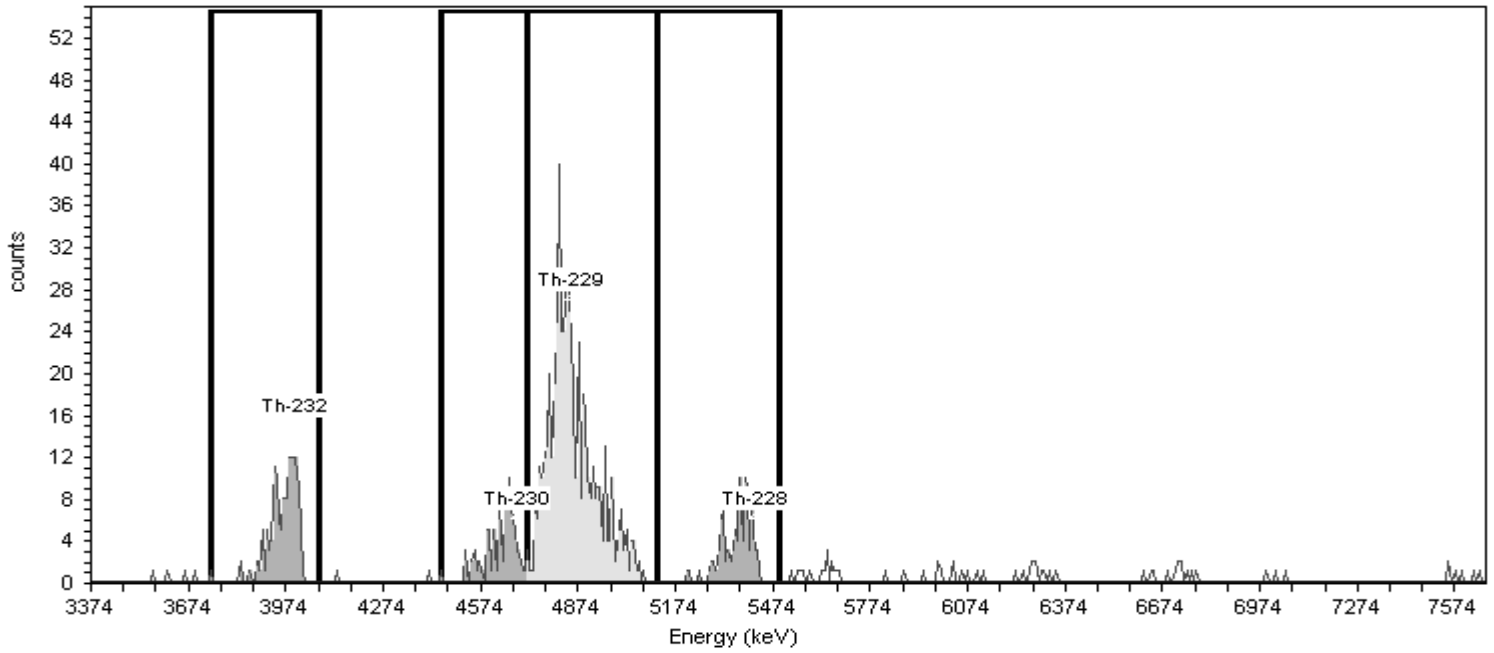
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 84.03%

Acquisition

Detector: AV7
Serial Number: 48-158EE5
Acquisition Start Date: 7/2/2014 6:02:22PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:20PM
Background Info: Sample: ICB;AV7; Det: AV7; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-8877;AV7-20140507
Calibration Date: 5/7/2014 10:48:48PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.80% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 5:59:21PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	90.3	100.2	136	1.6875	133.89	1.541	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	41.4	99.7	90	0.9953	88.63	1.025	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	94.1	99.6	529	0.7380	528.20	5.137	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	112.4	99.8	94	2.7843	91.22	1.054	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:05:30PM 7/2/2014

Sample

Sample Name: 680-102380-A-12-B
SampleType: Sample
: 680-102380-A-12-B
Sample Collection Date: 6/13/2014 9:15:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9992g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128412
AnalysisID: 613932

Analyst: 60040

Tracer

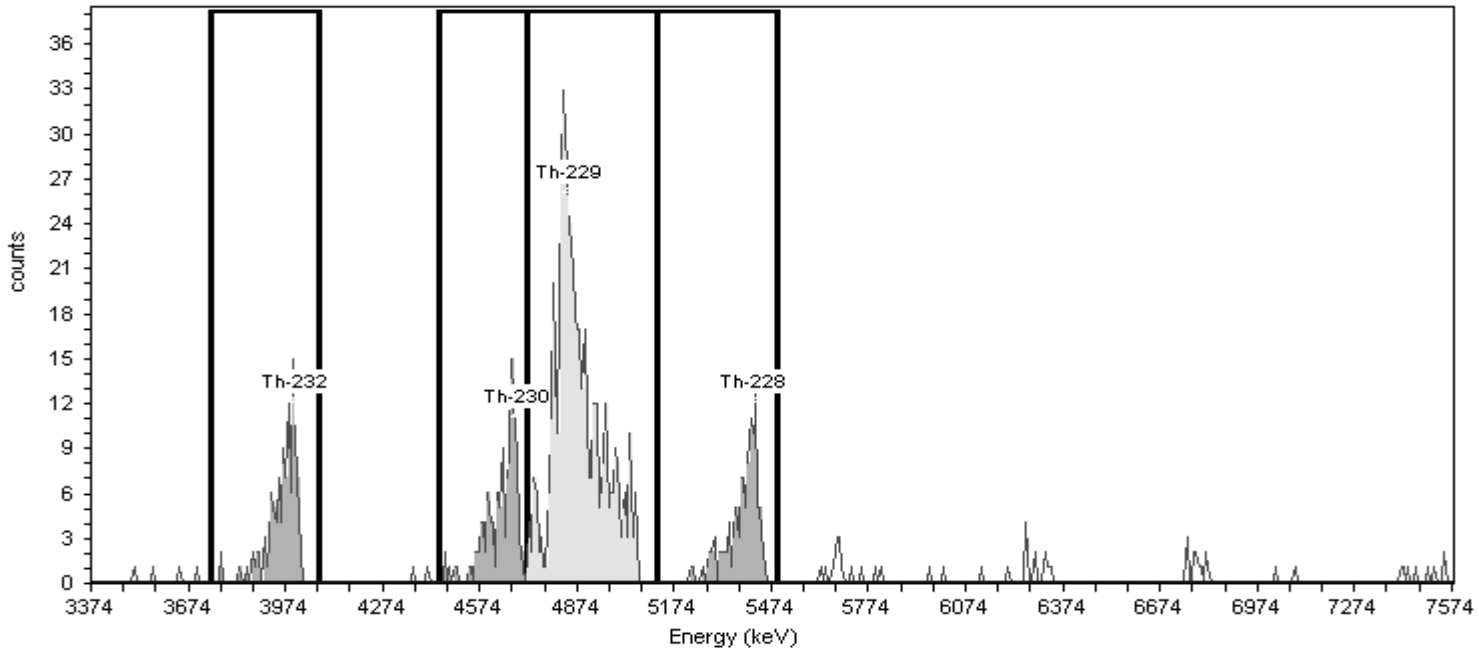
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 73.02%

Acquisition

Detector: AV8
Serial Number: 41-137Q6
Acquisition Start Date: 7/2/2014 6:02:24PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:22PM
Background Info: Sample: ICB;AV8; Det: AV8; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9792;AV8-20140505
Calibration Date: 5/6/2014 5:38:58PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.05% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 5:59:21PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	68.7	100.2	111	1.5000	109.50	1.385	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	24.6	99.7	114	0.2453	113.85	1.448	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	88.4	99.6	483	1.8750	481.22	4.472	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	70.2	99.8	109	3.5625	105.44	1.340	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:05:24PM 7/2/2014

Sample

Sample Name: 680-102380-A-13-B
SampleType: Sample
: 680-102380-A-13-B
Sample Collection Date: 6/13/2014 9:20:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9962g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128412
AnalysisID: 613931

Analyst: 60040

Tracer

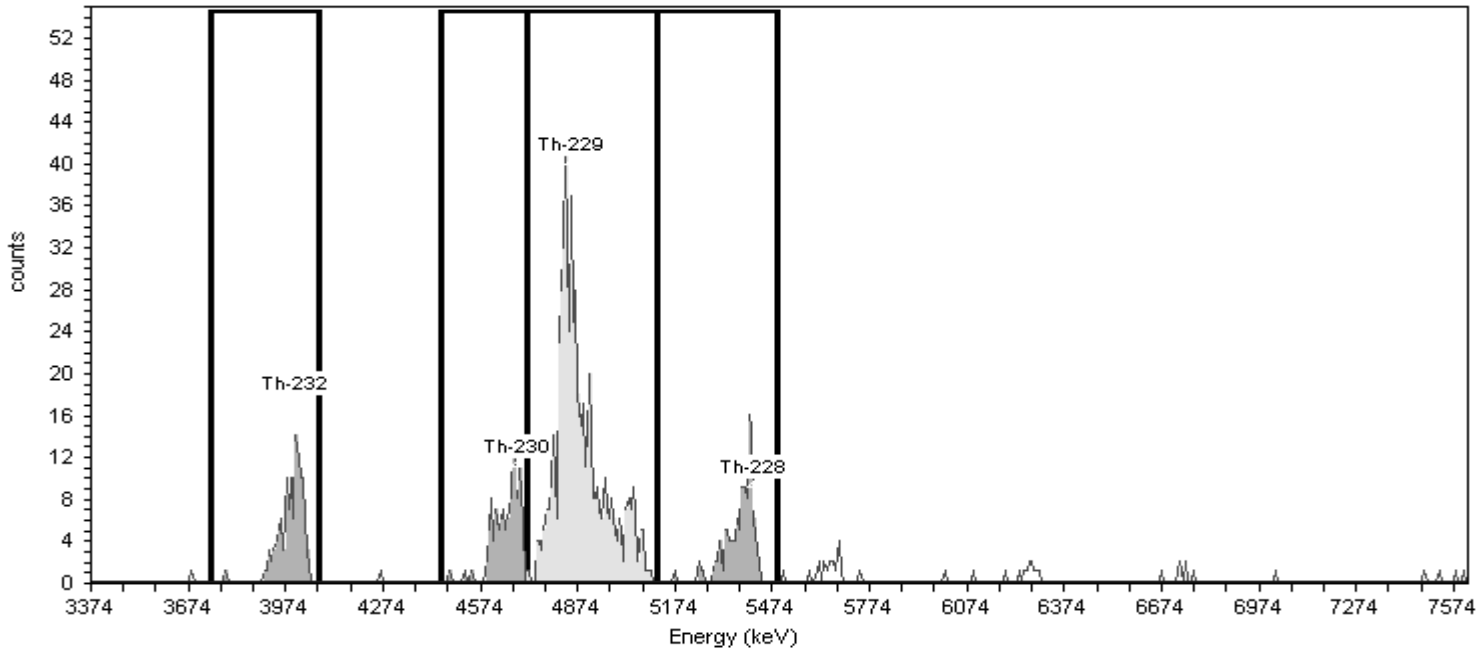
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 81.46%

Acquisition

Detector: AV9
Serial Number: 51-082V5
Acquisition Start Date: 7/2/2014 6:02:25PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:24PM
Background Info: Sample: ICB;AV9; Det: AV9; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9793;AV9-20140505
Calibration Date: 5/6/2014 5:39:04PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.04% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 5:59:21PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	71.9	100.2	117	0.3750	116.63	1.327	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	33.7	99.7	119	0.9375	118.06	1.350	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	77.9	99.6	537	0.3750	536.63	5.004	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	53.9	99.8	116	0.7662	115.23	1.317	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:05:36PM 7/2/2014

Sample

Sample Name: 680-102380-A-14-B
SampleType: Sample
: 680-102380-A-14-B
Sample Collection Date: 6/13/2014 9:25:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9993g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128412
AnalysisID: 613933

Analyst: 60040

Tracer

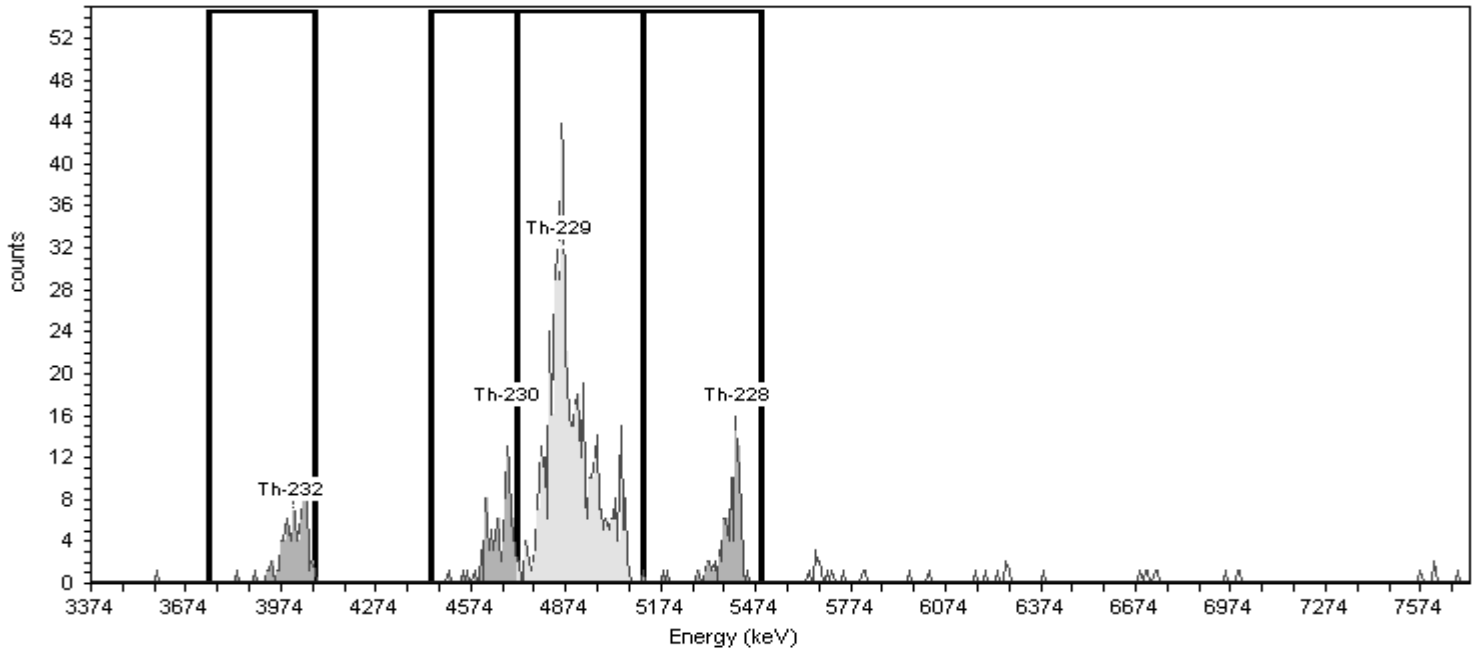
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 88.37%

Acquisition

Detector: AV10
Serial Number: 49-155N2
Acquisition Start Date: 7/2/2014 6:02:27PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:26PM
Background Info: Sample: ICB;AV10; Det: AV10; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9794;AV10-20140505
Calibration Date: 5/6/2014 5:39:10PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.84% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 5:59:21PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	32.6	100.2	82	0.0000	82.46	0.902	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	30.1	99.7	85	0.5625	84.44	0.929	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	67.0	99.6	558	1.6875	556.25	5.412	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.2	99.8	85	3.0000	81.94	0.901	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:17:30AM 7/3/2014

Sample

Sample Name: 680-102380-A-14-B
SampleType: Sample
: 680-102380-A-14-B
Sample Collection Date: 6/13/2014 9:25:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9993g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128412
AnalysisID: 614014

Analyst: 60040

Tracer

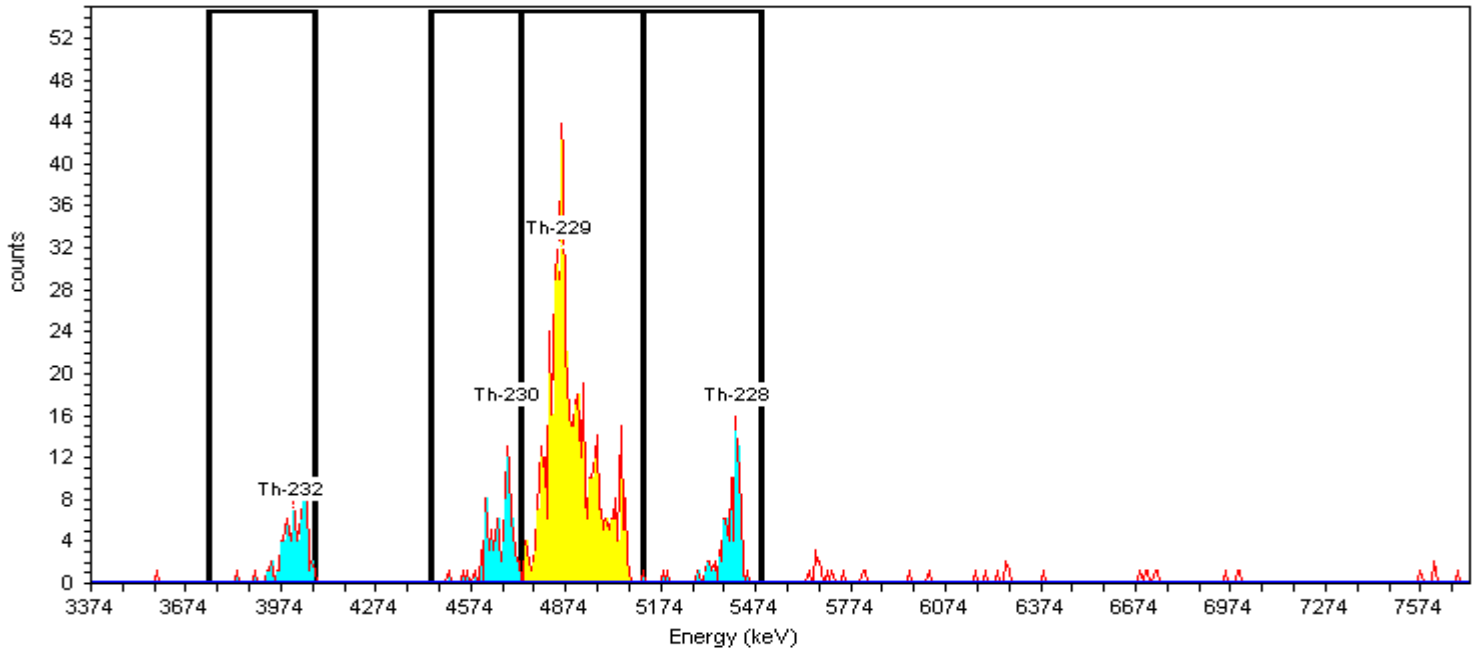
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 88.06%

Acquisition

Detector: AV10
Serial Number: 49-155N2
Acquisition Start Date: 7/2/2014 6:02:27PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:26PM
Background Info: Sample: ICB;AV10; Det: AV10; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9794;AV10-20140505
Calibration Date: 5/6/2014 5:39:10PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.84% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 5:59:21PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/3/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	32.6	100.2	82	0.0000	82.46	0.906	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4731.7	18.1	99.7	87	0.7500	86.25	0.952	pCi/g
Th-229	4848.0	4,845.3	2.7	4731.7	5119.5	67.0	99.6	556	1.6875	554.31	5.393	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.2	99.8	85	3.0000	81.94	0.904	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:05:41PM 7/2/2014

Sample

Sample Name: 680-102380-A-16-B
SampleType: Sample
: 680-102380-A-16-B
Sample Collection Date: 6/13/2014 10:05:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9982g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128412
AnalysisID: 613934

Analyst: 60040

Tracer

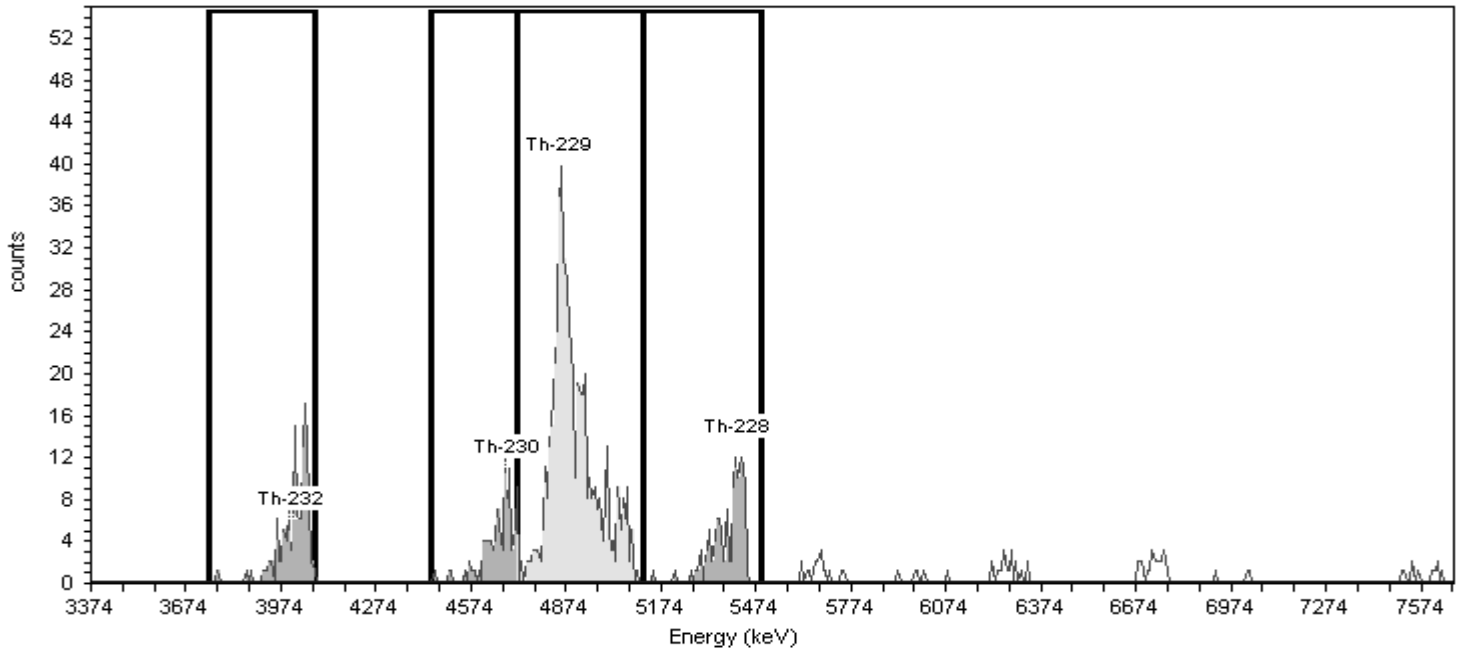
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 83.05%

Acquisition

Detector: AV11
Serial Number: 49-155dd2
Acquisition Start Date: 7/2/2014 6:02:28PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:27PM
Background Info: Sample: ICB;AV11; Det: AV11; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9795;AV11-20140505
Calibration Date: 5/6/2014 5:39:16PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.88% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 5:59:21PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	33.0	100.2	124	1.3280	123.13	1.380	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	28.6	99.7	95	0.7558	93.97	1.058	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	89.2	99.6	545	0.9433	543.78	5.091	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	52.8	99.8	118	2.9838	115.02	1.295	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:18:36AM 7/3/2014

Sample

Sample Name: 680-102380-A-16-B
SampleType: Sample
: 680-102380-A-16-B
Sample Collection Date: 6/13/2014 10:05:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9982g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128412
AnalysisID: 614015

Analyst: 60040

Tracer

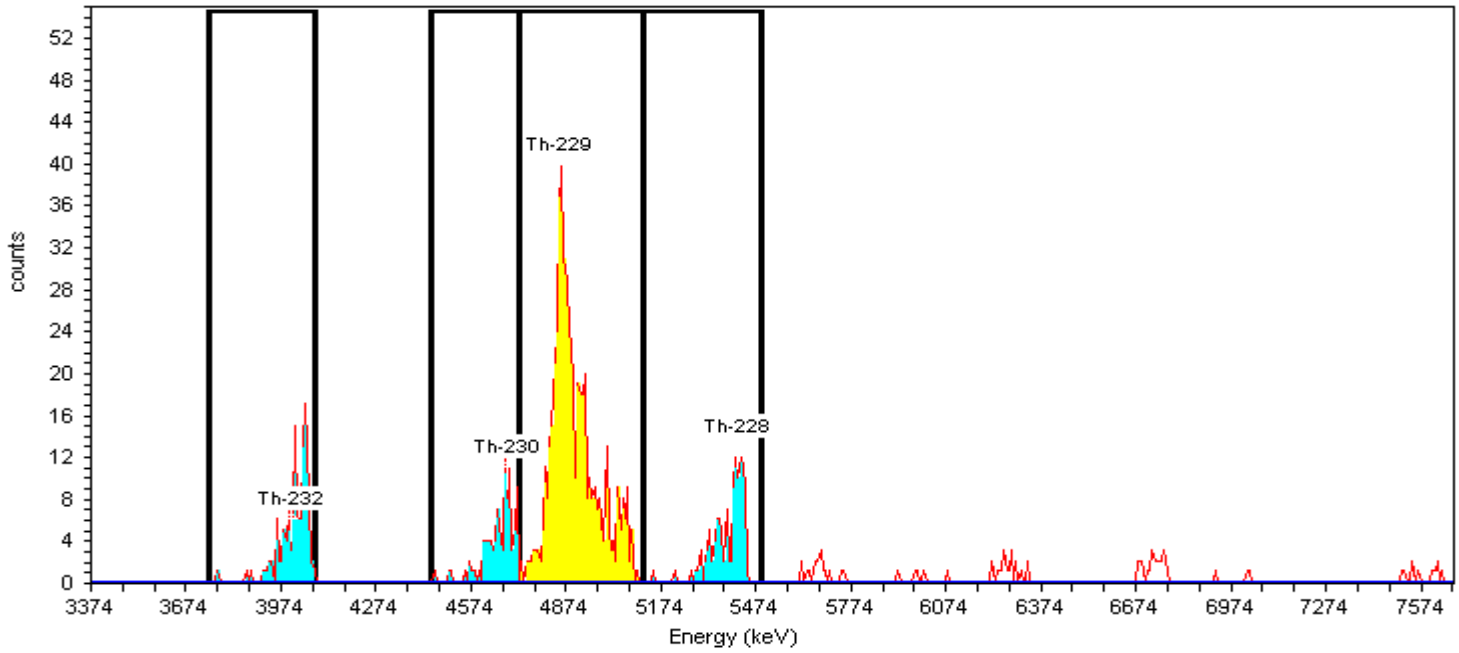
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 81.69%

Acquisition

Detector: AV11
Serial Number: 49-155dd2
Acquisition Start Date: 7/2/2014 6:02:28PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:27PM
Background Info: Sample: ICB;AV11; Det: AV11; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9795;AV11-20140505
Calibration Date: 5/6/2014 5:39:16PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.88% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 5:59:21PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/3/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	33.0	100.2	124	1.3280	123.13	1.403	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4724.2	20.8	99.7	95	0.9375	94.06	1.077	pCi/g
Th-229	4848.0	4,845.3	2.7	4724.2	5119.5	89.2	99.6	536	1.1250	534.88	5.008	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	52.8	99.8	118	2.9838	115.02	1.316	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:05:47PM 7/2/2014

Sample

Sample Name: 680-102380-A-17-B
SampleType: Sample
: 680-102380-A-17-B
Sample Collection Date: 6/13/2014 10:10:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0048g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128412
AnalysisID: 613935

Analyst: 60040

Tracer

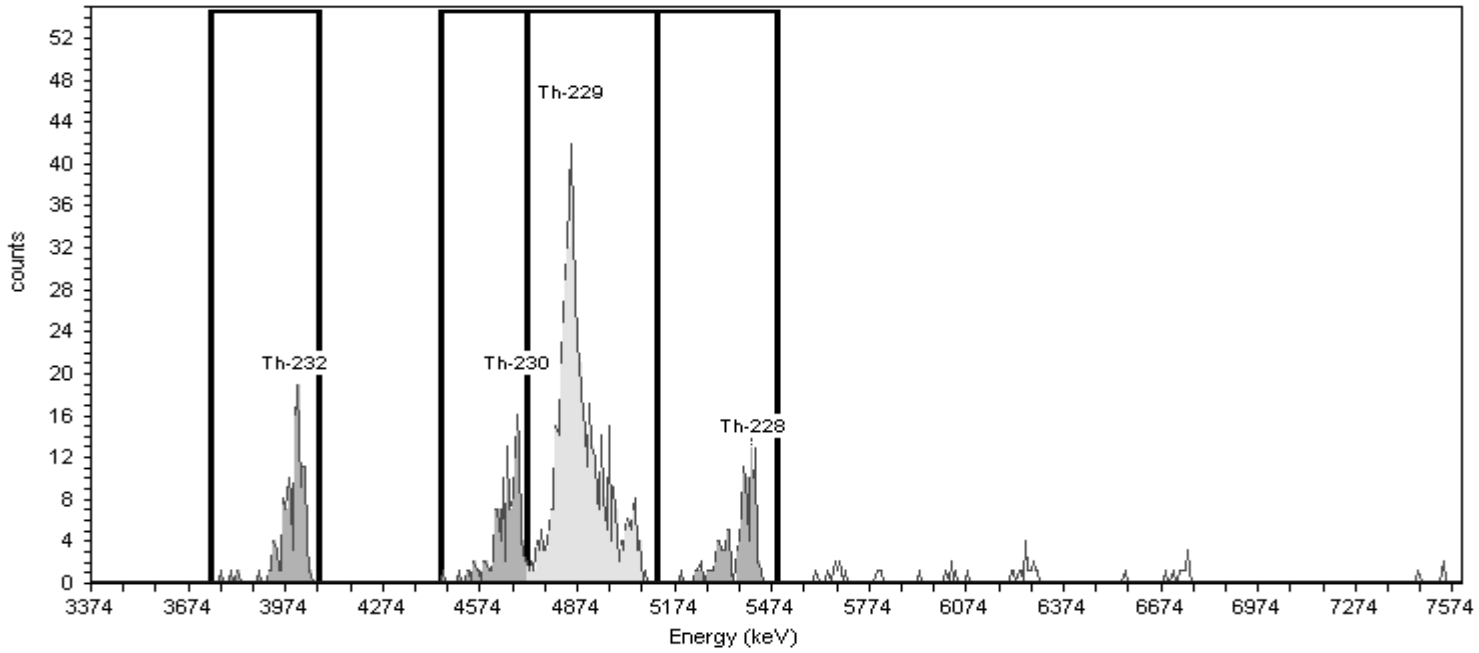
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 84.52%

Acquisition

Detector: AV12
Serial Number: 51-082B7
Acquisition Start Date: 7/2/2014 6:02:30PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:29PM
Background Info: Sample: ICB;AV12; Det: AV12; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9817;AV12-20140505
Calibration Date: 5/6/2014 5:39:22PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.97% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 5:59:21PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	51.2	100.2	122	1.5000	120.50	1.365	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	31.9	99.7	123	0.1875	122.78	1.398	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	72.2	99.6	535	0.3870	534.58	5.148	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	53.5	99.8	115	1.6995	113.30	1.289	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:05:54PM 7/2/2014

Sample

Sample Name: 680-102380-A-18-B
SampleType: Sample
: 680-102380-A-18-B
Sample Collection Date: 6/13/2014 10:15:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9957g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128412
AnalysisID: 613936

Analyst: 60040

Tracer

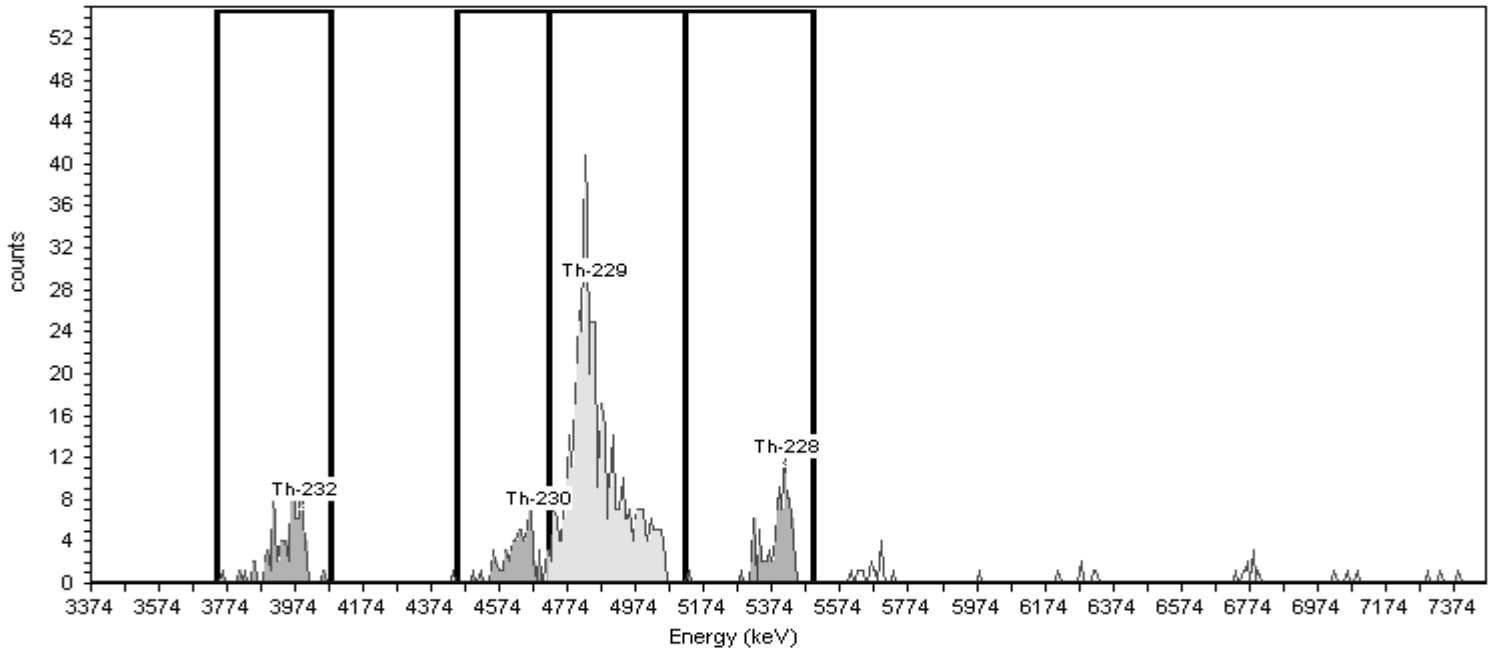
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 79.52%

Acquisition

Detector: AV13
Serial Number: 49-155M7
Acquisition Start Date: 7/2/2014 6:02:31PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:30PM
Background Info: Sample: ICB;AV13; Det: AV13; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9884;AV13-20140505
Calibration Date: 5/6/2014 5:39:28PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.99% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 5:59:21PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	95.4	100.2	95	1.9610	93.04	1.129	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	75.6	99.7	72	0.0000	71.97	0.878	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	69.9	99.6	504	0.5625	503.41	4.887	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	54.1	99.8	90	1.8750	88.13	1.074	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:21:00AM 7/3/2014

Sample

Sample Name: 680-102380-A-18-B
SampleType: Sample
: 680-102380-A-18-B
Sample Collection Date: 6/13/2014 10:15:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9957g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128412
AnalysisID: 614016

Analyst: 60040

Tracer

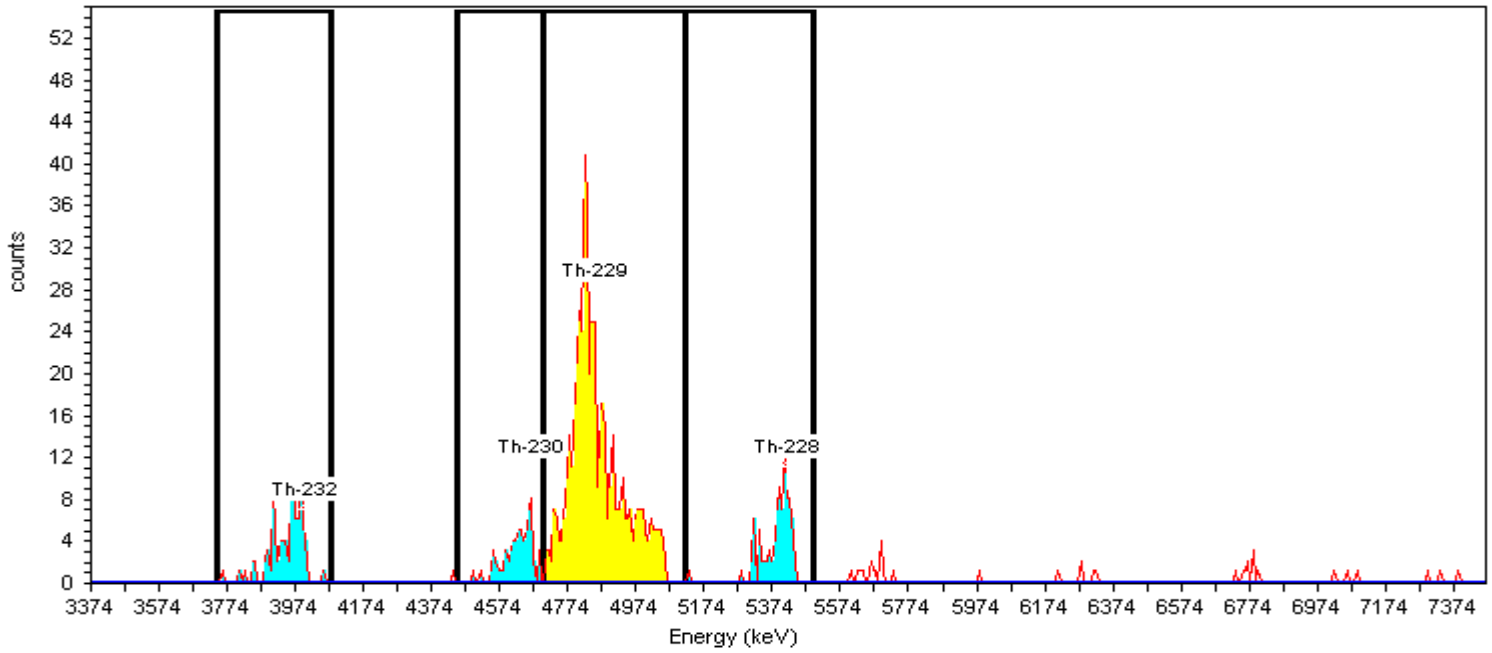
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 80.31%

Acquisition

Detector: AV13
Serial Number: 49-155M7
Acquisition Start Date: 7/2/2014 6:02:31PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:30PM
Background Info: Sample: ICB;AV13; Det: AV13; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9884;AV13-20140505
Calibration Date: 5/6/2014 5:39:28PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.99% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 5:59:21PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/3/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	95.4	100.2	95	1.9610	93.04	1.118	pCi/g
Th-230	4664.6	4,687.5	-22.9	4448.3	4701.9	13.4	99.7	66	0.0000	66.00	0.797	pCi/g
Th-229	4848.0	4,845.3	2.7	4701.9	5119.5	69.9	99.6	509	0.5625	508.44	4.936	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	54.1	99.8	90	1.8750	88.13	1.064	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:05:59PM 7/2/2014

Sample

Sample Name: 680-102380-A-20-B
SampleType: Sample
: 680-102380-A-20-B
Sample Collection Date: 6/13/2014 10:30:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0043g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128412
AnalysisID: 613937

Analyst: 60040

Tracer

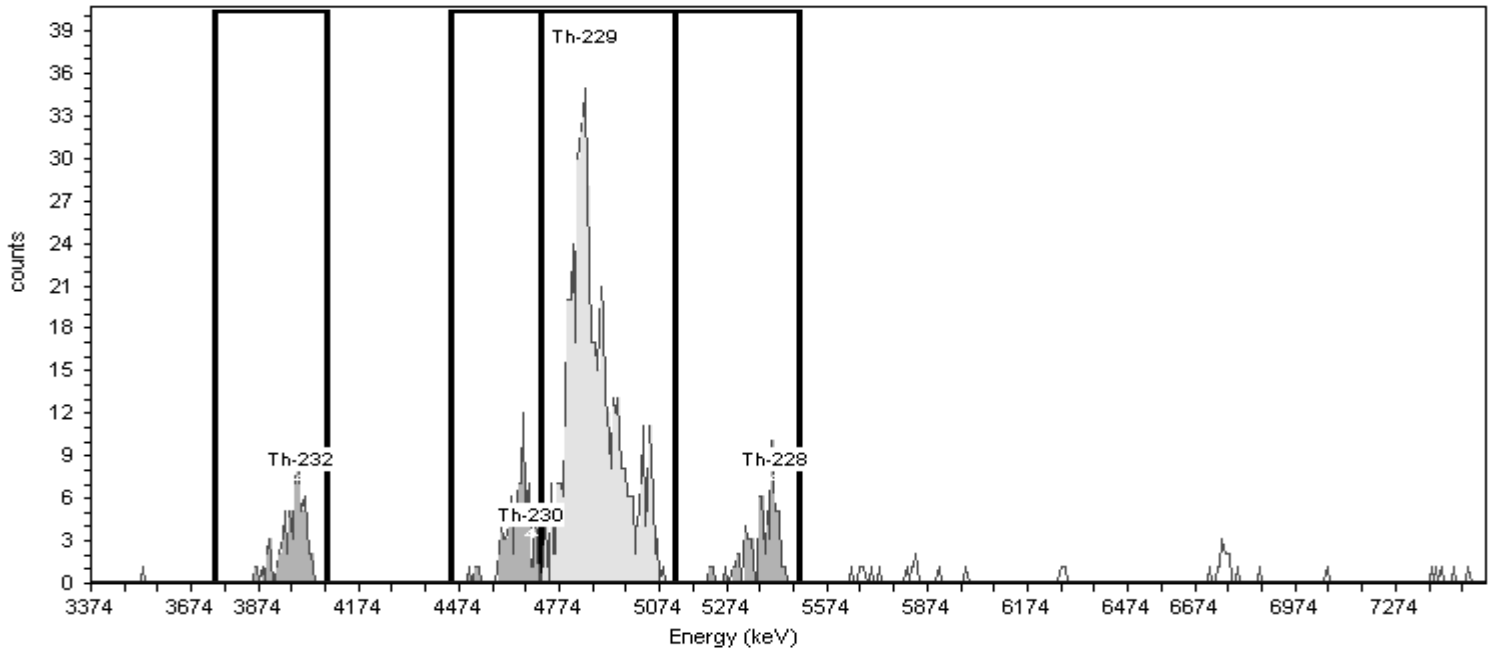
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 87.10%

Acquisition

Detector: AV14
Serial Number: 50-060W4
Acquisition Start Date: 7/2/2014 6:02:34PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:33PM
Background Info: Sample: ICB;AV14; Det: AV14; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9885;AV14-20140505
Calibration Date: 5/6/2014 5:39:36PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.34% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 5:59:21PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	63.1	100.2	72	0.1875	71.81	0.778	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	37.6	99.7	77	0.3750	76.66	0.835	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	107.4	99.6	560	1.1250	558.91	5.308	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	60.8	99.8	71	0.7500	70.25	0.765	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:06:05PM 7/2/2014

Sample

Sample Name: 680-102380-A-21-B
SampleType: Sample
: 680-102380-A-21-B
Sample Collection Date: 6/13/2014 10:35:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9975g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128412
AnalysisID: 613938

Analyst: 60040

Tracer

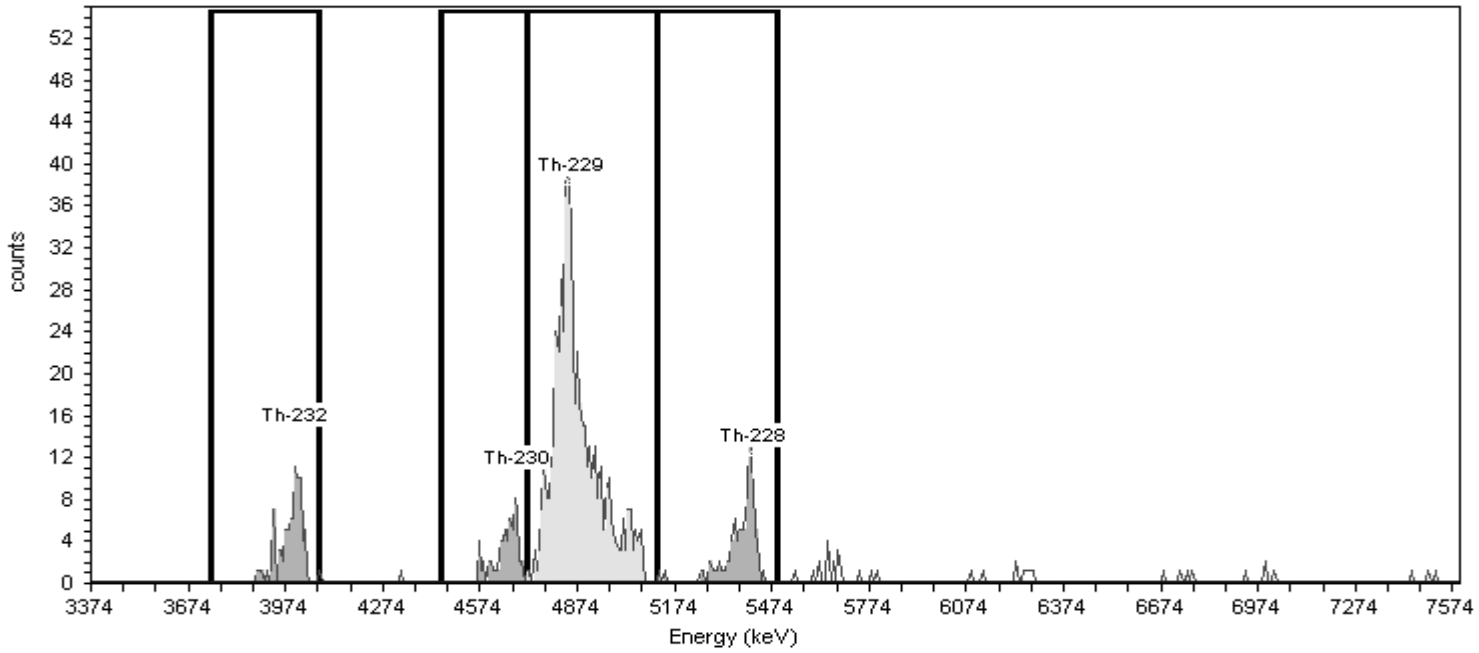
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 87.75%

Acquisition

Detector: AV15
Serial Number: 41-172C5
Acquisition Start Date: 7/2/2014 6:02:36PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:35PM
Background Info: Sample: ICB;AV15; Det: AV15; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9886;AV15-20140505
Calibration Date: 5/6/2014 5:39:42PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.62% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 5:59:21PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	60.4	100.2	84	0.1875	83.35	0.928	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	26.3	99.7	62	0.8136	61.19	0.685	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	77.0	99.6	549	1.3183	547.68	5.384	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	56.7	99.8	97	3.0000	94.00	1.051	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:06:11PM 7/2/2014

Sample

Sample Name: 680-102380-A-22-B
SampleType: Sample
: 680-102380-A-22-B
Sample Collection Date: 6/13/2014 11:00:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9991g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128412
AnalysisID: 613939

Analyst: 60040

Tracer

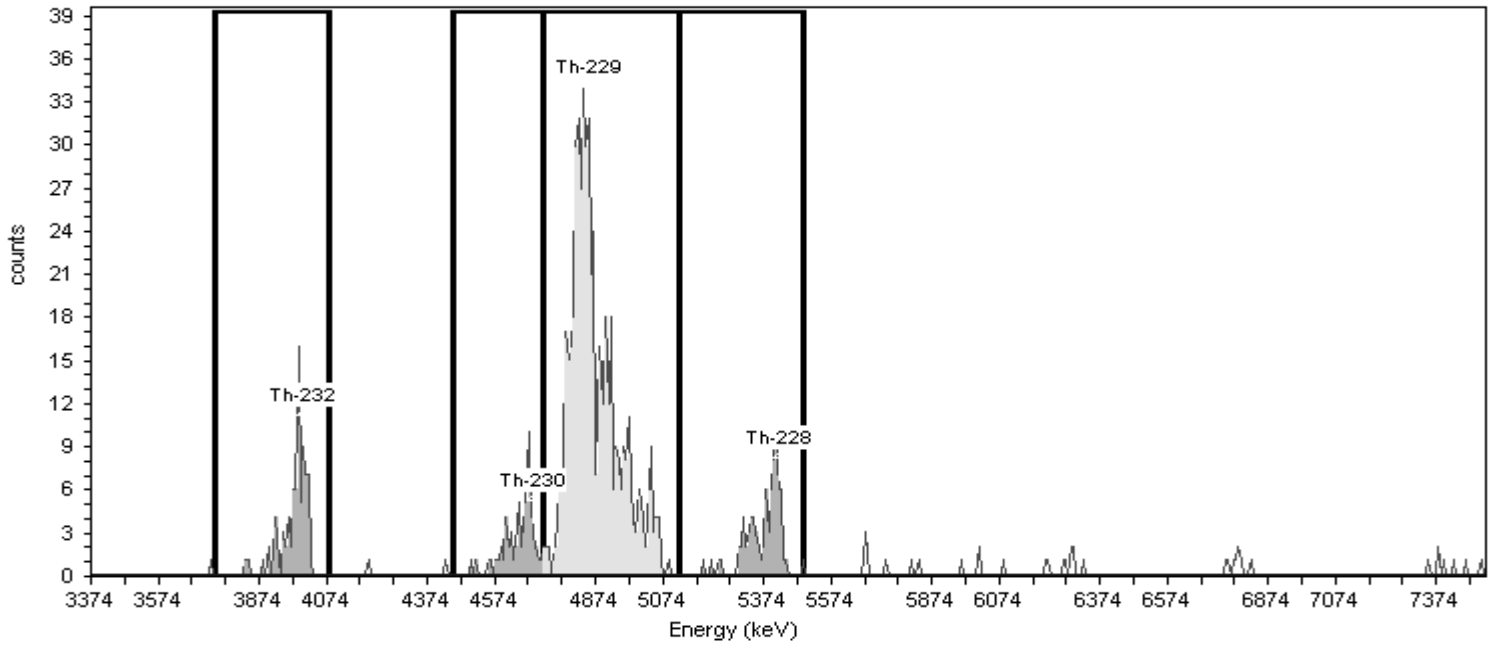
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 80.99%

Acquisition

Detector: AV16
Serial Number: 51-082B6
Acquisition Start Date: 7/2/2014 6:02:38PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:37PM
Background Info: Sample: ICB;AV16; Det: AV16; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-7107;AV16-20140505
Calibration Date: 5/5/2014 10:08:41PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.11% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 5:59:21PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	54.5	100.2	79	0.1875	78.81	0.897	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	17.8	99.7	60	0.8078	59.19	0.677	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	81.2	99.6	535	0.1875	534.81	4.961	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.1	99.8	81	1.6875	79.23	0.906	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:22:12AM 7/3/2014

Sample

Sample Name: 680-102380-A-22-B
SampleType: Sample
: 680-102380-A-22-B
Sample Collection Date: 6/13/2014 11:00:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9991g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128412
AnalysisID: 614017

Analyst: 60040

Tracer

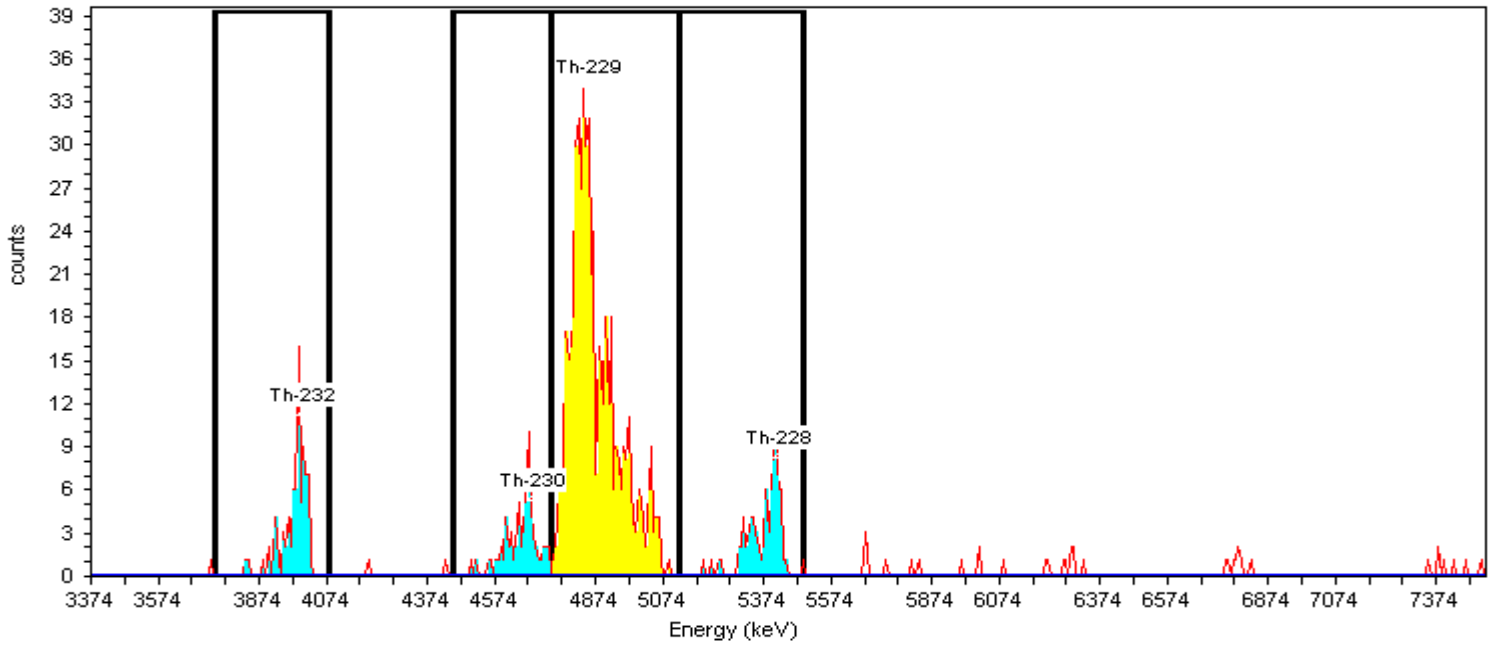
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 80.38%

Acquisition

Detector: AV16
Serial Number: 51-082B6
Acquisition Start Date: 7/2/2014 6:02:38PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:37PM
Background Info: Sample: ICB;AV16; Det: AV16; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-7107;AV16-20140505
Calibration Date: 5/5/2014 10:08:41PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 27.11% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 5:59:21PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/3/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	54.5	100.2	79	0.1875	78.81	0.904	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4739.1	63.2	99.7	64	0.7500	63.25	0.729	pCi/g
Th-229	4848.0	4,845.3	2.7	4739.1	5119.5	81.2	99.6	531	0.1875	530.81	4.923	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.1	99.8	81	1.6875	79.23	0.913	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:06:17PM 7/2/2014

Sample

Sample Name: 680-102380-A-23-B
SampleType: Sample
: 680-102380-A-23-B
Sample Collection Date: 6/13/2014 11:05:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9992g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128412
AnalysisID: 613940

Analyst: 60040

Tracer

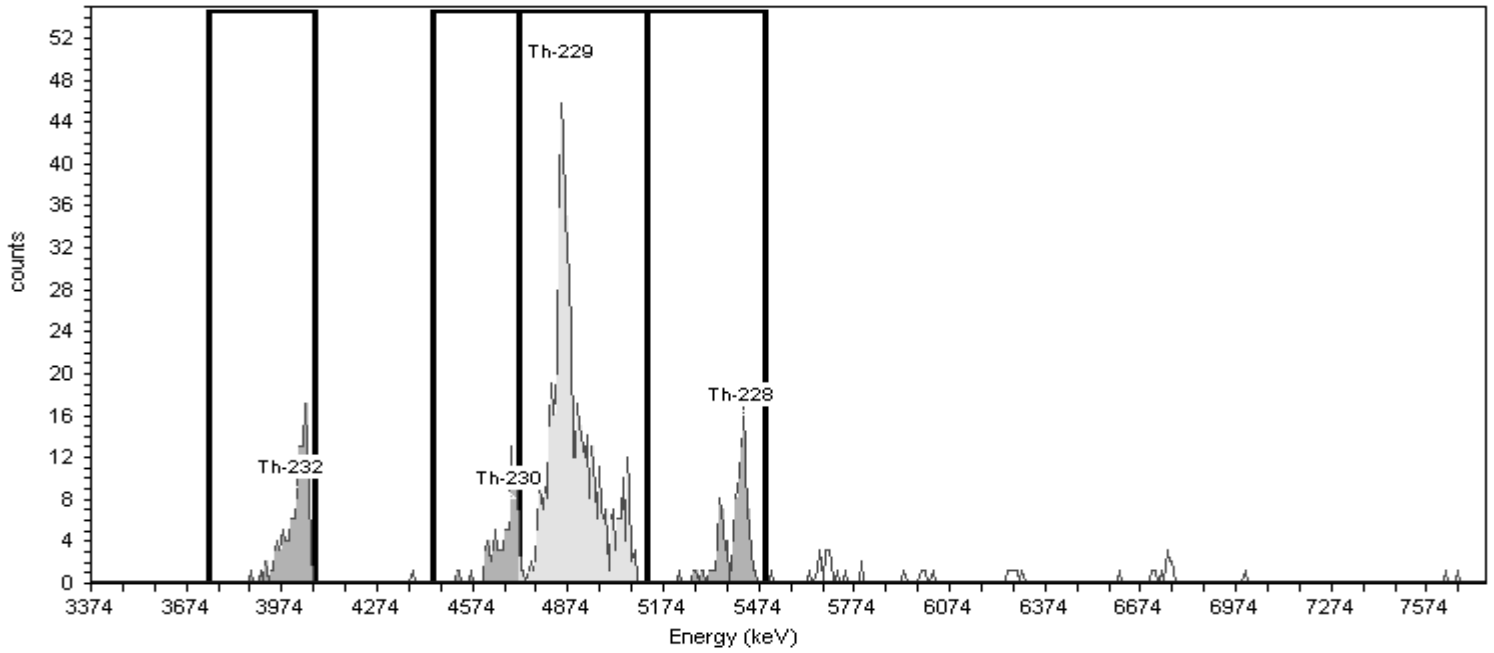
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 88.60%

Acquisition

Detector: AV17
Serial Number: 50-051C4
Acquisition Start Date: 7/2/2014 6:02:39PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:39PM
Background Info: Sample: ICB;AV17; Det: AV17; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-8874;AV17-20140505
Calibration Date: 5/5/2014 10:08:49PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.07% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 5:59:21PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	30.4	100.2	121	0.5625	120.44	1.304	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	55.3	99.7	80	0.5625	79.34	0.863	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	62.5	99.6	563	0.3750	562.53	5.426	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	52.3	99.8	110	3.9375	106.06	1.153	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:23:08AM 7/3/2014

Sample

Sample Name: 680-102380-A-23-B
SampleType: Sample
: 680-102380-A-23-B
Sample Collection Date: 6/13/2014 11:05:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9992g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128412
AnalysisID: 614018

Analyst: 60040

Tracer

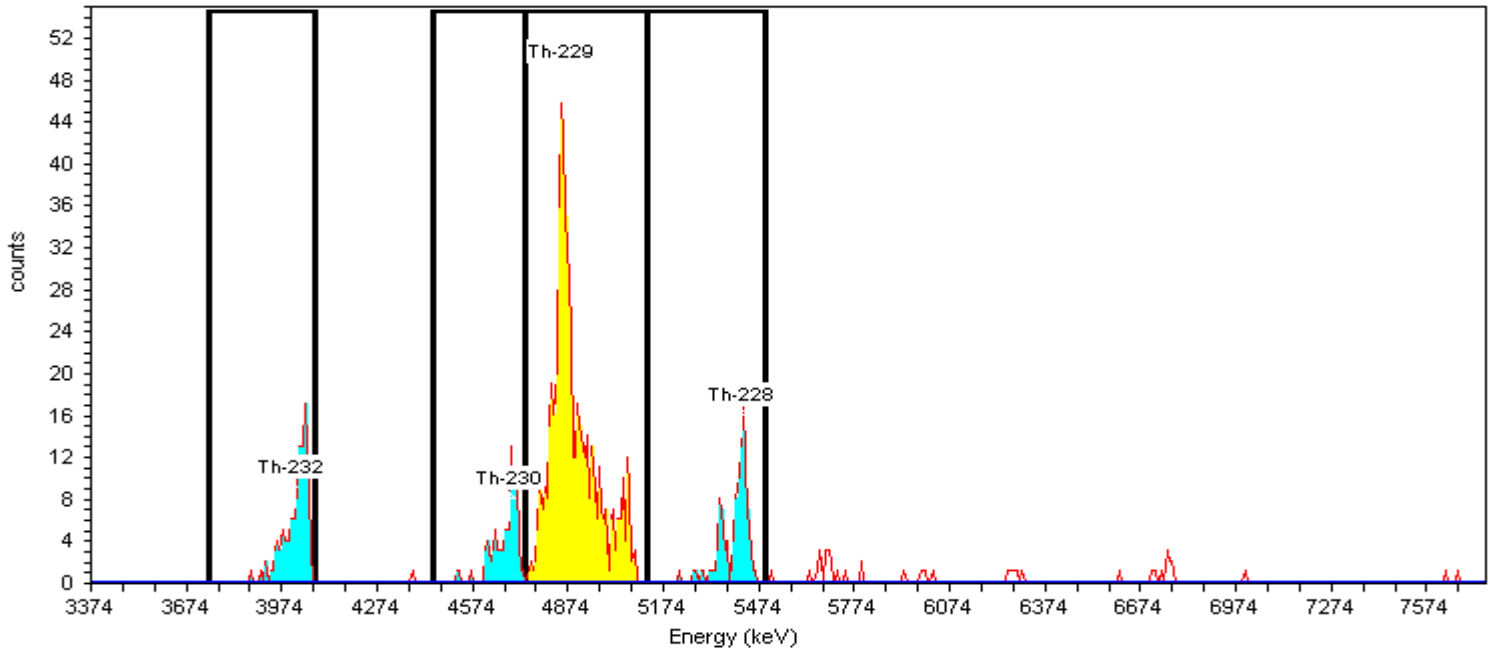
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 87.83%

Acquisition

Detector: AV17
Serial Number: 50-051C4
Acquisition Start Date: 7/2/2014 6:02:39PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:39PM
Background Info: Sample: ICB;AV17; Det: AV17; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-8874;AV17-20140505
Calibration Date: 5/5/2014 10:08:49PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.07% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 5:59:21PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/3/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	30.4	100.2	121	0.5625	120.44	1.315	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4739.1	21.1	99.7	82	0.5625	81.44	0.894	pCi/g
Th-229	4848.0	4,845.3	2.7	4739.1	5119.5	62.5	99.6	558	0.3750	557.63	5.379	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	52.3	99.8	110	3.9375	106.06	1.163	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:06:22PM 7/2/2014

Sample

Sample Name: 680-102380-A-24-B
SampleType: Sample
: 680-102380-A-24-B
Sample Collection Date: 6/13/2014 11:10:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9987g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128412
AnalysisID: 613941

Analyst: 60040

Tracer

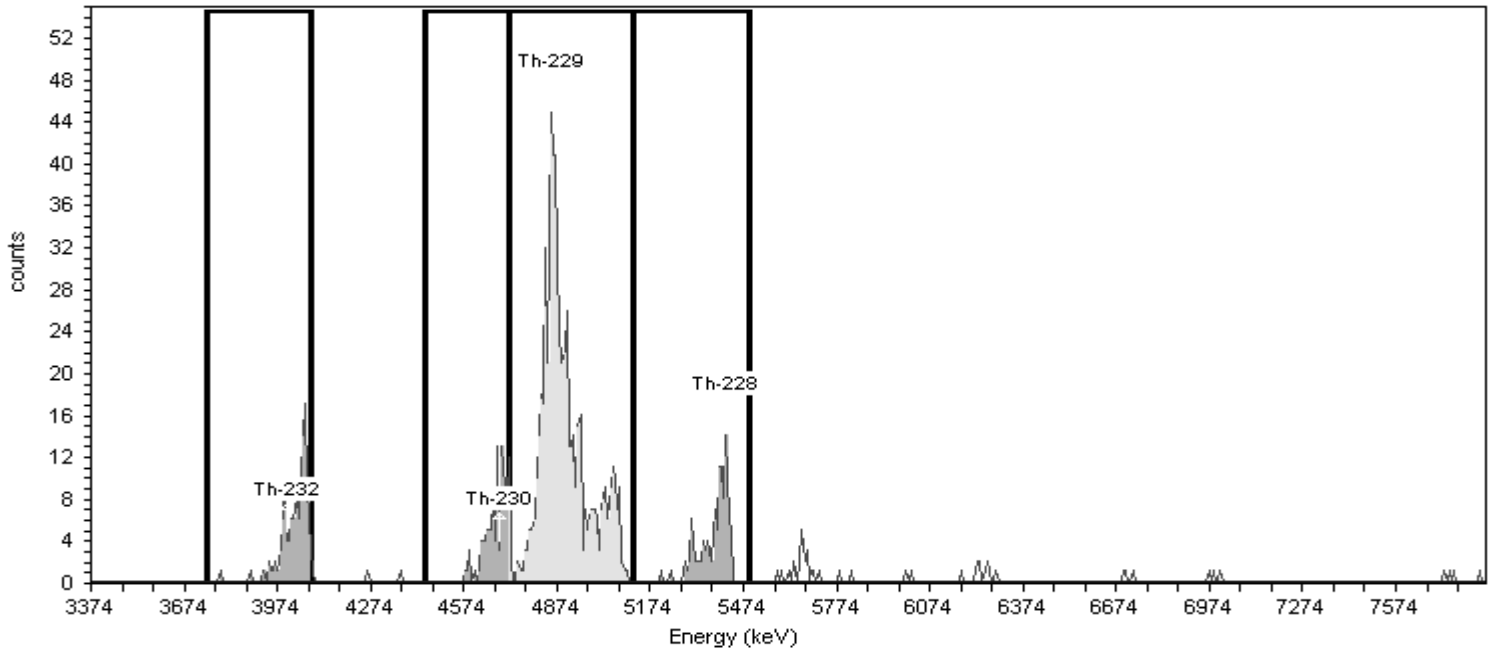
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 97.49%

Acquisition

Detector: AV18
Serial Number: 51-082C5
Acquisition Start Date: 7/2/2014 6:02:41PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:41PM
Background Info: Sample: ICB;AV18; Det: AV18; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-8875;AV18-20140505
Calibration Date: 5/5/2014 10:09:08PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.46% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 5:59:21PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	30.1	100.2	110	0.3750	109.38	1.102	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	46.1	99.7	99	0.3750	98.32	0.995	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	77.5	99.6	605	0.0000	604.69	5.974	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	50.9	99.8	106	1.3125	104.69	1.059	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:24:05AM 7/3/2014

Sample

Sample Name: 680-102380-A-24-B
SampleType: Sample
: 680-102380-A-24-B
Sample Collection Date: 6/13/2014 11:10:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9987g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128412
AnalysisID: 614019

Analyst: 60040

Tracer

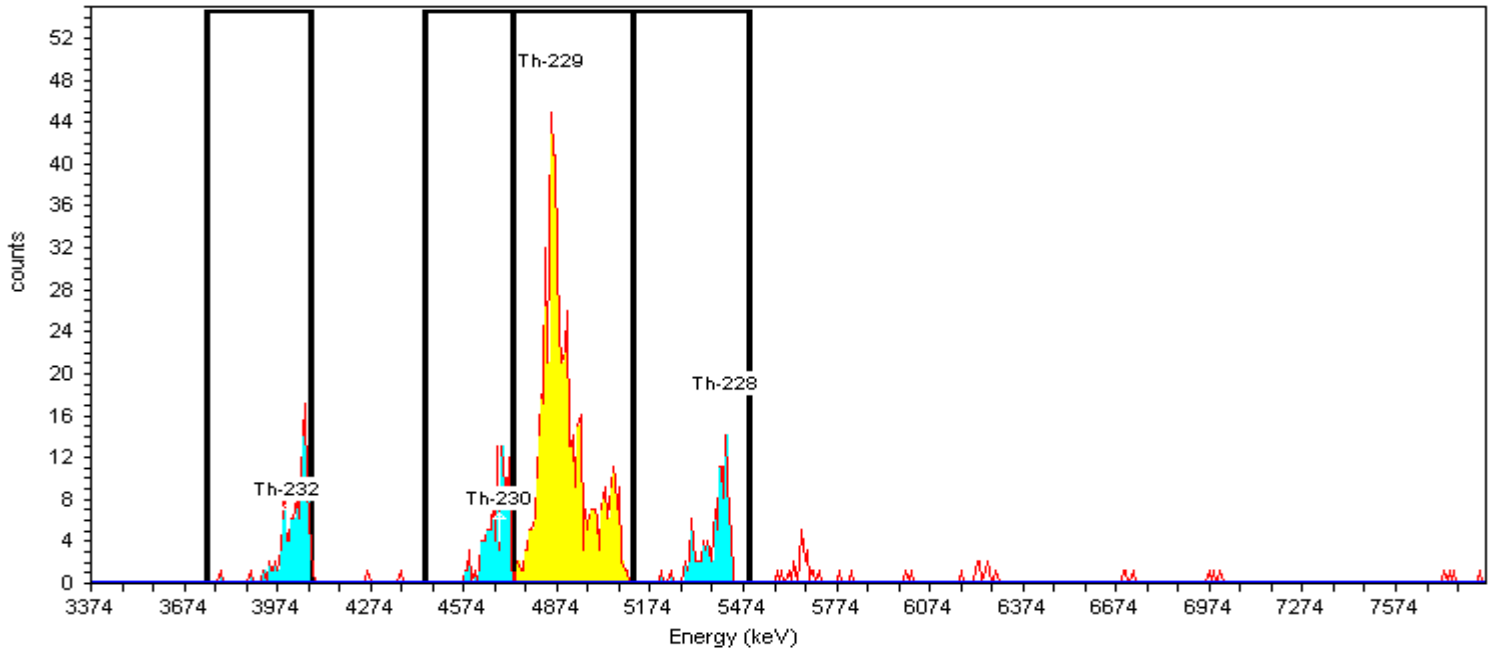
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 95.60%

Acquisition

Detector: AV18
Serial Number: 51-082C5
Acquisition Start Date: 7/2/2014 6:02:41PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:41PM
Background Info: Sample: ICB;AV18; Det: AV18; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-8875;AV18-20140505
Calibration Date: 5/5/2014 10:09:08PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.46% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 5:59:21PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/3/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	30.1	100.2	110	0.3750	109.38	1.124	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4731.7	33.2	99.7	101	0.3750	100.63	1.039	pCi/g
Th-229	4848.0	4,845.3	2.7	4731.7	5119.5	77.5	99.6	593	0.0000	593.00	5.858	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	50.9	99.8	106	1.3125	104.69	1.080	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:06:28PM 7/2/2014

Sample

Sample Name: 680-102380-A-26-B
SampleType: Sample
: 680-102380-A-26-B
Sample Collection Date: 6/13/2014 12:05:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9988g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128412
AnalysisID: 613942

Analyst: 60040

Tracer

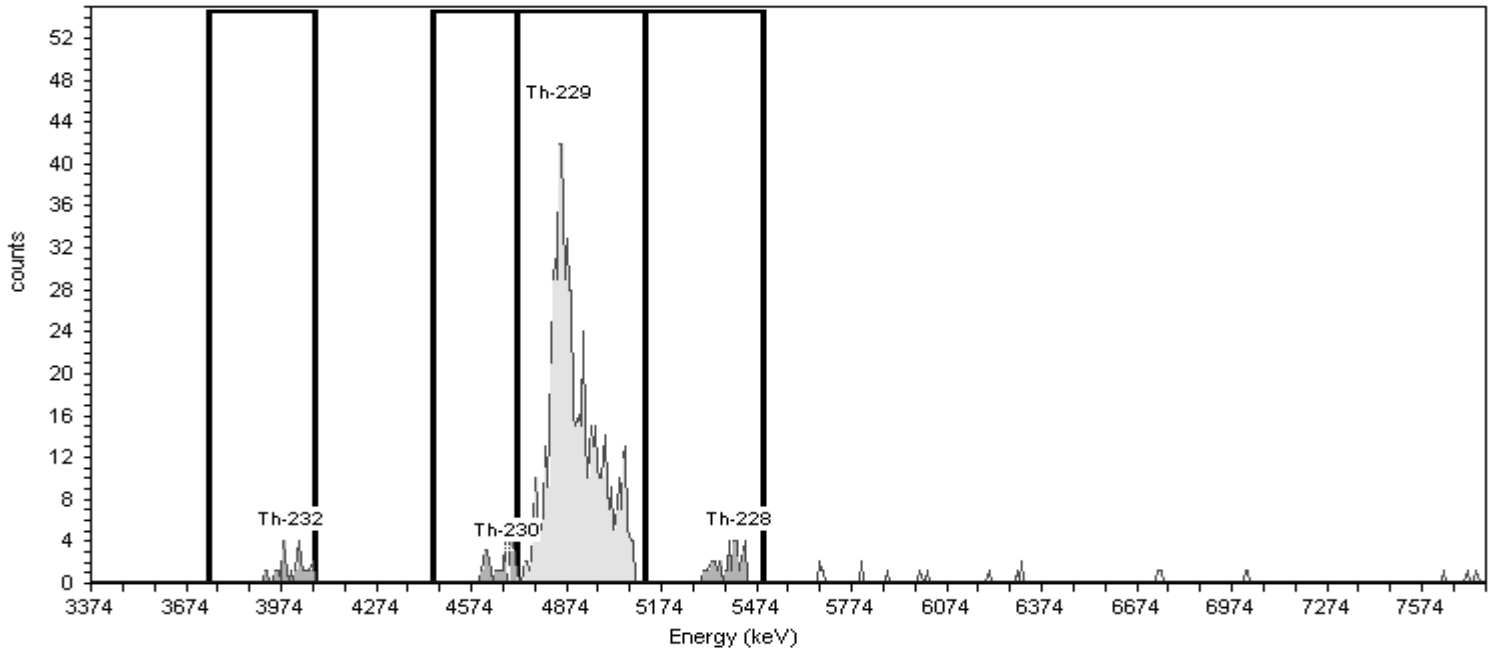
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 107.14%

Acquisition

Detector: AV19
Serial Number: 50-025FF5
Acquisition Start Date: 7/2/2014 6:02:43PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:42PM
Background Info: Sample: ICB;AV19; Det: AV19; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-8876;AV19-20140505
Calibration Date: 5/5/2014 10:09:02PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.34% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 5:59:21PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	24.0	100.2	23	0.3750	22.54	0.208	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	31.4	99.7	31	1.6817	29.29	0.271	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	85.9	99.6	663	1.6937	661.28	6.565	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	116.0	99.8	37	0.7620	36.24	0.335	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:06:33PM 7/2/2014

Sample

Sample Name: 680-102380-A-27-B
SampleType: Sample
: 680-102380-A-27-B
Sample Collection Date: 6/13/2014 12:10:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9978g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128412
AnalysisID: 613943

Analyst: 60040

Tracer

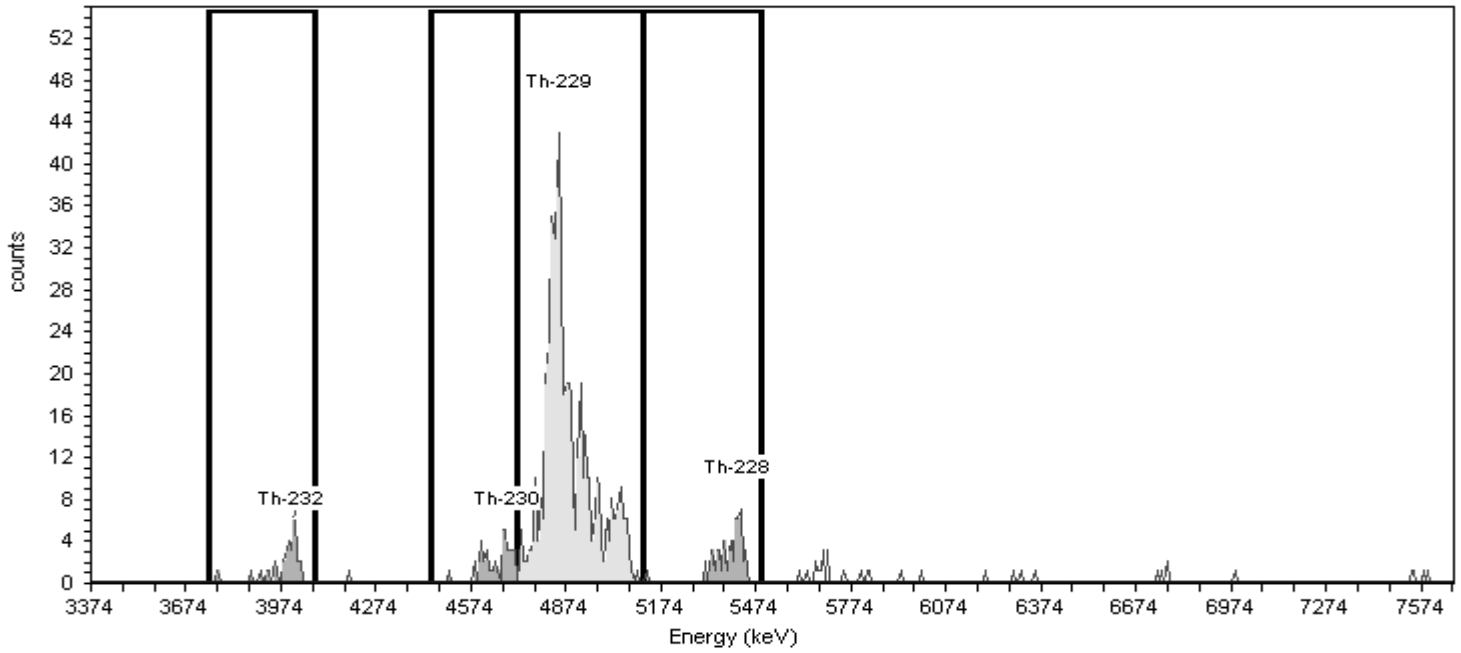
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 89.25%

Acquisition

Detector: AV20
Serial Number: 48-121A7
Acquisition Start Date: 7/2/2014 6:02:44PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:45PM
Background Info: Sample: ICB;AV20; Det: AV20; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-8877;AV20-20140505
Calibration Date: 5/5/2014 10:09:21PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.56% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 5:59:21PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	51.5	100.2	37	1.5000	35.50	0.389	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	62.2	99.7	42	1.5116	40.52	0.447	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	66.8	99.6	557	1.3241	555.71	5.474	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	59.9	99.8	54	3.0000	51.00	0.562	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:06:44PM 7/2/2014

Sample

Sample Name: 680-102380-A-28-B
SampleType: Sample
: 680-102380-A-28-B
Sample Collection Date: 6/13/2014 12:15:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0000g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128412
AnalysisID: 613944

Analyst: 60040

Tracer

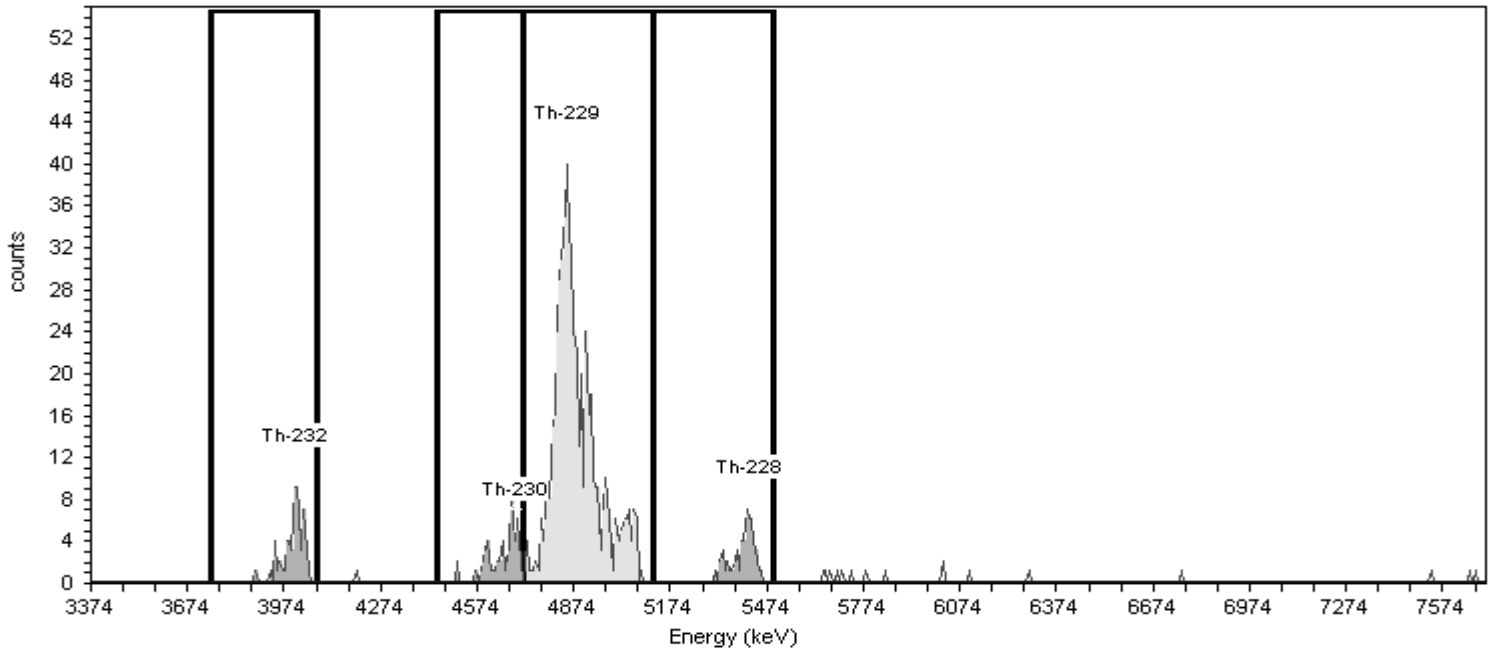
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 90.45%

Acquisition

Detector: AV21
Serial Number: 48-102BB6
Acquisition Start Date: 7/2/2014 6:02:46PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:46PM
Background Info: Sample: ICB;AV21; Det: AV21; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9520;AV21-20140505
Calibration Date: 5/5/2014 10:09:29PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.45% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 5:59:21PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	41.4	100.2	61	0.3750	60.63	0.658	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	33.4	99.7	54	0.7500	53.37	0.582	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	76.5	99.6	561	0.3750	560.75	5.535	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	60.9	99.8	53	2.0625	50.94	0.555	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:06:50PM 7/2/2014

Sample

Sample Name: 680-102380-A-29-B
SampleType: Sample
: 680-102380-A-29-B
Sample Collection Date: 6/13/2014 12:30:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0007g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128412
AnalysisID: 613945

Analyst: 60040

Tracer

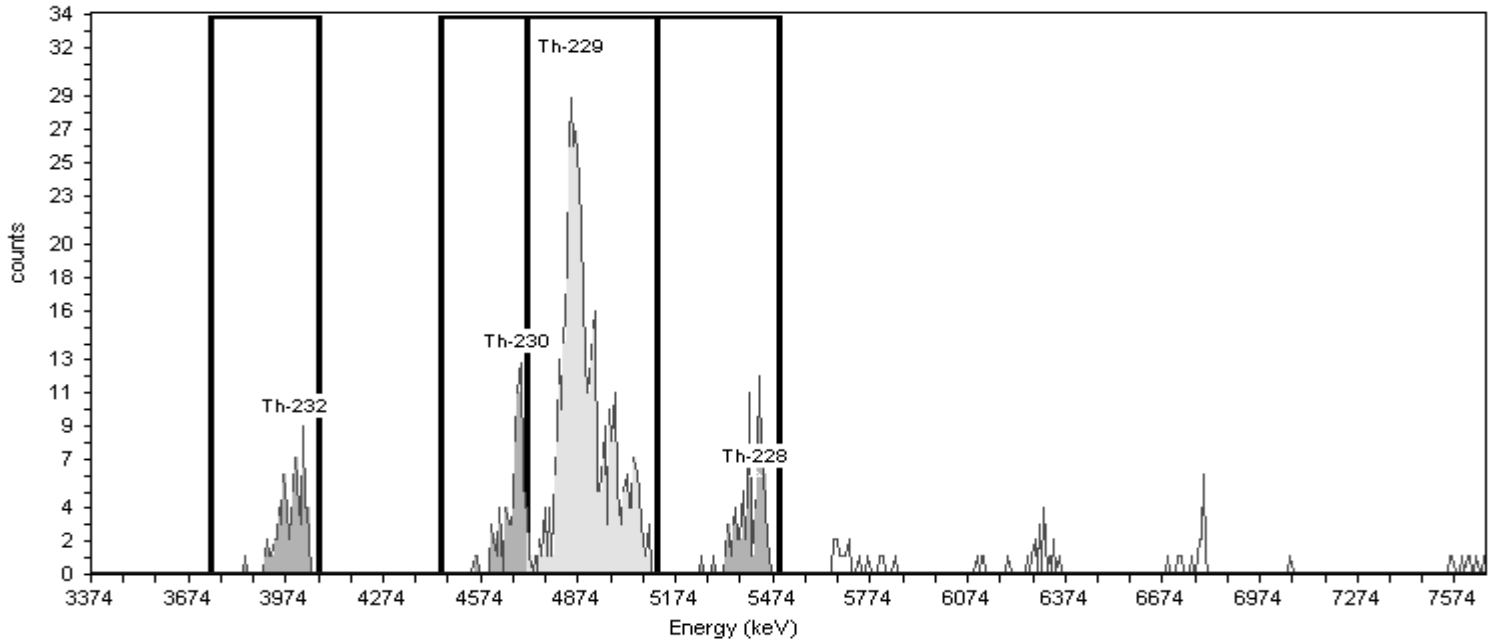
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 69.64%

Acquisition

Detector: AV23
Serial Number: 48-158FF3
Acquisition Start Date: 7/2/2014 6:02:48PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:49PM
Background Info: Sample: ICB;AV23; Det: AV23; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9792;AV23-20140505
Calibration Date: 5/5/2014 10:09:35PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.91% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 5:59:21PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	68.4	100.2	68	0.3750	67.63	0.935	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	30.2	99.7	74	0.9375	72.97	1.014	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	83.7	99.6	441	1.3125	439.59	4.259	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	44.5	99.8	80	1.8750	78.13	1.085	pCi/g

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Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:25:06AM 7/3/2014

Sample

Sample Name: 680-102380-A-29-B
SampleType: Sample
: 680-102380-A-29-B
Sample Collection Date: 6/13/2014 12:30:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0007g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128412
AnalysisID: 614020

Analyst: 60040

Tracer

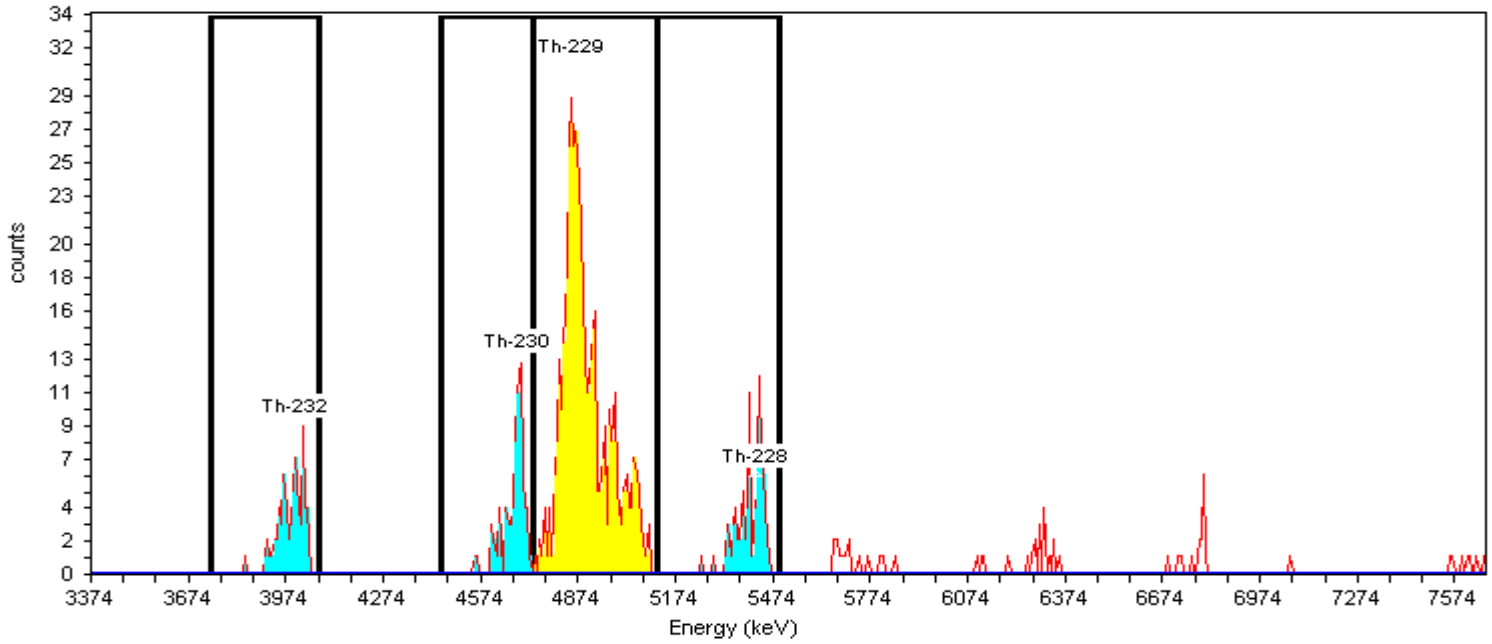
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 69.03%

Acquisition

Detector: AV23
Serial Number: 48-158FF3
Acquisition Start Date: 7/2/2014 6:02:48PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:49PM
Background Info: Sample: ICB;AV23; Det: AV23; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9792;AV23-20140505
Calibration Date: 5/5/2014 10:09:35PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.91% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 5:59:21PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/3/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	68.4	100.2	68	0.3750	67.63	0.944	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4731.7	17.0	99.7	75	0.9375	74.06	1.039	pCi/g
Th-229	4848.0	4,845.3	2.7	4731.7	5119.5	83.7	99.6	437	1.3125	435.69	4.221	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	44.5	99.8	80	1.8750	78.13	1.095	pCi/g

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Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:06:55PM 7/2/2014

Sample

Sample Name: 680-102380-A-30-B
SampleType: Sample
: 680-102380-A-30-B
Sample Collection Date: 6/13/2014 12:35:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9969g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128412
AnalysisID: 613946

Analyst: 60040

Tracer

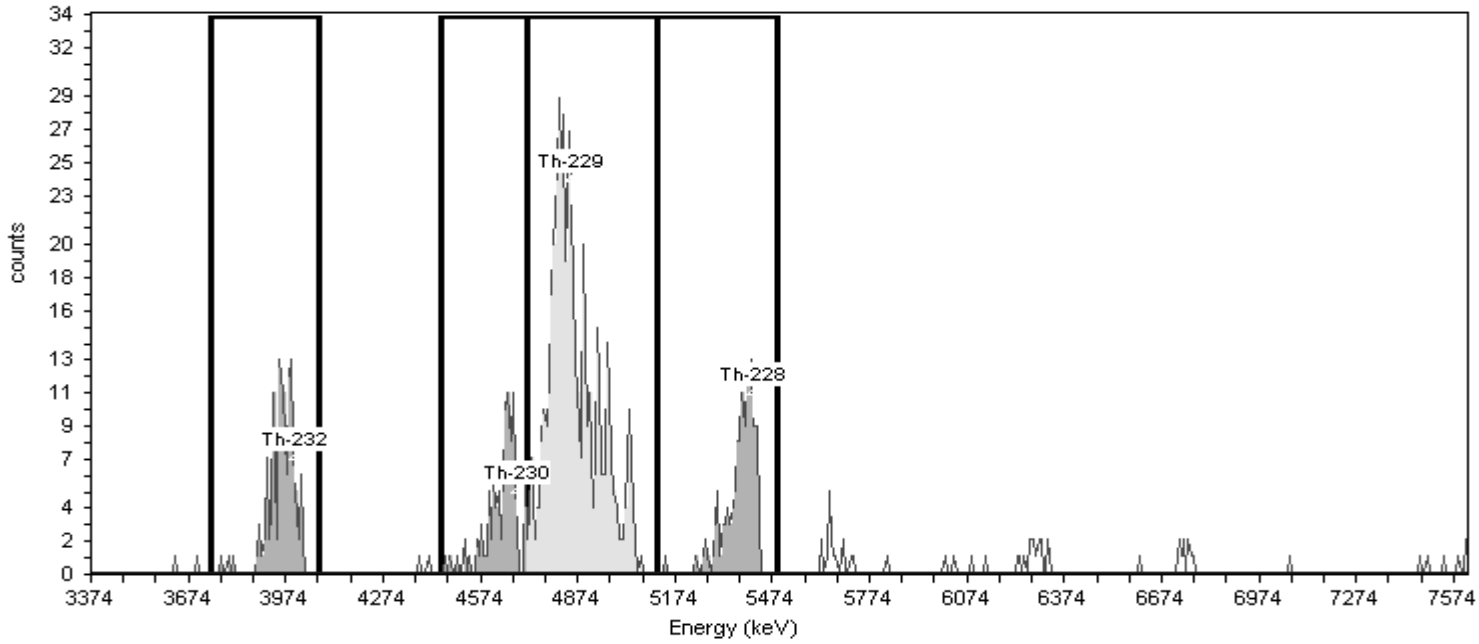
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 76.76%

Acquisition

Detector: AV24
Serial Number: 47-137Q4
Acquisition Start Date: 7/2/2014 6:02:50PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:51PM
Background Info: Sample: ICB;AV24; Det: AV24; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9793;AV24-20140505
Calibration Date: 5/5/2014 10:09:41PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.42% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 5:59:21PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	79.7	100.2	125	0.7500	124.25	1.535	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	16.4	99.7	100	0.9375	99.09	1.231	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	94.8	99.6	495	1.1250	493.91	4.712	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	67.9	99.8	132	4.7037	127.30	1.580	pCi/g

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Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:26:40AM 7/3/2014

Sample

Sample Name: 680-102380-A-30-B
SampleType: Sample
: 680-102380-A-30-B
Sample Collection Date: 6/13/2014 12:35:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9969g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128412
AnalysisID: 614021

Analyst: 60040

Tracer

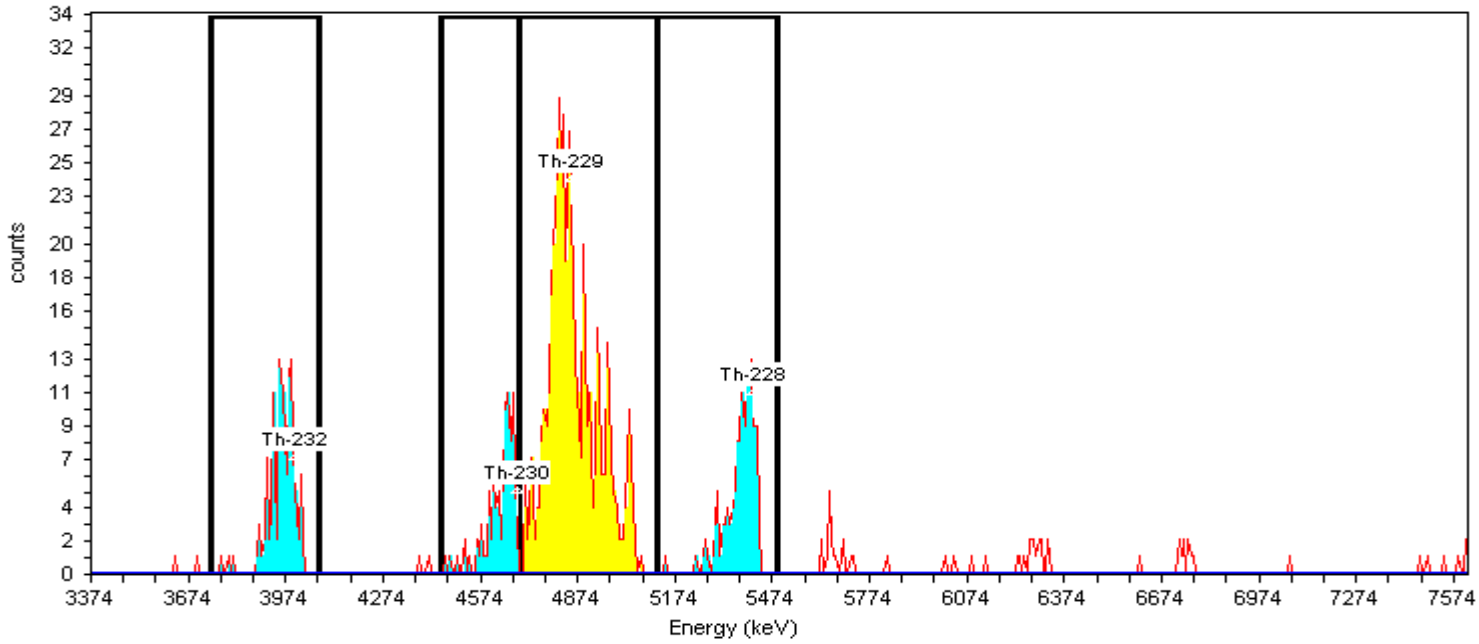
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 78.12%

Acquisition

Detector: AV24
Serial Number: 47-137Q4
Acquisition Start Date: 7/2/2014 6:02:50PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:51PM
Background Info: Sample: ICB;AV24; Det: AV24; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9793;AV24-20140505
Calibration Date: 5/5/2014 10:09:41PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.42% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 5:59:21PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/3/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	79.7	100.2	125	0.7500	124.25	1.508	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4694.4	30.6	99.7	92	0.9375	91.06	1.111	pCi/g
Th-229	4848.0	4,845.3	2.7	4694.4	5119.5	94.8	99.6	504	1.3125	502.69	4.796	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	67.9	99.8	132	4.7037	127.30	1.552	pCi/g

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:02:59PM 7/2/2014

Sample

Sample Name: 680-102380-A-31-B
SampleType: Sample
: 680-102380-A-31-B
Sample Collection Date: 6/13/2014 12:40:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0027g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128412
AnalysisID: 613924

Analyst: 60040

Tracer

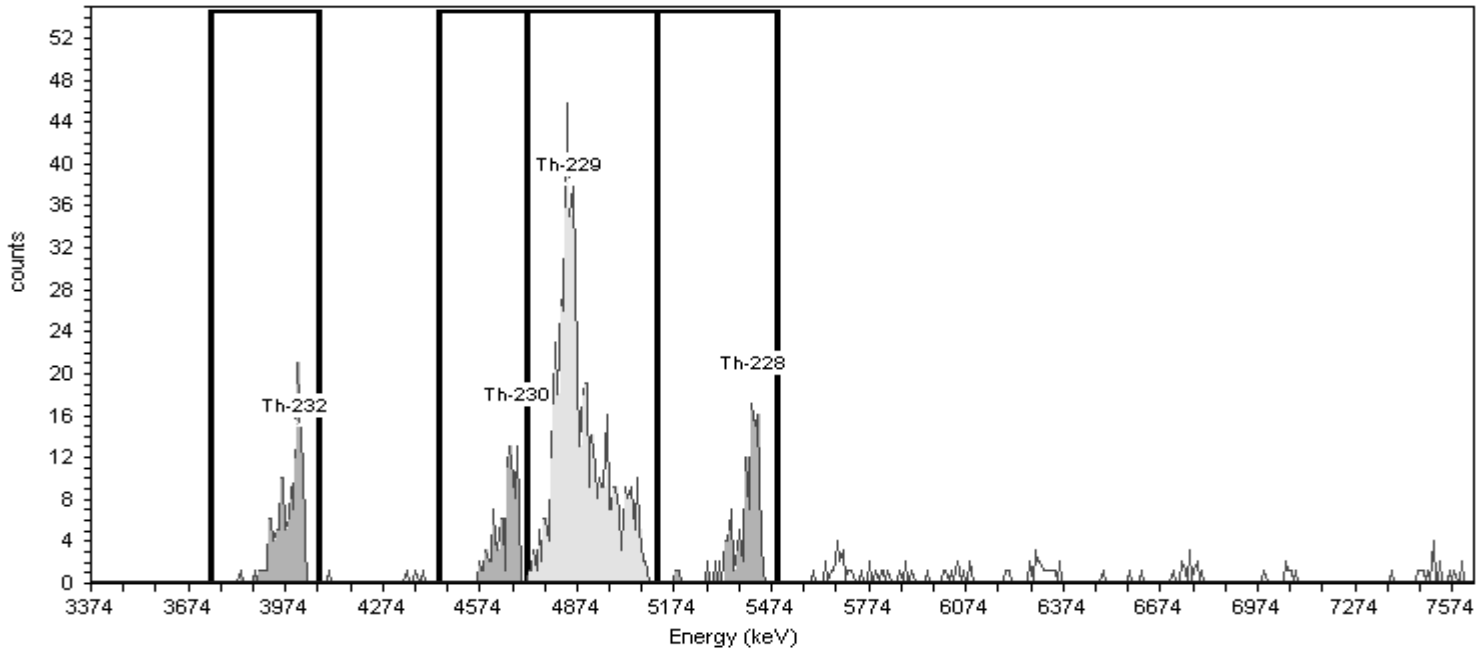
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 98.12%

Acquisition

Detector: AV43
Serial Number: 49-190X4
Acquisition Start Date: 7/2/2014 6:02:59PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/19/2014 12:17:24AM
Background Info: Sample: ICB;AV43; Det: AV43; Spectrum #1; Jun-19-2014 00:17

Calibration Name: IC-9794;AV43-20140505
Calibration Date: 5/5/2014 10:09:47PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.74% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 5:59:21PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	91.2	100.2	141	0.3750	140.63	1.387	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	30.9	99.7	100	0.6203	99.41	0.986	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	75.2	99.6	616	0.9375	615.09	5.988	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	49.6	99.8	130	1.6875	128.31	1.271	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:03:05PM 7/2/2014

Sample

Sample Name: 680-102380-A-33-B
SampleType: Sample
: 680-102380-A-33-B
Sample Collection Date: 6/13/2014 12:00:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0026g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128412
AnalysisID: 613925

Analyst: 60040

Tracer

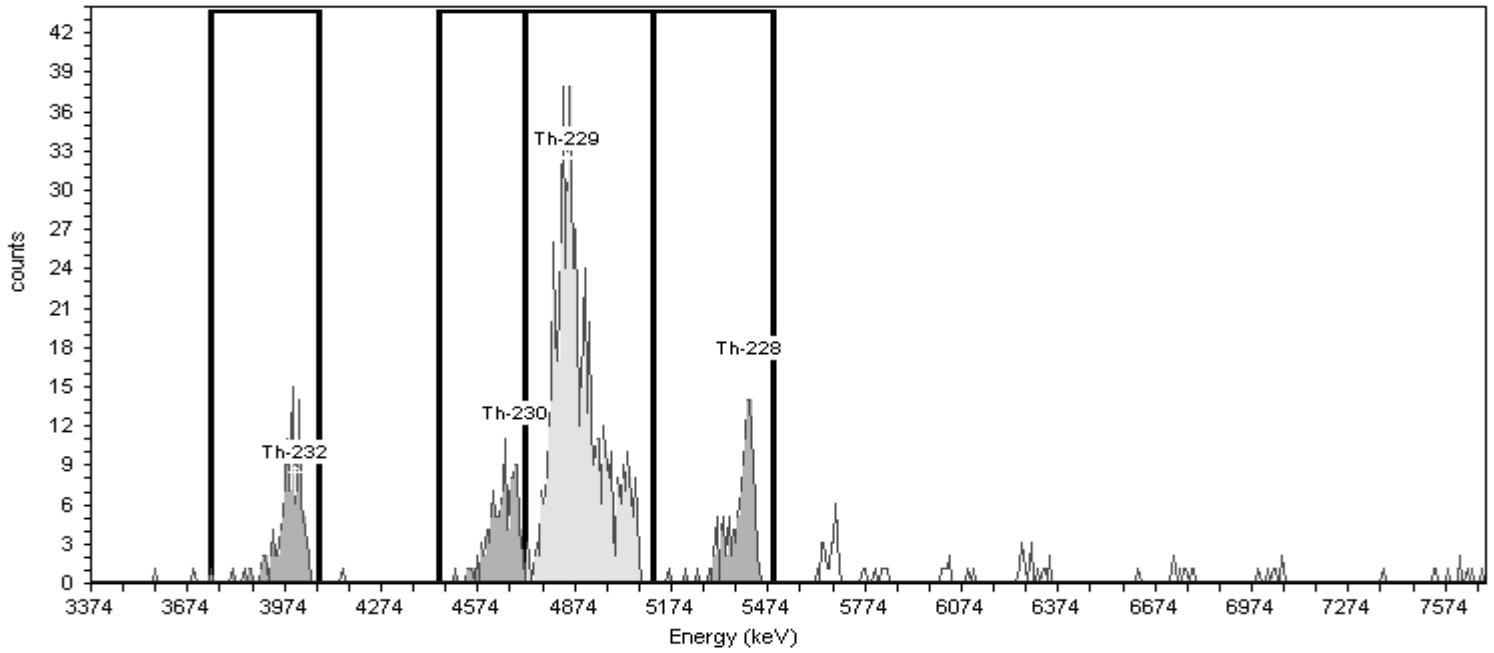
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 92.48%

Acquisition

Detector: AV44
Serial Number: 50-051JJ1
Acquisition Start Date: 7/2/2014 6:03:00PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/19/2014 12:17:25AM
Background Info: Sample: ICB;AV44; Det: AV44; Spectrum #1; Jun-19-2014 00:17

Calibration Name: IC-9795;AV44-20140505
Calibration Date: 5/5/2014 10:09:57PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.32% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 5:59:21PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	80.4	100.2	112	0.0000	111.58	1.142	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	36.3	99.7	108	0.1875	107.91	1.110	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	104.6	99.6	593	0.1875	592.91	5.645	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	52.4	99.8	114	3.0000	111.00	1.141	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:03:11PM 7/2/2014

Sample

Sample Name: 680-102380-A-34-B
SampleType: Sample
: 680-102380-A-34-B
Sample Collection Date: 6/13/2014 1:10:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0005g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128412
AnalysisID: 613926

Analyst: 60040

Tracer

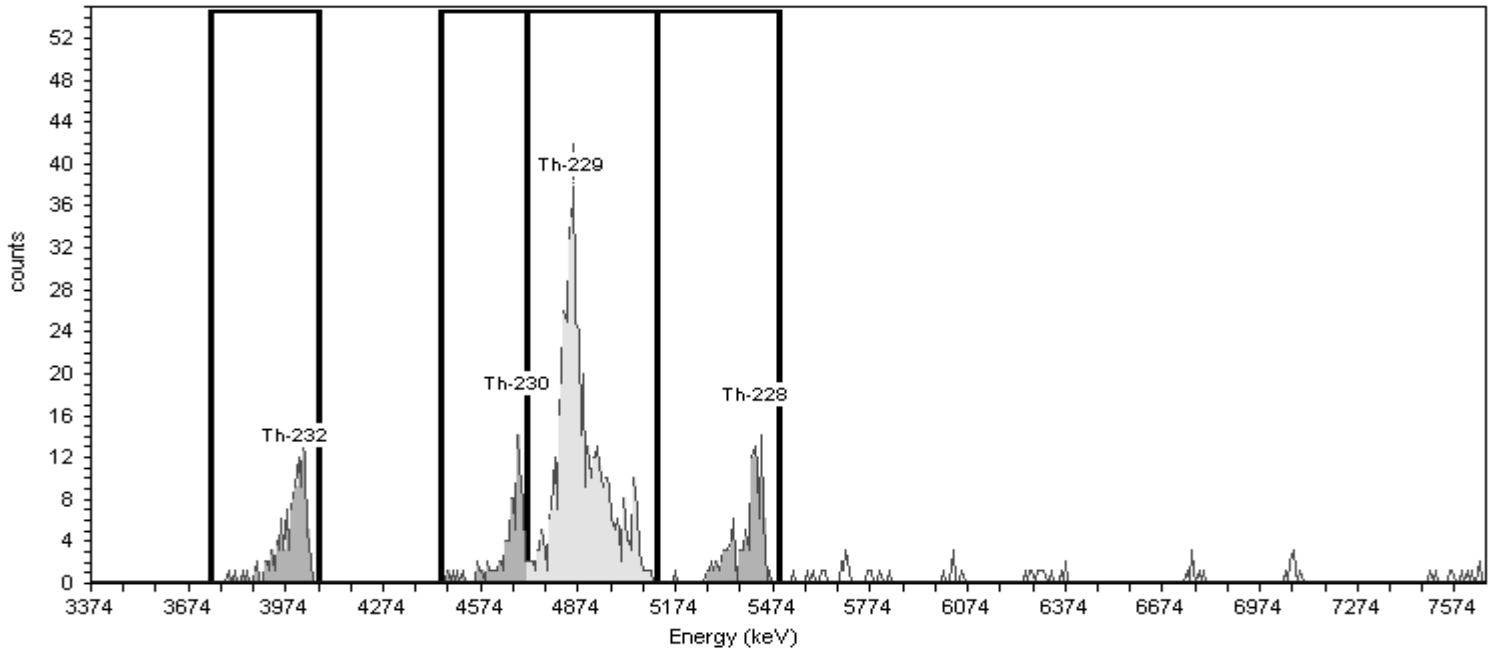
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 81.53%

Acquisition

Detector: AV45
Serial Number: 48-158FF2
Acquisition Start Date: 7/2/2014 6:03:01PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/19/2014 12:17:28AM
Background Info: Sample: ICB;AV45; Det: AV45; Spectrum #1;
Jun-19-2014 00:17

Calibration Name: IC-9817;AV45-20140505
Calibration Date: 5/5/2014 10:10:03PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.06% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 5:59:21PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	38.5	100.2	119	0.5625	118.44	1.391	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	36.5	99.7	83	0.1875	82.81	0.978	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	69.4	99.6	518	0.3750	517.63	4.987	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	58.1	99.8	113	2.2338	110.77	1.307	pCi/g

Prep Batch: 128417

, Extraction Chromatography Resin Actinide

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128417

Lab ID: MB 160-128417/1-A
Client ID:
Sigma: 2
Analyzed: 07/02/14 18:11
Detector: AV46
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	-0.009679	0.00858	0.00862	U	pCi/g	1.00	0.0660	129499
Thorium-230	0.03903	0.0410	0.0411	U	pCi/g	1.00	0.0462	129499
Thorium-232	0.008210	0.0206	0.0206	U	pCi/g	1.00	0.0460	129499

Tracer	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.642	0.460	0.661		pCi/g	0.0606	6.12	92.2	30 - 110

Lab ID: LCS 160-128417/2-A
Client ID:
Sigma: 2
Analyzed: 07/02/14 18:11
Detector: AV49
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	25.66	1.51	2.63		pCi/g	1.00	0.170	129502

Tracer	LCS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	10.44	0.891	1.25		pCi/g	0.139	12.2	85.3	30 - 110

Lab ID: 680-102380-35
Client ID: SD-227-01
Sigma: 2
Analyzed: 07/02/14 18:11
Detector: AV50
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.54	0.281	0.309		pCi/g	1.00	0.102	129503
Thorium-230	1.35	0.264	0.287		pCi/g	1.00	0.111	129503
Thorium-232	1.27	0.252	0.274		pCi/g	1.00	0.0710	129503

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.54	0.413	0.562		pCi/g	0.0840	6.12	74.3	30 - 110

Lab ID: 680-102380-36
Client ID: SD-227-02
Sigma: 2
Analyzed: 07/02/14 18:11
Detector: AV51
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.895	0.204	0.217		pCi/g	1.00	0.0981	129504
Thorium-230	0.753	0.184	0.194		pCi/g	1.00	0.0579	129504
Thorium-232	0.963	0.207	0.222		pCi/g	1.00	0.0505	129504

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128417

Lab ID:	680-102380-36	Analyzed:	07/02/14 18:11	Decay Corrected:	No
Client ID:	SD-227-02	Detector:	AV51	Yield Truncated:	No
Sigma:	2	Dil Fac:	1	Ts:	180

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.28	0.451	0.633		pCi/g	0.0546	6.14	86.1	30 - 110

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-128417/1-A	Thorium-228			-0.009679	U	pCi/g							
MB 160-128417/1-A	Thorium-230			0.03903	U	pCi/g							
MB 160-128417/1-A	Thorium-232			0.008210	U	pCi/g							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-128417/2-A	Thorium-230		24.5	25.66		pCi/g	105	81 - 118					

Glossary:

Ts = Count Duration, Sample

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102380-1

SDG No.: 680102380-1

Batch Number: 128228 Batch Start Date: 06/23/14 15:05 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/01/14 09:24

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-128228/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-128228/2		ExtChrom, A-01-R		0.4997 g	0.2 mL	0.4997 g			
680-102380-A-1-A	SD-224-SS	ExtChrom, A-01-R	T	1.0032 g	0.2 mL				
680-102380-A-2-A	SD-224-01	ExtChrom, A-01-R	T	0.9990 g	0.2 mL				
680-102380-A-3-A	SD-224-02	ExtChrom, A-01-R	T	0.9975 g	0.2 mL				
680-102380-A-5-A	SD-223-SS	ExtChrom, A-01-R	T	0.9993 g	0.2 mL				
680-102380-A-6-A	SD-223-01	ExtChrom, A-01-R	T	0.9980 g	0.2 mL				
680-102380-A-7-A	SD-223-02	ExtChrom, A-01-R	T	0.9983 g	0.2 mL				
680-102380-A-8-A	SD-226-SS	ExtChrom, A-01-R	T	0.9969 g	0.2 mL				
680-102380-A-9-A	SD-226-01	ExtChrom, A-01-R	T	1.0033 g	0.2 mL				

Batch Notes	
Balance ID	27050421
Column Analyst	scb
Column Date	6/27/14
CoPrecipitation Analyst	scb
CoPrecipitation Date	7/1/14
Person's name who witnessed reagent drop	nmn per scb
Analyst who added reagent	scb
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102380-1

SDG No.: 680102380-1

Batch Number: 128412 Batch Start Date: 06/24/14 14:58 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/02/14 14:52

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-128412/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-128412/2		ExtChrom, A-01-R		0.5018 g	0.2 mL	0.5018 g			
680-102380-A-10 -A	SD-226-02	ExtChrom, A-01-R	T	1.0046 g	0.2 mL				
680-102380-A-10 -A DU	SD-226-02	ExtChrom, A-01-R	T	1.0010 g	0.2 mL				
680-102380-A-12 -A	SD-225-SS	ExtChrom, A-01-R	T	0.9992 g	0.2 mL				
680-102380-A-13 -A	SD-225-01	ExtChrom, A-01-R	T	0.9962 g	0.2 mL				
680-102380-A-14 -A	SD-225-02	ExtChrom, A-01-R	T	0.9993 g	0.2 mL				
680-102380-A-16 -A	SD-228-SS	ExtChrom, A-01-R	T	0.9982 g	0.2 mL				
680-102380-A-17 -A	SD-228-01	ExtChrom, A-01-R	T	1.0048 g	0.2 mL				
680-102380-A-18 -A	SD-228-02	ExtChrom, A-01-R	T	0.9957 g	0.2 mL				
680-102380-A-20 -A	SD-234-SS	ExtChrom, A-01-R	T	1.0043 g	0.2 mL				
680-102380-A-21 -A	SD-234-01	ExtChrom, A-01-R	T	0.9975 g	0.2 mL				
680-102380-A-22 -A	SD-235-SS	ExtChrom, A-01-R	T	.9991 g	0.2 mL				
680-102380-A-23 -A	SD-23501	ExtChrom, A-01-R	T	0.9992 g	0.2 mL				
680-102380-A-24 -A	SD-235-02	ExtChrom, A-01-R	T	0.9987 g	0.2 mL				
680-102380-A-26 -A	SD-236-SS	ExtChrom, A-01-R	T	0.9988 g	0.2 mL				
680-102380-A-27 -A	SD-236-01	ExtChrom, A-01-R	T	0.9978 g	0.2 mL				
680-102380-A-28 -A	SD-236-02	ExtChrom, A-01-R	T	1.0000 g	0.2 mL				
680-102380-A-29 -A	SD-237-SS	ExtChrom, A-01-R	T	1.0007 g	0.2 mL				
680-102380-A-30 -A	SD-237-01	ExtChrom, A-01-R	T	0.9969 g	0.2 mL				
680-102380-A-31 -A	SD-237-02	ExtChrom, A-01-R	T	1.0027 g	0.2 mL				

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102380-1

SDG No.: 680102380-1

Batch Number: 128412 Batch Start Date: 06/24/14 14:58 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/02/14 14:52

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
680-102380-A-33-A	SD-DUP05	ExtChrom, A-01-R	T	1.0026 g	0.2 mL				
680-102380-A-34-A	SD-227-SS	ExtChrom, A-01-R	T	1.0005 g	0.2 mL				

Batch Notes	
Balance ID	27050421
Column Analyst	nmn per scb
Column Date	7/2/14
CoPrecipitation Analyst	scb
CoPrecipitation Date	7/2/14
Person's name who witnessed reagent drop	nmn per scb
Analyst who added reagent	scb
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102380-1

SDG No.: 680102380-1

Batch Number: 128417 Batch Start Date: 06/24/14 15:13 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/02/14 14:51

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-128417/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-128417/2		ExtChrom, A-01-R		0.4999 g	0.2 mL	0.4999 g			
680-102380-A-35 -A	SD-227-01	ExtChrom, A-01-R	T	1.0005 g	0.2 mL				
680-102380-A-36 -A	SD-227-02	ExtChrom, A-01-R	T	0.9967 g	0.2 mL				

Batch Notes	
Balance ID	27050421
Column Analyst	nmn per scb
Column Date	7/2/14
CoPrecipitation Analyst	scb
CoPrecipitation Date	7/2/14
Person's name who witnessed reagent drop	nmn per scb
Analyst who added reagent	scb
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:12:32PM 7/2/2014

Sample

Sample Name: MB 160-128417/1-A
SampleType: Blank
: MB 160-128417/1-A
Sample Collection Date: 6/25/2014 9:57:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0000g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128417
AnalysisID: 613950

Analyst: 60040

Tracer

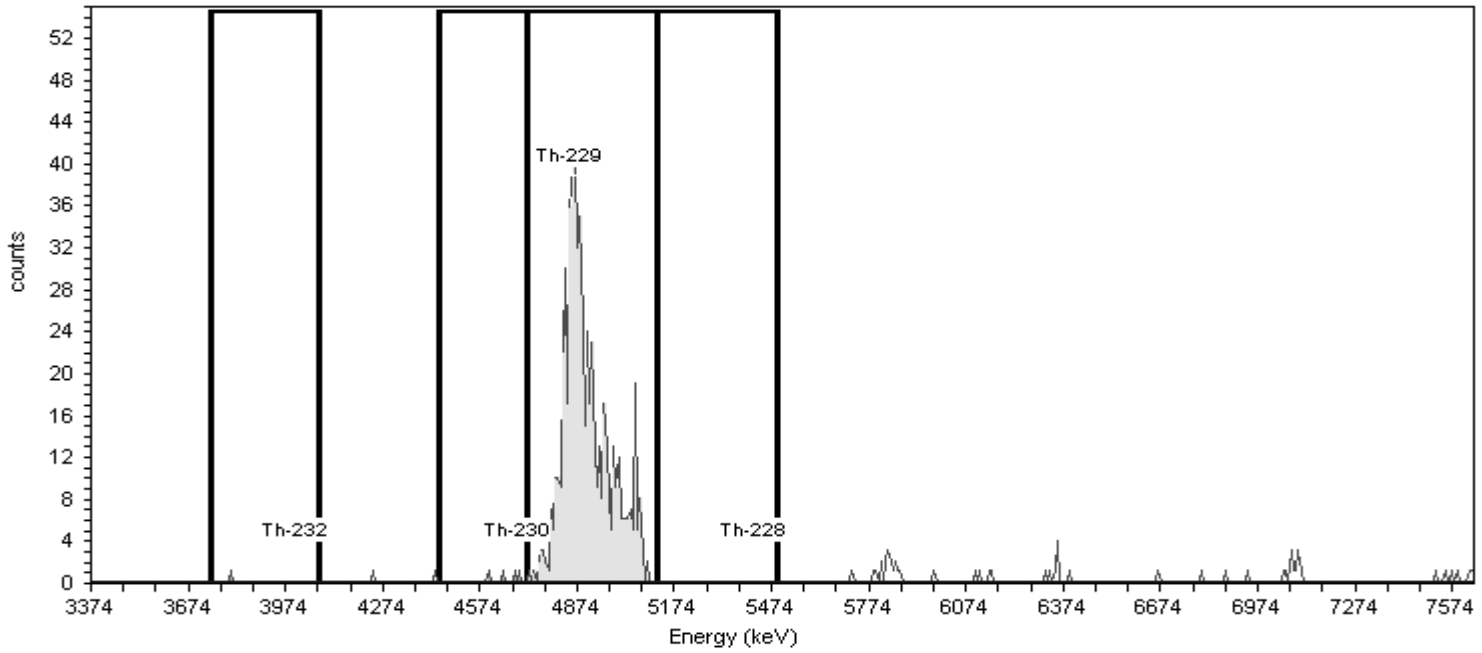
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 92.22%

Acquisition

Detector: AV46
Serial Number: 49-202GG2
Acquisition Start Date: 7/2/2014 6:11:30PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/19/2014 12:17:29AM
Background Info: Sample: ICB;AV46; Det: AV46; Spectrum #1; Jun-19-2014 00:17

Calibration Name: IC-9884;AV46-20140505
Calibration Date: 5/5/2014 10:10:09PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.80% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 6:06:59PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	44.5	100.2	1	0.1875	0.81	0.008	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	24.8	99.7	4	0.1875	3.84	0.039	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	81.4	99.6	603	0.9375	602.09	5.644	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	.0	99.8	0	0.9537	-0.95	-0.010	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:12:52PM 7/2/2014

Sample

Sample Name: LCS 160-128417/2-A
SampleType: Control
: LCS 160-128417/2-A
Sample Collection Date: 6/25/2014 9:57:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.4999g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128417
AnalysisID: 613951

Analyst: 60040

Tracer

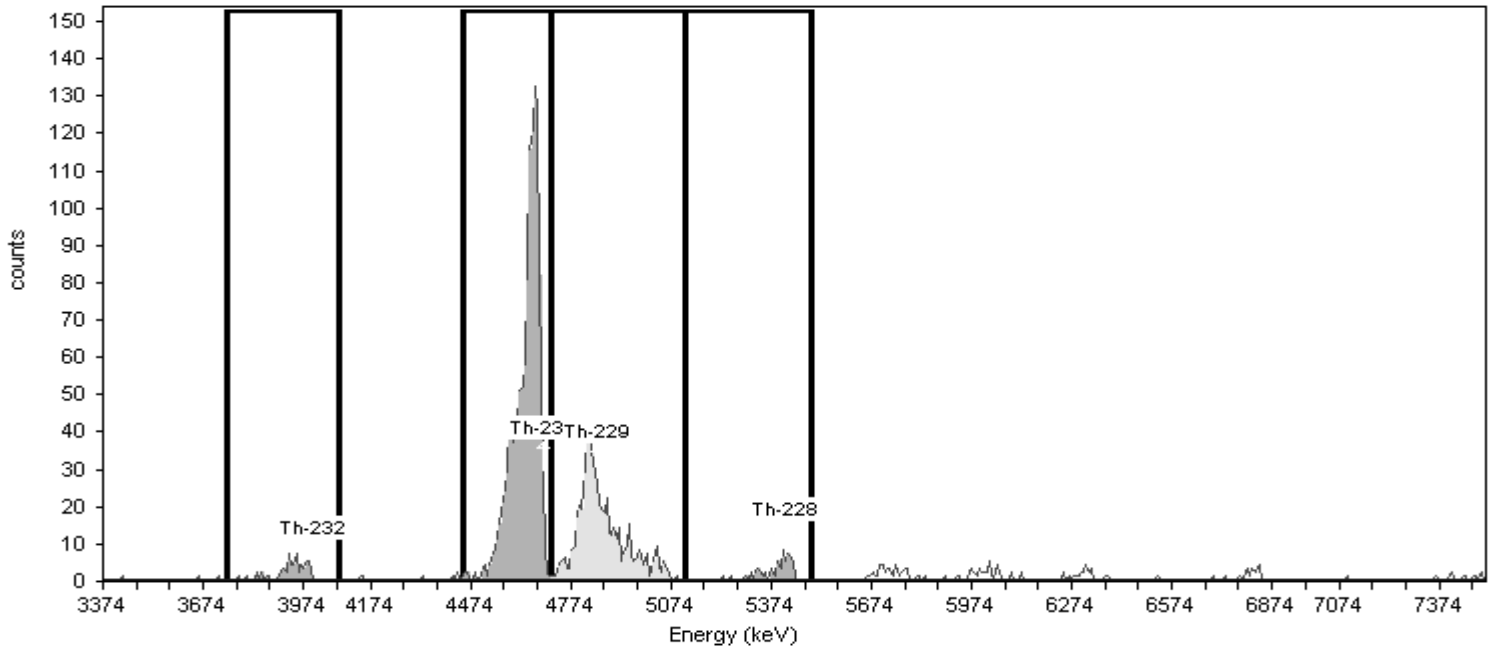
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 85.35%

Acquisition

Detector: AV49
Serial Number: 47-043hh4
Acquisition Start Date: 7/2/2014 6:11:31PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/19/2014 12:17:35AM
Background Info: Sample: ICB;AV49; Det: AV49; Spectrum #1; Jun-19-2014 00:17

Calibration Name: IC-7107;AV49-20140504
Calibration Date: 5/5/2014 6:52:38PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.53% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 6:06:59PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	86.3	100.2	60	0.9375	59.06	1.303	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	31.4	99.7	1159	1.6817	1157.01	25.659	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	81.0	99.6	553	1.4822	551.52	10.448	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	56.9	99.8	61	3.1755	57.82	1.282	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:12:58PM 7/2/2014

Sample

Sample Name: 680-102380-A-35-B
SampleType: Sample
: 680-102380-A-35-B
Sample Collection Date: 6/13/2014 1:15:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0005g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128417
AnalysisID: 613952

Analyst: 60040

Tracer

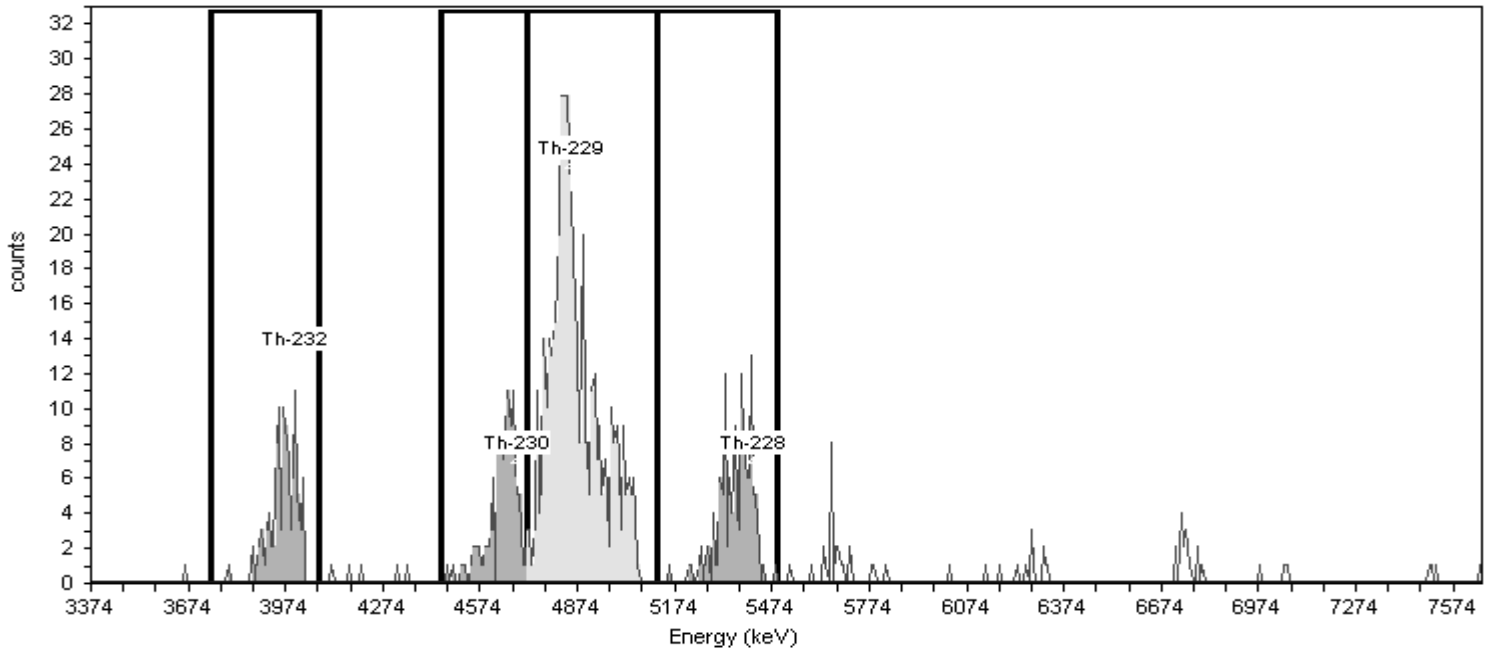
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 74.27%

Acquisition

Detector: AV50
Serial Number: 50-060W2
Acquisition Start Date: 7/2/2014 6:11:33PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/19/2014 12:17:37AM
Background Info: Sample: ICB;AV50; Det: AV50; Spectrum #1; Jun-19-2014 00:17

Calibration Name: IC-8874;AV50-20140504
Calibration Date: 5/5/2014 6:52:48PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.93% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 6:06:58PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	93.4	100.2	102	0.5625	101.44	1.266	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	37.8	99.7	110	2.6828	107.32	1.346	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	86.0	99.6	490	2.8125	487.19	4.543	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	117.9	99.8	125	2.0463	122.95	1.541	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:13:04PM 7/2/2014

Sample

Sample Name: 680-102380-A-36-B
SampleType: Sample
: 680-102380-A-36-B
Sample Collection Date: 6/13/2014 1:20:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9967g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128417
AnalysisID: 613953

Analyst: 60040

Tracer

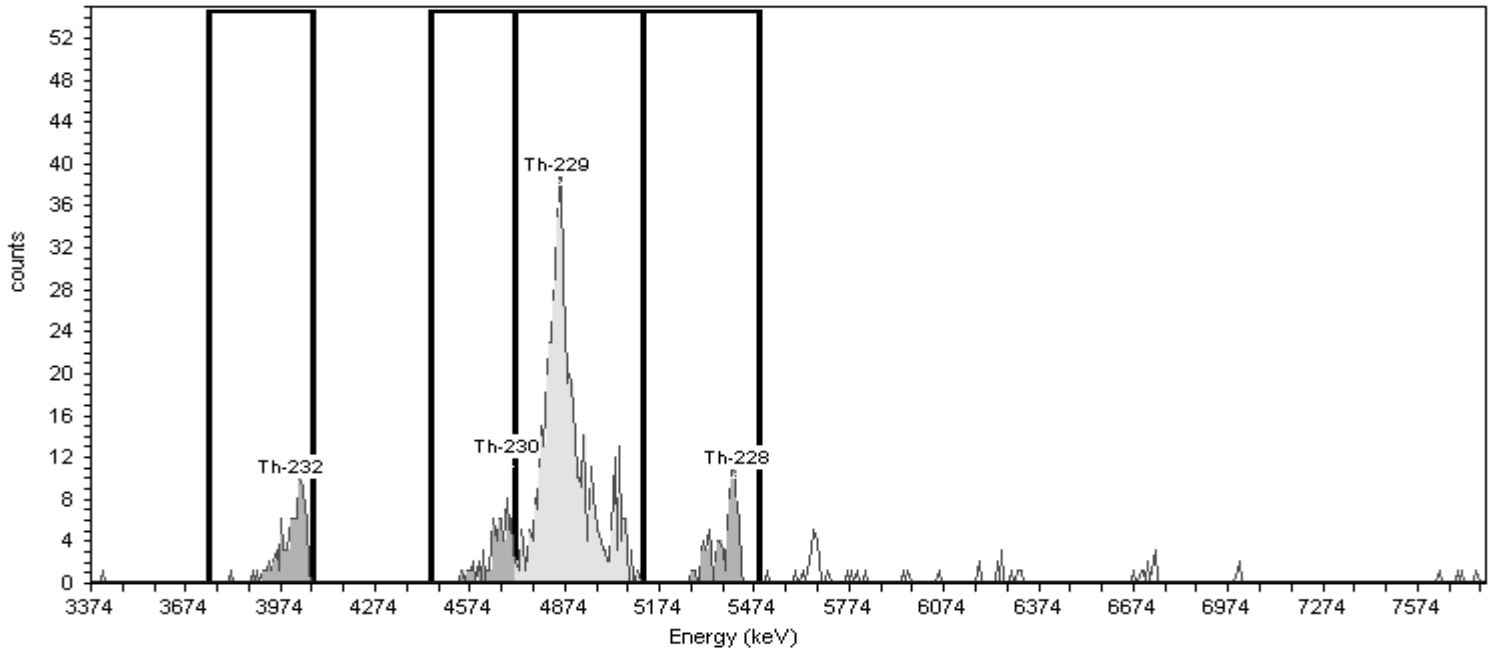
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 86.10%

Acquisition

Detector: AV51
Serial Number: 48-109I1
Acquisition Start Date: 7/2/2014 6:11:34PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:17:43AM
Background Info: Sample: ICB;AV51; Det: AV51; Spectrum #1;
Jun-19-2014 00:17

Calibration Name: IC-8875;AV51-20140504
Calibration Date: 5/5/2014 6:52:53PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.24% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 6:06:58PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	30.1	100.2	87	0.1875	86.81	0.963	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	41.8	99.7	68	0.3750	67.59	0.753	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	86.9	99.6	551	0.5625	550.41	5.286	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.3	99.8	83	2.6250	80.38	0.895	pCi/g

Daily Checks

Alpha Spectroscopy Daily Pulser Check

Analysis Date: 07/01/14

		Gross Counts			FWHM (keV)			Pulser Center			Energy (keV)		
Detector	Analysis Date	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F
AV3	07/01/14 01:00	7370	6995.6 - 7732.0	Pass	11.9	10 - 20	Pass	227.0	221.0 - 231.0	Pass	5060	5012.2 - 5092.2	Pass
AV15	07/01/14 01:00	7702	7313.8 - 8083.7	Pass	14.4	10 - 20	Pass	223.9	219.2 - 229.2	Pass	5036	4998.9 - 5078.9	Pass
AV16	07/01/14 01:00	7542	7055.7 - 7798.4	Pass	12.6	10 - 20	Pass	218.0	215.9 - 225.9	Pass	4993	4974.6 - 5054.6	Pass
AV17	07/01/14 01:00	7574	7224.6 - 7985.1	Pass	11.6	10 - 20	Pass	227.0	221.0 - 231.0	Pass	5060	5012.5 - 5092.5	Pass
AV18	07/01/14 01:00	7589	7204.8 - 7963.1	Pass	12.0	10 - 20	Pass	225.0	220.0 - 230.0	Pass	5045	5004.9 - 5084.9	Pass
AV19	07/01/14 01:00	7583	7231.9 - 7993.2	Pass	11.5	10 - 20	Pass	225.0	221.0 - 231.0	Pass	5045	5012.3 - 5092.3	Pass
AV20	07/01/14 01:00	7671	7255.1 - 8018.8	Pass	14.8	10 - 20	Pass	221.9	217.9 - 227.9	Pass	5022	4989.0 - 5069.0	Pass
AV21	07/01/14 01:00	7671	7278.7 - 8044.9	Pass	14.2	10 - 20	Pass	223.0	219.0 - 229.0	Pass	5030	4997.5 - 5077.5	Pass
AV23	07/01/14 01:00	7635	7259.0 - 8023.1	Pass	16.1	10 - 20	Pass	224.1	219.0 - 229.0	Pass	5038	4997.4 - 5077.4	Pass
AV115	07/01/14 01:38	7691	7254.6 - 8018.2	Pass	13.4	10 - 20	Pass	222.0	216.9 - 226.9	Pass	5022	4982.2 - 5062.2	Pass
AV116	07/01/14 01:38	7688	7295.5 - 8063.4	Pass	13.9	10 - 20	Pass	221.0	216.0 - 226.0	Pass	5015	4975.1 - 5055.1	Pass

Analysis Date: 07/02/14

		Gross Counts			FWHM (keV)			Pulser Center			Energy (keV)		
Detector	Analysis Date	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F
AV3	07/02/14 10:53	7326	6995.6 - 7732.0	Pass	12.3	10 - 20	Pass	227.0	221.0 - 231.0	Pass	5060	5012.2 - 5092.2	Pass
AV4	07/02/14 10:53	7440	7058.9 - 7801.9	Pass	14.1	10 - 20	Pass	226.0	220.0 - 230.0	Pass	5053	5004.6 - 5084.6	Pass
AV6	07/02/14 10:53	7440	7050.8 - 7793.0	Pass	13.7	10 - 20	Pass	217.0	212.0 - 222.0	Pass	4985	4944.9 - 5024.9	Pass
AV7	07/02/14 10:53	7325	7003.5 - 7740.8	Pass	17.8	10 - 20	Pass	226.9	222.0 - 232.0	Pass	5059	5020.1 - 5100.1	Pass
AV8	07/02/14 10:53	7429	7052.4 - 7794.7	Pass	14.6	10 - 20	Pass	220.9	216.0 - 226.0	Pass	5014	4975.1 - 5055.1	Pass
AV9	07/02/14 10:53	7511	7187.8 - 7944.4	Pass	12.9	10 - 20	Pass	221.0	216.0 - 226.0	Pass	5015	4975.3 - 5055.3	Pass
AV10	07/02/14 10:53	7430	7323.5 - 8094.4	Pass	12.6	10 - 20	Pass	224.1	216.0 - 226.0	Pass	5038	4974.9 - 5054.9	Pass
AV11	07/02/14 10:53	7711	7322.5 - 8093.3	Pass	13.5	10 - 20	Pass	226.0	221.1 - 231.1	Pass	5053	5012.8 - 5092.8	Pass
AV12	07/02/14 10:53	7629	7265.8 - 8030.6	Pass	11.5	10 - 20	Pass	221.0	214.9 - 224.9	Pass	5015	4967.1 - 5047.1	Pass
AV13	07/02/14 10:53	7642	7244.9 - 8007.5	Pass	16.6	10 - 20	Pass	222.8	219.1 - 229.1	Pass	5029	4998.3 - 5078.3	Pass
AV14	07/02/14 10:53	7611	7236.1 - 7997.8	Pass	12.0	10 - 20	Pass	224.0	219.0 - 229.0	Pass	5037	4997.5 - 5077.5	Pass
AV15	07/02/14 10:53	7699	7313.8 - 8083.7	Pass	14.4	10 - 20	Pass	223.9	219.2 - 229.2	Pass	5037	4998.9 - 5078.9	Pass
AV16	07/02/14 10:53	7556	7055.7 - 7798.4	Pass	12.5	10 - 20	Pass	218.0	215.9 - 225.9	Pass	4992	4974.6 - 5054.6	Pass
AV17	07/02/14 10:53	7552	7224.6 - 7985.1	Pass	11.8	10 - 20	Pass	227.0	221.0 - 231.0	Pass	5060	5012.5 - 5092.5	Pass
AV18	07/02/14 10:53	7582	7204.8 - 7963.1	Pass	12.0	10 - 20	Pass	225.0	220.0 - 230.0	Pass	5045	5004.9 - 5084.9	Pass
AV19	07/02/14 10:53	7594	7231.9 - 7993.2	Pass	11.3	10 - 20	Pass	225.0	221.0 - 231.0	Pass	5045	5012.3 - 5092.3	Pass
AV20	07/02/14 10:53	7669	7255.1 - 8018.8	Pass	15.0	10 - 20	Pass	221.9	217.9 - 227.9	Pass	5022	4989.0 - 5069.0	Pass
AV21	07/02/14 10:53	7668	7278.7 - 8044.9	Pass	14.1	10 - 20	Pass	223.0	219.0 - 229.0	Pass	5030	4997.5 - 5077.5	Pass
AV23	07/02/14 10:53	7630	7259.0 - 8023.1	Pass	16.0	10 - 20	Pass	224.1	219.0 - 229.0	Pass	5038	4997.4 - 5077.4	Pass
AV24	07/02/14 10:54	7663	7259.6 - 8023.8	Pass	14.5	10 - 20	Pass	218.0	212.9 - 222.9	Pass	4993	4952.1 - 5032.1	Pass
AV43	07/02/14 15:55	7449	7041.9 - 7783.1	Pass	12.1	10 - 20	Pass	220.9	216.9 - 226.9	Pass	5014	4982.0 - 5062.0	Pass
AV44	07/02/14 15:55	7610	7220.7 - 7980.8	Pass	11.7	10 - 20	Pass	221.0	216.0 - 226.0	Pass	5015	4975.1 - 5055.1	Pass
AV45	07/02/14 15:55	7639	7219.6 - 7979.6	Pass	16.3	10 - 20	Pass	224.0	219.7 - 229.7	Pass	5037	5003.0 - 5083.0	Pass

Alpha Spectroscopy Daily Pulser Check

Analysis Date: 07/02/14

		Gross Counts			FWHM (keV)			Pulser Center			Energy (keV)		
Detector	Analysis Date	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F
AV46	07/02/14 15:55	7661	7134.7 - 7885.7	Pass	13.6	10 - 20	Pass	225.0	220.0 - 230.0	Pass	5045	5004.8 - 5084.8	Pass
AV49	07/02/14 15:55	7628	7226.6 - 7987.3	Pass	15.7	10 - 20	Pass	221.1	215.0 - 225.0	Pass	5016	4967.4 - 5047.4	Pass
AV50	07/02/14 15:54	7651	7169.4 - 7924.1	Pass	13.5	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	4990.3 - 5070.3	Pass
AV51	07/02/14 15:54	7284	6922.8 - 7651.5	Pass	15.7	10 - 20	Pass	222.1	217.1 - 227.1	Pass	5023	4983.5 - 5063.5	Pass
AV58	07/02/14 15:54	7112	6766.5 - 7478.7	Pass	12.3	10 - 20	Pass	227.0	219.0 - 229.0	Pass	5060	4997.2 - 5077.2	Pass
AV60	07/02/14 15:54	7215	6867.8 - 7590.7	Pass	16.4	10 - 20	Pass	220.9	216.2 - 226.2	Pass	5014	4976.7 - 5056.7	Pass

Analysis Date: 07/03/14

		Gross Counts			FWHM (keV)			Pulser Center			Energy (keV)		
Detector	Analysis Date	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F	Result	Criteria	P/F
AV3	07/03/14 15:56	7349	6995.6 - 7732.0	Pass	12.1	10 - 20	Pass	227.0	221.0 - 231.0	Pass	5060	5012.2 - 5092.2	Pass

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:04:46AM 7/1/2014

Sample

Sample Name: Pulser;AV3 Spectrum #7 Analysis #1
Comment:

Batch

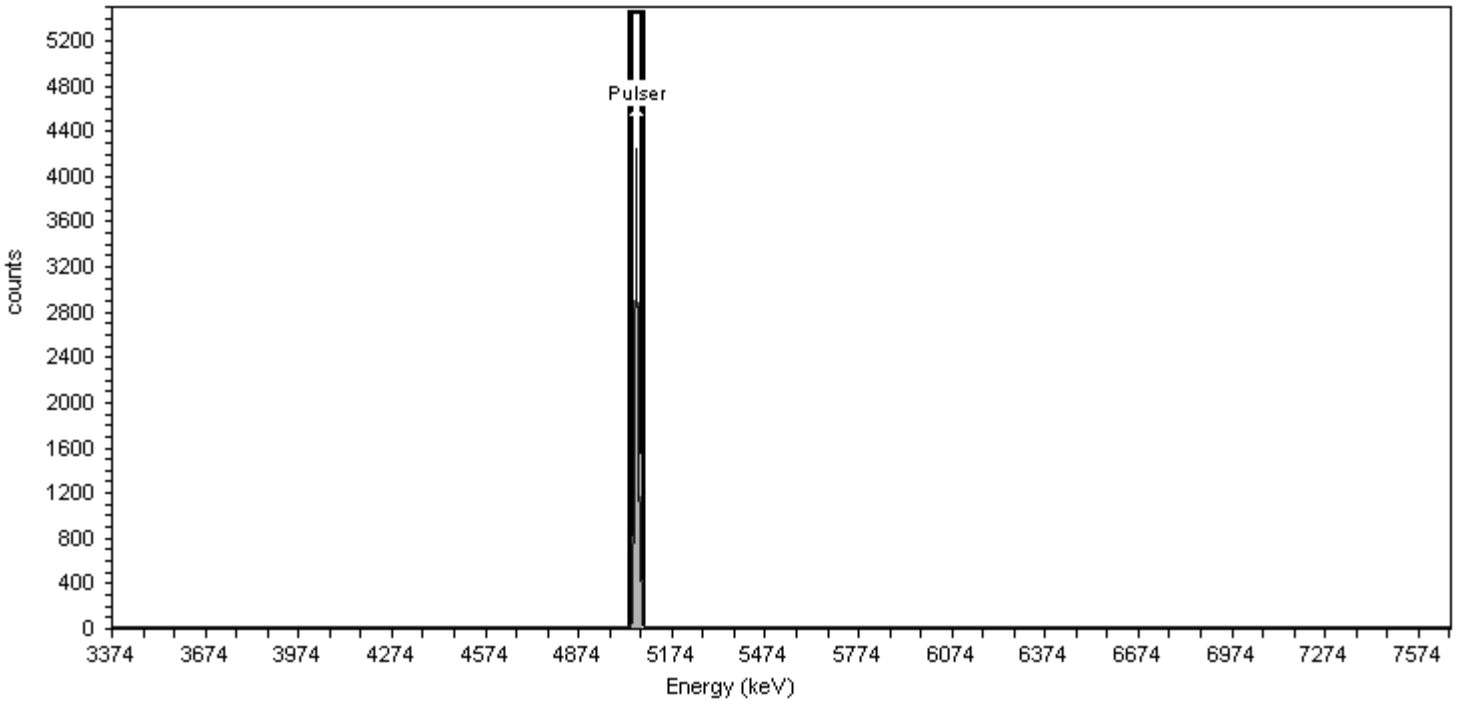
Batch Name: June2014a Analyst: 60040
Description:

Acquisition

Detector: AV3 , SN: 49-202 FF7
Acquisition Start Date: 7/1/2014 1:00:16AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-8875;AV3-20140505
Calibration Date: 5/6/2014 5:38:33PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.09% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5059.850	5039.561	5080.139	11.92	7,253.10	7,369.52

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:58:03AM 7/2/2014

Sample

Sample Name: Pulser;AV3 Spectrum #8 Analysis #1
Comment:

Batch

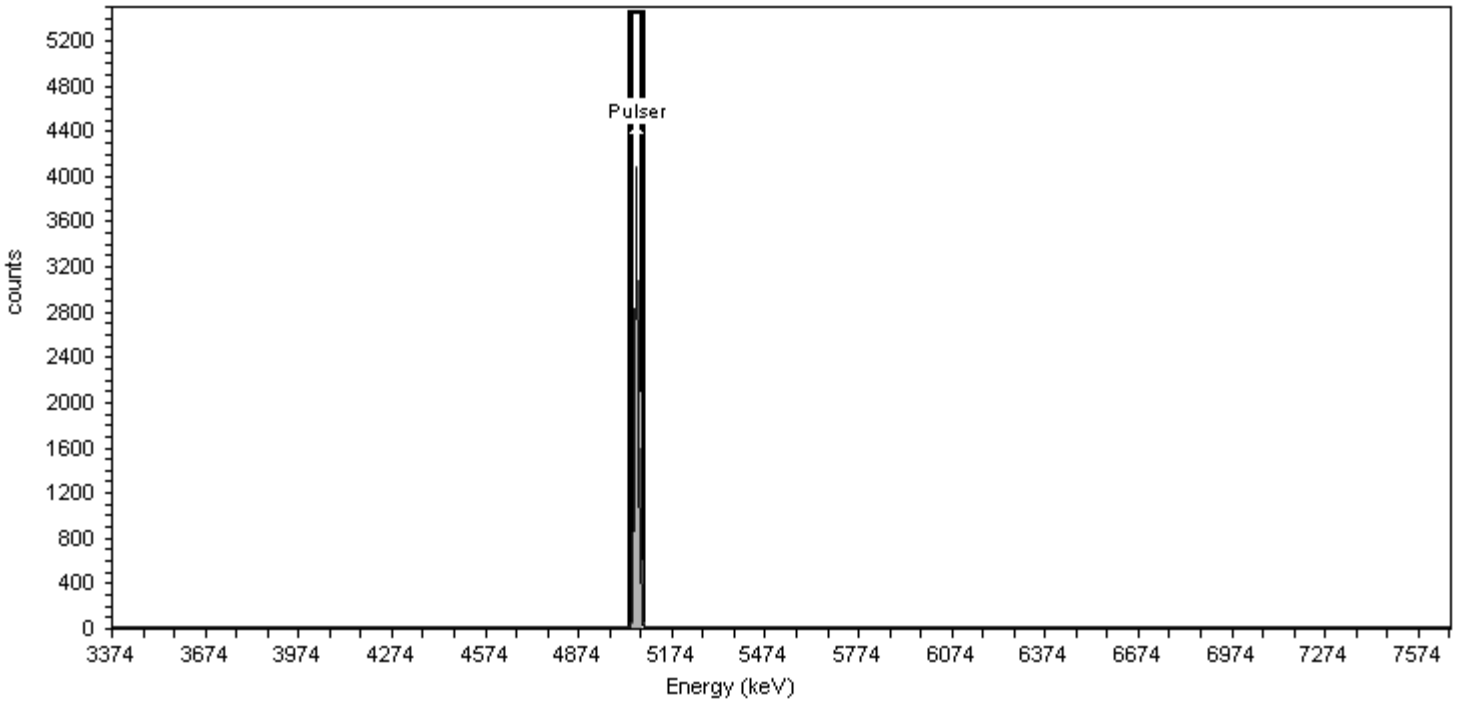
Batch Name: June2014a Analyst: 60040
Description:

Acquisition

Detector: AV3 , SN: 49-202 FF7
Acquisition Start Date: 7/2/2014 10:53:32AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-8875;AV3-20140505
Calibration Date: 5/6/2014 5:38:33PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.09% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5059.562	5038.624	5080.501	12.30	7,189.85	7,325.80

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:00:28PM 7/3/2014

Sample

Sample Name: Pulser;AV3
Comment:

Spectrum #10 Analysis #1

Batch

Batch Name: June2014a
Description:

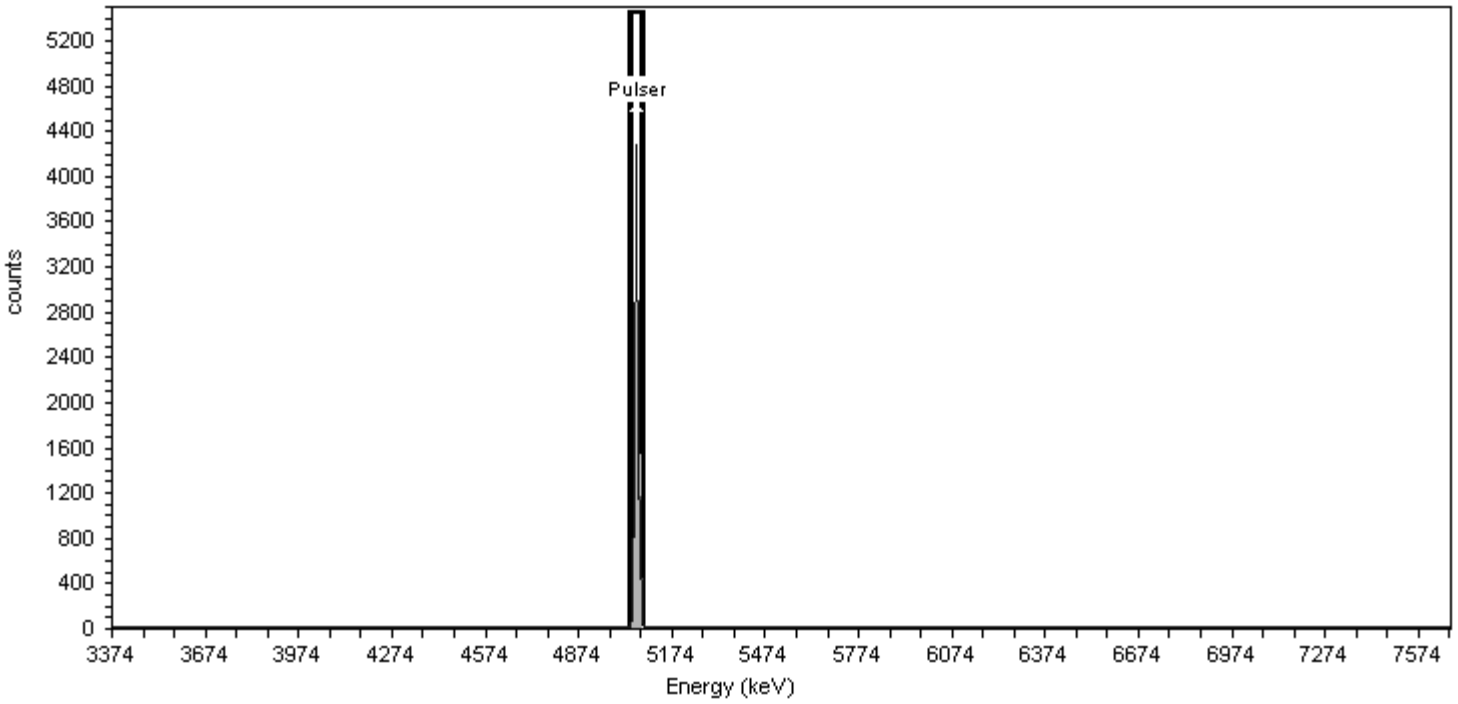
Analyst: 60040

Acquisition

Detector: AV3 , SN: 49-202 FF7
Acquisition Start Date: 7/3/2014 3:56:01PM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-8875;AV3-20140505
Calibration Date: 5/6/2014 5:38:33PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.09% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5059.836	5039.296	5080.376	12.07	7,410.05	7,348.67

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:58:15AM 7/2/2014

Sample

Sample Name: Pulser;AV4 Spectrum #8 Analysis #1
Comment:

Batch

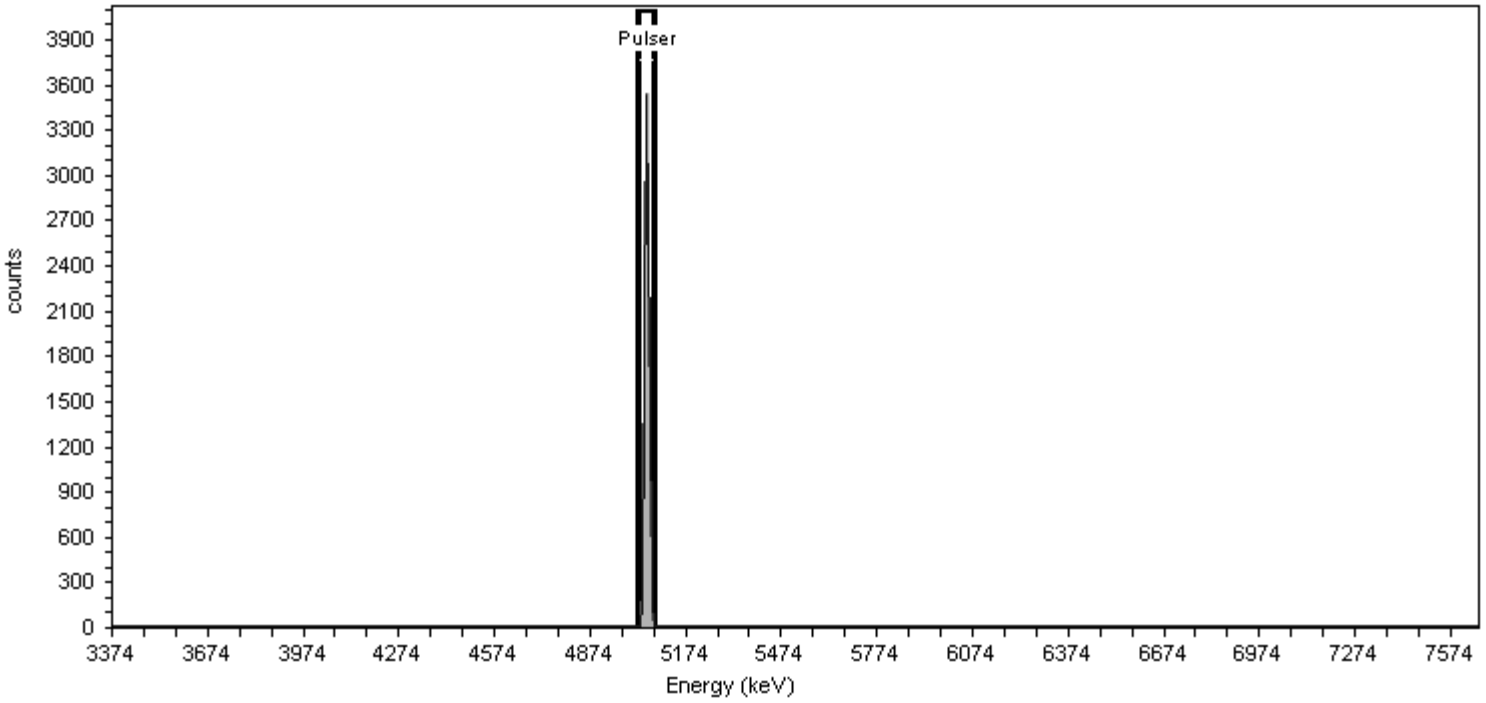
Batch Name: June2014a Analyst: 60040
Description:

Acquisition

Detector: AV4 , SN: 46-033Q4
Acquisition Start Date: 7/2/2014 10:53:33AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-8876;AV4-20140505
Calibration Date: 5/6/2014 5:38:40PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.82% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5052.672	5028.628	5076.716	14.13	7,161.19	7,440.38

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:58:21AM 7/2/2014

Sample

Sample Name: Pulser;AV6 Spectrum #8 Analysis #1
Comment:

Batch

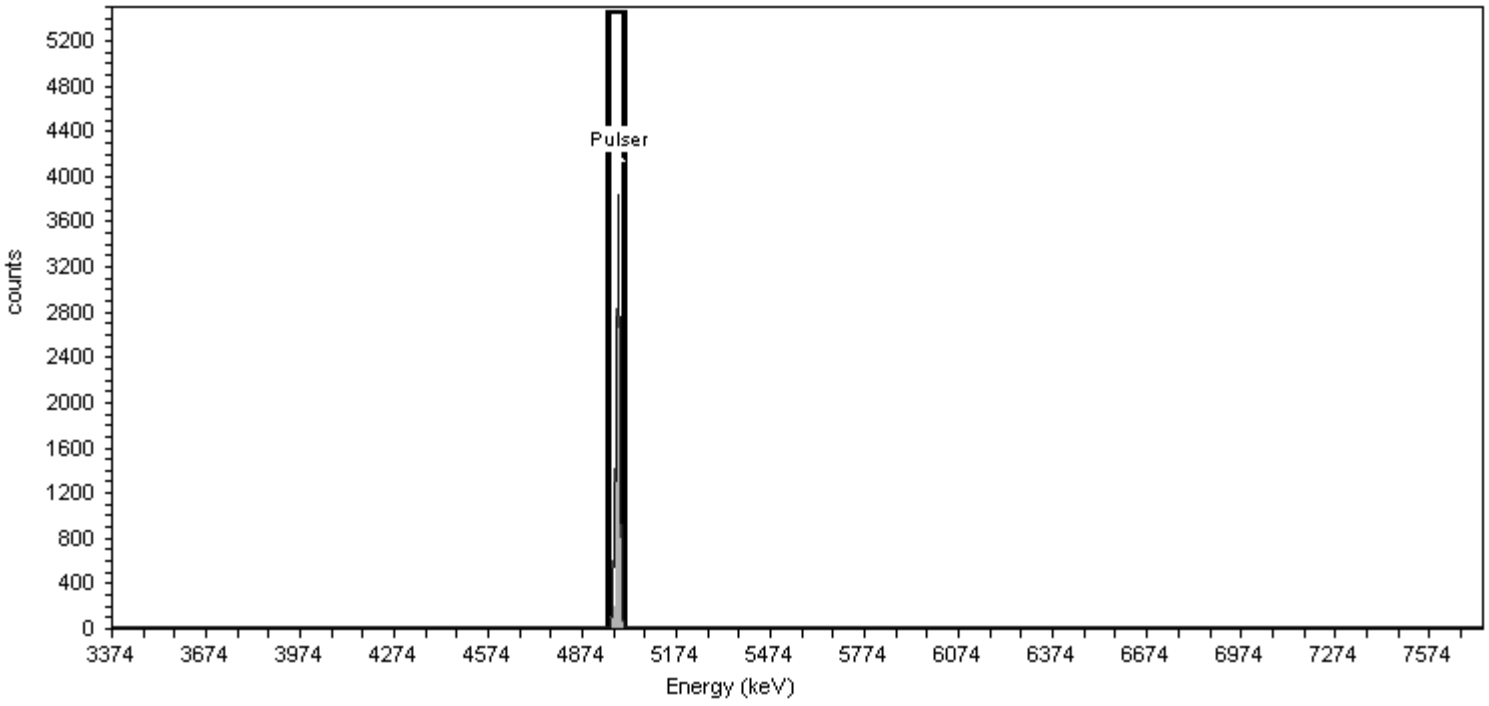
Batch Name: June2014a Analyst: 60040
Description:

Acquisition

Detector: AV6 , SN: 47-27FF2
Acquisition Start Date: 7/2/2014 10:53:34AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-9520;AV6-20140505
Calibration Date: 5/6/2014 5:38:46PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.89% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	4985.294	4961.974	5008.614	13.70	7,517.66	7,440.00

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:58:26AM 7/2/2014

Sample

Sample Name: Pulser;AV7
Comment:

Spectrum #8 Analysis #1

Batch

Batch Name: June2014a
Description:

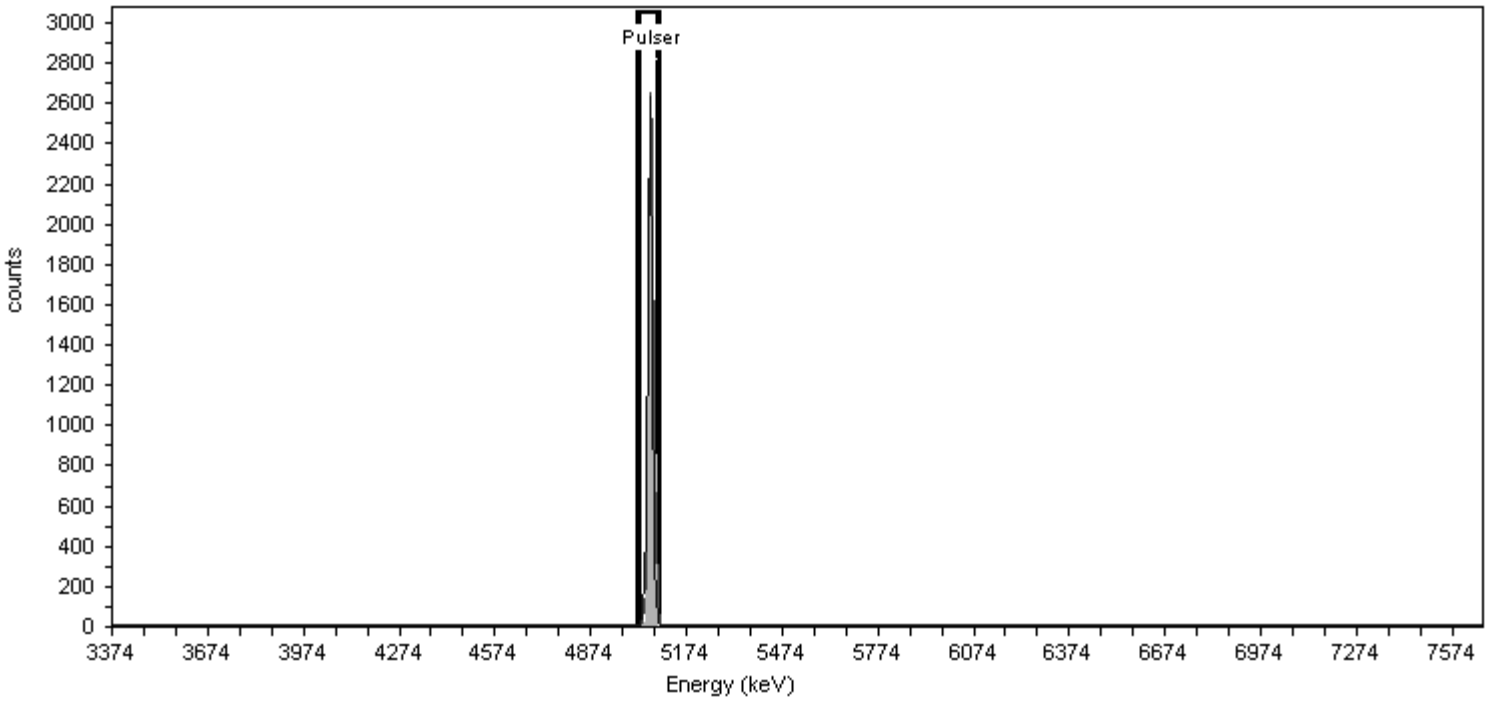
Analyst: 60040

Acquisition

Detector: AV7 , SN: 48-158EE5
Acquisition Start Date: 7/2/2014 10:53:35AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-8877;AV7-20140507
Calibration Date: 5/7/2014 10:48:48PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.80% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5058.970	5028.731	5089.208	17.77	6,760.40	7,324.64

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:58:32AM 7/2/2014

Sample

Sample Name: Pulser;AV8 Spectrum #8 Analysis #1
Comment:

Batch

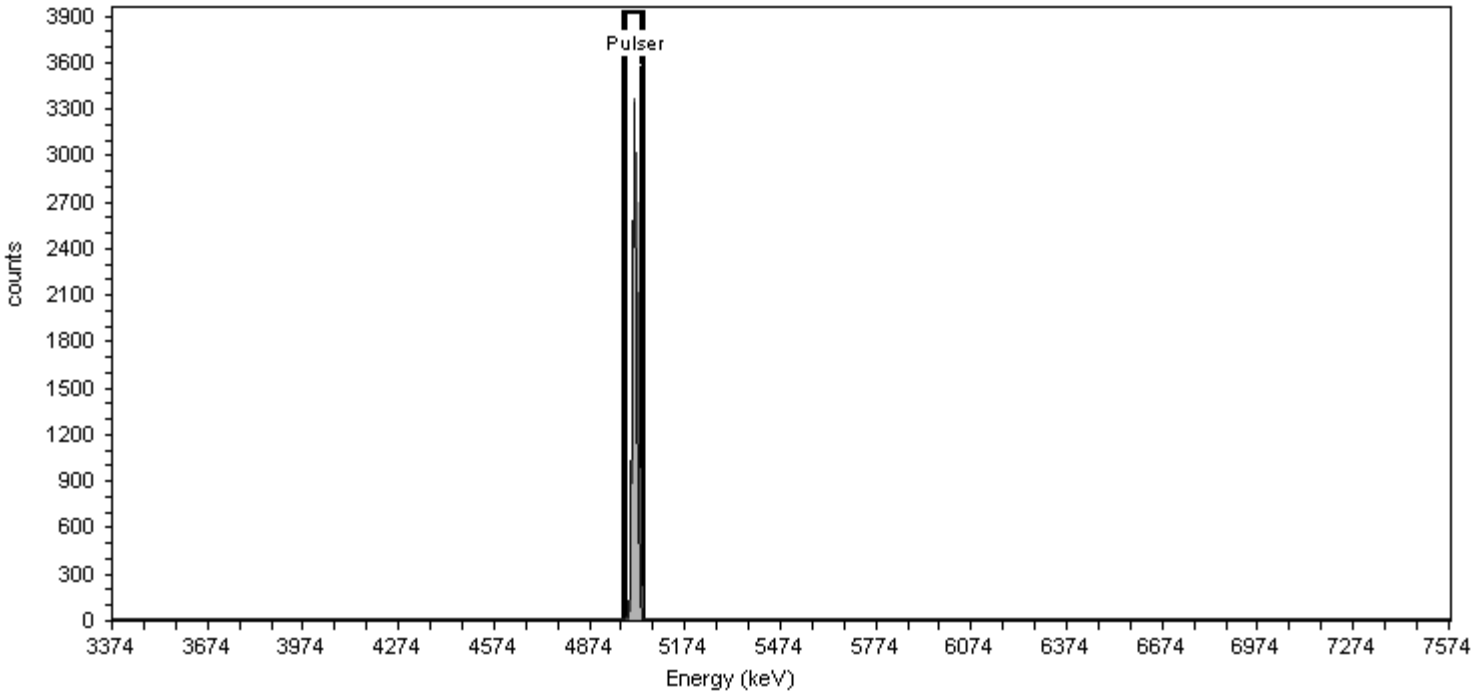
Batch Name: June2014a Analyst: 60040
Description:

Acquisition

Detector: AV8 , SN: 41-137Q6
Acquisition Start Date: 7/2/2014 10:53:35AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-9792;AV8-20140505
Calibration Date: 5/6/2014 5:38:58PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.05% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5014.480	4989.580	5039.380	14.63	7,050.13	7,428.91

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:58:37AM 7/2/2014

Sample

Sample Name: Pulser;AV9 Spectrum #8 Analysis #1
Comment:

Batch

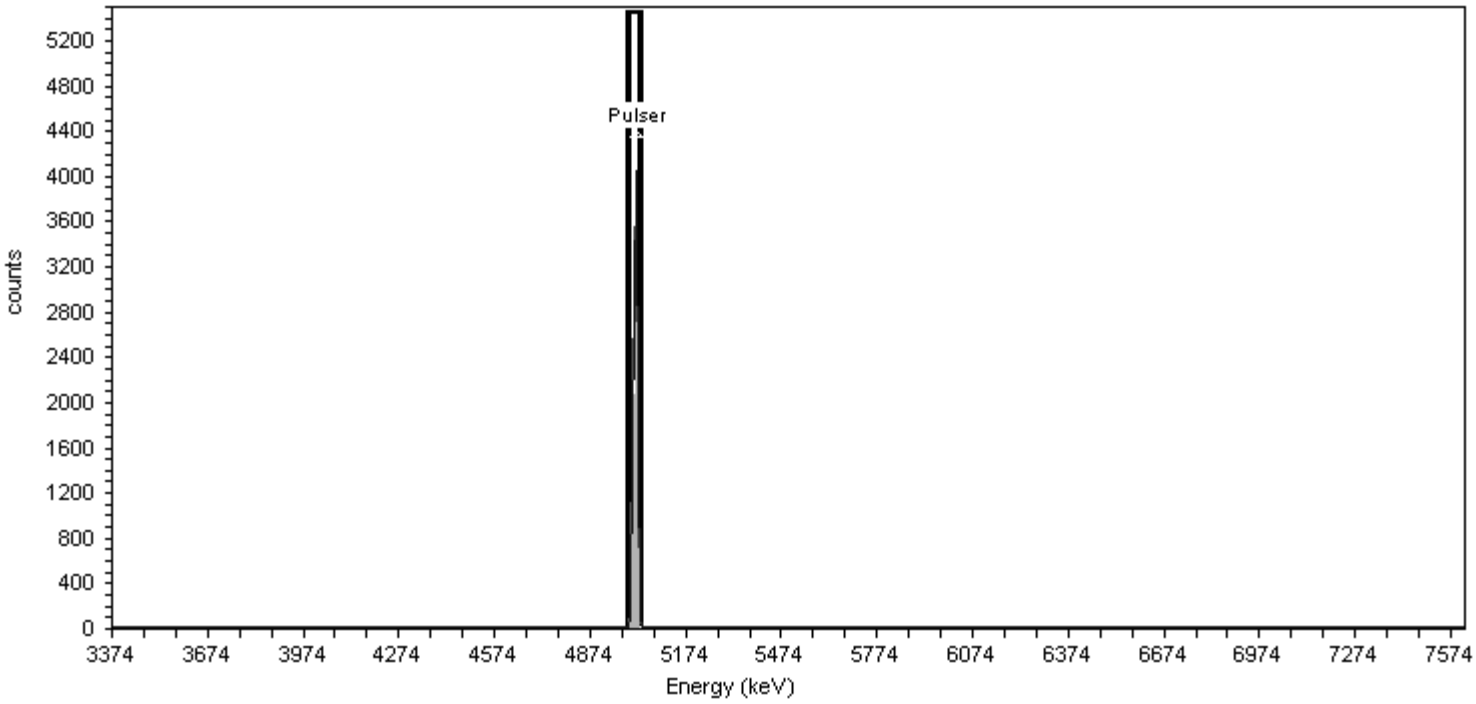
Batch Name: June2014a Analyst: 60040
Description:

Acquisition

Detector: AV9 , SN: 51-082V5
Acquisition Start Date: 7/2/2014 10:53:36AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9793;AV9-20140505
Calibration Date: 5/6/2014 5:39:04PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.04% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5015.201	4993.199	5037.202	12.93	7,491.94	7,510.56

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:58:43AM 7/2/2014

Sample

Sample Name: Pulser;AV10
Comment:

Spectrum #9 Analysis #1

Batch

Batch Name: June2014a
Description:

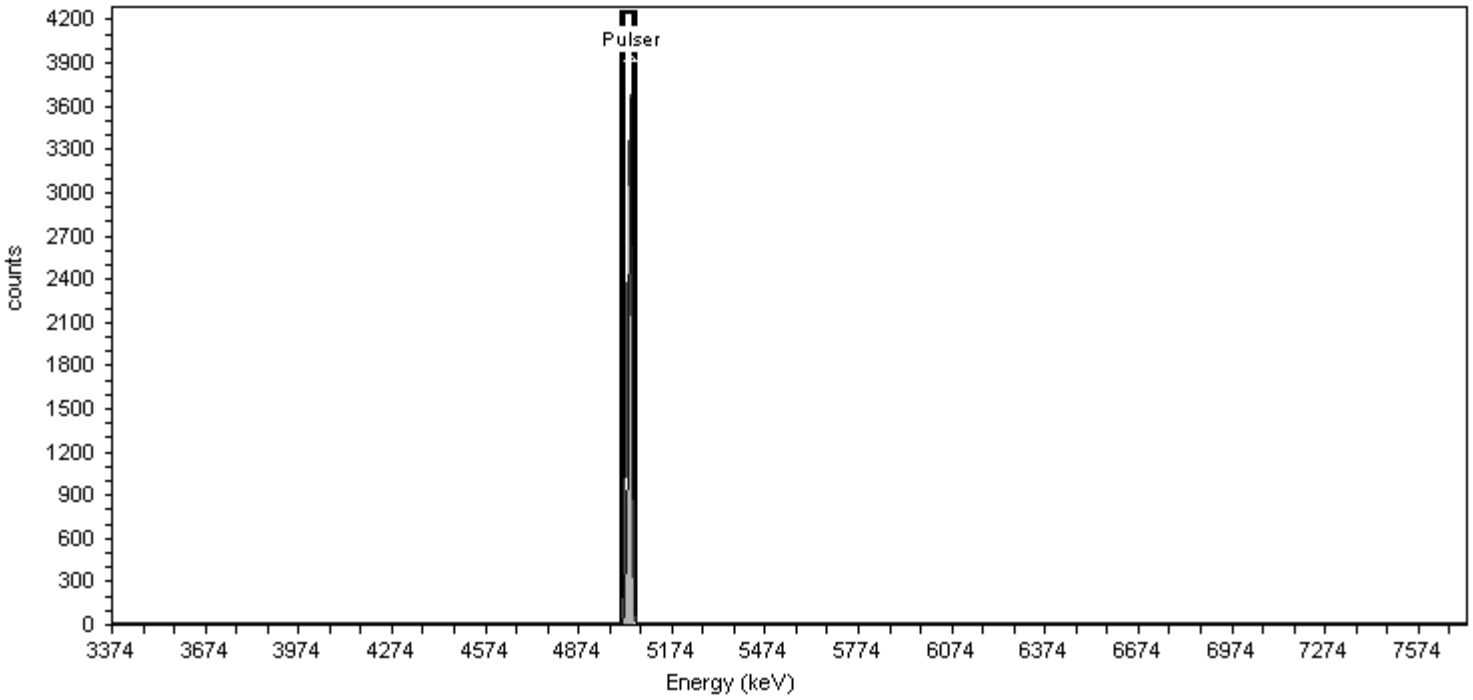
Analyst: 60040

Acquisition

Detector: AV10 , SN: 49-155N2
Acquisition Start Date: 7/2/2014 10:53:37AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9794;AV10-20140505
Calibration Date: 5/6/2014 5:39:10PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.84% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5037.997	5016.493	5059.500	12.63	6,661.00	7,430.21

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:58:49AM 7/2/2014

Sample

Sample Name: Pulser;AV11 Spectrum #8 Analysis #1
Comment:

Batch

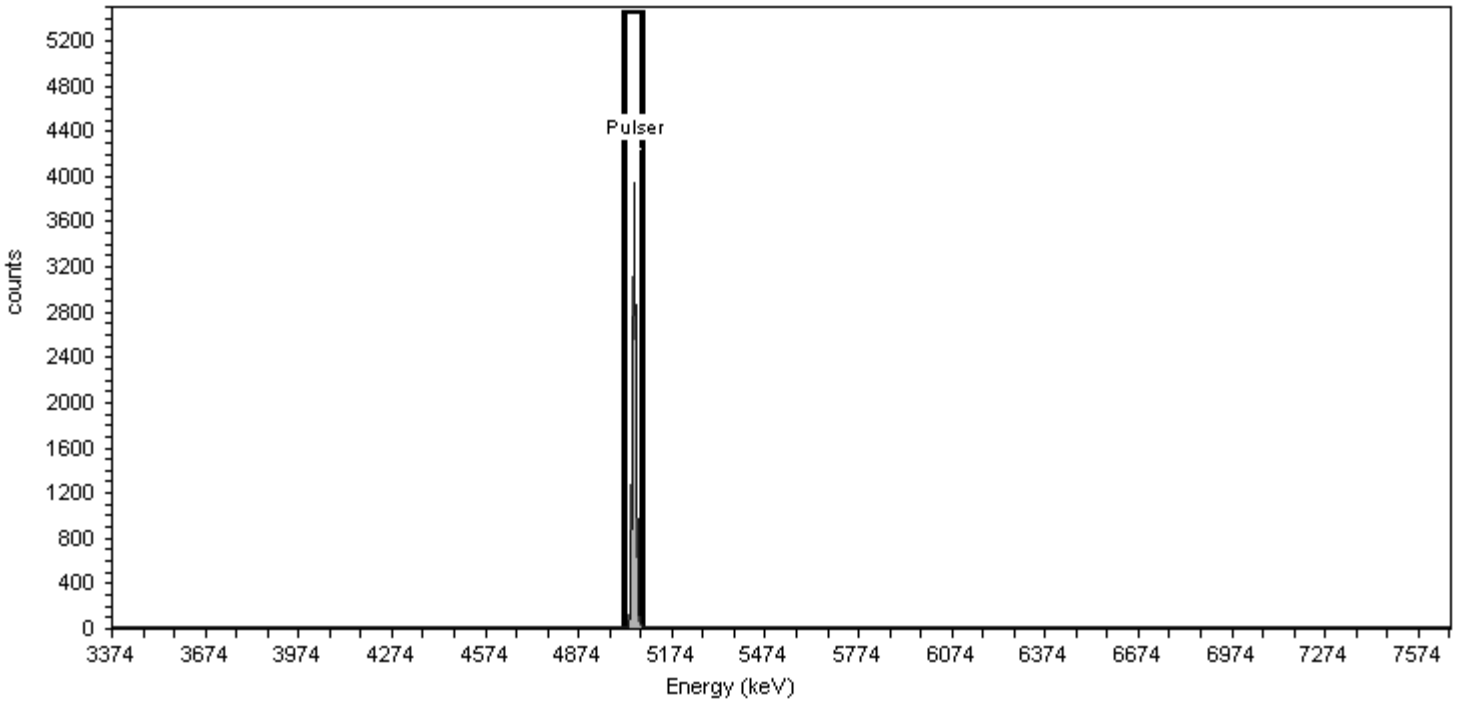
Batch Name: June2014a Analyst: 60040
Description:

Acquisition

Detector: AV11 , SN: 49-155dd2
Acquisition Start Date: 7/2/2014 10:53:38AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9795;AV11-20140505
Calibration Date: 5/6/2014 5:39:16PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.88% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5052.643	5029.743	5075.544	13.45	7,601.87	7,710.90

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:58:54AM 7/2/2014

Sample

Sample Name: Pulser;AV12 Spectrum #8 Analysis #1
Comment:

Batch

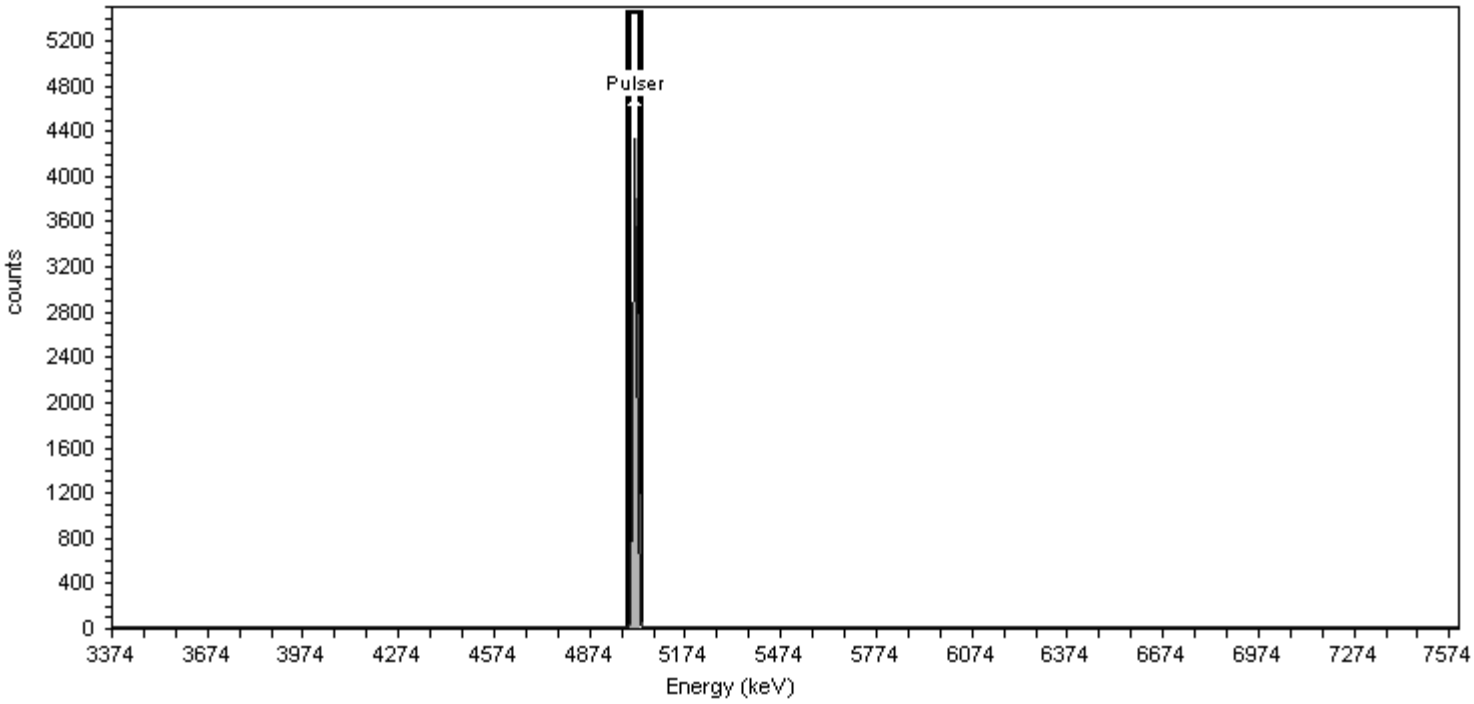
Batch Name: June2014a Analyst: 60040
Description:

Acquisition

Detector: AV12 , SN: 51-082B7
Acquisition Start Date: 7/2/2014 10:53:40AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9817;AV12-20140505
Calibration Date: 5/6/2014 5:39:22PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.97% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5014.872	4995.261	5034.483	11.52	7,150.86	7,628.69

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:59:00AM 7/2/2014

Sample

Sample Name: Pulser;AV13
Comment:

Spectrum #10 Analysis #1

Batch

Batch Name: June2014a
Description:

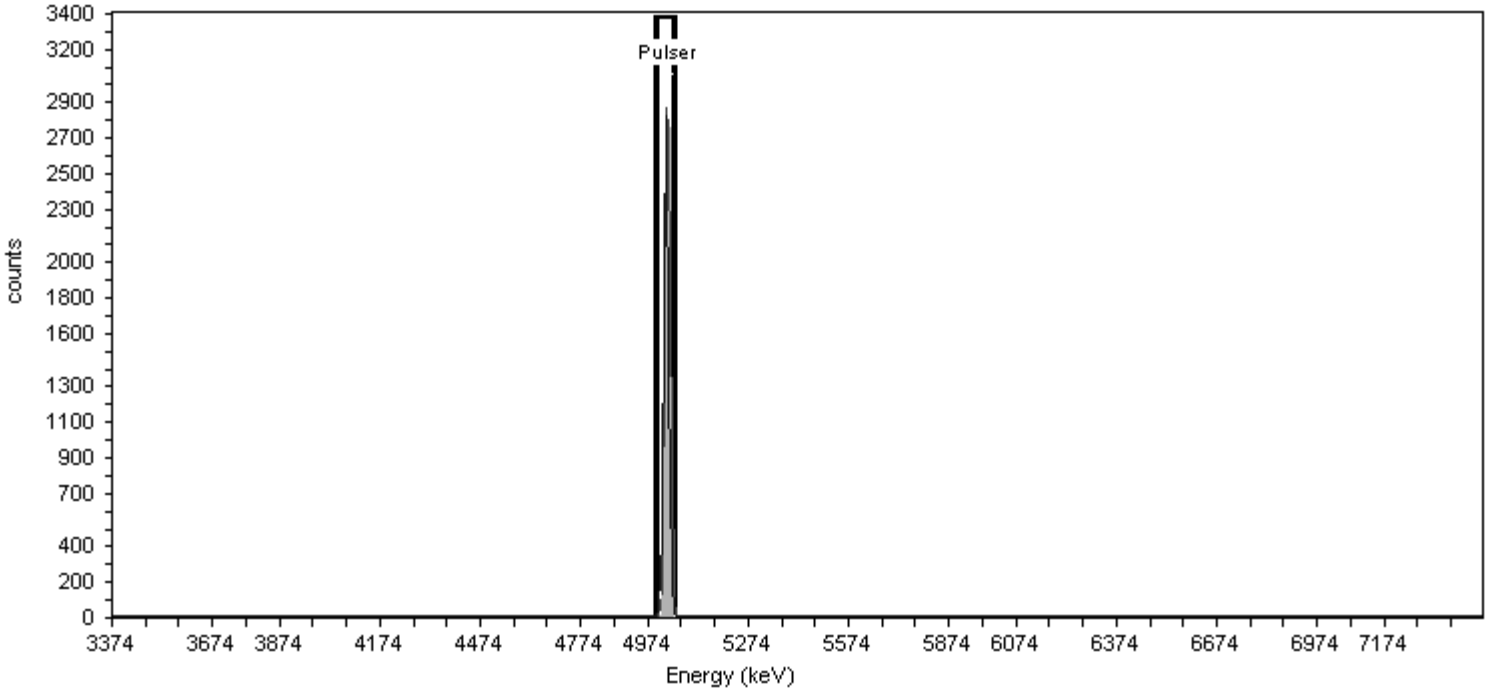
Analyst: 60040

Acquisition

Detector: AV13 , SN: 49-155M7
Acquisition Start Date: 7/2/2014 10:53:42AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9884;AV13-20140505
Calibration Date: 5/6/2014 5:39:28PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.99% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5028.736	5000.419	5057.053	16.64	6,854.07	7,641.50

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:59:05AM 7/2/2014

Sample

Sample Name: Pulser;AV14
Comment:

Spectrum #8 Analysis #1

Batch

Batch Name: June2014a
Description:

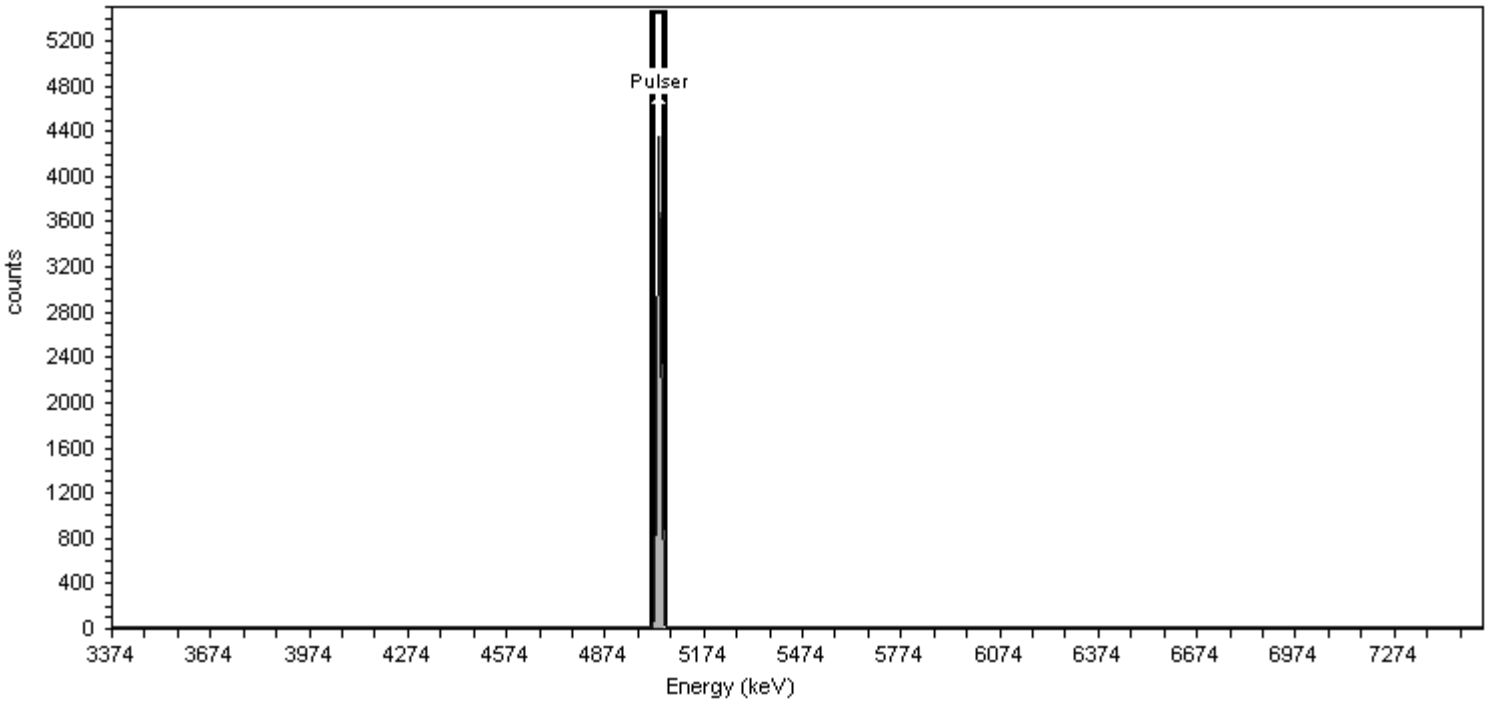
Analyst: 60040

Acquisition

Detector: AV14 , SN: 50-060W4
Acquisition Start Date: 7/2/2014 10:53:43AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9885;AV14-20140505
Calibration Date: 5/6/2014 5:39:36PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.34% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5037.401	5016.944	5057.857	12.02	7,498.65	7,610.63

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:05:41AM 7/1/2014

Sample

Sample Name: Pulser;AV15 Spectrum #7 Analysis #1
Comment:

Batch

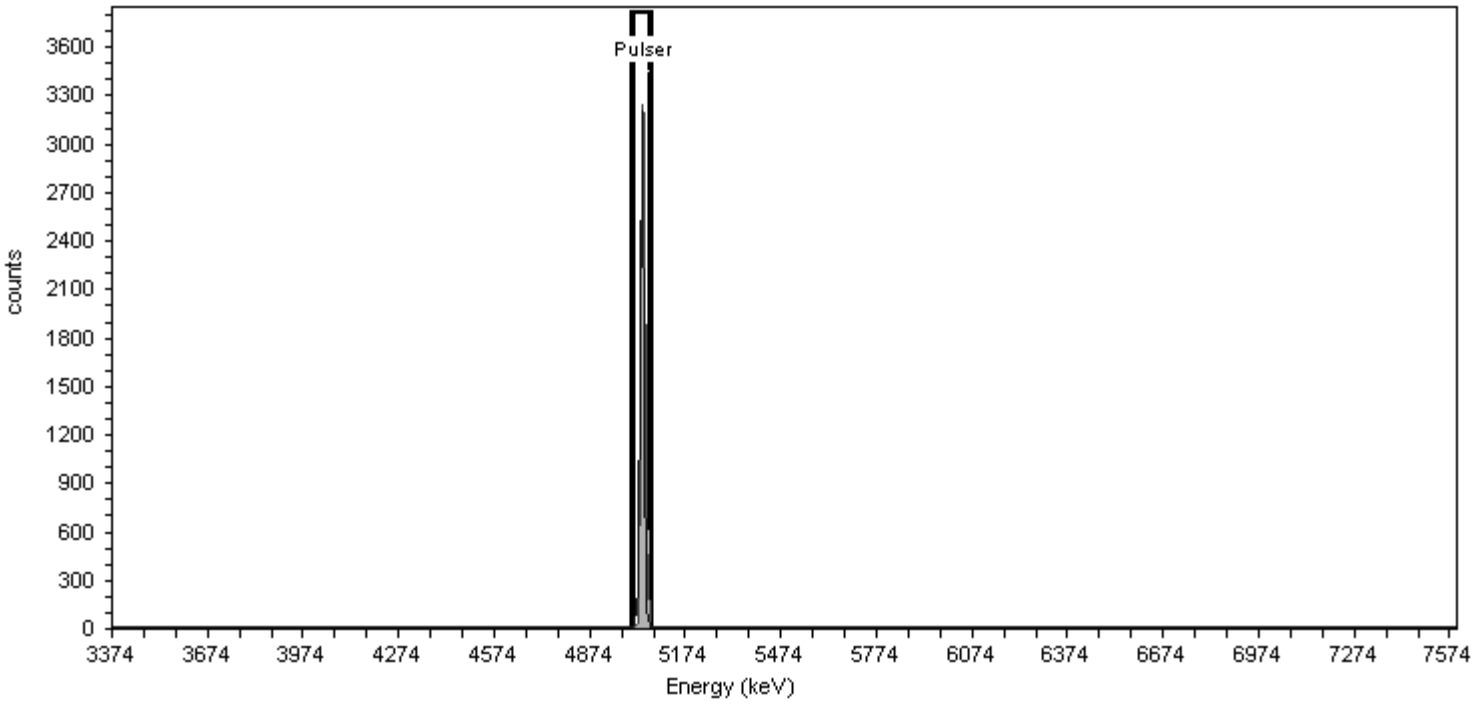
Batch Name: June2014a Analyst: 60040
Description:

Acquisition

Detector: AV15 , SN: 41-172C5
Acquisition Start Date: 7/1/2014 1:00:36AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9886;AV15-20140505
Calibration Date: 5/6/2014 5:39:42PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.62% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5036.490	5012.055	5060.925	14.36	6,674.15	7,701.58

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:59:11AM 7/2/2014

Sample

Sample Name: Pulser;AV15 Spectrum #8 Analysis #1
Comment:

Batch

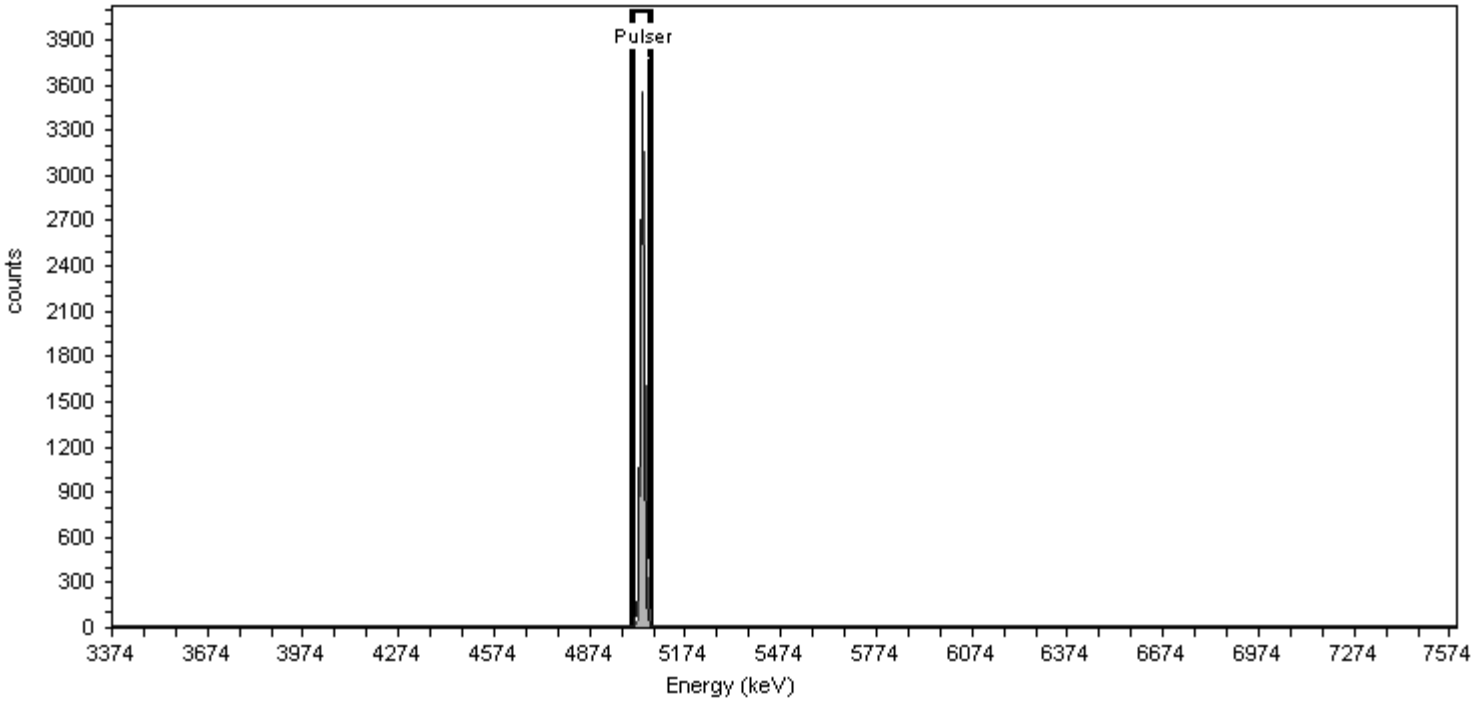
Batch Name: June2014a Analyst: 60040
Description:

Acquisition

Detector: AV15 , SN: 41-172C5
Acquisition Start Date: 7/2/2014 10:53:45AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9886;AV15-20140505
Calibration Date: 5/6/2014 5:39:42PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.62% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5036.918	5012.352	5061.484	14.43	7,362.09	7,698.62

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:05:47AM 7/1/2014

Sample

Sample Name: Pulser;AV16
Comment:

Spectrum #7 Analysis #1

Batch

Batch Name: June2014a
Description:

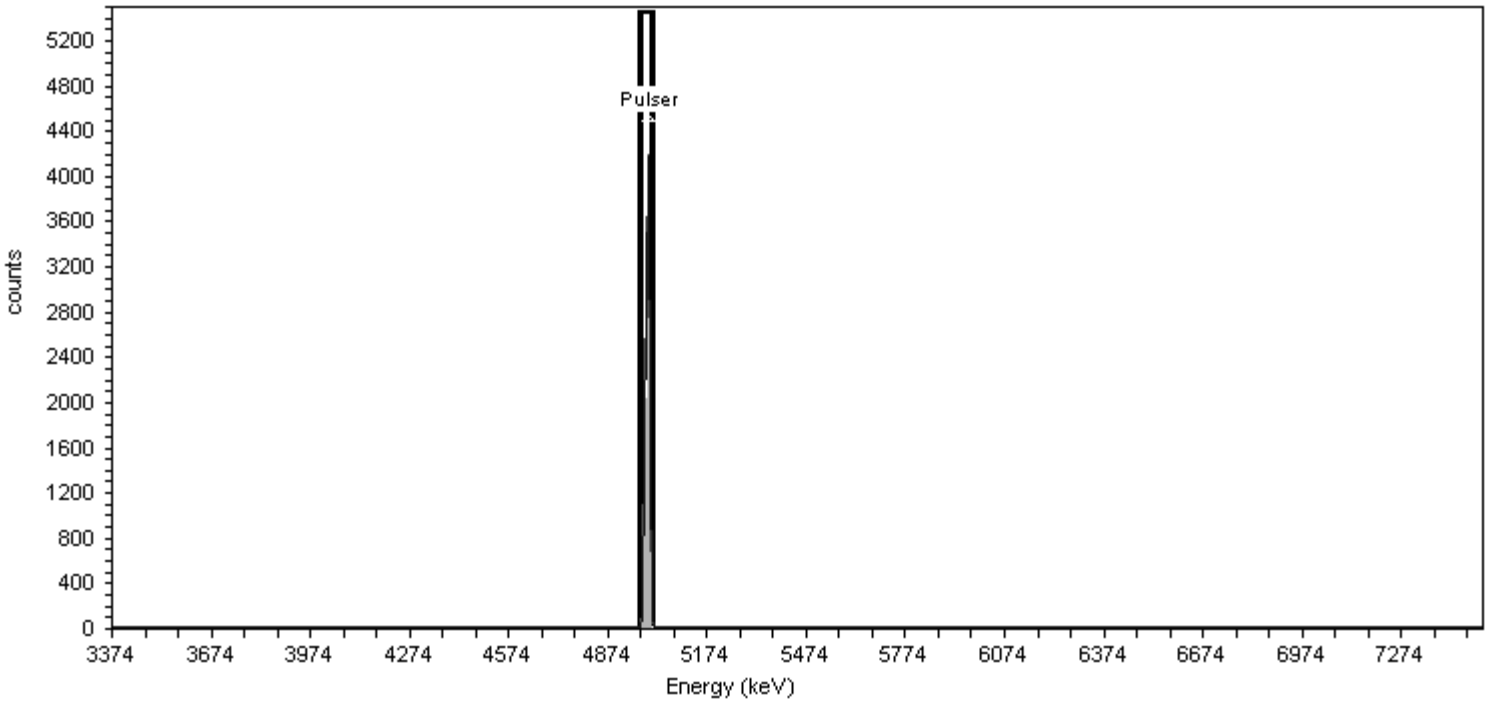
Analyst: 60040

Acquisition

Detector: AV16 , SN: 51-082B6
Acquisition Start Date: 7/1/2014 1:00:39AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-7107;AV16-20140505
Calibration Date: 5/5/2014 10:08:41PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.11% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	4992.829	4971.432	5014.226	12.57	7,535.87	7,541.77

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:59:17AM 7/2/2014

Sample

Sample Name: Pulser;AV16
Comment:

Spectrum #8 Analysis #1

Batch

Batch Name: June2014a
Description:

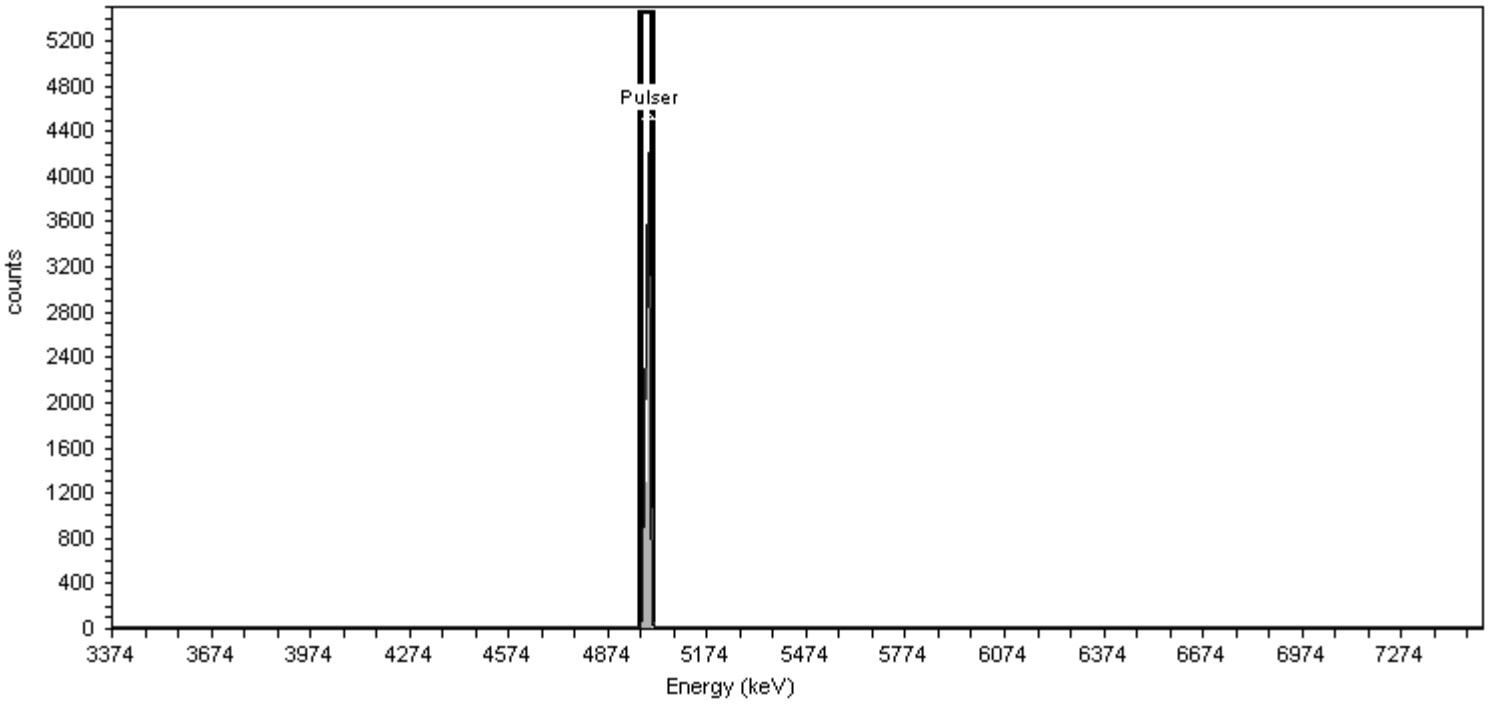
Analyst: 60040

Acquisition

Detector: AV16 , SN: 51-082B6
Acquisition Start Date: 7/2/2014 10:53:46AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-7107;AV16-20140505
Calibration Date: 5/5/2014 10:08:41PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.11% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	4992.465	4971.180	5013.750	12.50	7,544.80	7,555.57

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:05:52AM 7/1/2014

Sample

Sample Name: Pulser;AV17
Comment:

Spectrum #7 Analysis #1

Batch

Batch Name: June2014a
Description:

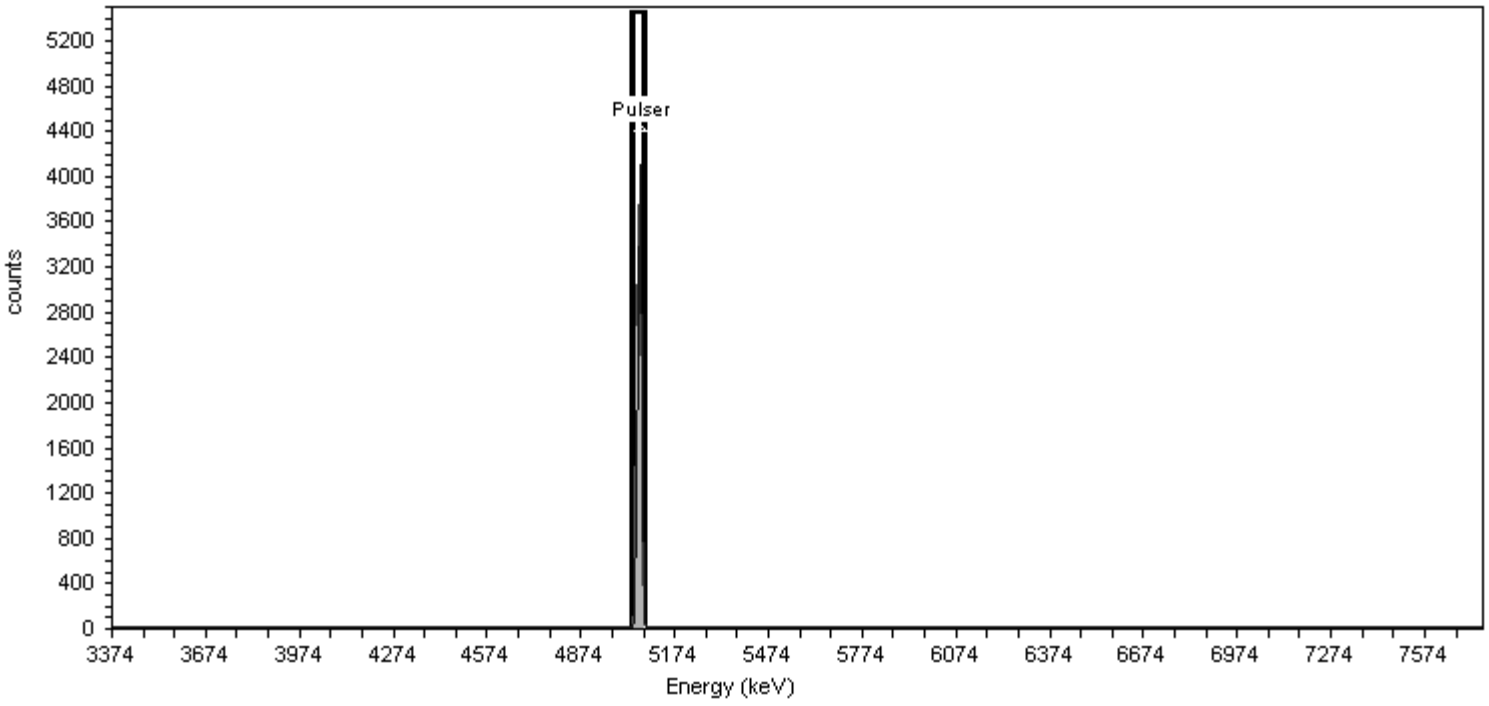
Analyst: 60040

Acquisition

Detector: AV17 , SN: 50-051C4
Acquisition Start Date: 7/1/2014 1:00:40AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8874;AV17-20140505
Calibration Date: 5/5/2014 10:08:49PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.07% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5060.145	5040.358	5079.932	11.62	6,844.22	7,573.55

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:59:22AM 7/2/2014

Sample

Sample Name: Pulser;AV17
Comment:

Spectrum #8 Analysis #1

Batch

Batch Name: June2014a
Description:

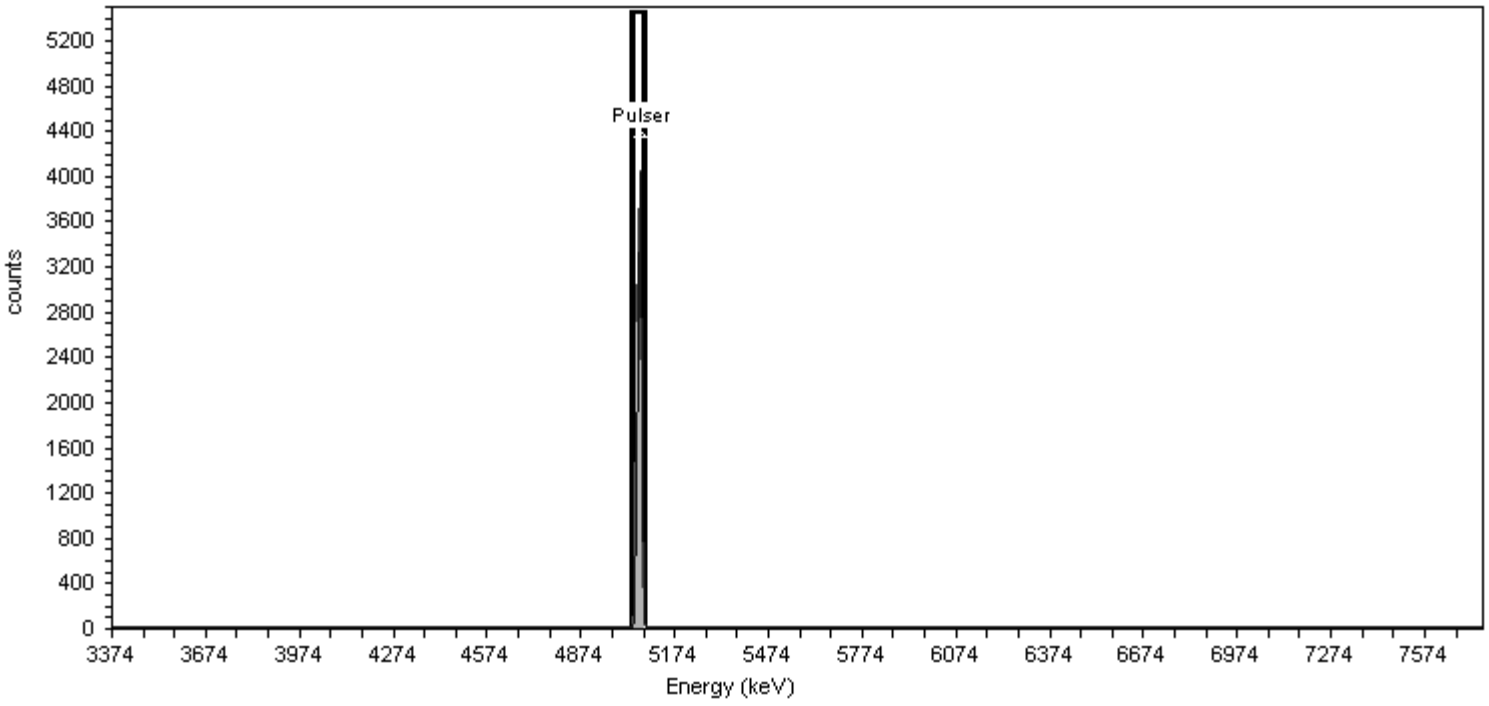
Analyst: 60040

Acquisition

Detector: AV17 , SN: 50-051C4
Acquisition Start Date: 7/2/2014 10:53:48AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8874;AV17-20140505
Calibration Date: 5/5/2014 10:08:49PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.07% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5060.160	5040.128	5080.190	11.77	6,829.34	7,551.62

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:05:58AM 7/1/2014

Sample

Sample Name: Pulser;AV18
Comment:

Spectrum #7 Analysis #1

Batch

Batch Name: June2014a
Description:

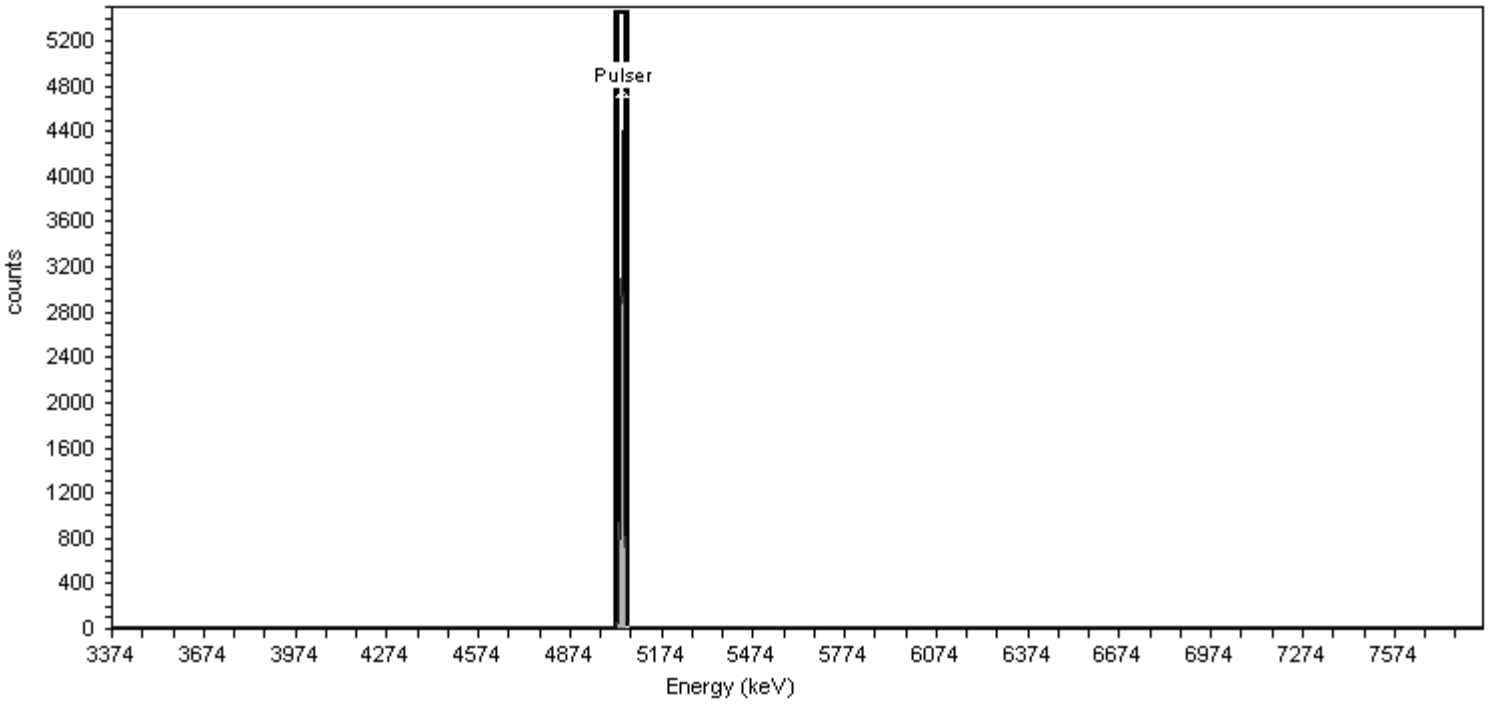
Analyst: 60040

Acquisition

Detector: AV18 , SN: 51-082C5
Acquisition Start Date: 7/1/2014 1:00:42AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8875;AV18-20140505
Calibration Date: 5/5/2014 10:09:08PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.46% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5045.007	5024.553	5065.461	12.02	7,592.25	7,589.03

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:59:27AM 7/2/2014

Sample

Sample Name: Pulser;AV18 Spectrum #8 Analysis #1
Comment:

Batch

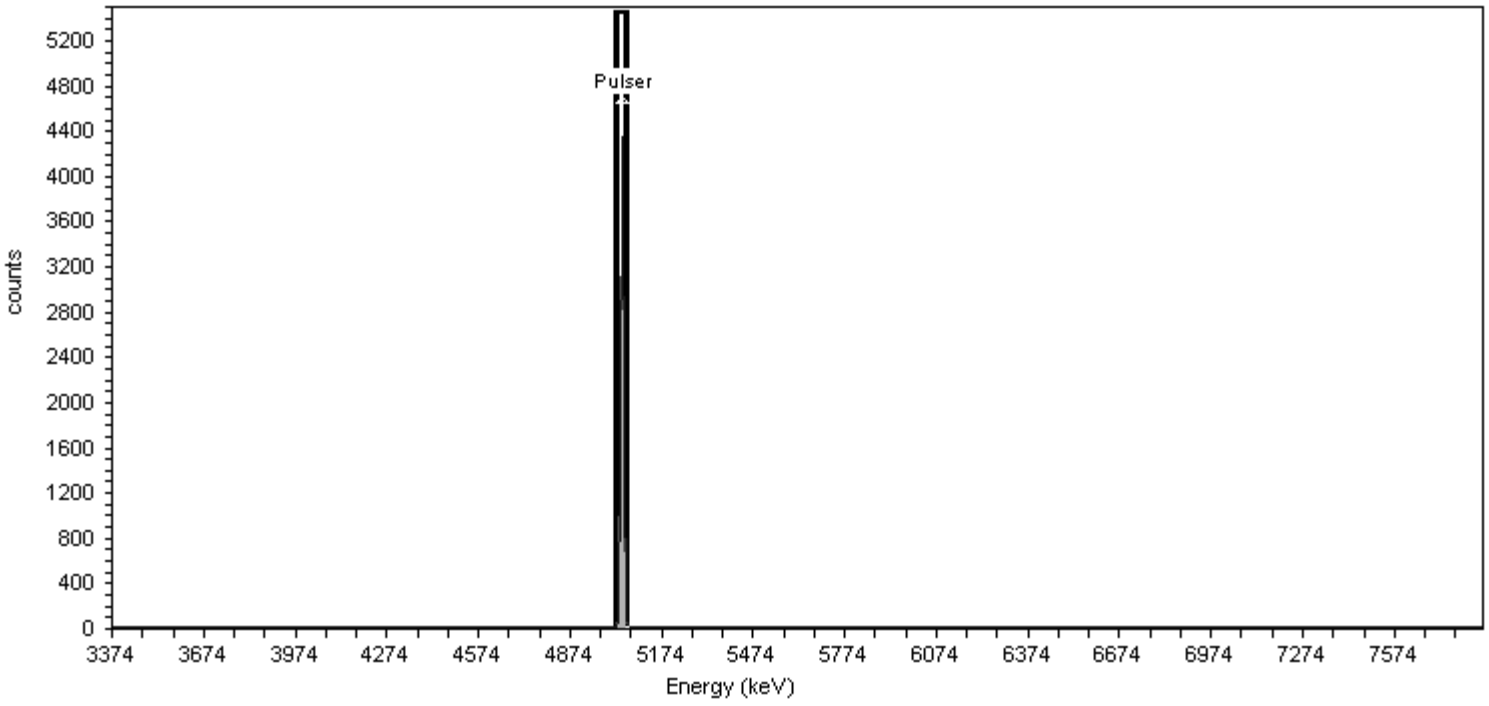
Batch Name: June2014a Analyst: 60040
Description:

Acquisition

Detector: AV18 , SN: 51-082C5
Acquisition Start Date: 7/2/2014 10:53:50AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8875;AV18-20140505
Calibration Date: 5/5/2014 10:09:08PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.46% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5044.974	5024.587	5065.361	11.98	7,481.80	7,581.52

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:04:12AM 7/1/2014

Sample

Sample Name: Pulser;AV19 Spectrum #7 Analysis #1
Comment:

Batch

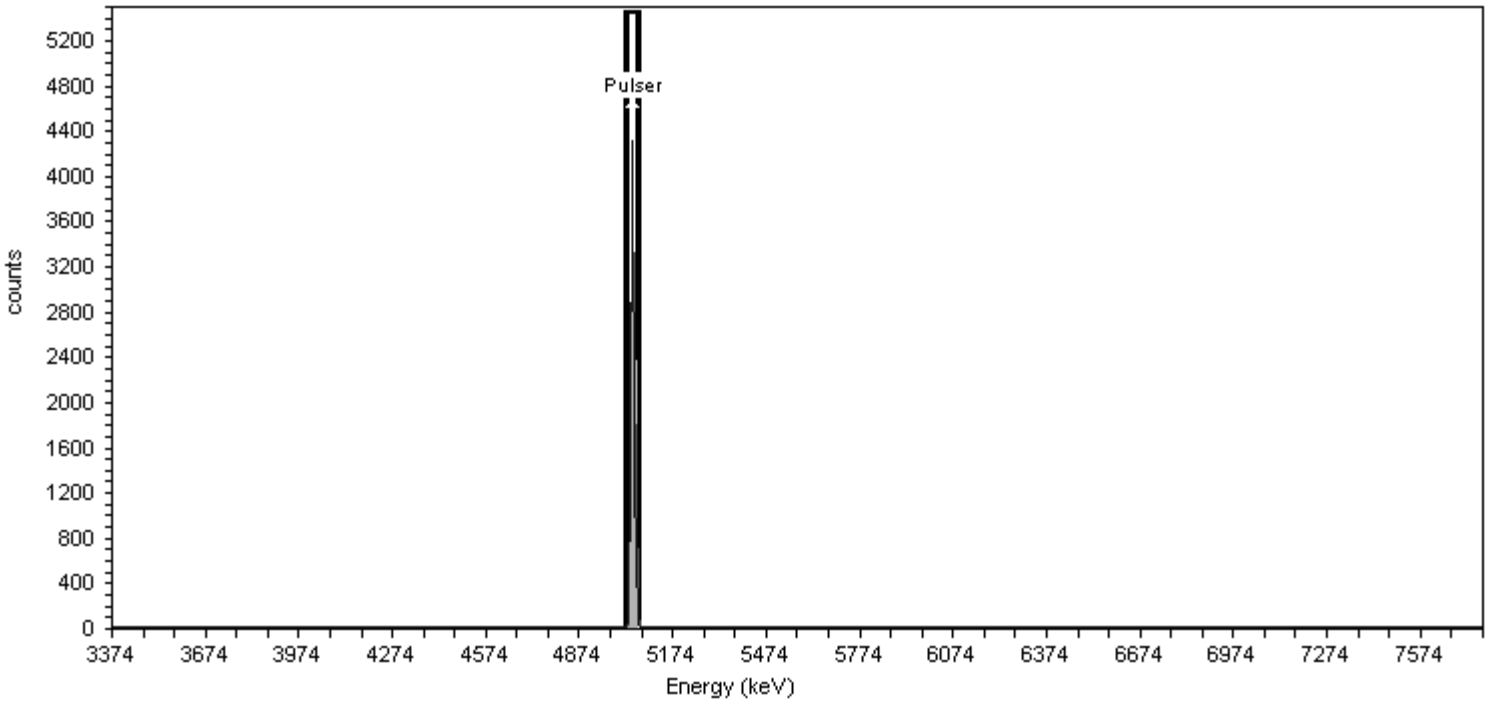
Batch Name: June2014a Analyst: 60040
Description:

Acquisition

Detector: AV19 , SN: 50-025FF5
Acquisition Start Date: 7/1/2014 1:00:43AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8876;AV19-20140505
Calibration Date: 5/5/2014 10:09:02PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.34% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5044.704	5025.077	5064.331	11.53	7,131.83	7,582.75

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:59:33AM 7/2/2014

Sample

Sample Name: Pulser;AV19
Comment:

Spectrum #8 Analysis #1

Batch

Batch Name: June2014a
Description:

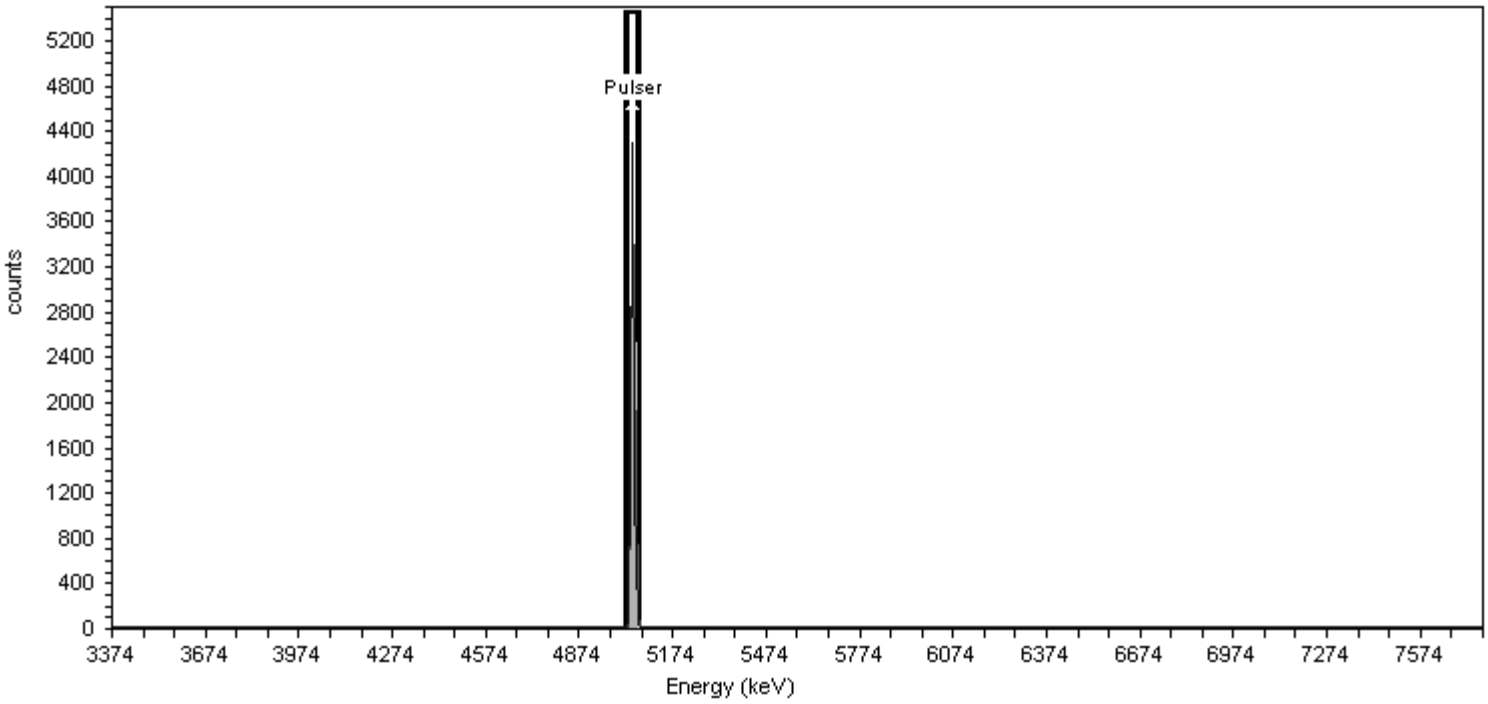
Analyst: 60040

Acquisition

Detector: AV19 , SN: 50-025FF5
Acquisition Start Date: 7/2/2014 10:53:51AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8876;AV19-20140505
Calibration Date: 5/5/2014 10:09:02PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.34% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5044.646	5025.363	5063.929	11.33	6,977.72	7,593.83

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:04:18AM 7/1/2014

Sample

Sample Name: Pulser;AV20
Comment:

Spectrum #7 Analysis #1

Batch

Batch Name: June2014a
Description:

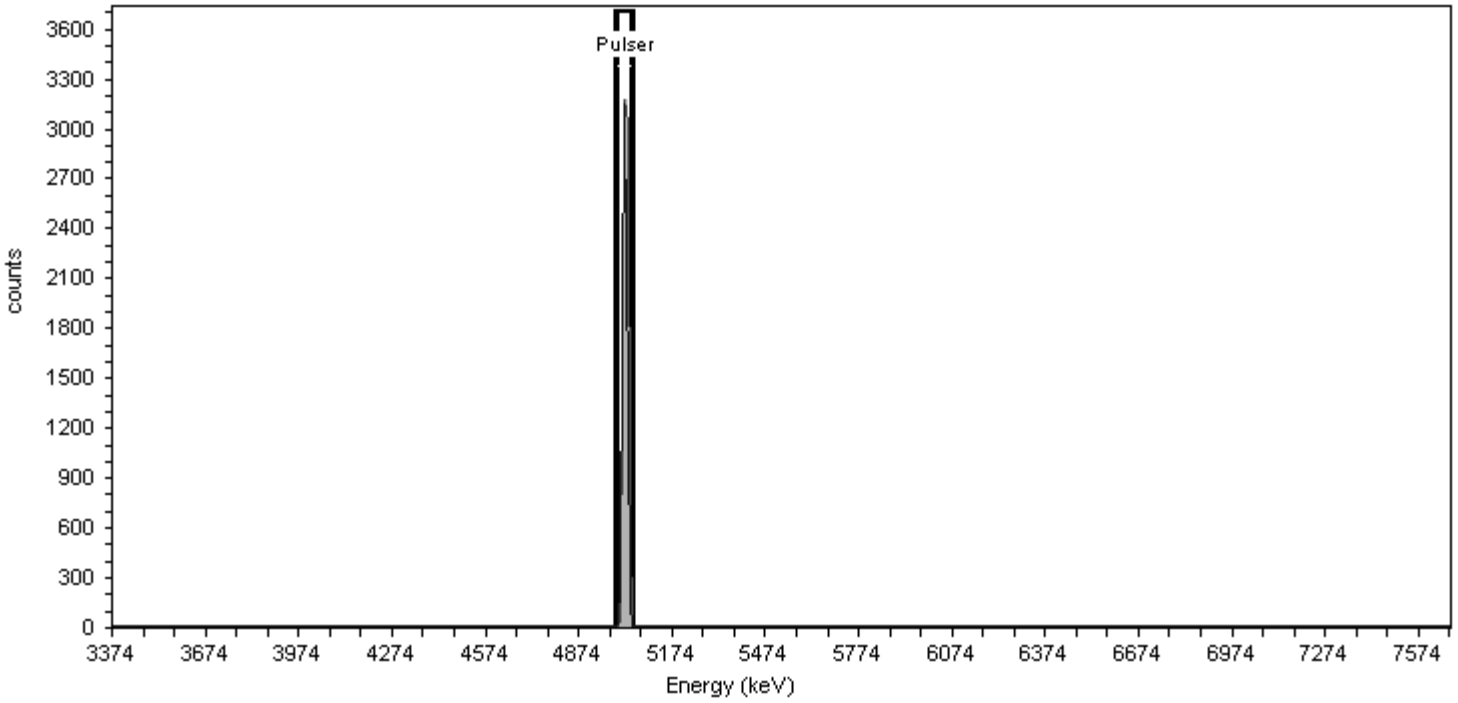
Analyst: 60040

Acquisition

Detector: AV20 , SN: 48-121A7
Acquisition Start Date: 7/1/2014 1:00:45AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8877;AV20-20140505
Calibration Date: 5/5/2014 10:09:21PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.56% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5021.675	4996.496	5046.855	14.79	6,737.98	7,670.70

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:59:38AM 7/2/2014

Sample

Sample Name: Pulser;AV20
Comment:

Spectrum #8 Analysis #1

Batch

Batch Name: June2014a
Description:

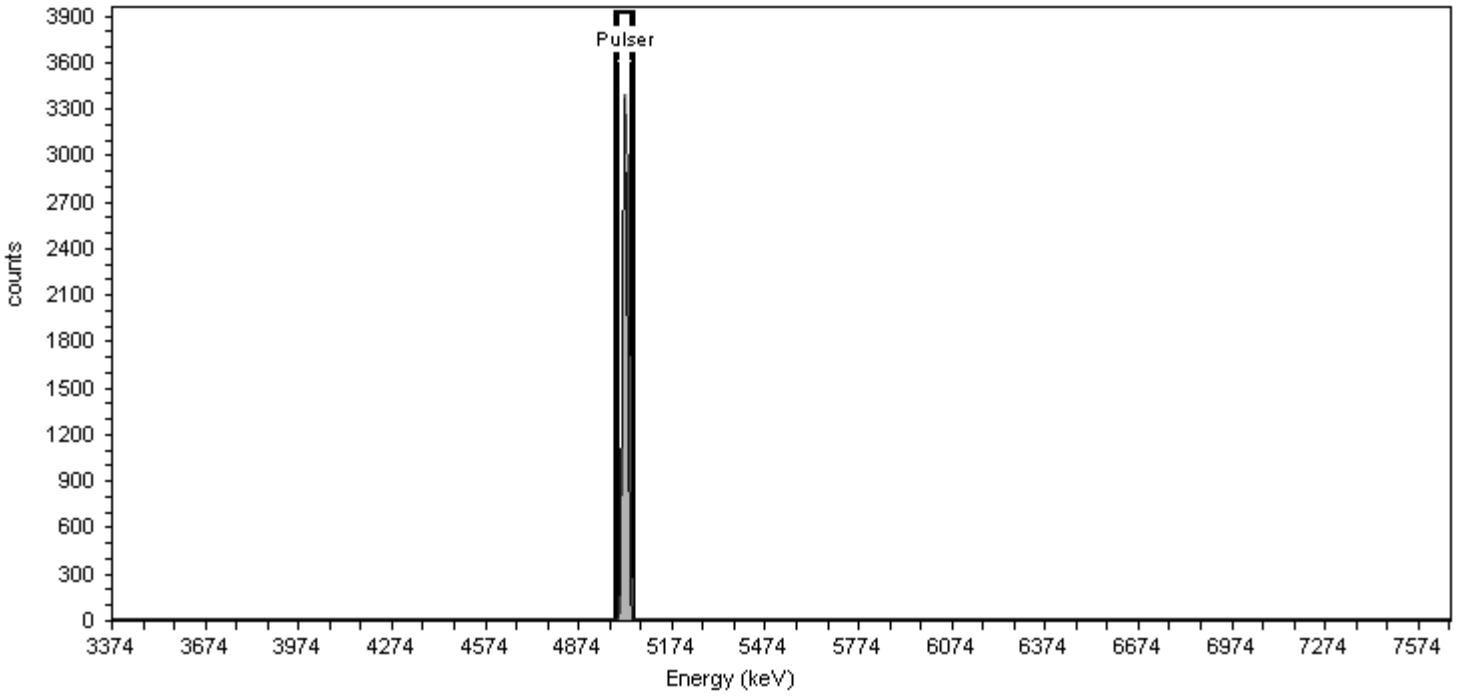
Analyst: 60040

Acquisition

Detector: AV20 , SN: 48-121A7
Acquisition Start Date: 7/2/2014 10:53:53AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8877;AV20-20140505
Calibration Date: 5/5/2014 10:09:21PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.56% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5021.816	4996.355	5047.277	14.96	7,268.92	7,668.90

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:04:23AM 7/1/2014

Sample

Sample Name: Pulser;AV21 Spectrum #7 Analysis #1
Comment:

Batch

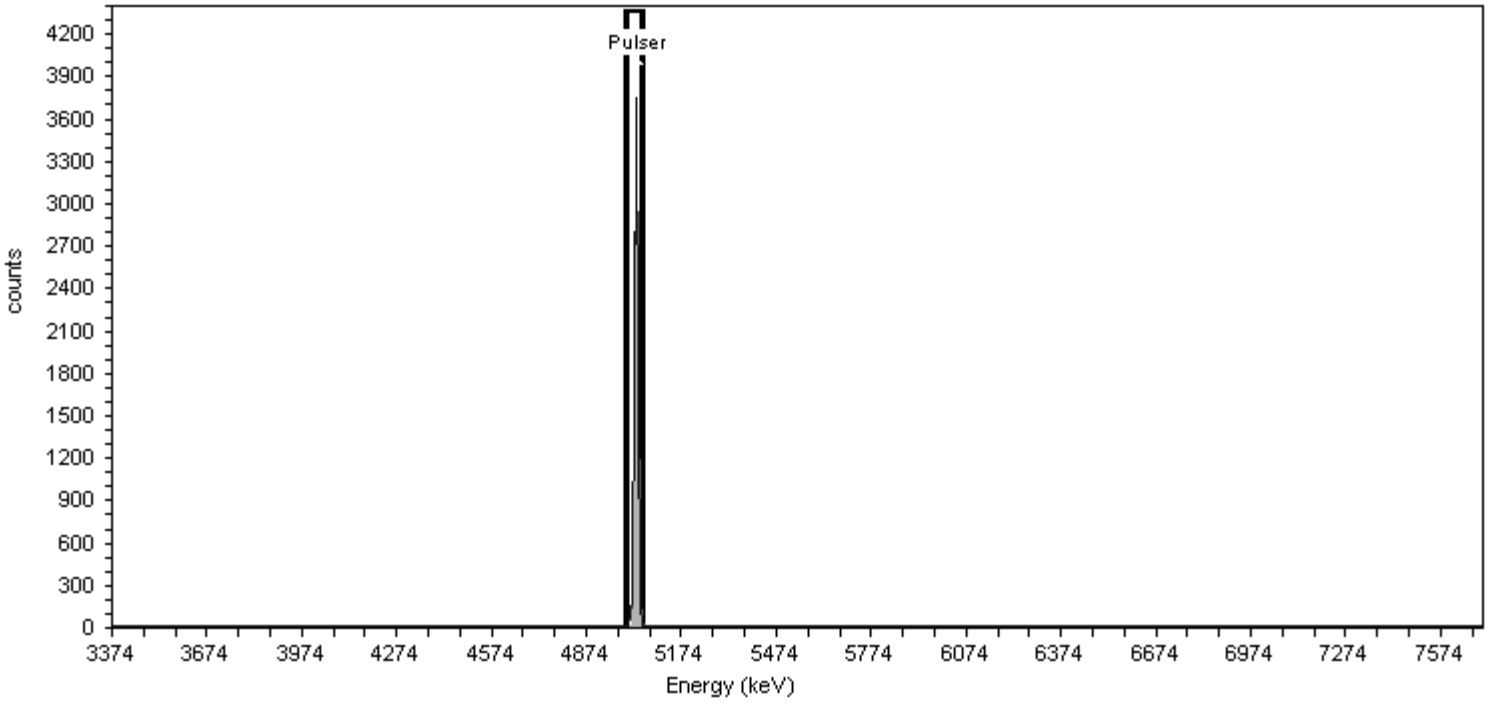
Batch Name: June2014a Analyst: 60040
Description:

Acquisition

Detector: AV21 , SN: 48-102BB6
Acquisition Start Date: 7/1/2014 1:00:47AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9520;AV21-20140505
Calibration Date: 5/5/2014 10:09:29PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.45% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5029.727	5005.595	5053.858	14.18	7,635.49	7,671.25

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:57:42AM 7/2/2014

Sample

Sample Name: Pulser;AV21
Comment:

Spectrum #8 Analysis #1

Batch

Batch Name: June2014a
Description:

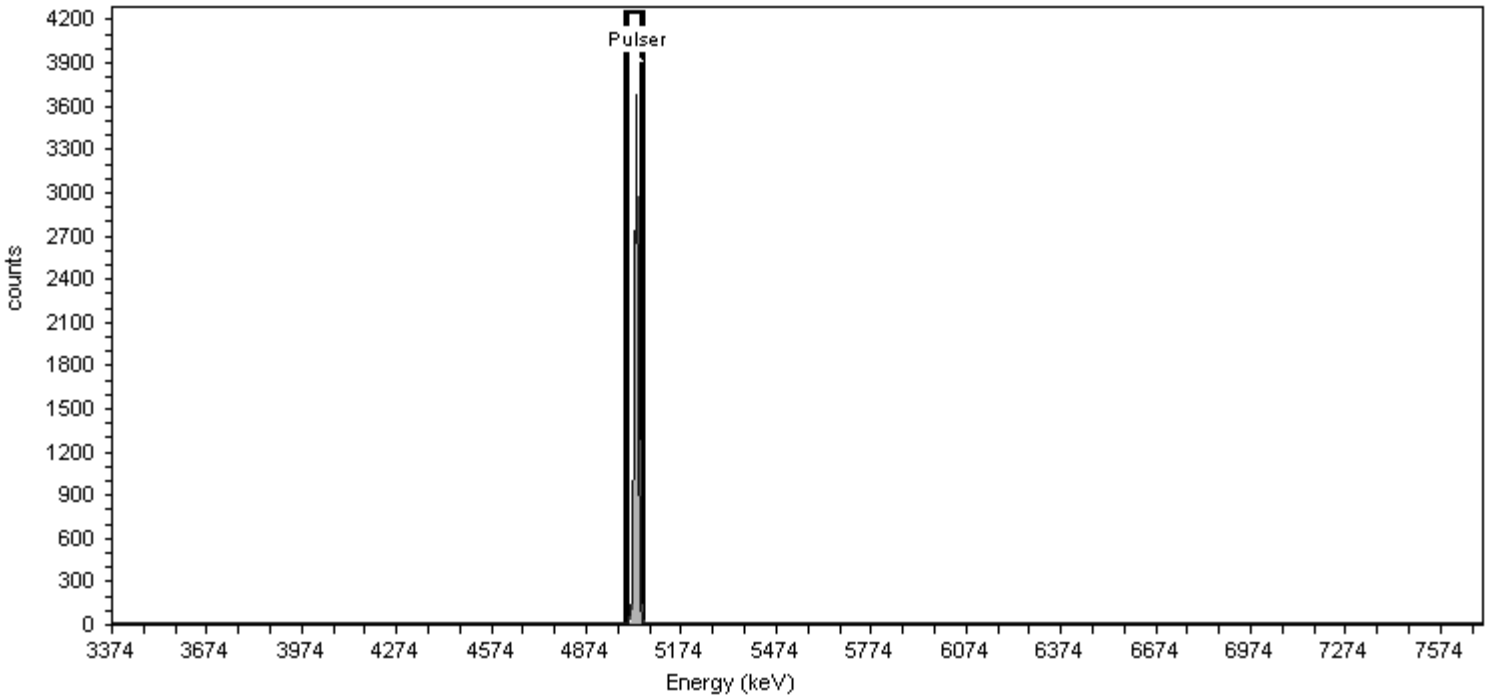
Analyst: 60040

Acquisition

Detector: AV21 , SN: 48-102BB6
Acquisition Start Date: 7/2/2014 10:53:55AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9520;AV21-20140505
Calibration Date: 5/5/2014 10:09:29PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.45% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5029.731	5005.687	5053.775	14.13	7,462.37	7,668.27

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:04:30AM 7/1/2014

Sample

Sample Name: Pulser;AV23
Comment:

Spectrum #7 Analysis #1

Batch

Batch Name: June2014a
Description:

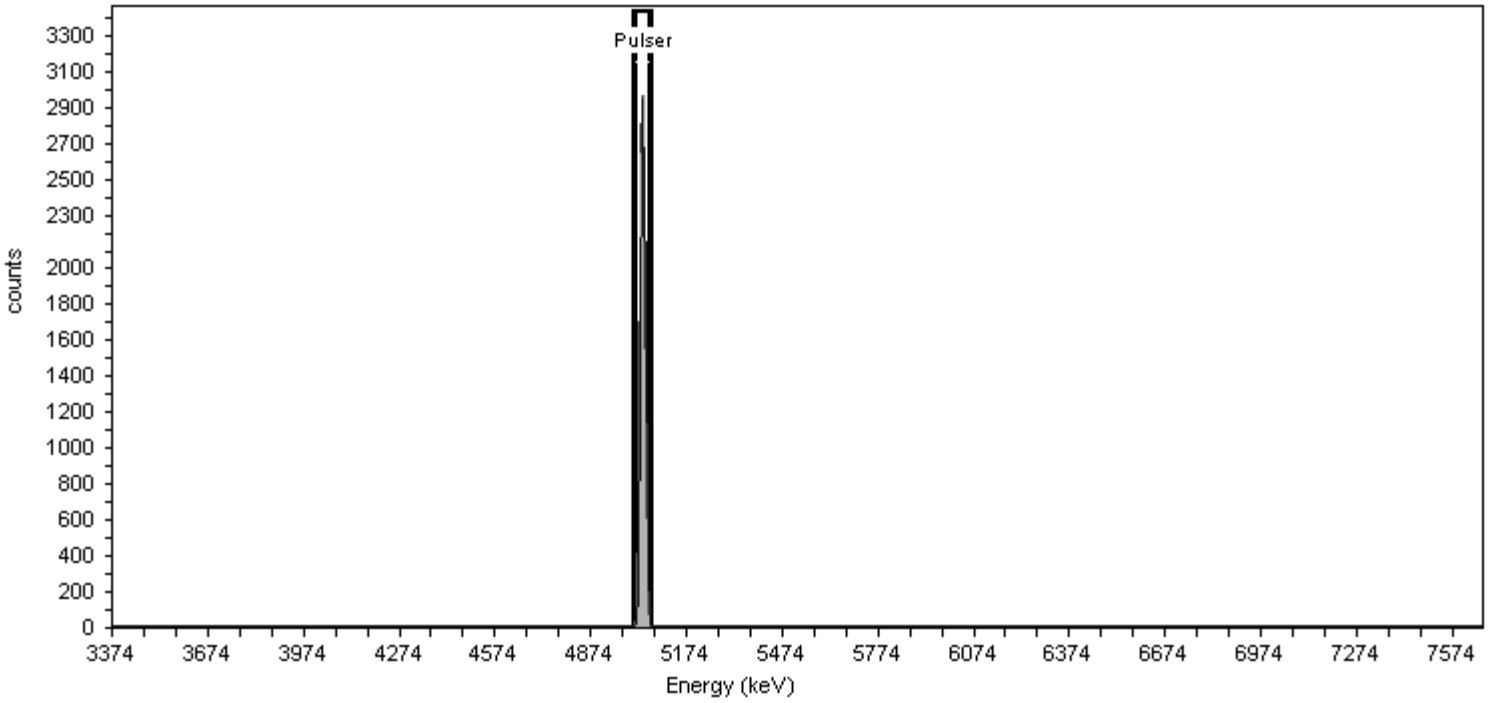
Analyst: 60040

Acquisition

Detector: AV23 , SN: 48-158FF3
Acquisition Start Date: 7/1/2014 1:00:49AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9792;AV23-20140505
Calibration Date: 5/5/2014 10:09:35PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.91% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5038.390	5010.921	5065.859	16.14	6,870.50	7,635.41

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:57:47AM 7/2/2014

Sample

Sample Name: Pulser;AV23
Comment:

Spectrum #8 Analysis #1

Batch

Batch Name: June2014a
Description:

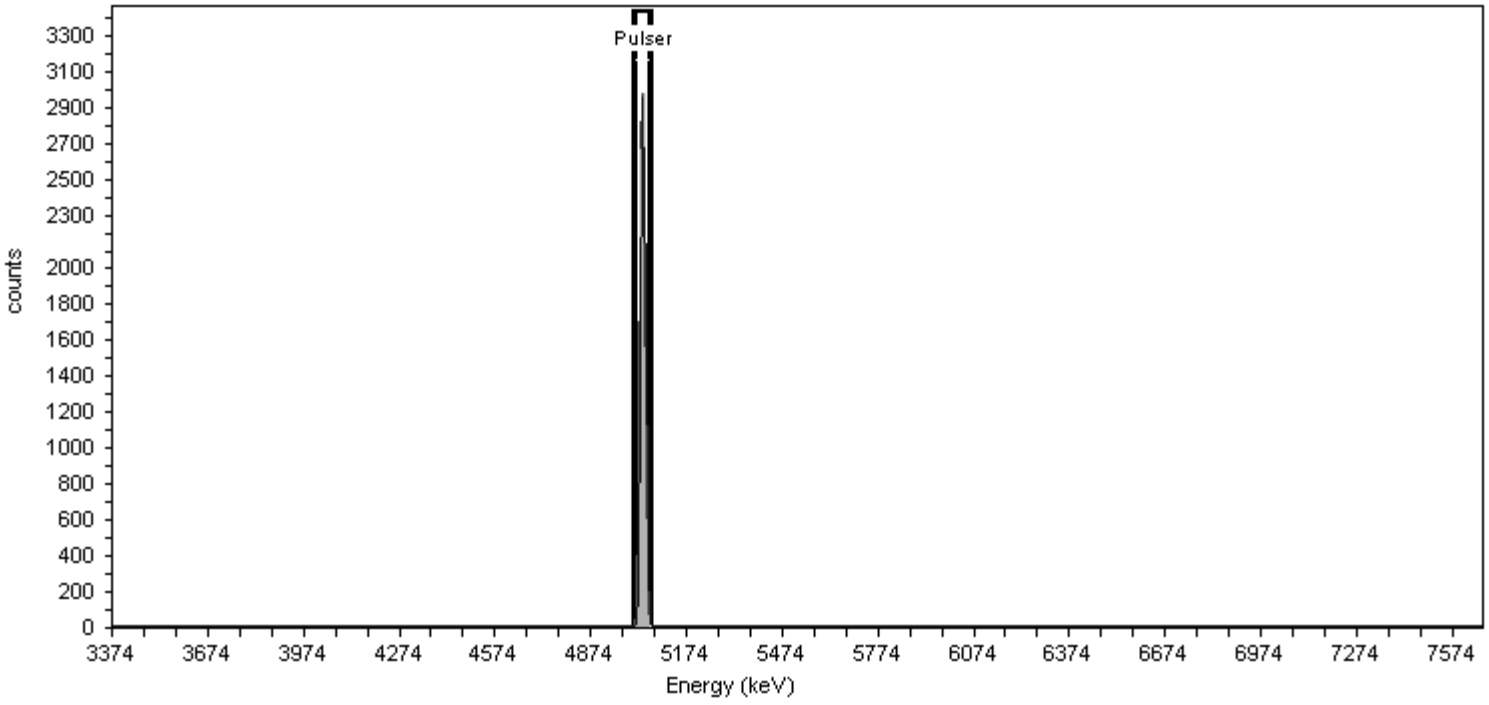
Analyst: 60040

Acquisition

Detector: AV23 , SN: 48-158FF3
Acquisition Start Date: 7/2/2014 10:53:56AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9792;AV23-20140505
Calibration Date: 5/5/2014 10:09:35PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.91% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5038.375	5011.074	5065.677	16.04	6,844.59	7,629.67

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:57:53AM 7/2/2014

Sample

Sample Name: Pulser;AV24
Comment:

Spectrum #8 Analysis #1

Batch

Batch Name: June2014a
Description:

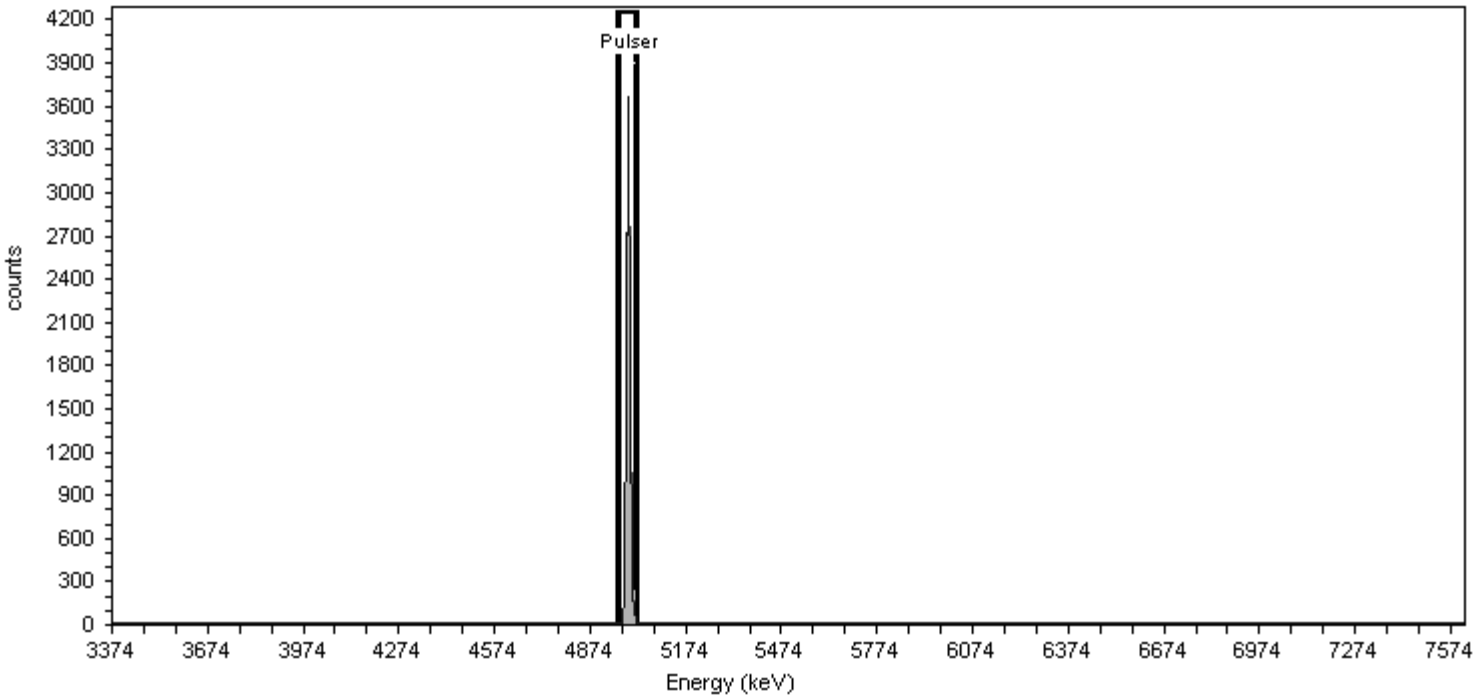
Analyst: 60040

Acquisition

Detector: AV24 , SN: 47-137Q4
Acquisition Start Date: 7/2/2014 10:54:00AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9793;AV24-20140505
Calibration Date: 5/5/2014 10:09:41PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.42% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	4992.657	4968.026	5017.289	14.47	7,603.07	7,663.18

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:04:16PM 7/2/2014

Sample

Sample Name: Pulser;AV43 Spectrum #9 Analysis #1
Comment:

Batch

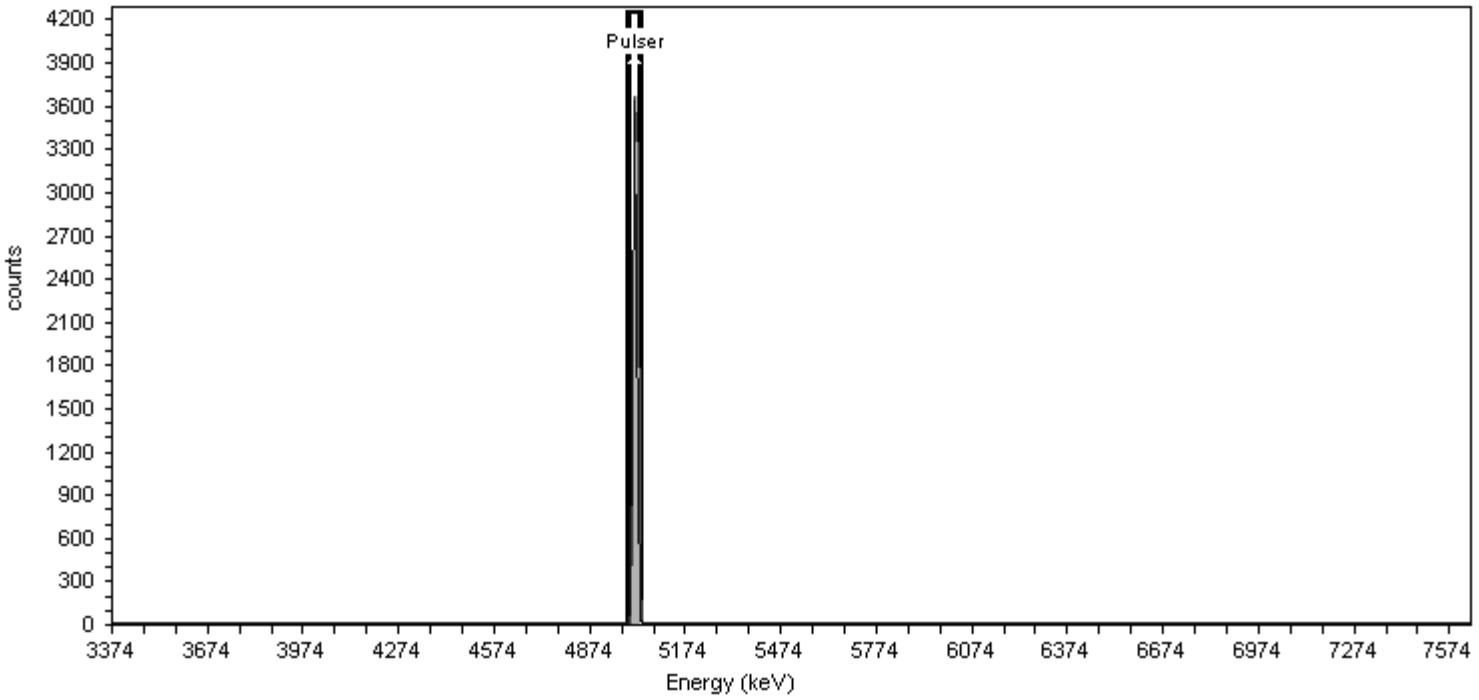
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV43 , SN: 49-190X4
Acquisition Start Date: 7/2/2014 3:55:21PM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9794;AV43-20140505
Calibration Date: 5/5/2014 10:09:47PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.74% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5014.389	4993.776	5035.002	12.11	6,376.68	7,449.35

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:04:22PM 7/2/2014

Sample

Sample Name: Pulser;AV44 Spectrum #8 Analysis #1
Comment:

Batch

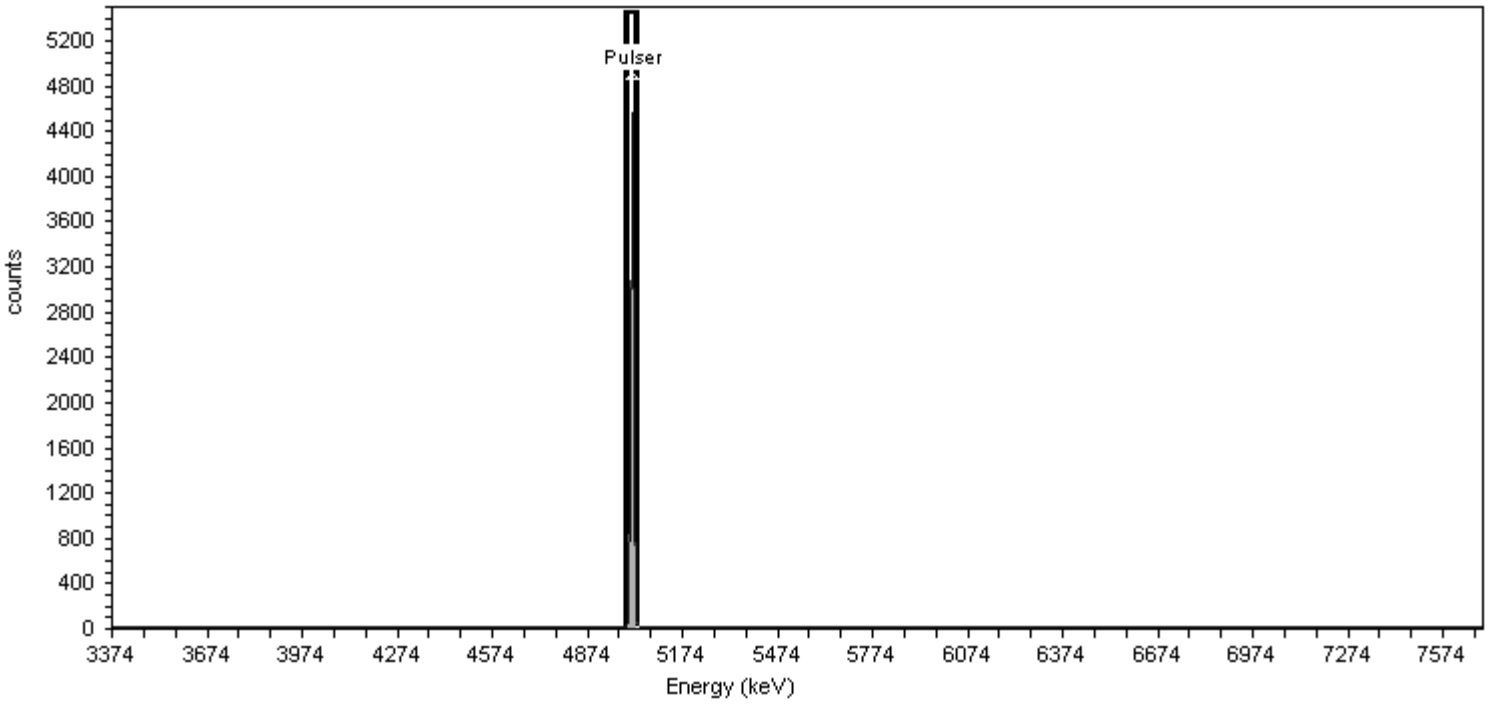
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV44 , SN: 50-051JJ1
Acquisition Start Date: 7/2/2014 3:55:23PM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9795;AV44-20140505
Calibration Date: 5/5/2014 10:09:57PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.32% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5015.095	4995.254	5034.935	11.66	7,614.41	7,610.29

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:04:27PM 7/2/2014

Sample

Sample Name: Pulser;AV45 Spectrum #8 Analysis #1
Comment:

Batch

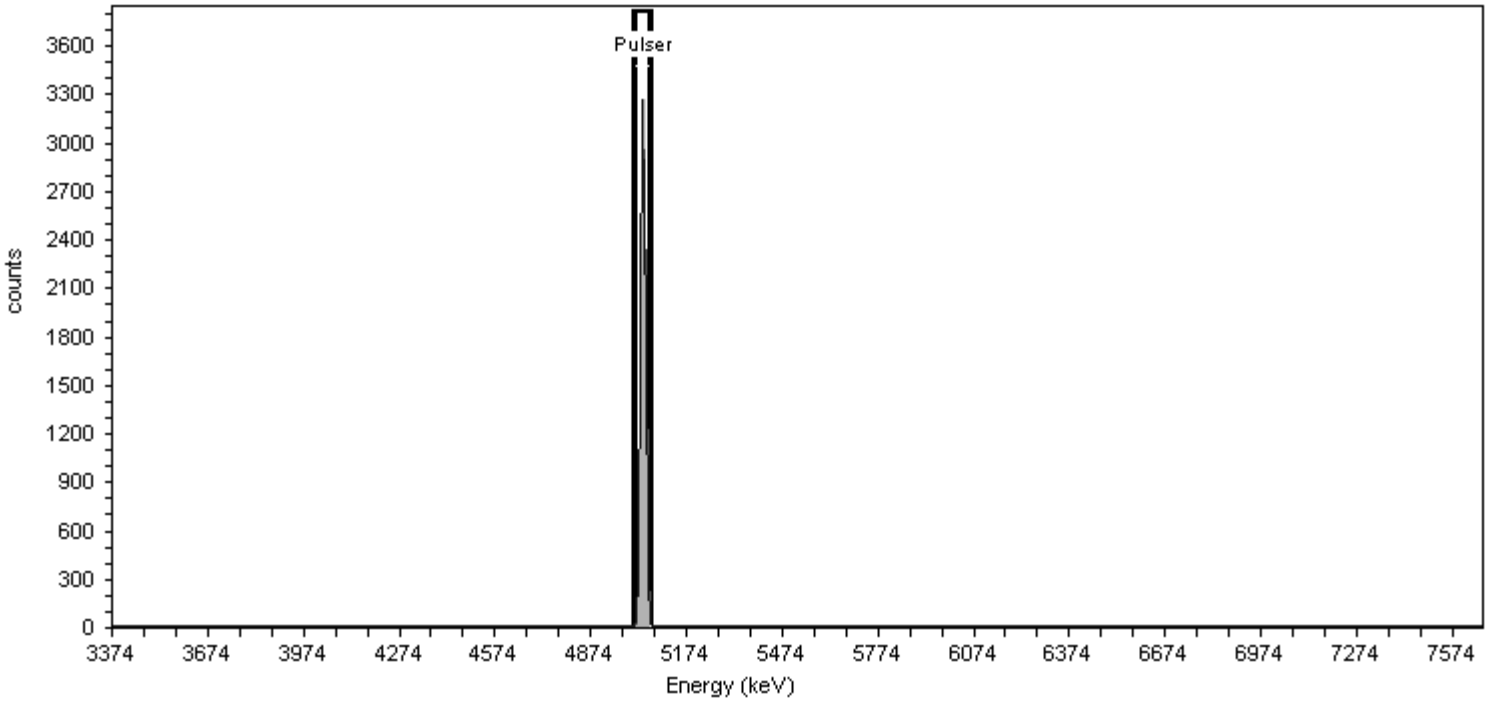
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV45 , SN: 48-158FF2
Acquisition Start Date: 7/2/2014 3:55:25PM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9817;AV45-20140505
Calibration Date: 5/5/2014 10:10:03PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.06% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5037.351	5009.582	5065.121	16.31	7,654.94	7,639.21

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:04:33PM 7/2/2014

Sample

Sample Name: Pulser;AV46 Spectrum #8 Analysis #1
Comment:

Batch

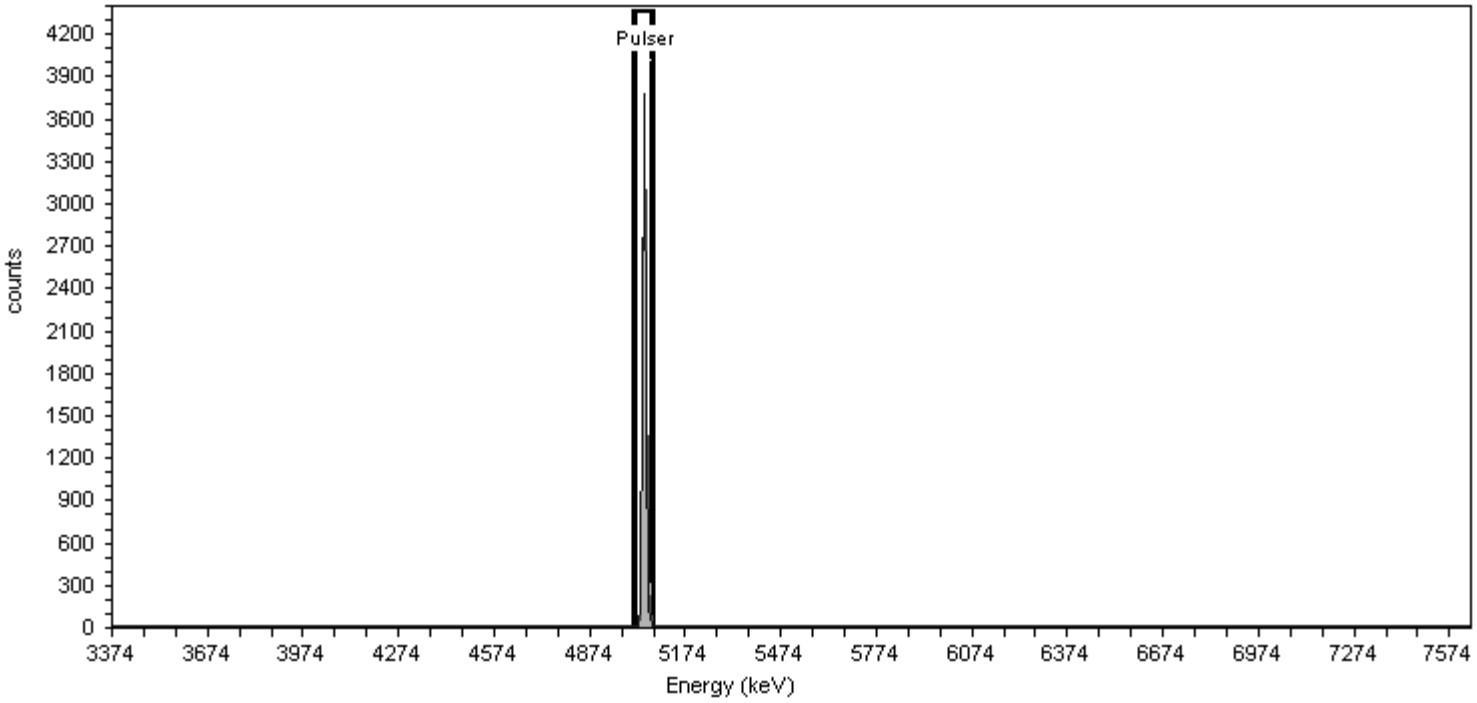
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV46 , SN: 49-202GG2
Acquisition Start Date: 7/2/2014 3:55:26PM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9884;AV46-20140505
Calibration Date: 5/5/2014 10:10:09PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.80% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5044.639	5021.490	5067.787	13.60	7,376.82	7,660.66

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:05:12PM 7/2/2014

Sample

Sample Name: Pulser;AV49 Spectrum #8 Analysis #1
Comment:

Batch

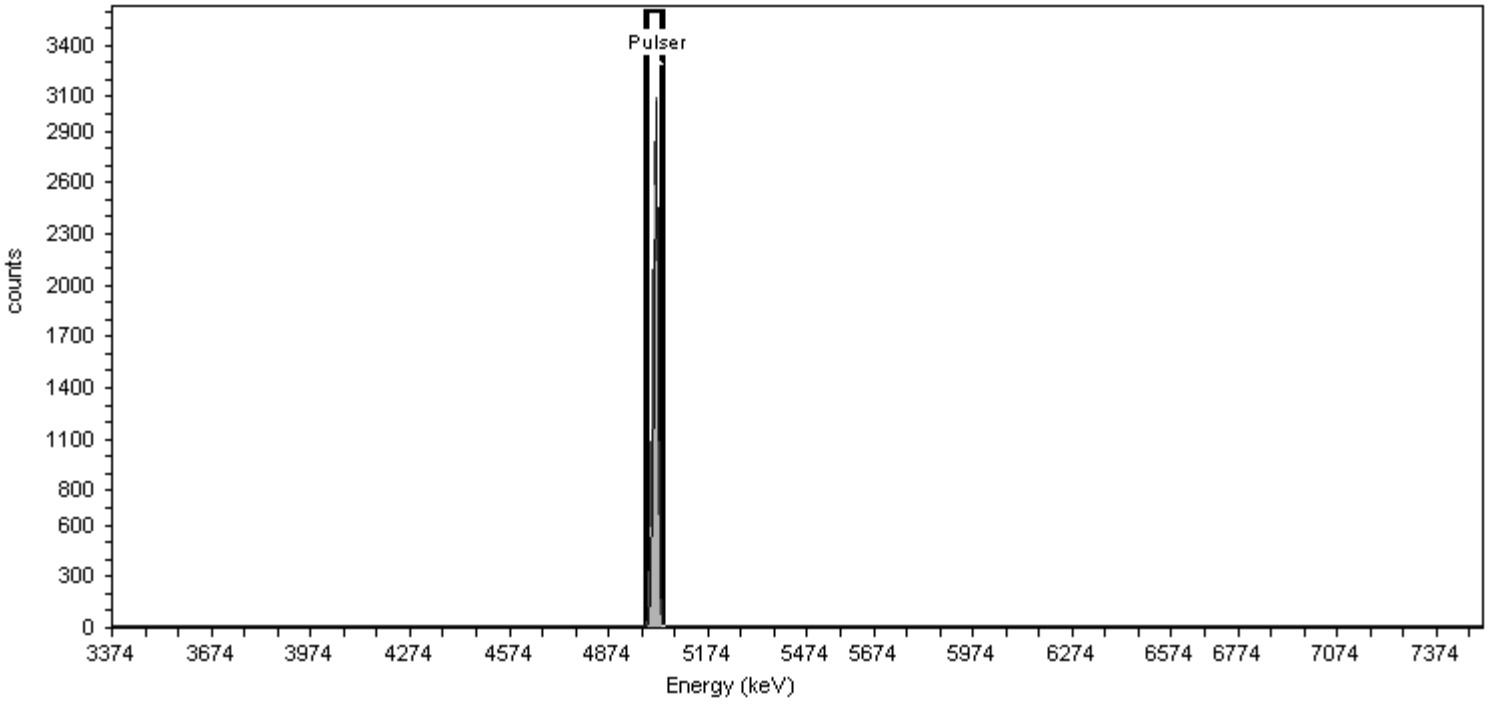
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV49 , SN: 47-043hh4
Acquisition Start Date: 7/2/2014 3:55:31PM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-7107;AV49-20140504
Calibration Date: 5/5/2014 6:52:38PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.53% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5015.781	4989.111	5042.452	15.67	6,948.56	7,627.81

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:05:17PM 7/2/2014

Sample

Sample Name: Pulser;AV50
Comment:

Spectrum #8 Analysis #1

Batch

Batch Name: June2014b
Description:

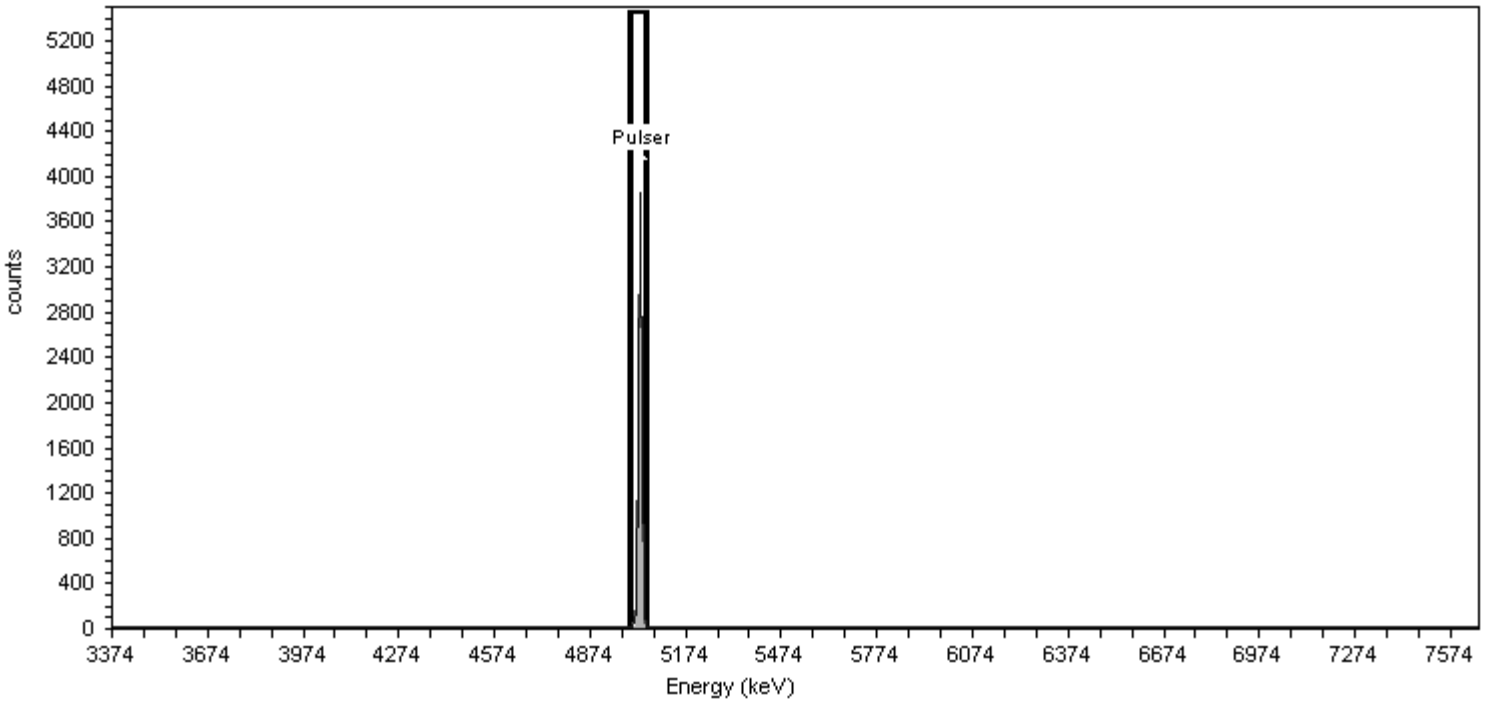
Analyst: 60040

Acquisition

Detector: AV50 , SN: 50-060W2
Acquisition Start Date: 7/2/2014 3:54:44PM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8874;AV50-20140504
Calibration Date: 5/5/2014 6:52:48PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.93% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5030.073	5007.172	5052.974	13.45	7,428.73	7,650.76

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:05:23PM 7/2/2014

Sample

Sample Name: Pulser;AV51
Comment:

Spectrum #8 Analysis #1

Batch

Batch Name: June2014b
Description:

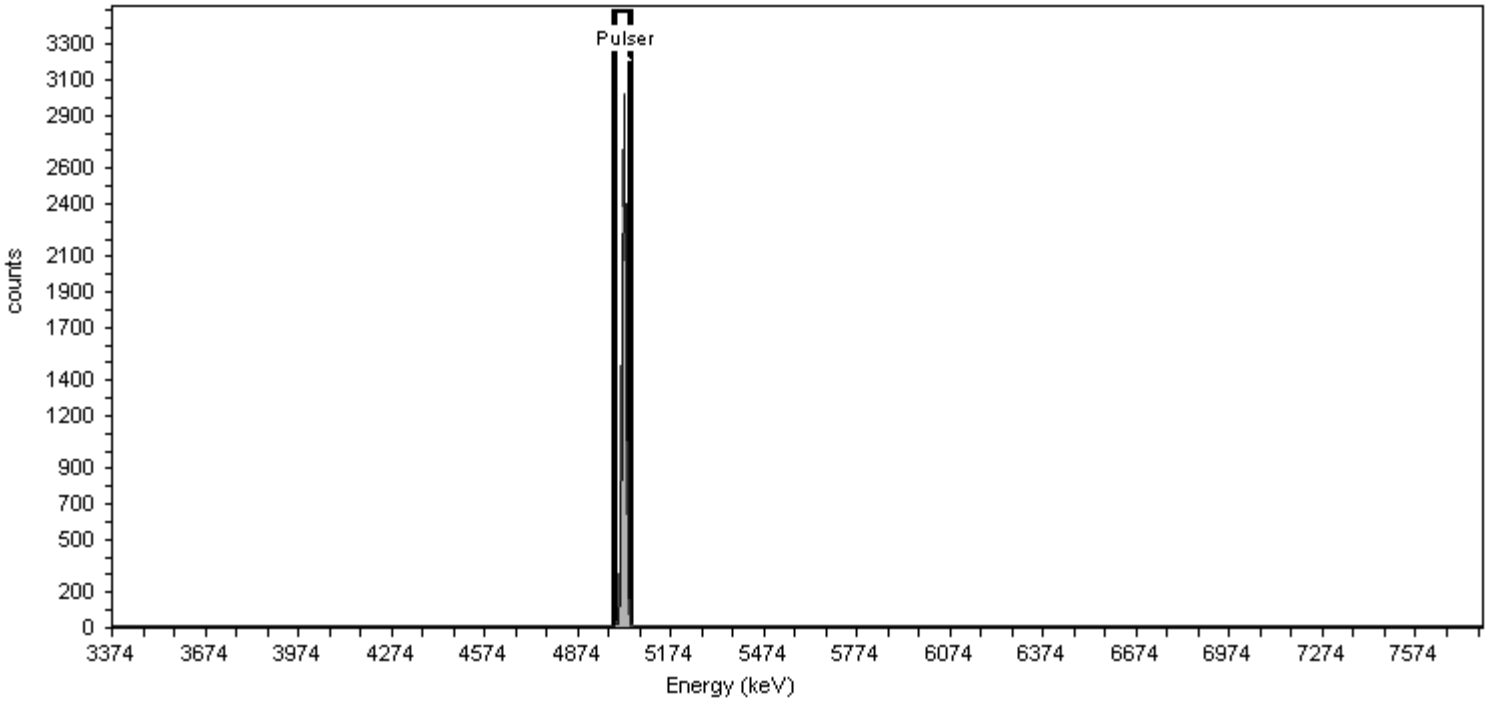
Analyst: 60040

Acquisition

Detector: AV51 , SN: 48-109I1
Acquisition Start Date: 7/2/2014 3:54:46PM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8875;AV51-20140504
Calibration Date: 5/5/2014 6:52:53PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.24% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5023.186	4996.463	5049.909	15.70	6,807.34	7,283.98

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:05:57PM 7/2/2014

Sample

Sample Name: Pulser;AV58 Spectrum #8 Analysis #1
Comment:

Batch

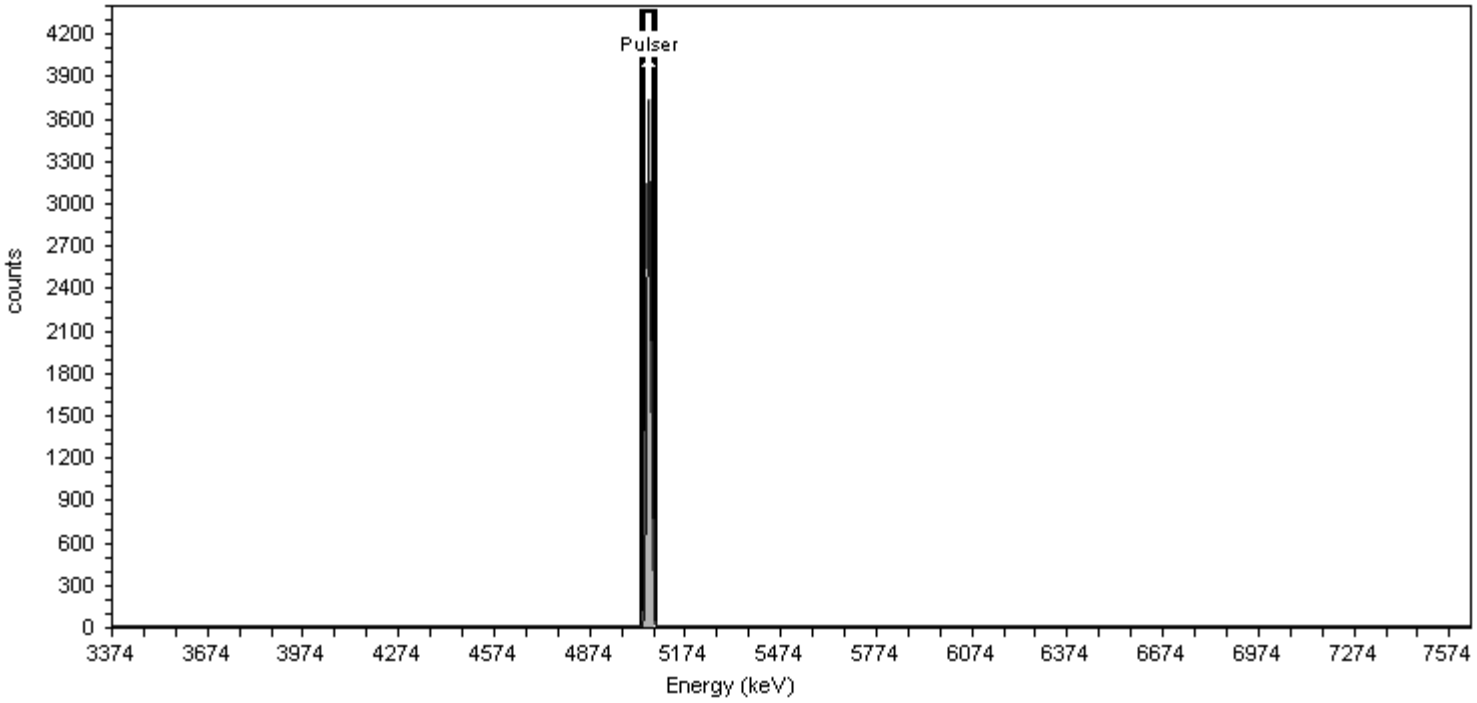
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV58 , SN: 52-102 C5
Acquisition Start Date: 7/2/2014 3:54:55PM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9794;AV58-20140504
Calibration Date: 5/5/2014 6:53:46PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.56% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5060.148	5039.293	5081.002	12.25	6,554.79	7,111.68

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:02:54PM 7/2/2014

Sample

Sample Name: Pulser;AV60
Comment:

Spectrum #8 Analysis #1

Batch

Batch Name: June2014b
Description:

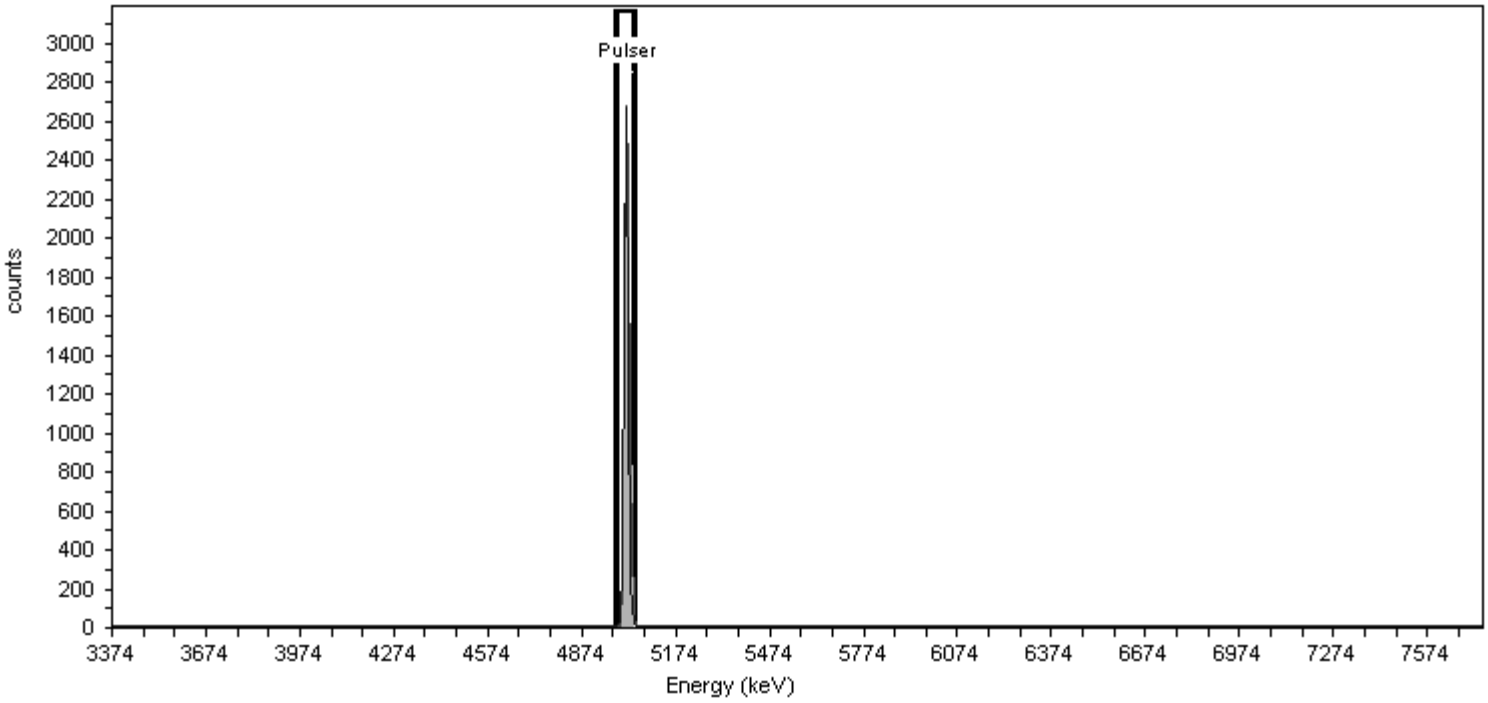
Analyst: 60040

Acquisition

Detector: AV60 , SN: 49-027117
Acquisition Start Date: 7/2/2014 3:54:58PM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9817;AV60-20140504
Calibration Date: 5/5/2014 6:53:59PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.33% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5014.354	4986.408	5042.301	16.42	6,306.68	7,214.54

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:44:11AM 7/1/2014

Sample

Sample Name: Pulser;AV115
Comment:

Spectrum #7 Analysis #1

Batch

Batch Name: June2014d
Description:

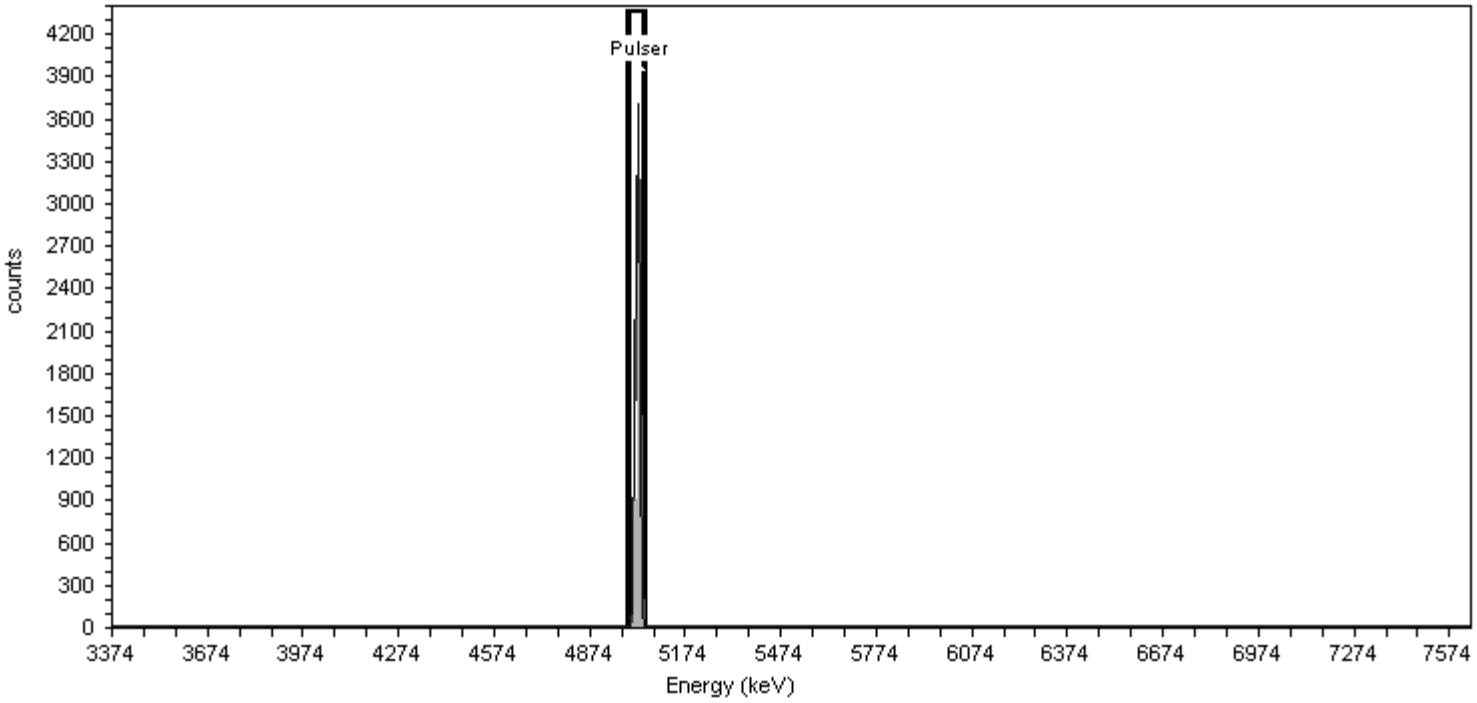
Analyst: 60040

Acquisition

Detector: AV115 , SN: 49-037E4
Acquisition Start Date: 7/1/2014 1:38:12AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9817;AV115-20140507
Calibration Date: 5/7/2014 10:49:29PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.26% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5022.238	4999.510	5044.966	13.35	7,109.25	7,690.89

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:44:16AM 7/1/2014

Sample

Sample Name: Pulser;AV116
Comment:

Spectrum #7 Analysis #1

Batch

Batch Name: June2014d
Description:

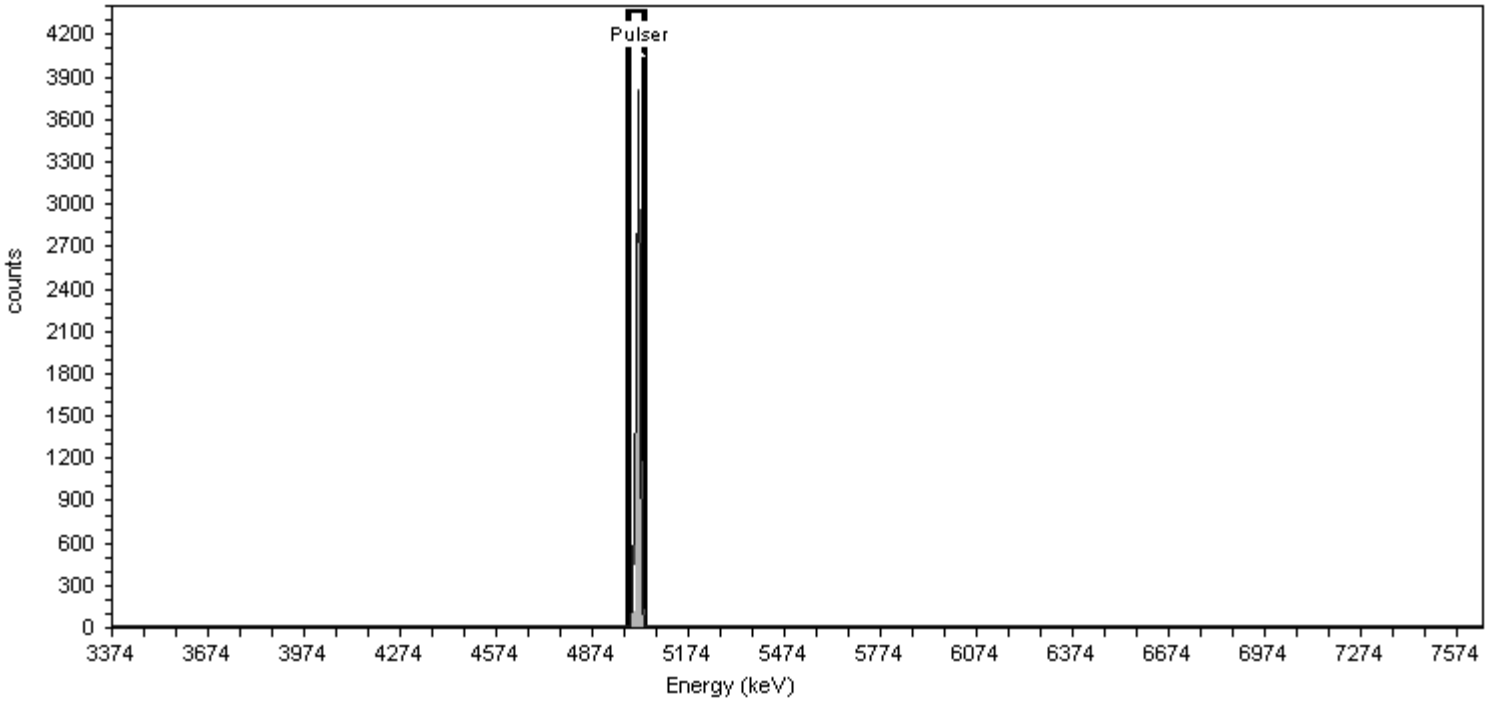
Analyst: 60040

Acquisition

Detector: AV116 , SN: 49-034G1
Acquisition Start Date: 7/1/2014 1:38:14AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9792;AV116-20140430
Calibration Date: 5/1/2014 1:16:57PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.04% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5014.917	4991.200	5038.633	13.93	7,597.87	7,688.48

Initial Calibrations

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:38:36PM 5/6/2014

Calibration

Sample Name: IC-8875;AV3-20140505
Description:
Detector: AV3

Calibration Date: 5/6/2014 5:38:33PM
Analyst: 60040

Source Info

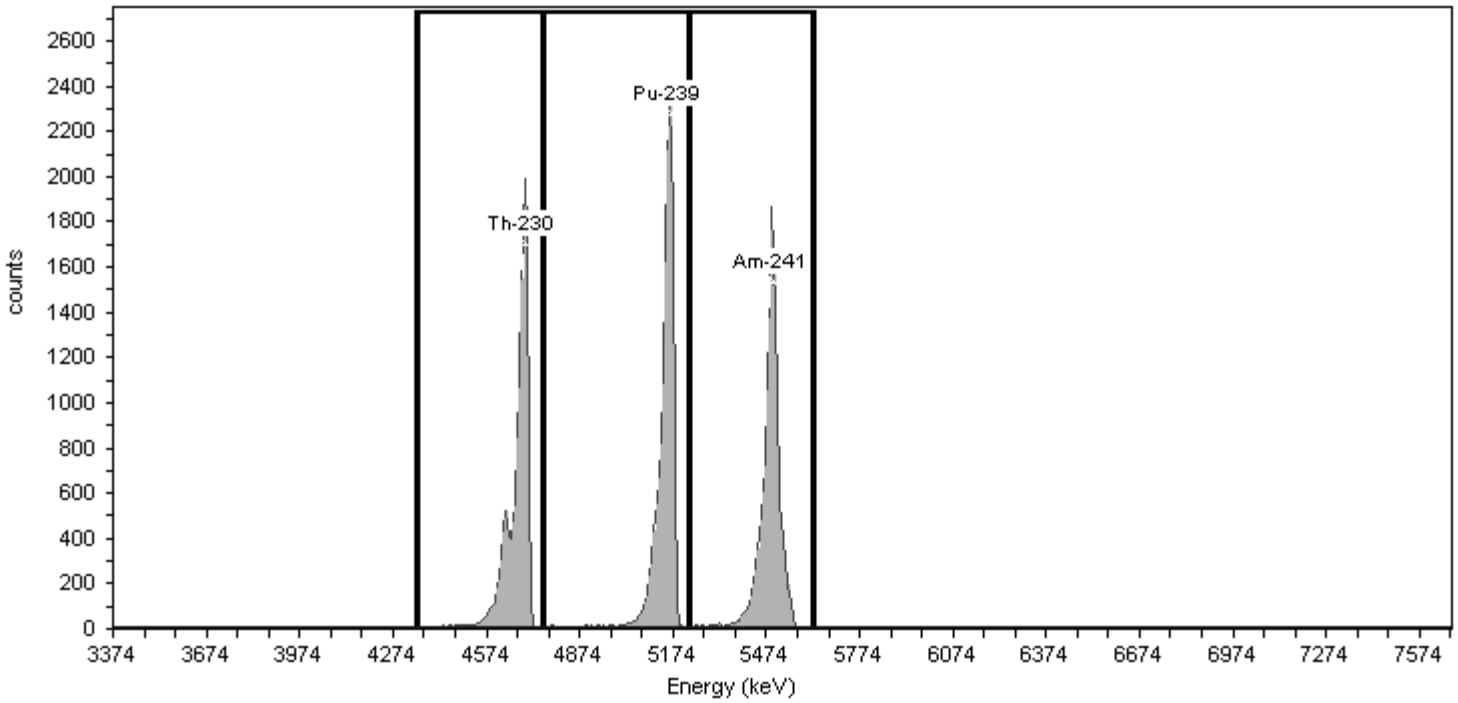
Certificate ID: 82234-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV3 , SN: 49-202 FF7
Acquisition Start Date: 5/5/2014 10:26:30PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 26.09% +/- 0.36% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	12,013.00	85.81
Pu-239	240	5.16	186	249	13,501.00	96.44
Am-241	284	5.49	249	303	12,324.00	88.03

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:38:43PM 5/6/2014

Calibration

Sample Name: IC-8876;AV4-20140505
Description:
Detector: AV4

Calibration Date: 5/6/2014 5:38:40PM
Analyst: 60040

Source Info

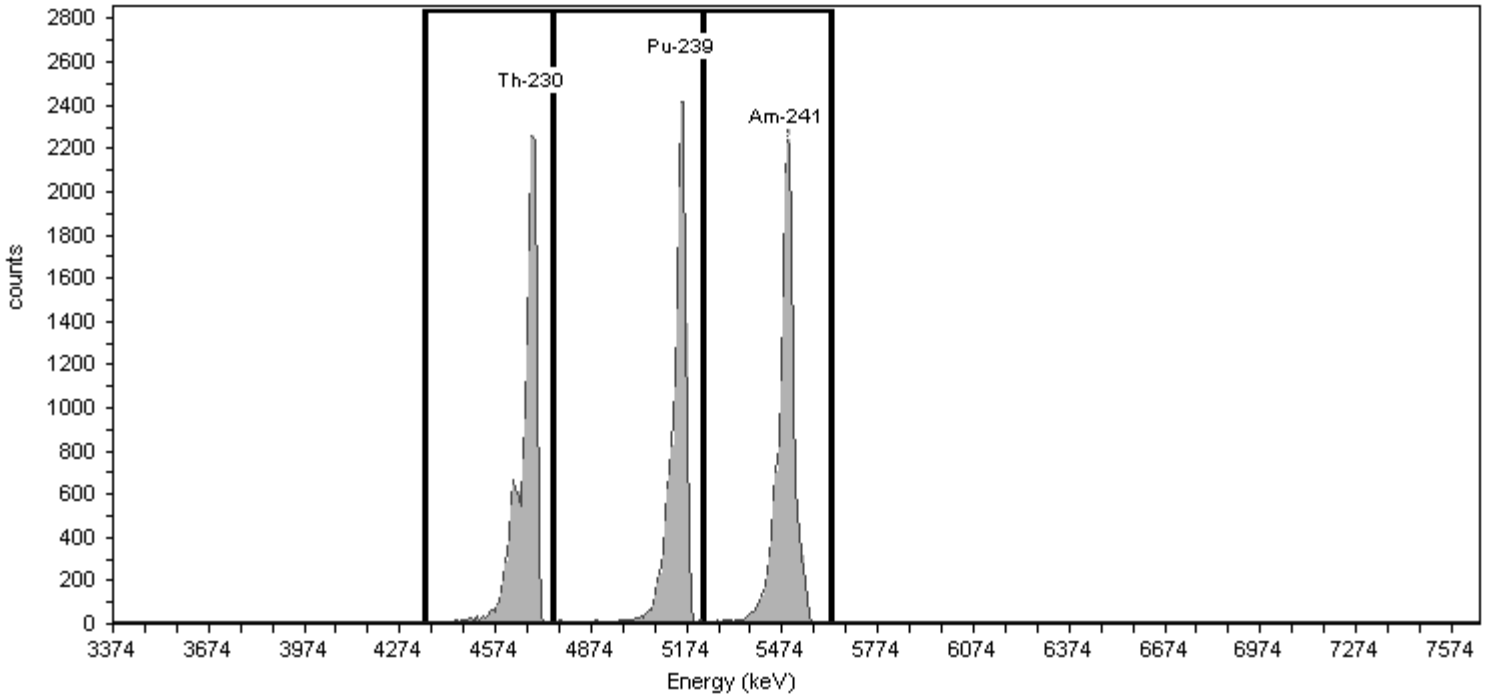
Certificate ID: 82235-334
Prepared by: Analytics

Certification Date: 6/4/2010 12:00:00PM
Description:

Acquisition

Detector: AV4 , SN: 46-033Q4
Acquisition Start Date: 5/5/2014 10:26:36PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 25.82% +/- 0.30% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	15,410.00	110.07
Pu-239	240	5.16	186	249	15,223.00	108.74
Am-241	284	5.49	249	303	15,993.00	114.24

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:38:50PM 5/6/2014

Calibration

Sample Name: IC-9520;AV6-20140505
Description:
Detector: AV6

Calibration Date: 5/6/2014 5:38:46PM
Analyst: 60040

Source Info

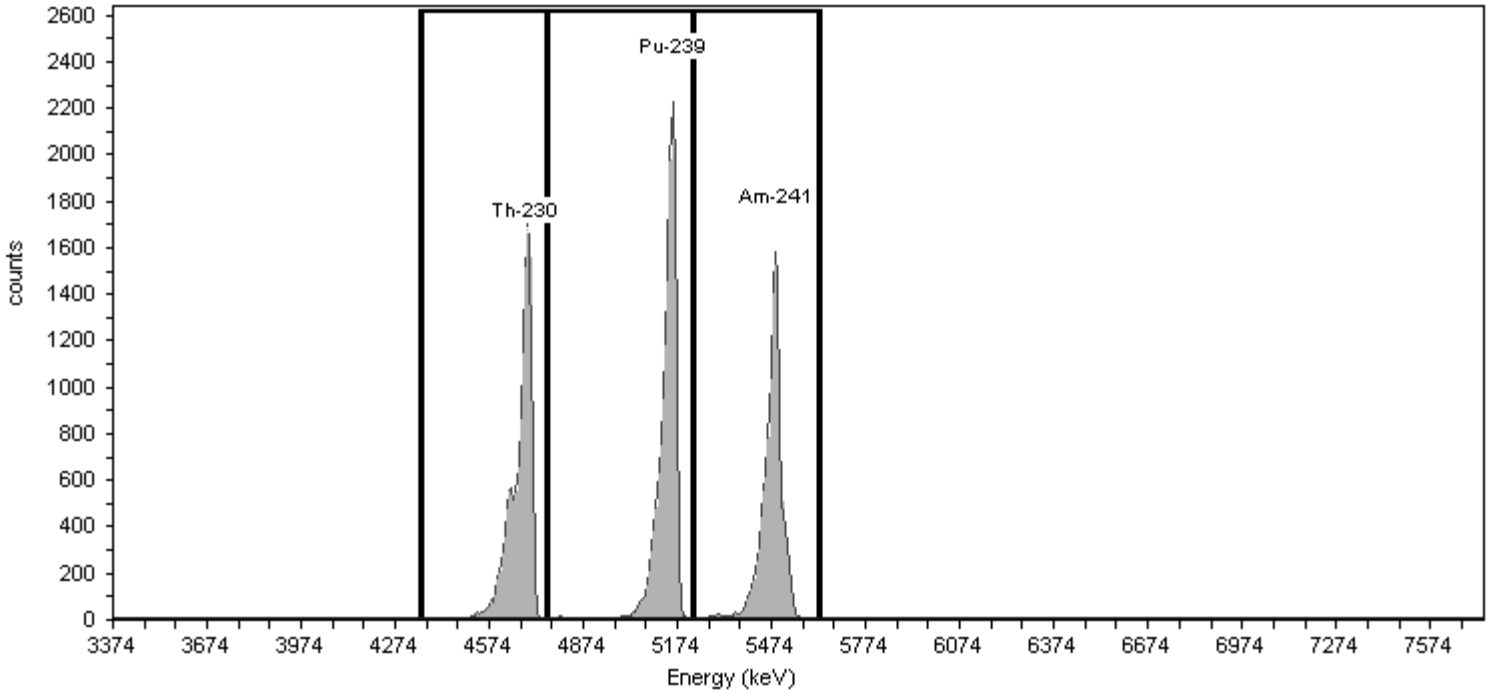
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV6 , SN: 47-27FF2
Acquisition Start Date: 5/5/2014 10:26:50PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 25.89% +/- 0.36% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	12,675.00	90.54
Pu-239	240	5.16	186	249	14,396.00	102.83
Am-241	284	5.49	249	303	11,748.00	83.91

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:48:53PM 5/7/2014

Calibration

Sample Name: IC-8877;AV7-20140507
Description:
Detector: AV7

Calibration Date: 5/7/2014 10:48:48PM
Analyst: 60040

Source Info

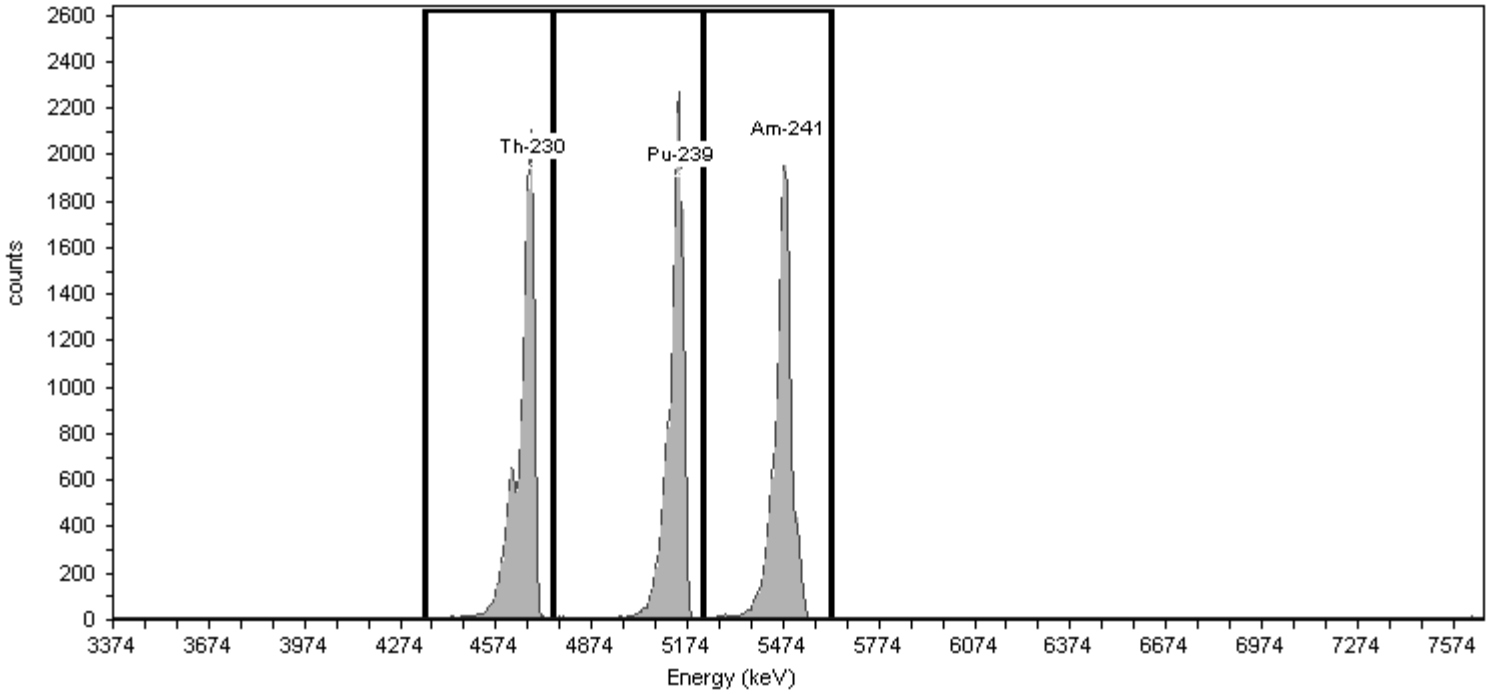
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV7 , SN: 48-158EE5
Acquisition Start Date: 5/7/2014 7:51:09PM
Live Time: 140.00 min.
Real Time: 140.02 min.
Efficiency: 25.80% +/- 0.31% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	15,068.00	107.63
Pu-239	240	5.16	186	249	15,043.00	107.45
Am-241	284	5.49	249	303	14,672.00	104.80

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:39:02PM 5/6/2014

Calibration

Sample Name: IC-9792;AV8-20140505
Description:
Detector: AV8

Calibration Date: 5/6/2014 5:38:58PM
Analyst: 60040

Source Info

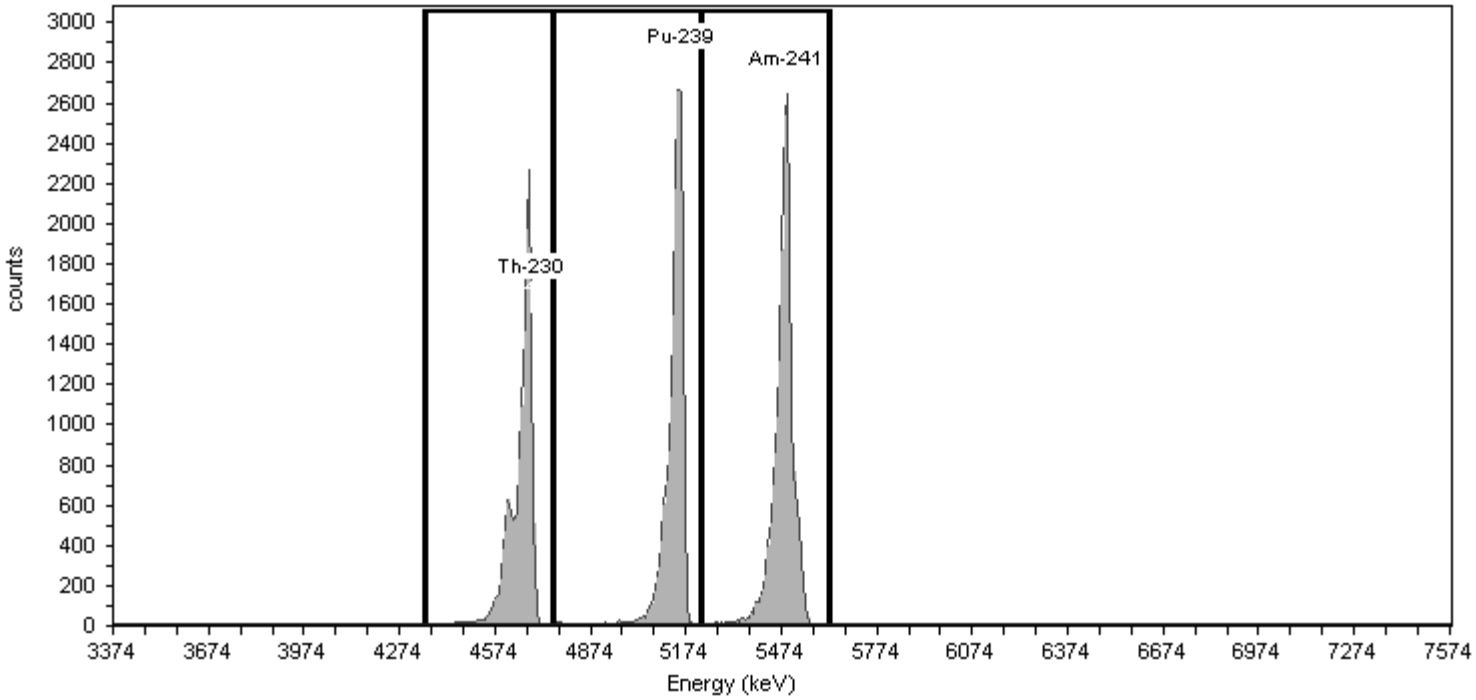
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV8 , SN: 41-137Q6
Acquisition Start Date: 5/5/2014 10:27:18PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 27.05% +/- 0.31% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,298.00	102.13
Pu-239	240	5.16	186	249	16,486.00	117.76
Am-241	284	5.49	249	303	18,583.00	132.74

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:39:08PM 5/6/2014

Calibration

Sample Name: IC-9793;AV9-20140505
Description:
Detector: AV9

Calibration Date: 5/6/2014 5:39:04PM
Analyst: 60040

Source Info

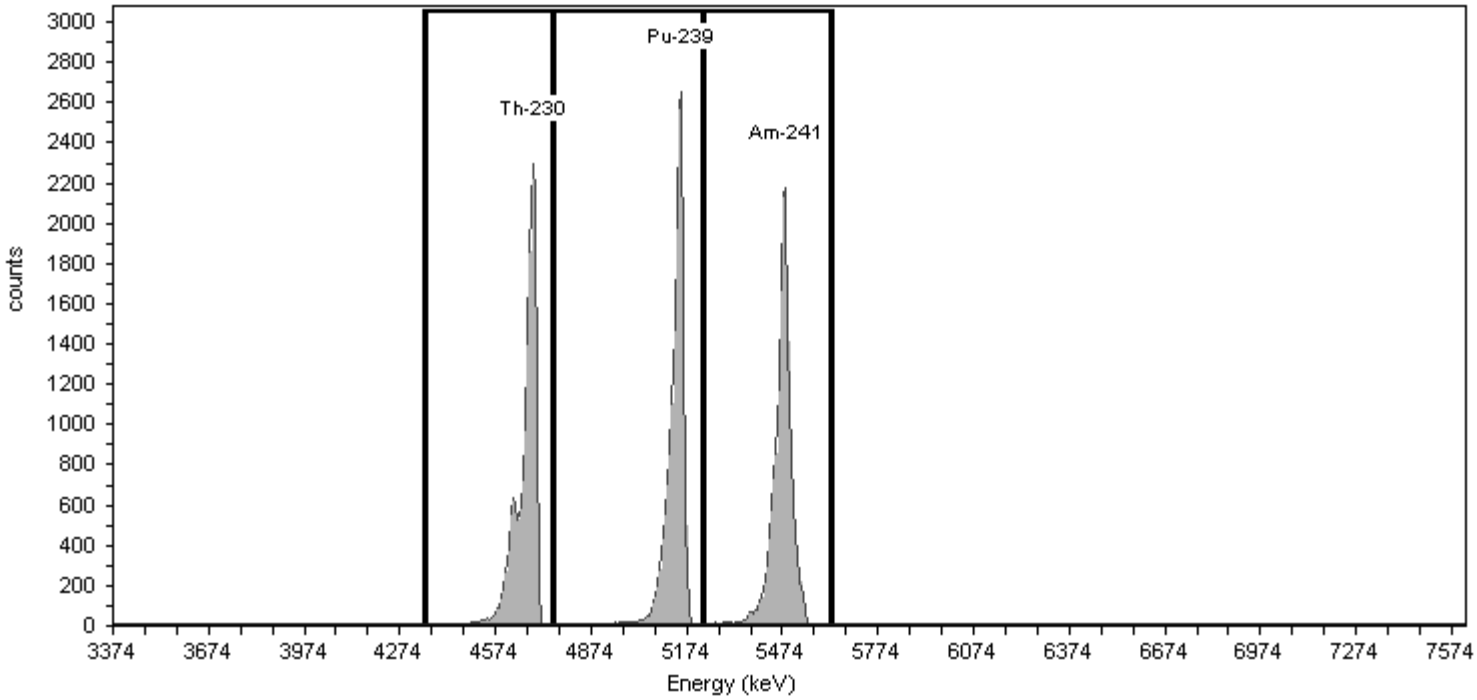
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV9 , SN: 51-082V5
Acquisition Start Date: 5/5/2014 10:27:25PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 27.04% +/- 0.33% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,917.00	106.55
Pu-239	240	5.16	186	249	15,566.00	111.19
Am-241	284	5.49	249	303	15,020.00	107.29

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:39:13PM 5/6/2014

Calibration

Sample Name: IC-9794;AV10-20140505
Description:
Detector: AV10

Calibration Date: 5/6/2014 5:39:10PM
Analyst: 60040

Source Info

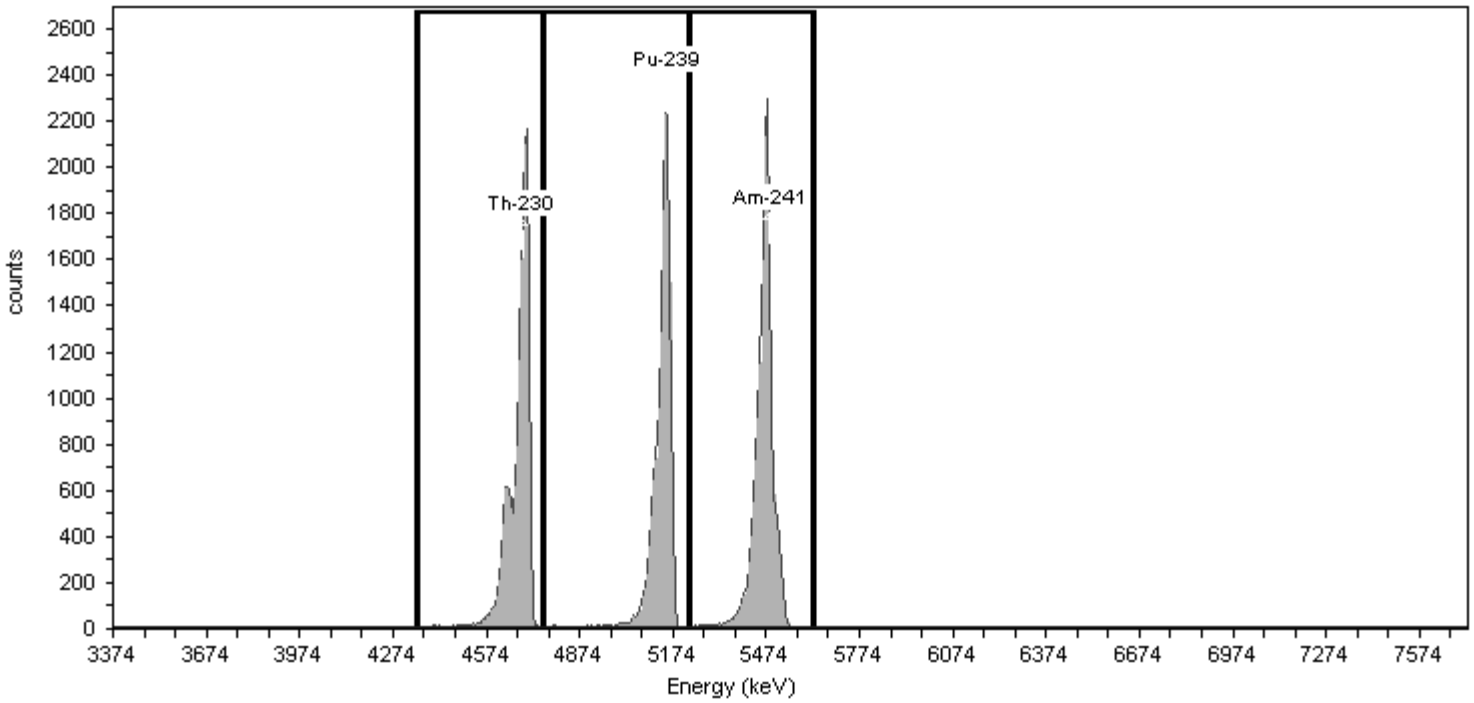
Certificate ID: 82242-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV10 , SN: 49-155N2
Acquisition Start Date: 5/5/2014 10:27:48PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 25.84% +/- 0.32% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,216.00	101.54
Pu-239	240	5.16	186	249	13,923.00	99.45
Am-241	284	5.49	249	303	15,497.00	110.69

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:39:19PM 5/6/2014

Calibration

Sample Name: IC-9795;AV11-20140505
Description:
Detector: AV11

Calibration Date: 5/6/2014 5:39:16PM
Analyst: 60040

Source Info

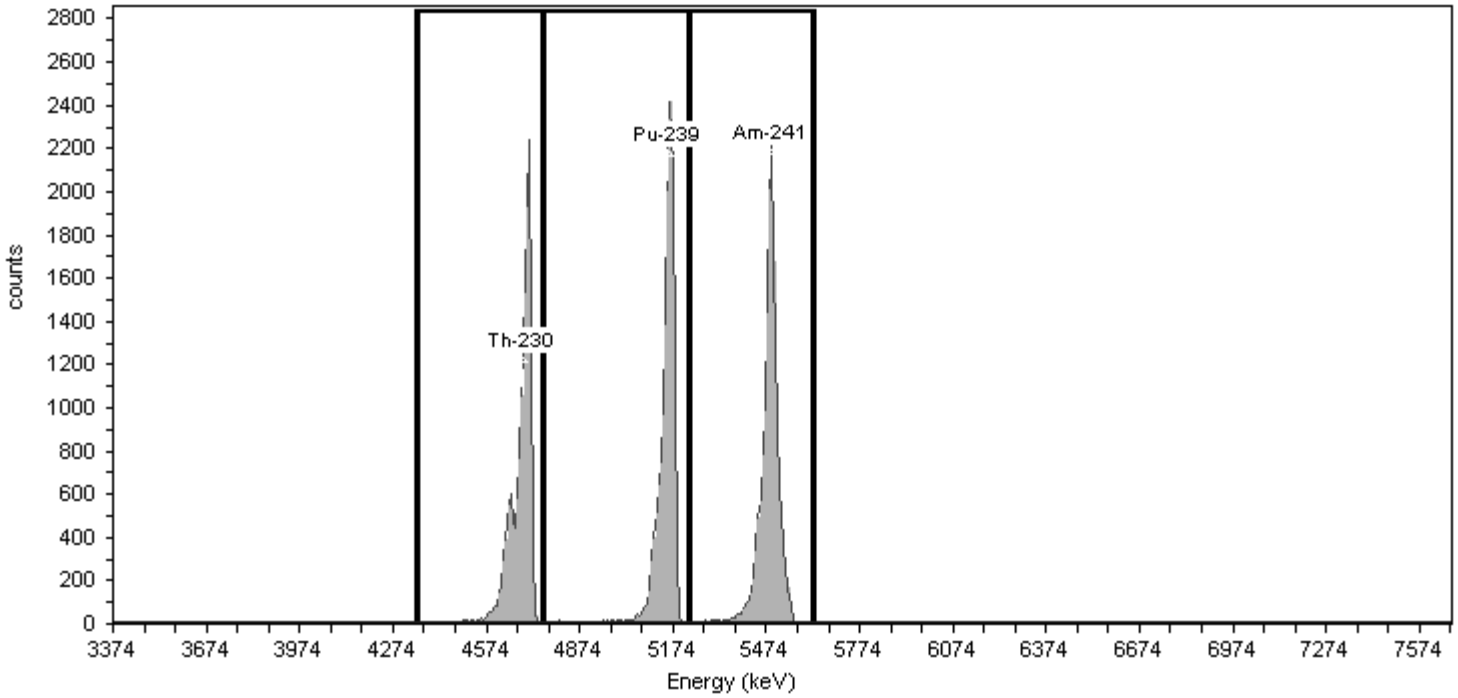
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV11 , SN: 49-155dd2
Acquisition Start Date: 5/5/2014 10:27:49PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 26.88% +/- 0.35% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	13,230.00	94.50
Pu-239	240	5.16	186	249	13,518.00	96.56
Am-241	284	5.49	249	303	14,326.00	102.33

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:39:25PM 5/6/2014

Calibration

Sample Name: IC-9817;AV12-20140505
Description:
Detector: AV12

Calibration Date: 5/6/2014 5:39:22PM
Analyst: 60040

Source Info

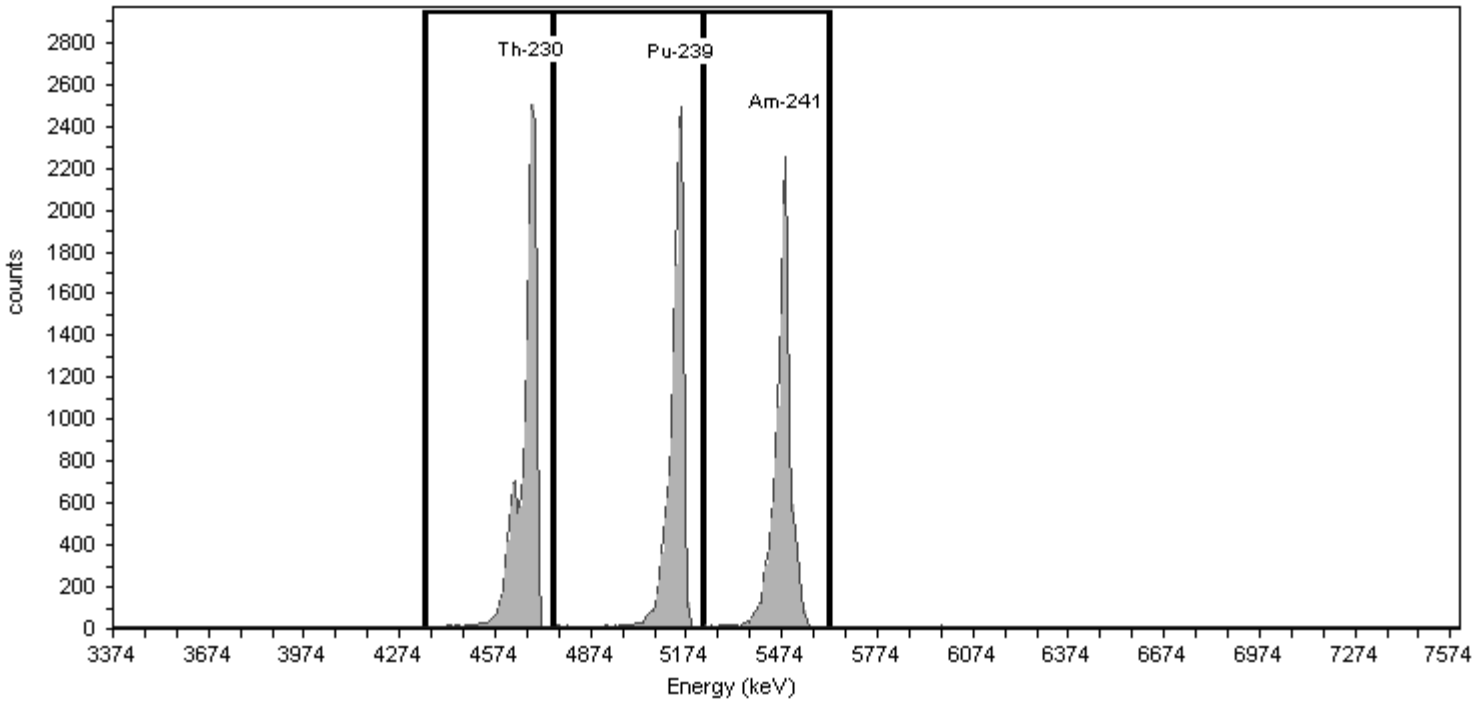
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV12 , SN: 51-082B7
Acquisition Start Date: 5/5/2014 10:28:07PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 25.97% +/- 0.31% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	16,108.00	115.06
Pu-239	240	5.16	186	249	14,620.00	104.43
Am-241	284	5.49	249	303	14,921.00	106.58

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:39:31PM 5/6/2014

Calibration

Sample Name: IC-9884;AV13-20140505
Description:
Detector: AV13

Calibration Date: 5/6/2014 5:39:28PM
Analyst: 60040

Source Info

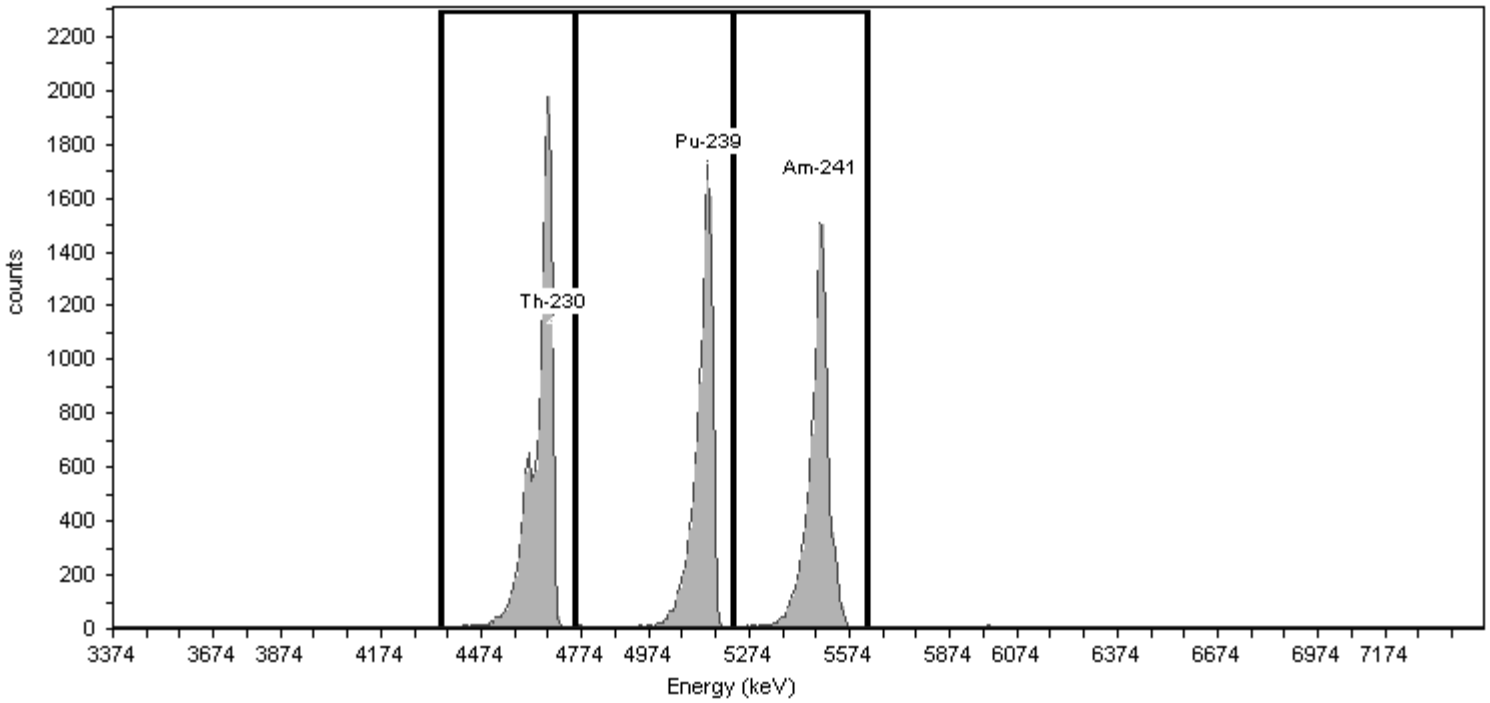
Certificate ID: 82245-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV13 , SN: 49-155M7
Acquisition Start Date: 5/5/2014 10:28:26PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 25.99% +/- 0.37% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,614.00	104.39
Pu-239	240	5.16	186	249	11,970.00	85.50
Am-241	284	5.49	249	303	11,995.00	85.68

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:39:39PM 5/6/2014

Calibration

Sample Name: IC-9885;AV14-20140505
Description:
Detector: AV14

Calibration Date: 5/6/2014 5:39:36PM
Analyst: 60040

Source Info

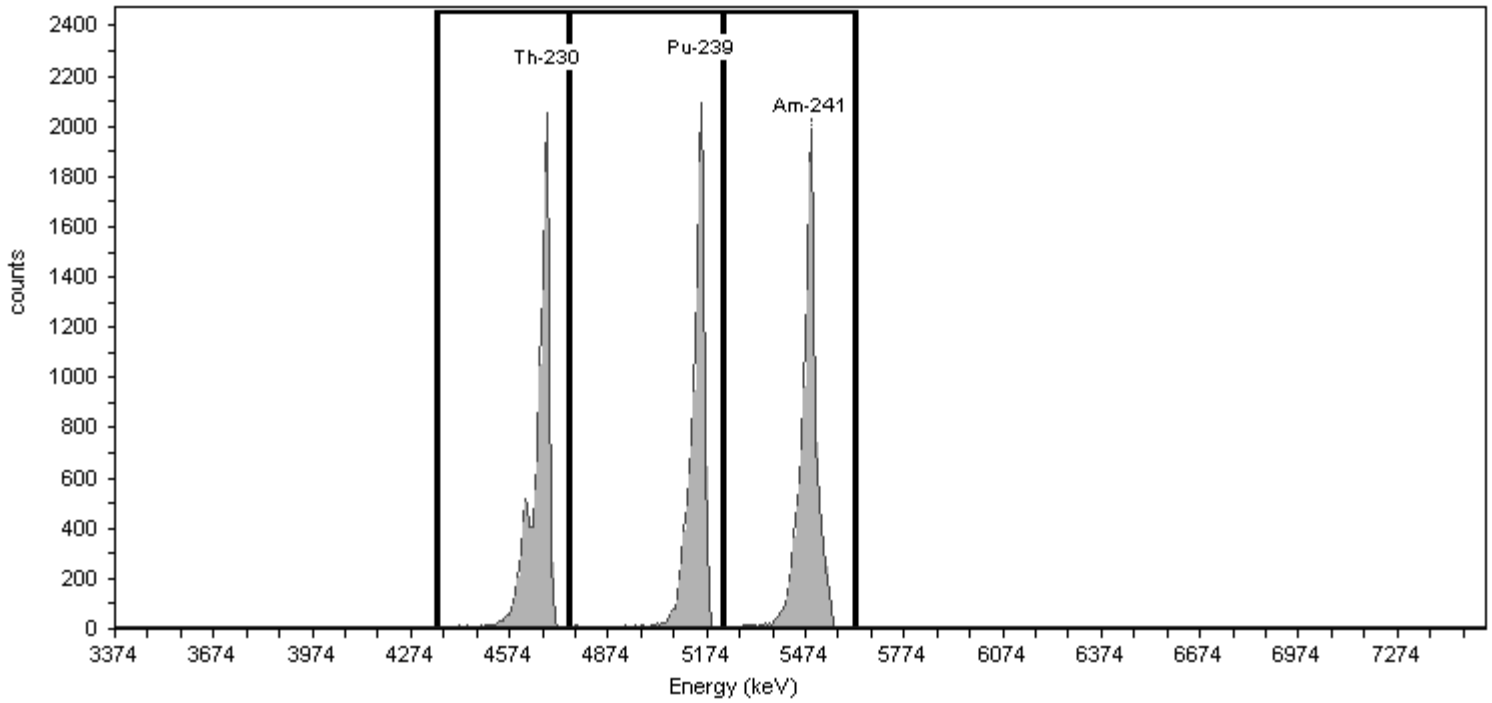
Certificate ID: 82246-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV14 , SN: 50-060W4
Acquisition Start Date: 5/5/2014 10:28:28PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 26.34% +/- 0.38% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	12,270.00	87.64
Pu-239	240	5.16	186	249	11,900.00	85.00
Am-241	284	5.49	249	303	13,210.00	94.36

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:39:45PM 5/6/2014

Calibration

Sample Name: IC-9886;AV15-20140505
Description:
Detector: AV15

Calibration Date: 5/6/2014 5:39:42PM
Analyst: 60040

Source Info

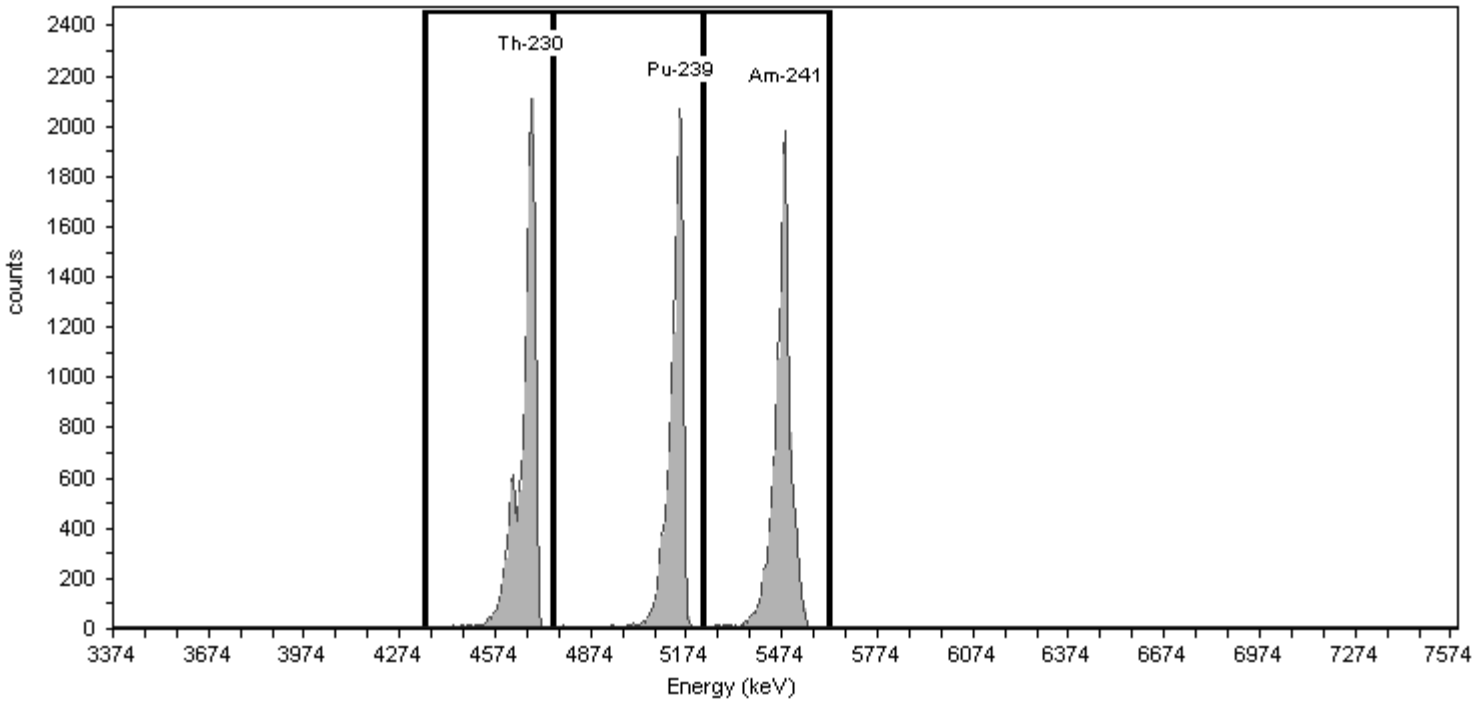
Certificate ID: 82247-334
Prepared by: Analytics

Certification Date: 6/10/2010 12:00:00PM
Description:

Acquisition

Detector: AV15 , SN: 41-172C5
Acquisition Start Date: 5/5/2014 10:28:49PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 25.62% +/- 0.34% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	13,308.00	95.06
Pu-239	240	5.16	186	249	12,470.00	89.07
Am-241	284	5.49	249	303	13,519.00	96.56

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:08:45PM 5/5/2014

Calibration

Sample Name: IC-7107;AV16-20140505
Description:
Detector: AV16

Calibration Date: 5/5/2014 10:08:41PM
Analyst: 60040

Source Info

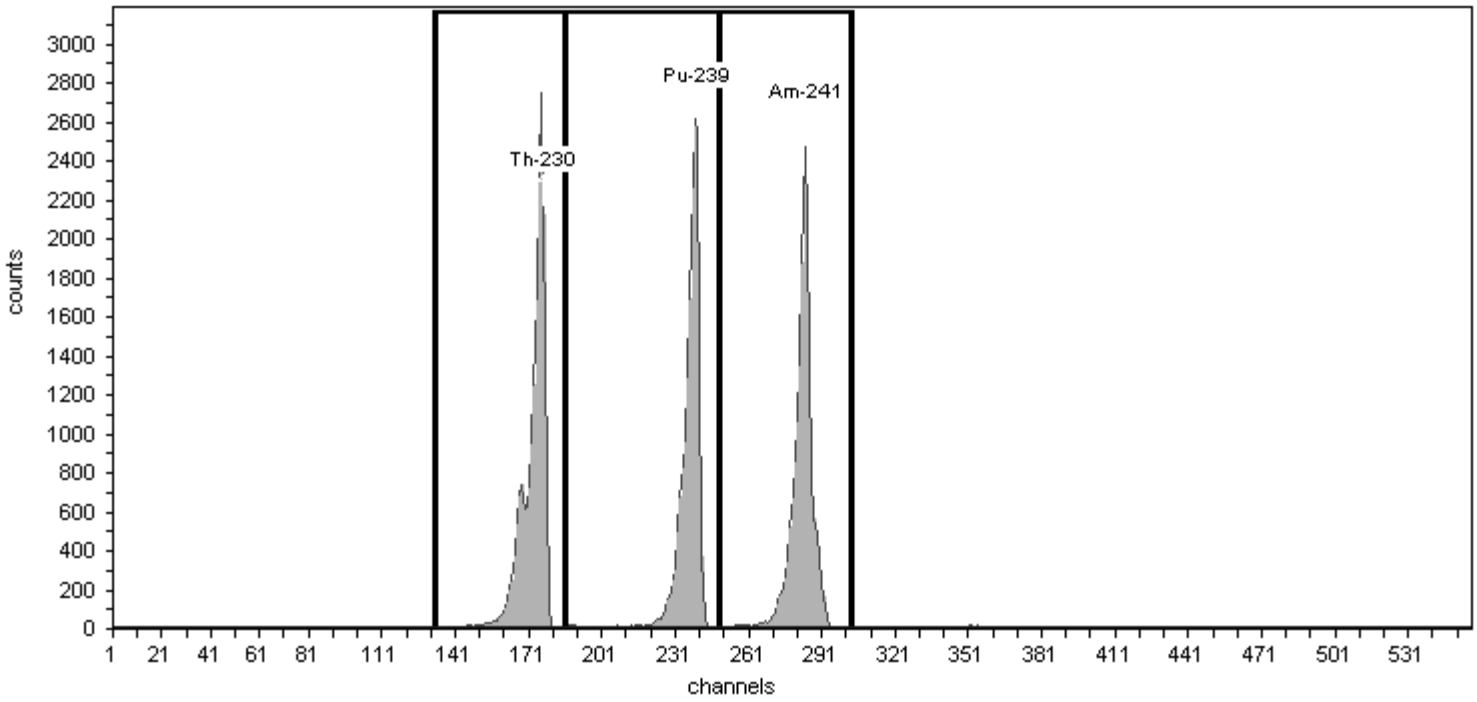
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV16 , SN: 51-082B6
Acquisition Start Date: 5/5/2014 7:27:49PM
Live Time: 140.00 min.
Real Time: 140.02 min.
Efficiency: 27.11% +/- 0.30% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	17,234.00	123.10
Pu-239	240	5.16	186	249	16,511.00	117.94
Am-241	284	5.49	249	303	16,391.00	117.08

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:08:53PM 5/5/2014

Calibration

Sample Name: IC-8874;AV17-20140505
Description:
Detector: AV17

Calibration Date: 5/5/2014 10:08:49PM
Analyst: 60040

Source Info

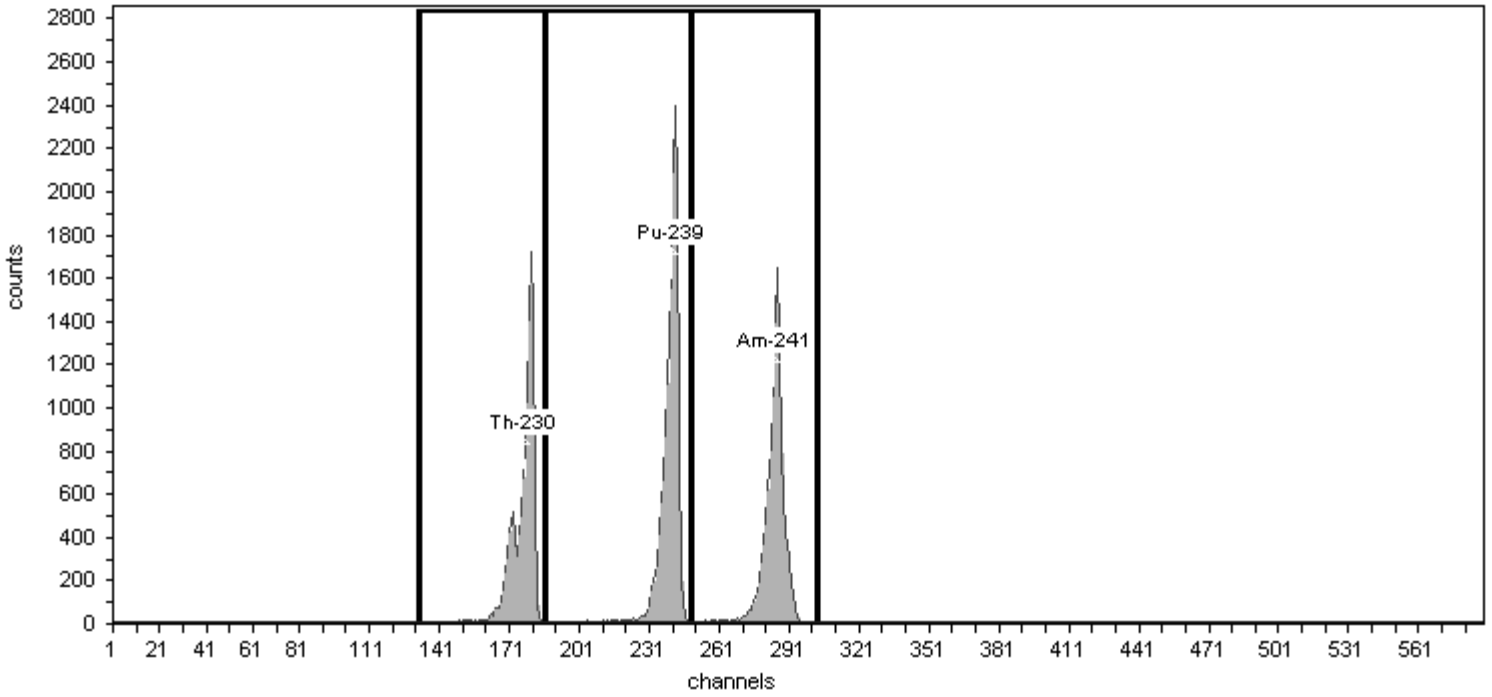
Certificate ID: 82233-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV17 , SN: 50-051C4
Acquisition Start Date: 5/5/2014 7:28:08PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 26.07% +/- 0.37% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	10,563.00	75.45
Pu-239	240	5.16	186	249	13,740.00	98.14
Am-241	284	5.49	249	303	10,934.00	78.10

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:09:15PM 5/5/2014

Calibration

Sample Name: IC-8875;AV18-20140505
Description:
Detector: AV18

Calibration Date: 5/5/2014 10:09:08PM
Analyst: 60040

Source Info

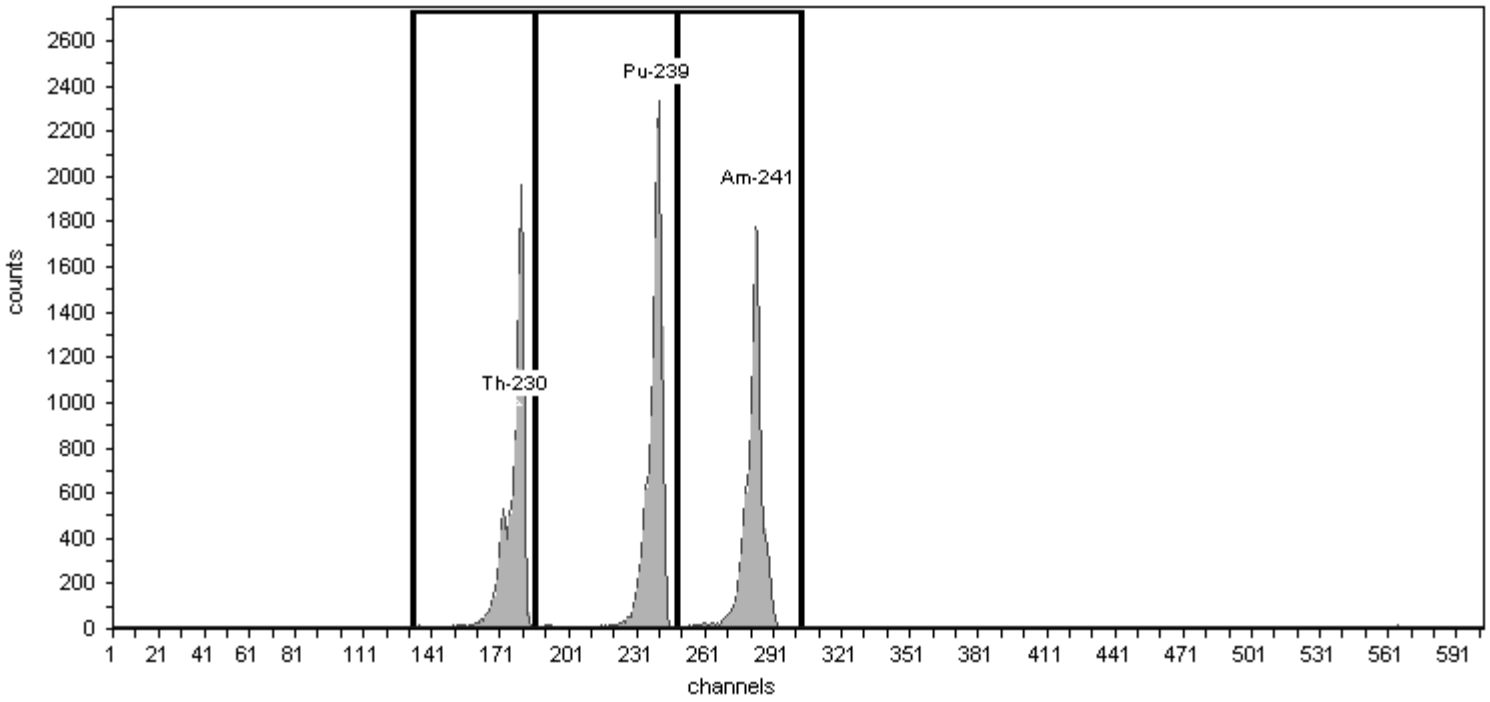
Certificate ID: 82234-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV18 , SN: 51-082C5
Acquisition Start Date: 5/5/2014 7:28:19PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 25.46% +/- 0.36% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	11,763.00	84.02
Pu-239	240	5.16	186	249	13,227.00	94.48
Am-241	284	5.49	249	303	11,935.00	85.25

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:09:08PM 5/5/2014

Calibration

Sample Name: IC-8876;AV19-20140505
Description:
Detector: AV19

Calibration Date: 5/5/2014 10:09:02PM
Analyst: 60040

Source Info

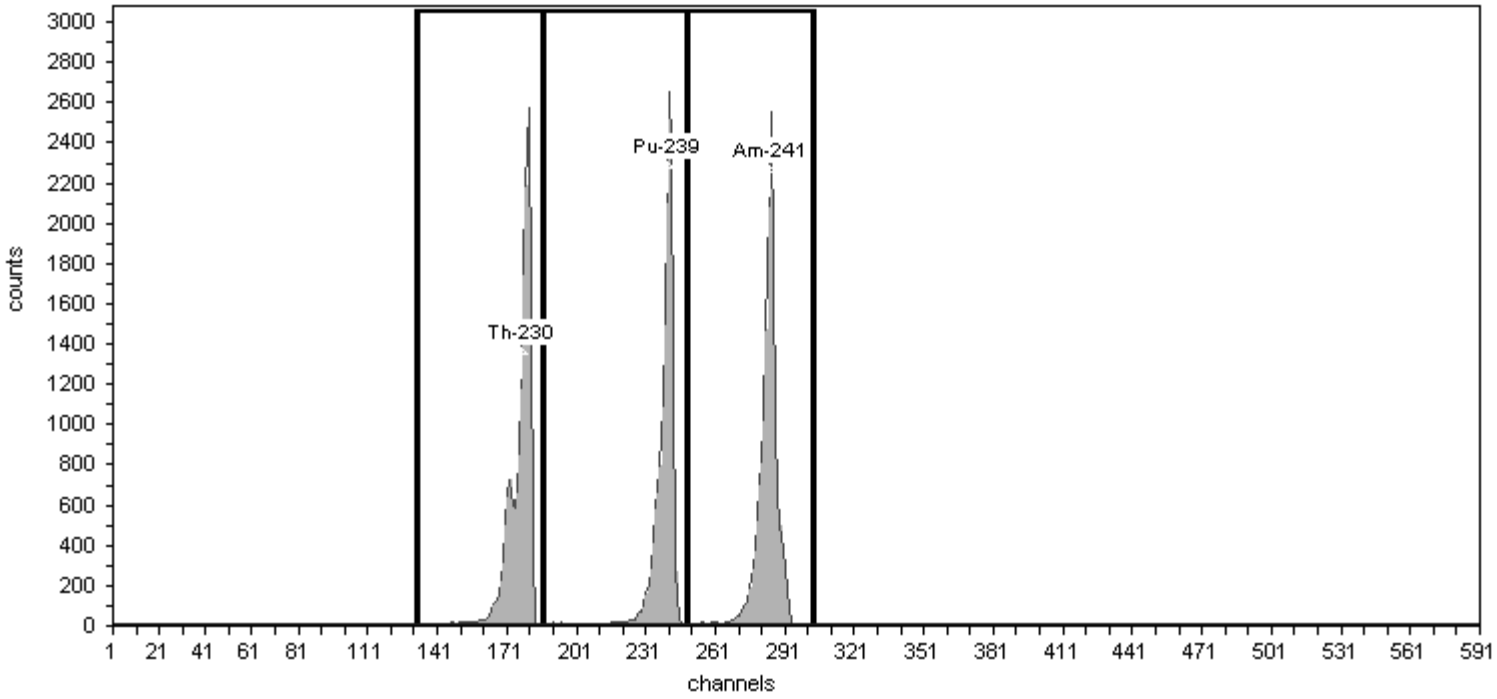
Certificate ID: 82235-334
Prepared by: Analytics

Certification Date: 6/4/2010 12:00:00PM
Description:

Acquisition

Detector: AV19 , SN: 50-025FF5
Acquisition Start Date: 5/5/2014 7:28:32PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 25.34% +/- 0.30% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	15,406.00	110.04
Pu-239	240	5.16	186	249	14,896.00	106.40
Am-241	284	5.49	249	303	15,462.00	110.44

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:09:25PM 5/5/2014

Calibration

Sample Name: IC-8877;AV20-20140505
Description:
Detector: AV20

Calibration Date: 5/5/2014 10:09:21PM
Analyst: 60040

Source Info

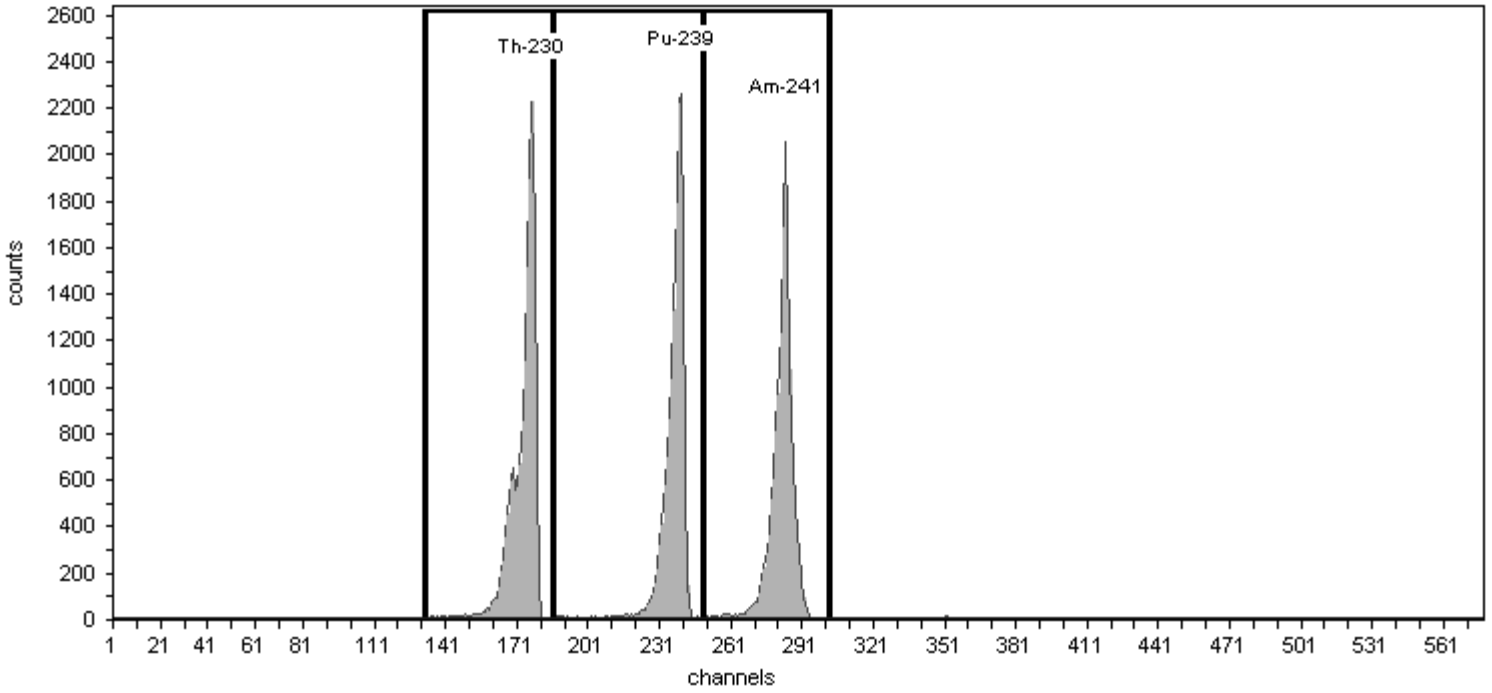
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV20 , SN: 48-121A7
Acquisition Start Date: 5/5/2014 7:28:49PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 25.56% +/- 0.31% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	15,158.00	108.27
Pu-239	240	5.16	186	249	14,844.00	106.03
Am-241	284	5.49	249	303	14,347.00	102.48

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:09:32PM 5/5/2014

Calibration

Sample Name: IC-9520;AV21-20140505
Description:
Detector: AV21

Calibration Date: 5/5/2014 10:09:29PM
Analyst: 60040

Source Info

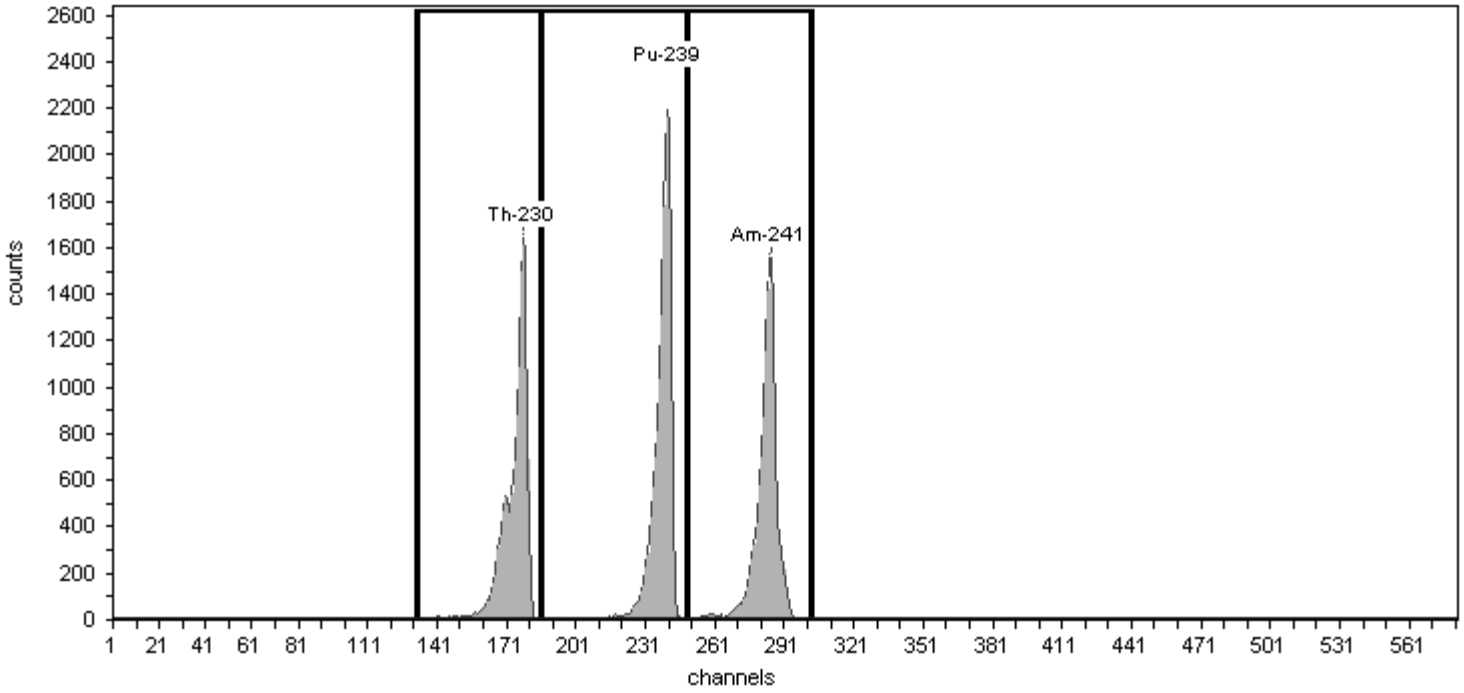
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV21 , SN: 48-102BB6
Acquisition Start Date: 5/5/2014 7:28:59PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 25.45% +/- 0.35% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	12,288.00	87.77
Pu-239	240	5.16	186	249	14,166.00	101.19
Am-241	284	5.49	249	303	11,709.00	83.64

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:09:39PM 5/5/2014

Calibration

Sample Name: IC-9792;AV23-20140505
Description:
Detector: AV23

Calibration Date: 5/5/2014 10:09:35PM
Analyst: 60040

Source Info

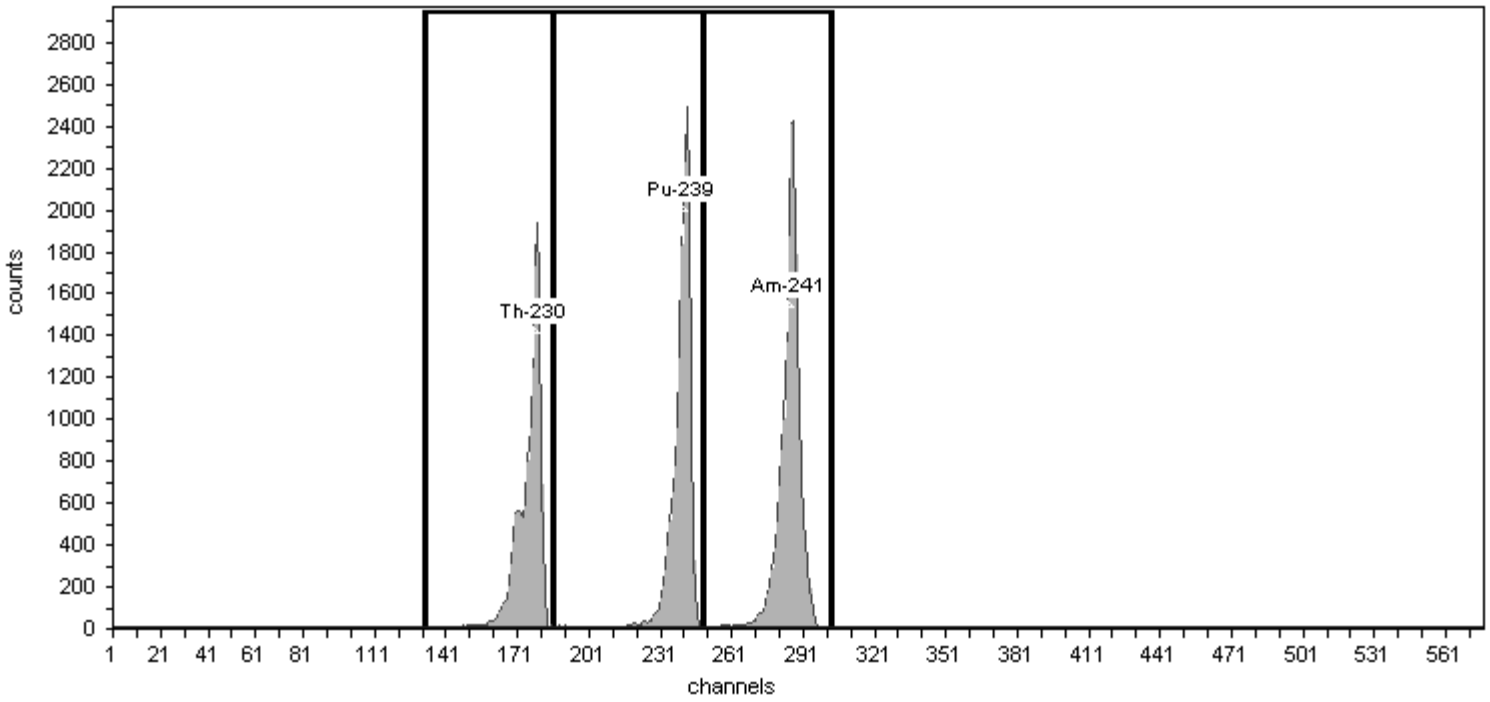
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV23 , SN: 48-158FF3
Acquisition Start Date: 5/5/2014 7:29:20PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 25.91% +/- 0.30% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	13,616.00	97.26
Pu-239	240	5.16	186	249	15,817.00	112.98
Am-241	284	5.49	249	303	17,844.00	127.46

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:09:45PM 5/5/2014

Calibration

Sample Name: IC-9793;AV24-20140505
Description:
Detector: AV24

Calibration Date: 5/5/2014 10:09:41PM
Analyst: 60040

Source Info

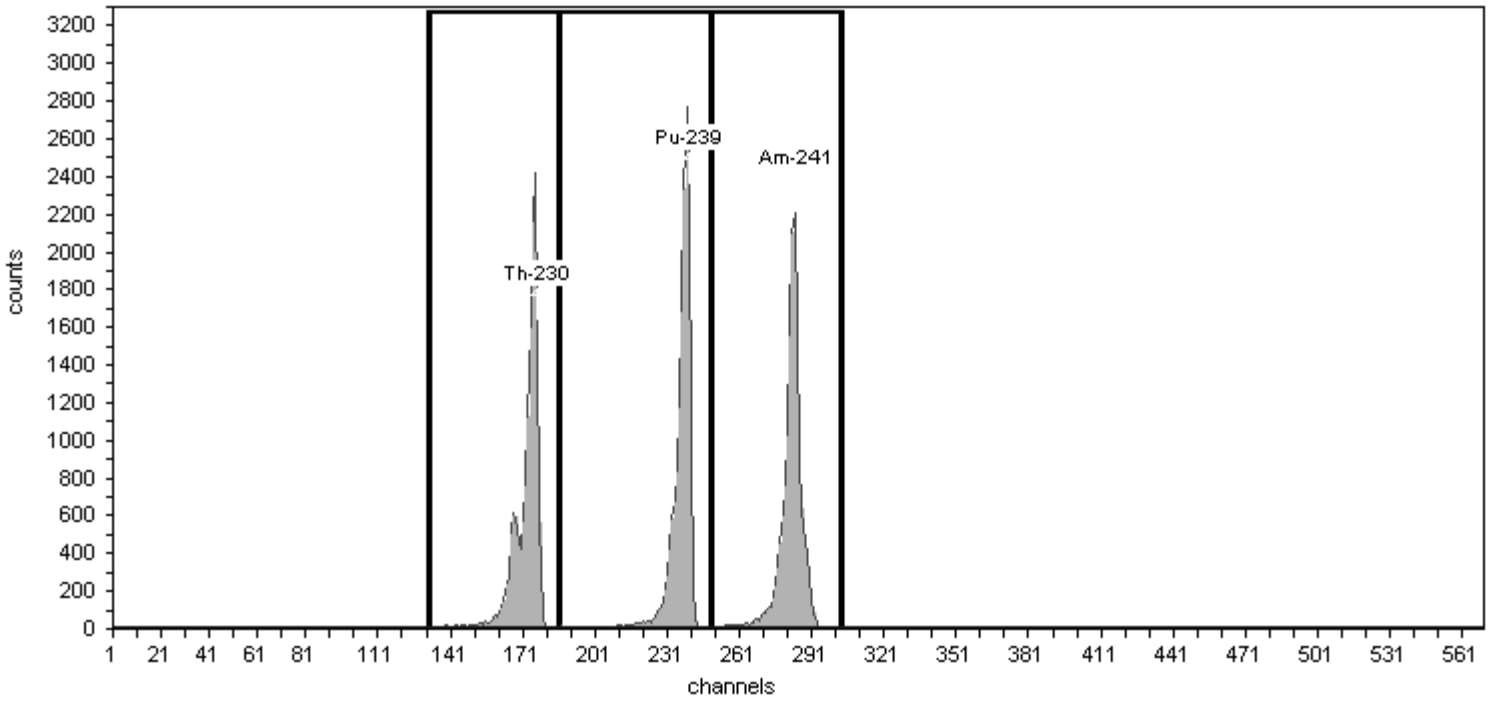
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV24 , SN: 47-137Q4
Acquisition Start Date: 5/5/2014 7:29:33PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 26.42% +/- 0.32% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,605.00	104.32
Pu-239	240	5.16	186	249	15,233.00	108.81
Am-241	284	5.49	249	303	14,607.00	104.34

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:09:51PM 5/5/2014

Calibration

Sample Name: IC-9794;AV43-20140505
Description:
Detector: AV43

Calibration Date: 5/5/2014 10:09:47PM
Analyst: 60040

Source Info

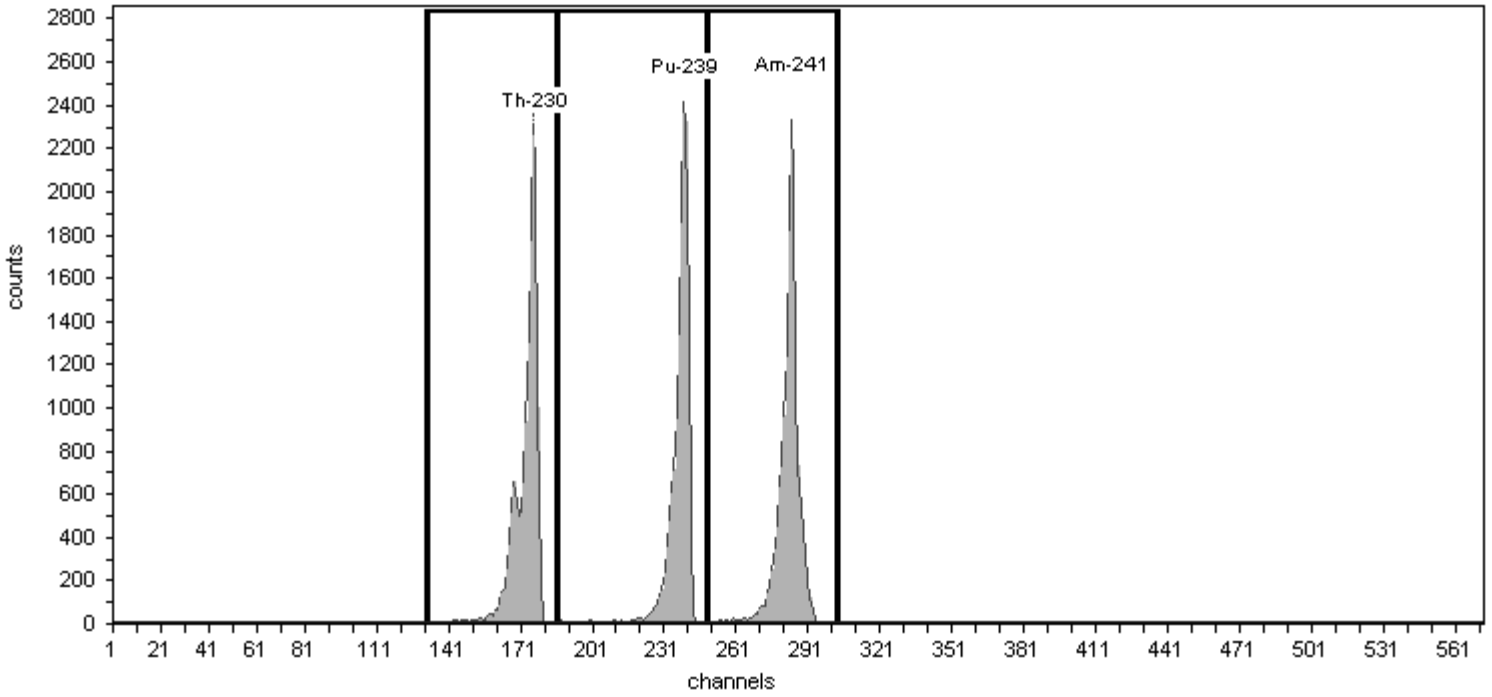
Certificate ID: 82242-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV43 , SN: 49-190X4
Acquisition Start Date: 5/5/2014 7:30:02PM
Live Time: 140.00 min.
Real Time: 140.08 min.
Efficiency: 25.74% +/- 0.32% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,478.00	103.41
Pu-239	240	5.16	186	249	13,913.00	99.38
Am-241	284	5.49	249	303	15,090.00	107.79

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:10:00PM 5/5/2014

Calibration

Sample Name: IC-9795;AV44-20140505
Description:
Detector: AV44

Calibration Date: 5/5/2014 10:09:57PM
Analyst: 60040

Source Info

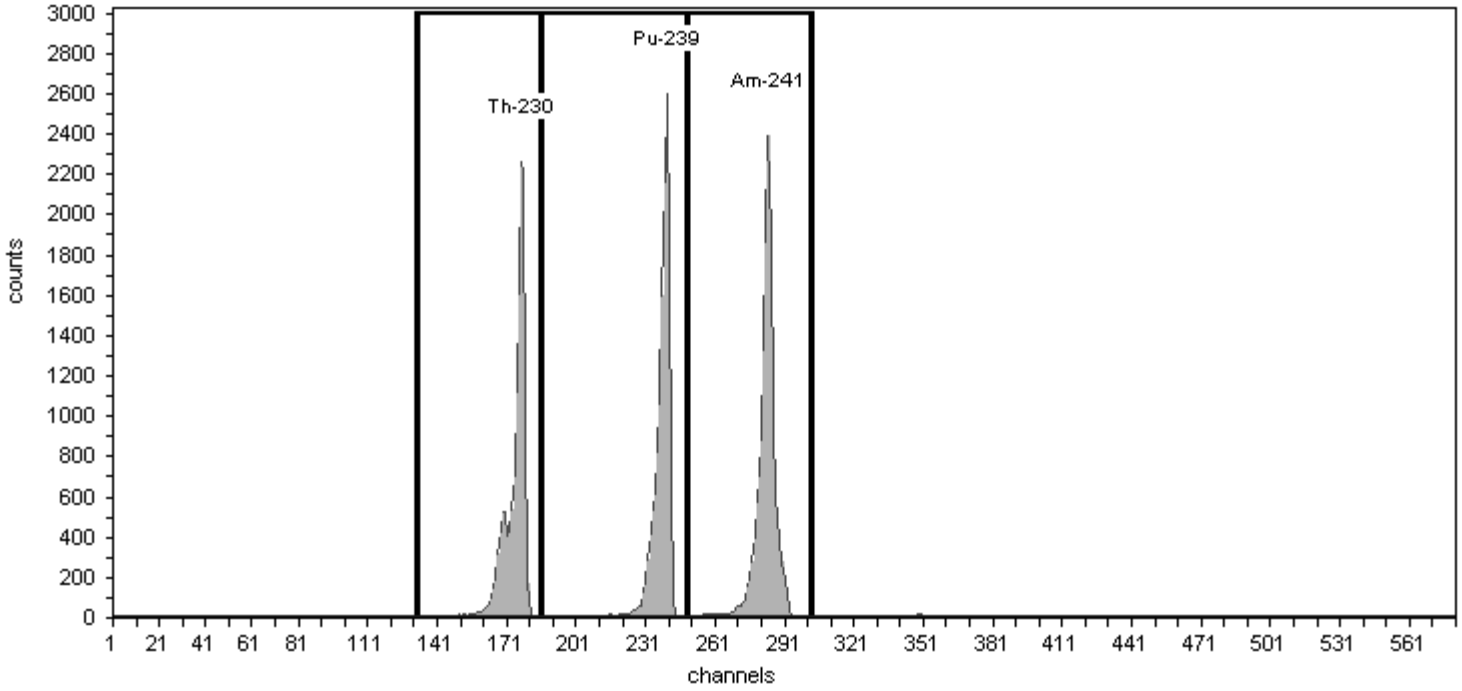
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV44 , SN: 50-051JJ1
Acquisition Start Date: 5/5/2014 7:30:18PM
Live Time: 140.00 min.
Real Time: 140.08 min.
Efficiency: 26.32% +/- 0.35% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	12,875.00	91.96
Pu-239	240	5.16	186	249	13,229.00	94.49
Am-241	284	5.49	249	303	14,113.00	100.81

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:10:06PM 5/5/2014

Calibration

Sample Name: IC-9817;AV45-20140505
Description:
Detector: AV45

Calibration Date: 5/5/2014 10:10:03PM
Analyst: 60040

Source Info

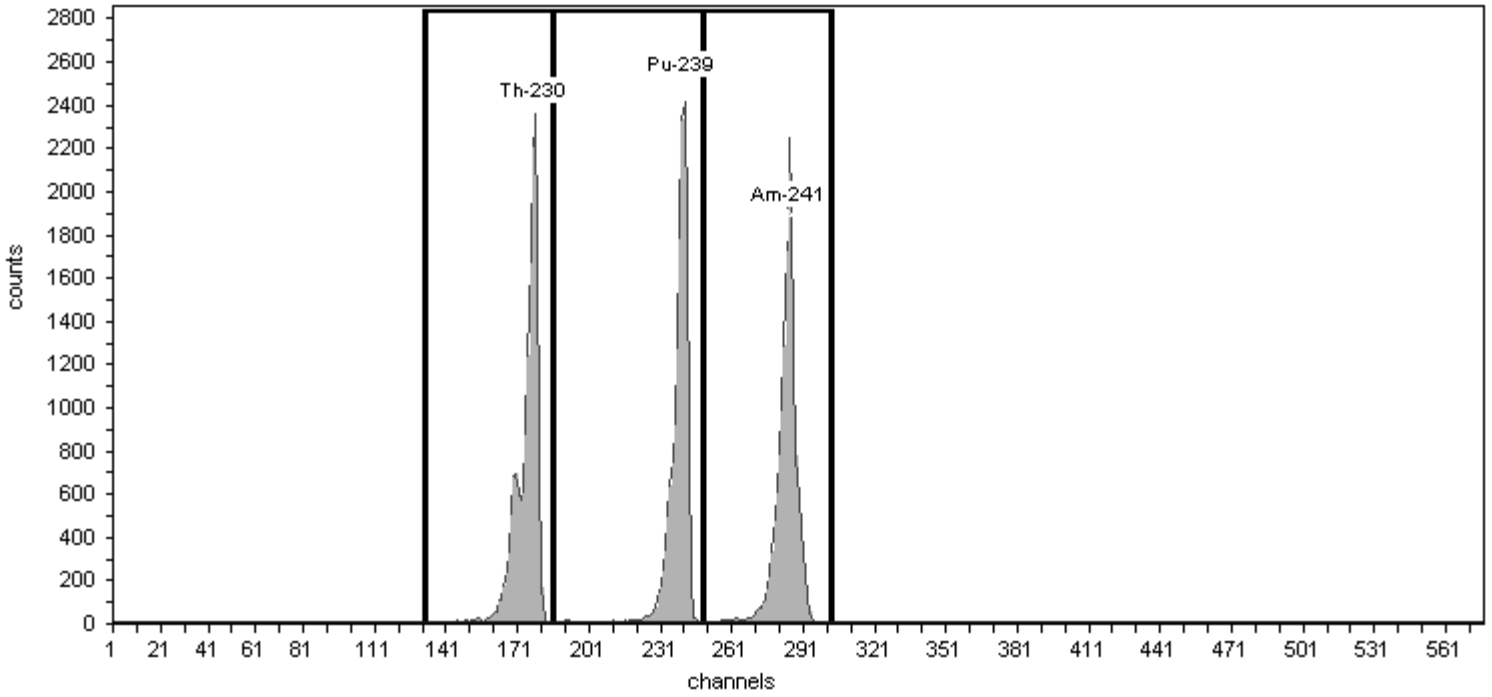
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV45 , SN: 48-158FF2
Acquisition Start Date: 5/5/2014 7:30:35PM
Live Time: 140.00 min.
Real Time: 140.08 min.
Efficiency: 26.06% +/- 0.31% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	16,022.00	114.44
Pu-239	240	5.16	186	249	14,730.00	105.21
Am-241	284	5.49	249	303	15,078.00	107.70

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:10:13PM 5/5/2014

Calibration

Sample Name: IC-9884;AV46-20140505
Description:
Detector: AV46

Calibration Date: 5/5/2014 10:10:09PM
Analyst: 60040

Source Info

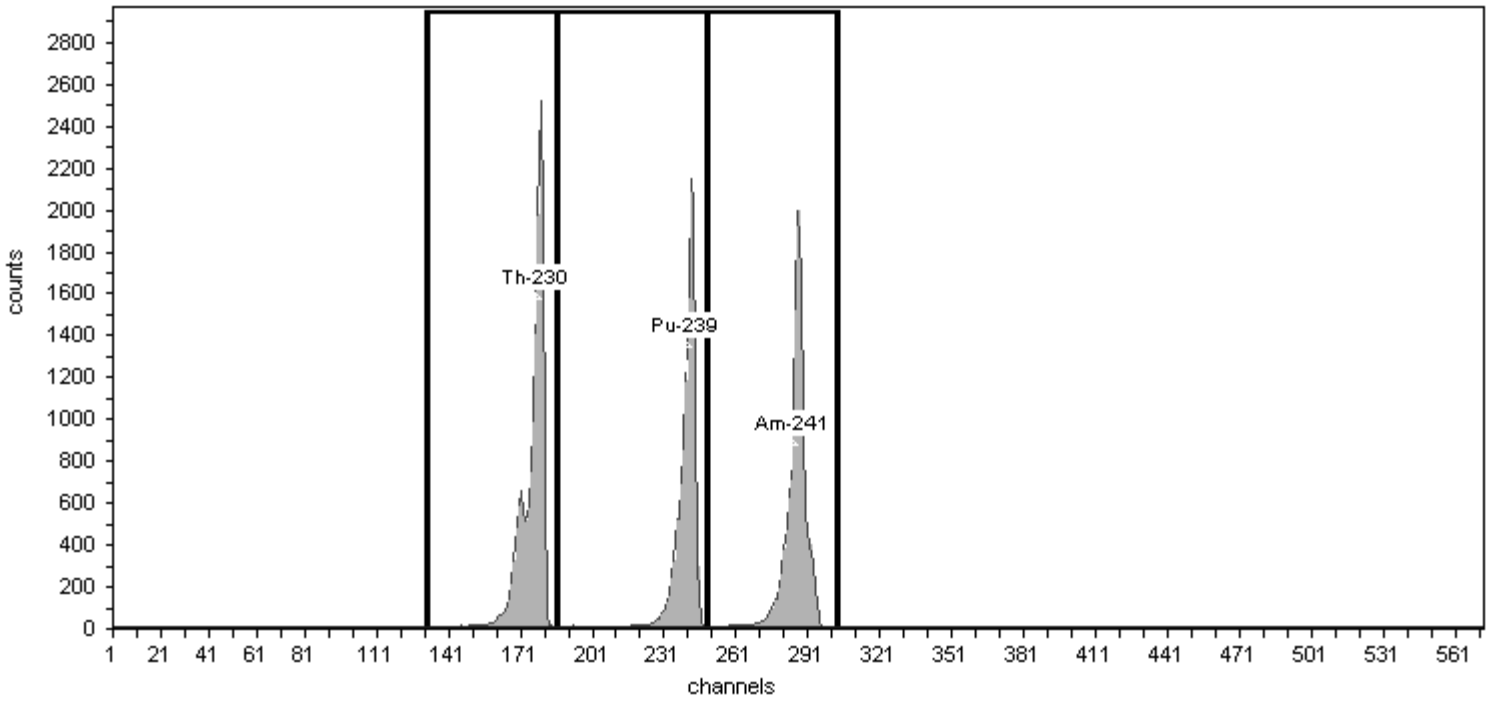
Certificate ID: 82245-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV46 , SN: 49-202GG2
Acquisition Start Date: 5/5/2014 7:30:55PM
Live Time: 140.00 min.
Real Time: 140.08 min.
Efficiency: 26.80% +/- 0.38% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,928.00	106.63
Pu-239	240	5.16	186	249	12,228.00	87.34
Am-241	284	5.49	249	303	12,660.00	90.43

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:52:45PM 5/5/2014

Calibration

Sample Name: IC-7107;AV49-20140504
Description:
Detector: AV49

Calibration Date: 5/5/2014 6:52:38PM
Analyst: 60040

Source Info

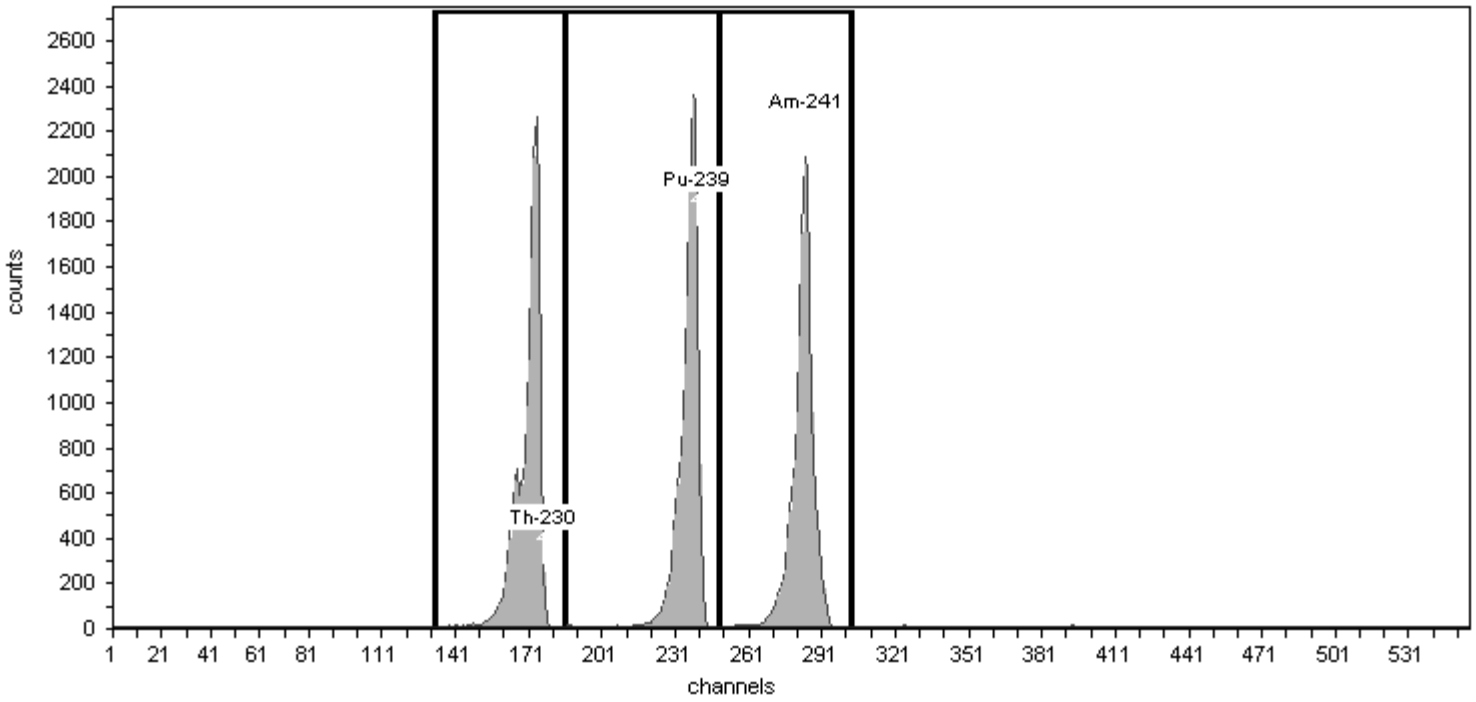
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV49 , SN: 47-043hh4
Acquisition Start Date: 5/4/2014 9:03:18PM
Live Time: 140.00 min.
Real Time: 140.03 min.
Efficiency: 26.53% +/- 0.30% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	16,670.00	119.07
Pu-239	240	5.16	186	249	16,300.00	116.43
Am-241	284	5.49	249	303	16,110.00	115.07

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:52:51PM 5/5/2014

Calibration

Sample Name: IC-8874;AV50-20140504
Description:
Detector: AV50

Calibration Date: 5/5/2014 6:52:48PM
Analyst: 60040

Source Info

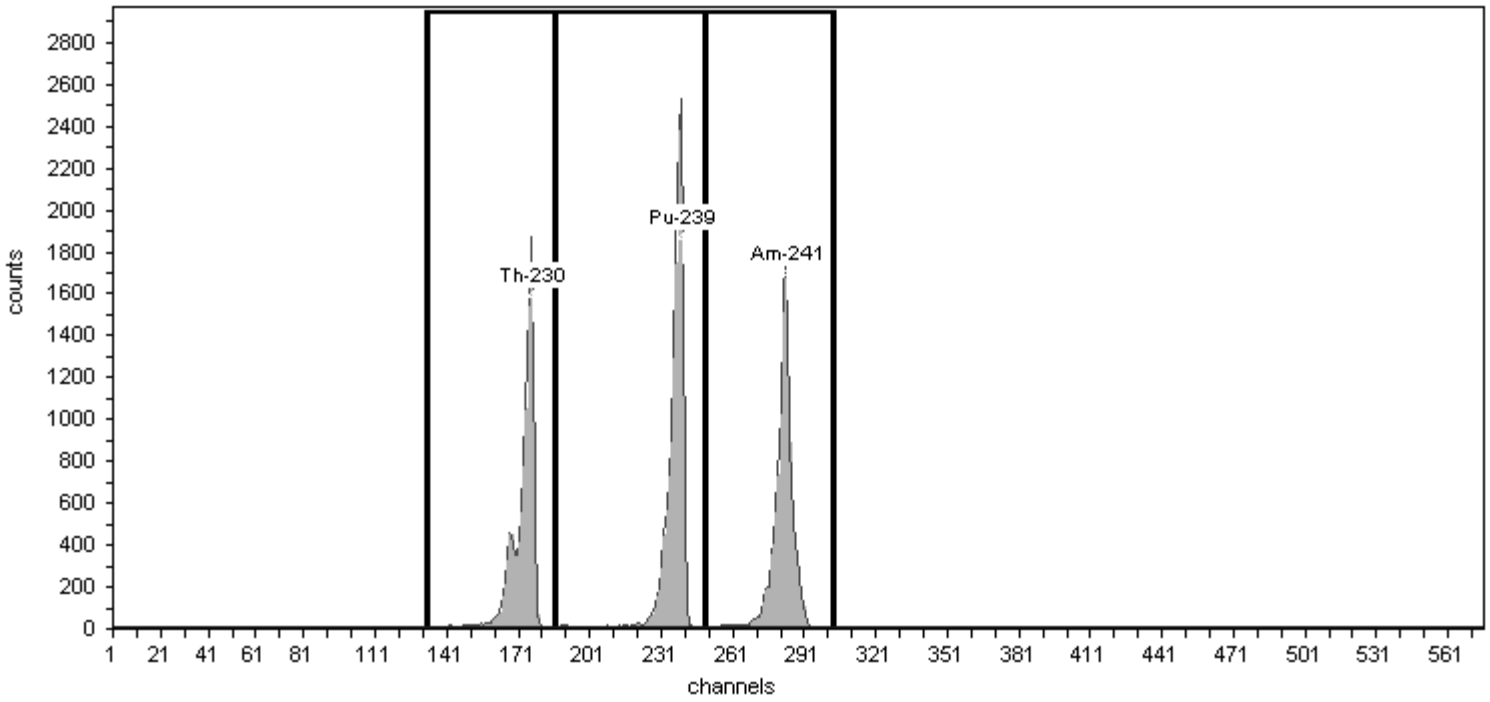
Certificate ID: 82233-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV50 , SN: 50-060W2
Acquisition Start Date: 5/4/2014 9:03:28PM
Live Time: 140.00 min.
Real Time: 140.03 min.
Efficiency: 26.93% +/- 0.38% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	10,897.00	77.84
Pu-239	240	5.16	186	249	14,009.00	100.06
Am-241	284	5.49	249	303	11,497.00	82.12

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:52:57PM 5/5/2014

Calibration

Sample Name: IC-8875;AV51-20140504
Description:
Detector: AV51

Calibration Date: 5/5/2014 6:52:53PM
Analyst: 60040

Source Info

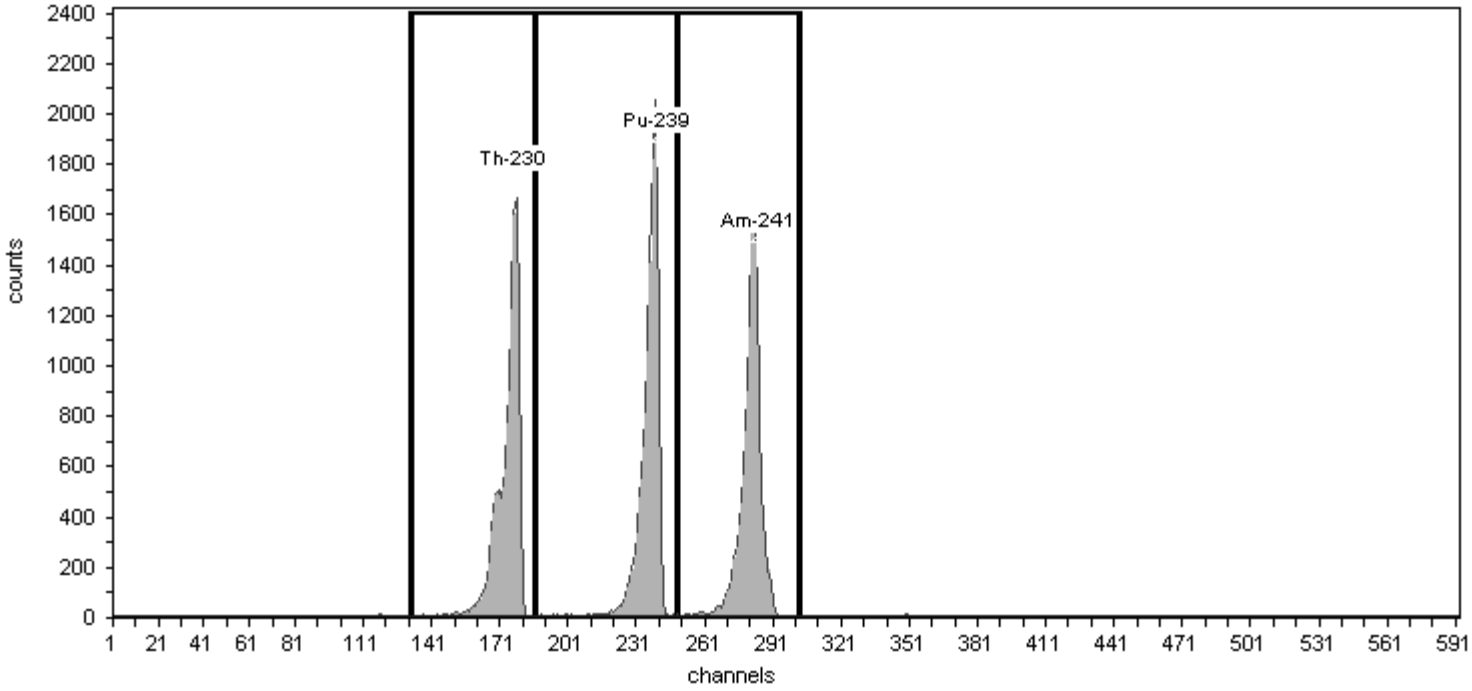
Certificate ID: 82234-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV51 , SN: 48-109I1
Acquisition Start Date: 5/4/2014 9:03:44PM
Live Time: 140.00 min.
Real Time: 140.12 min.
Efficiency: 26.24% +/- 0.36% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	12,176.00	86.97
Pu-239	240	5.16	186	249	13,518.00	96.56
Am-241	284	5.49	249	303	12,347.00	88.19

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:49:32PM 5/7/2014

Calibration

Sample Name: IC-9817;AV115-20140507
Description:
Detector: AV115

Calibration Date: 5/7/2014 10:49:29PM
Analyst: 60040

Source Info

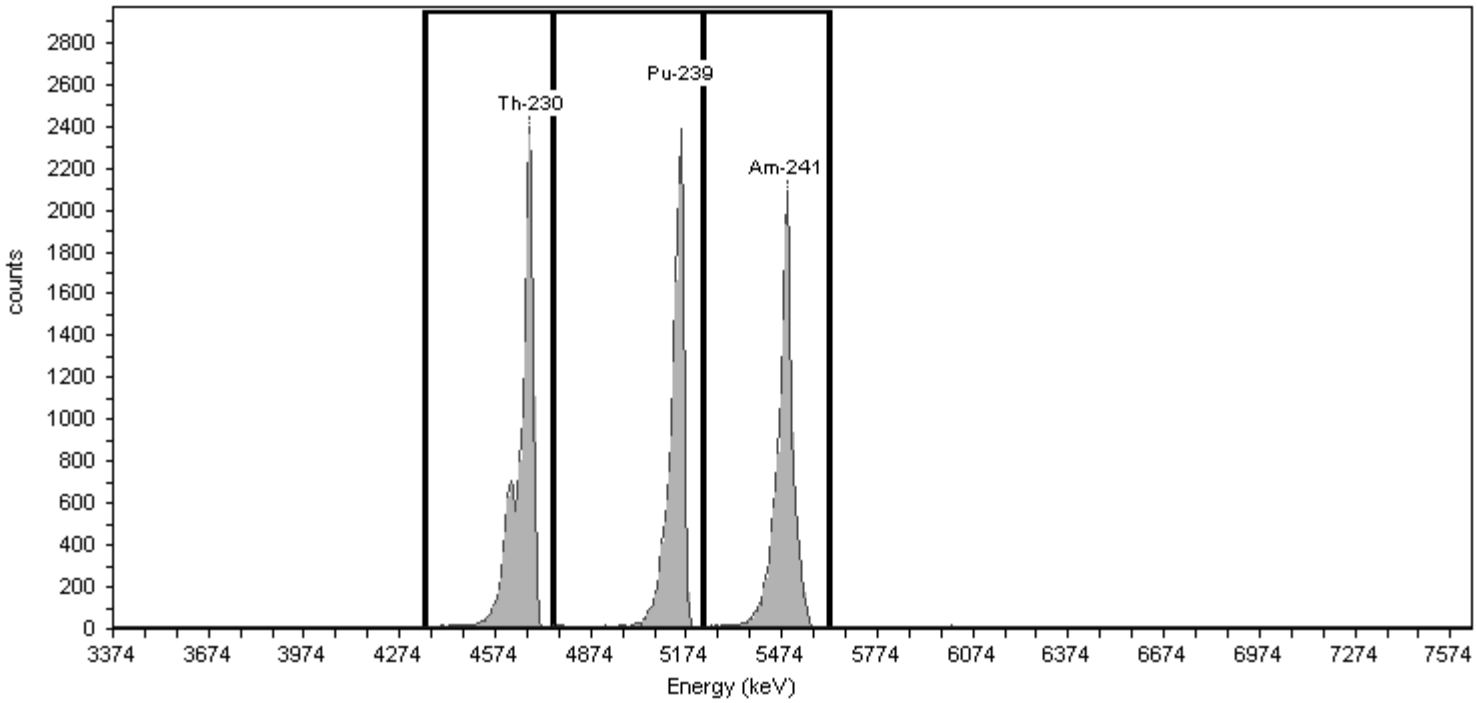
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV115 , SN: 49-037E4
Acquisition Start Date: 5/7/2014 7:52:44PM
Live Time: 140.00 min.
Real Time: 140.01 min.
Efficiency: 26.26% +/- 0.32% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	16,343.00	116.74
Pu-239	240	5.16	186	249	14,636.00	104.54
Am-241	284	5.49	249	303	15,191.00	108.51

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:17:01PM 5/1/2014

Calibration

Sample Name: IC-9792;AV116-20140430
Description:
Detector: AV116

Calibration Date: 5/1/2014 1:16:57PM
Analyst: 60040

Source Info

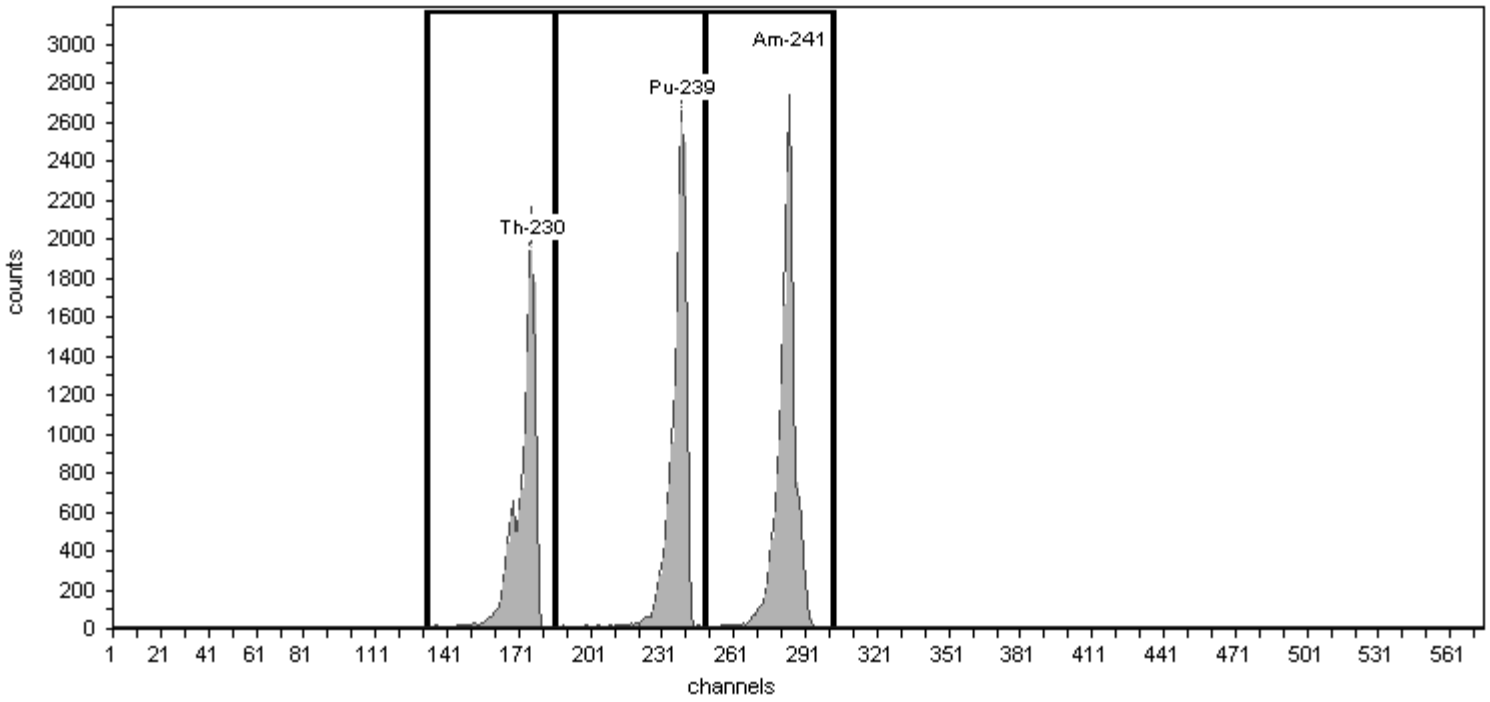
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV116 , SN: 49-034G1
Acquisition Start Date: 4/30/2014 10:55:12PM
Live Time: 140.00 min.
Real Time: 140.11 min.
Efficiency: 27.04% +/- 0.31% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,312.00	102.23
Pu-239	240	5.16	186	249	16,478.00	117.70
Am-241	284	5.49	249	303	18,564.00	132.60

Initial Calibration Verifications

Alpha Spectroscopy Calibration Summary

Detector: AV3

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120519/1	05/05/14 22:26	82234-334_00001	0.2609	0.20-0.32		
ICV 160-120855/1	05/07/14 23:02	82233-334_00001	0.2696	0.20-0.32	103.3	95-105
CCV 160-127913/1	06/19/14 16:44	82234-334_00001	0.2566	0.20-0.32	98.3	95-105

Detector: AV4

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120520/1	05/05/14 22:26	82235-334_00001	0.2582	0.20-0.32		
ICV 160-120856/1	05/07/14 23:03	82234-334_00001	0.2599	0.20-0.32	100.6	95-105
CCV 160-127914/1	06/19/14 16:44	82235-334_00001	0.2590	0.20-0.32	100.3	95-105

Detector: AV6

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120521/1	05/05/14 22:26	82237-334_00003	0.2589	0.20-0.32		
ICV 160-120857/1	05/07/14 23:03	82236-334_00001	0.2622	0.20-0.32	101.3	95-105
CCV 160-127932/1	06/19/14 18:06	82237-334_00003	0.2606	0.20-0.32	100.7	95-105

Detector: AV7

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120843/1	05/07/14 19:51	82236-334_00001	0.2580	0.20-0.32		
ICV 160-120858/1	05/07/14 23:03	82237-334_00003	0.2546	0.20-0.32	98.6	95-105
CCV 160-127943/1	06/19/14 16:44	82236-334_00001	0.2549	0.20-0.32	98.8	95-105

Detector: AV8

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120523/1	05/05/14 22:27	82240-334_00001	0.2705	0.20-0.32		
ICV 160-121084/1	05/08/14 00:14	82234-334_00001	0.2639	0.20-0.32	97.6	95-105
CCV 160-127954/1	06/19/14 18:06	82240-334_00001	0.2668	0.20-0.32	98.6	95-105

Detector: AV9

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120524/1	05/05/14 22:27	82241-334_00001	0.2704	0.20-0.32		
ICV 160-120859/1	05/07/14 23:03	82240-334_00001	0.2666	0.20-0.32	98.6	95-105
CCV 160-127962/1	06/19/14 18:06	82241-334_00001	0.2701	0.20-0.32	99.9	95-105

Detector: AV10

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120512/1	05/05/14 22:27	82242-334_00001	0.2584	0.20-0.32		
ICV 160-120847/1	05/07/14 23:03	82241-334_00001	0.2593	0.20-0.32	100.3	95-105
CCV 160-127860/1	06/19/14 18:06	82242-334_00001	0.2552	0.20-0.32	98.7	95-105

Detector: AV11

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120513/1	05/05/14 22:27	82243-334_00001	0.2688	0.20-0.32		
ICV 160-120848/1	05/07/14 23:04	82242-334_00001	0.2598	0.20-0.32	96.6	95-105
CCV 160-127871/1	06/19/14 18:07	82243-334_00001	0.2647	0.20-0.32	98.5	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV12

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120514/1	05/05/14 22:28	82244-334_00001	0.2597	0.20-0.32		
ICV 160-120849/1	05/07/14 23:04	82243-334_00001	0.2688	0.20-0.32	103.5	95-105
CCV 160-127881/1	06/19/14 18:07	82244-334_00001	0.2583	0.20-0.32	99.5	95-105

Detector: AV13

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120515/1	05/05/14 22:28	82245-334_00001	0.2599	0.20-0.32		
ICV 160-120850/1	05/07/14 23:04	82244-334_00001	0.2556	0.20-0.32	98.4	95-105
CCV 160-127892/1	06/19/14 19:45	82245-334_00001	0.2566	0.20-0.32	98.7	95-105

Detector: AV14

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120516/1	05/05/14 22:28	82246-334_00001	0.2634	0.20-0.32		
ICV 160-120851/1	05/07/14 23:04	82245-334_00001	0.2665	0.20-0.32	101.2	95-105
CCV 160-127902/1	06/19/14 18:08	82246-334_00001	0.2615	0.20-0.32	99.3	95-105

Detector: AV15

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120517/1	05/05/14 22:28	82247-334_00001	0.2562	0.20-0.32		
ICV 160-120852/1	05/07/14 23:04	82246-334_00001	0.2590	0.20-0.32	101.1	95-105
CCV 160-127903/1	06/19/14 19:45	82247-334_00001	0.2528	0.20-0.32	98.7	95-105

Detector: AV16

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120398/1	05/05/14 19:27	82232-334_00001	0.2711	0.20-0.32		
ICV 160-121072/1	05/08/14 00:14	82247-334_00001	0.2609	0.20-0.32	96.2	95-105
CCV 160-127904/1	06/19/14 18:08	82232-334_00001	0.2712	0.20-0.32	100.1	95-105

Detector: AV17

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120399/1	05/05/14 19:28	82233-334_00001	0.2607	0.20-0.32		
ICV 160-121073/1	05/08/14 00:14	82232-334_00001	0.2633	0.20-0.32	101.0	95-105
CCV 160-127905/1	06/19/14 18:08	82233-334_00001	0.2613	0.20-0.32	100.2	95-105

Detector: AV18

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120400/1	05/05/14 19:28	82234-334_00001	0.2546	0.20-0.32		
ICV 160-121074/1	05/08/14 00:14	82233-334_00001	0.2618	0.20-0.32	102.8	95-105
CCV 160-127906/1	06/19/14 18:08	82234-334_00001	0.2539	0.20-0.32	99.7	95-105

Detector: AV19

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120401/1	05/05/14 19:28	82235-334_00001	0.2534	0.20-0.32		
ICV 160-121361/1	05/08/14 14:33	82235-334_00001	0.2496	0.20-0.32	98.5	95-105
CCV 160-127907/1	06/19/14 18:08	82235-334_00001	0.2536	0.20-0.32	100.1	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV20

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120402/1	05/05/14 19:28	82236-334_00001	0.2556	0.20-0.32		
ICV 160-120854/1	05/07/14 23:05	82235-334_00001	0.2551	0.20-0.32	99.8	95-105
CCV 160-127909/1	06/19/14 18:08	82236-334_00001	0.2577	0.20-0.32	100.8	95-105

Detector: AV21

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120403/1	05/05/14 19:28	82237-334_00003	0.2545	0.20-0.32		
ICV 160-121075/1	05/08/14 00:16	82236-334_00001	0.2553	0.20-0.32	100.3	95-105
CCV 160-127910/1	06/19/14 19:45	82237-334_00003	0.2545	0.20-0.32	100.0	95-105

Detector: AV23

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120404/1	05/05/14 19:29	82240-334_00001	0.2591	0.20-0.32		
ICV 160-121362/1	05/08/14 14:33	82233-334_00001	0.2592	0.20-0.32	100.0	95-105
CCV 160-127911/1	06/19/14 19:45	82240-334_00001	0.2586	0.20-0.32	99.8	95-105

Detector: AV24

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120405/1	05/05/14 19:29	82241-334_00001	0.2642	0.20-0.32		
ICV 160-121076/1	05/08/14 00:16	82240-334_00001	0.2662	0.20-0.32	100.8	95-105
CCV 160-127912/1	06/19/14 19:45	82241-334_00001	0.2644	0.20-0.32	100.1	95-105

Detector: AV43

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120406/1	05/05/14 19:30	82242-334_00001	0.2574	0.20-0.32		
ICV 160-121077/1	05/08/14 00:16	82241-334_00001	0.2568	0.20-0.32	99.8	95-105
CCV 160-127969/1	06/22/14 17:38	82242-334_00001	0.2558	0.20-0.32	99.4	95-105

Detector: AV44

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120407/1	05/05/14 19:30	82243-334_00001	0.2632	0.20-0.32		
ICV 160-121078/1	05/08/14 00:17	82242-334_00001	0.2594	0.20-0.32	98.6	95-105
CCV 160-127970/1	06/22/14 17:38	82243-334_00001	0.2633	0.20-0.32	100.0	95-105

Detector: AV45

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120408/1	05/05/14 19:30	82244-334_00001	0.2606	0.20-0.32		
ICV 160-121363/1	05/08/14 14:32	82243-334_00001	0.2658	0.20-0.32	102.0	95-105
CCV 160-127985/1	06/22/14 20:07	82244-334_00001	0.2609	0.20-0.32	100.1	95-105

Detector: AV46

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120409/1	05/05/14 19:30	82245-334_00001	0.2680	0.20-0.32		
ICV 160-121079/1	05/08/14 00:18	82244-334_00001	0.2610	0.20-0.32	97.4	95-105
CCV 160-127986/1	06/22/14 21:17	82245-334_00001	0.2669	0.20-0.32	99.6	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV49

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120271/1	05/04/14 21:03	82232-334_00001	0.2653	0.20-0.32		
ICV 160-121364/1	05/08/14 14:34	82247-334_00001	0.2545	0.20-0.32	95.9	95-105
CCV 160-127989/1	06/22/14 18:52	82232-334_00001	0.2674	0.20-0.32	100.8	95-105

Detector: AV50

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120272/1	05/04/14 21:03	82233-334_00001	0.2693	0.20-0.32		
ICV 160-121365/1	05/08/14 14:34	82232-334_00001	0.2692	0.20-0.32	100.0	95-105
CCV 160-127990/1	06/22/14 18:52	82233-334_00001	0.2708	0.20-0.32	100.5	95-105

Detector: AV51

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120273/1	05/04/14 21:03	82234-334_00001	0.2624	0.20-0.32		
ICV 160-121366/1	05/08/14 17:17	82233-334_00001	0.2693	0.20-0.32	102.6	95-105
CCV 160-127991/1	06/22/14 20:07	82234-334_00001	0.2581	0.20-0.32	98.4	95-105

Detector: AV115

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120840/1	05/07/14 19:52	82244-334_00001	0.2626	0.20-0.32		
ICV 160-121418/1	05/11/14 20:54	82237-334_00003	0.2672	0.20-0.32	101.8	95-105
CCV 160-127876/1	06/19/14 15:10	82244-334_00001	0.2651	0.20-0.32	100.9	95-105

Detector: AV116

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-119675/1	04/30/14 22:55	82240-334_00001	0.2704	0.20-0.32		
ICV 160-121419/1	05/11/14 22:06	82245-334_00001	0.2603	0.20-0.32	96.2	95-105
CCV 160-127877/1	06/19/14 15:10	82240-334_00001	0.2694	0.20-0.32	99.6	95-105

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:05:47AM 5/8/2014

Calibration

Sample Name: ICV-8874;AV3-20140507
Description:
Detector: AV3

Calibration Date: 5/8/2014 12:05:44AM
Analyst: 60040

Source Info

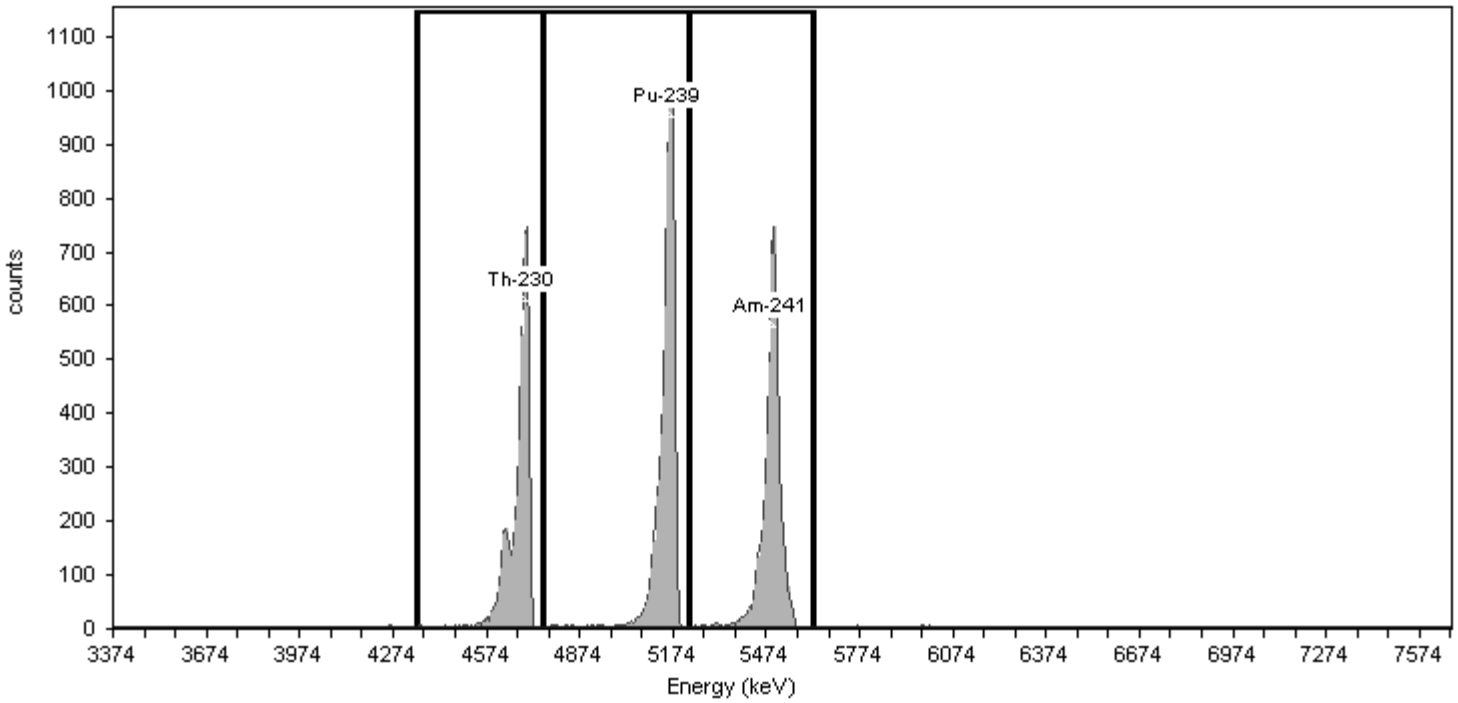
Certificate ID: 82233-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV3 , SN: 49-202 FF7
Acquisition Start Date: 5/7/2014 11:02:35PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 26.96% +/- 0.50% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	4,614.00	76.90
Pu-239	240	5.16	186	249	6,057.00	100.95
Am-241	284	5.49	249	303	4,958.00	82.63

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:05:53AM 5/8/2014

Calibration

Sample Name: ICV-8875;AV4-20140507
Description:
Detector: AV4

Calibration Date: 5/8/2014 12:05:50AM
Analyst: 60040

Source Info

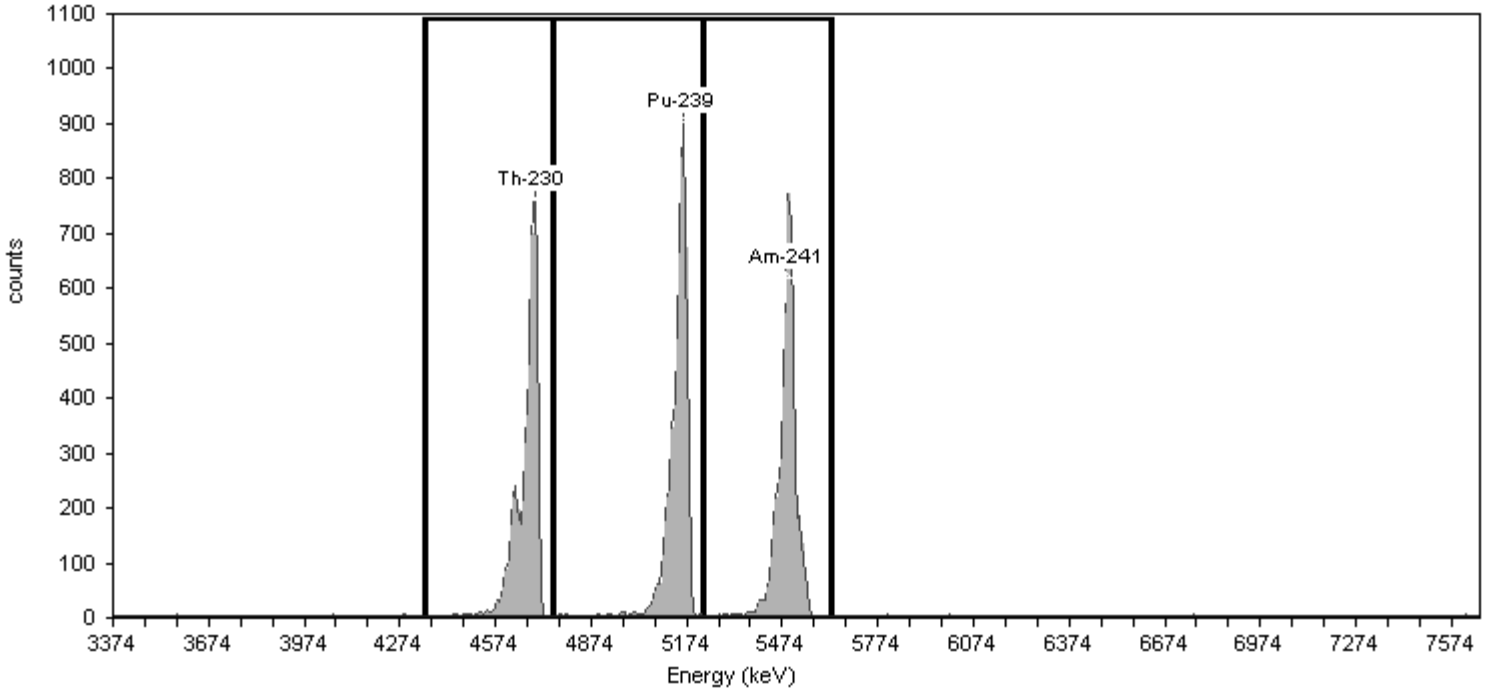
Certificate ID: 82234-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV4 , SN: 46-033Q4
Acquisition Start Date: 5/7/2014 11:03:00PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 25.99% +/- 0.48% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,162.00	86.03
Pu-239	240	5.16	186	249	5,783.00	96.38
Am-241	284	5.49	249	303	5,203.00	86.72

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:00AM 5/8/2014

Calibration

Sample Name: ICV-8877;AV6-20140507
Description:
Detector: AV6

Calibration Date: 5/8/2014 12:05:56AM
Analyst: 60040

Source Info

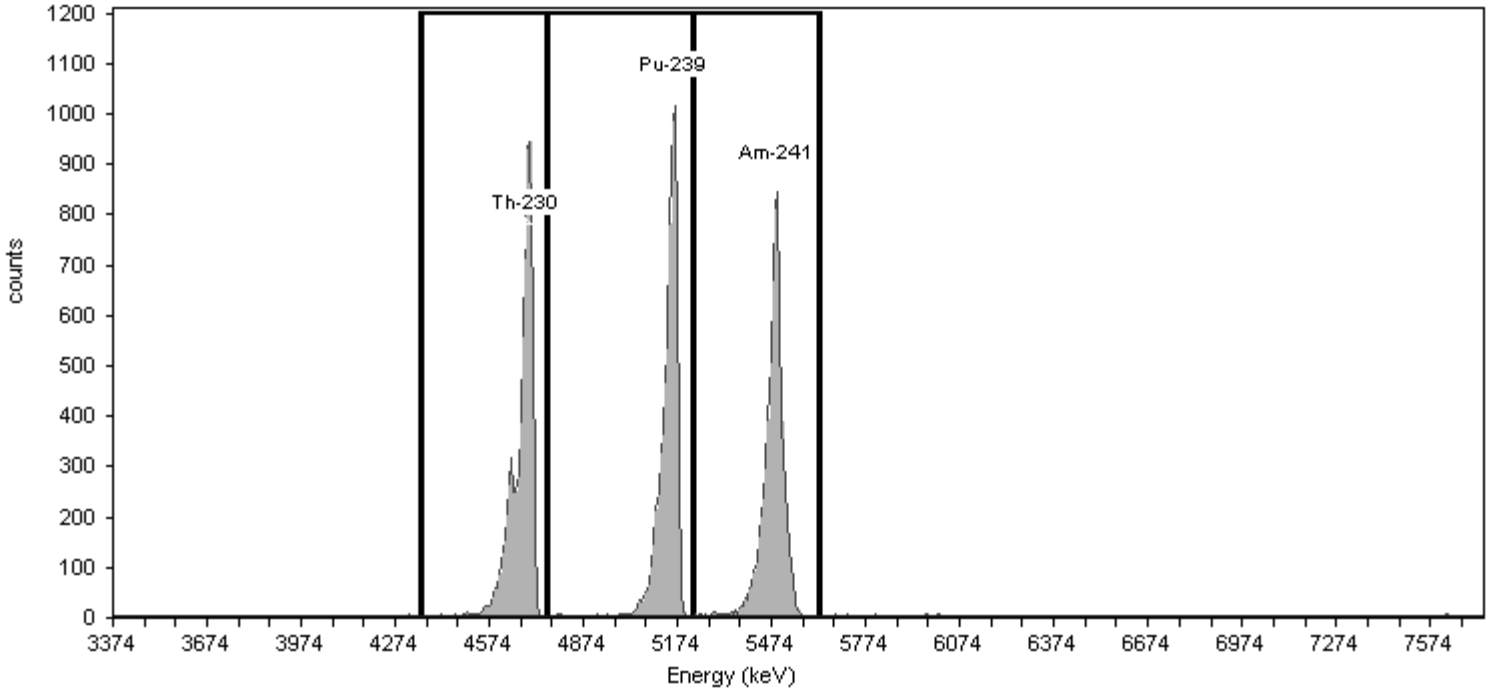
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV6 , SN: 47-27FF2
Acquisition Start Date: 5/7/2014 11:03:21PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 26.22% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,553.00	109.22
Pu-239	240	5.16	186	249	6,552.00	109.20
Am-241	284	5.49	249	303	6,392.00	106.53

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:07AM 5/8/2014

Calibration

Sample Name: ICV-9520;AV7-20140507
Description:
Detector: AV7

Calibration Date: 5/8/2014 12:06:03AM
Analyst: 60040

Source Info

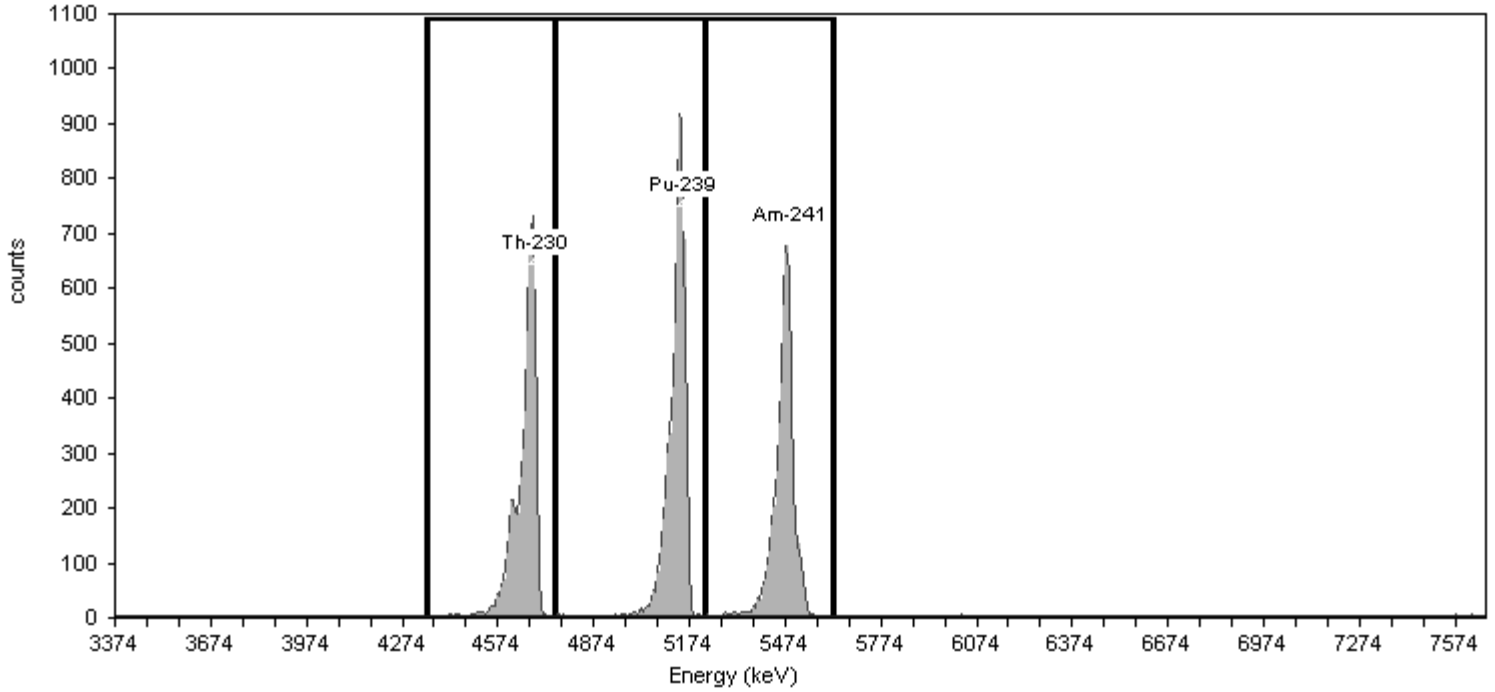
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV7 , SN: 48-158EE5
Acquisition Start Date: 5/7/2014 11:03:39PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 25.46% +/- 0.46% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,227.00	87.12
Pu-239	240	5.16	186	249	6,154.00	102.57
Am-241	284	5.49	249	303	4,991.00	83.18

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:19:28PM 5/8/2014

Calibration

Sample Name: ICV-8875;AV8-20140507
Description:
Detector: AV8

Calibration Date: 5/8/2014 2:19:23PM
Analyst: 60040

Source Info

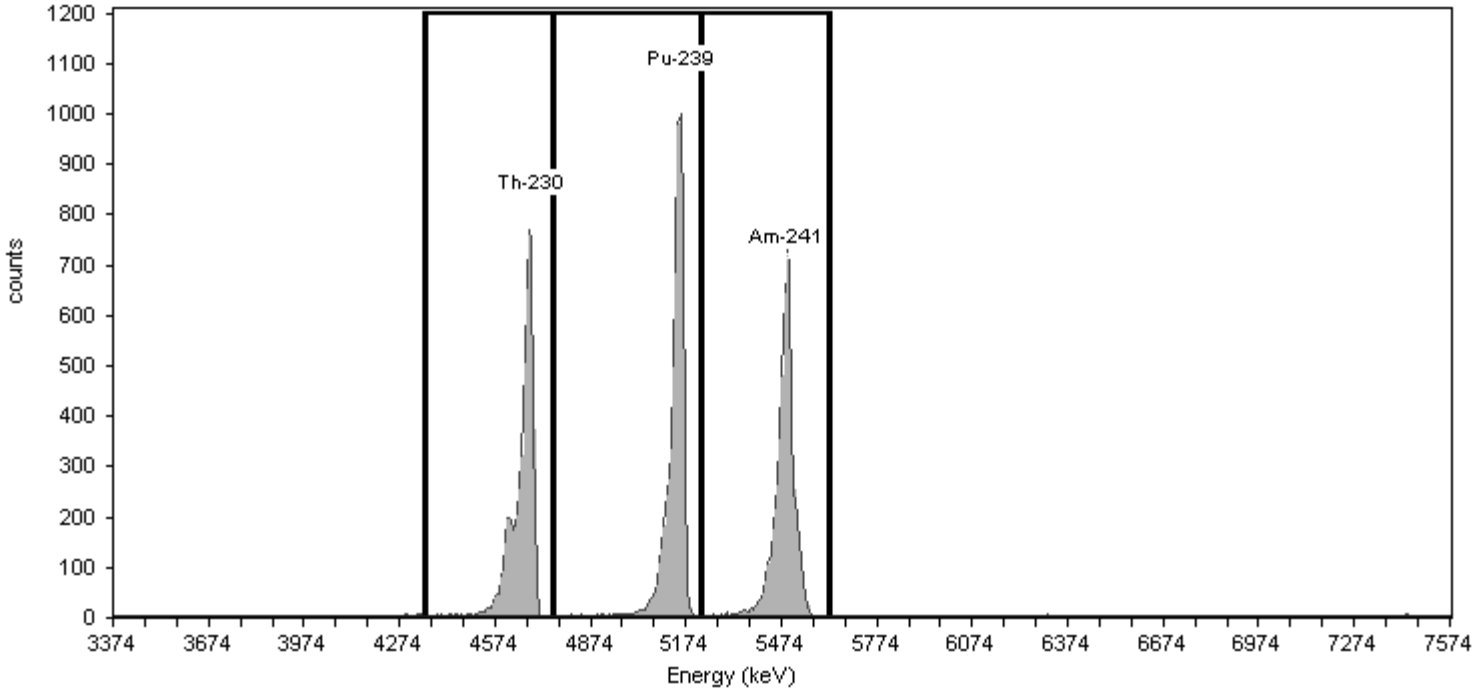
Certificate ID: 82234-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV8 , SN: 41-137Q6
Acquisition Start Date: 5/8/2014 12:14:03AM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.39% +/- 0.48% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,189.00	86.48
Pu-239	240	5.16	186	249	5,888.00	98.13
Am-241	284	5.49	249	303	5,329.00	88.82

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:13AM 5/8/2014

Calibration

Sample Name: ICV-9792;AV9-20140507
Description:
Detector: AV9

Calibration Date: 5/8/2014 12:06:10AM
Analyst: 60040

Source Info

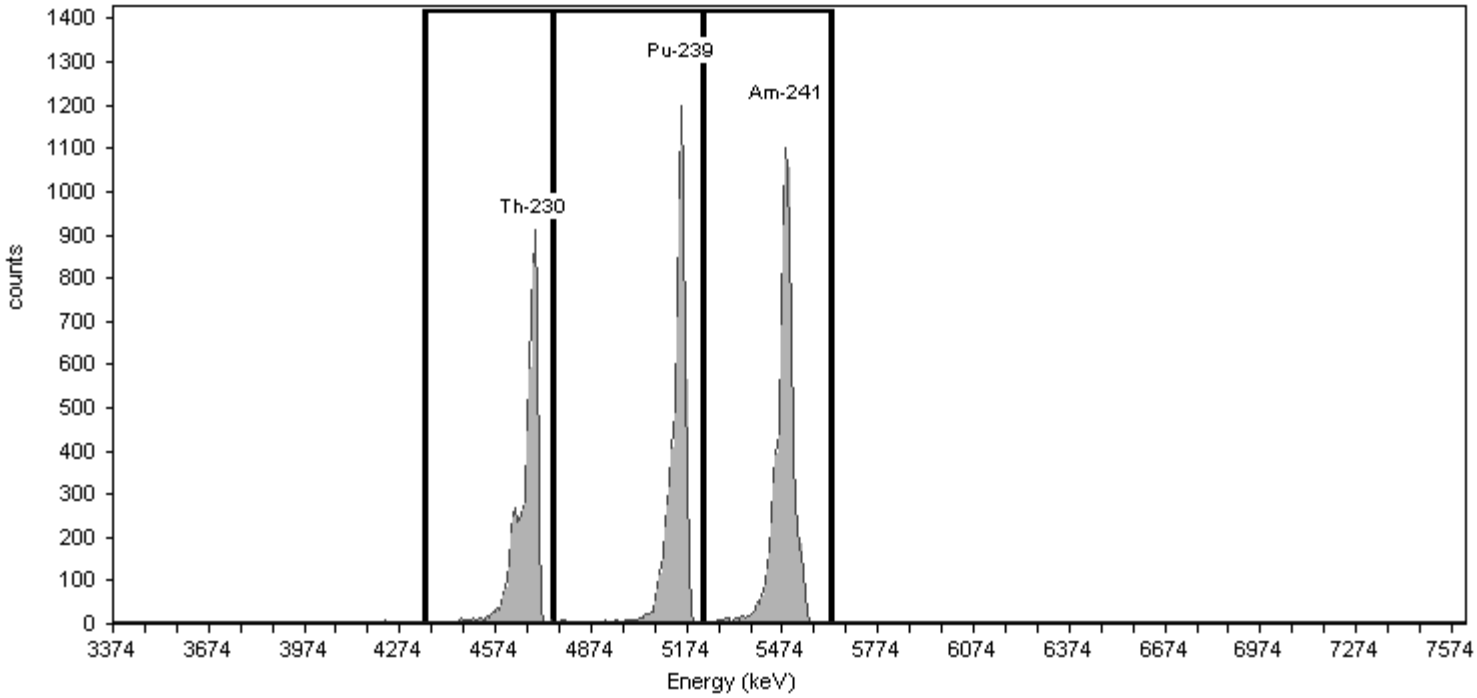
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV9 , SN: 51-082V5
Acquisition Start Date: 5/7/2014 11:03:40PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 26.66% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,053.00	100.88
Pu-239	240	5.16	186	249	6,939.00	115.65
Am-241	284	5.49	249	303	7,853.00	130.88

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:20AM 5/8/2014

Calibration

Sample Name: ICV-9793;AV10-20140507
Description:
Detector: AV10

Calibration Date: 5/8/2014 12:06:16AM
Analyst: 60040

Source Info

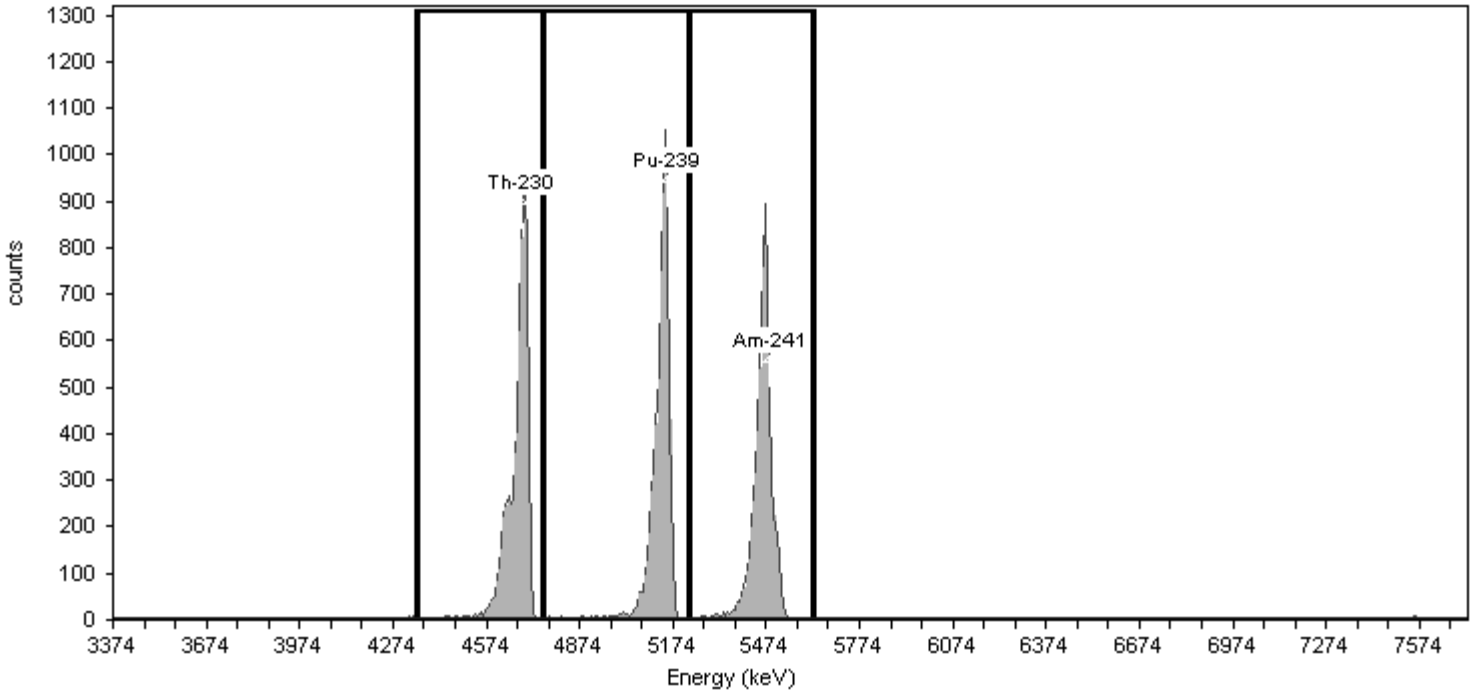
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV10 , SN: 49-155N2
Acquisition Start Date: 5/7/2014 11:03:59PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 25.93% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,246.00	104.10
Pu-239	240	5.16	186	249	6,407.00	106.78
Am-241	284	5.49	249	303	6,047.00	100.78

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:26AM 5/8/2014

Calibration

Sample Name: ICV-9794;AV11-20140507
Description:
Detector: AV11

Calibration Date: 5/8/2014 12:06:22AM
Analyst: 60040

Source Info

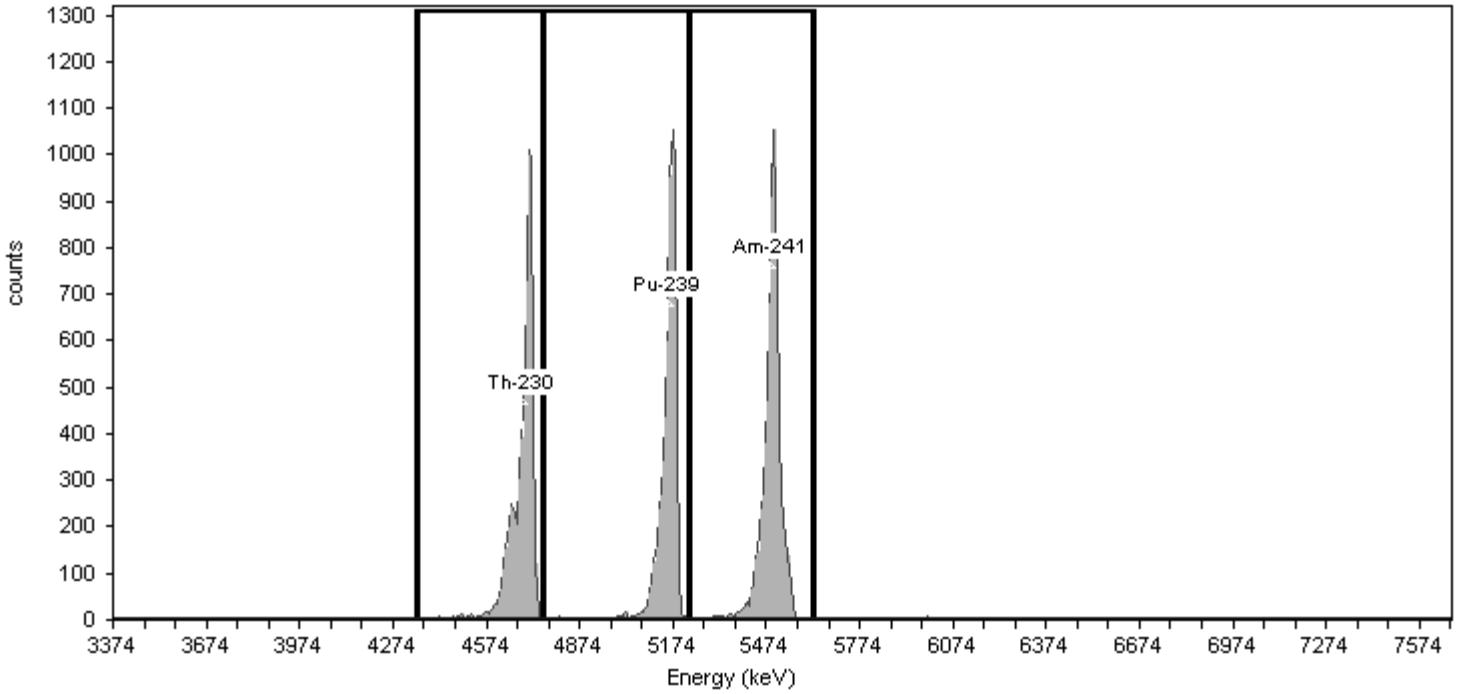
Certificate ID: 82242-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV11 , SN: 49-155dd2
Acquisition Start Date: 5/7/2014 11:04:13PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 25.98% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,238.00	103.97
Pu-239	240	5.16	186	249	5,922.00	98.70
Am-241	284	5.49	249	303	6,644.00	110.73

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:32AM 5/8/2014

Calibration

Sample Name: ICV-9795;AV12-20140507
Description:
Detector: AV12

Calibration Date: 5/8/2014 12:06:29AM
Analyst: 60040

Source Info

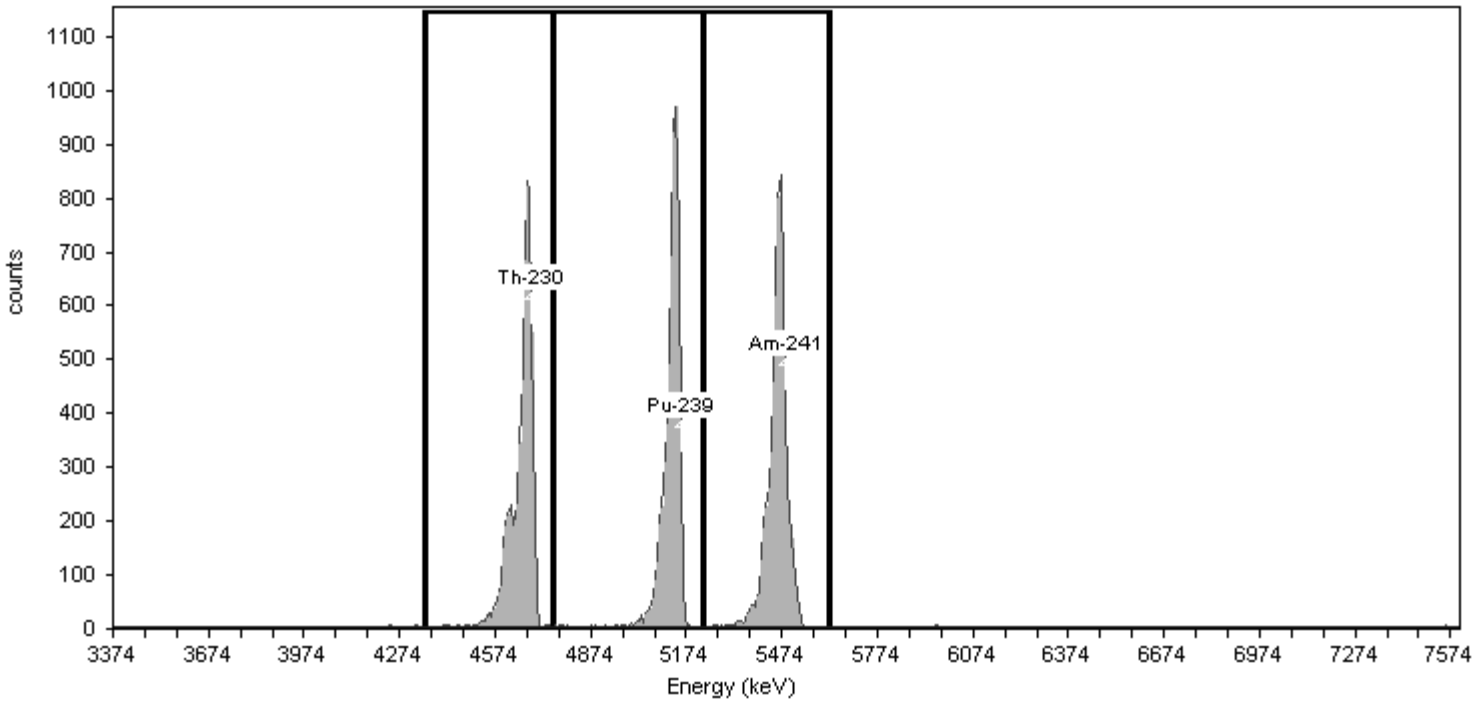
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV12 , SN: 51-082B7
Acquisition Start Date: 5/7/2014 11:04:29PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 26.88% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,706.00	95.10
Pu-239	240	5.16	186	249	5,810.00	96.83
Am-241	284	5.49	249	303	6,092.00	101.53

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:38AM 5/8/2014

Calibration

Sample Name: ICV-9817;AV13-20140507
Description:
Detector: AV13

Calibration Date: 5/8/2014 12:06:35AM
Analyst: 60040

Source Info

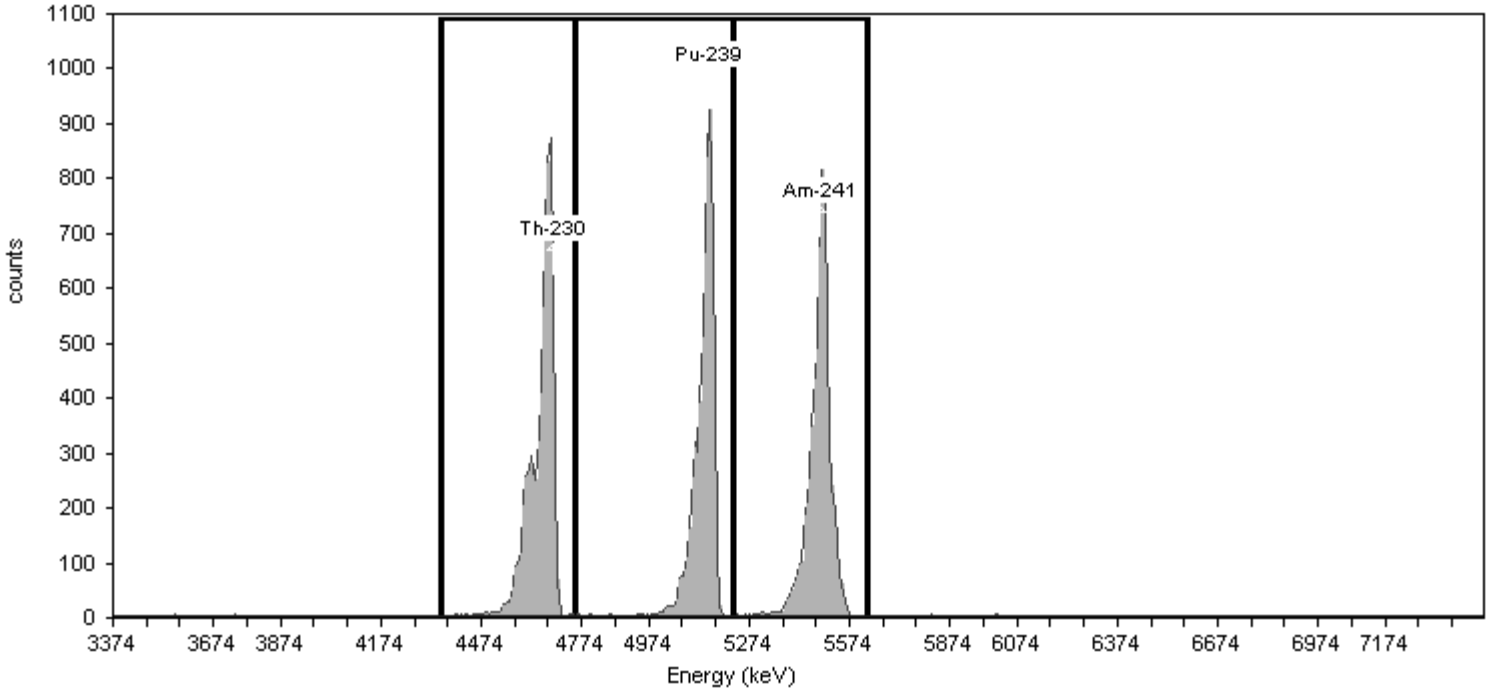
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV13 , SN: 49-155M7
Acquisition Start Date: 5/7/2014 11:04:39PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 25.56% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,777.00	112.95
Pu-239	240	5.16	186	249	6,153.00	102.55
Am-241	284	5.49	249	303	6,331.00	105.52

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:44AM 5/8/2014

Calibration

Sample Name: ICV-9884;AV14-20140507
Description:
Detector: AV14

Calibration Date: 5/8/2014 12:06:41AM
Analyst: 60040

Source Info

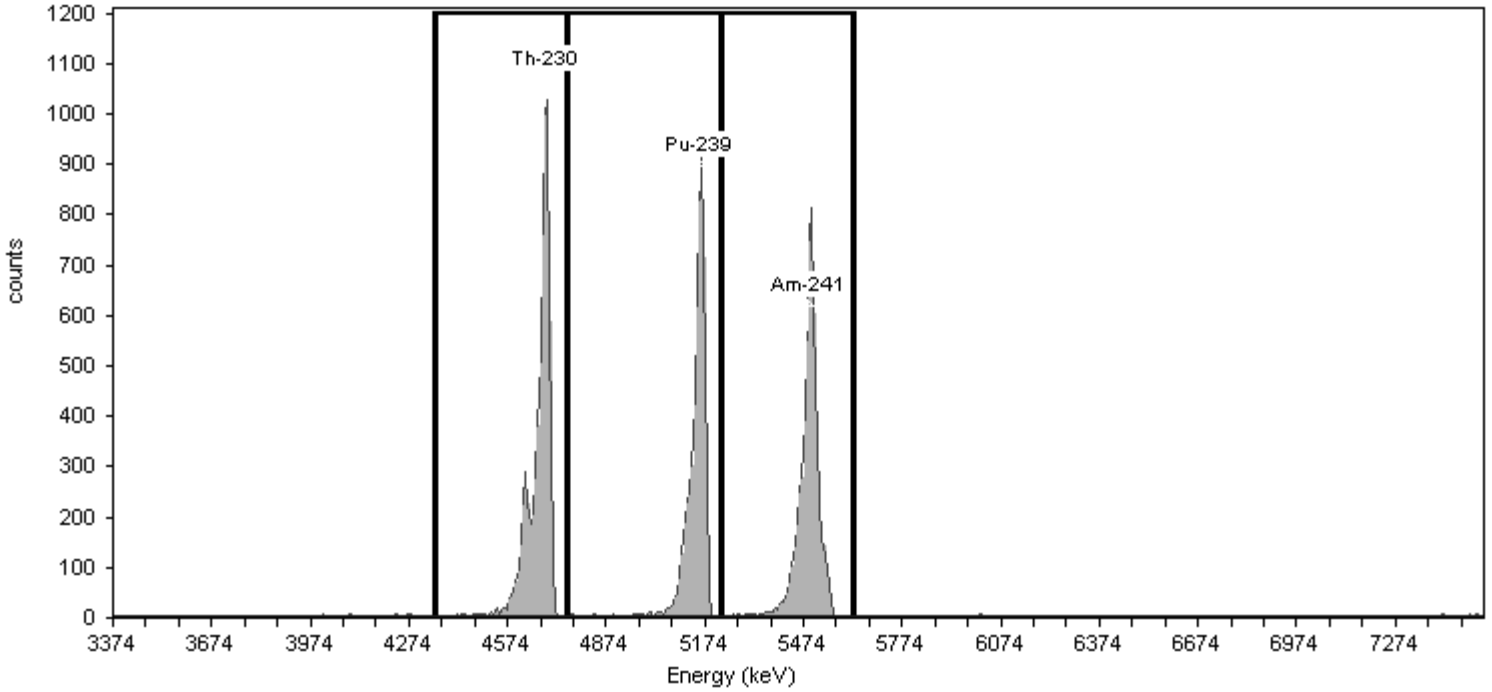
Certificate ID: 82245-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV14 , SN: 50-060W4
Acquisition Start Date: 5/7/2014 11:04:56PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 26.65% +/- 0.49% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,320.00	105.33
Pu-239	240	5.16	186	249	5,234.00	87.23
Am-241	284	5.49	249	303	5,413.00	90.22

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:50AM 5/8/2014

Calibration

Sample Name: ICV-9885;AV15-20140507
Description:
Detector: AV15

Calibration Date: 5/8/2014 12:06:47AM
Analyst: 60040

Source Info

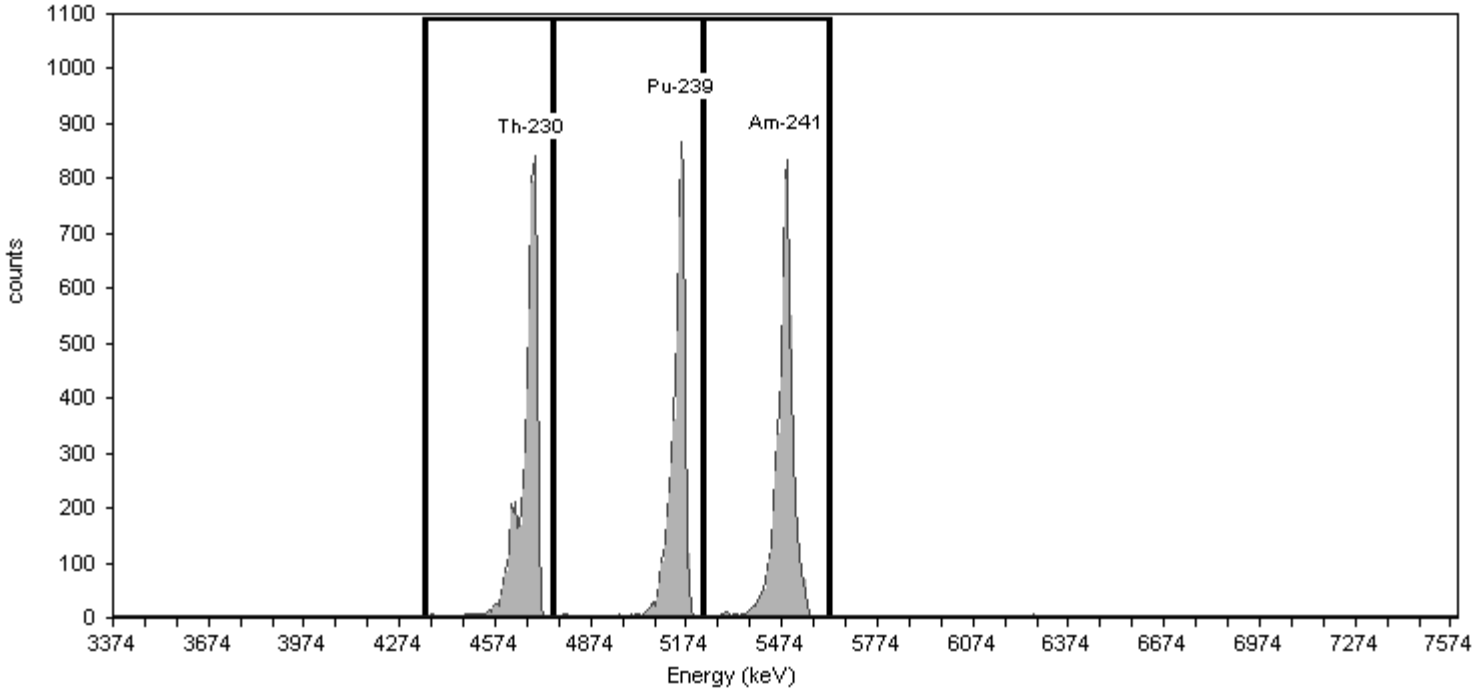
Certificate ID: 82246-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV15 , SN: 41-172C5
Acquisition Start Date: 5/7/2014 11:04:58PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 25.90% +/- 0.49% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,224.00	87.07
Pu-239	240	5.16	186	249	4,981.00	83.02
Am-241	284	5.49	249	303	5,544.00	92.40

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:19:38PM 5/8/2014

Calibration

Sample Name: ICV-9886;AV16-20140507
Description:
Detector: AV16

Calibration Date: 5/8/2014 2:19:34PM
Analyst: 60040

Source Info

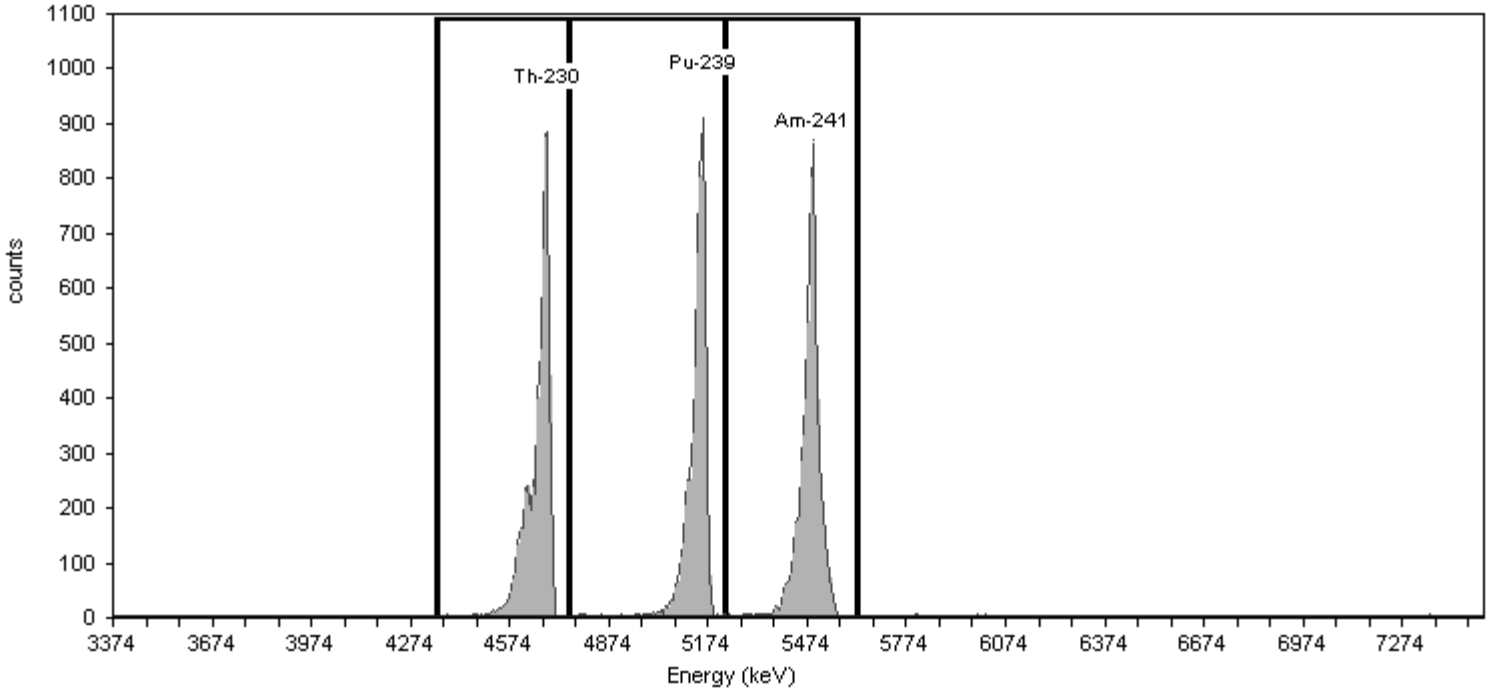
Certificate ID: 82247-334
Prepared by: Analytics

Certification Date: 6/10/2010 12:00:00PM
Description:

Acquisition

Detector: AV16 , SN: 51-082B6
Acquisition Start Date: 5/8/2014 12:14:17AM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.09% +/- 0.46% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,829.00	97.15
Pu-239	240	5.16	186	249	5,478.00	91.30
Am-241	284	5.49	249	303	5,844.00	97.40

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:19:44PM 5/8/2014

Calibration

Sample Name: ICV-7107;AV17-20140507
Description:
Detector: AV17

Calibration Date: 5/8/2014 2:19:41PM
Analyst: 60040

Source Info

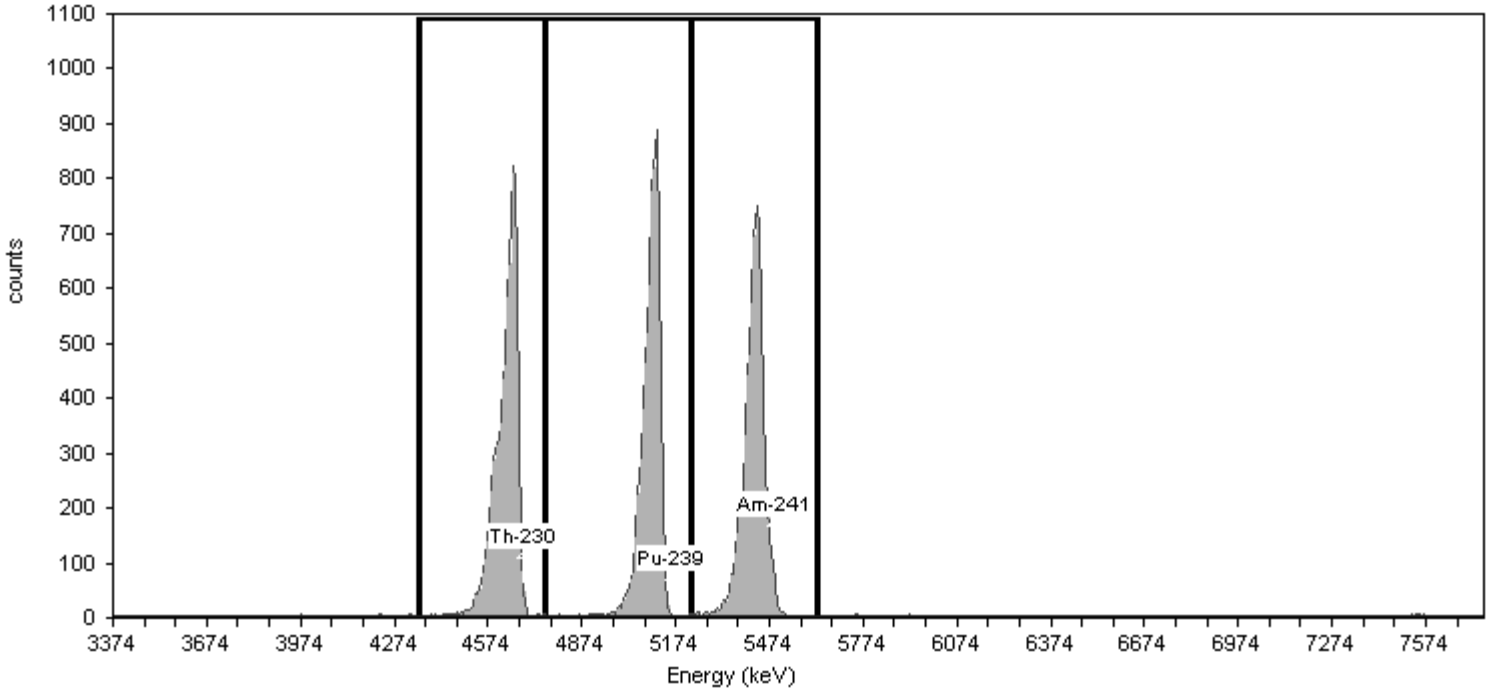
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV17 , SN: 50-051C4
Acquisition Start Date: 5/8/2014 12:14:34AM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 26.33% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	7,156.00	119.27
Pu-239	240	5.16	186	249	6,932.00	115.53
Am-241	284	5.49	249	303	6,785.00	113.08

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:19:50PM 5/8/2014

Calibration

Sample Name: ICV-8874;AV18-20140507
Description:
Detector: AV18

Calibration Date: 5/8/2014 2:19:46PM
Analyst: 60040

Source Info

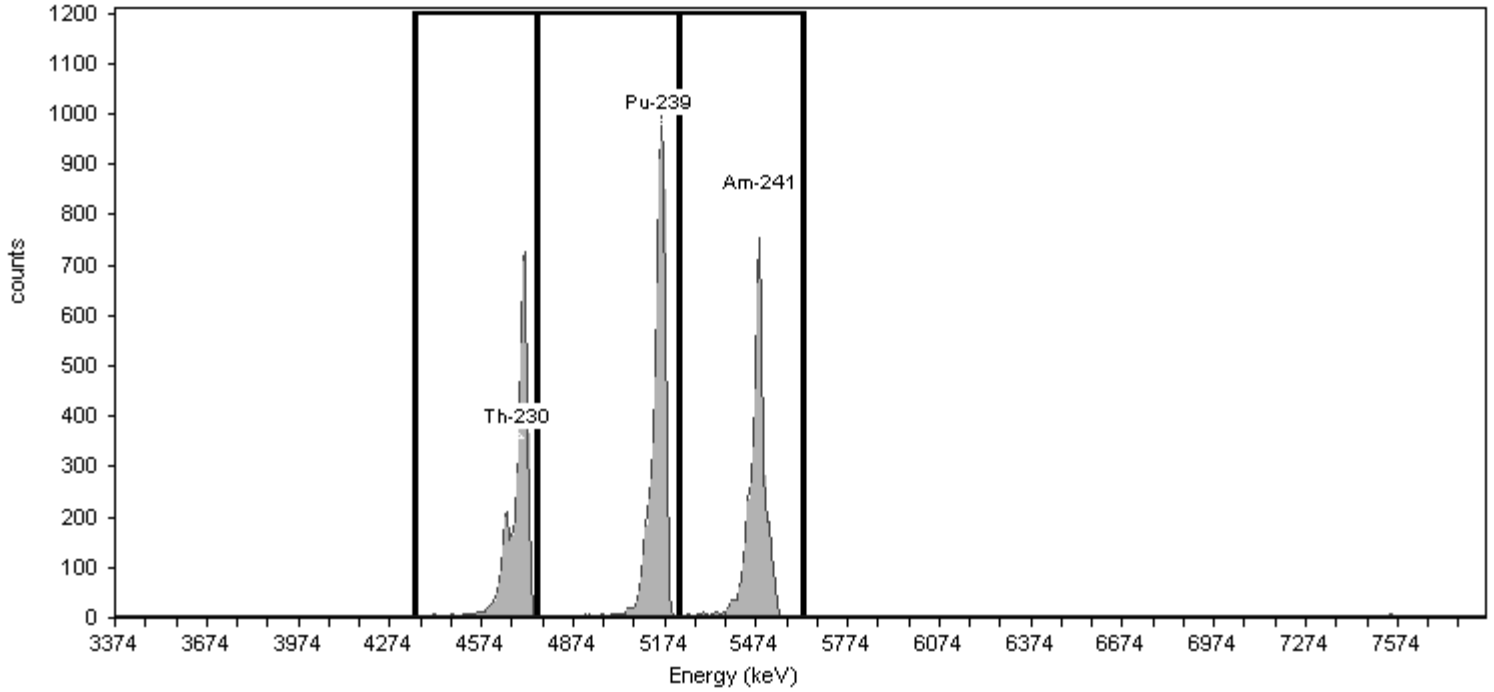
Certificate ID: 82233-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV18 , SN: 51-082C5
Acquisition Start Date: 5/8/2014 12:14:45AM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 26.18% +/- 0.49% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	4,525.00	75.42
Pu-239	240	5.16	186	249	5,794.00	96.57
Am-241	284	5.49	249	303	4,855.00	80.92

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:56:20PM 5/8/2014

Calibration

Sample Name: ICV-8876;AV19-050814
Description:
Detector: AV19

Calibration Date: 5/8/2014 4:56:13PM
Analyst: 60040

Source Info

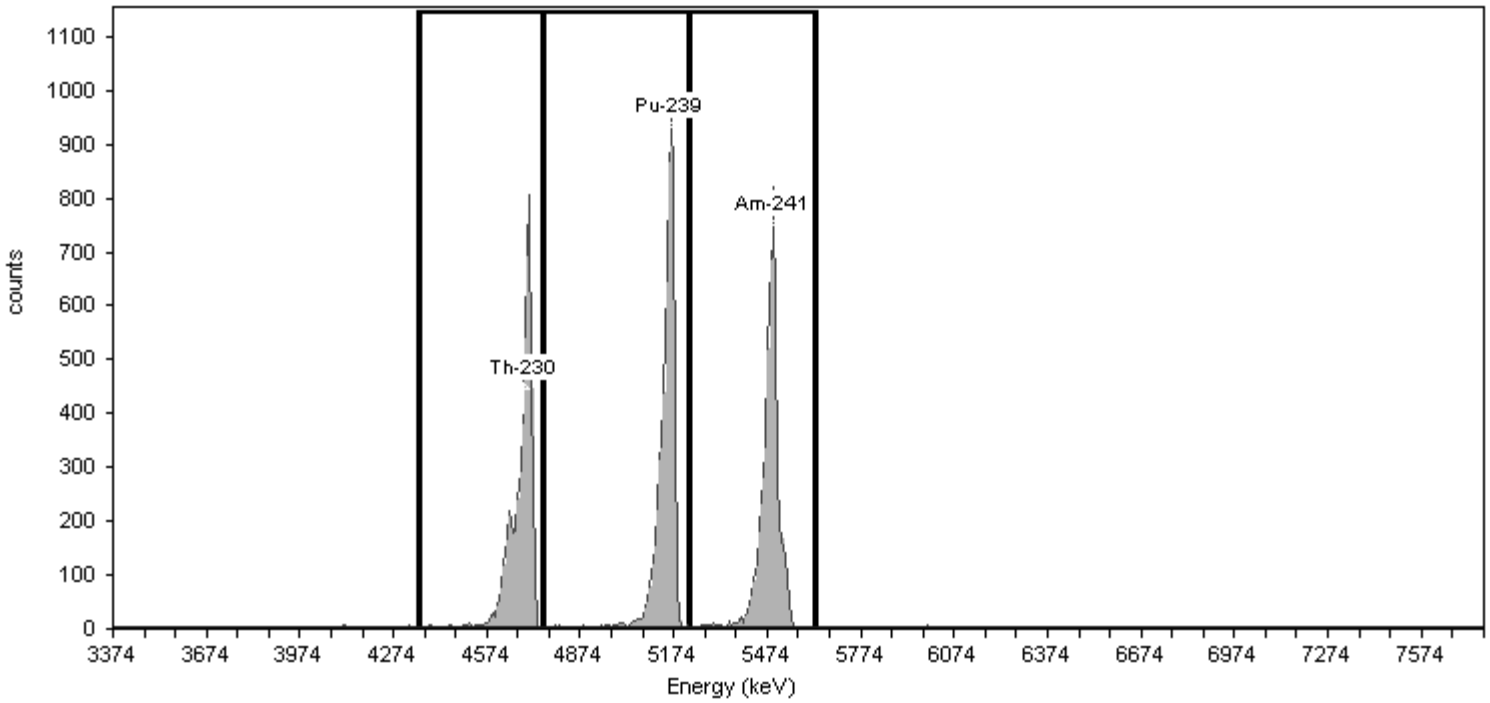
Certificate ID: 82234-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV19 , SN: 50-025FF5
Acquisition Start Date: 5/8/2014 2:33:29PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 24.96% +/- 0.46% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	4,852.00	80.87
Pu-239	240	5.16	186	249	5,673.00	94.55
Am-241	284	5.49	249	303	5,012.00	83.53

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:56AM 5/8/2014

Calibration

Sample Name: ICV-8876;AV20-20140507
Description:
Detector: AV20

Calibration Date: 5/8/2014 12:06:53AM
Analyst: 60040

Source Info

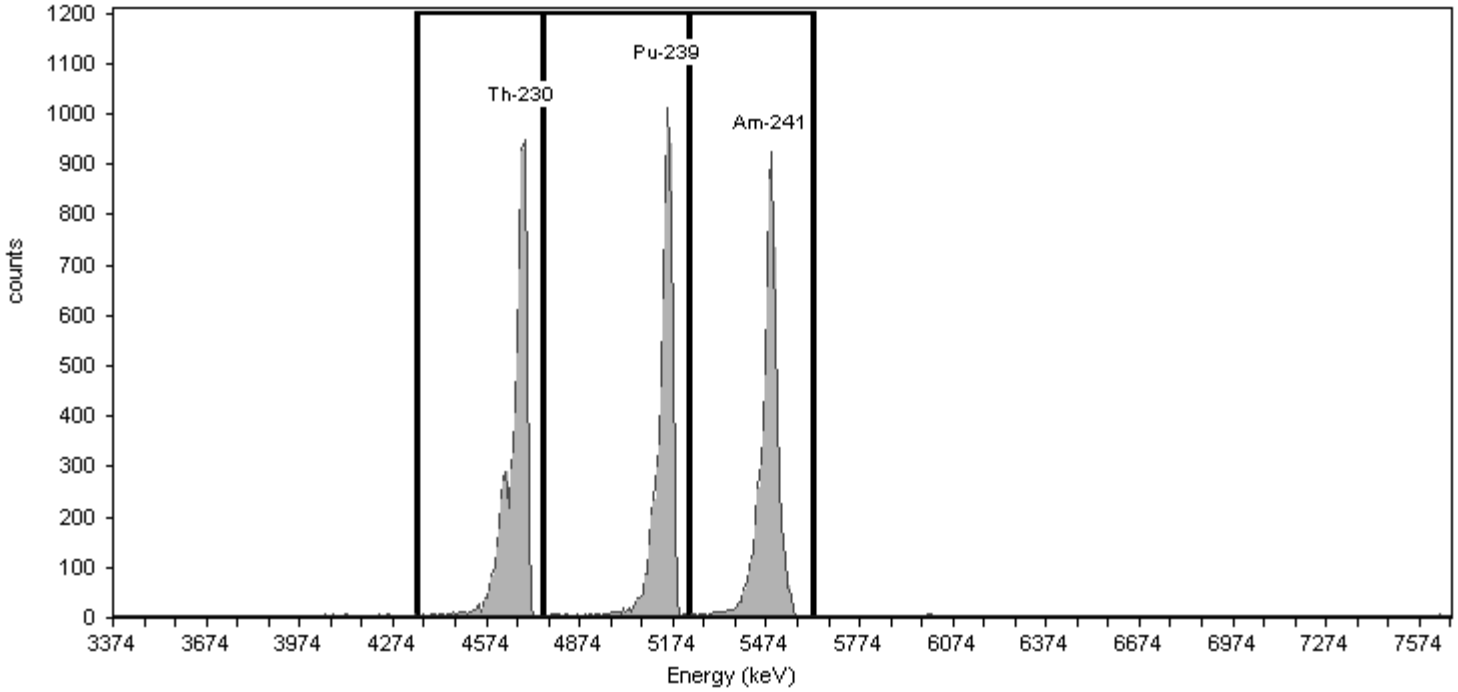
Certificate ID: 82235-334
Prepared by: Analytics

Certification Date: 6/4/2010 12:00:00PM
Description:

Acquisition

Detector: AV20 , SN: 48-121A7
Acquisition Start Date: 5/7/2014 11:05:20PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 25.51% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,706.00	111.77
Pu-239	240	5.16	186	249	6,368.00	106.13
Am-241	284	5.49	249	303	6,673.00	111.22

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:19:56PM 5/8/2014

Calibration

Sample Name: ICV-8877;AV21-20140507
Description:
Detector: AV21

Calibration Date: 5/8/2014 2:19:52PM
Analyst: 60040

Source Info

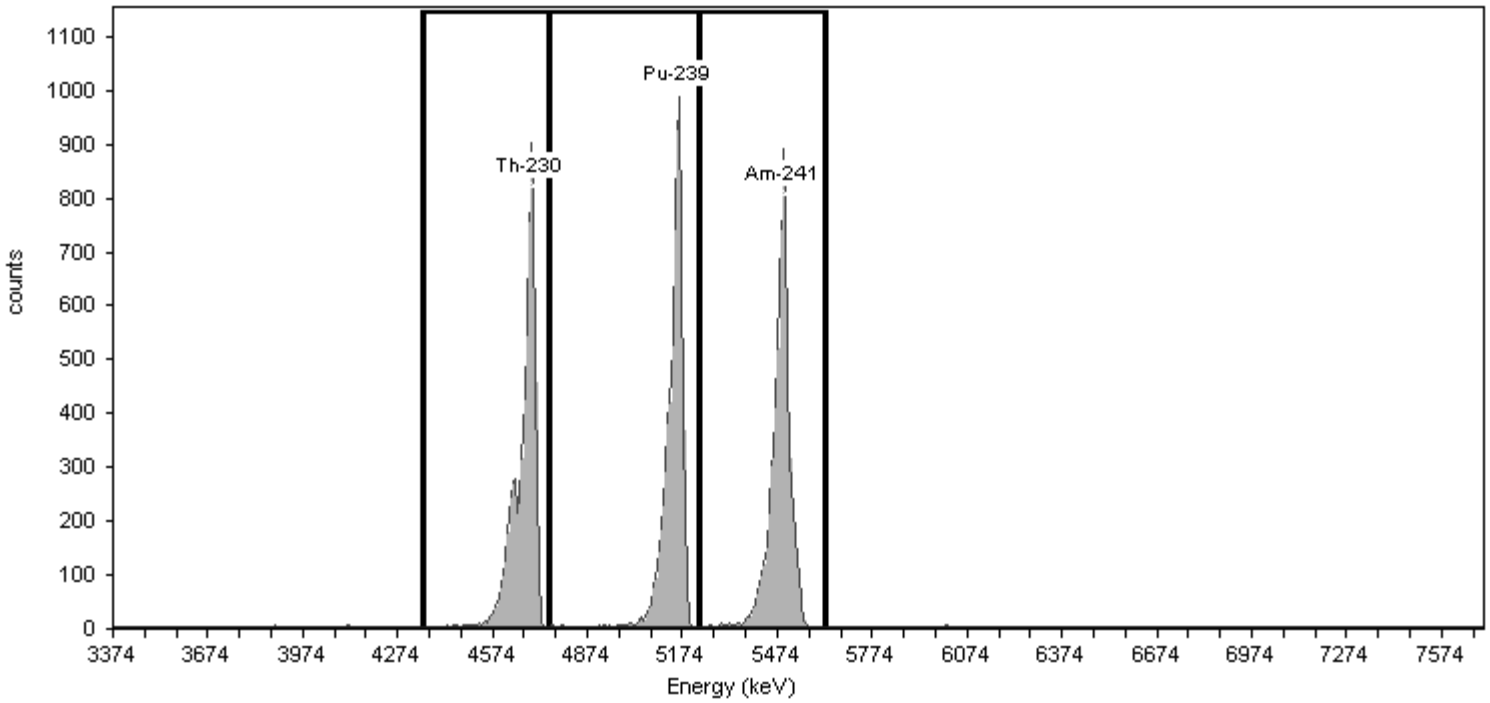
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV21 , SN: 48-102BB6
Acquisition Start Date: 5/8/2014 12:16:17AM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 25.53% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,251.00	104.18
Pu-239	240	5.16	186	249	6,383.00	106.38
Am-241	284	5.49	249	303	6,357.00	105.95

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:56:29PM 5/8/2014

Calibration

Sample Name: ICV-8874;AV23-050814
Description:
Detector: AV23

Calibration Date: 5/8/2014 4:56:26PM
Analyst: 60040

Source Info

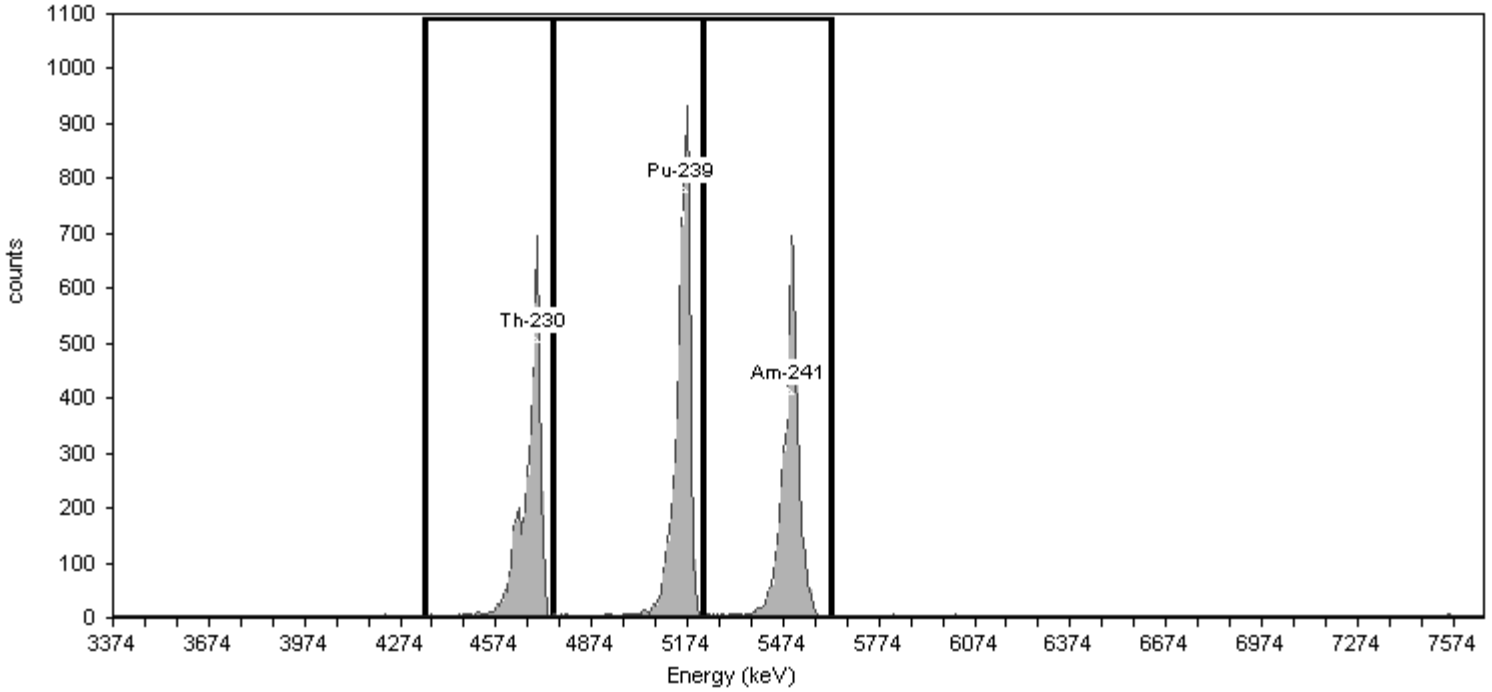
Certificate ID: 82233-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV23 , SN: 48-158FF3
Acquisition Start Date: 5/8/2014 2:33:47PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 25.92% +/- 0.49% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	4,512.00	75.20
Pu-239	240	5.16	186	249	5,789.00	96.48
Am-241	284	5.49	249	303	4,721.00	78.68

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:20:02PM 5/8/2014

Calibration

Sample Name: ICV-9792;AV24-20140507
Description:
Detector: AV24

Calibration Date: 5/8/2014 2:19:58PM
Analyst: 60040

Source Info

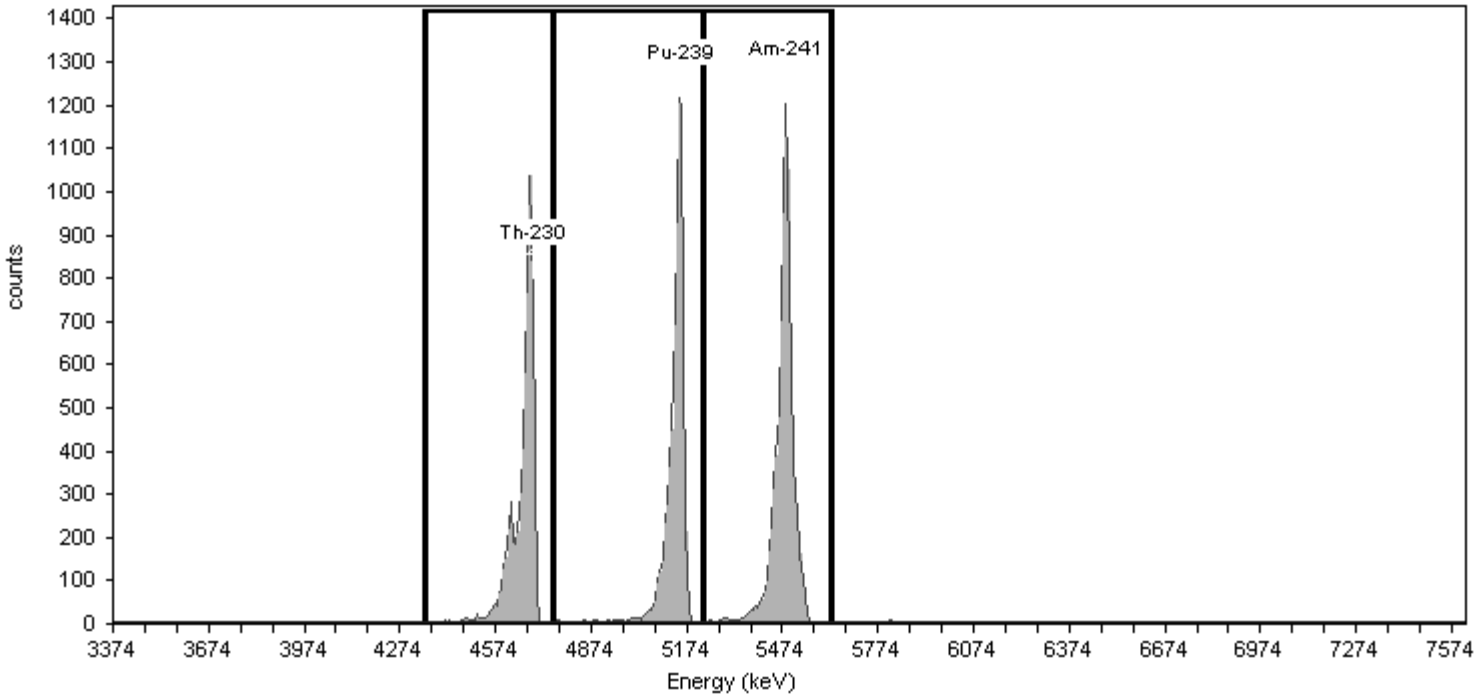
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV24 , SN: 47-137Q4
Acquisition Start Date: 5/8/2014 12:16:41AM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 26.62% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,034.00	100.57
Pu-239	240	5.16	186	249	6,927.00	115.45
Am-241	284	5.49	249	303	7,852.00	130.87

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:20:08PM 5/8/2014

Calibration

Sample Name: ICV-9793;AV43-20140507
Description:
Detector: AV43

Calibration Date: 5/8/2014 2:20:05PM
Analyst: 60040

Source Info

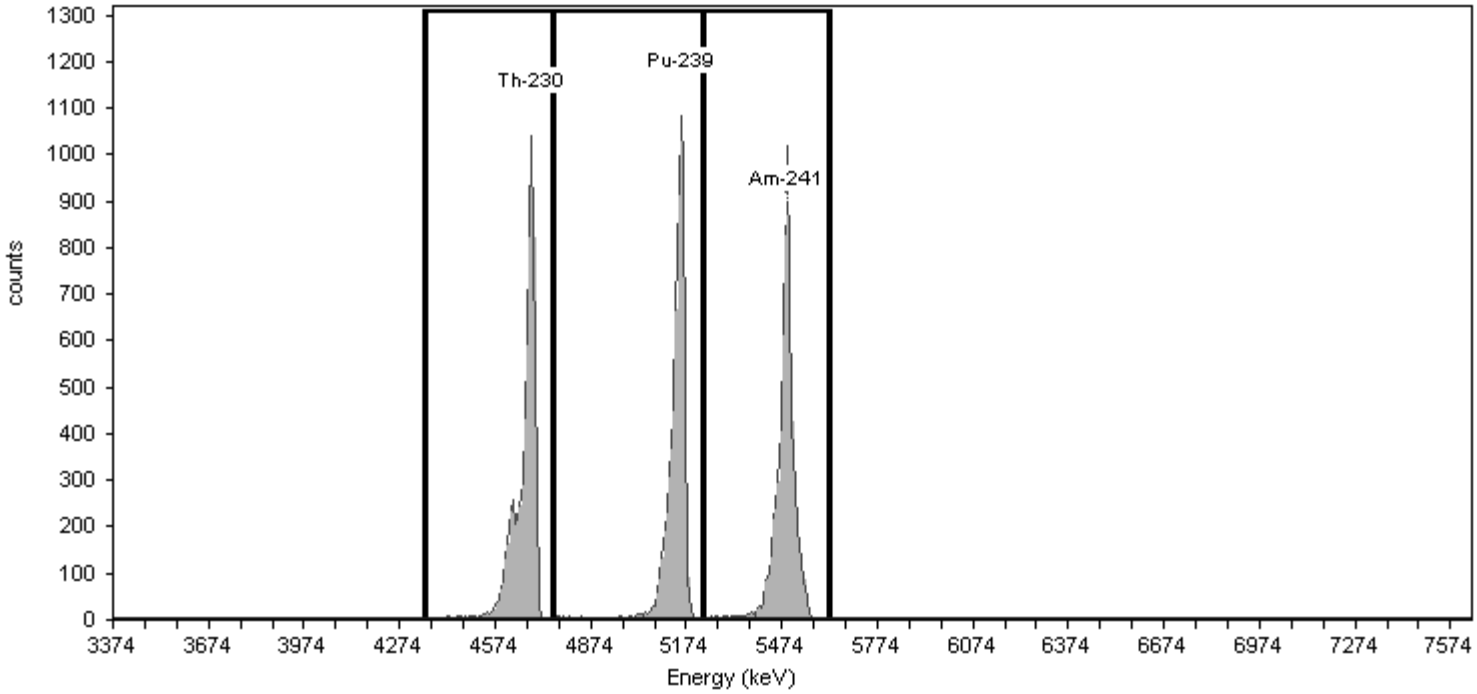
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV43 , SN: 49-190X4
Acquisition Start Date: 5/8/2014 12:16:52AM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 25.68% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,093.00	101.55
Pu-239	240	5.16	186	249	6,250.00	104.17
Am-241	284	5.49	249	303	6,174.00	102.90

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:20:18PM 5/8/2014

Calibration

Sample Name: ICV-9794;AV44-20140507
Description:
Detector: AV44

Calibration Date: 5/8/2014 2:20:13PM
Analyst: 60040

Source Info

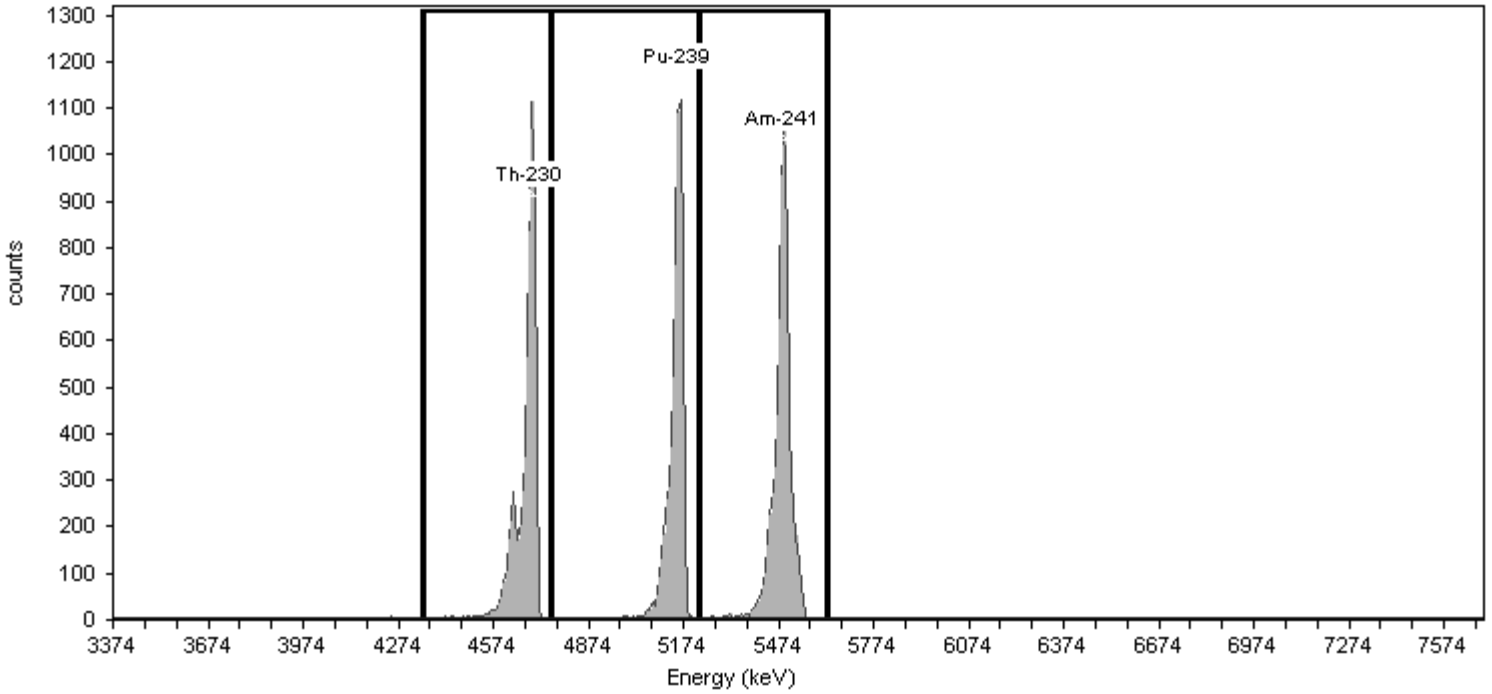
Certificate ID: 82242-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV44 , SN: 50-051JJ1
Acquisition Start Date: 5/8/2014 12:17:17AM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 25.94% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,074.00	101.23
Pu-239	240	5.16	186	249	5,990.00	99.83
Am-241	284	5.49	249	303	6,711.00	111.85

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:56:13PM 5/8/2014

Calibration

Sample Name: ICV-9795;AV45-050814
Description:
Detector: AV45

Calibration Date: 5/8/2014 4:56:08PM
Analyst: 60040

Source Info

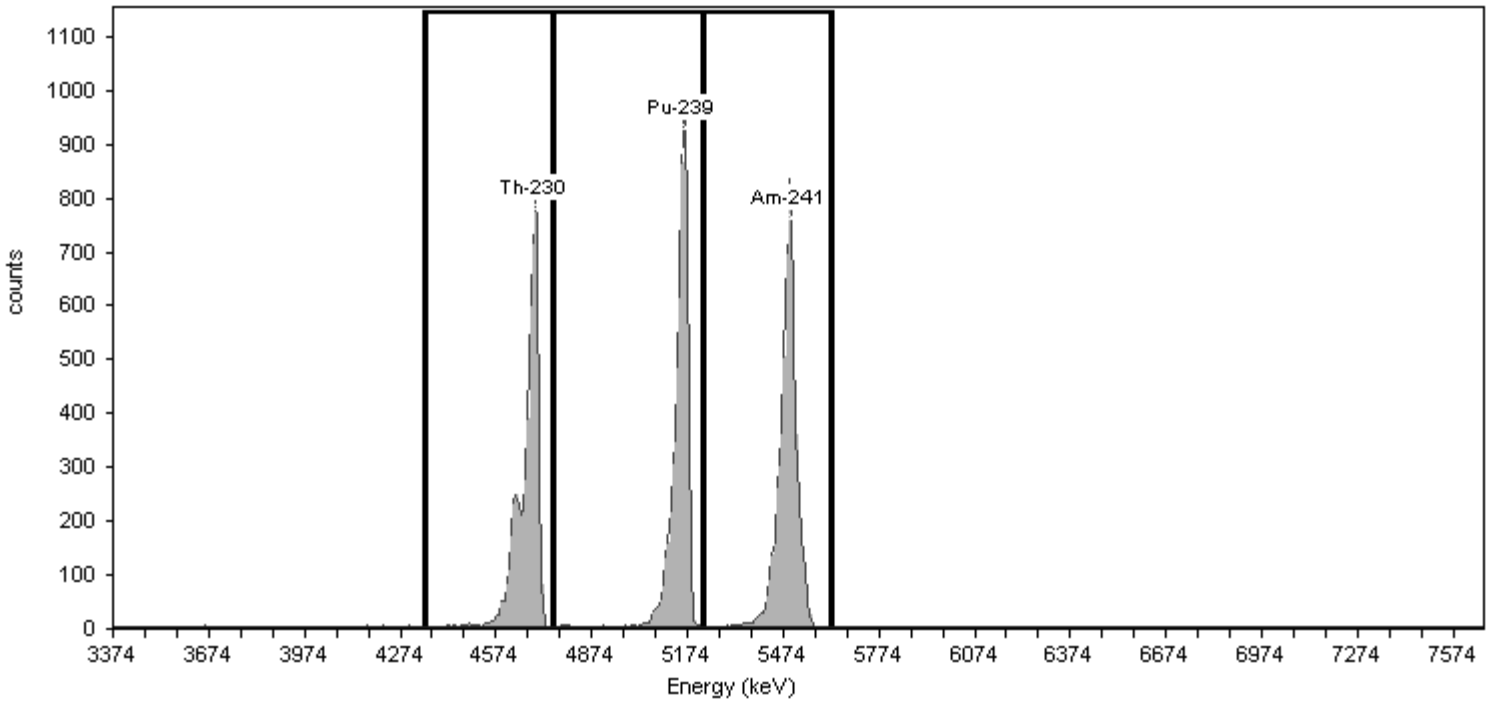
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV45 , SN: 48-158FF2
Acquisition Start Date: 5/8/2014 2:32:48PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.58% +/- 0.46% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,659.00	94.32
Pu-239	240	5.16	186	249	5,682.00	94.70
Am-241	284	5.49	249	303	6,066.00	101.10

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:20:40PM 5/8/2014

Calibration

Sample Name: ICV-9817;AV46-20140507
Description:
Detector: AV46

Calibration Date: 5/8/2014 2:20:37PM
Analyst: 60040

Source Info

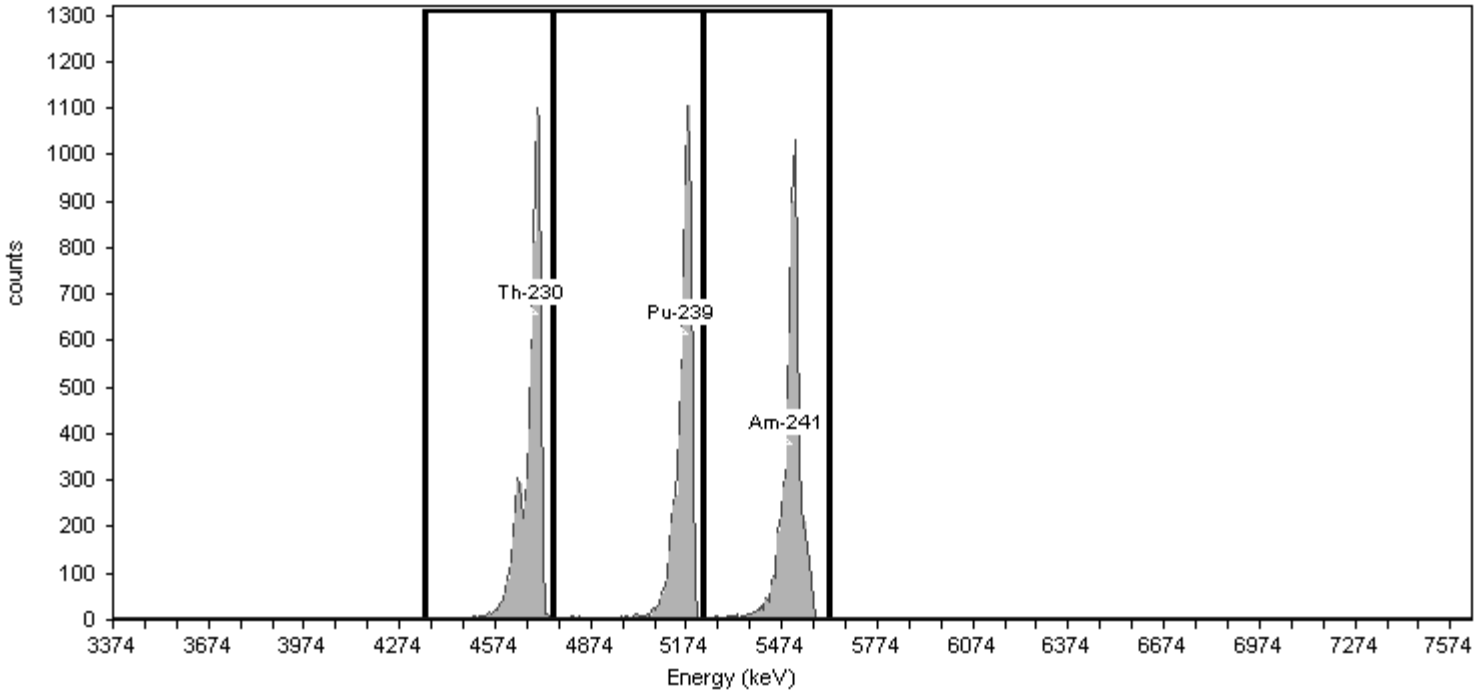
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV46 , SN: 49-202GG2
Acquisition Start Date: 5/8/2014 12:18:27AM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 26.10% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,959.00	115.98
Pu-239	240	5.16	186	249	6,287.00	104.78
Am-241	284	5.49	249	303	6,423.00	107.05

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:56:35PM 5/8/2014

Calibration

Sample Name: ICV-9886;AV49-050814
Description:
Detector: AV49

Calibration Date: 5/8/2014 4:56:32PM
Analyst: 60040

Source Info

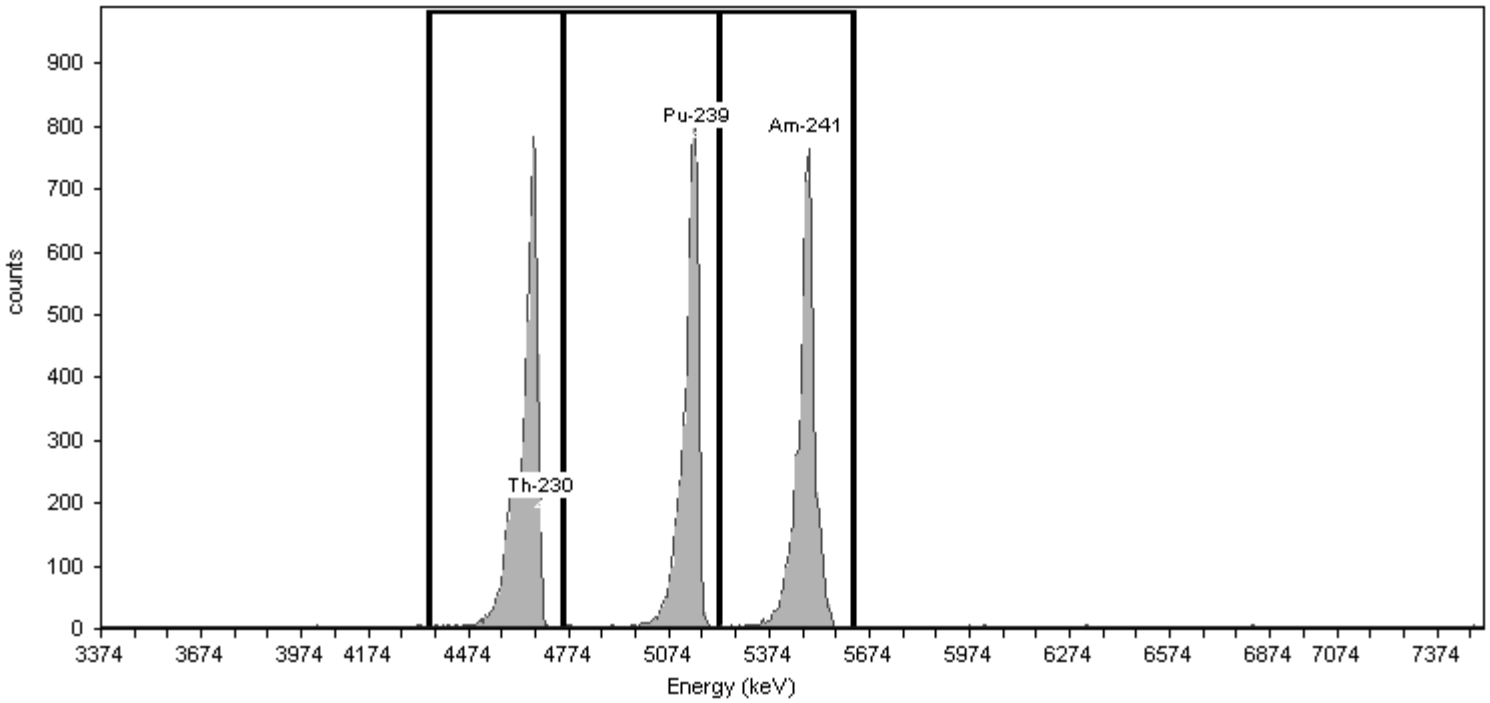
Certificate ID: 82247-334
Prepared by: Analytics

Certification Date: 6/10/2010 12:00:00PM
Description:

Acquisition

Detector: AV49 , SN: 47-043hh4
Acquisition Start Date: 5/8/2014 2:34:10PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 25.45% +/- 0.45% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,790.00	96.50
Pu-239	240	5.16	186	249	5,422.00	90.37
Am-241	284	5.49	249	303	5,531.00	92.18

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:56:41PM 5/8/2014

Calibration

Sample Name: ICV-7107;AV50-050814
Description:
Detector: AV50

Calibration Date: 5/8/2014 4:56:38PM
Analyst: 60040

Source Info

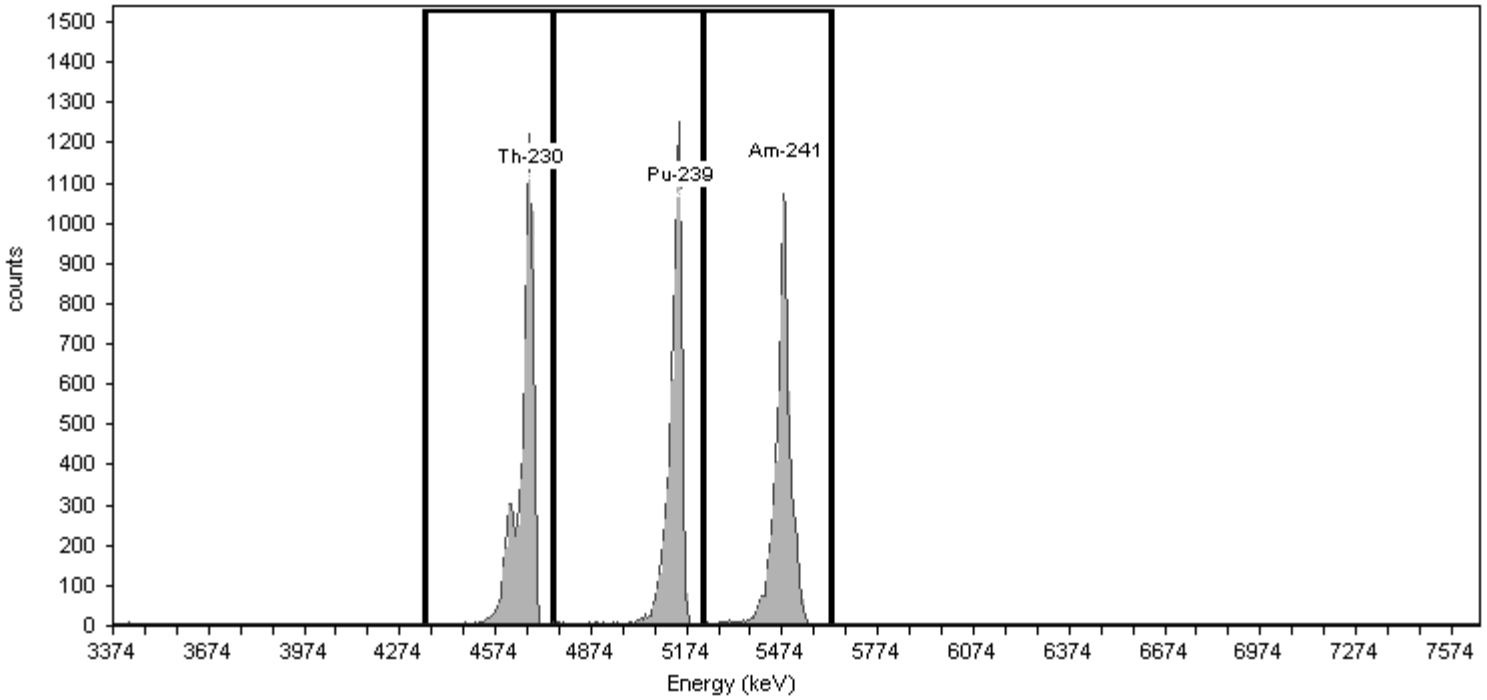
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV50 , SN: 50-060W2
Acquisition Start Date: 5/8/2014 2:34:26PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.92% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	7,259.00	120.98
Pu-239	240	5.16	186	249	7,052.00	117.53
Am-241	284	5.49	249	303	7,031.00	117.18

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:24:12PM 5/11/2014

Calibration

Sample Name: ICV-8874;AV51-20140508
Description:
Detector: AV51

Calibration Date: 5/11/2014 7:11:36PM
Analyst: 60040

Source Info

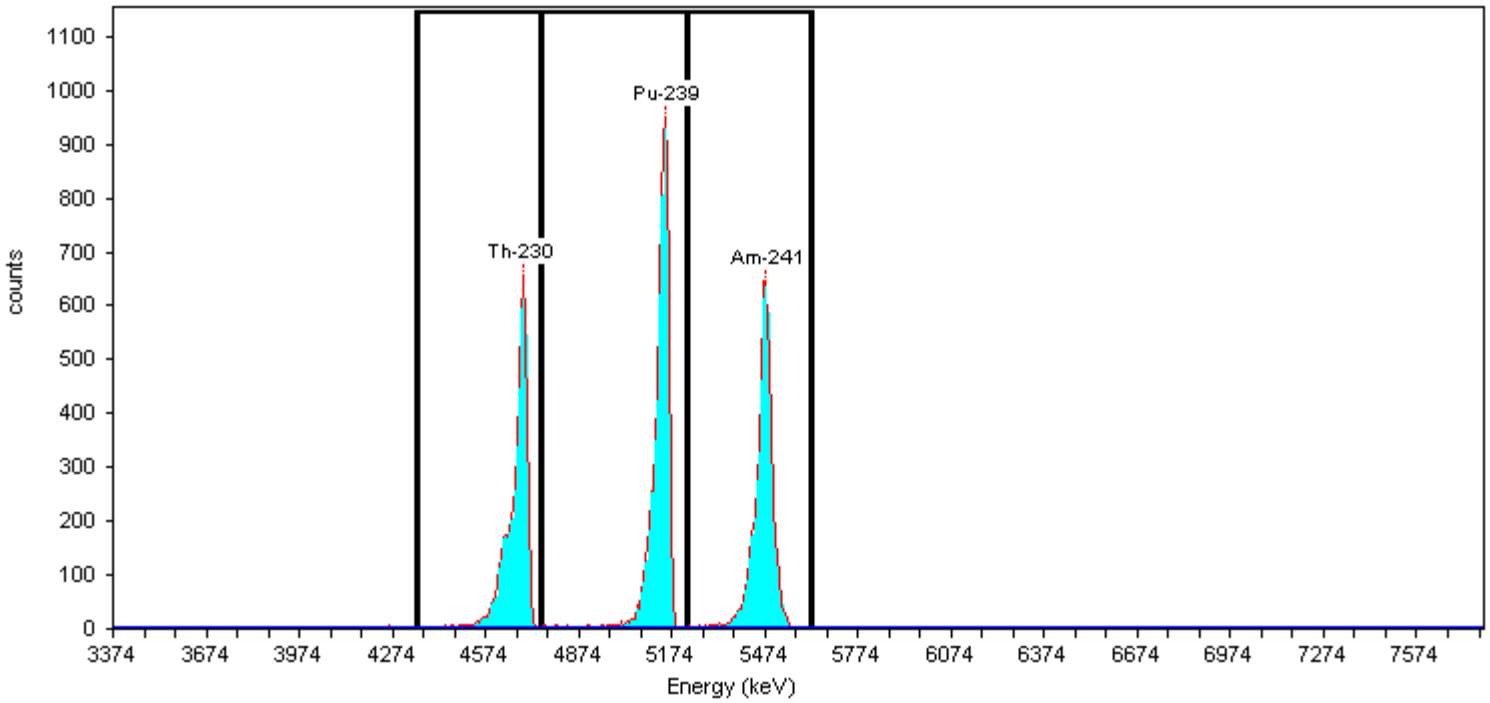
Certificate ID: 82233-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV51 , SN: 48-109I1
Acquisition Start Date: 5/8/2014 5:17:28PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.93% +/- 0.50% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	4,588.00	76.47
Pu-239	240	5.16	186	249	6,104.00	101.73
Am-241	284	5.49	249	303	4,927.00	82.12

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:54:55PM 5/11/2014

Calibration

Sample Name: ICV-9520;AV115-20140511
Description:
Detector: AV115

Calibration Date: 5/11/2014 9:54:52PM
Analyst: 60040

Source Info

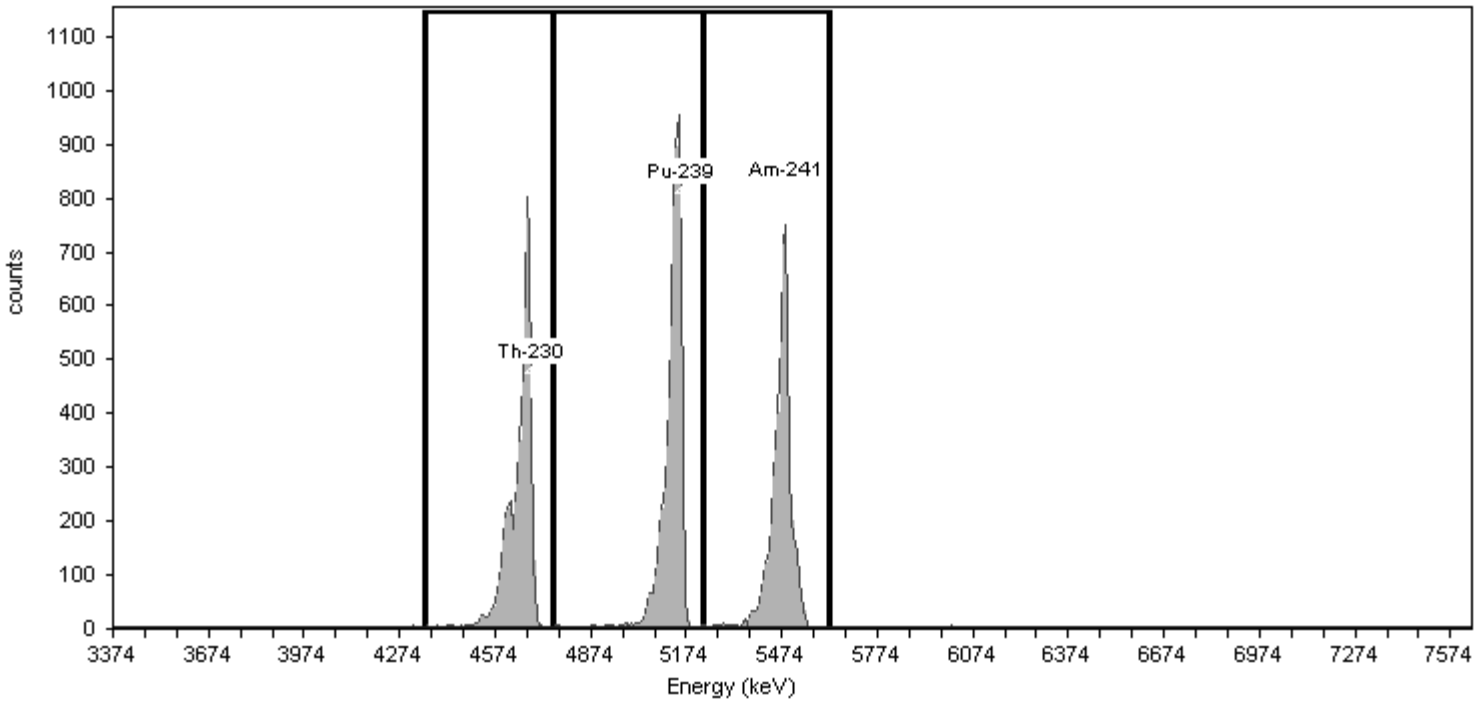
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV115 , SN: 49-037E4
Acquisition Start Date: 5/11/2014 8:54:45PM
Live Time: 60.00 min.
Real Time: 60.54 min.
Efficiency: 26.72% +/- 0.48% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,492.00	91.53
Pu-239	240	5.16	186	249	6,274.00	104.57
Am-241	284	5.49	249	303	5,418.00	90.30

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:09:36PM 5/11/2014

Calibration

Sample Name: ICV-9884;AV116-20140511
Description:
Detector: AV116

Calibration Date: 5/11/2014 11:09:33PM
Analyst: 60040

Source Info

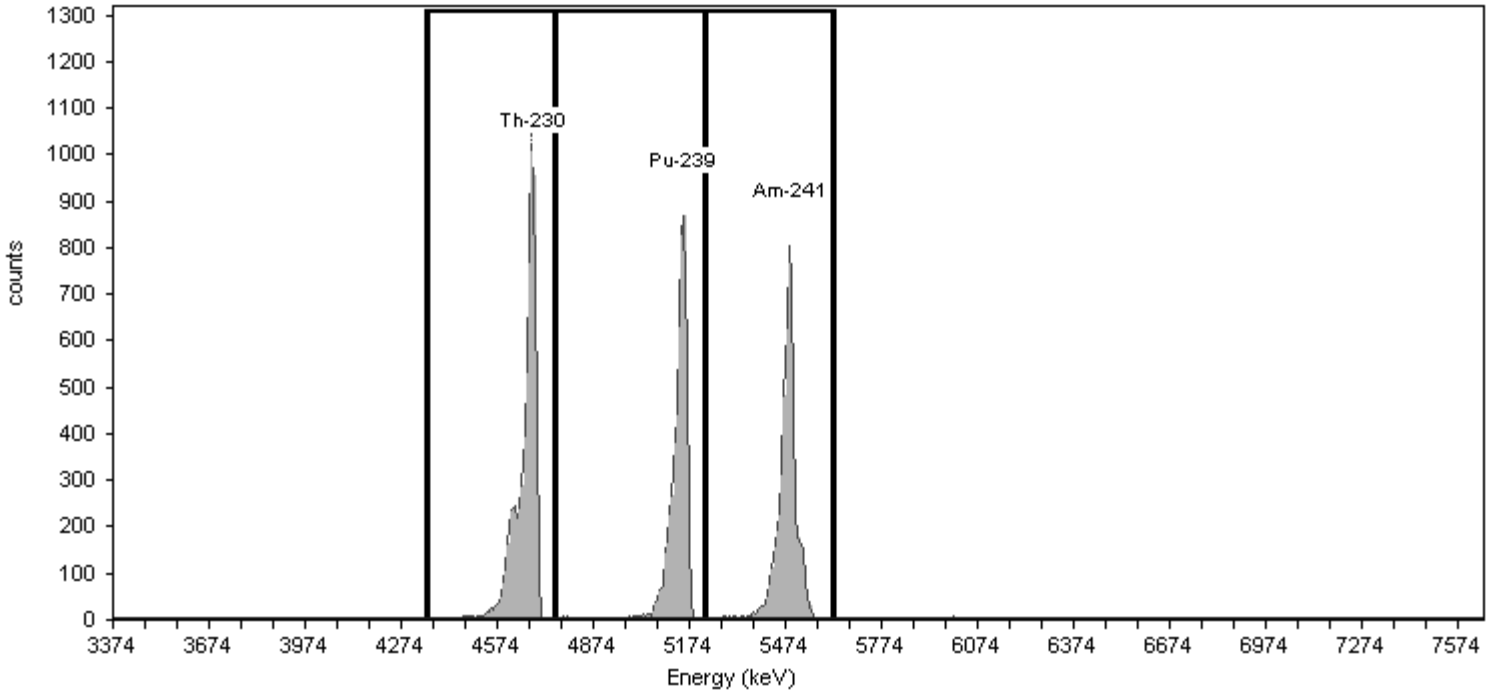
Certificate ID: 82245-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV116 , SN: 49-034G1
Acquisition Start Date: 5/11/2014 10:06:08PM
Live Time: 60.00 min.
Real Time: 60.06 min.
Efficiency: 26.03% +/- 0.48% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,269.00	104.48
Pu-239	240	5.16	186	249	5,050.00	84.17
Am-241	284	5.49	249	303	5,237.00	87.28

Monthly Calibration Verifications

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:48:39PM 6/19/2014

Calibration

Sample Name: CCV-8875;AV3-20140619
Description:
Detector: AV3

Calibration Date: 6/19/2014 5:48:36PM
Analyst: 60040

Source Info

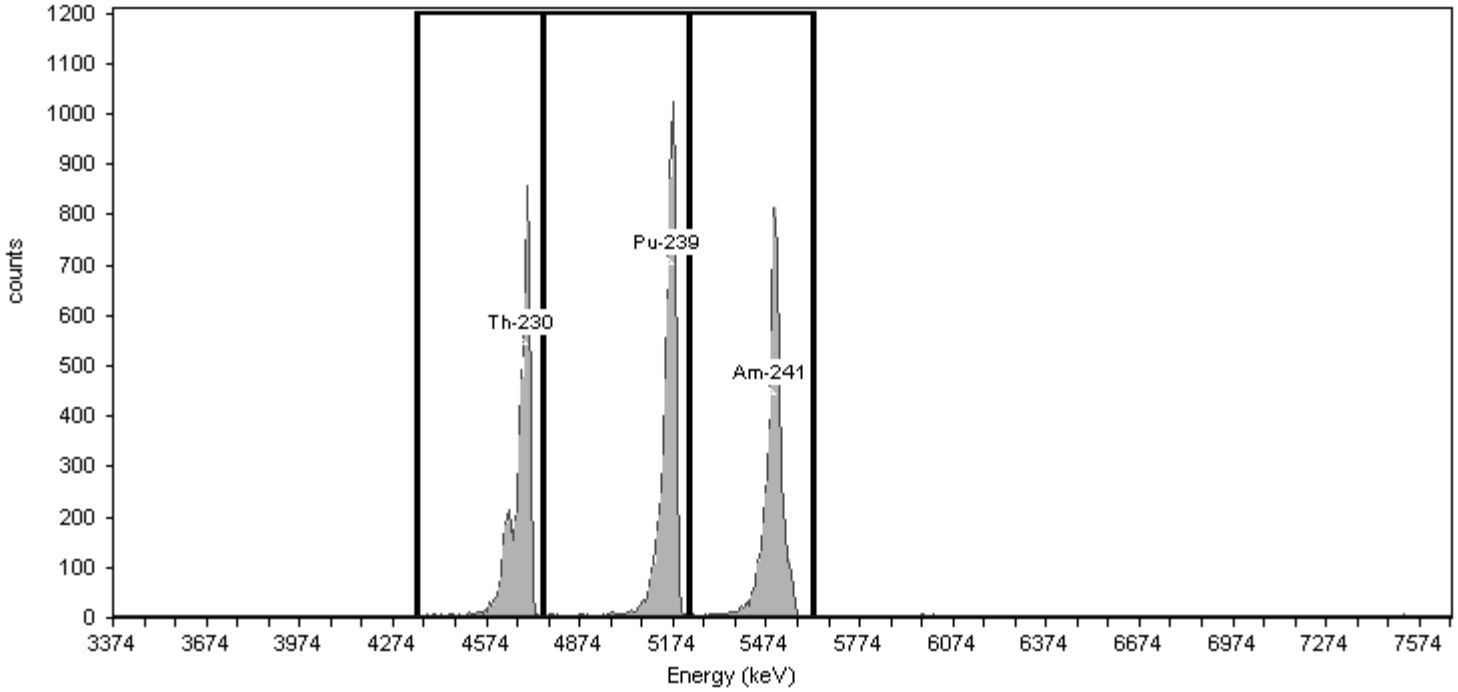
Certificate ID: 82234-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV3 , SN: 49-202 FF7
Acquisition Start Date: 6/19/2014 4:44:05PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 25.66% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,062.00	84.37
Pu-239	240	5.16	186	249	5,704.00	95.07
Am-241	284	5.49	249	303	5,177.00	86.28

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:48:45PM 6/19/2014

Calibration

Sample Name: CCV-8876;AV4-20140619
Description:
Detector: AV4

Calibration Date: 6/19/2014 5:48:42PM
Analyst: 60040

Source Info

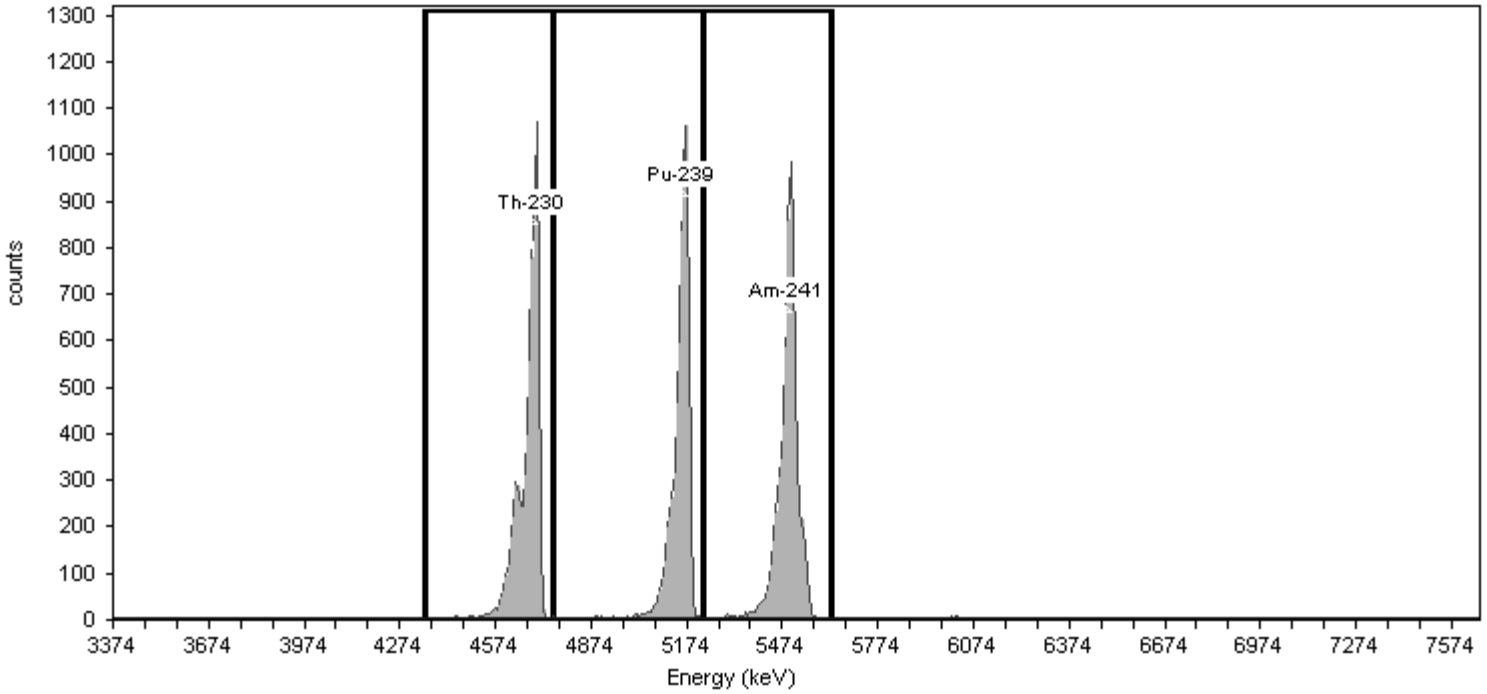
Certificate ID: 82235-334
Prepared by: Analytics

Certification Date: 6/4/2010 12:00:00PM
Description:

Acquisition

Detector: AV4 , SN: 46-033Q4
Acquisition Start Date: 6/19/2014 4:44:15PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 25.90% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,819.00	113.65
Pu-239	240	5.16	186	249	6,370.00	106.17
Am-241	284	5.49	249	303	6,852.00	114.20

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:34:49PM 6/19/2014

Calibration

Sample Name: CCV-9520;AV6-20140619
Description:
Detector: AV6

Calibration Date: 6/19/2014 7:34:43PM
Analyst: 60040

Source Info

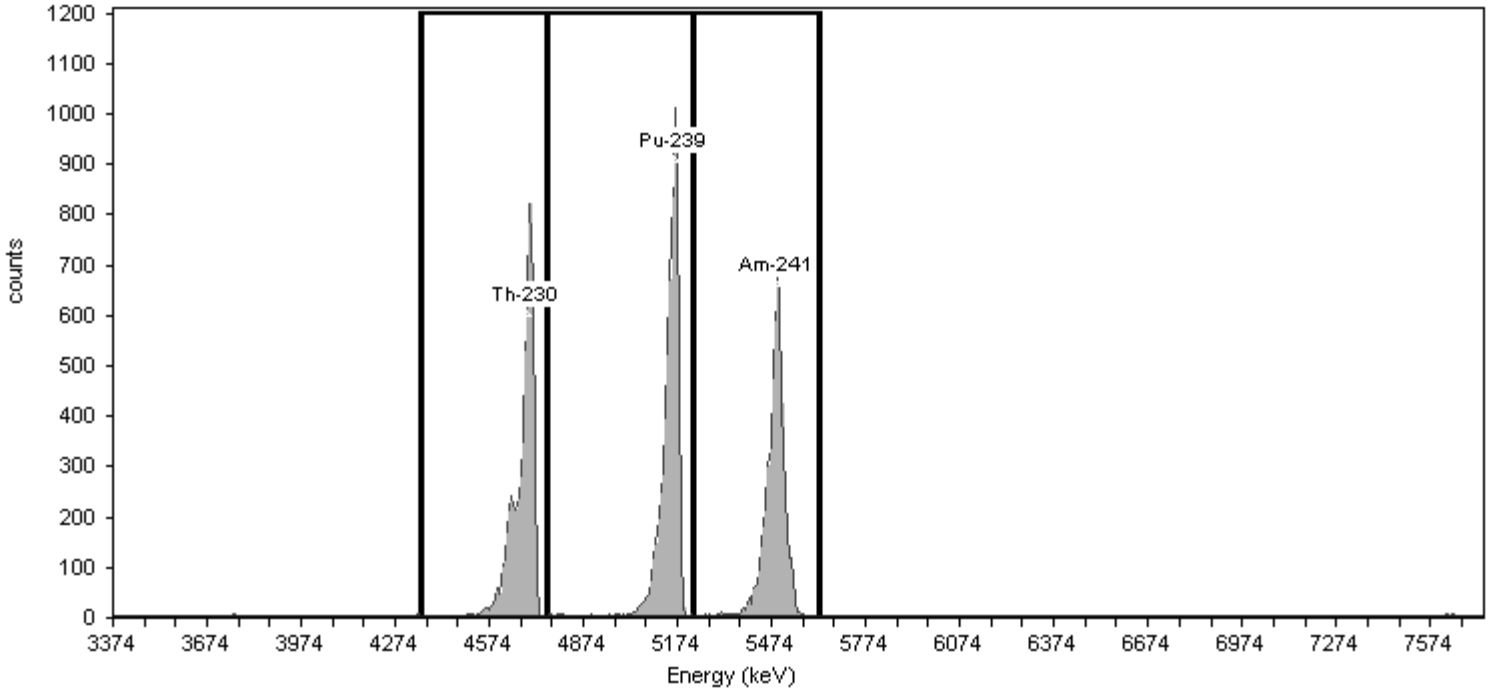
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV6 , SN: 47-27FF2
Acquisition Start Date: 6/19/2014 6:06:10PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.06% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,375.00	89.58
Pu-239	240	5.16	186	249	6,255.00	104.25
Am-241	284	5.49	249	303	5,126.00	85.43

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:48:52PM 6/19/2014

Calibration

Sample Name: CCV-8877;AV7-20140619
Description:
Detector: AV7

Calibration Date: 6/19/2014 5:48:49PM
Analyst: 60040

Source Info

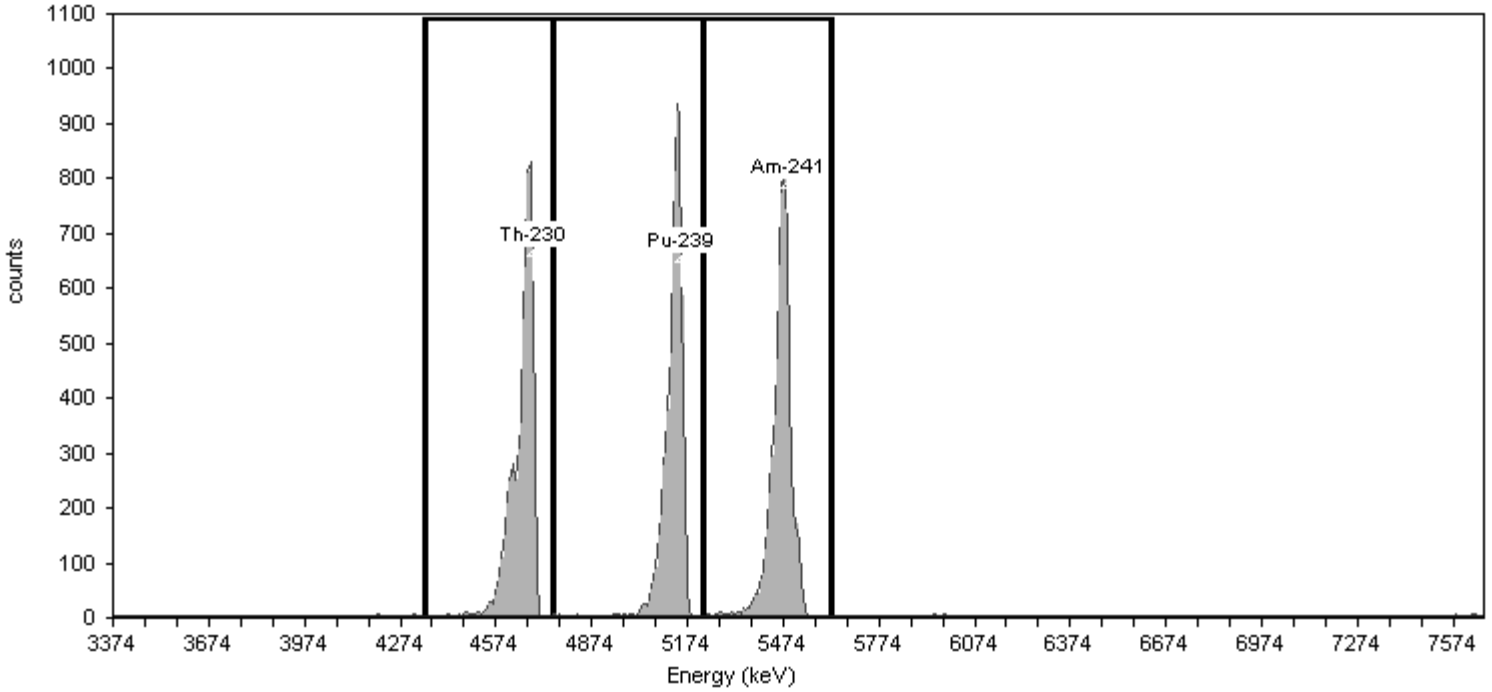
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV7 , SN: 48-158EE5
Acquisition Start Date: 6/19/2014 4:44:29PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 25.49% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,271.00	104.52
Pu-239	240	5.16	186	249	6,395.00	106.58
Am-241	284	5.49	249	303	6,298.00	104.97

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:35:00PM 6/19/2014

Calibration

Sample Name: CCV-9792;AV8-20140619
Description:
Detector: AV8

Calibration Date: 6/19/2014 7:34:56PM
Analyst: 60040

Source Info

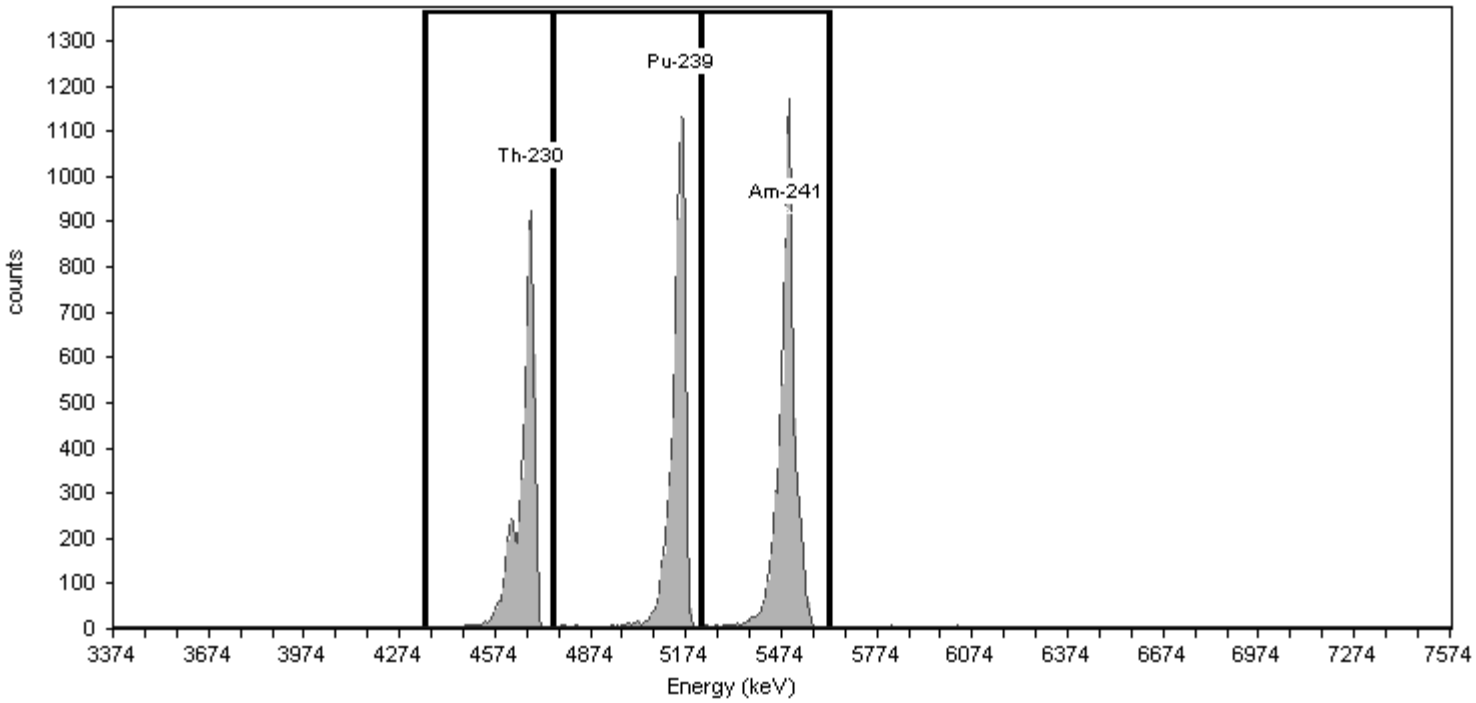
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV8 , SN: 41-137Q6
Acquisition Start Date: 6/19/2014 6:06:25PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.68% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,944.00	99.07
Pu-239	240	5.16	186	249	6,972.00	116.20
Am-241	284	5.49	249	303	7,944.00	132.40

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:35:06PM 6/19/2014

Calibration

Sample Name: CCV-9793;AV9-20140619
Description:
Detector: AV9

Calibration Date: 6/19/2014 7:35:02PM
Analyst: 60040

Source Info

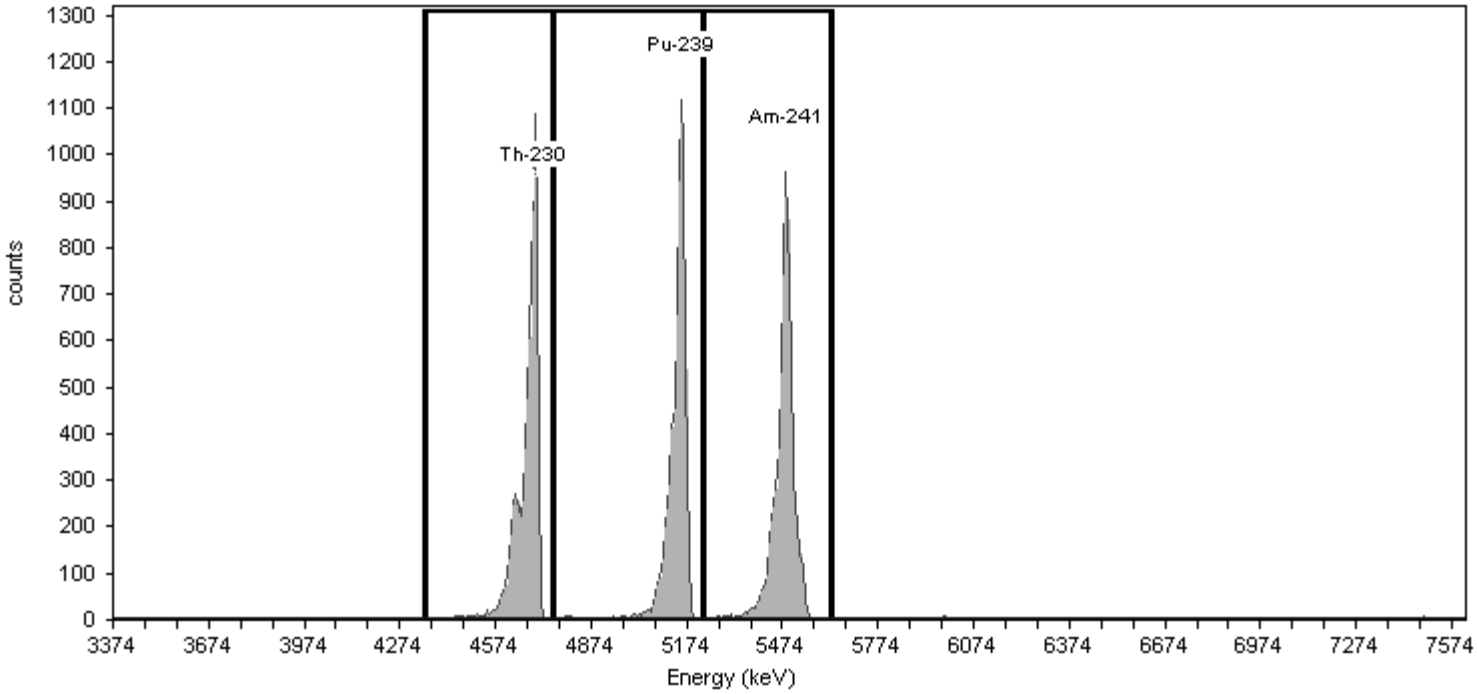
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV9 , SN: 51-082V5
Acquisition Start Date: 6/19/2014 6:06:37PM
Live Time: 60.00 min.
Real Time: 60.36 min.
Efficiency: 27.01% +/- 0.44% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,506.00	108.43
Pu-239	240	5.16	186	249	6,521.00	108.68
Am-241	284	5.49	249	303	6,451.00	107.52

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:35:13PM 6/19/2014

Calibration

Sample Name: CCV-9794;AV10-20140619
Description:
Detector: AV10

Calibration Date: 6/19/2014 7:35:09PM
Analyst: 60040

Source Info

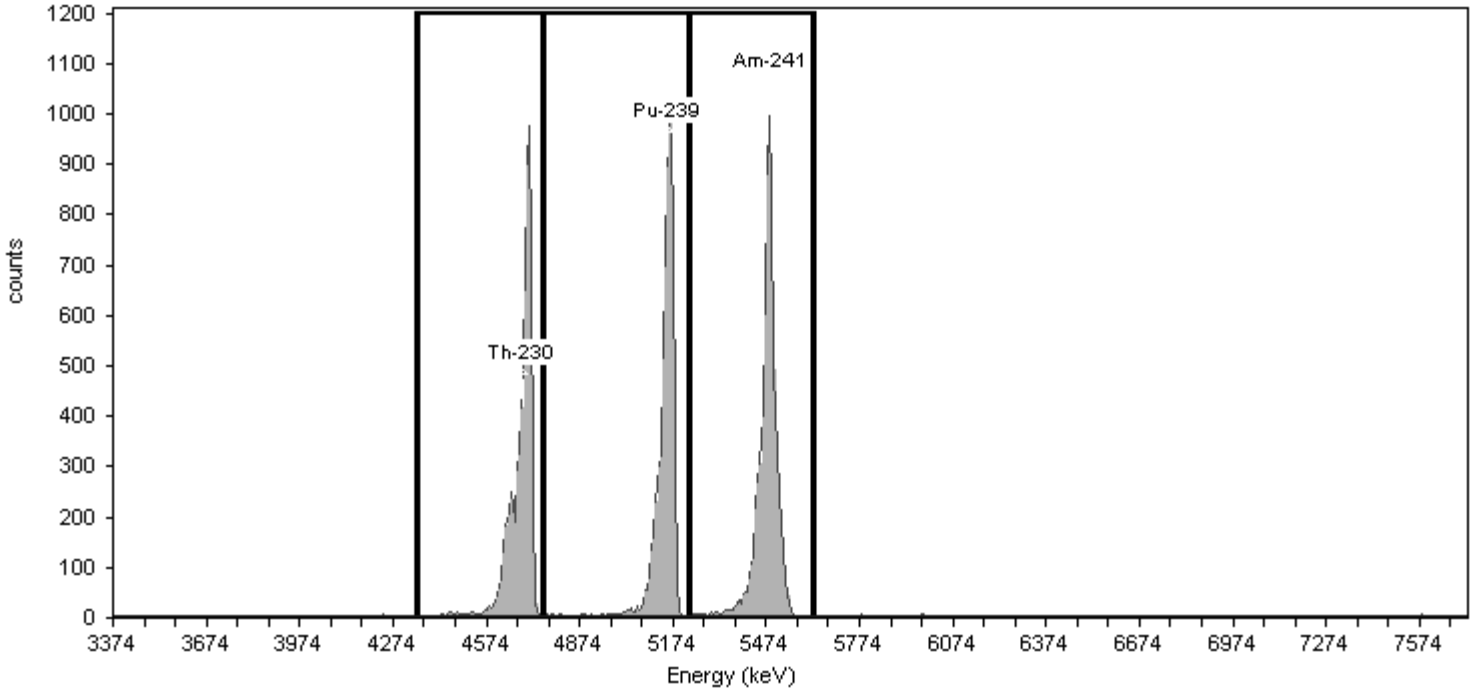
Certificate ID: 82242-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV10 , SN: 49-155N2
Acquisition Start Date: 6/19/2014 6:06:52PM
Live Time: 60.00 min.
Real Time: 60.36 min.
Efficiency: 25.52% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,044.00	100.73
Pu-239	240	5.16	186	249	5,811.00	96.85
Am-241	284	5.49	249	303	6,611.00	110.18

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:35:19PM 6/19/2014

Calibration

Sample Name: CCV-9795;AV11-20140619
Description:
Detector: AV11

Calibration Date: 6/19/2014 7:35:16PM
Analyst: 60040

Source Info

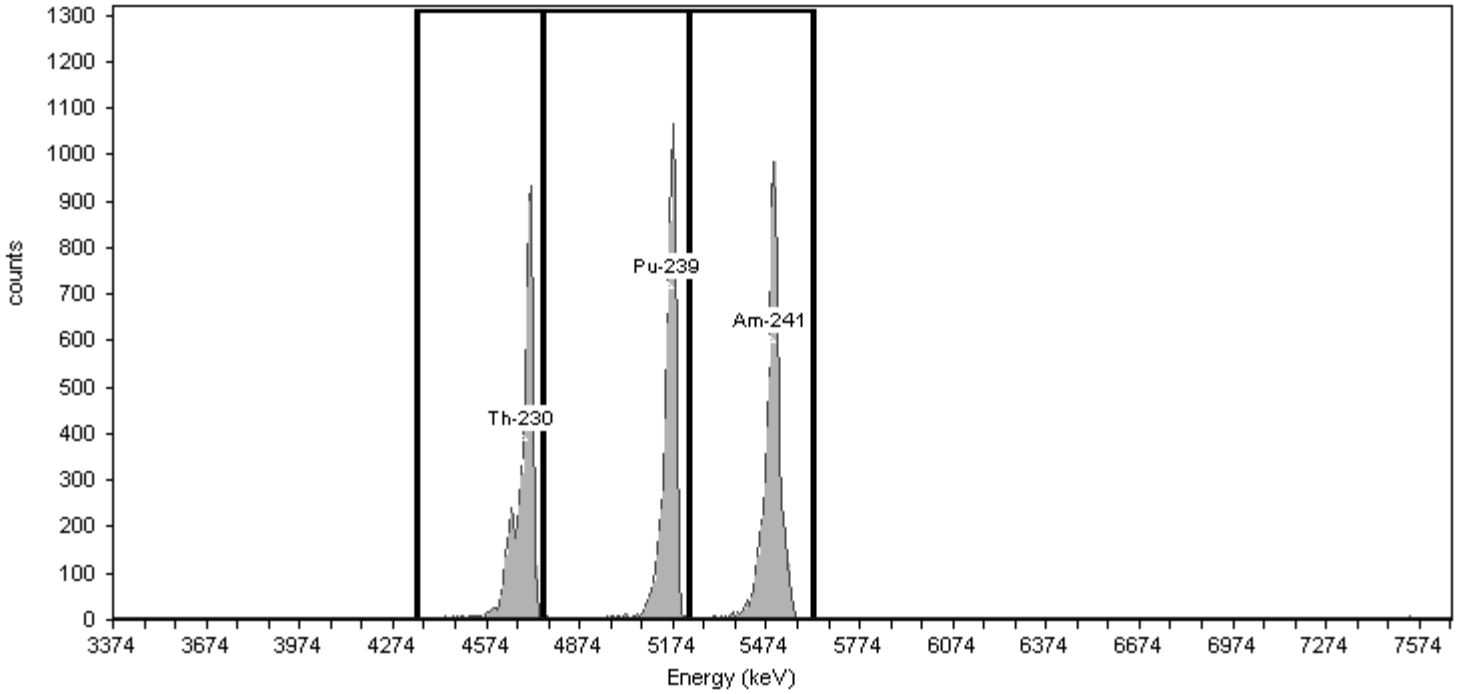
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV11 , SN: 49-155dd2
Acquisition Start Date: 6/19/2014 6:07:01PM
Live Time: 60.00 min.
Real Time: 60.36 min.
Efficiency: 26.47% +/- 0.46% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,658.00	94.30
Pu-239	240	5.16	186	249	5,667.00	94.45
Am-241	284	5.49	249	303	6,008.00	100.13

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:35:25PM 6/19/2014

Calibration

Sample Name: CCV-9817;AV12-20140619
Description:
Detector: AV12

Calibration Date: 6/19/2014 7:35:21PM
Analyst: 60040

Source Info

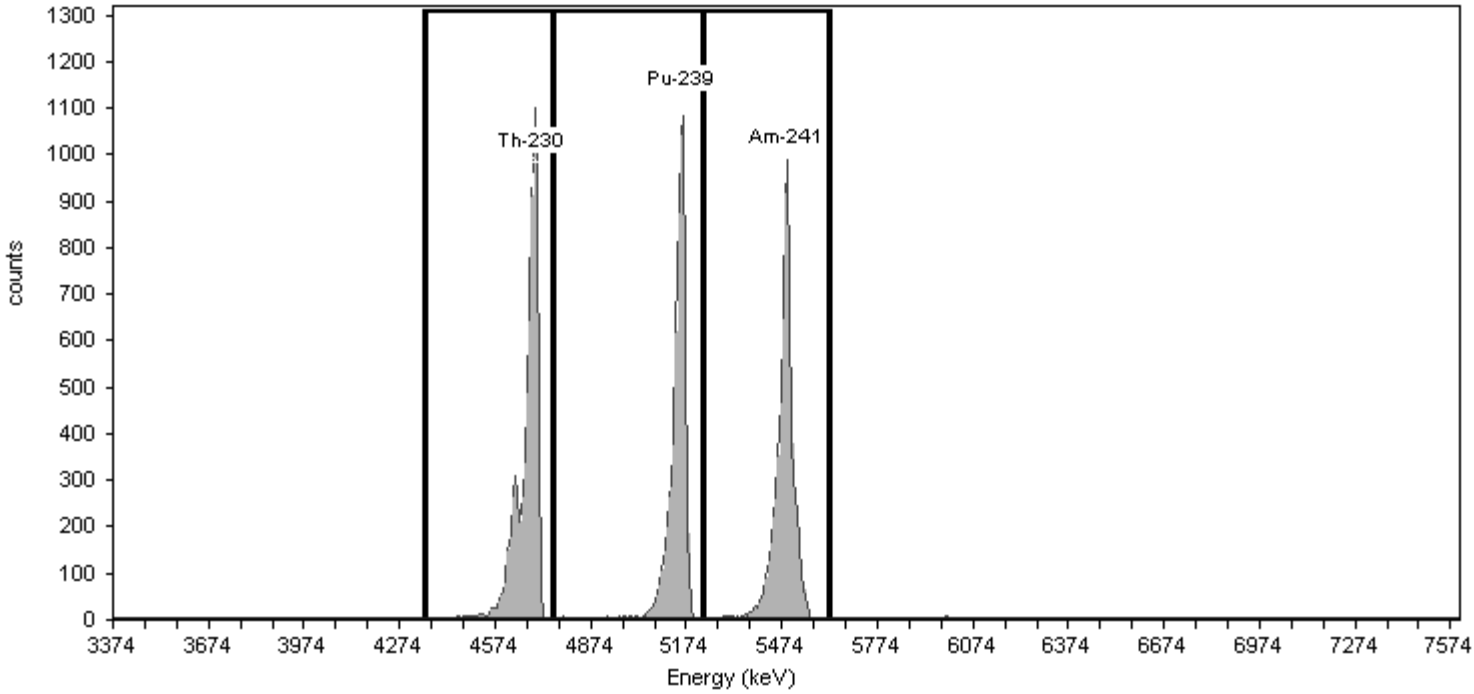
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV12 , SN: 51-082B7
Acquisition Start Date: 6/19/2014 6:07:13PM
Live Time: 60.00 min.
Real Time: 60.36 min.
Efficiency: 25.83% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,873.00	114.55
Pu-239	240	5.16	186	249	6,157.00	102.62
Am-241	284	5.49	249	303	6,435.00	107.25

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:19:56PM 6/22/2014

Calibration

Sample Name: CCV-9884;AV13-20140619a
Description:
Detector: AV13

Calibration Date: 6/22/2014 5:19:48PM
Analyst: 60040

Source Info

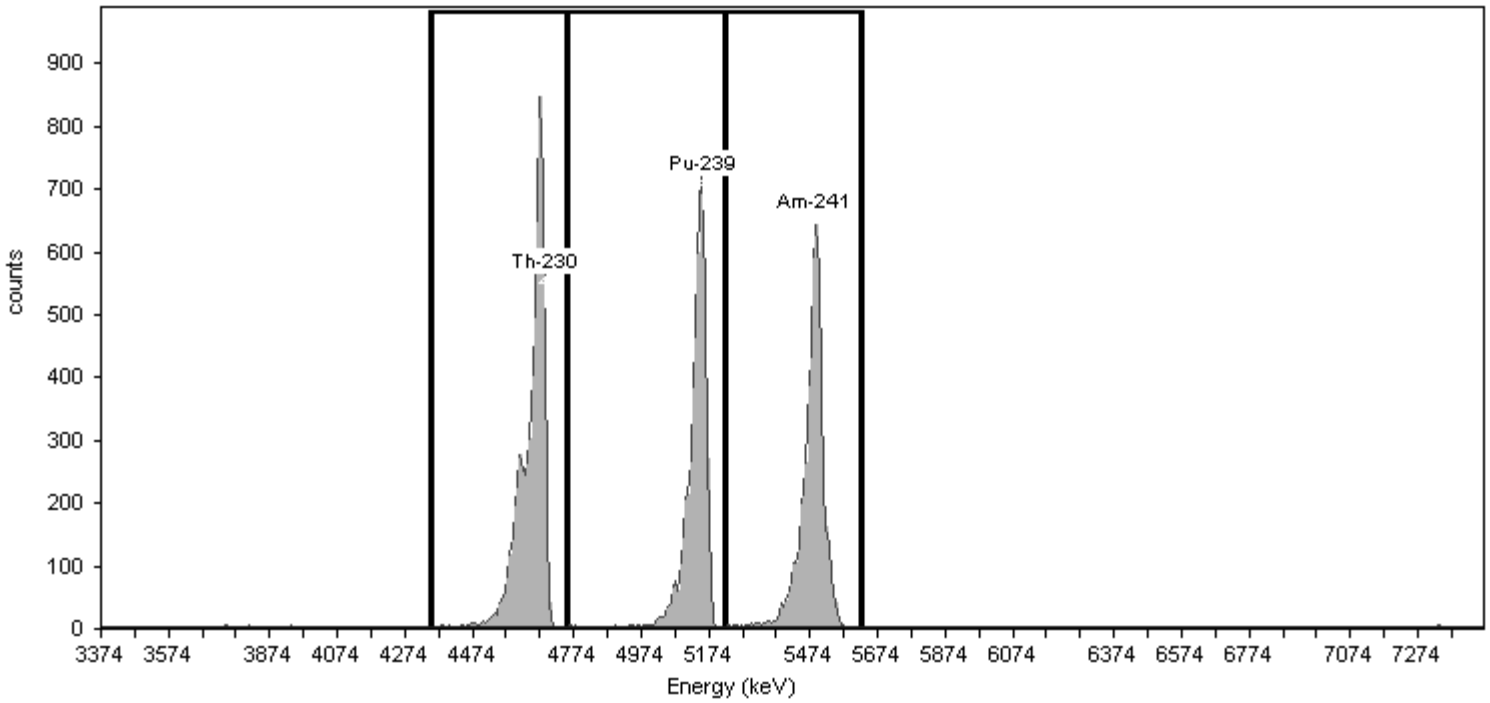
Certificate ID: 82245-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV13 , SN: 49-155M7
Acquisition Start Date: 6/19/2014 7:45:11PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 25.66% +/- 0.48% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,201.00	103.35
Pu-239	240	5.16	186	249	5,023.00	83.72
Am-241	284	5.49	249	303	5,096.00	84.93

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:35:46PM 6/19/2014

Calibration

Sample Name: CCV-9885;AV14-20140619
Description:
Detector: AV14

Calibration Date: 6/19/2014 7:35:43PM
Analyst: 60040

Source Info

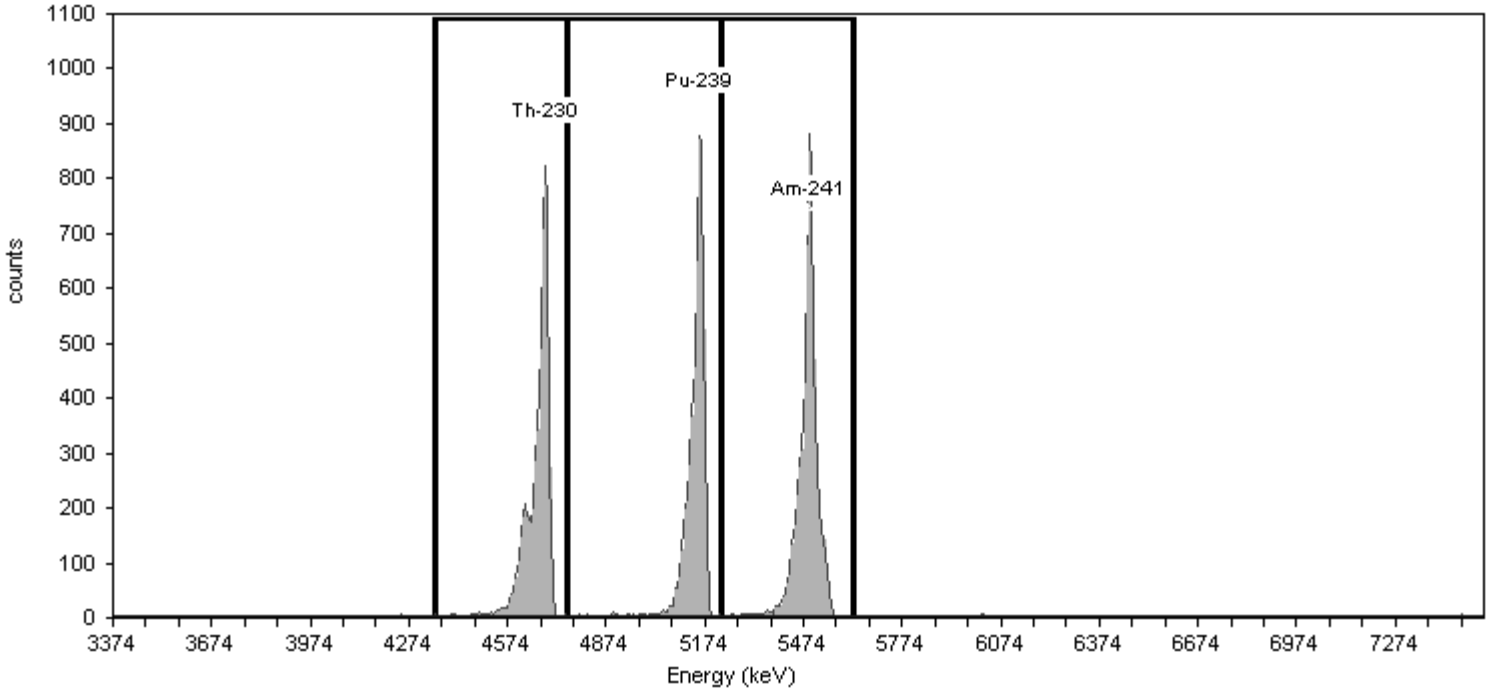
Certificate ID: 82246-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV14 , SN: 50-060W4
Acquisition Start Date: 6/19/2014 6:08:37PM
Live Time: 60.00 min.
Real Time: 60.36 min.
Efficiency: 26.15% +/- 0.49% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,216.00	86.93
Pu-239	240	5.16	186	249	5,025.00	83.75
Am-241	284	5.49	249	303	5,658.00	94.30

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:20:06PM 6/22/2014

Calibration

Sample Name: CCV-9886;AV15-20140619
Description:
Detector: AV15

Calibration Date: 6/22/2014 5:20:02PM
Analyst: 60040

Source Info

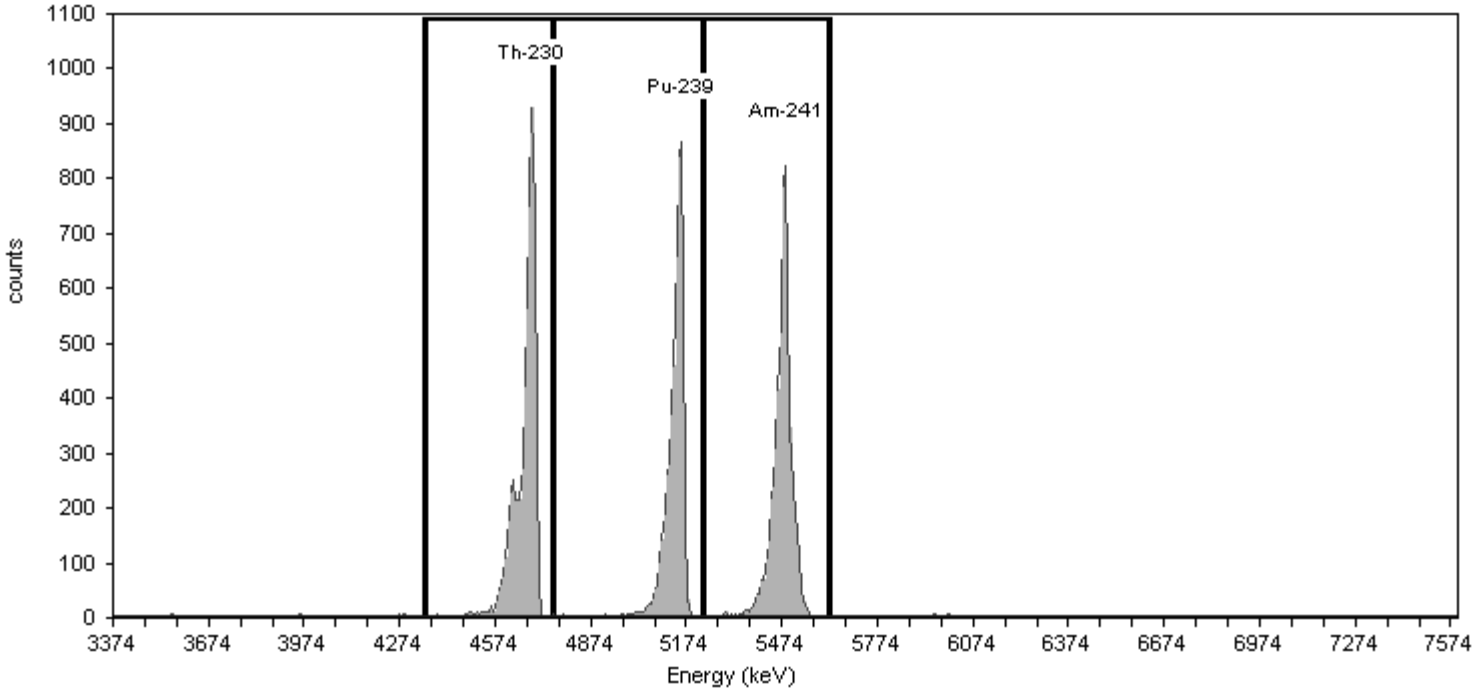
Certificate ID: 82247-334
Prepared by: Analytics

Certification Date: 6/10/2010 12:00:00PM
Description:

Acquisition

Detector: AV15 , SN: 41-172C5
Acquisition Start Date: 6/19/2014 7:45:33PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 25.28% +/- 0.45% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,765.00	96.08
Pu-239	240	5.16	186	249	5,241.00	87.35
Am-241	284	5.49	249	303	5,610.00	93.50

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:36:04PM 6/19/2014

Calibration

Sample Name: CCV-7107;AV16-20140619
Description:
Detector: AV16

Calibration Date: 6/19/2014 7:36:00PM
Analyst: 60040

Source Info

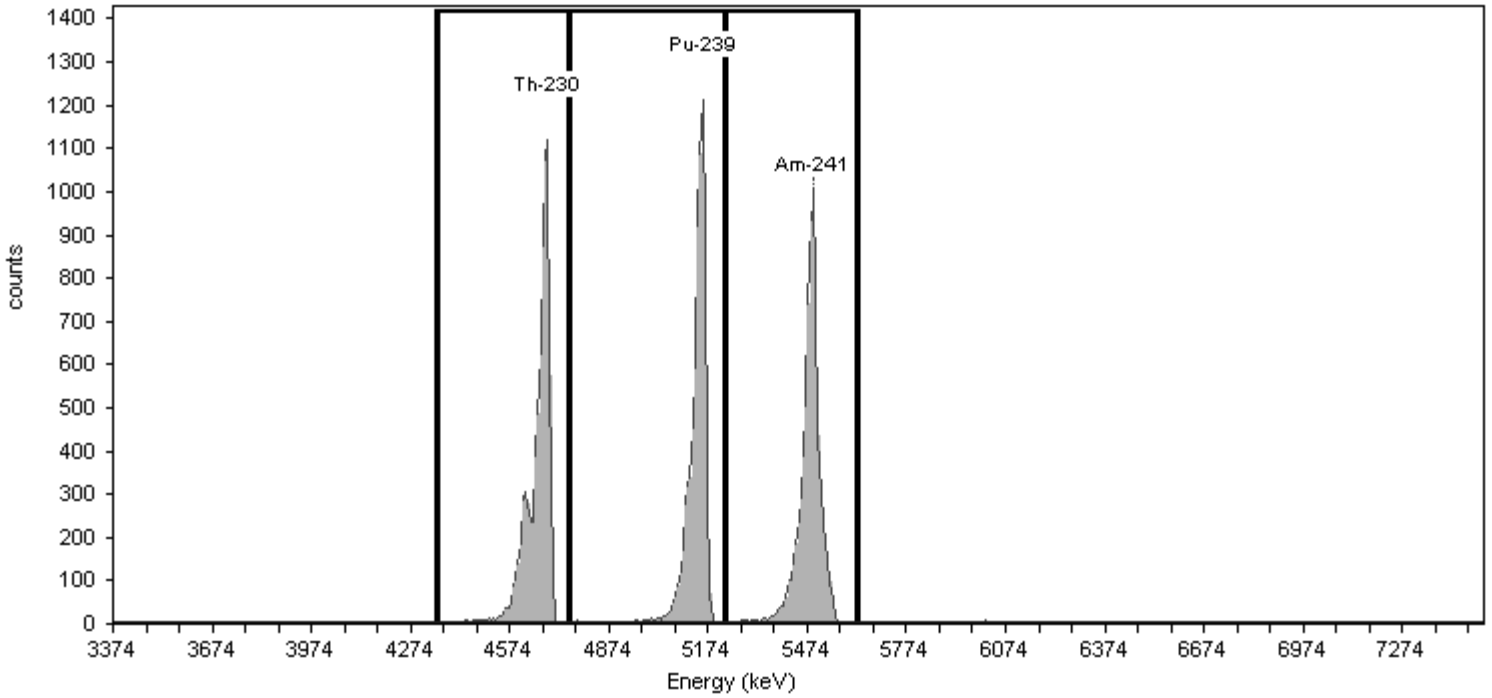
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV16 , SN: 51-082B6
Acquisition Start Date: 6/19/2014 6:08:38PM
Live Time: 60.00 min.
Real Time: 60.36 min.
Efficiency: 27.12% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	7,280.00	121.33
Pu-239	240	5.16	186	249	7,094.00	118.23
Am-241	284	5.49	249	303	7,128.00	118.80

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:35:52PM 6/19/2014

Calibration

Sample Name: CCV-8874;AV17-20140619
Description:
Detector: AV17

Calibration Date: 6/19/2014 7:35:49PM
Analyst: 60040

Source Info

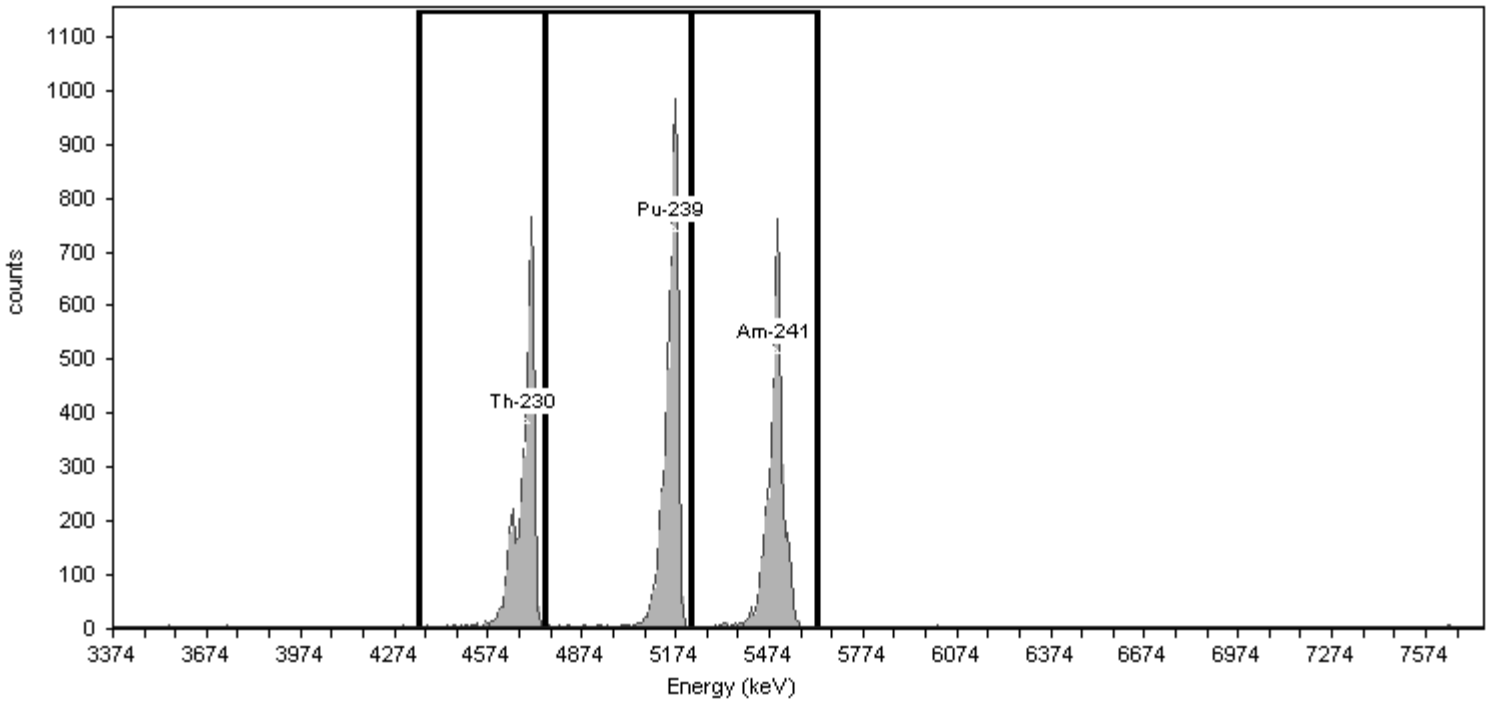
Certificate ID: 82233-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV17 , SN: 50-051C4
Acquisition Start Date: 6/19/2014 6:08:39PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 26.13% +/- 0.49% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	4,625.00	77.08
Pu-239	240	5.16	186	249	5,758.00	95.97
Am-241	284	5.49	249	303	4,757.00	79.28

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:35:58PM 6/19/2014

Calibration

Sample Name: CCV-8875;AV18-20140619
Description:
Detector: AV18

Calibration Date: 6/19/2014 7:35:55PM
Analyst: 60040

Source Info

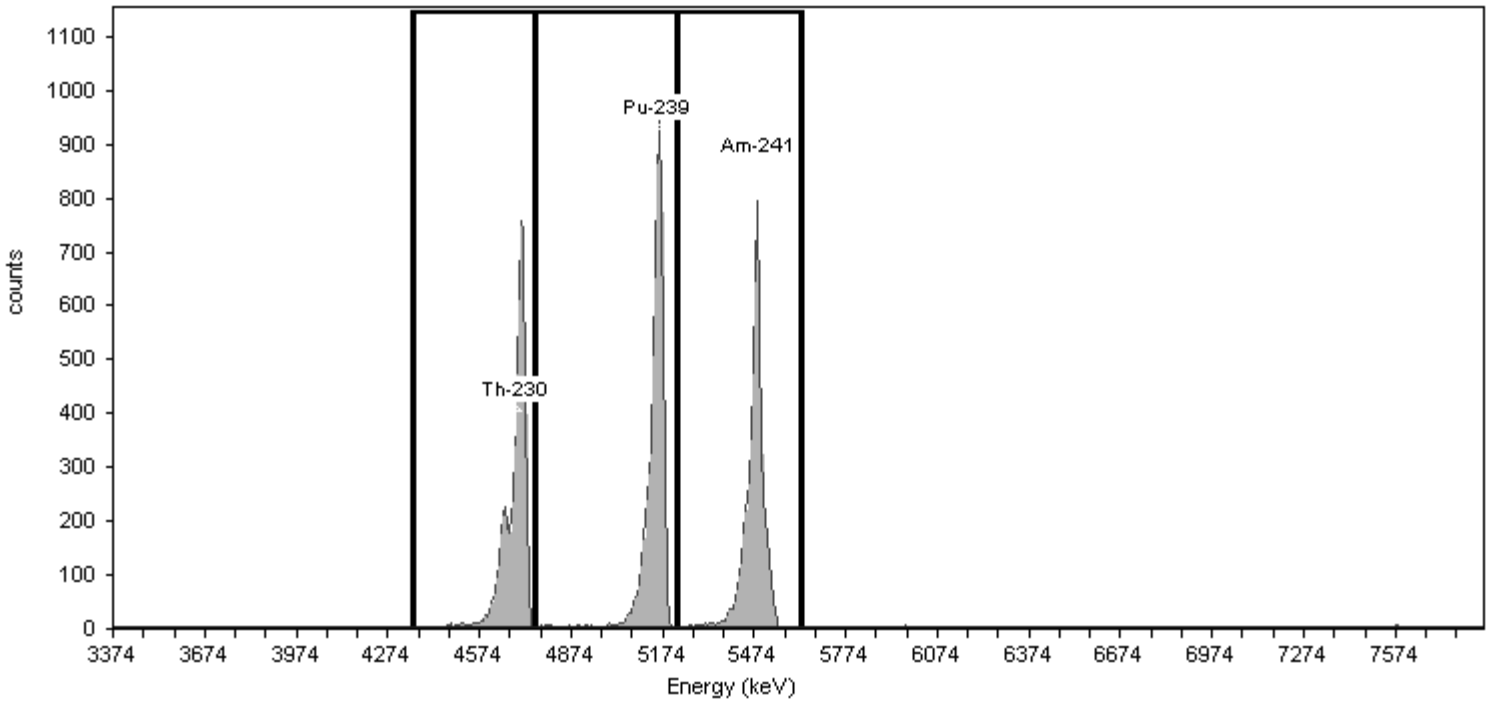
Certificate ID: 82234-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV18 , SN: 51-082C5
Acquisition Start Date: 6/19/2014 6:08:40PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 25.39% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,086.00	84.77
Pu-239	240	5.16	186	249	5,671.00	94.52
Am-241	284	5.49	249	303	5,020.00	83.67

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:36:09PM 6/19/2014

Calibration

Sample Name: CCV-8876;AV19-20140619
Description:
Detector: AV19

Calibration Date: 6/19/2014 7:36:06PM
Analyst: 60040

Source Info

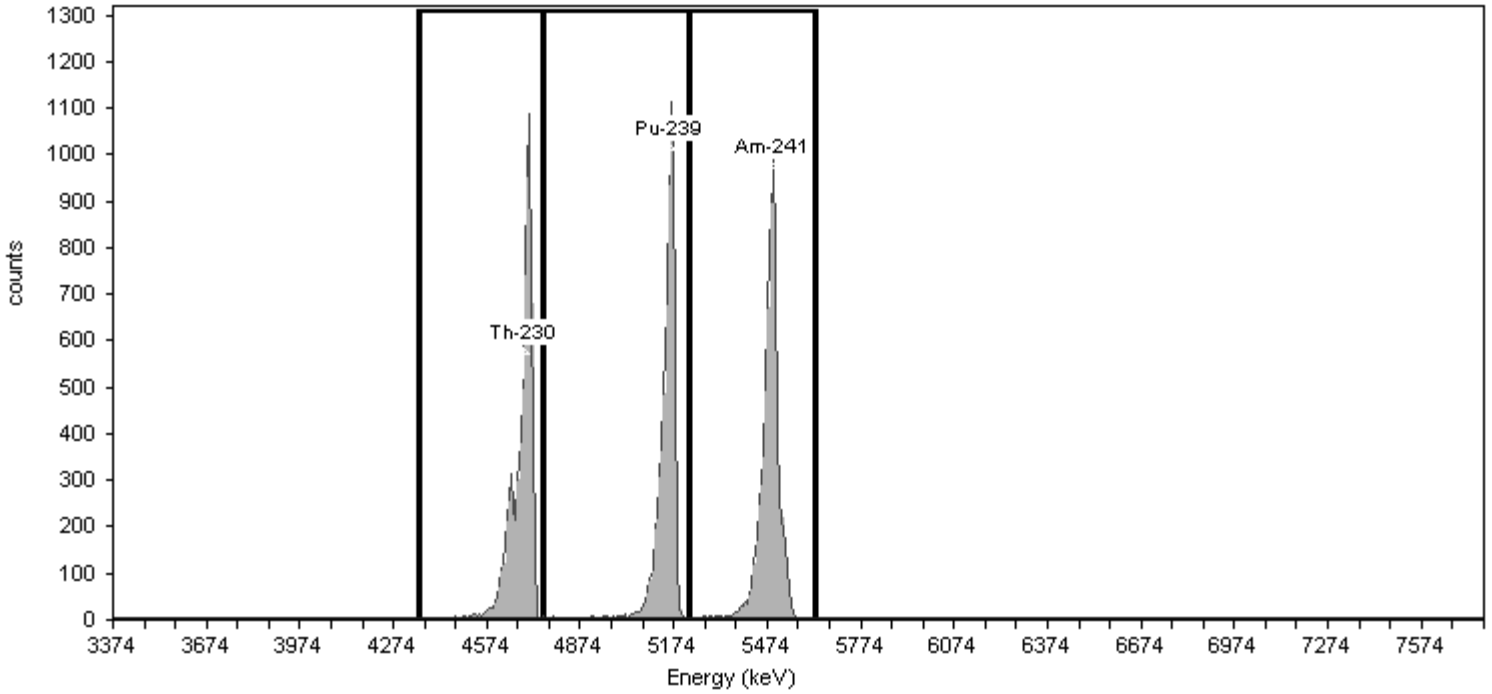
Certificate ID: 82235-334
Prepared by: Analytics

Certification Date: 6/4/2010 12:00:00PM
Description:

Acquisition

Detector: AV19 , SN: 50-025FF5
Acquisition Start Date: 6/19/2014 6:08:42PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 25.36% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,536.00	108.93
Pu-239	240	5.16	186	249	6,491.00	108.18
Am-241	284	5.49	249	303	6,610.00	110.17

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:36:15PM 6/19/2014

Calibration

Sample Name: CCV-8877;AV20-20140619
Description:
Detector: AV20

Calibration Date: 6/19/2014 7:36:12PM
Analyst: 60040

Source Info

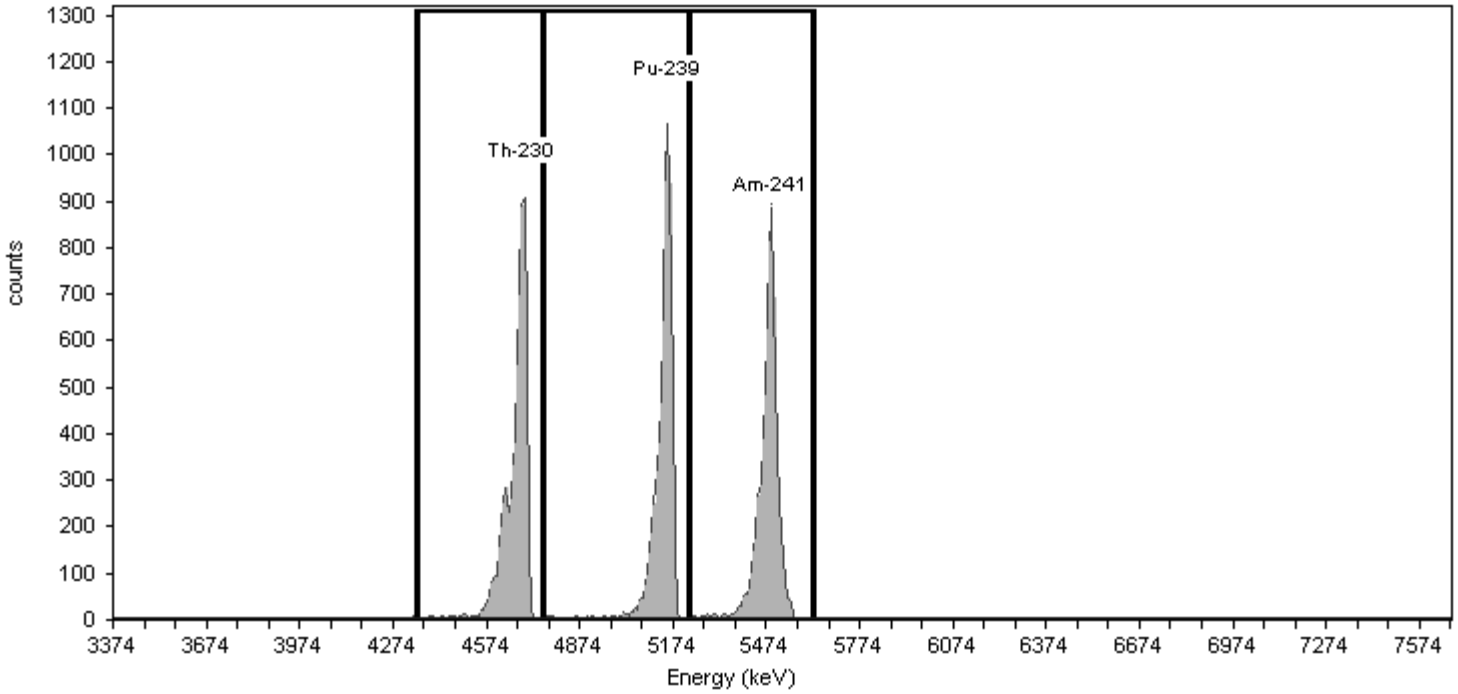
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV20 , SN: 48-121A7
Acquisition Start Date: 6/19/2014 6:08:43PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 25.77% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,402.00	106.70
Pu-239	240	5.16	186	249	6,444.00	107.40
Am-241	284	5.49	249	303	6,315.00	105.25

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:20:12PM 6/22/2014

Calibration

Sample Name: CCV-9520;AV21-20140619
Description:
Detector: AV21

Calibration Date: 6/22/2014 5:20:09PM
Analyst: 60040

Source Info

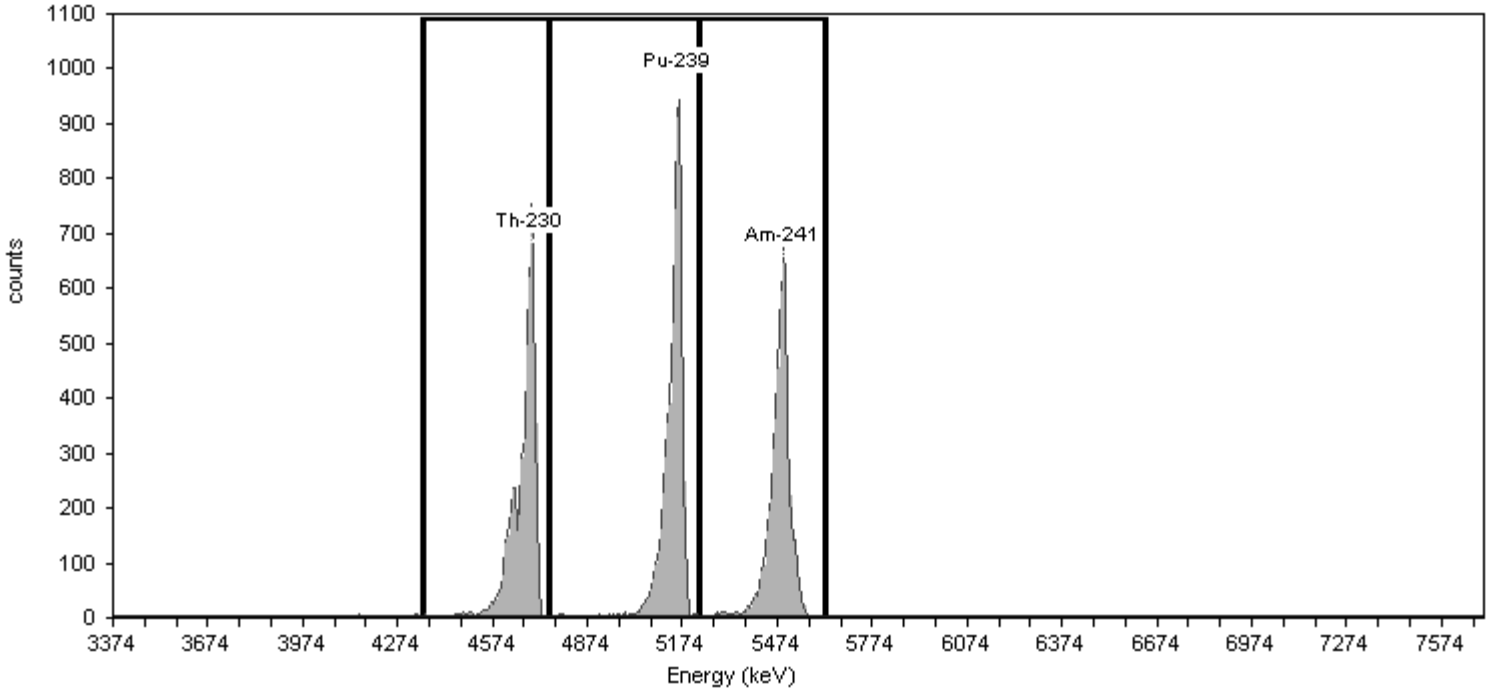
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV21 , SN: 48-102BB6
Acquisition Start Date: 6/19/2014 7:45:34PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 25.45% +/- 0.46% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,179.00	86.32
Pu-239	240	5.16	186	249	6,106.00	101.77
Am-241	284	5.49	249	303	5,079.00	84.65

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:20:18PM 6/22/2014

Calibration

Sample Name: CCV-9792;AV23-20140619
Description:
Detector: AV23

Calibration Date: 6/22/2014 5:20:15PM
Analyst: 60040

Source Info

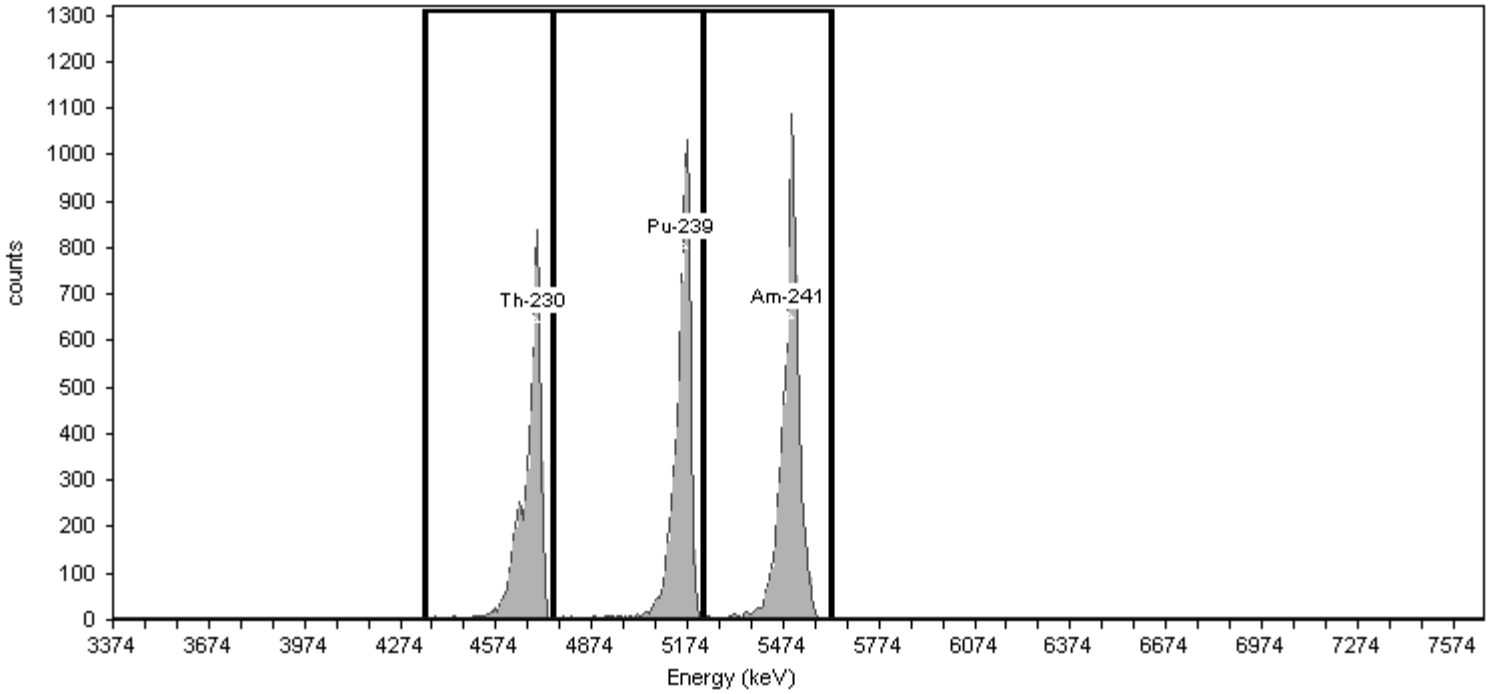
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV23 , SN: 48-158FF3
Acquisition Start Date: 6/19/2014 7:45:38PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 25.86% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,881.00	98.02
Pu-239	240	5.16	186	249	6,736.00	112.27
Am-241	284	5.49	249	303	7,607.00	126.78

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:20:24PM 6/22/2014

Calibration

Sample Name: CCV-9793;AV24-20140619
Description:
Detector: AV24

Calibration Date: 6/22/2014 5:20:21PM
Analyst: 60040

Source Info

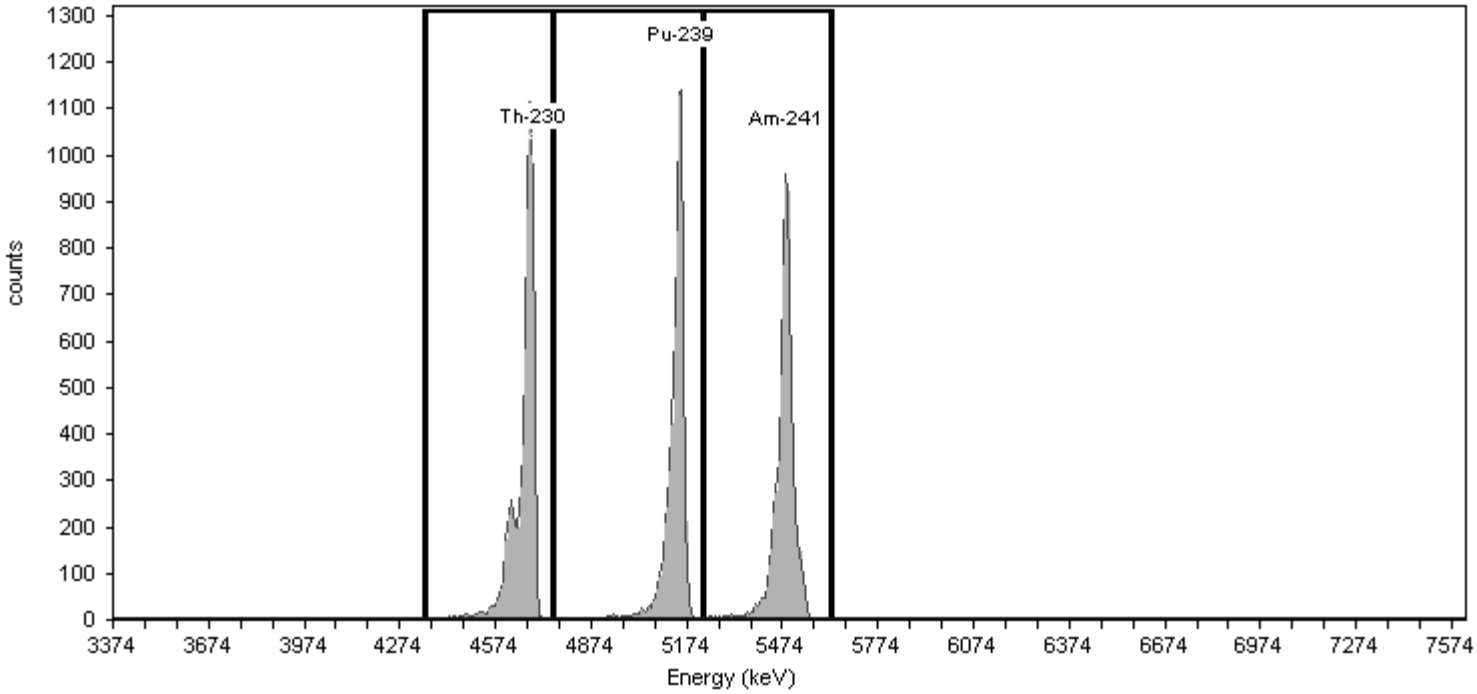
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV24 , SN: 47-137Q4
Acquisition Start Date: 6/19/2014 7:45:49PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.44% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,455.00	107.58
Pu-239	240	5.16	186	249	6,412.00	106.87
Am-241	284	5.49	249	303	6,203.00	103.38

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:41:16PM 6/22/2014

Calibration

Sample Name: CCV-9794;AV43-20140622
Description:
Detector: AV43

Calibration Date: 6/22/2014 6:41:13PM
Analyst: 60040

Source Info

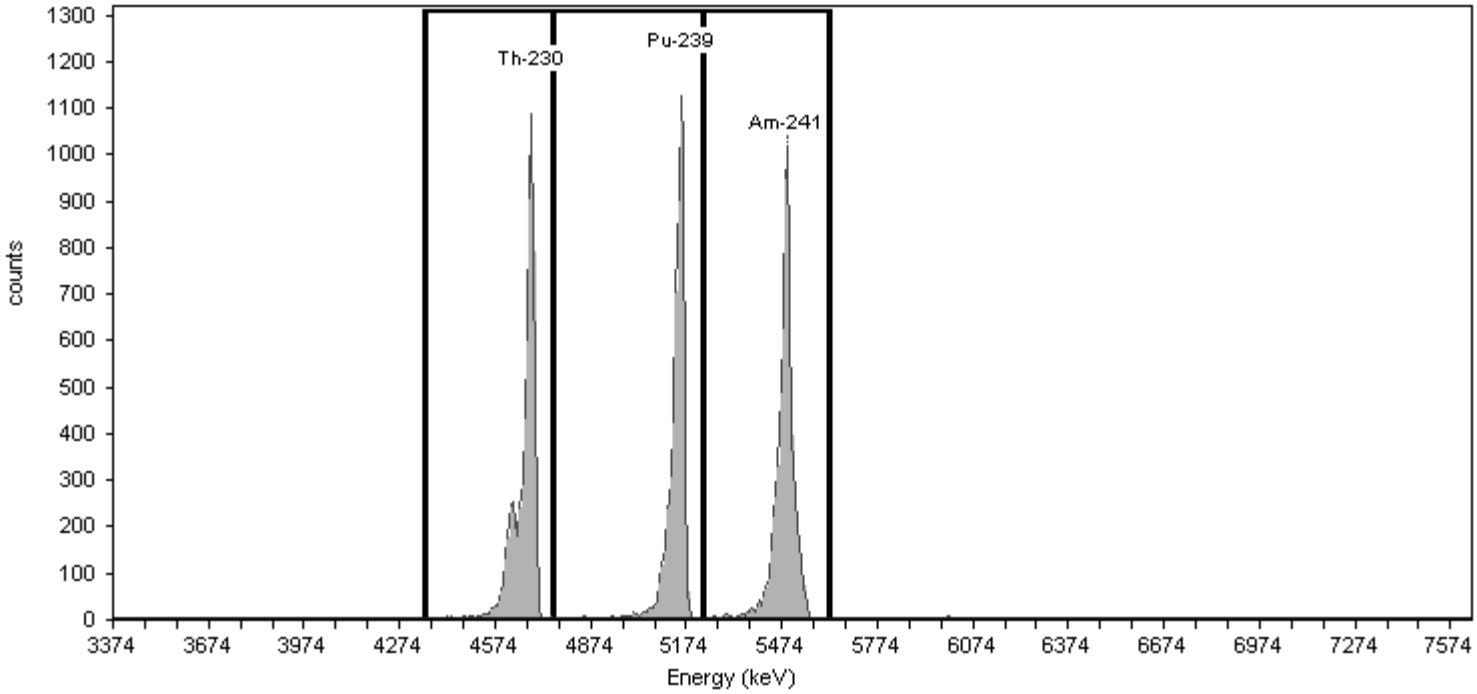
Certificate ID: 82242-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV43 , SN: 49-190X4
Acquisition Start Date: 6/22/2014 5:38:32PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 25.58% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,084.00	101.40
Pu-239	240	5.16	186	249	5,958.00	99.30
Am-241	284	5.49	249	303	6,471.00	107.85

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:41:22PM 6/22/2014

Calibration

Sample Name: CCV-9795;AV44-20140622
Description:
Detector: AV44

Calibration Date: 6/22/2014 6:41:19PM
Analyst: 60040

Source Info

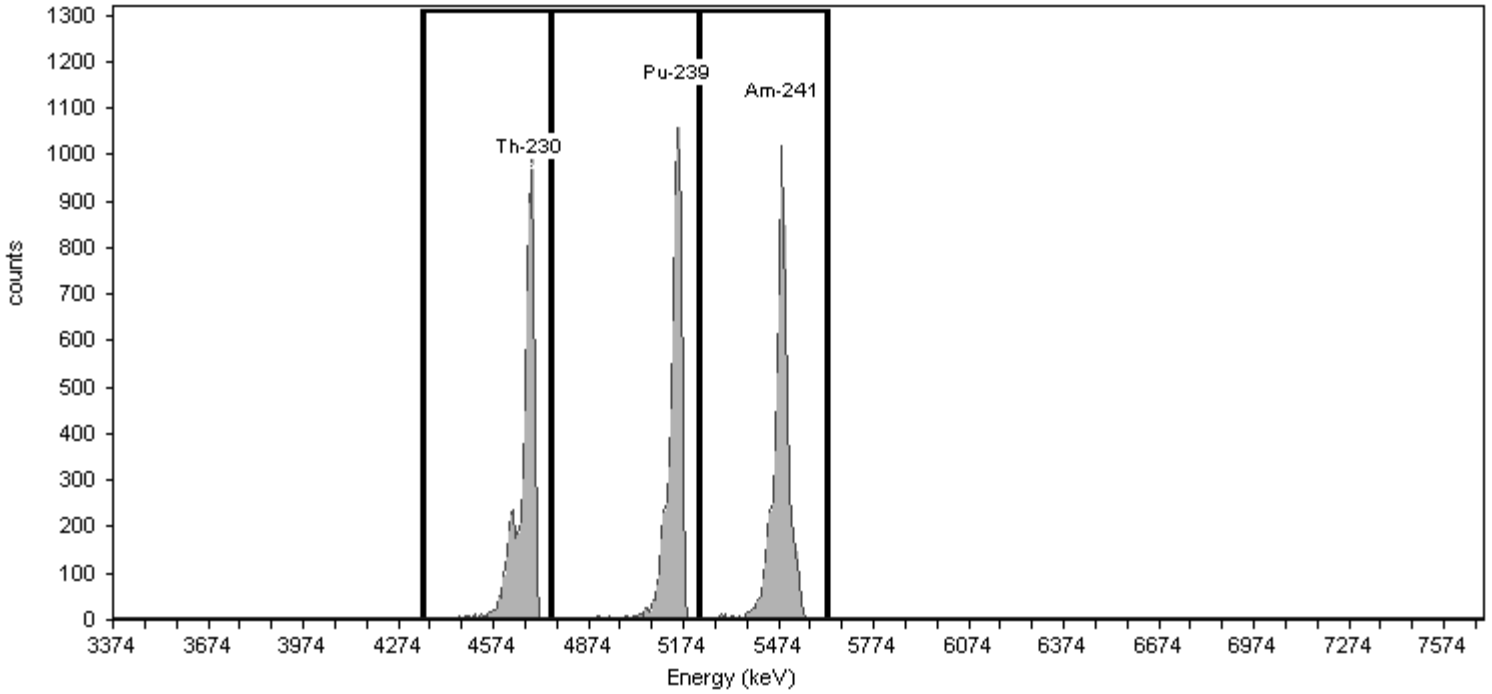
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV44 , SN: 50-051JJ1
Acquisition Start Date: 6/22/2014 5:38:54PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.33% +/- 0.46% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,581.00	93.02
Pu-239	240	5.16	186	249	5,685.00	94.75
Am-241	284	5.49	249	303	5,976.00	99.60

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:10:44PM 6/22/2014

Calibration

Sample Name: CCV-9817;AV45-20140622
Description:
Detector: AV45

Calibration Date: 6/22/2014 9:10:41PM
Analyst: 60040

Source Info

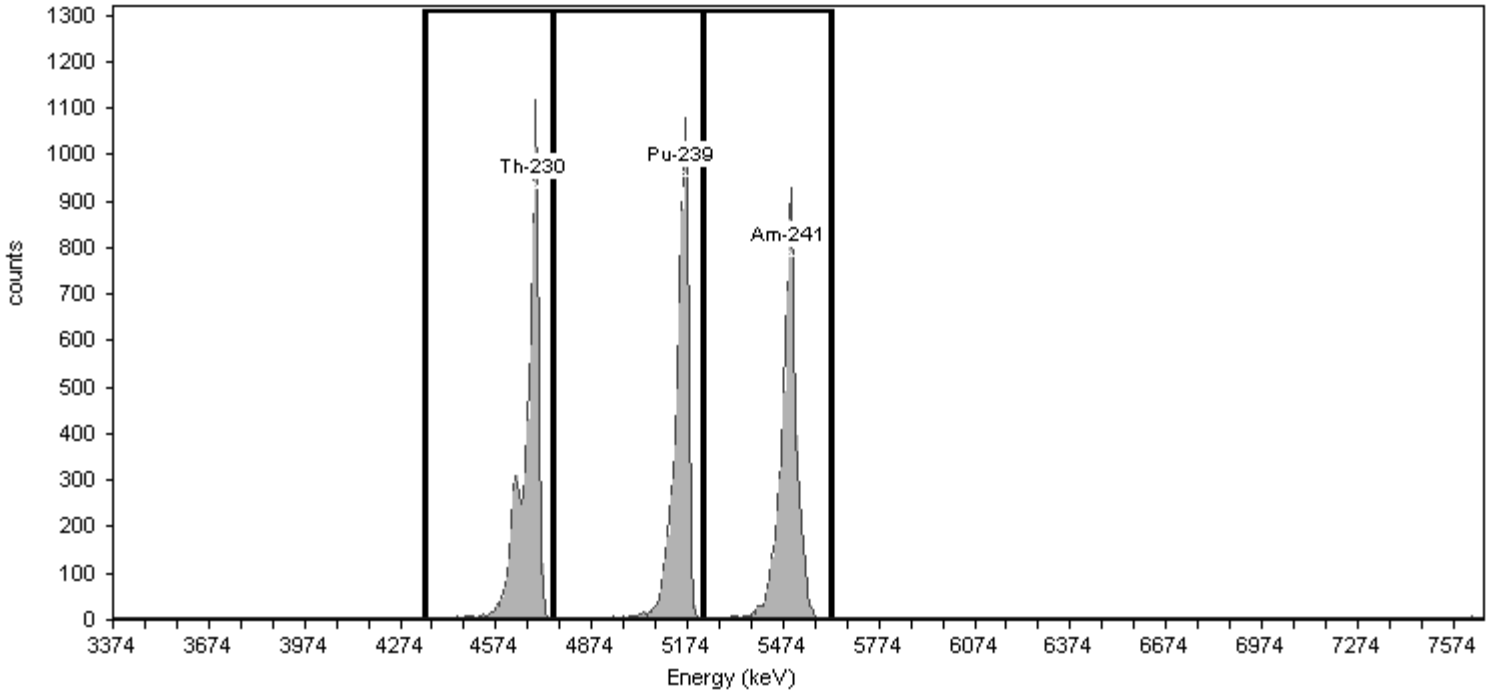
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV45 , SN: 48-158FF2
Acquisition Start Date: 6/22/2014 8:07:18PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.09% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,888.00	114.80
Pu-239	240	5.16	186	249	6,367.00	106.12
Am-241	284	5.49	249	303	6,402.00	106.70

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:18:25PM 6/22/2014

Calibration

Sample Name: CCV-9884;AV46-20140622
Description:
Detector: AV46

Calibration Date: 6/22/2014 10:18:20PM
Analyst: 60040

Source Info

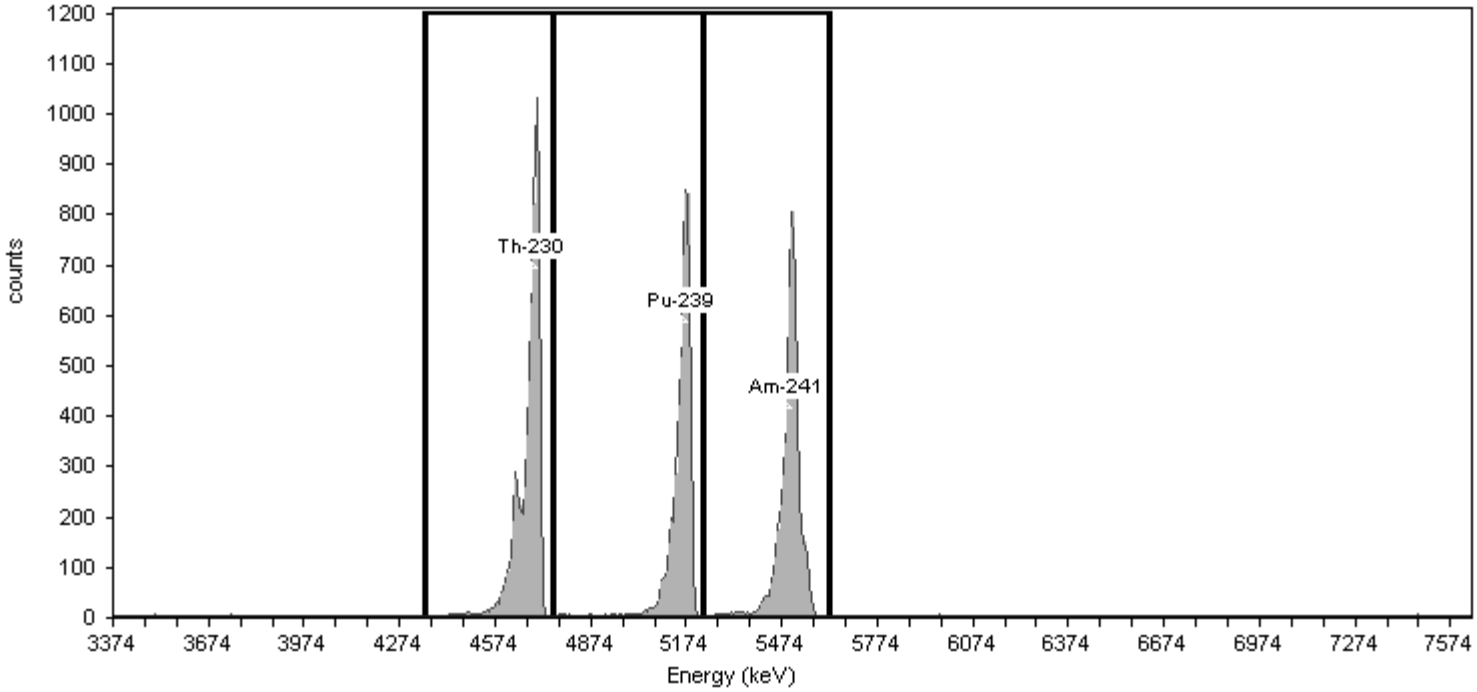
Certificate ID: 82245-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV46 , SN: 49-202GG2
Acquisition Start Date: 6/22/2014 9:17:40PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.69% +/- 0.49% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,425.00	107.08
Pu-239	240	5.16	186	249	5,164.00	86.07
Am-241	284	5.49	249	303	5,389.00	89.82

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:57:11PM 6/22/2014

Calibration

Sample Name: CCV-7107;AV49-20140622
Description:
Detector: AV49

Calibration Date: 6/22/2014 7:57:03PM
Analyst: 60040

Source Info

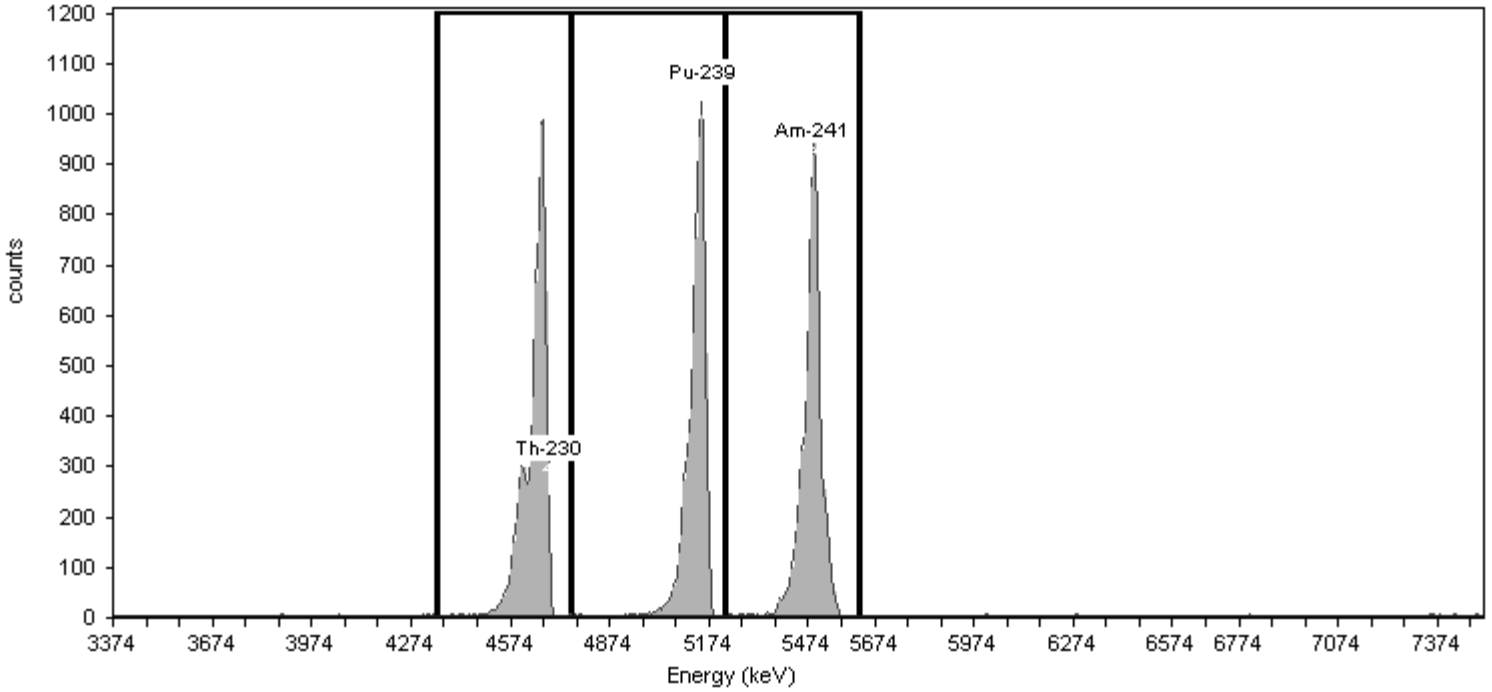
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV49 , SN: 47-043hh4
Acquisition Start Date: 6/22/2014 6:52:38PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.74% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	7,207.00	120.12
Pu-239	240	5.16	186	249	7,009.00	116.82
Am-241	284	5.49	249	303	6,983.00	116.38

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:57:17PM 6/22/2014

Calibration

Sample Name: CCV-8874;AV50-20140622
Description:
Detector: AV50

Calibration Date: 6/22/2014 7:57:11PM
Analyst: 60040

Source Info

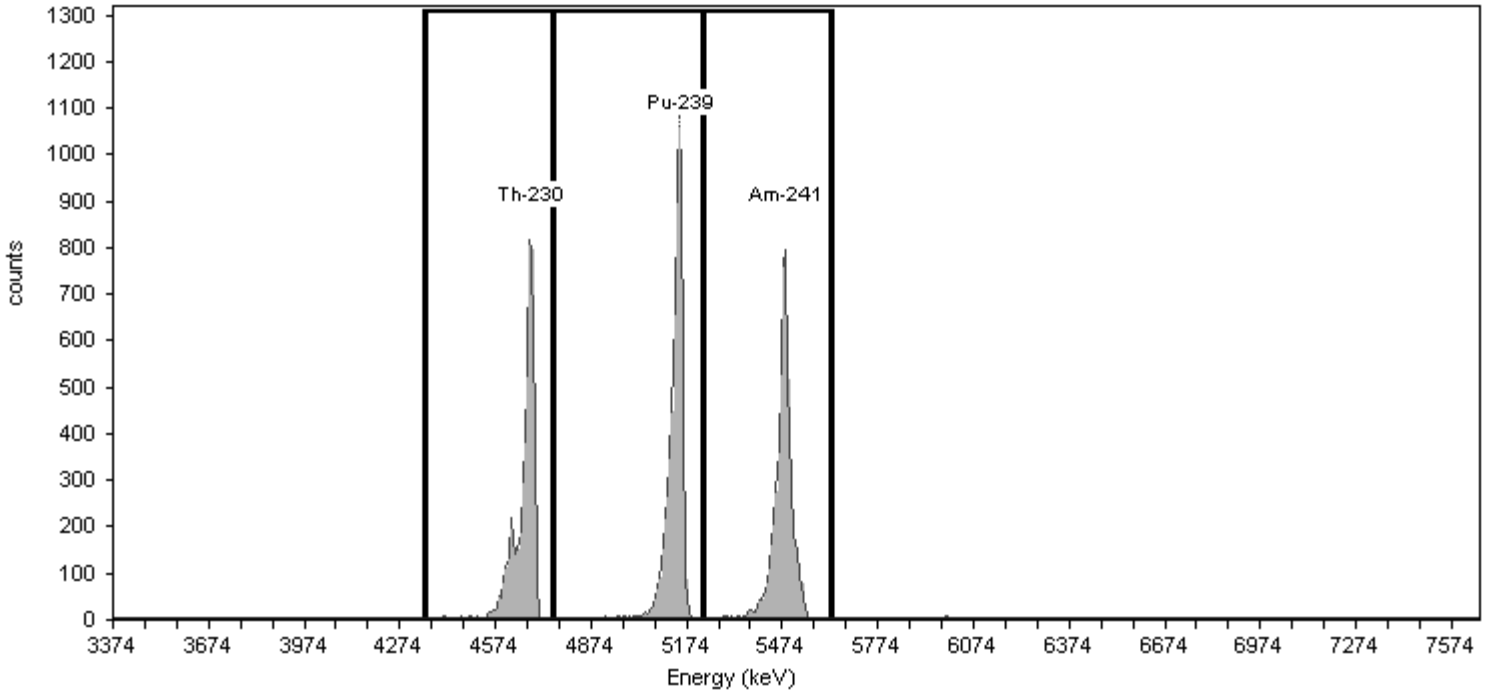
Certificate ID: 82233-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV50 , SN: 50-060W2
Acquisition Start Date: 6/22/2014 6:52:45PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 27.08% +/- 0.50% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	4,688.00	78.13
Pu-239	240	5.16	186	249	6,012.00	100.20
Am-241	284	5.49	249	303	4,993.00	83.22

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:10:56PM 6/22/2014

Calibration

Sample Name: CCV-8875;AV51-20140622
Description:
Detector: AV51

Calibration Date: 6/22/2014 9:10:53PM
Analyst: 60040

Source Info

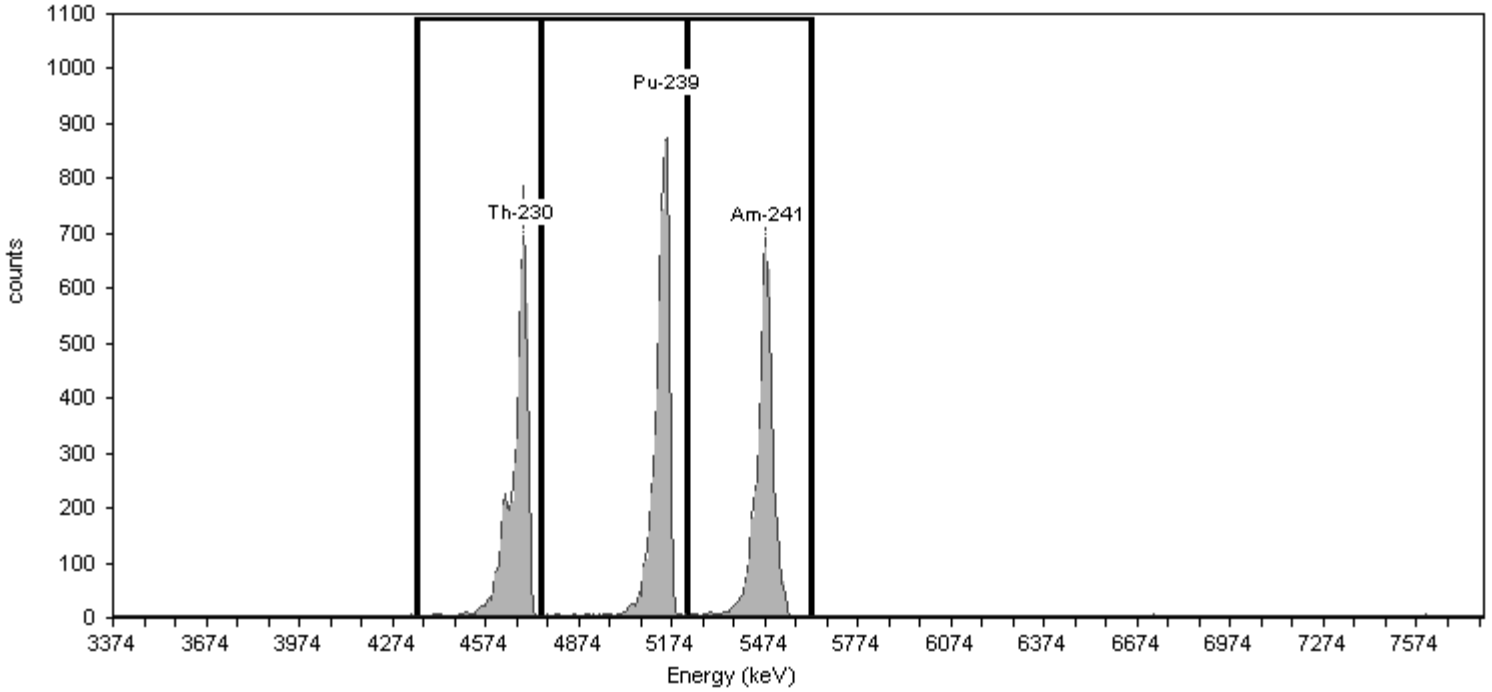
Certificate ID: 82234-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV51 , SN: 48-109I1
Acquisition Start Date: 6/22/2014 8:07:54PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 25.81% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,075.00	84.58
Pu-239	240	5.16	186	249	5,812.00	96.87
Am-241	284	5.49	249	303	5,164.00	86.07

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:30:53PM 6/19/2014

Calibration

Sample Name: CCV-9817;AV115-20140619
Description:
Detector: AV115

Calibration Date: 6/19/2014 4:30:50PM
Analyst: 60040

Source Info

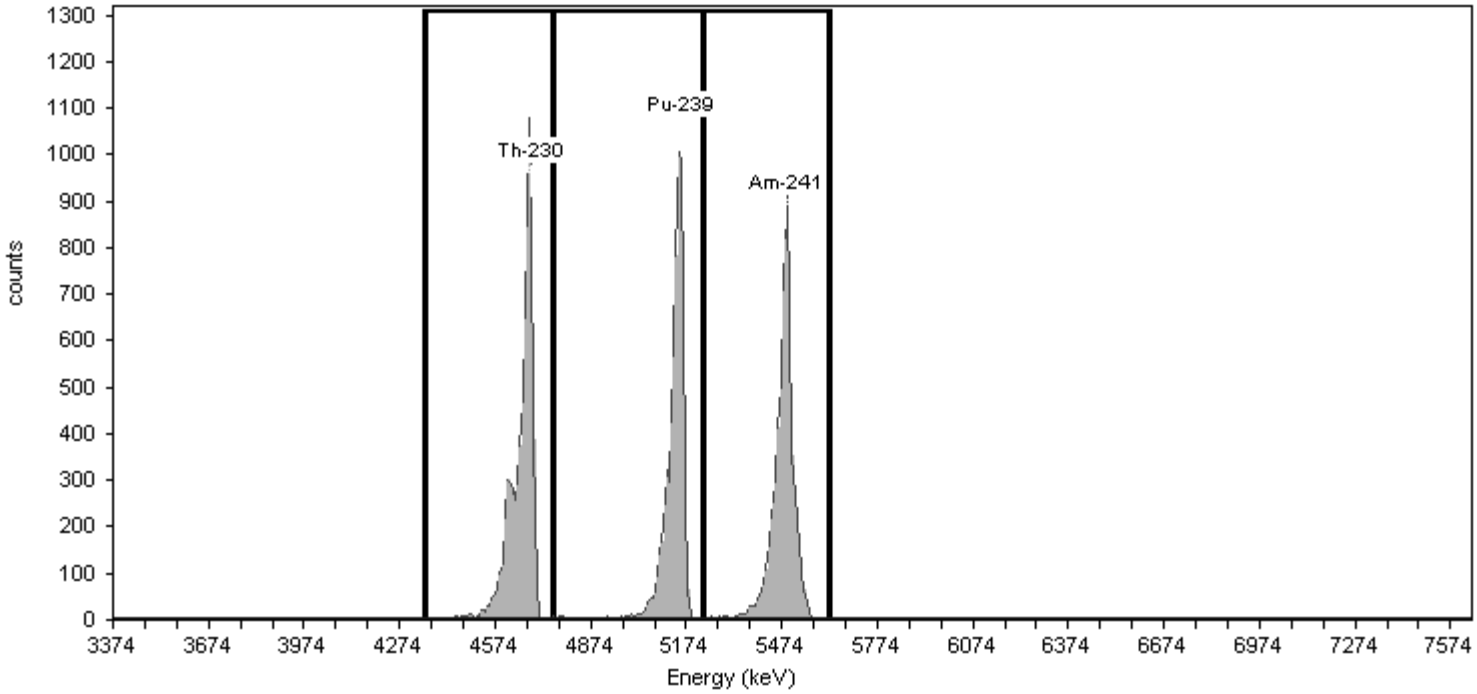
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV115 , SN: 49-037E4
Acquisition Start Date: 6/19/2014 3:10:46PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 26.51% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	7,018.00	116.97
Pu-239	240	5.16	186	249	6,339.00	105.65
Am-241	284	5.49	249	303	6,617.00	110.28

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:30:59PM 6/19/2014

Calibration

Sample Name: CCV-9792;AV116-20140619
Description:
Detector: AV116

Calibration Date: 6/19/2014 4:30:56PM
Analyst: 60040

Source Info

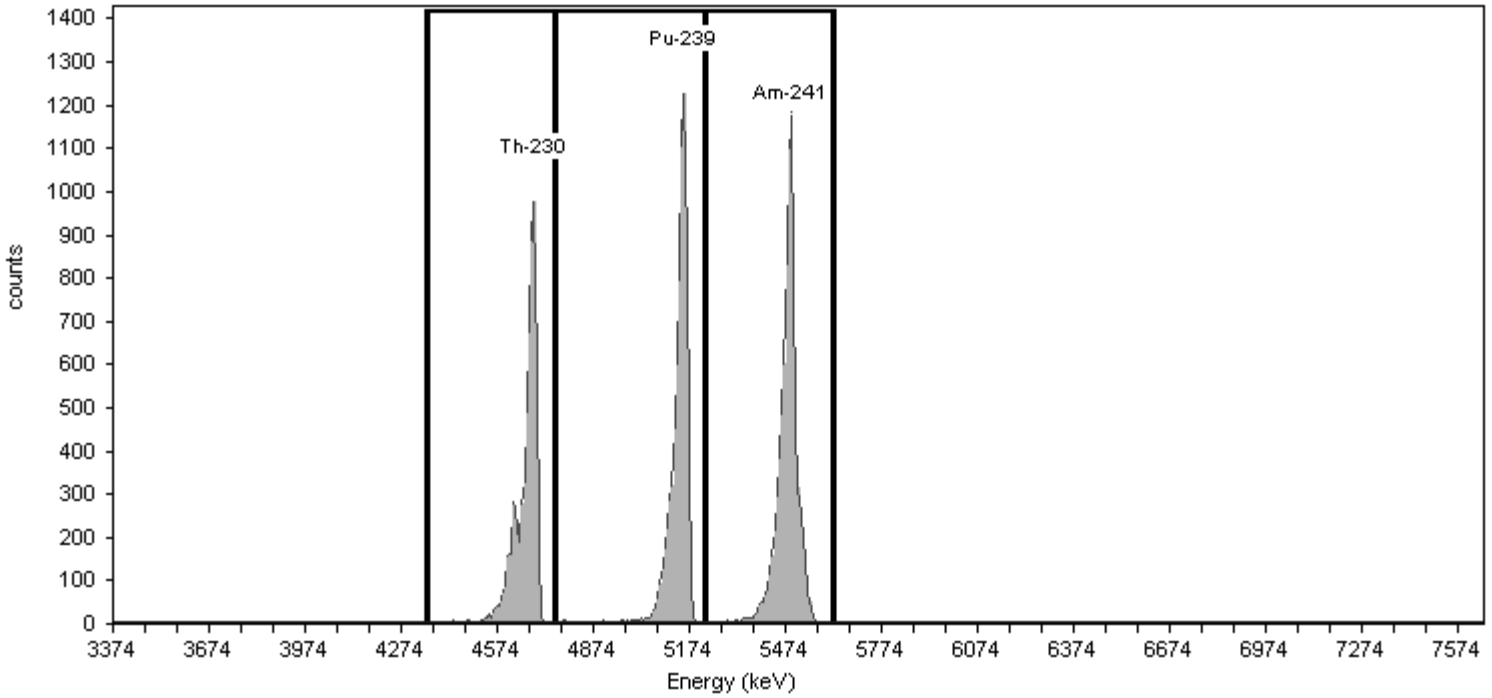
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV116 , SN: 49-034G1
Acquisition Start Date: 6/19/2014 3:10:47PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 26.94% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,046.00	100.77
Pu-239	240	5.16	186	249	6,986.00	116.43
Am-241	284	5.49	249	303	8,031.00	133.85

Monthly Backgrounds

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:13:14AM 6/19/2014

Sample

Sample Name: ICB;AV3
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

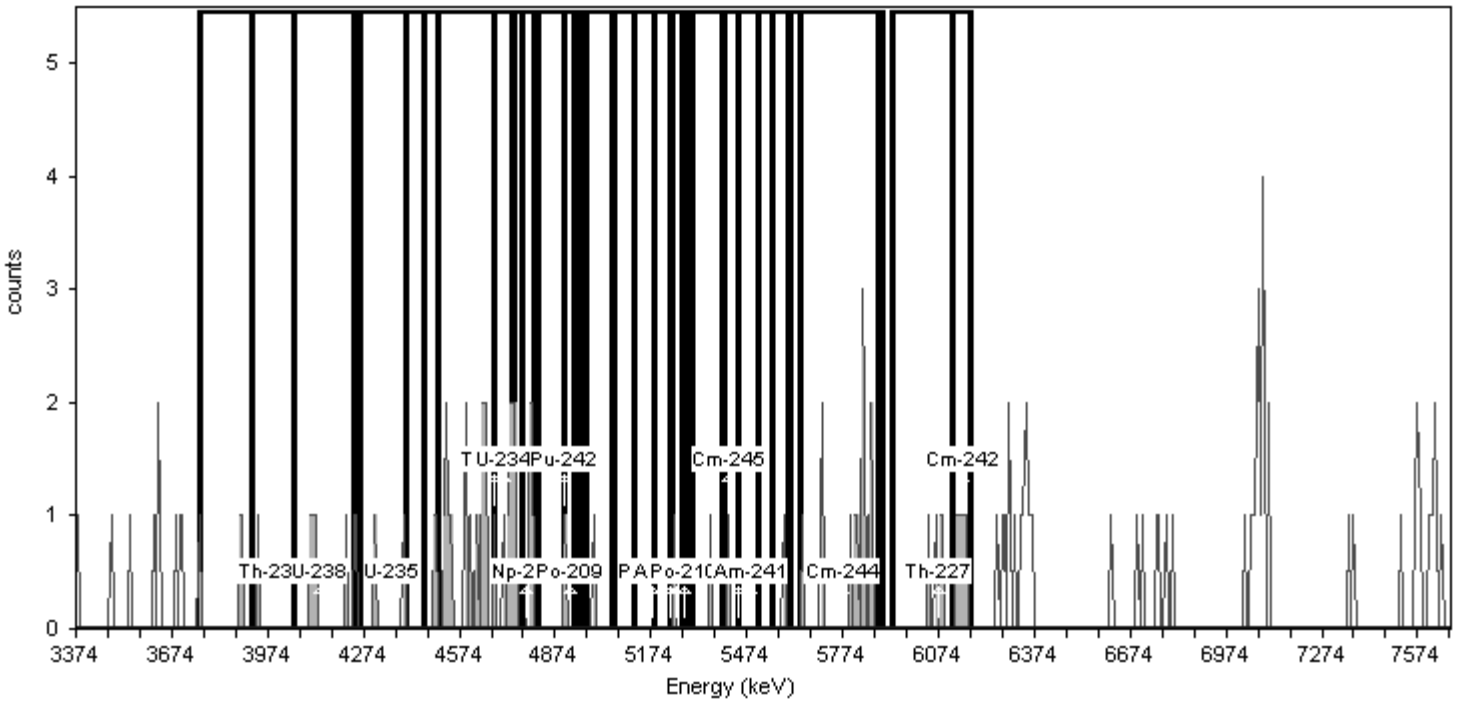
Analyst: 60040

Acquisition

Detector: AV3 , SN: 49-202 FF7
Acquisition Start Date: 6/18/2014 7:10:38PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-8875;AV3-20140505
Calibration Date: 5/6/2014 5:38:33PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.09% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 127.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	4.00	4.167E-003	2.329E-003
U-238	4.14	3.92	4.24	6.00	6.250E-003	2.756E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	26.00	2.708E-002	5.413E-003
U-234	4.71	4.51	4.82	28.00	2.917E-002	5.610E-003
Pu-242	4.90	4.68	4.95	14.00	1.458E-002	4.034E-003
Th-229	4.86	4.74	5.12	10.00	1.042E-002	3.455E-003
Np-237	4.78	4.77	4.81	4.00	4.167E-003	2.329E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	1.00	1.042E-003	1.473E-003
U-232	5.25	5.06	5.40	2.00	2.083E-003	1.804E-003
Th-228	5.45	5.19	5.51	3.00	3.125E-003	2.083E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	2.00	2.083E-003	1.804E-003
Am-241	5.48	5.30	5.60	3.00	3.125E-003	2.083E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	13.00	1.354E-002	3.898E-003
Cm-244	5.78	5.64	5.90	13.00	1.354E-002	3.898E-003
Th-227	6.07	5.93	6.18	9.00	9.375E-003	3.294E-003
Cm-242	6.15	6.12	6.18	5.00	5.208E-003	2.552E-003

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:13:20AM 6/19/2014

Sample

Sample Name: ICB;AV4
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

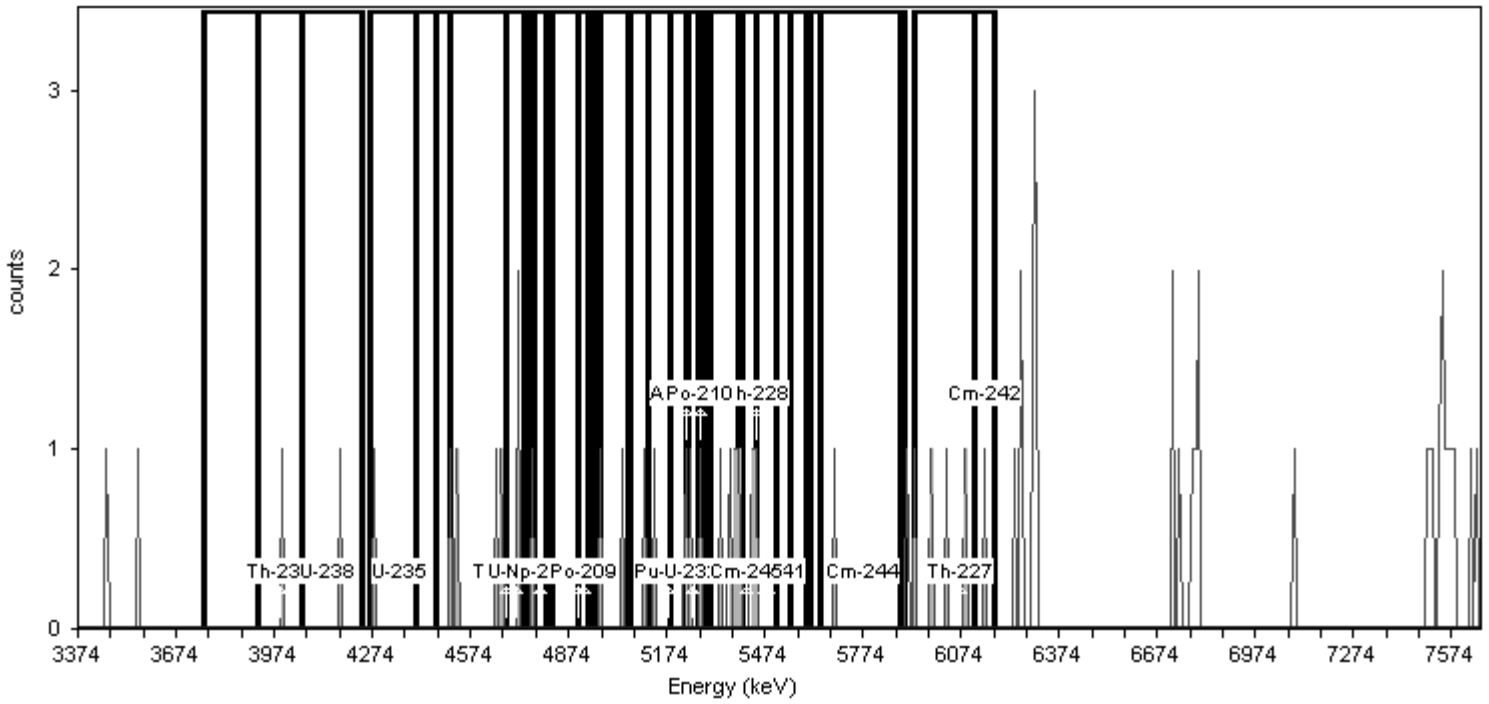
Analyst: 60040

Acquisition

Detector: AV4 , SN: 46-033Q4
Acquisition Start Date: 6/18/2014 7:10:40PM
Live Time: 960.00 min.
Real Time: 960.03 min.
Calibration Name: IC-8876;AV4-20140505
Calibration Date: 5/6/2014 5:38:40PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.82% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 64.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	7.00	7.292E-003	2.946E-003
Pu-242	4.90	4.68	4.95	3.00	3.125E-003	2.083E-003
Th-229	4.86	4.74	5.12	4.00	4.167E-003	2.329E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	5.00	5.208E-003	2.552E-003
Am-243	5.23	5.05	5.31	5.00	5.208E-003	2.552E-003
U-232	5.25	5.06	5.40	10.00	1.042E-002	3.455E-003
Th-228	5.45	5.19	5.51	11.00	1.146E-002	3.608E-003
Po-210	5.28	5.23	5.29	3.00	3.125E-003	2.083E-003
Pu-238	5.47	5.27	5.55	9.00	9.375E-003	3.294E-003
Am-241	5.48	5.30	5.60	8.00	8.333E-003	3.125E-003
Cm-245	5.42	5.40	5.45	4.00	4.167E-003	2.329E-003
Pu-236	5.76	5.61	5.89	1.00	1.042E-003	1.473E-003
Cm-244	5.78	5.64	5.90	1.00	1.042E-003	1.473E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:13:25AM 6/19/2014

Sample

Sample Name: ICB;AV6
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

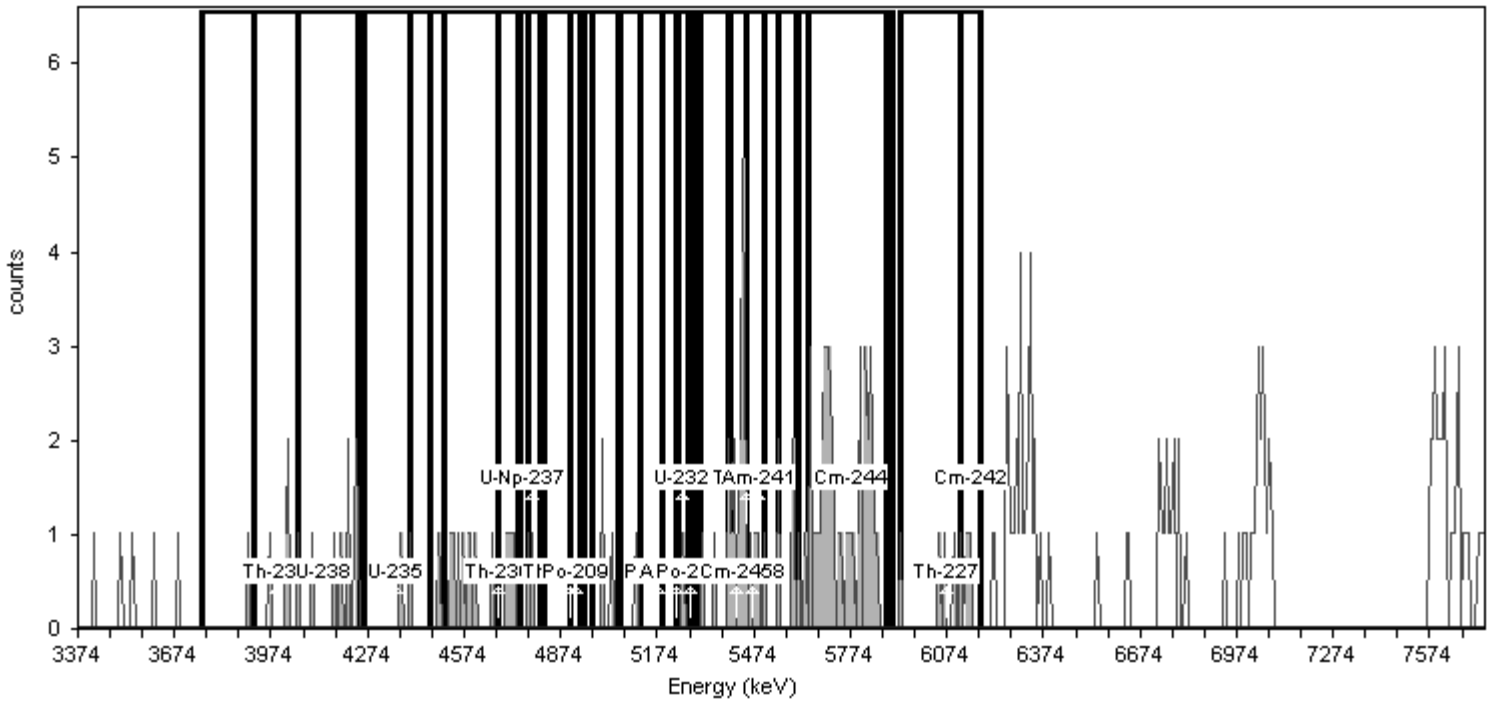
Analyst: 60040

Acquisition

Detector: AV6 , SN: 47-27FF2
Acquisition Start Date: 6/18/2014 7:08:18PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9520;AV6-20140505
Calibration Date: 5/6/2014 5:38:46PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.89% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 213.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	6.00	6.250E-003	2.756E-003
U-238	4.14	3.92	4.24	13.00	1.354E-002	3.898E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	14.00	1.458E-002	4.034E-003
U-234	4.71	4.51	4.82	14.00	1.458E-002	4.034E-003
Pu-242	4.90	4.68	4.95	6.00	6.250E-003	2.756E-003
Th-229	4.86	4.74	5.12	6.00	6.250E-003	2.756E-003
Np-237	4.78	4.77	4.81	2.00	2.083E-003	1.804E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	7.00	7.292E-003	2.946E-003
Th-228	5.45	5.19	5.51	21.00	2.187E-002	4.886E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	22.00	2.292E-002	4.996E-003
Am-241	5.48	5.30	5.60	24.00	2.500E-002	5.208E-003
Cm-245	5.42	5.40	5.45	14.00	1.458E-002	4.034E-003
Pu-236	5.76	5.61	5.89	44.00	4.583E-002	6.988E-003
Cm-244	5.78	5.64	5.90	42.00	4.375E-002	6.831E-003
Th-227	6.07	5.93	6.18	8.00	8.333E-003	3.125E-003
Cm-242	6.15	6.12	6.18	4.00	4.167E-003	2.329E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:13:31AM 6/19/2014

Sample

Sample Name: ICB;AV7
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

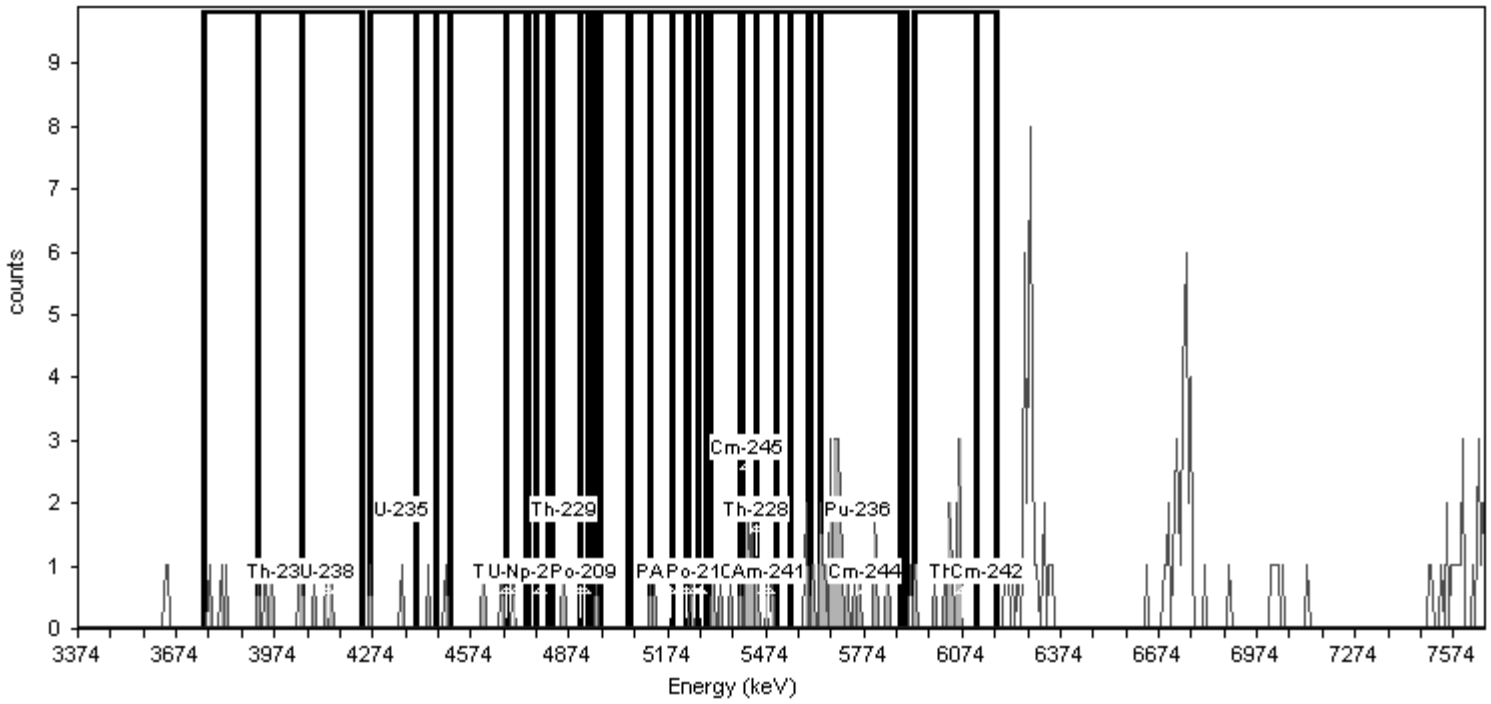
Analyst: 60040

Acquisition

Detector: AV7 , SN: 48-158EE5
Acquisition Start Date: 6/18/2014 7:08:20PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-8877;AV7-20140507
Calibration Date: 5/7/2014 10:48:48PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.80% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 167.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	9.00	9.375E-003	3.294E-003
U-238	4.14	3.92	4.24	9.00	9.375E-003	3.294E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	4.00	4.167E-003	2.329E-003
Pu-242	4.90	4.68	4.95	3.00	3.125E-003	2.083E-003
Th-229	4.86	4.74	5.12	4.00	4.167E-003	2.329E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	7.00	7.292E-003	2.946E-003
Th-228	5.45	5.19	5.51	13.00	1.354E-002	3.898E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	12.00	1.250E-002	3.756E-003
Am-241	5.48	5.30	5.60	14.00	1.458E-002	4.034E-003
Cm-245	5.42	5.40	5.45	7.00	7.292E-003	2.946E-003
Pu-236	5.76	5.61	5.89	26.00	2.708E-002	5.413E-003
Cm-244	5.78	5.64	5.90	25.00	2.604E-002	5.311E-003
Th-227	6.07	5.93	6.18	10.00	1.042E-002	3.455E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:13:36AM 6/19/2014

Sample

Sample Name: ICB;AV8
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

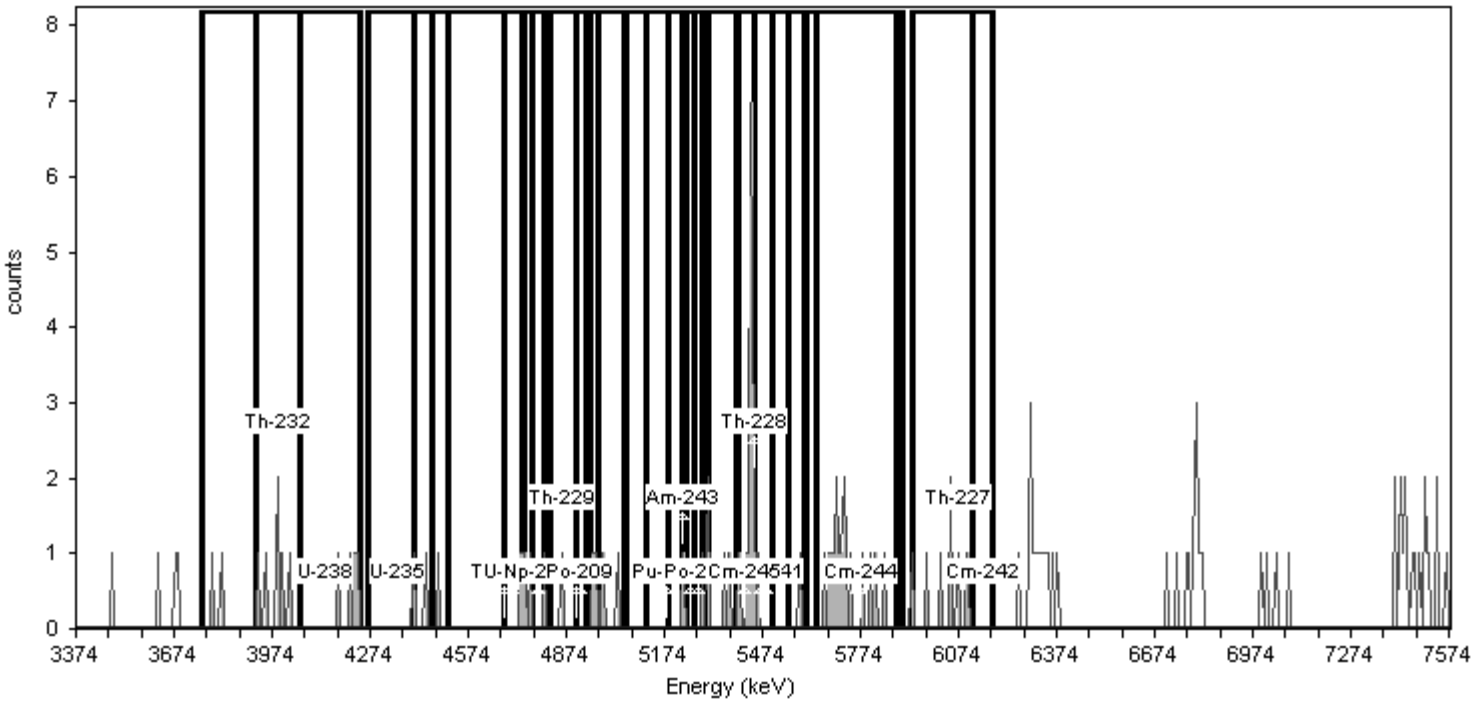
Analyst: 60040

Acquisition

Detector: AV8 , SN: 41-137Q6
Acquisition Start Date: 6/18/2014 7:08:22PM
Live Time: 960.01 min.
Real Time: 960.03 min.
Calibration Name: IC-9792;AV8-20140505
Calibration Date: 5/6/2014 5:38:58PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.05% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 119.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	8.00	8.333E-003	3.125E-003
U-238	4.14	3.92	4.24	10.00	1.042E-002	3.455E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	5.00	5.208E-003	2.552E-003
Pu-242	4.90	4.68	4.95	6.00	6.250E-003	2.756E-003
Th-229	4.86	4.74	5.12	9.00	9.375E-003	3.294E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	7.00	7.292E-003	2.946E-003
Th-228	5.45	5.19	5.51	19.00	1.979E-002	4.658E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	18.00	1.875E-002	4.540E-003
Am-241	5.48	5.30	5.60	18.00	1.875E-002	4.540E-003
Cm-245	5.42	5.40	5.45	12.00	1.250E-002	3.756E-003
Pu-236	5.76	5.61	5.89	16.00	1.667E-002	4.295E-003
Cm-244	5.78	5.64	5.90	16.00	1.667E-002	4.295E-003
Th-227	6.07	5.93	6.18	7.00	7.292E-003	2.946E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:26:28AM 6/19/2014

Sample

Sample Name: ICB;AV9
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

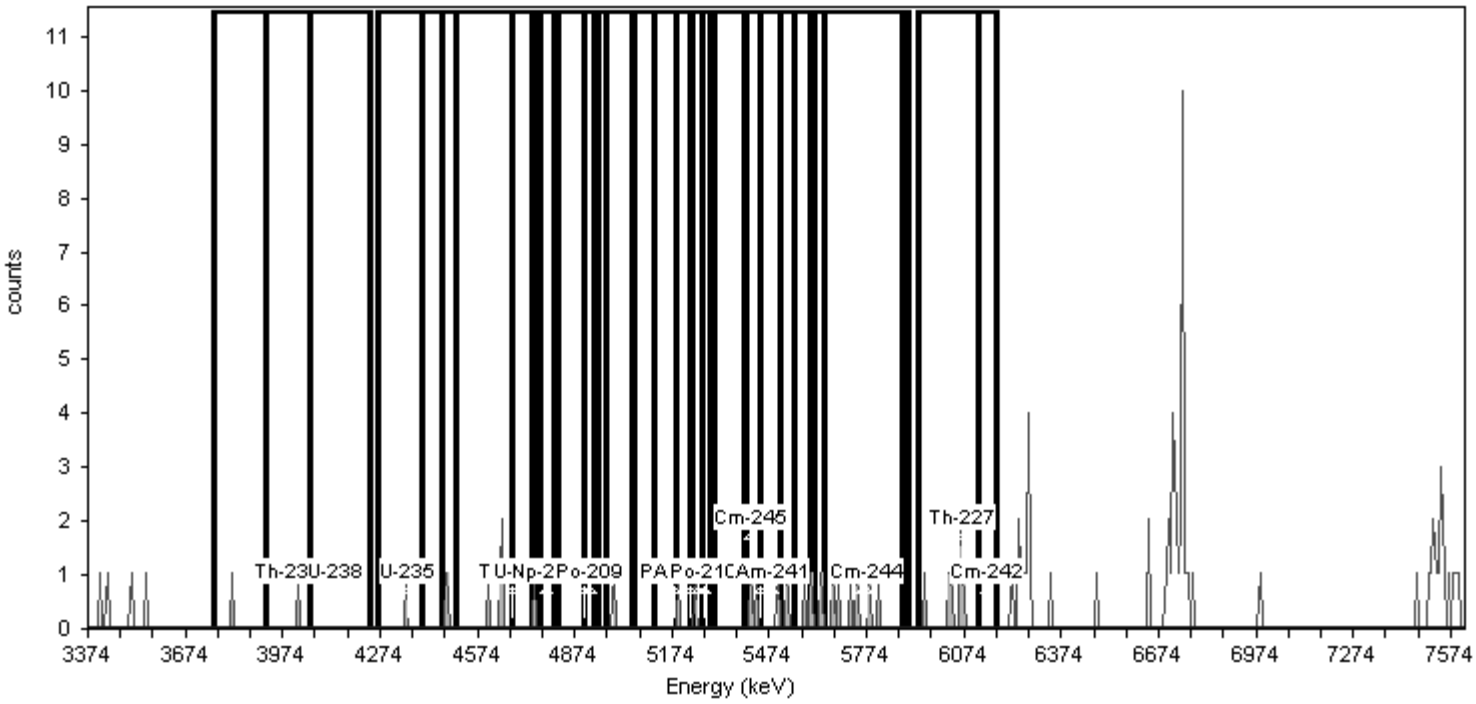
Analyst: 60040

Acquisition

Detector: AV9 , SN: 51-082V5
Acquisition Start Date: 6/18/2014 7:08:24PM
Live Time: 960.00 min.
Real Time: 970.50 min.
Calibration Name: IC-9793;AV9-20140505
Calibration Date: 5/6/2014 5:39:04PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.04% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 93.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	5.00	5.208E-003	2.552E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	2.00	2.083E-003	1.804E-003
Th-228	5.45	5.19	5.51	5.00	5.208E-003	2.552E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	4.00	4.167E-003	2.329E-003
Am-241	5.48	5.30	5.60	6.00	6.250E-003	2.756E-003
Cm-245	5.42	5.40	5.45	2.00	2.083E-003	1.804E-003
Pu-236	5.76	5.61	5.89	7.00	7.292E-003	2.946E-003
Cm-244	5.78	5.64	5.90	6.00	6.250E-003	2.756E-003
Th-227	6.07	5.93	6.18	6.00	6.250E-003	2.756E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:26:33AM 6/19/2014

Sample

Sample Name: ICB;AV10
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

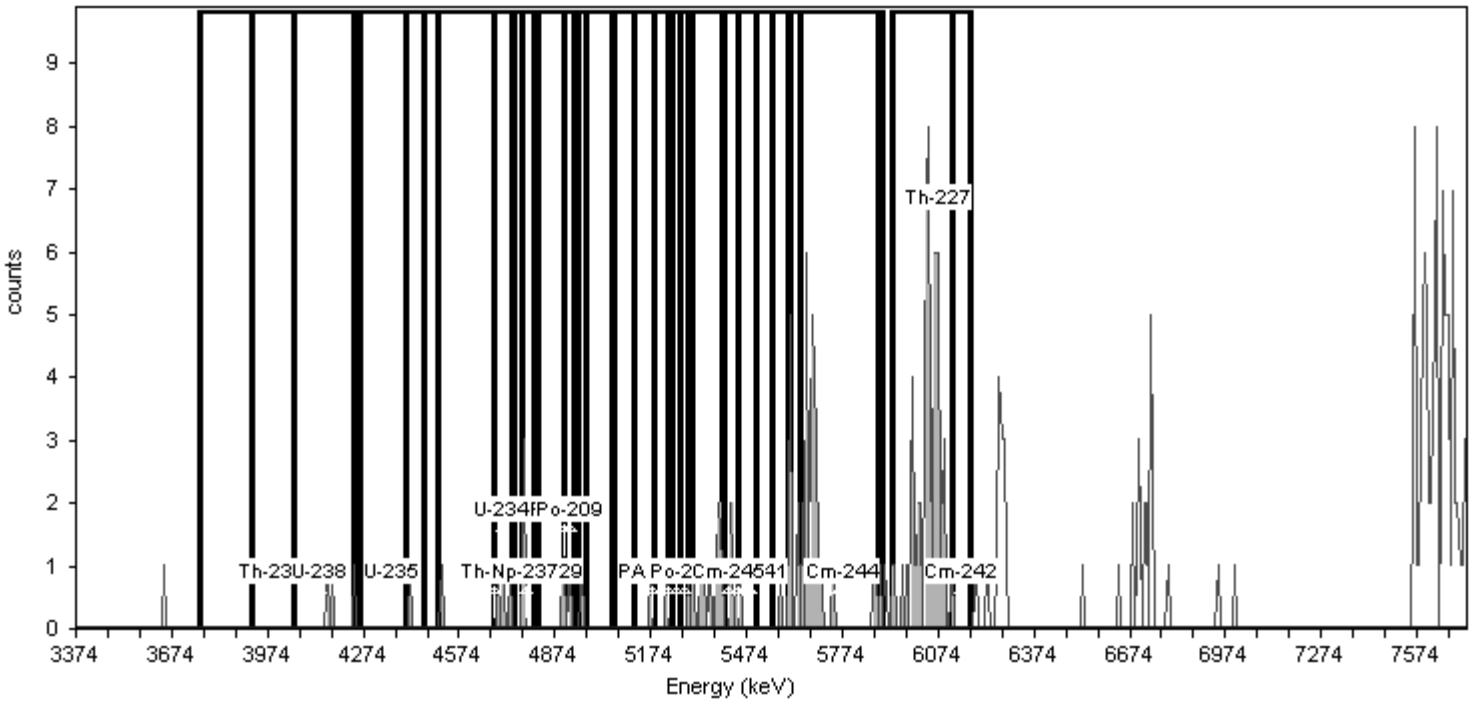
Acquisition

Detector: AV10 , SN: 49-155N2
Acquisition Start Date: 6/18/2014 7:08:26PM
Live Time: 960.00 min.
Real Time: 970.50 min.
Calibration Name: IC-9794;AV10-20140505
Calibration Date: 5/6/2014 5:39:10PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.84% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 237.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	5.00	5.208E-003	2.552E-003
U-234	4.71	4.51	4.82	8.00	8.333E-003	3.125E-003
Pu-242	4.90	4.68	4.95	10.00	1.042E-002	3.455E-003
Th-229	4.86	4.74	5.12	8.00	8.333E-003	3.125E-003
Np-237	4.78	4.77	4.81	4.00	4.167E-003	2.329E-003
Po-209	4.92	4.90	4.93	2.00	2.083E-003	1.804E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	12.00	1.250E-002	3.756E-003
Th-228	5.45	5.19	5.51	15.00	1.563E-002	4.167E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	14.00	1.458E-002	4.034E-003
Am-241	5.48	5.30	5.60	15.00	1.563E-002	4.167E-003
Cm-245	5.42	5.40	5.45	4.00	4.167E-003	2.329E-003
Pu-236	5.76	5.61	5.89	33.00	3.437E-002	6.074E-003
Cm-244	5.78	5.64	5.90	27.00	2.813E-002	5.512E-003
Th-227	6.07	5.93	6.18	52.00	5.417E-002	7.583E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:26:39AM 6/19/2014

Sample

Sample Name: ICB;AV11
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

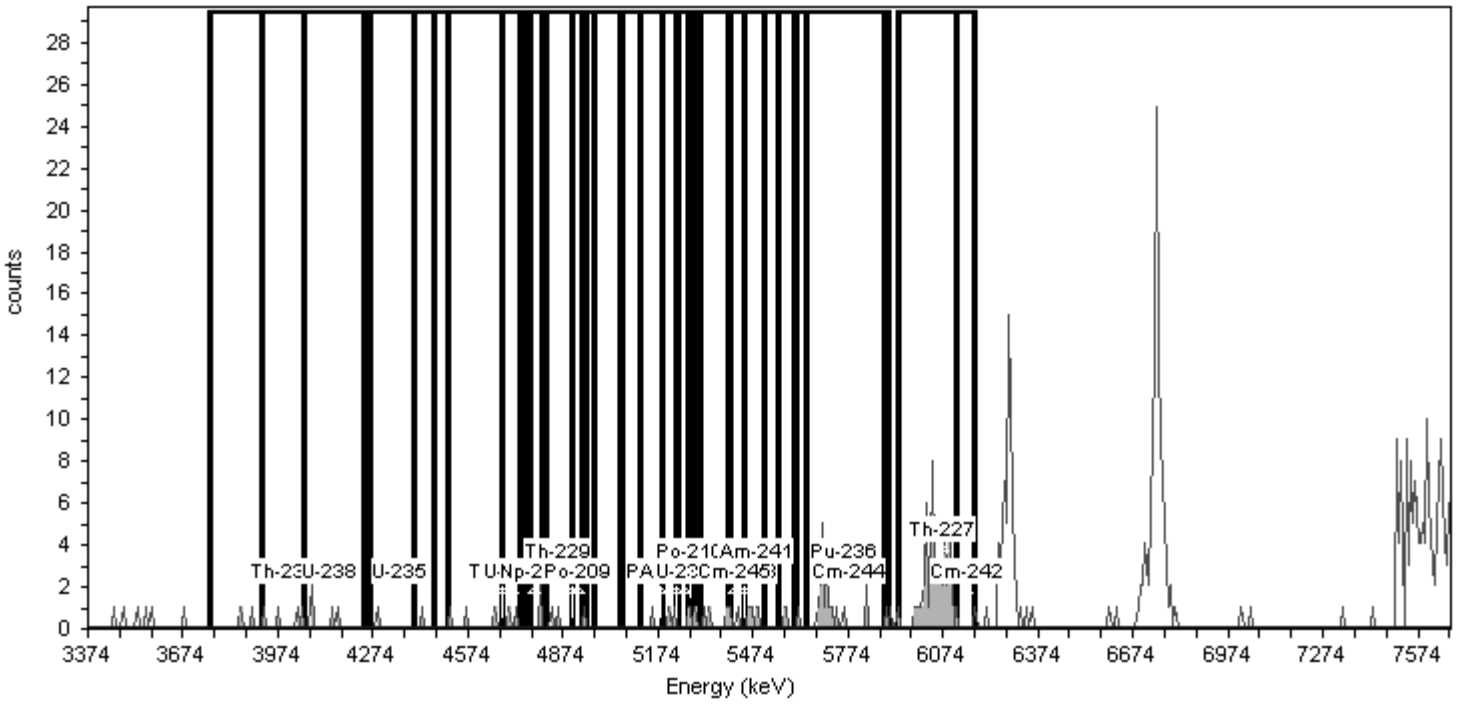
Acquisition

Detector: AV11 , SN: 49-155dd2
Acquisition Start Date: 6/18/2014 7:08:27PM
Live Time: 960.00 min.
Real Time: 970.50 min.
Calibration Name: IC-9795;AV11-20140505
Calibration Date: 5/6/2014 5:39:16PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.88% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 403.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	6.00	6.250E-003	2.756E-003
U-238	4.14	3.92	4.24	8.00	8.333E-003	3.125E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	7.00	7.292E-003	2.946E-003
Pu-242	4.90	4.68	4.95	7.00	7.292E-003	2.946E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	2.00	2.083E-003	1.804E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	6.00	6.250E-003	2.756E-003
U-232	5.25	5.06	5.40	11.00	1.146E-002	3.608E-003
Th-228	5.45	5.19	5.51	15.00	1.563E-002	4.167E-003
Po-210	5.28	5.23	5.29	3.00	3.125E-003	2.083E-003
Pu-238	5.47	5.27	5.55	13.00	1.354E-002	3.898E-003
Am-241	5.48	5.30	5.60	12.00	1.250E-002	3.756E-003
Cm-245	5.42	5.40	5.45	3.00	3.125E-003	2.083E-003
Pu-236	5.76	5.61	5.89	19.00	1.979E-002	4.658E-003
Cm-244	5.78	5.64	5.90	19.00	1.979E-002	4.658E-003
Th-227	6.07	5.93	6.18	52.00	5.417E-002	7.583E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:26:44AM 6/19/2014

Sample

Sample Name: ICB;AV12
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

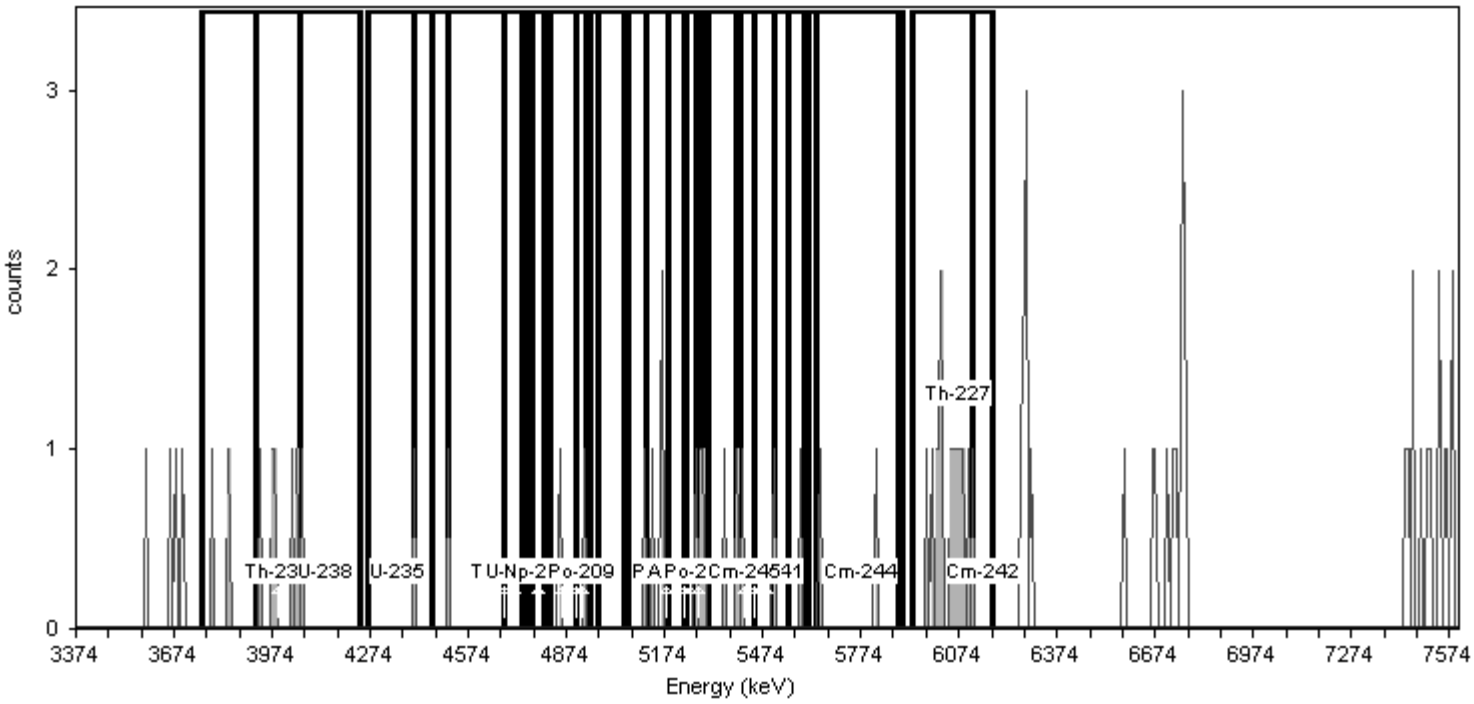
Acquisition

Detector: AV12 , SN: 51-082B7
Acquisition Start Date: 6/18/2014 7:08:29PM
Live Time: 960.00 min.
Real Time: 970.50 min.
Calibration Name: IC-9817;AV12-20140505
Calibration Date: 5/6/2014 5:39:22PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.97% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 77.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	7.00	7.292E-003	2.946E-003
U-238	4.14	3.92	4.24	6.00	6.250E-003	2.756E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	2.00	2.083E-003	1.804E-003
U-234	4.71	4.51	4.82	1.00	1.042E-003	1.473E-003
Pu-242	4.90	4.68	4.95	2.00	2.083E-003	1.804E-003
Th-229	4.86	4.74	5.12	3.00	3.125E-003	2.083E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	7.00	7.292E-003	2.946E-003
U-232	5.25	5.06	5.40	9.00	9.375E-003	3.294E-003
Th-228	5.45	5.19	5.51	7.00	7.292E-003	2.946E-003
Po-210	5.28	5.23	5.29	3.00	3.125E-003	2.083E-003
Pu-238	5.47	5.27	5.55	7.00	7.292E-003	2.946E-003
Am-241	5.48	5.30	5.60	5.00	5.208E-003	2.552E-003
Cm-245	5.42	5.40	5.45	2.00	2.083E-003	1.804E-003
Pu-236	5.76	5.61	5.89	2.00	2.083E-003	1.804E-003
Cm-244	5.78	5.64	5.90	2.00	2.083E-003	1.804E-003
Th-227	6.07	5.93	6.18	14.00	1.458E-002	4.034E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:26:50AM 6/19/2014

Sample

Sample Name: ICB;AV13
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

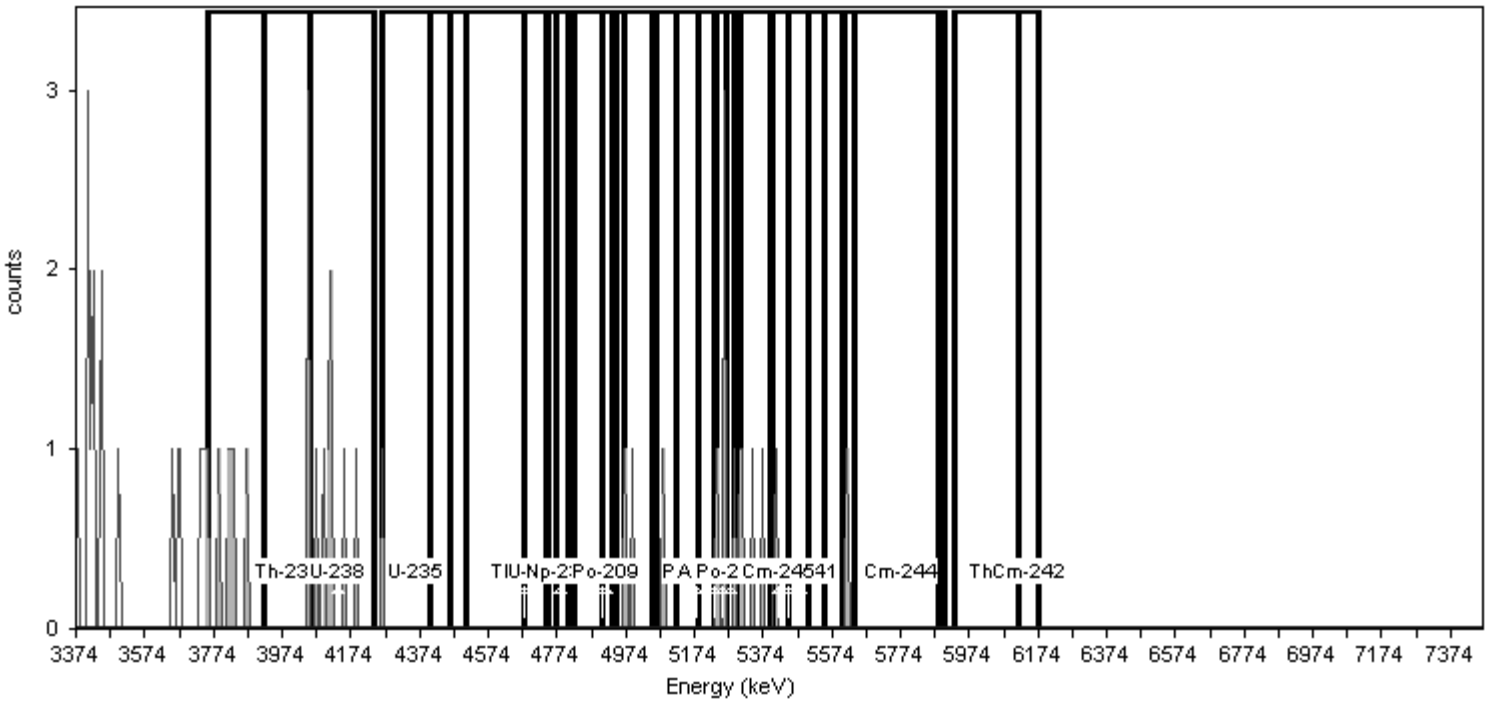
Analyst: 60040

Acquisition

Detector: AV13 , SN: 49-155M7
Acquisition Start Date: 6/18/2014 7:08:30PM
Live Time: 960.00 min.
Real Time: 970.52 min.
Calibration Name: IC-9884;AV13-20140505
Calibration Date: 5/6/2014 5:39:28PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.99% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 47.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	9.00	9.375E-003	3.294E-003
U-238	4.14	3.92	4.24	10.00	1.042E-002	3.455E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	0.00	0.000E+000	1.473E-003
U-234	4.71	4.51	4.82	0.00	0.000E+000	1.473E-003
Pu-242	4.90	4.68	4.95	0.00	0.000E+000	1.473E-003
Th-229	4.86	4.74	5.12	3.00	3.125E-003	2.083E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	7.00	7.292E-003	2.946E-003
U-232	5.25	5.06	5.40	10.00	1.042E-002	3.455E-003
Th-228	5.45	5.19	5.51	10.00	1.042E-002	3.455E-003
Po-210	5.28	5.23	5.29	5.00	5.208E-003	2.552E-003
Pu-238	5.47	5.27	5.55	6.00	6.250E-003	2.756E-003
Am-241	5.48	5.30	5.60	5.00	5.208E-003	2.552E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	1.00	1.042E-003	1.473E-003
Cm-244	5.78	5.64	5.90	0.00	0.000E+000	1.473E-003
Th-227	6.07	5.93	6.18	0.00	0.000E+000	1.473E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:26:57AM 6/19/2014

Sample

Sample Name: ICB;AV14
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

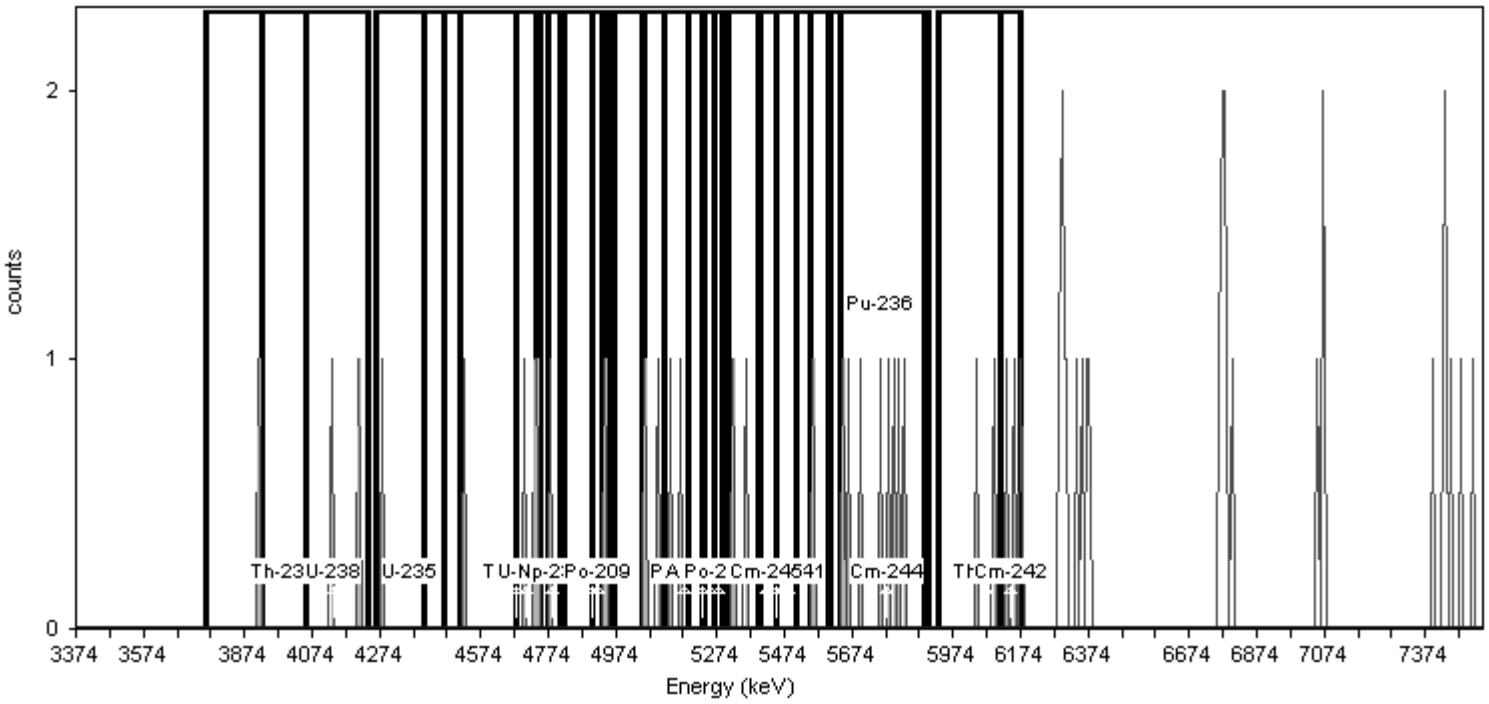
Acquisition

Detector: AV14 , SN: 50-060W4
Acquisition Start Date: 6/18/2014 7:08:33PM
Live Time: 960.00 min.
Real Time: 970.48 min.
Calibration Name: IC-9885;AV14-20140505
Calibration Date: 5/6/2014 5:39:36PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.34% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 57.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	4.00	4.167E-003	2.329E-003
U-234	4.71	4.51	4.82	5.00	5.208E-003	2.552E-003
Pu-242	4.90	4.68	4.95	5.00	5.208E-003	2.552E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	6.00	6.250E-003	2.756E-003
Th-228	5.45	5.19	5.51	2.00	2.083E-003	1.804E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	2.00	2.083E-003	1.804E-003
Am-241	5.48	5.30	5.60	3.00	3.125E-003	2.083E-003
Cm-245	5.42	5.40	5.45	0.00	0.000E+000	1.473E-003
Pu-236	5.76	5.61	5.89	8.00	8.333E-003	3.125E-003
Cm-244	5.78	5.64	5.90	8.00	8.333E-003	3.125E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:27:02AM 6/19/2014

Sample

Sample Name: ICB;AV15
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

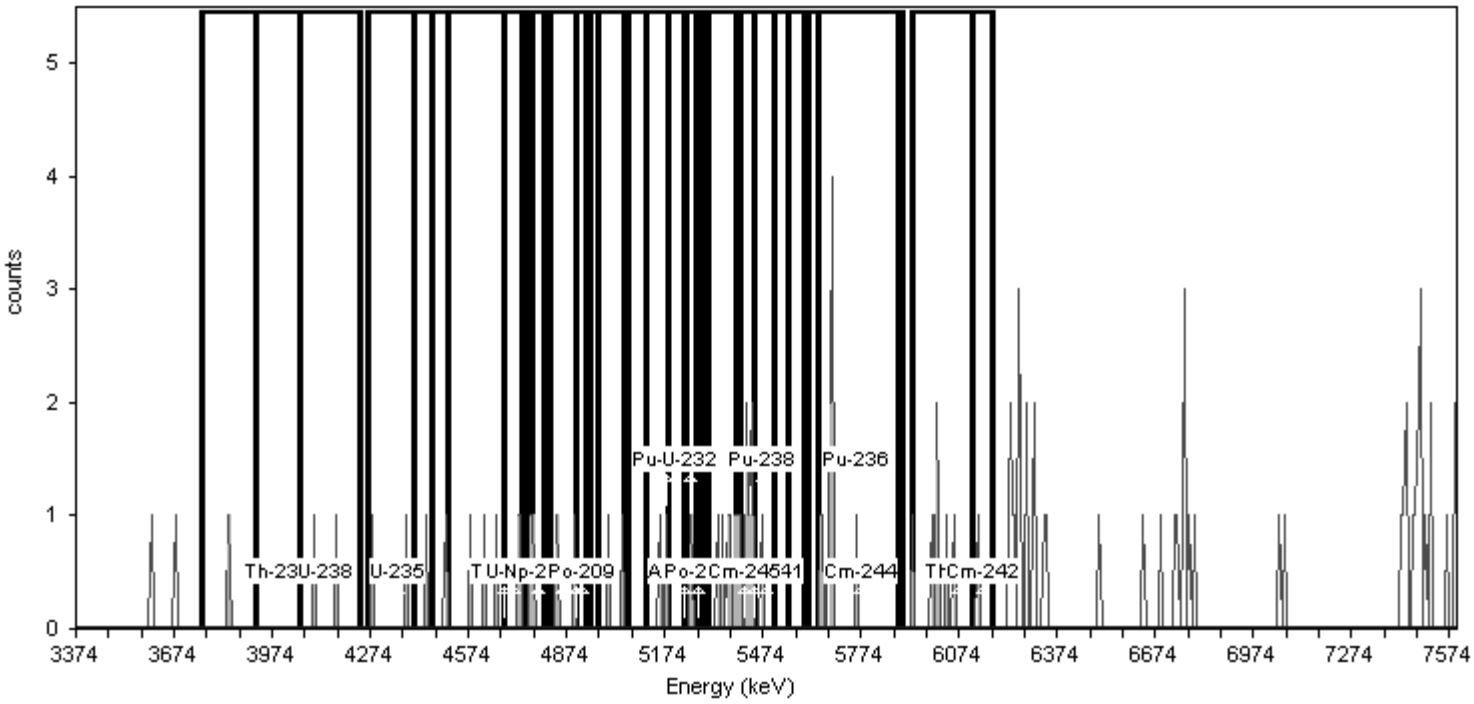
Acquisition

Detector: AV15 , SN: 41-172C5
Acquisition Start Date: 6/18/2014 7:08:35PM
Live Time: 960.00 min.
Real Time: 970.52 min.
Calibration Name: IC-9886;AV15-20140505
Calibration Date: 5/6/2014 5:39:42PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.62% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 96.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.68	4.40	4.75	7.00	7.292E-003	2.946E-003
U-234	4.71	4.51	4.82	7.00	7.292E-003	2.946E-003
Pu-242	4.90	4.68	4.95	6.00	6.250E-003	2.756E-003
Th-229	4.86	4.74	5.12	6.00	6.250E-003	2.756E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	10.00	1.042E-002	3.455E-003
Th-228	5.45	5.19	5.51	14.00	1.458E-002	4.034E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	13.00	1.354E-002	3.898E-003
Am-241	5.48	5.30	5.60	13.00	1.354E-002	3.898E-003
Cm-245	5.42	5.40	5.45	7.00	7.292E-003	2.946E-003
Pu-236	5.76	5.61	5.89	9.00	9.375E-003	3.294E-003
Cm-244	5.78	5.64	5.90	9.00	9.375E-003	3.294E-003
Th-227	6.07	5.93	6.18	8.00	8.333E-003	3.125E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:27:08AM 6/19/2014

Sample

Sample Name: ICB;AV16
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

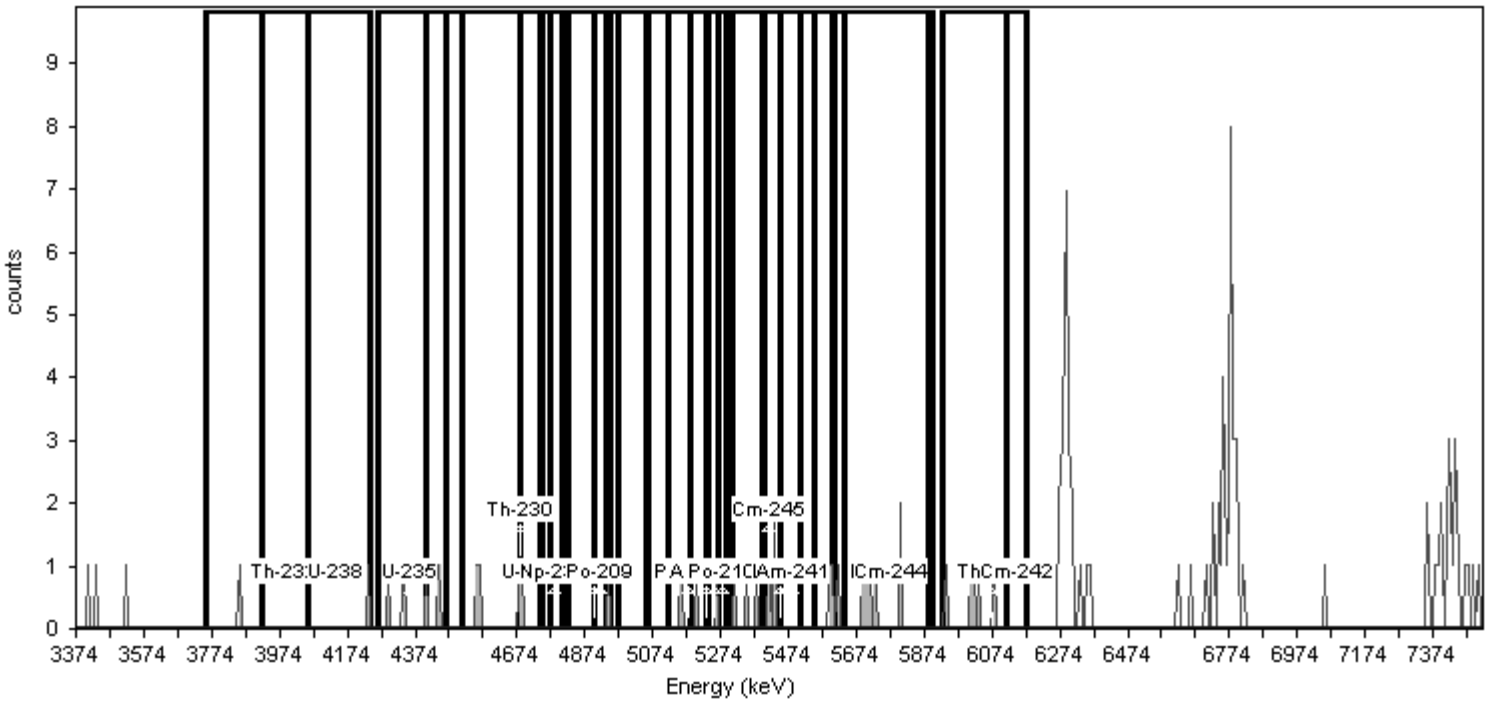
Analyst: 60040

Acquisition

Detector: AV16 , SN: 51-082B6
Acquisition Start Date: 6/18/2014 7:08:37PM
Live Time: 960.00 min.
Real Time: 970.48 min.
Calibration Name: IC-7107;AV16-20140505
Calibration Date: 5/5/2014 10:08:41PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.11% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 116.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	4.00	4.167E-003	2.329E-003
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	4.00	4.167E-003	2.329E-003
Pu-242	4.90	4.68	4.95	3.00	3.125E-003	2.083E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	6.00	6.250E-003	2.756E-003
Th-228	5.45	5.19	5.51	8.00	8.333E-003	3.125E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	6.00	6.250E-003	2.756E-003
Am-241	5.48	5.30	5.60	8.00	8.333E-003	3.125E-003
Cm-245	5.42	5.40	5.45	3.00	3.125E-003	2.083E-003
Pu-236	5.76	5.61	5.89	8.00	8.333E-003	3.125E-003
Cm-244	5.78	5.64	5.90	7.00	7.292E-003	2.946E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:13:46AM 6/19/2014

Sample

Sample Name: ICB;AV17
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

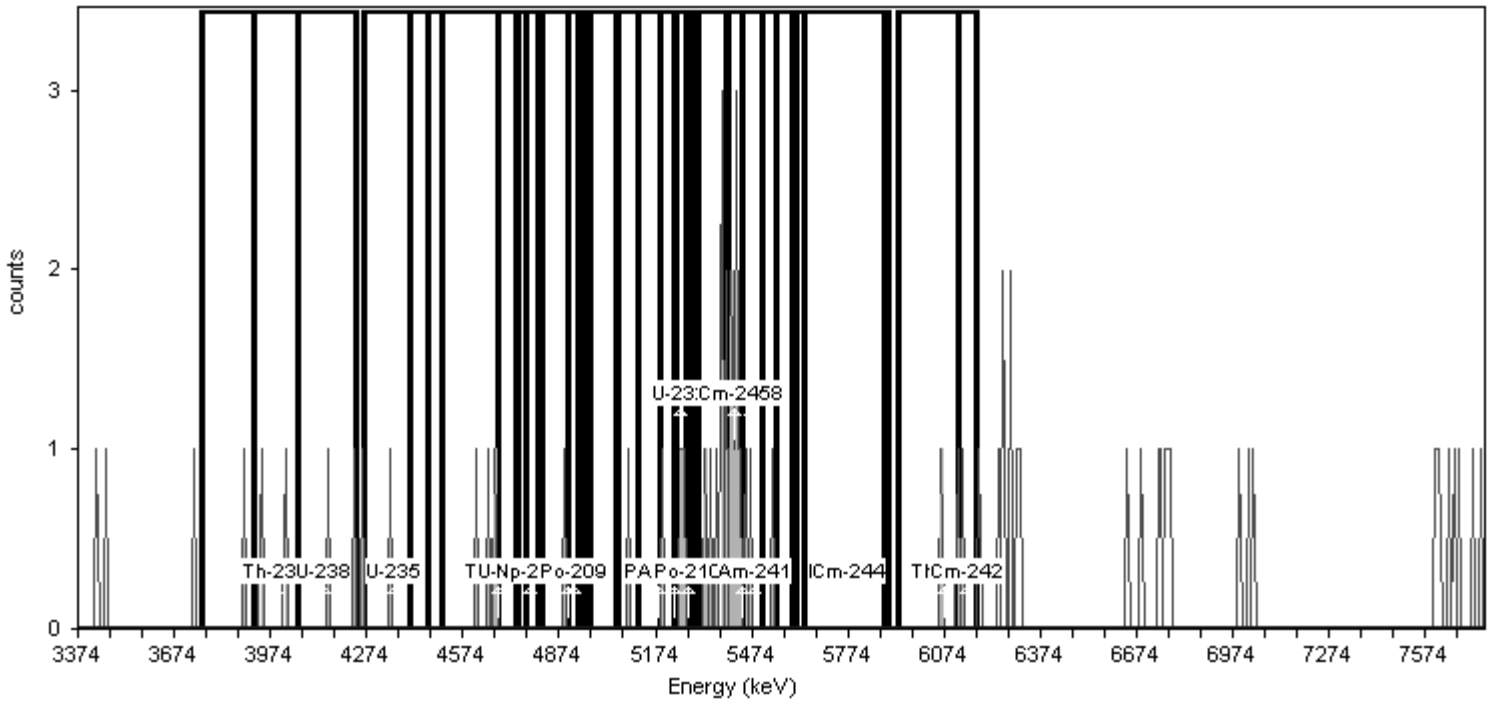
Acquisition

Detector: AV17 , SN: 50-051C4
Acquisition Start Date: 6/18/2014 7:08:39PM
Live Time: 960.00 min.
Real Time: 960.05 min.
Calibration Name: IC-8874;AV17-20140505
Calibration Date: 5/5/2014 10:08:49PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.07% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 66.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	3.00	3.125E-003	2.083E-003
U-238	4.14	3.92	4.24	4.00	4.167E-003	2.329E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	3.00	3.125E-003	2.083E-003
U-234	4.71	4.51	4.82	3.00	3.125E-003	2.083E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	12.00	1.250E-002	3.756E-003
Th-228	5.45	5.19	5.51	21.00	2.187E-002	4.886E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	19.00	1.979E-002	4.658E-003
Am-241	5.48	5.30	5.60	19.00	1.979E-002	4.658E-003
Cm-245	5.42	5.40	5.45	10.00	1.042E-002	3.455E-003
Pu-236	5.76	5.61	5.89	0.00	0.000E+000	1.473E-003
Cm-244	5.78	5.64	5.90	0.00	0.000E+000	1.473E-003
Th-227	6.07	5.93	6.18	3.00	3.125E-003	2.083E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:13:52AM 6/19/2014

Sample

Sample Name: ICB;AV18
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

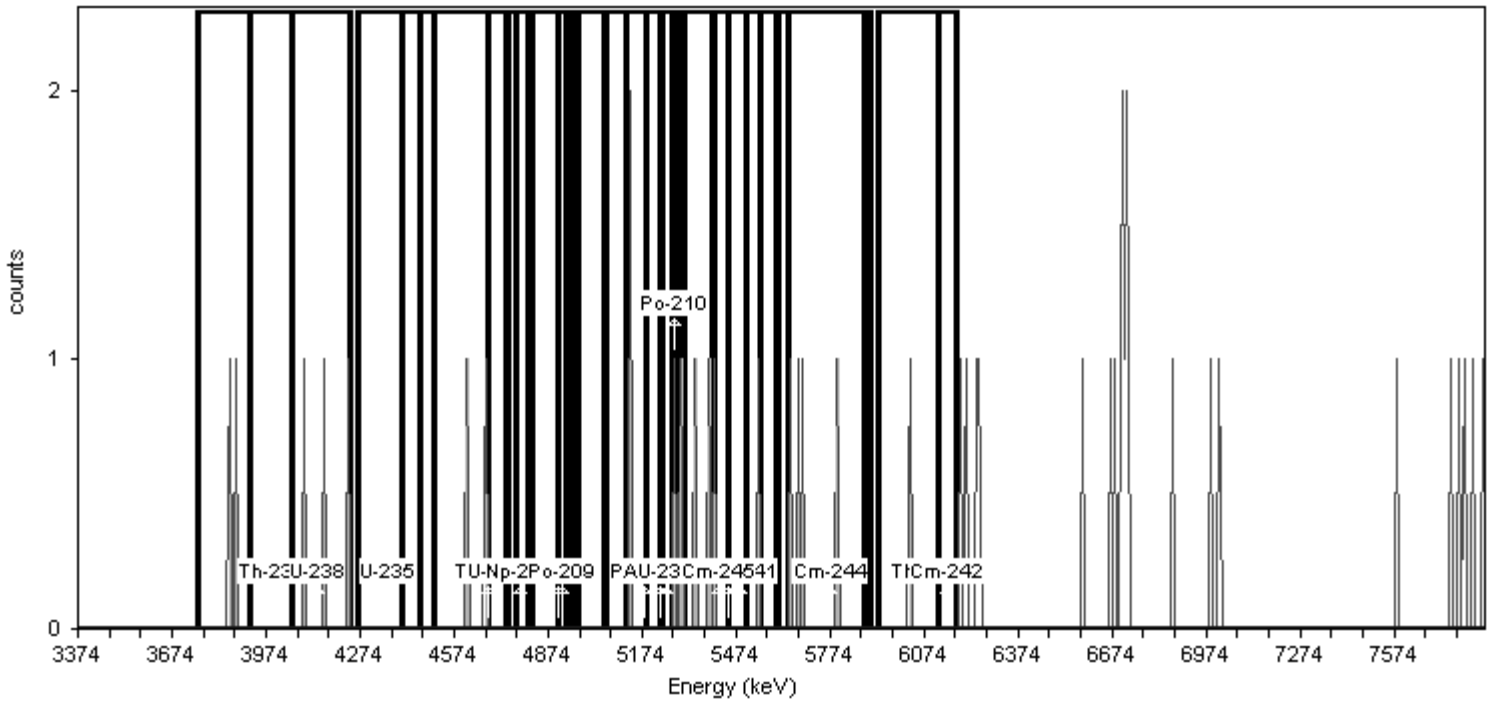
Analyst: 60040

Acquisition

Detector: AV18 , SN: 51-082C5
Acquisition Start Date: 6/18/2014 7:08:41PM
Live Time: 960.00 min.
Real Time: 960.05 min.
Calibration Name: IC-8875;AV18-20140505
Calibration Date: 5/5/2014 10:09:08PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.46% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 42.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	2.00	2.083E-003	1.804E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	0.00	0.000E+000	1.473E-003
Th-229	4.86	4.74	5.12	0.00	0.000E+000	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	7.00	7.292E-003	2.946E-003
Th-228	5.45	5.19	5.51	5.00	5.208E-003	2.552E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	6.00	6.250E-003	2.756E-003
Am-241	5.48	5.30	5.60	5.00	5.208E-003	2.552E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	4.00	4.167E-003	2.329E-003
Cm-244	5.78	5.64	5.90	4.00	4.167E-003	2.329E-003
Th-227	6.07	5.93	6.18	1.00	1.042E-003	1.473E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:13:58AM 6/19/2014

Sample

Sample Name: ICB;AV19
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

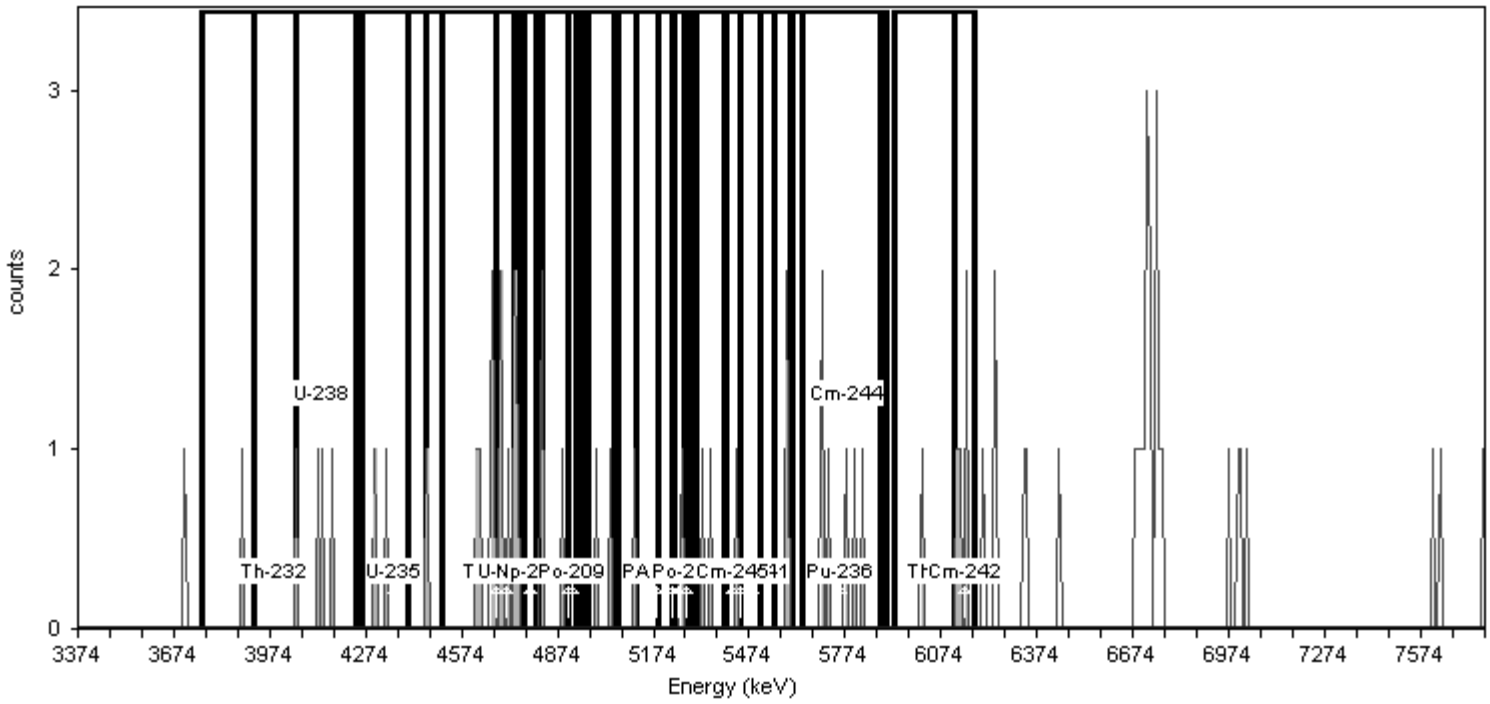
Acquisition

Detector: AV19 , SN: 50-025FF5
Acquisition Start Date: 6/18/2014 7:08:42PM
Live Time: 960.00 min.
Real Time: 960.05 min.
Calibration Name: IC-8876;AV19-20140505
Calibration Date: 5/5/2014 10:09:02PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.34% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 73.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	4.00	4.167E-003	2.329E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.68	4.40	4.75	12.00	1.250E-002	3.756E-003
U-234	4.71	4.51	4.82	13.00	1.354E-002	3.898E-003
Pu-242	4.90	4.68	4.95	9.00	9.375E-003	3.294E-003
Th-229	4.86	4.74	5.12	9.00	9.375E-003	3.294E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	4.00	4.167E-003	2.329E-003
Th-228	5.45	5.19	5.51	4.00	4.167E-003	2.329E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	3.00	3.125E-003	2.083E-003
Am-241	5.48	5.30	5.60	6.00	6.250E-003	2.756E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	6.00	6.250E-003	2.756E-003
Cm-244	5.78	5.64	5.90	6.00	6.250E-003	2.756E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	4.00	4.167E-003	2.329E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:14:04AM 6/19/2014

Sample

Sample Name: ICB;AV20
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

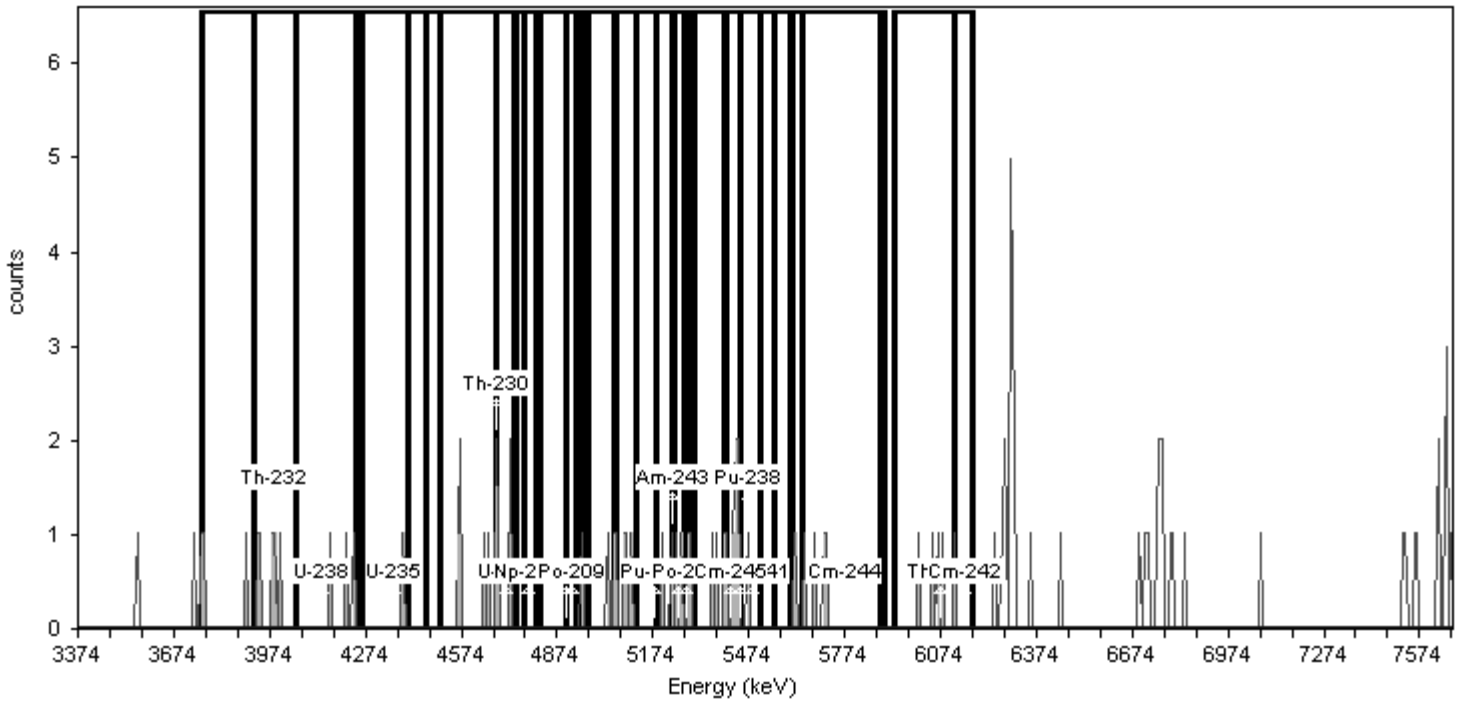
Analyst: 60040

Acquisition

Detector: AV20 , SN: 48-121A7
Acquisition Start Date: 6/18/2014 7:08:45PM
Live Time: 960.00 min.
Real Time: 960.05 min.
Calibration Name: IC-8877;AV20-20140505
Calibration Date: 5/5/2014 10:09:21PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.56% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 97.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	8.00	8.333E-003	3.125E-003
U-238	4.14	3.92	4.24	8.00	8.333E-003	3.125E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	10.00	1.042E-002	3.455E-003
U-234	4.71	4.51	4.82	10.00	1.042E-002	3.455E-003
Pu-242	4.90	4.68	4.95	6.00	6.250E-003	2.756E-003
Th-229	4.86	4.74	5.12	7.00	7.292E-003	2.946E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	8.00	8.333E-003	3.125E-003
Am-243	5.23	5.05	5.31	11.00	1.146E-002	3.608E-003
U-232	5.25	5.06	5.40	14.00	1.458E-002	4.034E-003
Th-228	5.45	5.19	5.51	16.00	1.667E-002	4.295E-003
Po-210	5.28	5.23	5.29	5.00	5.208E-003	2.552E-003
Pu-238	5.47	5.27	5.55	12.00	1.250E-002	3.756E-003
Am-241	5.48	5.30	5.60	10.00	1.042E-002	3.455E-003
Cm-245	5.42	5.40	5.45	7.00	7.292E-003	2.946E-003
Pu-236	5.76	5.61	5.89	5.00	5.208E-003	2.552E-003
Cm-244	5.78	5.64	5.90	4.00	4.167E-003	2.329E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:14:16AM 6/19/2014

Sample

Sample Name: ICB;AV21
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

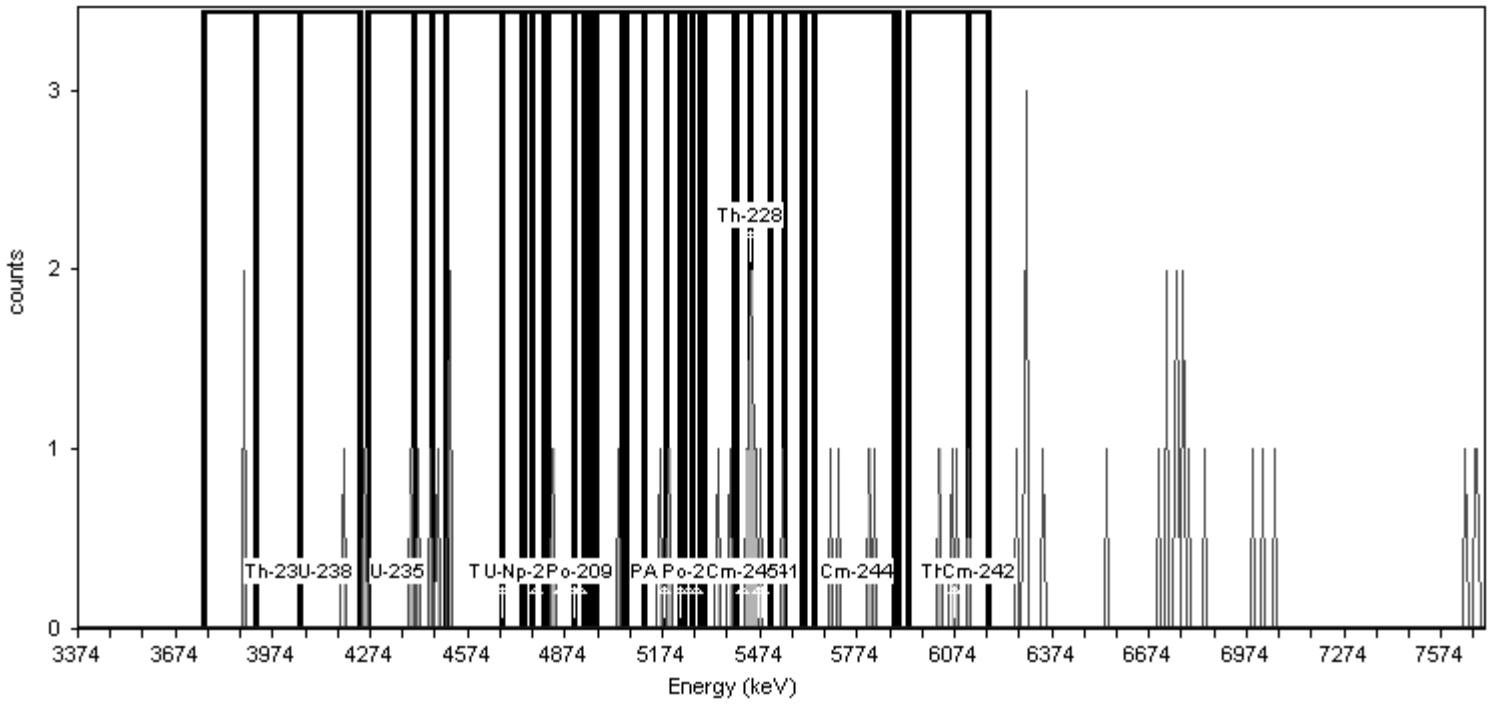
Acquisition

Detector: AV21 , SN: 48-102BB6
Acquisition Start Date: 6/18/2014 7:08:46PM
Live Time: 960.00 min.
Real Time: 960.05 min.
Calibration Name: IC-9520;AV21-20140505
Calibration Date: 5/5/2014 10:09:29PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.45% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 55.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.68	4.40	4.75	5.00	5.208E-003	2.552E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	4.00	4.167E-003	2.329E-003
Th-228	5.45	5.19	5.51	10.00	1.042E-002	3.455E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	10.00	1.042E-002	3.455E-003
Am-241	5.48	5.30	5.60	10.00	1.042E-002	3.455E-003
Cm-245	5.42	5.40	5.45	4.00	4.167E-003	2.329E-003
Pu-236	5.76	5.61	5.89	4.00	4.167E-003	2.329E-003
Cm-244	5.78	5.64	5.90	4.00	4.167E-003	2.329E-003
Th-227	6.07	5.93	6.18	4.00	4.167E-003	2.329E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:14:22AM 6/19/2014

Sample

Sample Name: ICB;AV23
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

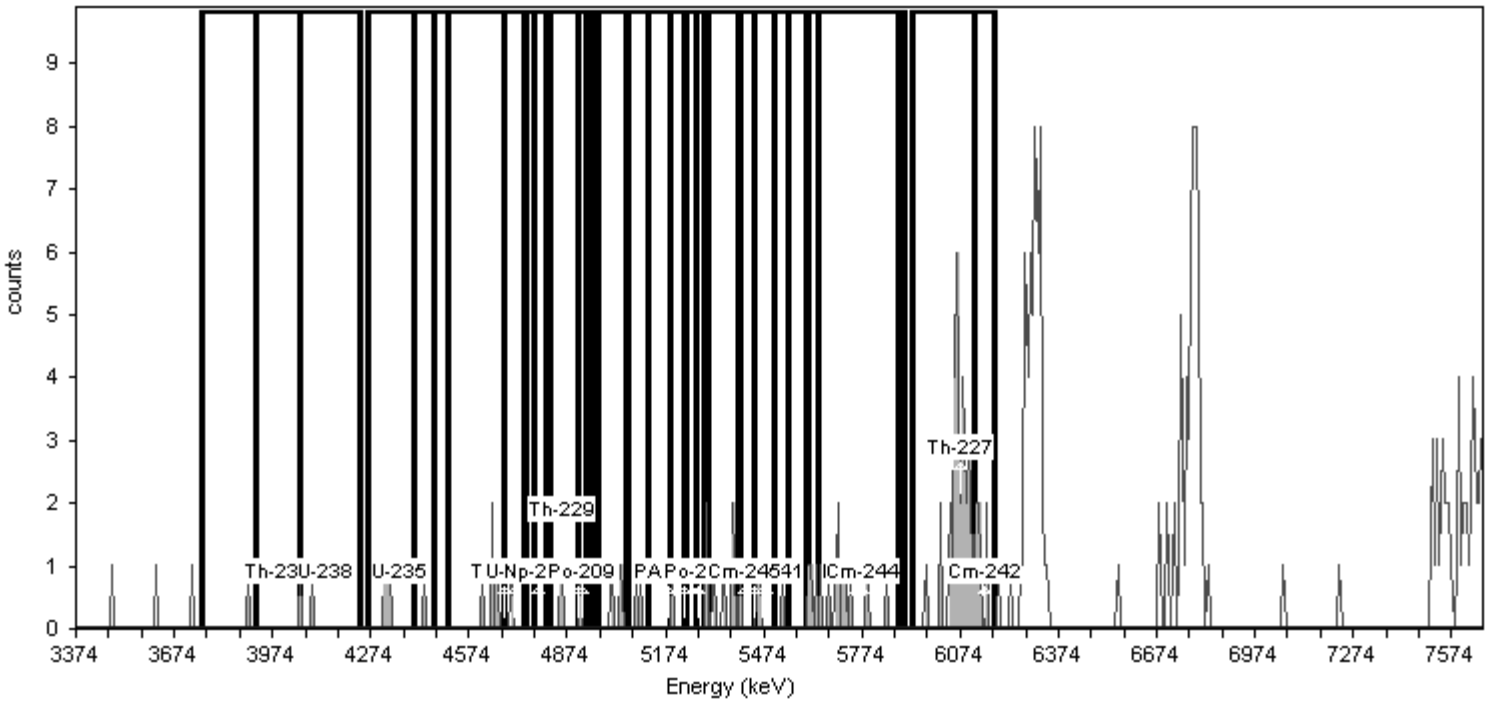
Acquisition

Detector: AV23 , SN: 48-158FF3
Acquisition Start Date: 6/18/2014 7:08:49PM
Live Time: 960.00 min.
Real Time: 960.05 min.
Calibration Name: IC-9792;AV23-20140505
Calibration Date: 5/5/2014 10:09:35PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.91% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 234.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	4.00	4.167E-003	2.329E-003
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	5.00	5.208E-003	2.552E-003
Pu-242	4.90	4.68	4.95	4.00	4.167E-003	2.329E-003
Th-229	4.86	4.74	5.12	7.00	7.292E-003	2.946E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	5.00	5.208E-003	2.552E-003
Am-243	5.23	5.05	5.31	5.00	5.208E-003	2.552E-003
U-232	5.25	5.06	5.40	10.00	1.042E-002	3.455E-003
Th-228	5.45	5.19	5.51	10.00	1.042E-002	3.455E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	10.00	1.042E-002	3.455E-003
Am-241	5.48	5.30	5.60	10.00	1.042E-002	3.455E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	13.00	1.354E-002	3.898E-003
Cm-244	5.78	5.64	5.90	10.00	1.042E-002	3.455E-003
Th-227	6.07	5.93	6.18	38.00	3.958E-002	6.505E-003
Cm-242	6.15	6.12	6.18	7.00	7.292E-003	2.946E-003

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:14:27AM 6/19/2014

Sample

Sample Name: ICB;AV24
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

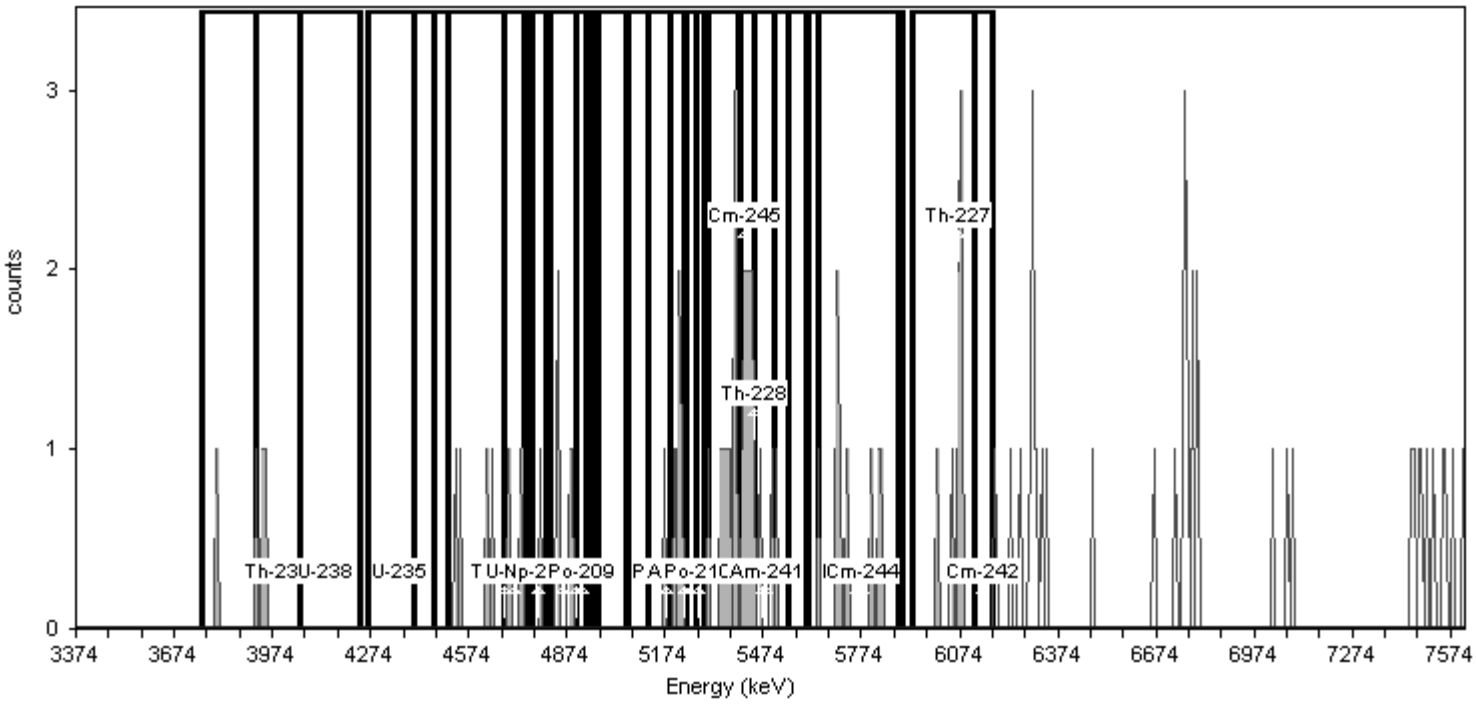
Acquisition

Detector: AV24 , SN: 47-137Q4
Acquisition Start Date: 6/18/2014 7:08:51PM
Live Time: 960.00 min.
Real Time: 960.05 min.
Calibration Name: IC-9793;AV24-20140505
Calibration Date: 5/5/2014 10:09:41PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.42% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 93.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	4.00	4.167E-003	2.329E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	7.00	7.292E-003	2.946E-003
Pu-242	4.90	4.68	4.95	7.00	7.292E-003	2.946E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	5.00	5.208E-003	2.552E-003
Am-243	5.23	5.05	5.31	6.00	6.250E-003	2.756E-003
U-232	5.25	5.06	5.40	14.00	1.458E-002	4.034E-003
Th-228	5.45	5.19	5.51	25.00	2.604E-002	5.311E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	22.00	2.292E-002	4.996E-003
Am-241	5.48	5.30	5.60	22.00	2.292E-002	4.996E-003
Cm-245	5.42	5.40	5.45	10.00	1.042E-002	3.455E-003
Pu-236	5.76	5.61	5.89	8.00	8.333E-003	3.125E-003
Cm-244	5.78	5.64	5.90	8.00	8.333E-003	3.125E-003
Th-227	6.07	5.93	6.18	7.00	7.292E-003	2.946E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:35:57PM 6/19/2014

Sample

Sample Name: ICB;AV43
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

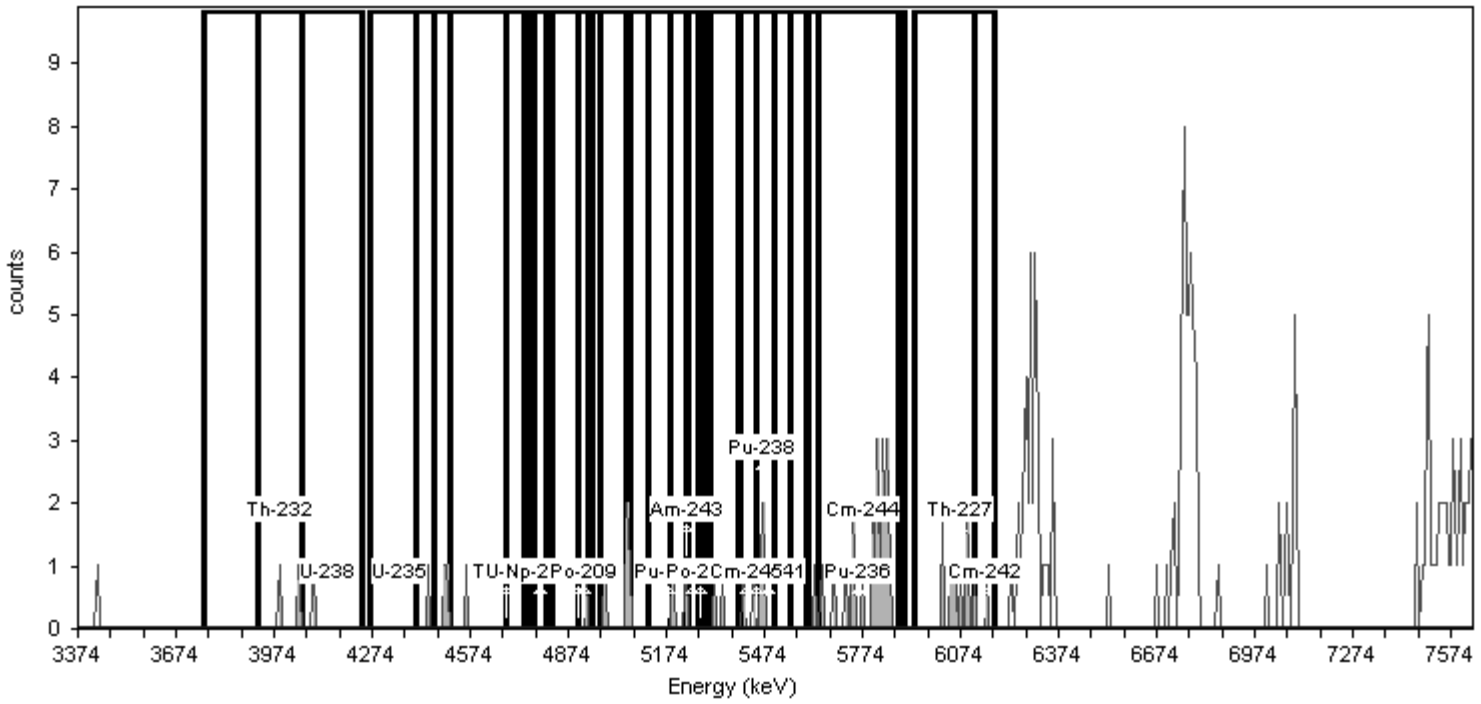
Analyst: 60040

Acquisition

Detector: AV43 , SN: 49-190X4
Acquisition Start Date: 6/19/2014 12:17:24AM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9794;AV43-20140505
Calibration Date: 5/5/2014 10:09:47PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.74% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 195.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	4.00	4.167E-003	2.329E-003
U-234	4.71	4.51	4.82	1.00	1.042E-003	1.473E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	6.00	6.250E-003	2.756E-003
Am-243	5.23	5.05	5.31	5.00	5.208E-003	2.552E-003
U-232	5.25	5.06	5.40	5.00	5.208E-003	2.552E-003
Th-228	5.45	5.19	5.51	9.00	9.375E-003	3.294E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	7.00	7.292E-003	2.946E-003
Am-241	5.48	5.30	5.60	7.00	7.292E-003	2.946E-003
Cm-245	5.42	5.40	5.45	2.00	2.083E-003	1.804E-003
Pu-236	5.76	5.61	5.89	23.00	2.396E-002	5.103E-003
Cm-244	5.78	5.64	5.90	22.00	2.292E-002	4.996E-003
Th-227	6.07	5.93	6.18	10.00	1.042E-002	3.455E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:36:08PM 6/19/2014

Sample

Sample Name: ICB;AV44
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

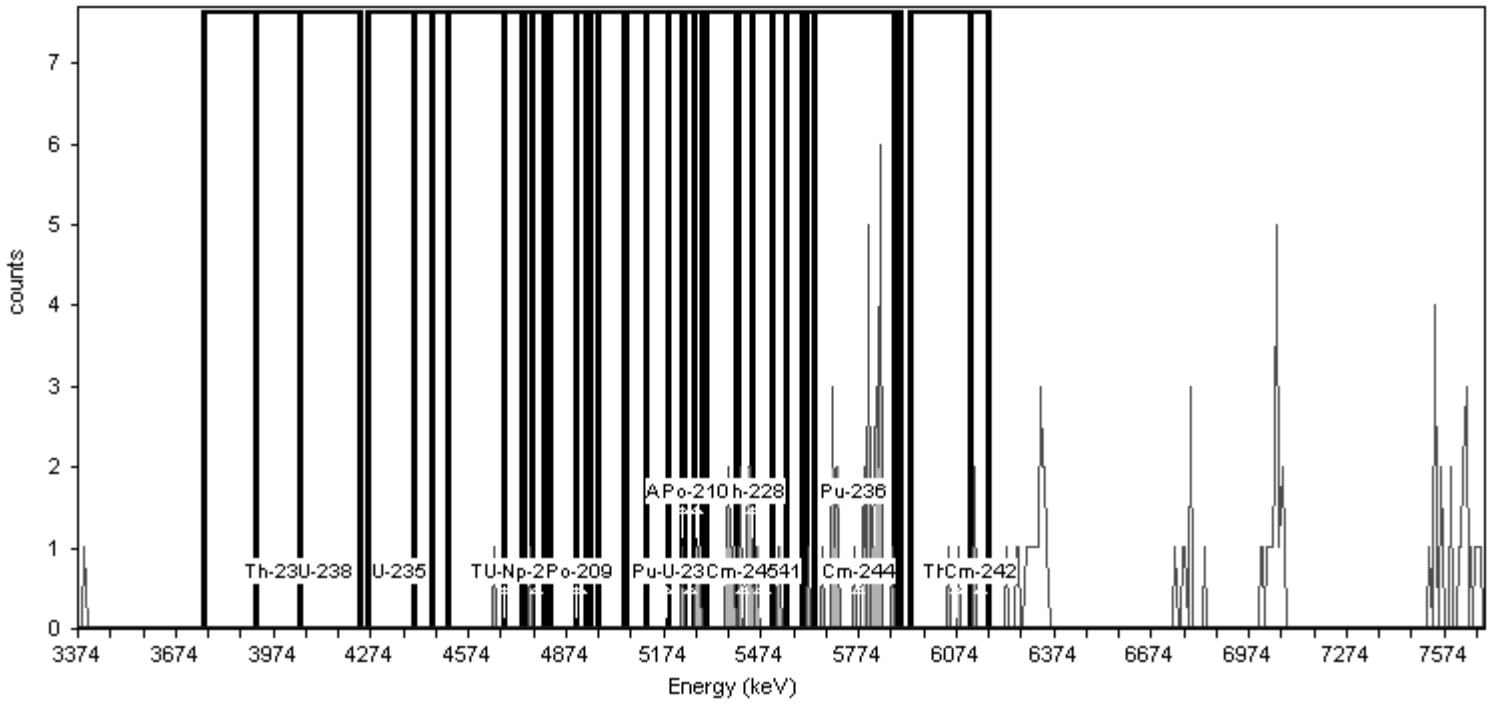
Analyst: 60040

Acquisition

Detector: AV44 , SN: 50-051JJ1
Acquisition Start Date: 6/19/2014 12:17:25AM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9795;AV44-20140505
Calibration Date: 5/5/2014 10:09:57PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.32% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 114.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	0.00	0.000E+000	1.473E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	1.00	1.042E-003	1.473E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	8.00	8.333E-003	3.125E-003
Th-228	5.45	5.19	5.51	16.00	1.667E-002	4.295E-003
Po-210	5.28	5.23	5.29	3.00	3.125E-003	2.083E-003
Pu-238	5.47	5.27	5.55	16.00	1.667E-002	4.295E-003
Am-241	5.48	5.30	5.60	14.00	1.458E-002	4.034E-003
Cm-245	5.42	5.40	5.45	7.00	7.292E-003	2.946E-003
Pu-236	5.76	5.61	5.89	29.00	3.021E-002	5.705E-003
Cm-244	5.78	5.64	5.90	28.00	2.917E-002	5.610E-003
Th-227	6.07	5.93	6.18	4.00	4.167E-003	2.329E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:36:14PM 6/19/2014

Sample

Sample Name: ICB;AV45
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

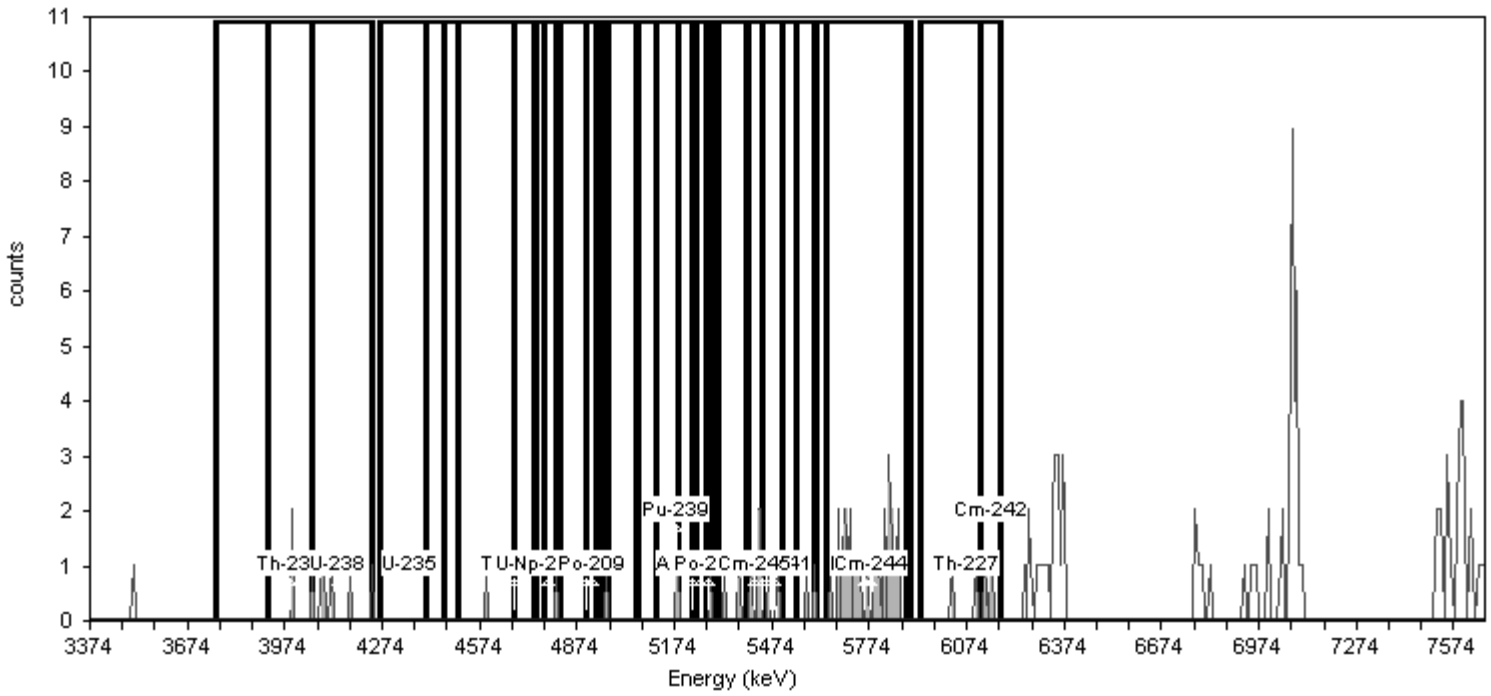
Analyst: 60040

Acquisition

Detector: AV45 , SN: 48-158FF2
Acquisition Start Date: 6/19/2014 12:17:28AM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9817;AV45-20140505
Calibration Date: 5/5/2014 10:10:03PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.06% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 153.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	3.00	3.125E-003	2.083E-003
U-238	4.14	3.92	4.24	8.00	8.333E-003	3.125E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	1.00	1.042E-003	1.473E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	5.00	5.208E-003	2.552E-003
Th-228	5.45	5.19	5.51	11.00	1.146E-002	3.608E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	10.00	1.042E-002	3.455E-003
Am-241	5.48	5.30	5.60	11.00	1.146E-002	3.608E-003
Cm-245	5.42	5.40	5.45	5.00	5.208E-003	2.552E-003
Pu-236	5.76	5.61	5.89	27.00	2.813E-002	5.512E-003
Cm-244	5.78	5.64	5.90	27.00	2.813E-002	5.512E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:36:19PM 6/19/2014

Sample

Sample Name: ICB;AV46
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

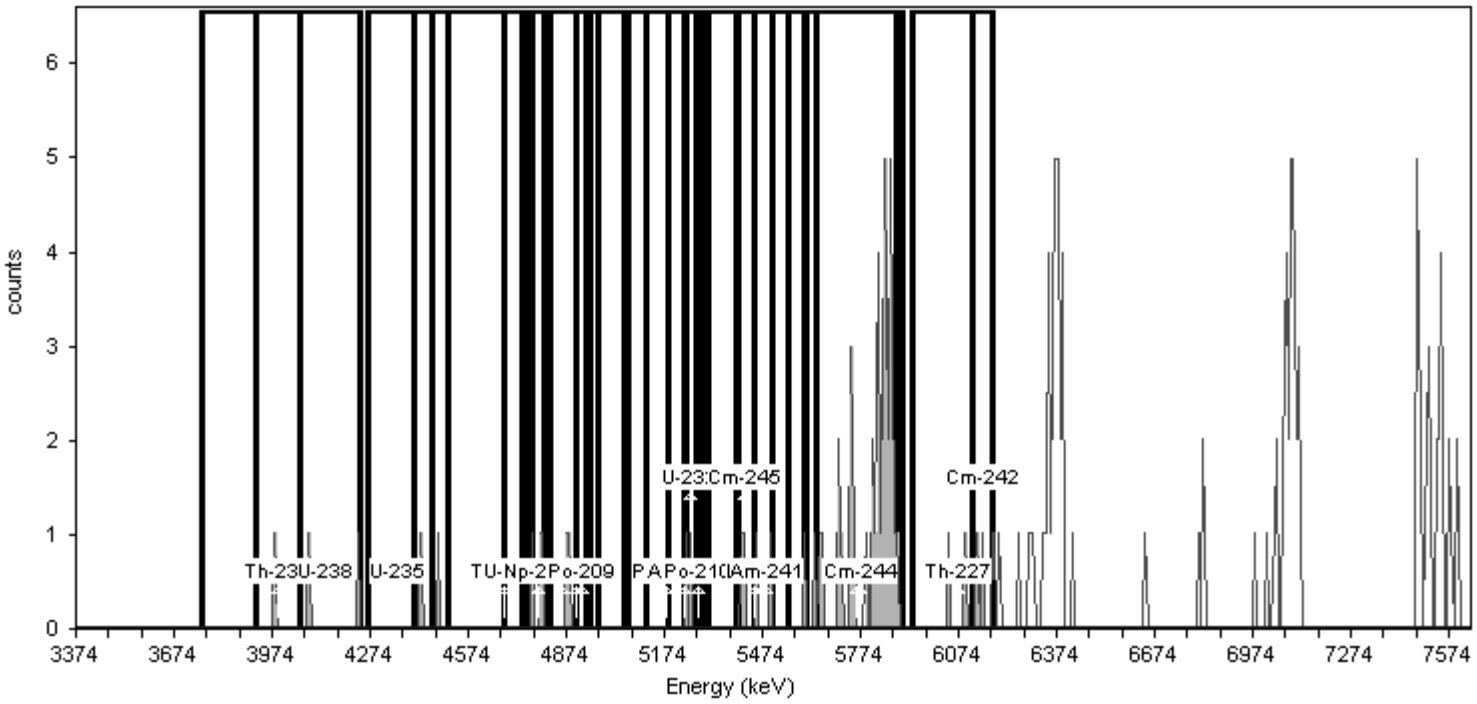
Acquisition

Detector: AV46 , SN: 49-202GG2
Acquisition Start Date: 6/19/2014 12:17:29AM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9884;AV46-20140505
Calibration Date: 5/5/2014 10:10:09PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.80% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 154.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	2.00	2.083E-003	1.804E-003
U-234	4.71	4.51	4.82	3.00	3.125E-003	2.083E-003
Pu-242	4.90	4.68	4.95	5.00	5.208E-003	2.552E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	3.00	3.125E-003	2.083E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	2.00	2.083E-003	1.804E-003
Th-228	5.45	5.19	5.51	6.00	6.250E-003	2.756E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	4.00	4.167E-003	2.329E-003
Am-241	5.48	5.30	5.60	5.00	5.208E-003	2.552E-003
Cm-245	5.42	5.40	5.45	2.00	2.083E-003	1.804E-003
Pu-236	5.76	5.61	5.89	38.00	3.958E-002	6.505E-003
Cm-244	5.78	5.64	5.90	37.00	3.854E-002	6.421E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:33:37PM 6/19/2014

Sample

Sample Name: ICB;AV49
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

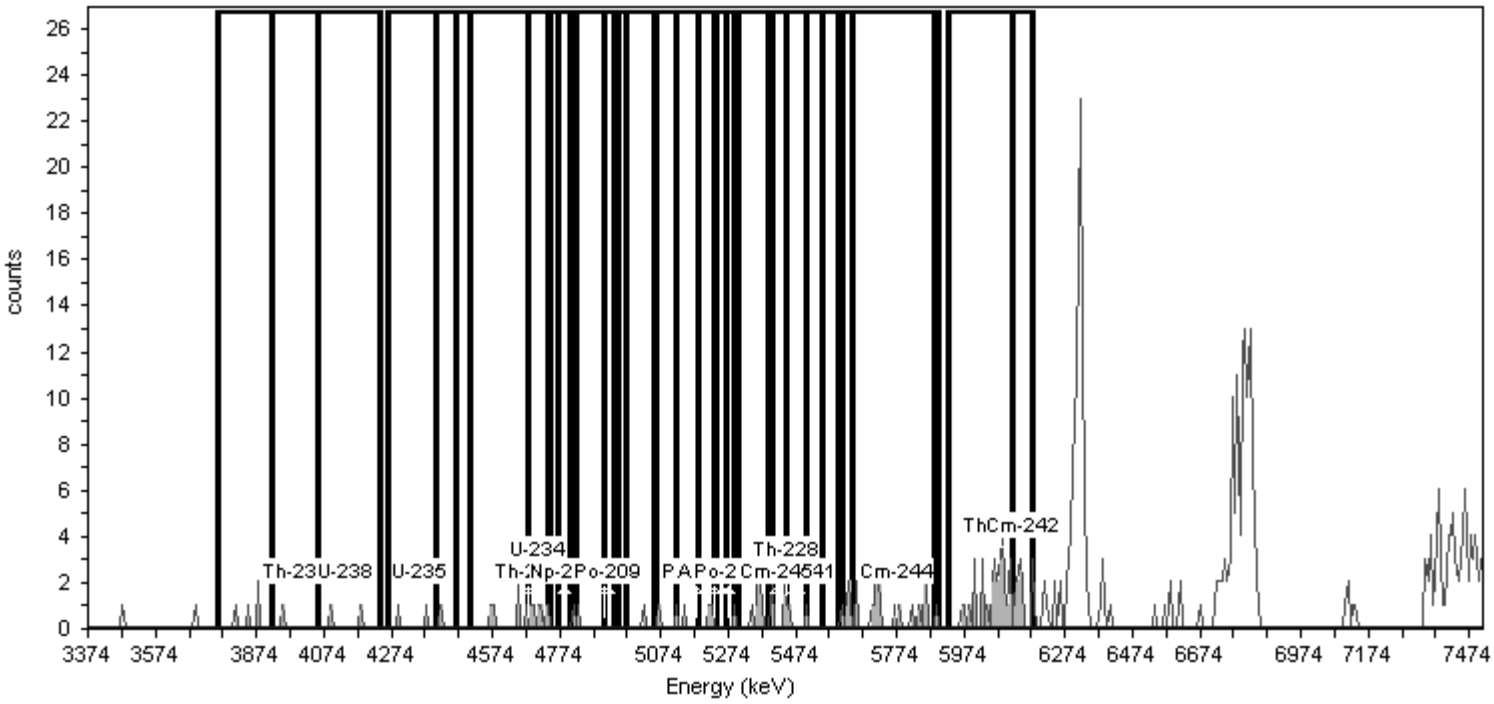
Analyst: 60040

Acquisition

Detector: AV49 , SN: 47-043hh4
Acquisition Start Date: 6/19/2014 12:17:35AM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-7107;AV49-20140504
Calibration Date: 5/5/2014 6:52:38PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.53% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 390.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	5.00	5.208E-003	2.552E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.68	4.40	4.75	12.00	1.250E-002	3.756E-003
U-234	4.71	4.51	4.82	12.00	1.250E-002	3.756E-003
Pu-242	4.90	4.68	4.95	8.00	8.333E-003	3.125E-003
Th-229	4.86	4.74	5.12	6.00	6.250E-003	2.756E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	6.00	6.250E-003	2.756E-003
Am-243	5.23	5.05	5.31	6.00	6.250E-003	2.756E-003
U-232	5.25	5.06	5.40	14.00	1.458E-002	4.034E-003
Th-228	5.45	5.19	5.51	16.00	1.667E-002	4.295E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	14.00	1.458E-002	4.034E-003
Am-241	5.48	5.30	5.60	13.00	1.354E-002	3.898E-003
Cm-245	5.42	5.40	5.45	5.00	5.208E-003	2.552E-003
Pu-236	5.76	5.61	5.89	21.00	2.187E-002	4.886E-003
Cm-244	5.78	5.64	5.90	18.00	1.875E-002	4.541E-003
Th-227	6.07	5.93	6.18	41.00	4.271E-002	6.751E-003
Cm-242	6.15	6.12	6.18	11.00	1.146E-002	3.608E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:33:43PM 6/19/2014

Sample

Sample Name: ICB;AV50
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

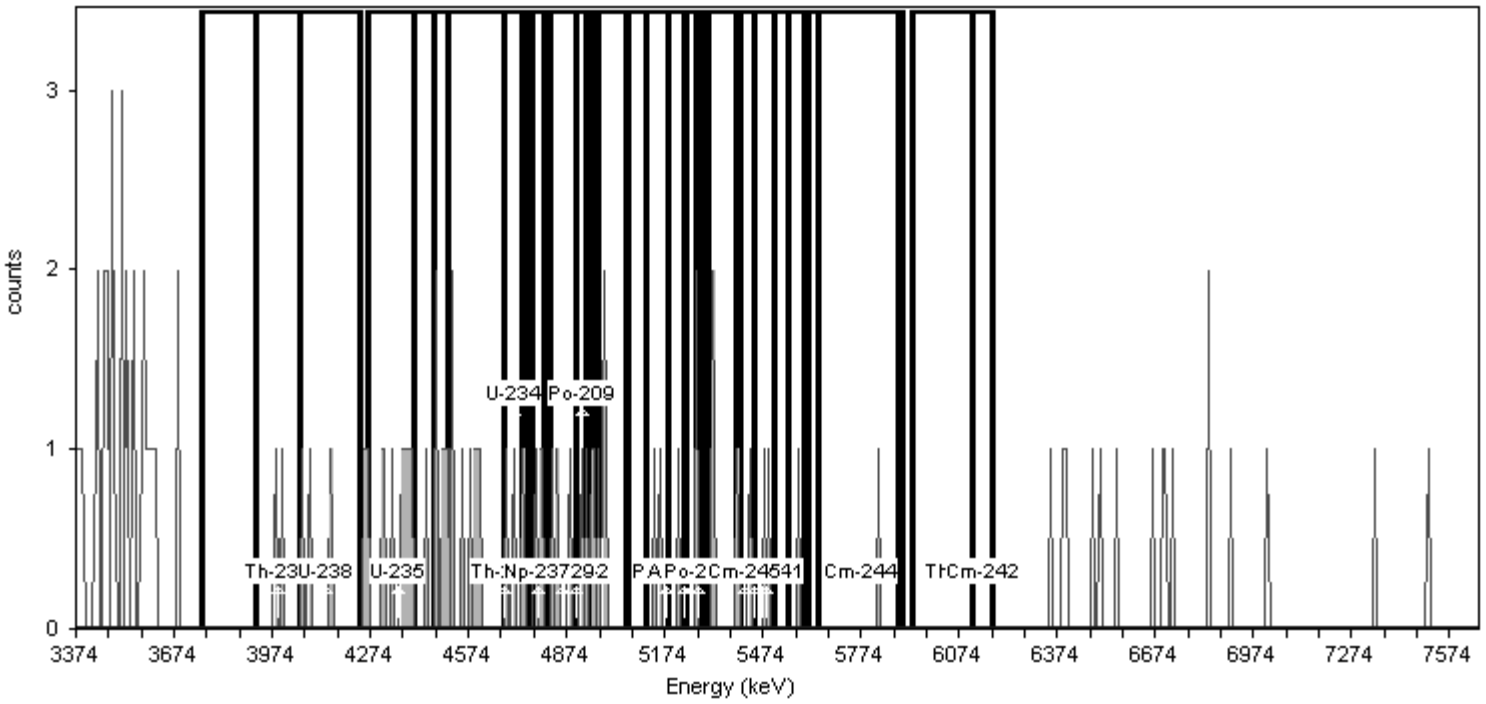
Acquisition

Detector: AV50 , SN: 50-060W2
Acquisition Start Date: 6/19/2014 12:17:37AM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-8874;AV50-20140504
Calibration Date: 5/5/2014 6:52:48PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.93% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 106.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	5.00	5.208E-003	2.552E-003
U-235	4.36	4.26	4.46	10.00	1.042E-002	3.455E-003
Th-230	4.68	4.40	4.75	16.00	1.667E-002	4.295E-003
U-234	4.71	4.51	4.82	14.00	1.458E-002	4.034E-003
Pu-242	4.90	4.68	4.95	12.00	1.250E-002	3.756E-003
Th-229	4.86	4.74	5.12	15.00	1.563E-002	4.167E-003
Np-237	4.78	4.77	4.81	3.00	3.125E-003	2.083E-003
Po-209	4.92	4.90	4.93	2.00	2.083E-003	1.804E-003
Pu-239	5.18	4.97	5.24	7.00	7.292E-003	2.946E-003
Am-243	5.23	5.05	5.31	5.00	5.208E-003	2.552E-003
U-232	5.25	5.06	5.40	8.00	8.333E-003	3.125E-003
Th-228	5.45	5.19	5.51	9.00	9.375E-003	3.294E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	8.00	8.333E-003	3.125E-003
Am-241	5.48	5.30	5.60	7.00	7.292E-003	2.946E-003
Cm-245	5.42	5.40	5.45	2.00	2.083E-003	1.804E-003
Pu-236	5.76	5.61	5.89	1.00	1.042E-003	1.473E-003
Cm-244	5.78	5.64	5.90	1.00	1.042E-003	1.473E-003
Th-227	6.07	5.93	6.18	0.00	0.000E+000	1.473E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:33:48PM 6/19/2014

Sample

Sample Name: ICB;AV51
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

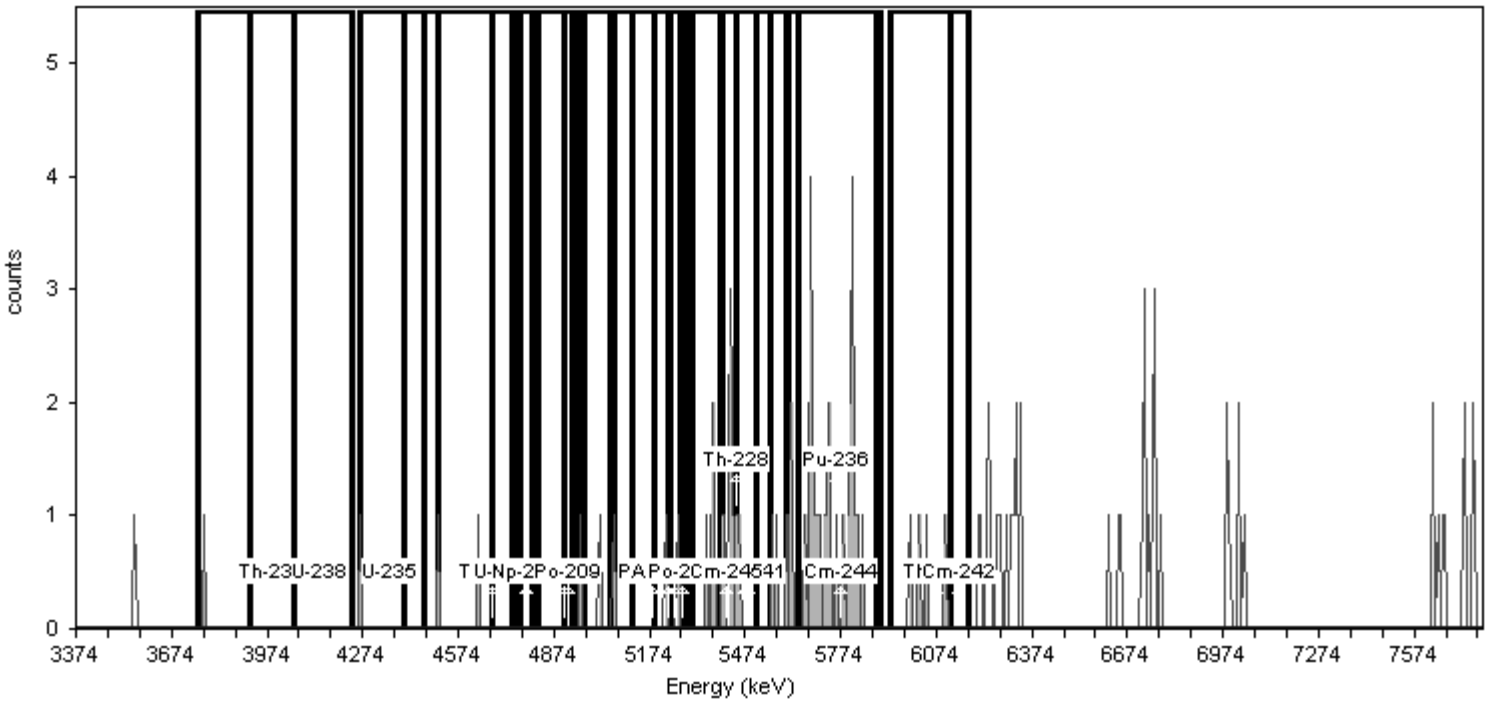
Acquisition

Detector: AV51 , SN: 48-109I1
Acquisition Start Date: 6/19/2014 12:17:43AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-8875;AV51-20140504
Calibration Date: 5/5/2014 6:52:53PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.24% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 98.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	0.00	0.000E+000	1.473E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	2.00	2.083E-003	1.804E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	0.00	0.000E+000	1.473E-003
Th-229	4.86	4.74	5.12	3.00	3.125E-003	2.083E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	7.00	7.292E-003	2.946E-003
Th-228	5.45	5.19	5.51	14.00	1.458E-002	4.034E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	12.00	1.250E-002	3.756E-003
Am-241	5.48	5.30	5.60	15.00	1.563E-002	4.167E-003
Cm-245	5.42	5.40	5.45	8.00	8.333E-003	3.125E-003
Pu-236	5.76	5.61	5.89	28.00	2.917E-002	5.610E-003
Cm-244	5.78	5.64	5.90	26.00	2.708E-002	5.413E-003
Th-227	6.07	5.93	6.18	4.00	4.167E-003	2.329E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:24:09AM 6/19/2014

Sample

Sample Name: ICB;AV115
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

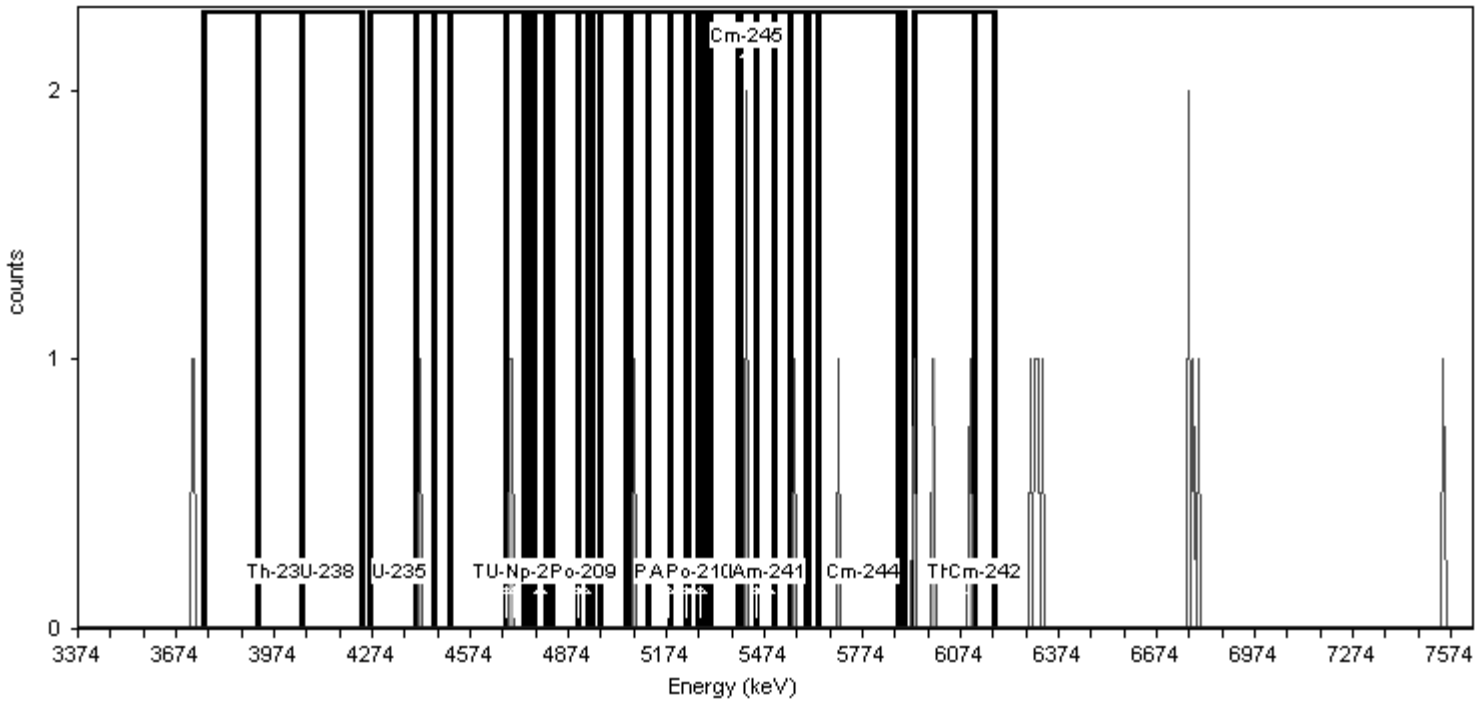
Analyst: 60040

Acquisition

Detector: AV115 , SN: 49-037E4
Acquisition Start Date: 6/18/2014 7:09:52PM
Live Time: 960.00 min.
Real Time: 960.03 min.
Calibration Name: IC-9817;AV115-20140507
Calibration Date: 5/7/2014 10:49:29PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.26% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 22.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	0.00	0.000E+000	1.473E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	3.00	3.125E-003	2.083E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	2.00	2.083E-003	1.804E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	1.00	1.042E-003	1.473E-003
U-232	5.25	5.06	5.40	1.00	1.042E-003	1.473E-003
Th-228	5.45	5.19	5.51	2.00	2.083E-003	1.804E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	2.00	2.083E-003	1.804E-003
Am-241	5.48	5.30	5.60	3.00	3.125E-003	2.083E-003
Cm-245	5.42	5.40	5.45	2.00	2.083E-003	1.804E-003
Pu-236	5.76	5.61	5.89	1.00	1.042E-003	1.473E-003
Cm-244	5.78	5.64	5.90	1.00	1.042E-003	1.473E-003
Th-227	6.07	5.93	6.18	3.00	3.125E-003	2.083E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:24:14AM 6/19/2014

Sample

Sample Name: ICB;AV116
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

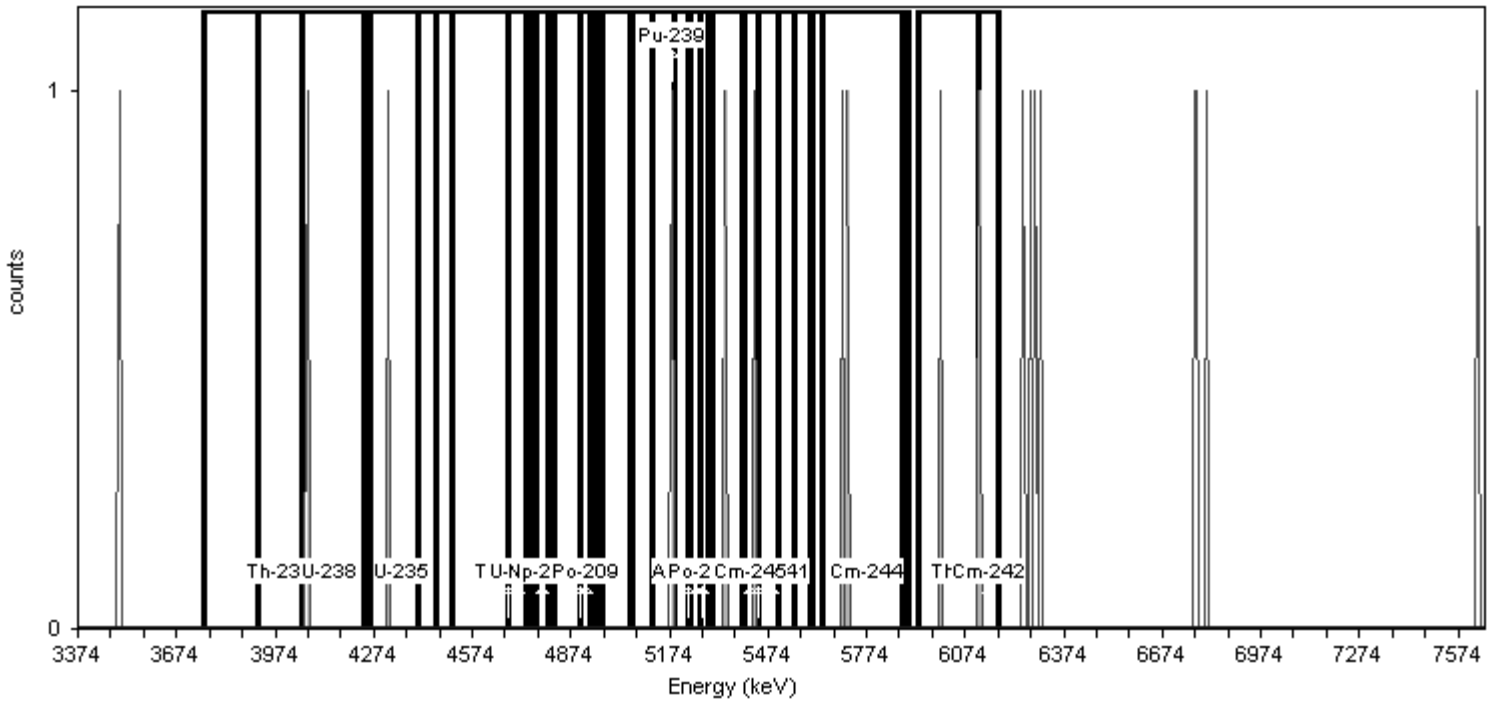
Acquisition

Detector: AV116 , SN: 49-034G1
Acquisition Start Date: 6/18/2014 7:09:53PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9792;AV116-20140430
Calibration Date: 5/1/2014 1:16:57PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.04% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 18.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	0.00	0.000E+000	1.473E-003
U-234	4.71	4.51	4.82	0.00	0.000E+000	1.473E-003
Pu-242	4.90	4.68	4.95	0.00	0.000E+000	1.473E-003
Th-229	4.86	4.74	5.12	0.00	0.000E+000	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	1.00	1.042E-003	1.473E-003
U-232	5.25	5.06	5.40	2.00	2.083E-003	1.804E-003
Th-228	5.45	5.19	5.51	2.00	2.083E-003	1.804E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	2.00	2.083E-003	1.804E-003
Am-241	5.48	5.30	5.60	2.00	2.083E-003	1.804E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	2.00	2.083E-003	1.804E-003
Cm-244	5.78	5.64	5.90	2.00	2.083E-003	1.804E-003
Th-227	6.07	5.93	6.18	2.00	2.083E-003	1.804E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

Run Logs

Alpha Spectroscopy Run Log

Detector: AV3

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:26	140	IC 160-120519/1		120519			PS
05/07/14 23:02	60	ICV 160-120855/1		120855			PS
06/18/14 19:10	960	ICB 160-127828/1		127828			PS
06/19/14 16:44	60	CCV 160-127913/1		127913			PS
07/01/14 01:00	1	PULSER 160-129269/1		129269			MLK
07/01/14 12:26	180	ZZZZZ		129269			
07/02/14 10:53	1	PULSER 160-129494/2		129494			MLK
07/02/14 18:02	180	MB 160-128412/1-A		129494	128412	A-01-R	MLK
07/03/14 15:56	1	PULSER 160-129774/1		129774			MLK
07/03/14 17:15	180	ZZZZZ		129774			

Detector: AV4

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:26	140	IC 160-120520/1		120520			PS
05/07/14 23:03	60	ICV 160-120856/1		120856			PS
06/18/14 19:10	960	ICB 160-127829/1		127829			PS
06/19/14 16:44	60	CCV 160-127914/1		127914			PS
07/02/14 10:53	1	PULSER 160-129495/2		129495			MLK
07/02/14 18:02	180	LCS 160-128412/2-A		129495	128412	A-01-R	MLK

Detector: AV6

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:26	140	IC 160-120521/1		120521			PS
05/07/14 23:03	60	ICV 160-120857/1		120857			PS
06/18/14 19:08	960	ICB 160-127830/1		127830			PS
06/19/14 18:06	60	CCV 160-127932/1		127932			PS
07/02/14 10:53	1	PULSER 160-129512/2		129512			MLK
07/02/14 18:02	180	680-102380-10	SD-226-02	129512	128412	A-01-R	MLK

Detector: AV7

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/07/14 19:51	140	IC 160-120843/1		120843			PS
05/07/14 23:03	60	ICV 160-120858/1		120858			PS
06/18/14 19:08	960	ICB 160-127831/1		127831			PS
06/19/14 16:44	60	CCV 160-127943/1		127943			PS
07/02/14 10:53	1	PULSER 160-129523/2		129523			MLK
07/02/14 18:02	180	680-102380-10 DU	SD-226-02 DU	129523	128412	A-01-R	MLK

Detector: AV8

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:27	140	IC 160-120523/1		120523			PS
05/08/14 00:14	60	ICV 160-121084/1		121084			PS
06/18/14 19:08	960	ICB 160-127837/1		127837			PS
06/19/14 18:06	60	CCV 160-127954/1		127954			PS
07/02/14 10:53	1	PULSER 160-129534/2		129534			MLK
07/02/14 18:02	180	680-102380-12	SD-225-SS	129534	128412	A-01-R	MLK

Alpha Spectroscopy Run Log

Detector: AV9

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:27	140	IC 160-120524/1		120524			PS
05/07/14 23:03	60	ICV 160-120859/1		120859			PS
06/18/14 19:08	960	ICB 160-127848/1		127848			PS
06/19/14 18:06	60	CCV 160-127962/1		127962			PS
07/02/14 10:53	1	PULSER 160-129545/2		129545			MLK
07/02/14 18:02	180	680-102380-13	SD-225-01	129545	128412	A-01-R	MLK

Detector: AV10

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:27	140	IC 160-120512/1		120512			PS
05/07/14 23:03	60	ICV 160-120847/1		120847			PS
06/18/14 19:08	960	ICB 160-127776/1		127776			PS
06/19/14 18:06	60	CCV 160-127860/1		127860			PS
07/02/14 10:53	1	PULSER 160-129466/2		129466			MLK
07/02/14 18:02	180	680-102380-14	SD-225-02	129466	128412	A-01-R	MLK

Detector: AV11

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:27	140	IC 160-120513/1		120513			PS
05/07/14 23:04	60	ICV 160-120848/1		120848			PS
06/18/14 19:08	960	ICB 160-127786/1		127786			PS
06/19/14 18:07	60	CCV 160-127871/1		127871			PS
07/02/14 10:53	1	PULSER 160-129477/2		129477			MLK
07/02/14 18:02	180	680-102380-16	SD-228-SS	129477	128412	A-01-R	MLK

Detector: AV12

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:28	140	IC 160-120514/1		120514			PS
05/07/14 23:04	60	ICV 160-120849/1		120849			PS
06/18/14 19:08	960	ICB 160-127796/1		127796			PS
06/19/14 18:07	60	CCV 160-127881/1		127881			PS
07/02/14 10:53	1	PULSER 160-129482/2		129482			MLK
07/02/14 18:02	180	680-102380-17	SD-228-01	129482	128412	A-01-R	MLK

Detector: AV13

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:28	140	IC 160-120515/1		120515			PS
05/07/14 23:04	60	ICV 160-120850/1		120850			PS
06/18/14 19:08	960	ICB 160-127807/1		127807			PS
06/19/14 19:45	60	CCV 160-127892/1		127892			PS
07/02/14 10:53	1	PULSER 160-129483/2		129483			MLK
07/02/14 18:02	180	680-102380-18	SD-228-02	129483	128412	A-01-R	MLK

Detector: AV14

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:28	140	IC 160-120516/1		120516			PS
05/07/14 23:04	60	ICV 160-120851/1		120851			PS

Alpha Spectroscopy Run Log

Detector: AV14 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
06/18/14 19:08	960	ICB 160-127817/1		127817			PS
06/19/14 18:08	60	CCV 160-127902/1		127902			PS
07/02/14 10:53	1	PULSER 160-129484/2		129484			MLK
07/02/14 18:02	180	680-102380-20	SD-234-SS	129484	128412	A-01-R	MLK

Detector: AV15

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:28	140	IC 160-120517/1		120517			PS
05/07/14 23:04	60	ICV 160-120852/1		120852			PS
06/18/14 19:08	960	ICB 160-127818/1		127818			PS
06/19/14 19:45	60	CCV 160-127903/1		127903			PS
07/01/14 01:00	1	PULSER 160-129260/1		129260			MLK
07/01/14 12:26	180	680-102380-1	SD-224-SS	129260	128228	A-01-R	MLK
07/02/14 10:53	1	PULSER 160-129485/2		129485			MLK
07/02/14 18:02	180	680-102380-21	SD-234-01	129485	128412	A-01-R	MLK

Detector: AV16

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:27	140	IC 160-120398/1		120398			PS
05/08/14 00:14	60	ICV 160-121072/1		121072			PS
06/18/14 19:08	960	ICB 160-127819/1		127819			PS
06/19/14 18:08	60	CCV 160-127904/1		127904			PS
07/01/14 01:00	1	PULSER 160-129261/1		129261			MLK
07/01/14 12:26	180	680-102380-2	SD-224-01	129261	128228	A-01-R	MLK
07/02/14 10:53	1	PULSER 160-129486/2		129486			MLK
07/02/14 18:02	180	680-102380-22	SD-235-SS	129486	128412	A-01-R	MLK

Detector: AV17

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:28	140	IC 160-120399/1		120399			PS
05/08/14 00:14	60	ICV 160-121073/1		121073			PS
06/18/14 19:08	960	ICB 160-127820/1		127820			PS
06/19/14 18:08	60	CCV 160-127905/1		127905			PS
07/01/14 01:00	1	PULSER 160-129262/1		129262			MLK
07/01/14 12:26	180	680-102380-3	SD-224-02	129262	128228	A-01-R	MLK
07/02/14 10:53	1	PULSER 160-129487/2		129487			MLK
07/02/14 18:02	180	680-102380-23	SD-23501	129487	128412	A-01-R	MLK

Detector: AV18

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:28	140	IC 160-120400/1		120400			PS
05/08/14 00:14	60	ICV 160-121074/1		121074			PS
06/18/14 19:08	960	ICB 160-127821/1		127821			PS
06/19/14 18:08	60	CCV 160-127906/1		127906			PS
07/01/14 01:00	1	PULSER 160-129263/1		129263			MLK
07/01/14 12:26	180	680-102380-5	SD-223-SS	129263	128228	A-01-R	MLK
07/02/14 10:53	1	PULSER 160-129488/2		129488			MLK
07/02/14 18:02	180	680-102380-24	SD-235-02	129488	128412	A-01-R	MLK

Alpha Spectroscopy Run Log

Detector: AV19

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:28	140	IC 160-120401/1		120401			PS
05/08/14 14:33	60	ICV 160-121361/1		121361			PS
06/18/14 19:08	960	ICB 160-127822/1		127822			PS
06/19/14 18:08	60	CCV 160-127907/1		127907			PS
07/01/14 01:00	1	PULSER 160-129264/1		129264			MLK
07/01/14 12:26	180	680-102380-6	SD-223-01	129264	128228	A-01-R	MLK
07/02/14 10:53	1	PULSER 160-129489/2		129489			MLK
07/02/14 18:02	180	680-102380-26	SD-236-SS	129489	128412	A-01-R	MLK

Detector: AV20

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:28	140	IC 160-120402/1		120402			PS
05/07/14 23:05	60	ICV 160-120854/1		120854			PS
06/18/14 19:08	960	ICB 160-127824/1		127824			PS
06/19/14 18:08	60	CCV 160-127909/1		127909			PS
07/01/14 01:00	1	PULSER 160-129265/1		129265			MLK
07/01/14 12:26	180	680-102380-7	SD-223-02	129265	128228	A-01-R	MLK
07/02/14 10:53	1	PULSER 160-129490/2		129490			MLK
07/02/14 18:02	180	680-102380-27	SD-236-01	129490	128412	A-01-R	MLK

Detector: AV21

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:28	140	IC 160-120403/1		120403			PS
05/08/14 00:16	60	ICV 160-121075/1		121075			PS
06/18/14 19:08	960	ICB 160-127825/1		127825			PS
06/19/14 19:45	60	CCV 160-127910/1		127910			PS
07/01/14 01:00	1	PULSER 160-129266/1		129266			MLK
07/01/14 12:26	180	680-102380-8	SD-226-SS	129266	128228	A-01-R	MLK
07/02/14 10:53	1	PULSER 160-129491/2		129491			MLK
07/02/14 18:02	180	680-102380-28	SD-236-02	129491	128412	A-01-R	MLK

Detector: AV23

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:29	140	IC 160-120404/1		120404			PS
05/08/14 14:33	60	ICV 160-121362/1		121362			PS
06/18/14 19:08	960	ICB 160-127826/1		127826			PS
06/19/14 19:45	60	CCV 160-127911/1		127911			PS
07/01/14 01:00	1	PULSER 160-129267/1		129267			MLK
07/01/14 12:26	180	680-102380-9	SD-226-01	129267	128228	A-01-R	MLK
07/02/14 10:53	1	PULSER 160-129492/2		129492			MLK
07/02/14 18:02	180	680-102380-29	SD-237-SS	129492	128412	A-01-R	MLK

Detector: AV24

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:29	140	IC 160-120405/1		120405			PS
05/08/14 00:16	60	ICV 160-121076/1		121076			PS
06/18/14 19:08	960	ICB 160-127827/1		127827			PS
06/19/14 19:45	60	CCV 160-127912/1		127912			PS
07/02/14 10:54	1	PULSER 160-129493/2		129493			MLK

Alpha Spectroscopy Run Log

Detector: AV24 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
07/02/14 18:02	180	680-102380-30	SD-237-01	129493	128412	A-01-R	MLK

Detector: AV43

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:30	140	IC 160-120406/1		120406			PS
05/08/14 00:16	60	ICV 160-121077/1		121077			PS
06/19/14 00:17	960	ICB 160-127915/1		127915			PS
06/22/14 17:38	60	CCV 160-127969/1		127969			PS
07/02/14 15:55	1	PULSER 160-129496/2		129496			MLK
07/02/14 18:02	180	680-102380-31	SD-237-02	129496	128412	A-01-R	MLK

Detector: AV44

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:30	140	IC 160-120407/1		120407			PS
05/08/14 00:17	60	ICV 160-121078/1		121078			PS
06/19/14 00:17	960	ICB 160-127916/1		127916			PS
06/22/14 17:38	60	CCV 160-127970/1		127970			PS
07/02/14 15:55	1	PULSER 160-129497/2		129497			MLK
07/02/14 18:03	180	680-102380-33	SD-DUP05	129497	128412	A-01-R	MLK

Detector: AV45

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:30	140	IC 160-120408/1		120408			PS
05/08/14 14:32	60	ICV 160-121363/1		121363			PS
06/19/14 00:17	960	ICB 160-127917/1		127917			PS
06/22/14 20:07	60	CCV 160-127985/1		127985			PS
07/02/14 15:55	1	PULSER 160-129498/2		129498			MLK
07/02/14 18:03	180	680-102380-34	SD-227-SS	129498	128412	A-01-R	MLK

Detector: AV46

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:30	140	IC 160-120409/1		120409			PS
05/08/14 00:18	60	ICV 160-121079/1		121079			PS
06/19/14 00:17	960	ICB 160-127918/1		127918			PS
06/22/14 21:17	60	CCV 160-127986/1		127986			PS
07/02/14 15:55	1	PULSER 160-129499/2		129499			MLK
07/02/14 18:11	180	MB 160-128417/1-A		129499	128417	A-01-R	MLK

Detector: AV49

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:03	140	IC 160-120271/1		120271			PS
05/08/14 14:34	60	ICV 160-121364/1		121364			PS
06/19/14 00:17	960	ICB 160-127921/1		127921			PS
06/22/14 18:52	60	CCV 160-127989/1		127989			PS
07/02/14 15:55	1	PULSER 160-129502/2		129502			MLK
07/02/14 18:11	180	LCS 160-128417/2-A		129502	128417	A-01-R	MLK

Alpha Spectroscopy Run Log

Detector: AV50

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:03	140	IC 160-120272/1		120272			PS
05/08/14 14:34	60	ICV 160-121365/1		121365			PS
06/19/14 00:17	960	ICB 160-127922/1		127922			PS
06/22/14 18:52	60	CCV 160-127990/1		127990			PS
07/02/14 15:54	1	PULSER 160-129503/2		129503			MLK
07/02/14 18:11	180	680-102380-35	SD-227-01	129503	128417	A-01-R	MLK

Detector: AV51

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:03	140	IC 160-120273/1		120273			PS
05/08/14 17:17	60	ICV 160-121366/1		121366			PS
06/19/14 00:17	960	ICB 160-127923/1		127923			PS
06/22/14 20:07	60	CCV 160-127991/1		127991			PS
07/02/14 15:54	1	PULSER 160-129504/2		129504			MLK
07/02/14 18:11	180	680-102380-36	SD-227-02	129504	128417	A-01-R	MLK

Detector: AV58

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:05	140	IC 160-120280/1		120280			PS
05/08/14 14:35	60	ICV 160-121371/1		121371			PS
06/19/14 00:18	960	ICB 160-127930/1		127930			PS
06/22/14 18:53	60	CCV 160-127997/1		127997			PS
07/02/14 15:54	1	PULSER 160-129510/2		129510			MLK
07/02/14 18:11	180	ZZZZZ		129510			

Detector: AV60

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:06	140	IC 160-120282/1		120282			PS
05/08/14 17:21	60	ICV 160-121373/1		121373			PS
06/19/14 00:18	960	ICB 160-127933/1		127933			PS
06/22/14 21:17	60	CCV 160-127999/1		127999			PS
07/02/14 15:54	1	PULSER 160-129513/2		129513			MLK
07/02/14 18:11	180	ZZZZZ		129513			

Detector: AV115

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/07/14 19:52	140	IC 160-120840/1		120840			PS
05/11/14 20:54	60	ICV 160-121418/1		121418			PS
06/18/14 19:09	960	ICB 160-127791/1		127791			PS
06/19/14 15:10	60	CCV 160-127876/1		127876			PS
07/01/14 01:38	1	PULSER 160-129241/1		129241			MLK
07/01/14 12:25	180	MB 160-128228/1-A		129241	128228	A-01-R	MLK

Detector: AV116

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
04/30/14 22:55	140	IC 160-119675/1		119675			PS
05/11/14 22:06	60	ICV 160-121419/1		121419			PS

Alpha Spectroscopy Run Log

Detector: AV116 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
06/18/14 19:09	960	ICB 160-127792/1		127792			PS
06/19/14 15:10	60	CCV 160-127877/1		127877			PS
07/01/14 01:38	1	PULSER 160-129242/1		129242			MLK
07/01/14 12:25	180	LCS 160-128228/2-A		129242	128228	A-01-R	MLK

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.19
Client Contact: Mike Martin	Phone: (703)542-8389	E-Mail: jerry.lanier@testamericainc.com		Page: ~~Page 19 of 46~~ Page 1 of 4
Company: Tetra Tech, Inc.				Job #: 680-102380
Address: 20251 Century Blvd Suite 200	Due Date Requested:	Analysis Requested		
City: Germantown	TAT Requested (days):			Preservation Codes:
State, Zip: MD, 20874				A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; G - Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA; M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2SO3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - ph 4-5; Z - other (specify)
Phone:	PO #: Purchase Order not required			Other:
Email: MIchael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	8020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-224-SS	6/13/14	0820	C	Solid				X				
SD-224-01		0825	C	Solid				X				
SD-224-02		0830	C	Solid				X				
SD-224-03		0835	C	Solid				X				Hold Pending Analysis of SS to 02
SD-223-SS		0840	C	Solid				X				
SD-223-01		0845	C	Solid				X				
SD-223-02		0850	C	Solid				X				
SD-226-SS		0855	C	Solid				X				
SD-226-01		0900	C	Solid				X				
SD-226-02		0905	C	Solid				X				
SD-226-03		0910	C	Solid				X				Hold Pending Analysis of SS to 02

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6/13/14 -			6/13/14 1430	TestAmerica
2		6/13/14 1800	TestAmerica		6/14/14 0830	TA
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: △ Yes △ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.22
Client Contact: Mike Martin	Phone: (703) 342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~22 of 48~~ 2 of 4
Company: Tetra Tech, Inc.				Job #: 680-102380
Address: 20251 Century Blvd Suite 200	Due Date Requested:			
City: Germantown	TAT Requested (days):			
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			
Email: Michael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	9020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:		N	N				N		
SD-225-55	6/13/14	0915	C	Solid				X				
SD-225-01		0928	C	Solid				X				
SD-225-02		0925	C	Solid				X				
SD-225-03		0930	C	Solid				X				Hold Pending Analysis of SS to Q
SD-228-55		1005	C	Solid				X				
SD-228-01		1010	C	Solid				X				
SD-228-02		1015	C	Solid				X				
SD-228-03		1020	C	Solid				X				Hold Pending Analysis of SS to Q
SD-234-55		1030	C	Solid				X				
SD-234-01		1035	C	Solid				X				
SD-235-55		1100	C	Solid				X				

Page 376 of 378

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6/13/14	TT		6/13/14 1430	TT
2	Relinquished by:	6/13/14 1800	TestAmerica		6/14/14 0830	TT
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.24
Client Contact: Mike Martin	Phone: (703)342-8889	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~24 of 46~~ 3 of 4
Company: Tetra Tech, Inc.				Job #: 680-102380
Address: 20251 Century Blvd Suite 200	Due Date Requested:	Analysis Requested		
City: Germantown	TAT Requested (days): Standard			
State, Zip: MD, 20874				Preservation Codes:
Phone:	PO #: Purchase Order not required			A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; G - Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA; M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2SO3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - ph 4-5; Z - other (specify)
Email: Michael.Martin@tetratech.com	WO #:			Other:
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-228/228	Total Number of containers	Special Instructions/Note:
		Preservation Code:			N	N		X				
SD-235-01	6/8/14	1105	C	Solid				X				
SD-235-02		1110	C	Solid				X				
SD-235-03		1115	C	Solid				X				Hold Pending Analysis of SS to 03
SD-236-SS		1205	C	Solid				X				
SD-236-01		1210	C	Solid				X				
SD-236-02		1215	C	Solid				X				
SD-237-SS		1230	C	Solid				X				
SD-237-01		1235	C	Solid				X				
SD-237-02		1240	C	Solid				X				
SD-237-03		1245	C	Solid				X				Hold pending Analysis of SS to 02
SD-DUP05	↓	0000	C	Solid				X				

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6/13/14 -	TT		6/15/14 1430	TT
2		6/15/14 1800	TT		6/18/14 0930	TT
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: △ Yes △ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

RAO

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Grieson	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.26
Client Contact: Mike Martin	Phone: (703) 341-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page 26 of 46 4 of 4
Company: Tetra Tech, Inc.				Job #: 680-102380
Address: 20251 Century Blvd Suite 200	Due Date Requested:	Analysis Requested		Preservation Codes:
City: Germantown	TAT Requested (days): Standard			A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; G - Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA; M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2SO3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - ph 4-5; Z - other (specify)
State, Zip: MD, 20874	PO #: Purchase Order not required			Other:
Phone:	WO #:			
Email: Michael.Martin@tetratech.com	Project #: 68012942			
Project Name: Sediments	SSOW#:			
Site:				

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	9020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-227-55	6/13/14	1310	C	Solid				X				
SD-227-01		1315	C	Solid				X				
SD-227-02		1320	C	Solid				X				
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:
Relinquished by:	Date/Time: 6/13/14 -	Company: TT	Received by:	Date/Time: 6/15/14 1430	Company: TT
Relinquished by:	Date/Time: 6/15/14 1800	Company: TT	Received by:	Date/Time: 6/14/14 0830	Company: TT
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: △ Yes △ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 680-102380-3

SDG Number: 680102380-1

Job Description: Sediments

For:
Tetra Tech, Inc.
20251 Century Blvd
Suite 200
Germantown, MD 20874

Attention: Mike Martin



Approved for release.
Jerry A Lanier
Project Manager I
9/12/2014 4:46 PM

Jerry A Lanier, Project Manager I
5102 LaRoche Avenue, Savannah, GA, 31404
(912)354-7858 e.3410
jerry.lanier@testamericainc.com
09/12/2014
Revision: 1

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

Savannah Certifications and ID #s: A2LA: 0399.01; AL: 41450; ARDEQ: 88-0692; ARDOH; AZ: AZ0741; CA: 03217CA; CO; CT: PH0161; DE; FL: E87052; GA: 803; Guam; HI; IL: 200022; IN: C-GA-02; IA: 353; KS: E-10322; KY EPPC: 90084; KY UST; LA DEQ: 30690; LA DHH: LA080008; ME: 2008022; MD: 250; MA: M-GA006; MI: 9925; MS; NFESC: 249; NV: GA00006; NJ: GA769; NM; NY: 10842; NC DWQ: 269; NC DHHS: 13701; PA: 68-00474; PR: GA00006; RI: LAO00244; SC: 98001001; TN: TN0296; TX: T104704185; USEPA: GA00006; VT: VT-87052; VA: 00302; WA; WV DEP: 094; WV DHHR: 9950 C; WI DNR: 999819810; WY/EPAR8: 8TMS-Q

Table of Contents

Cover Title Page 1

Data Summaries 4

Definitions 4

Case Narrative 5

Client Sample Results 7

Default Detection Limits 25

QC Sample Results 26

QC Association 30

Chronicle 35

Certification Summary 46

Method Summary 47

Sample Summary 48

Reagent Traceability 49

COAs 62

Inorganic Sample Data 91

Metals Data 91

Met Cover Page 92

Met Sample Data 93

Met QC Data 123

Met ICV/CCV 123

Met CRQL 132

Met Blanks 133

Met ICSA/ICSAB 141

Met MS/MSD/PDS 143

Met LCS/LCSD 147

Met Serial Dilution 149

Table of Contents

Met MDL 151

Met Linear Ranges 154

Met Preparation Log 155

Met Analysis Run Log 157

Met ICP/MS Int Stds 168

Met Raw Data 172

Met Prep Data 459

Subcontracted Data 462

Shipping and Receiving Documents 463

Client Chain of Custody 464

Sample Receipt Checklist 468

Definitions/Glossary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102380-3
SDG: 680102380-1

Qualifiers

Metals

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
^	ICV,CCV,ICB,CCB, ISA, ISB, CRI, CRA, DLCK or MRL standard: Instrument related QC exceeds the control limits.

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Sediments

Report Number: 680-102380-3

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 06/14/2014; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 1.8 C.

A revised report was necessary to correct the final volume that was used to calculate the Uranium data.

TOTAL URANIUM

Samples SD-224-SS (680-102380-1), SD-224-01 (680-102380-2), SD-224-02 (680-102380-3), SD-223-SS (680-102380-5), SD-223-01 (680-102380-6), SD-223-02 (680-102380-7), SD-226-SS (680-102380-8), SD-226-01 (680-102380-9), SD-226-02 (680-102380-10), SD-225-SS (680-102380-12), SD-225-01 (680-102380-13), SD-225-02 (680-102380-14), SD-228-SS (680-102380-16), SD-228-01 (680-102380-17), SD-228-02 (680-102380-18), SD-234-SS (680-102380-20), SD-234-01 (680-102380-21), SD-235-SS (680-102380-22), SD-235-01 (680-102380-23), SD-235-02 (680-102380-24), SD-236-SS (680-102380-26), SD-236-01 (680-102380-27), SD-236-02 (680-102380-28), SD-237-SS (680-102380-29), SD-237-01 (680-102380-30), SD-237-02 (680-102380-31), SD-DUP05 (680-102380-33), SD-227-SS (680-102380-34), SD-227-01 (680-102380-35) and SD-227-02 (680-102380-36) were analyzed for Total Uranium in accordance with EPA SW-846 6020A. The samples were analyzed on 08/11/2014 and 08/19/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM

Samples SD-224-SS (680-102380-1), SD-224-01 (680-102380-2), SD-224-02 (680-102380-3), SD-223-SS (680-102380-5), SD-223-01 (680-102380-6), SD-223-02 (680-102380-7), SD-226-SS (680-102380-8), SD-226-01 (680-102380-9), SD-226-02 (680-102380-10), SD-225-SS (680-102380-12), SD-225-01 (680-102380-13), SD-225-02 (680-102380-14), SD-228-SS (680-102380-16), SD-228-01 (680-102380-17), SD-228-02 (680-102380-18), SD-234-SS (680-102380-20), SD-234-01 (680-102380-21), SD-235-SS (680-102380-22), SD-235-01 (680-102380-23), SD-235-02 (680-102380-24), SD-236-SS (680-102380-26), SD-236-01 (680-102380-27), SD-236-02 (680-102380-28), SD-237-SS (680-102380-29), SD-237-01 (680-102380-30), SD-237-02 (680-102380-31), SD-DUP05 (680-102380-33), SD-227-SS (680-102380-34), SD-227-01 (680-102380-35) and SD-227-02 (680-102380-36) were analyzed for Isotopic Uranium in accordance with EPA SW-846 6020A. The samples were prepared on 08/11/2014 and analyzed on 08/14/2014 and 08/18/2014.

Due to the high concentration of uranium 238, the matrix spike / matrix spike duplicate (MS/MSD) could not be evaluated for accuracy and precision. The associated laboratory control sample (LCS) met acceptance criteria. (680-102380-1 MSD)

The presence of the '4' qualifier indicates analytes where the concentration in the unspiked sample exceeded four times the spiking amount.

Refer to the QC report for details.

Samples SD-224-SS (680-102380-1)[5X], SD-224-01 (680-102380-2)[5X], SD-224-02 (680-102380-3)[5X], SD-223-SS (680-102380-5)[5X], SD-223-01 (680-102380-6)[5X], SD-223-02 (680-102380-7)[5X], SD-226-SS (680-102380-8)[5X], SD-226-01 (680-102380-9)[5X], SD-226-02 (680-102380-10)[5X], SD-225-SS (680-102380-12)[5X], SD-225-01 (680-102380-13)[5X], SD-225-02 (680-102380-14)[5X], SD-228-SS (680-102380-16)[5X], SD-228-01 (680-102380-17)[5X], SD-228-02 (680-102380-18)[5X], SD-234-SS (680-102380-20)[5X], SD-234-01 (680-102380-21)[5X], SD-235-SS (680-102380-22)[5X], SD-235-01 (680-102380-23)[5X], SD-235-02 (680-102380-24)[5X], SD-236-SS (680-102380-26)[5X], SD-236-01 (680-102380-27)[5X], SD-236-02 (680-102380-28)[5X], SD-237-SS (680-102380-29)[5X], SD-237-01 (680-102380-30)[5X], SD-237-02 (680-102380-31)[5X], SD-DUP05 (680-102380-33)[5X], SD-227-SS (680-102380-34)[5X], SD-227-01 (680-102380-35)[5X] and SD-227-02 (680-102380-36)[5X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM PERCENTAGE

Samples SD-224-SS (680-102380-1), SD-224-01 (680-102380-2), SD-224-02 (680-102380-3), SD-223-SS (680-102380-5), SD-223-01 (680-102380-6), SD-223-02 (680-102380-7), SD-226-SS (680-102380-8), SD-226-01 (680-102380-9), SD-226-02 (680-102380-10),

SD-225-SS (680-102380-12), SD-225-01 (680-102380-13), SD-225-02 (680-102380-14), SD-228-SS (680-102380-16), SD-228-01 (680-102380-17), SD-228-02 (680-102380-18), SD-234-SS (680-102380-20), SD-234-01 (680-102380-21), SD-235-SS (680-102380-22), SD-235-01 (680-102380-23), SD-235-02 (680-102380-24), SD-236-SS (680-102380-26), SD-236-01 (680-102380-27), SD-236-02 (680-102380-28), SD-237-SS (680-102380-29), SD-237-01 (680-102380-30), SD-237-02 (680-102380-31), SD-DUP05 (680-102380-33), SD-227-SS (680-102380-34), SD-227-01 (680-102380-35) and SD-227-02 (680-102380-36) were analyzed for Isotopic Uranium Percentage in accordance with EPA SW-846 6020A. The samples were analyzed on 08/19/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM ACTIVITY

Samples SD-224-SS (680-102380-1), SD-224-01 (680-102380-2), SD-224-02 (680-102380-3), SD-223-SS (680-102380-5), SD-223-01 (680-102380-6), SD-223-02 (680-102380-7), SD-226-SS (680-102380-8), SD-226-01 (680-102380-9), SD-226-02 (680-102380-10), SD-225-SS (680-102380-12), SD-225-01 (680-102380-13), SD-225-02 (680-102380-14), SD-228-SS (680-102380-16), SD-228-01 (680-102380-17), SD-228-02 (680-102380-18), SD-234-SS (680-102380-20), SD-234-01 (680-102380-21), SD-235-SS (680-102380-22), SD-235-01 (680-102380-23), SD-235-02 (680-102380-24), SD-236-SS (680-102380-26), SD-236-01 (680-102380-27), SD-236-02 (680-102380-28), SD-237-SS (680-102380-29), SD-237-01 (680-102380-30), SD-237-02 (680-102380-31), SD-DUP05 (680-102380-33), SD-227-SS (680-102380-34), SD-227-01 (680-102380-35) and SD-227-02 (680-102380-36) were analyzed for Isotopic Uranium Activity in accordance with EPA SW-846 6020A. The samples were prepared on 08/11/2014 and analyzed on 08/14/2014 and 08/18/2014.

The continuing calibration verification (CCV) recovered above the upper control limit for uranium 233. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The following samples are impacted: (CCV 160-138778/116), (CCV 160-138778/87).

U-238 was detected in method blank MB 160-137068/1-A, and MB 160-137069/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged.

Samples SD-224-SS (680-102380-1)[5X], SD-224-01 (680-102380-2)[5X], SD-224-02 (680-102380-3)[5X], SD-223-SS (680-102380-5)[5X], SD-223-01 (680-102380-6)[5X], SD-223-02 (680-102380-7)[5X], SD-226-SS (680-102380-8)[5X], SD-226-01 (680-102380-9)[5X], SD-226-02 (680-102380-10)[5X], SD-225-SS (680-102380-12)[5X], SD-225-01 (680-102380-13)[5X], SD-225-02 (680-102380-14)[5X], SD-228-SS (680-102380-16)[5X], SD-228-01 (680-102380-17)[5X], SD-228-02 (680-102380-18)[5X], SD-234-SS (680-102380-20)[5X], SD-234-01 (680-102380-21)[5X], SD-235-SS (680-102380-22)[5X], SD-235-01 (680-102380-23)[5X], SD-235-02 (680-102380-24)[5X], SD-236-SS (680-102380-26)[5X], SD-236-01 (680-102380-27)[5X], SD-236-02 (680-102380-28)[5X], SD-237-SS (680-102380-29)[5X], SD-237-01 (680-102380-30)[5X], SD-237-02 (680-102380-31)[5X], SD-DUP05 (680-102380-33)[5X], SD-227-SS (680-102380-34)[5X], SD-227-01 (680-102380-35)[5X] and SD-227-02 (680-102380-36)[5X] required dilution prior to analysis due to high salt content in the samples. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Client Sample ID: SD-224-SS

Lab Sample ID: 680-102380-1

Date Collected: 06/13/14 08:20

Matrix: Solid

Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/11/14 11:25	08/18/14 20:04	5
U-234	ND		0.012	0.00071	mg/Kg		08/11/14 11:25	08/14/14 19:55	5
U-235	**0.016**		0.012	0.0048	mg/Kg		08/11/14 11:25	08/14/14 19:55	5
U-236	ND		0.012	0.00095	mg/Kg		08/11/14 11:25	08/14/14 19:55	5
U-238	**2.3**	**B**	0.012	0.00071	mg/Kg		08/11/14 11:25	08/14/14 19:55	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**2.3**		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.562	U	0.745	0.747	114	34.2	pCi/g	08/11/14 11:25	08/18/14 20:04	5
U-234	1.05	U	0.145	0.174	73.7	4.42	pCi/g	08/11/14 11:25	08/14/14 19:55	5
U-235	**0.0356**		0.00108	0.00345	0.0256	0.0104	pCi/g	08/11/14 11:25	08/14/14 19:55	5
U-236	-0.00172	U	0.00107	0.00108	0.766	0.0614	pCi/g	08/11/14 11:25	08/14/14 19:55	5
U-238	**0.780**		0.0192	0.0743	0.00398	0.000239	pCi/g	08/11/14 11:25	08/14/14 19:55	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.691**						%		08/19/14 13:49	1

Client Sample ID: SD-224-01

Lab Sample ID: 680-102380-2

Date Collected: 06/13/14 08:25

Matrix: Solid

Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0035	mg/Kg		08/11/14 11:25	08/18/14 20:22	5
U-234	ND		0.012	0.00070	mg/Kg		08/11/14 11:25	08/14/14 20:23	5
U-235	**0.026**		0.012	0.0047	mg/Kg		08/11/14 11:25	08/14/14 20:23	5
U-236	ND		0.012	0.00093	mg/Kg		08/11/14 11:25	08/14/14 20:23	5
U-238	**3.6**	**B**	0.012	0.00070	mg/Kg		08/11/14 11:25	08/14/14 20:23	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**3.6**		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.396	U	0.0408	0.0547	112	33.7	pCi/g	08/11/14 11:25	08/18/14 20:22	5
U-234	1.33	U	0.627	0.638	72.6	4.36	pCi/g	08/11/14 11:25	08/14/14 20:23	5
U-235	**0.0560**		0.00443	0.00680	0.0252	0.0103	pCi/g	08/11/14 11:25	08/14/14 20:23	5
U-236	-0.00148	U	0.000778	0.000790	0.755	0.0604	pCi/g	08/11/14 11:25	08/14/14 20:23	5
U-238	**1.20**		0.0731	0.132	0.00392	0.000236	pCi/g	08/11/14 11:25	08/14/14 20:23	5

Client Sample ID: SD-224-01

Lab Sample ID: 680-102380-2

Date Collected: 06/13/14 08:25

Matrix: Solid

Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.717						%		08/19/14 13:49	1

Client Sample ID: SD-224-02

Lab Sample ID: 680-102380-3

Date Collected: 06/13/14 08:30

Matrix: Solid

Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0033	mg/Kg		08/11/14 11:25	08/18/14 20:36	5
U-234	ND		0.011	0.00066	mg/Kg		08/11/14 11:25	08/14/14 20:28	5
U-235	0.019		0.011	0.0045	mg/Kg		08/11/14 11:25	08/14/14 20:28	5
U-236	ND		0.011	0.00088	mg/Kg		08/11/14 11:25	08/14/14 20:28	5
U-238	2.7	B	0.011	0.00066	mg/Kg		08/11/14 11:25	08/14/14 20:28	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.7		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.482	U	0.304	0.308	107	32.0	pCi/g	08/11/14 11:25	08/18/14 20:36	5
U-234	1.12	U	0.135	0.170	68.8	4.13	pCi/g	08/11/14 11:25	08/14/14 20:28	5
U-235	0.0419		0.00376	0.00538	0.0239	0.00973	pCi/g	08/11/14 11:25	08/14/14 20:28	5
U-236	-0.00197	U	0.00282	0.00283	0.715	0.0573	pCi/g	08/11/14 11:25	08/14/14 20:28	5
U-238	0.898		0.0511	0.0972	0.00372	0.000223	pCi/g	08/11/14 11:25	08/14/14 20:28	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.699						%		08/19/14 13:49	1

Client Sample ID: SD-223-SS

Lab Sample ID: 680-102380-5

Date Collected: 06/13/14 08:40

Matrix: Solid

Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0034	mg/Kg		08/11/14 11:25	08/18/14 20:41	5
U-234	ND		0.011	0.00068	mg/Kg		08/11/14 11:25	08/14/14 20:33	5
U-235	0.024		0.011	0.0046	mg/Kg		08/11/14 11:25	08/14/14 20:33	5
U-236	ND		0.011	0.00091	mg/Kg		08/11/14 11:25	08/14/14 20:33	5
U-238	3.2	B	0.011	0.00068	mg/Kg		08/11/14 11:25	08/14/14 20:33	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.2		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Client Sample ID: SD-223-SS

Lab Sample ID: 680-102380-5

Date Collected: 06/13/14 08:40

Matrix: Solid

Date Received: 06/14/14 08:30

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.462	U	0.565	0.567	109	32.7	pCi/g	08/11/14 11:25	08/18/14 20:41	5
U-234	1.57	U	0.355	0.383	70.4	4.23	pCi/g	08/11/14 11:25	08/14/14 20:33	5
U-235	**0.0526**		0.00451	0.00662	0.0245	0.00996	pCi/g	08/11/14 11:25	08/14/14 20:33	5
U-236	-0.00152	U	0.00231	0.00232	0.732	0.0586	pCi/g	08/11/14 11:25	08/14/14 20:33	5
U-238	**1.07**		0.0681	0.120	0.00380	0.000229	pCi/g	08/11/14 11:25	08/14/14 20:33	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.744**						%		08/19/14 13:49	1

Client Sample ID: SD-223-01

Lab Sample ID: 680-102380-6

Date Collected: 06/13/14 08:45

Matrix: Solid

Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0035	mg/Kg		08/11/14 11:25	08/18/14 20:46	5
U-234	ND		0.012	0.00070	mg/Kg		08/11/14 11:25	08/14/14 20:37	5
U-235	**0.026**		0.012	0.0048	mg/Kg		08/11/14 11:25	08/14/14 20:37	5
U-236	ND		0.012	0.00094	mg/Kg		08/11/14 11:25	08/14/14 20:37	5
U-238	**3.6**	**B**	0.012	0.00070	mg/Kg		08/11/14 11:25	08/14/14 20:37	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**3.6**		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.528	U	0.599	0.601	113	33.8	pCi/g	08/11/14 11:25	08/18/14 20:46	5
U-234	1.33	U	0.229	0.259	72.8	4.37	pCi/g	08/11/14 11:25	08/14/14 20:37	5
U-235	**0.0567**		0.00528	0.00742	0.0253	0.0103	pCi/g	08/11/14 11:25	08/14/14 20:37	5
U-236	-0.00209	U	0.00265	0.00266	0.757	0.0606	pCi/g	08/11/14 11:25	08/14/14 20:37	5
U-238	**1.21**		0.0908	0.143	0.00393	0.000236	pCi/g	08/11/14 11:25	08/14/14 20:37	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.717**						%		08/19/14 13:49	1

Client Sample ID: SD-223-02

Lab Sample ID: 680-102380-7

Date Collected: 06/13/14 08:50

Matrix: Solid

Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0033	mg/Kg		08/11/14 11:25	08/18/14 20:50	5
U-234	ND		0.011	0.00066	mg/Kg		08/11/14 11:25	08/14/14 20:42	5
U-235	**0.0068**	**J**	0.011	0.0045	mg/Kg		08/11/14 11:25	08/14/14 20:42	5
U-236	ND		0.011	0.00088	mg/Kg		08/11/14 11:25	08/14/14 20:42	5
U-238	**0.99**	**B**	0.011	0.00066	mg/Kg		08/11/14 11:25	08/14/14 20:42	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**1.0**		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.468	U	0.323	0.326	106	31.9	pCi/g	08/11/14 11:25	08/18/14 20:50	5
U-234	0.443	U	0.336	0.338	68.7	4.13	pCi/g	08/11/14 11:25	08/14/14 20:42	5
U-235	**0.0148**		0.00186	0.00230	0.0239	0.00972	pCi/g	08/11/14 11:25	08/14/14 20:42	5
U-236	-0.00260	U	0.00112	0.00115	0.714	0.0572	pCi/g	08/11/14 11:25	08/14/14 20:42	5
U-238	**0.334**		0.0229	0.0384	0.00371	0.000223	pCi/g	08/11/14 11:25	08/14/14 20:42	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.682**						%		08/19/14 13:49	1

Client Sample ID: SD-226-SS

Lab Sample ID: 680-102380-8

Date Collected: 06/13/14 08:55

Matrix: Solid

Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0036	mg/Kg		08/11/14 11:25	08/18/14 20:55	5
U-234	ND		0.012	0.00072	mg/Kg		08/11/14 11:25	08/14/14 20:47	5
U-235	**0.029**		0.012	0.0049	mg/Kg		08/11/14 11:25	08/14/14 20:47	5
U-236	ND		0.012	0.00096	mg/Kg		08/11/14 11:25	08/14/14 20:47	5
U-238	**4.0**	**B**	0.012	0.00072	mg/Kg		08/11/14 11:25	08/14/14 20:47	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**4.0**		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.697	U	0.361	0.367	116	34.8	pCi/g	08/11/14 11:25	08/18/14 20:55	5
U-234	1.51	U	0.517	0.535	75.0	4.50	pCi/g	08/11/14 11:25	08/14/14 20:47	5
U-235	**0.0631**		0.00391	0.00700	0.0260	0.0106	pCi/g	08/11/14 11:25	08/14/14 20:47	5
U-236	-0.00224	U	0.00227	0.00228	0.779	0.0624	pCi/g	08/11/14 11:25	08/14/14 20:47	5
U-238	**1.34**		0.108	0.164	0.00405	0.000243	pCi/g	08/11/14 11:25	08/14/14 20:47	5

Client Sample ID: SD-226-SS

Lab Sample ID: 680-102380-8

Date Collected: 06/13/14 08:55

Matrix: Solid

Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.720						%		08/19/14 13:49	1

Client Sample ID: SD-226-01

Lab Sample ID: 680-102380-9

Date Collected: 06/13/14 09:00

Matrix: Solid

Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0036	mg/Kg		08/11/14 11:25	08/18/14 21:00	5
U-234	ND		0.012	0.00072	mg/Kg		08/11/14 11:25	08/14/14 20:51	5
U-235	0.028		0.012	0.0049	mg/Kg		08/11/14 11:25	08/14/14 20:51	5
U-236	ND		0.012	0.00096	mg/Kg		08/11/14 11:25	08/14/14 20:51	5
U-238	3.7	B	0.012	0.00072	mg/Kg		08/11/14 11:25	08/14/14 20:51	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.7		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.885	U	0.395	0.403	116	34.7	pCi/g	08/11/14 11:25	08/18/14 21:00	5
U-234	1.67	U	0.293	0.331	74.8	4.49	pCi/g	08/11/14 11:25	08/14/14 20:51	5
U-235	0.0597		0.00711	0.00898	0.0260	0.0106	pCi/g	08/11/14 11:25	08/14/14 20:51	5
U-236	-0.00218	U	0.00184	0.00185	0.777	0.0622	pCi/g	08/11/14 11:25	08/14/14 20:51	5
U-238	1.25		0.125	0.170	0.00404	0.000243	pCi/g	08/11/14 11:25	08/14/14 20:51	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.751						%		08/19/14 13:49	1

Client Sample ID: SD-226-02

Lab Sample ID: 680-102380-10

Date Collected: 06/13/14 09:05

Matrix: Solid

Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0034	mg/Kg		08/11/14 11:25	08/18/14 21:04	5
U-234	ND		0.011	0.00067	mg/Kg		08/11/14 11:25	08/14/14 21:05	5
U-235	0.016		0.011	0.0046	mg/Kg		08/11/14 11:25	08/14/14 21:05	5
U-236	ND		0.011	0.00090	mg/Kg		08/11/14 11:25	08/14/14 21:05	5
U-238	2.2	B	0.011	0.00067	mg/Kg		08/11/14 11:25	08/14/14 21:05	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.2		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Client Sample ID: SD-226-02

Date Collected: 06/13/14 09:05
Date Received: 06/14/14 08:30

Lab Sample ID: 680-102380-10

Matrix: Solid

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.494	U	0.394	0.397	108	32.5	pCi/g	08/11/14 11:25	08/18/14 21:04	5
U-234	0.853	U	0.161	0.179	69.9	4.20	pCi/g	08/11/14 11:25	08/14/14 21:05	5
U-235	**0.0342**		0.00219	0.00383	0.0243	0.00989	pCi/g	08/11/14 11:25	08/14/14 21:05	5
U-236	-0.00160	U	0.00250	0.00251	0.727	0.0582	pCi/g	08/11/14 11:25	08/14/14 21:05	5
U-238	**0.725**		0.0380	0.0768	0.00378	0.000227	pCi/g	08/11/14 11:25	08/14/14 21:05	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.722**						%		08/19/14 13:49	1

Client Sample ID: SD-225-SS

Date Collected: 06/13/14 09:15
Date Received: 06/14/14 08:30

Lab Sample ID: 680-102380-12

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0036	mg/Kg		08/11/14 11:25	08/18/14 21:09	5
U-234	ND		0.012	0.00073	mg/Kg		08/11/14 11:25	08/14/14 21:10	5
U-235	**0.027**		0.012	0.0049	mg/Kg		08/11/14 11:25	08/14/14 21:10	5
U-236	ND		0.012	0.00097	mg/Kg		08/11/14 11:25	08/14/14 21:10	5
U-238	**3.6**	**B**	0.012	0.00073	mg/Kg		08/11/14 11:25	08/14/14 21:10	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**3.6**		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.821	U	0.390	0.397	117	35.0	pCi/g	08/11/14 11:25	08/18/14 21:09	5
U-234	1.45	U	0.757	0.768	75.3	4.52	pCi/g	08/11/14 11:25	08/14/14 21:10	5
U-235	**0.0577**		0.00614	0.00812	0.0262	0.0107	pCi/g	08/11/14 11:25	08/14/14 21:10	5
U-236	-0.00144	U	0.00110	0.00111	0.783	0.0627	pCi/g	08/11/14 11:25	08/14/14 21:10	5
U-238	**1.21**		0.109	0.156	0.00407	0.000245	pCi/g	08/11/14 11:25	08/14/14 21:10	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.744**						%		08/19/14 13:49	1

Client Sample ID: SD-225-01

Lab Sample ID: 680-102380-13

Date Collected: 06/13/14 09:20

Matrix: Solid

Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0033	mg/Kg		08/11/14 11:25	08/18/14 21:14	5
U-234	ND		0.011	0.00066	mg/Kg		08/11/14 11:25	08/14/14 21:15	5
U-235	**0.024**		0.011	0.0045	mg/Kg		08/11/14 11:25	08/14/14 21:15	5
U-236	ND		0.011	0.00088	mg/Kg		08/11/14 11:25	08/14/14 21:15	5
U-238	**3.3**	**B**	0.011	0.00066	mg/Kg		08/11/14 11:25	08/14/14 21:15	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**3.3**		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.686	U	0.180	0.191	107	32.0	pCi/g	08/11/14 11:25	08/18/14 21:14	5
U-234	1.34	U	0.651	0.662	68.8	4.13	pCi/g	08/11/14 11:25	08/14/14 21:15	5
U-235	**0.0529**		0.00558	0.00740	0.0239	0.00973	pCi/g	08/11/14 11:25	08/14/14 21:15	5
U-236	-0.00212	U	0.00147	0.00148	0.715	0.0573	pCi/g	08/11/14 11:25	08/14/14 21:15	5
U-238	**1.11**		0.0831	0.132	0.00372	0.000223	pCi/g	08/11/14 11:25	08/14/14 21:15	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.722**						%		08/19/14 13:49	1

Client Sample ID: SD-225-02

Lab Sample ID: 680-102380-14

Date Collected: 06/13/14 09:25

Matrix: Solid

Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0033	mg/Kg		08/11/14 11:25	08/18/14 21:18	5
U-234	ND		0.011	0.00065	mg/Kg		08/11/14 11:25	08/14/14 21:19	5
U-235	**0.018**		0.011	0.0044	mg/Kg		08/11/14 11:25	08/14/14 21:19	5
U-236	ND		0.011	0.00087	mg/Kg		08/11/14 11:25	08/14/14 21:19	5
U-238	**2.6**	**B**	0.011	0.00065	mg/Kg		08/11/14 11:25	08/14/14 21:19	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**2.6**		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.710	U	0.213	0.222	104	31.3	pCi/g	08/11/14 11:25	08/18/14 21:18	5
U-234	1.10	U	0.187	0.213	67.4	4.05	pCi/g	08/11/14 11:25	08/14/14 21:19	5
U-235	**0.0397**		0.00101	0.00379	0.0234	0.00954	pCi/g	08/11/14 11:25	08/14/14 21:19	5
U-236	-0.00179	U	0.000868	0.000884	0.701	0.0561	pCi/g	08/11/14 11:25	08/14/14 21:19	5
U-238	**0.860**		0.0429	0.0900	0.00364	0.000219	pCi/g	08/11/14 11:25	08/14/14 21:19	5

Client Sample ID: SD-225-02

Lab Sample ID: 680-102380-14

Date Collected: 06/13/14 09:25

Matrix: Solid

Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.688						%		08/19/14 13:49	1

Client Sample ID: SD-228-SS

Lab Sample ID: 680-102380-16

Date Collected: 06/13/14 10:05

Matrix: Solid

Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0033	mg/Kg		08/11/14 11:25	08/18/14 21:32	5
U-234	ND		0.011	0.00065	mg/Kg		08/11/14 11:25	08/14/14 21:24	5
U-235	0.029		0.011	0.0044	mg/Kg		08/11/14 11:25	08/14/14 21:24	5
U-236	ND		0.011	0.00087	mg/Kg		08/11/14 11:25	08/14/14 21:24	5
U-238	3.9	B	0.011	0.00065	mg/Kg		08/11/14 11:25	08/14/14 21:24	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.9		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.406	U	0.0937	0.101	105	31.4	pCi/g	08/11/14 11:25	08/18/14 21:32	5
U-234	1.64	U	0.239	0.282	67.6	4.06	pCi/g	08/11/14 11:25	08/14/14 21:24	5
U-235	0.0623		0.00588	0.00821	0.0235	0.00956	pCi/g	08/11/14 11:25	08/14/14 21:24	5
U-236	-0.00267	U	0.00152	0.00154	0.703	0.0563	pCi/g	08/11/14 11:25	08/14/14 21:24	5
U-238	1.32		0.110	0.164	0.00365	0.000220	pCi/g	08/11/14 11:25	08/14/14 21:24	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.738						%		08/19/14 13:49	1

Client Sample ID: SD-228-01

Lab Sample ID: 680-102380-17

Date Collected: 06/13/14 10:10

Matrix: Solid

Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0035	mg/Kg		08/11/14 11:25	08/18/14 21:37	5
U-234	0.0010	J	0.012	0.00070	mg/Kg		08/11/14 11:25	08/14/14 21:29	5
U-235	0.095		0.012	0.0047	mg/Kg		08/11/14 11:25	08/14/14 21:29	5
U-236	ND		0.012	0.00093	mg/Kg		08/11/14 11:25	08/14/14 21:29	5
U-238	4.4	B	0.012	0.00070	mg/Kg		08/11/14 11:25	08/14/14 21:29	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	4.5		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Client Sample ID: SD-228-01

Date Collected: 06/13/14 10:10
Date Received: 06/14/14 08:30

Lab Sample ID: 680-102380-17

Matrix: Solid

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.591	U	0.392	0.395	112	33.6	pCi/g	08/11/14 11:25	08/18/14 21:37	5
U-234	**6.47**		0.421	0.730	72.3	4.34	pCi/g	08/11/14 11:25	08/14/14 21:29	5
U-235	**0.206**		0.0255	0.0317	0.0251	0.0102	pCi/g	08/11/14 11:25	08/14/14 21:29	5
U-236	0.00787	U	0.00299	0.00307	0.751	0.0602	pCi/g	08/11/14 11:25	08/14/14 21:29	5
U-238	**1.47**		0.153	0.204	0.00390	0.000235	pCi/g	08/11/14 11:25	08/14/14 21:29	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**2.11**						%		08/19/14 13:49	1

Client Sample ID: SD-228-02

Date Collected: 06/13/14 10:15
Date Received: 06/14/14 08:30

Lab Sample ID: 680-102380-18

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0035	mg/Kg		08/11/14 11:25	08/18/14 21:42	5
U-234	ND		0.012	0.00070	mg/Kg		08/11/14 11:25	08/14/14 21:33	5
U-235	**0.019**		0.012	0.0047	mg/Kg		08/11/14 11:25	08/14/14 21:33	5
U-236	ND		0.012	0.00093	mg/Kg		08/11/14 11:25	08/14/14 21:33	5
U-238	**2.5**	**B**	0.012	0.00070	mg/Kg		08/11/14 11:25	08/14/14 21:33	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**2.5**		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.781	U	0.213	0.224	112	33.7	pCi/g	08/11/14 11:25	08/18/14 21:42	5
U-234	0.820	U	0.278	0.288	72.4	4.35	pCi/g	08/11/14 11:25	08/14/14 21:33	5
U-235	**0.0407**		0.00453	0.00588	0.0252	0.0102	pCi/g	08/11/14 11:25	08/14/14 21:33	5
U-236	-0.00190	U	0.000327	0.000371	0.753	0.0603	pCi/g	08/11/14 11:25	08/14/14 21:33	5
U-238	**0.829**		0.0905	0.118	0.00391	0.000235	pCi/g	08/11/14 11:25	08/14/14 21:33	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.754**						%		08/19/14 13:49	1

Client Sample ID: SD-234-SS

Lab Sample ID: 680-102380-20

Date Collected: 06/13/14 10:30

Matrix: Solid

Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0036	mg/Kg		08/11/14 11:25	08/18/14 21:46	5
U-234	ND		0.012	0.00073	mg/Kg		08/11/14 11:25	08/14/14 21:38	5
U-235	**0.018**		0.012	0.0049	mg/Kg		08/11/14 11:25	08/14/14 21:38	5
U-236	ND		0.012	0.00097	mg/Kg		08/11/14 11:25	08/14/14 21:38	5
U-238	**2.3**	**B**	0.012	0.00073	mg/Kg		08/11/14 11:25	08/14/14 21:38	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**2.3**		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-1.09	U	0.369	0.383	117	35.0	pCi/g	08/11/14 11:25	08/18/14 21:46	5
U-234	0.862	U	0.367	0.376	75.4	4.52	pCi/g	08/11/14 11:25	08/14/14 21:38	5
U-235	**0.0400**		0.00392	0.00537	0.0262	0.0107	pCi/g	08/11/14 11:25	08/14/14 21:38	5
U-236	-0.00197	U	0.000512	0.000543	0.783	0.0628	pCi/g	08/11/14 11:25	08/14/14 21:38	5
U-238	**0.772**		0.0860	0.111	0.00407	0.000245	pCi/g	08/11/14 11:25	08/14/14 21:38	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.777**						%		08/19/14 13:49	1

Client Sample ID: SD-234-01

Lab Sample ID: 680-102380-21

Date Collected: 06/13/14 10:35

Matrix: Solid

Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0035	mg/Kg		08/11/14 11:25	08/18/14 21:51	5
U-234	ND		0.012	0.00070	mg/Kg		08/11/14 11:25	08/14/14 21:43	5
U-235	**0.0059**	**J**	0.012	0.0047	mg/Kg		08/11/14 11:25	08/14/14 21:43	5
U-236	ND		0.012	0.00093	mg/Kg		08/11/14 11:25	08/14/14 21:43	5
U-238	**0.88**	**B**	0.012	0.00070	mg/Kg		08/11/14 11:25	08/14/14 21:43	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**0.89**		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.865	U	0.465	0.472	112	33.6	pCi/g	08/11/14 11:25	08/18/14 21:51	5
U-234	0.379	U	0.217	0.220	72.3	4.34	pCi/g	08/11/14 11:25	08/14/14 21:43	5
U-235	**0.0127**		0.00245	0.00272	0.0251	0.0102	pCi/g	08/11/14 11:25	08/14/14 21:43	5
U-236	-0.00216	U	0.000838	0.000861	0.752	0.0602	pCi/g	08/11/14 11:25	08/14/14 21:43	5
U-238	**0.295**		0.0324	0.0423	0.00391	0.000235	pCi/g	08/11/14 11:25	08/14/14 21:43	5

Client Sample ID: SD-234-01

Lab Sample ID: 680-102380-21

Date Collected: 06/13/14 10:35

Matrix: Solid

Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.666						%		08/19/14 13:49	1

Client Sample ID: SD-235-SS

Lab Sample ID: 680-102380-22

Date Collected: 06/13/14 11:00

Matrix: Solid

Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0032	mg/Kg		08/11/14 11:25	08/18/14 21:56	5
U-234	ND		0.011	0.00064	mg/Kg		08/11/14 11:25	08/14/14 21:48	5
U-235	0.021		0.011	0.0044	mg/Kg		08/11/14 11:25	08/14/14 21:48	5
U-236	ND		0.011	0.00086	mg/Kg		08/11/14 11:25	08/14/14 21:48	5
U-238	2.4	B	0.011	0.00064	mg/Kg		08/11/14 11:25	08/14/14 21:48	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.4		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.853	U	0.351	0.360	104	31.1	pCi/g	08/11/14 11:25	08/18/14 21:56	5
U-234	1.20	U	0.335	0.353	66.9	4.01	pCi/g	08/11/14 11:25	08/14/14 21:48	5
U-235	0.0457		0.00346	0.00544	0.0232	0.00946	pCi/g	08/11/14 11:25	08/14/14 21:48	5
U-236	-0.00108	U	0.00166	0.00167	0.695	0.0557	pCi/g	08/11/14 11:25	08/14/14 21:48	5
U-238	0.818		0.0692	0.102	0.00361	0.000217	pCi/g	08/11/14 11:25	08/14/14 21:48	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.867						%		08/19/14 13:49	1

Client Sample ID: SD-235-01

Lab Sample ID: 680-102380-23

Date Collected: 06/13/14 11:05

Matrix: Solid

Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0035	mg/Kg		08/11/14 11:25	08/18/14 22:00	5
U-234	ND		0.012	0.00070	mg/Kg		08/11/14 11:25	08/14/14 22:02	5
U-235	0.028		0.012	0.0047	mg/Kg		08/11/14 11:25	08/14/14 22:02	5
U-236	ND		0.012	0.00093	mg/Kg		08/11/14 11:25	08/14/14 22:02	5
U-238	3.3	B	0.012	0.00070	mg/Kg		08/11/14 11:25	08/14/14 22:02	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.3		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Client Sample ID: SD-235-01

Date Collected: 06/13/14 11:05
Date Received: 06/14/14 08:30

Lab Sample ID: 680-102380-23

Matrix: Solid

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.797	U	0.640	0.644	113	33.8	pCi/g	08/11/14 11:25	08/18/14 22:00	5
U-234	1.61	U	0.446	0.470	72.7	4.36	pCi/g	08/11/14 11:25	08/14/14 22:02	5
U-235	**0.0602**		0.00602	0.00818	0.0253	0.0103	pCi/g	08/11/14 11:25	08/14/14 22:02	5
U-236	-0.00178	U	0.000826	0.000842	0.756	0.0605	pCi/g	08/11/14 11:25	08/14/14 22:02	5
U-238	**1.12**		0.0730	0.126	0.00393	0.000236	pCi/g	08/11/14 11:25	08/14/14 22:02	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.841**						%		08/19/14 13:49	1

Client Sample ID: SD-235-02

Date Collected: 06/13/14 11:10
Date Received: 06/14/14 08:30

Lab Sample ID: 680-102380-24

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0036	mg/Kg		08/11/14 11:25	08/18/14 22:05	5
U-234	ND		0.012	0.00072	mg/Kg		08/11/14 11:25	08/14/14 22:06	5
U-235	**0.040**		0.012	0.0048	mg/Kg		08/11/14 11:25	08/14/14 22:06	5
U-236	ND		0.012	0.00095	mg/Kg		08/11/14 11:25	08/14/14 22:06	5
U-238	**3.8**	**B**	0.012	0.00072	mg/Kg		08/11/14 11:25	08/14/14 22:06	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**3.8**		0.0050	0.00030	mg/Kg			08/11/14 11:25	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.758	U	0.680	0.683	115	34.5	pCi/g	08/11/14 11:25	08/18/14 22:05	5
U-234	2.45	U	0.449	0.503	74.2	4.45	pCi/g	08/11/14 11:25	08/14/14 22:06	5
U-235	**0.0873**		0.00545	0.00971	0.0258	0.0105	pCi/g	08/11/14 11:25	08/14/14 22:06	5
U-236	0.000740	U	0.00192	0.00192	0.771	0.0617	pCi/g	08/11/14 11:25	08/14/14 22:06	5
U-238	**1.27**		0.0804	0.142	0.00401	0.000241	pCi/g	08/11/14 11:25	08/14/14 22:06	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**1.04**						%		08/19/14 13:49	1

Client Sample ID: SD-236-SS

Lab Sample ID: 680-102380-26

Date Collected: 06/13/14 12:05

Matrix: Solid

Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0035	mg/Kg		08/11/14 11:35	08/18/14 22:28	5
U-234	ND		0.012	0.00070	mg/Kg		08/11/14 11:35	08/14/14 22:20	5
U-235	ND		0.012	0.0047	mg/Kg		08/11/14 11:35	08/14/14 22:20	5
U-236	ND		0.012	0.00093	mg/Kg		08/11/14 11:35	08/14/14 22:20	5
U-238	**0.28**	**B**	0.012	0.00070	mg/Kg		08/11/14 11:35	08/14/14 22:20	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**0.28**		0.0050	0.00030	mg/Kg			08/19/14 13:51	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-1.20	U	0.328	0.346	112	33.6	pCi/g	08/11/14 11:35	08/18/14 22:28	5
U-234	0.168	U	0.281	0.282	72.3	4.34	pCi/g	08/11/14 11:35	08/14/14 22:20	5
U-235	0.00300	U	0.000961	0.00100	0.0251	0.0102	pCi/g	08/11/14 11:35	08/14/14 22:20	5
U-236	-0.00165	U	0.00186	0.00186	0.751	0.0602	pCi/g	08/11/14 11:35	08/14/14 22:20	5
U-238	**0.0929**		0.00264	0.00895	0.00390	0.000235	pCi/g	08/11/14 11:35	08/14/14 22:20	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.000**						%		08/19/14 13:50	1

Client Sample ID: SD-236-01

Lab Sample ID: 680-102380-27

Date Collected: 06/13/14 12:10

Matrix: Solid

Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0033	mg/Kg		08/11/14 11:35	08/18/14 22:47	5
U-234	ND		0.011	0.00065	mg/Kg		08/11/14 11:35	08/14/14 22:39	5
U-235	ND		0.011	0.0044	mg/Kg		08/11/14 11:35	08/14/14 22:39	5
U-236	ND		0.011	0.00087	mg/Kg		08/11/14 11:35	08/14/14 22:39	5
U-238	**0.62**	**B**	0.011	0.00065	mg/Kg		08/11/14 11:35	08/14/14 22:39	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**0.62**		0.0050	0.00030	mg/Kg			08/19/14 13:51	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-1.17	U	0.191	0.219	105	31.5	pCi/g	08/11/14 11:35	08/18/14 22:47	5
U-234	0.276	U	0.161	0.163	67.7	4.07	pCi/g	08/11/14 11:35	08/14/14 22:39	5
U-235	0.00893	U	0.00132	0.00155	0.0235	0.00958	pCi/g	08/11/14 11:35	08/14/14 22:39	5
U-236	-0.00206	U	0.000914	0.000934	0.704	0.0564	pCi/g	08/11/14 11:35	08/14/14 22:39	5
U-238	**0.208**		0.0229	0.0298	0.00366	0.000220	pCi/g	08/11/14 11:35	08/14/14 22:39	5

Client Sample ID: SD-236-01

Lab Sample ID: 680-102380-27

Date Collected: 06/13/14 12:10

Matrix: Solid

Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.000						%		08/19/14 13:50	1

Client Sample ID: SD-236-02

Lab Sample ID: 680-102380-28

Date Collected: 06/13/14 12:15

Matrix: Solid

Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/11/14 11:35	08/18/14 22:52	5
U-234	ND		0.012	0.00072	mg/Kg		08/11/14 11:35	08/14/14 22:44	5
U-235	0.0054	J	0.012	0.0048	mg/Kg		08/11/14 11:35	08/14/14 22:44	5
U-236	ND		0.012	0.00095	mg/Kg		08/11/14 11:35	08/14/14 22:44	5
U-238	0.84	B	0.012	0.00072	mg/Kg		08/11/14 11:35	08/14/14 22:44	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.85		0.0050	0.00030	mg/Kg			08/19/14 13:51	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-1.02	U	0.363	0.375	115	34.5	pCi/g	08/11/14 11:35	08/18/14 22:52	5
U-234	0.353	U	0.393	0.395	74.2	4.45	pCi/g	08/11/14 11:35	08/14/14 22:44	5
U-235	0.0116		0.00174	0.00205	0.0258	0.0105	pCi/g	08/11/14 11:35	08/14/14 22:44	5
U-236	-0.00228	U	0.000533	0.000573	0.771	0.0617	pCi/g	08/11/14 11:35	08/14/14 22:44	5
U-238	0.281		0.0250	0.0359	0.00401	0.000241	pCi/g	08/11/14 11:35	08/14/14 22:44	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.639						%		08/19/14 13:50	1

Client Sample ID: SD-237-SS

Lab Sample ID: 680-102380-29

Date Collected: 06/13/14 12:30

Matrix: Solid

Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0033	mg/Kg		08/11/14 11:35	08/18/14 22:56	5
U-234	ND		0.011	0.00066	mg/Kg		08/11/14 11:35	08/14/14 22:58	5
U-235	0.032		0.011	0.0045	mg/Kg		08/11/14 11:35	08/14/14 22:58	5
U-236	ND		0.011	0.00088	mg/Kg		08/11/14 11:35	08/14/14 22:58	5
U-238	2.6	B	0.011	0.00066	mg/Kg		08/11/14 11:35	08/14/14 22:58	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.6		0.0050	0.00030	mg/Kg			08/19/14 13:51	1

Client Sample ID: SD-237-SS

Date Collected: 06/13/14 12:30
Date Received: 06/14/14 08:30

Lab Sample ID: 680-102380-29

Matrix: Solid

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.871	U	0.471	0.478	106	31.9	pCi/g	08/11/14 11:35	08/18/14 22:56	5
U-234	1.67	U	0.583	0.603	68.6	4.12	pCi/g	08/11/14 11:35	08/14/14 22:58	5
U-235	**0.0684**		0.00424	0.00759	0.0238	0.00970	pCi/g	08/11/14 11:35	08/14/14 22:58	5
U-236	0.000314	U	0.00121	0.00121	0.713	0.0571	pCi/g	08/11/14 11:35	08/14/14 22:58	5
U-238	**0.872**		0.0541	0.0968	0.00370	0.000223	pCi/g	08/11/14 11:35	08/14/14 22:58	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**1.22**						%		08/19/14 13:50	1

Client Sample ID: SD-237-01

Date Collected: 06/13/14 12:35
Date Received: 06/14/14 08:30

Lab Sample ID: 680-102380-30

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0037	mg/Kg		08/11/14 11:35	08/18/14 23:01	5
U-234	ND		0.012	0.00075	mg/Kg		08/11/14 11:35	08/14/14 23:02	5
U-235	**0.025**		0.012	0.0051	mg/Kg		08/11/14 11:35	08/14/14 23:02	5
U-236	ND		0.012	0.0010	mg/Kg		08/11/14 11:35	08/14/14 23:02	5
U-238	**3.1**	**B**	0.012	0.00075	mg/Kg		08/11/14 11:35	08/14/14 23:02	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**3.1**		0.0050	0.00030	mg/Kg			08/19/14 13:51	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.856	U	0.249	0.261	120	36.0	pCi/g	08/11/14 11:35	08/18/14 23:01	5
U-234	1.36	U	0.148	0.194	77.6	4.66	pCi/g	08/11/14 11:35	08/14/14 23:02	5
U-235	**0.0540**		0.00224	0.00545	0.0269	0.0110	pCi/g	08/11/14 11:35	08/14/14 23:02	5
U-236	-0.00145	U	0.00191	0.00191	0.806	0.0646	pCi/g	08/11/14 11:35	08/14/14 23:02	5
U-238	**1.05**		0.0521	0.109	0.00419	0.000252	pCi/g	08/11/14 11:35	08/14/14 23:02	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.800**						%		08/19/14 13:50	1

Client Sample ID: SD-237-02

Lab Sample ID: 680-102380-31

Date Collected: 06/13/14 12:40

Matrix: Solid

Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0034	mg/Kg		08/11/14 11:35	08/18/14 23:06	5
U-234	ND		0.011	0.00068	mg/Kg		08/11/14 11:35	08/14/14 23:07	5
U-235	**0.057**		0.011	0.0046	mg/Kg		08/11/14 11:35	08/14/14 23:07	5
U-236	ND		0.011	0.00090	mg/Kg		08/11/14 11:35	08/14/14 23:07	5
U-238	**3.8**	**B**	0.011	0.00068	mg/Kg		08/11/14 11:35	08/14/14 23:07	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**3.9**		0.0050	0.00030	mg/Kg			08/19/14 13:51	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.649	U	0.376	0.381	109	32.7	pCi/g	08/11/14 11:35	08/18/14 23:06	5
U-234	3.47	U	0.692	0.762	70.3	4.22	pCi/g	08/11/14 11:35	08/14/14 23:07	5
U-235	**0.123**		0.0110	0.0158	0.0244	0.00995	pCi/g	08/11/14 11:35	08/14/14 23:07	5
U-236	0.00252	U	0.00199	0.00201	0.731	0.0586	pCi/g	08/11/14 11:35	08/14/14 23:07	5
U-238	**1.29**		0.0797	0.143	0.00380	0.000228	pCi/g	08/11/14 11:35	08/14/14 23:07	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**1.48**						%		08/19/14 13:50	1

Client Sample ID: SD-DUP05

Lab Sample ID: 680-102380-33

Date Collected: 06/13/14 00:00

Matrix: Solid

Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/11/14 11:35	08/18/14 23:10	5
U-234	ND		0.012	0.00073	mg/Kg		08/11/14 11:35	08/14/14 23:12	5
U-235	**0.044**		0.012	0.0049	mg/Kg		08/11/14 11:35	08/14/14 23:12	5
U-236	ND		0.012	0.00097	mg/Kg		08/11/14 11:35	08/14/14 23:12	5
U-238	**4.1**	**B**	0.012	0.00073	mg/Kg		08/11/14 11:35	08/14/14 23:12	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**4.1**		0.0050	0.00030	mg/Kg			08/19/14 13:51	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.741	U	0.452	0.457	116	34.9	pCi/g	08/11/14 11:35	08/18/14 23:10	5
U-234	2.44	U	0.300	0.375	75.2	4.51	pCi/g	08/11/14 11:35	08/14/14 23:12	5
U-235	**0.0956**		0.00723	0.0114	0.0261	0.0106	pCi/g	08/11/14 11:35	08/14/14 23:12	5
U-236	-0.0000938	U	0.00155	0.00155	0.782	0.0626	pCi/g	08/11/14 11:35	08/14/14 23:12	5
U-238	**1.37**		0.0979	0.159	0.00406	0.000244	pCi/g	08/11/14 11:35	08/14/14 23:12	5

Client Sample ID: SD-DUP05

Lab Sample ID: 680-102380-33

Date Collected: 06/13/14 00:00

Matrix: Solid

Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	1.06						%		08/19/14 13:50	1

Client Sample ID: SD-227-SS

Lab Sample ID: 680-102380-34

Date Collected: 06/13/14 13:10

Matrix: Solid

Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.012	0.0036	mg/Kg		08/11/14 11:35	08/18/14 23:24	5
U-234	ND		0.012	0.00073	mg/Kg		08/11/14 11:35	08/14/14 23:16	5
U-235	0.030		0.012	0.0049	mg/Kg		08/11/14 11:35	08/14/14 23:16	5
U-236	ND		0.012	0.00097	mg/Kg		08/11/14 11:35	08/14/14 23:16	5
U-238	4.1	B	0.012	0.00073	mg/Kg		08/11/14 11:35	08/14/14 23:16	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	4.1		0.0050	0.00030	mg/Kg			08/19/14 13:51	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.677	U	0.466	0.470	117	35.0	pCi/g	08/11/14 11:35	08/18/14 23:24	5
U-234	1.55	U	1.05	1.06	75.4	4.52	pCi/g	08/11/14 11:35	08/14/14 23:16	5
U-235	0.0649		0.00616	0.00857	0.0262	0.0107	pCi/g	08/11/14 11:35	08/14/14 23:16	5
U-236	-0.00191	U	0.00166	0.00167	0.784	0.0628	pCi/g	08/11/14 11:35	08/14/14 23:16	5
U-238	1.37		0.133	0.184	0.00407	0.000245	pCi/g	08/11/14 11:35	08/14/14 23:16	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.726						%		08/19/14 13:50	1

Client Sample ID: SD-227-01

Lab Sample ID: 680-102380-35

Date Collected: 06/13/14 13:15

Matrix: Solid

Date Received: 06/14/14 08:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0032	mg/Kg		08/11/14 11:35	08/18/14 23:29	5
U-234	ND		0.011	0.00065	mg/Kg		08/11/14 11:35	08/14/14 23:21	5
U-235	0.025		0.011	0.0044	mg/Kg		08/11/14 11:35	08/14/14 23:21	5
U-236	ND		0.011	0.00086	mg/Kg		08/11/14 11:35	08/14/14 23:21	5
U-238	3.3	B	0.011	0.00065	mg/Kg		08/11/14 11:35	08/14/14 23:21	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.3		0.0050	0.00030	mg/Kg			08/19/14 13:51	1

Client Sample ID: SD-227-01

Date Collected: 06/13/14 13:15
Date Received: 06/14/14 08:30

Lab Sample ID: 680-102380-35

Matrix: Solid

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.623	U	0.414	0.418	104	31.2	pCi/g	08/11/14 11:35	08/18/14 23:29	5
U-234	1.21	U	0.290	0.310	67.0	4.02	pCi/g	08/11/14 11:35	08/14/14 23:21	5
U-235	**0.0530**		0.00185	0.00522	0.0233	0.00948	pCi/g	08/11/14 11:35	08/14/14 23:21	5
U-236	-0.00212	U	0.00188	0.00189	0.697	0.0558	pCi/g	08/11/14 11:35	08/14/14 23:21	5
U-238	**1.11**		0.0563	0.116	0.00362	0.000218	pCi/g	08/11/14 11:35	08/14/14 23:21	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.752**						%		08/19/14 13:50	1

Client Sample ID: SD-227-02

Date Collected: 06/13/14 13:20
Date Received: 06/14/14 08:30

Lab Sample ID: 680-102380-36

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.011	0.0033	mg/Kg		08/11/14 11:35	08/18/14 23:34	5
U-234	ND		0.011	0.00066	mg/Kg		08/11/14 11:35	08/14/14 23:26	5
U-235	**0.025**		0.011	0.0045	mg/Kg		08/11/14 11:35	08/14/14 23:26	5
U-236	ND		0.011	0.00088	mg/Kg		08/11/14 11:35	08/14/14 23:26	5
U-238	**3.4**	**B**	0.011	0.00066	mg/Kg		08/11/14 11:35	08/14/14 23:26	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**3.4**		0.0050	0.00030	mg/Kg			08/19/14 13:51	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.834	U	0.346	0.355	106	31.8	pCi/g	08/11/14 11:35	08/18/14 23:34	5
U-234	1.33	U	0.528	0.542	68.4	4.10	pCi/g	08/11/14 11:35	08/14/14 23:26	5
U-235	**0.0543**		0.00593	0.00775	0.0237	0.00967	pCi/g	08/11/14 11:35	08/14/14 23:26	5
U-236	-0.00236	U	0.00140	0.00142	0.710	0.0569	pCi/g	08/11/14 11:35	08/14/14 23:26	5
U-238	**1.15**		0.114	0.155	0.00369	0.000222	pCi/g	08/11/14 11:35	08/14/14 23:26	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.730**						%		08/19/14 13:50	1

Default Detection Limits

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102380-3
SDG: 680102380-1

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	RL	MDL	Units	Method
U-233	0.0050	0.0015	mg/Kg	6020A
U-234	0.0050	0.00030	mg/Kg	6020A
U-235	0.0050	0.0020	mg/Kg	6020A
U-236	0.0050	0.00040	mg/Kg	6020A
U-238	0.0050	0.00030	mg/Kg	6020A

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	RL	MDL	Units	Method
Total Uranium	0.0050	0.00030	mg/Kg	6020A

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Lab Sample ID: MB 160-137068/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 138156 — **Prep Batch: 137068**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-234	ND		0.0044	0.00026	mg/Kg		08/11/14 11:25	08/14/14 19:46	2
U-235	ND		0.0044	0.0018	mg/Kg		08/11/14 11:25	08/14/14 19:46	2
U-236	ND		0.0044	0.00035	mg/Kg		08/11/14 11:25	08/14/14 19:46	2
U-238	0.00135	J	0.0044	0.00026	mg/Kg		08/11/14 11:25	08/14/14 19:46	2

Lab Sample ID: MB 160-137068/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 138778 — **Prep Batch: 137068**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.0044	0.0013	mg/Kg		08/11/14 11:25	08/18/14 19:54	2

Lab Sample ID: LCS 160-137068/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 138156 — **Prep Batch: 137068**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
U-234	0.00745	0.00711		mg/Kg		95	80 - 120
U-235	0.437	0.427		mg/Kg		98	80 - 120
U-238	0.453	0.438		mg/Kg		97	80 - 120

Lab Sample ID: 680-102380-1 MS — **Client Sample ID: SD-224-SS**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 138156 — **Prep Batch: 137068**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
U-234	ND		0.00811	0.00769	J	mg/Kg		95	75 - 125
U-235	0.016		0.475	0.467		mg/Kg		95	75 - 125
U-238	2.3	B	0.493	2.84	4	mg/Kg		106	75 - 125

Lab Sample ID: 680-102380-1 MSD — **Client Sample ID: SD-224-SS**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 138156 — **Prep Batch: 137068**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
U-234	ND		0.00747	0.00703	J	mg/Kg		94	75 - 125	9	20
U-235	0.016		0.438	0.431		mg/Kg		95	75 - 125	8	20
U-238	2.3	B	0.454	2.52	4	mg/Kg		44	75 - 125	12	20

Lab Sample ID: MB 160-137069/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 138156 — **Prep Batch: 137069**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-234	ND		0.0046	0.00028	mg/Kg		08/11/14 11:35	08/14/14 22:11	2
U-235	ND		0.0046	0.0019	mg/Kg		08/11/14 11:35	08/14/14 22:11	2
U-236	ND		0.0046	0.00037	mg/Kg		08/11/14 11:35	08/14/14 22:11	2
U-238	0.000480	J	0.0046	0.00028	mg/Kg		08/11/14 11:35	08/14/14 22:11	2

Method: 6020A - Metals (ICP/MS), Isotopic Uranium (Continued)

Lab Sample ID: MB 160-137069/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 138778 — **Prep Batch: 137069**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND	^	0.0046	0.0014	mg/Kg		08/11/14 11:35	08/18/14 22:10	2

Lab Sample ID: LCS 160-137069/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 138156 — **Prep Batch: 137069**

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
U-234			0.00816	0.00857		mg/Kg		105	80 - 120		
U-235			0.478	0.518		mg/Kg		108	80 - 120		
U-238			0.496	0.534		mg/Kg		108	80 - 120		

Lab Sample ID: 680-102380-26 MS — **Client Sample ID: SD-236-SS**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 138156 — **Prep Batch: 137069**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
U-234	ND		0.00726	0.00701	J	mg/Kg		97	75 - 125		
U-235	ND		0.426	0.425		mg/Kg		100	75 - 125		
U-238	0.28	B	0.441	0.727		mg/Kg		102	75 - 125		

Lab Sample ID: 680-102380-26 MSD — **Client Sample ID: SD-236-SS**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 138156 — **Prep Batch: 137069**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
U-234	ND		0.00774	0.00700	J	mg/Kg		90	75 - 125	0	20
U-235	ND		0.454	0.426		mg/Kg		94	75 - 125	0	20
U-238	0.28	B	0.470	0.722		mg/Kg		95	75 - 125	1	20

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Lab Sample ID: MB 160-137068/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 138157 — **Prep Batch: 137068**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-234	0.04175	U	0.127	0.127	27.5	1.65	pCi/g	08/11/14 11:25	08/14/14 19:46	2
U-235	-0.0004549	U	0.0000211	0.0000469	0.00954	0.00388	pCi/g	08/11/14 11:25	08/14/14 19:46	2
U-236	-0.0009821	U	0.000493	0.000501	0.285	0.0229	pCi/g	08/11/14 11:25	08/14/14 19:46	2
U-238	0.0004534		0.0000769	0.0000875	0.00148	0.000089 2	pCi/g	08/11/14 11:25	08/14/14 19:46	2

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity) (Continued)

Lab Sample ID: MB 160-137068/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 138779 — **Prep Batch: 137068**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.4662	U	0.0659	0.0786	42.5	12.8	pCi/g	08/11/14 11:25	08/18/14 19:54	2

Lab Sample ID: LCS 160-137068/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 138157 — **Prep Batch: 137068**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-235			0.944	0.9234		0.0946	0.00973	0.00396	pCi/g	98	80 - 120		
U-238			0.152	0.1474		0.0154	0.00151	0.0000910	pCi/g	97	80 - 120		

Lab Sample ID: 680-102380-1 MS — **Client Sample ID: SD-224-SS**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 138157 — **Prep Batch: 137068**

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-235	0.0356		1.03	1.010		0.0942	0.0265	0.0108	pCi/g	95	75 - 125		
U-238	0.780		0.166	0.9559		0.0901	0.00412	0.000248	pCi/g	106	75 - 125		

Lab Sample ID: 680-102380-1 MSD — **Client Sample ID: SD-224-SS**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 138157 — **Prep Batch: 137068**

Analyte	Sample Result	Sample Qual	Spike Added	MSD Result	MSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
U-235	0.0356		0.946	0.9313		0.0863	0.0244	0.00993	pCi/g	95	75 - 125	0.43	1
U-238	0.780		0.153	0.8467		0.0781	0.00379	0.000228	pCi/g	44	75 - 125	0.65	1

Lab Sample ID: MB 160-137069/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 138157 — **Prep Batch: 137069**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-234	-0.03425	U	0.0481	0.0482	28.5	1.71	pCi/g	08/11/14 11:35	08/14/14 22:11	2
U-235	-0.0005060	U	0.0000134	0.0000484	0.00991	0.00404	pCi/g	08/11/14 11:35	08/14/14 22:11	2
U-236	-0.001020	U	0.000443	0.000453	0.297	0.0238	pCi/g	08/11/14 11:35	08/14/14 22:11	2
U-238	0.0001615		0.0000402	0.0000428	0.00154	0.0000927	pCi/g	08/11/14 11:35	08/14/14 22:11	2

Lab Sample ID: MB 160-137069/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 138779 — **Prep Batch: 137069**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-0.5092	U	0.0972	0.108	44.2	13.3	pCi/g	08/11/14 11:35	08/18/14 22:10	2

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity) (Continued)

Lab Sample ID: LCS 160-137069/2-A
Matrix: Solid
Analysis Batch: 138157

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 137069

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-235			1.03	1.120		0.120	0.0107	0.00434	pCi/g	108	80 - 120		
U-238			0.167	0.1793		0.0205	0.00166	0.000099 7	pCi/g	108	80 - 120		

Lab Sample ID: 680-102380-26 MS
Matrix: Solid
Analysis Batch: 138157

Client Sample ID: SD-236-SS
Prep Type: Total/NA
Prep Batch: 137069

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-235	0.00300	U	0.920	0.9183		0.0885	0.0237	0.00966	pCi/g	100	75 - 125		
U-238	0.0929		0.148	0.2443		0.0240	0.00369	0.000222	pCi/g	102	75 - 125		

Lab Sample ID: 680-102380-26 MSD
Matrix: Solid
Analysis Batch: 138157

Client Sample ID: SD-236-SS
Prep Type: Total/NA
Prep Batch: 137069

Analyte	Sample Result	Sample Qual	Spike Added	MSD Result	MSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
U-235	0.00300	U	0.980	0.9202		0.0903	0.0253	0.0103	pCi/g	94	75 - 125	0.01	1
U-238	0.0929		0.158	0.2428		0.0248	0.00393	0.000236	pCi/g	95	75 - 125	0.03	1

Metals

Prep Batch: 137068

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102380-1	SD-224-SS	Total/NA	Solid	3050B	
680-102380-1 MS	SD-224-SS	Total/NA	Solid	3050B	
680-102380-1 MSD	SD-224-SS	Total/NA	Solid	3050B	
680-102380-1 SD	SD-224-SS	Total/NA	Solid	3050B	
680-102380-2	SD-224-01	Total/NA	Solid	3050B	
680-102380-3	SD-224-02	Total/NA	Solid	3050B	
680-102380-5	SD-223-SS	Total/NA	Solid	3050B	
680-102380-6	SD-223-01	Total/NA	Solid	3050B	
680-102380-7	SD-223-02	Total/NA	Solid	3050B	
680-102380-8	SD-226-SS	Total/NA	Solid	3050B	
680-102380-9	SD-226-01	Total/NA	Solid	3050B	
680-102380-10	SD-226-02	Total/NA	Solid	3050B	
680-102380-12	SD-225-SS	Total/NA	Solid	3050B	
680-102380-13	SD-225-01	Total/NA	Solid	3050B	
680-102380-14	SD-225-02	Total/NA	Solid	3050B	
680-102380-16	SD-228-SS	Total/NA	Solid	3050B	
680-102380-17	SD-228-01	Total/NA	Solid	3050B	
680-102380-18	SD-228-02	Total/NA	Solid	3050B	
680-102380-20	SD-234-SS	Total/NA	Solid	3050B	
680-102380-21	SD-234-01	Total/NA	Solid	3050B	
680-102380-22	SD-235-SS	Total/NA	Solid	3050B	
680-102380-23	SD-235-01	Total/NA	Solid	3050B	
680-102380-24	SD-235-02	Total/NA	Solid	3050B	
LCS 160-137068/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 160-137068/1-A	Method Blank	Total/NA	Solid	3050B	

Prep Batch: 137069

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102380-26	SD-236-SS	Total/NA	Solid	3050B	
680-102380-26 MS	SD-236-SS	Total/NA	Solid	3050B	
680-102380-26 MSD	SD-236-SS	Total/NA	Solid	3050B	
680-102380-26 SD	SD-236-SS	Total/NA	Solid	3050B	
680-102380-27	SD-236-01	Total/NA	Solid	3050B	
680-102380-28	SD-236-02	Total/NA	Solid	3050B	
680-102380-29	SD-237-SS	Total/NA	Solid	3050B	
680-102380-30	SD-237-01	Total/NA	Solid	3050B	
680-102380-31	SD-237-02	Total/NA	Solid	3050B	
680-102380-33	SD-DUP05	Total/NA	Solid	3050B	
680-102380-34	SD-227-SS	Total/NA	Solid	3050B	
680-102380-35	SD-227-01	Total/NA	Solid	3050B	
680-102380-36	SD-227-02	Total/NA	Solid	3050B	
LCS 160-137069/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 160-137069/1-A	Method Blank	Total/NA	Solid	3050B	

Analysis Batch: 138156

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102380-1	SD-224-SS	Total/NA	Solid	6020A	137068
680-102380-1 MS	SD-224-SS	Total/NA	Solid	6020A	137068
680-102380-1 MSD	SD-224-SS	Total/NA	Solid	6020A	137068
680-102380-1 SD	SD-224-SS	Total/NA	Solid	6020A	137068
680-102380-2	SD-224-01	Total/NA	Solid	6020A	137068

Metals (Continued)

Analysis Batch: 138156 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102380-3	SD-224-02	Total/NA	Solid	6020A	137068
680-102380-5	SD-223-SS	Total/NA	Solid	6020A	137068
680-102380-6	SD-223-01	Total/NA	Solid	6020A	137068
680-102380-7	SD-223-02	Total/NA	Solid	6020A	137068
680-102380-8	SD-226-SS	Total/NA	Solid	6020A	137068
680-102380-9	SD-226-01	Total/NA	Solid	6020A	137068
680-102380-10	SD-226-02	Total/NA	Solid	6020A	137068
680-102380-12	SD-225-SS	Total/NA	Solid	6020A	137068
680-102380-13	SD-225-01	Total/NA	Solid	6020A	137068
680-102380-14	SD-225-02	Total/NA	Solid	6020A	137068
680-102380-16	SD-228-SS	Total/NA	Solid	6020A	137068
680-102380-17	SD-228-01	Total/NA	Solid	6020A	137068
680-102380-18	SD-228-02	Total/NA	Solid	6020A	137068
680-102380-20	SD-234-SS	Total/NA	Solid	6020A	137068
680-102380-21	SD-234-01	Total/NA	Solid	6020A	137068
680-102380-22	SD-235-SS	Total/NA	Solid	6020A	137068
680-102380-23	SD-235-01	Total/NA	Solid	6020A	137068
680-102380-24	SD-235-02	Total/NA	Solid	6020A	137068
680-102380-26	SD-236-SS	Total/NA	Solid	6020A	137069
680-102380-26 MS	SD-236-SS	Total/NA	Solid	6020A	137069
680-102380-26 MSD	SD-236-SS	Total/NA	Solid	6020A	137069
680-102380-26 SD	SD-236-SS	Total/NA	Solid	6020A	137069
680-102380-27	SD-236-01	Total/NA	Solid	6020A	137069
680-102380-28	SD-236-02	Total/NA	Solid	6020A	137069
680-102380-29	SD-237-SS	Total/NA	Solid	6020A	137069
680-102380-30	SD-237-01	Total/NA	Solid	6020A	137069
680-102380-31	SD-237-02	Total/NA	Solid	6020A	137069
680-102380-33	SD-DUP05	Total/NA	Solid	6020A	137069
680-102380-34	SD-227-SS	Total/NA	Solid	6020A	137069
680-102380-35	SD-227-01	Total/NA	Solid	6020A	137069
680-102380-36	SD-227-02	Total/NA	Solid	6020A	137069
CRI 160-138156/92	DL		Solid	6020A	
CRI 160-138156/93	DL		Solid	6020A	
ICSA 160-138156/94	ICS		Solid	6020A	
ICSAB 160-138156/95	ICS		Solid	6020A	
LCS 160-137068/2-A	Lab Control Sample	Total/NA	Solid	6020A	137068
LCS 160-137069/2-A	Lab Control Sample	Total/NA	Solid	6020A	137069
MB 160-137068/1-A	Method Blank	Total/NA	Solid	6020A	137068
MB 160-137069/1-A	Method Blank	Total/NA	Solid	6020A	137069

Analysis Batch: 138778

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102380-1	SD-224-SS	Total/NA	Solid	6020A	137068
680-102380-1 SD	SD-224-SS	Total/NA	Solid	6020A	137068
680-102380-2	SD-224-01	Total/NA	Solid	6020A	137068
680-102380-3	SD-224-02	Total/NA	Solid	6020A	137068
680-102380-5	SD-223-SS	Total/NA	Solid	6020A	137068
680-102380-6	SD-223-01	Total/NA	Solid	6020A	137068
680-102380-7	SD-223-02	Total/NA	Solid	6020A	137068
680-102380-8	SD-226-SS	Total/NA	Solid	6020A	137068
680-102380-9	SD-226-01	Total/NA	Solid	6020A	137068

Metals (Continued)

Analysis Batch: 138778 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102380-10	SD-226-02	Total/NA	Solid	6020A	137068
680-102380-12	SD-225-SS	Total/NA	Solid	6020A	137068
680-102380-13	SD-225-01	Total/NA	Solid	6020A	137068
680-102380-14	SD-225-02	Total/NA	Solid	6020A	137068
680-102380-16	SD-228-SS	Total/NA	Solid	6020A	137068
680-102380-17	SD-228-01	Total/NA	Solid	6020A	137068
680-102380-18	SD-228-02	Total/NA	Solid	6020A	137068
680-102380-20	SD-234-SS	Total/NA	Solid	6020A	137068
680-102380-21	SD-234-01	Total/NA	Solid	6020A	137068
680-102380-22	SD-235-SS	Total/NA	Solid	6020A	137068
680-102380-23	SD-235-01	Total/NA	Solid	6020A	137068
680-102380-24	SD-235-02	Total/NA	Solid	6020A	137068
680-102380-26	SD-236-SS	Total/NA	Solid	6020A	137069
680-102380-26 SD	SD-236-SS	Total/NA	Solid	6020A	137069
680-102380-27	SD-236-01	Total/NA	Solid	6020A	137069
680-102380-28	SD-236-02	Total/NA	Solid	6020A	137069
680-102380-29	SD-237-SS	Total/NA	Solid	6020A	137069
680-102380-30	SD-237-01	Total/NA	Solid	6020A	137069
680-102380-31	SD-237-02	Total/NA	Solid	6020A	137069
680-102380-33	SD-DUP05	Total/NA	Solid	6020A	137069
680-102380-34	SD-227-SS	Total/NA	Solid	6020A	137069
680-102380-35	SD-227-01	Total/NA	Solid	6020A	137069
680-102380-36	SD-227-02	Total/NA	Solid	6020A	137069
CRI 160-138778/15	DL		Solid	6020A	
ICSA 160-138778/16	ICS		Solid	6020A	
ICSAB 160-138778/1	ICS		Solid	6020A	
MB 160-137068/1-A	Method Blank	Total/NA	Solid	6020A	137068
MB 160-137069/1-A	Method Blank	Total/NA	Solid	6020A	137069

Analysis Batch: 138826

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102380-1	SD-224-SS	Total/NA	Solid	6020A	
680-102380-2	SD-224-01	Total/NA	Solid	6020A	
680-102380-3	SD-224-02	Total/NA	Solid	6020A	
680-102380-5	SD-223-SS	Total/NA	Solid	6020A	
680-102380-6	SD-223-01	Total/NA	Solid	6020A	
680-102380-7	SD-223-02	Total/NA	Solid	6020A	
680-102380-8	SD-226-SS	Total/NA	Solid	6020A	
680-102380-9	SD-226-01	Total/NA	Solid	6020A	
680-102380-10	SD-226-02	Total/NA	Solid	6020A	
680-102380-12	SD-225-SS	Total/NA	Solid	6020A	
680-102380-13	SD-225-01	Total/NA	Solid	6020A	
680-102380-14	SD-225-02	Total/NA	Solid	6020A	
680-102380-16	SD-228-SS	Total/NA	Solid	6020A	
680-102380-17	SD-228-01	Total/NA	Solid	6020A	
680-102380-18	SD-228-02	Total/NA	Solid	6020A	
680-102380-20	SD-234-SS	Total/NA	Solid	6020A	
680-102380-21	SD-234-01	Total/NA	Solid	6020A	
680-102380-22	SD-235-SS	Total/NA	Solid	6020A	
680-102380-23	SD-235-01	Total/NA	Solid	6020A	
680-102380-24	SD-235-02	Total/NA	Solid	6020A	

Metals (Continued)

Analysis Batch: 138829

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102380-26	SD-236-SS	Total/NA	Solid	6020A	
680-102380-27	SD-236-01	Total/NA	Solid	6020A	
680-102380-28	SD-236-02	Total/NA	Solid	6020A	
680-102380-29	SD-237-SS	Total/NA	Solid	6020A	
680-102380-30	SD-237-01	Total/NA	Solid	6020A	
680-102380-31	SD-237-02	Total/NA	Solid	6020A	
680-102380-33	SD-DUP05	Total/NA	Solid	6020A	
680-102380-34	SD-227-SS	Total/NA	Solid	6020A	
680-102380-35	SD-227-01	Total/NA	Solid	6020A	
680-102380-36	SD-227-02	Total/NA	Solid	6020A	

Rad

Prep Batch: 137068

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102380-1	SD-224-SS	Total/NA	Solid	3050B	
680-102380-1 MS	SD-224-SS	Total/NA	Solid	3050B	
680-102380-1 MSD	SD-224-SS	Total/NA	Solid	3050B	
680-102380-1 SD	SD-224-SS	Total/NA	Solid	3050B	
680-102380-2	SD-224-01	Total/NA	Solid	3050B	
680-102380-3	SD-224-02	Total/NA	Solid	3050B	
680-102380-5	SD-223-SS	Total/NA	Solid	3050B	
680-102380-6	SD-223-01	Total/NA	Solid	3050B	
680-102380-7	SD-223-02	Total/NA	Solid	3050B	
680-102380-8	SD-226-SS	Total/NA	Solid	3050B	
680-102380-9	SD-226-01	Total/NA	Solid	3050B	
680-102380-10	SD-226-02	Total/NA	Solid	3050B	
680-102380-12	SD-225-SS	Total/NA	Solid	3050B	
680-102380-13	SD-225-01	Total/NA	Solid	3050B	
680-102380-14	SD-225-02	Total/NA	Solid	3050B	
680-102380-16	SD-228-SS	Total/NA	Solid	3050B	
680-102380-17	SD-228-01	Total/NA	Solid	3050B	
680-102380-18	SD-228-02	Total/NA	Solid	3050B	
680-102380-20	SD-234-SS	Total/NA	Solid	3050B	
680-102380-21	SD-234-01	Total/NA	Solid	3050B	
680-102380-22	SD-235-SS	Total/NA	Solid	3050B	
680-102380-23	SD-235-01	Total/NA	Solid	3050B	
680-102380-24	SD-235-02	Total/NA	Solid	3050B	
LCS 160-137068/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 160-137068/1-A	Method Blank	Total/NA	Solid	3050B	

Prep Batch: 137069

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102380-26	SD-236-SS	Total/NA	Solid	3050B	
680-102380-26 MS	SD-236-SS	Total/NA	Solid	3050B	
680-102380-26 MSD	SD-236-SS	Total/NA	Solid	3050B	
680-102380-26 SD	SD-236-SS	Total/NA	Solid	3050B	
680-102380-27	SD-236-01	Total/NA	Solid	3050B	
680-102380-28	SD-236-02	Total/NA	Solid	3050B	
680-102380-29	SD-237-SS	Total/NA	Solid	3050B	

Rad (Continued)

Prep Batch: 137069 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102380-30	SD-237-01	Total/NA	Solid	3050B	
680-102380-31	SD-237-02	Total/NA	Solid	3050B	
680-102380-33	SD-DUP05	Total/NA	Solid	3050B	
680-102380-34	SD-227-SS	Total/NA	Solid	3050B	
680-102380-35	SD-227-01	Total/NA	Solid	3050B	
680-102380-36	SD-227-02	Total/NA	Solid	3050B	
LCS 160-137069/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 160-137069/1-A	Method Blank	Total/NA	Solid	3050B	

Client Sample ID: SD-224-SS

Lab Sample ID: 680-102380-1

Date Collected: 06/13/14 08:20

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 19:55	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138778	08/18/14 20:04	MTS	TAL SL
Total/NA	Analysis	6020A		1	138826	08/11/14 11:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	138823	08/19/14 13:49	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 19:55	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138779	08/18/14 20:04	KLE	TAL SL

Client Sample ID: SD-224-01

Lab Sample ID: 680-102380-2

Date Collected: 06/13/14 08:25

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 20:23	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138778	08/18/14 20:22	MTS	TAL SL
Total/NA	Analysis	6020A		1	138826	08/11/14 11:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	138823	08/19/14 13:49	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 20:23	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138779	08/18/14 20:22	KLE	TAL SL

Client Sample ID: SD-224-02

Lab Sample ID: 680-102380-3

Date Collected: 06/13/14 08:30

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 20:28	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138778	08/18/14 20:36	MTS	TAL SL
Total/NA	Analysis	6020A		1	138826	08/11/14 11:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	138823	08/19/14 13:49	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 20:28	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138779	08/18/14 20:36	KLE	TAL SL

Client Sample ID: SD-223-SS

Lab Sample ID: 680-102380-5

Date Collected: 06/13/14 08:40

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 20:33	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138778	08/18/14 20:41	MTS	TAL SL
Total/NA	Analysis	6020A		1	138826	08/11/14 11:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	138823	08/19/14 13:49	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 20:33	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138779	08/18/14 20:41	KLE	TAL SL

Client Sample ID: SD-223-01

Lab Sample ID: 680-102380-6

Date Collected: 06/13/14 08:45

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 20:37	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138778	08/18/14 20:46	MTS	TAL SL
Total/NA	Analysis	6020A		1	138826	08/11/14 11:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	138823	08/19/14 13:49	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 20:37	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138779	08/18/14 20:46	KLE	TAL SL

Client Sample ID: SD-223-02

Lab Sample ID: 680-102380-7

Date Collected: 06/13/14 08:50

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 20:42	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138778	08/18/14 20:50	MTS	TAL SL
Total/NA	Analysis	6020A		1	138826	08/11/14 11:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	138823	08/19/14 13:49	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 20:42	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138779	08/18/14 20:50	KLE	TAL SL

Client Sample ID: SD-226-SS

Lab Sample ID: 680-102380-8

Date Collected: 06/13/14 08:55

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 20:47	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138778	08/18/14 20:55	MTS	TAL SL
Total/NA	Analysis	6020A		1	138826	08/11/14 11:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	138823	08/19/14 13:49	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 20:47	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138779	08/18/14 20:55	KLE	TAL SL

Client Sample ID: SD-226-01

Lab Sample ID: 680-102380-9

Date Collected: 06/13/14 09:00

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 20:51	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138778	08/18/14 21:00	MTS	TAL SL
Total/NA	Analysis	6020A		1	138826	08/11/14 11:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	138823	08/19/14 13:49	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 20:51	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138779	08/18/14 21:00	KLE	TAL SL

Client Sample ID: SD-226-02

Lab Sample ID: 680-102380-10

Date Collected: 06/13/14 09:05

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 21:05	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138778	08/18/14 21:04	MTS	TAL SL
Total/NA	Analysis	6020A		1	138826	08/11/14 11:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	138823	08/19/14 13:49	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 21:05	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138779	08/18/14 21:04	KLE	TAL SL

Client Sample ID: SD-225-SS

Lab Sample ID: 680-102380-12

Date Collected: 06/13/14 09:15

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 21:10	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138778	08/18/14 21:09	MTS	TAL SL
Total/NA	Analysis	6020A		1	138826	08/11/14 11:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	138823	08/19/14 13:49	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 21:10	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138779	08/18/14 21:09	KLE	TAL SL

Client Sample ID: SD-225-01

Lab Sample ID: 680-102380-13

Date Collected: 06/13/14 09:20

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 21:15	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138778	08/18/14 21:14	MTS	TAL SL
Total/NA	Analysis	6020A		1	138826	08/11/14 11:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	138823	08/19/14 13:49	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 21:15	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138779	08/18/14 21:14	KLE	TAL SL

Client Sample ID: SD-225-02

Lab Sample ID: 680-102380-14

Date Collected: 06/13/14 09:25

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 21:19	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138778	08/18/14 21:18	MTS	TAL SL
Total/NA	Analysis	6020A		1	138826	08/11/14 11:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	138823	08/19/14 13:49	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 21:19	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138779	08/18/14 21:18	KLE	TAL SL

Client Sample ID: SD-228-SS

Lab Sample ID: 680-102380-16

Date Collected: 06/13/14 10:05

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 21:24	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138778	08/18/14 21:32	MTS	TAL SL
Total/NA	Analysis	6020A		1	138826	08/11/14 11:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	138823	08/19/14 13:49	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 21:24	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138779	08/18/14 21:32	KLE	TAL SL

Client Sample ID: SD-228-01

Lab Sample ID: 680-102380-17

Date Collected: 06/13/14 10:10

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 21:29	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138778	08/18/14 21:37	MTS	TAL SL
Total/NA	Analysis	6020A		1	138826	08/11/14 11:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	138823	08/19/14 13:49	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 21:29	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138779	08/18/14 21:37	KLE	TAL SL

Client Sample ID: SD-228-02

Lab Sample ID: 680-102380-18

Date Collected: 06/13/14 10:15

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 21:33	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138778	08/18/14 21:42	MTS	TAL SL
Total/NA	Analysis	6020A		1	138826	08/11/14 11:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	138823	08/19/14 13:49	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 21:33	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138779	08/18/14 21:42	KLE	TAL SL

Client Sample ID: SD-234-SS

Lab Sample ID: 680-102380-20

Date Collected: 06/13/14 10:30

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 21:38	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138778	08/18/14 21:46	MTS	TAL SL
Total/NA	Analysis	6020A		1	138826	08/11/14 11:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	138823	08/19/14 13:49	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 21:38	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138779	08/18/14 21:46	KLE	TAL SL

Client Sample ID: SD-234-01

Lab Sample ID: 680-102380-21

Date Collected: 06/13/14 10:35

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 21:43	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138778	08/18/14 21:51	MTS	TAL SL
Total/NA	Analysis	6020A		1	138826	08/11/14 11:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	138823	08/19/14 13:49	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 21:43	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138779	08/18/14 21:51	KLE	TAL SL

Client Sample ID: SD-235-SS

Lab Sample ID: 680-102380-22

Date Collected: 06/13/14 11:00

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 21:48	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138778	08/18/14 21:56	MTS	TAL SL
Total/NA	Analysis	6020A		1	138826	08/11/14 11:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	138823	08/19/14 13:49	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 21:48	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138779	08/18/14 21:56	KLE	TAL SL

Client Sample ID: SD-235-01

Lab Sample ID: 680-102380-23

Date Collected: 06/13/14 11:05

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 22:02	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138778	08/18/14 22:00	MTS	TAL SL
Total/NA	Analysis	6020A		1	138826	08/11/14 11:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	138823	08/19/14 13:49	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 22:02	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138779	08/18/14 22:00	KLE	TAL SL

Client Sample ID: SD-235-02

Lab Sample ID: 680-102380-24

Date Collected: 06/13/14 11:10

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 22:06	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A		5	138778	08/18/14 22:05	MTS	TAL SL
Total/NA	Analysis	6020A		1	138826	08/11/14 11:25	KLE	TAL SL
Total/NA	Analysis	6020A		1	138823	08/19/14 13:49	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 22:06	KLE	TAL SL
Total/NA	Prep	3050B			137068	08/11/14 11:25	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138779	08/18/14 22:05	KLE	TAL SL

Client Sample ID: SD-236-SS

Lab Sample ID: 680-102380-26

Date Collected: 06/13/14 12:05

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 22:20	KLE	TAL SL
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A		5	138778	08/18/14 22:28	MTS	TAL SL
Total/NA	Analysis	6020A		1	138829	08/19/14 13:51	KLE	TAL SL
Total/NA	Analysis	6020A		1	138825	08/19/14 13:50	KLE	TAL SL
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 22:20	KLE	TAL SL
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138779	08/18/14 22:28	KLE	TAL SL

Client Sample ID: SD-236-01

Lab Sample ID: 680-102380-27

Date Collected: 06/13/14 12:10

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 22:39	KLE	TAL SL
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A		5	138778	08/18/14 22:47	MTS	TAL SL
Total/NA	Analysis	6020A		1	138829	08/19/14 13:51	KLE	TAL SL
Total/NA	Analysis	6020A		1	138825	08/19/14 13:50	KLE	TAL SL
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 22:39	KLE	TAL SL
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138779	08/18/14 22:47	KLE	TAL SL

Client Sample ID: SD-236-02

Lab Sample ID: 680-102380-28

Date Collected: 06/13/14 12:15

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 22:44	KLE	TAL SL
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A		5	138778	08/18/14 22:52	MTS	TAL SL
Total/NA	Analysis	6020A		1	138829	08/19/14 13:51	KLE	TAL SL
Total/NA	Analysis	6020A		1	138825	08/19/14 13:50	KLE	TAL SL
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 22:44	KLE	TAL SL
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138779	08/18/14 22:52	KLE	TAL SL

Client Sample ID: SD-237-SS

Lab Sample ID: 680-102380-29

Date Collected: 06/13/14 12:30

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 22:58	KLE	TAL SL
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A		5	138778	08/18/14 22:56	MTS	TAL SL
Total/NA	Analysis	6020A		1	138829	08/19/14 13:51	KLE	TAL SL
Total/NA	Analysis	6020A		1	138825	08/19/14 13:50	KLE	TAL SL
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 22:58	KLE	TAL SL
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138779	08/18/14 22:56	KLE	TAL SL

Client Sample ID: SD-237-01

Lab Sample ID: 680-102380-30

Date Collected: 06/13/14 12:35

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 23:02	KLE	TAL SL
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A		5	138778	08/18/14 23:01	MTS	TAL SL
Total/NA	Analysis	6020A		1	138829	08/19/14 13:51	KLE	TAL SL
Total/NA	Analysis	6020A		1	138825	08/19/14 13:50	KLE	TAL SL
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 23:02	KLE	TAL SL
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138779	08/18/14 23:01	KLE	TAL SL

Client Sample ID: SD-237-02

Lab Sample ID: 680-102380-31

Date Collected: 06/13/14 12:40

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 23:07	KLE	TAL SL
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A		5	138778	08/18/14 23:06	MTS	TAL SL
Total/NA	Analysis	6020A		1	138829	08/19/14 13:51	KLE	TAL SL
Total/NA	Analysis	6020A		1	138825	08/19/14 13:50	KLE	TAL SL
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 23:07	KLE	TAL SL
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138779	08/18/14 23:06	KLE	TAL SL

Client Sample ID: SD-DUP05

Lab Sample ID: 680-102380-33

Date Collected: 06/13/14 00:00

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 23:12	KLE	TAL SL
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A		5	138778	08/18/14 23:10	MTS	TAL SL
Total/NA	Analysis	6020A		1	138829	08/19/14 13:51	KLE	TAL SL
Total/NA	Analysis	6020A		1	138825	08/19/14 13:50	KLE	TAL SL
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 23:12	KLE	TAL SL
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138779	08/18/14 23:10	KLE	TAL SL

Client Sample ID: SD-227-SS

Lab Sample ID: 680-102380-34

Date Collected: 06/13/14 13:10

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 23:16	KLE	TAL SL
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A		5	138778	08/18/14 23:24	MTS	TAL SL
Total/NA	Analysis	6020A		1	138829	08/19/14 13:51	KLE	TAL SL
Total/NA	Analysis	6020A		1	138825	08/19/14 13:50	KLE	TAL SL
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 23:16	KLE	TAL SL
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138779	08/18/14 23:24	KLE	TAL SL

Client Sample ID: SD-227-01

Lab Sample ID: 680-102380-35

Date Collected: 06/13/14 13:15

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 23:21	KLE	TAL SL
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A		5	138778	08/18/14 23:29	MTS	TAL SL
Total/NA	Analysis	6020A		1	138829	08/19/14 13:51	KLE	TAL SL
Total/NA	Analysis	6020A		1	138825	08/19/14 13:50	KLE	TAL SL
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 23:21	KLE	TAL SL
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138779	08/18/14 23:29	KLE	TAL SL

Client Sample ID: SD-227-02

Lab Sample ID: 680-102380-36

Date Collected: 06/13/14 13:20

Matrix: Solid

Date Received: 06/14/14 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A		5	138156	08/14/14 23:26	KLE	TAL SL
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A		5	138778	08/18/14 23:34	MTS	TAL SL
Total/NA	Analysis	6020A		1	138829	08/19/14 13:51	KLE	TAL SL
Total/NA	Analysis	6020A		1	138825	08/19/14 13:50	KLE	TAL SL
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138157	08/14/14 23:26	KLE	TAL SL
Total/NA	Prep	3050B			137069	08/11/14 11:35	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	138779	08/18/14 23:34	KLE	TAL SL

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Certification Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102380-3
SDG: 680102380-1

Laboratory: TestAmerica Savannah

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Maryland	State Program	3	250	12-31-14

Laboratory: TestAmerica St. Louis

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska	State Program	10	MO00054	06-30-15
California	NELAP	9	2886	03-31-15
Connecticut	State Program	1	PH-0241	03-31-15
Florida	NELAP	4	E87689	06-30-15
Illinois	NELAP	5	200023	11-30-14
Iowa	State Program	7	373	12-01-14
Kansas	NELAP	7	E-10236	10-31-14 *
Kentucky (DW)	State Program	4	90125	12-31-14
L-A-B	DoD ELAP		L2305	01-10-16
Louisiana	NELAP	6	04080	06-30-15
Maryland	State Program	3	310	09-30-15
Missouri	State Program	7	780	06-30-14 *
Nevada	State Program	9	MO000542013-1	07-31-14 *
New Jersey	NELAP	2	MO002	06-30-15
New Mexico	State Program	6		06-30-10 *
New York	NELAP	2	11616	03-31-15
North Dakota	State Program	8	R207	06-30-14 *
NRC	NRC		24-24817-01	12-31-22
Oklahoma	State Program	6	9997	08-31-15
Pennsylvania	NELAP	3	68-00540	02-28-15
South Carolina	State Program	4	85002001	06-30-14 *
Texas	NELAP	6	T104704193-13-6	07-31-15
USDA	Federal		P330-07-00122	01-09-17
USEPA Reg V SDWA	Federal	1	WG-15J	08-30-14
Utah	NELAP	8	MO000542013-5	07-31-15
Virginia	NELAP	3	460230	06-14-15
Washington	State Program	10	C592	08-30-15
West Virginia DEP	State Program	3	381	12-31-14 *

* Certification renewal pending - certification considered valid.

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102380-3
SDG: 680102380-1

Method	Method Description	Protocol	Laboratory
6020A	Metals (ICP/MS), Isotopic Uranium	SW846	TAL SL
6020A	Metals (ICP/MS), Total Uranium	SW846	TAL SL
6020A	Metals (ICP/MS), Isotopic Uranium Percentage	SW846	TAL SL
6020A Activity	Metals (ICP/MS), Isotopic Uranium (Activity)	SW846	TAL SL

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102380-3
SDG: 680102380-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-102380-1	SD-224-SS	Solid	06/13/14 08:20	06/14/14 08:30
680-102380-2	SD-224-01	Solid	06/13/14 08:25	06/14/14 08:30
680-102380-3	SD-224-02	Solid	06/13/14 08:30	06/14/14 08:30
680-102380-5	SD-223-SS	Solid	06/13/14 08:40	06/14/14 08:30
680-102380-6	SD-223-01	Solid	06/13/14 08:45	06/14/14 08:30
680-102380-7	SD-223-02	Solid	06/13/14 08:50	06/14/14 08:30
680-102380-8	SD-226-SS	Solid	06/13/14 08:55	06/14/14 08:30
680-102380-9	SD-226-01	Solid	06/13/14 09:00	06/14/14 08:30
680-102380-10	SD-226-02	Solid	06/13/14 09:05	06/14/14 08:30
680-102380-12	SD-225-SS	Solid	06/13/14 09:15	06/14/14 08:30
680-102380-13	SD-225-01	Solid	06/13/14 09:20	06/14/14 08:30
680-102380-14	SD-225-02	Solid	06/13/14 09:25	06/14/14 08:30
680-102380-16	SD-228-SS	Solid	06/13/14 10:05	06/14/14 08:30
680-102380-17	SD-228-01	Solid	06/13/14 10:10	06/14/14 08:30
680-102380-18	SD-228-02	Solid	06/13/14 10:15	06/14/14 08:30
680-102380-20	SD-234-SS	Solid	06/13/14 10:30	06/14/14 08:30
680-102380-21	SD-234-01	Solid	06/13/14 10:35	06/14/14 08:30
680-102380-22	SD-235-SS	Solid	06/13/14 11:00	06/14/14 08:30
680-102380-23	SD-235-01	Solid	06/13/14 11:05	06/14/14 08:30
680-102380-24	SD-235-02	Solid	06/13/14 11:10	06/14/14 08:30
680-102380-26	SD-236-SS	Solid	06/13/14 12:05	06/14/14 08:30
680-102380-27	SD-236-01	Solid	06/13/14 12:10	06/14/14 08:30
680-102380-28	SD-236-02	Solid	06/13/14 12:15	06/14/14 08:30
680-102380-29	SD-237-SS	Solid	06/13/14 12:30	06/14/14 08:30
680-102380-30	SD-237-01	Solid	06/13/14 12:35	06/14/14 08:30
680-102380-31	SD-237-02	Solid	06/13/14 12:40	06/14/14 08:30
680-102380-33	SD-DUP05	Solid	06/13/14 00:00	06/14/14 08:30
680-102380-34	SD-227-SS	Solid	06/13/14 13:10	06/14/14 08:30
680-102380-35	SD-227-01	Solid	06/13/14 13:15	06/14/14 08:30
680-102380-36	SD-227-02	Solid	06/13/14 13:20	06/14/14 08:30

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
ISOU Cal 1_00018	08/15/14	08/08/14	2%HCL 2%HNO3, Lot 376565	50 mL	ISOU Cal Low_00006	0.25 mL	U-233	0.000515225 ug/L
							U-236	0.000889887 ug/L
							U-234	0.000826729 ug/L
							U-235	0.0484747 ug/L
							U-238	0.0502596 ug/L
							Total Uranium	0.05 ug/L
.ISOU Cal Low_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU Cal Int_00006	1 mL	U-233	0.103045 ug/L
							U-236	0.177977 ug/L
							U-234	0.165346 ug/L
							U-235	9.69494 ug/L
							U-238	10.0519 ug/L
							Total Uranium	10 ug/L
..ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
...ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
....ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
...ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
....ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
...ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
....ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
...STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
ISOU Cal 1_00019	08/25/14	08/18/14	2%HCL 2%HNO3, Lot 376565	50 mL	ISOU Cal Low_00006	0.25 mL	U-233	0.000515225 ug/L
							U-236	0.000889887 ug/L

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							U-234	0.000826729 ug/L
							U-235	0.0484747 ug/L
							U-238	0.0502596 ug/L
.ISOU Cal Low_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU Cal Int_00006	1 mL	U-233	0.103045 ug/L
							U-236	0.177977 ug/L
							U-234	0.165346 ug/L
							U-235	9.69494 ug/L
							U-238	10.0519 ug/L
..ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	U-238	1005.19 ug/L
...ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
....ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
...ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
....ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
...ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
....ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
...STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		U-238	1000 ug/mL
ISOU Cal 2_00019	08/15/14	08/08/14	2% Nitric Acid, Lot 376565	50 mL	ISOU Cal Int_00006	0.15 mL	U-233	0.0309135 ug/L
							U-236	0.0533932 ug/L
							U-234	0.0496037 ug/L
							U-235	2.90848 ug/L
							U-238	3.01557 ug/L
							Total Uranium	3 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
ISOU Cal 2_00020	08/25/14	08/18/14	2% Nitric Acid, Lot 376565	50 mL	ISOU Cal Int_00006	0.15 mL	U-233	0.0309135 ug/L
							U-236	0.0533932 ug/L
							U-234	0.0496037 ug/L
							U-235	2.90848 ug/L
							U-238	3.01557 ug/L
							Total Uranium	3 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
ISOU Cal 3_00018	08/15/14	08/08/14	2% Nitric Acid, Lot 376565	100 mL	ISOU Cal Int_00006	0.5 mL	U-233	0.0515225 ug/L
							U-236	0.0889887 ug/L
							U-234	0.0826729 ug/L
							U-235	4.84747 ug/L
							U-238	5.02596 ug/L
							Total Uranium	5 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
ISOU Cal 3_00019	08/25/14	08/18/14	2% Nitric Acid, Lot 376565	100 mL	ISOU Cal Int_00006	0.5 mL	U-233	0.0515225 ug/L
							U-236	0.0889887 ug/L
							U-234	0.0826729 ug/L
							U-235	4.84747 ug/L
							U-238	5.02596 ug/L
							Total Uranium	5 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
ISOU Cal 4_00018	08/15/14	08/08/14	2% Nitric Acid, Lot 376565	50 mL	ISOU Cal Int_00006	0.5 mL	U-236	0.177977 ug/L
							U-234	0.165346 ug/L
							U-235	9.69494 ug/L
							U-238	10.0519 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	U-238	1005.19 ug/L

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		U-238	1000 ug/mL
ISOU Cal 4_00019	08/25/14	08/18/14	2% Nitric Acid, Lot 376565	50 mL	ISOU Cal Int_00006	0.5 mL	U-233	0.103045 ug/L
							U-236	0.177977 ug/L
							U-234	0.165346 ug/L
							U-235	9.69494 ug/L
							U-238	10.0519 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		U-238	1000 ug/mL
ISOU Cal 5_00018	08/15/14	08/08/14	2% Nitric Acid, Lot 376565	50 mL	ISOU Cal Int_00006	1.5 mL	U-236	0.533932 ug/L
							U-234	0.496037 ug/L

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							U-235	29.0848 ug/L
							U-238	30.1557 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	U-238	1005.19 ug/L
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		U-238	1000 ug/mL
ISOU Cal 5_00019	08/25/14	08/18/14	2% Nitric Acid, Lot 376565	50 mL	ISOU Cal Int_00006	1.5 mL	U-233	0.309135 ug/L
							U-236	0.533932 ug/L
							U-234	0.496037 ug/L
							U-235	29.0848 ug/L
							U-238	30.1557 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		U-238	1000 ug/mL
ISOU ICSAB_00019	08/15/14	08/08/14	2% Nitric Acid, Lot 376565	50 mL	ISOU Cal Int_00006	0.25 mL	U-233	0.0515225 ug/L
							U-236	0.0889887 ug/L
							U-234	0.0826729 ug/L
							U-235	4.84747 ug/L
							U-238	5.02596 ug/L
							Total Uranium	5 ug/L
					MS ICSA_00012	2.5 mL	Al	50000 ug/L
							Ca	50000 ug/L
							Chlorine	500000 ug/L
							Fe	50000 ug/L
							K	50000 ug/L
							Mg	50000 ug/L
							Mo	1000 ug/L
							Na	50000 ug/L
							P	50000 ug/L
							Sulfur	50000 ug/L
							Ti	1000 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
.MS ICSA_00012	12/19/14	Inorganic Ventures, Lot G2-MEB476152			(Purchased Reagent)		Al	1000 ug/mL
							Ca	1000 ug/mL
							Chlorine	10000 ug/mL
							Fe	1000 ug/mL
							K	1000 ug/mL
							Mg	1000 ug/mL
							Mo	20 ug/mL
							Na	1000 ug/mL
							P	1000 ug/mL
							Sulfur	1000 ug/mL
							Ti	20 ug/mL
ISOU ICSAB_00020	08/25/14	08/18/14	2% Nitric Acid, Lot 376565	50 mL	ISOU Cal Int_00006	0.25 mL	U-233	0.0515225 ug/L
							U-236	0.0889887 ug/L
							U-234	0.0826729 ug/L
							U-235	4.84747 ug/L
							U-238	5.02596 ug/L
							Total Uranium	5 ug/L
					MS ICSA_00014	2.5 mL	Al	50000 ug/L
							Ca	50000 ug/L
							Chlorine	500000 ug/L
							Fe	50000 ug/L
							K	50000 ug/L
							Mg	50000 ug/L
							Mo	1000 ug/L
							Na	50000 ug/L
							P	50000 ug/L
							Sulfur	50000 ug/L
							Ti	1000 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
.MS ICSA_00014	07/01/15	Inorganic Ventures, Lot G2-MEB476152MCA			(Purchased Reagent)		Al	1000 ug/mL
							Ca	1000 ug/mL
							Chlorine	10000 ug/mL
							Fe	1000 ug/mL
							K	1000 ug/mL
							Mg	1000 ug/mL
							Mo	20 ug/mL
							Na	1000 ug/mL
							P	1000 ug/mL
							Sulfur	1000 ug/mL
							Ti	20 ug/mL
ISOU ICV(3)_00018	08/14/14	08/18/14	2% Nitric Acid, Lot 365730	50 mL	ISOU QC Low_00004	0.25 mL	U-234	0.000417422 ug/L
							U-235	0.00528391 ug/L
							U-238	0.0488908 ug/L
							U-233	0.223475 ug/L
							U-236	0.0000372865 ug/L
.ISOU QC Low_00004	11/01/14	08/18/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU QC Int_00005	1 mL	U-234	0.0834844 ug/L
							U-235	0.105678 ug/L
							U-238	9.77816 ug/L
							U-233	44.695 ug/L
							U-236	0.00745731 ug/L
..ISOU QC Int_00005	11/01/14	05/14/14	2%HCL 2%HNO3, Lot 355914	100 mL	ISOU UNAT_00002	1 mL	U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-238	977.816 ug/L
					ISOU-I 233 QC_00005	10 mL	U-233	4469.5 ug/L
							U-234	8.34844 ug/L
							U-235	10.5678 ug/L

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							U-236	0.745731 ug/L
							U-238	977.816 ug/L
...ISOU UNAT_00002	11/13/14	11/11/13	1M HNO3, Lot n/a	200 mL	ISOU U parent_00001	20 mL	U-234	5.10149 ug/L
							U-235	701.888 ug/L
							U-238	96754.7 ug/L
....ISOU U parent_00001	08/01/47	05/03/13	1M HNO3, Lot n/a	200 mL	ISOU ampule_00001	19.2509 g	U-234	51.0149 ug/L
							U-235	7018.88 ug/L
							U-238	967547 ug/L
.....ISOU ampule_00001	03/30/58	New Brunswick Lab, Lot CRM 145			(Purchased Reagent)		U-234	0.53 ug/g
							U-235	72.92 ug/g
							U-238	10052 ug/g
...ISOU-I 233 QC_00005	12/20/14	12/20/13	2%HCL 2% HNO3, Lot 250193	100 mL	ISOU-C 233 QC_00005	9.3263 g	U-233	44695 ug/L
							U-234	82.9742 ug/L
							U-235	35.4894 ug/L
							U-236	7.45731 ug/L
							U-238	102.695 ug/L
....ISOU-C 233 QC_00005	12/20/18	New Brunswick Laboratory, Lot CRM 111-A			(Purchased Reagent)		U-233	479.236 ug/g
							U-234	0.88968 ug/g
							U-235	0.38053 ug/g
							U-236	0.07996 ug/g
							U-238	1.10114 ug/g
ISOU ICV(4,8)_00017	08/15/14	08/08/14	2% Nitric Acid, Lot 376565	50 mL	ISOU QC Int_00005	0.5 mL	U-234	0.0834844 ug/L
							U-235	0.105678 ug/L
							U-238	9.77816 ug/L
							U-233	44.695 ug/L
							U-236	0.00745731 ug/L
.ISOU QC Int_00005	11/01/14	05/14/14	2%HCL 2%HNO3, Lot 355914	100 mL	ISOU UNAT_00002	1 mL	U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-238	977.816 ug/L
					ISOU-I 233 QC_00005	10 mL	U-233	4469.5 ug/L
							U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-236	0.745731 ug/L
							U-238	977.816 ug/L
..ISOU UNAT_00002	11/13/14	11/11/13	1M HNO3, Lot n/a	200 mL	ISOU U parent_00001	20 mL	U-234	5.10149 ug/L
							U-235	701.888 ug/L
							U-238	96754.7 ug/L
...ISOU U parent_00001	08/01/47	05/03/13	1M HNO3, Lot n/a	200 mL	ISOU ampule_00001	19.2509 g	U-234	51.0149 ug/L
							U-235	7018.88 ug/L
							U-238	967547 ug/L
....ISOU ampule_00001	03/30/58	New Brunswick Lab, Lot CRM 145			(Purchased Reagent)		U-234	0.53 ug/g
							U-235	72.92 ug/g

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							U-238	10052 ug/g
..ISOU-I 233 QC_00005	12/20/14	12/20/13	2%HCL 2% HNO3, Lot 250193	100 mL	ISOU-C 233 QC_00005	9.3263 g	U-233	44695 ug/L
							U-234	82.9742 ug/L
							U-235	35.4894 ug/L
							U-236	7.45731 ug/L
							U-238	102.695 ug/L
...ISOU-C 233 QC_00005	12/20/18	New Brunswick Laboratory, Lot CRM 111-A			(Purchased Reagent)		U-233	479.236 ug/g
							U-234	0.88968 ug/g
							U-235	0.38053 ug/g
							U-236	0.07996 ug/g
							U-238	1.10114 ug/g
ISOU ICV(5,6)_00019	08/15/14	08/08/14	2% Nitric Acid, Lot 376565	50 mL	ISOU QC Int_00005	5 mL	U-234	0.834844 ug/L
							U-235	1.05678 ug/L
							U-238	97.7816 ug/L
							U-233	446.95 ug/L
							U-236	0.0745731 ug/L
.ISOU QC Int_00005	11/01/14	05/14/14	2%HCL 2%HNO3, Lot 355914	100 mL	ISOU UNAT_00002	1 mL	U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-238	977.816 ug/L
					ISOU-I 233 QC_00005	10 mL	U-233	4469.5 ug/L
							U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-236	0.745731 ug/L
							U-238	977.816 ug/L
..ISOU UNAT_00002	11/13/14	11/11/13	1M HNO3, Lot n/a	200 mL	ISOU U parent_00001	20 mL	U-234	5.10149 ug/L
							U-235	701.888 ug/L
							U-238	96754.7 ug/L
...ISOU U parent_00001	08/01/47	05/03/13	1M HNO3, Lot n/a	200 mL	ISOU ampule_00001	19.2509 g	U-234	51.0149 ug/L
							U-235	7018.88 ug/L
							U-238	967547 ug/L
....ISOU ampule_00001	03/30/58	New Brunswick Lab, Lot CRM 145			(Purchased Reagent)		U-234	0.53 ug/g
							U-235	72.92 ug/g
							U-238	10052 ug/g
..ISOU-I 233 QC_00005	12/20/14	12/20/13	2%HCL 2% HNO3, Lot 250193	100 mL	ISOU-C 233 QC_00005	9.3263 g	U-233	44695 ug/L
							U-234	82.9742 ug/L
							U-235	35.4894 ug/L
							U-236	7.45731 ug/L
							U-238	102.695 ug/L
...ISOU-C 233 QC_00005	12/20/18	New Brunswick Laboratory, Lot CRM 111-A			(Purchased Reagent)		U-233	479.236 ug/g
							U-234	0.88968 ug/g
							U-235	0.38053 ug/g
							U-236	0.07996 ug/g

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							U-238	1.10114 ug/g
ISOU Prep Spk_00002	12/01/14	07/09/14	2%HCL 2%HNO3, Lot 397367	100 mL	ISOU-I 233CAL_00002	1 mL	U-233	947.058 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
.ISOU-I 233CAL_00002	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00006	5.1938 g	U-233	94705.8 ug/L
..ISOU-C 233CAL_00006	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1823.44 ug/g
.ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
..ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
.ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
..ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
.STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL

Reagent

ISOU ampule_00001

New Brunswick Laboratory
U.S. Department of Energy

Certificate of Analysis

CRM 145

228405
ID ISOU ampule_00001
Exp:03/30/58 Prpd:KLE Opn:05/03/13
UNAT Ampoule

Uranyl (Normal) Nitrate Assay and Isotopic Solution

Uranium Mass Fraction: **0.0101356 g U/g solution ± 0.0000011 g U/g solution**
[10.1356 mg U/g solution ± 0.0011 mg U/g solution]

	$^{234}U/^{238}U$	$^{235}U/^{238}U$
Atom Ratio:	0.000052841	0.0072543
Atom Ratio Uncertainty:	0.000000082	0.0000040

	^{234}U	^{235}U	^{238}U
Atom Percent:	0.0052458	0.72017	99.27458
Atom Percent Uncertainty:	0.0000081	0.00039	0.00039
Weight Percent:	0.0051579	0.71114	99.28370
Weight Percent Uncertainty:	0.0000080	0.00038	0.00038

Relative Atomic Weight: 238.028918
Relative Atomic Weight Uncertainty: 0.000012

Note: ^{233}U and ^{236}U were not detected. The detection limit of uranium ratios for the technique used is 5×10^{-9}.

This Certified Reference Material (CRM) is a uranium concentration and isotopic solution standard intended for use in calibration of and/or quality control for uranium analysis methods. Each unit of CRM 145 consists of approximately 20-mL of uranyl nitrate solution in 1M nitric acid, contained in a sealed glass ampoule.

NOTE: The vial should be handled under proper radiologically-controlled conditions at all times.

The certified uranium content value is based on the mass of high-purity metal dissolved and diluted to a known solution mass. The stated uranium concentration was calculated as the prepared value and verified experimentally by the NBL-modified Davies and Gray titration. The certified uranium isotopic composition and atomic weight is based upon measurements performed on multiple samples by two different measurement techniques on a Thermal Ionization Mass Spectrometer (TIMS), calibrated using CRM U030-A as primary comparator and CRM 129-A as a quality control sample. The isotopic values are shared with CRM 112-A, uranium (normal) metal standard which was the source of uranium used to produce the solutions.

RAD13-0018
UNAT Spike
marrss
None
Prep/Opened: 5/3/2013
Exp(1): 5/10/2014
Exp(2): 5/10/2014

All uncertainties for the certified values are expressed as expanded uncertainties (U) where $U = k*u_c$, where u_c is the

September 30, 2010
Argonne, Illinois

www.nbl.doe.gov
Page 1 of 2

Jon Neuhoff, Director
New Brunswick Laboratory

(Revision of Certificate dated March 30, 2008)

127971
ID: UNAT_00008
Exp: 05/10/14 Prpd: SB Crt: 05/03/13
UNAT spike

combined standard uncertainty and the coverage factor k = 2. Uncertainties were determined according to the JCGM 100:2008 *Guide to the Expression of Uncertainty in Measurement*. The coverage factor of 2 was chosen to provide an approximate 95% level of confidence. The input quantities associated with the uranium content included uncertainties due to weighing, CRM 112-A purity, and buoyancy factors. The input quantities associated with the uranium isotopic composition included uncertainties from the certified value for CRM U030-A, measurement precision, and background corrections associated with the analytical techniques.

The CRM was produced by dissolving uranium metal in a single batch and container, with extensive mixing of the resultant solution followed by dispensation into individual bottles. Subsequent measurements of a random sampling of the total lot produced did not indicate any inhomogeneity in uranium concentration or isotopic composition. The minimum sample sizes taken from packaged units and measured were 30 mg U by titration and 1 µg U by TIMS. The NBL makes no recommendation as to the minimum sample size to be used to ensure concentration or isotopic homogeneity.

Users are cautioned that once the vial is opened, the uranium concentration and/or isotopic composition of the material may be affected by evaporative losses or environmental contamination. User's should take appropriate precautions to safeguard the material before, during and after use to ensure valid certificate values.

Recommended Procedure for Ampoule Handling and Dispensing of Solution

1. The ampoule contains a strongly acidic solution of uranium. Appropriate precautions should be taken.

2. Before opening the ampoule, ensure that any dried uranium or condensed liquid in the neck or body of the ampoule is re-dissolved into solution. This can be accomplished by inverting the ampoule repeatedly.

3. The glass ampoules are scored at the neck for ease of opening. However, glass burrs and fragments pose a cut hazard to anyone opening the ampoules. Appropriate precautions should be taken.

4. Lightly moisten the scored line on the neck with distilled water to help ensure a clean break at the score.

5. Because of the narrow neck of the ampoule it may be difficult or impossible to pour the solution out. Here is one possible method:

    a. Obtain approximately 12-cm length of plastic capillary tubing (e.g. i.d. 0f 0.1", o.d. of 0.16").
    b. Insert one end of the capillary tubing fully into the ampoule
    c. Fold the remaining length of tubing along the outside of the ampoule, ensuring that the tube is not crimped and will allow the free flow of air through the tube and into the ampoule.
    d. Holding the ampoule and tubing in one hand, and a beaker or dispensing bottle in another, invert the ampoule over the container allowing the solution to drain into it.
    e. The capillary tubing allows air to flow into the ampoule, eliminating the "airlock" created by the narrow neck of the open ampoule.

6. The user should be wary of evaporative losses once the ampoule is opened, and prevent uranium contamination of the sample. It is recommended that the entire solution be accurately weighed and aliquanted as soon as possible after opening the sample. Precautions should be taken (clean glass/plastic ware, air filtration, etc) to prevent uranium contamination of the CRM with subsequent perturbation of the isotopic composition.

Reagent

ISOU-C 233 QC_00005

New Brunswick Laboratory
U.S. Department of Energy

Certificate of Analysis
CRM 111-A
Uranium-233 in Nitrate Form
Uranium Spike Assay and Isotopic Solution Standard

280627
ID ISOU-C 233 QC_00005
Exp 12/20/18 Prpd:KLE Opn:12/20/13
233 QC

Uranium Concentration : 2.06684 ± 0.00052 μmoles U/gram solution

	U-233	U-234	U-235	U-236	U-238
Atom Percent:	**99.4911**	**0.1847**	**0.0790**	**0.0166**	**0.2286**
Uncertainty:	**0.0006**	**0.0002**	**0.0002**	**0.0002**	**0.0004**

Relative Atomic Weight : 233.055

This Certified Reference Material (CRM) is intended for use as a spike in the analysis of uranium materials by isotope dilution mass spectrometry (IDMS). Each unit of CRM 111-A consists of approximately 5 milligrams of uranium dissolved in 10 grams of 0.8 N HNO_3. This solution is contained in a sealed glass ampoule.

NOTE: *The ampoule should be handled under proper radiologically-controlled conditions at all times.*

The indicated uncertainties for the certified values are 95% confidence intervals for the means. The uncertainty assigned to the uranium assay includes components due to analytical variation. The uncertainties assigned to the isotopic abundance values include random measurement variations and a component based on the uncertainties associated with the determination of the mass discrimination correction factors.

The uranium elemental concentration was determined by the NBL-modified Davies-Gray titrimetric method [Reference: A. R. Eberle, M. W. Lerner, C. G. Goldbeck, and C. J. Rodden, NBL-252 (1970), pp. 1-25] using NBL CRM 112-A (uranium (normal) metal assay standard) as a control to verify the measurement system. The uranium isotopic composition was determined by thermal ionization mass spectrometry using NBL CRM 111 (U-233 spike) to demonstrate compatibility. The uranium assay value obtained by chemical analysis was verified by IDMS using NBL CRM 115 (uranium (depleted) metal assay standard) and NBL CRM 135 (U-235 spike) as spikes. For both the isotopic abundance and the IDMS assay measurements, mass discrimination correction factors were established using NBL CRM U500 and were applied to the calculations. The total impurity content was less than 1600 μg/g U as determined by inductively-coupled plasma atomic emission spectrometry on a subsample of the master

March 30, 2008
Argonne, Illinois

www.nbl.doe.gov

Jon Neuhoff, Director
New Brunswick Laboratory

(Editorial revision of Certificate dated January 18, 1990)

solution. Iron is the dominant impurity at 1330 μg/g U. Calcium, zinc, sodium, and magnesium were also found at 90, 50,50, and 10 μg/g U respectively. These impurity values are provided for information only; the impurity values are not certified.

The starting material from which this CRM was prepared was supplied by Argonne National Laboratory (ANL). Preparation and packaging of CRM 111-A were carried out by V. E. Connolly, M. I. Spaletto, F. P. Orlowicz, and F. E. Jones, NBL. Titrimetric assay measurements were performed by M. I. Spaletto, NBL; IDMS assay measurements were performed by V. E. Connolly, NBL; isotopic abundance measurements were performed by M. A. Legel and F. E. Jones, NBL; impurity measurements were performed by E. A. Huff and associates, ANL; statistical assessment of the data for certification was performed by M. D. Soriano, NBL. Project technical direction was provided by V. E. Connolly, NBL; overall technical direction and coordination of the preparation, certification, and issuance of this CRM was provided by N. M. Trahey, NBL.

RECOMMENDED PROCEDURE FOR USING CRM 111-A

The package is designed to prepare a solution having a known concentration of uranium on a weight basis. Once prepared, it is suggested that all the solution be immediately distributed as subportions for later use as individual spikes. After the spike has been added to a sample and isotopic equilibrium has been assured, a chemical separation should be performed to remove isobaric isotopes before mass spectrometric analysis.

Shake the ampoule vigorously before opening to homogenize contents. Secure in an upright position and allow solution trapped in the ampoule tip to drain back into the reservoir. Wrap the ampoule in a small cloth or towel, and break off the tip at the pre-scored line. Discard the tip, transfer the solution to a tared container, and proceed to distribute it as weighed portions into suitable containers for use as spikes.

If a more dilute solution is desired, transfer the solution to a larger tared container, weigh, dilute and weigh again, mix vigorously, and distribute all the solution as weighed portions.

Reagent

ISOU-C 233CAL_00006

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404-352-8677
Fax 404-352-2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

95301
U-233 5 mL Liquid in Flame Sealed Vial

280632
ID ISOU-C 233CAL_00006
Exp 12/19/18 Prpd KLE Opn 12/19/13
233 CAL

Customer: TestAmerica - St. Louis
P.O. No.: 2548635, Item 1 Product Code: 8055

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide calibration and purity were checked by germanium gamma-ray spectrometry, liquid scintillation counting, and/or alpha spectrometry, as applicable. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty* , % Type u_A	u_B	U	Reference Date (12:00 PM EST)
U-233	5.815E+07	3.705E+03	0.1	0.6	1.2	12/12/2013

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: U-232 4.811 Bq; U-234 4.450 Bq; α-impurities<0.001%; γ-impurities<0.1%.
5.23229 g 1M HNO3 solution. Carrier free.
Original material calibrated by New Brunswick Laboratory as CRM 111-A.

Source Prepared by: K. Eardley, Radiochemist

QC Approved: J.D. McCorvey, Counting Room Manager

Date: 12 Dec 13

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

ISOU-C 233CAL_00007

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

95301
U-233 5 mL Liquid in Flame Sealed Vial

288644
ID ISOU-C 233CAL_00007
Exp 12/19/18 Prpd KLE Opn 12/19/13
233 CAL

Customer: TestAmerica - St. Louis
P.O. No.: 2548635, Item 1 Product Code: 8055

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide calibration and purity were checked by germanium gamma-ray spectrometry, liquid scintillation counting, and/or alpha spectrometry, as applicable. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty* , % Type u_A	u_B	U	Reference Date (12:00 PM EST)
U-233	5.815E+07	3.705E+03	0.1	0.6	1.2	12/12/2013

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: U-232 4.811 Bq; U-234 4.450 Bq; α-impurities<0.001%; γ-impurities<0.1%.
5.23229 g 1M HNO3 solution. Carrier free.
Original material calibrated by New Brunswick Laboratory as CRM 111-A.

Source Prepared by: K. Eardley, Radiochemist

QC Approved: J.D. McCorvey, Counting Room Manager Date: 12 Dec 13

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355
Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

ISOU-C 236_00002

Eckert & Ziegler
Isotope Products

24937 Avenue Tibbitts
Valencia, California 91355

Tel 661•309•1010
Fax 661•257•8303

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

Radionuclide:	U-236	**Customer:**	TEST AMERICA
Half-life:	(2.342 ± 0.003)E+07 years	**P.O. No.:**	2380469
Catalog No.:	7336	**Reference Date:**	15-Oct-10 12:00 PST
Source No.:	1480-21	**Contained Radioactivity: (Total alpha)**	0.01017 µCi 376.3 Bq

Physical Description:

A.	Mass of solution:	5.01498 g in 5 mL V-Vial
B.	Chemical form:	$UO_2(NO_3)_2$ in 0.1M HNO_3
C.	Carrier content:	None
D.	Density:	1.0016 g/mL @ 20°C

MT02535-10
ISOU U-236 QC CONC
elyk
.1M HN03
Prep/Opened: 10/5/2010
Exp(1): 10/5/2020
Exp(2): 10/5/2020

281584
ID ISOU-C 236_00002
Exp 10/05/15 Prpd KLE Opn 10/05/10
236 CAL

Radioimpurities:

See Technical Data Sheet

Radionuclide Concentration: 0.002028 µCi/g, 75.04 Bq/g

Method of Calibration:

This source was prepared from a weighed aliquot of solution whose activity in µCi/g was determined using a liquid scintillation counter.

Uncertainty of Measurement:

A.	Type A (random) uncertainty:	± 0.9 %
B.	Type B (systematic) uncertainty:	± 3.0 %
C.	Uncertainty in aliquot weighing:	± 0.4 %
D.	Total uncertainty at the 99% confidence level:	± 3.2 %

Notes:

- See reverse side for leak test(s) performed on this source.
- EZIP participates in a NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (as in NRC Regulatory Guide 4.15).
- Nuclear data was taken from "Table of Radioactive Isotopes", edited by Virginia Shirley, 1986.
- This solution has a working life of 5 years.

Daniel James Van Dalsem
Quality Control

21-Sep-10
Date

EZIP Ref. No.: 1480-21

Reagent

ISOU-C Enrich_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

95302

279791
ID: ISOU-C Enrich_00001
Exp:10/16/18 Prpd:KLE Opn:12/19/13
U enriched (234 and 235)

U-Enriched (97%) 5 mL Liquid in Flame Sealed Vial

Customer: Test America - St. Louis
P.O. No.: 2547082, Item 1 Product Code: 8235

This standard radionuclide source was prepared using an aliquot measured gravimetrically from a master radionuclide solution. The master radionuclide solution was prepared by dissolution of Uranium Oxide in 2.5M nitric acid. Total activity was calibrated by liquid scintillation counting. Atomic mass and weight percentages were certified by New Brunswick Laboratory. Radionuclide purity and calibration were checked by liquid scintillation counting and gamma-ray spectrometry. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July, 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date 12-December-2013 12:00 PM EST

Isotope	Activity (Bq)	Half-Life, Days	Uncertainty Type*, (%) u_A	u_B	U
U-234	3.924 E+04	8.967 E+07	1.9	0.9	4.2
U-235	7.991 E+02	2.571 E+11	1.9	0.9	4.2
U-236	3.653 E+01	8.554 E+09	1.9	0.9	4.2
U-238	6.653 E-01	1.632 E+12	1.9	0.9	4.2

***Uncertainty:** U – Relative expanded uncertainty, k=2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: α-impurities (other than decay products)< 0.1%; β-impurities(other than decay products)<0.1%; γ-impurities (other than decay products)<0.1%.
5.20568 grams of 1M HNO_3 solution with Uranium 1.97 mg/g.
Original material certified by New Brunswick Laboratory as CRM U970.

Source Prepared By: _____
R. Ormsby, Radiochemist

QA Approved: _____ 12 DEC 13
J.D. McCorvey, Counting Room Manager

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

MS ICSA_00012

INORGANIC VENTURES™
300 Technology Drive
Christiansburg, VA 24073 · USA
inorganicventures.com
tel: 800.669.6799 · 540.585.3030
fax: 540.585.3012
info@inorganicventures.com

CERTIFICATE OF ANALYSIS

1.0 **INORGANIC VENTURES** is an ISO Guide 34 "General Requirements for the Competence of Reference Material Producers" and ISO 9001 registered manufacturer. Our manufacturing laboratory is accredited to ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories."

ACCREDITED Testing Laboratory Certificate 883.01

ACCREDITED Reference Material Producer Certificate 883.02

2.0 **DESCRIPTION OF CRM** **Stock Solution**

Catalog No.:	6020ICS-0A
Lot Number:	**G2-MEB476152**
Matrix:	1.4% HNO3(v/v)

278024
ID: MS ICSA_00012
Exp:12/19/14 Prpd:CCB Opn:12/19/13
ICSA

10,000 µg/mL ea:
Chloride,

2,000 µg/mL ea:
C,

1,000 µg/mL ea:
Al, Ca, Fe, K, Mg, Na, P, S,

20 µg/mL ea:
Mo, Ti

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

ELEMENT	CERTIFIED VALUE	ELEMENT	CERTIFIED VALUE	ELEMENT	CERTIFIED VALUE
Aluminum, Al	1,002 ± 6 µg/mL	Calcium, Ca	1,002 ± 6 µg/mL	Carbon, C	2,004 ± 13 µg/mL
Chloride, Chloride	10,020.0 ± 50.0 µg/mL	Iron, Fe	1,002 ± 7 µg/mL	Magnesium, Mg	1,002 ± 4 µg/mL
Molybdenum, Mo	20.04 ± 0.14 µg/mL	Phosphorus, P	1,002 ± 7 µg/mL	Potassium, K	1,002 ± 4 µg/mL
Sodium, Na	1,002 ± 7 µg/mL	Sulfur, S	1,002 ± 5 µg/mL	Titanium, Ti	20.04 ± 0.13 µg/mL

Certified Density: 1.034 g/mL (measured at 20 ± 1° C)

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

$$\text{Certified Value } (\bar{x}) = \frac{\Sigma x_i}{n}$$

$$\text{Uncertainty } (\pm) = 2\,[\,\Sigma(s_i)^2\,]^{1/2}$$

($\bar{x}$) = mean
x_i = individual results
n = number of measurements
2 = the coverage factor.
$[\,\Sigma(s_i)^2\,]^{1/2}$ = The square root of the sum of the squares of the most common errors (where 's' stands for the standard deviation) from instrumental measurement, density, NIST SRM uncertainty, weighing, dilution to volume, homogeneity, long term stability and short term stability.

4.0 TRACEBILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

· "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

· This product is Traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRMs are available, the term 'in-house std.' is specified.

- The Calculated Value is a value calculated from the weight of a starting material that has been certified directly vs. a NIST SRM/RM. See section 4.2 for balance traceability.

4.1 ASSAY INFORMATION

ELEMENT	METHOD	NIST SRM#	SRM LOT#
Al	ICP Assay	3101a	060502
Al	EDTA	928	928
C	Gravimetric		See Sec. 4.2
Ca	ICP Assay	3109a	050825
Ca	EDTA	928	928
Chloride	Acidimetric	84L	84L
Fe	ICP Assay	3126a	051031
Fe	EDTA	928	928
K	Gravimetric		See Sec. 4.2
K	ICP Assay	3141a	051220
Mg	ICP Assay	3131a	050302
Mg	EDTA	928	928
Mo	Calculated		See Sec. 4.2
Mo	ICP Assay	3134	891307
Na	Gravimetric		See Sec. 4.2
Na	ICP Assay	3152a	010728
P	ICP Assay	3139a	060717
P	Acidimetric	84L	84L
S	Acidimetric	84k	84k
Ti	ICP Assay	3162a	060808

4.2 BALANCE CALIBRATION - All analytical balances are calibrated yearly by an accredited calibration laboratory and are traceable to a class E 2 analytical weight set with NIST Traceability. All balances are checked daily using an in-house procedure. The weights used for testing are annually compared to master weights and are traceable to the National Institute of Standards and Technology (NIST).

4.3 THERMOMETER CALIBRATION - All thermometers are NIST traceable through thermometers that are calibrated by an A2LA accredited calibration laboratory.

4.4 GLASSWARE CALIBRATION - An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM's.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP-MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

s	Al		M	Dy	< 0.000100	O	Li	0.002000	M	Pr	< 0.000100	M	Te	< 0.012007
M	Sb	< 0.000600	M	Er	< 0.000100	M	Lu	< 0.000100	M	Re	< 0.000100	M	Tb	< 0.000100
O	As	< 0.020000	M	Eu	< 0.000100	s	Mg		M	Rh	< 0.000100	M	Tl	< 0.000100
O	Ba	< 0.000200	M	Gd	< 0.000100	O	Mn	0.003000	M	Rb	< 0.020012	M	Th	< 0.000100
O	Be	< 0.000090	M	Ga	< 0.001001	O	Hg	< 0.005000	M	Ru	< 0.000100	M	Tm	< 0.000100
M	Bi	< 0.005003	O	Ge	< 0.015000	s	Mo		M	Sm	< 0.000100	M	Sn	< 0.003002
O	B	< 0.005000	M	Au	< 0.001001	M	Nd	< 0.000100	O	Sc	< 0.000700	s	Ti	
O	Cd	< 0.001000	M	Hf	< 0.002001	O	Ni	< 0.002000	M	Se	< 0.050029	O	W	< 0.007000
s	Ca		M	Ho	< 0.000100	M	Nb	< 0.002001	n	Si		M	U	< 0.000100
M	Ce	< 0.000500	M	In	< 0.001001	n	Os		M	Ag	< 0.001001	O	V	< 0.004000
M	Cs	< 0.001001	M	Ir	< 0.000100	M	Pd	< 0.003002	s	Na		M	Yb	< 0.000100
O	Cr	< 0.010000	s	Fe		s	P		O	Sr	0.005000	M	Y	< 0.000100
M	Co	< 0.001001	M	La	< 0.000200	M	Pt	< 0.000100	s	S		M	Zn	0.016610
O	Cu	< 0.020000	M	Pb	0.002001	s	K		M	Ta	< 0.001001	M	Zr	< 0.004002

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
HPLC, IC, TLC, ISE, IR, NMR, UV/VIS, MS, Capillary Electrophoresis, Potentiometry, Wet Chemistry and Voltammetry
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact Technical Staff

This CRM was manufactured using 18 megohm doubly deionized water that has been filtered through a 0.2 micron filter.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep **Tightly** sealed when not in use. Store and use at 20 ± 4°C. **Do Not** pipette from the container. **Do Not** return portions removed from pipetting to container.

Element Specific Information - For specific information regarding any element: Contact technical staff.

Uranium Note: If uranium is present in this standard, it is natural abundance unless specified in Section 3.0.

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Safety Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous.

Inorganic Ventures homogeneity data indicate that the end user should take a minimum sample size of 0.2mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration
- SAI Global File Number 010105

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration"
- Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 "General Requirements for the Competence of Reference Material Producers"
- Reference Materials Production - Accredited A2LA Certificate Number 883.02

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission
- Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission
- Reporting Defects and Non-Compliance

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies of chemically-stable solutions performed at the manufacturer's facility show a CRM shelf-life of twenty one months for solutions packaged in 125-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life. Manufacturer concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

11.3 Chemical Stability - Studies have been conducted on this or similar CRMs and it has been demonstrated that this CRM is chemically stable for a period of not less than two years provided the "Storage & Handling" conditions are followed that are described in section 7.0.

Certification Date: July 12, 2013

Expiration Date: EXPIRES 01/2015

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By: Zach Saunders
Product Documentation Technician

Certificate Approved By: Allyson Guilliams
Quality Control Supervisor

Certifying Officer: Paul Gaines
PhD., Senior Technical Director

Reagent

MS ICSA_00014

INORGANIC VENTURES
300 Technology Drive
Christiansburg, VA 24073 USA
inorganicventures.com

CERTIFICATE OF ANALYSIS

1.0 **INORGANIC VENTURES** is an ISO Guide 34 "General Requirements for the Competence of Reference Material Producers" and ISO 9001 registered manufacturer. Our manufacturing laboratory is accredited to ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories."

ACCREDITED Testing Laboratory Certificate 883.01

ACCREDITED Reference Material Producer Certificate 883.02

2.0 **DESCRIPTION OF CRM**

Stock Solution

Catalog No.: 6020ICS-0A

Lot Number: **G2-MEB476152MCA**

Matrix: 1.4% HNO3(v/v)

397615
ID: MS ICSA_00014
Exp:07/01/15 Prpd:CCB Opn:07/03/14
ICSA

10,000 µg/mL ea:
Chloride,

2,000 µg/mL ea:
C,

1,000 µg/mL ea:
Al, Ca, Fe, K, Mg, Na, P, S,

20 µg/mL ea:
Mo, Ti

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

ELEMENT	CERTIFIED VALUE	ELEMENT	CERTIFIED VALUE	ELEMENT	CERTIFIED VALUE
Aluminum, Al	1,002 ± 6 µg/mL	Calcium, Ca	1,002 ± 6 µg/mL	Carbon, C	2,004 ± 13 µg/mL
Chloride, Chloride	10,020.0 ± 50.0 µg/mL	Iron, Fe	1,002 ± 7 µg/mL	Magnesium, Mg	1,002 ± 4 µg/mL
Molybdenum, Mo	20.04 ± 0.14 µg/mL	Phosphorus, P	1,002 ± 7 µg/mL	Potassium, K	1,002 ± 4 µg/mL
Sodium, Na	1,002 ± 7 µg/mL	Sulfur, S	1,002 ± 5 µg/mL	Titanium, Ti	20.04 ± 0.13 µg/mL

Certified Density: 1.034 g/mL (measured at 20 ± 1° C)

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

$$\text{Certified Value } (\bar{x}) = \frac{\Sigma x_i}{n}$$

$$\text{Uncertainty } (\pm) = 2\,[\,\Sigma(s_i)^2\,]^{1/2}$$

($\bar{x}$) = mean

x_i = individual results

n = number of measurements

2 = the coverage factor.

$[\,\Sigma(s_i)^2\,]^{1/2}$ = The square root of the sum of the squares of the most common errors (where 's' stands for the standard deviation) from instrumental measurement, density, NIST SRM uncertainty, weighing, dilution to volume, homogeneity, long term stability and short term stability.

4.0 TRACEBILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

· "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)
· This product is Traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRMs are available, the term 'in-house std.' is specified.
- The Calculated Value is a value calculated from the weight of a starting material that has been certified directly vs. a NIST SRM/RM. See section 4.2 for balance traceability.

4.1 ASSAY INFORMATION

ELEMENT	METHOD	NIST SRM#	SRM LOT#
Al	ICP Assay	3101a	060502
Al	EDTA	928	928
C	Gravimetric		See Sec. 4.2
Ca	ICP Assay	3109a	050825
Ca	EDTA	928	928
Chloride	Acidimetric	84L	84L
Fe	ICP Assay	3126a	051031
Fe	EDTA	928	928
K	Gravimetric		See Sec. 4.2
K	ICP Assay	3141a	051220
Mg	ICP Assay	3131a	050302
Mg	EDTA	928	928
Mo	Calculated		See Sec. 4.2
Mo	ICP Assay	3134	891307
Na	Gravimetric		See Sec. 4.2
Na	ICP Assay	3152a	010728
P	ICP Assay	3139a	060717
P	Acidimetric	84L	84L
S	Acidimetric	84k	84k
Ti	ICP Assay	3162a	060808

4.2 BALANCE CALIBRATION - All analytical balances are calibrated yearly by an accredited calibration laboratory and are traceable to a class E 2 analytical weight set with NIST Traceability. All balances are checked daily using an in-house procedure. The weights used for testing are annually compared to master weights and are traceable to the National Institute of Standards and Technology (NIST).

4.3 THERMOMETER CALIBRATION - All thermometers are NIST traceable through thermometers that are calibrated by an A2LA accredited calibration laboratory.

4.4 GLASSWARE CALIBRATION - An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM's.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP-MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

s	Al		M	Dy	< 0.000100	O	Li	0.002000	M	Pr	< 0.000100	M	Te	< 0.012007
M	Sb	< 0.000600	M	Er	< 0.000100	M	Lu	< 0.000100	M	Re	< 0.000100	M	Tb	< 0.000100
O	As	< 0.020000	M	Eu	< 0.000100	s	Mg		M	Rh	< 0.000100	M	Tl	< 0.000100
O	Ba	< 0.000200	M	Gd	< 0.000100	O	Mn	0.003000	M	Rb	< 0.020012	M	Th	< 0.000100
O	Be	< 0.000090	M	Ga	< 0.001001	O	Hg	< 0.005000	M	Ru	< 0.000100	M	Tm	< 0.000100
M	Bi	< 0.005003	O	Ge	< 0.015000	s	Mo		M	Sm	< 0.000100	M	Sn	< 0.003002
O	B	< 0.005000	M	Au	< 0.001001	M	Nd	< 0.000100	O	Sc	< 0.000700	s	Ti	
O	Cd	0.003400	M	Hf	< 0.002001	O	Ni	< 0.002000	M	Se	< 0.050029	O	W	< 0.007000
s	Ca		M	Ho	< 0.000100	M	Nb	< 0.002001	n	Si		M	U	< 0.000100
M	Ce	< 0.000500	M	In	< 0.001001	n	Os		M	Ag	< 0.001001	O	V	< 0.004000
M	Cs	< 0.001001	M	Ir	< 0.000100	M	Pd	< 0.003002	s	Na		M	Yb	< 0.000100
O	Cr	< 0.010000	s	Fe		s	P		O	Sr	0.005000	M	Y	< 0.000100
M	Co	< 0.001001	M	La	< 0.000200	M	Pt	< 0.000100	s	S		M	Zn	0.016610
O	Cu	< 0.020000	M	Pb	0.002001	s	K		M	Ta	< 0.001001	M	Zr	< 0.004002

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
HPLC, IC, TLC, ISE, IR, NMR, UV/VIS, MS, Capillary Electrophoresis, Potentiometry, Wet Chemistry and Voltammetry
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact Technical Staff

This CRM was manufactured using 18 megohm doubly deionized water that has been filtered through a 0.2 micron filter.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep **Tightly** sealed when not in use. Store and use at 20 ± 4°C. **Do Not** pipette from the container. **Do Not** return portions removed from pipetting to container.

Element Specific Information - For specific information regarding any element: Contact technical staff.

Uranium Note: If uranium is present in this standard, it is natural abundance unless specified in Section 3.0.

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Safety Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous.

Inorganic Ventures homogeneity data indicate that the end user should take a minimum sample size of 0.2mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration
- SAI Global File Number 010105

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration"
- Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 "General Requirements for the Competence of Reference Material Producers"
- Reference Materials Production - Accredited A2LA Certificate Number 883.02

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission
- Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission
- Reporting Defects and Non-Compliance

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies of chemically-stable solutions performed at the manufacturer's facility show a CRM shelf-life of twenty one months for solutions packaged in 125-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life. Manufacturer concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

11.3 Chemical Stability - Studies have been conducted on this or similar CRMs and it has been demonstrated that this CRM is chemically stable for a period of not less than two years provided the "Storage & Handling" conditions are followed that are described in section 7.0.

Certification Date: July 12, 2013

Expiration Date: EXPIRES 1[illegible]2015

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By: Zach Saunders
Product Documentation Technician

Zachary Saunders

Certificate Approved By: Allyson Guilliams
Quality Control Supervisor

Allyson Guilliams

Certifying Officer: Paul Gaines
PhD., Senior Technical Director

Paul R Gaines

Reagent

STD U_00005

INORGANIC VENTURES™
CUSTOMER SUPPLY DRIVE
CHARLOTTESVILLE, VA 24073-3427
WWW.INORGANICVENTURES.COM

CERTIFICATE OF ANALYSIS

260559
ID STD U_00005
Exp 12/01/14 Prpd:REV Opn:12/02/13
U 1000PPM

1.0 **INORGANIC VENTURES** is an ISO Guide 34 "General Requirements for the Competence of Reference Material Producers" and ISO 9001 registered manufacturer. Our manufacturing laboratory is accredited to ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories."

ACCREDITED Testing Laboratory Certificate 883.01

ACCREDITED Reference Material Producer Certificate 883.02

2.0 DESCRIPTION OF CRM **1000 µg/mL Uranium in 2% (v/v) HNO3**

Catalog Number:	CGU1-1, CGU1-2, and CGU1-5
Lot Number:	**F2-U01098**
Starting Material:	UO2(NO3)2.6H2O
Starting Material Purity (%):	99.9979
Starting Material Lot No:	1627
Matrix:	2% (v/v) HNO3

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 1,003 ± 6 µg/mL - weighted mean

Certified Density: 1.010 g/mL (measured at 20 ± 1°C)

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

Certified Value $(\bar{x}) = \frac{\Sigma x_i}{n}$

($\bar{x}$) = mean

x_i = individual results

n = number of measurements

Uncertainty $(\pm) = 2\,[\,\Sigma(s_i)^2\,]^{1/2}$

2 = the coverage factor.

$[\,\Sigma(s_i)^2\,]^{1/2}$ = The square root of the sum of the squares of the most common errors (where 's' stands for the standard deviation) from instrumental measurement, density, NIST SRM uncertainty, weighing, dilution to volume, homogeneity, long term stability and short term stability.

Certified Abundance: The 235U in this standard is depleted. The Certified abundances in Atom % are as follows:

IV's Certified Abundance

Isotope	Atom%
Uranium 238U	99.6 ± 0.1
235U	0.42 ± 0.05

4.0 TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

· "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

· This product is Traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRMs are available, the term 'in-house std.' is specified.

- The Calculated Value is a value calculated from the weight of a starting material that has been certified directly vs. a NIST SRM/RM. See section 4.2 for balance traceability.

4.1 **Assay Method #1** **1,003 ± 4 µg/mL**
ICP Assay NIST SRM 3164 Lot Number: 080521

Assay Method #2 **1,002 ± 3 µg/mL**
Calculated NIST SRM Lot Number: See Sec. 4.2

4.2 **BALANCE CALIBRATION -** All analytical balances are calibrated yearly by an accredited calibration laboratory and are traceable to a class E 2 analytical weight set with NIST Traceability. All balances are checked daily using an in-house procedure. The weights used for testing are annually compared to master weights and are traceable to the National Institute of Standards and Technology (NIST).

4.3 **THERMOMETER CALIBRATION -** All thermometers are NIST traceable through thermometers that are calibrated by an A2LA accredited calibration laboratory.

4.4 **GLASSWARE CALIBRATION -** An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM's.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

CRM's solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O Al < 0.050000	M Dy < 0.015093	M Li < 0.025154	M Pr < 0.000755	M Te < 0.075463
M Sb < 0.001258	M Er < 0.012577	M Lu < 0.001006	M Re < 0.002515	M Tb < 0.000755
M As < 0.025154	M Eu < 0.007546	M Mg < 0.075463	M Rh < 0.002515	M Tl < 0.002515
M Ba < 0.025154	M Gd < 0.002515	M Mn < 0.010062	M Rb < 0.002515	M Th < 0.002515
M Be < 0.001258	M Ga < 0.002515	i Hg	M Ru < 0.005031	M Tm < 0.001006
M Bi < 0.001006	M Ge < 0.015093	M Mo < 0.005031	M Sm < 0.002515	O Sn < 0.100000
M B < 0.176080	M Au < 0.007546	M Nd < 0.005031	M Sc < 0.025154	M Ti < 0.125772
M Cd < 0.007546	M Hf < 0.005031	M Ni < 0.020123	M Se < 0.020123	M W < 0.025154
O Ca 0.003976	M Ho < 0.001258	M Nb < 0.001258	i Si	s U
M Ce < 0.012577	M In < 0.025154	n Os	M Ag < 0.005031	M V < 0.005031
M Cs < 0.000755	M Ir < 0.012577	M Pd < 0.012577	O Na 0.039757	M Yb < 0.002515
M Cr < 0.012577	M Fe < 0.503087	i P	M Sr < 0.001258	M Y < 0.100617
M Co < 0.007546	M La < 0.001258	M Pt < 0.005031	i S	M Zn < 0.025154
M Cu < 0.015093	M Pb < 0.007546	i K	M Ta < 0.017608	M Zr < 0.012577

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
HPLC, IC, TLC, ISE, IR, NMR, UV/VIS, MS, Capillary Eletrophoresis, Potentiometry, Wet Chemistry and Voltammetry
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact Technical Staff

This CRM was manufactured using 18 megohm-doubly deionized water that has been filtered through a 0.2 micron filter.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 238.0289; +6 ; 8; UO_2^{2+}(uranyl)

Chemical Compatibility - Soluble in HCl and HNO_3. Avoid H_3PO_4. H_2SO_4 and HF matrices should not be a problem depending upon [U]. Although the UO_2^{2+} ion is distinctly basic, any U^{+4} will precipitate in basic media. UO_2^{2+}salts are generally soluble in water and UO_2^{2+} is stable with most metals and inorganic anions. The uranyl phosphate is insoluble in water. UF_4 and UF_6 are water soluble.

Stability - 2-100 ppb levels stable for months in 1% HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 2-5% HNO_3 / LDPE container.

U Containing Samples (Preparation and Solution) - Metal (Dissolves rapidly in HCl and HNO_3); Oxide (Soluble in HNO_3); Ores (Digest for 1-2 hours with 1 gram of ore to 30 mL 1:1 HNO_3. Silica insolubles are removed by filtration after bringing the sample to fumes with conc. H_2SO_4.)

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Type	Interferences (underlined indicates severe)
ICP-OES 385.958 nm	0.3 / 0.01 µg/mL	1	ion	Th, Fe
ICP-OES 367.007 nm	0.3 / 0.02 µg/mL	1	ion	Th, Ce
ICP-OES 263.553 nm	0.3 / 0.01 µg/mL	1	ion	Ce, Ir, Th, Rh, W, Zr, Ta, **Ti**, V, Hf, Fe, Re, Ru
ICP-MS 238 amu	2 ppt	n/a	M+	206Pb16O2

Uranium Note: If uranium is present in this standard, it is natural abundance unless specified in Section 3.0.

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Safety Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to an in house procedure and is guaranteed to be homogeneous. Inorganic Ventures homogeneity data indicate that the end user should take a minimum sample size of 0.2mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration
- SAI Global File Number 010105

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration"
- Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 "General Requirements for the Competence of Reference Material Producers"
- Reference Materials Production - Accredited A2LA Certificate Number 883.02

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission
- Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission
- Reporting Defects and Non-Compliance

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability.

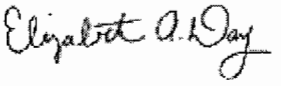
11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life. Manufacturer concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

11.3 Chemical Stability - Studies have been conducted on this or similar CRMs and it has been demonstrated that this CRM is chemically stable for a period of not less than two years provided the "Storage & Handling" conditions are followed that are described in section 7.0.

Certification Date: September 07, 2012
Expiration Date:

01 Dec 2014

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	Stephan Blaakman Manufacturing Tech	
Certificate Approved By:	Elizabeth Day Quality Assurance Specialist	
Certifying Officer:	Paul Gaines PhD., Senior Technical Director	

METALS

COVER PAGE
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102380-3

SDG No.: 680102380-1

Project: Sediments

Client Sample ID	Lab Sample ID
SD-224-SS	680-102380-1
SD-224-01	680-102380-2
SD-224-02	680-102380-3
SD-223-SS	680-102380-5
SD-223-01	680-102380-6
SD-223-02	680-102380-7
SD-226-SS	680-102380-8
SD-226-01	680-102380-9
SD-226-02	680-102380-10
SD-225-SS	680-102380-12
SD-225-01	680-102380-13
SD-225-02	680-102380-14
SD-228-SS	680-102380-16
SD-228-01	680-102380-17
SD-228-02	680-102380-18
SD-234-SS	680-102380-20
SD-234-01	680-102380-21
SD-235-SS	680-102380-22
SD-235-01	680-102380-23
SD-235-02	680-102380-24
SD-236-SS	680-102380-26
SD-236-01	680-102380-27
SD-236-02	680-102380-28
SD-237-SS	680-102380-29
SD-237-01	680-102380-30
SD-237-02	680-102380-31
SD-DUP05	680-102380-33
SD-227-SS	680-102380-34
SD-227-01	680-102380-35
SD-227-02	680-102380-36

Comments:

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-224-SS
Lab Sample ID: 680-102380-1
Lab Name: TestAmerica St. Louis
Job No.: 680-102380-3
SDG ID.: 680102380-1
Matrix: Solid
Date Sampled: 06/13/2014 08:20
Reporting Basis: WET
Date Received: 06/14/2014 08:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0036	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00071	mg/Kg			5	6020A
15117-96-1	U-235	0.016	0.012	0.0048	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00095	mg/Kg			5	6020A
7440-61-1	U-238	2.3	0.012	0.00071	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	2.3	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-224-01 Lab Sample ID: 680-102380-2

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG ID.: 680102380-1

Matrix: Solid Date Sampled: 06/13/2014 08:25

Reporting Basis: WET Date Received: 06/14/2014 08:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0035	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00070	mg/Kg			5	6020A
15117-96-1	U-235	0.026	0.012	0.0047	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00093	mg/Kg			5	6020A
7440-61-1	U-238	3.6	0.012	0.00070	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	3.6	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-224-02 Lab Sample ID: 680-102380-3

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG ID.: 680102380-1

Matrix: Solid Date Sampled: 06/13/2014 08:30

Reporting Basis: WET Date Received: 06/14/2014 08:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0033	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.011	0.00066	mg/Kg			5	6020A
15117-96-1	U-235	0.019	0.011	0.0045	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00088	mg/Kg			5	6020A
7440-61-1	U-238	2.7	0.011	0.00066	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	2.7	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-223-SS
Lab Sample ID: 680-102380-5
Lab Name: TestAmerica St. Louis
Job No.: 680-102380-3
SDG ID.: 680102380-1
Matrix: Solid
Date Sampled: 06/13/2014 08:40
Reporting Basis: WET
Date Received: 06/14/2014 08:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0034	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.011	0.00068	mg/Kg			5	6020A
15117-96-1	U-235	0.024	0.011	0.0046	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00091	mg/Kg			5	6020A
7440-61-1	U-238	3.2	0.011	0.00068	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	3.2	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-223-01 Lab Sample ID: 680-102380-6

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG ID.: 680102380-1

Matrix: Solid Date Sampled: 06/13/2014 08:45

Reporting Basis: WET Date Received: 06/14/2014 08:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0035	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.012	0.00070	mg/Kg			5	6020A
15117-96-1	U-235	0.026	0.012	0.0048	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00094	mg/Kg			5	6020A
7440-61-1	U-238	3.6	0.012	0.00070	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	3.6	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-223-02 Lab Sample ID: 680-102380-7

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG ID.: 680102380-1

Matrix: Solid Date Sampled: 06/13/2014 08:50

Reporting Basis: WET Date Received: 06/14/2014 08:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0033	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.011	0.00066	mg/Kg			5	6020A
15117-96-1	U-235	0.0068	0.011	0.0045	mg/Kg	J		5	6020A
13982-70-2	U-236	ND	0.011	0.00088	mg/Kg			5	6020A
7440-61-1	U-238	0.99	0.011	0.00066	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	1.0	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-226-SS
Lab Sample ID: 680-102380-8
Lab Name: TestAmerica St. Louis
Job No.: 680-102380-3
SDG ID.: 680102380-1
Matrix: Solid
Date Sampled: 06/13/2014 08:55
Reporting Basis: WET
Date Received: 06/14/2014 08:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0036	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.012	0.00072	mg/Kg			5	6020A
15117-96-1	U-235	0.029	0.012	0.0049	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00096	mg/Kg			5	6020A
7440-61-1	U-238	4.0	0.012	0.00072	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	4.0	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-226-01 Lab Sample ID: 680-102380-9

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG ID.: 680102380-1

Matrix: Solid Date Sampled: 06/13/2014 09:00

Reporting Basis: WET Date Received: 06/14/2014 08:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0036	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.012	0.00072	mg/Kg			5	6020A
15117-96-1	U-235	0.028	0.012	0.0049	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00096	mg/Kg			5	6020A
7440-61-1	U-238	3.7	0.012	0.00072	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	3.7	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-226-02 Lab Sample ID: 680-102380-10

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG ID.: 680102380-1

Matrix: Solid Date Sampled: 06/13/2014 09:05

Reporting Basis: WET Date Received: 06/14/2014 08:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0034	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.011	0.00067	mg/Kg			5	6020A
15117-96-1	U-235	0.016	0.011	0.0046	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00090	mg/Kg			5	6020A
7440-61-1	U-238	2.2	0.011	0.00067	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	2.2	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-225-SS
Lab Sample ID: 680-102380-12
Lab Name: TestAmerica St. Louis
Job No.: 680-102380-3
SDG ID.: 680102380-1
Matrix: Solid
Date Sampled: 06/13/2014 09:15
Reporting Basis: WET
Date Received: 06/14/2014 08:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0036	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.012	0.00073	mg/Kg			5	6020A
15117-96-1	U-235	0.027	0.012	0.0049	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00097	mg/Kg			5	6020A
7440-61-1	U-238	3.6	0.012	0.00073	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	3.6	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-225-01 Lab Sample ID: 680-102380-13

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG ID.: 680102380-1

Matrix: Solid Date Sampled: 06/13/2014 09:20

Reporting Basis: WET Date Received: 06/14/2014 08:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0033	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.011	0.00066	mg/Kg			5	6020A
15117-96-1	U-235	0.024	0.011	0.0045	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00088	mg/Kg			5	6020A
7440-61-1	U-238	3.3	0.011	0.00066	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	3.3	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-225-02 Lab Sample ID: 680-102380-14

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG ID.: 680102380-1

Matrix: Solid Date Sampled: 06/13/2014 09:25

Reporting Basis: WET Date Received: 06/14/2014 08:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0033	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.011	0.00065	mg/Kg			5	6020A
15117-96-1	U-235	0.018	0.011	0.0044	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00087	mg/Kg			5	6020A
7440-61-1	U-238	2.6	0.011	0.00065	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	2.6	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-228-SS
Lab Sample ID: 680-102380-16
Lab Name: TestAmerica St. Louis
Job No.: 680-102380-3
SDG ID.: 680102380-1
Matrix: Solid
Date Sampled: 06/13/2014 10:05
Reporting Basis: WET
Date Received: 06/14/2014 08:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0033	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.011	0.00065	mg/Kg			5	6020A
15117-96-1	U-235	0.029	0.011	0.0044	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00087	mg/Kg			5	6020A
7440-61-1	U-238	3.9	0.011	0.00065	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	3.9	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-228-01 Lab Sample ID: 680-102380-17

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG ID.: 680102380-1

Matrix: Solid Date Sampled: 06/13/2014 10:10

Reporting Basis: WET Date Received: 06/14/2014 08:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0035	mg/Kg		^	5	6020A
13966-29-5	U-234	0.0010	0.012	0.00070	mg/Kg	J		5	6020A
15117-96-1	U-235	0.095	0.012	0.0047	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00093	mg/Kg			5	6020A
7440-61-1	U-238	4.4	0.012	0.00070	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	4.5	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-228-02 Lab Sample ID: 680-102380-18

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG ID.: 680102380-1

Matrix: Solid Date Sampled: 06/13/2014 10:15

Reporting Basis: WET Date Received: 06/14/2014 08:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0035	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.012	0.00070	mg/Kg			5	6020A
15117-96-1	U-235	0.019	0.012	0.0047	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00093	mg/Kg			5	6020A
7440-61-1	U-238	2.5	0.012	0.00070	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	2.5	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-234-SS
Lab Sample ID: 680-102380-20
Lab Name: TestAmerica St. Louis
Job No.: 680-102380-3
SDG ID.: 680102380-1
Matrix: Solid
Date Sampled: 06/13/2014 10:30
Reporting Basis: WET
Date Received: 06/14/2014 08:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0036	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.012	0.00073	mg/Kg			5	6020A
15117-96-1	U-235	0.018	0.012	0.0049	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00097	mg/Kg			5	6020A
7440-61-1	U-238	2.3	0.012	0.00073	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	2.3	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-234-01 Lab Sample ID: 680-102380-21

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG ID.: 680102380-1

Matrix: Solid Date Sampled: 06/13/2014 10:35

Reporting Basis: WET Date Received: 06/14/2014 08:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0035	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.012	0.00070	mg/Kg			5	6020A
15117-96-1	U-235	0.0059	0.012	0.0047	mg/Kg	J		5	6020A
13982-70-2	U-236	ND	0.012	0.00093	mg/Kg			5	6020A
7440-61-1	U-238	0.88	0.012	0.00070	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	0.89	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-235-SS
Lab Sample ID: 680-102380-22
Lab Name: TestAmerica St. Louis
Job No.: 680-102380-3
SDG ID.: 680102380-1
Matrix: Solid
Date Sampled: 06/13/2014 11:00
Reporting Basis: WET
Date Received: 06/14/2014 08:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0032	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.011	0.00064	mg/Kg			5	6020A
15117-96-1	U-235	0.021	0.011	0.0044	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00086	mg/Kg			5	6020A
7440-61-1	U-238	2.4	0.011	0.00064	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	2.4	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-235-01 Lab Sample ID: 680-102380-23

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG ID.: 680102380-1

Matrix: Solid Date Sampled: 06/13/2014 11:05

Reporting Basis: WET Date Received: 06/14/2014 08:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0035	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.012	0.00070	mg/Kg			5	6020A
15117-96-1	U-235	0.028	0.012	0.0047	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00093	mg/Kg			5	6020A
7440-61-1	U-238	3.3	0.012	0.00070	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	3.3	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-235-02 Lab Sample ID: 680-102380-24

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG ID.: 680102380-1

Matrix: Solid Date Sampled: 06/13/2014 11:10

Reporting Basis: WET Date Received: 06/14/2014 08:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0036	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.012	0.00072	mg/Kg			5	6020A
15117-96-1	U-235	0.040	0.012	0.0048	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00095	mg/Kg			5	6020A
7440-61-1	U-238	3.8	0.012	0.00072	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	3.8	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-236-SS
Lab Sample ID: 680-102380-26
Lab Name: TestAmerica St. Louis
Job No.: 680-102380-3
SDG ID.: 680102380-1
Matrix: Solid
Date Sampled: 06/13/2014 12:05
Reporting Basis: WET
Date Received: 06/14/2014 08:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0035	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00070	mg/Kg			5	6020A
15117-96-1	U-235	ND	0.012	0.0047	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00093	mg/Kg			5	6020A
7440-61-1	U-238	0.28	0.012	0.00070	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	0.28	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-236-01 Lab Sample ID: 680-102380-27

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG ID.: 680102380-1

Matrix: Solid Date Sampled: 06/13/2014 12:10

Reporting Basis: WET Date Received: 06/14/2014 08:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0033	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00065	mg/Kg			5	6020A
15117-96-1	U-235	ND	0.011	0.0044	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00087	mg/Kg			5	6020A
7440-61-1	U-238	0.62	0.011	0.00065	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	0.62	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-236-02 Lab Sample ID: 680-102380-28

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG ID.: 680102380-1

Matrix: Solid Date Sampled: 06/13/2014 12:15

Reporting Basis: WET Date Received: 06/14/2014 08:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0036	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00072	mg/Kg			5	6020A
15117-96-1	U-235	0.0054	0.012	0.0048	mg/Kg	J		5	6020A
13982-70-2	U-236	ND	0.012	0.00095	mg/Kg			5	6020A
7440-61-1	U-238	0.84	0.012	0.00072	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	0.85	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-237-SS
Lab Sample ID: 680-102380-29
Lab Name: TestAmerica St. Louis
Job No.: 680-102380-3
SDG ID.: 680102380-1
Matrix: Solid
Date Sampled: 06/13/2014 12:30
Reporting Basis: WET
Date Received: 06/14/2014 08:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0033	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00066	mg/Kg			5	6020A
15117-96-1	U-235	0.032	0.011	0.0045	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00088	mg/Kg			5	6020A
7440-61-1	U-238	2.6	0.011	0.00066	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	2.6	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-237-01 Lab Sample ID: 680-102380-30

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG ID.: 680102380-1

Matrix: Solid Date Sampled: 06/13/2014 12:35

Reporting Basis: WET Date Received: 06/14/2014 08:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0037	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00075	mg/Kg			5	6020A
15117-96-1	U-235	0.025	0.012	0.0051	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.0010	mg/Kg			5	6020A
7440-61-1	U-238	3.1	0.012	0.00075	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	3.1	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-237-02 Lab Sample ID: 680-102380-31

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG ID.: 680102380-1

Matrix: Solid Date Sampled: 06/13/2014 12:40

Reporting Basis: WET Date Received: 06/14/2014 08:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0034	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00068	mg/Kg			5	6020A
15117-96-1	U-235	0.057	0.011	0.0046	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00090	mg/Kg			5	6020A
7440-61-1	U-238	3.8	0.011	0.00068	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	3.9	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-DUP05 Lab Sample ID: 680-102380-33

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG ID.: 680102380-1

Matrix: Solid Date Sampled: 06/13/2014 00:00

Reporting Basis: WET Date Received: 06/14/2014 08:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0036	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00073	mg/Kg			5	6020A
15117-96-1	U-235	0.044	0.012	0.0049	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00097	mg/Kg			5	6020A
7440-61-1	U-238	4.1	0.012	0.00073	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	4.1	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-227-SS
Lab Sample ID: 680-102380-34
Lab Name: TestAmerica St. Louis
Job No.: 680-102380-3
SDG ID.: 680102380-1
Matrix: Solid
Date Sampled: 06/13/2014 13:10
Reporting Basis: WET
Date Received: 06/14/2014 08:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0036	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.012	0.00073	mg/Kg			5	6020A
15117-96-1	U-235	0.030	0.012	0.0049	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00097	mg/Kg			5	6020A
7440-61-1	U-238	4.1	0.012	0.00073	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	4.1	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-227-01 Lab Sample ID: 680-102380-35

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG ID.: 680102380-1

Matrix: Solid Date Sampled: 06/13/2014 13:15

Reporting Basis: WET Date Received: 06/14/2014 08:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0032	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.011	0.00065	mg/Kg			5	6020A
15117-96-1	U-235	0.025	0.011	0.0044	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00086	mg/Kg			5	6020A
7440-61-1	U-238	3.3	0.011	0.00065	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	3.3	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-227-02 Lab Sample ID: 680-102380-36

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG ID.: 680102380-1

Matrix: Solid Date Sampled: 06/13/2014 13:20

Reporting Basis: WET Date Received: 06/14/2014 08:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0033	mg/Kg		^	5	6020A
13966-29-5	U-234	ND	0.011	0.00066	mg/Kg			5	6020A
15117-96-1	U-235	0.025	0.011	0.0045	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00088	mg/Kg			5	6020A
7440-61-1	U-238	3.4	0.011	0.00066	mg/Kg		B	5	6020A
7440-61-1	Total Uranium	3.4	0.0050	0.00030	mg/Kg			1	6020A

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

ICV Source: ISOU ICV(4,8)_00017 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00018

Analyte	ICV 160-138156/89 08/14/2014 18:55				CCV 160-138156/96 08/14/2014 19:27				CCV 160-138156/103 08/14/2014 20:00			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0872		0.0835	104	0.0789		0.0827	95	0.0781		0.0827	95
U-238	10.0		9.78	102	4.92		5.03	98	4.86		5.03	97

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

ICV Source: ISOU ICV(4,8)_00017 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00018

Analyte	CCV 160-138156/115 08/14/2014 20:56				CCV 160-138156/127 08/14/2014 21:52				CCV 160-138156/139 08/14/2014 22:48			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0839		0.0827	101	0.0817		0.0827	99	0.0841		0.0827	102
U-238	5.19		5.03	103	5.12		5.03	102	5.23		5.03	104

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

ICV Source: ISOU ICV(4,8)_00017 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00018

Analyte	CCV 160-138156/151 08/14/2014 23:44											
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0840		0.0827	102								
U-238	5.27		5.03	105								

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

ICV Source: ISOU ICV(5,6)_00019 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00018

Analyte	ICV 160-138156/90 08/14/2014 18:59				CCV 160-138156/96 08/14/2014 19:27				CCV 160-138156/103 08/14/2014 20:00			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	1.11		1.06	105	4.75		4.85	98	4.67		4.85	96
U-236	0.0677		0.0746	91	0.0857		0.0890	96	0.0838		0.0890	94

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

ICV Source: ISOU ICV(5,6)_00019 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00018

Analyte	CCV 160-138156/115 08/14/2014 20:56				CCV 160-138156/127 08/14/2014 21:52				CCV 160-138156/139 08/14/2014 22:48			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	4.99		4.85	103	4.92		4.85	102	5.04		4.85	104
U-236	0.0899		0.0890	101	0.0882		0.0890	99	0.0907		0.0890	102

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

ICV Source: ISOU ICV(5,6)_00019 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00018

Analyte	CCV 160-138156/151 08/14/2014 23:44											
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	5.05		4.85	104								
U-236	0.0912		0.0890	103								

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

ICV Source: ISOU ICV(3)_00018 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	ICV 160-138778/10 08/18/2014 14:58				CCV 160-138778/63 08/18/2014 19:31				CCV 160-138778/75 08/18/2014 20:27			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.231		0.223	103	0.0537		0.0515	104	0.0543		0.0515	105

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

ICV Source: ISOU ICV(3)_00018 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	CCV 160-138778/87 08/18/2014 21:23				CCV 160-138778/99 08/18/2014 22:19				CCV 160-138778/111 08/18/2014 23:15			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.0575		0.0515	112	0.0555		0.0515	108	0.0563		0.0515	109

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

ICV Source: ISOU ICV(3)_00018 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	CCV 160-138778/116 08/18/2014 23:38											
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.0574		0.0515	111								

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2B-IN
CRQL CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Method: 6020A Instrument ID: ICPMS6100

Lab Sample ID: CRI 160-138156/92 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 1_00018

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-235	0.0485	0.0476	J	98	70-130
U-238	0.0503	0.0515		102	70-130

Lab Sample ID: CRI 160-138156/93 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 2_00019

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-234	0.0496	0.0498	J	100	70-130
U-236	0.0534	0.0536		100	70-130

Lab Sample ID: CRI 160-138778/15 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 2_00020

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-233	0.0309	0.0353	J	114	70-130

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IIB-IN

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Concentration Units: ug/L

Analyte	RL	ICB 160-138156/91 08/14/2014 19:04		CCB 160-138156/97 08/14/2014 19:32		CCB 160-138156/104 08/14/2014 20:05		CCB 160-138156/116 08/14/2014 21:01	
		Found	C	Found	C	Found	C	Found	C
U-234	0.050	ND		ND		ND		ND	
U-235	0.050	ND		ND		ND		ND	
U-236	0.050	ND		ND		ND		ND	
U-238	0.050	0.0133	J	ND		ND		ND	

Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Concentration Units: ug/L

Analyte	RL	CCB 160-138156/128 08/14/2014 21:57		CCB 160-138156/140 08/14/2014 22:53		CCB 160-138156/152 08/14/2014 23:49			
		Found	C	Found	C	Found	C	Found	C
U-234	0.050	ND		ND		ND			
U-235	0.050	ND		ND		ND			
U-236	0.050	ND		ND		ND			
U-238	0.050	ND		ND		ND			

Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Concentration Units: ug/L

Analyte	RL	ICB 160-138778/13 08/18/2014 15:12		CCB 160-138778/64 08/18/2014 19:36		CCB 160-138778/76 08/18/2014 20:32		CCB 160-138778/88 08/18/2014 21:28	
		Found	C	Found	C	Found	C	Found	C
U-233	0.050	0.0973		0.0113	J	0.0112	J	0.0111	J

Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Concentration Units: ug/L

Analyte	RL	CCB 160-138778/100 08/18/2014 22:24		CCB 160-138778/112 08/18/2014 23:20		CCB 160-138778/117 08/18/2014 23:43			
		Found	C	Found	C	Found	C	Found	C
U-233	0.050	0.0111	J	0.0113	J	0.0114	J		

Italicized analytes were not requested for this sequence.

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-137068/1-A

Instrument Code: ICPMS6100 Batch No.: 138156

CAS No.	Analyte	Concentration	C	Q	Method
13966-29-5	U-234	ND			6020A_U
15117-96-1	U-235	ND			6020A_U
13982-70-2	U-236	ND			6020A_U
7440-61-1	U-238	0.00135	J		6020A_U

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-137069/1-A

Instrument Code: ICPMS6100 Batch No.: 138156

CAS No.	Analyte	Concentration	C	Q	Method
13966-29-5	U-234	ND			6020A_U
15117-96-1	U-235	ND			6020A_U
13982-70-2	U-236	ND			6020A_U
7440-61-1	U-238	0.000480	J		6020A_U

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-137068/1-A

Instrument Code: ICPMS6100 Batch No.: 138778

CAS No.	Analyte	Concentration	C	Q	Method
13968-55-3	U-233	ND			6020A_U

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-137069/1-A

Instrument Code: ICPMS6100 Batch No.: 138778

CAS No.	Analyte	Concentration	C	Q	Method
13968-55-3	U-233	ND		^	6020A_U

4A-IN
INTERFERENCE CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Lab Sample ID: ICSAB 160-138156/95 Instrument ID: ICPMS6100

Lab File ID: 081414m1.rep ICS Source: ISOU ICSAB_00019

Concentration Units: ug/L

Analyte	True Solution AB	Found Solution AB	Percent Recovery
U-234	**0.0827**	**0.0813**	**98**
U-235	**4.85**	**4.87**	**100**
U-236	**0.0890**	**0.0867**	**97**
U-238	**5.03**	**5.05**	**100**

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IVA-IN

4A-IN
INTERFERENCE CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Lab Sample ID: ICSAB 160-138778/1 Instrument ID: ICPMS6100

Lab File ID: 081814M3.rep ICS Source: ISOU ICSAB_00020

Concentration Units: ug/L

Analyte	True Solution AB	Found Solution AB	Percent Recovery
U-233	**0.0515**	**0.0543**	**105**

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IVA-IN

5A-IN
MATRIX SPIKE SAMPLE RECOVERY
METALS

Client ID: SD-224-SS MS
Lab ID: 680-102380-1 MS
Lab Name: TestAmerica St. Louis
Job No.: 680-102380-3
SDG No.: 680102380-1
Matrix: Solid
Concentration Units: mg/Kg
% Solids:

Analyte	SSR	C	Sample Result (SR)	C	Spike Added (SA)	%R	Control Limit %R	Q	Method
U-234	0.00769	J	ND		0.00811	95	75-125		6020A
U-235	0.467		0.016		0.475	95	75-125		6020A
U-238	2.84		2.3		0.493	106	75-125	4	6020A

SSR = Spiked Sample Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VA - IN

5A-IN
MATRIX SPIKE SAMPLE RECOVERY
METALS

Client ID: SD-236-SS MS
Lab ID: 680-102380-26 MS
Lab Name: TestAmerica St. Louis
Job No.: 680-102380-3
SDG No.: 680102380-1
Matrix: Solid
Concentration Units: mg/Kg
% Solids:

Analyte	SSR	C	Sample Result (SR)	C	Spike Added (SA)	%R	Control Limit %R	Q	Method
U-234	0.00701	J	ND		0.00726	97	75-125		6020A
U-235	0.425		ND		0.426	100	75-125		6020A
U-238	0.727		0.28		0.441	102	75-125		6020A

SSR = Spiked Sample Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VA - IN

5A-IN
MATRIX SPIKE DUPLICATE SAMPLE RECOVERY
METALS

Client ID: SD-224-SS MSD
Lab ID: 680-102380-1 MSD
Lab Name: TestAmerica St. Louis
Job No.: 680-102380-3
SDG No.: 680102380-1
Matrix: Solid
Concentration Units: mg/Kg
% Solids:

Analyte	(SDR)	C	Spike Added (SA)	%R	Control Limit %R	RPD	RPD Limit	Q	Method
U-234	0.00703	J	0.00747	94	75-125	9	20		6020A
U-235	0.431		0.438	95	75-125	8	20		6020A
U-238	2.52		0.454	44	75-125	12	20	4	6020A

SDR = Sample Duplicate Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VD - IN

5A-IN
MATRIX SPIKE DUPLICATE SAMPLE RECOVERY
METALS

Client ID: SD-236-SS MSD
Lab ID: 680-102380-26 MSD
Lab Name: TestAmerica St. Louis
Job No.: 680-102380-3
SDG No.: 680102380-1
Matrix: Solid
Concentration Units: mg/Kg
% Solids:

Analyte	(SDR)	C	Spike Added (SA)	%R	Control Limit %R	RPD	RPD Limit	Q	Method
U-234	0.00700	J	0.00774	90	75-125	0	20		6020A
U-235	0.426		0.454	94	75-125	0	20		6020A
U-238	0.722		0.470	95	75-125	1	20		6020A

SDR = Sample Duplicate Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VD - IN

7A-IN
LAB CONTROL SAMPLE
METALS

Lab ID: LCS 160-137068/2-A

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

Sample Matrix: Solid LCS Source: ISOU Prep Spk_00002

Analyte	Solid(mg/Kg)							
	True	Found	C	%R	Limits		Q	Method
U-234	0.00745	0.00711		95	80	120		6020A
U-235	0.437	0.427		98	80	120		6020A
U-238	0.453	0.438		97	80	120		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

7A-IN
LAB CONTROL SAMPLE
METALS

Lab ID: LCS 160-137069/2-A

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

Sample Matrix: Solid LCS Source: ISOU Prep Spk_00002

Analyte	Solid(mg/Kg)							
	True	Found	C	%R	Limits		Q	Method
U-234	0.00816	0.00857		105	80	120		6020A
U-235	0.478	0.518		108	80	120		6020A
U-238	0.496	0.534		108	80	120		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

8-IN
ICP-AES AND ICP-MS SERIAL DILUTIONS
METALS

Lab ID: 680-102380-1

SDG No: 680102380-1

Lab Name: TestAmerica St. Louis Job No: 680-102380-3

Matrix: Solid Concentration Units: mg/Kg

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Method
U-233	ND		ND		NC		6020A
U-234	ND		ND		NC		6020A
U-235	0.016		ND		NC		6020A
U-236	ND		ND		NC		6020A
U-238	2.3		2.26		2.5		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIII-IN

8-IN
ICP-AES AND ICP-MS SERIAL DILUTIONS
METALS

Lab ID: 680-102380-26

SDG No: 680102380-1

Lab Name: TestAmerica St. Louis Job No: 680-102380-3

Matrix: Solid Concentration Units: mg/Kg

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Method
U-233	ND		ND		NC		6020A
U-234	ND		ND		NC		6020A
U-235	ND		ND		NC		6020A
U-236	ND		ND		NC		6020A
U-238	0.28		0.274		0.82		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIII-IN

9-IN
DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102380-3

SDG Number: 680102380-1

Matrix: Solid Instrument ID: ICPMS6100

Method: 6020A MDL Date: 08/05/2013 10:01

Prep Method: 3050B

Analyte	Wavelength/ Mass	RL (mg/Kg)	MDL (mg/Kg)
U-233	233	0.005	0.0015
U-234	234	0.005	0.0003
U-235	235	0.005	0.00203
U-236	236	0.005	0.0004
U-238	238	0.005	0.0003

9-IN
CALIBRATION BLANK DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102380-3

SDG Number: 680102380-1

Matrix: Solid Instrument ID: ICPMS6100

Method: 6020A XMDL Date: 07/18/2014 15:08

Analyte	Wavelength/ Mass	XRL (ug/L)	XMDL (ug/L)
U-233	233	0.05	0.0066
U-234	234	0.05	0.0021
U-235	235	0.05	0.0034
U-236	236	0.05	0.0015
U-238	238	0.05	0.0082

9-IN
DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102380-3

SDG Number: 680102380-1

Matrix: Solid Instrument ID: NOEQUIP

Method: 6020A MDL Date: 06/12/2013 14:02

Analyte	Wavelength/ Mass	RL (mg/Kg)	MDL (mg/Kg)
Total Uranium		0.005	0.0003

11-IN
LINEAR RANGES
METALS

Lab Name: TestAmerica St. Louis Job No: 680-102380-3

SDG No.: 680102380-1

Instrument ID: ICPMS6100 Date: 02/14/2012 11:04

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	Method
U-233		2000	6020A
U-234		2000	6020A
U-235		2000	6020A
U-236		2000	6020A
U-238		2000	6020A

12-IN
PREPARATION LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Prep Method: 3050B

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight (g)	Initial Volume	Final Volume (mL)
MB 160-137068/1-A	08/11/2014 11:25	137068	0.5663		50
LCS 160-137068/2-A	08/11/2014 11:25	137068	0.5550		50
680-102380-1	08/11/2014 11:25	137068	0.5277		50
680-102380-1 MS	08/11/2014 11:25	137068	0.5100		50
680-102380-1 MSD	08/11/2014 11:25	137068	0.5536		50
680-102380-2	08/11/2014 11:25	137068	0.5356		50
680-102380-3	08/11/2014 11:25	137068	0.5650		50
680-102380-5	08/11/2014 11:25	137068	0.5522		50
680-102380-6	08/11/2014 11:25	137068	0.5342		50
680-102380-7	08/11/2014 11:25	137068	0.5657		50
680-102380-8	08/11/2014 11:25	137068	0.5188		50
680-102380-9	08/11/2014 11:25	137068	0.5201		50
680-102380-10	08/11/2014 11:25	137068	0.5563		50
680-102380-12	08/11/2014 11:25	137068	0.5163		50
680-102380-13	08/11/2014 11:25	137068	0.5653		50
680-102380-14	08/11/2014 11:25	137068	0.5766		50
680-102380-16	08/11/2014 11:25	137068	0.5751		50
680-102380-17	08/11/2014 11:25	137068	0.5382		50
680-102380-18	08/11/2014 11:25	137068	0.5369		50
680-102380-20	08/11/2014 11:25	137068	0.5159		50
680-102380-21	08/11/2014 11:25	137068	0.5378		50
680-102380-22	08/11/2014 11:25	137068	0.5815		50
680-102380-23	08/11/2014 11:25	137068	0.5348		50
680-102380-24	08/11/2014 11:25	137068	0.5243		50

12-IN
PREPARATION LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Prep Method: 3050B

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight (g)	Initial Volume	Final Volume (mL)
MB 160-137069/1-A	08/11/2014 11:35	137069	0.5450		50
LCS 160-137069/2-A	08/11/2014 11:35	137069	0.5066		50
680-102380-26	08/11/2014 11:35	137069	0.5380		50
680-102380-26 MS	08/11/2014 11:35	137069	0.5695		50
680-102380-26 MSD	08/11/2014 11:35	137069	0.5343		50
680-102380-27	08/11/2014 11:35	137069	0.5740		50
680-102380-28	08/11/2014 11:35	137069	0.5244		50
680-102380-29	08/11/2014 11:35	137069	0.5671		50
680-102380-30	08/11/2014 11:35	137069	0.5012		50
680-102380-31	08/11/2014 11:35	137069	0.5528		50
680-102380-33	08/11/2014 11:35	137069	0.5170		50
680-102380-34	08/11/2014 11:35	137069	0.5158		50
680-102380-35	08/11/2014 11:35	137069	0.5800		50
680-102380-36	08/11/2014 11:35	137069	0.5689		50

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/14/2014 11:32 End Date: 08/15/2014 00:12

Lab Sample Id	D/F	Type	Time	Analytes																									
				U-234	U-235	U-236	U-238																						
ICIS 160-138156/1			11:32	X	X	X	X																						
IC 160-138156/2			11:39	X	X	X	X																						
IC 160-138156/3			11:43	X	X	X	X																						
IC 160-138156/4			11:48	X	X	X	X																						
IC 160-138156/5			11:53	X	X	X	X																						
IC 160-138156/6			11:58	X	X	X	X																						
ICV 160-138156/7			12:02																										
ICV 160-138156/8			12:07																										
ICV 160-138156/9			12:12																										
ICB 160-138156/10			12:16																										
CRI 160-138156/11			12:21																										
CRI 160-138156/12			12:26																										
ICSA 160-138156/13			12:30																										
ICSAB 160-138156/14			12:35																										
CCV 160-138156/15			12:40																										
CCB 160-138156/16			12:44																										
ZZZZZZ			12:49																										
ZZZZZZ			12:54																										
ZZZZZZ			12:58																										
ZZZZZZ			13:03																										
ZZZZZZ			13:08																										
ZZZZZZ			13:12																										
ZZZZZZ			13:17																										
ZZZZZZ			13:22																										
ZZZZZZ			13:26																										
ZZZZZZ			13:31																										
CCV 160-138156/27			13:36																										
CCB 160-138156/28			13:40																										
ZZZZZZ			13:45																										
ZZZZZZ			13:50																										
ZZZZZZ			13:54																										
ZZZZZZ			13:59																										
ZZZZZZ			14:04																										
ZZZZZZ			14:08																										
ZZZZZZ			14:13																										
ZZZZZZ			14:18																										
ZZZZZZ			14:22																										
ZZZZZZ			14:27																										
CCV 160-138156/39			14:32																										

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/14/2014 11:32 End Date: 08/15/2014 00:12

Lab Sample Id	D/F	Type	Time	Analytes																									
				U-234	U-235	U-236	U-238																						
CCB 160-138156/40			14:36																										
ZZZZZZ			14:41																										
ZZZZZZ			14:46																										
ZZZZZZ			14:50																										
ZZZZZZ			14:55																										
ZZZZZZ			15:00																										
ZZZZZZ			15:04																										
ZZZZZZ			15:09																										
ZZZZZZ			15:14																										
ZZZZZZ			15:18																										
ZZZZZZ			15:23																										
CCV 160-138156/51			15:28																										
CCB 160-138156/52			15:32																										
ZZZZZZ			15:37																										
ZZZZZZ			15:42																										
ZZZZZZ			15:46																										
ZZZZZZ			15:51																										
ZZZZZZ			15:56																										
ZZZZZZ			16:00																										
ZZZZZZ			16:05																										
ZZZZZZ			16:10																										
ZZZZZZ			16:14																										
ZZZZZZ			16:19																										
CCV 160-138156/63			16:26																										
CCB 160-138156/64			16:32																										
ZZZZZZ			17:00																										
ZZZZZZ			17:05																										
ZZZZZZ			17:10																										
ZZZZZZ			17:14																										
ZZZZZZ			17:19																										
ZZZZZZ			17:24																										
ZZZZZZ			17:29																										
ZZZZZZ			17:33																										
ZZZZZZ			17:38																										
ZZZZZZ			17:43																										
CCV 160-138156/75			17:47																										
CCB 160-138156/76			17:52																										
ZZZZZZ			17:57																										
ZZZZZZ			18:01																										

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/14/2014 11:32 End Date: 08/15/2014 00:12

Lab Sample Id	D/F	Type	Time	Analytes																										
				U-234	U-235	U-236	U-238																							
ZZZZZZ			18:06																											
CCV 160-138156/80			18:11																											
CCB 160-138156/81			18:15																											
ICIS 160-138156/82			18:20	X	X	X	X																							
IC 160-138156/83	1		18:27	X	X	X	X																							
IC 160-138156/84	1		18:31	X	X	X	X																							
IC 160-138156/85	1		18:36	X	X	X	X																							
IC 160-138156/86	1		18:41	X	X	X	X																							
IC 160-138156/87	1		18:45	X	X	X	X																							
ICV 160-138156/88			18:50																											
ICV 160-138156/89	1		18:55	X			X																							
ICV 160-138156/90	1		18:59		X	X																								
ICB 160-138156/91	1		19:04	X	X	X	X																							
CRI 160-138156/92	1		19:09		X		X																							
CRI 160-138156/93	1		19:13	X		X																								
ICSA 160-138156/94	1		19:18	X	X	X	X																							
ICSAB 160-138156/95	1		19:23	X	X	X	X																							
CCV 160-138156/96	1		19:27	X	X	X	X																							
CCB 160-138156/97	1		19:32	X	X	X	X																							
ZZZZZZ			19:37																											
ZZZZZZ			19:41																											
MB 160-137068/1-A	2	T	19:46	X	X	X	X																							
LCS 160-137068/2-A	2	T	19:51	X	X		X																							
680-102380-1	5	T	19:55	X	X	X	X																							
CCV 160-138156/103	1		20:00	X	X	X	X																							
CCB 160-138156/104	1		20:05	X	X	X	X																							
680-102380-1 SD	25	T	20:09	X	X	X	X																							
680-102380-1 MS	5	T	20:14	X	X		X																							
680-102380-1 MSD	5	T	20:19	X	X		X																							
680-102380-2	5	T	20:23	X	X	X	X																							
680-102380-3	5	T	20:28	X	X	X	X																							
680-102380-5	5	T	20:33	X	X	X	X																							
680-102380-6	5	T	20:37	X	X	X	X																							
680-102380-7	5	T	20:42	X	X	X	X																							
680-102380-8	5	T	20:47	X	X	X	X																							
680-102380-9	5	T	20:51	X	X	X	X																							
CCV 160-138156/115	1		20:56	X	X	X	X																							
CCB 160-138156/116	1		21:01	X	X	X	X																							
680-102380-10	5	T	21:05	X	X	X	X																							

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/14/2014 11:32 End Date: 08/15/2014 00:12

Lab Sample Id	D/F	Type	Time	Analytes																											
				U-234	U-235	U-236	U-238																								
680-102380-12	5	T	21:10	X	X	X	X																								
680-102380-13	5	T	21:15	X	X	X	X																								
680-102380-14	5	T	21:19	X	X	X	X																								
680-102380-16	5	T	21:24	X	X	X	X																								
680-102380-17	5	T	21:29	X	X	X	X																								
680-102380-18	5	T	21:33	X	X	X	X																								
680-102380-20	5	T	21:38	X	X	X	X																								
680-102380-21	5	T	21:43	X	X	X	X																								
680-102380-22	5	T	21:48	X	X	X	X																								
CCV 160-138156/127	1		21:52	X	X	X	X																								
CCB 160-138156/128	1		21:57	X	X	X	X																								
680-102380-23	5	T	22:02	X	X	X	X																								
680-102380-24	5	T	22:06	X	X	X	X																								
MB 160-137069/1-A	2	T	22:11	X	X	X	X																								
LCS 160-137069/2-A	2	T	22:16	X	X		X																								
680-102380-26	5	T	22:20	X	X	X	X																								
680-102380-26 SD	25	T	22:25	X	X	X	X																								
680-102380-26 MS	5	T	22:30	X	X		X																								
680-102380-26 MSD	5	T	22:34	X	X		X																								
680-102380-27	5	T	22:39	X	X	X	X																								
680-102380-28	5	T	22:44	X	X	X	X																								
CCV 160-138156/139	1		22:48	X	X	X	X																								
CCB 160-138156/140	1		22:53	X	X	X	X																								
680-102380-29	5	T	22:58	X	X	X	X																								
680-102380-30	5	T	23:02	X	X	X	X																								
680-102380-31	5	T	23:07	X	X	X	X																								
680-102380-33	5	T	23:12	X	X	X	X																								
680-102380-34	5	T	23:16	X	X	X	X																								
680-102380-35	5	T	23:21	X	X	X	X																								
680-102380-36	5	T	23:26	X	X	X	X																								
ZZZZZZ			23:30																												
ZZZZZZ			23:35																												
ZZZZZZ			23:40																												
CCV 160-138156/151	1		23:44	X	X	X	X																								
CCB 160-138156/152	1		23:49	X	X	X	X																								
ZZZZZZ			23:54																												
ZZZZZZ			23:58																												
ZZZZZZ			00:03																												
CCV 160-138156/156			00:08																												

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/14/2014 11:32 End Date: 08/15/2014 00:12

Lab Sample Id	D/F	Type	Time	Analytes																									
				U-234	U-235	U-236	U-238																						
CCB 160-138156/157			00:12																										

Prep Types:
T = Total/NA

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/18/2014 14:28 End Date: 08/18/2014 23:43

Lab Sample Id	D/F	Type	Time	Analytes																								
				U-233																								
ICSAB 160-138778/1	1		15:31	X																								
CCV 160-138778/2			15:36																									
CCB 160-138778/3			15:40																									
ICIS 160-138778/4			14:28	X																								
IC 160-138778/5	1		14:35	X																								
IC 160-138778/6	1		14:40	X																								
IC 160-138778/7	1		14:44	X																								
IC 160-138778/8	1		14:49	X																								
IC 160-138778/9	1		14:54	X																								
ICV 160-138778/10	1		14:58	X																								
ICV 160-138778/11			15:03																									
ICV 160-138778/12			15:08																									
ICB 160-138778/13	1		15:12	X																								
CRI 160-138778/14			15:17																									
CRI 160-138778/15	1		15:22	X																								
ICSA 160-138778/16	1		15:26	X																								
ZZZZZZ			15:56																									
ZZZZZZ			16:01																									
ZZZZZZ			16:05																									
ZZZZZZ			16:10																									
ZZZZZZ			16:15																									
ZZZZZZ			16:19																									
ZZZZZZ			16:24																									
ZZZZZZ			16:29																									
ZZZZZZ			16:33																									
ZZZZZZ			16:38																									
CCV 160-138778/27			16:43																									
CCB 160-138778/28			16:47																									
ZZZZZZ			16:52																									
ZZZZZZ			16:57																									
ZZZZZZ			17:02																									
ZZZZZZ			17:06																									
ZZZZZZ			17:11																									
ZZZZZZ			17:15																									
ZZZZZZ			17:20																									
ZZZZZZ			17:25																									
ZZZZZZ			17:29																									
ZZZZZZ			17:34																									
CCV 160-138778/39			17:39																									

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/18/2014 14:28 End Date: 08/18/2014 23:43

Lab Sample Id	D/F	Type	Time	Analytes																								
				U-233																								
CCB 160-138778/40			17:44																									
ZZZZZZ			17:48																									
ZZZZZZ			17:53																									
ZZZZZZ			17:58																									
ZZZZZZ			18:02																									
ZZZZZZ			18:07																									
ZZZZZZ			18:12																									
ZZZZZZ			18:16																									
ZZZZZZ			18:21																									
ZZZZZZ			18:26																									
ZZZZZZ			18:30																									
CCV 160-138778/51			18:35																									
CCB 160-138778/52			18:40																									
ZZZZZZ			18:44																									
ZZZZZZ			18:49																									
ZZZZZZ			18:54																									
ZZZZZZ			18:58																									
ZZZZZZ			19:03																									
ZZZZZZ			19:08																									
ZZZZZZ			19:12																									
ZZZZZZ			19:17																									
ZZZZZZ			19:22																									
ZZZZZZ			19:26																									
CCV 160-138778/63	1		19:31	X																								
CCB 160-138778/64	1		19:36	X																								
ZZZZZZ			19:40																									
ZZZZZZ			19:45																									
ZZZZZZ			19:50																									
MB 160-137068/1-A	2	T	19:54	X																								
ZZZZZZ			19:59																									
680-102380-1	5	T	20:04	X																								
680-102380-1 SD	25	T	20:08	X																								
ZZZZZZ			20:13																									
ZZZZZZ			20:18																									
680-102380-2	5	T	20:22	X																								
CCV 160-138778/75	1		20:27	X																								
CCB 160-138778/76	1		20:32	X																								
680-102380-3	5	T	20:36	X																								
680-102380-5	5	T	20:41	X																								

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/18/2014 14:28 End Date: 08/18/2014 23:43

Lab Sample Id	D/F	Type	Time	Analytes																								
				U-233																								
680-102380-6	5	T	20:46	X																								
680-102380-7	5	T	20:50	X																								
680-102380-8	5	T	20:55	X																								
680-102380-9	5	T	21:00	X																								
680-102380-10	5	T	21:04	X																								
680-102380-12	5	T	21:09	X																								
680-102380-13	5	T	21:14	X																								
680-102380-14	5	T	21:18	X																								
CCV 160-138778/87	1		21:23	X																								
CCB 160-138778/88	1		21:28	X																								
680-102380-16	5	T	21:32	X																								
680-102380-17	5	T	21:37	X																								
680-102380-18	5	T	21:42	X																								
680-102380-20	5	T	21:46	X																								
680-102380-21	5	T	21:51	X																								
680-102380-22	5	T	21:56	X																								
680-102380-23	5	T	22:00	X																								
680-102380-24	5	T	22:05	X																								
MB 160-137069/1-A	2	T	22:10	X																								
ZZZZZZ			22:14																									
CCV 160-138778/99	1		22:19	X																								
CCB 160-138778/100	1		22:24	X																								
680-102380-26	5	T	22:28	X																								
680-102380-26 SD	25	T	22:33	X																								
ZZZZZZ			22:38																									
ZZZZZZ			22:42																									
680-102380-27	5	T	22:47	X																								
680-102380-28	5	T	22:52	X																								
680-102380-29	5	T	22:56	X																								
680-102380-30	5	T	23:01	X																								
680-102380-31	5	T	23:06	X																								
680-102380-33	5	T	23:10	X																								
CCV 160-138778/111	1		23:15	X																								
CCB 160-138778/112	1		23:20	X																								
680-102380-34	5	T	23:24	X																								
680-102380-35	5	T	23:29	X																								
680-102380-36	5	T	23:34	X																								
CCV 160-138778/116	1		23:38	X																								
CCB 160-138778/117	1		23:43	X																								

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/18/2014 14:28 End Date: 08/18/2014 23:43

Lab Sample Id	D/F	Type	Time	Analytes																								
				U-233																								

Prep Types:
T = Total/NA

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Instrument ID: NOEQUIP Analysis Method: 6020A

Start Date: 08/11/2014 11:25 End Date: 08/11/2014 11:25

Lab Sample Id	D/F	Type	Time	Analytes																								
				U																								
ZZZZZZ			11:25																									
ZZZZZZ			11:25																									
680-102380-1	1	T	11:25	X																								
ZZZZZZ			11:25																									
ZZZZZZ			11:25																									
680-102380-2	1	T	11:25	X																								
680-102380-3	1	T	11:25	X																								
680-102380-5	1	T	11:25	X																								
680-102380-6	1	T	11:25	X																								
680-102380-7	1	T	11:25	X																								
680-102380-8	1	T	11:25	X																								
680-102380-9	1	T	11:25	X																								
680-102380-10	1	T	11:25	X																								
680-102380-12	1	T	11:25	X																								
680-102380-13	1	T	11:25	X																								
680-102380-14	1	T	11:25	X																								
680-102380-16	1	T	11:25	X																								
680-102380-17	1	T	11:25	X																								
680-102380-18	1	T	11:25	X																								
680-102380-20	1	T	11:25	X																								
680-102380-21	1	T	11:25	X																								
680-102380-22	1	T	11:25	X																								
680-102380-23	1	T	11:25	X																								
680-102380-24	1	T	11:25	X																								

Prep Types:
T = Total/NA

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Instrument ID: NOEQUIP Analysis Method: 6020A

Start Date: 08/19/2014 13:51 End Date: 08/19/2014 13:51

Lab Sample Id	D/F	Type	Time	Analytes																								
				U																								
680-102380-26	1	T	13:51	X																								
680-102380-27	1	T	13:51	X																								
680-102380-28	1	T	13:51	X																								
680-102380-29	1	T	13:51	X																								
680-102380-30	1	T	13:51	X																								
680-102380-31	1	T	13:51	X																								
680-102380-33	1	T	13:51	X																								
680-102380-34	1	T	13:51	X																								
680-102380-35	1	T	13:51	X																								
680-102380-36	1	T	13:51	X																								

Prep Types:
T = Total/NA

FORM XIII-IN

15-IN
ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

ICP-MS Instrument ID: ICPMS6100 Start Date: 08/14/2014 End Date: 08/14/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
IC 160-138156/83	18:27										
IC 160-138156/84	18:31										
IC 160-138156/85	18:36										
IC 160-138156/86	18:41										
IC 160-138156/87	18:45										
ICV 160-138156/89	18:55	101									
ICV 160-138156/90	18:59	102									
ICB 160-138156/91	19:04	101									
CRI 160-138156/92	19:09	102									
CRI 160-138156/93	19:13	102									
ICSA 160-138156/94	19:18	98									
ICSAB 160-138156/95	19:23	98									
CCV 160-138156/96	19:27	106									
CCB 160-138156/97	19:32	106									
MB 160-137068/1-A	19:46	109									
LCS 160-137068/2-A	19:51	108									
680-102380-1	19:55	98									
CCV 160-138156/103	20:00	106									
CCB 160-138156/104	20:05	106									
680-102380-1 SD	20:09	103									
680-102380-1 MS	20:14	98									
680-102380-1 MSD	20:19	98									
680-102380-2	20:23	99									
680-102380-3	20:28	93									
680-102380-5	20:33	96									
680-102380-6	20:37	99									
680-102380-7	20:42	114									
680-102380-8	20:47	97									
680-102380-9	20:51	99									
CCV 160-138156/115	20:56	100									
CCB 160-138156/116	21:01	100									
680-102380-10	21:05	99									
680-102380-12	21:10	98									
680-102380-13	21:15	95									
680-102380-14	21:19	93									
680-102380-16	21:24	96									
680-102380-17	21:29	98									
680-102380-18	21:33	93									
680-102380-20	21:38	95									
680-102380-21	21:43	103									
680-102380-22	21:48	93									
CCV 160-138156/127	21:52	101									

15-IN
ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

ICP-MS Instrument ID: ICPMS6100 Start Date: 08/14/2014 End Date: 08/14/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
CCB 160-138156/128	21:57	99									
680-102380-23	22:02	96									
680-102380-24	22:06	96									
MB 160-137069/1-A	22:11	103									
LCS 160-137069/2-A	22:16	101									
680-102380-26	22:20	100									
680-102380-26 SD	22:25	98									
680-102380-26 MS	22:30	98									
680-102380-26 MSD	22:34	101									
680-102380-27	22:39	101									
680-102380-28	22:44	106									
CCV 160-138156/139	22:48	100									
CCB 160-138156/140	22:53	99									
680-102380-29	22:58	95									
680-102380-30	23:02	97									
680-102380-31	23:07	96									
680-102380-33	23:12	94									
680-102380-34	23:16	94									
680-102380-35	23:21	96									
680-102380-36	23:26	98									
CCV 160-138156/151	23:44	99									
CCB 160-138156/152	23:49	111									

15-IN
ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

ICP-MS Instrument ID: ICPMS6100 Start Date: 08/18/2014 End Date: 08/18/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
IC 160-138778/5	14:35										
IC 160-138778/6	14:40										
IC 160-138778/7	14:44										
IC 160-138778/8	14:49										
IC 160-138778/9	14:54										
ICV 160-138778/10	14:58	100									
ICB 160-138778/13	15:12	99									
CRI 160-138778/15	15:22	99									
ICSA 160-138778/16	15:26	95									
ICSAB 160-138778/1	15:31	94									
CCV 160-138778/63	19:31	96									
CCB 160-138778/64	19:36	92									
MB 160-137068/1-A	19:54	95									
680-102380-1	20:04	91									
680-102380-1 SD	20:08	93									
680-102380-2	20:22	90									
CCV 160-138778/75	20:27	94									
CCB 160-138778/76	20:32	93									
680-102380-3	20:36	89									
680-102380-5	20:41	89									
680-102380-6	20:46	91									
680-102380-7	20:50	102									
680-102380-8	20:55	89									
680-102380-9	21:00	91									
680-102380-10	21:04	92									
680-102380-12	21:09	91									
680-102380-13	21:14	90									
680-102380-14	21:18	90									
CCV 160-138778/87	21:23	92									
CCB 160-138778/88	21:28	93									
680-102380-16	21:32	90									
680-102380-17	21:37	90									
680-102380-18	21:42	89									
680-102380-20	21:46	89									
680-102380-21	21:51	96									
680-102380-22	21:56	88									
680-102380-23	22:00	91									
680-102380-24	22:05	91									
MB 160-137069/1-A	22:10	93									
CCV 160-138778/99	22:19	94									
CCB 160-138778/100	22:24	94									
680-102380-26	22:28	94									

15-IN
ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

ICP-MS Instrument ID: ICPMS6100 Start Date: 08/18/2014 End Date: 08/18/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
680-102380-26 SD	22:33	93									
680-102380-27	22:47	98									
680-102380-28	22:52	99									
680-102380-29	22:56	91									
680-102380-30	23:01	94									
680-102380-31	23:06	92									
680-102380-33	23:10	90									
CCV 160-138778/111	23:15	94									
CCB 160-138778/112	23:20	94									
680-102380-34	23:24	89									
680-102380-35	23:29	90									
680-102380-36	23:34	93									
CCV 160-138778/116	23:38	94									
CCB 160-138778/117	23:43	95									

KE 8/15/14
081414M1

A Batch 138156
138157

Sample/Batch Report

TA ST. LOUIS - PERKIN ELMER ELAN 6100 - METHOD 6020 / 200.8 QUANTITATIVE ANALYSIS REPORT

User Name: stlmetals
Computer Name: SLICP03
Sample File: D:\Elandata\Sample\SW846 ISOU.sam
Report Date/Time: Friday, August 15, 2014 10:31:08
Method File: d:\Elandata\Method\2014 isou.mth
Tuning File: d:\Elandata\Tuning\epa tuning.tun
Optimization File: d:\Elandata\Optimize\epa2008.dac
Calibration File: D:\Elandata\System\081414M1.cal
Calibration Type: External Calibration
Number of Replicates: 3
Number of Readings: 1
Number of Sweeps: 100
Dual Detector Mode: Dual

A/S Loc.	Batch ID	Sample ID	Description	Aliquot Vol.	Diluted Vol.
11		Test			
12		Test			
13		IDL			
14		IDL			
15		IDL			
16		IDL			
17		IDL			
18		IDL			
19		IDL			
20	137278	MB	2		
21		LCS	2		
22		680-102199-A-1-H	5		
23		680-102199-A-1-H SD	25		
24		680-102199-A-1-I MS	5		
25		680-102199-A-1-J MSD	5		
26		680-102199-A-2-F	5		
27		680-102199-A-3-F	5		
28		680-102199-A-7-F	5		
29		680-102199-A-8-F	5		
30		680-102199-A-9-F	5		
31		680-102199-A-11-F	5		
32		680-102199-A-12-D	5		
33		680-102199-A-13-D	5		
34		680-102199-A-14-D	5		
35		680-102199-A-15-D	5		
36		680-102199-A-16-D	5		
37		680-102199-A-17-D	5		
38		680-102199-A-18-D	5		
39		680-102199-A-19-D	5		
40		680-102199-A-20-D	5		
41		680-102199-A-22-E	5		
42		680-102199-A-23-E	5		
43		680-102199-A-24-E	5		
44		680-102199-A-25-E	5		
45	137385	MB	2		
46		LCS	2		
47		680-102199-A-30-D	5		
48		680-102199-A-30-D SD	25		
49		680-102199-A-30-E MS	5		
50		680-102199-A-30-F MS	5		
51		680-102199-A-31-D	5		

All

All

52		680-102199-A-32-D	5
53		680-102199-A-33-D	5
54		680-102199-A-35-D	5
55		680-102199-A-36-D	5
56		680-102199-A-37-C	5
57		680-102199-A-39-C	5
58		680-102199-A-40-C	5
59		680-102199-A-41-C	5
60	KE 8/15/14	680-102199-A-~~26-G~~ 42-E	5
61		680-102199-A-26-G	5
62		680-102199-A-27-F	5
63		680-102199-A-28-E	5
10		CCV 59,89	5
1		CCB	5
119		TEST	2
120		TEST	2
71	137068	MB	2
72		LCS	2
73		680-102380-A-1-C	5
74		680-102380-A-1-C SD	25
75		680-102380-A-1-D MS	5
76		680-102380-A-1-E MSD	5
77		680-102380-A-2-C	5
78		680-102380-A-3-C	5
79		680-102380-A-5-C	5
80		680-102380-A-6-C	5
81		680-102380-A-7-C	5
82		680-102380-A-8-C	5
83		680-102380-A-9-C	5
84		680-102380-A-10-D	5
85		680-102380-A-12-C	5
86		680-102380-A-13-C	5
87		680-102380-A-14-C	5
88		680-102380-A-16-C	5
89		680-102380-A-17-C	5
90		680-102380-A-18-C	5
91		680-102380-A-20-C	5
92		680-102380-A-21-C	5
93		680-102380-A-22-C	5
94		680-102380-A-23-C	5
95		680-102380-A-24-C	5
96	137069	MB	2
97		LCS	2
98		680-102380-A-26-C	5
99		680-102380-A-26-C SD	25
100		680-102380-A-26-D MS	5
101		680-102380-A-26-E MSD	5
102		680-102380-A-27-C	5
103		680-102380-A-28-C	5
104		680-102380-A-29-C	5
105		680-102380-A-30-C	5
106		680-102380-A-31-C	5
107		680-102380-A-33-C	5
108		680-102380-A-34-C	5
109		680-102380-A-35-C	5
110		680-102380-A-36-C	5
111	136716	MB	2
112		LCS	2
113		160-7752-A-1-D	100
114		160-7752-A-1-D SD	500

All

CCV/CCB

Recalc ICV|ICB|LLC|A|AB (3b)|CCV|CCB (3b)

All except 233

All

115	160-7752-A-1-E MS	100	A4
116	160-7752-A-1-F MSD	100	

Quantitative Analysis Calibration Report

File Name: 081414M1.cal
File Path: D:\Elandata\System
Calibration Type: External Calibration

Analyte	Mass	Curve Type	Slope	Intercept	Corr. Coeff.
Ho (IS)	164.930	Linear Thru Zero	0.000000	0.00	0.000000
U	233.000	Linear Thru Zero	0.047070	0.00	0.999991
U	234.041	Linear Thru Zero	0.035815	0.00	0.999992
U	235.044	Linear Thru Zero	0.033635	0.00	0.999999
U	236.000	Linear Thru Zero	0.050401	0.00	0.999991
U	238.050	Linear Thru Zero	0.030546	0.00	0.999996

Quantitative Analysis Calibration Report

File Name: 081414M1-2.cal
File Path: D:\Elandata\System
Calibration Type: External Calibration

Analyte	Mass	Curve Type	Slope	Intercept	Corr. Coeff.
Ho (IS)	164.930	Linear Thru Zero	0.000000	0.00	0.000000
U	233.000	Linear Thru Zero	0.047029	0.00	0.998961
U	234.041	Linear Thru Zero	0.038136	0.00	0.999983
U	235.044	Linear Thru Zero	0.035670	0.00	0.999999
U	236.000	Linear Thru Zero	0.053770	0.00	0.999985
U	238.050	Linear Thru Zero	0.032474	0.00	0.999995

Instrument Tuning Report

File Name: EPA TUNING.tun
File Path: d:\Elandata\Tuning
Sample ID: Sample
Sample Date/Time: Thursday, August 14, 2014 10:56:01

Analyte	Exact Mass	Meas. Mass	Mass DAC	Res. DAC	Meas. Pk. Width	Custom Res.
Li	7.016	7.025	1570	2065	0.664	
Mg	23.985	23.979	5688	2080	0.686	
Rh	102.905	102.879	24919	2080	0.695	
Ce	139.905	139.929	33931	2120	0.669	
Pb	207.977	207.977	50415	2310	0.644	

Replicates: 6

Daily Performance Report

Sample ID: Sample
Sample Date/Time: Thursday, August 14, 2014 11:15:17
Sample Description:
Method File: d:\Elandata\Method\DAILY EPA.mth
Dataset File: d:\Elandata\Dataset\daily3\Sample.133
Tuning File: d:\Elandata\Tuning\EPA TUNING.tun
Optimization File: d:\Elandata\Optimize\EPA2008.dac
Dual Detector Mode: Pulse

Acq. Dead Time(ns): 35
Current Dead Time (ns): 35

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Net Intens. SD	Net Intens. RSD
	Li	7.0	2087.0	2087.041	60.767	2.9
	Mg	24.0	10755.0	10755.047	106.876	1.0
	Rh	102.9	147381.2	147381.218	1223.762	0.8
	Pb	208.0	139015.8	139015.833	1351.618	1.0
⌈>	Ba	137.9	188127.6	188127.561	1693.691	0.9
⌊	Ba++	69.0	1326.2	0.007	0.000	1.2
⌈>	Ce	139.9	229805.5	229805.494	1819.264	0.8
⌊	CeO	155.9	3856.5	0.017	0.000	1.3
	Bkgd	220.0	5.6	5.556	1.047	18.8

Current Optimization File Data

Current Value	Description
0.97	Nebulizer Gas Flow
5.75	Lens Voltage
1400.00	ICP RF Power
-2156.25	Analog Stage Voltage
1200.00	Pulse Stage Voltage
70.00	Discriminator Threshold
-6.00	AC Rod Offset
60.00	Service DAC 1
0.00	Quadrupole Rod Offset

Current Autolens Data

Analyte	Mass	Num of Pts	DAC Value	Maximum Intensity
Be	9	33	7.3	1941.1
Mg	24	33	5.3	18569.4
Co	59	33	5.5	52159.4
Rh	103	33	6.3	196415.7
In	115	33	6.3	277235.2
Ba	138	33	6.3	270242.1
Ce	140	33	6.5	340126.4
Pb	208	33	7.8	231107.7

QUANTITATIVE ANALYSIS REPORT

Sample ID: Blank

Sample Date/Time: Thursday, August 14, 2014 11:32:38
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081414M1\Blank.001

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			884012.991	ug/L	
	233	**U**			5.867	ug/L	
	234	**U**			5.000	ug/L	
	235	**U**			5.600	ug/L	
	236	**U**			4.400	ug/L	
	238	**U**			114.400	ug/L	

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 1

Sample Date/Time: Thursday, August 14, 2014 11:39:18
Autosampler Position: 191
Dataset File: D:\Elandata\Dataset\081414M1\Standard 1.002

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			883133.637	ug/L	884012.991
	233	**U**			26.600	ug/L	5.867
	234	**U**			29.933	ug/L	5.000
	235	**U**	**0.048500**	2.307	1484.677	ug/L	5.600
	236	**U**			43.600	ug/L	4.400
	238	**U**	**0.050300**	2.780	1415.670	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 2
Sample Date/Time: Thursday, August 14, 2014 11:43:59
Autosampler Position: 192
Dataset File: D:\Elandata\Dataset\081414M1\Standard 2.003

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			878805.873	ug/L	884012.991
	233	**U**			1298.526	ug/L	5.867
	234	**U**	**0.049600**	3.192	1596.289	ug/L	5.000
	235	**U**	**2.945940**	2.470	89397.002	ug/L	5.600
	236	**U**	**0.053400**	3.437	2431.807	ug/L	4.400
	238	**U**	**3.291590**	2.062	84877.853	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 3
Sample Date/Time: Thursday, August 14, 2014 11:48:40
Autosampler Position: 193
Dataset File: D:\Elandata\Dataset\081414M1\Standard 3.004

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			856476.593	ug/L	884012.991
	233	**U**	**0.051500**	2.874	2060.082	ug/L	5.867
	234	**U**	**0.078725**	2.316	2467.080	ug/L	5.000
	235	**U**	**4.766798**	1.965	141000.670	ug/L	5.600
	236	**U**	**0.086592**	1.716	3843.117	ug/L	4.400
	238	**U**	**5.306269**	1.860	133296.138	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 4
Sample Date/Time: Thursday, August 14, 2014 11:53:21
Autosampler Position: 194
Dataset File: D:\Elandata\Dataset\081414M1\Standard 4.005

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			877890.169	ug/L	884012.991
	233	**U**	**0.102947**	2.093	4209.755	ug/L	5.867
	234	**U**	**0.164865**	1.764	5140.993	ug/L	5.000
	235	**U**	**9.694894**	2.287	287225.622	ug/L	5.600
	236	**U**	**0.177436**	1.874	7792.594	ug/L	4.400
	238	**U**	**10.051812**	2.120	271678.899	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 5
Sample Date/Time: Thursday, August 14, 2014 11:58:02
Autosampler Position: 195
Dataset File: D:\Elandata\Dataset\081414M1\Standard 5.006

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			879442.439	ug/L	884012.991
	233	**U**	**0.309590**	1.818	12812.083	ug/L	5.867
	234	**U**	**0.496510**	2.123	15630.555	ug/L	5.000
	235	**U**	**29.071161**	2.170	859197.132	ug/L	5.600
	236	**U**	**0.534370**	1.748	23673.756	ug/L	4.400
	238	**U**	**30.127471**	2.313	808689.455	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 1

Sample Date/Time: Thursday, August 14, 2014 12:02:44
Autosampler Position: 196
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 1.007

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			881910.061	ug/L	884012.991
	233	**U**	**0.229050**	2.343	9504.898	ug/L	5.867
	234	**U**	**0.000471**	10.891	19.933	ug/L	5.000
	235	**U**	**0.004469**	22.035	139.267	ug/L	5.600
	236	**U**	**0.000101**	27.688	8.867	ug/L	4.400
	238	**U**	**0.050573**	1.340	1476.276	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.762**	
	U	233		**102.483**
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 2

Sample Date/Time: Thursday, August 14, 2014 12:07:25
Autosampler Position: 197
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 2.008

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			888529.957	ug/L	884012.991
	233	**U**	**42.446169**	2.793	1773153.466	ug/L	5.867
	234	**U**	**0.086694**	3.293	2760.067	ug/L	5.000
	235	**U**	**0.110694**	2.839	3309.984	ug/L	5.600
	236	**U**	**0.006891**	6.036	312.270	ug/L	4.400
	238	**U**	**9.823007**	3.052	266379.972	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.511**	
	U	233		
	U	234		**103.825**
	U	235		
	U	236		
	U	238		**100.458**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 3

Sample Date/Time: Thursday, August 14, 2014 12:12:06
Autosampler Position: 198
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 3.009

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			865864.354	ug/L	884012.991
	233	**U**	**466.010062**	1.823	18980429.567	ug/L	5.867
	234	**U**	**0.894320**	1.271	27726.444	ug/L	5.000
	235	**U**	**1.142721**	1.617	33266.725	ug/L	5.600
	236	**U**	**0.069236**	1.325	3024.387	ug/L	4.400
	238	**U**	**103.114397**	1.548	2725855.180	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.947**	
	U	233		
	U	234		
	U	235		**108.130**
	U	236		**92.810**
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 4

Sample Date/Time: Thursday, August 14, 2014 12:16:46
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 4.010

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			871117.680	ug/L	884012.991
	233	**U**	**0.050268**	40.050	2100.575	ug/L	5.867
	234	**U**	**0.000071**	148.677	7.267	ug/L	5.000
	235	**U**	**0.000302**	30.980	14.467	ug/L	5.600
	236	**U**	**0.000024**	93.062	5.333	ug/L	4.400
	238	**U**	**0.007699**	50.966	321.804	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.541**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 5

Sample Date/Time: Thursday, August 14, 2014 12:21:26
Autosampler Position: 191
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 5.011

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			885682.174	ug/L	884012.991
	233	**U**	**0.009837**	28.964	413.806	ug/L	5.867
	234	**U**	**0.000870**	9.626	32.533	ug/L	5.000
	235	**U**	**0.049298**	3.085	1472.409	ug/L	5.600
	236	**U**	**0.000910**	1.945	45.067	ug/L	4.400
	238	**U**	**0.048934**	3.692	1436.539	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.189**	
	U	233		
	U	234		
	U	235		**101.645**
	U	236		
	U	238		**97.285**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Thursday, August 14, 2014 12:26:07
Autosampler Position: 192
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 6.012

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			887961.417	ug/L	884012.991
	233	**U**	**0.035513**	3.611	1491.478	ug/L	5.867
	234	**U**	**0.050078**	1.879	1596.756	ug/L	5.000
	235	**U**	**2.972217**	1.688	88738.617	ug/L	5.600
	236	**U**	**0.053273**	0.324	2388.333	ug/L	4.400
	238	**U**	**3.074030**	2.027	83449.968	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.447**	
	U	233		**114.929**
	U	234		**100.963**
	U	235		
	U	236		**99.761**
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Thursday, August 14, 2014 12:30:48
Autosampler Position: 199
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 7.013

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			801596.229	ug/L	884012.991
	233	**U**	**0.001267**	23.998	52.667	ug/L	5.867
	234	**U**	**0.000048**	25.103	5.933	ug/L	5.000
	235	**U**	**0.000256**	39.174	11.867	ug/L	5.600
	236	**U**	**0.000047**	53.051	5.867	ug/L	4.400
	238	**U**	**-0.002503**	7.101	42.267	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.677**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 8

Sample Date/Time: Thursday, August 14, 2014 12:35:30
Autosampler Position: 200
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 8.014

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			800363.929	ug/L	884012.991
	233	**U**	**0.055018**	2.636	2076.084	ug/L	5.867
	234	**U**	**0.086314**	3.249	2475.815	ug/L	5.000
	235	**U**	**5.175939**	2.463	139220.185	ug/L	5.600
	236	**U**	**0.092736**	1.604	3743.291	ug/L	4.400
	238	**U**	**5.408102**	2.307	132207.756	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.538**	
	U	233		**106.830**
	U	234		**104.370**
	U	235		**106.775**
	U	236		**104.198**
	U	238		**107.605**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9

Sample Date/Time: Thursday, August 14, 2014 12:40:11

Autosampler Position: 10

Dataset File: D:\Elandata\Dataset\081414M1\QC Std 9.015

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			862825.686	ug/L	884012.991
	233	**U**	**0.052358**	2.347	2130.026	ug/L	5.867
	234	**U**	**0.083093**	3.589	2568.698	ug/L	5.000
	235	**U**	**4.966144**	3.133	143936.821	ug/L	5.600
	236	**U**	**0.089518**	2.935	3892.397	ug/L	4.400
	238	**U**	**5.141413**	2.959	135445.792	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.603**	
	U	233		**101.667**
	U	234		**100.475**
	U	235		**102.448**
	U	236		**100.582**
	U	238		**102.298**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 14, 2014 12:44:51
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 10.016

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			874734.796	ug/L	884012.991
	233	**U**	**0.014572**	7.329	607.080	ug/L	5.867
	234	**U**	**0.000067**	54.208	7.000	ug/L	5.000
	235	**U**	**0.001676**	9.332	55.000	ug/L	5.600
	236	**U**	**0.000037**	62.613	6.000	ug/L	4.400
	238	**U**	**0.001253**	20.403	146.934	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.950**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Test

Sample Date/Time: Thursday, August 14, 2014 12:49:31
Autosampler Position: 11
Dataset File: D:\Elandata\Dataset\081414M1\Test.017

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			868578.405	ug/L	884012.991
	233	**U**	**0.001244**	21.426	57.000	ug/L	5.867
	234	**U**	**0.000438**	7.615	18.533	ug/L	5.000
	235	**U**	**0.024586**	4.056	722.752	ug/L	5.600
	236	**U**	**0.000415**	3.520	22.467	ug/L	4.400
	238	**U**	**0.022629**	4.660	711.818	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.254**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Test

Sample Date/Time: Thursday, August 14, 2014 12:54:11
Autosampler Position: 12
Dataset File: D:\Elandata\Dataset\081414M1\Test.018

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			860589.025	ug/L	884012.991
	233	**U**	**0.001258**	7.489	56.800	ug/L	5.867
	234	**U**	**0.000881**	15.735	31.867	ug/L	5.000
	235	**U**	**0.050213**	3.550	1457.074	ug/L	5.600
	236	**U**	**0.000936**	11.727	44.800	ug/L	4.400
	238	**U**	**0.047427**	2.860	1356.731	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.350**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: IDL

Sample Date/Time: Thursday, August 14, 2014 12:58:51
Autosampler Position: 13
Dataset File: D:\Elandata\Dataset\081414M1\IDL.019

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			879010.399	ug/L	884012.991
	233	**U**	**0.000440**	14.106	23.933	ug/L	5.867
	234	**U**	**0.000036**	133.663	6.067	ug/L	5.000
	235	**U**	**0.000060**	115.259	7.267	ug/L	5.600
	236	**U**	**0.000024**	111.996	5.467	ug/L	4.400
	238	**U**	**-0.003644**	0.595	15.933	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.434**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: IDL

Sample Date/Time: Thursday, August 14, 2014 13:03:31
Autosampler Position: 14
Dataset File: D:\Elandata\Dataset\081414M1\IDL.020

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			878187.613	ug/L	884012.991
	233	**U**	**0.000454**	12.936	24.600	ug/L	5.867
	234	**U**	**0.000013**	276.796	5.400	ug/L	5.000
	235	**U**	**0.000005**	514.315	5.733	ug/L	5.600
	236	**U**	**0.000052**	14.780	6.667	ug/L	4.400
	238	**U**	**-0.003591**	2.662	17.333	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.341**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: IDL

Sample Date/Time: Thursday, August 14, 2014 13:08:11
Autosampler Position: 15
Dataset File: D:\Elandata\Dataset\081414M1\IDL.021

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			874660.923	ug/L	884012.991
	233	**U**	**0.000203**	29.184	14.267	ug/L	5.867
	234	**U**	**0.000011**	278.945	5.267	ug/L	5.000
	235	**U**	**0.000019**	243.349	6.067	ug/L	5.600
	236	**U**	**0.000034**	131.629	5.800	ug/L	4.400
	238	**U**	**-0.003654**	3.736	15.667	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.942**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: IDL

Sample Date/Time: Thursday, August 14, 2014 13:12:51
Autosampler Position: 16
Dataset File: D:\Elandata\Dataset\081414M1\IDL.022

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			878125.747	ug/L	884012.991
	233	**U**	**0.000115**	14.593	10.600	ug/L	5.867
	234	**U**	**-0.000004**	519.788	4.800	ug/L	5.000
	235	**U**	**0.000028**	194.948	6.467	ug/L	5.600
	236	**U**	**0.000021**	121.884	5.267	ug/L	4.400
	238	**U**	**-0.003702**	1.922	14.267	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.334**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: IDL

Sample Date/Time: Thursday, August 14, 2014 13:17:32
Autosampler Position: 17
Dataset File: D:\Elandata\Dataset\081414M1\IDL.023

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			882719.211	ug/L	884012.991
	233	**U**	**0.000088**	40.658	9.467	ug/L	5.867
	234	**U**	**0.000012**	325.440	5.333	ug/L	5.000
	235	**U**	**-0.000026**	37.605	4.800	ug/L	5.600
	236	**U**	**0.000006**	667.195	4.733	ug/L	4.400
	238	**U**	**-0.003594**	5.205	17.133	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.854**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: IDL

Sample Date/Time: Thursday, August 14, 2014 13:22:11
Autosampler Position: 18
Dataset File: D:\Elandata\Dataset\081414M1\IDL.024

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			868426.841	ug/L	884012.991
	233	**U**	**0.000065**	19.625	8.400	ug/L	5.867
	234	**U**	**-0.000004**	246.233	4.800	ug/L	5.000
	235	**U**	**0.000003**	1414.821	5.600	ug/L	5.600
	236	**U**	**0.000043**	53.607	6.200	ug/L	4.400
	238	**U**	**-0.003688**	0.494	14.533	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.237**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: IDL

Sample Date/Time: Thursday, August 14, 2014 13:26:51

Autosampler Position: 19

Dataset File: D:\Elandata\Dataset\081414M1\IDL.025

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			870264.030	ug/L	884012.991
	233	**U**	**0.000042**	50.526	7.467	ug/L	5.867
	234	**U**	**0.000031**	88.240	5.867	ug/L	5.000
	235	**U**	**0.000074**	70.706	7.667	ug/L	5.600
	236	**U**	**0.000033**	44.532	5.733	ug/L	4.400
	238	**U**	**-0.003732**	0.867	13.400	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.445**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: MB

Sample Date/Time: Thursday, August 14, 2014 13:31:32
Autosampler Position: 20
Dataset File: D:\Elandata\Dataset\081414M1\MB.026

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			903157.949	ug/L	884012.991
	233	**U**	**0.000047**	71.529	8.000	ug/L	5.867
	234	**U**	**0.000022**	155.163	5.800	ug/L	5.000
	235	**U**	**0.000106**	38.528	8.933	ug/L	5.600
	236	**U**	**0.000030**	120.354	5.867	ug/L	4.400
	238	**U**	**0.010763**	1.996	413.606	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**102.166**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Thursday, August 14, 2014 13:36:12
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 9.027

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			872474.513	ug/L	884012.991
	233	**U**	**0.051981**	1.618	2139.027	ug/L	5.867
	234	**U**	**0.083095**	2.047	2599.370	ug/L	5.000
	235	**U**	**4.945295**	2.325	144987.045	ug/L	5.600
	236	**U**	**0.089194**	1.613	3923.873	ug/L	4.400
	238	**U**	**5.132297**	1.938	136780.651	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.695**	
	U	233		**100.934**
	U	234		**100.477**
	U	235		**102.017**
	U	236		**100.218**
	U	238		**102.117**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 14, 2014 13:40:52
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 10.028

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			886127.129	ug/L	884012.991
	233	**U**	**0.012864**	2.907	541.877	ug/L	5.867
	234	**U**	**0.000046**	106.238	6.533	ug/L	5.000
	235	**U**	**0.001390**	10.732	46.867	ug/L	5.600
	236	**U**	**0.000034**	44.752	5.933	ug/L	4.400
	238	**U**	**0.000621**	21.716	131.401	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.239**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: LCS

Sample Date/Time: Thursday, August 14, 2014 13:45:31
Autosampler Position: 21
Dataset File: D:\Elandata\Dataset\081414M1\LCS.029

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			917897.146	ug/L	884012.991
	233	**U**	**0.002563**	3.454	116.734	ug/L	5.867
	234	**U**	**0.040681**	1.526	1341.863	ug/L	5.000
	235	**U**	**2.402078**	2.478	74094.472	ug/L	5.600
	236	**U**	**0.043484**	2.518	2014.342	ug/L	4.400
	238	**U**	**2.491088**	2.280	69900.615	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**103.833**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-1-H

Sample Date/Time: Thursday, August 14, 2014 13:50:11

Autosampler Position: 22

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-1-H.030

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			847732.446	ug/L	884012.991
	233	**U**	**0.000121**	15.897	10.467	ug/L	5.867
	234	**U**	**0.000446**	7.630	18.333	ug/L	5.000
	235	**U**	**0.040431**	0.336	1158.114	ug/L	5.600
	236	**U**	**0.000040**	74.650	5.933	ug/L	4.400
	238	**U**	**5.370183**	0.062	139167.813	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.896**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-1-H SD

Sample Date/Time: Thursday, August 14, 2014 13:54:50

Autosampler Position: 23

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-1-H SD.031

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			860783.735	ug/L	884012.991
	233	**U**	**0.000076**	92.149	8.867	ug/L	5.867
	234	**U**	**0.000061**	68.656	6.733	ug/L	5.000
	235	**U**	**0.008187**	3.297	242.335	ug/L	5.600
	236	**U**	**0.000011**	299.924	4.800	ug/L	4.400
	238	**U**	**1.106905**	1.749	29199.096	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.372**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-1-I MS

Sample Date/Time: Thursday, August 14, 2014 13:59:30

Autosampler Position: 24

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-1-I MS.032

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			840369.245	ug/L	884012.991
	233	**U**	**0.001185**	6.289	52.467	ug/L	5.867
	234	**U**	**0.016151**	1.614	490.875	ug/L	5.000
	235	**U**	**1.011082**	0.475	28585.717	ug/L	5.600
	236	**U**	**0.016869**	1.532	718.551	ug/L	4.400
	238	**U**	**8.200261**	1.086	210596.577	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.063**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-1-J MSD

Sample Date/Time: Thursday, August 14, 2014 14:04:10

Autosampler Position: 25

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-1-J MSD.033

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			848127.834	ug/L	884012.991
	233	**U**	**0.001009**	6.611	45.933	ug/L	5.867
	234	**U**	**0.014856**	2.686	455.807	ug/L	5.000
	235	**U**	**0.907174**	1.781	25876.288	ug/L	5.600
	236	**U**	**0.015716**	1.613	675.883	ug/L	4.400
	238	**U**	**6.733730**	1.318	174520.555	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.941**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-2-F

Sample Date/Time: Thursday, August 14, 2014 14:08:50

Autosampler Position: 26

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-2-F.034

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			828080.232	ug/L	884012.991
	233	**U**	**0.000233**	37.814	14.600	ug/L	5.867
	234	**U**	**0.000471**	23.689	18.667	ug/L	5.000
	235	**U**	**0.050404**	4.983	1408.269	ug/L	5.600
	236	**U**	**0.000027**	204.597	5.267	ug/L	4.400
	238	**U**	**6.812442**	4.786	172314.472	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.673**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-3-F

Sample Date/Time: Thursday, August 14, 2014 14:13:30

Autosampler Position: 27

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-3-F.035

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			850676.018	ug/L	884012.991
	233	**U**	**0.000109**	41.372	10.000	ug/L	5.867
	234	**U**	**0.000290**	27.475	13.600	ug/L	5.000
	235	**U**	**0.027030**	5.768	777.821	ug/L	5.600
	236	**U**	**0.000010**	221.632	4.667	ug/L	4.400
	238	**U**	**3.640614**	5.466	94578.650	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.229**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-7-F

Sample Date/Time: Thursday, August 14, 2014 14:18:09

Autosampler Position: 28

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-7-F.036

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			841167.034	ug/L	884012.991
	233	**U**	**0.000241**	10.061	15.133	ug/L	5.867
	234	**U**	**0.000459**	19.039	18.533	ug/L	5.000
	235	**U**	**0.052227**	4.914	1481.544	ug/L	5.600
	236	**U**	**0.000023**	40.509	5.133	ug/L	4.400
	238	**U**	**6.980835**	5.449	179284.332	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.153**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-8-F

Sample Date/Time: Thursday, August 14, 2014 14:22:49

Autosampler Position: 29

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-8-F.037

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			841356.414	ug/L	884012.991
	233	**U**	**0.000197**	42.991	13.333	ug/L	5.867
	234	**U**	**0.000417**	12.820	17.333	ug/L	5.000
	235	**U**	**0.053822**	6.833	1527.348	ug/L	5.600
	236	**U**	**0.000009**	383.735	4.533	ug/L	4.400
	238	**U**	**7.156959**	6.156	183904.755	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.175**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-9-F

Sample Date/Time: Thursday, August 14, 2014 14:27:29

Autosampler Position: 30

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-9-F.038

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			819174.096	ug/L	884012.991
	233	**U**	**0.000281**	8.601	16.267	ug/L	5.867
	234	**U**	**0.000728**	18.593	25.933	ug/L	5.000
	235	**U**	**0.088208**	5.251	2433.941	ug/L	5.600
	236	**U**	**0.000049**	47.859	6.067	ug/L	4.400
	238	**U**	**11.826652**	4.835	295848.474	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.665**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Thursday, August 14, 2014 14:32:09
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 9.039

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			841976.395	ug/L	884012.991
	233	**U**	**0.053273**	2.373	2115.157	ug/L	5.867
	234	**U**	**0.085920**	2.178	2594.503	ug/L	5.000
	235	**U**	**5.125912**	1.898	145109.808	ug/L	5.600
	236	**U**	**0.092322**	0.879	3921.005	ug/L	4.400
	238	**U**	**5.340479**	1.394	137404.643	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.245**	
	U	233		**103.443**
	U	234		**103.894**
	U	235		**105.743**
	U	236		**103.733**
	U	238		**106.259**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 14, 2014 14:36:49

Autosampler Position: 1

Dataset File: D:\Elandata\Dataset\081414M1\QC Std 10.040

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			835957.711	ug/L	884012.991
	233	**U**	**0.013435**	2.726	533.677	ug/L	5.867
	234	**U**	**0.000078**	20.706	7.067	ug/L	5.000
	235	**U**	**0.001965**	14.721	60.867	ug/L	5.600
	236	**U**	**0.000120**	44.942	9.133	ug/L	4.400
	238	**U**	**0.001707**	22.328	152.001	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.564**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-11-F

Sample Date/Time: Thursday, August 14, 2014 14:41:29

Autosampler Position: 31

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-11-F.041

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			796002.069	ug/L	884012.991
	233	**U**	**0.000235**	19.791	14.067	ug/L	5.867
	234	**U**	**0.000504**	4.009	18.867	ug/L	5.000
	235	**U**	**0.043089**	6.444	1157.780	ug/L	5.600
	236	**U**	**0.000129**	3.560	9.133	ug/L	4.400
	238	**U**	**5.808803**	5.160	141253.917	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.044**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-12-D

Sample Date/Time: Thursday, August 14, 2014 14:46:09

Autosampler Position: 32

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-12-D.042

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			823053.193	ug/L	884012.991
	233	**U**	**0.000146**	44.895	11.067	ug/L	5.867
	234	**U**	**0.000494**	9.937	19.200	ug/L	5.000
	235	**U**	**0.050859**	4.835	1411.936	ug/L	5.600
	236	**U**	**0.000046**	59.140	6.000	ug/L	4.400
	238	**U**	**6.768099**	4.045	170139.312	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.104**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-13-D
Sample Date/Time: Thursday, August 14, 2014 14:50:50
Autosampler Position: 33
Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-13-D.043

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			888435.869	ug/L	884012.991
	233	**U**	**0.000184**	24.243	13.533	ug/L	5.867
	234	**U**	**0.000203**	19.447	11.467	ug/L	5.000
	235	**U**	**0.017604**	6.232	530.810	ug/L	5.600
	236	**U**	**0.000031**	70.914	5.800	ug/L	4.400
	238	**U**	**2.387956**	7.462	64775.966	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.500**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-14-D

Sample Date/Time: Thursday, August 14, 2014 14:55:31

Autosampler Position: 34

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-14-D.044

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			890112.500	ug/L	884012.991
	233	**U**	**0.000215**	21.945	14.933	ug/L	5.867
	234	**U**	**0.000441**	23.195	19.000	ug/L	5.000
	235	**U**	**0.061214**	6.538	1835.251	ug/L	5.600
	236	**U**	**0.000043**	66.070	6.400	ug/L	4.400
	238	**U**	**8.238397**	5.561	223779.414	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.690**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-15-D
Sample Date/Time: Thursday, August 14, 2014 15:00:11
Autosampler Position: 35
Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-15-D.045

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			823668.101	ug/L	884012.991
	233	**U**	**0.000351**	13.246	19.067	ug/L	5.867
	234	**U**	**0.000214**	27.455	10.933	ug/L	5.000
	235	**U**	**0.014184**	3.106	397.872	ug/L	5.600
	236	**U**	**0.000140**	55.637	9.867	ug/L	4.400
	238	**U**	**1.885851**	5.364	47487.944	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.174**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-16-D
Sample Date/Time: Thursday, August 14, 2014 15:04:50
Autosampler Position: 36
Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-16-D.046

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			879952.360	ug/L	884012.991
	233	**U**	**0.000227**	31.026	15.200	ug/L	5.867
	234	**U**	**0.000237**	26.675	12.400	ug/L	5.000
	235	**U**	**0.015478**	10.010	462.541	ug/L	5.600
	236	**U**	**0.000080**	64.593	7.867	ug/L	4.400
	238	**U**	**2.126484**	8.790	57146.604	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.541**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-17-D

Sample Date/Time: Thursday, August 14, 2014 15:09:30

Autosampler Position: 37

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-17-D.047

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			890372.349	ug/L	884012.991
	233	**U**	**0.000264**	31.255	16.933	ug/L	5.867
	234	**U**	**0.000129**	10.627	9.133	ug/L	5.000
	235	**U**	**0.010953**	4.867	333.404	ug/L	5.600
	236	**U**	**0.000023**	147.792	5.467	ug/L	4.400
	238	**U**	**1.471714**	6.802	40094.657	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.719**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-18-D

Sample Date/Time: Thursday, August 14, 2014 15:14:10

Autosampler Position: 38

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-18-D.048

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			792995.931	ug/L	884012.991
	233	**U**	**0.000290**	25.400	16.067	ug/L	5.867
	234	**U**	**0.000612**	33.539	21.800	ug/L	5.000
	235	**U**	**0.068695**	4.181	1836.185	ug/L	5.600
	236	**U**	**0.000094**	54.508	7.733	ug/L	4.400
	238	**U**	**9.205656**	3.525	222976.764	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.704**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-19-D

Sample Date/Time: Thursday, August 14, 2014 15:18:50

Autosampler Position: 39

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-19-D.049

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			758399.642	ug/L	884012.991
	233	**U**	**0.000242**	4.477	13.667	ug/L	5.867
	234	**U**	**0.000468**	8.931	17.000	ug/L	5.000
	235	**U**	**0.043577**	5.265	1115.977	ug/L	5.600
	236	**U**	**0.000114**	43.848	8.133	ug/L	4.400
	238	**U**	**5.843205**	3.721	135425.752	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**85.791**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-20-D

Sample Date/Time: Thursday, August 14, 2014 15:23:29

Autosampler Position: 40

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-20-D.050

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			787415.787	ug/L	884012.991
	233	**U**	**0.000231**	34.416	13.733	ug/L	5.867
	234	**U**	**0.000584**	10.014	20.933	ug/L	5.000
	235	**U**	**0.067106**	4.357	1781.111	ug/L	5.600
	236	**U**	**0.000082**	49.259	7.200	ug/L	4.400
	238	**U**	**6.992655**	4.374	168171.586	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.073**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Thursday, August 14, 2014 15:28:09
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 9.051

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			828718.947	ug/L	884012.991
	233	**U**	**0.053179**	3.714	2077.618	ug/L	5.867
	234	**U**	**0.087154**	1.734	2589.902	ug/L	5.000
	235	**U**	**5.202533**	1.646	144938.992	ug/L	5.600
	236	**U**	**0.093705**	1.419	3916.071	ug/L	4.400
	238	**U**	**5.405071**	2.233	136831.461	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.745**	
	U	233		**103.261**
	U	234		**105.385**
	U	235		**107.324**
	U	236		**105.286**
	U	238		**107.544**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 14, 2014 15:32:49
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 10.052

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			827205.512	ug/L	884012.991
	233	**U**	**0.013705**	4.242	538.143	ug/L	5.867
	234	**U**	**0.000114**	39.429	8.000	ug/L	5.000
	235	**U**	**0.001929**	13.262	59.133	ug/L	5.600
	236	**U**	**0.000081**	29.866	7.467	ug/L	4.400
	238	**U**	**0.001556**	9.259	146.467	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.574**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-22-E

Sample Date/Time: Thursday, August 14, 2014 15:37:29

Autosampler Position: 41

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-22-E.053

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			786806.448	ug/L	884012.991
	233	**U**	**0.000115**	27.997	9.467	ug/L	5.867
	234	**U**	**0.000472**	5.840	17.733	ug/L	5.000
	235	**U**	**0.047658**	7.255	1264.056	ug/L	5.600
	236	**U**	**0.000099**	25.458	7.800	ug/L	4.400
	238	**U**	**6.286899**	6.890	150934.935	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.004**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-23-E

Sample Date/Time: Thursday, August 14, 2014 15:42:08

Autosampler Position: 42

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-23-E.054

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			812783.758	ug/L	884012.991
	233	**U**	**0.000127**	35.216	10.200	ug/L	5.867
	234	**U**	**0.000332**	24.485	14.200	ug/L	5.000
	235	**U**	**0.034894**	6.399	957.432	ug/L	5.600
	236	**U**	**0.000065**	78.609	6.667	ug/L	4.400
	238	**U**	**4.713620**	7.959	116879.696	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.943**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-24-E

Sample Date/Time: Thursday, August 14, 2014 15:46:49
Autosampler Position: 43
Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-24-E.055

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			852883.793	ug/L	884012.991
	233	**U**	**0.000236**	14.844	15.133	ug/L	5.867
	234	**U**	**0.000171**	5.139	10.067	ug/L	5.000
	235	**U**	**0.013964**	5.248	405.406	ug/L	5.600
	236	**U**	**0.000061**	36.871	6.867	ug/L	4.400
	238	**U**	**1.848241**	3.565	48213.224	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.479**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-25-E

Sample Date/Time: Thursday, August 14, 2014 15:51:29

Autosampler Position: 44

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-25-E.056

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			847323.357	ug/L	884012.991
	233	**U**	**0.000262**	24.418	16.067	ug/L	5.867
	234	**U**	**0.000135**	24.023	8.867	ug/L	5.000
	235	**U**	**0.013825**	7.915	398.539	ug/L	5.600
	236	**U**	**0.000059**	15.087	6.733	ug/L	4.400
	238	**U**	**1.875700**	7.689	48560.952	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.850**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: MB

Sample Date/Time: Thursday, August 14, 2014 15:56:10
Autosampler Position: 45
Dataset File: D:\Elandata\Dataset\081414M1\MB.057

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			832456.661	ug/L	884012.991
	233	**U**	**0.000045**	88.459	7.333	ug/L	5.867
	234	**U**	**0.000045**	68.723	6.000	ug/L	5.000
	235	**U**	**0.000642**	25.750	23.067	ug/L	5.600
	236	**U**	**0.000076**	78.963	7.267	ug/L	4.400
	238	**U**	**0.068371**	5.075	1842.786	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.168**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: LCS

Sample Date/Time: Thursday, August 14, 2014 16:00:51
Autosampler Position: 46
Dataset File: D:\Elandata\Dataset\081414M1\LCS.058

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			837121.309	ug/L	884012.991
	233	**U**	**0.002848**	4.116	117.734	ug/L	5.867
	234	**U**	**0.044544**	2.528	1338.796	ug/L	5.000
	235	**U**	**2.647195**	2.942	74449.920	ug/L	5.600
	236	**U**	**0.047231**	1.265	1995.873	ug/L	4.400
	238	**U**	**2.762795**	3.111	70661.588	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.696**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-30-D

Sample Date/Time: Thursday, August 14, 2014 16:05:31

Autosampler Position: 47

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-30-D.059

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			794250.528	ug/L	884012.991
	233	**U**	**0.000187**	29.713	12.267	ug/L	5.867
	234	**U**	**0.000407**	5.321	16.067	ug/L	5.000
	235	**U**	**0.045196**	0.679	1212.318	ug/L	5.600
	236	**U**	**0.000068**	30.942	6.667	ug/L	4.400
	238	**U**	**5.887123**	0.748	142928.844	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.846**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-30-D SD

Sample Date/Time: Thursday, August 14, 2014 16:10:10

Autosampler Position: 48

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-30-D SD.060

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			823241.610	ug/L	884012.991
	233	**U**	**0.000061**	77.249	7.800	ug/L	5.867
	234	**U**	**0.000126**	32.696	8.400	ug/L	5.000
	235	**U**	**0.009309**	6.052	262.469	ug/L	5.600
	236	**U**	**0.000045**	53.609	5.933	ug/L	4.400
	238	**U**	**1.200964**	1.957	30288.832	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.126**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-30-E MS

Sample Date/Time: Thursday, August 14, 2014 16:14:50

Autosampler Position: 49

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-30-E MS.061

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			793688.046	ug/L	884012.991
	233	**U**	**0.001221**	5.290	50.933	ug/L	5.867
	234	**U**	**0.017794**	1.641	510.142	ug/L	5.000
	235	**U**	**1.086454**	1.359	29002.084	ug/L	5.600
	236	**U**	**0.018482**	1.413	743.086	ug/L	4.400
	238	**U**	**7.707719**	1.269	186923.902	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.782**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-30-F MSD

Sample Date/Time: Thursday, August 14, 2014 16:19:29

Autosampler Position: 50

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-30-F MSD.062

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			798053.940	ug/L	884012.991
	233	**U**	**0.001306**	7.304	54.400	ug/L	5.867
	234	**U**	**0.017772**	3.674	512.209	ug/L	5.000
	235	**U**	**1.080567**	0.823	29006.759	ug/L	5.600
	236	**U**	**0.018629**	0.766	753.220	ug/L	4.400
	238	**U**	**6.998104**	0.658	170677.164	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.276**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9

Sample Date/Time: Thursday, August 14, 2014 16:26:55
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 9.063

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			813069.805	ug/L	884012.991
	233	**U**	**0.054003**	2.194	2070.350	ug/L	5.867
	234	**U**	**0.086748**	1.385	2529.358	ug/L	5.000
	235	**U**	**5.198440**	2.185	142048.931	ug/L	5.600
	236	**U**	**0.094931**	2.530	3890.530	ug/L	4.400
	238	**U**	**5.407247**	2.420	134270.169	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.975**	
	U	233		**104.860**
	U	234		**104.895**
	U	235		**107.240**
	U	236		**106.664**
	U	238		**107.588**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 14, 2014 16:32:01
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 10.064

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			814886.326	ug/L	884012.991
	233	**U**	**0.013877**	3.990	536.810	ug/L	5.867
	234	**U**	**0.000101**	19.309	7.533	ug/L	5.000
	235	**U**	**0.001818**	19.665	54.600	ug/L	5.600
	236	**U**	**0.000087**	61.094	7.533	ug/L	4.400
	238	**U**	**0.001495**	43.075	142.001	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.180**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-31-D

Sample Date/Time: Thursday, August 14, 2014 17:00:59

Autosampler Position: 51

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-31-D.065

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			795990.260	ug/L	884012.991
	233	**U**	**0.000206**	48.538	13.000	ug/L	5.867
	234	**U**	**0.000519**	8.058	19.267	ug/L	5.000
	235	**U**	**0.052832**	6.135	1417.870	ug/L	5.600
	236	**U**	**0.000061**	28.069	6.400	ug/L	4.400
	238	**U**	**6.472706**	5.215	157326.848	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.043**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-32-D

Sample Date/Time: Thursday, August 14, 2014 17:05:39

Autosampler Position: 52

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-32-D.066

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			758167.724	ug/L	884012.991
	233	**U**	**0.000183**	27.580	11.533	ug/L	5.867
	234	**U**	**0.000456**	7.094	16.667	ug/L	5.000
	235	**U**	**0.046151**	4.473	1180.982	ug/L	5.600
	236	**U**	**0.000130**	25.433	8.733	ug/L	4.400
	238	**U**	**4.652002**	3.257	107787.390	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**85.764**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-33-D

Sample Date/Time: Thursday, August 14, 2014 17:10:19

Autosampler Position: 53

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-33-D.067

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			803551.921	ug/L	884012.991
	233	**U**	**0.000140**	15.039	10.600	ug/L	5.867
	234	**U**	**0.000434**	23.396	17.000	ug/L	5.000
	235	**U**	**0.048188**	4.888	1306.460	ug/L	5.600
	236	**U**	**0.000048**	44.685	5.933	ug/L	4.400
	238	**U**	**6.378996**	4.631	156566.641	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.898**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-35-D
Sample Date/Time: Thursday, August 14, 2014 17:14:59
Autosampler Position: 54
Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-35-D.068

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			798654.986	ug/L	884012.991
	233	**U**	**0.000225**	14.407	13.733	ug/L	5.867
	234	**U**	**0.000677**	6.368	23.867	ug/L	5.000
	235	**U**	**0.075488**	4.418	2032.011	ug/L	5.600
	236	**U**	**0.000125**	7.857	9.000	ug/L	4.400
	238	**U**	**10.137619**	5.314	247292.004	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.344**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-36-D

Sample Date/Time: Thursday, August 14, 2014 17:19:40

Autosampler Position: 55

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-36-D.069

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			811354.951	ug/L	884012.991
	233	**U**	**0.000213**	7.552	13.533	ug/L	5.867
	234	**U**	**0.000657**	8.286	23.667	ug/L	5.000
	235	**U**	**0.068181**	5.215	1864.655	ug/L	5.600
	236	**U**	**0.000078**	35.417	7.200	ug/L	4.400
	238	**U**	**8.646001**	5.214	214235.794	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.781**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-37-C

Sample Date/Time: Thursday, August 14, 2014 17:24:19

Autosampler Position: 56

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-37-C.070

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			743680.413	ug/L	884012.991
	233	**U**	**0.000235**	59.572	13.200	ug/L	5.867
	234	**U**	**0.000430**	8.869	15.667	ug/L	5.000
	235	**U**	**0.043369**	2.799	1089.308	ug/L	5.600
	236	**U**	**0.000123**	52.703	8.333	ug/L	4.400
	238	**U**	**5.795581**	3.587	131712.391	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**84.126**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-39-C

Sample Date/Time: Thursday, August 14, 2014 17:29:00

Autosampler Position: 57

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-39-C.071

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			788055.311	ug/L	884012.991
	233	**U**	**0.000126**	58.830	9.867	ug/L	5.867
	234	**U**	**0.000532**	5.995	19.467	ug/L	5.000
	235	**U**	**0.055213**	4.789	1467.409	ug/L	5.600
	236	**U**	**0.000020**	127.298	4.733	ug/L	4.400
	238	**U**	**7.331960**	5.361	176443.384	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.145**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-40-C

Sample Date/Time: Thursday, August 14, 2014 17:33:41

Autosampler Position: 58

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-40-C.072

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			801819.296	ug/L	884012.991
	233	**U**	**0.000174**	20.657	11.867	ug/L	5.867
	234	**U**	**0.000471**	20.237	18.000	ug/L	5.000
	235	**U**	**0.057899**	4.780	1565.086	ug/L	5.600
	236	**U**	**0.000071**	13.913	6.867	ug/L	4.400
	238	**U**	**7.226504**	5.082	176928.925	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.702**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-41-C

Sample Date/Time: Thursday, August 14, 2014 17:38:21

Autosampler Position: 59

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-41-C.073

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			782436.231	ug/L	884012.991
	233	**U**	**0.000198**	14.394	12.467	ug/L	5.867
	234	**U**	**0.000555**	7.604	20.000	ug/L	5.000
	235	**U**	**0.062166**	5.243	1639.494	ug/L	5.600
	236	**U**	**0.000042**	118.497	5.533	ug/L	4.400
	238	**U**	**8.256850**	5.495	197243.669	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.510**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-26-G

Sample Date/Time: Thursday, August 14, 2014 17:43:01

Autosampler Position: 60

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-26-G.074

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			786659.262	ug/L	884012.991
	233	**U**	**0.000290**	14.295	15.933	ug/L	5.867
	234	**U**	**0.000240**	35.477	11.133	ug/L	5.000
	235	**U**	**0.018114**	8.213	482.942	ug/L	5.600
	236	**U**	**0.000053**	36.408	6.000	ug/L	4.400
	238	**U**	**2.442217**	6.839	58647.044	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.987**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Thursday, August 14, 2014 17:47:42
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 9.075

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			791078.042	ug/L	884012.991
	233	**U**	**0.055438**	3.873	2066.216	ug/L	5.867
	234	**U**	**0.089340**	2.702	2532.891	ug/L	5.000
	235	**U**	**5.332038**	2.615	141725.718	ug/L	5.600
	236	**U**	**0.096631**	4.544	3849.385	ug/L	4.400
	238	**U**	**5.496587**	2.654	132774.036	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.487**	
	U	233		**107.647**
	U	234		**108.029**
	U	235		**109.996**
	U	236		**108.574**
	U	238		**109.365**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 14, 2014 17:52:22

Autosampler Position: 1

Dataset File: D:\Elandata\Dataset\081414M1\QC Std 10.076

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			791164.262	ug/L	884012.991
	233	**U**	**0.013891**	3.288	521.810	ug/L	5.867
	234	**U**	**0.000079**	35.614	6.733	ug/L	5.000
	235	**U**	**0.002378**	15.193	67.867	ug/L	5.600
	236	**U**	**0.000111**	27.614	8.400	ug/L	4.400
	238	**U**	**0.001878**	34.204	147.334	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.497**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-26-G

Sample Date/Time: Thursday, August 14, 2014 17:57:02

Autosampler Position: 61

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-26-G.077

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			777893.096	ug/L	884012.991
	233	**U**	**0.000237**	28.280	13.800	ug/L	5.867
	234	**U**	**0.000509**	13.498	18.533	ug/L	5.000
	235	**U**	**0.052401**	5.804	1374.666	ug/L	5.600
	236	**U**	**0.000051**	57.270	5.867	ug/L	4.400
	238	**U**	**6.921015**	4.837	164419.384	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**87.996**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-27-F

Sample Date/Time: Thursday, August 14, 2014 18:01:42

Autosampler Position: 62

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-27-F.078

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			796360.861	ug/L	884012.991
	233	**U**	**0.000189**	24.656	12.333	ug/L	5.867
	234	**U**	**0.000454**	4.699	17.467	ug/L	5.000
	235	**U**	**0.047554**	4.323	1277.657	ug/L	5.600
	236	**U**	**0.000073**	55.940	6.867	ug/L	4.400
	238	**U**	**6.209144**	4.643	151000.696	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.085**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-28-E

Sample Date/Time: Thursday, August 14, 2014 18:06:22

Autosampler Position: 63

Dataset File: D:\Elandata\Dataset\081414M1\680-102199-A-28-E.079

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			773632.205	ug/L	884012.991
	233	**U**	**0.000198**	30.742	12.333	ug/L	5.867
	234	**U**	**0.000343**	12.901	13.867	ug/L	5.000
	235	**U**	**0.038691**	4.109	1011.036	ug/L	5.600
	236	**U**	**0.000111**	38.345	8.133	ug/L	4.400
	238	**U**	**5.176400**	4.850	122315.807	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**87.514**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: CCV

Sample Date/Time: Thursday, August 14, 2014 18:11:02
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081414M1\CCV.080

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			794040.248	ug/L	884012.991
	233	**U**	**0.056100**	2.323	2099.888	ug/L	5.867
	234	**U**	**0.089540**	1.763	2549.094	ug/L	5.000
	235	**U**	**5.357085**	3.125	142881.264	ug/L	5.600
	236	**U**	**0.096082**	2.885	3844.251	ug/L	4.400
	238	**U**	**5.563402**	2.154	134910.317	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.822**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: CCB

Sample Date/Time: Thursday, August 14, 2014 18:15:43
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081414M1\CCB.081

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			797723.624	ug/L	884012.991
	233	**U**	**0.013875**	3.320	525.610	ug/L	5.867
	234	**U**	**0.000083**	53.723	6.933	ug/L	5.000
	235	**U**	**0.002926**	28.390	82.600	ug/L	5.600
	236	**U**	**0.000113**	42.503	8.467	ug/L	4.400
	238	**U**	**0.002811**	33.640	170.734	ug/L	114.400

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.239**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Blank

Sample Date/Time: Thursday, August 14, 2014 18:20:22
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081414M1\Blank.082

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			787112.810	ug/L	
	233	**U**			520.743	ug/L	
	234	**U**			5.000	ug/L	
	235	**U**			43.667	ug/L	
	236	**U**			8.267	ug/L	
	238	**U**			128.001	ug/L	

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 1
Sample Date/Time: Thursday, August 14, 2014 18:27:03
Autosampler Position: 191
Dataset File: D:\Elandata\Dataset\081414M1\Standard 1.083

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			802700.876	ug/L	787112.810
	233	**U**			387.739	ug/L	520.743
	234	**U**			33.133	ug/L	5.000
	235	**U**	**0.048500**	2.974	1423.604	ug/L	43.667
	236	**U**			45.733	ug/L	8.267
	238	**U**	**0.050300**	3.563	1433.939	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 2
Sample Date/Time: Thursday, August 14, 2014 18:31:44
Autosampler Position: 192
Dataset File: D:\Elandata\Dataset\081414M1\Standard 2.084

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			804449.017	ug/L	787112.810
	233	**U**			1399.402	ug/L	520.743
	234	**U**	**0.049600**	2.849	1540.950	ug/L	5.000
	235	**U**	**3.050233**	2.782	86993.772	ug/L	43.667
	236	**U**	**0.053400**	2.127	2367.396	ug/L	8.267
	238	**U**	**3.158584**	2.749	82200.534	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 3
Sample Date/Time: Thursday, August 14, 2014 18:36:25
Autosampler Position: 193
Dataset File: D:\Elandata\Dataset\081414M1\Standard 3.085

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			783109.503	ug/L	787112.810
	233	**U**	**0.051500**	2.339	2024.277	ug/L	520.743
	234	**U**	**0.082657**	2.842	2495.952	ug/L	5.000
	235	**U**	**5.009070**	2.422	139049.120	ug/L	43.667
	236	**U**	**0.088014**	1.660	3793.638	ug/L	8.267
	238	**U**	**5.213016**	2.570	131988.518	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 4
Sample Date/Time: Thursday, August 14, 2014 18:41:06
Autosampler Position: 194
Dataset File: D:\Elandata\Dataset\081414M1\Standard 4.086

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			799992.356	ug/L	787112.810
	233	**U**	**0.105625**	3.753	4040.438	ug/L	520.743
	234	**U**	**0.164913**	3.098	4952.392	ug/L	5.000
	235	**U**	**9.694902**	3.139	277167.498	ug/L	43.667
	236	**U**	**0.177437**	3.659	7532.453	ug/L	8.267
	238	**U**	**10.051803**	2.943	263375.322	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 5
Sample Date/Time: Thursday, August 14, 2014 18:45:47
Autosampler Position: 195
Dataset File: D:\Elandata\Dataset\081414M1\Standard 5.087

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			798811.363	ug/L	787112.810
	233	**U**	**0.314031**	2.411	12314.311	ug/L	520.743
	234	**U**	**0.496918**	2.255	15128.882	ug/L	5.000
	235	**U**	**29.074695**	2.810	827558.148	ug/L	43.667
	236	**U**	**0.534714**	2.406	22952.709	ug/L	8.267
	238	**U**	**30.123891**	2.661	780717.667	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 1

Sample Date/Time: Thursday, August 14, 2014 18:50:28
Autosampler Position: 196
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 1.088

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			790840.723	ug/L	787112.810
	233	**U**	**0.231121**	1.995	9111.909	ug/L	520.743
	234	**U**	**0.000801**	17.650	29.133	ug/L	5.000
	235	**U**	**0.019928**	22.805	603.413	ug/L	43.667
	236	**U**	**0.000317**	29.632	21.733	ug/L	8.267
	238	**U**	**0.067385**	6.994	1856.854	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.474**	
	U	233		**103.410**
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 2

Sample Date/Time: Thursday, August 14, 2014 18:55:09
Autosampler Position: 197
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 2.089

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			792374.375	ug/L	787112.810
	233	**U**	**45.590351**	1.722	1698239.868	ug/L	520.743
	234	**U**	**0.087186**	1.755	2637.710	ug/L	5.000
	235	**U**	**0.111740**	2.266	3199.492	ug/L	43.667
	236	**U**	**0.006655**	4.014	291.470	ug/L	8.267
	238	**U**	**10.000586**	2.384	257216.438	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.668**	
	U	233		
	U	234		**104.415**
	U	235		
	U	236		
	U	238		**102.274**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 3

Sample Date/Time: Thursday, August 14, 2014 18:59:50
Autosampler Position: 198
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 3.090

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			799219.339	ug/L	787112.810
	233	**U**	**474.043953**	1.857	17804206.740	ug/L	520.743
	234	**U**	**0.867279**	1.615	26420.517	ug/L	5.000
	235	**U**	**1.108441**	2.249	31613.720	ug/L	43.667
	236	**U**	**0.067713**	2.498	2915.498	ug/L	8.267
	238	**U**	**99.440656**	2.181	2578608.702	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.538**	
	U	233		
	U	234		
	U	235		**104.887**
	U	236		**90.768**
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 4

Sample Date/Time: Thursday, August 14, 2014 19:04:30
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 4.091

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			792480.812	ug/L	787112.810
	233	**U**	**0.063668**	44.065	2851.168	ug/L	520.743
	234	**U**	**0.000118**	48.841	8.533	ug/L	5.000
	235	**U**	**0.000075**	48.482	46.133	ug/L	43.667
	236	**U**	**-0.000017**	39.451	7.600	ug/L	8.267
	238	**U**	**0.013322**	43.036	465.208	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.682**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 5

Sample Date/Time: Thursday, August 14, 2014 19:09:11
Autosampler Position: 191
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 5.092

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			805810.641	ug/L	787112.810
	233	**U**	**0.009275**	50.763	880.428	ug/L	520.743
	234	**U**	**0.000886**	7.760	32.333	ug/L	5.000
	235	**U**	**0.047563**	4.004	1409.203	ug/L	43.667
	236	**U**	**0.000802**	7.360	43.133	ug/L	8.267
	238	**U**	**0.051471**	3.336	1476.010	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**102.375**	
	U	233		
	U	234		
	U	235		**98.069**
	U	236		
	U	238		**102.328**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Thursday, August 14, 2014 19:13:52
Autosampler Position: 192
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 6.093

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			804052.149	ug/L	787112.810
	233	**U**	**0.024728**	4.148	1465.342	ug/L	520.743
	234	**U**	**0.049810**	2.223	1531.216	ug/L	5.000
	235	**U**	**2.979542**	3.049	85390.879	ug/L	43.667
	236	**U**	**0.053571**	3.509	2321.122	ug/L	8.267
	238	**U**	**3.086376**	2.493	80636.282	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**102.152**	
	U	233		**80.027**
	U	234		**100.423**
	U	235		
	U	236		**100.320**
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Thursday, August 14, 2014 19:18:33
Autosampler Position: 199
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 7.094

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			769434.080	ug/L	787112.810
	233	**U**	**-0.011550**	0.781	91.000	ug/L	520.743
	234	**U**	**0.000028**	182.391	5.667	ug/L	5.000
	235	**U**	**-0.000628**	3.503	25.467	ug/L	43.667
	236	**U**	**-0.000043**	54.596	6.333	ug/L	8.267
	238	**U**	**-0.002927**	5.964	52.000	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.754**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 8
Sample Date/Time: Thursday, August 14, 2014 19:23:13
Autosampler Position: 200
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 8.095

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			770079.319	ug/L	787112.810
	233	**U**	**0.040210**	3.224	1963.602	ug/L	520.743
	234	**U**	**0.081259**	2.168	2389.600	ug/L	5.000
	235	**U**	**4.865077**	2.470	133533.706	ug/L	43.667
	236	**U**	**0.086703**	1.915	3595.120	ug/L	8.267
	238	**U**	**5.045086**	2.659	126143.342	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.836**	
	U	233		**78.077**
	U	234		**98.257**
	U	235		**100.363**
	U	236		**97.419**
	U	238		**100.382**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Thursday, August 14, 2014 19:27:54
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 9.096

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			833547.712	ug/L	787112.810
	233	**U**	**0.039227**	2.944	2087.419	ug/L	520.743
	234	**U**	**0.078928**	1.543	2512.688	ug/L	5.000
	235	**U**	**4.752211**	1.954	141231.784	ug/L	43.667
	236	**U**	**0.085682**	2.290	3845.651	ug/L	8.267
	238	**U**	**4.917316**	2.553	133104.643	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**105.899**	
	U	233		**76.168**
	U	234		**95.439**
	U	235		**98.034**
	U	236		**96.272**
	U	238		**97.840**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 14, 2014 19:32:35

Autosampler Position: 1

Dataset File: D:\Elandata\Dataset\081414M1\QC Std 10.097

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			834925.148	ug/L	787112.810
	233	**U**	**0.010899**	14.211	977.900	ug/L	520.743
	234	**U**	**0.000099**	34.229	8.400	ug/L	5.000
	235	**U**	**0.001229**	31.620	82.467	ug/L	43.667
	236	**U**	**-0.000044**	34.803	6.800	ug/L	8.267
	238	**U**	**0.003493**	30.018	229.335	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**106.074**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: TEST

Sample Date/Time: Thursday, August 14, 2014 19:37:14
Autosampler Position: 119
Dataset File: D:\Elandata\Dataset\081414M1\TEST.098

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			845901.561	ug/L	787112.810
	233	**U**	**-0.013319**	0.470	29.733	ug/L	520.743
	234	**U**	**0.000419**	26.865	18.933	ug/L	5.000
	235	**U**	**0.022715**	3.288	731.552	ug/L	43.667
	236	**U**	**0.000370**	10.691	25.667	ug/L	8.267
	238	**U**	**0.029554**	1.425	949.032	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**107.469**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: TEST

Sample Date/Time: Thursday, August 14, 2014 19:41:55
Autosampler Position: 120
Dataset File: D:\Elandata\Dataset\081414M1\TEST.099

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			855565.118	ug/L	787112.810
	233	**U**	**-0.013450**	0.822	24.667	ug/L	520.743
	234	**U**	**0.000380**	21.029	17.733	ug/L	5.000
	235	**U**	**0.022822**	5.202	742.486	ug/L	43.667
	236	**U**	**0.000376**	19.128	26.133	ug/L	8.267
	238	**U**	**0.023736**	3.860	797.622	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**108.697**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: MB

Sample Date/Time: Thursday, August 14, 2014 19:46:35
Autosampler Position: 71
Dataset File: D:\Elandata\Dataset\081414M1\MB.100

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			854809.039	ug/L	787112.810
	233	**U**	**-0.013774**	0.392	11.867	ug/L	520.743
	234	**U**	**0.000038**	151.502	6.600	ug/L	5.000
	235	**U**	**-0.001192**	2.321	11.067	ug/L	43.667
	236	**U**	**-0.000086**	25.103	5.000	ug/L	8.267
	238	**U**	**0.007639**	8.480	350.404	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**108.601**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: LCS

Sample Date/Time: Thursday, August 14, 2014 19:51:15
Autosampler Position: 72
Dataset File: D:\Elandata\Dataset\081414M1\LCS.101

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			849998.104	ug/L	787112.810
	233	**U**	**-0.011195**	1.272	114.600	ug/L	520.743
	234	**U**	**0.039466**	1.188	1284.191	ug/L	5.000
	235	**U**	**2.371621**	2.259	71890.749	ug/L	43.667
	236	**U**	**0.042570**	1.710	1953.200	ug/L	8.267
	238	**U**	**2.433233**	2.449	67237.533	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**107.989**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-1-C
Sample Date/Time: Thursday, August 14, 2014 19:55:55
Autosampler Position: 73
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-1-C.102

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			773591.707	ug/L	787112.810
	233	**U**	**-0.013738**	0.208	12.000	ug/L	520.743
	234	**U**	**0.000356**	6.915	15.400	ug/L	5.000
	235	**U**	**0.034798**	1.512	1003.169	ug/L	43.667
	236	**U**	**-0.000056**	31.230	5.800	ug/L	8.267
	238	**U**	**4.897644**	1.234	123168.544	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.282**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Thursday, August 14, 2014 20:00:35
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 9.103

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			837873.604	ug/L	787112.810
	233	**U**	**0.038246**	3.098	2059.482	ug/L	520.743
	234	**U**	**0.078132**	2.212	2499.819	ug/L	5.000
	235	**U**	**4.672840**	2.190	139581.772	ug/L	43.667
	236	**U**	**0.083834**	2.339	3782.568	ug/L	8.267
	238	**U**	**4.858315**	2.050	132219.144	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**106.449**	
	U	233		**74.263**
	U	234		**94.476**
	U	235		**96.397**
	U	236		**94.195**
	U	238		**96.666**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 14, 2014 20:05:16
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 10.104

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			837259.746	ug/L	787112.810
	233	**U**	**0.007150**	9.891	834.824	ug/L	520.743
	234	**U**	**0.000084**	69.531	7.933	ug/L	5.000
	235	**U**	**0.001894**	57.596	101.600	ug/L	43.667
	236	**U**	**-0.000004**	657.409	8.600	ug/L	8.267
	238	**U**	**0.003497**	35.504	229.802	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**106.371**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-1-C SD

Sample Date/Time: Thursday, August 14, 2014 20:09:55

Autosampler Position: 74

Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-1-C SD.105

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			813646.043	ug/L	787112.810
	233	**U**	**-0.013850**	0.071	8.333	ug/L	520.743
	234	**U**	**0.000079**	35.970	7.600	ug/L	5.000
	235	**U**	**0.005839**	4.417	214.402	ug/L	43.667
	236	**U**	**-0.000082**	17.711	4.933	ug/L	8.267
	238	**U**	**0.955395**	1.403	25367.383	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**103.371**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-1-D MS

Sample Date/Time: Thursday, August 14, 2014 20:14:35

Autosampler Position: 75

Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-1-D MS.106

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			767213.626	ug/L	787112.810
	233	**U**	**-0.012771**	0.742	46.800	ug/L	520.743
	234	**U**	**0.015691**	2.226	464.008	ug/L	5.000
	235	**U**	**0.953139**	0.772	26127.944	ug/L	43.667
	236	**U**	**0.016336**	1.248	681.950	ug/L	8.267
	238	**U**	**5.801864**	1.020	144681.350	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.472**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-1-E MSD

Sample Date/Time: Thursday, August 14, 2014 20:19:15

Autosampler Position: 76

Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-1-E MSD.107

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			767480.853	ug/L	787112.810
	233	**U**	**-0.012730**	0.754	48.333	ug/L	520.743
	234	**U**	**0.015564**	0.871	460.341	ug/L	5.000
	235	**U**	**0.954333**	0.550	26167.014	ug/L	43.667
	236	**U**	**0.016376**	1.368	683.950	ug/L	8.267
	238	**U**	**5.578810**	0.323	139172.336	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.506**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-2-C
Sample Date/Time: Thursday, August 14, 2014 20:23:56
Autosampler Position: 77
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-2-C.108

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			781660.340	ug/L	787112.810
	233	**U**	**-0.013679**	0.268	14.267	ug/L	520.743
	234	**U**	**0.000459**	23.501	18.600	ug/L	5.000
	235	**U**	**0.055545**	3.953	1591.422	ug/L	43.667
	236	**U**	**-0.000049**	26.296	6.133	ug/L	8.267
	238	**U**	**7.636507**	3.050	193886.016	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.307**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-3-C
Sample Date/Time: Thursday, August 14, 2014 20:28:36
Autosampler Position: 78
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-3-C.109

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			728647.617	ug/L	787112.810
	233	**U**	**-0.013762**	0.066	10.467	ug/L	520.743
	234	**U**	**0.000405**	6.057	15.867	ug/L	5.000
	235	**U**	**0.043823**	4.486	1179.049	ug/L	43.667
	236	**U**	**-0.000069**	71.496	4.933	ug/L	8.267
	238	**U**	**6.040052**	2.847	142995.623	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.572**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-5-C
Sample Date/Time: Thursday, August 14, 2014 20:33:16
Autosampler Position: 79
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-5-C.110

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			755103.710	ug/L	787112.810
	233	**U**	**-0.013677**	0.231	13.867	ug/L	520.743
	234	**U**	**0.000556**	11.335	20.800	ug/L	5.000
	235	**U**	**0.053789**	4.283	1490.278	ug/L	43.667
	236	**U**	**-0.000052**	75.981	5.800	ug/L	8.267
	238	**U**	**7.052940**	3.171	173031.239	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.933**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-6-C
Sample Date/Time: Thursday, August 14, 2014 20:37:57
Autosampler Position: 80
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-6-C.111

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			775413.906	ug/L	787112.810
	233	**U**	**-0.013657**	0.275	15.000	ug/L	520.743
	234	**U**	**0.000458**	8.571	18.467	ug/L	5.000
	235	**U**	**0.056058**	4.657	1592.889	ug/L	43.667
	236	**U**	**-0.000069**	63.408	5.267	ug/L	8.267
	238	**U**	**7.674108**	3.760	193306.236	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.514**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-7-C
Sample Date/Time: Thursday, August 14, 2014 20:42:37
Autosampler Position: 81
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-7-C.112

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			899749.945	ug/L	787112.810
	233	**U**	**-0.013721**	0.475	14.667	ug/L	520.743
	234	**U**	**0.000161**	37.899	11.200	ug/L	5.000
	235	**U**	**0.015462**	6.282	545.610	ug/L	43.667
	236	**U**	**-0.000091**	21.534	5.067	ug/L	8.267
	238	**U**	**2.249163**	3.434	65820.254	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**114.310**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-8-C
Sample Date/Time: Thursday, August 14, 2014 20:47:18
Autosampler Position: 82
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-8-C.113

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			762656.293	ug/L	787112.810
	233	**U**	**-0.013670**	0.061	14.267	ug/L	520.743
	234	**U**	**0.000503**	17.147	19.467	ug/L	5.000
	235	**U**	**0.060598**	3.095	1690.233	ug/L	43.667
	236	**U**	**-0.000072**	50.552	5.067	ug/L	8.267
	238	**U**	**8.266125**	4.030	204740.221	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.893**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-9-C
Sample Date/Time: Thursday, August 14, 2014 20:51:58
Autosampler Position: 83
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-9-C.114

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			781594.001	ug/L	787112.810
	233	**U**	**-0.013712**	0.224	13.067	ug/L	520.743
	234	**U**	**0.000560**	8.742	21.667	ug/L	5.000
	235	**U**	**0.057479**	5.950	1645.295	ug/L	43.667
	236	**U**	**-0.000070**	42.237	5.267	ug/L	8.267
	238	**U**	**7.749097**	4.998	196742.879	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.299**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Thursday, August 14, 2014 20:56:39
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 9.115

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			789648.539	ug/L	787112.810
	233	**U**	**0.040789**	4.190	2035.278	ug/L	520.743
	234	**U**	**0.083878**	1.530	2529.491	ug/L	5.000
	235	**U**	**4.989798**	1.680	140506.895	ug/L	43.667
	236	**U**	**0.089947**	2.562	3823.912	ug/L	8.267
	238	**U**	**5.187408**	2.342	133047.014	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.322**	
	U	233		**79.202**
	U	234		**101.425**
	U	235		**102.935**
	U	236		**101.064**
	U	238		**103.214**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 14, 2014 21:01:20

Autosampler Position: 1

Dataset File: D:\Elandata\Dataset\081414M1\QC Std 10.116

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			786939.429	ug/L	787112.810
	233	**U**	**0.011306**	1.361	938.831	ug/L	520.743
	234	**U**	**0.000111**	49.893	8.267	ug/L	5.000
	235	**U**	**0.001407**	42.618	82.400	ug/L	43.667
	236	**U**	**-0.000054**	30.089	6.000	ug/L	8.267
	238	**U**	**0.004093**	19.413	231.669	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.978**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-10-D
Sample Date/Time: Thursday, August 14, 2014 21:05:59
Autosampler Position: 84
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-10-D.117

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			782166.074	ug/L	787112.810
	233	**U**	**-0.013703**	0.060	13.400	ug/L	520.743
	234	**U**	**0.000305**	9.427	14.067	ug/L	5.000
	235	**U**	**0.035192**	3.200	1024.570	ug/L	43.667
	236	**U**	**-0.000055**	78.282	5.867	ug/L	8.267
	238	**U**	**4.801160**	2.619	122005.148	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.372**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-12-C
Sample Date/Time: Thursday, August 14, 2014 21:10:39
Autosampler Position: 85
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-12-C.118

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			769995.848	ug/L	787112.810
	233	**U**	**-0.013726**	0.416	12.333	ug/L	520.743
	234	**U**	**0.000482**	26.050	19.000	ug/L	5.000
	235	**U**	**0.055113**	5.327	1555.351	ug/L	43.667
	236	**U**	**-0.000046**	38.120	6.200	ug/L	8.267
	238	**U**	**7.448677**	4.488	186256.222	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.825**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-13-C
Sample Date/Time: Thursday, August 14, 2014 21:15:19
Autosampler Position: 86
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-13-C.119

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			749159.568	ug/L	787112.810
	233	**U**	**-0.013722**	0.565	12.200	ug/L	520.743
	234	**U**	**0.000486**	24.326	18.600	ug/L	5.000
	235	**U**	**0.055329**	5.277	1519.214	ug/L	43.667
	236	**U**	**-0.000074**	34.721	4.867	ug/L	8.267
	238	**U**	**7.469235**	3.742	181752.917	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.178**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-14-C
Sample Date/Time: Thursday, August 14, 2014 21:19:59
Autosampler Position: 87
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-14-C.120

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			734643.710	ug/L	787112.810
	233	**U**	**-0.013770**	0.245	10.267	ug/L	520.743
	234	**U**	**0.000407**	8.535	16.067	ug/L	5.000
	235	**U**	**0.042366**	1.271	1150.846	ug/L	43.667
	236	**U**	**-0.000064**	24.195	5.200	ug/L	8.267
	238	**U**	**5.904939**	2.491	140982.934	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.334**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-16-C
Sample Date/Time: Thursday, August 14, 2014 21:24:39
Autosampler Position: 88
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-16-C.121

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			759039.453	ug/L	787112.810
	233	**U**	**-0.013618**	0.061	16.067	ug/L	520.743
	234	**U**	**0.000605**	7.298	22.333	ug/L	5.000
	235	**U**	**0.066275**	4.721	1835.985	ug/L	43.667
	236	**U**	**-0.000095**	28.383	4.067	ug/L	8.267
	238	**U**	**9.039695**	4.150	222852.223	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.433**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-17-C

Sample Date/Time: Thursday, August 14, 2014 21:29:19

Autosampler Position: 89

Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-17-C.122

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			770346.379	ug/L	787112.810
	233	**U**	**-0.013704**	0.749	13.133	ug/L	520.743
	234	**U**	**0.002240**	3.254	70.667	ug/L	5.000
	235	**U**	**0.204728**	6.196	5663.390	ug/L	43.667
	236	**U**	**0.000262**	18.984	18.933	ug/L	8.267
	238	**U**	**9.425881**	5.198	235747.551	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.870**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-18-C
Sample Date/Time: Thursday, August 14, 2014 21:33:59
Autosampler Position: 90
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-18-C.123

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			732185.056	ug/L	787112.810
	233	**U**	**-0.013750**	0.219	10.933	ug/L	520.743
	234	**U**	**0.000283**	16.947	12.533	ug/L	5.000
	235	**U**	**0.040485**	5.562	1097.576	ug/L	43.667
	236	**U**	**-0.000063**	8.618	5.200	ug/L	8.267
	238	**U**	**5.295842**	5.462	125993.628	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.022**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-20-C
Sample Date/Time: Thursday, August 14, 2014 21:38:40
Autosampler Position: 91
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-20-C.124

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			747749.444	ug/L	787112.810
	233	**U**	**-0.013775**	0.195	10.267	ug/L	520.743
	234	**U**	**0.000286**	21.295	12.867	ug/L	5.000
	235	**U**	**0.038175**	4.897	1058.506	ug/L	43.667
	236	**U**	**-0.000063**	12.967	5.333	ug/L	8.267
	238	**U**	**4.737187**	5.572	115018.924	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.999**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-21-C
Sample Date/Time: Thursday, August 14, 2014 21:43:20
Autosampler Position: 92
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-21-C.125

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			813928.987	ug/L	787112.810
	233	**U**	**-0.013771**	0.376	11.333	ug/L	520.743
	234	**U**	**0.000131**	28.675	9.200	ug/L	5.000
	235	**U**	**0.012680**	9.616	412.206	ug/L	43.667
	236	**U**	**-0.000072**	19.355	5.400	ug/L	8.267
	238	**U**	**1.886324**	5.500	49908.972	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**103.407**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-22-C
Sample Date/Time: Thursday, August 14, 2014 21:48:01
Autosampler Position: 93
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-22-C.126

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			730498.920	ug/L	787112.810
	233	**U**	**-0.013742**	0.177	11.200	ug/L	520.743
	234	**U**	**0.000450**	13.929	17.200	ug/L	5.000
	235	**U**	**0.049143**	3.790	1320.261	ug/L	43.667
	236	**U**	**-0.000039**	76.681	6.133	ug/L	8.267
	238	**U**	**5.660014**	4.228	134304.019	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.807**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Thursday, August 14, 2014 21:52:42
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 9.127

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			793363.158	ug/L	787112.810
	233	**U**	**0.040014**	3.803	2015.276	ug/L	520.743
	234	**U**	**0.081714**	2.683	2474.348	ug/L	5.000
	235	**U**	**4.923838**	3.447	139172.093	ug/L	43.667
	236	**U**	**0.088215**	3.695	3765.297	ug/L	8.267
	238	**U**	**5.116208**	3.000	131766.239	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.794**	
	U	233		**77.697**
	U	234		**98.808**
	U	235		**101.575**
	U	236		**99.118**
	U	238		**101.797**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 14, 2014 21:57:22

Autosampler Position: 1

Dataset File: D:\Elandata\Dataset\081414M1\QC Std 10.128

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			778356.861	ug/L	787112.810
	233	**U**	**0.011167**	5.859	922.696	ug/L	520.743
	234	**U**	**0.000088**	84.326	7.467	ug/L	5.000
	235	**U**	**0.001551**	11.645	86.134	ug/L	43.667
	236	**U**	**-0.000001**	2796.915	8.133	ug/L	8.267
	238	**U**	**0.004380**	11.292	236.869	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.888**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-23-C
Sample Date/Time: Thursday, August 14, 2014 22:02:02
Autosampler Position: 94
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-23-C.129

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			755143.150	ug/L	787112.810
	233	**U**	**-0.013694**	0.044	13.267	ug/L	520.743
	234	**U**	**0.000553**	13.873	20.733	ug/L	5.000
	235	**U**	**0.059614**	4.996	1646.228	ug/L	43.667
	236	**U**	**-0.000059**	23.147	5.533	ug/L	8.267
	238	**U**	**7.137109**	3.253	175050.974	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.938**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-24-C
Sample Date/Time: Thursday, August 14, 2014 22:06:43
Autosampler Position: 95
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-24-C.130

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			752669.239	ug/L	787112.810
	233	**U**	**-0.013741**	0.494	11.533	ug/L	520.743
	234	**U**	**0.000827**	9.160	28.533	ug/L	5.000
	235	**U**	**0.084724**	3.122	2315.454	ug/L	43.667
	236	**U**	**0.000024**	129.707	8.867	ug/L	8.267
	238	**U**	**7.915540**	3.168	193511.423	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.624**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: MB

Sample Date/Time: Thursday, August 14, 2014 22:11:23
Autosampler Position: 96
Dataset File: D:\Elandata\Dataset\081414M1\MB .131

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			810182.586	ug/L	787112.810
	233	**U**	**-0.013946**	0.160	4.600	ug/L	520.743
	234	**U**	**-0.000030**	70.212	4.200	ug/L	5.000
	235	**U**	**-0.001276**	1.323	8.067	ug/L	43.667
	236	**U**	**-0.000086**	21.698	4.733	ug/L	8.267
	238	**U**	**0.002618**	12.435	200.268	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**102.931**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: LCS

Sample Date/Time: Thursday, August 14, 2014 22:16:03
Autosampler Position: 97
Dataset File: D:\Elandata\Dataset\081414M1\LCS.132

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			798243.845	ug/L	787112.810
	233	**U**	**-0.010925**	0.586	117.867	ug/L	520.743
	234	**U**	**0.043420**	1.827	1325.995	ug/L	5.000
	235	**U**	**2.624844**	2.748	74695.884	ug/L	43.667
	236	**U**	**0.046882**	2.727	2018.409	ug/L	8.267
	238	**U**	**2.702807**	3.392	70091.839	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.414**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-26-C

Sample Date/Time: Thursday, August 14, 2014 22:20:43

Autosampler Position: 98

Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-26-C.133

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			785255.071	ug/L	787112.810
	233	**U**	**-0.013893**	0.386	6.400	ug/L	520.743
	234	**U**	**0.000058**	83.829	6.667	ug/L	5.000
	235	**U**	**0.002990**	15.999	126.867	ug/L	43.667
	236	**U**	**-0.000055**	56.182	5.933	ug/L	8.267
	238	**U**	**0.595102**	1.420	15295.859	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.764**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-26-C SD

Sample Date/Time: Thursday, August 14, 2014 22:25:23

Autosampler Position: 99

Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-26-C SD.134

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			773600.360	ug/L	787112.810
	233	**U**	**-0.013896**	0.177	6.200	ug/L	520.743
	234	**U**	**0.000046**	121.250	6.267	ug/L	5.000
	235	**U**	**-0.000361**	24.092	33.067	ug/L	43.667
	236	**U**	**-0.000093**	39.802	4.200	ug/L	8.267
	238	**U**	**0.118046**	2.029	3088.868	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.283**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-26-D MS

Sample Date/Time: Thursday, August 14, 2014 22:30:03
Autosampler Position: 100
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-26-D MS.135

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			773219.610	ug/L	787112.810
	233	**U**	**-0.012785**	0.642	46.600	ug/L	520.743
	234	**U**	**0.015974**	1.929	475.741	ug/L	5.000
	235	**U**	**0.967966**	1.444	26728.466	ug/L	43.667
	236	**U**	**0.017230**	1.768	724.685	ug/L	8.267
	238	**U**	**1.655556**	1.726	41674.202	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.235**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-26-E MSD

Sample Date/Time: Thursday, August 14, 2014 22:34:44

Autosampler Position: 101

Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-26-E MSD.136

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			792510.295	ug/L	787112.810
	233	**U**	**-0.012918**	0.363	42.800	ug/L	520.743
	234	**U**	**0.014959**	1.610	456.941	ug/L	5.000
	235	**U**	**0.910093**	1.706	25757.748	ug/L	43.667
	236	**U**	**0.016196**	0.880	698.350	ug/L	8.267
	238	**U**	**1.544072**	2.198	39840.035	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.686**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-27-C

Sample Date/Time: Thursday, August 14, 2014 22:39:24

Autosampler Position: 102

Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-27-C.137

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			795484.764	ug/L	787112.810
	233	**U**	**-0.013825**	0.154	9.067	ug/L	520.743
	234	**U**	**0.000102**	29.136	8.133	ug/L	5.000
	235	**U**	**0.009491**	7.376	312.870	ug/L	43.667
	236	**U**	**-0.000073**	22.234	5.267	ug/L	8.267
	238	**U**	**1.419699**	5.506	36746.004	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.064**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-28-C

Sample Date/Time: Thursday, August 14, 2014 22:44:04

Autosampler Position: 103

Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-28-C.138

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			836195.170	ug/L	787112.810
	233	**U**	**-0.013852**	0.096	8.467	ug/L	520.743
	234	**U**	**0.000119**	55.720	9.067	ug/L	5.000
	235	**U**	**0.011289**	7.502	382.472	ug/L	43.667
	236	**U**	**-0.000074**	11.692	5.467	ug/L	8.267
	238	**U**	**1.751724**	4.450	47651.224	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**106.236**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Thursday, August 14, 2014 22:48:45
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 9.139

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			784033.925	ug/L	787112.810
	233	**U**	**0.041081**	1.660	2032.478	ug/L	520.743
	234	**U**	**0.084073**	2.600	2516.222	ug/L	5.000
	235	**U**	**5.036020**	1.892	140784.698	ug/L	43.667
	236	**U**	**0.090685**	2.319	3827.847	ug/L	8.267
	238	**U**	**5.225916**	1.877	133094.345	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.609**	
	U	233		**79.768**
	U	234		**101.660**
	U	235		**103.889**
	U	236		**101.893**
	U	238		**103.980**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 14, 2014 22:53:26
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 10.140

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			777189.379	ug/L	787112.810
	233	**U**	**0.012724**	4.333	978.300	ug/L	520.743
	234	**U**	**0.000078**	44.228	7.200	ug/L	5.000
	235	**U**	**0.001725**	2.389	91.000	ug/L	43.667
	236	**U**	**-0.000046**	82.937	6.267	ug/L	8.267
	238	**U**	**0.004419**	4.861	237.669	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.739**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-29-C
Sample Date/Time: Thursday, August 14, 2014 22:58:06
Autosampler Position: 104
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-29-C.141

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			745971.076	ug/L	787112.810
	233	**U**	**-0.013764**	0.202	10.667	ug/L	520.743
	234	**U**	**0.000610**	17.418	22.133	ug/L	5.000
	235	**U**	**0.071769**	3.102	1950.400	ug/L	43.667
	236	**U**	**0.000011**	193.613	8.267	ug/L	8.267
	238	**U**	**5.885708**	3.103	142648.897	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.773**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-30-C
Sample Date/Time: Thursday, August 14, 2014 23:02:46
Autosampler Position: 105
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-30-C.142

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			764935.220	ug/L	787112.810
	233	**U**	**-0.013706**	0.210	13.000	ug/L	520.743
	234	**U**	**0.000439**	5.433	17.667	ug/L	5.000
	235	**U**	**0.050109**	2.069	1409.403	ug/L	43.667
	236	**U**	**-0.000045**	65.660	6.200	ug/L	8.267
	238	**U**	**6.242418**	2.490	155135.648	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.182**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-31-C

Sample Date/Time: Thursday, August 14, 2014 23:07:27

Autosampler Position: 106

Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-31-C.143

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			752811.908	ug/L	787112.810
	233	**U**	**-0.013681**	0.591	13.667	ug/L	520.743
	234	**U**	**0.001233**	9.966	40.133	ug/L	5.000
	235	**U**	**0.126164**	4.472	3428.145	ug/L	43.667
	236	**U**	**0.000086**	39.607	11.400	ug/L	8.267
	238	**U**	**8.481258**	3.091	207384.956	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.642**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-33-C
Sample Date/Time: Thursday, August 14, 2014 23:12:08
Autosampler Position: 107
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-33-C.144

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			739595.215	ug/L	787112.810
	233	**U**	**-0.013729**	0.303	11.800	ug/L	520.743
	234	**U**	**0.000810**	6.157	27.533	ug/L	5.000
	235	**U**	**0.091463**	3.784	2453.077	ug/L	43.667
	236	**U**	**-0.000003**	826.022	7.667	ug/L	8.267
	238	**U**	**8.419317**	3.577	202248.334	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.963**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-34-C
Sample Date/Time: Thursday, August 14, 2014 23:16:48
Autosampler Position: 108
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-34-C.145

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			738691.086	ug/L	787112.810
	233	**U**	**-0.013740**	0.278	11.400	ug/L	520.743
	234	**U**	**0.000515**	33.782	19.133	ug/L	5.000
	235	**U**	**0.061936**	4.744	1671.965	ug/L	43.667
	236	**U**	**-0.000061**	43.376	5.333	ug/L	8.267
	238	**U**	**8.435712**	4.851	202347.479	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.848**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-35-C
Sample Date/Time: Thursday, August 14, 2014 23:21:28
Autosampler Position: 109
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-35-C.146

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			757820.432	ug/L	787112.810
	233	**U**	**-0.013728**	0.319	12.133	ug/L	520.743
	234	**U**	**0.000450**	12.000	17.800	ug/L	5.000
	235	**U**	**0.056948**	1.745	1581.021	ug/L	43.667
	236	**U**	**-0.000076**	44.265	4.867	ug/L	8.267
	238	**U**	**7.630253**	2.548	187813.814	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.279**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-36-C
Sample Date/Time: Thursday, August 14, 2014 23:26:07
Autosampler Position: 110
Dataset File: D:\Elandata\Dataset\081414M1\680-102380-A-36-C.147

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			773377.424	ug/L	787112.810
	233	**U**	**-0.013766**	0.318	11.000	ug/L	520.743
	234	**U**	**0.000485**	19.920	19.267	ug/L	5.000
	235	**U**	**0.057218**	5.455	1619.425	ug/L	43.667
	236	**U**	**-0.000083**	29.693	4.667	ug/L	8.267
	238	**U**	**7.753679**	4.976	194646.195	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.255**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: MB

Sample Date/Time: Thursday, August 14, 2014 23:30:48
Autosampler Position: 111
Dataset File: D:\Elandata\Dataset\081414M1\MB.148

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			781560.499	ug/L	787112.810
	233	**U**	**-0.013932**	0.293	4.933	ug/L	520.743
	234	**U**	**-0.000018**	214.444	4.400	ug/L	5.000
	235	**U**	**-0.001298**	4.151	7.133	ug/L	43.667
	236	**U**	**-0.000100**	20.842	4.000	ug/L	8.267
	238	**U**	**0.001389**	7.408	162.401	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.295**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: LCS

Sample Date/Time: Thursday, August 14, 2014 23:35:28
Autosampler Position: 112
Dataset File: D:\Elandata\Dataset\081414M1\LCS.149

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			787550.857	ug/L	787112.810
	233	**U**	**-0.011041**	1.465	112.200	ug/L	520.743
	234	**U**	**0.043859**	1.972	1321.595	ug/L	5.000
	235	**U**	**2.622057**	2.480	73639.008	ug/L	43.667
	236	**U**	**0.047197**	1.603	2005.874	ug/L	8.267
	238	**U**	**2.734739**	1.975	70020.709	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.056**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7752-A-1-D

Sample Date/Time: Thursday, August 14, 2014 23:40:08
Autosampler Position: 113
Dataset File: D:\Elandata\Dataset\081414M1\160-7752-A-1-D.150

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			774128.652	ug/L	787112.810
	233	**U**	**-0.013918**	0.132	5.467	ug/L	520.743
	234	**U**	**0.009920**	1.896	297.670	ug/L	5.000
	235	**U**	**1.187186**	1.777	32799.936	ug/L	43.667
	236	**U**	**-0.000037**	68.949	6.533	ug/L	8.267
	238	**U**	**158.317757**	1.693	3977280.956	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.350**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	238	

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Thursday, August 14, 2014 23:44:49
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 9.151

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			778435.804	ug/L	787112.810
	233	**U**	**0.041059**	3.122	2016.076	ug/L	520.743
	234	**U**	**0.084015**	1.732	2497.152	ug/L	5.000
	235	**U**	**5.046614**	2.473	140023.730	ug/L	43.667
	236	**U**	**0.091214**	1.586	3823.446	ug/L	8.267
	238	**U**	**5.268596**	1.734	133212.242	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.898**	
	U	233		**79.726**
	U	234		**101.590**
	U	235		**104.108**
	U	236		**102.488**
	U	238		**104.829**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 14, 2014 23:49:29

Autosampler Position: 1

Dataset File: D:\Elandata\Dataset\081414M1\QC Std 10.152

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			870709.895	ug/L	787112.810
	233	**U**	**-0.013845**	0.197	9.133	ug/L	520.743
	234	**U**	**0.000055**	31.171	7.333	ug/L	5.000
	235	**U**	**-0.001165**	5.601	12.067	ug/L	43.667
	236	**U**	**-0.000008**	320.728	8.733	ug/L	8.267
	238	**U**	**-0.003129**	11.795	52.267	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**110.621**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7752-A-1-D SD

Sample Date/Time: Thursday, August 14, 2014 23:54:09

Autosampler Position: 114

Dataset File: D:\Elandata\Dataset\081414M1\160-7752-A-1-D SD.153

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			751447.484	ug/L	787112.810
	233	**U**	**-0.013941**	0.084	4.467	ug/L	520.743
	234	**U**	**0.002058**	11.724	63.733	ug/L	5.000
	235	**U**	**0.232128**	2.488	6257.105	ug/L	43.667
	236	**U**	**-0.000039**	71.074	6.267	ug/L	8.267
	238	**U**	**30.743932**	2.725	749477.655	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.469**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7752-A-1-E MS

Sample Date/Time: Thursday, August 14, 2014 23:58:50
Autosampler Position: 115
Dataset File: D:\Elandata\Dataset\081414M1\160-7752-A-1-E MS.154

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			766590.999	ug/L	787112.810
	233	**U**	**-0.013881**	0.342	6.667	ug/L	520.743
	234	**U**	**0.011103**	3.175	329.270	ug/L	5.000
	235	**U**	**1.288058**	2.249	35233.042	ug/L	43.667
	236	**U**	**0.000820**	6.086	41.800	ug/L	8.267
	238	**U**	**166.190657**	2.150	4133728.976	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.393**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	238	

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7752-A-1-F MSD

Sample Date/Time: Friday, August 15, 2014 00:03:30
Autosampler Position: 116
Dataset File: D:\Elandata\Dataset\081414M1\160-7752-A-1-F MSD.155

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			762074.598	ug/L	787112.810
	233	**U**	**-0.013876**	0.144	6.867	ug/L	520.743
	234	**U**	**0.011910**	1.134	350.938	ug/L	5.000
	235	**U**	**1.374804**	2.138	37382.297	ug/L	43.667
	236	**U**	**0.000890**	13.831	44.267	ug/L	8.267
	238	**U**	**176.104024**	1.587	4355764.724	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.819**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	238	

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Friday, August 15, 2014 00:08:11
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 9.156

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			774727.465	ug/L	787112.810
	233	**U**	**0.042078**	5.496	2042.146	ug/L	520.743
	234	**U**	**0.084978**	4.128	2511.087	ug/L	5.000
	235	**U**	**5.069396**	3.080	139950.220	ug/L	43.667
	236	**U**	**0.091481**	2.882	3814.243	ug/L	8.267
	238	**U**	**5.298056**	3.074	133240.382	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.426**	
	U	233		**81.705**
	U	234		**102.755**
	U	235		**104.578**
	U	236		**102.787**
	U	238		**105.415**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Friday, August 15, 2014 00:12:52
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081414M1\QC Std 10.157

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			911307.265	ug/L	787112.810
	233	**U**	**-0.013864**	0.053	8.733	ug/L	520.743
	234	**U**	**0.000082**	32.904	8.600	ug/L	5.000
	235	**U**	**-0.001133**	7.913	13.867	ug/L	43.667
	236	**U**	**-0.000012**	115.291	9.000	ug/L	8.267
	238	**U**	**-0.002178**	14.387	83.334	ug/L	128.001

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**115.778**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

KC 8/19/14
File: 081814M3

A Batch 138778
138779

Sample/Batch Report

TA ST. LOUIS - PERKIN ELMER ELAN 6100 - METHOD 6020 / 200.8 QUANTITATIVE ANALYSIS REPORT

User Name: stlmetals
Computer Name: SLICP03
Sample File: D:\Elandata\Sample\SW846 TEMP1.sam
Report Date/Time: Tuesday, August 19, 2014 10:32:45
Method File: d:\Elandata\Method\2014 isou.mth
Tuning File: d:\Elandata\Tuning\epa tuning.tun
Optimization File: d:\Elandata\Optimize\epa2008.dac
Calibration File: D:\Elandata\System\081814M3.cal
Calibration Type: External Calibration
Number of Replicates: 3
Number of Readings: 1
Number of Sweeps: 100
Dual Detector Mode: Dual

A/S Loc.	Batch ID	Sample ID	Description	Aliquot Vol.	Diluted Vol.
11	137385	680-102199-A-26-G	5x		
12		680-102199-A-27-F	5x		
13		680-102199-A-28-E	5x		
14	137772	425520	2x		
15		425521	2x		
16		680-102327-A-1-E	5x		
17		680-102327-A-1-E SD	25x		
18		680-102327-A-1-F MS	5x		
19		680-102327-A-1-G MS	5x		
20		680-102327-A-2-D	5x		
21		680-102327-A-3-D	5x		
22		680-102327-A-5-C	5x		
23		680-102327-A-6-C	5x		
24		680-102327-A-7-C	5x		
25		680-102327-A-9-C	5x		
26		680-102327-A-10-C	5x		
27		680-102327-A-11-C	5x		
28		680-102327-A-13-C	5x		
29		680-102327-A-14-C	5x		
30		680-102327-A-15-E	5x		
31		680-102327-A-16-C	5x		
32		680-102327-A-17-C	5x		
33		680-102327-A-18-C	5x		
34		680-102327-A-19-C	5x		
35		680-102327-A-21-C	5x		
36		680-102327-A-22-C	5x		
37		680-102327-A-23-C	5x		
38	137774	425544	2x		
39		425545	2x		
40		680-102327-A-25-D	5x		
41		680-102327-A-25-D SD	25x		
42		680-102327-A-25-E MS	5x		
43		680-102327-A-25-F MS	5x		
44		680-102327-A-26-C	5x		
45		680-102327-A-27-C	5x		
46		680-102327-A-28-C	5x		
47		680-102327-A-29-C	5x		
48		680-102327-A-30-C	5x		
49		680-102327-A-31-C	5x		
50		680-102327-A-32-C	5x		
51		680-102327-A-34-C	5x		

- All

- All

52		680-102327-A-35-C	5x
53		680-102327-A-36-C	5x
54	137068	MB	2
55		LCS	2
56		680-102380-A-1-C	5
57		680-102380-A-1-C SD	25
58		680-102380-A-1-D MS	5
59		680-102380-A-1-E MSD	5
60		680-102380-A-2-C	5
61		680-102380-A-3-C	5
62		680-102380-A-5-C	5
63		680-102380-A-6-C	5
64		680-102380-A-7-C	5
65		680-102380-A-8-C	5
66		680-102380-A-9-C	5
67		680-102380-A-10-D	5
68		680-102380-A-12-C	5
69		680-102380-A-13-C	5
70		680-102380-A-14-C	5
71		680-102380-A-16-C	5
72		680-102380-A-17-C	5
73		680-102380-A-18-C	5
74		680-102380-A-20-C	5
75		680-102380-A-21-C	5
76		680-102380-A-22-C	5
77		680-102380-A-23-C	5
78		680-102380-A-24-C	5
79	137069	MB	2
80		LCS	2
81		680-102380-A-26-C	5
82		680-102380-A-26-C SD	25
83		680-102380-A-26-D MS	5
84		680-102380-A-26-E MS	5
85		680-102380-A-27-C	5
86		680-102380-A-28-C	5
87		680-102380-A-29-C	5
88		680-102380-A-30-C	5
89		680-102380-A-31-C	5
90		680-102380-A-33-C	5
91		680-102380-A-34-C	5
92		680-102380-A-35-C	5
93		680-102380-A-36-C	5

-U-233

Quantitative Analysis Calibration Report

File Name: 081814M3.cal
File Path: D:\Elandata\System
Calibration Type: External Calibration

Analyte	Mass	Curve Type	Slope	Intercept	Corr. Coeff.
Ho (IS)	164.930	Linear Thru Zero	0.000000	0.00	0.000000
U	233.000	Linear Thru Zero	0.046320	0.00	0.999997
U	234.041	Linear Thru Zero	0.035173	0.00	1.000000
U	235.044	Linear Thru Zero	0.032972	0.00	0.999992
U	236.000	Linear Thru Zero	0.050402	0.00	0.999999
U	238.050	Linear Thru Zero	0.029513	0.00	0.999995

Instrument Tuning Report

File Name: EPA TUNING.tun
File Path: d:\Elandata\Tuning
Sample ID: Sample
Sample Date/Time: Monday, August 18, 2014 08:27:15

Analyte	Exact Mass	Meas. Mass	Mass DAC	Res. DAC	Meas. Pk. Width	Custom Res.
Li	7.016	7.025	1570	2065	0.658	
Mg	23.985	23.979	5688	2080	0.686	
Rh	102.905	102.879	24919	2080	0.696	
Ce	139.905	139.929	33931	2120	0.672	
Pb	207.977	207.977	50415	2310	0.656	

Replicates: 6

Daily Performance Report

Sample ID: Sample
Sample Date/Time: Monday, August 18, 2014 09:05:14
Sample Description:
Method File: d:\Elandata\Method\DAILY EPA.mth
Dataset File: d:\Elandata\Dataset\daily3\Sample.135
Tuning File: d:\Elandata\Tuning\EPA TUNING.tun
Optimization File: d:\Elandata\Optimize\EPA2008.dac
Dual Detector Mode: Pulse

Acq. Dead Time(ns): 35
Current Dead Time (ns): 35

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Net Intens. SD	Net Intens. RSD
	Li	7.0	2197.2	2197.169	111.010	5.1
	Mg	24.0	13213.6	13213.556	351.050	2.7
	Rh	102.9	210971.1	210971.109	4399.659	2.1
	Pb	208.0	200853.6	200853.594	3286.709	1.6
⎡>	Ba	137.9	262035.7	262035.741	4133.500	1.6
⎣	Ba++	69.0	1892.2	0.007	0.000	1.6
⎡>	Ce	139.9	319642.0	319641.984	5458.595	1.7
⎣	CeO	155.9	7347.1	0.023	0.000	1.0
	Bkgd	220.0	5.4	5.444	1.377	25.3

Current Optimization File Data

Current Value	Description
0.97	Nebulizer Gas Flow
5.75	Lens Voltage
1400.00	ICP RF Power
-2156.25	Analog Stage Voltage
1200.00	Pulse Stage Voltage
70.00	Discriminator Threshold
-6.00	AC Rod Offset
60.00	Service DAC 1
0.00	Quadrupole Rod Offset

Current Autolens Data

Analyte	Mass	Num of Pts	DAC Value	Maximum Intensity
Be	9	33	6.8	2196.8
Mg	24	33	4.8	22637.3
Co	59	33	5.8	76899.1
Rh	103	33	6.0	281253.3
In	115	33	6.0	393649.6
Ba	138	33	6.3	380041.4
Ce	140	33	6.5	471954.9
Pb	208	33	8.0	315860.7

QUANTITATIVE ANALYSIS REPORT

Sample ID: Blank

Sample Date/Time: Monday, August 18, 2014 14:28:51
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081814M3\Blank.001

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			823597.028	ug/L	
	233	**U**			17.600	ug/L	
	234	**U**			8.400	ug/L	
	235	**U**			11.000	ug/L	
	236	**U**			13.400	ug/L	
	238	**U**			59.467	ug/L	

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 1
Sample Date/Time: Monday, August 18, 2014 14:35:31
Autosampler Position: 191
Dataset File: D:\Elandata\Dataset\081814M3\Standard 1.002

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			844212.763	ug/L	823597.028
	233	**U**	**0.000342**	16.215	31.333	ug/L	17.600
	234	**U**	**0.000717**	10.010	29.800	ug/L	8.400
	235	**U**	**0.049242**	1.937	1380.800	ug/L	11.000
	236	**U**	**0.000845**	3.810	49.667	ug/L	13.400
	238	**U**	**0.049263**	3.174	1287.058	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 2
Sample Date/Time: Monday, August 18, 2014 14:40:11
Autosampler Position: 192
Dataset File: D:\Elandata\Dataset\081814M3\Standard 2.003

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			830524.267	ug/L	823597.028
	233	**U**	**0.030847**	1.198	1204.718	ug/L	17.600
	234	**U**	**0.049696**	3.072	1458.474	ug/L	8.400
	235	**U**	**2.973367**	1.851	81378.101	ug/L	11.000
	236	**U**	**0.053636**	1.248	2257.645	ug/L	13.400
	238	**U**	**3.072357**	1.393	75328.407	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 3
Sample Date/Time: Monday, August 18, 2014 14:44:52
Autosampler Position: 193
Dataset File: D:\Elandata\Dataset\081814M3\Standard 3.004

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			825681.886	ug/L	823597.028
	233	**U**	**0.051693**	3.491	1991.606	ug/L	17.600
	234	**U**	**0.082728**	4.207	2406.603	ug/L	8.400
	235	**U**	**4.920751**	3.402	133773.833	ug/L	11.000
	236	**U**	**0.087763**	2.924	3661.203	ug/L	13.400
	238	**U**	**5.078466**	2.908	123652.166	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 4
Sample Date/Time: Monday, August 18, 2014 14:49:32
Autosampler Position: 194
Dataset File: D:\Elandata\Dataset\081814M3\Standard 4.005

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			821822.408	ug/L	823597.028
	233	**U**	**0.102294**	3.450	3905.601	ug/L	17.600
	234	**U**	**0.165252**	2.568	4779.534	ug/L	8.400
	235	**U**	**9.807923**	3.019	265414.925	ug/L	11.000
	236	**U**	**0.177483**	4.275	7350.959	ug/L	13.400
	238	**U**	**10.146151**	3.138	245795.262	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 5
Sample Date/Time: Monday, August 18, 2014 14:54:13
Autosampler Position: 195
Dataset File: D:\Elandata\Dataset\081814M3\Standard 5.006

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			821935.331	ug/L	823597.028
	233	**U**	**0.309303**	1.660	11785.333	ug/L	17.600
	234	**U**	**0.496006**	1.712	14338.136	ug/L	8.400
	235	**U**	**29.047125**	2.099	786522.759	ug/L	11.000
	236	**U**	**0.534049**	2.300	22116.191	ug/L	13.400
	238	**U**	**30.123951**	1.903	730243.435	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 1

Sample Date/Time: Monday, August 18, 2014 14:58:54
Autosampler Position: 196
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 1.007

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			823343.436	ug/L	823597.028
	233	**U**	**0.230920**	2.145	8816.123	ug/L	17.600
	234	**U**	**0.000453**	9.106	21.533	ug/L	8.400
	235	**U**	**0.010041**	20.744	284.603	ug/L	11.000
	236	**U**	**0.000120**	16.820	18.400	ug/L	13.400
	238	**U**	**0.058780**	3.934	1487.678	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.969**	
	U	233		**103.320**
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 2

Sample Date/Time: Monday, August 18, 2014 15:03:34
Autosampler Position: 197
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 2.008

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			821102.659	ug/L	823597.028
	233	**U**	**43.424094**	2.070	1650209.146	ug/L	17.600
	234	**U**	**0.088004**	1.654	2548.294	ug/L	8.400
	235	**U**	**0.113878**	2.630	3091.135	ug/L	11.000
	236	**U**	**0.006802**	3.311	294.603	ug/L	13.400
	238	**U**	**9.955167**	2.734	241033.021	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.697**	
	U	233		
	U	234		**105.394**
	U	235		
	U	236		
	U	238		**101.810**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 3

Sample Date/Time: Monday, August 18, 2014 15:08:15
Autosampler Position: 198
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 3.009

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			820309.044	ug/L	823597.028
	233	**U**	**443.303875**	1.411	16835023.106	ug/L	17.600
	234	**U**	**0.871858**	1.557	25149.078	ug/L	8.400
	235	**U**	**1.107327**	1.210	29948.473	ug/L	11.000
	236	**U**	**0.067141**	1.473	2787.739	ug/L	13.400
	238	**U**	**97.328072**	1.731	2354748.413	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.601**	
	U	233		
	U	234		
	U	235		**104.781**
	U	236		**90.002**
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 4

Sample Date/Time: Monday, August 18, 2014 15:12:55
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 4.010

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			817603.402	ug/L	823597.028
	233	**U**	**0.097251**	10.501	3695.481	ug/L	17.600
	234	**U**	**0.000133**	21.401	12.133	ug/L	8.400
	235	**U**	**0.000323**	26.157	19.533	ug/L	11.000
	236	**U**	**-0.000104**	14.316	9.000	ug/L	13.400
	238	**U**	**0.021112**	12.282	567.145	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.272**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 5

Sample Date/Time: Monday, August 18, 2014 15:17:35
Autosampler Position: 191
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 5.011

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			825677.739	ug/L	823597.028
	233	**U**	**0.022394**	22.330	867.027	ug/L	17.600
	234	**U**	**0.000714**	7.842	29.200	ug/L	8.400
	235	**U**	**0.049620**	2.126	1361.265	ug/L	11.000
	236	**U**	**0.000789**	22.127	46.000	ug/L	13.400
	238	**U**	**0.054072**	3.556	1375.400	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.253**	
	U	233		
	U	234		
	U	235		**102.309**
	U	236		
	U	238		**107.500**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6
Sample Date/Time: Monday, August 18, 2014 15:22:15
Autosampler Position: 192
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 6.012

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			817466.065	ug/L	823597.028
	233	**U**	**0.035265**	5.512	1349.797	ug/L	17.600
	234	**U**	**0.049614**	2.339	1433.672	ug/L	8.400
	235	**U**	**2.998098**	3.470	80703.405	ug/L	11.000
	236	**U**	**0.053708**	2.320	2223.973	ug/L	13.400
	238	**U**	**3.108687**	2.432	74984.451	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.256**	
	U	233		**114.126**
	U	234		**100.029**
	U	235		
	U	236		**100.577**
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7
Sample Date/Time: Monday, August 18, 2014 15:26:56
Autosampler Position: 199
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 7.013

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			784443.597	ug/L	823597.028
	233	**U**	**0.002176**	10.741	95.534	ug/L	17.600
	234	**U**	**-0.000046**	145.453	6.667	ug/L	8.400
	235	**U**	**0.000394**	34.785	20.533	ug/L	11.000
	236	**U**	**0.000025**	348.361	13.600	ug/L	13.400
	238	**U**	**0.000286**	113.091	63.067	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.246**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 8

Sample Date/Time: Monday, August 18, 2014 15:31:37
Autosampler Position: 200
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 8.014

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			776476.782	ug/L	823597.028
	233	**U**	**0.054286**	1.414	1968.002	ug/L	17.600
	234	**U**	**0.084444**	2.077	2312.454	ug/L	8.400
	235	**U**	**5.057302**	1.914	129388.853	ug/L	11.000
	236	**U**	**0.090061**	1.861	3534.571	ug/L	13.400
	238	**U**	**5.267588**	1.875	120674.368	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.279**	
	U	233		**105.410**
	U	234		**102.109**
	U	235		**104.328**
	U	236		**101.192**
	U	238		**104.809**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Monday, August 18, 2014 15:36:17
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 9.015

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			826480.641	ug/L	823597.028
	233	**U**	**0.053572**	1.602	2067.416	ug/L	17.600
	234	**U**	**0.084136**	1.319	2453.144	ug/L	8.400
	235	**U**	**5.022172**	1.998	136761.908	ug/L	11.000
	236	**U**	**0.090446**	3.918	3775.299	ug/L	13.400
	238	**U**	**5.215171**	2.102	127161.520	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.350**	
	U	233		**104.024**
	U	234		**101.736**
	U	235		**103.603**
	U	236		**101.624**
	U	238		**103.766**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Monday, August 18, 2014 15:40:57

Autosampler Position: 1

Dataset File: D:\Elandata\Dataset\081814M3\QC Std 10.016

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			820030.226	ug/L	823597.028
	233	**U**	**0.011264**	4.757	444.540	ug/L	17.600
	234	**U**	**0.000014**	273.133	8.733	ug/L	8.400
	235	**U**	**0.001674**	12.862	56.200	ug/L	11.000
	236	**U**	**-0.000069**	19.545	10.467	ug/L	13.400
	238	**U**	**0.004196**	11.309	160.268	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.567**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-26-G

Sample Date/Time: Monday, August 18, 2014 15:56:37

Autosampler Position: 11

Dataset File: D:\Elandata\Dataset\081814M3\680-102199-A-26-G.017

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			788190.967	ug/L	823597.028
	233	**U**	**0.000229**	44.362	25.133	ug/L	17.600
	234	**U**	**0.000175**	21.533	12.867	ug/L	8.400
	235	**U**	**0.037124**	1.356	975.567	ug/L	11.000
	236	**U**	**-0.000132**	26.451	7.533	ug/L	13.400
	238	**U**	**5.003578**	0.676	116433.998	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.701**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-27-F

Sample Date/Time: Monday, August 18, 2014 16:01:16

Autosampler Position: 12

Dataset File: D:\Elandata\Dataset\081814M3\680-102199-A-27-F.018

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			802986.173	ug/L	823597.028
	233	**U**	**0.000099**	58.950	20.867	ug/L	17.600
	234	**U**	**0.000287**	24.158	16.267	ug/L	8.400
	235	**U**	**0.039339**	1.933	1051.972	ug/L	11.000
	236	**U**	**-0.000164**	32.296	6.467	ug/L	13.400
	238	**U**	**5.186952**	0.865	122976.773	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.497**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102199-A-28-E

Sample Date/Time: Monday, August 18, 2014 16:05:56

Autosampler Position: 13

Dataset File: D:\Elandata\Dataset\081814M3\680-102199-A-28-E.019

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			795434.196	ug/L	823597.028
	233	**U**	**0.000028**	108.911	18.067	ug/L	17.600
	234	**U**	**0.000163**	18.400	12.667	ug/L	8.400
	235	**U**	**0.026975**	1.391	718.018	ug/L	11.000
	236	**U**	**-0.000144**	21.694	7.200	ug/L	13.400
	238	**U**	**3.616532**	2.123	84924.288	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.581**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 425520

Sample Date/Time: Monday, August 18, 2014 16:10:36
Autosampler Position: 14
Dataset File: D:\Elandata\Dataset\081814M3\425520.020

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			839199.971	ug/L	823597.028
	233	**U**	**-0.000176**	12.762	11.133	ug/L	17.600
	234	**U**	**-0.000091**	7.473	5.867	ug/L	8.400
	235	**U**	**-0.000108**	60.189	8.200	ug/L	11.000
	236	**U**	**-0.000130**	34.502	8.200	ug/L	13.400
	238	**U**	**0.000968**	25.018	84.334	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.894**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 425521

Sample Date/Time: Monday, August 18, 2014 16:15:16
Autosampler Position: 15
Dataset File: D:\Elandata\Dataset\081814M3\425521.021

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			830123.222	ug/L	823597.028
	233	**U**	**0.002572**	7.533	116.534	ug/L	17.600
	234	**U**	**0.042506**	1.250	1249.121	ug/L	8.400
	235	**U**	**2.565980**	2.300	70187.572	ug/L	11.000
	236	**U**	**0.046131**	1.711	1942.466	ug/L	13.400
	238	**U**	**2.649758**	1.940	64932.480	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.792**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-1-E

Sample Date/Time: Monday, August 18, 2014 16:19:56
Autosampler Position: 16
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-1-E.022

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			788738.336	ug/L	823597.028
	233	**U**	**0.000048**	33.494	18.600	ug/L	17.600
	234	**U**	**0.000218**	20.156	14.067	ug/L	8.400
	235	**U**	**0.038310**	1.217	1006.569	ug/L	11.000
	236	**U**	**-0.000176**	17.271	5.800	ug/L	13.400
	238	**U**	**5.121751**	1.139	119258.492	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.768**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-1-E SD

Sample Date/Time: Monday, August 18, 2014 16:24:37

Autosampler Position: 17

Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-1-E SD.023

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			804500.850	ug/L	823597.028
	233	**U**	**-0.000133**	23.600	12.200	ug/L	17.600
	234	**U**	**-0.000012**	131.122	7.867	ug/L	8.400
	235	**U**	**0.007978**	0.446	222.402	ug/L	11.000
	236	**U**	**-0.000163**	10.264	6.467	ug/L	13.400
	238	**U**	**1.051275**	0.458	25017.578	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.681**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-1-F MS

Sample Date/Time: Monday, August 18, 2014 16:29:17

Autosampler Position: 18

Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-1-F MS.024

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			774268.998	ug/L	823597.028
	233	**U**	**0.000942**	15.756	50.200	ug/L	17.600
	234	**U**	**0.017437**	0.498	482.741	ug/L	8.400
	235	**U**	**1.056448**	1.525	26970.976	ug/L	11.000
	236	**U**	**0.017886**	2.734	710.151	ug/L	13.400
	238	**U**	**7.348992**	1.287	167939.680	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.011**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-1-G MSD

Sample Date/Time: Monday, August 18, 2014 16:33:58

Autosampler Position: 19

Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-1-G MSD.025

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			775548.376	ug/L	823597.028
	233	**U**	**0.000907**	16.514	49.133	ug/L	17.600
	234	**U**	**0.014758**	4.173	410.206	ug/L	8.400
	235	**U**	**0.932995**	1.349	23862.583	ug/L	11.000
	236	**U**	**0.015937**	1.511	635.481	ug/L	13.400
	238	**U**	**7.063324**	1.200	161689.663	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.166**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-2-D

Sample Date/Time: Monday, August 18, 2014 16:38:37

Autosampler Position: 20

Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-2-D.026

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			768809.792	ug/L	823597.028
	233	**U**	**-0.000051**	78.973	14.600	ug/L	17.600
	234	**U**	**0.000327**	34.746	16.667	ug/L	8.400
	235	**U**	**0.045737**	2.017	1169.915	ug/L	11.000
	236	**U**	**-0.000143**	26.216	6.933	ug/L	13.400
	238	**U**	**5.262074**	0.423	119451.441	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.348**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Monday, August 18, 2014 16:43:19
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 9.027

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			793278.428	ug/L	823597.028
	233	**U**	**0.054031**	3.662	1999.473	ug/L	17.600
	234	**U**	**0.087797**	2.754	2455.144	ug/L	8.400
	235	**U**	**5.263724**	2.426	137558.048	ug/L	11.000
	236	**U**	**0.093626**	2.109	3753.227	ug/L	13.400
	238	**U**	**5.453345**	2.088	127627.621	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.319**	
	U	233		**104.915**
	U	234		**106.163**
	U	235		**108.586**
	U	236		**105.198**
	U	238		**108.505**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Monday, August 18, 2014 16:47:59
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 10.028

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			808048.561	ug/L	823597.028
	233	**U**	**0.010928**	5.710	425.273	ug/L	17.600
	234	**U**	**-0.000015**	239.448	7.800	ug/L	8.400
	235	**U**	**0.001531**	15.402	51.667	ug/L	11.000
	236	**U**	**-0.000158**	14.334	6.667	ug/L	13.400
	238	**U**	**0.004764**	7.930	171.601	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.112**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-3-D

Sample Date/Time: Monday, August 18, 2014 16:52:39

Autosampler Position: 21

Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-3-D.029

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			800560.717	ug/L	823597.028
	233	**U**	**-0.000096**	47.426	13.533	ug/L	17.600
	234	**U**	**0.000141**	9.732	12.133	ug/L	8.400
	235	**U**	**0.033381**	0.300	891.828	ug/L	11.000
	236	**U**	**-0.000144**	20.328	7.200	ug/L	13.400
	238	**U**	**4.534452**	0.610	107185.437	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.203**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-5-C

Sample Date/Time: Monday, August 18, 2014 16:57:20
Autosampler Position: 22
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-5-C.030

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			768033.349	ug/L	823597.028
	233	**U**	**-0.000033**	206.541	15.200	ug/L	17.600
	234	**U**	**0.000338**	20.816	16.933	ug/L	8.400
	235	**U**	**0.046519**	2.882	1187.583	ug/L	11.000
	236	**U**	**-0.000174**	10.632	5.733	ug/L	13.400
	238	**U**	**6.270487**	2.192	142117.205	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.254**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-6-C
Sample Date/Time: Monday, August 18, 2014 17:02:00
Autosampler Position: 23
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-6-C.031

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			789619.755	ug/L	823597.028
	233	**U**	**-0.000115**	18.618	12.667	ug/L	17.600
	234	**U**	**0.000364**	18.844	18.200	ug/L	8.400
	235	**U**	**0.045054**	0.590	1183.516	ug/L	11.000
	236	**U**	**-0.000165**	5.643	6.267	ug/L	13.400
	238	**U**	**6.146745**	1.146	143309.852	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.875**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-7-C

Sample Date/Time: Monday, August 18, 2014 17:06:40

Autosampler Position: 24

Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-7-C.032

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			823264.537	ug/L	823597.028
	233	**U**	**-0.000104**	41.042	13.600	ug/L	17.600
	234	**U**	**0.000135**	37.575	12.333	ug/L	8.400
	235	**U**	**0.022730**	1.716	627.947	ug/L	11.000
	236	**U**	**-0.000162**	13.861	6.667	ug/L	13.400
	238	**U**	**3.143174**	1.069	76414.835	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.960**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-9-C

Sample Date/Time: Monday, August 18, 2014 17:11:20

Autosampler Position: 25

Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-9-C.033

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			749321.234	ug/L	823597.028
	233	**U**	**-0.000102**	109.594	12.400	ug/L	17.600
	234	**U**	**0.000266**	37.657	14.600	ug/L	8.400
	235	**U**	**0.044387**	2.465	1106.243	ug/L	11.000
	236	**U**	**-0.000167**	17.106	5.867	ug/L	13.400
	238	**U**	**5.958640**	0.581	131827.709	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.982**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-10-C
Sample Date/Time: Monday, August 18, 2014 17:15:59
Autosampler Position: 26
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-10-C.034

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			788759.263	ug/L	823597.028
	233	**U**	**-0.000130**	38.862	12.067	ug/L	17.600
	234	**U**	**0.000375**	18.926	18.400	ug/L	8.400
	235	**U**	**0.049575**	1.853	1299.259	ug/L	11.000
	236	**U**	**-0.000139**	31.438	7.267	ug/L	13.400
	238	**U**	**5.740528**	1.461	133641.197	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.770**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-11-C
Sample Date/Time: Monday, August 18, 2014 17:20:39
Autosampler Position: 27
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-11-C.035

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			768840.857	ug/L	823597.028
	233	**U**	**-0.000100**	20.305	12.867	ug/L	17.600
	234	**U**	**0.000280**	24.982	15.467	ug/L	8.400
	235	**U**	**0.044568**	1.392	1139.645	ug/L	11.000
	236	**U**	**-0.000135**	20.593	7.267	ug/L	13.400
	238	**U**	**6.068490**	1.269	137715.107	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.352**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-13-C

Sample Date/Time: Monday, August 18, 2014 17:25:19

Autosampler Position: 28

Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-13-C.036

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			757932.442	ug/L	823597.028
	233	**U**	**-0.000109**	15.827	12.400	ug/L	17.600
	234	**U**	**0.000189**	32.090	12.733	ug/L	8.400
	235	**U**	**0.035980**	3.755	908.829	ug/L	11.000
	236	**U**	**-0.000130**	27.202	7.333	ug/L	13.400
	238	**U**	**4.852335**	1.048	108588.257	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.027**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-14-C
Sample Date/Time: Monday, August 18, 2014 17:29:59
Autosampler Position: 29
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-14-C.037

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			790335.449	ug/L	823597.028
	233	**U**	**-0.000046**	135.144	15.200	ug/L	17.600
	234	**U**	**0.000222**	18.584	14.200	ug/L	8.400
	235	**U**	**0.038462**	1.208	1012.769	ug/L	11.000
	236	**U**	**-0.000145**	13.631	7.067	ug/L	13.400
	238	**U**	**5.139324**	1.571	119901.101	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.961**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-15-E

Sample Date/Time: Monday, August 18, 2014 17:34:40

Autosampler Position: 30

Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-15-E.038

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			728582.697	ug/L	823597.028
	233	**U**	**-0.000002**	3651.887	15.533	ug/L	17.600
	234	**U**	**0.000153**	33.662	11.333	ug/L	8.400
	235	**U**	**0.020090**	0.870	492.275	ug/L	11.000
	236	**U**	**-0.000006**	501.985	11.667	ug/L	13.400
	238	**U**	**2.544898**	0.771	54765.950	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.463**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Monday, August 18, 2014 17:39:20
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 9.039

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			805236.626	ug/L	823597.028
	233	**U**	**0.053835**	1.732	2023.877	ug/L	17.600
	234	**U**	**0.086812**	3.090	2463.813	ug/L	8.400
	235	**U**	**5.177205**	2.825	137311.762	ug/L	11.000
	236	**U**	**0.092782**	3.707	3772.965	ug/L	13.400
	238	**U**	**5.410376**	3.066	128472.142	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.771**	
	U	233		**104.534**
	U	234		**104.972**
	U	235		**106.802**
	U	236		**104.249**
	U	238		**107.650**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Monday, August 18, 2014 17:44:01
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 10.040

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			805532.125	ug/L	823597.028
	233	**U**	**0.010763**	1.757	419.073	ug/L	17.600
	234	**U**	**0.000026**	236.934	8.933	ug/L	8.400
	235	**U**	**0.001855**	15.275	59.733	ug/L	11.000
	236	**U**	**0.000028**	86.616	14.200	ug/L	13.400
	238	**U**	**0.004718**	6.042	170.134	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.807**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-16-C
Sample Date/Time: Monday, August 18, 2014 17:48:41
Autosampler Position: 31
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-16-C.041

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			798279.372	ug/L	823597.028
	233	**U**	**-0.000110**	78.972	12.933	ug/L	17.600
	234	**U**	**0.000061**	100.381	9.867	ug/L	8.400
	235	**U**	**0.013116**	0.904	355.938	ug/L	11.000
	236	**U**	**-0.000067**	142.773	10.200	ug/L	13.400
	238	**U**	**1.750170**	1.184	41276.319	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.926**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-17-C
Sample Date/Time: Monday, August 18, 2014 17:53:21
Autosampler Position: 32
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-17-C.042

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			801762.958	ug/L	823597.028
	233	**U**	**-0.000123**	26.778	12.533	ug/L	17.600
	234	**U**	**0.000008**	47.565	8.400	ug/L	8.400
	235	**U**	**0.009841**	2.301	270.936	ug/L	11.000
	236	**U**	**-0.000167**	10.393	6.267	ug/L	13.400
	238	**U**	**1.351866**	0.785	32041.744	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.349**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-18-C
Sample Date/Time: Monday, August 18, 2014 17:58:02
Autosampler Position: 33
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-18-C.043

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			840184.386	ug/L	823597.028
	233	**U**	**-0.000190**	21.232	10.533	ug/L	17.600
	234	**U**	**-0.000066**	83.060	6.600	ug/L	8.400
	235	**U**	**0.008570**	0.736	248.602	ug/L	11.000
	236	**U**	**-0.000162**	13.089	6.800	ug/L	13.400
	238	**U**	**1.184804**	2.300	29416.472	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**102.014**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-19-C
Sample Date/Time: Monday, August 18, 2014 18:02:42
Autosampler Position: 34
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-19-C.044

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			813642.482	ug/L	823597.028
	233	**U**	**-0.000210**	16.608	9.467	ug/L	17.600
	234	**U**	**-0.000056**	53.469	6.667	ug/L	8.400
	235	**U**	**0.005626**	5.811	161.534	ug/L	11.000
	236	**U**	**-0.000193**	2.740	5.333	ug/L	13.400
	238	**U**	**0.807687**	2.788	19435.617	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.791**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-21-C
Sample Date/Time: Monday, August 18, 2014 18:07:23
Autosampler Position: 35
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-21-C.045

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			785320.505	ug/L	823597.028
	233	**U**	**-0.000211**	28.892	9.067	ug/L	17.600
	234	**U**	**0.000012**	646.233	8.400	ug/L	8.400
	235	**U**	**0.012591**	2.481	336.271	ug/L	11.000
	236	**U**	**-0.000154**	15.992	6.667	ug/L	13.400
	238	**U**	**1.645180**	1.121	38172.848	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.353**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-22-C
Sample Date/Time: Monday, August 18, 2014 18:12:02
Autosampler Position: 36
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-22-C.046

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			808401.786	ug/L	823597.028
	233	**U**	**-0.000170**	10.599	10.933	ug/L	17.600
	234	**U**	**0.000057**	76.132	9.867	ug/L	8.400
	235	**U**	**0.019961**	1.987	542.877	ug/L	11.000
	236	**U**	**-0.000207**	14.902	4.733	ug/L	13.400
	238	**U**	**2.739444**	1.286	65407.602	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.155**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-23-C

Sample Date/Time: Monday, August 18, 2014 18:16:42

Autosampler Position: 37

Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-23-C.047

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			800306.635	ug/L	823597.028
	233	**U**	**-0.000139**	51.485	11.867	ug/L	17.600
	234	**U**	**0.000021**	132.822	8.733	ug/L	8.400
	235	**U**	**0.009680**	5.011	265.936	ug/L	11.000
	236	**U**	**-0.000197**	9.921	5.067	ug/L	13.400
	238	**U**	**1.331847**	1.037	31502.881	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.172**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 425544

Sample Date/Time: Monday, August 18, 2014 18:21:22
Autosampler Position: 38
Dataset File: D:\Elandata\Dataset\081814M3\425544.048

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			796922.748	ug/L	823597.028
	233	**U**	**-0.000250**	19.469	7.733	ug/L	17.600
	234	**U**	**-0.000086**	36.127	5.733	ug/L	8.400
	235	**U**	**-0.000178**	28.604	6.000	ug/L	11.000
	236	**U**	**-0.000160**	4.586	6.533	ug/L	13.400
	238	**U**	**0.001477**	7.993	92.267	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.761**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 425545

Sample Date/Time: Monday, August 18, 2014 18:26:01
Autosampler Position: 39
Dataset File: D:\Elandata\Dataset\081814M3\425545.049

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			788491.010	ug/L	823597.028
	233	**U**	**0.002429**	2.606	105.467	ug/L	17.600
	234	**U**	**0.043705**	4.860	1217.519	ug/L	8.400
	235	**U**	**2.609542**	2.826	67767.992	ug/L	11.000
	236	**U**	**0.047231**	4.109	1886.391	ug/L	13.400
	238	**U**	**2.723862**	2.930	63360.679	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.737**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-25-D
Sample Date/Time: Monday, August 18, 2014 18:30:41
Autosampler Position: 40
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-25-D.050

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			843940.465	ug/L	823597.028
	233	**U**	**-0.000229**	1.743	9.067	ug/L	17.600
	234	**U**	**-0.000018**	196.351	8.067	ug/L	8.400
	235	**U**	**0.008558**	1.806	249.269	ug/L	11.000
	236	**U**	**-0.000163**	14.385	6.800	ug/L	13.400
	238	**U**	**1.165767**	2.186	29073.445	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**102.470**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Monday, August 18, 2014 18:35:22
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 9.051

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			777393.309	ug/L	823597.028
	233	**U**	**0.054630**	3.060	1981.337	ug/L	17.600
	234	**U**	**0.088293**	3.223	2419.072	ug/L	8.400
	235	**U**	**5.311193**	2.659	136002.018	ug/L	11.000
	236	**U**	**0.095373**	1.493	3747.359	ug/L	13.400
	238	**U**	**5.567558**	1.662	127706.191	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.390**	
	U	233		**106.077**
	U	234		**106.764**
	U	235		**109.566**
	U	236		**107.161**
	U	238		**110.777**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Monday, August 18, 2014 18:40:02
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 10.052

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			780613.066	ug/L	823597.028
	233	**U**	**0.010994**	2.946	414.139	ug/L	17.600
	234	**U**	**-0.000081**	24.698	5.733	ug/L	8.400
	235	**U**	**0.002361**	29.906	70.400	ug/L	11.000
	236	**U**	**-0.000132**	27.427	7.467	ug/L	13.400
	238	**U**	**0.005400**	13.962	180.001	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.781**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-25-D SD

Sample Date/Time: Monday, August 18, 2014 18:44:42

Autosampler Position: 41

Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-25-D SD.053

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			793065.200	ug/L	823597.028
	233	**U**	**-0.000275**	8.219	6.800	ug/L	17.600
	234	**U**	**-0.000098**	23.667	5.333	ug/L	8.400
	235	**U**	**0.001902**	10.174	60.200	ug/L	11.000
	236	**U**	**-0.000171**	26.476	6.000	ug/L	13.400
	238	**U**	**0.247929**	2.589	5862.007	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.293**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-25-E MS

Sample Date/Time: Monday, August 18, 2014 18:49:22

Autosampler Position: 42

Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-25-E MS.054

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			836638.606	ug/L	823597.028
	233	**U**	**0.000839**	8.972	50.467	ug/L	17.600
	234	**U**	**0.016915**	4.066	505.676	ug/L	8.400
	235	**U**	**1.014753**	1.663	27992.151	ug/L	11.000
	236	**U**	**0.017773**	0.695	763.087	ug/L	13.400
	238	**U**	**2.210204**	2.038	54599.718	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.583**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-25-F MSD

Sample Date/Time: Monday, August 18, 2014 18:54:02

Autosampler Position: 43

Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-25-F MSD.055

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			819984.680	ug/L	823597.028
	233	**U**	**0.000763**	10.990	46.533	ug/L	17.600
	234	**U**	**0.016302**	2.608	478.141	ug/L	8.400
	235	**U**	**1.001288**	0.808	27075.729	ug/L	11.000
	236	**U**	**0.017680**	1.429	744.286	ug/L	13.400
	238	**U**	**1.992402**	0.931	48261.400	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.561**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-26-C
Sample Date/Time: Monday, August 18, 2014 18:58:43
Autosampler Position: 44
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-26-C.056

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			801635.417	ug/L	823597.028
	233	**U**	**-0.000201**	5.312	9.667	ug/L	17.600
	234	**U**	**-0.000049**	158.575	6.800	ug/L	8.400
	235	**U**	**0.007494**	3.069	208.935	ug/L	11.000
	236	**U**	**-0.000165**	23.973	6.333	ug/L	13.400
	238	**U**	**1.063872**	0.223	25227.741	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.333**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-27-C
Sample Date/Time: Monday, August 18, 2014 19:03:23
Autosampler Position: 45
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-27-C.057

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			716639.445	ug/L	823597.028
	233	**U**	**-0.000264**	17.350	6.533	ug/L	17.600
	234	**U**	**0.000287**	44.441	14.533	ug/L	8.400
	235	**U**	**0.037196**	0.187	888.494	ug/L	11.000
	236	**U**	**-0.000165**	44.889	5.667	ug/L	13.400
	238	**U**	**4.194646**	0.589	88770.086	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**87.013**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-28-C
Sample Date/Time: Monday, August 18, 2014 19:08:04
Autosampler Position: 46
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-28-C.058

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			799567.664	ug/L	823597.028
	233	**U**	**-0.000212**	17.990	9.200	ug/L	17.600
	234	**U**	**-0.000032**	86.885	7.267	ug/L	8.400
	235	**U**	**0.008931**	4.770	245.735	ug/L	11.000
	236	**U**	**-0.000151**	35.167	6.867	ug/L	13.400
	238	**U**	**1.226256**	2.556	28968.556	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.082**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-29-C

Sample Date/Time: Monday, August 18, 2014 19:12:44
Autosampler Position: 47
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-29-C.059

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			791788.826	ug/L	823597.028
	233	**U**	**-0.000203**	2.704	9.467	ug/L	17.600
	234	**U**	**-0.000005**	387.900	7.933	ug/L	8.400
	235	**U**	**0.009827**	3.027	266.936	ug/L	11.000
	236	**U**	**-0.000181**	4.483	5.667	ug/L	13.400
	238	**U**	**1.373862**	3.337	32130.028	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.138**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-30-C

Sample Date/Time: Monday, August 18, 2014 19:17:24

Autosampler Position: 48

Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-30-C.060

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			785306.131	ug/L	823597.028
	233	**U**	**-0.000241**	20.590	8.000	ug/L	17.600
	234	**U**	**0.000334**	23.615	17.200	ug/L	8.400
	235	**U**	**0.048200**	3.510	1257.389	ug/L	11.000
	236	**U**	**-0.000163**	12.894	6.333	ug/L	13.400
	238	**U**	**6.014397**	1.417	139399.368	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.351**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-31-C

Sample Date/Time: Monday, August 18, 2014 19:22:04

Autosampler Position: 49

Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-31-C.061

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			763676.437	ug/L	823597.028
	233	**U**	**-0.000147**	39.799	11.133	ug/L	17.600
	234	**U**	**0.000586**	1.471	23.533	ug/L	8.400
	235	**U**	**0.072299**	1.559	1830.184	ug/L	11.000
	236	**U**	**-0.000087**	53.579	9.067	ug/L	13.400
	238	**U**	**5.099550**	1.744	114940.724	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.725**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-32-C
Sample Date/Time: Monday, August 18, 2014 19:26:43
Autosampler Position: 50
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-32-C.062

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			726085.295	ug/L	823597.028
	233	**U**	**-0.000162**	24.483	10.067	ug/L	17.600
	234	**U**	**0.000235**	12.557	13.400	ug/L	8.400
	235	**U**	**0.033322**	0.753	807.423	ug/L	11.000
	236	**U**	**-0.000143**	2.767	6.600	ug/L	13.400
	238	**U**	**4.522647**	0.413	96971.193	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.160**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Monday, August 18, 2014 19:31:24
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 9.063

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			787688.396	ug/L	823597.028
	233	**U**	**0.053683**	2.671	1973.937	ug/L	17.600
	234	**U**	**0.086942**	2.034	2415.271	ug/L	8.400
	235	**U**	**5.208721**	2.710	135137.616	ug/L	11.000
	236	**U**	**0.094200**	3.137	3748.092	ug/L	13.400
	238	**U**	**5.473612**	2.908	127142.086	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.640**	
	U	233		**104.239**
	U	234		**105.129**
	U	235		**107.452**
	U	236		**105.842**
	U	238		**108.908**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Monday, August 18, 2014 19:36:04
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 10.064

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			755708.408	ug/L	823597.028
	233	**U**	**0.011330**	3.064	412.206	ug/L	17.600
	234	**U**	**-0.000033**	116.119	6.867	ug/L	8.400
	235	**U**	**0.002079**	23.051	61.333	ug/L	11.000
	236	**U**	**-0.000099**	3.363	8.533	ug/L	13.400
	238	**U**	**0.005644**	9.854	179.868	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.757**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-34-C
Sample Date/Time: Monday, August 18, 2014 19:40:44
Autosampler Position: 51
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-34-C.065

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			756105.500	ug/L	823597.028
	233	**U**	**-0.000222**	2.315	8.400	ug/L	17.600
	234	**U**	**0.000134**	40.525	11.267	ug/L	8.400
	235	**U**	**0.022036**	1.190	559.611	ug/L	11.000
	236	**U**	**-0.000156**	25.540	6.333	ug/L	13.400
	238	**U**	**2.841868**	0.391	63474.891	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.805**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-35-C
Sample Date/Time: Monday, August 18, 2014 19:45:24
Autosampler Position: 52
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-35-C.066

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			762170.851	ug/L	823597.028
	233	**U**	**-0.000162**	32.233	10.600	ug/L	17.600
	234	**U**	**0.000696**	13.883	26.467	ug/L	8.400
	235	**U**	**0.079596**	1.333	2010.608	ug/L	11.000
	236	**U**	**-0.000051**	86.304	10.400	ug/L	13.400
	238	**U**	**5.734972**	1.677	129055.935	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.542**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-36-C
Sample Date/Time: Monday, August 18, 2014 19:50:04
Autosampler Position: 53
Dataset File: D:\Elandata\Dataset\081814M3\680-102327-A-36-C.067

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			751964.358	ug/L	823597.028
	233	**U**	**-0.000224**	10.531	8.267	ug/L	17.600
	234	**U**	**0.000071**	50.430	9.533	ug/L	8.400
	235	**U**	**0.019691**	2.274	498.009	ug/L	11.000
	236	**U**	**-0.000183**	13.162	5.267	ug/L	13.400
	238	**U**	**2.685104**	0.451	59644.912	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.302**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: MB

Sample Date/Time: Monday, August 18, 2014 19:54:45
Autosampler Position: 54
Dataset File: D:\Elandata\Dataset\081814M3\MB.068

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			778278.906	ug/L	823597.028
	233	**U**	**-0.000274**	7.062	6.733	ug/L	17.600
	234	**U**	**-0.000111**	29.979	4.933	ug/L	8.400
	235	**U**	**-0.000100**	108.359	7.733	ug/L	11.000
	236	**U**	**-0.000166**	11.974	6.133	ug/L	13.400
	238	**U**	**0.010361**	3.005	294.203	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.498**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: LCS

Sample Date/Time: Monday, August 18, 2014 19:59:25
Autosampler Position: 55
Dataset File: D:\Elandata\Dataset\081814M3\LCS.069

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			764545.297	ug/L	823597.028
	233	**U**	**0.002735**	5.215	113.134	ug/L	17.600
	234	**U**	**0.046413**	2.891	1254.455	ug/L	8.400
	235	**U**	**2.765708**	1.927	69675.035	ug/L	11.000
	236	**U**	**0.049562**	1.981	1920.863	ug/L	13.400
	238	**U**	**2.877860**	1.853	64942.130	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.830**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-1-C
Sample Date/Time: Monday, August 18, 2014 20:04:05
Autosampler Position: 56
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-1-C.070

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			750808.073	ug/L	823597.028
	233	**U**	**-0.000123**	66.364	11.733	ug/L	17.600
	234	**U**	**0.000250**	34.110	14.267	ug/L	8.400
	235	**U**	**0.039525**	1.791	988.301	ug/L	11.000
	236	**U**	**-0.000184**	19.099	5.267	ug/L	13.400
	238	**U**	**5.273145**	1.280	116880.509	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.162**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-1-C SD

Sample Date/Time: Monday, August 18, 2014 20:08:46

Autosampler Position: 57

Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-1-C SD.071

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			765687.155	ug/L	823597.028
	233	**U**	**-0.000249**	5.401	7.533	ug/L	17.600
	234	**U**	**-0.000039**	93.357	6.733	ug/L	8.400
	235	**U**	**0.008008**	0.857	212.402	ug/L	11.000
	236	**U**	**-0.000200**	6.810	4.733	ug/L	13.400
	238	**U**	**1.088937**	1.618	24666.769	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.969**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-1-D MS

Sample Date/Time: Monday, August 18, 2014 20:13:27

Autosampler Position: 58

Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-1-D MS.072

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			754388.095	ug/L	823597.028
	233	**U**	**0.000908**	7.961	47.800	ug/L	17.600
	234	**U**	**0.017064**	0.867	460.474	ug/L	8.400
	235	**U**	**1.054041**	1.361	26223.517	ug/L	11.000
	236	**U**	**0.018108**	1.881	700.951	ug/L	13.400
	238	**U**	**6.449856**	1.089	143635.279	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.597**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-1-E MSD

Sample Date/Time: Monday, August 18, 2014 20:18:07

Autosampler Position: 59

Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-1-E MSD.073

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			730520.575	ug/L	823597.028
	233	**U**	**0.000893**	14.939	45.733	ug/L	17.600
	234	**U**	**0.017557**	1.290	458.474	ug/L	8.400
	235	**U**	**1.088843**	0.576	26234.141	ug/L	11.000
	236	**U**	**0.018989**	0.806	710.951	ug/L	13.400
	238	**U**	**6.380736**	0.861	137607.234	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.699**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-2-C

Sample Date/Time: Monday, August 18, 2014 20:22:46

Autosampler Position: 60

Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-2-C.074

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			743401.623	ug/L	823597.028
	233	**U**	**-0.000088**	5.159	12.867	ug/L	17.600
	234	**U**	**0.000326**	19.281	16.133	ug/L	8.400
	235	**U**	**0.049108**	2.003	1214.052	ug/L	11.000
	236	**U**	**-0.000170**	0.891	5.733	ug/L	13.400
	238	**U**	**6.576087**	1.018	144313.564	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.263**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Monday, August 18, 2014 20:27:27
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 9.075

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			774633.133	ug/L	823597.028
	233	**U**	**0.054257**	3.052	1961.001	ug/L	17.600
	234	**U**	**0.088490**	3.116	2415.871	ug/L	8.400
	235	**U**	**5.283381**	2.622	134811.690	ug/L	11.000
	236	**U**	**0.095350**	3.355	3730.287	ug/L	13.400
	238	**U**	**5.550248**	2.412	126819.129	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.055**	
	U	233		**105.354**
	U	234		**107.001**
	U	235		**108.992**
	U	236		**107.134**
	U	238		**110.433**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Monday, August 18, 2014 20:32:07
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 10.076

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			762603.856	ug/L	823597.028
	233	**U**	**0.011187**	2.791	411.606	ug/L	17.600
	234	**U**	**-0.000001**	2744.448	7.733	ug/L	8.400
	235	**U**	**0.001807**	9.428	55.467	ug/L	11.000
	236	**U**	**-0.000109**	15.681	8.200	ug/L	13.400
	238	**U**	**0.005376**	6.333	175.734	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.594**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-3-C
Sample Date/Time: Monday, August 18, 2014 20:36:47
Autosampler Position: 61
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-3-C.077

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			729635.309	ug/L	823597.028
	233	**U**	**-0.000113**	31.590	11.800	ug/L	17.600
	234	**U**	**0.000258**	6.387	14.067	ug/L	8.400
	235	**U**	**0.032031**	3.248	780.755	ug/L	11.000
	236	**U**	**-0.000144**	48.023	6.600	ug/L	13.400
	238	**U**	**4.352884**	0.508	93789.580	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.591**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-5-C

Sample Date/Time: Monday, August 18, 2014 20:41:26

Autosampler Position: 62

Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-5-C.078

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			732585.703	ug/L	823597.028
	233	**U**	**-0.000106**	61.107	12.067	ug/L	17.600
	234	**U**	**0.000355**	23.839	16.600	ug/L	8.400
	235	**U**	**0.044938**	2.428	1095.642	ug/L	11.000
	236	**U**	**-0.000156**	24.430	6.133	ug/L	13.400
	238	**U**	**5.632190**	0.492	121825.845	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.950**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-6-C

Sample Date/Time: Monday, August 18, 2014 20:46:06

Autosampler Position: 63

Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-6-C.079

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			749864.589	ug/L	823597.028
	233	**U**	**-0.000117**	56.768	12.000	ug/L	17.600
	234	**U**	**0.000327**	8.019	16.267	ug/L	8.400
	235	**U**	**0.043910**	2.299	1095.909	ug/L	11.000
	236	**U**	**-0.000185**	18.154	5.200	ug/L	13.400
	238	**U**	**5.858059**	1.802	129705.264	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.048**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-7-C

Sample Date/Time: Monday, August 18, 2014 20:50:46

Autosampler Position: 64

Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-7-C.080

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			836755.101	ug/L	823597.028
	233	**U**	**-0.000110**	34.460	13.667	ug/L	17.600
	234	**U**	**-0.000014**	185.498	8.133	ug/L	8.400
	235	**U**	**0.013571**	2.076	385.472	ug/L	11.000
	236	**U**	**-0.000148**	11.374	7.333	ug/L	13.400
	238	**U**	**1.823310**	0.831	45076.984	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.598**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-8-C

Sample Date/Time: Monday, August 18, 2014 20:55:26

Autosampler Position: 65

Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-8-C.081

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			729449.191	ug/L	823597.028
	233	**U**	**-0.000150**	25.909	10.533	ug/L	17.600
	234	**U**	**0.000308**	14.726	15.333	ug/L	8.400
	235	**U**	**0.047904**	2.583	1161.781	ug/L	11.000
	236	**U**	**-0.000170**	17.779	5.600	ug/L	13.400
	238	**U**	**6.419047**	0.930	138222.252	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.569**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-9-C
Sample Date/Time: Monday, August 18, 2014 21:00:06
Autosampler Position: 66
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-9-C.082

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			751659.507	ug/L	823597.028
	233	**U**	**-0.000191**	22.325	9.400	ug/L	17.600
	234	**U**	**0.000267**	17.398	14.733	ug/L	8.400
	235	**U**	**0.044080**	0.934	1102.309	ug/L	11.000
	236	**U**	**-0.000187**	6.265	5.133	ug/L	13.400
	238	**U**	**5.979512**	0.791	132706.566	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.265**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-10-D

Sample Date/Time: Monday, August 18, 2014 21:04:47

Autosampler Position: 67

Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-10-D.083

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			756111.997	ug/L	823597.028
	233	**U**	**-0.000114**	39.946	12.133	ug/L	17.600
	234	**U**	**0.000161**	16.265	12.000	ug/L	8.400
	235	**U**	**0.030760**	1.464	777.155	ug/L	11.000
	236	**U**	**-0.000177**	3.922	5.533	ug/L	13.400
	238	**U**	**4.186141**	0.533	93462.601	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.806**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-12-C
Sample Date/Time: Monday, August 18, 2014 21:09:27
Autosampler Position: 68
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-12-C.084

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			751060.086	ug/L	823597.028
	233	**U**	**-0.000176**	23.759	9.933	ug/L	17.600
	234	**U**	**0.000276**	9.686	14.933	ug/L	8.400
	235	**U**	**0.043013**	0.524	1075.307	ug/L	11.000
	236	**U**	**-0.000173**	4.869	5.667	ug/L	13.400
	238	**U**	**5.762604**	0.960	127784.108	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.193**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-13-C
Sample Date/Time: Monday, August 18, 2014 21:14:08
Autosampler Position: 69
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-13-C.085

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			739210.935	ug/L	823597.028
	233	**U**	**-0.000161**	13.112	10.267	ug/L	17.600
	234	**U**	**0.000335**	34.247	16.200	ug/L	8.400
	235	**U**	**0.044921**	0.312	1104.776	ug/L	11.000
	236	**U**	**-0.000162**	16.082	6.000	ug/L	13.400
	238	**U**	**5.967989**	1.206	130275.468	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.754**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-14-C
Sample Date/Time: Monday, August 18, 2014 21:18:48
Autosampler Position: 70
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-14-C.086

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			737023.325	ug/L	823597.028
	233	**U**	**-0.000170**	14.964	9.933	ug/L	17.600
	234	**U**	**0.000263**	8.729	14.333	ug/L	8.400
	235	**U**	**0.030972**	2.238	762.487	ug/L	11.000
	236	**U**	**-0.000158**	38.474	6.067	ug/L	13.400
	238	**U**	**4.086260**	1.210	88937.346	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.488**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Monday, August 18, 2014 21:23:29
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 9.087

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			760138.815	ug/L	823597.028
	233	**U**	**0.057500**	3.414	2038.012	ug/L	17.600
	234	**U**	**0.093710**	3.253	2509.887	ug/L	8.400
	235	**U**	**5.538062**	1.835	138713.481	ug/L	11.000
	236	**U**	**0.099360**	1.577	3816.644	ug/L	13.400
	238	**U**	**5.764522**	2.105	129266.819	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.295**	
	U	233		**111.650**
	U	234		**113.313**
	U	235		**114.246**
	U	236		**111.641**
	U	238		**114.696**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q
U	234	Q
U	235	Q
U	236	Q
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Monday, August 18, 2014 21:28:10
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 10.088

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			763991.045	ug/L	823597.028
	233	**U**	**0.011114**	1.627	409.539	ug/L	17.600
	234	**U**	**-0.000028**	99.335	7.000	ug/L	8.400
	235	**U**	**0.003173**	27.702	89.200	ug/L	11.000
	236	**U**	**-0.000111**	18.403	8.200	ug/L	13.400
	238	**U**	**0.006580**	15.715	202.535	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.763**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-16-C
Sample Date/Time: Monday, August 18, 2014 21:32:50
Autosampler Position: 71
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-16-C.089

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			742704.793	ug/L	823597.028
	233	**U**	**-0.000097**	11.528	12.533	ug/L	17.600
	234	**U**	**0.000335**	12.553	16.333	ug/L	8.400
	235	**U**	**0.054043**	1.566	1332.929	ug/L	11.000
	236	**U**	**-0.000200**	3.304	4.600	ug/L	13.400
	238	**U**	**7.263563**	0.908	159251.949	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.178**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-17-C
Sample Date/Time: Monday, August 18, 2014 21:37:29
Autosampler Position: 72
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-17-C.090

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			738631.069	ug/L	823597.028
	233	**U**	**-0.000132**	33.138	11.267	ug/L	17.600
	234	**U**	**0.001329**	6.757	42.067	ug/L	8.400
	235	**U**	**0.149076**	1.071	3639.931	ug/L	11.000
	236	**U**	**0.000055**	75.764	14.067	ug/L	13.400
	238	**U**	**6.933285**	0.418	151184.322	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.684**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-18-C
Sample Date/Time: Monday, August 18, 2014 21:42:09
Autosampler Position: 73
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-18-C.091

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			731873.124	ug/L	823597.028
	233	**U**	**-0.000174**	13.620	9.733	ug/L	17.600
	234	**U**	**0.000174**	2.777	11.933	ug/L	8.400
	235	**U**	**0.029132**	1.061	712.618	ug/L	11.000
	236	**U**	**-0.000153**	6.991	6.267	ug/L	13.400
	238	**U**	**3.845228**	1.310	83114.273	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.863**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-20-C
Sample Date/Time: Monday, August 18, 2014 21:46:49
Autosampler Position: 74
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-20-C.092

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			736360.676	ug/L	823597.028
	233	**U**	**-0.000234**	16.899	7.800	ug/L	17.600
	234	**U**	**0.000258**	16.965	14.200	ug/L	8.400
	235	**U**	**0.029398**	0.642	723.485	ug/L	11.000
	236	**U**	**-0.000129**	10.272	7.200	ug/L	13.400
	238	**U**	**3.588997**	1.154	78030.959	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.408**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-21-C

Sample Date/Time: Monday, August 18, 2014 21:51:29

Autosampler Position: 75

Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-21-C.093

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			787212.723	ug/L	823597.028
	233	**U**	**-0.000193**	26.887	9.733	ug/L	17.600
	234	**U**	**-0.000015**	145.850	7.600	ug/L	8.400
	235	**U**	**0.010242**	5.886	276.203	ug/L	11.000
	236	**U**	**-0.000193**	11.099	5.133	ug/L	13.400
	238	**U**	**1.389740**	1.183	32332.580	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.582**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-22-C
Sample Date/Time: Monday, August 18, 2014 21:56:09
Autosampler Position: 76
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-22-C.094

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			722540.871	ug/L	823597.028
	233	**U**	**-0.000206**	20.574	8.533	ug/L	17.600
	234	**U**	**0.000235**	4.956	13.333	ug/L	8.400
	235	**U**	**0.038459**	0.707	925.763	ug/L	11.000
	236	**U**	**-0.000167**	9.268	5.667	ug/L	13.400
	238	**U**	**4.419762**	0.470	94295.260	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**87.730**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-23-C
Sample Date/Time: Monday, August 18, 2014 22:00:49
Autosampler Position: 77
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-23-C.095

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			748237.037	ug/L	823597.028
	233	**U**	**-0.000177**	40.155	9.933	ug/L	17.600
	234	**U**	**0.000289**	15.987	15.200	ug/L	8.400
	235	**U**	**0.044460**	3.376	1105.909	ug/L	11.000
	236	**U**	**-0.000167**	8.225	5.867	ug/L	13.400
	238	**U**	**5.386528**	0.875	118984.772	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.850**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-24-C
Sample Date/Time: Monday, August 18, 2014 22:05:29
Autosampler Position: 78
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-24-C.096

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			746885.867	ug/L	823597.028
	233	**U**	**-0.000165**	44.815	10.200	ug/L	17.600
	234	**U**	**0.000549**	14.135	22.000	ug/L	8.400
	235	**U**	**0.066058**	0.950	1636.894	ug/L	11.000
	236	**U**	**-0.000139**	24.506	6.933	ug/L	13.400
	238	**U**	**6.156322**	0.897	135775.651	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.686**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: MB

Sample Date/Time: Monday, August 18, 2014 22:10:10
Autosampler Position: 79
Dataset File: D:\Elandata\Dataset\081814M3\MB.097

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			767799.544	ug/L	823597.028
	233	**U**	**-0.000288**	9.549	6.200	ug/L	17.600
	234	**U**	**-0.000084**	38.459	5.533	ug/L	8.400
	235	**U**	**-0.000137**	37.869	6.733	ug/L	11.000
	236	**U**	**-0.000189**	18.902	5.133	ug/L	13.400
	238	**U**	**0.004065**	12.125	147.067	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.225**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: LCS

Sample Date/Time: Monday, August 18, 2014 22:14:50
Autosampler Position: 80
Dataset File: D:\Elandata\Dataset\081814M3\LCS.098

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			775101.331	ug/L	823597.028
	233	**U**	**0.002707**	1.882	113.800	ug/L	17.600
	234	**U**	**0.046912**	1.290	1286.258	ug/L	8.400
	235	**U**	**2.775612**	2.036	70886.923	ug/L	11.000
	236	**U**	**0.049904**	2.610	1960.268	ug/L	13.400
	238	**U**	**2.880496**	1.642	65903.349	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.112**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Monday, August 18, 2014 22:19:31
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 9.099

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			773371.228	ug/L	823597.028
	233	**U**	**0.055495**	2.510	2002.541	ug/L	17.600
	234	**U**	**0.089394**	2.758	2436.875	ug/L	8.400
	235	**U**	**5.308495**	2.854	135212.586	ug/L	11.000
	236	**U**	**0.095849**	2.023	3745.625	ug/L	13.400
	238	**U**	**5.555196**	1.903	126745.877	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.902**	
	U	233		**107.757**
	U	234		**108.094**
	U	235		**109.510**
	U	236		**107.696**
	U	238		**110.531**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Monday, August 18, 2014 22:24:12

Autosampler Position: 1

Dataset File: D:\Elandata\Dataset\081814M3\QC Std 10.100

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			775007.030	ug/L	823597.028
	233	**U**	**0.011063**	1.635	413.473	ug/L	17.600
	234	**U**	**-0.000012**	238.274	7.600	ug/L	8.400
	235	**U**	**0.002582**	15.940	75.867	ug/L	11.000
	236	**U**	**-0.000153**	16.571	6.600	ug/L	13.400
	238	**U**	**0.006097**	6.360	195.068	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.100**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-26-C
Sample Date/Time: Monday, August 18, 2014 22:28:52
Autosampler Position: 81
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-26-C.101

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			769767.261	ug/L	823597.028
	233	**U**	**-0.000268**	13.660	6.933	ug/L	17.600
	234	**U**	**-0.000035**	170.963	6.867	ug/L	8.400
	235	**U**	**0.005026**	4.486	137.667	ug/L	11.000
	236	**U**	**-0.000186**	28.186	5.267	ug/L	13.400
	238	**U**	**0.676281**	0.763	15419.197	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.464**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-26-C SD

Sample Date/Time: Monday, August 18, 2014 22:33:33

Autosampler Position: 82

Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-26-C SD.102

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			767740.246	ug/L	823597.028
	233	**U**	**-0.000296**	8.397	5.867	ug/L	17.600
	234	**U**	**-0.000099**	23.663	5.133	ug/L	8.400
	235	**U**	**0.000827**	10.550	31.267	ug/L	11.000
	236	**U**	**-0.000196**	16.511	4.867	ug/L	13.400
	238	**U**	**0.135252**	2.601	3117.340	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.218**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-26-D MS

Sample Date/Time: Monday, August 18, 2014 22:38:13
Autosampler Position: 83
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-26-D MS.103

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			777499.230	ug/L	823597.028
	233	**U**	**0.000882**	9.579	48.467	ug/L	17.600
	234	**U**	**0.018147**	1.260	504.009	ug/L	8.400
	235	**U**	**1.103801**	2.199	28285.794	ug/L	11.000
	236	**U**	**0.019703**	2.082	784.222	ug/L	13.400
	238	**U**	**1.885760**	2.083	43296.158	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.403**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-26-E MSD

Sample Date/Time: Monday, August 18, 2014 22:42:52

Autosampler Position: 84

Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-26-E MSD.104

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			796446.156	ug/L	823597.028
	233	**U**	**0.000847**	7.265	48.200	ug/L	17.600
	234	**U**	**0.017067**	1.067	486.142	ug/L	8.400
	235	**U**	**1.039466**	1.296	27296.411	ug/L	11.000
	236	**U**	**0.018683**	3.916	762.020	ug/L	13.400
	238	**U**	**1.768133**	0.840	41608.044	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.703**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-27-C
Sample Date/Time: Monday, August 18, 2014 22:47:32
Autosampler Position: 85
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-27-C.105

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			804403.435	ug/L	823597.028
	233	**U**	**-0.000278**	8.180	6.800	ug/L	17.600
	234	**U**	**-0.000056**	58.908	6.600	ug/L	8.400
	235	**U**	**0.007935**	4.681	220.868	ug/L	11.000
	236	**U**	**-0.000223**	17.583	4.000	ug/L	13.400
	238	**U**	**1.088234**	4.854	25838.887	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.670**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-28-C
Sample Date/Time: Monday, August 18, 2014 22:52:12
Autosampler Position: 86
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-28-C.106

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			814662.947	ug/L	823597.028
	233	**U**	**-0.000222**	17.776	9.000	ug/L	17.600
	234	**U**	**-0.000028**	206.584	7.467	ug/L	8.400
	235	**U**	**0.009999**	4.080	279.136	ug/L	11.000
	236	**U**	**-0.000202**	12.263	4.933	ug/L	13.400
	238	**U**	**1.397643**	1.398	33647.410	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.915**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-29-C
Sample Date/Time: Monday, August 18, 2014 22:56:52
Autosampler Position: 87
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-29-C.107

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			745371.137	ug/L	823597.028
	233	**U**	**-0.000205**	27.041	8.867	ug/L	17.600
	234	**U**	**0.000324**	18.764	16.067	ug/L	8.400
	235	**U**	**0.055680**	1.476	1378.133	ug/L	11.000
	236	**U**	**-0.000159**	24.596	6.133	ug/L	13.400
	238	**U**	**4.642478**	2.001	102161.080	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.502**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-30-C
Sample Date/Time: Monday, August 18, 2014 23:01:32
Autosampler Position: 88
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-30-C.108

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			771673.787	ug/L	823597.028
	233	**U**	**-0.000178**	14.540	10.133	ug/L	17.600
	234	**U**	**0.000276**	24.525	15.400	ug/L	8.400
	235	**U**	**0.038958**	0.559	1001.502	ug/L	11.000
	236	**U**	**-0.000221**	14.167	3.933	ug/L	13.400
	238	**U**	**4.758425**	0.809	108417.498	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.696**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-31-C
Sample Date/Time: Monday, August 18, 2014 23:06:12
Autosampler Position: 89
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-31-C.109

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			756143.896	ug/L	823597.028
	233	**U**	**-0.000149**	28.949	10.933	ug/L	17.600
	234	**U**	**0.000844**	9.202	30.133	ug/L	8.400
	235	**U**	**0.101917**	2.464	2551.361	ug/L	11.000
	236	**U**	**-0.000092**	11.354	8.800	ug/L	13.400
	238	**U**	**6.832128**	2.150	152537.495	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.810**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-33-C

Sample Date/Time: Monday, August 18, 2014 23:10:52

Autosampler Position: 90

Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-33-C.110

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			739751.089	ug/L	823597.028
	233	**U**	**-0.000159**	30.521	10.400	ug/L	17.600
	234	**U**	**0.000560**	18.244	22.133	ug/L	8.400
	235	**U**	**0.070199**	1.518	1722.504	ug/L	11.000
	236	**U**	**-0.000138**	32.907	6.867	ug/L	13.400
	238	**U**	**6.447810**	1.245	140833.728	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.820**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Monday, August 18, 2014 23:15:33
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 9.111

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			773819.765	ug/L	823597.028
	233	**U**	**0.056255**	1.871	2031.345	ug/L	17.600
	234	**U**	**0.090806**	3.613	2475.681	ug/L	8.400
	235	**U**	**5.436033**	3.055	138530.644	ug/L	11.000
	236	**U**	**0.097840**	2.642	3824.579	ug/L	13.400
	238	**U**	**5.705651**	2.971	130197.319	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.956**	
	U	233		**109.233**
	U	234		**109.801**
	U	235		**112.141**
	U	236		**109.932**
	U	238		**113.525**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	235	Q
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Monday, August 18, 2014 23:20:14
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 10.112

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			776518.769	ug/L	823597.028
	233	**U**	**0.011319**	1.599	423.540	ug/L	17.600
	234	**U**	**-0.000077**	28.684	5.800	ug/L	8.400
	235	**U**	**0.002476**	12.121	73.600	ug/L	11.000
	236	**U**	**-0.000162**	11.324	6.267	ug/L	13.400
	238	**U**	**0.006098**	9.888	195.268	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.284**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-34-C
Sample Date/Time: Monday, August 18, 2014 23:24:53
Autosampler Position: 91
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-34-C.113

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			734413.209	ug/L	823597.028
	233	**U**	**-0.000145**	34.369	10.733	ug/L	17.600
	234	**U**	**0.000314**	6.462	15.600	ug/L	8.400
	235	**U**	**0.046095**	1.962	1125.844	ug/L	11.000
	236	**U**	**-0.000187**	16.409	5.000	ug/L	13.400
	238	**U**	**6.145897**	2.010	133251.401	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.171**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-35-C
Sample Date/Time: Monday, August 18, 2014 23:29:34
Autosampler Position: 92
Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-35-C.114

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			741761.383	ug/L	823597.028
	233	**U**	**-0.000150**	33.208	10.733	ug/L	17.600
	234	**U**	**0.000383**	17.248	17.600	ug/L	8.400
	235	**U**	**0.050187**	1.403	1236.987	ug/L	11.000
	236	**U**	**-0.000222**	19.305	3.800	ug/L	13.400
	238	**U**	**6.731097**	0.938	147405.589	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.064**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-36-C

Sample Date/Time: Monday, August 18, 2014 23:34:15

Autosampler Position: 93

Dataset File: D:\Elandata\Dataset\081814M3\680-102380-A-36-C.115

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			766381.777	ug/L	823597.028
	233	**U**	**-0.000197**	20.757	9.400	ug/L	17.600
	234	**U**	**0.000201**	20.566	13.200	ug/L	8.400
	235	**U**	**0.042690**	0.534	1089.042	ug/L	11.000
	236	**U**	**-0.000177**	15.961	5.667	ug/L	13.400
	238	**U**	**5.759494**	0.922	130295.860	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.053**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Monday, August 18, 2014 23:38:56
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 9.116

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			773273.725	ug/L	823597.028
	233	**U**	**0.057441**	2.348	2071.884	ug/L	17.600
	234	**U**	**0.091663**	3.740	2497.352	ug/L	8.400
	235	**U**	**5.491401**	2.938	139842.117	ug/L	11.000
	236	**U**	**0.098979**	2.798	3865.857	ug/L	13.400
	238	**U**	**5.726721**	2.853	130587.302	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.890**	
	U	233		**111.536**
	U	234		**110.838**
	U	235		**113.283**
	U	236		**111.212**
	U	238		**113.944**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q
U	234	Q
U	235	Q
U	236	Q
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Monday, August 18, 2014 23:43:36
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\081814M3\QC Std 10.117

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			778226.496	ug/L	823597.028
	233	**U**	**0.011449**	2.941	428.940	ug/L	17.600
	234	**U**	**-0.000056**	117.400	6.333	ug/L	8.400
	235	**U**	**0.002887**	24.816	83.667	ug/L	11.000
	236	**U**	**-0.000164**	7.634	6.200	ug/L	13.400
	238	**U**	**0.006776**	10.067	211.135	ug/L	59.467

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.491**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

Quantitative Analysis Calibration Report

File Name: 081814M3.cal
File Path: D:\Elandata\System
Calibration Type: External Calibration

Analyte	Mass	Curve Type	Slope	Intercept	Corr. Coeff.
Ho (IS)	164.930	Linear Thru Zero	0.000000	0.00	0.000000
U	233.000	Linear Thru Zero	0.046320	0.00	0.999997
U	234.041	Linear Thru Zero	0.035173	0.00	1.000000
U	235.044	Linear Thru Zero	0.032972	0.00	0.999992
U	236.000	Linear Thru Zero	0.050402	0.00	0.999999
U	238.050	Linear Thru Zero	0.029513	0.00	0.999995

METALS BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Batch Number: 137068 Batch Start Date: 08/11/14 11:24 Batch Analyst: Davis, Shanika M

Batch Method: 3050B Batch End Date: 08/11/14 16:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	FinalAmount	ISOU Prep Spk 00002			
MB 160-137068/1		3050B, 6020A		0.5663 g	50 mL				
LCS 160-137068/2		3050B, 6020A		0.5550 g	50 mL	0.25 mL			
680-102380-A-1	SD-224-SS	3050B, 6020A	T	0.5277 g	50 mL				
680-102380-A-1 MS	SD-224-SS	3050B, 6020A	T	0.5100 g	50 mL	0.25 mL			
680-102380-A-1 MSD	SD-224-SS	3050B, 6020A	T	0.5536 g	50 mL	0.25 mL			
680-102380-A-2	SD-224-01	3050B, 6020A	T	0.5356 g	50 mL				
680-102380-A-3	SD-224-02	3050B, 6020A	T	0.5650 g	50 mL				
680-102380-A-5	SD-223-SS	3050B, 6020A	T	0.5522 g	50 mL				
680-102380-A-6	SD-223-01	3050B, 6020A	T	0.5342 g	50 mL				
680-102380-A-7	SD-223-02	3050B, 6020A	T	0.5657 g	50 mL				
680-102380-A-8	SD-226-SS	3050B, 6020A	T	0.5188 g	50 mL				
680-102380-A-9	SD-226-01	3050B, 6020A	T	0.5201 g	50 mL				
680-102380-A-10	SD-226-02	3050B, 6020A	T	0.5563 g	50 mL				
680-102380-A-12	SD-225-SS	3050B, 6020A	T	0.5163 g	50 mL				
680-102380-A-13	SD-225-01	3050B, 6020A	T	0.5653 g	50 mL				
680-102380-A-14	SD-225-02	3050B, 6020A	T	0.5766 g	50 mL				
680-102380-A-16	SD-228-SS	3050B, 6020A	T	0.5751 g	50 mL				
680-102380-A-17	SD-228-01	3050B, 6020A	T	0.5382 g	50 mL				
680-102380-A-18	SD-228-02	3050B, 6020A	T	0.5369 g	50 mL				
680-102380-A-20	SD-234-SS	3050B, 6020A	T	0.5159 g	50 mL				
680-102380-A-21	SD-234-01	3050B, 6020A	T	0.5378 g	50 mL				
680-102380-A-22	SD-235-SS	3050B, 6020A	T	0.5815 g	50 mL				
680-102380-A-23	SD-235-01	3050B, 6020A	T	0.5348 g	50 mL				
680-102380-A-24	SD-235-02	3050B, 6020A	T	0.5243 g	50 mL				

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

METALS BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Batch Number: 137068 Batch Start Date: 08/11/14 11:24 Batch Analyst: Davis, Shanika M

Batch Method: 3050B Batch End Date: 08/11/14 16:00

Batch Notes	
Balance ID	27150548
Hydrogen peroxide lot number	408031
Lot # of hydrochloric acid	422962
Lot # of Nitric Acid	422893
Hot Block ID number	HOTBLOCK1
Oven, Bath or Block Temperature 1	94.0 Degrees C
Pipette ID	M-PREP-2
ID number of the thermometer	111815886
Digestion Tube/Cup Lot #	191064

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

METALS BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102380-3

SDG No.: 680102380-1

Batch Number: 137069 Batch Start Date: 08/11/14 11:34 Batch Analyst: Davis, Shanika M

Batch Method: 3050B Batch End Date: 08/11/14 16:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	FinalAmount	ISOU Prep Spk 00002			
MB 160-137069/1		3050B, 6020A		0.5450 g	50 mL				
LCS 160-137069/2		3050B, 6020A		0.5066 g	50 mL	0.25 mL			
680-102380-A-26	SD-236-SS	3050B, 6020A	T	0.5380 g	50 mL				
680-102380-A-26 MS	SD-236-SS	3050B, 6020A	T	0.5695 g	50 mL	0.25 mL			
680-102380-A-26 MSD	SD-236-SS	3050B, 6020A	T	0.5343 g	50 mL	0.25 mL			
680-102380-A-27	SD-236-01	3050B, 6020A	T	0.5740 g	50 mL				
680-102380-A-28	SD-236-02	3050B, 6020A	T	0.5244 g	50 mL				
680-102380-A-29	SD-237-SS	3050B, 6020A	T	0.5671 g	50 mL				
680-102380-A-30	SD-237-01	3050B, 6020A	T	0.5012 g	50 mL				
680-102380-A-31	SD-237-02	3050B, 6020A	T	0.5528 g	50 mL				
680-102380-A-33	SD-DUP05	3050B, 6020A	T	0.5170 g	50 mL				
680-102380-A-34	SD-227-SS	3050B, 6020A	T	0.5158 g	50 mL				
680-102380-A-35	SD-227-01	3050B, 6020A	T	0.5800 g	50 mL				
680-102380-A-36	SD-227-02	3050B, 6020A	T	0.5689 g	50 mL				

Batch Notes	
Balance ID	27150548
Hydrogen peroxide lot number	408031
Lot # of hydrochloric acid	422962
Lot # of Nitric Acid	422893
Hot Block ID number	HOTBLOCK1
Oven, Bath or Block Temperature 1	94.0 Degrees C
Pipette ID	M-PREP-2
ID number of the thermometer	111815886
Digestion Tube/Cup Lot #	191064

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

Subcontract Data

Shipping and Receiving Documents

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.19
Client Contact: Mike Martin	Phone: (703)342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: ~~Page 19 of 46~~ Page 1 of 4
Company: Tetra Tech, Inc.				Job #: 680-102380
Address: 20251 Century Blvd Suite 200	Due Date Requested:			
City: Germantown	TAT Requested (days):			
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			
Email: MIchael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	8020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-224-SS	6/13/14	0820	C	Solid				X				
SD-224-01		0825	C	Solid				X				
SD-224-02		0830	C	Solid				X				
SD-224-03		0835	C	Solid				X				Hold Pending Analysis of SS to 02
SD-223-SS		0840	C	Solid				X				
SD-223-01		0845	C	Solid				X				
SD-223-02		0850	C	Solid				X				
SD-226-SS		0855	C	Solid				X				
SD-226-01		0900	C	Solid				X				
SD-226-02		0905	C	Solid				X				
SD-226-03		0910	C	Solid				X				Hold Pending Analysis of SS to 02

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6/13/14 -			6/13/14 1430	TestAmerica
2	Relinquished by:	6/13/14 1800	TestAmerica	Received by:	6/14/14 0830	TA
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.22
Client Contact: Mike Martin	Phone: (703) 342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~22 of 48~~ 2 of 4
Company: Tetra Tech, Inc.				Job #: 680-102380
Address: 20251 Century Blvd Suite 200	Due Date Requested:			
City: Germantown	TAT Requested (days):			
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			
Email: Michael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Analysis Requested

Field Filtered Sample (Yes or No) | Perform MS/MSD (Yes or No) | 680 - Local Method | A01R_Th - Standard Target List | 9020, 7470A | GA_01_R_Ra - (MOD) Radium-226/228 | Total Number of containers

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	9020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
		Preservation Code:			N	N						
SD-225-55	6/13/14	0915	C	Solid				X				
SD-225-01		0928	C	Solid				X				
SD-225-02		0925	C	Solid				X				
SD-225-03		0930	C	Solid				X				Hold Pending Analysis of SS to Q
SD-228-55		1005	C	Solid				X				
SD-228-01		1010	C	Solid				X				
SD-228-02		1015	C	Solid				X				
SD-228-03		1020	C	Solid				X				Hold Pending Analysis of SS to Q
SD-234-55		1030	C	Solid				X				
SD-234-01		1035	C	Solid				X				
SD-235-55		1100	C	Solid				X				

Page 465 of 469

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time: 6/13/14	Company TT	Received by:	Date/Time: 6/13/14 1430	Company TT
Relinquished by:	Date/Time: 6/13/14 1800	Company TestAmerica	Received by:	Date/Time: 6/14/14 0830	Company TA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.24
Client Contact: Mike Martin	Phone: (703)342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~24 of 46~~ 3 of 4
Company: Tetra Tech, Inc.				Job #: 680-102380
Address: 20251 Century Blvd Suite 200	Due Date Requested:	Analysis Requested		
City: Germantown	TAT Requested (days): Standard			
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			
Email: Michael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-228/228	Total Number of containers	Special Instructions/Note:
			Preservation Codes:		N	N	N	N	N	N		
SD-235-01	6/8/14	1105	C	Solid				X				
SD-235-02		1110	C	Solid				X				
SD-235-03		1115	C	Solid				X				Hold Pending Analysis of SS to 03
SD-236-SS		1205	C	Solid				X				
SD-236-01		1210	C	Solid				X				
SD-236-02		1215	C	Solid				X				
SD-237-SS		1230	C	Solid				X				
SD-237-01		1235	C	Solid				X				
SD-237-02		1240	C	Solid				X				
SD-237-03		1245	C	Solid				X				Hold pending Analysis of SS to 02
SD-DUP05	↓	0000	C	Solid				X				

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6/13/14 -	TT		6/15/14 1430	TT
2		6/15/14 1800	TT		6/18/14 0930	TT
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: △ Yes △ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

RAO

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Grieson	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.26
Client Contact: Mike Martin	Phone: (703) 341-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~26 of 46~~ 4 of 4
Company: Tetra Tech, Inc.				Job #: 680-102380

Address: 20251 Century Blvd Suite 200	Due Date Requested:	Analysis Requested	Preservation Codes:
City: Germantown	TAT Requested (days): Standard		A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
State, Zip: MD, 20874			
Phone:	PO #: Purchase Order not required		Other:
Email: Michael.Martin@tetratech.com	WO #:		
Project Name: Sediments	Project #: 68012942		
Site:	SSOW#:		

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-227-SS	6/13/14	1310	C	Solid				X				
SD-227-01	↓	1315	C	Solid				X				
SD-227-02	↓	1320	C	Solid				X				
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time: 6/13/14 -	Company: TT	Received by:	Date/Time: 6/15/14 1430	Company: TT
Relinquished by:	Date/Time: 6/15/14 1800	Company: TT	Received by:	Date/Time: 6/16/14 0830	Company: TT
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-102380-3
SDG Number: 680102380-1

Login Number: 102380
List Number: 1
Creator: Daughtry, Beth A

List Source: TestAmerica Savannah

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	False	-18: received broken & full of water,but intact in bubble bag
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-102380-3
SDG Number: 680102380-1

Login Number: 102380
List Number: 2
Creator: Daniels, Brian J

List Source: TestAmerica St. Louis
List Creation: 06/16/14 04:25 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	1.8
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	False	SD-228-02 WAS RECEIVED BROKEN & FULL OF WATER.
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 680-102380-4

SDG Number: 680102380-1

Job Description: Sediments

For:
Tetra Tech, Inc.
20251 Century Blvd
Suite 200
Germantown, MD 20874

Attention: Mike Martin



Approved for release.
Jerry A Lanier
Project Manager I
9/19/2014 4:14 PM

Jerry A Lanier, Project Manager I
5102 LaRoche Avenue, Savannah, GA, 31404
(912)354-7858 e.3410
jerry.lanier@testamericainc.com
09/19/2014

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

Savannah Certifications and ID #s: A2LA: 0399.01; AL: 41450; ARDEQ: 88-0692; ARDOH; AZ: AZ0741; CA: 03217CA; CO; CT: PH0161; DE; FL: E87052; GA: 803; Guam; HI; IL: 200022; IN: C-GA-02; IA: 353; KS: E-10322; KY EPPC: 90084; KY UST; LA DEQ: 30690; LA DHH: LA080008; ME: 2008022; MD: 250; MA: M-GA006; MI: 9925; MS; NFESC: 249; NV: GA00006; NJ: GA769; NM; NY: 10842; NC DWQ: 269; NC DHHS: 13701; PA: 68-00474; PR: GA00006; RI: LAO00244; SC: 98001001; TN: TN0296; TX: T104704185; USEPA: GA00006; VT: VT-87052; VA: 00302; WA; WV DEP: 094; WV DHHR: 9950 C; WI DNR: 999819810; WY/EPAR8: 8TMS-Q

Table of Contents

Cover Title Page 1

Data Summaries 4

Definitions 4

Case Narrative 5

Client Sample Results 6

Default Detection Limits 7

Tracer/Carrier Summary 8

QC Sample Results 9

QC Association 10

Chronicle 11

Certification Summary 12

Method Summary 13

Sample Summary 14

Reagent Traceability 15

COAs 16

Inorganic Sample Data 28

Metals Data 28

Met Cover Page 29

Met Sample Data 30

Met QC Data 31

Met ICV/CCV 31

Met CRQL 33

Met Blanks 34

Met LCS/LCSD 36

Met MDL 37

Met Linear Ranges 39

Table of Contents

Met Preparation Log 40
Met Analysis Run Log 41
Met ICP/MS Int Stds 46
Met Raw Data 47
Met Prep Data 248
Shipping and Receiving Documents 249
Client Chain of Custody 249

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Sediments

Report Number: 680-102380-4

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 06/14/2014; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 1.8 C.

METALS BY ICPMS

Sample SD-228-01 (680-102380-17) was analyzed for Metals by ICPMS in accordance with EPA SW-846 6020A. The samples were prepared on 09/12/2014 and analyzed on 09/17/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102380-4
SDG: 680102380-1

Client Sample ID: SD-228-01
Date Collected: 06/13/14 10:10
Date Received: 06/14/14 08:30

Lab Sample ID: 680-102380-17
Matrix: Solid

Method: 6020A - Metals (ICP/MS), Tc-99

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tc-99	ND		0.000056	0.000017	mg/Kg		09/12/14 13:53	09/17/14 15:43	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Re	*88*		*30 - 110*	*09/12/14 13:53*	*09/17/14 15:43*	*1*

Default Detection Limits

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102380-4
SDG: 680102380-1

Method: 6020A - Metals (ICP/MS), Tc-99

Analyte	RL	MDL	Units	Method
Tc-99	0.000050	0.000015	mg/Kg	6020A

Tracer/Carrier Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102380-4
SDG: 680102380-1

Method: 6020A - Metals (ICP/MS), Tc-99

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)								
		Re								
Lab Sample ID	Client Sample ID	(30-110)								
680-102380-17	SD-228-01	88								
LCS 160-143794/2-A	Lab Control Sample	101								
MB 160-143794/1-A	Method Blank	100								

Tracer/Carrier Legend

Re = Re

Method: 6020A - Metals (ICP/MS), Tc-99

Lab Sample ID: MB 160-143794/1-A
Matrix: Solid
Analysis Batch: 144626

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 143794

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tc-99	ND		0.000049	0.000015	mg/Kg		09/12/14 13:53	09/17/14 15:16	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Re	*100*		*30 - 110*	*09/12/14 13:53*	*09/17/14 15:16*	*1*

Lab Sample ID: LCS 160-143794/2-A
Matrix: Solid
Analysis Batch: 144626

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 143794

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Tc-99	0.00238	0.00240		mg/Kg		101	80 - 120

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Re	*101*		*30 - 110*

Metals

Prep Batch: 143794

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102380-17	SD-228-01	Total/NA	Solid	None	
LCS 160-143794/2-A	Lab Control Sample	Total/NA	Solid	None	
MB 160-143794/1-A	Method Blank	Total/NA	Solid	None	

Analysis Batch: 144626

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102380-17	SD-228-01	Total/NA	Solid	6020A	143794
CRI 160-144626/7	DL		Solid	6020A	
LCS 160-143794/2-A	Lab Control Sample	Total/NA	Solid	6020A	143794
MB 160-143794/1-A	Method Blank	Total/NA	Solid	6020A	143794

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102380-4
SDG: 680102380-1

Client Sample ID: SD-228-01
Date Collected: 06/13/14 10:10
Date Received: 06/14/14 08:30

Lab Sample ID: 680-102380-17
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	None			143794	09/12/14 13:53	MFM	TAL SL
Total/NA	Analysis	6020A		1	144626	09/17/14 15:43	MTS	TAL SL

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Certification Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102380-4
SDG: 680102380-1

Laboratory: TestAmerica Savannah

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Maryland	State Program	3	250	12-31-14

Laboratory: TestAmerica St. Louis

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska	State Program	10	MO00054	06-30-15
California	NELAP	9	2886	03-31-15
Connecticut	State Program	1	PH-0241	03-31-15
Florida	NELAP	4	E87689	06-30-15
Illinois	NELAP	5	200023	11-30-14
Iowa	State Program	7	373	12-01-14
Kansas	NELAP	7	E-10236	10-31-14 *
Kentucky (DW)	State Program	4	90125	12-31-14
L-A-B	DoD ELAP		L2305	01-10-16
Louisiana	NELAP	6	04080	06-30-15
Maryland	State Program	3	310	09-30-15
Missouri	State Program	7	780	06-30-14 *
Nevada	State Program	9	MO000542013-1	07-31-15
New Jersey	NELAP	2	MO002	06-30-15
New Mexico	State Program	6		06-30-10 *
New York	NELAP	2	11616	03-31-15
North Dakota	State Program	8	R207	06-30-14 *
NRC	NRC		24-24817-01	12-31-22
Oklahoma	State Program	6	9997	08-31-15
Pennsylvania	NELAP	3	68-00540	02-28-15
South Carolina	State Program	4	85002001	06-30-14 *
Texas	NELAP	6	T104704193-13-6	07-31-15
USDA	Federal		P330-07-00122	01-09-17
Utah	NELAP	8	MO000542013-5	07-31-15
Virginia	NELAP	3	460230	06-14-15
Washington	State Program	10	C592	08-30-15
West Virginia DEP	State Program	3	381	12-31-14 *

* Certification renewal pending - certification considered valid.

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102380-4
SDG: 680102380-1

Method	Method Description	Protocol	Laboratory
6020A	Metals (ICP/MS), Tc-99	SW846	TAL SL

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102380-4
SDG: 680102380-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-102380-17	SD-228-01	Solid	06/13/14 10:10	06/14/14 08:30

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102380-4

SDG No.: 680102380-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
TC99 CAL1/LLC_00043	09/24/14	09/17/14	2% HCL 2% HN03, Lot 442634	50 mL	TC99 RE CAL_00010	0.5 mL	Re	100 ug/L
					TC99-I CAL LL_00027	0.1 mL	Tc-99	0.004916 ug/L
.TC99 RE CAL_00010	12/01/14	08/27/14	2% HCL 2% HN03, Lot 432742	200 mL	STD RE_00006	2 mL	Re	10000 ug/L
..STD RE_00006	12/01/14	INORGANIC VENTURES, Lot f2-re-01082			(Purchased Reagent)		Re	1000 ug/mL
.TC99-I CAL LL_00027	10/17/14	09/17/14	2% HCL 2% HN03, Lot 442634	50 mL	TC99-I CAL_00020	1 mL	Tc-99	2.458 ug/L
..TC99-I CAL_00020	01/15/15	07/15/14	2% HCL 2% HN03, Lot 397367	50 mL	TC99-C CAL_00005	0.5 mL	Tc-99	122.9 ug/L
...TC99-C CAL_00005	01/14/24	Eckert & Ziegler Isotope Products, Lot 1595-47			(Purchased Reagent)		Tc-99	12.29 ug/mL
TC99 CAL2/CCV_00040	09/24/14	09/17/14	2% HCL 2% HN03, Lot 442634	100 mL	TC99 RE CAL_00010	5 mL	Re	500 ug/L
					TC99-I CAL_00020	0.25 mL	Tc-99	0.30725 ug/L
.TC99 RE CAL_00010	12/01/14	08/27/14	2% HCL 2% HN03, Lot 432742	200 mL	STD RE_00006	2 mL	Re	10000 ug/L
..STD RE_00006	12/01/14	INORGANIC VENTURES, Lot f2-re-01082			(Purchased Reagent)		Re	1000 ug/mL
.TC99-I CAL_00020	01/15/15	07/15/14	2% HCL 2% HN03, Lot 397367	50 mL	TC99-C CAL_00005	0.5 mL	Tc-99	122.9 ug/L
..TC99-C CAL_00005	01/14/24	Eckert & Ziegler Isotope Products, Lot 1595-47			(Purchased Reagent)		Tc-99	12.29 ug/mL
TC99 CAL3_00079	09/24/14	09/17/14	2% HCL 2% HN03, Lot 442634	50 mL	TC99 RE CAL_00010	5 mL	Re	1000 ug/L
					TC99-I CAL_00020	0.25 mL	Tc-99	0.6145 ug/L
.TC99 RE CAL_00010	12/01/14	08/27/14	2% HCL 2% HN03, Lot 432742	200 mL	STD RE_00006	2 mL	Re	10000 ug/L
..STD RE_00006	12/01/14	INORGANIC VENTURES, Lot f2-re-01082			(Purchased Reagent)		Re	1000 ug/mL
.TC99-I CAL_00020	01/15/15	07/15/14	2% HCL 2% HN03, Lot 397367	50 mL	TC99-C CAL_00005	0.5 mL	Tc-99	122.9 ug/L
..TC99-C CAL_00005	01/14/24	Eckert & Ziegler Isotope Products, Lot 1595-47			(Purchased Reagent)		Tc-99	12.29 ug/mL
TC99 ICV_00082	09/24/14	09/17/14	2% HCL 2% HN03, Lot 442634	50 mL	TC99 RE QC_00008	2.5 mL	Re	500 ug/L
					TC99-I QC_00008	0.125 mL	Tc-99	0.29205 ug/L
.TC99 RE QC_00008	10/31/14	01/31/14	2% HCL 2% HN03, Lot 205277	100 mL	STD RE_00006	1 mL	Re	10000 ug/L
..STD RE_00006	12/01/14	INORGANIC VENTURES, Lot f2-re-01082			(Purchased Reagent)		Re	1000 ug/mL
.TC99-I QC_00008	01/15/15	07/15/14	2% HCL 2% HN03, Lot 284374	50 mL	TC99-C QC_00001	0.5 mL	Tc-99	116.82 ug/L
..TC99-C QC_00001	11/08/20	Eckert & Ziegler Analytics, Lot 83550-334			(Purchased Reagent)		Tc-99	11.682 ug/mL
TC99 RE TRACE_00019	12/01/14	09/04/14	2% HCL 2% HNO3, Lot 410823	1000 mL	STD RE_00007	50 mL	Re	50 mg/L
.STD RE_00007	07/01/15	INORGANIC VENTURES, Lot f2-re-01085			(Purchased Reagent)		Re	1000 ug/mL
TC99-PREP_00004	10/26/14	04/28/14	2% HCL 2% HN03, Lot 346320	100 mL	TC99-C CAL_00004	1 mL	Tc-99	120 ug/L
.TC99-C CAL_00004	06/05/22	Eckert & Ziegler Isotope Products, Lot 1578-50			(Purchased Reagent)		Tc-99	12 ug/mL

Reagent

STD RE_00006

INORGANIC VENTURES
300 Technology Drive
Christiansburg, VA 24073 - USA
inorganicventures.com

CERTIFICATE OF ANALYSIS

260529
ID: STD RE_00006
Exp:12/01/14 Prpd:REV Opn:12/02/13
RE 100OPPM

1.0 **INORGANIC VENTURES** is an ISO Guide 34 "General Requirements for the Competence of Reference Material Producers" and ISO 9001 registered manufacturer. Our manufacturing laboratory is accredited to ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories."

ACCREDITED Testing Laboratory Certificate 883.01

ACCREDITED Reference Material Producer Certificate 883.02

2.0 DESCRIPTION OF CRM **1000 µg/mL Rhenium in 3% (v/v) HNO3**

Catalog Number:	CGRE1-1, CGRE1-2, and CGRE1-5
Lot Number:	**F2-RE01082**
Starting Material:	Re powder
Starting Material Purity (%):	99.9992
Starting Material Lot No:	1644
Matrix:	3% (v/v) HNO3

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 1,003 ± 5 µg/mL - weighted mean

Certified Density: 1.015 g/mL (measured at 20 ± 1°C)

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

Certified Value $(\bar{x}) = \frac{\Sigma x_i}{n}$ ($\bar{x}$) = mean

x_i = individual results

n = number of measurements

Uncertainty $(\pm) = 2 [\Sigma(s_i)^2]^{½}$ 2 = the coverage factor.

$[\Sigma(s_i)^2]^{½}$ = The square root of the sum of the squares of the most common errors (where 's' stands for the standard deviation) from instrumental measurement, density, NIST SRM uncertainty, weighing, dilution to volume, homogeneity, long term stability and short term stability.

4.0 TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

· "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

· This product is Traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRMs are available, the term 'in-house std.' is specified.

- The Calculated Value is a value calculated from the weight of a starting material that has been certified directly vs. a NIST SRM/RM. See section 4.2 for balance traceability.

4.1 **Assay Method #1** **1,001 ± 3 µg/mL**
ICP Assay NIST SRM 3143 Lot Number: 010816

Assay Method #2 **1,004 ± 3 µg/mL**
Calculated NIST SRM Lot Number: See Sec. 4.2

4.2 **BALANCE CALIBRATION -** All analytical balances are calibrated yearly by an accredited calibration laboratory and are traceable to a class E 2 analytical weight set with NIST Traceability. All balances are checked daily using an in-house procedure. The weights used for testing are annually compared to master weights and are traceable to the National Institute of Standards and Technology (NIST).

4.3 **THERMOMETER CALIBRATION -** All thermometers are NIST traceable through thermometers that are calibrated by an A2LA accredited calibration laboratory.

4.4 **GLASSWARE CALIBRATION -** An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM's.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

CRM's solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O Al < 0.006000	M Dy < 0.006036	O Li < 0.000030	M Pr < 0.000302	M Te < 0.030179
M Sb < 0.000503	M Er < 0.005030	M Lu < 0.000402	s Re	M Tb < 0.000302
M As < 0.010060	M Eu < 0.003018	O Mg < 0.100000	M Rh < 0.001006	M Tl < 0.001006
M Ba < 0.010060	M Gd < 0.001006	M Mn < 0.004024	M Rb < 0.001006	M Th < 0.001006
O Be < 0.000020	M Ga < 0.001006	i Hg	M Ru < 0.002012	M Tm < 0.000402
M Bi 0.000230	M Ge < 0.006036	M Mo < 0.002012	M Sm < 0.001006	M Sn < 0.005030
O B < 0.070000	M Au < 0.003018	M Nd < 0.002012	M Sc < 0.010060	M Ti < 0.050298
M Cd < 0.003018	M Hf < 0.002012	i Ni	M Se < 0.008048	M W < 0.010060
O Ca 0.000696	M Ho < 0.000503	M Nb < 0.000503	i Si	M U < 0.002012
M Ce < 0.005030	M In < 0.010060	n Os	M Ag < 0.002012	M V < 0.002012
M Cs 0.002500	M Ir < 0.005030	M Pd < 0.005030	O Na < 0.000100	M Yb < 0.001006
M Cr < 0.005030	i Fe	i P	M Sr < 0.000503	M Y < 0.040238
M Co < 0.003018	M La < 0.000503	M Pt < 0.002012	i S	M Zn 0.000400
M Cu 0.000200	M Pb < 0.003018	O K 0.002386	M Ta < 0.007042	M Zr < 0.005030

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
HPLC, IC, TLC, ISE, IR, NMR, UV/VIS, MS, Capillary Eletrophoresis, Potentiometry, Wet Chemistry and Voltammetry
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact Technical Staff

This CRM was manufactured using 18 megohm doubly deionized water that has been filtered through a 0.2 micron filter.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 186.207; +7; *4,6,7,8,9*; ReO41-

Chemical Compatibility - Stable in HCl, HNO3, H2SO4 ,HF, H3PO4 . Stable with most metals and inorganic anions in acidic media. Mixing higher levels of ReO41- with Ag+, Hg22+, K+, NH4+, Cs+, Rb+, or Tl+ will give the corresponding salt (solubilities are 1-12 g/L).

Stability - 2-100 ppb levels stable for months in 1% HNO3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 1-5% HNO3 / LDPE container.

Re Containing Samples (Preparation and Solution) - Metal (Soluble in HNO3); Oxides / Ores (Fuse in Pt0 with Na2CO3). Organic Matrix (All modes of acid attack invite the danger of loss of some volatile perrhenic acid. The use of a reflux condenser should be considered when a wet acid digestion is used such as a nitric / perchloric or sulfuric / peroxide digestion. The preferred approach is to ash the sample in Pt0 mixed with Na2CO3 starting the ash at 450EC and then increasing the temperature if necessary to 900EC to effect a fusion of accompanying alumino-silicates, etc.)

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Type	Interferences (underlined indicates severe)
ICP-OES 221.426 nm	0.006 / 0.0006 µg/mL	1	ion	Fe, Os Mo, Ta
ICP-OES 227.525 nm	0.006 / 0.0006 µg/mL	1	ion	Ru, Co, Ca
ICP-MS 187 amu	5 ppt	n/a	M+	171Yb16O, 187Os

Uranium Note: If uranium is present in this standard, it is natural abundance unless specified in Section 3.0.

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Safety Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to an in house procedure and is guaranteed to be homogeneous. Inorganic Ventures homogeneity data indicate that the end user should take a minimum sample size of 0.2mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration
- SAI Global File Number 010105

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration"
- Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 "General Requirements for the Competence of Reference Material Producers"
- Reference Materials Production - Accredited A2LA Certificate Number 883.02

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission
- Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission
- Reporting Defects and Non-Compliance

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life. Manufacturer concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

11.3 Chemical Stability - Studies have been conducted on this or similar CRMs and it has been demonstrated that this CRM is chemically stable for a period of not less than two years provided the "Storage & Handling" conditions are followed that are described in section 7.0.

Certification Date: June 18, 2012

Expiration Date:

01/2014

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	Stephan Blaakman Product Documentation Technician	
Certificate Approved By:	Brian Alexander PhD., Technical Process Director	
Certifying Officer:	Paul Gaines PhD., Senior Technical Director	

Reagent

STD RE_00007

INORGANIC VENTURES™

CERTIFICATE OF ANALYSIS

429123
ID: STD RE_00007
Exp:07/01/15 Prpd:REV Opn:08/18/14
RE 100OPPM

1.0 **INORGANIC VENTURES** is an ISO Guide 34 "General Requirements for the Competence of Reference Material Producers" and ISO 9001 registered manufacturer. Our manufacturing laboratory is accredited to ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories."

ACCREDITED Testing Laboratory Certificate 883.01

ACCREDITED Reference Material Producer Certificate 883.02

2.0 DESCRIPTION OF CRM **1000 µg/mL Rhenium in 3% (v/v) HNO3**

Catalog Number:	CGRE1-1, CGRE1-2, and CGRE1-5
Lot Number:	**G2-RE01085**
Starting Material:	Re powder
Starting Material Purity (%):	99.9982
Starting Material Lot No:	1708 and 1827
Matrix:	3% (v/v) HNO3

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 1,004 ± 2 µg/mL weighted mean

Certified Density: 1.015 g/mL (measured at 20 ± 1°C)

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence interval using a coverage factor of k = 2.

Characterization of CRM by two independent methods

Certified Value, X_{CRM}, where two methods of characterization are used, is the weighted mean of the two results = $[(w_a)(X_a) + (w_b)(X_b)]$

X_a is the mean of Assay Method A with standard uncertainty $U_{char\ a}$.

X_b is the mean of Assay Method B with standard uncertainty $U_{char\ b}$.

w_a and w_b = The weighting factors for each method calculated using the inverse square of the variance:

$$w_a = (1/U_{char\ a})^2 / ((1/U_{char\ a})^2 + (1/U_{char\ b})^2);$$

$$w_b = (1/U_{char\ b})^2 / ((1/U_{char\ a})^2 + (1/U_{char\ b})^2)$$

CRM Expanded Uncertainty (±) = $U_{CRM} = k\ (U^2_{char\ a\&b} + u^2_{bb} + u^2_{lts} + u^2_{sts})^{1/2}$

$U_{char\ a\&b} = [(w_a)^2 (U_{char\ a})^2 + (w_b)^2 (U_{char\ b})^2]^{0.5}$; $U_{char\ a}$ and $U_{char\ b}$ are the square root of the sum of the squares of the errors from characterization which include instrumental measurement, density, NIST SRM uncertainty, weighing, and volume; **k**, coverage factor = 2 in all cases at Inorganic Ventures; u_{bb} = bottle to bottle homogeneity standard uncertainty; u_{lts} = long term stability standard uncertainty (storage); u_{sts} = short term stability standard uncertainty (transportation).

Characterization of CRM by one method

Certified Value, X_{CRM}, where one method of characterization is used, is the mean of individual results:

X_a = Mean X_a is the mean of Assay Method A with standard uncertainty $U_{char\ a}$.

CRM Expanded Uncertainty (±) = $U_{CRM} = k\ (U^2_{char\ a} + u^2_{bb} + u^2_{lts} + u^2_{sts})^{1/2}$

$U_{char\ a}$ is the square root of the sum of the squares of the errors from characterization which include instrumental measurement, density, NIST SRM uncertainty, weighing, and volume; **k**, coverage factor = 2 in all cases at Inorganic Ventures; u_{bb} = bottle to bottle homogeneity standard uncertainty; u_{lts} = long term stability standard uncertainty (storage); u_{sts} = short term stability standard uncertainty (transportation).

4.0 TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

· "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

· This product is Traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRMs are available, the term 'in-house std.' is specified.

- The Calculated Value is a value calculated from the weight of a starting material that has been certified directly vs. a NIST SRM/RM. See section 4.2 for balance traceability.

4.1 **Assay Method #1** **1,005 ± 3 µg/mL**
ICP Assay NIST SRM 3143 Lot Number: 010816

Assay Method #2 **1,003 ± 3 µg/mL**
· Calculated NIST SRM Lot Number: See Sec. 4.2

4.2 **BALANCE CALIBRATION** - All analytical balances are calibrated yearly by an accredited calibration laboratory and are traceable to a class E 2 analytical weight set with NIST Traceability. All balances are checked daily using an in-house procedure. The weights used for testing are annually compared to master weights and are traceable to the National Institute of Standards and Technology (NIST).

4.3 **THERMOMETER CALIBRATION** - All thermometers are NIST traceable through thermometers that are calibrated by an A2LA accredited calibration laboratory.

4.4 **GLASSWARE CALIBRATION** - An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM's.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

CRM's solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O	Al	< 0.007000	M	Dy	< 0.000100	O	Li	< 0.000060	M	Pr	< 0.000100	M	Te	< 0.009999
M	Sb	< 0.005999	M	Er	< 0.000100	M	Lu	< 0.000100	s	Re		M	Tb	< 0.000100
M	As	< 0.003000	M	Eu	< 0.000100	O	Mg	< 0.030000	M	Rh	< 0.000100	M	Tl	0.003013
O	Ba	< 0.000400	M	Gd	< 0.000100	M	Mn	< 0.004000	M	Rb	< 0.004999	M	Th	< 0.001000
M	Be	< 0.000500	M	Ga	< 0.000100	i	Hg		M	Ru	< 0.000200	M	Tm	< 0.000100
M	Bi	< 0.004999	M	Ge	< 0.000500	M	Mo	< 0.019998	M	Sm	< 0.000100	M	Sn	< 0.004999
M	B	0.003877	M	Au	< 0.000100	M	Nd	< 0.000100	M	Sc	< 0.000300	M	Ti	< 0.002000
M	Cd	< 0.000800	M	Hf	< 0.002000	M	Ni	< 0.029997	M	Se	< 0.001000	M	W	< 0.019998
O	Ca	0.001004	M	Ho	< 0.000100	M	Nb	< 0.001000	i	Si		M	U	< 0.001000
M	Ce	< 0.000100	M	In	< 0.001000	n	Os		M	Ag	< 0.002000	M	V	< 0.000200
M	Cs	0.002069	M	Ir	< 0.000100	M	Pd	< 0.000500	O	Na	0.004520	M	Yb	< 0.000100
M	Cr	< 0.009999	i	Fe		i	P		M	Sr	< 0.000100	M	Y	< 0.000100
M	Co	< 0.003000	M	La	< 0.001000	M	Pt	< 0.000300	i	S		M	Zn	0.000522
M	Cu	< 0.004999	M	Pb	0.000402	O	K	0.003716	M	Ta	< 0.002000	M	Zr	< 0.001000

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
HPLC, IC, TLC, ISE, IR, NMR, UV/VIS, MS, Capillary Eletrophoresis, Potentiometry, Wet Chemistry and Voltammetry
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact Technical Staff

This CRM was manufactured using 18 megohm doubly deionized water that has been filtered through a 0.2 micron filter.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 186.207; +7; *4,6,7,8,9*; ReO41-

Chemical Compatibility - Stable in HCl, HNO3, H2SO4 ,HF, H3PO4 . Stable with most metals and inorganic anions in acidic media. Mixing higher levels of ReO41- with Ag+, Hg22+, K+, NH4+, Cs+, Rb+, or Tl+ will give the corresponding salt (solubilities are 1-12 g/L).

Stability - 2-100 ppb levels stable for months in 1% HNO3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 1-5% HNO3 / LDPE container.

Re Containing Samples (Preparation and Solution) - Metal (Soluble in HNO3); Oxides / Ores (Fuse in Pt0 with Na2CO3). Organic Matrix (All modes of acid attack invite the danger of loss of some volatile perrhenic acid. The use of a reflux condenser should be considered when a wet acid digestion is used such as a nitric / perchloric or sulfuric / peroxide digestion. The preferred approach is to ash the sample in Pt0 mixed with Na2CO3 starting the ash at 450EC and then increasing the temperature if necessary to 900EC to effect a fusion of accompanying alumino-silicates, etc.)

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Type	Interferences (underlined indicates severe)
ICP-OES 221.426 nm	0.006 / 0.0006 µg/mL	1	ion	Fe, Os Mo, Ta
ICP-OES 227.525 nm	0.006 / 0.0006 µg/mL	1	ion	Ru, Co, Ca
ICP-MS 187 amu	5 ppt	n/a	M+	171Yb16O, 187Os

Uranium Note: If uranium is present in this standard, it is natural abundance unless specified in Section 3.0.

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Safety Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to an in house procedure and is guaranteed to be homogeneous. Inorganic Ventures homogeneity data indicate that the end user should take a minimum sample size of 0.2mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration
- SAI Global File Number 010105

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration"
- Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 "General Requirements for the Competence of Reference Material Producers"
- Reference Materials Production - Accredited A2LA Certificate Number 883.02

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission
- Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission
- Reporting Defects and Non-Compliance

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life. Manufacturer concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

11.3 Chemical Stability - Studies have been conducted on this or similar CRMs and it has been demonstrated that this CRM is chemically stable for a period of not less than two years provided the "Storage & Handling" conditions are followed that are described in section 7.0.

Certification Date: November 25, 2013

Expiration Date: [illegible]
01?2015

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	Zach Saunders Product Documentation Technician	
Certificate Approved By:	Brian Alexander PhD., Technical Process Director	
Certifying Officer:	Paul Gaines PhD., Senior Technical Director	

Reagent

TC99-C QC_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

28119
ID: TC99-C QC_00001
TC99 QC CONC

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

MT02755-10
TC99 QC (1uCi)
elyk
None
Prep/Opened: 11/8/2010
Exp(1): 11/8/2020
Exp(2): 11/8/2020

83550-334

Tc-99 5 mL Liquid in Flame Sealed Vial

Customer: TestAmerica St. Louis
P.O. No.: 2387681, Item 1

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty* , % Type u_A	u_B	U	Reference Date (12:00 PM EST)
Tc-99	7.710E+07	3.707E+04	0.3	1.3	2.7	10/29/2010

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: γ-impurities <0.1%. 5.00792 g 0.001M NaOH solution, carrier free.

Source Prepared by: _____
Z. Dimitrova, Radiochemist

QA Approved: _____ Date: 11/3/10
J. D. McCorvey, QA Manager Alternate

ACCREDITED SOURCE CALIBRATION LABORATORY
HEALTH PHYSICS SOCIETY
FOUNDED 1956

ANA Form005 Rev. --

Single Isotope Certificate, Rev 1 9/28/2009

METALS

COVER PAGE
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102380-4

SDG No.: 680102380-1

Project: Sediments

Client Sample ID	Lab Sample ID
SD-228-01	680-102380-17

Comments:

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-228-01 Lab Sample ID: 680-102380-17

Lab Name: TestAmerica St. Louis Job No.: 680-102380-4

SDG ID.: 680102380-1

Matrix: Solid Date Sampled: 06/13/2014 10:10

Reporting Basis: WET Date Received: 06/14/2014 08:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
14133-76-7	Tc-99	ND	0.000056	0.000017	mg/Kg			1	6020A
7440-15-5	Re	4.4			mg/Kg			1	6020A

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-4

SDG No.: 680102380-1

ICV Source: TC99 ICV_00082 Concentration Units: ug/L

CCV Source: TC99 CAL2/CCV_00040

Analyte	ICV 160-144626/5 09/17/2014 06:52				CCV 160-144626/128 09/17/2014 14:49				CCV 160-144626/140 09/17/2014 15:35			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
Re	500		500	100	536		500	107	534		500	107
Tc-99	0.283		0.292	97	0.280		0.307	91	0.283		0.307	92

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-4

SDG No.: 680102380-1

ICV Source: TC99 ICV_00082 Concentration Units: ug/L

CCV Source: TC99 CAL2/CCV_00040

Analyte	CCV 160-144626/152 09/17/2014 16:22											
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
Re	516		500	103								
Tc-99	0.284		0.307	92								

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2B-IN
CRQL CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-4

SDG No.: 680102380-1

Method: 6020A Instrument ID: ICPMS6100

Lab Sample ID: CRI 160-144626/7 Concentration Units: ug/L

CRQL Check Standard Source: TC99 CAL1/LLC_00043

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
Tc-99	0.00492	0.00424	J	86	70-130
Re	100	112		112	30-110

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IIB-IN

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-4

SDG No.: 680102380-1

Concentration Units: ug/L

Analyte	RL	ICB 160-144626/6 09/17/2014 06:55		CCB 160-144626/129 09/17/2014 14:53		CCB 160-144626/141 09/17/2014 15:39		CCB 160-144626/153 09/17/2014 16:26	
		Found	C	Found	C	Found	C	Found	C
Re		0.142		0.788		0.809		0.555	
Tc-99	0.0050	ND		ND		ND		ND	

Italicized analytes were not requested for this sequence.

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-4

SDG No.: 680102380-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-143794/1-A

Instrument Code: ICPMS6100 Batch No.: 144626

CAS No.	Analyte	Concentration	C	Q	Method
14133-76-7	Tc-99	ND			6020A_TC99
7440-15-5	Re	4.89			6020A_TC99

7A-IN
LAB CONTROL SAMPLE
METALS

Lab ID: LCS 160-143794/2-A

Lab Name: TestAmerica St. Louis Job No.: 680-102380-4

Sample Matrix: Solid LCS Source: TC99-PREP_00004

Analyte	Solid(mg/Kg)							
	True	Found	C	%R	Limits		Q	Method
Tc-99	0.00238	0.00240		101	80	120		6020A
Re	4.97	5.00		101	30	110		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

9-IN
DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102380-4

SDG Number: 680102380-1

Matrix: Solid Instrument ID: ICPMS6100

Method: 6020A MDL Date: 08/07/2012 16:02

Prep Method: None

Analyte	Wavelength/ Mass	RL (mg/Kg)	MDL (mg/Kg)
Re			
Tc-99	99	0.00005	0.000015

9-IN
CALIBRATION BLANK DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102380-4

SDG Number: 680102380-1

Matrix: Solid Instrument ID: ICPMS6100

Method: 6020A XMDL Date: 08/24/2012 17:05

Analyte	Wavelength/ Mass	XRL (ug/L)	XMDL (ug/L)
Re			
Tc-99	99	0.005	0.001

11-IN
LINEAR RANGES
METALS

Lab Name: TestAmerica St. Louis Job No: 680-102380-4

SDG No.: 680102380-1

Instrument ID: ICPMS6100 Date: 02/14/2012 11:04

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	Method
Tc-99		2000	6020A
Re		2000	6020A

12-IN
PREPARATION LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-4

SDG No.: 680102380-1

Prep Method: None

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight (g)	Initial Volume	Final Volume (mL)
MB 160-143794/1-A	09/12/2014 13:53	143794	5.1140		50
LCS 160-143794/2-A	09/12/2014 13:53	143794	5.0344		50
680-102380-17	09/12/2014 13:53	143794	5.0278		50

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-4

SDG No.: 680102380-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/17/2014 06:36 End Date: 09/17/2014 17:40

Lab Sample Id	D/F	Type	Time	Analytes																										
				Re	Tc-99																									
ICIS 160-144626/1	1		06:36	X	X																									
IC 160-144626/2	1		06:40	X	X																									
IC 160-144626/3	1		06:44	X	X																									
IC 160-144626/4	1		06:48	X	X																									
ICV 160-144626/5	1		06:52	X	X																									
ICB 160-144626/6	1		06:55	X	X																									
CRI 160-144626/7	1		06:59	X	X																									
CCV 160-144626/8			07:03																											
CCB 160-144626/9			07:07																											
ZZZZZZ			07:11																											
ZZZZZZ			07:15																											
ZZZZZZ			07:19																											
ZZZZZZ			07:23																											
ZZZZZZ			07:27																											
ZZZZZZ			07:30																											
ZZZZZZ			07:34																											
ZZZZZZ			07:38																											
ZZZZZZ			07:42																											
ZZZZZZ			07:46																											
CCV 160-144626/20			07:50																											
CCB 160-144626/21			07:54																											
ZZZZZZ			07:57																											
ZZZZZZ			08:01																											
ZZZZZZ			08:05																											
ZZZZZZ			08:09																											
ZZZZZZ			08:13																											
ZZZZZZ			08:17																											
ZZZZZZ			08:21																											
ZZZZZZ			08:25																											
ZZZZZZ			08:28																											
ZZZZZZ			08:32																											
CCV 160-144626/32			08:36																											
CCB 160-144626/33			08:40																											
ZZZZZZ			08:44																											
ZZZZZZ			08:48																											
ZZZZZZ			08:52																											
ZZZZZZ			08:56																											
ZZZZZZ			08:59																											
ZZZZZZ			09:03																											

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-4

SDG No.: 680102380-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/17/2014 06:36 End Date: 09/17/2014 17:40

Lab Sample Id	D/F	Type	Time	Analytes																										
				Re	Tc-99																									
ZZZZZZ			09:07																											
ZZZZZZ			09:11																											
ZZZZZZ			09:15																											
ZZZZZZ			09:19																											
CCV 160-144626/44			09:23																											
CCB 160-144626/45			09:27																											
ZZZZZZ			09:30																											
ZZZZZZ			09:34																											
ZZZZZZ			09:38																											
ZZZZZZ			09:42																											
ZZZZZZ			09:46																											
ZZZZZZ			09:50																											
ZZZZZZ			09:54																											
ZZZZZZ			09:58																											
ZZZZZZ			10:01																											
ZZZZZZ			10:05																											
CCV 160-144626/56			10:09																											
CCB 160-144626/57			10:13																											
ZZZZZZ			10:17																											
ZZZZZZ			10:21																											
ZZZZZZ			10:25																											
ZZZZZZ			10:28																											
ZZZZZZ			10:32																											
ZZZZZZ			10:36																											
ZZZZZZ			10:40																											
ZZZZZZ			10:44																											
ZZZZZZ			10:48																											
ZZZZZZ			10:52																											
CCV 160-144626/68			10:56																											
CCB 160-144626/69			10:59																											
ZZZZZZ			11:03																											
ZZZZZZ			11:07																											
ZZZZZZ			11:11																											
ZZZZZZ			11:15																											
ZZZZZZ			11:19																											
ZZZZZZ			11:23																											
ZZZZZZ			11:27																											
ZZZZZZ			11:30																											
ZZZZZZ			11:34																											

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-4

SDG No.: 680102380-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/17/2014 06:36 End Date: 09/17/2014 17:40

Lab Sample Id	D/F	Type	Time	Analytes																										
				Re	Tc-99																									
ZZZZZZ			11:38																											
CCV 160-144626/80			11:42																											
CCB 160-144626/81			11:46																											
ZZZZZZ			11:50																											
ZZZZZZ			11:54																											
ZZZZZZ			11:58																											
ZZZZZZ			12:01																											
ZZZZZZ			12:05																											
ZZZZZZ			12:09																											
ZZZZZZ			12:13																											
ZZZZZZ			12:17																											
ZZZZZZ			12:21																											
ZZZZZZ			12:25																											
CCV 160-144626/92			12:29																											
CCB 160-144626/93			12:32																											
ZZZZZZ			12:36																											
ZZZZZZ			12:40																											
ZZZZZZ			12:45																											
ZZZZZZ			12:49																											
ZZZZZZ			12:53																											
ZZZZZZ			12:57																											
ZZZZZZ			13:01																											
ZZZZZZ			13:04																											
ZZZZZZ			13:08																											
ZZZZZZ			13:12																											
CCV 160-144626/104			13:16																											
CCB 160-144626/105			13:20																											
ZZZZZZ			13:24																											
ZZZZZZ			13:28																											
ZZZZZZ			13:32																											
ZZZZZZ			13:35																											
ZZZZZZ			13:39																											
ZZZZZZ			13:43																											
ZZZZZZ			13:47																											
ZZZZZZ			13:51																											
ZZZZZZ			13:55																											
ZZZZZZ			13:59																											
CCV 160-144626/116			14:02																											
CCB 160-144626/117			14:06																											

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-4

SDG No.: 680102380-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/17/2014 06:36 End Date: 09/17/2014 17:40

Lab Sample Id	D/F	Type	Time	Analytes																										
				Re	Tc-99																									
ZZZZZZ			14:10																											
ZZZZZZ			14:14																											
ZZZZZZ			14:18																											
ZZZZZZ			14:22																											
ZZZZZZ			14:26																											
ZZZZZZ			14:30																											
ZZZZZZ			14:33																											
ZZZZZZ			14:37																											
ZZZZZZ			14:41																											
ZZZZZZ			14:45																											
CCV 160-144626/128	1		14:49	X	X																									
CCB 160-144626/129	1		14:53	X	X																									
ZZZZZZ			14:57																											
ZZZZZZ			15:01																											
ZZZZZZ			15:04																											
ZZZZZZ			15:08																											
ZZZZZZ			15:12																											
MB 160-143794/1-A	1	T	15:16	X	X																									
LCS 160-143794/2-A	1	T	15:20	X	X																									
ZZZZZZ			15:24																											
ZZZZZZ			15:28																											
ZZZZZZ			15:32																											
CCV 160-144626/140	1		15:35	X	X																									
CCB 160-144626/141	1		15:39	X	X																									
680-102380-17	1	T	15:43	X	X																									
ZZZZZZ			15:47																											
ZZZZZZ			15:51																											
ZZZZZZ			15:55																											
ZZZZZZ			15:59																											
ZZZZZZ			16:03																											
ZZZZZZ			16:06																											
ZZZZZZ			16:10																											
ZZZZZZ			16:14																											
ZZZZZZ			16:18																											
CCV 160-144626/152	1		16:22	X	X																									
CCB 160-144626/153	1		16:26	X	X																									
ZZZZZZ			16:30																											
ZZZZZZ			16:34																											
ZZZZZZ			16:37																											

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-4

SDG No.: 680102380-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/17/2014 06:36 End Date: 09/17/2014 17:40

Lab Sample Id	D/F	Type	Time	Analytes																									
				Re	Tc-99																								
ZZZZZZ			16:41																										
ZZZZZZ			16:45																										
ZZZZZZ			16:49																										
ZZZZZZ			16:53																										
ZZZZZZ			16:57																										
ZZZZZZ			17:01																										
ZZZZZZ			17:05																										
CCV 160-144626/164			17:08																										
CCB 160-144626/165			17:12																										
ZZZZZZ			17:16																										
ZZZZZZ			17:20																										
ZZZZZZ			17:24																										
ZZZZZZ			17:28																										
ZZZZZZ			17:32																										
CCV 160-144626/171			17:36																										
CCB 160-144626/172			17:40																										

Prep Types:
T = Total/NA

FORM XIII-IN

15-IN
ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102380-4

SDG No.: 680102380-1

ICP-MS Instrument ID: ICPMS6100 Start Date: 09/17/2014 End Date: 09/17/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element In-115	Q	Element	Q	Element	Q	Element	Q	Element	Q
ICIS 160-144626/1	06:36										
IC 160-144626/2	06:40										
IC 160-144626/3	06:44										
IC 160-144626/4	06:48										
ICV 160-144626/5	06:52	102									
ICB 160-144626/6	06:55	102									
CRI 160-144626/7	06:59	102									
CCV 160-144626/128	14:49	96									
CCB 160-144626/129	14:53	95									
MB 160-143794/1-A	15:16	111									
LCS 160-143794/2-A	15:20	108									
CCV 160-144626/140	15:35	92									
CCB 160-144626/141	15:39	91									
680-102380-17	15:43	109									
CCV 160-144626/152	16:22	92									
CCB 160-144626/153	16:26	92									

Sample/Batch Report

TA ST. LOUIS - PERKIN ELMER ELAN 6100 - METHOD 6020 / 200.8 QUANTITATIVE ANALYSIS REPORT

User Name: stlmetals
Computer Name: SLICP03
Sample File: D:\Elandata\Sample\SW846 TEMP.sam
Report Date/Time: Wednesday, September 17, 2014 17:42:48
Method File: d:\Elandata\Method\2013_tc99_fast isou.mth
Tuning File: d:\Elandata\Tuning\epa tuning.tun
Optimization File: d:\Elandata\Optimize\epa2008.dac
Calibration File:
Calibration Type: External Calibration
Number of Replicates: 3
Number of Readings: 1
Number of Sweeps: 50
Dual Detector Mode: Dual

MTS 9/17/14
File: 091714M1
Act. Batch: 144626
Conc. Batch: 144627

A/S Loc.	Batch ID	Sample ID	Description	Aliquot Vol.	Diluted Vol.
11	142390	444649			
12		444650			
13		160-8231-A-1-A			
14		160-8231-A-1-B MS			
15		160-8231-A-1-C MSD			
16		160-8231-A-2-A			
17		160-8231-A-3-A			
18		160-8231-A-4-A			
19		160-8231-A-5-A			
20		160-8231-A-6-A			
21		160-8231-A-7-A			
22		160-8231-A-8-A			
23		160-8231-A-9-A			
24		160-8231-A-10-A			
25		160-8231-A-11-A			
26		160-8231-A-12-A			
27		160-8231-A-13-A			
28		160-8231-A-14-A			
29		160-8231-A-15-A			
30		160-8231-A-16-A			
31		160-8231-A-17-A			
32		160-8231-A-18-A			
33		160-8231-A-19-A			
34		160-8231-A-20-A			
35	142455	445202			
36		445203			
37		160-8229-A-1-E			
38		160-8229-A-1-F MS			
39		160-8229-A-1-G MSD			
40		160-8229-A-2-D			
41		160-8229-A-3-D			
42		160-8229-A-4-D			
43		160-8229-A-5-D			
44		160-8229-A-6-D			
45		160-8229-A-7-D			
46		160-8229-A-8-D			
47		160-8229-A-9-D			
48		160-8229-A-10-D			
49		160-8229-A-11-D			
50		160-8229-A-12-D			
51		160-8229-A-13-D			

All

52		160-8229-A-14-D
53		160-8229-A-15-D
54		160-8229-A-16-D
55		160-8229-A-17-D
56		160-8229-A-18-E
57		160-8229-A-19-D
58		160-8229-A-20-D
59	142456	445187
60		445188
61		160-8229-A-21-D
62		160-8229-A-21-E MS
63		160-8229-A-21-F MSD
64		160-8229-A-22-D
65		160-8229-A-23-D
66		160-8229-A-24-D
67		160-8229-A-25-D
68		160-8229-A-26-D
69		160-8229-A-27-D
70		160-8229-A-28-D
71		160-8229-A-29-D
72		160-8229-A-30-D
73		160-8229-A-31-D
74	142541	445734
75		445735
76		160-8251-A-1-A
77		160-8251-A-1-B MS
78		160-8251-A-1-C MSD
79		160-8251-A-2-A
80		160-8251-A-3-A
81		160-8251-A-4-A
82		160-8251-A-5-A
83		160-8251-A-6-A
84		160-8251-A-7-A
85		160-8251-A-8-A
86		160-8251-A-9-A
87		160-8251-A-10-A
88		160-8251-A-11-A
89		160-8251-A-12-A
90		160-8251-A-13-A
91		160-8251-A-14-A
92		160-8251-A-15-A
93		160-8251-A-16-A
94		160-8251-A-17-A
95		160-8251-A-18-A
96	143625	449355
97		449356
98		160-8324-A-1-A
99		160-8324-A-1-B MS
100		160-8324-A-1-C MSD
101		160-8324-A-2-A
102		160-8324-A-3-A
103		160-8324-A-4-A
104		160-8324-A-5-A
105		160-8324-A-6-A
106		160-8324-A-7-A
107		160-8324-A-8-A
108		160-8324-A-9-A
109		160-8324-A-10-A
110		160-8324-A-11-A
111		160-8324-A-12-A

All

112		160-8324-A-13-A
113		160-8324-A-14-A
114		160-8297-A-1-C
115		160-8297-A-2-C
116	143794	449750
117		449751
118		680-102327-A-31-J
119		680-102327-A-31-K MS
120		680-102327-A-31-L MSD
121		680-102380-A-17-E
122	143869	450488
123		450489
124		160-8344-A-1-A
125		160-8344-A-1-B MS
126		160-8344-A-1-C MSD
127		160-8344-A-2-A
128		160-8344-A-3-A
129		160-8344-A-4-A
130		160-8344-A-5-A
131		160-8344-A-6-A
132		160-8344-A-7-A
133		160-8344-A-8-A
134		160-8344-A-9-A
135		160-8344-A-10-A
136		160-8344-A-11-A
137		160-8344-A-12-A
138		160-8344-A-13-A
139		160-8344-A-14-A
140		160-8344-A-15-A
141		160-8344-A-16-A
142		160-8344-A-17-A
143		160-8344-A-18-A
144		160-8344-A-19-A
145		160-8344-A-20-A
146	142870	446894
147		446895
148		160-8271-A-1-A
149		160-8271-A-1-B MS
150		160-8271-A-1-C MSD
151		160-8271-A-2-A
152		160-8271-A-3-A
153		160-8271-A-4-A
154		160-8271-A-5-A
155		160-8271-A-6-A
156		160-8271-A-7-A
157		160-8271-A-8-A
158		160-8271-A-9-A
159		160-8271-A-10-A
160		160-8271-A-11-A
161		160-8271-A-12-A
162		160-8271-A-13-A
163		160-8271-A-14-A
164		160-8271-A-15-A

All

Quantitative Analysis Calibration Report

File Name: 091714M1.cal
File Path: D:\Elandata\System
Calibration Type: External Calibration

Analyte	Mass	Curve Type	Slope	Intercept	Corr. Coeff.
Tc	99.000	Linear Thru Zero	0.045971	0.00	0.999999
In-115 (IS)	114.904	Linear Thru Zero	0.000000	0.00	0.000000
Re	186.956	Linear Thru Zero	0.024262	0.00	0.999965

Instrument Tuning Report

File Name: EPA TUNING.tun
File Path: d:\Elandata\Tuning
Sample ID: Sample
Sample Date/Time: Wednesday, September 17, 2014 06:01:10

Analyte	Exact Mass	Meas. Mass	Mass DAC	Res. DAC	Meas. Pk. Width	Custom Res.
Li	7.016	7.025	1570	2065	0.637	
Mg	23.985	23.979	5688	2080	0.688	
Rh	102.905	102.879	24919	2080	0.693	
Ce	139.905	139.929	33931	2120	0.671	
Pb	207.977	207.977	50415	2310	0.658	

Replicates: 6

Daily Performance Report

Sample ID: Sample
Sample Date/Time: Wednesday, September 17, 2014 06:27:28
Sample Description:
Method File: d:\Elandata\Method\DAILY EPA.mth
Dataset File: d:\Elandata\Dataset\daily4\Sample.010
Tuning File: d:\Elandata\Tuning\EPA TUNING.tun
Optimization File: d:\Elandata\Optimize\EPA2008.dac
Dual Detector Mode: Pulse

Acq. Dead Time(ns): 35
Current Dead Time (ns): 35

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Net Intens. SD	Net Intens. RSD
	Li	7.0	2130.8	2130.770	122.495	5.7
	Mg	24.0	14223.0	14223.026	409.210	2.9
	Rh	102.9	205109.5	205109.533	3259.085	1.6
	Pb	208.0	178712.3	178712.251	1092.213	0.6
⌈>	Ba	137.9	235021.3	235021.348	2783.997	1.2
⌊	Ba++	69.0	1750.4	0.007	0.000	2.4
⌈>	Ce	139.9	289918.8	289918.797	3946.433	1.4
⌊	CeO	155.9	7258.1	0.025	0.000	1.8
	Bkgd	220.0	5.9	5.944	1.389	23.4

Current Optimization File Data

Current Value	Description
0.92	Nebulizer Gas Flow
5.75	Lens Voltage
1200.00	ICP RF Power
-2109.38	Analog Stage Voltage
1200.00	Pulse Stage Voltage
70.00	Discriminator Threshold
-6.00	AC Rod Offset
60.00	Service DAC 1
0.00	Quadrupole Rod Offset

Current Autolens Data

Analyte	Mass	Num of Pts	DAC Value	Maximum Intensity
Be	9	33	6.8	2115.2
Mg	24	33	5.5	22975.5
Co	59	33	5.5	77730.2
Rh	103	33	6.5	277022.5
In	115	33	6.3	358221.0
Ba	138	33	6.3	344770.4
Ce	140	33	6.5	439367.2
Pb	208	33	8.8	294177.7

QUANTITATIVE ANALYSIS REPORT

Sample ID: Blank

Sample Date/Time: Wednesday, September 17, 2014 06:36:36
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\091714M1\Blank.001

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**			1.920	ug/L	
| >	115	**In-115 (IS)**			426757.728	ug/L	
⌊	187	**Re**			388.864	ug/L	

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115		
⌊	**Re**	187		

QC Out Of Limits

Analyte	Mass	Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 1

Sample Date/Time: Wednesday, September 17, 2014 06:40:28
Autosampler Position: 191
Dataset File: D:\Elandata\Dataset\091714M1\Standard 1.002

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.004673**	13.304	90.492	ug/L	1.920
| >	115	**In-115 (IS)**			440884.216	ug/L	426757.728
⌊	187	**Re**	**100.000000**	2.747	1166989.560	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115		
⌊	**Re**	187		

QC Out Of Limits

Analyte	Mass	Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 2
Sample Date/Time: Wednesday, September 17, 2014 06:44:21
Autosampler Position: 2
Dataset File: D:\Elandata\Dataset\091714M1\Standard 2.003

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.292056**	0.519	5755.462	ug/L	1.920
| >	115	**In-115 (IS)**			427465.405	ug/L	426757.728
⌊	187	**Re**	**498.258929**	2.743	5185245.460	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115		
⌊	**Re**	187		

QC Out Of Limits

Analyte	Mass	Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 3

Sample Date/Time: Wednesday, September 17, 2014 06:48:14
Autosampler Position: 193
Dataset File: D:\Elandata\Dataset\091714M1\Standard 3.004

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.583725**	1.686	11682.398	ug/L	1.920
>	115	**In-115 (IS)**			434976.167	ug/L	426757.728
⌊	187	**Re**	**998.735444**	2.411	10526299.141	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
>	**In-115 (IS**	115		
⌊	**Re**	187		

QC Out Of Limits

Analyte	Mass	Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 1

Sample Date/Time: Wednesday, September 17, 2014 06:52:07
Autosampler Position: 194
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 1.005

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.283471**	0.986	5679.702	ug/L	1.920
| >	115	**In-115 (IS)**			435681.754	ug/L	426757.728
⌊	187	**Re**	**500.274780**	1.801	5284174.606	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**97.063**
| >	**In-115 (IS**	115	**102.091**	
⌊	**Re**	187		**100.055**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 2

Sample Date/Time: Wednesday, September 17, 2014 06:55:59
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 2.006

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000230**	71.656	6.652	ug/L	1.920
| >	115	**In-115 (IS)**			436613.240	ug/L	426757.728
⌊	187	**Re**	**0.142046**	33.635	1926.306	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**0.023**
| >	**In-115 (IS**	115	**102.309**	
⌊	**Re**	187		**1.420**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 3

Sample Date/Time: Wednesday, September 17, 2014 06:59:52
Autosampler Position: 191
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 3.007

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.004753**	5.829	96.789	ug/L	1.920
>	115	**In-115 (IS)**			434027.189	ug/L	426757.728
⌊	187	**Re**	**112.198469**	1.769	1180796.783	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**101.717**
>	**In-115 (IS**	115	**101.703**	
⌊	**Re**	187		**112.198**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Wednesday, September 17, 2014 07:03:44
Autosampler Position: 2
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 6.008

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.297112**	2.276	5893.552	ug/L	1.920
>	115	**In-115 (IS)**			431327.368	ug/L	426757.728
⌊	187	**Re**	**507.677637**	2.253	5307459.426	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**101.733**
>	**In-115 (IS**	115	**101.071**	
⌊	**Re**	187		**101.536**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Wednesday, September 17, 2014 07:07:36
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 7.009

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000200**	52.663	6.024	ug/L	1.920
| >	115	**In-115 (IS)**			435155.579	ug/L	426757.728
⌊	187	**Re**	**0.199049**	14.562	2515.956	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**0.020**
| >	**In-115 (IS**	115	**101.968**	
⌊	**Re**	187		**1.990**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 444649

Sample Date/Time: Wednesday, September 17, 2014 07:11:32

Autosampler Position: 11

Dataset File: D:\Elandata\Dataset\091714M1\444649.010

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000451**	69.967	12.453	ug/L	1.920
\>	115	**In-115 (IS)**			495005.490	ug/L	426757.728
⌊	187	**Re**	**502.941502**	2.546	6031823.107	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
\>	**In-115 (IS**	115	**115.992**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 444650

Sample Date/Time: Wednesday, September 17, 2014 07:15:23

Autosampler Position: 12

Dataset File: D:\Elandata\Dataset\091714M1\444650.011

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.237619**	2.312	5567.480	ug/L	1.920
\>	115	**In-115 (IS)**			509957.150	ug/L	426757.728
⌊	187	**Re**	**488.827723**	3.524	6036298.487	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
\>	**In-115 (IS**	115	**119.496**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-1-A

Sample Date/Time: Wednesday, September 17, 2014 07:19:15
Autosampler Position: 13
Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-1-A.012

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.005593**	4.538	135.053	ug/L	1.920
| >	115	**In-115 (IS)**			515167.592	ug/L	426757.728
⌊	187	**Re**	**466.359108**	2.503	5821281.096	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**120.717**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-1-B MS

Sample Date/Time: Wednesday, September 17, 2014 07:23:07
Autosampler Position: 14
Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-1-B MS.013

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.241863**	2.303	5579.554	ug/L	1.920
| >	115	**In-115 (IS)**			501172.369	ug/L	426757.728
⌊	187	**Re**	**481.070765**	2.746	5841860.170	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**117.437**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-1-C MSD

Sample Date/Time: Wednesday, September 17, 2014 07:27:00

Autosampler Position: 15

Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-1-C MSD.014

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.232932**	2.089	5369.138	ug/L	1.920
| >	115	**In-115 (IS)**			501393.460	ug/L	426757.728
⌊	187	**Re**	**479.322531**	3.604	5819284.233	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**117.489**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-2-A

Sample Date/Time: Wednesday, September 17, 2014 07:30:52

Autosampler Position: 16

Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-2-A.015

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.025346**	3.147	595.699	ug/L	1.920
| >	115	**In-115 (IS)**			509019.160	ug/L	426757.728
⌊	187	**Re**	**472.113498**	1.885	5826145.623	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**119.276**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-3-A

Sample Date/Time: Wednesday, September 17, 2014 07:34:45

Autosampler Position: 17

Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-3-A.016

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.062892**	1.936	1482.563	ug/L	1.920
| >	115	**In-115 (IS)**			511809.174	ug/L	426757.728
⌊	187	**Re**	**470.205936**	1.863	5833090.552	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**119.930**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-4-A

Sample Date/Time: Wednesday, September 17, 2014 07:38:37

Autosampler Position: 18

Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-4-A.017

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.024720**	2.954	575.964	ug/L	1.920
| >	115	**In-115 (IS)**			504787.018	ug/L	426757.728
⌊	187	**Re**	**479.155054**	3.285	5857540.159	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**118.284**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-5-A

Sample Date/Time: Wednesday, September 17, 2014 07:42:30

Autosampler Position: 19

Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-5-A.018

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.062600**	1.371	1455.691	ug/L	1.920
| >	115	**In-115 (IS)**			505255.132	ug/L	426757.728
⌊	187	**Re**	**464.454859**	3.144	5683223.301	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**118.394**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-6-A

Sample Date/Time: Wednesday, September 17, 2014 07:46:23

Autosampler Position: 20

Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-6-A.019

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.080410**	1.604	1887.612	ug/L	1.920
| >	115	**In-115 (IS)**			509873.730	ug/L	426757.728
⌊	187	**Re**	**467.355263**	2.353	5775558.378	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**119.476**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Wednesday, September 17, 2014 07:50:15
Autosampler Position: 2
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 6.020

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.299479**	0.506	6034.942	ug/L	1.920
>	115	**In-115 (IS)**			438190.075	ug/L	426757.728
⌊	187	**Re**	**518.130620**	1.629	5504150.105	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**102.544**
>	**In-115 (IS**	115	**102.679**	
⌊	**Re**	187		**103.626**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Wednesday, September 17, 2014 07:54:07
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 7.021

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000104**	48.827	4.082	ug/L	1.920
>	115	**In-115 (IS)**			437377.901	ug/L	426757.728
⌊	187	**Re**	**0.262548**	6.792	3179.535	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**0.010**
>	**In-115 (IS**	115	**102.489**	
⌊	**Re**	187		**2.625**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-7-A

Sample Date/Time: Wednesday, September 17, 2014 07:57:59
Autosampler Position: 21
Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-7-A.022

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.085420**	1.092	1955.622	ug/L	1.920
| >	115	**In-115 (IS)**			497562.039	ug/L	426757.728
⌊	187	**Re**	**475.133076**	1.111	5733472.064	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**116.591**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-8-A

Sample Date/Time: Wednesday, September 17, 2014 08:01:53
Autosampler Position: 22
Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-8-A.023

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.076921**	1.552	1799.033	ug/L	1.920
| >	115	**In-115 (IS)**			507685.399	ug/L	426757.728
⌊	187	**Re**	**472.422153**	2.891	5810684.002	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**118.963**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-9-A

Sample Date/Time: Wednesday, September 17, 2014 08:05:45
Autosampler Position: 23
Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-9-A.024

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.090484**	1.037	2153.718	ug/L	1.920
| >	115	**In-115 (IS)**			516922.111	ug/L	426757.728
⌊	187	**Re**	**465.698607**	2.455	5831970.234	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**121.128**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-10-A

Sample Date/Time: Wednesday, September 17, 2014 08:09:37

Autosampler Position: 24

Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-10-A.025

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.231083**	0.908	5315.550	ug/L	1.920
| >	115	**In-115 (IS)**			499997.647	ug/L	426757.728
⌊	187	**Re**	**481.241691**	2.395	5830664.159	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**117.162**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-11-A

Sample Date/Time: Wednesday, September 17, 2014 08:13:29

Autosampler Position: 25

Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-11-A.026

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.014348**	3.920	335.884	ug/L	1.920
| >	115	**In-115 (IS)**			504657.763	ug/L	426757.728
⌊	187	**Re**	**463.105657**	2.826	5661770.587	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**118.254**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-12-A

Sample Date/Time: Wednesday, September 17, 2014 08:17:21

Autosampler Position: 26

Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-12-A.027

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.029429**	2.510	677.171	ug/L	1.920
| >	115	**In-115 (IS)**			499022.890	ug/L	426757.728
⌊	187	**Re**	**483.098079**	2.557	5841357.821	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**116.934**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-13-A

Sample Date/Time: Wednesday, September 17, 2014 08:21:13

Autosampler Position: 27

Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-13-A.028

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.019740**	3.387	459.428	ug/L	1.920
| >	115	**In-115 (IS)**			504669.517	ug/L	426757.728
⌊	187	**Re**	**472.088454**	2.860	5771979.018	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**118.257**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-14-A

Sample Date/Time: Wednesday, September 17, 2014 08:25:05

Autosampler Position: 28

Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-14-A.029

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.022717**	5.900	537.029	ug/L	1.920
| >	115	**In-115 (IS)**			511276.637	ug/L	426757.728
⌊	187	**Re**	**468.904927**	2.589	5809364.501	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**119.805**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-15-A

Sample Date/Time: Wednesday, September 17, 2014 08:28:58

Autosampler Position: 29

Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-15-A.030

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.043355**	0.344	1017.760	ug/L	1.920
| >	115	**In-115 (IS)**			509404.175	ug/L	426757.728
⌊	187	**Re**	**466.186079**	2.710	5752820.510	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**119.366**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-16-A

Sample Date/Time: Wednesday, September 17, 2014 08:32:51

Autosampler Position: 30

Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-16-A.031

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.039375**	2.884	907.783	ug/L	1.920
>	115	**In-115 (IS)**			499628.641	ug/L	426757.728
⌊	187	**Re**	**472.116533**	1.225	5720112.788	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
>	**In-115 (IS**	115	**117.075**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Wednesday, September 17, 2014 08:36:43
Autosampler Position: 2
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 6.032

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.297451**	1.348	5986.181	ug/L	1.920
>	115	**In-115 (IS)**			437354.774	ug/L	426757.728
⌊	187	**Re**	**517.705179**	2.580	5486039.213	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**101.849**
>	**In-115 (IS**	115	**102.483**	
⌊	**Re**	187		**103.541**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Wednesday, September 17, 2014 08:40:35
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 7.033

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000343**	41.483	8.782	ug/L	1.920
| >	115	**In-115 (IS)**			439323.999	ug/L	426757.728
⌊	187	**Re**	**0.393826**	11.539	4573.085	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**0.034**
| >	**In-115 (IS**	115	**102.945**	
⌊	**Re**	187		**3.938**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-17-A

Sample Date/Time: Wednesday, September 17, 2014 08:44:27

Autosampler Position: 31

Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-17-A.034

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.068246**	0.793	1578.605	ug/L	1.920
| >	115	**In-115 (IS)**			502650.623	ug/L	426757.728
⌊	187	**Re**	**467.410677**	1.728	5695642.114	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**117.784**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-18-A

Sample Date/Time: Wednesday, September 17, 2014 08:48:20
Autosampler Position: 32
Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-18-A.035

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.152991**	3.296	3529.555	ug/L	1.920
| >	115	**In-115 (IS)**			500653.026	ug/L	426757.728
⌊	187	**Re**	**465.338458**	2.740	5644405.658	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**117.316**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-19-A

Sample Date/Time: Wednesday, September 17, 2014 08:52:13
Autosampler Position: 33
Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-19-A.036

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.086558**	2.519	2018.298	ug/L	1.920
| >	115	**In-115 (IS)**			505960.642	ug/L	426757.728
⌊	187	**Re**	**468.685675**	2.204	5747055.319	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**118.559**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8231-A-20-A

Sample Date/Time: Wednesday, September 17, 2014 08:56:06
Autosampler Position: 34
Dataset File: D:\Elandata\Dataset\091714M1\160-8231-A-20-A.037

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.207527**	2.218	4799.131	ug/L	1.920
| >	115	**In-115 (IS)**			502409.171	ug/L	426757.728
⌊	187	**Re**	**477.139882**	0.996	5814010.833	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**117.727**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 445202

Sample Date/Time: Wednesday, September 17, 2014 08:59:58
Autosampler Position: 35
Dataset File: D:\Elandata\Dataset\091714M1\445202.038

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000211**	21.438	7.018	ug/L	1.920
| >	115	**In-115 (IS)**			491422.413	ug/L	426757.728
⌊	187	**Re**	**495.290294**	2.507	5897352.087	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**115.153**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 445203

Sample Date/Time: Wednesday, September 17, 2014 09:03:50
Autosampler Position: 36
Dataset File: D:\Elandata\Dataset\091714M1\445203.039

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.242151**	2.595	5508.621	ug/L	1.920
| >	115	**In-115 (IS)**			493962.177	ug/L	426757.728
⌊	187	**Re**	**501.219546**	2.315	6000302.354	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**115.748**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-1-E

Sample Date/Time: Wednesday, September 17, 2014 09:07:42
Autosampler Position: 37
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-1-E.040

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000098**	77.785	4.655	ug/L	1.920
| >	115	**In-115 (IS)**			506180.594	ug/L	426757.728
⌊	187	**Re**	**466.626930**	3.502	5719152.783	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**118.611**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-1-F MS

Sample Date/Time: Wednesday, September 17, 2014 09:11:34
Autosampler Position: 38
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-1-F MS.041

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.223797**	1.076	5144.015	ug/L	1.920
| >	115	**In-115 (IS)**			499688.091	ug/L	426757.728
⌊	187	**Re**	**458.309084**	2.649	5548566.748	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**117.089**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-1-G MSD

Sample Date/Time: Wednesday, September 17, 2014 09:15:25

Autosampler Position: 39

Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-1-G MSD.042

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.215488**	1.584	4967.587	ug/L	1.920
>	115	**In-115 (IS)**			501308.659	ug/L	426757.728
⌊	187	**Re**	**454.626275**	2.352	5522641.746	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
>	**In-115 (IS**	115	**117.469**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-2-D

Sample Date/Time: Wednesday, September 17, 2014 09:19:17
Autosampler Position: 40
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-2-D.043

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000213**	80.867	6.983	ug/L	1.920
| >	115	**In-115 (IS)**			498332.489	ug/L	426757.728
⌊	187	**Re**	**467.677342**	2.295	5650454.434	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**116.772**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Wednesday, September 17, 2014 09:23:10

Autosampler Position: 2

Dataset File: D:\Elandata\Dataset\091714M1\QC Std 6.044

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.297397**	1.527	5922.760	ug/L	1.920
| >	115	**In-115 (IS)**			432808.711	ug/L	426757.728
⌊	187	**Re**	**509.622913**	1.540	5347446.539	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**101.831**
| >	**In-115 (IS**	115	**101.418**	
⌊	**Re**	187		**101.925**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Wednesday, September 17, 2014 09:27:02
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 7.045

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000329**	29.640	8.286	ug/L	1.920
| >	115	**In-115 (IS)**			425086.081	ug/L	426757.728
⌊	187	**Re**	**0.408728**	5.864	4588.317	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**0.033**
| >	**In-115 (IS**	115	**99.608**	
⌊	**Re**	187		**4.087**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-3-D

Sample Date/Time: Wednesday, September 17, 2014 09:30:54
Autosampler Position: 41
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-3-D.046

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000133**	45.292	5.222	ug/L	1.920
| >	115	**In-115 (IS)**			488267.719	ug/L	426757.728
⌊	187	**Re**	**469.811878**	0.947	5563074.428	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**114.413**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-4-D

Sample Date/Time: Wednesday, September 17, 2014 09:34:46
Autosampler Position: 42
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-4-D.047

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000143**	129.120	5.356	ug/L	1.920
| >	115	**In-115 (IS)**			505462.694	ug/L	426757.728
⌊	187	**Re**	**463.720134**	3.301	5676901.129	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**118.443**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-5-D

Sample Date/Time: Wednesday, September 17, 2014 09:38:39
Autosampler Position: 43
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-5-D.048

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000159**	56.041	5.751	ug/L	1.920
| >	115	**In-115 (IS)**			497354.346	ug/L	426757.728
⌊	187	**Re**	**467.000593**	2.375	5628232.169	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**116.543**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-6-D

Sample Date/Time: Wednesday, September 17, 2014 09:42:32
Autosampler Position: 44
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-6-D.049

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000071**	37.655	3.825	ug/L	1.920
| >	115	**In-115 (IS)**			493636.960	ug/L	426757.728
⌊	187	**Re**	**463.652958**	0.980	5551605.285	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**115.671**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-7-D

Sample Date/Time: Wednesday, September 17, 2014 09:46:24
Autosampler Position: 45
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-7-D.050

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000100**	104.266	4.623	ug/L	1.920
| >	115	**In-115 (IS)**			506935.167	ug/L	426757.728
⌊	187	**Re**	**462.532146**	2.663	5681802.881	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**118.788**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-8-D

Sample Date/Time: Wednesday, September 17, 2014 09:50:17

Autosampler Position: 46

Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-8-D.051

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000047**	223.453	3.253	ug/L	1.920
\>	115	**In-115 (IS)**			495885.782	ug/L	426757.728
⌊	187	**Re**	**478.377656**	2.764	5746633.683	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
\>	**In-115 (IS**	115	**116.198**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-9-D

Sample Date/Time: Wednesday, September 17, 2014 09:54:10
Autosampler Position: 47
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-9-D.052

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000135**	33.741	5.451	ug/L	1.920
| >	115	**In-115 (IS)**			507744.533	ug/L	426757.728
⌊	187	**Re**	**464.377705**	3.926	5707388.035	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**118.977**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-10-D

Sample Date/Time: Wednesday, September 17, 2014 09:58:02
Autosampler Position: 48
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-10-D.053

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**-0.000022**	177.180	1.693	ug/L	1.920
>	115	**In-115 (IS)**			487874.451	ug/L	426757.728
⌊	187	**Re**	**458.535047**	1.236	5426517.619	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
>	**In-115 (IS**	115	**114.321**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-11-D

Sample Date/Time: Wednesday, September 17, 2014 10:01:54
Autosampler Position: 49
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-11-D.054

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000025**	566.550	2.554	ug/L	1.920
| >	115	**In-115 (IS)**			483757.773	ug/L	426757.728
⌊	187	**Re**	**477.550927**	1.893	5599422.866	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**113.357**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-12-D

Sample Date/Time: Wednesday, September 17, 2014 10:05:46
Autosampler Position: 50
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-12-D.055

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**-0.000014**	688.304	1.955	ug/L	1.920
| >	115	**In-115 (IS)**			514860.036	ug/L	426757.728
⌊	187	**Re**	**454.573949**	4.184	5665494.339	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**120.645**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Wednesday, September 17, 2014 10:09:38

Autosampler Position: 2

Dataset File: D:\Elandata\Dataset\091714M1\QC Std 6.056

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.300255**	1.516	5838.690	ug/L	1.920
>	115	**In-115 (IS)**			422655.746	ug/L	426757.728
⌊	187	**Re**	**520.893448**	2.838	5334059.137	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**102.809**
>	**In-115 (IS**	115	**99.039**	
⌊	**Re**	187		**104.179**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Wednesday, September 17, 2014 10:13:30
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 7.057

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000393**	31.668	9.487	ug/L	1.920
| >	115	**In-115 (IS)**			424663.273	ug/L	426757.728
⌊	187	**Re**	**0.469283**	9.868	5212.884	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**0.039**
| >	**In-115 (IS**	115	**99.509**	
⌊	**Re**	187		**4.693**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-13-D

Sample Date/Time: Wednesday, September 17, 2014 10:17:22
Autosampler Position: 51
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-13-D.058

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000087**	232.438	3.923	ug/L	1.920
| >	115	**In-115 (IS)**			489555.797	ug/L	426757.728
⌊	187	**Re**	**471.006381**	2.190	5587084.448	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**114.715**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-14-D

Sample Date/Time: Wednesday, September 17, 2014 10:21:14
Autosampler Position: 52
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-14-D.059

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000118**	111.357	4.818	ug/L	1.920
| >	115	**In-115 (IS)**			500774.910	ug/L	426757.728
⌊	187	**Re**	**458.675625**	1.383	5569183.128	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**117.344**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-15-D

Sample Date/Time: Wednesday, September 17, 2014 10:25:06

Autosampler Position: 53

Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-15-D.060

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**-0.000023**	203.511	1.687	ug/L	1.920
| >	115	**In-115 (IS)**			498164.079	ug/L	426757.728
⌊	187	**Re**	**463.006126**	2.579	5588968.506	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**116.732**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-16-D

Sample Date/Time: Wednesday, September 17, 2014 10:28:59
Autosampler Position: 54
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-16-D.061

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000135**	160.232	5.283	ug/L	1.920
| >	115	**In-115 (IS)**			486260.208	ug/L	426757.728
⌊	187	**Re**	**471.661794**	2.546	5557582.952	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**113.943**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-17-D

Sample Date/Time: Wednesday, September 17, 2014 10:32:52
Autosampler Position: 55
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-17-D.062

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000107**	59.479	4.649	ug/L	1.920
| >	115	**In-115 (IS)**			490010.608	ug/L	426757.728
⌊	187	**Re**	**467.884858**	1.537	5558857.626	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**114.822**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-18-E

Sample Date/Time: Wednesday, September 17, 2014 10:36:45
Autosampler Position: 56
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-18-E.063

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000072**	59.749	3.916	ug/L	1.920
| >	115	**In-115 (IS)**			494195.029	ug/L	426757.728
⌊	187	**Re**	**480.766755**	3.340	5753932.098	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**115.802**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-19-D

Sample Date/Time: Wednesday, September 17, 2014 10:40:37

Autosampler Position: 57

Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-19-D.064

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000105**	143.628	4.483	ug/L	1.920
| >	115	**In-115 (IS)**			492780.413	ug/L	426757.728
⌊	187	**Re**	**465.416699**	3.540	5553948.682	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**115.471**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-20-D

Sample Date/Time: Wednesday, September 17, 2014 10:44:30

Autosampler Position: 58

Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-20-D.065

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000084**	128.628	4.186	ug/L	1.920
| >	115	**In-115 (IS)**			488089.807	ug/L	426757.728
⌊	187	**Re**	**477.242723**	2.489	5645542.254	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**114.372**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 445187

Sample Date/Time: Wednesday, September 17, 2014 10:48:23

Autosampler Position: 59

Dataset File: D:\Elandata\Dataset\091714M1\445187.066

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000058**	266.617	3.354	ug/L	1.920
\>	115	**In-115 (IS)**			491256.517	ug/L	426757.728
⌊	187	**Re**	**496.313564**	2.033	5910781.463	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
\>	**In-115 (IS**	115	**115.114**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 445188

Sample Date/Time: Wednesday, September 17, 2014 10:52:15

Autosampler Position: 60

Dataset File: D:\Elandata\Dataset\091714M1\445188.067

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.237256**	1.641	5447.632	ug/L	1.920
\>	115	**In-115 (IS)**			498783.066	ug/L	426757.728
⌊	187	**Re**	**490.475734**	2.736	5926396.313	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
\>	**In-115 (IS**	115	**116.877**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Wednesday, September 17, 2014 10:56:07

Autosampler Position: 2

Dataset File: D:\Elandata\Dataset\091714M1\QC Std 6.068

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.290529**	0.499	5770.095	ug/L	1.920
| >	115	**In-115 (IS)**			431993.259	ug/L	426757.728
⌊	187	**Re**	**507.252955**	2.927	5307981.211	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**99.479**
| >	**In-115 (IS**	115	**101.227**	
⌊	**Re**	187		**101.451**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Wednesday, September 17, 2014 10:59:58
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 7.069

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000255**	63.932	6.851	ug/L	1.920
| >	115	**In-115 (IS)**			413674.025	ug/L	426757.728
⌊	187	**Re**	**0.505386**	6.826	5427.356	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**0.025**
| >	**In-115 (IS**	115	**96.934**	
⌊	**Re**	187		**5.054**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-21-D

Sample Date/Time: Wednesday, September 17, 2014 11:03:51
Autosampler Position: 61
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-21-D.070

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000207**	90.887	7.018	ug/L	1.920
| >	115	**In-115 (IS)**			485516.900	ug/L	426757.728
⌊	187	**Re**	**467.626675**	2.273	5502120.713	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**113.769**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-21-E MS

Sample Date/Time: Wednesday, September 17, 2014 11:07:43
Autosampler Position: 62
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-21-E MS.071

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.227387**	0.986	5148.887	ug/L	1.920
| >	115	**In-115 (IS)**			492094.509	ug/L	426757.728
⌊	187	**Re**	**470.845514**	3.387	5611143.383	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**115.310**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-21-F MSD

Sample Date/Time: Wednesday, September 17, 2014 11:11:35

Autosampler Position: 63

Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-21-F MSD.072

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.225017**	1.850	5083.598	ug/L	1.920
\>	115	**In-115 (IS)**			490707.304	ug/L	426757.728
⌊	187	**Re**	**470.563070**	2.378	5595278.857	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
\>	**In-115 (IS**	115	**114.985**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-22-D

Sample Date/Time: Wednesday, September 17, 2014 11:15:26

Autosampler Position: 64

Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-22-D.073

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000118**	124.945	4.651	ug/L	1.920
| >	115	**In-115 (IS)**			475188.248	ug/L	426757.728
⌊	187	**Re**	**470.854421**	2.333	5422578.551	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**111.348**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-23-D

Sample Date/Time: Wednesday, September 17, 2014 11:19:19

Autosampler Position: 65

Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-23-D.074

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000123**	43.788	5.017	ug/L	1.920
| >	115	**In-115 (IS)**			487209.476	ug/L	426757.728
⌊	187	**Re**	**462.249964**	1.951	5458653.541	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**114.165**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-24-D

Sample Date/Time: Wednesday, September 17, 2014 11:23:11

Autosampler Position: 66

Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-24-D.075

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000106**	214.532	4.284	ug/L	1.920
| >	115	**In-115 (IS)**			482671.682	ug/L	426757.728
⌊	187	**Re**	**468.732004**	2.851	5481935.256	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**113.102**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-25-D

Sample Date/Time: Wednesday, September 17, 2014 11:27:04
Autosampler Position: 67
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-25-D.076

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000098**	57.515	4.384	ug/L	1.920
| >	115	**In-115 (IS)**			479830.641	ug/L	426757.728
⌊	187	**Re**	**482.197843**	3.573	5602583.362	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**112.436**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-26-D

Sample Date/Time: Wednesday, September 17, 2014 11:30:57

Autosampler Position: 68

Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-26-D.077

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000127**	48.048	5.051	ug/L	1.920
| >	115	**In-115 (IS)**			480367.258	ug/L	426757.728
⌊	187	**Re**	**469.788594**	2.158	5468877.700	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**112.562**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-27-D

Sample Date/Time: Wednesday, September 17, 2014 11:34:50
Autosampler Position: 69
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-27-D.078

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000029**	296.748	2.752	ug/L	1.920
| >	115	**In-115 (IS)**			480701.960	ug/L	426757.728
⌊	187	**Re**	**472.924432**	2.243	5508976.331	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**112.640**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-28-D

Sample Date/Time: Wednesday, September 17, 2014 11:38:43
Autosampler Position: 70
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-28-D.079

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000083**	91.504	3.921	ug/L	1.920
| >	115	**In-115 (IS)**			471389.011	ug/L	426757.728
⌊	187	**Re**	**481.033134**	2.932	5493441.810	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**110.458**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Wednesday, September 17, 2014 11:42:35
Autosampler Position: 2
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 6.080

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.294348**	1.155	5614.361	ug/L	1.920
| >	115	**In-115 (IS)**			414819.803	ug/L	426757.728
⌊	187	**Re**	**514.594126**	2.858	5171082.246	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**100.787**
| >	**In-115 (IS**	115	**97.203**	
⌊	**Re**	187		**102.919**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Wednesday, September 17, 2014 11:46:27
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 7.081

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000360**	63.865	8.689	ug/L	1.920
| >	115	**In-115 (IS)**			412402.974	ug/L	426757.728
⌊	187	**Re**	**0.534350**	5.735	5703.345	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**0.036**
| >	**In-115 (IS**	115	**96.636**	
⌊	**Re**	187		**5.343**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-29-D

Sample Date/Time: Wednesday, September 17, 2014 11:50:19

Autosampler Position: 71

Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-29-D.082

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000200**	26.286	6.525	ug/L	1.920
| >	115	**In-115 (IS)**			478616.698	ug/L	426757.728
⌊	187	**Re**	**479.627216**	2.204	5563208.459	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**112.152**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-30-D

Sample Date/Time: Wednesday, September 17, 2014 11:54:11

Autosampler Position: 72

Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-30-D.083

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000057**	372.547	3.158	ug/L	1.920
| >	115	**In-115 (IS)**			477852.351	ug/L	426757.728
⌊	187	**Re**	**466.095586**	2.151	5398234.334	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**111.973**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8229-A-31-D

Sample Date/Time: Wednesday, September 17, 2014 11:58:03
Autosampler Position: 73
Dataset File: D:\Elandata\Dataset\091714M1\160-8229-A-31-D.084

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000108**	51.720	4.451	ug/L	1.920
| >	115	**In-115 (IS)**			477678.313	ug/L	426757.728
⌊	187	**Re**	**483.587483**	2.984	5594475.105	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**111.932**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 445734

Sample Date/Time: Wednesday, September 17, 2014 12:01:55
Autosampler Position: 74
Dataset File: D:\Elandata\Dataset\091714M1\445734.085

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000156**	80.090	5.487	ug/L	1.920
| >	115	**In-115 (IS)**			473310.253	ug/L	426757.728
⌊	187	**Re**	**506.841688**	3.821	5807999.270	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**110.908**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 445735

Sample Date/Time: Wednesday, September 17, 2014 12:05:47
Autosampler Position: 75
Dataset File: D:\Elandata\Dataset\091714M1\445735.086

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.240023**	1.428	5256.960	ug/L	1.920
\>	115	**In-115 (IS)**			475855.137	ug/L	426757.728
⌊	187	**Re**	**499.025830**	1.818	5755903.834	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
\>	**In-115 (IS**	115	**111.505**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-1-A

Sample Date/Time: Wednesday, September 17, 2014 12:09:40
Autosampler Position: 76
Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-1-A.087

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.165578**	1.279	3601.342	ug/L	1.920
| >	115	**In-115 (IS)**			472883.707	ug/L	426757.728
⌊	187	**Re**	**477.390890**	3.290	5467100.783	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**110.808**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-1-B MS

Sample Date/Time: Wednesday, September 17, 2014 12:13:32
Autosampler Position: 77
Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-1-B MS.088

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.392725**	0.976	8577.807	ug/L	1.920
| >	115	**In-115 (IS)**			474926.360	ug/L	426757.728
⌊	187	**Re**	**495.238230**	3.127	5696453.454	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**111.287**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-1-C MSD

Sample Date/Time: Wednesday, September 17, 2014 12:17:25

Autosampler Position: 78

Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-1-C MSD.089

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.381518**	0.534	8286.540	ug/L	1.920
| >	115	**In-115 (IS)**			472240.021	ug/L	426757.728
⌊	187	**Re**	**489.564059**	3.548	5598643.087	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**110.658**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-2-A

Sample Date/Time: Wednesday, September 17, 2014 12:21:17
Autosampler Position: 79
Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-2-A.090

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.307800**	1.676	6697.165	ug/L	1.920
| >	115	**In-115 (IS)**			472815.002	ug/L	426757.728
⌊	187	**Re**	**487.887104**	2.469	5589460.124	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**110.792**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-3-A

Sample Date/Time: Wednesday, September 17, 2014 12:25:10

Autosampler Position: 80

Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-3-A.091

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.081541**	0.839	1783.129	ug/L	1.920
| >	115	**In-115 (IS)**			475288.974	ug/L	426757.728
⌊	187	**Re**	**493.498298**	4.096	5676275.546	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**111.372**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Wednesday, September 17, 2014 12:29:02

Autosampler Position: 2

Dataset File: D:\Elandata\Dataset\091714M1\QC Std 6.092

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.292556**	2.621	5541.768	ug/L	1.920
| >	115	**In-115 (IS)**			411451.743	ug/L	426757.728
⌊	187	**Re**	**516.065641**	1.714	5148189.690	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**100.173**
| >	**In-115 (IS**	115	**96.413**	
⌊	**Re**	187		**103.213**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Wednesday, September 17, 2014 12:32:54
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 7.093

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000411**	22.034	9.553	ug/L	1.920
| >	115	**In-115 (IS)**			406949.643	ug/L	426757.728
⌊	187	**Re**	**0.512382**	2.559	5436.821	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**0.041**
| >	**In-115 (IS**	115	**95.358**	
⌊	**Re**	187		**5.124**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-4-A

Sample Date/Time: Wednesday, September 17, 2014 12:36:47

Autosampler Position: 81

Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-4-A.094

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.106218**	3.427	2278.470	ug/L	1.920
| >	115	**In-115 (IS)**			465393.528	ug/L	426757.728
⌊	187	**Re**	**495.297651**	1.704	5588136.112	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**109.053**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-5-A

Sample Date/Time: Wednesday, September 17, 2014 12:40:40
Autosampler Position: 82
Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-5-A.095

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.239916**	0.442	5225.085	ug/L	1.920
| >	115	**In-115 (IS)**			473440.120	ug/L	426757.728
⌊	187	**Re**	**482.759200**	2.587	5537544.634	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**110.939**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-6-A

Sample Date/Time: Wednesday, September 17, 2014 12:45:33
Autosampler Position: 83
Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-6-A.096

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.158250**	1.226	3396.492	ug/L	1.920
| >	115	**In-115 (IS)**			466483.510	ug/L	426757.728
⌊	187	**Re**	**497.045812**	2.240	5618664.768	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**109.309**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-7-A

Sample Date/Time: Wednesday, September 17, 2014 12:49:25
Autosampler Position: 84
Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-7-A.097

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.205320**	2.032	4469.457	ug/L	1.920
| >	115	**In-115 (IS)**			472751.159	ug/L	426757.728
⌊	187	**Re**	**502.709545**	2.399	5758546.949	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**110.777**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-8-A

Sample Date/Time: Wednesday, September 17, 2014 12:53:17

Autosampler Position: 85

Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-8-A.098

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.157868**	0.968	3412.300	ug/L	1.920
| >	115	**In-115 (IS)**			469743.022	ug/L	426757.728
⌊	187	**Re**	**492.841570**	2.425	5609297.891	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**110.073**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-9-A

Sample Date/Time: Wednesday, September 17, 2014 12:57:09
Autosampler Position: 86
Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-9-A.099

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.061489**	0.206	1332.145	ug/L	1.920
| >	115	**In-115 (IS)**			470575.482	ug/L	426757.728
⌊	187	**Re**	**495.178963**	2.167	5647167.668	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**110.268**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-10-A

Sample Date/Time: Wednesday, September 17, 2014 13:01:02

Autosampler Position: 87

Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-10-A.100

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.112729**	2.120	2467.066	ug/L	1.920
| >	115	**In-115 (IS)**			476145.547	ug/L	426757.728
⌊	187	**Re**	**478.600929**	2.319	5522010.299	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**111.573**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-11-A

Sample Date/Time: Wednesday, September 17, 2014 13:04:54
Autosampler Position: 88
Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-11-A.101

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.125591**	1.528	2673.704	ug/L	1.920
| >	115	**In-115 (IS)**			462517.949	ug/L	426757.728
⌊	187	**Re**	**497.313038**	2.376	5574236.053	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**108.380**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-12-A

Sample Date/Time: Wednesday, September 17, 2014 13:08:46
Autosampler Position: 89
Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-12-A.102

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.026072**	4.525	563.729	ug/L	1.920
| >	115	**In-115 (IS)**			468083.207	ug/L	426757.728
⌊	187	**Re**	**477.844136**	2.601	5419357.335	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**109.684**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-13-A

Sample Date/Time: Wednesday, September 17, 2014 13:12:39

Autosampler Position: 90

Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-13-A.103

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.078146**	2.554	1690.120	ug/L	1.920
| >	115	**In-115 (IS)**			470242.461	ug/L	426757.728
⌊	187	**Re**	**471.935828**	3.642	5373166.521	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**110.190**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Wednesday, September 17, 2014 13:16:30
Autosampler Position: 2
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 6.104

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.295054**	2.121	5590.820	ug/L	1.920
| >	115	**In-115 (IS)**			411598.841	ug/L	426757.728
⌊	187	**Re**	**524.608897**	0.529	5237819.286	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**101.028**
| >	**In-115 (IS**	115	**96.448**	
⌊	**Re**	187		**104.922**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Wednesday, September 17, 2014 13:20:22
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 7.105

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000370**	26.648	8.787	ug/L	1.920
| >	115	**In-115 (IS)**			411010.545	ug/L	426757.728
⌊	187	**Re**	**0.624385**	7.819	6572.744	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**0.037**
| >	**In-115 (IS**	115	**96.310**	
⌊	**Re**	187		**6.244**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-14-A

Sample Date/Time: Wednesday, September 17, 2014 13:24:14

Autosampler Position: 91

Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-14-A.106

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.052742**	3.776	1144.565	ug/L	1.920
| >	115	**In-115 (IS)**			470302.832	ug/L	426757.728
⌊	187	**Re**	**483.708937**	1.873	5515286.577	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**110.204**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-15-A

Sample Date/Time: Wednesday, September 17, 2014 13:28:07

Autosampler Position: 92

Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-15-A.107

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.150609**	0.579	3191.079	ug/L	1.920
| >	115	**In-115 (IS)**			460686.706	ug/L	426757.728
⌊	187	**Re**	**485.741935**	3.598	5417244.443	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**107.950**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-16-A
Sample Date/Time: Wednesday, September 17, 2014 13:32:00
Autosampler Position: 93
Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-16-A.108

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.012463**	4.827	264.950	ug/L	1.920
| >	115	**In-115 (IS)**			458910.056	ug/L	426757.728
⌊	187	**Re**	**489.077831**	3.661	5433998.807	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**107.534**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-17-A

Sample Date/Time: Wednesday, September 17, 2014 13:35:53

Autosampler Position: 94

Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-17-A.109

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.009041**	7.432	201.989	ug/L	1.920
| >	115	**In-115 (IS)**			478993.138	ug/L	426757.728
⌊	187	**Re**	**472.406164**	2.542	5481558.036	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**112.240**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8251-A-18-A

Sample Date/Time: Wednesday, September 17, 2014 13:39:46

Autosampler Position: 95

Dataset File: D:\Elandata\Dataset\091714M1\160-8251-A-18-A.110

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.006878**	3.841	155.384	ug/L	1.920
>	115	**In-115 (IS)**			483844.761	ug/L	426757.728
⌊	187	**Re**	**464.862101**	2.750	5447818.763	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
>	**In-115 (IS**	115	**113.377**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 449355

Sample Date/Time: Wednesday, September 17, 2014 13:43:38
Autosampler Position: 96
Dataset File: D:\Elandata\Dataset\091714M1\449355.111

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000278**	81.962	8.188	ug/L	1.920
| >	115	**In-115 (IS)**			477015.454	ug/L	426757.728
⌊	187	**Re**	**492.643626**	3.017	5691110.205	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**111.777**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 449356

Sample Date/Time: Wednesday, September 17, 2014 13:47:30
Autosampler Position: 97
Dataset File: D:\Elandata\Dataset\091714M1\449356.112

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.244703**	0.809	5268.226	ug/L	1.920
| >	115	**In-115 (IS)**			467995.795	ug/L	426757.728
⌊	187	**Re**	**503.543610**	2.666	5709352.117	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**109.663**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8324-A-1-A

Sample Date/Time: Wednesday, September 17, 2014 13:51:22
Autosampler Position: 98
Dataset File: D:\Elandata\Dataset\091714M1\160-8324-A-1-A.113

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.003950**	7.005	87.118	ug/L	1.920
| >	115	**In-115 (IS)**			466460.988	ug/L	426757.728
⌊	187	**Re**	**524.612096**	2.446	5929427.287	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**109.303**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8324-A-1-B MS

Sample Date/Time: Wednesday, September 17, 2014 13:55:15
Autosampler Position: 99
Dataset File: D:\Elandata\Dataset\091714M1\160-8324-A-1-B MS.114

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.227189**	0.852	4865.524	ug/L	1.920
| >	115	**In-115 (IS)**			465435.231	ug/L	426757.728
⌊	187	**Re**	**471.801751**	2.494	5320428.096	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**109.063**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8324-A-1-C MSD

Sample Date/Time: Wednesday, September 17, 2014 13:59:07

Autosampler Position: 100

Dataset File: D:\Elandata\Dataset\091714M1\160-8324-A-1-C MSD.115

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.222784**	0.646	4940.679	ug/L	1.920
| >	115	**In-115 (IS)**			482079.965	ug/L	426757.728
⌊	187	**Re**	**463.361441**	3.098	5410128.695	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**112.963**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Wednesday, September 17, 2014 14:02:59

Autosampler Position: 2

Dataset File: D:\Elandata\Dataset\091714M1\QC Std 6.116

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.299944**	0.051	5654.416	ug/L	1.920
| >	115	**In-115 (IS)**			409947.365	ug/L	426757.728
⌊	187	**Re**	**527.630856**	1.909	5242960.208	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**102.703**
| >	**In-115 (IS**	115	**96.061**	
⌊	**Re**	187		**105.526**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Wednesday, September 17, 2014 14:06:51
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 7.117

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000419**	20.395	9.619	ug/L	1.920
| >	115	**In-115 (IS)**			408610.512	ug/L	426757.728
⌊	187	**Re**	**0.650339**	7.575	6792.917	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**0.042**
| >	**In-115 (IS**	115	**95.748**	
⌊	**Re**	187		**6.503**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8324-A-2-A

Sample Date/Time: Wednesday, September 17, 2014 14:10:43
Autosampler Position: 101
Dataset File: D:\Elandata\Dataset\091714M1\160-8324-A-2-A.118

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000988**	21.294	23.187	ug/L	1.920
| >	115	**In-115 (IS)**			466049.697	ug/L	426757.728
⌊	187	**Re**	**475.356814**	2.792	5367461.109	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**109.207**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8324-A-3-A

Sample Date/Time: Wednesday, September 17, 2014 14:14:36
Autosampler Position: 102
Dataset File: D:\Elandata\Dataset\091714M1\160-8324-A-3-A.119

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000410**	4.873	10.922	ug/L	1.920
| >	115	**In-115 (IS)**			468011.651	ug/L	426757.728
⌊	187	**Re**	**465.084057**	3.240	5271516.743	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**109.667**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8324-A-4-A

Sample Date/Time: Wednesday, September 17, 2014 14:18:28
Autosampler Position: 103
Dataset File: D:\Elandata\Dataset\091714M1\160-8324-A-4-A.120

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000441**	37.907	11.253	ug/L	1.920
| >	115	**In-115 (IS)**			461376.000	ug/L	426757.728
⌊	187	**Re**	**481.470104**	3.713	5378040.307	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**108.112**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8324-A-5-A

Sample Date/Time: Wednesday, September 17, 2014 14:22:21
Autosampler Position: 104
Dataset File: D:\Elandata\Dataset\091714M1\160-8324-A-5-A.121

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.002729**	9.786	61.684	ug/L	1.920
| >	115	**In-115 (IS)**			472292.280	ug/L	426757.728
⌊	187	**Re**	**492.728611**	2.959	5637720.727	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**110.670**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8324-A-6-A

Sample Date/Time: Wednesday, September 17, 2014 14:26:14
Autosampler Position: 105
Dataset File: D:\Elandata\Dataset\091714M1\160-8324-A-6-A.122

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.001644**	2.167	37.619	ug/L	1.920
| >	115	**In-115 (IS)**			469370.571	ug/L	426757.728
⌊	187	**Re**	**481.625889**	3.000	5476797.187	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**109.985**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8324-A-7-A

Sample Date/Time: Wednesday, September 17, 2014 14:30:07
Autosampler Position: 106
Dataset File: D:\Elandata\Dataset\091714M1\160-8324-A-7-A.123

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000276**	23.664	8.154	ug/L	1.920
| >	115	**In-115 (IS)**			470514.366	ug/L	426757.728
⌊	187	**Re**	**468.957937**	2.776	5345616.144	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**110.253**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8324-A-8-A

Sample Date/Time: Wednesday, September 17, 2014 14:33:59
Autosampler Position: 107
Dataset File: D:\Elandata\Dataset\091714M1\160-8324-A-8-A.124

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000924**	16.607	22.082	ug/L	1.920
| >	115	**In-115 (IS)**			472750.954	ug/L	426757.728
⌊	187	**Re**	**463.194037**	2.821	5305019.515	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**110.777**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8324-A-9-A

Sample Date/Time: Wednesday, September 17, 2014 14:37:52
Autosampler Position: 108
Dataset File: D:\Elandata\Dataset\091714M1\160-8324-A-9-A.125

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000212**	85.687	6.421	ug/L	1.920
| >	115	**In-115 (IS)**			465811.129	ug/L	426757.728
⌊	187	**Re**	**481.379024**	2.376	5433312.517	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**109.151**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8324-A-10-A

Sample Date/Time: Wednesday, September 17, 2014 14:41:44
Autosampler Position: 109
Dataset File: D:\Elandata\Dataset\091714M1\160-8324-A-10-A.126

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000284**	76.973	8.287	ug/L	1.920
| >	115	**In-115 (IS)**			461986.774	ug/L	426757.728
⌊	187	**Re**	**486.354348**	3.078	5442059.741	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**108.255**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8324-A-11-A

Sample Date/Time: Wednesday, September 17, 2014 14:45:37
Autosampler Position: 110
Dataset File: D:\Elandata\Dataset\091714M1\160-8324-A-11-A.127

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.001975**	4.294	44.320	ug/L	1.920
| >	115	**In-115 (IS)**			465457.736	ug/L	426757.728
⌊	187	**Re**	**481.174588**	3.360	5424051.174	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**109.068**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Wednesday, September 17, 2014 14:49:29
Autosampler Position: 2
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 6.128

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.300049**	0.505	5651.842	ug/L	1.920
| >	115	**In-115 (IS)**			409553.087	ug/L	426757.728
⌊	187	**Re**	**535.682839**	2.193	5317081.816	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**102.739**
| >	**In-115 (IS**	115	**95.969**	
⌊	**Re**	187		**107.137**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Wednesday, September 17, 2014 14:53:21
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 7.129

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000389**	32.757	9.020	ug/L	1.920
| >	115	**In-115 (IS)**			405377.509	ug/L	426757.728
⌊	187	**Re**	**0.788364**	7.939	8093.273	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**0.039**
| >	**In-115 (IS**	115	**94.990**	
⌊	**Re**	187		**7.884**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8324-A-12-A

Sample Date/Time: Wednesday, September 17, 2014 14:57:13
Autosampler Position: 111
Dataset File: D:\Elandata\Dataset\091714M1\160-8324-A-12-A.130

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000862**	22.802	20.154	ug/L	1.920
| >	115	**In-115 (IS)**			461403.104	ug/L	426757.728
⌊	187	**Re**	**477.209097**	1.954	5336724.818	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**108.118**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8324-A-13-A

Sample Date/Time: Wednesday, September 17, 2014 15:01:05
Autosampler Position: 112
Dataset File: D:\Elandata\Dataset\091714M1\160-8324-A-13-A.131

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000386**	25.115	10.385	ug/L	1.920
| >	115	**In-115 (IS)**			466475.544	ug/L	426757.728
⌊	187	**Re**	**464.840742**	3.596	5250439.804	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**109.307**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8324-A-14-A

Sample Date/Time: Wednesday, September 17, 2014 15:04:58
Autosampler Position: 113
Dataset File: D:\Elandata\Dataset\091714M1\160-8324-A-14-A.132

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000373**	29.653	10.185	ug/L	1.920
| >	115	**In-115 (IS)**			466475.476	ug/L	426757.728
⌊	187	**Re**	**474.317486**	1.742	5363328.801	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**109.307**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8297-A-1-C

Sample Date/Time: Wednesday, September 17, 2014 15:08:50
Autosampler Position: 114
Dataset File: D:\Elandata\Dataset\091714M1\160-8297-A-1-C.133

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.014624**	4.789	308.355	ug/L	1.920
| >	115	**In-115 (IS)**			456795.037	ug/L	426757.728
⌊	187	**Re**	**428.250024**	3.234	4737243.809	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**107.038**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8297-A-2-C

Sample Date/Time: Wednesday, September 17, 2014 15:12:43
Autosampler Position: 115
Dataset File: D:\Elandata\Dataset\091714M1\160-8297-A-2-C.134

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.036631**	4.747	797.877	ug/L	1.920
| >	115	**In-115 (IS)**			471323.789	ug/L	426757.728
⌊	187	**Re**	**470.367703**	2.732	5370774.541	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**110.443**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 449750

Sample Date/Time: Wednesday, September 17, 2014 15:16:35
Autosampler Position: 116
Dataset File: D:\Elandata\Dataset\091714M1\449750.135

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000046**	209.667	3.051	ug/L	1.920
>	115	**In-115 (IS)**			472455.592	ug/L	426757.728
⌊	187	**Re**	**500.482161**	1.685	5731488.057	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
>	**In-115 (IS**	115	**110.708**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 449751

Sample Date/Time: Wednesday, September 17, 2014 15:20:28
Autosampler Position: 117
Dataset File: D:\Elandata\Dataset\091714M1\449751.136

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.243842**	1.150	5186.868	ug/L	1.920
\>	115	**In-115 (IS)**			462312.691	ug/L	426757.728
⌊	187	**Re**	**503.805394**	2.095	5645127.635	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
\>	**In-115 (IS**	115	**108.331**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-31-J

Sample Date/Time: Wednesday, September 17, 2014 15:24:21
Autosampler Position: 118
Dataset File: D:\Elandata\Dataset\091714M1\680-102327-A-31-J.137

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000195**	107.067	5.984	ug/L	1.920
| >	115	**In-115 (IS)**			459634.883	ug/L	426757.728
⌊	187	**Re**	**454.431017**	2.414	5061622.537	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**107.704**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-31-K MS

Sample Date/Time: Wednesday, September 17, 2014 15:28:14
Autosampler Position: 119
Dataset File: D:\Elandata\Dataset\091714M1\680-102327-A-31-K MS.138

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.164614**	0.379	3530.331	ug/L	1.920
| >	115	**In-115 (IS)**			466153.678	ug/L	426757.728
⌊	187	**Re**	**435.823017**	3.572	4919753.722	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**109.231**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-31-L MSD

Sample Date/Time: Wednesday, September 17, 2014 15:32:06
Autosampler Position: 120
Dataset File: D:\Elandata\Dataset\091714M1\680-102327-A-31-L MSD.139

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.169930**	2.065	3612.384	ug/L	1.920
| >	115	**In-115 (IS)**			461607.322	ug/L	426757.728
⌊	187	**Re**	**441.476489**	2.811	4936901.863	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**108.166**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Wednesday, September 17, 2014 15:35:58
Autosampler Position: 2
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 6.140

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.302300**	2.282	5469.576	ug/L	1.920
| >	115	**In-115 (IS)**			393014.512	ug/L	426757.728
⌊	187	**Re**	**534.168413**	1.568	5091060.327	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**103.510**
| >	**In-115 (IS**	115	**92.093**	
⌊	**Re**	187		**106.834**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Wednesday, September 17, 2014 15:39:50
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 7.141

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000476**	33.897	10.087	ug/L	1.920
| >	115	**In-115 (IS)**			387205.114	ug/L	426757.728
⌊	187	**Re**	**0.809369**	9.605	7914.200	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**0.048**
| >	**In-115 (IS**	115	**90.732**	
⌊	**Re**	187		**8.094**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102380-A-17-E

Sample Date/Time: Wednesday, September 17, 2014 15:43:42
Autosampler Position: 121
Dataset File: D:\Elandata\Dataset\091714M1\680-102380-A-17-E.142

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000425**	18.819	11.052	ug/L	1.920
>	115	**In-115 (IS)**			463129.902	ug/L	426757.728
⌊	187	**Re**	**440.678163**	1.943	4946787.262	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
>	**In-115 (IS**	115	**108.523**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 450488

Sample Date/Time: Wednesday, September 17, 2014 15:47:35
Autosampler Position: 122
Dataset File: D:\Elandata\Dataset\091714M1\450488.143

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000264**	18.752	7.748	ug/L	1.920
| >	115	**In-115 (IS)**			462043.584	ug/L	426757.728
⌊	187	**Re**	**512.471413**	2.051	5738229.782	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**108.268**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 450489

Sample Date/Time: Wednesday, September 17, 2014 15:51:27
Autosampler Position: 123
Dataset File: D:\Elandata\Dataset\091714M1\450489.144

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.248659**	1.445	5227.814	ug/L	1.920
\>	115	**In-115 (IS)**			456870.393	ug/L	426757.728
⌊	187	**Re**	**517.464769**	1.967	5729809.338	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
\>	**In-115 (IS**	115	**107.056**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-1-A

Sample Date/Time: Wednesday, September 17, 2014 15:55:20
Autosampler Position: 124
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-1-A.145

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.001263**	13.573	28.753	ug/L	1.920
| >	115	**In-115 (IS)**			457929.696	ug/L	426757.728
⌊	187	**Re**	**497.747116**	4.092	5517285.296	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**107.304**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-1-B MS

Sample Date/Time: Wednesday, September 17, 2014 15:59:12
Autosampler Position: 125
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-1-B MS.146

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.243959**	1.136	5092.570	ug/L	1.920
| >	115	**In-115 (IS)**			453595.792	ug/L	426757.728
⌊	187	**Re**	**503.588841**	2.579	5533917.728	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**106.289**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-1-C MSD

Sample Date/Time: Wednesday, September 17, 2014 16:03:05
Autosampler Position: 126
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-1-C MSD.147

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.246076**	1.145	5165.527	ug/L	1.920
>	115	**In-115 (IS)**			456197.654	ug/L	426757.728
⌊	187	**Re**	**506.901311**	2.817	5601763.318	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
>	**In-115 (IS**	115	**106.899**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-2-A

Sample Date/Time: Wednesday, September 17, 2014 16:06:57
Autosampler Position: 127
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-2-A.148

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.006096**	5.793	132.214	ug/L	1.920
| >	115	**In-115 (IS)**			465500.721	ug/L	426757.728
⌊	187	**Re**	**483.522765**	1.905	5458684.942	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**109.078**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-3-A

Sample Date/Time: Wednesday, September 17, 2014 16:10:50
Autosampler Position: 128
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-3-A.149

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.001904**	9.129	42.919	ug/L	1.920
| >	115	**In-115 (IS)**			467838.226	ug/L	426757.728
⌊	187	**Re**	**484.034775**	2.542	5486627.703	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**109.626**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-4-A

Sample Date/Time: Wednesday, September 17, 2014 16:14:43
Autosampler Position: 129
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-4-A.150

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.002209**	17.116	49.852	ug/L	1.920
>	115	**In-115 (IS)**			466440.269	ug/L	426757.728
⌊	187	**Re**	**490.132459**	3.262	5537324.689	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
>	**In-115 (IS**	115	**109.299**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-5-A

Sample Date/Time: Wednesday, September 17, 2014 16:18:36
Autosampler Position: 130
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-5-A.151

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.006904**	1.957	152.020	ug/L	1.920
| >	115	**In-115 (IS)**			472050.692	ug/L	426757.728
⌊	187	**Re**	**484.042911**	1.957	5538657.801	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**110.613**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Wednesday, September 17, 2014 16:22:28
Autosampler Position: 2
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 6.152

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.293342**	1.469	5315.248	ug/L	1.920
>	115	**In-115 (IS)**			393734.872	ug/L	426757.728
⌊	187	**Re**	**516.397378**	1.625	4929456.295	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**100.442**
>	**In-115 (IS**	115	**92.262**	
⌊	**Re**	187		**103.279**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Wednesday, September 17, 2014 16:26:20
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 7.153

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000443**	27.903	9.820	ug/L	1.920
| >	115	**In-115 (IS)**			390374.375	ug/L	426757.728
⌊	187	**Re**	**0.555348**	1.787	5610.883	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**0.044**
| >	**In-115 (IS**	115	**91.474**	
⌊	**Re**	187		**5.553**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-6-A

Sample Date/Time: Wednesday, September 17, 2014 16:30:12
Autosampler Position: 131
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-6-A.154

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.008211**	3.379	173.882	ug/L	1.920
| >	115	**In-115 (IS)**			456096.504	ug/L	426757.728
⌊	187	**Re**	**491.200601**	3.066	5425844.516	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**106.875**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-7-A

Sample Date/Time: Wednesday, September 17, 2014 16:34:05
Autosampler Position: 132
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-7-A.155

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000759**	10.172	17.817	ug/L	1.920
| >	115	**In-115 (IS)**			454370.068	ug/L	426757.728
⌊	187	**Re**	**496.857625**	3.556	5468375.483	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**106.470**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-8-A

Sample Date/Time: Wednesday, September 17, 2014 16:37:58
Autosampler Position: 133
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-8-A.156

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.002200**	2.551	48.423	ug/L	1.920
| >	115	**In-115 (IS)**			457792.859	ug/L	426757.728
⌊	187	**Re**	**503.590940**	3.888	5579995.512	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**107.272**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-9-A

Sample Date/Time: Wednesday, September 17, 2014 16:41:50
Autosampler Position: 134
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-9-A.157

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.002057**	2.925	45.351	ug/L	1.920
| >	115	**In-115 (IS)**			457998.151	ug/L	426757.728
⌊	187	**Re**	**474.792205**	2.880	5268036.790	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**107.320**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-10-A

Sample Date/Time: Wednesday, September 17, 2014 16:45:43
Autosampler Position: 135
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-10-A.158

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.003454**	6.010	74.320	ug/L	1.920
| >	115	**In-115 (IS)**			455518.662	ug/L	426757.728
⌊	187	**Re**	**488.129180**	2.018	5390010.128	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**106.739**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-11-A

Sample Date/Time: Wednesday, September 17, 2014 16:49:36
Autosampler Position: 136
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-11-A.159

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.005740**	2.357	120.582	ug/L	1.920
| >	115	**In-115 (IS)**			449451.139	ug/L	426757.728
⌊	187	**Re**	**506.831253**	2.310	5520234.669	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**105.318**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-12-A

Sample Date/Time: Wednesday, September 17, 2014 16:53:29
Autosampler Position: 137
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-12-A.160

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.003193**	7.814	69.520	ug/L	1.920
| >	115	**In-115 (IS)**			461478.372	ug/L	426757.728
⌊	187	**Re**	**501.053590**	1.588	5605645.579	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**108.136**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-13-A

Sample Date/Time: Wednesday, September 17, 2014 16:57:21
Autosampler Position: 138
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-13-A.161

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.001562**	1.779	34.716	ug/L	1.920
| >	115	**In-115 (IS)**			455452.857	ug/L	426757.728
⌊	187	**Re**	**508.937038**	2.746	5615422.763	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**106.724**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-14-A

Sample Date/Time: Wednesday, September 17, 2014 17:01:14
Autosampler Position: 139
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-14-A.162

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.002651**	5.826	57.055	ug/L	1.920
| >	115	**In-115 (IS)**			452027.105	ug/L	426757.728
⌊	187	**Re**	**501.586767**	3.708	5487771.688	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**105.921**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-15-A

Sample Date/Time: Wednesday, September 17, 2014 17:05:07
Autosampler Position: 140
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-15-A.163

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.001591**	10.115	35.349	ug/L	1.920
| >	115	**In-115 (IS)**			457780.878	ug/L	426757.728
⌊	187	**Re**	**499.852924**	4.095	5538228.271	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**107.269**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Wednesday, September 17, 2014 17:08:59
Autosampler Position: 2
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 6.164

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.297567**	0.866	5324.253	ug/L	1.920
| >	115	**In-115 (IS)**			389105.826	ug/L	426757.728
⌊	187	**Re**	**531.260698**	2.375	5009023.504	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**101.889**
| >	**In-115 (IS**	115	**91.177**	
⌊	**Re**	187		**106.252**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Wednesday, September 17, 2014 17:12:51

Autosampler Position: 1

Dataset File: D:\Elandata\Dataset\091714M1\QC Std 7.165

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000509**	6.117	10.916	ug/L	1.920
| >	115	**In-115 (IS)**			390776.740	ug/L	426757.728
⌊	187	**Re**	**0.525637**	2.261	5333.443	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**0.051**
| >	**In-115 (IS**	115	**91.569**	
⌊	**Re**	187		**5.256**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-16-A

Sample Date/Time: Wednesday, September 17, 2014 17:16:42
Autosampler Position: 141
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-16-A.166

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.005412**	5.452	112.786	ug/L	1.920
| >	115	**In-115 (IS)**			446641.543	ug/L	426757.728
⌊	187	**Re**	**492.152553**	2.751	5325190.165	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**104.659**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-17-A

Sample Date/Time: Wednesday, September 17, 2014 17:20:35
Autosampler Position: 142
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-17-A.167

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.004914**	9.486	105.652	ug/L	1.920
| >	115	**In-115 (IS)**			457123.189	ug/L	426757.728
⌊	187	**Re**	**475.623039**	3.071	5265886.739	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**107.115**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-18-A

Sample Date/Time: Wednesday, September 17, 2014 17:24:28
Autosampler Position: 143
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-18-A.168

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.055126**	1.954	1153.668	ug/L	1.920
| >	115	**In-115 (IS)**			454137.659	ug/L	426757.728
⌊	187	**Re**	**498.138260**	3.449	5478140.475	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**106.416**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-19-A

Sample Date/Time: Wednesday, September 17, 2014 17:28:21
Autosampler Position: 144
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-19-A.169

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.003319**	20.164	73.520	ug/L	1.920
| >	115	**In-115 (IS)**			463904.202	ug/L	426757.728
⌊	187	**Re**	**470.266371**	1.776	5290118.350	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**108.704**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8344-A-20-A

Sample Date/Time: Wednesday, September 17, 2014 17:32:14
Autosampler Position: 145
Dataset File: D:\Elandata\Dataset\091714M1\160-8344-A-20-A.170

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.002978**	3.860	63.684	ug/L	1.920
| >	115	**In-115 (IS)**			449411.381	ug/L	426757.728
⌊	187	**Re**	**499.554348**	2.619	5439312.246	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**105.308**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Wednesday, September 17, 2014 17:36:05
Autosampler Position: 2
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 6.171

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.298863**	2.459	5284.873	ug/L	1.920
| >	115	**In-115 (IS)**			384211.535	ug/L	426757.728
⌊	187	**Re**	**528.502096**	1.602	4922732.772	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**102.333**
| >	**In-115 (IS**	115	**90.030**	
⌊	**Re**	187		**105.700**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Wednesday, September 17, 2014 17:40:40
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 7.172

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000370**	23.769	8.451	ug/L	1.920
| >	115	**In-115 (IS)**			391489.848	ug/L	426757.728
⌊	187	**Re**	**0.440900**	6.388	4531.779	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**0.037**
| >	**In-115 (IS**	115	**91.736**	
⌊	**Re**	187		**4.409**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 446894

Sample Date/Time: Wednesday, September 17, 2014 17:44:37
Autosampler Position: 146
Dataset File: D:\Elandata\Dataset\091714M1\446894.173

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000237**	61.169	7.052	ug/L	1.920
>	115	**In-115 (IS)**			457216.334	ug/L	426757.728
⌊	187	**Re**	**513.027760**	2.488	5683299.477	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
>	**In-115 (IS**	115	**107.137**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 446895

Sample Date/Time: Wednesday, September 17, 2014 17:48:30
Autosampler Position: 147
Dataset File: D:\Elandata\Dataset\091714M1\446895.174

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.246160**	0.957	5111.109	ug/L	1.920
| >	115	**In-115 (IS)**			451354.605	ug/L	426757.728
⌊	187	**Re**	**520.837125**	2.409	5696010.697	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**105.764**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8271-A-1-A

Sample Date/Time: Wednesday, September 17, 2014 17:52:23
Autosampler Position: 148
Dataset File: D:\Elandata\Dataset\091714M1\160-8271-A-1-A.175

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.049795**	1.065	1014.285	ug/L	1.920
| >	115	**In-115 (IS)**			442178.781	ug/L	426757.728
⌊	187	**Re**	**500.616890**	3.099	5361765.873	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**103.614**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8271-A-1-B MS

Sample Date/Time: Wednesday, September 17, 2014 17:56:15
Autosampler Position: 149
Dataset File: D:\Elandata\Dataset\091714M1\160-8271-A-1-B MS.176

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.345179**	1.918	6941.221	ug/L	1.920
| >	115	**In-115 (IS)**			436820.752	ug/L	426757.728
⌊	187	**Re**	**503.367805**	2.761	5327103.768	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**102.358**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8271-A-1-C MSD

Sample Date/Time: Wednesday, September 17, 2014 18:00:08

Autosampler Position: 150

Dataset File: D:\Elandata\Dataset\091714M1\160-8271-A-1-C MSD.177

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.267518**	1.666	5417.650	ug/L	1.920
>	115	**In-115 (IS)**			440085.691	ug/L	426757.728
⌊	187	**Re**	**505.593624**	2.242	5392652.036	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
>	**In-115 (IS**	115	**103.123**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8271-A-2-A

Sample Date/Time: Wednesday, September 17, 2014 18:04:01
Autosampler Position: 151
Dataset File: D:\Elandata\Dataset\091714M1\160-8271-A-2-A.178

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.051240**	0.684	1062.893	ug/L	1.920
| >	115	**In-115 (IS)**			450546.419	ug/L	426757.728
⌊	187	**Re**	**486.446001**	3.482	5306746.205	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**105.574**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8271-A-3-A

Sample Date/Time: Wednesday, September 17, 2014 18:07:54
Autosampler Position: 152
Dataset File: D:\Elandata\Dataset\091714M1\160-8271-A-3-A.179

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.010698**	7.539	225.523	ug/L	1.920
| >	115	**In-115 (IS)**			452889.845	ug/L	426757.728
⌊	187	**Re**	**500.165105**	3.667	5485052.583	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**106.123**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8271-A-4-A

Sample Date/Time: Wednesday, September 17, 2014 18:11:46
Autosampler Position: 153
Dataset File: D:\Elandata\Dataset\091714M1\160-8271-A-4-A.180

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.043624**	0.427	912.383	ug/L	1.920
| >	115	**In-115 (IS)**			453862.788	ug/L	426757.728
⌊	187	**Re**	**496.447199**	1.521	5462720.471	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**106.351**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8271-A-5-A

Sample Date/Time: Wednesday, September 17, 2014 18:15:39
Autosampler Position: 154
Dataset File: D:\Elandata\Dataset\091714M1\160-8271-A-5-A.181

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.067597**	3.215	1381.621	ug/L	1.920
| >	115	**In-115 (IS)**			443235.359	ug/L	426757.728
⌊	187	**Re**	**507.707094**	2.241	5453815.600	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**103.861**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8271-A-6-A

Sample Date/Time: Wednesday, September 17, 2014 18:19:32
Autosampler Position: 155
Dataset File: D:\Elandata\Dataset\091714M1\160-8271-A-6-A.182

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.103466**	1.059	2091.671	ug/L	1.920
| >	115	**In-115 (IS)**			439354.039	ug/L	426757.728
⌊	187	**Re**	**510.187751**	2.913	5429872.695	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**102.952**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Wednesday, September 17, 2014 18:23:25
Autosampler Position: 2
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 6.183

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.293030**	2.867	5176.964	ug/L	1.920
| >	115	**In-115 (IS)**			383712.098	ug/L	426757.728
⌊	187	**Re**	**526.478085**	1.943	4901014.091	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**100.336**
| >	**In-115 (IS**	115	**89.913**	
⌊	**Re**	187		**105.296**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Wednesday, September 17, 2014 18:27:16
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 7.184

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000519**	35.262	10.750	ug/L	1.920
| >	115	**In-115 (IS)**			376877.690	ug/L	426757.728
⌊	187	**Re**	**0.526314**	1.719	5161.026	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**0.052**
| >	**In-115 (IS**	115	**88.312**	
⌊	**Re**	187		**5.263**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8271-A-7-A

Sample Date/Time: Wednesday, September 17, 2014 18:31:09
Autosampler Position: 156
Dataset File: D:\Elandata\Dataset\091714M1\160-8271-A-7-A.185

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.064145**	0.891	1304.610	ug/L	1.920
| >	115	**In-115 (IS)**			441955.141	ug/L	426757.728
⌊	187	**Re**	**500.976371**	3.790	5360112.016	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**103.561**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8271-A-8-A

Sample Date/Time: Wednesday, September 17, 2014 18:35:01
Autosampler Position: 157
Dataset File: D:\Elandata\Dataset\091714M1\160-8271-A-8-A.186

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.052166**	1.909	1059.224	ug/L	1.920
| >	115	**In-115 (IS)**			441201.315	ug/L	426757.728
⌊	187	**Re**	**503.713685**	2.440	5385136.700	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**103.384**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8271-A-9-A

Sample Date/Time: Wednesday, September 17, 2014 18:38:54
Autosampler Position: 158
Dataset File: D:\Elandata\Dataset\091714M1\160-8271-A-9-A.187

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.042319**	1.055	869.577	ug/L	1.920
>	115	**In-115 (IS)**			445909.604	ug/L	426757.728
⌊	187	**Re**	**490.102255**	2.931	5294493.966	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
>	**In-115 (IS**	115	**104.488**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8271-A-10-A

Sample Date/Time: Wednesday, September 17, 2014 18:42:47
Autosampler Position: 159
Dataset File: D:\Elandata\Dataset\091714M1\160-8271-A-10-A.188

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.078120**	1.935	1614.711	ug/L	1.920
| >	115	**In-115 (IS)**			448752.970	ug/L	426757.728
⌊	187	**Re**	**490.990088**	2.262	5339861.235	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**105.154**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8271-A-11-A

Sample Date/Time: Wednesday, September 17, 2014 18:46:40
Autosampler Position: 160
Dataset File: D:\Elandata\Dataset\091714M1\160-8271-A-11-A.189

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.036954**	2.957	755.069	ug/L	1.920
| >	115	**In-115 (IS)**			442581.068	ug/L	426757.728
⌊	187	**Re**	**492.314841**	2.943	5277558.209	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**103.708**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8271-A-12-A

Sample Date/Time: Wednesday, September 17, 2014 18:50:33

Autosampler Position: 161

Dataset File: D:\Elandata\Dataset\091714M1\160-8271-A-12-A.190

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.062821**	0.841	1260.948	ug/L	1.920
>	115	**In-115 (IS)**			436161.652	ug/L	426757.728
⌊	187	**Re**	**512.855633**	3.067	5417499.943	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
>	**In-115 (IS**	115	**102.204**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8271-A-13-A

Sample Date/Time: Wednesday, September 17, 2014 18:54:26
Autosampler Position: 162
Dataset File: D:\Elandata\Dataset\091714M1\160-8271-A-13-A.191

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.020680**	2.426	424.090	ug/L	1.920
| >	115	**In-115 (IS)**			444135.416	ug/L	426757.728
⌊	187	**Re**	**494.460983**	4.073	5317377.341	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**104.072**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8271-A-14-A

Sample Date/Time: Wednesday, September 17, 2014 18:58:18
Autosampler Position: 163
Dataset File: D:\Elandata\Dataset\091714M1\160-8271-A-14-A.192

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.064313**	1.025	1306.644	ug/L	1.920
| >	115	**In-115 (IS)**			441026.281	ug/L	426757.728
⌊	187	**Re**	**504.000881**	2.779	5385047.350	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**103.343**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-8271-A-15-A

Sample Date/Time: Wednesday, September 17, 2014 19:02:11
Autosampler Position: 164
Dataset File: D:\Elandata\Dataset\091714M1\160-8271-A-15-A.193

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.093222**	3.209	1905.211	ug/L	1.920
| >	115	**In-115 (IS)**			443613.502	ug/L	426757.728
⌊	187	**Re**	**497.327600**	1.735	5348057.382	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		
| >	**In-115 (IS**	115	**103.950**	
⌊	**Re**	187		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Wednesday, September 17, 2014 19:06:04

Autosampler Position: 2

Dataset File: D:\Elandata\Dataset\091714M1\QC Std 6.194

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.297586**	0.333	5257.799	ug/L	1.920
>	115	**In-115 (IS)**			384273.483	ug/L	426757.728
⌊	187	**Re**	**538.346169**	2.351	5013112.550	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**101.896**
>	**In-115 (IS**	115	**90.045**	
⌊	**Re**	187		**107.669**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Wednesday, September 17, 2014 19:09:55
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\091714M1\QC Std 7.195

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
⌈	99	**Tc**	**0.000371**	25.507	8.156	ug/L	1.920
\>	115	**In-115 (IS)**			376993.645	ug/L	426757.728
⌊	187	**Re**	**0.624003**	7.018	6077.308	ug/L	388.864

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
⌈	**Tc**	99		**0.037**
\>	**In-115 (IS**	115	**88.339**	
⌊	**Re**	187		**6.240**

QC Out Of Limits

Analyte Mass Out of Limits Message

METALS BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102380-4

SDG No.: 680102380-1

Batch Number: 143794 Batch Start Date: 09/12/14 13:53 Batch Analyst: Minier, Mark F

Batch Method: None Batch End Date: 09/15/14 14:30

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	FinalAmount	TC99 RE TRACE 00019	TC99-PREP 00004		
MB 160-143794/1		None, 6020A		5.1140 g	50 mL	0.5 mL			
LCS 160-143794/2		None, 6020A		5.0344 g	50 mL	0.5 mL	0.1 mL		
680-102380-A-17	SD-228-01	None, 6020A	T	5.0278 g	50 mL	0.5 mL			

Batch Notes	
Balance ID	27050421
Person's name who witnessed reagent drop	JWM
Analyst who added reagent	MFM
SOP Number	ST-RC-0125

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.19
Client Contact: Mike Martin	Phone: (703)342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: ~~Page 19 of 46~~ Page 1 of 4
Company: Tetra Tech, Inc.				Job #: 680-102380
Address: 20251 Century Blvd Suite 200	Due Date Requested:			
City: Germantown	TAT Requested (days):			
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			
Email: MIchael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	8020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-224-SS	6/13/14	0820	C	Solid				X				
SD-224-01		0825	C	Solid				X				
SD-224-02		0830	C	Solid				X				
SD-224-03		0835	C	Solid				X				Hold Pending Analysis of SS to 02
SD-223-SS		0840	C	Solid				X				
SD-223-01		0845	C	Solid				X				
SD-223-02		0850	C	Solid				X				
SD-226-SS		0855	C	Solid				X				
SD-226-01		0900	C	Solid				X				
SD-226-02		0905	C	Solid				X				
SD-226-03		0910	C	Solid				X				Hold Pending Analysis of SS to 02

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6/13/14 -			6/13/14 1430	TestAmerica
2		6/13/14 1800	TestAmerica		6/14/14 0830	TA
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.22
Client Contact: Mike Martin	Phone: (703) 342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~22 of 48~~ 2 of 4
Company: Tetra Tech, Inc.				Job #: 680-102380
Address: 20251 Century Blvd Suite 200	Due Date Requested:			
City: Germantown	TAT Requested (days):			
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			
Email: Michael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	9020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:		N	N				N		
SD-225-55	6/13/14	0915	C	Solid				X				
SD-225-01		0928	C	Solid				X				
SD-225-02		0925	C	Solid				X				
SD-225-03		0930	C	Solid				X				Hold Pending Analysis of SS to Q
SD-228-55		1005	C	Solid				X				
SD-228-01		1010	C	Solid				X				
SD-228-02		1015	C	Solid				X				
SD-228-03		1020	C	Solid				X				Hold Pending Analysis of SS to Q
SD-234-55		1030	C	Solid				X				
SD-234-01		1035	C	Solid				X				
SD-235-55		1100	C	Solid				X				

Page 250 of 252

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:		Date:		Time:		Method of Shipment:	
Relinquished by:	Date/Time: 6/13/14	Company TT	Received by:	Date/Time: 6/13/14 1430	Company TT		
Relinquished by:	Date/Time: 6/13/14 1800	Company TestAmerica	Received by:	Date/Time: 6/14/14 0830	Company TA		
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company		

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.24
Client Contact: Mike Martin	Phone: (703)342-8889	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~24 of 46~~ 3 of 4
Company: Tetra Tech, Inc.				Job #: 680-102380
Address: 20251 Century Blvd Suite 200	Due Date Requested:	Analysis Requested		
City: Germantown	TAT Requested (days): Standard			
State, Zip: MD, 20874	PO #: Purchase Order not required			
Phone:	WO #:			
Email: Michael.Martin@tetratech.com	Project #: 68012942			
Project Name: Sediments	SSOW#:			
Site:				

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-228/228	Total Number of containers	Special Instructions/Note:
			Preservation Codes:		N	N	N	N	N	N		
SD-235-01	6/8/14	1105	C	Solid				X				
SD-235-02		1110	C	Solid				X				
SD-235-03		1115	C	Solid				X				Hold Pending Analysis of SS to 03
SD-236-SS		1205	C	Solid				X				
SD-236-01		1210	C	Solid				X				
SD-236-02		1215	C	Solid				X				
SD-237-SS		1230	C	Solid				X				
SD-237-01		1235	C	Solid				X				
SD-237-02		1240	C	Solid				X				
SD-237-03		1245	C	Solid				X				Hold pending Analysis of SS to 02
SD-DUP05	↓	0000	C	Solid				X				

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6/13/14 -	TT		6/15/14 1430	TT
2		6/15/14 1800	TT		6/18/14 0930	TT
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

RAO

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Gneran	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.26
Client Contact: Mike Martin	Phone: (703) 341-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~26 of 46~~ 4 of 4
Company: Tetra Tech, Inc.				Job #: 680-102380
Address: 20251 Century Blvd Suite 200	Due Date Requested:		Analysis Requested	Preservation Codes:
City: Germantown	TAT Requested (days): Standard			A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			Other:
Email: Michael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-227-SS	6/13/14	1310	C	Solid				X				
SD-227-01	↓	1315	C	Solid				X				
SD-227-02	↓	1320	C	Solid				X				
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6/13/14 -	TT		6/15/14 1430	TT
2		6/15/14 1800	TT		6/16/14 0830	TT
3		Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: △ Yes △ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 680-102431-1

SDG Number: 680-102431-1

Job Description: Sediments

For:
Tetra Tech, Inc.
20251 Century Blvd
Suite 200
Germantown, MD 20874

Attention: Mike Martin



Approved for release.
Jerry A Lanier
Project Manager I
7/31/2014 11:08 AM

Jerry A Lanier, Project Manager I
5102 LaRoche Avenue, Savannah, GA, 31404
(912)354-7858 e.3410
jerry.lanier@testamericainc.com
07/31/2014

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

Savannah Certifications and ID #s: A2LA: 0399.01; AL: 41450; ARDEQ: 88-0692; ARDOH; AZ: AZ0741; CA: 03217CA; CO; CT: PH0161; DE; FL: E87052; GA: 803; Guam; HI; IL: 200022; IN: C-GA-02; IA: 353; KS: E-10322; KY EPPC: 90084; KY UST; LA DEQ: 30690; LA DHH: LA080008; ME: 2008022; MD: 250; MA: M-GA006; MI: 9925; MS; NFESC: 249; NV: GA00006; NJ: GA769; NM; NY: 10842; NC DWQ: 269; NC DHHS: 13701; PA: 68-00474; PR: GA00006; RI: LAO00244; SC: 98001001; TN: TN0296; TX: T104704185; USEPA: GA00006; VT: VT-87052; VA: 00302; WA; WV DEP: 094; WV DHHR: 9950 C; WI DNR: 999819810; WY/EPAR8: 8TMS-Q

Table of Contents

Cover Title Page 1

Data Summaries 3

- Definitions 3
- Case Narrative 4
- Detection Summary 5
- Client Sample Results 6
- Tracer/Carrier Summary 10
- QC Sample Results 11
- QC Association 12
- Chronicle 13
- Certification Summary 16
- Method Summary 18
- Sample Summary 19
- Reagent Traceability 20
  - COAs 22

Radiochemistry Raw Data 87

- Alpha Spectroscopy 87
  - Method A-01-R Th 88
  - Daily Checks 124
  - Initial Calibrations 143
  - Monthly Calibration Verifications 184
  - Monthly Backgrounds 203
  - Run Logs 240

Shipping and Receiving Documents 245

- Client Chain of Custody 245

Qualifiers

Rad

Qualifier	Qualifier Description
F1	MS and/or MSD Recovery exceeds the control limits
U	Result is less than the sample detection limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Sediments

Report Number: 680-102431-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 06/17/2014; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 2.6 C.

ISOTOPIC THORIUM

Samples SD-229-SS (680-102431-1), SD-229-01 (680-102431-2), SD-230-SS (680-102431-3), SD-230-01 (680-102431-4), SD-230-02 (680-102431-5), SD-231-SS (680-102431-7), SD-231-01 (680-102431-8), SD-231-02 (680-102431-9), SD-232-SS (680-102431-11), SD-232-01 (680-102431-12), SD-232-02 (680-102431-13), SD-233-SS (680-102431-15), SD-233-01 (680-102431-16) and SD-233-02 (680-102431-17) were analyzed for Isotopic Thorium in accordance with A01R_Th. The samples were leached on 06/19/2014, prepared on 06/24/2014 and analyzed on 07/02/2014.

The matrix spike duplicate (MSD) recovery associated with the following samples was just outside the upper control limit of 115% (116%): SD-231-01 (680-102431-8). Sample matrix interference is suspected because the associated matrix spike (MS) and laboratory control sample (LCS) spike recoveries were within acceptance limits.

Refer to the QC report for details.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102431-1
SDG: 680-102431-1

Client Sample ID: SD-229-SS — **Lab Sample ID: 680-102431-1**

No Detections.

Client Sample ID: SD-229-01 — **Lab Sample ID: 680-102431-2**

No Detections.

Client Sample ID: SD-230-SS — **Lab Sample ID: 680-102431-3**

No Detections.

Client Sample ID: SD-230-01 — **Lab Sample ID: 680-102431-4**

No Detections.

Client Sample ID: SD-230-02 — **Lab Sample ID: 680-102431-5**

No Detections.

Client Sample ID: SD-231-SS — **Lab Sample ID: 680-102431-7**

No Detections.

Client Sample ID: SD-231-01 — **Lab Sample ID: 680-102431-8**

No Detections.

Client Sample ID: SD-231-02 — **Lab Sample ID: 680-102431-9**

No Detections.

Client Sample ID: SD-232-SS — **Lab Sample ID: 680-102431-11**

No Detections.

Client Sample ID: SD-232-01 — **Lab Sample ID: 680-102431-12**

No Detections.

Client Sample ID: SD-232-02 — **Lab Sample ID: 680-102431-13**

No Detections.

Client Sample ID: SD-233-SS — **Lab Sample ID: 680-102431-15**

No Detections.

Client Sample ID: SD-233-01 — **Lab Sample ID: 680-102431-16**

No Detections.

Client Sample ID: SD-233-02 — **Lab Sample ID: 680-102431-17**

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: SD-229-SS

Lab Sample ID: 680-102431-1

Date Collected: 06/16/14 12:05

Matrix: Solid

Date Received: 06/17/14 09:20

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.842		0.204	0.216	1.00	0.0895	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-230	1.02		0.225	0.241	1.00	0.0896	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-232	0.837		0.202	0.214	1.00	0.0686	pCi/g	06/24/14 15:13	07/02/14 18:11	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*78.3*		*30 - 110*	*06/24/14 15:13*	*07/02/14 18:11*	*1*

Client Sample ID: SD-229-01

Lab Sample ID: 680-102431-2

Date Collected: 06/16/14 12:10

Matrix: Solid

Date Received: 06/17/14 09:20

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.964		0.212	0.227	1.00	0.103	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-230	0.683		0.177	0.186	1.00	0.0763	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-232	1.04		0.215	0.232	1.00	0.0542	pCi/g	06/24/14 15:13	07/02/14 18:11	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*86.1*		*30 - 110*	*06/24/14 15:13*	*07/02/14 18:11*	*1*

Client Sample ID: SD-230-SS

Lab Sample ID: 680-102431-3

Date Collected: 06/16/14 13:40

Matrix: Solid

Date Received: 06/17/14 09:20

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.547		0.156	0.163	1.00	0.0766	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-230	0.638		0.167	0.176	1.00	0.0698	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-232	0.570		0.158	0.165	1.00	0.0695	pCi/g	06/24/14 15:13	07/02/14 18:11	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*86.5*		*30 - 110*	*06/24/14 15:13*	*07/02/14 18:11*	*1*

Client Sample ID: SD-230-01

Lab Sample ID: 680-102431-4

Date Collected: 06/16/14 13:45

Matrix: Solid

Date Received: 06/17/14 09:20

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.535		0.153	0.159	1.00	0.0751	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-230	0.706		0.173	0.183	1.00	0.0481	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-232	0.522		0.149	0.155	1.00	0.0546	pCi/g	06/24/14 15:13	07/02/14 18:11	1

Client Sample ID: SD-230-01

Lab Sample ID: 680-102431-4

Date Collected: 06/16/14 13:45

Matrix: Solid

Date Received: 06/17/14 09:20

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*90.7*		*30 - 110*	*06/24/14 15:13*	*07/02/14 18:11*	*1*

Client Sample ID: SD-230-02

Lab Sample ID: 680-102431-5

Date Collected: 06/16/14 13:50

Matrix: Solid

Date Received: 06/17/14 09:20

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.733**		0.183	0.193	1.00	0.0983	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-230	**0.673**		0.172	0.181	1.00	0.0567	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-232	**0.583**		0.160	0.168	1.00	0.0663	pCi/g	06/24/14 15:13	07/02/14 18:11	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*85.9*		*30 - 110*	*06/24/14 15:13*	*07/02/14 18:11*	*1*

Client Sample ID: SD-231-SS

Lab Sample ID: 680-102431-7

Date Collected: 06/16/14 14:10

Matrix: Solid

Date Received: 06/17/14 09:20

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.639**		0.166	0.174	1.00	0.0903	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-230	**0.857**		0.188	0.201	1.00	0.0470	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-232	**0.774**		0.178	0.190	1.00	0.0465	pCi/g	06/24/14 15:13	07/02/14 18:11	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*92.5*		*30 - 110*	*06/24/14 15:13*	*07/02/14 18:11*	*1*

Client Sample ID: SD-231-01

Lab Sample ID: 680-102431-8

Date Collected: 06/16/14 14:15

Matrix: Solid

Date Received: 06/17/14 09:20

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	**0.931**		0.211	0.225	1.00	0.0830	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-230	**1.23**		0.241	0.262	1.00	0.0607	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-232	**1.19**		0.235	0.255	1.00	0.0349	pCi/g	06/24/14 15:13	07/02/14 18:11	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*81.6*		*30 - 110*	*06/24/14 15:13*	*07/02/14 18:11*	*1*

Client Sample ID: SD-231-02

Lab Sample ID: 680-102431-9

Date Collected: 06/16/14 14:20

Matrix: Solid

Date Received: 06/17/14 09:20

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.878		0.199	0.212	1.00	0.106	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-230	0.889		0.196	0.210	1.00	0.0725	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-232	1.06		0.212	0.230	1.00	0.0430	pCi/g	06/24/14 15:13	07/02/14 18:11	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*92.5*		*30 - 110*	*06/24/14 15:13*	*07/02/14 18:11*	*1*

Client Sample ID: SD-232-SS

Lab Sample ID: 680-102431-11

Date Collected: 06/16/14 15:20

Matrix: Solid

Date Received: 06/17/14 09:20

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.21		0.238	0.258	1.00	0.0904	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-230	1.30		0.244	0.267	1.00	0.0650	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-232	1.21		0.235	0.256	1.00	0.0517	pCi/g	06/24/14 15:13	07/02/14 18:11	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*79.3*		*30 - 110*	*06/24/14 15:13*	*07/02/14 18:11*	*1*

Client Sample ID: SD-232-01

Lab Sample ID: 680-102431-12

Date Collected: 06/16/14 15:25

Matrix: Solid

Date Received: 06/17/14 09:20

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.38		0.260	0.284	1.00	0.121	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-230	1.22		0.240	0.261	1.00	0.0612	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-232	1.37		0.253	0.278	1.00	0.0609	pCi/g	06/24/14 15:13	07/02/14 18:11	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*78.9*		*30 - 110*	*06/24/14 15:13*	*07/02/14 18:11*	*1*

Client Sample ID: SD-232-02

Lab Sample ID: 680-102431-13

Date Collected: 06/16/14 15:30

Matrix: Solid

Date Received: 06/17/14 09:20

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.20		0.245	0.265	1.00	0.111	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-230	1.21		0.243	0.263	1.00	0.0859	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-232	1.11		0.232	0.250	1.00	0.0625	pCi/g	06/24/14 15:13	07/02/14 18:11	1

Client Sample ID: SD-232-02

Lab Sample ID: 680-102431-13

Date Collected: 06/16/14 15:30

Matrix: Solid

Date Received: 06/17/14 09:20

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	80.3		30 - 110	06/24/14 15:13	07/02/14 18:11	1

Client Sample ID: SD-233-SS

Lab Sample ID: 680-102431-15

Date Collected: 06/16/14 15:40

Matrix: Solid

Date Received: 06/17/14 09:20

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.06		0.223	0.240	1.00	0.0873	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-230	1.06		0.220	0.237	1.00	0.0649	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-232	1.24		0.238	0.260	1.00	0.0666	pCi/g	06/24/14 15:13	07/02/14 18:11	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	80.4		30 - 110	06/24/14 15:13	07/02/14 18:11	1

Client Sample ID: SD-233-01

Lab Sample ID: 680-102431-16

Date Collected: 06/16/14 15:45

Matrix: Solid

Date Received: 06/17/14 09:20

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.967		0.213	0.228	1.00	0.0846	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-230	0.971		0.211	0.226	1.00	0.0521	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-232	1.38		0.251	0.276	1.00	0.0519	pCi/g	06/24/14 15:13	07/02/14 18:11	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	85.8		30 - 110	06/24/14 15:13	07/02/14 18:11	1

Client Sample ID: SD-233-02

Lab Sample ID: 680-102431-17

Date Collected: 06/16/14 15:50

Matrix: Solid

Date Received: 06/17/14 09:20

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.19		0.238	0.258	1.00	0.0921	pCi/g	06/24/14 15:13	07/02/14 18:12	1
Thorium-230	1.11		0.228	0.247	1.00	0.0711	pCi/g	06/24/14 15:13	07/02/14 18:12	1
Thorium-232	1.25		0.241	0.263	1.00	0.0634	pCi/g	06/24/14 15:13	07/02/14 18:12	1

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	81.4		30 - 110	06/24/14 15:13	07/02/14 18:12	1

Tracer/Carrier Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102431-1
SDG: 680-102431-1

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
		Th-229
Lab Sample ID	Client Sample ID	(30-110)
680-102431-1	SD-229-SS	78.3
680-102431-2	SD-229-01	86.1
680-102431-3	SD-230-SS	86.5
680-102431-4	SD-230-01	90.7
680-102431-5	SD-230-02	85.9
680-102431-5 MS	SD-230-02	85.9
680-102431-5 MSD	SD-230-02	93.0
680-102431-7	SD-231-SS	92.5
680-102431-8	SD-231-01	81.6
680-102431-9	SD-231-02	92.5
680-102431-11	SD-232-SS	79.3
680-102431-12	SD-232-01	78.9
680-102431-13	SD-232-02	80.3
680-102431-15	SD-233-SS	80.4
680-102431-16	SD-233-01	85.8
680-102431-17	SD-233-02	81.4
LCS 160-128417/2-A	Lab Control Sample	85.3
MB 160-128417/1-A	Method Blank	92.2

Tracer/Carrier Legend

Th-229 = Thorium-229

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Lab Sample ID: MB 160-128417/1-A
Matrix: Solid
Analysis Batch: 129499

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 128417

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	-0.009679	U	0.00858	0.00862	1.00	0.0660	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-230	0.03903	U	0.0410	0.0411	1.00	0.0462	pCi/g	06/24/14 15:13	07/02/14 18:11	1
Thorium-232	0.008210	U	0.0206	0.0206	1.00	0.0460	pCi/g	06/24/14 15:13	07/02/14 18:11	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*92.2*		*30 - 110*	*06/24/14 15:13*	*07/02/14 18:11*	*1*

Lab Sample ID: LCS 160-128417/2-A
Matrix: Solid
Analysis Batch: 129502

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 128417

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Thorium-230			24.5	25.66		2.63	1.00	0.170	pCi/g	105	81 - 118		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*85.3*		*30 - 110*

Lab Sample ID: 680-102431-5 MS
Matrix: Solid
Analysis Batch: 129510

Client Sample ID: SD-230-02
Prep Type: Total/NA
Prep Batch: 128417

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Thorium-230	0.673		4.33	5.500		0.676	1.00	0.0873	pCi/g	111	76 - 115		

Tracer	*MS %Yield*	*MS Qualifier*	*Limits*
Thorium-229	*85.9*		*30 - 110*

Lab Sample ID: 680-102431-5 MSD
Matrix: Solid
Analysis Batch: 129513

Client Sample ID: SD-230-02
Prep Type: Total/NA
Prep Batch: 128417

Analyte	Sample Result	Sample Qual	Spike Added	MSD Result	MSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Thorium-230	0.673		4.31	5.655	F1	0.676	1.00	0.0662	pCi/g	116	76 - 115	0.11	1

Tracer	*MSD %Yield*	*MSD Qualifier*	*Limits*
Thorium-229	*93.0*		*30 - 110*

Rad

Leach Batch: 127643

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102431-1	SD-229-SS	Total/NA	Solid	Dry and Grind	
680-102431-2	SD-229-01	Total/NA	Solid	Dry and Grind	
680-102431-3	SD-230-SS	Total/NA	Solid	Dry and Grind	
680-102431-4	SD-230-01	Total/NA	Solid	Dry and Grind	
680-102431-5	SD-230-02	Total/NA	Solid	Dry and Grind	
680-102431-5 MS	SD-230-02	Total/NA	Solid	Dry and Grind	
680-102431-5 MSD	SD-230-02	Total/NA	Solid	Dry and Grind	
680-102431-7	SD-231-SS	Total/NA	Solid	Dry and Grind	
680-102431-8	SD-231-01	Total/NA	Solid	Dry and Grind	
680-102431-9	SD-231-02	Total/NA	Solid	Dry and Grind	
680-102431-11	SD-232-SS	Total/NA	Solid	Dry and Grind	
680-102431-12	SD-232-01	Total/NA	Solid	Dry and Grind	
680-102431-13	SD-232-02	Total/NA	Solid	Dry and Grind	
680-102431-15	SD-233-SS	Total/NA	Solid	Dry and Grind	
680-102431-16	SD-233-01	Total/NA	Solid	Dry and Grind	
680-102431-17	SD-233-02	Total/NA	Solid	Dry and Grind	

Prep Batch: 128417

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102431-1	SD-229-SS	Total/NA	Solid	ExtChrom	127643
680-102431-2	SD-229-01	Total/NA	Solid	ExtChrom	127643
680-102431-3	SD-230-SS	Total/NA	Solid	ExtChrom	127643
680-102431-4	SD-230-01	Total/NA	Solid	ExtChrom	127643
680-102431-5	SD-230-02	Total/NA	Solid	ExtChrom	127643
680-102431-5 MS	SD-230-02	Total/NA	Solid	ExtChrom	127643
680-102431-5 MSD	SD-230-02	Total/NA	Solid	ExtChrom	127643
680-102431-7	SD-231-SS	Total/NA	Solid	ExtChrom	127643
680-102431-8	SD-231-01	Total/NA	Solid	ExtChrom	127643
680-102431-9	SD-231-02	Total/NA	Solid	ExtChrom	127643
680-102431-11	SD-232-SS	Total/NA	Solid	ExtChrom	127643
680-102431-12	SD-232-01	Total/NA	Solid	ExtChrom	127643
680-102431-13	SD-232-02	Total/NA	Solid	ExtChrom	127643
680-102431-15	SD-233-SS	Total/NA	Solid	ExtChrom	127643
680-102431-16	SD-233-01	Total/NA	Solid	ExtChrom	127643
680-102431-17	SD-233-02	Total/NA	Solid	ExtChrom	127643
LCS 160-128417/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-128417/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102431-1
SDG: 680-102431-1

Client Sample ID: SD-229-SS
Lab Sample ID: 680-102431-1
Date Collected: 06/16/14 12:05
Matrix: Solid
Date Received: 06/17/14 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127643	06/19/14 11:27	DRO	TAL SL
Total/NA	Prep	ExtChrom			128417	06/24/14 15:13	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129505	07/02/14 18:11	MLK	TAL SL

Client Sample ID: SD-229-01
Lab Sample ID: 680-102431-2
Date Collected: 06/16/14 12:10
Matrix: Solid
Date Received: 06/17/14 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127643	06/19/14 11:27	DRO	TAL SL
Total/NA	Prep	ExtChrom			128417	06/24/14 15:13	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129506	07/02/14 18:11	MLK	TAL SL

Client Sample ID: SD-230-SS
Lab Sample ID: 680-102431-3
Date Collected: 06/16/14 13:40
Matrix: Solid
Date Received: 06/17/14 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127643	06/19/14 11:27	DRO	TAL SL
Total/NA	Prep	ExtChrom			128417	06/24/14 15:13	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129507	07/02/14 18:11	MLK	TAL SL

Client Sample ID: SD-230-01
Lab Sample ID: 680-102431-4
Date Collected: 06/16/14 13:45
Matrix: Solid
Date Received: 06/17/14 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127643	06/19/14 11:27	DRO	TAL SL
Total/NA	Prep	ExtChrom			128417	06/24/14 15:13	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129508	07/02/14 18:11	MLK	TAL SL

Client Sample ID: SD-230-02
Lab Sample ID: 680-102431-5
Date Collected: 06/16/14 13:50
Matrix: Solid
Date Received: 06/17/14 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127643	06/19/14 11:27	DRO	TAL SL
Total/NA	Prep	ExtChrom			128417	06/24/14 15:13	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129509	07/02/14 18:11	MLK	TAL SL

Client Sample ID: SD-231-SS
Lab Sample ID: 680-102431-7

Date Collected: 06/16/14 14:10
Matrix: Solid
Date Received: 06/17/14 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127643	06/19/14 11:27	DRO	TAL SL
Total/NA	Prep	ExtChrom			128417	06/24/14 15:13	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129514	07/02/14 18:11	MLK	TAL SL

Client Sample ID: SD-231-01
Lab Sample ID: 680-102431-8

Date Collected: 06/16/14 14:15
Matrix: Solid
Date Received: 06/17/14 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127643	06/19/14 11:27	DRO	TAL SL
Total/NA	Prep	ExtChrom			128417	06/24/14 15:13	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	133832	07/02/14 18:11	MLK	TAL SL

Client Sample ID: SD-231-02
Lab Sample ID: 680-102431-9

Date Collected: 06/16/14 14:20
Matrix: Solid
Date Received: 06/17/14 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127643	06/19/14 11:27	DRO	TAL SL
Total/NA	Prep	ExtChrom			128417	06/24/14 15:13	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129516	07/02/14 18:11	MLK	TAL SL

Client Sample ID: SD-232-SS
Lab Sample ID: 680-102431-11

Date Collected: 06/16/14 15:20
Matrix: Solid
Date Received: 06/17/14 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127643	06/19/14 11:27	DRO	TAL SL
Total/NA	Prep	ExtChrom			128417	06/24/14 15:13	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129517	07/02/14 18:11	MLK	TAL SL

Client Sample ID: SD-232-01
Lab Sample ID: 680-102431-12

Date Collected: 06/16/14 15:25
Matrix: Solid
Date Received: 06/17/14 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127643	06/19/14 11:27	DRO	TAL SL
Total/NA	Prep	ExtChrom			128417	06/24/14 15:13	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129518	07/02/14 18:11	MLK	TAL SL

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102431-1
SDG: 680-102431-1

Client Sample ID: SD-232-02

Lab Sample ID: 680-102431-13

Date Collected: 06/16/14 15:30

Matrix: Solid

Date Received: 06/17/14 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127643	06/19/14 11:27	DRO	TAL SL
Total/NA	Prep	ExtChrom			128417	06/24/14 15:13	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129519	07/02/14 18:11	MLK	TAL SL

Client Sample ID: SD-233-SS

Lab Sample ID: 680-102431-15

Date Collected: 06/16/14 15:40

Matrix: Solid

Date Received: 06/17/14 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127643	06/19/14 11:27	DRO	TAL SL
Total/NA	Prep	ExtChrom			128417	06/24/14 15:13	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129520	07/02/14 18:11	MLK	TAL SL

Client Sample ID: SD-233-01

Lab Sample ID: 680-102431-16

Date Collected: 06/16/14 15:45

Matrix: Solid

Date Received: 06/17/14 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127643	06/19/14 11:27	DRO	TAL SL
Total/NA	Prep	ExtChrom			128417	06/24/14 15:13	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129522	07/02/14 18:11	MLK	TAL SL

Client Sample ID: SD-233-02

Lab Sample ID: 680-102431-17

Date Collected: 06/16/14 15:50

Matrix: Solid

Date Received: 06/17/14 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			127643	06/19/14 11:27	DRO	TAL SL
Total/NA	Prep	ExtChrom			128417	06/24/14 15:13	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129524	07/02/14 18:12	MLK	TAL SL

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Certification Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102431-1
SDG: 680-102431-1

Laboratory: TestAmerica Savannah

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
	AFCEE		SAVLAB	
A2LA	DoD ELAP		399.01	02-28-15
A2LA	ISO/IEC 17025		399.01	02-28-15
Alabama	State Program	4	41450	06-30-15
Arkansas DEQ	State Program	6	88-0692	01-31-15
California	NELAP	9	3217CA	07-31-14 *
Colorado	State Program	8	N/A	12-31-14
Connecticut	State Program	1	PH-0161	03-31-15
Florida	NELAP	4	E87052	06-30-15
GA Dept. of Agriculture	State Program	4	N/A	06-12-17
Georgia	State Program	4	N/A	06-30-15
Georgia	State Program	4	803	06-30-15
Guam	State Program	9	09-005r	04-16-15
Hawaii	State Program	9	N/A	06-30-15
Illinois	NELAP	5	200022	11-30-14
Indiana	State Program	5	N/A	06-30-15
Iowa	State Program	7	353	07-01-15
Kentucky (DW)	State Program	4	90084	12-31-14
Kentucky (UST)	State Program	4	18	06-30-15
Louisiana	NELAP	6	30690	06-30-14 *
Louisiana (DW)	NELAP	6	LA140023	12-31-14
Maine	State Program	1	GA00006	08-16-14 *
Maryland	State Program	3	250	12-31-14
Massachusetts	State Program	1	M-GA006	06-30-15
Michigan	State Program	5	9925	06-30-14 *
Mississippi	State Program	4	N/A	06-30-14 *
Montana	State Program	8	CERT0081	01-01-15
Nebraska	State Program	7	TestAmerica-Savannah	06-30-14 *
New Jersey	NELAP	2	GA769	06-30-15
New Mexico	State Program	6	N/A	06-30-14 *
New York	NELAP	2	10842	03-31-15
North Carolina (DW)	State Program	4	13701	07-31-15
North Carolina (WW/SW)	State Program	4	269	12-31-14
Oklahoma	State Program	6	9984	08-31-14
Pennsylvania	NELAP	3	68-00474	06-30-15
Puerto Rico	State Program	2	GA00006	12-31-14
South Carolina	State Program	4	98001	06-30-14 *
Tennessee	State Program	4	TN02961	06-30-15
Texas	NELAP	6	T104704185-08-TX	11-30-14
USDA	Federal		SAV 3-04	06-11-17
Virginia	NELAP	3	460161	06-14-15
Washington	State Program	10	C805	06-10-15
West Virginia (DW)	State Program	3	9950C	12-31-14
West Virginia DEP	State Program	3	94	06-30-14 *
Wisconsin	State Program	5	999819810	08-31-14
Wyoming	State Program	8	8TMS-L	06-30-14 *

Laboratory: TestAmerica St. Louis

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

* Certification renewal pending - certification considered valid.

Certification Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102431-1
SDG: 680-102431-1

Laboratory: TestAmerica St. Louis (Continued)

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska	State Program	10	MO00054	06-30-15
California	NELAP	9	2886	03-31-15
Connecticut	State Program	1	PH-0241	03-31-15
Florida	NELAP	4	E87689	06-30-15
Illinois	NELAP	5	200023	11-30-14
Iowa	State Program	7	373	12-01-14
Kansas	NELAP	7	E-10236	10-31-14
Kentucky (DW)	State Program	4	90125	12-31-14
L-A-B	DoD ELAP		L2305	01-10-16
Louisiana	NELAP	6	04080	06-30-15
Maryland	State Program	3	310	09-30-14 *
Missouri	State Program	7	780	06-30-14 *
Nevada	State Program	9	MO000542013-1	07-31-14 *
New Jersey	NELAP	2	MO002	06-30-15
New Mexico	State Program	6		06-30-10 *
New York	NELAP	2	11616	03-31-15
North Dakota	State Program	8	R207	06-30-14 *
NRC	NRC		24-24817-01	12-31-22
Oklahoma	State Program	6	2013-049	08-31-14 *
Pennsylvania	NELAP	3	68-00540	02-28-15
South Carolina	State Program	4	85002001	06-30-14 *
Texas	NELAP	6	T104704193-13-6	07-31-14 *
USDA	Federal		P330-07-00122	01-09-17
USEPA Reg V SDWA	Federal	1	WG-15J	08-30-14
Utah	NELAP	8	MO000542013-5	07-31-14 *
Virginia	NELAP	3	460230	06-14-15
Washington	State Program	10	C592	08-30-14 *
West Virginia DEP	State Program	3	381	08-30-14 *

* Certification renewal pending - certification considered valid.

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102431-1
SDG: 680-102431-1

Method	Method Description	Protocol	Laboratory
A-01-R	Isotopic Thorium (Alpha Spectrometry)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102431-1
SDG: 680-102431-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-102431-1	SD-229-SS	Solid	06/16/14 12:05	06/17/14 09:20
680-102431-2	SD-229-01	Solid	06/16/14 12:10	06/17/14 09:20
680-102431-3	SD-230-SS	Solid	06/16/14 13:40	06/17/14 09:20
680-102431-4	SD-230-01	Solid	06/16/14 13:45	06/17/14 09:20
680-102431-5	SD-230-02	Solid	06/16/14 13:50	06/17/14 09:20
680-102431-7	SD-231-SS	Solid	06/16/14 14:10	06/17/14 09:20
680-102431-8	SD-231-01	Solid	06/16/14 14:15	06/17/14 09:20
680-102431-9	SD-231-02	Solid	06/16/14 14:20	06/17/14 09:20
680-102431-11	SD-232-SS	Solid	06/16/14 15:20	06/17/14 09:20
680-102431-12	SD-232-01	Solid	06/16/14 15:25	06/17/14 09:20
680-102431-13	SD-232-02	Solid	06/16/14 15:30	06/17/14 09:20
680-102431-15	SD-233-SS	Solid	06/16/14 15:40	06/17/14 09:20
680-102431-16	SD-233-01	Solid	06/16/14 15:45	06/17/14 09:20
680-102431-17	SD-233-02	Solid	06/16/14 15:50	06/17/14 09:20

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102431-1

SDG No.: 680-102431-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
82232-334_00001	06/03/60		Eckert & Ziegler, Lot 82232-334		(Purchased Reagent)		Am-241	7.281 Bq
							Pu-239	7.137 Bq
							Thorium-230	7.63 Bq
82233-334_00001	06/03/60		Eckert & Zigler, Lot 82233-334		(Purchased Reagent)		Am-241	5.114 Bq
							Pu-239	6.064 Bq
							Thorium-230	4.95 Bq
82234-334_00001	06/02/60		Eckert & Zigler, Lot 82234-334		(Purchased Reagent)		Am-241	5.652 Bq
							Pu-239	5.936 Bq
							Thorium-230	5.685 Bq
82235-334_00001	06/04/60		Eckert & Ziegler, Lot 82235-334		(Purchased Reagent)		Am-241	7.466 Bq
							Pu-239	6.897 Bq
							Thorium-230	7.167 Bq
82236-334_00001	06/02/60		Eckert & Ziegler, Lot 82236-334		(Purchased Reagent)		Am-241	6.891 Bq
							Pu-239	6.664 Bq
							Thorium-230	7.107 Bq
82237-334_00003	06/01/60		Eckert & Ziegler, Lot 82237-334		(Purchased Reagent)		Am-241	5.608 Bq
							Pu-239	6.424 Bq
							Thorium-230	5.856 Bq
82240-334_00001	06/08/60		Eckert & Ziegler, Lot 82240-334		(Purchased Reagent)		Am-241	8.298 Bq
							Pu-239	7.163 Bq
							Thorium-230	6.304 Bq
82241-334_00001	06/08/60		Eckert & Ziegler, Lot 82241-334		(Purchased Reagent)		Am-241	6.638 Bq
							Pu-239	6.797 Bq
							Thorium-230	6.629 Bq
82242-334_00001	06/08/60		Eckert & Ziegler, Lot 82242-334		(Purchased Reagent)		Am-241	7.145 Bq
							Pu-239	6.414 Bq
							Thorium-230	6.583 Bq
82243-334_00001	06/09/60		Eckert & Ziegler, Lot 82243-334		(Purchased Reagent)		Am-241	6.39 Bq
							Pu-239	5.979 Bq
							Thorium-230	5.856 Bq
82244-334_00001	06/09/60		Eckert & Zigler, Lot 82244-334		(Purchased Reagent)		Am-241	6.897 Bq
							Pu-239	6.717 Bq
							Thorium-230	7.352 Bq
82245-334_00001	06/09/60		Eckert & Ziegler, Lot 82245-334		(Purchased Reagent)		Am-241	5.528 Bq
							Pu-239	5.437 Bq
							Thorium-230	6.727 Bq
82246-334_00001	06/09/60		Eckert & Ziegler, Lot 82246-334		(Purchased Reagent)		Am-241	6.002 Bq
							Pu-239	5.353 Bq
							Thorium-230	5.57 Bq
82247-334_00001	06/10/60		Eckert & Ziegler, Lot 82247-334		(Purchased Reagent)		Am-241	6.291 Bq
							Pu-239	5.746 Bq
							Thorium-230	6.251 Bq

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102431-1

SDG No.: 680-102431-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
Th-229_00012	12/26/14	12/23/13	0.1M HNO3, Lot L0022	500 mL	Th-229_00004	15 mL	At-217	67.9293 dpm/mL
							Thorium-229	67.9293 dpm/mL
.Th-229_00004	07/14/60	01/26/11	0.1M HNO3, Lot 0	100 mL	Th-229_00002	5.0613 g	At-217	2264.31 dpm/mL
							Thorium-229	2264.31 dpm/mL
..Th-229_00002	07/14/60	Eckert & Ziegler, Lot 82832-334			(Purchased Reagent)		At-217	745.63 Bq/g
							Thorium-229	745.63 Bq/g
Th-230_00023	01/28/15	02/04/13	1M HNO3, Lot 0	200 mL	Th-230_00006	4 mL	Thorium-230	47.9403 dpm/mL
.Th-230_00006	04/11/61	06/24/11	1M HNO3, Lot 0	100 mL	Th-230_00002	5.0878 g	Thorium-230	2397.01 dpm/mL
..Th-230_00002	04/11/61	Eckert & Ziegler, Lot 84460-334			(Purchased Reagent)		Thorium-230	785.217 Bq/g
TRM-2_00001	03/20/50	DOE, Lot TRM-2			(Purchased Reagent)		Pb-210	22.1 pCi/g
							Ra-226	25.4 pCi/g
							Thorium-230	24.5 pCi/g
							U-234	6.2 pCi/g
							U-238	6 pCi/g

Reagent

82232-334_00001

Eckert & Ziegler
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CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82232-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 3-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	7.630E+00	4420-4800	7.540E+04	0.7	1.1	2.6
Pu-239	7.137E+00	4950-5240	2.410E+04	0.7	1.1	2.6
Am-241	7.281E+00	5280-5600	4.326E+02	0.7	1.1	2.6
Total Activity	2.210E+01	3000-8000		0.4	1.1	2.3

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82233-334_00001

Eckert & Ziegler
Analytics

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www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82233-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 3-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	4.950E+00	4420-4800	7.540E+04	0.8	1.1	2.7
Pu-239	6.064E+00	4950-5240	2.410E+04	0.7	1.1	2.6
Am-241	5.114E+00	5280-5600	4.326E+02	0.8	1.1	2.7
Total Activity	1.616E+01	3000-8000		0.1	1.1	2.2

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82234-334_00001

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CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82234-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 2-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	5.685E+00	4420-4800	7.540E+04	0.9	1.1	2.8
Pu-239	5.936E+00	4950-5240	2.410E+04	0.9	1.1	2.8
Am-241	5.652E+00	5280-5600	4.326E+02	0.9	1.1	2.8
Total Activity	1.732E+01	3000-8000		0.5	1.1	2.4

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82235-334_00001

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CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82235-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 4-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	7.167E+00	4420-4800	7.540E+04	0.8	1.1	2.7
Pu-239	6.897E+00	4950-5240	2.410E+04	0.8	1.1	2.7
Am-241	7.466E+00	5280-5600	4.326E+02	0.8	1.1	2.7
Total Activity	2.161E+01	3000-8000		0.5	1.1	2.4

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82236-334_00001

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Analytics

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CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82236-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 2-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	7.107E+00	4420-4800	7.540E+04	0.7	1.1	2.6
Pu-239	6.664E+00	4950-5240	2.410E+04	0.8	1.1	2.7
Am-241	6.891E+00	5280-5600	4.326E+02	0.7	1.1	2.6
Total Activity	2.071E+01	3000-8000		0.4	1.1	2.3

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.46 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82237-334_00003

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CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82237-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 1-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	5.856E+00	4420-4800	7.540E+04	1.0	1.1	3.0
Pu-239	6.424E+00	4950-5240	2.410E+04	0.9	1.1	2.8
Am-241	5.608E+00	5280-5600	4.326E+02	1.0	1.1	3.0
Total Activity	1.793E+01	3000-8000		0.6	1.1	2.5

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1958

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82240-334_00001

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CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82240-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 8-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	6.304E+00	4420-4800	7.540E+04	0.9	1.1	2.8
Pu-239	7.163E+00	4950-5240	2.410E+04	0.8	1.1	2.7
Am-241	8.298E+00	5280-5600	4.326E+02	0.8	1.1	2.7
Total Activity	2.182E+01	3000-8000		0.5	1.1	2.4

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82241-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82241-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 8-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	6.629E+00	4420-4800	7.540E+04	0.8	1.1	2.7
Pu-239	6.797E+00	4950-5240	2.410E+04	0.8	1.1	2.7
Am-241	6.638E+00	5280-5600	4.326E+02	0.8	1.1	2.7
Total Activity	2.011E+01	3000-8000		0.4	1.1	2.3

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY
HEALTH PHYSICS SOCIETY
FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82242-334_00001

Eckert & Ziegler
Analytics

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Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82242-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 8-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	6.583E+00	4420-4800	7.540E+04	0.9	1.1	2.8
Pu-239	6.414E+00	4950-5240	2.410E+04	0.9	1.1	2.8
Am-241	7.145E+00	5280-5600	4.326E+02	0.9	1.1	2.8
Total Activity	2.018E+01	3000-8000		0.6	1.1	2.5

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1958

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82243-334_00001

Eckert & Ziegler
Analytics

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Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82243-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 9-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	5.856E+00	4420-4800	7.540E+04	0.8	1.1	2.7
Pu-239	5.979E+00	4950-5240	2.410E+04	0.8	1.1	2.7
Am-241	6.390E+00	5280-5600	4.326E+02	0.8	1.1	2.7
Total Activity	1.827E+01	3000-8000		0.3	1.1	2.3

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY
HEALTH PHYSICS SOCIETY
FOUNDED 1966

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82244-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82244-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 9-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	7.352E+00	4420-4800	7.540E+04	0.8	1.1	2.7
Pu-239	6.717E+00	4950-5240	2.410E+04	0.9	1.1	2.8
Am-241	6.897E+00	5280-5600	4.326E+02	0.9	1.1	2.8
Total Activity	2.101E+01	3000-8000		0.6	1.1	2.5

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY
HEALTH PHYSICS SOCIETY
FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82245-334_00001

Eckert & Ziegler
Analytics

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Atlanta, Georgia 30318
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Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82245-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 9-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	6.727E+00	4420-4800	7.540E+04	1.0	1.1	3.0
Pu-239	5.437E+00	4950-5240	2.410E+04	1.1	1.1	3.1
Am-241	5.528E+00	5280-5600	4.326E+02	1.1	1.1	3.1
Total Activity	1.773E+01	3000-8000		0.8	1.1	2.7

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82246-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
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Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82246-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 9-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	5.570E+00	4420-4800	7.540E+04	1.0	1.1	3.0
Pu-239	5.353E+00	4950-5240	2.410E+04	1.0	1.1	3.0
Am-241	6.002E+00	5280-5600	4.326E+02	1.0	1.1	3.0
Total Activity	1.696E+01	3000-8000		0.7	1.1	2.6

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY
HEALTH PHYSICS SOCIETY
FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06.24.2010
E. A. Taskaev, QA Manager Alternate

Reagent

82247-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82247-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 10-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	6.251E+00	4420-4800	7.540E+04	0.9	1.1	2.8
Pu-239	5.746E+00	4950-5240	2.410E+04	0.9	1.1	2.8
Am-241	6.291E+00	5280-5600	4.326E+02	0.9	1.1	2.8
Total Activity	1.832E+01	3000-8000		0.6	1.1	2.5

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1966

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

Th-229_00002

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

82832-334
5 mL Liquid in Flame Sealed Vial

Customer: Test America/Earth City, MO
P.O. No.: 2370431, Item 1

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty*, % Type u_A	u_B	U	Reference Date (12:00 PM EST)
Th-229	2.681E+06	3.813E+03	0.3	1.0	2.1	07/14/2010

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: Th-228 - 1.25 Bq, Th-230 - 23.7 Bq, Th-232 - 1.5 Bq. 5.11380 grams 0.5M HNO3 solution.

Source Prepared by: _____
W. Mao, Radiochemist

QA Approved: _____ Date: 7/21/10
J. D. McCorvey, QA Manager Alternate

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1956

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Th-229_00012

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Th - 229 - 00012

Reagent ID: Th-229_00012

Description:	Th-229 Tracer	Expiration Date:	12/26/2014
No. of Bottles:	1	Laboratory:	TestAmerica St. Louis
Storage Location:	RAD Actinide STDs	Prepared By:	Bramblett, Megan L
Reagent Volume:	500.000 mL	Solvent:	0.1M HNO3
Creation Date:	12/23/2013	Solvent Lot:	L0022
Container(s):	282329		
Comment:			

282329
ID: Th-229_00012
Exp: 12/26/14 Prpd: MLM Crt: 12/23/13
Th-229 Tracer

Reagent Analyte Information

Analyte	Source ID	Source Exp. Date	Source Conc.	Source Conc. Units	Final Conc.	Final Conc. Units
Th-229	Th-229_00004	07/14/2060	2264.31000	dpm/mL	67.92931	dpm/mL

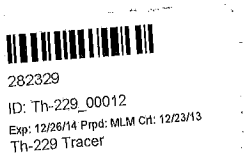
Source Reagents

Reagent	Description	Type	Expiration	Vendor	Vendor Lot #	Vendor Cat Lot #	Volume Used	Volume Units
Th-229_00004	Th-229 Parent		07/14/60				15.00000	mL

St. Louis Radiological Standard Reverification Form

Standard ID Number: Th-229_00012
True Value = 67.90686 DPM/L or g
Date Analyzed: 12/26/2013

Radionuclide: Th-229



Replicates

#1	69.113	DPM/L or g
#2	66.755	DPM/L or g
#3	68.034	DPM/L or g

Mean = 67.96733

1 sigma = 1.180413

1.96 sigma = 2.313609

True Value minus 5% = 64.51152 (True Value - 5%)
True Value plus 5% = 71.3022 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? Yes **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? Yes **(Acceptance Criteria)**

Standard Reverification Acceptable? Yes

Note: Criteria for reverification of radiological standards is taken from the DOE QSAS and LANL Statements of Work

Reviewed By/Date: RTM 12/30/2013

SOP Reference: STL-QA-0002, Current Revision

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:30:35AM 12/30/2013

Sample

Sample Name: Verification-1
SampleType: Sample
:
Sample Collection Date:

Spectrum #1 Analysis #1
Sample Volume : 0.1000mL
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: Th-229_0012
AnalysisID: 592567

Analyst: 60040

Tracer

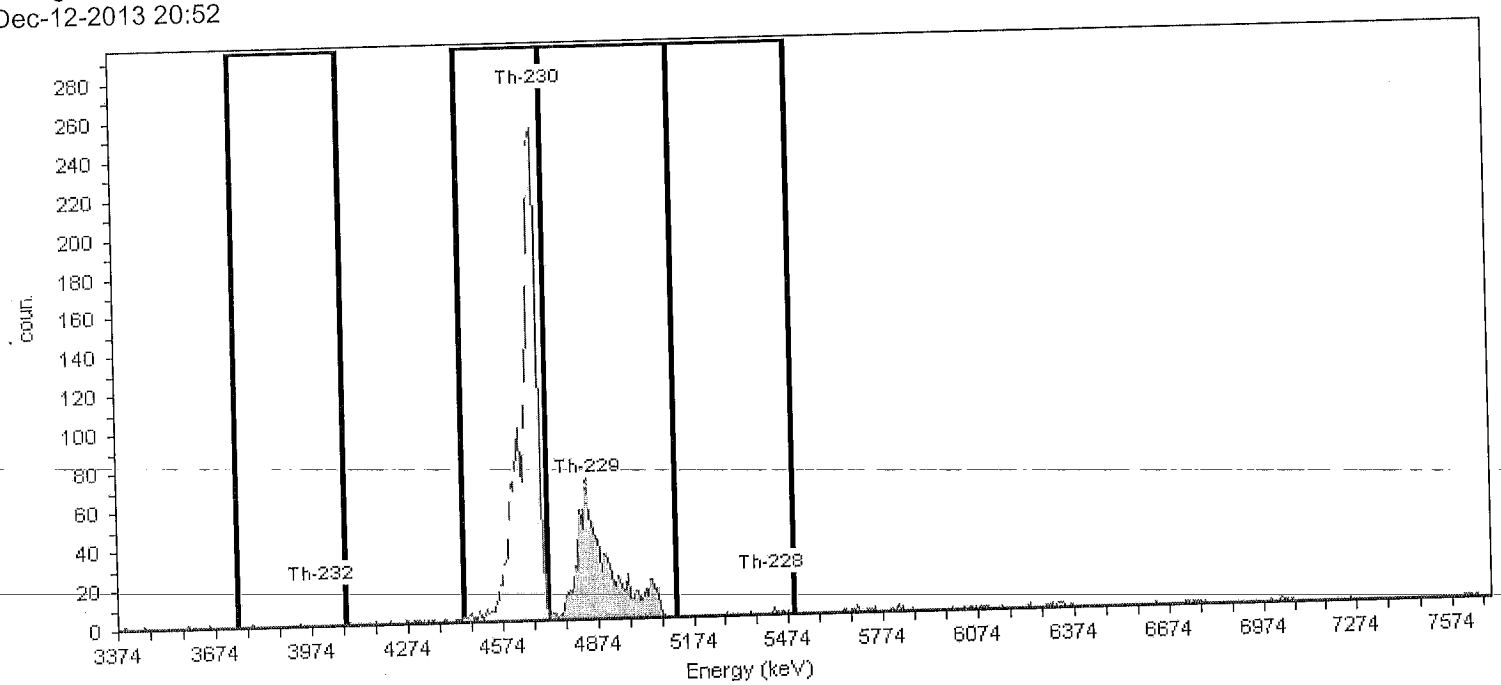
Tracer Name: Th-230_00017
Tracer Activity: 47.94 DPM/mL x (Vol.)0.30 mL = 14.38 DPM
Tracer Ref. Date: 4/11/2011 11:00:10AM

Tracer Nuclide: Th-230
Tracer Recovery: 90.73%

Acquisition

Detector: AV44
Serial Number: 50-051JJ1
Acquisition Start Date: 12/26/2013 4:26:11PM
Live Time: 600.00 min.
Real Time: 600.01 min.
Background Date: 12/12/2013 8:52:36PM
Background Info: Sample: ICB;AV44; Det: AV44; Spectrum #1; Dec-12-2013 20:52

Calibration Name: IC-9795;AV44-20130515
Calibration Date: 5/15/2013 9:25:41PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.64% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th-230_Tracer
Decay Correction: 12/26/2013 4:24:41PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	61.6	100.2	2	0.6250	1.38	0.095	DPM/mL
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	31.6	99.7	2079	0.0000	2079.38	130.481	DPM/mL
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	84.3	99.8	1004	3.7500	1000.25	69.113	DPM/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	36.0	99.8	8	7.5000	0.50	0.035	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:31:26AM 12/30/2013

Sample

Sample Name: Verification-2
SampleType: Sample
:
Sample Collection Date:

Spectrum #1 Analysis #1
Sample Volume : 0.1000mL
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: Th-229_0012
AnalysisID: 592570

Analyst: 60040

Tracer

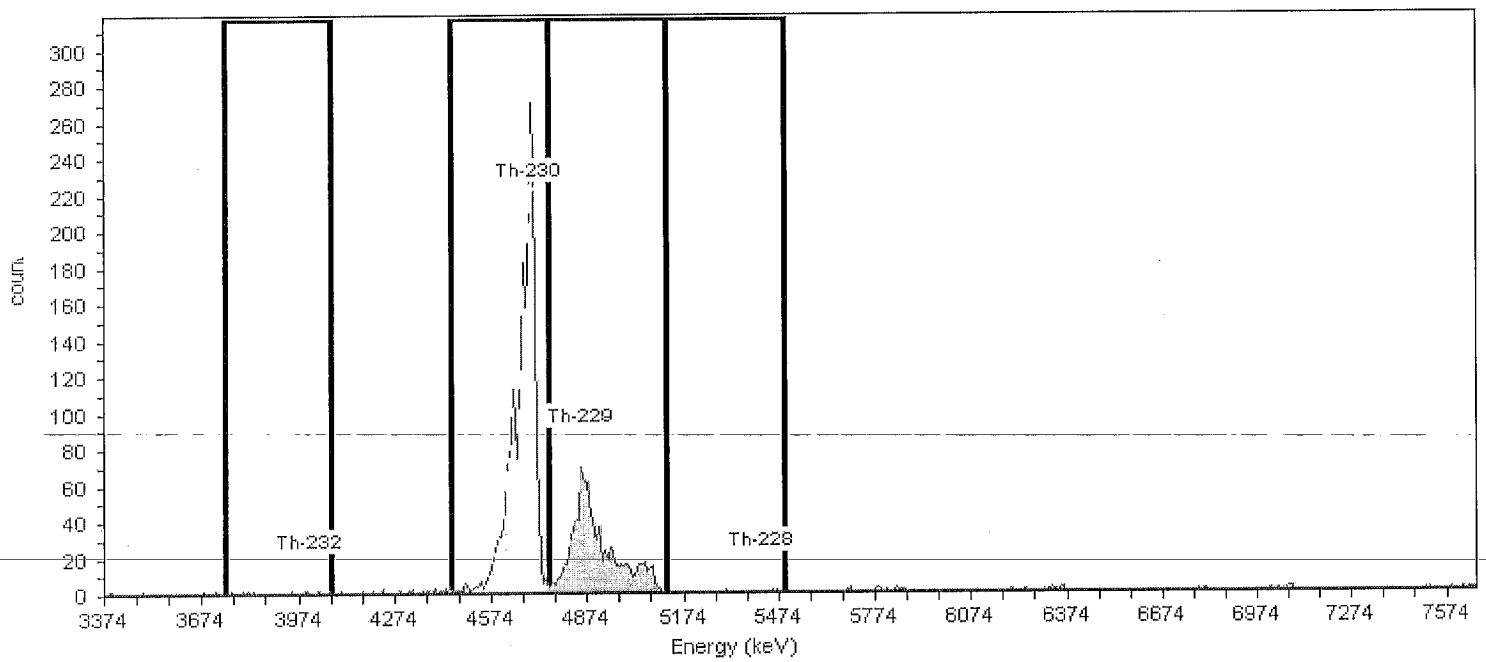
Tracer Name: Th-230_00017
Tracer Activity: 47.94 DPM/mL x (Vol.)0.30 mL = 14.38 DPM
Tracer Ref. Date: 4/11/2011 11:00:10AM

Tracer Nuclide: Th-230
Tracer Recovery: 95.22%

Acquisition

Detector: AV45
Serial Number: 48-158FF2
Acquisition Start Date: 12/26/2013 4:26:13PM
Live Time: 600.00 min.
Real Time: 600.01 min.
Background Date: 12/12/2013 8:52:38PM
Background Info: Sample: ICB;AV45; Det: AV45; Spectrum #1; Dec-12-2013 20:52

Calibration Name: IC-9817;AV45-20130515
Calibration Date: 5/15/2013 9:25:55PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.68% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th-230_Tracer
Decay Correction: 12/26/2013 4:24:41PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	37.3	100.2	7	0.0000	7.46	0.488	DPM/mL
Th-230	4688.0	4,687.5	0.5	4448.3	4754.1	64.3	99.7	2186	0.6250	2185.38	136.944	DPM/mL
Th-229	4848.0	4,845.3	2.7	4754.1	5119.5	79.8	99.8	1016	0.6250	1015.38	66.755	DPM/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	24.9	99.8	3	5.6250	-2.63	-0.173	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:32:04AM 12/30/2013

Sample

Sample Name: Verification-3
SampleType: Sample
:
Sample Collection Date:

Spectrum #1 Analysis #1
Sample Volume : 0.1000mL
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: Th-229_0012
AnalysisID: 592571

Analyst: 60040

Tracer

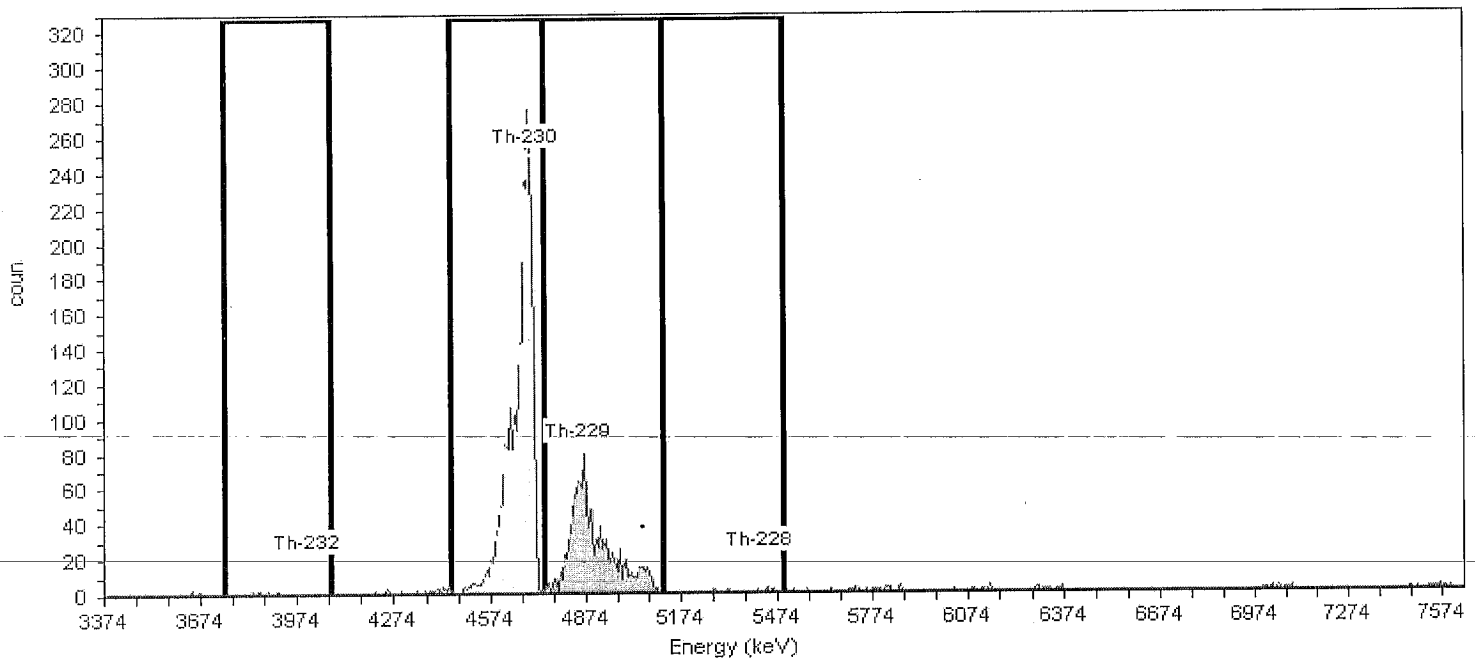
Tracer Name: Th-230_00017
Tracer Activity: 47.94 DPM/mL x (Vol.)0.30 mL = 14.38 DPM
Tracer Ref. Date: 4/11/2011 11:00:10AM

Tracer Nuclide: Th-230
Tracer Recovery: 93.94%

Acquisition

Detector: AV46
Serial Number: 49-202GG2
Acquisition Start Date: 12/26/2013 4:26:15PM
Live Time: 600.00 min.
Real Time: 600.01 min.
Background Date: 12/12/2013 8:52:40PM
Background Info: Sample: ICB;AV46; Det: AV46; Spectrum #1; Dec-12-2013 20:52

Calibration Name: IC-9884;AV46-20130515a
Calibration Date: 5/16/2013 12:12:59AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 27.46% +/- 0.39% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th-230_Tracer
Decay Correction: 12/26/2013 4:24:41PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	95.0	100.2	5	0.6250	4.38	0.282	DPM/mL
Th-230	4688.0	4,687.5	0.5	4448.3	4739.1	36.4	99.7	2219	0.0000	2219.00	135.103	DPM/mL
Th-229	4848.0	4,845.3	2.7	4739.1	5119.5	78.0	99.8	1052	1.2500	1050.75	68.034	DPM/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	15.7	99.8	7	4.3750	2.63	0.170	DPM/mL

Decay Correction

Thorium-229								
Initial Activity:	67.929	dpm						
Reference Date:	7/14/2010							
Current Date:	12/26/2013		(or date at which you wish to determine activity)					
Elapsed Time:	1261	days						
Half Life:	2680935	days	64342440					
Exponential Term:	0.999674026							
Corrected Activity:	67.90685689	dpm	30.58867427	pCi				

Lm 12/30/13

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Actinide Prep

Batch No. : —

Balance ID : —

Note: If a section below is not used, marked the N/A box and initial & date next to the N/A. i.e. Mark the N/A box if a tracer is not added to the sample(s) then initial and date next to the N/A

No.	Sample Number	Aliquot (g / mL)	MS	Initials
44 1	Verification 1	0.1		
45 2	1 2 3	1		
46 3	1 2 3	1		
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				

Tracer ☐ N/A

Initials / Date

Isotope : Th-230

Std Sol'n No. : Th-230.0007

Vol (mL) : 0.3

Ref Activity (dpm/mL) : 47.94 dpm/mL

Act Ref Date : 4-11-11

Samples Spiked and Traced By: MB 12/23/13 (Initials / Date)

Verification Signature & Date: [signature] 12/23/13 (Initials / Date)

LCS Standard ☐ N/A

Initials / Date

Isotope : Th-229

Std Sol'n ID. : Th-229-0002

Vol (mL) : 0.1

Ref Activity (dpm/mL) : 67.929 dpm/mL — corrected activity 67.9086

Act Ref Date : 7-14-10

SOP's applied in preparing these samples. Mark box to left for all that apply:

☐	ST-RC-0003 Rev.	☐	ST-RC-0040 Rev.	☐	ST-RC-0110 Rev.
☐	ST-RC-0004 Rev.	☐	ST-RC-0041 Rev.	☐	ST-RC-0120 Rev.
☐	ST-RC-0014 Rev.	☐	ST-RC-0050 Rev.	☐	ST-RC-0232 Rev.
☐	ST-RC-0020 Rev.	☐	ST-RC-0090 Rev.	☐	ST-RC-0238 Rev.
☐	ST-RC-0021 Rev.	☑	ST-RC-0100 Rev.	☐	ST-RC-0240 Rev.
				☐	ST-RC-0241 Rev.
				☑	ST-RC-0242 Rev.
				☐	ST-RC-5016 Rev.
				☐	
				☐	

Isotope(s)

αβ ☐	Iso Pu ☐	Tc-99 ☐	Iso Cm ☐
Iso Am ☐	Ra ☐	Iso Th ☑	Pu-241 ☐
KPA ☐	Sr ☐	Iso U ☐	Th-229 ☐
Np ☐	TAR ☐	C-14 ☑	Cl-36 ☐

Count Time		Matrix	
Long Count	☐	Soil	☐
Short Count	☐	H_2O	☐

Prepared By : MB

Date : 12/23/13

Reviewed by: _____

Date: _____

\\SIsvr01\RAD\MasterForms\RAD-0045 Rev(3)

Sequential Thorium, Plutonium and Uranium via TEVA/UTEVA ST-RC-0242

Batch: Th229 Verification

All rinses should flow at 1 mL/minute (only 3M HNO_3 may be done at 3 mL/minute)

*only necessary when analyzing for *Pu*

TEVA lot: TE512BM

UTEVA lot: _____

11.5.2 Stack TEVA on top of UTEVA cartridge

11.5.3 5mL 3M HNO_3 — COMPLETED ☐

*11.5.4 To samples, add 1mL ascorbic acid solution Place in hot water bath for 5 minutes — COMPLETED ☐

*11.5.5 To samples, add 1mL $NaNO_2$ solution Place in hot water bath for 5 minutes — COMPLETED ☐

*11.5.6 Cold water bath until samples reach room temperature

11.5.7 Load sample

11.5.8 20mL 3M HNO_3 — COMPLETED ☐

11.59 Split cartridges: TEVA / UTEVA

TEVA:

11.5.10-11.5.11 Elute *Th* into clean tube using 20mL 9M HCl — COMPLETED ☐

11.5.12 5mL 6M HCl into *Th* tube — COMPLETED ☐

11.5.16 Elute *Pu* into clean tube with 20mL 1M HCl + 0.250 mL $TiCl_3$ — COMPLETED ☐ — COMPLETED ☐

UTEVA:

11.5.19 5mL 3M HNO_3 — COMPLETED ☐

11.5.20 5mL 9M HCl — COMPLETED ☐

11.5.21 20mL 5M HCl / 0.05M oxalic — COMPLETED ☐

11.5.22-11.5.23 Elute *U* into clean tube with 15mL 1M HCl — COMPLETED ☐

Reagent

Th-230_00002

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

84460-334
5 mL Liquid in Flame Sealed Vial

Customer: Test America/Earth City, MO
P.O. No.: 2414204, Item 1

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995,'"Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty* , % Type u_A	u_B	U	Reference Date (12:00 PM EST)
Th-230	2.753E+07	4.016E+03	0.1	0.9	1.8	04/11/2011

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: γ-impurities < 0.1 %, α-impurities < 0.01 %. 5.11451 grams 0.5M HNO3 solution.

Source Prepared by: _____
W. Mao, Radiochemist

QA Approved: _____ Date: 4/11/11
J. D. McCorvey, QA Manager Alternate

ACCREDITED SOURCE CALIBRATION LABORATORY · HEALTH PHYSICS SOCIETY · FOUNDED 1956

Corporate Office
24937 Avenue Tibbitts · Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd · Atlanta, Georgia 30318

Reagent

Th-230_00023

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Th - 230_ 00023

Reagent ID: Th-230_00023

		Expiration Date:	01/28/2015
Description:	Th-230 Spike	Laboratory:	TestAmerica St. Louis
No. of Bottles:	1	Prepared By:	Bernsen, Sarah C
Storage Location:	RAD Actinide STDs	Solvent:	1M HNO3
Reagent Volume:	200.000 mL	Solvent Lot:	0
Creation Date:	02/04/2013		
Container(s):	304693		
Comment:	Rad13-0003 Re-certified from Th-230_00017		

Reagent Analyte Information

Analyte	Source ID	Source Exp. Date	Source Conc.	Source Conc. Units	Final Conc.	Final Conc. Units
Th-230	Th-230_00006	04/11/2061	2397.01400	dpm/mL	47.94028	dpm/mL

Source Reagents

Reagent	Description	Type	Expiration	Vendor	Vendor Lot #	Vendor Cat Lot #	Volume Used	Volume Units
Th-230_00006	Th-230 Parent		04/11/61				4.00000	mL

St. Louis Radiological Standard Reverification Form

Standard ID Number: Th-230_00017
True Value = 47.94 DPM/L or g
Date Analyzed: 1/28/2014

Radionuclide: Th-230

Replicates		
#1	49.462	DPM/L or g
#2	48.579	DPM/L or g
#3	49.802	DPM/L or g

Mean = 49.281

1 sigma = 0.631271

1.96 sigma = 1.237291

True Value minus 5% = 45.543 (True Value - 5%)
True Value plus 5% = 50.337 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? **Yes** **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? **Yes** **(Acceptance Criteria)**

Standard Reverification Acceptable? **Yes**

Note: Criteria for reverification of radiological standards is taken from the DOE QSAS and LANL Statements of Work

Reviewed By/Date: RTM 1/29/2014

SOP Reference: STL-QA-0002, Current Revision

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Th-230 Verification

Aliquot Only

Batch No. : —

Balance ID : —

Note: If a section below is not used, marked the N/A box and initial & date next to the N/A.
i.e. Mark the N/A box if a tracer is not added to the sample(s) then initial and date next to the N/A

No.	Sample Number	Aliquot (g / mL)	Crucible ID	Dilution
1	verification-1	0.3	112	960 min.
2	2	1	113	
3	3		114	
4				
5				
6				
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14				
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16				
17				
18				
19				
20				
21				
22				
23				
24				

Tracer ☐ N/A

Initials / Date

Isotope : Th-229

Std Sol'n No. : Th-229-00012

Vol (mL) : 0.1

Ref Activity (dpm/mL) : 67.929

Act Ref Date : 07-14-2010

Samples Spiked and Traced By: SLB 1/28/14
Initials / Date

Verification Signature & Date: NB 1/28/14
Initials / Date

LCS Standard ☐ N/A

Initials / Date

Isotope : Th-230

Std Sol'n ID. : Th-230-00017

Vol (mL) : 0.3

Ref Activity (dpm/mL) : 47.94

Act Ref Date : 04-11-2011

SOP's applied in preparing these samples. Mark box to left for all that apply:

☐	ST-RC-0003 Rev.	☐	ST-RC-0040 Rev.	☐	ST-RC-0110 Rev.		
☐	ST-RC-0004 Rev.	☐	ST-RC-0041 Rev.	☐	ST-RC-0120 Rev.		
☐	ST-RC-0014 Rev.	☐	ST-RC-0050 Rev.	☐	ST-RC-0232 Rev.		
☐	ST-RC-0020 Rev.	☐	ST-RC-0090 Rev.	☐	ST-RC-0238 Rev.		
☐	ST-RC-0021 Rev.	☑	ST-RC-0100 Rev.	☐	ST-RC-0240 Rev.		
				☐	ST-RC-0241 Rev.		
				☑	ST-RC-0242 Rev.		
				☐	ST-RC-5016 Rev.		
				☐			
				☐			

Isotope(s)

αβ ☐	Iso Pu ☐	Tc-99 ☐	Iso Cm ☐
Iso Am ☐	Ra ☐	Iso Th ☑	Pu-241 ☐
KPA ☐	Sr ☐	Iso U ☐	Th-229 ☐
Np ☐	TAR ☐	C-14 ☐	Cl-36 ☐

Count Time	Matrix
Long Count ☐	Soil ☐
Short Count ☐	H_2O ☐

Prepared By : SLB

Date : 1/28/14

Reviewed by: _____

Date: _____

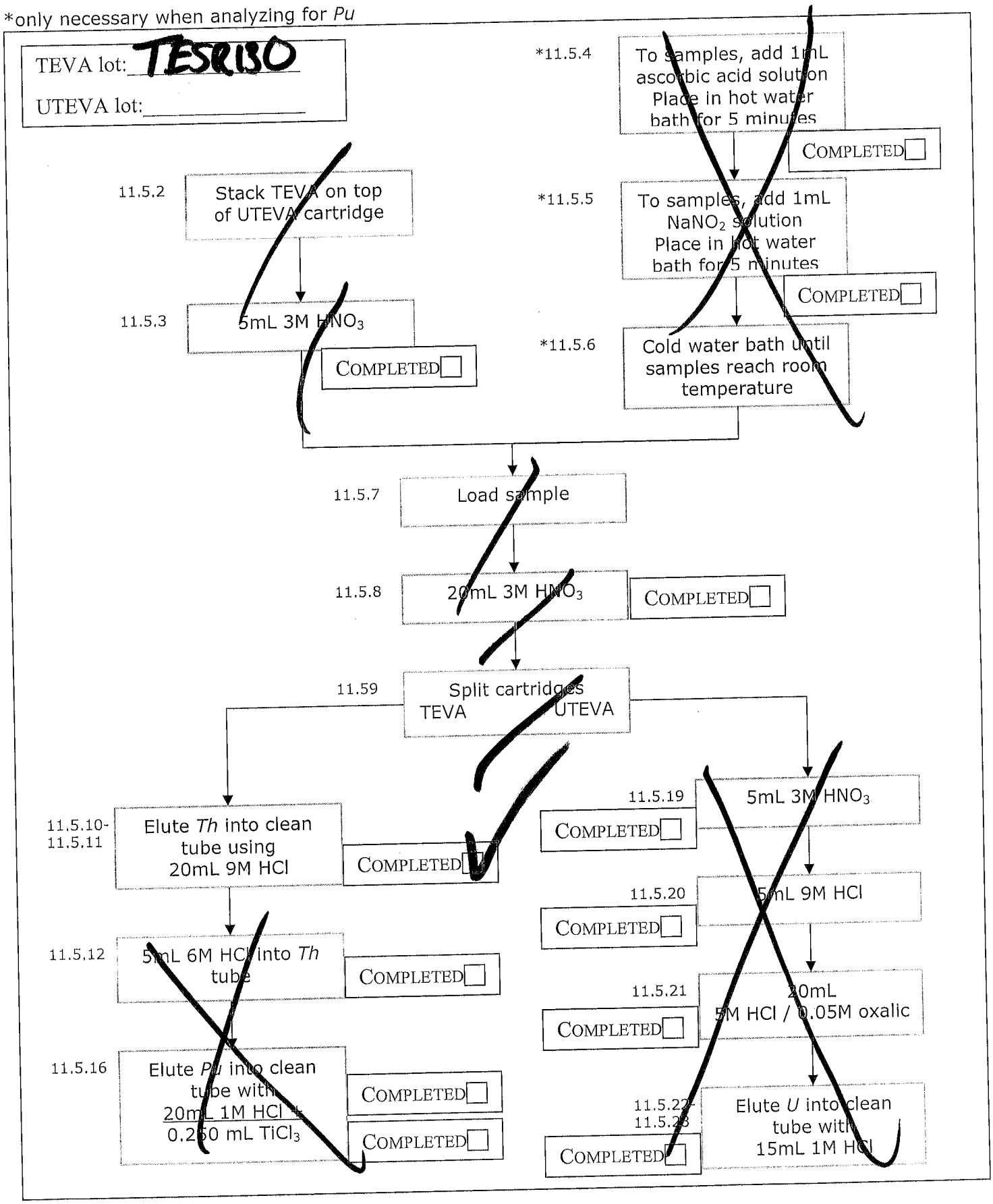
\\Slsvr01\RAD\MasterForms\RAD-0045 Rev(3)

Sequential Thorium, Plutonium and Uranium via TEVA/UTEVA ST-RC-0242

Batch:_____

All rinses should flow at 1 mL/minute (only 3M HNO_3 may be done at 3 mL/minute)

*only necessary when analyzing for *Pu*



Form: RAD-0063, Revised 09/18/13

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:19:33PM 1/29/2014

Sample

Sample Name: Verification 1
SampleType: Sample
:
Sample Collection Date:

Spectrum #1 Analysis #1
Sample Volume : 0.3000mL
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: Th-230_00017_Re-Verify
AnalysisID: 597024

Analyst: 60040

Tracer

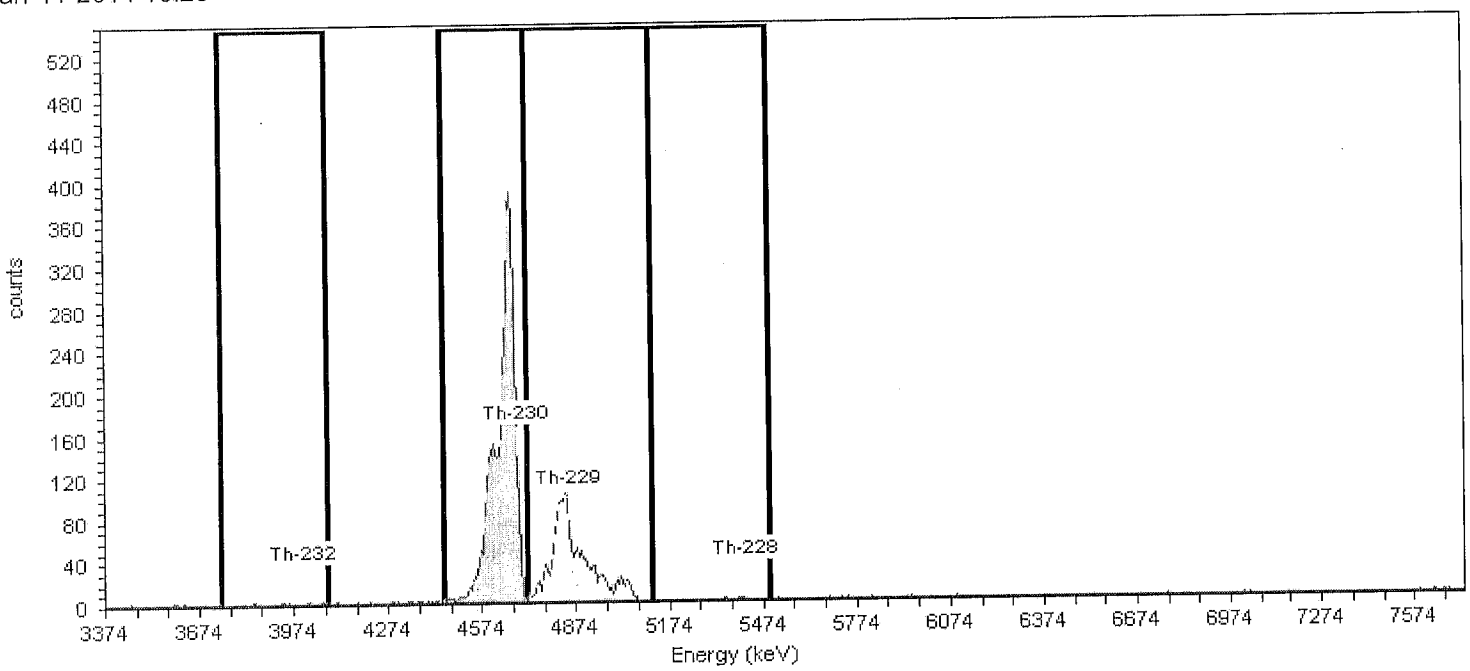
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.10 mL = 6.79 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 88.83%

Acquisition

Detector: AV112
Serial Number: 49-037G7
Acquisition Start Date: 1/28/2014 7:31:48PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Background Date: 1/11/2014 4:25:27PM
Background Info: Sample: ICB;AV112; Det: AV112; Spectrum #1; Jan-11-2014 16:25

Calibration Name: IC-8876;AV112-20130514
Calibration Date: 5/14/2013 8:47:13PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.87% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 1/28/2014 7:30:15PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	.0	100.2	6	0.0000	6.46	0.094	DPM/mL
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	20.4	99.7	3391	2.0000	3389.32	49.462	DPM/mL
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	74.0	99.6	1552	2.0000	1550.25	20.113	DPM/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	44.4	99.8	4	2.0000	2.00	0.029	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:19:42PM 1/29/2014

Sample

Sample Name: Verification 2
SampleType: Sample
:
Sample Collection Date:

Spectrum #1 Analysis #1
Sample Volume : 0.3000mL
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: Th-230_00017_Re-Verify
AnalysisID: 597025

Analyst: 60040

Tracer

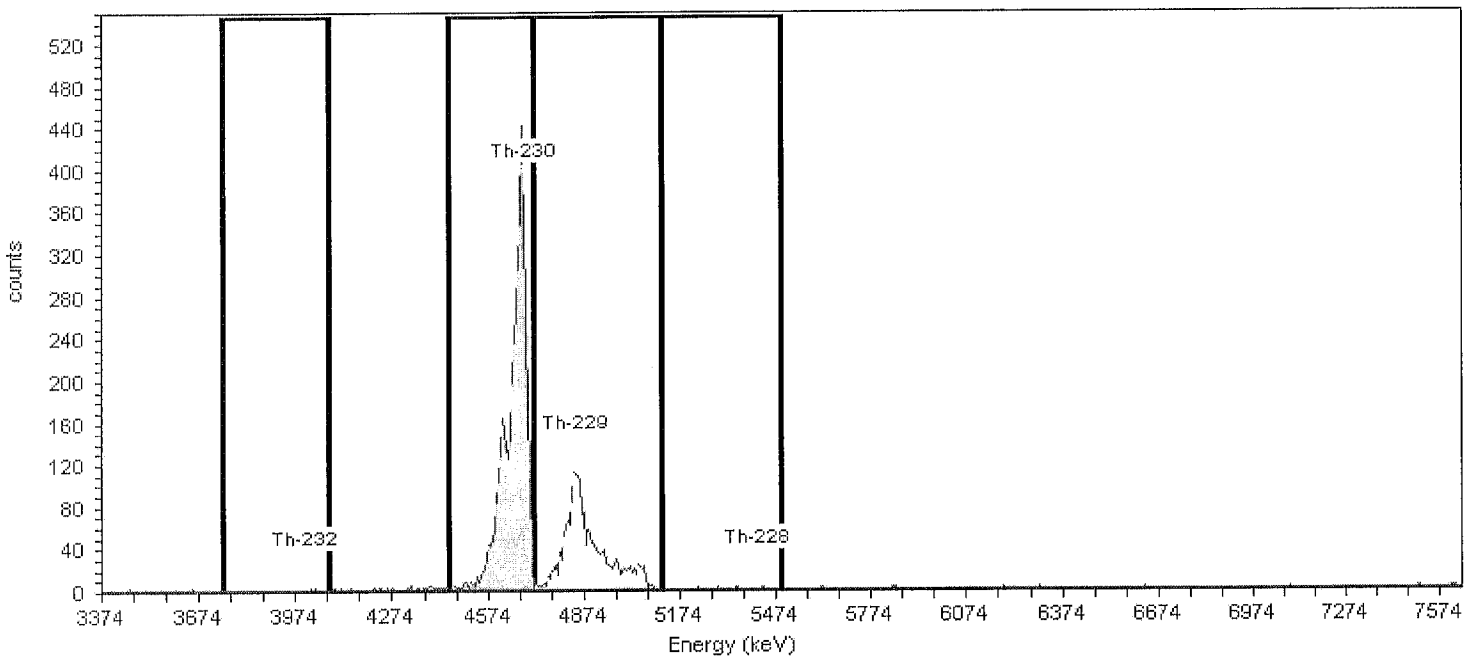
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.10 mL = 6.79 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 92.22%

Acquisition

Detector: AV113
Serial Number: 49-037X5
Acquisition Start Date: 1/28/2014 7:31:50PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Background Date: 1/11/2014 4:25:29PM
Background Info: Sample: ICB;AV113; Det: AV113; Spectrum #1; Jan-11-2014 16:25

Calibration Name: IC-8877;AV113-20130514
Calibration Date: 5/14/2013 8:47:28PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.66% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 1/28/2014 7:30:15PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	10.5	100.2	2	2.0000	0.00	0.000	DPM/mL
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	30.5	99.7	3429	0.0000	3429.40	48.579	DPM/mL
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	72.2	99.6	1598	1.0000	1597.09	20.881	DPM/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	163.8	99.8	4	3.0000	1.00	0.014	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:19:51PM 1/29/2014

Sample

Sample Name: Verification 3
SampleType: Sample
:
Sample Collection Date:

Spectrum #1 Analysis #1
Sample Volume : 0.3000mL
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: Th-230_00017_Re-Verify
AnalysisID: 597026

Analyst: 60040

Tracer

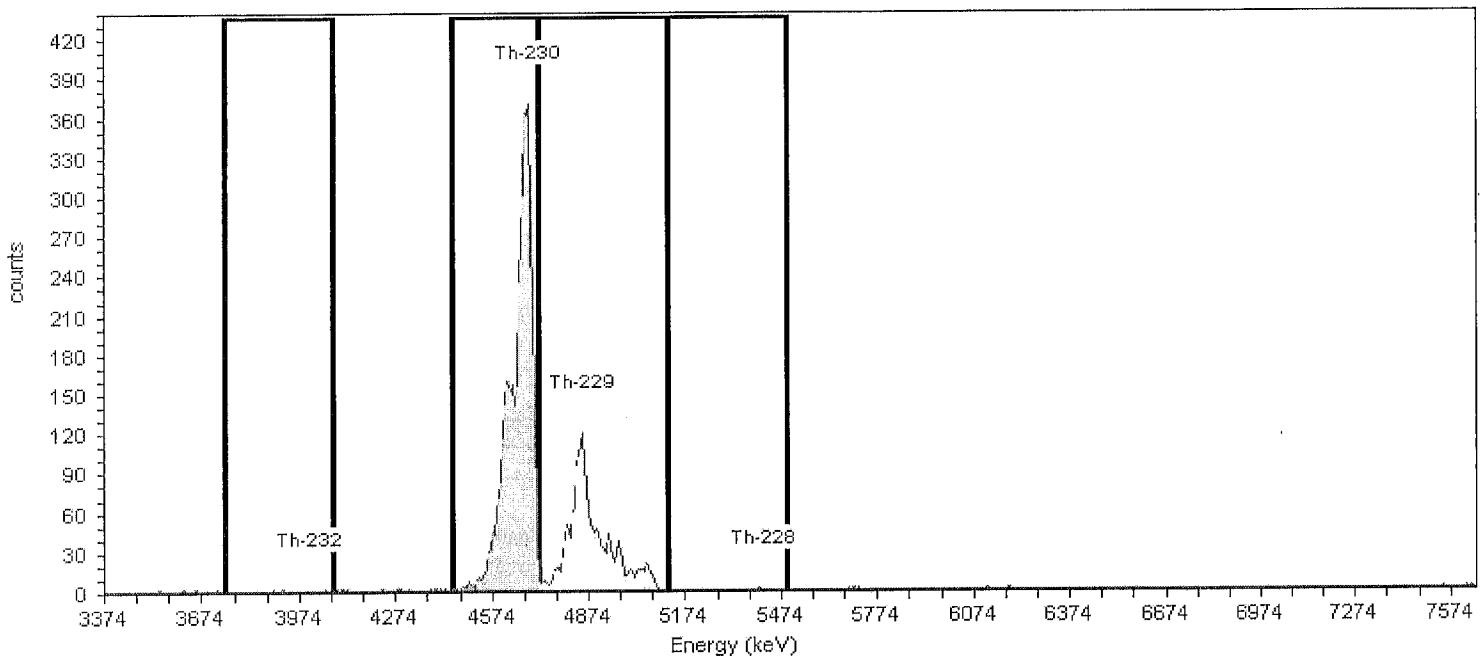
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.10 mL = 6.79 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 92.05%

Acquisition

Detector: AV114
Serial Number: 49-037E7
Acquisition Start Date: 1/28/2014 7:31:52PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Background Date: 1/11/2014 4:25:31PM
Background Info: Sample: ICB;AV114; Det: AV114; Spectrum #1; Jan-11-2014 16:25

Calibration Name: IC-9520;AV114-20130514
Calibration Date: 5/14/2013 8:47:43PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.73% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 1/28/2014 7:30:15PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	10.7	100.2	3	0.4250	2.57	0.036	DPM/mL
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	33.9	99.7	3518	0.0000	3517.66	49.802	DPM/mL
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	72.2	99.6	1598	0.0000	1597.97	20.842	DPM/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	44.5	99.8	1	1.0000	0.00	0.000	DPM/mL

Reagent

TRM-2_00001

Perry, Doug E

From: Salmi, Douglas R
Sent: March 20, 2000 10:48 AM
To: Perry, Doug E; Puissant, Pamela M
Subject: FW: SRMs for radiochemistry LCSs

Pam, Doug
FYI

-----Original Message-----
From: Minteer@aol.com [mailto:Minteer@aol.com]
Sent: March 20, 2000 10:36 AM
To: drsalmi@sandia.gov
Cc: dbourne@doeal.gov; GLDechant@aol.com; crandallb@quanterra.com
Subject: SRMs for radiochemistry LCSs

Doug:

As we discussed by telephone, please send approximately 500 grams each of PEM-1, TRM-2, and NBHD to STL St. Louis. These are to be used by STL as laboratory control samples. As with our other laboratories, STL will be asked to provide summaries of the data obtained in quarterly progress reports. This is not to assess their proficiency, but rather to help us develop interlaboratory acceptance criteria. The known values (given below) for PEM and TRM are good because the samples are well characterized. The known values for NBHD result from a single analysis and hence should be taken as estimates. All the values below are in pCi/g.

PEM-1:

Parameter	Result	Std. Dev.
Pu-238	8.03	0.37
Pu-239	41.0	3.0
Am-241	32.5	1.1
Cs-137	73.5	0.9
U-234	5.99	0.2
U-235	0.27	0.04
U-238	18.1	0.5

TRM-2

Parameter	Result	Uncertainty
U-238	6.0	+/- 4.0
U-234	6.2	+/- 4.0
Th-230	24.5	+/- 0.6
Ra-226	25.4	+/- 0.9
Pb-210	22.1	+/- 1.2

NBHD

Parameter	Result	Uncertainty
Am-241	1.47	+/- 0.28
Ra-226	67.3	+/- 5.5
U-234	174	none available
U-235	8.7	"
U-238	212	"
Cs-137	52.1	+/- 4.6
Pb-210	78.3	+/- 2.4
Pu-239/40	4.7	+/- 0.63
Pu-238	0.3	+/- 0.11
Th-230	83.4	+/- 6.5

ALPHA SPECTROSCOPY

Method A-01-R Th

Isotopic Thorium (Alpha Spectrometry) by Method A-01-R

Prep Batch: 128417

, Extraction Chromatography Resin Actinide

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128417

Lab ID: MB 160-128417/1-A
Client ID:
Sigma: 2
Analyzed: 07/02/14 18:11
Detector: AV46
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	-0.009679	0.00858	0.00862	U	pCi/g	1.00	0.0660	129499
Thorium-230	0.03903	0.0410	0.0411	U	pCi/g	1.00	0.0462	129499
Thorium-232	0.008210	0.0206	0.0206	U	pCi/g	1.00	0.0460	129499

Tracer	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.642	0.460	0.661		pCi/g	0.0606	6.12	92.2	30 - 110

Lab ID: LCS 160-128417/2-A
Client ID:
Sigma: 2
Analyzed: 07/02/14 18:11
Detector: AV49
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	25.66	1.51	2.63		pCi/g	1.00	0.170	129502

Tracer	LCS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	10.44	0.891	1.25		pCi/g	0.139	12.2	85.3	30 - 110

Lab ID: 680-102431-1
Client ID: SD-229-SS
Sigma: 2
Analyzed: 07/02/14 18:11
Detector: AV53
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.842	0.204	0.216		pCi/g	1.00	0.0895	129505
Thorium-230	1.02	0.225	0.241		pCi/g	1.00	0.0896	129505
Thorium-232	0.837	0.202	0.214		pCi/g	1.00	0.0686	129505

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.77	0.426	0.585		pCi/g	0.0580	6.09	78.3	30 - 110

Lab ID: 680-102431-2
Client ID: SD-229-01
Sigma: 2
Analyzed: 07/02/14 18:11
Detector: AV54
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.964	0.212	0.227		pCi/g	1.00	0.103	129506
Thorium-230	0.683	0.177	0.186		pCi/g	1.00	0.0763	129506
Thorium-232	1.04	0.215	0.232		pCi/g	1.00	0.0542	129506

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128417

Lab ID: 680-102431-2 | Analyzed: 07/02/14 18:11 | Decay Corrected: No
Client ID: SD-229-01 | Detector: AV54 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.28	0.453	0.634		pCi/g	0.0626	6.13	86.1	30 - 110

Lab ID: 680-102431-3 | Analyzed: 07/02/14 18:11 | Decay Corrected: No
Client ID: SD-230-SS | Detector: AV55 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.547	0.156	0.163		pCi/g	1.00	0.0766	129507
Thorium-230	0.638	0.167	0.176		pCi/g	1.00	0.0698	129507
Thorium-232	0.570	0.158	0.165		pCi/g	1.00	0.0695	129507

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.27	0.444	0.627		pCi/g	0.0485	6.10	86.5	30 - 110

Lab ID: 680-102431-4 | Analyzed: 07/02/14 18:11 | Decay Corrected: No
Client ID: SD-230-01 | Detector: AV56 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.535	0.153	0.159		pCi/g	1.00	0.0751	129508
Thorium-230	0.706	0.173	0.183		pCi/g	1.00	0.0481	129508
Thorium-232	0.522	0.149	0.155		pCi/g	1.00	0.0546	129508

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.53	0.461	0.654		pCi/g	0.0546	6.10	90.7	30 - 110

Lab ID: 680-102431-5 | Analyzed: 07/02/14 18:11 | Decay Corrected: No
Client ID: SD-230-02 | Detector: AV57 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.733	0.183	0.193		pCi/g	1.00	0.0983	129509
Thorium-230	0.673	0.172	0.181		pCi/g	1.00	0.0567	129509
Thorium-232	0.583	0.160	0.168		pCi/g	1.00	0.0663	129509

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.25	0.445	0.627		pCi/g	0.0788	6.12	85.9	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128417

Lab ID: 680-102431-5 MS
Client ID: SD-230-02
Sigma: 2
Analyzed: 07/02/14 18:11
Detector: AV58
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	MS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	5.500	0.494	0.676		pCi/g	1.00	0.0873	129510

Tracer	MS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.269	0.447	0.629		pCi/g	0.0540	6.14	85.9	30 - 110

Lab ID: 680-102431-5 MSD
Client ID: SD-230-02
Sigma: 2
Analyzed: 07/02/14 18:11
Detector: AV60
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	MSD Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	5.655	0.481	0.676	F1	pCi/g	1.00	0.0662	129513

Tracer	MSD Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.681	0.465	0.666		pCi/g	0.0433	6.11	93.0	30 - 110

Lab ID: 680-102431-7
Client ID: SD-231-SS
Sigma: 2
Analyzed: 07/02/14 18:11
Detector: AV61
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.639	0.166	0.174		pCi/g	1.00	0.0903	129514
Thorium-230	0.857	0.188	0.201		pCi/g	1.00	0.0470	129514
Thorium-232	0.774	0.178	0.190		pCi/g	1.00	0.0465	129514

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.66	0.464	0.664		pCi/g	0.0581	6.12	92.5	30 - 110

Lab ID: 680-102431-8
Client ID: SD-231-01
Sigma: 2
Analyzed: 07/02/14 18:11
Detector: AV62
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.931	0.211	0.225		pCi/g	1.00	0.0830	133832
Thorium-230	1.23	0.241	0.262		pCi/g	1.00	0.0607	133832
Thorium-232	1.19	0.235	0.255		pCi/g	1.00	0.0349	133832

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.00	0.437	0.606		pCi/g	0.0435	6.13	81.6	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128417

Lab ID: 680-102431-9 | Analyzed: 07/02/14 18:11 | Decay Corrected: No
Client ID: SD-231-02 | Detector: AV63 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.878	0.199	0.212		pCi/g	1.00	0.106	129516
Thorium-230	0.889	0.196	0.210		pCi/g	1.00	0.0725	129516
Thorium-232	1.06	0.212	0.230		pCi/g	1.00	0.0430	129516

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.67	0.474	0.672		pCi/g	0.0638	6.14	92.5	30 - 110

Lab ID: 680-102431-11 | Analyzed: 07/02/14 18:11 | Decay Corrected: No
Client ID: SD-232-SS | Detector: AV64 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.21	0.238	0.258		pCi/g	1.00	0.0904	129517
Thorium-230	1.30	0.244	0.267		pCi/g	1.00	0.0650	129517
Thorium-232	1.21	0.235	0.256		pCi/g	1.00	0.0517	129517

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.86	0.420	0.586		pCi/g	0.0586	6.13	79.3	30 - 110

Lab ID: 680-102431-12 | Analyzed: 07/02/14 18:11 | Decay Corrected: No
Client ID: SD-232-01 | Detector: AV65 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.38	0.260	0.284		pCi/g	1.00	0.121	129518
Thorium-230	1.22	0.240	0.261		pCi/g	1.00	0.0612	129518
Thorium-232	1.37	0.253	0.278		pCi/g	1.00	0.0609	129518

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.85	0.425	0.588		pCi/g	0.0529	6.14	78.9	30 - 110

Lab ID: 680-102431-13 | Analyzed: 07/02/14 18:11 | Decay Corrected: No
Client ID: SD-232-02 | Detector: AV66 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.20	0.245	0.265		pCi/g	1.00	0.111	129519
Thorium-230	1.21	0.243	0.263		pCi/g	1.00	0.0859	129519

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128417

Lab ID: 680-102431-13 | Analyzed: 07/02/14 18:11 | Decay Corrected: No
Client ID: SD-232-02 | Detector: AV66 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-232	1.11	0.232	0.250		pCi/g	1.00	0.0625	129519

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.92	0.438	0.603		pCi/g	0.0768	6.14	80.3	30 - 110

Lab ID: 680-102431-15 | Analyzed: 07/02/14 18:11 | Decay Corrected: No
Client ID: SD-233-SS | Detector: AV67 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.06	0.223	0.240		pCi/g	1.00	0.0873	129520
Thorium-230	1.06	0.220	0.237		pCi/g	1.00	0.0649	129520
Thorium-232	1.24	0.238	0.260		pCi/g	1.00	0.0666	129520

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.90	0.424	0.591		pCi/g	0.0417	6.11	80.4	30 - 110

Lab ID: 680-102431-16 | Analyzed: 07/02/14 18:11 | Decay Corrected: No
Client ID: SD-233-01 | Detector: AV69 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.967	0.213	0.228		pCi/g	1.00	0.0846	129522
Thorium-230	0.971	0.211	0.226		pCi/g	1.00	0.0521	129522
Thorium-232	1.38	0.251	0.276		pCi/g	1.00	0.0519	129522

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.26	0.455	0.634		pCi/g	0.0511	6.13	85.8	30 - 110

Lab ID: 680-102431-17 | Analyzed: 07/02/14 18:12 | Decay Corrected: No
Client ID: SD-233-02 | Detector: AV70 | Yield Truncated: No
Sigma: 2 | Dil Fac: 1 | Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.19	0.238	0.258		pCi/g	1.00	0.0921	129524
Thorium-230	1.11	0.228	0.247		pCi/g	1.00	0.0711	129524
Thorium-232	1.25	0.241	0.263		pCi/g	1.00	0.0634	129524

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128417

Lab ID:	680-102431-17	Analyzed:	07/02/14 18:12	Decay Corrected:	No
Client ID:	SD-233-02	Detector:	AV70	Yield Truncated:	No
Sigma:	2	Dil Fac:	1	Ts:	180

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.99	0.435	0.604		pCi/g	0.0432	6.13	81.4	30 - 110

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-128417/1-A	Thorium-228			-0.009679	U	pCi/g							
MB 160-128417/1-A	Thorium-230			0.03903	U	pCi/g							
MB 160-128417/1-A	Thorium-232			0.008210	U	pCi/g							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-128417/2-A	Thorium-230		24.5	25.66		pCi/g	105	81 - 118					

Matrix Spike ID:	Analyte	Parent Result	Spike Added	MS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
680-102431-5	Thorium-230	0.673	4.33	5.500		pCi/g	111	76 - 115	3				

Matrix Spike Duplicate ID:	Analyte	Parent Result	Spike Added	MSD Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
680-102431-5	Thorium-230	0.673	4.31	5.655	F1	pCi/g	116	76 - 115	3	0.11	0.32	1	

Glossary:

Ts = Count Duration, Sample

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102431-1

SDG No.: 680-102431-1

Batch Number: 128417 Batch Start Date: 06/24/14 15:13 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/02/14 14:51

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	Th-230 00023	TRM-2 00001		
MB 160-128417/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-128417/2		ExtChrom, A-01-R		0.4999 g	0.2 mL		0.4999 g		
680-102431-A-1-A	SD-229-SS	ExtChrom, A-01-R	T	1.0046 g	0.2 mL				
680-102431-A-2-A	SD-229-01	ExtChrom, A-01-R	T	0.9977 g	0.2 mL				
680-102431-A-3-A	SD-230-SS	ExtChrom, A-01-R	T	1.0035 g	0.2 mL				
680-102431-A-4-A	SD-230-01	ExtChrom, A-01-R	T	1.0038 g	0.2 mL				
680-102431-A-5-A	SD-230-02	ExtChrom, A-01-R	T	1.0006 g	0.2 mL				
680-102431-A-5-B MS	SD-230-02	ExtChrom, A-01-R	T	0.9969 g	0.2 mL	0.2 mL			
680-102431-A-5-C MSD	SD-230-02	ExtChrom, A-01-R	T	1.0020 g	0.2 mL	0.2 mL			
680-102431-A-7-A	SD-231-SS	ExtChrom, A-01-R	T	0.9995 g	0.2 mL				
680-102431-A-8-A	SD-231-01	ExtChrom, A-01-R	T	0.9985 g	0.2 mL				
680-102431-A-9-A	SD-231-02	ExtChrom, A-01-R	T	0.9974 g	0.2 mL				
680-102431-A-11-A	SD-232-SS	ExtChrom, A-01-R	T	0.9990 g	0.2 mL				
680-102431-A-12-A	SD-232-01	ExtChrom, A-01-R	T	0.9960 g	0.2 mL				
680-102431-A-13-A	SD-232-02	ExtChrom, A-01-R	T	0.9974 g	0.2 mL				
680-102431-A-15-A	SD-233-SS	ExtChrom, A-01-R	T	1.0024 g	0.2 mL				
680-102431-A-16-A	SD-233-01	ExtChrom, A-01-R	T	0.9990 g	0.2 mL				
680-102431-A-17-A	SD-233-02	ExtChrom, A-01-R	T	0.9984 g	0.2 mL				

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102431-1

SDG No.: 680-102431-1

Batch Number: 128417 Batch Start Date: 06/24/14 15:13 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/02/14 14:51

Batch Notes	
Balance ID	27050421
Column Analyst	nmn per scb
Column Date	7/2/14
CoPrecipitation Analyst	scb
CoPrecipitation Date	7/2/14
Person's name who witnessed reagent drop	nmn per scb
Analyst who added reagent	scb
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:12:32PM 7/2/2014

Sample

Sample Name: MB 160-128417/1-A
SampleType: Blank
: MB 160-128417/1-A
Sample Collection Date: 6/25/2014 9:57:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0000g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128417
AnalysisID: 613950

Analyst: 60040

Tracer

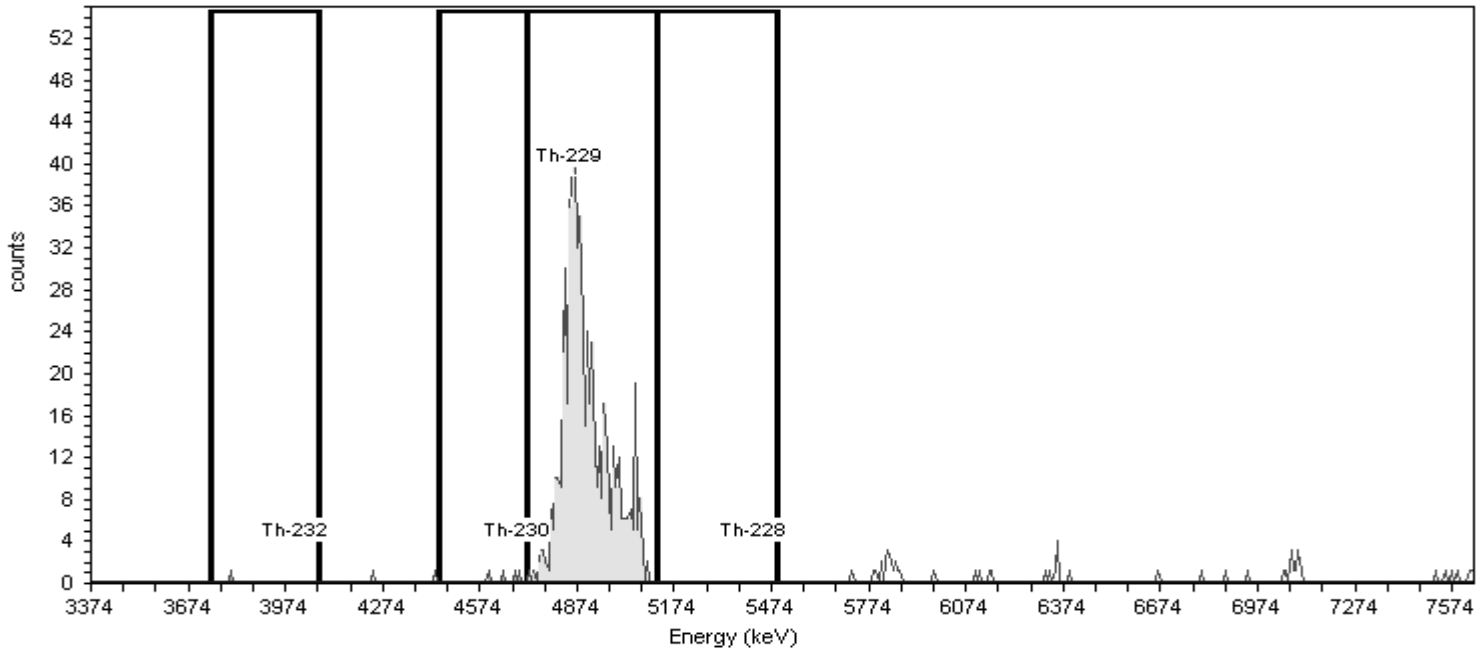
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 92.22%

Acquisition

Detector: AV46
Serial Number: 49-202GG2
Acquisition Start Date: 7/2/2014 6:11:30PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/19/2014 12:17:29AM
Background Info: Sample: ICB;AV46; Det: AV46; Spectrum #1; Jun-19-2014 00:17

Calibration Name: IC-9884;AV46-20140505
Calibration Date: 5/5/2014 10:10:09PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.80% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 6:06:59PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	44.5	100.2	1	0.1875	0.81	0.008	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	24.8	99.7	4	0.1875	3.84	0.039	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	81.4	99.6	603	0.9375	602.09	5.644	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	.0	99.8	0	0.9537	-0.95	-0.010	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:12:52PM 7/2/2014

Sample

Sample Name: LCS 160-128417/2-A
SampleType: Control
: LCS 160-128417/2-A
Sample Collection Date: 6/25/2014 9:57:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.4999g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128417
AnalysisID: 613951

Analyst: 60040

Tracer

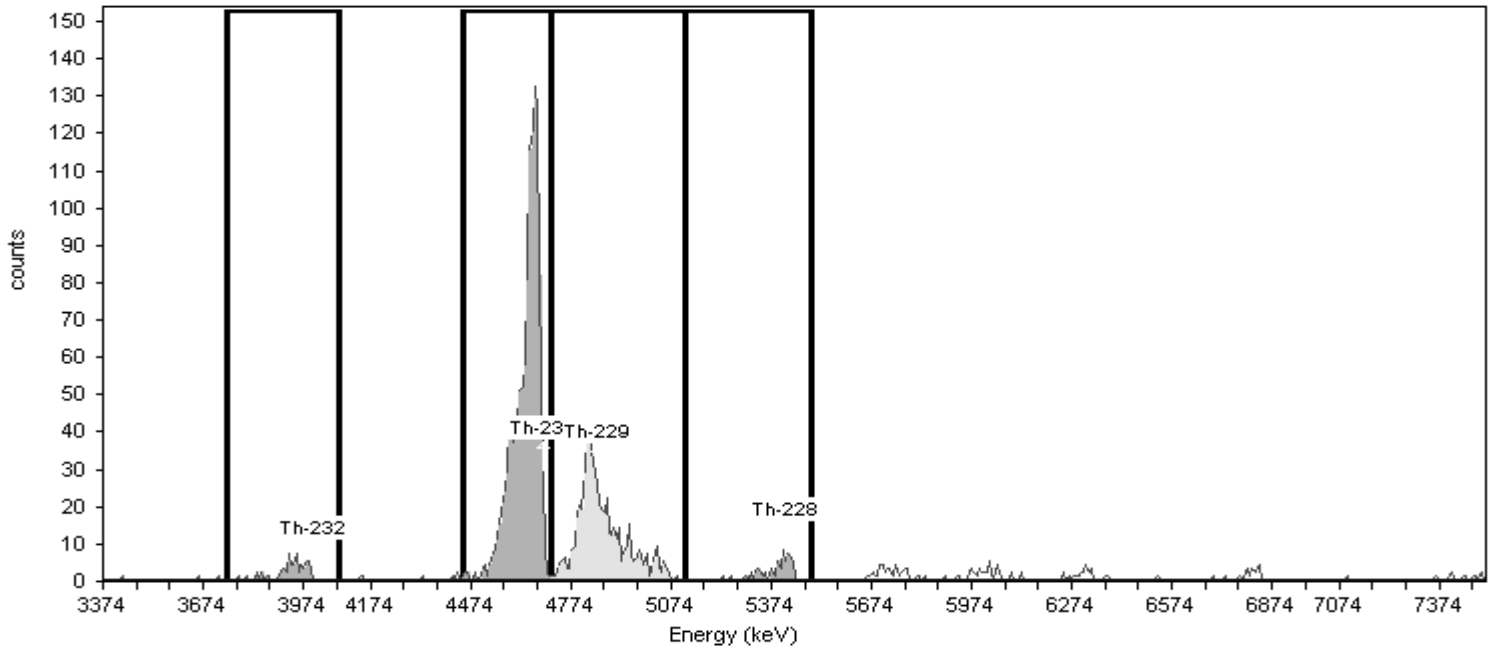
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 85.35%

Acquisition

Detector: AV49
Serial Number: 47-043hh4
Acquisition Start Date: 7/2/2014 6:11:31PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/19/2014 12:17:35AM
Background Info: Sample: ICB;AV49; Det: AV49; Spectrum #1; Jun-19-2014 00:17

Calibration Name: IC-7107;AV49-20140504
Calibration Date: 5/5/2014 6:52:38PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.53% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 6:06:59PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	86.3	100.2	60	0.9375	59.06	1.303	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	31.4	99.7	1159	1.6817	1157.01	25.659	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	81.0	99.6	553	1.4822	551.52	10.448	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	56.9	99.8	61	3.1755	57.82	1.282	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:13:10PM 7/2/2014

Sample

Sample Name: 680-102431-A-1-B
SampleType: Sample
: 680-102431-A-1-B
Sample Collection Date: 6/16/2014 12:05:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0046g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128417
AnalysisID: 613954

Analyst: 60040

Tracer

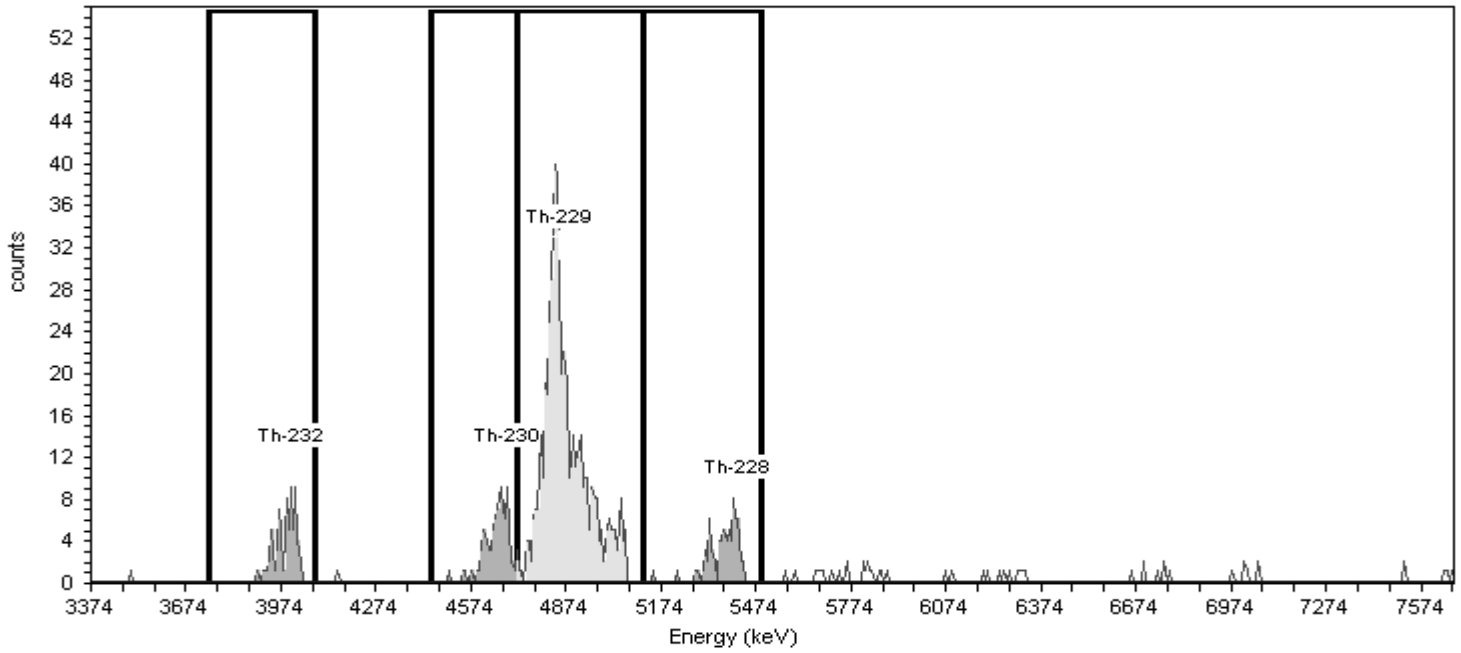
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 78.95%

Acquisition

Detector: AV53
Serial Number: 50-051A6
Acquisition Start Date: 7/2/2014 6:11:35PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:17:59AM
Background Info: Sample: ICB;AV53; Det: AV53; Spectrum #1;
Jun-19-2014 00:17

Calibration Name: IC-8877;AV53-20140504
Calibration Date: 5/5/2014 6:53:06PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.32% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 6:06:58PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	83.0	100.2	70	0.5625	69.44	0.831	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	32.9	99.7	84	1.3125	82.63	0.993	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	67.0	99.6	507	0.7500	506.19	4.809	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	92.7	99.8	71	1.5000	69.50	0.835	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:36:48AM 7/3/2014

Sample

Sample Name: 680-102431-A-1-B
SampleType: Sample
: 680-102431-A-1-B
Sample Collection Date: 6/16/2014 12:05:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0046g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128417
AnalysisID: 614028

Analyst: 60040

Tracer

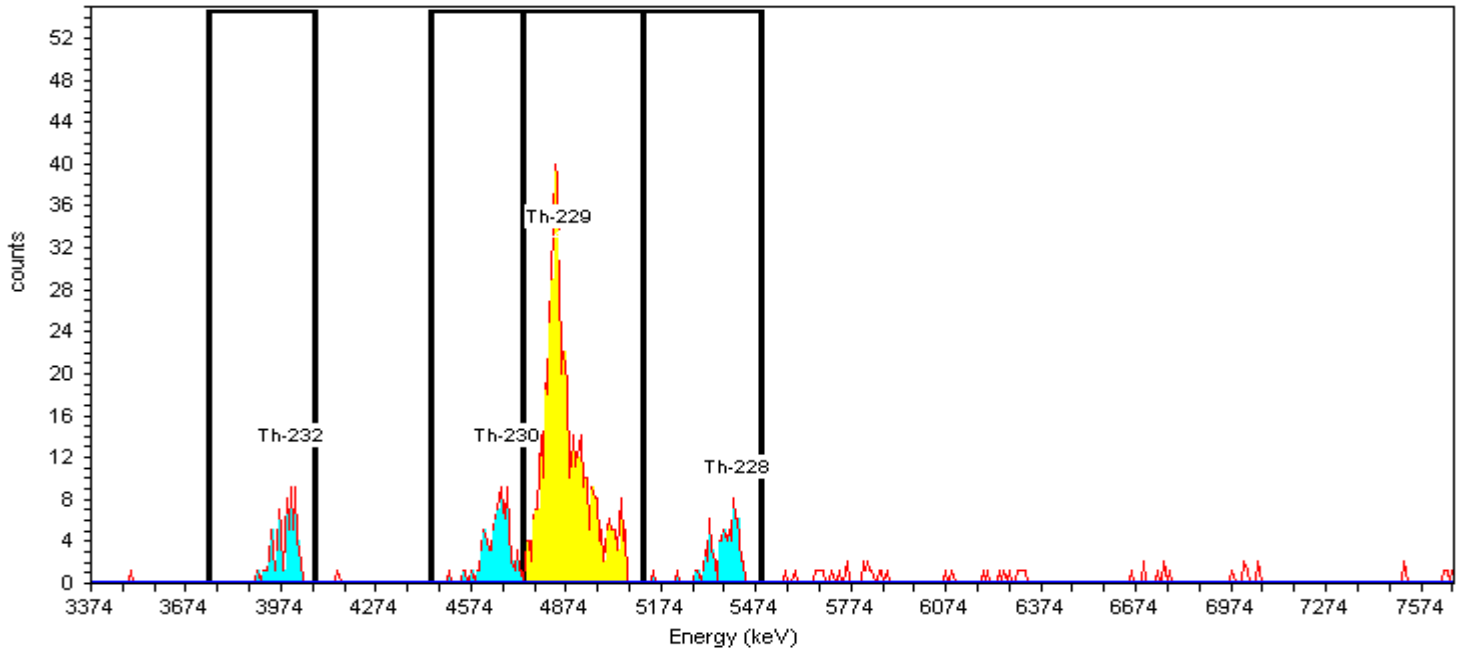
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 78.33%

Acquisition

Detector: AV53
Serial Number: 50-051A6
Acquisition Start Date: 7/2/2014 6:11:35PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:17:59AM
Background Info: Sample: ICB;AV53; Det: AV53; Spectrum #1; Jun-19-2014 00:17

Calibration Name: IC-8877;AV53-20140504
Calibration Date: 5/5/2014 6:53:06PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.32% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 6:06:58PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/3/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	83.0	100.2	70	0.5625	69.44	0.837	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4739.1	78.4	99.7	86	1.5000	84.50	1.024	pCi/g
Th-229	4848.0	4,845.3	2.7	4739.1	5119.5	67.0	99.6	503	0.7500	502.25	4.772	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	92.7	99.8	71	1.5000	69.50	0.842	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:13:16PM 7/2/2014

Sample

Sample Name: 680-102431-A-2-B
SampleType: Sample
: 680-102431-A-2-B
Sample Collection Date: 6/16/2014 12:10:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9977g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128417
AnalysisID: 613955

Analyst: 60040

Tracer

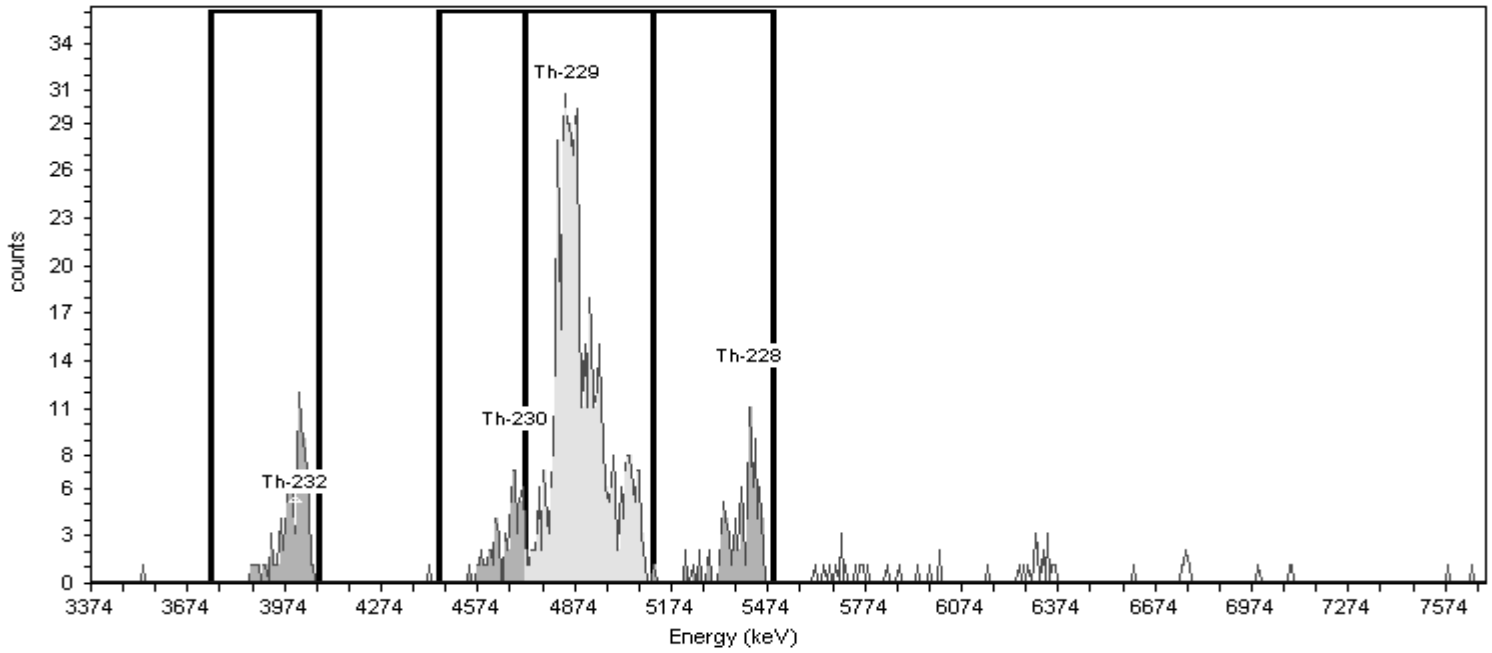
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 86.59%

Acquisition

Detector: AV54
Serial Number: 48-046II6
Acquisition Start Date: 7/2/2014 6:11:38PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:06AM
Background Info: Sample: ICB;AV54; Det: AV54; Spectrum #1;
Jun-19-2014 00:18

Calibration Name: IC-9520;AV54-20140504
Calibration Date: 5/5/2014 6:53:13PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.02% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 6:06:58PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	32.3	100.2	93	0.2672	92.73	1.030	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	296.8	99.7	60	1.1250	58.81	0.657	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	89.5	99.6	550	0.9375	548.94	5.311	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	49.9	99.8	89	2.9838	85.96	0.959	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:37:40AM 7/3/2014

Sample

Sample Name: 680-102431-A-2-B
SampleType: Sample
: 680-102431-A-2-B
Sample Collection Date: 6/16/2014 12:10:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9977g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128417
AnalysisID: 614029

Analyst: 60040

Tracer

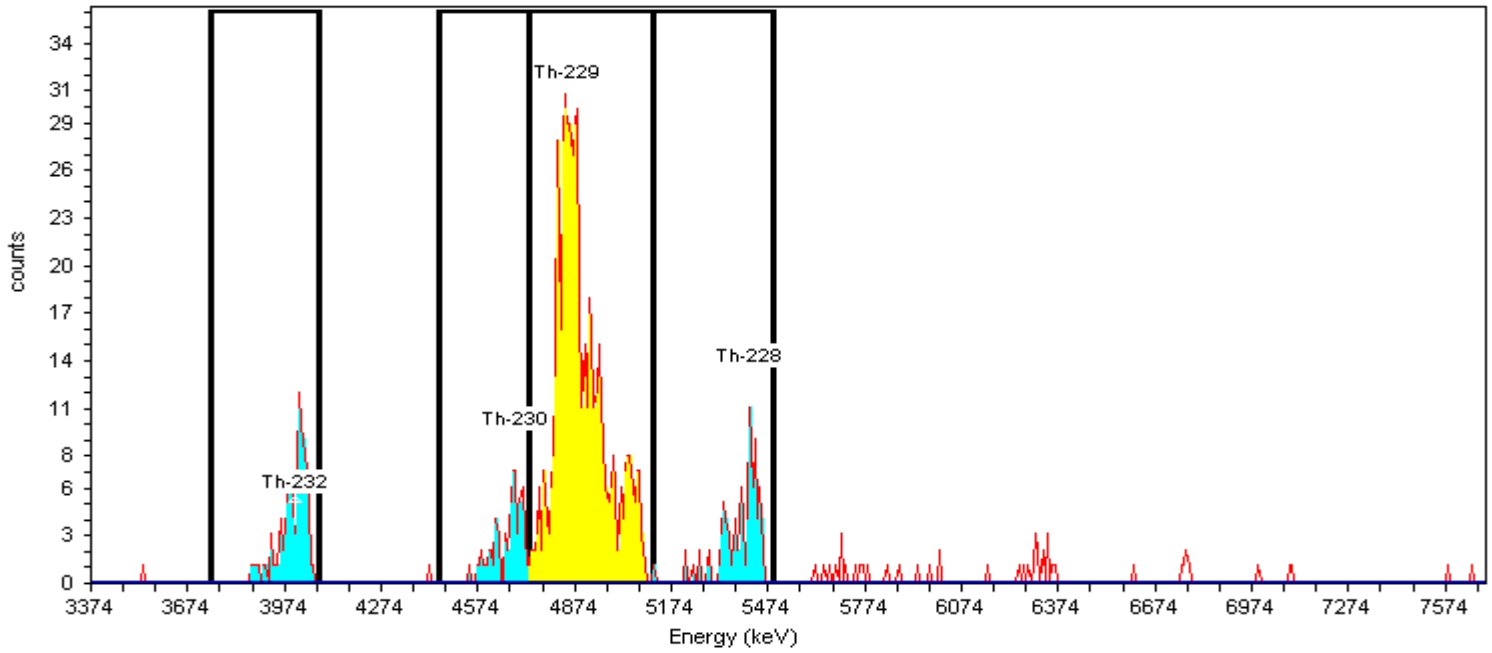
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 86.14%

Acquisition

Detector: AV54
Serial Number: 48-046II6
Acquisition Start Date: 7/2/2014 6:11:38PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:06AM
Background Info: Sample: ICB;AV54; Det: AV54; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-9520;AV54-20140504
Calibration Date: 5/5/2014 6:53:13PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.02% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 6:06:58PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/3/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	32.3	100.2	93	0.2672	92.73	1.036	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4731.7	39.9	99.7	62	1.1250	60.88	0.683	pCi/g
Th-229	4848.0	4,845.3	2.7	4731.7	5119.5	89.5	99.6	547	0.9375	546.06	5.284	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	49.9	99.8	89	2.9838	85.95	0.964	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:13:22PM 7/2/2014

Sample

Sample Name: 680-102431-A-3-B
SampleType: Sample
: 680-102431-A-3-B
Sample Collection Date: 6/16/2014 1:40:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0035g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128417
AnalysisID: 613956

Analyst: 60040

Tracer

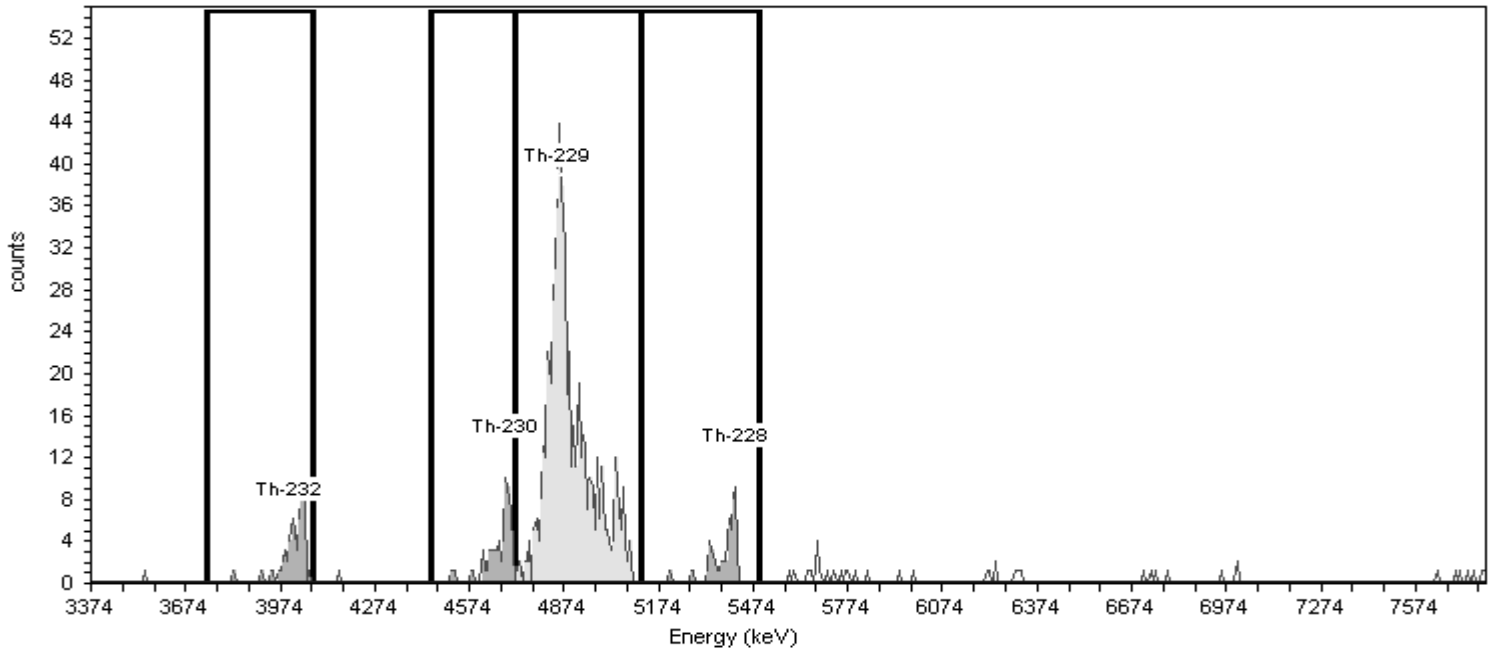
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 86.52%

Acquisition

Detector: AV55
Serial Number: 50-051C2
Acquisition Start Date: 7/2/2014 6:11:39PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:11AM
Background Info: Sample: ICB;AV55; Det: AV55; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-7107;AV55-20140507
Calibration Date: 5/7/2014 10:48:56PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.79% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 6:06:58PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	25.2	100.2	54	0.9375	53.06	0.570	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	28.8	99.7	60	0.9375	59.09	0.638	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	69.3	99.6	565	0.3750	564.66	5.276	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	45.4	99.8	52	1.3125	50.69	0.547	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:13:28PM 7/2/2014

Sample

Sample Name: 680-102431-A-4-B
SampleType: Sample
: 680-102431-A-4-B
Sample Collection Date: 6/16/2014 1:45:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0038g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128417
AnalysisID: 613957

Analyst: 60040

Tracer

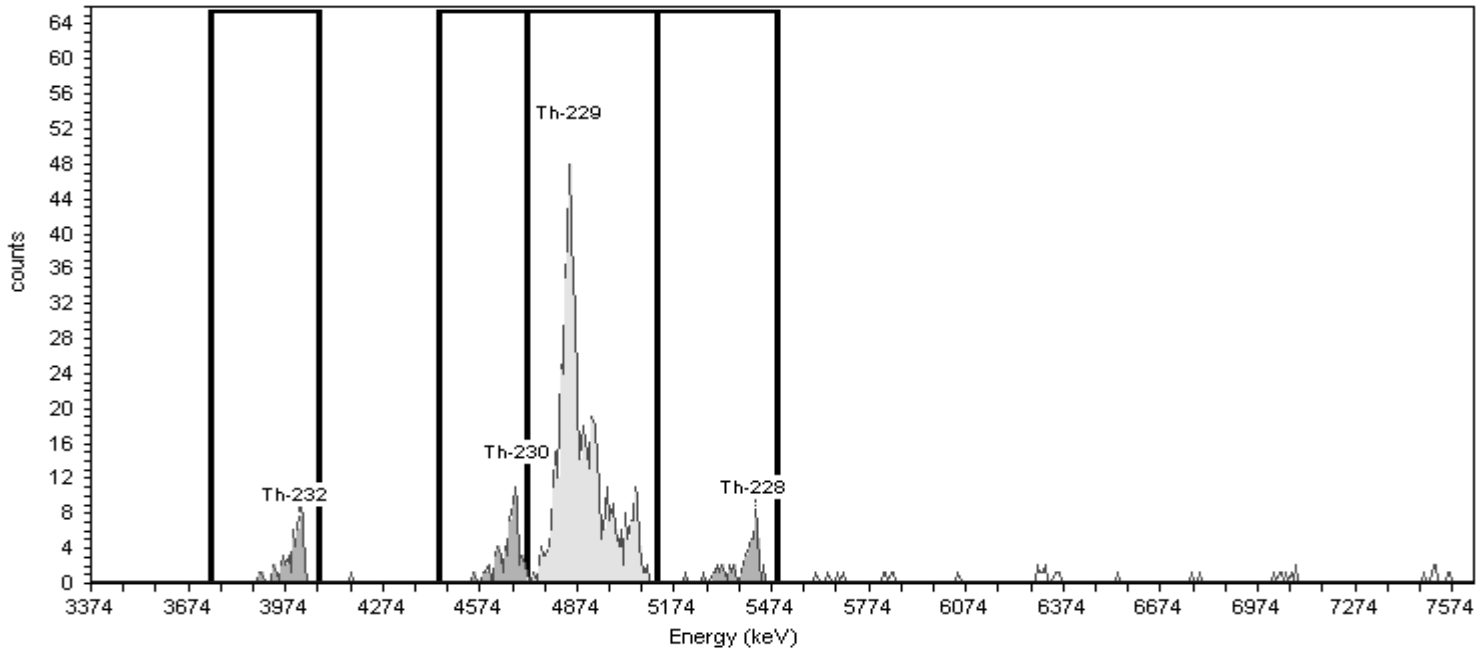
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 90.71%

Acquisition

Detector: AV56
Serial Number: 52-059EE5
Acquisition Start Date: 7/2/2014 6:11:40PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:17AM
Background Info: Sample: ICB;AV56; Det: AV56; Spectrum #1;
Jun-19-2014 00:18

Calibration Name: IC-9792;AV56-20140504
Calibration Date: 5/5/2014 6:53:34PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.09% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 6:06:58PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	52.9	100.2	50	0.3750	49.63	0.522	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	24.9	99.7	67	0.1875	66.78	0.706	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	65.3	99.6	577	0.5625	576.41	5.530	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	55.1	99.8	52	1.3125	50.69	0.535	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:13:38PM 7/2/2014

Sample

Sample Name: 680-102431-A-5-D
SampleType: Sample
: 680-102431-A-5-D
Sample Collection Date: 6/16/2014 1:50:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0006g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128417
AnalysisID: 613958

Analyst: 60040

Tracer

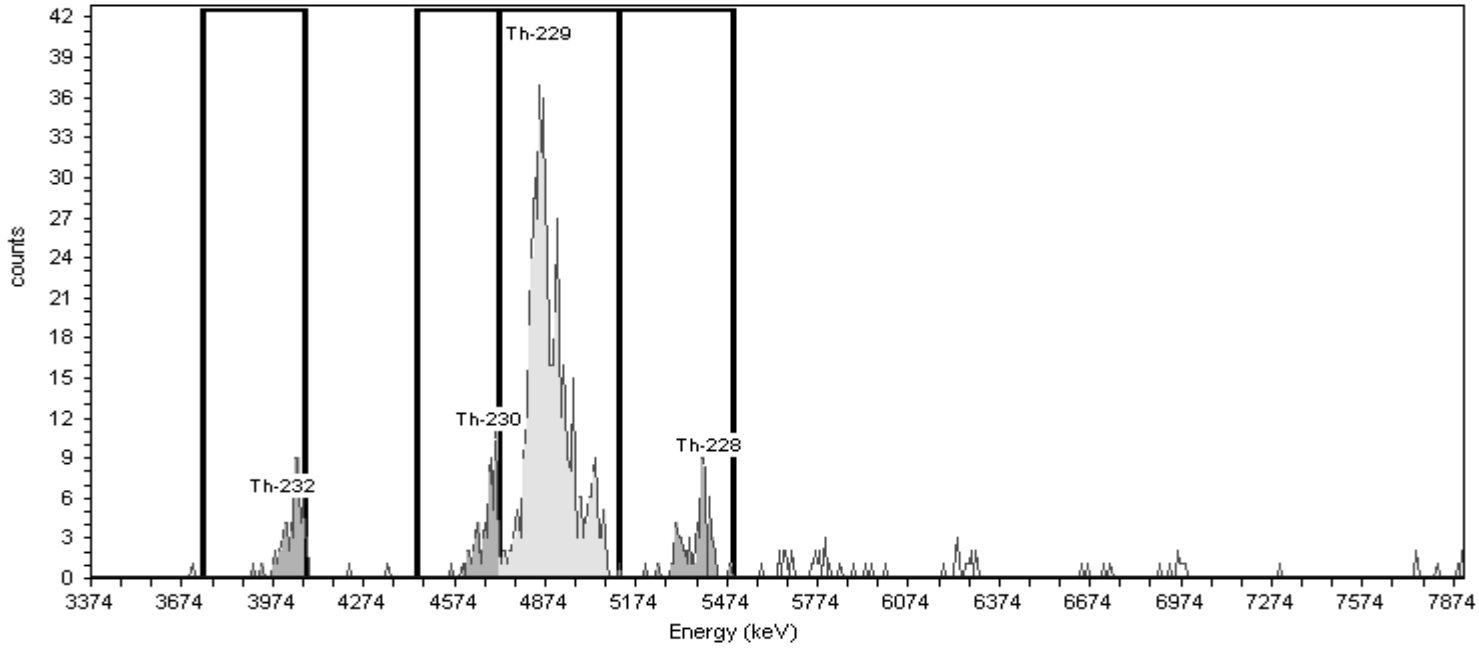
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 85.93%

Acquisition

Detector: AV57
Serial Number: 48-158EE3
Acquisition Start Date: 7/2/2014 6:11:42PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:24AM
Background Info: Sample: ICB;AV57; Det: AV57; Spectrum #1;
Jun-19-2014 00:18

Calibration Name: IC-9793;AV57-20140504
Calibration Date: 5/5/2014 6:53:40PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.74% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 6:06:58PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	36.5	100.2	54	0.7500	53.63	0.583	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	19.2	99.7	62	0.3750	61.59	0.673	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	104.9	99.6	562	2.2620	559.64	5.255	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	53.2	99.8	70	2.8082	67.13	0.733	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:13:46PM 7/2/2014

Sample

Sample Name: 680-102431-A-5-E MS
SampleType: Sample
: 680-102431-A-5-E MS
Sample Collection Date: 6/16/2014 1:50:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9969g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128417
AnalysisID: 613959

Analyst: 60040

Tracer

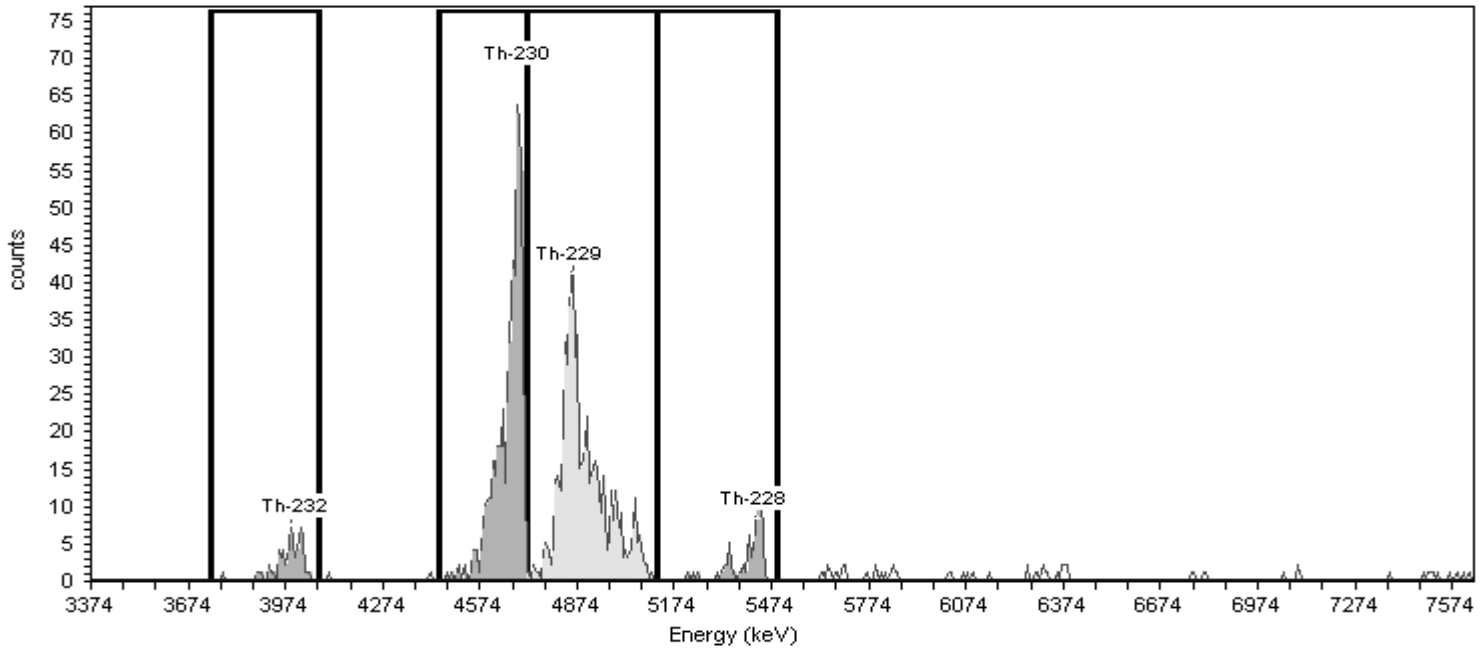
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 86.01%

Acquisition

Detector: AV58
Serial Number: 52-102 C5
Acquisition Start Date: 7/2/2014 6:11:44PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:31AM
Background Info: Sample: ICB;AV58; Det: AV58; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-9794;AV58-20140504
Calibration Date: 5/5/2014 6:53:46PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.56% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 6:06:58PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	81.7	100.2	61	0.2735	60.73	0.666	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	37.7	99.7	499	1.6933	497.31	5.482	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	69.4	99.6	557	0.5683	556.43	5.280	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	41.7	99.8	70	1.1250	68.88	0.759	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:39:44AM 7/3/2014

Sample

Sample Name: 680-102431-A-5-E MS
SampleType: Sample
: 680-102431-A-5-E MS
Sample Collection Date: 6/16/2014 1:50:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9969g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128417
AnalysisID: 614030

Analyst: 60040

Tracer

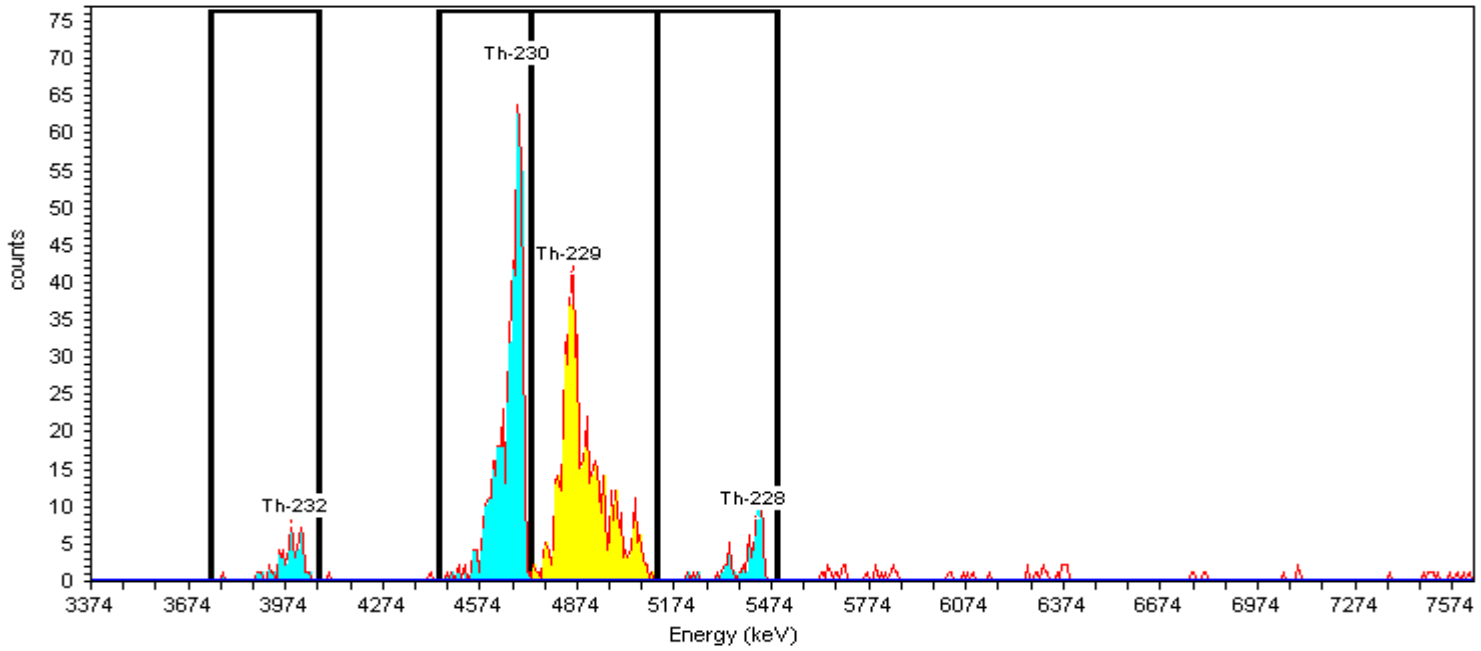
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 85.86%

Acquisition

Detector: AV58
Serial Number: 52-102 C5
Acquisition Start Date: 7/2/2014 6:11:44PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:31AM
Background Info: Sample: ICB;AV58; Det: AV58; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-9794;AV58-20140504
Calibration Date: 5/5/2014 6:53:46PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.56% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 6:06:58PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/3/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	81.7	100.2	61	0.2735	60.73	0.667	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4731.7	19.2	99.7	500	1.8750	498.13	5.500	pCi/g
Th-229	4848.0	4,845.3	2.7	4731.7	5119.5	69.4	99.6	556	0.5625	555.44	5.271	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	41.7	99.8	70	1.1250	68.88	0.760	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:13:52PM 7/2/2014

Sample

Sample Name: 680-102431-A-5-F MSD
SampleType: Sample
: 680-102431-A-5-F MSD
Sample Collection Date: 6/16/2014 1:50:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0020g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128417
AnalysisID: 613960

Analyst: 60040

Tracer

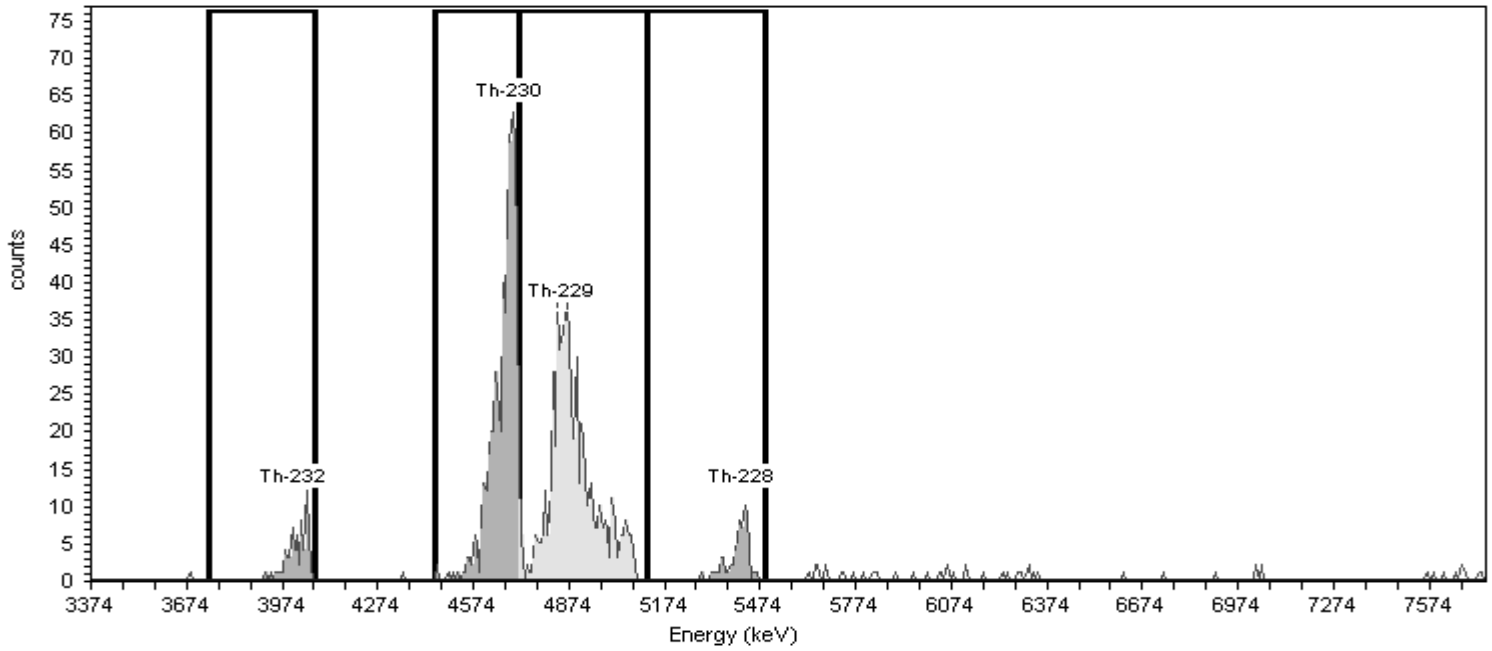
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 95.50%

Acquisition

Detector: AV60
Serial Number: 49-027117
Acquisition Start Date: 7/2/2014 6:11:46PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:33AM
Background Info: Sample: ICB;AV60; Det: AV60; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-9817;AV60-20140504
Calibration Date: 5/5/2014 6:53:59PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.33% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 6:06:58PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	29.8	100.2	67	0.5625	66.44	0.659	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	46.8	99.7	548	0.9375	546.75	5.447	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	96.2	99.6	613	0.1755	612.51	5.833	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	48.3	99.8	66	3.3630	62.64	0.624	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:40:27AM 7/3/2014

Sample

Sample Name: 680-102431-A-5-F MSD
SampleType: Sample
: 680-102431-A-5-F MSD
Sample Collection Date: 6/16/2014 1:50:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0020g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128417
AnalysisID: 614031

Analyst: 60040

Tracer

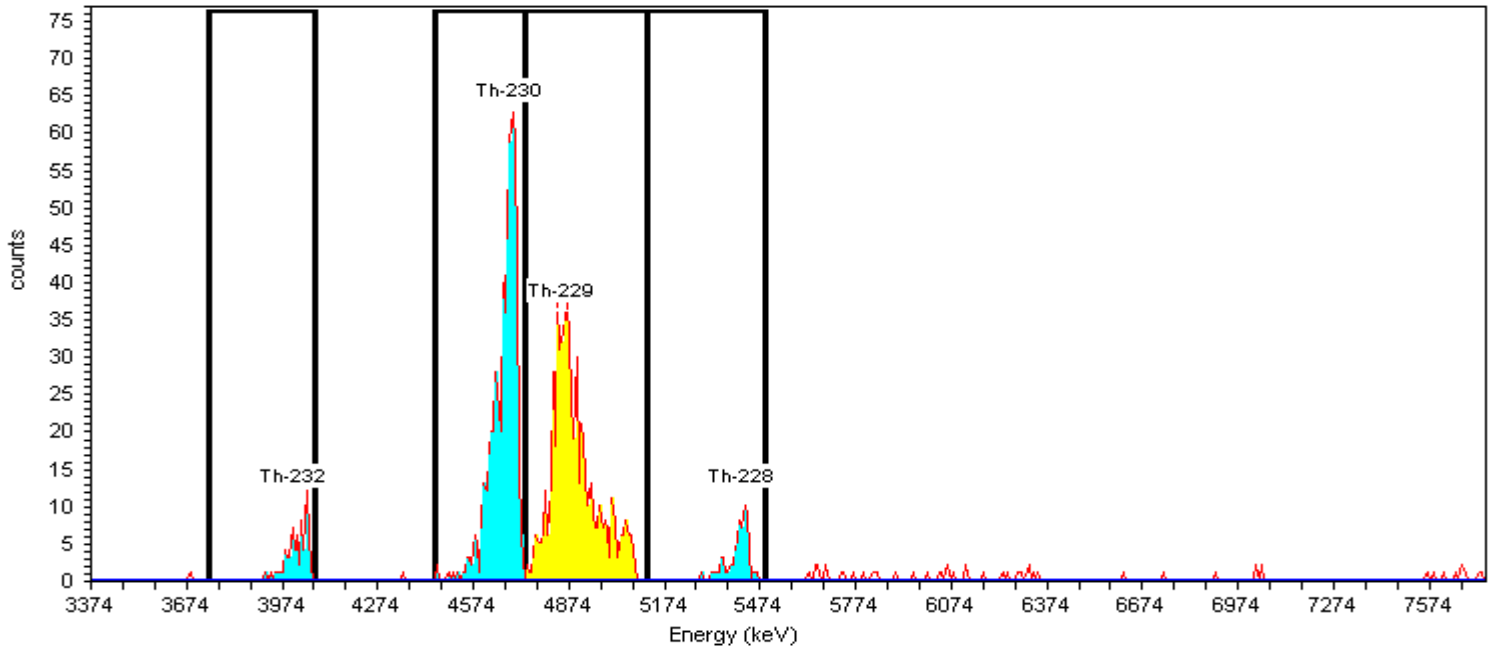
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 93.05%

Acquisition

Detector: AV60
Serial Number: 49-027117
Acquisition Start Date: 7/2/2014 6:11:46PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:33AM
Background Info: Sample: ICB;AV60; Det: AV60; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-9817;AV60-20140504
Calibration Date: 5/5/2014 6:53:59PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.33% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 6:06:58PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/3/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	29.8	100.2	67	0.5625	66.44	0.676	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4731.7	24.9	99.7	554	0.9375	553.06	5.655	pCi/g
Th-229	4848.0	4,845.3	2.7	4731.7	5119.5	96.2	99.6	597	0.1875	596.81	5.683	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	48.3	99.8	66	3.3630	62.64	0.640	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:13:58PM 7/2/2014

Sample

Sample Name: 680-102431-A-7-B
SampleType: Sample
: 680-102431-A-7-B
Sample Collection Date: 6/16/2014 2:10:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9995g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128417
AnalysisID: 613961

Analyst: 60040

Tracer

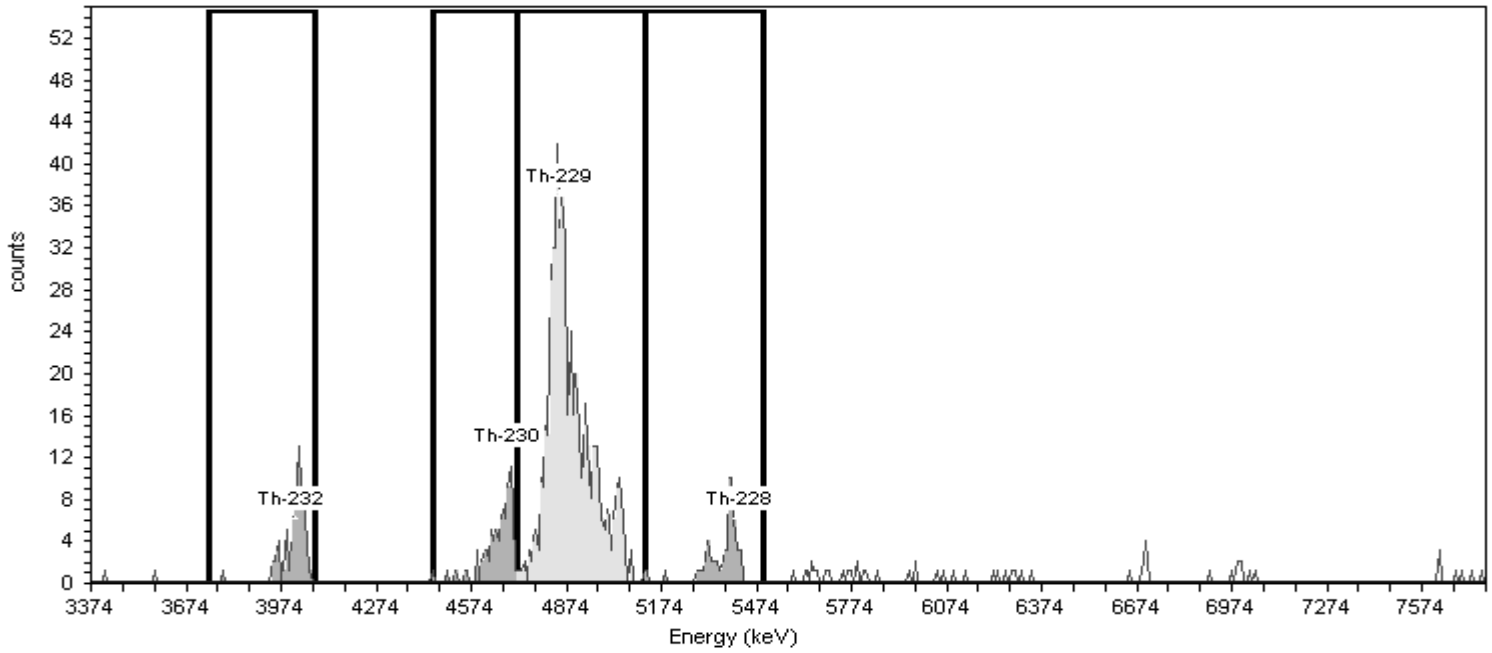
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 92.49%

Acquisition

Detector: AV61
Serial Number: 5-051JJ3
Acquisition Start Date: 7/2/2014 6:11:47PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:33AM
Background Info: Sample: ICB;AV61; Det: AV61; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-9884;AV61-20140504
Calibration Date: 5/5/2014 6:54:06PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.46% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 6:06:58PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	25.9	100.2	76	0.1875	75.81	0.774	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	36.4	99.7	84	0.1933	83.50	0.857	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	79.0	99.6	597	0.7558	596.18	5.663	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	50.7	99.8	65	2.6250	62.31	0.639	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:47:05AM 7/25/2014

Sample

Sample Name: 680-102431-A-8-B
SampleType: Sample
: 680-102431-A-8-B
Sample Collection Date: 6/16/2014 2:15:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9985g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128417
AnalysisID: 614032

Analyst: 60040

Tracer

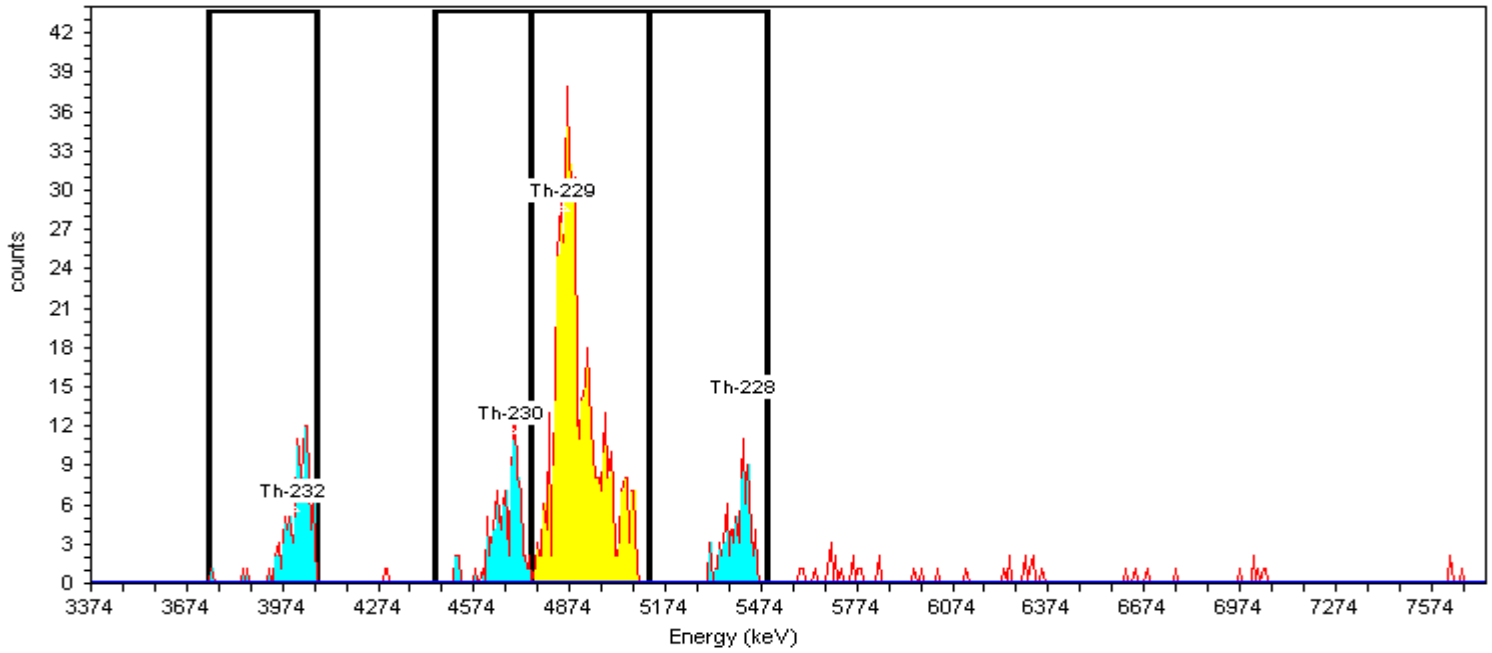
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 81.65%

Acquisition

Detector: AV62
Serial Number: 52-060FF2
Acquisition Start Date: 7/2/2014 6:11:49PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:34AM
Background Info: Sample: ICB;AV62; Det: AV62; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-9885;AV62-20140504
Calibration Date: 5/5/2014 6:54:13PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.34% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 6:06:59PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	33.4	100.2	102	0.0000	102.18	1.188	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4754.1	44.5	99.7	106	0.3750	105.63	1.235	pCi/g
Th-229	4848.0	4,845.3	2.7	4754.1	5119.5	71.3	99.6	524	0.1875	523.81	5.004	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	75.3	99.8	81	1.3125	79.69	0.931	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:14:09PM 7/2/2014

Sample

Sample Name: 680-102431-A-9-B
SampleType: Sample
: 680-102431-A-9-B
Sample Collection Date: 6/16/2014 2:20:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9974g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128417
AnalysisID: 613963

Analyst: 60040

Tracer

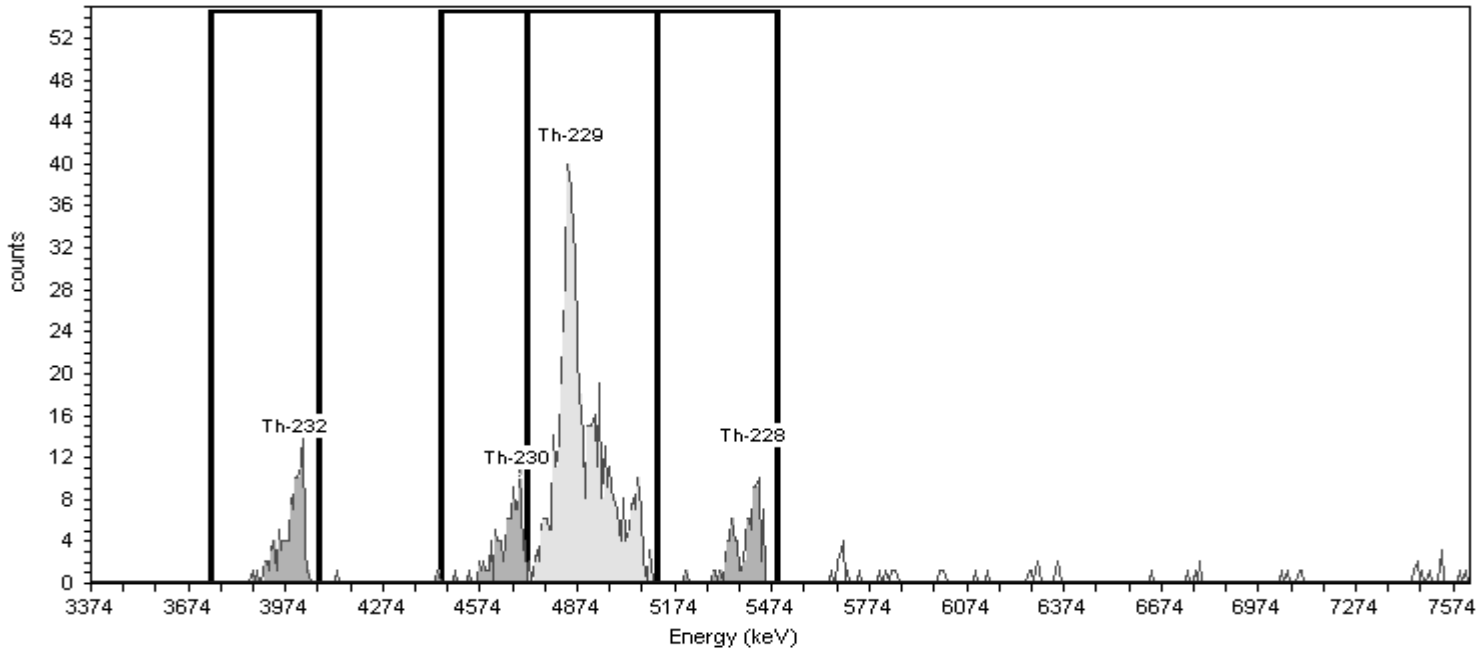
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 92.50%

Acquisition

Detector: AV63
Serial Number: 47-029ff2
Acquisition Start Date: 7/2/2014 6:11:50PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:35AM
Background Info: Sample: ICB;AV63; Det: AV63; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-9886;AV63-20140504
Calibration Date: 5/5/2014 6:54:19PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.48% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 6:06:59PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	60.6	100.2	100	0.0860	99.91	1.061	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	34.6	99.7	84	1.1192	83.25	0.889	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	65.9	99.6	575	0.9317	574.13	5.675	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	50.9	99.8	86	3.7500	82.25	0.878	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:14:15PM 7/2/2014

Sample

Sample Name: 680-102431-A-11-B
SampleType: Sample
: 680-102431-A-11-B
Sample Collection Date: 6/16/2014 3:20:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9990g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128417
AnalysisID: 613964

Analyst: 60040

Tracer

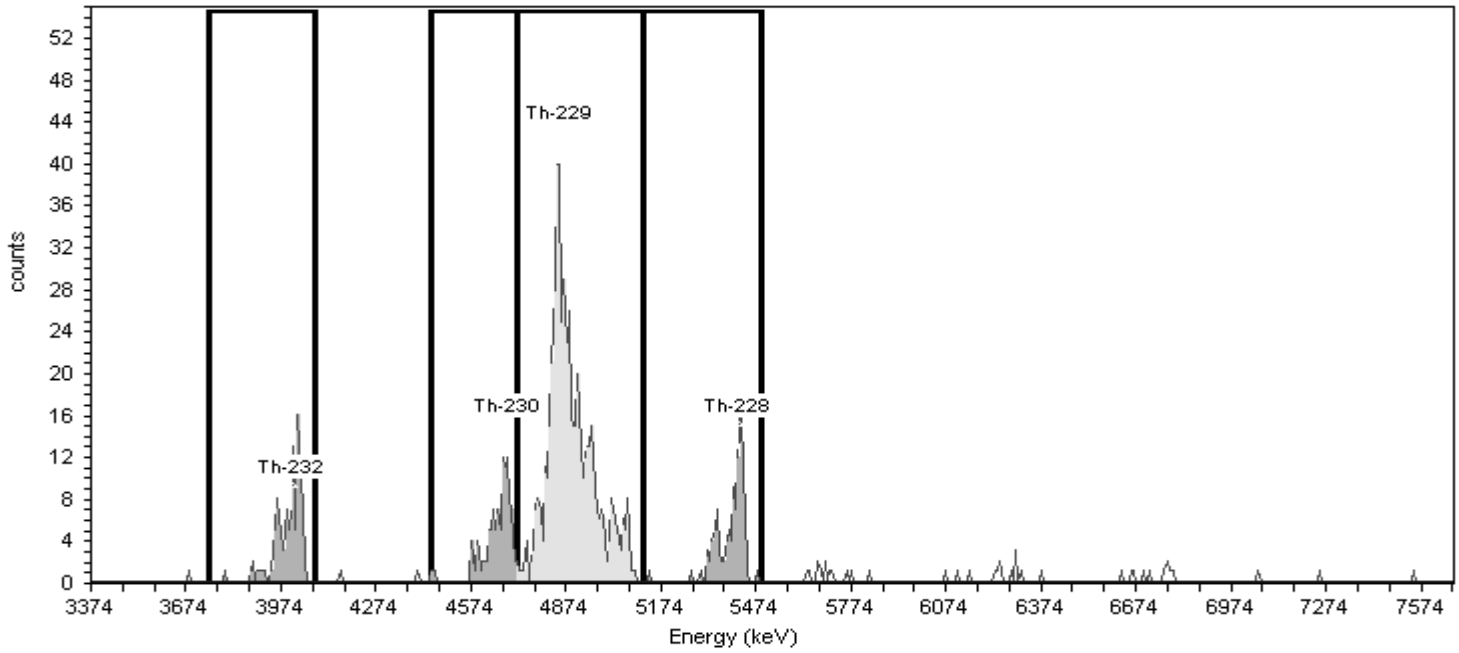
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 80.52%

Acquisition

Detector: AV64
Serial Number: 47-029ee4
Acquisition Start Date: 7/2/2014 6:11:53PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:36AM
Background Info: Sample: ICB;AV64; Det: AV64; Spectrum #1;
Jun-19-2014 00:18

Calibration Name: IC-7107;AV64-20140504a
Calibration Date: 5/4/2014 8:44:03PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.75% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 6:06:58PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	34.1	100.2	107	0.1875	106.81	1.195	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	36.7	99.7	107	0.5625	106.10	1.193	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	80.0	99.6	545	0.7620	544.21	4.932	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	53.6	99.8	108	1.8870	106.11	1.193	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:31:37AM 7/3/2014

Sample

Sample Name: 680-102431-A-11-B
SampleType: Sample
: 680-102431-A-11-B
Sample Collection Date: 6/16/2014 3:20:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9990g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128417
AnalysisID: 614023

Analyst: 60040

Tracer

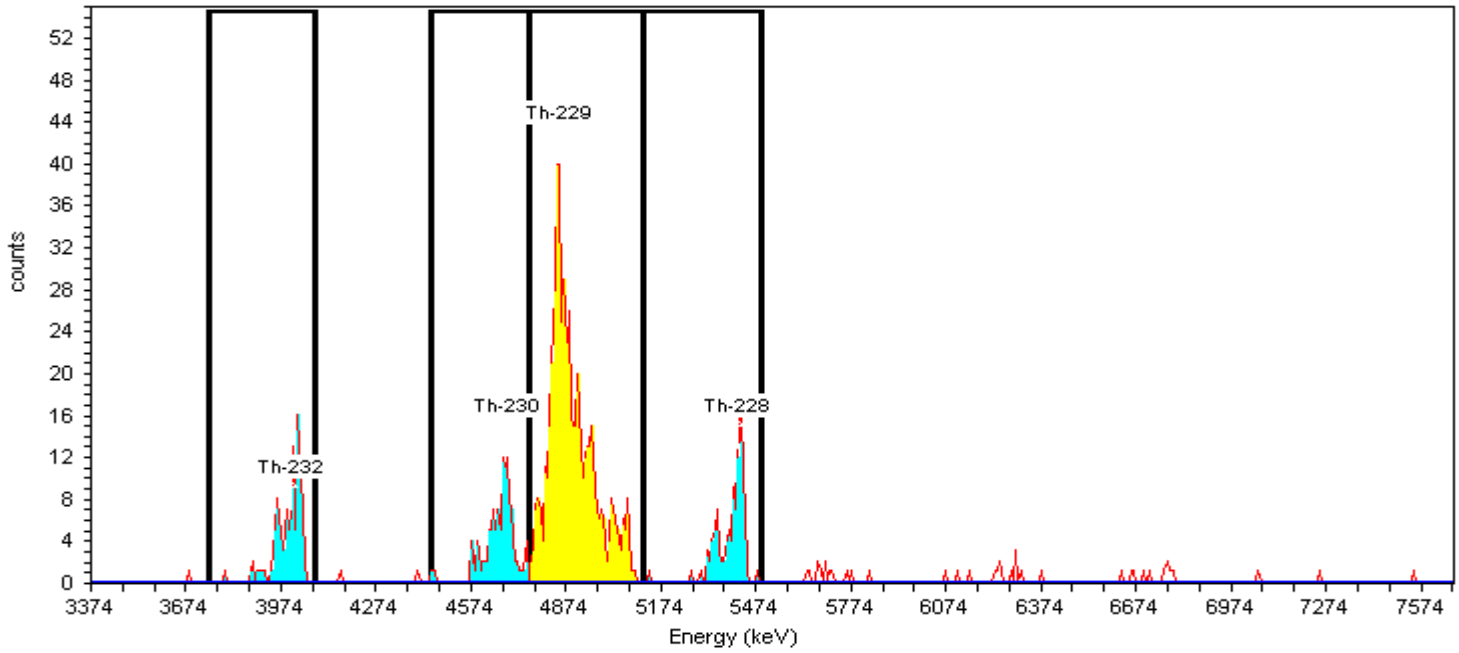
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 79.31%

Acquisition

Detector: AV64
Serial Number: 47-029ee4
Acquisition Start Date: 7/2/2014 6:11:53PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:36AM
Background Info: Sample: ICB;AV64; Det: AV64; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-7107;AV64-20140504a
Calibration Date: 5/4/2014 8:44:03PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 27.75% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 6:06:58PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/3/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	34.1	100.2	107	0.1875	106.81	1.213	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4754.1	66.2	99.7	114	0.5625	113.44	1.295	pCi/g
Th-229	4848.0	4,845.3	2.7	4754.1	5119.5	80.0	99.6	537	0.9375	536.06	4.859	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	53.6	99.8	108	1.8870	106.11	1.211	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:14:21PM 7/2/2014

Sample

Sample Name: 680-102431-A-12-B
SampleType: Sample
: 680-102431-A-12-B
Sample Collection Date: 6/16/2014 3:25:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9960g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128417
AnalysisID: 613965

Analyst: 60040

Tracer

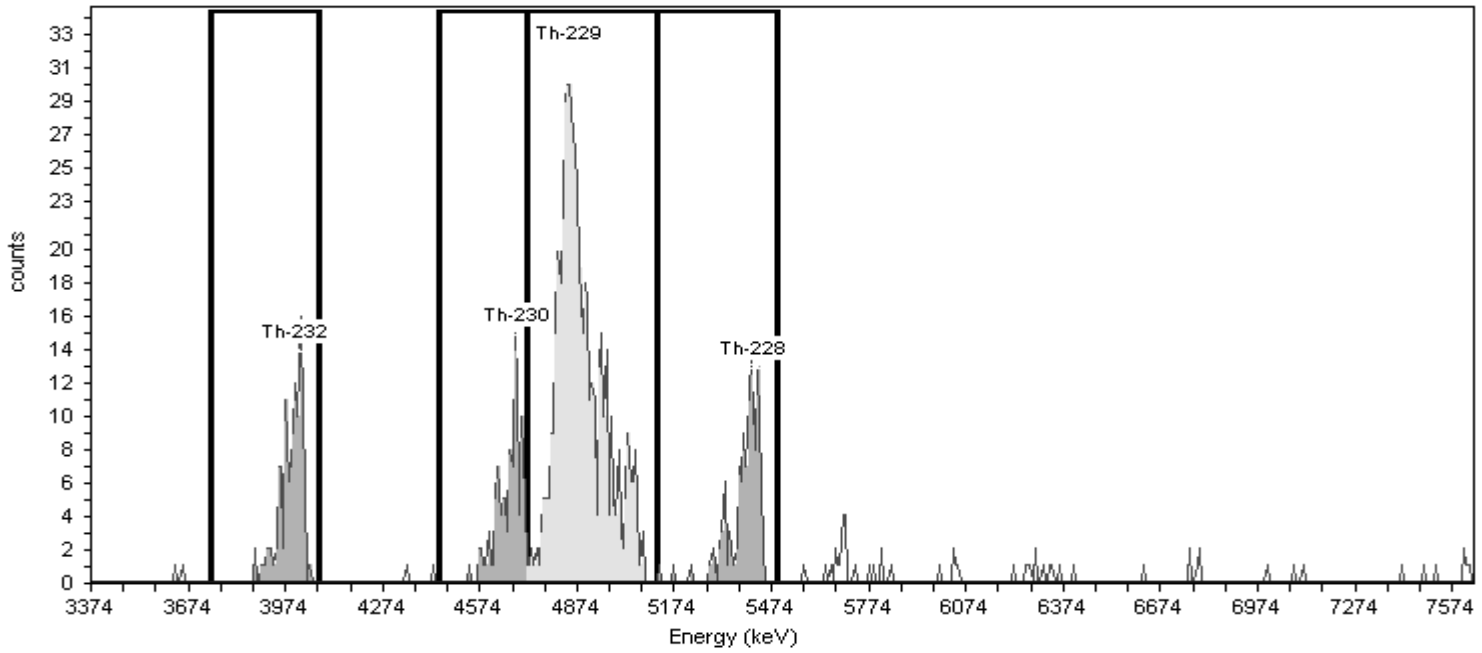
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 78.89%

Acquisition

Detector: AV65
Serial Number: 44-049JJ1
Acquisition Start Date: 7/2/2014 6:11:54PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 7:57:24PM
Background Info: Sample: ICB;AV65; Det: AV65; Spectrum #1; Jun-19-2014 19:57

Calibration Name: IC-8874;AV65-20140504
Calibration Date: 5/4/2014 8:43:55PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.13% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 6:06:58PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	70.8	100.2	117	0.3750	116.63	1.366	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	37.7	99.7	104	0.3750	103.63	1.220	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	94.2	99.6	522	0.5625	521.44	4.847	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	67.4	99.8	121	4.1250	116.88	1.375	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:14:26PM 7/2/2014

Sample

Sample Name: 680-102431-A-13-B
SampleType: Sample
: 680-102431-A-13-B
Sample Collection Date: 6/16/2014 3:30:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9974g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128417
AnalysisID: 613966

Analyst: 60040

Tracer

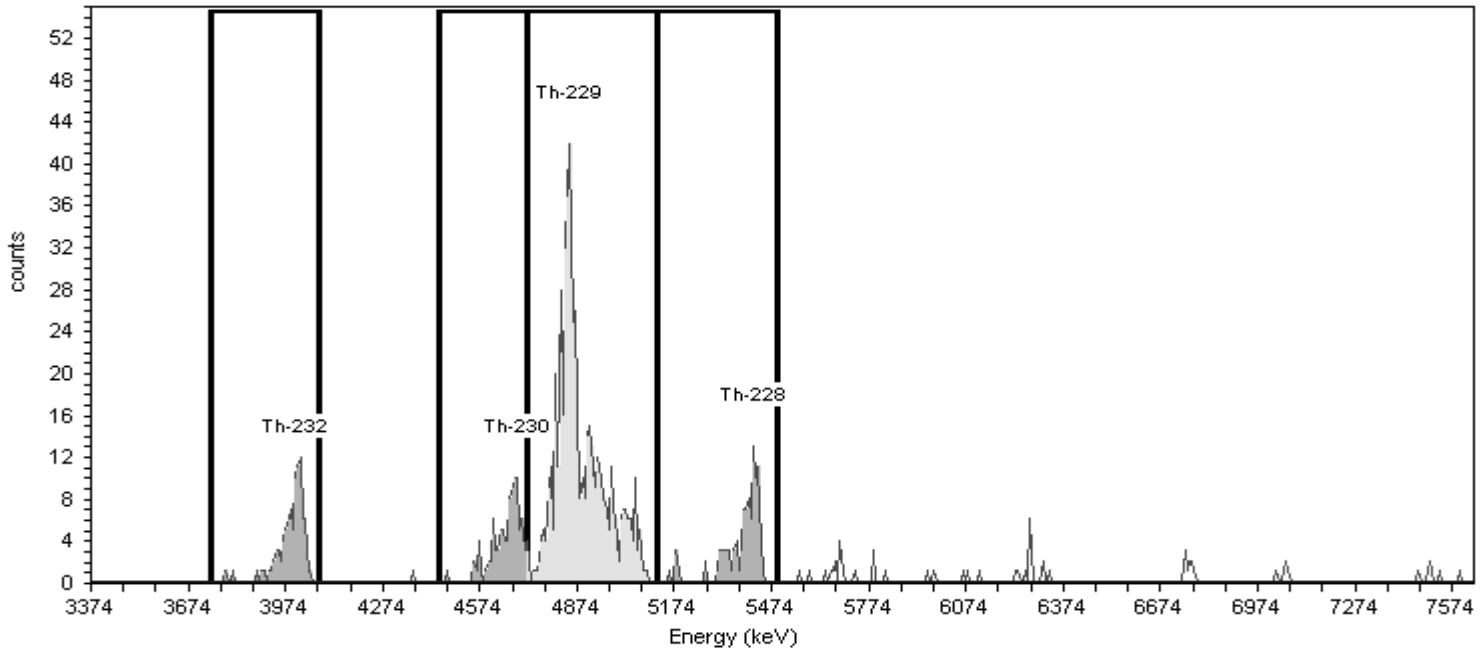
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 80.94%

Acquisition

Detector: AV66
Serial Number: 48-158EE2
Acquisition Start Date: 7/2/2014 6:11:56PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:38AM
Background Info: Sample: ICB;AV66; Det: AV66; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-8875;AV66-20140504
Calibration Date: 5/4/2014 8:44:10PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.93% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 6:06:58PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	56.9	100.2	93	0.3750	92.63	1.105	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	38.2	99.7	99	1.1308	97.81	1.173	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	62.0	99.6	513	1.7053	511.23	4.966	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	58.7	99.8	102	3.0120	98.99	1.186	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:32:35AM 7/3/2014

Sample

Sample Name: 680-102431-A-13-B
SampleType: Sample
: 680-102431-A-13-B
Sample Collection Date: 6/16/2014 3:30:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9974g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128417
AnalysisID: 614024

Analyst: 60040

Tracer

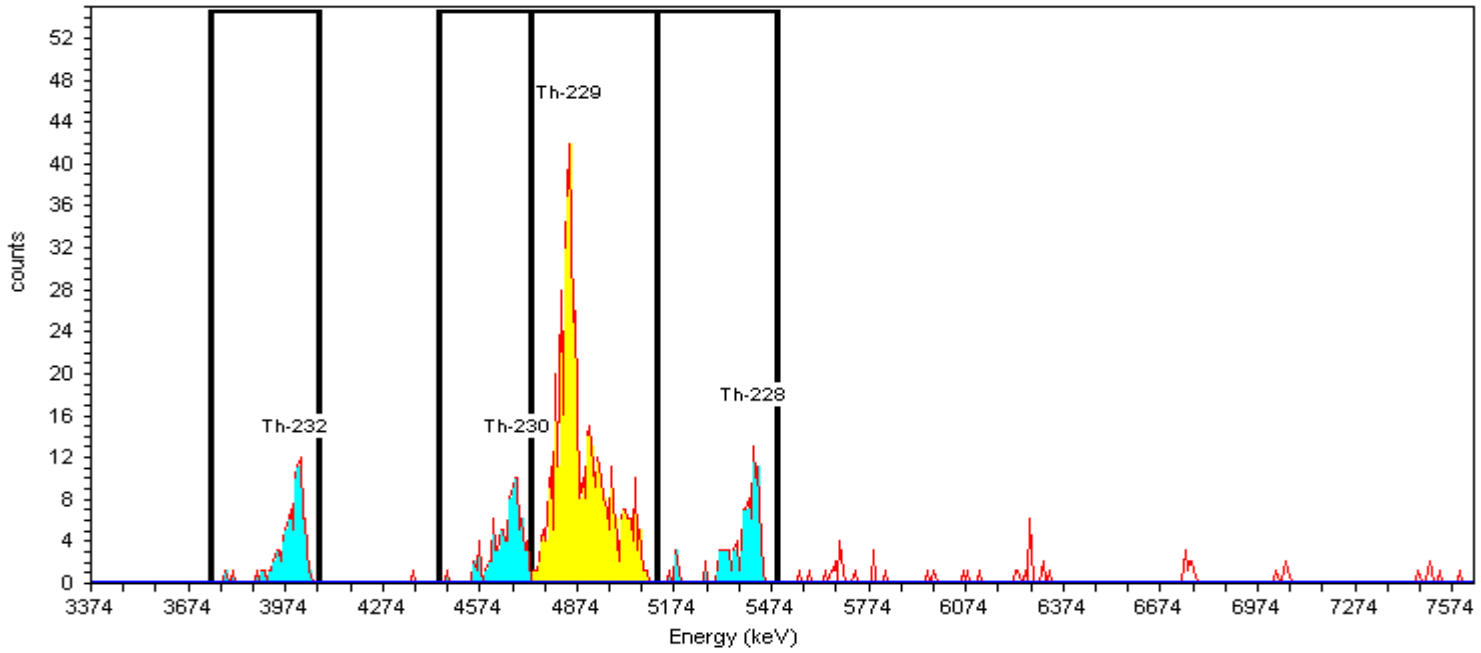
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 80.29%

Acquisition

Detector: AV66
Serial Number: 48-158EE2
Acquisition Start Date: 7/2/2014 6:11:56PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/19/2014 12:18:38AM
Background Info: Sample: ICB;AV66; Det: AV66; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-8875;AV66-20140504
Calibration Date: 5/4/2014 8:44:10PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.93% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 6:06:58PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/3/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	56.9	100.2	93	0.3750	92.63	1.114	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4731.7	62.8	99.7	101	1.3125	99.69	1.205	pCi/g
Th-229	4848.0	4,845.3	2.7	4731.7	5119.5	62.0	99.6	509	1.8750	507.13	4.927	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	58.7	99.8	102	3.0120	98.99	1.196	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:14:32PM 7/2/2014

Sample

Sample Name: 680-102431-A-15-B
SampleType: Sample
: 680-102431-A-15-B
Sample Collection Date: 6/16/2014 3:40:00PM

Spectrum #1 Analysis #1
Sample Weight : 1.0024g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128417
AnalysisID: 613967

Analyst: 60040

Tracer

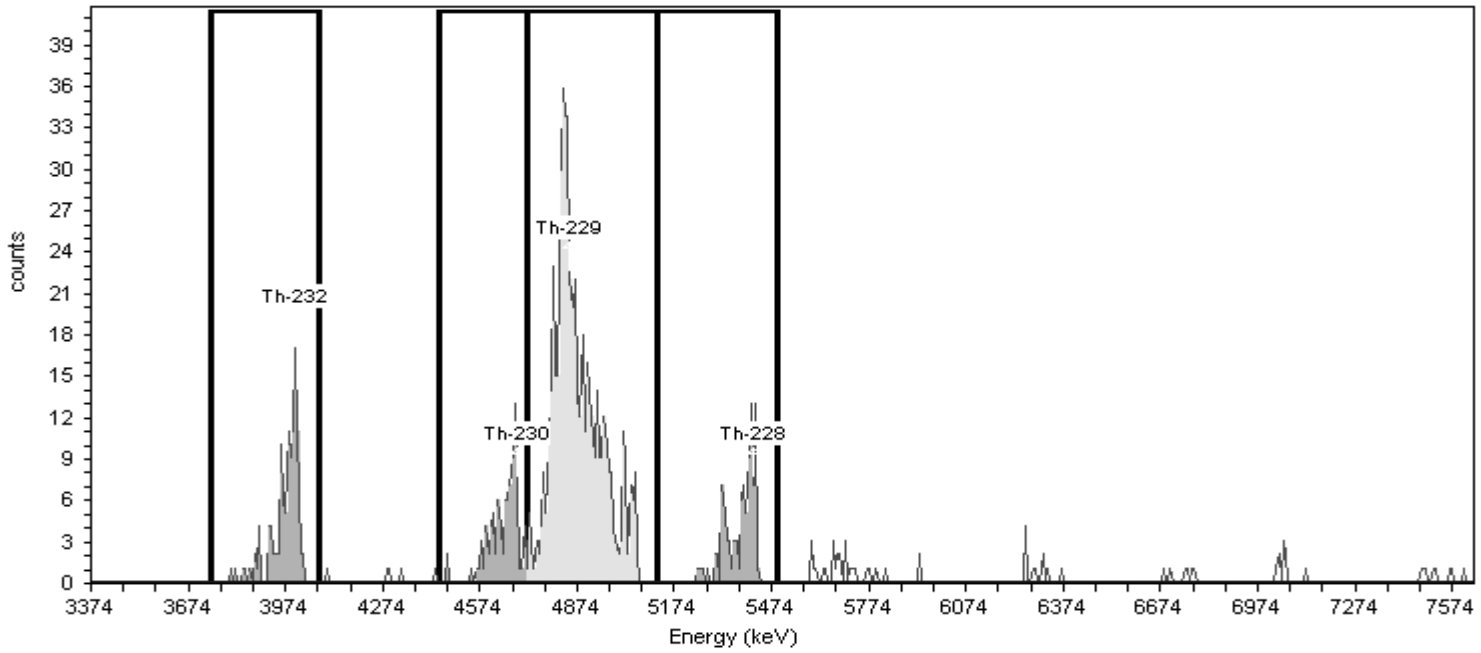
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 80.37%

Acquisition

Detector: AV67
Serial Number: 52-102 D7
Acquisition Start Date: 7/2/2014 6:11:57PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/19/2014 12:18:39AM
Background Info: Sample: ICB;AV67; Det: AV67; Spectrum #1;
Jun-19-2014 00:18

Calibration Name: IC-8876;AV67-20140504
Calibration Date: 5/4/2014 8:44:15PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.32% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 6:06:58PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	54.8	100.2	110	0.6422	109.36	1.241	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	21.8	99.7	93	0.5625	92.56	1.055	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	77.8	99.6	535	0.1875	534.94	4.907	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	52.3	99.8	95	1.6875	93.31	1.063	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:14:38PM 7/2/2014

Sample

Sample Name: 680-102431-A-16-B
SampleType: Sample
: 680-102431-A-16-B
Sample Collection Date: 6/16/2014 3:45:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9990g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128417
AnalysisID: 613968

Analyst: 60040

Tracer

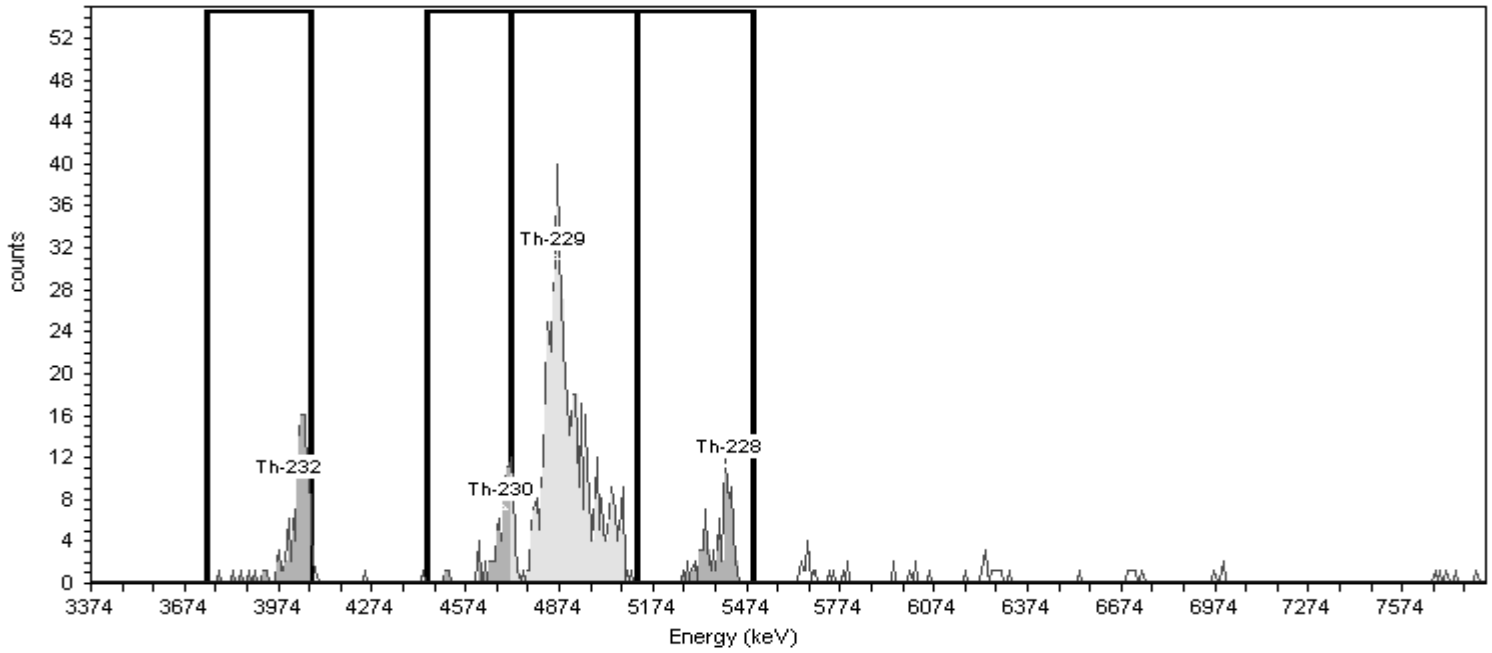
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 88.55%

Acquisition

Detector: AV69
Serial Number: 49-155DD5
Acquisition Start Date: 7/2/2014 6:11:59PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/19/2014 12:18:42AM
Background Info: Sample: ICB;AV69; Det: AV69; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-9520;AV69-20140504
Calibration Date: 5/4/2014 8:44:28PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.57% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 6:06:58PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	55.7	100.2	109	0.0000	109.21	1.206	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	.0	99.7	71	0.1875	70.72	0.785	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	74.0	99.6	552	0.3750	551.53	5.425	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	49.4	99.8	86	1.5000	84.50	0.937	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:34:15AM 7/3/2014

Sample

Sample Name: 680-102431-A-16-B
SampleType: Sample
: 680-102431-A-16-B
Sample Collection Date: 6/16/2014 3:45:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9990g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128417
AnalysisID: 614026

Analyst: 60040

Tracer

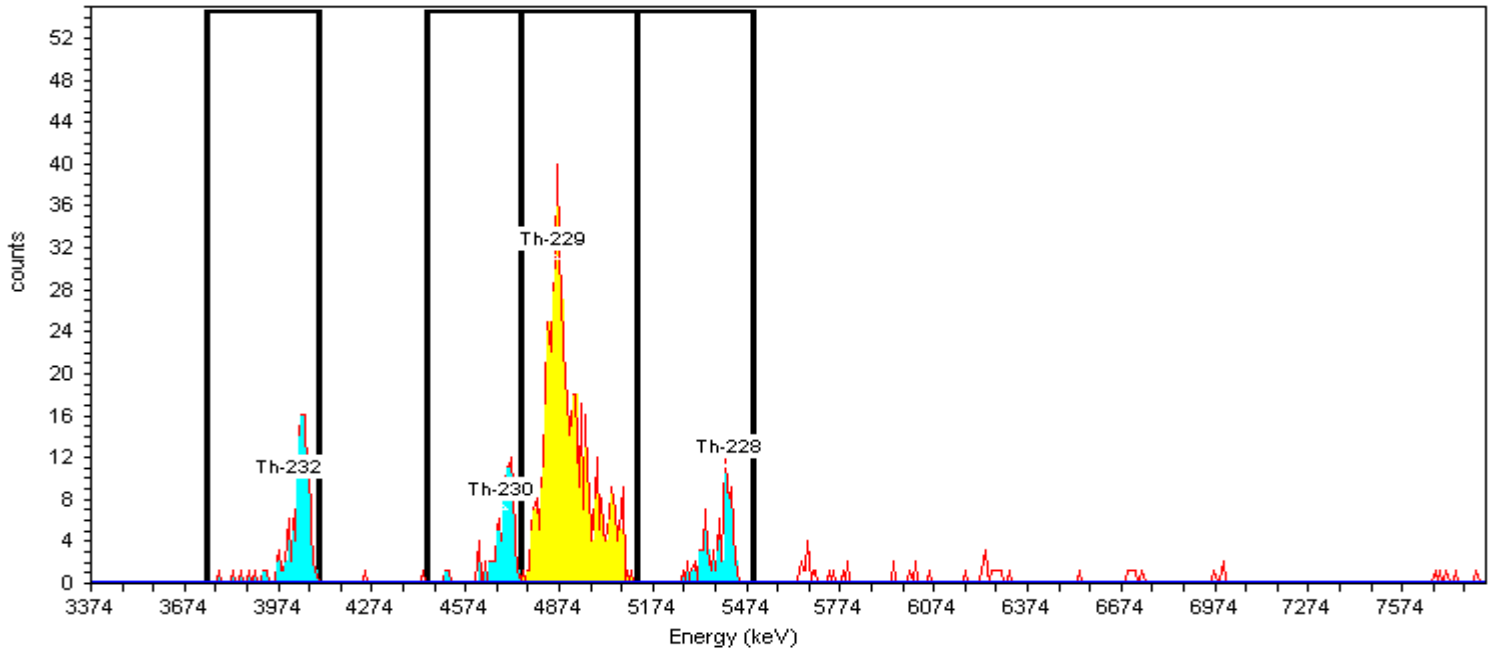
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 85.84%

Acquisition

Detector: AV69
Serial Number: 49-155DD5
Acquisition Start Date: 7/2/2014 6:11:59PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/19/2014 12:18:42AM
Background Info: Sample: ICB;AV69; Det: AV69; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-9520;AV69-20140504
Calibration Date: 5/4/2014 8:44:28PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.57% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 6:06:58PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/3/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3739.8	4097.8	37.6	100.2	121	0.1875	120.81	1.376	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4746.6	26.4	99.7	85	0.1875	84.81	0.971	pCi/g
Th-229	4848.0	4,845.3	2.7	4746.6	5119.5	74.0	99.6	535	0.3750	534.63	5.258	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	49.4	99.8	86	1.5000	84.50	0.967	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:14:43PM 7/2/2014

Sample

Sample Name: 680-102431-A-17-B
SampleType: Sample
: 680-102431-A-17-B
Sample Collection Date: 6/16/2014 3:50:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9984g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128417
AnalysisID: 613969

Analyst: 60040

Tracer

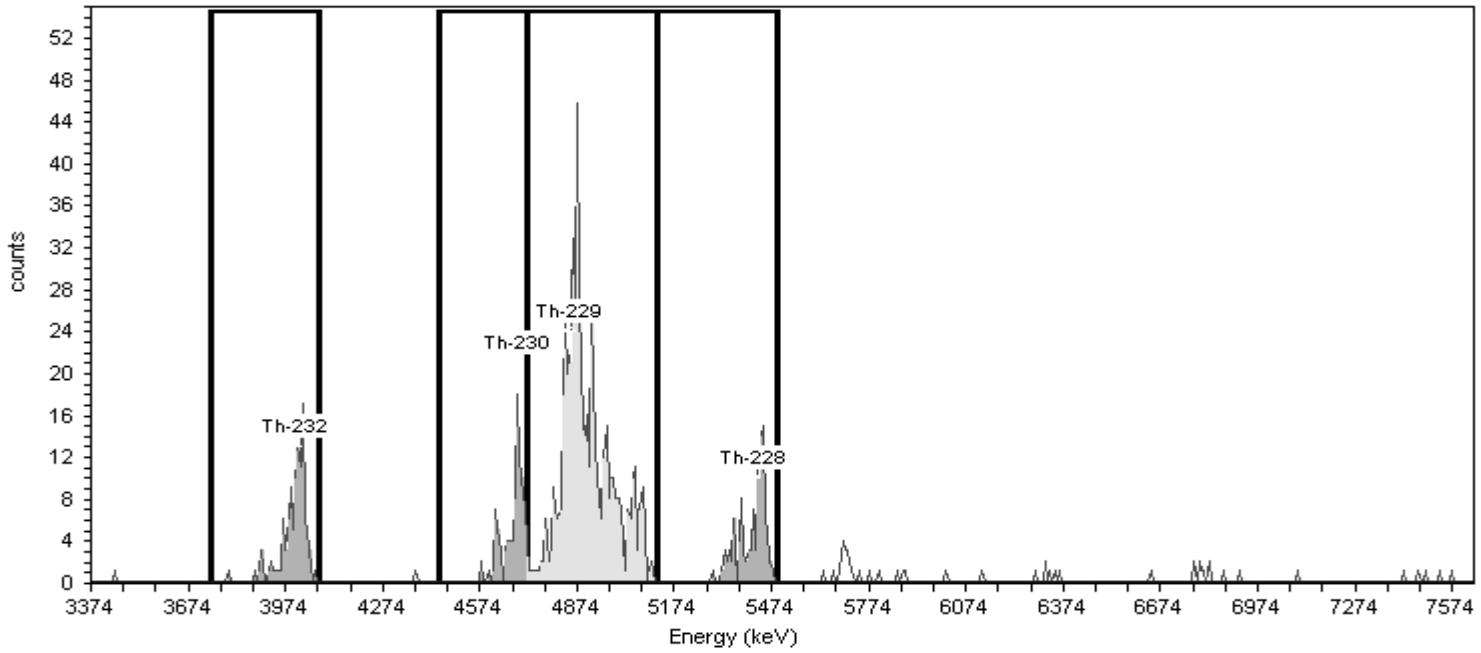
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 82.15%

Acquisition

Detector: AV70
Serial Number: 48-158FF1
Acquisition Start Date: 7/2/2014 6:12:01PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/19/2014 12:18:44AM
Background Info: Sample: ICB;AV70; Det: AV70; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-8876;AV70-20140507
Calibration Date: 5/7/2014 10:49:02PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.52% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 6:06:58PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	54.8	100.2	108	0.4765	107.52	1.235	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	30.9	99.7	93	0.7500	92.16	1.063	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	78.2	99.6	531	0.1875	530.72	5.035	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	15.7	99.8	104	1.8750	102.13	1.178	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:35:45AM 7/3/2014

Sample

Sample Name: 680-102431-A-17-B
SampleType: Sample
: 680-102431-A-17-B
Sample Collection Date: 6/16/2014 3:50:00PM

Spectrum #1 Analysis #1
Sample Weight : 0.9984g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128417
AnalysisID: 614027

Analyst: 60040

Tracer

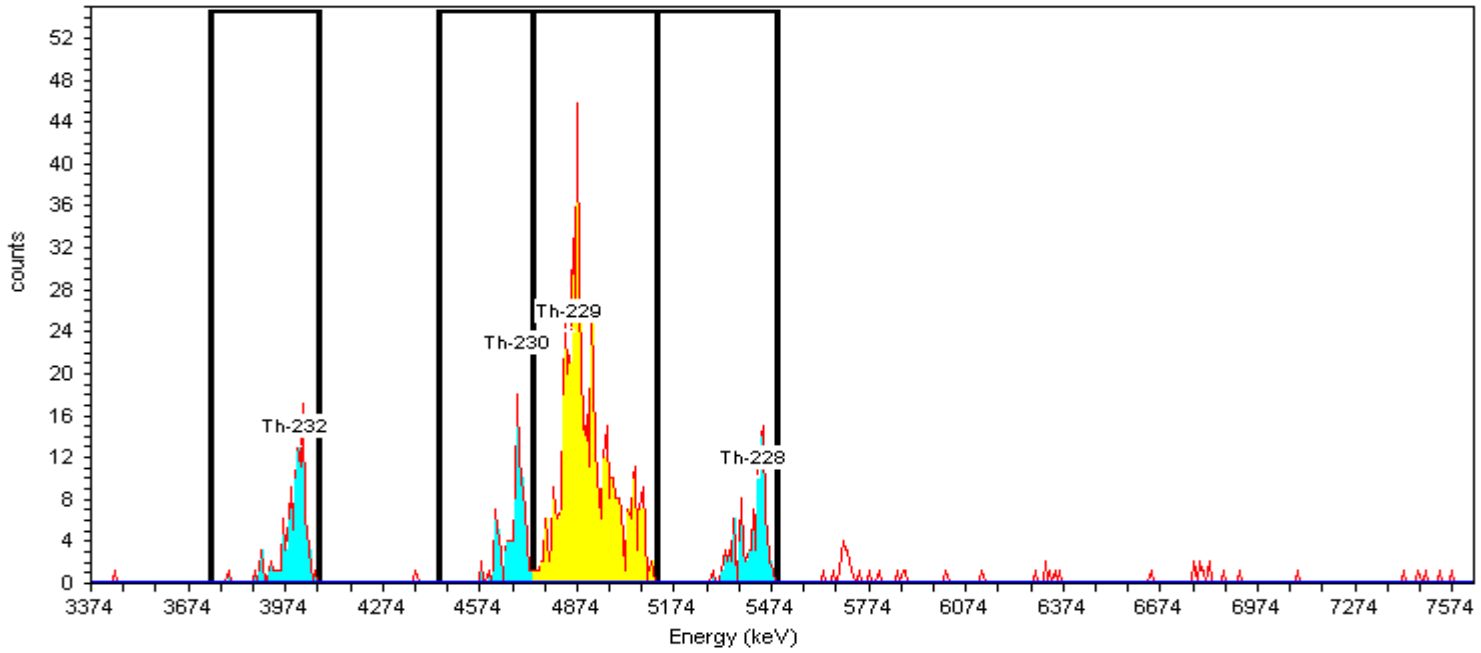
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 81.39%

Acquisition

Detector: AV70
Serial Number: 48-158FF1
Acquisition Start Date: 7/2/2014 6:12:01PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 6/19/2014 12:18:44AM
Background Info: Sample: ICB;AV70; Det: AV70; Spectrum #1; Jun-19-2014 00:18

Calibration Name: IC-8876;AV70-20140507
Calibration Date: 5/7/2014 10:49:02PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.52% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/2/2014 6:06:58PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/3/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	54.8	100.2	108	0.4765	107.52	1.246	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4739.1	34.1	99.7	96	0.7500	95.25	1.109	pCi/g
Th-229	4848.0	4,845.3	2.7	4739.1	5119.5	78.2	99.6	526	0.1875	525.81	4.989	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	15.7	99.8	104	1.8750	102.13	1.189	pCi/g

Daily Checks

Alpha Spectroscopy Daily Pulser Check

Analysis Date: 07/02/14

		Gross Counts			FWHM (keV)			Pulser Center			Energy (keV)		
Detector	**Analysis Date**	**Result**	**Criteria**	**P/F**	**Result**	**Criteria**	**P/F**	**Result**	**Criteria**	**P/F**	**Result**	**Criteria**	**P/F**
AV46	07/02/14 15:55	7661	7134.7 - 7885.7	Pass	13.6	10 - 20	Pass	225.0	220.0 - 230.0	Pass	5045	5004.8 - 5084.8	Pass
AV49	07/02/14 15:55	7628	7226.6 - 7987.3	Pass	15.7	10 - 20	Pass	221.1	215.0 - 225.0	Pass	5016	4967.4 - 5047.4	Pass
AV53	07/02/14 15:54	7240	6906.6 - 7633.6	Pass	11.2	10 - 20	Pass	222.0	217.0 - 227.0	Pass	5023	4982.6 - 5062.6	Pass
AV54	07/02/14 15:54	7269	6918.5 - 7646.8	Pass	15.7	10 - 20	Pass	227.2	222.1 - 232.1	Pass	5061	5020.5 - 5100.5	Pass
AV55	07/02/14 15:54	7233	6899.4 - 7625.7	Pass	11.7	10 - 20	Pass	225.0	220.0 - 230.0	Pass	5045	5004.9 - 5084.9	Pass
AV56	07/02/14 15:54	6982	6868.1 - 7591.0	Pass	13.1	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	5004.9 - 5069.9	Pass
AV57	07/02/14 15:54	7289	6901.7 - 7628.2	Pass	18.9	10 - 20	Pass	229.0	224.0 - 234.0	Pass	5075	5034.9 - 5114.9	Pass
AV58	07/02/14 15:54	7112	6766.5 - 7478.7	Pass	12.3	10 - 20	Pass	227.0	219.0 - 229.0	Pass	5060	4997.2 - 5077.2	Pass
AV60	07/02/14 15:54	7215	6867.8 - 7590.7	Pass	16.4	10 - 20	Pass	220.9	216.2 - 226.2	Pass	5014	4976.7 - 5056.7	Pass
AV61	07/02/14 15:55	7207	6682.3 - 7385.7	Pass	17.1	10 - 20	Pass	223.0	219.0 - 229.0	Pass	5030	4997.8 - 5077.8	Pass
AV62	07/02/14 15:55	7249	6875.3 - 7599.0	Pass	19.6	10 - 20	Pass	221.9	217.1 - 227.1	Pass	5022	4983.0 - 5063.0	Pass
AV63	07/02/14 15:55	7245	6829.2 - 7548.0	Pass	14.1	10 - 20	Pass	223.0	217.9 - 227.9	Pass	5030	4989.3 - 5069.3	Pass
AV64	07/02/14 15:55	7245	6847.3 - 7568.1	Pass	14.3	10 - 20	Pass	225.0	219.4 - 229.4	Pass	5045	5000.4 - 5080.4	Pass
AV65	07/02/14 15:55	7226	6864.5 - 7587.1	Pass	15.8	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	4989.7 - 5069.7	Pass
AV66	07/02/14 15:55	7231	6865.2 - 7587.8	Pass	15.3	10 - 20	Pass	223.0	218.0 - 228.0	Pass	5030	4989.9 - 5069.9	Pass
AV67	07/02/14 15:55	7271	6893.5 - 7619.1	Pass	12.9	10 - 20	Pass	228.0	221.9 - 231.9	Pass	5067	5019.4 - 5099.4	Pass
AV69	07/02/14 15:55	7283	6915.8 - 7643.8	Pass	12.7	10 - 20	Pass	221.0	216.0 - 226.0	Pass	5015	4975.3 - 5055.3	Pass
AV70	07/02/14 15:55	7447	7073.8 - 7818.4	Pass	14.2	10 - 20	Pass	220.1	214.1 - 224.1	Pass	5008	4960.7 - 5040.7	Pass

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:04:33PM 7/2/2014

Sample

Sample Name: Pulser;AV46 Spectrum #8 Analysis #1
Comment:

Batch

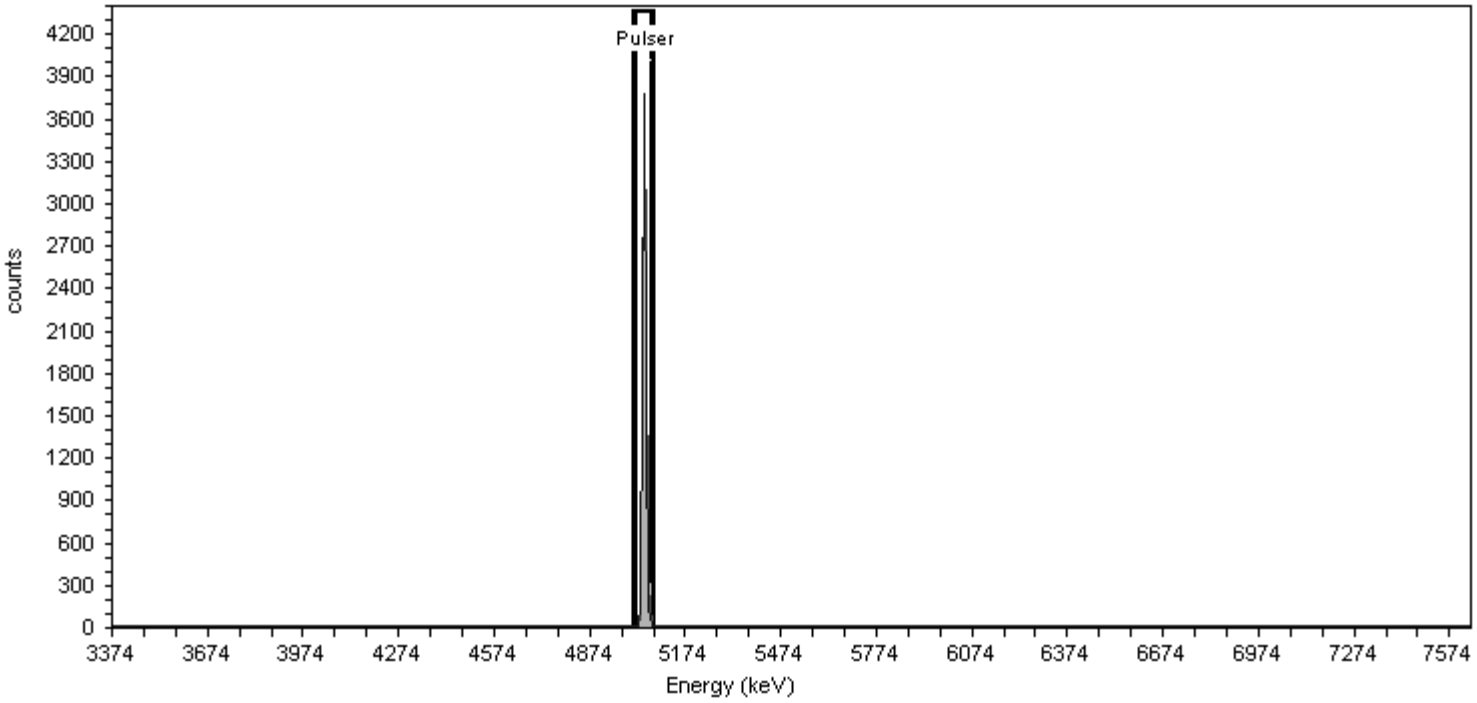
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV46 , SN: 49-202GG2
Acquisition Start Date: 7/2/2014 3:55:26PM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9884;AV46-20140505
Calibration Date: 5/5/2014 10:10:09PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.80% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5044.639	5021.490	5067.787	13.60	7,376.82	7,660.66

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:05:12PM 7/2/2014

Sample

Sample Name: Pulser;AV49 Spectrum #8 Analysis #1
Comment:

Batch

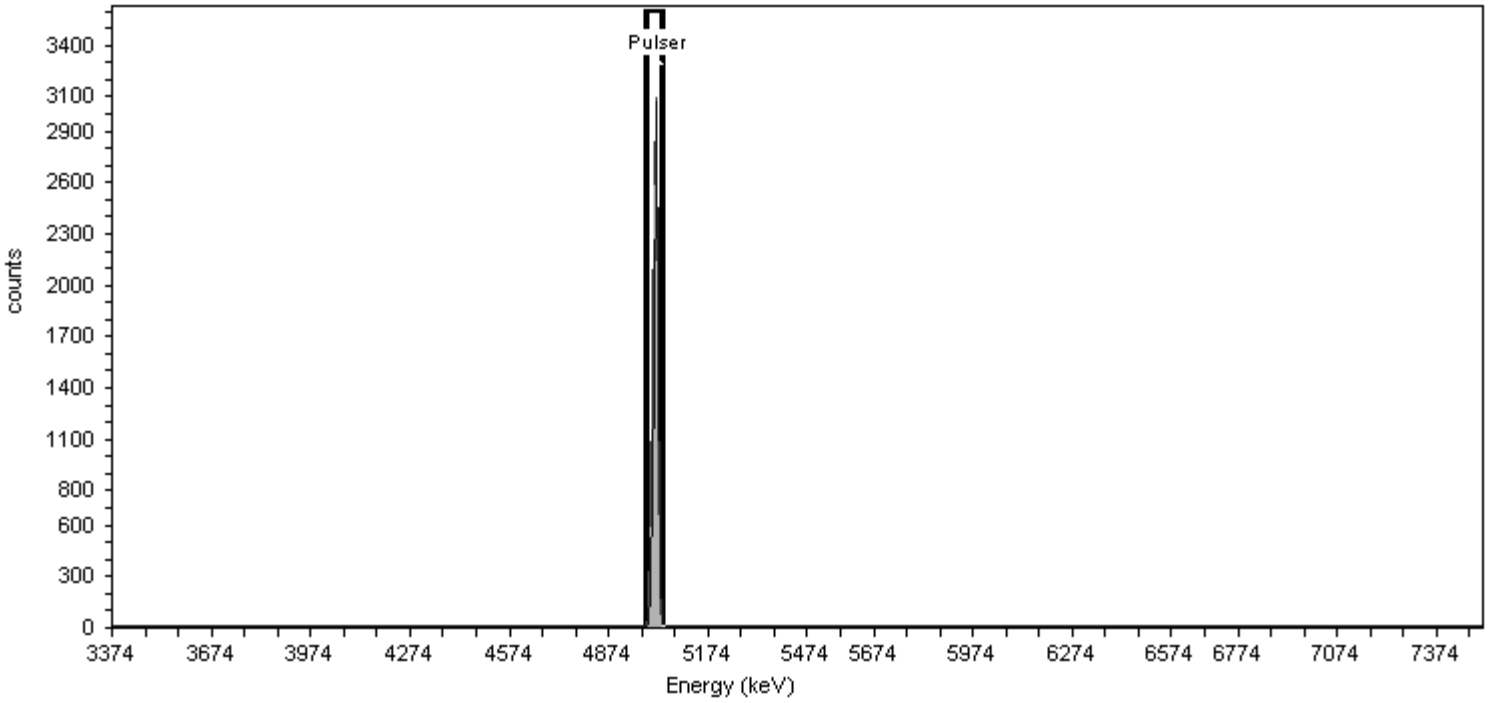
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV49 , SN: 47-043hh4
Acquisition Start Date: 7/2/2014 3:55:31PM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-7107;AV49-20140504
Calibration Date: 5/5/2014 6:52:38PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.53% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5015.781	4989.111	5042.452	15.67	6,948.56	7,627.81

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:05:28PM 7/2/2014

Sample

Sample Name: Pulser;AV53 Spectrum #8 Analysis #1
Comment:

Batch

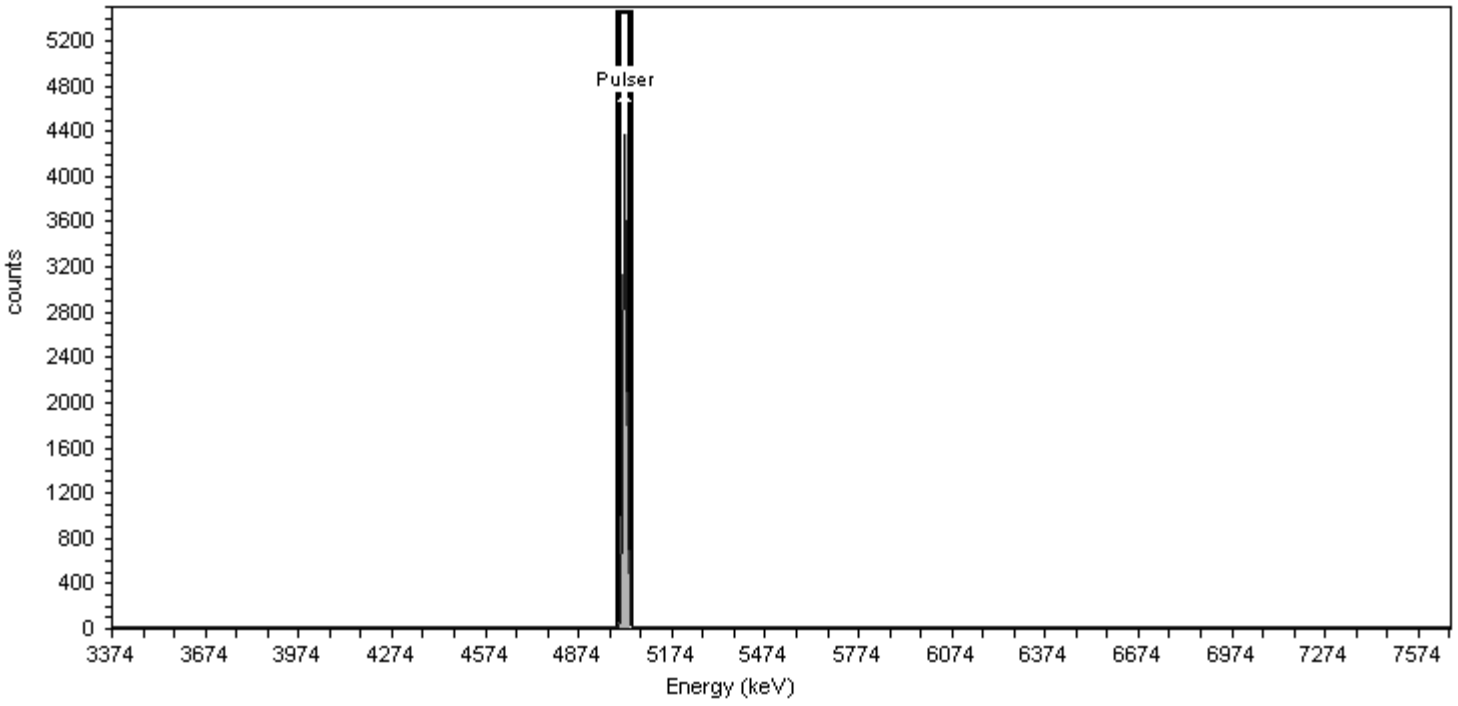
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV53 , SN: 50-051A6
Acquisition Start Date: 7/2/2014 3:54:47PM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8877;AV53-20140504
Calibration Date: 5/5/2014 6:53:06PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.32% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5022.618	5003.475	5041.762	11.25	7,038.33	7,240.00

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:05:34PM 7/2/2014

Sample

Sample Name: Pulser;AV54
Comment:

Spectrum #8 Analysis #1

Batch

Batch Name: June2014b
Description:

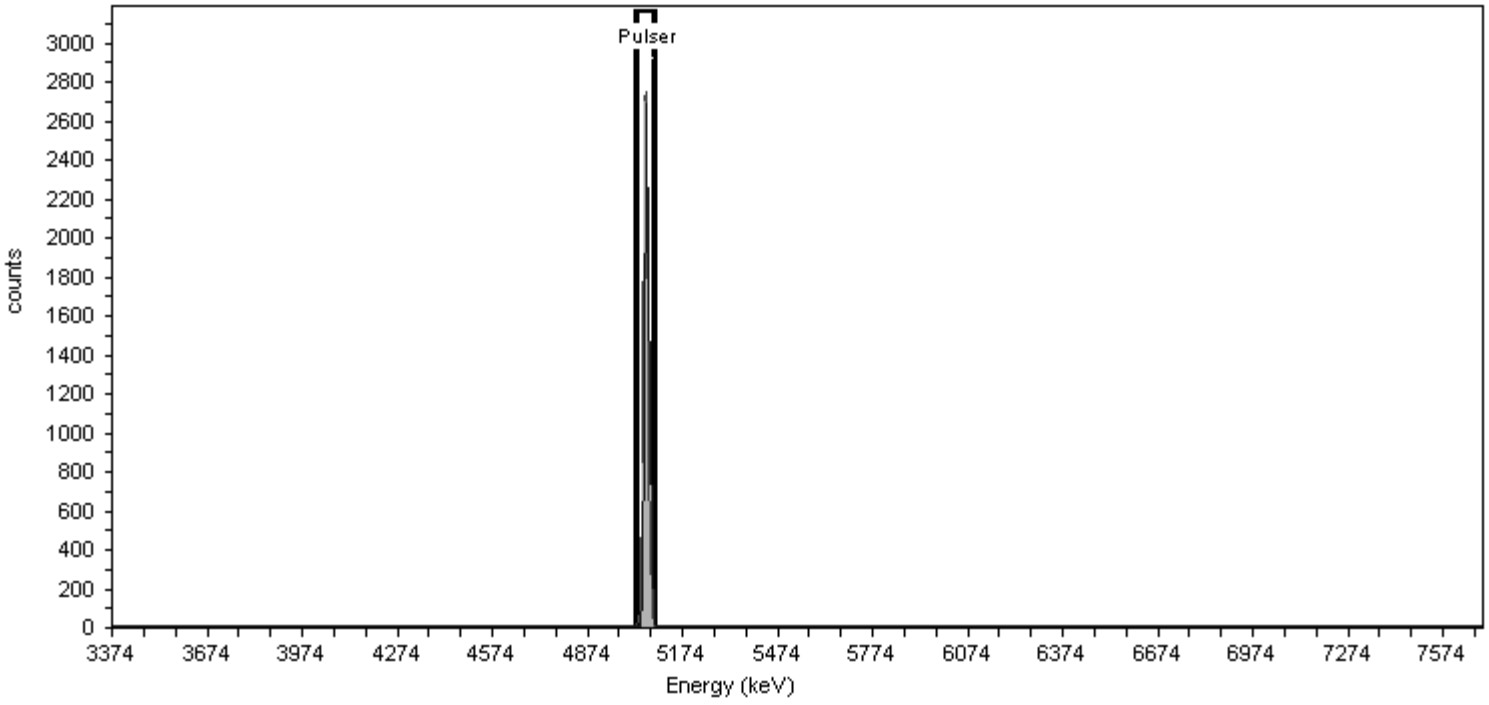
Analyst: 60040

Acquisition

Detector: AV54 , SN: 48-046II6
Acquisition Start Date: 7/2/2014 3:54:49PM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9520;AV54-20140504
Calibration Date: 5/5/2014 6:53:13PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.02% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5061.255	5034.459	5088.050	15.74	6,206.69	7,268.62

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:05:40PM 7/2/2014

Sample

Sample Name: Pulser;AV55
Comment:

Spectrum #8 Analysis #1

Batch

Batch Name: June2014b
Description:

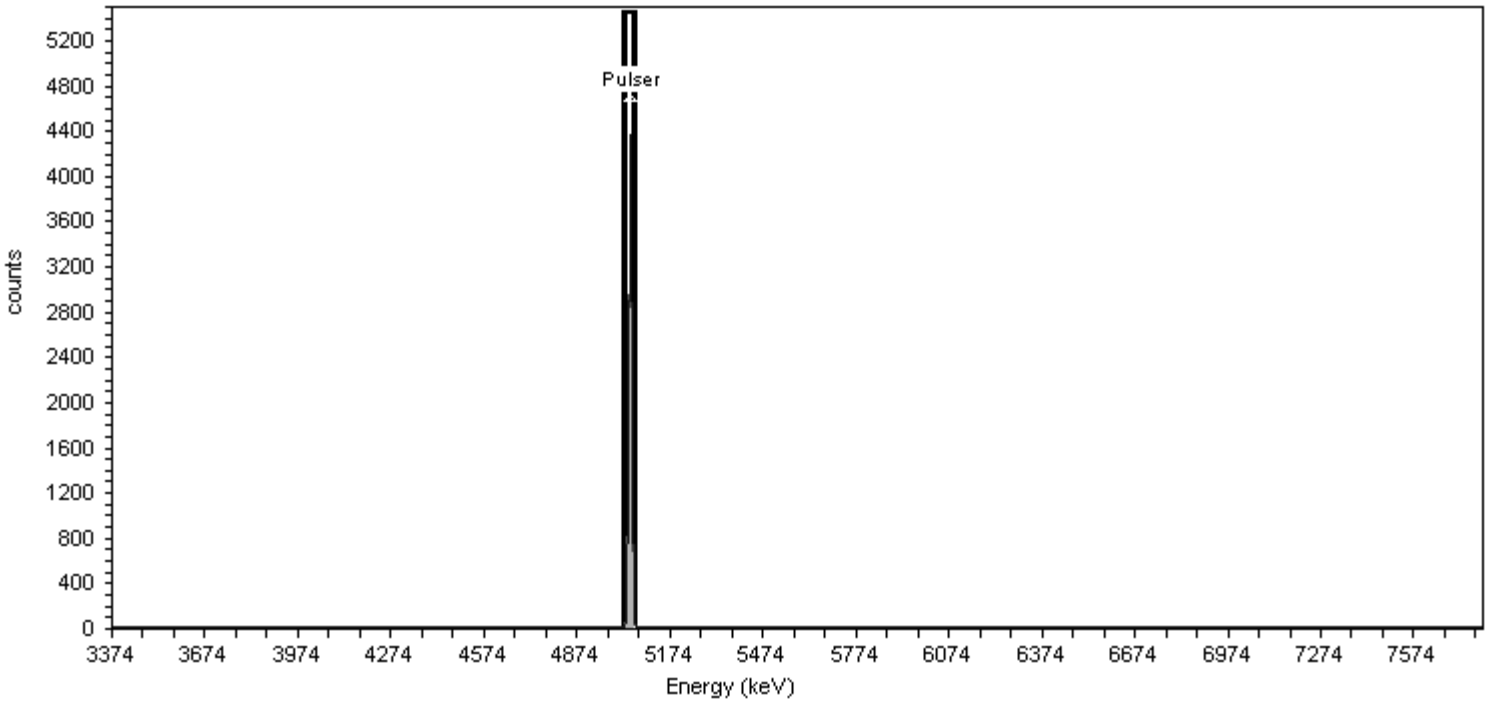
Analyst: 60040

Acquisition

Detector: AV55 , SN: 50-051C2
Acquisition Start Date: 7/2/2014 3:54:51PM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-7107;AV55-20140507
Calibration Date: 5/7/2014 10:48:56PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.79% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5044.898	5025.019	5064.778	11.68	7,307.20	7,233.08

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:05:46PM 7/2/2014

Sample

Sample Name: Pulser;AV56 Spectrum #8 Analysis #1
Comment:

Batch

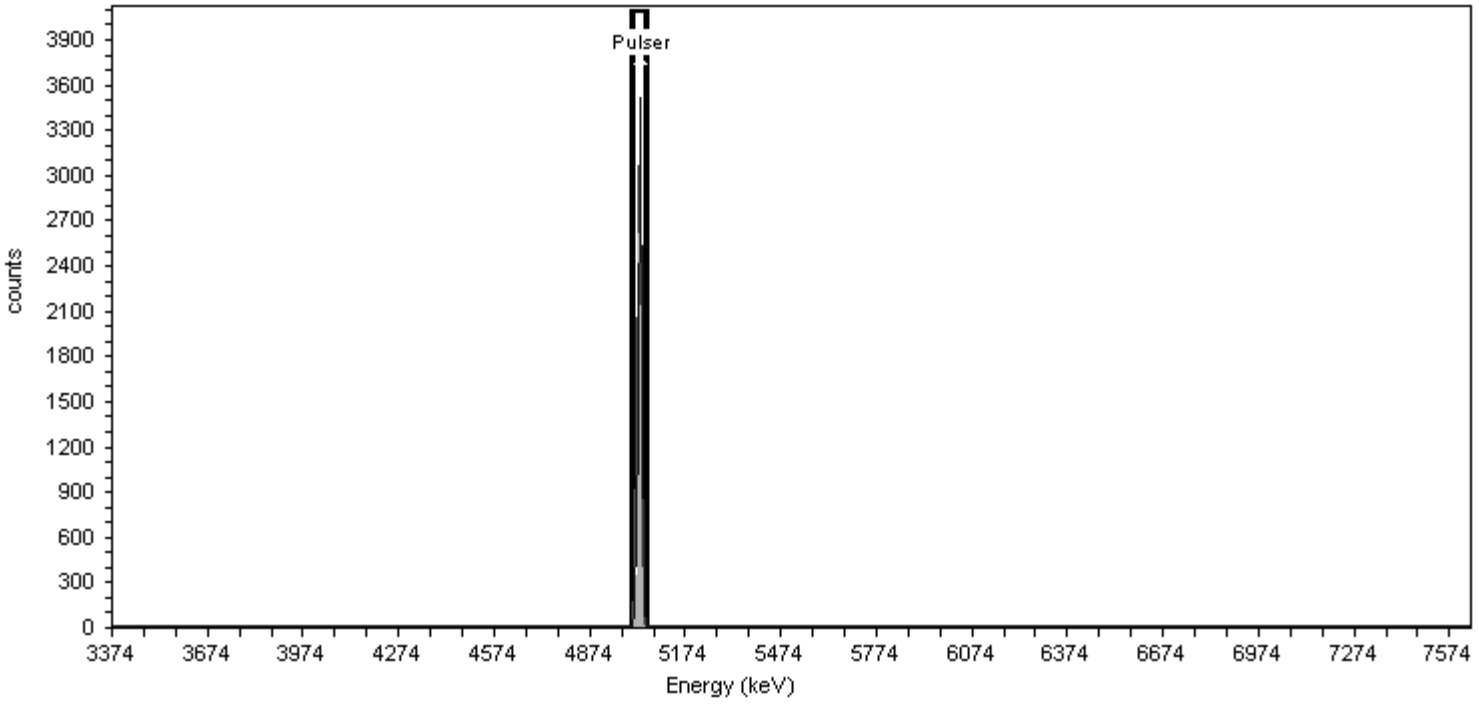
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV56 , SN: 52-059EE5
Acquisition Start Date: 7/2/2014 3:54:52PM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9792;AV56-20140504
Calibration Date: 5/5/2014 6:53:34PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.09% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5030.352	5008.061	5052.643	13.10	6,611.11	6,981.67

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:05:51PM 7/2/2014

Sample

Sample Name: Pulser;AV57
Comment:

Spectrum #8 Analysis #1

Batch

Batch Name: June2014b
Description:

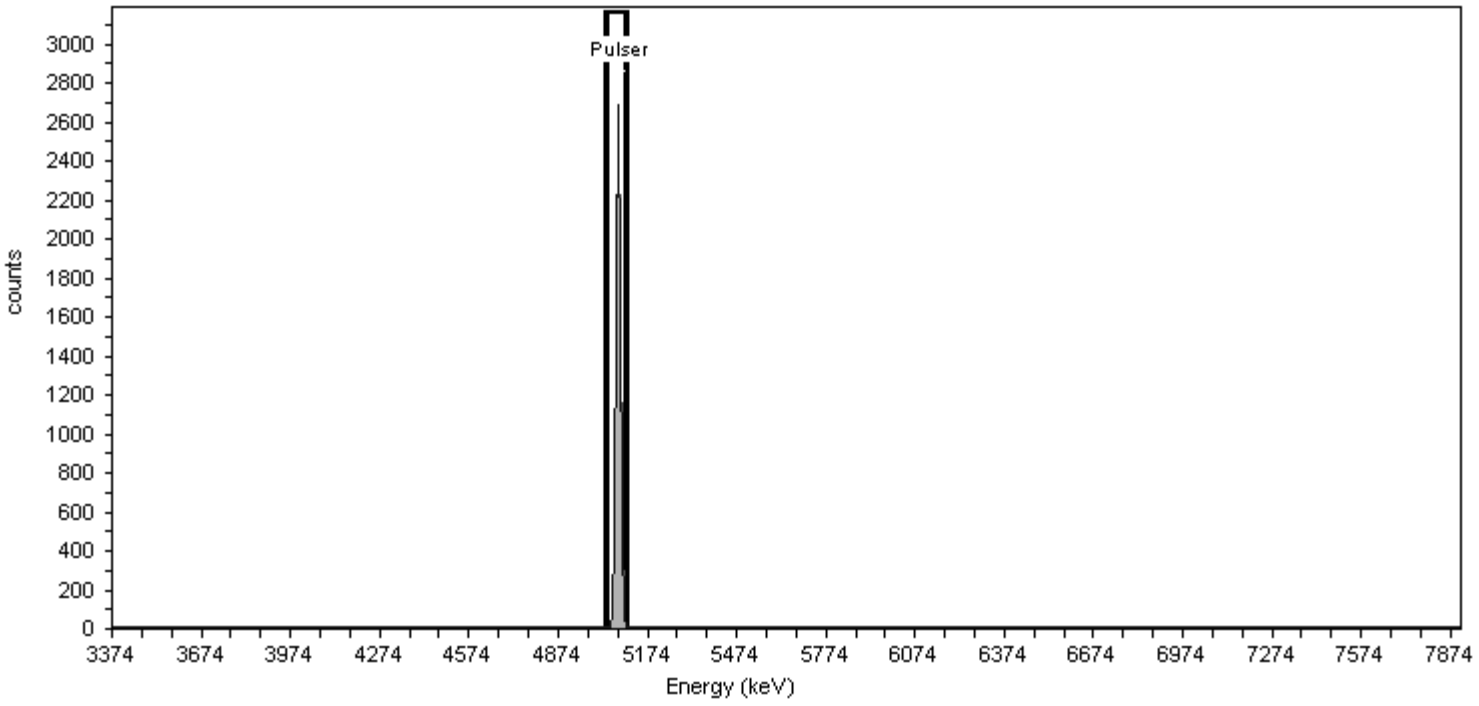
Analyst: 60040

Acquisition

Detector: AV57 , SN: 48-158EE3
Acquisition Start Date: 7/2/2014 3:54:54PM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9793;AV57-20140504
Calibration Date: 5/5/2014 6:53:40PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.74% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5074.680	5042.515	5106.845	18.90	7,277.55	7,289.41

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:05:57PM 7/2/2014

Sample

Sample Name: Pulser;AV58 Spectrum #8 Analysis #1
Comment:

Batch

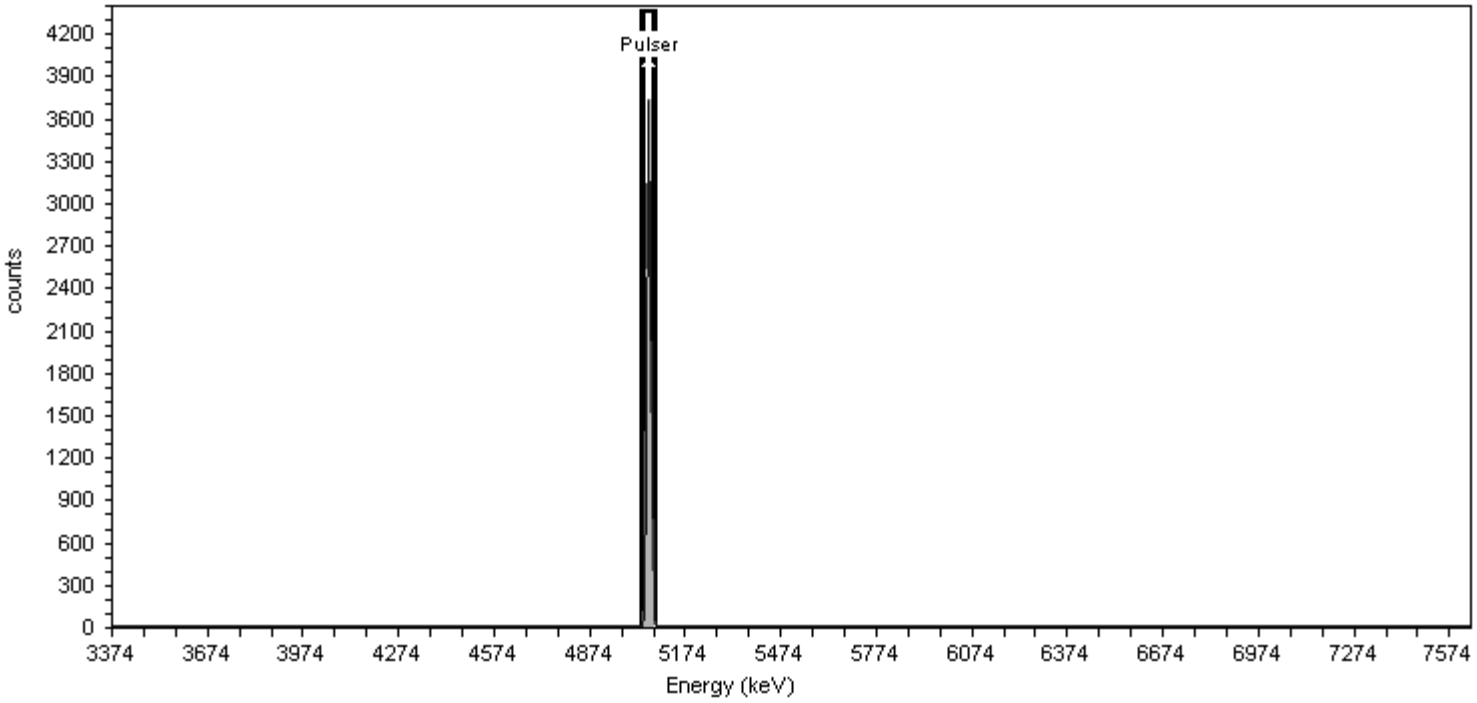
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV58 , SN: 52-102 C5
Acquisition Start Date: 7/2/2014 3:54:55PM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9794;AV58-20140504
Calibration Date: 5/5/2014 6:53:46PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.56% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5060.148	5039.293	5081.002	12.25	6,554.79	7,111.68

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:02:54PM 7/2/2014

Sample

Sample Name: Pulser;AV60
Comment:

Spectrum #8 Analysis #1

Batch

Batch Name: June2014b
Description:

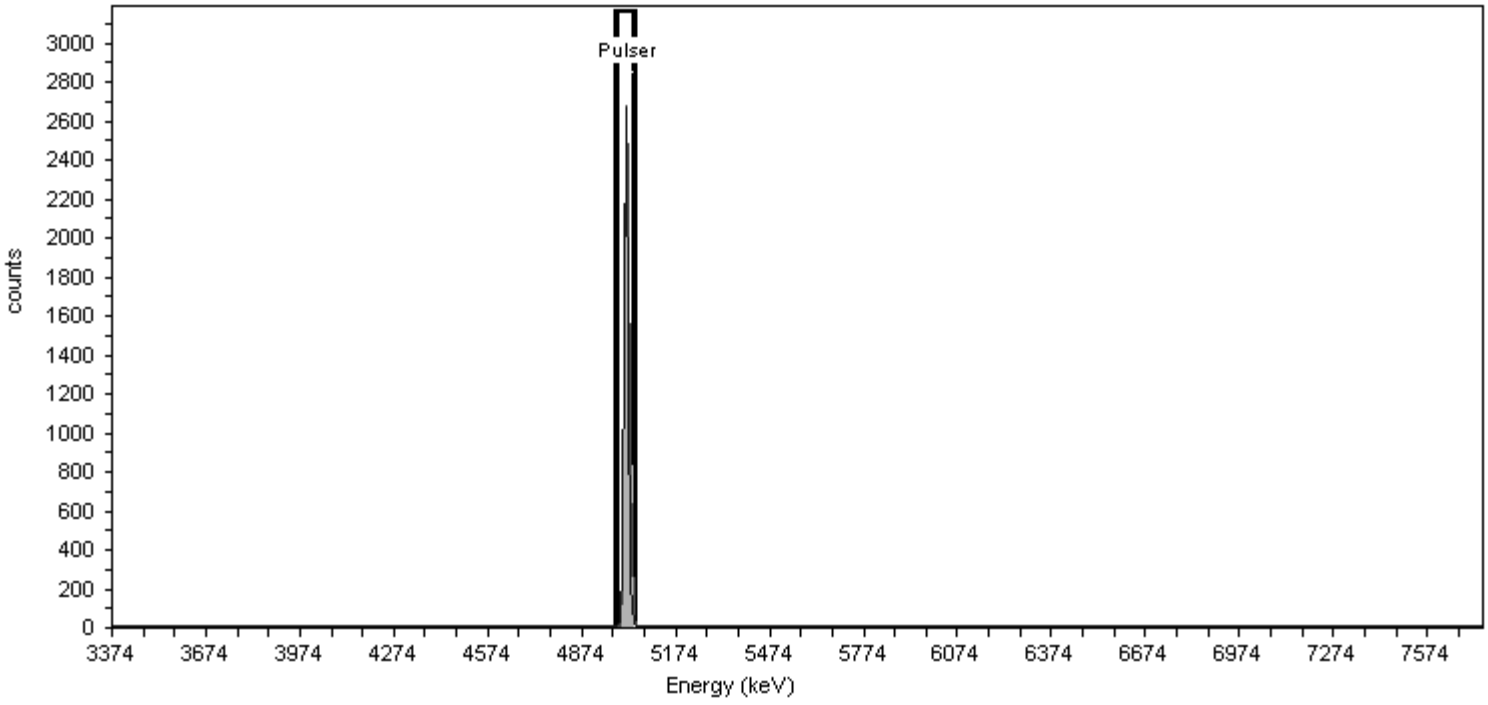
Analyst: 60040

Acquisition

Detector: AV60 , SN: 49-027117
Acquisition Start Date: 7/2/2014 3:54:58PM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9817;AV60-20140504
Calibration Date: 5/5/2014 6:53:59PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.33% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5014.354	4986.408	5042.301	16.42	6,306.68	7,214.54

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:03:00PM 7/2/2014

Sample

Sample Name: Pulser;AV61 Spectrum #8 Analysis #1
Comment:

Batch

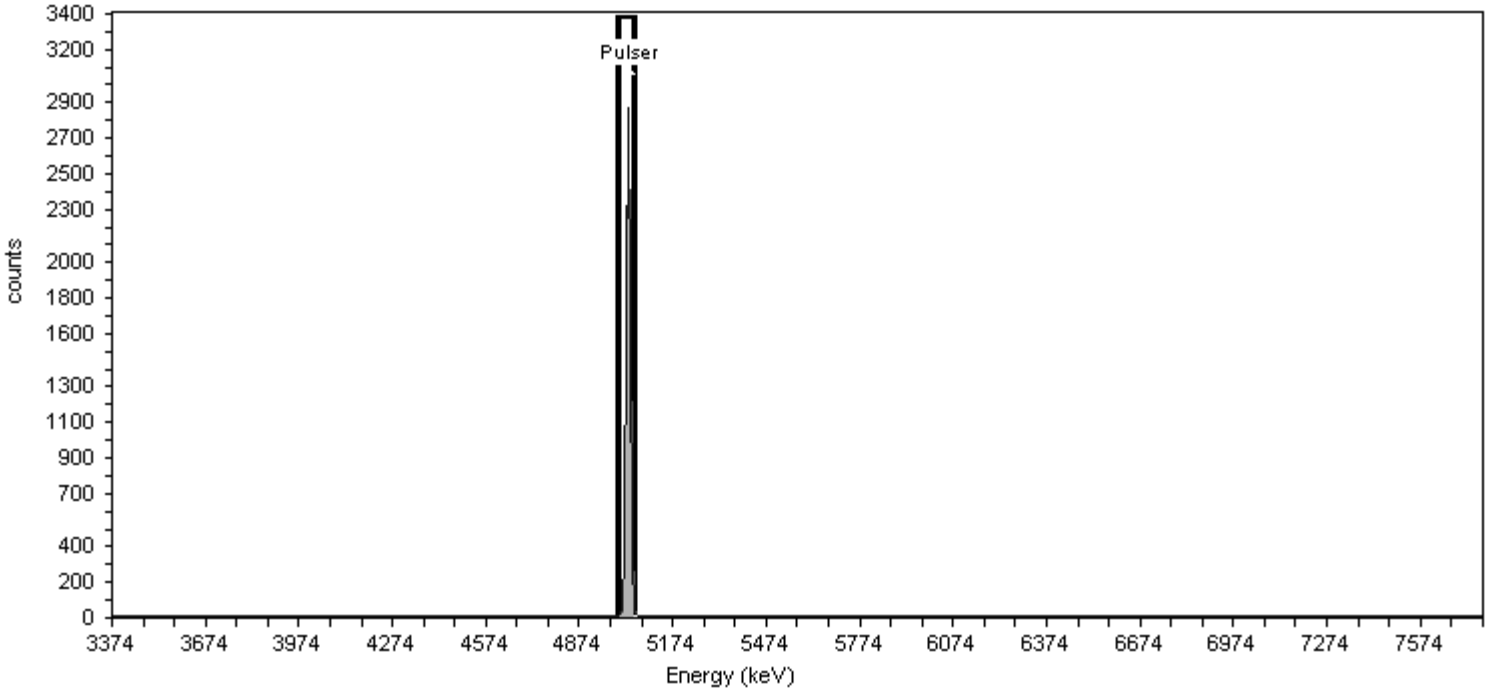
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV61 , SN: 5-051JJ3
Acquisition Start Date: 7/2/2014 3:55:00PM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9884;AV61-20140504
Calibration Date: 5/5/2014 6:54:06PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.46% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5029.703	5000.612	5058.793	17.09	7,046.35	7,207.16

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:03:11PM 7/2/2014

Sample

Sample Name: Pulser;AV63 Spectrum #8 Analysis #1
Comment:

Batch

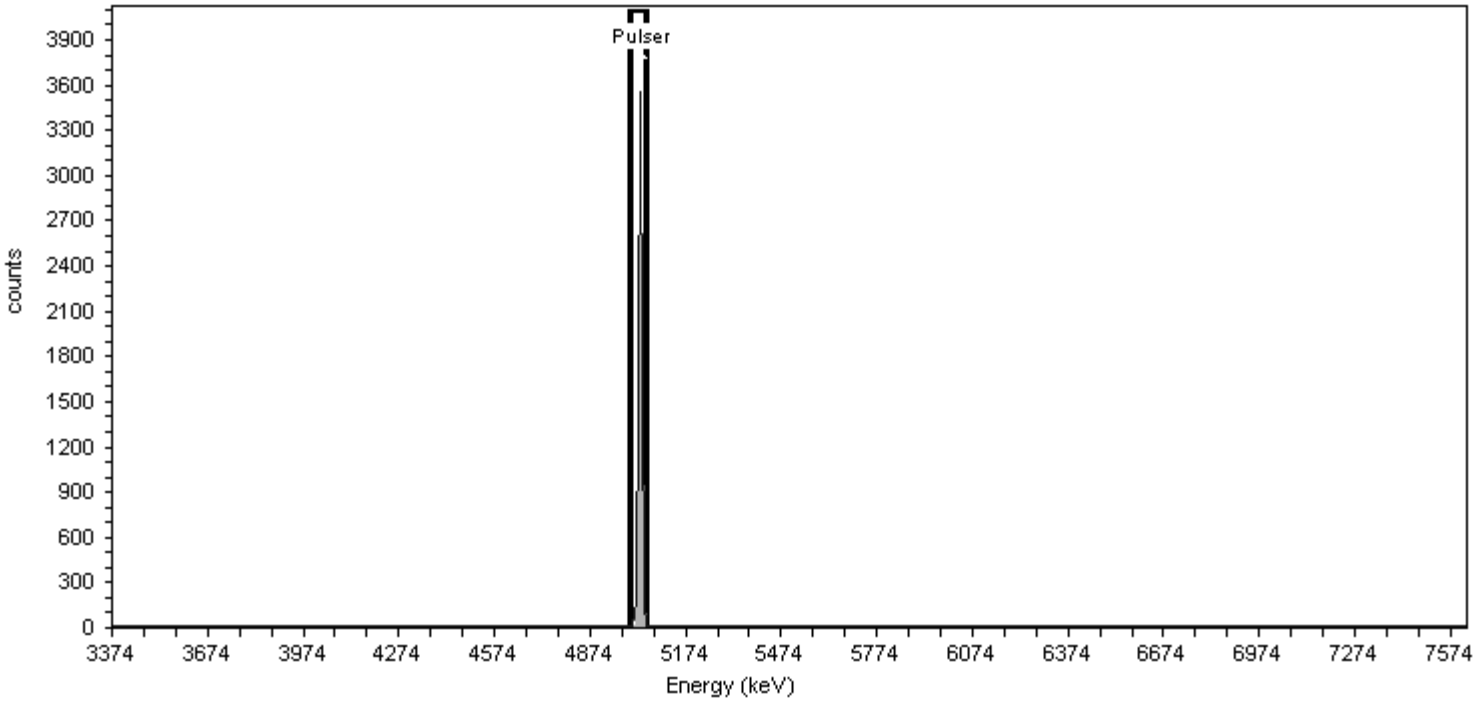
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV63 , SN: 47-029ff2
Acquisition Start Date: 7/2/2014 3:55:03PM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9886;AV63-20140504
Calibration Date: 5/5/2014 6:54:19PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.48% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5030.017	5005.998	5054.036	14.11	7,188.15	7,245.43

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:03:16PM 7/2/2014

Sample

Sample Name: Pulser;AV64 Spectrum #8 Analysis #1
Comment:

Batch

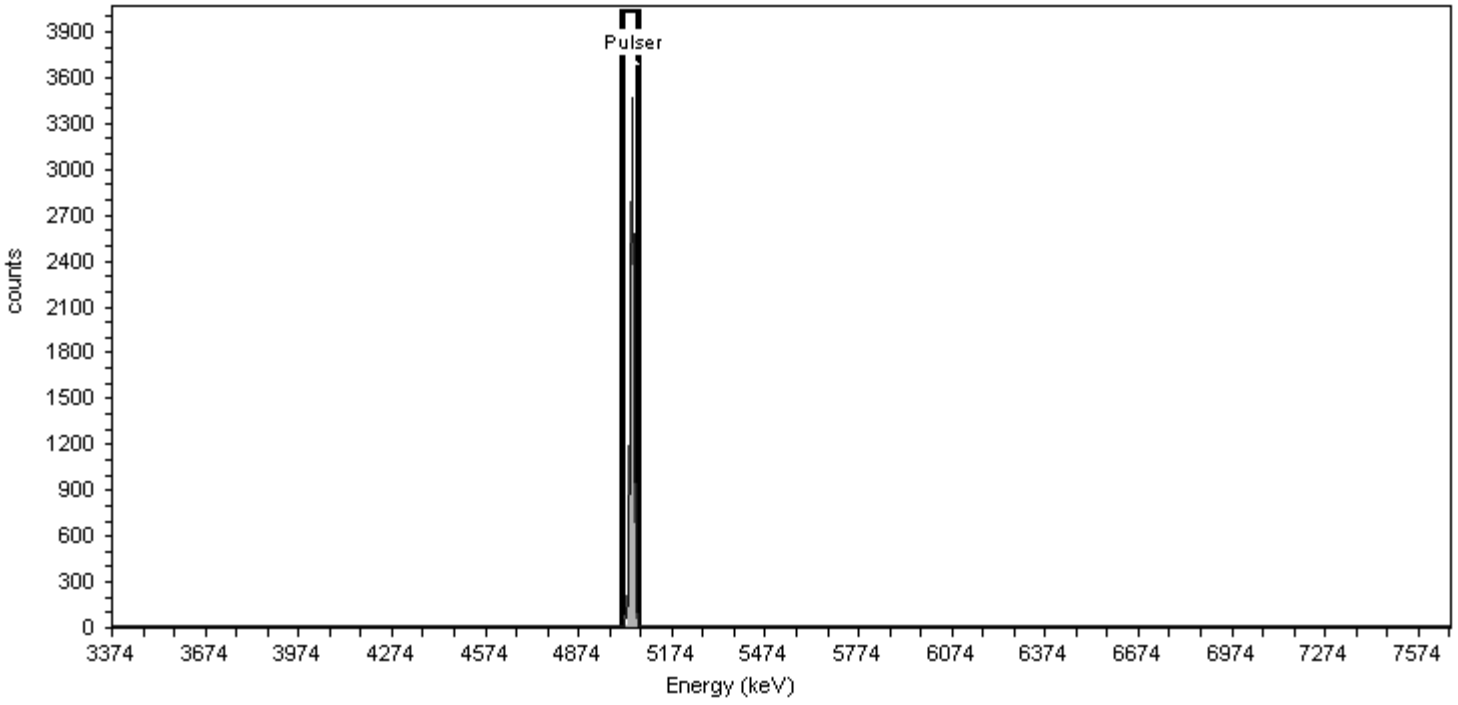
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV64 , SN: 47-029ee4
Acquisition Start Date: 7/2/2014 3:55:04PM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-7107;AV64-20140504a
Calibration Date: 5/4/2014 8:44:03PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.75% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5045.123	5020.841	5069.404	14.27	7,091.13	7,244.81

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:03:22PM 7/2/2014

Sample

Sample Name: Pulser;AV65 Spectrum #8 Analysis #1
Comment:

Batch

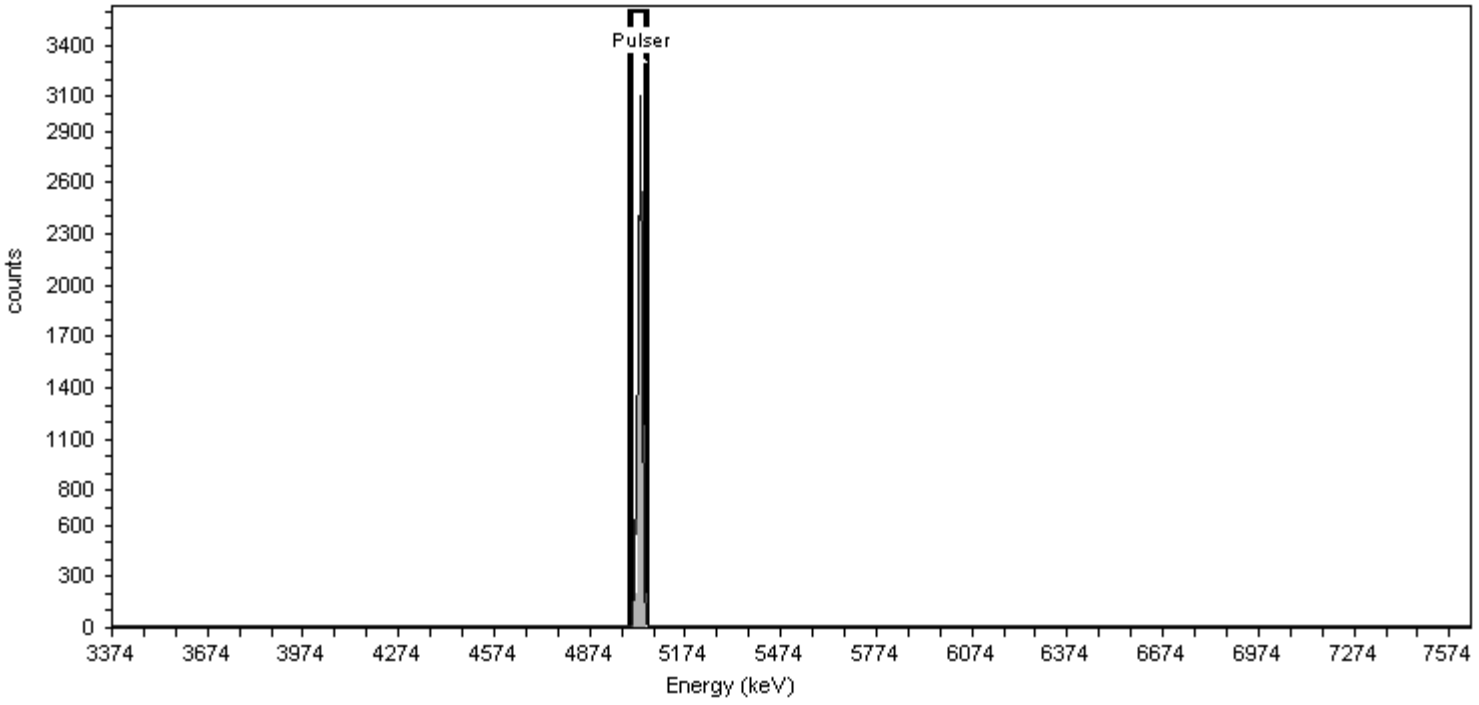
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV65 , SN: 44-049JJ1
Acquisition Start Date: 7/2/2014 3:55:06PM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8874;AV65-20140504
Calibration Date: 5/4/2014 8:43:55PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.13% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5029.872	5002.985	5056.758	15.80	7,043.29	7,225.92

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:03:27PM 7/2/2014

Sample

Sample Name: Pulser;AV66 Spectrum #8 Analysis #1
Comment:

Batch

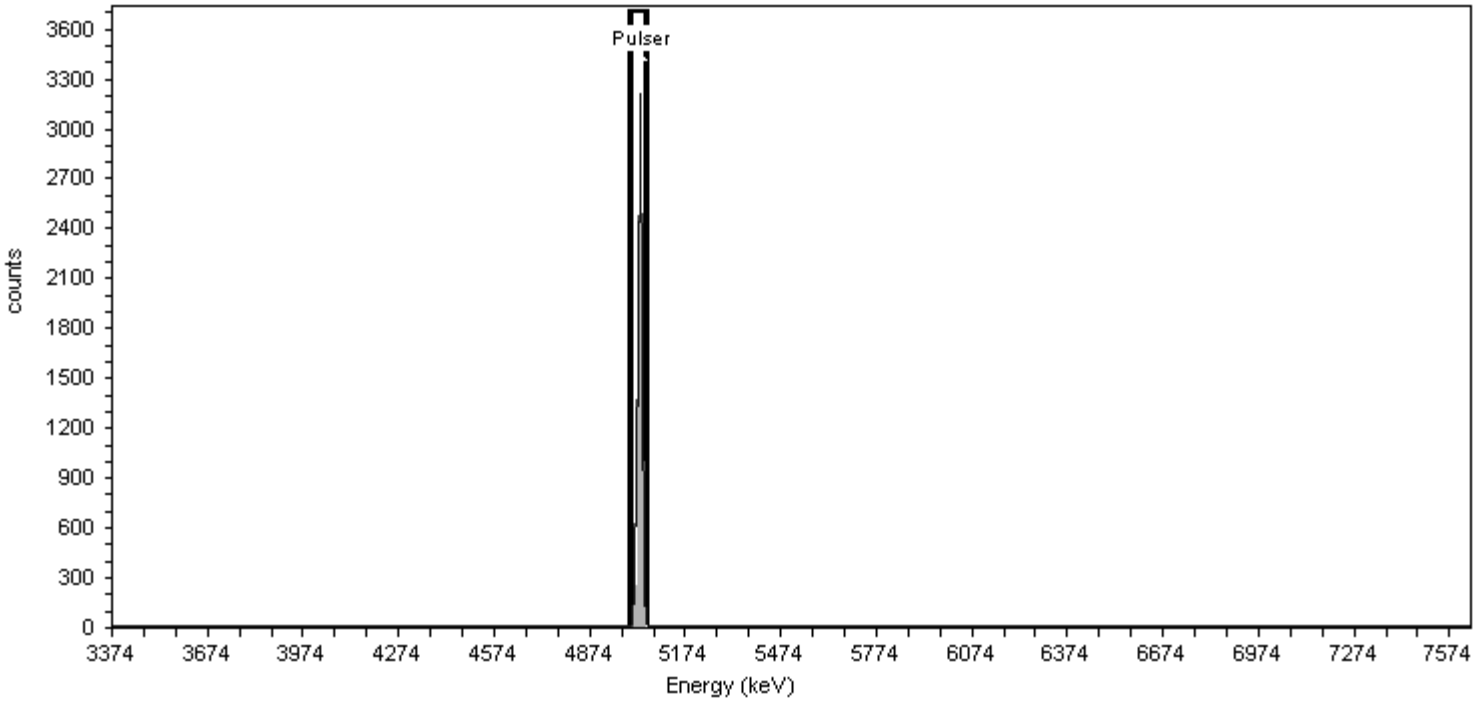
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV66 , SN: 48-158EE2
Acquisition Start Date: 7/2/2014 3:55:08PM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8875;AV66-20140504
Calibration Date: 5/4/2014 8:44:10PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.93% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5029.940	5003.851	5056.030	15.33	7,053.74	7,231.08

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:03:33PM 7/2/2014

Sample

Sample Name: Pulser;AV67 Spectrum #8 Analysis #1
Comment:

Batch

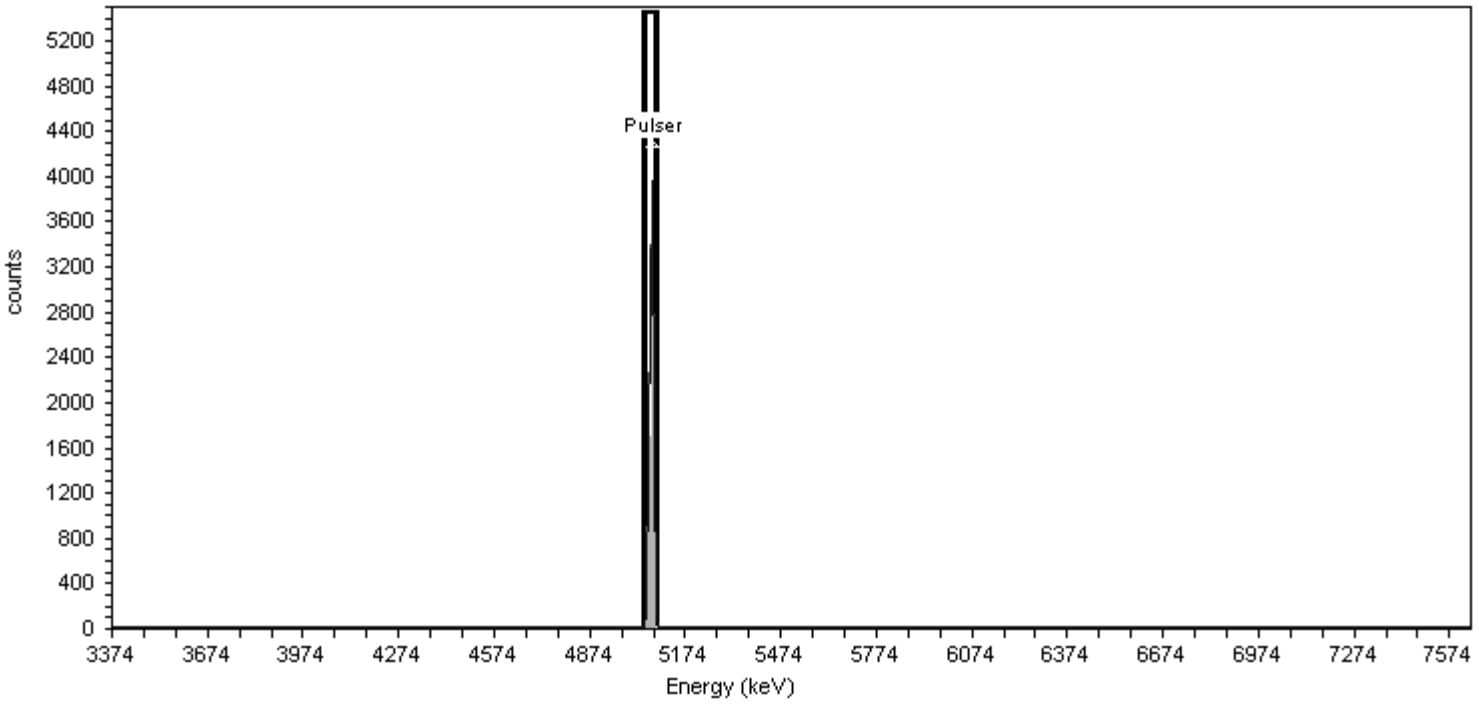
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV67 , SN: 52-102 D7
Acquisition Start Date: 7/2/2014 3:55:09PM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8876;AV67-20140504
Calibration Date: 5/4/2014 8:44:15PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.32% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5067.284	5045.332	5089.236	12.90	7,323.98	7,270.84

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:03:44PM 7/2/2014

Sample

Sample Name: Pulser;AV69 Spectrum #8 Analysis #1
Comment:

Batch

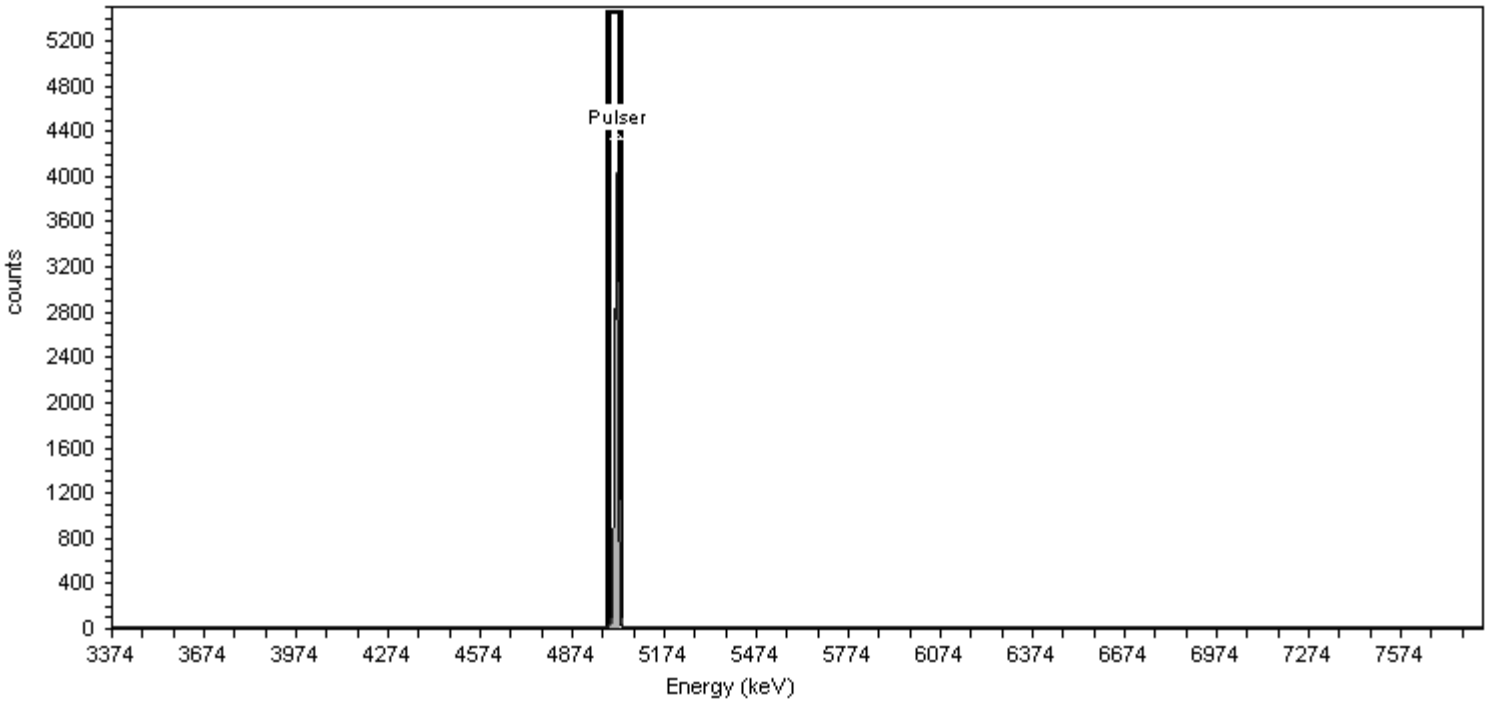
Batch Name: June2014b Analyst: 60040
Description:

Acquisition

Detector: AV69 , SN: 49-155DD5
Acquisition Start Date: 7/2/2014 3:55:12PM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9520;AV69-20140504
Calibration Date: 5/4/2014 8:44:28PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.57% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5014.846	4993.294	5036.397	12.66	7,302.40	7,282.78

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:03:49PM 7/2/2014

Sample

Sample Name: Pulser;AV70
Comment:

Spectrum #9 Analysis #1

Batch

Batch Name: June2014b
Description:

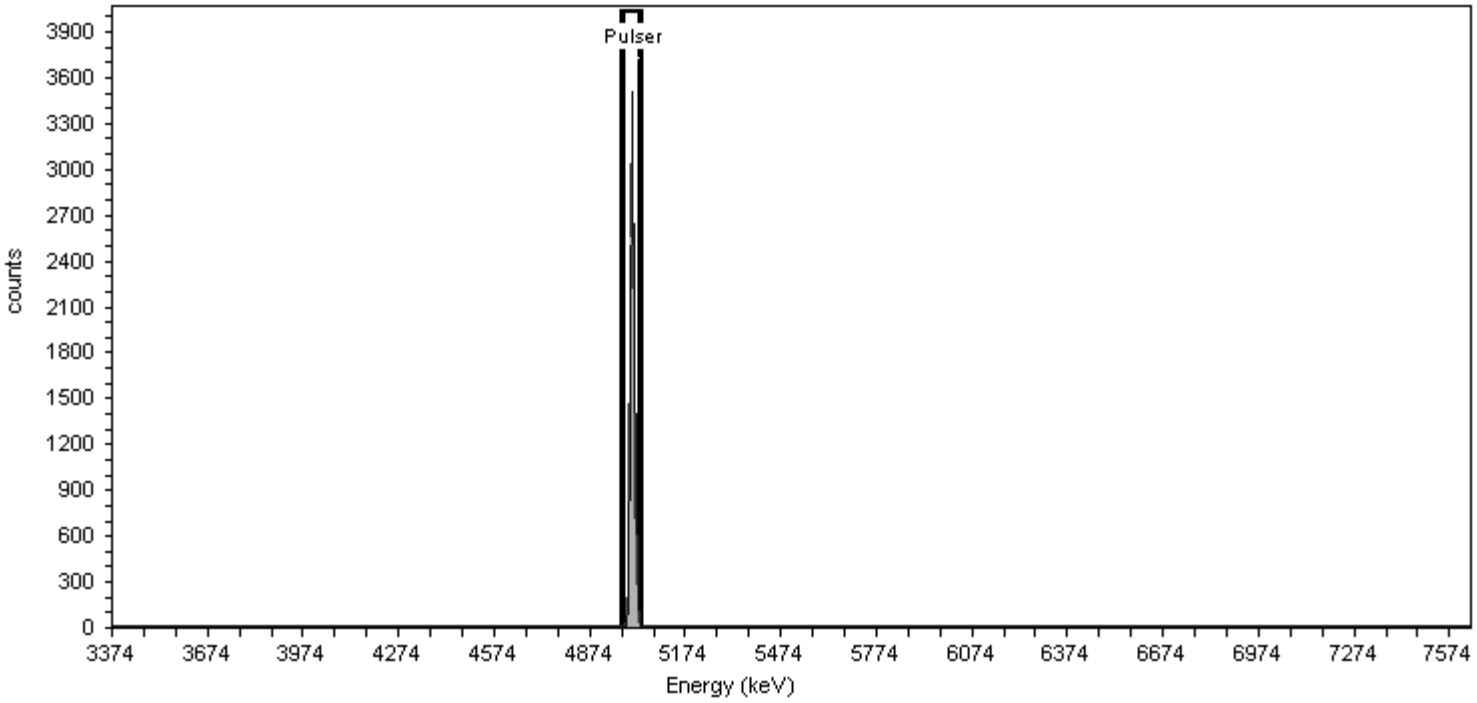
Analyst: 60040

Acquisition

Detector: AV70 , SN: 48-158FF1
Acquisition Start Date: 7/2/2014 3:55:14PM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-8876;AV70-20140507
Calibration Date: 5/7/2014 10:49:02PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.52% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5008.072	4983.848	5032.297	14.23	7,168.27	7,446.95

Initial Calibrations

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:10:13PM 5/5/2014

Calibration

Sample Name: IC-9884;AV46-20140505
Description:
Detector: AV46

Calibration Date: 5/5/2014 10:10:09PM
Analyst: 60040

Source Info

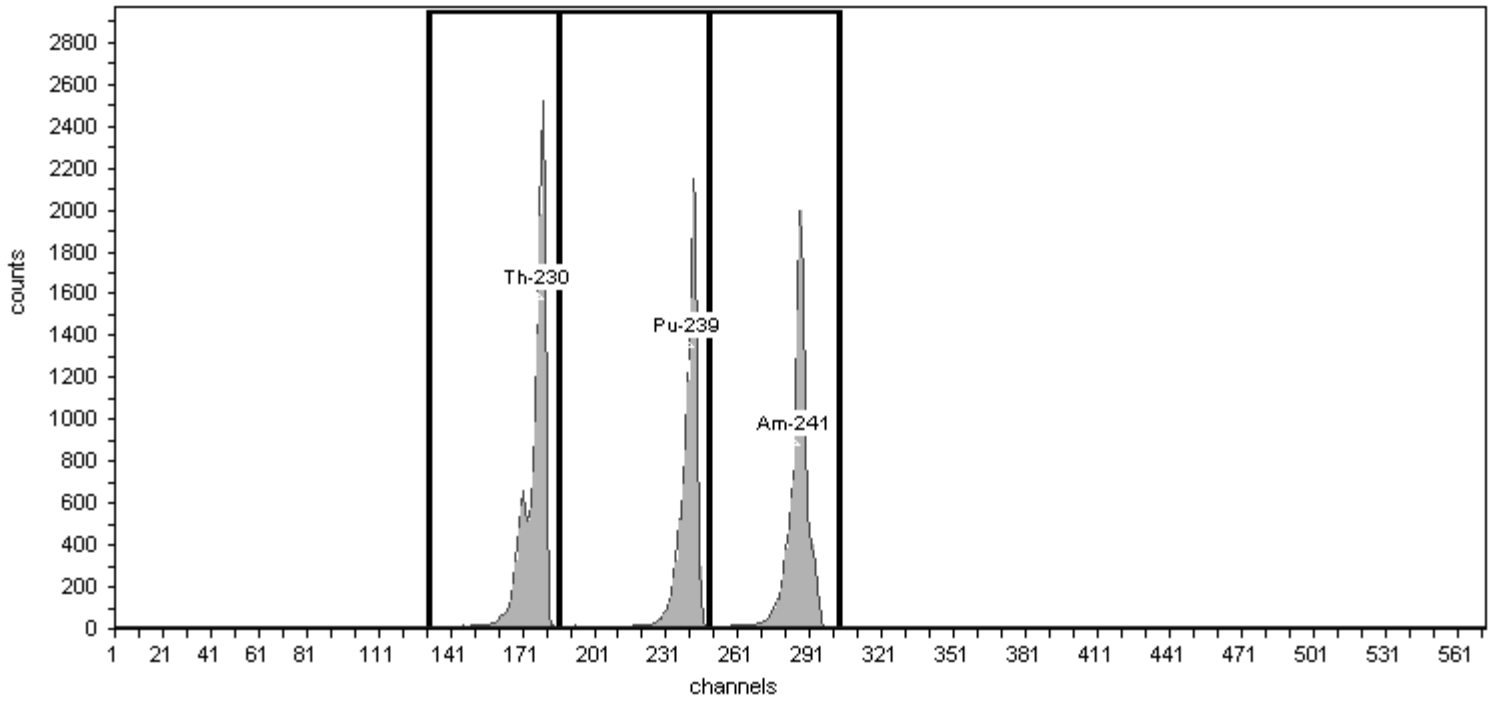
Certificate ID: 82245-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV46 , SN: 49-202GG2
Acquisition Start Date: 5/5/2014 7:30:55PM
Live Time: 140.00 min.
Real Time: 140.08 min.
Efficiency: 26.80% +/- 0.38% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,928.00	106.63
Pu-239	240	5.16	186	249	12,228.00	87.34
Am-241	284	5.49	249	303	12,660.00	90.43

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:52:45PM 5/5/2014

Calibration

Sample Name: IC-7107;AV49-20140504
Description:
Detector: AV49

Calibration Date: 5/5/2014 6:52:38PM
Analyst: 60040

Source Info

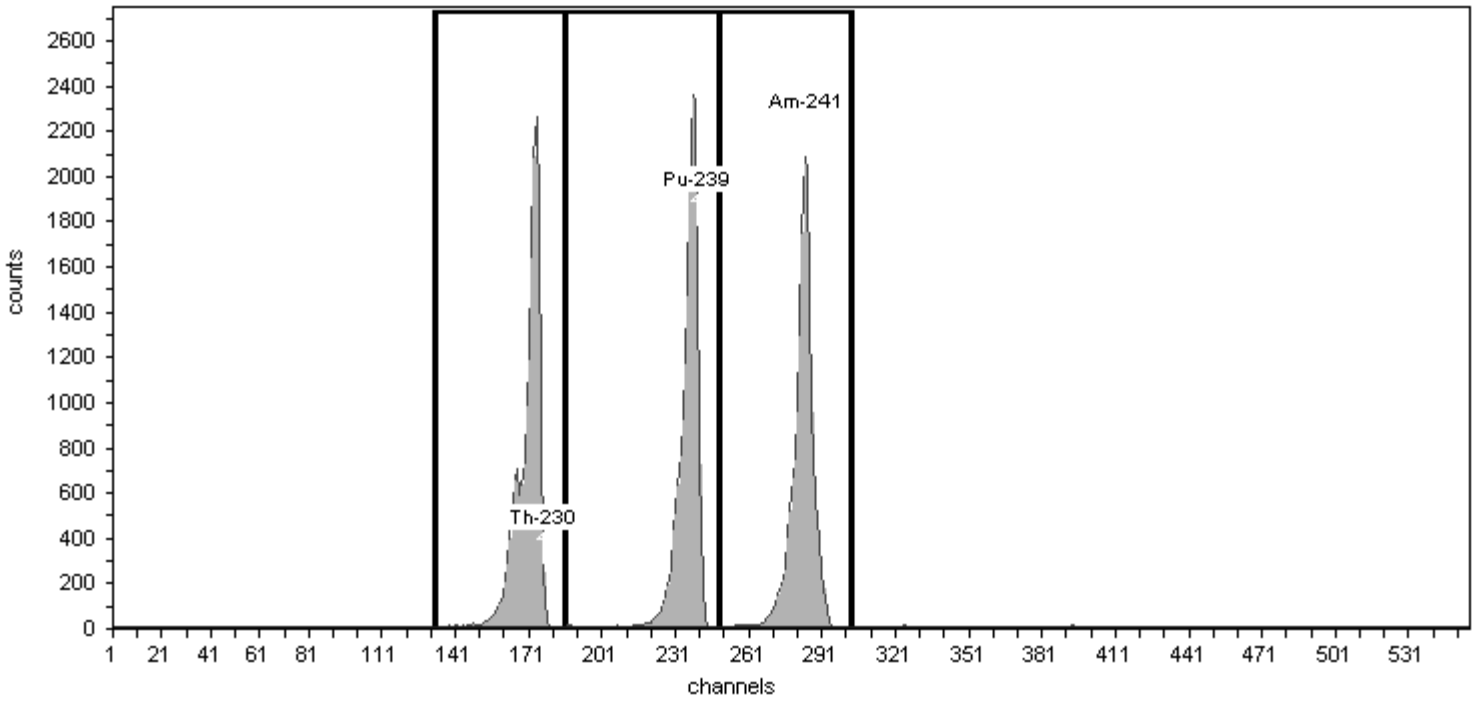
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV49 , SN: 47-043hh4
Acquisition Start Date: 5/4/2014 9:03:18PM
Live Time: 140.00 min.
Real Time: 140.03 min.
Efficiency: 26.53% +/- 0.30% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	16,670.00	119.07
Pu-239	240	5.16	186	249	16,300.00	116.43
Am-241	284	5.49	249	303	16,110.00	115.07

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:53:10PM 5/5/2014

Calibration

Sample Name: IC-8877;AV53-20140504
Description:
Detector: AV53

Calibration Date: 5/5/2014 6:53:06PM
Analyst: 60040

Source Info

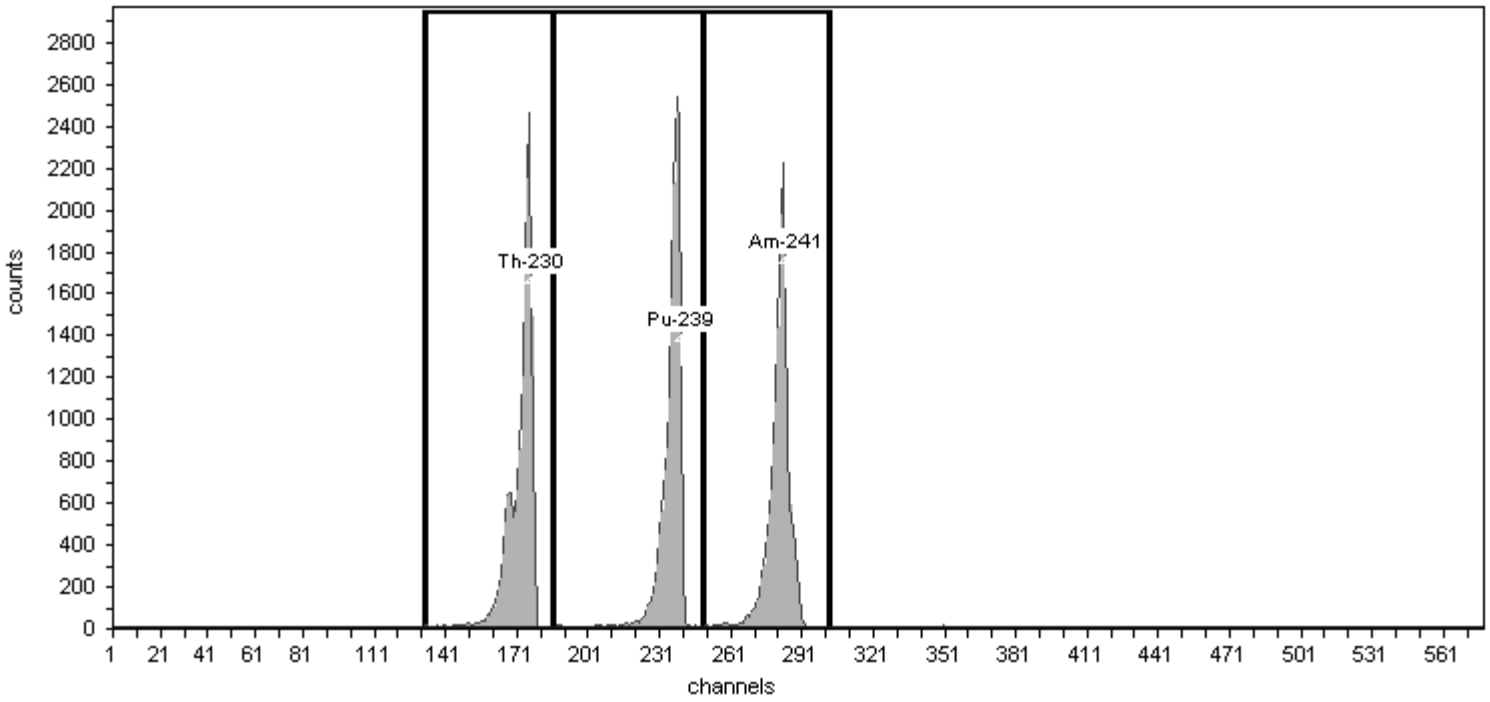
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV53 , SN: 50-051A6
Acquisition Start Date: 5/4/2014 9:04:11PM
Live Time: 140.00 min.
Real Time: 140.12 min.
Efficiency: 26.32% +/- 0.31% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	15,332.00	109.51
Pu-239	240	5.16	186	249	15,251.00	108.94
Am-241	284	5.49	249	303	15,087.00	107.76

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:53:17PM 5/5/2014

Calibration

Sample Name: IC-9520;AV54-20140504
Description:
Detector: AV54

Calibration Date: 5/5/2014 6:53:13PM
Analyst: 60040

Source Info

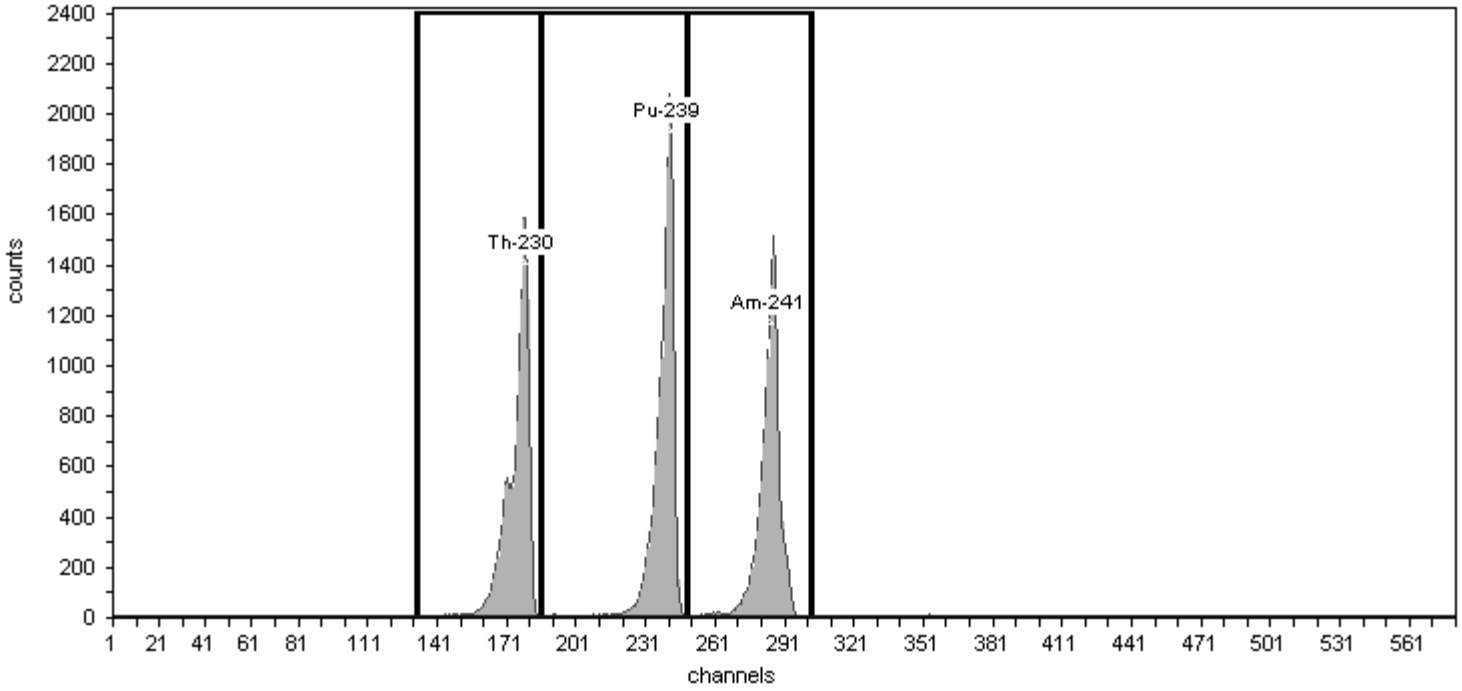
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV54 , SN: 48-046II6
Acquisition Start Date: 5/4/2014 9:04:26PM
Live Time: 140.00 min.
Real Time: 140.12 min.
Efficiency: 26.02% +/- 0.36% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	12,557.00	89.69
Pu-239	240	5.16	186	249	14,649.00	104.64
Am-241	284	5.49	249	303	11,824.00	84.46

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:48:59PM 5/7/2014

Calibration

Sample Name: IC-7107;AV55-20140507
Description:
Detector: AV55

Calibration Date: 5/7/2014 10:48:56PM
Analyst: 60040

Source Info

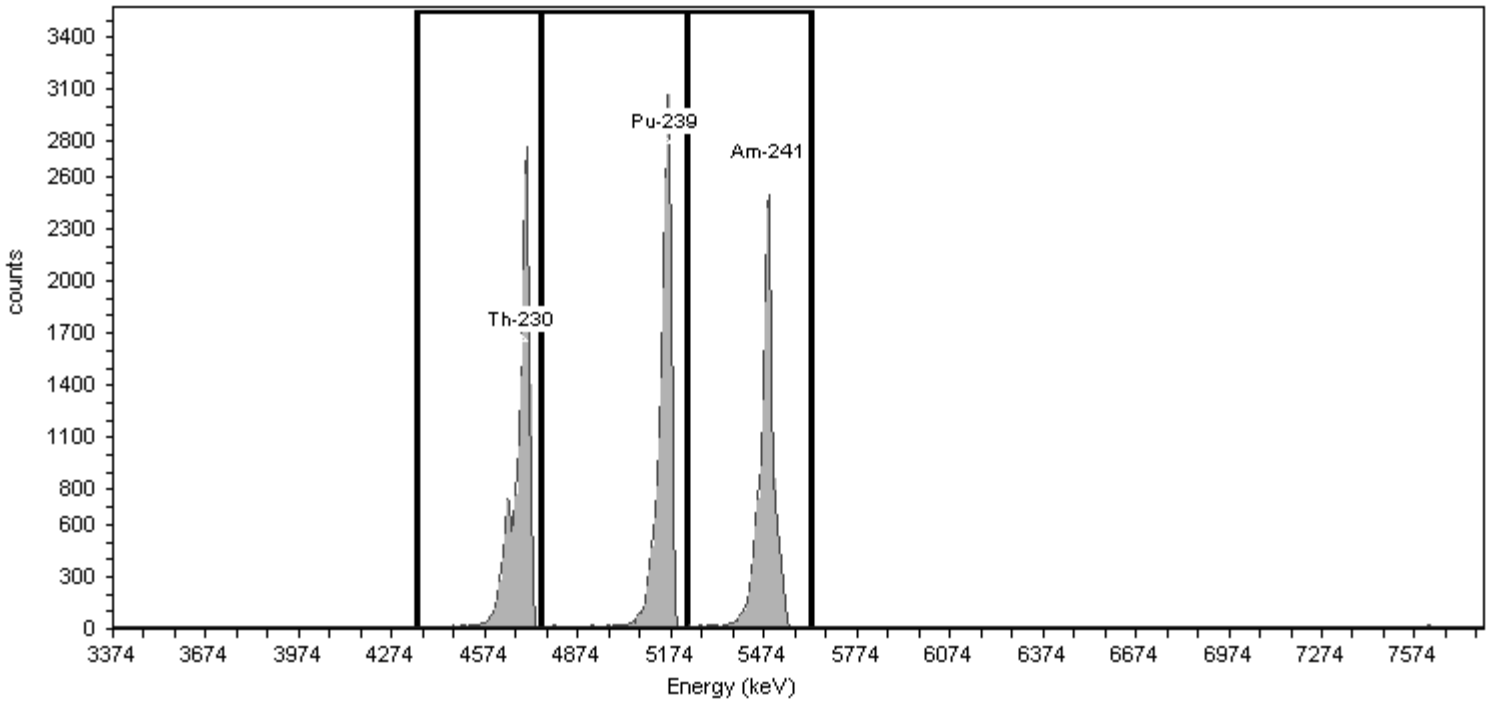
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV55 , SN: 50-051C2
Acquisition Start Date: 5/7/2014 7:51:23PM
Live Time: 140.00 min.
Real Time: 140.02 min.
Efficiency: 26.79% +/- 0.30% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	16,945.00	121.04
Pu-239	240	5.16	186	249	16,514.00	117.96
Am-241	284	5.49	249	303	16,110.00	115.07

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:53:38PM 5/5/2014

Calibration

Sample Name: IC-9792;AV56-20140504
Description:
Detector: AV56

Calibration Date: 5/5/2014 6:53:34PM
Analyst: 60040

Source Info

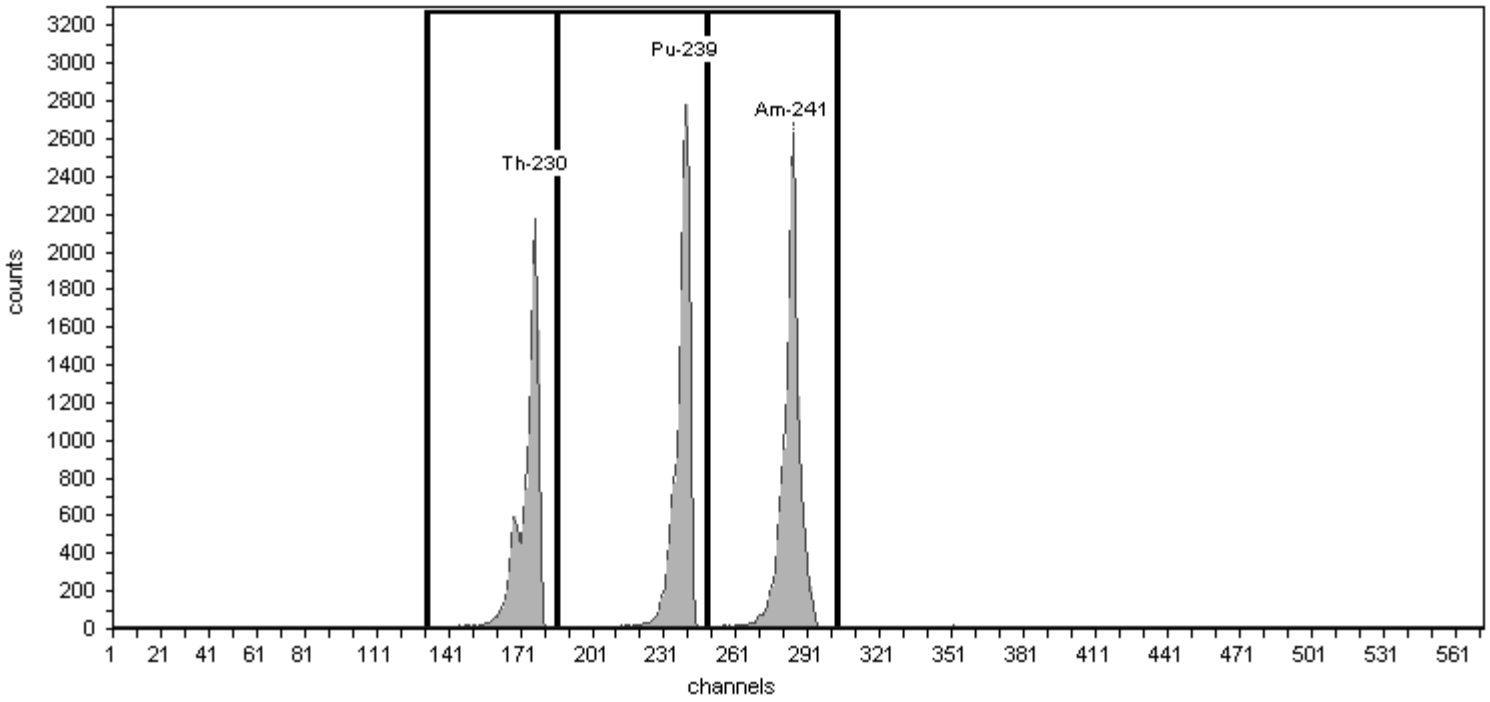
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV56 , SN: 52-059EE5
Acquisition Start Date: 5/4/2014 9:04:54PM
Live Time: 140.00 min.
Real Time: 140.12 min.
Efficiency: 26.09% +/- 0.30% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	13,567.00	96.91
Pu-239	240	5.16	186	249	15,909.00	113.64
Am-241	284	5.49	249	303	18,104.00	129.31

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:53:44PM 5/5/2014

Calibration

Sample Name: IC-9793;AV57-20140504
Description:
Detector: AV57

Calibration Date: 5/5/2014 6:53:40PM
Analyst: 60040

Source Info

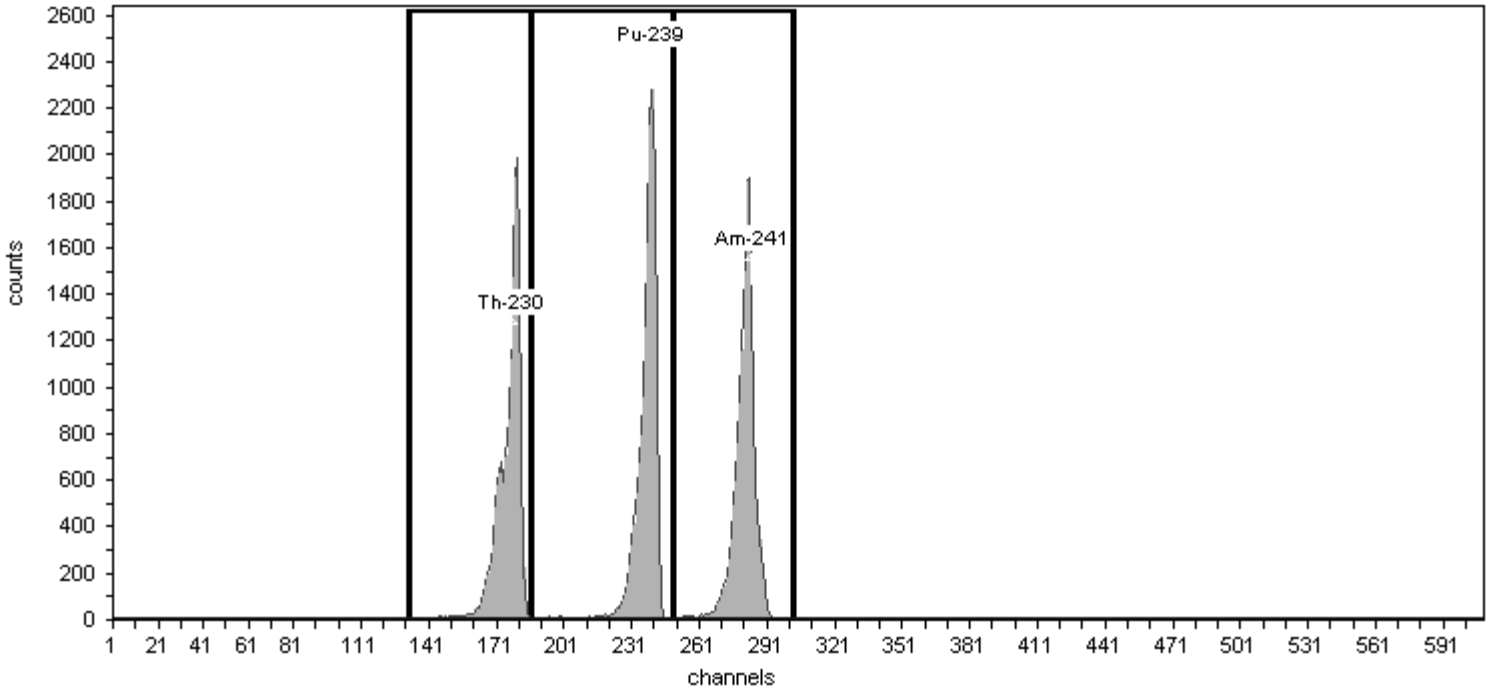
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV57 , SN: 48-158EE3
Acquisition Start Date: 5/4/2014 9:05:08PM
Live Time: 140.00 min.
Real Time: 140.12 min.
Efficiency: 26.74% +/- 0.33% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,915.00	106.54
Pu-239	240	5.16	186	249	15,361.00	109.72
Am-241	284	5.49	249	303	14,709.00	105.06

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:53:50PM 5/5/2014

Calibration

Sample Name: IC-9794;AV58-20140504
Description:
Detector: AV58

Calibration Date: 5/5/2014 6:53:46PM
Analyst: 60040

Source Info

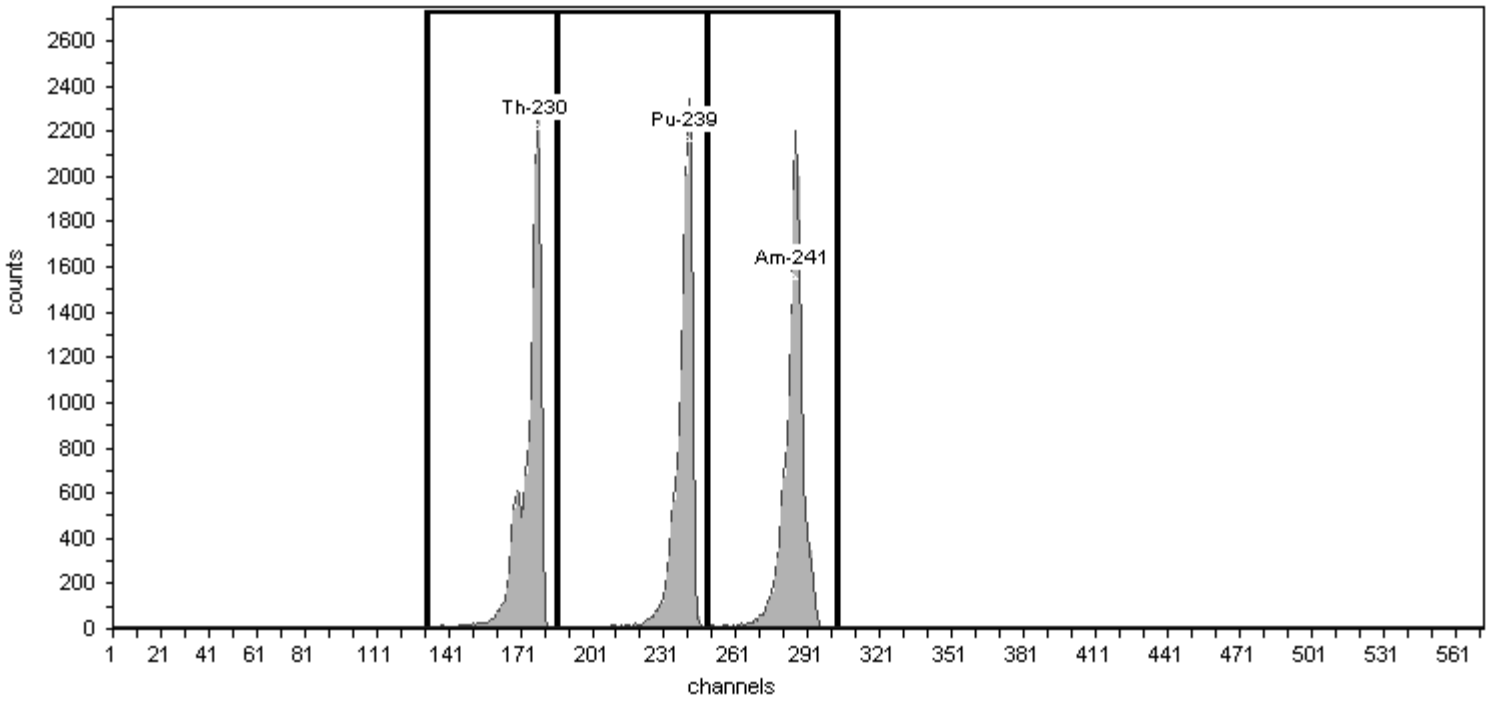
Certificate ID: 82242-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV58 , SN: 52-102 C5
Acquisition Start Date: 5/4/2014 9:05:25PM
Live Time: 140.00 min.
Real Time: 140.12 min.
Efficiency: 26.56% +/- 0.33% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,633.00	104.52
Pu-239	240	5.16	186	249	14,396.00	102.83
Am-241	284	5.49	249	303	15,822.00	113.01

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:54:03PM 5/5/2014

Calibration

Sample Name: IC-9817;AV60-20140504
Description:
Detector: AV60

Calibration Date: 5/5/2014 6:53:59PM
Analyst: 60040

Source Info

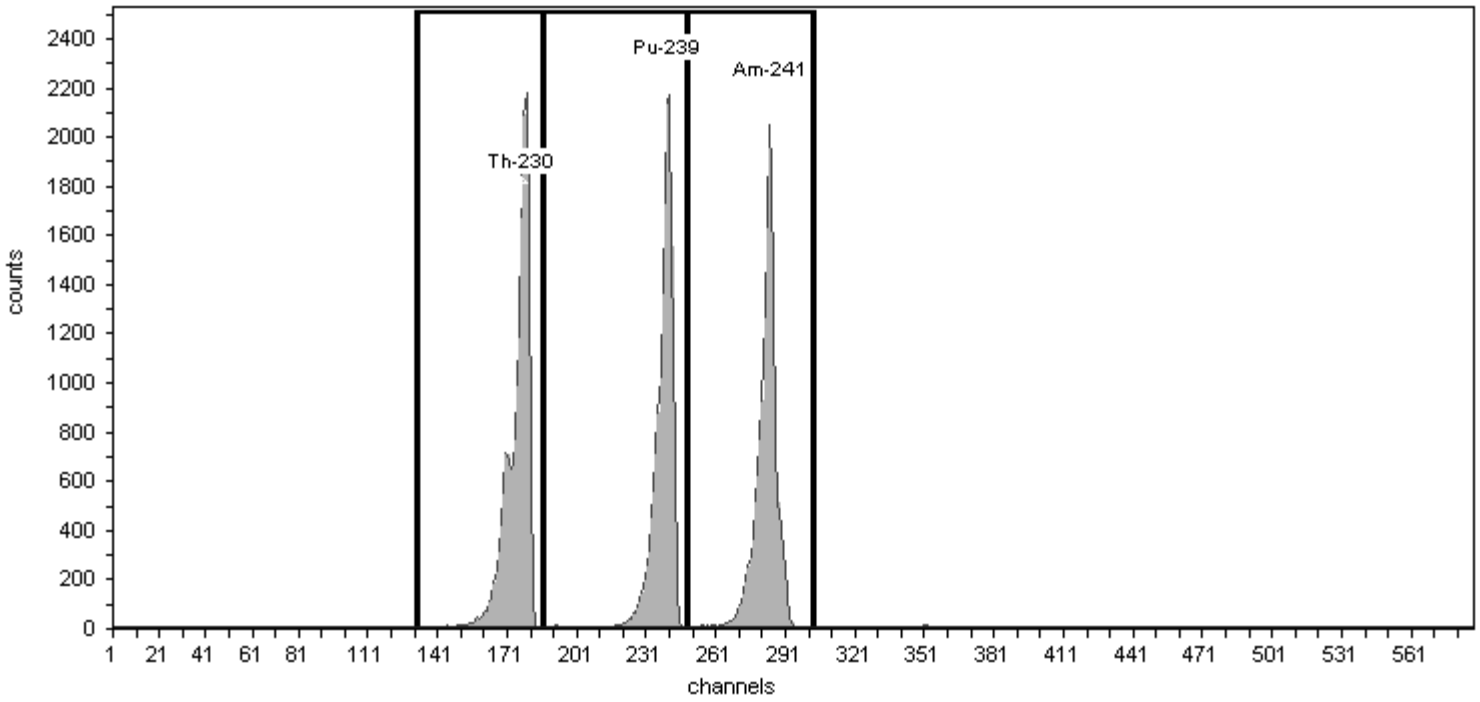
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV60 , SN: 49-027117
Acquisition Start Date: 5/4/2014 9:06:02PM
Live Time: 140.00 min.
Real Time: 140.07 min.
Efficiency: 26.33% +/- 0.32% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	16,279.00	116.28
Pu-239	240	5.16	186	249	14,858.00	106.13
Am-241	284	5.49	249	303	15,157.00	108.26

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:54:10PM 5/5/2014

Calibration

Sample Name: IC-9884;AV61-20140504
Description:
Detector: AV61

Calibration Date: 5/5/2014 6:54:06PM
Analyst: 60040

Source Info

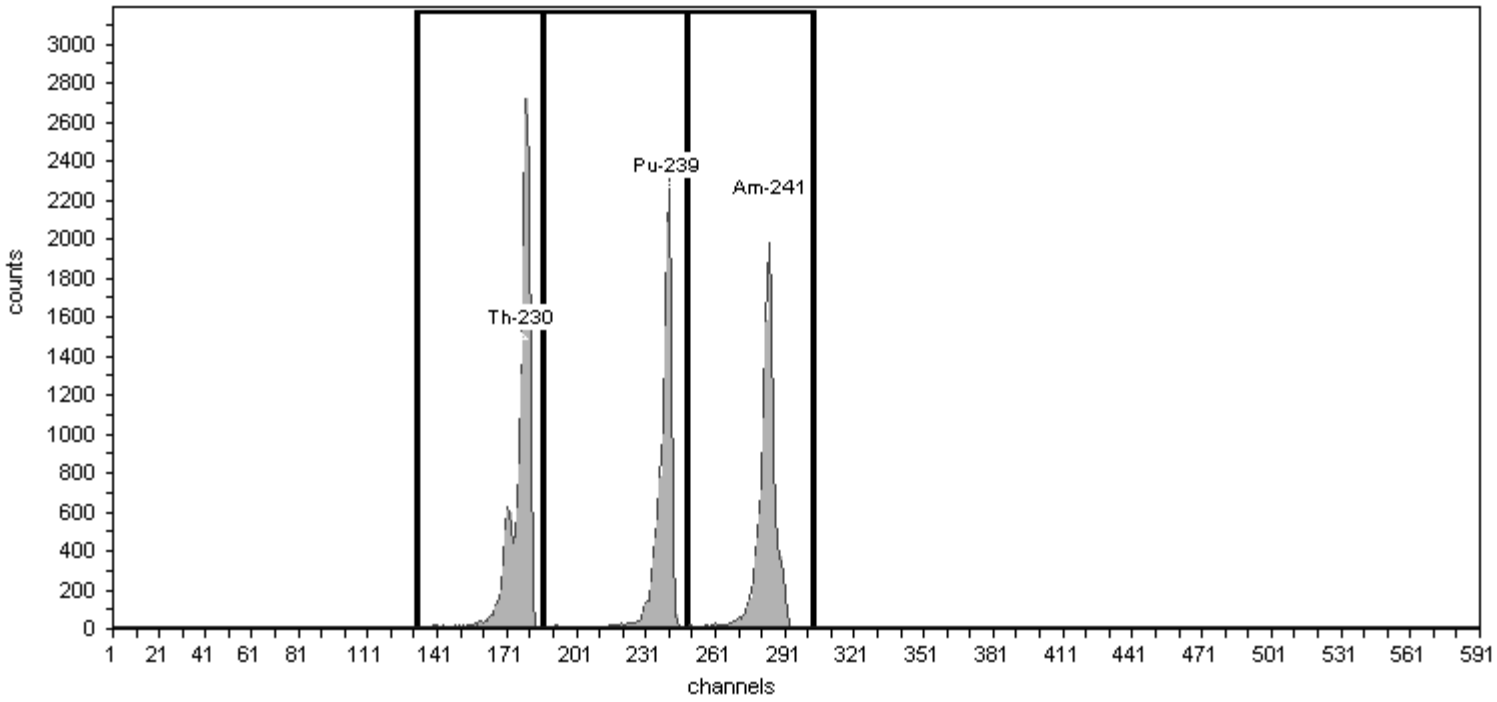
Certificate ID: 82245-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV61 , SN: 5-051JJ3
Acquisition Start Date: 5/4/2014 9:06:04PM
Live Time: 140.00 min.
Real Time: 140.07 min.
Efficiency: 26.46% +/- 0.38% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,902.00	106.44
Pu-239	240	5.16	186	249	12,091.00	86.36
Am-241	284	5.49	249	303	12,283.00	87.74

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:54:16PM 5/5/2014

Calibration

Sample Name: IC-9885;AV62-20140504
Description:
Detector: AV62

Calibration Date: 5/5/2014 6:54:13PM
Analyst: 60040

Source Info

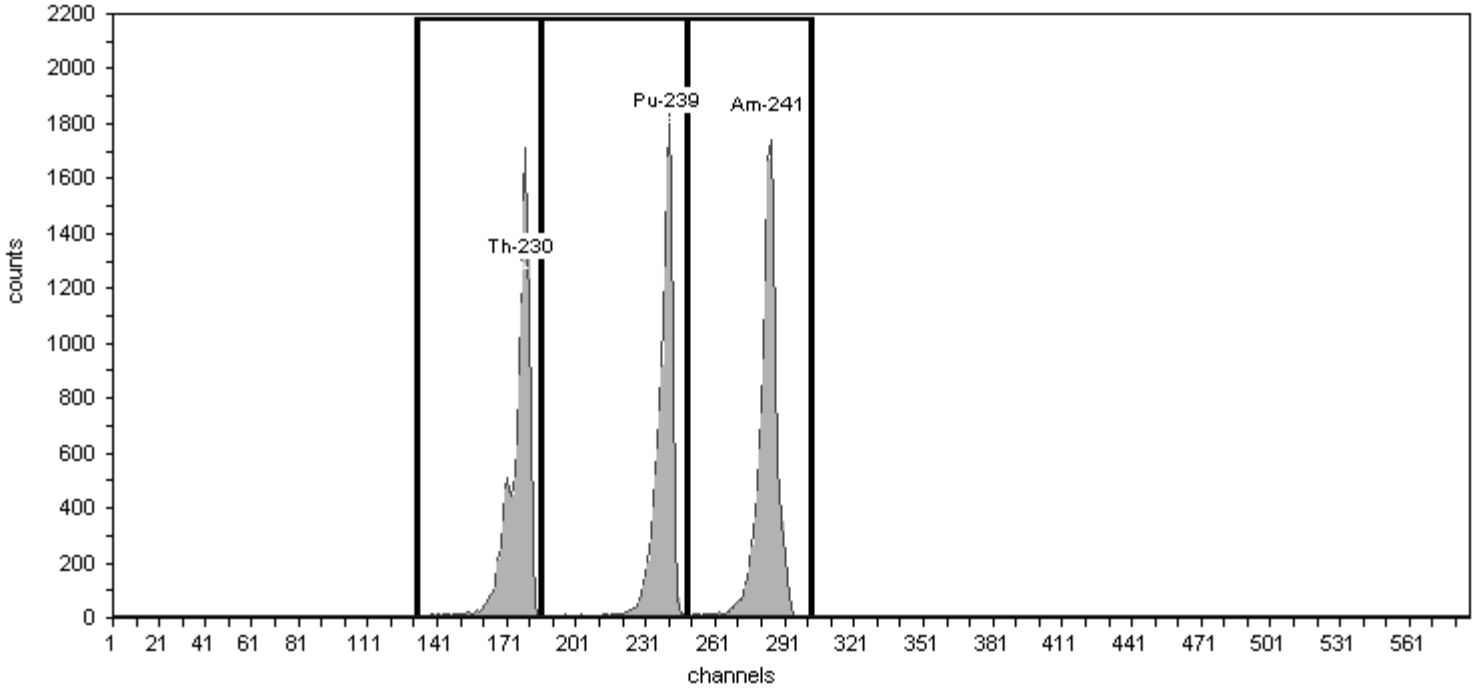
Certificate ID: 82246-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV62 , SN: 52-060FF2
Acquisition Start Date: 5/4/2014 9:06:28PM
Live Time: 140.00 min.
Real Time: 140.07 min.
Efficiency: 26.34% +/- 0.38% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	12,181.00	87.01
Pu-239	240	5.16	186	249	12,037.00	85.98
Am-241	284	5.49	249	303	13,168.00	94.06

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:54:23PM 5/5/2014

Calibration

Sample Name: IC-9886;AV63-20140504
Description:
Detector: AV63

Calibration Date: 5/5/2014 6:54:19PM
Analyst: 60040

Source Info

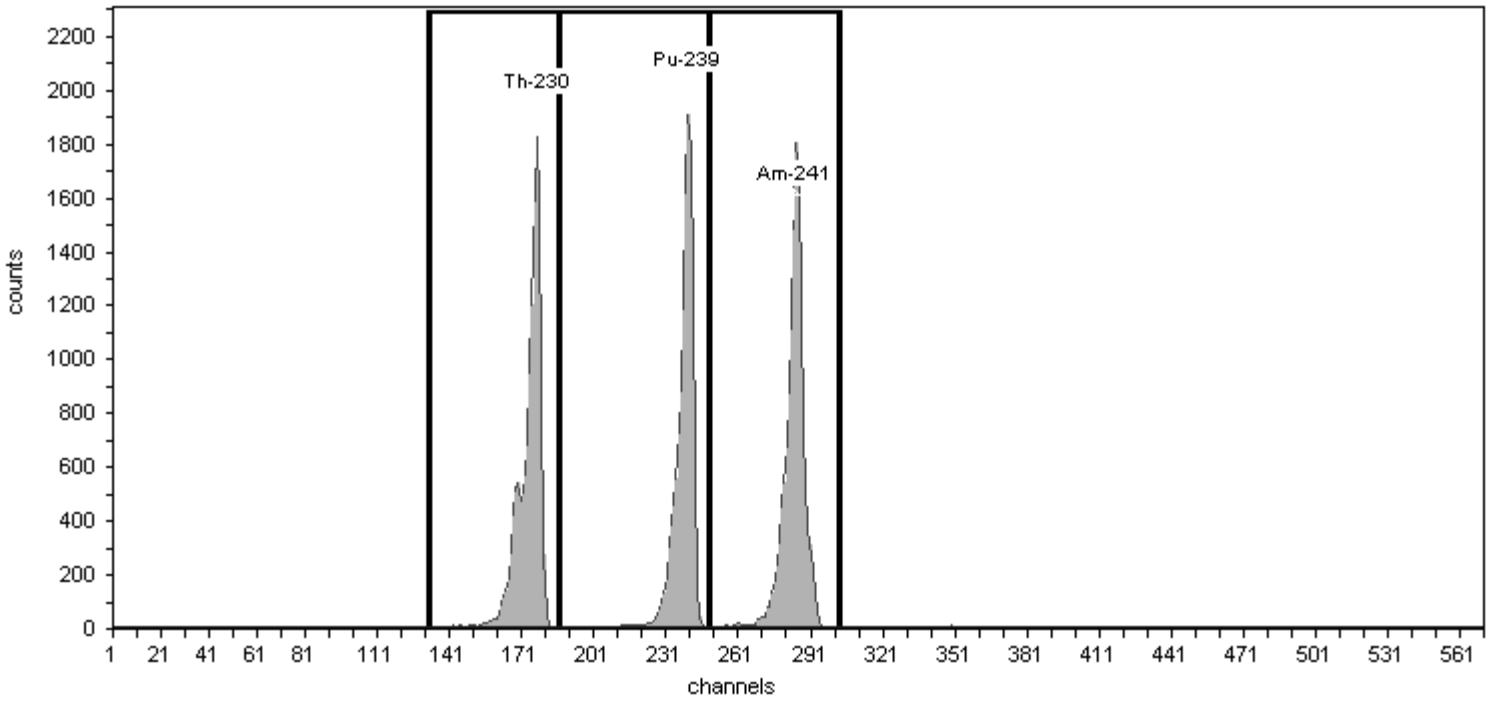
Certificate ID: 82247-334
Prepared by: Analytics

Certification Date: 6/10/2010 12:00:00PM
Description:

Acquisition

Detector: AV63 , SN: 47-029ff2
Acquisition Start Date: 5/4/2014 9:06:30PM
Live Time: 140.00 min.
Real Time: 140.07 min.
Efficiency: 25.48% +/- 0.34% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	13,102.00	93.59
Pu-239	240	5.16	186	249	12,548.00	89.63
Am-241	284	5.49	249	303	13,448.00	96.06

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:44:07PM 5/4/2014

Calibration

Sample Name: IC-7107;AV64-20140504a
Description:
Detector: AV64

Calibration Date: 5/4/2014 8:44:03PM
Analyst: 60040

Source Info

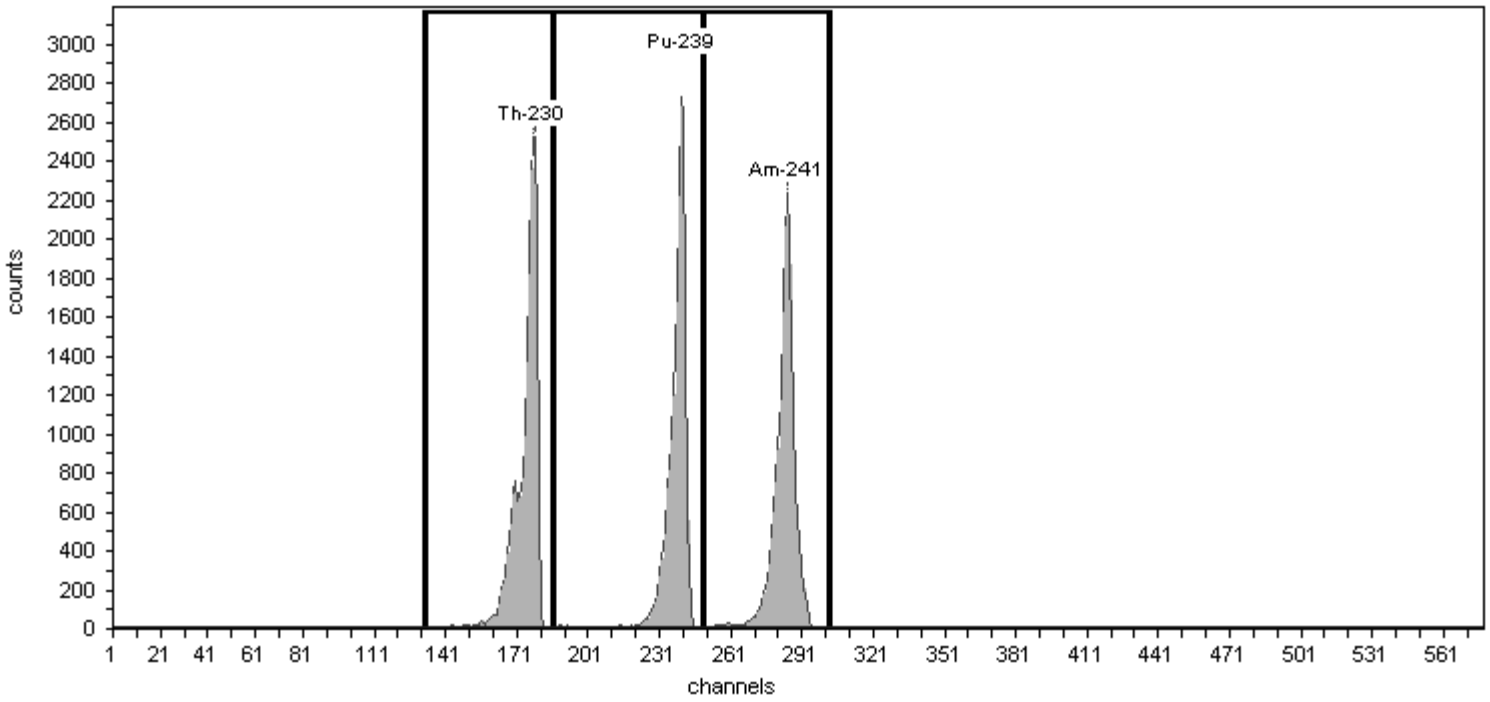
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV64 , SN: 47-029ee4
Acquisition Start Date: 5/4/2014 5:47:46PM
Live Time: 140.00 min.
Real Time: 140.04 min.
Efficiency: 27.75% +/- 0.31% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	17,513.00	125.09
Pu-239	240	5.16	186	249	17,121.00	122.29
Am-241	284	5.49	249	303	16,702.00	119.30

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:44:00PM 5/4/2014

Calibration

Sample Name: IC-8874;AV65-20140504
Description:
Detector: AV65

Calibration Date: 5/4/2014 8:43:55PM
Analyst: 60040

Source Info

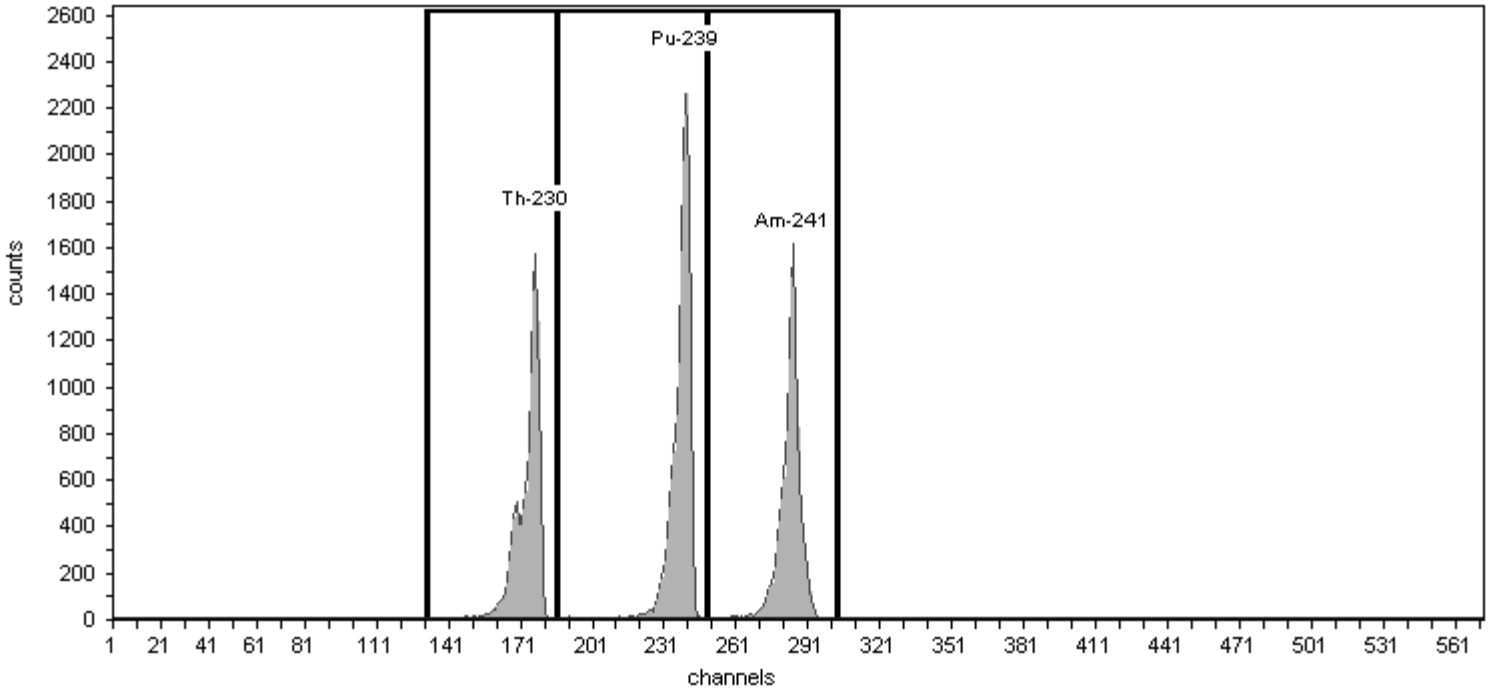
Certificate ID: 82233-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV65 , SN: 44-049JJ1
Acquisition Start Date: 5/4/2014 5:47:20PM
Live Time: 140.00 min.
Real Time: 140.04 min.
Efficiency: 27.13% +/- 0.38% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	10,885.00	77.75
Pu-239	240	5.16	186	249	14,355.00	102.54
Am-241	284	5.49	249	303	11,446.00	81.76

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:44:13PM 5/4/2014

Calibration

Sample Name: IC-8875;AV66-20140504
Description:
Detector: AV66

Calibration Date: 5/4/2014 8:44:10PM
Analyst: 60040

Source Info

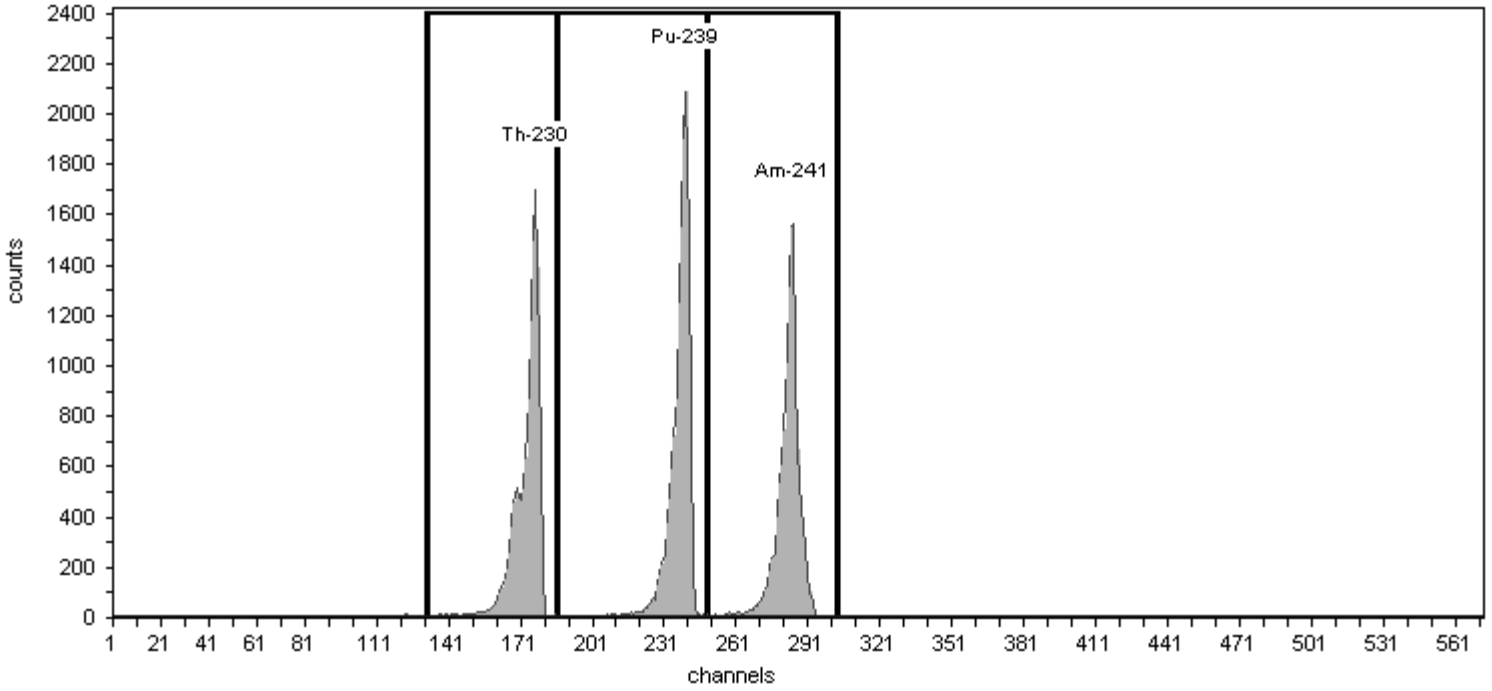
Certificate ID: 82234-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV66 , SN: 48-158EE2
Acquisition Start Date: 5/4/2014 5:47:59PM
Live Time: 140.00 min.
Real Time: 140.04 min.
Efficiency: 25.93% +/- 0.36% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	12,034.00	85.96
Pu-239	240	5.16	186	249	13,485.00	96.32
Am-241	284	5.49	249	303	12,078.00	86.27

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:44:19PM 5/4/2014

Calibration

Sample Name: IC-8876;AV67-20140504
Description:
Detector: AV67

Calibration Date: 5/4/2014 8:44:15PM
Analyst: 60040

Source Info

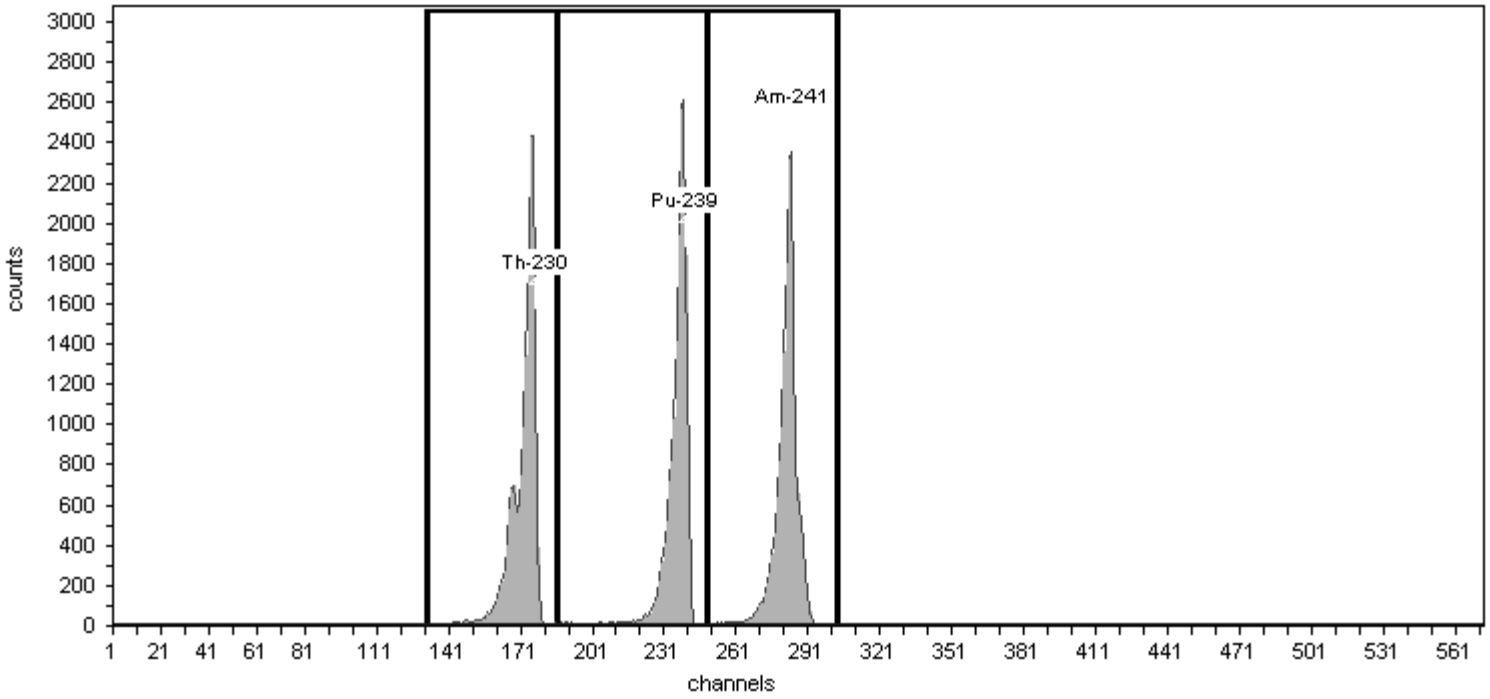
Certificate ID: 82235-334
Prepared by: Analytics

Certification Date: 6/4/2010 12:00:00PM
Description:

Acquisition

Detector: AV67 , SN: 52-102 D7
Acquisition Start Date: 5/4/2014 5:48:10PM
Live Time: 140.00 min.
Real Time: 140.12 min.
Efficiency: 27.32% +/- 0.32% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	16,552.00	118.23
Pu-239	240	5.16	186	249	16,093.00	114.95
Am-241	284	5.49	249	303	16,706.00	119.33

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:44:31PM 5/4/2014

Calibration

Sample Name: IC-9520;AV69-20140504
Description:
Detector: AV69

Calibration Date: 5/4/2014 8:44:28PM
Analyst: 60040

Source Info

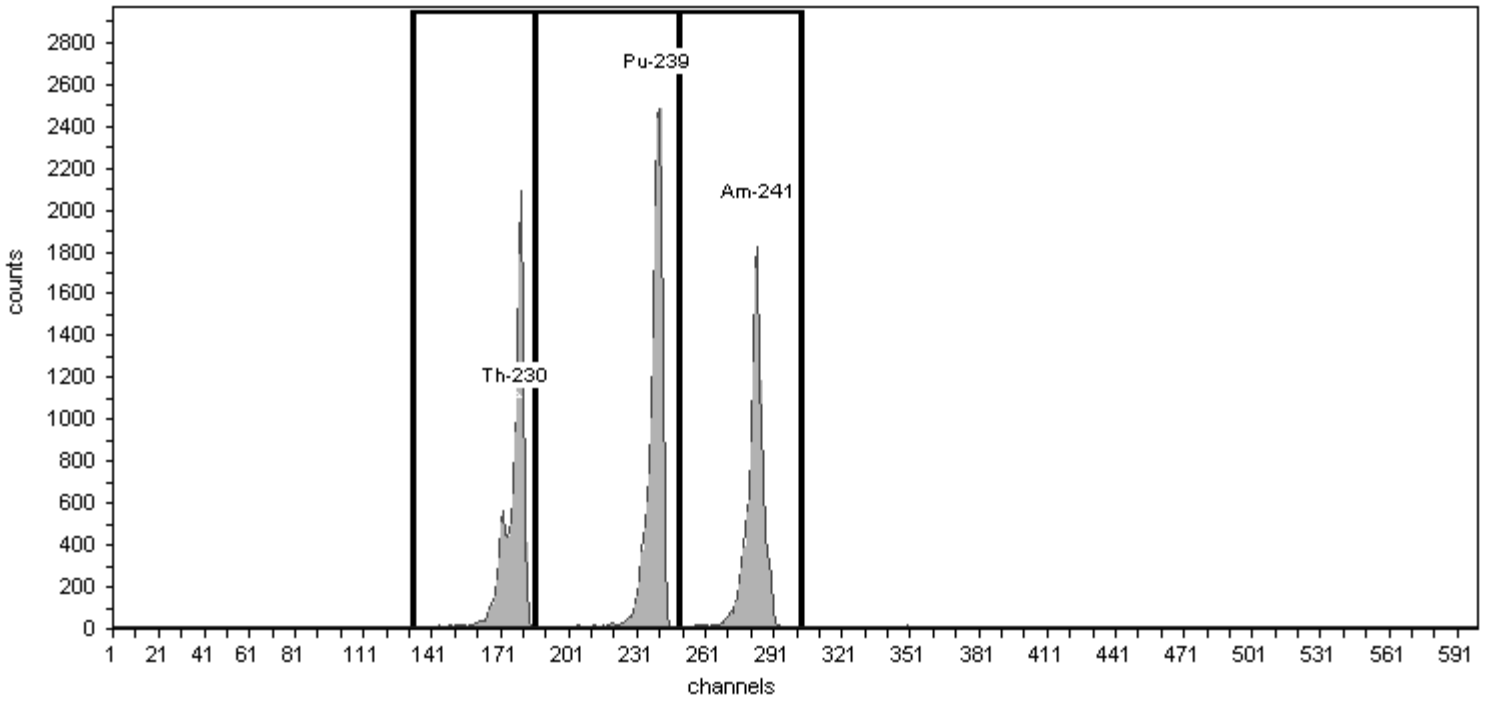
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV69 , SN: 49-155DD5
Acquisition Start Date: 5/4/2014 5:48:48PM
Live Time: 140.00 min.
Real Time: 140.12 min.
Efficiency: 25.57% +/- 0.36% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	12,251.00	87.51
Pu-239	240	5.16	186	249	14,290.00	102.07
Am-241	284	5.49	249	303	11,803.00	84.31

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:49:05PM 5/7/2014

Calibration

Sample Name: IC-8876;AV70-20140507
Description:
Detector: AV70

Calibration Date: 5/7/2014 10:49:02PM
Analyst: 60040

Source Info

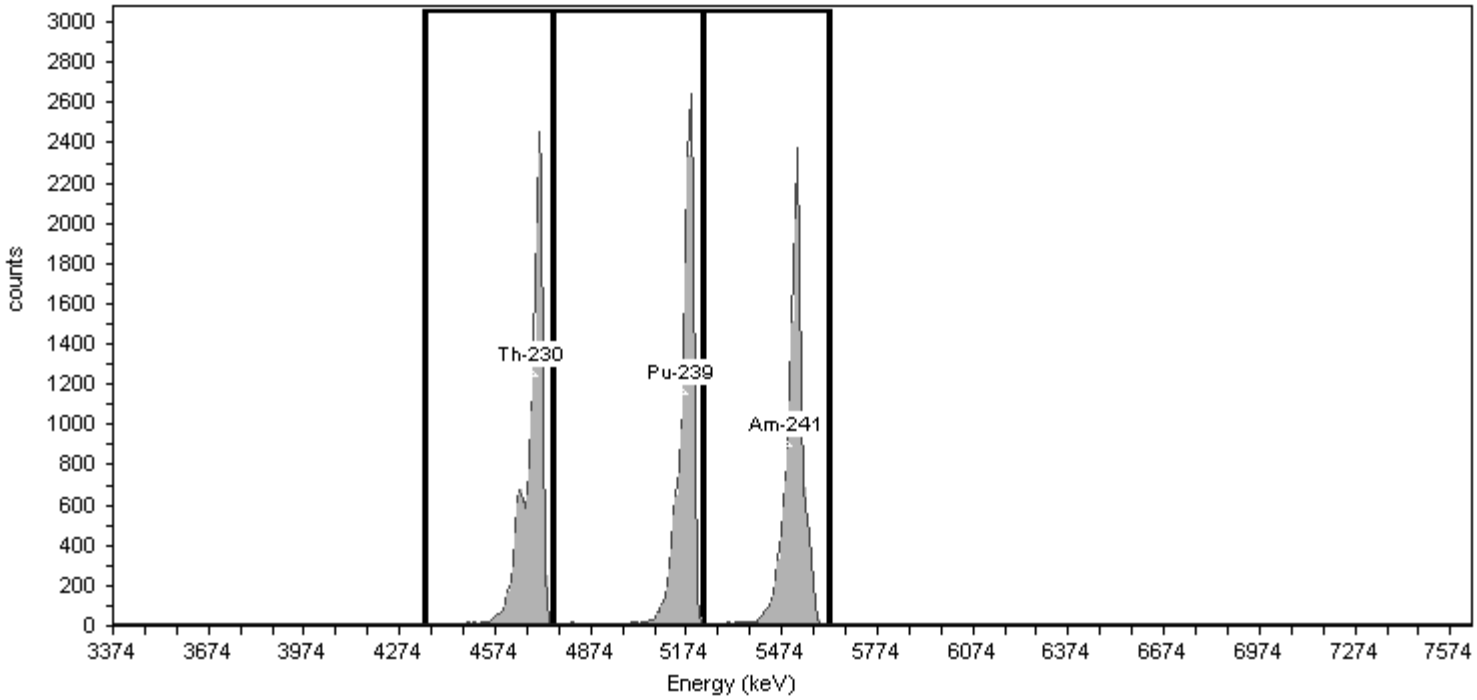
Certificate ID: 82235-334
Prepared by: Analytics

Certification Date: 6/4/2010 12:00:00PM
Description:

Acquisition

Detector: AV70 , SN: 48-158FF1
Acquisition Start Date: 5/7/2014 7:51:43PM
Live Time: 140.00 min.
Real Time: 140.02 min.
Efficiency: 26.52% +/- 0.31% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	16,123.00	115.16
Pu-239	240	5.16	186	249	15,598.00	111.41
Am-241	284	5.49	249	303	16,182.00	115.59

Initial Calibration Verifications

Alpha Spectroscopy Calibration Summary

Detector: AV46

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120409/1	05/05/14 19:30	82245-334_00001	0.2680	0.20-0.32		
ICV 160-121079/1	05/08/14 00:18	82244-334_00001	0.2610	0.20-0.32	97.4	95-105
CCV 160-127986/1	06/22/14 21:17	82245-334_00001	0.2669	0.20-0.32	99.6	95-105

Detector: AV49

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120271/1	05/04/14 21:03	82232-334_00001	0.2653	0.20-0.32		
ICV 160-121364/1	05/08/14 14:34	82247-334_00001	0.2545	0.20-0.32	95.9	95-105
CCV 160-127989/1	06/22/14 18:52	82232-334_00001	0.2674	0.20-0.32	100.8	95-105

Detector: AV53

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120275/1	05/04/14 21:04	82236-334_00001	0.2632	0.20-0.32		
ICV 160-121082/1	05/08/14 00:18	82235-334_00001	0.2648	0.20-0.32	100.6	95-105
CCV 160-127992/1	06/22/14 18:53	82236-334_00001	0.2651	0.20-0.32	100.7	95-105

Detector: AV54

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120276/1	05/04/14 21:04	82237-334_00003	0.2602	0.20-0.32		
ICV 160-121368/1	05/08/14 14:34	82236-334_00001	0.2609	0.20-0.32	100.3	95-105
CCV 160-127993/1	06/22/14 18:53	82237-334_00003	0.2628	0.20-0.32	101.0	95-105

Detector: AV55

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120842/1	05/07/14 19:51	82232-334_00001	0.2679	0.20-0.32		
ICV 160-121083/1	05/08/14 00:19	82237-334_00003	0.2569	0.20-0.32	95.9	95-105
CCV 160-127994/1	06/22/14 20:08	82232-334_00001	0.2683	0.20-0.32	100.2	95-105

Detector: AV56

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120278/1	05/04/14 21:04	82240-334_00001	0.2609	0.20-0.32		
ICV 160-121369/1	05/08/14 17:18	82247-334_00001	0.2519	0.20-0.32	96.5	95-105
CCV 160-127995/1	06/22/14 18:53	82240-334_00001	0.2626	0.20-0.32	100.7	95-105

Detector: AV57

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120279/1	05/04/14 21:05	82241-334_00001	0.2674	0.20-0.32		
ICV 160-121370/1	05/08/14 14:35	82240-334_00001	0.2676	0.20-0.32	100.1	95-105
CCV 160-127996/1	06/22/14 18:53	82241-334_00001	0.2692	0.20-0.32	100.7	95-105

Detector: AV58

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120280/1	05/04/14 21:05	82242-334_00001	0.2656	0.20-0.32		
ICV 160-121371/1	05/08/14 14:35	82241-334_00001	0.2710	0.20-0.32	102.0	95-105
CCV 160-127997/1	06/22/14 18:53	82242-334_00001	0.2631	0.20-0.32	99.1	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV60

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120282/1	05/04/14 21:06	82244-334_00001	0.2633	0.20-0.32		
ICV 160-121373/1	05/08/14 17:21	82243-334_00001	0.2725	0.20-0.32	103.5	95-105
CCV 160-127999/1	06/22/14 21:17	82244-334_00001	0.2629	0.20-0.32	99.8	95-105

Detector: AV61

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120283/1	05/04/14 21:06	82245-334_00001	0.2646	0.20-0.32		
ICV 160-121374/1	05/08/14 14:36	82244-334_00001	0.2581	0.20-0.32	97.5	95-105
CCV 160-128018/1	06/22/14 22:21	82245-334_00001	0.2622	0.20-0.32	99.1	95-105

Detector: AV62

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120284/1	05/04/14 21:06	82246-334_00001	0.2634	0.20-0.32		
ICV 160-121375/1	05/08/14 14:36	82245-334_00001	0.2622	0.20-0.32	99.6	95-105
CCV 160-128000/1	06/22/14 20:09	82246-334_00001	0.2650	0.20-0.32	100.6	95-105

Detector: AV63

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120285/1	05/04/14 21:06	82247-334_00001	0.2548	0.20-0.32		
ICV 160-121376/1	05/08/14 14:36	82246-334_00001	0.2601	0.20-0.32	102.1	95-105
CCV 160-128001/1	06/22/14 21:18	82247-334_00001	0.2557	0.20-0.32	100.3	95-105

Detector: AV64

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120041/1	05/04/14 17:47	82232-334_00001	0.2775	0.20-0.32		
ICV 160-121389/1	05/11/14 19:31	82247-334_00001	0.2666	0.20-0.32	96.1	95-105
CCV 160-128002/1	06/22/14 21:18	82232-334_00001	0.2776	0.20-0.32	100.0	95-105

Detector: AV65

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120042/1	05/04/14 17:47	82233-334_00001	0.2713	0.20-0.32		
ICV 160-121377/1	05/08/14 17:18	82232-334_00001	0.2712	0.20-0.32	99.9	95-105
CCV 160-128003/1	06/22/14 20:09	82233-334_00001	0.2695	0.20-0.32	99.3	95-105

Detector: AV66

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120043/1	05/04/14 17:47	82234-334_00001	0.2593	0.20-0.32		
ICV 160-121390/1	05/11/14 19:32	82233-334_00001	0.2667	0.20-0.32	102.9	95-105
CCV 160-128004/1	06/22/14 21:18	82234-334_00001	0.2570	0.20-0.32	99.1	95-105

Detector: AV67

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120044/1	05/04/14 17:48	82235-334_00001	0.2732	0.20-0.32		
ICV 160-121391/1	05/11/14 19:32	82234-334_00001	0.2702	0.20-0.32	98.9	95-105
CCV 160-128005/1	06/22/14 18:54	82235-334_00001	0.2782	0.20-0.32	101.8	95-105

Alpha Spectroscopy Calibration Summary

Detector: AV69

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120046/1	05/04/14 17:48	82237-334_00003	0.2557	0.20-0.32		
ICV 160-121379/1	05/08/14 17:19	82236-334_00001	0.2646	0.20-0.32	103.5	95-105
CCV 160-128007/1	06/22/14 20:09	82237-334_00003	0.2594	0.20-0.32	101.5	95-105

Detector: AV70

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120844/1	05/07/14 19:51	82235-334_00001	0.2652	0.20-0.32		
ICV 160-121380/1	05/08/14 14:36	82237-334_00003	0.2579	0.20-0.32	97.2	95-105
CCV 160-128008/1	06/22/14 20:10	82235-334_00001	0.2569	0.20-0.32	96.9	95-105

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:20:40PM 5/8/2014

Calibration

Sample Name: ICV-9817;AV46-20140507
Description:
Detector: AV46

Calibration Date: 5/8/2014 2:20:37PM
Analyst: 60040

Source Info

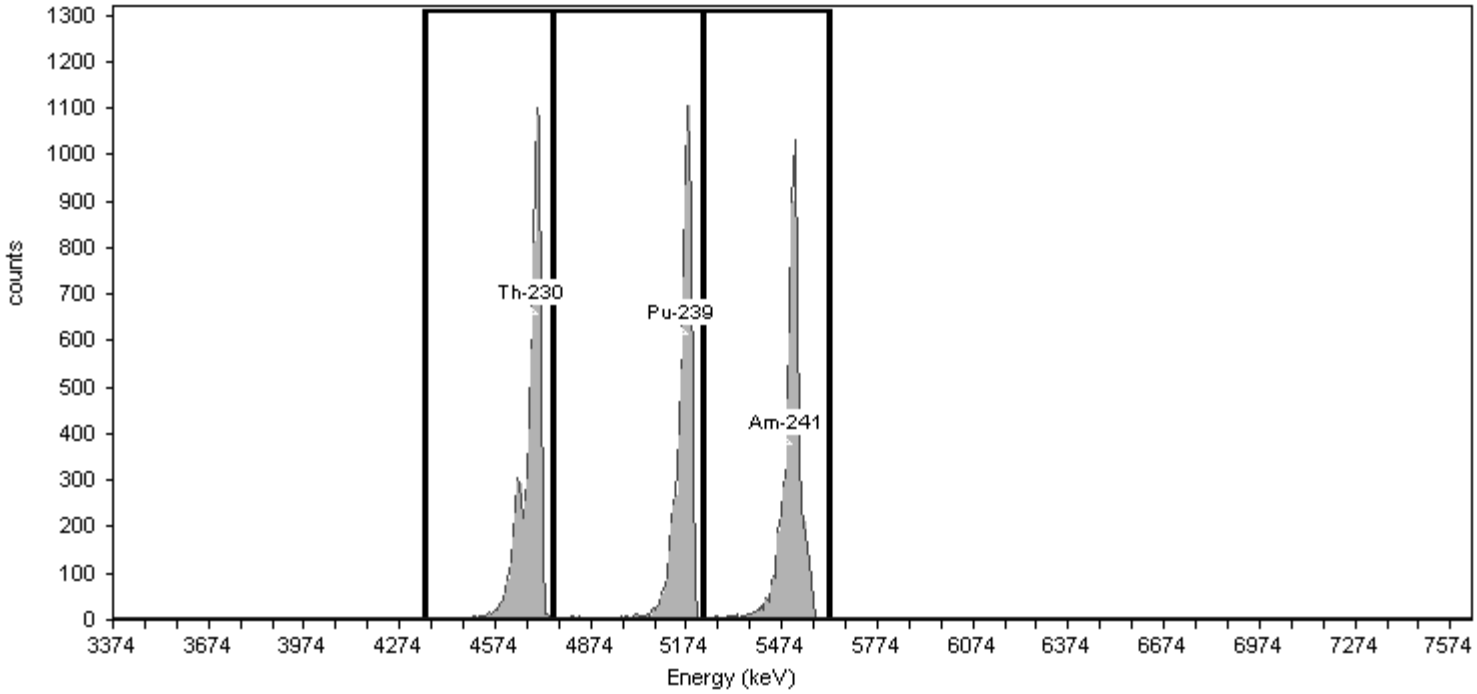
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV46 , SN: 49-202GG2
Acquisition Start Date: 5/8/2014 12:18:27AM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 26.10% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,959.00	115.98
Pu-239	240	5.16	186	249	6,287.00	104.78
Am-241	284	5.49	249	303	6,423.00	107.05

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:56:35PM 5/8/2014

Calibration

Sample Name: ICV-9886;AV49-050814
Description:
Detector: AV49

Calibration Date: 5/8/2014 4:56:32PM
Analyst: 60040

Source Info

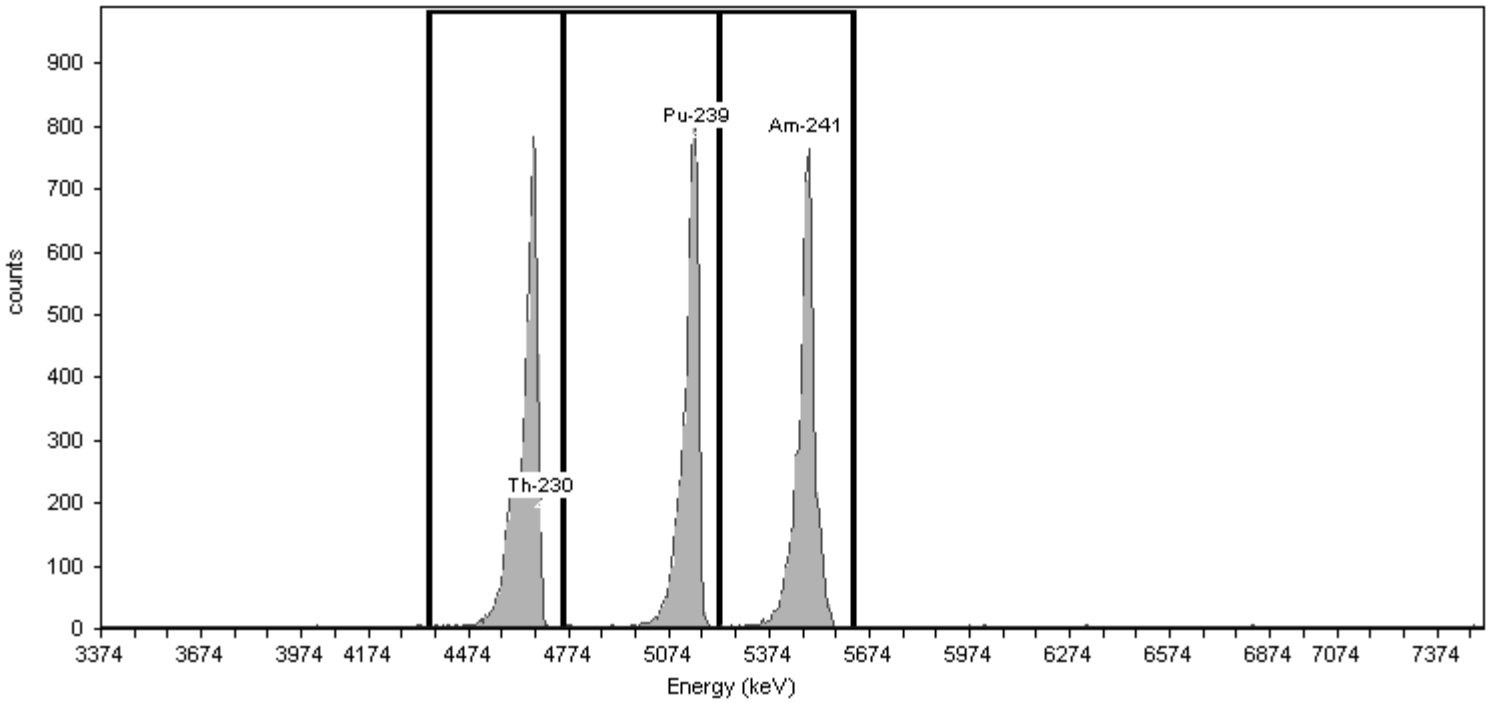
Certificate ID: 82247-334
Prepared by: Analytics

Certification Date: 6/10/2010 12:00:00PM
Description:

Acquisition

Detector: AV49 , SN: 47-043hh4
Acquisition Start Date: 5/8/2014 2:34:10PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 25.45% +/- 0.45% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,790.00	96.50
Pu-239	240	5.16	186	249	5,422.00	90.37
Am-241	284	5.49	249	303	5,531.00	92.18

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:21:00PM 5/8/2014

Calibration

Sample Name: ICV-8876;AV53-20140507
Description:
Detector: AV53

Calibration Date: 5/8/2014 2:20:55PM
Analyst: 60040

Source Info

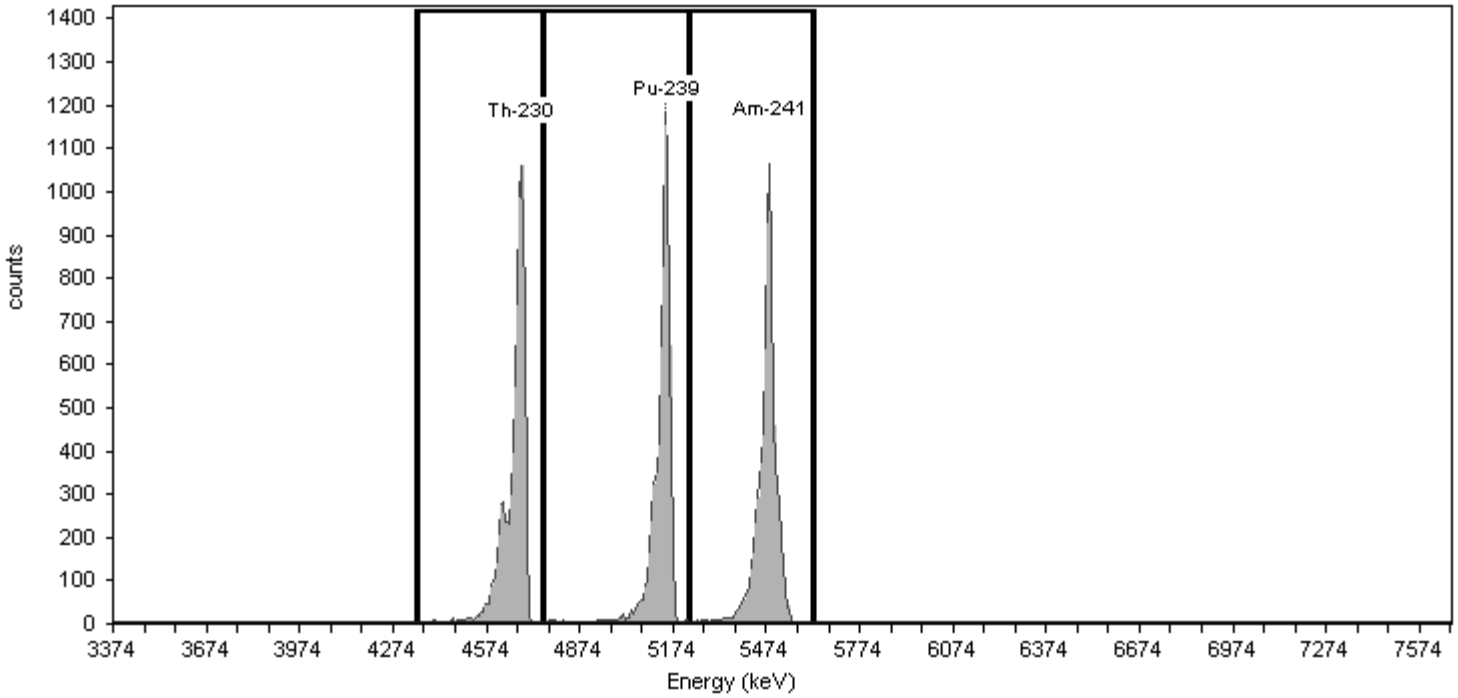
Certificate ID: 82235-334
Prepared by: Analytics

Certification Date: 6/4/2010 12:00:00PM
Description:

Acquisition

Detector: AV53 , SN: 50-051A6
Acquisition Start Date: 5/8/2014 12:18:30AM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.48% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,832.00	113.87
Pu-239	240	5.16	186	249	6,635.00	110.58
Am-241	284	5.49	249	303	7,020.00	117.00

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:56:47PM 5/8/2014

Calibration

Sample Name: ICV-8877;AV54-050814
Description:
Detector: AV54

Calibration Date: 5/8/2014 4:56:44PM
Analyst: 60040

Source Info

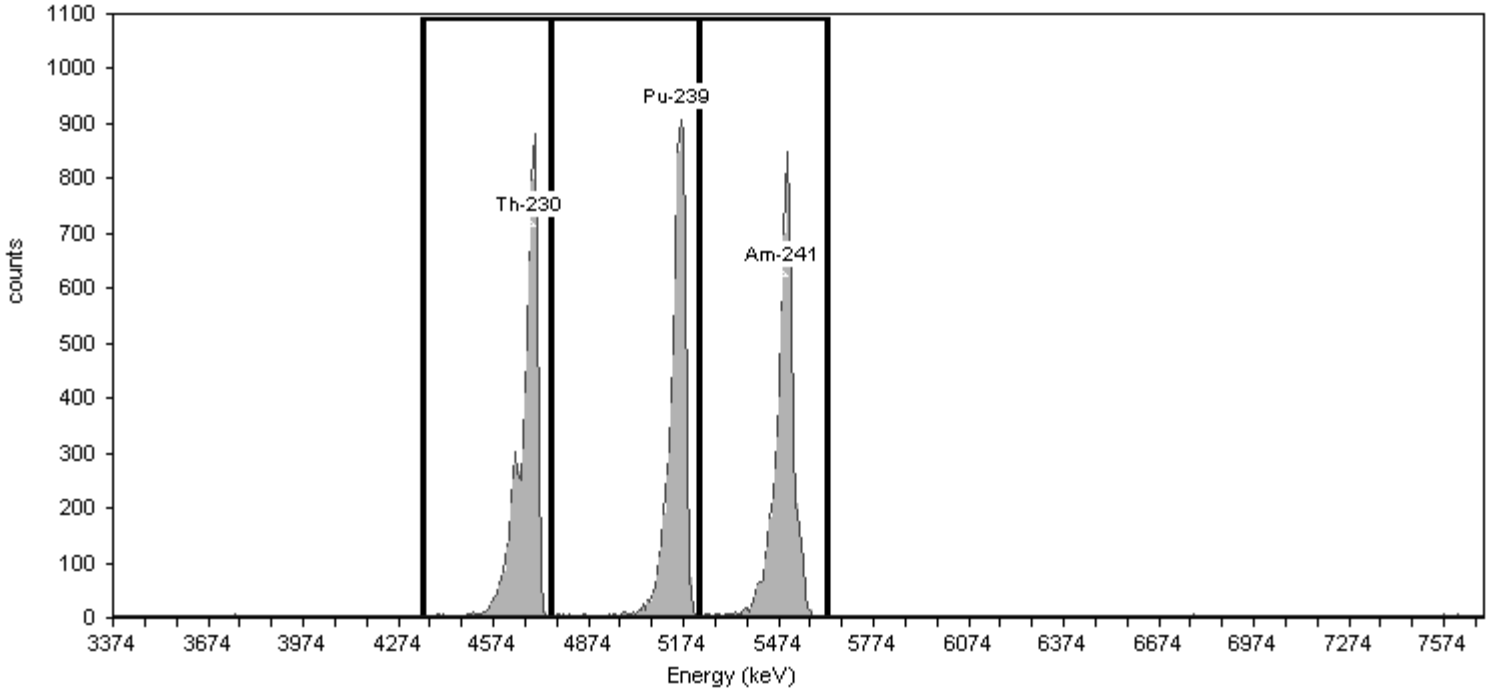
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV54 , SN: 48-046II6
Acquisition Start Date: 5/8/2014 2:34:44PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.09% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,474.00	107.90
Pu-239	240	5.16	186	249	6,518.00	108.63
Am-241	284	5.49	249	303	6,409.00	106.82

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:21:05PM 5/8/2014

Calibration

Sample Name: ICV-9520;AV55-20140507
Description:
Detector: AV55

Calibration Date: 5/8/2014 2:21:02PM
Analyst: 60040

Source Info

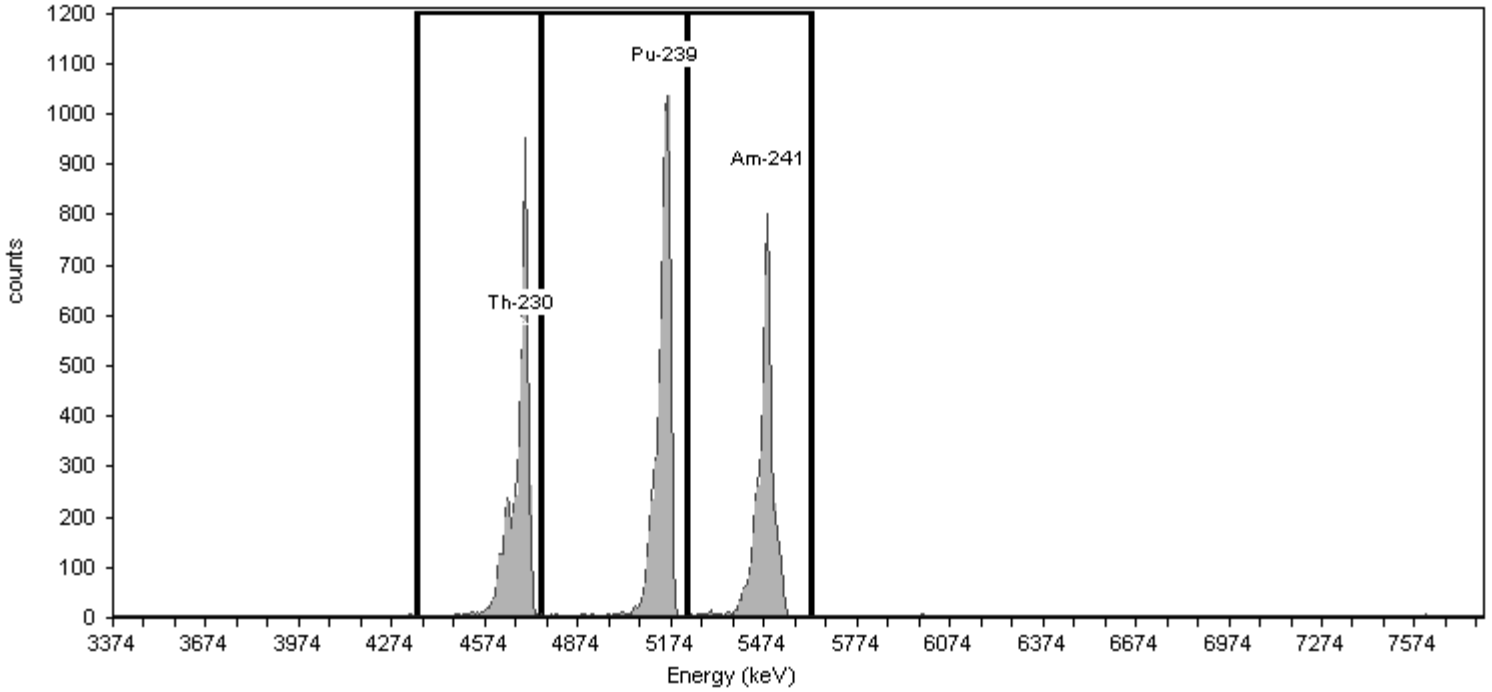
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV55 , SN: 50-051C2
Acquisition Start Date: 5/8/2014 12:19:12AM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 25.69% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,273.00	87.88
Pu-239	240	5.16	186	249	6,108.00	101.80
Am-241	284	5.49	249	303	5,136.00	85.60

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:24:33PM 5/11/2014

Calibration

Sample Name: ICV-9886;AV56-20140508
Description:
Detector: AV56

Calibration Date: 5/11/2014 7:11:51PM
Analyst: 60040

Source Info

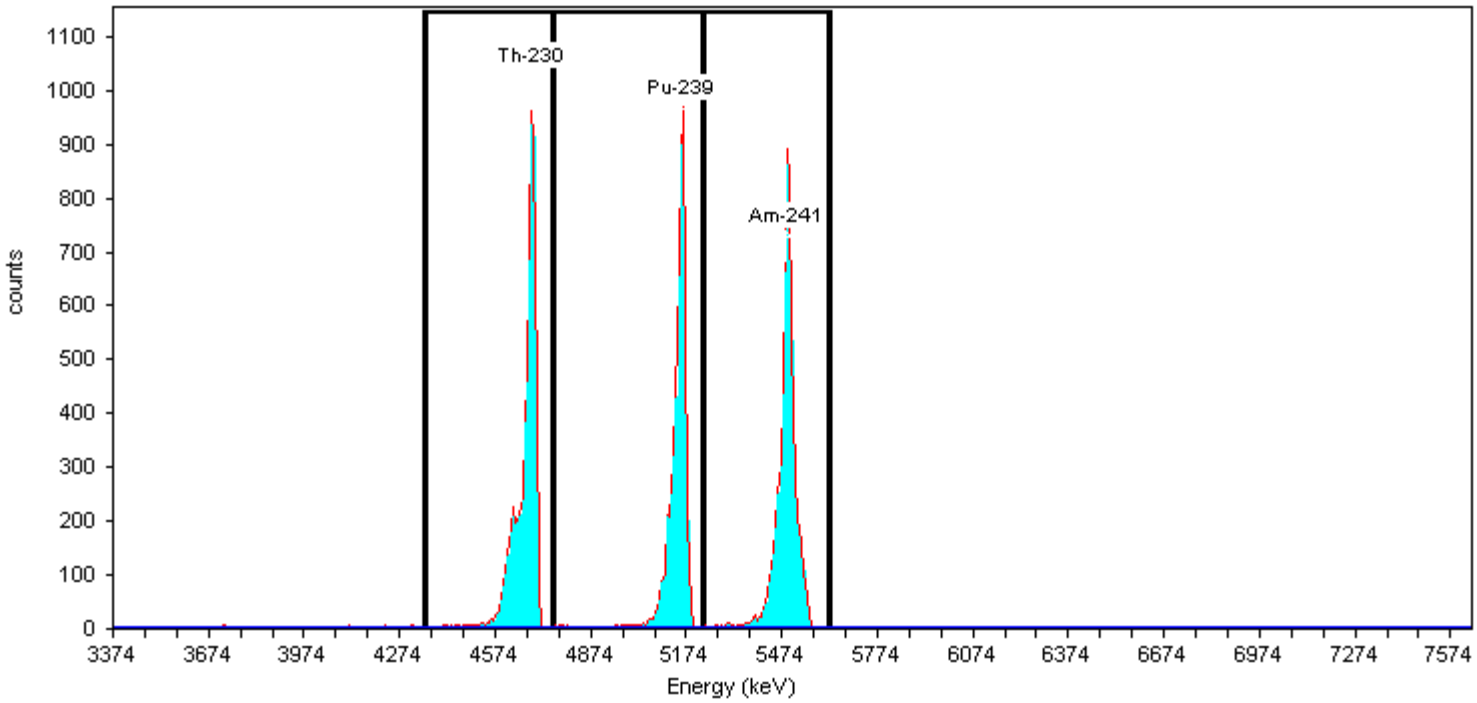
Certificate ID: 82247-334
Prepared by: Analytics

Certification Date: 6/10/2010 12:00:00PM
Description:

Acquisition

Detector: AV56 , SN: 52-059EE5
Acquisition Start Date: 5/8/2014 5:18:05PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 25.19% +/- 0.45% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,679.00	94.65
Pu-239	240	5.16	186	249	5,201.00	86.68
Am-241	284	5.49	249	303	5,671.00	94.52

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:56:53PM 5/8/2014

Calibration

Sample Name: ICV-9792;AV57-050814
Description:
Detector: AV57

Calibration Date: 5/8/2014 4:56:50PM
Analyst: 60040

Source Info

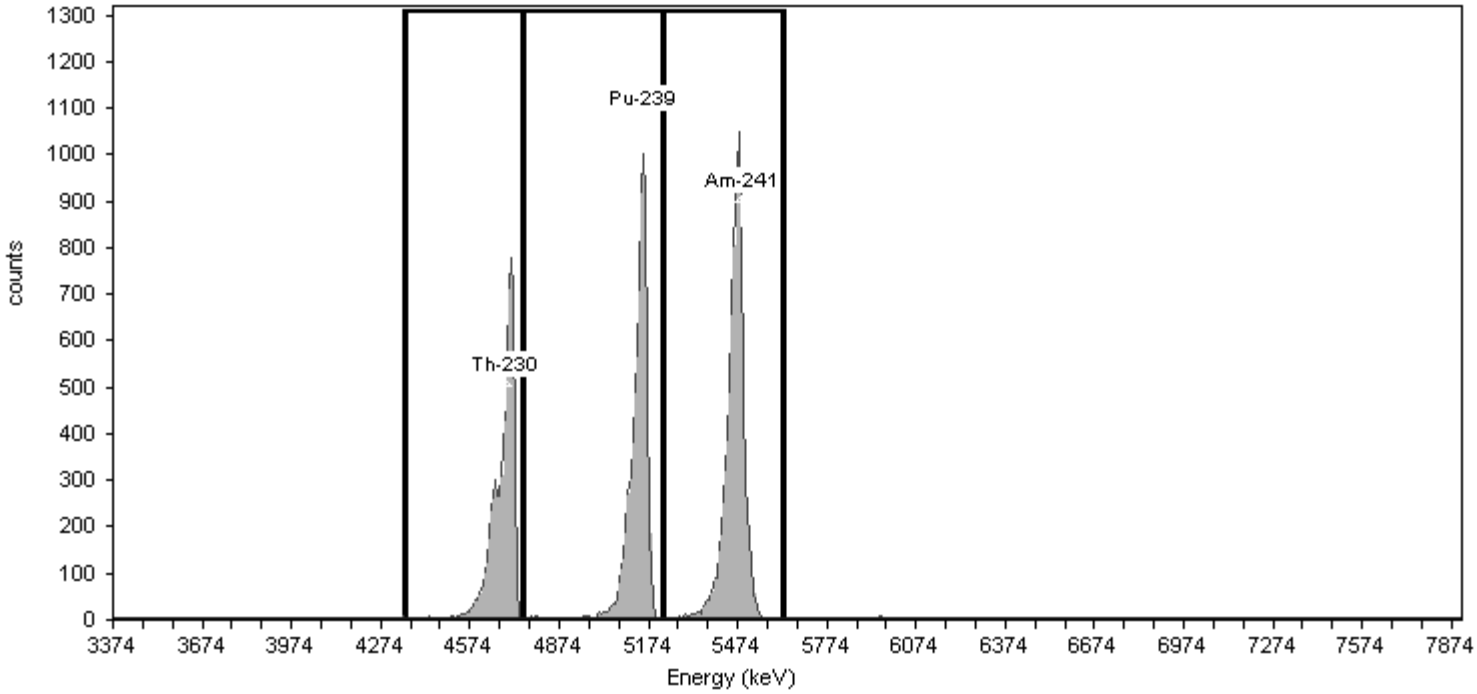
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV57 , SN: 48-158EE3
Acquisition Start Date: 5/8/2014 2:35:05PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.76% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,940.00	99.00
Pu-239	240	5.16	186	249	7,041.00	117.35
Am-241	284	5.49	249	303	7,940.00	132.33

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:56:59PM 5/8/2014

Calibration

Sample Name: ICV-9793;AV58-050814
Description:
Detector: AV58

Calibration Date: 5/8/2014 4:56:56PM
Analyst: 60040

Source Info

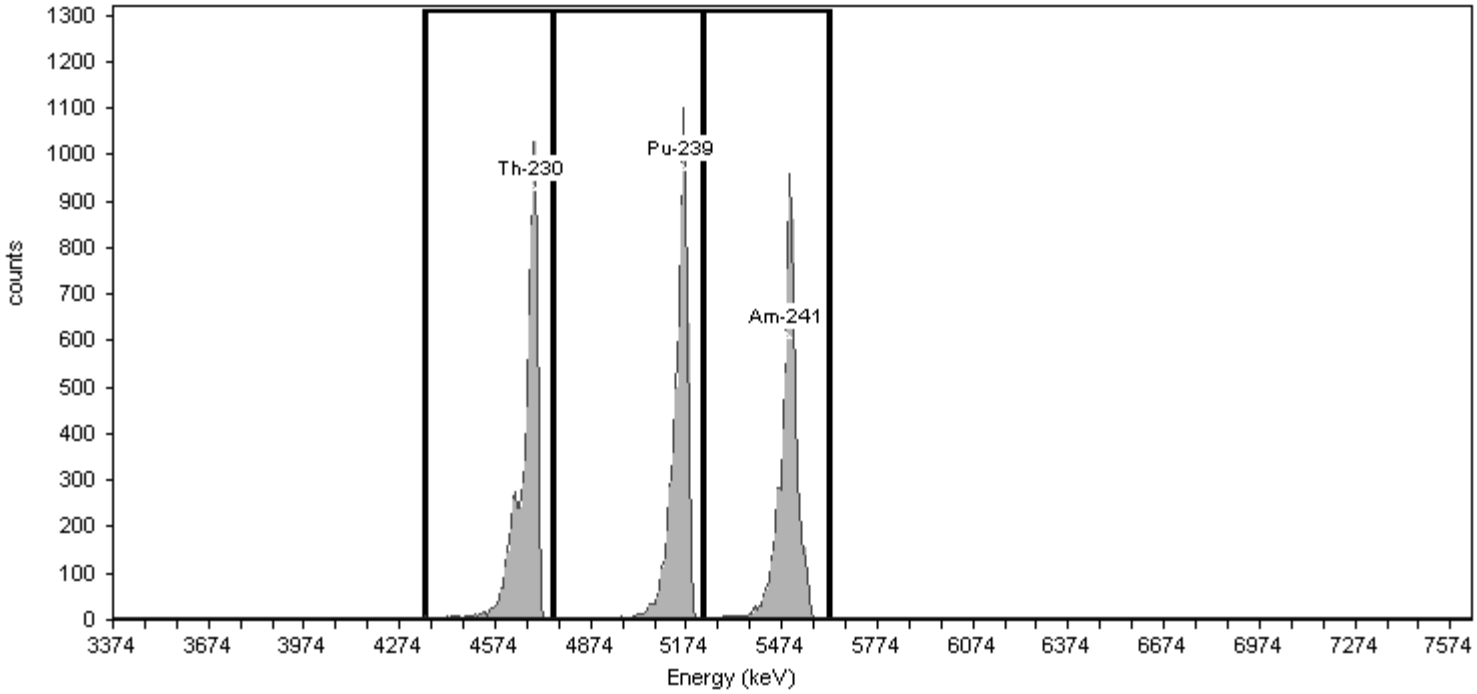
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV58 , SN: 52-102 C5
Acquisition Start Date: 5/8/2014 2:35:18PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 27.10% +/- 0.44% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,559.00	109.32
Pu-239	240	5.16	186	249	6,569.00	109.48
Am-241	284	5.49	249	303	6,413.00	106.88

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:24:44PM 5/11/2014

Calibration

Sample Name: ICV-9795;AV60-20140508
Description:
Detector: AV60

Calibration Date: 5/11/2014 7:13:44PM
Analyst: 60040

Source Info

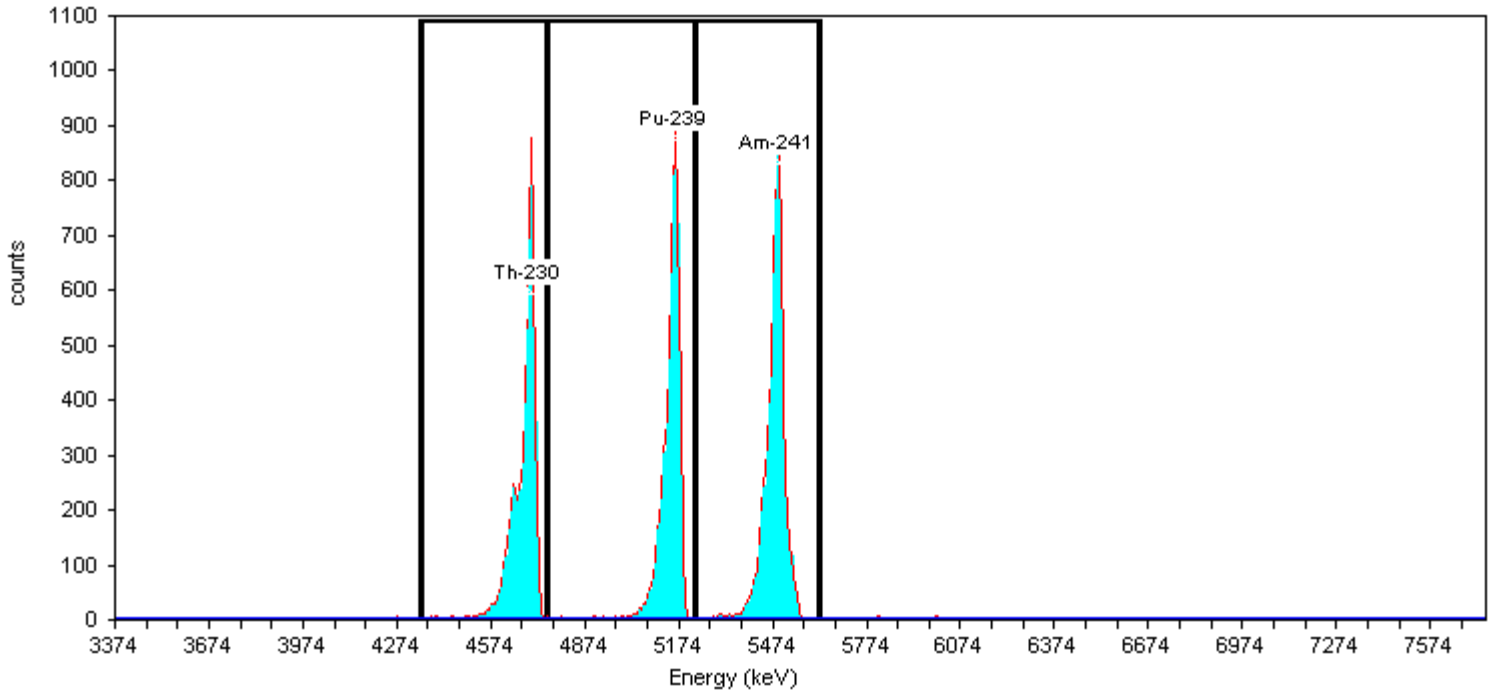
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV60 , SN: 49-027117
Acquisition Start Date: 5/8/2014 5:21:42PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 27.25% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,727.00	95.45
Pu-239	240	5.16	186	249	5,760.00	96.00
Am-241	284	5.49	249	303	6,362.00	106.03

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:57:49PM 5/8/2014

Calibration

Sample Name: ICV-9817;AV61-050814
Description:
Detector: AV61

Calibration Date: 5/8/2014 4:57:46PM
Analyst: 60040

Source Info

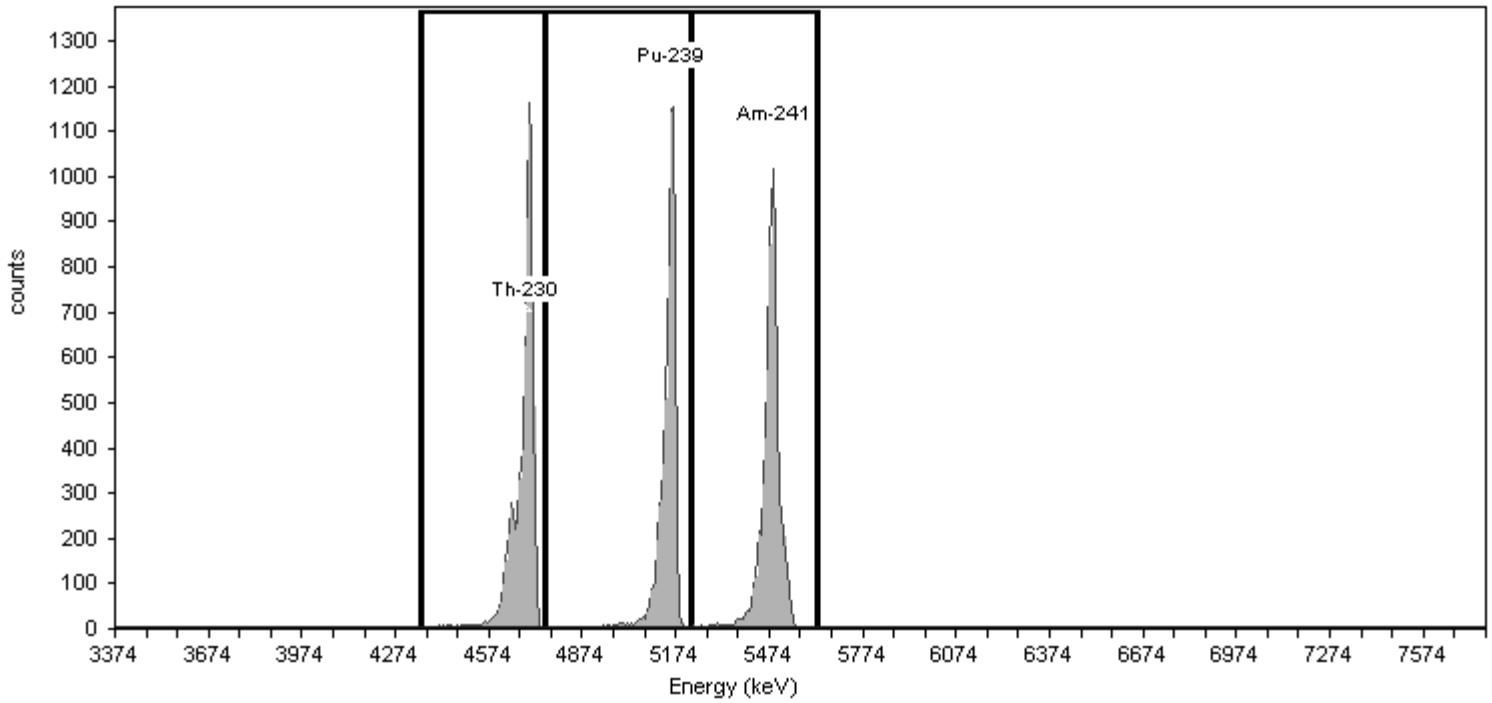
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV61 , SN: 5-051JJ3
Acquisition Start Date: 5/8/2014 2:36:18PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 25.81% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,807.00	113.45
Pu-239	240	5.16	186	249	6,203.00	103.38
Am-241	284	5.49	249	303	6,437.00	107.28

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:57:55PM 5/8/2014

Calibration

Sample Name: ICV-9884;AV62-050814
Description:
Detector: AV62

Calibration Date: 5/8/2014 4:57:52PM
Analyst: 60040

Source Info

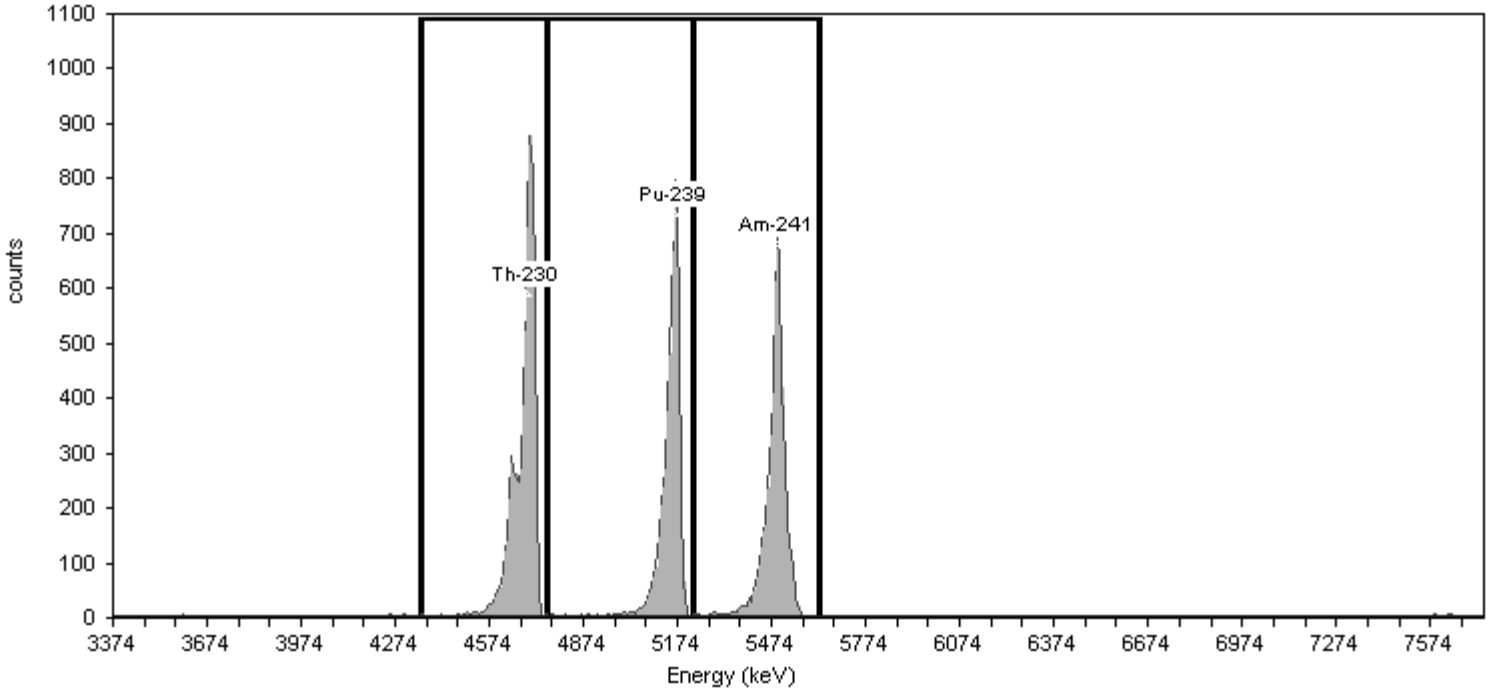
Certificate ID: 82245-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV62 , SN: 52-060FF2
Acquisition Start Date: 5/8/2014 2:36:19PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.22% +/- 0.48% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,368.00	106.13
Pu-239	240	5.16	186	249	5,206.00	86.77
Am-241	284	5.49	249	303	5,104.00	85.07

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:58:01PM 5/8/2014

Calibration

Sample Name: ICV-9885;AV63-050814
Description:
Detector: AV63

Calibration Date: 5/8/2014 4:57:58PM
Analyst: 60040

Source Info

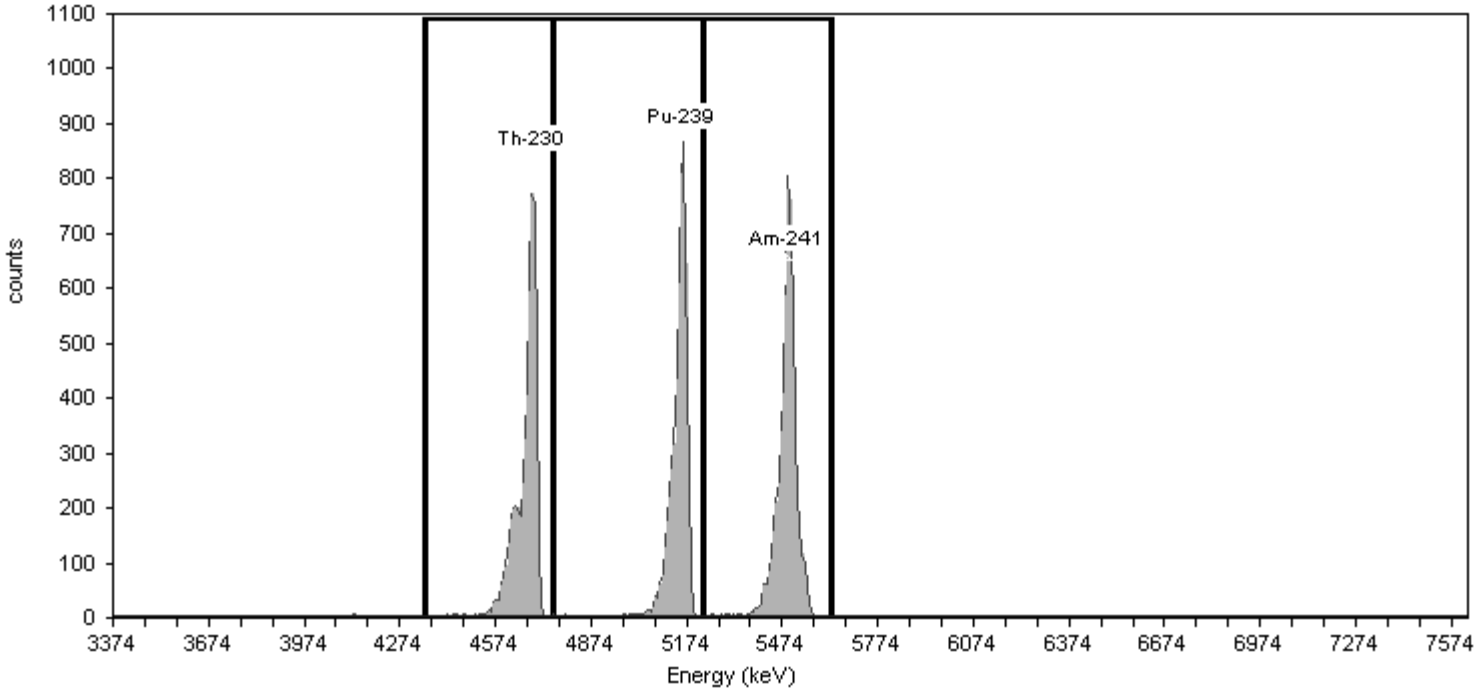
Certificate ID: 82246-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV63 , SN: 47-029ff2
Acquisition Start Date: 5/8/2014 2:36:20PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.01% +/- 0.49% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,165.00	86.08
Pu-239	240	5.16	186	249	5,120.00	85.33
Am-241	284	5.49	249	303	5,539.00	92.32

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:38:14PM 5/11/2014

Calibration

Sample Name: ICV-9886;AV64-20140511
Description:
Detector: AV64

Calibration Date: 5/11/2014 8:38:09PM
Analyst: 60040

Source Info

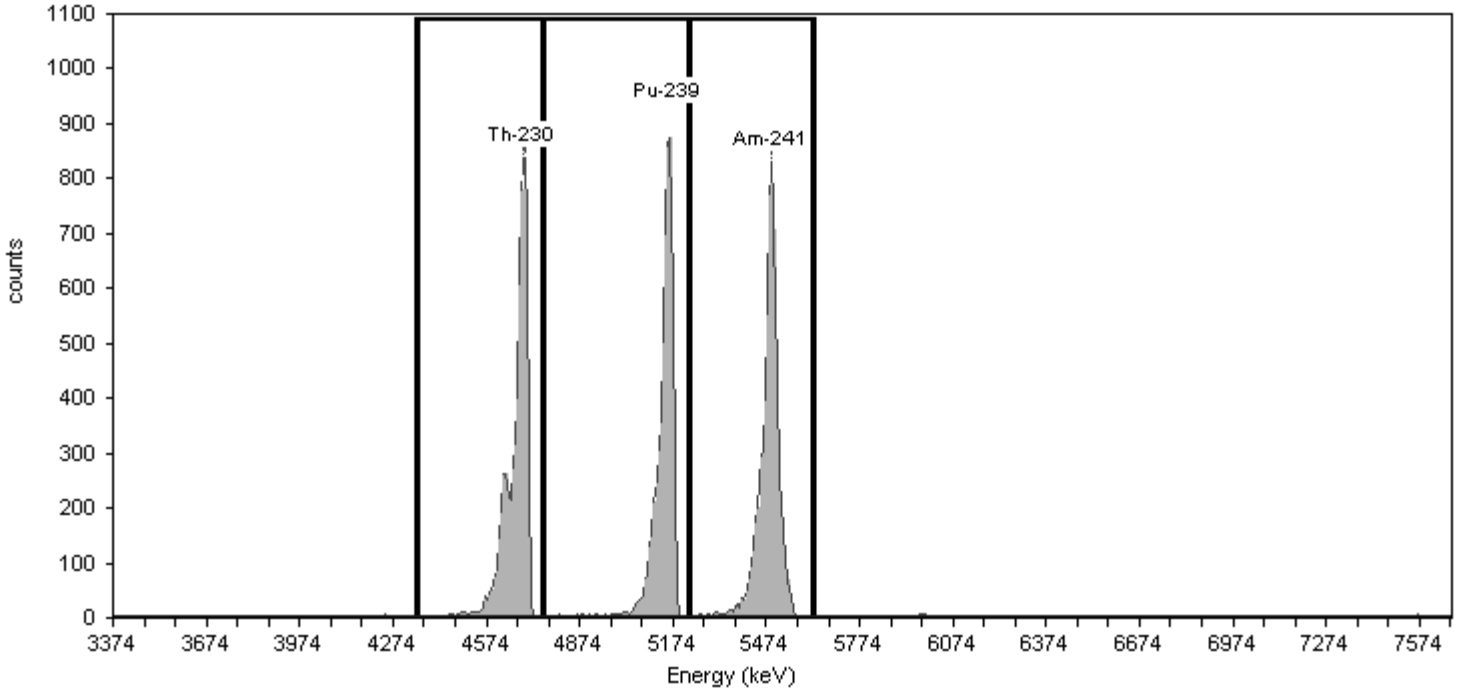
Certificate ID: 82247-334
Prepared by: Analytics

Certification Date: 6/10/2010 12:00:00PM
Description:

Acquisition

Detector: AV64 , SN: 47-029ee4
Acquisition Start Date: 5/11/2014 7:31:26PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.66% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,933.00	98.88
Pu-239	240	5.16	186	249	5,541.00	92.35
Am-241	284	5.49	249	303	6,049.00	100.82

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:24:54PM 5/11/2014

Calibration

Sample Name: ICV-7107;AV65-20140508
Description:
Detector: AV65

Calibration Date: 5/11/2014 7:11:57PM
Analyst: 60040

Source Info

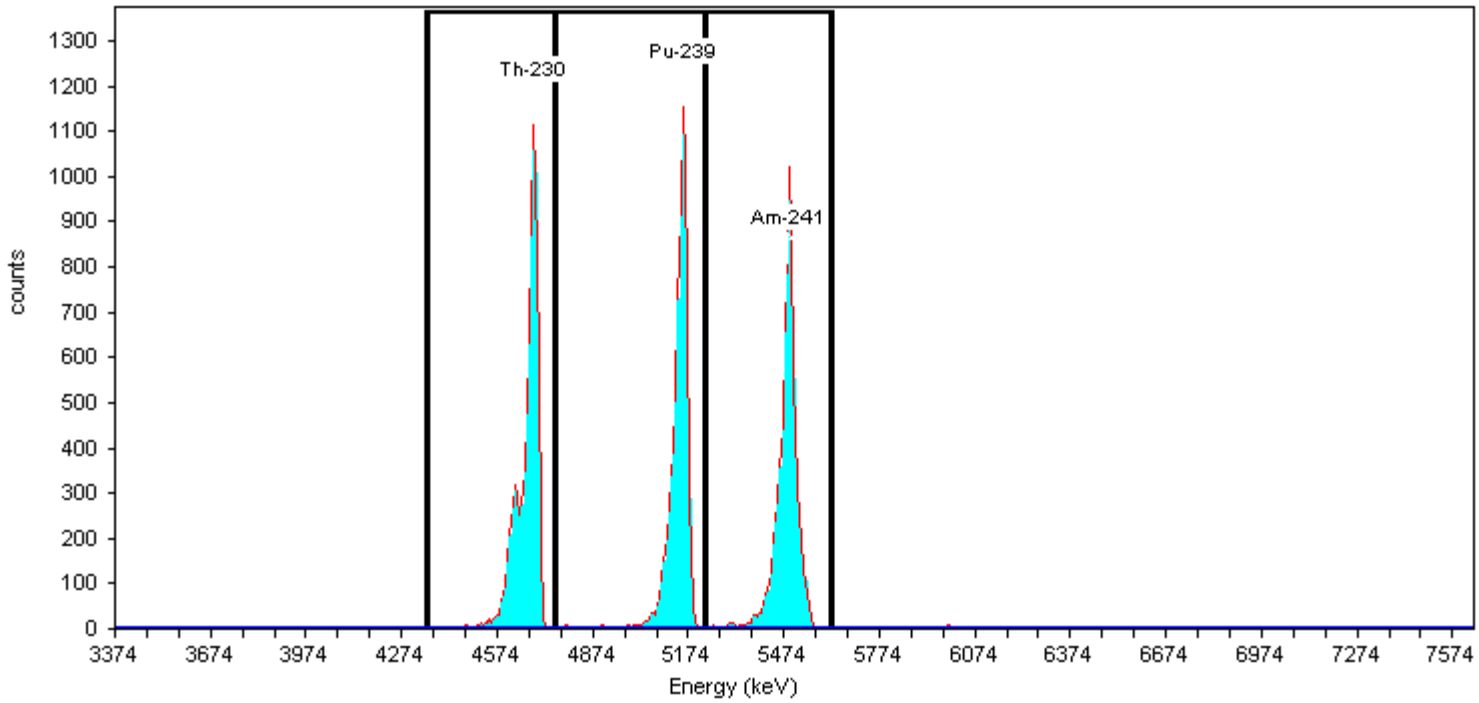
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV65 , SN: 44-049JJ1
Acquisition Start Date: 5/8/2014 5:18:33PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 27.12% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	7,390.00	123.17
Pu-239	240	5.16	186	249	7,136.00	118.93
Am-241	284	5.49	249	303	6,971.00	116.18

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:38:22PM 5/11/2014

Calibration

Sample Name: ICV-8874;AV66-20140511
Description:
Detector: AV66

Calibration Date: 5/11/2014 8:38:19PM
Analyst: 60040

Source Info

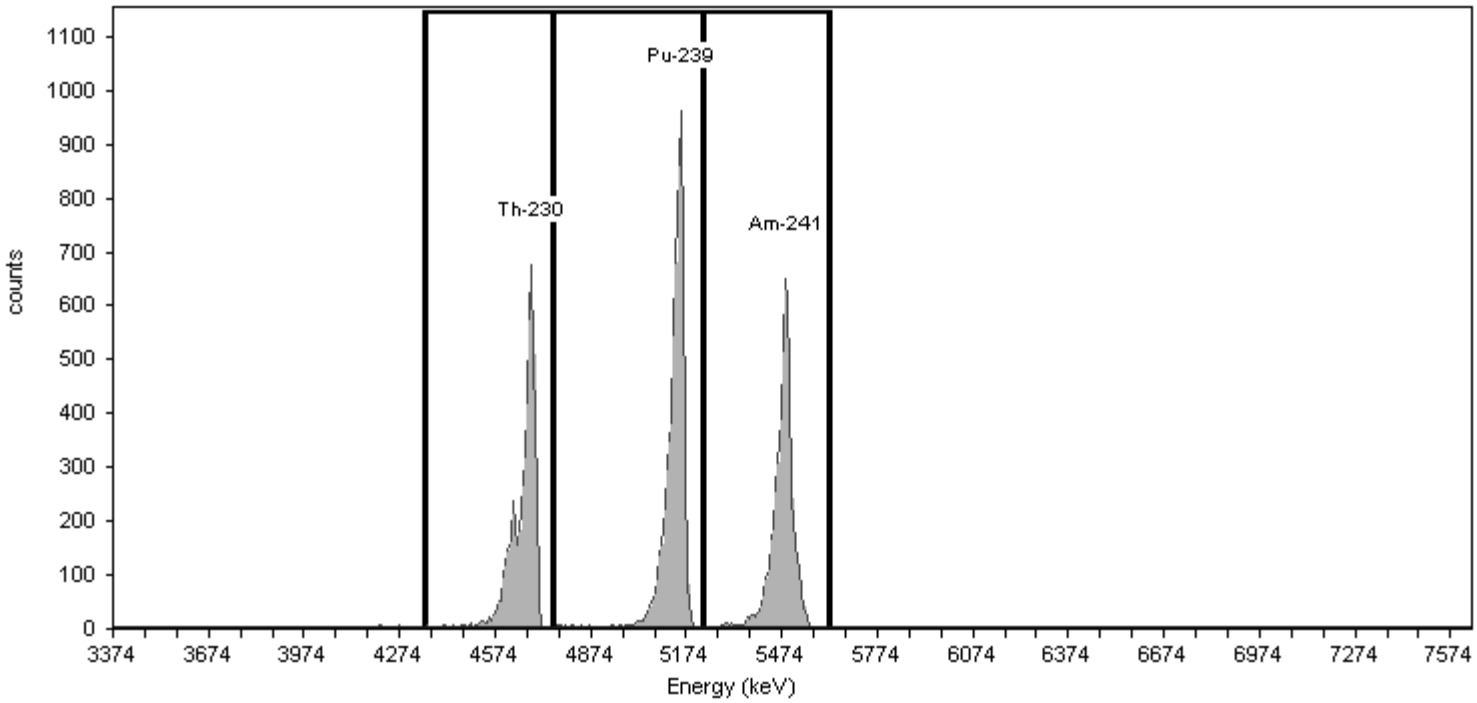
Certificate ID: 82233-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV66 , SN: 48-158EE2
Acquisition Start Date: 5/11/2014 7:32:00PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.67% +/- 0.50% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	4,596.00	76.60
Pu-239	240	5.16	186	249	6,078.00	101.30
Am-241	284	5.49	249	303	4,792.00	79.87

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:38:28PM 5/11/2014

Calibration

Sample Name: ICV-8875;AV67-20140511
Description:
Detector: AV67

Calibration Date: 5/11/2014 8:38:25PM
Analyst: 60040

Source Info

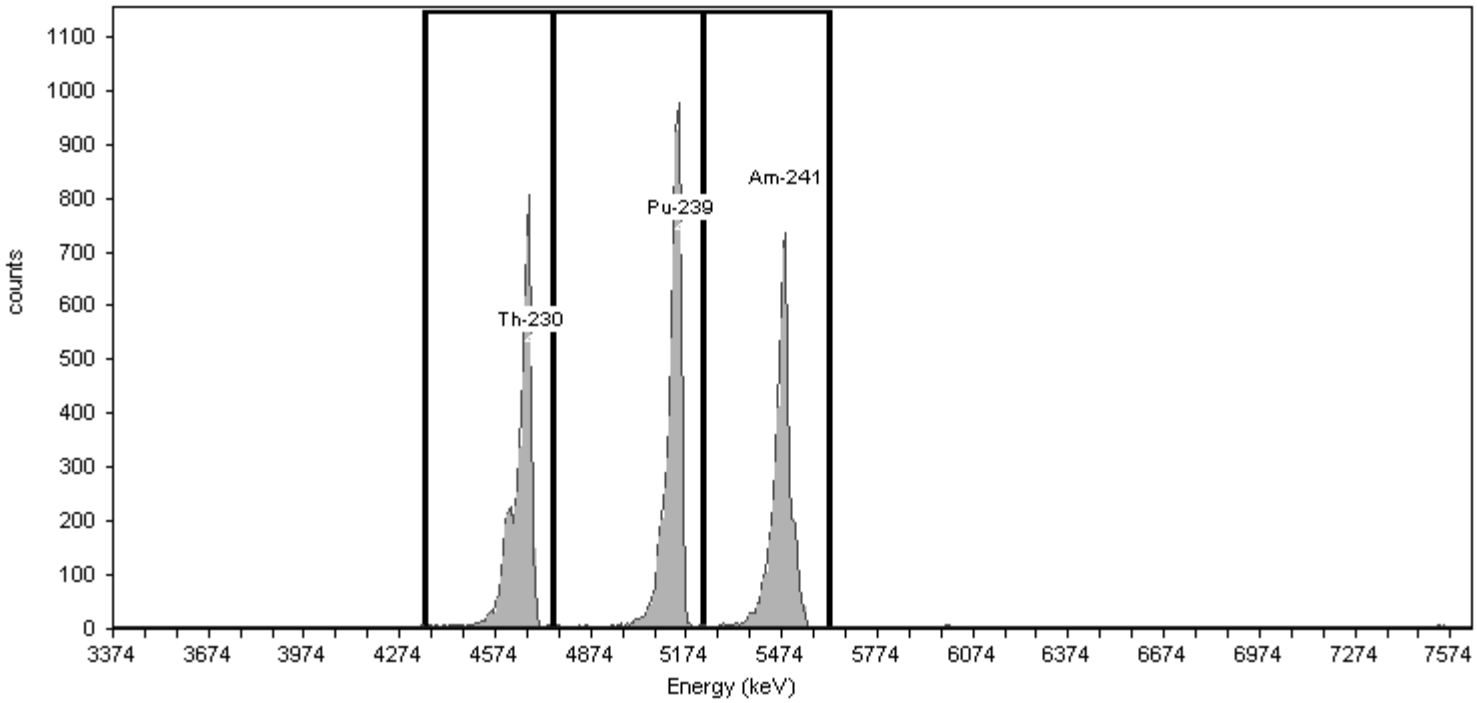
Certificate ID: 82234-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV67 , SN: 52-102 D7
Acquisition Start Date: 5/11/2014 7:32:06PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 27.02% +/- 0.49% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,466.00	91.10
Pu-239	240	5.16	186	249	6,008.00	100.13
Am-241	284	5.49	249	303	5,315.00	88.58

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:25:07PM 5/11/2014

Calibration

Sample Name: ICV-8877;AV69-20140508
Description:
Detector: AV69

Calibration Date: 5/11/2014 7:12:03PM
Analyst: 60040

Source Info

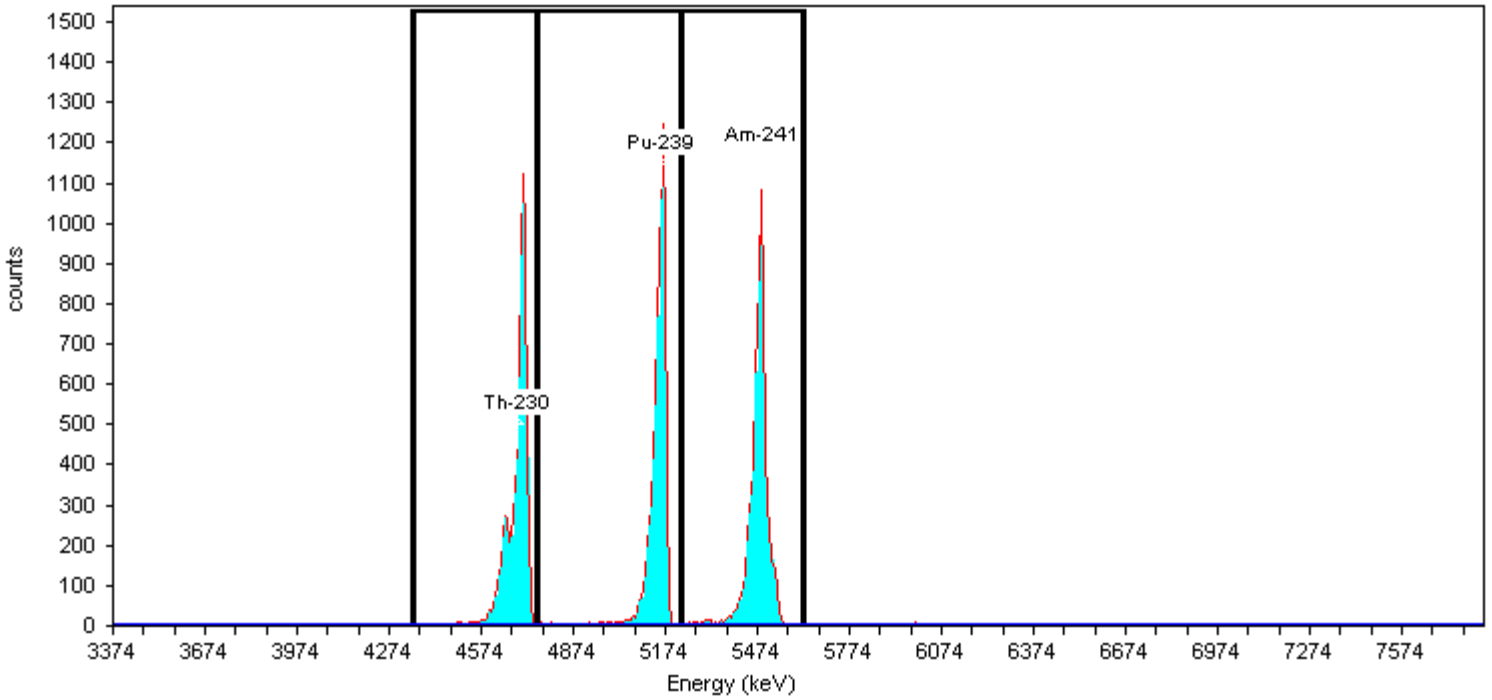
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV69 , SN: 49-155DD5
Acquisition Start Date: 5/8/2014 5:19:00PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 26.46% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,600.00	110.00
Pu-239	240	5.16	186	249	6,559.00	109.32
Am-241	284	5.49	249	303	6,509.00	108.48

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:58:13PM 5/8/2014

Calibration

Sample Name: ICV-9520;AV70-050814
Description:
Detector: AV70

Calibration Date: 5/8/2014 4:58:10PM
Analyst: 60040

Source Info

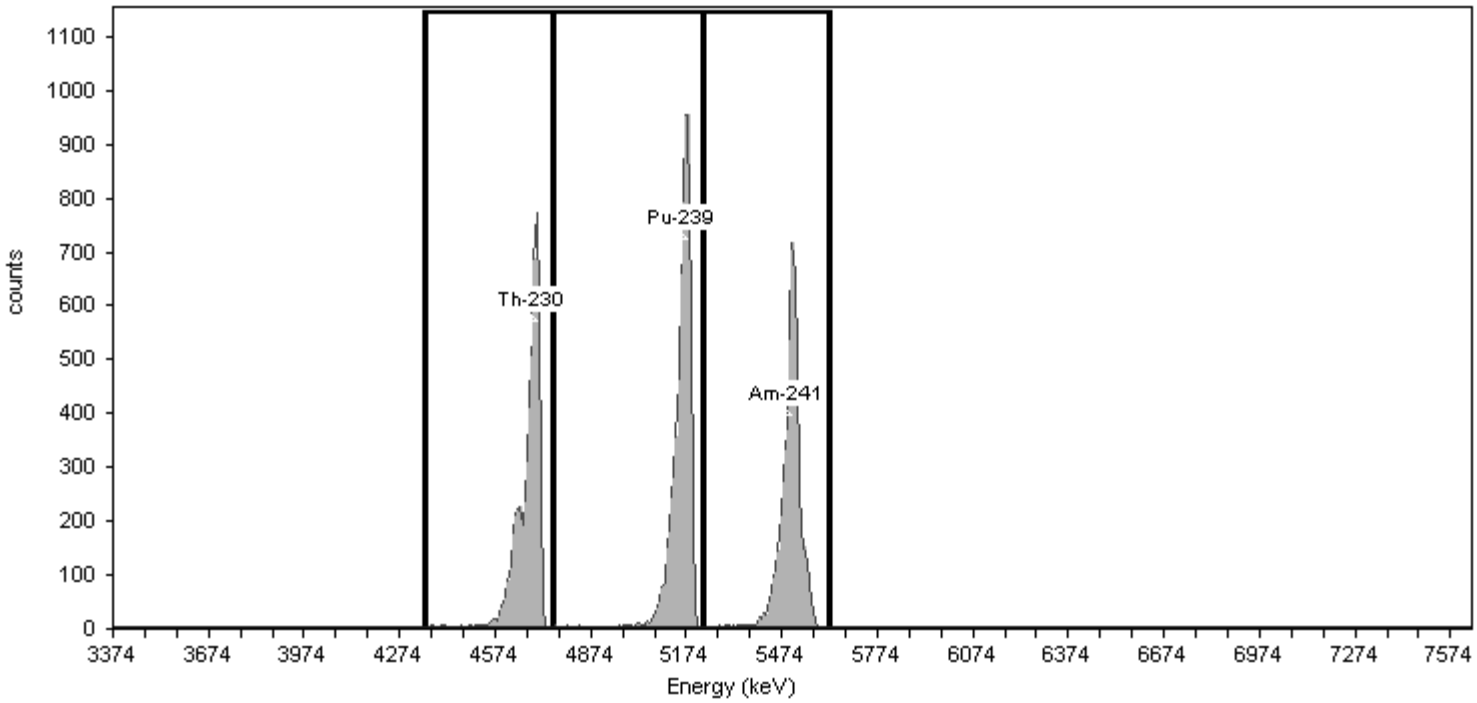
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV70 , SN: 48-158FF1
Acquisition Start Date: 5/8/2014 2:36:57PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 25.79% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,282.00	88.03
Pu-239	240	5.16	186	249	6,228.00	103.80
Am-241	284	5.49	249	303	5,074.00	84.57

Monthly Calibration Verifications

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:18:25PM 6/22/2014

Calibration

Sample Name: CCV-9884;AV46-20140622
Description:
Detector: AV46

Calibration Date: 6/22/2014 10:18:20PM
Analyst: 60040

Source Info

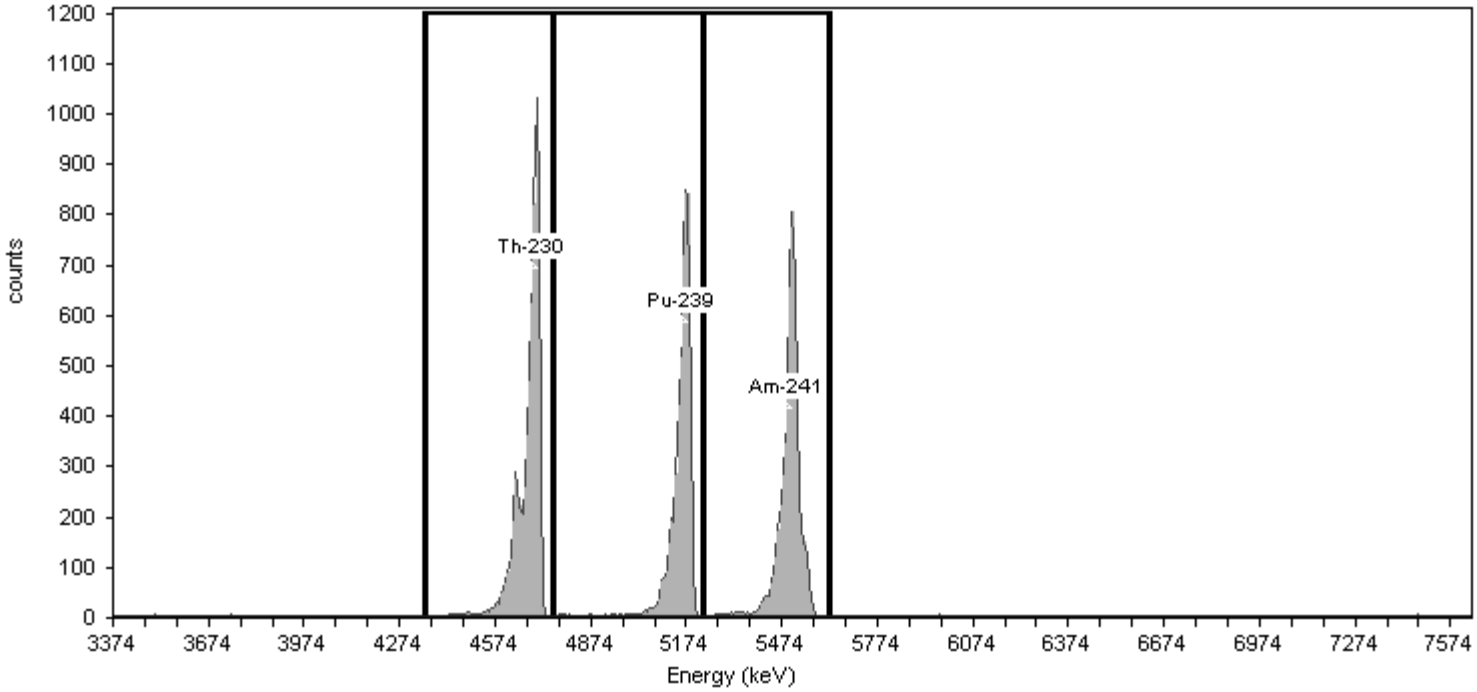
Certificate ID: 82245-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV46 , SN: 49-202GG2
Acquisition Start Date: 6/22/2014 9:17:40PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.69% +/- 0.49% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,425.00	107.08
Pu-239	240	5.16	186	249	5,164.00	86.07
Am-241	284	5.49	249	303	5,389.00	89.82

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:57:11PM 6/22/2014

Calibration

Sample Name: CCV-7107;AV49-20140622
Description:
Detector: AV49

Calibration Date: 6/22/2014 7:57:03PM
Analyst: 60040

Source Info

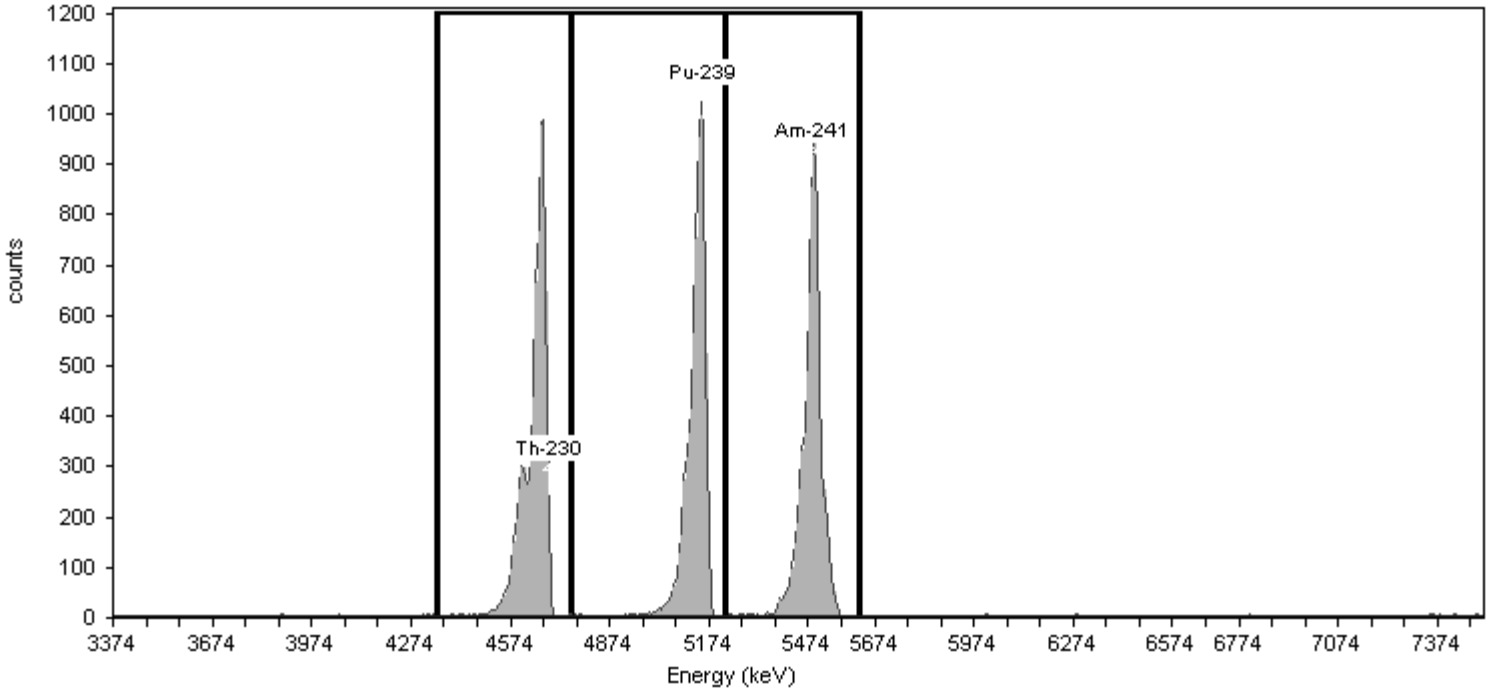
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV49 , SN: 47-043hh4
Acquisition Start Date: 6/22/2014 6:52:38PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.74% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	7,207.00	120.12
Pu-239	240	5.16	186	249	7,009.00	116.82
Am-241	284	5.49	249	303	6,983.00	116.38

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:57:27PM 6/22/2014

Calibration

Sample Name: CCV-8877;AV53-20140622
Description:
Detector: AV53

Calibration Date: 6/22/2014 7:57:23PM
Analyst: 60040

Source Info

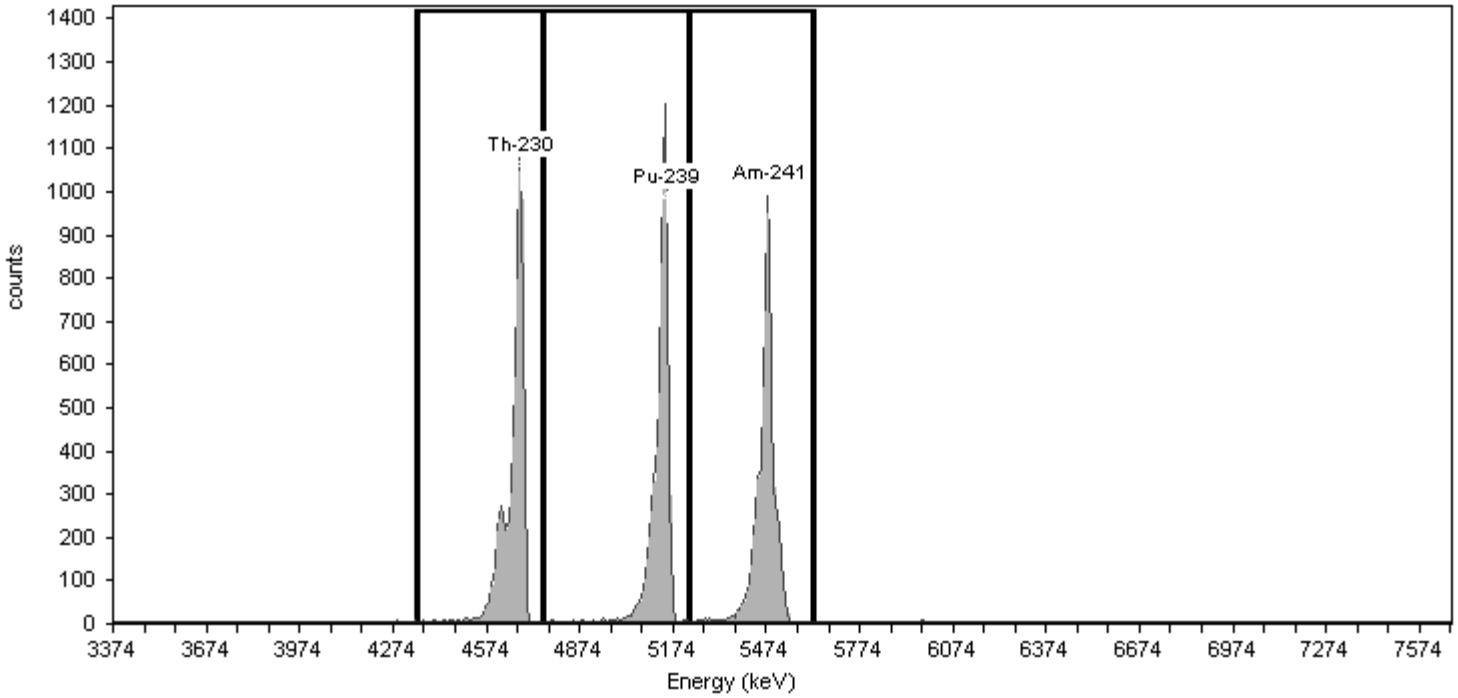
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV53 , SN: 50-051A6
Acquisition Start Date: 6/22/2014 6:53:01PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 26.51% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,536.00	108.93
Pu-239	240	5.16	186	249	6,690.00	111.50
Am-241	284	5.49	249	303	6,495.00	108.25

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:57:33PM 6/22/2014

Calibration

Sample Name: CCV-9520;AV54-20140622
Description:
Detector: AV54

Calibration Date: 6/22/2014 7:57:29PM
Analyst: 60040

Source Info

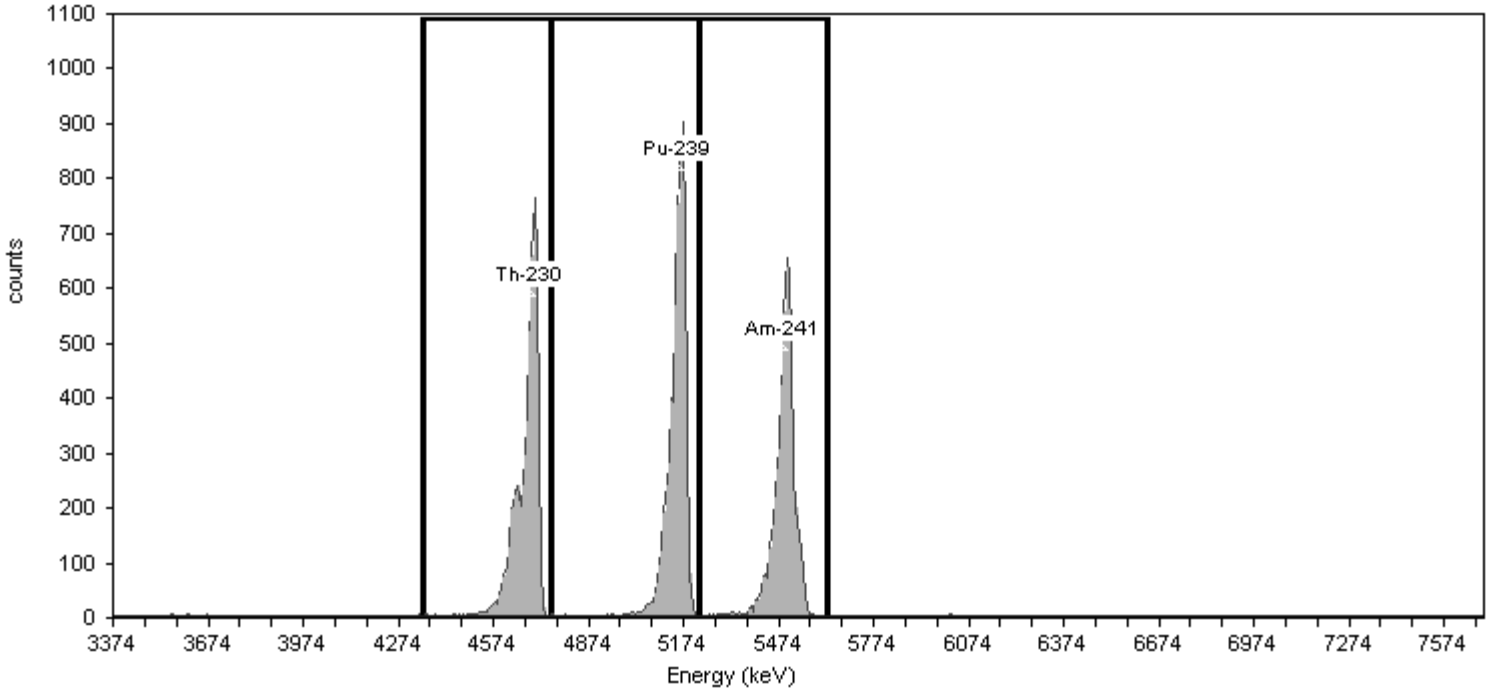
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV54 , SN: 48-046II6
Acquisition Start Date: 6/22/2014 6:53:11PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 26.28% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,514.00	91.90
Pu-239	240	5.16	186	249	6,221.00	103.68
Am-241	284	5.49	249	303	5,158.00	85.97

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:11:02PM 6/22/2014

Calibration

Sample Name: CCV-7107;AV55-20140622
Description:
Detector: AV55

Calibration Date: 6/22/2014 9:10:59PM
Analyst: 60040

Source Info

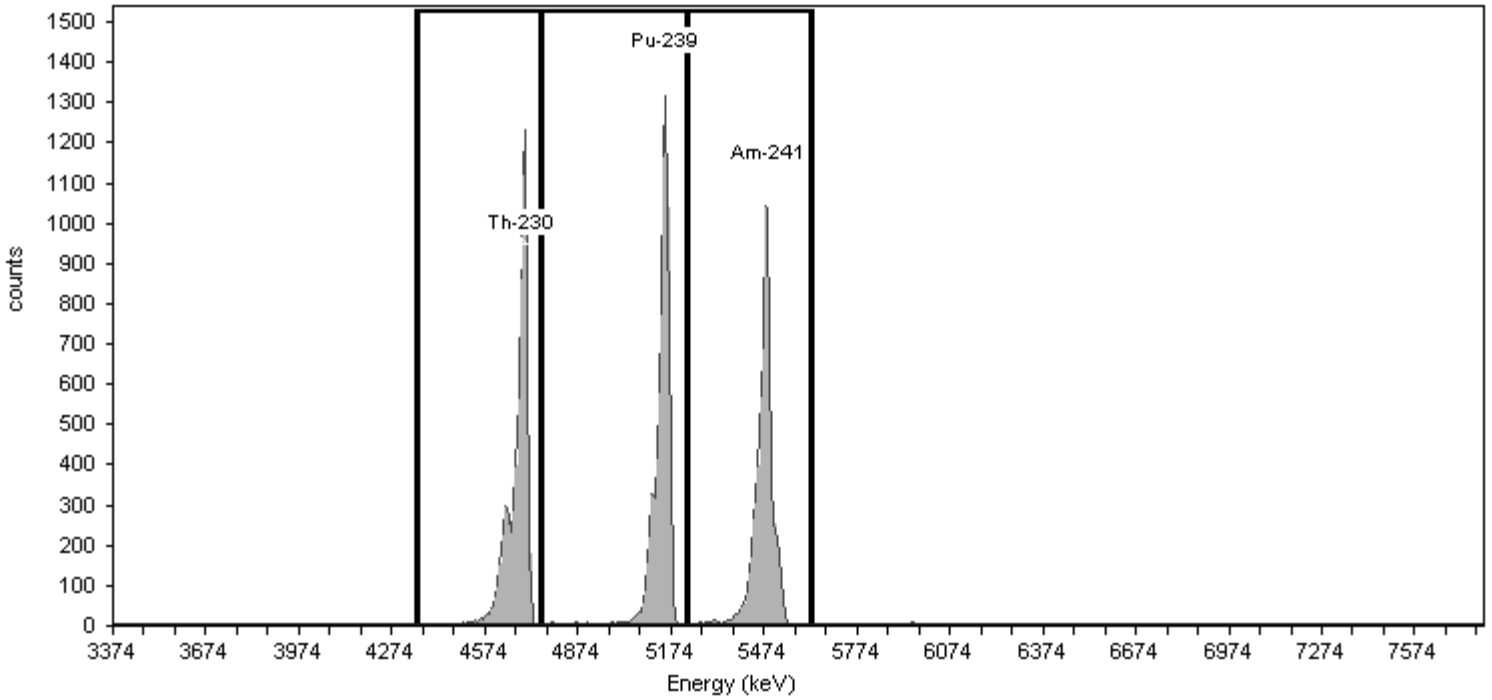
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV55 , SN: 50-051C2
Acquisition Start Date: 6/22/2014 8:08:07PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.83% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	7,262.00	121.03
Pu-239	240	5.16	186	249	7,151.00	119.18
Am-241	284	5.49	249	303	6,866.00	114.43

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:57:39PM 6/22/2014

Calibration

Sample Name: CCV-9792;AV56-20140622
Description:
Detector: AV56

Calibration Date: 6/22/2014 7:57:36PM
Analyst: 60040

Source Info

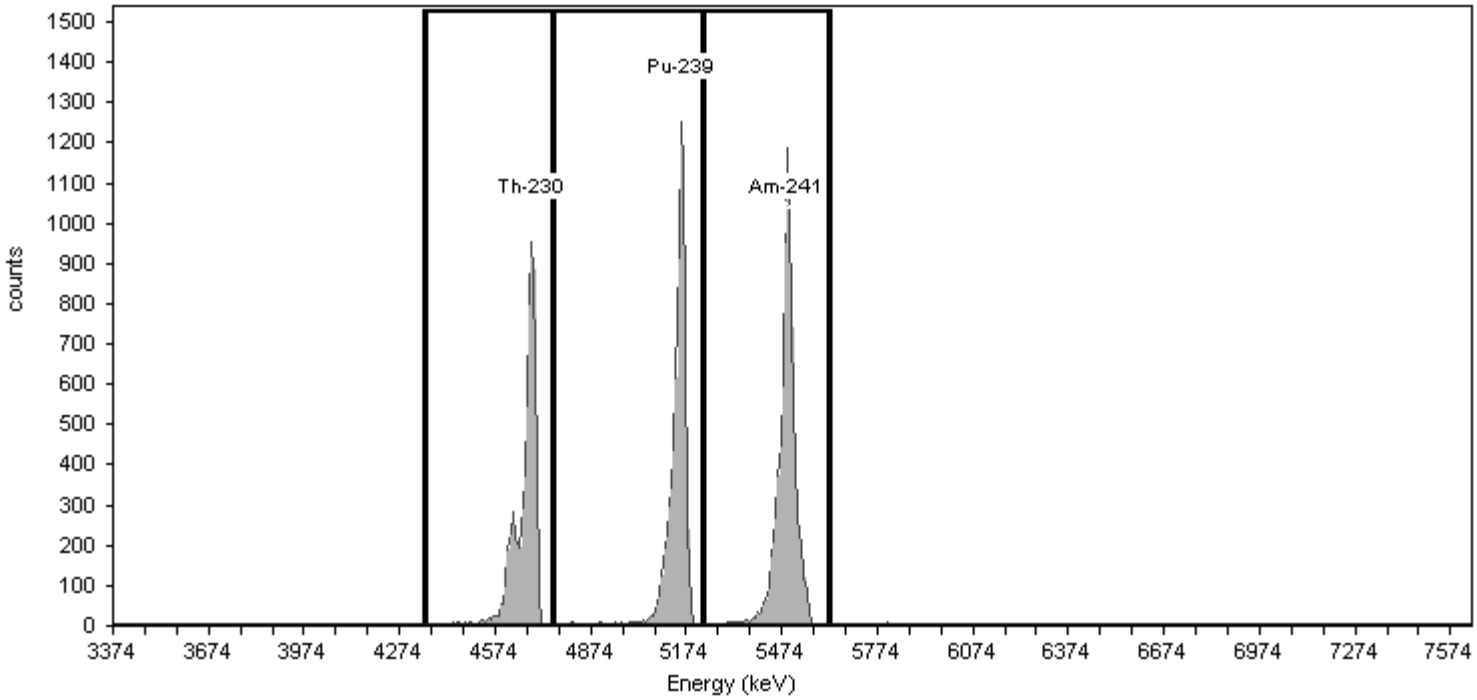
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV56 , SN: 52-059EE5
Acquisition Start Date: 6/22/2014 6:53:29PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 26.26% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,964.00	99.40
Pu-239	240	5.16	186	249	6,853.00	114.22
Am-241	284	5.49	249	303	7,721.00	128.68

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:57:45PM 6/22/2014

Calibration

Sample Name: CCV-9793;AV57-20140622
Description:
Detector: AV57

Calibration Date: 6/22/2014 7:57:42PM
Analyst: 60040

Source Info

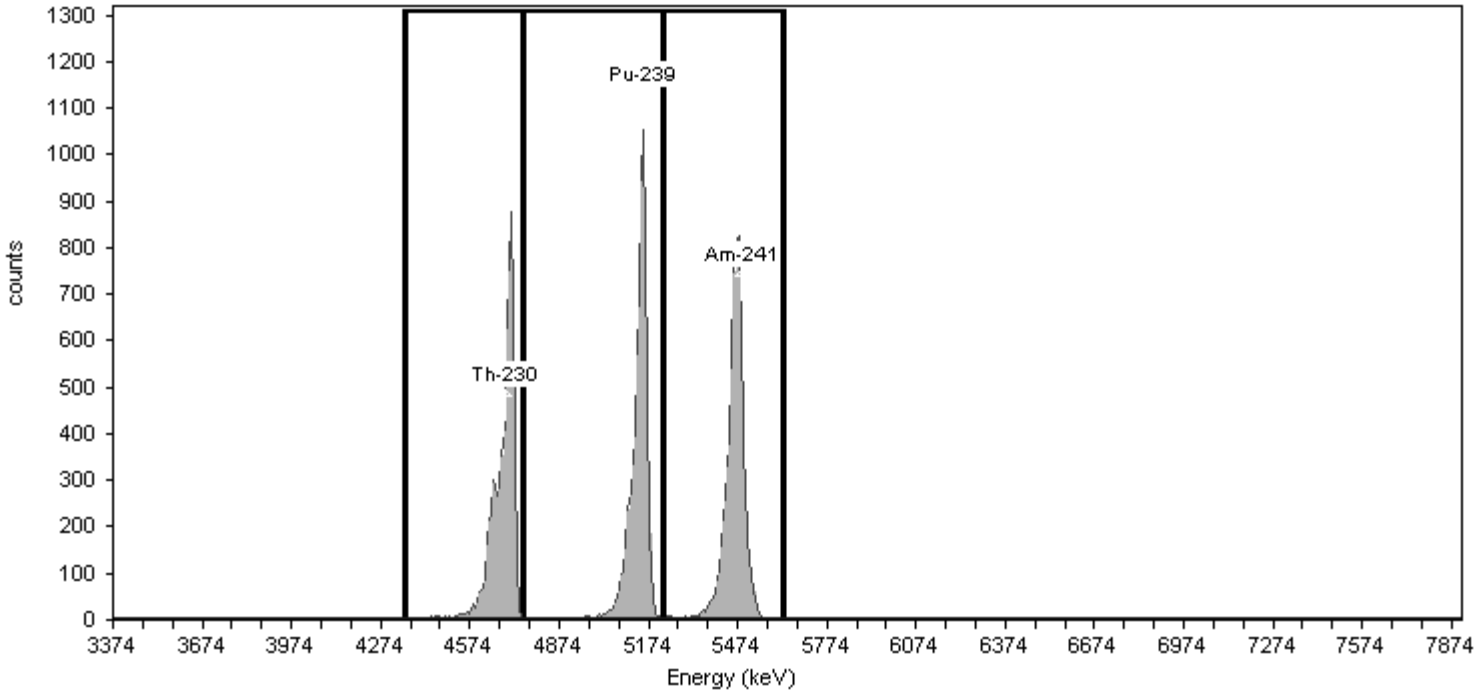
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV57 , SN: 48-158EE3
Acquisition Start Date: 6/22/2014 6:53:40PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 26.92% +/- 0.44% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,313.00	105.22
Pu-239	240	5.16	186	249	6,621.00	110.35
Am-241	284	5.49	249	303	6,480.00	108.00

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:57:52PM 6/22/2014

Calibration

Sample Name: CCV-9794;AV58-20140622
Description:
Detector: AV58

Calibration Date: 6/22/2014 7:57:48PM
Analyst: 60040

Source Info

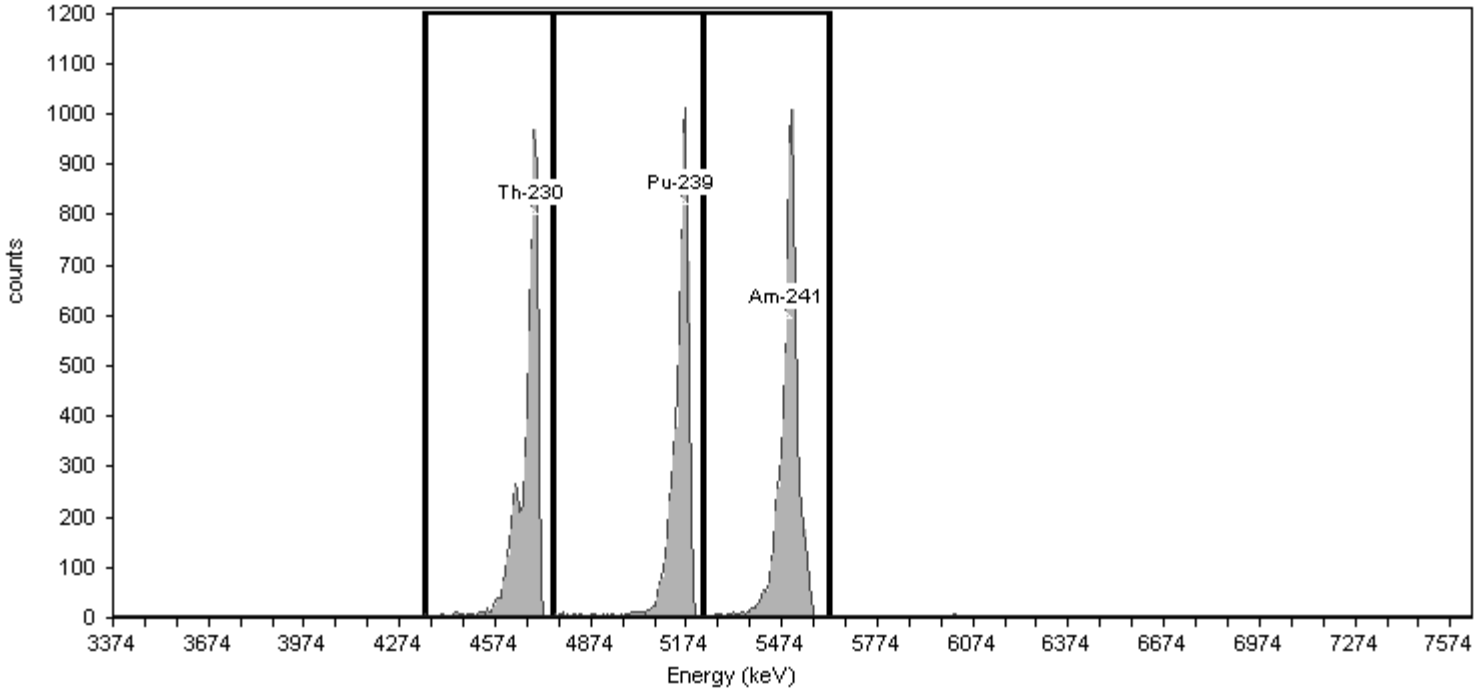
Certificate ID: 82242-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV58 , SN: 52-102 C5
Acquisition Start Date: 6/22/2014 6:53:50PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 26.31% +/- 0.44% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,121.00	102.02
Pu-239	240	5.16	186	249	6,054.00	100.90
Am-241	284	5.49	249	303	6,868.00	114.47

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:18:32PM 6/22/2014

Calibration

Sample Name: CCV-9817;AV60-20140622
Description:
Detector: AV60

Calibration Date: 6/22/2014 10:18:27PM
Analyst: 60040

Source Info

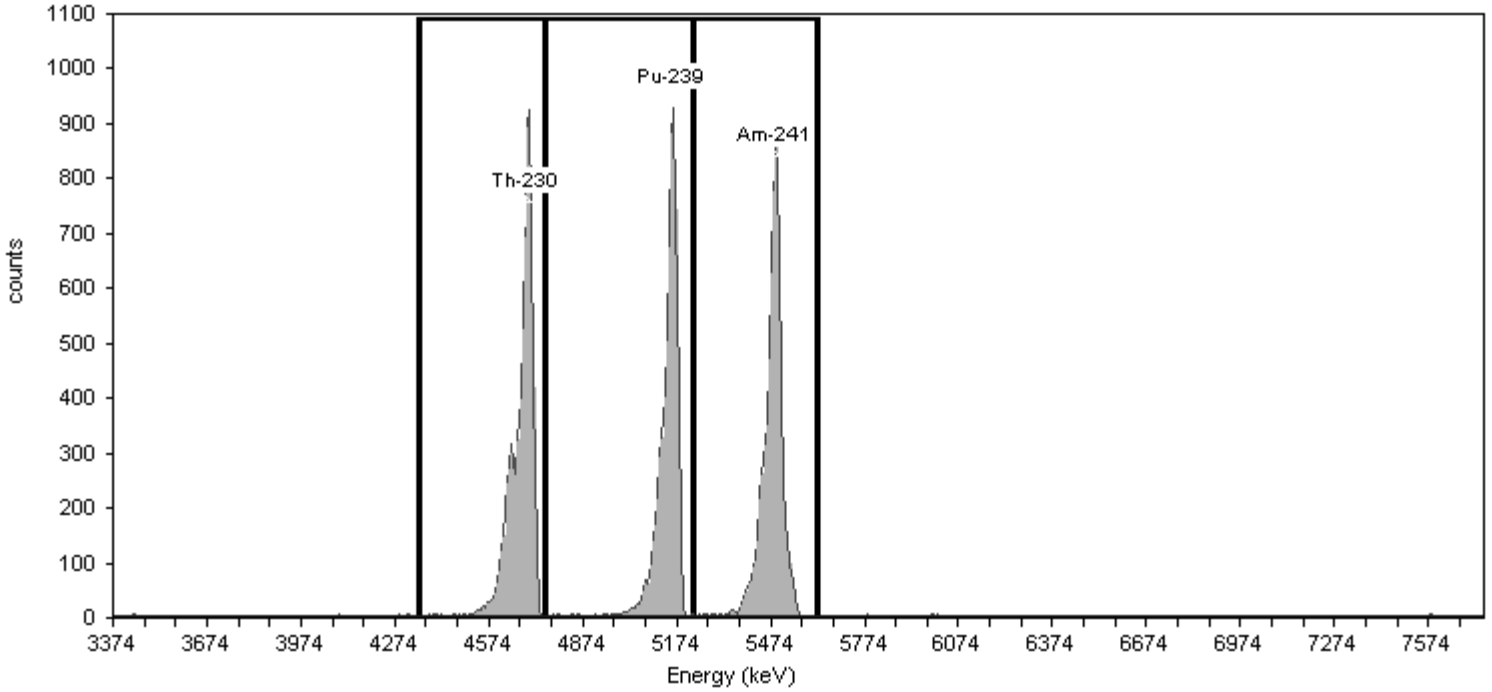
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV60 , SN: 49-027117
Acquisition Start Date: 6/22/2014 9:17:54PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.29% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	7,080.00	118.00
Pu-239	240	5.16	186	249	6,306.00	105.10
Am-241	284	5.49	249	303	6,421.00	107.02

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:22:15PM 6/22/2014

Calibration

Sample Name: CCV-9884;AV61-20140622
Description:
Detector: AV61

Calibration Date: 6/22/2014 11:22:10PM
Analyst: 60040

Source Info

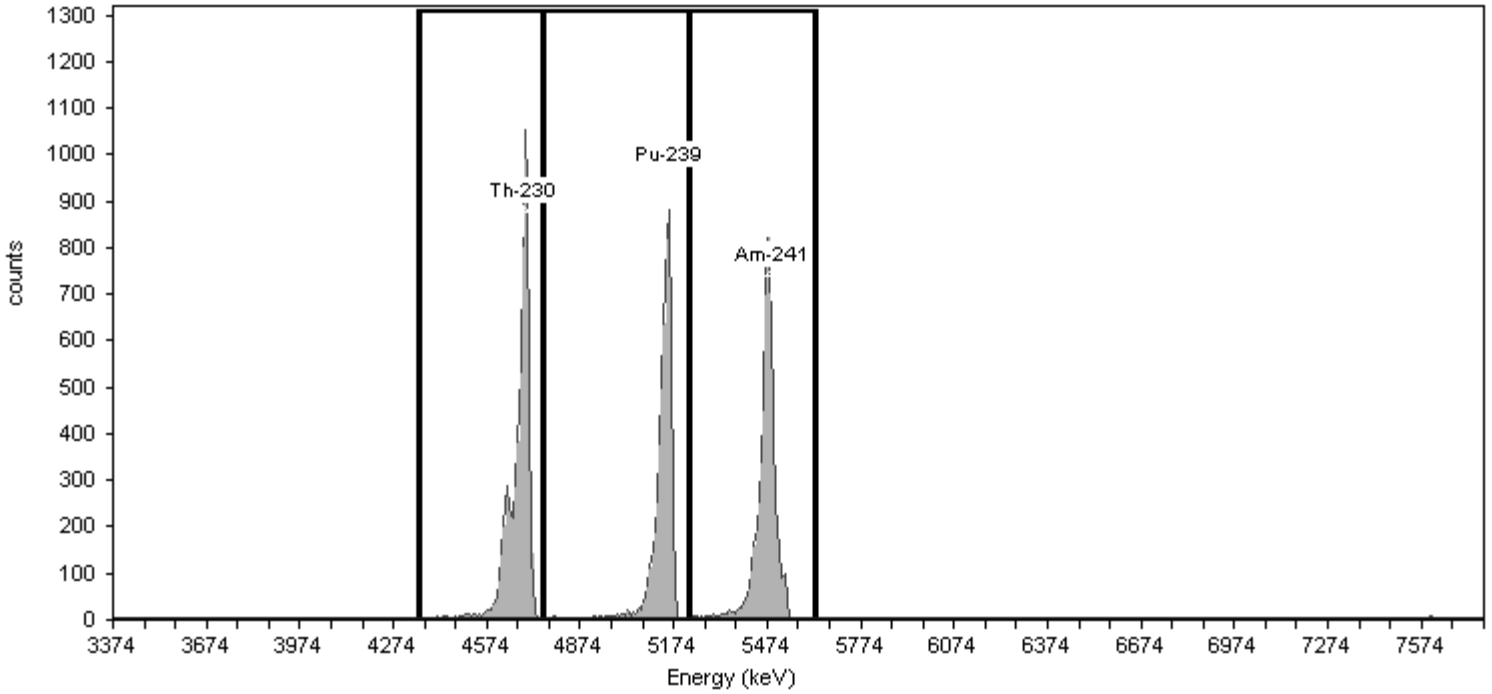
Certificate ID: 82245-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV61 , SN: 5-051JJ3
Acquisition Start Date: 6/22/2014 10:21:45PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.22% +/- 0.48% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,287.00	104.78
Pu-239	240	5.16	186	249	5,130.00	85.50
Am-241	284	5.49	249	303	5,261.00	87.68

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:11:16PM 6/22/2014

Calibration

Sample Name: CCV-9885;AV62-20140622
Description:
Detector: AV62

Calibration Date: 6/22/2014 9:11:13PM
Analyst: 60040

Source Info

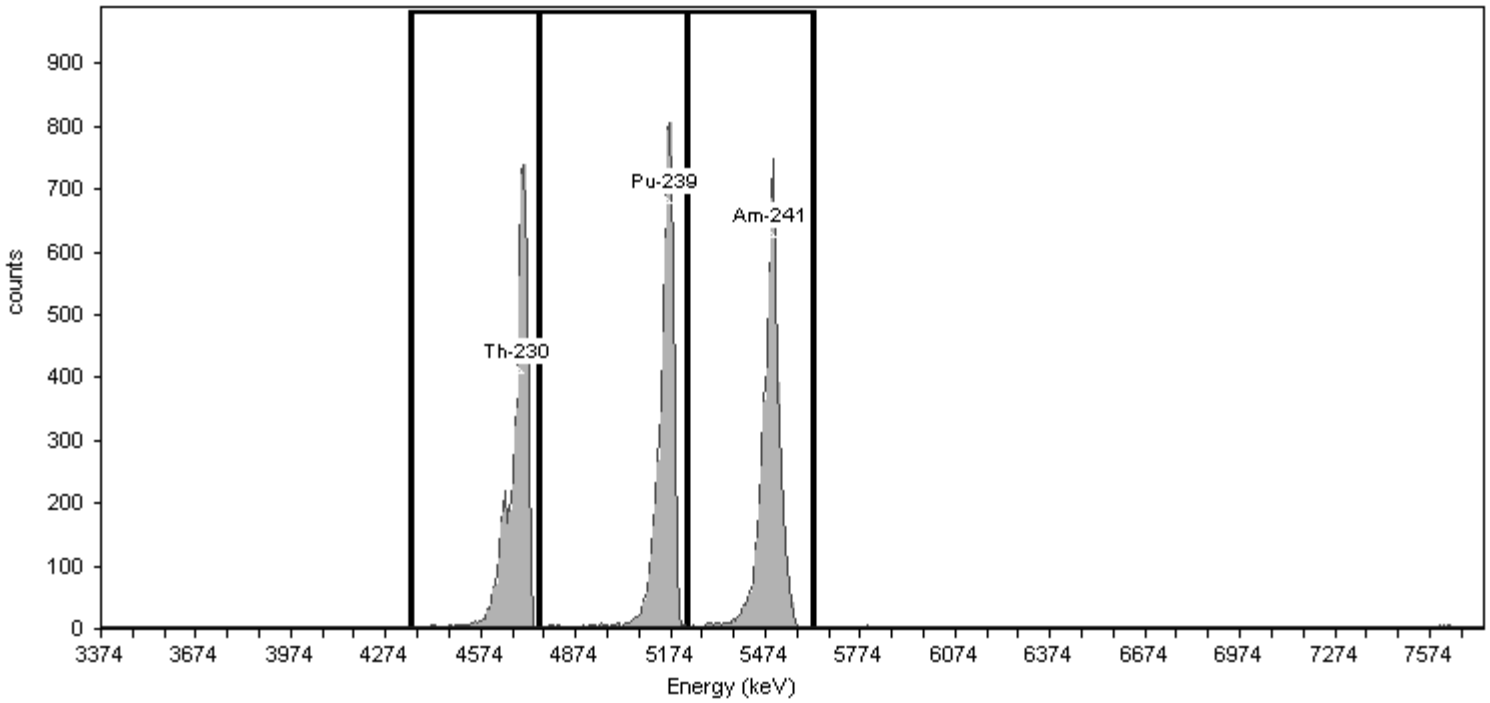
Certificate ID: 82246-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV62 , SN: 52-060FF2
Acquisition Start Date: 6/22/2014 8:09:10PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.50% +/- 0.50% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,284.00	88.07
Pu-239	240	5.16	186	249	5,185.00	86.42
Am-241	284	5.49	249	303	5,651.00	94.18

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:18:43PM 6/22/2014

Calibration

Sample Name: CCV-9886;AV63-20140622
Description:
Detector: AV63

Calibration Date: 6/22/2014 10:18:39PM
Analyst: 60040

Source Info

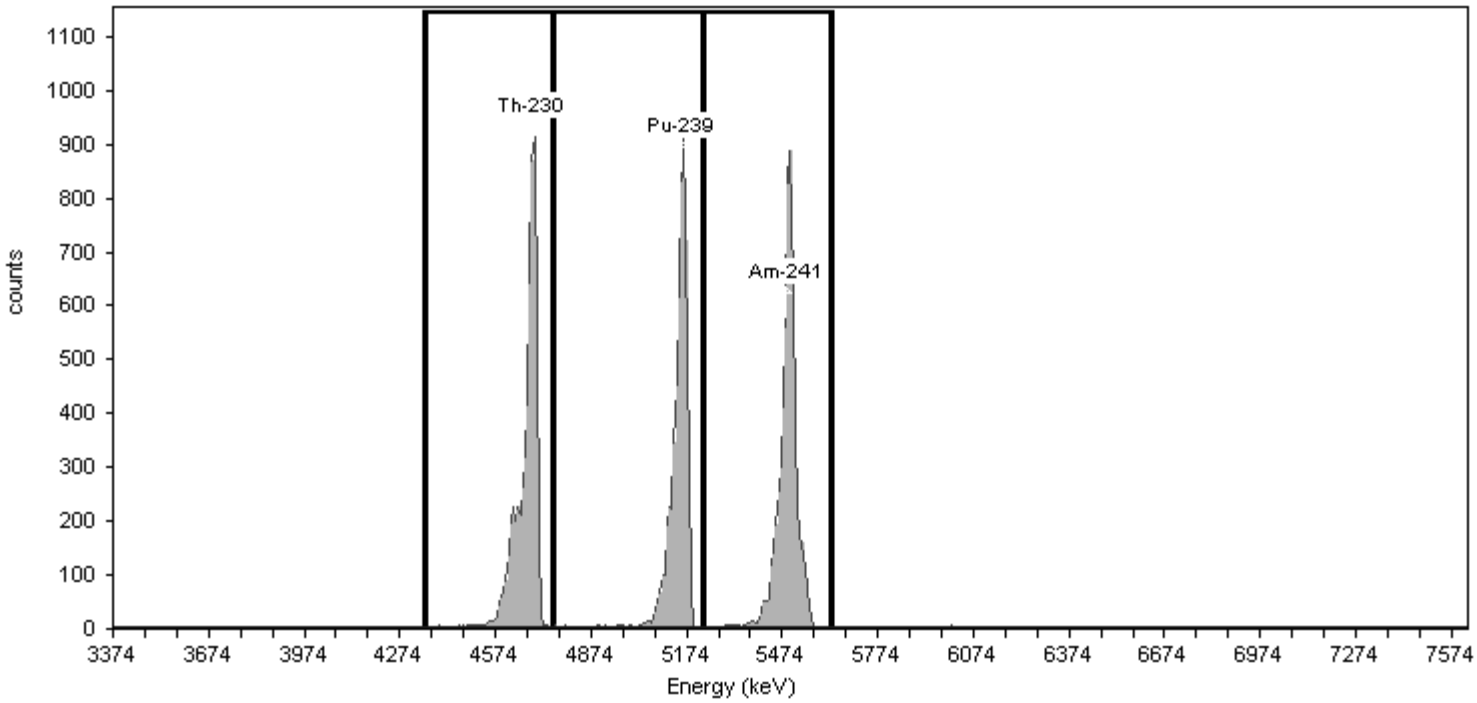
Certificate ID: 82247-334
Prepared by: Analytics

Certification Date: 6/10/2010 12:00:00PM
Description:

Acquisition

Detector: AV63 , SN: 47-029ff2
Acquisition Start Date: 6/22/2014 9:18:07PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 25.57% +/- 0.45% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,695.00	94.92
Pu-239	240	5.16	186	249	5,354.00	89.23
Am-241	284	5.49	249	303	5,757.00	95.95

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:18:51PM 6/22/2014

Calibration

Sample Name: CCV-7107;AV64-20140622
Description:
Detector: AV64

Calibration Date: 6/22/2014 10:18:48PM
Analyst: 60040

Source Info

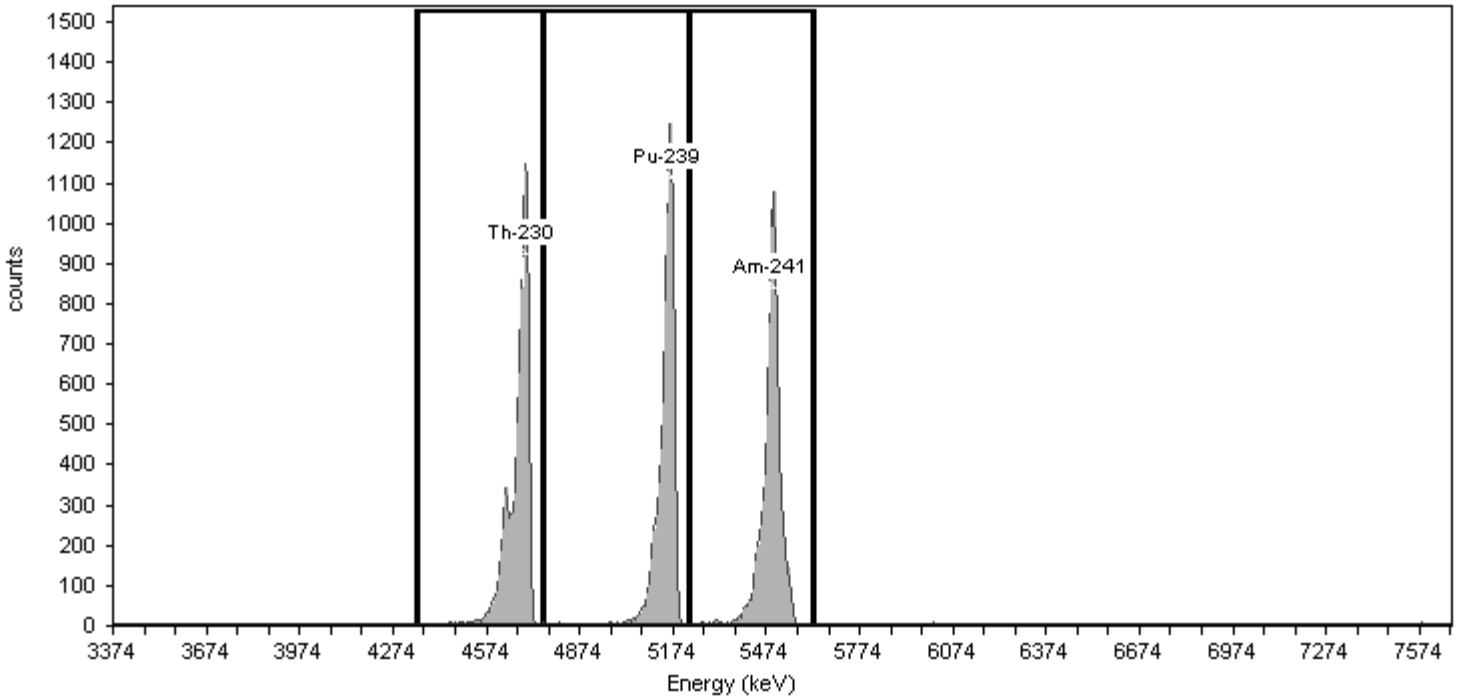
Certificate ID: 82232-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV64 , SN: 47-029ee4
Acquisition Start Date: 6/22/2014 9:18:17PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 27.76% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	7,489.00	124.82
Pu-239	240	5.16	186	249	7,273.00	121.22
Am-241	284	5.49	249	303	7,239.00	120.65

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:11:24PM 6/22/2014

Calibration

Sample Name: CCV-8874;AV65-20140622
Description:
Detector: AV65

Calibration Date: 6/22/2014 9:11:20PM
Analyst: 60040

Source Info

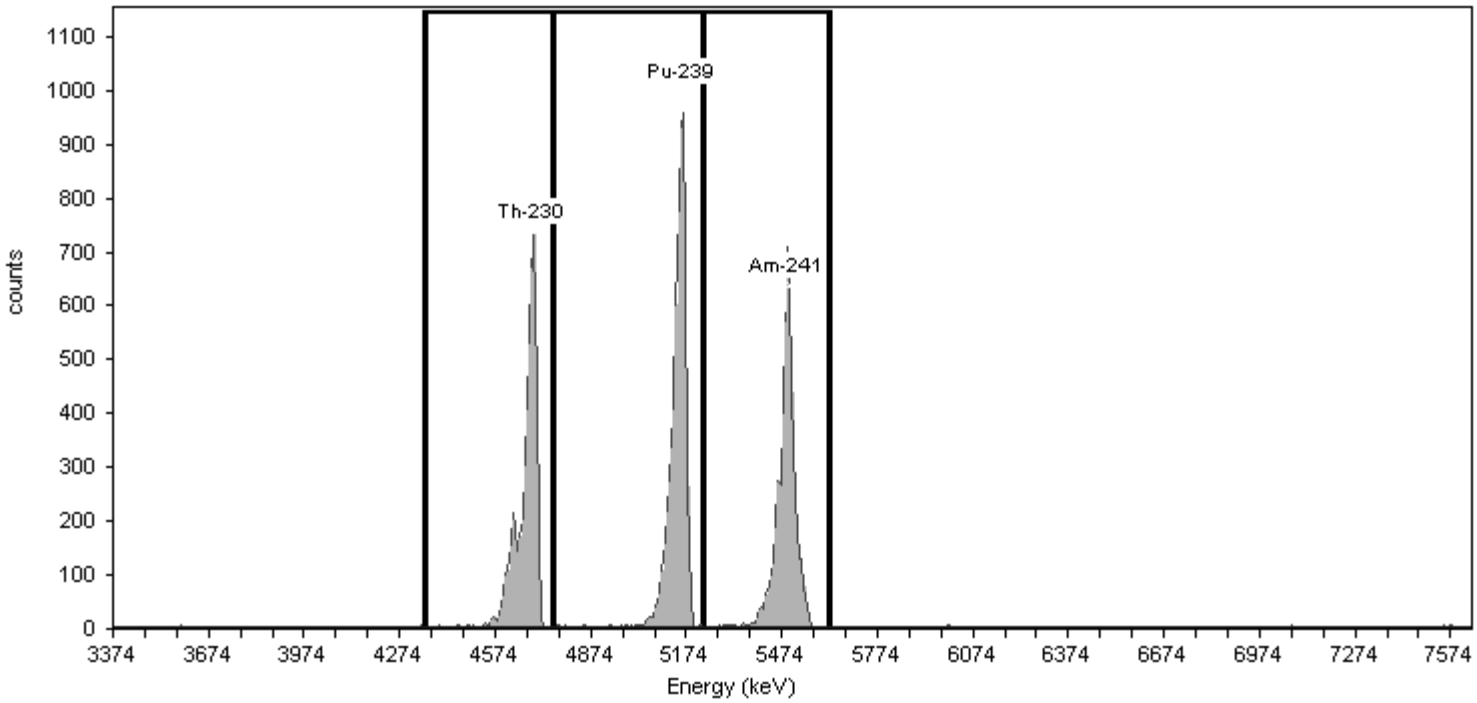
Certificate ID: 82233-334
Prepared by: Analytics

Certification Date: 6/3/2010 12:00:00PM
Description:

Acquisition

Detector: AV65 , SN: 44-049JJ1
Acquisition Start Date: 6/22/2014 8:09:47PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 26.95% +/- 0.50% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	4,739.00	78.98
Pu-239	240	5.16	186	249	6,042.00	100.70
Am-241	284	5.49	249	303	4,836.00	80.60

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:18:57PM 6/22/2014

Calibration

Sample Name: CCV-8875;AV66-20140622
Description:
Detector: AV66

Calibration Date: 6/22/2014 10:18:53PM
Analyst: 60040

Source Info

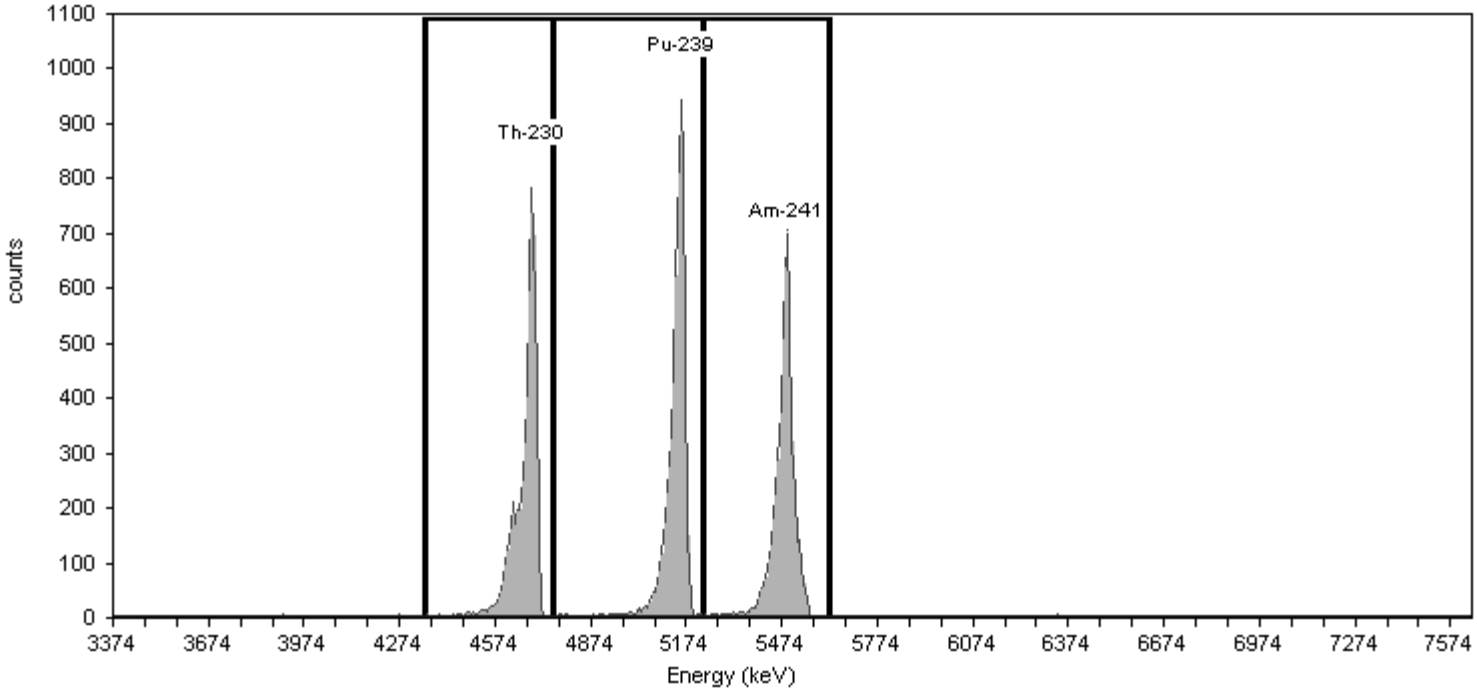
Certificate ID: 82234-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV66 , SN: 48-158EE2
Acquisition Start Date: 6/22/2014 9:18:27PM
Live Time: 60.00 min.
Real Time: 60.02 min.
Efficiency: 25.70% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,101.00	85.02
Pu-239	240	5.16	186	249	5,821.00	97.02
Am-241	284	5.49	249	303	5,063.00	84.38

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:58:15PM 6/22/2014

Calibration

Sample Name: CCV-8876;AV67-20140622
Description:
Detector: AV67

Calibration Date: 6/22/2014 7:58:11PM
Analyst: 60040

Source Info

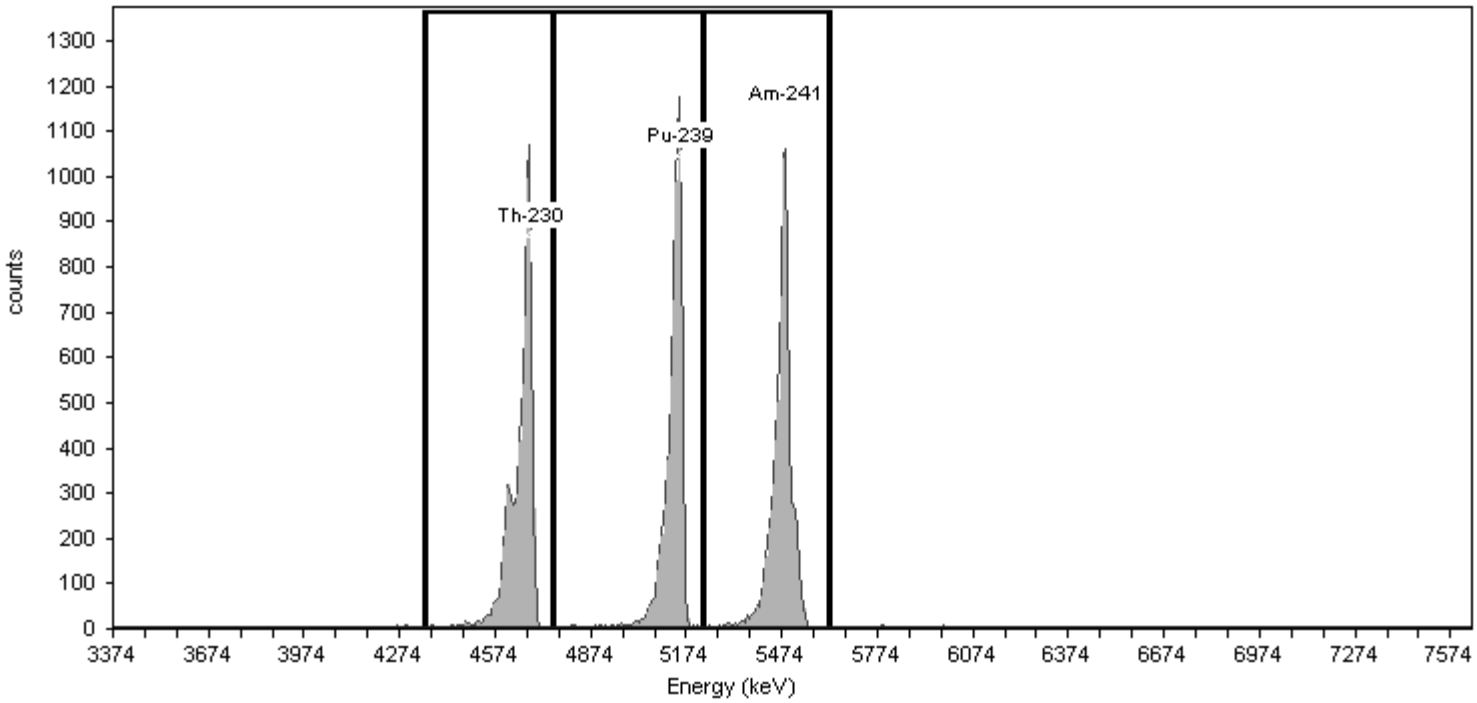
Certificate ID: 82235-334
Prepared by: Analytics

Certification Date: 6/4/2010 12:00:00PM
Description:

Acquisition

Detector: AV67 , SN: 52-102 D7
Acquisition Start Date: 6/22/2014 6:54:26PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 27.82% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	7,161.00	119.35
Pu-239	240	5.16	186	249	6,928.00	115.47
Am-241	284	5.49	249	303	7,431.00	123.85

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:11:36PM 6/22/2014

Calibration

Sample Name: CCV-9520;AV69-20140622
Description:
Detector: AV69

Calibration Date: 6/22/2014 9:11:33PM
Analyst: 60040

Source Info

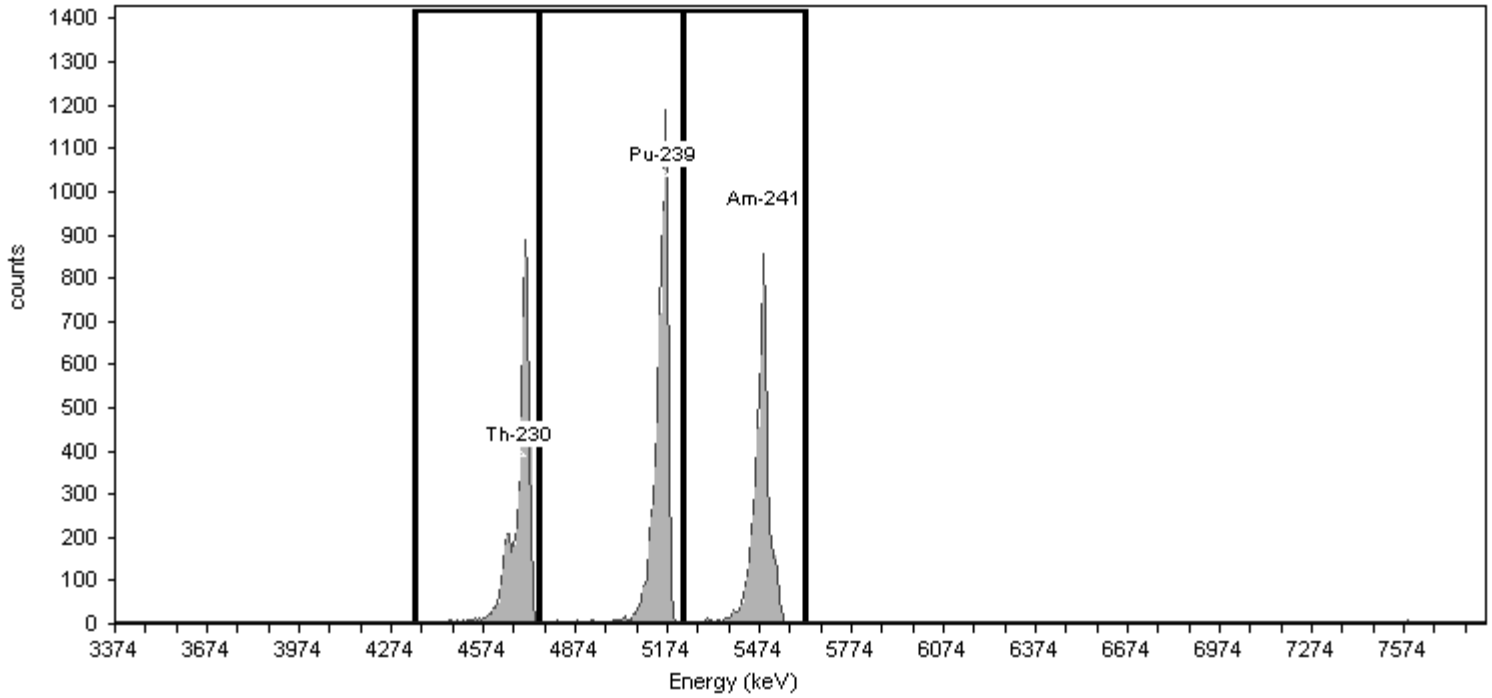
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV69 , SN: 49-155DD5
Acquisition Start Date: 6/22/2014 8:09:59PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 25.94% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,260.00	87.67
Pu-239	240	5.16	186	249	6,329.00	105.48
Am-241	284	5.49	249	303	5,104.00	85.07

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:11:42PM 6/22/2014

Calibration

Sample Name: CCV-8876;AV70-20140622
Description:
Detector: AV70

Calibration Date: 6/22/2014 9:11:39PM
Analyst: 60040

Source Info

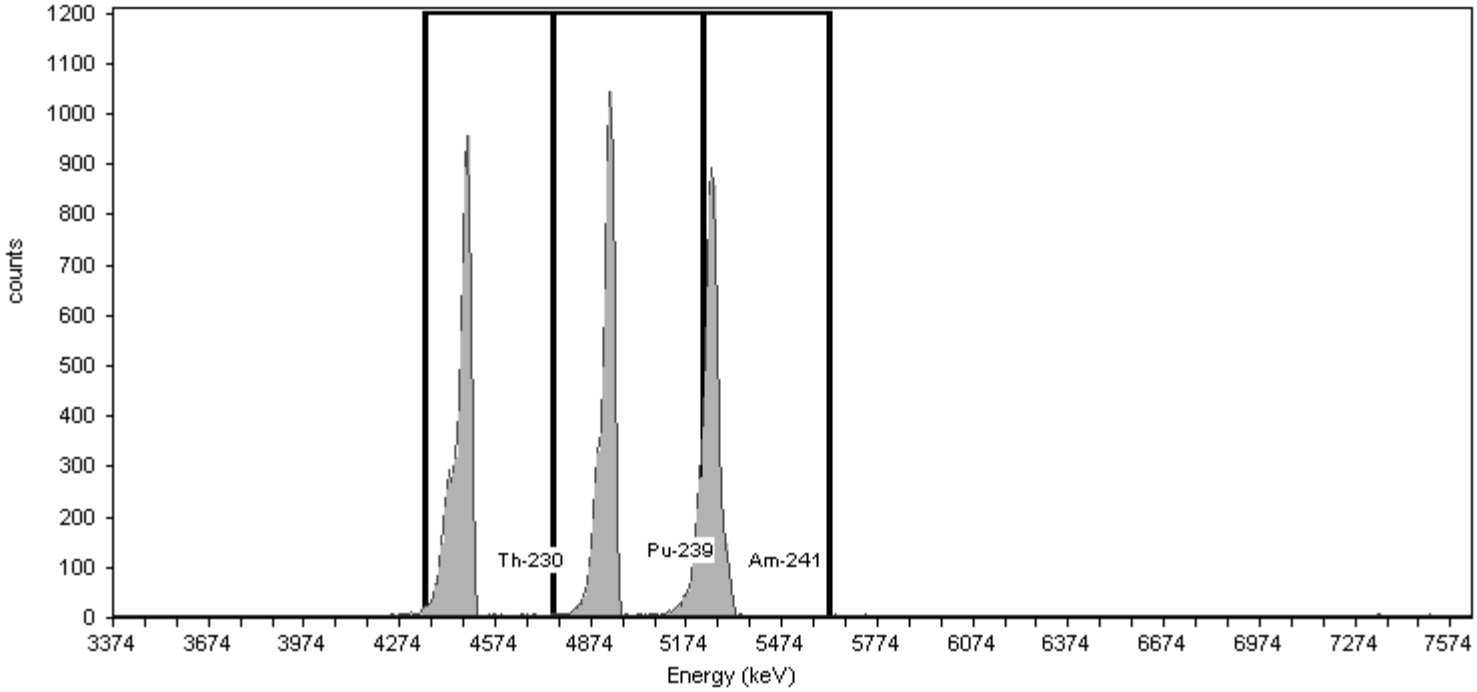
Certificate ID: 82235-334
Prepared by: Analytics

Certification Date: 6/4/2010 12:00:00PM
Description:

Acquisition

Detector: AV70 , SN: 48-158FF1
Acquisition Start Date: 6/22/2014 8:10:17PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 25.69% +/- 0.41% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,709.00	111.82
Pu-239	240	5.16	186	249	7,937.00	132.28
Am-241	284	5.49	249	303	5,836.00	97.27

Monthly Backgrounds

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:36:19PM 6/19/2014

Sample

Sample Name: ICB;AV46
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

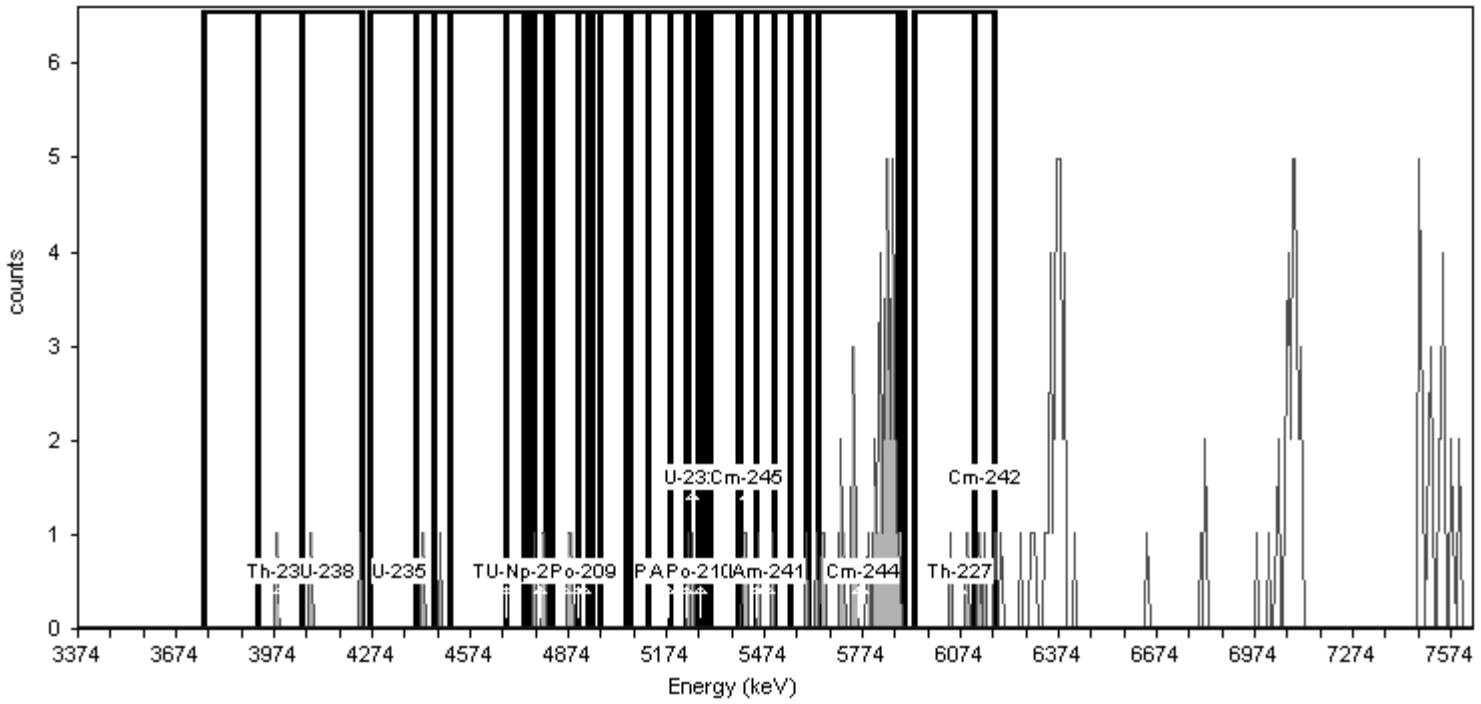
Acquisition

Detector: AV46 , SN: 49-202GG2
Acquisition Start Date: 6/19/2014 12:17:29AM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-9884;AV46-20140505
Calibration Date: 5/5/2014 10:10:09PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.80% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 154.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	2.00	2.083E-003	1.804E-003
U-234	4.71	4.51	4.82	3.00	3.125E-003	2.083E-003
Pu-242	4.90	4.68	4.95	5.00	5.208E-003	2.552E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	3.00	3.125E-003	2.083E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	2.00	2.083E-003	1.804E-003
Th-228	5.45	5.19	5.51	6.00	6.250E-003	2.756E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	4.00	4.167E-003	2.329E-003
Am-241	5.48	5.30	5.60	5.00	5.208E-003	2.552E-003
Cm-245	5.42	5.40	5.45	2.00	2.083E-003	1.804E-003
Pu-236	5.76	5.61	5.89	38.00	3.958E-002	6.505E-003
Cm-244	5.78	5.64	5.90	37.00	3.854E-002	6.421E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:33:37PM 6/19/2014

Sample

Sample Name: ICB;AV49
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

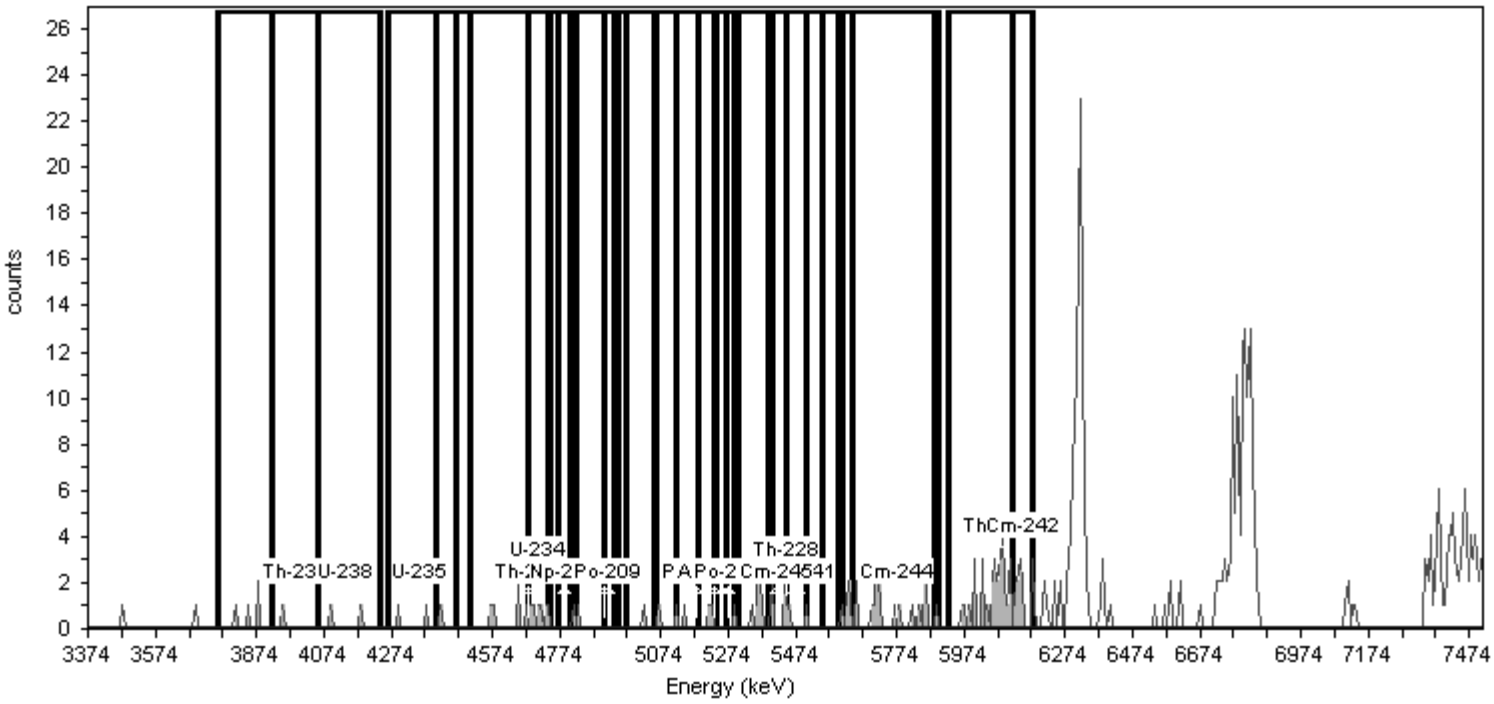
Analyst: 60040

Acquisition

Detector: AV49 , SN: 47-043hh4
Acquisition Start Date: 6/19/2014 12:17:35AM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-7107;AV49-20140504
Calibration Date: 5/5/2014 6:52:38PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.53% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 390.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	5.00	5.208E-003	2.552E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.68	4.40	4.75	12.00	1.250E-002	3.756E-003
U-234	4.71	4.51	4.82	12.00	1.250E-002	3.756E-003
Pu-242	4.90	4.68	4.95	8.00	8.333E-003	3.125E-003
Th-229	4.86	4.74	5.12	6.00	6.250E-003	2.756E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	6.00	6.250E-003	2.756E-003
Am-243	5.23	5.05	5.31	6.00	6.250E-003	2.756E-003
U-232	5.25	5.06	5.40	14.00	1.458E-002	4.034E-003
Th-228	5.45	5.19	5.51	16.00	1.667E-002	4.295E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	14.00	1.458E-002	4.034E-003
Am-241	5.48	5.30	5.60	13.00	1.354E-002	3.898E-003
Cm-245	5.42	5.40	5.45	5.00	5.208E-003	2.552E-003
Pu-236	5.76	5.61	5.89	21.00	2.187E-002	4.886E-003
Cm-244	5.78	5.64	5.90	18.00	1.875E-002	4.541E-003
Th-227	6.07	5.93	6.18	41.00	4.271E-002	6.751E-003
Cm-242	6.15	6.12	6.18	11.00	1.146E-002	3.608E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:33:59PM 6/19/2014

Sample

Sample Name: ICB;AV53
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

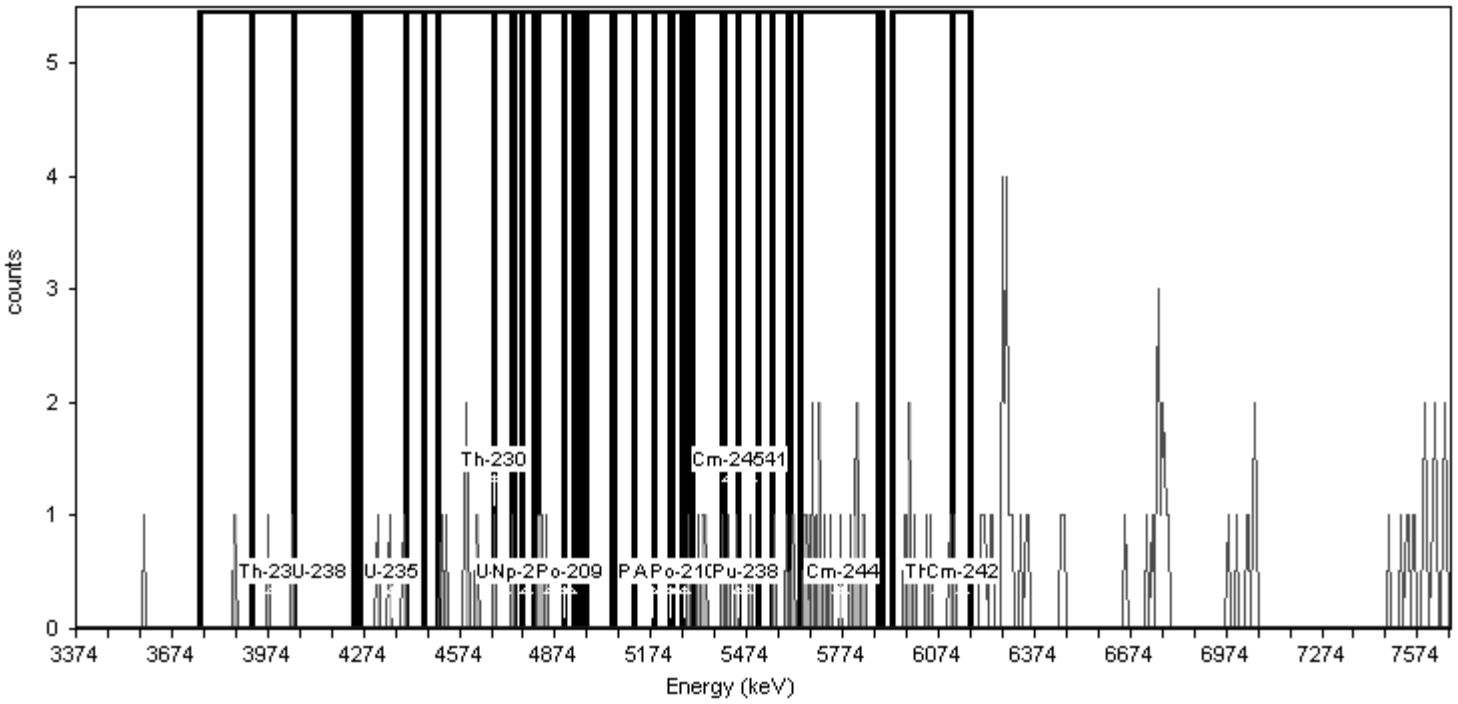
Analyst: 60040

Acquisition

Detector: AV53 , SN: 50-051A6
Acquisition Start Date: 6/19/2014 12:17:59AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-8877;AV53-20140504
Calibration Date: 5/5/2014 6:53:06PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.32% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 111.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	3.00	3.125E-003	2.083E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.68	4.40	4.75	8.00	8.333E-003	3.125E-003
U-234	4.71	4.51	4.82	9.00	9.375E-003	3.294E-003
Pu-242	4.90	4.68	4.95	5.00	5.208E-003	2.552E-003
Th-229	4.86	4.74	5.12	4.00	4.167E-003	2.329E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	0.00	0.000E+000	1.473E-003
Am-243	5.23	5.05	5.31	1.00	1.042E-003	1.473E-003
U-232	5.25	5.06	5.40	5.00	5.208E-003	2.552E-003
Th-228	5.45	5.19	5.51	8.00	8.333E-003	3.125E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	8.00	8.333E-003	3.125E-003
Am-241	5.48	5.30	5.60	9.00	9.375E-003	3.294E-003
Cm-245	5.42	5.40	5.45	3.00	3.125E-003	2.083E-003
Pu-236	5.76	5.61	5.89	16.00	1.667E-002	4.295E-003
Cm-244	5.78	5.64	5.90	15.00	1.563E-002	4.167E-003
Th-227	6.07	5.93	6.18	8.00	8.333E-003	3.125E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:05PM 6/19/2014

Sample

Sample Name: ICB;AV54
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

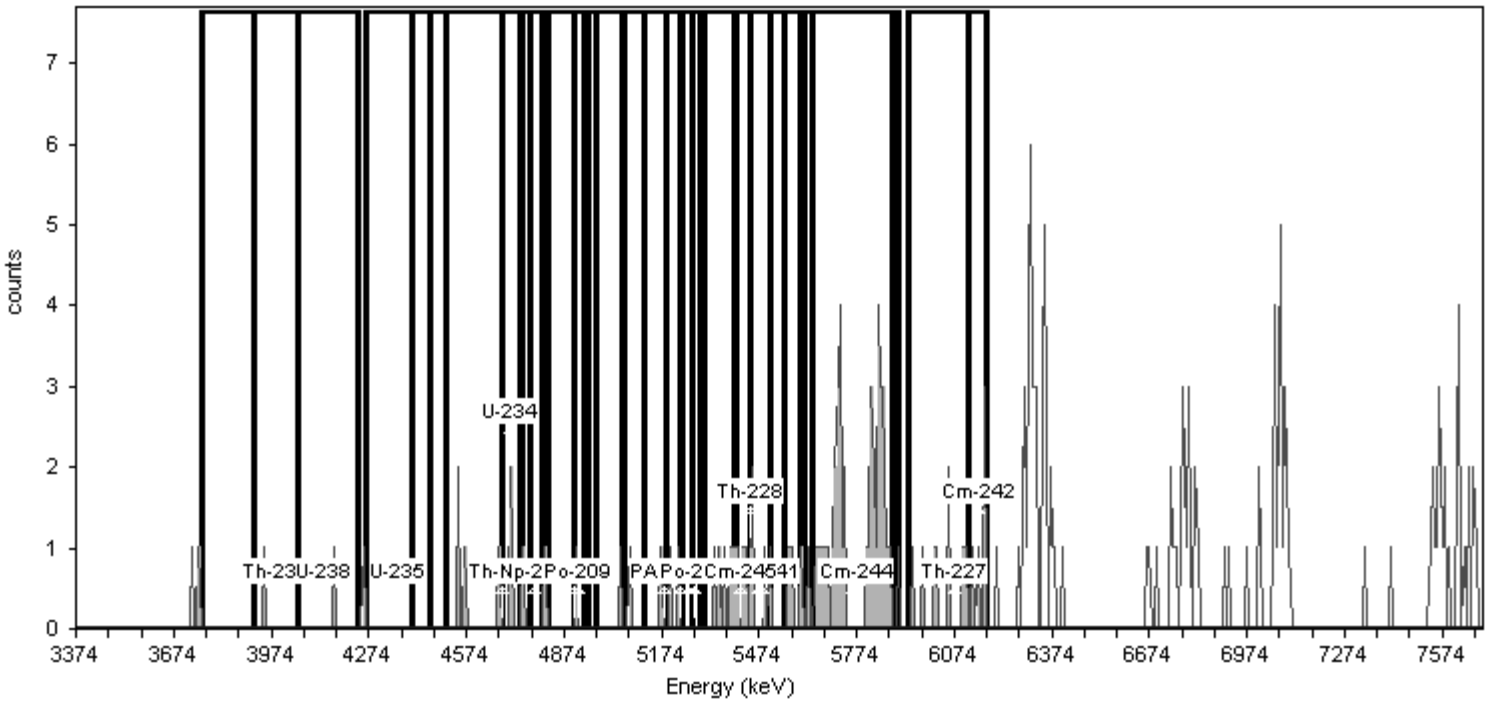
Analyst: 60040

Acquisition

Detector: AV54 , SN: 48-046II6
Acquisition Start Date: 6/19/2014 12:18:06AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9520;AV54-20140504
Calibration Date: 5/5/2014 6:53:13PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.02% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 195.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	7.00	7.292E-003	2.946E-003
U-234	4.71	4.51	4.82	8.00	8.333E-003	3.125E-003
Pu-242	4.90	4.68	4.95	5.00	5.208E-003	2.552E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	5.00	5.208E-003	2.552E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	10.00	1.042E-002	3.455E-003
Th-228	5.45	5.19	5.51	16.00	1.667E-002	4.295E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	14.00	1.458E-002	4.034E-003
Am-241	5.48	5.30	5.60	17.00	1.771E-002	4.419E-003
Cm-245	5.42	5.40	5.45	6.00	6.250E-003	2.756E-003
Pu-236	5.76	5.61	5.89	41.00	4.271E-002	6.751E-003
Cm-244	5.78	5.64	5.90	41.00	4.271E-002	6.751E-003
Th-227	6.07	5.93	6.18	13.00	1.354E-002	3.898E-003
Cm-242	6.15	6.12	6.18	5.00	5.208E-003	2.552E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:10PM 6/19/2014

Sample

Sample Name: ICB;AV55
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

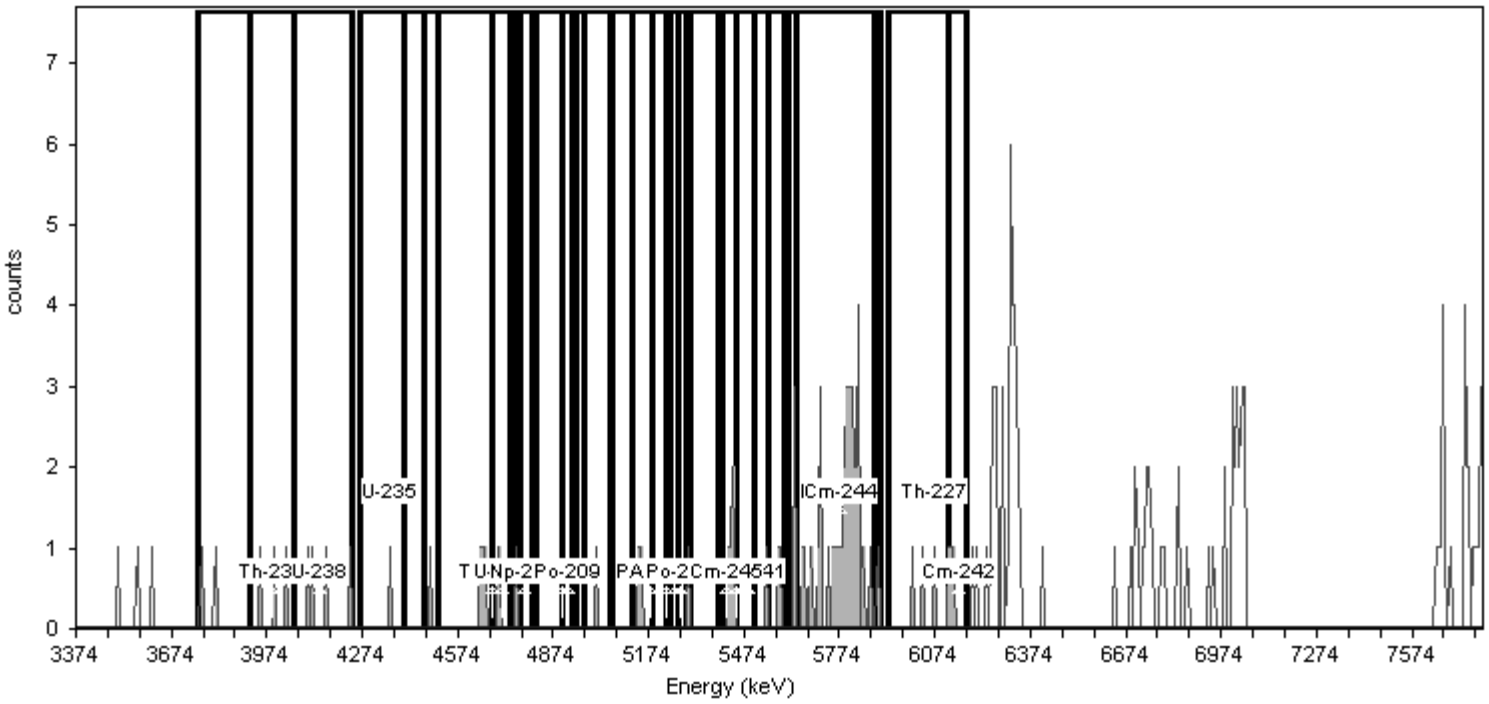
Analyst: 60040

Acquisition

Detector: AV55 , SN: 50-051C2
Acquisition Start Date: 6/19/2014 12:18:11AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-7107;AV55-20140507
Calibration Date: 5/7/2014 10:48:56PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.79% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 168.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	5.00	5.208E-003	2.552E-003
U-238	4.14	3.92	4.24	7.00	7.292E-003	2.946E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	5.00	5.208E-003	2.552E-003
U-234	4.71	4.51	4.82	5.00	5.208E-003	2.552E-003
Pu-242	4.90	4.68	4.95	2.00	2.083E-003	1.804E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	3.00	3.125E-003	2.083E-003
Th-228	5.45	5.19	5.51	5.00	5.208E-003	2.552E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	6.00	6.250E-003	2.756E-003
Am-241	5.48	5.30	5.60	8.00	8.333E-003	3.125E-003
Cm-245	5.42	5.40	5.45	4.00	4.167E-003	2.329E-003
Pu-236	5.76	5.61	5.89	37.00	3.854E-002	6.421E-003
Cm-244	5.78	5.64	5.90	35.00	3.646E-002	6.250E-003
Th-227	6.07	5.93	6.18	6.00	6.250E-003	2.756E-003
Cm-242	6.15	6.12	6.18	3.00	3.125E-003	2.083E-003

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:16PM 6/19/2014

Sample

Sample Name: ICB;AV56
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

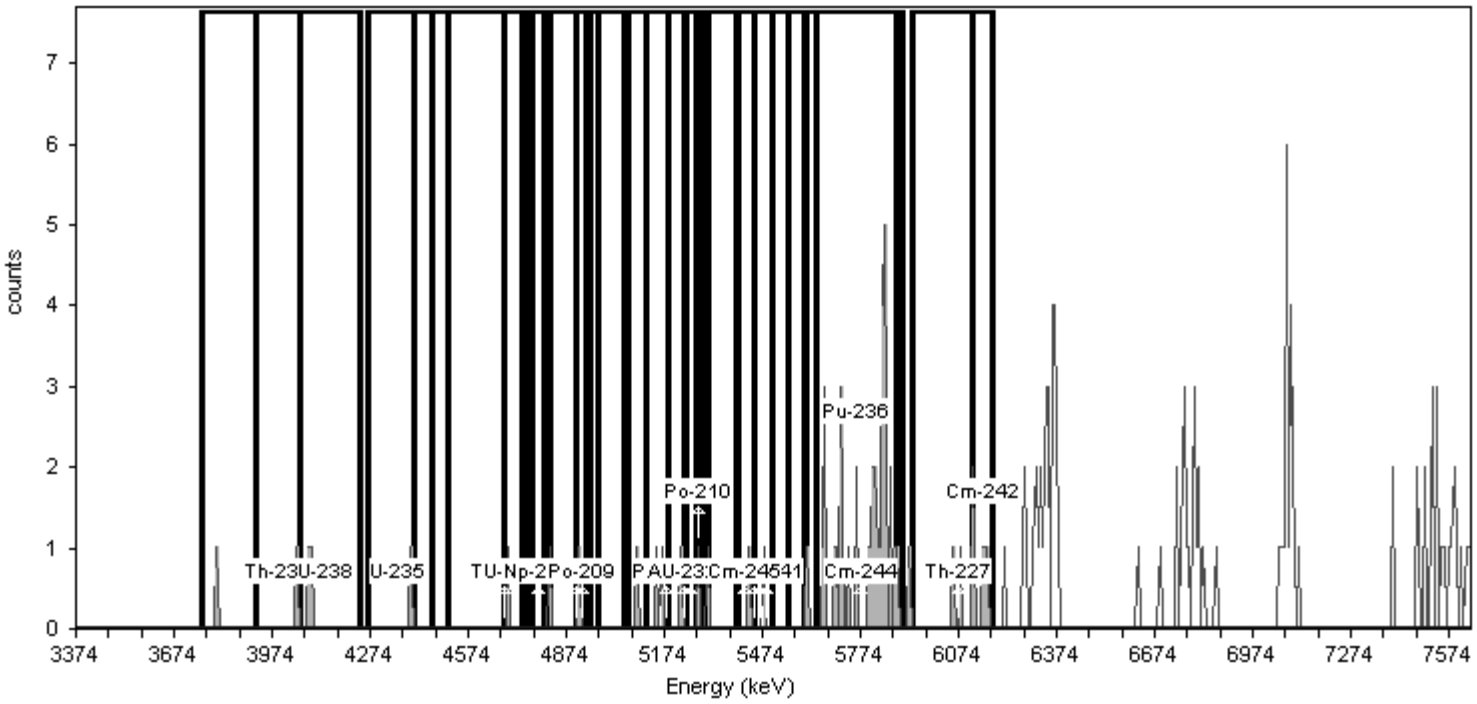
Analyst: 60040

Acquisition

Detector: AV56 , SN: 52-059EE5
Acquisition Start Date: 6/19/2014 12:18:17AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9792;AV56-20140504
Calibration Date: 5/5/2014 6:53:34PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.09% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 143.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	1.00	1.042E-003	1.473E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	3.00	3.125E-003	2.083E-003
Th-229	4.86	4.74	5.12	3.00	3.125E-003	2.083E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	6.00	6.250E-003	2.756E-003
U-232	5.25	5.06	5.40	6.00	6.250E-003	2.756E-003
Th-228	5.45	5.19	5.51	5.00	5.208E-003	2.552E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	4.00	4.167E-003	2.329E-003
Am-241	5.48	5.30	5.60	3.00	3.125E-003	2.083E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	34.00	3.542E-002	6.163E-003
Cm-244	5.78	5.64	5.90	33.00	3.437E-002	6.074E-003
Th-227	6.07	5.93	6.18	8.00	8.333E-003	3.125E-003
Cm-242	6.15	6.12	6.18	6.00	6.250E-003	2.756E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:21PM 6/19/2014

Sample

Sample Name: ICB;AV57
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

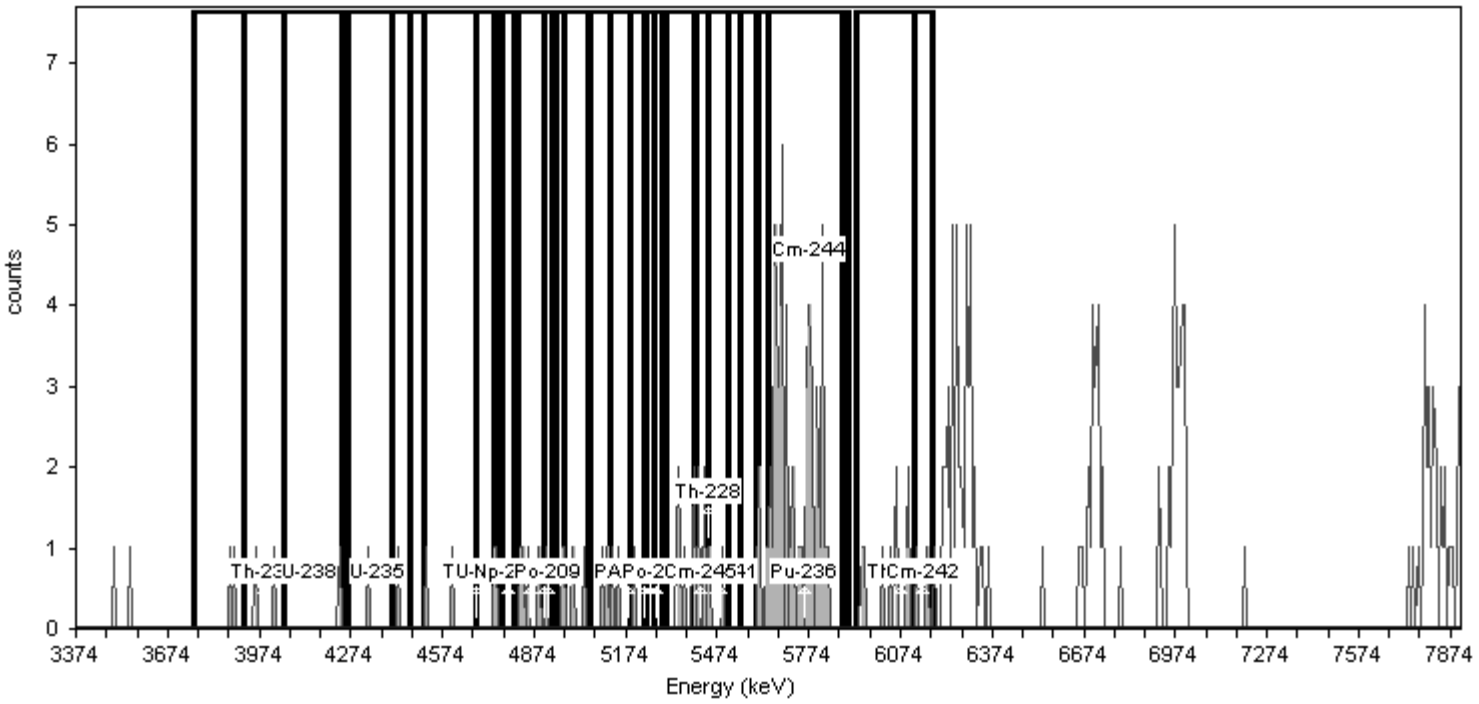
Analyst: 60040

Acquisition

Detector: AV57 , SN: 48-158EE3
Acquisition Start Date: 6/19/2014 12:18:24AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9793;AV57-20140504
Calibration Date: 5/5/2014 6:53:40PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.74% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 233.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	4.00	4.167E-003	2.329E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	5.00	5.208E-003	2.552E-003
U-234	4.71	4.51	4.82	4.00	4.167E-003	2.329E-003
Pu-242	4.90	4.68	4.95	7.00	7.292E-003	2.946E-003
Th-229	4.86	4.74	5.12	13.00	1.354E-002	3.898E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	8.00	8.333E-003	3.125E-003
Am-243	5.23	5.05	5.31	5.00	5.208E-003	2.552E-003
U-232	5.25	5.06	5.40	11.00	1.146E-002	3.608E-003
Th-228	5.45	5.19	5.51	13.00	1.354E-002	3.898E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	12.00	1.250E-002	3.756E-003
Am-241	5.48	5.30	5.60	12.00	1.250E-002	3.756E-003
Cm-245	5.42	5.40	5.45	7.00	7.292E-003	2.946E-003
Pu-236	5.76	5.61	5.89	58.00	6.042E-002	8.001E-003
Cm-244	5.78	5.64	5.90	55.00	5.729E-002	7.795E-003
Th-227	6.07	5.93	6.18	11.00	1.146E-002	3.608E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:28PM 6/19/2014

Sample

Sample Name: ICB;AV58
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

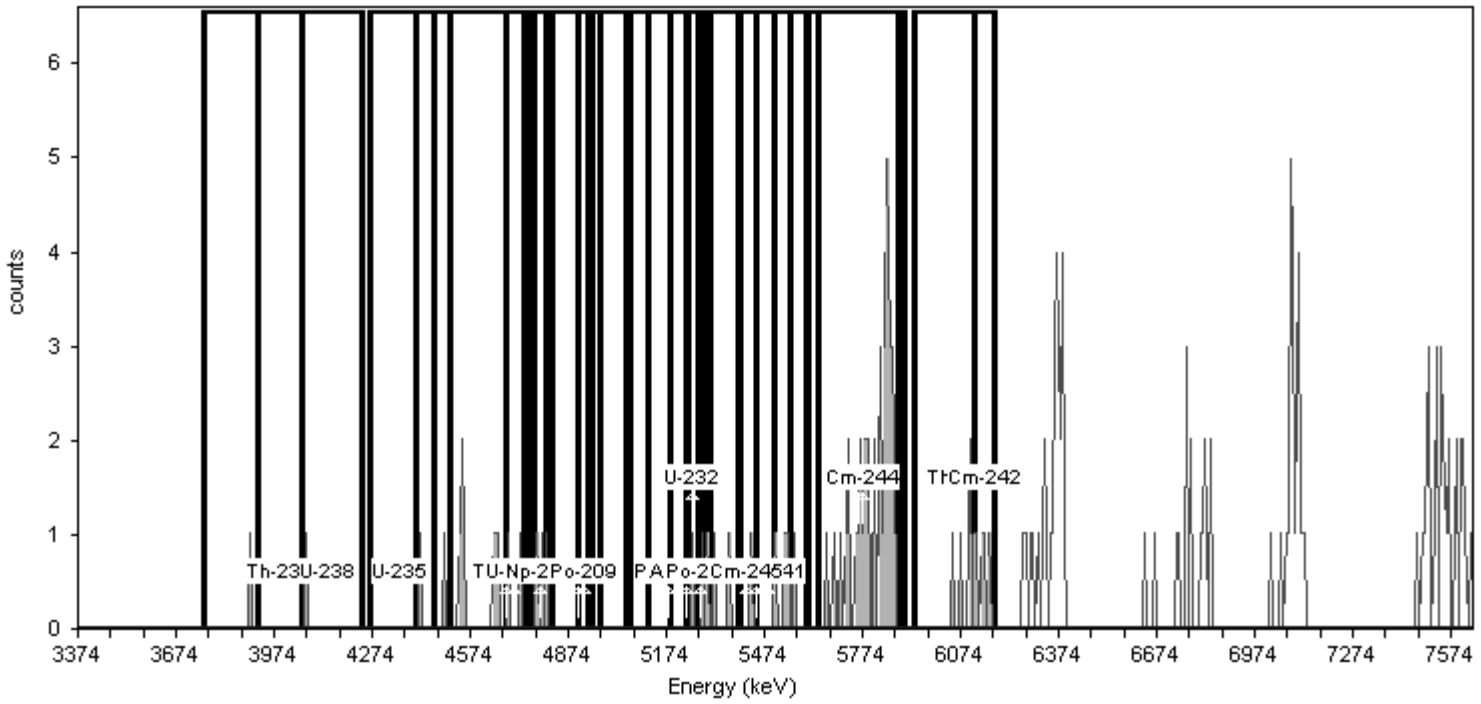
Analyst: 60040

Acquisition

Detector: AV58 , SN: 52-102 C5
Acquisition Start Date: 6/19/2014 12:18:31AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9794;AV58-20140504
Calibration Date: 5/5/2014 6:53:46PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.56% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 160.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	11.00	1.146E-002	3.608E-003
U-234	4.71	4.51	4.82	12.00	1.250E-002	3.756E-003
Pu-242	4.90	4.68	4.95	5.00	5.208E-003	2.552E-003
Th-229	4.86	4.74	5.12	3.00	3.125E-003	2.083E-003
Np-237	4.78	4.77	4.81	3.00	3.125E-003	2.083E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	0.00	0.000E+000	1.473E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	5.00	5.208E-003	2.552E-003
Th-228	5.45	5.19	5.51	7.00	7.292E-003	2.946E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	8.00	8.333E-003	3.125E-003
Am-241	5.48	5.30	5.60	8.00	8.333E-003	3.125E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	37.00	3.854E-002	6.421E-003
Cm-244	5.78	5.64	5.90	37.00	3.854E-002	6.421E-003
Th-227	6.07	5.93	6.18	9.00	9.375E-003	3.294E-003
Cm-242	6.15	6.12	6.18	5.00	5.208E-003	2.552E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:39PM 6/19/2014

Sample

Sample Name: ICB;AV60
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

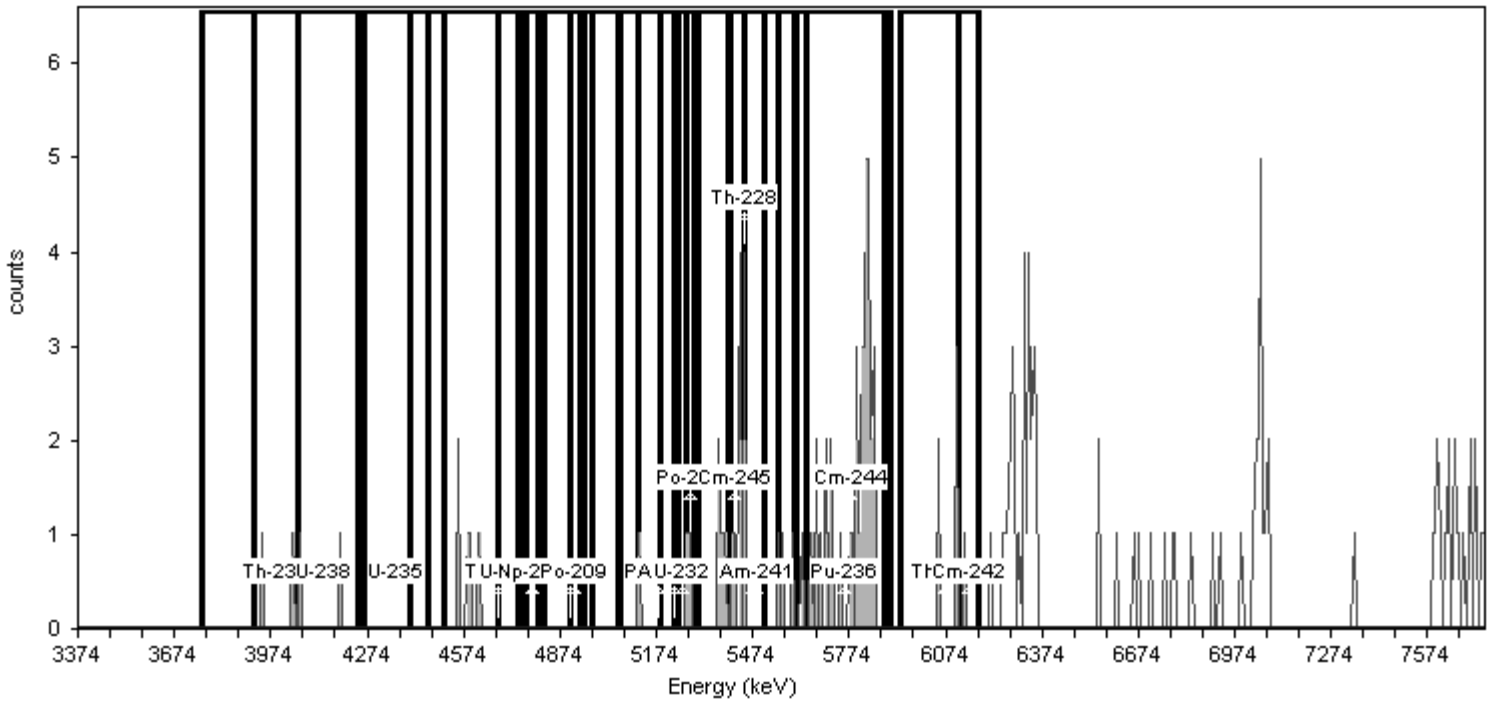
Acquisition

Detector: AV60 , SN: 49-027117
Acquisition Start Date: 6/19/2014 12:18:33AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9817;AV60-20140504
Calibration Date: 5/5/2014 6:53:59PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.33% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 151.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	4.00	4.167E-003	2.329E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	5.00	5.208E-003	2.552E-003
U-234	4.71	4.51	4.82	5.00	5.208E-003	2.552E-003
Pu-242	4.90	4.68	4.95	0.00	0.000E+000	1.473E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	8.00	8.333E-003	3.125E-003
Th-228	5.45	5.19	5.51	17.00	1.771E-002	4.419E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	18.00	1.875E-002	4.541E-003
Am-241	5.48	5.30	5.60	18.00	1.875E-002	4.541E-003
Cm-245	5.42	5.40	5.45	10.00	1.042E-002	3.455E-003
Pu-236	5.76	5.61	5.89	38.00	3.958E-002	6.505E-003
Cm-244	5.78	5.64	5.90	37.00	3.854E-002	6.421E-003
Th-227	6.07	5.93	6.18	6.00	6.250E-003	2.756E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:44PM 6/19/2014

Sample

Sample Name: ICB;AV61
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

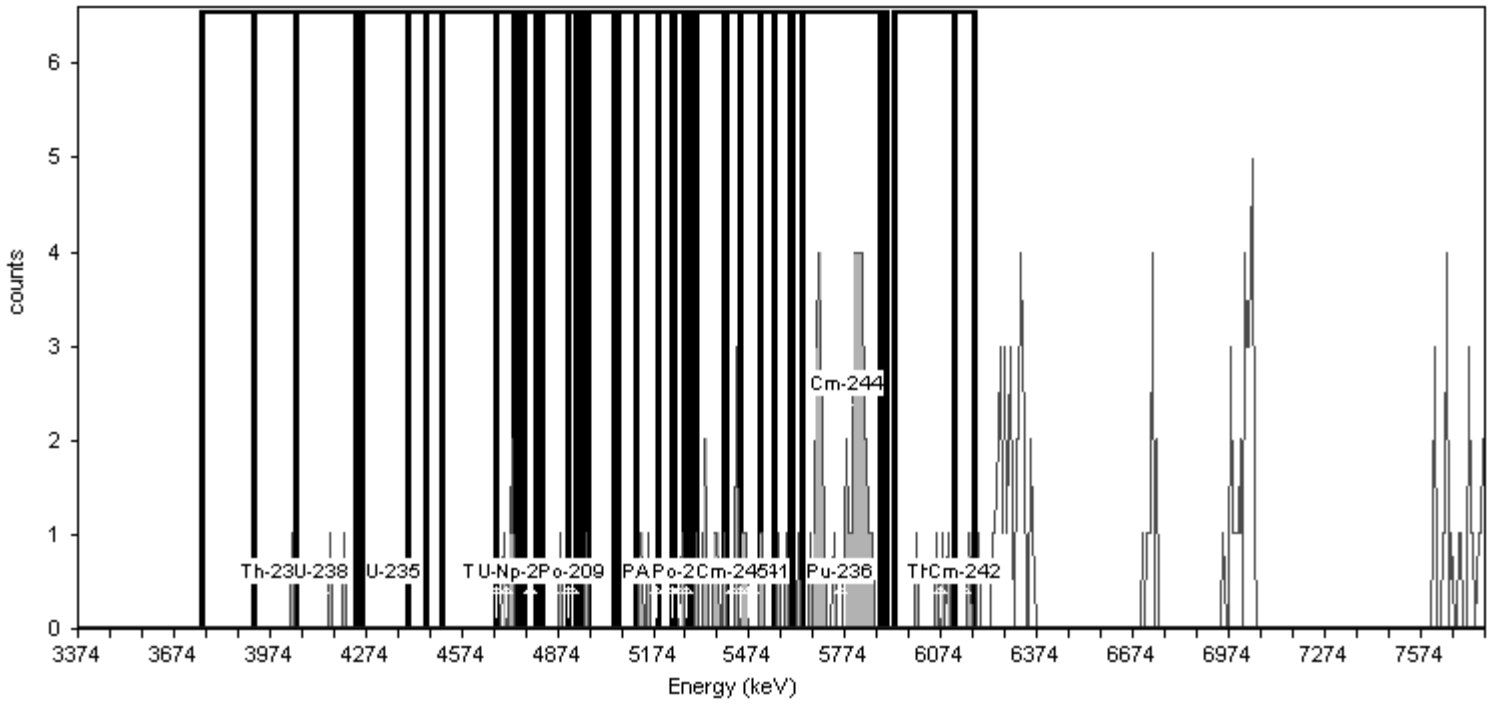
Analyst: 60040

Acquisition

Detector: AV61 , SN: 5-051JJ3
Acquisition Start Date: 6/19/2014 12:18:33AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9884;AV61-20140504
Calibration Date: 5/5/2014 6:54:06PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.46% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 159.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	4.00	4.167E-003	2.329E-003
U-234	4.71	4.51	4.82	4.00	4.167E-003	2.329E-003
Pu-242	4.90	4.68	4.95	5.00	5.208E-003	2.552E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	9.00	9.375E-003	3.294E-003
Th-228	5.45	5.19	5.51	13.00	1.354E-002	3.898E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	13.00	1.354E-002	3.898E-003
Am-241	5.48	5.30	5.60	15.00	1.563E-002	4.167E-003
Cm-245	5.42	5.40	5.45	4.00	4.167E-003	2.329E-003
Pu-236	5.76	5.61	5.89	41.00	4.271E-002	6.751E-003
Cm-244	5.78	5.64	5.90	40.00	4.167E-002	6.670E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:50PM 6/19/2014

Sample

Sample Name: ICB;AV62
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

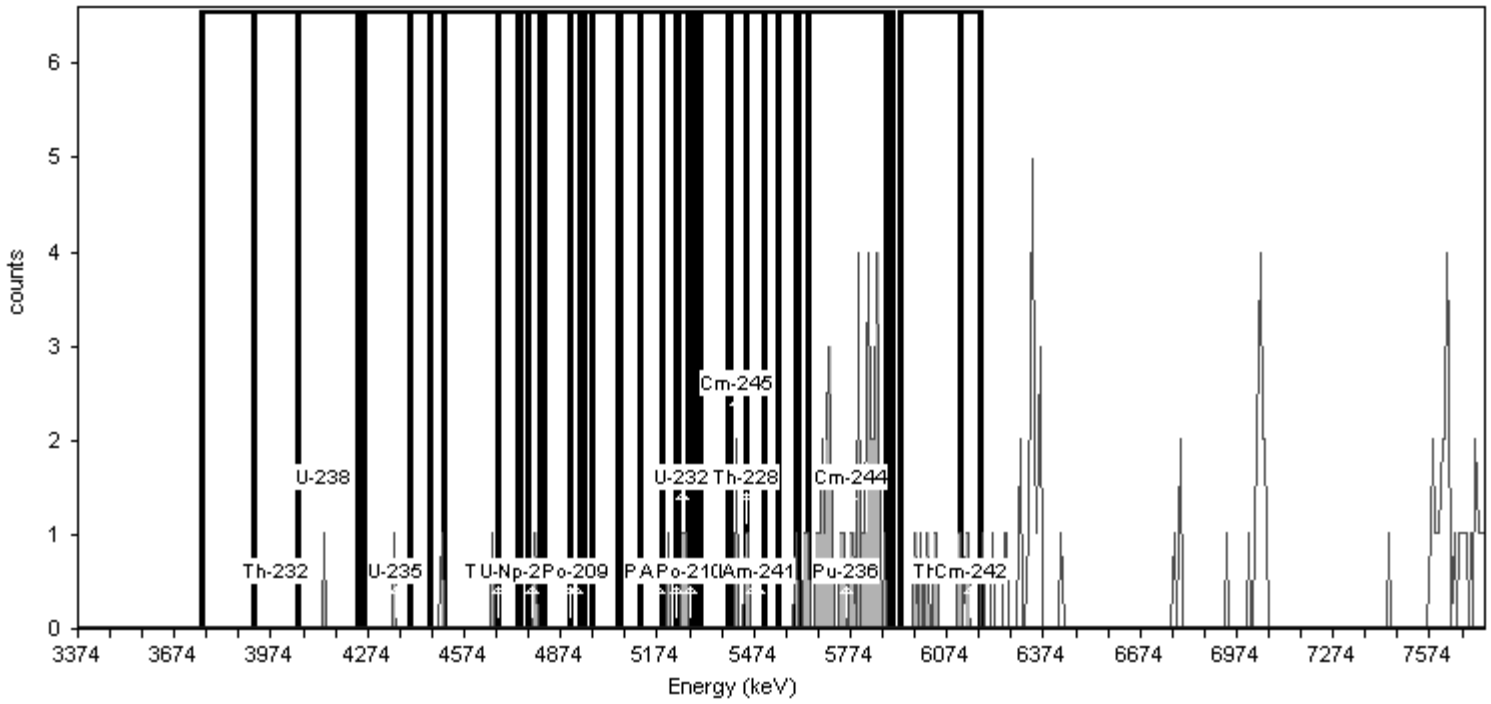
Analyst: 60040

Acquisition

Detector: AV62 , SN: 52-060FF2
Acquisition Start Date: 6/19/2014 12:18:34AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9885;AV62-20140504
Calibration Date: 5/5/2014 6:54:13PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.34% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 132.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	2.00	2.083E-003	1.804E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	1.00	1.042E-003	1.473E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	3.00	3.125E-003	2.083E-003
Th-228	5.45	5.19	5.51	7.00	7.292E-003	2.946E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	4.00	4.167E-003	2.329E-003
Am-241	5.48	5.30	5.60	5.00	5.208E-003	2.552E-003
Cm-245	5.42	5.40	5.45	3.00	3.125E-003	2.083E-003
Pu-236	5.76	5.61	5.89	39.00	4.062E-002	6.588E-003
Cm-244	5.78	5.64	5.90	38.00	3.958E-002	6.505E-003
Th-227	6.07	5.93	6.18	9.00	9.375E-003	3.294E-003
Cm-242	6.15	6.12	6.18	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:34:56PM 6/19/2014

Sample

Sample Name: ICB;AV63
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

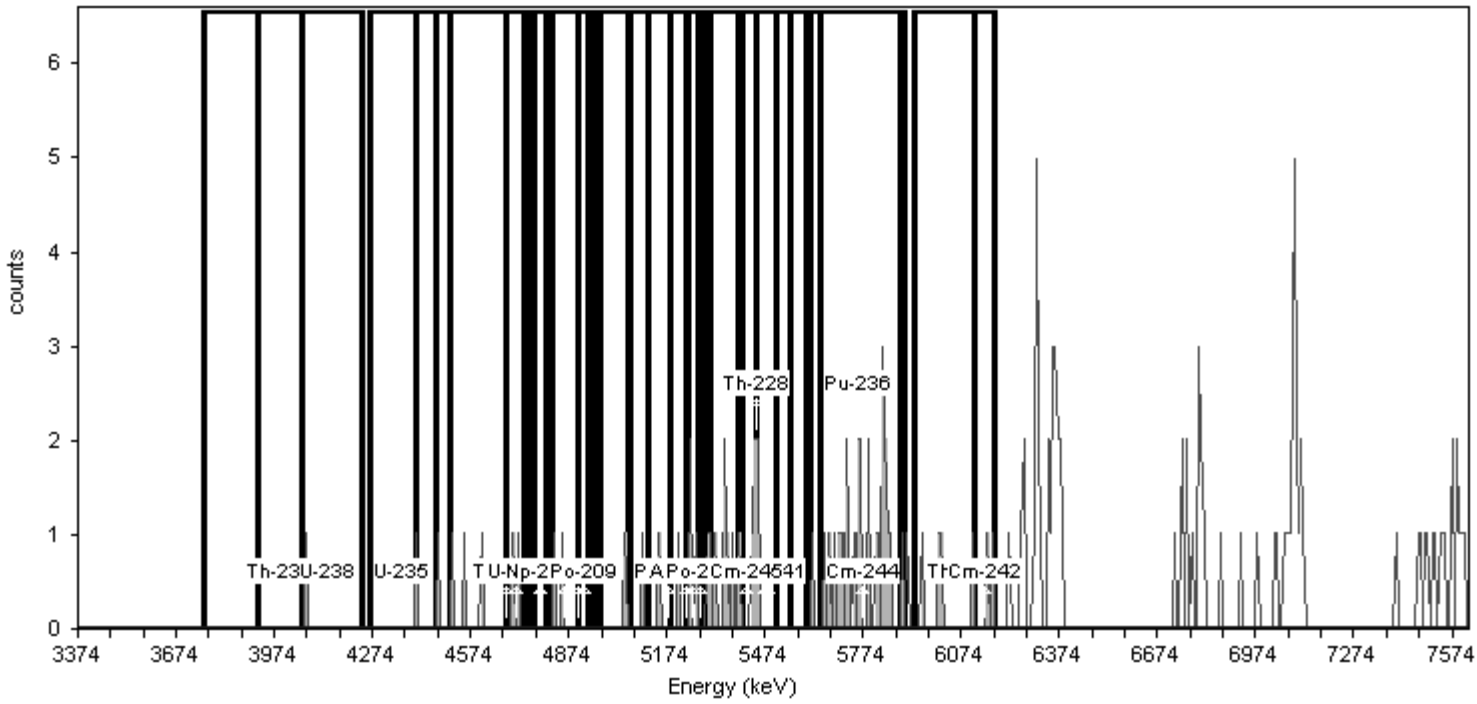
Analyst: 60040

Acquisition

Detector: AV63 , SN: 47-029ff2
Acquisition Start Date: 6/19/2014 12:18:35AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9886;AV63-20140504
Calibration Date: 5/5/2014 6:54:19PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.48% +/- 0.34% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 141.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	7.00	7.292E-003	2.946E-003
U-234	4.71	4.51	4.82	5.00	5.208E-003	2.552E-003
Pu-242	4.90	4.68	4.95	4.00	4.167E-003	2.329E-003
Th-229	4.86	4.74	5.12	4.00	4.167E-003	2.329E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	8.00	8.333E-003	3.125E-003
U-232	5.25	5.06	5.40	14.00	1.458E-002	4.034E-003
Th-228	5.45	5.19	5.51	19.00	1.979E-002	4.658E-003
Po-210	5.28	5.23	5.29	3.00	3.125E-003	2.083E-003
Pu-238	5.47	5.27	5.55	15.00	1.563E-002	4.167E-003
Am-241	5.48	5.30	5.60	15.00	1.563E-002	4.167E-003
Cm-245	5.42	5.40	5.45	6.00	6.250E-003	2.756E-003
Pu-236	5.76	5.61	5.89	25.00	2.604E-002	5.311E-003
Cm-244	5.78	5.64	5.90	25.00	2.604E-002	5.311E-003
Th-227	6.07	5.93	6.18	6.00	6.250E-003	2.756E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:35:01PM 6/19/2014

Sample

Sample Name: ICB;AV64
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

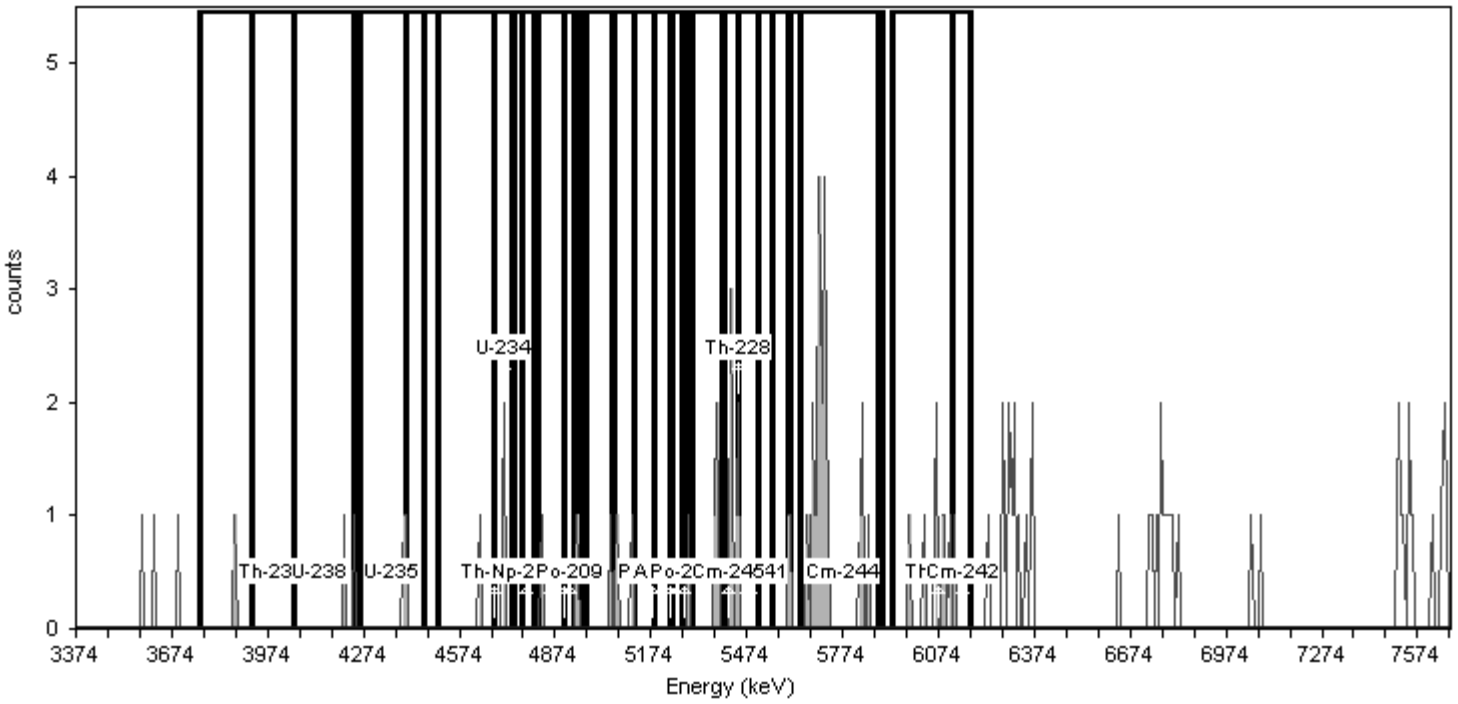
Analyst: 60040

Acquisition

Detector: AV64 , SN: 47-029ee4
Acquisition Start Date: 6/19/2014 12:18:36AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-7107;AV64-20140504a
Calibration Date: 5/4/2014 8:44:03PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.75% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 100.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	1.00	1.042E-003	1.473E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	4.00	4.167E-003	2.329E-003
U-234	4.71	4.51	4.82	3.00	3.125E-003	2.083E-003
Pu-242	4.90	4.68	4.95	4.00	4.167E-003	2.329E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	6.00	6.250E-003	2.756E-003
Th-228	5.45	5.19	5.51	10.00	1.042E-002	3.455E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	10.00	1.042E-002	3.455E-003
Am-241	5.48	5.30	5.60	10.00	1.042E-002	3.455E-003
Cm-245	5.42	5.40	5.45	6.00	6.250E-003	2.756E-003
Pu-236	5.76	5.61	5.89	23.00	2.396E-002	5.103E-003
Cm-244	5.78	5.64	5.90	22.00	2.292E-002	4.996E-003
Th-227	6.07	5.93	6.18	8.00	8.333E-003	3.125E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:22:41PM 6/22/2014

Sample

Sample Name: ICB;AV65
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014c
Description:

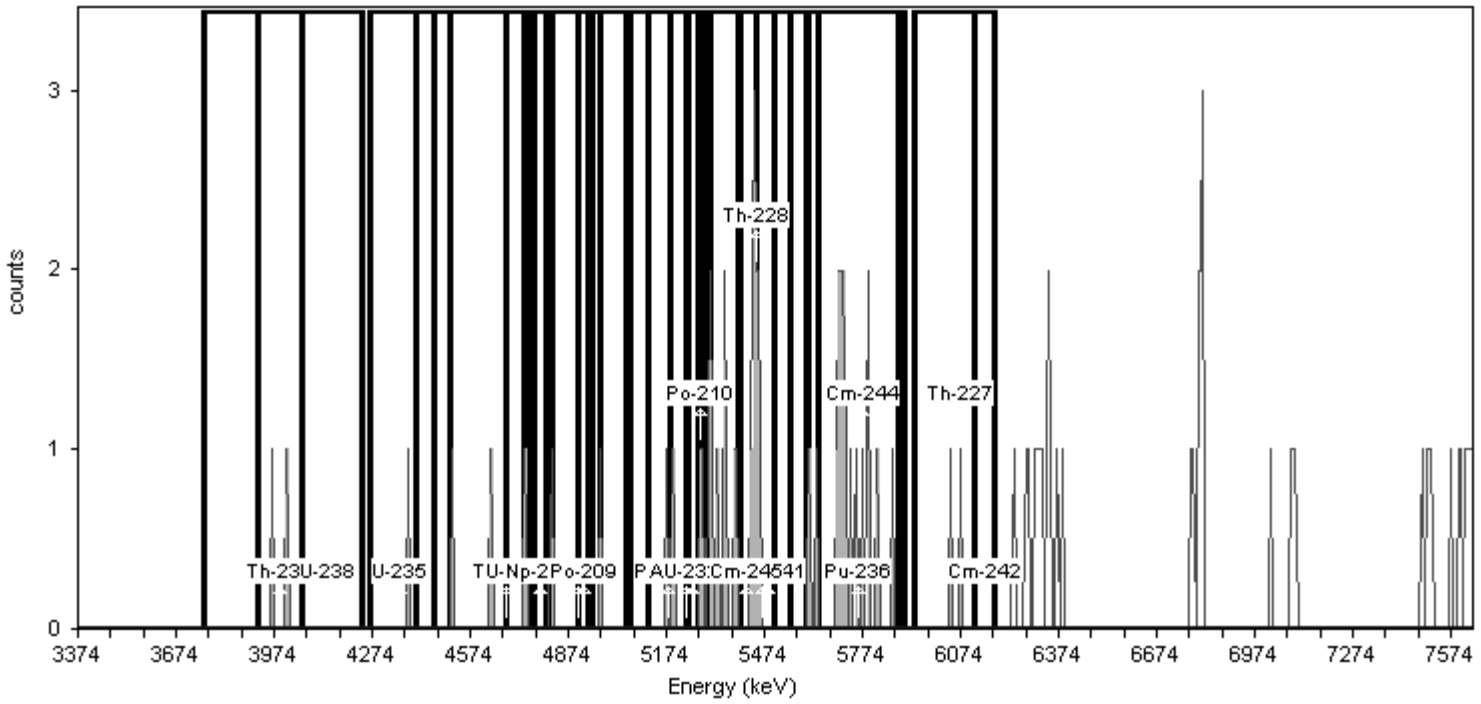
Analyst: 60040

Acquisition

Detector: AV65 , SN: 44-049JJ1
Acquisition Start Date: 6/19/2014 7:57:24PM
Live Time: 960.00 min.
Real Time: 960.00 min.
Calibration Name: IC-8874;AV65-20140504
Calibration Date: 5/4/2014 8:43:55PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.13% +/- 0.38% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 84.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	3.00	3.125E-003	2.083E-003
U-234	4.71	4.51	4.82	4.00	4.167E-003	2.329E-003
Pu-242	4.90	4.68	4.95	2.00	2.083E-003	1.804E-003
Th-229	4.86	4.74	5.12	3.00	3.125E-003	2.083E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	6.00	6.250E-003	2.756E-003
U-232	5.25	5.06	5.40	13.00	1.354E-002	3.898E-003
Th-228	5.45	5.19	5.51	21.00	2.187E-002	4.886E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	20.00	2.083E-002	4.774E-003
Am-241	5.48	5.30	5.60	18.00	1.875E-002	4.541E-003
Cm-245	5.42	5.40	5.45	6.00	6.250E-003	2.756E-003
Pu-236	5.76	5.61	5.89	17.00	1.771E-002	4.419E-003
Cm-244	5.78	5.64	5.90	15.00	1.563E-002	4.167E-003
Th-227	6.07	5.93	6.18	2.00	2.083E-003	1.804E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:35:12PM 6/19/2014

Sample

Sample Name: ICB;AV66
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

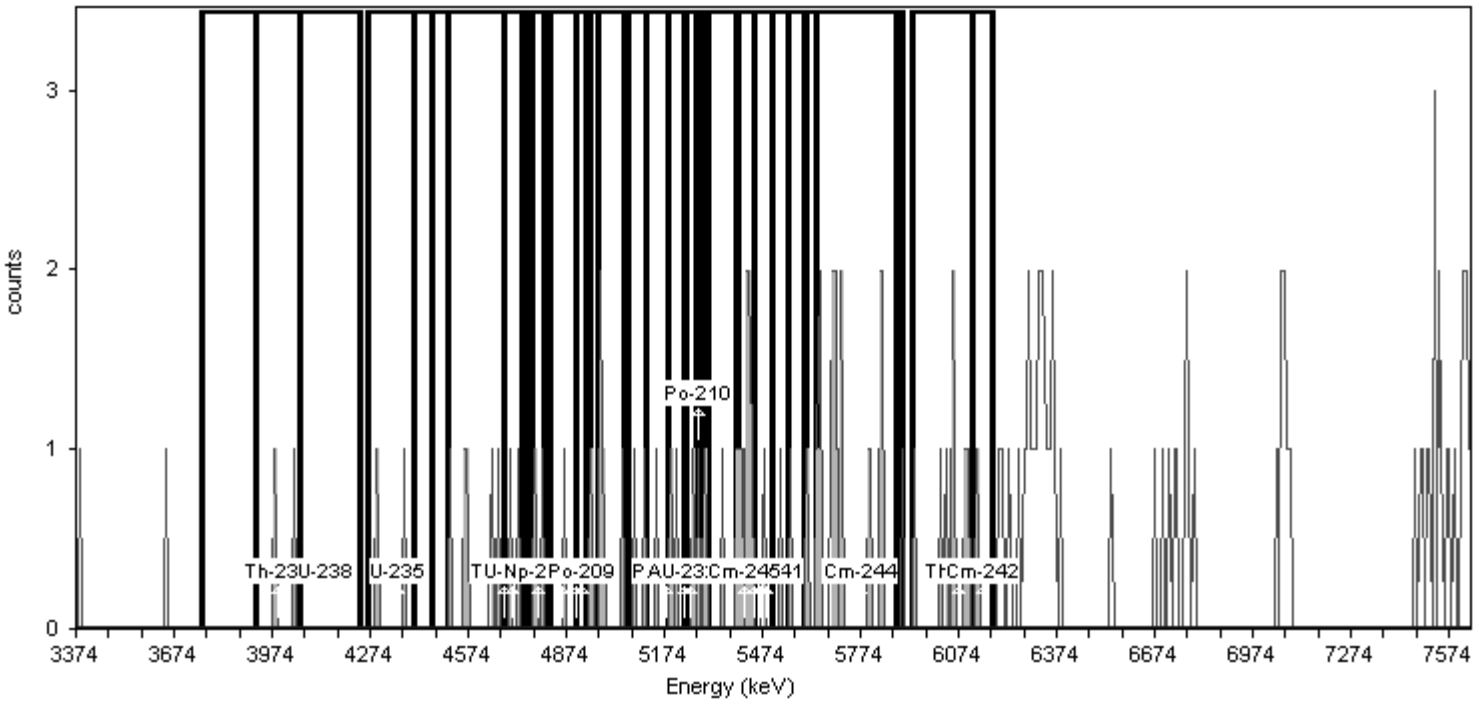
Acquisition

Detector: AV66 , SN: 48-158EE2
Acquisition Start Date: 6/19/2014 12:18:38AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-8875;AV66-20140504
Calibration Date: 5/4/2014 8:44:10PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.93% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 131.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	2.00	2.083E-003	1.804E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	7.00	7.292E-003	2.946E-003
U-234	4.71	4.51	4.82	9.00	9.375E-003	3.294E-003
Pu-242	4.90	4.68	4.95	6.00	6.250E-003	2.756E-003
Th-229	4.86	4.74	5.12	10.00	1.042E-002	3.455E-003
Np-237	4.78	4.77	4.81	2.00	2.083E-003	1.804E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	9.00	9.375E-003	3.294E-003
Am-243	5.23	5.05	5.31	8.00	8.333E-003	3.125E-003
U-232	5.25	5.06	5.40	11.00	1.146E-002	3.608E-003
Th-228	5.45	5.19	5.51	15.00	1.563E-002	4.167E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	13.00	1.354E-002	3.898E-003
Am-241	5.48	5.30	5.60	13.00	1.354E-002	3.898E-003
Cm-245	5.42	5.40	5.45	8.00	8.333E-003	3.125E-003
Pu-236	5.76	5.61	5.89	18.00	1.875E-002	4.541E-003
Cm-244	5.78	5.64	5.90	18.00	1.875E-002	4.541E-003
Th-227	6.07	5.93	6.18	8.00	8.333E-003	3.125E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:35:18PM 6/19/2014

Sample

Sample Name: ICB;AV67
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

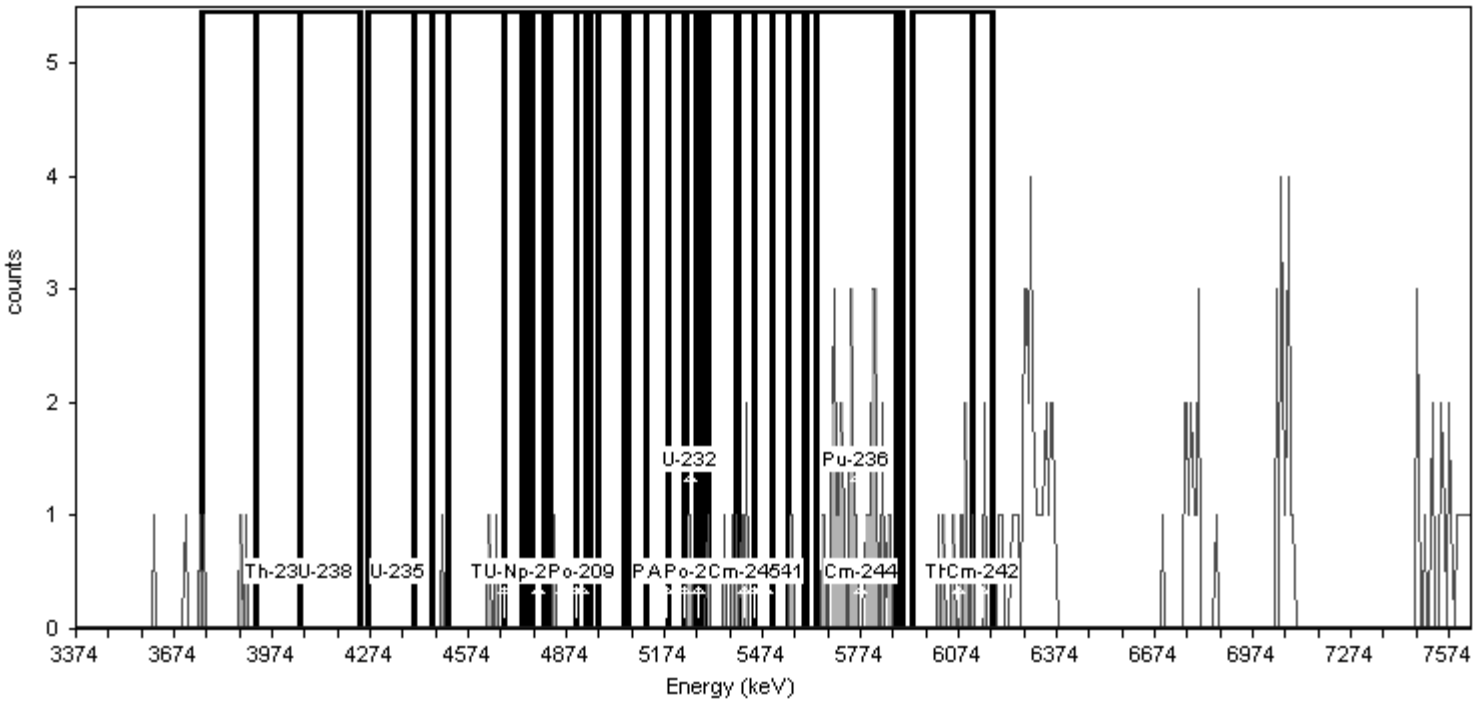
Acquisition

Detector: AV67 , SN: 52-102 D7
Acquisition Start Date: 6/19/2014 12:18:39AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-8876;AV67-20140504
Calibration Date: 5/4/2014 8:44:15PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.32% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 140.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	3.00	3.125E-003	2.083E-003
U-238	4.14	3.92	4.24	0.00	0.000E+000	1.473E-003
U-235	4.36	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.68	4.40	4.75	3.00	3.125E-003	2.083E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	0.00	0.000E+000	1.473E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	6.00	6.250E-003	2.756E-003
Th-228	5.45	5.19	5.51	9.00	9.375E-003	3.294E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	7.00	7.292E-003	2.946E-003
Am-241	5.48	5.30	5.60	9.00	9.375E-003	3.294E-003
Cm-245	5.42	5.40	5.45	4.00	4.167E-003	2.329E-003
Pu-236	5.76	5.61	5.89	30.00	3.125E-002	5.800E-003
Cm-244	5.78	5.64	5.90	30.00	3.125E-002	5.800E-003
Th-227	6.07	5.93	6.18	9.00	9.375E-003	3.294E-003
Cm-242	6.15	6.12	6.18	3.00	3.125E-003	2.083E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:35:30PM 6/19/2014

Sample

Sample Name: ICB;AV69
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

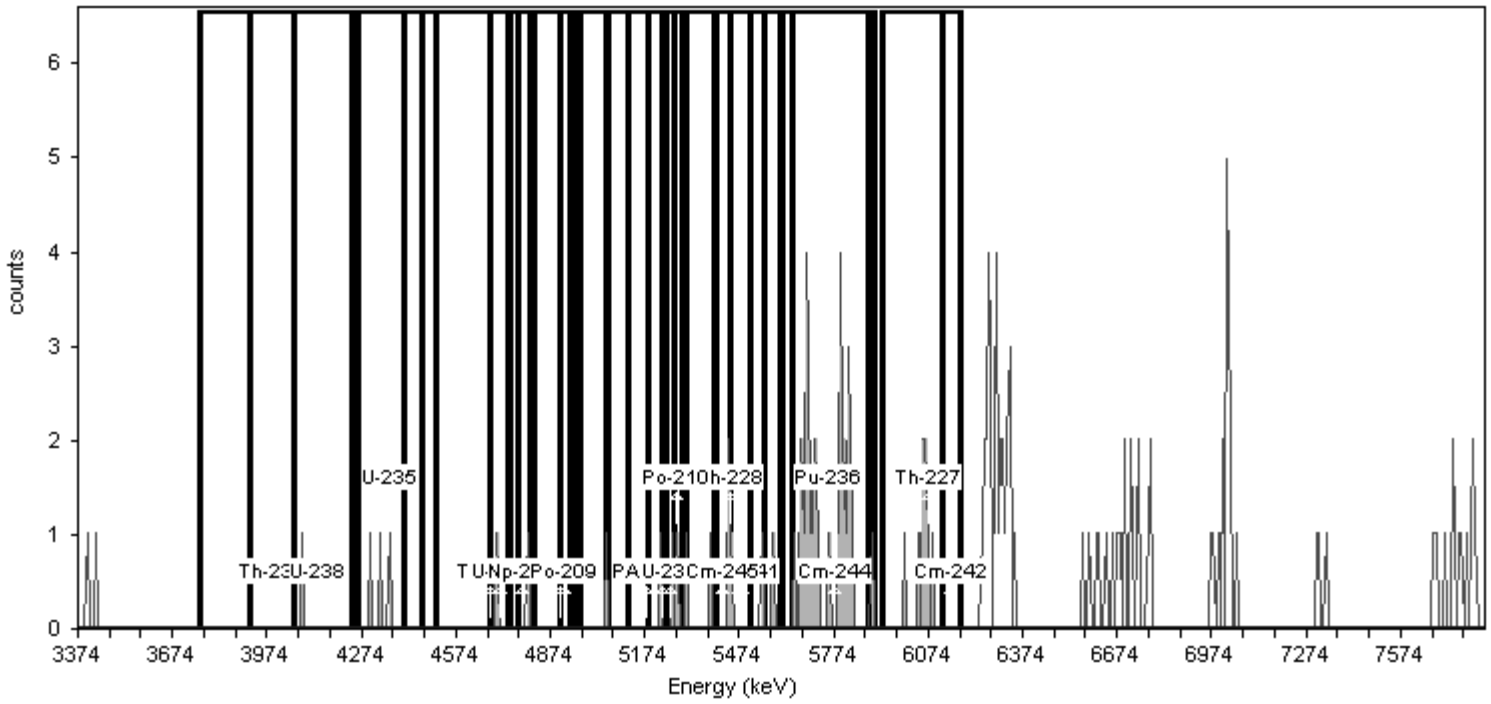
Analyst: 60040

Acquisition

Detector: AV69 , SN: 49-155DD5
Acquisition Start Date: 6/19/2014 12:18:42AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-9520;AV69-20140504
Calibration Date: 5/4/2014 8:44:28PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.57% +/- 0.36% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 134.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.68	4.40	4.75	1.00	1.042E-003	1.473E-003
U-234	4.71	4.51	4.82	2.00	2.083E-003	1.804E-003
Pu-242	4.90	4.68	4.95	2.00	2.083E-003	1.804E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	5.00	5.208E-003	2.552E-003
U-232	5.25	5.06	5.40	5.00	5.208E-003	2.552E-003
Th-228	5.45	5.19	5.51	8.00	8.333E-003	3.125E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	7.00	7.292E-003	2.946E-003
Am-241	5.48	5.30	5.60	7.00	7.292E-003	2.946E-003
Cm-245	5.42	5.40	5.45	3.00	3.125E-003	2.083E-003
Pu-236	5.76	5.61	5.89	31.00	3.229E-002	5.893E-003
Cm-244	5.78	5.64	5.90	32.00	3.333E-002	5.984E-003
Th-227	6.07	5.93	6.18	8.00	8.333E-003	3.125E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:35:35PM 6/19/2014

Sample

Sample Name: ICB;AV70
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

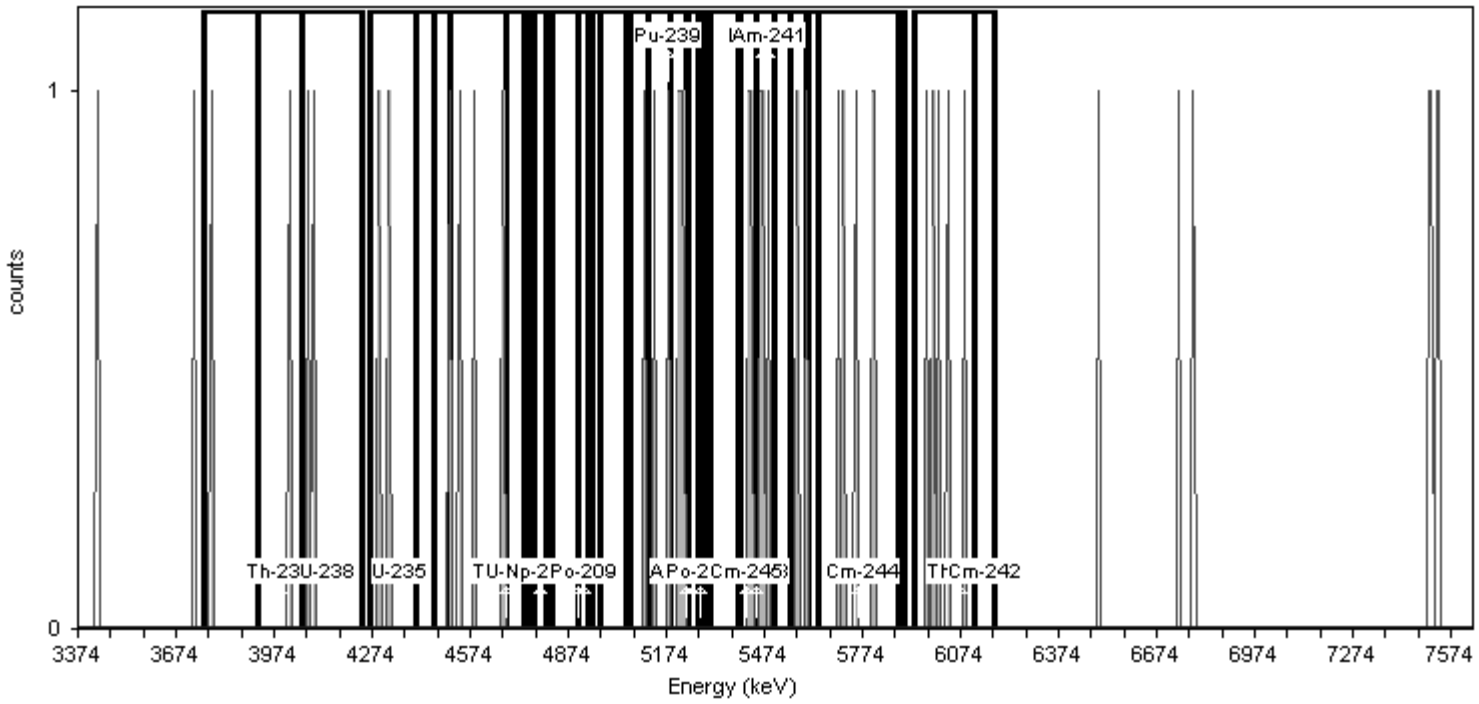
Analyst: 60040

Acquisition

Detector: AV70 , SN: 48-158FF1
Acquisition Start Date: 6/19/2014 12:18:44AM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: IC-8876;AV70-20140507
Calibration Date: 5/7/2014 10:49:02PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.52% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 42.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	4.00	4.167E-003	2.329E-003
U-234	4.71	4.51	4.82	4.00	4.167E-003	2.329E-003
Pu-242	4.90	4.68	4.95	0.00	0.000E+000	1.473E-003
Th-229	4.86	4.74	5.12	1.00	1.042E-003	1.473E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	6.00	6.250E-003	2.756E-003
Am-243	5.23	5.05	5.31	6.00	6.250E-003	2.756E-003
U-232	5.25	5.06	5.40	6.00	6.250E-003	2.756E-003
Th-228	5.45	5.19	5.51	8.00	8.333E-003	3.125E-003
Po-210	5.28	5.23	5.29	0.00	0.000E+000	1.473E-003
Pu-238	5.47	5.27	5.55	5.00	5.208E-003	2.552E-003
Am-241	5.48	5.30	5.60	7.00	7.292E-003	2.946E-003
Cm-245	5.42	5.40	5.45	2.00	2.083E-003	1.804E-003
Pu-236	5.76	5.61	5.89	5.00	5.208E-003	2.552E-003
Cm-244	5.78	5.64	5.90	5.00	5.208E-003	2.552E-003
Th-227	6.07	5.93	6.18	5.00	5.208E-003	2.552E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

Run Logs

Alpha Spectroscopy Run Log

Detector: AV46

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 19:30	140	IC 160-120409/1		120409			PS
05/08/14 00:18	60	ICV 160-121079/1		121079			PS
06/19/14 00:17	960	ICB 160-127918/1		127918			PS
06/22/14 21:17	60	CCV 160-127986/1		127986			PS
07/02/14 15:55	1	PULSER 160-129499/2		129499			MLK
07/02/14 18:11	180	MB 160-128417/1-A		129499	128417	A-01-R	MLK
07/02/14 18:22	240	ZZZZZ		129499			

Detector: AV49

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:03	140	IC 160-120271/1		120271			PS
05/08/14 14:34	60	ICV 160-121364/1		121364			PS
06/19/14 00:17	960	ICB 160-127921/1		127921			PS
06/22/14 18:52	60	CCV 160-127989/1		127989			PS
07/02/14 15:55	1	PULSER 160-129502/2		129502			MLK
07/02/14 18:11	180	LCS 160-128417/2-A		129502	128417	A-01-R	MLK

Detector: AV53

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:04	140	IC 160-120275/1		120275			PS
05/08/14 00:18	60	ICV 160-121082/1		121082			PS
06/19/14 00:17	960	ICB 160-127925/1		127925			PS
06/22/14 18:53	60	CCV 160-127992/1		127992			PS
07/02/14 15:54	1	PULSER 160-129505/2		129505			MLK
07/02/14 18:11	180	680-102431-1	SD-229-SS	129505	128417	A-01-R	MLK

Detector: AV54

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:04	140	IC 160-120276/1		120276			PS
05/08/14 14:34	60	ICV 160-121368/1		121368			PS
06/19/14 00:18	960	ICB 160-127926/1		127926			PS
06/22/14 18:53	60	CCV 160-127993/1		127993			PS
07/02/14 15:54	1	PULSER 160-129506/2		129506			MLK
07/02/14 18:11	180	680-102431-2	SD-229-01	129506	128417	A-01-R	MLK

Detector: AV55

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/07/14 19:51	140	IC 160-120842/1		120842			PS
05/08/14 00:19	60	ICV 160-121083/1		121083			PS
06/19/14 00:18	960	ICB 160-127927/1		127927			PS
06/22/14 20:08	60	CCV 160-127994/1		127994			PS
07/02/14 15:54	1	PULSER 160-129507/2		129507			MLK
07/02/14 18:11	180	680-102431-3	SD-230-SS	129507	128417	A-01-R	MLK

Detector: AV56

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:04	140	IC 160-120278/1		120278			PS

Alpha Spectroscopy Run Log

Detector: AV56 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/08/14 17:18	60	ICV 160-121369/1		121369			PS
06/19/14 00:18	960	ICB 160-127928/1		127928			PS
06/22/14 18:53	60	CCV 160-127995/1		127995			PS
07/02/14 15:54	1	PULSER 160-129508/2		129508			MLK
07/02/14 18:11	180	680-102431-4	SD-230-01	129508	128417	A-01-R	MLK

Detector: AV57

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:05	140	IC 160-120279/1		120279			PS
05/08/14 14:35	60	ICV 160-121370/1		121370			PS
06/19/14 00:18	960	ICB 160-127929/1		127929			PS
06/22/14 18:53	60	CCV 160-127996/1		127996			PS
07/02/14 15:54	1	PULSER 160-129509/2		129509			MLK
07/02/14 18:11	180	680-102431-5	SD-230-02	129509	128417	A-01-R	MLK

Detector: AV58

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:05	140	IC 160-120280/1		120280			PS
05/08/14 14:35	60	ICV 160-121371/1		121371			PS
06/19/14 00:18	960	ICB 160-127930/1		127930			PS
06/22/14 18:53	60	CCV 160-127997/1		127997			PS
07/02/14 15:54	1	PULSER 160-129510/2		129510			MLK
07/02/14 18:11	180	680-102431-5 MS	SD-230-02 MS	129510	128417	A-01-R	MLK

Detector: AV60

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:06	140	IC 160-120282/1		120282			PS
05/08/14 17:21	60	ICV 160-121373/1		121373			PS
06/19/14 00:18	960	ICB 160-127933/1		127933			PS
06/22/14 21:17	60	CCV 160-127999/1		127999			PS
07/02/14 15:54	1	PULSER 160-129513/2		129513			MLK
07/02/14 18:11	180	680-102431-5 MSD	SD-230-02 MSD	129513	128417	A-01-R	MLK

Detector: AV61

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:06	140	IC 160-120283/1		120283			PS
05/08/14 14:36	60	ICV 160-121374/1		121374			PS
06/19/14 00:18	960	ICB 160-127934/1		127934			PS
06/22/14 22:21	60	CCV 160-128018/1		128018			PS
07/02/14 15:55	1	PULSER 160-129514/2		129514			MLK
07/02/14 18:11	180	680-102431-7	SD-231-SS	129514	128417	A-01-R	MLK

Detector: AV62

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:06	140	IC 160-120284/1		120284			PS
05/08/14 14:36	60	ICV 160-121375/1		121375			PS
06/19/14 00:18	960	ICB 160-127935/1		127935			PS

Alpha Spectroscopy Run Log

Detector: AV62 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
06/22/14 20:09	60	CCV 160-128000/1		128000			PS
07/02/14 15:55	1	PULSER 160-133832/2		133832			MLK
07/02/14 18:11	180	680-102431-8	SD-231-01	133832	128417	A-01-R	MLK

Detector: AV63

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 21:06	140	IC 160-120285/1		120285			PS
05/08/14 14:36	60	ICV 160-121376/1		121376			PS
06/19/14 00:18	960	ICB 160-127936/1		127936			PS
06/22/14 21:18	60	CCV 160-128001/1		128001			PS
07/02/14 15:55	1	PULSER 160-129516/2		129516			MLK
07/02/14 18:11	180	680-102431-9	SD-231-02	129516	128417	A-01-R	MLK

Detector: AV64

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 17:47	140	IC 160-120041/1		120041			PS
05/11/14 19:31	60	ICV 160-121389/1		121389			PS
06/19/14 00:18	960	ICB 160-127937/1		127937			PS
06/22/14 21:18	60	CCV 160-128002/1		128002			PS
07/02/14 15:55	1	PULSER 160-129517/2		129517			MLK
07/02/14 18:11	180	680-102431-11	SD-232-SS	129517	128417	A-01-R	MLK

Detector: AV65

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 17:47	140	IC 160-120042/1		120042			PS
05/08/14 17:18	60	ICV 160-121377/1		121377			PS
06/19/14 00:18	960	ICB 160-127938/1		127938			
06/19/14 19:57	960	ICB 160-127938/2		127938			PS
06/22/14 20:09	60	CCV 160-128003/1		128003			PS
07/02/14 15:55	1	PULSER 160-129518/2		129518			MLK
07/02/14 18:11	180	680-102431-12	SD-232-01	129518	128417	A-01-R	MLK

Detector: AV66

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 17:47	140	IC 160-120043/1		120043			PS
05/11/14 19:32	60	ICV 160-121390/1		121390			PS
06/19/14 00:18	960	ICB 160-127939/1		127939			PS
06/22/14 21:18	60	CCV 160-128004/1		128004			PS
07/02/14 15:55	1	PULSER 160-129519/2		129519			MLK
07/02/14 18:11	180	680-102431-13	SD-232-02	129519	128417	A-01-R	MLK

Detector: AV67

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 17:48	140	IC 160-120044/1		120044			PS
05/11/14 19:32	60	ICV 160-121391/1		121391			PS
06/19/14 00:18	960	ICB 160-127940/1		127940			PS
06/22/14 18:54	60	CCV 160-128005/1		128005			PS

Alpha Spectroscopy Run Log

Detector: AV67 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
07/02/14 15:55	1	PULSER 160-129520/2		129520			MLK
07/02/14 18:11	180	680-102431-15	SD-233-SS	129520	128417	A-01-R	MLK

Detector: AV69

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/04/14 17:48	140	IC 160-120046/1		120046			PS
05/08/14 17:19	60	ICV 160-121379/1		121379			PS
06/19/14 00:18	960	ICB 160-127942/1		127942			PS
06/22/14 20:09	60	CCV 160-128007/1		128007			PS
07/02/14 15:55	1	PULSER 160-129522/2		129522			MLK
07/02/14 18:11	180	680-102431-16	SD-233-01	129522	128417	A-01-R	MLK

Detector: AV70

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/07/14 19:51	140	IC 160-120844/1		120844			PS
05/08/14 14:36	60	ICV 160-121380/1		121380			PS
06/19/14 00:18	960	ICB 160-127944/1		127944			PS
06/22/14 20:10	60	CCV 160-128008/1		128008			PS
07/02/14 15:55	1	PULSER 160-129524/2		129524			MLK
07/02/14 18:12	180	680-102431-17	SD-233-02	129524	128417	A-01-R	MLK

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.28
Client Contact: Mike Martin	Phone: (703) 342-8589	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~28 of 28~~ 1 of 2
Company: Tetra Tech, Inc.			Analysis Requested	Job #: 680-102431-1
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes:
City: Germantown	TAT Requested (days): Standard			A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; G - Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA; M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2SO3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - ph 4-5; Z - other (specify)
State, Zip: MD, 20874	PO #: Purchase Order not required			
Phone:	WO #:			Other:
Email: Michael.Martin@tetratech.com	Project #: 68012942			
Project Name: Sediments	SSOW#:			
Site:				

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	8020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-229-SS	6/16/14	1205	C	Solid				X				
SD-229-01		1210	C	Solid				X				
SD-230-SS		1340	C	Solid				X				
SD-230-01		1345	C	Solid				X				
SD-230-01		1350	C	Solid				X				MS/MSD
SD-230-03		1355	C	Solid				X				
SD-231-SS		1410	C	Solid				X				
SD-231-01		1415	C	Solid				X				
SD-231-02		1420	C	Solid				X				
SD-231-03		1425	C	Solid				X				
SD-232-SS		1520	C	Solid				X				

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6-16-14 / 1600	TT		6/16/14 1600	TA
2		6/16/14 1700	TA		6.17.14 0820	TA
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

RA 1

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.30
Client Contact: Mike Martin	Phone: (703) 342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page ~~30 of 45~~ 2 of 2
Company: Tetra Tech, Inc.		Analysis Requested		Job #: 680-102431-1
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes:
City: Germantown	TAT Requested (days): Standard			A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; G - Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA; M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2SO3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - pH 4-5; Z - other (specify)
State, Zip: MD, 20874	PO #: Purchase Order not required			Other:
Phone:	WO #:			
Email: Michael.Martin@tetratech.com	Project #: 68012942			
Project Name: Sediments	SSOW#:			
Site:				

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-228/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-232-01	6/16/14	1525		Solid				X				
SD-232-02	"	1530		Solid				X				
SD-232-03	"	1535		Solid				X				
SD-233-55	"	1540		Solid				X				
SD-233-01	"	1545		Solid				X				
SD-233-02	"	1550		Solid				X				
SD-233-03	↓	1555		Solid				X				
				Solid								
				Solid								
				Solid								
				Solid								

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6-16-14 / 1600	TT		6/16/14 / 1616	TestAmerica
2		6/16/14 / 1910	TestAmerica		6-17-14 0920	TA STL
3		Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

Page 246 of 246

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 680-102431-3

SDG Number: 680-102431-1

Job Description: Sediments

For:
Tetra Tech, Inc.
20251 Century Blvd
Suite 200
Germantown, MD 20874

Attention: Mike Martin



Approved for release.
Jerry A Lanier
Project Manager I
9/5/2014 4:54 PM

Jerry A Lanier, Project Manager I
5102 LaRoche Avenue, Savannah, GA, 31404
(912)354-7858 e.3410
jerry.lanier@testamericainc.com
09/05/2014

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

Savannah Certifications and ID #s: A2LA: 0399.01; AL: 41450; ARDEQ: 88-0692; ARDOH; AZ: AZ0741; CA: 03217CA; CO; CT: PH0161; DE; FL: E87052; GA: 803; Guam; HI; IL: 200022; IN: C-GA-02; IA: 353; KS: E-10322; KY EPPC: 90084; KY UST; LA DEQ: 30690; LA DHH: LA080008; ME: 2008022; MD: 250; MA: M-GA006; MI: 9925; MS; NFESC: 249; NV: GA00006; NJ: GA769; NM; NY: 10842; NC DWQ: 269; NC DHHS: 13701; PA: 68-00474; PR: GA00006; RI: LAO00244; SC: 98001001; TN: TN0296; TX: T104704185; USEPA: GA00006; VT: VT-87052; VA: 00302; WA; WV DEP: 094; WV DHHR: 9950 C; WI DNR: 999819810; WY/EPAR8: 8TMS-Q

Table of Contents

Cover Title Page 1

Data Summaries 4

Definitions 4

Case Narrative 5

Detection Summary 7

Client Sample Results 9

Default Detection Limits 18

QC Sample Results 19

QC Association 22

Chronicle 24

Certification Summary 28

Method Summary 30

Sample Summary 31

Reagent Traceability 32

COAs 40

Inorganic Sample Data 64

Metals Data 64

Met Cover Page 65

Met Sample Data 66

Met QC Data 80

Met ICV/CCV 80

Met CRQL 86

Met Blanks 87

Met ICSA/ICSAB 90

Met MS/MSD/PDS 91

Met LCS/LCSD 95

Table of Contents

Met Serial Dilution 96

Met MDL 97

Met Linear Ranges 100

Met Preparation Log 101

Met Analysis Run Log 102

Met ICP/MS Int Stds 106

Met Raw Data 107

Met Prep Data 199

Subcontracted Data 201

Shipping and Receiving Documents 202

Client Chain of Custody 203

Sample Receipt Checklist 205

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
F2	MS/MSD RPD exceeds control limits
F1	MS and/or MSD Recovery exceeds the control limits
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.
F	MS/MSD Recovery and/or RPD exceeds the control limits
F1	MS and/or MSD Recovery exceeds the control limits

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Sediments

Report Number: 680-102431-3

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 06/17/2014; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 2.6 C.

TOTAL URANIUM

Samples SD-229-SS (680-102431-1), SD-229-01 (680-102431-2), SD-230-SS (680-102431-3), SD-230-01 (680-102431-4), SD-230-02 (680-102431-5), SD-231-SS (680-102431-7), SD-231-01 (680-102431-8), SD-231-02 (680-102431-9), SD-232-SS (680-102431-11), SD-232-01 (680-102431-12), SD-232-02 (680-102431-13), SD-233-SS (680-102431-15), SD-233-01 (680-102431-16) and SD-233-02 (680-102431-17) were analyzed for Total Uranium in accordance with EPA SW-846 6020A. The samples were analyzed on 09/04/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM

Samples SD-229-SS (680-102431-1), SD-229-01 (680-102431-2), SD-230-SS (680-102431-3), SD-230-01 (680-102431-4), SD-230-02 (680-102431-5), SD-231-SS (680-102431-7), SD-231-01 (680-102431-8), SD-231-02 (680-102431-9), SD-232-SS (680-102431-11), SD-232-01 (680-102431-12), SD-232-02 (680-102431-13), SD-233-SS (680-102431-15), SD-233-01 (680-102431-16) and SD-233-02 (680-102431-17) were analyzed for Isotopic Uranium in accordance with EPA SW-846 6020A. The samples were prepared on 08/21/2014 and analyzed on 09/02/2014 and 09/03/2014.

The instrument blank (ICB) contained uranium 233 greater than the reporting limit (RL). All associated samples were non-detect, showing there was no high bias. The data have been qualified and reported. (ICB 160-141597/10)

U-238 exceeded the recovery criteria low for the MSD of sample SD-230-02MSD (680-102431-5) in batch 160-141597. U-234, U-235 and U-238 exceeded the RPD limit.

Refer to the QC report for details.

The presence of the '4' qualifier indicates analytes where the concentration in the unspiked sample exceeded four times the spiking amount.

Samples SD-229-SS (680-102431-1)[5X], SD-229-01 (680-102431-2)[5X], SD-230-SS (680-102431-3)[5X], SD-230-01 (680-102431-4)[5X], SD-230-02 (680-102431-5)[5X], SD-231-SS (680-102431-7)[5X], SD-231-01 (680-102431-8)[5X], SD-231-02 (680-102431-9)[5X], SD-232-SS (680-102431-11)[5X], SD-232-01 (680-102431-12)[5X], SD-232-02 (680-102431-13)[5X], SD-233-SS (680-102431-15)[5X], SD-233-01 (680-102431-16)[5X] and SD-233-02 (680-102431-17)[5X] required dilution prior to analysis. Samples were high in salts. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM PERCENTAGE

Samples SD-229-SS (680-102431-1), SD-229-01 (680-102431-2), SD-230-SS (680-102431-3), SD-230-01 (680-102431-4), SD-230-02 (680-102431-5), SD-231-SS (680-102431-7), SD-231-01 (680-102431-8), SD-231-02 (680-102431-9), SD-232-SS (680-102431-11), SD-232-01 (680-102431-12), SD-232-02 (680-102431-13), SD-233-SS (680-102431-15), SD-233-01 (680-102431-16) and SD-233-02 (680-102431-17) were analyzed for Isotopic Uranium Percentage in accordance with EPA SW-846 6020A. The samples were analyzed on 09/04/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM ACTIVITY

Samples SD-229-SS (680-102431-1), SD-229-01 (680-102431-2), SD-230-SS (680-102431-3), SD-230-01 (680-102431-4), SD-230-02 (680-102431-5), SD-231-SS (680-102431-7), SD-231-01 (680-102431-8), SD-231-02 (680-102431-9), SD-232-SS (680-102431-11),

SD-232-01 (680-102431-12), SD-232-02 (680-102431-13), SD-233-SS (680-102431-15), SD-233-01 (680-102431-16) and SD-233-02 (680-102431-17) were analyzed for Isotopic Uranium Activity in accordance with EPA SW-846 6020A. The samples were prepared on 08/21/2014 and analyzed on 09/02/2014 and 09/03/2014.

U-238 exceeded the recovery criteria low for the MSD of sample SD-230-02MSD (680-102431-5) in batch 160-141598.

The Relative Error Ratio (RER) and Duplicate Error Ratio (DER) were outside control limits for uranium 234, 235 and 238. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample was within acceptance limits. (680-102431-5 MS), (680-102431-5 MSD), SD-230-02 (680-102431-5 MS), SD-230-02 (680-102431-5 MSD)

Refer to the QC report for details.

Samples SD-229-SS (680-102431-1)[5X], SD-229-01 (680-102431-2)[5X], SD-230-SS (680-102431-3)[5X], SD-230-01 (680-102431-4)[5X], SD-230-02 (680-102431-5)[5X], SD-231-SS (680-102431-7)[5X], SD-231-01 (680-102431-8)[5X], SD-231-02 (680-102431-9)[5X], SD-232-SS (680-102431-11)[5X], SD-232-01 (680-102431-12)[5X], SD-232-02 (680-102431-13)[5X], SD-233-SS (680-102431-15)[5X], SD-233-01 (680-102431-16)[5X] and SD-233-02 (680-102431-17)[5X] required dilution prior to analysis. Samples were high in salts. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102431-3
SDG: 680-102431-1

Client Sample ID: SD-229-SS — Lab Sample ID: 680-102431-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.0050	J	0.011	0.0043	mg/Kg	5		6020A	Total/NA
U-238	0.71		0.011	0.00063	mg/Kg	5		6020A	Total/NA
Total Uranium	0.72		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-229-01 — Lab Sample ID: 680-102431-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.0063	J	0.012	0.0047	mg/Kg	5		6020A	Total/NA
U-238	0.88		0.012	0.00069	mg/Kg	5		6020A	Total/NA
Total Uranium	0.89		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-230-SS — Lab Sample ID: 680-102431-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.0054	J	0.012	0.0049	mg/Kg	5		6020A	Total/NA
U-238	0.76		0.012	0.00072	mg/Kg	5		6020A	Total/NA
Total Uranium	0.77		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-230-01 — Lab Sample ID: 680-102431-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.0053	J	0.012	0.0050	mg/Kg	5		6020A	Total/NA
U-238	0.73		0.012	0.00074	mg/Kg	5		6020A	Total/NA
Total Uranium	0.74		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-230-02 — Lab Sample ID: 680-102431-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.0074	J	0.012	0.0050	mg/Kg	5		6020A	Total/NA
U-238	1.0		0.012	0.00074	mg/Kg	5		6020A	Total/NA
Total Uranium	1.0		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-231-SS — Lab Sample ID: 680-102431-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.011		0.011	0.0046	mg/Kg	5		6020A	Total/NA
U-238	1.5		0.011	0.00068	mg/Kg	5		6020A	Total/NA
Total Uranium	1.5		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-231-01 — Lab Sample ID: 680-102431-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.014		0.011	0.0044	mg/Kg	5		6020A	Total/NA
U-238	1.8		0.011	0.00065	mg/Kg	5		6020A	Total/NA
Total Uranium	1.8		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-231-02 — Lab Sample ID: 680-102431-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.013		0.012	0.0049	mg/Kg	5		6020A	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: SD-231-02 (Continued) — Lab Sample ID: 680-102431-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-238	1.6		0.012	0.00073	mg/Kg	5		6020A	Total/NA
Total Uranium	1.6		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-232-SS — Lab Sample ID: 680-102431-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.014		0.011	0.0046	mg/Kg	5		6020A	Total/NA
U-238	1.9		0.011	0.00067	mg/Kg	5		6020A	Total/NA
Total Uranium	1.9		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-232-01 — Lab Sample ID: 680-102431-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.015		0.012	0.0048	mg/Kg	5		6020A	Total/NA
U-238	2.1		0.012	0.00072	mg/Kg	5		6020A	Total/NA
Total Uranium	2.1		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-232-02 — Lab Sample ID: 680-102431-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.010	J	0.012	0.0050	mg/Kg	5		6020A	Total/NA
U-238	1.4		0.012	0.00073	mg/Kg	5		6020A	Total/NA
Total Uranium	1.4		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-233-SS — Lab Sample ID: 680-102431-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.015		0.011	0.0047	mg/Kg	5		6020A	Total/NA
U-238	2.0		0.011	0.00069	mg/Kg	5		6020A	Total/NA
Total Uranium	2.0		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-233-01 — Lab Sample ID: 680-102431-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.015		0.012	0.0048	mg/Kg	5		6020A	Total/NA
U-238	2.0		0.012	0.00071	mg/Kg	5		6020A	Total/NA
Total Uranium	2.0		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-233-02 — Lab Sample ID: 680-102431-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.013		0.011	0.0047	mg/Kg	5		6020A	Total/NA
U-238	1.6		0.011	0.00069	mg/Kg	5		6020A	Total/NA
Total Uranium	1.6		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: SD-229-SS

Lab Sample ID: 680-102431-1

Date Collected: 06/16/14 12:05

Matrix: Solid

Date Received: 06/17/14 09:20

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0032	mg/Kg		08/21/14 10:35	09/02/14 23:02	5
U-234	ND		0.011	0.00063	mg/Kg		08/21/14 10:35	09/02/14 23:02	5
U-235	**0.0050**	**J**	0.011	0.0043	mg/Kg		08/21/14 10:35	09/02/14 23:02	5
U-236	ND		0.011	0.00084	mg/Kg		08/21/14 10:35	09/02/14 23:02	5
U-238	**0.71**		0.011	0.00063	mg/Kg		08/21/14 10:35	09/02/14 23:02	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**0.72**		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-19.7	U	0.169	1.82	102	30.5	pCi/g	08/21/14 10:35	09/02/14 23:02	5
U-234	0.179	U F	0.254	0.254	65.7	3.94	pCi/g	08/21/14 10:35	09/02/14 23:02	5
U-235	**0.0107**	**F**	0.000763	0.00125	0.0228	0.00929	pCi/g	08/21/14 10:35	09/02/14 23:02	5
U-236	-0.00142	U	0.000417	0.000437	0.683	0.0547	pCi/g	08/21/14 10:35	09/02/14 23:02	5
U-238	**0.237**	**F**	0.00464	0.0223	0.00355	0.000213	pCi/g	08/21/14 10:35	09/02/14 23:02	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.699**						%		09/04/14 13:23	1

Client Sample ID: SD-229-01

Lab Sample ID: 680-102431-2

Date Collected: 06/16/14 12:10

Matrix: Solid

Date Received: 06/17/14 09:20

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0035	mg/Kg		08/21/14 10:35	09/02/14 23:16	5
U-234	ND		0.012	0.00069	mg/Kg		08/21/14 10:35	09/02/14 23:16	5
U-235	**0.0063**	**J**	0.012	0.0047	mg/Kg		08/21/14 10:35	09/02/14 23:16	5
U-236	ND		0.012	0.00093	mg/Kg		08/21/14 10:35	09/02/14 23:16	5
U-238	**0.88**		0.012	0.00069	mg/Kg		08/21/14 10:35	09/02/14 23:16	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**0.89**		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-21.7	U	0.225	2.01	112	33.5	pCi/g	08/21/14 10:35	09/02/14 23:16	5
U-234	0.435	U F	0.335	0.338	72.1	4.32	pCi/g	08/21/14 10:35	09/02/14 23:16	5
U-235	**0.0137**	**F**	0.00138	0.00187	0.0250	0.0102	pCi/g	08/21/14 10:35	09/02/14 23:16	5
U-236	-0.00123	U	0.00165	0.00166	0.749	0.0600	pCi/g	08/21/14 10:35	09/02/14 23:16	5
U-238	**0.296**	**F**	0.0198	0.0336	0.00389	0.000234	pCi/g	08/21/14 10:35	09/02/14 23:16	5

Client Sample ID: SD-229-01

Lab Sample ID: 680-102431-2

Date Collected: 06/16/14 12:10

Matrix: Solid

Date Received: 06/17/14 09:20

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.711						%		09/04/14 13:23	1

Client Sample ID: SD-230-SS

Lab Sample ID: 680-102431-3

Date Collected: 06/16/14 13:40

Matrix: Solid

Date Received: 06/17/14 09:20

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/21/14 10:35	09/02/14 23:21	5
U-234	ND		0.012	0.00072	mg/Kg		08/21/14 10:35	09/02/14 23:21	5
U-235	0.0054	J	0.012	0.0049	mg/Kg		08/21/14 10:35	09/02/14 23:21	5
U-236	ND		0.012	0.00096	mg/Kg		08/21/14 10:35	09/02/14 23:21	5
U-238	0.76		0.012	0.00072	mg/Kg		08/21/14 10:35	09/02/14 23:21	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.77		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-22.8	U	0.597	2.18	116	34.8	pCi/g	08/21/14 10:35	09/02/14 23:21	5
U-234	0.261	U F	0.372	0.373	75.0	4.50	pCi/g	08/21/14 10:35	09/02/14 23:21	5
U-235	0.0116	F	0.000167	0.00108	0.0260	0.0106	pCi/g	08/21/14 10:35	09/02/14 23:21	5
U-236	-0.00125	U	0.000514	0.000526	0.779	0.0624	pCi/g	08/21/14 10:35	09/02/14 23:21	5
U-238	0.255	F	0.00735	0.0246	0.00405	0.000243	pCi/g	08/21/14 10:35	09/02/14 23:21	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.706						%		09/04/14 13:23	1

Client Sample ID: SD-230-01

Lab Sample ID: 680-102431-4

Date Collected: 06/16/14 13:45

Matrix: Solid

Date Received: 06/17/14 09:20

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0037	mg/Kg		08/21/14 10:35	09/02/14 23:26	5
U-234	ND		0.012	0.00074	mg/Kg		08/21/14 10:35	09/02/14 23:26	5
U-235	0.0053	J	0.012	0.0050	mg/Kg		08/21/14 10:35	09/02/14 23:26	5
U-236	ND		0.012	0.00099	mg/Kg		08/21/14 10:35	09/02/14 23:26	5
U-238	0.73		0.012	0.00074	mg/Kg		08/21/14 10:35	09/02/14 23:26	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	0.74		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Client Sample ID: SD-230-01

Date Collected: 06/16/14 13:45
Date Received: 06/17/14 09:20

Lab Sample ID: 680-102431-4

Matrix: Solid

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-23.3	U	0.237	2.16	119	35.8	pCi/g	08/21/14 10:35	09/02/14 23:26	5
U-234	0.370	U F	0.110	0.116	77.1	4.63	pCi/g	08/21/14 10:35	09/02/14 23:26	5
U-235	**0.0114**	**F**	0.000773	0.00130	0.0268	0.0109	pCi/g	08/21/14 10:35	09/02/14 23:26	5
U-236	-0.000705	U	0.00253	0.00253	0.801	0.0642	pCi/g	08/21/14 10:35	09/02/14 23:26	5
U-238	**0.246**	**F**	0.00340	0.0229	0.00416	0.000250	pCi/g	08/21/14 10:35	09/02/14 23:26	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.721**						%		09/04/14 13:23	1

Client Sample ID: SD-230-02

Date Collected: 06/16/14 13:50
Date Received: 06/17/14 09:20

Lab Sample ID: 680-102431-5

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0037	mg/Kg		08/21/14 10:35	09/02/14 23:30	5
U-234	ND		0.012	0.00074	mg/Kg		08/21/14 10:35	09/02/14 23:30	5
U-235	**0.0074**	**J**	0.012	0.0050	mg/Kg		08/21/14 10:35	09/02/14 23:30	5
U-236	ND		0.012	0.00098	mg/Kg		08/21/14 10:35	09/02/14 23:30	5
U-238	**1.0**		0.012	0.00074	mg/Kg		08/21/14 10:35	09/02/14 23:30	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**1.0**		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-23.3	U	0.282	2.16	118	35.5	pCi/g	08/21/14 10:35	09/02/14 23:30	5
U-234	0.473	U F	0.253	0.256	76.3	4.58	pCi/g	08/21/14 10:35	09/02/14 23:30	5
U-235	**0.0160**	**F**	0.000628	0.00160	0.0265	0.0108	pCi/g	08/21/14 10:35	09/02/14 23:30	5
U-236	-0.00165	U	0.00195	0.00195	0.793	0.0636	pCi/g	08/21/14 10:35	09/02/14 23:30	5
U-238	**0.336**	**F**	0.0190	0.0362	0.00412	0.000248	pCi/g	08/21/14 10:35	09/02/14 23:30	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.735**						%		09/04/14 13:23	1

Client Sample ID: SD-231-SS

Date Collected: 06/16/14 14:10
Date Received: 06/17/14 09:20

Lab Sample ID: 680-102431-7

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0034	mg/Kg		08/21/14 10:35	09/02/14 23:49	5
U-234	ND		0.011	0.00068	mg/Kg		08/21/14 10:35	09/02/14 23:49	5
U-235	**0.011**		0.011	0.0046	mg/Kg		08/21/14 10:35	09/02/14 23:49	5
U-236	ND		0.011	0.00091	mg/Kg		08/21/14 10:35	09/02/14 23:49	5
U-238	**1.5**		0.011	0.00068	mg/Kg		08/21/14 10:35	09/02/14 23:49	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**1.5**		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-21.5	U	0.110	1.98	110	33.0	pCi/g	08/21/14 10:35	09/02/14 23:49	5
U-234	0.690	U F	0.260	0.268	71.0	4.26	pCi/g	08/21/14 10:35	09/02/14 23:49	5
U-235	**0.0238**	**F**	0.00232	0.00319	0.0247	0.0100	pCi/g	08/21/14 10:35	09/02/14 23:49	5
U-236	-0.000767	U	0.00181	0.00181	0.738	0.0591	pCi/g	08/21/14 10:35	09/02/14 23:49	5
U-238	**0.512**	**F**	0.0257	0.0536	0.00384	0.000231	pCi/g	08/21/14 10:35	09/02/14 23:49	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.728**						%		09/04/14 13:23	1

Client Sample ID: SD-231-01

Date Collected: 06/16/14 14:15
Date Received: 06/17/14 09:20

Lab Sample ID: 680-102431-8

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0033	mg/Kg		08/21/14 10:35	09/02/14 23:54	5
U-234	ND		0.011	0.00065	mg/Kg		08/21/14 10:35	09/02/14 23:54	5
U-235	**0.014**		0.011	0.0044	mg/Kg		08/21/14 10:35	09/02/14 23:54	5
U-236	ND		0.011	0.00087	mg/Kg		08/21/14 10:35	09/02/14 23:54	5
U-238	**1.8**		0.011	0.00065	mg/Kg		08/21/14 10:35	09/02/14 23:54	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**1.8**		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-20.4	U	0.509	1.95	105	31.5	pCi/g	08/21/14 10:35	09/02/14 23:54	5
U-234	0.702	U	0.221	0.230	67.7	4.06	pCi/g	08/21/14 10:35	09/02/14 23:54	5
U-235	**0.0296**		0.00138	0.00306	0.0235	0.00958	pCi/g	08/21/14 10:35	09/02/14 23:54	5
U-236	-0.00121	U	0.00215	0.00215	0.704	0.0564	pCi/g	08/21/14 10:35	09/02/14 23:54	5
U-238	**0.595**		0.00768	0.0552	0.00366	0.000220	pCi/g	08/21/14 10:35	09/02/14 23:54	5

Client Sample ID: SD-231-01

Lab Sample ID: 680-102431-8

Date Collected: 06/16/14 14:15

Matrix: Solid

Date Received: 06/17/14 09:20

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.772						%		09/04/14 13:23	1

Client Sample ID: SD-231-02

Lab Sample ID: 680-102431-9

Date Collected: 06/16/14 14:20

Matrix: Solid

Date Received: 06/17/14 09:20

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/21/14 10:35	09/03/14 00:17	5
U-234	ND		0.012	0.00073	mg/Kg		08/21/14 10:35	09/03/14 00:17	5
U-235	0.013		0.012	0.0049	mg/Kg		08/21/14 10:35	09/03/14 00:17	5
U-236	ND		0.012	0.00097	mg/Kg		08/21/14 10:35	09/03/14 00:17	5
U-238	1.6		0.012	0.00073	mg/Kg		08/21/14 10:35	09/03/14 00:17	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.6		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-22.7	U	0.494	2.15	117	35.0	pCi/g	08/21/14 10:35	09/03/14 00:17	5
U-234	0.878	U	0.130	0.153	75.4	4.52	pCi/g	08/21/14 10:35	09/03/14 00:17	5
U-235	0.0284		0.00117	0.00286	0.0262	0.0107	pCi/g	08/21/14 10:35	09/03/14 00:17	5
U-236	-0.000658	U	0.00210	0.00210	0.784	0.0628	pCi/g	08/21/14 10:35	09/03/14 00:17	5
U-238	0.550		0.0107	0.0517	0.00407	0.000245	pCi/g	08/21/14 10:35	09/03/14 00:17	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.806						%		09/04/14 13:23	1

Client Sample ID: SD-232-SS

Lab Sample ID: 680-102431-11

Date Collected: 06/16/14 15:20

Matrix: Solid

Date Received: 06/17/14 09:20

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0034	mg/Kg		08/21/14 10:35	09/03/14 00:22	5
U-234	ND		0.011	0.00067	mg/Kg		08/21/14 10:35	09/03/14 00:22	5
U-235	0.014		0.011	0.0046	mg/Kg		08/21/14 10:35	09/03/14 00:22	5
U-236	ND		0.011	0.00090	mg/Kg		08/21/14 10:35	09/03/14 00:22	5
U-238	1.9		0.011	0.00067	mg/Kg		08/21/14 10:35	09/03/14 00:22	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.9		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Client Sample ID: SD-232-SS

Date Collected: 06/16/14 15:20
Date Received: 06/17/14 09:20

Lab Sample ID: 680-102431-11

Matrix: Solid

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-21.2	U	0.451	2.00	108	32.5	pCi/g	08/21/14 10:35	09/03/14 00:22	5
U-234	0.833	U	0.0664	0.101	69.9	4.19	pCi/g	08/21/14 10:35	09/03/14 00:22	5
U-235	**0.0293**		0.00136	0.00302	0.0243	0.00988	pCi/g	08/21/14 10:35	09/03/14 00:22	5
U-236	-0.00110	U	0.000740	0.000747	0.726	0.0582	pCi/g	08/21/14 10:35	09/03/14 00:22	5
U-238	**0.624**		0.00964	0.0582	0.00377	0.000227	pCi/g	08/21/14 10:35	09/03/14 00:22	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.731**						%		09/04/14 13:23	1

Client Sample ID: SD-232-01

Date Collected: 06/16/14 15:25
Date Received: 06/17/14 09:20

Lab Sample ID: 680-102431-12

Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0036	mg/Kg		08/21/14 10:35	09/03/14 00:26	5
U-234	ND		0.012	0.00072	mg/Kg		08/21/14 10:35	09/03/14 00:26	5
U-235	**0.015**		0.012	0.0048	mg/Kg		08/21/14 10:35	09/03/14 00:26	5
U-236	ND		0.012	0.00095	mg/Kg		08/21/14 10:35	09/03/14 00:26	5
U-238	**2.1**		0.012	0.00072	mg/Kg		08/21/14 10:35	09/03/14 00:26	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**2.1**		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-22.1	U	0.142	2.04	115	34.5	pCi/g	08/21/14 10:35	09/03/14 00:26	5
U-234	0.938	U	0.203	0.221	74.2	4.45	pCi/g	08/21/14 10:35	09/03/14 00:26	5
U-235	**0.0331**		0.00135	0.00333	0.0258	0.0105	pCi/g	08/21/14 10:35	09/03/14 00:26	5
U-236	-0.00160	U	0.00164	0.00165	0.771	0.0618	pCi/g	08/21/14 10:35	09/03/14 00:26	5
U-238	**0.696**		0.0125	0.0652	0.00401	0.000241	pCi/g	08/21/14 10:35	09/03/14 00:26	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.709**						%		09/04/14 13:23	1

Client Sample ID: SD-232-02

Lab Sample ID: 680-102431-13

Date Collected: 06/16/14 15:30

Matrix: Solid

Date Received: 06/17/14 09:20

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0037	mg/Kg		08/21/14 10:35	09/03/14 00:31	5
U-234	ND		0.012	0.00073	mg/Kg		08/21/14 10:35	09/03/14 00:31	5
U-235	**0.010**	**J**	0.012	0.0050	mg/Kg		08/21/14 10:35	09/03/14 00:31	5
U-236	ND		0.012	0.00098	mg/Kg		08/21/14 10:35	09/03/14 00:31	5
U-238	**1.4**		0.012	0.00073	mg/Kg		08/21/14 10:35	09/03/14 00:31	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**1.4**		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-22.6	U	0.256	2.10	118	35.3	pCi/g	08/21/14 10:35	09/03/14 00:31	5
U-234	0.629	U	0.595	0.598	76.0	4.56	pCi/g	08/21/14 10:35	09/03/14 00:31	5
U-235	**0.0217**		0.00189	0.00275	0.0264	0.0108	pCi/g	08/21/14 10:35	09/03/14 00:31	5
U-236	-0.00101	U	0.00105	0.00105	0.790	0.0633	pCi/g	08/21/14 10:35	09/03/14 00:31	5
U-238	**0.456**		0.0167	0.0452	0.00411	0.000247	pCi/g	08/21/14 10:35	09/03/14 00:31	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.709**						%		09/04/14 13:23	1

Client Sample ID: SD-233-SS

Lab Sample ID: 680-102431-15

Date Collected: 06/16/14 15:40

Matrix: Solid

Date Received: 06/17/14 09:20

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0034	mg/Kg		08/21/14 10:35	09/03/14 00:36	5
U-234	ND		0.011	0.00069	mg/Kg		08/21/14 10:35	09/03/14 00:36	5
U-235	**0.015**		0.011	0.0047	mg/Kg		08/21/14 10:35	09/03/14 00:36	5
U-236	ND		0.011	0.00092	mg/Kg		08/21/14 10:35	09/03/14 00:36	5
U-238	**2.0**		0.011	0.00069	mg/Kg		08/21/14 10:35	09/03/14 00:36	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**2.0**		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-21.4	U	0.217	1.98	110	33.1	pCi/g	08/21/14 10:35	09/03/14 00:36	5
U-234	0.918	U	0.298	0.310	71.3	4.28	pCi/g	08/21/14 10:35	09/03/14 00:36	5
U-235	**0.0319**		0.000204	0.00294	0.0248	0.0101	pCi/g	08/21/14 10:35	09/03/14 00:36	5
U-236	-0.00133	U	0.00146	0.00147	0.741	0.0593	pCi/g	08/21/14 10:35	09/03/14 00:36	5
U-238	**0.671**		0.0131	0.0631	0.00385	0.000231	pCi/g	08/21/14 10:35	09/03/14 00:36	5

Client Sample ID: SD-233-SS

Lab Sample ID: 680-102431-15

Date Collected: 06/16/14 15:40

Matrix: Solid

Date Received: 06/17/14 09:20

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.744						%		09/04/14 13:23	1

Client Sample ID: SD-233-01

Lab Sample ID: 680-102431-16

Date Collected: 06/16/14 15:45

Matrix: Solid

Date Received: 06/17/14 09:20

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.012	0.0035	mg/Kg		08/21/14 10:35	09/03/14 00:40	5
U-234	ND		0.012	0.00071	mg/Kg		08/21/14 10:35	09/03/14 00:40	5
U-235	0.015		0.012	0.0048	mg/Kg		08/21/14 10:35	09/03/14 00:40	5
U-236	ND		0.012	0.00094	mg/Kg		08/21/14 10:35	09/03/14 00:40	5
U-238	2.0		0.012	0.00071	mg/Kg		08/21/14 10:35	09/03/14 00:40	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.0		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-21.9	U	0.124	2.02	113	34.0	pCi/g	08/21/14 10:35	09/03/14 00:40	5
U-234	0.917	U	0.172	0.191	73.3	4.40	pCi/g	08/21/14 10:35	09/03/14 00:40	5
U-235	0.0319		0.000725	0.00302	0.0254	0.0104	pCi/g	08/21/14 10:35	09/03/14 00:40	5
U-236	-0.000548	U	0.00204	0.00204	0.762	0.0610	pCi/g	08/21/14 10:35	09/03/14 00:40	5
U-238	0.670		0.0170	0.0639	0.00396	0.000238	pCi/g	08/21/14 10:35	09/03/14 00:40	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.744						%		09/04/14 13:23	1

Client Sample ID: SD-233-02

Lab Sample ID: 680-102431-17

Date Collected: 06/16/14 15:50

Matrix: Solid

Date Received: 06/17/14 09:20

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0034	mg/Kg		08/21/14 10:35	09/03/14 00:45	5
U-234	ND		0.011	0.00069	mg/Kg		08/21/14 10:35	09/03/14 00:45	5
U-235	0.013		0.011	0.0047	mg/Kg		08/21/14 10:35	09/03/14 00:45	5
U-236	ND		0.011	0.00092	mg/Kg		08/21/14 10:35	09/03/14 00:45	5
U-238	1.6		0.011	0.00069	mg/Kg		08/21/14 10:35	09/03/14 00:45	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	1.6		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Client Sample ID: SD-233-02
Date Collected: 06/16/14 15:50
Date Received: 06/17/14 09:20

Lab Sample ID: 680-102431-17
Matrix: Solid

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-21.3	U	0.154	1.97	111	33.2	pCi/g	08/21/14 10:35	09/03/14 00:45	5
U-234	0.671	U	0.227	0.235	71.4	4.28	pCi/g	08/21/14 10:35	09/03/14 00:45	5
U-235	**0.0283**		0.000406	0.00264	0.0248	0.0101	pCi/g	08/21/14 10:35	09/03/14 00:45	5
U-236	-0.000683	U	0.00317	0.00317	0.742	0.0594	pCi/g	08/21/14 10:35	09/03/14 00:45	5
U-238	**0.538**		0.0156	0.0519	0.00386	0.000232	pCi/g	08/21/14 10:35	09/03/14 00:45	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.806**						%		09/04/14 13:23	1

Default Detection Limits

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102431-3
SDG: 680-102431-1

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	RL	MDL	Units	Method
U-233	0.0050	0.0015	mg/Kg	6020A
U-234	0.0050	0.00030	mg/Kg	6020A
U-235	0.0050	0.0020	mg/Kg	6020A
U-236	0.0050	0.00040	mg/Kg	6020A
U-238	0.0050	0.00030	mg/Kg	6020A

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	RL	MDL	Units	Method
Total Uranium	0.0050	0.00030	mg/Kg	6020A

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Lab Sample ID: MB 160-139348/1-A
Matrix: Solid
Analysis Batch: 141597

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 139348

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.0042	0.0013	mg/Kg		08/21/14 10:35	09/02/14 22:44	2
U-234	ND		0.0042	0.00025	mg/Kg		08/21/14 10:35	09/02/14 22:44	2
U-235	ND		0.0042	0.0017	mg/Kg		08/21/14 10:35	09/02/14 22:44	2
U-236	ND		0.0042	0.00034	mg/Kg		08/21/14 10:35	09/02/14 22:44	2
U-238	ND		0.0042	0.00025	mg/Kg		08/21/14 10:35	09/02/14 22:44	2

Lab Sample ID: LCS 160-139348/2-A
Matrix: Solid
Analysis Batch: 141597

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 139348

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
U-234	0.00785	0.00845		mg/Kg		108	80 - 120
U-235	0.461	0.508		mg/Kg		110	80 - 120
U-238	0.477	0.525		mg/Kg		110	80 - 120

Lab Sample ID: 680-102431-5 MS
Matrix: Solid
Analysis Batch: 141597

Client Sample ID: SD-230-02
Prep Type: Total/NA
Prep Batch: 139348

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
U-234	ND		0.00794	0.00899	J	mg/Kg		113	75 - 125
U-235	0.0074	J	0.465	0.543		mg/Kg		115	75 - 125
U-238	1.0		0.483	1.54		mg/Kg		112	75 - 125

Lab Sample ID: 680-102431-5 MSD
Matrix: Solid
Analysis Batch: 141597

Client Sample ID: SD-230-02
Prep Type: Total/NA
Prep Batch: 139348

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
U-234	ND		0.00752	0.00689	J F2	mg/Kg		92	75 - 125	26	20
U-235	0.0074	J	0.441	0.408	F2	mg/Kg		91	75 - 125	28	20
U-238	1.0		0.457	1.16	F1 F2	mg/Kg		36	75 - 125	28	20

Lab Sample ID: 680-102431-8 MS
Matrix: Solid
Analysis Batch: 141597

Client Sample ID: SD-231-01
Prep Type: Total/NA
Prep Batch: 139348

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
U-234	ND		0.00690	0.00608	J	mg/Kg		88	75 - 125
U-235	0.014		0.405	0.369		mg/Kg		88	75 - 125
U-238	1.8		0.420	2.20	4	mg/Kg		102	75 - 125

Lab Sample ID: 680-102431-8 MSD
Matrix: Solid
Analysis Batch: 141597

Client Sample ID: SD-231-01
Prep Type: Total/NA
Prep Batch: 139348

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
U-234	ND		0.00699	0.00591	J	mg/Kg		85	75 - 125	3	20
U-235	0.014		0.410	0.354		mg/Kg		83	75 - 125	4	20

Method: 6020A - Metals (ICP/MS), Isotopic Uranium (Continued)

Lab Sample ID: 680-102431-8 MSD — **Client Sample ID: SD-231-01**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 141597 — **Prep Batch: 139348**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
U-238	1.8		0.425	2.11	4	mg/Kg		81	75 - 125	4	20

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Lab Sample ID: MB 160-139348/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 141598 — **Prep Batch: 139348**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-8.054	U	0.0544	0.743	40.6	12.2	pCi/g	08/21/14 10:35	09/02/14 22:44	2
U-234	-0.01364	U	0.0205	0.0205	26.2	1.57	pCi/g	08/21/14 10:35	09/02/14 22:44	2
U-235	-0.0002605	U	0.0000147	0.0000281	0.00911	0.00371	pCi/g	08/21/14 10:35	09/02/14 22:44	2
U-236	-0.0007415	U	0.000196	0.000208	0.273	0.0218	pCi/g	08/21/14 10:35	09/02/14 22:44	2
U-238	-0.0002862	U	0.0000374	0.0000458	0.00142	0.000085 1	pCi/g	08/21/14 10:35	09/02/14 22:44	2

Lab Sample ID: LCS 160-139348/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 141598 — **Prep Batch: 139348**

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-235			0.995	1.098		0.109	0.0103	0.00418	pCi/g	110	80 - 120		
U-238			0.160	0.1764		0.0174	0.00160	0.000096 0	pCi/g	110	80 - 120		

Lab Sample ID: 680-102431-5 MS — **Client Sample ID: SD-230-02**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 141598 — **Prep Batch: 139348**

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-235	0.0160	F	1.01	1.173		0.111	0.0259	0.0106	pCi/g	115	75 - 125		
U-238	0.336	F	0.162	0.5174		0.0480	0.00403	0.000242	pCi/g	112	75 - 125		

Lab Sample ID: 680-102431-5 MSD — **Client Sample ID: SD-230-02**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 141598 — **Prep Batch: 139348**

Analyte	Sample Result	Sample Qual	Spike Added	MSD Result	MSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
U-235	0.0160	F	0.953	0.8809	F	0.0911	0.0246	0.0100	pCi/g	91	75 - 125	1.45	1
U-238	0.336	F	0.154	0.3908	F1 F	0.0403	0.00382	0.000230	pCi/g	36	75 - 125	1.43	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity) (Continued)

Lab Sample ID: 680-102431-8 MS
Matrix: Solid
Analysis Batch: 141598

Client Sample ID: SD-231-01
Prep Type: Total/NA
Prep Batch: 139348

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-235	0.0296		0.875	0.7982		0.0742	0.0226	0.00918	pCi/g	88	75 - 125		
U-238	0.595		0.141	0.7391		0.0705	0.00351	0.000211	pCi/g	102	75 - 125		

Lab Sample ID: 680-102431-8 MSD
Matrix: Solid
Analysis Batch: 141598

Client Sample ID: SD-231-01
Prep Type: Total/NA
Prep Batch: 139348

Analyte	Sample Result	Sample Qual	Spike Added	MSD Result	MSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
U-235	0.0296		0.885	0.7657		0.0716	0.0228	0.00930	pCi/g	83	75 - 125	0.22	1
U-238	0.595		0.143	0.7108		0.0666	0.00355	0.000213	pCi/g	81	75 - 125	0.21	1

Metals

Prep Batch: 139348

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102431-1	SD-229-SS	Total/NA	Solid	3050B	
680-102431-2	SD-229-01	Total/NA	Solid	3050B	
680-102431-3	SD-230-SS	Total/NA	Solid	3050B	
680-102431-4	SD-230-01	Total/NA	Solid	3050B	
680-102431-5	SD-230-02	Total/NA	Solid	3050B	
680-102431-5 MS	SD-230-02	Total/NA	Solid	3050B	
680-102431-5 MSD	SD-230-02	Total/NA	Solid	3050B	
680-102431-5 SD	SD-230-02	Total/NA	Solid	3050B	
680-102431-7	SD-231-SS	Total/NA	Solid	3050B	
680-102431-8	SD-231-01	Total/NA	Solid	3050B	
680-102431-8 MS	SD-231-01	Total/NA	Solid	3050B	
680-102431-8 MSD	SD-231-01	Total/NA	Solid	3050B	
680-102431-9	SD-231-02	Total/NA	Solid	3050B	
680-102431-11	SD-232-SS	Total/NA	Solid	3050B	
680-102431-12	SD-232-01	Total/NA	Solid	3050B	
680-102431-13	SD-232-02	Total/NA	Solid	3050B	
680-102431-15	SD-233-SS	Total/NA	Solid	3050B	
680-102431-16	SD-233-01	Total/NA	Solid	3050B	
680-102431-17	SD-233-02	Total/NA	Solid	3050B	
LCS 160-139348/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 160-139348/1-A	Method Blank	Total/NA	Solid	3050B	

Analysis Batch: 141597

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102431-1	SD-229-SS	Total/NA	Solid	6020A	139348
680-102431-2	SD-229-01	Total/NA	Solid	6020A	139348
680-102431-3	SD-230-SS	Total/NA	Solid	6020A	139348
680-102431-4	SD-230-01	Total/NA	Solid	6020A	139348
680-102431-5	SD-230-02	Total/NA	Solid	6020A	139348
680-102431-5 MS	SD-230-02	Total/NA	Solid	6020A	139348
680-102431-5 MSD	SD-230-02	Total/NA	Solid	6020A	139348
680-102431-5 SD	SD-230-02	Total/NA	Solid	6020A	139348
680-102431-7	SD-231-SS	Total/NA	Solid	6020A	139348
680-102431-8	SD-231-01	Total/NA	Solid	6020A	139348
680-102431-8 MS	SD-231-01	Total/NA	Solid	6020A	139348
680-102431-8 MSD	SD-231-01	Total/NA	Solid	6020A	139348
680-102431-9	SD-231-02	Total/NA	Solid	6020A	139348
680-102431-11	SD-232-SS	Total/NA	Solid	6020A	139348
680-102431-12	SD-232-01	Total/NA	Solid	6020A	139348
680-102431-13	SD-232-02	Total/NA	Solid	6020A	139348
680-102431-15	SD-233-SS	Total/NA	Solid	6020A	139348
680-102431-16	SD-233-01	Total/NA	Solid	6020A	139348
680-102431-17	SD-233-02	Total/NA	Solid	6020A	139348
CRI 160-141597/11	DL		Solid	6020A	
CRI 160-141597/12	DL		Solid	6020A	
ICSA 160-141597/13	ICS		Solid	6020A	
ICSAB 160-141597/14	ICS		Solid	6020A	
LCS 160-139348/2-A	Lab Control Sample	Total/NA	Solid	6020A	139348
MB 160-139348/1-A	Method Blank	Total/NA	Solid	6020A	139348

Metals (Continued)

Analysis Batch: 142110

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102431-1	SD-229-SS	Total/NA	Solid	6020A	
680-102431-2	SD-229-01	Total/NA	Solid	6020A	
680-102431-3	SD-230-SS	Total/NA	Solid	6020A	
680-102431-4	SD-230-01	Total/NA	Solid	6020A	
680-102431-5	SD-230-02	Total/NA	Solid	6020A	
680-102431-7	SD-231-SS	Total/NA	Solid	6020A	
680-102431-8	SD-231-01	Total/NA	Solid	6020A	
680-102431-9	SD-231-02	Total/NA	Solid	6020A	
680-102431-11	SD-232-SS	Total/NA	Solid	6020A	
680-102431-12	SD-232-01	Total/NA	Solid	6020A	
680-102431-13	SD-232-02	Total/NA	Solid	6020A	
680-102431-15	SD-233-SS	Total/NA	Solid	6020A	
680-102431-16	SD-233-01	Total/NA	Solid	6020A	
680-102431-17	SD-233-02	Total/NA	Solid	6020A	

Rad

Prep Batch: 139348

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102431-1	SD-229-SS	Total/NA	Solid	3050B	
680-102431-2	SD-229-01	Total/NA	Solid	3050B	
680-102431-3	SD-230-SS	Total/NA	Solid	3050B	
680-102431-4	SD-230-01	Total/NA	Solid	3050B	
680-102431-5	SD-230-02	Total/NA	Solid	3050B	
680-102431-5 MS	SD-230-02	Total/NA	Solid	3050B	
680-102431-5 MSD	SD-230-02	Total/NA	Solid	3050B	
680-102431-5 SD	SD-230-02	Total/NA	Solid	3050B	
680-102431-7	SD-231-SS	Total/NA	Solid	3050B	
680-102431-8	SD-231-01	Total/NA	Solid	3050B	
680-102431-8 MS	SD-231-01	Total/NA	Solid	3050B	
680-102431-8 MSD	SD-231-01	Total/NA	Solid	3050B	
680-102431-9	SD-231-02	Total/NA	Solid	3050B	
680-102431-11	SD-232-SS	Total/NA	Solid	3050B	
680-102431-12	SD-232-01	Total/NA	Solid	3050B	
680-102431-13	SD-232-02	Total/NA	Solid	3050B	
680-102431-15	SD-233-SS	Total/NA	Solid	3050B	
680-102431-16	SD-233-01	Total/NA	Solid	3050B	
680-102431-17	SD-233-02	Total/NA	Solid	3050B	
LCS 160-139348/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 160-139348/1-A	Method Blank	Total/NA	Solid	3050B	

Client Sample ID: SD-229-SS

Lab Sample ID: 680-102431-1

Date Collected: 06/16/14 12:05

Matrix: Solid

Date Received: 06/17/14 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139348	08/21/14 10:35	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/02/14 23:02	KLE	TAL SL
Total/NA	Analysis	6020A		1	142110	09/04/14 13:20	KLE	TAL SL
Total/NA	Analysis	6020A		1	142113	09/04/14 13:23	KLE	TAL SL
Total/NA	Prep	3050B			139348	08/21/14 10:35	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/02/14 23:02	KLE	TAL SL

Client Sample ID: SD-229-01

Lab Sample ID: 680-102431-2

Date Collected: 06/16/14 12:10

Matrix: Solid

Date Received: 06/17/14 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139348	08/21/14 10:35	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/02/14 23:16	KLE	TAL SL
Total/NA	Analysis	6020A		1	142110	09/04/14 13:20	KLE	TAL SL
Total/NA	Analysis	6020A		1	142113	09/04/14 13:23	KLE	TAL SL
Total/NA	Prep	3050B			139348	08/21/14 10:35	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/02/14 23:16	KLE	TAL SL

Client Sample ID: SD-230-SS

Lab Sample ID: 680-102431-3

Date Collected: 06/16/14 13:40

Matrix: Solid

Date Received: 06/17/14 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139348	08/21/14 10:35	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/02/14 23:21	KLE	TAL SL
Total/NA	Analysis	6020A		1	142110	09/04/14 13:20	KLE	TAL SL
Total/NA	Analysis	6020A		1	142113	09/04/14 13:23	KLE	TAL SL
Total/NA	Prep	3050B			139348	08/21/14 10:35	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/02/14 23:21	KLE	TAL SL

Client Sample ID: SD-230-01

Lab Sample ID: 680-102431-4

Date Collected: 06/16/14 13:45

Matrix: Solid

Date Received: 06/17/14 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139348	08/21/14 10:35	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/02/14 23:26	KLE	TAL SL
Total/NA	Analysis	6020A		1	142110	09/04/14 13:20	KLE	TAL SL
Total/NA	Analysis	6020A		1	142113	09/04/14 13:23	KLE	TAL SL
Total/NA	Prep	3050B			139348	08/21/14 10:35	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/02/14 23:26	KLE	TAL SL

Client Sample ID: SD-230-02

Lab Sample ID: 680-102431-5

Date Collected: 06/16/14 13:50

Matrix: Solid

Date Received: 06/17/14 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139348	08/21/14 10:35	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/02/14 23:30	KLE	TAL SL
Total/NA	Analysis	6020A		1	142110	09/04/14 13:20	KLE	TAL SL
Total/NA	Analysis	6020A		1	142113	09/04/14 13:23	KLE	TAL SL
Total/NA	Prep	3050B			139348	08/21/14 10:35	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/02/14 23:30	KLE	TAL SL

Client Sample ID: SD-231-SS

Lab Sample ID: 680-102431-7

Date Collected: 06/16/14 14:10

Matrix: Solid

Date Received: 06/17/14 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139348	08/21/14 10:35	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/02/14 23:49	KLE	TAL SL
Total/NA	Analysis	6020A		1	142110	09/04/14 13:20	KLE	TAL SL
Total/NA	Analysis	6020A		1	142113	09/04/14 13:23	KLE	TAL SL
Total/NA	Prep	3050B			139348	08/21/14 10:35	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/02/14 23:49	KLE	TAL SL

Client Sample ID: SD-231-01

Lab Sample ID: 680-102431-8

Date Collected: 06/16/14 14:15

Matrix: Solid

Date Received: 06/17/14 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139348	08/21/14 10:35	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/02/14 23:54	KLE	TAL SL
Total/NA	Analysis	6020A		1	142110	09/04/14 13:20	KLE	TAL SL
Total/NA	Analysis	6020A		1	142113	09/04/14 13:23	KLE	TAL SL
Total/NA	Prep	3050B			139348	08/21/14 10:35	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/02/14 23:54	KLE	TAL SL

Client Sample ID: SD-231-02

Lab Sample ID: 680-102431-9

Date Collected: 06/16/14 14:20

Matrix: Solid

Date Received: 06/17/14 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139348	08/21/14 10:35	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/03/14 00:17	KLE	TAL SL
Total/NA	Analysis	6020A		1	142110	09/04/14 13:20	KLE	TAL SL
Total/NA	Analysis	6020A		1	142113	09/04/14 13:23	KLE	TAL SL
Total/NA	Prep	3050B			139348	08/21/14 10:35	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/03/14 00:17	KLE	TAL SL

Client Sample ID: SD-232-SS

Lab Sample ID: 680-102431-11

Date Collected: 06/16/14 15:20

Matrix: Solid

Date Received: 06/17/14 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139348	08/21/14 10:35	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/03/14 00:22	KLE	TAL SL
Total/NA	Analysis	6020A		1	142110	09/04/14 13:20	KLE	TAL SL
Total/NA	Analysis	6020A		1	142113	09/04/14 13:23	KLE	TAL SL
Total/NA	Prep	3050B			139348	08/21/14 10:35	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/03/14 00:22	KLE	TAL SL

Client Sample ID: SD-232-01

Lab Sample ID: 680-102431-12

Date Collected: 06/16/14 15:25

Matrix: Solid

Date Received: 06/17/14 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139348	08/21/14 10:35	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/03/14 00:26	KLE	TAL SL
Total/NA	Analysis	6020A		1	142110	09/04/14 13:20	KLE	TAL SL
Total/NA	Analysis	6020A		1	142113	09/04/14 13:23	KLE	TAL SL
Total/NA	Prep	3050B			139348	08/21/14 10:35	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/03/14 00:26	KLE	TAL SL

Client Sample ID: SD-232-02

Lab Sample ID: 680-102431-13

Date Collected: 06/16/14 15:30

Matrix: Solid

Date Received: 06/17/14 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139348	08/21/14 10:35	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/03/14 00:31	KLE	TAL SL
Total/NA	Analysis	6020A		1	142110	09/04/14 13:20	KLE	TAL SL
Total/NA	Analysis	6020A		1	142113	09/04/14 13:23	KLE	TAL SL
Total/NA	Prep	3050B			139348	08/21/14 10:35	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/03/14 00:31	KLE	TAL SL

Client Sample ID: SD-233-SS

Lab Sample ID: 680-102431-15

Date Collected: 06/16/14 15:40

Matrix: Solid

Date Received: 06/17/14 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139348	08/21/14 10:35	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/03/14 00:36	KLE	TAL SL
Total/NA	Analysis	6020A		1	142110	09/04/14 13:20	KLE	TAL SL
Total/NA	Analysis	6020A		1	142113	09/04/14 13:23	KLE	TAL SL
Total/NA	Prep	3050B			139348	08/21/14 10:35	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/03/14 00:36	KLE	TAL SL

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102431-3
SDG: 680-102431-1

Client Sample ID: SD-233-01

Lab Sample ID: 680-102431-16

Date Collected: 06/16/14 15:45

Matrix: Solid

Date Received: 06/17/14 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139348	08/21/14 10:35	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/03/14 00:40	KLE	TAL SL
Total/NA	Analysis	6020A		1	142110	09/04/14 13:20	KLE	TAL SL
Total/NA	Analysis	6020A		1	142113	09/04/14 13:23	KLE	TAL SL
Total/NA	Prep	3050B			139348	08/21/14 10:35	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/03/14 00:40	KLE	TAL SL

Client Sample ID: SD-233-02

Lab Sample ID: 680-102431-17

Date Collected: 06/16/14 15:50

Matrix: Solid

Date Received: 06/17/14 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139348	08/21/14 10:35	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/03/14 00:45	KLE	TAL SL
Total/NA	Analysis	6020A		1	142110	09/04/14 13:20	KLE	TAL SL
Total/NA	Analysis	6020A		1	142113	09/04/14 13:23	KLE	TAL SL
Total/NA	Prep	3050B			139348	08/21/14 10:35	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/03/14 00:45	KLE	TAL SL

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Certification Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102431-3
SDG: 680-102431-1

Laboratory: TestAmerica Savannah

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
	AFCEE		SAVLAB	
A2LA	DoD ELAP		399.01	02-28-15
A2LA	ISO/IEC 17025		399.01	02-28-15
Alabama	State Program	4	41450	06-30-15
Arkansas DEQ	State Program	6	88-0692	01-31-15
California	NELAP	9	3217CA	07-31-14 *
Colorado	State Program	8	N/A	12-31-14
Connecticut	State Program	1	PH-0161	03-31-15
Florida	NELAP	4	E87052	06-30-15
GA Dept. of Agriculture	State Program	4	N/A	06-12-17
Georgia	State Program	4	N/A	06-30-15
Georgia	State Program	4	803	06-30-15
Guam	State Program	9	09-005r	04-16-15
Hawaii	State Program	9	N/A	06-30-15
Illinois	NELAP	5	200022	11-30-14
Indiana	State Program	5	N/A	06-30-15
Iowa	State Program	7	353	07-01-15
Kentucky (DW)	State Program	4	90084	12-31-14
Kentucky (UST)	State Program	4	18	06-30-15
Louisiana	NELAP	6	30690	06-30-14 *
Louisiana (DW)	NELAP	6	LA140023	12-31-14
Maine	State Program	1	GA00006	08-16-14 *
Maryland	State Program	3	250	12-31-14
Massachusetts	State Program	1	M-GA006	06-30-15
Michigan	State Program	5	9925	06-30-15
Mississippi	State Program	4	N/A	06-30-15
Montana	State Program	8	CERT0081	01-01-15
Nebraska	State Program	7	TestAmerica-Savannah	06-30-15
New Jersey	NELAP	2	GA769	06-30-15
New Mexico	State Program	6	N/A	06-30-15
New York	NELAP	2	10842	03-31-15
North Carolina (DW)	State Program	4	13701	07-31-15
North Carolina (WW/SW)	State Program	4	269	12-31-14
Oklahoma	State Program	6	9984	08-31-14 *
Pennsylvania	NELAP	3	68-00474	06-30-15
Puerto Rico	State Program	2	GA00006	12-31-14
South Carolina	State Program	4	98001	06-30-14 *
Tennessee	State Program	4	TN02961	06-30-15
Texas	NELAP	6	T104704185-08-TX	11-30-14
USDA	Federal		SAV 3-04	06-11-17
Virginia	NELAP	3	460161	06-14-15
Washington	State Program	10	C805	06-10-15
West Virginia (DW)	State Program	3	9950C	12-31-14
West Virginia DEP	State Program	3	94	06-30-15
Wisconsin	State Program	5	999819810	08-31-14 *
Wyoming	State Program	8	8TMS-L	06-30-15

Laboratory: TestAmerica St. Louis

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

* Certification renewal pending - certification considered valid.

Certification Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102431-3
SDG: 680-102431-1

Laboratory: TestAmerica St. Louis (Continued)

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska	State Program	10	MO00054	06-30-15
California	NELAP	9	2886	03-31-15
Connecticut	State Program	1	PH-0241	03-31-15
Florida	NELAP	4	E87689	06-30-15
Illinois	NELAP	5	200023	11-30-14
Iowa	State Program	7	373	12-01-14
Kansas	NELAP	7	E-10236	10-31-14 *
Kentucky (DW)	State Program	4	90125	12-31-14
L-A-B	DoD ELAP		L2305	01-10-16
Louisiana	NELAP	6	04080	06-30-15
Maryland	State Program	3	310	09-30-15
Missouri	State Program	7	780	06-30-14 *
Nevada	State Program	9	MO000542013-1	07-31-14 *
New Jersey	NELAP	2	MO002	06-30-15
New Mexico	State Program	6		06-30-10 *
New York	NELAP	2	11616	03-31-15
North Dakota	State Program	8	R207	06-30-14 *
NRC	NRC		24-24817-01	12-31-22
Oklahoma	State Program	6	9997	08-31-15
Pennsylvania	NELAP	3	68-00540	02-28-15
South Carolina	State Program	4	85002001	06-30-14 *
Texas	NELAP	6	T104704193-13-6	07-31-15
USDA	Federal		P330-07-00122	01-09-17
Utah	NELAP	8	MO000542013-5	07-31-15
Virginia	NELAP	3	460230	06-14-15
Washington	State Program	10	C592	08-30-15
West Virginia DEP	State Program	3	381	12-31-14 *

* Certification renewal pending - certification considered valid.

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102431-3
SDG: 680-102431-1

Method	Method Description	Protocol	Laboratory
6020A	Metals (ICP/MS), Isotopic Uranium	SW846	TAL SL
6020A	Metals (ICP/MS), Total Uranium	SW846	TAL SL
6020A	Metals (ICP/MS), Isotopic Uranium Percentage	SW846	TAL SL
6020A Activity	Metals (ICP/MS), Isotopic Uranium (Activity)	SW846	TAL SL

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102431-3
SDG: 680-102431-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-102431-1	SD-229-SS	Solid	06/16/14 12:05	06/17/14 09:20
680-102431-2	SD-229-01	Solid	06/16/14 12:10	06/17/14 09:20
680-102431-3	SD-230-SS	Solid	06/16/14 13:40	06/17/14 09:20
680-102431-4	SD-230-01	Solid	06/16/14 13:45	06/17/14 09:20
680-102431-5	SD-230-02	Solid	06/16/14 13:50	06/17/14 09:20
680-102431-7	SD-231-SS	Solid	06/16/14 14:10	06/17/14 09:20
680-102431-8	SD-231-01	Solid	06/16/14 14:15	06/17/14 09:20
680-102431-9	SD-231-02	Solid	06/16/14 14:20	06/17/14 09:20
680-102431-11	SD-232-SS	Solid	06/16/14 15:20	06/17/14 09:20
680-102431-12	SD-232-01	Solid	06/16/14 15:25	06/17/14 09:20
680-102431-13	SD-232-02	Solid	06/16/14 15:30	06/17/14 09:20
680-102431-15	SD-233-SS	Solid	06/16/14 15:40	06/17/14 09:20
680-102431-16	SD-233-01	Solid	06/16/14 15:45	06/17/14 09:20
680-102431-17	SD-233-02	Solid	06/16/14 15:50	06/17/14 09:20

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
ISOU Cal 1_00021	09/05/14	08/29/14	2%HCL 2%HNO3, Lot 422375	50 mL	ISOU Cal Low_00006	0.25 mL	U-233	0.000515225 ug/L
							U-236	0.000889887 ug/L
							U-234	0.000826729 ug/L
							U-235	0.0484747 ug/L
							U-238	0.0502596 ug/L
							Total Uranium	0.05 ug/L
.ISOU Cal Low_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU Cal Int_00006	1 mL	U-233	0.103045 ug/L
							U-236	0.177977 ug/L
							U-234	0.165346 ug/L
							U-235	9.69494 ug/L
							U-238	10.0519 ug/L
							Total Uranium	10 ug/L
..ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
...ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
....ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
...ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
....ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
...ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
....ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
...STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
ISOU Cal 2_00022	09/05/14	08/29/14	2% Nitric Acid, Lot 422375	50 mL	ISOU Cal Int_00006	0.15 mL	U-233	0.0309135 ug/L
							U-236	0.0533932 ug/L

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							U-234	0.0496037 ug/L
							U-235	2.90848 ug/L
							U-238	3.01557 ug/L
							Total Uranium	3 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
ISOU Cal 3_00021	09/05/14	08/29/14	2% Nitric Acid, Lot 422375	100 mL	ISOU Cal Int_00006	0.5 mL	U-233	0.0515225 ug/L
							U-236	0.0889887 ug/L
							U-234	0.0826729 ug/L
							U-235	4.84747 ug/L
							U-238	5.02596 ug/L
							Total Uranium	5 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
ISOU Cal 4_00021	09/05/14	08/29/14	2% Nitric Acid, Lot 422375	50 mL	ISOU Cal Int_00006	0.5 mL	U-233	0.103045 ug/L
							U-236	0.177977 ug/L
							U-234	0.165346 ug/L
							U-235	9.69494 ug/L
							U-238	10.0519 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		U-238	1000 ug/mL
ISOU Cal 5_00021	09/05/14	08/29/14	2% Nitric Acid, Lot 422375	50 mL	ISOU Cal Int_00006	1.5 mL	U-233	0.309135 ug/L
							U-236	0.533932 ug/L
							U-234	0.496037 ug/L
							U-235	29.0848 ug/L
							U-238	30.1557 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		U-238	1000 ug/mL
ISOU ICSAB_00022	09/05/14	08/29/14	2% Nitric Acid, Lot 422375	50 mL	ISOU Cal Int_00006	0.25 mL	U-233	0.0515225 ug/L
							U-236	0.0889887 ug/L
							U-234	0.0826729 ug/L
							U-235	4.84747 ug/L
							U-238	5.02596 ug/L
							Total Uranium	5 ug/L
					MS ICSA_00014	2.5 mL	Al	50000 ug/L
							Ca	50000 ug/L
							Chlorine	500000 ug/L
							Fe	50000 ug/L
							K	50000 ug/L
							Mg	50000 ug/L
							Mo	1000 ug/L

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Na	50000 ug/L
							P	50000 ug/L
							Sulfur	50000 ug/L
							Ti	1000 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
.MS ICSA_00014	07/01/15	Inorganic Ventures, Lot G2-MEB476152MCA			(Purchased Reagent)		Al	1000 ug/mL
							Ca	1000 ug/mL
							Chlorine	10000 ug/mL
							Fe	1000 ug/mL
							K	1000 ug/mL
							Mg	1000 ug/mL
							Mo	20 ug/mL
							Na	1000 ug/mL
							P	1000 ug/mL
							Sulfur	1000 ug/mL
							Ti	20 ug/mL
ISOU ICV(3)_00020	09/05/14	08/29/14	2% Nitric Acid, Lot 422375	50 mL	ISOU QC Low_00004	0.25 mL	U-234	0.000417422 ug/L
							U-235	0.000528391 ug/L
							U-238	0.0488908 ug/L

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							U-233	0.223475 ug/L
							U-236	0.0000372865 ug/L
.ISOU QC Low_00004	11/01/14	08/18/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU QC Int_00005	1 mL	U-234	0.0834844 ug/L
							U-235	0.105678 ug/L
							U-238	9.77816 ug/L
							U-233	44.695 ug/L
							U-236	0.00745731 ug/L
..ISOU QC Int_00005	11/01/14	05/14/14	2%HCL 2%HNO3, Lot 355914	100 mL	ISOU UNAT_00002	1 mL	U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-238	977.816 ug/L
					ISOU-I 233 QC_00005	10 mL	U-233	4469.5 ug/L
							U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-236	0.745731 ug/L
							U-238	977.816 ug/L
...ISOU UNAT_00002	11/13/14	11/11/13	1M HNO3, Lot n/a	200 mL	ISOU U parent_00001	20 mL	U-234	5.10149 ug/L
							U-235	701.888 ug/L
							U-238	96754.7 ug/L
....ISOU U parent_00001	08/01/47	05/03/13	1M HNO3, Lot n/a	200 mL	ISOU ampule_00001	19.2509 g	U-234	51.0149 ug/L
							U-235	7018.88 ug/L
							U-238	967547 ug/L
.....ISOU ampule_00001	03/30/58	New Brunswick Lab, Lot CRM 145			(Purchased Reagent)		U-234	0.53 ug/g
							U-235	72.92 ug/g
							U-238	10052 ug/g
...ISOU-I 233 QC_00005	12/20/14	12/20/13	2%HCL 2% HNO3, Lot 250193	100 mL	ISOU-C 233 QC_00005	9.3263 g	U-233	44695 ug/L
							U-234	82.9742 ug/L
							U-235	35.4894 ug/L
							U-236	7.45731 ug/L
							U-238	102.695 ug/L
....ISOU-C 233 QC_00005	12/20/18	New Brunswick Laboratory, Lot CRM 111-A			(Purchased Reagent)		U-233	479.236 ug/g
							U-234	0.88968 ug/g
							U-235	0.38053 ug/g
							U-236	0.07996 ug/g
							U-238	1.10114 ug/g
ISOU ICV(4,8)_00020	09/05/14	08/29/14	2% Nitric Acid, Lot 422375	50 mL	ISOU QC Int_00005	0.5 mL	U-234	0.0834844 ug/L
							U-235	0.105678 ug/L
							U-238	9.77816 ug/L
							U-233	44.695 ug/L
							U-236	0.00745731 ug/L
.ISOU QC Int_00005	11/01/14	05/14/14	2%HCL 2%HNO3, Lot 355914	100 mL	ISOU UNAT_00002	1 mL	U-234	8.34844 ug/L

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							U-235	10.5678 ug/L
							U-238	977.816 ug/L
					ISOU-I 233 QC_00005	10 mL	U-233	4469.5 ug/L
							U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-236	0.745731 ug/L
							U-238	977.816 ug/L
..ISOU UNAT_00002	11/13/14	11/11/13	1M HNO3, Lot n/a	200 mL	ISOU U parent_00001	20 mL	U-234	5.10149 ug/L
							U-235	701.888 ug/L
							U-238	96754.7 ug/L
...ISOU U parent_00001	08/01/47	05/03/13	1M HNO3, Lot n/a	200 mL	ISOU ampule_00001	19.2509 g	U-234	51.0149 ug/L
							U-235	7018.88 ug/L
							U-238	967547 ug/L
....ISOU ampule_00001	03/30/58	New Brunswick Lab, Lot CRM 145			(Purchased Reagent)		U-234	0.53 ug/g
							U-235	72.92 ug/g
							U-238	10052 ug/g
..ISOU-I 233 QC_00005	12/20/14	12/20/13	2%HCL 2% HNO3, Lot 250193	100 mL	ISOU-C 233 QC_00005	9.3263 g	U-233	44695 ug/L
							U-234	82.9742 ug/L
							U-235	35.4894 ug/L
							U-236	7.45731 ug/L
							U-238	102.695 ug/L
...ISOU-C 233 QC_00005	12/20/18	New Brunswick Laboratory, Lot CRM 111-A			(Purchased Reagent)		U-233	479.236 ug/g
							U-234	0.88968 ug/g
							U-235	0.38053 ug/g
							U-236	0.07996 ug/g
							U-238	1.10114 ug/g
ISOU ICV(5,6)_00022	09/05/14	08/29/14	2% Nitric Acid, Lot 422375	50 mL	ISOU QC Int_00005	5 mL	U-234	0.834844 ug/L
							U-235	1.05678 ug/L
							U-238	97.7816 ug/L
							U-233	446.95 ug/L
							U-236	0.0745731 ug/L
.ISOU QC Int_00005	11/01/14	05/14/14	2%HCL 2%HNO3, Lot 355914	100 mL	ISOU UNAT_00002	1 mL	U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-238	977.816 ug/L
					ISOU-I 233 QC_00005	10 mL	U-233	4469.5 ug/L
							U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-236	0.745731 ug/L
							U-238	977.816 ug/L
..ISOU UNAT_00002	11/13/14	11/11/13	1M HNO3, Lot n/a	200 mL	ISOU U parent_00001	20 mL	U-234	5.10149 ug/L
							U-235	701.888 ug/L
							U-238	96754.7 ug/L

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
...ISOU U parent_00001	08/01/47	05/03/13	1M HNO3, Lot n/a	200 mL	ISOU ampule_00001	19.2509 g	U-234	51.0149 ug/L
							U-235	7018.88 ug/L
							U-238	967547 ug/L
....ISOU ampule_00001	03/30/58	New Brunswick Lab, Lot CRM 145			(Purchased Reagent)		U-234	0.53 ug/g
							U-235	72.92 ug/g
							U-238	10052 ug/g
..ISOU-I 233 QC_00005	12/20/14	12/20/13	2%HCL 2% HNO3, Lot 250193	100 mL	ISOU-C 233 QC_00005	9.3263 g	U-233	44695 ug/L
							U-234	82.9742 ug/L
							U-235	35.4894 ug/L
							U-236	7.45731 ug/L
							U-238	102.695 ug/L
...ISOU-C 233 QC_00005	12/20/18	New Brunswick Laboratory, Lot CRM 111-A			(Purchased Reagent)		U-233	479.236 ug/g
							U-234	0.88968 ug/g
							U-235	0.38053 ug/g
							U-236	0.07996 ug/g
							U-238	1.10114 ug/g
ISOU Prep Spk_00002	12/01/14	07/09/14	2%HCL 2%HNO3, Lot 397367	100 mL	ISOU-I 233CAL_00002	1 mL	U-233	947.058 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
.ISOU-I 233CAL_00002	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00006	5.1938 g	U-233	94705.8 ug/L
..ISOU-C 233CAL_00006	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1823.44 ug/g
.ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
..ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
.ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
..ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
.STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL

Reagent

ISOU ampule_00001

New Brunswick Laboratory
U.S. Department of Energy

Certificate of Analysis

CRM 145

228405
ID ISOU ampule_00001
Exp:03/30/58 Prpd:KLE Opn:05/03/13
UNAT Ampoule

Uranyl (Normal) Nitrate Assay and Isotopic Solution

Uranium Mass Fraction: **0.0101356 g U/g solution ± 0.0000011 g U/g solution**
[10.1356 mg U/g solution ± 0.0011 mg U/g solution]

	$^{234}U/^{238}U$	$^{235}U/^{238}U$
Atom Ratio:	**0.000052841**	**0.0072543**
Atom Ratio Uncertainty:	**0.000000082**	**0.0000040**

	^{234}U	^{235}U	^{238}U
Atom Percent:	**0.0052458**	**0.72017**	**99.27458**
Atom Percent Uncertainty:	**0.0000081**	**0.00039**	**0.00039**
Weight Percent:	**0.0051579**	**0.71114**	**99.28370**
Weight Percent Uncertainty:	**0.0000080**	**0.00038**	**0.00038**

Relative Atomic Weight: **238.028918**
Relative Atomic Weight Uncertainty: **0.000012**

Note: ^{233}U and ^{236}U were not detected. The detection limit of uranium ratios for the technique used is 5×10^{-9}.

This Certified Reference Material (CRM) is a uranium concentration and isotopic solution standard intended for use in calibration of and/or quality control for uranium analysis methods. Each unit of CRM 145 consists of approximately 20-mL of uranyl nitrate solution in 1M nitric acid, contained in a sealed glass ampoule.

NOTE: The vial should be handled under proper radiologically-controlled conditions at all times.

The certified uranium content value is based on the mass of high-purity metal dissolved and diluted to a known solution mass. The stated uranium concentration was calculated as the prepared value and verified experimentally by the NBL-modified Davies and Gray titration. The certified uranium isotopic composition and atomic weight is based upon measurements performed on multiple samples by two different measurement techniques on a Thermal Ionization Mass Spectrometer (TIMS), calibrated using CRM U030-A as primary comparator and CRM 129-A as a quality control sample. The isotopic values are shared with CRM 112-A, uranium (normal) metal standard which was the source of uranium used to produce the solutions.

RAD13-0018
UNAT Spike
marrss
None
Prep/Opened: 5/3/2013
Exp(1): 5/10/2014
Exp(2): 5/10/2014

All uncertainties for the certified values are expressed as expanded uncertainties (U) where $U = k*u_c$, where u_c is the

September 30, 2010
Argonne, Illinois

www.nbl.doe.gov
Page 1 of 2

Jon Neuhoff, Director
New Brunswick Laboratory

(Revision of Certificate dated March 30, 2008)

127971
ID: UNAT_00008
Exp: 05/10/14 Prpd: SB Crt: 05/03/13
UNAT spike

combined standard uncertainty and the coverage factor k = 2. Uncertainties were determined according to the JCGM 100:2008 *Guide to the Expression of Uncertainty in Measurement*. The coverage factor of 2 was chosen to provide an approximate 95% level of confidence. The input quantities associated with the uranium content included uncertainties due to weighing, CRM 112-A purity, and buoyancy factors. The input quantities associated with the uranium isotopic composition included uncertainties from the certified value for CRM U030-A, measurement precision, and background corrections associated with the analytical techniques.

The CRM was produced by dissolving uranium metal in a single batch and container, with extensive mixing of the resultant solution followed by dispensation into individual bottles. Subsequent measurements of a random sampling of the total lot produced did not indicate any inhomogeneity in uranium concentration or isotopic composition. The minimum sample sizes taken from packaged units and measured were 30 mg U by titration and 1 µg U by TIMS. The NBL makes no recommendation as to the minimum sample size to be used to ensure concentration or isotopic homogeneity.

Users are cautioned that once the vial is opened, the uranium concentration and/or isotopic composition of the material may be affected by evaporative losses or environmental contamination. User's should take appropriate precautions to safeguard the material before, during and after use to ensure valid certificate values.

Recommended Procedure for Ampoule Handling and Dispensing of Solution

1. The ampoule contains a strongly acidic solution of uranium. Appropriate precautions should be taken.

2. Before opening the ampoule, ensure that any dried uranium or condensed liquid in the neck or body of the ampoule is re-dissolved into solution. This can be accomplished by inverting the ampoule repeatedly.

3. The glass ampoules are scored at the neck for ease of opening. However, glass burrs and fragments pose a cut hazard to anyone opening the ampoules. Appropriate precautions should be taken.

4. Lightly moisten the scored line on the neck with distilled water to help ensure a clean break at the score.

5. Because of the narrow neck of the ampoule it may be difficult or impossible to pour the solution out. Here is one possible method:

    a. Obtain approximately 12-cm length of plastic capillary tubing (e.g. i.d. 0f 0.1", o.d. of 0.16").
    b. Insert one end of the capillary tubing fully into the ampoule
    c. Fold the remaining length of tubing along the outside of the ampoule, ensuring that the tube is not crimped and will allow the free flow of air through the tube and into the ampoule.
    d. Holding the ampoule and tubing in one hand, and a beaker or dispensing bottle in another, invert the ampoule over the container allowing the solution to drain into it.
    e. The capillary tubing allows air to flow into the ampoule, eliminating the "airlock" created by the narrow neck of the open ampoule.

6. The user should be wary of evaporative losses once the ampoule is opened, and prevent uranium contamination of the sample. It is recommended that the entire solution be accurately weighed and aliquanted as soon as possible after opening the sample. Precautions should be taken (clean glass/plastic ware, air filtration, etc) to prevent uranium contamination of the CRM with subsequent perturbation of the isotopic composition.

Reagent

ISOU-C 233 QC_00005

New Brunswick Laboratory
U.S. Department of Energy

Certificate of Analysis
CRM 111-A
Uranium-233 in Nitrate Form
Uranium Spike Assay and Isotopic Solution Standard

280627
ID ISOU-C 233 QC_00005
Exp 12/20/18 Prpd:KLE Opn:12/20/13
233 QC

Uranium Concentration : 2.06684 ± 0.00052 μmoles U/gram solution

	U-233	U-234	U-235	U-236	U-238
Atom Percent:	**99.4911**	**0.1847**	**0.0790**	**0.0166**	**0.2286**
Uncertainty:	**0.0006**	**0.0002**	**0.0002**	**0.0002**	**0.0004**

Relative Atomic Weight : 233.055

This Certified Reference Material (CRM) is intended for use as a spike in the analysis of uranium materials by isotope dilution mass spectrometry (IDMS). Each unit of CRM 111-A consists of approximately 5 milligrams of uranium dissolved in 10 grams of 0.8 N HNO_3. This solution is contained in a sealed glass ampoule.

NOTE: *The ampoule should be handled under proper radiologically-controlled conditions at all times.*

The indicated uncertainties for the certified values are 95% confidence intervals for the means. The uncertainty assigned to the uranium assay includes components due to analytical variation. The uncertainties assigned to the isotopic abundance values include random measurement variations and a component based on the uncertainties associated with the determination of the mass discrimination correction factors.

The uranium elemental concentration was determined by the NBL-modified Davies-Gray titrimetric method [Reference: A. R. Eberle, M. W. Lerner, C. G. Goldbeck, and C. J. Rodden, NBL-252 (1970), pp. 1-25] using NBL CRM 112-A (uranium (normal) metal assay standard) as a control to verify the measurement system. The uranium isotopic composition was determined by thermal ionization mass spectrometry using NBL CRM 111 (U-233 spike) to demonstrate compatibility. The uranium assay value obtained by chemical analysis was verified by IDMS using NBL CRM 115 (uranium (depleted) metal assay standard) and NBL CRM 135 (U-235 spike) as spikes. For both the isotopic abundance and the IDMS assay measurements, mass discrimination correction factors were established using NBL CRM U500 and were applied to the calculations. The total impurity content was less than 1600 μg/g U as determined by inductively-coupled plasma atomic emission spectrometry on a subsample of the master

March 30, 2008
Argonne, Illinois

www.nbl.doe.gov

Jon Neuhoff, Director
New Brunswick Laboratory

(Editorial revision of Certificate dated January 18, 1990)

solution. Iron is the dominant impurity at 1330 μg/g U. Calcium, zinc, sodium, and magnesium were also found at 90, 50,50, and 10 μg/g U respectively. These impurity values are provided for information only; the impurity values are not certified.

The starting material from which this CRM was prepared was supplied by Argonne National Laboratory (ANL). Preparation and packaging of CRM 111-A were carried out by V. E. Connolly, M. I. Spaletto, F. P. Orlowicz, and F. E. Jones, NBL. Titrimetric assay measurements were performed by M. I. Spaletto, NBL; IDMS assay measurements were performed by V. E. Connolly, NBL; isotopic abundance measurements were performed by M. A. Legel and F. E. Jones, NBL; impurity measurements were performed by E. A. Huff and associates, ANL; statistical assessment of the data for certification was performed by M. D. Soriano, NBL. Project technical direction was provided by V. E. Connolly, NBL; overall technical direction and coordination of the preparation, certification, and issuance of this CRM was provided by N. M. Trahey, NBL.

RECOMMENDED PROCEDURE FOR USING CRM 111-A

The package is designed to prepare a solution having a known concentration of uranium on a weight basis. Once prepared, it is suggested that all the solution be immediately distributed as subportions for later use as individual spikes. After the spike has been added to a sample and isotopic equilibrium has been assured, a chemical separation should be performed to remove isobaric isotopes before mass spectrometric analysis.

Shake the ampoule vigorously before opening to homogenize contents. Secure in an upright position and allow solution trapped in the ampoule tip to drain back into the reservoir. Wrap the ampoule in a small cloth or towel, and break off the tip at the pre-scored line. Discard the tip, transfer the solution to a tared container, and proceed to distribute it as weighed portions into suitable containers for use as spikes.

If a more dilute solution is desired, transfer the solution to a larger tared container, weigh, dilute and weigh again, mix vigorously, and distribute all the solution as weighed portions.

Reagent

ISOU-C 233CAL_00006

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404-352-8677
Fax 404-352-2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

95301
U-233 5 mL Liquid in Flame Sealed Vial

280632
ID ISOU-C 233CAL_00006
Exp 12/19/18 Prpd KLE Opn 12/19/13
233 CAL

Customer: TestAmerica - St. Louis
P.O. No.: 2548635, Item 1 Product Code: 8055

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide calibration and purity were checked by germanium gamma-ray spectrometry, liquid scintillation counting, and/or alpha spectrometry, as applicable. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty* , % Type u_A	u_B	U	Reference Date (12:00 PM EST)
U-233	5.815E+07	3.705E+03	0.1	0.6	1.2	12/12/2013

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: U-232 4.811 Bq; U-234 4.450 Bq; α-impurities<0.001%; γ-impurities<0.1%.
5.23229 g 1M HNO3 solution. Carrier free.
Original material calibrated by New Brunswick Laboratory as CRM 111-A.

Source Prepared by: K. Eardley, Radiochemist

QC Approved: J.D. McCorvey, Counting Room Manager Date: 12 Dec 13

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

ISOU-C 233CAL_00007

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

95301
U-233 5 mL Liquid in Flame Sealed Vial

288644
ID ISOU-C 233CAL_00007
Exp 12/19/18 Prpd KLE Opn 12/19/13
233 CAL

Customer: TestAmerica - St. Louis
P.O. No.: 2548635, Item 1 Product Code: 8055

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide calibration and purity were checked by germanium gamma-ray spectrometry, liquid scintillation counting, and/or alpha spectrometry, as applicable. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty* , % Type u_A	u_B	U	Reference Date (12:00 PM EST)
U-233	5.815E+07	3.705E+03	0.1	0.6	1.2	12/12/2013

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: U-232 4.811 Bq; U-234 4.450 Bq; α-impurities<0.001%; γ-impurities<0.1%.
5.23229 g 1M HNO3 solution. Carrier free.
Original material calibrated by New Brunswick Laboratory as CRM 111-A.

Source Prepared by: K. Eardley, Radiochemist

QC Approved: J.D. McCorvey, Counting Room Manager Date: 12 Dec 13

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355
Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

ISOU-C 236_00002

Eckert & Ziegler
Isotope Products

24937 Avenue Tibbitts
Valencia, California 91355

Tel 661•309•1010
Fax 661•257•8303

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

Radionuclide:	U-236	**Customer:**	TEST AMERICA
Half-life:	(2.342 ± 0.003)E+07 years	**P.O. No.:**	2380469
Catalog No.:	7336	**Reference Date:**	15-Oct-10 12:00 PST
Source No.:	1480-21	**Contained Radioactivity: (Total alpha)**	0.01017 µCi 376.3 Bq

Physical Description:

A.	Mass of solution:	5.01498 g in 5 mL V-Vial
B.	Chemical form:	$UO_2(NO_3)_2$ in 0.1M HNO_3
C.	Carrier content:	None
D.	Density:	1.0016 g/mL @ 20°C

MT02535-10
ISOU U-236 QC CONC
elyk
.1M HN03
Prep/Opened: 10/5/2010
Exp(1): 10/5/2020
Exp(2): 10/5/2020

281584
ID ISOU-C 236_00002
Exp 10/05/15 Prpd KLE Opn 10/05/10
236 CAL

Radioimpurities:

See Technical Data Sheet

Radionuclide Concentration: 0.002028 µCi/g, 75.04 Bq/g

Method of Calibration:

This source was prepared from a weighed aliquot of solution whose activity in µCi/g was determined using a liquid scintillation counter.

Uncertainty of Measurement:

A.	Type A (random) uncertainty:	± 0.9 %
B.	Type B (systematic) uncertainty:	± 3.0 %
C.	Uncertainty in aliquot weighing:	± 0.4 %
D.	Total uncertainty at the 99% confidence level:	± 3.2 %

Notes:

- See reverse side for leak test(s) performed on this source.
- EZIP participates in a NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (as in NRC Regulatory Guide 4.15).
- Nuclear data was taken from "Table of Radioactive Isotopes", edited by Virginia Shirley, 1986.
- This solution has a working life of 5 years.

Daniel James Van Dalsem
Quality Control

21-Sep-10
Date

EZIP Ref. No.: 1480-21

Reagent

ISOU-C Enrich_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

95302

279791
ID: ISOU-C Enrich_00001
Exp:10/16/18 Prpd:KLE Opn:12/19/13
U enriched (234 and 235)

U-Enriched (97%) 5 mL Liquid in Flame Sealed Vial

Customer: Test America - St. Louis
P.O. No.: 2547082, Item 1 Product Code: 8235

This standard radionuclide source was prepared using an aliquot measured gravimetrically from a master radionuclide solution. The master radionuclide solution was prepared by dissolution of Uranium Oxide in 2.5M nitric acid. Total activity was calibrated by liquid scintillation counting. Atomic mass and weight percentages were certified by New Brunswick Laboratory. Radionuclide purity and calibration were checked by liquid scintillation counting and gamma-ray spectrometry. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July, 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date 12-December-2013 12:00 PM EST

Isotope	Activity (Bq)	Half-Life, Days	Uncertainty Type*, (%) u_A	u_B	U
U-234	3.924 E+04	8.967 E+07	1.9	0.9	4.2
U-235	7.991 E+02	2.571 E+11	1.9	0.9	4.2
U-236	3.653 E+01	8.554 E+09	1.9	0.9	4.2
U-238	6.653 E-01	1.632 E+12	1.9	0.9	4.2

***Uncertainty:** U – Relative expanded uncertainty, k=2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: α-impurities (other than decay products)< 0.1%; β-impurities(other than decay products)<0.1%; γ-impurities (other than decay products)<0.1%.
5.20568 grams of 1M HNO_3 solution with Uranium 1.97 mg/g.
Original material certified by New Brunswick Laboratory as CRM U970.

Source Prepared By: _____
R. Ormsby, Radiochemist

QA Approved: _____ 12 DEC 13
J.D. McCorvey, Counting Room Manager

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

MS ICSA_00014

INORGANIC VENTURES
300 Technology Drive
Christiansburg, VA 24073 USA
inorganicventures.com

CERTIFICATE OF ANALYSIS

1.0 **INORGANIC VENTURES** is an ISO Guide 34 "General Requirements for the Competence of Reference Material Producers" and ISO 9001 registered manufacturer. Our manufacturing laboratory is accredited to ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories."

ACCREDITED Testing Laboratory Certificate 883.01

ACCREDITED Reference Material Producer Certificate 883.02

2.0 **DESCRIPTION OF CRM**

Stock Solution

Catalog No.: 6020ICS-0A

Lot Number: **G2-MEB476152MCA**

Matrix: 1.4% HNO3(v/v)

397615
ID: MS ICSA_00014
Exp:07/01/15 Prpd:CCB Opn:07/03/14
ICSA

10,000 µg/mL ea:
Chloride,

2,000 µg/mL ea:
C,

1,000 µg/mL ea:
Al, Ca, Fe, K, Mg, Na, P, S,

20 µg/mL ea:
Mo, Ti

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

ELEMENT	CERTIFIED VALUE	ELEMENT	CERTIFIED VALUE	ELEMENT	CERTIFIED VALUE
Aluminum, Al	1,002 ± 6 µg/mL	Calcium, Ca	1,002 ± 6 µg/mL	Carbon, C	2,004 ± 13 µg/mL
Chloride, Chloride	10,020.0 ± 50.0 µg/mL	Iron, Fe	1,002 ± 7 µg/mL	Magnesium, Mg	1,002 ± 4 µg/mL
Molybdenum, Mo	20.04 ± 0.14 µg/mL	Phosphorus, P	1,002 ± 7 µg/mL	Potassium, K	1,002 ± 4 µg/mL
Sodium, Na	1,002 ± 7 µg/mL	Sulfur, S	1,002 ± 5 µg/mL	Titanium, Ti	20.04 ± 0.13 µg/mL

Certified Density: 1.034 g/mL (measured at 20 ± 1° C)

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

$$\text{Certified Value } (\bar{x}) = \frac{\Sigma x_i}{n}$$

$$\text{Uncertainty } (\pm) = 2\,[\,\Sigma(s_i)^2\,]^{1/2}$$

($\bar{x}$) = mean

x_i = individual results

n = number of measurements

2 = the coverage factor.

$[\,\Sigma(s_i)^2\,]^{1/2}$ = The square root of the sum of the squares of the most common errors (where 's' stands for the standard deviation) from instrumental measurement, density, NIST SRM uncertainty, weighing, dilution to volume, homogeneity, long term stability and short term stability.

4.0 TRACEBILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

· "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)
· This product is Traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRMs are available, the term 'in-house std.' is specified.
- The Calculated Value is a value calculated from the weight of a starting material that has been certified directly vs. a NIST SRM/RM. See section 4.2 for balance traceability.

4.1 ASSAY INFORMATION

ELEMENT	METHOD	NIST SRM#	SRM LOT#
Al	ICP Assay	3101a	060502
Al	EDTA	928	928
C	Gravimetric		See Sec. 4.2
Ca	ICP Assay	3109a	050825
Ca	EDTA	928	928
Chloride	Acidimetric	84L	84L
Fe	ICP Assay	3126a	051031
Fe	EDTA	928	928
K	Gravimetric		See Sec. 4.2
K	ICP Assay	3141a	051220
Mg	ICP Assay	3131a	050302
Mg	EDTA	928	928
Mo	Calculated		See Sec. 4.2
Mo	ICP Assay	3134	891307
Na	Gravimetric		See Sec. 4.2
Na	ICP Assay	3152a	010728
P	ICP Assay	3139a	060717
P	Acidimetric	84L	84L
S	Acidimetric	84k	84k
Ti	ICP Assay	3162a	060808

4.2 BALANCE CALIBRATION - All analytical balances are calibrated yearly by an accredited calibration laboratory and are traceable to a class E 2 analytical weight set with NIST Traceability. All balances are checked daily using an in-house procedure. The weights used for testing are annually compared to master weights and are traceable to the National Institute of Standards and Technology (NIST).

4.3 THERMOMETER CALIBRATION - All thermometers are NIST traceable through thermometers that are calibrated by an A2LA accredited calibration laboratory.

4.4 GLASSWARE CALIBRATION - An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM's.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP-MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

s	Al		M	Dy	< 0.000100	O	Li	0.002000	M	Pr	< 0.000100	M	Te	< 0.012007
M	Sb	< 0.000600	M	Er	< 0.000100	M	Lu	< 0.000100	M	Re	< 0.000100	M	Tb	< 0.000100
O	As	< 0.020000	M	Eu	< 0.000100	s	Mg		M	Rh	< 0.000100	M	Tl	< 0.000100
O	Ba	< 0.000200	M	Gd	< 0.000100	O	Mn	0.003000	M	Rb	< 0.020012	M	Th	< 0.000100
O	Be	< 0.000090	M	Ga	< 0.001001	O	Hg	< 0.005000	M	Ru	< 0.000100	M	Tm	< 0.000100
M	Bi	< 0.005003	O	Ge	< 0.015000	s	Mo		M	Sm	< 0.000100	M	Sn	< 0.003002
O	B	< 0.005000	M	Au	< 0.001001	M	Nd	< 0.000100	O	Sc	< 0.000700	s	Ti	
O	Cd	0.003400	M	Hf	< 0.002001	O	Ni	< 0.002000	M	Se	< 0.050029	O	W	< 0.007000
s	Ca		M	Ho	< 0.000100	M	Nb	< 0.002001	n	Si		M	U	< 0.000100
M	Ce	< 0.000500	M	In	< 0.001001	n	Os		M	Ag	< 0.001001	O	V	< 0.004000
M	Cs	< 0.001001	M	Ir	< 0.000100	M	Pd	< 0.003002	s	Na		M	Yb	< 0.000100
O	Cr	< 0.010000	s	Fe		s	P		O	Sr	0.005000	M	Y	< 0.000100
M	Co	< 0.001001	M	La	< 0.000200	M	Pt	< 0.000100	s	S		M	Zn	0.016610
O	Cu	< 0.020000	M	Pb	0.002001	s	K		M	Ta	< 0.001001	M	Zr	< 0.004002

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
HPLC, IC, TLC, ISE, IR, NMR, UV/VIS, MS, Capillary Electrophoresis, Potentiometry, Wet Chemistry and Voltammetry
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact Technical Staff

This CRM was manufactured using 18 megohm doubly deionized water that has been filtered through a 0.2 micron filter.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep **Tightly** sealed when not in use. Store and use at 20 ± 4°C. **Do Not** pipette from the container. **Do Not** return portions removed from pipetting to container.

Element Specific Information - For specific information regarding any element: Contact technical staff.

Uranium Note: If uranium is present in this standard, it is natural abundance unless specified in Section 3.0.

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Safety Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous.

Inorganic Ventures homogeneity data indicate that the end user should take a minimum sample size of 0.2mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration
- SAI Global File Number 010105

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration"
- Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 "General Requirements for the Competence of Reference Material Producers"
- Reference Materials Production - Accredited A2LA Certificate Number 883.02

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission
- Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission
- Reporting Defects and Non-Compliance

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies of chemically-stable solutions performed at the manufacturer's facility show a CRM shelf-life of twenty one months for solutions packaged in 125-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life. Manufacturer concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

11.3 Chemical Stability - Studies have been conducted on this or similar CRMs and it has been demonstrated that this CRM is chemically stable for a period of not less than two years provided the "Storage & Handling" conditions are followed that are described in section 7.0.

Certification Date: July 12, 2013

Expiration Date: EXPIRES 1[illegible]2015

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By: Zach Saunders
Product Documentation Technician

Zachary Saunders

Certificate Approved By: Allyson Guilliams
Quality Control Supervisor

Allyson Guilliams

Certifying Officer: Paul Gaines
PhD., Senior Technical Director

Paul R Gaines

Reagent

STD U_00005

INORGANIC VENTURES™
CUSTOMER COPY
Drive
Virginia VA 24073
info@inorganicventures.com

CERTIFICATE OF ANALYSIS

260559
ID STD U_00005
Exp 12/01/14 Prpd:REV Opn:12/02/13
U 1000PPM

1.0 **INORGANIC VENTURES** is an ISO Guide 34 "General Requirements for the Competence of Reference Material Producers" and ISO 9001 registered manufacturer. Our manufacturing laboratory is accredited to ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories."

ACCREDITED Testing Laboratory Certificate 883.01

ACCREDITED Reference Material Producer Certificate 883.02

2.0 DESCRIPTION OF CRM **1000 µg/mL Uranium in 2% (v/v) HNO3**

Catalog Number:	CGU1-1, CGU1-2, and CGU1-5
Lot Number:	**F2-U01098**
Starting Material:	UO2(NO3)2.6H2O
Starting Material Purity (%):	99.9979
Starting Material Lot No:	1627
Matrix:	2% (v/v) HNO3

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 1,003 ± 6 µg/mL - weighted mean

Certified Density: 1.010 g/mL (measured at 20 ± 1°C)

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

Certified Value $(\bar{x}) = \frac{\Sigma x_i}{n}$

($\bar{x}$) = mean

x_i = individual results

n = number of measurements

Uncertainty (±) = $2 [\Sigma(s_i)^2]^{½}$

2 = the coverage factor.

$[\Sigma(s_i)^2]^{½}$ = The square root of the sum of the squares of the most common errors (where 's' stands for the standard deviation) from instrumental measurement, density, NIST SRM uncertainty, weighing, dilution to volume, homogeneity, long term stability and short term stability.

Certified Abundance: The 235U in this standard is depleted. The Certified abundances in Atom % are as follows:

IV's Certified Abundance

Isotope	Atom%
Uranium 238U	99.6 ± 0.1
235U	0.42 ± 0.05

4.0 TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

· "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

· This product is Traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRMs are available, the term 'in-house std.' is specified.

- The Calculated Value is a value calculated from the weight of a starting material that has been certified directly vs. a NIST SRM/RM. See section 4.2 for balance traceability.

4.1 **Assay Method #1** **1,003 ± 4 µg/mL**
ICP Assay NIST SRM 3164 Lot Number: 080521

Assay Method #2 **1,002 ± 3 µg/mL**
Calculated NIST SRM Lot Number: See Sec. 4.2

4.2 **BALANCE CALIBRATION -** All analytical balances are calibrated yearly by an accredited calibration laboratory and are traceable to a class E 2 analytical weight set with NIST Traceability. All balances are checked daily using an in-house procedure. The weights used for testing are annually compared to master weights and are traceable to the National Institute of Standards and Technology (NIST).

4.3 **THERMOMETER CALIBRATION -** All thermometers are NIST traceable through thermometers that are calibrated by an A2LA accredited calibration laboratory.

4.4 **GLASSWARE CALIBRATION -** An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM's.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

CRM's solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O Al < 0.050000	M Dy < 0.015093	M Li < 0.025154	M Pr < 0.000755	M Te < 0.075463
M Sb < 0.001258	M Er < 0.012577	M Lu < 0.001006	M Re < 0.002515	M Tb < 0.000755
M As < 0.025154	M Eu < 0.007546	M Mg < 0.075463	M Rh < 0.002515	M Tl < 0.002515
M Ba < 0.025154	M Gd < 0.002515	M Mn < 0.010062	M Rb < 0.002515	M Th < 0.002515
M Be < 0.001258	M Ga < 0.002515	i Hg	M Ru < 0.005031	M Tm < 0.001006
M Bi < 0.001006	M Ge < 0.015093	M Mo < 0.005031	M Sm < 0.002515	O Sn < 0.100000
M B < 0.176080	M Au < 0.007546	M Nd < 0.005031	M Sc < 0.025154	M Ti < 0.125772
M Cd < 0.007546	M Hf < 0.005031	M Ni < 0.020123	M Se < 0.020123	M W < 0.025154
O Ca 0.003976	M Ho < 0.001258	M Nb < 0.001258	i Si	s U
M Ce < 0.012577	M In < 0.025154	n Os	M Ag < 0.005031	M V < 0.005031
M Cs < 0.000755	M Ir < 0.012577	M Pd < 0.012577	O Na 0.039757	M Yb < 0.002515
M Cr < 0.012577	M Fe < 0.503087	i P	M Sr < 0.001258	M Y < 0.100617
M Co < 0.007546	M La < 0.001258	M Pt < 0.005031	i S	M Zn < 0.025154
M Cu < 0.015093	M Pb < 0.007546	i K	M Ta < 0.017608	M Zr < 0.012577

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
HPLC, IC, TLC, ISE, IR, NMR, UV/VIS, MS, Capillary Eletrophoresis, Potentiometry, Wet Chemistry and Voltammetry
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact Technical Staff

This CRM was manufactured using 18 megohm doubly deionized water that has been filtered through a 0.2 micron filter.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 238.0289; +6 ; 8; UO_2^{2+}(uranyl)

Chemical Compatibility - Soluble in HCl and HNO_3. Avoid H_3PO_4. H_2SO_4 and HF matrices should not be a problem depending upon [U]. Although the UO_2^{2+} ion is distinctly basic, any U^{+4} will precipitate in basic media. UO_2^{2+}salts are generally soluble in water and UO_2^{2+} is stable with most metals and inorganic anions. The uranyl phosphate is insoluble in water. UF_4 and UF_6 are water soluble.

Stability - 2-100 ppb levels stable for months in 1% HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 2-5% HNO_3 / LDPE container.

U Containing Samples (Preparation and Solution) - Metal (Dissolves rapidly in HCl and HNO_3); Oxide (Soluble in HNO_3); Ores (Digest for 1-2 hours with 1 gram of ore to 30 mL 1:1 HNO_3. Silica insolubles are removed by filtration after bringing the sample to fumes with conc. H_2SO_4.)

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Type	Interferences (underlined indicates severe)
ICP-OES 385.958 nm	0.3 / 0.01 µg/mL	1	ion	Th, Fe
ICP-OES 367.007 nm	0.3 / 0.02 µg/mL	1	ion	Th, Ce
ICP-OES 263.553 nm	0.3 / 0.01 µg/mL	1	ion	Ce, Ir, Th, Rh, W, Zr, Ta, Ti, V, Hf, Fe, Re, Ru
ICP-MS 238 amu	2 ppt	n/a	M+	206Pb16O2

Uranium Note: If uranium is present in this standard, it is natural abundance unless specified in Section 3.0.

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Safety Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to an in house procedure and is guaranteed to be homogeneous. Inorganic Ventures homogeneity data indicate that the end user should take a minimum sample size of 0.2mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration
- SAI Global File Number 010105

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration"
- Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 "General Requirements for the Competence of Reference Material Producers"
- Reference Materials Production - Accredited A2LA Certificate Number 883.02

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission
- Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission
- Reporting Defects and Non-Compliance

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life. Manufacturer concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

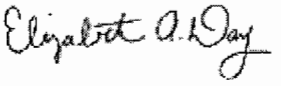
11.3 Chemical Stability - Studies have been conducted on this or similar CRMs and it has been demonstrated that this CRM is chemically stable for a period of not less than two years provided the "Storage & Handling" conditions are followed that are described in section 7.0.

Certification Date: September 07, 2012

Expiration Date:

01 Dec 2014

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	Stephan Blaakman Manufacturing Tech	
Certificate Approved By:	Elizabeth Day Quality Assurance Specialist	
Certifying Officer:	Paul Gaines PhD., Senior Technical Director	

METALS

COVER PAGE
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102431-3

SDG No.: 680-102431-1

Project: Sediments

Client Sample ID	Lab Sample ID
SD-229-SS	680-102431-1
SD-229-01	680-102431-2
SD-230-SS	680-102431-3
SD-230-01	680-102431-4
SD-230-02	680-102431-5
SD-231-SS	680-102431-7
SD-231-01	680-102431-8
SD-231-02	680-102431-9
SD-232-SS	680-102431-11
SD-232-01	680-102431-12
SD-232-02	680-102431-13
SD-233-SS	680-102431-15
SD-233-01	680-102431-16
SD-233-02	680-102431-17

Comments:

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-229-SS
Lab Sample ID: 680-102431-1
Lab Name: TestAmerica St. Louis
Job No.: 680-102431-3
SDG ID.: 680-102431-1
Matrix: Solid
Date Sampled: 06/16/2014 12:05
Reporting Basis: WET
Date Received: 06/17/2014 09:20

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0032	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00063	mg/Kg			5	6020A
15117-96-1	U-235	0.0050	0.011	0.0043	mg/Kg	J		5	6020A
13982-70-2	U-236	ND	0.011	0.00084	mg/Kg			5	6020A
7440-61-1	U-238	0.71	0.011	0.00063	mg/Kg			5	6020A
7440-61-1	Total Uranium	0.72	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-229-01 Lab Sample ID: 680-102431-2

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG ID.: 680-102431-1

Matrix: Solid Date Sampled: 06/16/2014 12:10

Reporting Basis: WET Date Received: 06/17/2014 09:20

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0035	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00069	mg/Kg			5	6020A
15117-96-1	U-235	0.0063	0.012	0.0047	mg/Kg	J		5	6020A
13982-70-2	U-236	ND	0.012	0.00093	mg/Kg			5	6020A
7440-61-1	U-238	0.88	0.012	0.00069	mg/Kg			5	6020A
7440-61-1	Total Uranium	0.89	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-230-SS
Lab Sample ID: 680-102431-3
Lab Name: TestAmerica St. Louis
Job No.: 680-102431-3
SDG ID.: 680-102431-1
Matrix: Solid
Date Sampled: 06/16/2014 13:40
Reporting Basis: WET
Date Received: 06/17/2014 09:20

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0036	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00072	mg/Kg			5	6020A
15117-96-1	U-235	0.0054	0.012	0.0049	mg/Kg	J		5	6020A
13982-70-2	U-236	ND	0.012	0.00096	mg/Kg			5	6020A
7440-61-1	U-238	0.76	0.012	0.00072	mg/Kg			5	6020A
7440-61-1	Total Uranium	0.77	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-230-01 Lab Sample ID: 680-102431-4

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG ID.: 680-102431-1

Matrix: Solid Date Sampled: 06/16/2014 13:45

Reporting Basis: WET Date Received: 06/17/2014 09:20

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0037	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00074	mg/Kg			5	6020A
15117-96-1	U-235	0.0053	0.012	0.0050	mg/Kg	J		5	6020A
13982-70-2	U-236	ND	0.012	0.00099	mg/Kg			5	6020A
7440-61-1	U-238	0.73	0.012	0.00074	mg/Kg			5	6020A
7440-61-1	Total Uranium	0.74	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-230-02 Lab Sample ID: 680-102431-5

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG ID.: 680-102431-1

Matrix: Solid Date Sampled: 06/16/2014 13:50

Reporting Basis: WET Date Received: 06/17/2014 09:20

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0037	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00074	mg/Kg			5	6020A
15117-96-1	U-235	0.0074	0.012	0.0050	mg/Kg	J		5	6020A
13982-70-2	U-236	ND	0.012	0.00098	mg/Kg			5	6020A
7440-61-1	U-238	1.0	0.012	0.00074	mg/Kg			5	6020A
7440-61-1	Total Uranium	1.0	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-231-SS
Lab Sample ID: 680-102431-7
Lab Name: TestAmerica St. Louis
Job No.: 680-102431-3
SDG ID.: 680-102431-1
Matrix: Solid
Date Sampled: 06/16/2014 14:10
Reporting Basis: WET
Date Received: 06/17/2014 09:20

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0034	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00068	mg/Kg			5	6020A
15117-96-1	U-235	0.011	0.011	0.0046	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00091	mg/Kg			5	6020A
7440-61-1	U-238	1.5	0.011	0.00068	mg/Kg			5	6020A
7440-61-1	Total Uranium	1.5	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-231-01 Lab Sample ID: 680-102431-8

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG ID.: 680-102431-1

Matrix: Solid Date Sampled: 06/16/2014 14:15

Reporting Basis: WET Date Received: 06/17/2014 09:20

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0033	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00065	mg/Kg			5	6020A
15117-96-1	U-235	0.014	0.011	0.0044	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00087	mg/Kg			5	6020A
7440-61-1	U-238	1.8	0.011	0.00065	mg/Kg			5	6020A
7440-61-1	Total Uranium	1.8	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-231-02 Lab Sample ID: 680-102431-9

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG ID.: 680-102431-1

Matrix: Solid Date Sampled: 06/16/2014 14:20

Reporting Basis: WET Date Received: 06/17/2014 09:20

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0036	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00073	mg/Kg			5	6020A
15117-96-1	U-235	0.013	0.012	0.0049	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00097	mg/Kg			5	6020A
7440-61-1	U-238	1.6	0.012	0.00073	mg/Kg			5	6020A
7440-61-1	Total Uranium	1.6	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-232-SS
Lab Sample ID: 680-102431-11
Lab Name: TestAmerica St. Louis
Job No.: 680-102431-3
SDG ID.: 680-102431-1
Matrix: Solid
Date Sampled: 06/16/2014 15:20
Reporting Basis: WET
Date Received: 06/17/2014 09:20

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0034	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00067	mg/Kg			5	6020A
15117-96-1	U-235	0.014	0.011	0.0046	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00090	mg/Kg			5	6020A
7440-61-1	U-238	1.9	0.011	0.00067	mg/Kg			5	6020A
7440-61-1	Total Uranium	1.9	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-232-01 Lab Sample ID: 680-102431-12

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG ID.: 680-102431-1

Matrix: Solid Date Sampled: 06/16/2014 15:25

Reporting Basis: WET Date Received: 06/17/2014 09:20

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0036	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00072	mg/Kg			5	6020A
15117-96-1	U-235	0.015	0.012	0.0048	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00095	mg/Kg			5	6020A
7440-61-1	U-238	2.1	0.012	0.00072	mg/Kg			5	6020A
7440-61-1	Total Uranium	2.1	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-232-02 Lab Sample ID: 680-102431-13

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG ID.: 680-102431-1

Matrix: Solid Date Sampled: 06/16/2014 15:30

Reporting Basis: WET Date Received: 06/17/2014 09:20

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0037	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00073	mg/Kg			5	6020A
15117-96-1	U-235	0.010	0.012	0.0050	mg/Kg	J		5	6020A
13982-70-2	U-236	ND	0.012	0.00098	mg/Kg			5	6020A
7440-61-1	U-238	1.4	0.012	0.00073	mg/Kg			5	6020A
7440-61-1	Total Uranium	1.4	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-233-SS
Lab Sample ID: 680-102431-15
Lab Name: TestAmerica St. Louis
Job No.: 680-102431-3
SDG ID.: 680-102431-1
Matrix: Solid
Date Sampled: 06/16/2014 15:40
Reporting Basis: WET
Date Received: 06/17/2014 09:20

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0034	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00069	mg/Kg			5	6020A
15117-96-1	U-235	0.015	0.011	0.0047	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00092	mg/Kg			5	6020A
7440-61-1	U-238	2.0	0.011	0.00069	mg/Kg			5	6020A
7440-61-1	Total Uranium	2.0	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-233-01 Lab Sample ID: 680-102431-16

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG ID.: 680-102431-1

Matrix: Solid Date Sampled: 06/16/2014 15:45

Reporting Basis: WET Date Received: 06/17/2014 09:20

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.012	0.0035	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.012	0.00071	mg/Kg			5	6020A
15117-96-1	U-235	0.015	0.012	0.0048	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.012	0.00094	mg/Kg			5	6020A
7440-61-1	U-238	2.0	0.012	0.00071	mg/Kg			5	6020A
7440-61-1	Total Uranium	2.0	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-233-02 Lab Sample ID: 680-102431-17

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG ID.: 680-102431-1

Matrix: Solid Date Sampled: 06/16/2014 15:50

Reporting Basis: WET Date Received: 06/17/2014 09:20

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0034	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00069	mg/Kg			5	6020A
15117-96-1	U-235	0.013	0.011	0.0047	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00092	mg/Kg			5	6020A
7440-61-1	U-238	1.6	0.011	0.00069	mg/Kg			5	6020A
7440-61-1	Total Uranium	1.6	0.0050	0.00030	mg/Kg			1	6020A

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

ICV Source: ISOU ICV(3)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00021

Analyte	ICV 160-141597/7 09/02/2014 18:45				CCV 160-141597/51 09/02/2014 22:11				CCV 160-141597/63 09/02/2014 23:07			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.226		0.223	101	0.0493	J	0.0515	96	0.0508		0.0515	99

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

ICV Source: ISOU ICV(3)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00021

Analyte	CCV 160-141597/75 09/03/2014 00:03				CCV 160-141597/85 09/03/2014 00:50							
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.0510		0.0515	99	0.0506		0.0515	98				

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

ICV Source: ISOU ICV(4,8)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00021

Analyte	ICV 160-141597/8 09/02/2014 18:50				CCV 160-141597/51 09/02/2014 22:11				CCV 160-141597/63 09/02/2014 23:07			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0892		0.0835	107	0.0871		0.0827	105	0.0874		0.0827	106
U-238	10.1		9.78	103	5.50		5.03	109	5.49		5.03	109

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

ICV Source: ISOU ICV(4,8)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00021

Analyte	CCV 160-141597/75 09/03/2014 00:03				CCV 160-141597/85 09/03/2014 00:50							
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0885		0.0827	107	0.0884		0.0827	107				
U-238	5.53		5.03	110	5.47		5.03	109				

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

ICV Source: ISOU ICV(5,6)_00022 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00021

Analyte	ICV 160-141597/9 09/02/2014 18:55				CCV 160-141597/51 09/02/2014 22:11				CCV 160-141597/63 09/02/2014 23:07			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	1.16		1.06	109	5.27		4.85	109	5.25		4.85	108
U-236	0.0702		0.0746	94	0.0933		0.0890	105	0.0945		0.0890	106

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

ICV Source: ISOU ICV(5,6)_00022 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00021

Analyte	CCV 160-141597/75 09/03/2014 00:03				CCV 160-141597/85 09/03/2014 00:50							
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	5.32		4.85	110	5.26		4.85	109				
U-236	0.0946		0.0890	106	0.0942		0.0890	106				

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2B-IN
CRQL CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

Method: 6020A Instrument ID: ICPMS6100

Lab Sample ID: CRI 160-141597/11 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 1_00021

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-235	0.0485	0.0499	J	103	70-130
U-238	0.0503	0.0496	J	99	70-130

Lab Sample ID: CRI 160-141597/12 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 2_00022

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-233	0.0309	0.0363	J	117	70-130
U-234	0.0496	0.0495	J	100	70-130
U-236	0.0534	0.0529		99	70-130

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IIB-IN

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

Concentration Units: ug/L

Analyte	RL	ICB 160-141597/10 09/02/2014 18:59		CCB 160-141597/52 09/02/2014 22:16		CCB 160-141597/64 09/02/2014 23:12		CCB 160-141597/76 09/03/2014 00:08	
		Found	C	Found	C	Found	C	Found	C
U-233	0.025	0.0345		0.0146	J	0.0150	J	0.0141	J
U-234	0.025	ND		ND		ND		ND	
U-235	0.025	ND		ND		ND		ND	
U-236	0.025	ND		ND		ND		ND	
U-238	0.025	0.00507	J	ND		ND		ND	

Italicized analytes were not requested for this sequence.

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

Concentration Units: ug/L

Analyte	RL	CCB 160-141597/86 09/03/2014 00:54							
		Found	C	Found	C	Found	C	Found	C
U-233	0.025	0.0139	J						
U-234	0.025	ND							
U-235	0.025	ND							
U-236	0.025	ND							
U-238	0.025	ND							

Italicized analytes were not requested for this sequence.

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-139348/1-A

Instrument Code: ICPMS6100 Batch No.: 141597

CAS No.	Analyte	Concentration	C	Q	Method
13968-55-3	U-233	ND			6020A_U
13966-29-5	U-234	ND			6020A_U
15117-96-1	U-235	ND			6020A_U
13982-70-2	U-236	ND			6020A_U
7440-61-1	U-238	ND			6020A_U

4A-IN
INTERFERENCE CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

Lab Sample ID: ICSAB 160-141597/14 Instrument ID: ICPMS6100

Lab File ID: 090214M2.rep ICS Source: ISOU ICSAB_00022

Concentration Units: ug/L

Analyte	True Solution AB	Found Solution AB	Percent Recovery
U-233	**0.0515**	**0.0537**	**104**
U-234	**0.0827**	**0.0910**	**110**
U-235	**4.85**	**5.47**	**113**
U-236	**0.0890**	**0.0975**	**110**
U-238	**5.03**	**5.69**	**113**

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IVA-IN

5A-IN
MATRIX SPIKE SAMPLE RECOVERY
METALS

Client ID: SD-230-02 MS
Lab ID: 680-102431-5 MS
Lab Name: TestAmerica St. Louis
Job No.: 680-102431-3
SDG No.: 680-102431-1
Matrix: Solid
Concentration Units: mg/Kg
% Solids:

Analyte	SSR	C	Sample Result (SR)	C	Spike Added (SA)	%R	Control Limit %R	Q	Method
U-234	0.00899	J	ND		0.00794	113	75-125		6020A
U-235	0.543		0.0074	J	0.465	115	75-125		6020A
U-238	1.54		1.0		0.483	112	75-125		6020A

SSR = Spiked Sample Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VA - IN

5A-IN
MATRIX SPIKE SAMPLE RECOVERY
METALS

Client ID: SD-231-01 MS | Lab ID: 680-102431-8 MS

Lab Name: TestAmerica St. Louis | Job No.: 680-102431-3

SDG No.: 680-102431-1

Matrix: Solid | Concentration Units: mg/Kg

% Solids:

Analyte	SSR	C	Sample Result (SR)	C	Spike Added (SA)	%R	Control Limit %R	Q	Method
U-234	0.00608	J	ND		0.00690	88	75-125		6020A
U-235	0.369		0.014		0.405	88	75-125		6020A
U-238	2.20		1.8		0.420	102	75-125	4	6020A

SSR = Spiked Sample Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VA - IN

5A-IN
MATRIX SPIKE DUPLICATE SAMPLE RECOVERY
METALS

Client ID: SD-230-02 MSD
Lab ID: 680-102431-5 MSD
Lab Name: TestAmerica St. Louis
Job No.: 680-102431-3
SDG No.: 680-102431-1
Matrix: Solid
Concentration Units: mg/Kg
% Solids:

Analyte	(SDR)	C	Spike Added (SA)	%R	Control Limit %R	RPD	RPD Limit	Q	Method
U-234	0.00689	J	0.00752	92	75-125	26	20	F2	6020A
U-235	0.408		0.441	91	75-125	28	20	F2	6020A
U-238	1.16		0.457	36	75-125	28	20	F1 F2	6020A

SDR = Sample Duplicate Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VD - IN

5A-IN
MATRIX SPIKE DUPLICATE SAMPLE RECOVERY
METALS

Client ID: SD-231-01 MSD
Lab ID: 680-102431-8 MSD
Lab Name: TestAmerica St. Louis
Job No.: 680-102431-3
SDG No.: 680-102431-1
Matrix: Solid
Concentration Units: mg/Kg
% Solids:

Analyte	(SDR)	C	Spike Added (SA)	%R	Control Limit %R	RPD	RPD Limit	Q	Method
U-234	0.00591	J	0.00699	85	75-125	3	20		6020A
U-235	0.354		0.410	83	75-125	4	20		6020A
U-238	2.11		0.425	81	75-125	4	20	4	6020A

SDR = Sample Duplicate Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VD - IN

7A-IN
LAB CONTROL SAMPLE
METALS

Lab ID: LCS 160-139348/2-A

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

Sample Matrix: Solid LCS Source: ISOU Prep Spk_00002

Analyte	Solid(mg/Kg)							
	True	Found	C	%R	Limits		Q	Method
U-234	0.00785	0.00845		108	80	120		6020A
U-235	0.461	0.508		110	80	120		6020A
U-238	0.477	0.525		110	80	120		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

8-IN
ICP-AES AND ICP-MS SERIAL DILUTIONS
METALS

Lab ID: 680-102431-5

SDG No: 680-102431-1

Lab Name: TestAmerica St. Louis Job No: 680-102431-3

Matrix: Solid Concentration Units: mg/Kg

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Method
U-233	ND		ND		NC		6020A
U-234	ND		ND		NC		6020A
U-235	0.0074	J	ND		NC		6020A
U-236	ND		ND		NC		6020A
U-238	1.0		0.963		3.5		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIII-IN

9-IN
DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102431-3

SDG Number: 680-102431-1

Matrix: Solid Instrument ID: ICPMS6100

Method: 6020A MDL Date: 08/05/2013 10:01

Prep Method: 3050B

Analyte	Wavelength/ Mass	RL (mg/Kg)	MDL (mg/Kg)
U-233	233	0.005	0.0015
U-234	234	0.005	0.0003
U-235	235	0.005	0.00203
U-236	236	0.005	0.0004
U-238	238	0.005	0.0003

9-IN
CALIBRATION BLANK DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102431-3

SDG Number: 680-102431-1

Matrix: Solid Instrument ID: ICPMS6100

Method: 6020A XMDL Date: 07/18/2014 15:08

Analyte	Wavelength/ Mass	XRL (ug/L)	XMDL (ug/L)
U-233	233	0.05	0.0066
U-234	234	0.05	0.0021
U-235	235	0.05	0.0034
U-236	236	0.05	0.0015
U-238	238	0.05	0.0082

9-IN
DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102431-3

SDG Number: 680-102431-1

Matrix: Solid Instrument ID: NOEQUIP

Method: 6020A MDL Date: 06/12/2013 14:02

Analyte	Wavelength/ Mass	RL (mg/Kg)	MDL (mg/Kg)
Total Uranium		0.005	0.0003

11-IN
LINEAR RANGES
METALS

Lab Name: TestAmerica St. Louis Job No: 680-102431-3

SDG No.: 680-102431-1

Instrument ID: ICPMS6100 Date: 02/14/2012 11:04

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	Method
U-233		2000	6020A
U-234		2000	6020A
U-235		2000	6020A
U-236		2000	6020A
U-238		2000	6020A

12-IN
PREPARATION LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

Prep Method: 3050B

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight (g)	Initial Volume	Final Volume (mL)
MB 160-139348/1-A	08/21/2014 10:35	139348	0.5931		50
LCS 160-139348/2-A	08/21/2014 10:35	139348	0.5263		50
680-102431-1	08/21/2014 10:35	139348	0.5918		50
680-102431-2	08/21/2014 10:35	139348	0.5397		50
680-102431-3	08/21/2014 10:35	139348	0.5187		50
680-102431-4	08/21/2014 10:35	139348	0.5044		50
680-102431-5	08/21/2014 10:35	139348	0.5094		50
680-102431-5 MS	08/21/2014 10:35	139348	0.5208		50
680-102431-5 MSD	08/21/2014 10:35	139348	0.5496		50
680-102431-7	08/21/2014 10:35	139348	0.5477		50
680-102431-8	08/21/2014 10:35	139348	0.5742		50
680-102431-8 MS	08/21/2014 10:35	139348	0.5989		50
680-102431-8 MSD	08/21/2014 10:35	139348	0.5915		50
680-102431-9	08/21/2014 10:35	139348	0.5158		50
680-102431-11	08/21/2014 10:35	139348	0.5565		50
680-102431-12	08/21/2014 10:35	139348	0.5239		50
680-102431-13	08/21/2014 10:35	139348	0.5116		50
680-102431-15	08/21/2014 10:35	139348	0.5456		50
680-102431-16	08/21/2014 10:35	139348	0.5307		50
680-102431-17	08/21/2014 10:35	139348	0.5447		50

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/02/2014 18:15 End Date: 09/03/2014 00:54

Lab Sample Id	D/F	Type	Time	Analytes																										
				U-233	U-234	U-235	U-236	U-238																						
ICIS 160-141597/1			18:15	X	X	X	X	X																						
IC 160-141597/2	1		18:22	X	X	X	X	X																						
IC 160-141597/3	1		18:27	X	X	X	X	X																						
IC 160-141597/4	1		18:31	X	X	X	X	X																						
IC 160-141597/5	1		18:36	X	X	X	X	X																						
IC 160-141597/6	1		18:41	X	X	X	X	X																						
ICV 160-141597/7	1		18:45	X																										
ICV 160-141597/8	1		18:50		X			X																						
ICV 160-141597/9	1		18:55			X	X																							
ICB 160-141597/10	1		18:59	X	X	X	X	X																						
CRI 160-141597/11	1		19:04			X		X																						
CRI 160-141597/12	1		19:09	X	X		X																							
ICSA 160-141597/13	1		19:13	X	X	X	X	X																						
ICSAB 160-141597/14	1		19:18	X	X	X	X	X																						
CCV 160-141597/15			19:23																											
CCB 160-141597/16			19:27																											
ZZZZZZ			19:32																											
ZZZZZZ			19:37																											
ZZZZZZ			19:41																											
ZZZZZZ			19:46																											
ZZZZZZ			19:51																											
ZZZZZZ			19:55																											
ZZZZZZ			20:00																											
ZZZZZZ			20:05																											
ZZZZZZ			20:09																											
ZZZZZZ			20:14																											
CCV 160-141597/27			20:19																											
CCB 160-141597/28			20:23																											
ZZZZZZ			20:28																											
ZZZZZZ			20:33																											
ZZZZZZ			20:37																											
ZZZZZZ			20:42																											
ZZZZZZ			20:47																											
ZZZZZZ			20:51																											
ZZZZZZ			20:56																											
ZZZZZZ			21:01																											
ZZZZZZ			21:05																											
ZZZZZZ			21:10																											
CCV 160-141597/39			21:15																											

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/02/2014 18:15 End Date: 09/03/2014 00:54

Lab Sample Id	D/F	Type	Time	Analytes																										
				U-233	U-234	U-235	U-236	U-238																						
CCB 160-141597/40			21:19																											
ZZZZZZ			21:24																											
ZZZZZZ			21:29																											
ZZZZZZ			21:33																											
ZZZZZZ			21:38																											
ZZZZZZ			21:43																											
ZZZZZZ			21:48																											
ZZZZZZ			21:52																											
ZZZZZZ			21:57																											
ZZZZZZ			22:01																											
ZZZZZZ			22:06																											
CCV 160-141597/51	1		22:11	X	X	X	X	X																						
CCB 160-141597/52	1		22:16	X	X	X	X	X																						
ZZZZZZ			22:20																											
ZZZZZZ			22:25																											
ZZZZZZ			22:30																											
ZZZZZZ			22:34																											
ZZZZZZ			22:39																											
MB 160-139348/1-A	2	T	22:44	X	X	X	X	X																						
LCS 160-139348/2-A	2	T	22:48		X	X		X																						
ZZZZZZ			22:53																											
ZZZZZZ			22:58																											
680-102431-1	5	T	23:02	X	X	X	X	X																						
CCV 160-141597/63	1		23:07	X	X	X	X	X																						
CCB 160-141597/64	1		23:12	X	X	X	X	X																						
680-102431-2	5	T	23:16	X	X	X	X	X																						
680-102431-3	5	T	23:21	X	X	X	X	X																						
680-102431-4	5	T	23:26	X	X	X	X	X																						
680-102431-5	5	T	23:30	X	X	X	X	X																						
680-102431-5 SD	25	T	23:35	X	X	X	X	X																						
680-102431-5 MS	5	T	23:40		X	X		X																						
680-102431-5 MSD	5	T	23:44		X	X		X																						
680-102431-7	5	T	23:49	X	X	X	X	X																						
680-102431-8	5	T	23:54	X	X	X	X	X																						
680-102431-8 MS	5	T	23:58		X	X		X																						
CCV 160-141597/75	1		00:03	X	X	X	X	X																						
CCB 160-141597/76	1		00:08	X	X	X	X	X																						
680-102431-8 MSD	5	T	00:12		X	X		X																						
680-102431-9	5	T	00:17	X	X	X	X	X																						

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/02/2014 18:15 End Date: 09/03/2014 00:54

Lab Sample Id	D/F	Type	Time	Analytes																										
				U-233	U-234	U-235	U-236	U-238																						
680-102431-11	5	T	00:22	X	X	X	X	X																						
680-102431-12	5	T	00:26	X	X	X	X	X																						
680-102431-13	5	T	00:31	X	X	X	X	X																						
680-102431-15	5	T	00:36	X	X	X	X	X																						
680-102431-16	5	T	00:40	X	X	X	X	X																						
680-102431-17	5	T	00:45	X	X	X	X	X																						
CCV 160-141597/85	1		00:50	X	X	X	X	X																						
CCB 160-141597/86	1		00:54	X	X	X	X	X																						

Prep Types:
T = Total/NA

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

Instrument ID: NOEQUIP Analysis Method: 6020A

Start Date: 09/04/2014 13:20 End Date: 09/04/2014 13:20

Lab Sample Id	D/F	Type	Time	Analytes																								
				U																								
ZZZZZZ			13:20																									
ZZZZZZ			13:20																									
680-102431-1	1	T	13:20	X																								
680-102431-2	1	T	13:20	X																								
680-102431-3	1	T	13:20	X																								
680-102431-4	1	T	13:20	X																								
680-102431-5	1	T	13:20	X																								
680-102431-7	1	T	13:20	X																								
680-102431-8	1	T	13:20	X																								
680-102431-9	1	T	13:20	X																								
680-102431-11	1	T	13:20	X																								
680-102431-12	1	T	13:20	X																								
680-102431-13	1	T	13:20	X																								
680-102431-15	1	T	13:20	X																								
680-102431-16	1	T	13:20	X																								
680-102431-17	1	T	13:20	X																								

Prep Types:
T = Total/NA

FORM XIII-IN

15-IN
ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

ICP-MS Instrument ID: ICPMS6100 Start Date: 09/02/2014 End Date: 09/03/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
IC 160-141597/2	18:22										
IC 160-141597/3	18:27										
IC 160-141597/4	18:31										
IC 160-141597/5	18:36										
IC 160-141597/6	18:41										
ICV 160-141597/7	18:45	101									
ICV 160-141597/8	18:50	101									
ICV 160-141597/9	18:55	99									
ICB 160-141597/10	18:59	98									
CRI 160-141597/11	19:04	100									
CRI 160-141597/12	19:09	100									
ICSA 160-141597/13	19:13	90									
ICSAB 160-141597/14	19:18	89									
CCV 160-141597/51	22:11	94									
CCB 160-141597/52	22:16	92									
MB 160-139348/1-A	22:44	96									
LCS 160-139348/2-A	22:48	95									
680-102431-1	23:02	98									
CCV 160-141597/63	23:07	92									
CCB 160-141597/64	23:12	90									
680-102431-2	23:16	92									
680-102431-3	23:21	85									
680-102431-4	23:26	87									
680-102431-5	23:30	90									
680-102431-5 SD	23:35	95									
680-102431-5 MS	23:40	89									
680-102431-5 MSD	23:44	87									
680-102431-7	23:49	86									
680-102431-8	23:54	91									
680-102431-8 MS	23:58	89									
CCV 160-141597/75	00:03	93									
CCB 160-141597/76	00:08	93									
680-102431-8 MSD	00:12	89									
680-102431-9	00:17	87									
680-102431-11	00:22	89									
680-102431-12	00:26	89									
680-102431-13	00:31	88									
680-102431-15	00:36	88									
680-102431-16	00:40	89									
680-102431-17	00:45	89									
CCV 160-141597/85	00:50	93									
CCB 160-141597/86	00:54	92									

KE 9/3/14

File: 090214M2

A Batch
141597
141598

Sample/Batch Report

TA ST. LOUIS - PERKIN ELMER ELAN 6100 - METHOD 6020 / 200.8 QUANTITATIVE ANALYSIS REPORT

User Name: stlmetals
Computer Name: SLICP03
Sample File: D:\Elandata\Sample\SW846 TEMP1.sam
Report Date/Time: Wednesday, September 03, 2014 09:34:49
Method File: d:\Elandata\Method\2014 isou.mth
Tuning File: d:\Elandata\Tuning\epa tuning.tun
Optimization File: d:\Elandata\Optimize\epa2008.dac
Calibration File:
Calibration Type: External Calibration
Number of Replicates: 3
Number of Readings: 1
Number of Sweeps: 100
Dual Detector Mode: Dual

A/S Loc.	Batch ID	Sample ID	Description	Aliquot Vol.	Diluted Vol.
11	139040	430685	2		
12		430686	2		
13		680-102370-A-7-D	5		
14		680-102370-A-8-C	5		
15		680-102370-A-9-C	5		
16		680-102370-A-10-C	5		
17		680-102370-A-11-C	5		
18		680-102370-A-12-C	5		
19		680-102370-A-13-C	5		
20	CCV	680-102370-A-14-C	5		
21	CCB	680-102370-A-15-C	5		
22		680-102370-A-16-C	5		
23		680-102370-A-17-C	5		
24		680-102370-A-18-C	5		
25		680-102370-A-19-C	5		
26		680-102370-A-20-C	5		
27		680-102370-A-22-C	5		
28		680-102370-A-23-G	5		
29		680-102370-A-23-G	SD25		
30	CCV	680-102370-A-23-H	MS5		
31	CCB	680-102370-A-23-I	MSD5		
32		680-102370-A-24-C	5		
33		680-102370-A-25-C	5		
34	139047	430790	2		
35		430791	2		
36		680-102370-A-26-C	5		
37		680-102370-A-26-C	SD25		
38		680-102370-A-26-D	MS5		
39		680-102370-A-26-E	MS5		
40	CCV	680-102370-A-28-C	5		
41	CCB	680-102370-A-29-C	5		
42		680-102370-A-30-C	5		
43		680-102370-A-31-C	5		
44		680-102370-A-33-D	5		
45		680-102370-A-34-C	5		
46	139348	431772	2		
47		431773	2		
48		680-102577-A-1-D	5		
49		680-102577-A-2-C	5		
50	CCV	680-102431-A-1-C	5		
51	CCB	680-102431-A-2-C	5		

All

52		680-102431-A-3-C	5
53		680-102431-A-4-C	5
54		680-102431-A-5-G	5
55		680-102431-A-5-G SD	25
56		680-102431-A-5-H MS	5
57		680-102431-A-5-I MSD	5
58		680-102431-A-7-C	5
59		680-102431-A-8-C	5
60	ccv	680-102431-A-8-D MS	5
61	ccv	680-102431-A-8-E MSD	5
62		680-102431-A-9-C	5
63		680-102431-A-11-C	5
64		680-102431-A-12-C	5
65		680-102431-A-13-C	5
66		680-102431-A-15-C	5
67		680-102431-A-16-C	5
68		680-102431-A-17-C	5

- All

ccv
ccv

Quantitative Analysis Calibration Report

File Name: 090214M2.cal
File Path: D:\Elandata\System
Calibration Type: External Calibration

Analyte	Mass	Curve Type	Slope	Intercept	Corr. Coeff.
Ho (IS)	164.930	Linear Thru Zero	0.000000	0.00	0.000000
U	233.000	Linear Thru Zero	0.047454	0.00	0.999971
U	234.041	Linear Thru Zero	0.036480	0.00	0.999974
U	235.044	Linear Thru Zero	0.033872	0.00	0.999922
U	236.000	Linear Thru Zero	0.052600	0.00	0.999967
U	238.050	Linear Thru Zero	0.030132	0.00	0.999932

Instrument Tuning Report

File Name: EPA TUNING.tun
File Path: d:\Elandata\Tuning
Sample ID: Sample
Sample Date/Time: Tuesday, September 02, 2014 17:30:16

Analyte	Exact Mass	Meas. Mass	Mass DAC	Res. DAC	Meas. Pk. Width	Custom Res.
Li	7.016	7.025	1570	2065	0.643	
Mg	23.985	23.979	5688	2080	0.678	
Rh	102.905	102.879	24919	2080	0.693	
Ce	139.905	139.929	33931	2120	0.673	
Pb	207.977	207.977	50415	2310	0.664	

Replicates: 6

Daily Performance Report

Sample ID: Sample
Sample Date/Time: Tuesday, September 02, 2014 17:48:47
Sample Description:
Method File: d:\Elandata\Method\DAILY EPA.mth
Dataset File: d:\Elandata\Dataset\daily3\Sample.157
Tuning File: d:\Elandata\Tuning\EPA TUNING.tun
Optimization File: d:\Elandata\Optimize\EPA2008.dac
Dual Detector Mode: Pulse
Acq. Dead Time(ns): 35
Current Dead Time (ns): 35

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Net Intens. SD	Net Intens. RSD
	Li	7.0	5059.0	5059.008	181.710	3.6
	Mg	24.0	22040.4	22040.437	314.060	1.4
	Rh	102.9	308814.2	308814.162	3879.016	1.3
	Pb	208.0	284822.2	284822.242	2758.220	1.0
⎡>	Ba	137.9	344587.0	344587.031	5003.107	1.5
⎣	Ba++	69.0	2836.1	0.008	0.000	1.4
⎡>	Ce	139.9	422424.4	422424.369	4644.459	1.1
⎣	CeO	155.9	14719.5	0.035	0.000	1.2
	Bkgd	220.0	6.1	6.056	1.237	20.4

Current Optimization File Data

Current Value	Description
1.00	Nebulizer Gas Flow
5.75	Lens Voltage
1600.00	ICP RF Power
-2109.38	Analog Stage Voltage
1200.00	Pulse Stage Voltage
70.00	Discriminator Threshold
-6.00	AC Rod Offset
60.00	Service DAC 1
0.00	Quadrupole Rod Offset

Current Autolens Data

Analyte	Mass	Num of Pts	DAC Value	Maximum Intensity
Be	9	33	5.8	3790.5
Mg	24	33	5.3	38794.6
Co	59	33	6.0	120968.0
Rh	103	33	6.0	410955.8
In	115	33	6.3	535549.1
Ba	138	33	6.5	493063.2
Ce	140	33	6.8	606693.1
Pb	208	33	8.5	437779.2

Daily Performance Report

Sample ID: Sample
Sample Date/Time: Tuesday, September 02, 2014 17:53:20
Sample Description:
Method File: d:\Elandata\Method\DAILY EPA.mth
Dataset File: d:\Elandata\Dataset\daily3\Sample.158
Tuning File: d:\Elandata\Tuning\EPA TUNING.tun
Optimization File: d:\Elandata\Optimize\EPA2008.dac
Dual Detector Mode: Pulse
Acq. Dead Time(ns): 35
Current Dead Time (ns): 35

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Net Intens. SD	Net Intens. RSD
	Li	7.0	3595.6	3595.564	144.770	4.0
	Mg	24.0	18044.1	18044.114	354.293	2.0
	Rh	102.9	261860.2	261860.165	1846.488	0.7
	Pb	208.0	230123.3	230123.304	767.346	0.3
⎡>	Ba	137.9	289067.4	289067.370	2191.660	0.8
⎣	Ba++	69.0	2378.0	0.008	0.000	1.7
⎡>	Ce	139.9	357557.6	357557.556	2688.005	0.8
⎣	CeO	155.9	10215.4	0.029	0.001	1.9
	Bkgd	220.0	6.8	6.778	1.917	28.3

Current Optimization File Data

Current Value	Description
0.98	Nebulizer Gas Flow
5.75	Lens Voltage
1600.00	ICP RF Power
-2109.38	Analog Stage Voltage
1200.00	Pulse Stage Voltage
70.00	Discriminator Threshold
-6.00	AC Rod Offset
60.00	Service DAC 1
0.00	Quadrupole Rod Offset

Current Autolens Data

Analyte	Mass	Num of Pts	DAC Value	Maximum Intensity
Be	9	33	5.8	3790.5
Mg	24	33	5.3	38794.6
Co	59	33	6.0	120968.0
Rh	103	33	6.0	410955.8
In	115	33	6.3	535549.1
Ba	138	33	6.5	493063.2
Ce	140	33	6.8	606693.1
Pb	208	33	8.5	437779.2

QUANTITATIVE ANALYSIS REPORT

Sample ID: Blank

Sample Date/Time: Tuesday, September 02, 2014 18:15:40
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\090214M2\Blank.001

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			871479.031	ug/L	
	233	**U**			213.002	ug/L	
	234	**U**			6.800	ug/L	
	235	**U**			30.600	ug/L	
	236	**U**			8.600	ug/L	
	238	**U**			260.536	ug/L	

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 1
Sample Date/Time: Tuesday, September 02, 2014 18:22:20
Autosampler Position: 191
Dataset File: D:\Elandata\Dataset\090214M2\Standard 1.002

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			877833.654	ug/L	871479.031
	233	**U**			28.000	ug/L	213.002
	234	**U**			31.800	ug/L	6.800
	235	**U**	**0.048500**	2.265	1514.680	ug/L	30.600
	236	**U**			54.000	ug/L	8.600
	238	**U**	**0.050300**	4.463	1417.070	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 2
Sample Date/Time: Tuesday, September 02, 2014 18:27:01
Autosampler Position: 192
Dataset File: D:\Elandata\Dataset\090214M2\Standard 2.003

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			877238.558	ug/L	871479.031
	233	**U**			1360.198	ug/L	213.002
	234	**U**	**0.049600**	3.938	1622.225	ug/L	6.800
	235	**U**	**2.923211**	2.834	89362.979	ug/L	30.600
	236	**U**	**0.053400**	2.939	2501.486	ug/L	8.600
	238	**U**	**3.552753**	2.583	81802.223	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 3

Sample Date/Time: Tuesday, September 02, 2014 18:31:42

Autosampler Position: 193

Dataset File: D:\Elandata\Dataset\090214M2\Standard 3.004

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			878969.266	ug/L	871479.031
	233	**U**	**0.051500**	3.204	2261.046	ug/L	213.002
	234	**U**	**0.082594**	1.962	2704.656	ug/L	6.800
	235	**U**	**4.885157**	2.687	149649.968	ug/L	30.600
	236	**U**	**0.088787**	3.446	4161.540	ug/L	8.600
	238	**U**	**5.926777**	2.502	136576.296	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 4

Sample Date/Time: Tuesday, September 02, 2014 18:36:23
Autosampler Position: 194
Dataset File: D:\Elandata\Dataset\090214M2\Standard 4.005

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			874096.866	ug/L	871479.031
	233	**U**	**0.103854**	3.090	4458.563	ug/L	213.002
	234	**U**	**0.165318**	1.316	5385.483	ug/L	6.800
	235	**U**	**9.694902**	1.010	297740.953	ug/L	30.600
	236	**U**	**0.178156**	1.054	8385.998	ug/L	8.600
	238	**U**	**10.051840**	1.064	274170.864	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 5

Sample Date/Time: Tuesday, September 02, 2014 18:41:04
Autosampler Position: 195
Dataset File: D:\Elandata\Dataset\090214M2\Standard 5.006

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			879848.746	ug/L	871479.031
	233	**U**	**0.309687**	2.826	13129.570	ug/L	213.002
	234	**U**	**0.494758**	3.061	15867.683	ug/L	6.800
	235	**U**	**28.963445**	3.050	862044.495	ug/L	30.600
	236	**U**	**0.532412**	2.717	24619.484	ug/L	8.600
	238	**U**	**30.038201**	2.681	795705.300	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 1

Sample Date/Time: Tuesday, September 02, 2014 18:45:45
Autosampler Position: 196
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 1.007

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			879143.222	ug/L	871479.031
	233	**U**	**0.226050**	1.842	9638.788	ug/L	213.002
	234	**U**	**0.000564**	18.077	24.867	ug/L	6.800
	235	**U**	**0.009009**	25.139	296.603	ug/L	30.600
	236	**U**	**0.000110**	33.711	13.733	ug/L	8.600
	238	**U**	**0.049227**	6.059	1563.952	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.879**	
	U	233		**101.141**
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 2

Sample Date/Time: Tuesday, September 02, 2014 18:50:26
Autosampler Position: 197
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 2.008

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			880894.558	ug/L	871479.031
	233	**U**	**44.140322**	2.338	1843768.974	ug/L	213.002
	234	**U**	**0.089186**	2.633	2870.088	ug/L	6.800
	235	**U**	**0.114889**	1.914	3456.752	ug/L	30.600
	236	**U**	**0.006645**	7.040	315.870	ug/L	8.600
	238	**U**	**10.088659**	1.697	267879.812	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.080**	
	U	233		
	U	234		**106.810**
	U	235		
	U	236		
	U	238		**103.175**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 3

Sample Date/Time: Tuesday, September 02, 2014 18:55:07

Autosampler Position: 198

Dataset File: D:\Elandata\Dataset\090214M2\QC Std 3.009

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			865018.137	ug/L	871479.031
	233	**U**	**429.199578**	2.214	17607424.649	ug/L	213.002
	234	**U**	**0.905791**	1.987	28578.732	ug/L	6.800
	235	**U**	**1.155253**	2.556	33854.708	ug/L	30.600
	236	**U**	**0.070183**	3.171	3198.492	ug/L	8.600
	238	**U**	**92.852103**	2.535	2418505.251	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.259**	
	U	233		
	U	234		
	U	235		**109.316**
	U	236		**94.079**
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 4

Sample Date/Time: Tuesday, September 02, 2014 18:59:48
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 4.010

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			856444.036	ug/L	871479.031
	233	**U**	**0.034502**	19.267	1619.761	ug/L	213.002
	234	**U**	**0.000064**	68.738	8.667	ug/L	6.800
	235	**U**	**-0.000066**	33.294	28.133	ug/L	30.600
	236	**U**	**0.000008**	344.367	8.867	ug/L	8.600
	238	**U**	**0.005071**	29.359	388.072	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.275**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 5

Sample Date/Time: Tuesday, September 02, 2014 19:04:28
Autosampler Position: 191
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 5.011

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			870074.027	ug/L	871479.031
	233	**U**	**0.028036**	20.106	1361.399	ug/L	213.002
	234	**U**	**0.000909**	2.655	35.600	ug/L	6.800
	235	**U**	**0.049860**	3.603	1497.812	ug/L	30.600
	236	**U**	**0.000812**	9.513	45.667	ug/L	8.600
	238	**U**	**0.049613**	4.931	1558.218	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.839**	
	U	233		
	U	234		
	U	235		**102.805**
	U	236		
	U	238		**98.634**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Tuesday, September 02, 2014 19:09:09
Autosampler Position: 192
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 6.012

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			875095.293	ug/L	871479.031
	233	**U**	**0.036297**	7.050	1717.170	ug/L	213.002
	234	**U**	**0.049549**	0.836	1588.288	ug/L	6.800
	235	**U**	**2.983820**	1.664	88417.674	ug/L	30.600
	236	**U**	**0.052886**	2.219	2440.942	ug/L	8.600
	238	**U**	**3.092020**	1.905	81738.491	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.415**	
	U	233		**117.466**
	U	234		**99.897**
	U	235		
	U	236		**99.037**
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Tuesday, September 02, 2014 19:13:50
Autosampler Position: 199
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 7.013

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			783490.929	ug/L	871479.031
	233	**U**	**-0.001390**	32.984	139.401	ug/L	213.002
	234	**U**	**0.000058**	81.838	7.800	ug/L	6.800
	235	**U**	**-0.000035**	303.887	26.467	ug/L	30.600
	236	**U**	**-0.000018**	186.985	6.933	ug/L	8.600
	238	**U**	**-0.007232**	6.121	63.667	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.904**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 8

Sample Date/Time: Tuesday, September 02, 2014 19:18:30
Autosampler Position: 200
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 8.014

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			772882.876	ug/L	871479.031
	233	**U**	**0.053663**	3.730	2153.696	ug/L	213.002
	234	**U**	**0.090990**	2.499	2568.498	ug/L	6.800
	235	**U**	**5.469291**	2.340	143066.628	ug/L	30.600
	236	**U**	**0.097483**	3.218	3965.351	ug/L	8.600
	238	**U**	**5.691618**	2.953	132603.032	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.686**	
	U	233		**104.201**
	U	234		**110.024**
	U	235		**112.827**
	U	236		**109.531**
	U	238		**113.246**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9

Sample Date/Time: Tuesday, September 02, 2014 19:23:11

Autosampler Position: 10

Dataset File: D:\Elandata\Dataset\090214M2\QC Std 9.015

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			858402.021	ug/L	871479.031
	233	**U**	**0.051075**	2.463	2288.450	ug/L	213.002
	234	**U**	**0.086737**	3.321	2718.992	ug/L	6.800
	235	**U**	**5.234835**	2.651	152061.441	ug/L	30.600
	236	**U**	**0.093078**	2.113	4207.220	ug/L	8.600
	238	**U**	**5.395863**	2.499	139672.487	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.499**	
	U	233		**99.174**
	U	234		**104.882**
	U	235		**107.990**
	U	236		**104.582**
	U	238		**107.361**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Tuesday, September 02, 2014 19:27:51
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 10.016

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			870055.449	ug/L	871479.031
	233	**U**	**0.014028**	2.291	791.955	ug/L	213.002
	234	**U**	**0.000100**	52.127	9.933	ug/L	6.800
	235	**U**	**0.000737**	27.688	52.467	ug/L	30.600
	236	**U**	**-0.000016**	240.514	7.800	ug/L	8.600
	238	**U**	**0.000987**	24.598	286.070	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.837**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 430685

Sample Date/Time: Tuesday, September 02, 2014 19:32:31
Autosampler Position: 11
Dataset File: D:\Elandata\Dataset\090214M2\430685.017

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			884794.789	ug/L	871479.031
	233	**U**	**-0.004523**	1.748	26.200	ug/L	213.002
	234	**U**	**0.000019**	157.744	7.467	ug/L	6.800
	235	**U**	**-0.000129**	15.715	27.200	ug/L	30.600
	236	**U**	**-0.000036**	18.789	7.067	ug/L	8.600
	238	**U**	**-0.006361**	3.227	94.867	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.528**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 430686

Sample Date/Time: Tuesday, September 02, 2014 19:37:11
Autosampler Position: 12
Dataset File: D:\Elandata\Dataset\090214M2\430686.018

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			884397.139	ug/L	871479.031
	233	**U**	**-0.001754**	4.447	142.401	ug/L	213.002
	234	**U**	**0.045024**	2.597	1458.008	ug/L	6.800
	235	**U**	**2.710722**	2.066	81166.280	ug/L	30.600
	236	**U**	**0.048862**	1.472	2280.382	ug/L	8.600
	238	**U**	**2.791975**	1.524	74620.203	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.482**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-7-D

Sample Date/Time: Tuesday, September 02, 2014 19:41:50

Autosampler Position: 13

Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-7-D.019

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			872992.022	ug/L	871479.031
	233	**U**	**-0.004693**	2.005	18.800	ug/L	213.002
	234	**U**	**0.000081**	53.747	9.333	ug/L	6.800
	235	**U**	**0.005060**	5.324	180.201	ug/L	30.600
	236	**U**	**-0.000026**	39.937	7.400	ug/L	8.600
	238	**U**	**0.728456**	2.209	19406.589	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.174**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-8-C

Sample Date/Time: Tuesday, September 02, 2014 19:46:30

Autosampler Position: 14

Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-8-C.020

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			786792.304	ug/L	871479.031
	233	**U**	**-0.004734**	0.475	15.533	ug/L	213.002
	234	**U**	**0.000116**	5.255	9.467	ug/L	6.800
	235	**U**	**0.006522**	3.942	201.468	ug/L	30.600
	236	**U**	**-0.000014**	273.330	7.200	ug/L	8.600
	238	**U**	**0.965476**	2.246	23124.910	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.282**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-9-C

Sample Date/Time: Tuesday, September 02, 2014 19:51:10

Autosampler Position: 15

Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-9-C.021

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			690710.506	ug/L	871479.031
	233	**U**	**-0.004717**	1.226	14.200	ug/L	213.002
	234	**U**	**0.000210**	15.527	10.667	ug/L	6.800
	235	**U**	**0.014069**	3.001	353.271	ug/L	30.600
	236	**U**	**0.000012**	101.427	7.267	ug/L	8.600
	238	**U**	**1.998207**	4.018	41772.268	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**79.257**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-10-C

Sample Date/Time: Tuesday, September 02, 2014 19:55:51

Autosampler Position: 16

Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-10-C.022

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			825992.061	ug/L	871479.031
	233	**U**	**-0.004781**	0.904	14.467	ug/L	213.002
	234	**U**	**0.000142**	51.481	10.733	ug/L	6.800
	235	**U**	**0.009785**	3.728	302.603	ug/L	30.600
	236	**U**	**-0.000018**	147.541	7.400	ug/L	8.600
	238	**U**	**1.388266**	0.677	34800.823	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.780**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-11-C
Sample Date/Time: Tuesday, September 02, 2014 20:00:31
Autosampler Position: 17
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-11-C.023

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			859340.493	ug/L	871479.031
	233	**U**	**-0.004789**	0.490	14.733	ug/L	213.002
	234	**U**	**0.000067**	39.404	8.800	ug/L	6.800
	235	**U**	**0.007017**	2.820	234.269	ug/L	30.600
	236	**U**	**-0.000049**	29.169	6.267	ug/L	8.600
	238	**U**	**1.047836**	2.583	27365.131	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.607**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-12-C
Sample Date/Time: Tuesday, September 02, 2014 20:05:11
Autosampler Position: 18
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-12-C.024

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			877904.012	ug/L	871479.031
	233	**U**	**-0.004782**	0.559	15.333	ug/L	213.002
	234	**U**	**0.000096**	8.415	9.933	ug/L	6.800
	235	**U**	**0.012980**	2.149	416.739	ug/L	30.600
	236	**U**	**-0.000065**	53.307	5.600	ug/L	8.600
	238	**U**	**1.861696**	1.935	49483.280	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.737**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-13-C
Sample Date/Time: Tuesday, September 02, 2014 20:09:52
Autosampler Position: 19
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-13-C.025

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			880656.659	ug/L	871479.031
	233	**U**	**-0.004765**	0.863	16.067	ug/L	213.002
	234	**U**	**0.000108**	48.643	10.267	ug/L	6.800
	235	**U**	**0.013619**	1.081	437.007	ug/L	30.600
	236	**U**	**-0.000038**	25.816	6.933	ug/L	8.600
	238	**U**	**1.908307**	2.178	50858.727	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.053**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-14-C
Sample Date/Time: Tuesday, September 02, 2014 20:14:32
Autosampler Position: 20
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-14-C.026

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			860742.165	ug/L	871479.031
	233	**U**	**-0.004802**	1.745	14.267	ug/L	213.002
	234	**U**	**0.000179**	37.687	12.400	ug/L	6.800
	235	**U**	**0.011478**	5.458	364.138	ug/L	30.600
	236	**U**	**-0.000041**	38.157	6.667	ug/L	8.600
	238	**U**	**1.615032**	3.357	42089.342	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.768**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9

Sample Date/Time: Tuesday, September 02, 2014 20:19:13

Autosampler Position: 10

Dataset File: D:\Elandata\Dataset\090214M2\QC Std 9.027

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			832417.542	ug/L	871479.031
	233	**U**	**0.050707**	5.151	2202.570	ug/L	213.002
	234	**U**	**0.087627**	4.504	2662.315	ug/L	6.800
	235	**U**	**5.280731**	3.511	148696.805	ug/L	30.600
	236	**U**	**0.094781**	2.424	4153.938	ug/L	8.600
	238	**U**	**5.514783**	3.724	138352.945	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.518**	
	U	233		**98.460**
	U	234		**105.957**
	U	235		**108.937**
	U	236		**106.495**
	U	238		**109.727**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Tuesday, September 02, 2014 20:23:54
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 10.028

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			830497.718	ug/L	871479.031
	233	**U**	**0.014176**	3.240	760.954	ug/L	213.002
	234	**U**	**0.000098**	30.113	9.467	ug/L	6.800
	235	**U**	**0.000512**	17.322	43.600	ug/L	30.600
	236	**U**	**-0.000014**	161.109	7.600	ug/L	8.600
	238	**U**	**0.001323**	40.411	280.936	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.297**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-15-C

Sample Date/Time: Tuesday, September 02, 2014 20:28:34

Autosampler Position: 21

Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-15-C.029

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			854135.867	ug/L	871479.031
	233	**U**	**-0.004822**	1.153	13.267	ug/L	213.002
	234	**U**	**0.000174**	39.427	12.067	ug/L	6.800
	235	**U**	**0.015262**	2.202	471.208	ug/L	30.600
	236	**U**	**-0.000019**	123.602	7.533	ug/L	8.600
	238	**U**	**2.088738**	1.523	53985.983	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.010**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-16-C
Sample Date/Time: Tuesday, September 02, 2014 20:33:15
Autosampler Position: 22
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-16-C.030

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			854467.388	ug/L	871479.031
	233	**U**	**-0.004840**	0.434	12.600	ug/L	213.002
	234	**U**	**0.000114**	27.426	10.200	ug/L	6.800
	235	**U**	**0.011487**	3.229	362.138	ug/L	30.600
	236	**U**	**-0.000043**	16.612	6.467	ug/L	8.600
	238	**U**	**1.597980**	2.349	41364.170	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.048**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-17-C
Sample Date/Time: Tuesday, September 02, 2014 20:37:55
Autosampler Position: 23
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-17-C.031

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			843325.434	ug/L	871479.031
	233	**U**	**-0.004815**	0.762	13.400	ug/L	213.002
	234	**U**	**0.000056**	54.787	8.333	ug/L	6.800
	235	**U**	**0.005078**	3.953	174.734	ug/L	30.600
	236	**U**	**-0.000022**	105.186	7.333	ug/L	8.600
	238	**U**	**0.770295**	1.046	19820.624	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.769**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-18-C
Sample Date/Time: Tuesday, September 02, 2014 20:42:35
Autosampler Position: 24
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-18-C.032

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			792676.250	ug/L	871479.031
	233	**U**	**-0.004869**	0.256	10.600	ug/L	213.002
	234	**U**	**0.000236**	20.073	13.000	ug/L	6.800
	235	**U**	**0.021428**	1.211	603.146	ug/L	30.600
	236	**U**	**-0.000028**	88.563	6.667	ug/L	8.600
	238	**U**	**2.909892**	1.488	69741.486	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.958**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-19-C

Sample Date/Time: Tuesday, September 02, 2014 20:47:14
Autosampler Position: 25
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-19-C.033

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			797506.105	ug/L	871479.031
	233	**U**	**-0.004892**	0.426	9.800	ug/L	213.002
	234	**U**	**0.000143**	26.644	10.400	ug/L	6.800
	235	**U**	**0.017006**	0.826	487.408	ug/L	30.600
	236	**U**	**-0.000035**	45.662	6.400	ug/L	8.600
	238	**U**	**2.149986**	0.493	51905.786	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.512**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-20-C
Sample Date/Time: Tuesday, September 02, 2014 20:51:54
Autosampler Position: 26
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-20-C.034

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			779599.854	ug/L	871479.031
	233	**U**	**-0.004833**	0.438	11.733	ug/L	213.002
	234	**U**	**0.000158**	19.718	10.600	ug/L	6.800
	235	**U**	**0.014079**	1.775	399.139	ug/L	30.600
	236	**U**	**-0.000020**	154.270	6.867	ug/L	8.600
	238	**U**	**1.941961**	1.130	45853.513	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.457**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-22-C
Sample Date/Time: Tuesday, September 02, 2014 20:56:34
Autosampler Position: 27
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-22-C.035

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			786566.331	ug/L	871479.031
	233	**U**	**-0.004815**	0.188	12.533	ug/L	213.002
	234	**U**	**0.000306**	4.971	14.933	ug/L	6.800
	235	**U**	**0.030624**	1.185	843.425	ug/L	30.600
	236	**U**	**-0.000035**	69.048	6.333	ug/L	8.600
	238	**U**	**4.176876**	0.718	99225.594	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.256**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-23-G

Sample Date/Time: Tuesday, September 02, 2014 21:01:14

Autosampler Position: 28

Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-23-G.036

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			797224.450	ug/L	871479.031
	233	**U**	**-0.004837**	0.749	11.867	ug/L	213.002
	234	**U**	**0.000357**	13.092	16.600	ug/L	6.800
	235	**U**	**0.039126**	2.582	1084.441	ug/L	30.600
	236	**U**	**-0.000059**	46.248	5.400	ug/L	8.600
	238	**U**	**5.180147**	1.012	124673.420	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.479**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-23-G SD

Sample Date/Time: Tuesday, September 02, 2014 21:05:54

Autosampler Position: 29

Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-23-G SD.037

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			835975.654	ug/L	871479.031
	233	**U**	**-0.004888**	0.135	10.400	ug/L	213.002
	234	**U**	**0.000051**	56.356	8.067	ug/L	6.800
	235	**U**	**0.007009**	3.830	227.935	ug/L	30.600
	236	**U**	**-0.000062**	78.163	5.533	ug/L	8.600
	238	**U**	**1.016736**	1.639	25847.047	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.926**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-23-H MS

Sample Date/Time: Tuesday, September 02, 2014 21:10:35

Autosampler Position: 30

Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-23-H MS.038

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			779979.583	ug/L	871479.031
	233	**U**	**-0.003678**	1.795	54.467	ug/L	213.002
	234	**U**	**0.018158**	1.492	522.676	ug/L	6.800
	235	**U**	**1.135961**	0.496	30037.015	ug/L	30.600
	236	**U**	**0.019268**	2.041	798.022	ug/L	8.600
	238	**U**	**6.974903**	1.056	164156.370	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.501**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Tuesday, September 02, 2014 21:15:18
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 9.039

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			843936.985	ug/L	871479.031
	233	**U**	**0.049177**	2.135	2175.366	ug/L	213.002
	234	**U**	**0.084676**	1.183	2612.372	ug/L	6.800
	235	**U**	**5.080323**	1.294	145193.821	ug/L	30.600
	236	**U**	**0.090976**	1.327	4044.907	ug/L	8.600
	238	**U**	**5.321035**	1.516	135488.742	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.840**	
	U	233		**95.489**
	U	234		**102.390**
	U	235		**104.803**
	U	236		**102.220**
	U	238		**105.872**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Tuesday, September 02, 2014 21:19:58
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 10.040

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			836605.960	ug/L	871479.031
	233	**U**	**0.013896**	0.775	756.287	ug/L	213.002
	234	**U**	**0.000076**	62.848	8.800	ug/L	6.800
	235	**U**	**0.000557**	23.776	45.000	ug/L	30.600
	236	**U**	**0.000015**	233.686	8.867	ug/L	8.600
	238	**U**	**0.000956**	45.161	273.936	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.998**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-23-I MSD

Sample Date/Time: Tuesday, September 02, 2014 21:24:38

Autosampler Position: 31

Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-23-I MSD.041

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			777371.136	ug/L	871479.031
	233	**U**	**-0.003571**	1.797	58.267	ug/L	213.002
	234	**U**	**0.019463**	1.567	557.944	ug/L	6.800
	235	**U**	**1.165653**	0.556	30717.400	ug/L	30.600
	236	**U**	**0.019675**	2.536	812.023	ug/L	8.600
	238	**U**	**6.603466**	0.842	154905.741	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.201**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-24-C
Sample Date/Time: Tuesday, September 02, 2014 21:29:19
Autosampler Position: 32
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-24-C.042

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			775377.460	ug/L	871479.031
	233	**U**	**-0.004837**	0.294	11.533	ug/L	213.002
	234	**U**	**0.000356**	12.497	16.133	ug/L	6.800
	235	**U**	**0.041422**	1.060	1115.044	ug/L	30.600
	236	**U**	**-0.000018**	112.466	6.933	ug/L	8.600
	238	**U**	**5.172267**	1.406	121067.701	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.973**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-25-C
Sample Date/Time: Tuesday, September 02, 2014 21:33:59
Autosampler Position: 33
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-25-C.043

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			790799.841	ug/L	871479.031
	233	**U**	**-0.004890**	1.238	9.733	ug/L	213.002
	234	**U**	**0.000343**	12.158	16.067	ug/L	6.800
	235	**U**	**0.032770**	0.714	905.429	ug/L	30.600
	236	**U**	**-0.000032**	8.340	6.467	ug/L	8.600
	238	**U**	**4.436906**	0.892	105962.566	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.742**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 430790
Sample Date/Time: Tuesday, September 02, 2014 21:38:40
Autosampler Position: 34
Dataset File: D:\Elandata\Dataset\090214M2\430790.044

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			857058.240	ug/L	871479.031
	233	**U**	**-0.004949**	0.766	8.200	ug/L	213.002
	234	**U**	**0.000015**	430.907	7.200	ug/L	6.800
	235	**U**	**-0.000355**	27.166	19.867	ug/L	30.600
	236	**U**	**-0.000025**	39.337	7.333	ug/L	8.600
	238	**U**	**-0.007293**	1.396	67.800	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.345**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 430791

Sample Date/Time: Tuesday, September 02, 2014 21:43:20

Autosampler Position: 35

Dataset File: D:\Elandata\Dataset\090214M2\430791.045

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			851901.021	ug/L	871479.031
	233	**U**	**-0.002147**	2.305	121.401	ug/L	213.002
	234	**U**	**0.043846**	2.130	1368.199	ug/L	6.800
	235	**U**	**2.642822**	1.942	76232.728	ug/L	30.600
	236	**U**	**0.046903**	1.298	2109.289	ug/L	8.600
	238	**U**	**2.741272**	1.651	70577.981	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.753**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-26-C
Sample Date/Time: Tuesday, September 02, 2014 21:48:00
Autosampler Position: 36
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-26-C.046

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			783418.642	ug/L	871479.031
	233	**U**	**-0.004847**	0.403	11.267	ug/L	213.002
	234	**U**	**0.000318**	13.868	15.200	ug/L	6.800
	235	**U**	**0.032605**	0.828	892.628	ug/L	30.600
	236	**U**	**-0.000003**	194.360	7.600	ug/L	8.600
	238	**U**	**4.349762**	1.741	102917.667	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.895**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-26-C SD

Sample Date/Time: Tuesday, September 02, 2014 21:52:39

Autosampler Position: 37

Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-26-C SD.047

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			818968.518	ug/L	871479.031
	233	**U**	**-0.004965**	0.406	7.200	ug/L	213.002
	234	**U**	**0.000083**	78.075	8.800	ug/L	6.800
	235	**U**	**0.005754**	2.080	188.401	ug/L	30.600
	236	**U**	**-0.000025**	40.043	7.000	ug/L	8.600
	238	**U**	**0.847213**	2.082	21137.303	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.975**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-26-D MS

Sample Date/Time: Tuesday, September 02, 2014 21:57:19

Autosampler Position: 38

Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-26-D MS.048

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			762820.028	ug/L	871479.031
	233	**U**	**-0.003581**	1.532	56.800	ug/L	213.002
	234	**U**	**0.018656**	1.454	525.010	ug/L	6.800
	235	**U**	**1.138036**	0.979	29429.627	ug/L	30.600
	236	**U**	**0.019667**	0.624	796.689	ug/L	8.600
	238	**U**	**5.848231**	1.127	134664.691	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**87.532**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-26-E MSD

Sample Date/Time: Tuesday, September 02, 2014 22:01:59

Autosampler Position: 39

Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-26-E MSD.049

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			768514.920	ug/L	871479.031
	233	**U**	**-0.003744**	2.729	51.200	ug/L	213.002
	234	**U**	**0.016976**	1.292	482.075	ug/L	6.800
	235	**U**	**1.048521**	0.532	27323.998	ug/L	30.600
	236	**U**	**0.018193**	2.460	743.019	ug/L	8.600
	238	**U**	**5.258573**	0.771	122011.020	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.185**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-28-C

Sample Date/Time: Tuesday, September 02, 2014 22:06:39

Autosampler Position: 40

Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-28-C.050

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			758602.723	ug/L	871479.031
	233	**U**	**-0.004817**	1.513	12.000	ug/L	213.002
	234	**U**	**0.000284**	21.699	13.800	ug/L	6.800
	235	**U**	**0.030151**	2.837	801.089	ug/L	30.600
	236	**U**	**-0.000056**	32.737	5.267	ug/L	8.600
	238	**U**	**4.099648**	1.444	93918.472	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**87.048**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9

Sample Date/Time: Tuesday, September 02, 2014 22:11:20

Autosampler Position: 10

Dataset File: D:\Elandata\Dataset\090214M2\QC Std 9.051

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			816860.468	ug/L	871479.031
	233	**U**	**0.049340**	2.105	2110.756	ug/L	213.002
	234	**U**	**0.087122**	0.987	2601.571	ug/L	6.800
	235	**U**	**5.268790**	1.918	145696.009	ug/L	30.600
	236	**U**	**0.093305**	2.479	4013.431	ug/L	8.600
	238	**U**	**5.503374**	2.017	135595.839	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.733**	
	U	233		**95.806**
	U	234		**105.347**
	U	235		**108.691**
	U	236		**104.837**
	U	238		**109.500**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Tuesday, September 02, 2014 22:16:00
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 10.052

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			804815.232	ug/L	871479.031
	233	**U**	**0.014614**	1.613	754.753	ug/L	213.002
	234	**U**	**0.000076**	149.492	8.400	ug/L	6.800
	235	**U**	**0.000914**	12.383	53.200	ug/L	30.600
	236	**U**	**0.000010**	425.542	8.333	ug/L	8.600
	238	**U**	**0.001937**	26.661	287.070	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.350**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-29-C
Sample Date/Time: Tuesday, September 02, 2014 22:20:40
Autosampler Position: 41
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-29-C.053

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			780115.866	ug/L	871479.031
	233	**U**	**-0.004840**	0.654	11.533	ug/L	213.002
	234	**U**	**0.000321**	12.720	15.200	ug/L	6.800
	235	**U**	**0.034888**	1.398	949.232	ug/L	30.600
	236	**U**	**-0.000046**	3.680	5.800	ug/L	8.600
	238	**U**	**4.732945**	0.700	111493.794	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.516**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-30-C
Sample Date/Time: Tuesday, September 02, 2014 22:25:20
Autosampler Position: 42
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-30-C.054

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			755728.685	ug/L	871479.031
	233	**U**	**-0.004821**	0.703	11.800	ug/L	213.002
	234	**U**	**0.000330**	5.776	15.000	ug/L	6.800
	235	**U**	**0.038576**	1.105	1014.103	ug/L	30.600
	236	**U**	**-0.000043**	18.186	5.733	ug/L	8.600
	238	**U**	**5.074654**	1.170	115790.761	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**86.718**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-31-C
Sample Date/Time: Tuesday, September 02, 2014 22:30:01
Autosampler Position: 43
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-31-C.055

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			756793.765	ug/L	871479.031
	233	**U**	**-0.004840**	0.403	11.133	ug/L	213.002
	234	**U**	**0.000243**	15.513	12.600	ug/L	6.800
	235	**U**	**0.027562**	0.063	733.085	ug/L	30.600
	236	**U**	**-0.000012**	533.316	7.000	ug/L	8.600
	238	**U**	**3.854799**	0.136	88132.702	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**86.840**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-33-D
Sample Date/Time: Tuesday, September 02, 2014 22:34:41
Autosampler Position: 44
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-33-D.056

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			806534.241	ug/L	871479.031
	233	**U**	**-0.004915**	0.829	9.067	ug/L	213.002
	234	**U**	**0.000099**	24.243	9.200	ug/L	6.800
	235	**U**	**0.017154**	2.687	496.742	ug/L	30.600
	236	**U**	**-0.000009**	255.388	7.533	ug/L	8.600
	238	**U**	**2.329200**	1.391	56821.419	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.548**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-34-C
Sample Date/Time: Tuesday, September 02, 2014 22:39:22
Autosampler Position: 45
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-34-C.057

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			769563.723	ug/L	871479.031
	233	**U**	**-0.004870**	0.820	10.267	ug/L	213.002
	234	**U**	**0.000273**	26.004	13.667	ug/L	6.800
	235	**U**	**0.031050**	1.522	836.625	ug/L	30.600
	236	**U**	**-0.000034**	94.269	6.200	ug/L	8.600
	238	**U**	**4.119544**	0.434	95756.502	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.305**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 431772
Sample Date/Time: Tuesday, September 02, 2014 22:44:03
Autosampler Position: 46
Dataset File: D:\Elandata\Dataset\090214M2\431772.058

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			834675.626	ug/L	871479.031
	233	**U**	**-0.004957**	0.338	7.667	ug/L	213.002
	234	**U**	**-0.000013**	74.979	6.133	ug/L	6.800
	235	**U**	**-0.000715**	2.813	9.067	ug/L	30.600
	236	**U**	**-0.000068**	13.248	5.267	ug/L	8.600
	238	**U**	**-0.005050**	6.541	122.334	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.777**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 431773
Sample Date/Time: Tuesday, September 02, 2014 22:48:43
Autosampler Position: 47
Dataset File: D:\Elandata\Dataset\090214M2\431773.059

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			831417.512	ug/L	871479.031
	233	**U**	**-0.002060**	5.863	121.734	ug/L	213.002
	234	**U**	**0.044486**	2.390	1354.398	ug/L	6.800
	235	**U**	**2.673403**	1.920	75254.895	ug/L	30.600
	236	**U**	**0.047592**	1.834	2088.086	ug/L	8.600
	238	**U**	**2.761716**	1.765	69385.272	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.403**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102577-A-1-D

Sample Date/Time: Tuesday, September 02, 2014 22:53:22

Autosampler Position: 48

Dataset File: D:\Elandata\Dataset\090214M2\680-102577-A-1-D.060

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			816888.361	ug/L	871479.031
	233	**U**	**-0.004858**	1.075	11.333	ug/L	213.002
	234	**U**	**0.000229**	31.353	13.133	ug/L	6.800
	235	**U**	**0.026249**	1.622	754.887	ug/L	30.600
	236	**U**	**-0.000004**	270.612	7.867	ug/L	8.600
	238	**U**	**3.083787**	1.629	76115.962	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.736**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102577-A-2-C

Sample Date/Time: Tuesday, September 02, 2014 22:58:02

Autosampler Position: 49

Dataset File: D:\Elandata\Dataset\090214M2\680-102577-A-2-C.061

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			814257.313	ug/L	871479.031
	233	**U**	**-0.004842**	0.384	11.933	ug/L	213.002
	234	**U**	**0.000350**	44.945	16.600	ug/L	6.800
	235	**U**	**0.042802**	2.029	1208.451	ug/L	30.600
	236	**U**	**-0.000041**	84.426	6.333	ug/L	8.600
	238	**U**	**5.762728**	1.129	141585.289	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.434**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-1-C
Sample Date/Time: Tuesday, September 02, 2014 23:02:42
Autosampler Position: 50
Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-1-C.062

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			851946.988	ug/L	871479.031
	233	**U**	**-0.004842**	0.429	12.467	ug/L	213.002
	234	**U**	**0.000068**	70.928	8.800	ug/L	6.800
	235	**U**	**0.011728**	3.564	367.938	ug/L	30.600
	236	**U**	**-0.000052**	14.664	6.067	ug/L	8.600
	238	**U**	**1.671683**	0.977	43160.732	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.759**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9

Sample Date/Time: Tuesday, September 02, 2014 23:07:22

Autosampler Position: 10

Dataset File: D:\Elandata\Dataset\090214M2\QC Std 9.063

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			804741.390	ug/L	871479.031
	233	**U**	**0.050782**	4.114	2132.226	ug/L	213.002
	234	**U**	**0.087438**	3.879	2568.498	ug/L	6.800
	235	**U**	**5.251190**	3.226	142945.438	ug/L	30.600
	236	**U**	**0.094525**	4.094	4001.628	ug/L	8.600
	238	**U**	**5.486435**	3.043	133088.260	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.342**	
	U	233		**98.606**
	U	234		**105.729**
	U	235		**108.328**
	U	236		**106.208**
	U	238		**109.163**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Tuesday, September 02, 2014 23:12:03

Autosampler Position: 1

Dataset File: D:\Elandata\Dataset\090214M2\QC Std 10.064

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			785094.506	ug/L	871479.031
	233	**U**	**0.015027**	3.313	751.020	ug/L	213.002
	234	**U**	**0.000090**	37.557	8.667	ug/L	6.800
	235	**U**	**0.000797**	12.938	48.667	ug/L	30.600
	236	**U**	**0.000017**	128.736	8.400	ug/L	8.600
	238	**U**	**0.001910**	18.492	279.536	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.088**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-2-C

Sample Date/Time: Tuesday, September 02, 2014 23:16:42

Autosampler Position: 51

Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-2-C.065

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			800738.130	ug/L	871479.031
	233	**U**	**-0.004852**	0.520	11.333	ug/L	213.002
	234	**U**	**0.000151**	38.507	10.667	ug/L	6.800
	235	**U**	**0.013661**	5.052	397.939	ug/L	30.600
	236	**U**	**-0.000041**	67.228	6.133	ug/L	8.600
	238	**U**	**1.898983**	3.349	46001.258	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.883**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-3-C
Sample Date/Time: Tuesday, September 02, 2014 23:21:22
Autosampler Position: 52
Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-3-C.066

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			738188.649	ug/L	871479.031
	233	**U**	**-0.004903**	1.310	8.600	ug/L	213.002
	234	**U**	**0.000087**	71.325	8.067	ug/L	6.800
	235	**U**	**0.011153**	0.717	304.737	ug/L	30.600
	236	**U**	**-0.000040**	20.606	5.733	ug/L	8.600
	238	**U**	**1.576122**	1.439	35280.631	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**84.705**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-4-C
Sample Date/Time: Tuesday, September 02, 2014 23:26:02
Autosampler Position: 53
Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-4-C.067

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			754935.939	ug/L	871479.031
	233	**U**	**-0.004887**	0.508	9.467	ug/L	213.002
	234	**U**	**0.000120**	14.923	9.200	ug/L	6.800
	235	**U**	**0.010646**	3.391	298.670	ug/L	30.600
	236	**U**	**-0.000022**	179.327	6.600	ug/L	8.600
	238	**U**	**1.478326**	0.691	33853.018	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**86.627**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-5-G

Sample Date/Time: Tuesday, September 02, 2014 23:30:42

Autosampler Position: 54

Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-5-G.068

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			779566.511	ug/L	871479.031
	233	**U**	**-0.004920**	0.607	8.533	ug/L	213.002
	234	**U**	**0.000155**	26.692	10.467	ug/L	6.800
	235	**U**	**0.015047**	1.967	424.606	ug/L	30.600
	236	**U**	**-0.000052**	58.934	5.533	ug/L	8.600
	238	**U**	**2.034493**	2.826	48009.278	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.453**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-5-G SD

Sample Date/Time: Tuesday, September 02, 2014 23:35:23

Autosampler Position: 55

Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-5-G SD.069

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			827685.891	ug/L	871479.031
	233	**U**	**-0.004941**	0.438	8.200	ug/L	213.002
	234	**U**	**0.000019**	294.532	7.000	ug/L	6.800
	235	**U**	**0.002390**	8.188	95.934	ug/L	30.600
	236	**U**	**-0.000036**	82.098	6.533	ug/L	8.600
	238	**U**	**0.392506**	2.502	10027.920	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.975**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-5-H MS

Sample Date/Time: Tuesday, September 02, 2014 23:40:03

Autosampler Position: 56

Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-5-H MS.070

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			773979.757	ug/L	871479.031
	233	**U**	**-0.003702**	4.222	53.200	ug/L	213.002
	234	**U**	**0.018728**	0.665	534.877	ug/L	6.800
	235	**U**	**1.130946**	1.109	29674.800	ug/L	30.600
	236	**U**	**0.019813**	0.158	814.223	ug/L	8.600
	238	**U**	**3.207127**	0.562	75020.908	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.812**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-5-I MSD

Sample Date/Time: Tuesday, September 02, 2014 23:44:44

Autosampler Position: 57

Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-5-I MSD.071

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			754517.149	ug/L	871479.031
	233	**U**	**-0.003926**	1.819	43.800	ug/L	213.002
	234	**U**	**0.015153**	1.328	422.940	ug/L	6.800
	235	**U**	**0.896120**	2.362	22910.765	ug/L	30.600
	236	**U**	**0.015602**	3.236	626.080	ug/L	8.600
	238	**U**	**2.556198**	2.318	58297.764	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**86.579**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-7-C
Sample Date/Time: Tuesday, September 02, 2014 23:49:25
Autosampler Position: 58
Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-7-C.072

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			752647.796	ug/L	871479.031
	233	**U**	**-0.004885**	0.257	9.467	ug/L	213.002
	234	**U**	**0.000243**	18.869	12.533	ug/L	6.800
	235	**U**	**0.024106**	4.877	640.348	ug/L	30.600
	236	**U**	**-0.000026**	117.689	6.400	ug/L	8.600
	238	**U**	**3.334732**	2.511	75796.742	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**86.364**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-8-C
Sample Date/Time: Tuesday, September 02, 2014 23:54:05
Autosampler Position: 59
Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-8-C.073

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			791853.969	ug/L	871479.031
	233	**U**	**-0.004867**	1.247	10.600	ug/L	213.002
	234	**U**	**0.000259**	15.739	13.667	ug/L	6.800
	235	**U**	**0.031509**	2.328	872.560	ug/L	30.600
	236	**U**	**-0.000043**	88.679	6.000	ug/L	8.600
	238	**U**	**4.063575**	0.646	97190.465	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.863**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-8-D MS

Sample Date/Time: Tuesday, September 02, 2014 23:58:44

Autosampler Position: 60

Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-8-D MS.074

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			778384.426	ug/L	871479.031
	233	**U**	**-0.003897**	1.788	46.333	ug/L	213.002
	234	**U**	**0.014574**	3.176	419.806	ug/L	6.800
	235	**U**	**0.884814**	0.687	23354.482	ug/L	30.600
	236	**U**	**0.015171**	0.842	628.747	ug/L	8.600
	238	**U**	**5.268332**	1.265	123780.473	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.318**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9

Sample Date/Time: Wednesday, September 03, 2014 00:03:25
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 9.075

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			810031.312	ug/L	871479.031
	233	**U**	**0.050953**	4.255	2152.296	ug/L	213.002
	234	**U**	**0.088483**	3.176	2616.773	ug/L	6.800
	235	**U**	**5.319555**	5.145	145594.461	ug/L	30.600
	236	**U**	**0.094590**	4.905	4028.035	ug/L	8.600
	238	**U**	**5.528168**	4.110	134888.353	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.949**	
	U	233		**98.938**
	U	234		**106.993**
	U	235		**109.738**
	U	236		**106.281**
	U	238		**109.994**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Wednesday, September 03, 2014 00:08:05
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 10.076

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			810222.869	ug/L	871479.031
	233	**U**	**0.014083**	6.804	738.086	ug/L	213.002
	234	**U**	**0.000038**	104.250	7.467	ug/L	6.800
	235	**U**	**0.001174**	13.756	60.600	ug/L	30.600
	236	**U**	**0.000017**	210.940	8.667	ug/L	8.600
	238	**U**	**0.001801**	22.778	285.803	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.971**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-8-E MSD

Sample Date/Time: Wednesday, September 03, 2014 00:12:45

Autosampler Position: 61

Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-8-E MSD.077

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			772848.782	ug/L	871479.031
	233	**U**	**-0.003853**	3.640	47.533	ug/L	213.002
	234	**U**	**0.013991**	1.205	400.472	ug/L	6.800
	235	**U**	**0.838307**	0.842	21970.957	ug/L	30.600
	236	**U**	**0.014090**	0.696	580.478	ug/L	8.600
	238	**U**	**5.003829**	0.900	116769.368	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.682**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-9-C

Sample Date/Time: Wednesday, September 03, 2014 00:17:25

Autosampler Position: 62

Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-9-C.078

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			756524.108	ug/L	871479.031
	233	**U**	**-0.004862**	1.088	10.333	ug/L	213.002
	234	**U**	**0.000291**	7.413	13.933	ug/L	6.800
	235	**U**	**0.027085**	2.062	720.818	ug/L	30.600
	236	**U**	**-0.000021**	159.629	6.600	ug/L	8.600
	238	**U**	**3.373340**	0.977	77128.700	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**86.809**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-11-C
Sample Date/Time: Wednesday, September 03, 2014 00:22:05
Autosampler Position: 63
Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-11-C.079

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			771873.717	ug/L	871479.031
	233	**U**	**-0.004887**	1.065	9.600	ug/L	213.002
	234	**U**	**0.000298**	3.988	14.400	ug/L	6.800
	235	**U**	**0.030142**	2.325	815.223	ug/L	30.600
	236	**U**	**-0.000038**	33.536	6.067	ug/L	8.600
	238	**U**	**4.130252**	0.773	96288.297	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.571**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-12-C
Sample Date/Time: Wednesday, September 03, 2014 00:26:45
Autosampler Position: 64
Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-12-C.080

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			772060.846	ug/L	871479.031
	233	**U**	**-0.004812**	0.321	12.400	ug/L	213.002
	234	**U**	**0.000316**	10.824	14.933	ug/L	6.800
	235	**U**	**0.032082**	2.045	865.893	ug/L	30.600
	236	**U**	**-0.000052**	51.076	5.467	ug/L	8.600
	238	**U**	**4.337591**	0.896	101121.520	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.592**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-13-C

Sample Date/Time: Wednesday, September 03, 2014 00:31:25

Autosampler Position: 65

Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-13-C.081

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			770022.626	ug/L	871479.031
	233	**U**	**-0.004810**	0.566	12.400	ug/L	213.002
	234	**U**	**0.000207**	47.279	11.733	ug/L	6.800
	235	**U**	**0.020596**	4.338	563.611	ug/L	30.600
	236	**U**	**-0.000032**	51.810	6.267	ug/L	8.600
	238	**U**	**2.775066**	1.837	64584.904	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.358**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-15-C
Sample Date/Time: Wednesday, September 03, 2014 00:36:05
Autosampler Position: 66
Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-15-C.082

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			764370.876	ug/L	871479.031
	233	**U**	**-0.004849**	0.506	10.933	ug/L	213.002
	234	**U**	**0.000322**	16.247	14.933	ug/L	6.800
	235	**U**	**0.032224**	0.319	861.093	ug/L	30.600
	236	**U**	**-0.000045**	54.873	5.733	ug/L	8.600
	238	**U**	**4.354307**	0.975	100493.521	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**87.710**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-16-C
Sample Date/Time: Wednesday, September 03, 2014 00:40:46
Autosampler Position: 67
Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-16-C.083

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			779166.392	ug/L	871479.031
	233	**U**	**-0.004824**	0.282	12.067	ug/L	213.002
	234	**U**	**0.000313**	9.353	15.000	ug/L	6.800
	235	**U**	**0.031310**	1.137	853.492	ug/L	30.600
	236	**U**	**-0.000018**	186.007	6.933	ug/L	8.600
	238	**U**	**4.228677**	1.270	99495.167	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.407**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-17-C
Sample Date/Time: Wednesday, September 03, 2014 00:45:26
Autosampler Position: 68
Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-17-C.084

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			773193.773	ug/L	871479.031
	233	**U**	**-0.004825**	0.361	11.933	ug/L	213.002
	234	**U**	**0.000235**	16.901	12.667	ug/L	6.800
	235	**U**	**0.028551**	0.716	774.888	ug/L	30.600
	236	**U**	**-0.000023**	232.333	6.667	ug/L	8.600
	238	**U**	**3.487272**	1.453	81492.322	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.722**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9

Sample Date/Time: Wednesday, September 03, 2014 00:50:07
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 9.085

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			810880.675	ug/L	871479.031
	233	**U**	**0.050600**	2.469	2143.694	ug/L	213.002
	234	**U**	**0.088389**	1.580	2619.574	ug/L	6.800
	235	**U**	**5.262554**	2.079	144468.125	ug/L	30.600
	236	**U**	**0.094169**	0.907	4023.301	ug/L	8.600
	238	**U**	**5.469910**	2.298	133786.161	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.046**	
	U	233		**98.253**
	U	234		**106.879**
	U	235		**108.562**
	U	236		**105.808**
	U	238		**108.834**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Wednesday, September 03, 2014 00:54:48
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 10.086

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			798529.659	ug/L	871479.031
	233	**U**	**0.013884**	4.008	720.418	ug/L	213.002
	234	**U**	**0.000029**	25.276	7.067	ug/L	6.800
	235	**U**	**0.001596**	18.265	70.867	ug/L	30.600
	236	**U**	**0.000027**	159.194	9.000	ug/L	8.600
	238	**U**	**0.002700**	20.258	303.270	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.629**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

METALS BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

Batch Number: 139348 Batch Start Date: 08/21/14 10:35 Batch Analyst: Davis, Shanika M

Batch Method: 3050B Batch End Date: 08/21/14 15:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	FinalAmount	ISOU Prep Spk 00002			
MB 160-139348/1		3050B, 6020A		0.5931 g	50 mL				
LCS 160-139348/2		3050B, 6020A		0.5263 g	50 mL	0.25 mL			
680-102431-A-1	SD-229-SS	3050B, 6020A	T	0.5918 g	50 mL				
680-102431-A-2	SD-229-01	3050B, 6020A	T	0.5397 g	50 mL				
680-102431-A-3	SD-230-SS	3050B, 6020A	T	0.5187 g	50 mL				
680-102431-A-4	SD-230-01	3050B, 6020A	T	0.5044 g	50 mL				
680-102431-A-5	SD-230-02	3050B, 6020A	T	0.5094 g	50 mL				
680-102431-A-5 MS	SD-230-02	3050B, 6020A	T	0.5208 g	50 mL	0.25 mL			
680-102431-A-5 MSD	SD-230-02	3050B, 6020A	T	0.5496 g	50 mL	0.25 mL			
680-102431-A-7	SD-231-SS	3050B, 6020A	T	0.5477 g	50 mL				
680-102431-A-8	SD-231-01	3050B, 6020A	T	0.5742 g	50 mL				
680-102431-A-8 MS	SD-231-01	3050B, 6020A	T	0.5989 g	50 mL	0.25 mL			
680-102431-A-8 MSD	SD-231-01	3050B, 6020A	T	0.5915 g	50 mL	0.25 mL			
680-102431-A-9	SD-231-02	3050B, 6020A	T	0.5158 g	50 mL				
680-102431-A-11	SD-232-SS	3050B, 6020A	T	0.5565 g	50 mL				
680-102431-A-12	SD-232-01	3050B, 6020A	T	0.5239 g	50 mL				
680-102431-A-13	SD-232-02	3050B, 6020A	T	0.5116 g	50 mL				
680-102431-A-15	SD-233-SS	3050B, 6020A	T	0.5456 g	50 mL				
680-102431-A-16	SD-233-01	3050B, 6020A	T	0.5307 g	50 mL				
680-102431-A-17	SD-233-02	3050B, 6020A	T	0.5447 g	50 mL				

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

METALS BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102431-3

SDG No.: 680-102431-1

Batch Number: 139348 Batch Start Date: 08/21/14 10:35 Batch Analyst: Davis, Shanika M

Batch Method: 3050B Batch End Date: 08/21/14 15:00

Batch Notes	
Balance ID	27150548
Hydrogen peroxide lot number	408031
Lot # of hydrochloric acid	422962
Lot # of Nitric Acid	422893
Hot Block ID number	HOTBLOCK1
Oven, Bath or Block Temperature 1	94.0 Degrees C
Pipette ID	M-PREP-2
ID number of the thermometer	111815886
Digestion Tube/Cup Lot #	191064

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

Subcontract Data

Shipping and Receiving Documents

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.28
Client Contact: Mike Martin	Phone: (703) 342-8589	E-Mail: jerry.lanier@testamericainc.com		Page: ~~Page 28 of 28~~ 1 of 2
Company: Tetra Tech, Inc.				Job #: 680-102431-1
Address: 20251 Century Blvd Suite 200	Due Date Requested:	Analysis Requested		Preservation Codes:
City: Germantown	TAT Requested (days): Standard			A - HCL M - Hexane B - NaOH N - None C - Zn Acetate O - AsNaO2 D - Nitric Acid P - Na2O4S E - NaHSO4 Q - Na2SO3 F - MeOH R - Na2S2SO3 G - Amchlor S - H2SO4 H - Ascorbic Acid T - TSP Dodecahydrate I - Ice U - Acetone J - DI Water V - MCAA K - EDTA W - ph 4-5 L - EDA Z - other (specify)
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			Other:
Email: Michael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	8020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-229-SS	6/16/14	1205	C	Solid				X				
SD-229-01		1210	C	Solid				X				
SD-230-SS		1340	C	Solid				X				
SD-230-01		1345	C	Solid				X				
SD-230-01		1350	C	Solid				X				MS/MSD
SD-230-03		1355	C	Solid				X				
SD-231-SS		1410	C	Solid				X				
SD-231-01		1415	C	Solid				X				
SD-231-02		1420	C	Solid				X				
SD-231-03		1425	C	Solid				X				
SD-232-SS		1520	C	Solid				X				

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6-16-14 / 1600	TT		6/16/14/1610	TA
2		6/16/14/1710	TA		6.17.14 0820	TA
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

RA 1

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.30
Client Contact: Mike Martin	Phone: (703) 342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: ~~Page 30 of 45~~ 2 of 2
Company: Tetra Tech, Inc.			Analysis Requested	Job #: 680-102431-1
Address: 20251 Century Blvd Suite 200	Due Date Requested:			
City: Germantown	TAT Requested (days): Standard			
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			
Email: Michael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-228/228	Total Number of containers	Special Instructions/Note:
		Preservation Code:					N	N	N	N		
SD-232-01	6/16/14	1525		Solid				X				
SD-232-02	"	1530		Solid				X				
SD-232-03	"	1535		Solid				X				
SD-233-55	"	1540		Solid				X				
SD-233-01	"	1545		Solid				X				
SD-233-02	"	1550		Solid				X				
SD-233-03	↓	1555		Solid				X				
				Solid								
				Solid								
				Solid								
				Solid								

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		6-16-14 / 1600	TT		6/16/14 / 1616	TestAmerica
2		6/16/14 / 1910	TestAmerica		6-17-14 0920	TA STL
3		Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

Page 204 of 207

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-102431-3
SDG Number: 680-102431-1

Login Number: 102431
List Source: TestAmerica Savannah
List Number: 1
Creator: Daughtry, Beth A

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-102431-3
SDG Number: 680-102431-1

Login Number: 102431
List Number: 2
Creator: Daniels, Brian J

List Source: TestAmerica St. Louis
List Creation: 06/18/14 12:41 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	2.6
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-102431-3
SDG Number: 680-102431-1

Login Number: 102431
List Number: 3
Creator: Oetter, David R

List Source: TestAmerica St. Louis
List Creation: 06/19/14 11:27 AM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	True	

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 680-102577-1

SDG Number: 680102577-1

Job Description: Sediments

For:
Tetra Tech, Inc.
20251 Century Blvd
Suite 200
Germantown, MD 20874

Attention: Mike Martin



Approved for release.
Jerry A Lanier
Project Manager I
7/31/2014 12:31 PM

Jerry A Lanier, Project Manager I
5102 LaRoche Avenue, Savannah, GA, 31404
(912)354-7858 e.3410
jerry.lanier@testamericainc.com
07/31/2014

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

Savannah Certifications and ID #s: A2LA: 0399.01; AL: 41450; ARDEQ: 88-0692; ARDOH; AZ: AZ0741; CA: 03217CA; CO; CT: PH0161; DE; FL: E87052; GA: 803; Guam; HI; IL: 200022; IN: C-GA-02; IA: 353; KS: E-10322; KY EPPC: 90084; KY UST; LA DEQ: 30690; LA DHH: LA080008; ME: 2008022; MD: 250; MA: M-GA006; MI: 9925; MS; NFESC: 249; NV: GA00006; NJ: GA769; NM; NY: 10842; NC DWQ: 269; NC DHHS: 13701; PA: 68-00474; PR: GA00006; RI: LAO00244; SC: 98001001; TN: TN0296; TX: T104704185; USEPA: GA00006; VT: VT-87052; VA: 00302; WA; WV DEP: 094; WV DHHR: 9950 C; WI DNR: 999819810; WY/EPAR8: 8TMS-Q

Table of Contents

Cover Title Page 1

Data Summaries 4

Definitions 4

Case Narrative 5

Detection Summary 6

Client Sample Results 7

QC Sample Results 8

QC Association 9

Chronicle 10

Certification Summary 11

Method Summary 13

Sample Summary 14

Reagent Traceability 15

COAs 18

Radiochemistry Raw Data 94

Gamma Spectroscopy 94

Method GA-01-R Ra-226 95

Daily Checks 156

Initial Calibrations 212

Initial Calibration Verifications 248

Annual Calibration Verifications 281

Monthly Backgrounds 312

Run Logs 349

Subcontracted Data 353

Shipping and Receiving Documents 354

Client Chain of Custody 355

Table of Contents

Sample Receipt Checklist 356

Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Sediments

Report Number: 680-102577-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 06/20/2014; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 1.2 C.

RADIUM-226 AND OTHER GAMMA EMITTERS (GS)

Samples SD-005W-02 (680-102577-1) and SD-005E-02 (680-102577-2) were analyzed for Radium-226 and other gamma emitters (GS) in accordance with approved methodologies. The samples were leached on 06/25/2014, prepared on 07/03/2014 and analyzed on 07/24/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102577-1
SDG: 680102577-1

Client Sample ID: SD-005W-02 — Lab Sample ID: 680-102577-1

No Detections.

Client Sample ID: SD-005E-02 — Lab Sample ID: 680-102577-2

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: SD-005W-02

Lab Sample ID: 680-102577-1

Date Collected: 06/13/14 12:00

Matrix: Solid

Date Received: 06/20/14 09:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	**0.953**		0.246	0.265	1.00	0.201	pCi/g	07/03/14 14:41	07/24/14 02:06	1
Radium-228	**1.08**		0.349	0.366		0.209	pCi/g	07/03/14 14:41	07/24/14 02:06	1
Thorium-232	**1.08**		0.349	0.366		0.209	pCi/g	07/03/14 14:41	07/24/14 02:06	1
Uranium-235	-0.0826	U	0.379	0.379		0.660	pCi/g	07/03/14 14:41	07/24/14 02:06	1
Uranium-238	0.641	U	1.73	1.74		3.09	pCi/g	07/03/14 14:41	07/24/14 02:06	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Ac-228	*1.08*		*0.349*	*0.366*		*0.209*	*pCi/g*	*07/03/14 14:41*	*07/24/14 02:06*	*1*
Bi-214	*0.953*		*0.246*	*0.265*		*0.201*	*pCi/g*	*07/03/14 14:41*	*07/24/14 02:06*	*1*
K-40	*13.7*		*2.53*	*2.89*		*0.857*	*pCi/g*	*07/03/14 14:41*	*07/24/14 02:06*	*1*
Pb-212	*1.04*		*0.229*	*0.266*		*0.225*	*pCi/g*	*07/03/14 14:41*	*07/24/14 02:06*	*1*
Pb-214	*0.956*		*0.250*	*0.269*		*0.217*	*pCi/g*	*07/03/14 14:41*	*07/24/14 02:06*	*1*
Tl-208	*0.225*		*0.114*	*0.116*		*0.134*	*pCi/g*	*07/03/14 14:41*	*07/24/14 02:06*	*1*

Client Sample ID: SD-005E-02

Lab Sample ID: 680-102577-2

Date Collected: 06/13/14 12:05

Matrix: Solid

Date Received: 06/20/14 09:30

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	**0.902**		0.234	0.252	1.00	0.190	pCi/g	07/03/14 14:41	07/24/14 02:40	1
Radium-228	**1.38**		0.304	0.335		0.276	pCi/g	07/03/14 14:41	07/24/14 02:40	1
Thorium-232	**1.38**		0.304	0.335		0.276	pCi/g	07/03/14 14:41	07/24/14 02:40	1
Uranium-235	-0.147	U	2.58	2.58		0.843	pCi/g	07/03/14 14:41	07/24/14 02:40	1
Uranium-238	1.64	U	0.998	1.01		3.14	pCi/g	07/03/14 14:41	07/24/14 02:40	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Ac-228	*1.38*		*0.304*	*0.335*		*0.276*	*pCi/g*	*07/03/14 14:41*	*07/24/14 02:40*	*1*
Bi-214	*0.902*		*0.234*	*0.252*		*0.190*	*pCi/g*	*07/03/14 14:41*	*07/24/14 02:40*	*1*
K-40	*14.4*		*2.39*	*2.81*		*1.04*	*pCi/g*	*07/03/14 14:41*	*07/24/14 02:40*	*1*
Pb-212	*1.41*		*0.250*	*0.309*		*0.224*	*pCi/g*	*07/03/14 14:41*	*07/24/14 02:40*	*1*
Pb-214	*0.849*		*0.204*	*0.222*		*0.187*	*pCi/g*	*07/03/14 14:41*	*07/24/14 02:40*	*1*
Tl-208	*0.461*		*0.124*	*0.133*		*0.0893*	*pCi/g*	*07/03/14 14:41*	*07/24/14 02:40*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-129597/1-A
Matrix: Solid
Analysis Batch: 133788

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 129597

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.03143	U	0.0391	0.0392	1.00	0.186	pCi/g	07/03/14 14:41	07/24/14 02:06	1
Radium-228	0.06282	U	0.0909	0.0911		0.201	pCi/g	07/03/14 14:41	07/24/14 02:06	1
Thorium-232	0.06282	U	0.0909	0.0911		0.201	pCi/g	07/03/14 14:41	07/24/14 02:06	1
Uranium-235	0.02916	U	0.117	0.117		0.235	pCi/g	07/03/14 14:41	07/24/14 02:06	1
Uranium-238	0.05176	U	0.178	0.178		1.20	pCi/g	07/03/14 14:41	07/24/14 02:06	1

Other Detected Radionuclides	*MB Result*	*MB Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*07/03/14 14:41*	*07/24/14 02:06*	*1*

Lab Sample ID: LCS 160-129597/2-A
Matrix: Solid
Analysis Batch: 133792

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 129597

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Americium-241			97.4	100.0		10.6		1.70	pCi/g	103	87 - 116		
Cesium-137			31.0	29.85		3.27		0.381	pCi/g	96	87 - 120		
Cobalt-60			21.9	21.05		2.23		0.163	pCi/g	96	87 - 115		

Lab Sample ID: 680-102577-1 DU
Matrix: Solid
Analysis Batch: 133793

Client Sample ID: SD-005W-02
Prep Type: Total/NA
Prep Batch: 129597

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Radium-226	0.953			0.7903		0.212	1.00	0.121	pCi/g			0.34	1
Radium-228	1.08			1.282		0.300		0.267	pCi/g			0.31	1
Thorium-232	1.08			1.282		0.300		0.267	pCi/g			0.31	1
Uranium-235	-0.0826	U		0.07357	U	0.260		0.495	pCi/g			0.24	1
Uranium-238	0.641	U		1.192	U	0.749		2.13	pCi/g			0.22	1

Rad

Leach Batch: 128628

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102577-1	SD-005W-02	Total/NA	Solid	Dry and Grind	
680-102577-1 DU	SD-005W-02	Total/NA	Solid	Dry and Grind	
680-102577-2	SD-005E-02	Total/NA	Solid	Dry and Grind	

Prep Batch: 129597

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102577-1	SD-005W-02	Total/NA	Solid	Fill_Geo-21	128628
680-102577-1 DU	SD-005W-02	Total/NA	Solid	Fill_Geo-21	128628
680-102577-2	SD-005E-02	Total/NA	Solid	Fill_Geo-21	128628
LCS 160-129597/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-129597/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102577-1
SDG: 680102577-1

Client Sample ID: SD-005W-02

Lab Sample ID: 680-102577-1

Date Collected: 06/13/14 12:00

Matrix: Solid

Date Received: 06/20/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			128628	06/25/14 13:25	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			129597	07/03/14 14:41	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	133787	07/24/14 02:06	SMP	TAL SL

Client Sample ID: SD-005E-02

Lab Sample ID: 680-102577-2

Date Collected: 06/13/14 12:05

Matrix: Solid

Date Received: 06/20/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			128628	06/25/14 13:25	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			129597	07/03/14 14:41	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	133794	07/24/14 02:40	SMP	TAL SL

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Certification Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102577-1
SDG: 680102577-1

Laboratory: TestAmerica Savannah

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
	AFCEE		SAVLAB	
A2LA	DoD ELAP		399.01	02-28-15
A2LA	ISO/IEC 17025		399.01	02-28-15
Alabama	State Program	4	41450	06-30-15
Arkansas DEQ	State Program	6	88-0692	01-31-15
California	NELAP	9	3217CA	07-31-14 *
Colorado	State Program	8	N/A	12-31-14
Connecticut	State Program	1	PH-0161	03-31-15
Florida	NELAP	4	E87052	06-30-15
GA Dept. of Agriculture	State Program	4	N/A	06-12-17
Georgia	State Program	4	N/A	06-30-15
Georgia	State Program	4	803	06-30-15
Guam	State Program	9	09-005r	04-16-15
Hawaii	State Program	9	N/A	06-30-15
Illinois	NELAP	5	200022	11-30-14
Indiana	State Program	5	N/A	06-30-15
Iowa	State Program	7	353	07-01-15
Kentucky (DW)	State Program	4	90084	12-31-14
Kentucky (UST)	State Program	4	18	06-30-15
Louisiana	NELAP	6	30690	06-30-14 *
Louisiana (DW)	NELAP	6	LA140023	12-31-14
Maine	State Program	1	GA00006	08-16-14 *
Maryland	State Program	3	250	12-31-14
Massachusetts	State Program	1	M-GA006	06-30-15
Michigan	State Program	5	9925	06-30-14 *
Mississippi	State Program	4	N/A	06-30-14 *
Montana	State Program	8	CERT0081	01-01-15
Nebraska	State Program	7	TestAmerica-Savannah	06-30-14 *
New Jersey	NELAP	2	GA769	06-30-15
New Mexico	State Program	6	N/A	06-30-14 *
New York	NELAP	2	10842	03-31-15
North Carolina (DW)	State Program	4	13701	07-31-15
North Carolina (WW/SW)	State Program	4	269	12-31-14
Oklahoma	State Program	6	9984	08-31-14
Pennsylvania	NELAP	3	68-00474	06-30-15
Puerto Rico	State Program	2	GA00006	12-31-14
South Carolina	State Program	4	98001	06-30-14 *
Tennessee	State Program	4	TN02961	06-30-15
Texas	NELAP	6	T104704185-08-TX	11-30-14
USDA	Federal		SAV 3-04	06-11-17
Virginia	NELAP	3	460161	06-14-15
Washington	State Program	10	C805	06-10-15
West Virginia (DW)	State Program	3	9950C	12-31-14
West Virginia DEP	State Program	3	94	06-30-14 *
Wisconsin	State Program	5	999819810	08-31-14
Wyoming	State Program	8	8TMS-L	06-30-14 *

Laboratory: TestAmerica St. Louis

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

* Certification renewal pending - certification considered valid.

Certification Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102577-1
SDG: 680102577-1

Laboratory: TestAmerica St. Louis (Continued)

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska	State Program	10	MO00054	06-30-15
California	NELAP	9	2886	03-31-15
Connecticut	State Program	1	PH-0241	03-31-15
Florida	NELAP	4	E87689	06-30-15
Illinois	NELAP	5	200023	11-30-14
Iowa	State Program	7	373	12-01-14
Kansas	NELAP	7	E-10236	10-31-14
Kentucky (DW)	State Program	4	90125	12-31-14
L-A-B	DoD ELAP		L2305	01-10-16
Louisiana	NELAP	6	04080	06-30-15
Maryland	State Program	3	310	09-30-14 *
Missouri	State Program	7	780	06-30-14 *
Nevada	State Program	9	MO000542013-1	07-31-14 *
New Jersey	NELAP	2	MO002	06-30-15
New Mexico	State Program	6		06-30-10 *
New York	NELAP	2	11616	03-31-15
North Dakota	State Program	8	R207	06-30-14 *
NRC	NRC		24-24817-01	12-31-22
Oklahoma	State Program	6	2013-049	08-31-14 *
Pennsylvania	NELAP	3	68-00540	02-28-15
South Carolina	State Program	4	85002001	06-30-14 *
Texas	NELAP	6	T104704193-13-6	07-31-14 *
USDA	Federal		P330-07-00122	01-09-17
USEPA Reg V SDWA	Federal	1	WG-15J	08-30-14
Utah	NELAP	8	MO000542013-5	07-31-14 *
Virginia	NELAP	3	460230	06-14-15
Washington	State Program	10	C592	08-30-14 *
West Virginia DEP	State Program	3	381	08-30-14 *

* Certification renewal pending - certification considered valid.

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102577-1
SDG: 680102577-1

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102577-1
SDG: 680102577-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-102577-1	SD-005W-02	Solid	06/13/14 12:00	06/20/14 09:30
680-102577-2	SD-005E-02	Solid	06/13/14 12:05	06/20/14 09:30

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102577-1

SDG No.: 680102577-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
Marn Soil_00002	03/01/16	Eckert & Ziegler, Lot 83814-334			(Purchased Reagent)		Americium-241	2870 Bq
							Cd-109	39231 Bq
							Ce-139	1302 Bq
							Cesium-137	1087 Bq
							Co-57	849 Bq
							Cobalt-60	1788 Bq
							Hg-203	2820 Bq
							Pb-210	35040 Bq
							Sn-113	2306 Bq
							Y-88	3762 Bq
MarnSolid_00002	02/09/17	Eckert & Ziegler, Lot 90099			(Purchased Reagent)		Americium-241	2797 Bq
							Cd-109	39337 Bq
							Ce-139	1320 Bq
							Cesium-137	1122 Bq
							Co-57	870 Bq
							Hg-203	2814 Bq
							Pb-210	35883 Bq
							Sn-113	2322 Bq
							Y-88	3821 Bq
Source C_00001	04/01/59	02/23/12	water, Lot 79670-334	1.0148 g	Gamma Ampuole_00001	1.0148 g	Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
.Gamma Ampuole_00001	04/07/59	Analytics, Lot 79670-334			(Purchased Reagent)		Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
Source D_00001	04/01/59	02/23/11	water, Lot 79670-334	0.9781 g	Gamma Ampuole_00001	0.9781 g	Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq

Lab Name: TestAmerica St. Louis Job No.: 680-102577-1

SDG No.: 680102577-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
.Gamma Ampuole_00001	04/07/59		Analytics, Lot 79670-334		(Purchased Reagent)		Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
Source E_00001	04/01/59	02/23/11	water, Lot 79670-334	1.0205 g	Gamma Ampuole_00001	1.0205 g	Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
.Gamma Ampuole_00001	04/07/59		Analytics, Lot 79670-334		(Purchased Reagent)		Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
Source F_00001	01/01/61	02/23/11	water, Lot 83725-334	10 mL	Gamma Ampuole_00003	2.0327 mL	Americium-241	1846.42 Bq
							Cd-109	26819.3 Bq
							Ce-139	890.424 Bq
							Cesium-137	743.562 Bq
							Co-57	580.6 Bq
							Cobalt-60	1222.38 Bq
							Hg-203	1926.02 Bq
							Sn-113	1576.93 Bq
							Y-88	2572.87 Bq
.Gamma Ampuole_00003	01/19/61		Analytics, Lot 83725-334		(Purchased Reagent)		Americium-241	9083.6 Bq
							Cd-109	131939 Bq
							Ce-139	4380.5 Bq
							Cesium-137	3658 Bq
							Co-57	2856.3 Bq
							Cobalt-60	6013.6 Bq
							Hg-203	9475.2 Bq
							Sn-113	7757.8 Bq
							Y-88	12657.4 Bq
Tuna Can LCS_00002	01/22/14		Analytics, Lot 74139-334		(Purchased Reagent)		Americium-241	219 dpm/g

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102577-1

SDG No.: 680102577-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Cesium-137	82.3 dpm/g
							Cobalt-60	136 dpm/g
Tuna Can LCS_00003	10/31/14	Analytics, Lot 74139-334			(Purchased Reagent)		Americium-241	219 dpm/g
							Cesium-137	82.3 dpm/g
							Cobalt-60	136 dpm/g
Tuna Can_00002	02/03/15	Eckert & Ziegler, Lot 81427-334			(Purchased Reagent)		Americium-241	1164 Bq
							Cd-109	16063 Bq
							Ce-139	546 Bq
							Cesium-137	465 Bq
							Co-57	357 Bq
							Cobalt-60	742 Bq
							Hg-203	1208 Bq
							Pb-210	15186 Bq
							Sn-113	943 Bq
							Y-88	1571 Bq
Tuna Can_00003	02/09/17	Eckert & Ziegler, Lot 90099			(Purchased Reagent)		Americium-241	1164 Bq
							Cd-109	16373 Bq
							Ce-139	549 Bq
							Cesium-137	467 Bq
							Co-57	362 Bq
							Cobalt-60	735 Bq
							Hg-203	1171 Bq
							Pb-210	14936 Bq
							Sn-113	967 Bq
							Y-88	1590 Bq
Tuna Can_00006	03/01/16	Eckert & Ziegler, Lot 83814-334			(Purchased Reagent)		Americium-241	1195 Bq
							Cd-109	16353 Bq
							Ce-139	543 Bq
							Cesium-137	453 Bq
							Co-57	354 Bq
							Cobalt-60	745 Bq
							Hg-203	1175 Bq
							Pb-210	14606 Bq
							Sn-113	961 Bq
							Y-88	1568 Bq

Reagent

Gamma Ampuole_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

Customer: TestAmerica St. Louis
P.O. No.: 2303925, Item 1
Calibration Date: 01-Apr-2009 12:00 EST **Grams of Master Source:** 0.028371

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	157860	———	3.390E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	462.60	1.691E+05	4.798E+03	0.4	1.7	3.5	HPGe
Co-57	122.1	271.79	8.904E+04	2.526E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	137.6	1.256E+05	3.563E+03	0.4	1.1	2.3	HPGe
Hg-203	279.2	46.61	2.788E+05	7.910E+03	0.3	1.1	2.3	HPGe
Sn-113	391.7	115.1	1.725E+05	4.894E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	10983	1.120E+05	3.178E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	106.6	4.205E+05	1.193E+04	0.8	1.1	2.7	HPGe
Co-60	1173.2	1925.4	2.184E+05	6.196E+03	0.7	1.1	2.6	HPGe
Co-60	1332.5	1925.4	2.185E+05	6.199E+03	0.7	1.1	2.6	HPGe
Y-88	1836.1	106.6	4.444E+05	1.261E+04	0.7	1.1	2.6	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
5.31740 grams 4M HCl solution with approximately 30 microg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the calibration date.

Source Prepared by: [signature] for
W. Mao, Radiochemist

QA Approved: [signature] Date: 5-13-09
D. M. Montgomery, QA Manager

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Gamma Ampuole_00003

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

83725-334

5 mL Liquid in Flame Sealed Vial

Customer: Test America St. Louis/Earth City, MO
P.O. No.: 2397508, Item 1
Reference Date: 01-Jan-2011 12:00 PM EST **Grams of Master Source:** 0.028066

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	1.580E+05	———	3.261E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	4.626E+02	1.697E+05	4.763E+03	0.8	1.7	3.8	HPGe
Co-57	122.1	2.718E+02	8.711E+04	2.445E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	1.376E+02	1.247E+05	3.500E+03	0.5	1.1	2.4	HPGe
Hg-203	279.2	4.661E+01	2.753E+05	7.727E+03	0.4	1.1	2.3	HPGe
Sn-113	391.7	1.151E+02	1.769E+05	4.965E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	1.098E+04	1.109E+05	3.113E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	1.066E+02	4.224E+05	1.186E+04	0.5	1.1	2.4	HPGe
Co-60	1173.2	1.925E+03	2.142E+05	6.012E+03	0.6	1.1	2.5	HPGe
Co-60	1332.5	1.925E+03	2.143E+05	6.015E+03	0.6	1.1	2.5	HPGe
Y-88	1836.1	1.066E+02	4.472E+05	1.255E+04	0.5	1.1	2.4	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Comments:
5.30203 grams 4M HCl solution with approximately 30 µg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the reference date.

Source Prepared by: M I Taskaeva
M. I. Taskaeva, Radiochemist

QA Approved: _____ Date: 13 JAN 11
J. D. McCorvey, QA Manager Alternate

Reagent

Marn Soil_00002

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

83814-334

1.0 Liter Sand in 1 Liter Wide Mouth HDPE Silgan Jar

Customer: Test America St. Louis
P.O. No.: 2395112, Item 1
Reference Date: 01-Jan-2011 12:00 PM EST **Grams of Master Source:** 0.016927

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Pb-210	46.5	8.120E+03	———	3.021E+03	0.1	2.1	4.1	4π LS
Am-241	59.5	1.580E+05	———	2.090E+03	0.1	1.7	3.5	4π LS
Cd-109	88.0	4.626E+02	1.697E+05	2.873E+03	0.8	2.3	4.9	HPGe
Co-57	122.1	2.718E+02	8.711E+04	1.475E+03	0.5	2.0	4.1	HPGe
Ce-139	165.9	1.376E+02	1.247E+05	2.111E+03	0.5	1.9	3.9	HPGe
Hg-203	279.2	4.661E+01	2.753E+05	4.660E+03	0.4	1.9	3.9	HPGe
Sn-113	391.7	1.151E+02	1.769E+05	2.994E+03	0.5	1.9	3.9	HPGe
Cs-137	661.7	1.098E+04	1.109E+05	1.877E+03	0.7	1.9	4.0	HPGe
Y-88	898.0	1.066E+02	4.224E+05	7.150E+03	0.5	1.9	3.9	HPGe
Co-60	1173.2	1.925E+03	2.142E+05	3.626E+03	0.6	1.9	4.0	HPGe
Co-60	1332.5	1.925E+03	2.143E+05	3.627E+03	0.6	1.9	4.0	HPGe
Y-88	1836.1	1.066E+02	4.472E+05	7.570E+03	0.5	1.9	3.9	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Corporate Office
Laboratory

Comments:
1550 grams of sand. Homogeneous down to 10 gram aliquot.
This standard will expire one year after the reference date.

Source Prepared by: _____
Z. Dimitrova, Radiochemist

QA Approved: _____ Date: 2/11/11
J. D. McCorvey, QA Manager Alternate

Reagent

MarnSolid_00002

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

90099
1.0 Liter Sand in 1 Liter Wide Mouth HDPE Silgan Jar

Customer: TestAmerica St. Louis / Earth City, MO
P.O. No.: 2454150, Item 1
Reference Date: 01-Jan-2012 12:00 PM EST **Grams of Master Source:** 0.017180

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Additional radionuclides were added gravimetrically from solutions calibrated by gamma-ray spectrometry, ionization chamber, or liquid scintillation counting. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty* , % Type u_A	u_B	U	Calibration Method*
Pb-210	46.5	8.109E+03	———	3.094E+03	0.1	2.1	4.1	4π LS
Am-241	59.5	1.580E+05	———	2.037E+03	0.1	1.7	3.5	4π LS
Cd-109	88.0	4.626E+02	1.677E+05	2.881E+03	0.5	2.3	4.7	HPGe
Co-57	122.1	2.718E+02	8.795E+04	1.511E+03	0.4	2.0	4.1	HPGe
Ce-139	165.9	1.376E+02	1.245E+05	2.139E+03	0.4	1.9	3.9	HPGe
Hg-203	279.2	4.661E+01	2.707E+05	4.651E+03	0.3	1.9	3.8	HPGe
Sn-113	391.7	1.151E+02	1.755E+05	3.015E+03	0.4	1.9	3.9	HPGe
Cs-137	661.7	1.098E+04	1.128E+05	1.938E+03	0.7	1.9	4.0	HPGe
Y-88	898.0	1.066E+02	4.228E+05	7.264E+03	0.5	1.9	3.9	HPGe
Co-60	1173.2	1.925E+03	2.084E+05	3.580E+03	0.6	1.9	4.0	HPGe
Co-60	1332.5	1.925E+03	2.084E+05	3.581E+03	0.7	1.9	4.0	HPGe
Y-88	1836.1	1.066E+02	4.476E+05	7.690E+03	0.7	1.9	4.0	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Corporate Office

Comments:
1550 grams of sand. Homogenous down to 10 grams aliquot.
This standard will expire one year after the reference date.

Source Prepared by: _____
Z. Dimitrova, Radiochemist

QA Approved: _____ Date: 30 JAN 12
J.D. McCorvey, Counting Room Manager

Reagent

Source C_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

Customer: TestAmerica St. Louis
P.O. No.: 2303925, Item 1
Calibration Date: 01-Apr-2009 12:00 EST **Grams of Master Source:** 0.028371

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	157860	———	3.390E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	462.60	1.691E+05	4.798E+03	0.4	1.7	3.5	HPGe
Co-57	122.1	271.79	8.904E+04	2.526E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	137.6	1.256E+05	3.563E+03	0.4	1.1	2.3	HPGe
Hg-203	279.2	46.61	2.788E+05	7.910E+03	0.3	1.1	2.3	HPGe
Sn-113	391.7	115.1	1.725E+05	4.894E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	10983	1.120E+05	3.178E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	106.6	4.205E+05	1.193E+04	0.8	1.1	2.7	HPGe
Co-60	1173.2	1925.4	2.184E+05	6.196E+03	0.7	1.1	2.6	HPGe
Co-60	1332.5	1925.4	2.185E+05	6.199E+03	0.7	1.1	2.6	HPGe
Y-88	1836.1	106.6	4.444E+05	1.261E+04	0.7	1.1	2.6	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
5.31740 grams 4M HCl solution with approximately 30 microg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the calibration date.

Source Prepared by: _____ for
W. Mao, Radiochemist

QA Approved: _____ Date: 5-13-09
D. M. Montgomery, QA Manager

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Source D_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

Customer: TestAmerica St. Louis
P.O. No.: 2303925, Item 1
Calibration Date: 01-Apr-2009 12:00 EST **Grams of Master Source:** 0.028371

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	157860	———	3.390E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	462.60	1.691E+05	4.798E+03	0.4	1.7	3.5	HPGe
Co-57	122.1	271.79	8.904E+04	2.526E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	137.6	1.256E+05	3.563E+03	0.4	1.1	2.3	HPGe
Hg-203	279.2	46.61	2.788E+05	7.910E+03	0.3	1.1	2.3	HPGe
Sn-113	391.7	115.1	1.725E+05	4.894E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	10983	1.120E+05	3.178E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	106.6	4.205E+05	1.193E+04	0.8	1.1	2.7	HPGe
Co-60	1173.2	1925.4	2.184E+05	6.196E+03	0.7	1.1	2.6	HPGe
Co-60	1332.5	1925.4	2.185E+05	6.199E+03	0.7	1.1	2.6	HPGe
Y-88	1836.1	106.6	4.444E+05	1.261E+04	0.7	1.1	2.6	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
5.31740 grams 4M HCl solution with approximately 30 microg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the calibration date.

Source Prepared by: _____ for
W. Mao, Radiochemist

QA Approved: _____ Date: 5-13-09
D. M. Montgomery, QA Manager

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Source E_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

Customer: TestAmerica St. Louis
P.O. No.: 2303925, Item 1
Calibration Date: 01-Apr-2009 12:00 EST **Grams of Master Source:** 0.028371

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	157860	———	3.390E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	462.60	1.691E+05	4.798E+03	0.4	1.7	3.5	HPGe
Co-57	122.1	271.79	8.904E+04	2.526E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	137.6	1.256E+05	3.563E+03	0.4	1.1	2.3	HPGe
Hg-203	279.2	46.61	2.788E+05	7.910E+03	0.3	1.1	2.3	HPGe
Sn-113	391.7	115.1	1.725E+05	4.894E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	10983	1.120E+05	3.178E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	106.6	4.205E+05	1.193E+04	0.8	1.1	2.7	HPGe
Co-60	1173.2	1925.4	2.184E+05	6.196E+03	0.7	1.1	2.6	HPGe
Co-60	1332.5	1925.4	2.185E+05	6.199E+03	0.7	1.1	2.6	HPGe
Y-88	1836.1	106.6	4.444E+05	1.261E+04	0.7	1.1	2.6	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
5.31740 grams 4M HCl solution with approximately 30 microg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the calibration date.

Source Prepared by: _____ for
W. Mao, Radiochemist

QA Approved: _____ Date: 5-13-09
D. M. Montgomery, QA Manager

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Source F_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

83725-334

5 mL Liquid in Flame Sealed Vial

Customer: Test America St. Louis/Earth City, MO
P.O. No.: 2397508, Item 1
Reference Date: 01-Jan-2011 12:00 PM EST **Grams of Master Source:** 0.028066

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	1.580E+05	———	3.261E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	4.626E+02	1.697E+05	4.763E+03	0.8	1.7	3.8	HPGe
Co-57	122.1	2.718E+02	8.711E+04	2.445E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	1.376E+02	1.247E+05	3.500E+03	0.5	1.1	2.4	HPGe
Hg-203	279.2	4.661E+01	2.753E+05	7.727E+03	0.4	1.1	2.3	HPGe
Sn-113	391.7	1.151E+02	1.769E+05	4.965E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	1.098E+04	1.109E+05	3.113E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	1.066E+02	4.224E+05	1.186E+04	0.5	1.1	2.4	HPGe
Co-60	1173.2	1.925E+03	2.142E+05	6.012E+03	0.6	1.1	2.5	HPGe
Co-60	1332.5	1.925E+03	2.143E+05	6.015E+03	0.6	1.1	2.5	HPGe
Y-88	1836.1	1.066E+02	4.472E+05	1.255E+04	0.5	1.1	2.4	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Comments:
5.30203 grams 4M HCl solution with approximately 30 µg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the reference date.

Source Prepared by: MTaskaeva
M. I. Taskaeva, Radiochemist

QA Approved: _____ Date: 13 JAN 11
J. D. McCorvey, QA Manager Alternate

Reagent

Tuna Can LCS_00002

Rec'd : 12-26-06

ANALYTICS
An Isotope Products Laboratories Company

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

74139-334
1.0 Liter Sand in 1 Liter Wide Mouth HDPE "S" Bottle

Customer: Severn Trent Laboratories/Earth City, MO
P.O. No.: 2169577, Item 1
Calibration Date: 01-Oct-2006 12:00 EST **Grams of Master Source:** 0.01552

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty , % Type u_A	u_B	U	Calibration Method
Pb-210	46.5	8145.9	———	3079.8	0.33	1.46	2.99	4π LS
Am-241	59.5	157860	———	2034.3	0.33	1.46	2.99	4π LS
Cd-109	88.0	462.60	189000	2933.5	0.57	1.70	3.59	HPGe
Co-57	122.1	271.79	94570	1467.8	0.34	1.30	2.69	HPGe
Ce-139	165.9	137.6	133800	2076.7	0.35	1.10	2.31	HPGe
Hg-203	279.2	46.61	295300	4583	0.40	1.10	2.34	HPGe
Sn-113	391.7	115.1	185600	2880.7	0.42	1.10	2.35	HPGe
Cs-137	661.7	10983	116700	1811.3	0.70	1.20	2.78	HPGe
Y-88	898.0	106.60	455400	7068	0.50	1.10	2.42	HPGe
Co-60	1173.2	1925.4	226900	3522	0.60	1.10	2.51	HPGe
Co-60	1332.5	1925.4	227000	3523	0.90	1.10	2.84	HPGe
Y-88	1836.1	106.6	481200	7469	0.90	1.10	2.84	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
1550 grams of sand. NOTE: Homogeneity was checked by the addition of Tc-99 tracer to the solution used to spike the sand. Ten 10-gram aliquots were removed after mixing and counted to measure the Tc-99. The standard deviation for the 10 measurements was 1.3% with a range of 4.8%. This demonstrates reasonable homogeneity for this source material down to a 10-gram aliquot.
This standard will expire one year after the calibration date.

Source Prepared by: M. I. Taskaeva, Radiochemist

QA Approved: for D. M. Montgomery, QA Manager Date: 12-21-06

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Gamma LCS per Geometry

Geometry: Tuna Can
Reference date 10/1/2006
Calibration Standard: 74139-334
Standard volume g / vial 1550
volume transferred in g / geometry 341.9

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	dpm/g
Am-241	2034.3	449	0.359	219.35
Cs-137	1811.3	400	0.851	82.39
Co-60	3523	777	0.999856	136.39

Reviewed By: Chris Hough

Date: 3/15/2013

Reagent

Tuna Can LCS_00003

Rec'd : 12-26-06

ANALYTICS
An Isotope Products Laboratories Company

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

74139-334
1.0 Liter Sand in 1 Liter Wide Mouth HDPE "S" Bottle

Customer: Severn Trent Laboratories/Earth City, MO
P.O. No.: 2169577, Item 1
Calibration Date: 01-Oct-2006 12:00 EST **Grams of Master Source:** 0.01552

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Pb-210	46.5	8145.9	———	3079.8	0.33	1.46	2.99	4π LS
Am-241	59.5	157860	———	2034.3	0.33	1.46	2.99	4π LS
Cd-109	88.0	462.60	189000	2933.5	0.57	1.70	3.59	HPGe
Co-57	122.1	271.79	94570	1467.8	0.34	1.30	2.69	HPGe
Ce-139	165.9	137.6	133800	2076.7	0.35	1.10	2.31	HPGe
Hg-203	279.2	46.61	295300	4583	0.40	1.10	2.34	HPGe
Sn-113	391.7	115.1	185600	2880.7	0.42	1.10	2.35	HPGe
Cs-137	661.7	10983	116700	1811.3	0.70	1.20	2.78	HPGe
Y-88	898.0	106.60	455400	7068	0.50	1.10	2.42	HPGe
Co-60	1173.2	1925.4	226900	3522	0.60	1.10	2.51	HPGe
Co-60	1332.5	1925.4	227000	3523	0.90	1.10	2.84	HPGe
Y-88	1836.1	106.6	481200	7469	0.90	1.10	2.84	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
1550 grams of sand. NOTE: Homogeneity was checked by the addition of Tc-99 tracer to the solution used to spike the sand. Ten 10-gram aliquots were removed after mixing and counted to measure the Tc-99. The standard deviation for the 10 measurements was 1.3% with a range of 4.8%. This demonstrates reasonable homogeneity for this source material down to a 10-gram aliquot.
This standard will expire one year after the calibration date.

Source Prepared by: M Taskaeva
M. I. Taskaeva, Radiochemist

QA Approved: for
D. M. Montgomery, QA Manager

Date: 12-21-06

End of Certificate

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ANALYSIS OF UNCERTAINTY FOR MIXED GAMMA STANDARDS
BATCH 127
CALIBRATION DATE: October 1, 2006 12:00 EST

Isotope	Energy (keV)	Calibration Method[1]	Statistics[2]	Calibration[2]	Peak Fitting[2]	Geometry[2]	Impurities[2]	Weighing	Combined Standard Uncertainty	Relative Expanded Uncertinty (k=2)
Cd-109	88	HPGe	0.16	1.1	0.88	0.8	0	0.2	1.64	3.3
Co-57	122	HPGe	0.23	1.1	0.71	0.7	0	0.2	1.52	3.0
Ce-139	166	HPGe	0.17	1.0	0.58	0.7	0	0.2	1.38	2.8
Hg-203	279	HPGe	0.11	1.1	0.34	0.7	0	0.2	1.37	2.7
Sn-113	392	HPGe	0.21	1.0	0.35	0.7	0	0.2	1.30	2.6
Cs-137	662	HPGe	0.36	1.1	0.60	0.7	0	0.2	1.49	3.0
Y-88	898	HPGe	0.19	1.0	0.33	0.7	0	0.2	1.29	2.6
Co-60	1173	HPGe	0.31	.97	0.45	0.7	0	0.2	1.33	2.7
Co-60	1332	HPGe	0.33	.93	0.48	0.7	0	0.2	1.32	2.6
Y-88	1836	HPGe	0.24	1.0	0.35	0.7	0	0.2	1.31	2.6

Optional Additional Isotopes

Pb-210	46.5	4π LS	0.33	1.1	0	0.9	0.30	0.2	1.50	3.0
Am-241	59.5	4π LS	0.33	1.1	0	0.9	0.30	0.2	1.50	3.0
Sr-85	514	IC	0.30	1.1	0	0.7	0.17	0.2	1.36	2.7
Cs-134	605	IC	0.30	1.0	0	0.8	0.17	0.2	1.34	2.7
Cs-134	796	IC	0.30	1.0	0	0.8	0.17	0.2	1.34	2.7
Mn-54	835	IC	0.30	1.0	0	0.8	0.17	0.2	1.34	2.7
Zn-65	1116	IC	0.30	1.0	0	0.8	0.17	0.2	1.34	2.7

[1]Calibration Methods:

4π LS (4 pi Liquid Scintillation Counting)
HPGe (High Purity Germanium Gamma Ray Spectrometer)
IC (Gamma Ray Ionization Chamber)

[2]As Percent (%)from counting data

No interfering gamma emitting impurities were detected during calibration. Depending on the resolution and energy dispersion (keV/channel) of the measuring system, the following spectral conflicts may occur: (1) between the 88 keV gamma-ray and the X-rays emitted in the decay of Hg-203, (2) between the 1333 keV gamma-ray and the 1325 keV single escape peak from the 1836 keV gamma-ray.

St. Louis Radiological Standard Reverification Form

Standard ID Number: Tuna Can LCS_00003 (259586)
True Value = 1249.94 Bq/Sample
Date Analyzed: 10/31/2013

Radionuclide: Am-241

	Replicates	
#1	1215	Bq/Sample
#2	1264	Bq/Sample
#3	1267	Bq/Sample

Mean = 1248.667

1 sigma = 29.19475

1.96 sigma = 57.22171

True Value minus 5% = 1187.443 (True Value - 5%)
True Value plus 5% = 1312.437 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? **Yes** **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? **Yes** **(Acceptance Criteria)**

Standard Reverification Acceptable? **Yes**

Note: Criteria for reverification of radiological standards is taken from the DOE QSAS and LANL Statements of Work

Reviewed By/Date: Jody Watson 12/1/13

SOP Reference: STL-QA-0002, Current Revision

St. Louis Radiological Standard Reverification Form

Standard ID Number: Tuna Can LCS_00003 (259586)
True Value = 469.49 Bq/Sample
Date Analyzed: 10/31/2013

Radionuclide: Cs-137

	Replicates	
#1	451.6	Bq/Sample
#2	477.4	Bq/Sample
#3	455.6	Bq/Sample

Mean = 461.5333

1 sigma = 13.88572

1.96 sigma = 27.21602

True Value minus 5% = 446.0155 (True Value - 5%)
True Value plus 5% = 492.9645 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? Yes **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? Yes **(Acceptance Criteria)**

Standard Reverification Acceptable? Yes

Note: Criteria for reverification of radiological standards is taken from the DOE QSAS and LANL Statements of Work

Reviewed By/Date: Jody Watson 12/1/14

SOP Reference: STL-QA-0002, Current Revision

St. Louis Radiological Standard Reverification Form

Standard ID Number: Tuna Can LCS_00003 (259586)
True Value = 777 Bq/Sample
Date Analyzed: 10/31/2013

Radionuclide: Co-60

	Replicates	
#1	724.3	Bq/Sample
#2	774.1	Bq/Sample
#3	770	Bq/Sample

Mean = 756.1333

1 sigma = 27.64459

1.96 sigma = 54.1834

True Value minus 5% = 738.15 (True Value - 5%)
True Value plus 5% = 815.85 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? Yes **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? Yes **(Acceptance Criteria)**

Standard Reverification Acceptable? Yes

Note: Criteria for reverification of radiological standards is taken from the DOE QSAS and LANL Statements of Work

Reviewed By/Date: Jody Watson 12/1/14

SOP Reference: STL-QA-0002, Current Revision

Gamma LCS per Geometry - Tuna Can

Reagent ID: Tuna Can LCS_00003
Container: 259586
Reference date 10/1/2006
Calibration Standard: 74139-334
Standard volume: 1550 g/vial
Standard volume transferred: 341.9 g/geometry

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	dpm/g	Bq/sample
Am-241	2034.3	448.7	0.359	219.35	1249.94
Cs-137	1811.3	399.5	0.851	82.39	469.49
Co-60	3522	776.9	0.999856	136.36	777.00

Reviewed By: Jody Watson

Date: 12/1/2013

SOP Reference: ST-RD-0102, Current Rev **Form:** RAD-0080 **Revised:** 11/27/2013

Test America St. Louis Spectrum ID: 9_Gamma_20130915

Sample Description: 77739_Gamma_LCS 160-77739~2-A
Detector: Ge9 S/N100228730
Batch ID: 77739
Work Order Number: Gamma
Lot Number: LCS 160-77739~2-A

Decay to Time: 10/1/2006 12:00 Live Time: 1800 sec
Acquisition Time: 10/31/2013 08:28:21 Real Time: 1810 sec
Analysis Time: 11/11/2013 19:50 Dead Time: 0.57 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 9_Soil_TunaCan.Clb
Efficiency Cal Desc: 9_Soil_TunaCan_90099_050312
Efficiency Cal Date: 6/14/2012 10:19
Energy Cal Date: 3/1/2012 13:57
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 9_2013-10-05_0100.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
K-40	5.305E-01	769.5	4.082E+00	4.082E+00	1.578E+01
CO-60	7.243E+02	1.0	7.254E+00	3.708E+01	3.977E+00
CS-134	7.235E+00	93.6	6.774E+00	6.784E+00	2.680E+01
CS-137	4.516E+02	1.0	4.733E+00	2.396E+01	3.540E+00
EU-152	6.293E+00	42.6	2.678E+00	2.698E+00	1.271E+01
EU-154	4.025E+00	75.0	3.020E+00	3.027E+00	5.177E+01
EU-155	5.881E+00	110.2	6.478E+00	6.486E+00	2.150E+01
TL-208	3.059E+01	64.6	1.977E+01	1.984E+01	3.918E+01
PB-210	1.442E+04	0.9	1.325E+02	8.572E+02	2.204E+02
PB-212	5.630E+01	36.7	2.065E+01	2.097E+01	6.722E+01
PB-214	5.714E+00	34.9	1.996E+00	2.018E+00	6.384E+00
BI-212	9.580E+01	152.1	1.457E+02	1.458E+02	4.895E+02
BI-214	7.078E+00	34.4	2.432E+00	2.460E+00	4.992E+00
AC-228	1.477E+01	57.1	8.428E+00	8.462E+00	3.552E+01
Pa-234	5.684E+00	65.7	3.737E+00	3.748E+00	9.406E+00
TH-234	-2.970E+02	9.4	2.787E+01	3.191E+01	8.608E+01
PA-234M	9.991E+01	80.0	7.990E+01	8.006E+01	4.336E+02
U-235	-4.791E+00	104.0	4.982E+00	4.988E+00	1.653E+01
AM-241	1.215E+03	0.8	9.198E+00	6.370E+01	1.316E+01
Total	1.715E+04				

Analyst: Jody Watson

TestAmerica, Inc Spectrum name: 9_Gamma_20130915.An1

Sample description
77739_Gamma_LCS 160-77739~2-A

Spectrum Filename: C:\User\SPC\Det9\9_Gamma_20130915.An1

Acquisition information
Start time: 10/31/2013 8:28:21 AM
Live time: 1800
Real time: 1810
Dead time: 0.57 %
Detector ID: 9

Detector system
Ge9 S/N100228730

Calibration
Filename: 9_Soil_TunaCan.Clb
9_Soil_TunaCan_90099_050312

Energy Calibration
Created: 3/1/2012 1:57:17 PM
Zero offset: 0.074 keV
Gain: 0.250 keV/channel
Quadratic: -2.269E-08 keV/channel^2

Efficiency Calibration
Created: 6/14/2012 10:19:51 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.30 %
Log(Eff): -8.079856E-01 + (-2.367265E-01*Log(E)) + (-3.950640E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.42 %
Log(Eff): -2.387916E+01 + (8.875647E+00*Log(E)) + (-9.401100E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.59keV)
Stop channel: 8000 (1999.34keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	9_2013-10-05_0100.PBC 10/5/2013 1:00:21 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 35 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 134.9778

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.60	401.	16.10	1.13	1.639E-02				
46.55	22813.	0.92	0.93	2.578E-02	46.54	4.250	1.442E+04	PB210
59.57	28391.	0.76	0.93	3.661E-02	59.54	35.900	1.215E+03	AM241
77.08	140.	39.21	0.98	4.675E-02				
88.08	1206.	7.29	1.06	5.052E-02				
93.88	58.	87.63	1.04	5.171E-02	93.35	5.561	PBC<MDA	AC228
					93.35	5.810	1.069E+01	U235
					92.59	5.584	1.115E+01	TH234
					93.35	5.810	1.069E+01	U235
					93.35	5.561	2.622E+01	AC228
93.88	58.	87.63	1.04	5.171E-02	93.35	5.561	PBC<MDA	AC228
					93.35	5.810	1.069E+01	U235
105.44	44.	110.15	1.05	5.318E-02	105.31	21.200	PBC<MDA	EU155
					105.31	21.200	5.881E+00	EU155
122.44	45.	108.81	1.07	5.305E-02	121.78	28.580	PBC<MDA	EU152
					121.78	28.580	2.352E+00	EU152
131.16	35.	137.33	1.08	5.216E-02	131.29	18.000	PBC<MDA	Pa234
161.84	5.	850.44	1.11	4.676E-02	163.38	5.080	PBC<MDA	U235
					163.38	5.080	1.068E+00	U235
191.89	75.	47.73	0.55	4.310E-02				
199.99	66.	64.08	0.38	4.195E-02				
238.40	138.	27.30	0.91	3.734E-02	238.63	43.300	6.216E+01	PB212
242.14	11.	403.77	1.18	3.697E-02	242.00	7.430	PBC<MDA	PB214
276.94	34.	114.35	1.21	3.372E-02	277.28	6.310	PBC<MDA	TL208
283.56	5.	702.33	1.22	3.315E-02	284.30	6.140	HL>Cutoff	I131
294.85	92.	54.23	0.49	3.232E-02	295.09	19.300	PBC<MDA	PB214
300.38	48.	84.68	1.24	3.195E-02	300.03	3.280	PBC<MDA	PB212
338.25	45.	84.62	1.27	2.940E-02	338.32	12.010	PBC<MDA	AC228

					338.32	12.010	1.661E+01 AC228
344.89	28.	130.46	1.27	2.905E-02	344.29	26.500	PBC<MDA EU152
					344.29	26.500	2.923E+00 EU152
351.72	86.	44.07	1.28	2.860E-02	351.93	37.600	PBC<MDA PB214
367.42	39.	64.82	0.53	2.775E-02			
519.92	99.	37.67	0.41	2.164E-02			
562.86	22.	127.02	1.47	2.040E-02	563.24	8.350	PBC<MDA CS134
570.13	20.	136.61	1.47	2.024E-02	569.32	15.380	PBC<MDA CS134

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					569.47	8.200	6.589E+00	Pa234
570.13	20.	136.24	1.47	2.024E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	6.607E+00	Pa234
583.13	40.	60.64	1.48	1.989E-02	583.02	84.500	PBC<MDA	TL208
609.58	105.	31.70	0.98	1.925E-02	609.31	46.090	6.578E+00	BI214
661.61	10643.	1.05	1.45	1.810E-02	661.66	85.210	4.516E+02	CS137
712.89	39.	39.12	0.70	1.711E-02				
727.11	17.	152.13	1.60	1.686E-02	727.17	7.550	PBC<MDA	BI212
766.71	33.	79.97	1.63	1.620E-02	766.41	0.294	PBC<MDA	PA234M
					766.41	0.294	3.867E+02	PA234M
779.17	59.	42.55	1.64	1.600E-02	778.92	12.940	PBC<MDA	EU152
					778.92	12.940	2.273E+01	EU152
797.04	6.	290.73	1.66	1.565E-02	801.95	8.690	PBC<MDA	CS134
860.47	19.	137.44	1.71	1.482E-02	860.56	12.420	PBC<MDA	TL208
883.68	19.	133.89	1.72	1.456E-02	880.53	6.000	PBC<MDA	Pa234
					883.24	9.600	7.529E+00	Pa234
910.66	44.	76.62	1.75	1.418E-02	911.07	29.000	PBC<MDA	AC228
					911.07	29.000	1.400E+01	AC228
943.80	24.	117.47	1.77	1.377E-02	946.02	13.400	PBC<MDA	Pa234
964.12	14.	228.97	1.79	1.357E-02	964.11	14.605	PBC<MDA	EU152
					964.11	14.605	5.560E+00	EU152
996.48	16.	177.62	1.81	1.323E-02	996.33	10.600	PBC<MDA	EU154
					996.33	10.600	1.149E+01	EU154
1121.05	28.	81.71	1.90	1.206E-02	1120.29	15.100	PBC<MDA	BI214
1173.15	5976.	1.44	1.98	1.163E-02	1173.24	99.900	7.254E+02	CO60
1272.28	11.	75.03	2.01	1.088E-02	1274.54	35.190	PBC<MDA	EU154
					1274.54	35.190	2.924E+00	EU154
1332.36	5385.	1.39	2.00	1.050E-02	1332.50	99.980	7.231E+02	CO60
1460.86	1.	76.97	2.13	9.749E-03	1460.83	10.670	PBC<MDA	K40
1764.37	7.	64.03	2.31	8.350E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
146.03	36.60	1187.	401.	2.444E+04	16.10	1.125	-	
307.92	77.08	958.	140.	2.995E+03	39.21	0.976	-	s
351.89	88.08	1452.	1215.	2.405E+04	5.28	1.055	-	
767.05	191.89	448.	75.	1.732E+03	47.73	0.547	-	s
799.44	199.99	552.	66.	1.585E+03	64.08	0.381	-	s
1469.05	367.42	225.	39.	1.407E+03	56.65	0.534	-	sM
2079.05	519.92	287.	99.	4.576E+03	37.67	0.415	-	sM
2850.97	712.89	70.	39.	2.299E+03	39.12	0.697	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.85	46.55	5511.	22813.	12.674	0.92	0.933
AM-241	237.89	59.57	4281.	28391.	15.773	0.76	0.933
TH-234	245.32	61.42	2410.	-799.	-0.444	9.38	1.014s
TH-234	365.80	91.55	1239.	-50.	-0.028	101.12	1.042s
AC-228	372.98	93.35	1253.	58.	0.032	87.63	1.043D
U-235	372.98	93.35	1253.	58.	0.032	87.63	1.043D
EU-155	421.32	105.44	1171.	44.	0.025	110.15	1.054s
EU-152	489.29	122.44	1159.	45.	0.025	108.81	1.070s
Pa-234	524.18	131.16	1124.	35.	0.019	137.33	1.079s
U-235	574.13	143.65	1203.	-48.	-0.026	103.98	1.091s
U-235	646.89	161.84	752.	5.	0.003	850.44	1.109s
U-235	821.22	205.44	1091.	-13.	-0.007	349.16	1.148s
PB-212	953.27	238.46	993.	125.	0.070	36.68	1.179
PB-214	968.00	242.14	1005.	11.	0.006	403.77	1.182
TL-208	1107.16	276.94	791.	34.	0.019	114.35	1.214
I-131	1133.66	283.56	738.	5.	0.003	702.33	1.221
PB-214	1178.79	294.85	573.	92.	0.051	54.23	0.490s
PB-212	1200.93	300.38	789.	48.	0.026	84.68	1.235
AC-228	1352.39	338.25	701.	45.	0.025	84.62	1.270s
EU-152	1378.94	344.89	662.	28.	0.016	130.46	1.275s
PB-214	1406.26	351.72	669.	86.	0.048	44.07	1.282
I-131	1455.88	364.13	713.	-34.	-0.019	113.88	1.293
BE-7	1909.01	477.42	744.	-6.	-0.003	644.25	1.392s
CS-134	2250.78	562.86	388.	22.	0.012	127.02	1.466s
CS-134	2279.86	570.13	352.	20.	0.011	136.61	1.471s
Pa-234	2279.88	570.13	352.	20.	0.011	136.24	1.471
TL-208	2331.87	583.13	356.	40.	0.022	60.64	1.482s
CS-134	2410.14	602.69	309.	-17.	-0.010	144.66	1.500s
BI-214	2437.68	609.58	271.	105.	0.058	31.70	0.982s
CS-137	2645.82	661.61	300.	10643.	5.913	1.05	1.452
BI-212	2907.87	727.11	318.	17.	0.009	152.13	1.601s
PA-234M	3066.30	766.71	335.	33.	0.018	79.97	1.633s
EU-152	3116.13	779.17	285.	59.	0.033	42.55	1.643s
CS-134	3187.66	797.04	169.	6.	0.004	290.73	1.661s
TL-208	3441.43	860.47	347.	19.	0.011	137.44	1.707
Pa-234	3534.30	883.68	311.	19.	0.010	133.89	1.722
AC-228	3642.26	910.66	550.	44.	0.025	76.62	1.746s
Pa-234	3774.84	943.80	378.	24.	0.013	117.47	1.772
EU-152	3856.15	964.12	492.	14.	0.008	228.97	1.786s
AC-228	3874.97	968.82	503.	-12.	-0.007	261.56	1.790s
EU-154	3985.65	996.48	415.	16.	0.009	177.62	1.810s
BI-214	4484.12	1121.05	307.	28.	0.016	81.71	1.901
CO-60	4692.63	1173.15	172.	5976.	3.320	1.44	1.975
EU-154	5089.34	1272.28	31.	11.	0.006	75.03	2.008s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	5329.81	1332.36	33.	5385.	2.991	1.39	1.997
K-40	5844.14	1460.86	33.	1.	0.001	76.97	2.131
BI-214	7059.18	1764.37	18.	7.	0.004	64.03	2.314s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	Peak MDA Value Bq/Sample		COMMENTS
BE-7	C	-1.3766E+00				5.31E+01		
			477.60	-1.377E+00	&(	2.979E+01	6.44E+02 1.05E+01	G
K-40	N	5.3052E-01				4.66E+11		
			1460.83	5.305E-01	(P	1.578E+01	7.70E+01 1.07E+01	G
CO-60	F	7.2427E+02				1.93E+03		
			1332.50	7.231E+02	(	3.977E+00	1.39E+00 1.00E+02	G
			1173.24	7.254E+02	(	7.748E+00	1.44E+00 9.99E+01	G
I-131	I	-6.5562E-01				8.02E+00		
			364.48	-8.173E-01	(	3.098E+00	1.14E+02 8.17E+01	G
			284.30	1.496E+00	(	3.530E+01	7.02E+02 6.14E+00	G
			636.97	-6.785E-01	%	3.837E+01	1.67E+03 7.17E+00	G
CS-134	I	7.2349E+00				7.54E+02		
			604.71	-5.518E+00	?(	2.680E+01	1.45E+02 9.76E+01	G
			795.87	5.593E-02	%	3.854E+01	2.03E+04 8.55E+01	G
			569.32	3.786E+01	?(	1.733E+02	1.37E+02 1.54E+01	G
			801.95	2.811E+01	&(	2.787E+02	2.91E+02 8.69E+00	G
			563.24	7.820E+01	?(	3.322E+02	1.27E+02 8.35E+00	G
CS-137	I	4.5157E+02				1.10E+04		
			661.66	4.516E+02	(	3.540E+00	1.05E+00 8.52E+01	G
EU-152	F	6.2931E+00				4.94E+03		
			344.29	2.923E+00	(	1.271E+01	1.30E+02 2.65E+01	G
			121.78	2.352E+00	&(	8.497E+00	1.09E+02 2.86E+01	G
			778.92	2.273E+01	(	3.138E+01	4.25E+01 1.29E+01	G
			964.11	5.560E+00	?(	4.275E+01	2.29E+02 1.46E+01	G
			1112.07	3.764E-02	&	4.286E+01	3.35E+04 1.36E+01	G
			1408.00	2.382E-01	%	9.762E+00	1.12E+03 2.10E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	I	4.0247E+00					3.14E+03	
			873.23	7.271E-01	&(	5.177E+01	2.10E+03	1.23E+01 G
			123.10	6.921E-02	&	7.391E+00	3.19E+03	4.08E+01 G
			1274.54	2.924E+00	?(	7.338E+00	7.50E+01	3.52E+01 G
			723.36	4.766E-01	%	2.324E+01	1.43E+03	2.02E+01 G
			1004.77	4.567E-01	%	3.539E+01	2.28E+03	1.80E+01 G
			996.33	1.149E+01	(	6.852E+01	1.78E+02	1.06E+01 G
EU-155	I	5.8806E+00					1.81E+03	
			105.31	5.881E+00	(	2.150E+01	1.10E+02	2.12E+01 G
			86.54	-3.761E-01	%	1.959E+01	1.56E+03	3.07E+01 G
TL-208	N	3.0591E+01					6.98E+02	
			583.02	1.750E+01	?(P	3.918E+01	6.06E+01	8.45E+01 G
			277.28	1.153E+02	(P	4.564E+02	1.14E+02	6.31E+00 G
			860.56	7.666E+01	(	3.531E+02	1.37E+02	1.24E+01 G
PB-210	N	1.4424E+04					8.14E+03	
			46.54	1.442E+04	(	2.204E+02	9.19E-01	4.25E+00 G
PB-212	N	5.6299E+01					6.98E+02	
			238.63	5.630E+01	?(	6.722E+01	3.67E+01	4.33E+01 G
			300.03	3.298E+02	+	9.255E+02	8.47E+01	3.28E+00 G
PB-214	N	5.7137E+00					5.84E+05	
			351.93	4.435E+00	?(	6.384E+00	4.41E+01	3.76E+01 G
			295.09	8.205E+00	(	1.021E+01	5.42E+01	1.93E+01 G
			242.00	2.259E+00	-	3.053E+01	4.04E+02	7.43E+00 G
BI-212	N	9.5804E+01					6.98E+02	
			727.17	9.580E+01	&(	4.895E+02	1.52E+02	7.55E+00 G
			785.42	5.436E+01	&	2.991E+03	1.62E+03	1.28E+00 G
BI-214	N	7.0777E+00					5.84E+05	
			609.31	6.578E+00	(P	4.992E+00	3.17E+01	4.61E+01 G
			1120.29	8.602E+00	(P	2.581E+01	8.17E+01	1.51E+01 G
			1764.49	3.099E+00	- P	9.807E+00	6.40E+01	1.54E+01 G
AC-228	N	1.4766E+01					2.10E+03	
			911.07	1.400E+01	?(	3.552E+01	7.66E+01	2.90E+01 G
			968.97	-6.746E+00	-	5.930E+01	2.62E+02	1.75E+01 G
			338.32	1.661E+01	(	4.660E+01	8.46E+01	1.20E+01 G
								Energy duplication
			93.35	2.622E+01	&	7.608E+01	8.76E+01	5.56E+00 XA
Pa-234	N	5.6844E+00					1.63E+12	
			131.29	2.059E+00	?(	9.406E+00	1.37E+02	1.80E+01 G
			569.47	6.607E+00	(	3.016E+01	1.36E+02	8.20E+00 G

TestAmerica, Inc Spectrum name: 9_Gamma_20130915.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		946.02	7.154E+00	(	2.808E+01	1.17E+02	1.34E+01 G
		883.24	0.000E+00	-	4.308E+01	1.00E+03	9.60E+00 G
		880.53	1.202E+01	(	5.396E+01	1.34E+02	6.00E+00 G
TH-234	N -2.9703E+02					1.63E+12	
		63.29-2.970E+02		(	8.608E+01	9.38E+00	3.81E+00 G
		92.59-9.593E+00		&	3.217E+01	1.01E+02	5.58E+00 G
PA-234M	N 9.9914E+01					1.63E+12	
		1001.00-8.049E-01		%(	4.336E+02	1.58E+04	8.37E-01 G
		766.41	3.867E+02	&(	1.026E+03	8.00E+01	2.94E-01 G
U-235	N -4.7913E+00					2.57E+11	
		143.79-4.791E+00		?(	1.653E+01	1.04E+02	1.10E+01 G
		205.33-3.609E+00		&	4.212E+01	3.49E+02	5.01E+00 G
		163.38	1.068E+00	+	3.053E+01	8.50E+02	5.08E+00 G
							Energy duplication
		93.35	1.069E+01	&	3.101E+01	8.76E+01	5.81E+00 X
AM-241	T 1.2145E+03					1.58E+05	
		59.54	1.215E+03	(	1.316E+01	7.57E-01	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average

R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
TH-234	61.42	2410.	-799.	-0.444	9.38	-2.970E+02
TH-234	91.55	1239.	-50.	-0.028	101.12	-9.593E+00
AC-228	93.35	1253.	58.	0.032	87.63	2.622E+01
U-235	93.35	1253.	58.	0.032	87.63	1.069E+01
EU-155	105.44	1171.	44.	0.025	110.15	5.881E+00
EU-152	122.44	1159.	45.	0.025	108.81	2.352E+00
U-235	143.65	1203.	-48.	-0.026	103.98	-4.791E+00
U-235	161.84	752.	5.	0.003	850.44	1.068E+00
U-235	205.44	1091.	-13.	-0.007	349.16	-3.609E+00
AC-228	338.25	701.	45.	0.025	84.62	1.661E+01
EU-152	344.89	662.	28.	0.016	130.46	2.923E+00
BE-7	477.42	744.	-6.	-0.003	644.25	0.000E+00
CS-134	562.86	388.	22.	0.012	127.02	7.820E+01
CS-134	570.13	352.	20.	0.011	136.61	3.786E+01
CS-134	602.69	309.	-17.	-0.010	144.66	-5.518E+00
PA-234M	766.71	335.	33.	0.018	79.97	3.867E+02
EU-152	779.17	285.	59.	0.033	42.55	2.273E+01
CS-134	797.04	169.	6.	0.004	290.73	2.811E+01
AC-228	910.66	550.	44.	0.025	76.62	1.400E+01
EU-152	964.12	492.	14.	0.008	228.97	5.560E+00
AC-228	968.82	503.	-12.	-0.007	261.56	-6.746E+00
EU-154	996.48	415.	16.	0.009	177.62	1.149E+01
EU-154	1272.28	31.	11.	0.006	75.03	2.924E+00

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting		MDA Bq/Sample
BE-7	#A	-1.3766E+00	>12 Halflives	6.4425E+02%	2.9788E+01	
K-40	A	5.3052E-01	5.3052E-01	7.695E+02%		1.58E+01
CO-60		2.8537E+02	7.2427E+02	1.001E+00%		3.98E+00
I-131	A	-6.5562E-01	>12 Halflives	1.1388E+02%	3.0977E+00	
CS-134	#A	6.7120E-01	7.2349E+00	9.362E+01%		2.68E+01
CS-137		3.8340E+02	4.5157E+02	1.048E+00%		3.54E+00
EU-152	#A	4.3789E+00	6.2931E+00	4.255E+01%		1.27E+01
EU-154	#A	2.2731E+00	4.0247E+00	7.503E+01%		5.18E+01
EU-155	#A	2.1856E+00	5.8806E+00	1.102E+02%		2.15E+01
TL-208	A	2.3406E+00	3.0591E+01	6.464E+01%		3.92E+01
PB-210		1.1574E+04	1.4424E+04	9.188E-01%		2.20E+02
PB-212	A	4.3076E+00	5.6299E+01	3.668E+01%		6.72E+01

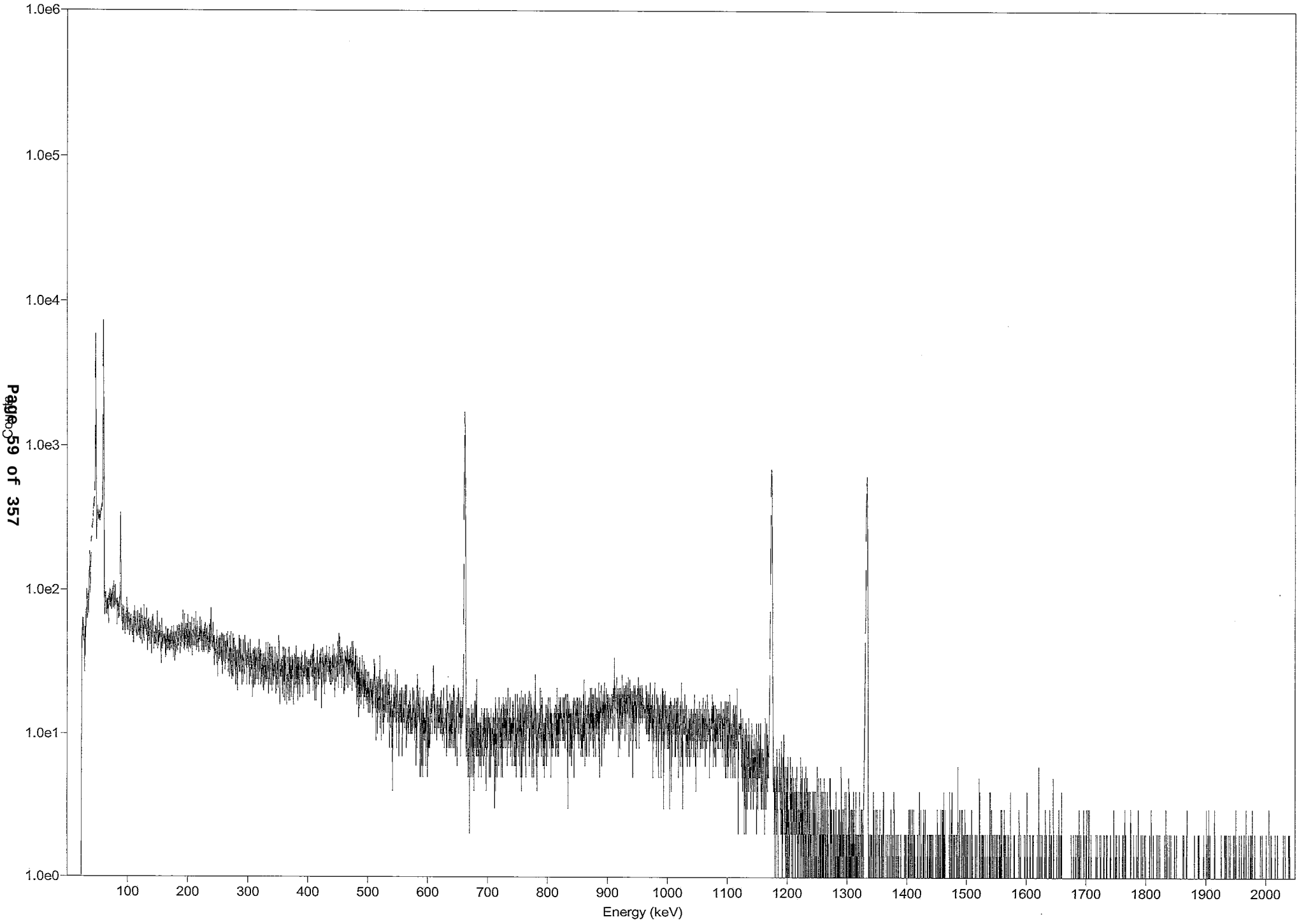
PB-214	A	5.6962E+00	5.7137E+00	3.494E+01%	6.38E+00
BI-212	#A	7.3301E+00	9.5804E+01	1.521E+02%	4.89E+02
BI-214		7.0561E+00	7.0777E+00	3.436E+01%	4.99E+00
AC-228	#A	6.2874E+00	1.4766E+01	5.708E+01%	3.55E+01
Pa-234	A	5.6844E+00	5.6844E+00	6.574E+01%	9.41E+00
TH-234	#A	-2.9703E+02	-2.9703E+02	9.384E+00%	8.61E+01
PA-234M	#A	9.9914E+01	9.9914E+01	7.997E+01%	4.34E+02
U-235	#A	-4.7913E+00	-4.7913E+00	1.040E+02%	1.65E+01
AM-241		1.2008E+03	1.2145E+03	7.573E-01%	1.32E+01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.3 keV) 1.346E+04 Bq/Sample
Total Decayed Activity (37.6 to 1999.3 keV) 1.6883195E+04 Bq/Sample

The library has energies which are not separable.


77739_Gamma_LCS 160-77739~2-A. 9_Gamma_20130915.spc.
1.0e6
1.0e5
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)

Test America St. Louis Spectrum ID: 11_Gamma_20131574

Sample Description: 77739_Gamma_LCS 160-77739~2-A
Detector: Ge11 S/N09363993
Batch ID: 77739
Work Order Number: Gamma
Lot Number: LCS 160-77739~2-A

Decay to Time: 10/1/2006 12:00 Live Time: 1800 sec
Acquisition Time: 10/31/2013 09:57:50 Real Time: 1893 sec
Analysis Time: 11/11/2013 19:53 Dead Time: 4.93 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 11_Soil_TunaCan.Clb
Efficiency Cal Desc: Ge11_TunaCanCal_90099_032912
Efficiency Cal Date: 4/2/2012 17:29
Energy Cal Date: 2/28/2012 13:09
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 11_2013-10-05_0101.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
K-40	-3.130E+00	551.4	1.726E+01	1.726E+01	1.982E+01
CO-60	7.741E+02	1.0	7.995E+00	3.968E+01	3.551E+00
CS-134	5.627E+00	57.9	3.259E+00	3.273E+00	3.600E+01
CS-137	4.774E+02	1.1	5.441E+00	2.542E+01	4.209E+00
EU-152	2.514E+00	70.6	1.774E+00	1.779E+00	1.482E+01
EU-154	2.899E+00	99.0	2.868E+00	2.872E+00	6.079E+01
EU-155	-4.263E-01	1708.0	7.281E+00	7.281E+00	2.440E+01
TL-208	4.864E+01	31.0	1.507E+01	1.528E+01	3.485E+01
PB-210	1.502E+04	1.0	1.504E+02	8.949E+02	2.572E+02
PB-212	9.754E+01	22.9	2.231E+01	2.319E+01	5.738E+01
PB-214	8.604E+00	23.5	2.021E+00	2.070E+00	5.061E+00
BI-212	3.977E+02	48.0	1.908E+02	1.919E+02	5.097E+02
BI-214	2.554E+00	72.7	1.857E+00	1.862E+00	6.709E+00
AC-228	2.142E+01	41.5	8.893E+00	8.960E+00	3.627E+01
Pa-234	3.857E+00	167.3	6.451E+00	6.454E+00	7.418E+00
TH-234	-8.093E+01	34.3	2.773E+01	2.805E+01	7.226E+01
PA-234M	2.658E+01	103.4	2.749E+01	2.752E+01	5.227E+02
U-235	4.288E+00	110.2	4.726E+00	4.731E+00	1.716E+01
AM-241	1.264E+03	0.8	1.065E+01	6.644E+01	1.590E+01
Total	1.816E+04				

Analyst: Jody Watson

TestAmerica, Inc Spectrum name: 11_Gamma_20131574.An1

Sample description
77739_Gamma_LCS 160-77739~2-A

Spectrum Filename: C:\User\SPC\Det11\11_Gamma_20131574.An1

Acquisition information
Start time: 10/31/2013 9:57:50 AM
Live time: 1800
Real time: 1893
Dead time: 4.93 %
Detector ID: 11

Detector system
Ge11 S/N09363993

Calibration
Filename: 11_Soil_TunaCan.Clb
Ge11_TunaCanCal_90099_032912

Energy Calibration
Created: 2/28/2012 1:09:34 PM
Zero offset: 0.055 keV
Gain: 0.250 keV/channel
Quadratic: -2.946E-08 keV/channel^2

Efficiency Calibration
Created: 4/2/2012 5:29:36 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.14 %
Log(Eff): -6.858644E-01 + (-3.337421E-01*Log(E)) + (-3.199860E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.72 %
Log(Eff): -2.393599E+01 + (8.833910E+00*Log(E)) + (-9.364157E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.58keV)
Stop channel: 8000 (1999.47keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	11_2013-10-05_0101.PBC 10/5/2013 1:01:56 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 20 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 46.5155

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.68	379.	16.28	1.05	1.405E-02				
40.49	133.	55.66	1.66	1.711E-02				
46.62	19658.	0.86	0.90	2.193E-02	46.54	4.250	1.460E+04	PB210
49.77	415.	28.03	0.60	2.434E-02				
55.95	145.	50.29	0.62	2.870E-02				
59.56	25028.	0.84	0.88	3.101E-02	59.54	35.900	1.264E+03	AM241
77.07	147.	27.49	0.93	3.947E-02				
79.28	92.	44.04	0.93	4.022E-02				
88.07	1082.	8.02	0.97	4.263E-02				
93.79	56.	88.49	0.94	4.362E-02	93.35	5.561	PBC<MDA	AC228
					93.35	5.810	1.224E+01	U235
					93.35	5.561	3.003E+01	AC228
93.79	56.	88.49	0.94	4.362E-02	93.35	5.561	PBC<MDA	AC228
					93.35	5.810	1.224E+01	U235
122.18	61.	70.58	0.97	4.466E-02	121.78	28.580	PBC<MDA	EU152
143.95	39.	110.20	0.99	4.238E-02	143.79	10.960	PBC<MDA	U235
205.37	11.	379.21	1.05	3.439E-02	205.33	5.010	PBC<MDA	U235
238.51	197.	20.94	0.80	3.106E-02	238.63	43.300	9.754E+01	PB212
					242.00	7.430	4.711E+01	PB214
276.63	35.	99.46	1.11	2.800E-02	277.28	6.310	PBC<MDA	TL208
283.85	38.	97.31	1.12	2.752E-02	284.30	6.140	HL>Cutoff	I131
295.03	118.	34.12	0.33	2.681E-02	295.09	19.300	1.273E+01	PB214
338.09	43.	83.18	1.17	2.436E-02	338.32	12.010	PBC<MDA	AC228
					338.32	12.010	1.900E+01	AC228
351.83	104.	27.31	1.27	2.369E-02	351.93	37.600	6.484E+00	PB214
430.82	38.	58.13	0.50	2.050E-02				
582.88	93.	29.40	0.81	1.643E-02	583.02	84.500	4.864E+01	TL208
609.24	36.	53.14	1.41	1.550E-02	609.31	46.090	PBC<MDA	BI214

					609.31	46.090	PBC<MDA BI214
661.78	9292.	1.14	1.38	1.495E-02	661.66	85.210	4.774E+02 CS137
727.09	28.	78.07	1.51	1.392E-02	727.17	7.550	PBC<MDA BI212
766.55	21.	103.43	1.54	1.338E-02	766.41	0.294	PBC<MDA PA234M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
777.51	11.	209.97	1.55	1.322E-02	778.92	12.940	PBC<MDA	EU152
783.74	37.	55.82	1.56	1.313E-02	785.42	1.280	PBC<MDA	BI212
794.26	21.	97.99	1.57	1.300E-02	795.87	85.530	PBC<MDA	CS134
					795.87	85.530	1.118E+01	CS134
803.02	24.	97.75	1.57	1.293E-02	801.95	8.690	PBC<MDA	CS134
					801.95	8.690	1.296E+02	CS134
809.12	83.	35.39	0.57	1.284E-02				
881.76	16.	167.27	1.64	1.203E-02	880.53	6.000	PBC<MDA	Pa234
					880.53	6.000	1.263E+01	Pa234
911.09	50.	56.96	1.66	1.172E-02	911.07	29.000	PBC<MDA	AC228
					911.07	29.000	1.937E+01	AC228
946.06	15.	197.34	1.69	1.139E-02	946.02	13.400	PBC<MDA	Pa234
					946.02	13.400	5.589E+00	Pa234
964.47	6.	552.78	1.71	1.122E-02	964.11	14.605	PBC<MDA	EU152
969.64	40.	73.12	1.71	1.118E-02	968.97	17.460	PBC<MDA	AC228
					968.97	17.460	2.650E+01	AC228
995.59	5.	472.23	1.73	1.094E-02	996.33	10.600	PBC<MDA	EU154
					996.33	10.600	4.659E+00	EU154
1005.86	25.	98.95	1.74	1.087E-02	1004.77	18.010	PBC<MDA	EU154
					1004.77	18.010	1.238E+01	EU154
1111.78	13.	217.05	1.83	1.004E-02	1112.07	13.644	PBC<MDA	EU152
1120.17	-3.	815.86	1.83	9.985E-03	1120.29	15.100	PBC<MDA	BI214
					1120.29	15.100	PBC<MDA	BI214
1173.37	5261.	1.46	1.87	9.629E-03	1173.24	99.900	7.711E+02	CO60
1332.61	4798.	1.46	2.01	8.708E-03	1332.50	99.980	7.771E+02	CO60
1408.05	2.	375.29	2.06	8.334E-03	1408.00	21.005	PBC<MDA	EU152
1461.51	-5.	196.71	2.10	8.093E-03	1460.83	10.670	PBC<MDA	K40
1764.74	4.	76.03	2.34	6.950E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
146.42	36.68	1142.	379.	2.697E+04	16.28	1.053	-	s
161.64	40.49	2139.	133.	7.772E+03	55.66	1.663	-	s
198.72	49.77	3929.	415.	1.703E+04	28.03	0.596	-	sM
223.43	55.95	2399.	145.	5.063E+03	50.29	0.624	-	sM
307.85	76.98	749.	144.	3.650E+03	28.13	0.929	-	D
316.66	79.18	776.	92.	2.284E+03	44.14	0.931	-	D
351.83	88.07	1541.	1188.	2.786E+04	5.50	0.967	-	M
1722.30	430.82	189.	38.	1.838E+03	58.13	0.499	-	sM
3235.39	809.12	156.	83.	6.465E+03	35.39	0.565	-	sM

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.97	46.58	5420.	20194.	11.219	1.00	0.891
AM-241	237.87	59.56	4487.	25028.	13.905	0.84	0.879
TH-234	245.79	61.54	1206.	-184.	-0.102	30.79	0.916s
EU-155	344.35	86.20	1723.	-110.	-0.061	54.41	0.938s
TH-234	380.25	95.17	736.	-49.	-0.027	217.31	0.943s
AC-228	372.95	93.35	1192.	56.	0.031	88.49	0.944D
U-235	372.95	93.35	1192.	56.	0.031	88.49	0.944D
EU-152	488.19	122.18	902.	61.	0.034	70.58	0.970
Pa-234	515.00	128.88	487.	-5.	-0.003	614.61	0.979s
U-235	575.24	143.95	913.	39.	0.022	110.20	0.990
U-235	653.29	163.47	852.	-24.	-0.013	174.70	1.008s
U-235	820.79	205.37	802.	11.	0.006	379.21	1.047s
PB-212	953.29	238.51	493.	181.	0.100	20.94	0.805s
TL-208	1105.71	276.63	601.	35.	0.020	99.46	1.112
I-131	1134.60	283.85	649.	38.	0.021	97.31	1.118s
PB-214	1179.31	295.03	449.	118.	0.066	34.12	0.326s
AC-228	1351.48	338.09	606.	43.	0.024	83.18	1.167s
EU-152	1375.50	344.10	616.	-11.	-0.006	332.03	1.172s
PB-214	1406.43	351.83	281.	104.	0.058	27.31	1.272
I-131	1459.85	365.19	588.	-9.	-0.005	397.04	1.190s
CS-134	2276.28	569.34	325.	-6.	-0.003	443.16	1.371s
TL-208	2330.42	582.88	188.	93.	0.052	29.40	0.812s
CS-134	2420.48	605.39	382.	-27.	-0.015	105.10	1.401s
BI-214	2435.87	609.24	337.	36.	0.020	53.14	1.405
I-131	2546.22	636.83	346.	-21.	-0.011	129.62	1.429s
CS-137	2645.99	661.78	289.	9292.	5.162	1.14	1.383
BI-212	2907.26	727.09	233.	28.	0.016	78.07	1.507s
PA-234M	3065.10	766.55	231.	21.	0.012	103.43	1.540s
EU-152	3108.94	777.51	242.	11.	0.006	209.97	1.551
BI-212	3133.87	783.74	191.	37.	0.020	55.82	1.556s
CS-134	3175.96	794.26	196.	21.	0.012	97.99	1.565s
CS-134	3210.97	803.02	270.	24.	0.014	97.75	1.570s
EU-154	3489.14	872.55	366.	-19.	-0.011	144.57	1.630s
Pa-234	3525.99	881.76	369.	16.	0.009	167.27	1.637s
AC-228	3643.32	911.09	388.	50.	0.028	56.96	1.662s
Pa-234	3783.25	946.06	451.	15.	0.009	197.34	1.691s
EU-152	3856.91	964.47	471.	6.	0.003	552.78	1.706
AC-228	3877.61	969.64	400.	40.	0.022	73.12	1.710s
EU-154	3981.42	995.59	334.	5.	0.003	472.23	1.733s
PA-234M	3998.45	999.85	318.	-11.	-0.006	222.98	1.737s
EU-154	4022.53	1005.86	285.	25.	0.014	98.95	1.740s
EU-152	4446.33	1111.78	362.	13.	0.007	217.05	1.828
CO-60	4692.81	1173.37	99.	5261.	2.923	1.46	1.869
EU-154	5088.59	1272.27	32.	-3.	-0.002	240.74	1.958s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	5330.12	1332.61	17.	4798.	2.666	1.46	2.011
EU-152	5632.05	1408.05	23.	2.	0.001	375.29	2.064s
K-40	5846.05	1461.51	36.	-5.	-0.003	196.71	2.105s
BI-214	7060.05	1764.74	19.	4.	0.002	76.03	2.336s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample		Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	5.0838E-01					5.31E+01		
			477.60	5.084E-01	%(		3.156E+01	1.84E+03	1.05E+01 G
K-40	N	-3.1300E+00					4.66E+11		
			1460.83	-3.130E+00	?(P		1.982E+01	1.97E+02	1.07E+01 G
CO-60	F	7.7409E+02					1.93E+03		
			1332.50	7.771E+02	(		3.551E+00	1.46E+00	1.00E+02 G
			1173.24	7.711E+02	(		7.193E+00	1.46E+00	9.99E+01 G
I-131	I	6.2628E-01					8.02E+00		
			364.48	-2.551E-01	?(		3.405E+00	3.97E+02	8.17E+01 G
			284.30	1.235E+01	&(		3.994E+01	9.73E+01	6.14E+00 G
			636.97	-1.037E+01	+		4.501E+01	1.30E+02	7.17E+00 G
CS-134	I	5.6266E+00					7.54E+02		
			604.71	-1.027E+01	?(		3.600E+01	1.05E+02	9.76E+01 G
			795.87	1.118E+01	&(		3.663E+01	9.80E+01	8.55E+01 G
			569.32	-1.345E+01	+		2.019E+02	4.43E+02	1.54E+01 G
			801.95	1.296E+02	(		4.227E+02	9.78E+01	8.69E+00 G
			563.24	8.247E+00	&		3.713E+02	1.33E+03	8.35E+00 G
CS-137	I	4.7736E+02					1.10E+04		
			661.66	4.774E+02	(		4.209E+00	1.14E+00	8.52E+01 G
EU-152	F	2.5135E+00					4.94E+03		
			344.29	-1.329E+00	?(		1.482E+01	3.32E+02	2.65E+01 G
			121.78	3.826E+00	(		8.921E+00	7.06E+01	2.86E+01 G
			778.92	4.945E+00	(		3.511E+01	2.10E+02	1.29E+01 G
			964.11	2.713E+00	(		5.060E+01	5.53E+02	1.46E+01 G
			1112.07	7.290E+00	(		5.327E+01	2.17E+02	1.36E+01 G
			1408.00	8.363E-01	&(		1.138E+01	3.75E+02	2.10E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	I	2.8987E+00					3.14E+03	
			873.23-1.254E+01	?(		6.079E+01	1.45E+02	1.23E+01 G
			123.10-1.484E-01	&		7.938E+00	1.59E+03	4.08E+01 G
			1274.54-1.049E+00	+		8.950E+00	2.41E+02	3.52E+01 G
			723.36 0.000E+00	+		3.157E+01	1.00E+03	2.02E+01 G
			1004.77 1.238E+01	?(		4.090E+01	9.90E+01	1.80E+01 G
			996.33 4.659E+00	?(		7.449E+01	4.72E+02	1.06E+01 G
EU-155	I	-4.2626E-01					1.81E+03	
			105.31-4.263E-01	%(		2.440E+01	1.71E+03	2.12E+01 G
			86.54-1.262E+01	+		2.258E+01	5.44E+01	3.07E+01 G
TL-208	N	4.8643E+01					6.98E+02	
			583.02 4.864E+01	(P		3.485E+01	2.94E+01	8.45E+01 G
			277.28 1.453E+02	+		4.806E+02	9.95E+01	6.31E+00 G
			860.56 1.003E+01	%		4.122E+02	1.21E+03	1.24E+01 G
PB-210	N	1.5023E+04					8.14E+03	
			46.54 1.502E+04	(P		2.572E+02	1.00E+00	4.25E+00 G
PB-212	N	9.7541E+01					6.98E+02	
			238.63 9.754E+01	(P		5.738E+01	2.09E+01	4.33E+01 G
			300.03-3.442E+00	%		9.786E+02	8.43E+03	3.28E+00 G
PB-214	N	8.6039E+00					5.84E+05	
			351.93 6.484E+00	(P		5.061E+00	2.73E+01	3.76E+01 G
			295.09 1.273E+01	(P		1.092E+01	3.41E+01	1.93E+01 G
			242.00-1.846E-01	& P		2.604E+01	9.18E+02	7.43E+00 G
BI-212	N	3.9766E+02					6.98E+02	
			727.17 1.966E+02	?(		5.097E+02	7.81E+01	7.55E+00 G
			785.42 1.584E+03	&(		2.899E+03	5.58E+01	1.28E+00 G
BI-214	N	2.5543E+00					5.84E+05	
			609.31 2.760E+00	(P		6.709E+00	5.31E+01	4.61E+01 G
			1120.29-9.480E-01	% P		2.996E+01	8.16E+02	1.51E+01 G
			1764.49 1.937E+00	&(P		1.185E+01	7.60E+01	1.54E+01 G
AC-228	N	2.1423E+01					2.10E+03	
			911.07 1.937E+01	?(		3.627E+01	5.70E+01	2.90E+01 G
			968.97 2.650E+01	&(		6.414E+01	7.31E+01	1.75E+01 G
			338.32 1.900E+01	(		5.238E+01	8.32E+01	1.20E+01 G
							Energy duplication	
			93.35 3.003E+01	*		8.802E+01	8.85E+01	5.56E+00 XA
Pa-234	N	3.8567E+00					1.63E+12	
			131.29-3.578E-01	&(		7.418E+00	6.15E+02	1.80E+01 G
			569.47 4.218E-01	%		3.150E+01	2.19E+03	8.20E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		946.02	5.589E+00	&(	3.703E+01	1.97E+02	1.34E+01 G
		883.24	1.525E-01	%	4.471E+01	8.64E+03	9.60E+00 G
		880.53	1.263E+01	&(	7.094E+01	1.67E+02	6.00E+00 G
TH-234	N -8.0934E+01					1.63E+12	
		63.29-8.093E+01		?(P	7.226E+01	3.08E+01	3.81E+00 G
		92.59-1.124E+01		& P	2.953E+01	2.17E+02	5.58E+00 G
PA-234M	N 2.6576E+01					1.63E+12	
		1001.00-6.951E+01		&(	5.227E+02	2.23E+02	8.37E-01 G
		766.41	3.001E+02	&(	1.038E+03	1.03E+02	2.94E-01 G
U-235	N 4.2884E+00					2.57E+11	
		143.79	4.687E+00	?(	1.716E+01	1.10E+02	1.10E+01 G
		205.33	3.417E+00	?(	4.342E+01	3.79E+02	5.01E+00 G
		163.38-6.618E+00		+	3.859E+01	1.75E+02	5.08E+00 G
							Energy duplication
		93.35	1.224E+01	*	3.587E+01	8.85E+01	5.81E+00 X
AM-241	T 1.2637E+03					1.58E+05	
		59.54	1.264E+03	(	1.590E+01	8.43E-01	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average

R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-234	61.54	1206.	-184.	-0.102	30.79	-8.093E+01	P
EU-155	86.20	1723.	-110.	-0.061	54.41	-1.262E+01	
TH-234	95.17	736.	-49.	-0.027	217.31	-1.124E+01	P
AC-228	93.35	1192.	56.	0.031	88.49	3.003E+01	
U-235	93.35	1192.	56.	0.031	88.49	1.224E+01	
Pa-234	128.88	487.	-5.	-0.003	614.61	-3.578E-01	
U-235	143.95	913.	39.	0.022	110.20	4.687E+00	
U-235	163.47	852.	-24.	-0.013	174.70	-6.618E+00	
U-235	205.37	802.	11.	0.006	379.21	3.417E+00	
I-131	283.85	649.	38.	0.021	97.31	0.000E+00	
AC-228	338.09	606.	43.	0.024	83.18	1.900E+01	
I-131	365.19	588.	-9.	-0.005	397.04	0.000E+00	
CS-134	569.34	325.	-6.	-0.003	443.16	-1.345E+01	
CS-134	605.39	382.	-27.	-0.015	105.10	-1.027E+01	
BI-214	609.24	337.	36.	0.020	53.14	2.760E+00	P
I-131	636.83	346.	-21.	-0.011	129.62	0.000E+00	
BI-212	727.09	233.	28.	0.016	78.07	1.966E+02	
PA-234M	766.55	231.	21.	0.012	103.43	3.001E+02	
BI-212	783.74	191.	37.	0.020	55.82	1.584E+03	
CS-134	794.26	196.	21.	0.012	97.99	1.118E+01	
CS-134	803.02	270.	24.	0.014	97.75	1.296E+02	
EU-154	872.55	366.	-19.	-0.011	144.57	-1.254E+01	
Pa-234	881.76	369.	16.	0.009	167.27	1.263E+01	
AC-228	911.09	388.	50.	0.028	56.96	1.937E+01	
Pa-234	946.06	451.	15.	0.009	197.34	5.589E+00	
AC-228	969.64	400.	40.	0.022	73.12	2.650E+01	
EU-154	995.59	334.	5.	0.003	472.23	4.659E+00	
PA-234M	999.85	318.	-11.	-0.006	222.98	-6.951E+01	
EU-154	1005.86	285.	25.	0.014	98.95	1.238E+01	
EU-154	1272.27	32.	-3.	-0.002	240.74	-1.049E+00	
K-40	1461.51	36.	-5.	-0.003	196.71	-3.130E+00	P
BI-214	1764.74	19.	4.	0.002	76.03	1.937E+00	P

P - Peakbackground subtraction

TestAmerica, Inc Spectrum name: 11_Gamma_20131574.An1

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

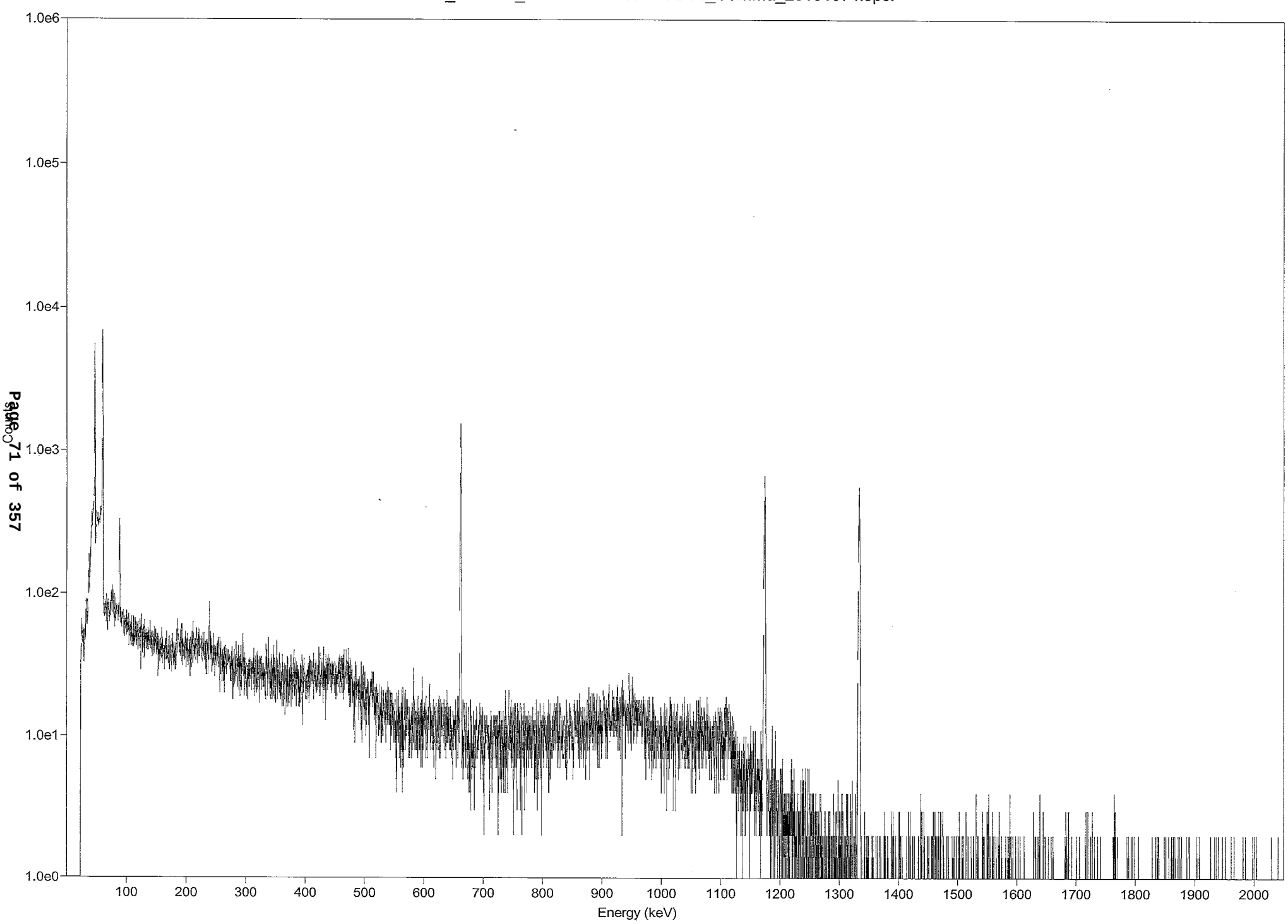
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma	MDA Bq/Sample
BE-7	A	5.0838E-01	>12 Halflives	1.8406E+03%	3.1560E+01	
K-40	#A	-3.1300E+00	-3.1300E+00	5.514E+02%		1.98E+01
CO-60		3.0499E+02	7.7409E+02	1.033E+00%		3.55E+00
I-131	#A	6.2628E-01	>12 Halflives	9.7311E+01%	3.4047E+00	
CS-134	#A	5.2196E-01	5.6266E+00	5.793E+01%		3.60E+01
CS-137		4.0529E+02	4.7736E+02	1.140E+00%		4.21E+00
EU-152	A	1.7489E+00	2.5135E+00	7.058E+01%		1.48E+01
EU-154	#A	1.6371E+00	2.8987E+00	9.895E+01%		6.08E+01
EU-155	#A	-1.5842E-01	-4.2626E-01	1.708E+03%		2.44E+01
TL-208		3.7216E+00	4.8643E+01	3.099E+01%		3.48E+01
PB-210		1.2054E+04	1.5023E+04	1.001E+00%		2.57E+02
PB-212		7.4625E+00	9.7541E+01	2.288E+01%		5.74E+01
PB-214		8.5775E+00	8.6039E+00	2.349E+01%		5.06E+00
BI-212	#A	3.0424E+01	3.9766E+02	4.799E+01%		5.10E+02
BI-214	#A	2.5465E+00	2.5543E+00	7.270E+01%		6.71E+00
AC-228	#A	9.1217E+00	2.1423E+01	4.151E+01%		3.63E+01
Pa-234	#A	3.8567E+00	3.8567E+00	1.673E+02%		7.42E+00
TH-234	#A	-8.0934E+01	-8.0934E+01	3.426E+01%		7.23E+01
PA-234M	#A	2.6576E+01	2.6576E+01	1.034E+02%		5.23E+02
U-235	#A	4.2884E+00	4.2884E+00	1.102E+02%		1.72E+01
AM-241		1.2494E+03	1.2637E+03	8.426E-01%		1.59E+01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

S U M M A R Y

Total Activity (87.9 to 1999.5 keV) 1.403E+04 Bq/Sample
Total Decayed Activity (87.9 to 1999.5 keV) 1.7692848E+04 Bq/Sample

The library has energies which are not separable.


77739_Gamma_LCS 160-77739~2-A. 11_Gamma_20131574.spc.
1.0e6
1.0e5
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)

Sample Description: 77739_Gamma_LCS 160-77739~2-A
Detector: Ge15 SN/11012216
Batch ID: 77739
Work Order Number: Gamma
Lot Number: LCS 160-77739~2-A

Decay to Time: 10/1/2006 12:00 Live Time: 1800 sec
Acquisition Time: 10/31/2013 10:54:41 Real Time: 1807 sec
Analysis Time: 11/11/2013 12:28 Dead Time: 0.38 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 15_Soil_TunaCan.Clb
Efficiency Cal Desc: 15_TunaCan_90099_032212
Efficiency Cal Date: 3/22/2012 13:03
Energy Cal Date: 2/28/2012 16:29
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 15_2013-10-05_0052.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
K-40	3.365E+00	147.9	4.978E+00	4.980E+00	1.890E+01
CO-60	7.700E+02	1.2	9.559E+00	3.982E+01	5.695E+00
CS-134	5.179E+00	73.9	3.829E+00	3.839E+00	3.939E+01
CS-137	4.556E+02	1.3	6.088E+00	2.447E+01	5.061E+00
EU-152	4.086E+00	106.8	4.362E+00	4.367E+00	1.678E+01
EU-154	1.345E+01	155.0	2.084E+01	2.085E+01	7.011E+01
EU-155	1.419E+00	123.9	1.757E+00	1.759E+00	2.813E+01
TL-208	4.567E+01	43.4	1.980E+01	1.994E+01	5.254E+01
PB-210	1.493E+04	1.1	1.619E+02	8.917E+02	2.762E+02
PB-212	1.324E+02	21.1	2.790E+01	2.919E+01	6.645E+01
PB-214	6.175E+00	39.3	2.429E+00	2.450E+00	8.077E+00
BI-212	4.218E+02	59.0	2.489E+02	2.499E+02	5.958E+02
BI-214	6.688E+00	33.6	2.247E+00	2.274E+00	5.883E+00
AC-228	1.495E+01	55.3	8.263E+00	8.298E+00	4.572E+01
Pa-234	3.895E+00	85.0	3.312E+00	3.318E+00	1.110E+01
TH-234	-3.768E+02	9.8	3.708E+01	4.199E+01	1.088E+02
PA-234M	1.072E+02	159.5	1.710E+02	1.710E+02	5.770E+02
U-235	5.110E+00	111.1	5.678E+00	5.684E+00	1.888E+01
AM-241	1.267E+03	0.9	1.133E+01	6.673E+01	1.689E+01
Total	1.820E+04				

Analyst: Jody Watson

TestAmerica, Inc. Spectrum name: 15_Gamma_20131338.An1

Sample description
77739_Gamma_LCS 160-77739~2-A

Spectrum Filename: C:\User\SPC\Det15\15_Gamma_20131338.An1

Acquisition information

Start time:	10/31/2013 10:54:41 AM
Live time:	1800
Real time:	1807
Dead time:	0.38 %
Detector ID:	15

Detector system
Ge15 SN/11012216

Calibration

Filename:	15_Soil_TunaCan.Clb

15_TunaCan_90099_032212

Energy Calibration

Created:	2/28/2012 4:29:17 PM
Zero offset:	0.044 keV
Gain:	0.250 keV/channel
Quadratic:	-3.267E-08 keV/channel^2

Efficiency Calibration

Created:	3/22/2012 1:03:01 PM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 1.00 %
Log(Eff):	-6.894897E-01 + (-3.290613E-01*Log(E)) + (-3.875629E-02*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 1.13 %
Log(Eff):	-2.362677E+01 + (8.666669E+00*Log(E)) + (-9.214638E-01*Log(E)^2)

Library Files

Main analysis library:	Client_Routine Short Rev1.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.57keV)
Stop channel:	8000 (1999.52keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	15_2013-10-05_0052.PBC 10/5/2013 12:52:55 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 22 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 0.0729

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
40.83	107.	69.92	0.27	1.564E-02				
46.57	16947.	0.93	0.95	1.956E-02	46.54	4.250	1.409E+04	PB210
49.39	13.	607.24	0.95	2.141E-02				
59.56	22159.	0.89	0.99	2.738E-02	59.54	35.900	1.267E+03	AM241
77.46	120.	41.83	0.82	3.462E-02				
84.09	32.	123.88	0.98	3.679E-02	86.54	30.700	PBC<MDA	EU155
88.11	901.	7.82	1.12	3.707E-02				
92.79	98.	44.60	0.51	3.778E-02	92.59	5.584	PBC<MDA	TH234
					92.59	5.584	1.948E+01	TH234
93.24	5.	773.45	0.99	3.785E-02	93.35	5.561	PBC<MDA	AC228
					93.35	5.810	1.178E+00	U235
112.41	97.	39.62	0.77	3.882E-02				
121.38	35.	121.43	1.02	3.848E-02	121.78	28.580	PBC<MDA	EU152
					121.78	28.580	2.539E+00	EU152
124.36	78.	43.12	0.45	3.831E-02				
131.26	48.	85.04	1.02	3.775E-02	131.29	18.000	PBC<MDA	Pa234
					131.29	18.000	3.938E+00	Pa234
143.74	37.	111.11	1.04	3.639E-02	143.79	10.960	PBC<MDA	U235
					143.79	10.960	5.110E+00	U235
181.54	53.	54.86	0.41	3.176E-02				
185.96	61.	51.19	0.62	3.120E-02				
228.17	43.	62.64	0.30	2.681E-02				
233.55	23.	89.52	0.49	2.634E-02				
238.59	205.	19.87	1.43	2.592E-02	238.63	43.300	1.324E+02	PB212
243.73	4.	848.75	1.12	2.565E-02	242.00	7.430	PBC<MDA	PB214
					242.00	7.430	1.143E+00	PB214
246.53	44.	71.15	0.34	2.529E-02				
277.43	21.	164.07	1.15	2.513E-02	277.28	6.310	PBC<MDA	TL208

					277.28	6.310	PBC<MDA	TL208
289.99	45.	62.18	0.31	2.235E-02				
295.38	45.	74.52	1.17	2.205E-02	295.09	19.300	PBC<MDA	PB214
					295.09	19.300	5.882E+00	PB214
338.60	50.	55.28	0.30	1.983E-02	338.32	12.010	PBC<MDA	AC228
344.74	4.	742.34	1.21	1.956E-02	344.29	26.500	PBC<MDA	EU152
					344.29	26.500	6.704E-01	EU152
351.99	82.	39.34	1.22	1.923E-02	351.93	37.600	PBC<MDA	PB214
					351.93	37.600	6.325E+00	PB214
362.41	3.	994.26	1.23	1.871E-02	364.48	81.700	HL>Cutoff	I131
					364.48	81.700	HL>Cutoff	I131
434.37	25.	69.79	0.47	1.628E-02				
540.45	22.	51.83	0.32	1.364E-02				
563.18	29.	73.94	1.39	1.319E-02	563.24	8.350	PBC<MDA	CS134
					563.24	8.350	1.594E+02	CS134
583.36	55.	38.89	1.41	1.282E-02	583.02	84.500	PBC<MDA	TL208
					583.02	84.500	PBC<MDA	TL208
609.27	82.	30.58	0.70	1.236E-02	609.31	46.090	7.344E+00	BI214
637.24	36.	60.77	1.45	1.192E-02	636.97	7.170	HL>Cutoff	I131
					636.97	7.170	HL>Cutoff	I131
661.74	6850.	1.34	1.48	1.154E-02	661.66	85.210	4.556E+02	CS137

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
726.85	34.	59.01	1.52	1.067E-02	727.17	7.550	PBC<MDA	BI212
775.52	2.	756.00	1.56	1.007E-02	778.92	12.940	PBC<MDA	EU152
					778.92	12.940	1.462E+00	EU152
785.23	19.	107.79	1.57	9.998E-03	785.42	1.280	PBC<MDA	BI212
860.96	12.	207.24	1.62	9.252E-03	860.56	12.420	PBC<MDA	TL208
					860.56	12.420	7.432E+01	TL208
872.69	15.	154.96	1.63	9.137E-03	873.23	12.270	PBC<MDA	EU154
					873.23	12.270	1.345E+01	EU154
880.64	6.	446.96	1.64	9.072E-03	880.53	6.000	PBC<MDA	Pa234
					883.24	9.600	3.612E+00	Pa234
					880.53	6.000	5.764E+00	Pa234
881.05	4.	542.69	1.64	9.048E-03	880.53	6.000	PBC<MDA	Pa234
					883.24	9.600	2.646E+00	Pa234
					883.24	9.600	2.646E+00	Pa234
910.94	42.	55.81	0.50	8.812E-03	911.07	29.000	2.145E+01	AC228
969.54	11.	233.14	1.70	8.357E-03	968.97	17.460	PBC<MDA	AC228
998.60	13.	159.52	1.72	8.125E-03	1001.00	0.837	PBC<MDA	PA234M
1043.81	22.	49.44	0.50	7.836E-03				
1113.40	21.	106.75	1.80	7.416E-03	1112.07	13.644	PBC<MDA	EU152
					1112.07	13.644	1.645E+01	EU152
1120.71	3.	324.01	1.80	7.368E-03	1120.29	15.100	PBC<MDA	BI214
1173.35	3847.	1.77	1.69	7.076E-03	1173.24	99.900	7.674E+02	CO60
1274.60	4.	168.52	1.90	6.579E-03	1274.54	35.190	PBC<MDA	EU154
					1274.54	35.190	1.833E+00	EU154
1332.66	3465.	1.74	1.93	6.324E-03	1332.50	99.980	7.726E+02	CO60
1461.86	4.	71.29	2.02	5.828E-03	1460.83	10.670	PBC<MDA	K40
1764.84	6.	62.35	2.18	4.916E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
163.02	40.83	2072.	107.	6.861E+03	69.92	0.275	-	s
197.05	49.34	2432.	256.	1.197E+04	32.03	0.813	-	M
309.42	77.46	800.	120.	3.466E+03	41.83	0.818	-	s
352.00	88.11	1017.	901.	2.430E+04	6.01	1.125	-	s
370.26	92.79	564.	97.	2.580E+03	35.89	0.989	-	D
449.15	112.41	460.	97.	2.499E+03	39.62	0.767	-	
496.92	124.36	413.	96.	2.498E+03	31.71	0.446	-	s
725.46	181.54	293.	53.	1.658E+03	54.86	0.413	-	s
743.15	185.96	347.	61.	1.966E+03	51.19	0.620	-	s
911.90	228.17	273.	43.	1.604E+03	62.64	0.301	-	s
933.42	233.55	188.	23.	8.795E+02	89.52	0.493	-	sc
985.29	246.53	312.	44.	1.740E+03	71.15	0.344	-	sM
1159.03	289.99	246.	45.	2.014E+03	62.18	0.308	-	sM
1736.34	434.37	127.	25.	1.526E+03	69.79	0.469	-	sc
2160.53	540.45	54.	22.	1.613E+03	51.83	0.320	-	s
4174.07	1043.81	40.	22.	2.871E+03	49.44	0.500	-	sM

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.77	46.52	4987.	17937.	9.965	1.08	0.948
AM-241	237.90	59.56	3943.	22159.	12.310	0.89	0.989
TH-234	245.27	61.41	2137.	-756.	-0.420	9.58	0.962s
EU-155	335.93	84.09	763.	32.	0.018	123.88	0.983s
TH-234	370.20	92.66	1149.	52.	0.029	63.10	0.989s
AC-228	372.95	93.35	648.	5.	0.003	773.45	0.989D
U-235	372.95	93.35	981.	89.	0.049	50.97	0.989D
EU-155	421.17	105.41	1063.	-14.	-0.008	319.41	1.000s
EU-152	485.01	121.38	884.	35.	0.019	121.43	1.015s
EU-154	491.96	123.12	1007.	-29.	-0.016	154.75	1.017s
Pa-234	524.49	131.26	815.	48.	0.027	85.04	1.024s
U-235	574.37	143.74	812.	37.	0.020	111.11	1.036s
U-235	652.91	163.39	727.	-19.	-0.010	203.98	1.053s
PB-212	953.55	238.59	460.	205.	0.114	19.87	1.430s
PB-214	974.11	243.73	548.	4.	0.002	848.75	1.123s
TL-208	1108.85	277.43	600.	21.	0.012	164.07	1.154s
I-131	1131.84	283.18	485.	-11.	-0.006	281.74	1.160s
PB-214	1180.60	295.38	538.	45.	0.025	74.52	1.170
AC-228	1353.39	338.60	238.	50.	0.028	55.28	0.297s
EU-152	1377.94	344.74	520.	4.	0.002	742.34	1.212s
PB-214	1406.93	351.99	480.	82.	0.046	39.34	1.219
I-131	1448.61	362.41	377.	3.	0.002	994.26	1.229s
BE-7	1908.87	477.52	536.	-7.	-0.004	497.88	1.324s
CS-134	2251.43	563.18	220.	29.	0.016	73.94	1.394s
CS-134	2276.67	569.49	238.	-18.	-0.010	122.24	1.399s
Pa-234	2276.53	569.45	236.	-17.	-0.010	127.24	1.399s
TL-208	2332.17	583.36	264.	55.	0.031	38.89	1.410
CS-134	2417.07	604.59	274.	-16.	-0.009	146.27	1.427s
BI-214	2435.76	609.27	152.	75.	0.042	30.58	0.701s
I-131	2547.65	637.24	223.	36.	0.020	60.77	1.452s
CS-137	2645.63	661.74	248.	6850.	3.806	1.34	1.481
EU-154	2890.98	723.08	251.	-25.	-0.014	92.05	1.519s
BI-212	2906.06	726.85	185.	34.	0.019	59.01	1.522s
EU-152	3100.71	775.52	162.	2.	0.001	756.00	1.561s
BI-212	3139.57	785.23	208.	19.	0.011	107.79	1.566s
TL-208	3442.52	860.96	291.	12.	0.007	207.24	1.622s
EU-154	3489.45	872.69	274.	15.	0.009	154.96	1.631s
Pa-234	3521.25	880.64	316.	6.	0.003	446.96	1.636s
Pa-234	3522.88	881.05	250.	4.	0.002	542.69	1.638s
AC-228	3643.08	911.09	347.	25.	0.014	106.08	1.658s
Pa-234	3767.65	942.23	214.	-2.	-0.001	998.44	1.683s
AC-228	3876.90	969.54	319.	11.	0.006	233.14	1.699
EU-154	3986.82	997.01	298.	-15.	-0.008	169.19	1.718s
PA-234M	3993.17	998.60	212.	13.	0.007	159.52	1.722s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	4452.54	1113.40	237.	21.	0.012	106.75	1.797s
BI-214	4481.79	1120.71	179.	3.	0.002	324.01	1.803
CO-60	4692.45	1173.35	117.	3847.	2.137	1.77	1.694
EU-154	5097.64	1274.60	24.	4.	0.002	168.52	1.902s
CO-60	5330.02	1332.66	24.	3465.	1.925	1.74	1.926
K-40	5847.16	1461.86	16.	4.	0.002	71.29	2.015s
BI-214	7060.16	1764.84	15.	6.	0.004	62.35	2.180s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-2.3099E+00				5.31E+01	
			477.60	-2.310E+00	&(	3.873E+01 4.98E+02 1.05E+01	G
K-40	N	3.3645E+00				4.66E+11	
			1460.83	3.365E+00	&(P	1.890E+01 7.13E+01 1.07E+01	G
CO-60	F	7.7002E+02				1.93E+03	
			1332.50	7.726E+02	(	5.695E+00 1.74E+00 1.00E+02	G
			1173.24	7.674E+02	(	1.058E+01 1.77E+00 9.99E+01	G
I-131	I	1.9868E+00				8.02E+00	
			364.48	1.005E-01	&(	3.386E+00 9.94E+02 8.17E+01	G
			284.30	-4.432E+00	+	4.199E+01 2.82E+02 6.14E+00	G
			636.97	2.348E+01	(	4.698E+01 6.08E+01 7.17E+00	G
CS-134	I	5.1785E+00				7.54E+02	
			604.71	-8.013E+00	?(	3.939E+01 1.46E+02 9.76E+01	G
			795.87	2.035E-01	%	5.332E+01 7.67E+03 8.55E+01	G
			569.32	-5.420E+01	+	2.223E+02 1.22E+02 1.54E+01	G
			801.95	-5.550E+00	&	5.174E+02 2.73E+03 8.69E+00	G
			563.24	1.594E+02	&(	3.908E+02 7.39E+01 8.35E+00	G
CS-137	I	4.5561E+02				1.10E+04	
			661.66	4.556E+02	(	5.061E+00 1.34E+00 8.52E+01	G
EU-152	F	4.0858E+00				4.94E+03	
			344.29	6.704E-01	&(	1.678E+01 7.42E+02 2.65E+01	G
			121.78	2.539E+00	*(	1.026E+01 1.21E+02 2.86E+01	G
			778.92	1.462E+00	?(	3.795E+01 7.56E+02 1.29E+01	G
			964.11	1.838E-01	&	5.194E+01 8.29E+03 1.46E+01	G
			1112.07	1.645E+01	&(	5.876E+01 1.07E+02 1.36E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1408.00	-9.699E-03 %		1.274E+01	3.45E+04	2.10E+01 G
EU-154	I	1.3449E+01					3.14E+03	
			873.23	1.345E+01 &(		7.011E+01	1.55E+02	1.23E+01 G
			123.10	-1.835E+00 -		9.460E+00	1.55E+02	4.08E+01 G
			1274.54	1.833E+00 -		1.090E+01	1.69E+02	3.52E+01 G
			723.36	-1.133E+01 +		3.476E+01	9.20E+01	2.02E+01 G
			1004.77	-4.802E-01 &		5.487E+01	3.35E+03	1.80E+01 G
			996.33	-1.660E+01 &		9.452E+01	1.69E+02	1.06E+01 G
EU-155	I	1.4186E+00					1.81E+03	
			105.31	-2.635E+00 ?(		2.813E+01	3.19E+02	2.12E+01 G
			86.54	4.218E+00 ?(		1.740E+01	1.24E+02	3.07E+01 G
TL-208	N	4.5666E+01					6.98E+02	
			583.02	3.712E+01 ?(P		5.254E+01	3.89E+01	8.45E+01 G
			277.28	1.037E+02 &(P		5.816E+02	1.64E+02	6.31E+00 G
			860.56	7.432E+01 ?(		5.196E+02	2.07E+02	1.24E+01 G
PB-210	N	1.4933E+04					8.14E+03	
			46.54	1.493E+04 (P		2.762E+02	1.08E+00	4.25E+00 G
PB-212	N	1.3244E+02					6.98E+02	
			238.63	1.324E+02 (P		6.645E+01	1.99E+01	4.33E+01 G
			300.03	-5.919E+00 %		1.025E+03	5.11E+03	3.28E+00 G
PB-214	N	6.1745E+00					5.84E+05	
			351.93	6.325E+00 (		8.077E+00	3.93E+01	3.76E+01 G
			295.09	5.882E+00 ?(		1.450E+01	7.45E+01	1.93E+01 G
			242.00	1.143E+00 -		3.269E+01	8.49E+02	7.43E+00 G
BI-212	N	4.2178E+02					6.98E+02	
			727.17	3.071E+02 (		5.958E+02	5.90E+01	7.55E+00 G
			785.42	1.098E+03 (		3.967E+03	1.08E+02	1.28E+00 G
BI-214	N	6.6878E+00					5.84E+05	
			609.31	7.344E+00 (P		5.883E+00	3.06E+01	4.61E+01 G
			1120.29	1.624E+00 - P		3.260E+01	3.24E+02	1.51E+01 G
			1764.49	4.725E+00 ?(P		1.524E+01	6.23E+01	1.54E+01 G
AC-228	N	1.4948E+01					2.10E+03	
			911.07	1.291E+01 ?(		4.572E+01	1.06E+02	2.90E+01 G
			968.97	9.765E+00 (		7.681E+01	2.33E+02	1.75E+01 G
			338.32	2.739E+01 (		4.087E+01	5.53E+01	1.20E+01 G
								Energy duplication
			93.35	2.891E+00 -		7.523E+01	7.73E+02	5.56E+00 XA

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Pa-234	N 3.8949E+00					1.63E+12	
		131.29	3.938E+00	&(	1.110E+01	8.50E+01	1.80E+01 G
		569.47	-9.005E+00	+	3.848E+01	1.27E+02	8.20E+00 G
		946.02	-1.010E+00	-	3.446E+01	9.98E+02	1.34E+01 G
		883.24	2.646E+00	?(	4.886E+01	5.43E+02	9.60E+00 G
		880.53	5.764E+00	&(	8.727E+01	4.47E+02	6.00E+00 G
TH-234	N -3.7684E+02					1.63E+12	
		63.29	-3.768E+02	?(P	1.088E+02	9.58E+00	3.81E+00 G
		92.59	1.379E+01	+ P	4.233E+01	6.31E+01	5.58E+00 G
PA-234M	N 1.0717E+02					1.63E+12	
		1001.00	1.072E+02	?(	5.770E+02	1.60E+02	8.37E-01 G
		766.41	1.437E+01	%	1.209E+03	2.45E+03	2.94E-01 G
U-235	N 5.1103E+00					2.57E+11	
		143.79	5.110E+00	(	1.888E+01	1.11E+02	1.10E+01 G
		205.33	1.168E+00	&	5.126E+01	1.31E+03	5.01E+00 G
		163.38	-6.110E+00	+	4.168E+01	2.04E+02	5.08E+00 G
							Energy duplication
		93.35	2.244E+01	&	3.756E+01	5.10E+01	5.81E+00 X
AM-241	T 1.2671E+03					1.58E+05	
		59.54	1.267E+03	(	1.689E+01	8.94E-01	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma	MDA Bq/Sample
BE-7	#A	-2.3099E+00	>12 Halflives	4.9788E+02%	3.8727E+01	
K-40	#A	3.3645E+00	3.3645E+00	1.479E+02%		1.89E+01
CO-60		3.0338E+02	7.7002E+02	1.241E+00%		5.69E+00
I-131	#A	1.9868E+00	>12 Halflives	6.0769E+01%	3.3861E+00	
CS-134	#A	4.8037E-01	5.1785E+00	7.394E+01%		3.94E+01
CS-137		3.8683E+02	4.5561E+02	1.336E+00%		5.06E+00
EU-152	#A	2.8429E+00	4.0858E+00	1.068E+02%		1.68E+01
EU-154	#A	7.5957E+00	1.3449E+01	1.550E+02%		7.01E+01
EU-155	#A	5.2723E-01	1.4186E+00	1.239E+02%		2.81E+01
TL-208	#A	3.4936E+00	4.5666E+01	4.336E+01%		5.25E+01
PB-210		1.1982E+04	1.4933E+04	1.084E+00%		2.76E+02
PB-212	#	1.0132E+01	1.3244E+02	2.107E+01%		6.64E+01
PB-214	#A	6.1556E+00	6.1745E+00	3.934E+01%		8.08E+00
BI-212	#A	3.2268E+01	4.2178E+02	5.901E+01%		5.96E+02
BI-214		6.6673E+00	6.6878E+00	3.360E+01%		5.88E+00
AC-228	A	6.3644E+00	1.4948E+01	5.528E+01%		4.57E+01
Pa-234	#A	3.8949E+00	3.8949E+00	8.504E+01%		1.11E+01
TH-234	#A	-3.7684E+02	-3.7684E+02	9.841E+00%		1.09E+02
PA-234M	#A	1.0717E+02	1.0717E+02	1.595E+02%		5.77E+02
U-235	#A	5.1103E+00	5.1103E+00	1.111E+02%		1.89E+01
AM-241		1.2528E+03	1.2671E+03	8.940E-01%		1.69E+01

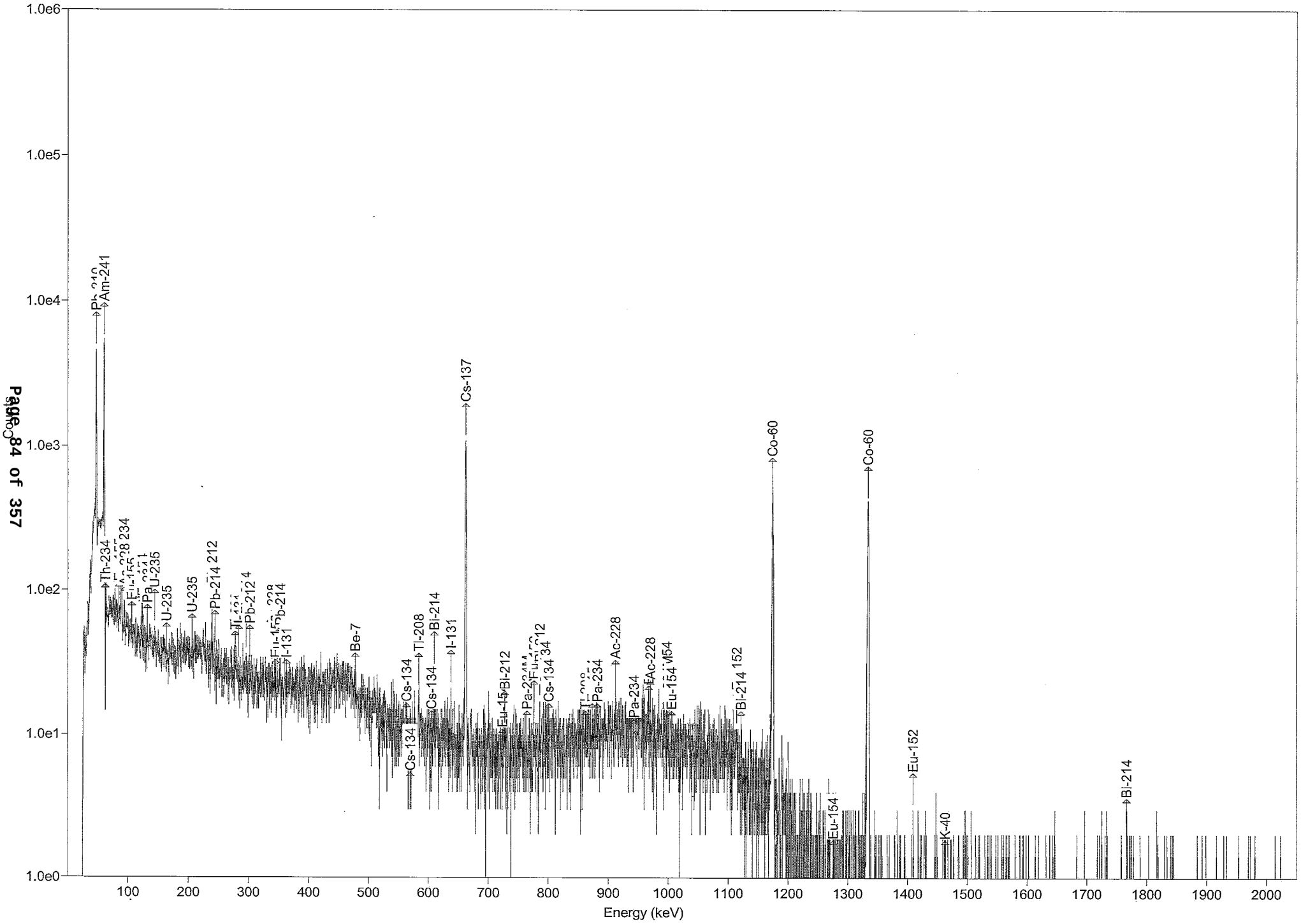
- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (112.4 to 1999.5 keV) 1.394E+04 Bq/Sample
Total Decayed Activity (112.4 to 1999.5 keV) 1.7565109E+04 Bq/Sample

The library has energies which are not separable.

77739_Gamma_LCS 160-77739~2-A. 15_Gamma_20131338.spc.



Reagent

Tuna Can_00002

Rec'd 2/3/10

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

81427-334
1.0 Liter Sand in 1 Liter HDPE Silgan Jar

Customer: TestAmerica/St. Louis, MO
P.O. No.: 2339090, Item 1
Reference Date: 01-Jan-2010 12:00 PM EST **Grams of Master Source:** 0.017570

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Pb-210	46.5	8.120E+03	———	3.141E+03	0.1	2.1	4.1	4π LS
Am-241	59.5	1.580E+05	———	2.034E+03	0.1	1.7	3.5	4π LS
Cd-109	88.0	4.626E+02	1.606E+05	2.822E+03	0.4	2.3	4.7	HPGe
Co-57	122.1	2.718E+02	8.471E+04	1.488E+03	0.5	2.0	4.1	HPGe
Ce-139	165.9	1.376E+02	1.209E+05	2.124E+03	0.4	1.9	3.9	HPGe
Hg-203	279.2	4.661E+01	2.726E+05	4.790E+03	0.4	1.9	3.9	HPGe
Sn-113	391.7	1.151E+02	1.672E+05	2.938E+03	0.5	1.9	3.9	HPGe
Cs-137	661.7	1.098E+04	1.096E+05	1.926E+03	0.6	1.9	4.0	HPGe
Y-88	898.0	1.066E+02	4.077E+05	7.163E+03	0.4	1.9	3.9	HPGe
Co-60	1173.2	1.925E+03	2.055E+05	3.611E+03	0.5	1.9	3.9	HPGe
Co-60	1332.5	1.925E+03	2.056E+05	3.612E+03	0.7	1.9	4.0	HPGe
Y-88	1836.1	1.066E+02	4.308E+05	7.569E+03	0.5	1.9	3.9	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1956

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd Atlanta, Georgia 30318

Comments:
1550 grams of sand.
This standard will expire one year after the reference date.

Source Prepared by: _____
W. Mao, Radiochemist

QA Approved: _____ Date: 2/1/10
J. D. McCorvey, QA Manager Alternate

Reagent

Tuna Can_00003

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

90099
1.0 Liter Sand in 1 Liter Wide Mouth HDPE Silgan Jar

Customer: TestAmerica St. Louis / Earth City, MO
P.O. No.: 2454150, Item 1
Reference Date: 01-Jan-2012 12:00 PM EST **Grams of Master Source:** 0.017180

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Additional radionuclides were added gravimetrically from solutions calibrated by gamma-ray spectrometry, ionization chamber, or liquid scintillation counting. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty* , % Type u_A	u_B	U	Calibration Method*
Pb-210	46.5	8.109E+03	———	3.094E+03	0.1	2.1	4.1	4π LS
Am-241	59.5	1.580E+05	———	2.037E+03	0.1	1.7	3.5	4π LS
Cd-109	88.0	4.626E+02	1.677E+05	2.881E+03	0.5	2.3	4.7	HPGe
Co-57	122.1	2.718E+02	8.795E+04	1.511E+03	0.4	2.0	4.1	HPGe
Ce-139	165.9	1.376E+02	1.245E+05	2.139E+03	0.4	1.9	3.9	HPGe
Hg-203	279.2	4.661E+01	2.707E+05	4.651E+03	0.3	1.9	3.8	HPGe
Sn-113	391.7	1.151E+02	1.755E+05	3.015E+03	0.4	1.9	3.9	HPGe
Cs-137	661.7	1.098E+04	1.128E+05	1.938E+03	0.7	1.9	4.0	HPGe
Y-88	898.0	1.066E+02	4.228E+05	7.264E+03	0.5	1.9	3.9	HPGe
Co-60	1173.2	1.925E+03	2.084E+05	3.580E+03	0.6	1.9	4.0	HPGe
Co-60	1332.5	1.925E+03	2.084E+05	3.581E+03	0.7	1.9	4.0	HPGe
Y-88	1836.1	1.066E+02	4.476E+05	7.690E+03	0.7	1.9	4.0	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Comments:
1550 grams of sand. Homogenous down to 10 grams aliquot.
This standard will expire one year after the reference date.

Source Prepared by: _____
Z. Dimitrova, Radiochemist

QA Approved: _____ Date: 30 JAN 12
J.D. McCorvey, Counting Room Manager

Reagent

Tuna Can_00006

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

83814-334

1.0 Liter Sand in 1 Liter Wide Mouth HDPE Silgan Jar

Customer: Test America St. Louis
P.O. No.: 2395112, Item 1
Reference Date: 01-Jan-2011 12:00 PM EST **Grams of Master Source:** 0.016927

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Pb-210	46.5	8.120E+03	———	3.021E+03	0.1	2.1	4.1	4π LS
Am-241	59.5	1.580E+05	———	2.090E+03	0.1	1.7	3.5	4π LS
Cd-109	88.0	4.626E+02	1.697E+05	2.873E+03	0.8	2.3	4.9	HPGe
Co-57	122.1	2.718E+02	8.711E+04	1.475E+03	0.5	2.0	4.1	HPGe
Ce-139	165.9	1.376E+02	1.247E+05	2.111E+03	0.5	1.9	3.9	HPGe
Hg-203	279.2	4.661E+01	2.753E+05	4.660E+03	0.4	1.9	3.9	HPGe
Sn-113	391.7	1.151E+02	1.769E+05	2.994E+03	0.5	1.9	3.9	HPGe
Cs-137	661.7	1.098E+04	1.109E+05	1.877E+03	0.7	1.9	4.0	HPGe
Y-88	898.0	1.066E+02	4.224E+05	7.150E+03	0.5	1.9	3.9	HPGe
Co-60	1173.2	1.925E+03	2.142E+05	3.626E+03	0.6	1.9	4.0	HPGe
Co-60	1332.5	1.925E+03	2.143E+05	3.627E+03	0.6	1.9	4.0	HPGe
Y-88	1836.1	1.066E+02	4.472E+05	7.570E+03	0.5	1.9	3.9	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Corporate Office
Laboratory

Comments:
1550 grams of sand. Homogeneous down to 10 gram aliquot.
This standard will expire one year after the reference date.

Source Prepared by: _____
Z. Dimitrova, Radiochemist

QA Approved: _____ Date: 2/11/11
J. D. McCorvey, QA Manager Alternate

GAMMA SPECTROSCOPY

Method GA-01-R
Ra-226

Radium-226 & Other Gamma Emitters (GS) by Method GA-01-R

Prep Batch: 129597

Fill Geometry, 21-Day In-Growth

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 129597

Lab ID: MB 160-129597/1-A | Analyzed: 07/24/14 02:06 | Ts: 30 | Sigma: 2
Client ID: | Detector: GV14 | Decay Corrected: No

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.03143	0.0391	0.0392	U	pCi/g	1.00	0.186	133788
Radium-228	0.06282	0.0909	0.0911	U	pCi/g		0.201	133788
Thorium-232	0.06282	0.0909	0.0911	U	pCi/g		0.201	133788
Uranium-235	0.02916	0.117	0.117	U	pCi/g		0.235	133788
Uranium-238	0.05176	0.178	0.178	U	pCi/g		1.20	133788

Other Detected Radionuclides	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Other Detected Radionuclide	None				pCi/g	

Lab ID: LCS 160-129597/2-A | Analyzed: 07/24/14 08:13 | Ts: 30 | Sigma: 2
Client ID: | Detector: GV4 | Decay Corrected: No

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Americium-241	100.0	2.24	10.6		pCi/g		1.70	133792
Cesium-137	29.85	1.02	3.27		pCi/g		0.381	133792
Cobalt-60	21.05	0.705	2.23		pCi/g		0.163	133792

Lab ID: 680-102577-1 | Analyzed: 07/24/14 02:06 | Ts: 30 | Sigma: 2
Client ID: SD-005W-02 | Detector: GV15 | Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.953	0.246	0.265		pCi/g	1.00	0.201	133787
Radium-228	1.08	0.349	0.366		pCi/g		0.209	133787
Thorium-232	1.08	0.349	0.366		pCi/g		0.209	133787
Uranium-235	-0.0826	0.379	0.379	U	pCi/g		0.660	133787
Uranium-238	0.641	1.73	1.74	U	pCi/g		3.09	133787

Other Detected Radionuclides	Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Ac-228	1.08	0.349	0.366		pCi/g	0.209
Bi-214	0.953	0.246	0.265		pCi/g	0.201
K-40	13.7	2.53	2.89		pCi/g	0.857
Pb-212	1.04	0.229	0.266		pCi/g	0.225
Pb-214	0.956	0.250	0.269		pCi/g	0.217
Tl-208	0.225	0.114	0.116		pCi/g	0.134

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 129597

Lab ID: 680-102577-1 DU Analyzed: 07/24/14 02:40 Ts: 30 Sigma: 2
Client ID: SD-005W-02 Detector: GV7 Decay Corrected: No

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.7903	0.195	0.212		pCi/g	1.00	0.121	133793
Radium-228	1.282	0.270	0.300		pCi/g		0.267	133793
Thorium-232	1.282	0.270	0.300		pCi/g		0.267	133793
Uranium-235	0.07357	0.260	0.260	U	pCi/g		0.495	133793
Uranium-238	1.192	0.738	0.749	U	pCi/g		2.13	133793

Other Detected Radionuclides	DU Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Ac-228	1.282	0.270	0.300		pCi/g	0.267
Bi-214	0.7903	0.195	0.212		pCi/g	0.121
K-40	8.414	1.91	2.10		pCi/g	1.60
Pb-212	0.9880	0.168	0.211		pCi/g	0.142
Pb-214	1.035	0.199	0.226		pCi/g	0.158
Tl-208	0.3179	0.0807	0.0872		pCi/g	0.0378

Lab ID: 680-102577-2 Analyzed: 07/24/14 02:40 Ts: 30 Sigma: 2
Client ID: SD-005E-02 Detector: GV8 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.902	0.234	0.252		pCi/g	1.00	0.190	133794
Radium-228	1.38	0.304	0.335		pCi/g		0.276	133794
Thorium-232	1.38	0.304	0.335		pCi/g		0.276	133794
Uranium-235	-0.147	2.58	2.58	U	pCi/g		0.843	133794
Uranium-238	1.64	0.998	1.01	U	pCi/g		3.14	133794

Other Detected Radionuclides	Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Ac-228	1.38	0.304	0.335		pCi/g	0.276
Bi-214	0.902	0.234	0.252		pCi/g	0.190
K-40	14.4	2.39	2.81		pCi/g	1.04
Pb-212	1.41	0.250	0.309		pCi/g	0.224
Pb-214	0.849	0.204	0.222		pCi/g	0.187
Tl-208	0.461	0.124	0.133		pCi/g	0.0893

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 129597

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-129597/1-A	Radium-226			0.03143	U	pCi/g							
MB 160-129597/1-A	Radium-228			0.06282	U	pCi/g							
MB 160-129597/1-A	Thorium-232			0.06282	U	pCi/g							
MB 160-129597/1-A	Uranium-235			0.02916	U	pCi/g							
MB 160-129597/1-A	Uranium-238			0.05176	U	pCi/g							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-129597/2-A	Americium-241		97.4	100.0		pCi/g	103	87 - 116					
LCS 160-129597/2-A	Cesium-137		31.0	29.85		pCi/g	96	87 - 120					
LCS 160-129597/2-A	Cobalt-60		21.9	21.05		pCi/g	96	87 - 115					

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
680-102577-1	Radium-226	0.953		0.7903		pCi/g			19	0.34	0.96	1	
680-102577-1	Radium-228	1.08		1.282		pCi/g			18	0.31	0.88	1	
680-102577-1	Thorium-232	1.08		1.282		pCi/g			18	0.31	0.88	1	
680-102577-1	Uranium-235	-0.0826		0.07357	U	pCi/g			3465	0.24	0.68	1	
680-102577-1	Uranium-238	0.641		1.192	U	pCi/g			60	0.22	0.58	1	

Glossary:

Ts = Count Duration, Sample

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102577-1

SDG No.: 680102577-1

Batch Number: 129597 Batch Start Date: 07/03/14 14:41 Batch Analyst: Lockhart, Justin D

Batch Method: Fill_Geo-21 Batch End Date: 07/03/14 16:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	TareWeight	GrossWeight	InitialAmount	IngDecDate1	IngDecDate3	Geometry
MB 160-129597/1		Fill_Geo-21, GA-01-R				291.18 g	07/03/2014	07/24/2014	tuna can
LCS 160-129597/2		Fill_Geo-21, GA-01-R				341.9 g	07/03/2014	07/24/2014	tuna can
680-102577-A-1-A	SD-005W-02	Fill_Geo-21, GA-01-R	T	46.9 g	254.6 g	207.7 g	07/03/2014	07/24/2014	tuna can
680-102577-A-1-A DU	SD-005W-02	Fill_Geo-21, GA-01-R	T	46.9 g	254.6 g	207.7 g	07/03/2014	07/24/2014	tuna can
680-102577-A-2-A	SD-005E-02	Fill_Geo-21, GA-01-R	T	47.2 g	282.8 g	235.6 g	07/03/2014	07/24/2014	tuna can

Lab Sample ID	Client Sample ID	Method Chain	Basis	Tuna Can LCS 00003					
MB 160-129597/1		Fill_Geo-21, GA-01-R							
LCS 160-129597/2		Fill_Geo-21, GA-01-R		# g					
680-102577-A-1-A	SD-005W-02	Fill_Geo-21, GA-01-R	T						
680-102577-A-1-A DU	SD-005W-02	Fill_Geo-21, GA-01-R	T						
680-102577-A-2-A	SD-005E-02	Fill_Geo-21, GA-01-R	T						

Batch Notes	
Balance ID	1121432711
SOP Number	ST-RC-0003 ST-RC-0025

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

Test America St. Louis Spectrum ID: 14_Gamma_20141583

Sample Description: 129597_Gamma_MB 160-129597~1-A
Detector: Ge14 SN/11080670
Batch ID: 129597
Work Order Number: Gamma
Lot Number: MB 160-129597~1-A

Decay to Time: 7/24/2014 02:05 Live Time: 1800 sec
Acquisition Time: 7/24/2014 02:06:03 Real Time: 1808 sec
Analysis Time: 7/24/2014 02:36 Dead Time: 0.45 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 14_Soil_TunaCan.Clb
Efficiency Cal Desc: 14_TunaCan_90099_042312
Efficiency Cal Date: 4/23/2012 11:29
Energy Cal Date: 2/28/2012 10:48
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 14_2014-07-12_0310.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	0.000E+00	1000.0	8.768E-01	8.768E-01	5.366E+00
K-40	-1.222E+00	444.9	5.435E+00	5.436E+00	1.146E+01
CO-60	1.347E-01	83.4	1.124E-01	1.126E-01	1.252E+00
I-131	0.000E+00	707.1	3.225E-02	3.225E-02	6.975E-01
CS-134	-2.601E-02	711.5	1.851E-01	1.851E-01	7.097E-01
CS-137	0.000E+00	1000.0	2.220E-01	2.220E-01	3.659E-01
EU-152	3.203E-01	89.1	2.854E-01	2.858E-01	1.918E+00
EU-154	1.406E-01	124.7	1.753E-01	1.754E-01	7.158E+00
EU-155	0.000E+00	1000.0	1.458E-01	1.458E-01	1.305E+00
TL-208	-2.102E-01	712.1	1.497E+00	1.497E+00	9.630E-01
PB-210	6.707E+00	65.0	4.360E+00	4.378E+00	1.644E+01
PB-212	2.118E-01	161.1	3.412E-01	3.415E-01	1.160E+00
PB-214	1.026E-01	277.7	2.849E-01	2.850E-01	1.171E+00
BI-212	1.892E+00	119.7	2.265E+00	2.268E+00	8.219E+00
BI-214	3.386E-01	62.1	2.104E-01	2.111E-01	2.004E+00
AC-228	6.768E-01	72.3	4.895E-01	4.907E-01	2.167E+00
Pa-234	7.974E-02	524.5	4.182E-01	4.183E-01	1.550E+00
TH-234	5.576E-01	172.1	9.598E-01	9.602E-01	1.292E+01
PA-234M	0.000E+00	1000.0	7.069E+00	7.069E+00	5.210E+01
U-235	3.141E-01	201.4	6.327E-01	6.329E-01	2.530E+00
AM-241	6.968E-01	49.8	3.471E-01	3.490E-01	1.099E+00
Total	1.217E+01				

Analyst: Siobhan Perry

TestAmerica, Inc. Spectrum name: 14_Gamma_20141583.An1

Sample description
129597_Gamma_MB 160-129597~1-A

Spectrum Filename: C:\User\SPC\Det14\14_Gamma_20141583.An1

Acquisition information
Start time: 7/24/2014 2:06:03 AM
Live time: 1800
Real time: 1808
Dead time: 0.45 %
Detector ID: 14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_Soil_TunaCan.Clb
14_TunaCan_90099_042312

Energy Calibration
Created: 2/28/2012 10:48:23 AM
Zero offset: 0.130 keV
Gain: 0.250 keV/channel
Quadratic: -2.050E-08 keV/channel^2

Efficiency Calibration
Created: 4/23/2012 11:29:47 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.02 %
Log(Eff): 2.101260E-01 + (-5.951973E-01*Log(E)) +
(-1.605331E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -2.391492E+01 + (8.828985E+00*Log(E)) +
(-9.371496E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.64keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	7/24/2014 2:05:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	14_2014-07-12_0310.PBC 7/12/2014 3:10:18 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 5 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.2191

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.68	32.	22.87	0.79	2.182E-02	46.54	4.250	PBC<MDA	PB210
59.76	14.	49.82	0.76	3.065E-02	59.54	35.900	PBC<MDA	AM241
63.62	-2.	38.49	0.47	3.281E-02	63.29	3.810	PBC<MDA	TH234
92.54	19.	44.06	0.80	4.291E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.810	4.179E+00	U235
					93.35	5.561	4.367E+00	AC228
92.54	19.	44.06	0.80	4.291E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.810	4.179E+00	U235
					93.35	5.561	4.367E+00	AC228
92.61	7.	34.35	0.40	4.279E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.810	PBC<MDA	U235
					93.35	5.561	PBC<MDA	AC228
123.38	6.	124.70	0.83	4.372E-02	123.10	40.790	PBC<MDA	EU154
131.04	1.	524.49	0.84	4.301E-02	131.29	18.000	PBC<MDA	Pa234
143.52	3.	201.40	0.85	4.148E-02	143.79	10.960	PBC<MDA	U235
204.23	1.	876.52	0.91	3.290E-02	205.33	5.010	PBC<MDA	U235
238.52	4.	56.49	0.94	2.931E-02	238.63	43.300	PBC<MDA	PB212
244.04	1.	301.08	0.95	2.900E-02	242.00	7.430	PBC<MDA	PB214
277.65	1.	712.13	0.98	2.610E-02	277.28	6.310	PBC<MDA	TL208
295.28	2.	277.73	1.00	2.487E-02	295.09	19.300	PBC<MDA	PB214
300.43	1.	378.93	1.01	2.455E-02	300.03	3.280	PBC<MDA	PB212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
338.64	4.	129.62	1.04	2.235E-02	338.32	12.010	PBC<MDA	AC228
609.68	-4.	126.91	1.30	1.403E-02	609.31	46.090	PBC<MDA	BI214
727.33	3.	119.75	1.40	1.217E-02	727.17	7.550	PBC<MDA	BI212
910.69	3.	95.13	1.55	1.014E-02	911.07	29.000	PBC<MDA	AC228
968.98	2.	145.72	1.60	9.642E-03	968.97	17.460	PBC<MDA	AC228
1120.28	6.	58.43	1.72	8.562E-03	1120.29	15.100	PBC<MDA	BI214
1173.17	5.	83.42	1.76	8.244E-03	1173.24	99.900	PBC<MDA	CO60
1408.94	2.	89.09	1.92	7.092E-03	1408.00	21.005	PBC<MDA	EU152
1461.49	-2.	130.82	1.96	6.879E-03	1460.83	10.670	PBC<MDA	K40

No unknown peaks passed sensitivity test.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV	
PB-210	186.16	46.68	28.	11.	0.006	22.87	0.794	
AM-241	238.45	59.76	17.	14.	0.008	49.82	0.761	s
TH-234	253.89	63.62	32.	-2.	-0.001	38.49	0.474	s
EU-155	343.83	86.12	31.	-8.	-0.004	110.09	0.790	s
TH-234	369.80	92.61	53.	7.	0.004	34.35	0.404	s
U-235	372.76	93.35	25.	19.	0.010	44.06	0.797	D
AC-228	372.76	93.35	25.	19.	0.010	44.06	0.797	D
EU-152	485.45	121.53	39.	-6.	-0.004	144.12	0.826	s
EU-154	492.83	123.38	24.	6.	0.003	124.70	0.827	s
Pa-234	523.49	131.04	16.	1.	0.001	524.49	0.836	s
U-235	573.38	143.52	15.	3.	0.002	201.40	0.849	s
U-235	652.32	163.26	26.	-2.	-0.001	386.04	0.869	s
U-235	816.15	204.23	20.	1.	0.000	876.52	0.911	s
PB-212	953.30	238.52	26.	4.	0.002	56.49	0.945	
PB-214	975.36	244.04	9.	1.	0.001	301.08	0.948	s
TL-208	1109.80	277.65	16.	1.	0.000	712.13	0.983	s
PB-214	1180.32	295.28	10.	2.	0.001	277.73	1.001	s
PB-212	1200.91	300.43	18.	1.	0.000	378.93	1.006	s
AC-228	1353.72	338.64	10.	4.	0.002	129.62	1.043	s
CS-134	2428.11	607.25	10.	-1.	0.000	711.52	1.292	s
BI-214	2437.82	609.68	20.	-4.	-0.002	126.91	1.296	s
BI-212	2908.49	727.33	5.	3.	0.002	119.75	1.400	s
PA-234M	3067.87	767.17	10.	-2.	-0.001	207.77	1.434	s
EU-152	3114.52	778.83	8.	-1.	0.000	612.65	1.444	s
TL-208	3441.48	860.56	17.	-4.	-0.002	146.73	1.513	s
Pa-234	3532.68	883.35	7.	-1.	-0.001	284.13	1.531	s
AC-228	3642.04	910.69	4.	3.	0.002	95.13	1.554	s
Pa-234	3776.75	944.36	9.	-3.	-0.002	149.86	1.582	s
AC-228	3875.28	968.98	3.	2.	0.001	145.72	1.601	s
BI-214	4480.68	1120.28	4.	6.	0.003	58.43	1.718	s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	4692.34	1173.17	6.	5.	0.003	83.42	1.757s
CO-60	5330.52	1332.64	9.	-1.	-0.001	439.70	1.871s
EU-152	5635.85	1408.94	1.	2.	0.001	89.09	1.923s
K-40	5846.18	1461.49	7.	-2.	-0.001	130.82	1.958s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
K-40	N	-1.2218E+00				4.66E+11	
			1460.83	-1.222E+00	?(P	1.146E+01	1.31E+02 1.07E+01 G
CO-60	F	1.3471E-01				1.93E+03	
			1332.50	-7.438E-02	?(	1.252E+00	4.40E+02 1.00E+02 G
			1173.24	3.440E-01	?(	9.841E-01	8.34E+01 9.99E+01 G
CS-134	I	-2.6013E-02				7.54E+02	
			604.71	-2.601E-02	?(	7.097E-01	7.12E+02 9.76E+01 G
			795.87	0.000E+00	+	4.231E-01	1.00E+03 8.55E+01 G
			569.32	0.000E+00	+	6.091E+00	1.00E+03 1.54E+01 G
			801.95	0.000E+00	+	4.190E+00	1.00E+03 8.69E+00 G
			563.24	0.000E+00	+	6.151E+00	1.00E+03 8.35E+00 G
EU-152	F	3.2030E-01				4.94E+03	
			344.29	-7.173E-03	%(	1.918E+00	7.03E+03 2.65E+01 G
			121.78	-2.839E-01	+	1.417E+00	1.44E+02 2.86E+01 G
			778.92	-2.505E-01	+	5.966E+00	6.13E+02 1.29E+01 G
			964.11	0.000E+00	+	8.895E+00	1.00E+03 1.46E+01 G
			1112.07	0.000E+00	+	3.484E+00	1.00E+03 1.36E+01 G
			1408.00	7.334E-01	?(	2.749E+00	8.91E+01 2.10E+01 G
EU-154	I	1.4056E-01				3.14E+03	
			873.23	0.000E+00	?(	7.158E+00	1.00E+03 1.23E+01 G
			123.10	1.828E-01	?(	7.934E-01	1.25E+02 4.08E+01 G
			1274.54	0.000E+00	-	1.511E+00	1.00E+03 3.52E+01 G
			723.36	0.000E+00	-	6.175E+00	1.00E+03 2.02E+01 G
			1004.77	0.000E+00	-	5.791E+00	1.00E+03 1.80E+01 G
			996.33	0.000E+00	-	4.098E+00	1.00E+03 1.06E+01 G
TL-208	N	-2.1020E-01				6.98E+02	
			583.02	-2.460E-01	%(P	9.630E-01	5.50E+03 8.45E+01 G
			277.28	2.690E-01	?(	7.147E+00	7.12E+02 6.31E+00 G
			860.56	-1.799E+00	+ P	9.192E+00	1.47E+02 1.24E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-210	N	6.7068E+00					8.14E+03	
			46.54	6.707E+00	(P	1.644E+01	2.29E+01	4.25E+00 G
PB-212	N	2.1178E-01					6.98E+02	
			238.63	1.890E-01	(P	1.160E+00	5.65E+01	4.33E+01 G
			300.03	5.120E-01	&(P	1.546E+01	3.79E+02	3.28E+00 G
PB-214	N	1.0259E-01					5.84E+05	
			351.93	0.000E+00	?(	1.171E+00	1.00E+03	3.76E+01 G
			295.09	1.956E-01	&(	2.034E+00	2.78E+02	1.93E+01 G
			242.00	3.800E-01	?(	4.325E+00	3.01E+02	7.43E+00 G
BI-212	N	1.8918E+00					6.98E+02	
			727.17	1.892E+00	?(	8.219E+00	1.20E+02	7.55E+00 G
			785.42	-5.411E-02	%	4.634E+01	2.02E+04	1.28E+00 G
BI-214	N	3.3862E-01					5.84E+05	
			609.31	-3.818E-01	?(P	2.004E+00	1.27E+02	4.61E+01 G
			1120.29	2.538E+00	&(P	5.153E+00	5.84E+01	1.51E+01 G
			1764.49	-1.551E+00	% P	1.567E+01	1.00E+03	1.54E+01 G
AC-228	N	6.7677E-01					2.10E+03	
			911.07	6.426E-01	?(	2.167E+00	9.51E+01	2.90E+01 G
			968.97	6.554E-01	?(	3.643E+00	1.46E+02	1.75E+01 G
			338.32	7.903E-01	?(	3.662E+00	1.30E+02	1.20E+01 G
								Energy duplication
			93.35	4.367E+00	?	6.030E+00	4.41E+01	5.56E+00 XA
Pa-234	N	7.9741E-02					1.63E+12	
			131.29	7.974E-02	?(	1.550E+00	5.24E+02	1.80E+01 G
			569.47	-2.136E-02	%	7.620E+00	9.08E+03	8.20E+00 G
			946.02	-1.296E+00	+	7.063E+00	1.50E+02	1.34E+01 G
			883.24	-7.758E-01	+	8.441E+00	2.84E+02	9.60E+00 G
			880.53	0.000E+00	-	6.547E+00	1.00E+03	6.00E+00 G
TH-234	N	5.5763E-01					1.63E+12	
			63.29	-8.920E-01	(P	1.292E+01	3.85E+01	3.81E+00 G
			92.59	1.547E+00	(P	8.543E+00	3.44E+01	5.58E+00 G
U-235	N	3.1414E-01					2.57E+11	
			143.79	3.467E-01	*(	2.530E+00	2.01E+02	1.10E+01 G
			205.33	2.428E-01	?(	7.862E+00	8.77E+02	5.01E+00 G
			163.38	-5.417E-01	+	7.540E+00	3.86E+02	5.08E+00 G
								Energy duplication
			93.35	4.179E+00	?	5.772E+00	4.41E+01	5.81E+00 X
AM-241	T	6.9676E-01					1.58E+05	
			59.54	6.968E-01	(	1.099E+00	4.98E+01	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
AM-241	59.76	17.	14.	0.008	49.82	6.968E-01	
EU-155	86.12	31.	-8.	-0.004	110.09	-3.294E-01	
U-235	93.35	25.	19.	0.010	44.06	4.179E+00	
AC-228	93.35	25.	19.	0.010	44.06	4.367E+00	
EU-152	121.53	39.	-6.	-0.004	144.12	-2.839E-01	
EU-154	123.38	24.	6.	0.003	124.70	1.828E-01	
Pa-234	131.04	16.	1.	0.001	524.49	7.974E-02	
U-235	143.52	15.	3.	0.002	201.40	3.467E-01	
U-235	163.26	26.	-2.	-0.001	386.04	-5.417E-01	
U-235	204.23	20.	1.	0.000	876.52	2.428E-01	
PB-212	238.52	26.	4.	0.002	56.49	1.890E-01	P
PB-214	244.04	9.	1.	0.001	301.08	3.800E-01	
TL-208	277.65	16.	1.	0.000	712.13	2.690E-01	
PB-214	295.28	10.	2.	0.001	277.73	1.956E-01	
PB-212	300.43	18.	1.	0.000	378.93	5.120E-01	P
AC-228	338.64	10.	4.	0.002	129.62	7.903E-01	
CS-134	607.25	10.	-1.	0.000	711.52	-2.601E-02	
BI-214	609.68	20.	-4.	-0.002	126.91	-3.818E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
BI-212	727.33	5.	3.	0.002	119.75	1.892E+00		
PA-234M	767.17	10.	-2.	-0.001	207.77	-3.723E+01		
EU-152	778.83	8.	-1.	0.000	612.65	-2.505E-01		
TL-208	860.56	17.	-4.	-0.002	146.73	-1.799E+00		P
Pa-234	883.35	7.	-1.	-0.001	284.13	-7.758E-01		
AC-228	910.69	4.	3.	0.002	95.13	6.426E-01		
Pa-234	944.36	9.	-3.	-0.002	149.86	-1.296E+00		
AC-228	968.98	3.	2.	0.001	145.72	6.554E-01		
BI-214	1120.28	4.	6.	0.003	58.43	2.538E+00		P
CO-60	1173.17	6.	5.	0.003	83.42	3.440E-01		
CO-60	1332.64	9.	-1.	-0.001	439.70	-7.438E-02		
EU-152	1408.94	1.	2.	0.001	89.09	7.334E-01		
K-40	1461.49	7.	-2.	-0.001	130.82	-1.222E+00		P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.37E+00
K-40	#A	-1.2218E+00	-1.2218E+00	4.449E+02%	1.15E+01
CO-60	#A	1.3471E-01	1.3471E-01	8.342E+01%	1.25E+00
I-131	#A	0.0000E+00	0.0000E+00	7.071E+02%	6.97E-01
CS-134	#A	-2.6013E-02	-2.6013E-02	7.115E+02%	7.10E-01
CS-137	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.66E-01
EU-152	#A	3.2030E-01	3.2030E-01	8.909E+01%	1.92E+00
EU-154	#A	1.4056E-01	1.4056E-01	1.247E+02%	7.16E+00
EU-155	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.30E+00
TL-208	#A	-2.1020E-01	-2.1020E-01	7.121E+02%	9.63E-01
PB-210	A	6.7068E+00	6.7068E+00	6.501E+01%	1.64E+01
PB-212	#A	2.1178E-01	2.1178E-01	1.611E+02%	1.16E+00
PB-214	#A	1.0259E-01	1.0259E-01	2.777E+02%	1.17E+00
BI-212	#A	1.8918E+00	1.8918E+00	1.197E+02%	8.22E+00
BI-214	#A	3.3862E-01	3.3862E-01	6.214E+01%	2.00E+00
AC-228	#A	6.7677E-01	6.7677E-01	7.233E+01%	2.17E+00
Pa-234	#A	7.9741E-02	7.9741E-02	5.245E+02%	1.55E+00
TH-234	A	5.5763E-01	5.5763E-01	1.721E+02%	1.29E+01
PA-234M	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.21E+01
U-235	#A	3.1414E-01	3.1414E-01	2.014E+02%	2.53E+00
AM-241	#A	6.9676E-01	6.9676E-01	4.982E+01%	1.10E+00

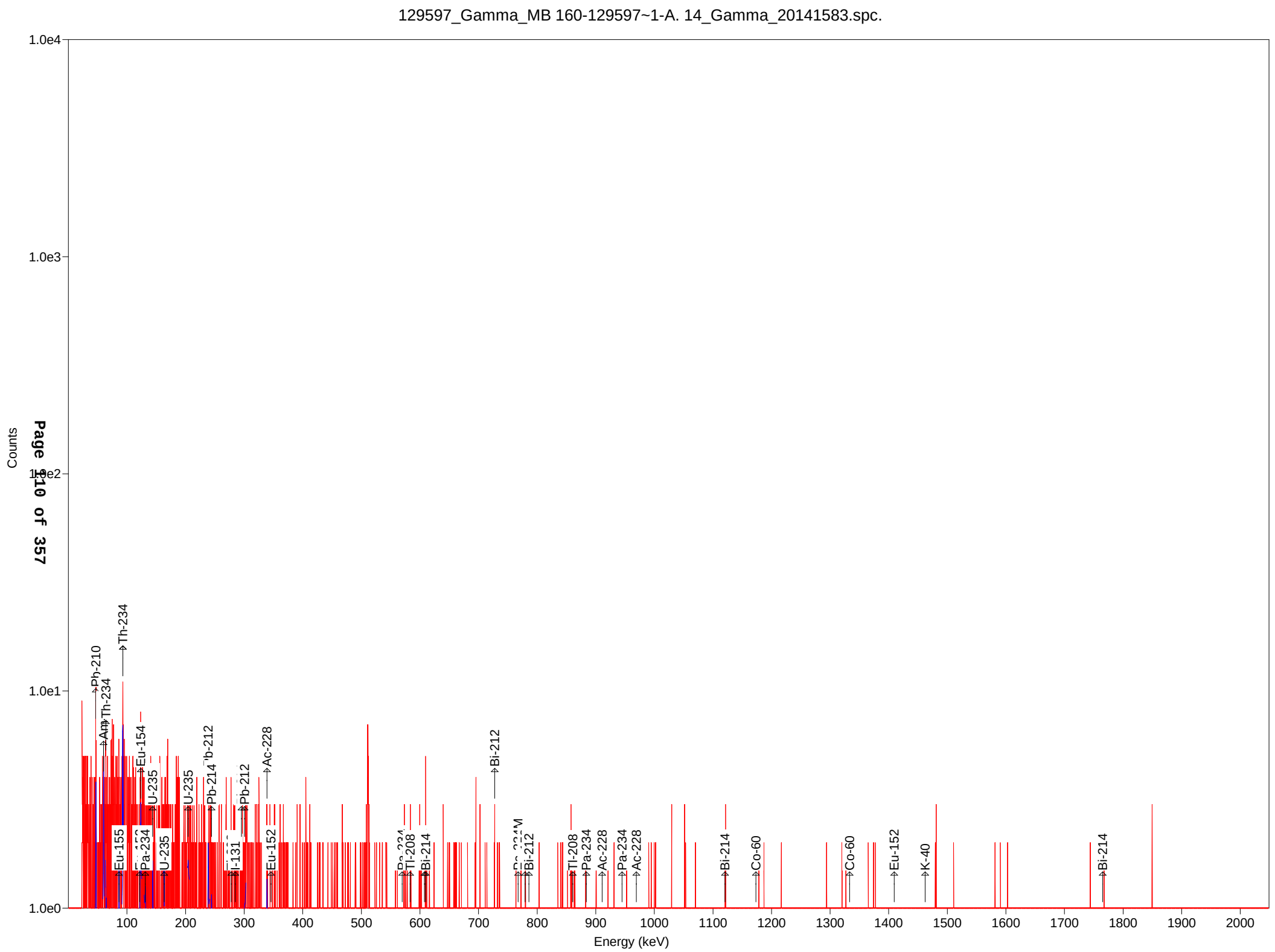
\# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 0.000E+00 Bq/Sample
Total Decayed Activity (37.6 to 1999.5 keV) 0.0000000E+00 Bq/Sample

The library has energies which are not separable.


129597_Gamma_MB 160-129597~1-A. 14_Gamma_20141583.spc.
Counts
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Energy (keV)
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Pb-210
Am
Th-234
Eu-155
Eu-154
Pa-234
U-235
U-235
U-235
Pb-214
Pb-212
I-131
Pb-212
Eu-152
Ac-228
Bi-212
Pb-214
Tl-208
Bi-214
Bi-212
Bi-212
Tl-208
Pa-234
Ac-228
Pa-234
Ac-228
Bi-214
Co-60
Co-60
Eu-152
K-40
Bi-214

Test America St. Louis Spectrum ID: 4_Gamma_20141347

Sample Description: 129597_Gamma_LCS 160-129597~2-A
Detector: Ge 4 SN/181
Batch ID: 129597
Work Order Number: Gamma
Lot Number: LCS 160-129597~2-A

Decay to Time: 7/24/2014 08:13 Live Time: 1800 sec
Acquisition Time: 7/24/2014 08:13:20 Real Time: 1812 sec
Analysis Time: 7/24/2014 08:43 Dead Time: 0.67 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 4_Soil_TunaCan.Clb
Efficiency Cal Desc: 4_Soil_TunaCan_90099_033012
Efficiency Cal Date: 4/2/2012 13:19
Energy Cal Date: 2/28/2012 14:55
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 4_2014-07-12_0325.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	1.318E+00	1084.0	1.429E+01	1.429E+01	4.860E+01
K-40	-2.802E+00	664.6	1.862E+01	1.863E+01	2.815E+01
CO-60	2.663E+02	1.7	4.459E+00	1.409E+01	2.058E+00
I-131	2.791E-01	511.0	1.426E+00	1.426E+00	4.846E+00
CS-134	2.459E-01	216.4	5.321E-01	5.323E-01	4.161E+00
CS-137	3.776E+02	1.7	6.448E+00	2.068E+01	4.819E+00
EU-152	4.894E+00	80.4	3.935E+00	3.944E+00	1.446E+01
EU-154	5.922E+00	117.2	6.943E+00	6.949E+00	5.099E+01
EU-155	4.545E-01	750.9	3.413E+00	3.413E+00	1.151E+01
TL-208	2.621E+00	58.9	1.543E+00	1.549E+00	6.136E+00
PB-210	1.218E+04	1.3	1.574E+02	7.321E+02	2.717E+02
PB-212	1.018E+01	27.2	2.765E+00	2.842E+00	6.618E+00
PB-214	5.525E+00	58.8	3.250E+00	3.262E+00	1.048E+01
BI-212	1.184E+01	135.7	1.608E+01	1.609E+01	5.471E+01
BI-214	1.205E+01	23.8	2.872E+00	2.940E+00	7.457E+00
AC-228	1.102E+01	53.0	5.837E+00	5.864E+00	2.300E+01
Pa-234	5.616E-01	102.0	5.726E-01	5.733E-01	1.357E+01
TH-234	1.702E+01	183.1	3.116E+01	3.117E+01	1.046E+02
PA-234M	8.928E+01	104.6	9.335E+01	9.346E+01	1.051E+03
U-235	9.399E+00	78.1	7.339E+00	7.354E+00	2.152E+01
AM-241	1.266E+03	1.1	1.418E+01	6.720E+01	2.157E+01
Total	1.427E+04				

Analyst: Jody Watson

TestAmerica Spectrum name: 4_Gamma_20141347.An1

Sample description
129597_Gamma_LCS 160-129597~2-A

Spectrum Filename: C:\User\SPC\Det4\4_Gamma_20141347.An1

Acquisition information
Start time: 7/24/2014 8:13:20 AM
Live time: 1800
Real time: 1812
Dead time: 0.67 %
Detector ID: 4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_Soil_TunaCan.Clb
4_Soil_TunaCan_90099_033012

Energy Calibration
Created: 2/28/2012 2:55:17 PM
Zero offset: 0.091 keV
Gain: 0.250 keV/channel
Quadratic: -2.917E-08 keV/channel^2

Efficiency Calibration
Created: 4/2/2012 1:19:41 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.78 %
Log(Eff): -3.983609E-01 + (-5.746278E-01*Log(E)) +
(-2.046438E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.80 %
Log(Eff): -2.546791E+01 + (9.285295E+00*Log(E)) +
(-9.904428E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (1999.44keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	7/24/2014 8:13:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	4_2014-07-12_0325.PBC 7/12/2014 3:25:48 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 17 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1109

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.56	186.	26.99	0.78	7.603E-03				
46.55	11268.	1.29	0.74	1.208E-02	46.54	4.250	1.218E+04	PB210
59.58	14060.	1.12	0.77	1.721E-02	59.54	35.900	1.266E+03	AM241
63.42	21.	112.35	0.82	1.842E-02	63.29	3.810	PBC<MDA	TH234
75.09	86.	33.36	0.73	2.148E-02				
82.70	56.	41.91	0.77	2.284E-02				
88.20	485.	10.70	0.76	2.355E-02				
92.50	-9.	316.53	0.84	2.397E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.810	PBC<MDA	U235
					93.35	5.561	PBC<MDA	AC228
					93.35	5.810	PBC<MDA	U235
					93.35	5.561	PBC<MDA	AC228
99.57	67.	45.78	0.52	2.440E-02				
104.94	4.	750.94	0.85	2.456E-02	105.31	21.200	PBC<MDA	EU155
145.05	37.	78.08	0.89	2.273E-02	143.79	10.960	PBC<MDA	U235
					143.79	10.960	8.314E+00	U235
163.24	13.	228.17	0.91	2.083E-02	163.38	5.080	PBC<MDA	U235
					163.38	5.080	6.938E+00	U235
205.39	23.	120.45	0.95	1.763E-02	205.33	5.010	PBC<MDA	U235
					205.33	5.010	1.427E+01	U235
238.40	104.	31.91	0.69	1.565E-02	238.63	43.300	8.097E+00	PB212
295.10	26.	102.78	1.03	1.319E-02	295.09	19.300	PBC<MDA	PB214
					295.09	19.300	5.741E+00	PB214
338.06	24.	100.44	1.07	1.181E-02	338.32	12.010	PBC<MDA	AC228
					338.32	12.010	9.435E+00	AC228
344.25	4.	530.83	1.07	1.164E-02	344.29	26.500	PBC<MDA	EU152
351.58	42.	58.82	1.08	1.143E-02	351.93	37.600	PBC<MDA	PB214
					351.93	37.600	5.414E+00	PB214
365.40	5.	511.01	1.09	1.111E-02	364.48	81.700	PBC<MDA	I131
					364.48	81.700	2.791E-01	I131
436.34	34.	39.18	0.51	9.588E-03				
532.82	47.	34.40	0.44	8.127E-03				
542.83	28.	35.27	0.25	8.012E-03				
609.22	68.	28.84	0.68	7.266E-03	609.31	46.090	1.125E+01	BI214

661.48	3928.	1.71	1.37	6.782E-03	661.66	85.210	3.776E+02	CS137
668.35	47.	34.50	0.66	6.724E-03				
727.01	10.	135.74	1.40	6.262E-03	727.17	7.550	PBC<MDA	BI212
766.30	14.	104.57	1.44	5.990E-03	766.41	0.294	PBC<MDA	PA234M
777.82	18.	80.42	1.45	5.909E-03	778.92	12.940	PBC<MDA	EU152

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
791.76	5.	216.44	1.46	5.802E-03	795.87	85.530	PBC<MDA	CS134
					795.87	85.530	5.580E-01	CS134
859.95	26.	58.89	1.52	5.429E-03	860.56	12.420	PBC<MDA	TL208
					860.56	12.420	2.153E+01	TL208
880.71	4.	304.61	1.53	5.324E-03	880.53	6.000	PBC<MDA	Pa234
883.42	5.	227.24	1.53	5.310E-03	883.24	9.600	PBC<MDA	Pa234
910.33	36.	52.98	1.56	5.172E-03	911.07	29.000	PBC<MDA	AC228
					911.07	29.000	1.327E+01	AC228
968.49	13.	132.94	1.60	4.906E-03	968.97	17.460	PBC<MDA	AC228
					968.97	17.460	8.357E+00	AC228
1004.85	14.	117.24	1.63	4.756E-03	1004.77	18.010	PBC<MDA	EU154
					1004.77	18.010	9.291E+00	EU154
1173.17	1984.	2.35	1.61	4.162E-03	1173.24	99.900	2.651E+02	CO60
1332.43	1794.	2.39	1.76	3.728E-03	1332.50	99.980	2.675E+02	CO60
1459.89	-2.	218.88	1.99	3.441E-03	1460.83	10.670	PBC<MDA	K40
1763.62	12.	37.95	2.21	2.916E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
145.79	36.56	778.	186.	2.446E+04	26.99	0.778	-	
299.81	75.09	316.	86.	4.003E+03	33.36	0.730	-	
330.23	82.70	230.	56.	2.459E+03	41.91	0.766	-	s
352.22	88.20	619.	529.	2.246E+04	7.95	0.762	-	s
397.68	99.57	312.	67.	2.760E+03	45.78	0.518	-	s
1744.29	436.34	68.	34.	3.581E+03	39.18	0.515	-	s
2130.16	532.82	67.	47.	5.763E+03	34.40	0.436	-	s
2170.18	542.83	31.	28.	3.541E+03	35.27	0.252	-	s
2672.24	668.35	54.	47.	6.990E+03	34.50	0.660	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.74	46.55	2839.	11249.	6.249	1.29	0.737
AM-241	237.84	59.58	2584.	14060.	7.811	1.12	0.768
TH-234	253.19	63.42	771.	21.	0.012	112.35	0.816s
EU-155	344.82	86.35	807.	-75.	-0.042	54.99	0.837s
EU-155	419.14	104.94	509.	4.	0.002	750.94	0.854s
EU-154	492.18	123.20	539.	-20.	-0.011	167.65	0.871s
Pa-234	524.42	131.27	475.	-31.	-0.017	101.95	0.878s
U-235	579.54	145.05	405.	37.	0.021	78.08	0.890s
U-235	652.25	163.24	448.	13.	0.007	228.17	0.908s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	820.78	205.39	362.	23.	0.013	120.45	0.946
PB-212	952.06	238.23	280.	124.	0.069	26.07	0.765
PB-214	967.12	241.99	409.	-13.	-0.007	224.96	0.979s
I-131	1136.19	284.27	307.	-4.	-0.002	588.69	1.018s
PB-214	1179.47	295.10	352.	26.	0.015	102.78	1.027s
AC-228	1351.26	338.06	280.	24.	0.013	100.44	1.066s
EU-152	1376.02	344.25	277.	4.	0.002	530.83	1.071s
PB-214	1405.32	351.58	283.	42.	0.023	58.82	1.078
I-131	1460.58	365.40	269.	5.	0.003	511.01	1.089s
CS-134	2246.84	562.00	144.	-23.	-0.013	77.42	1.264s
CS-134	2276.21	569.34	134.	-6.	-0.004	262.54	1.269s
Pa-234	2278.20	569.84	135.	-5.	-0.003	334.90	1.269s
BI-214	2435.73	609.22	82.	68.	0.038	28.84	0.675s
CS-137	2644.76	661.48	104.	3928.	2.182	1.71	1.367
EU-154	2893.94	723.77	135.	-21.	-0.011	82.84	1.401s
BI-212	2906.88	727.01	89.	10.	0.006	135.74	1.404s
PA-234M	3064.07	766.30	97.	14.	0.008	104.57	1.437s
EU-152	3110.13	777.82	99.	18.	0.010	80.42	1.448s
CS-134	3165.93	791.76	56.	5.	0.003	216.44	1.462s
CS-134	3207.31	802.11	127.	-13.	-0.007	128.08	1.467s
TL-208	3438.73	859.95	105.	26.	0.015	58.89	1.516s
Pa-234	3521.06	880.53	56.	4.	0.002	304.61	1.532D
Pa-234	3531.90	883.24	66.	5.	0.003	227.24	1.535D
AC-228	3640.30	910.33	162.	36.	0.020	52.98	1.557s
Pa-234	3786.58	946.89	201.	-16.	-0.009	129.70	1.586s
EU-152	3857.41	964.60	199.	-25.	-0.014	82.90	1.601s
AC-228	3872.99	968.49	140.	13.	0.007	132.94	1.605s
EU-154	3976.85	994.45	95.	-8.	-0.004	179.54	1.627s
PA-234M	4003.05	1001.00	244.	-2.	-0.001	957.12	1.631s
EU-154	4018.48	1004.85	134.	14.	0.008	117.24	1.634s
CO-60	4692.02	1173.17	31.	1984.	1.102	2.35	1.610
CO-60	5329.41	1332.43	6.	1794.	0.997	2.39	1.762
K-40	5839.62	1459.89	12.	-2.	-0.001	218.88	1.991s
BI-214	7055.61	1763.62	4.	12.	0.006	37.95	2.214s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Peak Code	Peak MDA Value Bq/Sample	COMMENTS
BE-7	C	1.3178E+00				5.31E+01	
			477.60	1.318E+00	%(	4.860E+01 1.08E+03	1.05E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
K-40	N	-2.8024E+00					4.66E+11	
			1460.83	-2.802E+00	?(P	2.815E+01	2.19E+02	1.07E+01 G
CO-60	F	2.6629E+02					1.93E+03	
			1332.50	2.675E+02	(	2.058E+00	2.39E+00	1.00E+02 G
			1173.24	2.651E+02	(	3.829E+00	2.35E+00	9.99E+01 G
I-131	I	2.7911E-01					8.02E+00	
			364.48	2.791E-01	&(	4.846E+00	5.11E+02	8.17E+01 G
			284.30	-2.811E+00	&	5.615E+01	5.89E+02	6.14E+00 G
			636.97	-2.085E+00	%	7.190E+01	1.01E+03	7.17E+00 G
CS-134	I	2.4585E-01					7.54E+02	
			604.71	-2.766E-02	%(	4.161E+00	4.34E+03	9.76E+01 G
			795.87	5.580E-01	?(	4.197E+00	2.16E+02	8.55E+01 G
			569.32	-2.961E+00	+	2.659E+01	2.63E+02	1.54E+01 G
			801.95	-1.415E+01	+	6.128E+01	1.28E+02	8.69E+00 G
			563.24	-1.954E+01	&	5.032E+01	7.74E+01	8.35E+00 G
CS-137	I	3.7763E+02					1.10E+04	
			661.66	3.776E+02	(	4.819E+00	1.71E+00	8.52E+01 G
EU-152	F	4.8937E+00					4.94E+03	
			344.29	8.019E-01	&(	1.446E+01	5.31E+02	2.65E+01 G
			121.78	1.977E-01	%	9.179E+00	1.38E+03	2.86E+01 G
			778.92	1.327E+01	(	3.562E+01	8.04E+01	1.29E+01 G
			964.11	-1.916E+01	+	5.288E+01	8.29E+01	1.46E+01 G
			1112.07	-4.544E-02	&	4.776E+01	3.02E+04	1.36E+01 G
			1408.00	0.000E+00	&	1.571E+01	1.00E+03	2.10E+01 G
EU-154	I	5.9217E+00					3.14E+03	
			873.23	9.768E-01	%(	5.099E+01	1.52E+03	1.23E+01 G
			123.10	-1.113E+00	+	6.243E+00	1.68E+02	4.08E+01 G
			1274.54	0.000E+00	-	1.319E+01	1.00E+03	3.52E+01 G
			723.36	-8.994E+00	+	2.485E+01	8.28E+01	2.02E+01 G
			1004.77	9.291E+00	?(	3.673E+01	1.17E+02	1.80E+01 G
			996.33	-8.562E+00	&	5.261E+01	1.80E+02	1.06E+01 G
EU-155	I	4.5452E-01					1.81E+03	
			105.31	4.545E-01	(	1.151E+01	7.51E+02	2.12E+01 G
			86.54	-5.789E+00	+	1.047E+01	5.50E+01	3.07E+01 G
TL-208	N	2.6209E+00					6.98E+02	
			583.02	-1.585E-01	%(	6.136E+00	1.13E+03	8.45E+01 G
			277.28	4.617E-01	&	5.569E+01	3.55E+03	6.31E+00 G
			860.56	2.153E+01	(	4.164E+01	5.89E+01	1.24E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-210	N	1.2177E+04					8.14E+03	
			46.54	1.218E+04	(P	2.717E+02	1.29E+00	4.25E+00 G
PB-212	N	1.0175E+01					6.98E+02	
			238.63	1.017E+01	(P	6.618E+00	2.61E+01	4.33E+01 G
			300.03	1.905E+00	%	1.111E+02	1.71E+03	3.28E+00 G
PB-214	N	5.5251E+00					5.84E+05	
			351.93	5.414E+00	?(	1.048E+01	5.88E+01	3.76E+01 G
			295.09	5.741E+00	?(	1.968E+01	1.03E+02	1.93E+01 G
			242.00	-6.196E+00	-	4.688E+01	2.25E+02	7.43E+00 G
BI-212	N	1.1844E+01					6.98E+02	
			727.17	1.184E+01	?(	5.471E+01	1.36E+02	7.55E+00 G
			785.42	-6.420E+00	%	3.764E+02	1.69E+03	1.28E+00 G
BI-214	N	1.2052E+01					5.84E+05	
			609.31	1.125E+01	(	7.457E+00	2.88E+01	4.61E+01 G
			1120.29	-9.658E-03	%	4.408E+01	1.31E+05	1.51E+01 G
			1764.49	1.444E+01	?(	1.485E+01	3.80E+01	1.54E+01 G
AC-228	N	1.1017E+01					2.10E+03	
			911.07	1.327E+01	(	2.300E+01	5.30E+01	2.90E+01 G
			968.97	8.357E+00	?(	3.755E+01	1.33E+02	1.75E+01 G
			338.32	9.435E+00	(	3.164E+01	1.00E+02	1.20E+01 G
							Energy duplication	
			93.35	6.879E-01	&	4.423E+01	1.90E+03	5.56E+00 XA
Pa-234	N	5.6161E-01					1.63E+12	
			131.29	-3.999E+00	&(	1.357E+01	1.02E+02	1.80E+01 G
			569.47	-4.369E+00	&	5.017E+01	3.35E+02	8.20E+00 G
			946.02	-1.303E+01	+	5.688E+01	1.30E+02	1.34E+01 G
			883.24	5.624E+00	(	4.427E+01	2.27E+02	9.60E+00 G
			880.53	6.143E+00	(	6.542E+01	3.05E+02	6.00E+00 G
TH-234	N	1.7017E+01					1.63E+12	
			63.29	1.702E+01	*(P	1.046E+02	1.12E+02	3.81E+00 G
			92.59	-3.777E+00	& P	4.882E+01	3.17E+02	5.58E+00 G
PA-234M	N	8.9276E+01					1.63E+12	
			1001.00	-3.221E+01	?(	1.051E+03	9.57E+02	8.37E-01 G
			766.41	4.351E+02	&(	1.534E+03	1.05E+02	2.94E-01 G
U-235	N	9.3991E+00					2.57E+11	
			143.79	8.314E+00	&(	2.152E+01	7.81E+01	1.10E+01 G
			205.33	1.427E+01	?(	5.747E+01	1.20E+02	5.01E+00 G
			163.38	6.938E+00	?(	5.321E+01	2.28E+02	5.08E+00 G
							Energy duplication	
			93.35	6.584E-01	&	4.233E+01	1.90E+03	5.81E+00 X

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AM-241	T 1.2656E+03					1.58E+05	
		59.54	1.266E+03	(	2.157E+01	1.12E+00	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-234	63.42	771.	21.	0.012	112.35	1.702E+01	P
EU-155	86.35	807.	-75.	-0.042	54.99	-5.789E+00	
EU-155	104.94	509.	4.	0.002	750.94	4.545E-01	
EU-154	123.20	539.	-20.	-0.011	167.65	-1.113E+00	
U-235	145.05	405.	37.	0.021	78.08	8.314E+00	
U-235	163.24	448.	13.	0.007	228.17	6.938E+00	
U-235	205.39	362.	23.	0.013	120.45	1.427E+01	
PB-214	241.99	409.	-13.	-0.007	224.96	-6.196E+00	
I-131	284.27	307.	-4.	-0.002	588.69	-2.811E+00	
PB-214	295.10	352.	26.	0.015	102.78	5.741E+00	
AC-228	338.06	280.	24.	0.013	100.44	9.435E+00	
EU-152	344.25	277.	4.	0.002	530.83	8.019E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
PB-214	351.58	283.	42.	0.023	58.82	5.414E+00		
I-131	365.40	269.	5.	0.003	511.01	2.791E-01		
CS-134	562.00	144.	-23.	-0.013	77.42	-1.954E+01		
CS-134	569.34	134.	-6.	-0.004	262.54	-2.961E+00		
EU-154	723.77	135.	-21.	-0.011	82.84	-8.994E+00		
BI-212	727.01	89.	10.	0.006	135.74	1.184E+01		
PA-234M	766.30	97.	14.	0.008	104.57	4.351E+02		
EU-152	777.82	99.	18.	0.010	80.42	1.327E+01		
CS-134	791.76	56.	5.	0.003	216.44	5.580E-01		
CS-134	802.11	127.	-13.	-0.007	128.08	-1.415E+01		
TL-208	859.95	105.	26.	0.015	58.89	2.153E+01		
AC-228	910.33	162.	36.	0.020	52.98	1.327E+01		
EU-152	964.60	199.	-25.	-0.014	82.90	-1.916E+01		
AC-228	968.49	140.	13.	0.007	132.94	8.357E+00		
EU-154	994.45	95.	-8.	-0.004	179.54	-8.562E+00		
PA-234M	1001.00	244.	-2.	-0.001	957.12	-3.221E+01		
EU-154	1004.85	134.	14.	0.008	117.24	9.291E+00		
K-40	1459.89	12.	-2.	-0.001	218.88	-2.802E+00	P	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

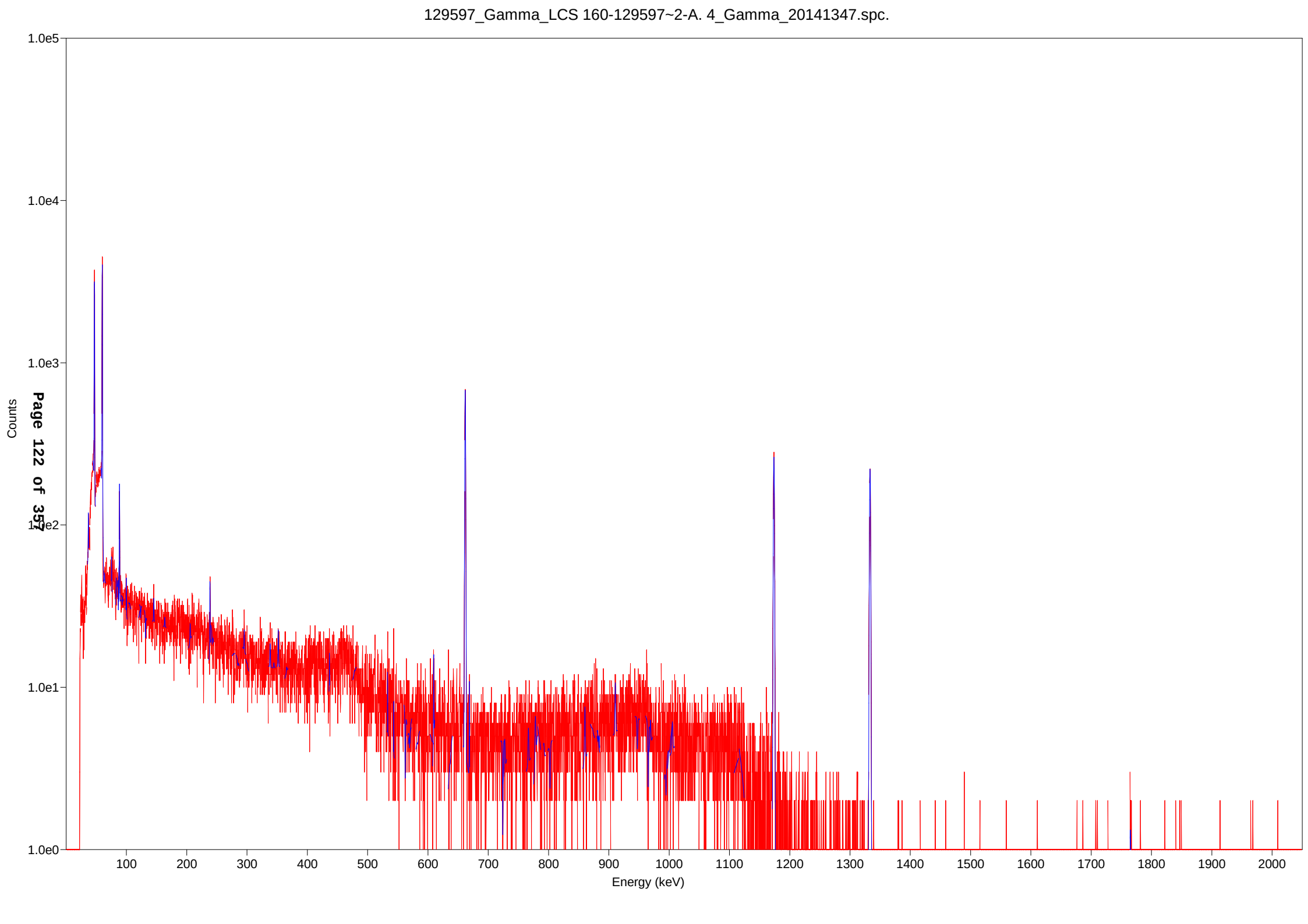
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	1.3178E+00	1.3178E+00	1.084E+03%	4.86E+01
K-40	#A	-2.8024E+00	-2.8024E+00	6.646E+02%	2.82E+01
CO-60		2.6629E+02	2.6629E+02	1.675E+00%	2.06E+00
I-131	#A	2.7910E-01	2.7911E-01	5.110E+02%	4.85E+00
CS-134	#A	2.4585E-01	2.4585E-01	2.164E+02%	4.16E+00
CS-137		3.7763E+02	3.7763E+02	1.707E+00%	4.82E+00
EU-152	#A	4.8937E+00	4.8937E+00	8.042E+01%	1.45E+01
EU-154	#A	5.9217E+00	5.9217E+00	1.172E+02%	5.10E+01
EU-155	#A	4.5452E-01	4.5452E-01	7.509E+02%	1.15E+01
TL-208	#A	2.6209E+00	2.6209E+00	5.889E+01%	6.14E+00
PB-210		1.2177E+04	1.2177E+04	1.292E+00%	2.72E+02
PB-212		1.0175E+01	1.0175E+01	2.718E+01%	6.62E+00
PB-214	#A	5.5251E+00	5.5251E+00	5.882E+01%	1.05E+01
BI-212	#A	1.1844E+01	1.1844E+01	1.357E+02%	5.47E+01
BI-214		1.2052E+01	1.2052E+01	2.383E+01%	7.46E+00
AC-228	#A	1.1017E+01	1.1017E+01	5.298E+01%	2.30E+01
Pa-234	A	5.6161E-01	5.6161E-01	1.020E+02%	1.36E+01
TH-234	#A	1.7017E+01	1.7017E+01	1.831E+02%	1.05E+02
PA-234M	#A	8.9276E+01	8.9276E+01	1.046E+02%	1.05E+03
U-235	#A	9.3991E+00	9.3991E+00	7.808E+01%	2.15E+01
AM-241		1.2656E+03	1.2656E+03	1.121E+00%	2.16E+01

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

--------------------------- S U M M A R Y ---------------------------

Total Activity (946.0 to 1999.4 keV)   1.411E+04 Bq/Sample
Total Decayed Activity (946.0 to 1999.4 keV) 1.4108524E+04 Bq/Sample

The library has energies which are not separable.


129597_Gamma_LCS 160-129597~2-A. 4_Gamma_20141347.spc.
1.0e5
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Counts
Page 122 of 357
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)

Test America St. Louis Spectrum ID: 15_Gamma_20141456

Sample Description: 129597_Gamma_680-102577-A-1-B
Detector: Ge15 SN/11012216
Batch ID: 129597
Work Order Number: Gamma
Lot Number: 680-102577-A-1-B

Decay to Time: 7/24/2014 02:06 Live Time: 1800 sec
Acquisition Time: 7/24/2014 02:06:28 Real Time: 1803 sec
Analysis Time: 7/24/2014 02:36 Dead Time: 0.19 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 15_Soil_TunaCan.Clb
Efficiency Cal Desc: 15_TunaCan_90099_032212
Efficiency Cal Date: 3/22/2012 13:03
Energy Cal Date: 2/28/2012 16:29
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 15_2014-07-12_0308.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	9.437E-02	2244.0	2.118E+00	2.118E+00	7.901E+00
K-40	1.054E+02	9.2	9.705E+00	1.110E+01	6.585E+00
CO-60	1.740E-01	95.9	1.669E-01	1.671E-01	1.818E+00
I-131	-1.137E-01	209.5	2.382E-01	2.383E-01	8.542E-01
CS-134	-1.592E+00	41.4	6.597E-01	6.649E-01	2.108E+00
CS-137	3.695E-01	88.3	3.261E-01	3.267E-01	1.116E+00
EU-152	5.302E-01	79.5	4.216E-01	4.225E-01	2.495E+00
EU-154	4.705E-01	204.8	9.637E-01	9.640E-01	8.169E+00
EU-155	1.036E-01	180.6	1.871E-01	1.872E-01	2.036E+00
TL-208	1.732E+00	25.3	4.382E-01	4.473E-01	1.033E+00
PB-210	1.680E+01	55.0	9.232E+00	9.285E+00	2.549E+01
PB-212	8.024E+00	11.0	8.809E-01	1.022E+00	1.731E+00
PB-214	7.346E+00	13.1	9.599E-01	1.033E+00	1.668E+00
BI-212	1.372E+00	187.4	2.571E+00	2.572E+00	1.448E+01
BI-214	7.321E+00	12.9	9.459E-01	1.020E+00	1.543E+00
AC-228	8.262E+00	16.2	1.340E+00	1.405E+00	1.602E+00
Pa-234	7.291E-01	151.6	1.105E+00	1.106E+00	2.707E+00
TH-234	4.928E+00	135.2	6.662E+00	6.667E+00	2.378E+01
PA-234M	1.344E+01	280.0	3.764E+01	3.765E+01	1.413E+02
U-235	-6.347E-01	229.4	1.456E+00	1.456E+00	5.074E+00
AM-241	2.343E-01	204.7	4.798E-01	4.799E-01	1.688E+00
Total	1.774E+02				

Analyst: Siobhan Perry

TestAmerica, Inc. Spectrum name: 15_Gamma_20141456.An1

Sample description
129597_Gamma_680-102577-A-1-B

Spectrum Filename: C:\User\SPC\Det15\15_Gamma_20141456.An1

Acquisition information
Start time: 7/24/2014 2:06:28 AM
Live time: 1800
Real time: 1803
Dead time: 0.19 %
Detector ID: 15

Detector system
Ge15 SN/11012216

Calibration
Filename: 15_Soil_TunaCan.Clb
15_TunaCan_90099_032212

Energy Calibration
Created: 2/28/2012 4:29:17 PM
Zero offset: 0.044 keV
Gain: 0.250 keV/channel
Quadratic: -3.267E-08 keV/channel^2

Efficiency Calibration
Created: 3/22/2012 1:03:01 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.00 %
Log(Eff): -6.894897E-01 + (-3.290613E-01*Log(E)) +
(-3.875629E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.13 %
Log(Eff): -2.362677E+01 + (8.666669E+00*Log(E)) +
(-9.214638E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.57keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	7/24/2014 2:06:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	15_2014-07-12_0308.PBC 7/12/2014 3:08:49 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 13 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1377

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.92	47.	29.40	0.71	1.982E-02	46.54	4.250	PBC<MDA	PB210
57.54	4.	204.74	0.96	2.737E-02	59.54	35.900	PBC<MDA	AM241
63.24	10.	48.45	0.96	2.924E-02	63.29	3.810	PBC<MDA	TH234
77.17	119.	16.25	0.85	3.454E-02				
86.73	6.	188.81	0.98	3.679E-02	86.54	30.700	PBC<MDA	EU155
87.38	43.	26.88	0.52	3.694E-02				
93.02	-11.	104.90	0.99	3.776E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.810	PBC<MDA	U235
					93.35	5.561	PBC<MDA	AC228
93.06	28.	55.77	0.99	3.785E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.810	7.112E+00	U235
					93.35	5.561	7.431E+00	AC228
93.49	66.	31.47	0.38	3.785E-02	93.35	5.561	1.751E+01	AC228
121.85	12.	79.52	1.02	3.848E-02	121.78	28.580	PBC<MDA	EU152
131.48	4.	234.48	1.02	3.775E-02	131.29	18.000	PBC<MDA	Pa234
238.57	170.	10.47	0.89	2.592E-02	238.63	43.300	8.024E+00	PB212
241.61	21.	59.51	0.36	2.565E-02	242.00	7.430	PBC<MDA	PB214
277.53	12.	67.70	1.15	2.313E-02	277.28	6.310	PBC<MDA	TL208
295.01	63.	19.68	0.62	2.205E-02	295.09	19.300	8.285E+00	PB214
300.28	26.	36.85	0.58	2.177E-02	300.03	3.280	2.031E+01	PB212
338.40	53.	19.95	1.19	1.983E-02	338.32	12.010	1.229E+01	AC228
344.42	3.	197.14	1.21	1.956E-02	344.29	26.500	PBC<MDA	EU152
351.53	98.	12.26	0.85	1.925E-02	351.93	37.600	7.099E+00	PB214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
561.73	2.	292.17	1.39	1.319E-02	563.24	8.350	PBC<MDA	CS134
570.30	3.	192.11	1.40	1.307E-02	569.47	8.200	PBC<MDA	Pa234
582.97	35.	21.42	0.84	1.282E-02	583.02	84.500	1.795E+00	TL208
609.42	75.	12.18	1.69	1.236E-02	609.31	46.090	7.321E+00	BI214
661.89	7.	88.25	1.47	1.155E-02	661.66	85.210	PBC<MDA	CS137
724.00	3.	204.83	1.52	1.072E-02				
784.97	3.	187.41	1.57	9.998E-03	785.42	1.280	PBC<MDA	BI212
860.90	3.	171.65	1.62	9.252E-03	860.56	12.420	PBC<MDA	TL208
910.96	38.	16.22	0.83	8.811E-03	911.07	29.000	8.262E+00	AC228
966.11	1.	970.76	1.70	8.393E-03	964.11	14.605	PBC<MDA	EU152
1000.23	2.	280.03	1.72	8.125E-03	1001.00	0.837	PBC<MDA	PA234M
1005.42	1.	355.02	1.72	8.099E-03	1004.77	18.010	PBC<MDA	EU154
1112.97	2.	237.71	1.80	7.416E-03	1112.07	13.644	PBC<MDA	EU152
1120.00	5.	58.78	1.80	7.368E-03	1120.29	15.100	PBC<MDA	BI214
1173.37	4.	95.91	1.84	7.076E-03	1173.24	99.900	PBC<MDA	CO60
					1173.24	99.900	3.481E-01	CO60
1460.87	118.	9.21	0.91	5.828E-03	1460.83	10.670	1.054E+02	K40

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
308.29	77.17	80.	119.	3.441E+03	16.25	0.854	-	
349.83	87.38	36.	40.	1.075E+03	26.68	0.984	-	D

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV	
PB-210	187.37	46.92	58.	25.	0.014	29.40	0.709	s
AM-241	229.80	57.54	34.	4.	0.002	204.74	0.958	s
TH-234	252.60	63.24	93.	10.	0.005	48.45	0.962	s
EU-155	345.74	86.54	65.	6.	0.003	188.81	0.983	D
TH-234	371.64	93.02	174.	-11.	-0.006	104.90	0.989	s
U-235	372.95	93.35	109.	28.	0.016	55.77	0.989	D
AC-228	372.95	93.35	89.	66.	0.037	31.47	0.382	D
EU-155	431.65	108.04	35.	-3.	-0.002	308.00	1.000	
EU-152	486.87	121.85	41.	12.	0.007	79.52	1.015	s
Pa-234	525.37	131.48	43.	4.	0.002	234.48	1.024	s
U-235	575.81	144.10	52.	-5.	-0.003	229.43	1.036	s
U-235	654.34	163.74	50.	-3.	-0.001	399.85	1.053	s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-212	953.48	238.57	48.	162.	0.090	10.47	0.888
PB-214	965.62	241.61	48.	21.	0.012	59.51	0.362s
TL-208	1109.25	277.53	32.	12.	0.007	67.70	1.154
I-131	1140.35	285.31	26.	-1.	-0.001	645.26	1.160s
PB-214	1179.13	295.01	25.	63.	0.035	19.68	0.616s
PB-212	1200.21	300.28	19.	26.	0.014	36.85	0.584s
AC-228	1352.59	338.40	13.	53.	0.029	19.95	1.189
EU-152	1376.66	344.42	19.	3.	0.002	197.14	1.212s
PB-214	1405.08	351.53	17.	92.	0.051	12.26	0.852s
I-131	1458.38	364.86	20.	-3.	-0.002	209.45	1.229s
CS-134	2245.66	561.73	15.	2.	0.001	292.17	1.394s
Pa-234	2279.91	570.30	16.	3.	0.002	192.11	1.399s
TL-208	2330.60	582.97	14.	35.	0.019	21.42	0.842s
CS-134	2427.91	607.30	87.	-35.	-0.019	41.43	1.427s
BI-214	2436.36	609.42	8.	75.	0.042	12.18	1.692s
CS-137	2646.23	661.89	13.	7.	0.004	88.25	1.472s
EU-154	2894.66	724.00	17.	3.	0.002	204.83	1.519s
EU-152	3107.77	777.28	8.	-1.	-0.001	438.87	1.561s
BI-212	3138.55	784.97	11.	3.	0.001	187.41	1.566s
CS-134	3168.70	792.51	7.	-1.	-0.001	281.32	1.574s
TL-208	3442.27	860.90	17.	3.	0.002	171.65	1.622s
AC-228	3642.53	910.96	0.	38.	0.021	16.22	0.831s
Pa-234	3783.44	946.18	16.	-4.	-0.002	150.18	1.683s
EU-152	3863.21	966.11	17.	1.	0.000	970.76	1.696s
EU-154	3981.11	995.58	13.	-1.	-0.001	356.82	1.718s
PA-234M	3999.70	1000.23	10.	2.	0.001	280.03	1.722s
EU-154	4020.47	1005.42	9.	1.	0.001	355.02	1.724s
EU-152	4450.79	1112.97	8.	2.	0.001	237.71	1.797s
BI-214	4478.93	1120.00	8.	5.	0.003	58.78	1.803s
CO-60	4692.50	1173.37	7.	4.	0.002	95.91	1.838s
K-40	5843.19	1460.87	0.	118.	0.066	9.21	0.909s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	9.4368E-02				5.31E+01	
			477.60	9.437E-02	%(	7.901E+00	2.24E+03 1.05E+01 G
K-40	N	1.0542E+02				4.66E+11	
			1460.83	1.054E+02	(	6.585E+00	9.21E+00 1.07E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-60	F 1.7399E-01					1.93E+03	
		1332.50	0.000E+00	?(	1.818E+00	1.00E+03	1.00E+02 G
		1173.24	3.481E-01	?(	1.169E+00	9.59E+01	9.99E+01 G
I-131	I -1.1371E-01					8.02E+00	
		364.48	-1.137E-01	?(	8.542E-01	2.09E+02	8.17E+01 G
		284.30	-4.514E-01	+	1.058E+01	6.45E+02	6.14E+00 G
		636.97	-1.895E-01	%	1.451E+01	2.05E+03	7.17E+00 G
CS-134	I -1.5923E+00					7.54E+02	
		604.71	-1.592E+00	?(	2.108E+00	4.14E+01	9.76E+01 G
		795.87	-9.282E-02	+	9.991E-01	2.81E+02	8.55E+01 G
		569.32	4.157E-02	%	6.146E+00	3.95E+03	1.54E+01 G
		801.95	0.000E+00	+	1.398E+01	1.00E+03	8.69E+00 G
		563.24	9.796E-01	+	1.051E+01	2.92E+02	8.35E+00 G
CS-137	I 3.6951E-01					1.10E+04	
		661.66	3.695E-01	?(	1.116E+00	8.83E+01	8.52E+01 G
EU-152	F 5.3015E-01					4.94E+03	
		344.29	3.534E-01	?(	2.495E+00	1.97E+02	2.65E+01 G
		121.78	6.152E-01	(	1.641E+00	7.95E+01	2.86E+01 G
		778.92	-3.933E-01	+	6.681E+00	4.39E+02	1.29E+01 G
		964.11	2.746E-01	?(	9.934E+00	9.71E+02	1.46E+01 G
		1112.07	9.688E-01	?(	8.686E+00	2.38E+02	1.36E+01 G
		1408.00	0.000E+00	-	3.237E+00	1.00E+03	2.10E+01 G
EU-154	I 4.7052E-01					3.14E+03	
		873.23	0.000E+00	?(	8.169E+00	1.00E+03	1.23E+01 G
		123.10	-3.150E-02	%	1.262E+00	1.13E+03	4.08E+01 G
		1274.54	-2.998E-02	%	4.043E+00	3.45E+03	3.52E+01 G
		723.36	7.554E-01	?(	5.582E+00	2.05E+02	2.02E+01 G
		1004.77	4.713E-01	?(	6.366E+00	3.55E+02	1.80E+01 G
		996.33	-9.298E-01	+	1.237E+01	3.57E+02	1.06E+01 G
EU-155	I 1.0357E-01					1.81E+03	
		105.31	-1.861E-01	?(	2.036E+00	3.08E+02	2.12E+01 G
		86.54	3.036E-01	(	1.979E+00	1.89E+02	3.07E+01 G
TL-208	N 1.7323E+00					6.98E+02	
		583.02	1.795E+00	(P	1.033E+00	2.14E+01	8.45E+01 G
		277.28	4.662E+00	+ P	1.105E+01	6.77E+01	6.31E+00 G
		860.56	1.306E+00	?(P	1.056E+01	1.72E+02	1.24E+01 G
PB-210	N 1.6798E+01					8.14E+03	
		46.54	1.680E+01	@(P	2.549E+01	2.94E+01	4.25E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	8.0238E+00					6.98E+02	
			238.63	8.024E+00	(P	1.731E+00	1.05E+01	4.33E+01 G
			300.03	2.031E+01	+ P	1.787E+01	3.69E+01	3.28E+00 G
PB-214	N	7.3457E+00					5.84E+05	
			351.93	7.099E+00	(P	1.668E+00	1.23E+01	3.76E+01 G
			295.09	8.285E+00	(P	3.368E+00	1.97E+01	1.93E+01 G
			242.00	6.153E+00	(P	1.019E+01	5.95E+01	7.43E+00 G
BI-212	N	1.3716E+00					6.98E+02	
			727.17	-3.746E-01	%(	1.448E+01	1.03E+03	7.55E+00 G
			785.42	1.167E+01	&(	7.992E+01	1.87E+02	1.28E+00 G
BI-214	N	7.3210E+00					5.84E+05	
			609.31	7.321E+00	@(P	1.543E+00	1.22E+01	4.61E+01 G
			1120.29	2.634E+00	- P	8.071E+00	5.88E+01	1.51E+01 G
			1764.49	-1.881E+00	% P	7.463E+00	1.00E+03	1.54E+01 G
AC-228	N	8.2618E+00					2.10E+03	
			911.07	8.262E+00	(	1.602E+00	1.62E+01	2.90E+01 G
			968.97	0.000E+00	&	4.726E+00	1.00E+03	1.75E+01 G
			338.32	1.229E+01	+	4.601E+00	2.00E+01	1.20E+01 G
								Energy duplication
			93.35	1.751E+01	+	1.230E+01	3.15E+01	5.56E+00 XA
Pa-234	N	7.2906E-01					1.63E+12	
			131.29	3.293E-01	?(	2.707E+00	2.34E+02	1.80E+01 G
			569.47	1.607E+00	?(	1.112E+01	1.92E+02	8.20E+00 G
			946.02	-1.956E+00	+	1.045E+01	1.50E+02	1.34E+01 G
			883.24	0.000E+00	-	4.714E+00	1.00E+03	9.60E+00 G
			880.53	0.000E+00	-	1.687E+01	1.00E+03	6.00E+00 G
TH-234	N	4.9279E+00					1.63E+12	
			63.29	4.928E+00	*(P	2.378E+01	4.85E+01	3.81E+00 G
			92.59	-3.029E+00	+ P	1.689E+01	1.05E+02	5.58E+00 G
PA-234M	N	1.3443E+01					1.63E+12	
			1001.00	1.344E+01	&(	1.413E+02	2.80E+02	8.37E-01 G
			766.41	0.000E+00	-	2.921E+02	1.00E+03	2.94E-01 G
U-235	N	-6.3466E-01					2.57E+11	
			143.79	-6.347E-01	?(	5.074E+00	2.29E+02	1.10E+01 G
			205.33	0.000E+00	&	1.772E+01	1.00E+03	5.01E+00 G
			163.38	-8.193E-01	+	1.154E+01	4.00E+02	5.08E+00 G
								Energy duplication
			93.35	7.112E+00	*	1.299E+01	5.58E+01	5.81E+00 X

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AM-241	T 2.3434E-01					1.58E+05	
		59.54	2.343E-01	?(	1.688E+00	2.05E+02	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
AM-241	57.54	34.	4.	0.002	204.74	2.343E-01	
TH-234	63.24	93.	10.	0.005	48.45	4.928E+00	P
TH-234	93.02	174.	-11.	-0.006	104.90	-3.029E+00	P
U-235	93.35	109.	28.	0.016	55.77	7.112E+00	
EU-152	121.85	41.	12.	0.007	79.52	6.152E-01	
Pa-234	131.48	43.	4.	0.002	234.48	3.293E-01	
U-235	144.10	52.	-5.	-0.003	229.43	-6.347E-01	
U-235	163.74	50.	-3.	-0.001	399.85	-8.193E-01	
I-131	285.31	26.	-1.	-0.001	645.26	-4.514E-01	
EU-152	344.42	19.	3.	0.002	197.14	3.534E-01	
I-131	364.86	20.	-3.	-0.002	209.45	-1.137E-01	
CS-134	561.73	15.	2.	0.001	292.17	9.796E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Pa-234	570.30	16.	3.	0.002	192.11	1.607E+00	
CS-134	607.30	87.	-35.	-0.019	41.43	-1.592E+00	
CS-137	661.89	13.	7.	0.004	88.25	3.695E-01	
EU-154	724.00	17.	3.	0.002	204.83	7.554E-01	
EU-152	777.28	8.	-1.	-0.001	438.87	-3.933E-01	
BI-212	784.97	11.	3.	0.001	187.41	1.167E+01	
CS-134	792.51	7.	-1.	-0.001	281.32	-9.282E-02	
Pa-234	946.18	16.	-4.	-0.002	150.18	-1.956E+00	
EU-152	966.11	17.	1.	0.000	970.76	2.746E-01	
EU-154	995.58	13.	-1.	-0.001	356.82	-9.298E-01	
PA-234M	1000.23	10.	2.	0.001	280.03	1.344E+01	
EU-154	1005.42	9.	1.	0.001	355.02	4.713E-01	
EU-152	1112.97	8.	2.	0.001	237.71	9.688E-01	
CO-60	1173.37	7.	4.	0.002	95.91	3.481E-01	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Activity Bq/Sample	Time of Count Activity Bq/Sample	Time Corrected Uncertainty Counting	1 Sigma MDA Bq/Sample
BE-7	#A	9.4368E-02	9.4368E-02	2.244E+03%	7.90E+00
K-40		1.0542E+02	1.0542E+02	9.206E+00%	6.58E+00
CO-60	#A	1.7399E-01	1.7399E-01	9.591E+01%	1.82E+00
I-131	#A	-1.1371E-01	-1.1371E-01	2.095E+02%	8.54E-01
CS-134	#A	-1.5923E+00	-1.5923E+00	4.143E+01%	2.11E+00
CS-137	#A	3.6951E-01	3.6951E-01	8.825E+01%	1.12E+00
EU-152	#A	5.3015E-01	5.3015E-01	7.952E+01%	2.49E+00
EU-154	#A	4.7052E-01	4.7052E-01	2.048E+02%	8.17E+00
EU-155	A	1.0357E-01	1.0357E-01	1.806E+02%	2.04E+00
TL-208		1.7323E+00	1.7323E+00	2.530E+01%	1.03E+00
PB-210	#A	1.6798E+01	1.6798E+01	5.496E+01%	2.55E+01
PB-212		8.0238E+00	8.0238E+00	1.098E+01%	1.73E+00
PB-214		7.3457E+00	7.3457E+00	1.307E+01%	1.67E+00
BI-212	#A	1.3716E+00	1.3716E+00	1.874E+02%	1.45E+01
BI-214	#	7.3210E+00	7.3210E+00	1.292E+01%	1.54E+00
AC-228		8.2618E+00	8.2618E+00	1.622E+01%	1.60E+00
Pa-234	#A	7.2906E-01	7.2906E-01	1.516E+02%	2.71E+00
TH-234	#A	4.9279E+00	4.9279E+00	1.352E+02%	2.38E+01
PA-234M	#A	1.3443E+01	1.3443E+01	2.800E+02%	1.41E+02
U-235	#A	-6.3466E-01	-6.3466E-01	2.294E+02%	5.07E+00
AM-241	#A	2.3434E-01	2.3434E-01	2.047E+02%	1.69E+00

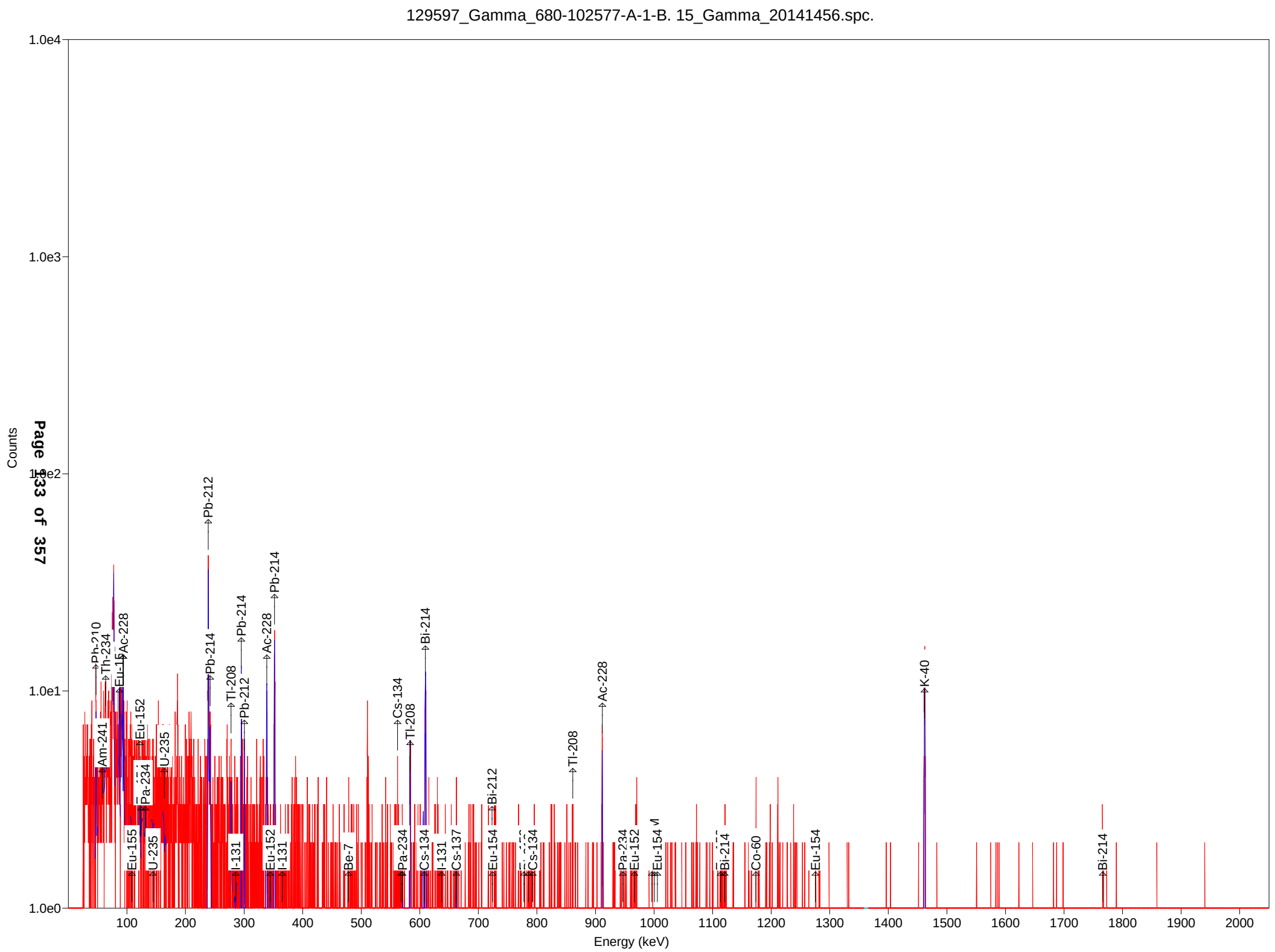
- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

--- S U M M A R Y ---

Total Activity (93.1 to 1999.5 keV) 1.549E+02 Bq/Sample
Total Decayed Activity (93.1 to 1999.5 keV) 1.5490689E+02 Bq/Sample

The library has energies which are not separable.


129597_Gamma_680-102577-A-1-B. 15_Gamma_20141456.spc.
Counts
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Energy (keV)
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Pb-210
Th-234
Eu-155
Ac-228
Eu-152
Pa-234
U-235
Am-241
Eu-155
U-235
I-131
Pb-212
Pb-214
Tl-208
Pb-212
Pb-214
Ac-228
Pb-214
Eu-152
I-131
Be-7
Cs-134
Tl-208
Pa-234
Cs-134
Bi-214
I-131
Cs-137
Bi-212
Eu-154
Cs-134
Tl-208
Ac-228
Pa-234
Eu-152
Eu-154
Bi-214
Co-60
Eu-154
K-40
Bi-214

Test America St. Louis Spectrum ID: 7_Gamma_20141605

Sample Description: 129597_Gamma_680-102577-A-1-C DU
Detector: Ge 7 SN/154
Batch ID: 129597
Work Order Number: Gamma
Lot Number: 680-102577-A-1-C DU

Decay to Time: 7/24/2014 02:40 Live Time: 1800 sec
Acquisition Time: 7/24/2014 02:40:18 Real Time: 1828 sec
Analysis Time: 7/24/2014 03:11 Dead Time: 1.51 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 7_Soil_TunaCan.Clb
Efficiency Cal Desc: 7_TunaCan_90099_032712
Efficiency Cal Date: 3/16/2012 11:45
Energy Cal Date: 2/23/2012 08:40
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 7_2014-07-12_0337.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	1.345E+00	103.9	1.397E+00	1.399E+00	4.882E+00
K-40	6.466E+01	11.4	7.354E+00	8.064E+00	1.233E+01
CO-60	6.776E-02	363.3	2.462E-01	2.462E-01	9.684E-01
I-131	2.453E-01	104.3	2.559E-01	2.562E-01	6.725E-01
CS-134	-2.470E-01	125.1	3.090E-01	3.092E-01	1.066E+00
CS-137	5.294E-01	59.1	3.128E-01	3.140E-01	1.019E+00
EU-152	3.510E-01	123.3	4.329E-01	4.333E-01	2.087E+00
EU-154	1.756E+00	113.2	1.987E+00	1.989E+00	7.008E+00
EU-155	1.438E+00	28.6	4.112E-01	4.187E-01	1.460E+00
TL-208	2.443E+00	12.7	3.102E-01	3.351E-01	2.904E-01
PB-210	1.249E+01	45.4	5.671E+00	5.718E+00	1.700E+01
PB-212	7.593E+00	8.5	6.464E-01	8.118E-01	1.091E+00
PB-214	7.952E+00	9.6	7.639E-01	8.685E-01	1.215E+00
BI-212	8.578E+00	58.4	5.006E+00	5.026E+00	1.310E+01
BI-214	6.074E+00	12.4	7.501E-01	8.138E-01	9.320E-01
AC-228	9.854E+00	10.5	1.039E+00	1.154E+00	2.054E+00
Pa-234	1.014E-01	280.8	2.848E-01	2.849E-01	2.468E+00
TH-234	9.160E+00	31.0	2.836E+00	2.876E+00	1.638E+01
PA-234M	2.801E+00	1315.0	3.683E+01	3.683E+01	1.380E+02
U-235	5.654E-01	176.7	9.993E-01	9.997E-01	3.806E+00
AM-241	-4.141E-01	148.3	6.141E-01	6.145E-01	2.090E+00
Total	1.380E+02				

Analyst: Siobhan Perry

TestAmerica Spectrum name: 7_Gamma_20141605.An1

Sample description
129597_Gamma_680-102577-A-1-C DU

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20141605.An1

Acquisition information
Start time: 7/24/2014 2:40:18 AM
Live time: 1800
Real time: 1828
Dead time: 1.51 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Soil_TunaCan.Clb
7_TunaCan_90099_032712

Energy Calibration
Created: 2/23/2012 8:40:56 AM
Zero offset: 0.117 keV
Gain: 0.250 keV/channel
Quadratic: 3.508E-09 keV/channel^2

Efficiency Calibration
Created: 3/16/2012 11:45:14 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.87 %
Log(Eff): 6.716580E-01 + (-6.166540E-01*Log(E)) + (-2.065917E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.48 %
Log(Eff): -2.689695E+01 + (1.019544E+01*Log(E)) + (-1.081671E+00*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (2000.12keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	7/24/2014 2:40:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2014-07-12_0337.PBC 7/12/2014 3:37:35 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 16 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0895

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.58	24.	28.34	0.36	2.483E-02	46.54	4.250	PBC<MDA	PB210
63.68	34.	30.60	0.78	4.005E-02	63.29	3.810	PBC<MDA	TH234
74.83	124.	13.73	0.87	4.766E-02				
77.17	148.	11.99	0.87	4.889E-02				
87.31	57.	28.60	0.88	5.281E-02	86.54	30.700	1.947E+00	EU155
89.73	40.	27.70	0.88	5.380E-02				
92.85	78.	19.21	0.89	5.460E-02	92.59	5.584	9.643E+00	TH234
					93.35	5.810	1.368E+01	U235
93.44	36.	43.15	0.89	5.470E-02	93.35	5.561	PBC<MDA	AC228
104.54	15.	63.35	0.90	5.638E-02	105.31	21.200	PBC<MDA	EU155
123.18	3.	318.42	0.92	5.596E-02	123.10	40.790	PBC<MDA	EU154
144.07	6.	109.15	0.94	5.271E-02	143.79	10.960	PBC<MDA	U235
					143.79	10.960	PBC<MDA	U235
163.73	2.	263.80	0.96	4.826E-02	163.38	5.080	PBC<MDA	U235
					163.38	5.080	PBC<MDA	U235
238.64	221.	8.22	1.26	3.602E-02	238.63	43.300	7.593E+00	PB212
241.88	50.	19.28	0.83	3.560E-02	242.00	7.430	1.059E+01	PB214
284.24	7.	118.85	1.09	3.106E-02	284.30	6.140	PBC<MDA	I131
295.51	89.	15.91	1.07	3.009E-02	295.09	19.300	8.528E+00	PB214
300.13	21.	34.39	0.82	2.966E-02	300.03	3.280	1.172E+01	PB212
338.26	64.	14.02	0.81	2.677E-02	338.32	12.010	1.097E+01	AC228
352.02	138.	9.88	0.98	2.587E-02	351.93	37.600	7.657E+00	PB214
478.08	5.	103.91	1.28	1.987E-02	477.60	10.520	PBC<MDA	BE7
583.04	62.	12.70	0.86	1.669E-02	583.02	84.500	2.443E+00	TL208
609.00	84.	12.35	1.51	1.605E-02	609.31	46.090	6.283E+00	BI214
637.27	5.	109.49	1.43	1.543E-02	636.97	7.170	PBC<MDA	I131
661.71	12.	59.09	1.46	1.492E-02	661.66	85.210	PBC<MDA	CS137

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
726.82	12.	61.03	1.51	1.373E-02	727.17	7.550	PBC<MDA	BI212
785.57	6.	99.51	1.57	1.281E-02	785.42	1.280	PBC<MDA	BI212
860.42	12.	50.04	1.63	1.181E-02	860.56	12.420	PBC<MDA	TL208
873.26	5.	113.16	1.64	1.166E-02	873.23	12.270	PBC<MDA	EU154
911.41	55.	15.75	0.83	1.122E-02	911.07	29.000	9.390E+00	AC228
946.09	1.	422.80	1.70	1.085E-02	946.02	13.400	PBC<MDA	Pa234
968.74	17.	45.01	1.72	1.062E-02	968.97	17.460	PBC<MDA	AC228
1120.40	11.	49.15	1.85	9.311E-03	1120.29	15.100	PBC<MDA	BI214
1332.79	1.	363.34	2.01	7.951E-03	1332.50	99.980	PBC<MDA	CO60
1407.56	3.	123.35	2.06	7.560E-03	1408.00	21.005	PBC<MDA	EU152
1461.05	91.	10.91	2.10	7.309E-03	1460.83	10.670	6.466E+01	K40
1765.10	9.	49.83	2.29	6.141E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
298.73	74.79	117.	103.	2.161E+03	21.13	0.762	-	
308.08	77.13	128.	112.	2.281E+03	21.18	0.703	-	
358.78	89.80	36.	37.	6.877E+02	28.22	0.632	-	sM

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.87	46.58	40.	24.	0.013	28.34	0.360s
AM-241	237.40	59.46	103.	-10.	-0.006	148.31	0.850s
TH-234	254.29	63.68	82.	34.	0.019	30.60	0.783s
EU-155	348.82	87.31	104.	57.	0.032	28.60	0.880s
TH-234	369.93	92.59	107.	38.	0.021	23.54	0.886D
AC-228	372.97	93.35	104.	36.	0.020	43.15	0.887D
U-235	372.97	93.35	67.	75.	0.042	19.33	0.887D
EU-155	417.75	104.54	38.	15.	0.008	63.35	0.900s
EU-154	492.31	123.18	49.	3.	0.002	318.42	0.919s
Pa-234	525.81	131.56	78.	-3.	-0.002	369.55	0.928s
U-235	575.89	144.07	63.	6.	0.004	109.15	0.941s
U-235	654.54	163.73	37.	2.	0.001	263.80	0.962s
U-235	823.22	205.90	49.	-7.	-0.004	149.69	1.007s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-212	954.18	238.64	36.	213.	0.118	8.22	1.264s
PB-214	967.14	241.88	17.	50.	0.028	19.28	0.834s
I-131	1136.58	284.24	30.	7.	0.004	118.85	1.089s
PB-214	1181.67	295.51	28.	89.	0.050	15.91	1.067s
PB-212	1200.17	300.13	11.	21.	0.011	34.39	0.824s
AC-228	1352.71	338.26	4.	64.	0.035	14.02	0.812s
PB-214	1407.75	352.02	16.	134.	0.075	9.88	0.978
I-131	1458.65	364.75	23.	-3.	-0.001	268.05	1.170s
BE-7	1912.01	478.08	11.	5.	0.003	103.91	1.282s
CS-134	2257.34	564.41	20.	-2.	-0.001	258.45	1.364s
TL-208	2331.87	583.04	0.	62.	0.034	12.70	0.857s
CS-134	2420.98	605.32	35.	-7.	-0.004	125.07	1.403s
BI-214	2435.70	609.00	4.	84.	0.046	12.35	1.507
I-131	2548.81	637.27	11.	5.	0.003	109.49	1.433s
CS-137	2646.57	661.71	20.	12.	0.007	59.09	1.455s
BI-212	2907.00	726.82	22.	12.	0.007	61.03	1.515s
EU-152	3125.80	781.52	17.	-5.	-0.003	122.87	1.561s
BI-212	3142.02	785.57	15.	6.	0.003	99.51	1.567s
CS-134	3207.51	801.94	12.	-2.	-0.001	315.29	1.581s
TL-208	3441.41	860.42	13.	12.	0.007	50.04	1.632s
EU-154	3492.78	873.26	11.	5.	0.003	113.16	1.643s
AC-228	3645.39	911.41	4.	55.	0.031	15.75	0.832s
Pa-234	3784.10	946.09	14.	1.	0.001	422.80	1.704s
AC-228	3874.71	968.74	19.	17.	0.009	45.01	1.724s
EU-154	3973.55	993.45	12.	-1.	0.000	607.26	1.746s
EU-154	4017.52	1004.44	18.	-4.	-0.002	179.27	1.753s
EU-152	4447.13	1111.85	12.	-3.	-0.002	179.82	1.839s
BI-214	4481.34	1120.40	10.	11.	0.006	49.15	1.845s
CO-60	5330.87	1332.79	6.	1.	0.001	363.34	2.005s
EU-152	5629.93	1407.56	5.	3.	0.002	123.35	2.059s
K-40	5843.88	1461.05	10.	91.	0.050	10.91	2.095s
BI-214	7060.01	1765.10	6.	9.	0.005	49.83	2.290s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	1.3448E+00				5.31E+01		
			477.60	1.345E+00	?(	4.882E+00	1.04E+02 1.05E+01 G	
K-40	N	6.4662E+01				4.66E+11		
			1460.83	6.466E+01	?(P	1.233E+01	1.09E+01 1.07E+01 G	

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-60	F	6.7764E-02					1.93E+03	
			1332.50	6.776E-02	?(	9.684E-01	3.63E+02	1.00E+02 G
			1173.24	0.000E+00	-	4.590E-01	1.00E+03	9.99E+01 G
I-131	I	2.4527E-01					8.02E+00	
			364.48	-6.974E-02	?(	6.725E-01	2.68E+02	8.17E+01 G
			284.30	1.995E+00	&(	8.186E+00	1.19E+02	6.14E+00 G
			636.97	2.337E+00	?(	8.998E+00	1.09E+02	7.17E+00 G
CS-134	I	-2.4704E-01					7.54E+02	
			604.71	-2.470E-01	?(	1.066E+00	1.25E+02	9.76E+01 G
			795.87	9.752E-03	%	1.118E+00	3.06E+03	8.55E+01 G
			569.32	-1.634E-02	%	3.960E+00	6.30E+03	1.54E+01 G
			801.95	-8.184E-01	+	9.610E+00	3.15E+02	8.69E+00 G
			563.24	-9.646E-01	+	9.012E+00	2.58E+02	8.35E+00 G
CS-137	I	5.2939E-01					1.10E+04	
			661.66	5.294E-01	(	1.019E+00	5.91E+01	8.52E+01 G
EU-152	F	3.5098E-01					4.94E+03	
			344.29	0.000E+00	?(	2.087E+00	1.00E+03	2.65E+01 G
			121.78	2.187E-02	&	1.015E+00	1.28E+03	2.86E+01 G
			778.92	-1.712E+00	+	7.370E+00	1.23E+02	1.29E+01 G
			964.11	0.000E+00	?(	1.687E+01	1.00E+03	1.46E+01 G
			1112.07	-1.259E+00	+	8.227E+00	1.80E+02	1.36E+01 G
			1408.00	1.038E+00	?(	4.670E+00	1.23E+02	2.10E+01 G
EU-154	I	1.7559E+00					3.14E+03	
			873.23	1.756E+00	&(	7.008E+00	1.13E+02	1.23E+01 G
			123.10	7.721E-02	&	8.634E-01	3.18E+02	4.08E+01 G
			1274.54	0.000E+00	-	1.405E+00	1.00E+03	3.52E+01 G
			723.36	6.950E-04	%	5.690E+00	2.25E+05	2.02E+01 G
			1004.77	-1.058E+00	-	6.781E+00	1.79E+02	1.80E+01 G
			996.33	-4.167E-01	&	9.572E+00	6.07E+02	1.06E+01 G
EU-155	I	1.4376E+00					1.81E+03	
			105.31	6.998E-01	?(	1.460E+00	6.33E+01	2.12E+01 G
			86.54	1.947E+00	&(	1.719E+00	2.86E+01	3.07E+01 G
TL-208	N	2.4428E+00					6.98E+02	
			583.02	2.443E+00	(	2.904E-01	1.27E+01	8.45E+01 G
			277.28	5.254E-02	%	6.697E+00	3.44E+03	6.31E+00 G
			860.56	4.646E+00	+	7.318E+00	5.00E+01	1.24E+01 G
PB-210	N	1.2490E+01					8.14E+03	
			46.54	1.249E+01	(P	1.700E+01	2.83E+01	4.25E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	7.5927E+00					6.98E+02	
			238.63	7.593E+00	(P	1.091E+00	8.22E+00	4.33E+01 G
			300.03	1.172E+01	+ P	1.056E+01	3.44E+01	3.28E+00 G
PB-214	N	7.9524E+00					5.84E+05	
			351.93	7.657E+00	(P	1.215E+00	9.88E+00	3.76E+01 G
			295.09	8.528E+00	*(P	2.613E+00	1.59E+01	1.93E+01 G
			242.00	1.059E+01	+ P	4.553E+00	1.93E+01	7.43E+00 G
BI-212	N	8.5776E+00					6.98E+02	
			727.17	6.554E+00	?(	1.310E+01	6.10E+01	7.55E+00 G
			785.42	2.051E+01	?(	7.057E+01	9.95E+01	1.28E+00 G
BI-214	N	6.0737E+00					5.84E+05	
			609.31	6.283E+00	(	9.320E-01	1.24E+01	4.61E+01 G
			1120.29	4.509E+00	-	6.900E+00	4.91E+01	1.51E+01 G
			1764.49	5.447E+00	?(	8.318E+00	4.98E+01	1.54E+01 G
AC-228	N	9.8536E+00					2.10E+03	
			911.07	9.390E+00	(	2.054E+00	1.57E+01	2.90E+01 G
			968.97	4.963E+00	&	6.980E+00	4.50E+01	1.75E+01 G
			338.32	1.097E+01	(	1.975E+00	1.40E+01	1.20E+01 G
								Energy duplication
			93.35	6.610E+00	-	9.167E+00	4.31E+01	5.56E+00 XA
Pa-234	N	1.0144E-01					1.63E+12	
			131.29	-1.922E-01	&(	2.468E+00	3.70E+02	1.80E+01 G
			569.47	-9.604E-04	%	6.129E+00	1.60E+05	8.20E+00 G
			946.02	4.959E-01	?(	7.794E+00	4.23E+02	1.34E+01 G
			883.24	0.000E+00	-	8.302E+00	1.00E+03	9.60E+00 G
			880.53	0.000E+00	-	5.898E+00	1.00E+03	6.00E+00 G
TH-234	N	9.1602E+00					1.63E+12	
			63.29	1.229E+01	@(P	1.638E+01	3.06E+01	3.81E+00 G
			92.59	7.025E+00	(P	9.270E+00	2.35E+01	5.58E+00 G
PA-234M	N	2.8011E+00					1.63E+12	
			1001.00	2.801E+00	%(	1.380E+02	1.31E+03	8.37E-01 G
			766.41	-1.667E+00	&	3.094E+02	4.93E+03	2.94E-01 G
U-235	N	5.6539E-01					2.57E+11	
			143.79	6.147E-01	(P	3.806E+00	1.09E+02	1.10E+01 G
			205.33	-1.856E+00	+	9.588E+00	1.50E+02	5.01E+00 G
			163.38	4.590E-01	?(P	7.060E+00	2.64E+02	5.08E+00 G
								Energy duplication
			93.35	1.308E+01	*	7.151E+00	1.93E+01	5.81E+00 X

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AM-241	T -4.1410E-01					1.58E+05	
		59.54	-4.141E-01	?(	2.090E+00	1.48E+02	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
AM-241	59.46	103.	-10.	-0.006	148.31	-4.141E-01	
EU-155	87.31	104.	57.	0.032	28.60	1.947E+00	
U-235	93.35	67.	75.	0.042	19.33	1.308E+01	
EU-155	104.54	38.	15.	0.008	63.35	6.998E-01	
EU-154	123.18	49.	3.	0.002	318.42	7.721E-02	
Pa-234	131.56	78.	-3.	-0.002	369.55	-1.922E-01	
U-235	144.07	63.	6.	0.004	109.15	6.147E-01	P
U-235	163.73	37.	2.	0.001	263.80	4.590E-01	P
U-235	205.90	49.	-7.	-0.004	149.69	-1.856E+00	
I-131	284.24	30.	7.	0.004	118.85	1.995E+00	
I-131	364.75	23.	-3.	-0.001	268.05	-6.974E-02	
BE-7	478.08	11.	5.	0.003	103.91	1.345E+00	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	564.41	20.	-2.	-0.001	258.45	-9.646E-01	
CS-134	605.32	35.	-7.	-0.004	125.07	-2.470E-01	
I-131	637.27	11.	5.	0.003	109.49	2.337E+00	
CS-137	661.71	20.	12.	0.007	59.09	5.294E-01	
BI-212	726.82	22.	12.	0.007	61.03	6.554E+00	
EU-152	781.52	17.	-5.	-0.003	122.87	-1.712E+00	
BI-212	785.57	15.	6.	0.003	99.51	2.051E+01	
CS-134	801.94	12.	-2.	-0.001	315.29	-8.184E-01	
EU-154	873.26	11.	5.	0.003	113.16	1.756E+00	
Pa-234	946.09	14.	1.	0.001	422.80	4.959E-01	
EU-154	993.45	12.	-1.	0.000	607.26	-4.167E-01	
EU-154	1004.44	18.	-4.	-0.002	179.27	-1.058E+00	
EU-152	1111.85	12.	-3.	-0.002	179.82	-1.259E+00	
CO-60	1332.79	6.	1.	0.001	363.34	6.776E-02	
EU-152	1407.56	5.	3.	0.002	123.35	1.038E+00	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

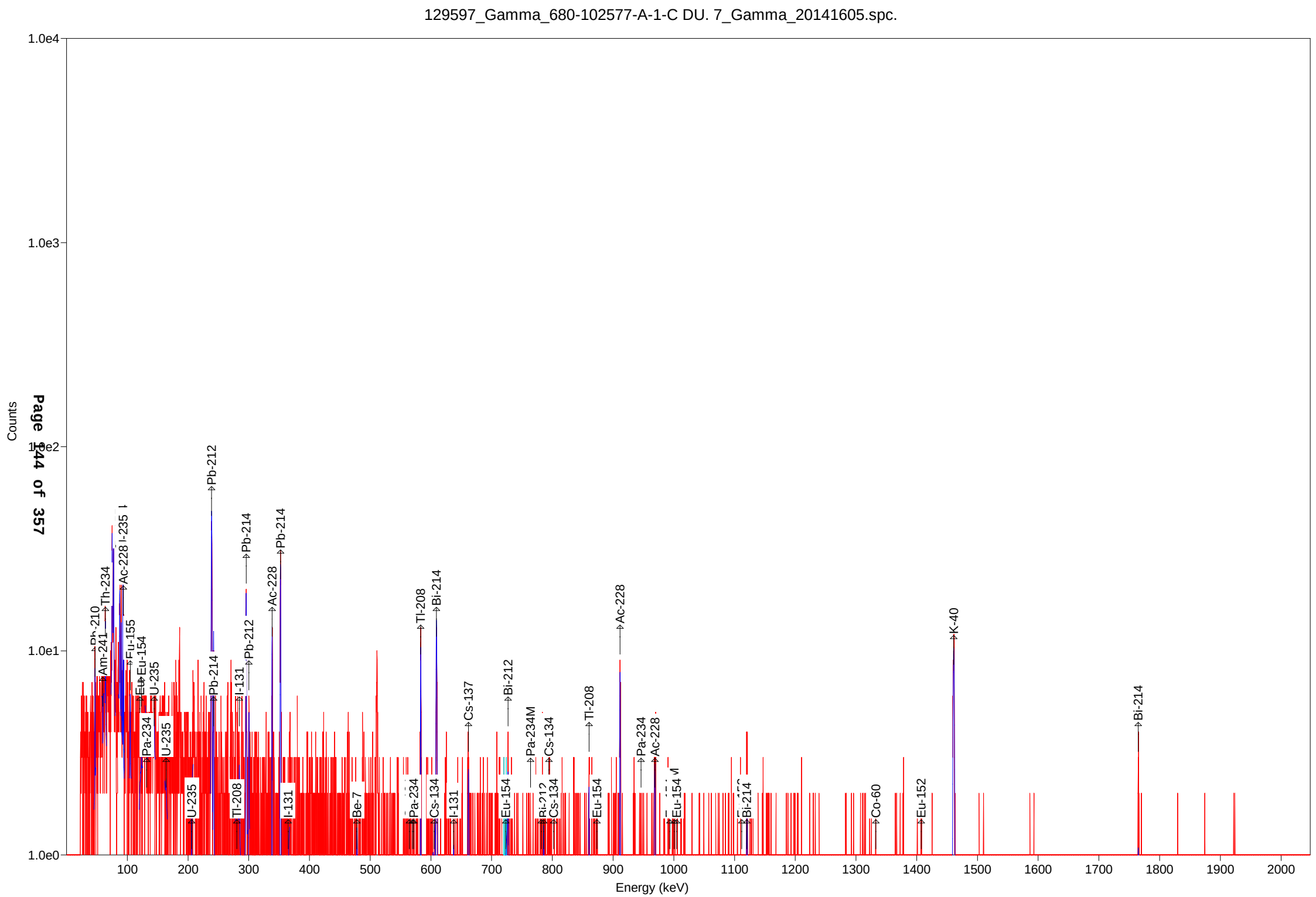
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	1.3448E+00	1.3448E+00	1.039E+02%	4.88E+00
K-40	#	6.4662E+01	6.4662E+01	1.137E+01%	1.23E+01
CO-60	#A	6.7764E-02	6.7764E-02	3.633E+02%	9.68E-01
I-131	#A	2.4527E-01	2.4527E-01	1.043E+02%	6.72E-01
CS-134	#A	-2.4704E-01	-2.4704E-01	1.251E+02%	1.07E+00
CS-137	#A	5.2939E-01	5.2939E-01	5.909E+01%	1.02E+00
EU-152	#A	3.5098E-01	3.5098E-01	1.233E+02%	2.09E+00
EU-154	#A	1.7559E+00	1.7559E+00	1.132E+02%	7.01E+00
EU-155	#A	1.4376E+00	1.4376E+00	2.860E+01%	1.46E+00
TL-208		2.4428E+00	2.4428E+00	1.270E+01%	2.90E-01
PB-210	A	1.2490E+01	1.2490E+01	4.540E+01%	1.70E+01
PB-212		7.5927E+00	7.5927E+00	8.513E+00%	1.09E+00
PB-214		7.9524E+00	7.9524E+00	9.606E+00%	1.22E+00
BI-212	#A	8.5776E+00	8.5776E+00	5.837E+01%	1.31E+01
BI-214		6.0737E+00	6.0737E+00	1.235E+01%	9.32E-01
AC-228		9.8536E+00	9.8536E+00	1.054E+01%	2.05E+00
Pa-234	#A	1.0144E-01	1.0144E-01	2.808E+02%	2.47E+00
TH-234	A	9.1602E+00	9.1602E+00	3.096E+01%	1.64E+01
PA-234M	#A	2.8011E+00	2.8011E+00	1.315E+03%	1.38E+02
U-235	#A	5.6539E-01	5.6539E-01	1.767E+02%	3.81E+00
AM-241	#A	-4.1410E-01	-4.1410E-01	1.483E+02%	2.09E+00

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

--------------------------- S U M M A R Y ---------------------------

Total Activity (238.6 to 2000.1 keV)   5.557E+01 Bq/Sample
Total Decayed Activity (238.6 to 2000.1 keV) 5.5565060E+01 Bq/Sample

The library has energies which are not separable.


129597_Gamma_680-102577-A-1-C DU. 7_Gamma_20141605.spc.
Counts
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Energy (keV)
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Pb-210
Th-234
Am-241
Ac-228
I-235
Eu-155
Eu-154
U-235
Pa-234
Pb-212
Pb-214
I-131
Tl-208
Be-7
Cs-134
Cs-137
Bi-212
Pa-234M
Bi-214
K-40
Co-60
Eu-152

Test America St. Louis Spectrum ID: 8_Gamma_20140457

Sample Description: 129597_Gamma_680-102577-A-2-B
Detector: Ge 8 SN/174
Batch ID: 129597
Work Order Number: Gamma
Lot Number: 680-102577-A-2-B

Decay to Time: 7/24/2014 02:40 Live Time: 1800 sec
Acquisition Time: 7/24/2014 02:40:55 Real Time: 1855 sec
Analysis Time: 7/24/2014 03:12 Dead Time: 2.96 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 8_Soil_TunaCan.Clb
Efficiency Cal Desc: 8_Soil_TunaCan_90099_032712
Efficiency Cal Date: 3/28/2012 10:35
Energy Cal Date: 2/28/2012 10:34
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 8_2014-07-12_0348.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-4.594E-01	470.0	2.159E+00	2.159E+00	7.902E+00
K-40	1.259E+02	8.3	1.041E+01	1.224E+01	9.034E+00
CO-60	1.006E-02	3698.0	3.721E-01	3.721E-01	1.594E+00
I-131	-5.472E-02	420.9	2.303E-01	2.304E-01	8.391E-01
CS-134	-3.035E-01	105.9	3.214E-01	3.218E-01	1.528E+00
CS-137	-2.785E-01	970.6	2.703E+00	2.703E+00	1.465E+00
EU-152	9.302E-01	89.0	8.276E-01	8.290E-01	2.638E+00
EU-154	7.695E-01	75.0	5.767E-01	5.780E-01	7.528E+00
EU-155	1.557E+00	51.3	7.982E-01	8.028E-01	2.590E+00
TL-208	4.016E+00	13.5	5.410E-01	5.797E-01	7.783E-01
PB-210	1.264E+01	61.0	7.710E+00	7.746E+00	2.535E+01
PB-212	1.227E+01	8.9	1.091E+00	1.349E+00	1.957E+00
PB-214	7.402E+00	12.0	8.878E-01	9.675E-01	1.634E+00
BI-212	8.579E+00	46.6	3.993E+00	4.018E+00	1.236E+01
BI-214	7.867E+00	12.9	1.018E+00	1.097E+00	1.660E+00
AC-228	1.204E+01	11.0	1.324E+00	1.460E+00	2.410E+00
Pa-234	1.113E+00	101.2	1.127E+00	1.128E+00	2.561E+00
TH-234	1.432E+01	30.4	4.351E+00	4.415E+00	2.738E+01
PA-234M	1.773E+01	232.5	4.122E+01	4.123E+01	1.602E+02
U-235	-1.284E+00	875.5	1.125E+01	1.125E+01	7.353E+00
AM-241	-7.936E-01	850.0	6.746E+00	6.746E+00	2.768E+00
Total	2.271E+02				

Analyst: Siobhan Perry

TestAmerica Spectrum name: 8_Gamma_20140457.An1

Sample description
129597_Gamma_680-102577-A-2-B

Spectrum Filename: C:\User\SPC\Det8\8_Gamma_20140457.An1

Acquisition information
Start time: 7/24/2014 2:40:55 AM
Live time: 1800
Real time: 1855
Dead time: 2.96 %
Detector ID: 8

Detector system
Ge 8 SN/174

Calibration
Filename: 8_Soil_TunaCan.Clb
8_Soil_TunaCan_90099_032712

Energy Calibration
Created: 2/28/2012 10:34:41 AM
Zero offset: 0.052 keV
Gain: 0.250 keV/channel
Quadratic: 5.282E-10 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 10:35:20 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.39 %
Log(Eff): -1.098764E-01 + (-4.958544E-01*Log(E)) + (-2.572270E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.71 %
Log(Eff): -2.525301E+01 + (9.398253E+00*Log(E)) + (-1.000034E+00*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.55keV)
Stop channel: 8000 (1999.96keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	7/24/2014 2:40:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	8_2014-07-12_0348.PBC 7/12/2014 3:48:07 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 21 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1154

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.78	19.	60.98	1.01	2.005E-02	46.54	4.250	PBC<MDA	PB210
63.47	78.	22.99	1.01	3.103E-02	63.29	3.810	PBC<MDA	TH234
74.63	124.	14.30	1.03	3.608E-02				
77.19	191.	9.61	1.04	3.700E-02				
89.16	6.	273.42	1.04	3.961E-02	86.54	30.700	PBC<MDA	EU155
					86.54	30.700	2.623E-01	EU155
89.76	42.	29.78	1.05	4.025E-02				
92.65	108.	15.62	1.05	4.073E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	2.648E+01	AC228
93.36	11.	134.03	1.05	4.083E-02	93.35	5.810	PBC<MDA	U235
105.31	25.	51.27	1.06	4.185E-02	105.31	21.200	PBC<MDA	EU155
					105.31	21.200	1.557E+00	EU155
121.73	12.	100.53	1.07	4.148E-02	121.78	28.580	PBC<MDA	EU152
122.88	16.	75.43	1.07	4.138E-02	123.10	40.790	PBC<MDA	EU154
128.49	2.	604.58	1.08	4.061E-02	131.29	18.000	PBC<MDA	Pa234
238.61	270.	8.65	1.03	2.744E-02	238.63	43.300	1.227E+01	PB212
241.84	58.	21.92	1.60	2.714E-02	242.00	7.430	1.595E+01	PB214
277.26	30.	30.74	1.19	2.440E-02	277.28	6.310	1.089E+01	TL208
295.41	101.	13.56	0.77	2.322E-02	295.09	19.300	1.207E+01	PB214
299.76	13.	39.47	0.32	2.294E-02	300.03	3.280	PBC<MDA	PB212
338.26	58.	15.88	0.35	2.086E-02	338.32	12.010	1.294E+01	AC228
351.78	101.	11.21	1.26	2.021E-02	351.93	37.600	7.402E+00	PB214
563.55	2.	255.00	1.39	1.381E-02	563.24	8.350	PBC<MDA	CS134
583.06	82.	13.47	0.99	1.342E-02	583.02	84.500	4.016E+00	TL208
608.96	84.	12.42	1.30	1.294E-02	609.31	46.090	7.867E+00	BI214
665.71	-5.	421.68	1.46	1.209E-02	661.66	85.210	PBC<MDA	CS137

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
727.23	13.	46.55	1.50	1.118E-02	727.17	7.550	PBC<MDA	BI212
767.90	-3.	414.13	1.53	1.070E-02	766.41	0.294	PBC<MDA	PA234M
860.77	13.	48.05	1.59	9.703E-03	860.56	12.420	PBC<MDA	TL208
875.13	3.	129.54	1.59	9.584E-03	873.23	12.270	PBC<MDA	EU154
880.78	4.	101.19	1.60	9.517E-03	880.53	6.000	PBC<MDA	Pa234
911.14	66.	12.31	0.86	9.246E-03	911.07	29.000	1.367E+01	AC228
964.52	8.	88.97	1.65	8.814E-03	964.11	14.605	PBC<MDA	EU152
969.18	16.	43.86	1.65	8.776E-03	968.97	17.460	PBC<MDA	AC228
1000.96	2.	89.15	1.67	8.537E-03	1001.00	0.837	PBC<MDA	PA234M
1119.70	10.	56.19	1.74	7.754E-03	1120.29	15.100	PBC<MDA	BI214
1331.92	0.	86.62	1.86	6.678E-03	1332.50	99.980	PBC<MDA	CO60
1460.80	149.	8.11	1.67	6.165E-03	1460.83	10.670	1.259E+02	K40
1764.50	19.	24.43	2.07	5.226E-03	1764.49	15.400	1.288E+01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
298.32	74.57	94.	124.	3.425E+03	14.30	1.034	-	D
308.56	77.13	74.	191.	5.174E+03	9.61	1.036	-	D
358.92	89.78	48.	33.	8.245E+02	34.20	0.517	-	sM

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV	
PB-210	186.91	46.78	60.	19.	0.011	60.98	1.012	s
AM-241	232.23	58.11	110.	-15.	-0.008	472.73	1.022	s
TH-234	253.11	63.33	141.	32.	0.018	29.27	1.025	
EU-155	356.44	89.16	120.	6.	0.003	273.42	1.043	s
TH-234	370.17	92.59	145.	56.	0.031	16.06	1.048	D
AC-228	373.21	93.35	70.	49.	0.027	11.43	1.049	D
U-235	373.21	93.35	188.	11.	0.006	134.03	1.049	D
EU-155	421.04	105.31	69.	25.	0.014	51.27	1.058	s
EU-152	486.73	121.73	69.	12.	0.007	100.53	1.071	s
EU-154	491.34	122.88	62.	16.	0.009	75.43	1.072	
Pa-234	513.78	128.49	44.	2.	0.001	604.58	1.078	
U-235	574.97	143.79	134.	-10.	-0.005	518.82	1.087	s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	821.57	205.43	67.	-7.	-0.004	549.29	1.134s
PB-212	954.29	238.61	71.	262.	0.146	8.65	1.026
PB-214	967.20	241.84	36.	58.	0.032	21.92	1.597s
TL-208	1108.88	277.26	28.	30.	0.017	30.74	1.188
I-131	1137.87	284.50	30.	-2.	-0.001	370.22	1.193s
PB-214	1181.51	295.41	22.	97.	0.054	13.56	0.770s
PB-212	1198.89	299.76	5.	13.	0.007	39.47	0.322s
AC-228	1352.92	338.26	9.	58.	0.032	15.88	0.347s
PB-214	1407.00	351.78	18.	101.	0.056	11.21	1.262
I-131	1455.65	363.94	21.	-2.	-0.001	420.92	1.252s
BE-7	1912.87	478.24	20.	-1.	-0.001	470.03	1.332s
CS-134	2254.12	563.55	16.	2.	0.001	255.00	1.391s
TL-208	2332.16	583.06	8.	82.	0.046	13.47	0.995s
CS-134	2425.77	606.46	48.	-10.	-0.005	105.91	1.419s
BI-214	2435.78	608.96	11.	84.	0.047	12.42	1.298
I-131	2548.96	637.26	20.	-1.	-0.001	643.08	1.441s
CS-137	2662.78	665.71	28.	-5.	-0.003	421.68	1.457s
BI-212	2908.85	727.23	12.	13.	0.007	46.55	1.500s
EU-152	3118.59	779.66	17.	-2.	-0.001	273.59	1.534s
BI-212	3143.53	785.89	20.	-2.	-0.001	293.30	1.538s
TL-208	3443.07	860.77	13.	13.	0.007	48.05	1.585s
EU-154	3500.48	875.13	8.	3.	0.002	129.54	1.593s
Pa-234	3523.10	880.78	7.	4.	0.002	101.19	1.598s
AC-228	3644.87	911.22	4.	56.	0.031	15.21	0.849s
EU-152	3858.08	964.52	20.	8.	0.004	88.97	1.649s
AC-228	3876.70	969.18	16.	16.	0.009	43.86	1.652s
PA-234M	4003.84	1000.96	15.	2.	0.001	89.15	1.671s
EU-154	4018.73	1004.68	19.	-3.	-0.001	240.59	1.673s
BI-214	4478.83	1119.70	10.	10.	0.005	56.19	1.740s
EU-154	5112.32	1278.07	8.	-2.	-0.001	221.97	1.826s
EU-152	5649.59	1412.38	5.	-1.	-0.001	283.12	1.896s
K-40	5843.26	1460.80	3.	149.	0.083	8.11	1.672
BI-214	7058.11	1764.50	1.	19.	0.010	24.43	2.067s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Peak Code	Peak MDA Value Bq/Sample	COMMENTS
BE-7	C	-4.5938E-01				5.31E+01	
			477.60	-4.594E-01	?(	7.902E+00	4.70E+02 1.05E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
K-40	N	1.2589E+02					4.66E+11	
			1460.83	1.259E+02	(P	9.034E+00	8.11E+00	1.07E+01 G
CO-60	F	1.0062E-02					1.93E+03	
			1332.50	1.006E-02	%(P	1.594E+00	8.66E+01	1.00E+02 G
			1173.24	-4.617E-01	% P	1.854E+00	2.20E+03	9.99E+01 G
I-131	I	-5.4722E-02					8.02E+00	
			364.48	-5.472E-02	?(	8.391E-01	4.21E+02	8.17E+01 G
			284.30	-7.998E-01	+	1.061E+01	3.70E+02	6.14E+00 G
			636.97	-6.194E-01	+	1.465E+01	6.43E+02	7.17E+00 G
CS-134	I	-3.0352E-01					7.54E+02	
			604.71	-4.240E-01	?(	1.528E+00	1.06E+02	9.76E+01 G
			795.87	0.000E+00	+	9.302E-01	1.00E+03	8.55E+01 G
			569.32	-1.200E-01	%	6.429E+00	1.45E+03	1.54E+01 G
			801.95	-6.159E-02	%	1.216E+01	5.17E+03	8.69E+00 G
			563.24	1.105E+00	?(	1.027E+01	2.55E+02	8.35E+00 G
CS-137	I	-2.7846E-01					1.10E+04	
			661.66	-2.785E-01	?(P	1.465E+00	4.22E+02	8.52E+01 G
EU-152	F	9.3018E-01					4.94E+03	
			344.29	-2.237E-02	%(	2.638E+00	3.21E+03	2.65E+01 G
			121.78	5.702E-01	&(	1.937E+00	1.01E+02	2.86E+01 G
			778.92	-8.873E-01	+	8.853E+00	2.74E+02	1.29E+01 G
			964.11	3.363E+00	?(	1.019E+01	8.90E+01	1.46E+01 G
			1112.07	-3.992E-03	%	9.035E+00	5.79E+04	1.36E+01 G
			1408.00	-5.059E-01	+	5.597E+00	2.83E+02	2.10E+01 G
EU-154	I	7.6946E-01					3.14E+03	
			873.23	1.611E+00	?(	7.528E+00	1.30E+02	1.23E+01 G
			123.10	5.162E-01	?(	1.298E+00	7.54E+01	4.08E+01 G
			1274.54	-4.269E-01	-	3.565E+00	2.22E+02	3.52E+01 G
			723.36	4.131E-03	%	3.388E+00	2.00E+04	2.02E+01 G
			1004.77	-9.617E-01	+	8.354E+00	2.41E+02	1.80E+01 G
			996.33	0.000E+00	-	1.734E+01	1.00E+03	1.06E+01 G
EU-155	I	1.5567E+00					1.81E+03	
			105.31	1.557E+00	(	2.590E+00	5.13E+01	2.12E+01 G
			86.54	2.623E-01	-	2.459E+00	2.73E+02	3.07E+01 G
TL-208	N	4.0163E+00					6.98E+02	
			583.02	4.016E+00	(	7.783E-01	1.35E+01	8.45E+01 G
			277.28	1.089E+01	+	9.867E+00	3.07E+01	6.31E+00 G
			860.56	5.998E+00	+	9.006E+00	4.81E+01	1.24E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-210	N	1.2644E+01					8.14E+03	
			46.54	1.264E+01	(	2.535E+01	6.10E+01	4.25E+00 G
PB-212	N	1.2270E+01					6.98E+02	
			238.63	1.227E+01	(P	1.957E+00	8.65E+00	4.33E+01 G
			300.03	9.600E+00	-	9.696E+00	3.95E+01	3.28E+00 G
PB-214	N	7.4022E+00					5.84E+05	
			351.93	7.402E+00	(P	1.634E+00	1.12E+01	3.76E+01 G
			295.09	1.207E+01	+ P	3.016E+00	1.36E+01	1.93E+01 G
			242.00	1.595E+01	+ P	8.460E+00	2.19E+01	7.43E+00 G
BI-212	N	8.5785E+00					6.98E+02	
			727.17	8.579E+00	?(	1.236E+01	4.65E+01	7.55E+00 G
			785.42	-9.188E+00	-	9.767E+01	2.93E+02	1.28E+00 G
BI-214	N	7.8669E+00					5.84E+05	
			609.31	7.867E+00	(P	1.660E+00	1.24E+01	4.61E+01 G
			1120.29	4.600E+00	-	8.275E+00	5.62E+01	1.51E+01 G
			1764.49	1.288E+01	+	5.184E+00	2.44E+01	1.54E+01 G
AC-228	N	1.2042E+01					2.10E+03	
			911.07	1.167E+01	(	2.410E+00	1.52E+01	2.90E+01 G
			968.97	5.676E+00	-	7.686E+00	4.39E+01	1.75E+01 G
			338.32	1.294E+01	(	3.644E+00	1.59E+01	1.20E+01 G
							Energy duplication	
			93.35	1.204E+01	}	1.018E+01	1.14E+01	5.56E+00 XA
Pa-234	N	1.1133E+00					1.63E+12	
			131.29	1.193E-01	?(	2.561E+00	6.05E+02	1.80E+01 G
			569.47	7.862E-02	%	1.154E+01	3.95E+03	8.20E+00 G
			946.02	0.000E+00	-	1.073E+01	1.00E+03	1.34E+01 G
			883.24	0.000E+00	-	9.915E+00	1.00E+03	9.60E+00 G
			880.53	4.095E+00	?(	1.460E+01	1.01E+02	6.00E+00 G
TH-234	N	1.4319E+01					1.63E+12	
			63.29	1.529E+01	?(P	2.738E+01	2.93E+01	3.81E+00 G
			92.59	1.366E+01	(P	1.438E+01	1.61E+01	5.58E+00 G
PA-234M	N	1.7730E+01					1.63E+12	
			1001.00	1.773E+01	?(P	1.602E+02	8.92E+01	8.37E-01 G
			766.41	-4.447E+01	% P	4.006E+02	4.14E+02	2.94E-01 G
U-235	N	-1.2844E+00					2.57E+11	
			143.79	-1.284E+00	&(P	7.353E+00	5.19E+02	1.10E+01 G
			205.33	-2.609E+00	& P	1.468E+01	5.49E+02	5.01E+00 G
			163.38	-1.659E+00	& P	1.665E+01	1.00E+03	5.08E+00 G
							Energy duplication	
			93.35	2.528E+00	}	1.562E+01	1.34E+02	5.81E+00 X

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
AM-241	T -7.9359E-01				1.58E+05	
		59.54	-7.936E-01	&(P	2.768E+00	4.73E+02 3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	46.78	60.	19.	0.011	60.98	1.264E+01	
AM-241	58.11	110.	-15.	-0.008	472.73	-7.936E-01	P
EU-155	89.16	120.	6.	0.003	273.42	2.623E-01	
EU-155	105.31	69.	25.	0.014	51.27	1.557E+00	
EU-152	121.73	69.	12.	0.007	100.53	5.702E-01	
EU-154	122.88	62.	16.	0.009	75.43	5.162E-01	
Pa-234	128.49	44.	2.	0.001	604.58	1.193E-01	
I-131	284.50	30.	-2.	-0.001	370.22	-7.998E-01	
I-131	363.94	21.	-2.	-0.001	420.92	-5.472E-02	
BE-7	478.24	20.	-1.	-0.001	470.03	-4.594E-01	
CS-134	563.55	16.	2.	0.001	255.00	1.105E+00	
CS-134	606.46	48.	-10.	-0.005	105.91	-4.240E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
I-131	637.26	20.	-1.	-0.001	643.08	-6.194E-01		
CS-137	665.71	28.	-5.	-0.003	421.68	-2.785E-01	P	
EU-152	779.66	17.	-2.	-0.001	273.59	-8.873E-01		
EU-154	875.13	8.	3.	0.002	129.54	1.611E+00		
Pa-234	880.78	7.	4.	0.002	101.19	4.095E+00		
EU-152	964.52	20.	8.	0.004	88.97	3.363E+00		
PA-234M	1000.96	15.	2.	0.001	89.15	1.773E+01	P	
EU-154	1004.68	19.	-3.	-0.001	240.59	-9.617E-01		
EU-154	1278.07	8.	-2.	-0.001	221.97	-4.269E-01		
EU-152	1412.38	5.	-1.	-0.001	283.12	-5.059E-01		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

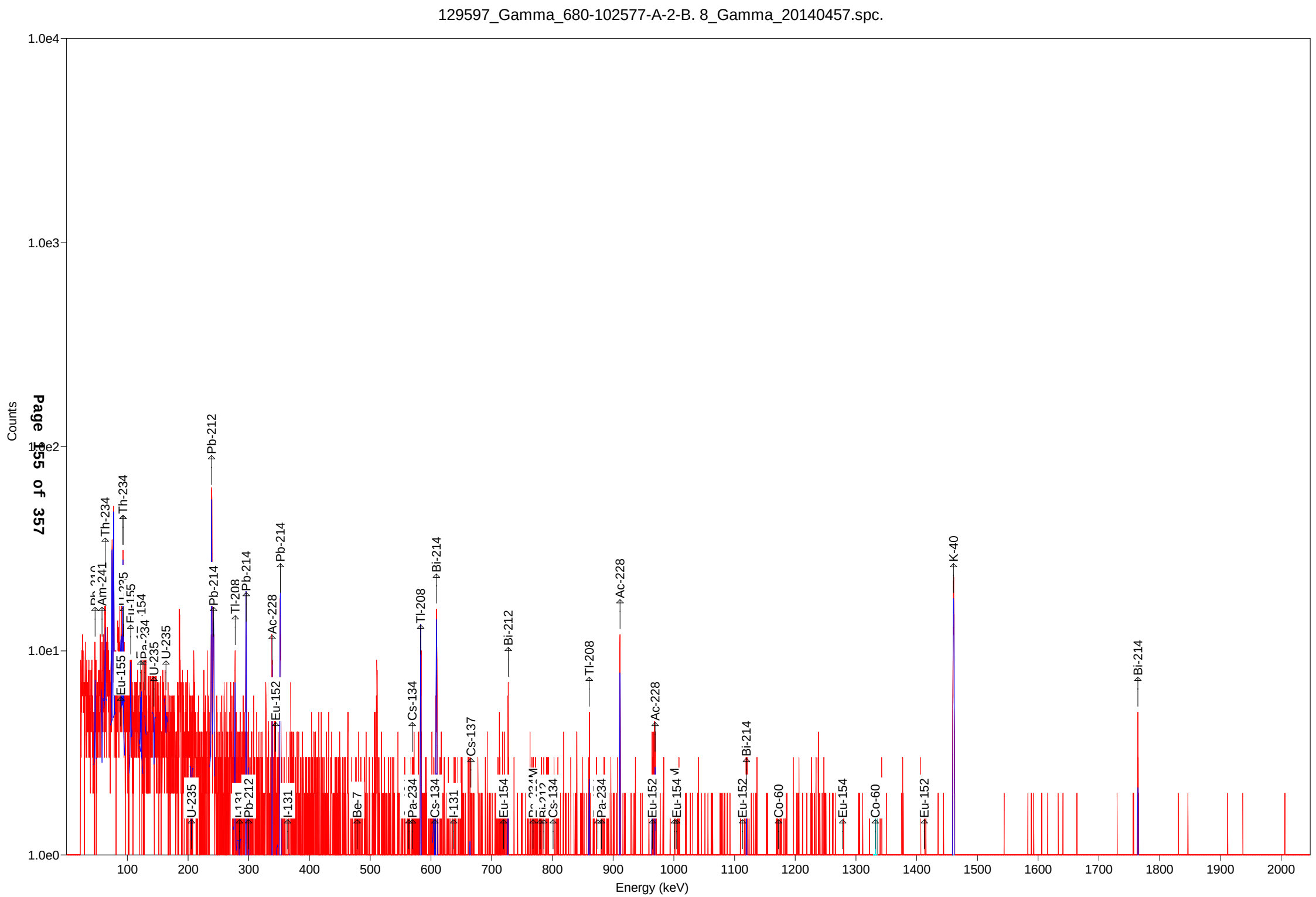
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	-4.5938E-01	-4.5938E-01	4.700E+02%	7.90E+00
K-40		1.2589E+02	1.2589E+02	8.271E+00%	9.03E+00
CO-60	#A	1.0062E-02	1.0062E-02	3.698E+03%	1.59E+00
I-131	#A	-5.4719E-02	-5.4722E-02	4.209E+02%	8.39E-01
CS-134	#A	-3.0352E-01	-3.0352E-01	1.059E+02%	1.53E+00
CS-137	#A	-2.7846E-01	-2.7846E-01	9.706E+02%	1.46E+00
EU-152	#A	9.3018E-01	9.3018E-01	8.897E+01%	2.64E+00
EU-154	#A	7.6946E-01	7.6946E-01	7.495E+01%	7.53E+00
EU-155	#A	1.5567E+00	1.5567E+00	5.127E+01%	2.59E+00
TL-208		4.0163E+00	4.0163E+00	1.347E+01%	7.78E-01
PB-210	#A	1.2644E+01	1.2644E+01	6.098E+01%	2.53E+01
PB-212		1.2270E+01	1.2270E+01	8.889E+00%	1.96E+00
PB-214		7.4022E+00	7.4022E+00	1.199E+01%	1.63E+00
BI-212	#A	8.5785E+00	8.5785E+00	4.655E+01%	1.24E+01
BI-214		7.8669E+00	7.8669E+00	1.294E+01%	1.66E+00
AC-228		1.2042E+01	1.2042E+01	1.099E+01%	2.41E+00
Pa-234	#A	1.1133E+00	1.1133E+00	1.012E+02%	2.56E+00
TH-234	A	1.4319E+01	1.4319E+01	3.038E+01%	2.74E+01
PA-234M	#A	1.7730E+01	1.7730E+01	2.325E+02%	1.60E+02
U-235	A	-1.2844E+00	-1.2844E+00	8.755E+02%	7.35E+00
AM-241	#A	-7.9359E-01	-7.9359E-01	8.500E+02%	2.77E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (143.5 to 2000.0 keV)	1.924E+02	Bq/Sample
Total Decayed Activity (143.5 to 2000.0 keV)	1.9238446E+02	Bq/Sample

The library has energies which are not separable.


129597_Gamma_680-102577-A-2-B. 8_Gamma_20140457.spc.
Counts
Energy (keV)
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Th-234
Th-234
Am-241
Eu-155
Eu-155
Pa-234
U-235
U-235
Pb-212
Pb-214
Tl-208
Pb-214
Ac-228
Pb-214
Eu-152
Cs-134
Tl-208
Bi-214
Bi-212
Cs-137
Tl-208
Ac-228
Ac-228
Eu-152
Bi-214
Co-60
Eu-154
Co-60
Eu-152
K-40
Bi-214
U-235
Pb-212
I-131
Be-7
Pa-234
Cs-134
I-131
Eu-154
Pa-234
Cs-134
Eu-152
Eu-154
Eu-152

Daily Checks

Test America
St. Louis
Background Check

Spectrum: 4_20140724001_BG
Acquired: 7/24/2014 12:00:52 AM
Detector: Ge 4 SN/181
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.32	1.20	1.24	1.26	1.39	1.43	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

TestAmerica Spectrum name: 4_20140724001_BG.An1

Sample description
Background Contamination Check

Spectrum Filename: C:\User\SPC\Det4\4_20140724001_BG.An1

Acquisition information
Start time:	7/24/2014 12:00:52 AM
Live time:	1800
Real time:	1801
Dead time:	0.07 %
Detector ID:	4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_QC.Clb
4_QA-D_Rad11-0018_032612

Energy Calibration
Created:	2/28/2012 2:55:17 PM
Zero offset:	0.091 keV
Gain:	0.250 keV/channel
Quadratic:	-2.917E-08 keV/channel^2

Efficiency Calibration
Created:	3/27/2012 7:34:55 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (1999.44keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 2 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 1.0000

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc

No unknown peaks passed sensitivity test.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Ra-226	742.05	185.70	4.	22.	0.012	27.46	0.883s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS	COMMENTS
Ra-226		6.3282E+00				5.84E+05	
			185.99	6.328E+00	(	3.625E+00	2.75E+01 3.28E+00 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.

```
  ! - Peak is part of a multiplet and this area went
      negative during deconvolution.
  ? - Peak is too narrow.
  @ - Peak is too wide at FW25M, but ok at FWHM.
  % - Peak fails sensitivity test.
  $ - Peak identified, but first peak of this nuclide
      failed one or more qualification tests.
  + - Peak activity higher than counting uncertainty range.
  - - Peak activity lower than counting uncertainty range.
  = - Peak outside analysis energy range.
  & - Calculated peak centroid is not close enough to the
      library energy centroid for positive identification.
  P - Peakbackground subtraction
  } - Peak is too close to another for the activity
      to be found directly.

  Nuclide Codes:                      Peak Codes:
  T - Thermal Neutron Activation      G - Gamma Ray
  F - Fast Neutron Activation         X - X-Ray
  I - Fission Product                 P - Positron Decay
  N - Naturally Occurring Isotope     S - Single-Escape
  P - Photon Reaction                 D - Double-Escape
  C - Charged Particle Reaction       K - Key Line
  M - No MDA Calculation              A - Not in Average
  R - Coincidence Corrected           C - Coincidence Peak
  H - Halflife limit exceeded
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- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	<	2.1668E+00	
NA-22	<	5.0059E-01	
K-40	<	4.8985E+00	
Sc-46	<	3.9205E-01	
CR-51	<	8.9114E-01	
MN-54	<	3.5513E-01	
FE-59	<	7.8867E-01	
Co-56	<	3.6277E-01	
CO-57	<	1.8886E-01	
CO-58	<	3.4270E-01	
CO-60	<	5.2255E-01	
ZN-65	<	1.3006E+00	

NB-94	<	2.9513E-01			
ZR-95	<	5.7430E-01			
NB-95	<	3.1781E-01			
RU-103	<	1.4914E-01			
RH-106	<	2.2095E+00			
AG-108M	<	1.2558E-01			
AG-110M	<	5.3464E-01			
SN-113	<	2.6146E-01			
SB-124	<	2.0391E-01			
SB-125	<	6.1699E-01			
I-131	<	2.1094E-01			
BA-133	<	1.5320E-01			
CS-134	<	2.0710E-01			
CS-137	<	3.2058E-01			
CE-139	<	8.5752E-02			
Ba-140	<	1.1292E+00			
La-140	<	5.4812E-01			
CE-141	<	3.0976E-01			
CE-144	<	7.3405E-01			
PM-144	<	5.1553E-01			
EU-152	<	3.5036E-01			
EU-154	<	3.0996E+00			
EU-155	<	4.4270E-01			
HF-181	<	1.6099E-01			
Ta-182	<	1.2935E+00			
Hg-203	<	2.0591E-01			
TL-208	<	3.5537E-01			
pm-146	<	9.0667E-01			
y-88	<	4.2545E-01			
PB-210	<	8.7121E+00			
PB-212	<	4.3669E-01			
PB-214	<	4.4672E-01			
BI-207	<	2.6091E-01			
BI-212	<	3.9639E+00			
BI-214	<	4.4806E-01			
BI-210M	<	3.6372E-01			
RA-224	<	3.0660E+00			
AC-228	<	1.3842E+00			
TH-227	<	1.3389E+00			
TH-229	<	2.3744E+00			
TH-234	<	8.1683E+00			
PA-231	<	2.9771E+00			
PA-233	<	2.4234E-01			
PA-234	<	7.2838E-01			
PA-234M	<	5.0342E+01			
Ra-226	#	6.3282E+00	2.7456E+01%		3.625E+00
U-235	<	9.7891E-01			
AM-241	<	3.2750E-01			
Np-237	<	1.2465E+00			

```
  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
----------------------------   S U M M A R Y   ----------------------------
Total Activity (   37.6 to  1999.4 keV)     6.328E+00  DPS
```

Test America
St. Louis
Quality Control Check

Spectrum: 4_20140724002_QCAsLeft
Acquired: 7/24/2014 1:02:10 AM
Detector: Ge 4 SN/181
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.54	59.22	59.29	59.62	59.79	59.86	PASS
FWHM	0.77	0.00	0.00	0.76	1.87	1.97	PASS
ActivityDiff	650.60	-5.00	-4.00	-1.77	4.00	5.00	PASS
QA-662							
FWHM	1.34	0.00	0.00	1.32	3.04	3.14	PASS
ActivityDiff	609.90	-5.00	-4.00	-2.30	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.50	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.45	1333.01	1333.26	PASS
FWHM	1.84	0.00	0.00	1.81	4.04	4.14	PASS
ActivityDiff	1189.70	-5.00	-4.00	-0.38	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

TestAmerica Spectrum name: 4_20140724002_QCAsLeft.An1

Sample description
Quality control Check (QC Source 'D') Post Stabilization

Spectrum Filename: C:\User\SPC\Det4\4_20140724002_QCAsLeft.An1

Acquisition information
Start time:	7/24/2014 1:02:10 AM
Live time:	1000
Real time:	1018
Dead time:	1.73 %
Detector ID:	4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_QC.Clb
4_QA-D_Rad11-0018_032612

Energy Calibration
Created:	2/28/2012 2:55:17 PM
Zero offset:	0.091 keV
Gain:	0.250 keV/channel
Quadratic:	-2.917E-08 keV/channel^2

Efficiency Calibration
Created:	3/27/2012 7:34:55 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_QC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (1999.44keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	1.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

TestAmerica Spectrum name: 4_20140724002_QCAsLeft.An1

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	4/1/2009 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 5 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0766

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. GPS	Nuc
59.62	28851.	0.66	0.76	4.400E-02	59.54	100.000	6.621E+02	QA60
88.13	3268.	2.15	0.79	6.283E-02	88.03	100.000	9.512E+02	QA88
661.50	8274.	1.24	1.32	1.500E-02	661.66	100.000	6.239E+02	QA662
1173.20	5365.	1.51	1.64	8.791E-03	1173.23	100.000	1.227E+03	QA1173
1332.45	4655.	1.48	1.81	7.837E-03	1332.51	100.000	1.194E+03	QA1332

No unknown peaks passed sensitivity test.

This section based on library: DET_QC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
QA-60	237.96	59.62	1773.	28851.	28.851	0.66	0.763
QA-88	351.96	88.13	456.	3268.	3.268	2.15	0.794
QA-662	2644.83	661.50	363.	8274.	8.274	1.24	1.320
QA-1173	4692.14	1173.20	173.	5365.	5.365	1.51	1.638
QA-1332	5329.51	1332.45	11.	4655.	4.655	1.48	1.812

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Nuclide Code	Average Activity GPS	Peak Energy keV	Peak Activity GPS	Peak Code	MDA Value GPS			COMMENTS
QA-60		6.6209E+02				1.58E+05			
			59.54	6.621E+02	(	4.565E+00	6.57E-01	1.00E+02	G
QA-88		9.5124E+02				4.63E+02			
			88.03	9.512E+02	(	2.975E+01	2.15E+00	1.00E+02	G
QA-662		6.2392E+02				1.10E+04			
			661.66	6.239E+02	(	6.896E+00	1.24E+00	1.00E+02	G
QA-1173		1.2272E+03				1.92E+03			
			1173.23	1.227E+03	(	1.463E+01	1.51E+00	1.00E+02	G
QA-1332		1.1942E+03				1.92E+03			
			1332.51	1.194E+03	(	4.720E+00	1.48E+00	1.00E+02	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average

R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity GPS	Time Corrected Activity GPS	Uncertainty 1 Sigma Counting	MDA
QA-60		6.5647E+02	6.6209E+02	6.571E-01%	4.57E+00
QA-88		5.2019E+01	9.5124E+02	2.151E+00%	2.98E+01
QA-122	<	1.6726E+00	2.3528E+02		
QA-166			>12 Halflives		
QA-279			>12 Halflives		
QA-392			>12 Halflives		
QA-514			>12 Halflives		
QA-662		5.5203E+02	6.2392E+02	1.243E+00%	6.90E+00
QA-898			>12 Halflives		
QA-1173		6.1033E+02	1.2272E+03	1.514E+00%	1.46E+01
QA-1332		5.9393E+02	1.1942E+03	1.478E+00%	4.72E+00
QA-1836			>12 Halflives		

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.4 keV) 2.465E+03 GPS
Total Decayed Activity (37.6 to 1999.4 keV) 4.6585854E+03 GPS

Test America
St. Louis
Quality Control Check

Spectrum: 7_20140724001_QCAsLeft
Acquired: 7/24/2014 12:21:48 AM
Detector: Ge 7 SN/154
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.58	59.04	59.29	59.60	59.79	60.04	PASS
FWHM	0.84	0.00	0.00	0.86	1.94	2.04	PASS
ActivityDiff	647.00	-5.00	-4.00	1.30	4.00	5.00	PASS
QA-662							
FWHM	1.45	0.00	0.00	1.45	3.15	3.25	PASS
ActivityDiff	606.50	-5.00	-4.00	-0.19	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.40	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.69	1333.01	1333.26	PASS
FWHM	1.98	0.00	0.00	1.94	4.18	4.28	PASS
ActivityDiff	1183.00	-5.00	-4.00	0.39	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

TestAmerica Spectrum name: 7_20140724001_QCAsLeft.An1

Sample description
Quality control Check (QC Source 'C') Post Stabilization

Spectrum Filename: C:\User\SPC\Det7\7_20140724001_QCAsLeft.An1

Acquisition information
Start time:	7/24/2014 12:21:48 AM
Live time:	1000
Real time:	1029
Dead time:	2.83 %
Detector ID:	7

Detector system
Ge 7 SN/154

Calibration
Filename:	7_QC.Clb

Ge7_QC

Energy Calibration
Created:	2/23/2012 8:40:56 AM
Zero offset:	0.117 keV
Gain:	0.250 keV/channel
Quadratic:	3.508E-09 keV/channel^2

Efficiency Calibration
Created:	1/6/2011 8:06:10 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_QC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (2000.12keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	1.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

TestAmerica Spectrum name: 7_20140724001_QCAsLeft.An1

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	4/1/2009 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 6 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0610

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. GPS	Nuc
59.60	71875.	0.40	0.86	1.137E-01	59.54	100.000	6.386E+02	QA60
88.04	9164.	1.31	0.89	1.845E-01	88.03	100.000	9.083E+02	QA88
122.04	719.	9.19	0.95	1.962E-01	122.06	100.000	5.154E+02	QA122
661.77	25169.	0.69	1.45	4.681E-02	661.66	100.000	6.076E+02	QA662
1173.42	14324.	0.97	1.82	2.392E-02	1173.23	100.000	1.204E+03	QA1173
1332.69	12440.	0.94	1.94	2.125E-02	1332.51	100.000	1.177E+03	QA1332

No unknown peaks passed sensitivity test.

This section based on library: DET_QC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
QA-60	237.95	59.60	3352.	71875.	71.875	0.40	0.856
QA-88	351.74	88.04	1282.	9164.	9.165	1.31	0.891
QA-122	487.76	122.04	952.	719.	0.719	9.19	0.951
QA-662	2646.81	661.77	736.	25169.	25.169	0.69	1.448
QA-1173	4693.42	1173.42	609.	14324.	14.324	0.97	1.819
QA-1332	5330.48	1332.69	150.	12457.	12.457	0.94	1.937

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity GPS	Peak Energy keV	Peak Activity GPS		Peak Code	MDA Value GPS		COMMENTS
QA-60		6.3860E+02					1.58E+05		
			59.54	6.386E+02	(	2.421E+00	4.05E-01	1.00E+02	G
QA-88		9.0829E+02					4.63E+02		
			88.03	9.083E+02	(	1.681E+01	1.31E+00	1.00E+02	G
QA-122		5.1536E+02					2.72E+02		
			122.06	5.154E+02	(	1.050E+02	9.19E+00	1.00E+02	G
QA-662		6.0764E+02					1.10E+04		
			661.66	6.076E+02	(	3.118E+00	6.86E-01	1.00E+02	G
QA-1173		1.2039E+03					1.92E+03		
			1173.23	1.204E+03	(	9.890E+00	9.72E-01	1.00E+02	G
QA-1332		1.1784E+03					1.92E+03		
			1332.51	1.178E+03	(	5.655E+00	9.41E-01	1.00E+02	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape

C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity GPS	Time Corrected Activity GPS	Uncertainty 1 Sigma Counting	MDA
QA-60	6.3319E+02	6.3860E+02	4.050E-01%	2.42E+00
QA-88	4.9672E+01	9.0829E+02	1.314E+00%	1.68E+01
QA-122	3.6639E+00	5.1536E+02	9.192E+00%	1.05E+02
QA-166		>12 Halflives		
QA-279		>12 Halflives		
QA-392		>12 Halflives		
QA-514		>12 Halflives		
QA-662	5.3763E+02	6.0764E+02	6.862E-01%	3.12E+00
QA-898		>12 Halflives		
QA-1173	5.9878E+02	1.2039E+03	9.723E-01%	9.89E+00
QA-1332	5.8611E+02	1.1784E+03	9.407E-01%	5.66E+00
QA-1836		>12 Halflives		

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.1 keV) 2.409E+03 GPS
Total Decayed Activity (37.6 to 2000.1 keV) 5.0522495E+03 GPS

Test America
St. Louis
Background Check

Spectrum: 7_20140724002_BG
Acquired: 7/24/2014 12:41:16 AM
Detector: Ge 7 SN/154
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.23	1.40	1.45	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

TestAmerica Spectrum name: 7_20140724002_BG.An1

Sample description
Background Contamination Check

Spectrum Filename: C:\User\SPC\Det7\7_20140724002_BG.An1

Acquisition information

Start time:	7/24/2014 12:41:16 AM
Live time:	1800
Real time:	1828
Dead time:	1.52 %
Detector ID:	7

Detector system
Ge 7 SN/154

Calibration

Filename:	7_QC.Clb

Ge7_QC

Energy Calibration

Created:	2/23/2012 8:40:56 AM
Zero offset:	0.117 keV
Gain:	0.250 keV/channel
Quadratic:	3.508E-09 keV/channel^2

Efficiency Calibration

Created:	1/6/2011 8:06:10 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files

Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (2000.12keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

```
       Half lives decay limit:    12.000
       Activity range factor:      2.000
       Min. step backg. energy     0.000
       Multiplet shift channel     2.000

 Corrections                          Status          Comments
       Decay correct to date:          NO
       Decay during acquisition:       NO
       Decay during collection:        NO
       True coincidence correction:    NO
       Peaked background correction:   NO
       Absorption (Internal):          NO
       Geometry correction:            NO
       Random summing:                 NO


 total peaks alloc.    2 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.3056

 *****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
  Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
  Energy                             Factor    Energy   Ratio    DPS
 ____________________________________________________________________________
 No unknown peaks passed sensitivity test.

 ------------------------------------------------------------
 This section based on library: DET_Long Background PBC.lib


 ************** I D E N T I F I E D   P E A K    S U M M A R Y **************
 Nuclide  Peak    Centroid  Background  Net Area   Intensity   Uncert  FWHM
          Channel Energy    Counts      Counts     Cts/Sec  1 Sigma %  keV
 ____________________________________________________________________________
 PB-210    184.69    46.28         7.        21.     0.012    29.32   0.489s

   s - Peak fails shape tests.
   D - Peak area deconvoluted.
   A   Derived peak area.


 *****   S U M M A R Y   O F   L I B R A R Y   P E A K   U S A G E   *****
 - Nuclide -  Average     ------------- Peak --------------
 Name   Code  Activity     Energy   Activity Code MDA Value
              DPS           keV     DPS           DPS            COMMENTS
 ____________________________________________________________________________

 PB-210   N   3.4377E+00                                        8.14E+03
                            46.54 3.438E+00  (  2.376E+00 2.93E+01 4.25E+00 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
```

```
  ! - Peak is part of a multiplet and this area went
      negative during deconvolution.
  ? - Peak is too narrow.
  @ - Peak is too wide at FW25M, but ok at FWHM.
  % - Peak fails sensitivity test.
  $ - Peak identified, but first peak of this nuclide
      failed one or more qualification tests.
  + - Peak activity higher than counting uncertainty range.
  - - Peak activity lower than counting uncertainty range.
  = - Peak outside analysis energy range.
  & - Calculated peak centroid is not close enough to the
      library energy centroid for positive identification.
  P - Peakbackground subtraction
  } - Peak is too close to another for the activity
      to be found directly.

  Nuclide Codes:                      Peak Codes:
  T - Thermal Neutron Activation      G - Gamma Ray
  F - Fast Neutron Activation         X - X-Ray
  I - Fission Product                 P - Positron Decay
  N - Naturally Occurring Isotope     S - Single-Escape
  P - Photon Reaction                 D - Double-Escape
  C - Charged Particle Reaction       K - Key Line
  M - No MDA Calculation              A - Not in Average
  R - Coincidence Corrected           C - Coincidence Peak
  H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


********** D I S C A R D E D  I S O T O P E  P E A K S **********
Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
          Energy   Counts     Counts     Cts/Sec  1 Sigma %
_____________________________________________________________________
  P - Peakbackground subtraction

*****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
         Time of Count   Uncertainty  1 Sigma
Nuclide    Activity        Counting                  MDA
               DPS
_____________________________________________________________________
BE-7    <    5.6504E-01
NA-22   <    1.8434E-01
K-40    <    1.9219E+00
Sc-46   <    1.6135E-01
CR-51   <    7.2808E-01
MN-54   <    1.1516E-01
FE-59   <    2.7928E-01
Co-56   <    1.1777E-01
CO-57   <    3.5657E-02
CO-58   <    1.1088E-01
CO-60   <    1.9268E-01
ZN-65   <    3.1730E-01
```

NB-94	<	9.4723E-02		
ZR-95	<	3.2960E-01		
NB-95	<	1.0245E-01		
RU-103	<	6.7685E-02		
RH-106	<	1.1694E+00		
AG-108M	<	6.1057E-02		
AG-110M	<	1.7428E-01		
SN-113	<	8.0798E-02		
SB-124	<	7.7339E-02		
SB-125	<	2.7037E-01		
I-131	<	9.0599E-02		
BA-133	<	7.0380E-02		
CS-134	<	1.1438E-01		
CS-137	<	1.0264E-01		
CE-139	<	3.7723E-02		
Ba-140	<	2.7196E-01		
La-140	<	2.3065E-01		
CE-141	<	1.0513E-01		
CE-144	<	4.7961E-01		
PM-144	<	9.2839E-02		
EU-152	<	1.5679E-01		
EU-154	<	1.0091E+00		
EU-155	<	1.0140E-01		
HF-181	<	9.3900E-02		
Ta-182	<	4.6290E-01		
Hg-203	<	4.0170E-02		
TL-208	<	1.4063E-01		
pm-146	<	2.9187E-01		
y-88	<	1.3891E-01		
PB-210		3.4377E+00	2.9315E+01%	2.376E+00
PB-212	<	1.5797E-01		
PB-214	<	1.8628E-01		
BI-207	<	1.1822E-01		
BI-212	<	1.2743E+00		
BI-214	<	3.2069E-01		
BI-210M	<	6.2708E-02		
RA-224	<	1.4480E+00		
AC-228	<	5.7290E-01		
TH-227	<	2.9420E-01		
TH-229	<	1.1137E+00		
TH-234	<	3.1957E+00		
PA-231	<	2.0083E+00		
PA-233	<	1.8136E-01		
PA-234	<	3.1528E-01		
PA-234M	<	1.7081E+01		
Ra-226	<	1.9566E+00		
U-235	<	2.5631E-01		
AM-241	<	1.7901E-01		
Np-237	<	1.7300E-01		

```
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
----------------------------   S U M M A R Y   ----------------------------
Total Activity (   37.6 to  2000.1 keV)     3.438E+00  DPS
```

Test America
St. Louis
Quality Control Check

Spectrum: 8_20140724001_QCAsLeft
Acquired: 7/24/2014 12:22:48 AM
Detector: Ge 8 SN/174
  Quality Control Evaluation Criteria:
  1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
  2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.80	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.50	59.79	60.04	PASS
FWHM	1.10	0.00	0.00	0.86	2.20	2.30	PASS
ActivityDiff	650.60	-5.00	-4.00	0.47	4.00	5.00	PASS
QA-662							
FWHM	1.53	0.00	0.00	1.37	3.23	3.33	PASS
ActivityDiff	609.90	-5.00	-4.00	-0.80	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.60	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.39	1333.01	1333.26	PASS
FWHM	1.90	0.00	0.00	1.74	4.10	4.20	PASS
ActivityDiff	1189.70	-5.00	-4.00	-0.50	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

TestAmerica Spectrum name: 8_20140724001_QCAsLeft.An1

Sample description
Quality control Check (QC Source 'D') Post Stabilization

Spectrum Filename: C:\User\SPC\Det8\8_20140724001_QCAsLeft.An1

Acquisition information
Start time:	7/24/2014 12:22:48 AM
Live time:	1000
Real time:	1041
Dead time:	3.93 %
Detector ID:	8

Detector system
Ge 8 SN/174

Calibration
Filename: 8_QC.Clb
Ge8_QC

Energy Calibration
Created:	2/28/2012 10:34:41 AM
Zero offset:	0.052 keV
Gain:	0.250 keV/channel
Quadratic:	5.282E-10 keV/channel^2

Efficiency Calibration
Created:	1/6/2011 8:07:20 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_QC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.55keV)
Stop channel:	8000 (1999.96keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	1.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	4/1/2009 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 6 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0562

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. GPS	Nuc
59.50	55806.	0.48	0.86	8.686E-02	59.54	100.000	6.476E+02	QA60
87.99	6496.	1.68	0.91	1.289E-01	88.03	100.000	9.213E+02	QA88
122.15	523.	8.33	0.98	1.332E-01	122.06	100.000	5.522E+02	QA122
661.55	18136.	0.81	1.37	3.335E-02	661.66	100.000	6.148E+02	QA662
1173.15	10878.	1.04	1.70	1.834E-02	1173.23	100.000	1.193E+03	QA1173
1332.39	9736.	1.03	1.74	1.637E-02	1332.51	100.000	1.196E+03	QA1332

No unknown peaks passed sensitivity test.

This section based on library: DET_QC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
QA-60	237.82	59.50	3186.	55806.	55.806	0.48	0.858
QA-88	351.79	87.99	1116.	6496.	6.496	1.68	0.910
QA-122	488.43	122.15	458.	523.	0.523	8.33	0.976
QA-662	2646.15	661.55	522.	18136.	18.136	0.81	1.373
QA-1173	4692.65	1173.15	284.	10878.	10.878	1.04	1.704
QA-1332	5329.60	1332.39	38.	9736.	9.736	1.03	1.741

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Nuclide Code	Average Activity GPS	Peak Energy keV	Peak Activity GPS	Peak Code	MDA Value GPS		COMMENTS
QA-60		6.4757E+02				1.58E+05		
			59.54	6.476E+02	(	3.083E+00	4.78E-01 1.00E+02	G
QA-88		9.2127E+02				4.63E+02		
			88.03	9.213E+02	(	2.246E+01	1.68E+00 1.00E+02	G
QA-122		5.5219E+02				2.72E+02		
			122.06	5.522E+02	(	1.082E+02	8.33E+00 1.00E+02	G
QA-662		6.1478E+02				1.10E+04		
			661.66	6.148E+02	(	3.700E+00	8.06E-01 1.00E+02	G
QA-1173		1.1928E+03				1.92E+03		
			1173.23	1.193E+03	(	8.903E+00	1.04E+00 1.00E+02	G
QA-1332		1.1956E+03				1.92E+03		
			1332.51	1.196E+03	(	3.860E+00	1.03E+00 1.00E+02	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape

C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity GPS	Time Corrected Activity GPS	Uncertainty 1 Sigma Counting	MDA
QA-60	6.4208E+02	6.4757E+02	4.782E-01%	3.08E+00
QA-88	5.0382E+01	9.2127E+02	1.679E+00%	2.25E+01
QA-122	3.9257E+00	5.5219E+02	8.328E+00%	1.08E+02
QA-166		>12 Halflives		
QA-279		>12 Halflives		
QA-392		>12 Halflives		
QA-514		>12 Halflives		
QA-662	5.4395E+02	6.1478E+02	8.057E-01%	3.70E+00
QA-898		>12 Halflives		
QA-1173	5.9325E+02	1.1928E+03	1.045E+00%	8.90E+00
QA-1332	5.9463E+02	1.1956E+03	1.028E+00%	3.86E+00
QA-1836		>12 Halflives		

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.5 to 2000.0 keV) 2.428E+03 GPS
Total Decayed Activity (37.5 to 2000.0 keV) 5.1241812E+03 GPS

Test America
St. Louis
Background Check

Spectrum: 8_20140724002_BG
Acquired: 7/24/2014 12:41:53 AM
Detector: Ge 8 SN/174
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.56	1.39	1.45	1.58	1.68	1.74	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

TestAmerica Spectrum name: 8_20140724002_BG.An1

Sample description
Background Contamination Check

Spectrum Filename: C:\User\SPC\Det8\8_20140724002_BG.An1

Acquisition information
Start time:	7/24/2014 12:41:53 AM
Live time:	1800
Real time:	1855
Dead time:	2.94 %
Detector ID:	8

Detector system
Ge 8 SN/174

Calibration
Filename: 8_QC.Clb
Ge8_QC

Energy Calibration
Created:	2/28/2012 10:34:41 AM
Zero offset:	0.052 keV
Gain:	0.250 keV/channel
Quadratic:	5.282E-10 keV/channel^2

Efficiency Calibration
Created:	1/6/2011 8:07:20 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.55keV)
Stop channel:	8000 (1999.96keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 5 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0412

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
63.23	28.	27.71	0.81	9.244E-02	63.29	3.810	4.364E+00	TH234
92.57	61.	16.57	0.82	1.295E-01	92.59	5.584	4.686E+00	TH234
					93.35	5.561	4.702E+00	AC228
185.88	37.	20.99	1.21	1.107E-01	185.72	54.000	PBC<MDA	U235
					185.99	3.280	5.661E+00	Ra226

No unknown peaks passed sensitivity test.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
TH-234	252.71	63.23	9.	28.	0.015	27.71	0.812
TH-234	370.08	92.57	13.	61.	0.034	16.57	0.823
Ra-226	743.35	185.88	7.	37.	0.021	20.99	1.205

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS			COMMENTS
TH-234	N	4.5557E+00				1.63E+12			
			63.29	4.364E+00	(	2.673E+00	2.77E+01	3.81E+00	G
			92.59	4.686E+00	(	1.499E+00	1.66E+01	5.58E+00	G
Ra-226		5.6611E+00				5.84E+05			
			185.99	5.661E+00	?(	2.301E+00	2.10E+01	3.28E+00	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Time of Count Uncertainty 1 Sigma

Nuclide	Activity DPS	Counting	MDA
BE-7	< 1.3249E+00		
NA-22	< 2.3975E-01		
K-40	< 2.4875E+00		
Sc-46	< 1.7150E-01		
CR-51	< 5.5486E-01		
MN-54	< 1.5666E-01		
FE-59	< 3.6732E-01		
Co-56	< 1.5976E-01		
CO-57	< 4.5307E-02		
CO-58	< 1.5167E-01		
CO-60	< 2.5012E-01		
ZN-65	< 5.2574E-01		
NB-94	< 2.3550E-01		
ZR-95	< 2.5582E-01		
NB-95	< 1.4143E-01		
RU-103	< 9.7065E-02		
RH-106	< 1.1298E+00		
AG-108M	< 8.8015E-02		
AG-110M	< 2.3406E-01		
SN-113	< 1.1681E-01		
SB-124	< 1.0960E-01		
SB-125	< 6.8183E-01		
I-131	< 8.0617E-02		
BA-133	< 1.0235E-01		
CS-134	< 1.1078E-01		
CS-137	< 3.2637E-01		
CE-139	< 1.1678E-01		
Ba-140	< 7.4450E-01		
La-140	< 2.9747E-01		
CE-141	< 1.3965E-01		
CE-144	< 3.6184E-01		
PM-144	< 1.2968E-01		
EU-152	< 4.3767E-01		
EU-154	< 1.3595E+00		
EU-155	< 2.4045E-01		
HF-181	< 1.3484E-01		

Ta-182	<	7.6652E-01			
Hg-203	<	5.8887E-02			
TL-208	<	1.2241E-01			
pm-146	<	4.0429E-01			
y-88	<	1.8583E-01			
PB-210	<	4.6435E+00			
PB-212	<	3.4623E-01			
PB-214	<	3.1824E-01			
BI-207	<	2.8177E-01			
BI-212	<	1.7712E+00			
BI-214	<	5.3652E-01			
BI-210M	<	1.3461E-01			
RA-224	<	1.0430E+00			
AC-228	<	1.0811E+00			
TH-227	<	4.3256E-01			
TH-229	<	1.0807E+00			
TH-234		4.5557E+00	1.6144E+01%		2.673E+00
PA-231	<	4.2611E+00			
PA-233	<	1.4880E-01			
PA-234	<	3.1262E-01			
PA-234M	<	4.0390E+01			
Ra-226	#	5.6611E+00	2.0993E+01%		2.301E+00
U-235	<	5.0421E-01			
AM-241	<	4.7940E-01			
Np-237	<	3.1141E-01			

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.5 to 2000.0 keV) 1.022E+01 DPS

Test America
St. Louis
Background Check

Spectrum: 14_20140724001_BG
Acquired: 7/24/2014 12:01:53 AM
Detector: Ge14 SN/11080670
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.91	1.75	1.80	1.80	2.01	2.06	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

TestAmerica, Inc. Spectrum name: 14_20140724001_BG.An1

Sample description
Background Contamination Check

Spectrum Filename: C:\User\SPC\Det14\14_20140724001_BG.An1

Acquisition information
Start time: 7/24/2014 12:01:53 AM
Live time: 1800
Real time: 1808
Dead time: 0.44 %
Detector ID: 14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_QC.Clb
14_QC_79670-334_SOURCE E_042211

Energy Calibration
Created: 2/28/2012 10:48:23 AM
Zero offset: 0.130 keV
Gain: 0.250 keV/channel
Quadratic: -2.050E-08 keV/channel^2

Efficiency Calibration
Created: 5/1/2011 8:43:09 AM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.64keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 1 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.2061

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc

No unknown peaks passed sensitivity test.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.19	46.69	11.	26.	0.015	29.72	0.738

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS	COMMENTS
PB-210	N	5.5880E+00				8.14E+03	
			46.54	5.588E+00	(	3.854E+00	2.97E+01 4.25E+00 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.

```
  ! - Peak is part of a multiplet and this area went
      negative during deconvolution.
  ? - Peak is too narrow.
  @ - Peak is too wide at FW25M, but ok at FWHM.
  % - Peak fails sensitivity test.
  $ - Peak identified, but first peak of this nuclide
      failed one or more qualification tests.
  + - Peak activity higher than counting uncertainty range.
  - - Peak activity lower than counting uncertainty range.
  = - Peak outside analysis energy range.
  & - Calculated peak centroid is not close enough to the
      library energy centroid for positive identification.
  P - Peakbackground subtraction
  } - Peak is too close to another for the activity
      to be found directly.

  Nuclide Codes:                      Peak Codes:
  T - Thermal Neutron Activation      G - Gamma Ray
  F - Fast Neutron Activation         X - X-Ray
  I - Fission Product                 P - Positron Decay
  N - Naturally Occurring Isotope     S - Single-Escape
  P - Photon Reaction                 D - Double-Escape
  C - Charged Particle Reaction       K - Key Line
  M - No MDA Calculation              A - Not in Average
  R - Coincidence Corrected           C - Coincidence Peak
  H - Halflife limit exceeded
```

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	<	8.0709E-01	
NA-22	<	2.3647E-01	
K-40	<	3.6044E+00	
Sc-46	<	1.5940E-01	
CR-51	<	9.9904E-01	
MN-54	<	2.1900E-01	
FE-59	<	4.4621E-01	
Co-56	<	1.5180E-01	
CO-57	<	1.2036E-01	
CO-58	<	1.4654E-01	
CO-60	<	2.4748E-01	
ZN-65	<	4.0267E-01	

NB-94	<	1.3319E-01			
ZR-95	<	2.5275E-01			
NB-95	<	1.3924E-01			
RU-103	<	2.2892E-01			
RH-106	<	1.1449E+00			
AG-108M	<	1.0999E-01			
AG-110M	<	2.1809E-01			
SN-113	<	1.1529E-01			
SB-124	<	1.1071E-01			
SB-125	<	3.8596E-01			
I-131	<	1.3127E-01			
BA-133	<	2.2077E-01			
CS-134	<	1.1193E-01			
CS-137	<	1.4715E-01			
CE-139	<	8.1402E-02			
Ba-140	<	6.3465E-01			
La-140	<	2.9504E-01			
CE-141	<	1.2854E-01			
CE-144	<	5.4361E-01			
PM-144	<	3.4664E-01			
EU-152	<	2.2930E-01			
EU-154	<	1.2746E+00			
EU-155	<	4.8044E-01			
HF-181	<	1.7350E-01			
Ta-182	<	5.8794E-01			
Hg-203	<	6.0042E-02			
TL-208	<	1.2328E-01			
pm-146	<	4.0090E-01			
y-88	<	3.7061E-01			
PB-210		5.5880E+00	2.9719E+01%		3.854E+00
PB-212	<	3.5543E-01			
PB-214	<	3.5865E-01			
BI-207	<	1.0361E-01			
BI-212	<	1.7694E+00			
BI-214	<	4.2680E-01			
BI-210M	<	1.1868E-01			
RA-224	<	1.5658E+00			
AC-228	<	5.6248E-01			
TH-227	<	1.0198E+00			
TH-229	<	1.4437E+00			
TH-234	<	4.9656E+00			
PA-231	<	1.8267E+00			
PA-233	<	1.5068E-01			
PA-234	<	3.3323E-01			
PA-234M	<	2.1361E+01			
Ra-226	<	4.8504E+00			
U-235	<	7.1578E-01			
AM-241	<	3.8992E-01			
Np-237	<	8.0231E-01			

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity	(37.6 to 1999.5 keV)	5.588E+00	DPS

Test America
St. Louis
Quality Control Check

Spectrum: 14_20140724002_QCAsLeft
Acquired: 7/24/2014 1:03:31 AM
Detector: Ge14 SN/11080670
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.63	59.79	60.04	PASS
FWHM	0.76	0.00	0.00	0.81	1.86	1.96	PASS
ActivityDiff	671.90	-5.00	-4.00	-0.93	4.00	5.00	PASS
QA-662							
FWHM	1.35	0.00	0.00	1.38	3.05	3.15	PASS
ActivityDiff	628.85	-5.00	-4.00	-0.82	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.50	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.66	1333.01	1333.26	PASS
FWHM	1.91	0.00	0.00	1.82	4.11	4.21	PASS
ActivityDiff	1224.59	-5.00	-4.00	-1.77	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

TestAmerica, Inc. Spectrum name: 14_20140724002_QCAsLeft.An1

Sample description
Quality control Check (QC Source 'E') Post Stabilization

Spectrum Filename: C:\User\SPC\Det14\14_20140724002_QCAsLeft.An1

Acquisition information
Start time:	7/24/2014 1:03:31 AM
Live time:	1000
Real time:	1015
Dead time:	1.44 %
Detector ID:	14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_QC.Clb
14_QC_79670-334_SOURCE E_042211

Energy Calibration
Created:	2/28/2012 10:48:23 AM
Zero offset:	0.130 keV
Gain:	0.250 keV/channel
Quadratic:	-2.050E-08 keV/channel^2

Efficiency Calibration
Created:	5/1/2011 8:43:09 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_QC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.64keV)
Stop channel:	8000 (1999.52keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	1.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	4/1/2009 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 6 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0754

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. GPS	Nuc
59.63	53767.	0.47	0.81	8.010E-02	59.54	100.000	6.782E+02	QA60
88.03	6419.	1.52	0.87	1.210E-01	88.03	100.000	9.697E+02	QA88
122.02	484.	9.19	0.89	1.241E-01	122.06	100.000	5.485E+02	QA122
661.80	18318.	0.79	1.38	3.265E-02	661.66	100.000	6.340E+02	QA662
1173.39	11316.	1.00	1.75	1.868E-02	1173.23	100.000	1.218E+03	QA1173
1332.66	10257.	1.01	1.82	1.655E-02	1332.51	100.000	1.246E+03	QA1332

No unknown peaks passed sensitivity test.

This section based on library: DET_QC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
QA-60	237.94	59.63	2969.	53767.	53.767	0.47	0.810
QA-88	351.47	88.03	802.	6419.	6.419	1.52	0.870
QA-122	487.40	122.02	498.	484.	0.484	9.19	0.892
QA-662	2646.33	661.80	446.	18318.	18.319	0.79	1.378
QA-1173	4693.21	1173.39	255.	11316.	11.316	1.00	1.754
QA-1332	5330.57	1332.66	66.	10257.	10.257	1.01	1.824

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Nuclide Code	Average Activity GPS	Peak Energy keV	Peak Activity GPS		Peak Code	MDA Value GPS			COMMENTS
QA-60		6.7816E+02					1.58E+05			
			59.54	6.782E+02	(	3.237E+00	4.75E-01	1.00E+02	G	
QA-88		9.6971E+02					4.63E+02			
			88.03	9.697E+02	(	2.034E+01	1.52E+00	1.00E+02	G	
QA-122		5.4845E+02					2.72E+02			
			122.06	5.485E+02	(	1.209E+02	9.19E+00	1.00E+02	G	
QA-662		6.3403E+02					1.10E+04			
			661.66	6.340E+02	(	3.498E+00	7.87E-01	1.00E+02	G	
QA-1173		1.2179E+03					1.92E+03			
			1173.23	1.218E+03	(	8.300E+00	1.00E+00	1.00E+02	G	
QA-1332		1.2463E+03					1.92E+03			
			1332.51	1.246E+03	(	4.929E+00	1.01E+00	1.00E+02	G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape

C - Charged Particle Reaction K - Key Line
M - No MDA Calculation A - Not in Average
R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity GPS	Time Corrected Activity GPS	Uncertainty 1 Sigma Counting	MDA
QA-60	6.7241E+02	6.7816E+02	4.747E-01%	3.24E+00
QA-88	5.3029E+01	9.6971E+02	1.518E+00%	2.03E+01
QA-122	3.8988E+00	5.4845E+02	9.189E+00%	1.21E+02
QA-166		>12 Halflives		
QA-279		>12 Halflives		
QA-392		>12 Halflives		
QA-514		>12 Halflives		
QA-662	5.6098E+02	6.3403E+02	7.867E-01%	3.50E+00
QA-898		>12 Halflives		
QA-1173	6.0570E+02	1.2179E+03	1.002E+00%	8.30E+00
QA-1332	6.1983E+02	1.2463E+03	1.014E+00%	4.93E+00
QA-1836		>12 Halflives		

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 2.516E+03 GPS
Total Decayed Activity (37.6 to 1999.5 keV) 5.2944600E+03 GPS

Test America
St. Louis
Background Check

Spectrum: 15_20140724001_BG
Acquired: 7/24/2014 12:02:28 AM
Detector: Ge15 SN/11012216
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.72	1.60	1.64	1.68	1.80	1.84	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

TestAmerica, Inc. Spectrum name: 15_20140724001_BG.An1

Sample description
Background Contamination Check

Spectrum Filename: C:\User\SPC\Det15\15_20140724001_BG.An1

Acquisition information
Start time: 7/24/2014 12:02:28 AM
Live time: 1800
Real time: 1801
Dead time: 0.05 %
Detector ID: 15

Detector system
Ge15 SN/11012216

Calibration
Filename: 15_20140724001_BG.An1
15_QC_83725-334_SOURCE F_2011

Energy Calibration
Created: 2/28/2012 4:29:17 PM
Zero offset: 0.044 keV
Gain: 0.250 keV/channel
Quadratic: -3.267E-08 keV/channel^2

Efficiency Calibration
Created: 8/2/2011 8:55:45 AM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.57keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 3 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 1.0000

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc

No unknown peaks passed sensitivity test.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV	
PB-212	955.35	239.04	2.	19.	0.010	27.55	0.527s	

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS	COMMENTS
PB-212	N	2.8172E-01				6.98E+02	
			238.63	2.817E-01	?(	1.483E-01	2.75E+01 4.33E+01 G
			300.03	0.000E+00	&	2.759E+00	9.51E+01 3.28E+00 GA

(- This peak used in the nuclide activity average.

```
  * - Peak is too wide, but only one peak in library.
  ! - Peak is part of a multiplet and this area went
      negative during deconvolution.
  ? - Peak is too narrow.
  @ - Peak is too wide at FW25M, but ok at FWHM.
  % - Peak fails sensitivity test.
  $ - Peak identified, but first peak of this nuclide
      failed one or more qualification tests.
  + - Peak activity higher than counting uncertainty range.
  - - Peak activity lower than counting uncertainty range.
  = - Peak outside analysis energy range.
  & - Calculated peak centroid is not close enough to the
      library energy centroid for positive identification.
  P - Peakbackground subtraction
  } - Peak is too close to another for the activity
      to be found directly.

  Nuclide Codes:                      Peak Codes:
  T - Thermal Neutron Activation      G - Gamma Ray
  F - Fast Neutron Activation         X - X-Ray
  I - Fission Product                 P - Positron Decay
  N - Naturally Occurring Isotope     S - Single-Escape
  P - Photon Reaction                 D - Double-Escape
  C - Charged Particle Reaction       K - Key Line
  M - No MDA Calculation              A - Not in Average
  R - Coincidence Corrected           C - Coincidence Peak
  H - Halflife limit exceeded
```

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Activity	Time of Count Uncertainty 1 Sigma Counting DPS	MDA
BE-7	<	9.3188E-01		
NA-22	<	2.7764E-01		
K-40	<	2.9206E+00		
Sc-46	<	1.9584E-01		
CR-51	<	1.4281E+00		
MN-54	<	1.8040E-01		
FE-59	<	4.1935E-01		
Co-56	<	1.8366E-01		
CO-57	<	9.2401E-02		
CO-58	<	1.7523E-01		
CO-60	<	2.9221E-01		

ZN-65	<	4.7569E-01		
NB-94	<	1.5462E-01		
ZR-95	<	2.9752E-01		
NB-95	<	2.0734E-01		
RU-103	<	1.1163E-01		
RH-106	<	1.3180E+00		
AG-108M	<	1.6438E-01		
AG-110M	<	2.6748E-01		
SN-113	<	3.5283E-01		
SB-124	<	1.6092E-01		
SB-125	<	7.2161E-01		
I-131	<	1.8736E-01		
BA-133	<	1.1651E-01		
CS-134	<	2.2968E-01		
CS-137	<	3.0146E-01		
CE-139	<	7.3057E-02		
Ba-140	<	7.9898E-01		
La-140	<	3.5136E-01		
CE-141	<	9.7963E-02		
CE-144	<	4.1085E-01		
PM-144	<	2.9088E-01		
EU-152	<	3.8009E-01		
EU-154	<	1.5566E+00		
EU-155	<	3.4127E-01		
HF-181	<	1.7952E-01		
Ta-182	<	6.9359E-01		
Hg-203	<	9.7773E-02		
TL-208	<	1.4206E-01		
pm-146	<	4.7069E-01		
y-88	<	2.6739E-01		
PB-210	<	6.9475E+00		
PB-212	#	2.8172E-01	2.7549E+01%	1.483E-01
PB-214	<	5.4750E-01		
BI-207	<	1.1943E-01		
BI-212	<	4.8919E+00		
BI-214	<	2.7589E-01		
BI-210M	<	2.1304E-01		
RA-224	<	1.1826E+00		
AC-228	<	1.4919E+00		
TH-227	<	1.2418E+00		
TH-229	<	1.5835E+00		
TH-234	<	4.8668E+00		
PA-231	<	6.2366E+00		
PA-233	<	1.6907E-01		
PA-234	<	2.9152E-01		
PA-234M	<	2.5865E+01		
Ra-226	<	4.8183E+00		
U-235	<	1.0611E+00		
AM-241	<	2.4116E-01		

Np-237 < 5.3622E-01

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

--- S U M M A R Y ---

Total Activity (37.6 to 1999.5 keV) 2.817E-01 DPS

Test America
St. Louis
Quality Control Check

Spectrum: 15_20140724002_QCAsLeft
Acquired: 7/24/2014 1:03:55 AM
Detector: Ge15 SN/11012216
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.58	59.79	60.04	PASS
FWHM	0.95	0.00	0.00	1.09	2.05	2.15	PASS
ActivityDiff	670.56	-5.00	-4.00	4.04	4.00	5.00	High OOT
QA-662							
FWHM	1.51	0.00	0.00	1.54	3.21	3.31	PASS
ActivityDiff	668.76	-5.00	-4.00	2.52	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.90	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.65	1333.01	1333.26	PASS
FWHM	1.99	0.00	0.00	1.99	4.19	4.29	PASS
ActivityDiff	1277.79	-5.00	-4.00	0.59	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Siobhan Perry

TestAmerica, Inc. Spectrum name: 15_20140724002_QCAsLeft.An1

Sample description
Quality control Check (QC Source 'F') Post Stabilization

Spectrum Filename: C:\User\SPC\Det15\15_20140724002_QCAsLeft.An1

Acquisition information
Start time:	7/24/2014 1:03:55 AM
Live time:	1000
Real time:	1011
Dead time:	1.13 %
Detector ID:	15

Detector system
Ge15 SN/11012216

Calibration
Filename: 15_20140724002_QCAsLeft.An1
15_QC_83725-334_SOURCE F_2011

Energy Calibration
Created:	2/28/2012 4:29:17 PM
Zero offset:	0.044 keV
Gain:	0.250 keV/channel
Quadratic:	-3.267E-08 keV/channel^2

Efficiency Calibration
Created:	8/2/2011 8:55:45 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_QC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.57keV)
Stop channel:	8000 (1999.52keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	1.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2011 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 6 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0492

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. GPS	Nuc
59.58	49395.	0.50	1.09	7.725E-02	59.54	100.000	6.435E+02	QA60
88.05	15397.	0.97	1.09	1.137E-01	88.03	100.000	9.494E+02	QA88
122.10	2130.	3.32	1.19	1.172E-01	122.06	100.000	4.997E+02	QA122
661.72	17055.	0.84	1.54	2.840E-02	661.66	100.000	6.519E+02	QA662
1173.37	12188.	1.00	1.97	1.605E-02	1173.23	100.000	1.212E+03	QA1173
1332.65	11148.	0.98	1.99	1.401E-02	1332.51	100.000	1.270E+03	QA1332

No unknown peaks passed sensitivity test.

This section based on library: DET_QC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
QA-60	237.97	59.58	2827.	49395.	49.395	0.50	1.087
QA-88	351.76	88.05	1489.	15397.	15.397	0.97	1.093
QA-122	487.88	122.10	714.	2130.	2.130	3.32	1.188
QA-662	2645.55	661.72	609.	17055.	17.055	0.84	1.544
QA-1173	4692.50	1173.37	380.	12188.	12.188	1.00	1.966
QA-1332	5329.98	1332.65	102.	11148.	11.148	0.98	1.989

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Nuclide Code	Average Activity GPS	Peak Energy keV	Peak Activity GPS		Peak Code	MDA Value GPS			COMMENTS
QA-60		6.4350E+02					1.58E+05			
			59.54	6.435E+02	(	3.263E+00	5.03E-01	1.00E+02	G	
QA-88		9.4939E+02					4.63E+02			
			88.03	9.494E+02	(	1.125E+01	9.71E-01	1.00E+02	G	
QA-122		4.9974E+02					2.72E+02			
			122.06	4.997E+02	(	2.985E+01	3.32E+00	1.00E+02	G	
QA-662		6.5193E+02					1.10E+04			
			661.66	6.519E+02	(	4.499E+00	8.42E-01	1.00E+02	G	
QA-1173		1.2124E+03					1.92E+03			
			1173.23	1.212E+03	(	9.306E+00	1.00E+00	1.00E+02	G	
QA-1332		1.2702E+03					1.92E+03			
			1332.51	1.270E+03	(	5.671E+00	9.77E-01	1.00E+02	G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape

C - Charged Particle Reaction K - Key Line
M - No MDA Calculation A - Not in Average
R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity GPS	Time Corrected Activity GPS	Uncertainty 1 Sigma Counting	MDA
QA-60		6.3984E+02	6.4350E+02	5.026E-01%	3.26E+00
QA-88		1.3544E+02	9.4939E+02	9.708E-01%	1.13E+01
QA-122		1.8169E+01	4.9974E+02	3.315E+00%	2.99E+01
QA-166	<	1.2891E+00	8.9826E+02		
QA-279			>12 Halflives		
QA-392	<	2.5276E+00	6.3332E+03		
QA-514			>12 Halflives		
QA-662		6.0059E+02	6.5193E+02	8.417E-01%	4.50E+00
QA-898			>12 Halflives		
QA-1173		7.5926E+02	1.2124E+03	1.004E+00%	9.31E+00
QA-1332		7.9546E+02	1.2702E+03	9.770E-01%	5.67E+00
QA-1836			>12 Halflives		

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 2.949E+03 GPS
Total Decayed Activity (37.6 to 1999.5 keV) 5.2270986E+03 GPS

Initial Calibrations

Gamma Verification per Geometry

Detector: Ge4

Geometry: Tunacan

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 317.8

lab ID# of cal standard 6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14534	97.4
Am-241	2037	418	0.3590	1163	1211.4	104.1
Cd-109	2881	591	0.0361	16363	16123	98.5
Co-57	1511	310	0.8560	362	353.51	97.7
Ce-139	2139	439	0.7990	549	541.9	98.7
Hg-203	4651	954	0.8146	1171	1197.5	102.3
Sn-113	3015	618	0.6400	966	965.83	100.0
Cs-137	1938	397	0.8510	467	464.8	99.5
Y-88	7264	1489	0.9370	1589	1568.4	98.7
Co-60	3580	734	0.9997	734	732.09	99.7
Co-60	3581	734	0.9999	734	730.52	99.5
Y-88	7690	1577	0.9920	1589	1608.9	101.2

Reviewed By: Jody Watson

Date: 4/2/2012

Calibration Data from file: 4_Soil_TunaCan.Clb
Energy Calibration Date: 4/2/2012 Time: 1:19:28 PM
Efficiency Calibration Date: 4/2/2012 Time: 1:19:41 PM

Calibration Description:
4_Soil_TunaCan_90099_033012

Energy Calibration Fit
Energy = 0.0841 +0.250111*Channel -2.82165e-008*Channel**2
FWHM (ch) = 2.9699 +0.000905*Channel -1.12861e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta	
185.86	46.54	46.57	-0.06%	0.77	0.78	-2.05%	*
237.99	59.54	59.61	-0.11%	0.77	0.80	-2.87%	*
352.07	88.03	88.14	-0.12%	0.80	0.82	-3.00%	*
487.89	122.06	122.10	-0.04%	0.85	0.85	-0.79%	
662.68	165.85	165.81	0.02%	0.92	0.89	2.85%	
1115.49	279.17	279.05	0.04%	1.04	0.99	4.71%	*
1565.30	391.69	391.51	0.04%	1.10	1.09	0.87%	
2645.59	661.66	661.58	0.01%	1.34	1.32	1.45%	
3591.88	898.02	898.09	-0.01%	1.50	1.52	-1.26%	*
4693.38	1173.24	1173.33	-0.01%	1.74	1.74	0.11%	
5330.90	1332.50	1332.60	-0.01%	1.83	1.87	-2.11%	*
7346.21	1836.01	1835.93	0.00%	2.27	2.25	0.88%	*

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.7786 %
Ln(Eff) = -0.3984 -0.574628*Ln(Eng) -0.0204644*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 0.8003 %
Ln(Eff) = -25.4679 +9.285295*Ln(Eng) -0.990443*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	1.1765E-002	1.2076E-002	-2.64%
59.54	1.7788E-002	1.7193E-002	3.35%
88.03	2.3178E-002	2.3534E-002	-1.53%
122.06	2.3675E-002	2.4250E-002	-2.43%
165.85	========== Knee ==========		
165.85	2.0578E-002	2.0860E-002	-1.37%
279.17	1.4119E-002	1.3792E-002	2.32%
391.69	1.0481E-002	1.0476E-002	0.05%
661.66	6.7648E-003	6.7809E-003	-0.24%
898.02	5.1688E-003	5.2356E-003	-1.29%
1173.24	4.1471E-003	4.1620E-003	-0.36%
1332.50	3.7091E-003	3.7274E-003	-0.49%
1836.01	2.8499E-003	2.8152E-003	1.22%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

```
     ORTEC g v - i (1087) Env32  G53W4.25  4/2/2012 2:16:12 PM
TestAmerica                      Spectrum name: 4_TunaCan_20120147.An1

Sample description
     4_TunaCan_90099_033012


Spectrum Filename: C:\User\Cal\Spectra\Det4\4_TunaCan_20120147.An1

Acquisition information
       Start time:                 3/30/2012 1:58:17 PM
       Live time:                7200
       Real time:                7338
       Dead time:                   1.88 %
       Detector ID:                    4

Detector system
     Ge 4 SN/181


Calibration
       Filename:                   4_Soil_TunaCan.Clb
     4_Soil_TunaCan_90099_033012


       Energy Calibration
            Created:               4/2/2012 1:19:28 PM
            Zero offset:           0.084 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -2.822E-08 keV/channel^2

       Efficiency Calibration
            Created:               4/2/2012 1:19:41 PM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =    0.78 %
            Log(Eff):             -3.983609E-01 + (-5.746278E-01*Log(E) ) +
                                   ( -2.046438E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =    0.80 %
            Log(Eff):             -2.546791E+01 + ( 9.285295E+00*Log(E) ) +
                                   ( -9.904428E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.60keV )
       Stop channel:            8000 (  1999.16keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

ORTEC g v - i (1087) Env32 G53W4.25 4/2/2012 2:16:12 PM
TestAmerica Spectrum name: 4_TunaCan_20120147.An1

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0727

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.57	53301.	0.71	0.77	1.209E-02	46.54	4.250	1.453E+04	Pb210
59.61	53514.	0.70	0.77	1.722E-02	59.54	35.700	1.211E+03	AM241
72.99	2672.	6.56	0.81	2.103E-02				
88.14	86292.	0.46	0.80	2.355E-02	88.03	3.610	1.612E+04	CD109
122.10	42094.	0.74	0.85	2.425E-02	122.06	85.600	3.535E+02	CO57
136.52	5015.	4.27	0.87	2.334E-02				
165.81	41514.	0.70	0.92	2.058E-02	165.85	79.900	5.419E+02	Ce139
254.94	1501.	9.38	0.88	1.484E-02				
279.05	25767.	0.82	1.04	1.380E-02	279.17	81.500	1.198E+03	Hg203
391.51	27259.	0.80	1.10	1.048E-02	391.69	64.000	9.658E+02	SN113
661.58	19228.	1.08	1.34	6.782E-03	661.66	85.210	4.648E+02	CS137
898.08	31032.	0.70	1.50	5.235E-03	898.02	93.700	1.568E+03	Y898
1173.32	21224.	0.86	1.74	4.162E-03	1173.24	99.900	7.321E+02	Co1173
1332.60	18983.	0.84	1.83	3.727E-03	1332.50	99.982	7.305E+02	Co1332
1835.92	18122.	0.77	2.27	2.815E-03	1836.01	99.200	1.609E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
291.55	73.00	15410.	2435.	1.158E+05	9.06	0.811	-	D
545.54	136.52	10631.	5015.	2.149E+05	4.27	0.869	-	
1019.10	254.94	4774.	1501.	1.012E+05	9.38	0.884	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.86	46.57	22518.	53301.	7.403	0.71	0.769
AM-241	237.99	59.61	21765.	53514.	7.432	0.70	0.774
CD-109	352.07	88.14	19168.	86292.	11.985	0.46	0.798
CO-57	487.89	122.10	12939.	42094.	5.846	0.74	0.846
Ce-139	662.68	165.81	9873.	41514.	5.766	0.70	0.918
Hg-203	1115.49	279.05	4611.	25767.	3.579	0.82	1.041
SN-113	1565.30	391.51	4016.	27259.	3.786	0.80	1.099
CS-137	2645.59	661.58	4040.	19228.	2.671	1.08	1.341
Y-898	3591.86	898.08	2594.	31032.	4.310	0.70	1.500
Co-1173	4693.36	1173.32	1627.	21224.	2.948	0.86	1.745
Co-1332	5330.90	1332.60	968.	18983.	2.636	0.84	1.828
Y-1836	7346.17	1835.92	184.	18122.	2.517	0.77	2.271

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq		COMMENTS
Pb-210	N	1.4534E+04				8.15E+03		
			46.54	1.453E+04	(	1.914E+02	7.10E-01	4.25E+00 G
AM-241		1.2114E+03				1.58E+05		
			59.54	1.211E+03	(	1.562E+01	7.01E-01	3.57E+01 G
CD-109		1.6123E+04				4.63E+02		
			88.03	1.612E+04	(	1.210E+02	4.63E-01	3.61E+00 G
CO-57		3.5351E+02				2.72E+02		
			122.06	3.535E+02	(	4.474E+00	7.36E-01	8.56E+01 G

ORTEC g v - i (1087) Env32 G53W4.25 4/2/2012 2:16:12 PM
TestAmerica Spectrum name: 4_TunaCan_20120147.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ce-139	5.4190E+02					1.38E+02	
		165.85	5.419E+02	(	6.080E+00	6.99E-01	7.99E+01 G
Hg-203	1.1975E+03					4.66E+01	
		279.17	1.198E+03	(	1.483E+01	8.16E-01	8.15E+01 G
SN-113	9.6583E+02					1.15E+02	
		391.69	9.658E+02	(	1.056E+01	7.98E-01	6.40E+01 G
CS-137	4.6480E+02					1.10E+04	
		661.66	4.648E+02	(	7.225E+00	1.08E+00	8.52E+01 G
Y-898	1.5684E+03					1.07E+02	
		898.02	1.568E+03	(	1.213E+01	6.99E-01	9.37E+01 G
Co-1173	7.3209E+02					1.93E+03	
		1173.24	7.321E+02	(	6.576E+00	8.65E-01	9.99E+01 G
Co-1332	7.3052E+02					1.93E+03	
		1332.50	7.305E+02	(	5.685E+00	8.43E-01	1.00E+02 G
Y-1836	1.6089E+03					1.07E+02	
		1836.01	1.609E+03	(	5.860E+00	7.72E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

ORTEC g v - i (1087) Env32 G53W4.25 4/2/2012 2:16:12 PM
TestAmerica Spectrum name: 4_TunaCan_20120147.An1

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
Pb-210	1.4424E+04	1.4534E+04	7.104E-01%	1.91E+02
AM-241	1.2109E+03	1.2114E+03	7.006E-01%	1.56E+01
CD-109	1.4107E+04	1.6123E+04	4.632E-01%	1.21E+02
CO-57	2.8164E+02	3.5351E+02	7.361E-01%	4.47E+00
Ce-139	3.4594E+02	5.4190E+02	6.994E-01%	6.08E+00
Hg-203	3.1837E+02	1.1975E+03	8.160E-01%	1.48E+01
SN-113	5.6466E+02	9.6583E+02	7.982E-01%	1.06E+01
CS-137	4.6220E+02	4.6480E+02	1.084E+00%	7.23E+00
Y-898	8.7856E+02	1.5684E+03	6.988E-01%	1.21E+01
Co-1173	7.0897E+02	7.3209E+02	8.649E-01%	6.58E+00
Co-1332	7.0745E+02	7.3052E+02	8.429E-01%	5.68E+00
Y-1836	9.0125E+02	1.6089E+03	7.719E-01%	5.86E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.2 keV) 3.491E+04 Bq
Total Decayed Activity (37.6 to 1999.2 keV) 4.0031488E+04 Bq

Analyzed by: _____
Admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica

Gamma Verification per Geometry

Detector: Ge7

Geometry: Tunacan

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 317.8

lab ID# of cal standard 6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14726	98.7
Am-241	2037	418	0.3590	1163	1241.6	106.7
Cd-109	2881	591	0.0361	16363	15976	97.6
Co-57	1511	310	0.8560	362	346.77	95.8
Ce-139	2139	439	0.7990	549	539.48	98.3
Hg-203	4651	954	0.8146	1171	1199.2	102.4
Sn-113	3015	618	0.6400	966	976.76	101.1
Cs-137	1938	397	0.8510	467	467.66	100.2
Y-88	7264	1489	0.9370	1589	1567.3	98.6
Co-60	3580	734	0.9997	734	726.23	98.9
Co-60	3581	734	0.9999	734	719.64	98.0
Y-88	7690	1577	0.9920	1589	1635.7	102.9

Reviewed By: Jody Watson

Date: 3/16/2012

Calibration Data from file: 7_Soil_TunaCan.Clb
Energy Calibration Date: 3/16/2012 Time: 11:44:50 AM
Efficiency Calibration Date: 3/16/2012 Time: 11:45:14 AM

Calibration Description:
7_TunaCan_90099_030512

Energy Calibration Fit
Energy = 0.1533 +0.249954*Channel +6.71576e-009*Channel**2
FWHM (ch) = 3.2969 +0.001030*Channel -2.25091e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.73	46.54	46.58	-0.08%	0.86	0.87	-1.80%
237.72	59.54	59.57	-0.06%	0.86	0.88	-3.29%
351.56	88.03	88.03	0.00%	0.91	0.91	-0.17%
487.42	122.06	121.99	0.06%	0.97	0.95	2.36%
662.55	165.85	165.76	0.05%	1.00	0.99	1.26%
1116.52	279.17	279.24	-0.03%	1.13	1.10	1.85%
1566.54	391.69	391.73	-0.01%	1.21	1.21	-0.23%
2646.25	661.66	661.64	0.00%	1.47	1.47	0.54%
3591.85	898.02	898.04	-0.00%	1.66	1.68	-1.15%
4692.53	1173.24	1173.22	0.00%	1.92	1.91	0.69%
5329.58	1332.50	1332.49	0.00%	2.02	2.04	-0.87%
7343.37	1836.01	1836.02	-0.00%	2.42	2.41	0.28%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.8690 %
Ln(Eff) = 0.6717 -0.616654*Ln(Eng) -0.0206592*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.4845 %
Ln(Eff) = -26.8969 +10.195443*Ln(Eng) -1.08167*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	2.3732E-002	2.4829E-002	-4.62%
59.54	3.9252E-002	3.7016E-002	5.70%
88.03	5.1999E-002	5.3285E-002	-2.47%
122.06	5.3679E-002	5.6057E-002	-4.43%
165.85	========== Knee ==========		
165.85	4.7932E-002	4.8811E-002	-1.83%
279.17	3.2322E-002	3.1541E-002	2.42%
391.69	2.3837E-002	2.3601E-002	0.99%
661.66	1.4947E-002	1.4924E-002	0.15%
898.02	1.1205E-002	1.1367E-002	-1.45%
1173.24	8.8255E-003	8.9287E-003	-1.17%
1332.50	7.7833E-003	7.9508E-003	-2.15%
1836.01	6.0876E-003	5.9192E-003	2.77%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14941.00	635.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	967.19	619.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	467.08	398.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1590.20	1490.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	735.15	735.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1590.70	1578.00	4.00%	1/1/2012 11:00:00 AM

ORTEC g v - i (1087) Env32 G53W4.25 2/28/2014 11:43:43 AM
TestAmerica Spectrum name: 7_TunaCan_20120388.An1

Sample description
7_TunaCan_90099_030512

Spectrum Filename: C:\User\SPC\Det7\7_TunaCan_20120388.An1

Acquisition information
Start time: 3/5/2012 2:07:36 PM
Live time: 3600
Real time: 3721
Dead time: 3.25 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Soil_TunaCan.Clb
7_TunaCan_90099_032712

Energy Calibration
Created: 3/16/2012 11:44:50 AM
Zero offset: 0.153 keV
Gain: 0.250 keV/channel
Quadratic: 6.716E-09 keV/channel^2

Efficiency Calibration
Created: 3/16/2012 11:45:14 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.87 %
Log(Eff): 6.716580E-01 + (-6.166540E-01*Log(E)) +
(-2.065917E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.48 %
Log(Eff): -2.689695E+01 + (1.019544E+01*Log(E)) +
(-1.081671E+00*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix & Pb.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.65keV)
Stop channel: 8000 (2000.21keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 0.0324

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.63	53946.	0.53	0.87	2.487E-02	46.54	4.250	1.428E+04	Pb210
59.57	59050.	0.65	0.86	3.704E-02	59.54	35.700	1.242E+03	AM241
70.74	2770.	6.58	0.90	4.527E-02				
72.95	4536.	4.27	0.90	4.661E-02				
88.03	100494.	0.43	0.91	5.328E-02	88.03	3.610	1.598E+04	CD109
121.99	50865.	0.71	0.97	5.606E-02	122.06	85.600	3.468E+02	CO57
136.41	6524.	3.77	0.93	5.411E-02				
165.76	54838.	0.57	1.00	4.767E-02	165.85	79.900	5.395E+02	Ce139
255.13	1772.	7.37	1.21	3.404E-02				
279.24	42776.	0.59	1.13	3.153E-02	279.17	81.500	1.199E+03	Hg203
391.73	36096.	0.66	1.21	2.360E-02	391.69	64.000	9.768E+02	SN113
661.68	21323.	0.77	1.47	1.492E-02	661.66	85.210	4.677E+02	CS137
898.03	39603.	0.63	1.66	1.137E-02	898.02	93.700	1.567E+03	Y898
1173.21	22788.	0.85	1.92	8.929E-03	1173.24	99.900	7.262E+02	Co1173
1332.49	20124.	0.85	2.02	7.951E-03	1332.50	99.982	7.196E+02	Co1332
1836.00	22787.	0.70	2.43	5.919E-03	1836.01	99.200	1.636E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
282.41	70.73	15146.	2828.	6.248E+04	6.43	0.896	-	D
291.25	72.94	16305.	4682.	1.005E+05	4.12	0.899	-	D
545.11	136.41	12980.	6524.	1.206E+05	3.77	0.932	-	
1020.07	255.13	4580.	1772.	5.204E+04	7.37	1.209	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.73	46.58	19825.	55636.	15.454	0.65	0.856
AM-241	237.72	59.57	21942.	59050.	16.403	0.65	0.857
CD-109	351.56	88.03	21396.	100494.	27.915	0.43	0.912
CO-57	487.42	121.99	16859.	50865.	14.129	0.71	0.971
Ce-139	662.55	165.76	9893.	54838.	15.233	0.57	1.005
Hg-203	1116.52	279.24	5111.	42776.	11.882	0.59	1.126
SN-113	1566.54	391.73	4106.	36096.	10.027	0.66	1.211
CS-137	2646.33	661.66	2922.	21323.	5.923	0.77	1.466D
Y-898	3591.84	898.03	3210.	39603.	11.001	0.63	1.659
Co-1173	4692.50	1173.21	1804.	22788.	6.330	0.85	1.924
Co-1332	5329.58	1332.49	1286.	20124.	5.590	0.85	2.020
Y-1836	7343.30	1836.00	283.	22787.	6.330	0.70	2.426

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq		Peak MDA Value Bq			COMMENTS
Pb-210	N	1.4726E+04						8.15E+03	
			46.54	1.473E+04	(	1.744E+02	6.52E-01	4.25E+00	G
AM-241		1.2416E+03						1.58E+05	
			59.54	1.242E+03	(	1.457E+01	6.49E-01	3.57E+01	G
CD-109		1.5976E+04						4.63E+02	
			88.03	1.598E+04	(	1.088E+02	4.29E-01	3.61E+00	G
CO-57		3.4677E+02						2.72E+02	
			122.06	3.468E+02	(	4.144E+00	7.08E-01	8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 2/28/2014 11:43:43 AM
TestAmerica Spectrum name: 7_TunaCan_20120388.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
Ce-139	5.3948E+02				1.38E+02	
		165.85	5.395E+02	(	4.586E+00 5.65E-01 7.99E+01	G
Hg-203	1.1992E+03				4.66E+01	
		279.17	1.199E+03	(	9.415E+00 5.92E-01 8.15E+01	G
SN-113	9.7676E+02				1.15E+02	
		391.69	9.768E+02	(	8.153E+00 6.55E-01 6.40E+01	G
CS-137	4.6766E+02				1.10E+04	
		661.66	4.677E+02	(	5.584E+00 7.73E-01 8.52E+01	G
Y-898	1.5673E+03				1.07E+02	
		898.02	1.567E+03	(	1.056E+01 6.29E-01 9.37E+01	G
Co-1173	7.2623E+02				1.93E+03	
		1173.24	7.262E+02	(	6.394E+00 8.53E-01 9.99E+01	G
Co-1332	7.1964E+02				1.93E+03	
		1332.50	7.196E+02	(	6.072E+00 8.54E-01 1.00E+02	G
Y-1836	1.6357E+03				1.07E+02	
		1836.01	1.636E+03	(	5.819E+00 7.02E-01 9.92E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

ORTEC g v - i (1087) Env32 G53W4.25 2/28/2014 11:43:43 AM
TestAmerica Spectrum name: 7_TunaCan_20120388.An1

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - -

Gamma Verification per Geometry

Detector:	Ge8
Geometry:	Tunacan
Reference date	1/1/2012
Calibration Standard:	90099
Standard volume g / vial	1550
Standard volume transferred in g / geometry	317.8
lab ID# of cal standard	6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14960	100.2
Am-241	2037	418	0.3590	1163	1240.5	106.6
Cd-109	2881	591	0.0361	16363	16066	98.2
Co-57	1511	310	0.8560	362	345.12	95.4
Ce-139	2139	439	0.7990	549	536.34	97.7
Hg-203	4651	954	0.8146	1171	1218.2	104.1
Sn-113	3015	618	0.6400	966	967.15	100.1
Cs-137	1938	397	0.8510	467	465.86	99.8
Y-88	7264	1489	0.9370	1589	1552.1	97.6
Co-60	3580	734	0.9997	734	724.48	98.7
Co-60	3581	734	0.9999	734	729.98	99.4
Y-88	7690	1577	0.9920	1589	1627.2	102.4

Reviewed By: Jody Watson

Date: 3/28/2012

Calibration Data from file: 8_Soil_TunaCan.Clb
Energy Calibration Date: 3/28/2012 Time: 10:35:07 AM
Efficiency Calibration Date: 3/28/2012 Time: 10:35:20 AM

Calibration Description:
8_Soil_TunaCan_90099_032712

Energy Calibration Fit
Energy = 0.0505 +0.250025*Channel +8.06699e-010*Channel**2
FWHM (ch) = 3.6351 +0.000832*Channel -2.49195e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.74	46.54	46.49	0.11%	0.94	0.95	-0.61%
237.86	59.54	59.52	0.03%	0.95	0.96	-1.36%
351.89	88.03	88.03	-0.00%	0.97	0.98	-1.63%
488.04	122.06	122.07	-0.01%	1.01	1.01	0.12%
663.26	165.85	165.88	-0.02%	1.07	1.04	2.17%
1116.59	279.17	279.23	-0.02%	1.15	1.13	1.73%
1566.40	391.69	391.69	-0.00%	1.22	1.22	0.24%
2645.92	661.66	661.60	0.01%	1.39	1.42	-1.95%
3591.62	898.02	898.05	-0.00%	1.61	1.58	2.16%
4692.17	1173.24	1173.23	0.00%	1.74	1.75	-0.61%
5329.14	1332.50	1332.49	0.00%	1.82	1.84	-1.05%
7342.97	1836.01	1836.02	-0.00%	2.11	2.10	0.42%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.3942 %
Ln(Eff) = -0.1099 -0.495854*Ln(Eng) -0.0257227*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.7131 %
Ln(Eff) = -25.2530 +9.398253*Ln(Eng) -1.00003*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	1.9170E-002	2.0055E-002	-4.62%
59.54	3.0526E-002	2.8813E-002	5.61%
88.03	3.9175E-002	3.9918E-002	-1.90%
122.06	3.9509E-002	4.1457E-002	-4.93%
165.85	========== Knee ==========		
165.85	3.5429E-002	3.6291E-002	-2.43%
279.17	2.5270E-002	2.4275E-002	3.94%
391.69	1.8582E-002	1.8550E-002	0.17%
661.66	1.2089E-002	1.2090E-002	-0.01%
898.02	9.1435E-003	9.3604E-003	-2.37%
1173.24	7.3487E-003	7.4527E-003	-1.42%
1332.50	6.6398E-003	6.6776E-003	-0.57%
1836.01	5.1654E-003	5.0457E-003	2.32%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

```
     ORTEC g v - i (1087) Env32  G53W4.25  3/28/2012 10:36:01 AM
TestAmerica                      Spectrum name: 8_TunaCan_20120676.An1

Sample description
     8_TunaCan_90099_032712


Spectrum Filename: C:\User\SPC\Det8\8_TunaCan_20120676.An1

Acquisition information
       Start time:                 3/27/2012 10:58:29 AM
       Live time:                3600
       Real time:                3655
       Dead time:                   1.49 %
       Detector ID:                    8

Detector system
     Ge 8 SN/174


Calibration
       Filename:                   8_Soil_TunaCan.Clb
     8_Soil_TunaCan_90099_032712


       Energy Calibration
            Created:               3/28/2012 10:35:07 AM
            Zero offset:           0.050 keV
            Gain:                  0.250 keV/channel
            Quadratic:             8.067E-10 keV/channel^2

       Efficiency Calibration
            Created:               3/28/2012 10:35:20 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   1.39 %
            Log(Eff):             -1.098764E-01 + (-4.958544E-01*Log(E) ) +
                                   ( -2.572270E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   1.71 %
            Log(Eff):             -2.525301E+01 + ( 9.398253E+00*Log(E) ) +
                                   ( -1.000034E+00*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix & Pb.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.55keV )
       Stop channel:            8000 (  2000.30keV )
       Peak rejection level:      10.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 0.0205

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.54	43426.	0.60	0.95	2.002E-02	46.54	4.250	1.426E+04	Pb210
59.52	45918.	0.77	0.95	2.880E-02	59.54	35.700	1.240E+03	AM241
72.86	2434.	6.68	0.97	3.542E-02				
88.03	73269.	0.53	0.97	3.992E-02	88.03	3.610	1.607E+04	CD109
122.07	35407.	0.77	1.01	4.146E-02	122.06	85.600	3.451E+02	CO57
136.51	4312.	4.44	1.06	3.999E-02				
165.88	36308.	0.76	1.07	3.629E-02	165.85	79.900	5.363E+02	Ce139
279.23	24162.	0.88	1.15	2.427E-02	279.17	81.500	1.218E+03	Hg203
391.69	24625.	0.77	1.22	1.855E-02	391.69	64.000	9.671E+02	SN113
661.60	17184.	1.10	1.39	1.209E-02	661.66	85.210	4.659E+02	CS137
898.05	28015.	0.71	1.61	9.360E-03	898.02	93.700	1.552E+03	Y898
1173.23	18826.	0.79	1.74	7.453E-03	1173.24	99.900	7.245E+02	Co1173
1332.49	17010.	0.84	1.82	6.678E-03	1332.50	99.982	7.300E+02	Co1332
1836.02	16762.	0.79	2.11	5.046E-03	1836.01	99.200	1.627E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
291.19	72.85	12003.	2434.	6.872E+04	6.68	0.969	-	D
545.78	136.51	8432.	4312.	1.078E+05	4.44	1.059	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.74	46.49	17505.	45568.	12.658	0.76	0.942
AM-241	237.86	59.52	18397.	45918.	12.755	0.77	0.945
CD-109	351.89	88.03	17370.	73269.	20.353	0.53	0.966
CO-57	488.04	122.07	9639.	35407.	9.835	0.77	1.010
Ce-139	663.26	165.88	8356.	36308.	10.085	0.76	1.067
Hg-203	1116.59	279.23	4382.	24162.	6.712	0.88	1.153
SN-113	1566.40	391.69	2677.	24625.	6.840	0.77	1.223
CS-137	2645.92	661.60	3145.	17184.	4.773	1.10	1.389
Y-898	3591.62	898.05	1881.	28015.	7.782	0.71	1.611
Co-1173	4692.17	1173.23	650.	18826.	5.229	0.79	1.738
Co-1332	5329.14	1332.49	576.	17010.	4.725	0.84	1.822
Y-1836	7342.97	1836.02	111.	16762.	4.656	0.79	2.110

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq		Peak Code	MDA Value Bq		COMMENTS
Pb-210	N	1.4960E+04					8.15E+03		
			46.54	1.496E+04	(	2.033E+02	7.55E-01	4.25E+00	G
AM-241		1.2405E+03					1.58E+05		
			59.54	1.240E+03	(	1.715E+01	7.72E-01	3.57E+01	G
CD-109		1.6066E+04					4.63E+02		
			88.03	1.607E+04	(	1.353E+02	5.26E-01	3.61E+00	G
CO-57		3.4512E+02					2.72E+02		
			122.06	3.451E+02	(	4.486E+00	7.68E-01	8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 10:36:01 AM
TestAmerica Spectrum name: 8_TunaCan_20120676.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
Ce-139	5.3634E+02				1.38E+02	
		165.85	5.363E+02	(6.333E+00	7.56E-01	7.99E+01 G
Hg-203	1.2182E+03				4.66E+01	
		279.17	1.218E+03	(1.569E+01	8.81E-01	8.15E+01 G
SN-113	9.6715E+02				1.15E+02	
		391.69	9.671E+02	(9.575E+00	7.73E-01	6.40E+01 G
CS-137	4.6586E+02				1.10E+04	
		661.66	4.659E+02	(7.158E+00	1.10E+00	8.52E+01 G
Y-898	1.5521E+03				1.07E+02	
		898.02	1.552E+03	(1.135E+01	7.10E-01	9.37E+01 G
Co-1173	7.2448E+02				1.93E+03	
		1173.24	7.245E+02	(4.676E+00	7.93E-01	9.99E+01 G
Co-1332	7.2998E+02				1.93E+03	
		1332.50	7.300E+02	(4.916E+00	8.45E-01	1.00E+02 G
Y-1836	1.6272E+03				1.07E+02	
		1836.01	1.627E+03	(5.029E+00	7.91E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
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$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 10:36:01 AM
TestAmerica Spectrum name: 8_TunaCan_20120676.An1

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
Pb-210	1.4851E+04	1.4960E+04	7.555E-01%	2.03E+02
AM-241	1.2400E+03	1.2405E+03	7.719E-01%	1.71E+01
CD-109	1.4124E+04	1.6066E+04	5.260E-01%	1.35E+02
CO-57	2.7715E+02	3.4512E+02	7.681E-01%	4.49E+00
Ce-139	3.4782E+02	5.3634E+02	7.558E-01%	6.33E+00
Hg-203	3.3925E+02	1.2182E+03	8.812E-01%	1.57E+01
SN-113	5.7617E+02	9.6715E+02	7.729E-01%	9.58E+00
CS-137	4.6334E+02	4.6586E+02	1.105E+00%	7.16E+00
Y-898	8.8728E+02	1.5521E+03	7.104E-01%	1.13E+01
Co-1173	7.0239E+02	7.2448E+02	7.931E-01%	4.68E+00
Co-1332	7.0772E+02	7.2998E+02	8.450E-01%	4.92E+00
Y-1836	9.3024E+02	1.6272E+03	7.905E-01%	5.03E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (82.3 to 2000.3 keV) 3.545E+04 Bq
Total Decayed Activity (82.3 to 2000.3 keV) 4.0432598E+04 Bq

Analyzed by: _____
Admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica

Gamma Verification per Geometry

Detector: Ge14

Geometry: Tunacan

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 317.8

lab ID# of cal standard 6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14422	96.6
Am-241	2037	418	0.3590	1163	1222.5	105.1
Cd-109	2881	591	0.0361	16363	16145	98.7
Co-57	1511	310	0.8560	362	349.28	96.5
Ce-139	2139	439	0.7990	549	538.52	98.1
Hg-203	4651	954	0.8146	1171	1205.9	103.0
Sn-113	3015	618	0.6400	966	971.36	100.6
Cs-137	1938	397	0.8510	467	465.65	99.7
Y-88	7264	1489	0.9370	1589	1570	98.8
Co-60	3580	734	0.9997	734	724.16	98.6
Co-60	3581	734	0.9999	734	720.6	98.1
Y-88	7690	1577	0.9920	1589	1634	102.8

Reviewed By: Jody Watson

Date: 4/23/2012

Calibration Data from file: 14_Soil_TunaCan.Clb
Energy Calibration Date: 4/23/2012 Time: 11:29:29 AM
Efficiency Calibration Date: 4/23/2012 Time: 11:29:47 AM

Calibration Description:
14_TunaCan_90099_042312

Energy Calibration Fit
Energy = 0.1578 +0.250077*Channel -1.95882e-008*Channel**2
FWHM (ch) = 2.7879 +0.000947*Channel -1.45727e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
186.01	46.54	46.67	-0.29%	0.73	0.74	-2.18%
237.82	59.54	59.63	-0.15%	0.74	0.75	-1.99%
351.26	88.03	88.00	0.04%	0.78	0.78	-0.25%
487.04	122.06	121.95	0.09%	0.82	0.81	0.58%
662.28	165.85	165.77	0.05%	0.86	0.85	1.23%
1115.71	279.17	279.15	0.01%	0.98	0.96	2.15%
1565.69	391.69	391.65	0.01%	1.09	1.06	2.42%
2645.83	661.66	661.68	-0.00%	1.30	1.30	0.28%
3591.53	898.02	898.06	-0.00%	1.42	1.50	-5.87%
4692.63	1173.24	1173.24	-0.00%	1.76	1.73	2.11%
5329.97	1332.50	1332.50	-0.00%	1.88	1.86	1.08%
7345.32	1836.01	1836.00	0.00%	2.23	2.24	-0.37%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.0212 %
Ln(Eff) = 0.2101 -0.595197*Ln(Eng) -0.0160533*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.2797 %
Ln(Eff) = -23.9149 +8.828985*Ln(Eng) -0.93715*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	2.0990E-002	2.1711E-002	-3.44%
59.54	3.2006E-002	3.0654E-002	4.23%
88.03	4.1381E-002	4.1960E-002	-1.40%
122.06	4.2230E-002	4.3784E-002	-3.68%
165.85	========== Knee ==========		
165.85	3.7957E-002	3.8722E-002	-2.02%
279.17	2.6754E-002	2.5963E-002	2.96%
391.69	2.0047E-002	1.9926E-002	0.60%
661.66	1.3125E-002	1.3132E-002	-0.05%
898.02	1.0136E-002	1.0258E-002	-1.20%
1173.24	8.1251E-003	8.2437E-003	-1.46%
1332.50	7.2859E-003	7.4227E-003	-1.88%
1836.01	5.8454E-003	5.6863E-003	2.72%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

ORTEC g v - i (1087) Env32 G53W4.25 7/6/2012 11:13:09 AM Page 1
TestAmerica, Inc. Spectrum name: 14_TunaCan_20120385.An1

Sample description
17_TunaCan_90099_032612

Spectrum Filename: C:\User\Cal\Spectra\Det14\14_TunaCan_20120385.An1

Acquisition information
Start time: 4/23/2012 9:56:44 AM
Live time: 3600
Real time: 3665
Dead time: 1.77 %
Detector ID: 14

Detector system
Ge17 SN/11080671

Calibration
Filename: 14_Soil_TunaCan.Clb
14_TunaCan_90099_042312

Energy Calibration
Created: 4/23/2012 11:29:29 AM
Zero offset: 0.158 keV
Gain: 0.250 keV/channel
Quadratic: -1.959E-08 keV/channel^2

Efficiency Calibration
Created: 4/23/2012 11:29:47 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.02 %
Log(Eff): 2.101260E-01 + (-5.951973E-01*Log(E)) +
(-1.605331E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -2.391492E+01 + (8.828985E+00*Log(E)) +
(-9.371496E-01*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix & Pb.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.67keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (1087) Env32 G53W4.25 7/6/2012 11:13:09 AM Page 2
TestAmerica, Inc. Spectrum name: 14_TunaCan_20120385.An1
Page 1

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0575

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.67	47449.	0.64	0.73	2.181E-02	46.54	4.250	1.442E+04	Pb210
59.63	48139.	0.67	0.74	3.071E-02	59.54	35.700	1.223E+03	AM241
72.88	1815.	8.13	0.77	3.737E-02				
88.00	74331.	0.47	0.79	4.195E-02	88.03	3.610	1.614E+04	CD109
121.95	35331.	0.76	0.82	4.379E-02	122.06	85.600	3.493E+02	CO57
136.39	4314.	3.84	0.82	4.244E-02				
165.77	33960.	0.70	0.89	3.800E-02	165.85	79.900	5.385E+02	Ce139
279.15	17136.	1.05	1.00	2.596E-02	279.17	81.500	1.206E+03	Hg203
391.65	22586.	0.85	1.13	1.993E-02	391.69	64.000	9.714E+02	SN113
661.68	18625.	0.92	1.36	1.313E-02	661.66	85.210	4.657E+02	CS137
898.06	26064.	0.74	1.56	1.026E-02	898.02	93.700	1.570E+03	Y898
1173.24	20614.	0.80	1.76	8.244E-03	1173.24	99.900	7.242E+02	Co1173
1332.50	18485.	0.81	1.88	7.423E-03	1332.50	99.982	7.206E+02	Co1332
1835.98	15919.	0.83	2.23	5.686E-03	1836.01	99.200	1.634E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
290.81	72.88	9094.	1708.	4.569E+04	9.16	0.857	-
544.77	136.39	6618.	4314.	1.017E+05	3.84	0.819	-

ORTEC g v - i (1087) Env32 G53W4.25 7/6/2012 11:13:09 AM Page 3
TestAmerica, Inc. Spectrum name: 14_TunaCan_20120385.An1

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	186.01	46.67	13580.	47449.	13.180	0.64	0.728
AM-241	237.82	59.63	14856.	48139.	13.372	0.67	0.736
CD-109	351.26	88.00	13424.	74331.	20.647	0.47	0.793
CO-57	487.04	121.95	9138.	35331.	9.814	0.76	0.820
Ce-139	662.28	165.77	5743.	33960.	9.433	0.70	0.887
Hg-203	1115.71	279.15	3658.	17136.	4.760	1.05	0.998
SN-113	1565.69	391.65	3032.	22586.	6.274	0.85	1.125
CS-137	2645.83	661.68	2231.	18625.	5.174	0.92	1.364
Y-898	3591.53	898.06	1967.	26064.	7.240	0.74	1.562
Co-1173	4692.63	1173.24	1001.	20614.	5.726	0.80	1.765
Co-1332	5329.97	1332.50	650.	18485.	5.135	0.81	1.875
Y-1836	7345.28	1835.98	147.	15919.	4.422	0.83	2.232

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq	COMMENTS
Pb-210	N	1.4422E+04				8.15E+03	
			46.54	1.442E+04	(	1.659E+02 6.42E-01 4.25E+00	G
AM-241		1.2225E+03				1.58E+05	
			59.54	1.223E+03	(	1.449E+01 6.65E-01 3.57E+01	G
CD-109		1.6145E+04				4.63E+02	
			88.03	1.614E+04	(	1.179E+02 4.73E-01 3.61E+00	G
CO-57		3.4928E+02				2.72E+02	
			122.06	3.493E+02	(	4.431E+00 7.59E-01 8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 7/6/2012 11:13:09 AM Page 4
TestAmerica, Inc. Spectrum name: 14_TunaCan_20120385.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
Ce-139	5.3852E+02				1.38E+02	
		165.85	5.385E+02	(	5.643E+00 6.97E-01 7.99E+01	G
Hg-203	1.2059E+03				4.66E+01	
		279.17	1.206E+03	(	2.002E+01 1.05E+00 8.15E+01	G
SN-113	9.7136E+02				1.15E+02	
		391.69	9.714E+02	(	1.115E+01 8.54E-01 6.40E+01	G
CS-137	4.6565E+02				1.10E+04	
		661.66	4.657E+02	(	5.571E+00 9.21E-01 8.52E+01	G
Y-898	1.5700E+03				1.07E+02	

898.02 1.570E+03 (1.261E+01 7.43E-01 9.37E+01 G

Co-1173 7.2416E+02 1.93E+03
1173.24 7.242E+02 (5.275E+00 7.99E-01 9.99E+01 G

Co-1332 7.206OE+02 1.93E+03
1332.50 7.206E+02 (4.737E+00 8.09E-01 1.00E+02 G

Y-1836 1.6340E+03 1.07E+02
1836.01 1.634E+03 (6.084E+00 8.27E-01 9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
Pb-210	1.4284E+04	1.4422E+04	6.417E-01%	1.66E+02
AM-241	1.2219E+03	1.2225E+03	6.654E-01%	1.45E+01
CD-109	1.3631E+04	1.6145E+04	4.729E-01%	1.18E+02

CO-57	2.6186E+02	3.4928E+02	7.589E-01%	4.43E+00
Ce-139	3.0490E+02	5.3852E+02	6.967E-01%	5.64E+00
Hg-203	2.2495E+02	1.2059E+03	1.050E+00%	2.00E+01
SN-113	4.9196E+02	9.7136E+02	8.544E-01%	1.12E+01
CS-137	4.6235E+02	4.6565E+02	9.207E-01%	5.57E+00
Y-898	7.5323E+02	1.5700E+03	7.434E-01%	1.26E+01
Co-1173	6.9530E+02	7.2416E+02	7.989E-01%	5.27E+00
Co-1332	6.9188E+02	7.2060E+02	8.094E-01%	4.74E+00
Y-1836	7.8390E+02	1.6340E+03	8.273E-01%	6.08E+00

  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.7 to 1999.5 keV) 3.381E+04 Bq
Total Decayed Activity (37.7 to 1999.5 keV) 3.9968746E+04 Bq

Gamma Verification per Geometry

Detector: Ge15

Geometry: Tunacan

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 317.8

lab ID# of cal standard 6699

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	634	0.0425	14926	14410	96.5
Am-241	2037	418	0.3590	1163	1206.9	103.7
Cd-109	2881	591	0.0361	16363	16069	98.2
Co-57	1511	310	0.8560	362	356.06	98.4
Ce-139	2139	439	0.7990	549	538.81	98.2
Hg-203	4651	954	0.8146	1171	1202.4	102.7
Sn-113	3015	618	0.6400	966	974.62	100.9
Cs-137	1938	397	0.8510	467	465.43	99.7
Y-88	7264	1489	0.9370	1589	1573.7	99.0
Co-60	3580	734	0.9997	734	716.44	97.6
Co-60	3581	734	0.9999	734	726.55	98.9
Y-88	7690	1577	0.9920	1589	1633.2	102.8

Reviewed By: Jody Watson

Date: 3/22/2012

Calibration Data from file: 15_Soil_TunaCan.Clb
Energy Calibration Date: 3/22/2012 Time: 1:02:46 PM
Efficiency Calibration Date: 3/22/2012 Time: 1:03:01 PM

Calibration Description:
15_TunaCan_90099_032212

Energy Calibration Fit
Energy = 0.0042 +0.250192*Channel -3.10425e-008*Channel**2
FWHM (ch) = 3.5032 +0.001000*Channel -3.73783e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.91	46.54	46.52	0.05%	0.90	0.92	-2.54%
237.99	59.54	59.55	-0.01%	0.91	0.94	-2.43%
352.01	88.03	88.07	-0.05%	0.95	0.96	-1.92%
487.92	122.06	122.07	-0.01%	1.00	1.00	0.30%
663.08	165.85	165.89	-0.02%	1.05	1.04	1.34%
1115.99	279.17	279.18	-0.00%	1.18	1.14	3.23%
1565.41	391.69	391.58	0.03%	1.26	1.24	1.14%
2645.35	661.66	661.63	0.00%	1.50	1.47	2.11%
3590.98	898.02	898.04	-0.00%	1.67	1.65	0.79%
4692.06	1173.24	1173.24	-0.00%	1.80	1.84	-2.06%
5329.66	1332.50	1332.56	-0.00%	1.90	1.94	-2.28%
7344.95	1836.01	1835.98	0.00%	2.23	2.21	1.30%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.9975 %
Ln(Eff) = -0.6895 -0.329061*Ln(Eng) -0.0387563*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.1273 %
Ln(Eff) = -23.6268 +8.666669*Ln(Eng) -0.921464*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	1.8904E-002	1.9569E-002	-3.52%
59.54	2.8630E-002	2.7372E-002	4.39%
88.03	3.6378E-002	3.7061E-002	-1.88%
122.06	3.7201E-002	3.8461E-002	-3.39%
165.85	========== Knee ==========		
165.85	3.3266E-002	3.3919E-002	-1.96%
279.17	2.3641E-002	2.3007E-002	2.68%
391.69	1.7841E-002	1.7674E-002	0.94%
661.66	1.1534E-002	1.1545E-002	-0.10%
898.02	8.8355E-003	8.9209E-003	-0.97%
1173.24	6.9001E-003	7.0763E-003	-2.55%
1332.50	6.2597E-003	6.3249E-003	-1.04%
1836.01	4.8716E-003	4.7412E-003	2.68%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	14918.00	634.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	1170.90	418.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	16371.00	591.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	362.15	310.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	549.44	439.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	1170.60	954.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	965.63	618.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	465.91	397.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1589.10	1489.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	734.73	734.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	734.15	734.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1589.70	1577.00	4.00%	1/1/2012 11:00:00 AM

ORTEC g v - i (1087) Env32 G53W4.25 3/22/2012 1:04:51 PM Page 1
TestAmerica, Inc. Spectrum name: 15_TunaCan_20120283.An1

Sample description
15_TunaCan_90099_032212

Spectrum Filename: C:\User\SPC\Det15\15_TunaCan_20120283.An1

Acquisition information
Start time: 3/22/2012 11:06:02 AM
Live time: 3600
Real time: 3653
Dead time: 1.44 %
Detector ID: 15

Detector system
Ge15 SN/1102216

Calibration
Filename: 15_TunaCan.Clb
15_TunaCan_90099_032212

Energy Calibration
Created: 3/22/2012 1:02:46 PM
Zero offset: 0.004 keV
Gain: 0.250 keV/channel
Quadratic: -3.104E-08 keV/channel^2

Efficiency Calibration
Created: 3/22/2012 1:03:01 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.00 %
Log(Eff): -6.894897E-01 + (-3.290613E-01*Log(E)) +
(-3.875629E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.13 %
Log(Eff): -2.362677E+01 + (8.666669E+00*Log(E)) +
(-9.214638E-01*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix & Pb.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.53keV)
Stop channel: 8000 (1999.56keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (1087) Env32 G53W4.25 3/22/2012 1:04:51 PM Page 2
TestAmerica, Inc. Spectrum name: 15_TunaCan_20120283.An1
Page 1

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0249

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
46.52	42849.	0.75	0.90	1.955E-02	46.54	4.250	1.441E+04	Pb210
59.55	42443.	0.72	0.91	2.738E-02	59.54	35.700	1.207E+03	AM241
72.95	2606.	6.34	0.95	3.318E-02				
88.07	68550.	0.54	0.95	3.707E-02	88.03	3.610	1.607E+04	CD109
122.10	33756.	0.64	1.00	3.846E-02	122.06	85.600	3.502E+02	CO57
136.52	4295.	2.96	1.01	3.724E-02				
165.89	34959.	0.78	1.05	3.391E-02	165.85	79.900	5.388E+02	Ce139
279.18	24347.	0.88	1.18	2.301E-02	279.17	81.500	1.202E+03	Hg203
391.58	24366.	0.82	1.26	1.768E-02	391.69	64.000	9.746E+02	SN113
661.63	16400.	1.16	1.50	1.155E-02	661.66	85.210	4.654E+02	CS137
898.03	27965.	0.74	1.67	8.921E-03	898.02	93.700	1.574E+03	Y898
1173.23	17709.	0.94	1.81	7.076E-03	1173.24	99.900	7.164E+02	Co1173
1332.55	16065.	0.98	1.90	6.325E-03	1332.50	99.982	7.266E+02	Co1332
1835.95	16330.	0.85	2.24	4.741E-03	1836.01	99.200	1.633E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
291.58	72.93	12341.	2606.	7.854E+04	6.34	0.949	-	D
545.42	136.45	8010.	4524.	1.215E+05	4.23	1.054	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.91	46.52	15447.	42849.	11.903	0.75	0.900
AM-241	237.99	59.55	14029.	42443.	11.790	0.72	0.913
CD-109	352.01	88.07	16260.	68550.	19.042	0.54	0.945
CO-57	487.92	122.07	9130.	34324.	9.535	0.78	0.999
Ce-139	663.08	165.89	8215.	34959.	9.711	0.78	1.052
Hg-203	1115.99	279.18	4252.	24347.	6.763	0.88	1.182
SN-113	1565.41	391.58	3012.	24366.	6.768	0.82	1.259
CS-137	2645.35	661.63	3077.	16400.	4.555	1.16	1.503
Y-898	3590.94	898.03	2252.	27965.	7.768	0.74	1.667
Co-1173	4692.02	1173.23	1355.	17709.	4.919	0.94	1.807
Co-1332	5329.60	1332.55	1160.	16065.	4.463	0.98	1.900
Y-1836	7344.81	1835.95	345.	16330.	4.536	0.85	2.240

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq		COMMENTS
Pb-210	N	1.4410E+04				8.15E+03		
			46.54	1.441E+04	(	1.957E+02	7.55E-01 4.25E+00	G
AM-241		1.2069E+03				1.58E+05		
			59.54	1.207E+03	(	1.577E+01	7.22E-01 3.57E+01	G
CD-109		1.6069E+04				4.63E+02		
			88.03	1.607E+04	(	1.399E+02	5.44E-01 3.61E+00	G
CO-57		3.5606E+02				2.72E+02		
			122.06	3.561E+02	(	4.647E+00	7.84E-01 8.56E+01	G

ORTEC g v - i (1087) Env32 G53W4.25 3/22/2012 1:04:51 PM Page 4
TestAmerica, Inc. Spectrum name: 15_TunaCan_20120283.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA		Comments
Ce-139	5.3881E+02				1.38E+02		
		165.85	5.388E+02	(	6.551E+00	7.82E-01 7.99E+01	G
Hg-203	1.2024E+03				4.66E+01		
		279.17	1.202E+03	(	1.514E+01	8.77E-01 8.15E+01	G
SN-113	9.7462E+02				1.15E+02		
		391.69	9.746E+02	(	1.034E+01	8.20E-01 6.40E+01	G
CS-137	4.6543E+02				1.10E+04		
		661.66	4.654E+02	(	7.413E+00	1.16E+00 8.52E+01	G
Y-898	1.5737E+03				1.07E+02		

898.02 1.574E+03 (1.260E+01 7.45E-01 9.37E+01 G

Co-1173 7.1644E+02 1.93E+03
1173.24 7.164E+02 (7.050E+00 9.39E-01 9.99E+01 G

Co-1332 7.2655E+02 1.93E+03
1332.50 7.266E+02 (7.301E+00 9.83E-01 1.00E+02 G

Y-1836 1.6332E+03 1.07E+02
1836.01 1.633E+03 (8.923E+00 8.49E-01 9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape

P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
Pb-210	1.4311E+04	1.4410E+04	7.549E-01%	1.96E+02
AM-241	1.2065E+03	1.2069E+03	7.219E-01%	1.58E+01
CD-109	1.4233E+04	1.6069E+04	5.439E-01%	1.40E+02

CO-57	2.8961E+02	3.5606E+02	7.837E-01%	4.65E+00
Ce-139	3.5832E+02	5.3881E+02	7.816E-01%	6.55E+00
Hg-203	3.6068E+02	1.2024E+03	8.771E-01%	1.51E+01
SN-113	5.9836E+02	9.7462E+02	8.201E-01%	1.03E+01
CS-137	4.6306E+02	4.6543E+02	1.155E+00%	7.41E+00
Y-898	9.2933E+02	1.5737E+03	7.445E-01%	1.26E+01
Co-1173	6.9585E+02	7.1644E+02	9.390E-01%	7.05E+00
Co-1332	7.0567E+02	7.2655E+02	9.834E-01%	7.30E+00
Y-1836	9.6449E+02	1.6332E+03	8.486E-01%	8.92E+00

  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (82.3 to 1999.6 keV) 3.512E+04 Bq
Total Decayed Activity (82.3 to 1999.6 keV) 3.9873703E+04 Bq

Initial Calibration Verifications

2nd Source Verification

Detector: Ge4

Geometry: Tunacan

Reference date 1/1/2010

Source: 81427-334

Standard volume g / vial 1550

Standard volume transferred in g / geometry 318.5

lab ID# of cal standard Tuna Can_00002

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1179.4	101.3
Cs-137	1926	396	0.851	465	435.81	93.7
Co-60	3611	742	0.99974	742	706.01	95.1
Co-60	3612	742	0.999856	742	707.18	95.3

Reviewed By: Megan McAfee

Date: 4/5/2012

ORTEC g v - i (3263) Env32 G53W4.25 4/3/2012 8:08:30 AM Page 1
TestAmerica Spectrum name: 4_TunaCan2nd_20120155.An1

Sample description
4_TunaCan2nd_Rad11_040212

Spectrum Filename: C:\User\SPC\Det4\4_TunaCan2nd_20120155.An1

Acquisition information
Start time: 4/2/2012 4:50:30 PM
Live time: 7200
Real time: 7269
Dead time: 0.95 %
Detector ID: 4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_Soil_TunaCan.Clb
4_Soil_TunaCan_90099_033012

Energy Calibration
Created: 4/2/2012 1:19:28 PM
Zero offset: 0.084 keV
Gain: 0.250 keV/channel
Quadratic: -2.822E-08 keV/channel^2

Efficiency Calibration
Created: 4/2/2012 1:19:41 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.78 %
Log(Eff): -3.983609E-01 + (-5.746278E-01*Log(E)) + (-2.046438E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.80 %
Log(Eff): -2.546791E+01 + (9.285295E+00*Log(E)) + (-9.904428E-01*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix & Pb.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.60keV)
Stop channel: 8000 (1999.16keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (3263) Env32 G53W4.25 4/3/2012 8:08:30 AM Page 2
TestAmerica Spectrum name: 4_TunaCan2nd_20120155.An1
Page 1

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	4_2012-04-01_0505.PBC 4/1/2012 5:05:33 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0600

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.42	806.	13.21	0.80	7.538E-03				
46.54	50484.	0.61	0.75	1.208E-02	46.54	4.250	1.463E+04	Pb210
49.71	736.	21.48	1.02	1.343E-02				
59.58	51934.	0.60	0.77	1.721E-02	59.54	35.700	1.179E+03	AM241
63.49	155.	63.51	0.54	1.848E-02				
88.11	27333.	0.79	0.79	2.354E-02	88.03	3.610	1.532E+04	CD109
122.09	6277.	1.96	0.86	2.425E-02	122.06	85.600	3.419E+02	CO57
134.27	52.	97.34	0.86	2.351E-02				
136.47	659.	9.66	0.87	2.334E-02				
148.82	69.	86.21	0.36	2.228E-02				
158.85	43.	92.59	0.33	2.130E-02				
165.81	1043.	6.61	0.81	2.058E-02	165.85	79.900	5.464E+02	Ce139
238.49	236.	22.32	0.96	1.565E-02				
241.88	116.	42.88	0.96	1.547E-02				
313.38	122.	47.39	0.75	1.256E-02				
344.70	47.	65.34	0.49	1.163E-02				
351.68	160.	27.20	0.66	1.144E-02				
391.67	434.	16.95	1.10	1.048E-02	391.69	64.000	1.272E+03	SN113
419.11	117.	48.70	0.60	9.911E-03				
473.76	122.	50.01	0.45	8.958E-03				
537.00	45.	87.01	0.37	8.074E-03				
592.99	36.	69.91	0.40	7.433E-03				
620.80	59.	58.25	0.37	7.153E-03				
661.57	17213.	0.84	1.29	6.782E-03	661.66	85.210	4.358E+02	CS137
860.29	61.	44.90	0.75	5.431E-03				
898.19	323.	17.33	1.63	5.236E-03	898.02	93.700	1.920E+03	Y898
935.59	77.	51.48	0.57	5.056E-03				
1173.33	15720.	0.87	1.73	4.162E-03	1173.24	99.900	7.060E+02	Co1173
1332.63	14113.	0.86	1.81	3.727E-03	1332.50	99.982	7.072E+02	Co1332
1835.84	135.	10.17	1.24	2.815E-03	1836.01	99.200	1.406E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
145.26	36.42	3510.	806.	1.069E+05	13.21	0.797	- s
198.40	49.71	8086.	736.	5.481E+04	21.48	1.022	- s
253.51	63.49	3351.	155.	8.368E+03	63.51	0.538	- s
536.51	134.26	898.	64.	2.722E+03	67.39	0.281	- sc

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
545.30	136.46	2079.	727.	3.115E+04	12.04	0.949	- s
594.74	148.82	1288.	69.	3.082E+03	86.21	0.363	- sc
634.84	158.85	771.	43.	2.019E+03	92.59	0.329	- sc
953.28	238.48	1188.	206.	1.316E+04	29.01	1.147	-
966.87	241.88	864.	60.	3.878E+03	75.94	0.463	- c
1252.81	313.38	1023.	122.	9.737E+03	47.39	0.746	- s
1378.05	344.70	448.	47.	4.042E+03	65.34	0.489	- sc
1405.98	351.68	650.	160.	1.399E+04	27.20	0.659	- s
1675.68	419.11	933.	117.	1.177E+04	48.70	0.600	- s
1894.25	473.76	1038.	122.	1.367E+04	50.01	0.454	- s
2147.23	537.00	496.	45.	5.573E+03	87.01	0.368	- sc
2371.22	592.99	256.	36.	4.843E+03	69.91	0.402	- sc
2482.47	620.80	374.	59.	8.248E+03	58.25	0.372	- s
3440.64	860.29	299.	61.	1.129E+04	44.90	0.752	- s
3741.93	935.59	530.	77.	1.526E+04	51.48	0.570	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.75	46.54	12490.	50416.	7.002	0.61	0.755
AM-241	237.88	59.58	11109.	51934.	7.213	0.60	0.767
CD-109	351.97	88.11	5395.	27333.	3.796	0.79	0.790
CO-57	487.82	122.09	2530.	6277.	0.872	1.96	0.855
Ce-139	662.66	165.81	1311.	1043.	0.145	6.61	0.812
SN-113	1565.91	391.67	1245.	434.	0.060	16.95	1.102s
CS-137	2645.56	661.57	829.	17213.	2.391	0.84	1.295
Y-898	3592.29	898.19	734.	323.	0.045	17.33	1.625
Co-1173	4693.38	1173.33	470.	15720.	2.183	0.87	1.726
Co-1332	5331.03	1332.63	76.	14113.	1.960	0.86	1.814
Y-1836	7345.88	1835.84	9.	135.	0.019	10.17	1.237s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
Pb-210	N	1.4632E+04				8.15E+03		
			46.54	1.463E+04	(P	1.519E+02	6.07E-01	4.25E+00 G
AM-241		1.1794E+03				1.58E+05		
			59.54	1.179E+03	(	1.122E+01	5.98E-01	3.57E+01 G
CD-109		1.5319E+04				4.63E+02		
			88.03	1.532E+04	(	1.933E+02	7.94E-01	3.61E+00 G
CO-57		3.4190E+02				2.72E+02		
			122.06	3.419E+02	(	1.291E+01	1.96E+00	8.56E+01 G
Ce-139		5.4636E+02				1.38E+02		
			165.85	5.464E+02	(	8.978E+01	6.61E+00	7.99E+01 G
Hg-203		-4.3324E-04				4.66E+01		
			279.17	-4.332E-04	%(	2.541E+00	1.76E+05	8.15E+01 G
SN-113		1.2718E+03				1.15E+02		
			391.69	1.272E+03	(	4.898E+02	1.70E+01	6.40E+01 G
CS-137		4.3581E+02				1.10E+04		
			661.66	4.358E+02	(	3.465E+00	8.43E-01	8.52E+01 G
Y-898		1.9202E+03				1.07E+02		
			898.02	1.920E+03	(	7.662E+02	1.73E+01	9.37E+01 G
Co-1173		7.0601E+02				1.93E+03		
			1173.24	7.060E+02	(	4.661E+00	8.74E-01	9.99E+01 G
Co-1332		7.0718E+02				1.93E+03		
			1332.50	7.072E+02	(	2.171E+00	8.58E-01	1.00E+02 G
Y-1836		1.4056E+03				1.07E+02		
			1836.01	1.406E+03	(	1.769E+02	1.02E+01	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the

library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting		MDA Bq/Sample
Pb-210	1.3643E+04	1.4632E+04	6.080E-01%		1.52E+02
AM-241	1.1752E+03	1.1794E+03	5.977E-01%		1.12E+01
CD-109	4.4685E+03	1.5319E+04	7.941E-01%		1.93E+02
CO-57	4.1998E+01	3.4190E+02	1.960E+00%		1.29E+01
Ce-139	8.6929E+00	5.4636E+02	6.612E+00%		8.98E+01
Hg-203 #A	-4.3324E-04	>12 Halflives	1.7564E+05%	2.5409E+00	
SN-113 #	8.9902E+00	1.2718E+03	1.695E+01%		4.90E+02
CS-137	4.1377E+02	4.3581E+02	8.435E-01%		3.46E+00
Y-898	9.1492E+00	1.9202E+03	1.733E+01%		7.66E+02
Co-1173	5.2510E+02	7.0601E+02	8.735E-01%		4.66E+00
Co-1332	5.2597E+02	7.0718E+02	8.582E-01%		2.17E+00
Y-1836	6.6974E+00	1.4056E+03	1.017E+01%		1.77E+02

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.2 keV)	2.083E+04	Bq/Sample
Total Decayed Activity (37.6 to 1999.2 keV)	3.8465293E+04	Bq/Sample

2nd Source Verification

Detector:	Ge7
Geometry:	Tunacan
Reference date	1/1/2010
Source:	81427-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	318.5
lab ID# of cal standard	6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1150.4	98.8
Cs-137	1926	396	0.851	465	440.47	94.7
Co-60	3611	742	0.99974	742	681.72	91.9
Co-60	3612	742	0.999856	742	692.1	93.2

Reviewed By: Jody Watson

Date: 3/27/2012

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:52:25 AM
TestAmerica Spectrum name: 7_TunaCan2ndSource_20120479.An1

Sample description
7_TunaCan2ndSource_81427-334_032712

Spectrum Filename: C:\User\SPC\Det7\7_TunaCan2ndSource_20120479.An1

Acquisition information
Start time: 3/27/2012 3:25:25 PM
Live time: 3600
Real time: 3684
Dead time: 2.28 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Soil_TunaCan.Clb
7_TunaCan_90099_032712

Energy Calibration
Created: 3/16/2012 11:44:50 AM
Zero offset: 0.153 keV
Gain: 0.250 keV/channel
Quadratic: 6.716E-09 keV/channel^2

Efficiency Calibration
Created: 3/16/2012 11:45:14 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.87 %
Log(Eff): 6.716580E-01 + (-6.166540E-01*Log(E)) +
(-2.065917E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.48 %
Log(Eff): -2.689695E+01 + (1.019544E+01*Log(E)) +
(-1.081671E+00*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix & Pb.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.65keV)
Stop channel: 8000 (2000.21keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:52:25 AM
TestAmerica Spectrum name: 7_TunaCan2ndSource_20120479.An1

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2012-02-26_0327.PBC 2/26/2012 3:27:47 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0270

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.65	788.	12.78	0.82	1.487E-02				
40.49	109.	96.90	0.59	1.869E-02				
46.62	49142.	0.63	0.84	2.491E-02	46.54	4.250	1.386E+04	Pb210
49.64	876.	18.72	0.86	2.792E-02				
59.61	54530.	0.58	0.87	3.707E-02	59.54	35.700	1.150E+03	AM241
76.99	260.	38.90	1.03	4.881E-02				
88.06	31019.	0.77	0.89	5.329E-02	88.03	3.610	1.522E+04	CD109
122.04	6834.	2.04	0.94	5.606E-02	122.06	85.600	3.171E+02	CO57
136.41	810.	9.51	1.00	5.411E-02				
165.84	1193.	6.45	0.96	4.765E-02	165.85	79.900	5.180E+02	Ce139
185.66	92.	57.01	0.73	4.445E-02				
213.19	122.	50.56	0.75	3.960E-02				
272.80	146.	47.29	0.28	3.217E-02				
391.67	372.	19.60	1.11	2.360E-02	391.69	64.000	9.332E+02	SN113
442.91	47.	93.72	0.45	2.122E-02				
483.77	95.	38.10	0.62	1.965E-02				
524.63	67.	65.12	0.73	1.831E-02				
604.78	31.	59.37	0.27	1.616E-02				
628.99	32.	94.37	0.58	1.561E-02				
661.67	19152.	0.86	1.47	1.492E-02	661.66	85.210	4.405E+02	CS137
898.03	322.	23.53	1.90	1.137E-02	898.02	93.700	1.694E+03	Y898
910.18	180.	33.99	0.85	1.123E-02				
963.79	49.	71.39	0.69	1.067E-02				
1173.23	16317.	0.86	1.89	8.929E-03	1173.24	99.900	6.817E+02	Co1173
1332.49	14763.	0.85	2.04	7.951E-03	1332.50	99.982	6.921E+02	Co1332
1836.09	186.	9.19	1.40	5.919E-03	1836.01	99.200	1.780E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
146.00	36.65	3116.	788.	5.300E+04	12.78	0.819	-	
161.37	40.49	4419.	109.	5.831E+03	96.90	0.587	-	c
197.99	49.64	8222.	876.	3.513E+04	18.72	0.855	-	sM

307.39	76.99	3728.	260.	5.319E+03	38.90	1.033	-

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:52:25 AM
TestAmerica Spectrum name: 7_TunaCan2ndSource_20120479.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
545.11	136.41	1706.	810.	1.497E+04	9.51	1.002	-	
742.15	185.66	1076.	92.	2.081E+03	57.01	0.725	-	s
852.30	213.19	1296.	122.	3.077E+03	50.56	0.748	-	s
1090.74	272.80	1320.	146.	4.539E+03	47.29	0.283	-	s
1771.26	442.91	710.	47.	2.215E+03	93.72	0.453	-	sc
1934.71	483.77	486.	95.	4.835E+03	38.10	0.616	-	s
2098.18	524.63	583.	67.	3.669E+03	65.12	0.732	-	s
2418.80	604.78	172.	31.	1.939E+03	59.37	0.268	-	s
2515.62	628.99	330.	32.	2.050E+03	94.37	0.581	-	sc
3640.41	910.18	855.	180.	1.603E+04	33.99	0.852	-	s
3854.87	963.79	447.	49.	4.625E+03	71.39	0.695	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.90	46.62	12530.	49107.	13.641	0.63	0.840
AM-241	237.87	59.61	10985.	54530.	15.147	0.58	0.871
CD-109	351.70	88.06	6100.	31019.	8.616	0.77	0.892
CO-57	487.62	122.04	3040.	6834.	1.898	2.04	0.937
Ce-139	662.88	165.84	1495.	1193.	0.331	6.45	0.956
Hg-203	1114.79	278.81	2119.	-42.	-0.012	155.58	1.105s
SN-113	1566.31	391.67	1236.	372.	0.103	19.60	1.107
CS-137	2646.35	661.67	1156.	19152.	5.320	0.86	1.474
Y-898	3591.81	898.03	1084.	322.	0.089	23.53	1.897
Co-1173	4692.59	1173.23	493.	16317.	4.532	0.86	1.893
Co-1332	5329.55	1332.49	127.	14763.	4.101	0.85	2.038
Y-1836	7343.66	1836.09	16.	186.	0.052	9.19	1.399s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	Peak MDA Value Bq/Sample		COMMENTS
Pb-210	N	1.3857E+04				8.15E+03		
			46.54	1.386E+04	(P	1.480E+02	6.34E-01	4.25E+00 G
AM-241		1.1504E+03				1.58E+05		
			59.54	1.150E+03	(	1.036E+01	5.81E-01	3.57E+01 G
CD-109		1.5217E+04				4.63E+02		
			88.03	1.522E+04	(	1.799E+02	7.73E-01	3.61E+00 G
CO-57		3.1712E+02				2.72E+02		
			122.06	3.171E+02	(	1.205E+01	2.04E+00	8.56E+01 G
Ce-139		5.1801E+02				1.38E+02		
			165.85	5.180E+02	(	7.941E+01	6.45E+00	7.99E+01 G
Hg-203		-4.5441E-01				4.66E+01		
			279.17	-4.544E-01	?(	2.347E+00	1.56E+02	8.15E+01 G
SN-113		9.3315E+02				1.15E+02		
			391.69	9.332E+02	(	4.178E+02	1.96E+01	6.40E+01 G
CS-137		4.4047E+02				1.10E+04		
			661.66	4.405E+02	(	3.706E+00	8.56E-01	8.52E+01 G
Y-898		1.6944E+03				1.07E+02		
			898.02	1.694E+03	(	8.216E+02	2.35E+01	9.37E+01 G
Co-1173		6.8172E+02				1.93E+03		
			1173.24	6.817E+02	(	4.436E+00	8.58E-01	9.99E+01 G
Co-1332		6.9210E+02				1.93E+03		
			1332.50	6.921E+02	(	2.586E+00	8.49E-01	1.00E+02 G
Y-1836		1.7801E+03				1.07E+02		
			1836.01	1.780E+03	(	2.065E+02	9.19E+00	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide
failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the
library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
Hg-203	278.81	2119.	-42.	-0.012	155.58	0.000E+00

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma	MDA Bq/Sample
Pb-210	1.2927E+04	1.3857E+04	6.344E-01%		1.48E+02
AM-241	1.1462E+03	1.1504E+03	5.808E-01%		1.04E+01
CD-109	4.4794E+03	1.5217E+04	7.727E-01%		1.80E+02
CO-57	3.9561E+01	3.1712E+02	2.043E+00%		1.20E+01
Ce-139	8.4971E+00	5.1801E+02	6.453E+00%		7.94E+01
Hg-203 #A	-4.5441E-01	>12 Halflives	1.5558E+02%	2.3474E+00	
SN-113	6.8413E+00	9.3315E+02	1.960E+01%		4.18E+02
CS-137	4.1835E+02	4.4047E+02	8.557E-01%		3.71E+00
Y-898	8.3979E+00	1.6944E+03	2.353E+01%		8.22E+02
Co-1173	5.0814E+02	6.8172E+02	8.581E-01%		4.44E+00
Co-1332	5.1588E+02	6.9210E+02	8.485E-01%		2.59E+00
Y-1836	8.8227E+00	1.7801E+03	9.190E+00%		2.07E+02

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.2 keV) 2.007E+04 Bq/Sample
Total Decayed Activity (37.6 to 2000.2 keV) 3.7281199E+04 Bq/Sample

Analyzed by: _____
Admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica

2nd Source Verification

Detector: Ge8

Geometry: Tunacan

Reference date 1/1/2010

Source: 81427-334

Standard volume g / vial 1550

Standard volume transferred in g / geometry 318.5

lab ID# of cal standard 6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1175.4	101.0
Cs-137	1926	396	0.851	465	446.61	96.0
Co-60	3611	742	0.99974	742	697.22	93.9
Co-60	3612	742	0.999856	742	691.92	93.2

Reviewed By: Jody Watson

Date: 3/29/2012

ORTEC g v - i (3263) Env32 G53W4.25 3/29/2012 7:45:38 AM Page 1
TestAmerica Spectrum name: 8_TunaCan2nd_20120697.An1

Sample description
8_TunaCan_81427-334_2ndsource_032912

Spectrum Filename: C:\User\SPC\Det8\8_TunaCan2nd_20120697.An1

Acquisition information
Start time: 3/29/2012 1:58:04 AM
Live time: 3600
Real time: 3622
Dead time: 0.61 %
Detector ID: 8

Detector system
Ge 8 SN/174

Calibration
Filename: 8_Soil_TunaCan.Clb
8_Soil_TunaCan_90099_032712

Energy Calibration
Created: 3/28/2012 10:35:07 AM
Zero offset: 0.050 keV
Gain: 0.250 keV/channel
Quadratic: 8.067E-10 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 10:35:20 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.39 %
Log(Eff): -1.098764E-01 + (-4.958544E-01*Log(E)) + (-2.572270E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.71 %
Log(Eff): -2.525301E+01 + (9.398253E+00*Log(E)) + (-1.000034E+00*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix & Pb.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.55keV)
Stop channel: 8000 (2000.30keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (3263) Env32 G53W4.25 3/29/2012 7:45:38 AM Page 2
TestAmerica Spectrum name: 8_TunaCan2nd_20120697.An1
Page 1

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	8_2012-03-02_0402.PBC 3/2/2012 4:02:11 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 27.9595

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.61	594.	17.47	1.15	1.254E-02				
46.53	38495.	0.62	0.95	2.001E-02	46.54	4.250	1.345E+04	Pb210
49.81	542.	25.92	1.04	2.243E-02				
59.48	43371.	0.71	0.98	2.878E-02	59.54	35.700	1.175E+03	AM241
84.86	327.	26.82	0.98	3.922E-02				
88.03	22911.	0.76	0.98	3.992E-02	88.03	3.610	1.504E+04	CD109
122.06	5318.	2.55	1.03	4.146E-02	122.06	85.600	3.349E+02	CO57
136.54	691.	14.03	0.89	3.998E-02				
165.93	1033.	8.62	1.19	3.628E-02	165.85	79.900	6.077E+02	Ce139
177.05	71.	70.08	0.69	3.453E-02				
185.74	128.	40.98	0.85	3.329E-02				
227.93	52.	65.04	0.45	2.844E-02				
270.79	87.	50.41	0.41	2.486E-02				
278.94	44.	131.33	1.13	2.428E-02	279.17	81.500	HL>Cutoff	Hg203
302.52	63.	54.81	0.69	2.279E-02				
370.09	35.	84.23	0.41	1.941E-02				
391.61	316.	17.91	0.81	1.855E-02	391.69	64.000	1.016E+03	SN113
409.22	93.	50.95	0.41	1.791E-02				
428.24	88.	46.51	0.39	1.726E-02				
564.57	72.	45.26	0.57	1.378E-02				
591.73	73.	42.60	0.61	1.326E-02				
661.62	15734.	0.88	1.38	1.209E-02	661.66	85.210	4.466E+02	CS137
720.39	41.	72.89	0.46	1.126E-02				
831.73	36.	50.61	0.44	9.986E-03				
897.91	396.	17.93	1.52	9.360E-03	898.02	93.700	2.554E+03	Y898
1092.31	69.	44.41	0.50	7.924E-03				
1173.30	13922.	0.92	1.73	7.452E-03	1173.24	99.900	6.972E+02	Co1173
1332.56	12390.	0.92	1.75	6.677E-03	1332.50	99.982	6.919E+02	Co1332
1836.18	152.	9.00	1.63	5.046E-03	1836.01	99.200	1.724E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
146.23	36.61	3218.	594.	4.742E+04	17.47	1.147	- s
199.01	49.81	6400.	542.	2.416E+04	25.92	1.039	- sM
339.16	84.85	3491.	236.	6.026E+03	42.58	0.697	- sM

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
545.91	136.54	2178.	691.	1.728E+04	14.03	0.888	-
707.94	177.05	893.	71.	2.046E+03	70.08	0.693	- sM
742.68	185.74	978.	128.	3.835E+03	40.98	0.847	- sM
911.43	227.93	546.	52.	1.829E+03	65.04	0.445	- sc
1082.86	270.79	683.	87.	3.486E+03	50.41	0.413	- sM
1209.76	302.52	484.	63.	2.765E+03	54.81	0.692	- s
1480.00	370.09	385.	35.	1.803E+03	84.23	0.412	- sc
1636.49	409.22	685.	93.	5.212E+03	50.95	0.407	- s
1712.56	428.24	565.	88.	5.117E+03	46.51	0.393	- s
2257.86	564.57	330.	72.	5.224E+03	45.26	0.565	- s
2366.45	591.73	298.	73.	5.505E+03	42.60	0.613	- s
2881.06	720.39	284.	41.	3.640E+03	72.89	0.464	- s
3326.37	831.73	148.	36.	3.605E+03	50.61	0.439	- s
4368.55	1092.31	290.	69.	8.708E+03	44.41	0.495	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.71	46.48	12173.	40702.	11.306	0.74	0.992
AM-241	237.70	59.48	10649.	43371.	12.047	0.71	0.984
CD-109	351.85	88.02	4506.	23196.	6.443	0.88	1.056
CO-57	487.99	122.06	2908.	5318.	1.477	2.55	1.026
Ce-139	663.47	165.93	1722.	1033.	0.287	8.62	1.189s
Hg-203	1115.46	278.94	1642.	44.	0.012	131.33	1.133
SN-113	1566.07	391.61	822.	316.	0.088	17.91	0.806s
CS-137	2646.01	661.62	665.	15731.	4.370	0.88	1.379
Y-898	3591.03	897.91	871.	396.	0.110	17.93	1.524
Co-1173	4692.46	1173.30	374.	13922.	3.867	0.92	1.726
Co-1332	5329.42	1332.56	82.	12390.	3.442	0.92	1.753
Y-1836	7343.62	1836.18	6.	152.	0.042	9.00	1.626s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
Pb-210	N	1.4221E+04				8.15E+03	
			46.54	1.422E+04	(	1.806E+02 7.43E-01 4.25E+00	G
AM-241		1.1754E+03				1.58E+05	
			59.54	1.175E+03	(	1.311E+01 7.10E-01 3.57E+01	G
CD-109		1.5223E+04				4.63E+02	
			88.03	1.522E+04	(	2.071E+02 8.83E-01 3.61E+00	G
CO-57		3.3494E+02				2.72E+02	
			122.06	3.349E+02	(	1.600E+01 2.55E+00 8.56E+01	G
Ce-139		6.0766E+02				1.38E+02	
			165.85	6.077E+02	*(	1.153E+02 8.62E+00 7.99E+01	G
Hg-203		6.1671E-01				4.66E+01	
			279.17	6.167E-01	(	2.689E+00 1.31E+02 8.15E+01	G
SN-113		1.0157E+03				1.15E+02	
			391.69	1.016E+03	(	4.390E+02 1.79E+01 6.40E+01	G
CS-137		4.4661E+02				1.10E+04	
			661.66	4.466E+02	(P	3.489E+00 8.85E-01 8.52E+01	G
Y-898		2.5543E+03				1.07E+02	
			898.02	2.554E+03	(	9.046E+02 1.79E+01 9.37E+01	G
Co-1173		6.9722E+02				1.93E+03	
			1173.24	6.972E+02	(	4.649E+00 9.19E-01 9.99E+01	G
Co-1332		6.9192E+02				1.93E+03	
			1332.50	6.919E+02	(	2.515E+00 9.18E-01 1.00E+02	G
Y-1836		1.7236E+03				1.07E+02	
			1836.01	1.724E+03	(	1.542E+02 9.00E+00 9.92E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.

P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting		MDA Bq/Sample
Pb-210	1.3265E+04	1.4221E+04	7.429E-01%		1.81E+02
AM-241	1.1712E+03	1.1754E+03	7.101E-01%		1.31E+01
CD-109	4.4713E+03	1.5223E+04	8.832E-01%		2.07E+02
CO-57	4.1631E+01	3.3494E+02	2.551E+00%		1.60E+01
Ce-139 #	9.8959E+00	6.0766E+02	8.616E+00%		1.15E+02
Hg-203 A	6.1671E-01	>12 Halflives	1.3133E+02%	2.6892E+00	
SN-113	7.3819E+00	1.0157E+03	1.791E+01%		4.39E+02
CS-137	4.2415E+02	4.4661E+02	8.848E-01%		3.49E+00
Y-898	1.2542E+01	2.5543E+03	1.793E+01%		9.05E+02
Co-1173	5.1942E+02	6.9722E+02	9.185E-01%		4.65E+00
Co-1332	5.1548E+02	6.9192E+02	9.176E-01%		2.52E+00
Y-1836	8.4633E+00	1.7236E+03	8.997E+00%		1.54E+02

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

S U M M A R Y

Total Activity (37.6 to 2000.3 keV) 2.045E+04 Bq/Sample
Total Decayed Activity (37.6 to 2000.3 keV) 3.8690848E+04 Bq/Sample

2nd Source Verification

Detector: Ge14

Geometry: Tunacan

Reference date 1/1/2010

Source: 81427-334

Standard volume g / vial 1550

Standard volume transferred in g / geometry 318.5

lab ID# of cal standard 6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1140.8	98.0
Cs-137	1926	396	0.851	465	447.55	96.2
Co-60	3611	742	0.99974	742	690.01	93.0
Co-60	3612	742	0.999856	742	699.61	94.2

Reviewed By: Jody Watson

Date: 4/24/2012

ORTEC g v - i (3263) Env32 G53W4.25 7/6/2012 9:20:28 AM Page 1
TestAmerica, Inc. Spectrum name: 14_TunaCan2nd_20120390.An1

Sample description
14_TunaCan2nd_rad10_042412

Spectrum Filename: C:\User\SPC\Det14\14_TunaCan2nd_20120390.An1

Acquisition information
Start time: 4/24/2012 8:12:45 AM
Live time: 3600
Real time: 3635
Dead time: 0.95 %
Detector ID: 14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_Soil_TunaCan.Clb
14_TunaCan_90099_042312

Energy Calibration
Created: 4/23/2012 11:29:29 AM
Zero offset: 0.158 keV
Gain: 0.250 keV/channel
Quadratic: -1.959E-08 keV/channel^2

Efficiency Calibration
Created: 4/23/2012 11:29:47 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.02 %
Log(Eff): 2.101260E-01 + (-5.951973E-01*Log(E)) + (-1.605331E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -2.391492E+01 + (8.828985E+00*Log(E)) + (-9.371496E-01*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix & Pb.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.67keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (3263) Env32 G53W4.25 7/6/2012 9:20:28 AM Page 2
TestAmerica, Inc. Spectrum name: 14_TunaCan2nd_20120390.An1
Page 1

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	14_2012-04-01_0328.PBC 4/1/2012 3:28:19 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0804

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.65	636.	14.35	0.68	1.394E-02				
46.70	42844.	0.65	0.73	2.183E-02	46.54	4.250	1.384E+04	Pb210
49.57	579.	23.20	1.08	2.397E-02				
59.66	44776.	0.62	0.73	3.072E-02	59.54	35.700	1.141E+03	AM241
88.02	24143.	0.88	0.79	4.196E-02	88.03	3.610	1.568E+04	CD109
121.97	5150.	2.07	0.81	4.379E-02	122.06	85.600	3.284E+02	CO57
136.39	594.	12.74	0.84	4.244E-02				
165.76	922.	8.50	0.93	3.800E-02	165.85	79.900	5.802E+02	Ce139
238.43	269.	23.37	0.71	2.933E-02				
315.48	114.	42.70	0.42	2.361E-02				
327.51	51.	61.93	0.45	2.293E-02				
351.90	216.	23.90	0.91	2.167E-02				
364.95	52.	64.29	0.48	2.106E-02				
374.52	129.	45.68	0.49	2.064E-02				
391.67	297.	17.91	1.16	1.993E-02	391.69	64.000	1.044E+03	SN113
510.55	153.	33.44	0.60	1.616E-02				
661.74	16713.	0.81	1.30	1.313E-02	661.66	85.210	4.376E+02	CS137
665.93	55.	47.01	1.30	1.306E-02				
682.98	51.	73.33	0.31	1.280E-02				
802.77	123.	33.88	0.65	1.124E-02				
897.96	328.	20.32	1.77	1.026E-02	898.02	93.700	2.290E+03	Y898
978.13	53.	59.31	0.31	9.568E-03				
1173.32	15097.	0.91	1.81	8.243E-03	1173.24	99.900	6.900E+02	Co1173
1332.58	13794.	0.88	1.91	7.422E-03	1332.50	99.982	6.996E+02	Co1332
1836.21	153.	8.94	1.16	5.686E-03	1836.01	99.200	1.816E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide

145.93	36.65	2712.	636.	4.559E+04	14.35	0.681	-	s
197.59	49.57	6158.	579.	2.414E+04	23.20	1.078	-	s
544.79	136.39	1623.	594.	1.400E+04	12.74	0.836	-	
952.87	238.43	1166.	269.	9.182E+03	23.37	0.709	-	

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
1261.02	315.48	752.	114.	4.829E+03	42.70	0.415	- s
1309.15	327.51	440.	51.	2.232E+03	61.93	0.449	- s
1406.69	351.90	776.	216.	9.981E+03	23.90	0.914	-
1458.89	364.95	463.	52.	2.484E+03	64.29	0.475	- s
1497.18	374.52	912.	129.	6.250E+03	45.68	0.487	- s
2041.26	510.55	669.	153.	9.449E+03	33.44	0.603	- s
2662.75	665.91	160.	40.	3.074E+03	48.94	0.586	- sM
2731.03	682.98	385.	51.	3.984E+03	73.33	0.306	- s
3210.25	802.77	443.	123.	1.098E+04	33.88	0.654	- s
3911.87	978.13	330.	53.	5.539E+03	59.31	0.307	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	186.10	46.70	10276.	42803.	11.890	0.65	0.733
AM-241	237.93	59.66	8589.	44776.	12.438	0.62	0.733
CD-109	351.36	88.02	4956.	24143.	6.706	0.88	0.785
CO-57	487.12	121.97	1860.	5150.	1.431	2.07	0.805
Ce-139	662.24	165.76	1490.	922.	0.256	8.50	0.930s
Hg-203	1114.33	278.80	1377.	-40.	-0.011	133.76	0.957s
SN-113	1565.78	391.67	802.	297.	0.083	17.91	1.165
CS-137	2645.99	661.72	749.	17094.	4.748	0.86	1.367
Y-898	3591.10	897.96	851.	328.	0.091	20.32	1.769s
Co-1173	4692.93	1173.32	513.	15097.	4.194	0.91	1.810
Co-1332	5330.26	1332.58	105.	13794.	3.832	0.88	1.907
Y-1836	7346.17	1836.21	5.	153.	0.042	8.94	1.165s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS

```
Pb-210    N   1.3845E+04                                          8.15E+03
                          46.54 1.384E+04  (P 1.537E+02 6.55E-01 4.25E+00 G

AM-241        1.1408E+03                                          1.58E+05
                          59.54 1.141E+03  (  1.107E+01 6.17E-01 3.57E+01 G

CD-109        1.5678E+04                                          4.63E+02
                          88.03 1.568E+04  (  2.148E+02 8.77E-01 3.61E+00 G

CO-57         3.2838E+02                                          2.72E+02
                         122.06 3.284E+02  (  1.299E+01 2.07E+00 8.56E+01 G

Ce-139        5.8018E+02                                          1.38E+02
                         165.85 5.802E+02 *(  1.149E+02 8.50E+00 7.99E+01 G

Hg-203       -5.1862E-01                                          4.66E+01
                         279.17-5.186E-01 ?(  2.305E+00 1.34E+02 8.15E+01 G

SN-113        1.0438E+03                                          1.15E+02
                         391.69 1.044E+03  (  4.727E+02 1.79E+01 6.40E+01 G

CS-137        4.4755E+02                                          1.10E+04
                         661.66 4.475E+02  (  3.410E+00 8.57E-01 8.52E+01 G

Y-898         2.2899E+03                                          1.07E+02
                         898.02 2.290E+03 *(  9.680E+02 2.03E+01 9.37E+01 G

Co-1173       6.9001E+02                                          1.93E+03
                        1173.24 6.900E+02  (  4.948E+00 9.10E-01 9.99E+01 G

Co-1332       6.9961E+02                                          1.93E+03
                        1332.50 6.996E+02  (  2.559E+00 8.77E-01 1.00E+02 G

Y-1836        1.8162E+03                                          1.07E+02
                        1836.01 1.816E+03  (  1.603E+02 8.94E+00 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
```



```
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
                                       Page 4
```

I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
Hg-203	278.80	1377.	-40.	-0.011	133.76	0.000E+00

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting		MDA Bq/Sample
Pb-210	1.2885E+04	1.3845E+04	6.553E-01%		1.54E+02
AM-241	1.1366E+03	1.1408E+03	6.168E-01%		1.11E+01
CD-109	4.4274E+03	1.5678E+04	8.766E-01%		2.15E+02
CO-57	3.8172E+01	3.2838E+02	2.068E+00%		1.30E+01
Ce-139 #	8.2779E+00	5.8018E+02	8.497E+00%		1.15E+02
Hg-203 #A	-5.1862E-01	>12 Halflives	1.3376E+02%	2.3053E+00	
SN-113	6.4765E+00	1.0438E+03	1.791E+01%		4.73E+02
CS-137	4.2434E+02	4.4755E+02	8.571E-01%		3.41E+00
Y-898 #	9.4790E+00	2.2899E+03	2.032E+01%		9.68E+02
Co-1173	5.0921E+02	6.9001E+02	9.096E-01%		4.95E+00
Co-1332	5.1630E+02	6.9961E+02	8.770E-01%		2.56E+00
Y-1836	7.5179E+00	1.8162E+03	8.944E+00%		1.60E+02

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.7 to 1999.5 keV) 1.997E+04 Bq/Sample
Total Decayed Activity (37.7 to 1999.5 keV) 3.8559289E+04 Bq/Sample

2nd Source Verification

Detector: Ge 15

Geometry: Tunacan

Reference date 1/1/2010

Source: 81427-334

Standard volume g / vial 1550

Standard volume transferred in g / geometry 318.5

lab ID# of cal standard 6665

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2034	418	0.359	1164	1151	98.9
Cs-137	1926	396	0.851	465	435.18	93.6
Co-60	3611	742	0.99974	742	687.16	92.6
Co-60	3612	742	0.999856	742	696.46	93.8

Reviewed By: Jody Watson

Date: 3/23/2012

ORTEC g v - i (3263) Env32 G53W4.25 7/5/2012 1:14:04 PM Page 1
TestAmerica, Inc. Spectrum name: 15_TunaCan2nd_20120288.An1

Sample description
15_TunaCan2nd_rad10_032312

Spectrum Filename: C:\User\SPC\Det15\15_TunaCan2nd_20120288.An1

Acquisition information
Start time: 3/23/2012 6:10:28 AM
Live time: 7200
Real time: 7248
Dead time: 0.66 %
Detector ID: 15

Detector system
Ge15 SN/1102216

Calibration
Filename: 15_Soil_TunaCan.Clb
15_TunaCan_90099_032212

Energy Calibration
Created: 3/22/2012 1:02:46 PM
Zero offset: 0.004 keV
Gain: 0.250 keV/channel
Quadratic: -3.104E-08 keV/channel^2

Efficiency Calibration
Created: 3/22/2012 1:03:01 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.00 %
Log(Eff): -6.894897E-01 + (-3.290613E-01*Log(E)) + (-3.875629E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.13 %
Log(Eff): -2.362677E+01 + (8.666669E+00*Log(E)) + (-9.214638E-01*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix & Pb.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.53keV)
Stop channel: 8000 (1999.56keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (3263) Env32 G53W4.25 7/5/2012 1:14:04 PM Page 2
TestAmerica, Inc. Spectrum name: 15_TunaCan2nd_20120288.An1
Page 1

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	15_2012-02-26_0425.PBC 2/26/2012 4:25:10 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 26.5953

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.48	1231.	11.17	1.20	1.258E-02				
46.44	76440.	0.51	0.91	1.950E-02	46.54	4.250	1.366E+04	Pb210
49.65	1514.	14.37	1.25	2.160E-02				
59.44	80694.	0.48	0.94	2.732E-02	59.54	35.700	1.151E+03	AM241
87.99	43578.	0.68	0.97	3.705E-02	88.03	3.610	1.527E+04	CD109
92.63	219.	44.56	0.42	3.776E-02				
122.00	10133.	1.58	1.01	3.846E-02	122.06	85.600	3.389E+02	CO57
136.33	1390.	8.77	1.13	3.725E-02				
165.85	1699.	7.29	1.05	3.392E-02	165.85	79.900	5.192E+02	Ce139
238.39	480.	20.10	1.42	2.594E-02				
260.67	81.	57.86	0.33	2.424E-02				
279.32	56.	141.32	1.14	2.301E-02	279.17	81.500	HL>Cutoff	Hg203
352.13	110.	54.66	0.68	1.922E-02				
368.26	125.	49.84	0.46	1.856E-02				
391.56	581.	13.59	1.28	1.768E-02	391.69	64.000	9.477E+02	SN113
400.57	73.	61.58	0.54	1.736E-02				
661.57	29285.	0.71	1.46	1.155E-02	661.66	85.210	4.352E+02	CS137
754.74	100.	52.53	0.39	1.034E-02				
898.10	516.	14.74	1.96	8.921E-03	898.02	93.700	1.681E+03	Y898
904.89	86.	54.53	0.36	8.863E-03				
1000.75	82.	43.22	0.58	8.127E-03				
1096.51	181.	26.16	0.80	7.507E-03				
1173.15	26111.	0.71	1.80	7.077E-03	1173.24	99.900	6.872E+02	Co1173
1226.66	98.	36.87	0.74	6.805E-03				
1332.45	23674.	0.68	1.95	6.325E-03	1332.50	99.982	6.965E+02	Co1332
1835.96	284.	9.76	1.20	4.741E-03	1836.01	99.200	1.642E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide

145.78	36.48	5577.	1231.	9.786E+04	11.17	1.202	-	s
198.43	49.65	13746.	1514.	7.010E+04	14.37	1.248	-	sM
370.24	92.63	3274.	219.	5.791E+03	44.56	0.421	-	s

ORTEC g v - i (3263) Env32 G53W4.25 7/5/2012 1:14:04 PM Page 3
TestAmerica, Inc. Spectrum name: 15_TunaCan2nd_20120288.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
544.93	136.33	3516.	1390.	3.731E+04	8.77	1.130	- s
952.92	238.39	2518.	480.	1.849E+04	20.10	1.422	- sM
1042.01	260.67	968.	81.	3.328E+03	57.86	0.332	- sM
1407.66	352.13	1248.	110.	5.749E+03	54.66	0.679	- s
1472.16	368.26	1252.	125.	6.736E+03	49.84	0.459	- s
1601.36	400.57	843.	73.	4.224E+03	61.58	0.543	- s
3017.75	754.74	768.	100.	9.719E+03	52.53	0.393	- s
3618.39	904.89	752.	86.	9.741E+03	54.53	0.363	- s
4001.87	1000.75	476.	82.	1.015E+04	43.22	0.582	- s
4385.05	1096.51	621.	181.	2.415E+04	26.16	0.796	- s
4905.82	1226.66	215.	98.	1.445E+04	36.87	0.740	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.62	46.44	19930.	76355.	10.605	0.51	0.907
AM-241	237.58	59.44	16824.	80694.	11.208	0.48	0.935
CD-109	351.67	87.99	9695.	43578.	6.052	0.68	0.972
CO-57	487.63	122.00	4069.	10133.	1.407	1.58	1.014
Ce-139	662.95	165.85	3411.	1699.	0.236	7.29	1.054
Hg-203	1116.56	279.32	3139.	56.	0.008	141.32	1.144
SN-113	1565.32	391.56	1615.	581.	0.081	13.59	1.282
CS-137	2645.11	661.57	2071.	29285.	4.067	0.71	1.459
Y-898	3591.24	898.10	1317.	516.	0.072	14.74	1.959
Co-1173	4691.69	1173.15	1159.	26111.	3.627	0.71	1.803
Co-1332	5329.20	1332.45	323.	23674.	3.288	0.68	1.945
Y-1836	7345.58	1836.14	48.	260.	0.036	8.96	1.181s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

ORTEC g v - i (3263) Env32 G53W4.25 7/5/2012 1:14:04 PM Page 4
TestAmerica, Inc. Spectrum name: 15_TunaCan2nd_20120288.An1

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS

Pb-210	N	1.3663E+04						8.15E+03		
			46.54	1.366E+04	(	P 1.182E+02	5.11E-01	4.25E+00	G	
AM-241		1.1510E+03						1.58E+05		
			59.54	1.151E+03	(	8.660E+00	4.81E-01	3.57E+01	G	
CD-109		1.5268E+04						4.63E+02		
			88.03	1.527E+04	(	1.617E+02	6.78E-01	3.61E+00	G	
CO-57		3.3887E+02						2.72E+02		
			122.06	3.389E+02	(	1.003E+01	1.58E+00	8.56E+01	G	
Ce-139		5.1921E+02						1.38E+02		
			165.85	5.192E+02	(	8.400E+01	7.29E+00	7.99E+01	G	
Hg-203		4.1717E-01						4.66E+01		
			279.17	4.172E-01	(	1.954E+00	1.41E+02	8.15E+01	G	
SN-113		9.4771E+02						1.15E+02		
			391.69	9.477E+02	(	3.099E+02	1.36E+01	6.40E+01	G	
CS-137		4.3518E+02						1.10E+04		
			661.66	4.352E+02	(	3.191E+00	7.12E-01	8.52E+01	G	
Y-898		1.6812E+03						1.07E+02		
			898.02	1.681E+03	(	5.598E+02	1.47E+01	9.37E+01	G	
Co-1173		6.8716E+02						1.93E+03		
			1173.24	6.872E+02	(	4.246E+00	7.12E-01	9.99E+01	G	
Co-1332		6.9646E+02						1.93E+03		
			1332.50	6.965E+02	(	2.544E+00	6.82E-01	1.00E+02	G	
Y-1836		1.5036E+03						1.07E+02		
			1836.01	1.504E+03	(	2.033E+02	8.96E+00	9.92E+01	G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went
negative during deconvolution.
? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide
failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the
library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation

Peak Codes:
G - Gamma Ray

```
  F - Fast Neutron Activation          X - X-Ray
  I - Fission Product                  P - Positron Decay
  N - Naturally Occurring Isotope      S - Single-Escape
  P - Photon Reaction                  D - Double-Escape
  C - Charged Particle Reaction        K - Key Line
  M - No MDA Calculation               A - Not in Average
  R - Coincidence Corrected            C - Coincidence Peak
  H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


*************** D I S C A R D E D  I S O T O P E  P E A K S ***************
Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
           Energy   Counts     Counts     Cts/Sec  1 Sigma %
_____________________________________________________________________________
  P - Peakbackground subtraction

*****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
         Time of Count  Time Corrected  Uncertainty  1 Sigma
Nuclide     Activity       Activity       Counting                    MDA
               Bq/Sample     Bq/Sample                                  Bq/Sample

_____________________________________________________________________________
Pb-210       1.2751E+04    1.3663E+04    5.115E-01%                1.18E+02
AM-241       1.1469E+03    1.1510E+03    4.812E-01%                8.66E+00
CD-109       4.5239E+03    1.5268E+04    6.776E-01%                1.62E+02
CO-57        4.2749E+01    3.3887E+02    1.583E+00%                1.00E+01
Ce-139       8.7071E+00    5.1921E+02    7.291E+00%                8.40E+01
Hg-203  A    4.1717E-01 >12 Halflives   1.4132E+02%   1.9540E+00
SN-113       7.1340E+00    9.4771E+02    1.359E+01%                3.10E+02
CS-137       4.1344E+02    4.3518E+02    7.117E-01%                3.19E+00
Y-898        8.5738E+00    1.6812E+03    1.474E+01%                5.60E+02
Co-1173      5.1301E+02    6.8716E+02    7.125E-01%                4.25E+00
Co-1332      5.1995E+02    6.9646E+02    6.817E-01%                2.54E+00
Y-1836       7.6681E+00    1.5036E+03    8.962E+00%                2.03E+02
```

```
     ORTEC g v - i (3263) Env32  G53W4.25  7/5/2012 1:14:04 PM     Page  6
TestAmerica, Inc.              Spectrum name: 15_TunaCan2nd_20120288.An1

  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
-----------------------------   S U M M A R Y   ----------------------------
Total Activity (   37.5 to  1999.6 keV)     1.994E+04  Bq/Sample
Total Decayed Activity (   37.5 to  1999.6 keV) 3.6891324E+04  Bq/Sample
```

Annual Calibration Verifications

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector # 4**
SpectrumID: 4_20130227011_EffVerif
Analysis Description: ACVTop-91774;Tuna Can 2006
Calibration: 4_Soil_TunaCan_90099_033012
Detector: Ge 4 SN/181

Verification Date: 2013-02-27 16:17
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.48E+02	0.3%
Cs-137	661.66	400	3.83E+02	4.3%
Co-1332	1332.5	777	7.45E+02	4.1%

Comments:

Perform ____KM 2/27/13_____ Reviev ___RM 2/27/13_____

C:\User\CRpt\4_20130227011_EffVerif.xls

Sample Description: ACVTop-91774;Tuna Can 2006
Detector: Ge 4 SN/181
Source Date: 10/1/2006 11:00
Acquired: 2/27/2013 16:17:24
Analyzed: 3/4/2013 09:45

Analyst: Jody Watson

Efficiency: 4_Soil_TunaCan_90099_033012
Library: DET_EfficiencyVerification.lib

Nuclide	Activity uCi/Source	Uncertainty %
AM-241	4.478E+02	0.56
CS-137	3.829E+02	0.86
Co-1332	7.452E+02	1.09
Total	1.576E+03	

TestAmerica Spectrum name: 4_20130227011_EffVerif.An1

Sample description
ACVTop-91774;Tuna Can 2006

Spectrum Filename: C:\User\SPC\Det4\4_20130227011_EffVerif.An1

Acquisition information
Start time: 2/27/2013 4:17:24 PM
Live time: 7200
Real time: 7253
Dead time: 0.72 %
Detector ID: 4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_Soil_TunaCan.Clb
4_Soil_TunaCan_90099_033012

Energy Calibration
Created: 2/28/2012 2:55:17 PM
Zero offset: 0.091 keV
Gain: 0.250 keV/channel
Quadratic: -2.917E-08 keV/channel^2

Efficiency Calibration
Created: 4/2/2012 1:19:41 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.78 %
Log(Eff): -3.983609E-01 + (-5.746278E-01*Log(E)) + (-2.046438E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.80 %
Log(Eff): -2.546791E+01 + (9.285295E+00*Log(E)) + (-9.904428E-01*Log(E)^2)

Library Files
Main analysis library: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (1999.44keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 3 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1108

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. uCi/Sour	Nuc
46.55	47124.	0.63	0.76	1.208E-02				
59.59	54866.	0.56	0.76	1.721E-02	59.54	100.000	4.478E+02	AM241
88.12	3315.	2.53	0.84	2.354E-02				
661.43	16127.	0.86	1.34	6.783E-03	661.66	100.000	3.829E+02	CS137
1173.07	9616.	1.14	1.61	4.163E-03				
1332.31	8608.	1.09	1.83	3.728E-03	1332.50	100.000	7.452E+02	Co1332

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
185.74	46.55	11672.	47124.	3.900E+06	0.63	0.759	-	
351.92	88.08	1814.	3335.	1.417E+05	2.50	0.839	-	D
4691.64	1173.07	330.	9616.	2.310E+06	1.14	1.611	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EfficiencyVerification.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.85	59.59	10017.	54866.	7.620	0.56	0.763
CS-137	2644.55	661.43	602.	16127.	2.240	0.86	1.344
Co-1332	5328.94	1332.31	36.	8608.	1.196	1.09	1.834

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/Source	Peak Energy keV	Peak Activity uCi/Source	Code	MDA Value uCi/Source	COMMENTS
AM-241		4.4779E+02				1.58E+05	
			59.54	4.478E+02	(	3.829E+00 5.62E-01	1.00E+02 G
CS-137		3.8291E+02				1.10E+04	
			661.66	3.829E+02	(	2.780E+00 8.62E-01	1.00E+02 G
Co-1332		7.4516E+02				1.93E+03	
			1332.50	7.452E+02	(	2.655E+00 1.09E+00	1.00E+02 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity uCi/Source	Time Corrected Activity uCi/Source	Uncertainty 1 Sigma Counting	MDA
AM-241	4.4322E+02	4.4779E+02	5.616E-01%	3.83E+00
CS-137	3.3031E+02	3.8291E+02	8.623E-01%	2.78E+00
Co-1332	3.2075E+02	7.4516E+02	1.093E+00%	2.65E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (92.9 to 1999.4 keV) 1.094E+03 uCi/Source
Total Decayed Activity (92.9 to 1999.4 keV) 1.5758633E+03 uCi/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector # 7**
SpectrumID: 7_20140128004_EffVerif
Analysis Description: ACVTOP-259586;TunaCan2006
Calibration: 7_TunaCan_90099_032712
Detector: Ge 7 SN/154

Verification Date: 2014-01-28 18:43
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.25E+02	5.2%
Cs-137	661.66	400	3.78E+02	5.6%
Co-1332	1332.5	777	7.28E+02	6.2%

Comments:

Perform Jody Watson Reviev 1/28/2014

C:\User\CRpt\7_20140128004_EffVerif.xls

Sample Description: ACVTOP-259586;TunaCan2006
Detector: Ge 7 SN/154
Source Date: 10/1/2006 11:00
Acquired: 1/28/2014 18:43:13
Analyzed: 1/28/2014 20:45

Analyst: Jody Watson

Efficiency: 7_TunaCan_90099_032712
Library: DET_EfficiencyVerification.lib

Nuclide	Activity GPS/Source	Uncertainty %
AM-241	4.255E+02	0.39
CS-137	3.777E+02	0.59
Co-1332	7.285E+02	0.82
Total	1.532E+03	

TestAmerica Spectrum name: 7_20140128004_EffVerif.An1

Sample description
ACVTOP-259586;TunaCan2006

Spectrum Filename: C:\User\SPC\Det7\7_20140128004_EffVerif.An1

Acquisition information
Start time:	1/28/2014 6:43:13 PM
Live time:	7200
Real time:	7330
Dead time:	1.77 %
Detector ID:	7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Soil_TunaCan.Clb
7_TunaCan_90099_032712

Energy Calibration
Created:	2/23/2012 8:40:56 AM
Zero offset:	0.117 keV
Gain:	0.250 keV/channel
Quadratic:	3.508E-09 keV/channel^2

Efficiency Calibration
Created:	3/16/2012 11:45:14 AM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 0.87 %
Log(Eff):	6.716580E-01 + (-6.166540E-01*Log(E)) + (-2.065917E-02*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 1.48 %
Log(Eff):	-2.689695E+01 + (1.019544E+01*Log(E)) + (-1.081671E+00*Log(E)^2)

Library Files
Main analysis library:	DET_EfficiencyVerification.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (2000.12keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method

```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.

       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                          Status          Comments
       Decay correct to date:         YES       10/1/2006 11:00:00 AM
       Decay during acquisition:      YES
       Decay during collection:       NO
       True coincidence correction:   NO
       Peaked background correction:  NO
       Absorption (Internal):         NO
       Geometry correction:           NO
       Random summing:                NO


total peaks alloc.    3 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0148
```

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. GPS/Sour	Nuc
36.68	1330.	9.67	1.05	1.489E-02				
46.60	80032.	0.43	0.84	2.484E-02				
59.54	112070.	0.39	0.88	3.701E-02	59.54	100.000	4.255E+02	AM241
88.01	3908.	2.64	0.88	5.327E-02				
661.64	34273.	0.59	1.49	1.492E-02	661.66	100.000	3.777E+02	CS137
1173.20	17374.	0.85	1.92	8.929E-03				
1332.45	15910.	0.82	2.01	7.951E-03	1332.50	100.000	7.285E+02	Co1332

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
146.25	36.68	5068.	1330.	8.929E+04	9.67	1.047	-	s
185.76	46.55	21357.	85177.	3.429E+06	0.47	0.876	-	
351.61	87.98	3362.	3908.	7.336E+04	2.64	0.881	-	D
4692.54	1173.20	614.	17374.	1.946E+06	0.85	1.923	-	

```
  s - Peak fails shape tests.
  D - Peak area deconvoluted.
  L - Peak written from unknown list.
  C - Area < Critical level.

------------------------------------------------------------
This section based on library: DET_EfficiencyVerification.lib
```

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.70	59.54	19241.	112070.	15.565	0.39	0.882
CS-137	2646.28	661.64	1145.	34273.	4.760	0.59	1.489
Co-1332	5329.51	1332.45	128.	15910.	2.210	0.82	2.010

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity GPS/Source	Peak Energy keV	Peak Activity GPS/Source	Code	MDA Value GPS/Source	COMMENTS
AM-241		4.2547E+02				1.58E+05	
			59.54	4.255E+02	(	2.464E+00 3.91E-01 1.00E+02 G	
CS-137		3.7766E+02				1.10E+04	
			661.66	3.777E+02	(	1.767E+00 5.92E-01 1.00E+02 G	
Co-1332		7.2849E+02				1.93E+03	
			1332.50	7.285E+02	(	2.533E+00 8.19E-01 1.00E+02 G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity GPS/Source	Time Corrected Activity GPS/Source	Uncertainty 1 Sigma Counting	MDA
AM-241	4.2051E+02	4.2547E+02	3.912E-01%	2.46E+00
CS-137	3.1896E+02	3.7766E+02	5.918E-01%	1.77E+00
Co-1332	2.7793E+02	7.2849E+02	8.193E-01%	2.53E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (98.9 to 2000.1 keV) 1.017E+03 GPS/Source
Total Decayed Activity (98.9 to 2000.1 keV) 1.5316135E+03 GPS/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector # 8**
SpectrumID: 8_20140610003_EffVerif
Analysis Description: ACVTop-259586;TunaCan2006
Calibration: 8_Soil_TunaCan_90099_032712
Detector: Ge 8 SN/174

Verification Date: 2014-06-10 05:54
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.70E+02	-4.7%
Cs-137	661.66	400	3.95E+02	1.3%
Co-1332	1332.5	777	7.55E+02	2.8%

Comments:

Perform __Jody Watson 6/10/14_____ Reviev _Elizabeth Hoerchler 06/10/14_____

C:\User\CRpt\8_20140610003_EffVerif.xls

Sample Description: ACVTop-259586;TunaCan2006
Detector: Ge 8 SN/174
Source Date: 10/1/2006 11:00
Acquired: 6/10/2014 05:54:59
Analyzed: 6/10/2014 07:59

Analyst: Jody Watson

Efficiency: 8_Soil_TunaCan_90099_032712
Library: DET_EfficiencyVerification.lib

Nuclide	Activity GPS/Source	Uncertainty %
AM-241	4.701E+02	0.43
CS-137	3.948E+02	0.65
Co-1332	7.554E+02	0.88
Total	1.620E+03	

TestAmerica Spectrum name: 8_20140610003_EffVerif.An1

Sample description
ACVTop-259586;TunaCan2006

Spectrum Filename: C:\User\SPC\Det8\8_20140610003_EffVerif.An1

Acquisition information
Start time: 6/10/2014 5:54:59 AM
Live time: 7200
Real time: 7438
Dead time: 3.20 %
Detector ID: 8

Detector system
Ge 8 SN/174

Calibration
Filename: 8_Soil_TunaCan.Clb
8_Soil_TunaCan_90099_032712

Energy Calibration
Created: 2/28/2012 10:34:41 AM
Zero offset: 0.052 keV
Gain: 0.250 keV/channel
Quadratic: 5.282E-10 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 10:35:20 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.39 %
Log(Eff): -1.098764E-01 + (-4.958544E-01*Log(E)) + (-2.572270E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.71 %
Log(Eff): -2.525301E+01 + (9.398253E+00*Log(E)) + (-1.000034E+00*Log(E)^2)

Library Files
Main analysis library: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.55keV)
Stop channel: 8000 (1999.96keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 3 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0646

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. GPS/Sour	Nuc
46.48	74388.	0.54	1.12	2.001E-02				
59.48	96326.	0.43	1.10	2.878E-02	59.54	100.000	4.701E+02	AM241
87.98	2894.	5.50	1.13	3.991E-02				
661.55	28787.	0.65	1.51	1.209E-02	661.66	100.000	3.948E+02	CS137
1173.15	14711.	0.88	1.84	7.453E-03				
1332.39	13210.	0.88	1.91	6.678E-03	1332.50	100.000	7.554E+02	Co1332

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
185.72	46.48	21350.	74388.	3.718E+06	0.54	1.116	-	
351.74	87.98	4980.	2894.	7.250E+04	5.50	1.130	-	s
4692.64	1173.15	355.	14711.	1.974E+06	0.88	1.837	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EfficiencyVerification.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.73	59.48	16488.	96326.	13.379	0.43	1.102
CS-137	2646.15	661.55	986.	28787.	3.998	0.65	1.513
Co-1332	5329.60	1332.39	62.	13210.	1.835	0.88	1.913

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity GPS/Source	Peak Energy keV	Peak Activity GPS/Source	Code	MDA Value GPS/Source	COMMENTS
AM-241		4.7008E+02				1.58E+05	
			59.54	4.701E+02	(	2.933E+00 4.29E-01 1.00E+02 G	
CS-137		3.9484E+02				1.10E+04	
			661.66	3.948E+02	(	2.044E+00 6.53E-01 1.00E+02 G	
Co-1332		7.5537E+02				1.93E+03	
			1332.50	7.554E+02	(	2.247E+00 8.84E-01 1.00E+02 G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity GPS/Source	Time Corrected Activity GPS/Source	Uncertainty 1 Sigma Counting	MDA
AM-241	4.6432E+02	4.7008E+02	4.287E-01%	2.93E+00
CS-137	3.3070E+02	3.9484E+02	6.532E-01%	2.04E+00
Co-1332	2.7477E+02	7.5537E+02	8.845E-01%	2.25E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.5 to 2000.0 keV) 1.070E+03 GPS/Source
Total Decayed Activity (37.5 to 2000.0 keV) 1.6202783E+03 GPS/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector #14**
SpectrumID: 14_20140124005_EffVerif
Analysis Description: ACVTop-259586;TunaCan2006
Calibration: 14_TunaCan_90099_042312
Detector: Ge14 SN/11080670

Verification Date: 2014-01-24 08:37
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.50E+02	-0.3%
Cs-137	661.66	400	3.96E+02	1.0%
Co-1332	1332.5	777	7.52E+02	3.3%

Comments:

Perform Jody Watson Revie 1/24/2014

C:\User\CRpt\14_20140124005_EffVerif.xls

Sample Description: ACVTop-259586;TunaCan2006
Detector: Ge14 SN/11080670
Source Date: 10/1/2006 11:00
Acquired: 1/24/2014 08:37:03
Analyzed: 1/24/2014 10:38

Analyst: Jody Watson

Efficiency: 14_TunaCan_90099_042312
Library: DET_EfficiencyVerification.lib

Nuclide	Activity GPS/Source	Uncertainty %
AM-241	4.504E+02	0.41
CS-137	3.959E+02	0.61
Co-1332	7.517E+02	0.83
Total	1.598E+03	

TestAmerica, Inc. Spectrum name: 14_20140124005_EffVerif.An1

Sample description
ACVTop-259586;TunaCan2006

Spectrum Filename: C:\User\SPC\Det14\14_20140124005_EffVerif.An1

Acquisition information
Start time: 1/24/2014 8:37:03 AM
Live time: 7200
Real time: 7252
Dead time: 0.72 %
Detector ID: 14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_Soil_TunaCan.Clb
14_TunaCan_90099_042312

Energy Calibration
Created: 2/28/2012 10:48:23 AM
Zero offset: 0.130 keV
Gain: 0.250 keV/channel
Quadratic: -2.050E-08 keV/channel^2

Efficiency Calibration
Created: 4/23/2012 11:29:47 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.02 %
Log(Eff): 2.101260E-01 + (-5.951973E-01*Log(E)) + (-1.605331E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -2.391492E+01 + (8.828985E+00*Log(E)) + (-9.371496E-01*Log(E)^2)

Library Files
Main analysis library: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.64keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 3 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0538

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. GPS/Sour	Nuc
36.71	1330.	9.37	0.74	1.399E-02				
46.66	77034.	0.50	0.77	2.180E-02				
59.60	98253.	0.41	0.78	3.069E-02	59.54	100.000	4.504E+02	AM241
87.91	3613.	3.51	0.89	4.194E-02				
661.71	31623.	0.61	1.37	1.313E-02	661.66	100.000	3.959E+02	CS137
1173.29	17093.	0.83	1.70	8.243E-03				
1332.57	15352.	0.83	1.88	7.422E-03	1332.50	100.000	7.517E+02	Co1332

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
146.27	36.71	4728.	1330.	9.509E+04	9.37	0.737	-	s
186.05	46.66	19645.	77034.	3.534E+06	0.50	0.771	-	
351.01	87.91	3738.	3613.	8.616E+04	3.51	0.888	-	s
4692.81	1173.29	462.	17093.	2.074E+06	0.83	1.704	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EfficiencyVerification.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.82	59.60	15728.	98253.	13.646	0.41	0.779
CS-137	2645.98	661.71	958.	31623.	4.392	0.61	1.366
Co-1332	5330.24	1332.57	122.	15352.	2.132	0.83	1.879

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity GPS/Source	Peak Energy keV	Peak Activity GPS/Source	Code	MDA Value GPS/Source	COMMENTS
AM-241		4.5043E+02				1.58E+05	
			59.54	4.504E+02	(	2.692E+00 4.05E-01 1.00E+02	G
CS-137		3.9589E+02				1.10E+04	
			661.66	3.959E+02	(	1.839E+00 6.06E-01 1.00E+02	G
Co-1332		7.5170E+02				1.93E+03	
			1332.50	7.517E+02	(	2.658E+00 8.29E-01 1.00E+02	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity GPS/Source	Time Corrected Activity GPS/Source	Uncertainty 1 Sigma Counting	MDA
AM-241	4.4518E+02	4.5043E+02	4.053E-01%	2.69E+00
CS-137	3.3446E+02	3.9589E+02	6.060E-01%	1.84E+00
Co-1332	2.8725E+02	7.5170E+02	8.288E-01%	2.66E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 1.067E+03 GPS/Source
Total Decayed Activity (37.6 to 1999.5 keV) 1.5980186E+03 GPS/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector #15**
SpectrumID: 15_20140124007_EffVerif
Analysis Description: ACVTop-259586;TunaCan2006
Calibration: 15_TunaCan_90099_032212
Detector: Ge15 SN/11012216

Verification Date: 2014-01-24 15:13
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.42E+02	1.5%
Cs-137	661.66	400	3.86E+02	3.5%
Co-1332	1332.5	777	7.51E+02	3.3%

Comments:

Perforn ____Jody Watson_____ Revie 1/24/2014

C:\User\CRpt\15_20140124007_EffVerif.xls

Sample Description: ACVTop-259586;TunaCan2006
Detector: Ge15 SN/11012216
Source Date: 10/1/2006 11:00
Acquired: 1/24/2014 15:13:10
Analyzed: 1/24/2014 17:13

Analyst: Jody Watson

Efficiency: 15_TunaCan_90099_032212
Library: DET_EfficiencyVerification.lib

Nuclide	Activity GPS/Source	Uncertainty %
AM-241	4.423E+02	0.46
CS-137	3.861E+02	0.67
Co-1332	7.514E+02	0.92
Total	1.580E+03	

TestAmerica, Inc. Spectrum name: 15_20140124007_EffVerif.An1

Sample description
ACVTop-259586;TunaCan2006

Spectrum Filename: C:\User\SPC\Det15\15_20140124007_EffVerif.An1

Acquisition information
Start time: 1/24/2014 3:13:10 PM
Live time: 7200
Real time: 7227
Dead time: 0.37 %
Detector ID: 15

Detector system
Ge15 SN/11012216

Calibration
Filename: 15_Soil_TunaCan.Clb
15_TunaCan_90099_032212

Energy Calibration
Created: 2/28/2012 4:29:17 PM
Zero offset: 0.044 keV
Gain: 0.250 keV/channel
Quadratic: -3.267E-08 keV/channel^2

Efficiency Calibration
Created: 3/22/2012 1:03:01 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.00 %
Log(Eff): -6.894897E-01 + (-3.290613E-01*Log(E)) + (-3.875629E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.13 %
Log(Eff): -2.362677E+01 + (8.666669E+00*Log(E)) + (-9.214638E-01*Log(E)^2)

Library Files
Main analysis library: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.57keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 3 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0029

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. GPS/Sour	Nuc
46.55	63242.	0.50	0.95	1.954E-02				
59.54	86146.	0.46	1.02	2.737E-02	59.54	100.000	4.423E+02	AM241
88.03	3254.	4.88	1.09	3.706E-02				
661.65	27112.	0.67	1.55	1.155E-02	661.66	100.000	3.861E+02	CS137
1173.21	14966.	0.95	1.84	7.076E-03				
1332.50	13074.	0.92	1.94	6.325E-03	1332.50	100.000	7.514E+02	Co1332

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
185.66	46.49	20160.	68291.	3.495E+06	0.57	1.022	-
351.69	88.03	4872.	3254.	8.780E+04	4.88	1.089	-
4691.88	1173.21	622.	14966.	2.115E+06	0.95	1.839	-

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EfficiencyVerification.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.80	59.54	15953.	86146.	11.965	0.46	1.023
CS-137	2645.26	661.65	1040.	27112.	3.766	0.67	1.551
Co-1332	5329.37	1332.50	161.	13074.	1.816	0.92	1.937

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity GPS/Source	Peak Energy keV	Peak Activity GPS/Source	Code	MDA Value GPS/Source	COMMENTS
AM-241		4.4227E+02				1.58E+05	
			59.54	4.423E+02	(	3.036E+00 4.61E-01	1.00E+02 G
CS-137		3.8607E+02				1.10E+04	
			661.66	3.861E+02	(	2.179E+00 6.74E-01	1.00E+02 G
Co-1332		7.5135E+02				1.93E+03	
			1332.50	7.514E+02	(	3.557E+00 9.18E-01	1.00E+02 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity GPS/Source	Time Corrected Activity GPS/Source	Uncertainty 1 Sigma Counting	MDA
AM-241	4.3711E+02	4.4227E+02	4.613E-01%	3.04E+00
CS-137	3.2615E+02	3.8607E+02	6.736E-01%	2.18E+00
Co-1332	2.8708E+02	7.5135E+02	9.185E-01%	3.56E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 1.050E+03 GPS/Source
Total Decayed Activity (37.6 to 1999.5 keV) 1.5796848E+03 GPS/Source

Monthly Backgrounds

Test America
St. Louis
Background Check

Spectrum: 4_20140711008_BGLong
Acquired: 7/11/2014 3:24:18 PM
Detector: Ge 4 SN/181
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.32	1.20	1.24	1.27	1.39	1.43	PASS

Analyst: Micha Korrinhizer Reviewer:

TestAmerica Spectrum name: 4_20140711008_BGLong.An1

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det4\4_20140711008_BGLong.An1

Acquisition information
Start time:	7/11/2014 3:24:18 PM
Live time:	43200
Real time:	43249
Dead time:	0.11 %
Detector ID:	4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_QC.Clb
4_QA-D_Rad11-0018_032612

Energy Calibration
Created:	2/28/2012 2:55:17 PM
Zero offset:	0.091 keV
Gain:	0.250 keV/channel
Quadratic:	-2.917E-08 keV/channel^2

Efficiency Calibration
Created:	3/27/2012 7:34:55 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (1999.44keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

TestAmerica Spectrum name: 4_20140711008_BGLong.An1

Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 0.0378

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.66	461.	9.14	0.81	3.541E-02	46.54	4.250	7.101E+00	PB210
63.32	325.	9.78	0.96	4.645E-02	63.29	3.810	4.253E+00	TH234
74.90	126.	19.42	0.83	5.411E-02				
77.12	100.	25.29	0.83	5.559E-02				
92.62	480.	7.80	1.05	6.309E-02	92.59	5.584	3.152E+00	TH234
					93.35	5.561	3.163E+00	AC228
185.62	256.	14.28	1.10	5.802E-02	185.72	54.000	1.888E-01	U235
					185.99	3.280	3.109E+00	Ra226
238.49	127.	23.74	0.93	5.338E-02	238.63	43.300	1.272E-01	PB212
1460.45	90.	17.95	0.62	7.834E-03	1460.83	10.670	2.506E+00	K40

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
299.00	74.88	250.	140.	2.587E+03	20.29	1.054	-	s
307.91	77.11	210.	98.	1.763E+03	25.47	0.392	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.16	46.66	357.	461.	0.011	9.14	0.813s
TH-234	252.76	63.32	242.	325.	0.008	9.78	0.957
TH-234	369.92	92.62	290.	480.	0.011	7.80	1.050s
Ra-226	741.74	185.62	280.	256.	0.006	14.28	1.103s
PB-212	953.12	238.49	247.	127.	0.003	23.74	0.929
K-40	5841.85	1460.45	32.	90.	0.002	17.95	0.621s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS		COMMENTS
K-40	N	2.5063E+00				4.66E+11		
			1460.83	2.506E+00	(	7.994E-01	1.79E+01 1.07E+01	G
PB-210	N	7.1008E+00				8.14E+03		
			46.54	7.101E+00	@(	1.400E+00	9.14E+00 4.25E+00	G
PB-212	N	1.2721E-01				6.98E+02		
			238.63	1.272E-01	?(	7.607E-02	2.37E+01 4.33E+01	G
			300.03	0.000E+00		1.084E-01	0.00E+00 3.28E+00	GA
TH-234	N	4.2527E+00				1.63E+12		
			63.29	4.253E+00	(	9.840E-01	9.78E+00 3.81E+00	G
			92.59	3.152E+00	-	5.396E-01	7.80E+00 5.58E+00	G
Ra-226		3.1093E+00				5.84E+05		
			185.99	3.109E+00	@(	9.828E-01	1.43E+01 3.28E+00	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.

- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - -

SB-124	<	5.0570E-02			
SB-125	<	1.2064E-01			
I-131	<	2.4091E-02			
BA-133	<	4.7653E-02			
CS-134	<	5.1669E-02			
CS-137	<	1.0661E-01			
CE-139	<	2.7270E-02			
Ba-140	<	7.8561E-02			
La-140	<	2.8820E-02			
CE-141	<	5.8617E-02			
CE-144	<	2.5980E-01			
PM-144	<	1.0295E-01			
EU-152	<	8.1484E-02			
EU-154	<	4.9476E-01			
EU-155	<	1.2289E-01			
HF-181	<	5.2472E-02			
Ta-182	<	2.5344E-01			
Hg-203	<	3.8859E-02			
TL-208	<	6.3492E-02			
pm-146	<	1.9581E-01			
y-88	<	4.9930E-02			
PB-210	#	7.1008E+00	9.1350E+00%		1.400E+00
PB-212	#	1.2721E-01	2.3742E+01%		7.607E-02
PB-214	<	7.1210E-02			
BI-207	<	5.4420E-02			
BI-212	<	1.0292E+00			
BI-214	<	1.6077E-01			
BI-210M	<	5.7143E-02			
RA-224	<	4.1210E-01			
AC-228	<	2.9410E-01			
TH-227	<	2.4489E-01			
TH-229	<	3.4771E-01			
TH-234		4.2527E+00	9.7818E+00%		9.840E-01
PA-231	<	8.3775E-01			
PA-233	<	8.7202E-02			
PA-234	<	1.5739E-01			
PA-234M	<	6.8492E+00			
Ra-226	#	3.1093E+00	1.4278E+01%		9.828E-01
U-235	<	2.8961E-01			
AM-241	<	1.2181E-01			
Np-237	<	1.2542E-01			

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.

  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

--- S U M M A R Y ---

Total Activity (37.6 to 1999.4 keV)	1.710E+01	DPS

Test America
St. Louis
Background Check

Spectrum: 7_20140711008_BGLong
Acquired: 7/11/2014 3:25:03 PM
Detector: Ge 7 SN/154
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.26	1.40	1.45	PASS

Analyst: Micha Korrinhizer Reviewer: Siobhan Perry

TestAmerica Spectrum name: 7_20140711008_BGLong.An1

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det7\7_20140711008_BGLong.An1

Acquisition information
Start time:	7/11/2014 3:25:03 PM
Live time:	43200
Real time:	43914
Dead time:	1.63 %
Detector ID:	7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_QC.Clb
Ge7_QC

Energy Calibration
Created:	2/23/2012 8:40:56 AM
Zero offset:	0.117 keV
Gain:	0.250 keV/channel
Quadratic:	3.508E-09 keV/channel^2

Efficiency Calibration
Created:	1/6/2011 8:06:10 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (2000.12keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 18 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0907

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.62	343.	11.54	0.75	8.133E-02	46.54	4.250	2.301E+00	PB210
63.24	462.	10.24	0.93	1.227E-01	63.29	3.810	2.285E+00	TH234
92.57	609.	7.80	1.12	1.861E-01	92.59	5.584	1.357E+00	TH234
					93.35	5.561	1.361E+00	AC228
143.70	95.	28.11	0.82	1.840E-01	143.79	10.960	1.091E-01	U235
185.78	301.	13.43	0.89	1.633E-01	185.72	54.000	7.901E-02	U235
					185.99	3.280	1.302E+00	Ra226
238.55	180.	16.52	1.09	1.417E-01	238.63	43.300	6.810E-02	PB212
352.07	93.	25.18	0.73	9.536E-02	351.93	37.600	6.022E-02	PB214
511.00	841.	5.55	1.59	6.488E-02	511.86	20.000	1.503E+00	RH106
883.96	88.	23.53	0.56	3.237E-02				
1461.66	92.	15.58	0.56	1.997E-02	1460.83	10.670	9.996E-01	K40

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
2043.69	511.00	217.	841.	1.296E+04	5.55	1.593	-	sM
3535.60	883.96	53.	88.	2.708E+03	23.53	0.562	-	sM

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.05	46.62	366.	343.	0.008	11.54	0.749
TH-234	252.52	63.24	410.	462.	0.011	10.24	0.927
TH-234	369.87	92.57	396.	609.	0.014	7.80	1.115s
U-235	574.39	143.70	206.	95.	0.002	28.11	0.818
U-235	742.49	185.72	277.	260.	0.006	10.93	0.986D
PB-212	953.84	238.55	202.	180.	0.004	16.52	1.092
PB-214	1407.92	352.07	138.	93.	0.002	25.18	0.726s
K-40	5846.31	1461.66	17.	92.	0.002	15.58	0.564s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Peak Code	Peak MDA Value DPS	Peak COMMENTS
K-40	N	9.9964E-01				4.66E+11	
			1460.83	9.996E-01	(	2.382E-01 1.56E+01 1.07E+01	G
PB-210	N	2.3008E+00				8.14E+03	
			46.54	2.301E+00	(	6.171E-01 1.15E+01 4.25E+00	G
PB-212	N	6.8100E-02				6.98E+02	
			238.63	6.810E-02	?(	2.604E-02 1.65E+01 4.33E+01	G
			300.03	0.000E+00	%	3.234E-01 1.53E+02 3.28E+00	GA
PB-214	N	6.0219E-02				5.84E+05	
			351.93	6.022E-02	(	3.703E-02 2.52E+01 3.76E+01	G
			295.09	0.000E+00	%	6.705E-02 4.81E+01 1.93E+01	G
			242.00	0.000E+00	%	1.575E-01 7.97E+01 7.43E+00	GA
TH-234	N	2.2848E+00				1.63E+12	
			63.29	2.285E+00	(	4.800E-01 1.02E+01 3.81E+00	G
			92.59	1.357E+00	-	2.126E-01 7.80E+00 5.58E+00	G
U-235	N	1.0909E-01				2.57E+11	
			185.72	6.825E-02	}	2.108E-02 1.09E+01 5.40E+01	GA
			143.79	1.091E-01	(	7.991E-02 2.81E+01 1.10E+01	G
			205.33	0.000E+00		2.193E-02 0.00E+00 5.01E+00	G
			163.38	0.000E+00	&	1.863E-01 8.29E+01 5.08E+00	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went
negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide
failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the
library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Activity DPS	Time of Count Uncertainty 1 Sigma Counting	MDA
BE-7	<	1.6760E-01		
NA-22	<	3.6819E-02		
K-40	#	9.9964E-01	1.5575E+01%	2.382E-01
Sc-46	<	1.0872E-02		
CR-51	<	1.6721E-01		
MN-54	<	2.8213E-02		
FE-59	<	2.2302E-02		
Co-56	<	1.0580E-02		
CO-57	<	9.9413E-03		
CO-58	<	2.3363E-02		

CO-60	<	2.3882E-02		
ZN-65	<	4.4952E-02		
NB-94	<	2.4459E-02		
ZR-95	<	5.7978E-02		
NB-95	<	3.2697E-02		
RU-103	<	8.8098E-03		
RH-106	<	2.2703E-01		
AG-108M	<	1.6860E-02		
AG-110M	<	3.5136E-02		
SN-113	<	2.8664E-02		
SB-124	<	2.0940E-02		
SB-125	<	6.0446E-02		
I-131	<	1.7903E-02		
BA-133	<	2.4088E-02		
CS-134	<	3.0403E-02		
CS-137	<	3.4359E-02		
CE-139	<	1.0757E-02		
Ba-140	<	9.3368E-02		
La-140	<	1.2127E-02		
CE-141	<	9.4452E-03		
CE-144	<	4.3347E-02		
PM-144	<	2.7307E-02		
EU-152	<	2.1778E-02		
EU-154	<	1.0363E-01		
EU-155	<	4.3113E-02		
HF-181	<	2.1228E-02		
Ta-182	<	5.6379E-02		
Hg-203	<	1.4893E-02		
TL-208	<	2.7595E-02		
pm-146	<	4.9963E-02		
y-88	<	4.0159E-02		
PB-210		2.3008E+00	1.1540E+01%	6.171E-01
PB-212 #		6.8100E-02	1.6521E+01%	2.604E-02
PB-214		6.0219E-02	2.5178E+01%	3.703E-02
BI-207	<	2.5915E-02		
BI-212	<	4.2931E-01		
BI-214	<	5.6914E-02		
BI-210M	<	2.2753E-02		
RA-224	<	3.0527E-01		
AC-228	<	1.4175E-01		
TH-227	<	3.9909E-02		
TH-229	<	2.3340E-01		
TH-234		2.2848E+00	1.0241E+01%	4.800E-01
PA-231	<	5.1471E-01		
PA-233	<	2.8379E-02		
PA-234	<	2.6329E-02		
PA-234M	<	4.5309E+00		
Ra-226	<	4.7459E-01		
U-235		1.0909E-01	2.8107E+01%	7.991E-02

AM-241 < 4.9920E-02
Np-237 < 8.0402E-02

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

--- S U M M A R Y ---

Total Activity (205.1 to 2000.1 keV) 5.823E+00 DPS

Test America
St. Louis
Background Check

Spectrum: 8_20140711008_BGLong
Acquired: 7/11/2014 3:25:42 PM
Detector: Ge 8 SN/174
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.56	1.39	1.45	1.59	1.68	1.74	PASS

Analyst: Micha Korrinhizer Reviewer: Siobhan Perry

TestAmerica Spectrum name: 8_20140711008_BGLong.An1

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det8\8_20140711008_BGLong.An1

Acquisition information
Start time:	7/11/2014 3:25:42 PM
Live time:	43200
Real time:	44520
Dead time:	2.96 %
Detector ID:	8

Detector system
Ge 8 SN/174

Calibration
Filename: 8_QC.Clb
Ge8_QC

Energy Calibration
Created:	2/28/2012 10:34:41 AM
Zero offset:	0.052 keV
Gain:	0.250 keV/channel
Quadratic:	5.282E-10 keV/channel^2

Efficiency Calibration
Created:	1/6/2011 8:07:20 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.55keV)
Stop channel:	8000 (1999.96keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 26 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0709

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
59.52	266.	12.73	1.02	8.694E-02	59.54	35.900	1.970E-01	AM241
63.29	612.	6.18	1.03	9.251E-02	63.29	3.810	4.021E+00	TH234
92.56	1226.	4.31	1.03	1.295E-01	92.59	5.584	3.925E+00	TH234
					93.35	5.561	3.938E+00	AC228
143.72	163.	27.26	0.86	1.248E-01	143.79	10.960	2.759E-01	U235
185.77	641.	7.00	0.82	1.108E-01	185.72	54.000	2.479E-01	U235
					185.99	3.280	4.084E+00	Ra226
205.47	125.	29.62	1.15	1.054E-01	205.33	5.010	5.485E-01	U235
238.62	174.	21.06	0.87	9.639E-02	238.63	43.300	9.632E-02	PB212
352.19	170.	21.19	0.46	6.551E-02	351.93	37.600	1.598E-01	PB214
510.87	709.	6.67	1.90	4.531E-02	511.86	20.000	1.814E+00	RH106
596.34	60.	29.93	0.52	3.853E-02				
609.20	84.	28.33	0.82	3.750E-02	609.31	46.090	1.132E-01	BI214
661.57	161.	12.55	1.63	3.334E-02	661.66	85.210	1.315E-01	CS137
766.76	92.	25.50	1.28	2.899E-02	766.41	0.294	2.508E+01	PA234M
1001.00	88.	25.02	0.54	2.158E-02	1001.00	0.837	1.128E+01	PA234M
1173.26	142.	15.86	0.51	1.834E-02	1173.24	99.900	1.796E-01	CO60
1332.53	121.	14.34	1.39	1.637E-02	1332.50	99.980	1.711E-01	CO60
1460.54	70.	17.33	0.82	1.543E-02	1460.83	10.670	9.914E-01	K40

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
2043.39	510.87	255.	709.	1.565E+04	6.67	1.898	- s
2385.28	596.34	75.	60.	1.557E+03	29.93	0.519	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	238.05	59.56	560.	283.	0.007	18.39	0.880
TH-234	253.14	63.33	459.	616.	0.014	8.04	0.908
TH-234	370.06	92.56	469.	1226.	0.028	4.31	1.034
U-235	574.70	143.72	453.	163.	0.004	27.26	0.858s
U-235	742.72	185.72	373.	696.	0.016	5.05	0.818D
U-235	821.71	205.47	326.	125.	0.003	29.62	1.155
PB-212	954.32	238.62	317.	174.	0.004	21.06	0.872s
PB-214	1408.62	352.19	234.	170.	0.004	21.19	0.462s
BI-214	2436.72	609.20	128.	84.	0.002	28.33	0.820s
CS-137	2646.22	661.57	75.	161.	0.004	12.55	1.629
PA-234M	3067.01	766.76	87.	92.	0.002	25.50	1.282s
PA-234M	4004.02	1001.00	70.	88.	0.002	25.02	0.545s
CO-60	4693.08	1173.26	63.	142.	0.003	15.86	0.507s
CO-60	5330.16	1332.53	36.	121.	0.003	14.34	1.386s
K-40	5842.24	1460.54	18.	70.	0.002	17.33	0.823s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS		COMMENTS
K-40	N	9.9145E-01					4.66E+11	
			1460.83	9.914E-01	(	3.123E-01	1.73E+01 1.07E+01	G
CO-60	F	1.7537E-01					1.93E+03	
			1332.50	1.711E-01	?(	4.337E-02	1.43E+01 1.00E+02	G
			1173.24	1.796E-01	(	5.010E-02	1.59E+01 9.99E+01	G
CS-137	I	1.3145E-01					1.10E+04	
			661.66	1.315E-01	(	3.502E-02	1.26E+01 8.52E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	9.6322E-02					6.98E+02	
			238.63	9.632E-02	?(	4.755E-02	2.11E+01	4.33E+01 G
			300.03	0.000E+00		6.527E-02	0.00E+00	3.28E+00 GA
PB-214	N	1.5975E-01					5.84E+05	
			351.93	1.598E-01	*(	6.944E-02	2.12E+01	3.76E+01 G
			295.09	0.000E+00	%	1.117E-01	4.11E+01	1.93E+01 G
			242.00	0.000E+00	%	2.061E-01	6.34E+01	7.43E+00 GA
BI-214	N	1.1318E-01					5.84E+05	
			609.31	1.132E-01	?(	7.411E-02	2.83E+01	4.61E+01 G
			1120.29	0.000E+00		5.844E-02	0.00E+00	1.51E+01 G
			1764.49	0.000E+00		8.401E-02	0.00E+00	1.54E+01 G
TH-234	N	3.9748E+00					1.63E+12	
			63.29	4.049E+00	(	6.740E-01	8.04E+00	3.81E+00 G
			92.59	3.925E+00	(	3.317E-01	4.31E+00	5.58E+00 G
PA-234M	N	1.1279E+01					1.63E+12	
			1001.00	1.128E+01	?(	5.345E+00	2.50E+01	8.37E-01 G
			766.41	2.508E+01	+	1.252E+01	2.55E+01	2.94E-01 G
U-235	N	3.6143E-01					2.57E+11	
			185.72	2.693E-01	}	3.589E-02	5.05E+00	5.40E+01 GA
			143.79	2.759E-01	@(	1.725E-01	2.73E+01	1.10E+01 G
			205.33	5.485E-01	(	3.805E-01	2.96E+01	5.01E+00 G
			163.38	0.000E+00	%	3.716E-01	3.12E+01	5.08E+00 G
AM-241	T	2.0996E-01					1.58E+05	
			59.54	2.100E-01	?(	8.383E-02	1.84E+01	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction

} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	<	1.1043E-01		
NA-22	<	1.7797E-02		
K-40	#	9.9145E-01	1.7329E+01%	3.123E-01
Sc-46	<	4.1757E-02		
CR-51	<	2.0625E-01		
MN-54	<	2.7843E-02		
FE-59	<	4.5528E-02		
Co-56	<	3.0367E-02		
CO-57	<	1.6714E-02		
CO-58	<	3.3276E-02		
CO-60		1.7537E-01	1.0692E+01%	4.337E-02
ZN-65	<	6.5492E-02		
NB-94	<	1.5056E-02		
ZR-95	<	3.8723E-02		
NB-95	<	4.4269E-02		
RU-103	<	3.1636E-02		
RH-106	<	3.3372E-01		
AG-108M	<	3.5270E-02		
AG-110M	<	2.6658E-02		
SN-113	<	4.7020E-02		
SB-124	<	3.3963E-02		
SB-125	<	7.7062E-02		
I-131	<	2.3205E-02		
BA-133	<	3.7945E-02		
CS-134	<	3.3535E-02		

CS-137		1.3145E-01	1.2554E+01%	3.502E-02
CE-139	<	1.3083E-02		
Ba-140	<	8.7184E-02		
La-140	<	4.6761E-02		
CE-141	<	3.9135E-02		
CE-144	<	8.2901E-02		
PM-144	<	4.1977E-02		
EU-152	<	3.4177E-02		
EU-154	<	3.0057E-01		
EU-155	<	7.3395E-02		
HF-181	<	2.9788E-02		
Ta-182	<	1.1785E-01		
Hg-203	<	2.7458E-02		
TL-208	<	4.4903E-02		
pm-146	<	3.9876E-02		
y-88	<	5.5805E-02		
PB-210	<	6.6855E-01		
PB-212	#	9.6322E-02	2.1056E+01%	4.755E-02
PB-214	#	1.5975E-01	2.1191E+01%	6.944E-02
BI-207	<	3.0702E-02		
BI-212	<	5.6529E-01		
BI-214	#	1.1318E-01	2.8334E+01%	7.411E-02
BI-210M	<	4.1023E-02		
RA-224	<	2.5553E-01		
AC-228	<	2.1151E-01		
TH-227	<	1.4221E-01		
TH-229	<	3.4854E-01		
TH-234		3.9748E+00	4.3078E+00%	6.740E-01
PA-231	<	8.9168E-01		
PA-233	<	3.0820E-02		
PA-234	<	1.1228E-01		
PA-234M	#	1.1279E+01	2.5017E+01%	5.345E+00
Ra-226	<	9.4348E-01		
U-235		3.6143E-01	2.0128E+01%	1.725E-01
AM-241	#	2.0996E-01	1.8394E+01%	8.383E-02
Np-237	<	7.5886E-02		

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (205.3 to 2000.0 keV) 1.749E+01 DPS

Test America
St. Louis
Background Check

Spectrum: 14_20140711008_BGLong
Acquired: 7/11/2014 3:06:49 PM
Detector: Ge14 SN/11080670
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.91	1.75	1.80	1.81	2.01	2.06	PASS

Analyst: Micha Korrinhizer Reviewer: Siobhan Perry

TestAmerica, Inc. Spectrum name: 14_20140711008_BGLong.An1

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det14\14_20140711008_BGLong.An1

Acquisition information
Start time: 7/11/2014 3:06:49 PM
Live time: 43200
Real time: 43395
Dead time: 0.45 %
Detector ID: 14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_QC.Clb
14_QC_79670-334_SOURCE E_042211

Energy Calibration
Created: 2/28/2012 10:48:23 AM
Zero offset: 0.130 keV
Gain: 0.250 keV/channel
Quadratic: -2.050E-08 keV/channel^2

Efficiency Calibration
Created: 5/1/2011 8:43:09 AM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.64keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 21 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.2048

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.74	493.	10.80	0.99	6.150E-02	46.54	4.250	4.384E+00	PB210
63.39	446.	11.51	1.02	8.551E-02	63.29	3.810	3.174E+00	TH234
72.95	110.	26.62	0.78	9.935E-02				
74.97	215.	16.11	0.78	1.023E-01				
77.17	137.	23.17	0.78	1.054E-01				
84.74	193.	22.53	0.97	1.163E-01				
92.68	640.	8.63	1.06	1.215E-01	92.59	5.584	2.185E+00	TH234
					93.35	5.561	2.193E+00	AC228
185.77	326.	14.19	0.92	1.072E-01	185.72	54.000	1.303E-01	U235
					185.99	3.280	2.146E+00	Ra226
198.22	105.	28.02	0.55	1.040E-01				
238.74	192.	20.78	1.14	9.386E-02	238.63	43.300	1.093E-01	PB212
352.21	199.	17.72	1.12	6.540E-02	351.93	37.600	1.870E-01	PB214
583.29	132.	20.18	0.99	3.931E-02	583.02	84.500	9.235E-02	TL208
609.05	204.	14.32	0.80	3.710E-02	609.31	46.090	2.756E-01	BI214
694.89	73.	29.95	0.57	3.164E-02				
1461.42	93.	19.60	1.67	1.557E-02	1460.83	10.670	1.295E+00	K40
1764.99	61.	21.71	0.60	1.327E-02	1764.49	15.400	6.872E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
299.42	75.01	470.	182.	1.780E+03	20.82	0.591	-	
308.20	77.20	417.	139.	1.321E+03	25.38	0.930	-	
338.32	84.74	535.	193.	1.658E+03	22.53	0.972	-	s
792.15	198.22	283.	105.	1.006E+03	28.02	0.550	-	sM
1407.97	352.21	250.	199.	3.040E+03	17.72	1.123	-	s
2778.72	694.89	109.	73.	2.297E+03	29.95	0.573	-	sM

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.38	46.74	637.	493.	0.011	10.80	0.986s
TH-234	253.17	63.44	666.	480.	0.011	11.47	1.053s
TH-234	370.07	92.68	659.	640.	0.015	8.63	1.061s
Ra-226	742.35	185.77	493.	326.	0.008	14.19	0.917
PB-212	954.20	238.74	400.	192.	0.004	20.78	1.140s
TL-208	2332.26	583.29	130.	132.	0.003	20.18	0.995
BI-214	2435.33	609.05	144.	204.	0.005	14.32	0.797s
K-40	5845.91	1461.42	35.	93.	0.002	19.60	1.666
BI-214	7061.07	1764.99	19.	61.	0.001	21.71	0.599s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS		COMMENTS
K-40	N	1.2955E+00				4.66E+11		
			1460.83	1.295E+00	(	4.218E-01	1.96E+01 1.07E+01	G
TL-208	N	9.2346E-02				6.98E+02		
			583.02	9.235E-02	(	3.885E-02	2.02E+01 8.45E+01	G
			277.28	0.000E+00		3.211E-02	0.00E+00 6.31E+00	G
			860.56	0.000E+00	%	1.682E-01	2.93E+02 1.24E+01	G
PB-210	N	4.3838E+00				8.14E+03		
			46.54	4.384E+00	(	1.071E+00	1.08E+01 4.25E+00	G
PB-212	N	1.0932E-01				6.98E+02		
			238.63	1.093E-01	(	5.461E-02	2.08E+01 4.33E+01	G
			300.03	0.000E+00	&	5.723E-01	1.06E+02 3.28E+00	GA
BI-214	N	2.7562E-01				5.84E+05		
			609.31	2.756E-01	@(	7.928E-02	1.43E+01 4.61E+01	G
			1120.29	0.000E+00	&	2.166E-01	1.02E+02 1.51E+01	G
			1764.49	6.872E-01	+	2.628E-01	2.17E+01 1.54E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-234	N	3.4174E+00					1.63E+12	
			63.29	3.417E+00	*(	8.751E-01	1.15E+01	3.81E+00 G
			92.59	2.185E+00	-	4.174E-01	8.63E+00	5.58E+00 G
Ra-226		2.1460E+00					5.84E+05	
			185.99	2.146E+00	(	6.999E-01	1.42E+01	3.28E+00 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Activity DPS	Time of Count Uncertainty 1 Sigma Counting	MDA
BE-7	<	3.0700E-01		
NA-22	<	1.7554E-02		
K-40		1.2955E+00	1.9597E+01%	4.218E-01
Sc-46	<	2.3016E-02		
CR-51	<	2.1909E-01		
MN-54	<	3.8442E-02		
FE-59	<	3.3365E-02		
Co-56	<	3.1440E-02		
CO-57	<	1.8319E-02		
CO-58	<	3.8048E-02		
CO-60	<	6.4953E-02		
ZN-65	<	1.0455E-01		
NB-94	<	3.1188E-02		
ZR-95	<	7.3393E-02		
NB-95	<	2.9338E-02		
RU-103	<	2.8922E-02		
RH-106	<	1.5243E-01		
AG-108M	<	3.4455E-02		
AG-110M	<	2.1511E-02		
SN-113	<	4.0546E-02		
SB-124	<	3.0863E-02		
SB-125	<	1.0036E-01		
I-131	<	2.3855E-02		
BA-133	<	3.7153E-02		
CS-134	<	3.7590E-02		
CS-137	<	5.4698E-02		
CE-139	<	1.9619E-02		
Ba-140	<	1.4262E-01		
La-140	<	4.8492E-02		
CE-141	<	2.6748E-02		
CE-144	<	1.1519E-01		
PM-144	<	4.8542E-02		
EU-152	<	6.1770E-02		
EU-154	<	4.0091E-01		
EU-155	<	9.0048E-02		
HF-181	<	3.1919E-02		
Ta-182	<	1.5349E-01		
Hg-203	<	2.9481E-02		
TL-208		9.2346E-02	2.0184E+01%	3.885E-02
pm-146	<	7.0388E-02		
y-88	<	5.0344E-02		
PB-210		4.3838E+00	1.0797E+01%	1.071E+00
PB-212		1.0932E-01	2.0781E+01%	5.461E-02

PB-214	<	9.5409E-02			
BI-207	<	4.2713E-02			
BI-212	<	4.6605E-01			
BI-214		2.7562E-01	1.4320E+01%		7.928E-02
BI-210M	<	3.7091E-02			
RA-224	<	3.3915E-01			
AC-228	<	1.6822E-01			
TH-227	<	9.1900E-02			
TH-229	<	5.0674E-01			
TH-234	#	3.4174E+00	1.1469E+01%		8.751E-01
PA-231	<	5.9536E-01			
PA-233	<	6.3551E-02			
PA-234	<	1.1015E-01			
PA-234M	<	6.4921E+00			
Ra-226		2.1460E+00	1.4187E+01%		6.999E-01
U-235	<	1.7304E-01			
AM-241	<	7.6241E-02			
Np-237	<	9.9044E-02			

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

S U M M A R Y

Total Activity (37.6 to 1999.5 keV) 1.172E+01 DPS

Test America
St. Louis
Background Check

Spectrum: 15_20140711007_BGLong
Acquired: 7/11/2014 3:07:24 PM
Detector: Ge15 SN/11012216
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.72	1.60	1.64	1.67	1.80	1.84	PASS

Analyst: Joseph Hunt Reviewer: Siobhan Perry

TestAmerica, Inc. Spectrum name: 15_20140711007_BGLong.An1

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det15\15_20140711007_BGLong.An1

Acquisition information
Start time: 7/11/2014 3:07:24 PM
Live time: 43200
Real time: 43223
Dead time: 0.05 %
Detector ID: 15

Detector system
Ge15 SN/11012216

Calibration
Filename: 15_20140711007_BGLong.An1
15_QC_83725-334_SOURCE F_2011

Energy Calibration
Created: 2/28/2012 4:29:17 PM
Zero offset: 0.044 keV
Gain: 0.250 keV/channel
Quadratic: -3.267E-08 keV/channel^2

Efficiency Calibration
Created: 8/2/2011 8:55:45 AM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.57keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 16 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0803

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.58	524.	10.88	0.88	6.060E-02	46.54	4.250	4.718E+00	PB210
63.61	424.	13.04	1.17	8.242E-02	63.29	3.810	3.145E+00	TH234
92.90	715.	8.50	1.19	1.142E-01	92.59	5.584	2.598E+00	TH234
					93.35	5.561	2.607E+00	AC228
185.98	331.	13.30	1.18	9.774E-02	185.72	54.000	1.449E-01	U235
					185.99	3.280	2.388E+00	Ra226
238.56	190.	22.40	1.59	8.501E-02	238.63	43.300	1.194E-01	PB212
351.93	147.	20.53	1.08	5.762E-02	351.93	37.600	1.567E-01	PB214
511.08	803.	6.67	2.53	3.933E-02	511.86	20.000	2.365E+00	RH106
583.37	152.	17.50	1.17	3.411E-02	583.02	84.500	1.221E-01	TL208
609.82	110.	21.32	1.09	3.220E-02	609.31	46.090	1.716E-01	BI214
					610.30	5.750	1.378E+00	RU103
1764.32	62.	21.12	1.28	1.107E-02	1764.49	15.400	8.353E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
2043.10	511.08	325.	803.	2.041E+04	6.67	2.532	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.99	46.58	656.	524.	0.012	10.88	0.882s
TH-234	254.08	63.61	688.	424.	0.010	13.04	1.167s
TH-234	370.99	92.86	711.	677.	0.016	8.76	1.179s
Ra-226	743.22	185.98	437.	331.	0.008	13.30	1.185
PB-212	953.43	238.56	422.	190.	0.004	22.40	1.589s
PB-214	1406.68	351.93	198.	147.	0.003	20.53	1.082
TL-208	2332.19	583.37	115.	152.	0.004	17.50	1.167s
BI-214	2437.99	609.82	120.	110.	0.003	21.32	1.087s
BI-214	7058.08	1764.32	16.	62.	0.001	21.12	1.277s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS	COMMENTS
TL-208	N	1.2208E-01				6.98E+02	
			583.02	1.221E-01	*(	4.231E-02 1.75E+01 8.45E+01	G
			277.28	0.000E+00	%	2.391E-01 1.04E+02 6.31E+00	G
			860.56	0.000E+00	%	2.231E-01 4.72E+01 1.24E+01	G
PB-210	N	4.7178E+00				8.14E+03	
			46.54	4.718E+00	(	1.098E+00 1.09E+01 4.25E+00	G
PB-212	N	1.1938E-01				6.98E+02	
			238.63	1.194E-01	(	6.191E-02 2.24E+01 4.33E+01	G
			300.03	0.000E+00	%	5.582E-01 7.99E+01 3.28E+00	GA
PB-214	N	1.5671E-01				5.84E+05	
			351.93	1.567E-01	(	7.302E-02 2.05E+01 3.76E+01	G
			295.09	0.000E+00	%	1.175E-01 3.00E+01 1.93E+01	G
			242.00	0.000E+00	%	2.983E-01 4.45E+01 7.43E+00	GA
BI-214	N	1.7158E-01				5.84E+05	
			609.31	1.716E-01	?(	8.385E-02 2.13E+01 4.61E+01	G
			1120.29	0.000E+00	%	3.581E-01 3.56E+01 1.51E+01	G
			1764.49	8.353E-01	+	2.939E-01 2.11E+01 1.54E+01	G
TH-234	N	3.1453E+00				1.63E+12	
			63.29	3.145E+00	@(	9.261E-01 1.30E+01 3.81E+00	G
			92.59	2.458E+00	-	4.611E-01 8.76E+00 5.58E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ra-226	2.3876E+00					5.84E+05	
		185.99	2.388E+00	(	7.232E-01	1.33E+01	3.28E+00 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Activity DPS	Time of Count Uncertainty 1 Sigma Counting	MDA
BE-7	< 2.5231E-01		
NA-22	< 2.0609E-02		
K-40	< 5.5126E-01		
Sc-46	< 5.9521E-02		

CR-51	<	2.2819E-01			
MN-54	<	3.8960E-02			
FE-59	<	1.1524E-01			
Co-56	<	3.7705E-02			
CO-57	<	2.5512E-02			
CO-58	<	3.9036E-02			
CO-60	<	3.5271E-02			
ZN-65	<	1.0910E-01			
NB-94	<	5.2589E-02			
ZR-95	<	8.7880E-02			
NB-95	<	6.0270E-02			
RU-103	<	1.5504E-02			
RH-106	<	5.0881E-01			
AG-108M	<	1.3987E-02			
AG-110M	<	4.8106E-02			
SN-113	<	5.7557E-02			
SB-124	<	4.1276E-02			
SB-125	<	9.9015E-02			
I-131	<	1.7633E-02			
BA-133	<	4.3985E-02			
CS-134	<	4.5339E-02			
CS-137	<	4.8921E-02			
CE-139	<	2.2544E-02			
Ba-140	<	1.7186E-01			
La-140	<	2.3897E-02			
CE-141	<	3.4858E-02			
CE-144	<	1.6408E-01			
PM-144	<	2.2318E-02			
EU-152	<	1.1308E-01			
EU-154	<	2.7664E-01			
EU-155	<	7.8494E-02			
HF-181	<	2.9314E-02			
Ta-182	<	1.6460E-01			
Hg-203	<	1.7542E-02			
TL-208	#	1.2208E-01	1.7503E+01%		4.231E-02
pm-146	<	1.4305E-01			
y-88	<	2.2585E-02			
PB-210	#	4.7178E+00	1.0879E+01%		1.098E+00
PB-212		1.1938E-01	2.2400E+01%		6.191E-02
PB-214		1.5671E-01	2.0533E+01%		7.302E-02
BI-207	<	4.6438E-02			
BI-212	<	5.5670E-01			
BI-214	#	1.7158E-01	2.1320E+01%		8.385E-02
BI-210M	<	2.0255E-02			
RA-224	<	6.0018E-01			
AC-228	<	2.4898E-01			
TH-227	<	1.8651E-01			
TH-229	<	5.7946E-01			
TH-234	#	3.1453E+00	1.3039E+01%		9.261E-01

PA-231	<	7.4797E-01			
PA-233	<	8.4602E-02			
PA-234	<	8.0925E-02			
PA-234M	<	8.1359E+00			
Ra-226		2.3876E+00	1.3300E+01%		7.232E-01
U-235	<	2.0331E-01			
AM-241	<	1.0964E-01			
Np-237	<	1.7318E-01			

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

S U M M A R Y

Total Activity (37.6 to 1999.5 keV) 1.082E+01 DPS

Run Logs

Gamma Spectroscopy Run Log

Detector: GV4

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/30/12 13:58		IC 160-11761/1		11761			JLW
04/02/12 16:50		ICV 160-11761/2		11761			JLW
02/27/13 16:17		ACVTOP 160-38300/1		38300			JLW
07/11/14 15:24		ICB 160-130904/1		130904			JLW
07/24/14 00:00		CCB 160-133792/1		133792			SMP
07/24/14 00:41		CCV 160-133792/2		133792			
07/24/14 01:02		CCV 160-133792/3		133792			SMP
07/24/14 01:31	180	ZZZZZ		133792			
07/24/14 08:13	30	LCS 160-129597/2-A		133792	129597	GA-01-R	SMP
07/24/14 09:27	30	ZZZZZ		133792			
07/24/14 10:09	30	ZZZZZ		133792			
07/24/14 10:49	30	ZZZZZ		133792			
07/24/14 14:27	30	ZZZZZ		133792			
07/24/14 15:09	30	ZZZZZ		133792			
07/24/14 15:50	30	ZZZZZ		133792			
07/24/14 17:58	30	ZZZZZ		133792			
07/24/14 18:43	30	ZZZZZ		133792			
07/24/14 19:20	30	ZZZZZ		133792			
07/24/14 19:54	30	ZZZZZ		133792			
07/24/14 20:26	30	ZZZZZ		133792			
07/24/14 20:59	30	ZZZZZ		133792			
07/24/14 21:32	30	ZZZZZ		133792			
07/24/14 22:04	30	ZZZZZ		133792			

Detector: GV7

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/27/12 08:10		IC 160-12302/1		12302			JLW
03/27/12 15:25		ICV 160-12302/2		12302			JLW
01/28/14 18:43		ACVTOP 160-101797/1		101797			JLW
07/11/14 15:25		ICB 160-130901/1		130901			JLW
07/24/14 00:00		CCV 160-133793/1		133793			
07/24/14 00:21		CCV 160-133793/2		133793			SMP
07/24/14 00:41		CCB 160-133793/3		133793			SMP
07/24/14 01:31	60	ZZZZZ		133793			
07/24/14 02:40	30	680-102577-1 DU	SD-005W-02 DU	133793	129597	GA-01-R	SMP
07/24/14 08:13	30	ZZZZZ		133793			
07/24/14 09:28	30	ZZZZZ		133793			
07/24/14 10:10	30	ZZZZZ		133793			
07/24/14 10:50	30	ZZZZZ		133793			
07/24/14 13:56	30	ZZZZZ		133793			
07/24/14 14:33	30	ZZZZZ		133793			
07/24/14 15:11	30	ZZZZZ		133793			
07/24/14 15:52	30	ZZZZZ		133793			
07/24/14 17:49		ZZZZZ		133793			
07/24/14 18:02	60	ZZZZZ		133793			
07/24/14 19:20	30	ZZZZZ		133793			
07/24/14 19:54	30	ZZZZZ		133793			
07/24/14 20:26	30	ZZZZZ		133793			
07/24/14 20:59	30	ZZZZZ		133793			
07/24/14 21:32	60	ZZZZZ		133793			

Gamma Spectroscopy Run Log

Detector: GV8

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/27/12 10:58		IC 160-12311/1		12311			JLW
03/29/12 01:58		ICV 160-12311/2		12311			JLW
06/10/14 05:54		ACVTOP 160-126217/1		126217			JLW
07/11/14 15:25		ICB 160-130902/1		130902			JLW
07/24/14 00:01		CCV 160-133794/1		133794			
07/24/14 00:22		CCV 160-133794/2		133794			SMP
07/24/14 00:41		CCB 160-133794/3		133794			SMP
07/24/14 01:32	60	ZZZZZ		133794			
07/24/14 02:40	30	680-102577-2	SD-005E-02	133794	129597	GA-01-R	SMP
07/24/14 08:14	30	ZZZZZ		133794			
07/24/14 09:29	30	ZZZZZ		133794			
07/24/14 10:11	30	ZZZZZ		133794			
07/24/14 10:52	30	ZZZZZ		133794			
07/24/14 13:57	30	ZZZZZ		133794			
07/24/14 14:34	30	ZZZZZ		133794			
07/24/14 15:12	30	ZZZZZ		133794			
07/24/14 15:53	30	ZZZZZ		133794			
07/24/14 17:50		ZZZZZ		133794			
07/24/14 18:02	120	ZZZZZ		133794			
07/24/14 20:27	30	ZZZZZ		133794			
07/24/14 20:59	30	ZZZZZ		133794			
07/24/14 21:32	30	ZZZZZ		133794			
07/24/14 22:05	30	ZZZZZ		133794			

Detector: GV14

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
04/23/12 09:56		IC 160-12359/1		12359			JLW
04/24/12 08:12		ICV 160-12359/2		12359			JLW
01/24/14 08:37		ACVTOP 160-101066/1		101066			JLW
07/11/14 15:06		ICB 160-130894/1		130894			JLW
07/24/14 00:01		CCB 160-133788/1		133788			SMP
07/24/14 00:43		CCV 160-133788/2		133788			
07/24/14 01:03		CCV 160-133788/3		133788			SMP
07/24/14 01:28	30	ZZZZZ		133788			
07/24/14 02:06	30	MB 160-129597/1-A		133788	129597	GA-01-R	SMP
07/24/14 02:37	60	ZZZZZ		133788			
07/24/14 08:11	30	ZZZZZ		133788			
07/24/14 09:25	30	ZZZZZ		133788			
07/24/14 10:07		ZZZZZ		133788			
07/24/14 10:07	30	ZZZZZ		133788			
07/24/14 10:42	30	ZZZZZ		133788			
07/24/14 14:38	30	ZZZZZ		133788			
07/24/14 15:34	30	ZZZZZ		133788			
07/24/14 17:53	60	ZZZZZ		133788			
07/24/14 19:16	30	ZZZZZ		133788			
07/24/14 19:52	30	ZZZZZ		133788			
07/24/14 20:24	30	ZZZZZ		133788			
07/24/14 20:56	30	ZZZZZ		133788			
07/24/14 21:29	30	ZZZZZ		133788			
07/24/14 22:03	30	ZZZZZ		133788			
07/24/14 22:34	30	ZZZZZ		133788			

Gamma Spectroscopy Run Log

Detector: GV15

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/22/12 11:06		IC 160-12362/1		12362			JLW
03/23/12 06:10		ICV 160-12362/2		12362			JLW
01/24/14 15:13		ACVTOP 160-101162/1		101162			JLW
07/11/14 15:07		ICB 160-130897/1		130897			JLW
07/24/14 00:02		CCB 160-133787/1		133787			SMP
07/24/14 00:43		CCV 160-133787/2		133787			
07/24/14 01:03		CCV 160-133787/3		133787			SMP
07/24/14 01:28	30	ZZZZZ		133787			
07/24/14 02:06	30	680-102577-1	SD-005W-02	133787	129597	GA-01-R	SMP
07/24/14 02:38	30	ZZZZZ		133787			
07/24/14 08:12	30	ZZZZZ		133787			
07/24/14 09:26	30	ZZZZZ		133787			
07/24/14 10:08	30	ZZZZZ		133787			
07/24/14 10:45	60	ZZZZZ		133787			
07/24/14 13:59	60	ZZZZZ		133787			
07/24/14 16:23	60	ZZZZZ		133787			
07/24/14 19:17	30	ZZZZZ		133787			
07/24/14 19:53	30	ZZZZZ		133787			
07/24/14 20:25	30	ZZZZZ		133787			
07/24/14 20:57	30	ZZZZZ		133787			
07/24/14 21:29	30	ZZZZZ		133787			
07/24/14 22:03	30	ZZZZZ		133787			
07/24/14 22:35	30	ZZZZZ		133787			

Subcontract Data

Shipping and Receiving Documents

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.43
Client Contact: Mike Martin	Phone: (703) 342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page [redacted] 1 of 1
Company: Tetra Tech, Inc.				Job #: 680-102577
Address: 20251 Century Blvd Suite 200	Due Date Requested:	Analysis Requested		Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
City: Germantown	TAT Requested (days): Standard			
State, Zip: MD, 20874	PO #: Purchase Order not required			
Phone:	WO #:			Other:
Email: Michael.Martin@tetratech.com				
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-005W-02	6/13/14	1200	C	Solid						X		
SD-005E-02	6/13/14	1205	C	Solid						X		
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	[signature]	6/19/14 - 1600	TT	[signature]	6/19/14 1620	TestAmerica
2	[signature]	6/19/14 1720	TT	[signature]	6/20/14 0930	TA
3						

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-102577-1
SDG Number: 680102577-1

Login Number: 102577
List Number: 1
Creator: Daughtry, Beth A

List Source: TestAmerica Savannah

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-102577-1
SDG Number: 680102577-1

Login Number: 102577
List Number: 2
Creator: Daniels, Brian J

List Source: TestAmerica St. Louis
List Creation: 06/25/14 12:42 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	Thermal preservation not required.
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	True	

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 680-102577-2

SDG Number: 680102577-1

Job Description: Sediments

For:
Tetra Tech, Inc.
20251 Century Blvd
Suite 200
Germantown, MD 20874

Attention: Mike Martin



Approved for release.
Jerry A Lanier
Project Manager I
9/5/2014 5:07 PM

Jerry A Lanier, Project Manager I
5102 LaRoche Avenue, Savannah, GA, 31404
(912)354-7858 e.3410
jerry.lanier@testamericainc.com
09/05/2014

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

Savannah Certifications and ID #s: A2LA: 0399.01; AL: 41450; ARDEQ: 88-0692; ARDOH; AZ: AZ0741; CA: 03217CA; CO; CT: PH0161; DE; FL: E87052; GA: 803; Guam; HI; IL: 200022; IN: C-GA-02; IA: 353; KS: E-10322; KY EPPC: 90084; KY UST; LA DEQ: 30690; LA DHH: LA080008; ME: 2008022; MD: 250; MA: M-GA006; MI: 9925; MS; NFESC: 249; NV: GA00006; NJ: GA769; NM; NY: 10842; NC DWQ: 269; NC DHHS: 13701; PA: 68-00474; PR: GA00006; RI: LAO00244; SC: 98001001; TN: TN0296; TX: T104704185; USEPA: GA00006; VT: VT-87052; VA: 00302; WA; WV DEP: 094; WV DHHR: 9950 C; WI DNR: 999819810; WY/EPAR8: 8TMS-Q

Table of Contents

Cover Title Page 1

Data Summaries 4

- Definitions 4
- Case Narrative 5
- Detection Summary 6
- Client Sample Results 7
- Default Detection Limits 9
- QC Sample Results 10
- QC Association 11
- Chronicle 12
- Certification Summary 13
- Method Summary 15
- Sample Summary 16
- Reagent Traceability 17
  - COAs 25

Inorganic Sample Data 49

- Metals Data 49
  - Met Cover Page 50
  - Met Sample Data 51
  - Met QC Data 53
    - Met ICV/CCV 53
    - Met CRQL 59
    - Met Blanks 60
    - Met ICSA/ICSAB 62
    - Met LCS/LCSD 63
  - Met MDL 64

Table of Contents

Met Linear Ranges 67

Met Preparation Log 68

Met Analysis Run Log 69

Met ICP/MS Int Stds 73

Met Raw Data 74

Met Prep Data 166

Subcontracted Data 167

Shipping and Receiving Documents 168

Client Chain of Custody 169

Sample Receipt Checklist 170

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.
F	MS/MSD Recovery and/or RPD exceeds the control limits

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Sediments

Report Number: 680-102577-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT
The samples were received on 06/20/2014; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 1.2 C.

TOTAL URANIUM
Samples SD-005W-02 (680-102577-1) and SD-005E-02 (680-102577-2) were analyzed for Total Uranium in accordance with EPA SW-846 6020A. The samples were analyzed on 09/04/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM
Samples SD-005W-02 (680-102577-1) and SD-005E-02 (680-102577-2) were analyzed for Isotopic Uranium in accordance with EPA SW-846 6020A. The samples were prepared on 08/21/2014 and analyzed on 09/02/2014.

The instrument blank (ICB) contained uranium 233 greater than the reporting limit (RL). All associated samples were non-detect, showing there was no high bias. The data have been qualified and reported. (ICB 160-141597/10)

Refer to the QC report for details.

Samples SD-005W-02 (680-102577-1)[5X] and SD-005E-02 (680-102577-2)[5X] required dilution prior to analysis. Samples were high in salts. . The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM PERCENTAGE
Samples SD-005W-02 (680-102577-1) and SD-005E-02 (680-102577-2) were analyzed for Isotopic Uranium Percentage in accordance with EPA SW-846 6020A. The samples were analyzed on 09/04/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM ACTIVITY
Samples SD-005W-02 (680-102577-1) and SD-005E-02 (680-102577-2) were analyzed for Isotopic Uranium Activity in accordance with EPA SW-846 6020A. The samples were prepared on 08/21/2014 and analyzed on 09/02/2014.

Samples SD-005W-02 (680-102577-1)[5X] and SD-005E-02 (680-102577-2)[5X] required dilution prior to analysis. Samples were high in salts. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102577-2
SDG: 680102577-1

Client Sample ID: SD-005W-02 — Lab Sample ID: 680-102577-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.012		0.011	0.0046	mg/Kg	5		6020A	Total/NA
U-238	1.4		0.011	0.00068	mg/Kg	5		6020A	Total/NA
Total Uranium	1.4		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

Client Sample ID: SD-005E-02 — Lab Sample ID: 680-102577-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
U-235	0.019		0.011	0.0045	mg/Kg	5		6020A	Total/NA
U-238	2.6		0.011	0.00067	mg/Kg	5		6020A	Total/NA
Total Uranium	2.6		0.0050	0.00030	mg/Kg	1		6020A	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: SD-005W-02

Lab Sample ID: 680-102577-1

Date Collected: 06/13/14 12:00

Matrix: Solid

Date Received: 06/20/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0034	mg/Kg		08/21/14 10:35	09/02/14 22:53	5
U-234	ND		0.011	0.00068	mg/Kg		08/21/14 10:35	09/02/14 22:53	5
U-235	**0.012**		0.011	0.0046	mg/Kg		08/21/14 10:35	09/02/14 22:53	5
U-236	ND		0.011	0.00090	mg/Kg		08/21/14 10:35	09/02/14 22:53	5
U-238	**1.4**		0.011	0.00068	mg/Kg		08/21/14 10:35	09/02/14 22:53	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**1.4**		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-21.1	U	0.453	1.99	108	32.5	pCi/g	08/21/14 10:35	09/02/14 22:53	5
U-234	0.642	U F	0.402	0.407	70.0	4.20	pCi/g	08/21/14 10:35	09/02/14 22:53	5
U-235	**0.0255**	**F**	0.000829	0.00249	0.0243	0.00991	pCi/g	08/21/14 10:35	09/02/14 22:53	5
U-236	-0.000116	U	0.000630	0.000631	0.728	0.0583	pCi/g	08/21/14 10:35	09/02/14 22:53	5
U-238	**0.467**	**F**	0.0152	0.0455	0.00378	0.000227	pCi/g	08/21/14 10:35	09/02/14 22:53	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.850**						%		09/04/14 13:23	1

Client Sample ID: SD-005E-02

Lab Sample ID: 680-102577-2

Date Collected: 06/13/14 12:05

Matrix: Solid

Date Received: 06/20/14 09:30

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.011	0.0033	mg/Kg		08/21/14 10:35	09/02/14 22:58	5
U-234	ND		0.011	0.00067	mg/Kg		08/21/14 10:35	09/02/14 22:58	5
U-235	**0.019**		0.011	0.0045	mg/Kg		08/21/14 10:35	09/02/14 22:58	5
U-236	ND		0.011	0.00089	mg/Kg		08/21/14 10:35	09/02/14 22:58	5
U-238	**2.6**		0.011	0.00067	mg/Kg		08/21/14 10:35	09/02/14 22:58	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**2.6**		0.0050	0.00030	mg/Kg			09/04/14 13:20	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-20.8	U	0.160	1.92	107	32.2	pCi/g	08/21/14 10:35	09/02/14 22:58	5
U-234	0.971	U F	0.873	0.877	69.3	4.16	pCi/g	08/21/14 10:35	09/02/14 22:58	5
U-235	**0.0412**	**F**	0.00167	0.00415	0.0241	0.00981	pCi/g	08/21/14 10:35	09/02/14 22:58	5
U-236	-0.00118	U	0.00200	0.00200	0.721	0.0577	pCi/g	08/21/14 10:35	09/02/14 22:58	5
U-238	**0.863**	**F**	0.0195	0.0818	0.00375	0.000225	pCi/g	08/21/14 10:35	09/02/14 22:58	5

Client Sample ID: SD-005E-02
Date Collected: 06/13/14 12:05
Date Received: 06/20/14 09:30

Lab Sample ID: 680-102577-2
Matrix: Solid

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.725						%		09/04/14 13:23	1

Default Detection Limits

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102577-2
SDG: 680102577-1

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	RL	MDL	Units	Method
U-233	0.0050	0.0015	mg/Kg	6020A
U-234	0.0050	0.00030	mg/Kg	6020A
U-235	0.0050	0.0020	mg/Kg	6020A
U-236	0.0050	0.00040	mg/Kg	6020A
U-238	0.0050	0.00030	mg/Kg	6020A

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	RL	MDL	Units	Method
Total Uranium	0.0050	0.00030	mg/Kg	6020A

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Lab Sample ID: MB 160-139348/1-A
Matrix: Solid
Analysis Batch: 141597

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 139348

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	ND		0.0042	0.0013	mg/Kg		08/21/14 10:35	09/02/14 22:44	2
U-234	ND		0.0042	0.00025	mg/Kg		08/21/14 10:35	09/02/14 22:44	2
U-235	ND		0.0042	0.0017	mg/Kg		08/21/14 10:35	09/02/14 22:44	2
U-236	ND		0.0042	0.00034	mg/Kg		08/21/14 10:35	09/02/14 22:44	2
U-238	ND		0.0042	0.00025	mg/Kg		08/21/14 10:35	09/02/14 22:44	2

Lab Sample ID: LCS 160-139348/2-A
Matrix: Solid
Analysis Batch: 141597

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 139348

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
U-234	0.00785	0.00845		mg/Kg		108	80 - 120
U-235	0.461	0.508		mg/Kg		110	80 - 120
U-238	0.477	0.525		mg/Kg		110	80 - 120

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Lab Sample ID: MB 160-139348/1-A
Matrix: Solid
Analysis Batch: 141598

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 139348

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-8.054	U	0.0544	0.743	40.6	12.2	pCi/g	08/21/14 10:35	09/02/14 22:44	2
U-234	-0.01364	U	0.0205	0.0205	26.2	1.57	pCi/g	08/21/14 10:35	09/02/14 22:44	2
U-235	-0.0002605	U	0.0000147	0.0000281	0.00911	0.00371	pCi/g	08/21/14 10:35	09/02/14 22:44	2
U-236	-0.0007415	U	0.000196	0.000208	0.273	0.0218	pCi/g	08/21/14 10:35	09/02/14 22:44	2
U-238	-0.0002862	U	0.0000374	0.0000458	0.00142	0.000085 1	pCi/g	08/21/14 10:35	09/02/14 22:44	2

Lab Sample ID: LCS 160-139348/2-A
Matrix: Solid
Analysis Batch: 141598

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 139348

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
U-235	0.995	1.098		0.109	0.0103	0.00418	pCi/g	110	80 - 120
U-238	0.160	0.1764		0.0174	0.00160	0.000096 0	pCi/g	110	80 - 120

Metals

Prep Batch: 139348

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102577-1	SD-005W-02	Total/NA	Solid	3050B	
680-102577-2	SD-005E-02	Total/NA	Solid	3050B	
LCS 160-139348/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 160-139348/1-A	Method Blank	Total/NA	Solid	3050B	

Analysis Batch: 141597

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102577-1	SD-005W-02	Total/NA	Solid	6020A	139348
680-102577-2	SD-005E-02	Total/NA	Solid	6020A	139348
CRI 160-141597/11	DL		Solid	6020A	
CRI 160-141597/12	DL		Solid	6020A	
ICSA 160-141597/13	ICS		Solid	6020A	
ICSAB 160-141597/14	ICS		Solid	6020A	
LCS 160-139348/2-A	Lab Control Sample	Total/NA	Solid	6020A	139348
MB 160-139348/1-A	Method Blank	Total/NA	Solid	6020A	139348

Analysis Batch: 142110

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102577-1	SD-005W-02	Total/NA	Solid	6020A	
680-102577-2	SD-005E-02	Total/NA	Solid	6020A	

Rad

Prep Batch: 139348

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102577-1	SD-005W-02	Total/NA	Solid	3050B	
680-102577-2	SD-005E-02	Total/NA	Solid	3050B	
LCS 160-139348/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 160-139348/1-A	Method Blank	Total/NA	Solid	3050B	

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102577-2
SDG: 680102577-1

Client Sample ID: SD-005W-02

Lab Sample ID: 680-102577-1

Date Collected: 06/13/14 12:00

Matrix: Solid

Date Received: 06/20/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139348	08/21/14 10:35	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/02/14 22:53	KLE	TAL SL
Total/NA	Analysis	6020A		1	142110	09/04/14 13:20	KLE	TAL SL
Total/NA	Analysis	6020A		1	142113	09/04/14 13:23	KLE	TAL SL
Total/NA	Prep	3050B			139348	08/21/14 10:35	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/02/14 22:53	KLE	TAL SL

Client Sample ID: SD-005E-02

Lab Sample ID: 680-102577-2

Date Collected: 06/13/14 12:05

Matrix: Solid

Date Received: 06/20/14 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			139348	08/21/14 10:35	SMD	TAL SL
Total/NA	Analysis	6020A		5	141597	09/02/14 22:58	KLE	TAL SL
Total/NA	Analysis	6020A		1	142110	09/04/14 13:20	KLE	TAL SL
Total/NA	Analysis	6020A		1	142113	09/04/14 13:23	KLE	TAL SL
Total/NA	Prep	3050B			139348	08/21/14 10:35	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	141598	09/02/14 22:58	KLE	TAL SL

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Certification Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102577-2
SDG: 680102577-1

Laboratory: TestAmerica Savannah

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
	AFCEE		SAVLAB	
A2LA	DoD ELAP		399.01	02-28-15
A2LA	ISO/IEC 17025		399.01	02-28-15
Alabama	State Program	4	41450	06-30-15
Arkansas DEQ	State Program	6	88-0692	01-31-15
California	NELAP	9	3217CA	07-31-14 *
Colorado	State Program	8	N/A	12-31-14
Connecticut	State Program	1	PH-0161	03-31-15
Florida	NELAP	4	E87052	06-30-15
GA Dept. of Agriculture	State Program	4	N/A	06-12-17
Georgia	State Program	4	N/A	06-30-15
Georgia	State Program	4	803	06-30-15
Guam	State Program	9	09-005r	04-16-15
Hawaii	State Program	9	N/A	06-30-15
Illinois	NELAP	5	200022	11-30-14
Indiana	State Program	5	N/A	06-30-15
Iowa	State Program	7	353	07-01-15
Kentucky (DW)	State Program	4	90084	12-31-14
Kentucky (UST)	State Program	4	18	06-30-15
Louisiana	NELAP	6	30690	06-30-14 *
Louisiana (DW)	NELAP	6	LA140023	12-31-14
Maine	State Program	1	GA00006	08-16-14 *
Maryland	State Program	3	250	12-31-14
Massachusetts	State Program	1	M-GA006	06-30-15
Michigan	State Program	5	9925	06-30-15
Mississippi	State Program	4	N/A	06-30-15
Montana	State Program	8	CERT0081	01-01-15
Nebraska	State Program	7	TestAmerica-Savannah	06-30-15
New Jersey	NELAP	2	GA769	06-30-15
New Mexico	State Program	6	N/A	06-30-15
New York	NELAP	2	10842	03-31-15
North Carolina (DW)	State Program	4	13701	07-31-15
North Carolina (WW/SW)	State Program	4	269	12-31-14
Oklahoma	State Program	6	9984	08-31-14 *
Pennsylvania	NELAP	3	68-00474	06-30-15
Puerto Rico	State Program	2	GA00006	12-31-14
South Carolina	State Program	4	98001	06-30-14 *
Tennessee	State Program	4	TN02961	06-30-15
Texas	NELAP	6	T104704185-08-TX	11-30-14
USDA	Federal		SAV 3-04	06-11-17
Virginia	NELAP	3	460161	06-14-15
Washington	State Program	10	C805	06-10-15
West Virginia (DW)	State Program	3	9950C	12-31-14
West Virginia DEP	State Program	3	94	06-30-15
Wisconsin	State Program	5	999819810	08-31-14 *
Wyoming	State Program	8	8TMS-L	06-30-15

Laboratory: TestAmerica St. Louis

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

* Certification renewal pending - certification considered valid.

Certification Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102577-2
SDG: 680102577-1

Laboratory: TestAmerica St. Louis (Continued)

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska	State Program	10	MO00054	06-30-15
California	NELAP	9	2886	03-31-15
Connecticut	State Program	1	PH-0241	03-31-15
Florida	NELAP	4	E87689	06-30-15
Illinois	NELAP	5	200023	11-30-14
Iowa	State Program	7	373	12-01-14
Kansas	NELAP	7	E-10236	10-31-14 *
Kentucky (DW)	State Program	4	90125	12-31-14
L-A-B	DoD ELAP		L2305	01-10-16
Louisiana	NELAP	6	04080	06-30-15
Maryland	State Program	3	310	09-30-15
Missouri	State Program	7	780	06-30-14 *
Nevada	State Program	9	MO000542013-1	07-31-14 *
New Jersey	NELAP	2	MO002	06-30-15
New Mexico	State Program	6		06-30-10 *
New York	NELAP	2	11616	03-31-15
North Dakota	State Program	8	R207	06-30-14 *
NRC	NRC		24-24817-01	12-31-22
Oklahoma	State Program	6	9997	08-31-15
Pennsylvania	NELAP	3	68-00540	02-28-15
South Carolina	State Program	4	85002001	06-30-14 *
Texas	NELAP	6	T104704193-13-6	07-31-15
USDA	Federal		P330-07-00122	01-09-17
Utah	NELAP	8	MO000542013-5	07-31-15
Virginia	NELAP	3	460230	06-14-15
Washington	State Program	10	C592	08-30-15
West Virginia DEP	State Program	3	381	12-31-14 *

* Certification renewal pending - certification considered valid.

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102577-2
SDG: 680102577-1

Method	Method Description	Protocol	Laboratory
6020A	Metals (ICP/MS), Isotopic Uranium	SW846	TAL SL
6020A	Metals (ICP/MS), Total Uranium	SW846	TAL SL
6020A	Metals (ICP/MS), Isotopic Uranium Percentage	SW846	TAL SL
6020A Activity	Metals (ICP/MS), Isotopic Uranium (Activity)	SW846	TAL SL

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102577-2
SDG: 680102577-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-102577-1	SD-005W-02	Solid	06/13/14 12:00	06/20/14 09:30
680-102577-2	SD-005E-02	Solid	06/13/14 12:05	06/20/14 09:30

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
ISOU Cal 1_00021	09/05/14	08/29/14	2%HCL 2%HNO3, Lot 422375	50 mL	ISOU Cal Low_00006	0.25 mL	U-233	0.000515225 ug/L
							U-236	0.000889887 ug/L
							U-234	0.000826729 ug/L
							U-235	0.0484747 ug/L
							U-238	0.0502596 ug/L
							Total Uranium	0.05 ug/L
.ISOU Cal Low_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU Cal Int_00006	1 mL	U-233	0.103045 ug/L
							U-236	0.177977 ug/L
							U-234	0.165346 ug/L
							U-235	9.69494 ug/L
							U-238	10.0519 ug/L
							Total Uranium	10 ug/L
..ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
...ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
....ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
...ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
....ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
...ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
....ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
...STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
ISOU Cal 2_00022	09/05/14	08/29/14	2% Nitric Acid, Lot 422375	50 mL	ISOU Cal Int_00006	0.15 mL	U-233	0.0309135 ug/L
							U-236	0.0533932 ug/L

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							U-234	0.0496037 ug/L
							U-235	2.90848 ug/L
							U-238	3.01557 ug/L
							Total Uranium	3 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
ISOU Cal 3_00021	09/05/14	08/29/14	2% Nitric Acid, Lot 422375	100 mL	ISOU Cal Int_00006	0.5 mL	U-233	0.0515225 ug/L
							U-236	0.0889887 ug/L
							U-234	0.0826729 ug/L
							U-235	4.84747 ug/L
							U-238	5.02596 ug/L
							Total Uranium	5 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
ISOU Cal 4_00021	09/05/14	08/29/14	2% Nitric Acid, Lot 422375	50 mL	ISOU Cal Int_00006	0.5 mL	U-233	0.103045 ug/L
							U-236	0.177977 ug/L
							U-234	0.165346 ug/L
							U-235	9.69494 ug/L
							U-238	10.0519 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		U-238	1000 ug/mL
ISOU Cal 5_00021	09/05/14	08/29/14	2% Nitric Acid, Lot 422375	50 mL	ISOU Cal Int_00006	1.5 mL	U-233	0.309135 ug/L
							U-236	0.533932 ug/L
							U-234	0.496037 ug/L
							U-235	29.0848 ug/L
							U-238	30.1557 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		U-238	1000 ug/mL
ISOU ICSAB_00022	09/05/14	08/29/14	2% Nitric Acid, Lot 422375	50 mL	ISOU Cal Int_00006	0.25 mL	U-233	0.0515225 ug/L
							U-236	0.0889887 ug/L
							U-234	0.0826729 ug/L
							U-235	4.84747 ug/L
							U-238	5.02596 ug/L
							Total Uranium	5 ug/L
					MS ICSA_00014	2.5 mL	Al	50000 ug/L
							Ca	50000 ug/L
							Chlorine	500000 ug/L
							Fe	50000 ug/L
							K	50000 ug/L
							Mg	50000 ug/L
							Mo	1000 ug/L

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Na	50000 ug/L
							P	50000 ug/L
							Sulfur	50000 ug/L
							Ti	1000 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
.MS ICSA_00014	07/01/15	Inorganic Ventures, Lot G2-MEB476152MCA			(Purchased Reagent)		Al	1000 ug/mL
							Ca	1000 ug/mL
							Chlorine	10000 ug/mL
							Fe	1000 ug/mL
							K	1000 ug/mL
							Mg	1000 ug/mL
							Mo	20 ug/mL
							Na	1000 ug/mL
							P	1000 ug/mL
							Sulfur	1000 ug/mL
							Ti	20 ug/mL
ISOU ICV(3)_00020	09/05/14	08/29/14	2% Nitric Acid, Lot 422375	50 mL	ISOU QC Low_00004	0.25 mL	U-234	0.000417422 ug/L
							U-235	0.000528391 ug/L
							U-238	0.0488908 ug/L

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							U-233	0.223475 ug/L
							U-236	0.0000372865 ug/L
.ISOU QC Low_00004	11/01/14	08/18/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU QC Int_00005	1 mL	U-234	0.0834844 ug/L
							U-235	0.105678 ug/L
							U-238	9.77816 ug/L
							U-233	44.695 ug/L
							U-236	0.00745731 ug/L
..ISOU QC Int_00005	11/01/14	05/14/14	2%HCL 2%HNO3, Lot 355914	100 mL	ISOU UNAT_00002	1 mL	U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-238	977.816 ug/L
					ISOU-I 233 QC_00005	10 mL	U-233	4469.5 ug/L
							U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-236	0.745731 ug/L
							U-238	977.816 ug/L
...ISOU UNAT_00002	11/13/14	11/11/13	1M HNO3, Lot n/a	200 mL	ISOU U parent_00001	20 mL	U-234	5.10149 ug/L
							U-235	701.888 ug/L
							U-238	96754.7 ug/L
....ISOU U parent_00001	08/01/47	05/03/13	1M HNO3, Lot n/a	200 mL	ISOU ampule_00001	19.2509 g	U-234	51.0149 ug/L
							U-235	7018.88 ug/L
							U-238	967547 ug/L
.....ISOU ampule_00001	03/30/58	New Brunswick Lab, Lot CRM 145			(Purchased Reagent)		U-234	0.53 ug/g
							U-235	72.92 ug/g
							U-238	10052 ug/g
...ISOU-I 233 QC_00005	12/20/14	12/20/13	2%HCL 2% HNO3, Lot 250193	100 mL	ISOU-C 233 QC_00005	9.3263 g	U-233	44695 ug/L
							U-234	82.9742 ug/L
							U-235	35.4894 ug/L
							U-236	7.45731 ug/L
							U-238	102.695 ug/L
....ISOU-C 233 QC_00005	12/20/18	New Brunswick Laboratory, Lot CRM 111-A			(Purchased Reagent)		U-233	479.236 ug/g
							U-234	0.88968 ug/g
							U-235	0.38053 ug/g
							U-236	0.07996 ug/g
							U-238	1.10114 ug/g
ISOU ICV(4,8)_00020	09/05/14	08/29/14	2% Nitric Acid, Lot 422375	50 mL	ISOU QC Int_00005	0.5 mL	U-234	0.0834844 ug/L
							U-235	0.105678 ug/L
							U-238	9.77816 ug/L
							U-233	44.695 ug/L
							U-236	0.00745731 ug/L
.ISOU QC Int_00005	11/01/14	05/14/14	2%HCL 2%HNO3, Lot 355914	100 mL	ISOU UNAT_00002	1 mL	U-234	8.34844 ug/L

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							U-235	10.5678 ug/L
							U-238	977.816 ug/L
					ISOU-I 233 QC_00005	10 mL	U-233	4469.5 ug/L
							U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-236	0.745731 ug/L
							U-238	977.816 ug/L
..ISOU UNAT_00002	11/13/14	11/11/13	1M HNO3, Lot n/a	200 mL	ISOU U parent_00001	20 mL	U-234	5.10149 ug/L
							U-235	701.888 ug/L
							U-238	96754.7 ug/L
...ISOU U parent_00001	08/01/47	05/03/13	1M HNO3, Lot n/a	200 mL	ISOU ampule_00001	19.2509 g	U-234	51.0149 ug/L
							U-235	7018.88 ug/L
							U-238	967547 ug/L
....ISOU ampule_00001	03/30/58	New Brunswick Lab, Lot CRM 145			(Purchased Reagent)		U-234	0.53 ug/g
							U-235	72.92 ug/g
							U-238	10052 ug/g
..ISOU-I 233 QC_00005	12/20/14	12/20/13	2%HCL 2% HNO3, Lot 250193	100 mL	ISOU-C 233 QC_00005	9.3263 g	U-233	44695 ug/L
							U-234	82.9742 ug/L
							U-235	35.4894 ug/L
							U-236	7.45731 ug/L
							U-238	102.695 ug/L
...ISOU-C 233 QC_00005	12/20/18	New Brunswick Laboratory, Lot CRM 111-A			(Purchased Reagent)		U-233	479.236 ug/g
							U-234	0.88968 ug/g
							U-235	0.38053 ug/g
							U-236	0.07996 ug/g
							U-238	1.10114 ug/g
ISOU ICV(5,6)_00022	09/05/14	08/29/14	2% Nitric Acid, Lot 422375	50 mL	ISOU QC Int_00005	5 mL	U-234	0.834844 ug/L
							U-235	1.05678 ug/L
							U-238	97.7816 ug/L
							U-233	446.95 ug/L
							U-236	0.0745731 ug/L
.ISOU QC Int_00005	11/01/14	05/14/14	2%HCL 2%HNO3, Lot 355914	100 mL	ISOU UNAT_00002	1 mL	U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-238	977.816 ug/L
					ISOU-I 233 QC_00005	10 mL	U-233	4469.5 ug/L
							U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-236	0.745731 ug/L
							U-238	977.816 ug/L
..ISOU UNAT_00002	11/13/14	11/11/13	1M HNO3, Lot n/a	200 mL	ISOU U parent_00001	20 mL	U-234	5.10149 ug/L
							U-235	701.888 ug/L
							U-238	96754.7 ug/L

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
...ISOU U parent_00001	08/01/47	05/03/13	1M HNO3, Lot n/a	200 mL	ISOU ampule_00001	19.2509 g	U-234	51.0149 ug/L
							U-235	7018.88 ug/L
							U-238	967547 ug/L
....ISOU ampule_00001	03/30/58	New Brunswick Lab, Lot CRM 145			(Purchased Reagent)		U-234	0.53 ug/g
							U-235	72.92 ug/g
							U-238	10052 ug/g
..ISOU-I 233 QC_00005	12/20/14	12/20/13	2%HCL 2% HNO3, Lot 250193	100 mL	ISOU-C 233 QC_00005	9.3263 g	U-233	44695 ug/L
							U-234	82.9742 ug/L
							U-235	35.4894 ug/L
							U-236	7.45731 ug/L
							U-238	102.695 ug/L
...ISOU-C 233 QC_00005	12/20/18	New Brunswick Laboratory, Lot CRM 111-A			(Purchased Reagent)		U-233	479.236 ug/g
							U-234	0.88968 ug/g
							U-235	0.38053 ug/g
							U-236	0.07996 ug/g
							U-238	1.10114 ug/g
ISOU Prep Spk_00002	12/01/14	07/09/14	2%HCL 2%HNO3, Lot 397367	100 mL	ISOU-I 233CAL_00002	1 mL	U-233	947.058 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
.ISOU-I 233CAL_00002	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00006	5.1938 g	U-233	94705.8 ug/L
..ISOU-C 233CAL_00006	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1823.44 ug/g
.ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
..ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
.ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
..ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
.STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL

Reagent

ISOU ampule_00001

New Brunswick Laboratory
U.S. Department of Energy

Certificate of Analysis
CRM 145

228405
ID ISOU ampule_00001
Exp:03/30/58 Prpd:KLE Opn:05/03/13
UNAT Ampoule

Uranyl (Normal) Nitrate Assay and Isotopic Solution

Uranium Mass Fraction: 0.0101356 g U/g solution ± 0.0000011 g U/g solution
[10.1356 mg U/g solution ± 0.0011 mg U/g solution]

	$^{234}U/^{238}U$	$^{235}U/^{238}U$
Atom Ratio:	0.000052841	0.0072543
Atom Ratio Uncertainty:	0.000000082	0.0000040

	^{234}U	^{235}U	^{238}U
Atom Percent:	0.0052458	0.72017	99.27458
Atom Percent Uncertainty:	0.0000081	0.00039	0.00039
Weight Percent:	0.0051579	0.71114	99.28370
Weight Percent Uncertainty:	0.0000080	0.00038	0.00038

Relative Atomic Weight: 238.028918
Relative Atomic Weight Uncertainty: 0.000012

Note: ^{233}U and ^{236}U were not detected. The detection limit of uranium ratios for the technique used is 5×10^{-9}.

This Certified Reference Material (CRM) is a uranium concentration and isotopic solution standard intended for use in calibration of and/or quality control for uranium analysis methods. Each unit of CRM 145 consists of approximately 20-mL of uranyl nitrate solution in 1M nitric acid, contained in a sealed glass ampoule.

NOTE: The vial should be handled under proper radiologically-controlled conditions at all times.

The certified uranium content value is based on the mass of high-purity metal dissolved and diluted to a known solution mass. The stated uranium concentration was calculated as the prepared value and verified experimentally by the NBL-modified Davies and Gray titration. The certified uranium isotopic composition and atomic weight is based upon measurements performed on multiple samples by two different measurement techniques on a Thermal Ionization Mass Spectrometer (TIMS), calibrated using CRM U030-A as primary comparator and CRM 129-A as a quality control sample. The isotopic values are shared with CRM 112-A, uranium (normal) metal standard which was the source of uranium used to produce the solutions.

RAD13-0018
UNAT Spike
marrss
None
Prep/Opened: 5/3/2013
Exp(1): 5/10/2014
Exp(2): 5/10/2014

All uncertainties for the certified values are expressed as expanded uncertainties (U) where $U = k*u_c$, where u_c is the

September 30, 2010
Argonne, Illinois

www.nbl.doe.gov
Page 1 of 2

Jon Neuhoff, Director
New Brunswick Laboratory

(Revision of Certificate dated March 30, 2008)

127971
ID: UNAT_00008
Exp: 05/10/14 Prpd: SB Crt: 05/03/13
UNAT spike

combined standard uncertainty and the coverage factor k = 2. Uncertainties were determined according to the JCGM 100:2008 *Guide to the Expression of Uncertainty in Measurement*. The coverage factor of 2 was chosen to provide an approximate 95% level of confidence. The input quantities associated with the uranium content included uncertainties due to weighing, CRM 112-A purity, and buoyancy factors. The input quantities associated with the uranium isotopic composition included uncertainties from the certified value for CRM U030-A, measurement precision, and background corrections associated with the analytical techniques.

The CRM was produced by dissolving uranium metal in a single batch and container, with extensive mixing of the resultant solution followed by dispensation into individual bottles. Subsequent measurements of a random sampling of the total lot produced did not indicate any inhomogeneity in uranium concentration or isotopic composition. The minimum sample sizes taken from packaged units and measured were 30 mg U by titration and 1 µg U by TIMS. The NBL makes no recommendation as to the minimum sample size to be used to ensure concentration or isotopic homogeneity.

Users are cautioned that once the vial is opened, the uranium concentration and/or isotopic composition of the material may be affected by evaporative losses or environmental contamination. User's should take appropriate precautions to safeguard the material before, during and after use to ensure valid certificate values.

Recommended Procedure for Ampoule Handling and Dispensing of Solution

1. The ampoule contains a strongly acidic solution of uranium. Appropriate precautions should be taken.

2. Before opening the ampoule, ensure that any dried uranium or condensed liquid in the neck or body of the ampoule is re-dissolved into solution. This can be accomplished by inverting the ampoule repeatedly.

3. The glass ampoules are scored at the neck for ease of opening. However, glass burrs and fragments pose a cut hazard to anyone opening the ampoules. Appropriate precautions should be taken.

4. Lightly moisten the scored line on the neck with distilled water to help ensure a clean break at the score.

5. Because of the narrow neck of the ampoule it may be difficult or impossible to pour the solution out. Here is one possible method:

    a. Obtain approximately 12-cm length of plastic capillary tubing (e.g. i.d. 0f 0.1", o.d. of 0.16").
    b. Insert one end of the capillary tubing fully into the ampoule
    c. Fold the remaining length of tubing along the outside of the ampoule, ensuring that the tube is not crimped and will allow the free flow of air through the tube and into the ampoule.
    d. Holding the ampoule and tubing in one hand, and a beaker or dispensing bottle in another, invert the ampoule over the container allowing the solution to drain into it.
    e. The capillary tubing allows air to flow into the ampoule, eliminating the "airlock" created by the narrow neck of the open ampoule.

6. The user should be wary of evaporative losses once the ampoule is opened, and prevent uranium contamination of the sample. It is recommended that the entire solution be accurately weighed and aliquanted as soon as possible after opening the sample. Precautions should be taken (clean glass/plastic ware, air filtration, etc) to prevent uranium contamination of the CRM with subsequent perturbation of the isotopic composition.

Reagent

ISOU-C 233 QC_00005

New Brunswick Laboratory
U.S. Department of Energy

Certificate of Analysis
CRM 111-A
Uranium-233 in Nitrate Form
Uranium Spike Assay and Isotopic Solution Standard

280627
ID ISOU-C 233 QC_00005
Exp 12/20/18 Prpd:KLE Opn:12/20/13
233 QC

Uranium Concentration : 2.06684 ± 0.00052 μmoles U/gram solution

	U-233	U-234	U-235	U-236	U-238
Atom Percent:	**99.4911**	**0.1847**	**0.0790**	**0.0166**	**0.2286**
Uncertainty:	**0.0006**	**0.0002**	**0.0002**	**0.0002**	**0.0004**

Relative Atomic Weight : 233.055

This Certified Reference Material (CRM) is intended for use as a spike in the analysis of uranium materials by isotope dilution mass spectrometry (IDMS). Each unit of CRM 111-A consists of approximately 5 milligrams of uranium dissolved in 10 grams of 0.8 N HNO_3. This solution is contained in a sealed glass ampoule.

NOTE: *The ampoule should be handled under proper radiologically-controlled conditions at all times.*

The indicated uncertainties for the certified values are 95% confidence intervals for the means. The uncertainty assigned to the uranium assay includes components due to analytical variation. The uncertainties assigned to the isotopic abundance values include random measurement variations and a component based on the uncertainties associated with the determination of the mass discrimination correction factors.

The uranium elemental concentration was determined by the NBL-modified Davies-Gray titrimetric method [Reference: A. R. Eberle, M. W. Lerner, C. G. Goldbeck, and C. J. Rodden, NBL-252 (1970), pp. 1-25] using NBL CRM 112-A (uranium (normal) metal assay standard) as a control to verify the measurement system. The uranium isotopic composition was determined by thermal ionization mass spectrometry using NBL CRM 111 (U-233 spike) to demonstrate compatibility. The uranium assay value obtained by chemical analysis was verified by IDMS using NBL CRM 115 (uranium (depleted) metal assay standard) and NBL CRM 135 (U-235 spike) as spikes. For both the isotopic abundance and the IDMS assay measurements, mass discrimination correction factors were established using NBL CRM U500 and were applied to the calculations. The total impurity content was less than 1600 μg/g U as determined by inductively-coupled plasma atomic emission spectrometry on a subsample of the master

March 30, 2008
Argonne, Illinois

Jon Neuhoff, Director
New Brunswick Laboratory

(Editorial revision of Certificate dated January 18, 1990)

solution. Iron is the dominant impurity at 1330 μg/g U. Calcium, zinc, sodium, and magnesium were also found at 90, 50,50, and 10 μg/g U respectively. These impurity values are provided for information only; the impurity values are not certified.

The starting material from which this CRM was prepared was supplied by Argonne National Laboratory (ANL). Preparation and packaging of CRM 111-A were carried out by V. E. Connolly, M. I. Spaletto, F. P. Orlowicz, and F. E. Jones, NBL. Titrimetric assay measurements were performed by M. I. Spaletto, NBL; IDMS assay measurements were performed by V. E. Connolly, NBL; isotopic abundance measurements were performed by M. A. Legel and F. E. Jones, NBL; impurity measurements were performed by E. A. Huff and associates, ANL; statistical assessment of the data for certification was performed by M. D. Soriano, NBL. Project technical direction was provided by V. E. Connolly, NBL; overall technical direction and coordination of the preparation, certification, and issuance of this CRM was provided by N. M. Trahey, NBL.

RECOMMENDED PROCEDURE FOR USING CRM 111-A

The package is designed to prepare a solution having a known concentration of uranium on a weight basis. Once prepared, it is suggested that all the solution be immediately distributed as subportions for later use as individual spikes. After the spike has been added to a sample and isotopic equilibrium has been assured, a chemical separation should be performed to remove isobaric isotopes before mass spectrometric analysis.

Shake the ampoule vigorously before opening to homogenize contents. Secure in an upright position and allow solution trapped in the ampoule tip to drain back into the reservoir. Wrap the ampoule in a small cloth or towel, and break off the tip at the pre-scored line. Discard the tip, transfer the solution to a tared container, and proceed to distribute it as weighed portions into suitable containers for use as spikes.

If a more dilute solution is desired, transfer the solution to a larger tared container, weigh, dilute and weigh again, mix vigorously, and distribute all the solution as weighed portions.

Reagent

ISOU-C 233CAL_00006

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404-352-8677
Fax 404-352-2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

95301
U-233 5 mL Liquid in Flame Sealed Vial

280632
ID ISOU-C 233CAL_00006
Exp 12/19/18 Prpd KLE Opn 12/19/13
233 CAL

Customer: TestAmerica - St. Louis
P.O. No.: 2548635, Item 1 Product Code: 8055

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide calibration and purity were checked by germanium gamma-ray spectrometry, liquid scintillation counting, and/or alpha spectrometry, as applicable. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty* , % Type u_A	u_B	U	Reference Date (12:00 PM EST)
U-233	5.815E+07	3.705E+03	0.1	0.6	1.2	12/12/2013

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: U-232 4.811 Bq; U-234 4.450 Bq; α-impurities<0.001%; γ-impurities<0.1%.
5.23229 g 1M HNO3 solution. Carrier free.
Original material calibrated by New Brunswick Laboratory as CRM 111-A.

Source Prepared by: K. Eardley, Radiochemist

QC Approved: J.D. McCorvey, Counting Room Manager Date: 12 Dec 13

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

ISOU-C 233CAL_00007

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

95301
U-233 5 mL Liquid in Flame Sealed Vial

288644
ID ISOU-C 233CAL_00007
Exp 12/19/18 Prpd KLE Opn 12/19/13
233 CAL

Customer: TestAmerica - St. Louis
P.O. No.: 2548635, Item 1 Product Code: 8055

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide calibration and purity were checked by germanium gamma-ray spectrometry, liquid scintillation counting, and/or alpha spectrometry, as applicable. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty* , % Type u_A	u_B	U	Reference Date (12:00 PM EST)
U-233	5.815E+07	3.705E+03	0.1	0.6	1.2	12/12/2013

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: U-232 4.811 Bq; U-234 4.450 Bq; α-impurities<0.001%; γ-impurities<0.1%.
5.23229 g 1M HNO3 solution. Carrier free.
Original material calibrated by New Brunswick Laboratory as CRM 111-A.

Source Prepared by: K. Eardley, Radiochemist

QC Approved: J.D. McCorvey, Counting Room Manager Date: 12 Dec 13

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1958

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

ISOU-C 236_00002

Eckert & Ziegler
Isotope Products

24937 Avenue Tibbitts
Valencia, California 91355

Tel 661•309•1010
Fax 661•257•8303

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

Radionuclide:	U-236	**Customer:**	TEST AMERICA
Half-life:	(2.342 ± 0.003)E+07 years	**P.O. No.:**	2380469
Catalog No.:	7336	**Reference Date:**	15-Oct-10 12:00 PST
Source No.:	1480-21	**Contained Radioactivity: (Total alpha)**	0.01017 µCi 376.3 Bq

Physical Description:

A.	Mass of solution:	5.01498 g in 5 mL V-Vial
B.	Chemical form:	$UO_2(NO_3)_2$ in 0.1M HNO_3
C.	Carrier content:	None
D.	Density:	1.0016 g/mL @ 20°C

MT02535-10
ISOU U-236 QC CONC
elyk
.1M HN03
Prep/Opened: 10/5/2010
Exp(1): 10/5/2020
Exp(2): 10/5/2020

281584
ID ISOU-C 236_00002
Exp 10/05/15 Prpd KLE Opn 10/05/10
236 CAL

Radioimpurities:

See Technical Data Sheet

Radionuclide Concentration: 0.002028 µCi/g, 75.04 Bq/g

Method of Calibration:

This source was prepared from a weighed aliquot of solution whose activity in µCi/g was determined using a liquid scintillation counter.

Uncertainty of Measurement:

A.	Type A (random) uncertainty:	± 0.9 %
B.	Type B (systematic) uncertainty:	± 3.0 %
C.	Uncertainty in aliquot weighing:	± 0.4 %
D.	Total uncertainty at the 99% confidence level:	± 3.2 %

Notes:

- See reverse side for leak test(s) performed on this source.
- EZIP participates in a NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (as in NRC Regulatory Guide 4.15).
- Nuclear data was taken from "Table of Radioactive Isotopes", edited by Virginia Shirley, 1986.
- This solution has a working life of 5 years.

Daniel James Van Dalsem
Quality Control

21-Sep-10
Date

EZIP Ref. No.: 1480-21

Reagent

ISOU-C Enrich_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

95302

279791
ID: ISOU-C Enrich_00001
Exp:10/16/18 Prpd:KLE Opn:12/19/13
U enriched (234 and 235)

U-Enriched (97%) 5 mL Liquid in Flame Sealed Vial

Customer: Test America - St. Louis
P.O. No.: 2547082, Item 1 Product Code: 8235

This standard radionuclide source was prepared using an aliquot measured gravimetrically from a master radionuclide solution. The master radionuclide solution was prepared by dissolution of Uranium Oxide in 2.5M nitric acid. Total activity was calibrated by liquid scintillation counting. Atomic mass and weight percentages were certified by New Brunswick Laboratory. Radionuclide purity and calibration were checked by liquid scintillation counting and gamma-ray spectrometry. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July, 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date 12-December-2013 12:00 PM EST

Isotope	Activity (Bq)	Half-Life, Days	Uncertainty Type*, (%) u_A	u_B	U
U-234	3.924 E+04	8.967 E+07	1.9	0.9	4.2
U-235	7.991 E+02	2.571 E+11	1.9	0.9	4.2
U-236	3.653 E+01	8.554 E+09	1.9	0.9	4.2
U-238	6.653 E-01	1.632 E+12	1.9	0.9	4.2

***Uncertainty:** U – Relative expanded uncertainty, k=2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: α-impurities (other than decay products)< 0.1%; β-impurities(other than decay products)<0.1%; γ-impurities (other than decay products)<0.1%.
5.20568 grams of 1M HNO_3 solution with Uranium 1.97 mg/g.
Original material certified by New Brunswick Laboratory as CRM U970.

Source Prepared By: _____
R. Ormsby, Radiochemist

QA Approved: _____ 12 DEC 13
J.D. McCorvey, Counting Room Manager

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

MS ICSA_00014

INORGANIC VENTURES
CERTIFICATE OF ANALYSIS
300 Technology Drive
Christiansburg, VA 24073 USA
inorganicventures.com

1.0 **INORGANIC VENTURES** is an ISO Guide 34 "General Requirements for the Competence of Reference Material Producers" and ISO 9001 registered manufacturer. Our manufacturing laboratory is accredited to ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories."

ACCREDITED Testing Laboratory Certificate 883.01

ACCREDITED Reference Material Producer Certificate 883.02

2.0 **DESCRIPTION OF CRM**

	Stock Solution
Catalog No.:	6020ICS-0A
Lot Number:	**G2-MEB476152MCA**
Matrix:	1.4% HNO3(v/v)

397615
ID: MS ICSA_00014
Exp:07/01/15 Prpd:CCB Opn:07/03/14
ICSA

10,000 µg/mL ea:
Chloride,

2,000 µg/mL ea:
C,

1,000 µg/mL ea:
Al, Ca, Fe, K, Mg, Na, P, S,

20 µg/mL ea:
Mo, Ti

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

ELEMENT	CERTIFIED VALUE	ELEMENT	CERTIFIED VALUE	ELEMENT	CERTIFIED VALUE
Aluminum, Al	1,002 ± 6 µg/mL	Calcium, Ca	1,002 ± 6 µg/mL	Carbon, C	2,004 ± 13 µg/mL
Chloride, Chloride	10,020.0 ± 50.0 µg/mL	Iron, Fe	1,002 ± 7 µg/mL	Magnesium, Mg	1,002 ± 4 µg/mL
Molybdenum, Mo	20.04 ± 0.14 µg/mL	Phosphorus, P	1,002 ± 7 µg/mL	Potassium, K	1,002 ± 4 µg/mL
Sodium, Na	1,002 ± 7 µg/mL	Sulfur, S	1,002 ± 5 µg/mL	Titanium, Ti	20.04 ± 0.13 µg/mL

Certified Density: 1.034 g/mL (measured at 20 ± 1° C)

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

$$\text{Certified Value } (\bar{x}) = \frac{\Sigma x_i}{n}$$

$$\text{Uncertainty } (\pm) = 2\,[\,\Sigma(s_i)^2\,]^{1/2}$$

($\bar{x}$) = mean
x_i = individual results
n = number of measurements
2 = the coverage factor.
$[\,\Sigma(s_i)^2\,]^{1/2}$ = The square root of the sum of the squares of the most common errors (where 's' stands for the standard deviation) from instrumental measurement, density, NIST SRM uncertainty, weighing, dilution to volume, homogeneity, long term stability and short term stability.

4.0 TRACEBILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

· "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)
· This product is Traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRMs are available, the term 'in-house std.' is specified.
- The Calculated Value is a value calculated from the weight of a starting material that has been certified directly vs. a NIST SRM/RM. See section 4.2 for balance traceability.

4.1 ASSAY INFORMATION

ELEMENT	METHOD	NIST SRM#	SRM LOT#
Al	ICP Assay	3101a	060502
Al	EDTA	928	928
C	Gravimetric		See Sec. 4.2
Ca	ICP Assay	3109a	050825
Ca	EDTA	928	928
Chloride	Acidimetric	84L	84L
Fe	ICP Assay	3126a	051031
Fe	EDTA	928	928
K	Gravimetric		See Sec. 4.2
K	ICP Assay	3141a	051220
Mg	ICP Assay	3131a	050302
Mg	EDTA	928	928
Mo	Calculated		See Sec. 4.2
Mo	ICP Assay	3134	891307
Na	Gravimetric		See Sec. 4.2
Na	ICP Assay	3152a	010728
P	ICP Assay	3139a	060717
P	Acidimetric	84L	84L
S	Acidimetric	84k	84k
Ti	ICP Assay	3162a	060808

4.2 BALANCE CALIBRATION - All analytical balances are calibrated yearly by an accredited calibration laboratory and are traceable to a class E 2 analytical weight set with NIST Traceability. All balances are checked daily using an in-house procedure. The weights used for testing are annually compared to master weights and are traceable to the National Institute of Standards and Technology (NIST).

4.3 THERMOMETER CALIBRATION - All thermometers are NIST traceable through thermometers that are calibrated by an A2LA accredited calibration laboratory.

4.4 GLASSWARE CALIBRATION - An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM's.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP-MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

s	Al		M	Dy	< 0.000100	O	Li	0.002000	M	Pr	< 0.000100	M	Te	< 0.012007
M	Sb	< 0.000600	M	Er	< 0.000100	M	Lu	< 0.000100	M	Re	< 0.000100	M	Tb	< 0.000100
O	As	< 0.020000	M	Eu	< 0.000100	s	Mg		M	Rh	< 0.000100	M	Tl	< 0.000100
O	Ba	< 0.000200	M	Gd	< 0.000100	O	Mn	0.003000	M	Rb	< 0.020012	M	Th	< 0.000100
O	Be	< 0.000090	M	Ga	< 0.001001	O	Hg	< 0.005000	M	Ru	< 0.000100	M	Tm	< 0.000100
M	Bi	< 0.005003	O	Ge	< 0.015000	s	Mo		M	Sm	< 0.000100	M	Sn	< 0.003002
O	B	< 0.005000	M	Au	< 0.001001	M	Nd	< 0.000100	O	Sc	< 0.000700	s	Ti	
O	Cd	0.003400	M	Hf	< 0.002001	O	Ni	< 0.002000	M	Se	< 0.050029	O	W	< 0.007000
s	Ca		M	Ho	< 0.000100	M	Nb	< 0.002001	n	Si		M	U	< 0.000100
M	Ce	< 0.000500	M	In	< 0.001001	n	Os		M	Ag	< 0.001001	O	V	< 0.004000
M	Cs	< 0.001001	M	Ir	< 0.000100	M	Pd	< 0.003002	s	Na		M	Yb	< 0.000100
O	Cr	< 0.010000	s	Fe		s	P		O	Sr	0.005000	M	Y	< 0.000100
M	Co	< 0.001001	M	La	< 0.000200	M	Pt	< 0.000100	s	S		M	Zn	0.016610
O	Cu	< 0.020000	M	Pb	0.002001	s	K		M	Ta	< 0.001001	M	Zr	< 0.004002

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
HPLC, IC, TLC, ISE, IR, NMR, UV/VIS, MS, Capillary Electrophoresis, Potentiometry, Wet Chemistry and Voltammetry
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact Technical Staff

This CRM was manufactured using 18 megohm doubly deionized water that has been filtered through a 0.2 micron filter.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep **Tightly** sealed when not in use. Store and use at 20 ± 4°C. **Do Not** pipette from the container. **Do Not** return portions removed from pipetting to container.

Element Specific Information - For specific information regarding any element: Contact technical staff.

Uranium Note: If uranium is present in this standard, it is natural abundance unless specified in Section 3.0.

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Safety Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous.

Inorganic Ventures homogeneity data indicate that the end user should take a minimum sample size of 0.2mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration
- SAI Global File Number 010105

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration"
- Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 "General Requirements for the Competence of Reference Material Producers"
- Reference Materials Production - Accredited A2LA Certificate Number 883.02

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission
- Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission
- Reporting Defects and Non-Compliance

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies of chemically-stable solutions performed at the manufacturer's facility show a CRM shelf-life of twenty one months for solutions packaged in 125-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life. Manufacturer concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

11.3 Chemical Stability - Studies have been conducted on this or similar CRMs and it has been demonstrated that this CRM is chemically stable for a period of not less than two years provided the "Storage & Handling" conditions are followed that are described in section 7.0.

Certification Date: July 12, 2013

Expiration Date: EXPIRES 1[illegible]2015

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By: Zach Saunders
Product Documentation Technician

Zachary Saunders

Certificate Approved By: Allyson Guilliams
Quality Control Supervisor

Allyson Guilliams

Certifying Officer: Paul Gaines
PhD., Senior Technical Director

Paul R Gaines

Reagent

STD U_00005

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CUSTOM SOLUTIONS
CERTIFICATE OF ANALYSIS
Greenbrook Drive
Lakewood, VA 24073
www.inorganicventures.com

260559
ID STD U_00005
Exp 12/01/14 Prpd:REV Opn:12/02/13
U 1000PPM

1.0 **INORGANIC VENTURES** is an ISO Guide 34 "General Requirements for the Competence of Reference Material Producers" and ISO 9001 registered manufacturer. Our manufacturing laboratory is accredited to ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories."

ACCREDITED Testing Laboratory Certificate 883.01
ACCREDITED Reference Material Producer Certificate 883.02

2.0 DESCRIPTION OF CRM **1000 µg/mL Uranium in 2% (v/v) HNO3**

Catalog Number:	CGU1-1, CGU1-2, and CGU1-5
Lot Number:	**F2-U01098**
Starting Material:	UO2(NO3)2.6H2O
Starting Material Purity (%):	99.9979
Starting Material Lot No:	1627
Matrix:	2% (v/v) HNO3

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 1,003 ± 6 µg/mL - weighted mean

Certified Density: 1.010 g/mL (measured at 20 ± 1°C)

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

Certified Value $(\bar{x}) = \frac{\Sigma x_i}{n}$

($\bar{x}$) = mean
x_i = individual results
n = number of measurements

Uncertainty (±) = $2 [\Sigma(s_i)^2]^{½}$

2 = the coverage factor.
$[\Sigma(s_i)^2]^{½}$ = The square root of the sum of the squares of the most common errors (where 's' stands for the standard deviation) from instrumental measurement, density, NIST SRM uncertainty, weighing, dilution to volume, homogeneity, long term stability and short term stability.

Certified Abundance: The 235U in this standard is depleted. The Certified abundances in Atom % are as follows:

IV's Certified Abundance

Isotope	Atom%
Uranium 238U	99.6 ± 0.1
235U	0.42 ± 0.05

4.0 TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

· "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

· This product is Traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRMs are available, the term 'in-house std.' is specified.

- The Calculated Value is a value calculated from the weight of a starting material that has been certified directly vs. a NIST SRM/RM. See section 4.2 for balance traceability.

4.1 **Assay Method #1** **1,003 ± 4 µg/mL**
ICP Assay NIST SRM 3164 Lot Number: 080521

Assay Method #2 **1,002 ± 3 µg/mL**
Calculated NIST SRM Lot Number: See Sec. 4.2

4.2 **BALANCE CALIBRATION -** All analytical balances are calibrated yearly by an accredited calibration laboratory and are traceable to a class E 2 analytical weight set with NIST Traceability. All balances are checked daily using an in-house procedure. The weights used for testing are annually compared to master weights and are traceable to the National Institute of Standards and Technology (NIST).

4.3 **THERMOMETER CALIBRATION -** All thermometers are NIST traceable through thermometers that are calibrated by an A2LA accredited calibration laboratory.

4.4 **GLASSWARE CALIBRATION -** An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM's.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

CRM's solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O Al < 0.050000	M Dy < 0.015093	M Li < 0.025154	M Pr < 0.000755	M Te < 0.075463
M Sb < 0.001258	M Er < 0.012577	M Lu < 0.001006	M Re < 0.002515	M Tb < 0.000755
M As < 0.025154	M Eu < 0.007546	M Mg < 0.075463	M Rh < 0.002515	M Tl < 0.002515
M Ba < 0.025154	M Gd < 0.002515	M Mn < 0.010062	M Rb < 0.002515	M Th < 0.002515
M Be < 0.001258	M Ga < 0.002515	i Hg	M Ru < 0.005031	M Tm < 0.001006
M Bi < 0.001006	M Ge < 0.015093	M Mo < 0.005031	M Sm < 0.002515	O Sn < 0.100000
M B < 0.176080	M Au < 0.007546	M Nd < 0.005031	M Sc < 0.025154	M Ti < 0.125772
M Cd < 0.007546	M Hf < 0.005031	M Ni < 0.020123	M Se < 0.020123	M W < 0.025154
O Ca 0.003976	M Ho < 0.001258	M Nb < 0.001258	i Si	s U
M Ce < 0.012577	M In < 0.025154	n Os	M Ag < 0.005031	M V < 0.005031
M Cs < 0.000755	M Ir < 0.012577	M Pd < 0.012577	O Na 0.039757	M Yb < 0.002515
M Cr < 0.012577	M Fe < 0.503087	i P	M Sr < 0.001258	M Y < 0.100617
M Co < 0.007546	M La < 0.001258	M Pt < 0.005031	i S	M Zn < 0.025154
M Cu < 0.015093	M Pb < 0.007546	i K	M Ta < 0.017608	M Zr < 0.012577

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
HPLC, IC, TLC, ISE, IR, NMR, UV/VIS, MS, Capillary Eletrophoresis, Potentiometry, Wet Chemistry and Voltammetry
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact Technical Staff

This CRM was manufactured using 18 megohm-double deionized water that has been filtered through a 0.2 micron filter.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 238.0289; +6 ; 8; UO_2^{2+}(uranyl)

Chemical Compatibility - Soluble in HCl and HNO_3. Avoid H_3PO_4. H_2SO_4 and HF matrices should not be a problem depending upon [U]. Although the UO_2^{2+} ion is distinctly basic, any U^{+4} will precipitate in basic media. UO_2^{2+}salts are generally soluble in water and UO_2^{2+} is stable with most metals and inorganic anions. The uranyl phosphate is insoluble in water. UF_4 and UF_6 are water soluble.

Stability - 2-100 ppb levels stable for months in 1% HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 2-5% HNO_3 / LDPE container.

U Containing Samples (Preparation and Solution) - Metal (Dissolves rapidly in HCl and HNO_3); Oxide (Soluble in HNO_3); Ores (Digest for 1-2 hours with 1 gram of ore to 30 mL 1:1 HNO_3. Silica insolubles are removed by filtration after bringing the sample to fumes with conc. H_2SO_4.)

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Type	Interferences (underlined indicates severe)
ICP-OES 385.958 nm	0.3 / 0.01 µg/mL	1	ion	Th, Fe
ICP-OES 367.007 nm	0.3 / 0.02 µg/mL	1	ion	Th, Ce
ICP-OES 263.553 nm	0.3 / 0.01 µg/mL	1	ion	Ce, Ir, Th, Rh, W, Zr, Ta, Ti, V, Hf, Fe, Re, Ru
ICP-MS 238 amu	2 ppt	n/a	M+	206Pb16O2

Uranium Note: If uranium is present in this standard, it is natural abundance unless specified in Section 3.0.

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Safety Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to an in house procedure and is guaranteed to be homogeneous. Inorganic Ventures homogeneity data indicate that the end user should take a minimum sample size of 0.2mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration
- SAI Global File Number 010105

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration"
- Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 "General Requirements for the Competence of Reference Material Producers"
- Reference Materials Production - Accredited A2LA Certificate Number 883.02

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission
- Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission
- Reporting Defects and Non-Compliance

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life. Manufacturer concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

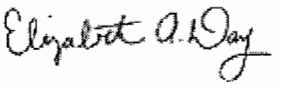
11.3 Chemical Stability - Studies have been conducted on this or similar CRMs and it has been demonstrated that this CRM is chemically stable for a period of not less than two years provided the "Storage & Handling" conditions are followed that are described in section 7.0.

Certification Date: September 07, 2012

Expiration Date:

01 Dec 2014

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	Stephan Blaakman Manufacturing Tech	
Certificate Approved By:	Elizabeth Day Quality Assurance Specialist	
Certifying Officer:	Paul Gaines PhD., Senior Technical Director	

METALS

COVER PAGE
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102577-2

SDG No.: 680102577-1

Project: Sediments

Client Sample ID	Lab Sample ID
SD-005W-02	680-102577-1
SD-005E-02	680-102577-2

Comments:

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-005W-02 Lab Sample ID: 680-102577-1

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG ID.: 680102577-1

Matrix: Solid Date Sampled: 06/13/2014 12:00

Reporting Basis: WET Date Received: 06/20/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0034	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00068	mg/Kg			5	6020A
15117-96-1	U-235	0.012	0.011	0.0046	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00090	mg/Kg			5	6020A
7440-61-1	U-238	1.4	0.011	0.00068	mg/Kg			5	6020A
7440-61-1	Total Uranium	1.4	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-005E-02 Lab Sample ID: 680-102577-2

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG ID.: 680102577-1

Matrix: Solid Date Sampled: 06/13/2014 12:05

Reporting Basis: WET Date Received: 06/20/2014 09:30

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	ND	0.011	0.0033	mg/Kg			5	6020A
13966-29-5	U-234	ND	0.011	0.00067	mg/Kg			5	6020A
15117-96-1	U-235	0.019	0.011	0.0045	mg/Kg			5	6020A
13982-70-2	U-236	ND	0.011	0.00089	mg/Kg			5	6020A
7440-61-1	U-238	2.6	0.011	0.00067	mg/Kg			5	6020A
7440-61-1	Total Uranium	2.6	0.0050	0.00030	mg/Kg			1	6020A

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

ICV Source: ISOU ICV(3)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00021

Analyte	ICV 160-141597/7 09/02/2014 18:45				CCV 160-141597/51 09/02/2014 22:11				CCV 160-141597/63 09/02/2014 23:07			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.226		0.223	101	0.0493	J	0.0515	96	0.0508		0.0515	99

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

ICV Source: ISOU ICV(3)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00021

Analyte	CCV 160-141597/75 09/03/2014 00:03											
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.0510		0.0515	99								

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

ICV Source: ISOU ICV(4,8)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00021

Analyte	ICV 160-141597/8 09/02/2014 18:50				CCV 160-141597/51 09/02/2014 22:11				CCV 160-141597/63 09/02/2014 23:07			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0892		0.0835	107	0.0871		0.0827	105	0.0874		0.0827	106
U-238	10.1		9.78	103	5.50		5.03	109	5.49		5.03	109

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

ICV Source: ISOU ICV(4,8)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00021

Analyte	CCV 160-141597/75 09/03/2014 00:03											
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0885		0.0827	107								
U-238	5.53		5.03	110								

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

ICV Source: ISOU ICV(5,6)_00022 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00021

Analyte	ICV 160-141597/9 09/02/2014 18:55				CCV 160-141597/51 09/02/2014 22:11				CCV 160-141597/63 09/02/2014 23:07			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	1.16		1.06	109	5.27		4.85	109	5.25		4.85	108
U-236	0.0702		0.0746	94	0.0933		0.0890	105	0.0945		0.0890	106

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

ICV Source: ISOU ICV(5,6)_00022 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00021

Analyte	CCV 160-141597/75 09/03/2014 00:03											
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	5.32		4.85	110								
U-236	0.0946		0.0890	106								

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2B-IN
CRQL CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

Method: 6020A Instrument ID: ICPMS6100

Lab Sample ID: CRI 160-141597/11 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 1_00021

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-235	0.0485	0.0499	J	103	70-130
U-238	0.0503	0.0496	J	99	70-130

Lab Sample ID: CRI 160-141597/12 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 2_00022

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-233	0.0309	0.0363	J	117	70-130
U-234	0.0496	0.0495	J	100	70-130
U-236	0.0534	0.0529		99	70-130

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IIB-IN

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

Concentration Units: ug/L

Analyte	RL	ICB 160-141597/10 09/02/2014 18:59		CCB 160-141597/52 09/02/2014 22:16		CCB 160-141597/64 09/02/2014 23:12		CCB 160-141597/76 09/03/2014 00:08	
		Found	C	Found	C	Found	C	Found	C
U-233	0.025	0.0345		0.0146	J	0.0150	J	0.0141	J
U-234	0.025	ND		ND		ND		ND	
U-235	0.025	ND		ND		ND		ND	
U-236	0.025	ND		ND		ND		ND	
U-238	0.025	0.00507	J	ND		ND		ND	

Italicized analytes were not requested for this sequence.

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-139348/1-A

Instrument Code: ICPMS6100 Batch No.: 141597

CAS No.	Analyte	Concentration	C	Q	Method
13968-55-3	U-233	ND			6020A_U
13966-29-5	U-234	ND			6020A_U
15117-96-1	U-235	ND			6020A_U
13982-70-2	U-236	ND			6020A_U
7440-61-1	U-238	ND			6020A_U

4A-IN
INTERFERENCE CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

Lab Sample ID: ICSAB 160-141597/14 Instrument ID: ICPMS6100

Lab File ID: 090214M2.rep ICS Source: ISOU ICSAB_00022

Concentration Units: ug/L

Analyte	True Solution AB	Found Solution AB	Percent Recovery
U-233	**0.0515**	**0.0537**	**104**
U-234	**0.0827**	**0.0910**	**110**
U-235	**4.85**	**5.47**	**113**
U-236	**0.0890**	**0.0975**	**110**
U-238	**5.03**	**5.69**	**113**

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IVA-IN

7A-IN
LAB CONTROL SAMPLE
METALS

Lab ID: LCS 160-139348/2-A

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

Sample Matrix: Solid LCS Source: ISOU Prep Spk_00002

Analyte	Solid(mg/Kg)							
	True	Found	C	%R	Limits		Q	Method
U-234	0.00785	0.00845		108	80	120		6020A
U-235	0.461	0.508		110	80	120		6020A
U-238	0.477	0.525		110	80	120		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

9-IN
DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102577-2

SDG Number: 680102577-1

Matrix: Solid Instrument ID: ICPMS6100

Method: 6020A MDL Date: 08/05/2013 10:01

Prep Method: 3050B

Analyte	Wavelength/ Mass	RL (mg/Kg)	MDL (mg/Kg)
U-233	233	0.005	0.0015
U-234	234	0.005	0.0003
U-235	235	0.005	0.00203
U-236	236	0.005	0.0004
U-238	238	0.005	0.0003

9-IN
CALIBRATION BLANK DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102577-2

SDG Number: 680102577-1

Matrix: Solid Instrument ID: ICPMS6100

Method: 6020A XMDL Date: 07/18/2014 15:08

Analyte	Wavelength/ Mass	XRL (ug/L)	XMDL (ug/L)
U-233	233	0.05	0.0066
U-234	234	0.05	0.0021
U-235	235	0.05	0.0034
U-236	236	0.05	0.0015
U-238	238	0.05	0.0082

9-IN
DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102577-2

SDG Number: 680102577-1

Matrix: Solid Instrument ID: NOEQUIP

Method: 6020A MDL Date: 06/12/2013 14:02

Analyte	Wavelength/ Mass	RL (mg/Kg)	MDL (mg/Kg)
Total Uranium		0.005	0.0003

11-IN
LINEAR RANGES
METALS

Lab Name: TestAmerica St. Louis Job No: 680-102577-2

SDG No.: 680102577-1

Instrument ID: ICPMS6100 Date: 02/14/2012 11:04

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	Method
U-233		2000	6020A
U-234		2000	6020A
U-235		2000	6020A
U-236		2000	6020A
U-238		2000	6020A

12-IN
PREPARATION LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

Prep Method: 3050B

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight (g)	Initial Volume	Final Volume (mL)
MB 160-139348/1-A	08/21/2014 10:35	139348	0.5931		50
LCS 160-139348/2-A	08/21/2014 10:35	139348	0.5263		50
680-102577-1	08/21/2014 10:35	139348	0.5552		50
680-102577-2	08/21/2014 10:35	139348	0.5608		50

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/02/2014 18:15 End Date: 09/03/2014 00:54

Lab Sample Id	D/F	Type	Time	Analytes																										
				U-233	U-234	U-235	U-236	U-238																						
ICIS 160-141597/1			18:15	X	X	X	X	X																						
IC 160-141597/2	1		18:22	X	X	X	X	X																						
IC 160-141597/3	1		18:27	X	X	X	X	X																						
IC 160-141597/4	1		18:31	X	X	X	X	X																						
IC 160-141597/5	1		18:36	X	X	X	X	X																						
IC 160-141597/6	1		18:41	X	X	X	X	X																						
ICV 160-141597/7	1		18:45	X																										
ICV 160-141597/8	1		18:50		X			X																						
ICV 160-141597/9	1		18:55			X	X																							
ICB 160-141597/10	1		18:59	X	X	X	X	X																						
CRI 160-141597/11	1		19:04			X		X																						
CRI 160-141597/12	1		19:09	X	X		X																							
ICSA 160-141597/13	1		19:13	X	X	X	X	X																						
ICSAB 160-141597/14	1		19:18	X	X	X	X	X																						
CCV 160-141597/15			19:23																											
CCB 160-141597/16			19:27																											
ZZZZZZ			19:32																											
ZZZZZZ			19:37																											
ZZZZZZ			19:41																											
ZZZZZZ			19:46																											
ZZZZZZ			19:51																											
ZZZZZZ			19:55																											
ZZZZZZ			20:00																											
ZZZZZZ			20:05																											
ZZZZZZ			20:09																											
ZZZZZZ			20:14																											
CCV 160-141597/27			20:19																											
CCB 160-141597/28			20:23																											
ZZZZZZ			20:28																											
ZZZZZZ			20:33																											
ZZZZZZ			20:37																											
ZZZZZZ			20:42																											
ZZZZZZ			20:47																											
ZZZZZZ			20:51																											
ZZZZZZ			20:56																											
ZZZZZZ			21:01																											
ZZZZZZ			21:05																											
ZZZZZZ			21:10																											
CCV 160-141597/39			21:15																											

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/02/2014 18:15 End Date: 09/03/2014 00:54

Lab Sample Id	D/F	Type	Time	Analytes																										
				U-233	U-234	U-235	U-236	U-238																						
CCB 160-141597/40			21:19																											
ZZZZZZ			21:24																											
ZZZZZZ			21:29																											
ZZZZZZ			21:33																											
ZZZZZZ			21:38																											
ZZZZZZ			21:43																											
ZZZZZZ			21:48																											
ZZZZZZ			21:52																											
ZZZZZZ			21:57																											
ZZZZZZ			22:01																											
ZZZZZZ			22:06																											
CCV 160-141597/51	1		22:11	X	X	X	X	X																						
CCB 160-141597/52	1		22:16	X	X	X	X	X																						
ZZZZZZ			22:20																											
ZZZZZZ			22:25																											
ZZZZZZ			22:30																											
ZZZZZZ			22:34																											
ZZZZZZ			22:39																											
MB 160-139348/1-A	2	T	22:44	X	X	X	X	X																						
LCS 160-139348/2-A	2	T	22:48		X	X		X																						
680-102577-1	5	T	22:53	X	X	X	X	X																						
680-102577-2	5	T	22:58	X	X	X	X	X																						
ZZZZZZ			23:02																											
CCV 160-141597/63	1		23:07	X	X	X	X	X																						
CCB 160-141597/64	1		23:12	X	X	X	X	X																						
ZZZZZZ			23:16																											
ZZZZZZ			23:21																											
ZZZZZZ			23:26																											
ZZZZZZ			23:30																											
ZZZZZZ			23:35																											
ZZZZZZ			23:40																											
ZZZZZZ			23:44																											
ZZZZZZ			23:49																											
ZZZZZZ			23:54																											
ZZZZZZ			23:58																											
CCV 160-141597/75	1		00:03	X	X	X	X	X																						
CCB 160-141597/76	1		00:08	X	X	X	X	X																						
ZZZZZZ			00:12																											
ZZZZZZ			00:17																											

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 09/02/2014 18:15 End Date: 09/03/2014 00:54

Lab Sample Id	D/F	Type	Time	Analytes																									
				U-233	U-234	U-235	U-236	U-238																					
ZZZZZZ			00:22																										
ZZZZZZ			00:26																										
ZZZZZZ			00:31																										
ZZZZZZ			00:36																										
ZZZZZZ			00:40																										
ZZZZZZ			00:45																										
CCV 160-141597/85			00:50																										
CCB 160-141597/86			00:54																										

Prep Types:
T = Total/NA

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

Instrument ID: NOEQUIP Analysis Method: 6020A

Start Date: 09/04/2014 13:20 End Date: 09/04/2014 13:20

Lab Sample Id	D/F	Type	Time	Analytes																								
				U																								
680-102577-1	1	T	13:20	X																								
680-102577-2	1	T	13:20	X																								
ZZZZZZ			13:20																									
ZZZZZZ			13:20																									
ZZZZZZ			13:20																									
ZZZZZZ			13:20																									
ZZZZZZ			13:20																									
ZZZZZZ			13:20																									
ZZZZZZ			13:20																									
ZZZZZZ			13:20																									
ZZZZZZ			13:20																									
ZZZZZZ			13:20																									
ZZZZZZ			13:20																									
ZZZZZZ			13:20																									
ZZZZZZ			13:20																									
ZZZZZZ			13:20																									

Prep Types:
T = Total/NA

FORM XIII-IN

15-IN
ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

ICP-MS Instrument ID: ICPMS6100 Start Date: 09/02/2014 End Date: 09/03/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
IC 160-141597/2	18:22										
IC 160-141597/3	18:27										
IC 160-141597/4	18:31										
IC 160-141597/5	18:36										
IC 160-141597/6	18:41										
ICV 160-141597/7	18:45	101									
ICV 160-141597/8	18:50	101									
ICV 160-141597/9	18:55	99									
ICB 160-141597/10	18:59	98									
CRI 160-141597/11	19:04	100									
CRI 160-141597/12	19:09	100									
ICSA 160-141597/13	19:13	90									
ICSAB 160-141597/14	19:18	89									
CCV 160-141597/51	22:11	94									
CCB 160-141597/52	22:16	92									
MB 160-139348/1-A	22:44	96									
LCS 160-139348/2-A	22:48	95									
680-102577-1	22:53	94									
680-102577-2	22:58	93									
CCV 160-141597/63	23:07	92									
CCB 160-141597/64	23:12	90									
CCV 160-141597/75	00:03	93									
CCB 160-141597/76	00:08	93									

KE 9/3/14

File: 090214M2

A Batch
141597
141598

Sample/Batch Report

TA ST. LOUIS - PERKIN ELMER ELAN 6100 - METHOD 6020 / 200.8 QUANTITATIVE ANALYSIS REPORT

User Name: stlmetals
Computer Name: SLICP03
Sample File: D:\Elandata\Sample\SW846 TEMP1.sam
Report Date/Time: Wednesday, September 03, 2014 09:34:49
Method File: d:\Elandata\Method\2014 isou.mth
Tuning File: d:\Elandata\Tuning\epa tuning.tun
Optimization File: d:\Elandata\Optimize\epa2008.dac
Calibration File:
Calibration Type: External Calibration
Number of Replicates: 3
Number of Readings: 1
Number of Sweeps: 100
Dual Detector Mode: Dual

A/S Loc.	Batch ID	Sample ID	Description	Aliquot Vol.	Diluted Vol.
11	139040	430685	2		
12		430686	2		
13		680-102370-A-7-D	5		
14		680-102370-A-8-C	5		
15		680-102370-A-9-C	5		
16		680-102370-A-10-C	5		
17		680-102370-A-11-C	5		
18		680-102370-A-12-C	5		
19		680-102370-A-13-C	5		
20	CCV	680-102370-A-14-C	5		
21	CCB	680-102370-A-15-C	5		
22		680-102370-A-16-C	5		
23		680-102370-A-17-C	5		
24		680-102370-A-18-C	5		
25		680-102370-A-19-C	5		
26		680-102370-A-20-C	5		
27		680-102370-A-22-C	5		
28		680-102370-A-23-G	5		
29		680-102370-A-23-G	SD25		
30	CCV	680-102370-A-23-H	MS5		
31	CCB	680-102370-A-23-I	MSD5		
32		680-102370-A-24-C	5		
33		680-102370-A-25-C	5		
34	139047	430790	2		
35		430791	2		
36		680-102370-A-26-C	5		
37		680-102370-A-26-C	SD25		
38		680-102370-A-26-D	MS5		
39		680-102370-A-26-E	MS5		
40	CCV	680-102370-A-28-C	5		
41	CCB	680-102370-A-29-C	5		
42		680-102370-A-30-C	5		
43		680-102370-A-31-C	5		
44		680-102370-A-33-D	5		
45		680-102370-A-34-C	5		
46	139348	431772	2		
47		431773	2		
48		680-102577-A-1-D	5		
49		680-102577-A-2-C	5		
50	CCV	680-102431-A-1-C	5		
51	CCB	680-102431-A-2-C	5		

All

52		680-102431-A-3-C	5
53		680-102431-A-4-C	5
54		680-102431-A-5-G	5
55		680-102431-A-5-G SD	25
56		680-102431-A-5-H MS	5
57		680-102431-A-5-I MSD	5
58		680-102431-A-7-C	5
59		680-102431-A-8-C	5
60	ccv	680-102431-A-8-D MS	5
61	ccv	680-102431-A-8-E MSD	5
62		680-102431-A-9-C	5
63		680-102431-A-11-C	5
64		680-102431-A-12-C	5
65		680-102431-A-13-C	5
66		680-102431-A-15-C	5
67		680-102431-A-16-C	5
68		680-102431-A-17-C	5

- All

ccv
ccv

Quantitative Analysis Calibration Report

File Name: 090214M2.cal
File Path: D:\Elandata\System
Calibration Type: External Calibration

Analyte	Mass	Curve Type	Slope	Intercept	Corr. Coeff.
Ho (IS)	164.930	Linear Thru Zero	0.000000	0.00	0.000000
U	233.000	Linear Thru Zero	0.047454	0.00	0.999971
U	234.041	Linear Thru Zero	0.036480	0.00	0.999974
U	235.044	Linear Thru Zero	0.033872	0.00	0.999922
U	236.000	Linear Thru Zero	0.052600	0.00	0.999967
U	238.050	Linear Thru Zero	0.030132	0.00	0.999932

Instrument Tuning Report

File Name: EPA TUNING.tun
File Path: d:\Elandata\Tuning
Sample ID: Sample
Sample Date/Time: Tuesday, September 02, 2014 17:30:16

Analyte	Exact Mass	Meas. Mass	Mass DAC	Res. DAC	Meas. Pk. Width	Custom Res.
Li	7.016	7.025	1570	2065	0.643	
Mg	23.985	23.979	5688	2080	0.678	
Rh	102.905	102.879	24919	2080	0.693	
Ce	139.905	139.929	33931	2120	0.673	
Pb	207.977	207.977	50415	2310	0.664	

Replicates: 6

Daily Performance Report

Sample ID: Sample
Sample Date/Time: Tuesday, September 02, 2014 17:48:47
Sample Description:
Method File: d:\Elandata\Method\DAILY EPA.mth
Dataset File: d:\Elandata\Dataset\daily3\Sample.157
Tuning File: d:\Elandata\Tuning\EPA TUNING.tun
Optimization File: d:\Elandata\Optimize\EPA2008.dac
Dual Detector Mode: Pulse
Acq. Dead Time(ns): 35
Current Dead Time (ns): 35

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Net Intens. SD	Net Intens. RSD
	Li	7.0	5059.0	5059.008	181.710	3.6
	Mg	24.0	22040.4	22040.437	314.060	1.4
	Rh	102.9	308814.2	308814.162	3879.016	1.3
	Pb	208.0	284822.2	284822.242	2758.220	1.0
⌈>	Ba	137.9	344587.0	344587.031	5003.107	1.5
⌊	Ba++	69.0	2836.1	0.008	0.000	1.4
⌈>	Ce	139.9	422424.4	422424.369	4644.459	1.1
⌊	CeO	155.9	14719.5	0.035	0.000	1.2
	Bkgd	220.0	6.1	6.056	1.237	20.4

Current Optimization File Data

Current Value	Description
1.00	Nebulizer Gas Flow
5.75	Lens Voltage
1600.00	ICP RF Power
-2109.38	Analog Stage Voltage
1200.00	Pulse Stage Voltage
70.00	Discriminator Threshold
-6.00	AC Rod Offset
60.00	Service DAC 1
0.00	Quadrupole Rod Offset

Current Autolens Data

Analyte	Mass	Num of Pts	DAC Value	Maximum Intensity
Be	9	33	5.8	3790.5
Mg	24	33	5.3	38794.6
Co	59	33	6.0	120968.0
Rh	103	33	6.0	410955.8
In	115	33	6.3	535549.1
Ba	138	33	6.5	493063.2
Ce	140	33	6.8	606693.1
Pb	208	33	8.5	437779.2

Daily Performance Report

Sample ID: Sample
Sample Date/Time: Tuesday, September 02, 2014 17:53:20
Sample Description:
Method File: d:\Elandata\Method\DAILY EPA.mth
Dataset File: d:\Elandata\Dataset\daily3\Sample.158
Tuning File: d:\Elandata\Tuning\EPA TUNING.tun
Optimization File: d:\Elandata\Optimize\EPA2008.dac
Dual Detector Mode: Pulse
Acq. Dead Time(ns): 35
Current Dead Time (ns): 35

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Net Intens. SD	Net Intens. RSD
	Li	7.0	3595.6	3595.564	144.770	4.0
	Mg	24.0	18044.1	18044.114	354.293	2.0
	Rh	102.9	261860.2	261860.165	1846.488	0.7
	Pb	208.0	230123.3	230123.304	767.346	0.3
⌈>	Ba	137.9	289067.4	289067.370	2191.660	0.8
⌊	Ba++	69.0	2378.0	0.008	0.000	1.7
⌈>	Ce	139.9	357557.6	357557.556	2688.005	0.8
⌊	CeO	155.9	10215.4	0.029	0.001	1.9
	Bkgd	220.0	6.8	6.778	1.917	28.3

Current Optimization File Data

Current Value	Description
0.98	Nebulizer Gas Flow
5.75	Lens Voltage
1600.00	ICP RF Power
-2109.38	Analog Stage Voltage
1200.00	Pulse Stage Voltage
70.00	Discriminator Threshold
-6.00	AC Rod Offset
60.00	Service DAC 1
0.00	Quadrupole Rod Offset

Current Autolens Data

Analyte	Mass	Num of Pts	DAC Value	Maximum Intensity
Be	9	33	5.8	3790.5
Mg	24	33	5.3	38794.6
Co	59	33	6.0	120968.0
Rh	103	33	6.0	410955.8
In	115	33	6.3	535549.1
Ba	138	33	6.5	493063.2
Ce	140	33	6.8	606693.1
Pb	208	33	8.5	437779.2

QUANTITATIVE ANALYSIS REPORT

Sample ID: Blank

Sample Date/Time: Tuesday, September 02, 2014 18:15:40
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\090214M2\Blank.001

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			871479.031	ug/L	
	233	**U**			213.002	ug/L	
	234	**U**			6.800	ug/L	
	235	**U**			30.600	ug/L	
	236	**U**			8.600	ug/L	
	238	**U**			260.536	ug/L	

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 1
Sample Date/Time: Tuesday, September 02, 2014 18:22:20
Autosampler Position: 191
Dataset File: D:\Elandata\Dataset\090214M2\Standard 1.002

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			877833.654	ug/L	871479.031
	233	**U**			28.000	ug/L	213.002
	234	**U**			31.800	ug/L	6.800
	235	**U**	**0.048500**	2.265	1514.680	ug/L	30.600
	236	**U**			54.000	ug/L	8.600
	238	**U**	**0.050300**	4.463	1417.070	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 2
Sample Date/Time: Tuesday, September 02, 2014 18:27:01
Autosampler Position: 192
Dataset File: D:\Elandata\Dataset\090214M2\Standard 2.003

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			877238.558	ug/L	871479.031
	233	**U**			1360.198	ug/L	213.002
	234	**U**	**0.049600**	3.938	1622.225	ug/L	6.800
	235	**U**	**2.923211**	2.834	89362.979	ug/L	30.600
	236	**U**	**0.053400**	2.939	2501.486	ug/L	8.600
	238	**U**	**3.552753**	2.583	81802.223	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 3
Sample Date/Time: Tuesday, September 02, 2014 18:31:42
Autosampler Position: 193
Dataset File: D:\Elandata\Dataset\090214M2\Standard 3.004

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			878969.266	ug/L	871479.031
	233	**U**	**0.051500**	3.204	2261.046	ug/L	213.002
	234	**U**	**0.082594**	1.962	2704.656	ug/L	6.800
	235	**U**	**4.885157**	2.687	149649.968	ug/L	30.600
	236	**U**	**0.088787**	3.446	4161.540	ug/L	8.600
	238	**U**	**5.926777**	2.502	136576.296	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 4
Sample Date/Time: Tuesday, September 02, 2014 18:36:23
Autosampler Position: 194
Dataset File: D:\Elandata\Dataset\090214M2\Standard 4.005

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			874096.866	ug/L	871479.031
	233	**U**	**0.103854**	3.090	4458.563	ug/L	213.002
	234	**U**	**0.165318**	1.316	5385.483	ug/L	6.800
	235	**U**	**9.694902**	1.010	297740.953	ug/L	30.600
	236	**U**	**0.178156**	1.054	8385.998	ug/L	8.600
	238	**U**	**10.051840**	1.064	274170.864	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 5
Sample Date/Time: Tuesday, September 02, 2014 18:41:04
Autosampler Position: 195
Dataset File: D:\Elandata\Dataset\090214M2\Standard 5.006

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			879848.746	ug/L	871479.031
	233	**U**	**0.309687**	2.826	13129.570	ug/L	213.002
	234	**U**	**0.494758**	3.061	15867.683	ug/L	6.800
	235	**U**	**28.963445**	3.050	862044.495	ug/L	30.600
	236	**U**	**0.532412**	2.717	24619.484	ug/L	8.600
	238	**U**	**30.038201**	2.681	795705.300	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 1

Sample Date/Time: Tuesday, September 02, 2014 18:45:45
Autosampler Position: 196
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 1.007

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			879143.222	ug/L	871479.031
	233	**U**	**0.226050**	1.842	9638.788	ug/L	213.002
	234	**U**	**0.000564**	18.077	24.867	ug/L	6.800
	235	**U**	**0.009009**	25.139	296.603	ug/L	30.600
	236	**U**	**0.000110**	33.711	13.733	ug/L	8.600
	238	**U**	**0.049227**	6.059	1563.952	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.879**	
	U	233		**101.141**
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 2

Sample Date/Time: Tuesday, September 02, 2014 18:50:26
Autosampler Position: 197
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 2.008

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			880894.558	ug/L	871479.031
	233	**U**	**44.140322**	2.338	1843768.974	ug/L	213.002
	234	**U**	**0.089186**	2.633	2870.088	ug/L	6.800
	235	**U**	**0.114889**	1.914	3456.752	ug/L	30.600
	236	**U**	**0.006645**	7.040	315.870	ug/L	8.600
	238	**U**	**10.088659**	1.697	267879.812	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.080**	
	U	233		
	U	234		**106.810**
	U	235		
	U	236		
	U	238		**103.175**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 3

Sample Date/Time: Tuesday, September 02, 2014 18:55:07
Autosampler Position: 198
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 3.009

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			865018.137	ug/L	871479.031
	233	**U**	**429.199578**	2.214	17607424.649	ug/L	213.002
	234	**U**	**0.905791**	1.987	28578.732	ug/L	6.800
	235	**U**	**1.155253**	2.556	33854.708	ug/L	30.600
	236	**U**	**0.070183**	3.171	3198.492	ug/L	8.600
	238	**U**	**92.852103**	2.535	2418505.251	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.259**	
	U	233		
	U	234		
	U	235		**109.316**
	U	236		**94.079**
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 4

Sample Date/Time: Tuesday, September 02, 2014 18:59:48

Autosampler Position: 1

Dataset File: D:\Elandata\Dataset\090214M2\QC Std 4.010

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			856444.036	ug/L	871479.031
	233	**U**	**0.034502**	19.267	1619.761	ug/L	213.002
	234	**U**	**0.000064**	68.738	8.667	ug/L	6.800
	235	**U**	**-0.000066**	33.294	28.133	ug/L	30.600
	236	**U**	**0.000008**	344.367	8.867	ug/L	8.600
	238	**U**	**0.005071**	29.359	388.072	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.275**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 5

Sample Date/Time: Tuesday, September 02, 2014 19:04:28
Autosampler Position: 191
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 5.011

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			870074.027	ug/L	871479.031
	233	**U**	**0.028036**	20.106	1361.399	ug/L	213.002
	234	**U**	**0.000909**	2.655	35.600	ug/L	6.800
	235	**U**	**0.049860**	3.603	1497.812	ug/L	30.600
	236	**U**	**0.000812**	9.513	45.667	ug/L	8.600
	238	**U**	**0.049613**	4.931	1558.218	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.839**	
	U	233		
	U	234		
	U	235		**102.805**
	U	236		
	U	238		**98.634**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Tuesday, September 02, 2014 19:09:09
Autosampler Position: 192
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 6.012

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			875095.293	ug/L	871479.031
	233	**U**	**0.036297**	7.050	1717.170	ug/L	213.002
	234	**U**	**0.049549**	0.836	1588.288	ug/L	6.800
	235	**U**	**2.983820**	1.664	88417.674	ug/L	30.600
	236	**U**	**0.052886**	2.219	2440.942	ug/L	8.600
	238	**U**	**3.092020**	1.905	81738.491	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.415**	
	U	233		**117.466**
	U	234		**99.897**
	U	235		
	U	236		**99.037**
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7

Sample Date/Time: Tuesday, September 02, 2014 19:13:50
Autosampler Position: 199
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 7.013

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			783490.929	ug/L	871479.031
	233	**U**	**-0.001390**	32.984	139.401	ug/L	213.002
	234	**U**	**0.000058**	81.838	7.800	ug/L	6.800
	235	**U**	**-0.000035**	303.887	26.467	ug/L	30.600
	236	**U**	**-0.000018**	186.985	6.933	ug/L	8.600
	238	**U**	**-0.007232**	6.121	63.667	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.904**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 8

Sample Date/Time: Tuesday, September 02, 2014 19:18:30
Autosampler Position: 200
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 8.014

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			772882.876	ug/L	871479.031
	233	**U**	**0.053663**	3.730	2153.696	ug/L	213.002
	234	**U**	**0.090990**	2.499	2568.498	ug/L	6.800
	235	**U**	**5.469291**	2.340	143066.628	ug/L	30.600
	236	**U**	**0.097483**	3.218	3965.351	ug/L	8.600
	238	**U**	**5.691618**	2.953	132603.032	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.686**	
	U	233		**104.201**
	U	234		**110.024**
	U	235		**112.827**
	U	236		**109.531**
	U	238		**113.246**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9

Sample Date/Time: Tuesday, September 02, 2014 19:23:11
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 9.015

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			858402.021	ug/L	871479.031
	233	**U**	**0.051075**	2.463	2288.450	ug/L	213.002
	234	**U**	**0.086737**	3.321	2718.992	ug/L	6.800
	235	**U**	**5.234835**	2.651	152061.441	ug/L	30.600
	236	**U**	**0.093078**	2.113	4207.220	ug/L	8.600
	238	**U**	**5.395863**	2.499	139672.487	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.499**	
	U	233		**99.174**
	U	234		**104.882**
	U	235		**107.990**
	U	236		**104.582**
	U	238		**107.361**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Tuesday, September 02, 2014 19:27:51

Autosampler Position: 1

Dataset File: D:\Elandata\Dataset\090214M2\QC Std 10.016

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			870055.449	ug/L	871479.031
	233	**U**	**0.014028**	2.291	791.955	ug/L	213.002
	234	**U**	**0.000100**	52.127	9.933	ug/L	6.800
	235	**U**	**0.000737**	27.688	52.467	ug/L	30.600
	236	**U**	**-0.000016**	240.514	7.800	ug/L	8.600
	238	**U**	**0.000987**	24.598	286.070	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.837**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 430685

Sample Date/Time: Tuesday, September 02, 2014 19:32:31
Autosampler Position: 11
Dataset File: D:\Elandata\Dataset\090214M2\430685.017

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			884794.789	ug/L	871479.031
	233	**U**	**-0.004523**	1.748	26.200	ug/L	213.002
	234	**U**	**0.000019**	157.744	7.467	ug/L	6.800
	235	**U**	**-0.000129**	15.715	27.200	ug/L	30.600
	236	**U**	**-0.000036**	18.789	7.067	ug/L	8.600
	238	**U**	**-0.006361**	3.227	94.867	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.528**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 430686

Sample Date/Time: Tuesday, September 02, 2014 19:37:11
Autosampler Position: 12
Dataset File: D:\Elandata\Dataset\090214M2\430686.018

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			884397.139	ug/L	871479.031
	233	**U**	**-0.001754**	4.447	142.401	ug/L	213.002
	234	**U**	**0.045024**	2.597	1458.008	ug/L	6.800
	235	**U**	**2.710722**	2.066	81166.280	ug/L	30.600
	236	**U**	**0.048862**	1.472	2280.382	ug/L	8.600
	238	**U**	**2.791975**	1.524	74620.203	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.482**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-7-D

Sample Date/Time: Tuesday, September 02, 2014 19:41:50

Autosampler Position: 13

Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-7-D.019

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			872992.022	ug/L	871479.031
	233	**U**	**-0.004693**	2.005	18.800	ug/L	213.002
	234	**U**	**0.000081**	53.747	9.333	ug/L	6.800
	235	**U**	**0.005060**	5.324	180.201	ug/L	30.600
	236	**U**	**-0.000026**	39.937	7.400	ug/L	8.600
	238	**U**	**0.728456**	2.209	19406.589	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.174**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-8-C

Sample Date/Time: Tuesday, September 02, 2014 19:46:30

Autosampler Position: 14

Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-8-C.020

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			786792.304	ug/L	871479.031
	233	**U**	**-0.004734**	0.475	15.533	ug/L	213.002
	234	**U**	**0.000116**	5.255	9.467	ug/L	6.800
	235	**U**	**0.006522**	3.942	201.468	ug/L	30.600
	236	**U**	**-0.000014**	273.330	7.200	ug/L	8.600
	238	**U**	**0.965476**	2.246	23124.910	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.282**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-9-C

Sample Date/Time: Tuesday, September 02, 2014 19:51:10

Autosampler Position: 15

Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-9-C.021

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			690710.506	ug/L	871479.031
	233	**U**	**-0.004717**	1.226	14.200	ug/L	213.002
	234	**U**	**0.000210**	15.527	10.667	ug/L	6.800
	235	**U**	**0.014069**	3.001	353.271	ug/L	30.600
	236	**U**	**0.000012**	101.427	7.267	ug/L	8.600
	238	**U**	**1.998207**	4.018	41772.268	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**79.257**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-10-C
Sample Date/Time: Tuesday, September 02, 2014 19:55:51
Autosampler Position: 16
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-10-C.022

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			825992.061	ug/L	871479.031
	233	**U**	**-0.004781**	0.904	14.467	ug/L	213.002
	234	**U**	**0.000142**	51.481	10.733	ug/L	6.800
	235	**U**	**0.009785**	3.728	302.603	ug/L	30.600
	236	**U**	**-0.000018**	147.541	7.400	ug/L	8.600
	238	**U**	**1.388266**	0.677	34800.823	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.780**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-11-C

Sample Date/Time: Tuesday, September 02, 2014 20:00:31

Autosampler Position: 17

Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-11-C.023

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			859340.493	ug/L	871479.031
	233	**U**	**-0.004789**	0.490	14.733	ug/L	213.002
	234	**U**	**0.000067**	39.404	8.800	ug/L	6.800
	235	**U**	**0.007017**	2.820	234.269	ug/L	30.600
	236	**U**	**-0.000049**	29.169	6.267	ug/L	8.600
	238	**U**	**1.047836**	2.583	27365.131	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.607**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-12-C
Sample Date/Time: Tuesday, September 02, 2014 20:05:11
Autosampler Position: 18
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-12-C.024

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			877904.012	ug/L	871479.031
	233	**U**	**-0.004782**	0.559	15.333	ug/L	213.002
	234	**U**	**0.000096**	8.415	9.933	ug/L	6.800
	235	**U**	**0.012980**	2.149	416.739	ug/L	30.600
	236	**U**	**-0.000065**	53.307	5.600	ug/L	8.600
	238	**U**	**1.861696**	1.935	49483.280	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.737**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-13-C
Sample Date/Time: Tuesday, September 02, 2014 20:09:52
Autosampler Position: 19
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-13-C.025

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			880656.659	ug/L	871479.031
	233	**U**	**-0.004765**	0.863	16.067	ug/L	213.002
	234	**U**	**0.000108**	48.643	10.267	ug/L	6.800
	235	**U**	**0.013619**	1.081	437.007	ug/L	30.600
	236	**U**	**-0.000038**	25.816	6.933	ug/L	8.600
	238	**U**	**1.908307**	2.178	50858.727	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.053**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-14-C
Sample Date/Time: Tuesday, September 02, 2014 20:14:32
Autosampler Position: 20
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-14-C.026

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			860742.165	ug/L	871479.031
	233	**U**	**-0.004802**	1.745	14.267	ug/L	213.002
	234	**U**	**0.000179**	37.687	12.400	ug/L	6.800
	235	**U**	**0.011478**	5.458	364.138	ug/L	30.600
	236	**U**	**-0.000041**	38.157	6.667	ug/L	8.600
	238	**U**	**1.615032**	3.357	42089.342	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.768**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9

Sample Date/Time: Tuesday, September 02, 2014 20:19:13

Autosampler Position: 10

Dataset File: D:\Elandata\Dataset\090214M2\QC Std 9.027

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			832417.542	ug/L	871479.031
	233	**U**	**0.050707**	5.151	2202.570	ug/L	213.002
	234	**U**	**0.087627**	4.504	2662.315	ug/L	6.800
	235	**U**	**5.280731**	3.511	148696.805	ug/L	30.600
	236	**U**	**0.094781**	2.424	4153.938	ug/L	8.600
	238	**U**	**5.514783**	3.724	138352.945	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.518**	
	U	233		**98.460**
	U	234		**105.957**
	U	235		**108.937**
	U	236		**106.495**
	U	238		**109.727**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Tuesday, September 02, 2014 20:23:54
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 10.028

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			830497.718	ug/L	871479.031
	233	**U**	**0.014176**	3.240	760.954	ug/L	213.002
	234	**U**	**0.000098**	30.113	9.467	ug/L	6.800
	235	**U**	**0.000512**	17.322	43.600	ug/L	30.600
	236	**U**	**-0.000014**	161.109	7.600	ug/L	8.600
	238	**U**	**0.001323**	40.411	280.936	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.297**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-15-C
Sample Date/Time: Tuesday, September 02, 2014 20:28:34
Autosampler Position: 21
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-15-C.029

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			854135.867	ug/L	871479.031
	233	**U**	**-0.004822**	1.153	13.267	ug/L	213.002
	234	**U**	**0.000174**	39.427	12.067	ug/L	6.800
	235	**U**	**0.015262**	2.202	471.208	ug/L	30.600
	236	**U**	**-0.000019**	123.602	7.533	ug/L	8.600
	238	**U**	**2.088738**	1.523	53985.983	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.010**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-16-C
Sample Date/Time: Tuesday, September 02, 2014 20:33:15
Autosampler Position: 22
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-16-C.030

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			854467.388	ug/L	871479.031
	233	**U**	**-0.004840**	0.434	12.600	ug/L	213.002
	234	**U**	**0.000114**	27.426	10.200	ug/L	6.800
	235	**U**	**0.011487**	3.229	362.138	ug/L	30.600
	236	**U**	**-0.000043**	16.612	6.467	ug/L	8.600
	238	**U**	**1.597980**	2.349	41364.170	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.048**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-17-C
Sample Date/Time: Tuesday, September 02, 2014 20:37:55
Autosampler Position: 23
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-17-C.031

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			843325.434	ug/L	871479.031
	233	**U**	**-0.004815**	0.762	13.400	ug/L	213.002
	234	**U**	**0.000056**	54.787	8.333	ug/L	6.800
	235	**U**	**0.005078**	3.953	174.734	ug/L	30.600
	236	**U**	**-0.000022**	105.186	7.333	ug/L	8.600
	238	**U**	**0.770295**	1.046	19820.624	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.769**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-18-C
Sample Date/Time: Tuesday, September 02, 2014 20:42:35
Autosampler Position: 24
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-18-C.032

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			792676.250	ug/L	871479.031
	233	**U**	**-0.004869**	0.256	10.600	ug/L	213.002
	234	**U**	**0.000236**	20.073	13.000	ug/L	6.800
	235	**U**	**0.021428**	1.211	603.146	ug/L	30.600
	236	**U**	**-0.000028**	88.563	6.667	ug/L	8.600
	238	**U**	**2.909892**	1.488	69741.486	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.958**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-19-C

Sample Date/Time: Tuesday, September 02, 2014 20:47:14

Autosampler Position: 25

Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-19-C.033

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			797506.105	ug/L	871479.031
	233	**U**	**-0.004892**	0.426	9.800	ug/L	213.002
	234	**U**	**0.000143**	26.644	10.400	ug/L	6.800
	235	**U**	**0.017006**	0.826	487.408	ug/L	30.600
	236	**U**	**-0.000035**	45.662	6.400	ug/L	8.600
	238	**U**	**2.149986**	0.493	51905.786	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.512**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-20-C
Sample Date/Time: Tuesday, September 02, 2014 20:51:54
Autosampler Position: 26
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-20-C.034

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			779599.854	ug/L	871479.031
	233	**U**	**-0.004833**	0.438	11.733	ug/L	213.002
	234	**U**	**0.000158**	19.718	10.600	ug/L	6.800
	235	**U**	**0.014079**	1.775	399.139	ug/L	30.600
	236	**U**	**-0.000020**	154.270	6.867	ug/L	8.600
	238	**U**	**1.941961**	1.130	45853.513	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.457**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-22-C
Sample Date/Time: Tuesday, September 02, 2014 20:56:34
Autosampler Position: 27
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-22-C.035

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			786566.331	ug/L	871479.031
	233	**U**	**-0.004815**	0.188	12.533	ug/L	213.002
	234	**U**	**0.000306**	4.971	14.933	ug/L	6.800
	235	**U**	**0.030624**	1.185	843.425	ug/L	30.600
	236	**U**	**-0.000035**	69.048	6.333	ug/L	8.600
	238	**U**	**4.176876**	0.718	99225.594	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.256**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-23-G

Sample Date/Time: Tuesday, September 02, 2014 21:01:14

Autosampler Position: 28

Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-23-G.036

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			797224.450	ug/L	871479.031
	233	**U**	**-0.004837**	0.749	11.867	ug/L	213.002
	234	**U**	**0.000357**	13.092	16.600	ug/L	6.800
	235	**U**	**0.039126**	2.582	1084.441	ug/L	30.600
	236	**U**	**-0.000059**	46.248	5.400	ug/L	8.600
	238	**U**	**5.180147**	1.012	124673.420	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.479**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-23-G SD

Sample Date/Time: Tuesday, September 02, 2014 21:05:54

Autosampler Position: 29

Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-23-G SD.037

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			835975.654	ug/L	871479.031
	233	**U**	**-0.004888**	0.135	10.400	ug/L	213.002
	234	**U**	**0.000051**	56.356	8.067	ug/L	6.800
	235	**U**	**0.007009**	3.830	227.935	ug/L	30.600
	236	**U**	**-0.000062**	78.163	5.533	ug/L	8.600
	238	**U**	**1.016736**	1.639	25847.047	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.926**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-23-H MS

Sample Date/Time: Tuesday, September 02, 2014 21:10:35
Autosampler Position: 30
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-23-H MS.038

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			779979.583	ug/L	871479.031
	233	**U**	**-0.003678**	1.795	54.467	ug/L	213.002
	234	**U**	**0.018158**	1.492	522.676	ug/L	6.800
	235	**U**	**1.135961**	0.496	30037.015	ug/L	30.600
	236	**U**	**0.019268**	2.041	798.022	ug/L	8.600
	238	**U**	**6.974903**	1.056	164156.370	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.501**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9

Sample Date/Time: Tuesday, September 02, 2014 21:15:18

Autosampler Position: 10

Dataset File: D:\Elandata\Dataset\090214M2\QC Std 9.039

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			843936.985	ug/L	871479.031
	233	**U**	**0.049177**	2.135	2175.366	ug/L	213.002
	234	**U**	**0.084676**	1.183	2612.372	ug/L	6.800
	235	**U**	**5.080323**	1.294	145193.821	ug/L	30.600
	236	**U**	**0.090976**	1.327	4044.907	ug/L	8.600
	238	**U**	**5.321035**	1.516	135488.742	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.840**	
	U	233		**95.489**
	U	234		**102.390**
	U	235		**104.803**
	U	236		**102.220**
	U	238		**105.872**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Tuesday, September 02, 2014 21:19:58
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 10.040

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			836605.960	ug/L	871479.031
	233	**U**	**0.013896**	0.775	756.287	ug/L	213.002
	234	**U**	**0.000076**	62.848	8.800	ug/L	6.800
	235	**U**	**0.000557**	23.776	45.000	ug/L	30.600
	236	**U**	**0.000015**	233.686	8.867	ug/L	8.600
	238	**U**	**0.000956**	45.161	273.936	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.998**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-23-I MSD

Sample Date/Time: Tuesday, September 02, 2014 21:24:38

Autosampler Position: 31

Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-23-I MSD.041

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			777371.136	ug/L	871479.031
	233	**U**	**-0.003571**	1.797	58.267	ug/L	213.002
	234	**U**	**0.019463**	1.567	557.944	ug/L	6.800
	235	**U**	**1.165653**	0.556	30717.400	ug/L	30.600
	236	**U**	**0.019675**	2.536	812.023	ug/L	8.600
	238	**U**	**6.603466**	0.842	154905.741	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.201**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-24-C
Sample Date/Time: Tuesday, September 02, 2014 21:29:19
Autosampler Position: 32
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-24-C.042

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			775377.460	ug/L	871479.031
	233	**U**	**-0.004837**	0.294	11.533	ug/L	213.002
	234	**U**	**0.000356**	12.497	16.133	ug/L	6.800
	235	**U**	**0.041422**	1.060	1115.044	ug/L	30.600
	236	**U**	**-0.000018**	112.466	6.933	ug/L	8.600
	238	**U**	**5.172267**	1.406	121067.701	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.973**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-25-C
Sample Date/Time: Tuesday, September 02, 2014 21:33:59
Autosampler Position: 33
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-25-C.043

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			790799.841	ug/L	871479.031
	233	**U**	**-0.004890**	1.238	9.733	ug/L	213.002
	234	**U**	**0.000343**	12.158	16.067	ug/L	6.800
	235	**U**	**0.032770**	0.714	905.429	ug/L	30.600
	236	**U**	**-0.000032**	8.340	6.467	ug/L	8.600
	238	**U**	**4.436906**	0.892	105962.566	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.742**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 430790

Sample Date/Time: Tuesday, September 02, 2014 21:38:40
Autosampler Position: 34
Dataset File: D:\Elandata\Dataset\090214M2\430790.044

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			857058.240	ug/L	871479.031
	233	**U**	**-0.004949**	0.766	8.200	ug/L	213.002
	234	**U**	**0.000015**	430.907	7.200	ug/L	6.800
	235	**U**	**-0.000355**	27.166	19.867	ug/L	30.600
	236	**U**	**-0.000025**	39.337	7.333	ug/L	8.600
	238	**U**	**-0.007293**	1.396	67.800	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.345**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 430791
Sample Date/Time: Tuesday, September 02, 2014 21:43:20
Autosampler Position: 35
Dataset File: D:\Elandata\Dataset\090214M2\430791.045

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			851901.021	ug/L	871479.031
	233	**U**	**-0.002147**	2.305	121.401	ug/L	213.002
	234	**U**	**0.043846**	2.130	1368.199	ug/L	6.800
	235	**U**	**2.642822**	1.942	76232.728	ug/L	30.600
	236	**U**	**0.046903**	1.298	2109.289	ug/L	8.600
	238	**U**	**2.741272**	1.651	70577.981	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.753**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-26-C
Sample Date/Time: Tuesday, September 02, 2014 21:48:00
Autosampler Position: 36
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-26-C.046

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			783418.642	ug/L	871479.031
	233	**U**	**-0.004847**	0.403	11.267	ug/L	213.002
	234	**U**	**0.000318**	13.868	15.200	ug/L	6.800
	235	**U**	**0.032605**	0.828	892.628	ug/L	30.600
	236	**U**	**-0.000003**	194.360	7.600	ug/L	8.600
	238	**U**	**4.349762**	1.741	102917.667	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.895**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-26-C SD

Sample Date/Time: Tuesday, September 02, 2014 21:52:39

Autosampler Position: 37

Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-26-C SD.047

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			818968.518	ug/L	871479.031
	233	**U**	**-0.004965**	0.406	7.200	ug/L	213.002
	234	**U**	**0.000083**	78.075	8.800	ug/L	6.800
	235	**U**	**0.005754**	2.080	188.401	ug/L	30.600
	236	**U**	**-0.000025**	40.043	7.000	ug/L	8.600
	238	**U**	**0.847213**	2.082	21137.303	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.975**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-26-D MS

Sample Date/Time: Tuesday, September 02, 2014 21:57:19

Autosampler Position: 38

Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-26-D MS.048

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			762820.028	ug/L	871479.031
	233	**U**	**-0.003581**	1.532	56.800	ug/L	213.002
	234	**U**	**0.018656**	1.454	525.010	ug/L	6.800
	235	**U**	**1.138036**	0.979	29429.627	ug/L	30.600
	236	**U**	**0.019667**	0.624	796.689	ug/L	8.600
	238	**U**	**5.848231**	1.127	134664.691	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**87.532**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-26-E MSD

Sample Date/Time: Tuesday, September 02, 2014 22:01:59

Autosampler Position: 39

Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-26-E MSD.049

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			768514.920	ug/L	871479.031
	233	**U**	**-0.003744**	2.729	51.200	ug/L	213.002
	234	**U**	**0.016976**	1.292	482.075	ug/L	6.800
	235	**U**	**1.048521**	0.532	27323.998	ug/L	30.600
	236	**U**	**0.018193**	2.460	743.019	ug/L	8.600
	238	**U**	**5.258573**	0.771	122011.020	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.185**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-28-C
Sample Date/Time: Tuesday, September 02, 2014 22:06:39
Autosampler Position: 40
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-28-C.050

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			758602.723	ug/L	871479.031
	233	**U**	**-0.004817**	1.513	12.000	ug/L	213.002
	234	**U**	**0.000284**	21.699	13.800	ug/L	6.800
	235	**U**	**0.030151**	2.837	801.089	ug/L	30.600
	236	**U**	**-0.000056**	32.737	5.267	ug/L	8.600
	238	**U**	**4.099648**	1.444	93918.472	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**87.048**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9

Sample Date/Time: Tuesday, September 02, 2014 22:11:20

Autosampler Position: 10

Dataset File: D:\Elandata\Dataset\090214M2\QC Std 9.051

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			816860.468	ug/L	871479.031
	233	**U**	**0.049340**	2.105	2110.756	ug/L	213.002
	234	**U**	**0.087122**	0.987	2601.571	ug/L	6.800
	235	**U**	**5.268790**	1.918	145696.009	ug/L	30.600
	236	**U**	**0.093305**	2.479	4013.431	ug/L	8.600
	238	**U**	**5.503374**	2.017	135595.839	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.733**	
	U	233		**95.806**
	U	234		**105.347**
	U	235		**108.691**
	U	236		**104.837**
	U	238		**109.500**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Tuesday, September 02, 2014 22:16:00

Autosampler Position: 1

Dataset File: D:\Elandata\Dataset\090214M2\QC Std 10.052

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			804815.232	ug/L	871479.031
	233	**U**	**0.014614**	1.613	754.753	ug/L	213.002
	234	**U**	**0.000076**	149.492	8.400	ug/L	6.800
	235	**U**	**0.000914**	12.383	53.200	ug/L	30.600
	236	**U**	**0.000010**	425.542	8.333	ug/L	8.600
	238	**U**	**0.001937**	26.661	287.070	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.350**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-29-C
Sample Date/Time: Tuesday, September 02, 2014 22:20:40
Autosampler Position: 41
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-29-C.053

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			780115.866	ug/L	871479.031
	233	**U**	**-0.004840**	0.654	11.533	ug/L	213.002
	234	**U**	**0.000321**	12.720	15.200	ug/L	6.800
	235	**U**	**0.034888**	1.398	949.232	ug/L	30.600
	236	**U**	**-0.000046**	3.680	5.800	ug/L	8.600
	238	**U**	**4.732945**	0.700	111493.794	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.516**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-30-C
Sample Date/Time: Tuesday, September 02, 2014 22:25:20
Autosampler Position: 42
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-30-C.054

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			755728.685	ug/L	871479.031
	233	**U**	**-0.004821**	0.703	11.800	ug/L	213.002
	234	**U**	**0.000330**	5.776	15.000	ug/L	6.800
	235	**U**	**0.038576**	1.105	1014.103	ug/L	30.600
	236	**U**	**-0.000043**	18.186	5.733	ug/L	8.600
	238	**U**	**5.074654**	1.170	115790.761	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**86.718**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-31-C
Sample Date/Time: Tuesday, September 02, 2014 22:30:01
Autosampler Position: 43
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-31-C.055

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			756793.765	ug/L	871479.031
	233	**U**	**-0.004840**	0.403	11.133	ug/L	213.002
	234	**U**	**0.000243**	15.513	12.600	ug/L	6.800
	235	**U**	**0.027562**	0.063	733.085	ug/L	30.600
	236	**U**	**-0.000012**	533.316	7.000	ug/L	8.600
	238	**U**	**3.854799**	0.136	88132.702	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**86.840**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-33-D

Sample Date/Time: Tuesday, September 02, 2014 22:34:41

Autosampler Position: 44

Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-33-D.056

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			806534.241	ug/L	871479.031
	233	**U**	**-0.004915**	0.829	9.067	ug/L	213.002
	234	**U**	**0.000099**	24.243	9.200	ug/L	6.800
	235	**U**	**0.017154**	2.687	496.742	ug/L	30.600
	236	**U**	**-0.000009**	255.388	7.533	ug/L	8.600
	238	**U**	**2.329200**	1.391	56821.419	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.548**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-34-C
Sample Date/Time: Tuesday, September 02, 2014 22:39:22
Autosampler Position: 45
Dataset File: D:\Elandata\Dataset\090214M2\680-102370-A-34-C.057

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			769563.723	ug/L	871479.031
	233	**U**	**-0.004870**	0.820	10.267	ug/L	213.002
	234	**U**	**0.000273**	26.004	13.667	ug/L	6.800
	235	**U**	**0.031050**	1.522	836.625	ug/L	30.600
	236	**U**	**-0.000034**	94.269	6.200	ug/L	8.600
	238	**U**	**4.119544**	0.434	95756.502	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.305**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 431772
Sample Date/Time: Tuesday, September 02, 2014 22:44:03
Autosampler Position: 46
Dataset File: D:\Elandata\Dataset\090214M2\431772.058

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			834675.626	ug/L	871479.031
	233	**U**	**-0.004957**	0.338	7.667	ug/L	213.002
	234	**U**	**-0.000013**	74.979	6.133	ug/L	6.800
	235	**U**	**-0.000715**	2.813	9.067	ug/L	30.600
	236	**U**	**-0.000068**	13.248	5.267	ug/L	8.600
	238	**U**	**-0.005050**	6.541	122.334	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.777**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 431773

Sample Date/Time: Tuesday, September 02, 2014 22:48:43
Autosampler Position: 47
Dataset File: D:\Elandata\Dataset\090214M2\431773.059

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			831417.512	ug/L	871479.031
	233	**U**	**-0.002060**	5.863	121.734	ug/L	213.002
	234	**U**	**0.044486**	2.390	1354.398	ug/L	6.800
	235	**U**	**2.673403**	1.920	75254.895	ug/L	30.600
	236	**U**	**0.047592**	1.834	2088.086	ug/L	8.600
	238	**U**	**2.761716**	1.765	69385.272	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.403**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102577-A-1-D

Sample Date/Time: Tuesday, September 02, 2014 22:53:22

Autosampler Position: 48

Dataset File: D:\Elandata\Dataset\090214M2\680-102577-A-1-D.060

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			816888.361	ug/L	871479.031
	233	**U**	**-0.004858**	1.075	11.333	ug/L	213.002
	234	**U**	**0.000229**	31.353	13.133	ug/L	6.800
	235	**U**	**0.026249**	1.622	754.887	ug/L	30.600
	236	**U**	**-0.000004**	270.612	7.867	ug/L	8.600
	238	**U**	**3.083787**	1.629	76115.962	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.736**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102577-A-2-C
Sample Date/Time: Tuesday, September 02, 2014 22:58:02
Autosampler Position: 49
Dataset File: D:\Elandata\Dataset\090214M2\680-102577-A-2-C.061

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			814257.313	ug/L	871479.031
	233	**U**	**-0.004842**	0.384	11.933	ug/L	213.002
	234	**U**	**0.000350**	44.945	16.600	ug/L	6.800
	235	**U**	**0.042802**	2.029	1208.451	ug/L	30.600
	236	**U**	**-0.000041**	84.426	6.333	ug/L	8.600
	238	**U**	**5.762728**	1.129	141585.289	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.434**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-1-C

Sample Date/Time: Tuesday, September 02, 2014 23:02:42

Autosampler Position: 50

Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-1-C.062

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			851946.988	ug/L	871479.031
	233	**U**	**-0.004842**	0.429	12.467	ug/L	213.002
	234	**U**	**0.000068**	70.928	8.800	ug/L	6.800
	235	**U**	**0.011728**	3.564	367.938	ug/L	30.600
	236	**U**	**-0.000052**	14.664	6.067	ug/L	8.600
	238	**U**	**1.671683**	0.977	43160.732	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.759**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Tuesday, September 02, 2014 23:07:22
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 9.063

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			804741.390	ug/L	871479.031
	233	**U**	**0.050782**	4.114	2132.226	ug/L	213.002
	234	**U**	**0.087438**	3.879	2568.498	ug/L	6.800
	235	**U**	**5.251190**	3.226	142945.438	ug/L	30.600
	236	**U**	**0.094525**	4.094	4001.628	ug/L	8.600
	238	**U**	**5.486435**	3.043	133088.260	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.342**	
	U	233		**98.606**
	U	234		**105.729**
	U	235		**108.328**
	U	236		**106.208**
	U	238		**109.163**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Tuesday, September 02, 2014 23:12:03

Autosampler Position: 1

Dataset File: D:\Elandata\Dataset\090214M2\QC Std 10.064

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			785094.506	ug/L	871479.031
	233	**U**	**0.015027**	3.313	751.020	ug/L	213.002
	234	**U**	**0.000090**	37.557	8.667	ug/L	6.800
	235	**U**	**0.000797**	12.938	48.667	ug/L	30.600
	236	**U**	**0.000017**	128.736	8.400	ug/L	8.600
	238	**U**	**0.001910**	18.492	279.536	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.088**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-2-C

Sample Date/Time: Tuesday, September 02, 2014 23:16:42

Autosampler Position: 51

Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-2-C.065

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			800738.130	ug/L	871479.031
	233	**U**	**-0.004852**	0.520	11.333	ug/L	213.002
	234	**U**	**0.000151**	38.507	10.667	ug/L	6.800
	235	**U**	**0.013661**	5.052	397.939	ug/L	30.600
	236	**U**	**-0.000041**	67.228	6.133	ug/L	8.600
	238	**U**	**1.898983**	3.349	46001.258	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.883**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-3-C
Sample Date/Time: Tuesday, September 02, 2014 23:21:22
Autosampler Position: 52
Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-3-C.066

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			738188.649	ug/L	871479.031
	233	**U**	**-0.004903**	1.310	8.600	ug/L	213.002
	234	**U**	**0.000087**	71.325	8.067	ug/L	6.800
	235	**U**	**0.011153**	0.717	304.737	ug/L	30.600
	236	**U**	**-0.000040**	20.606	5.733	ug/L	8.600
	238	**U**	**1.576122**	1.439	35280.631	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**84.705**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-4-C
Sample Date/Time: Tuesday, September 02, 2014 23:26:02
Autosampler Position: 53
Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-4-C.067

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			754935.939	ug/L	871479.031
	233	**U**	**-0.004887**	0.508	9.467	ug/L	213.002
	234	**U**	**0.000120**	14.923	9.200	ug/L	6.800
	235	**U**	**0.010646**	3.391	298.670	ug/L	30.600
	236	**U**	**-0.000022**	179.327	6.600	ug/L	8.600
	238	**U**	**1.478326**	0.691	33853.018	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**86.627**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-5-G

Sample Date/Time: Tuesday, September 02, 2014 23:30:42

Autosampler Position: 54

Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-5-G.068

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			779566.511	ug/L	871479.031
	233	**U**	**-0.004920**	0.607	8.533	ug/L	213.002
	234	**U**	**0.000155**	26.692	10.467	ug/L	6.800
	235	**U**	**0.015047**	1.967	424.606	ug/L	30.600
	236	**U**	**-0.000052**	58.934	5.533	ug/L	8.600
	238	**U**	**2.034493**	2.826	48009.278	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.453**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-5-G SD

Sample Date/Time: Tuesday, September 02, 2014 23:35:23

Autosampler Position: 55

Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-5-G SD.069

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			827685.891	ug/L	871479.031
	233	**U**	**-0.004941**	0.438	8.200	ug/L	213.002
	234	**U**	**0.000019**	294.532	7.000	ug/L	6.800
	235	**U**	**0.002390**	8.188	95.934	ug/L	30.600
	236	**U**	**-0.000036**	82.098	6.533	ug/L	8.600
	238	**U**	**0.392506**	2.502	10027.920	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.975**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-5-H MS

Sample Date/Time: Tuesday, September 02, 2014 23:40:03

Autosampler Position: 56

Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-5-H MS.070

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			773979.757	ug/L	871479.031
	233	**U**	**-0.003702**	4.222	53.200	ug/L	213.002
	234	**U**	**0.018728**	0.665	534.877	ug/L	6.800
	235	**U**	**1.130946**	1.109	29674.800	ug/L	30.600
	236	**U**	**0.019813**	0.158	814.223	ug/L	8.600
	238	**U**	**3.207127**	0.562	75020.908	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.812**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-5-I MSD

Sample Date/Time: Tuesday, September 02, 2014 23:44:44

Autosampler Position: 57

Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-5-I MSD.071

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			754517.149	ug/L	871479.031
	233	**U**	**-0.003926**	1.819	43.800	ug/L	213.002
	234	**U**	**0.015153**	1.328	422.940	ug/L	6.800
	235	**U**	**0.896120**	2.362	22910.765	ug/L	30.600
	236	**U**	**0.015602**	3.236	626.080	ug/L	8.600
	238	**U**	**2.556198**	2.318	58297.764	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**86.579**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-7-C
Sample Date/Time: Tuesday, September 02, 2014 23:49:25
Autosampler Position: 58
Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-7-C.072

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			752647.796	ug/L	871479.031
	233	**U**	**-0.004885**	0.257	9.467	ug/L	213.002
	234	**U**	**0.000243**	18.869	12.533	ug/L	6.800
	235	**U**	**0.024106**	4.877	640.348	ug/L	30.600
	236	**U**	**-0.000026**	117.689	6.400	ug/L	8.600
	238	**U**	**3.334732**	2.511	75796.742	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**86.364**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-8-C

Sample Date/Time: Tuesday, September 02, 2014 23:54:05

Autosampler Position: 59

Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-8-C.073

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			791853.969	ug/L	871479.031
	233	**U**	**-0.004867**	1.247	10.600	ug/L	213.002
	234	**U**	**0.000259**	15.739	13.667	ug/L	6.800
	235	**U**	**0.031509**	2.328	872.560	ug/L	30.600
	236	**U**	**-0.000043**	88.679	6.000	ug/L	8.600
	238	**U**	**4.063575**	0.646	97190.465	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.863**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-8-D MS

Sample Date/Time: Tuesday, September 02, 2014 23:58:44

Autosampler Position: 60

Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-8-D MS.074

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			778384.426	ug/L	871479.031
	233	**U**	**-0.003897**	1.788	46.333	ug/L	213.002
	234	**U**	**0.014574**	3.176	419.806	ug/L	6.800
	235	**U**	**0.884814**	0.687	23354.482	ug/L	30.600
	236	**U**	**0.015171**	0.842	628.747	ug/L	8.600
	238	**U**	**5.268332**	1.265	123780.473	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.318**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9

Sample Date/Time: Wednesday, September 03, 2014 00:03:25

Autosampler Position: 10

Dataset File: D:\Elandata\Dataset\090214M2\QC Std 9.075

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			810031.312	ug/L	871479.031
	233	**U**	**0.050953**	4.255	2152.296	ug/L	213.002
	234	**U**	**0.088483**	3.176	2616.773	ug/L	6.800
	235	**U**	**5.319555**	5.145	145594.461	ug/L	30.600
	236	**U**	**0.094590**	4.905	4028.035	ug/L	8.600
	238	**U**	**5.528168**	4.110	134888.353	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.949**	
	U	233		**98.938**
	U	234		**106.993**
	U	235		**109.738**
	U	236		**106.281**
	U	238		**109.994**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Wednesday, September 03, 2014 00:08:05
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 10.076

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			810222.869	ug/L	871479.031
	233	**U**	**0.014083**	6.804	738.086	ug/L	213.002
	234	**U**	**0.000038**	104.250	7.467	ug/L	6.800
	235	**U**	**0.001174**	13.756	60.600	ug/L	30.600
	236	**U**	**0.000017**	210.940	8.667	ug/L	8.600
	238	**U**	**0.001801**	22.778	285.803	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.971**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-8-E MSD

Sample Date/Time: Wednesday, September 03, 2014 00:12:45

Autosampler Position: 61

Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-8-E MSD.077

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			772848.782	ug/L	871479.031
	233	**U**	**-0.003853**	3.640	47.533	ug/L	213.002
	234	**U**	**0.013991**	1.205	400.472	ug/L	6.800
	235	**U**	**0.838307**	0.842	21970.957	ug/L	30.600
	236	**U**	**0.014090**	0.696	580.478	ug/L	8.600
	238	**U**	**5.003829**	0.900	116769.368	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.682**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-9-C
Sample Date/Time: Wednesday, September 03, 2014 00:17:25
Autosampler Position: 62
Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-9-C.078

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			756524.108	ug/L	871479.031
	233	**U**	**-0.004862**	1.088	10.333	ug/L	213.002
	234	**U**	**0.000291**	7.413	13.933	ug/L	6.800
	235	**U**	**0.027085**	2.062	720.818	ug/L	30.600
	236	**U**	**-0.000021**	159.629	6.600	ug/L	8.600
	238	**U**	**3.373340**	0.977	77128.700	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**86.809**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-11-C
Sample Date/Time: Wednesday, September 03, 2014 00:22:05
Autosampler Position: 63
Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-11-C.079

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			771873.717	ug/L	871479.031
	233	**U**	**-0.004887**	1.065	9.600	ug/L	213.002
	234	**U**	**0.000298**	3.988	14.400	ug/L	6.800
	235	**U**	**0.030142**	2.325	815.223	ug/L	30.600
	236	**U**	**-0.000038**	33.536	6.067	ug/L	8.600
	238	**U**	**4.130252**	0.773	96288.297	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.571**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-12-C
Sample Date/Time: Wednesday, September 03, 2014 00:26:45
Autosampler Position: 64
Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-12-C.080

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			772060.846	ug/L	871479.031
	233	**U**	**-0.004812**	0.321	12.400	ug/L	213.002
	234	**U**	**0.000316**	10.824	14.933	ug/L	6.800
	235	**U**	**0.032082**	2.045	865.893	ug/L	30.600
	236	**U**	**-0.000052**	51.076	5.467	ug/L	8.600
	238	**U**	**4.337591**	0.896	101121.520	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.592**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-13-C
Sample Date/Time: Wednesday, September 03, 2014 00:31:25
Autosampler Position: 65
Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-13-C.081

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			770022.626	ug/L	871479.031
	233	**U**	**-0.004810**	0.566	12.400	ug/L	213.002
	234	**U**	**0.000207**	47.279	11.733	ug/L	6.800
	235	**U**	**0.020596**	4.338	563.611	ug/L	30.600
	236	**U**	**-0.000032**	51.810	6.267	ug/L	8.600
	238	**U**	**2.775066**	1.837	64584.904	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.358**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-15-C

Sample Date/Time: Wednesday, September 03, 2014 00:36:05

Autosampler Position: 66

Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-15-C.082

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			764370.876	ug/L	871479.031
	233	**U**	**-0.004849**	0.506	10.933	ug/L	213.002
	234	**U**	**0.000322**	16.247	14.933	ug/L	6.800
	235	**U**	**0.032224**	0.319	861.093	ug/L	30.600
	236	**U**	**-0.000045**	54.873	5.733	ug/L	8.600
	238	**U**	**4.354307**	0.975	100493.521	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**87.710**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-16-C
Sample Date/Time: Wednesday, September 03, 2014 00:40:46
Autosampler Position: 67
Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-16-C.083

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			779166.392	ug/L	871479.031
	233	**U**	**-0.004824**	0.282	12.067	ug/L	213.002
	234	**U**	**0.000313**	9.353	15.000	ug/L	6.800
	235	**U**	**0.031310**	1.137	853.492	ug/L	30.600
	236	**U**	**-0.000018**	186.007	6.933	ug/L	8.600
	238	**U**	**4.228677**	1.270	99495.167	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.407**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102431-A-17-C
Sample Date/Time: Wednesday, September 03, 2014 00:45:26
Autosampler Position: 68
Dataset File: D:\Elandata\Dataset\090214M2\680-102431-A-17-C.084

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			773193.773	ug/L	871479.031
	233	**U**	**-0.004825**	0.361	11.933	ug/L	213.002
	234	**U**	**0.000235**	16.901	12.667	ug/L	6.800
	235	**U**	**0.028551**	0.716	774.888	ug/L	30.600
	236	**U**	**-0.000023**	232.333	6.667	ug/L	8.600
	238	**U**	**3.487272**	1.453	81492.322	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.722**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Wednesday, September 03, 2014 00:50:07
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 9.085

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			810880.675	ug/L	871479.031
	233	**U**	**0.050600**	2.469	2143.694	ug/L	213.002
	234	**U**	**0.088389**	1.580	2619.574	ug/L	6.800
	235	**U**	**5.262554**	2.079	144468.125	ug/L	30.600
	236	**U**	**0.094169**	0.907	4023.301	ug/L	8.600
	238	**U**	**5.469910**	2.298	133786.161	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.046**	
	U	233		**98.253**
	U	234		**106.879**
	U	235		**108.562**
	U	236		**105.808**
	U	238		**108.834**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Wednesday, September 03, 2014 00:54:48
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\090214M2\QC Std 10.086

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			798529.659	ug/L	871479.031
	233	**U**	**0.013884**	4.008	720.418	ug/L	213.002
	234	**U**	**0.000029**	25.276	7.067	ug/L	6.800
	235	**U**	**0.001596**	18.265	70.867	ug/L	30.600
	236	**U**	**0.000027**	159.194	9.000	ug/L	8.600
	238	**U**	**0.002700**	20.258	303.270	ug/L	260.536

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.629**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

METALS BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102577-2

SDG No.: 680102577-1

Batch Number: 139348 Batch Start Date: 08/21/14 10:35 Batch Analyst: Davis, Shanika M

Batch Method: 3050B Batch End Date: 08/21/14 15:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	FinalAmount	ISOU Prep Spk 00002			
MB 160-139348/1		3050B, 6020A		0.5931 g	50 mL				
LCS 160-139348/2		3050B, 6020A		0.5263 g	50 mL	0.25 mL			
680-102577-A-1	SD-005W-02	3050B, 6020A	T	0.5552 g	50 mL				
680-102577-A-2	SD-005E-02	3050B, 6020A	T	0.5608 g	50 mL				

Batch Notes	
Balance ID	27150548
Hydrogen peroxide lot number	408031
Lot # of hydrochloric acid	422962
Lot # of Nitric Acid	422893
Hot Block ID number	HOTBLOCK1
Oven, Bath or Block Temperature 1	94.0 Degrees C
Pipette ID	M-PREP-2
ID number of the thermometer	111815886
Digestion Tube/Cup Lot #	191064

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

Subcontract Data

Shipping and Receiving Documents

RAD

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.43
Client Contact: Mike Martin	Phone: (703) 342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page [redacted] 1 of 1
Company: Tetra Tech, Inc.				Job #: 680-102577
Address: 20251 Century Blvd Suite 200	Due Date Requested:	Analysis Requested		Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
City: Germantown	TAT Requested (days): Standard			
State, Zip: MD, 20874	PO #: Purchase Order not required			
Phone:	WO #:			Other:
Email: Michael.Martin@tetratech.com				
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-005W-02	6/13/14	1200	C	Solid						X		
SD-005E-02	6/13/14	1205	C	Solid						X		
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	[signature]	6/19/14 - 1600	TT	[signature]	6/19/14 1620	TestAmerica
2	[signature]	6/19/14 1720	TT	[signature]	6/20/14 0930	TA
3						

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-102577-2
SDG Number: 680102577-1

Login Number: 102577
List Source: TestAmerica Savannah
List Number: 1
Creator: Daughtry, Beth A

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-102577-2
SDG Number: 680102577-1

Login Number: 102577
List Number: 2
Creator: Daniels, Brian J

List Source: TestAmerica St. Louis
List Creation: 06/25/14 12:42 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	Thermal preservation not required.
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	True	

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 680-102600-2

SDG Number: 680102600-2

Job Description: Sediments

For:
Tetra Tech, Inc.
20251 Century Blvd
Suite 200
Germantown, MD 20874

Attention: Mike Martin



Approved for release.
Jerry A Lanier
Project Manager I
7/23/2014 2:50 PM

Jerry A Lanier, Project Manager I
5102 LaRoche Avenue, Savannah, GA, 31404
(912)354-7858 e.3410
jerry.lanier@testamericainc.com
07/23/2014

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

Savannah Certifications and ID #s: A2LA: 0399.01; AL: 41450; ARDEQ: 88-0692; ARDOH; AZ: AZ0741; CA: 03217CA; CO; CT: PH0161; DE; FL: E87052; GA: 803; Guam; HI; IL: 200022; IN: C-GA-02; IA: 353; KS: E-10322; KY EPPC: 90084; KY UST; LA DEQ: 30690; LA DHH: LA080008; ME: 2008022; MD: 250; MA: M-GA006; MI: 9925; MS; NFESC: 249; NV: GA00006; NJ: GA769; NM; NY: 10842; NC DWQ: 269; NC DHHS: 13701; PA: 68-00474; PR: GA00006; RI: LAO00244; SC: 98001001; TN: TN0296; TX: T104704185; USEPA: GA00006; VT: VT-87052; VA: 00302; WA; WV DEP: 094; WV DHHR: 9950 C; WI DNR: 999819810; WY/EPAR8: 8TMS-Q

Table of Contents

Cover Title Page 1

Data Summaries 3

- Definitions 3
- Case Narrative 4
- Detection Summary 5
- Client Sample Results 6
- Tracer/Carrier Summary 8
- QC Sample Results 9
- QC Association 10
- Chronicle 11
- Certification Summary 12
- Method Summary 14
- Sample Summary 15
- Reagent Traceability 16
  - COAs 17

Radiochemistry Raw Data 57

- Alpha Spectroscopy 57
  - Method A-01-R Th 58
  - Daily Checks 74
  - Initial Calibrations 83
  - Monthly Calibration Verifications 100
  - Monthly Backgrounds 108
  - Run Logs 123

Shipping and Receiving Documents 126

- Client Chain of Custody 126

Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Sediments

Report Number: 680-102600-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 06/23/2014; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the coolers at receipt was 24.2 C.

ISOTOPIC THORIUM

Samples SD-278-SS (680-102600-6), SD-278-01 (680-102600-7), SD-278-02 (680-102600-8) and SD-278-03 (680-102600-9) were analyzed for Isotopic Thorium in accordance with A01R_Th. The samples were leached on 06/24/2014, prepared on 06/27/2014 and analyzed on 07/07/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102600-2
SDG: 680102600-2

Client Sample ID: SD-278-SS — Lab Sample ID: 680-102600-6

No Detections.

Client Sample ID: SD-278-01 — Lab Sample ID: 680-102600-7

No Detections.

Client Sample ID: SD-278-02 — Lab Sample ID: 680-102600-8

No Detections.

Client Sample ID: SD-278-03 — Lab Sample ID: 680-102600-9

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: SD-278-SS

Lab Sample ID: 680-102600-6

Date Collected: 06/20/14 10:00

Matrix: Solid

Date Received: 06/23/14 09:00

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	0.996		0.210	0.226	1.00	0.0670	pCi/g	06/27/14 17:25	07/07/14 18:11	1
Thorium-230	1.27		0.236	0.259	1.00	0.0707	pCi/g	06/27/14 17:25	07/07/14 18:11	1
Thorium-232	1.31		0.239	0.263	1.00	0.0564	pCi/g	06/27/14 17:25	07/07/14 18:11	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*85.1*		*30 - 110*	*06/27/14 17:25*	*07/07/14 18:11*	*1*

Client Sample ID: SD-278-01

Lab Sample ID: 680-102600-7

Date Collected: 06/20/14 10:05

Matrix: Solid

Date Received: 06/23/14 09:00

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.45		0.266	0.292	1.00	0.109	pCi/g	06/27/14 17:25	07/07/14 18:11	1
Thorium-230	1.38		0.257	0.282	1.00	0.0768	pCi/g	06/27/14 17:25	07/07/14 18:11	1
Thorium-232	1.38		0.257	0.282	1.00	0.0842	pCi/g	06/27/14 17:25	07/07/14 18:11	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*79.0*		*30 - 110*	*06/27/14 17:25*	*07/07/14 18:11*	*1*

Client Sample ID: SD-278-02

Lab Sample ID: 680-102600-8

Date Collected: 06/20/14 10:10

Matrix: Solid

Date Received: 06/23/14 09:00

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.29		0.235	0.259	1.00	0.0809	pCi/g	06/27/14 17:25	07/07/14 18:11	1
Thorium-230	0.905		0.196	0.210	1.00	0.0480	pCi/g	06/27/14 17:25	07/07/14 18:11	1
Thorium-232	1.15		0.221	0.242	1.00	0.0776	pCi/g	06/27/14 17:25	07/07/14 18:11	1

Tracer	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*91.3*		*30 - 110*	*06/27/14 17:25*	*07/07/14 18:11*	*1*

Client Sample ID: SD-278-03

Lab Sample ID: 680-102600-9

Date Collected: 06/20/14 10:15

Matrix: Solid

Date Received: 06/23/14 09:00

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	1.69		0.294	0.326	1.00	0.0991	pCi/g	06/27/14 17:25	07/07/14 18:11	1
Thorium-230	1.23		0.248	0.269	1.00	0.0376	pCi/g	06/27/14 17:25	07/07/14 18:11	1
Thorium-232	1.42		0.269	0.294	1.00	0.100	pCi/g	06/27/14 17:25	07/07/14 18:11	1

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102600-2
SDG: 680102600-2

Client Sample ID: SD-278-03
Date Collected: 06/20/14 10:15
Date Received: 06/23/14 09:00

Lab Sample ID: 680-102600-9
Matrix: Solid

Tracer	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Thorium-229	77.0		30 - 110	06/27/14 17:25	07/07/14 18:11	1

Tracer/Carrier Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102600-2
SDG: 680102600-2

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Matrix: Solid **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
		Th-229
Lab Sample ID	Client Sample ID	(30-110)
680-102600-6	SD-278-SS	85.1
680-102600-6 DU	SD-278-SS	78.2
680-102600-7	SD-278-01	79.0
680-102600-8	SD-278-02	91.3
680-102600-9	SD-278-03	77.0
LCS 160-128863/2-A	Lab Control Sample	93.7
MB 160-128863/1-A	Method Blank	84.4

Tracer/Carrier Legend

Th-229 = Thorium-229

Method: A-01-R - Isotopic Thorium (Alpha Spectrometry)

Lab Sample ID: MB 160-128863/1-A
Matrix: Solid
Analysis Batch: 130012

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 128863

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-228	-0.02056	U	0.0284	0.0285	1.00	0.104	pCi/g	06/27/14 17:25	07/07/14 18:10	1
Thorium-230	0.3143		0.123	0.126	1.00	0.0758	pCi/g	06/27/14 17:25	07/07/14 18:10	1
Thorium-232	0.003586	U	0.0349	0.0349	1.00	0.0879	pCi/g	06/27/14 17:25	07/07/14 18:10	1

Tracer	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Thorium-229	*84.4*		*30 - 110*	*06/27/14 17:25*	*07/07/14 18:10*	*1*

Lab Sample ID: LCS 160-128863/2-A
Matrix: Solid
Analysis Batch: 130023

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 128863

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Thorium-230			24.5	23.67		2.42	1.00	0.0950	pCi/g	97	81 - 118		

Tracer	*LCS %Yield*	*LCS Qualifier*	*Limits*
Thorium-229	*93.7*		*30 - 110*

Lab Sample ID: 680-102600-6 DU
Matrix: Solid
Analysis Batch: 129939

Client Sample ID: SD-278-SS
Prep Type: Total/NA
Prep Batch: 128863

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Thorium-228	0.996			1.417		0.295	1.00	0.115	pCi/g			0.81	1
Thorium-230	1.27			1.486		0.300	1.00	0.0708	pCi/g			0.39	1
Thorium-232	1.31			1.596		0.311	1.00	0.0371	pCi/g			0.50	1

Tracer	*DU %Yield*	*DU Qualifier*	*Limits*
Thorium-229	*78.2*		*30 - 110*

Rad

Leach Batch: 128400

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102600-6	SD-278-SS	Total/NA	Solid	Dry and Grind	
680-102600-6 DU	SD-278-SS	Total/NA	Solid	Dry and Grind	
680-102600-7	SD-278-01	Total/NA	Solid	Dry and Grind	
680-102600-8	SD-278-02	Total/NA	Solid	Dry and Grind	
680-102600-9	SD-278-03	Total/NA	Solid	Dry and Grind	

Prep Batch: 128863

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102600-6	SD-278-SS	Total/NA	Solid	ExtChrom	128400
680-102600-6 DU	SD-278-SS	Total/NA	Solid	ExtChrom	128400
680-102600-7	SD-278-01	Total/NA	Solid	ExtChrom	128400
680-102600-8	SD-278-02	Total/NA	Solid	ExtChrom	128400
680-102600-9	SD-278-03	Total/NA	Solid	ExtChrom	128400
LCS 160-128863/2-A	Lab Control Sample	Total/NA	Solid	ExtChrom	
MB 160-128863/1-A	Method Blank	Total/NA	Solid	ExtChrom	

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102600-2
SDG: 680102600-2

Client Sample ID: SD-278-SS
Lab Sample ID: 680-102600-6

Date Collected: 06/20/14 10:00
Matrix: Solid
Date Received: 06/23/14 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			128400	06/24/14 14:38	DRO	TAL SL
Total/NA	Prep	ExtChrom			128863	06/27/14 17:25	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	130034	07/07/14 18:11	MLK	TAL SL

Client Sample ID: SD-278-01
Lab Sample ID: 680-102600-7

Date Collected: 06/20/14 10:05
Matrix: Solid
Date Received: 06/23/14 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			128400	06/24/14 14:38	DRO	TAL SL
Total/NA	Prep	ExtChrom			128863	06/27/14 17:25	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129950	07/07/14 18:11	MLK	TAL SL

Client Sample ID: SD-278-02
Lab Sample ID: 680-102600-8

Date Collected: 06/20/14 10:10
Matrix: Solid
Date Received: 06/23/14 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			128400	06/24/14 14:38	DRO	TAL SL
Total/NA	Prep	ExtChrom			128863	06/27/14 17:25	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129960	07/07/14 18:11	MLK	TAL SL

Client Sample ID: SD-278-03
Lab Sample ID: 680-102600-9

Date Collected: 06/20/14 10:15
Matrix: Solid
Date Received: 06/23/14 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			128400	06/24/14 14:38	DRO	TAL SL
Total/NA	Prep	ExtChrom			128863	06/27/14 17:25	SCB	TAL SL
Total/NA	Analysis	A-01-R		1	129971	07/07/14 18:11	MLK	TAL SL

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Certification Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102600-2
SDG: 680102600-2

Laboratory: TestAmerica Savannah

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
	AFCEE		SAVLAB	
A2LA	DoD ELAP		399.01	02-28-15
A2LA	ISO/IEC 17025		399.01	02-28-15
Alabama	State Program	4	41450	06-30-15
Arkansas DEQ	State Program	6	88-0692	01-31-15
California	NELAP	9	3217CA	07-31-14 *
Colorado	State Program	8	N/A	12-31-14
Connecticut	State Program	1	PH-0161	03-31-15
Florida	NELAP	4	E87052	06-30-15
GA Dept. of Agriculture	State Program	4	N/A	06-30-14 *
Georgia	State Program	4	N/A	06-30-15
Georgia	State Program	4	803	06-30-15
Guam	State Program	9	09-005r	04-16-15
Hawaii	State Program	9	N/A	06-30-15
Illinois	NELAP	5	200022	11-30-14
Indiana	State Program	5	N/A	06-30-15
Iowa	State Program	7	353	07-01-15
Kentucky (DW)	State Program	4	90084	12-31-14
Kentucky (UST)	State Program	4	18	06-30-15
Louisiana	NELAP	6	30690	06-30-14 *
Louisiana (DW)	NELAP	6	LA140023	12-31-14
Maine	State Program	1	GA00006	08-16-14 *
Maryland	State Program	3	250	12-31-14
Massachusetts	State Program	1	M-GA006	06-30-15
Michigan	State Program	5	9925	06-30-14 *
Mississippi	State Program	4	N/A	06-30-14 *
Montana	State Program	8	CERT0081	01-01-15
Nebraska	State Program	7	TestAmerica-Savannah	06-30-14 *
New Jersey	NELAP	2	GA769	06-30-15
New Mexico	State Program	6	N/A	06-30-14 *
New York	NELAP	2	10842	03-31-15
North Carolina (DW)	State Program	4	13701	07-31-15
North Carolina (WW/SW)	State Program	4	269	12-31-14
Oklahoma	State Program	6	9984	08-31-14
Pennsylvania	NELAP	3	68-00474	06-30-15
Puerto Rico	State Program	2	GA00006	12-31-14
South Carolina	State Program	4	98001	06-30-14 *
Tennessee	State Program	4	TN02961	06-30-15
Texas	NELAP	6	T104704185-08-TX	11-30-14
USDA	Federal		SAV 3-04	06-11-17
Virginia	NELAP	3	460161	06-14-15
Washington	State Program	10	C805	06-10-15
West Virginia (DW)	State Program	3	9950C	12-31-14
West Virginia DEP	State Program	3	94	06-30-14 *
Wisconsin	State Program	5	999819810	08-31-14
Wyoming	State Program	8	8TMS-L	06-30-14 *

Laboratory: TestAmerica St. Louis

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

* Certification renewal pending - certification considered valid.

Laboratory: TestAmerica St. Louis (Continued)

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska	State Program	10	MO00054	06-30-15
California	NELAP	9	09266CA	03-31-15
Connecticut	State Program	1	PH-0241	03-31-15
Florida	NELAP	4	E87689	06-30-14 *
Illinois	NELAP	5	200023	11-30-14
Iowa	State Program	7	373	12-01-14
Kansas	NELAP	7	E-10236	10-31-14
Kentucky (DW)	State Program	4	90125	12-31-14
L-A-B	DoD ELAP		L2305	01-10-16
Louisiana	NELAP	6	04080	06-30-15
Maryland	State Program	3	310	09-30-14 *
Missouri	State Program	7	780	06-30-14 *
Nevada	State Program	9	MO000542013-1	07-31-14 *
New Jersey	NELAP	2	MO002	06-30-15
New Mexico	State Program	6		06-30-10 *
New York	NELAP	2	11616	03-31-15
North Dakota	State Program	8	R207	06-30-14 *
NRC	NRC		24-24817-01	12-31-22
Oklahoma	State Program	6	2013-049	08-31-14 *
Pennsylvania	NELAP	3	68-00540	02-28-15
South Carolina	State Program	4	85002001	06-30-14 *
Texas	NELAP	6	T104704193-13-6	07-31-14 *
USDA	Federal		P330-07-00122	01-09-17
USEPA Reg V SDWA	Federal	1	WG-15J	08-30-14
Utah	NELAP	8	MO000542013-5	07-31-14 *
Virginia	NELAP	3	2236	06-14-14 *
Washington	State Program	10	C592	08-30-14
West Virginia DEP	State Program	3	381	08-30-14

* Certification renewal pending - certification considered valid.

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102600-2
SDG: 680102600-2

Method	Method Description	Protocol	Laboratory
A-01-R	Isotopic Thorium (Alpha Spectrometry)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102600-2
SDG: 680102600-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-102600-6	SD-278-SS	Solid	06/20/14 10:00	06/23/14 09:00
680-102600-7	SD-278-01	Solid	06/20/14 10:05	06/23/14 09:00
680-102600-8	SD-278-02	Solid	06/20/14 10:10	06/23/14 09:00
680-102600-9	SD-278-03	Solid	06/20/14 10:15	06/23/14 09:00

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102600-2

SDG No.: 680102600-2

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
82234-334_00001	06/02/60	Eckert & Zigler, Lot 82234-334			(Purchased Reagent)		Am-241	5.652 Bq
							Pu-239	5.936 Bq
							Thorium-230	5.685 Bq
82236-334_00001	06/02/60	Eckert & Ziegler, Lot 82236-334			(Purchased Reagent)		Am-241	6.891 Bq
							Pu-239	6.664 Bq
							Thorium-230	7.107 Bq
82237-334_00003	06/01/60	Eckert & Ziegler, Lot 82237-334			(Purchased Reagent)		Am-241	5.608 Bq
							Pu-239	6.424 Bq
							Thorium-230	5.856 Bq
82240-334_00001	06/08/60	Eckert & Ziegler, Lot 82240-334			(Purchased Reagent)		Am-241	8.298 Bq
							Pu-239	7.163 Bq
							Thorium-230	6.304 Bq
82241-334_00001	06/08/60	Eckert & Ziegler, Lot 82241-334			(Purchased Reagent)		Am-241	6.638 Bq
							Pu-239	6.797 Bq
							Thorium-230	6.629 Bq
82242-334_00001	06/08/60	Eckert & Ziegler, Lot 82242-334			(Purchased Reagent)		Am-241	7.145 Bq
							Pu-239	6.414 Bq
							Thorium-230	6.583 Bq
82243-334_00001	06/09/60	Eckert & Ziegler, Lot 82243-334			(Purchased Reagent)		Am-241	6.39 Bq
							Pu-239	5.979 Bq
							Thorium-230	5.856 Bq
82244-334_00001	06/09/60	Eckert & Zigler, Lot 82244-334			(Purchased Reagent)		Am-241	6.897 Bq
							Pu-239	6.717 Bq
							Thorium-230	7.352 Bq
82245-334_00001	06/09/60	Eckert & Ziegler, Lot 82245-334			(Purchased Reagent)		Am-241	5.528 Bq
							Pu-239	5.437 Bq
							Thorium-230	6.727 Bq
Th-229_00012	12/26/14	12/23/13	0.1M HNO3, Lot L0022	500 mL	Th-229_00004	15 mL	Thorium-229	67.9293 dpm/mL
.Th-229_00004	07/14/60	01/26/11	0.1M HNO3, Lot 0	100 mL	Th-229_00002	5.0613 g	Thorium-229	2264.31 dpm/mL
..Th-229_00002	07/14/60	Eckert & Ziegler, Lot 82832-334			(Purchased Reagent)		Thorium-229	745.63 Bq/g
TRM-2_00001	03/20/50	DOE, Lot TRM-2			(Purchased Reagent)		Pb-210	22.1 pCi/g
							Ra-226	25.4 pCi/g
							Thorium-230	24.5 pCi/g
							U-234	6.2 pCi/g
							U-238	6 pCi/g

Reagent

82234-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82234-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 2-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	5.685E+00	4420-4800	7.540E+04	0.9	1.1	2.8
Pu-239	5.936E+00	4950-5240	2.410E+04	0.9	1.1	2.8
Am-241	5.652E+00	5280-5600	4.326E+02	0.9	1.1	2.8
Total Activity	1.732E+01	3000-8000		0.5	1.1	2.4

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82236-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82236-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 2-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	7.107E+00	4420-4800	7.540E+04	0.7	1.1	2.6
Pu-239	6.664E+00	4950-5240	2.410E+04	0.8	1.1	2.7
Am-241	6.891E+00	5280-5600	4.326E+02	0.7	1.1	2.6
Total Activity	2.071E+01	3000-8000		0.4	1.1	2.3

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.46 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82237-334_00003

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82237-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 1-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	5.856E+00	4420-4800	7.540E+04	1.0	1.1	3.0
Pu-239	6.424E+00	4950-5240	2.410E+04	0.9	1.1	2.8
Am-241	5.608E+00	5280-5600	4.326E+02	1.0	1.1	3.0
Total Activity	1.793E+01	3000-8000		0.6	1.1	2.5

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1958

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82240-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82240-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 8-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	6.304E+00	4420-4800	7.540E+04	0.9	1.1	2.8
Pu-239	7.163E+00	4950-5240	2.410E+04	0.8	1.1	2.7
Am-241	8.298E+00	5280-5600	4.326E+02	0.8	1.1	2.7
Total Activity	2.182E+01	3000-8000		0.5	1.1	2.4

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82241-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82241-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 8-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	6.629E+00	4420-4800	7.540E+04	0.8	1.1	2.7
Pu-239	6.797E+00	4950-5240	2.410E+04	0.8	1.1	2.7
Am-241	6.638E+00	5280-5600	4.326E+02	0.8	1.1	2.7
Total Activity	2.011E+01	3000-8000		0.4	1.1	2.3

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY
HEALTH PHYSICS SOCIETY
FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82242-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82242-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 8-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	6.583E+00	4420-4800	7.540E+04	0.9	1.1	2.8
Pu-239	6.414E+00	4950-5240	2.410E+04	0.9	1.1	2.8
Am-241	7.145E+00	5280-5600	4.326E+02	0.9	1.1	2.8
Total Activity	2.018E+01	3000-8000		0.6	1.1	2.5

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1958

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82243-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82243-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 9-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	5.856E+00	4420-4800	7.540E+04	0.8	1.1	2.7
Pu-239	5.979E+00	4950-5240	2.410E+04	0.8	1.1	2.7
Am-241	6.390E+00	5280-5600	4.326E+02	0.8	1.1	2.7
Total Activity	1.827E+01	3000-8000		0.3	1.1	2.3

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY
HEALTH PHYSICS SOCIETY
FOUNDED 1966

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82244-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82244-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 9-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	7.352E+00	4420-4800	7.540E+04	0.8	1.1	2.7
Pu-239	6.717E+00	4950-5240	2.410E+04	0.9	1.1	2.8
Am-241	6.897E+00	5280-5600	4.326E+02	0.9	1.1	2.8
Total Activity	2.101E+01	3000-8000		0.6	1.1	2.5

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY
HEALTH PHYSICS SOCIETY
FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

82245-334_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
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Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82245-334

24.1 mm Diameter x 0.65 mm Thick Stainless Steel Disk

Customer: Test America/St. Louis
P.O. No.: 2355182, Item 1

This standard radionuclide source was prepared by electrodeposition onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities and impurities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date: 9-Jun-2010 12:00 PM EST

Isotope	Activity (Bq)	Energy Range (keV)	Half-Life, years	Uncertainty* Type (%) u_A	u_B	U
Th-230	6.727E+00	4420-4800	7.540E+04	1.0	1.1	3.0
Pu-239	5.437E+00	4950-5240	2.410E+04	1.1	1.1	3.1
Am-241	5.528E+00	5280-5600	4.326E+02	1.1	1.1	3.1
Total Activity	1.773E+01	3000-8000		0.8	1.1	2.7

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1956

Comments:
Diameter of active area: 19 mm. Disk mounted on customer supplied disk 31.8 mm diameter x 0.45 mm thick stainless steel disk.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

Source Calibrated by: _____
A. Chen, Spectroscopist

QA Approved: _____ Date: 06-24-2010
E. A. Taskaev, QA Manager Alternate

Reagent

Th-229_00002

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

82832-334

5 mL Liquid in Flame Sealed Vial

Customer: Test America/Earth City, MO
P.O. No.: 2370431, Item 1

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty*, % Type u_A	u_B	U	Reference Date (12:00 PM EST)
Th-229	2.681E+06	3.813E+03	0.3	1.0	2.1	07/14/2010

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: Th-228 - 1.25 Bq, Th-230 - 23.7 Bq, Th-232 - 1.5 Bq. 5.11380 grams 0.5M HNO3 solution.

Source Prepared by: _____
W. Mao, Radiochemist

QA Approved: _____ Date: 7/21/10
J. D. McCorvey, QA Manager Alternate

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1956

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Th-229_00012

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Th-229-00012

Reagent ID: Th-229_00012

Description:	Th-229 Tracer	Expiration Date:	12/26/2014
No. of Bottles:	1	Laboratory:	TestAmerica St. Louis
Storage Location:	RAD Actinide STDs	Prepared By:	Bramblett, Megan L
Reagent Volume:	500.000 mL	Solvent:	0.1M HNO3
Creation Date:	12/23/2013	Solvent Lot:	L0022
Container(s):	282329		
Comment:			

282329
ID: Th-229_00012
Exp: 12/26/14 Prpd: MLM Crt: 12/23/13
Th-229 Tracer

Reagent Analyte Information

Analyte	Source ID	Source Exp. Date	Source Conc.	Source Conc. Units	Final Conc.	Final Conc. Units
Th-229	Th-229_00004	07/14/2060	2264.31000	dpm/mL	67.92931	dpm/mL

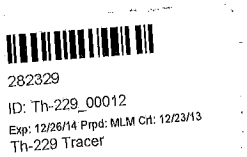
Source Reagents

Reagent	Description	Type	Expiration	Vendor	Vendor Lot #	Vendor Cat Lot #	Volume Used	Volume Units
Th-229_00004	Th-229 Parent		07/14/60				15.00000	mL

St. Louis Radiological Standard Reverification Form

Standard ID Number: Th-229_00012
True Value = 67.90686 DPM/L or g
Date Analyzed: 12/26/2013

Radionuclide: Th-229



Replicates

#1	69.113	DPM/L or g
#2	66.755	DPM/L or g
#3	68.034	DPM/L or g

Mean = 67.96733

1 sigma = 1.180413

1.96 sigma = 2.313609

True Value minus 5% = 64.51152 (True Value - 5%)
True Value plus 5% = 71.3022 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? Yes **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? Yes **(Acceptance Criteria)**

Standard Reverification Acceptable? Yes

Note: Criteria for reverification of radiological standards is taken from the DOE QSAS and LANL Statements of Work

Reviewed By/Date: RTM 12/30/2013

SOP Reference: STL-QA-0002, Current Revision

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:30:35AM 12/30/2013

Sample

Sample Name: Verification-1
SampleType: Sample
:
Sample Collection Date:

Spectrum #1 Analysis #1
Sample Volume : 0.1000mL
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: Th-229_0012
AnalysisID: 592567

Analyst: 60040

Tracer

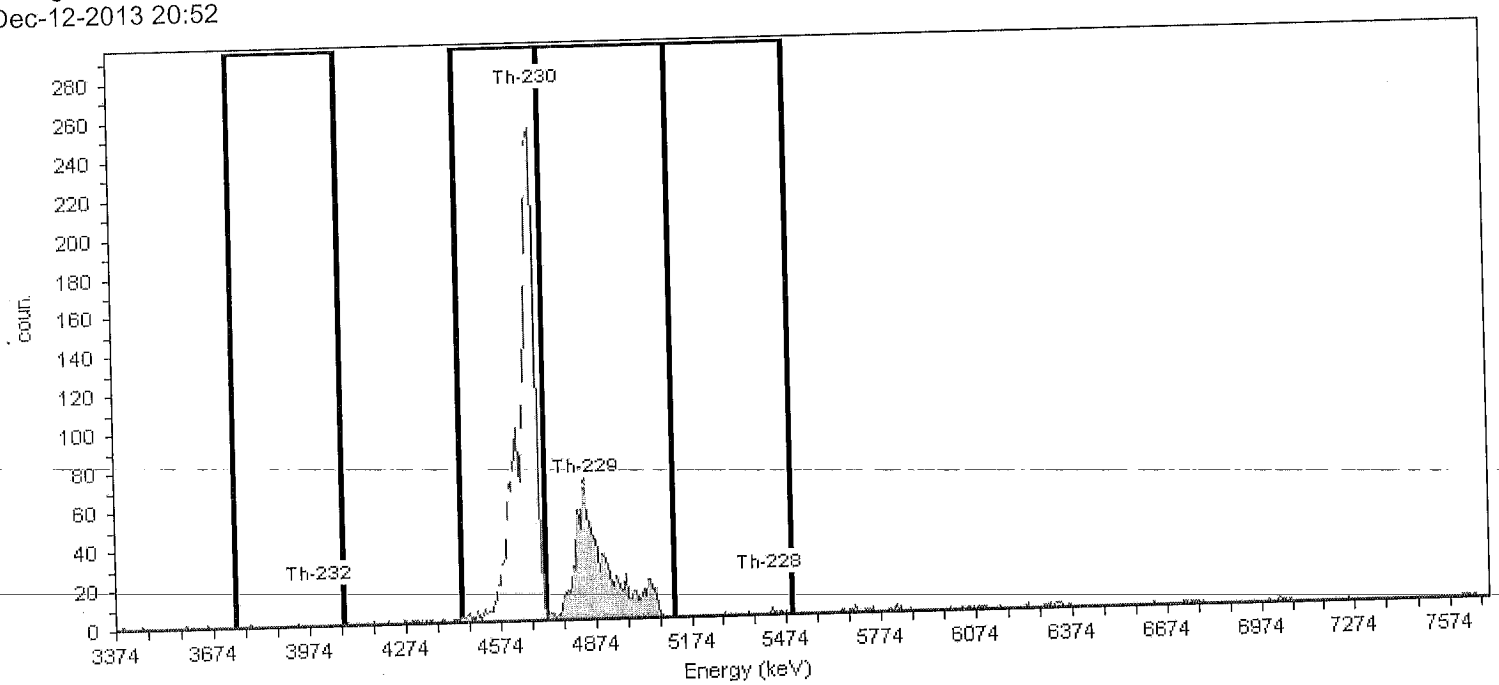
Tracer Name: Th-230_00017
Tracer Activity: 47.94 DPM/mL x (Vol.)0.30 mL = 14.38 DPM
Tracer Ref. Date: 4/11/2011 11:00:10AM

Tracer Nuclide: Th-230
Tracer Recovery: 90.73%

Acquisition

Detector: AV44
Serial Number: 50-051JJ1
Acquisition Start Date: 12/26/2013 4:26:11PM
Live Time: 600.00 min.
Real Time: 600.01 min.
Background Date: 12/12/2013 8:52:36PM
Background Info: Sample: ICB;AV44; Det: AV44; Spectrum #1; Dec-12-2013 20:52

Calibration Name: IC-9795;AV44-20130515
Calibration Date: 5/15/2013 9:25:41PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.64% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th-230_Tracer
Decay Correction: 12/26/2013 4:24:41PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	61.6	100.2	2	0.6250	1.38	0.095	DPM/mL
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	31.6	99.7	2079	0.0000	2079.38	130.481	DPM/mL
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	84.3	99.8	1004	3.7500	1000.25	69.113	DPM/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	36.0	99.8	8	7.5000	0.50	0.035	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:31:26AM 12/30/2013

Sample

Sample Name: Verification-2
SampleType: Sample
:
Sample Collection Date:

Spectrum #1 Analysis #1
Sample Volume : 0.1000mL
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: Th-229_0012
AnalysisID: 592570

Analyst: 60040

Tracer

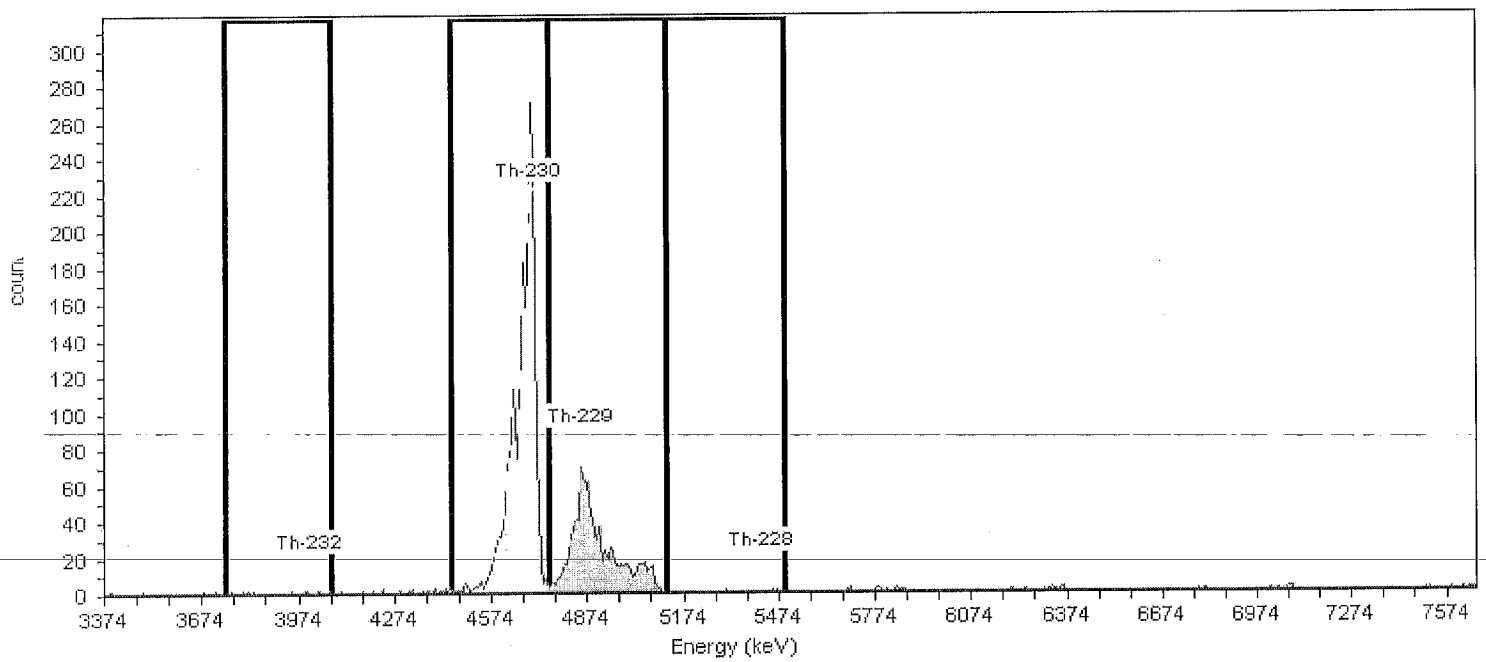
Tracer Name: Th-230_00017
Tracer Activity: 47.94 DPM/mL x (Vol.)0.30 mL = 14.38 DPM
Tracer Ref. Date: 4/11/2011 11:00:10AM

Tracer Nuclide: Th-230
Tracer Recovery: 95.22%

Acquisition

Detector: AV45
Serial Number: 48-158FF2
Acquisition Start Date: 12/26/2013 4:26:13PM
Live Time: 600.00 min.
Real Time: 600.01 min.
Background Date: 12/12/2013 8:52:38PM
Background Info: Sample: ICB;AV45; Det: AV45; Spectrum #1; Dec-12-2013 20:52

Calibration Name: IC-9817;AV45-20130515
Calibration Date: 5/15/2013 9:25:55PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.68% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th-230_Tracer
Decay Correction: 12/26/2013 4:24:41PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	37.3	100.2	7	0.0000	7.46	0.488	DPM/mL
Th-230	4688.0	4,687.5	0.5	4448.3	4754.1	64.3	99.7	2186	0.6250	2185.38	136.944	DPM/mL
Th-229	4848.0	4,845.3	2.7	4754.1	5119.5	79.8	99.8	1016	0.6250	1015.38	66.755	DPM/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	24.9	99.8	3	5.6250	-2.63	-0.173	DPM/mL

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:32:04AM 12/30/2013

Sample

Sample Name: Verification-3
SampleType: Sample
Sample Collection Date:

Spectrum #1 Analysis #1
Sample Volume : 0.1000mL
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: Th-229_0012
AnalysisID: 592571

Analyst: 60040

Tracer

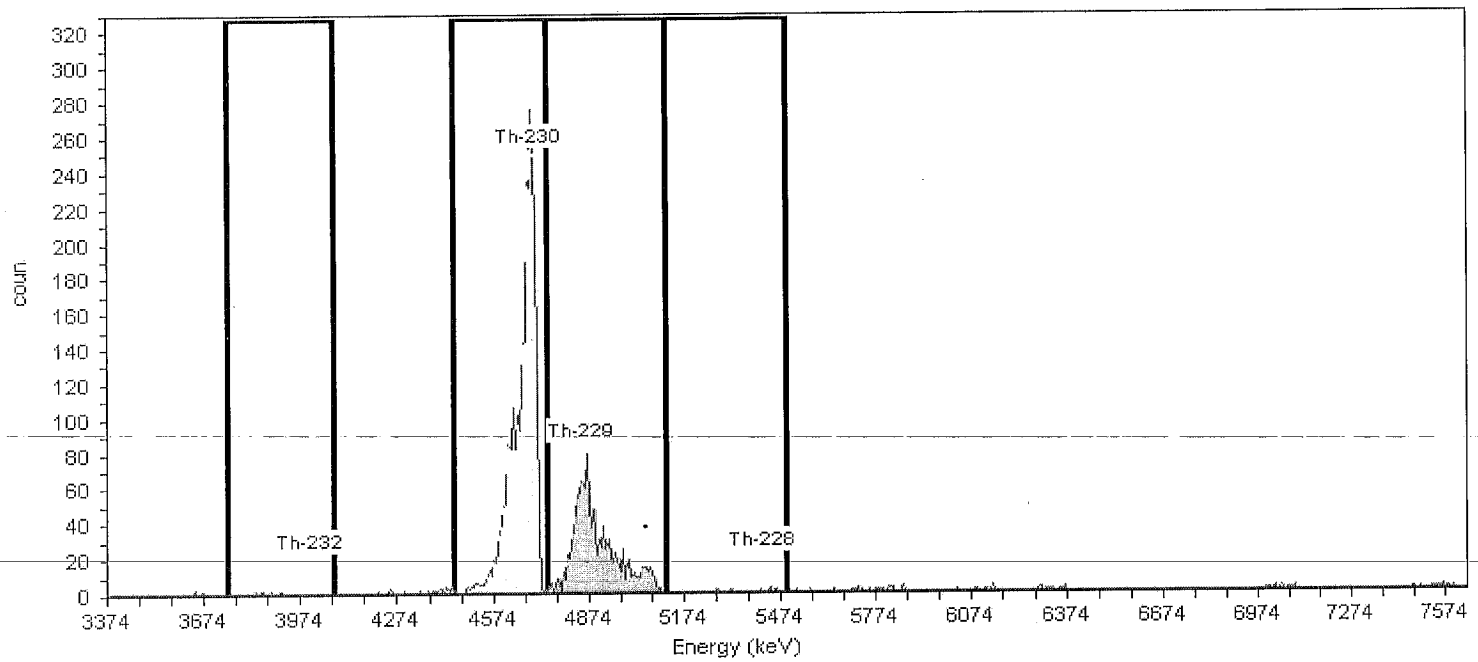
Tracer Name: Th-230_00017
Tracer Activity: 47.94 DPM/mL x (Vol.)0.30 mL = 14.38 DPM
Tracer Ref. Date: 4/11/2011 11:00:10AM

Tracer Nuclide: Th-230
Tracer Recovery: 93.94%

Acquisition

Detector: AV46
Serial Number: 49-202GG2
Acquisition Start Date: 12/26/2013 4:26:15PM
Live Time: 600.00 min.
Real Time: 600.01 min.
Background Date: 12/12/2013 8:52:40PM
Background Info: Sample: ICB;AV46; Det: AV46; Spectrum #1; Dec-12-2013 20:52

Calibration Name: IC-9884;AV46-20130515a
Calibration Date: 5/16/2013 12:12:59AM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 27.46% +/- 0.39% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th-230_Tracer
Decay Correction: 12/26/2013 4:24:41PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	95.0	100.2	5	0.6250	4.38	0.282	DPM/mL
Th-230	4688.0	4,687.5	0.5	4448.3	4739.1	36.4	99.7	2219	0.0000	2219.00	135.103	DPM/mL
Th-229	4848.0	4,845.3	2.7	4739.1	5119.5	78.0	99.8	1052	1.2500	1050.75	68.034	DPM/mL
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	15.7	99.8	7	4.3750	2.63	0.170	DPM/mL

Decay Correction

Thorium-229								
Initial Activity:	67.929	dpm						
Reference Date:	7/14/2010							
Current Date:	12/26/2013		(or date at which you wish to determine activity)					
Elapsed Time:	1261	days						
Half Life:	2680935	days	64342440					
Exponential Term:	0.999674026							
Corrected Activity:	67.90685689	dpm	30.58867427	pCi				

Lm 12/30/13

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Actinide Prep

Batch No. : —

Balance ID : —

Note: If a section below is not used, marked the N/A box and initial & date next to the N/A. i.e. Mark the N/A box if a tracer is not added to the sample(s) then initial and date next to the N/A

No.	Sample Number	Aliquot (g / mL)	MS	Initials
44 1	Verification 1	0.1		
45 2	1 2 3	1		
46 3	1 2 3	1		
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				

Tracer ☐ N/A

Initials / Date

Isotope : Th-230

Std Sol'n No. : Th-230.00017

Vol (mL) : 0.3

Ref Activity (dpm/mL) : 47.94 dpm/mL

Act Ref Date : 4-11-11

Samples Spiked and Traced By: MB 12/23/13 (Initials / Date)

Verification Signature & Date: [signature] 12/23/13 (Initials / Date)

LCS Standard ☐ N/A

Initials / Date

Isotope : Th-229

Std Sol'n ID. : Th-229-00012

Vol (mL) : 0.1

Ref Activity (dpm/mL) : 67.929 dpm/mL — corrected activity 67.9086

Act Ref Date : 7-14-10

SOP's applied in preparing these samples. Mark box to left for all that apply:

☐	ST-RC-0003 Rev.	☐	ST-RC-0040 Rev.	☐	ST-RC-0110 Rev.
☐	ST-RC-0004 Rev.	☐	ST-RC-0041 Rev.	☐	ST-RC-0120 Rev.
☐	ST-RC-0014 Rev.	☐	ST-RC-0050 Rev.	☐	ST-RC-0232 Rev.
☐	ST-RC-0020 Rev.	☐	ST-RC-0090 Rev.	☐	ST-RC-0238 Rev.
☐	ST-RC-0021 Rev.	☑	ST-RC-0100 Rev.	☐	ST-RC-0240 Rev.
				☐	ST-RC-0241 Rev.
				☑	ST-RC-0242 Rev.
				☐	ST-RC-5016 Rev.
				☐	
				☐	

Isotope(s)

αβ ☐	Iso Pu ☐	Tc-99 ☐	Iso Cm ☐
Iso Am ☐	Ra ☐	Iso Th ☑	Pu-241 ☐
KPA ☐	Sr ☐	Iso U ☐	Th-229 ☐
Np ☐	TAR ☐	C-14 ☑	Cl-36 ☐

Count Time		Matrix	
Long Count	☐	Soil	☐
Short Count	☐	H_2O	☐

Prepared By : MB

Date : 12/23/13

Reviewed by: _____

Date: _____

Sequential Thorium, Plutonium and Uranium via TEVA/UTEVA ST-RC-0242

Batch: Th229 Verification

All rinses should flow at 1 mL/minute (only 3M HNO_3 may be done at 3 mL/minute)

*only necessary when analyzing for *Pu*

TEVA lot: TE512BM

UTEVA lot: _____

11.5.2 Stack TEVA on top of UTEVA cartridge

11.5.3 5mL 3M HNO_3 — COMPLETED ☐

*11.5.4 To samples, add 1mL ascorbic acid solution Place in hot water bath for 5 minutes — COMPLETED ☐

*11.5.5 To samples, add 1mL $NaNO_2$ solution Place in hot water bath for 5 minutes — COMPLETED ☐

*11.5.6 Cold water bath until samples reach room temperature

11.5.7 Load sample

11.5.8 20mL 3M HNO_3 — COMPLETED ☐

11.59 Split cartridges: TEVA / UTEVA

TEVA

11.5.10-11.5.11 Elute *Th* into clean tube using 20mL 9M HCl — COMPLETED ☐

11.5.12 5mL 6M HCl into *Th* tube — COMPLETED ☐

11.5.16 Elute *Pu* into clean tube with 20mL 1M HCl + 0.250 mL $TiCl_3$ — COMPLETED ☐ — COMPLETED ☐

UTEVA

11.5.19 5mL 3M HNO_3 — COMPLETED ☐

11.5.20 5mL 9M HCl — COMPLETED ☐

11.5.21 20mL 5M HCl / 0.05M oxalic — COMPLETED ☐

11.5.22-11.5.23 Elute *U* into clean tube with 15mL 1M HCl — COMPLETED ☐

Reagent

TRM-2_00001

Perry, Doug E

From: Salmi, Douglas R
Sent: March 20, 2000 10:48 AM
To: Perry, Doug E; Puissant, Pamela M
Subject: FW: SRMs for radiochemistry LCSs

Pam, Doug
FYI

-----Original Message-----
From: Minteer@aol.com [mailto:Minteer@aol.com]
Sent: March 20, 2000 10:36 AM
To: drsalmi@sandia.gov
Cc: dbourne@doeal.gov; GLDechant@aol.com; crandallb@quanterra.com
Subject: SRMs for radiochemistry LCSs

Doug:

As we discussed by telephone, please send approximately 500 grams each of PEM-1, TRM-2, and NBHD to STL St. Louis. These are to be used by STL as laboratory control samples. As with our other laboratories, STL will be asked to provide summaries of the data obtained in quarterly progress reports. This is not to assess their proficiency, but rather to help us develop interlaboratory acceptance criteria. The known values (given below) for PEM and TRM are good because the samples are well characterized. The known values for NBHD result from a single analysis and hence should be taken as estimates. All the values below are in pCi/g.

PEM-1:

Parameter	Result	Std. Dev.
Pu-238	8.03	0.37
Pu-239	41.0	3.0
Am-241	32.5	1.1
Cs-137	73.5	0.9
U-234	5.99	0.2
U-235	0.27	0.04
U-238	18.1	0.5

TRM-2

Parameter	Result	Uncertainty
U-238	6.0	+/- 4.0
U-234	6.2	+/- 4.0
Th-230	24.5	+/- 0.6
Ra-226	25.4	+/- 0.9
Pb-210	22.1	+/- 1.2

NBHD

Parameter	Result	Uncertainty
Am-241	1.47	+/- 0.28
Ra-226	67.3	+/- 5.5
U-234	174	none available
U-235	8.7	"
U-238	212	"
Cs-137	52.1	+/- 4.6
Pb-210	78.3	+/- 2.4
Pu-239/40	4.7	+/- 0.63
Pu-238	0.3	+/- 0.11
Th-230	83.4	+/- 6.5

ALPHA SPECTROSCOPY

Method A-01-R Th

Isotopic Thorium (Alpha Spectrometry) by Method A-01-R

Prep Batch: 128863

, Extraction Chromatography Resin Actinide

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128863

Lab ID: MB 160-128863/1-A
Client ID:
Sigma: 2
Analyzed: 07/07/14 18:10
Detector: AV7
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	-0.02056	0.0284	0.0285	U	pCi/g	1.00	0.104	130012
Thorium-230	0.3143	0.123	0.126		pCi/g	1.00	0.0758	130012
Thorium-232	0.003586	0.0349	0.0349	U	pCi/g	1.00	0.0879	130012

Tracer	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.160	0.449	0.624		pCi/g	0.0592	6.12	84.4	30 - 110

Lab ID: LCS 160-128863/2-A
Client ID:
Sigma: 2
Analyzed: 07/07/14 18:11
Detector: AV8
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-230	23.67	1.37	2.42		pCi/g	1.00	0.0950	130023

Tracer	LCS Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	11.51	0.928	1.34		pCi/g	0.147	12.3	93.7	30 - 110

Lab ID: 680-102600-6
Client ID: SD-278-SS
Sigma: 2
Analyzed: 07/07/14 18:11
Detector: AV9
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	0.996	0.210	0.226		pCi/g	1.00	0.0670	130034
Thorium-230	1.27	0.236	0.259		pCi/g	1.00	0.0707	130034
Thorium-232	1.31	0.239	0.263		pCi/g	1.00	0.0564	130034

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.21	0.441	0.621		pCi/g	0.0483	6.13	85.1	30 - 110

Lab ID: 680-102600-6 DU
Client ID: SD-278-SS
Sigma: 2
Analyzed: 07/07/14 18:11
Detector: AV10
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.417	0.270	0.295		pCi/g	1.00	0.115	129939
Thorium-230	1.486	0.273	0.300		pCi/g	1.00	0.0708	129939
Thorium-232	1.596	0.281	0.311		pCi/g	1.00	0.0371	129939

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128863

Lab ID: 680-102600-6 DU
Client ID: SD-278-SS
Sigma: 2
Analyzed: 07/07/14 18:11
Detector: AV10
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Tracer	DU Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.793	0.433	0.591		pCi/g	0.0745	6.13	78.2	30 - 110

Lab ID: 680-102600-7
Client ID: SD-278-01
Sigma: 2
Analyzed: 07/07/14 18:11
Detector: AV11
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.45	0.266	0.292		pCi/g	1.00	0.109	129950
Thorium-230	1.38	0.257	0.282		pCi/g	1.00	0.0768	129950
Thorium-232	1.38	0.257	0.282		pCi/g	1.00	0.0842	129950

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.85	0.427	0.590		pCi/g	0.0607	6.14	79.0	30 - 110

Lab ID: 680-102600-8
Client ID: SD-278-02
Sigma: 2
Analyzed: 07/07/14 18:11
Detector: AV12
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.29	0.235	0.259		pCi/g	1.00	0.0809	129960
Thorium-230	0.905	0.196	0.210		pCi/g	1.00	0.0480	129960
Thorium-232	1.15	0.221	0.242		pCi/g	1.00	0.0776	129960

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	5.57	0.463	0.658		pCi/g	0.0504	6.10	91.3	30 - 110

Lab ID: 680-102600-9
Client ID: SD-278-03
Sigma: 2
Analyzed: 07/07/14 18:11
Detector: AV13
Dil Fac: 1
Decay Corrected: No
Yield Truncated: No
Ts: 180

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-228	1.69	0.294	0.326		pCi/g	1.00	0.0991	129971
Thorium-230	1.23	0.248	0.269		pCi/g	1.00	0.0376	129971
Thorium-232	1.42	0.269	0.294		pCi/g	1.00	0.100	129971

Tracer	Result	Count Unc	Total Unc	Qualifier	Unit	MDC	Spike Added	% Rec	% Rec Limits
Thorium-229	4.71	0.427	0.582		pCi/g	0.0549	6.12	77.0	30 - 110

Alpha Spectroscopy Analysis Detail Report
Prep Batch: 128863

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-128863/1-A	Thorium-228			-0.02056	U	pCi/g							
MB 160-128863/1-A	Thorium-230			0.3143		pCi/g							
MB 160-128863/1-A	Thorium-232			0.003586	U	pCi/g							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-128863/2-A	Thorium-230		24.5	23.67		pCi/g	97	81 - 118					

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
680-102600-6	Thorium-228	0.996		1.417		pCi/g			35	0.81	2.27	1	
680-102600-6	Thorium-230	1.27		1.486		pCi/g			16	0.39	1.10	1	
680-102600-6	Thorium-232	1.31		1.596		pCi/g			20	0.50	1.40	1	

Glossary:

Ts = Count Duration, Sample

ALPHA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102600-2

SDG No.: 680102600-2

Batch Number: 128863 Batch Start Date: 06/27/14 17:25 Batch Analyst: Bernsen, Sarah C

Batch Method: ExtChrom Batch End Date: 07/07/14 14:04

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	Th-229 00012	TRM-2 00001			
MB 160-128863/1		ExtChrom, A-01-R		1.0 g	0.2 mL				
LCS 160-128863/2		ExtChrom, A-01-R		0.4979 g	0.2 mL	0.4979 g			
680-102600-A-6-A	SD-278-SS	ExtChrom, A-01-R	T	0.9987 g	0.2 mL				
680-102600-A-6-A DU	SD-278-SS	ExtChrom, A-01-R	T	0.9983 g	0.2 mL				
680-102600-A-7-A	SD-278-01	ExtChrom, A-01-R	T	0.9967 g	0.2 mL				
680-102600-A-8-A	SD-278-02	ExtChrom, A-01-R	T	1.0037 g	0.2 mL				
680-102600-A-9-A	SD-278-03	ExtChrom, A-01-R	T	1.0005 g	0.2 mL				

Batch Notes	
Balance ID	27050421
Column Analyst	nmn per scb
Column Date	7/7/14
CoPrecipitation Analyst	mfm per scb
CoPrecipitation Date	7/7/14
Person's name who witnessed reagent drop	nmn per scb
Analyst who added reagent	scb
SOP Number	ST-RC-0003, ST-RC-0004, ST-RC-0100, ST-RC-0242

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

TestAmerica
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Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:09:42AM 7/8/2014

Sample

Sample Name: MB 160-128863/1-A
SampleType: Blank
: MB 160-128863/1-A
Sample Collection Date: 7/2/2014 8:27:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0000g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128863
AnalysisID: 614359

Analyst: 60040

Tracer

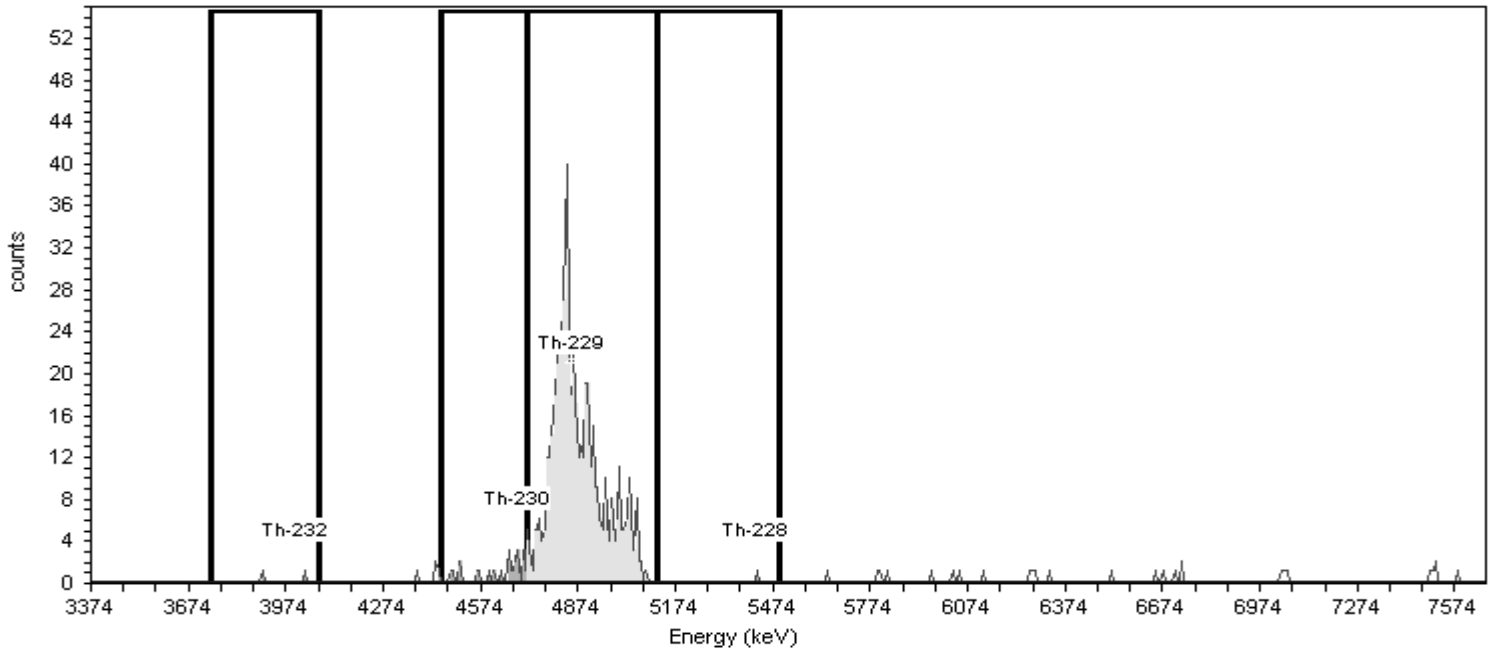
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 84.35%

Acquisition

Detector: AV7
Serial Number: 48-158EE5
Acquisition Start Date: 7/7/2014 6:10:59PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:20PM
Background Info: Sample: ICB;AV7; Det: AV7; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-8877;AV7-20140507
Calibration Date: 5/7/2014 10:48:48PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.80% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/7/2014 6:09:39PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	9.7	100.2	2	1.6875	0.31	0.004	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	21.2	99.7	28	0.9953	27.25	0.314	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	124.1	99.6	531	0.7380	530.20	5.162	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	44.5	99.8	1	2.7843	-1.78	-0.021	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:11:28PM 7/7/2014

Sample

Sample Name: LCS 160-128863/2-A
SampleType: Control
: LCS 160-128863/2-A
Sample Collection Date: 7/2/2014 8:27:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.4979g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128863
AnalysisID: 614353

Analyst: 60040

Tracer

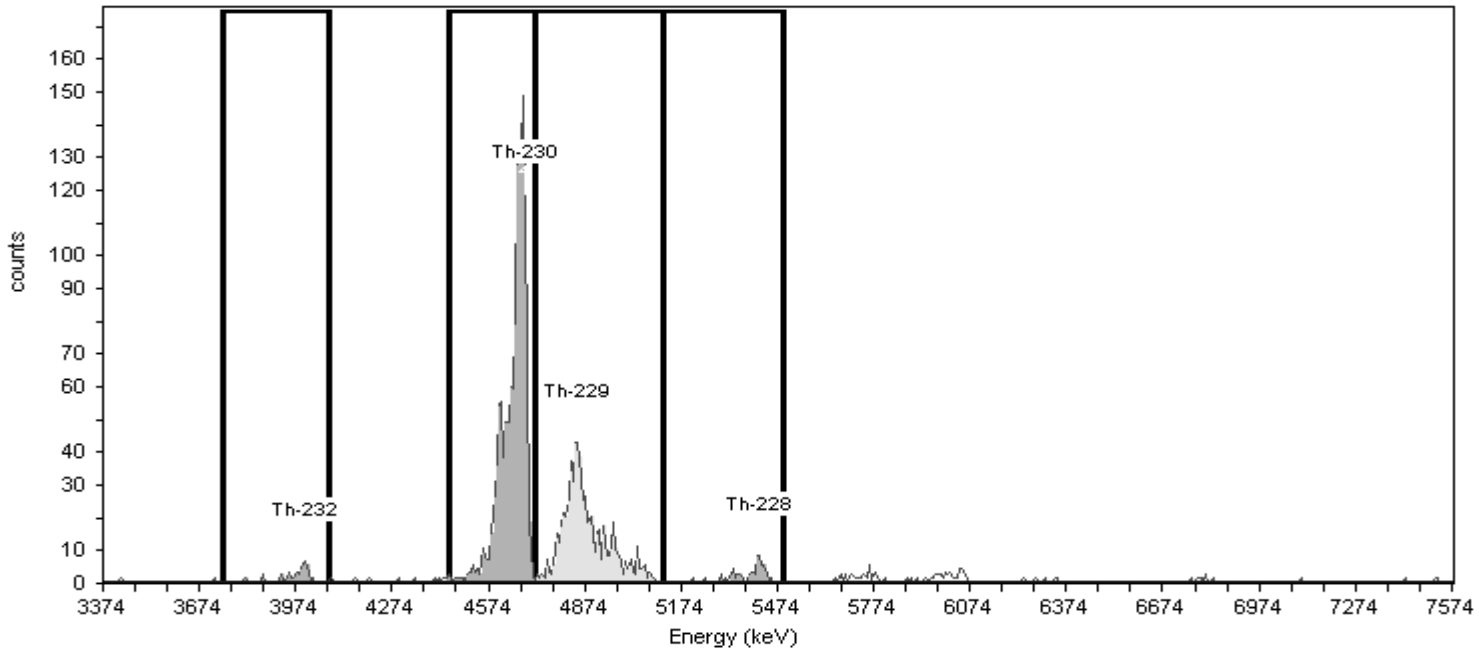
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 93.66%

Acquisition

Detector: AV8
Serial Number: 41-137Q6
Acquisition Start Date: 7/7/2014 6:11:01PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:22PM
Background Info: Sample: ICB;AV8; Det: AV8; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9792;AV8-20140505
Calibration Date: 5/6/2014 5:38:58PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.05% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/7/2014 6:09:39PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	49.9	100.2	37	1.5000	35.50	0.703	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	28.0	99.7	1190	0.2453	1189.51	23.667	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	79.9	99.6	619	1.8750	617.19	11.511	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	46.8	99.8	54	3.5625	50.44	1.003	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:11:41PM 7/7/2014

Sample

Sample Name: 680-102600-A-6-B
SampleType: Sample
: 680-102600-A-6-B
Sample Collection Date: 6/20/2014 10:00:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9987g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128863
AnalysisID: 614354

Analyst: 60040

Tracer

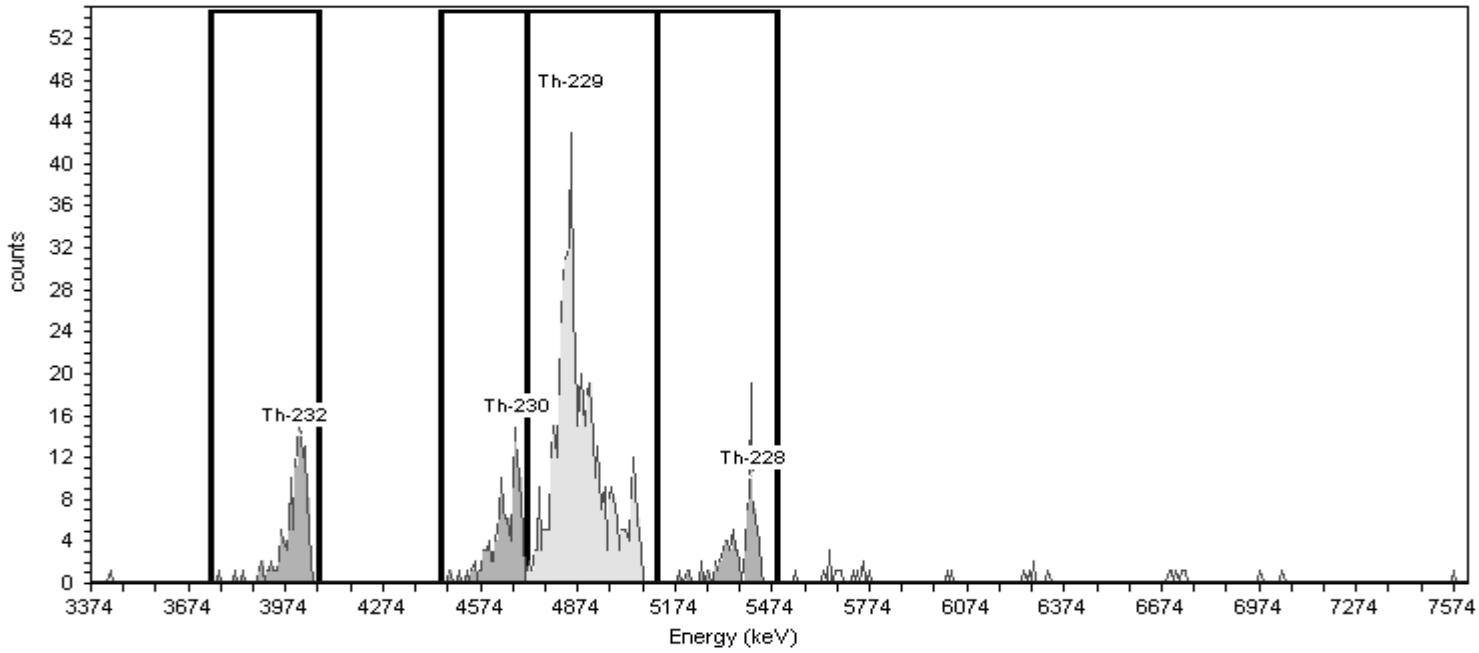
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 85.11%

Acquisition

Detector: AV9
Serial Number: 51-082V5
Acquisition Start Date: 7/7/2014 6:11:03PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:24PM
Background Info: Sample: ICB;AV9; Det: AV9; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9793;AV9-20140505
Calibration Date: 5/6/2014 5:39:04PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.04% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/7/2014 6:09:39PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	37.0	100.2	121	0.3750	120.63	1.311	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	31.4	99.7	117	0.9375	116.09	1.268	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	80.8	99.6	561	0.3750	560.66	5.215	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	46.8	99.8	92	0.7662	91.23	0.996	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:11:46PM 7/7/2014

Sample

Sample Name: 680-102600-A-6-C DU
SampleType: Sample
: 680-102600-A-6-C DU
Sample Collection Date: 6/20/2014 10:00:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9983g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128863
AnalysisID: 614355

Analyst: 60040

Tracer

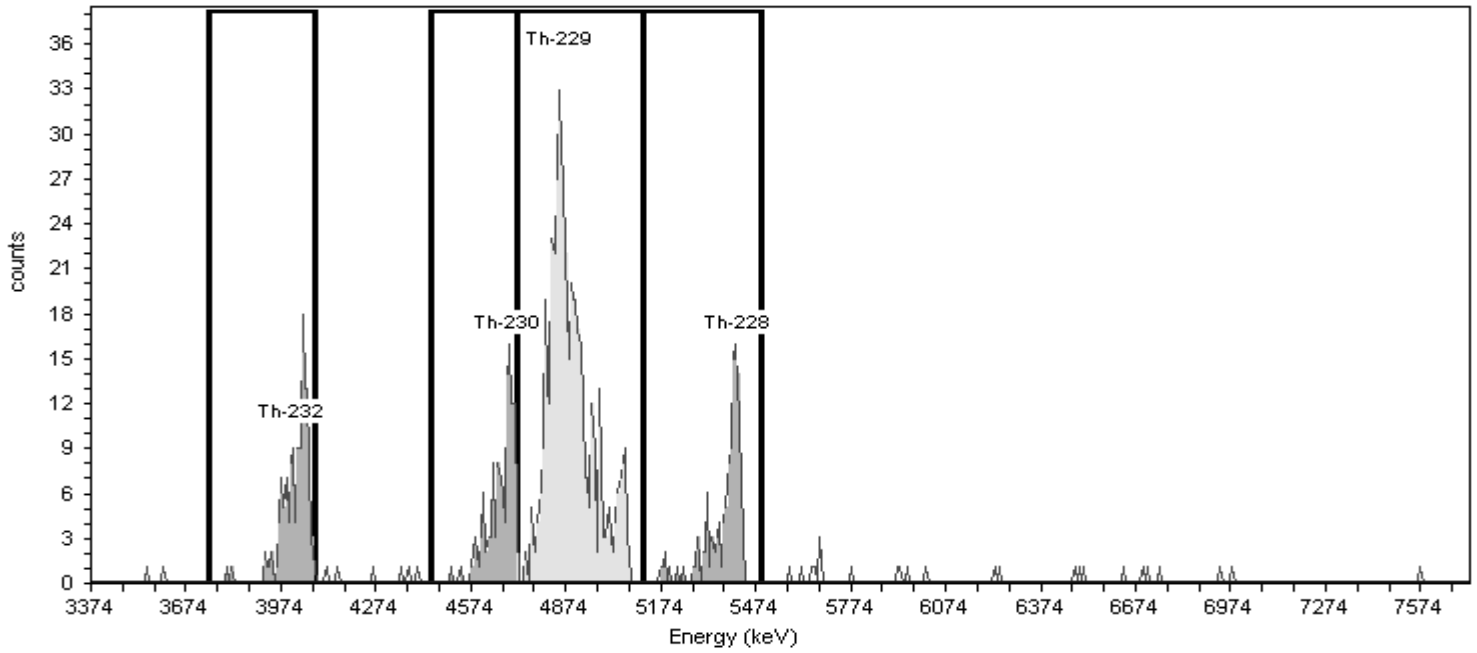
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 78.83%

Acquisition

Detector: AV10
Serial Number: 49-155N2
Acquisition Start Date: 7/7/2014 6:11:04PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:26PM
Background Info: Sample: ICB;AV10; Det: AV10; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9794;AV10-20140505
Calibration Date: 5/6/2014 5:39:10PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.84% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/7/2014 6:09:39PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	33.6	100.2	129	0.0000	128.92	1.583	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	45.1	99.7	120	0.5625	119.31	1.473	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	105.4	99.6	498	1.6875	496.19	4.832	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	48.5	99.8	117	3.0000	114.00	1.406	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:22:33AM 7/8/2014

Sample

Sample Name: 680-102600-A-6-C DU
SampleType: Sample
: 680-102600-A-6-C DU
Sample Collection Date: 6/20/2014 10:00:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9983g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128863
AnalysisID: 614434

Analyst: 60040

Tracer

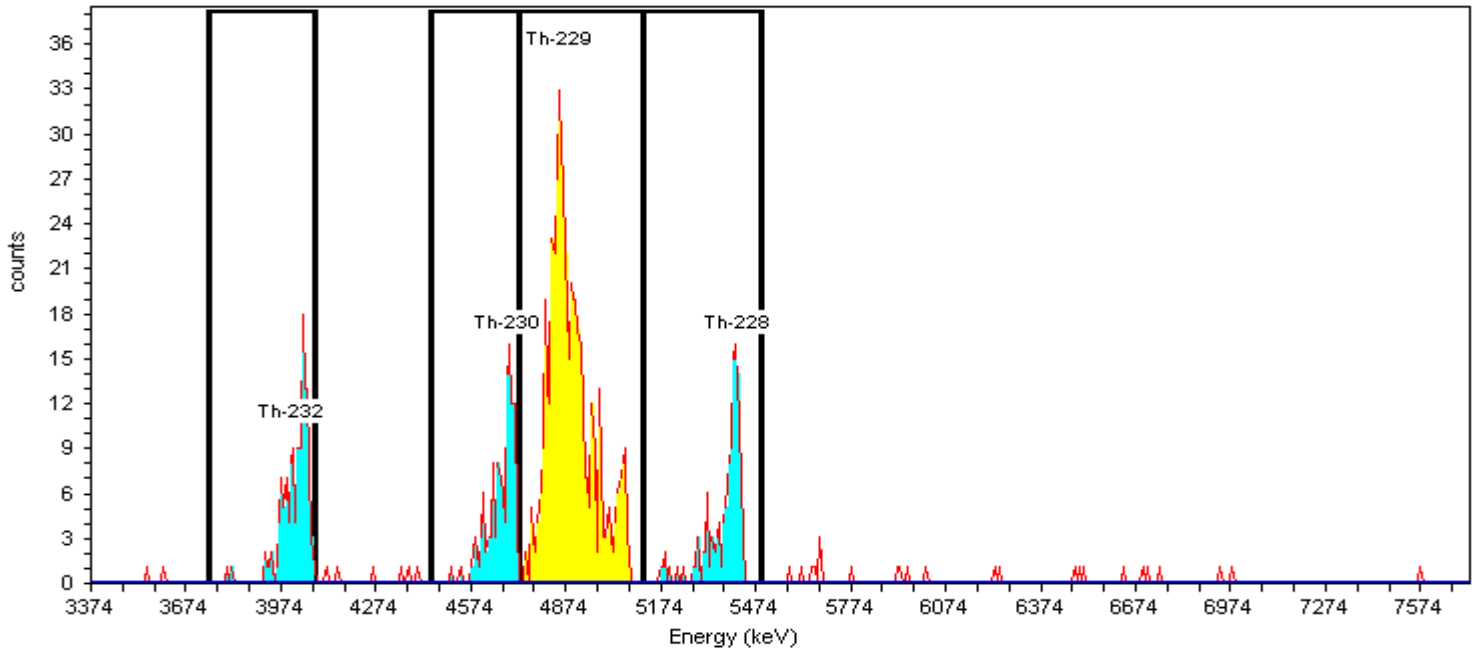
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 78.21%

Acquisition

Detector: AV10
Serial Number: 49-155N2
Acquisition Start Date: 7/7/2014 6:11:04PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:26PM
Background Info: Sample: ICB;AV10; Det: AV10; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9794;AV10-20140505
Calibration Date: 5/6/2014 5:39:10PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.84% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/7/2014 6:09:39PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/8/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	33.6	100.2	129	0.0000	128.92	1.596	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4724.2	31.9	99.7	120	0.5625	119.44	1.486	pCi/g
Th-229	4848.0	4,845.3	2.7	4724.2	5119.5	105.4	99.6	494	1.6875	492.31	4.795	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	48.5	99.8	117	3.0000	114.00	1.417	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:11:53PM 7/7/2014

Sample

Sample Name: 680-102600-A-7-B
SampleType: Sample
: 680-102600-A-7-B
Sample Collection Date: 6/20/2014 10:05:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9967g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128863
AnalysisID: 614356

Analyst: 60040

Tracer

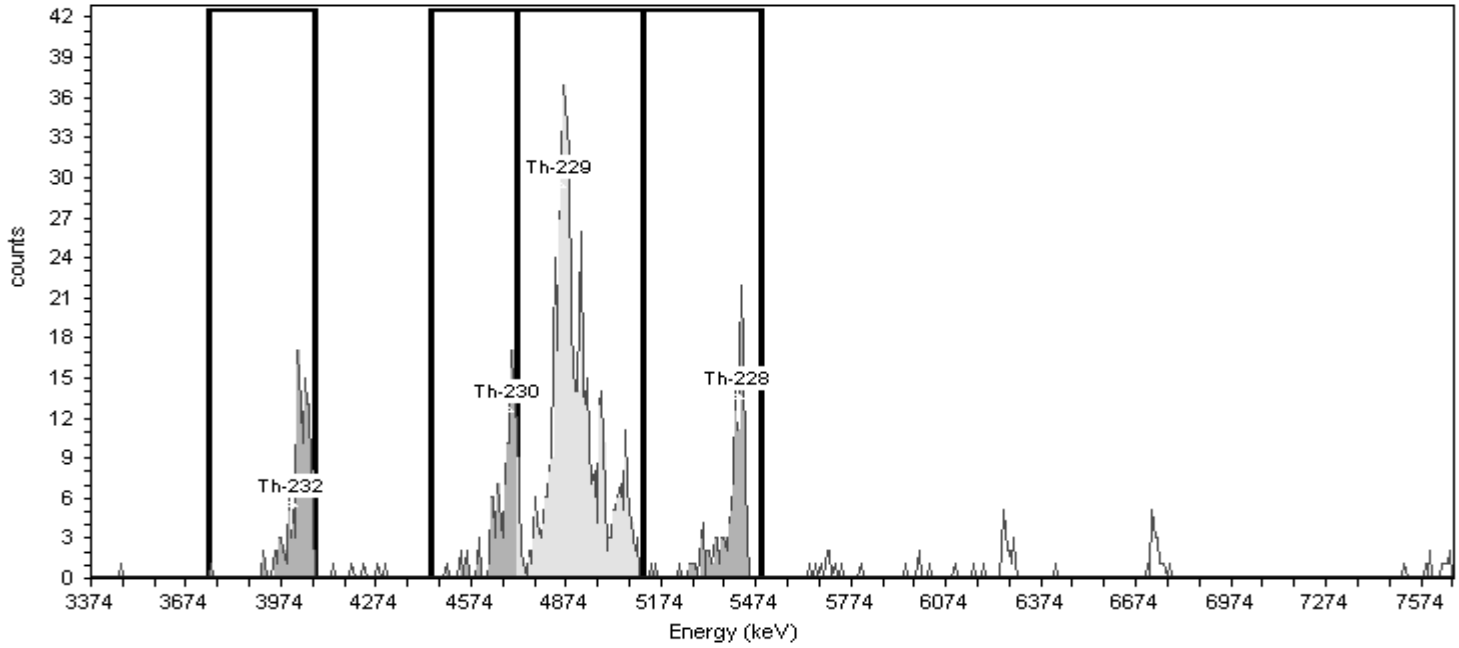
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 81.23%

Acquisition

Detector: AV11
Serial Number: 49-155dd2
Acquisition Start Date: 7/7/2014 6:11:06PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:27PM
Background Info: Sample: ICB;AV11; Det: AV11; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9795;AV11-20140505
Calibration Date: 5/6/2014 5:39:16PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.88% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/7/2014 6:09:39PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	44.8	100.2	118	1.3280	116.77	1.340	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	38.4	99.7	108	0.7558	107.06	1.235	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	75.7	99.6	533	0.9433	531.87	4.987	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	52.1	99.8	125	2.9838	122.02	1.406	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:23:48AM 7/8/2014

Sample

Sample Name: 680-102600-A-7-B
SampleType: Sample
: 680-102600-A-7-B
Sample Collection Date: 6/20/2014 10:05:00AM

Spectrum #1 Analysis #1
Sample Weight : 0.9967g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128863
AnalysisID: 614435

Analyst: 60040

Tracer

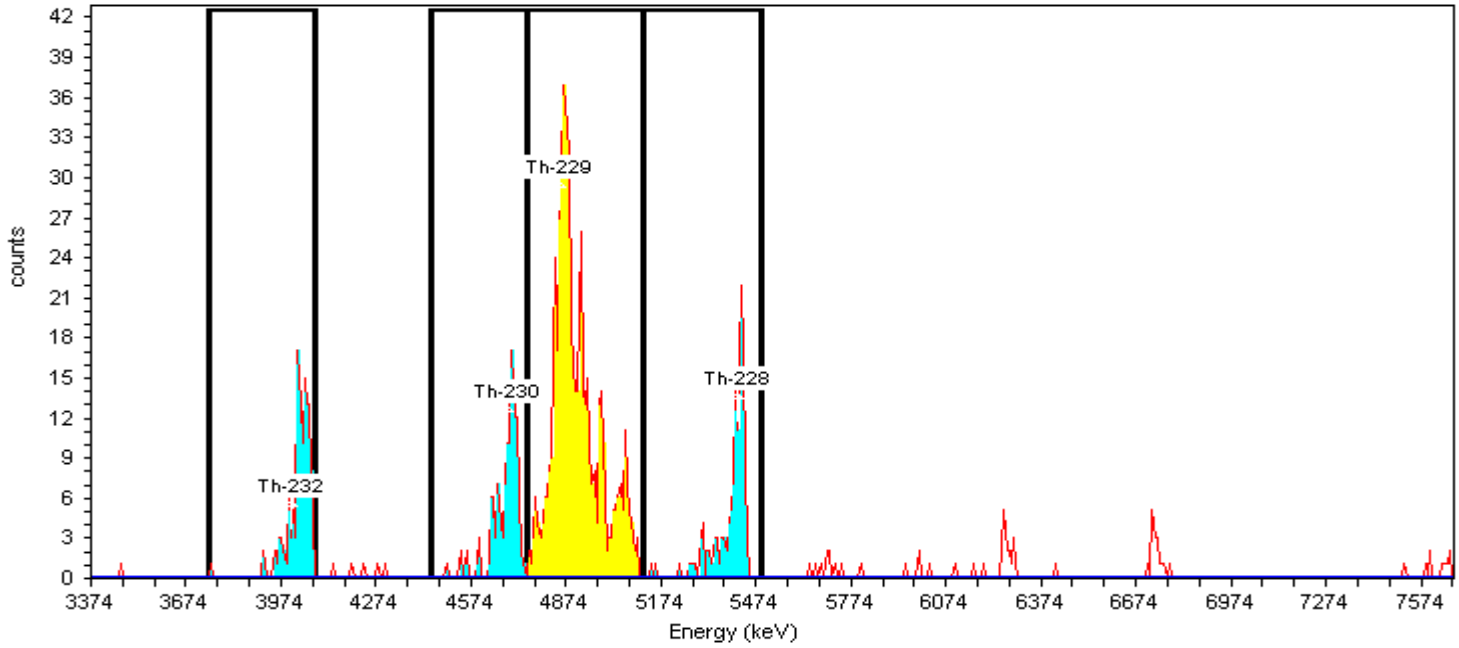
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 78.97%

Acquisition

Detector: AV11
Serial Number: 49-155dd2
Acquisition Start Date: 7/7/2014 6:11:06PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:27PM
Background Info: Sample: ICB;AV11; Det: AV11; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9795;AV11-20140505
Calibration Date: 5/6/2014 5:39:16PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.88% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/7/2014 6:09:39PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/8/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	44.8	100.2	118	1.3280	116.77	1.378	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4746.6	22.4	99.7	117	0.9375	116.06	1.377	pCi/g
Th-229	4848.0	4,845.3	2.7	4746.6	5119.5	75.7	99.6	518	0.9375	517.06	4.849	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	52.1	99.8	125	2.9838	122.02	1.447	pCi/g

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:11:59PM 7/7/2014

Sample

Sample Name: 680-102600-A-8-B
SampleType: Sample
: 680-102600-A-8-B
Sample Collection Date: 6/20/2014 10:10:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0037g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128863
AnalysisID: 614357

Analyst: 60040

Tracer

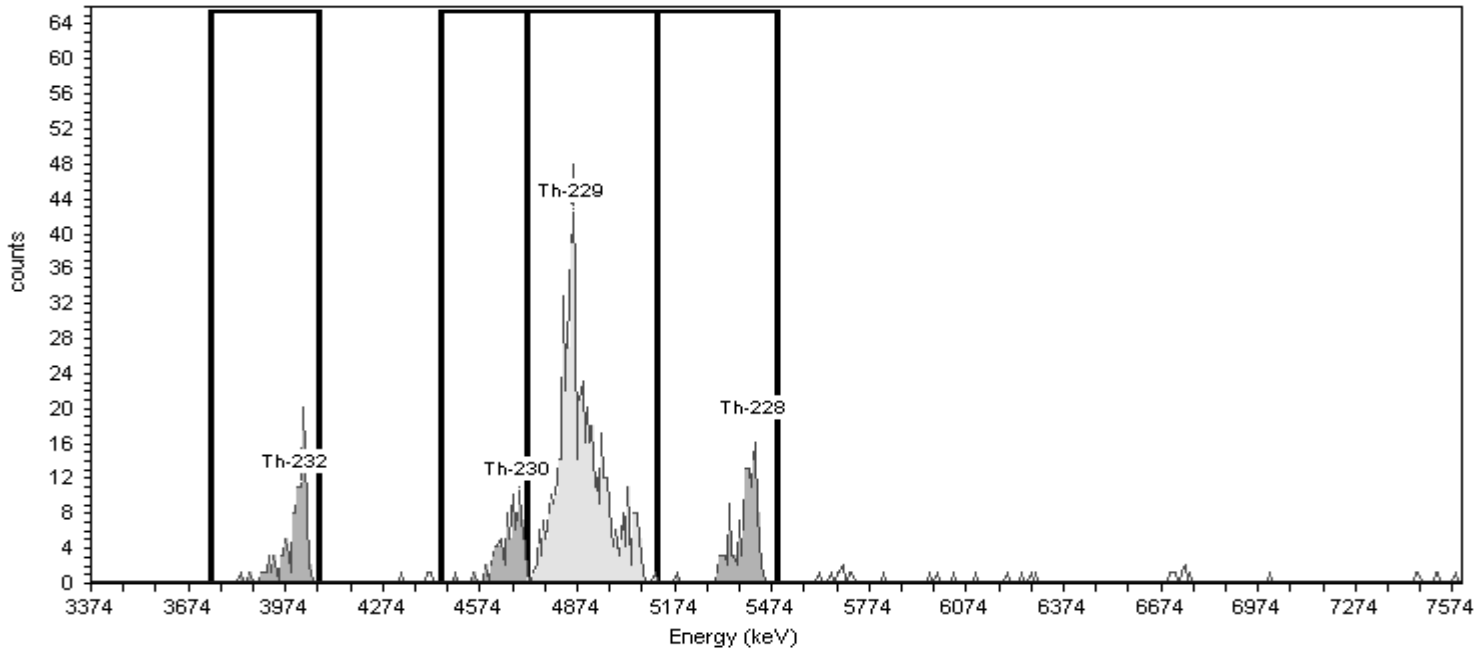
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 91.33%

Acquisition

Detector: AV12
Serial Number: 51-082B7
Acquisition Start Date: 7/7/2014 6:11:07PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:29PM
Background Info: Sample: ICB;AV12; Det: AV12; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9817;AV12-20140505
Calibration Date: 5/6/2014 5:39:22PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.97% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/7/2014 6:09:39PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	28.3	100.2	111	1.5000	109.50	1.149	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	39.6	99.7	86	0.1875	85.78	0.905	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	75.1	99.6	578	0.3870	577.65	5.568	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	51.3	99.8	124	1.6995	122.36	1.290	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:12:04PM 7/7/2014

Sample

Sample Name: 680-102600-A-9-B
SampleType: Sample
: 680-102600-A-9-B
Sample Collection Date: 6/20/2014 10:15:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0005g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128863
AnalysisID: 614358

Analyst: 60040

Tracer

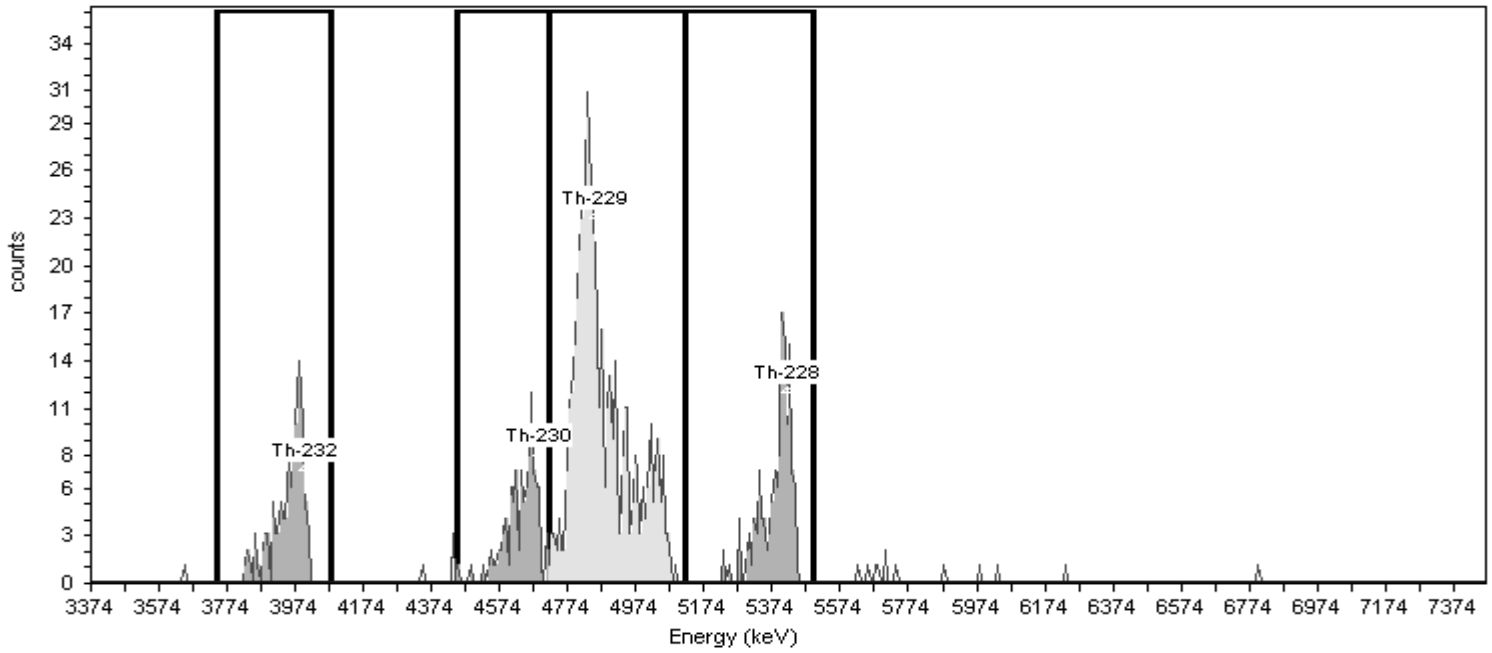
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 76.06%

Acquisition

Detector: AV13
Serial Number: 49-155M7
Acquisition Start Date: 7/7/2014 6:11:09PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:30PM
Background Info: Sample: ICB;AV13; Det: AV13; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9884;AV13-20140505
Calibration Date: 5/6/2014 5:39:28PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.99% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/7/2014 6:09:39PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	57.5	100.2	116	1.9610	114.04	1.440	pCi/g
Th-230	4688.0	4,687.5	0.5	4446.0	4717.0	39.8	99.7	102	0.0000	101.75	1.291	pCi/g
Th-229	4848.0	4,845.3	2.7	4717.0	5119.0	78.8	99.6	482	0.5625	481.50	4.652	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	55.7	99.8	137	1.8750	135.13	1.714	pCi/g

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Analysis Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:25:05AM 7/8/2014

Sample

Sample Name: 680-102600-A-9-B
SampleType: Sample
: 680-102600-A-9-B
Sample Collection Date: 6/20/2014 10:15:00AM

Spectrum #1 Analysis #1
Sample Weight : 1.0005g
Aliquot: N/A Aliquot Fraction: N/A

Batch

Batch Name: 128863
AnalysisID: 614436

Analyst: 60040

Tracer

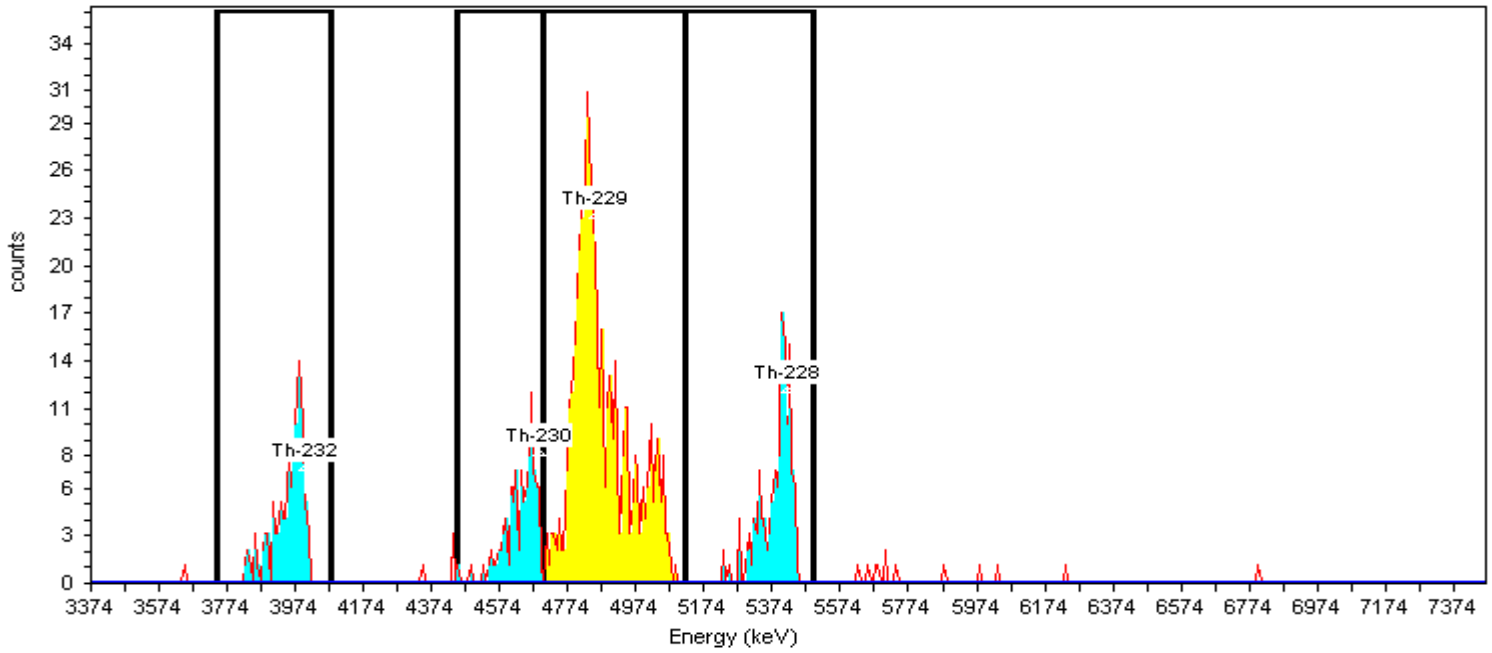
Tracer Name: Th-229_00012
Tracer Activity: 67.93 DPM/mL x (Vol.)0.20 mL = 13.59 DPM
Tracer Ref. Date: 7/14/2010 11:00:17AM

Tracer Nuclide: Th-229
Tracer Recovery: 76.99%

Acquisition

Detector: AV13
Serial Number: 49-155M7
Acquisition Start Date: 7/7/2014 6:11:09PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 6/18/2014 7:08:30PM
Background Info: Sample: ICB;AV13; Det: AV13; Spectrum #1; Jun-18-2014 19:08

Calibration Name: IC-9884;AV13-20140505
Calibration Date: 5/6/2014 5:39:28PM
Energy Cal: Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.99% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = Th2007_ROI
Decay Correction: 7/7/2014 6:09:39PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Manual integration for tailing.
MLK 7/8/2014

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	Peak Expected keV	Peak Diff keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity	Units
Th-232	3999.0	4,010.0	-11.0	3743.0	4072.0	57.5	100.2	116	1.9610	114.04	1.423	pCi/g
Th-230	4688.0	4,687.5	0.5	4448.3	4701.9	28.3	99.7	98	0.0000	98.00	1.229	pCi/g
Th-229	4848.0	4,845.3	2.7	4701.9	5119.5	78.8	99.6	488	0.5625	487.44	4.710	pCi/g
Th-228	5420.0	5,423.3	-3.3	5119.0	5493.0	55.7	99.8	137	1.8750	135.13	1.693	pCi/g

Daily Checks

Alpha Spectroscopy Daily Pulser Check

Analysis Date: 07/07/14

		Gross Counts			FWHM (keV)			Pulser Center			Energy (keV)		
Detector	**Analysis Date**	**Result**	**Criteria**	**P/F**	**Result**	**Criteria**	**P/F**	**Result**	**Criteria**	**P/F**	**Result**	**Criteria**	**P/F**
AV7	07/07/14 00:37	7343	7003.5 - 7740.8	Pass	17.6	10 - 20	Pass	226.9	222.0 - 232.0	Pass	5059	5020.1 - 5100.1	Pass
AV8	07/07/14 00:37	7432	7052.4 - 7794.7	Pass	15.0	10 - 20	Pass	220.9	216.0 - 226.0	Pass	5014	4975.1 - 5055.1	Pass
AV9	07/07/14 00:37	7525	7187.8 - 7944.4	Pass	12.9	10 - 20	Pass	221.0	216.0 - 226.0	Pass	5015	4975.3 - 5055.3	Pass
AV10	07/07/14 00:37	7454	7323.5 - 8094.4	Pass	12.6	10 - 20	Pass	224.1	216.0 - 226.0	Pass	5038	4974.9 - 5054.9	Pass
AV11	07/07/14 00:37	7714	7322.5 - 8093.3	Pass	13.4	10 - 20	Pass	226.0	221.1 - 231.1	Pass	5053	5012.8 - 5092.8	Pass
AV12	07/07/14 00:37	7629	7265.8 - 8030.6	Pass	11.6	10 - 20	Pass	221.0	214.9 - 224.9	Pass	5015	4967.1 - 5047.1	Pass
AV13	07/07/14 00:37	7659	7244.9 - 8007.5	Pass	16.1	10 - 20	Pass	224.2	219.1 - 229.1	Pass	5039	4998.3 - 5078.3	Pass

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:41:00AM 7/7/2014

Sample

Sample Name: Pulser;AV7
Comment:

Spectrum #11 Analysis #1

Batch

Batch Name: June2014a
Description:

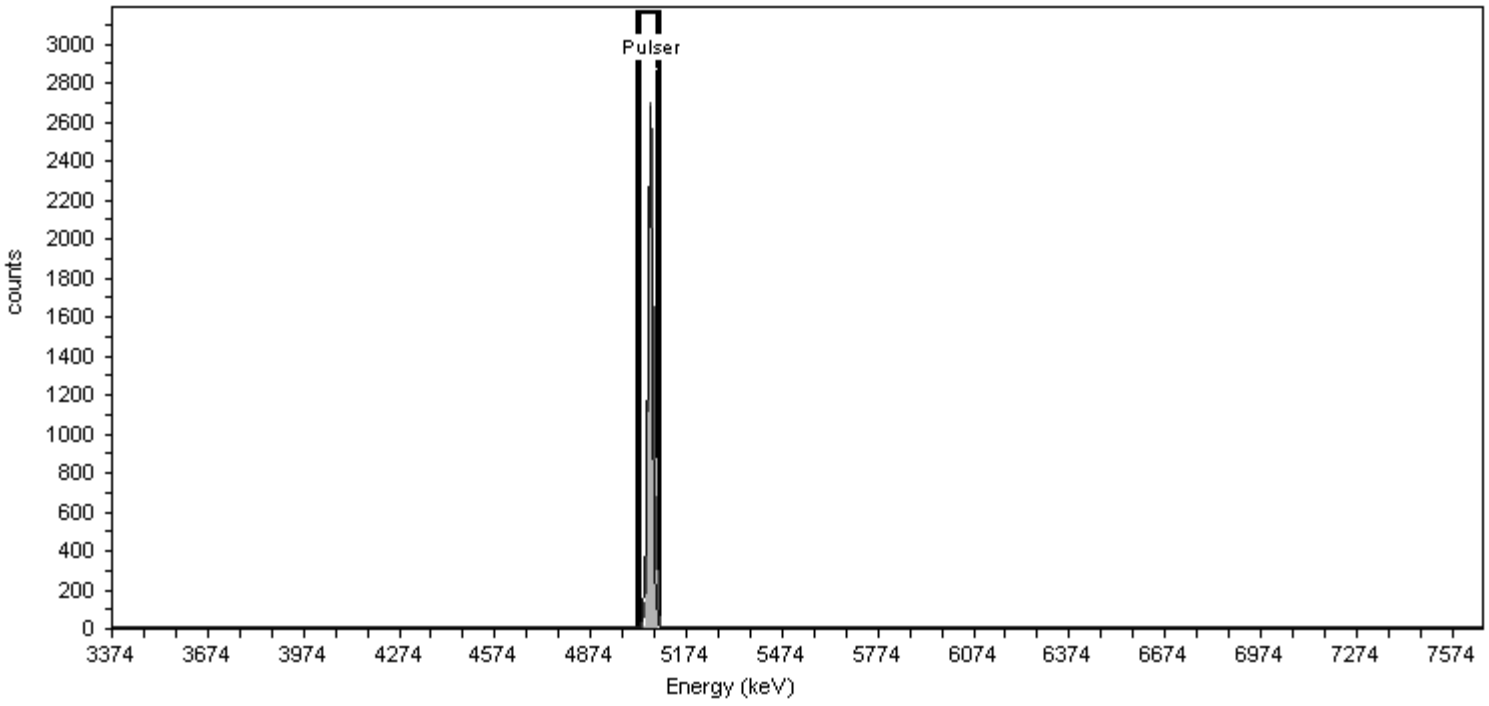
Analyst: 60040

Acquisition

Detector: AV7 , SN: 48-158EE5
Acquisition Start Date: 7/7/2014 12:37:07AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-8877;AV7-20140507
Calibration Date: 5/7/2014 10:48:48PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.80% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5058.863	5028.892	5088.835	17.61	6,811.57	7,343.44

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:41:12AM 7/7/2014

Sample

Sample Name: Pulser;AV8
Comment:

Spectrum #11 Analysis #1

Batch

Batch Name: June2014a
Description:

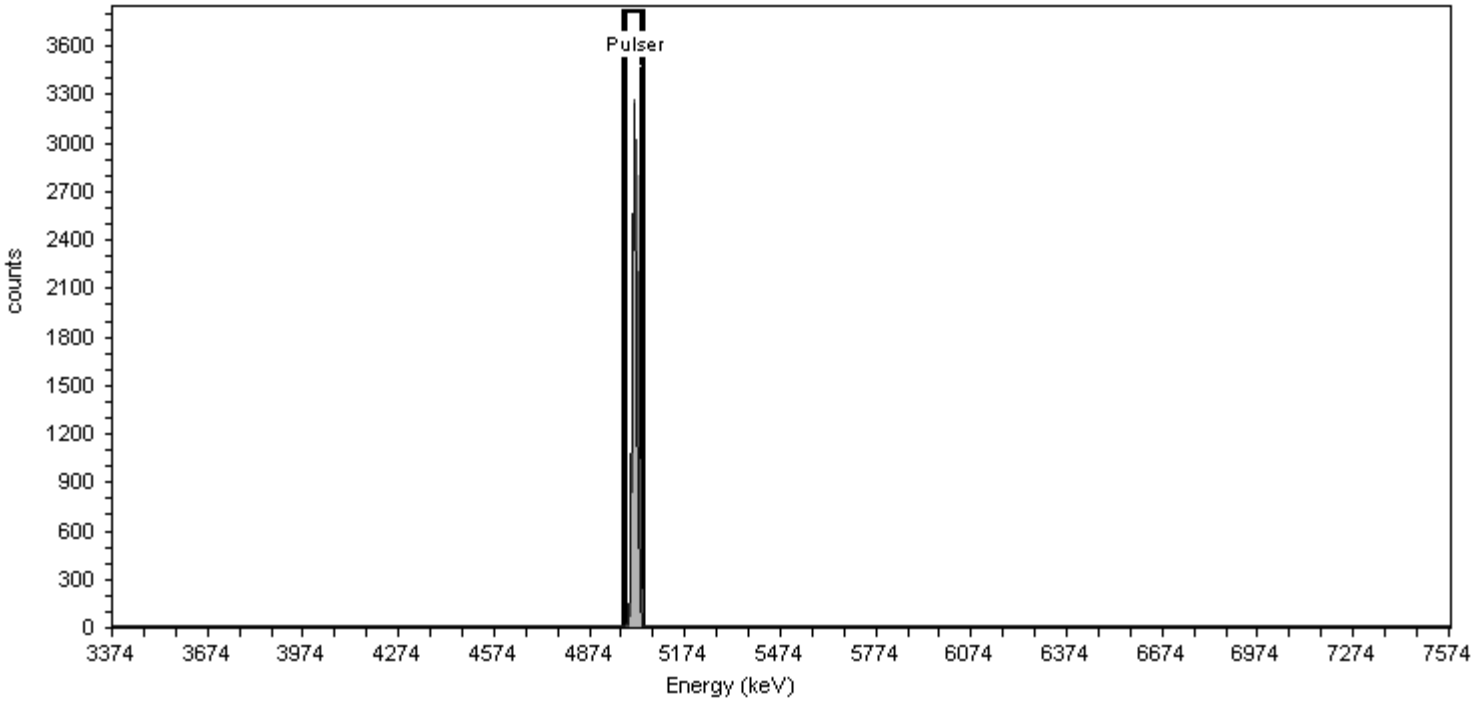
Analyst: 60040

Acquisition

Detector: AV8 , SN: 41-137Q6
Acquisition Start Date: 7/7/2014 12:37:13AM
Live Time: 1.00 min.
Real Time: 1.01 min.
Calibration Name: IC-9792;AV8-20140505
Calibration Date: 5/6/2014 5:38:58PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.05% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5014.321	4988.767	5039.875	15.01	7,022.72	7,432.09

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:41:23AM 7/7/2014

Sample

Sample Name: Pulser;AV9
Comment:

Spectrum #11 Analysis #1

Batch

Batch Name: June2014a
Description:

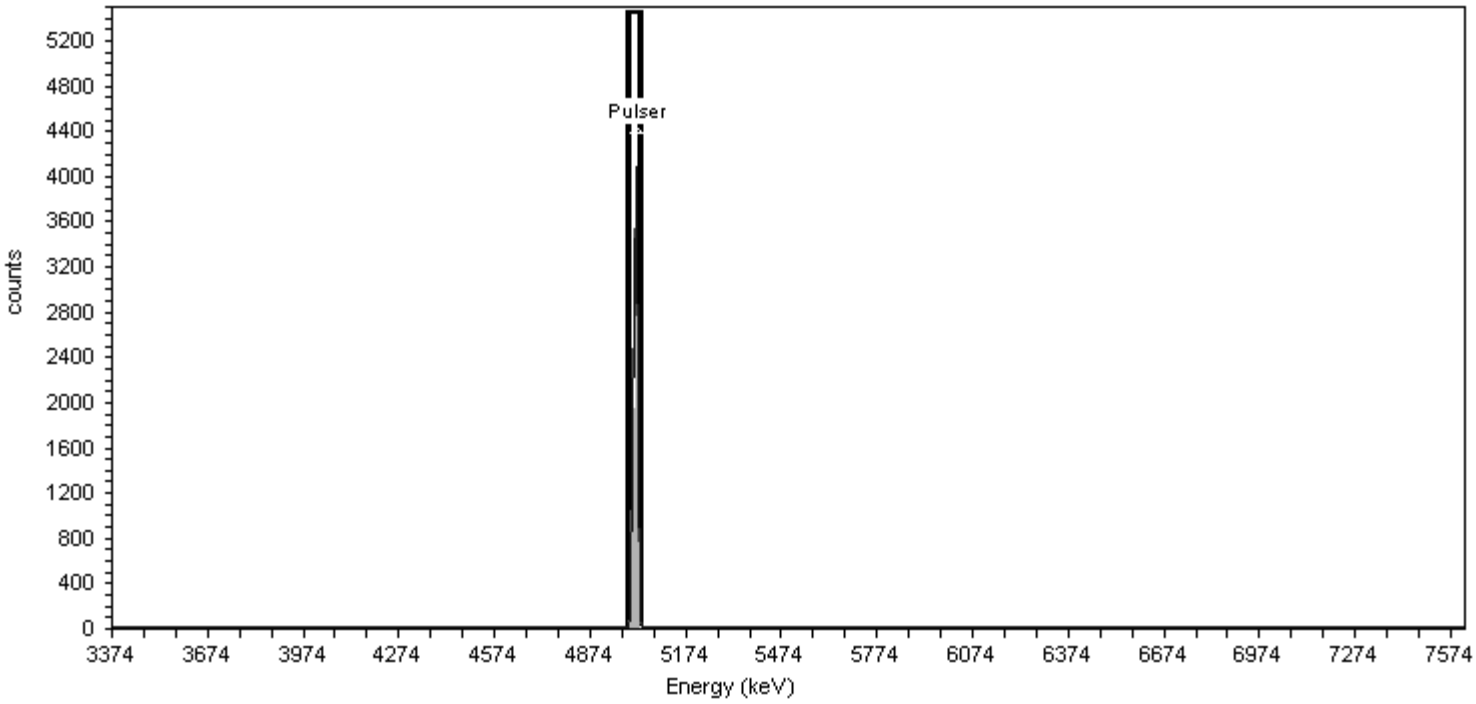
Analyst: 60040

Acquisition

Detector: AV9 , SN: 51-082V5
Acquisition Start Date: 7/7/2014 12:37:14AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9793;AV9-20140505
Calibration Date: 5/6/2014 5:39:04PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.04% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5015.187	4993.267	5037.108	12.88	7,550.92	7,525.01

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:41:35AM 7/7/2014

Sample

Sample Name: Pulser;AV10
Comment:

Spectrum #12 Analysis #1

Batch

Batch Name: June2014a
Description:

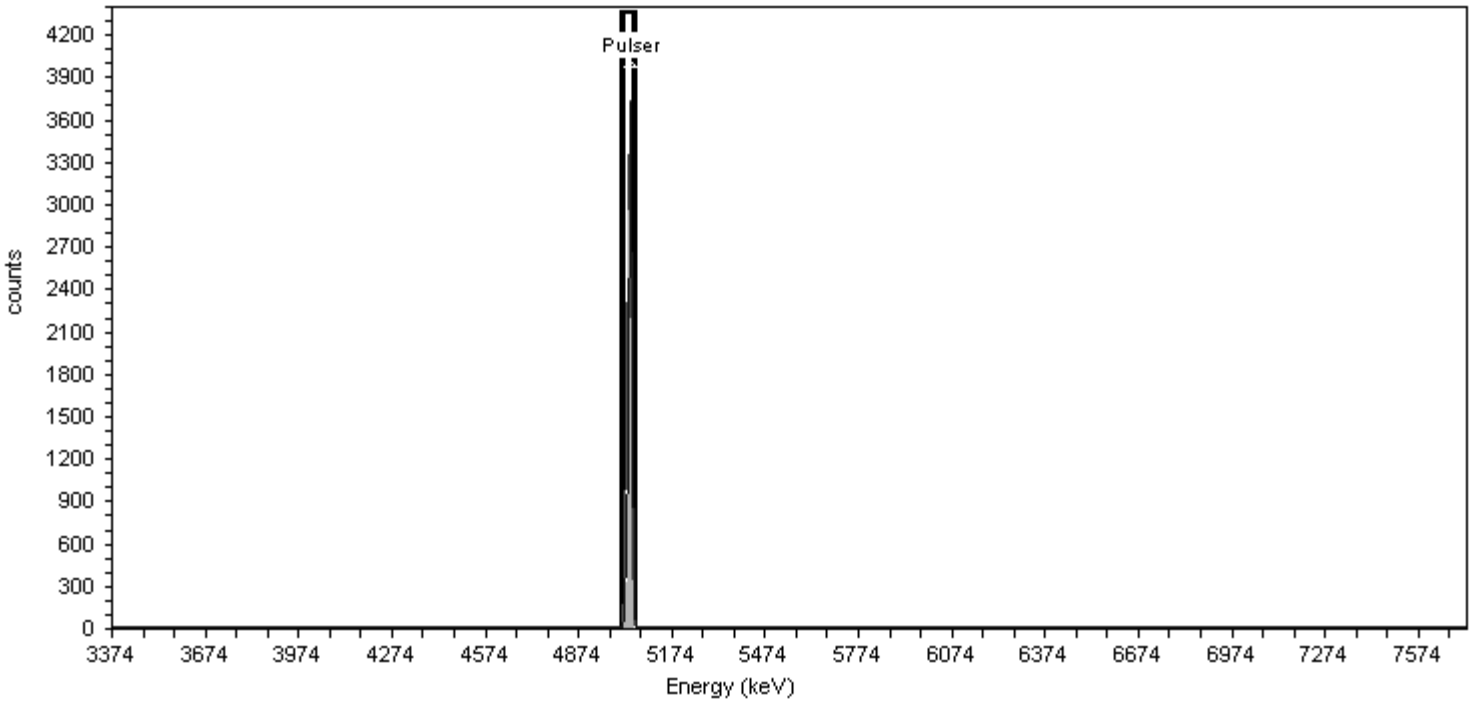
Analyst: 60040

Acquisition

Detector: AV10 , SN: 49-155N2
Acquisition Start Date: 7/7/2014 12:37:15AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9794;AV10-20140505
Calibration Date: 5/6/2014 5:39:10PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.84% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5037.933	5016.539	5059.327	12.57	6,733.19	7,454.36

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:41:48AM 7/7/2014

Sample

Sample Name: Pulser;AV11
Comment:

Spectrum #11 Analysis #1

Batch

Batch Name: June2014a
Description:

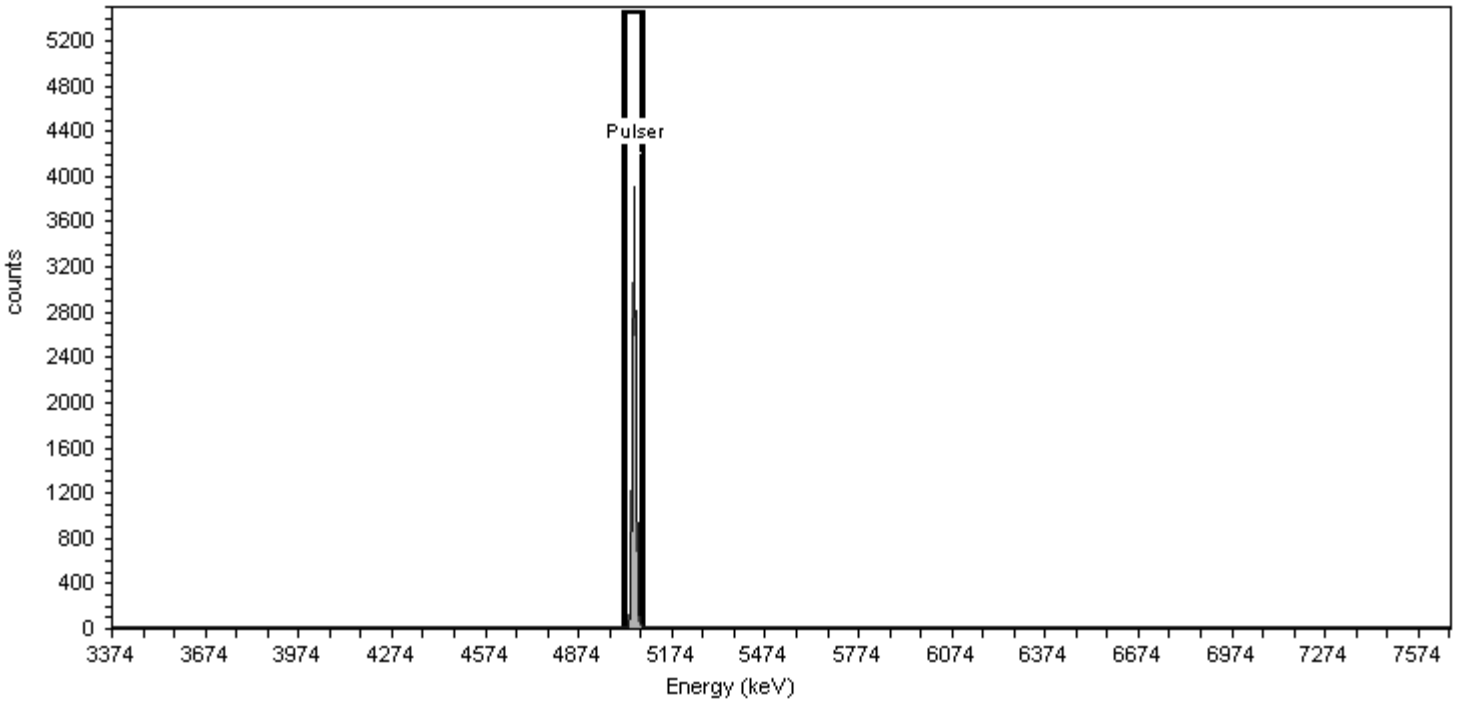
Analyst: 60040

Acquisition

Detector: AV11 , SN: 49-155dd2
Acquisition Start Date: 7/7/2014 12:37:16AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9795;AV11-20140505
Calibration Date: 5/6/2014 5:39:16PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.88% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5052.561	5029.803	5075.319	13.37	7,502.82	7,713.87

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Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:41:06AM 7/7/2014

Sample

Sample Name: Pulser;AV12
Comment:

Spectrum #11 Analysis #1

Batch

Batch Name: June2014a
Description:

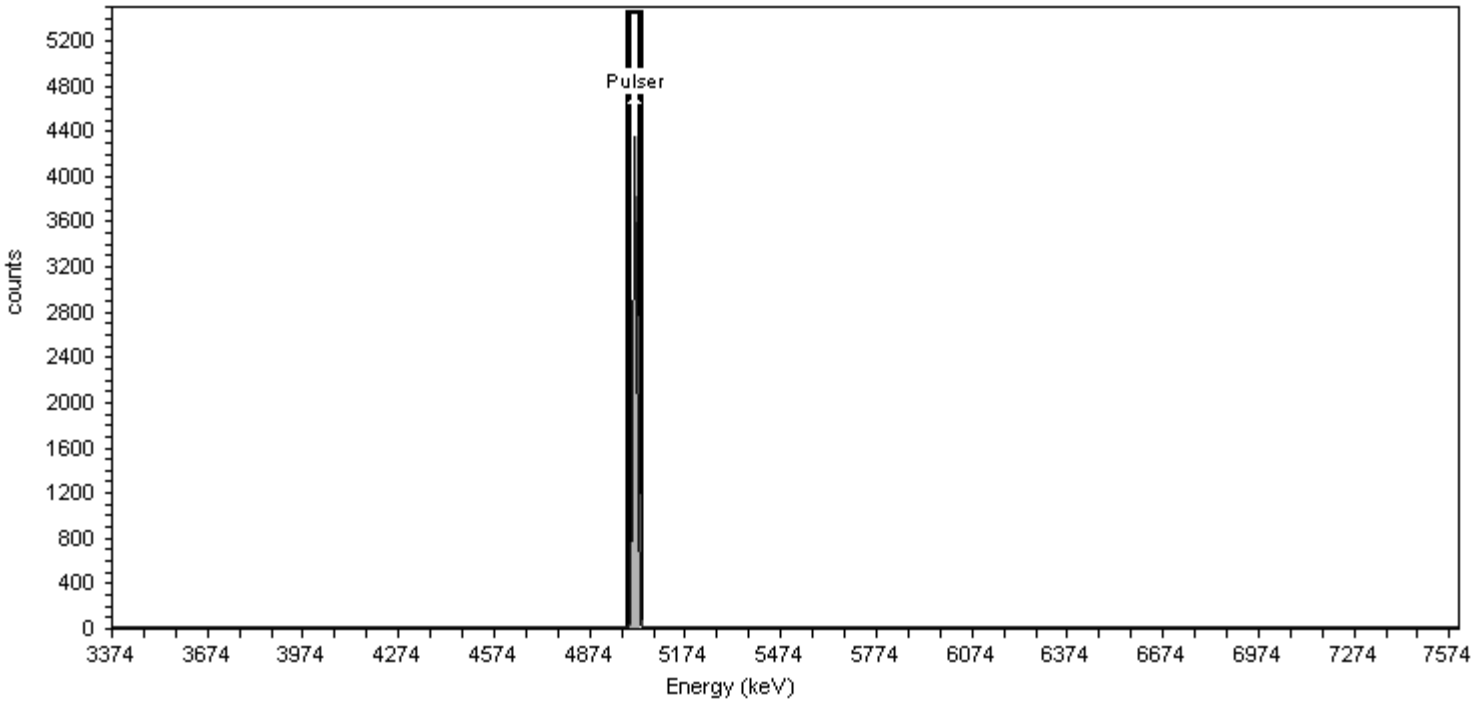
Analyst: 60040

Acquisition

Detector: AV12 , SN: 51-082B7
Acquisition Start Date: 7/7/2014 12:37:17AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9817;AV12-20140505
Calibration Date: 5/6/2014 5:39:22PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.97% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5014.893	4995.201	5034.585	11.57	7,218.43	7,628.88

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THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Pulser Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:41:18AM 7/7/2014

Sample

Sample Name: Pulser;AV13
Comment:

Spectrum #13 Analysis #1

Batch

Batch Name: June2014a
Description:

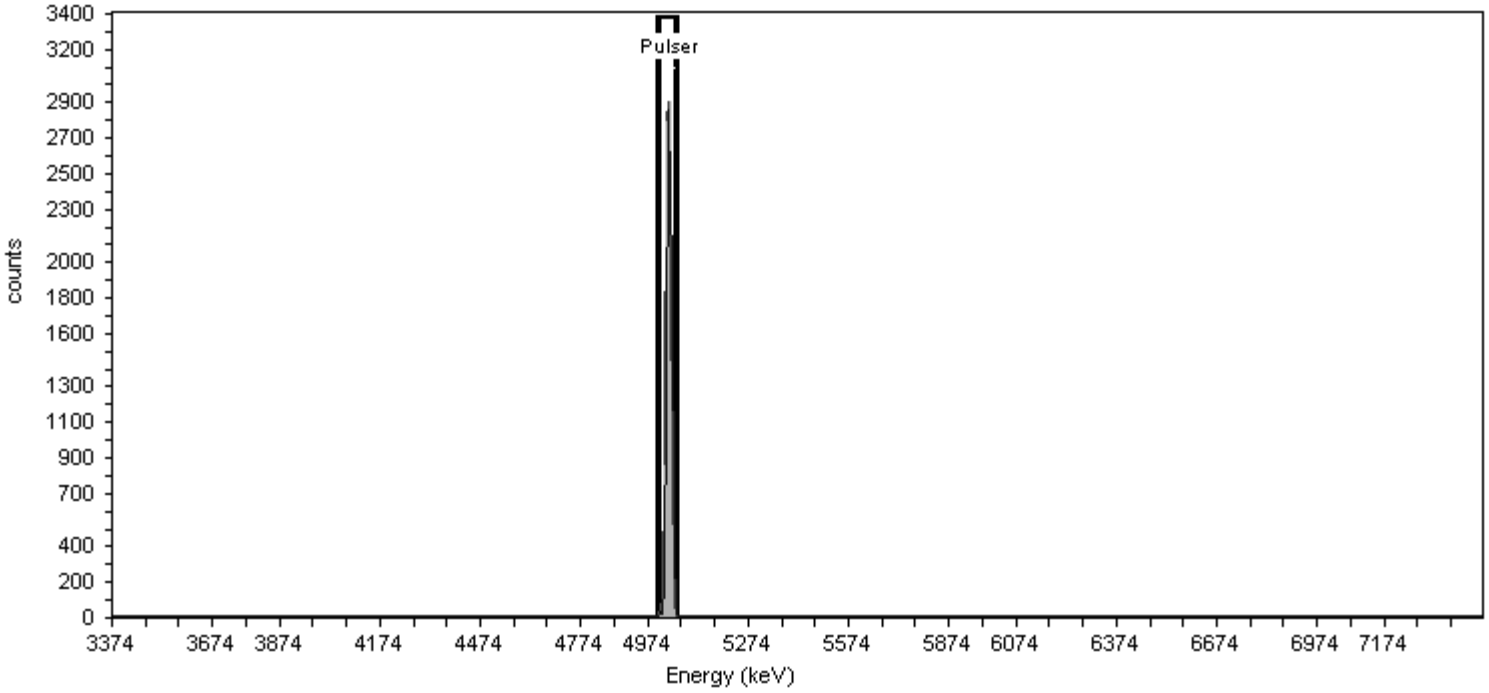
Analyst: 60040

Acquisition

Detector: AV13 , SN: 49-155M7
Acquisition Start Date: 7/7/2014 12:37:18AM
Live Time: 1.00 min.
Real Time: 1.02 min.
Calibration Name: IC-9884;AV13-20140505
Calibration Date: 5/6/2014 5:39:28PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.99% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Peak Fit Analysis

Nuclide Summary (Peak Search)

Nuclide	Peak Energy keV	Start Energy keV	End Energy keV	FWHM keV	Fit Area	Gross Counts
Pulser	5038.671	5011.229	5066.113	16.12	6,720.82	7,658.80

Initial Calibrations

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Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:48:53PM 5/7/2014

Calibration

Sample Name: IC-8877;AV7-20140507
Description:
Detector: AV7

Calibration Date: 5/7/2014 10:48:48PM
Analyst: 60040

Source Info

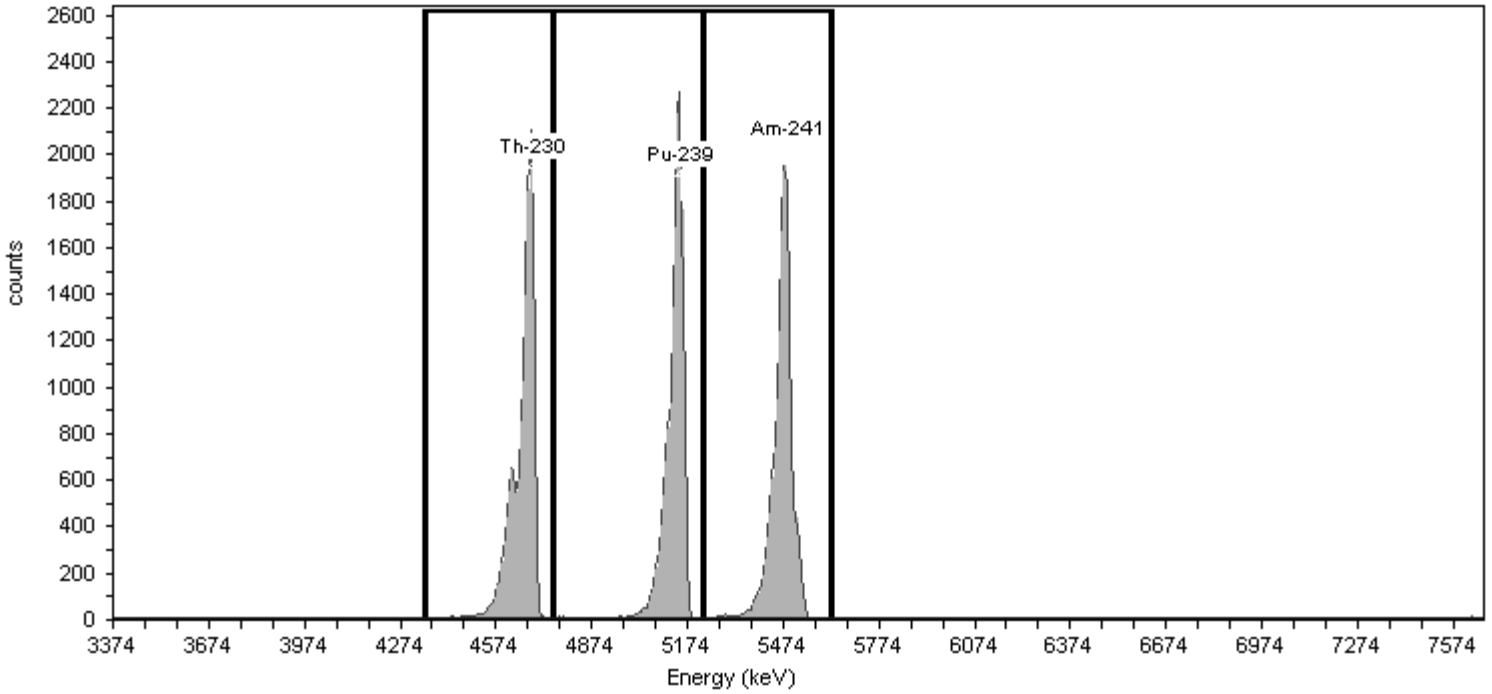
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV7 , SN: 48-158EE5
Acquisition Start Date: 5/7/2014 7:51:09PM
Live Time: 140.00 min.
Real Time: 140.02 min.
Efficiency: 25.80% +/- 0.31% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	15,068.00	107.63
Pu-239	240	5.16	186	249	15,043.00	107.45
Am-241	284	5.49	249	303	14,672.00	104.80

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:39:02PM 5/6/2014

Calibration

Sample Name: IC-9792;AV8-20140505
Description:
Detector: AV8

Calibration Date: 5/6/2014 5:38:58PM
Analyst: 60040

Source Info

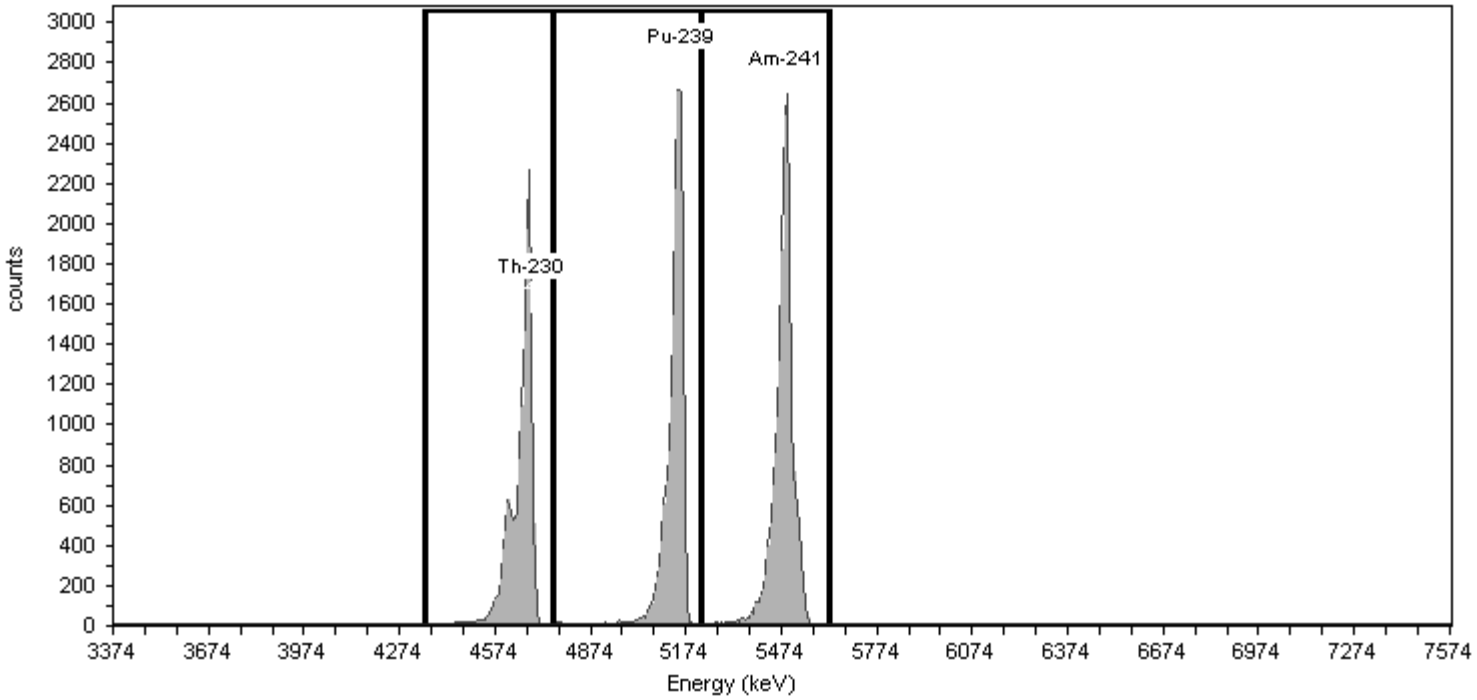
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV8 , SN: 41-137Q6
Acquisition Start Date: 5/5/2014 10:27:18PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 27.05% +/- 0.31% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,298.00	102.13
Pu-239	240	5.16	186	249	16,486.00	117.76
Am-241	284	5.49	249	303	18,583.00	132.74

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:39:08PM 5/6/2014

Calibration

Sample Name: IC-9793;AV9-20140505
Description:
Detector: AV9

Calibration Date: 5/6/2014 5:39:04PM
Analyst: 60040

Source Info

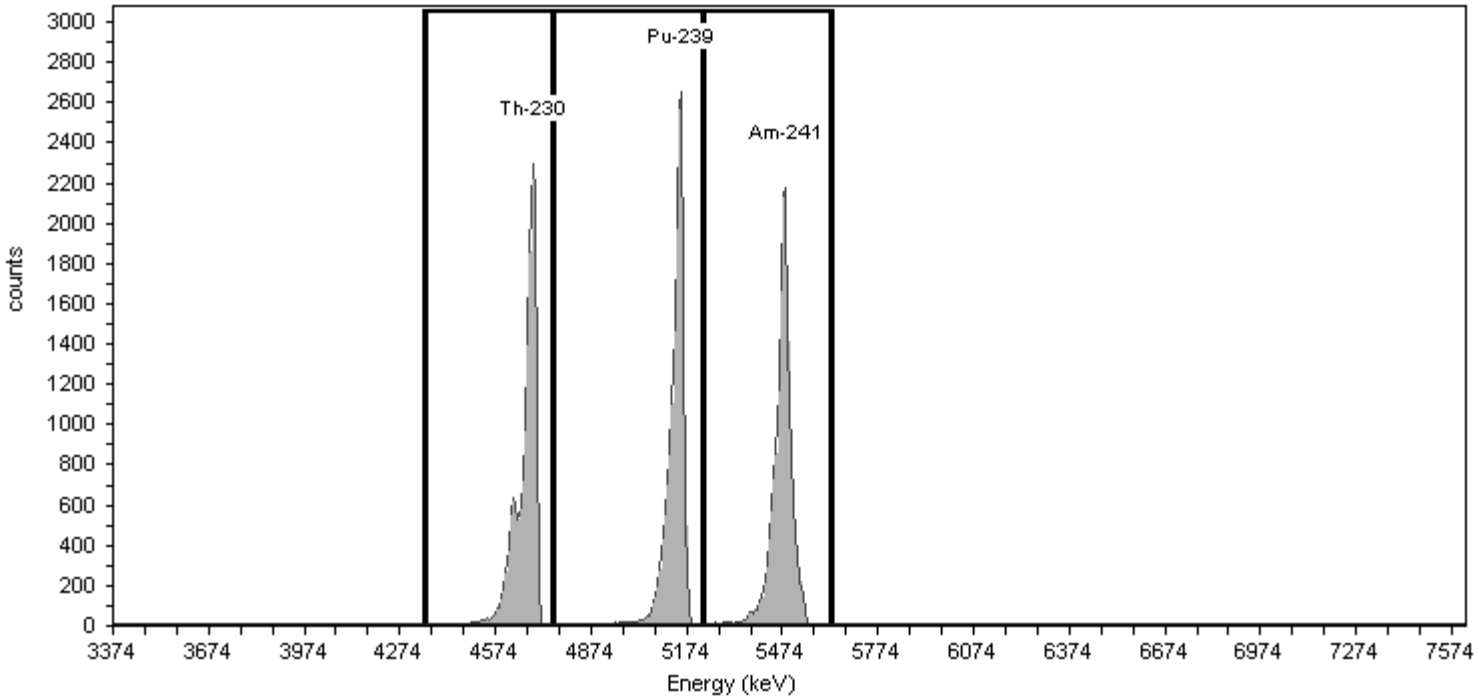
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV9 , SN: 51-082V5
Acquisition Start Date: 5/5/2014 10:27:25PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 27.04% +/- 0.33% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,917.00	106.55
Pu-239	240	5.16	186	249	15,566.00	111.19
Am-241	284	5.49	249	303	15,020.00	107.29

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:39:13PM 5/6/2014

Calibration

Sample Name: IC-9794;AV10-20140505
Description:
Detector: AV10

Calibration Date: 5/6/2014 5:39:10PM
Analyst: 60040

Source Info

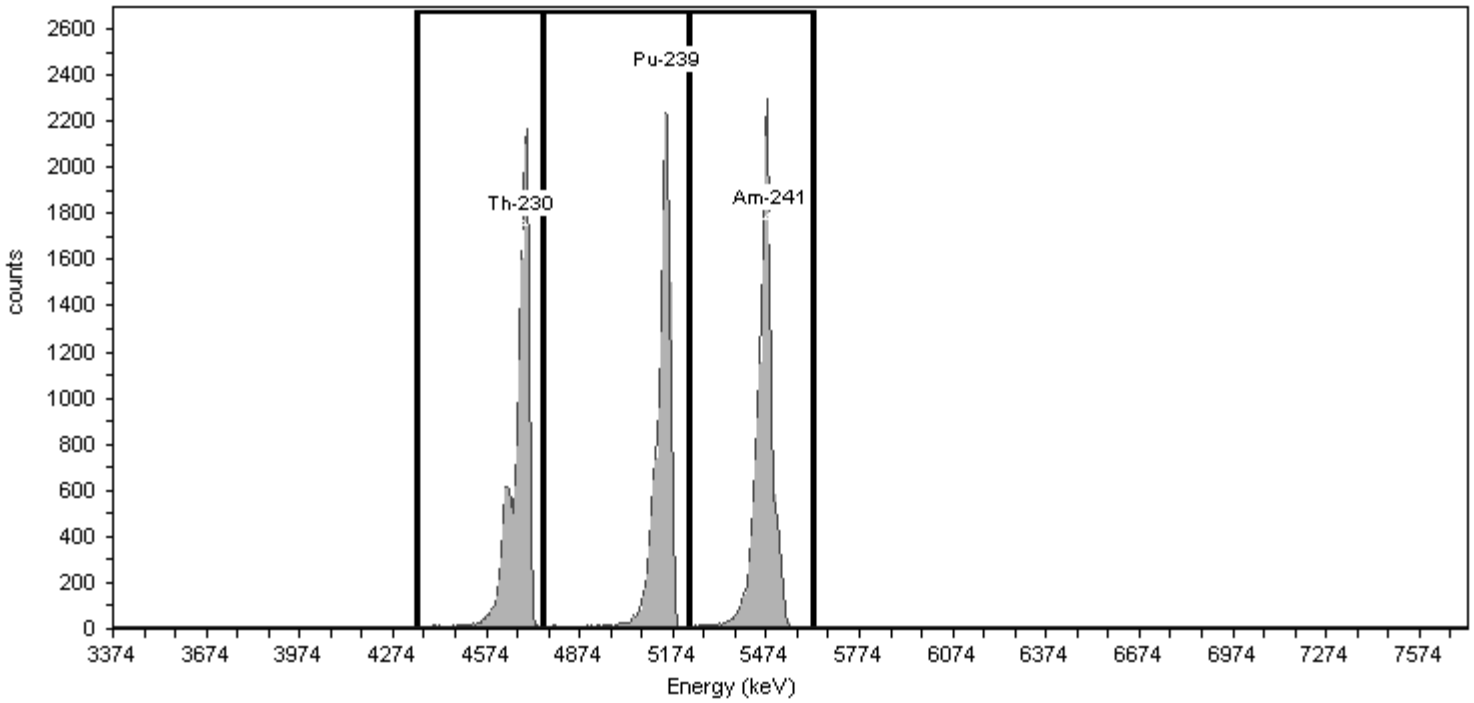
Certificate ID: 82242-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV10 , SN: 49-155N2
Acquisition Start Date: 5/5/2014 10:27:48PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 25.84% +/- 0.32% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,216.00	101.54
Pu-239	240	5.16	186	249	13,923.00	99.45
Am-241	284	5.49	249	303	15,497.00	110.69

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:39:19PM 5/6/2014

Calibration

Sample Name: IC-9795;AV11-20140505
Description:
Detector: AV11

Calibration Date: 5/6/2014 5:39:16PM
Analyst: 60040

Source Info

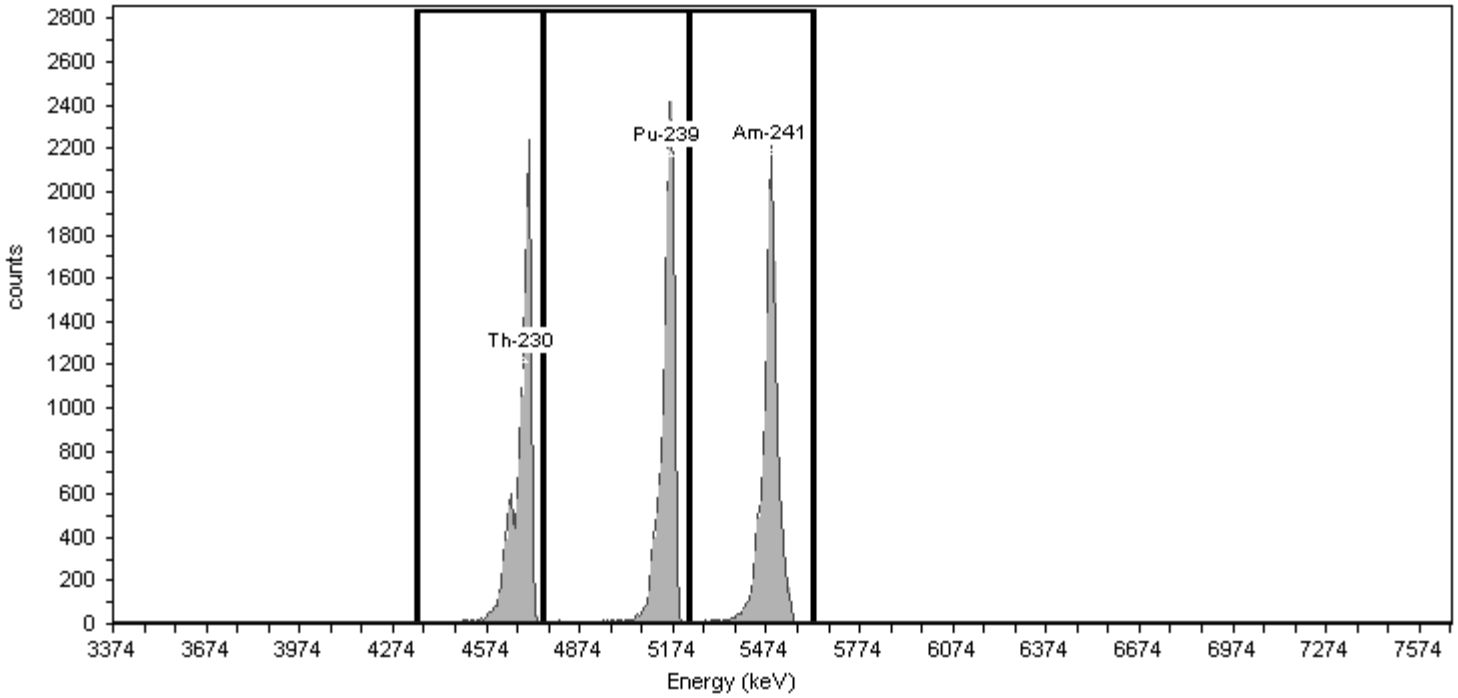
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV11 , SN: 49-155dd2
Acquisition Start Date: 5/5/2014 10:27:49PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 26.88% +/- 0.35% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	13,230.00	94.50
Pu-239	240	5.16	186	249	13,518.00	96.56
Am-241	284	5.49	249	303	14,326.00	102.33

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:39:25PM 5/6/2014

Calibration

Sample Name: IC-9817;AV12-20140505
Description:
Detector: AV12

Calibration Date: 5/6/2014 5:39:22PM
Analyst: 60040

Source Info

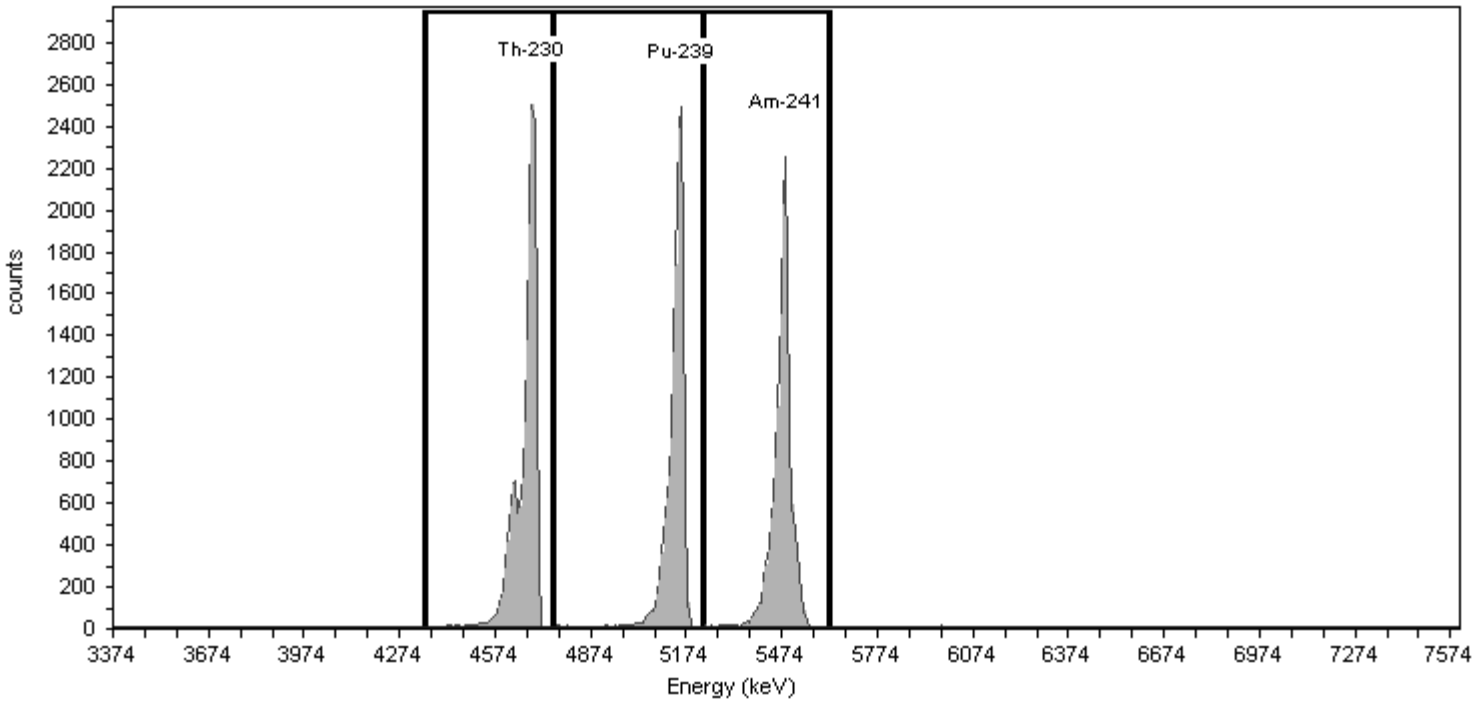
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV12 , SN: 51-082B7
Acquisition Start Date: 5/5/2014 10:28:07PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 25.97% +/- 0.31% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	16,108.00	115.06
Pu-239	240	5.16	186	249	14,620.00	104.43
Am-241	284	5.49	249	303	14,921.00	106.58

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:39:31PM 5/6/2014

Calibration

Sample Name: IC-9884;AV13-20140505
Description:
Detector: AV13

Calibration Date: 5/6/2014 5:39:28PM
Analyst: 60040

Source Info

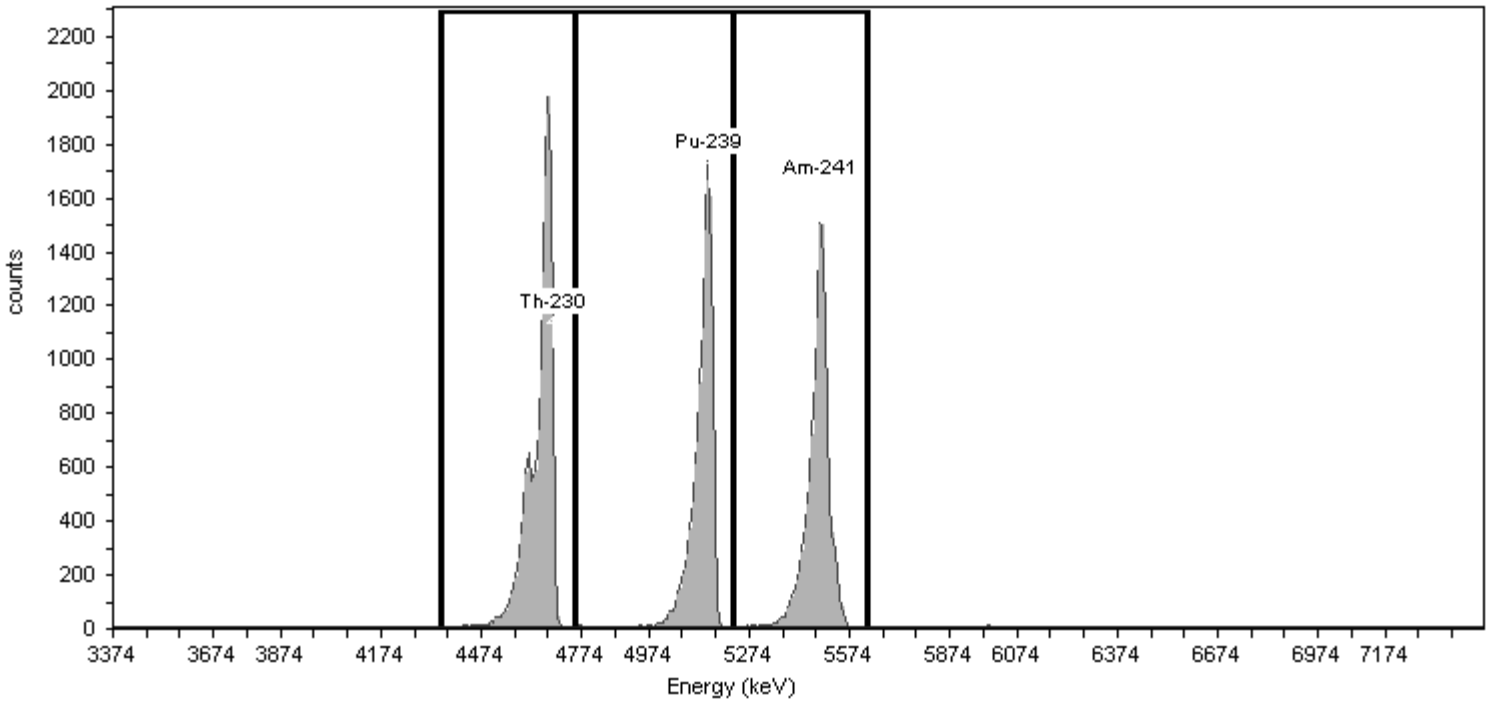
Certificate ID: 82245-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV13 , SN: 49-155M7
Acquisition Start Date: 5/5/2014 10:28:26PM
Live Time: 140.00 min.
Real Time: 140.10 min.
Efficiency: 25.99% +/- 0.37% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch²



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	14,614.00	104.39
Pu-239	240	5.16	186	249	11,970.00	85.50
Am-241	284	5.49	249	303	11,995.00	85.68

Initial Calibration Verifications

Alpha Spectroscopy Calibration Summary

Detector: AV7

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120843/1	05/07/14 19:51	82236-334_00001	0.2580	0.20-0.32		
ICV 160-120858/1	05/07/14 23:03	82237-334_00003	0.2546	0.20-0.32	98.6	95-105
CCV 160-127943/1	06/19/14 16:44	82236-334_00001	0.2549	0.20-0.32	98.8	95-105

Detector: AV8

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120523/1	05/05/14 22:27	82240-334_00001	0.2705	0.20-0.32		
ICV 160-121084/1	05/08/14 00:14	82234-334_00001	0.2639	0.20-0.32	97.6	95-105
CCV 160-127954/1	06/19/14 18:06	82240-334_00001	0.2668	0.20-0.32	98.6	95-105

Detector: AV9

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120524/1	05/05/14 22:27	82241-334_00001	0.2704	0.20-0.32		
ICV 160-120859/1	05/07/14 23:03	82240-334_00001	0.2666	0.20-0.32	98.6	95-105
CCV 160-127962/1	06/19/14 18:06	82241-334_00001	0.2701	0.20-0.32	99.9	95-105

Detector: AV10

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120512/1	05/05/14 22:27	82242-334_00001	0.2584	0.20-0.32		
ICV 160-120847/1	05/07/14 23:03	82241-334_00001	0.2593	0.20-0.32	100.3	95-105
CCV 160-127860/1	06/19/14 18:06	82242-334_00001	0.2552	0.20-0.32	98.7	95-105

Detector: AV11

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120513/1	05/05/14 22:27	82243-334_00001	0.2688	0.20-0.32		
ICV 160-120848/1	05/07/14 23:04	82242-334_00001	0.2598	0.20-0.32	96.6	95-105
CCV 160-127871/1	06/19/14 18:07	82243-334_00001	0.2647	0.20-0.32	98.5	95-105

Detector: AV12

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120514/1	05/05/14 22:28	82244-334_00001	0.2597	0.20-0.32		
ICV 160-120849/1	05/07/14 23:04	82243-334_00001	0.2688	0.20-0.32	103.5	95-105
CCV 160-127881/1	06/19/14 18:07	82244-334_00001	0.2583	0.20-0.32	99.5	95-105

Detector: AV13

Lab Sample ID	Analysis Date	Reagent ID	Efficiency	Efficiency Limits	Efficiency Recovery	Recovery Limits
IC 160-120515/1	05/05/14 22:28	82245-334_00001	0.2599	0.20-0.32		
ICV 160-120850/1	05/07/14 23:04	82244-334_00001	0.2556	0.20-0.32	98.4	95-105
CCV 160-127892/1	06/19/14 19:45	82245-334_00001	0.2566	0.20-0.32	98.7	95-105

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:07AM 5/8/2014

Calibration

Sample Name: ICV-9520;AV7-20140507
Description:
Detector: AV7

Calibration Date: 5/8/2014 12:06:03AM
Analyst: 60040

Source Info

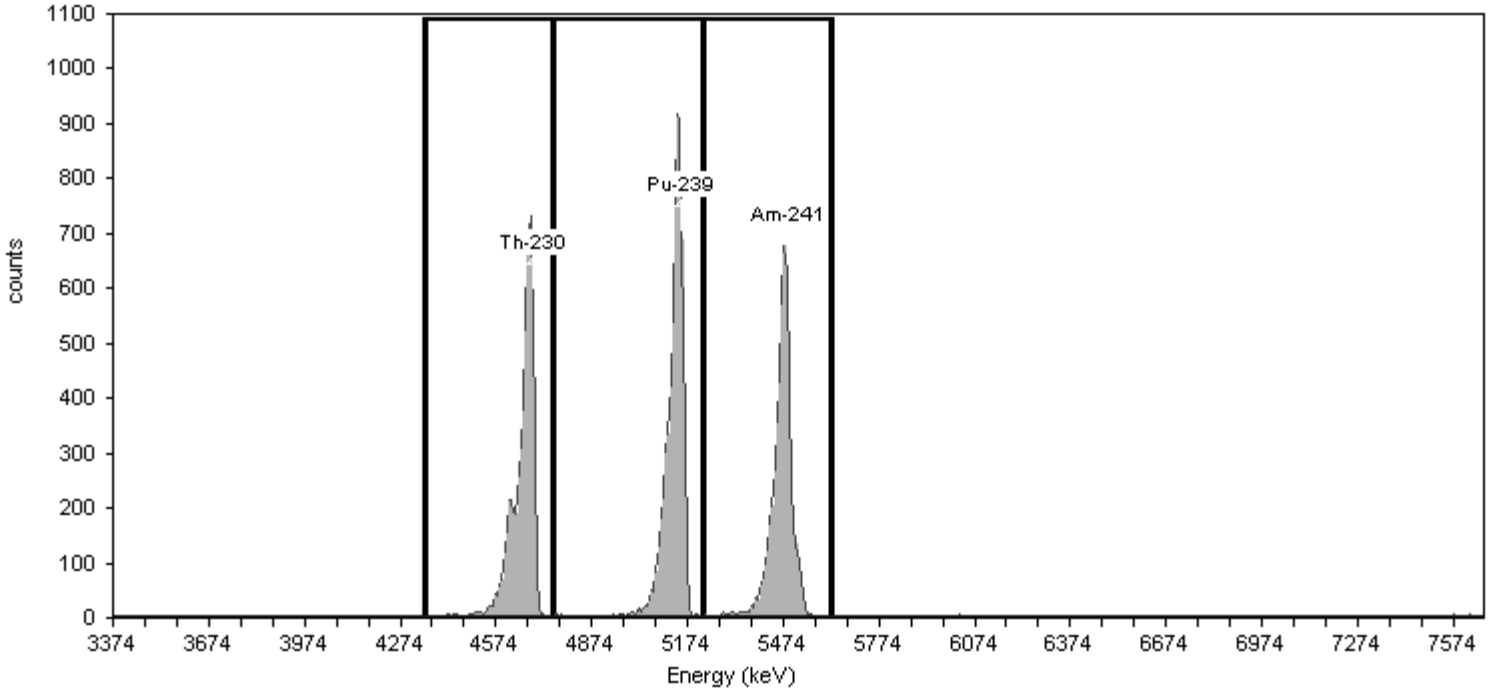
Certificate ID: 82237-334
Prepared by: Analytics

Certification Date: 6/1/2010 12:00:00PM
Description:

Acquisition

Detector: AV7 , SN: 48-158EE5
Acquisition Start Date: 5/7/2014 11:03:39PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 25.46% +/- 0.46% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,227.00	87.12
Pu-239	240	5.16	186	249	6,154.00	102.57
Am-241	284	5.49	249	303	4,991.00	83.18

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:19:28PM 5/8/2014

Calibration

Sample Name: ICV-8875;AV8-20140507
Description:
Detector: AV8

Calibration Date: 5/8/2014 2:19:23PM
Analyst: 60040

Source Info

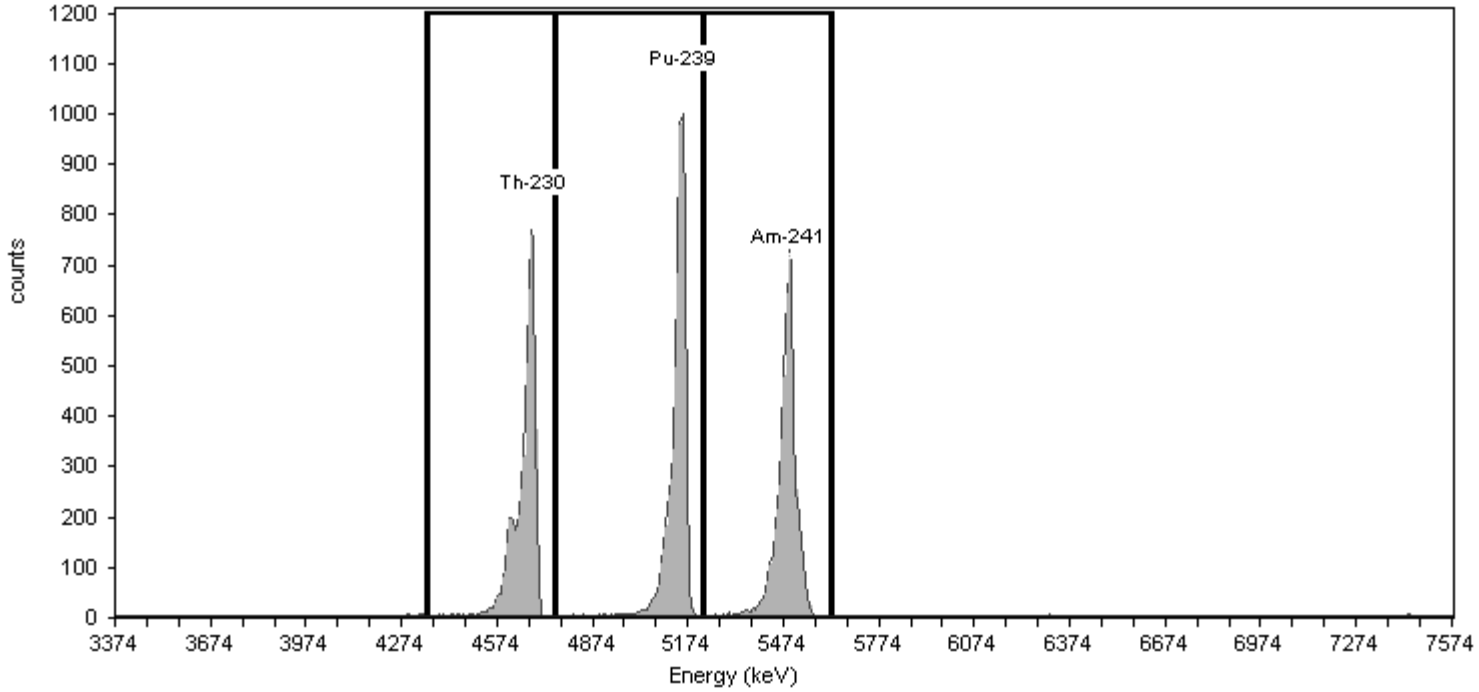
Certificate ID: 82234-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV8 , SN: 41-137Q6
Acquisition Start Date: 5/8/2014 12:14:03AM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.39% +/- 0.48% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,189.00	86.48
Pu-239	240	5.16	186	249	5,888.00	98.13
Am-241	284	5.49	249	303	5,329.00	88.82

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:13AM 5/8/2014

Calibration

Sample Name: ICV-9792;AV9-20140507
Description:
Detector: AV9

Calibration Date: 5/8/2014 12:06:10AM
Analyst: 60040

Source Info

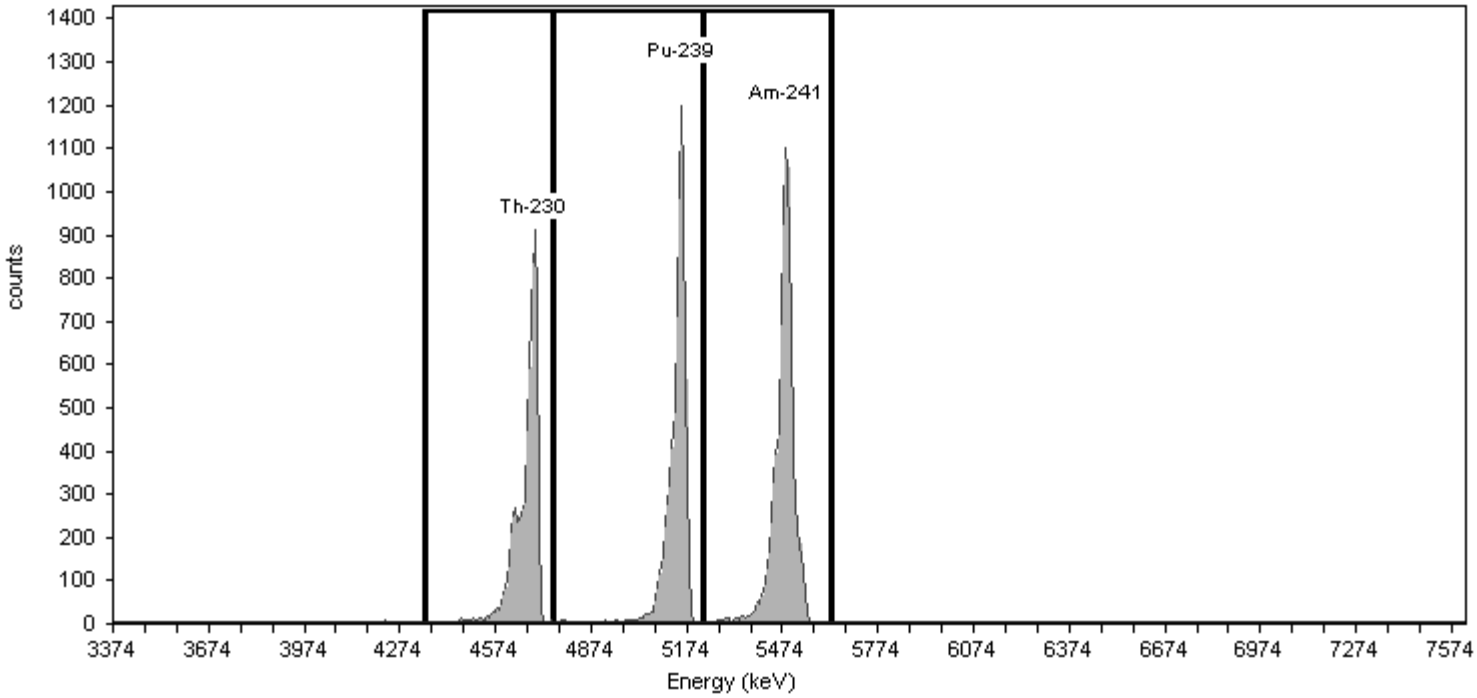
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV9 , SN: 51-082V5
Acquisition Start Date: 5/7/2014 11:03:40PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 26.66% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,053.00	100.88
Pu-239	240	5.16	186	249	6,939.00	115.65
Am-241	284	5.49	249	303	7,853.00	130.88

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:20AM 5/8/2014

Calibration

Sample Name: ICV-9793;AV10-20140507
Description:
Detector: AV10

Calibration Date: 5/8/2014 12:06:16AM
Analyst: 60040

Source Info

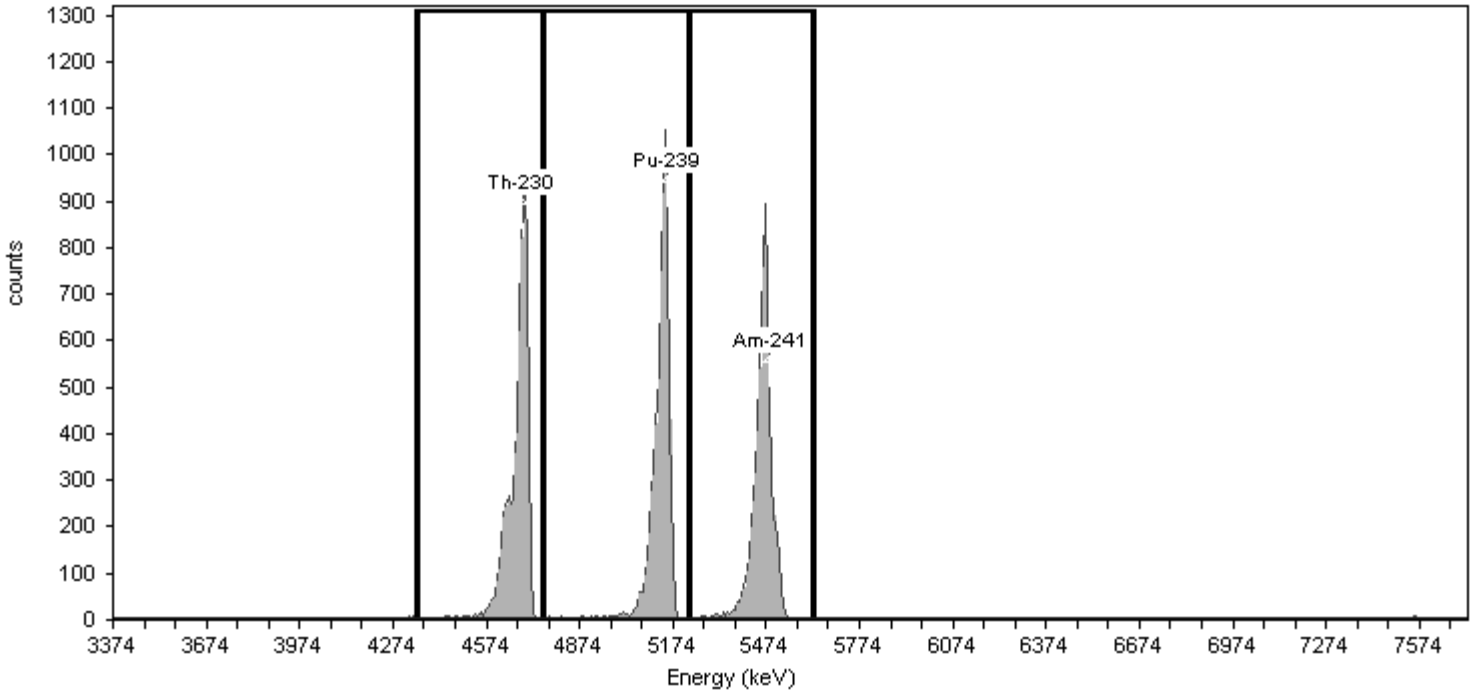
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV10 , SN: 49-155N2
Acquisition Start Date: 5/7/2014 11:03:59PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 25.93% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,246.00	104.10
Pu-239	240	5.16	186	249	6,407.00	106.78
Am-241	284	5.49	249	303	6,047.00	100.78

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:26AM 5/8/2014

Calibration

Sample Name: ICV-9794;AV11-20140507
Description:
Detector: AV11

Calibration Date: 5/8/2014 12:06:22AM
Analyst: 60040

Source Info

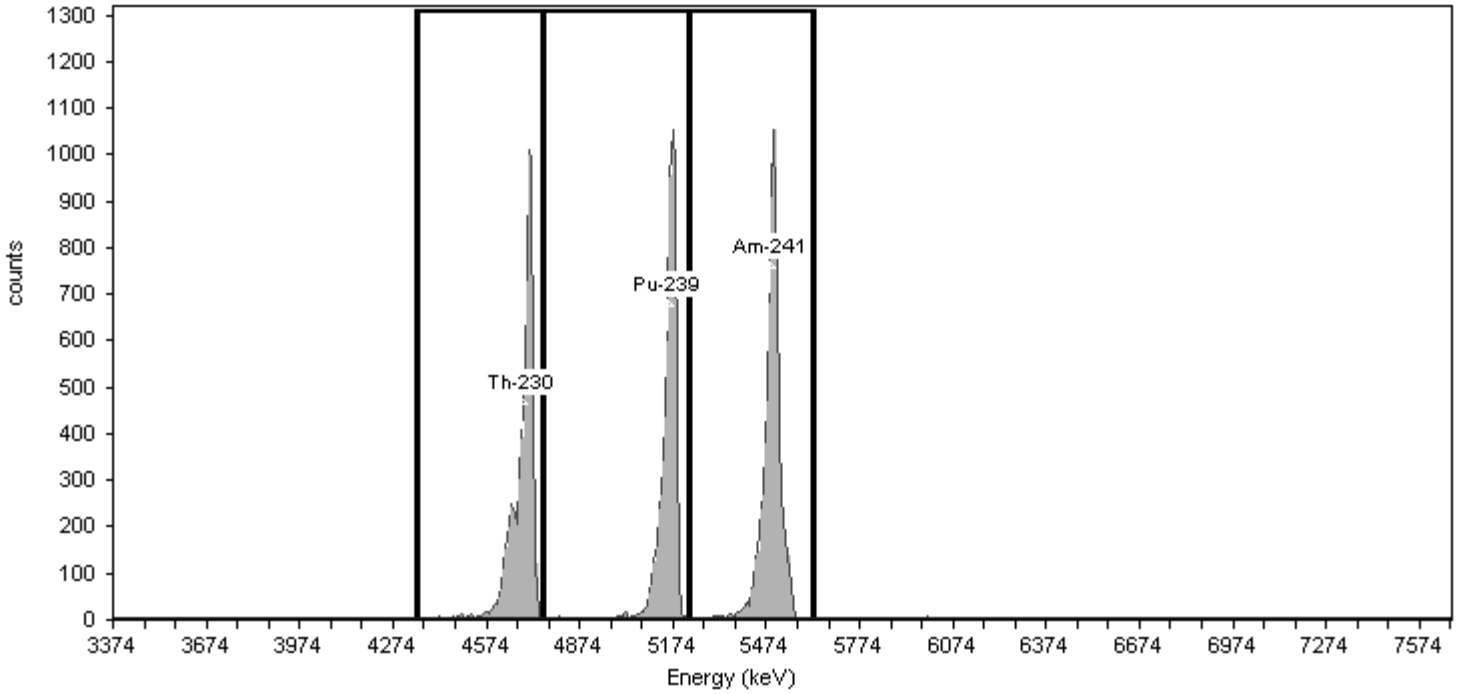
Certificate ID: 82242-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV11 , SN: 49-155dd2
Acquisition Start Date: 5/7/2014 11:04:13PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 25.98% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,238.00	103.97
Pu-239	240	5.16	186	249	5,922.00	98.70
Am-241	284	5.49	249	303	6,644.00	110.73

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:32AM 5/8/2014

Calibration

Sample Name: ICV-9795;AV12-20140507
Description:
Detector: AV12

Calibration Date: 5/8/2014 12:06:29AM
Analyst: 60040

Source Info

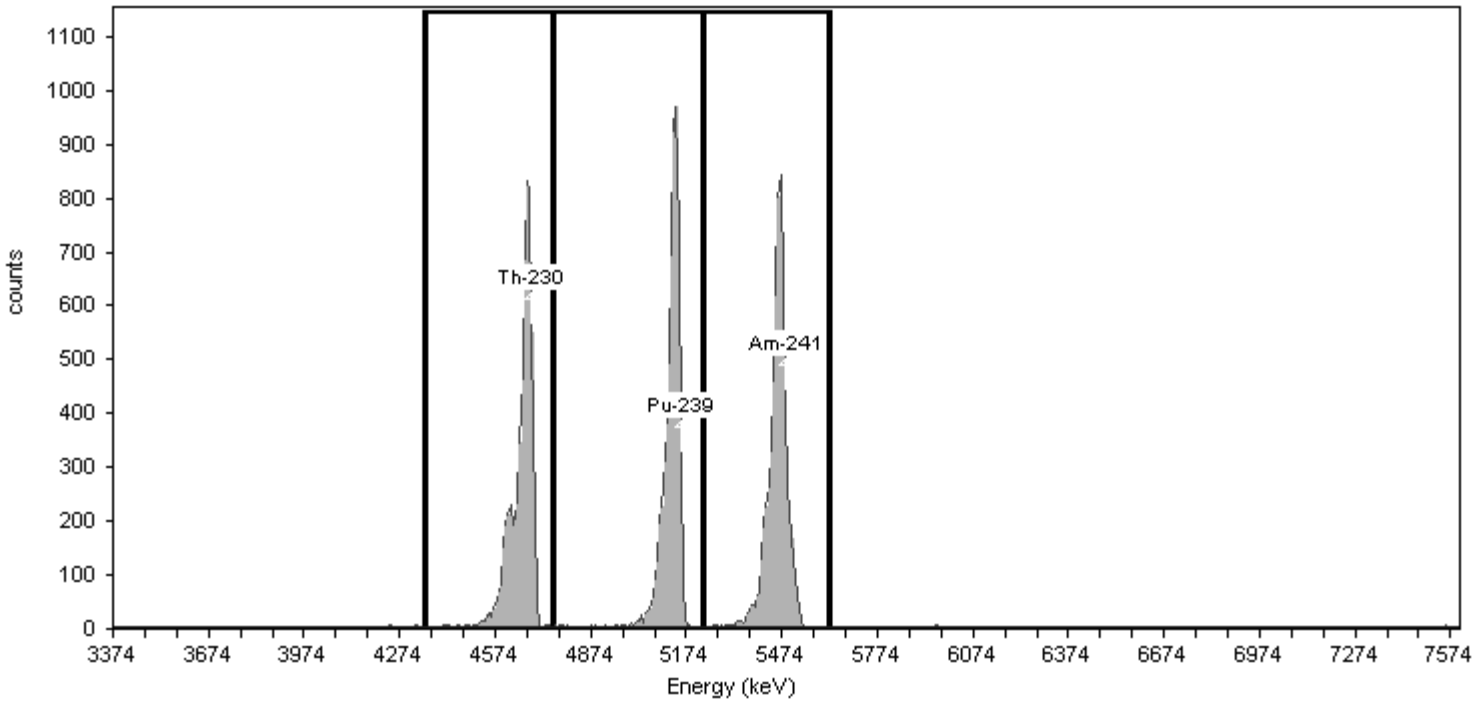
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV12 , SN: 51-082B7
Acquisition Start Date: 5/7/2014 11:04:29PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 26.88% +/- 0.47% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,706.00	95.10
Pu-239	240	5.16	186	249	5,810.00	96.83
Am-241	284	5.49	249	303	6,092.00	101.53

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:06:38AM 5/8/2014

Calibration

Sample Name: ICV-9817;AV13-20140507
Description:
Detector: AV13

Calibration Date: 5/8/2014 12:06:35AM
Analyst: 60040

Source Info

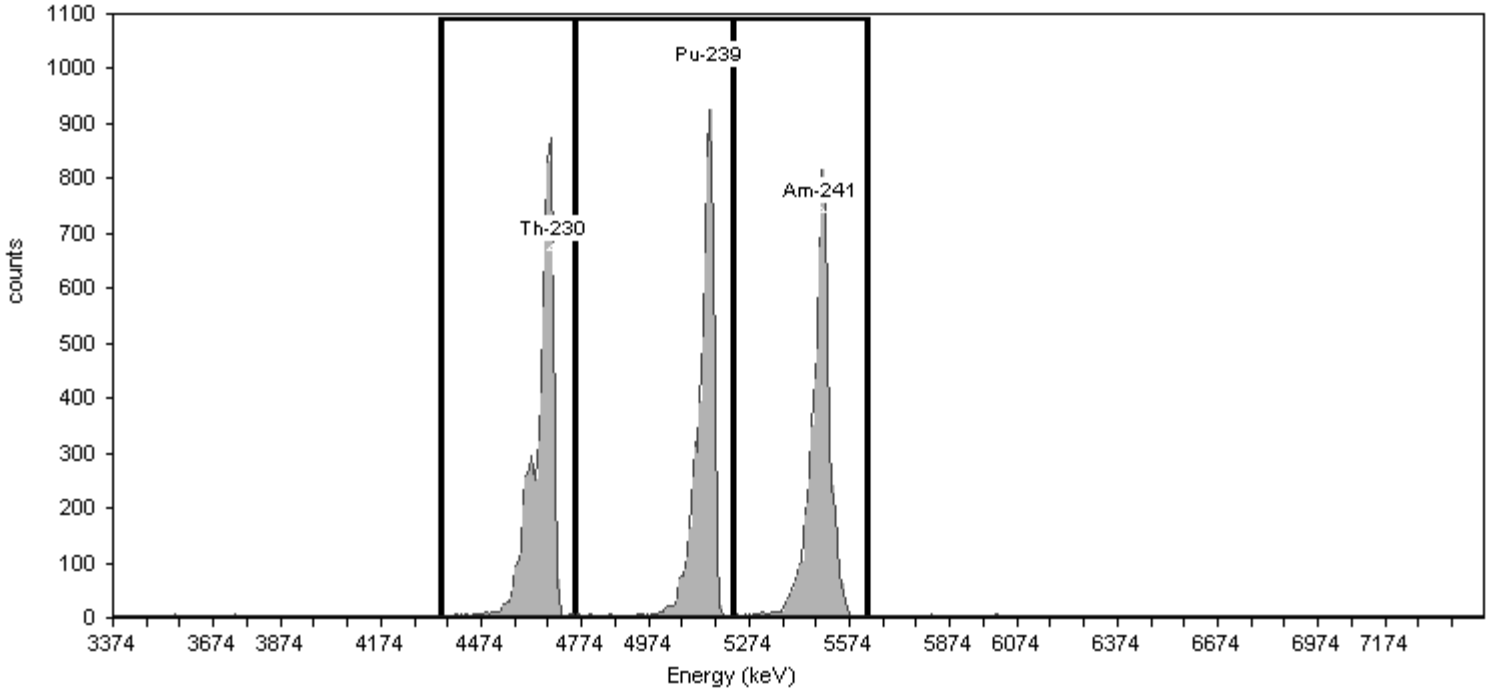
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV13 , SN: 49-155M7
Acquisition Start Date: 5/7/2014 11:04:39PM
Live Time: 60.00 min.
Real Time: 60.04 min.
Efficiency: 25.56% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,777.00	112.95
Pu-239	240	5.16	186	249	6,153.00	102.55
Am-241	284	5.49	249	303	6,331.00	105.52

Monthly Calibration Verifications

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:48:52PM 6/19/2014

Calibration

Sample Name: CCV-8877;AV7-20140619
Description:
Detector: AV7

Calibration Date: 6/19/2014 5:48:49PM
Analyst: 60040

Source Info

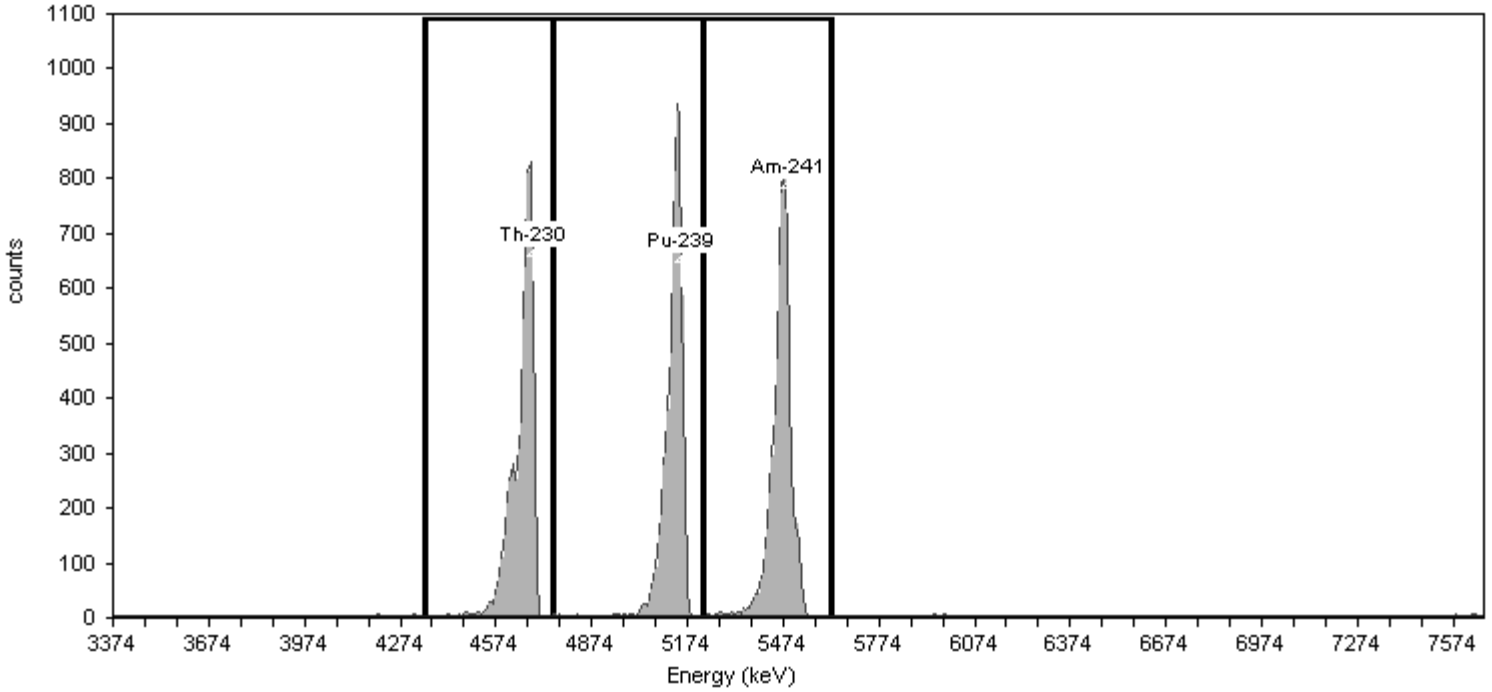
Certificate ID: 82236-334
Prepared by: Analytics

Certification Date: 6/2/2010 12:00:00PM
Description:

Acquisition

Detector: AV7 , SN: 48-158EE5
Acquisition Start Date: 6/19/2014 4:44:29PM
Live Time: 60.00 min.
Real Time: 60.03 min.
Efficiency: 25.49% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,271.00	104.52
Pu-239	240	5.16	186	249	6,395.00	106.58
Am-241	284	5.49	249	303	6,298.00	104.97

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:35:00PM 6/19/2014

Calibration

Sample Name: CCV-9792;AV8-20140619
Description:
Detector: AV8

Calibration Date: 6/19/2014 7:34:56PM
Analyst: 60040

Source Info

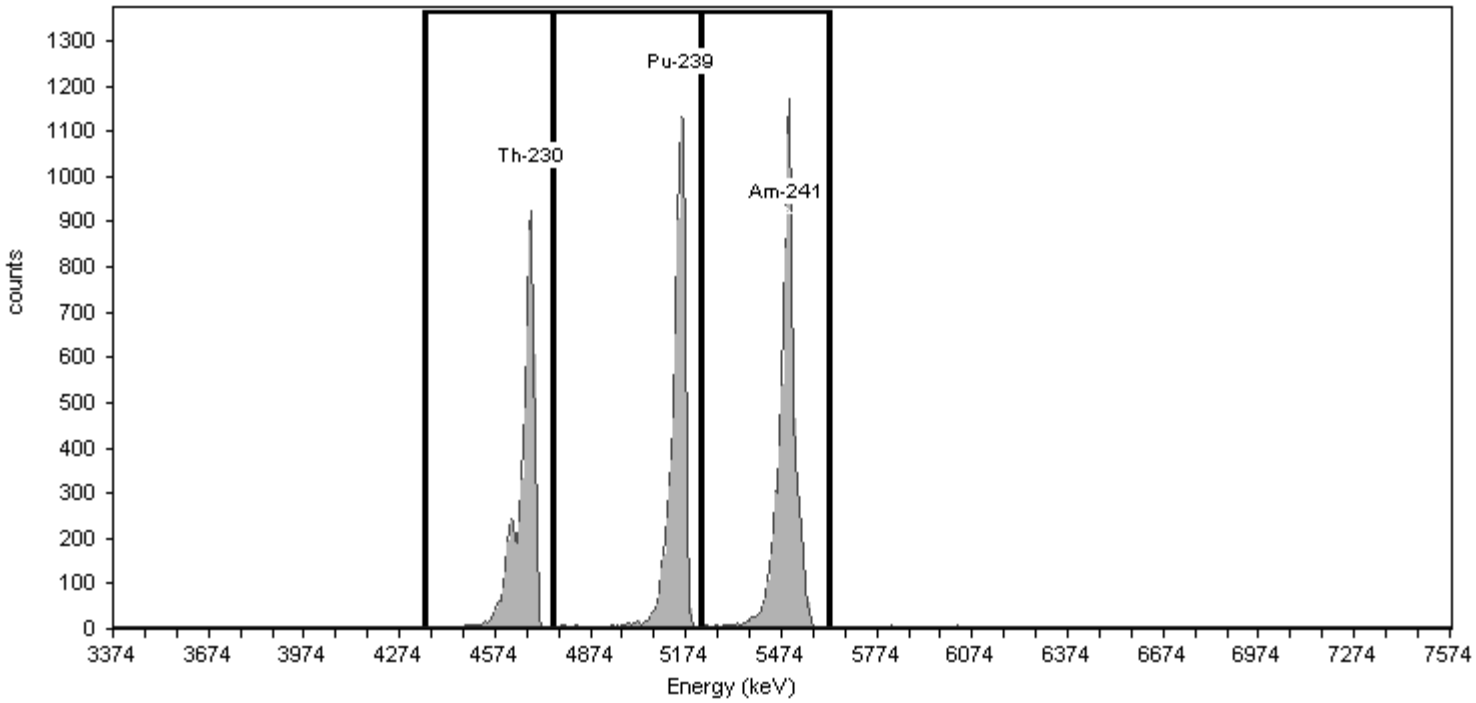
Certificate ID: 82240-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV8 , SN: 41-137Q6
Acquisition Start Date: 6/19/2014 6:06:25PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 26.68% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,944.00	99.07
Pu-239	240	5.16	186	249	6,972.00	116.20
Am-241	284	5.49	249	303	7,944.00	132.40

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:35:06PM 6/19/2014

Calibration

Sample Name: CCV-9793;AV9-20140619
Description:
Detector: AV9

Calibration Date: 6/19/2014 7:35:02PM
Analyst: 60040

Source Info

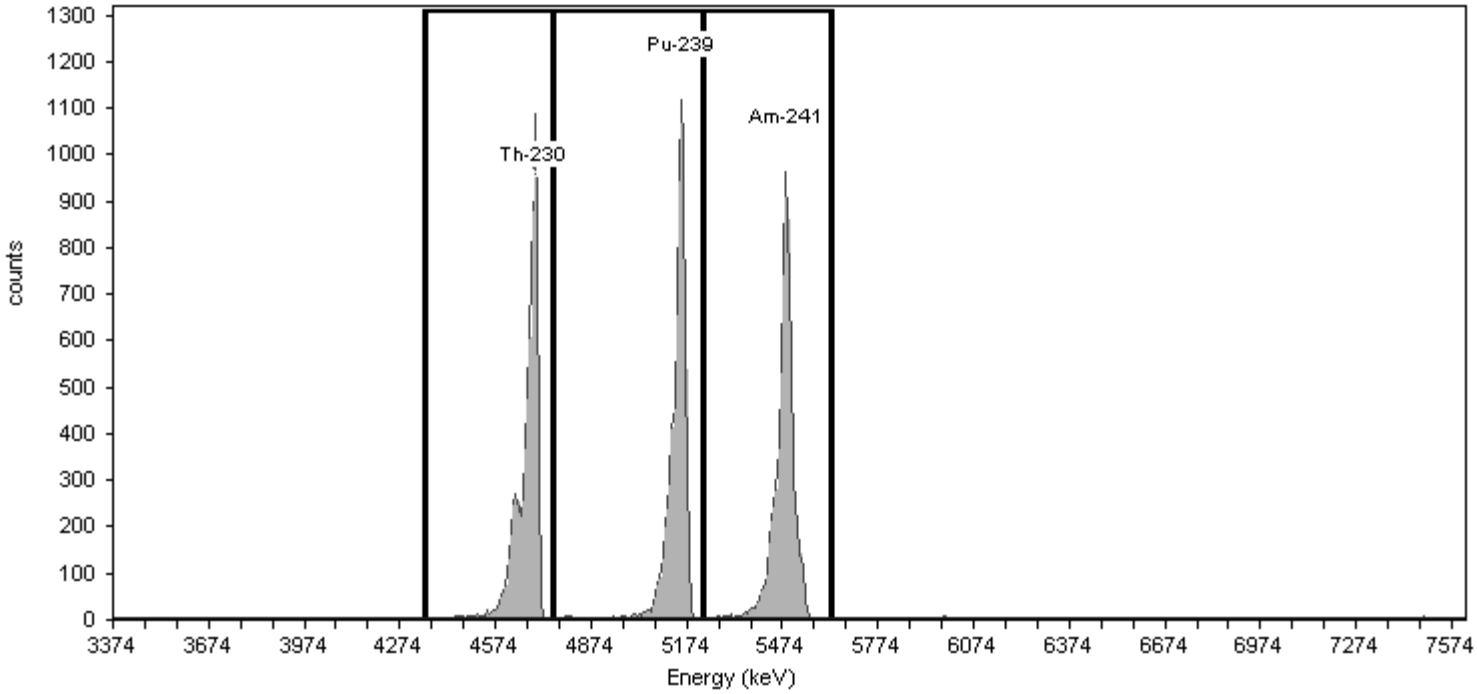
Certificate ID: 82241-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV9 , SN: 51-082V5
Acquisition Start Date: 6/19/2014 6:06:37PM
Live Time: 60.00 min.
Real Time: 60.36 min.
Efficiency: 27.01% +/- 0.44% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,506.00	108.43
Pu-239	240	5.16	186	249	6,521.00	108.68
Am-241	284	5.49	249	303	6,451.00	107.52

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:35:13PM 6/19/2014

Calibration

Sample Name: CCV-9794;AV10-20140619
Description:
Detector: AV10

Calibration Date: 6/19/2014 7:35:09PM
Analyst: 60040

Source Info

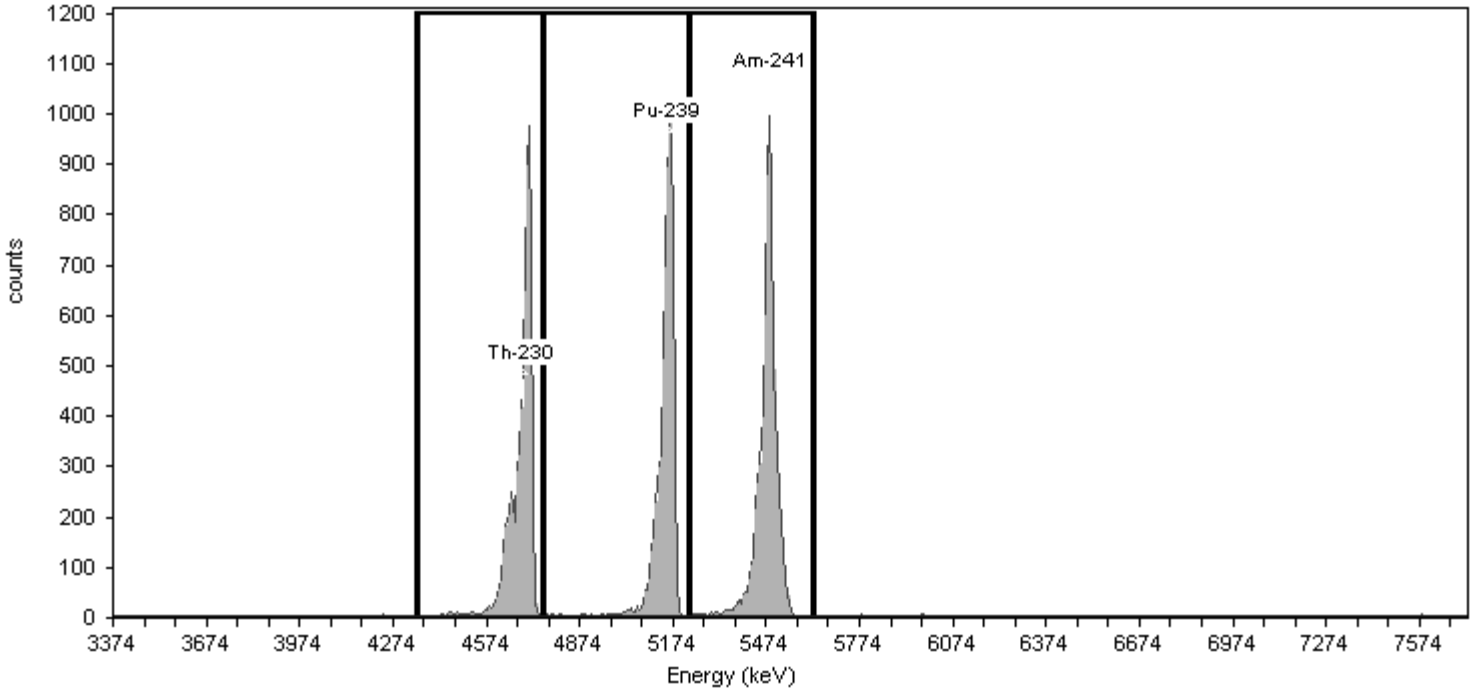
Certificate ID: 82242-334
Prepared by: Analytics

Certification Date: 6/8/2010 12:00:00PM
Description:

Acquisition

Detector: AV10 , SN: 49-155N2
Acquisition Start Date: 6/19/2014 6:06:52PM
Live Time: 60.00 min.
Real Time: 60.36 min.
Efficiency: 25.52% +/- 0.43% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,044.00	100.73
Pu-239	240	5.16	186	249	5,811.00	96.85
Am-241	284	5.49	249	303	6,611.00	110.18

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:35:19PM 6/19/2014

Calibration

Sample Name: CCV-9795;AV11-20140619
Description:
Detector: AV11

Calibration Date: 6/19/2014 7:35:16PM
Analyst: 60040

Source Info

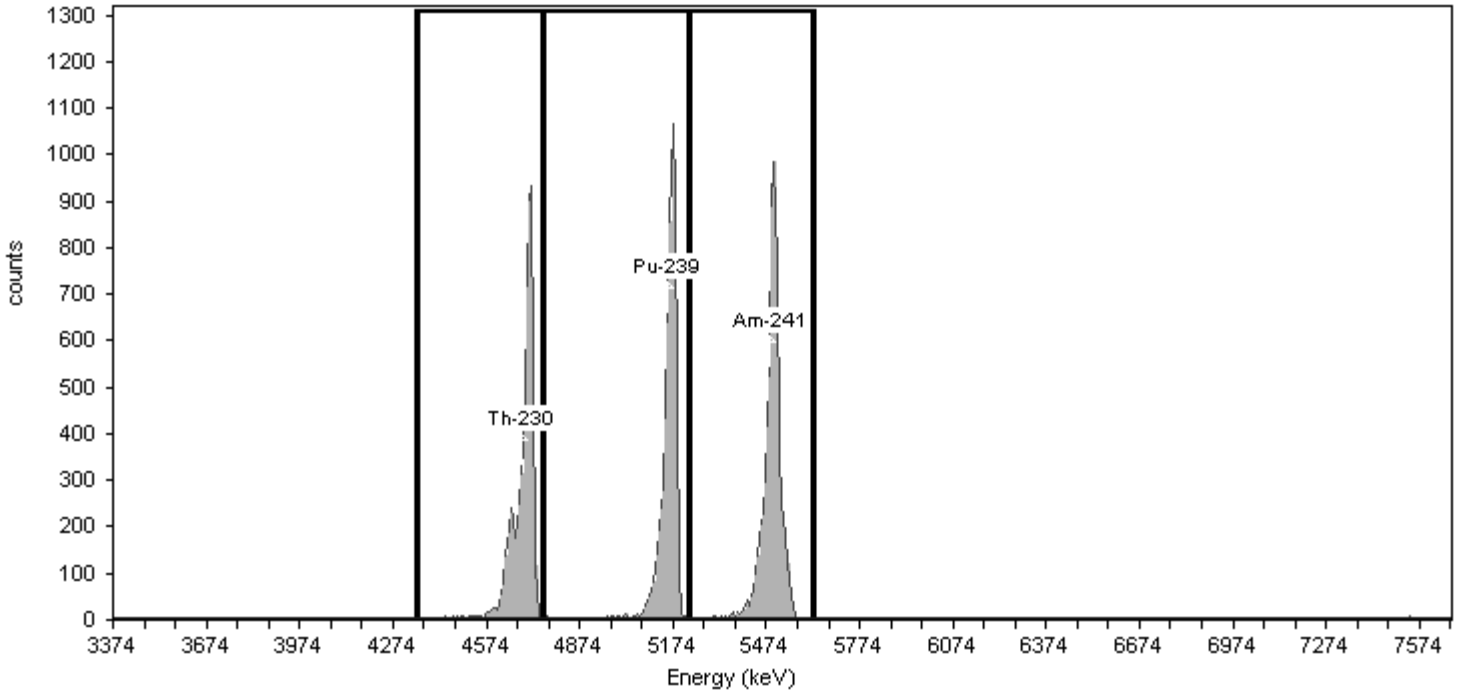
Certificate ID: 82243-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV11 , SN: 49-155dd2
Acquisition Start Date: 6/19/2014 6:07:01PM
Live Time: 60.00 min.
Real Time: 60.36 min.
Efficiency: 26.47% +/- 0.46% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	5,658.00	94.30
Pu-239	240	5.16	186	249	5,667.00	94.45
Am-241	284	5.49	249	303	6,008.00	100.13

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:35:25PM 6/19/2014

Calibration

Sample Name: CCV-9817;AV12-20140619
Description:
Detector: AV12

Calibration Date: 6/19/2014 7:35:21PM
Analyst: 60040

Source Info

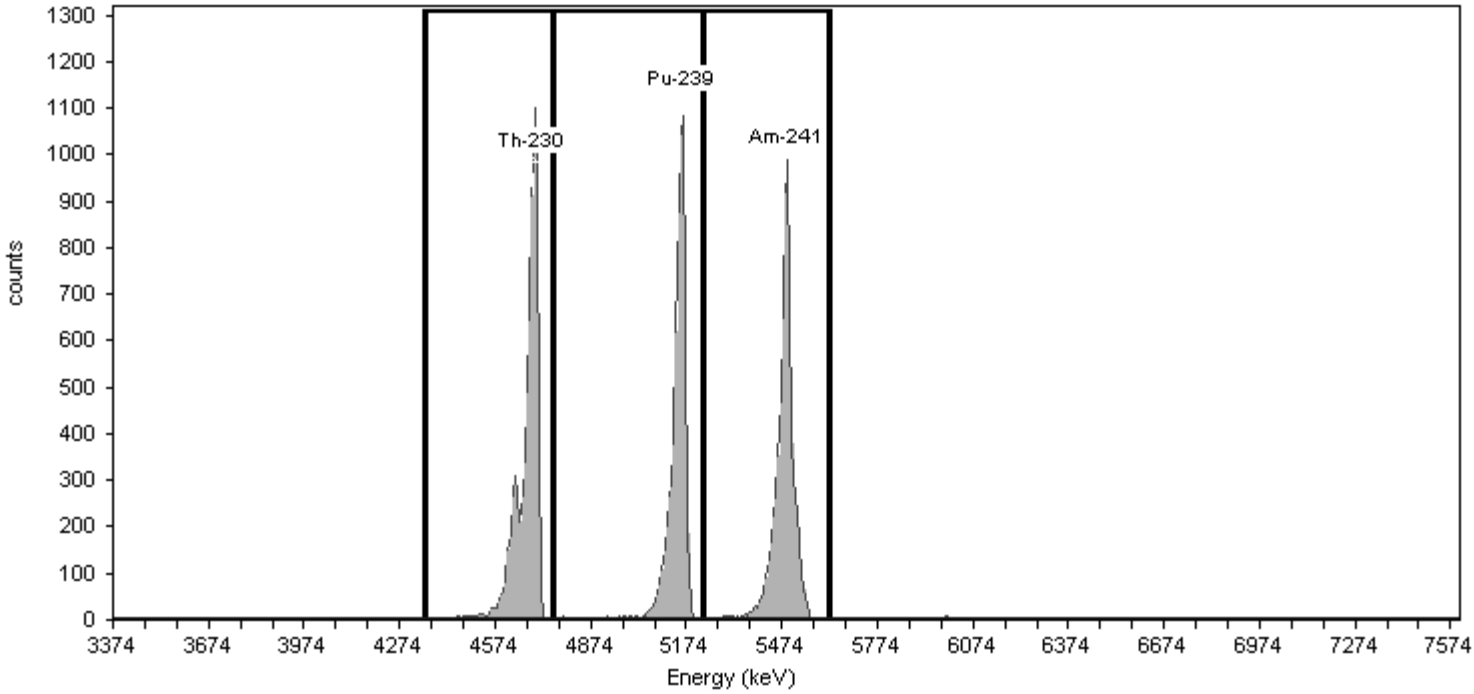
Certificate ID: 82244-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV12 , SN: 51-082B7
Acquisition Start Date: 6/19/2014 6:07:13PM
Live Time: 60.00 min.
Real Time: 60.36 min.
Efficiency: 25.83% +/- 0.42% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 0

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,873.00	114.55
Pu-239	240	5.16	186	249	6,157.00	102.62
Am-241	284	5.49	249	303	6,435.00	107.25

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Calibration Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:19:56PM 6/22/2014

Calibration

Sample Name: CCV-9884;AV13-20140619a
Description:
Detector: AV13

Calibration Date: 6/22/2014 5:19:48PM
Analyst: 60040

Source Info

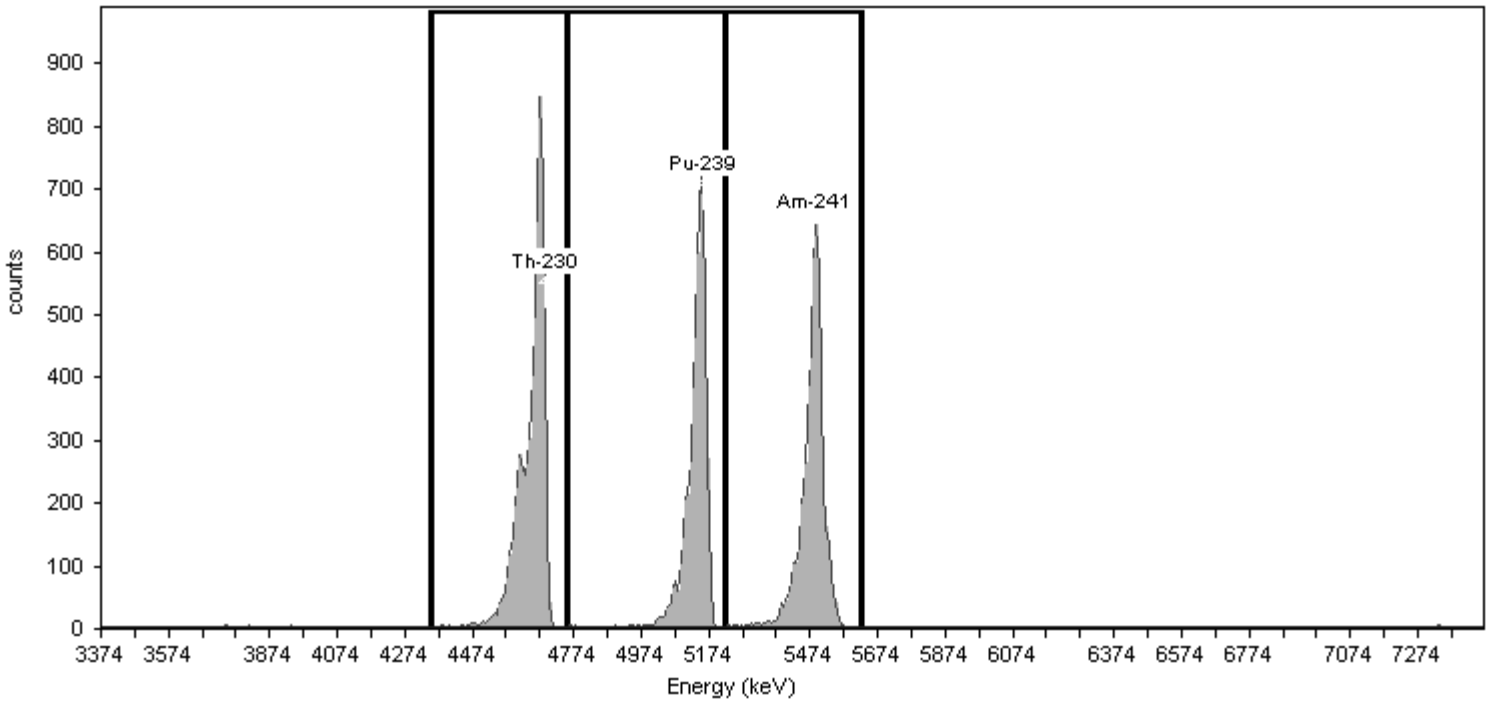
Certificate ID: 82245-334
Prepared by: Analytics

Certification Date: 6/9/2010 12:00:00PM
Description:

Acquisition

Detector: AV13 , SN: 49-155M7
Acquisition Start Date: 6/19/2014 7:45:11PM
Live Time: 60.00 min.
Real Time: 60.01 min.
Efficiency: 25.66% +/- 0.48% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	177	4.69	132	186	6,201.00	103.35
Pu-239	240	5.16	186	249	5,023.00	83.72
Am-241	284	5.49	249	303	5,096.00	84.93

Monthly Backgrounds

Sample

Sample Name: ICB;AV7
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

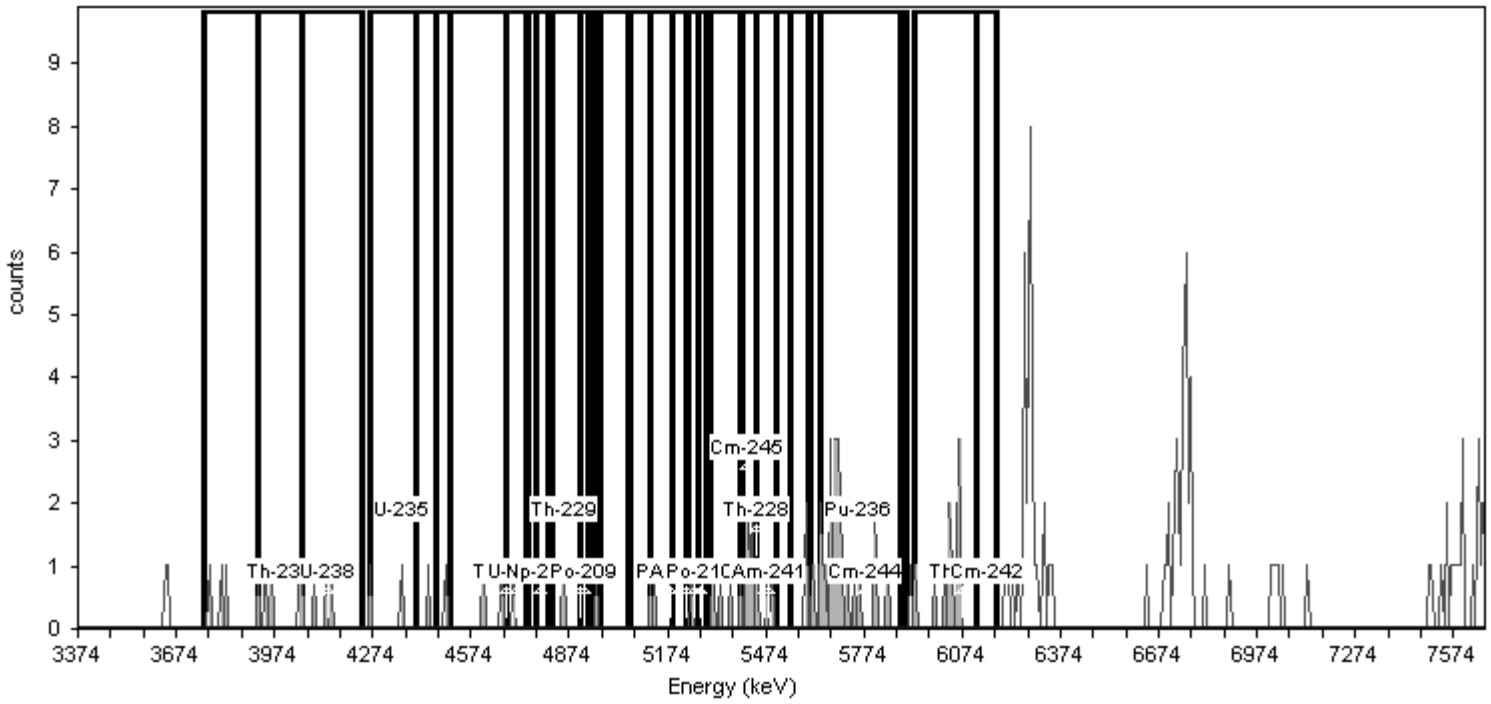
Analyst: 60040

Acquisition

Detector: AV7 , SN: 48-158EE5
Acquisition Start Date: 6/18/2014 7:08:20PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: IC-8877;AV7-20140507
Calibration Date: 5/7/2014 10:48:48PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.80% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 167.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	9.00	9.375E-003	3.294E-003
U-238	4.14	3.92	4.24	9.00	9.375E-003	3.294E-003
U-235	4.36	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	4.00	4.167E-003	2.329E-003
Pu-242	4.90	4.68	4.95	3.00	3.125E-003	2.083E-003
Th-229	4.86	4.74	5.12	4.00	4.167E-003	2.329E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	3.00	3.125E-003	2.083E-003
U-232	5.25	5.06	5.40	7.00	7.292E-003	2.946E-003
Th-228	5.45	5.19	5.51	13.00	1.354E-002	3.898E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	12.00	1.250E-002	3.756E-003
Am-241	5.48	5.30	5.60	14.00	1.458E-002	4.034E-003
Cm-245	5.42	5.40	5.45	7.00	7.292E-003	2.946E-003
Pu-236	5.76	5.61	5.89	26.00	2.708E-002	5.413E-003
Cm-244	5.78	5.64	5.90	25.00	2.604E-002	5.311E-003
Th-227	6.07	5.93	6.18	10.00	1.042E-002	3.455E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:13:36AM 6/19/2014

Sample

Sample Name: ICB;AV8
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

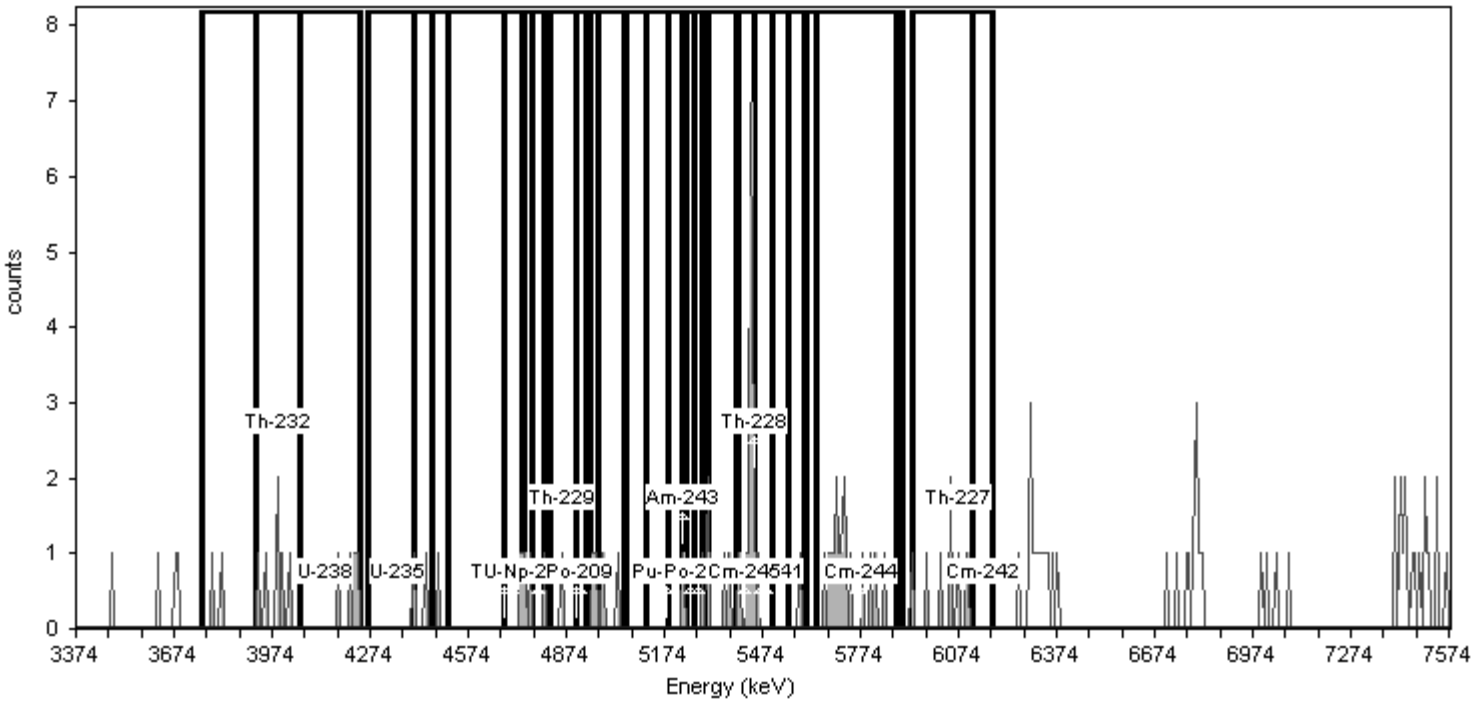
Analyst: 60040

Acquisition

Detector: AV8 , SN: 41-137Q6
Acquisition Start Date: 6/18/2014 7:08:22PM
Live Time: 960.01 min.
Real Time: 960.03 min.
Calibration Name: IC-9792;AV8-20140505
Calibration Date: 5/6/2014 5:38:58PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.05% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 119.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	8.00	8.333E-003	3.125E-003
U-238	4.14	3.92	4.24	10.00	1.042E-002	3.455E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	5.00	5.208E-003	2.552E-003
Pu-242	4.90	4.68	4.95	6.00	6.250E-003	2.756E-003
Th-229	4.86	4.74	5.12	9.00	9.375E-003	3.294E-003
Np-237	4.78	4.77	4.81	1.00	1.042E-003	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	7.00	7.292E-003	2.946E-003
Th-228	5.45	5.19	5.51	19.00	1.979E-002	4.658E-003
Po-210	5.28	5.23	5.29	2.00	2.083E-003	1.804E-003
Pu-238	5.47	5.27	5.55	18.00	1.875E-002	4.540E-003
Am-241	5.48	5.30	5.60	18.00	1.875E-002	4.540E-003
Cm-245	5.42	5.40	5.45	12.00	1.250E-002	3.756E-003
Pu-236	5.76	5.61	5.89	16.00	1.667E-002	4.295E-003
Cm-244	5.78	5.64	5.90	16.00	1.667E-002	4.295E-003
Th-227	6.07	5.93	6.18	7.00	7.292E-003	2.946E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:26:28AM 6/19/2014

Sample

Sample Name: ICB;AV9
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

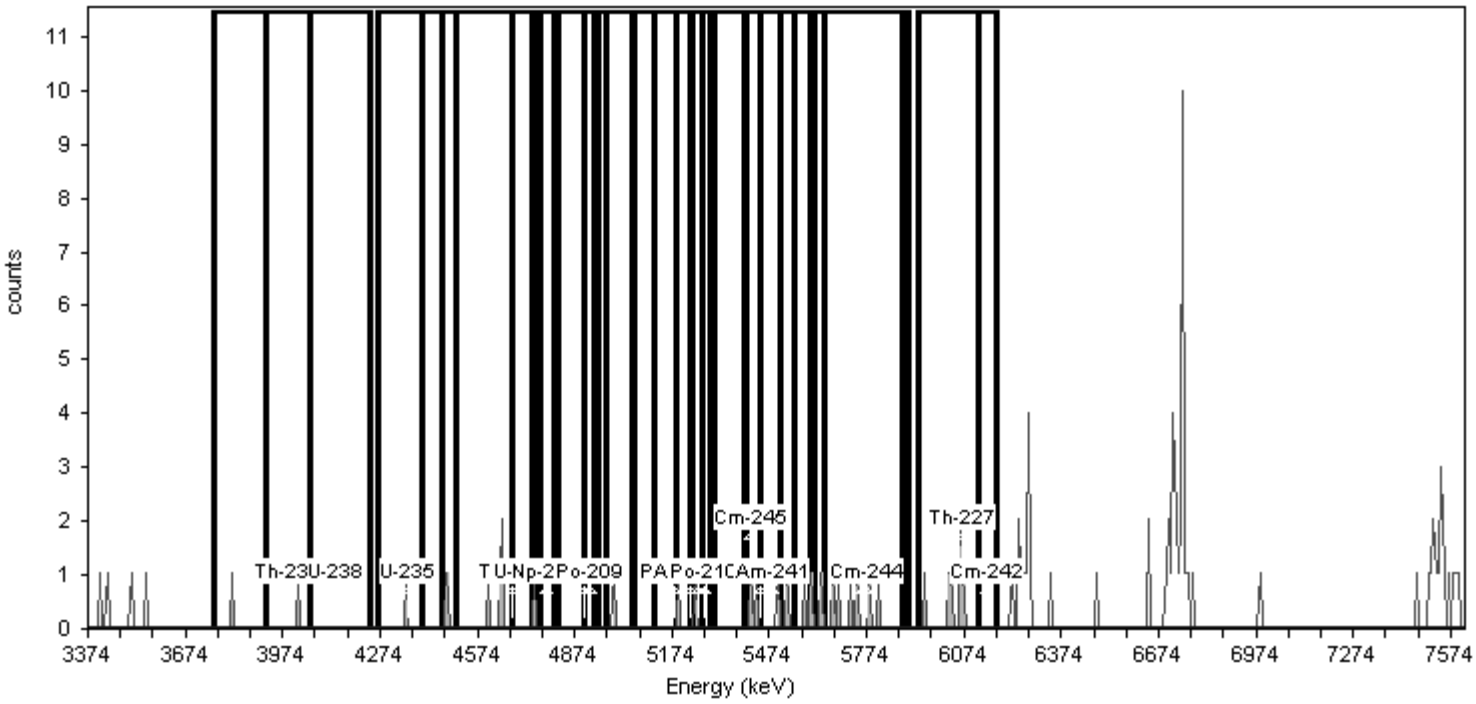
Analyst: 60040

Acquisition

Detector: AV9 , SN: 51-082V5
Acquisition Start Date: 6/18/2014 7:08:24PM
Live Time: 960.00 min.
Real Time: 970.50 min.
Calibration Name: IC-9793;AV9-20140505
Calibration Date: 5/6/2014 5:39:04PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.04% +/- 0.33% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 93.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	2.00	2.083E-003	1.804E-003
U-238	4.14	3.92	4.24	1.00	1.042E-003	1.473E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	5.00	5.208E-003	2.552E-003
Pu-242	4.90	4.68	4.95	1.00	1.042E-003	1.473E-003
Th-229	4.86	4.74	5.12	2.00	2.083E-003	1.804E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	2.00	2.083E-003	1.804E-003
U-232	5.25	5.06	5.40	2.00	2.083E-003	1.804E-003
Th-228	5.45	5.19	5.51	5.00	5.208E-003	2.552E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	4.00	4.167E-003	2.329E-003
Am-241	5.48	5.30	5.60	6.00	6.250E-003	2.756E-003
Cm-245	5.42	5.40	5.45	2.00	2.083E-003	1.804E-003
Pu-236	5.76	5.61	5.89	7.00	7.292E-003	2.946E-003
Cm-244	5.78	5.64	5.90	6.00	6.250E-003	2.756E-003
Th-227	6.07	5.93	6.18	6.00	6.250E-003	2.756E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:26:33AM 6/19/2014

Sample

Sample Name: ICB;AV10
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

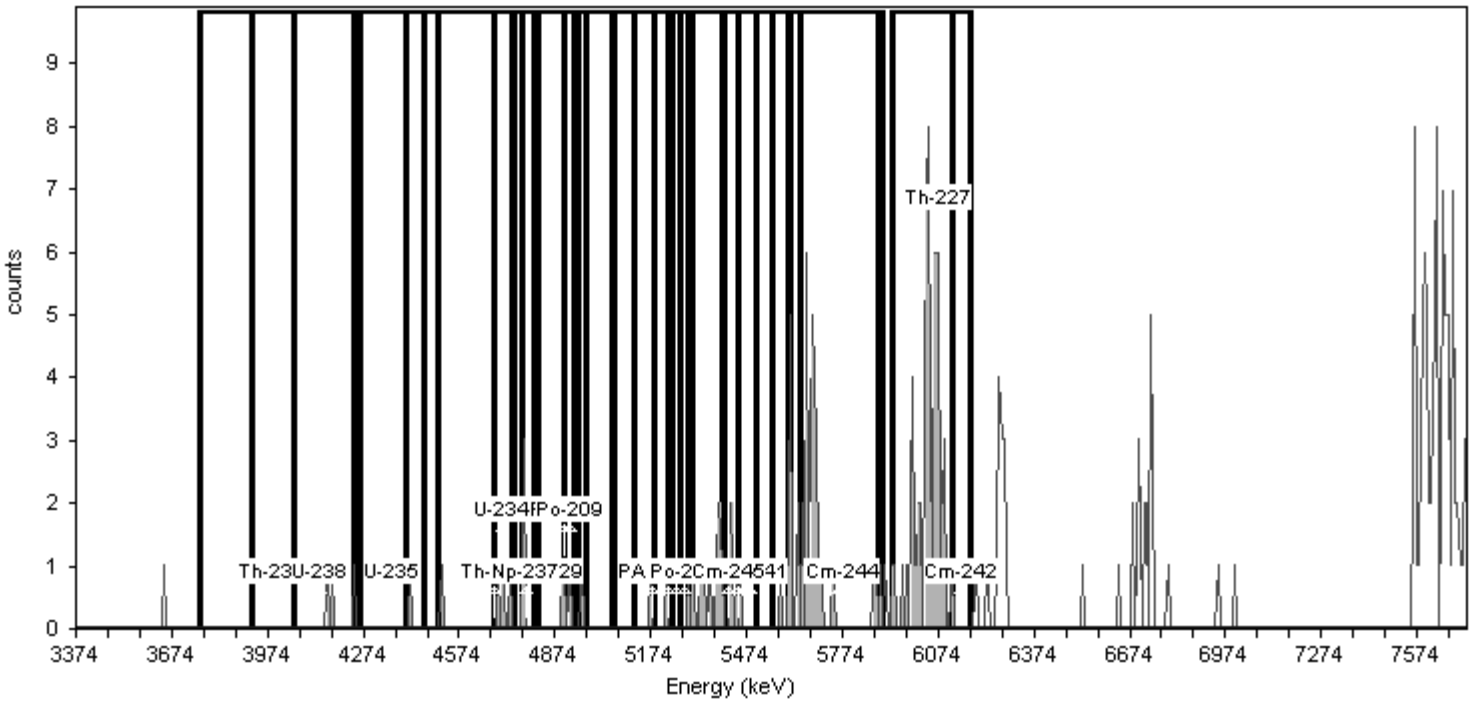
Acquisition

Detector: AV10 , SN: 49-155N2
Acquisition Start Date: 6/18/2014 7:08:26PM
Live Time: 960.00 min.
Real Time: 970.50 min.
Calibration Name: IC-9794;AV10-20140505
Calibration Date: 5/6/2014 5:39:10PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.84% +/- 0.32% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 237.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	0.00	0.000E+000	1.473E-003
U-238	4.14	3.92	4.24	3.00	3.125E-003	2.083E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	5.00	5.208E-003	2.552E-003
U-234	4.71	4.51	4.82	8.00	8.333E-003	3.125E-003
Pu-242	4.90	4.68	4.95	10.00	1.042E-002	3.455E-003
Th-229	4.86	4.74	5.12	8.00	8.333E-003	3.125E-003
Np-237	4.78	4.77	4.81	4.00	4.167E-003	2.329E-003
Po-209	4.92	4.90	4.93	2.00	2.083E-003	1.804E-003
Pu-239	5.18	4.97	5.24	2.00	2.083E-003	1.804E-003
Am-243	5.23	5.05	5.31	4.00	4.167E-003	2.329E-003
U-232	5.25	5.06	5.40	12.00	1.250E-002	3.756E-003
Th-228	5.45	5.19	5.51	15.00	1.563E-002	4.167E-003
Po-210	5.28	5.23	5.29	1.00	1.042E-003	1.473E-003
Pu-238	5.47	5.27	5.55	14.00	1.458E-002	4.034E-003
Am-241	5.48	5.30	5.60	15.00	1.563E-002	4.167E-003
Cm-245	5.42	5.40	5.45	4.00	4.167E-003	2.329E-003
Pu-236	5.76	5.61	5.89	33.00	3.437E-002	6.074E-003
Cm-244	5.78	5.64	5.90	27.00	2.813E-002	5.512E-003
Th-227	6.07	5.93	6.18	52.00	5.417E-002	7.583E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:26:39AM 6/19/2014

Sample

Sample Name: ICB;AV11
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

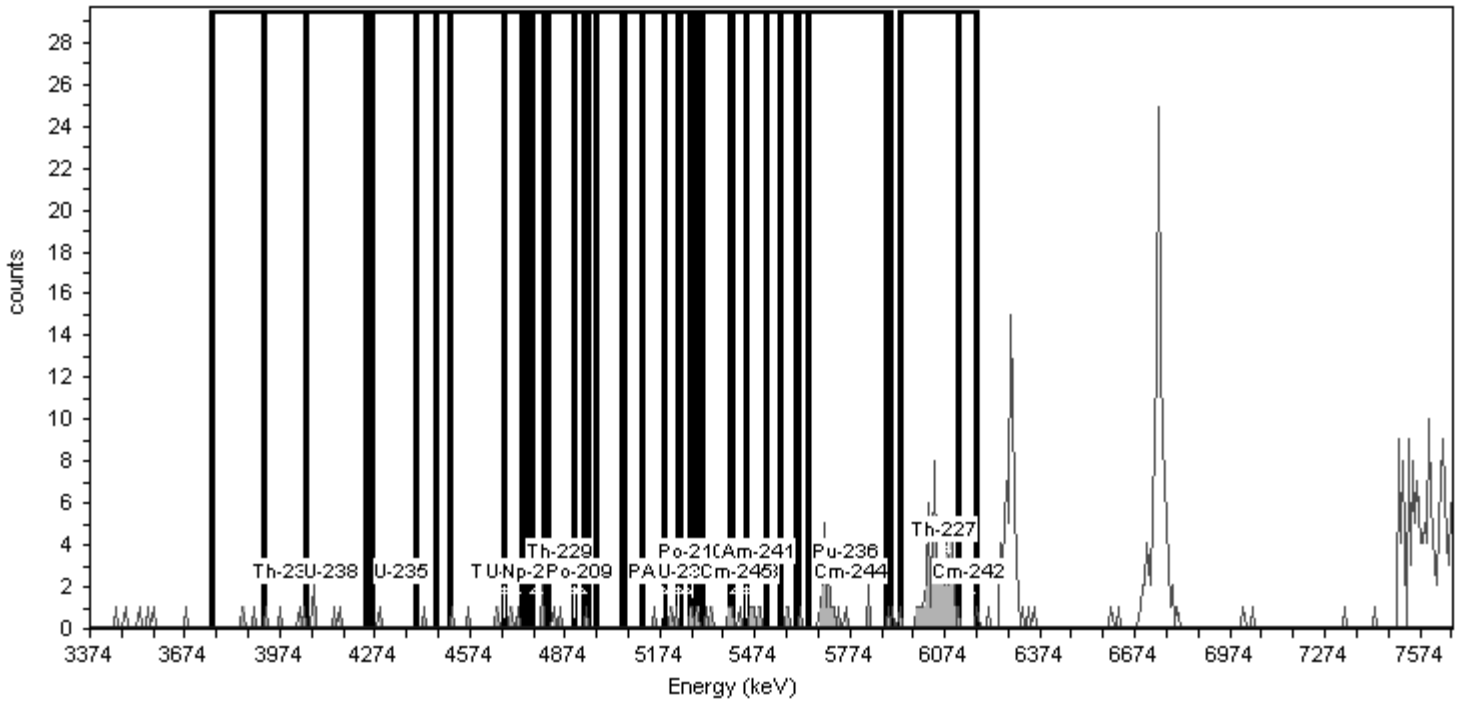
Acquisition

Detector: AV11 , SN: 49-155dd2
Acquisition Start Date: 6/18/2014 7:08:27PM
Live Time: 960.00 min.
Real Time: 970.50 min.
Calibration Name: IC-9795;AV11-20140505
Calibration Date: 5/6/2014 5:39:16PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.88% +/- 0.35% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 403.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	6.00	6.250E-003	2.756E-003
U-238	4.14	3.92	4.24	8.00	8.333E-003	3.125E-003
U-235	4.36	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.68	4.40	4.75	6.00	6.250E-003	2.756E-003
U-234	4.71	4.51	4.82	7.00	7.292E-003	2.946E-003
Pu-242	4.90	4.68	4.95	7.00	7.292E-003	2.946E-003
Th-229	4.86	4.74	5.12	5.00	5.208E-003	2.552E-003
Np-237	4.78	4.77	4.81	2.00	2.083E-003	1.804E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	3.00	3.125E-003	2.083E-003
Am-243	5.23	5.05	5.31	6.00	6.250E-003	2.756E-003
U-232	5.25	5.06	5.40	11.00	1.146E-002	3.608E-003
Th-228	5.45	5.19	5.51	15.00	1.563E-002	4.167E-003
Po-210	5.28	5.23	5.29	3.00	3.125E-003	2.083E-003
Pu-238	5.47	5.27	5.55	13.00	1.354E-002	3.898E-003
Am-241	5.48	5.30	5.60	12.00	1.250E-002	3.756E-003
Cm-245	5.42	5.40	5.45	3.00	3.125E-003	2.083E-003
Pu-236	5.76	5.61	5.89	19.00	1.979E-002	4.658E-003
Cm-244	5.78	5.64	5.90	19.00	1.979E-002	4.658E-003
Th-227	6.07	5.93	6.18	52.00	5.417E-002	7.583E-003
Cm-242	6.15	6.12	6.18	2.00	2.083E-003	1.804E-003

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:26:44AM 6/19/2014

Sample

Sample Name: ICB;AV12
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

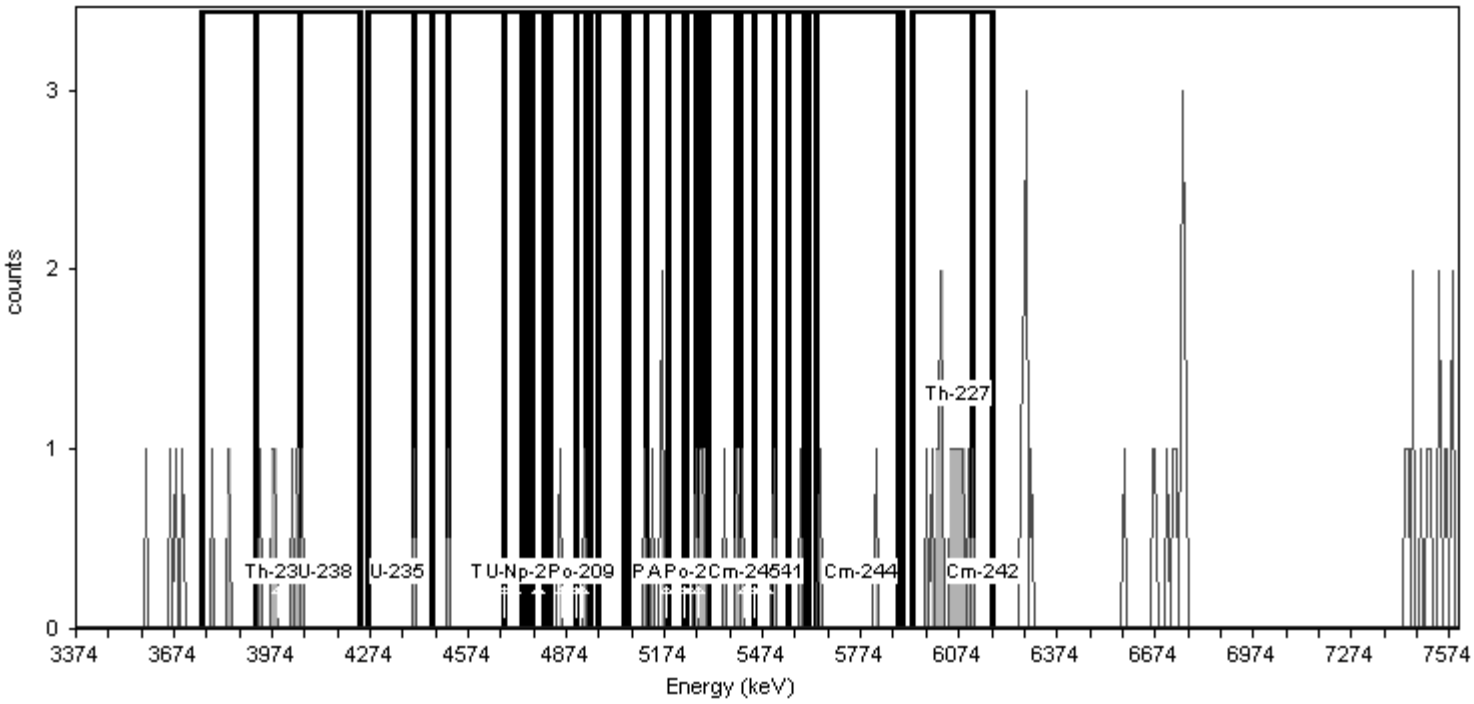
Analyst: 60040

Acquisition

Detector: AV12 , SN: 51-082B7
Acquisition Start Date: 6/18/2014 7:08:29PM
Live Time: 960.00 min.
Real Time: 970.50 min.
Calibration Name: IC-9817;AV12-20140505
Calibration Date: 5/6/2014 5:39:22PM

Energy Calibration Equation:
Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.97% +/- 0.31% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 77.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	7.00	7.292E-003	2.946E-003
U-238	4.14	3.92	4.24	6.00	6.250E-003	2.756E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	2.00	2.083E-003	1.804E-003
U-234	4.71	4.51	4.82	1.00	1.042E-003	1.473E-003
Pu-242	4.90	4.68	4.95	2.00	2.083E-003	1.804E-003
Th-229	4.86	4.74	5.12	3.00	3.125E-003	2.083E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	1.00	1.042E-003	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	7.00	7.292E-003	2.946E-003
U-232	5.25	5.06	5.40	9.00	9.375E-003	3.294E-003
Th-228	5.45	5.19	5.51	7.00	7.292E-003	2.946E-003
Po-210	5.28	5.23	5.29	3.00	3.125E-003	2.083E-003
Pu-238	5.47	5.27	5.55	7.00	7.292E-003	2.946E-003
Am-241	5.48	5.30	5.60	5.00	5.208E-003	2.552E-003
Cm-245	5.42	5.40	5.45	2.00	2.083E-003	1.804E-003
Pu-236	5.76	5.61	5.89	2.00	2.083E-003	1.804E-003
Cm-244	5.78	5.64	5.90	2.00	2.083E-003	1.804E-003
Th-227	6.07	5.93	6.18	14.00	1.458E-002	4.034E-003
Cm-242	6.15	6.12	6.18	1.00	1.042E-003	1.473E-003

Alpha-Spectroscopy Background Report

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
11:26:50AM 6/19/2014

Sample

Sample Name: ICB;AV13
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: June2014
Description:

Analyst: 60040

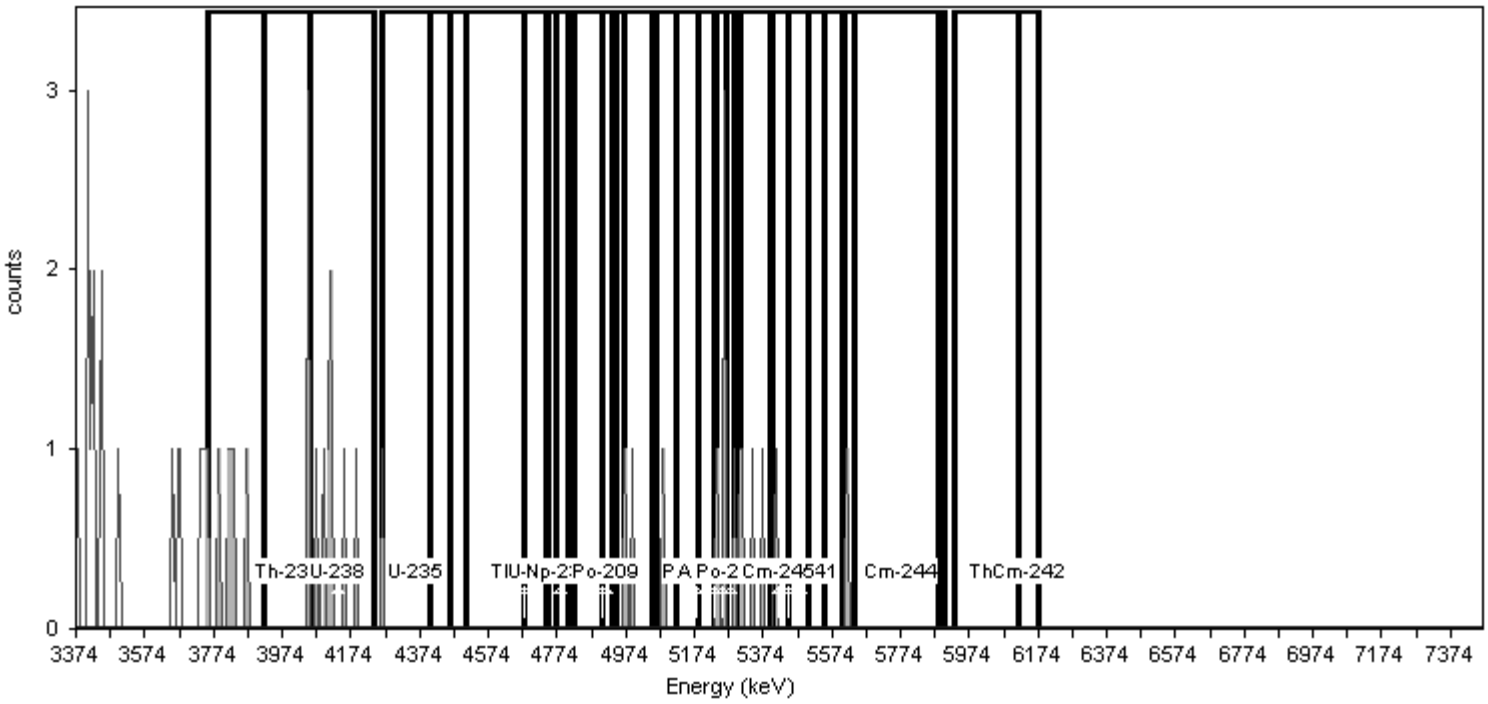
Acquisition

Detector: AV13 , SN: 49-155M7
Acquisition Start Date: 6/18/2014 7:08:30PM
Live Time: 960.00 min.
Real Time: 970.52 min.
Calibration Name: IC-9884;AV13-20140505
Calibration Date: 5/6/2014 5:39:28PM

Energy Calibration Equation:

Gain = 7.4575 keV / Ch
Offset = 3,366.95 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.99% +/- 0.37% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 47.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.75	4.05	9.00	9.375E-003	3.294E-003
U-238	4.14	3.92	4.24	10.00	1.042E-002	3.455E-003
U-235	4.36	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.68	4.40	4.75	0.00	0.000E+000	1.473E-003
U-234	4.71	4.51	4.82	0.00	0.000E+000	1.473E-003
Pu-242	4.90	4.68	4.95	0.00	0.000E+000	1.473E-003
Th-229	4.86	4.74	5.12	3.00	3.125E-003	2.083E-003
Np-237	4.78	4.77	4.81	0.00	0.000E+000	1.473E-003
Po-209	4.92	4.90	4.93	0.00	0.000E+000	1.473E-003
Pu-239	5.18	4.97	5.24	4.00	4.167E-003	2.329E-003
Am-243	5.23	5.05	5.31	7.00	7.292E-003	2.946E-003
U-232	5.25	5.06	5.40	10.00	1.042E-002	3.455E-003
Th-228	5.45	5.19	5.51	10.00	1.042E-002	3.455E-003
Po-210	5.28	5.23	5.29	5.00	5.208E-003	2.552E-003
Pu-238	5.47	5.27	5.55	6.00	6.250E-003	2.756E-003
Am-241	5.48	5.30	5.60	5.00	5.208E-003	2.552E-003
Cm-245	5.42	5.40	5.45	1.00	1.042E-003	1.473E-003
Pu-236	5.76	5.61	5.89	1.00	1.042E-003	1.473E-003
Cm-244	5.78	5.64	5.90	0.00	0.000E+000	1.473E-003
Th-227	6.07	5.93	6.18	0.00	0.000E+000	1.473E-003
Cm-242	6.15	6.12	6.18	0.00	0.000E+000	1.473E-003

Run Logs

Alpha Spectroscopy Run Log

Detector: AV7

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/07/14 19:51	140	IC 160-120843/1		120843			PS
05/07/14 23:03	60	ICV 160-120858/1		120858			PS
06/18/14 19:08	960	ICB 160-127831/1		127831			PS
06/19/14 16:44	60	CCV 160-127943/1		127943			PS
07/07/14 00:37	1	PULSER 160-130012/1		130012			MLK
07/07/14 16:35	30	ZZZZZ		130012			
07/07/14 18:10	180	MB 160-128863/1-A		130012	128863	A-01-R	MLK

Detector: AV8

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:27	140	IC 160-120523/1		120523			PS
05/08/14 00:14	60	ICV 160-121084/1		121084			PS
06/18/14 19:08	960	ICB 160-127837/1		127837			PS
06/19/14 18:06	60	CCV 160-127954/1		127954			PS
07/07/14 00:37	1	PULSER 160-130023/1		130023			MLK
07/07/14 16:35	30	ZZZZZ		130023			
07/07/14 18:11	180	LCS 160-128863/2-A		130023	128863	A-01-R	MLK

Detector: AV9

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:27	140	IC 160-120524/1		120524			PS
05/07/14 23:03	60	ICV 160-120859/1		120859			PS
06/18/14 19:08	960	ICB 160-127848/1		127848			PS
06/19/14 18:06	60	CCV 160-127962/1		127962			PS
07/07/14 00:37	1	PULSER 160-130034/1		130034			MLK
07/07/14 16:35	30	ZZZZZ		130034			
07/07/14 18:11	180	680-102600-6	SD-278-SS	130034	128863	A-01-R	MLK

Detector: AV10

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:27	140	IC 160-120512/1		120512			PS
05/07/14 23:03	60	ICV 160-120847/1		120847			PS
06/18/14 19:08	960	ICB 160-127776/1		127776			PS
06/19/14 18:06	60	CCV 160-127860/1		127860			PS
07/07/14 00:37	1	PULSER 160-129939/1		129939			MLK
07/07/14 16:36	30	ZZZZZ		129939			
07/07/14 18:11	180	680-102600-6 DU	SD-278-SS DU	129939	128863	A-01-R	MLK

Detector: AV11

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:27	140	IC 160-120513/1		120513			PS
05/07/14 23:04	60	ICV 160-120848/1		120848			PS
06/18/14 19:08	960	ICB 160-127786/1		127786			PS
06/19/14 18:07	60	CCV 160-127871/1		127871			PS
07/07/14 00:37	1	PULSER 160-129950/1		129950			MLK
07/07/14 16:36	30	ZZZZZ		129950			
07/07/14 18:11	180	680-102600-7	SD-278-01	129950	128863	A-01-R	MLK

Alpha Spectroscopy Run Log

Detector: AV12

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:28	140	IC 160-120514/1		120514			PS
05/07/14 23:04	60	ICV 160-120849/1		120849			PS
06/18/14 19:08	960	ICB 160-127796/1		127796			PS
06/19/14 18:07	60	CCV 160-127881/1		127881			PS
07/07/14 00:37	1	PULSER 160-129960/1		129960			MLK
07/07/14 16:36	30	ZZZZZ		129960			
07/07/14 18:11	180	680-102600-8	SD-278-02	129960	128863	A-01-R	MLK

Detector: AV13

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
05/05/14 22:28	140	IC 160-120515/1		120515			PS
05/07/14 23:04	60	ICV 160-120850/1		120850			PS
06/18/14 19:08	960	ICB 160-127807/1		127807			PS
06/19/14 19:45	60	CCV 160-127892/1		127892			PS
07/07/14 00:37	1	PULSER 160-129971/1		129971			MLK
07/07/14 16:36	30	ZZZZZ		129971			
07/07/14 18:11	180	680-102600-9	SD-278-03	129971	128863	A-01-R	MLK

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.43
Client Contact: Mike Martin	Phone: (703) 342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page [redacted] 1 of 1
Company: Tetra Tech, Inc.		Analysis Requested		Job #:
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
City: Germantown	TAT Requested (days): Standard			
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			Other:
Email: MIchael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-278-SS	6/20/14	1000	C	Solid				X				
SD-278-01	↓	1005	C	Solid				X				
SD-278-02		1010	C	Solid				X				
SD-278-03		1015	C	Solid				X				
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements: 680 - 102600

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	[signature]	6/20/14 - 1100	TT	[signature]	6/23/14 09:00	TA
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks: 2.4, 2.2 C

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 680-102600-3

SDG Number: 680102600-1

Job Description: Sediments

For:
Tetra Tech, Inc.
20251 Century Blvd
Suite 200
Germantown, MD 20874

Attention: Mike Martin



Approved for release.
Jerry A Lanier
Project Manager I
9/12/2014 1:34 PM

Jerry A Lanier, Project Manager I
5102 LaRoche Avenue, Savannah, GA, 31404
(912)354-7858 e.3410
jerry.lanier@testamericainc.com
09/12/2014

cc: Samantha Brenner
Keir Craigie
Dan Drzik
Mr. Fred Kolberg
Ms. Amy Thomson

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

Savannah Certifications and ID #s: A2LA: 0399.01; AL: 41450; ARDEQ: 88-0692; ARDOH; AZ: AZ0741; CA: 03217CA; CO; CT: PH0161; DE; FL: E87052; GA: 803; Guam; HI; IL: 200022; IN: C-GA-02; IA: 353; KS: E-10322; KY EPPC: 90084; KY UST; LA DEQ: 30690; LA DHH: LA080008; ME: 2008022; MD: 250; MA: M-GA006; MI: 9925; MS; NFESC: 249; NV: GA00006; NJ: GA769; NM; NY: 10842; NC DWQ: 269; NC DHHS: 13701; PA: 68-00474; PR: GA00006; RI: LAO00244; SC: 98001001; TN: TN0296; TX: T104704185; USEPA: GA00006; VT: VT-87052; VA: 00302; WA; WV

Table of Contents

Cover Title Page 1

Data Summaries 3

- Definitions 3
- Case Narrative 4
- Client Sample Results 6
- QC Sample Results 9
- QC Association 11
- Chronicle 12
- Certification Summary 13
- Method Summary 15
- Sample Summary 16
- Reagent Traceability 17
  - COAs 20

Radiochemistry Raw Data 142

- Gamma Spectroscopy 142
  - Method GA-01-R Ra-226 143
  - Daily Checks 355
  - Initial Calibrations 430
  - Initial Calibration Verifications 475
  - Annual Calibration Verifications 515
  - Monthly Backgrounds 546
  - Run Logs 592

Shipping and Receiving Documents 596

- Client Chain of Custody 596

Qualifiers

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

Rad TICs

Qualifier	Qualifier Description
F	Duplicate RPD exceeds the control limit

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Sediments

Report Number: 680-102600-3

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 06/23/2014; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 24.2 C.

RADIUM-226 AND OTHER GAMMA EMITTERS (GS)

Samples SD-278-SS (680-102600-6), SD-278-01 (680-102600-7) and SD-278-02 (680-102600-8) were analyzed for Radium-226 and other gamma emitters (GS) in accordance with The Department of Energy. The samples were leached on 08/12/2014, prepared on 08/15/2014 and analyzed on 08/26/2014.

Method(s) GA-01-R: Prep Batch #140177: Ra-226 by gamma spectroscopy is typically determined by inference from daughters (e.g. Bi-214) after sealing the sample in an appropriate counting geometry/container and waiting 21 days to allow the Ra-226 decay chain through Rn-222 to reach secular equilibrium. Such an approach is considered to be the most reliable and representative means for establishing the true Ra-226 concentration in the sample. The method requested by the client to report Ra-226, using its own 186 keV gamma-ray emission, is subject to interference and potential bias due to the 185.7 keV U-235 gamma ray. Experience also indicates gamma spectroscopy software does not consistently assign accurate peak areas to Ra-226 (186 keV), with the problem compounded by slight drift of the instrumentation. The laboratory considers Ra-226 reported based upon the 186 keV gamma-ray emission to be best used by the client in a qualitative fashion.
The following samples were affected: (680-102600-6), (680-102600-6 DU), (680-102600-7), (680-102600-8), (LCS 160-140177/2-A), (MB 160-140177/1-A), SD-278-01 (680-102600-7), SD-278-02 (680-102600-8), SD-278-SS (680-102600-6).
Prep Batch #140177: The MDC was greater than the requested limit of 1 pCi/g for Radium-226. Radium-226 was requested to be reported with no ingrowth for this batch; therefore, samples were reported from the only usable gamma energy line, 185.99 KeV. This energy line has a low efficiency which causes an elevated MDC. . . (680-102600-6), (680-102600-6 DU), (680-102600-7), (680-102600-8), (LCS 160-140177/2-A), (MB 160-140177/1-A), SD-278-01 (680-102600-7), SD-278-02 (680-102600-8), SD-278-SS (680-102600-6)
Prep Batch #140177: Lead-212 analyzed by gamma spectroscopy was detected above the MDC in the blank. Variations in Compton backgrounds and statistical analyses allowed for small area counts in the ROIs of this nuclide. Other thorium decay chain products are not present in the blank to support lead-212 identification. The data is reported. (680-102600-6), (680-102600-6 DU), (680-102600-7), (680-102600-8), (LCS 160-140177/2-A), (MB 160-140177/1-A), SD-278-01 (680-102600-7), SD-278-02 (680-102600-8), SD-278-SS (680-102600-6)

Actinium-227, Americium-241, Bismuth-212, Cobalt-60, Protactinium-231, Thorium-234 and Uranium-238 exceeded the RPD limit for the duplicate of sample SD-278-SSDU (680-102600-6). Refer to the QC report for details.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

RADIUM-226 AND OTHER GAMMA EMITTERS (GS)

Samples SD-278-SS (680-102600-6), SD-278-01 (680-102600-7) and SD-278-02 (680-102600-8) were analyzed for Radium-226 and other gamma emitters (GS) in accordance with approved methodologies. The samples were leached on 08/08/2014, prepared on 08/15/2014 and analyzed on 09/08/2014 and 09/10/2014.

Method(s) Fill_Geo-21: Insufficient sample was provided for the following sample(s) to fill a geometry (e.g. tuna can) calibrated for Ra-226 analysis by gamma spectroscopy: (680-102600-6), (680-102600-6 DU), (680-102600-7), (680-102600-8), SD-278-01 (680-102600-7), SD-278-02 (680-102600-8), SD-278-SS (680-102600-6) a 25mL geometry was used instead.
Gamma (batch:138233) Gamma (batch:140177)

Americium-241, Cobalt-60 and Uranium-238 exceeded the RPD limit for the duplicate of sample SD-278-SSDU (680-102600-6). Refer to the QC report for details.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Client Sample ID: SD-278-SS

Lab Sample ID: 680-102600-6

Date Collected: 06/20/14 10:00

Matrix: Solid

Date Received: 06/23/14 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.743	U	0.496	0.502		0.788	pCi/g	08/15/14 18:30	08/26/14 11:33	1
Radium-226	**0.948**		0.347	0.359	1.00	0.409	pCi/g	08/15/14 18:30	09/08/14 12:05	1
Actinium 228	**1.15**		0.612	0.622		1.08	pCi/g	08/15/14 18:30	08/26/14 11:33	1
Radium-228	**1.83**		0.473	0.506		0.346	pCi/g	08/15/14 18:30	09/08/14 12:05	1
Bismuth-212	0.000	U	2.96	2.96		3.30	pCi/g	08/15/14 18:30	08/26/14 11:33	1
Bismuth-214	0.567	U	0.487	0.490		0.745	pCi/g	08/15/14 18:30	08/26/14 11:33	1
Lead-210	3.22	U	2.16	2.20		3.33	pCi/g	08/15/14 18:30	08/26/14 11:33	1
Lead-212	**0.773**		0.339	0.349		0.464	pCi/g	08/15/14 18:30	08/26/14 11:33	1
Thorium-232	**1.83**		0.473	0.506		0.346	pCi/g	08/15/14 18:30	09/08/14 12:05	1
Lead-214	0.626	U	0.363	0.368		0.638	pCi/g	08/15/14 18:30	08/26/14 11:33	1
Uranium-235	0.188	U	0.420	0.421		0.855	pCi/g	08/15/14 18:30	09/08/14 12:05	1
Potassium-40	**14.7**		4.27	4.50		5.23	pCi/g	08/15/14 18:30	08/26/14 11:33	1
Uranium-238	1.90	U	1.80	1.81		2.44	pCi/g	08/15/14 18:30	09/08/14 12:05	1
Protactinium-231	-0.126	U	0.357	0.357		7.46	pCi/g	08/15/14 18:30	08/26/14 11:33	1
Radium-226	**5.35**		3.72	3.79	1.00	5.19	pCi/g	08/15/14 18:30	08/26/14 11:33	1
Radium-228	**1.15**		0.612	0.622		1.08	pCi/g	08/15/14 18:30	08/26/14 11:33	1
Thorium-232	**1.15**		0.612	0.622		1.08	pCi/g	08/15/14 18:30	08/26/14 11:33	1
Thorium-234	3.30	U	2.26	2.29		3.37	pCi/g	08/15/14 18:30	08/26/14 11:33	1
Thallium-208	**0.371**		0.227	0.230		0.336	pCi/g	08/15/14 18:30	08/26/14 11:33	1
Uranium-235	0.614	U	0.668	0.671		1.09	pCi/g	08/15/14 18:30	08/26/14 11:33	1
Uranium-238	3.30	U	2.26	2.29		3.37	pCi/g	08/15/14 18:30	08/26/14 11:33	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Ac-228	*1.83*		*0.473*	*0.506*		*0.346*	*pCi/g*	*08/15/14 18:30*	*09/08/14 12:05*	*1*
Bi-214	*0.948*		*0.347*	*0.359*		*0.409*	*pCi/g*	*08/15/14 18:30*	*09/08/14 12:05*	*1*
K-40	*18.2*		*2.58*	*3.12*		*2.07*	*pCi/g*	*08/15/14 18:30*	*09/08/14 12:05*	*1*
Pb-212	*1.00*		*0.213*	*0.239*		*0.262*	*pCi/g*	*08/15/14 18:30*	*09/08/14 12:05*	*1*
Pb-214	*0.532*		*0.234*	*0.239*		*0.381*	*pCi/g*	*08/15/14 18:30*	*09/08/14 12:05*	*1*
Tl-208	*0.428*		*0.155*	*0.160*		*0.181*	*pCi/g*	*08/15/14 18:30*	*09/08/14 12:05*	*1*

Client Sample ID: SD-278-01

Lab Sample ID: 680-102600-7

Date Collected: 06/20/14 10:05

Matrix: Solid

Date Received: 06/23/14 09:00

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	0.177	U	0.312	0.313		2.42	pCi/g	08/15/14 18:30	08/26/14 11:28	1
Radium-226	**0.773**		0.287	0.298	1.00	0.389	pCi/g	08/15/14 18:30	09/10/14 01:56	1
Actinium 228	**1.79**		0.440	0.476		0.573	pCi/g	08/15/14 18:30	08/26/14 11:28	1
Radium-228	**1.38**		0.390	0.414		0.528	pCi/g	08/15/14 18:30	09/10/14 01:56	1
Bismuth-212	0.799	U	1.25	1.25		2.09	pCi/g	08/15/14 18:30	08/26/14 11:28	1
Bismuth-214	**1.05**		0.293	0.313		0.335	pCi/g	08/15/14 18:30	08/26/14 11:28	1
Lead-210	1.33	U	1.90	1.91		2.98	pCi/g	08/15/14 18:30	08/26/14 11:28	1
Lead-212	**1.39**		0.225	0.288		0.288	pCi/g	08/15/14 18:30	08/26/14 11:28	1

Client Sample ID: SD-278-01

Date Collected: 06/20/14 10:05
Date Received: 06/23/14 09:00

Lab Sample ID: 680-102600-7

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-232	**1.38**		0.390	0.414		0.528	pCi/g	08/15/14 18:30	09/10/14 01:56	1
Lead-214	**1.18**		0.289	0.313		0.341	pCi/g	08/15/14 18:30	08/26/14 11:28	1
Uranium-235	0.275	U	0.457	0.458		0.678	pCi/g	08/15/14 18:30	09/10/14 01:56	1
Potassium-40	**18.4**		2.70	3.29		2.25	pCi/g	08/15/14 18:30	08/26/14 11:28	1
Uranium-238	1.92	U	0.872	0.895		2.12	pCi/g	08/15/14 18:30	09/10/14 01:56	1
Protactinium-231	0.690	U	0.624	0.628		4.85	pCi/g	08/15/14 18:30	08/26/14 11:28	1
Radium-226	**7.55**		2.53	2.85	1.00	2.90	pCi/g	08/15/14 18:30	08/26/14 11:28	1
Radium-228	**1.79**		0.440	0.476		0.573	pCi/g	08/15/14 18:30	08/26/14 11:28	1
Thorium-232	**1.79**		0.440	0.476		0.573	pCi/g	08/15/14 18:30	08/26/14 11:28	1
Thorium-234	1.40	U	1.96	1.96		3.01	pCi/g	08/15/14 18:30	08/26/14 11:28	1
Thallium-208	**0.475**		0.147	0.155		0.166	pCi/g	08/15/14 18:30	08/26/14 11:28	1
Uranium-235	0.150	U	0.515	0.515		0.944	pCi/g	08/15/14 18:30	08/26/14 11:28	1
Uranium-238	1.40	U	1.96	1.96		3.01	pCi/g	08/15/14 18:30	08/26/14 11:28	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Ac-228	*1.38*		*0.390*	*0.414*		*0.528*	*pCi/g*	*08/15/14 18:30*	*09/10/14 01:56*	*1*
Bi-214	*0.773*		*0.287*	*0.298*		*0.389*	*pCi/g*	*08/15/14 18:30*	*09/10/14 01:56*	*1*
K-40	*18.2*		*2.79*	*3.35*		*2.06*	*pCi/g*	*08/15/14 18:30*	*09/10/14 01:56*	*1*
Pb-212	*1.23*		*0.258*	*0.303*		*0.291*	*pCi/g*	*08/15/14 18:30*	*09/10/14 01:56*	*1*
Pb-214	*0.926*		*0.327*	*0.341*		*0.382*	*pCi/g*	*08/15/14 18:30*	*09/10/14 01:56*	*1*
Tl-208	*0.545*		*0.158*	*0.167*		*0.174*	*pCi/g*	*08/15/14 18:30*	*09/10/14 01:56*	*1*

Client Sample ID: SD-278-02

Date Collected: 06/20/14 10:10
Date Received: 06/23/14 09:00

Lab Sample ID: 680-102600-8

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	**0.586**		0.293	0.303		0.405	pCi/g	08/15/14 18:30	08/26/14 11:29	1
Radium-226	**0.769**		0.255	0.267	1.00	0.298	pCi/g	08/15/14 18:30	09/08/14 17:33	1
Actinium 228	**1.75**		0.518	0.548		0.431	pCi/g	08/15/14 18:30	08/26/14 11:29	1
Radium-228	**1.21**		0.321	0.344		0.457	pCi/g	08/15/14 18:30	09/08/14 17:33	1
Bismuth-212	**3.45**		1.37	1.41		1.30	pCi/g	08/15/14 18:30	08/26/14 11:29	1
Bismuth-214	**0.747**		0.258	0.270		0.350	pCi/g	08/15/14 18:30	08/26/14 11:29	1
Lead-210	0.773	U	1.37	1.38		2.18	pCi/g	08/15/14 18:30	08/26/14 11:29	1
Lead-212	**1.24**		0.232	0.282		0.267	pCi/g	08/15/14 18:30	08/26/14 11:29	1
Thorium-232	**1.21**		0.321	0.344		0.457	pCi/g	08/15/14 18:30	09/08/14 17:33	1
Lead-214	**0.820**		0.220	0.235		0.326	pCi/g	08/15/14 18:30	08/26/14 11:29	1
Uranium-235	0.235	U	0.273	0.274		0.409	pCi/g	08/15/14 18:30	09/08/14 17:33	1
Potassium-40	**16.1**		2.71	3.17		2.64	pCi/g	08/15/14 18:30	08/26/14 11:29	1
Uranium-238	1.68	U	0.827	0.845		1.77	pCi/g	08/15/14 18:30	09/08/14 17:33	1
Protactinium-231	1.81	U	1.59	1.61		3.58	pCi/g	08/15/14 18:30	08/26/14 11:29	1
Radium-226	-0.382	U	2.39	2.39	1.00	3.37	pCi/g	08/15/14 18:30	08/26/14 11:29	1
Radium-228	**1.75**		0.518	0.548		0.431	pCi/g	08/15/14 18:30	08/26/14 11:29	1

Client Sample ID: SD-278-02

Date Collected: 06/20/14 10:10
Date Received: 06/23/14 09:00

Lab Sample ID: 680-102600-8

Matrix: Solid

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Thorium-232	**1.75**		0.518	0.548		0.431	pCi/g	08/15/14 18:30	08/26/14 11:29	1
Thorium-234	1.59	U	1.29	1.31		2.04	pCi/g	08/15/14 18:30	08/26/14 11:29	1
Thallium-208	**0.560**		0.170	0.179		0.179	pCi/g	08/15/14 18:30	08/26/14 11:29	1
Uranium-235	0.410	U	0.458	0.460		0.714	pCi/g	08/15/14 18:30	08/26/14 11:29	1
Uranium-238	1.59	U	1.29	1.31		2.04	pCi/g	08/15/14 18:30	08/26/14 11:29	1

Other Detected Radionuclides	*Result*	*Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Ac-228	*1.21*		*0.321*	*0.344*		*0.457*	*pCi/g*	*08/15/14 18:30*	*09/08/14 17:33*	*1*
Bi-214	*0.769*		*0.255*	*0.267*		*0.298*	*pCi/g*	*08/15/14 18:30*	*09/08/14 17:33*	*1*
K-40	*17.8*		*2.80*	*3.34*		*2.64*	*pCi/g*	*08/15/14 18:30*	*09/08/14 17:33*	*1*
Pb-212	*1.60*		*0.210*	*0.295*		*0.187*	*pCi/g*	*08/15/14 18:30*	*09/08/14 17:33*	*1*
Pb-214	*0.977*		*0.243*	*0.263*		*0.225*	*pCi/g*	*08/15/14 18:30*	*09/08/14 17:33*	*1*
Tl-208	*0.620*		*0.146*	*0.160*		*0.116*	*pCi/g*	*08/15/14 18:30*	*09/08/14 17:33*	*1*

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-138233/1-A
Matrix: Solid
Analysis Batch: 142442

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 138233

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.4531	U	0.380	0.382	1.00	0.589	pCi/g	08/15/14 18:30	09/08/14 10:44	1
Radium-228	0.2550	U	0.581	0.581		1.13	pCi/g	08/15/14 18:30	09/08/14 10:44	1
Thorium-232	0.2550	U	0.581	0.581		1.13	pCi/g	08/15/14 18:30	09/08/14 10:44	1
Uranium-235	0.1111	U	0.644	0.644		1.12	pCi/g	08/15/14 18:30	09/08/14 10:44	1
Uranium-238	-1.928	U	6.55	6.55		3.56	pCi/g	08/15/14 18:30	09/08/14 10:44	1

Other Detected Radionuclides	*MB Result*	*MB Qualifier*	*Count Uncert. (2σ+/-)*	*Total Uncert. (2σ+/-)*	*RL*	*MDC*	*Unit*	*Prepared*	*Analyzed*	*Dil Fac*
Other Detected Radionuclide	*None*						*pCi/g*	*08/15/14 18:30*	*09/08/14 10:44*	*1*

Lab Sample ID: LCS 160-138233/2-A
Matrix: Solid
Analysis Batch: 142447

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 138233

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	981	1013		100		2.01	pCi/g	103	87 - 116
Cesium-137	362	381.8		37.3		1.38	pCi/g	105	87 - 120
Cobalt-60	382	416.1		40.0		0.955	pCi/g	109	87 - 115

Lab Sample ID: 680-102600-6 DU
Matrix: Solid
Analysis Batch: 142447

Client Sample ID: SD-278-SS
Prep Type: Total/NA
Prep Batch: 138233

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Radium-226	0.948		0.6753		0.254	1.00	0.271	pCi/g	0.45	1
Radium-228	1.83		1.609		0.437		0.259	pCi/g	0.24	1
Thorium-232	1.83		1.609		0.437		0.259	pCi/g	0.24	1
Uranium-235	0.188	U	0.1930	U	0.318		0.531	pCi/g	0.01	1
Uranium-238	1.90	U	0.3359	U	0.414		1.90	pCi/g	0.70	1

Lab Sample ID: MB 160-140177/1-A
Matrix: Solid
Analysis Batch: 140267

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 140177

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Actinium-227	-0.4512	U	0.668	0.669		1.11	pCi/g	08/15/14 18:30	08/26/14 11:36	1
Actinium 228	0.1887	U	0.267	0.268		0.539	pCi/g	08/15/14 18:30	08/26/14 11:36	1
Bismuth-212	0.1466	U	1.01	1.01		1.80	pCi/g	08/15/14 18:30	08/26/14 11:36	1
Bismuth-214	-0.07571	U	0.332	0.332		0.422	pCi/g	08/15/14 18:30	08/26/14 11:36	1
Lead-210	-0.07242	U	1.64	1.64		2.46	pCi/g	08/15/14 18:30	08/26/14 11:36	1
Lead-212	0.2592		0.185	0.187		0.256	pCi/g	08/15/14 18:30	08/26/14 11:36	1
Lead-214	0.1092	U	0.195	0.195		0.318	pCi/g	08/15/14 18:30	08/26/14 11:36	1
Potassium-40	-2.315	U	92.6	92.6		2.63	pCi/g	08/15/14 18:30	08/26/14 11:36	1
Protactinium-231	1.014	U	2.07	2.07		3.50	pCi/g	08/15/14 18:30	08/26/14 11:36	1

Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: MB 160-140177/1-A
Matrix: Solid
Analysis Batch: 140267

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 140177

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.9427	U	2.13	2.14	1.00	3.10	pCi/g	08/15/14 18:30	08/26/14 11:36	1
Radium-228	0.1887	U	0.267	0.268		0.539	pCi/g	08/15/14 18:30	08/26/14 11:36	1
Thorium-232	0.1887	U	0.267	0.268		0.539	pCi/g	08/15/14 18:30	08/26/14 11:36	1
Thorium-234	-0.9281	U	2.43	2.43		2.36	pCi/g	08/15/14 18:30	08/26/14 11:36	1
Thallium-208	-0.07418	U	0.218	0.218		0.205	pCi/g	08/15/14 18:30	08/26/14 11:36	1
Uranium-235	0.1587	U	0.280	0.281		0.679	pCi/g	08/15/14 18:30	08/26/14 11:36	1
Uranium-238	-0.9281	U	2.43	2.43		2.36	pCi/g	08/15/14 18:30	08/26/14 11:36	1

Lab Sample ID: LCS 160-140177/2-A
Matrix: Solid
Analysis Batch: 140271

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 140177

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Americium-241	981	995.9		98.7		1.98	pCi/g	101	87 - 116
Cesium-137	362	369.5		36.1		1.33	pCi/g	102	87 - 120
Cobalt-60	384	412.8		39.6		0.977	pCi/g	108	87 - 115

Lab Sample ID: 680-102600-6 DU
Matrix: Solid
Analysis Batch: 140267

Client Sample ID: SD-278-SS
Prep Type: Total/NA
Prep Batch: 140177

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Actinium-227	0.743	U	0.2976	U	0.429		0.710	pCi/g	0.48	1
Actinium 228	1.15		1.141		0.459		0.595	pCi/g	0	1
Bismuth-212	0.000	U	1.491	U	1.23		1.91	pCi/g	0.36	1
Bismuth-214	0.567	U	0.9441		0.300		0.345	pCi/g	0.48	1
Lead-210	3.22	U	3.103		1.97		2.60	pCi/g	0.03	1
Lead-212	0.773		0.9958		0.234		0.296	pCi/g	0.38	1
Lead-214	0.626	U	0.7779		0.297		0.366	pCi/g	0.23	1
Potassium-40	14.7		15.59		3.09		2.53	pCi/g	0.12	1
Protactinium-231	-0.126	U	-0.03342	U	0.0765		4.10	pCi/g	0.21	1
Radium-226	5.35		3.887		2.98	1.00	3.52	pCi/g	0.22	1
Radium-228	1.15		1.141		0.459		0.595	pCi/g	0	1
Thorium-232	1.15		1.141		0.459		0.595	pCi/g	0	1
Thorium-234	3.30	U	0.9843	U	0.858		2.26	pCi/g	0.74	1
Thallium-208	0.371		0.3704		0.160		0.192	pCi/g	0	1
Uranium-235	0.614	U	0.4186	U	0.481		0.774	pCi/g	0.17	1
Uranium-238	3.30	U	0.9843	U	0.858		2.26	pCi/g	0.74	1

Rad

Leach Batch: 136843

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102600-6	SD-278-SS	Total/NA	Solid	Dry and Grind	
680-102600-6 DU	SD-278-SS	Total/NA	Solid	Dry and Grind	
680-102600-7	SD-278-01	Total/NA	Solid	Dry and Grind	
680-102600-8	SD-278-02	Total/NA	Solid	Dry and Grind	

Leach Batch: 137170

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102600-6	SD-278-SS	Total/NA	Solid	Dry and Grind	
680-102600-6 DU	SD-278-SS	Total/NA	Solid	Dry and Grind	
680-102600-7	SD-278-01	Total/NA	Solid	Dry and Grind	
680-102600-8	SD-278-02	Total/NA	Solid	Dry and Grind	

Prep Batch: 138233

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102600-6	SD-278-SS	Total/NA	Solid	Fill_Geo-21	136843
680-102600-6 DU	SD-278-SS	Total/NA	Solid	Fill_Geo-21	136843
680-102600-7	SD-278-01	Total/NA	Solid	Fill_Geo-21	136843
680-102600-8	SD-278-02	Total/NA	Solid	Fill_Geo-21	136843
LCS 160-138233/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
MB 160-138233/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	

Prep Batch: 140177

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102600-6	SD-278-SS	Total/NA	Solid	Fill_Geo-0	137170
680-102600-6 DU	SD-278-SS	Total/NA	Solid	Fill_Geo-0	137170
680-102600-7	SD-278-01	Total/NA	Solid	Fill_Geo-0	137170
680-102600-8	SD-278-02	Total/NA	Solid	Fill_Geo-0	137170
LCS 160-140177/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-0	
MB 160-140177/1-A	Method Blank	Total/NA	Solid	Fill_Geo-0	

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102600-3
SDG: 680102600-1

Client Sample ID: SD-278-SS

Lab Sample ID: 680-102600-6

Date Collected: 06/20/14 10:00

Matrix: Solid

Date Received: 06/23/14 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			137170	08/12/14 08:37	DRO	TAL SL
Total/NA	Prep	Fill_Geo-0			140177	08/15/14 18:30	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	140269	08/26/14 11:33	SMP	TAL SL
Total/NA	Leach	Dry and Grind			136843	08/08/14 12:50	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			138233	08/15/14 18:30	MJS	TAL SL
Total/NA	Analysis	GA-01-R		1	142436	09/08/14 12:05	EMN	TAL SL

Client Sample ID: SD-278-01

Lab Sample ID: 680-102600-7

Date Collected: 06/20/14 10:05

Matrix: Solid

Date Received: 06/23/14 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			137170	08/12/14 08:37	DRO	TAL SL
Total/NA	Prep	Fill_Geo-0			140177	08/15/14 18:30	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	140266	08/26/14 11:28	SMP	TAL SL
Total/NA	Leach	Dry and Grind			136843	08/08/14 12:50	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			138233	08/15/14 18:30	MJS	TAL SL
Total/NA	Analysis	GA-01-R		1	143250	09/10/14 01:56	SMP	TAL SL

Client Sample ID: SD-278-02

Lab Sample ID: 680-102600-8

Date Collected: 06/20/14 10:10

Matrix: Solid

Date Received: 06/23/14 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			137170	08/12/14 08:37	DRO	TAL SL
Total/NA	Prep	Fill_Geo-0			140177	08/15/14 18:30	JDL	TAL SL
Total/NA	Analysis	GA-01-R		1	140264	08/26/14 11:29	SMP	TAL SL
Total/NA	Leach	Dry and Grind			136843	08/08/14 12:50	DRO	TAL SL
Total/NA	Prep	Fill_Geo-21			138233	08/15/14 18:30	MJS	TAL SL
Total/NA	Analysis	GA-01-R		1	142447	09/08/14 17:33	EMN	TAL SL

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Certification Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102600-3
SDG: 680102600-1

Laboratory: TestAmerica Savannah

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
	AFCEE		SAVLAB	
A2LA	DoD ELAP		399.01	02-28-15
A2LA	ISO/IEC 17025		399.01	02-28-15
Alabama	State Program	4	41450	06-30-15
Arkansas DEQ	State Program	6	88-0692	01-31-15
California	NELAP	9	3217CA	07-31-14 *
Colorado	State Program	8	N/A	12-31-14
Connecticut	State Program	1	PH-0161	03-31-15
Florida	NELAP	4	E87052	06-30-15
GA Dept. of Agriculture	State Program	4	N/A	06-12-17
Georgia	State Program	4	N/A	06-30-15
Georgia	State Program	4	803	06-30-15
Guam	State Program	9	09-005r	04-16-15
Hawaii	State Program	9	N/A	06-30-15
Illinois	NELAP	5	200022	11-30-14
Indiana	State Program	5	N/A	06-30-15
Iowa	State Program	7	353	07-01-15
Kentucky (DW)	State Program	4	90084	12-31-14
Kentucky (UST)	State Program	4	18	06-30-15
Louisiana	NELAP	6	30690	06-30-14 *
Louisiana (DW)	NELAP	6	LA140023	12-31-14
Maine	State Program	1	GA00006	08-16-14 *
Maryland	State Program	3	250	12-31-14
Massachusetts	State Program	1	M-GA006	06-30-15
Michigan	State Program	5	9925	06-30-15
Mississippi	State Program	4	N/A	06-30-15
Montana	State Program	8	CERT0081	01-01-15
Nebraska	State Program	7	TestAmerica-Savannah	06-30-15
New Jersey	NELAP	2	GA769	06-30-15
New Mexico	State Program	6	N/A	06-30-15
New York	NELAP	2	10842	03-31-15
North Carolina (DW)	State Program	4	13701	07-31-15
North Carolina (WW/SW)	State Program	4	269	12-31-14
Oklahoma	State Program	6	9984	08-31-14 *
Pennsylvania	NELAP	3	68-00474	06-30-15
Puerto Rico	State Program	2	GA00006	12-31-14
South Carolina	State Program	4	98001	06-30-14 *
Tennessee	State Program	4	TN02961	06-30-15
Texas	NELAP	6	T104704185-08-TX	11-30-14
USDA	Federal		SAV 3-04	06-11-17
Virginia	NELAP	3	460161	06-14-15
Washington	State Program	10	C805	06-10-15
West Virginia (DW)	State Program	3	9950C	12-31-14
West Virginia DEP	State Program	3	94	06-30-15
Wisconsin	State Program	5	999819810	08-31-15
Wyoming	State Program	8	8TMS-L	06-30-15

Laboratory: TestAmerica St. Louis

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

* Certification renewal pending - certification considered valid.

Certification Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102600-3
SDG: 680102600-1

Laboratory: TestAmerica St. Louis (Continued)

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska	State Program	10	MO00054	06-30-15
California	NELAP	9	2886	03-31-15
Connecticut	State Program	1	PH-0241	03-31-15
Florida	NELAP	4	E87689	06-30-15
Illinois	NELAP	5	200023	11-30-14
Iowa	State Program	7	373	12-01-14
Kansas	NELAP	7	E-10236	10-31-14 *
Kentucky (DW)	State Program	4	90125	12-31-14
L-A-B	DoD ELAP		L2305	01-10-16
Louisiana	NELAP	6	04080	06-30-15
Maryland	State Program	3	310	09-30-15
Missouri	State Program	7	780	06-30-14 *
Nevada	State Program	9	MO000542013-1	07-31-14 *
New Jersey	NELAP	2	MO002	06-30-15
New Mexico	State Program	6		06-30-10 *
New York	NELAP	2	11616	03-31-15
North Dakota	State Program	8	R207	06-30-14 *
NRC	NRC		24-24817-01	12-31-22
Oklahoma	State Program	6	9997	08-31-15
Pennsylvania	NELAP	3	68-00540	02-28-15
South Carolina	State Program	4	85002001	06-30-14 *
Texas	NELAP	6	T104704193-13-6	07-31-15
USDA	Federal		P330-07-00122	01-09-17
Utah	NELAP	8	MO000542013-5	07-31-15
Virginia	NELAP	3	460230	06-14-15
Washington	State Program	10	C592	08-30-15
West Virginia DEP	State Program	3	381	12-31-14 *

* Certification renewal pending - certification considered valid.

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102600-3
SDG: 680102600-1

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL

Protocol References:

DOE = U.S. Department of Energy

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102600-3
SDG: 680102600-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-102600-6	SD-278-SS	Solid	06/20/14 10:00	06/23/14 09:00
680-102600-7	SD-278-01	Solid	06/20/14 10:05	06/23/14 09:00
680-102600-8	SD-278-02	Solid	06/20/14 10:10	06/23/14 09:00

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102600-3

SDG No.: 680102600-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
25mL Solid_00002	03/01/16		Eckert & Ziegler, Lot 83814-334		(Purchased Reagent)		Americium-241	211 Bq
							Cd-109	2880 Bq
							Ce-139	96 Bq
							Cesium-137	80 Bq
							Co-57	62 Bq
							Cobalt-60	131 Bq
							Hg-203	207 Bq
							Lead-210	2573 Bq
							Sn-113	169 Bq
							Y-88	276 Bq
25mL solid_00003	02/09/17		Eckert & Ziegler, Lot 90099		(Purchased Reagent)		Americium-241	205 Bq
							Cd-109	2883 Bq
							Ce-139	97 Bq
							Cesium-137	82 Bq
							Co-57	64 Bq
							Cobalt-60	129 Bq
							Hg-203	206 Bq
							Lead-210	3630 Bq
							Sn-113	170 Bq
							Y-88	170 Bq
25mLD=1_00001	03/02/16		Eckert & Ziegler, Lot 83925-334		(Purchased Reagent)		Americium-241	867.9 Bq
							Cd-109	12608 Bq
							Ce-139	418.6 Bq
							Cesium-137	349.5 Bq
							Co-57	273 Bq
							Cobalt-60	574.7 Bq
							Hg-203	905.4 Bq
							Sn-113	741.4 Bq
							Y-88	1209 Bq
25mLD=1_00002	02/09/17		Eckert & Ziegler, Lot 90101		(Purchased Reagent)		Americium-241	864.4 Bq
							Cd-109	12507 Bq
							Ce-139	419.6 Bq
							Cesium-137	356.9 Bq
							Co-57	276.6 Bq
							Cobalt-60	561.2 Bq
							Hg-203	893.6 Bq
							Sn-113	738.1 Bq
							Y-88	1214.6 Bq
25mLD=1_00004	03/02/16		Eckert & Ziegler, Lot 81593-334		(Purchased Reagent)		Americium-241	928.5 Bq
							Cesium-137	370.8 Bq
							Cobalt-60	592 Bq
25mLD=1_00005	07/01/66		Eckert & Ziegler, Lot 85520-334		(Purchased Reagent)		Americium-241	912.4 Bq
							Cd-109	12877.9 Bq
							Ce-139	432.4 Bq
							Cesium-137	364.3 Bq
							Co-57	290.2 Bq

Lab Name: TestAmerica St. Louis Job No.: 680-102600-3

SDG No.: 680102600-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Cobalt-60	573.6 Bq
							Hg-203	936.3 Bq
							Sn-113	749.5 Bq
							Y-88	1243.2 Bq
25mLD=1_00006	11/19/14	Eckert & Ziegler, Lot 85520-334			(Purchased Reagent)		Americium-241	2191.11 dpm/g
							Cesium-137	874.93 dpm/g
							Cobalt-60	1377.46 dpm/g
Source C_00001	04/01/59	02/23/12	water, Lot 79670-334	1.0148 g	Gamma Ampuole_00001	1.0148 g	Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
.Gamma Ampuole_00001	04/07/59	Analytics, Lot 79670-334			(Purchased Reagent)		Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
Source D_00001	04/01/59	02/23/11	water, Lot 79670-334	0.9781 g	Gamma Ampuole_00001	0.9781 g	Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
.Gamma Ampuole_00001	04/07/59	Analytics, Lot 79670-334			(Purchased Reagent)		Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
Source E_00001	04/01/59	02/23/11	water, Lot 79670-334	1.0205 g	Gamma Ampuole_00001	1.0205 g	Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102600-3

SDG No.: 680102600-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
.Gamma Ampuole_00001	04/07/59		Analytics, Lot 79670-334		(Purchased Reagent)		Americium-241	9442.9 Bq
							Cd-109	132909 Bq
							Ce-139	4453.8 Bq
							Cesium-137	3729.6 Bq
							Co-57	2951.3 Bq
							Cobalt-60	6200.2 Bq
							Hg-203	9699.6 Bq
							Sn-113	7626.6 Bq
							Y-88	12712 Bq
Source H_00002	01/01/51	01/01/12	wataer, Lot 83725-334	10 mL	Gamma Ampuole_00003	2.1184 g	Americium-241	1924.27 Bq
							Cd-109	27950 Bq
							Ce-139	927.965 Bq
							Cesium-137	774.911 Bq
							Co-57	605.079 Bq
							Cobalt-60	1273.92 Bq
							Hg-203	2007.23 Bq
							Sn-113	1643.41 Bq
							Y-88	2681.34 Bq
.Gamma Ampuole_00003	01/19/61		Analytics, Lot 83725-334		(Purchased Reagent)		Americium-241	9083.6 Bq
							Cd-109	131939 Bq
							Ce-139	4380.5 Bq
							Cesium-137	3658 Bq
							Co-57	2856.3 Bq
							Cobalt-60	6013.6 Bq
							Hg-203	9475.2 Bq
							Sn-113	7757.8 Bq
							Y-88	12657.4 Bq
Tuna Can LCS_00002	01/22/14		Analytics, Lot 74139-334		(Purchased Reagent)		Americium-241	219 dpm/g
							Cesium-137	82.3 dpm/g
							Cobalt-60	136 dpm/g
Tuna Can LCS_00003	10/31/14		Analytics, Lot 74139-334		(Purchased Reagent)		Americium-241	219 dpm/g
							Cesium-137	82.3 dpm/g
							Cobalt-60	136 dpm/g

Reagent

25mL Solid_00002

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
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Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

83814-334

1.0 Liter Sand in 1 Liter Wide Mouth HDPE Silgan Jar

Customer: Test America St. Louis
P.O. No.: 2395112, Item 1
Reference Date: 01-Jan-2011 12:00 PM EST **Grams of Master Source:** 0.016927

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Pb-210	46.5	8.120E+03	———	3.021E+03	0.1	2.1	4.1	4π LS
Am-241	59.5	1.580E+05	———	2.090E+03	0.1	1.7	3.5	4π LS
Cd-109	88.0	4.626E+02	1.697E+05	2.873E+03	0.8	2.3	4.9	HPGe
Co-57	122.1	2.718E+02	8.711E+04	1.475E+03	0.5	2.0	4.1	HPGe
Ce-139	165.9	1.376E+02	1.247E+05	2.111E+03	0.5	1.9	3.9	HPGe
Hg-203	279.2	4.661E+01	2.753E+05	4.660E+03	0.4	1.9	3.9	HPGe
Sn-113	391.7	1.151E+02	1.769E+05	2.994E+03	0.5	1.9	3.9	HPGe
Cs-137	661.7	1.098E+04	1.109E+05	1.877E+03	0.7	1.9	4.0	HPGe
Y-88	898.0	1.066E+02	4.224E+05	7.150E+03	0.5	1.9	3.9	HPGe
Co-60	1173.2	1.925E+03	2.142E+05	3.626E+03	0.6	1.9	4.0	HPGe
Co-60	1332.5	1.925E+03	2.143E+05	3.627E+03	0.6	1.9	4.0	HPGe
Y-88	1836.1	1.066E+02	4.472E+05	7.570E+03	0.5	1.9	3.9	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Corporate Office
Laboratory

Comments:
1550 grams of sand. Homogeneous down to 10 gram aliquot.
This standard will expire one year after the reference date.

Source Prepared by: _____
Z. Dimitrova, Radiochemist

QA Approved: _____ Date: 2/11/11
J. D. McCorvey, QA Manager Alternate

Reagent

25mL solid_00003

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
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Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

90099

1.0 Liter Sand in 1 Liter Wide Mouth HDPE Silgan Jar

Customer: TestAmerica St. Louis / Earth City, MO
P.O. No.: 2454150, Item 1
Reference Date: 01-Jan-2012 12:00 PM EST **Grams of Master Source:** 0.017180

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Additional radionuclides were added gravimetrically from solutions calibrated by gamma-ray spectrometry, ionization chamber, or liquid scintillation counting. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty* , % Type u_A	u_B	U	Calibration Method*
Pb-210	46.5	8.109E+03	———	3.094E+03	0.1	2.1	4.1	4π LS
Am-241	59.5	1.580E+05	———	2.037E+03	0.1	1.7	3.5	4π LS
Cd-109	88.0	4.626E+02	1.677E+05	2.881E+03	0.5	2.3	4.7	HPGe
Co-57	122.1	2.718E+02	8.795E+04	1.511E+03	0.4	2.0	4.1	HPGe
Ce-139	165.9	1.376E+02	1.245E+05	2.139E+03	0.4	1.9	3.9	HPGe
Hg-203	279.2	4.661E+01	2.707E+05	4.651E+03	0.3	1.9	3.8	HPGe
Sn-113	391.7	1.151E+02	1.755E+05	3.015E+03	0.4	1.9	3.9	HPGe
Cs-137	661.7	1.098E+04	1.128E+05	1.938E+03	0.7	1.9	4.0	HPGe
Y-88	898.0	1.066E+02	4.228E+05	7.264E+03	0.5	1.9	3.9	HPGe
Co-60	1173.2	1.925E+03	2.084E+05	3.580E+03	0.6	1.9	4.0	HPGe
Co-60	1332.5	1.925E+03	2.084E+05	3.581E+03	0.7	1.9	4.0	HPGe
Y-88	1836.1	1.066E+02	4.476E+05	7.690E+03	0.7	1.9	4.0	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Corporate Office

Comments:
1550 grams of sand. Homogenous down to 10 grams aliquot.
This standard will expire one year after the reference date.

Source Prepared by: _____
Z. Dimitrova, Radiochemist

QA Approved: _____ Date: 30 JAN 12
J.D. McCorvey, Counting Room Manager

Reagent

25mLD=1_00001

Eckert & Ziegler
Analytics

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CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

83925-334

5 mL Liquid in Flame Sealed Vial

Customer: Test America St. Louis
P.O. No.: 2401509, Item 2
Reference Date: 01-Jan-2011 12:00 PM EST **Grams of Master Source:** 0.028010

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty , % Type u_A	u_B	U	Calibration Method
Am-241	59.5	1.580E+05	———	3.254E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	4.626E+02	1.697E+05	4.753E+03	0.8	1.7	3.8	HPGe
Co-57	122.1	2.718E+02	8.711E+04	2.440E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	1.376E+02	1.247E+05	3.493E+03	0.5	1.1	2.4	HPGe
Hg-203	279.2	4.661E+01	2.753E+05	7.711E+03	0.4	1.1	2.3	HPGe
Sn-113	391.7	1.151E+02	1.769E+05	4.955E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	1.098E+04	1.109E+05	3.106E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	1.066E+02	4.224E+05	1.183E+04	0.5	1.1	2.4	HPGe
Co-60	1173.2	1.925E+03	2.142E+05	6.000E+03	0.6	1.1	2.5	HPGe
Co-60	1332.5	1.925E+03	2.143E+05	6.003E+03	0.6	1.1	2.5	HPGe
Y-88	1836.1	1.066E+02	4.472E+05	1.253E+04	0.5	1.1	2.4	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Comments:
5.29152 g 4M HCl solution with approximately 30 µg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the reference date.

Source Prepared by: _____
W. Mao, Radiochemist

QA Approved: _____ Date: 2/23/11
J. D. McCorvey, QA Manager Alternate

Reagent

25mLD=1_00002

Eckert & Ziegler
Analytics

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CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

90101
5 mL Liquid in Flame Sealed Vial

Customer: TestAmerica St. Louis / Earth City, MO
P.O. No.: 2454150, Item 3
Reference Date: 01-Jan-2012 12:00 PM EST **Grams of Master Source:** 0.028219

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty* , % Type u_A	u_B	U	Calibration Method*
Am-241	59.5	1.580E+05	———	3.253E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	4.626E+02	1.677E+05	4.733E+03	0.5	1.7	3.5	HPGe
Co-57	122.1	2.718E+02	8.795E+04	2.482E+03	0.4	1.3	2.7	HPGe
Ce-139	165.9	1.376E+02	1.245E+05	3.514E+03	0.4	1.1	2.3	HPGe
Hg-203	279.2	4.661E+01	2.707E+05	7.639E+03	0.3	1.1	2.3	HPGe
Sn-113	391.7	1.151E+02	1.755E+05	4.952E+03	0.4	1.1	2.3	HPGe
Cs-137	661.7	1.098E+04	1.128E+05	3.184E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	1.066E+02	4.228E+05	1.193E+04	0.5	1.1	2.4	HPGe
Co-60	1173.2	1.925E+03	2.084E+05	5.881E+03	0.6	1.1	2.5	HPGe
Co-60	1332.5	1.925E+03	2.084E+05	5.882E+03	0.7	1.1	2.6	HPGe
Y-88	1836.1	1.066E+02	4.476E+05	1.263E+04	0.7	1.1	2.6	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia 30318

Comments:
5.31144g 4M HCl solution with approximately 30 µg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the reference date.

Source Prepared by: _____
M. Williford, Radiochemist

QA Approved: _____ Date: 30 JAN 12
J.D. McCorvey, Counting Room Manager

Reagent

25mLD=1_00004

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

81593-334

5 mL Liquid in Flame Sealed Vial

Customer: Test America/Earth City, MO
P.O. No.: 2344874, Item 2
Reference Date: 01-Jan-2010 12:00 PM EST **Grams of Master Source:** 0.030007

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty , % Type u_A	u_B	U	Calibration Method
Am-241	59.5	1.580E+05	———	3.474E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	4.626E+02	1.606E+05	4.819E+03	0.4	1.7	3.5	HPGe
Co-57	122.1	2.718E+02	8.471E+04	2.542E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	1.376E+02	1.209E+05	3.628E+03	0.4	1.1	2.4	HPGe
Hg-203	279.2	4.661E+01	2.726E+05	8.180E+03	0.4	1.1	2.3	HPGe
Sn-113	391.7	1.151E+02	1.672E+05	5.017E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	1.098E+04	1.096E+05	3.289E+03	0.6	1.2	2.7	HPGe
Y-88	898.0	1.066E+02	4.077E+05	1.223E+04	0.4	1.1	2.4	HPGe
Co-60	1173.2	1.925E+03	2.055E+05	6.166E+03	0.5	1.1	2.4	HPGe
Co-60	1332.5	1.925E+03	2.056E+05	6.169E+03	0.7	1.1	2.6	HPGe
Y-88	1836.1	1.066E+02	4.308E+05	1.293E+04	0.5	1.1	2.4	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

70016
ID: 0.5L Marn LCS_000
Exp:01/01/50 Prpd:JW Opn:03/
Gamma 05L Marn LCS

ACCREDITED SOURCE CALIBRATION LABORATORY
HEALTH PHYSICS SOCIETY
FOUNDED 1956

Comments:
5.31128 grams 4M HCl solution with approximately 30 microg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y.
This standard will expire one year after the reference date.

Source Prepared by: _____
W. Mao, Radiochemist

QA Approved: _____ for _____ Date: 2-22-10
J. D. McCorvey, QA Manager Alternate

Reagent

25mLD=1_00005

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

85520-334

5 mL Liquid in Flame Sealed Vial

Customer: Test America St. Louis
P.O. No.: 2434437, Item 1
Reference Date: 01-Jul-2011 12:00 PM EST **Grams of Master Source:** 0.029166

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	1.580E+05	———	3.368E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	4.626E+02	1.639E+05	4.780E+03	0.5	1.7	3.5	HPGe
Co-57	122.1	2.718E+02	8.758E+04	2.554E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	1.376E+02	1.218E+05	3.552E+03	0.5	1.1	2.4	HPGe
Hg-203	279.2	4.661E+01	2.692E+05	7.851E+03	0.4	1.1	2.3	HPGe
Sn-113	391.7	1.151E+02	1.691E+05	4.932E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	1.098E+04	1.093E+05	3.188E+03	0.6	1.2	2.7	HPGe
Y-88	898.0	1.066E+02	4.105E+05	1.197E+04	0.4	1.1	2.3	HPGe
Co-60	1173.2	1.925E+03	2.022E+05	5.897E+03	0.5	1.1	2.4	HPGe
Co-60	1332.5	1.925E+03	2.022E+05	5.897E+03	0.5	1.1	2.4	HPGe
Y-88	1836.1	1.066E+02	4.346E+05	1.268E+04	0.5	1.1	2.4	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1956

Comments:
5.32298 g 4M HCl solution with approximately 30 µg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the reference date.

Source Prepared by: _____
Z. Dimitrova, Radiochemist

QA Approved: _____ Date: 8/18/11
J. D. McCorvey, QA Manager Alternate

Reagent

25mLD=1_00006

St. Louis Radiological Standard Reverification Form

Standard ID Number: 25mLD=1_00006 (255235)
True Value = 912.96 Bq/Sample
Date Analyzed: 11/19/2013

Radionuclide: Am-241

	Replicates	
#1	952.6	Bq/Sample
#2	944.9	Bq/Sample
#3	929.5	Bq/Sample

Mean = 942.3333

1 sigma = 11.76194

1.96 sigma = 23.05341

True Value minus 5% = 867.312 (True Value - 5%)
True Value plus 5% = 958.608 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? Yes **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? Yes **(Acceptance Criteria)**

Standard Reverification Acceptable? Yes

Note: Criteria for reverification of radiological standards is taken from the DOE QSAS and LANL Statements of Work

Reviewed By/Date: Jody Watson 11/22/13

SOP Reference: STL-QA-0002, Current Revision

St. Louis Radiological Standard Reverification Form

Standard ID Number: 25mLD=1_00006 (255235)
True Value = 364.56 Bq/Sample
Date Analyzed: 11/19/2013

Radionuclide: Cs-137

	Replicates	
#1	384.1	Bq/Sample
#2	379.3	Bq/Sample
#3	375.5	Bq/Sample

Mean = 379.6333

1 sigma = 4.309679

1.96 sigma = 8.446971

True Value minus 5% = 346.332 (True Value - 5%)
True Value plus 5% = 382.788 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? Yes **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? Yes **(Acceptance Criteria)**

Standard Reverification Acceptable? Yes

Note: Criteria for reverification of radiological standards is taken from the DOE QSAS and LANL Statements of Work

Reviewed By/Date: Jody Watson 11/22/13

SOP Reference: STL-QA-0002, Current Revision

St. Louis Radiological Standard Reverification Form

Standard ID Number: 25mLD=1_00006 (255235)
True Value = 573.94 Bq/Sample
Date Analyzed: 11/19/2013

Radionuclide: Co-60

	Replicates	
#1	594.4	Bq/Sample
#2	587.6	Bq/Sample
#3	580.1	Bq/Sample

Mean = 587.3667

1 sigma = 7.152855

1.96 sigma = 14.0196

True Value minus 5% = 545.243 (True Value - 5%)
True Value plus 5% = 602.637 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? Yes **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? Yes **(Acceptance Criteria)**

Standard Reverification Acceptable? Yes

Note: Criteria for reverification of radiological standards is taken from the DOE QSAS and LANL Statements of Work

Reviewed By/Date: Jody Watson 11/22/13

SOP Reference: STL-QA-0002, Current Revision

Gamma LCS per Geometry - 25mL D=1

Reagent ID: 25mLD=1_00006
Container: 255235
Reference date 1/1/2011
Calibration Standard: 85520-334
Standard volume: 5.32298 g/vial
Standard volume transferred: 0.518 g/geometry

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	dpm/g	Bq/sample
Am-241	3368	327.8	0.359	105748.46	912.96
Cs-137	3188	310.2	0.851	42226.51	364.56
Co-60	5897	573.9	0.999856	66479.86	573.94

Reviewed By: Jody Watson

Date: 12/1/2013

SOP Reference: ST-RD-0102, Current Rev **Form:** RAD-0080 **Revised:** 11/27/2013

Test America St. Louis Spectrum ID: 10_85520-334_20130886

Sample Description: 25mL d=1_85520-334_2011Cal
Detector: Ge10 S/N08316756
Batch ID: 25mL d
Work Order Number: 85520-334
Lot Number: 2011Cal

Decay to Time: 7/1/2011 12:00 Live Time: 7200 sec
Acquisition Time: 11/19/2013 12:24:33 Real Time: 7382 sec
Analysis Time: 11/19/2013 14:27 Dead Time: 2.47 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 10_Liquid_D=1 25ml.Clb
Efficiency Cal Desc: 10_25mlD=1_90101_030512
Efficiency Cal Date: 3/7/2012 13:02
Energy Cal Date: 2/23/2012 09:27
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 10_2013-11-02_0117.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
K-40	3.824E+00	46.0	1.757E+00	1.767E+00	5.698E+00
CO-60	5.944E+02	0.3	2.007E+00	2.854E+01	1.216E+00
CS-134	-2.768E-01	142.1	3.933E-01	3.936E-01	2.285E+00
CS-137	3.841E+02	0.4	1.692E+00	1.878E+01	1.408E+00
EU-152	3.968E+01	0.9	3.543E-01	1.957E+00	3.469E+00
EU-154	1.757E+00	31.0	5.454E-01	5.519E-01	1.567E+01
EU-155	1.894E-01	103.1	1.953E-01	1.956E-01	2.497E+00
TL-208	-1.517E-01	1035.0	1.570E+00	1.570E+00	2.567E+00
PB-210	-5.279E+00	33190.0	1.752E+03	1.752E+03	2.261E+01
PB-212	1.052E+00	77.7	8.170E-01	8.190E-01	3.504E+00
PB-214	2.825E-01	206.0	5.819E-01	5.821E-01	2.202E+00
BI-212	2.082E-02	55190.0	1.149E+01	1.149E+01	3.832E+01
BI-214	-5.390E-02	121.4	6.543E-02	6.548E-02	2.226E+00
AC-228	2.041E+00	132.4	2.703E+00	2.705E+00	8.961E+00
Pa-234	2.256E+00	115.7	2.611E+00	2.613E+00	2.093E+00
TH-234	1.136E+00	79.8	9.057E-01	9.074E-01	7.957E+00
PA-234M	5.972E+01	103.4	6.172E+01	6.179E+01	2.259E+02
U-235	5.344E-01	185.0	9.886E-01	9.889E-01	3.283E+00
AM-241	9.526E+02	0.2	2.082E+00	4.724E+01	2.290E+00
Total	2.044E+03				

Analyst: Jody Watson

TestAmerica, Inc Spectrum name: 10_85520-334_20130886.An1

Sample description
25mL d=1_85520-334_2011Cal

Spectrum Filename: C:\User\SPC\Det10\10_85520-334_20130886.An1

Acquisition information
Start time: 11/19/2013 12:24:33 PM
Live time: 7200
Real time: 7382
Dead time: 2.47 %
Detector ID: 10

Detector system
Ge10 S/N08316756

Calibration
Filename: 10_Liquid_D=1 25ml.Clb
10_25mlD=1_90101_030512

Energy Calibration
Created: 2/23/2012 9:27:47 AM
Zero offset: 0.044 keV
Gain: 0.250 keV/channel
Quadratic: -1.974E-08 keV/channel^2

Efficiency Calibration
Created: 3/7/2012 1:02:43 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 2.26 %
Log(Eff): -3.625053E-01 + (-1.308041E-01*Log(E)) +
(-5.582707E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.24 %
Log(Eff): -1.180856E+01 + (4.456856E+00*Log(E)) +
(-5.152261E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.56keV)
Stop channel: 8000 (1999.70keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	7/1/2011 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	10_2013-11-02_0117.PBC 11/2/2013 1:17:18 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 29 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 0.1277

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.56	3337.	4.76	0.91	8.699E-02				
43.58	1070.	14.47	1.31	9.764E-02				
49.50	5519.	5.17	1.29	1.041E-01				
59.51	271894.	0.22	0.87	1.108E-01	59.54	35.900	9.526E+02	AM241
63.26	-4.	62.55	0.68	1.123E-01	63.29	3.810	PBC<MDA	TH234
73.56	277.	35.58	0.73	1.141E-01				
86.54	148.	184.79	0.87	1.131E-01	86.54	30.700	PBC<MDA	EU155
88.00	106174.	0.34	0.91	1.128E-01				
92.39	230.	35.46	0.94	1.118E-01	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	PBC<MDA	AC228
93.07	63.	116.89	0.88	1.116E-01	93.35	5.810	PBC<MDA	U235
					93.35	5.561	7.934E-01	AC228
103.27	266.	36.23	1.01	1.086E-01				
122.02	20666.	0.89	0.95	1.014E-01	121.78	28.580	1.118E+02	EU152
123.10	279.	31.03	0.91	1.010E-01	123.10	40.790	PBC<MDA	EU154
					123.10	40.790	1.140E+00	EU154
136.45	2594.	4.65	0.92	9.535E-02				
145.32	39.	184.98	0.93	9.223E-02	143.79	10.960	PBC<MDA	U235
165.76	2706.	4.84	1.08	8.307E-02				
238.50	-10.	153.05	1.02	6.380E-02	238.63	43.300	PBC<MDA	PB212
289.14	174.	36.58	0.84	5.521E-02				
295.38	34.	133.22	1.08	5.436E-02	295.09	19.300	PBC<MDA	PB214
					295.09	19.300	PBC<MDA	PB214
298.17	88.	77.69	1.08	5.367E-02	300.03	3.280	PBC<MDA	PB212
310.34	185.	52.64	0.97	5.229E-02				
351.89	26.	135.64	1.13	4.742E-02	351.93	37.600	PBC<MDA	PB214
					351.93	37.600	PBC<MDA	PB214
391.69	1154.	9.69	1.31	4.356E-02				

470.49	235.	43.73	0.52	3.757E-02			
563.36	19.	365.02	1.33	3.237E-02	563.24	8.350	PBC<MDA CS134
581.65	-12.	265.63	1.35	3.144E-02	583.02	84.500	PBC<MDA TL208
609.02	97.	55.05	0.46	3.031E-02			
637.18	27.	256.76	1.40	2.917E-02	636.97	7.170	HL>Cutoff I131
661.75	62978.	0.44	1.44	2.824E-02	661.66	85.210	3.841E+02 CS137
672.96	161.	39.59	0.68	2.784E-02			
679.85	140.	39.62	0.59	2.759E-02			
760.25	15.	174.38	0.37	2.505E-02			
766.73	49.	150.11	1.52	2.487E-02	766.41	0.294	PBC<MDA PA234M
					766.41	0.294	9.321E+01 PA234M
875.61	62.	124.16	1.61	2.218E-02	873.23	12.270	PBC<MDA EU154
					873.23	12.270	3.809E+00 EU154
881.75	22.	374.15	1.62	2.201E-02	880.53	6.000	PBC<MDA Pa234
					880.53	6.000	2.360E+00 Pa234
883.51	55.	157.85	1.62	2.195E-02	883.24	9.600	PBC<MDA Pa234
					883.24	9.600	3.626E+00 Pa234
887.17	42.	87.16	0.30	2.187E-02			
898.14	867.	14.16	1.93	2.163E-02			

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
911.67	68.	104.84	1.64	2.136E-02	911.07	29.000	PBC<MDA	AC228
					911.07	29.000	PBC<MDA	AC228
945.53	84.	115.72	1.67	2.065E-02	946.02	13.400	PBC<MDA	Pa234
					946.02	13.400	4.227E+00	Pa234
961.61	74.	125.00	0.29	2.035E-02				
964.21	52.	129.64	1.69	2.030E-02	964.11	14.605	PBC<MDA	EU152
999.49	57.	142.13	1.72	1.963E-02	1001.00	0.837	PBC<MDA	PA234M
					1001.00	0.837	4.795E+01	PA234M
1058.24	145.	38.31	1.77	1.867E-02				
1064.54	96.	54.60	1.77	1.857E-02				
1114.31	79.	97.50	1.81	1.784E-02	1112.07	13.644	PBC<MDA	EU152
1173.48	52543.	0.48	1.87	1.698E-02	1173.24	99.900	5.888E+02	CO60
1278.13	3.	720.12	1.94	1.573E-02	1274.54	35.190	PBC<MDA	EU154
					1274.54	35.190	9.771E-02	EU154
1332.79	47632.	0.47	1.97	1.509E-02	1332.50	99.980	6.001E+02	CO60
1384.11	0.	943.40	0.15	1.457E-02				
1461.10	41.	45.95	2.08	1.384E-02	1460.83	10.670	PBC<MDA	K40
1764.41	13.	121.39	2.30	1.156E-02	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
146.01	36.56	6557.	3337.	3.836E+04	4.76	0.913	-	s
174.08	43.58	7222.	1070.	1.095E+04	11.65	1.311	-	s
197.75	49.50	21690.	5519.	5.302E+04	4.01	1.293	-	s
293.94	73.56	4044.	277.	2.428E+03	35.58	0.729	-	
351.68	88.00	6705.	106034.	9.401E+05	0.33	0.908	-	
412.72	103.27	2692.	288.	2.650E+03	26.18	1.009	-	s
545.42	136.45	2982.	2594.	2.720E+04	4.65	0.918	-	
662.58	165.76	3230.	2723.	3.278E+04	3.52	1.081	-	M
1155.97	289.14	1448.	174.	3.146E+03	36.58	0.841	-	
1240.73	310.34	2536.	185.	3.538E+03	52.64	0.975	-	s
1566.08	391.69	2726.	1154.	2.650E+04	9.69	1.314	-	sM
1881.20	470.49	2816.	235.	6.255E+03	43.73	0.517	-	sM
2435.26	609.02	918.	97.	3.201E+03	55.05	0.463	-	l
2690.99	672.96	1064.	161.	5.784E+03	39.59	0.682	-	s
2718.57	679.85	925.	140.	5.068E+03	39.62	0.588	-	s
3040.13	760.25	365.	15.	5.988E+02	174.38	0.373	-	sc
3547.85	887.17	649.	42.	1.921E+03	87.16	0.303	-	sc
3591.76	898.14	2750.	867.	4.008E+04	14.16	1.934	-	s
3846.02	961.61	1602.	89.	4.372E+03	64.51	1.688	-	sc
4231.43	1058.04	992.	82.	4.393E+03	67.44	0.660	-	sM
4256.63	1064.33	615.	96.	5.189E+03	40.61	0.783	-	sM

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.76	59.51	19516.	271894.	37.763	0.22	0.871
EU-155	345.84	86.54	37248.	148.	0.021	184.79	0.868s
TH-234	370.03	92.59	2618.	90.	0.013	31.06	0.874D
AC-228	373.06	93.35	3130.	178.	0.025	37.31	0.875D
U-235	373.06	93.35	2659.	63.	0.009	116.89	0.875D
EU-155	421.51	105.47	3920.	-86.	-0.012	103.12	0.888s
EU-152	487.70	122.02	3345.	20666.	2.870	0.89	0.953
EU-154	492.02	123.10	3606.	279.	0.039	31.03	0.906s
U-235	580.84	145.32	2569.	39.	0.005	184.98	0.927s
U-235	653.07	163.38	8287.	-43.	-0.006	299.93	0.947s
U-235	825.82	206.58	3458.	-83.	-0.011	101.36	0.989s
PB-214	969.66	242.55	3847.	-86.	-0.012	133.34	1.025s
I-131	1136.45	284.26	3570.	-91.	-0.013	93.20	1.067s
PB-214	1180.93	295.38	3364.	34.	0.005	133.22	1.078s
PB-212	1192.08	298.17	2310.	88.	0.012	77.69	1.083s
PB-214	1406.89	351.89	3601.	26.	0.004	135.64	1.133s
I-131	1456.06	364.18	3640.	-48.	-0.007	177.39	1.146s
BE-7	1911.46	478.06	4149.	-69.	-0.010	131.92	1.254s
CS-134	2252.64	563.36	2342.	19.	0.003	365.02	1.334
Pa-234	2281.22	570.51	2335.	-52.	-0.007	132.63	1.340s
CS-134	2417.43	604.57	2168.	-47.	-0.006	142.10	1.372s
I-131	2547.87	637.18	2365.	27.	0.004	256.76	1.402s
CS-137	2646.16	661.75	2397.	62978.	8.747	0.44	1.439
EU-154	2910.17	727.75	1325.	-27.	-0.004	190.97	1.480s
PA-234M	3066.09	766.73	2689.	49.	0.007	150.11	1.518s
EU-152	3113.07	778.48	2758.	-28.	-0.004	263.30	1.529s
BI-212	3144.65	786.37	2795.	-41.	-0.006	183.10	1.535s
CS-134	3183.63	796.12	2892.	-46.	-0.006	166.15	1.544s
CS-134	3207.84	802.17	2971.	-29.	-0.004	262.61	1.550s
EU-154	3501.60	875.61	2890.	62.	0.009	124.16	1.612s
Pa-234	3526.20	881.75	3514.	22.	0.003	374.15	1.618s
Pa-234	3533.23	883.51	3745.	55.	0.008	157.85	1.620s
AC-228	3645.86	911.67	4060.	68.	0.009	104.84	1.644s
Pa-234	3781.33	945.53	4707.	84.	0.012	115.72	1.674s
EU-152	3855.66	964.11	2242.	52.	0.007	129.64	1.690D
EU-154	3990.97	997.93	3509.	-28.	-0.004	303.26	1.717s
PA-234M	3997.21	999.49	3221.	57.	0.008	142.13	1.721s
EU-152	4456.58	1114.31	2915.	79.	0.011	97.50	1.812
CO-60	4693.31	1173.48	1520.	52543.	7.298	0.48	1.870
EU-154	5112.06	1278.13	266.	3.	0.000	720.12	1.942s
CO-60	5330.75	1332.79	405.	47632.	6.616	0.47	1.965
EU-152	5634.63	1408.73	198.	-16.	-0.002	126.85	2.045s
K-40	5844.24	1461.10	154.	41.	0.006	45.95	2.084s
BI-214	7058.13	1764.41	125.	13.	0.002	121.39	2.301s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-2.4666E+00				5.31E+01	
			477.60	-2.467E+00	&(	1.077E+01 1.32E+02 1.05E+01	G
K-40	N	3.8242E+00				4.66E+11	
			1460.83	3.824E+00	?(	5.698E+00 4.60E+01 1.07E+01	G
CO-60	F	5.9444E+02				1.93E+03	
			1332.50	6.001E+02	(	1.216E+00 4.74E-01 1.00E+02	G
			1173.24	5.888E+02	(	2.066E+00 4.80E-01 9.99E+01	G
I-131	I	-1.9688E-02				8.02E+00	
			364.48	-1.785E-01	&(	1.050E+00 1.77E+02 8.17E+01	G
			284.30	-3.704E+00	+	1.141E+01 9.32E+01 6.14E+00	G
			636.97	1.790E+00	?(	1.528E+01 2.57E+02 7.17E+00	G
CS-134	I	-2.7680E-01				7.54E+02	
			604.71	-4.845E-01	?(	2.285E+00 1.42E+02 9.76E+01	G
			795.87	-6.911E-01	+	3.809E+00 1.66E+02 8.55E+01	G
			569.32	-1.016E-01	&	1.436E+01 4.24E+03 1.54E+01	G
			801.95	-4.385E+00	&	3.825E+01 2.63E+02 8.69E+00	G
			563.24	2.152E+00	(	2.614E+01 3.65E+02 8.35E+00	G
CS-137	I	3.8408E+02				1.10E+04	
			661.66	3.841E+02	(	1.408E+00 4.41E-01 8.52E+01	G
EU-152	F	3.9683E+01				4.94E+03	
			344.29	8.202E-02	&(	3.469E+00 1.27E+03 2.65E+01	G
			121.78	1.118E+02	(	1.473E+00 8.93E-01 2.86E+01	G
			778.92	-1.399E+00	-	1.224E+01 2.63E+02 1.29E+01	G
			964.11	2.750E+00	(	1.182E+01 1.30E+02 1.46E+01	G
			1112.07	5.084E+00	(	1.640E+01 9.75E+01 1.36E+01	G
			1408.00	-8.350E-01	-	3.563E+00 1.27E+02 2.10E+01	G
EU-154	I	1.7573E+00				3.14E+03	
			873.23	3.809E+00	&(	1.567E+01 1.24E+02 1.23E+01	G
			123.10	1.140E+00	?(	1.155E+00 3.10E+01 4.08E+01	G
			1274.54	9.771E-02	-	2.394E+00 7.20E+02 3.52E+01	G
			723.36	-8.627E-01	-	5.487E+00 1.91E+02 2.02E+01	G
			1004.77	-9.286E-02	%	1.365E+01 4.42E+03 1.80E+01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		996.33	-2.231E+00 +		2.247E+01	3.03E+02	1.06E+01 G
EU-155	I 1.8944E-01					1.81E+03	
		105.31	-7.322E-01 ?(		2.497E+00	1.03E+02	2.12E+01 G
		86.54	8.259E-01 ?(		5.039E+00	1.85E+02	3.07E+01 G
TL-208	N -1.5170E-01					6.98E+02	
		583.02	-1.517E-01 &(P		2.567E+00	2.66E+02	8.45E+01 G
		277.28	5.226E-01 %		2.574E+01	1.48E+03	6.31E+00 G
		860.56	-9.312E-01 %		3.211E+01	1.04E+03	1.24E+01 G
PB-210	N -5.2791E+00					8.14E+03	
		46.54	-5.279E+00 %(P		2.261E+01	1.67E+04	4.25E+00 G
PB-212	N 1.0517E+00					6.98E+02	
		238.63	-1.243E-01 %(P		3.504E+00	1.53E+02	4.33E+01 G
		300.03	1.658E+01 &(		4.254E+01	7.77E+01	3.28E+00 G
PB-214	N 2.8253E-01					5.84E+05	
		351.93	1.996E-01 (P		2.202E+00	1.36E+02	3.76E+01 G
		295.09	4.441E-01 (P		3.618E+00	1.33E+02	1.93E+01 G
		242.00	-2.557E+00 & P		8.647E+00	1.33E+02	7.43E+00 G
BI-212	N 2.0819E-02					6.98E+02	
		727.17	2.082E-02 &(		3.832E+01	5.52E+04	7.55E+00 G
		785.42	-4.344E+01 &		2.640E+02	1.83E+02	1.28E+00 G
BI-214	N -5.3900E-02					5.84E+05	
		609.31	-4.210E-01 %(P		2.226E+00	1.72E+03	4.61E+01 G
		1120.29	-8.208E-01 % P		1.304E+01	1.98E+03	1.51E+01 G
		1764.49	1.045E+00 ?(		4.283E+00	1.21E+02	1.54E+01 G
AC-228	N 2.0409E+00					2.10E+03	
		911.07	2.041E+00 ?(P		8.961E+00	1.05E+02	2.90E+01 G
		968.97	-1.034E+00 & P		1.572E+01	2.29E+03	1.75E+01 G
		338.32	-6.700E-01 & P		8.740E+00	1.02E+05	1.20E+01 G
						Energy duplication	
		93.35	5.323E+00 & P		7.865E+00	3.73E+01	5.56E+00 XA
Pa-234	N 2.2562E+00					1.63E+12	
		131.29	2.367E-02 &(		2.093E+00	2.66E+03	1.80E+01 G
		569.47	-2.736E+00 &		1.204E+01	1.33E+02	8.20E+00 G
		946.02	4.227E+00 ?(		1.618E+01	1.16E+02	1.34E+01 G
		883.24	3.626E+00 &(		1.897E+01	1.58E+02	9.60E+00 G
		880.53	2.360E+00 &(		2.933E+01	3.74E+02	6.00E+00 G
TH-234	N 1.1356E+00					1.63E+12	
		63.29	-1.452E-01 %(P		7.957E+00	6.25E+01	3.81E+00 G
		92.59	2.009E+00 (P		5.367E+00	3.11E+01	5.58E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234M	N	5.9718E+01					1.63E+12	
			1001.00	4.795E+01	&(	2.259E+02	1.42E+02	8.37E-01 G
			766.41	9.321E+01	&(	4.641E+02	1.50E+02	2.94E-01 G
U-235	N	5.3442E-01					2.57E+11	
			143.79	5.344E-01	?(	3.283E+00	1.85E+02	1.10E+01 G
			205.33	-3.212E+00	&	1.077E+01	1.01E+02	5.01E+00 G
			163.38	-1.398E+00	&	1.389E+01	3.00E+02	5.08E+00 G
								Energy duplication
			93.35	1.345E+00		5.208E+00	1.17E+02	5.81E+00 X
AM-241	T	9.5260E+02					1.58E+05	
			59.54	9.526E+02	(	2.290E+00	2.19E-01	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
EU-155	86.54	37248.	148.	0.021	184.79	8.259E-01	
AC-228	93.35	3130.	178.	0.025	37.31	5.323E+00	P
EU-155	105.47	3920.	-86.	-0.012	103.12	-7.322E-01	
EU-154	123.10	3606.	279.	0.039	31.03	1.140E+00	
PB-214	242.55	3847.	-86.	-0.012	133.34	-2.557E+00	P
I-131	284.26	3570.	-91.	-0.013	93.20	0.000E+00	
PB-214	295.38	3364.	34.	0.005	133.22	4.441E-01	P
PB-212	298.17	2310.	88.	0.012	77.69	1.658E+01	
PB-214	351.89	3601.	26.	0.004	135.64	1.996E-01	P
I-131	364.18	3640.	-48.	-0.007	177.39	0.000E+00	
BE-7	478.06	4149.	-69.	-0.010	131.92	0.000E+00	
Pa-234	570.51	2335.	-52.	-0.007	132.63	-2.736E+00	
I-131	637.18	2365.	27.	0.004	256.76	0.000E+00	
EU-154	727.75	1325.	-27.	-0.004	190.97	-8.627E-01	
PA-234M	766.73	2689.	49.	0.007	150.11	9.321E+01	
BI-212	786.37	2795.	-41.	-0.006	183.10	-4.344E+01	
EU-154	875.61	2890.	62.	0.009	124.16	3.809E+00	
Pa-234	881.75	3514.	22.	0.003	374.15	2.360E+00	
Pa-234	883.51	3745.	55.	0.008	157.85	3.626E+00	
AC-228	911.67	4060.	68.	0.009	104.84	2.041E+00	P
Pa-234	945.53	4707.	84.	0.012	115.72	4.227E+00	
EU-154	997.93	3509.	-28.	-0.004	303.26	-2.231E+00	
PA-234M	999.49	3221.	57.	0.008	142.13	4.795E+01	
EU-154	1278.13	266.	3.	0.000	720.12	9.771E-02	
K-40	1461.10	154.	41.	0.006	45.95	3.824E+00	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting		MDA Bq/Sample
BE-7	#A	-2.4666E+00	>12 Halflives	1.3192E+02%	1.0774E+01	
K-40	#A	3.8242E+00	3.8242E+00	4.595E+01%		5.70E+00
CO-60		4.3427E+02	5.9444E+02	3.376E-01%		1.22E+00
I-131	#A	-1.9688E-02	>12 Halflives	1.5604E+02%	1.0501E+00	
CS-134	A	-1.2419E-01	-2.7680E-01	1.421E+02%		2.28E+00
CS-137		3.6346E+02	3.8408E+02	4.405E-01%		1.41E+00
EU-152	C	3.5117E+01	3.9683E+01	8.928E-01%		3.47E+00
EU-154	#A	1.4495E+00	1.7573E+00	3.103E+01%		1.57E+01
EU-155	#A	1.3570E-01	1.8944E-01	1.031E+02%		2.50E+00
TL-208	#A	-6.3781E-02	-1.5170E-01	1.035E+03%		2.57E+00
PB-210	#A	-4.9016E+00	-5.2791E+00	3.319E+04%		2.26E+01

PB-212	#A	4.4216E-01	1.0517E+00	7.769E+01%	3.50E+00
PB-214	#A	2.8224E-01	2.8253E-01	2.060E+02%	2.20E+00
BI-212	A	8.7531E-03	2.0819E-02	5.519E+04%	3.83E+01
BI-214	#A	-5.3844E-02	-5.3900E-02	1.214E+02%	2.23E+00
AC-228	#A	1.5305E+00	2.0409E+00	1.324E+02%	8.96E+00
Pa-234	#C	2.2562E+00	2.2562E+00	1.157E+02%	2.09E+00
TH-234	A	1.1356E+00	1.1356E+00	7.975E+01%	7.96E+00
PA-234M	#A	5.9718E+01	5.9718E+01	1.034E+02%	2.26E+02
U-235	A	5.3442E-01	5.3442E-01	1.850E+02%	3.28E+00
AM-241		9.4896E+02	9.5260E+02	2.186E-01%	2.29E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (1057.9 to 1999.7 keV) 1.747E+03 Bq/Sample
Total Decayed Activity (1057.9 to 1999.7 keV) 1.9311187E+03 Bq/Sample

The library has energies which are not separable.

Test America St. Louis Spectrum ID: 11_85520-334_20131678

Sample Description: 25mL d=1_85520-334_2011Cal
Detector: Ge11 S/N09363993
Batch ID: 25mL d
Work Order Number: 85520-334
Lot Number: 2011Cal

Decay to Time: 7/1/2011 12:00 Live Time: 7200 sec
Acquisition Time: 11/21/2013 10:41:53 Real Time: 7391 sec
Analysis Time: 11/22/2013 08:47 Dead Time: 2.58 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 11_Liquid_D=1 25ml.Clb
Efficiency Cal Desc: 11_25mLd=1cal_90101_032712
Efficiency Cal Date: 4/2/2012 17:34
Energy Cal Date: 2/28/2012 13:09
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 11_2013-11-02_0145.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
K-40	-4.291E-01	495.4	2.126E+00	2.126E+00	6.105E+00
CO-60	5.876E+02	0.3	1.928E+00	2.820E+01	1.130E+00
CS-134	3.347E-01	210.0	7.030E-01	7.032E-01	2.335E+00
CS-137	3.793E+02	0.4	1.642E+00	1.854E+01	1.394E+00
EU-152	3.881E+01	0.8	3.041E-01	1.906E+00	3.281E+00
EU-154	6.352E+01	0.8	4.846E-01	3.108E+00	1.160E+01
EU-155	-1.068E+00	60.0	6.405E-01	6.429E-01	2.110E+00
TL-208	6.654E-01	114.6	7.628E-01	7.635E-01	2.732E+00
PB-210	-6.363E+01	12.4	7.887E+00	8.881E+00	2.279E+01
PB-212	-3.044E-01	150.9	4.595E-01	4.598E-01	2.602E+00
PB-214	2.033E-01	300.8	6.114E-01	6.115E-01	2.037E+00
BI-212	4.626E+00	81.3	3.761E+00	3.767E+00	3.779E+01
BI-214	1.548E+00	44.6	6.910E-01	6.951E-01	1.665E+00
AC-228	7.662E-01	214.0	1.640E+00	1.640E+00	7.619E+00
Pa-234	1.311E+00	103.8	1.361E+00	1.362E+00	2.050E+00
TH-234	-6.300E+01	6.3	3.995E+00	5.043E+00	1.142E+01
PA-234M	-4.522E+01	244.2	1.104E+02	1.104E+02	2.266E+02
U-235	6.141E-02	184.1	1.130E-01	1.131E-01	3.611E+00
AM-241	9.449E+02	0.2	2.004E+00	4.685E+01	2.220E+00
Total	2.024E+03				

Analyst: Jody Watson

TestAmerica, Inc Spectrum name: 11_85520-334_20131678.An1

Sample description
25mL d=1_85520-334_2011Cal

Spectrum Filename: C:\User\SPC\Det11\11_85520-334_20131678.An1

Acquisition information
Start time: 11/21/2013 10:41:53 AM
Live time: 7200
Real time: 7391
Dead time: 2.58 %
Detector ID: 11

Detector system
Ge11 S/N09363993

Calibration
Filename: 11_Liquid_D=1 25ml.Clb
11_25mLd=1cal_90101_032712

Energy Calibration
Created: 2/28/2012 1:09:34 PM
Zero offset: 0.055 keV
Gain: 0.250 keV/channel
Quadratic: -2.946E-08 keV/channel^2

Efficiency Calibration
Created: 4/2/2012 5:34:04 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 2.41 %
Log(Eff): -6.288737E-01 + (-1.993453E-02*Log(E)) + (-6.475168E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.36 %
Log(Eff): -1.198743E+01 + (4.557082E+00*Log(E)) + (-5.253999E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.58keV)
Stop channel: 8000 (1999.47keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	7/1/2011 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	11_2013-11-02_0145.PBC 11/2/2013 1:45:59 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 14 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1385

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.67	3345.	5.41	0.91	9.166E-02				
43.68	1247.	13.82	1.53	1.033E-01				
49.67	6428.	4.68	1.47	1.104E-01				
59.59	286616.	0.21	0.87	1.178E-01	59.54	35.900	9.449E+02	AM241
74.96	140.	73.84	0.44	1.217E-01				
86.54	88.	231.75	0.94	1.208E-01	86.54	30.700	PBC<MDA	EU155
88.06	111216.	0.35	0.91	1.205E-01				
92.62	-62.	130.72	0.94	1.194E-01	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	PBC<MDA	AC228
93.94	77.	119.25	0.94	1.192E-01	93.35	5.561	PBC<MDA	AC228
					93.35	5.810	1.549E+00	U235
93.94	77.	119.25	0.94	1.192E-01	93.35	5.561	PBC<MDA	AC228
					93.35	5.810	1.549E+00	U235
98.98	109.	64.03	0.69	1.175E-01				
122.11	21697.	0.83	0.94	1.085E-01	121.78	28.580	1.097E+02	EU152
					123.10	40.790	8.292E+01	EU154
					121.78	28.580	1.097E+02	EU152
136.54	2679.	4.39	0.98	1.020E-01				
154.95	118.	56.79	0.75	9.367E-02				
163.38	21.	617.59	1.01	8.992E-02	163.38	5.080	PBC<MDA	U235
165.98	2794.	4.66	1.03	8.867E-02				
205.45	25.	363.00	1.05	7.647E-02	205.33	5.010	PBC<MDA	U235
253.63	122.	58.79	1.09	6.563E-02				
255.11	125.	50.56	1.09	6.535E-02				
296.34	-3.	333.55	1.13	5.862E-02	295.09	19.300	PBC<MDA	PB214
299.50	58.	150.95	1.13	5.789E-02	300.03	3.280	PBC<MDA	PB212
338.80	33.	265.49	1.17	5.280E-02	338.32	12.010	PBC<MDA	AC228
					338.32	12.010	9.670E-01	AC228

353.17	28.	112.62	1.18	5.121E-02	351.93	37.600	PBC<MDA PB214
364.53	110.	82.05	1.19	4.982E-02	364.48	81.700	HL>Cutoff I131
					364.48	81.700	HL>Cutoff I131
391.52	1029.	11.99	1.29	4.709E-02			
398.80	200.	45.02	0.52	4.640E-02			
604.44	35.	210.03	1.40	3.295E-02	604.71	97.620	PBC<MDA CS134
609.74	168.	34.72	0.39	3.274E-02	609.31	46.090	PBC<MDA BI214
661.81	67180.	0.43	1.42	3.050E-02	661.66	85.210	3.793E+02 CS137
723.38	38.	191.70	1.50	2.824E-02	723.36	20.220	PBC<MDA EU154
					723.36	20.220	1.113E+00 EU154
787.04	272.	33.45	0.80	2.622E-02	785.42	1.280	2.680E+02 BI212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
861.19	74.	114.64	1.62	2.422E-02	860.56	12.420	PBC<MDA	TL208
880.36	80.	110.33	1.64	2.373E-02	880.53	6.000	PBC<MDA	Pa234
883.20	14.	637.00	1.64	2.366E-02	883.24	9.600	PBC<MDA	Pa234
898.25	858.	15.97	1.53	2.331E-02				
913.96	25.	335.80	1.66	2.301E-02	911.07	29.000	PBC<MDA	AC228
					911.07	29.000	6.830E-01	AC228
943.60	48.	94.23	0.54	2.229E-02				
964.07	58.	168.09	1.71	2.186E-02	964.11	14.605	PBC<MDA	EU152
					964.11	14.605	2.868E+00	EU152
1112.66	66.	130.32	1.83	1.917E-02	1112.07	13.644	PBC<MDA	EU152
					1112.07	13.644	3.940E+00	EU152
1152.21	83.	44.48	0.43	1.855E-02				
1168.25	95.	43.32	1.87	1.831E-02				
1173.46	56258.	0.43	1.88	1.824E-02	1173.24	99.900	5.874E+02	CO60
1332.74	50320.	0.46	1.99	1.617E-02	1332.50	99.980	5.919E+02	CO60
1460.75	-5.	52.32	2.10	1.481E-02	1460.83	10.670	PBC<MDA	K40
1764.81	3.	74.86	2.34	1.232E-02	1764.49	15.400	PBC<MDA	BI214
1836.31	439.	7.59	2.12	1.184E-02				

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
146.36	36.67	8005.	3345.	3.649E+04	5.41	0.911	-	s
174.40	43.68	8538.	1247.	1.208E+04	10.85	1.528	-	s
198.34	49.67	24129.	6504.	5.891E+04	3.60	1.470	-	s
299.45	74.96	4520.	140.	1.150E+03	73.84	0.439	-	sc
351.82	88.06	8343.	111130.	9.225E+05	0.32	0.907	-	
395.45	98.98	1905.	109.	9.273E+02	64.03	0.686	-	s
545.63	136.54	2901.	2679.	2.626E+04	4.39	0.981	-	
619.21	154.95	1640.	118.	1.260E+03	56.79	0.746	-	s
663.31	165.98	3264.	2790.	3.147E+04	3.46	1.033	-	
1013.77	253.69	2508.	122.	1.858E+03	58.79	1.090	-	D
1019.67	255.16	1943.	125.	1.917E+03	50.56	1.092	-	D
1565.14	391.52	3277.	1029.	2.186E+04	11.99	1.292	-	
1594.24	398.80	2248.	200.	4.299E+03	45.02	0.515	-	s
3147.08	787.04	1802.	190.	7.233E+03	32.47	0.803	-	sM
3591.96	898.25	3254.	858.	3.679E+04	15.97	1.533	-	s
3773.39	943.60	942.	48.	2.175E+03	90.62	0.536	-	sc
4608.13	1152.21	480.	83.	4.474E+03	44.48	0.433	-	s
4672.26	1168.24	270.	18.	9.829E+02	131.23	0.520	-	sc
7346.62	1836.31	96.	439.	3.707E+04	7.59	2.120	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	188.90	47.31	21904.	-1933.	-0.268	11.71	0.901s
AM-241	237.97	59.59	20715.	286616.	39.808	0.21	0.874
TH-234	245.11	61.37	6356.	-2065.	-0.287	6.09	0.916s
EU-155	345.74	86.54	20652.	88.	0.012	231.75	0.938s
TH-234	370.02	92.62	4388.	-62.	-0.009	130.72	0.943s
AC-228	372.95	93.35	4202.	77.	0.011	119.25	0.944D
U-235	372.95	93.35	4202.	77.	0.011	119.25	0.944D
EU-155	415.96	104.11	3190.	-135.	-0.019	59.99	0.955s
EU-152	487.94	122.11	3615.	21720.	3.017	0.78	0.970
EU-154	487.94	122.11	2912.	21778.	3.025	0.76	0.971s
Pa-234	526.95	131.87	3474.	-81.	-0.011	103.78	0.979s
U-235	576.04	144.15	3575.	-46.	-0.006	184.07	0.990s
U-235	652.92	163.38	8768.	21.	0.003	617.59	1.008s
U-235	821.14	205.45	3965.	25.	0.003	363.00	1.047s
PB-212	966.60	241.83	2456.	-99.	-0.014	167.56	1.077s
TL-208	1111.64	278.11	3977.	-69.	-0.010	130.72	1.112s
PB-212	1197.17	299.50	3852.	58.	0.008	150.95	1.132s
AC-228	1354.33	338.80	3842.	33.	0.005	265.49	1.167s
PB-214	1411.76	353.17	3594.	28.	0.004	112.62	1.179s
I-131	1457.21	364.53	3994.	110.	0.015	82.05	1.190s
BE-7	1907.82	477.21	4669.	-116.	-0.016	83.96	1.290s
CS-134	2248.07	562.29	2403.	-55.	-0.008	126.53	1.365s
CS-134	2416.67	604.44	2641.	35.	0.005	210.03	1.401s
BI-214	2437.87	609.74	1459.	168.	0.023	34.72	0.392s
I-131	2546.13	636.81	2577.	-39.	-0.005	183.43	1.429s
CS-137	2646.13	661.81	2747.	67180.	9.331	0.43	1.419
EU-154	2892.42	723.38	2598.	38.	0.005	191.70	1.503s
BI-212	2910.25	727.84	2645.	-54.	-0.007	136.02	1.507s
PA-234M	3065.25	766.59	2772.	-62.	-0.009	134.32	1.540s
BI-212	3145.62	786.68	2667.	83.	0.011	89.05	1.556
CS-134	3223.04	806.03	1854.	-16.	-0.002	370.97	1.570s
TL-208	3443.70	861.19	3590.	74.	0.010	114.64	1.620s
EU-154	3472.72	868.44	1828.	-35.	-0.005	173.99	1.630s
Pa-234	3520.40	880.36	3827.	80.	0.011	110.33	1.637s
Pa-234	3531.77	883.20	3903.	14.	0.002	637.00	1.639s
AC-228	3654.81	913.96	3398.	25.	0.003	335.80	1.662s
EU-152	3855.31	964.07	4776.	58.	0.008	168.09	1.706s
AC-228	3870.98	967.99	4197.	-96.	-0.013	95.99	1.710s
EU-154	3977.94	994.72	3446.	-25.	-0.003	332.05	1.733s
PA-234M	4002.04	1000.74	3761.	-58.	-0.008	197.51	1.737s
EU-152	4449.87	1112.66	3627.	66.	0.009	130.32	1.828s
CO-60	4693.09	1173.44	1670.	55858.	7.758	0.47	1.829
EU-154	5093.29	1273.44	463.	-22.	-0.003	138.63	1.958s
CO-60	5330.62	1332.74	401.	50320.	6.989	0.46	1.993

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	5641.49	1410.41	192.	-13.	-0.002	151.92	2.064s
K-40	5843.00	1460.75	205.	-5.	-0.001	52.32	2.105s
BI-214	7060.30	1764.81	187.	3.	0.000	74.86	2.336s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample		Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	-3.8111E+00					5.31E+01		
			477.60	-3.811E+00	&	(	1.057E+01	8.40E+01	1.05E+01 G
K-40	N	-4.2914E-01					4.66E+11		
			1460.83	-4.291E-01	&(P		6.105E+00	5.23E+01	1.07E+01 G
CO-60	F	5.8755E+02					1.93E+03		
			1332.50	5.919E+02	(		1.130E+00	4.60E-01	1.00E+02 G
			1173.24	5.832E+02	(		2.017E+00	4.68E-01	9.99E+01 G
I-131	I	3.7561E-01					8.02E+00		
			364.48	3.756E-01	(		1.018E+00	8.20E+01	8.17E+01 G
			284.30	-2.772E-02	%		1.061E+01	1.15E+04	6.14E+00 G
			636.97	-2.423E+00	&		1.476E+01	1.83E+02	7.17E+00 G
CS-134	I	3.3470E-01					7.54E+02		
			604.71	3.347E-01	*(		2.335E+00	2.10E+02	9.76E+01 G
			795.87	-1.862E-02	&		3.451E+00	5.56E+03	8.55E+01 G
			569.32	1.523E-01	&		1.386E+01	2.73E+03	1.54E+01 G
			801.95	-2.276E+00	&		2.814E+01	3.71E+02	8.69E+00 G
			563.24	-5.848E+00	+		2.453E+01	1.27E+02	8.35E+00 G
CS-137	I	3.7930E+02					1.10E+04		
			661.66	3.793E+02	(		1.394E+00	4.33E-01	8.52E+01 G
EU-152	F	3.8813E+01					4.94E+03		
			344.29	0.000E+00	(		3.281E+00	1.00E+03	2.65E+01 G
			121.78	1.098E+02	(		1.430E+00	7.83E-01	2.86E+01 G
			778.92	-2.513E-01	&		1.146E+01	1.37E+03	1.29E+01 G
			964.11	2.868E+00	?(		1.597E+01	1.68E+02	1.46E+01 G
			1112.07	3.940E+00	?(		1.701E+01	1.30E+02	1.36E+01 G
			1408.00	-6.384E-01	&		3.274E+00	1.52E+02	2.10E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	I 6.3521E+01					3.14E+03	
		873.23-2.005E+00	?(		1.160E+01	1.74E+02	1.23E+01 G
		123.10 8.323E+01	?(		9.714E-01	7.63E-01	4.08E+01 G
		1274.54-6.299E-01	&		2.920E+00	1.39E+02	3.52E+01 G
		723.36 1.113E+00	-		7.086E+00	1.92E+02	2.02E+01 G
		1004.77 1.097E-01	%		1.269E+01	3.48E+03	1.80E+01 G
		996.33-1.876E+00	&		2.069E+01	3.32E+02	1.06E+01 G
EU-155	I -1.0677E+00					1.81E+03	
		105.31-1.068E+00	?(		2.110E+00	6.00E+01	2.12E+01 G
		86.54 4.595E-01	+		3.519E+00	2.32E+02	3.07E+01 G
TL-208	N 6.6539E-01					6.98E+02	
		583.02-4.382E-01	%(P		2.732E+00	1.02E+03	8.45E+01 G
		277.28-5.850E+00	+		2.532E+01	1.31E+02	6.31E+00 G
		860.56 8.173E+00	?(		3.101E+01	1.15E+02	1.24E+01 G
PB-210	N -6.3627E+01					8.14E+03	
		46.54-6.363E+01	?(P		2.279E+01	1.17E+01	4.25E+00 G
PB-212	N -3.0438E-01					6.98E+02	
		238.63-1.098E+00	&(P		2.602E+00	1.68E+02	4.33E+01 G
		300.03 1.017E+01	?(		5.088E+01	1.51E+02	3.28E+00 G
PB-214	N 2.0329E-01					5.84E+05	
		351.93 2.033E-01	&(P		2.037E+00	1.13E+02	3.76E+01 G
		295.09-3.136E-02	& P		3.553E+00	3.34E+02	1.93E+01 G
		242.00-9.728E-01	& P		8.261E+00	8.72E+02	7.43E+00 G
BI-212	N 4.6263E+00					6.98E+02	
		727.17-8.380E+00	?(		3.779E+01	1.36E+02	7.55E+00 G
		785.42 8.135E+01	(		2.395E+02	8.91E+01	1.28E+00 G
BI-214	N 1.5484E+00					5.84E+05	
		609.31 1.548E+00	(P		1.665E+00	3.47E+01	4.61E+01 G
		1120.29-5.945E-01	% P		1.182E+01	1.35E+03	1.51E+01 G
		1764.49 2.563E-01	- P		4.862E+00	7.49E+01	1.54E+01 G
AC-228	N 7.6620E-01					2.10E+03	
		911.07 6.830E-01	&(		7.619E+00	3.36E+02	2.90E+01 G
		968.97-4.682E+00	+		1.486E+01	9.60E+01	1.75E+01 G
		338.32 9.670E-01	?(		8.521E+00	2.65E+02	1.20E+01 G
							Energy duplication
		93.35 2.159E+00	&		8.520E+00	1.19E+02	5.56E+00 XA
Pa-234	N 1.3111E+00					1.63E+12	
		131.29-5.970E-01	?(		2.050E+00	1.04E+02	1.80E+01 G
		569.47-1.067E-02	&		1.167E+01	3.28E+04	8.20E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		946.02	1.798E-01	%	1.541E+01	2.58E+03	1.34E+01 G
		883.24	8.487E-01	?(	1.796E+01	6.37E+02	9.60E+00 G
		880.53	7.776E+00	?(	2.839E+01	1.10E+02	6.00E+00 G
TH-234	N -6.2997E+01					1.63E+12	
		63.29-6.300E+01		?(P	1.142E+01	6.09E+00	3.81E+00 G
		92.59-1.291E+00		+ P	6.486E+00	1.31E+02	5.58E+00 G
PA-234M	N -4.5218E+01					1.63E+12	
		1001.00-4.522E+01		&(P	2.266E+02	1.98E+02	8.37E-01 G
		766.41-1.086E+02		+ P	4.365E+02	1.34E+02	2.94E-01 G
U-235	N 6.1411E-02					2.57E+11	
		143.79-5.916E-01		?(	3.611E+00	1.84E+02	1.10E+01 G
		205.33	8.907E-01	?(	1.074E+01	3.63E+02	5.01E+00 G
		163.38	6.523E-01	&(	1.335E+01	6.18E+02	5.08E+00 G
							Energy duplication
		93.35	1.549E+00	&	6.112E+00	1.19E+02	5.81E+00 X
AM-241	T 9.4494E+02					1.58E+05	
		59.54	9.449E+02	(	2.220E+00	2.12E-01	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average

R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	47.31	21904.	-1933.	-0.268	11.71	-6.363E+01	P
TH-234	61.37	6356.	-2065.	-0.287	6.09	-6.300E+01	P
EU-155	86.54	20652.	88.	0.012	231.75	4.595E-01	
TH-234	92.62	4388.	-62.	-0.009	130.72	-1.291E+00	P
AC-228	93.35	4202.	77.	0.011	119.25	2.159E+00	
U-235	93.35	4202.	77.	0.011	119.25	1.549E+00	
EU-155	104.11	3190.	-135.	-0.019	59.99	-1.068E+00	
EU-152	122.11	3615.	21720.	3.017	0.78	1.098E+02	
EU-154	122.11	2912.	21778.	3.025	0.76	8.323E+01	
Pa-234	131.87	3474.	-81.	-0.011	103.78	-5.970E-01	
U-235	144.15	3575.	-46.	-0.006	184.07	-5.916E-01	
U-235	163.38	8768.	21.	0.003	617.59	6.523E-01	
U-235	205.45	3965.	25.	0.003	363.00	8.907E-01	
PB-212	241.83	2456.	-99.	-0.014	167.56	-1.098E+00	P
TL-208	278.11	3977.	-69.	-0.010	130.72	-5.850E+00	
PB-212	299.50	3852.	58.	0.008	150.95	1.017E+01	
AC-228	338.80	3842.	33.	0.005	265.49	9.670E-01	
PB-214	353.17	3594.	28.	0.004	112.62	2.033E-01	P
I-131	364.53	3994.	110.	0.015	82.05	0.000E+00	
BE-7	477.21	4669.	-116.	-0.016	83.96	0.000E+00	
CS-134	562.29	2403.	-55.	-0.008	126.53	-5.848E+00	
CS-134	604.44	2641.	35.	0.005	210.03	3.347E-01	
I-131	636.81	2577.	-39.	-0.005	183.43	0.000E+00	
EU-154	723.38	2598.	38.	0.005	191.70	1.113E+00	
PA-234M	766.59	2772.	-62.	-0.009	134.32	-1.086E+02	P
CS-134	806.03	1854.	-16.	-0.002	370.97	-2.276E+00	
TL-208	861.19	3590.	74.	0.010	114.64	8.173E+00	
EU-154	868.44	1828.	-35.	-0.005	173.99	-2.005E+00	
Pa-234	880.36	3827.	80.	0.011	110.33	7.776E+00	
Pa-234	883.20	3903.	14.	0.002	637.00	8.487E-01	
AC-228	913.96	3398.	25.	0.003	335.80	6.830E-01	
EU-152	964.07	4776.	58.	0.008	168.09	2.868E+00	
AC-228	967.99	4197.	-96.	-0.013	95.99	-4.682E+00	
EU-154	994.72	3446.	-25.	-0.003	332.05	-1.876E+00	
PA-234M	1000.74	3761.	-58.	-0.008	197.51	-4.522E+01	P
EU-152	1112.66	3627.	66.	0.009	130.32	3.940E+00	
EU-154	1273.44	463.	-22.	-0.003	138.63	-6.299E-01	
EU-152	1410.41	192.	-13.	-0.002	151.92	-6.384E-01	
K-40	1460.75	205.	-5.	-0.001	52.32	-4.291E-01	P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

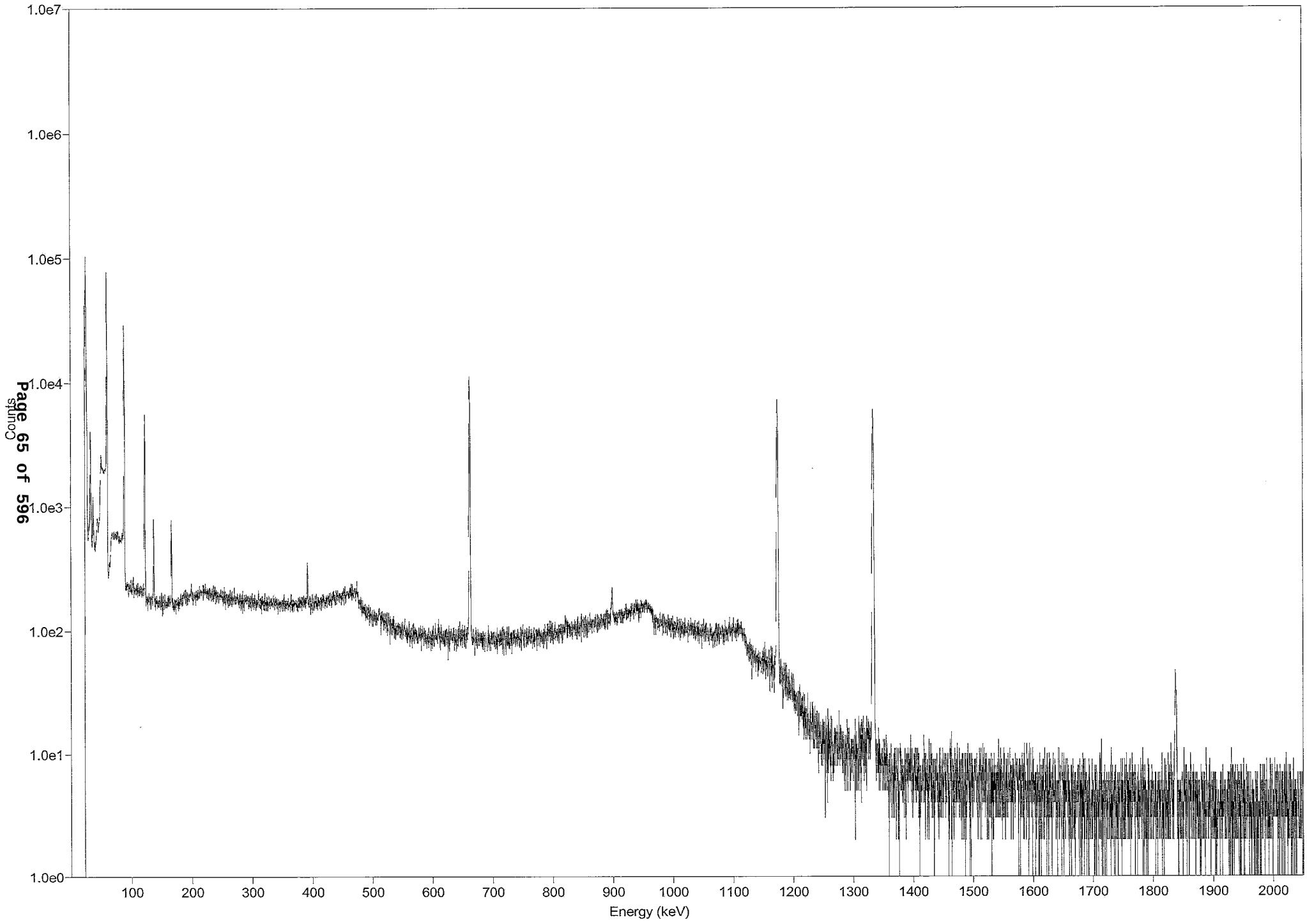
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma	MDA Bq/Sample
BE-7	#A	-3.8111E+00	>12 Halflives	8.3960E+01%	1.0568E+01	
K-40	#A	-4.2914E-01	-4.2914E-01	4.954E+02%		6.10E+00
CO-60		4.2893E+02	5.8755E+02	3.282E-01%		1.13E+00
I-131	#A	3.7561E-01	>12 Halflives	8.2046E+01%	1.0178E+00	
CS-134	#A	1.4990E-01	3.3470E-01	2.100E+02%		2.33E+00
CS-137		3.5890E+02	3.7930E+02	4.329E-01%		1.39E+00
EU-152	#C	3.4338E+01	3.8813E+01	7.834E-01%		3.28E+00
EU-154	#C	5.2371E+01	6.3521E+01	7.629E-01%		1.16E+01
EU-155	#A	-7.6421E-01	-1.0677E+00	5.999E+01%		2.11E+00
TL-208	#A	2.7922E-01	6.6539E-01	1.146E+02%		2.73E+00
PB-210	#A	-5.9066E+01	-6.3627E+01	1.240E+01%		2.28E+01
PB-212	#A	-1.2773E-01	-3.0438E-01	1.509E+02%		2.60E+00
PB-214	#A	2.0308E-01	2.0329E-01	3.008E+02%		2.04E+00
BI-212	A	1.9414E+00	4.6263E+00	8.129E+01%		3.78E+01
BI-214	A	1.5468E+00	1.5484E+00	4.463E+01%		1.66E+00
AC-228	#A	5.7421E-01	7.6620E-01	2.140E+02%		7.62E+00
Pa-234	#A	1.3111E+00	1.3111E+00	1.038E+02%		2.05E+00
TH-234	#A	-6.2997E+01	-6.2997E+01	6.341E+00%		1.14E+01
PA-234M	#A	-4.5218E+01	-4.5218E+01	2.442E+02%		2.27E+02
U-235	#A	6.1411E-02	6.1411E-02	1.841E+02%		3.61E+00
AM-241		9.4132E+02	9.4494E+02	2.121E-01%		2.22E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (391.5 to 1999.5 keV) 1.731E+03 Bq/Sample
Total Decayed Activity (391.5 to 1999.5 keV) 1.9133364E+03 Bq/Sample

The library has energies which are not separable.


25mL d=1_85520-334_2011Cal. 11_85520-334_20131678.spc.
1.0e7
1.0e6
1.0e5
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Counts
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)

Test America St. Louis Spectrum ID: 12_85520-334_20131748

Sample Description: 25mL d=1_85520-334_2011Cal
Detector: Ge12 S/N10034336
Batch ID: 25mL d
Work Order Number: 85520-334
Lot Number: 2011Cal

Decay to Time: 7/1/2011 12:00 Live Time: 7200 sec
Acquisition Time: 11/21/2013 13:15:58 Real Time: 7380 sec
Analysis Time: 11/22/2013 08:48 Dead Time: 2.43 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Liquid_D=1 25ml.Clb
Efficiency Cal Desc: Ge12_25mLd=1Cal_85520-334_090111
Efficiency Cal Date: 9/2/2011 07:07
Energy Cal Date: 2/28/2012 13:26
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 12_2013-11-02_0118.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
K-40	1.328E+00	125.4	1.665E+00	1.666E+00	5.782E+00
CO-60	5.801E+02	0.3	1.933E+00	2.788E+01	1.792E+00
CS-134	-4.648E-03	14240.0	6.621E-01	6.621E-01	2.206E+00
CS-137	3.755E+02	0.4	1.597E+00	1.849E+01	1.435E+00
EU-152	3.875E+01	1.2	4.555E-01	1.944E+00	3.059E+00
EU-154	1.670E+01	3.2	5.318E-01	9.717E-01	1.589E+01
EU-155	2.919E+02	0.4	1.097E+00	1.543E+01	2.313E+00
TL-208	3.490E-01	229.7	8.017E-01	8.018E-01	2.563E+00
PB-210	-5.288E+00	1028.0	5.436E+01	5.436E+01	1.710E+01
PB-212	9.578E-01	140.1	1.342E+00	1.343E+00	3.046E+00
PB-214	6.643E-01	74.1	4.923E-01	4.934E-01	1.984E+00
BI-212	-2.901E-01	3672.0	1.065E+01	1.065E+01	3.549E+01
BI-214	-4.340E-01	31500.0	1.367E+02	1.367E+02	2.085E+00
AC-228	-1.533E+00	161.8	2.480E+00	2.481E+00	8.215E+00
Pa-234	8.428E-01	73.9	6.225E-01	6.239E-01	1.977E+00
TH-234	-1.358E+02	3.7	5.050E+00	8.799E+00	1.488E+01
PA-234M	8.401E+00	618.6	5.197E+01	5.197E+01	1.757E+02
U-235	4.430E-01	129.4	5.734E-01	5.738E-01	3.578E+00
AM-241	9.295E+02	0.2	2.016E+00	5.151E+01	2.360E+00
Total	2.245E+03				

Analyst: Jody Watson

TestAmerica, Inc Spectrum name: 12_85520-334_20131748.An1

Sample description
25mL d=1_85520-334_2011Cal

Spectrum Filename: C:\User\SPC\Det12\12_85520-334_20131748.An1

Acquisition information
Start time: 11/21/2013 1:15:58 PM
Live time: 7200
Real time: 7380
Dead time: 2.43 %
Detector ID: 12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_Liquid_D=1 25ml.Clb
Ge12_25mLd=1Cal_85520-334_090111

Energy Calibration
Created: 2/28/2012 1:26:42 PM
Zero offset: 0.049 keV
Gain: 0.250 keV/channel
Quadratic: -3.945E-08 keV/channel^2

Efficiency Calibration
Created: 9/2/2011 7:07:23 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 2.02 %
Log(Eff): -6.442716E-01 + (-8.678082E-03*Log(E)) +
(-6.444773E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.33 %
Log(Eff): -1.236768E+01 + (4.728110E+00*Log(E)) +
(-5.423915E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.58keV)
Stop channel: 8000 (1999.36keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	7/1/2011 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2013-11-02_0118.PBC 11/2/2013 1:18:59 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 32 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 298.3564

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.67	3542.	5.15	1.26	9.307E-02				
43.52	810.	20.35	0.44	1.054E-01				
49.74	5767.	5.38	1.66	1.137E-01				
59.59	291952.	0.22	1.16	1.220E-01	59.54	35.900	9.295E+02	AM241
88.10	114715.	0.34	1.20	1.260E-01	86.54	30.700	5.743E+02	EU155
92.91	10.	947.66	0.93	1.248E-01	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	2.578E-01	AC228
					93.35	5.810	1.849E-01	U235
					92.59	5.584	PBC<MDA	TH234
					93.35	5.810	1.849E-01	U235
					93.35	5.561	2.578E-01	AC228
92.91	10.	947.66	0.93	1.248E-01	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	2.578E-01	AC228
					93.35	5.810	1.849E-01	U235
122.16	22476.	0.91	1.20	1.139E-01	121.78	28.580	1.082E+02	EU152
123.10	6162.	3.18	0.96	1.135E-01	123.10	40.790	2.242E+01	EU154
136.56	2684.	4.60	1.19	1.072E-01				
165.92	2918.	5.11	1.21	9.325E-02				
188.41	122.	64.64	0.69	8.557E-02				
199.66	148.	58.11	0.49	8.223E-02				
203.95	62.	129.44	1.04	8.065E-02	205.33	5.010	PBC<MDA	U235
					205.33	5.010	2.120E+00	U235
235.05	71.	69.39	0.52	7.333E-02				
237.66	41.	74.01	1.07	7.254E-02	238.63	43.300	PBC<MDA	PB212
242.01	31.	300.44	1.07	7.182E-02	242.00	7.430	PBC<MDA	PB214
285.59	87.	59.37	0.48	6.367E-02	284.30	6.140	HL>Cutoff	I131
293.55	28.	280.40	1.12	6.215E-02	295.09	19.300	PBC<MDA	PB214
301.27	48.	185.20	1.13	6.139E-02	300.03	3.280	PBC<MDA	PB212

352.55	119.	74.11	1.18	5.443E-02	351.93	37.600	PBC<MDA PB214
355.87	120.	63.84	0.50	5.397E-02			
391.72	1079.	11.61	1.53	5.011E-02			
583.33	-16.	410.66	1.38	3.640E-02	583.02	84.500	PBC<MDA TL208
					583.02	84.500	PBC<MDA TL208
637.26	43.	171.14	1.43	3.381E-02	636.97	7.170	HL>Cutoff I131
661.73	71374.	0.43	1.64	3.274E-02	661.66	85.210	3.755E+02 CS137
702.74	36.	98.78	0.47	3.111E-02			
722.73	75.	98.26	1.50	3.035E-02	723.36	20.220	PBC<MDA EU154

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
766.36	12.	618.61	1.54	2.887E-02	766.41	0.294	PBC<MDA	PA234M
					766.41	0.294	2.029E+01	PA234M
778.99	44.	176.59	1.55	2.847E-02	778.92	12.940	PBC<MDA	EU152
860.26	38.	207.57	1.62	2.610E-02	860.56	12.420	PBC<MDA	TL208
					860.56	12.420	PBC<MDA	TL208
879.98	222.	48.80	0.45	2.559E-02				
898.06	940.	14.24	2.10	2.513E-02				
945.19	71.	142.70	1.69	2.400E-02	946.02	13.400	PBC<MDA	Pa234
					946.02	13.400	3.064E+00	Pa234
995.90	31.	291.33	1.73	2.291E-02	996.33	10.600	PBC<MDA	EU154
1003.92	50.	71.39	0.32	2.275E-02				
1018.86	39.	89.60	0.57	2.245E-02				
1095.65	101.	72.07	0.57	2.102E-02				
1113.29	122.	70.44	1.82	2.074E-02	1112.07	13.644	PBC<MDA	EU152
1123.19	99.	46.78	1.83	2.056E-02				
1126.64	62.	90.78	1.83	2.050E-02				
1173.29	59718.	0.47	2.00	1.975E-02	1173.24	99.900	5.759E+02	CO60
1272.67	6.	478.08	1.95	1.829E-02	1274.54	35.190	PBC<MDA	EU154
1315.23	113.	29.73	0.63	1.776E-02				
1332.57	53870.	0.47	2.07	1.755E-02	1332.50	99.980	5.842E+02	CO60
1460.29	16.	46.00	2.08	1.609E-02	1460.83	10.670	PBC<MDA	K40
1759.91	-7.	96.92	2.30	1.342E-02	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
146.34	36.67	8117.	3542.	3.805E+04	5.15	1.256	-	s
173.72	43.52	8322.	810.	7.686E+03	16.30	0.442	-	s
198.59	49.74	25855.	5767.	5.073E+04	5.38	1.657	-	s
351.91	88.10	107387.	16148.	1.282E+05	2.98	1.201	-	s
545.60	136.56	3278.	2684.	2.503E+04	4.60	1.190	-	sM
662.94	165.92	4002.	2918.	3.129E+04	3.58	1.206	-	sM
752.86	188.41	2158.	122.	1.428E+03	64.64	0.685	-	sM
797.82	199.66	2416.	148.	1.800E+03	58.11	0.490	-	sM
939.27	235.05	1178.	71.	9.682E+02	69.39	0.519	-	sc
1141.31	285.59	1208.	75.	1.175E+03	66.72	0.481	-	sc
1422.28	355.87	1916.	120.	2.224E+03	52.39	0.504	-	sM
1565.62	391.72	3373.	1079.	2.152E+04	11.61	1.530	-	sM
2809.41	702.74	567.	36.	1.157E+03	98.78	0.469	-	sc
3518.43	879.98	2461.	221.	8.639E+03	32.44	0.447	-	sM
3590.80	898.06	3185.	940.	3.740E+04	14.24	2.102	-	sM
4014.33	1003.92	612.	50.	2.197E+03	71.39	0.320	-	lc
4074.14	1018.86	591.	39.	1.737E+03	89.60	0.570	-	lc
4381.40	1095.65	1485.	101.	4.804E+03	72.07	0.569	-	sM
4491.61	1122.75	1018.	99.	4.805E+03	46.78	1.830	-	D
4505.44	1126.21	1551.	62.	3.022E+03	90.78	1.833	-	c
5260.26	1315.23	211.	113.	6.371E+03	29.73	0.635	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.95	59.59	25113.	291952.	40.549	0.22	1.162s
TH-234	245.89	61.58	11655.	-4618.	-0.641	3.66	0.905
EU-155	351.91	88.10	19336.	98583.	13.692	0.38	0.928s
AC-228	372.89	93.35	4181.	10.	0.001	947.66	0.934D
U-235	372.89	93.35	4181.	10.	0.001	947.66	0.934D
EU-152	486.50	121.78	9141.	15680.	2.178	1.18	0.961D
EU-154	491.79	123.10	16163.	6162.	0.856	3.18	0.963D
Pa-234	526.76	131.85	3570.	-115.	-0.016	73.86	0.970s
U-235	574.86	143.88	3881.	-27.	-0.004	332.79	0.982s
U-235	645.89	161.65	2482.	-124.	-0.017	57.31	1.001s
U-235	814.95	203.95	3156.	62.	0.009	129.44	1.040s
PB-212	949.71	237.66	3775.	41.	0.006	74.01	1.071s
PB-214	967.12	242.01	4211.	31.	0.004	300.44	1.075
TL-208	1117.98	279.75	2905.	-25.	-0.003	306.65	1.107s
I-131	1141.63	285.67	3643.	13.	0.002	658.63	1.114
PB-214	1173.16	293.55	3124.	28.	0.004	280.40	1.124
PB-212	1204.00	301.27	3906.	48.	0.007	185.20	1.128s
AC-228	1354.85	339.00	3997.	-68.	-0.009	132.87	1.163s
EU-152	1372.70	343.46	3689.	-80.	-0.011	108.31	1.169s
PB-214	1409.03	352.55	3853.	119.	0.017	74.11	1.176s
BE-7	1911.27	478.16	4498.	-57.	-0.008	166.57	1.289
CS-134	2238.13	559.90	1555.	-21.	-0.003	270.06	1.365s
CS-134	2275.37	569.21	2635.	-30.	-0.004	240.00	1.370s
Pa-234	2275.47	569.23	2635.	-29.	-0.004	249.18	1.371s
I-131	2547.54	637.26	2656.	43.	0.006	171.14	1.429
CS-137	2645.39	661.73	3358.	71374.	9.913	0.43	1.641
EU-154	2889.40	722.73	2655.	75.	0.010	98.26	1.503s
PA-234M	3063.90	766.36	2935.	12.	0.002	618.61	1.540s
EU-152	3114.44	778.99	2965.	44.	0.006	176.59	1.550
BI-212	3138.24	784.94	3017.	-45.	-0.006	172.98	1.556s
CS-134	3184.30	796.46	3094.	-39.	-0.005	200.02	1.565s
CS-134	3206.65	802.04	3158.	-35.	-0.005	228.19	1.570s
TL-208	3439.53	860.26	3843.	38.	0.005	207.57	1.618s
EU-154	3495.50	874.25	4020.	-43.	-0.006	208.59	1.629s
AC-228	3642.48	910.98	4607.	-60.	-0.008	161.81	1.660s
Pa-234	3779.34	945.19	5089.	71.	0.010	142.70	1.689s
EU-152	3853.82	963.80	4872.	-57.	-0.008	172.28	1.703
EU-154	3982.27	995.90	3958.	31.	0.004	291.33	1.729s
EU-154	4015.55	1004.22	3969.	-50.	-0.007	180.35	1.736s
EU-152	4452.01	1113.29	3616.	122.	0.017	70.44	1.821
BI-214	4481.03	1120.54	3061.	-56.	-0.008	199.20	1.828s
CO-60	4692.13	1173.29	2548.	59718.	8.294	0.47	1.999
EU-154	5089.88	1272.67	404.	6.	0.001	478.08	1.946s
CO-60	5329.66	1332.57	1216.	53870.	7.482	0.47	2.071

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	5626.60	1406.74	236.	-3.	0.000	624.31	2.046
K-40	5840.97	1460.29	218.	16.	0.002	46.00	2.085s
BI-214	7040.80	1759.91	140.	-7.	-0.001	96.92	2.297s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Peak Code	Peak MDA Value Bq/Sample	Peak COMMENTS
BE-7	C	-1.7605E+00				5.31E+01	
			477.60	-1.760E+00	(	9.716E+00	1.67E+02 1.05E+01 G
K-40	N	1.3275E+00				4.66E+11	
			1460.83	1.328E+00	&(P	5.782E+00	4.60E+01 1.07E+01 G
CO-60	F	5.8008E+02				1.93E+03	
			1332.50	5.842E+02	(	1.792E+00	4.73E-01 1.00E+02 G
			1173.24	5.759E+02	(	2.295E+00	4.70E-01 9.99E+01 G
I-131	I	2.1591E-01				8.02E+00	
			364.48	6.489E-04	%(	9.420E-01	4.36E+04 8.17E+01 G
			284.30	4.610E-01	(	1.009E+01	6.59E+02 6.14E+00 G
			636.97	2.459E+00	(	1.397E+01	1.71E+02 7.17E+00 G
CS-134	I	-4.6482E-03				7.54E+02	
			604.71	-4.648E-03	&(	2.206E+00	1.42E+04 9.76E+01 G
			795.87	-5.120E-01	+	3.399E+00	2.00E+02 8.55E+01 G
			569.32	-1.648E+00	&	1.314E+01	2.40E+02 1.54E+01 G
			801.95	-4.490E+00	&	3.401E+01	2.28E+02 8.69E+00 G
			563.24	-2.054E+00	+	1.849E+01	2.70E+02 8.35E+00 G
CS-137	I	3.7553E+02				1.10E+04	
			661.66	3.755E+02	(	1.435E+00	4.25E-01 8.52E+01 G
EU-152	F	3.8751E+01				4.94E+03	
			344.29	-8.535E-01	?(	3.059E+00	1.08E+02 2.65E+01 G
			121.78	7.547E+01	(	2.158E+00	1.18E+00 2.86E+01 G
			778.92	1.865E+00	-	1.093E+01	1.77E+02 1.29E+01 G
			964.11	-2.618E+00	-	1.494E+01	1.72E+02 1.46E+01 G
			1112.07	6.754E+00	-	1.570E+01	7.04E+01 1.36E+01 G
			1408.00	-1.568E-01	-	3.335E+00	6.24E+02 2.10E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	I	1.6703E+01					3.14E+03	
			873.23	-2.297E+00	&(	1.589E+01	2.09E+02	1.23E+01 G
			123.10	2.242E+01	(	2.165E+00	3.18E+00	4.08E+01 G
			1274.54	1.561E-01	&	2.521E+00	4.78E+02	3.52E+01 G
			723.36	2.050E+00	&	6.666E+00	9.83E+01	2.02E+01 G
			1004.77	-2.039E+00	&	1.219E+01	1.80E+02	1.80E+01 G
			996.33	2.123E+00	-	2.052E+01	2.91E+02	1.06E+01 G
EU-155	I	2.9192E+02					1.81E+03	
			105.31	-2.068E-02	%(	2.313E+00	3.36E+03	2.12E+01 G
			86.54	4.935E+02	?(	3.258E+00	3.76E-01	3.07E+01 G
TL-208	N	3.4896E-01					6.98E+02	
			583.02	-1.739E-01	&(P	2.563E+00	4.11E+02	8.45E+01 G
			277.28	-2.008E+00	+	2.047E+01	3.07E+02	6.31E+00 G
			860.56	3.906E+00	?(P	2.978E+01	2.08E+02	1.24E+01 G
PB-210	N	-5.2878E+00					8.14E+03	
			46.54	-5.288E+00	%(P	1.710E+01	5.63E+02	4.25E+00 G
PB-212	N	9.5779E-01					6.98E+02	
			238.63	4.343E-01	(P	3.046E+00	7.40E+01	4.33E+01 G
			300.03	7.869E+00	?(	4.832E+01	1.85E+02	3.28E+00 G
PB-214	N	6.6429E-01					5.84E+05	
			351.93	8.109E-01	&(	1.984E+00	7.41E+01	3.76E+01 G
			295.09	3.275E-01	(	3.051E+00	2.80E+02	1.93E+01 G
			242.00	7.973E-01	(	7.949E+00	3.00E+02	7.43E+00 G
BI-212	N	-2.9011E-01					6.98E+02	
			727.17	-2.901E-01	%(	3.549E+01	3.67E+03	7.55E+00 G
			785.42	-4.123E+01	&	2.366E+02	1.73E+02	1.28E+00 G
BI-214	N	-4.3401E-01					5.84E+05	
			609.31	-4.340E-01	%(P	2.085E+00	1.57E+04	4.61E+01 G
			1120.29	-2.501E+00	+ P	1.164E+01	1.99E+02	1.51E+01 G
			1764.49	-4.431E-01	+ P	3.896E+00	9.69E+01	1.54E+01 G
AC-228	N	-1.5327E+00					2.10E+03	
			911.07	-1.533E+00	&(	8.215E+00	1.62E+02	2.90E+01 G
			968.97	2.384E-01	&	1.436E+01	1.81E+03	1.75E+01 G
			338.32	-1.859E+00	&	8.180E+00	1.33E+02	1.20E+01 G
								Energy duplication
			93.35	2.578E-01	&	8.118E+00	9.48E+02	5.56E+00 XA
Pa-234	N	8.4277E-01					1.63E+12	
			131.29	-8.110E-01	?(	1.977E+00	7.39E+01	1.80E+01 G
			569.47	-1.333E+00	&	1.104E+01	2.49E+02	8.20E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		946.02	3.064E+00	&(	1.448E+01	1.43E+02	1.34E+01 G
		883.24-5.451E-02		%	1.720E+01	9.49E+03	9.60E+00 G
		880.53	5.600E-02	%	2.716E+01	1.46E+04	6.00E+00 G
TH-234	N -1.3582E+02					1.63E+12	
		63.29-1.358E+02		?(P	1.488E+01	3.66E+00	3.81E+00 G
		92.59-2.668E+00		% P	6.336E+00	3.29E+03	5.58E+00 G
PA-234M	N 8.4009E+00					1.63E+12	
		1001.00	4.226E+00	%(	1.757E+02	1.25E+03	8.37E-01 G
		766.41	2.029E+01	?(	4.175E+02	6.19E+02	2.94E-01 G
U-235	N 4.4297E-01					2.57E+11	
		143.79-3.238E-01		?(	3.578E+00	3.33E+02	1.10E+01 G
		205.33	2.120E+00	&(	9.093E+00	1.29E+02	5.01E+00 G
		163.38-3.600E+00		+	6.792E+00	5.73E+01	5.08E+00 G
						Energy duplication	
		93.35	1.849E-01	&	5.823E+00	9.48E+02	5.81E+00 X
AM-241	T 9.2951E+02					1.58E+05	
		59.54	9.295E+02	*(	2.360E+00	2.17E-01	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average

R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-234	61.58	11655.	-4618.	-0.641	3.66	-1.358E+02	P
EU-155	88.10	19336.	98583.	13.692	0.38	4.935E+02	
AC-228	93.35	4181.	10.	0.001	947.66	2.578E-01	
U-235	93.35	4181.	10.	0.001	947.66	1.849E-01	
Pa-234	131.85	3570.	-115.	-0.016	73.86	-8.110E-01	
U-235	143.88	3881.	-27.	-0.004	332.79	-3.238E-01	
U-235	161.65	2482.	-124.	-0.017	57.31	-3.600E+00	
U-235	203.95	3156.	62.	0.009	129.44	2.120E+00	
PB-212	237.66	3775.	41.	0.006	74.01	4.343E-01	P
TL-208	279.75	2905.	-25.	-0.003	306.65	-2.008E+00	
PB-212	301.27	3906.	48.	0.007	185.20	7.869E+00	
AC-228	339.00	3997.	-68.	-0.009	132.87	-1.859E+00	
BE-7	478.16	4498.	-57.	-0.008	166.57	0.000E+00	
CS-134	559.90	1555.	-21.	-0.003	270.06	-2.054E+00	
CS-134	569.21	2635.	-30.	-0.004	240.00	-1.648E+00	
Pa-234	569.23	2635.	-29.	-0.004	249.18	-1.333E+00	
PA-234M	766.36	2935.	12.	0.002	618.61	2.029E+01	
BI-212	784.94	3017.	-45.	-0.006	172.98	-4.123E+01	
CS-134	796.46	3094.	-39.	-0.005	200.02	-5.120E-01	
CS-134	802.04	3158.	-35.	-0.005	228.19	-4.490E+00	
TL-208	860.26	3843.	38.	0.005	207.57	3.906E+00	P
AC-228	910.98	4607.	-60.	-0.008	161.81	-1.533E+00	
Pa-234	945.19	5089.	71.	0.010	142.70	3.064E+00	
BI-214	1120.54	3061.	-56.	-0.008	199.20	-2.501E+00	P
BI-214	1759.91	140.	-7.	-0.001	96.92	-4.431E-01	P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting		MDA Bq/Sample
BE-7	#A	-1.7605E+00	>12 Halflives	1.6657E+02%	9.7156E+00	
K-40	#A	1.3275E+00	1.3275E+00	1.254E+02%		5.78E+00
CO-60		4.2346E+02	5.8008E+02	3.333E-01%		1.79E+00
I-131	A	2.1591E-01	>12 Halflives	1.7114E+02%	9.4197E-01	
CS-134	#A	-2.0816E-03	-4.6482E-03	1.424E+04%		2.21E+00
CS-137		3.5533E+02	3.7553E+02	4.252E-01%		1.44E+00
EU-152	C	3.4282E+01	3.8751E+01	1.175E+00%		3.06E+00
EU-154	C	1.3770E+01	1.6703E+01	3.184E+00%		1.59E+01
EU-155	#C	2.0894E+02	2.9192E+02	3.758E-01%		2.31E+00
TL-208	#A	1.4642E-01	3.4896E-01	2.297E+02%		2.56E+00

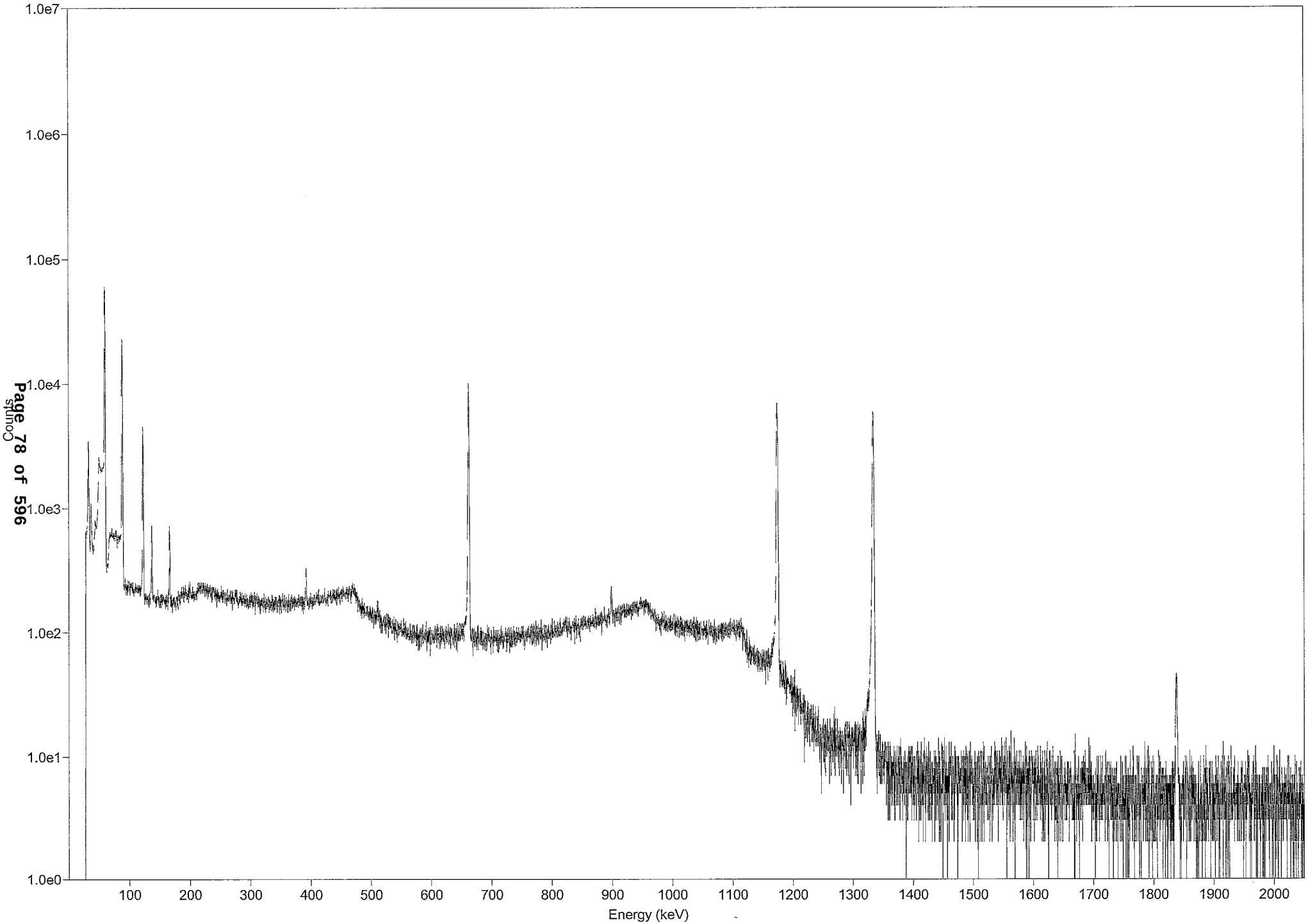
PB-210 #A	-4.9087E+00	-5.2878E+00	1.028E+03%	1.71E+01
PB-212 #A	4.0188E-01	9.5779E-01	1.401E+02%	3.05E+00
PB-214 A	6.6360E-01	6.6429E-01	7.411E+01%	1.98E+00
BI-212 #A	-1.2173E-01	-2.9011E-01	3.672E+03%	3.55E+01
BI-214 #A	-4.3356E-01	-4.3401E-01	3.150E+04%	2.09E+00
AC-228 #A	-1.1486E+00	-1.5327E+00	1.618E+02%	8.22E+00
Pa-234 #A	8.4277E-01	8.4277E-01	7.386E+01%	1.98E+00
TH-234 #A	-1.3582E+02	-1.3582E+02	3.718E+00%	1.49E+01
PA-234M#A	8.4009E+00	8.4009E+00	6.186E+02%	1.76E+02
U-235 #A	4.4297E-01	4.4297E-01	1.294E+02%	3.58E+00
AM-241 #	9.2596E+02	9.2951E+02	2.168E-01%	2.36E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (1173.0 to 1999.4 keV) 1.705E+03 Bq/Sample
Total Decayed Activity (1173.0 to 1999.4 keV) 1.8851224E+03 Bq/Sample

The library has energies which are not separable.


25mL d=1_85520-334_2011Cal. 12_85520-334_20131748.spc.
1.0e7
1.0e6
1.0e5
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Counts
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

85520-334
5 mL Liquid in Flame Sealed Vial

Customer: Test America St. Louis
P.O. No.: 2434437, Item 1
Reference Date: 01-Jul-2011 12:00 PM EST **Grams of Master Source:** 0.029166

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	1.580E+05	———	3.368E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	4.626E+02	1.639E+05	4.780E+03	0.5	1.7	3.5	HPGe
Co-57	122.1	2.718E+02	8.758E+04	2.554E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	1.376E+02	1.218E+05	3.552E+03	0.5	1.1	2.4	HPGe
Hg-203	279.2	4.661E+01	2.692E+05	7.851E+03	0.4	1.1	2.3	HPGe
Sn-113	391.7	1.151E+02	1.691E+05	4.932E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	1.098E+04	1.093E+05	3.188E+03	0.6	1.2	2.7	HPGe
Y-88	898.0	1.066E+02	4.105E+05	1.197E+04	0.4	1.1	2.3	HPGe
Co-60	1173.2	1.925E+03	2.022E+05	5.897E+03	0.5	1.1	2.4	HPGe
Co-60	1332.5	1.925E+03	2.022E+05	5.897E+03	0.5	1.1	2.4	HPGe
Y-88	1836.1	1.066E+02	4.346E+05	1.268E+04	0.5	1.1	2.4	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1966

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Comments:
5.32298 g 4M HCl solution with approximately 30 µg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the reference date.

Source Prepared by: _____
Z. Dimitrova, Radiochemist

QA Approved: _____ Date: 8/18/11
J. D. McCorvey, QA Manager Alternate

Reagent

Gamma Ampuole_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

Customer: TestAmerica St. Louis
P.O. No.: 2303925, Item 1
Calibration Date: 01-Apr-2009 12:00 EST **Grams of Master Source:** 0.028371

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	157860	———	3.390E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	462.60	1.691E+05	4.798E+03	0.4	1.7	3.5	HPGe
Co-57	122.1	271.79	8.904E+04	2.526E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	137.6	1.256E+05	3.563E+03	0.4	1.1	2.3	HPGe
Hg-203	279.2	46.61	2.788E+05	7.910E+03	0.3	1.1	2.3	HPGe
Sn-113	391.7	115.1	1.725E+05	4.894E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	10983	1.120E+05	3.178E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	106.6	4.205E+05	1.193E+04	0.8	1.1	2.7	HPGe
Co-60	1173.2	1925.4	2.184E+05	6.196E+03	0.7	1.1	2.6	HPGe
Co-60	1332.5	1925.4	2.185E+05	6.199E+03	0.7	1.1	2.6	HPGe
Y-88	1836.1	106.6	4.444E+05	1.261E+04	0.7	1.1	2.6	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
5.31740 grams 4M HCl solution with approximately 30 microg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the calibration date.

Source Prepared by: _____ for
W. Mao, Radiochemist

QA Approved: _____ Date: 5-13-09
D. M. Montgomery, QA Manager

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Gamma Ampuole_00003

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

83725-334

5 mL Liquid in Flame Sealed Vial

Customer: Test America St. Louis/Earth City, MO
P.O. No.: 2397508, Item 1
Reference Date: 01-Jan-2011 12:00 PM EST **Grams of Master Source:** 0.028066

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	1.580E+05	———	3.261E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	4.626E+02	1.697E+05	4.763E+03	0.8	1.7	3.8	HPGe
Co-57	122.1	2.718E+02	8.711E+04	2.445E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	1.376E+02	1.247E+05	3.500E+03	0.5	1.1	2.4	HPGe
Hg-203	279.2	4.661E+01	2.753E+05	7.727E+03	0.4	1.1	2.3	HPGe
Sn-113	391.7	1.151E+02	1.769E+05	4.965E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	1.098E+04	1.109E+05	3.113E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	1.066E+02	4.224E+05	1.186E+04	0.5	1.1	2.4	HPGe
Co-60	1173.2	1.925E+03	2.142E+05	6.012E+03	0.6	1.1	2.5	HPGe
Co-60	1332.5	1.925E+03	2.143E+05	6.015E+03	0.6	1.1	2.5	HPGe
Y-88	1836.1	1.066E+02	4.472E+05	1.255E+04	0.5	1.1	2.4	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ACCREDITED SOURCE CALIBRATION LABORATORY — HEALTH PHYSICS SOCIETY — FOUNDED 1956

Comments:
5.30203 grams 4M HCl solution with approximately 30 µg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the reference date.

Source Prepared by: MTaskaeva
M. I. Taskaeva, Radiochemist

QA Approved: _____ Date: 13 JAN 11
J. D. McCorvey, QA Manager Alternate

Reagent

Source C_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

Customer: TestAmerica St. Louis
P.O. No.: 2303925, Item 1
Calibration Date: 01-Apr-2009 12:00 EST **Grams of Master Source:** 0.028371

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	157860	———	3.390E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	462.60	1.691E+05	4.798E+03	0.4	1.7	3.5	HPGe
Co-57	122.1	271.79	8.904E+04	2.526E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	137.6	1.256E+05	3.563E+03	0.4	1.1	2.3	HPGe
Hg-203	279.2	46.61	2.788E+05	7.910E+03	0.3	1.1	2.3	HPGe
Sn-113	391.7	115.1	1.725E+05	4.894E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	10983	1.120E+05	3.178E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	106.6	4.205E+05	1.193E+04	0.8	1.1	2.7	HPGe
Co-60	1173.2	1925.4	2.184E+05	6.196E+03	0.7	1.1	2.6	HPGe
Co-60	1332.5	1925.4	2.185E+05	6.199E+03	0.7	1.1	2.6	HPGe
Y-88	1836.1	106.6	4.444E+05	1.261E+04	0.7	1.1	2.6	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
5.31740 grams 4M HCl solution with approximately 30 microg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the calibration date.

Source Prepared by: for
W. Mao, Radiochemist

QA Approved: Date: 5-13-09
D. M. Montgomery, QA Manager

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Source D_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

Customer: TestAmerica St. Louis
P.O. No.: 2303925, Item 1
Calibration Date: 01-Apr-2009 12:00 EST **Grams of Master Source:** 0.028371

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	157860	———	3.390E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	462.60	1.691E+05	4.798E+03	0.4	1.7	3.5	HPGe
Co-57	122.1	271.79	8.904E+04	2.526E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	137.6	1.256E+05	3.563E+03	0.4	1.1	2.3	HPGe
Hg-203	279.2	46.61	2.788E+05	7.910E+03	0.3	1.1	2.3	HPGe
Sn-113	391.7	115.1	1.725E+05	4.894E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	10983	1.120E+05	3.178E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	106.6	4.205E+05	1.193E+04	0.8	1.1	2.7	HPGe
Co-60	1173.2	1925.4	2.184E+05	6.196E+03	0.7	1.1	2.6	HPGe
Co-60	1332.5	1925.4	2.185E+05	6.199E+03	0.7	1.1	2.6	HPGe
Y-88	1836.1	106.6	4.444E+05	1.261E+04	0.7	1.1	2.6	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
5.31740 grams 4M HCl solution with approximately 30 microg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the calibration date.

Source Prepared by: _____ for
W. Mao, Radiochemist

QA Approved: _____ Date: 5-13-09
D. M. Montgomery, QA Manager

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Source E_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

79670-334

5 mL Liquid in Flame Sealed Vial

Customer: TestAmerica St. Louis
P.O. No.: 2303925, Item 1
Calibration Date: 01-Apr-2009 12:00 EST **Grams of Master Source:** 0.028371

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	157860	———	3.390E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	462.60	1.691E+05	4.798E+03	0.4	1.7	3.5	HPGe
Co-57	122.1	271.79	8.904E+04	2.526E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	137.6	1.256E+05	3.563E+03	0.4	1.1	2.3	HPGe
Hg-203	279.2	46.61	2.788E+05	7.910E+03	0.3	1.1	2.3	HPGe
Sn-113	391.7	115.1	1.725E+05	4.894E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	10983	1.120E+05	3.178E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	106.6	4.205E+05	1.193E+04	0.8	1.1	2.7	HPGe
Co-60	1173.2	1925.4	2.184E+05	6.196E+03	0.7	1.1	2.6	HPGe
Co-60	1332.5	1925.4	2.185E+05	6.199E+03	0.7	1.1	2.6	HPGe
Y-88	1836.1	106.6	4.444E+05	1.261E+04	0.7	1.1	2.6	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
5.31740 grams 4M HCl solution with approximately 30 microg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the calibration date.

Source Prepared by: _____ for
W. Mao, Radiochemist

QA Approved: _____ Date: 5-13-09
D. M. Montgomery, QA Manager

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

Source H_00002

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

83725-334

5 mL Liquid in Flame Sealed Vial

Customer: Test America St. Louis/Earth City, MO
P.O. No.: 2397508, Item 1
Reference Date: 01-Jan-2011 12:00 PM EST **Grams of Master Source:** 0.028066

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, % Type u_A	u_B	U	Calibration Method
Am-241	59.5	1.580E+05	———	3.261E+03	0.1	0.9	1.8	4π LS
Cd-109	88.0	4.626E+02	1.697E+05	4.763E+03	0.8	1.7	3.8	HPGe
Co-57	122.1	2.718E+02	8.711E+04	2.445E+03	0.5	1.3	2.8	HPGe
Ce-139	165.9	1.376E+02	1.247E+05	3.500E+03	0.5	1.1	2.4	HPGe
Hg-203	279.2	4.661E+01	2.753E+05	7.727E+03	0.4	1.1	2.3	HPGe
Sn-113	391.7	1.151E+02	1.769E+05	4.965E+03	0.5	1.1	2.4	HPGe
Cs-137	661.7	1.098E+04	1.109E+05	3.113E+03	0.7	1.2	2.8	HPGe
Y-88	898.0	1.066E+02	4.224E+05	1.186E+04	0.5	1.1	2.4	HPGe
Co-60	1173.2	1.925E+03	2.142E+05	6.012E+03	0.6	1.1	2.5	HPGe
Co-60	1332.5	1.925E+03	2.143E+05	6.015E+03	0.6	1.1	2.5	HPGe
Y-88	1836.1	1.066E+02	4.472E+05	1.255E+04	0.5	1.1	2.4	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

Comments:
5.30203 grams 4M HCl solution with approximately 30 µg/g each of Cd, Co, Ce, Hg, Sn, Cs, and Y carriers.

This standard will expire one year after the reference date.

Source Prepared by: MTaskaeva
M. I. Taskaeva, Radiochemist

QA Approved: _____ Date: 13 JAN 11
J. D. McCorvey, QA Manager Alternate

Reagent

Tuna Can LCS_00002

Rec'd : 12-26-06

ANALYTICS
An Isotope Products Laboratories Company

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
Fax 404•352•2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

74139-334
1.0 Liter Sand in 1 Liter Wide Mouth HDPE "S" Bottle

Customer: Severn Trent Laboratories/Earth City, MO
P.O. No.: 2169577, Item 1
Calibration Date: 01-Oct-2006 12:00 EST **Grams of Master Source:** 0.01552

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Analytics maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST."

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty , % Type u_A	u_B	U	Calibration Method
Pb-210	46.5	8145.9	———	3079.8	0.33	1.46	2.99	4π LS
Am-241	59.5	157860	———	2034.3	0.33	1.46	2.99	4π LS
Cd-109	88.0	462.60	189000	2933.5	0.57	1.70	3.59	HPGe
Co-57	122.1	271.79	94570	1467.8	0.34	1.30	2.69	HPGe
Ce-139	165.9	137.6	133800	2076.7	0.35	1.10	2.31	HPGe
Hg-203	279.2	46.61	295300	4583	0.40	1.10	2.34	HPGe
Sn-113	391.7	115.1	185600	2880.7	0.42	1.10	2.35	HPGe
Cs-137	661.7	10983	116700	1811.3	0.70	1.20	2.78	HPGe
Y-88	898.0	106.60	455400	7068	0.50	1.10	2.42	HPGe
Co-60	1173.2	1925.4	226900	3522	0.60	1.10	2.51	HPGe
Co-60	1332.5	1925.4	227000	3523	0.90	1.10	2.84	HPGe
Y-88	1836.1	106.6	481200	7469	0.90	1.10	2.84	HPGe

* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
1550 grams of sand. NOTE: Homogeneity was checked by the addition of Tc-99 tracer to the solution used to spike the sand. Ten 10-gram aliquots were removed after mixing and counted to measure the Tc-99. The standard deviation for the 10 measurements was 1.3% with a range of 4.8%. This demonstrates reasonable homogeneity for this source material down to a 10-gram aliquot.
This standard will expire one year after the calibration date.

Source Prepared by: M. I. Taskaeva, Radiochemist

QA Approved: for D. M. Montgomery, QA Manager Date: 12-21-06

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Gamma LCS per Geometry

Geometry: Tuna Can
Reference date 10/1/2006
Calibration Standard: 74139-334
Standard volume g / vial 1550
volume transferred in g / geometry 341.9

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	dpm/g
Am-241	2034.3	449	0.359	219.35
Cs-137	1811.3	400	0.851	82.39
Co-60	3523	777	0.999856	136.39

Reviewed By: Chris Hough

Date: 3/15/2013

Reagent

Tuna Can LCS_00003

Rec'd : 12-26-06

ANALYTICS
An Isotope Products Laboratories Company

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404•352•8677
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www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

74139-334
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P.O. No.: 2169577, Item 1
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Ce-139	165.9	137.6	133800	2076.7	0.35	1.10	2.31	HPGe
Hg-203	279.2	46.61	295300	4583	0.40	1.10	2.34	HPGe
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Cs-137	661.7	10983	116700	1811.3	0.70	1.20	2.78	HPGe
Y-88	898.0	106.60	455400	7068	0.50	1.10	2.42	HPGe
Co-60	1173.2	1925.4	226900	3522	0.60	1.10	2.51	HPGe
Co-60	1332.5	1925.4	227000	3523	0.90	1.10	2.84	HPGe
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Source Prepared by: M Taskaeva
M. I. Taskaeva, Radiochemist

QA Approved: for
D. M. Montgomery, QA Manager

Date: 12-21-06

End of Certificate

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ANALYSIS OF UNCERTAINTY FOR MIXED GAMMA STANDARDS
BATCH 127
CALIBRATION DATE: October 1, 2006 12:00 EST

Isotope	Energy (keV)	Calibration Method[1]	Statistics[2]	Calibration[2]	Peak Fitting[2]	Geometry[2]	Impurities[2]	Weighing	Combined Standard Uncertainty	Relative Expanded Uncertinty (k=2)
Cd-109	88	HPGe	0.16	1.1	0.88	0.8	0	0.2	1.64	3.3
Co-57	122	HPGe	0.23	1.1	0.71	0.7	0	0.2	1.52	3.0
Ce-139	166	HPGe	0.17	1.0	0.58	0.7	0	0.2	1.38	2.8
Hg-203	279	HPGe	0.11	1.1	0.34	0.7	0	0.2	1.37	2.7
Sn-113	392	HPGe	0.21	1.0	0.35	0.7	0	0.2	1.30	2.6
Cs-137	662	HPGe	0.36	1.1	0.60	0.7	0	0.2	1.49	3.0
Y-88	898	HPGe	0.19	1.0	0.33	0.7	0	0.2	1.29	2.6
Co-60	1173	HPGe	0.31	.97	0.45	0.7	0	0.2	1.33	2.7
Co-60	1332	HPGe	0.33	.93	0.48	0.7	0	0.2	1.32	2.6
Y-88	1836	HPGe	0.24	1.0	0.35	0.7	0	0.2	1.31	2.6
Optional Additional Isotopes										
Pb-210	46.5	4π LS	0.33	1.1	0	0.9	0.30	0.2	1.50	3.0
Am-241	59.5	4π LS	0.33	1.1	0	0.9	0.30	0.2	1.50	3.0
Sr-85	514	IC	0.30	1.1	0	0.7	0.17	0.2	1.36	2.7
Cs-134	605	IC	0.30	1.0	0	0.8	0.17	0.2	1.34	2.7
Cs-134	796	IC	0.30	1.0	0	0.8	0.17	0.2	1.34	2.7
Mn-54	835	IC	0.30	1.0	0	0.8	0.17	0.2	1.34	2.7
Zn-65	1116	IC	0.30	1.0	0	0.8	0.17	0.2	1.34	2.7

[1]Calibration Methods:

4π LS (4 pi Liquid Scintillation Counting)
HPGe (High Purity Germanium Gamma Ray Spectrometer)
IC (Gamma Ray Ionization Chamber)

[2]As Percent (%)from counting data

No interfering gamma emitting impurities were detected during calibration. Depending on the resolution and energy dispersion (keV/channel) of the measuring system, the following spectral conflicts may occur: (1) between the 88 keV gamma-ray and the X-rays emitted in the decay of Hg-203, (2) between the 1333 keV gamma-ray and the 1325 keV single escape peak from the 1836 keV gamma-ray.

St. Louis Radiological Standard Reverification Form

Standard ID Number: Tuna Can LCS_00003 (259586)
True Value = 1249.94 Bq/Sample
Date Analyzed: 10/31/2013

Radionuclide: Am-241

	Replicates	
#1	1215	Bq/Sample
#2	1264	Bq/Sample
#3	1267	Bq/Sample

Mean = 1248.667

1 sigma = 29.19475

1.96 sigma = 57.22171

True Value minus 5% = 1187.443 (True Value - 5%)
True Value plus 5% = 1312.437 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? **Yes** **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? **Yes** **(Acceptance Criteria)**

Standard Reverification Acceptable? **Yes**

Note: Criteria for reverification of radiological standards is taken from the DOE QSAS and LANL Statements of Work

Reviewed By/Date: Jody Watson 12/1/13

SOP Reference: STL-QA-0002, Current Revision

St. Louis Radiological Standard Reverification Form

Standard ID Number: Tuna Can LCS_00003 (259586)
True Value = 469.49 Bq/Sample
Date Analyzed: 10/31/2013

Radionuclide: Cs-137

	Replicates	
#1	451.6	Bq/Sample
#2	477.4	Bq/Sample
#3	455.6	Bq/Sample

Mean = 461.5333

1 sigma = 13.88572

1.96 sigma = 27.21602

True Value minus 5% = 446.0155 (True Value - 5%)
True Value plus 5% = 492.9645 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? Yes **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? Yes **(Acceptance Criteria)**

Standard Reverification Acceptable? Yes

Note: Criteria for reverification of radiological standards is taken from the DOE QSAS and LANL Statements of Work

Reviewed By/Date: Jody Watson 12/1/14

SOP Reference: STL-QA-0002, Current Revision

St. Louis Radiological Standard Reverification Form

Standard ID Number: Tuna Can LCS_00003 (259586)
True Value = 777 Bq/Sample
Date Analyzed: 10/31/2013

Radionuclide: Co-60

	Replicates	
#1	724.3	Bq/Sample
#2	774.1	Bq/Sample
#3	770	Bq/Sample

Mean = 756.1333

1 sigma = 27.64459

1.96 sigma = 54.1834

True Value minus 5% = 738.15 (True Value - 5%)
True Value plus 5% = 815.85 (True Value + 5%)

Accuracy:
Mean value within 5% of Certified (True) Value? Yes **(Acceptance Criteria)**

Precision:
1.96 sigma Value Within 10% of Mean Value? Yes **(Acceptance Criteria)**

Standard Reverification Acceptable? Yes

Note: Criteria for reverification of radiological standards is taken from the DOE QSAS and LANL Statements of Work

Reviewed By/Date: Jody Watson 12/1/14

SOP Reference: STL-QA-0002, Current Revision

Gamma LCS per Geometry - Tuna Can

Reagent ID: Tuna Can LCS_00003
Container: 259586
Reference date 10/1/2006
Calibration Standard: 74139-334
Standard volume: 1550 g/vial
Standard volume transferred: 341.9 g/geometry

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	dpm/g	Bq/sample
Am-241	2034.3	448.7	0.359	219.35	1249.94
Cs-137	1811.3	399.5	0.851	82.39	469.49
Co-60	3522	776.9	0.999856	136.36	777.00

Reviewed By: Jody Watson

Date: 12/1/2013

SOP Reference: ST-RD-0102, Current Rev **Form:** RAD-0080 **Revised:** 11/27/2013

Test America St. Louis Spectrum ID: 9_Gamma_20130915

Sample Description: 77739_Gamma_LCS 160-77739~2-A
Detector: Ge9 S/N100228730
Batch ID: 77739
Work Order Number: Gamma
Lot Number: LCS 160-77739~2-A

Decay to Time: 10/1/2006 12:00 Live Time: 1800 sec
Acquisition Time: 10/31/2013 08:28:21 Real Time: 1810 sec
Analysis Time: 11/11/2013 19:50 Dead Time: 0.57 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 9_Soil_TunaCan.Clb
Efficiency Cal Desc: 9_Soil_TunaCan_90099_050312
Efficiency Cal Date: 6/14/2012 10:19
Energy Cal Date: 3/1/2012 13:57
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 9_2013-10-05_0100.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
K-40	5.305E-01	769.5	4.082E+00	4.082E+00	1.578E+01
CO-60	7.243E+02	1.0	7.254E+00	3.708E+01	3.977E+00
CS-134	7.235E+00	93.6	6.774E+00	6.784E+00	2.680E+01
CS-137	4.516E+02	1.0	4.733E+00	2.396E+01	3.540E+00
EU-152	6.293E+00	42.6	2.678E+00	2.698E+00	1.271E+01
EU-154	4.025E+00	75.0	3.020E+00	3.027E+00	5.177E+01
EU-155	5.881E+00	110.2	6.478E+00	6.486E+00	2.150E+01
TL-208	3.059E+01	64.6	1.977E+01	1.984E+01	3.918E+01
PB-210	1.442E+04	0.9	1.325E+02	8.572E+02	2.204E+02
PB-212	5.630E+01	36.7	2.065E+01	2.097E+01	6.722E+01
PB-214	5.714E+00	34.9	1.996E+00	2.018E+00	6.384E+00
BI-212	9.580E+01	152.1	1.457E+02	1.458E+02	4.895E+02
BI-214	7.078E+00	34.4	2.432E+00	2.460E+00	4.992E+00
AC-228	1.477E+01	57.1	8.428E+00	8.462E+00	3.552E+01
Pa-234	5.684E+00	65.7	3.737E+00	3.748E+00	9.406E+00
TH-234	-2.970E+02	9.4	2.787E+01	3.191E+01	8.608E+01
PA-234M	9.991E+01	80.0	7.990E+01	8.006E+01	4.336E+02
U-235	-4.791E+00	104.0	4.982E+00	4.988E+00	1.653E+01
AM-241	1.215E+03	0.8	9.198E+00	6.370E+01	1.316E+01
Total	1.715E+04				

Analyst: Jody Watson

TestAmerica, Inc Spectrum name: 9_Gamma_20130915.An1

Sample description
77739_Gamma_LCS 160-77739~2-A

Spectrum Filename: C:\User\SPC\Det9\9_Gamma_20130915.An1

Acquisition information
Start time: 10/31/2013 8:28:21 AM
Live time: 1800
Real time: 1810
Dead time: 0.57 %
Detector ID: 9

Detector system
Ge9 S/N100228730

Calibration
Filename: 9_Soil_TunaCan.Clb
9_Soil_TunaCan_90099_050312

Energy Calibration
Created: 3/1/2012 1:57:17 PM
Zero offset: 0.074 keV
Gain: 0.250 keV/channel
Quadratic: -2.269E-08 keV/channel^2

Efficiency Calibration
Created: 6/14/2012 10:19:51 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.30 %
Log(Eff): -8.079856E-01 + (-2.367265E-01*Log(E)) + (-3.950640E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.42 %
Log(Eff): -2.387916E+01 + (8.875647E+00*Log(E)) + (-9.401100E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.59keV)
Stop channel: 8000 (1999.34keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	9_2013-10-05_0100.PBC 10/5/2013 1:00:21 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 35 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 134.9778

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.60	401.	16.10	1.13	1.639E-02				
46.55	22813.	0.92	0.93	2.578E-02	46.54	4.250	1.442E+04	PB210
59.57	28391.	0.76	0.93	3.661E-02	59.54	35.900	1.215E+03	AM241
77.08	140.	39.21	0.98	4.675E-02				
88.08	1206.	7.29	1.06	5.052E-02				
93.88	58.	87.63	1.04	5.171E-02	93.35	5.561	PBC<MDA	AC228
					93.35	5.810	1.069E+01	U235
					92.59	5.584	1.115E+01	TH234
					93.35	5.810	1.069E+01	U235
					93.35	5.561	2.622E+01	AC228
93.88	58.	87.63	1.04	5.171E-02	93.35	5.561	PBC<MDA	AC228
					93.35	5.810	1.069E+01	U235
105.44	44.	110.15	1.05	5.318E-02	105.31	21.200	PBC<MDA	EU155
					105.31	21.200	5.881E+00	EU155
122.44	45.	108.81	1.07	5.305E-02	121.78	28.580	PBC<MDA	EU152
					121.78	28.580	2.352E+00	EU152
131.16	35.	137.33	1.08	5.216E-02	131.29	18.000	PBC<MDA	Pa234
161.84	5.	850.44	1.11	4.676E-02	163.38	5.080	PBC<MDA	U235
					163.38	5.080	1.068E+00	U235
191.89	75.	47.73	0.55	4.310E-02				
199.99	66.	64.08	0.38	4.195E-02				
238.40	138.	27.30	0.91	3.734E-02	238.63	43.300	6.216E+01	PB212
242.14	11.	403.77	1.18	3.697E-02	242.00	7.430	PBC<MDA	PB214
276.94	34.	114.35	1.21	3.372E-02	277.28	6.310	PBC<MDA	TL208
283.56	5.	702.33	1.22	3.315E-02	284.30	6.140	HL>Cutoff	I131
294.85	92.	54.23	0.49	3.232E-02	295.09	19.300	PBC<MDA	PB214
300.38	48.	84.68	1.24	3.195E-02	300.03	3.280	PBC<MDA	PB212
338.25	45.	84.62	1.27	2.949E-02	338.32	12.010	PBC<MDA	AC228

					338.32	12.010	1.661E+01	AC228
344.89	28.	130.46	1.27	2.905E-02	344.29	26.500	PBC<MDA	EU152
					344.29	26.500	2.923E+00	EU152
351.72	86.	44.07	1.28	2.860E-02	351.93	37.600	PBC<MDA	PB214
367.42	39.	64.82	0.53	2.775E-02				
519.92	99.	37.67	0.41	2.164E-02				
562.86	22.	127.02	1.47	2.040E-02	563.24	8.350	PBC<MDA	CS134
570.13	20.	136.61	1.47	2.024E-02	569.32	15.380	PBC<MDA	CS134

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					569.47	8.200	6.589E+00	Pa234
570.13	20.	136.24	1.47	2.024E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	6.607E+00	Pa234
583.13	40.	60.64	1.48	1.989E-02	583.02	84.500	PBC<MDA	TL208
609.58	105.	31.70	0.98	1.925E-02	609.31	46.090	6.578E+00	BI214
661.61	10643.	1.05	1.45	1.810E-02	661.66	85.210	4.516E+02	CS137
712.89	39.	39.12	0.70	1.711E-02				
727.11	17.	152.13	1.60	1.686E-02	727.17	7.550	PBC<MDA	BI212
766.71	33.	79.97	1.63	1.620E-02	766.41	0.294	PBC<MDA	PA234M
					766.41	0.294	3.867E+02	PA234M
779.17	59.	42.55	1.64	1.600E-02	778.92	12.940	PBC<MDA	EU152
					778.92	12.940	2.273E+01	EU152
797.04	6.	290.73	1.66	1.565E-02	801.95	8.690	PBC<MDA	CS134
860.47	19.	137.44	1.71	1.482E-02	860.56	12.420	PBC<MDA	TL208
883.68	19.	133.89	1.72	1.456E-02	880.53	6.000	PBC<MDA	Pa234
					883.24	9.600	7.529E+00	Pa234
910.66	44.	76.62	1.75	1.418E-02	911.07	29.000	PBC<MDA	AC228
					911.07	29.000	1.400E+01	AC228
943.80	24.	117.47	1.77	1.377E-02	946.02	13.400	PBC<MDA	Pa234
964.12	14.	228.97	1.79	1.357E-02	964.11	14.605	PBC<MDA	EU152
					964.11	14.605	5.560E+00	EU152
996.48	16.	177.62	1.81	1.323E-02	996.33	10.600	PBC<MDA	EU154
					996.33	10.600	1.149E+01	EU154
1121.05	28.	81.71	1.90	1.206E-02	1120.29	15.100	PBC<MDA	BI214
1173.15	5976.	1.44	1.98	1.163E-02	1173.24	99.900	7.254E+02	CO60
1272.28	11.	75.03	2.01	1.088E-02	1274.54	35.190	PBC<MDA	EU154
					1274.54	35.190	2.924E+00	EU154
1332.36	5385.	1.39	2.00	1.050E-02	1332.50	99.980	7.231E+02	CO60
1460.86	1.	76.97	2.13	9.749E-03	1460.83	10.670	PBC<MDA	K40
1764.37	7.	64.03	2.31	8.350E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
146.03	36.60	1187.	401.	2.444E+04	16.10	1.125	-	
307.92	77.08	958.	140.	2.995E+03	39.21	0.976	-	s
351.89	88.08	1452.	1215.	2.405E+04	5.28	1.055	-	
767.05	191.89	448.	75.	1.732E+03	47.73	0.547	-	s
799.44	199.99	552.	66.	1.585E+03	64.08	0.381	-	s
1469.05	367.42	225.	39.	1.407E+03	56.65	0.534	-	sM
2079.05	519.92	287.	99.	4.576E+03	37.67	0.415	-	sM
2850.97	712.89	70.	39.	2.299E+03	39.12	0.697	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.85	46.55	5511.	22813.	12.674	0.92	0.933
AM-241	237.89	59.57	4281.	28391.	15.773	0.76	0.933
TH-234	245.32	61.42	2410.	-799.	-0.444	9.38	1.014s
TH-234	365.80	91.55	1239.	-50.	-0.028	101.12	1.042s
AC-228	372.98	93.35	1253.	58.	0.032	87.63	1.043D
U-235	372.98	93.35	1253.	58.	0.032	87.63	1.043D
EU-155	421.32	105.44	1171.	44.	0.025	110.15	1.054s
EU-152	489.29	122.44	1159.	45.	0.025	108.81	1.070s
Pa-234	524.18	131.16	1124.	35.	0.019	137.33	1.079s
U-235	574.13	143.65	1203.	-48.	-0.026	103.98	1.091s
U-235	646.89	161.84	752.	5.	0.003	850.44	1.109s
U-235	821.22	205.44	1091.	-13.	-0.007	349.16	1.148s
PB-212	953.27	238.46	993.	125.	0.070	36.68	1.179
PB-214	968.00	242.14	1005.	11.	0.006	403.77	1.182
TL-208	1107.16	276.94	791.	34.	0.019	114.35	1.214
I-131	1133.66	283.56	738.	5.	0.003	702.33	1.221
PB-214	1178.79	294.85	573.	92.	0.051	54.23	0.490s
PB-212	1200.93	300.38	789.	48.	0.026	84.68	1.235
AC-228	1352.39	338.25	701.	45.	0.025	84.62	1.270s
EU-152	1378.94	344.89	662.	28.	0.016	130.46	1.275s
PB-214	1406.26	351.72	669.	86.	0.048	44.07	1.282
I-131	1455.88	364.13	713.	-34.	-0.019	113.88	1.293
BE-7	1909.01	477.42	744.	-6.	-0.003	644.25	1.392s
CS-134	2250.78	562.86	388.	22.	0.012	127.02	1.466s
CS-134	2279.86	570.13	352.	20.	0.011	136.61	1.471s
Pa-234	2279.88	570.13	352.	20.	0.011	136.24	1.471
TL-208	2331.87	583.13	356.	40.	0.022	60.64	1.482s
CS-134	2410.14	602.69	309.	-17.	-0.010	144.66	1.500s
BI-214	2437.68	609.58	271.	105.	0.058	31.70	0.982s
CS-137	2645.82	661.61	300.	10643.	5.913	1.05	1.452
BI-212	2907.87	727.11	318.	17.	0.009	152.13	1.601s
PA-234M	3066.30	766.71	335.	33.	0.018	79.97	1.633s
EU-152	3116.13	779.17	285.	59.	0.033	42.55	1.643s
CS-134	3187.66	797.04	169.	6.	0.004	290.73	1.661s
TL-208	3441.43	860.47	347.	19.	0.011	137.44	1.707
Pa-234	3534.30	883.68	311.	19.	0.010	133.89	1.722
AC-228	3642.26	910.66	550.	44.	0.025	76.62	1.746s
Pa-234	3774.84	943.80	378.	24.	0.013	117.47	1.772
EU-152	3856.15	964.12	492.	14.	0.008	228.97	1.786s
AC-228	3874.97	968.82	503.	-12.	-0.007	261.56	1.790s
EU-154	3985.65	996.48	415.	16.	0.009	177.62	1.810s
BI-214	4484.12	1121.05	307.	28.	0.016	81.71	1.901
CO-60	4692.63	1173.15	172.	5976.	3.320	1.44	1.975
EU-154	5089.34	1272.28	31.	11.	0.006	75.03	2.008s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	5329.81	1332.36	33.	5385.	2.991	1.39	1.997
K-40	5844.14	1460.86	33.	1.	0.001	76.97	2.131
BI-214	7059.18	1764.37	18.	7.	0.004	64.03	2.314s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	Peak MDA Value Bq/Sample		COMMENTS
BE-7	C	-1.3766E+00				5.31E+01		
			477.60	-1.377E+00	&(	2.979E+01	6.44E+02 1.05E+01 G	
K-40	N	5.3052E-01				4.66E+11		
			1460.83	5.305E-01	(P	1.578E+01	7.70E+01 1.07E+01 G	
CO-60	F	7.2427E+02				1.93E+03		
			1332.50	7.231E+02	(	3.977E+00	1.39E+00 1.00E+02 G	
			1173.24	7.254E+02	(	7.748E+00	1.44E+00 9.99E+01 G	
I-131	I	-6.5562E-01				8.02E+00		
			364.48	-8.173E-01	(	3.098E+00	1.14E+02 8.17E+01 G	
			284.30	1.496E+00	(	3.530E+01	7.02E+02 6.14E+00 G	
			636.97	-6.785E-01	%	3.837E+01	1.67E+03 7.17E+00 G	
CS-134	I	7.2349E+00				7.54E+02		
			604.71	-5.518E+00	?(	2.680E+01	1.45E+02 9.76E+01 G	
			795.87	5.593E-02	%	3.854E+01	2.03E+04 8.55E+01 G	
			569.32	3.786E+01	?(	1.733E+02	1.37E+02 1.54E+01 G	
			801.95	2.811E+01	&(	2.787E+02	2.91E+02 8.69E+00 G	
			563.24	7.820E+01	?(	3.322E+02	1.27E+02 8.35E+00 G	
CS-137	I	4.5157E+02				1.10E+04		
			661.66	4.516E+02	(	3.540E+00	1.05E+00 8.52E+01 G	
EU-152	F	6.2931E+00				4.94E+03		
			344.29	2.923E+00	(	1.271E+01	1.30E+02 2.65E+01 G	
			121.78	2.352E+00	&(	8.497E+00	1.09E+02 2.86E+01 G	
			778.92	2.273E+01	(	3.138E+01	4.25E+01 1.29E+01 G	
			964.11	5.560E+00	?(	4.275E+01	2.29E+02 1.46E+01 G	
			1112.07	3.764E-02	&	4.286E+01	3.35E+04 1.36E+01 G	
			1408.00	2.382E-01	%	9.762E+00	1.12E+03 2.10E+01 G	

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	I	4.0247E+00					3.14E+03	
			873.23	7.271E-01	&(	5.177E+01	2.10E+03	1.23E+01 G
			123.10	6.921E-02	&	7.391E+00	3.19E+03	4.08E+01 G
			1274.54	2.924E+00	?(	7.338E+00	7.50E+01	3.52E+01 G
			723.36	4.766E-01	%	2.324E+01	1.43E+03	2.02E+01 G
			1004.77	4.567E-01	%	3.539E+01	2.28E+03	1.80E+01 G
			996.33	1.149E+01	(	6.852E+01	1.78E+02	1.06E+01 G
EU-155	I	5.8806E+00					1.81E+03	
			105.31	5.881E+00	(	2.150E+01	1.10E+02	2.12E+01 G
			86.54	-3.761E-01	%	1.959E+01	1.56E+03	3.07E+01 G
TL-208	N	3.0591E+01					6.98E+02	
			583.02	1.750E+01	?(P	3.918E+01	6.06E+01	8.45E+01 G
			277.28	1.153E+02	(P	4.564E+02	1.14E+02	6.31E+00 G
			860.56	7.666E+01	(	3.531E+02	1.37E+02	1.24E+01 G
PB-210	N	1.4424E+04					8.14E+03	
			46.54	1.442E+04	(	2.204E+02	9.19E-01	4.25E+00 G
PB-212	N	5.6299E+01					6.98E+02	
			238.63	5.630E+01	?(	6.722E+01	3.67E+01	4.33E+01 G
			300.03	3.298E+02	+	9.255E+02	8.47E+01	3.28E+00 G
PB-214	N	5.7137E+00					5.84E+05	
			351.93	4.435E+00	?(	6.384E+00	4.41E+01	3.76E+01 G
			295.09	8.205E+00	(	1.021E+01	5.42E+01	1.93E+01 G
			242.00	2.259E+00	-	3.053E+01	4.04E+02	7.43E+00 G
BI-212	N	9.5804E+01					6.98E+02	
			727.17	9.580E+01	&(	4.895E+02	1.52E+02	7.55E+00 G
			785.42	5.436E+01	&	2.991E+03	1.62E+03	1.28E+00 G
BI-214	N	7.0777E+00					5.84E+05	
			609.31	6.578E+00	(P	4.992E+00	3.17E+01	4.61E+01 G
			1120.29	8.602E+00	(P	2.581E+01	8.17E+01	1.51E+01 G
			1764.49	3.099E+00	- P	9.807E+00	6.40E+01	1.54E+01 G
AC-228	N	1.4766E+01					2.10E+03	
			911.07	1.400E+01	?(	3.552E+01	7.66E+01	2.90E+01 G
			968.97	-6.746E+00	-	5.930E+01	2.62E+02	1.75E+01 G
			338.32	1.661E+01	(	4.660E+01	8.46E+01	1.20E+01 G
								Energy duplication
			93.35	2.622E+01	&	7.608E+01	8.76E+01	5.56E+00 XA
Pa-234	N	5.6844E+00					1.63E+12	
			131.29	2.059E+00	?(	9.406E+00	1.37E+02	1.80E+01 G
			569.47	6.607E+00	(	3.016E+01	1.36E+02	8.20E+00 G

TestAmerica, Inc Spectrum name: 9_Gamma_20130915.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		946.02	7.154E+00	(	2.808E+01	1.17E+02	1.34E+01 G
		883.24	0.000E+00	-	4.308E+01	1.00E+03	9.60E+00 G
		880.53	1.202E+01	(	5.396E+01	1.34E+02	6.00E+00 G
TH-234	N -2.9703E+02					1.63E+12	
		63.29-2.970E+02		(	8.608E+01	9.38E+00	3.81E+00 G
		92.59-9.593E+00		&	3.217E+01	1.01E+02	5.58E+00 G
PA-234M	N 9.9914E+01					1.63E+12	
		1001.00-8.049E-01		%(	4.336E+02	1.58E+04	8.37E-01 G
		766.41	3.867E+02	&(	1.026E+03	8.00E+01	2.94E-01 G
U-235	N -4.7913E+00					2.57E+11	
		143.79-4.791E+00		?(	1.653E+01	1.04E+02	1.10E+01 G
		205.33-3.609E+00		&	4.212E+01	3.49E+02	5.01E+00 G
		163.38	1.068E+00	+	3.053E+01	8.50E+02	5.08E+00 G
							Energy duplication
		93.35	1.069E+01	&	3.101E+01	8.76E+01	5.81E+00 X
AM-241	T 1.2145E+03					1.58E+05	
		59.54	1.215E+03	(	1.316E+01	7.57E-01	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average

R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
TH-234	61.42	2410.	-799.	-0.444	9.38	-2.970E+02
TH-234	91.55	1239.	-50.	-0.028	101.12	-9.593E+00
AC-228	93.35	1253.	58.	0.032	87.63	2.622E+01
U-235	93.35	1253.	58.	0.032	87.63	1.069E+01
EU-155	105.44	1171.	44.	0.025	110.15	5.881E+00
EU-152	122.44	1159.	45.	0.025	108.81	2.352E+00
U-235	143.65	1203.	-48.	-0.026	103.98	-4.791E+00
U-235	161.84	752.	5.	0.003	850.44	1.068E+00
U-235	205.44	1091.	-13.	-0.007	349.16	-3.609E+00
AC-228	338.25	701.	45.	0.025	84.62	1.661E+01
EU-152	344.89	662.	28.	0.016	130.46	2.923E+00
BE-7	477.42	744.	-6.	-0.003	644.25	0.000E+00
CS-134	562.86	388.	22.	0.012	127.02	7.820E+01
CS-134	570.13	352.	20.	0.011	136.61	3.786E+01
CS-134	602.69	309.	-17.	-0.010	144.66	-5.518E+00
PA-234M	766.71	335.	33.	0.018	79.97	3.867E+02
EU-152	779.17	285.	59.	0.033	42.55	2.273E+01
CS-134	797.04	169.	6.	0.004	290.73	2.811E+01
AC-228	910.66	550.	44.	0.025	76.62	1.400E+01
EU-152	964.12	492.	14.	0.008	228.97	5.560E+00
AC-228	968.82	503.	-12.	-0.007	261.56	-6.746E+00
EU-154	996.48	415.	16.	0.009	177.62	1.149E+01
EU-154	1272.28	31.	11.	0.006	75.03	2.924E+00

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting		MDA Bq/Sample
BE-7	#A	-1.3766E+00	>12 Halflives	6.4425E+02%	2.9788E+01	
K-40	A	5.3052E-01	5.3052E-01	7.695E+02%		1.58E+01
CO-60		2.8537E+02	7.2427E+02	1.001E+00%		3.98E+00
I-131	A	-6.5562E-01	>12 Halflives	1.1388E+02%	3.0977E+00	
CS-134	#A	6.7120E-01	7.2349E+00	9.362E+01%		2.68E+01
CS-137		3.8340E+02	4.5157E+02	1.048E+00%		3.54E+00
EU-152	#A	4.3789E+00	6.2931E+00	4.255E+01%		1.27E+01
EU-154	#A	2.2731E+00	4.0247E+00	7.503E+01%		5.18E+01
EU-155	#A	2.1856E+00	5.8806E+00	1.102E+02%		2.15E+01
TL-208	A	2.3406E+00	3.0591E+01	6.464E+01%		3.92E+01
PB-210		1.1574E+04	1.4424E+04	9.188E-01%		2.20E+02
PB-212	A	4.3076E+00	5.6299E+01	3.668E+01%		6.72E+01

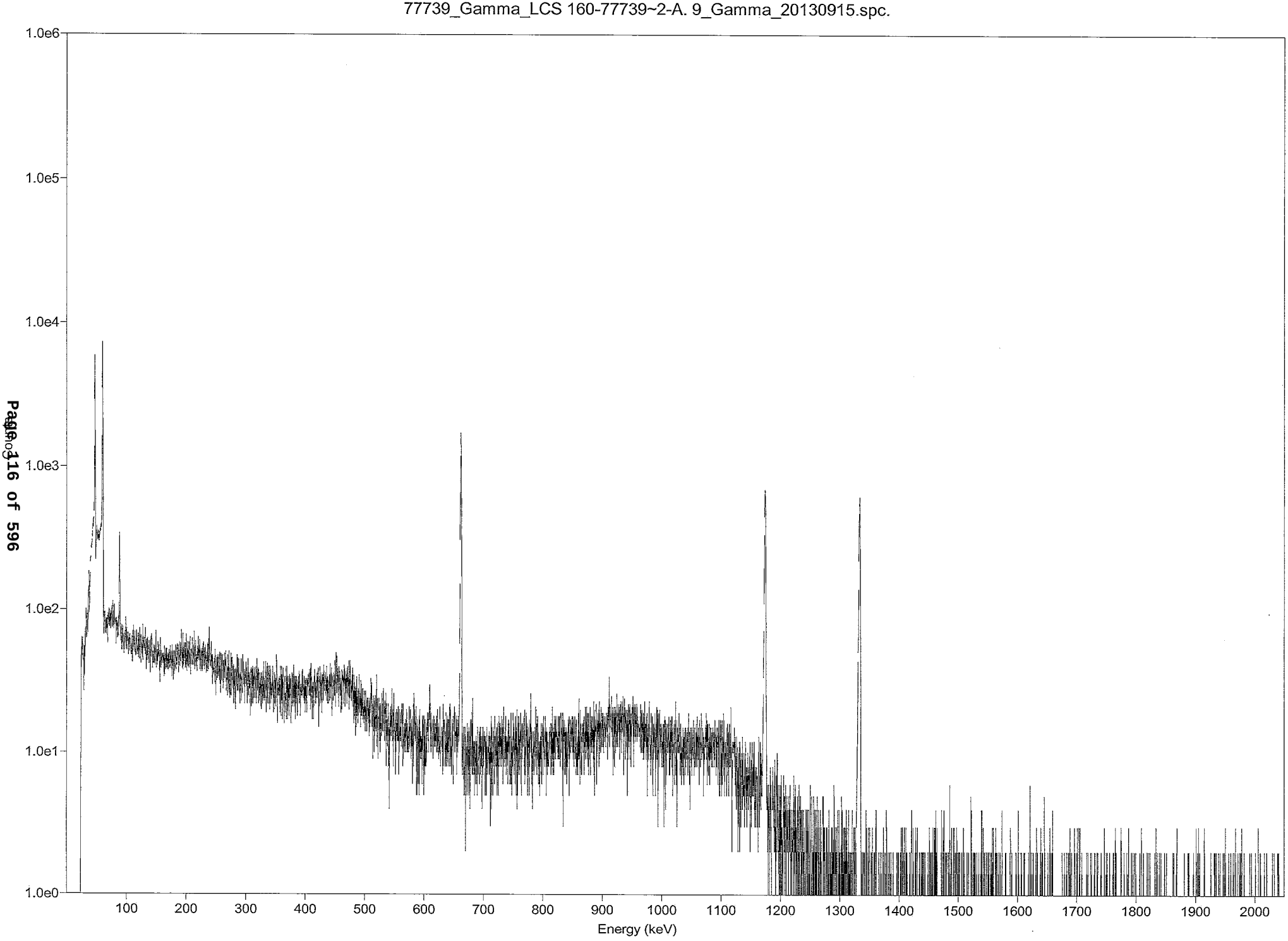
PB-214	A	5.6962E+00	5.7137E+00	3.494E+01%	6.38E+00
BI-212	#A	7.3301E+00	9.5804E+01	1.521E+02%	4.89E+02
BI-214		7.0561E+00	7.0777E+00	3.436E+01%	4.99E+00
AC-228	#A	6.2874E+00	1.4766E+01	5.708E+01%	3.55E+01
Pa-234	A	5.6844E+00	5.6844E+00	6.574E+01%	9.41E+00
TH-234	#A	-2.9703E+02	-2.9703E+02	9.384E+00%	8.61E+01
PA-234M	#A	9.9914E+01	9.9914E+01	7.997E+01%	4.34E+02
U-235	#A	-4.7913E+00	-4.7913E+00	1.040E+02%	1.65E+01
AM-241		1.2008E+03	1.2145E+03	7.573E-01%	1.32E+01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.3 keV) 1.346E+04 Bq/Sample
Total Decayed Activity (37.6 to 1999.3 keV) 1.6883195E+04 Bq/Sample

The library has energies which are not separable.


77739_Gamma_LCS 160-77739~2-A. 9_Gamma_20130915.spc.
1.0e6
1.0e5
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Log
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)

Test America St. Louis Spectrum ID: 11_Gamma_20131574

Sample Description: 77739_Gamma_LCS 160-77739~2-A
Detector: Ge11 S/N09363993
Batch ID: 77739
Work Order Number: Gamma
Lot Number: LCS 160-77739~2-A

Decay to Time: 10/1/2006 12:00 Live Time: 1800 sec
Acquisition Time: 10/31/2013 09:57:50 Real Time: 1893 sec
Analysis Time: 11/11/2013 19:53 Dead Time: 4.93 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 11_Soil_TunaCan.Clb
Efficiency Cal Desc: Ge11_TunaCanCal_90099_032912
Efficiency Cal Date: 4/2/2012 17:29
Energy Cal Date: 2/28/2012 13:09
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 11_2013-10-05_0101.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
K-40	-3.130E+00	551.4	1.726E+01	1.726E+01	1.982E+01
CO-60	7.741E+02	1.0	7.995E+00	3.968E+01	3.551E+00
CS-134	5.627E+00	57.9	3.259E+00	3.273E+00	3.600E+01
CS-137	4.774E+02	1.1	5.441E+00	2.542E+01	4.209E+00
EU-152	2.514E+00	70.6	1.774E+00	1.779E+00	1.482E+01
EU-154	2.899E+00	99.0	2.868E+00	2.872E+00	6.079E+01
EU-155	-4.263E-01	1708.0	7.281E+00	7.281E+00	2.440E+01
TL-208	4.864E+01	31.0	1.507E+01	1.528E+01	3.485E+01
PB-210	1.502E+04	1.0	1.504E+02	8.949E+02	2.572E+02
PB-212	9.754E+01	22.9	2.231E+01	2.319E+01	5.738E+01
PB-214	8.604E+00	23.5	2.021E+00	2.070E+00	5.061E+00
BI-212	3.977E+02	48.0	1.908E+02	1.919E+02	5.097E+02
BI-214	2.554E+00	72.7	1.857E+00	1.862E+00	6.709E+00
AC-228	2.142E+01	41.5	8.893E+00	8.960E+00	3.627E+01
Pa-234	3.857E+00	167.3	6.451E+00	6.454E+00	7.418E+00
TH-234	-8.093E+01	34.3	2.773E+01	2.805E+01	7.226E+01
PA-234M	2.658E+01	103.4	2.749E+01	2.752E+01	5.227E+02
U-235	4.288E+00	110.2	4.726E+00	4.731E+00	1.716E+01
AM-241	1.264E+03	0.8	1.065E+01	6.644E+01	1.590E+01
Total	1.816E+04				

Analyst: Jody Watson

TestAmerica, Inc Spectrum name: 11_Gamma_20131574.An1

Sample description
77739_Gamma_LCS 160-77739~2-A

Spectrum Filename: C:\User\SPC\Det11\11_Gamma_20131574.An1

Acquisition information
Start time: 10/31/2013 9:57:50 AM
Live time: 1800
Real time: 1893
Dead time: 4.93 %
Detector ID: 11

Detector system
Ge11 S/N09363993

Calibration
Filename: 11_Soil_TunaCan.Clb
Ge11_TunaCanCal_90099_032912

Energy Calibration
Created: 2/28/2012 1:09:34 PM
Zero offset: 0.055 keV
Gain: 0.250 keV/channel
Quadratic: -2.946E-08 keV/channel^2

Efficiency Calibration
Created: 4/2/2012 5:29:36 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.14 %
Log(Eff): -6.858644E-01 + (-3.337421E-01*Log(E)) + (-3.199860E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.72 %
Log(Eff): -2.393599E+01 + (8.833910E+00*Log(E)) + (-9.364157E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.58keV)
Stop channel: 8000 (1999.47keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	11_2013-10-05_0101.PBC 10/5/2013 1:01:56 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 20 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 46.5155

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.68	379.	16.28	1.05	1.405E-02				
40.49	133.	55.66	1.66	1.711E-02				
46.62	19658.	0.86	0.90	2.193E-02	46.54	4.250	1.460E+04	PB210
49.77	415.	28.03	0.60	2.434E-02				
55.95	145.	50.29	0.62	2.870E-02				
59.56	25028.	0.84	0.88	3.101E-02	59.54	35.900	1.264E+03	AM241
77.07	147.	27.49	0.93	3.947E-02				
79.28	92.	44.04	0.93	4.022E-02				
88.07	1082.	8.02	0.97	4.263E-02				
93.79	56.	88.49	0.94	4.362E-02	93.35	5.561	PBC<MDA	AC228
					93.35	5.810	1.224E+01	U235
					93.35	5.561	3.003E+01	AC228
93.79	56.	88.49	0.94	4.362E-02	93.35	5.561	PBC<MDA	AC228
					93.35	5.810	1.224E+01	U235
122.18	61.	70.58	0.97	4.466E-02	121.78	28.580	PBC<MDA	EU152
143.95	39.	110.20	0.99	4.238E-02	143.79	10.960	PBC<MDA	U235
205.37	11.	379.21	1.05	3.439E-02	205.33	5.010	PBC<MDA	U235
238.51	197.	20.94	0.80	3.106E-02	238.63	43.300	9.754E+01	PB212
					242.00	7.430	4.711E+01	PB214
276.63	35.	99.46	1.11	2.800E-02	277.28	6.310	PBC<MDA	TL208
283.85	38.	97.31	1.12	2.752E-02	284.30	6.140	HL>Cutoff	I131
295.03	118.	34.12	0.33	2.681E-02	295.09	19.300	1.273E+01	PB214
338.09	43.	83.18	1.17	2.436E-02	338.32	12.010	PBC<MDA	AC228
					338.32	12.010	1.900E+01	AC228
351.83	104.	27.31	1.27	2.369E-02	351.93	37.600	6.484E+00	PB214
430.82	38.	58.13	0.50	2.050E-02				
582.88	93.	29.40	0.81	1.643E-02	583.02	84.500	4.864E+01	TL208
609.24	36.	53.14	1.41	1.591E-02	609.31	46.090	PBC<MDA	BI214

					609.31	46.090	PBC<MDA BI214
661.78	9292.	1.14	1.38	1.495E-02	661.66	85.210	4.774E+02 CS137
727.09	28.	78.07	1.51	1.392E-02	727.17	7.550	PBC<MDA BI212
766.55	21.	103.43	1.54	1.338E-02	766.41	0.294	PBC<MDA PA234M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
777.51	11.	209.97	1.55	1.322E-02	778.92	12.940	PBC<MDA	EU152
783.74	37.	55.82	1.56	1.313E-02	785.42	1.280	PBC<MDA	BI212
794.26	21.	97.99	1.57	1.300E-02	795.87	85.530	PBC<MDA	CS134
					795.87	85.530	1.118E+01	CS134
803.02	24.	97.75	1.57	1.293E-02	801.95	8.690	PBC<MDA	CS134
					801.95	8.690	1.296E+02	CS134
809.12	83.	35.39	0.57	1.284E-02				
881.76	16.	167.27	1.64	1.203E-02	880.53	6.000	PBC<MDA	Pa234
					880.53	6.000	1.263E+01	Pa234
911.09	50.	56.96	1.66	1.172E-02	911.07	29.000	PBC<MDA	AC228
					911.07	29.000	1.937E+01	AC228
946.06	15.	197.34	1.69	1.139E-02	946.02	13.400	PBC<MDA	Pa234
					946.02	13.400	5.589E+00	Pa234
964.47	6.	552.78	1.71	1.122E-02	964.11	14.605	PBC<MDA	EU152
969.64	40.	73.12	1.71	1.118E-02	968.97	17.460	PBC<MDA	AC228
					968.97	17.460	2.650E+01	AC228
995.59	5.	472.23	1.73	1.094E-02	996.33	10.600	PBC<MDA	EU154
					996.33	10.600	4.659E+00	EU154
1005.86	25.	98.95	1.74	1.087E-02	1004.77	18.010	PBC<MDA	EU154
					1004.77	18.010	1.238E+01	EU154
1111.78	13.	217.05	1.83	1.004E-02	1112.07	13.644	PBC<MDA	EU152
1120.17	-3.	815.86	1.83	9.985E-03	1120.29	15.100	PBC<MDA	BI214
					1120.29	15.100	PBC<MDA	BI214
1173.37	5261.	1.46	1.87	9.629E-03	1173.24	99.900	7.711E+02	CO60
1332.61	4798.	1.46	2.01	8.708E-03	1332.50	99.980	7.771E+02	CO60
1408.05	2.	375.29	2.06	8.334E-03	1408.00	21.005	PBC<MDA	EU152
1461.51	-5.	196.71	2.10	8.093E-03	1460.83	10.670	PBC<MDA	K40
1764.74	4.	76.03	2.34	6.950E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
146.42	36.68	1142.	379.	2.697E+04	16.28	1.053	-	s
161.64	40.49	2139.	133.	7.772E+03	55.66	1.663	-	s
198.72	49.77	3929.	415.	1.703E+04	28.03	0.596	-	sM
223.43	55.95	2399.	145.	5.063E+03	50.29	0.624	-	sM
307.85	76.98	749.	144.	3.650E+03	28.13	0.929	-	D
316.66	79.18	776.	92.	2.284E+03	44.14	0.931	-	D
351.83	88.07	1541.	1188.	2.786E+04	5.50	0.967	-	M
1722.30	430.82	189.	38.	1.838E+03	58.13	0.499	-	sM
3235.39	809.12	156.	83.	6.465E+03	35.39	0.565	-	sM

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.97	46.58	5420.	20194.	11.219	1.00	0.891
AM-241	237.87	59.56	4487.	25028.	13.905	0.84	0.879
TH-234	245.79	61.54	1206.	-184.	-0.102	30.79	0.916s
EU-155	344.35	86.20	1723.	-110.	-0.061	54.41	0.938s
TH-234	380.25	95.17	736.	-49.	-0.027	217.31	0.943s
AC-228	372.95	93.35	1192.	56.	0.031	88.49	0.944D
U-235	372.95	93.35	1192.	56.	0.031	88.49	0.944D
EU-152	488.19	122.18	902.	61.	0.034	70.58	0.970
Pa-234	515.00	128.88	487.	-5.	-0.003	614.61	0.979s
U-235	575.24	143.95	913.	39.	0.022	110.20	0.990
U-235	653.29	163.47	852.	-24.	-0.013	174.70	1.008s
U-235	820.79	205.37	802.	11.	0.006	379.21	1.047s
PB-212	953.29	238.51	493.	181.	0.100	20.94	0.805s
TL-208	1105.71	276.63	601.	35.	0.020	99.46	1.112
I-131	1134.60	283.85	649.	38.	0.021	97.31	1.118s
PB-214	1179.31	295.03	449.	118.	0.066	34.12	0.326s
AC-228	1351.48	338.09	606.	43.	0.024	83.18	1.167s
EU-152	1375.50	344.10	616.	-11.	-0.006	332.03	1.172s
PB-214	1406.43	351.83	281.	104.	0.058	27.31	1.272
I-131	1459.85	365.19	588.	-9.	-0.005	397.04	1.190s
CS-134	2276.28	569.34	325.	-6.	-0.003	443.16	1.371s
TL-208	2330.42	582.88	188.	93.	0.052	29.40	0.812s
CS-134	2420.48	605.39	382.	-27.	-0.015	105.10	1.401s
BI-214	2435.87	609.24	337.	36.	0.020	53.14	1.405
I-131	2546.22	636.83	346.	-21.	-0.011	129.62	1.429s
CS-137	2645.99	661.78	289.	9292.	5.162	1.14	1.383
BI-212	2907.26	727.09	233.	28.	0.016	78.07	1.507s
PA-234M	3065.10	766.55	231.	21.	0.012	103.43	1.540s
EU-152	3108.94	777.51	242.	11.	0.006	209.97	1.551
BI-212	3133.87	783.74	191.	37.	0.020	55.82	1.556s
CS-134	3175.96	794.26	196.	21.	0.012	97.99	1.565s
CS-134	3210.97	803.02	270.	24.	0.014	97.75	1.570s
EU-154	3489.14	872.55	366.	-19.	-0.011	144.57	1.630s
Pa-234	3525.99	881.76	369.	16.	0.009	167.27	1.637s
AC-228	3643.32	911.09	388.	50.	0.028	56.96	1.662s
Pa-234	3783.25	946.06	451.	15.	0.009	197.34	1.691s
EU-152	3856.91	964.47	471.	6.	0.003	552.78	1.706
AC-228	3877.61	969.64	400.	40.	0.022	73.12	1.710s
EU-154	3981.42	995.59	334.	5.	0.003	472.23	1.733s
PA-234M	3998.45	999.85	318.	-11.	-0.006	222.98	1.737s
EU-154	4022.53	1005.86	285.	25.	0.014	98.95	1.740s
EU-152	4446.33	1111.78	362.	13.	0.007	217.05	1.828
CO-60	4692.81	1173.37	99.	5261.	2.923	1.46	1.869
EU-154	5088.59	1272.27	32.	-3.	-0.002	240.74	1.958s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-60	5330.12	1332.61	17.	4798.	2.666	1.46	2.011
EU-152	5632.05	1408.05	23.	2.	0.001	375.29	2.064s
K-40	5846.05	1461.51	36.	-5.	-0.003	196.71	2.105s
BI-214	7060.05	1764.74	19.	4.	0.002	76.03	2.336s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	5.0838E-01				5.31E+01	
			477.60	5.084E-01	%(	3.156E+01	1.84E+03 1.05E+01 G
K-40	N	-3.1300E+00				4.66E+11	
			1460.83	-3.130E+00	?(P	1.982E+01	1.97E+02 1.07E+01 G
CO-60	F	7.7409E+02				1.93E+03	
			1332.50	7.771E+02	(	3.551E+00	1.46E+00 1.00E+02 G
			1173.24	7.711E+02	(	7.193E+00	1.46E+00 9.99E+01 G
I-131	I	6.2628E-01				8.02E+00	
			364.48	-2.551E-01	?(	3.405E+00	3.97E+02 8.17E+01 G
			284.30	1.235E+01	&(	3.994E+01	9.73E+01 6.14E+00 G
			636.97	-1.037E+01	+	4.501E+01	1.30E+02 7.17E+00 G
CS-134	I	5.6266E+00				7.54E+02	
			604.71	-1.027E+01	?(	3.600E+01	1.05E+02 9.76E+01 G
			795.87	1.118E+01	&(	3.663E+01	9.80E+01 8.55E+01 G
			569.32	-1.345E+01	+	2.019E+02	4.43E+02 1.54E+01 G
			801.95	1.296E+02	(	4.227E+02	9.78E+01 8.69E+00 G
			563.24	8.247E+00	&	3.713E+02	1.33E+03 8.35E+00 G
CS-137	I	4.7736E+02				1.10E+04	
			661.66	4.774E+02	(	4.209E+00	1.14E+00 8.52E+01 G
EU-152	F	2.5135E+00				4.94E+03	
			344.29	-1.329E+00	?(	1.482E+01	3.32E+02 2.65E+01 G
			121.78	3.826E+00	(	8.921E+00	7.06E+01 2.86E+01 G
			778.92	4.945E+00	(	3.511E+01	2.10E+02 1.29E+01 G
			964.11	2.713E+00	(	5.060E+01	5.53E+02 1.46E+01 G
			1112.07	7.290E+00	(	5.327E+01	2.17E+02 1.36E+01 G
			1408.00	8.363E-01	&(	1.138E+01	3.75E+02 2.10E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	I 2.8987E+00					3.14E+03	
		873.23	-1.254E+01	?(	6.079E+01	1.45E+02	1.23E+01 G
		123.10	-1.484E-01	&	7.938E+00	1.59E+03	4.08E+01 G
		1274.54	-1.049E+00	+	8.950E+00	2.41E+02	3.52E+01 G
		723.36	0.000E+00	+	3.157E+01	1.00E+03	2.02E+01 G
		1004.77	1.238E+01	?(	4.090E+01	9.90E+01	1.80E+01 G
		996.33	4.659E+00	?(	7.449E+01	4.72E+02	1.06E+01 G
EU-155	I -4.2626E-01					1.81E+03	
		105.31	-4.263E-01	%(	2.440E+01	1.71E+03	2.12E+01 G
		86.54	-1.262E+01	+	2.258E+01	5.44E+01	3.07E+01 G
TL-208	N 4.8643E+01					6.98E+02	
		583.02	4.864E+01	(P	3.485E+01	2.94E+01	8.45E+01 G
		277.28	1.453E+02	+	4.806E+02	9.95E+01	6.31E+00 G
		860.56	1.003E+01	%	4.122E+02	1.21E+03	1.24E+01 G
PB-210	N 1.5023E+04					8.14E+03	
		46.54	1.502E+04	(P	2.572E+02	1.00E+00	4.25E+00 G
PB-212	N 9.7541E+01					6.98E+02	
		238.63	9.754E+01	(P	5.738E+01	2.09E+01	4.33E+01 G
		300.03	-3.442E+00	%	9.786E+02	8.43E+03	3.28E+00 G
PB-214	N 8.6039E+00					5.84E+05	
		351.93	6.484E+00	(P	5.061E+00	2.73E+01	3.76E+01 G
		295.09	1.273E+01	(P	1.092E+01	3.41E+01	1.93E+01 G
		242.00	-1.846E-01	& P	2.604E+01	9.18E+02	7.43E+00 G
BI-212	N 3.9766E+02					6.98E+02	
		727.17	1.966E+02	?(	5.097E+02	7.81E+01	7.55E+00 G
		785.42	1.584E+03	&(	2.899E+03	5.58E+01	1.28E+00 G
BI-214	N 2.5543E+00					5.84E+05	
		609.31	2.760E+00	(P	6.709E+00	5.31E+01	4.61E+01 G
		1120.29	-9.480E-01	% P	2.996E+01	8.16E+02	1.51E+01 G
		1764.49	1.937E+00	&(P	1.185E+01	7.60E+01	1.54E+01 G
AC-228	N 2.1423E+01					2.10E+03	
		911.07	1.937E+01	?(	3.627E+01	5.70E+01	2.90E+01 G
		968.97	2.650E+01	&(	6.414E+01	7.31E+01	1.75E+01 G
		338.32	1.900E+01	(	5.238E+01	8.32E+01	1.20E+01 G
						Energy duplication	
		93.35	3.003E+01	*	8.802E+01	8.85E+01	5.56E+00 XA
Pa-234	N 3.8567E+00					1.63E+12	
		131.29	-3.578E-01	&(	7.418E+00	6.15E+02	1.80E+01 G
		569.47	4.218E-01	%	3.150E+01	2.19E+03	8.20E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		946.02	5.589E+00	&(	3.703E+01	1.97E+02	1.34E+01 G
		883.24	1.525E-01	%	4.471E+01	8.64E+03	9.60E+00 G
		880.53	1.263E+01	&(	7.094E+01	1.67E+02	6.00E+00 G
TH-234	N -8.0934E+01					1.63E+12	
		63.29-8.093E+01		?(P	7.226E+01	3.08E+01	3.81E+00 G
		92.59-1.124E+01		& P	2.953E+01	2.17E+02	5.58E+00 G
PA-234M	N 2.6576E+01					1.63E+12	
		1001.00-6.951E+01		&(	5.227E+02	2.23E+02	8.37E-01 G
		766.41	3.001E+02	&(	1.038E+03	1.03E+02	2.94E-01 G
U-235	N 4.2884E+00					2.57E+11	
		143.79	4.687E+00	?(	1.716E+01	1.10E+02	1.10E+01 G
		205.33	3.417E+00	?(	4.342E+01	3.79E+02	5.01E+00 G
		163.38-6.618E+00		+	3.859E+01	1.75E+02	5.08E+00 G
						Energy duplication	
		93.35	1.224E+01	*	3.587E+01	8.85E+01	5.81E+00 X
AM-241	T 1.2637E+03					1.58E+05	
		59.54	1.264E+03	(	1.590E+01	8.43E-01	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average

R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-234	61.54	1206.	-184.	-0.102	30.79	-8.093E+01	P
EU-155	86.20	1723.	-110.	-0.061	54.41	-1.262E+01	
TH-234	95.17	736.	-49.	-0.027	217.31	-1.124E+01	P
AC-228	93.35	1192.	56.	0.031	88.49	3.003E+01	
U-235	93.35	1192.	56.	0.031	88.49	1.224E+01	
Pa-234	128.88	487.	-5.	-0.003	614.61	-3.578E-01	
U-235	143.95	913.	39.	0.022	110.20	4.687E+00	
U-235	163.47	852.	-24.	-0.013	174.70	-6.618E+00	
U-235	205.37	802.	11.	0.006	379.21	3.417E+00	
I-131	283.85	649.	38.	0.021	97.31	0.000E+00	
AC-228	338.09	606.	43.	0.024	83.18	1.900E+01	
I-131	365.19	588.	-9.	-0.005	397.04	0.000E+00	
CS-134	569.34	325.	-6.	-0.003	443.16	-1.345E+01	
CS-134	605.39	382.	-27.	-0.015	105.10	-1.027E+01	
BI-214	609.24	337.	36.	0.020	53.14	2.760E+00	P
I-131	636.83	346.	-21.	-0.011	129.62	0.000E+00	
BI-212	727.09	233.	28.	0.016	78.07	1.966E+02	
PA-234M	766.55	231.	21.	0.012	103.43	3.001E+02	
BI-212	783.74	191.	37.	0.020	55.82	1.584E+03	
CS-134	794.26	196.	21.	0.012	97.99	1.118E+01	
CS-134	803.02	270.	24.	0.014	97.75	1.296E+02	
EU-154	872.55	366.	-19.	-0.011	144.57	-1.254E+01	
Pa-234	881.76	369.	16.	0.009	167.27	1.263E+01	
AC-228	911.09	388.	50.	0.028	56.96	1.937E+01	
Pa-234	946.06	451.	15.	0.009	197.34	5.589E+00	
AC-228	969.64	400.	40.	0.022	73.12	2.650E+01	
EU-154	995.59	334.	5.	0.003	472.23	4.659E+00	
PA-234M	999.85	318.	-11.	-0.006	222.98	-6.951E+01	
EU-154	1005.86	285.	25.	0.014	98.95	1.238E+01	
EU-154	1272.27	32.	-3.	-0.002	240.74	-1.049E+00	
K-40	1461.51	36.	-5.	-0.003	196.71	-3.130E+00	P
BI-214	1764.74	19.	4.	0.002	76.03	1.937E+00	P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

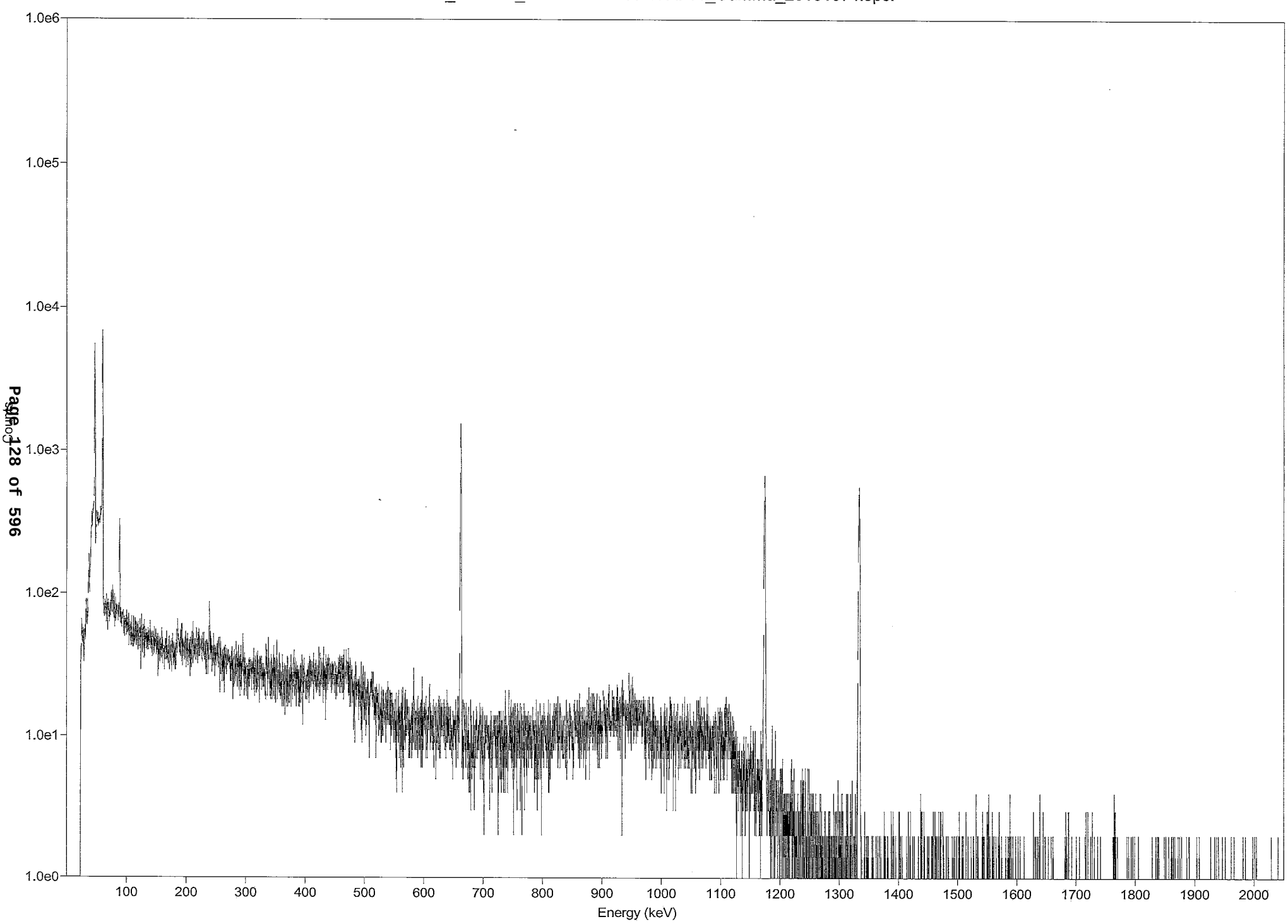
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting		MDA Bq/Sample
BE-7	A	5.0838E-01	>12 Halflives	1.8406E+03%	3.1560E+01	
K-40	#A	-3.1300E+00	-3.1300E+00	5.514E+02%		1.98E+01
CO-60		3.0499E+02	7.7409E+02	1.033E+00%		3.55E+00
I-131	#A	6.2628E-01	>12 Halflives	9.7311E+01%	3.4047E+00	
CS-134	#A	5.2196E-01	5.6266E+00	5.793E+01%		3.60E+01
CS-137		4.0529E+02	4.7736E+02	1.140E+00%		4.21E+00
EU-152	A	1.7489E+00	2.5135E+00	7.058E+01%		1.48E+01
EU-154	#A	1.6371E+00	2.8987E+00	9.895E+01%		6.08E+01
EU-155	#A	-1.5842E-01	-4.2626E-01	1.708E+03%		2.44E+01
TL-208		3.7216E+00	4.8643E+01	3.099E+01%		3.48E+01
PB-210		1.2054E+04	1.5023E+04	1.001E+00%		2.57E+02
PB-212		7.4625E+00	9.7541E+01	2.288E+01%		5.74E+01
PB-214		8.5775E+00	8.6039E+00	2.349E+01%		5.06E+00
BI-212	#A	3.0424E+01	3.9766E+02	4.799E+01%		5.10E+02
BI-214	#A	2.5465E+00	2.5543E+00	7.270E+01%		6.71E+00
AC-228	#A	9.1217E+00	2.1423E+01	4.151E+01%		3.63E+01
Pa-234	#A	3.8567E+00	3.8567E+00	1.673E+02%		7.42E+00
TH-234	#A	-8.0934E+01	-8.0934E+01	3.426E+01%		7.23E+01
PA-234M	#A	2.6576E+01	2.6576E+01	1.034E+02%		5.23E+02
U-235	#A	4.2884E+00	4.2884E+00	1.102E+02%		1.72E+01
AM-241		1.2494E+03	1.2637E+03	8.426E-01%		1.59E+01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

S U M M A R Y

Total Activity (87.9 to 1999.5 keV) 1.403E+04 Bq/Sample
Total Decayed Activity (87.9 to 1999.5 keV) 1.7692848E+04 Bq/Sample

The library has energies which are not separable.


77739_Gamma_LCS 160-77739~2-A. 11_Gamma_20131574.spc.
1.0e6
1.0e5
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Counts
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)

Sample Description: 77739_Gamma_LCS 160-77739~2-A
Detector: Ge15 SN/11012216
Batch ID: 77739
Work Order Number: Gamma
Lot Number: LCS 160-77739~2-A

Decay to Time: 10/1/2006 12:00 Live Time: 1800 sec
Acquisition Time: 10/31/2013 10:54:41 Real Time: 1807 sec
Analysis Time: 11/11/2013 12:28 Dead Time: 0.38 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 15_Soil_TunaCan.Clb
Efficiency Cal Desc: 15_TunaCan_90099_032212
Efficiency Cal Date: 3/22/2012 13:03
Energy Cal Date: 2/28/2012 16:29
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 15_2013-10-05_0052.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
K-40	3.365E+00	147.9	4.978E+00	4.980E+00	1.890E+01
CO-60	7.700E+02	1.2	9.559E+00	3.982E+01	5.695E+00
CS-134	5.179E+00	73.9	3.829E+00	3.839E+00	3.939E+01
CS-137	4.556E+02	1.3	6.088E+00	2.447E+01	5.061E+00
EU-152	4.086E+00	106.8	4.362E+00	4.367E+00	1.678E+01
EU-154	1.345E+01	155.0	2.084E+01	2.085E+01	7.011E+01
EU-155	1.419E+00	123.9	1.757E+00	1.759E+00	2.813E+01
TL-208	4.567E+01	43.4	1.980E+01	1.994E+01	5.254E+01
PB-210	1.493E+04	1.1	1.619E+02	8.917E+02	2.762E+02
PB-212	1.324E+02	21.1	2.790E+01	2.919E+01	6.645E+01
PB-214	6.175E+00	39.3	2.429E+00	2.450E+00	8.077E+00
BI-212	4.218E+02	59.0	2.489E+02	2.499E+02	5.958E+02
BI-214	6.688E+00	33.6	2.247E+00	2.274E+00	5.883E+00
AC-228	1.495E+01	55.3	8.263E+00	8.298E+00	4.572E+01
Pa-234	3.895E+00	85.0	3.312E+00	3.318E+00	1.110E+01
TH-234	-3.768E+02	9.8	3.708E+01	4.199E+01	1.088E+02
PA-234M	1.072E+02	159.5	1.710E+02	1.710E+02	5.770E+02
U-235	5.110E+00	111.1	5.678E+00	5.684E+00	1.888E+01
AM-241	1.267E+03	0.9	1.133E+01	6.673E+01	1.689E+01
Total	1.820E+04				

Analyst: Jody Watson

TestAmerica, Inc. Spectrum name: 15_Gamma_20131338.An1

Sample description
77739_Gamma_LCS 160-77739~2-A

Spectrum Filename: C:\User\SPC\Det15\15_Gamma_20131338.An1

Acquisition information

Start time:	10/31/2013 10:54:41 AM
Live time:	1800
Real time:	1807
Dead time:	0.38 %
Detector ID:	15

Detector system
Ge15 SN/11012216

Calibration

Filename:	15_Soil_TunaCan.Clb

15_TunaCan_90099_032212

Energy Calibration

Created:	2/28/2012 4:29:17 PM
Zero offset:	0.044 keV
Gain:	0.250 keV/channel
Quadratic:	-3.267E-08 keV/channel^2

Efficiency Calibration

Created:	3/22/2012 1:03:01 PM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 1.00 %
Log(Eff):	-6.894897E-01 + (-3.290613E-01*Log(E)) + (-3.875629E-02*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 1.13 %
Log(Eff):	-2.362677E+01 + (8.666669E+00*Log(E)) + (-9.214638E-01*Log(E)^2)

Library Files

Main analysis library:	Client_Routine Short Rev1.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters

Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.57keV)
Stop channel:	8000 (1999.52keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	15_2013-10-05_0052.PBC 10/5/2013 12:52:55 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 22 cutoff: 5.00E+01%

Energy Calibration
Normalized diff: 0.0729

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
40.83	107.	69.92	0.27	1.564E-02				
46.57	16947.	0.93	0.95	1.956E-02	46.54	4.250	1.409E+04	PB210
49.39	13.	607.24	0.95	2.141E-02				
59.56	22159.	0.89	0.99	2.738E-02	59.54	35.900	1.267E+03	AM241
77.46	120.	41.83	0.82	3.462E-02				
84.09	32.	123.88	0.98	3.679E-02	86.54	30.700	PBC<MDA	EU155
88.11	901.	7.82	1.12	3.707E-02				
92.79	98.	44.60	0.51	3.778E-02	92.59	5.584	PBC<MDA	TH234
					92.59	5.584	1.948E+01	TH234
93.24	5.	773.45	0.99	3.785E-02	93.35	5.561	PBC<MDA	AC228
					93.35	5.810	1.178E+00	U235
112.41	97.	39.62	0.77	3.882E-02				
121.38	35.	121.43	1.02	3.848E-02	121.78	28.580	PBC<MDA	EU152
					121.78	28.580	2.539E+00	EU152
124.36	78.	43.12	0.45	3.831E-02				
131.26	48.	85.04	1.02	3.775E-02	131.29	18.000	PBC<MDA	Pa234
					131.29	18.000	3.938E+00	Pa234
143.74	37.	111.11	1.04	3.639E-02	143.79	10.960	PBC<MDA	U235
					143.79	10.960	5.110E+00	U235
181.54	53.	54.86	0.41	3.176E-02				
185.96	61.	51.19	0.62	3.120E-02				
228.17	43.	62.64	0.30	2.681E-02				
233.55	23.	89.52	0.49	2.634E-02				
238.59	205.	19.87	1.43	2.592E-02	238.63	43.300	1.324E+02	PB212
243.73	4.	848.75	1.12	2.565E-02	242.00	7.430	PBC<MDA	PB214
					242.00	7.430	1.143E+00	PB214
246.53	44.	71.15	0.34	2.529E-02				
277.43	21.	164.07	1.15	2.513E-02	277.28	6.310	PBC<MDA	TL208

					277.28	6.310	PBC<MDA	TL208
289.99	45.	62.18	0.31	2.235E-02				
295.38	45.	74.52	1.17	2.205E-02	295.09	19.300	PBC<MDA	PB214
					295.09	19.300	5.882E+00	PB214
338.60	50.	55.28	0.30	1.983E-02	338.32	12.010	PBC<MDA	AC228
344.74	4.	742.34	1.21	1.956E-02	344.29	26.500	PBC<MDA	EU152
					344.29	26.500	6.704E-01	EU152
351.99	82.	39.34	1.22	1.923E-02	351.93	37.600	PBC<MDA	PB214
					351.93	37.600	6.325E+00	PB214
362.41	3.	994.26	1.23	1.871E-02	364.48	81.700	HL>Cutoff	I131
					364.48	81.700	HL>Cutoff	I131
434.37	25.	69.79	0.47	1.628E-02				
540.45	22.	51.83	0.32	1.364E-02				
563.18	29.	73.94	1.39	1.319E-02	563.24	8.350	PBC<MDA	CS134
					563.24	8.350	1.594E+02	CS134
583.36	55.	38.89	1.41	1.282E-02	583.02	84.500	PBC<MDA	TL208
					583.02	84.500	PBC<MDA	TL208
609.27	82.	30.58	0.70	1.236E-02	609.31	46.090	7.344E+00	BI214
637.24	36.	60.77	1.45	1.192E-02	636.97	7.170	HL>Cutoff	I131
					636.97	7.170	HL>Cutoff	I131
661.74	6850.	1.34	1.48	1.154E-02	661.66	85.210	4.556E+02	CS137

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
726.85	34.	59.01	1.52	1.067E-02	727.17	7.550	PBC<MDA	BI212
775.52	2.	756.00	1.56	1.007E-02	778.92	12.940	PBC<MDA	EU152
					778.92	12.940	1.462E+00	EU152
785.23	19.	107.79	1.57	9.998E-03	785.42	1.280	PBC<MDA	BI212
860.96	12.	207.24	1.62	9.252E-03	860.56	12.420	PBC<MDA	TL208
					860.56	12.420	7.432E+01	TL208
872.69	15.	154.96	1.63	9.137E-03	873.23	12.270	PBC<MDA	EU154
					873.23	12.270	1.345E+01	EU154
880.64	6.	446.96	1.64	9.072E-03	880.53	6.000	PBC<MDA	Pa234
					883.24	9.600	3.612E+00	Pa234
					880.53	6.000	5.764E+00	Pa234
881.05	4.	542.69	1.64	9.048E-03	880.53	6.000	PBC<MDA	Pa234
					883.24	9.600	2.646E+00	Pa234
					883.24	9.600	2.646E+00	Pa234
910.94	42.	55.81	0.50	8.812E-03	911.07	29.000	2.145E+01	AC228
969.54	11.	233.14	1.70	8.357E-03	968.97	17.460	PBC<MDA	AC228
998.60	13.	159.52	1.72	8.125E-03	1001.00	0.837	PBC<MDA	PA234M
1043.81	22.	49.44	0.50	7.836E-03				
1113.40	21.	106.75	1.80	7.416E-03	1112.07	13.644	PBC<MDA	EU152
					1112.07	13.644	1.645E+01	EU152
1120.71	3.	324.01	1.80	7.368E-03	1120.29	15.100	PBC<MDA	BI214
1173.35	3847.	1.77	1.69	7.076E-03	1173.24	99.900	7.674E+02	CO60
1274.60	4.	168.52	1.90	6.579E-03	1274.54	35.190	PBC<MDA	EU154
					1274.54	35.190	1.833E+00	EU154
1332.66	3465.	1.74	1.93	6.324E-03	1332.50	99.980	7.726E+02	CO60
1461.86	4.	71.29	2.02	5.828E-03	1460.83	10.670	PBC<MDA	K40
1764.84	6.	62.35	2.18	4.916E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
163.02	40.83	2072.	107.	6.861E+03	69.92	0.275	-	s
197.05	49.34	2432.	256.	1.197E+04	32.03	0.813	-	M
309.42	77.46	800.	120.	3.466E+03	41.83	0.818	-	s
352.00	88.11	1017.	901.	2.430E+04	6.01	1.125	-	s
370.26	92.79	564.	97.	2.580E+03	35.89	0.989	-	D
449.15	112.41	460.	97.	2.499E+03	39.62	0.767	-	
496.92	124.36	413.	96.	2.498E+03	31.71	0.446	-	s
725.46	181.54	293.	53.	1.658E+03	54.86	0.413	-	s
743.15	185.96	347.	61.	1.966E+03	51.19	0.620	-	s
911.90	228.17	273.	43.	1.604E+03	62.64	0.301	-	s
933.42	233.55	188.	23.	8.795E+02	89.52	0.493	-	sc
985.29	246.53	312.	44.	1.740E+03	71.15	0.344	-	sM
1159.03	289.99	246.	45.	2.014E+03	62.18	0.308	-	sM
1736.34	434.37	127.	25.	1.526E+03	69.79	0.469	-	sc
2160.53	540.45	54.	22.	1.613E+03	51.83	0.320	-	s
4174.07	1043.81	40.	22.	2.871E+03	49.44	0.500	-	sM

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.77	46.52	4987.	17937.	9.965	1.08	0.948
AM-241	237.90	59.56	3943.	22159.	12.310	0.89	0.989
TH-234	245.27	61.41	2137.	-756.	-0.420	9.58	0.962s
EU-155	335.93	84.09	763.	32.	0.018	123.88	0.983s
TH-234	370.20	92.66	1149.	52.	0.029	63.10	0.989s
AC-228	372.95	93.35	648.	5.	0.003	773.45	0.989D
U-235	372.95	93.35	981.	89.	0.049	50.97	0.989D
EU-155	421.17	105.41	1063.	-14.	-0.008	319.41	1.000s
EU-152	485.01	121.38	884.	35.	0.019	121.43	1.015s
EU-154	491.96	123.12	1007.	-29.	-0.016	154.75	1.017s
Pa-234	524.49	131.26	815.	48.	0.027	85.04	1.024s
U-235	574.37	143.74	812.	37.	0.020	111.11	1.036s
U-235	652.91	163.39	727.	-19.	-0.010	203.98	1.053s
PB-212	953.55	238.59	460.	205.	0.114	19.87	1.430s
PB-214	974.11	243.73	548.	4.	0.002	848.75	1.123s
TL-208	1108.85	277.43	600.	21.	0.012	164.07	1.154s
I-131	1131.84	283.18	485.	-11.	-0.006	281.74	1.160s
PB-214	1180.60	295.38	538.	45.	0.025	74.52	1.170
AC-228	1353.39	338.60	238.	50.	0.028	55.28	0.297s
EU-152	1377.94	344.74	520.	4.	0.002	742.34	1.212s
PB-214	1406.93	351.99	480.	82.	0.046	39.34	1.219
I-131	1448.61	362.41	377.	3.	0.002	994.26	1.229s
BE-7	1908.87	477.52	536.	-7.	-0.004	497.88	1.324s
CS-134	2251.43	563.18	220.	29.	0.016	73.94	1.394s
CS-134	2276.67	569.49	238.	-18.	-0.010	122.24	1.399s
Pa-234	2276.53	569.45	236.	-17.	-0.010	127.24	1.399s
TL-208	2332.17	583.36	264.	55.	0.031	38.89	1.410
CS-134	2417.07	604.59	274.	-16.	-0.009	146.27	1.427s
BI-214	2435.76	609.27	152.	75.	0.042	30.58	0.701s
I-131	2547.65	637.24	223.	36.	0.020	60.77	1.452s
CS-137	2645.63	661.74	248.	6850.	3.806	1.34	1.481
EU-154	2890.98	723.08	251.	-25.	-0.014	92.05	1.519s
BI-212	2906.06	726.85	185.	34.	0.019	59.01	1.522s
EU-152	3100.71	775.52	162.	2.	0.001	756.00	1.561s
BI-212	3139.57	785.23	208.	19.	0.011	107.79	1.566s
TL-208	3442.52	860.96	291.	12.	0.007	207.24	1.622s
EU-154	3489.45	872.69	274.	15.	0.009	154.96	1.631s
Pa-234	3521.25	880.64	316.	6.	0.003	446.96	1.636s
Pa-234	3522.88	881.05	250.	4.	0.002	542.69	1.638s
AC-228	3643.08	911.09	347.	25.	0.014	106.08	1.658s
Pa-234	3767.65	942.23	214.	-2.	-0.001	998.44	1.683s
AC-228	3876.90	969.54	319.	11.	0.006	233.14	1.699
EU-154	3986.82	997.01	298.	-15.	-0.008	169.19	1.718s
PA-234M	3993.17	998.60	212.	13.	0.007	159.52	1.722s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
EU-152	4452.54	1113.40	237.	21.	0.012	106.75	1.797s
BI-214	4481.79	1120.71	179.	3.	0.002	324.01	1.803
CO-60	4692.45	1173.35	117.	3847.	2.137	1.77	1.694
EU-154	5097.64	1274.60	24.	4.	0.002	168.52	1.902s
CO-60	5330.02	1332.66	24.	3465.	1.925	1.74	1.926
K-40	5847.16	1461.86	16.	4.	0.002	71.29	2.015s
BI-214	7060.16	1764.84	15.	6.	0.004	62.35	2.180s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-2.3099E+00				5.31E+01	
			477.60	-2.310E+00	&(	3.873E+01 4.98E+02 1.05E+01	G
K-40	N	3.3645E+00				4.66E+11	
			1460.83	3.365E+00	&(P	1.890E+01 7.13E+01 1.07E+01	G
CO-60	F	7.7002E+02				1.93E+03	
			1332.50	7.726E+02	(	5.695E+00 1.74E+00 1.00E+02	G
			1173.24	7.674E+02	(	1.058E+01 1.77E+00 9.99E+01	G
I-131	I	1.9868E+00				8.02E+00	
			364.48	1.005E-01	&(	3.386E+00 9.94E+02 8.17E+01	G
			284.30	-4.432E+00	+	4.199E+01 2.82E+02 6.14E+00	G
			636.97	2.348E+01	(	4.698E+01 6.08E+01 7.17E+00	G
CS-134	I	5.1785E+00				7.54E+02	
			604.71	-8.013E+00	?(	3.939E+01 1.46E+02 9.76E+01	G
			795.87	2.035E-01	%	5.332E+01 7.67E+03 8.55E+01	G
			569.32	-5.420E+01	+	2.223E+02 1.22E+02 1.54E+01	G
			801.95	-5.550E+00	&	5.174E+02 2.73E+03 8.69E+00	G
			563.24	1.594E+02	&(	3.908E+02 7.39E+01 8.35E+00	G
CS-137	I	4.5561E+02				1.10E+04	
			661.66	4.556E+02	(	5.061E+00 1.34E+00 8.52E+01	G
EU-152	F	4.0858E+00				4.94E+03	
			344.29	6.704E-01	&(	1.678E+01 7.42E+02 2.65E+01	G
			121.78	2.539E+00	*(	1.026E+01 1.21E+02 2.86E+01	G
			778.92	1.462E+00	?(	3.795E+01 7.56E+02 1.29E+01	G
			964.11	1.838E-01	&	5.194E+01 8.29E+03 1.46E+01	G
			1112.07	1.645E+01	&(	5.876E+01 1.07E+02 1.36E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1408.00	-9.699E-03 %		1.274E+01	3.45E+04	2.10E+01 G
EU-154	I	1.3449E+01					3.14E+03	
			873.23	1.345E+01 &(		7.011E+01	1.55E+02	1.23E+01 G
			123.10	-1.835E+00 -		9.460E+00	1.55E+02	4.08E+01 G
			1274.54	1.833E+00 -		1.090E+01	1.69E+02	3.52E+01 G
			723.36	-1.133E+01 +		3.476E+01	9.20E+01	2.02E+01 G
			1004.77	-4.802E-01 &		5.487E+01	3.35E+03	1.80E+01 G
			996.33	-1.660E+01 &		9.452E+01	1.69E+02	1.06E+01 G
EU-155	I	1.4186E+00					1.81E+03	
			105.31	-2.635E+00 ?(		2.813E+01	3.19E+02	2.12E+01 G
			86.54	4.218E+00 ?(		1.740E+01	1.24E+02	3.07E+01 G
TL-208	N	4.5666E+01					6.98E+02	
			583.02	3.712E+01 ?(P		5.254E+01	3.89E+01	8.45E+01 G
			277.28	1.037E+02 &(P		5.816E+02	1.64E+02	6.31E+00 G
			860.56	7.432E+01 ?(		5.196E+02	2.07E+02	1.24E+01 G
PB-210	N	1.4933E+04					8.14E+03	
			46.54	1.493E+04 (P		2.762E+02	1.08E+00	4.25E+00 G
PB-212	N	1.3244E+02					6.98E+02	
			238.63	1.324E+02 (P		6.645E+01	1.99E+01	4.33E+01 G
			300.03	-5.919E+00 %		1.025E+03	5.11E+03	3.28E+00 G
PB-214	N	6.1745E+00					5.84E+05	
			351.93	6.325E+00 (		8.077E+00	3.93E+01	3.76E+01 G
			295.09	5.882E+00 ?(		1.450E+01	7.45E+01	1.93E+01 G
			242.00	1.143E+00 -		3.269E+01	8.49E+02	7.43E+00 G
BI-212	N	4.2178E+02					6.98E+02	
			727.17	3.071E+02 (		5.958E+02	5.90E+01	7.55E+00 G
			785.42	1.098E+03 (		3.967E+03	1.08E+02	1.28E+00 G
BI-214	N	6.6878E+00					5.84E+05	
			609.31	7.344E+00 (P		5.883E+00	3.06E+01	4.61E+01 G
			1120.29	1.624E+00 - P		3.260E+01	3.24E+02	1.51E+01 G
			1764.49	4.725E+00 ?(P		1.524E+01	6.23E+01	1.54E+01 G
AC-228	N	1.4948E+01					2.10E+03	
			911.07	1.291E+01 ?(		4.572E+01	1.06E+02	2.90E+01 G
			968.97	9.765E+00 (		7.681E+01	2.33E+02	1.75E+01 G
			338.32	2.739E+01 (		4.087E+01	5.53E+01	1.20E+01 G
								Energy duplication
			93.35	2.891E+00 -		7.523E+01	7.73E+02	5.56E+00 XA

Nuclide		Ave activity	Energy		Activity	Code	Peak	MDA	Comments
Pa-234	N	3.8949E+00						1.63E+12	
			131.29	3.938E+00	&(		1.110E+01	8.50E+01	1.80E+01 G
			569.47	-9.005E+00	+		3.848E+01	1.27E+02	8.20E+00 G
			946.02	-1.010E+00	-		3.446E+01	9.98E+02	1.34E+01 G
			883.24	2.646E+00	?(		4.886E+01	5.43E+02	9.60E+00 G
			880.53	5.764E+00	&(		8.727E+01	4.47E+02	6.00E+00 G
TH-234	N	-3.7684E+02						1.63E+12	
			63.29	-3.768E+02	?(P		1.088E+02	9.58E+00	3.81E+00 G
			92.59	1.379E+01	+ P		4.233E+01	6.31E+01	5.58E+00 G
PA-234M	N	1.0717E+02						1.63E+12	
			1001.00	1.072E+02	?(		5.770E+02	1.60E+02	8.37E-01 G
			766.41	1.437E+01	%		1.209E+03	2.45E+03	2.94E-01 G
U-235	N	5.1103E+00						2.57E+11	
			143.79	5.110E+00	(		1.888E+01	1.11E+02	1.10E+01 G
			205.33	1.168E+00	&		5.126E+01	1.31E+03	5.01E+00 G
			163.38	-6.110E+00	+		4.168E+01	2.04E+02	5.08E+00 G
									Energy duplication
			93.35	2.244E+01	&		3.756E+01	5.10E+01	5.81E+00 X
AM-241	T	1.2671E+03						1.58E+05	
			59.54	1.267E+03	(		1.689E+01	8.94E-01	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- - - -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

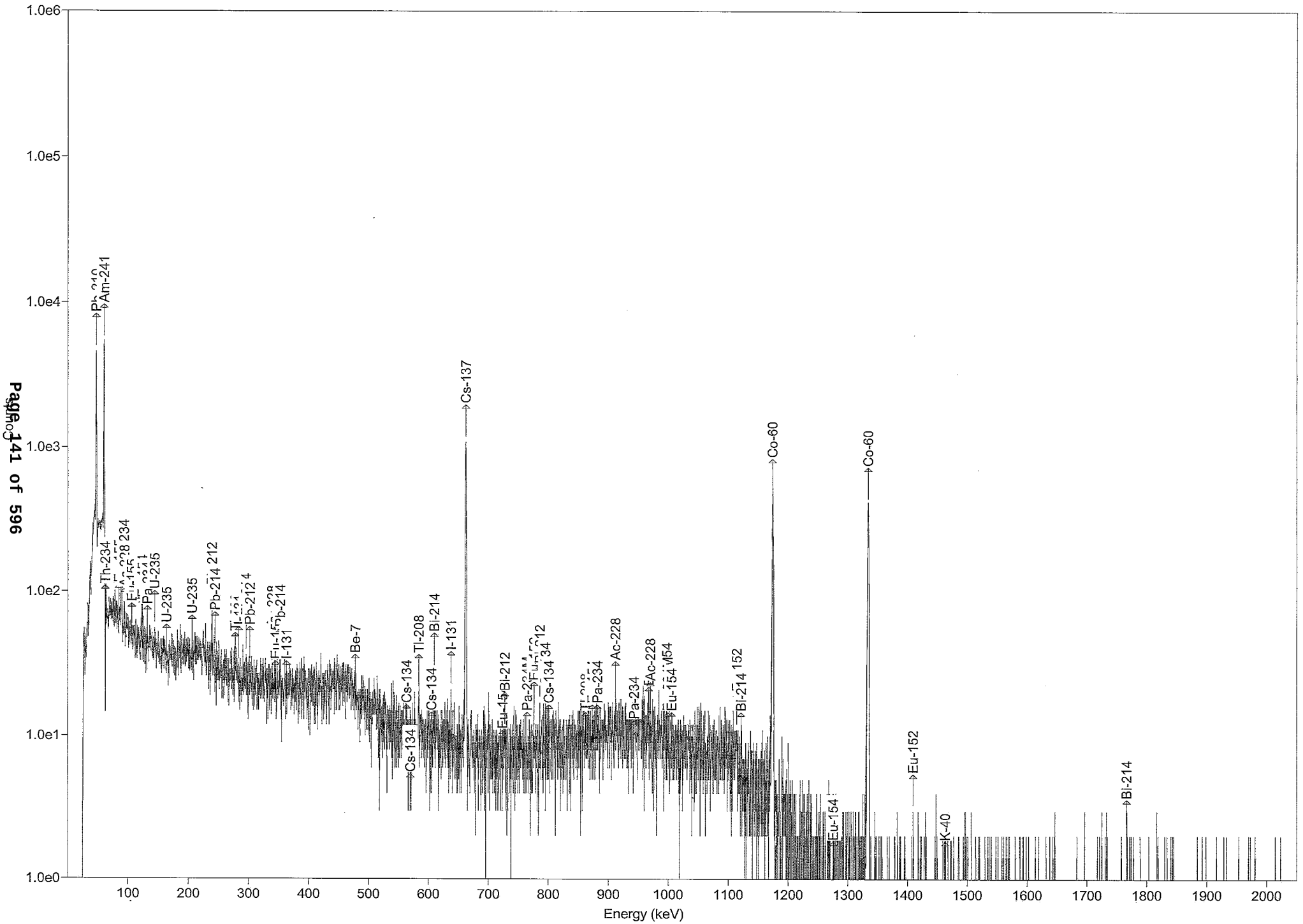
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting		MDA Bq/Sample
BE-7	#A	-2.3099E+00	>12 Halflives	4.9788E+02%	3.8727E+01	
K-40	#A	3.3645E+00	3.3645E+00	1.479E+02%		1.89E+01
CO-60		3.0338E+02	7.7002E+02	1.241E+00%		5.69E+00
I-131	#A	1.9868E+00	>12 Halflives	6.0769E+01%	3.3861E+00	
CS-134	#A	4.8037E-01	5.1785E+00	7.394E+01%		3.94E+01
CS-137		3.8683E+02	4.5561E+02	1.336E+00%		5.06E+00
EU-152	#A	2.8429E+00	4.0858E+00	1.068E+02%		1.68E+01
EU-154	#A	7.5957E+00	1.3449E+01	1.550E+02%		7.01E+01
EU-155	#A	5.2723E-01	1.4186E+00	1.239E+02%		2.81E+01
TL-208	#A	3.4936E+00	4.5666E+01	4.336E+01%		5.25E+01
PB-210		1.1982E+04	1.4933E+04	1.084E+00%		2.76E+02
PB-212	#	1.0132E+01	1.3244E+02	2.107E+01%		6.64E+01
PB-214	#A	6.1556E+00	6.1745E+00	3.934E+01%		8.08E+00
BI-212	#A	3.2268E+01	4.2178E+02	5.901E+01%		5.96E+02
BI-214		6.6673E+00	6.6878E+00	3.360E+01%		5.88E+00
AC-228	A	6.3644E+00	1.4948E+01	5.528E+01%		4.57E+01
Pa-234	#A	3.8949E+00	3.8949E+00	8.504E+01%		1.11E+01
TH-234	#A	-3.7684E+02	-3.7684E+02	9.841E+00%		1.09E+02
PA-234M	#A	1.0717E+02	1.0717E+02	1.595E+02%		5.77E+02
U-235	#A	5.1103E+00	5.1103E+00	1.111E+02%		1.89E+01
AM-241		1.2528E+03	1.2671E+03	8.940E-01%		1.69E+01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (112.4 to 1999.5 keV) 1.394E+04 Bq/Sample
Total Decayed Activity (112.4 to 1999.5 keV) 1.7565109E+04 Bq/Sample

The library has energies which are not separable.


77739_Gamma_LCS 160-77739~2-A. 15_Gamma_20131338.spc.
Counts
1.0e6
1.0e5
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)
Am-241
Th-234
U-235
U-235
Pb-214
Pb-214
I-131
Be-7
Cs-134
Cs-134
Tl-208
Bi-214
Cs-137
I-131
Bi-212
Cs-134
Ac-228
Pa-234
Ac-228
Co-60
Co-60
Bi-214
Eu-152
K-40
Bi-214

GAMMA SPECTROSCOPY

Method GA-01-R
Ra-226

Radium-226 & Other Gamma Emitters (GS) by Method GA-01-R

Prep Batch: 138233

Fill Geometry, 21-Day In-Growth

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 138233

Lab ID: MB 160-138233/1-A Analyzed: 09/08/14 10:44 Ts: 120 Sigma: 2
Client ID: Detector: GV4 Decay Corrected: No

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.4531	0.380	0.382	U	pCi/g	1.00	0.589	142442
Radium-228	0.2550	0.581	0.581	U	pCi/g		1.13	142442
Thorium-232	0.2550	0.581	0.581	U	pCi/g		1.13	142442
Uranium-235	0.1111	0.644	0.644	U	pCi/g		1.12	142442
Uranium-238	-1.928	6.55	6.55	U	pCi/g		3.56	142442

Other Detected Radionuclides	MB Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Other Detected Radionuclide	None				pCi/g	

Lab ID: LCS 160-138233/2-A Analyzed: 09/08/14 12:28 Ts: 120 Sigma: 2
Client ID: Detector: GV7 Decay Corrected: No

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Americium-241	1013	3.80	100		pCi/g		2.01	142447
Cesium-137	381.8	3.25	37.3		pCi/g		1.38	142447
Cobalt-60	416.1	2.98	40.0		pCi/g		0.955	142447

Lab ID: 680-102600-6 Analyzed: 09/08/14 12:05 Ts: 120 Sigma: 2
Client ID: SD-278-SS Detector: GV12 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.948	0.347	0.359		pCi/g	1.00	0.409	142436
Radium-228	1.83	0.473	0.506		pCi/g		0.346	142436
Thorium-232	1.83	0.473	0.506		pCi/g		0.346	142436
Uranium-235	0.188	0.420	0.421	U	pCi/g		0.855	142436
Uranium-238	1.90	1.80	1.81	U	pCi/g		2.44	142436

Other Detected Radionuclides	Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Ac-228	1.83	0.473	0.506		pCi/g	0.346
Bi-214	0.948	0.347	0.359		pCi/g	0.409
K-40	18.2	2.58	3.12		pCi/g	2.07
Pb-212	1.00	0.213	0.239		pCi/g	0.262
Pb-214	0.532	0.234	0.239		pCi/g	0.381
Tl-208	0.428	0.155	0.160		pCi/g	0.181

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 138233

Lab ID: 680-102600-6 DU | Analyzed: 09/08/14 14:34 | Ts: 120 | Sigma: 2
Client ID: SD-278-SS | Detector: GV7 | Decay Corrected: No

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.6753	0.245	0.254		pCi/g	1.00	0.271	142447
Radium-228	1.609	0.408	0.437		pCi/g		0.259	142447
Thorium-232	1.609	0.408	0.437		pCi/g		0.259	142447
Uranium-235	0.1930	0.318	0.318	U	pCi/g		0.531	142447
Uranium-238	0.3359	0.412	0.414	U	pCi/g		1.90	142447

Other Detected Radionuclides	DU Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Ac-228	1.609	0.408	0.437		pCi/g	0.259
Bi-214	0.6753	0.245	0.254		pCi/g	0.271
K-40	11.99	2.60	2.85	F	pCi/g	3.00
Pb-212	1.280	0.212	0.253		pCi/g	0.207
Pb-214	0.9133	0.236	0.252		pCi/g	0.243
Tl-208	0.5887	0.130	0.142		pCi/g	0.0835

Lab ID: 680-102600-7 | Analyzed: 09/10/14 01:56 | Ts: 120 | Sigma: 2
Client ID: SD-278-01 | Detector: GV14 | Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.773	0.287	0.298		pCi/g	1.00	0.389	143250
Radium-228	1.38	0.390	0.414		pCi/g		0.528	143250
Thorium-232	1.38	0.390	0.414		pCi/g		0.528	143250
Uranium-235	0.275	0.457	0.458	U	pCi/g		0.678	143250
Uranium-238	1.92	0.872	0.895	U	pCi/g		2.12	143250

Other Detected Radionuclides	Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Ac-228	1.38	0.390	0.414		pCi/g	0.528
Bi-214	0.773	0.287	0.298		pCi/g	0.389
K-40	18.2	2.79	3.35		pCi/g	2.06
Pb-212	1.23	0.258	0.303		pCi/g	0.291
Pb-214	0.926	0.327	0.341		pCi/g	0.382
Tl-208	0.545	0.158	0.167		pCi/g	0.174

Lab ID: 680-102600-8 | Analyzed: 09/08/14 17:33 | Ts: 120 | Sigma: 2
Client ID: SD-278-02 | Detector: GV7 | Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	0.769	0.255	0.267		pCi/g	1.00	0.298	142447
Radium-228	1.21	0.321	0.344		pCi/g		0.457	142447

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 138233

Lab ID: 680-102600-8 Analyzed: 09/08/14 17:33 Ts: 120 Sigma: 2
Client ID: SD-278-02 Detector: GV7 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Thorium-232	1.21	0.321	0.344		pCi/g		0.457	142447
Uranium-235	0.235	0.273	0.274	U	pCi/g		0.409	142447
Uranium-238	1.68	0.827	0.845	U	pCi/g		1.77	142447

Other Detected Radionuclides	Result	Count Unc	Total Unc	Qualifier	Unit	MDC
Ac-228	1.21	0.321	0.344		pCi/g	0.457
Bi-214	0.769	0.255	0.267		pCi/g	0.298
K-40	17.8	2.80	3.34		pCi/g	2.64
Pb-212	1.60	0.210	0.295		pCi/g	0.187
Pb-214	0.977	0.243	0.263		pCi/g	0.225
Tl-208	0.620	0.146	0.160		pCi/g	0.116

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-138233/1-A	Radium-226			0.4531	U	pCi/g							
MB 160-138233/1-A	Radium-228			0.2550	U	pCi/g							
MB 160-138233/1-A	Thorium-232			0.2550	U	pCi/g							
MB 160-138233/1-A	Uranium-235			0.1111	U	pCi/g							
MB 160-138233/1-A	Uranium-238			-1.928	U	pCi/g							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-138233/2-A	Americium-241		981	1013		pCi/g	103	87 - 116					
LCS 160-138233/2-A	Cesium-137		362	381.8		pCi/g	105	87 - 120					
LCS 160-138233/2-A	Cobalt-60		382	416.1		pCi/g	109	87 - 115					

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
680-102600-6	Radium-226	0.948		0.6753		pCi/g			34	0.45	1.24	1	
680-102600-6	Radium-228	1.83		1.609		pCi/g			13	0.24	0.67	1	
680-102600-6	Thorium-232	1.83		1.609		pCi/g			13	0.24	0.67	1	
680-102600-6	Uranium-235	0.188		0.1930	U	pCi/g			3	0.01	0.02	1	
680-102600-6	Uranium-238	1.90		0.3359	U	pCi/g			140	0.70	1.69	1	

Glossary:

Ts = Count Duration, Sample

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102600-3

SDG No.: 680102600-1

Batch Number: 138233 Batch Start Date: 08/15/14 18:30 Batch Analyst: Santos, Mario J

Batch Method: Fill_Geo-21 Batch End Date:

Lab Sample ID	Client Sample ID	Method Chain	Basis	TareWeight	GrossWeight	InitialAmount	IngDecDate1	IngDecDate3	Geometry
MB 160-138233/1		Fill_Geo-21, GA-01-R				25 g	8/15/14	9/5/14	25mL d=1
LCS 160-138233/2		Fill_Geo-21, GA-01-R				25 g	8/15/14	9/5/14	25mL d=1
680-102600-A-6-D	SD-278-SS	Fill_Geo-21, GA-01-R	T	37.0 g	63.3 g	26.3 g	8/15/14	9/5/14	25mL d=1
680-102600-A-6-D DU	SD-278-SS	Fill_Geo-21, GA-01-R	T	37.0 g	63.3 g	26.3 g	8/15/14	9/5/14	25mL d=1
680-102600-A-7-C	SD-278-01	Fill_Geo-21, GA-01-R	T	36.7 g	67.4 g	30.7 g	8/15/14	9/5/14	25mL Solid
680-102600-A-8-C	SD-278-02	Fill_Geo-21, GA-01-R	T	36.8 g	69.3 g	32.5 g	8/15/14	9/5/14	25mL Solid

Lab Sample ID	Client Sample ID	Method Chain	Basis	25mLD=1 00006					
MB 160-138233/1		Fill_Geo-21, GA-01-R							
LCS 160-138233/2		Fill_Geo-21, GA-01-R		# mL					
680-102600-A-6-D	SD-278-SS	Fill_Geo-21, GA-01-R	T						
680-102600-A-6-D DU	SD-278-SS	Fill_Geo-21, GA-01-R	T						
680-102600-A-7-C	SD-278-01	Fill_Geo-21, GA-01-R	T						
680-102600-A-8-C	SD-278-02	Fill_Geo-21, GA-01-R	T						

Batch Notes	

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102600-3

SDG No.: 680102600-1

Batch Number: 140177 Batch Start Date: 08/26/14 09:42 Batch Analyst: Lockhart, Justin D

Batch Method: Fill_Geo-0 Batch End Date:

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	TareWeight	GrossWeight	Geometry	25mLD=1 00006	
MB 160-140177/1		Fill_Geo-0, GA-01-R		25 g			25mL d=1		
LCS 160-140177/2		Fill_Geo-0, GA-01-R		25 g			25mL d=1	# mL	
680-102600-A-6-E	SD-278-SS	Fill_Geo-0, GA-01-R	T	26.3 g	37.0 g	63.3 g	25mL d=1		
680-102600-A-6-E DU	SD-278-SS	Fill_Geo-0, GA-01-R	T	26.3 g	37.0 g	63.3 g	25mL d=1		
680-102600-A-7-D	SD-278-01	Fill_Geo-0, GA-01-R	T	30.7 g	36.7 g	67.4 g	25mL Solid		
680-102600-A-8-D	SD-278-02	Fill_Geo-0, GA-01-R	T	32.5 g	36.8 g	69.3 g	25mL Solid		

Batch Notes	

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

Test America St. Louis Spectrum ID: 4_Gamma_20141748

Sample Description: 138233_Gamma_MB 160-138233~1-A
Detector: Ge 4 SN/181
Batch ID: 138233
Work Order Number: Gamma
Lot Number: MB 160-138233~1-A

Decay to Time: 9/8/2014 10:44 Live Time: 7200 sec
Acquisition Time: 9/8/2014 10:44:55 Real Time: 7212 sec
Analysis Time: 9/8/2014 12:45 Dead Time: 0.16 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 4_Liquid_D=1 25ml.Clb
Efficiency Cal Desc: 4_Liquid_D=1 25ml_90101_030512
Efficiency Cal Date: 3/27/2012 20:51
Energy Cal Date: 2/28/2012 14:55
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 4_2014-09-06_0557.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-1.283E-01	383.3	4.918E-01	4.919E-01	1.793E+00
K-40	1.558E+00	66.8	1.041E+00	1.044E+00	3.435E+00
CO-60	4.083E-02	258.3	1.055E-01	1.055E-01	3.903E-01
I-131	7.421E-02	107.6	7.988E-02	7.996E-02	2.109E-01
CS-134	2.262E-02	249.1	5.635E-02	5.636E-02	4.350E-01
CS-137	4.573E-02	182.9	8.367E-02	8.369E-02	2.983E-01
EU-152	1.781E-01	120.8	2.153E-01	2.154E-01	7.181E-01
EU-154	3.480E-01	102.3	3.560E-01	3.564E-01	2.124E+00
EU-155	1.058E-01	121.4	1.284E-01	1.285E-01	4.382E-01
TL-208	-1.224E-01	234.2	2.865E-01	2.866E-01	3.793E-01
PB-210	1.960E+00	49.7	9.735E-01	9.816E-01	2.950E+00
PB-212	-1.816E-01	213.2	3.871E-01	3.872E-01	4.888E-01
PB-214	2.118E-01	70.3	1.490E-01	1.493E-01	4.376E-01
BI-212	5.435E-02	150.5	8.177E-02	8.181E-02	3.666E+00
BI-214	4.192E-01	41.9	1.757E-01	1.768E-01	5.451E-01
AC-228	2.358E-01	113.9	2.686E-01	2.688E-01	1.043E+00
Pa-234	1.921E-01	141.8	2.723E-01	2.725E-01	5.066E-01
TH-234	-1.783E+00	169.9	3.030E+00	3.031E+00	3.294E+00
PA-234M	8.654E+00	114.9	9.942E+00	9.951E+00	3.358E+01
U-235	1.028E-01	289.9	2.980E-01	2.980E-01	1.036E+00
AM-241	-1.464E-02	544.2	7.965E-02	7.965E-02	2.779E-01
Total	1.420E+01				

Analyst: Curtis Carey

TestAmerica Spectrum name: 4_Gamma_20141748.An1

Sample description
138233_Gamma_MB 160-138233~1-A

Spectrum Filename: C:\User\SPC\Det4\4_Gamma_20141748.An1

Acquisition information
Start time: 9/8/2014 10:44:55 AM
Live time: 7200
Real time: 7212
Dead time: 0.16 %
Detector ID: 4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_Liquid_D=1 25ml.Clb
4_Liquid_D=1 25ml_90101_030512

Energy Calibration
Created: 2/28/2012 2:55:17 PM
Zero offset: 0.091 keV
Gain: 0.250 keV/channel
Quadratic: -2.917E-08 keV/channel^2

Efficiency Calibration
Created: 3/27/2012 8:51:45 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.48 %
Log(Eff): 8.809878E-01 + (-6.811249E-01*Log(E)) +
(-1.909804E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -1.031199E+01 + (3.529752E+00*Log(E)) +
(-4.143154E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (1999.44keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/8/2014 10:44:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	4_2014-09-06_0557.PBC 9/6/2014 5:57:53 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 7 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1136

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.49	34.	17.83	1.18	5.687E-02	46.54	4.250	PBC<MDA	PB210
63.43	-30.	62.96	0.82	6.085E-02	63.29	3.810	PBC<MDA	TH234
92.69	68.	23.55	0.76	5.936E-02	92.59	5.584	PBC<MDA	TH234
					93.35	5.810	2.723E+00	U235
					93.35	5.561	2.845E+00	AC228
105.91	9.	121.40	0.85	5.730E-02	105.31	21.200	PBC<MDA	EU155
132.29	3.	282.39	0.88	5.223E-02	131.29	18.000	PBC<MDA	Pa234
143.29	4.	289.91	0.89	4.968E-02	143.79	10.960	PBC<MDA	U235
238.45	-19.	73.43	0.98	3.269E-02	238.63	43.300	PBC<MDA	PB212
244.10	6.	139.15	0.98	3.229E-02	242.00	7.430	PBC<MDA	PB214
277.31	4.	130.80	1.01	2.859E-02	277.28	6.310	PBC<MDA	TL208
284.45	9.	107.64	1.02	2.796E-02	284.30	6.140	PBC<MDA	I131
350.79	12.	70.32	1.08	2.307E-02	351.93	37.600	PBC<MDA	PB214
364.50	4.	216.23	1.09	2.235E-02	364.48	81.700	PBC<MDA	I131
567.03	2.	273.65	1.27	1.486E-02	569.47	8.200	PBC<MDA	Pa234
569.17	3.	249.14	1.27	1.486E-02	569.32	15.380	PBC<MDA	CS134
608.76	19.	41.91	1.30	1.396E-02	609.31	46.090	PBC<MDA	BI214
662.75	4.	182.94	1.35	1.293E-02	661.66	85.210	PBC<MDA	CS137
723.84	4.	123.44	1.40	1.190E-02	723.36	20.220	PBC<MDA	EU154
765.88	5.	114.88	1.44	1.127E-02	766.41	0.294	PBC<MDA	PA234M
783.20	3.	169.55	1.45	1.102E-02	785.42	1.280	PBC<MDA	BI212

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
861.30	2.	272.87	1.52	1.011E-02	860.56	12.420	PBC<MDA	TL208
871.88	5.	117.25	1.53	9.976E-03	873.23	12.270	PBC<MDA	EU154
883.60	3.	162.01	1.53	9.869E-03	883.24	9.600	PBC<MDA	Pa234
911.06	4.	164.11	1.56	9.585E-03	911.07	29.000	PBC<MDA	AC228
968.03	4.	157.92	1.60	9.045E-03	968.97	17.460	PBC<MDA	AC228
995.70	2.	255.38	1.63	8.810E-03	996.33	10.600	PBC<MDA	EU154
1000.80	2.	202.14	1.63	8.771E-03	1001.00	0.837	PBC<MDA	PA234M
1111.41	2.	246.70	1.72	7.939E-03	1112.07	13.644	PBC<MDA	EU152
1331.69	2.	258.28	1.89	6.683E-03	1332.50	99.980	PBC<MDA	CO60
1408.84	4.	120.85	1.95	6.340E-03	1408.00	21.005	PBC<MDA	EU152
1461.27	7.	66.84	1.99	6.120E-03	1460.83	10.670	PBC<MDA	K40

No unknown peaks passed sensitivity test.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.51	46.49	109.	34.	0.005	17.83	1.183s
AM-241	239.81	60.08	76.	-2.	0.000	544.18	0.812s
TH-234	253.20	63.43	126.	-30.	-0.004	62.96	0.816s
EU-155	342.60	85.79	61.	-11.	-0.001	107.69	0.837s
U-235	372.83	93.35	75.	49.	0.007	28.64	0.843D
AC-228	372.83	93.35	75.	49.	0.007	28.64	0.843D
EU-155	423.06	105.91	58.	9.	0.001	121.40	0.854s
EU-154	491.69	123.08	73.	-4.	-0.001	313.64	0.871s
Pa-234	528.49	132.29	46.	3.	0.000	282.39	0.878s
U-235	572.48	143.29	66.	4.	0.001	289.91	0.890
U-235	651.05	162.94	42.	-2.	0.000	614.91	0.908s
PB-212	952.97	238.45	102.	-19.	-0.003	73.43	0.976s
PB-214	975.54	244.10	30.	6.	0.001	139.15	0.979s
TL-208	1108.35	277.31	45.	4.	0.001	130.80	1.011s
I-131	1136.91	284.45	38.	9.	0.001	107.64	1.018s
PB-212	1202.73	300.91	45.	-8.	-0.001	125.10	1.032s
EU-152	1376.16	344.29	40.	-2.	0.000	595.08	1.071s
PB-214	1402.15	350.79	28.	12.	0.002	70.32	1.078s
I-131	1457.01	364.50	29.	4.	0.001	216.23	1.089s
BE-7	1907.94	477.26	20.	-2.	0.000	383.32	1.189s
CS-134	2275.53	569.17	22.	3.	0.000	249.14	1.269s
Pa-234	2266.99	567.03	14.	2.	0.000	273.65	1.269s
BI-214	2433.87	608.76	23.	19.	0.003	41.91	1.304s
CS-137	2649.85	662.75	20.	4.	0.001	182.94	1.348s
EU-154	2894.22	723.84	13.	4.	0.001	123.44	1.401s
BI-212	2906.68	726.96	20.	-3.	0.000	248.59	1.404s
PA-234M	3062.36	765.88	13.	5.	0.001	114.88	1.437s
EU-152	3114.44	778.89	20.	-4.	-0.001	155.50	1.448s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
BI-212	3131.66	783.20	10.	3.	0.000	169.55	1.453s
CS-134	3174.59	793.93	16.	-4.	-0.001	156.81	1.462s
CS-134	3204.55	801.42	23.	-3.	0.000	205.46	1.467s
TL-208	3444.14	861.30	18.	2.	0.000	272.87	1.516s
EU-154	3486.47	871.88	12.	5.	0.001	117.25	1.526s
Pa-234	3533.36	883.60	10.	3.	0.000	162.01	1.534s
AC-228	3643.18	911.06	15.	4.	0.000	164.11	1.557s
EU-152	3858.64	964.90	25.	-2.	0.000	289.76	1.601s
AC-228	3871.14	968.03	16.	4.	0.001	157.92	1.605s
EU-154	3981.86	995.70	15.	2.	0.000	255.38	1.627s
PA-234M	4002.26	1000.80	10.	2.	0.000	202.14	1.631s
EU-154	4020.66	1005.40	16.	-2.	0.000	274.87	1.634s
EU-152	4444.88	1111.41	14.	2.	0.000	246.70	1.720s
CO-60	4692.92	1173.39	13.	-1.	0.000	889.50	1.769s
CO-60	5326.48	1331.69	12.	2.	0.000	258.28	1.893s
EU-152	5635.28	1408.84	8.	4.	0.001	120.85	1.950s
K-40	5845.13	1461.27	8.	7.	0.001	66.84	1.991s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-1.2831E-01				5.31E+01	
			477.60	-1.283E-01	?(	1.793E+00	3.83E+02 1.05E+01 G
K-40	N	1.5575E+00				4.66E+11	
			1460.83	1.558E+00	?(	3.435E+00	6.68E+01 1.07E+01 G
CO-60	F	4.0833E-02				1.93E+03	
			1332.50	4.083E-02	?(	3.903E-01	2.58E+02 1.00E+02 G
			1173.24	-1.069E-02	+	3.599E-01	8.90E+02 9.99E+01 G
I-131	I	7.4208E-02				8.02E+00	
			364.48	2.752E-02	&(	2.109E-01	2.16E+02 8.17E+01 G
			284.30	6.954E-01	?(	2.559E+00	1.08E+02 6.14E+00 G
			636.97	1.595E-02	%	3.714E+00	6.33E+03 7.17E+00 G
CS-134	I	2.2618E-02				7.54E+02	
			604.71	0.000E+00	?(	4.350E-01	1.00E+03 9.76E+01 G
			795.87	-5.696E-02	+	3.186E-01	1.57E+02 8.55E+01 G
			569.32	1.662E-01	?(	1.488E+00	2.49E+02 1.54E+01 G
			801.95	-5.026E-01	+	3.683E+00	2.05E+02 8.69E+00 G
			563.24	0.000E+00	&	3.536E+00	1.00E+03 8.35E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CS-137	I	4.5734E-02					1.10E+04	
			661.66	4.573E-02	?(	2.983E-01	1.83E+02	8.52E+01 G
EU-152	F	1.7813E-01					4.94E+03	
			344.29	-3.386E-02	?(	7.181E-01	5.95E+02	2.65E+01 G
			121.78	0.000E+00	+	4.109E-01	1.00E+03	2.86E+01 G
			778.92	-4.128E-01	+	2.272E+00	1.56E+02	1.29E+01 G
			964.11	-2.611E-01	+	2.717E+00	2.90E+02	1.46E+01 G
			1112.07	2.819E-01	?(	2.552E+00	2.47E+02	1.36E+01 G
			1408.00	3.781E-01	?(	1.639E+00	1.21E+02	2.10E+01 G
EU-154	I	3.4797E-01					3.14E+03	
			873.23	5.133E-01	&(	2.124E+00	1.17E+02	1.23E+01 G
			123.10	-2.459E-02	-	2.679E-01	3.14E+02	4.08E+01 G
			1274.54	0.000E+00	-	4.172E-01	1.00E+03	3.52E+01 G
			723.36	2.548E-01	?(	1.113E+00	1.23E+02	2.02E+01 G
			1004.77	-1.869E-01	-	1.879E+00	2.75E+02	1.80E+01 G
			996.33	3.343E-01	?(	3.119E+00	2.55E+02	1.06E+01 G
EU-155	I	1.0575E-01					1.81E+03	
			105.31	1.057E-01	&(	4.382E-01	1.21E+02	2.12E+01 G
			86.54	-8.035E-02	&	2.938E-01	1.08E+02	3.07E+01 G
TL-208	N	-1.2235E-01					6.98E+02	
			583.02	-2.094E-01	%(P	3.793E-01	3.83E+03	8.45E+01 G
			277.28	3.138E-01	&(P	2.619E+00	1.31E+02	6.31E+00 G
			860.56	2.484E-01	?(	2.465E+00	2.73E+02	1.24E+01 G
PB-210	N	1.9601E+00					8.14E+03	
			46.54	1.960E+00	*(P	2.950E+00	1.78E+01	4.25E+00 G
PB-212	N	-1.8157E-01					6.98E+02	
			238.63	-1.816E-01	?(P	4.888E-01	7.34E+01	4.33E+01 G
			300.03	-1.259E+00	+	5.409E+00	1.25E+02	3.28E+00 G
PB-214	N	2.1183E-01					5.84E+05	
			351.93	1.871E-01	(	4.376E-01	7.03E+01	3.76E+01 G
			295.09	-7.865E-03	&	7.833E-01	2.75E+03	1.93E+01 G
			242.00	3.370E-01	&(	1.632E+00	1.39E+02	7.43E+00 G
BI-212	N	5.4350E-02					6.98E+02	
			727.17	-4.089E-01	?(	3.666E+00	2.49E+02	7.55E+00 G
			785.42	2.787E+00	?(	1.725E+01	1.70E+02	1.28E+00 G
BI-214	N	4.1915E-01					5.84E+05	
			609.31	4.192E-01	(	5.451E-01	4.19E+01	4.61E+01 G
			1120.29	0.000E+00	-	2.175E+00	1.00E+03	1.51E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		1764.49	0.000E+00	-	4.245E+00	1.00E+03	1.54E+01 G
AC-228	N 2.3583E-01					2.10E+03	
		911.07	1.774E-01	?(	1.043E+00	1.64E+02	2.90E+01 G
		968.97	3.328E-01	?(	1.876E+00	1.58E+02	1.75E+01 G
		338.32	-1.402E-02	%	1.433E+00	2.82E+03	1.20E+01 G
							Energy duplication
		93.35	2.074E+00	?	1.812E+00	2.86E+01	5.56E+00 XA
Pa-234	N 1.9211E-01					1.63E+12	
		131.29	5.108E-02	&(	5.066E-01	2.82E+02	1.80E+01 G
		569.47	2.290E-01	?(	2.304E+00	2.74E+02	8.20E+00 G
		946.02	-1.688E-02	%	2.903E+00	4.68E+03	1.34E+01 G
		883.24	4.250E-01	?(	2.512E+00	1.62E+02	9.60E+00 G
		880.53	-9.215E-02	%	4.523E+00	1.29E+03	6.00E+00 G
TH-234	N -1.7832E+00					1.63E+12	
		63.29	-1.783E+00	&(P	3.294E+00	6.30E+01	3.81E+00 G
		92.59	1.396E-02	% P	2.302E+00	2.36E+01	5.58E+00 G
PA-234M	N 8.6542E+00					1.63E+12	
		1001.00	4.510E+00	?(	3.358E+01	2.02E+02	8.37E-01 G
		766.41	2.045E+01	?(	8.252E+01	1.15E+02	2.94E-01 G
U-235	N 1.0278E-01					2.57E+11	
		143.79	1.028E-01	(	1.036E+00	2.90E+02	1.10E+01 G
		205.33	-4.709E-05	&	2.452E+00	1.45E+06	5.01E+00 G
		163.38	-8.972E-02	+	1.964E+00	6.15E+02	5.08E+00 G
							Energy duplication
		93.35	1.985E+00	?	1.734E+00	2.86E+01	5.81E+00 X
AM-241	T -1.4636E-02					1.58E+05	
		59.54	-1.464E-02	?(	2.779E-01	5.44E+02	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction

} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
AM-241	60.08	76.	-2.	0.000	544.18	-1.464E-02	
TH-234	63.43	126.	-30.	-0.004	62.96	-1.783E+00	P
EU-155	85.79	61.	-11.	-0.001	107.69	-8.035E-02	
U-235	93.35	75.	49.	0.007	28.64	1.985E+00	
AC-228	93.35	75.	49.	0.007	28.64	2.074E+00	
EU-155	105.91	58.	9.	0.001	121.40	1.057E-01	
EU-154	123.08	73.	-4.	-0.001	313.64	-2.459E-02	
Pa-234	132.29	46.	3.	0.000	282.39	5.108E-02	
U-235	143.29	66.	4.	0.001	289.91	1.028E-01	
U-235	162.94	42.	-2.	0.000	614.91	-8.972E-02	
PB-212	238.45	102.	-19.	-0.003	73.43	-1.816E-01	P
PB-214	244.10	30.	6.	0.001	139.15	3.370E-01	
TL-208	277.31	45.	4.	0.001	130.80	3.138E-01	P
I-131	284.45	38.	9.	0.001	107.64	6.954E-01	
PB-212	300.91	45.	-8.	-0.001	125.10	-1.259E+00	
EU-152	344.29	40.	-2.	0.000	595.08	-3.386E-02	
PB-214	350.79	28.	12.	0.002	70.32	1.871E-01	
I-131	364.50	29.	4.	0.001	216.23	2.752E-02	
BE-7	477.26	20.	-2.	0.000	383.32	-1.283E-01	
CS-134	569.17	22.	3.	0.000	249.14	1.662E-01	
Pa-234	567.03	14.	2.	0.000	273.65	2.290E-01	
BI-214	608.76	23.	19.	0.003	41.91	4.192E-01	
CS-137	662.75	20.	4.	0.001	182.94	4.573E-02	
EU-154	723.84	13.	4.	0.001	123.44	2.548E-01	
BI-212	726.96	20.	-3.	0.000	248.59	-4.089E-01	
PA-234M	765.88	13.	5.	0.001	114.88	2.045E+01	
EU-152	778.89	20.	-4.	-0.001	155.50	-4.128E-01	
BI-212	783.20	10.	3.	0.000	169.55	2.787E+00	
CS-134	793.93	16.	-4.	-0.001	156.81	-5.696E-02	
CS-134	801.42	23.	-3.	0.000	205.46	-5.026E-01	
TL-208	861.30	18.	2.	0.000	272.87	2.484E-01	
EU-154	871.88	12.	5.	0.001	117.25	5.133E-01	
Pa-234	883.60	10.	3.	0.000	162.01	4.250E-01	

TestAmerica Spectrum name: 4_Gamma_20141748.An1

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AC-228	911.06	15.	4.	0.000	164.11	1.774E-01	
EU-152	964.90	25.	-2.	0.000	289.76	-2.611E-01	
AC-228	968.03	16.	4.	0.001	157.92	3.328E-01	
EU-154	995.70	15.	2.	0.000	255.38	3.343E-01	
PA-234M	1000.80	10.	2.	0.000	202.14	4.510E+00	
EU-154	1005.40	16.	-2.	0.000	274.87	-1.869E-01	
EU-152	1111.41	14.	2.	0.000	246.70	2.819E-01	
CO-60	1173.39	13.	-1.	0.000	889.50	-1.069E-02	
CO-60	1331.69	12.	2.	0.000	258.28	4.083E-02	
EU-152	1408.84	8.	4.	0.001	120.85	3.781E-01	
K-40	1461.27	8.	7.	0.001	66.84	1.558E+00	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	-1.2831E-01	-1.2831E-01	3.833E+02%	1.79E+00
K-40	#A	1.5575E+00	1.5575E+00	6.684E+01%	3.43E+00
CO-60	#A	4.0833E-02	4.0833E-02	2.583E+02%	3.90E-01
I-131	#A	7.4204E-02	7.4208E-02	1.076E+02%	2.11E-01
CS-134	#A	2.2618E-02	2.2618E-02	2.491E+02%	4.35E-01
CS-137	#A	4.5734E-02	4.5734E-02	1.829E+02%	2.98E-01
EU-152	#A	1.7813E-01	1.7813E-01	1.208E+02%	7.18E-01
EU-154	#A	3.4797E-01	3.4797E-01	1.023E+02%	2.12E+00
EU-155	#A	1.0575E-01	1.0575E-01	1.214E+02%	4.38E-01
TL-208	#A	-1.2234E-01	-1.2235E-01	2.342E+02%	3.79E-01
PB-210	#A	1.9601E+00	1.9601E+00	4.966E+01%	2.95E+00
PB-212	#A	-1.8157E-01	-1.8157E-01	2.132E+02%	4.89E-01
PB-214	#A	2.1183E-01	2.1183E-01	7.032E+01%	4.38E-01
BI-212	#A	5.4350E-02	5.4350E-02	1.505E+02%	3.67E+00
BI-214	#A	4.1915E-01	4.1915E-01	4.191E+01%	5.45E-01
AC-228	#A	2.3583E-01	2.3583E-01	1.139E+02%	1.04E+00
Pa-234	#A	1.9211E-01	1.9211E-01	1.418E+02%	5.07E-01
TH-234	#A	-1.7832E+00	-1.7832E+00	1.699E+02%	3.29E+00
PA-234M	#A	8.6542E+00	8.6542E+00	1.149E+02%	3.36E+01
U-235	#A	1.0278E-01	1.0278E-01	2.899E+02%	1.04E+00
AM-241	#A	-1.4636E-02	-1.4636E-02	5.442E+02%	2.78E-01

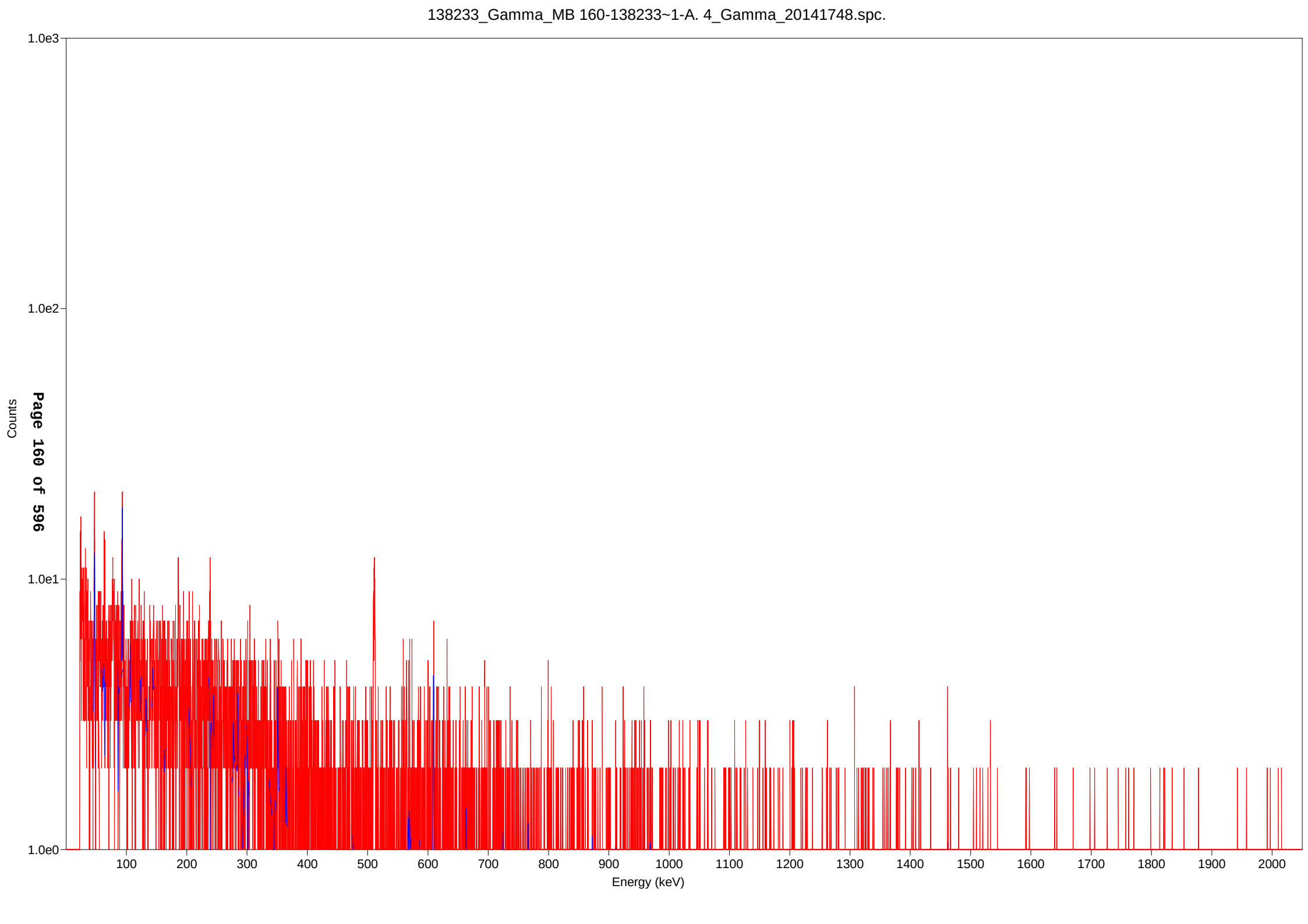
\# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (	37.6 to 1999.4 keV)	1.960E+00	Bq/Sample
Total Decayed Activity (	37.6 to 1999.4 keV)	1.9601245E+00	Bq/Sample

The library has energies which are not separable.


138233_Gamma_MB 160-138233~1-A. 4_Gamma_20141748.spc.
1.0e3
1.0e2
1.0e1
1.0e0
Counts
Page 160 of 596
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)

Test America St. Louis Spectrum ID: 7_Gamma_20142020

Sample Description: 138233_Gamma_LCS 160-138233~2-A
Detector: Ge 7 SN/154
Batch ID: 138233
Work Order Number: Gamma
Lot Number: LCS 160-138233~2-A

Decay to Time: 9/8/2014 12:27 Live Time: 7200 sec
Acquisition Time: 9/8/2014 12:28:19 Real Time: 7426 sec
Analysis Time: 9/8/2014 14:33 Dead Time: 3.04 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 7_Liquid_D=1 25ml.Clb
Efficiency Cal Desc: 7_25mld=1_90101_032612
Efficiency Cal Date: 3/28/2012 09:22
Energy Cal Date: 2/23/2012 08:40
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 7_2014-09-06_0610.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	3.426E-02	7821.0	2.679E+00	2.679E+00	8.911E+00
K-40	8.956E+00	37.2	3.330E+00	3.358E+00	6.138E+00
CO-60	3.849E+02	0.4	1.377E+00	1.848E+01	8.834E-01
I-131	1.031E-01	126.0	1.298E-01	1.299E-01	9.448E-01
CS-134	5.126E-01	88.4	4.531E-01	4.538E-01	8.926E-01
CS-137	3.532E+02	0.4	1.503E+00	1.726E+01	1.274E+00
EU-152	1.575E+01	1.2	1.926E-01	7.876E-01	2.695E+00
EU-154	1.357E+01	39.6	5.379E+00	5.419E+00	1.140E+01
EU-155	1.362E+02	0.4	5.717E-01	7.117E+00	1.290E+00
TL-208	3.563E-01	93.4	3.326E-01	3.331E-01	1.100E+00
PB-210	-2.348E+01	23.5	5.516E+00	5.719E+00	1.583E+01
PB-212	-2.074E-02	1680.0	3.486E-01	3.486E-01	1.159E+00
PB-214	2.743E-01	125.8	3.450E-01	3.452E-01	1.954E+00
BI-212	1.569E+01	39.0	6.113E+00	6.161E+00	1.231E+01
BI-214	4.665E-01	123.4	5.756E-01	5.760E-01	2.199E+00
AC-228	-1.113E-01	209.8	2.336E-01	2.337E-01	6.612E+00
Pa-234	8.244E-01	125.8	1.037E+00	1.038E+00	1.626E+00
TH-234	-3.467E+01	8.4	2.899E+00	3.358E+00	8.112E+00
PA-234M	4.199E+01	136.2	5.718E+01	5.722E+01	1.896E+02
U-235	1.124E+00	97.0	1.090E+00	1.091E+00	2.879E+00
AM-241	9.367E+02	0.2	1.758E+00	4.643E+01	1.860E+00
Total	1.911E+03				

Analyst: Curtis Carey

TestAmerica Spectrum name: 7_Gamma_20142020.An1

Sample description
138233_Gamma_LCS 160-138233~2-A

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20142020.An1

Acquisition information
Start time:	9/8/2014 12:28:19 PM
Live time:	7200
Real time:	7426
Dead time:	3.04 %
Detector ID:	7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Liquid_D=1 25ml.Clb
7_25mld=1_90101_032612

Energy Calibration
Created:	2/23/2012 8:40:56 AM
Zero offset:	0.117 keV
Gain:	0.250 keV/channel
Quadratic:	3.508E-09 keV/channel^2

Efficiency Calibration
Created:	3/28/2012 9:22:15 AM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 1.82 %
Log(Eff):	-7.206837E-02 + (-5.220592E-02*Log(E)) + (-7.214522E-02*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 0.58 %
Log(Eff):	-1.343090E+01 + (5.323811E+00*Log(E)) + (-6.125181E-01*Log(E)^2)

Library Files
Main analysis library:	Client_Routine Short Rev1.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (2000.12keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/8/2014 12:27:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2014-09-06_0610.PBC 9/6/2014 6:10:25 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 30 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1983

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.61	4096.	3.84	1.32	1.105E-01				
43.40	824.	18.02	1.04	1.268E-01				
49.60	7754.	3.94	1.79	1.378E-01				
59.59	360720.	0.19	1.15	1.490E-01	59.54	35.900	9.367E+02	AM241
72.12	133.	71.22	0.86	1.548E-01				
74.52	73.	123.71	0.87	1.551E-01				
88.05	92210.	0.37	1.17	1.536E-01	86.54	30.700	2.709E+02	EU155
92.79	-37.	114.13	0.89	1.521E-01	92.59	5.584	PBC<MDA	TH234
					93.35	5.810	PBC<MDA	U235
					93.35	5.561	PBC<MDA	AC228
92.82	79.	108.24	0.89	1.518E-01	92.59	5.584	PBC<MDA	TH234
					93.35	5.810	1.237E+00	U235
					93.35	5.561	1.292E+00	AC228
92.82	79.	108.24	0.89	1.518E-01	92.59	5.584	PBC<MDA	TH234
					93.35	5.810	1.237E+00	U235
					93.35	5.561	1.292E+00	AC228
102.99	415.	23.50	0.74	1.475E-01				
122.02	13408.	1.28	1.22	1.365E-01	121.78	28.580	4.768E+01	EU152
					121.78	28.580	4.768E+01	EU152
123.08	1295.	12.58	0.92	1.358E-01	123.10	40.790	3.246E+00	EU154
133.23	70.	92.55	0.93	1.293E-01				
136.41	1353.	5.89	0.93	1.273E-01				
143.89	36.	229.84	0.94	1.225E-01	143.79	10.960	PBC<MDA	U235
165.70	923.	11.42	1.43	1.086E-01				
204.62	91.	96.96	1.01	9.113E-02	205.33	5.010	PBC<MDA	U235
209.57	72.	87.03	0.50	8.961E-02				
215.77	145.	61.47	0.39	8.748E-02				
241.80	75.	125.78	1.04	7.948E-02	242.00	7.430	PBC<MDA	PB214
266.81	87.	55.57	0.33	7.314E-02				
338.85	16.	557.88	1.14	5.942E-02	338.32	12.010	PBC<MDA	AC228
562.95	25.	303.85	1.36	3.700E-02	563.24	8.350	PBC<MDA	CS134
					563.24	8.350	1.118E+00	CS134
567.97	163.	48.66	0.29	3.676E-02				
568.88	62.	117.65	1.37	3.662E-02	569.32	15.380	PBC<MDA	CS134

					569.47	8.200	2.891E+00	Pa234
					569.32	15.380	1.541E+00	CS134
					569.47	8.200	2.891E+00	Pa234
568.90	57.	125.83	1.37	3.661E-02	569.32	15.380	PBC<MDA	CS134

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
					569.47	8.200	2.659E+00	Pa234
583.08	78.	93.35	1.38	3.578E-02	583.02	84.500	PBC<MDA	TL208
634.76	65.	57.00	0.72	3.293E-02				
636.90	49.	151.10	1.43	3.282E-02	636.97	7.170	PBC<MDA	I131
661.77	68487.	0.43	1.63	3.160E-02	661.66	85.210	3.532E+02	CS137
667.69	106.	54.72	0.66	3.133E-02				
708.32	38.	85.84	0.46	2.954E-02				
722.98	20.	375.98	1.51	2.892E-02	723.36	20.220	PBC<MDA	EU154
726.94	221.	38.96	0.32	2.877E-02	727.17	7.550	1.413E+01	BI212
755.56	148.	43.34	0.68	2.768E-02				
779.53	59.	129.46	1.56	2.684E-02	778.92	12.940	PBC<MDA	EU152
					778.92	12.940	2.367E+00	EU152
786.27	61.	126.27	1.57	2.662E-02	785.42	1.280	PBC<MDA	BI212
796.23	59.	133.13	1.58	2.626E-02	795.87	85.530	PBC<MDA	CS134
					795.87	85.530	3.664E-01	CS134
802.38	142.	51.21	0.58	2.605E-02	801.95	8.690	8.708E+00	CS134
802.73	91.	88.40	1.58	2.606E-02	801.95	8.690	PBC<MDA	CS134
873.07	286.	39.64	0.62	2.389E-02	873.23	12.270	1.357E+01	EU154
969.35	27.	361.77	1.72	2.145E-02	968.97	17.460	PBC<MDA	AC228
996.33	17.	343.15	1.75	2.083E-02	996.33	10.600	PBC<MDA	EU154
998.86	195.	44.28	0.91	2.077E-02				
1001.00	52.	136.18	1.75	2.073E-02	1001.00	0.837	PBC<MDA	PA234M
1004.77	73.	96.82	1.75	2.065E-02	1004.77	18.010	PBC<MDA	EU154
1059.63	153.	45.73	0.84	1.952E-02				
1072.79	170.	44.30	1.07	1.927E-02				
1097.82	142.	51.51	0.66	1.880E-02				
1111.75	70.	124.50	1.84	1.855E-02	1112.07	13.644	PBC<MDA	EU152
					1112.07	13.644	3.836E+00	EU152
1119.49	51.	142.02	1.85	1.840E-02	1120.29	15.100	PBC<MDA	BI214
1173.42	48201.	0.51	2.05	1.751E-02	1173.24	99.900	3.826E+02	CO60
1332.68	42539.	0.50	2.14	1.526E-02	1332.50	99.980	3.872E+02	CO60
1461.68	95.	31.52	0.33	1.380E-02	1460.83	10.670	8.956E+00	K40
1763.71	14.	120.92	2.29	1.117E-02	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
146.00	36.61	5637.	4096.	3.708E+04	3.84	1.322	-	s
173.16	43.40	6706.	824.	6.502E+03	18.02	1.040	-	s
197.94	49.60	24755.	7992.	5.802E+04	3.00	1.786	-	s
288.08	72.13	5212.	197.	1.272E+03	63.87	0.377	-	sM
297.70	74.53	2217.	72.	4.662E+02	88.91	0.395	-	sc
351.77	88.05	84994.	13692.	8.914E+04	3.13	1.167	-	sM
411.55	102.99	2638.	507.	3.434E+03	15.01	0.736	-	sM
487.58	122.02	4401.	11376.	8.334E+04	1.25	0.918	-	D
532.44	133.21	1664.	61.	4.679E+02	96.18	0.466	-	c
545.14	136.39	3101.	1538.	1.208E+04	7.39	1.278	-	s
662.94	165.70	2435.	744.	6.858E+03	10.06	0.965	-	D
837.88	209.57	1652.	72.	8.035E+02	87.03	0.504	-	c
862.71	215.77	2600.	145.	1.658E+03	61.47	0.388	-	sM
1066.88	266.81	1125.	87.	1.189E+03	55.57	0.329	-	sM
2271.59	567.97	1658.	100.	2.735E+03	58.23	0.292	-	s
2538.74	634.76	598.	64.	1.952E+03	55.22	0.720	-	s
2670.49	667.69	1036.	106.	3.394E+03	54.72	0.660	-	s
2833.00	708.32	513.	38.	1.287E+03	85.84	0.456	-	sc
3021.99	755.56	1190.	148.	5.346E+03	43.34	0.681	-	sM
3209.24	802.38	1561.	51.	1.974E+03	109.54	0.581	-	sc
3995.16	998.86	2352.	87.	4.181E+03	79.68	1.748	-	sc

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
4238.25	1059.63	1355.	153.	7.838E+03	45.73	0.838	- s
4290.89	1072.79	1507.	170.	8.840E+03	44.30	1.066	- s
4391.01	1097.82	1478.	142.	7.526E+03	51.51	0.659	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	189.63	47.52	18884.	-954.	-0.132	22.03	0.836s
AM-241	237.93	59.59	23440.	360720.	50.100	0.19	1.155s
TH-234	245.57	61.50	5155.	-1441.	-0.200	7.90	0.854s
EU-155	351.76	88.05	15035.	78522.	10.906	0.42	0.880
TH-234	370.75	92.79	4113.	-37.	-0.005	114.13	0.886s
U-235	372.97	93.35	3578.	79.	0.011	108.24	0.887D
AC-228	372.97	93.35	3578.	79.	0.011	108.24	0.887D
EU-155	418.45	104.72	3753.	-121.	-0.017	72.27	0.900
EU-152	487.68	122.02	4566.	11843.	1.645	1.22	0.918s
EU-154	491.98	123.10	12617.	1295.	0.180	12.58	0.919D
U-235	575.17	143.89	3495.	36.	0.005	229.84	0.941s
U-235	653.12	163.38	4868.	-20.	-0.003	482.16	0.962D
U-235	818.11	204.62	3819.	91.	0.013	96.96	1.007
PB-214	966.82	241.80	4396.	75.	0.010	125.78	1.045s
TL-208	1110.43	277.70	4094.	-13.	-0.002	690.11	1.081
I-131	1137.08	284.36	4374.	-36.	-0.005	263.45	1.089s
PB-214	1192.09	298.11	2491.	-53.	-0.007	132.95	1.100s
PB-212	1205.65	301.50	3698.	-18.	-0.002	478.98	1.105s
AC-228	1355.04	338.85	4208.	16.	0.002	557.88	1.144
I-131	1456.38	364.18	4283.	-46.	-0.006	201.61	1.170s
CS-134	2251.50	562.95	2845.	25.	0.003	303.85	1.364s
CS-134	2275.22	568.88	2671.	62.	0.009	117.65	1.369s
Pa-234	2275.31	568.90	2586.	57.	0.008	125.83	1.370s
TL-208	2332.04	583.08	2583.	78.	0.011	93.35	1.382s
BI-214	2435.05	608.83	2820.	-49.	-0.007	230.55	1.407s
I-131	2547.33	636.90	2687.	49.	0.007	151.10	1.433s
CS-137	2646.80	661.77	2750.	68487.	9.512	0.43	1.634
EU-154	2891.64	722.98	2781.	20.	0.003	375.98	1.511s
BI-212	2907.50	726.94	1660.	221.	0.031	38.96	0.325s
EU-152	3117.85	779.53	2907.	59.	0.008	129.46	1.561s
BI-212	3144.82	786.27	2941.	61.	0.008	126.27	1.567

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-134	3184.65	796.23	3083.	59.	0.008	133.13	1.576s
CS-134	3210.68	802.73	3161.	91.	0.013	88.40	1.581s
EU-154	3492.02	873.07	2607.	286.	0.040	39.64	0.624s
Pa-234	3525.25	881.38	4156.	-56.	-0.008	163.90	1.649s
Pa-234	3526.79	881.76	3681.	-63.	-0.009	136.17	1.651s
AC-228	3649.74	912.50	4510.	-45.	-0.006	209.82	1.675s
EU-152	3859.24	964.87	5125.	-101.	-0.014	100.48	1.719s
AC-228	3877.16	969.35	4606.	27.	0.004	361.77	1.724
EU-154	3985.06	996.33	1647.	17.	0.002	343.15	1.746D
PA-234M	4003.73	1001.00	2525.	52.	0.007	136.18	1.750D
EU-154	4018.84	1004.77	2449.	73.	0.010	96.82	1.753D
EU-152	4446.75	1111.75	3749.	70.	0.010	124.50	1.839s
BI-214	4477.68	1119.49	3108.	51.	0.007	142.02	1.846s
CO-60	4693.40	1173.42	1647.	48201.	6.695	0.51	2.048
CO-60	5330.42	1332.68	410.	42539.	5.908	0.50	2.139
EU-152	5633.85	1408.54	254.	-9.	-0.001	255.87	2.059s
K-40	5846.40	1461.68	179.	95.	0.013	31.52	0.335s
BI-214	7054.43	1763.71	163.	14.	0.002	120.92	2.290

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	3.4258E-02				5.31E+01	
			477.60	3.426E-02	%(	8.911E+00 7.82E+03	1.05E+01 G
K-40	N	8.9563E+00				4.66E+11	
			1460.83	8.956E+00	(P	6.138E+00 3.15E+01	1.07E+01 G
CO-60	F	3.8488E+02				1.93E+03	
			1332.50	3.872E+02	(	8.834E-01 5.03E-01	1.00E+02 G
			1173.24	3.826E+02	(	1.522E+00 5.09E-01	9.99E+01 G
I-131	I	1.0306E-01				8.02E+00	
			364.48	-1.413E-01	?(	9.448E-01 2.02E+02	8.17E+01 G
			284.30	-1.167E+00	&	1.019E+01 2.63E+02	6.14E+00 G
			636.97	2.888E+00	&(	1.447E+01 1.51E+02	7.17E+00 G
CS-134	I	5.1255E-01				7.54E+02	
			604.71	-2.217E-02	%(	8.926E-01 1.21E+03	9.76E+01 G
			795.87	3.664E-01	?(	1.616E+00 1.33E+02	8.55E+01 G
			569.32	1.541E+00	&(	6.007E+00 1.18E+02	1.54E+01 G
			801.95	5.555E+00	(	1.623E+01 8.84E+01	8.69E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			563.24	1.118E+00	&(	1.130E+01	3.04E+02	8.35E+00 G
CS-137	I	3.5317E+02					1.10E+04	
			661.66	3.532E+02	(	1.274E+00	4.26E-01	8.52E+01 G
EU-152	F	1.5749E+01					4.94E+03	
			344.29	-1.627E-02	%(	2.695E+00	4.98E+03	2.65E+01 G
			121.78	4.211E+01	*(	1.129E+00	1.22E+00	2.86E+01 G
			778.92	2.367E+00	?(	1.015E+01	1.29E+02	1.29E+01 G
			964.11	-4.466E+00	+	1.484E+01	1.00E+02	1.46E+01 G
			1112.07	3.836E+00	&(	1.581E+01	1.24E+02	1.36E+01 G
			1408.00	-4.092E-01	&	3.545E+00	2.56E+02	2.10E+01 G
EU-154	I	1.3568E+01					3.14E+03	
			873.23	1.357E+01	(	1.140E+01	3.96E+01	1.23E+01 G
			123.10	3.246E+00	-	1.319E+00	1.26E+01	4.08E+01 G
			1274.54	-4.770E-02	&	2.173E+00	1.34E+03	3.52E+01 G
			723.36	4.719E-01	-	5.901E+00	3.76E+02	2.02E+01 G
			1004.77	2.720E+00	-	8.716E+00	9.68E+01	1.80E+01 G
			996.33	1.055E+00	-	1.207E+01	3.43E+02	1.06E+01 G
EU-155	I	1.3622E+02					1.81E+03	
			105.31	-5.410E-01	(	1.290E+00	7.23E+01	2.12E+01 G
			86.54	2.307E+02	(	1.686E+00	4.20E-01	3.07E+01 G
TL-208	N	3.5629E-01					6.98E+02	
			583.02	3.563E-01	&(	1.100E+00	9.34E+01	8.45E+01 G
			277.28	-4.082E-01	-	9.359E+00	6.90E+02	6.31E+00 G
			860.56	-1.710E-02	%	1.065E+01	1.87E+04	1.24E+01 G
PB-210	N	-2.3482E+01					8.14E+03	
			46.54	-2.348E+01	?(P	1.583E+01	2.20E+01	4.25E+00 G
PB-212	N	-2.0744E-02					6.98E+02	
			238.63	-2.074E-02	%(	1.159E+00	1.68E+03	4.33E+01 G
			300.03	-1.152E+00	&	1.834E+01	4.79E+02	3.28E+00 G
PB-214	N	2.7425E-01					5.84E+05	
			351.93	-1.946E-02	%(	1.954E+00	3.02E+03	3.76E+01 G
			295.09	-5.729E-01	+	2.526E+00	1.33E+02	1.93E+01 G
			242.00	1.761E+00	&(	7.330E+00	1.26E+02	7.43E+00 G
BI-212	N	1.5690E+01					6.98E+02	
			727.17	1.413E+01	(	1.231E+01	3.90E+01	7.55E+00 G
			785.42	2.489E+01	(	1.041E+02	1.26E+02	1.28E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BI-214	N	4.6649E-01					5.84E+05	
			609.31	-4.351E-01	?(P	2.199E+00	2.31E+02	4.61E+01 G
			1120.29	2.527E+00	?(P	1.312E+01	1.42E+02	1.51E+01 G
			1764.49	1.145E+00	(P	5.015E+00	1.21E+02	1.54E+01 G
AC-228	N	-1.1133E-01					2.10E+03	
			911.07	-9.505E-01	?(	6.612E+00	2.10E+02	2.90E+01 G
			968.97	9.855E-01	(	1.183E+01	3.62E+02	1.75E+01 G
			338.32	3.204E-01	(	5.936E+00	5.58E+02	1.20E+01 G
							Energy	duplication
			93.35	1.292E+00		4.629E+00	1.08E+02	5.56E+00 XA
Pa-234	N	8.2438E-01					1.63E+12	
			131.29	-1.147E-02	&(	1.626E+00	4.26E+03	1.80E+01 G
			569.47	2.659E+00	&(	1.109E+01	1.26E+02	8.20E+00 G
			946.02	-4.325E-01	&	1.449E+01	1.01E+03	1.34E+01 G
			883.24	-3.878E+00	&	1.749E+01	1.36E+02	9.60E+00 G
			880.53	-5.455E+00	&	2.963E+01	1.64E+02	6.00E+00 G
TH-234	N	-3.4666E+01					1.63E+12	
			63.29	-3.467E+01	?(P	8.112E+00	7.90E+00	3.81E+00 G
			92.59	-5.976E-01	+ P	4.931E+00	1.14E+02	5.58E+00 G
PA-234M	N	4.1989E+01					1.63E+12	
			1001.00	4.199E+01	(	1.896E+02	1.36E+02	8.37E-01 G
			766.41	-8.719E+00	%	4.466E+02	1.54E+03	2.94E-01 G
U-235	N	1.1243E+00					2.57E+11	
			143.79	3.774E-01	?(	2.879E+00	2.30E+02	1.10E+01 G
			205.33	2.758E+00	(	8.843E+00	9.70E+01	5.01E+00 G
			163.38	-5.093E-01	+	8.150E+00	4.82E+02	5.08E+00 G
							Energy	duplication
			93.35	1.237E+00		4.431E+00	1.08E+02	5.81E+00 X
AM-241	T	9.3665E+02					1.58E+05	
			59.54	9.367E+02	*(	1.860E+00	1.88E-01	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went
negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide
failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.

= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	47.52	18884.	-954.	-0.132	22.03	-2.348E+01	P
TH-234	61.50	5155.	-1441.	-0.200	7.90	-3.467E+01	P
TH-234	92.79	4113.	-37.	-0.005	114.13	-5.976E-01	P
EU-152	122.02	4566.	11843.	1.645	1.22	4.211E+01	
PB-214	241.80	4396.	75.	0.010	125.78	1.761E+00	
I-131	284.36	4374.	-36.	-0.005	263.45	-1.167E+00	
PB-214	298.11	2491.	-53.	-0.007	132.95	-5.729E-01	
PB-212	301.50	3698.	-18.	-0.002	478.98	-1.152E+00	
I-131	364.18	4283.	-46.	-0.006	201.61	-1.413E-01	
CS-134	562.95	2845.	25.	0.003	303.85	1.118E+00	
CS-134	568.88	2671.	62.	0.009	117.65	1.541E+00	
Pa-234	568.90	2586.	57.	0.008	125.83	2.659E+00	
I-131	636.90	2687.	49.	0.007	151.10	2.888E+00	
EU-152	779.53	2907.	59.	0.008	129.46	2.367E+00	
CS-134	796.23	3083.	59.	0.008	133.13	3.664E-01	
CS-134	802.73	3161.	91.	0.013	88.40	5.555E+00	
Pa-234	881.38	4156.	-56.	-0.008	163.90	-5.455E+00	
Pa-234	881.76	3681.	-63.	-0.009	136.17	-3.878E+00	
EU-152	964.87	5125.	-101.	-0.014	100.48	-4.466E+00	
EU-152	1111.75	3749.	70.	0.010	124.50	3.836E+00	
EU-152	1408.54	254.	-9.	-0.001	255.87	-4.092E-01	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	3.4258E-02	3.4258E-02	7.821E+03%	8.91E+00
K-40		8.9563E+00	8.9563E+00	3.718E+01%	6.14E+00
CO-60		3.8488E+02	3.8488E+02	3.579E-01%	8.83E-01
I-131	#A	1.0305E-01	1.0306E-01	1.260E+02%	9.45E-01
CS-134	#A	5.1255E-01	5.1255E-01	8.840E+01%	8.93E-01
CS-137		3.5317E+02	3.5317E+02	4.257E-01%	1.27E+00
EU-152	#C	1.5749E+01	1.5749E+01	1.223E+00%	2.70E+00
EU-154		1.3568E+01	1.3568E+01	3.964E+01%	1.14E+01
EU-155	C	1.3622E+02	1.3622E+02	4.197E-01%	1.29E+00
TL-208	A	3.5629E-01	3.5629E-01	9.335E+01%	1.10E+00
PB-210	#A	-2.3482E+01	-2.3482E+01	2.349E+01%	1.58E+01
PB-212	#A	-2.0744E-02	-2.0744E-02	1.680E+03%	1.16E+00
PB-214	#A	2.7425E-01	2.7425E-01	1.258E+02%	1.95E+00
BI-212		1.5690E+01	1.5690E+01	3.896E+01%	1.23E+01
BI-214	A	4.6649E-01	4.6649E-01	1.234E+02%	2.20E+00
AC-228	A	-1.1133E-01	-1.1133E-01	2.098E+02%	6.61E+00
Pa-234	#A	8.2438E-01	8.2438E-01	1.258E+02%	1.63E+00
TH-234	#A	-3.4666E+01	-3.4666E+01	8.364E+00%	8.11E+00
PA-234M	A	4.1989E+01	4.1989E+01	1.362E+02%	1.90E+02
U-235	A	1.1243E+00	1.1243E+00	9.696E+01%	2.88E+00
AM-241	#	9.3665E+02	9.3665E+02	1.877E-01%	1.86E+00

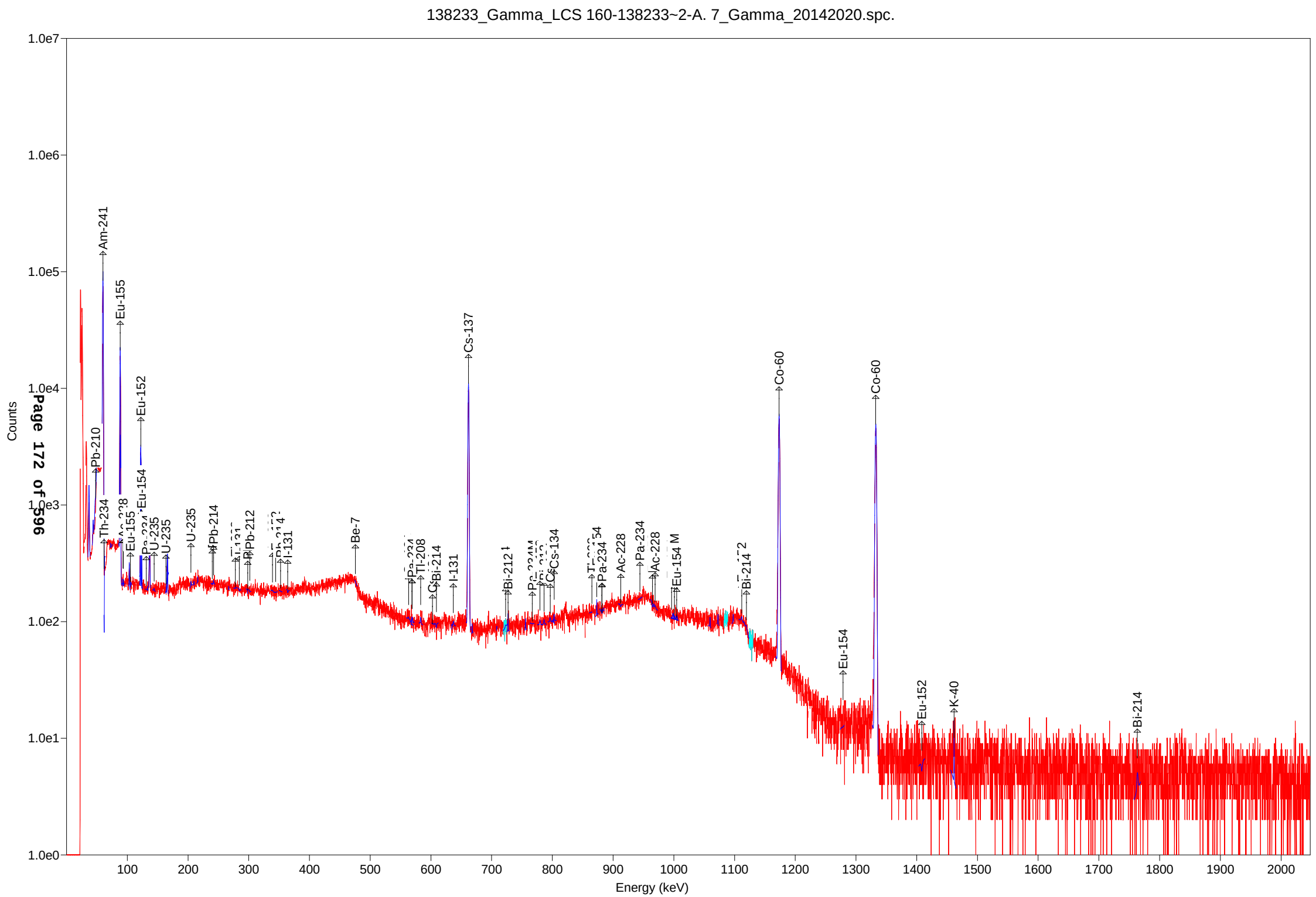
- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (1059.6 to 2000.1 keV) 1.713E+03 Bq/Sample
Total Decayed Activity (1059.6 to 2000.1 keV) 1.7129211E+03 Bq/Sample

The library has energies which are not separable.

138233_Gamma_LCS 160-138233~2-A. 7_Gamma_20142020.spc.



Test America St. Louis Spectrum ID: 12_Gamma_20141994

Sample Description: 138233_Gamma_680-102600-A-6-F
Detector: Ge12 S/N10034336
Batch ID: 138233
Work Order Number: Gamma
Lot Number: 680-102600-A-6-F

Decay to Time: 9/8/2014 12:04 Live Time: 7200 sec
Acquisition Time: 9/8/2014 12:05:12 Real Time: 7215 sec
Analysis Time: 9/8/2014 14:05 Dead Time: 0.21 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Liquid_D=1 25ml.Clb
Efficiency Cal Desc: Ge12_25mLd=1Cal_85520-334_090111
Efficiency Cal Date: 9/2/2011 07:07
Energy Cal Date: 2/28/2012 13:26
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 12_2014-09-06_0552.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-8.805E-02	383.7	3.379E-01	3.379E-01	1.184E+00
K-40	1.766E+01	7.1	1.256E+00	1.518E+00	2.014E+00
CO-60	-7.749E-03	189.2	1.466E-02	1.467E-02	2.093E-01
I-131	3.491E-02	204.6	7.144E-02	7.146E-02	1.220E-01
CS-134	3.316E-02	63.5	2.104E-02	2.111E-02	1.872E-01
CS-137	7.045E-01	13.7	9.621E-02	1.022E-01	1.784E-01
EU-152	1.739E-01	48.7	8.473E-02	8.516E-02	3.323E-01
EU-154	-1.966E-01	212.7	4.182E-01	4.183E-01	1.463E+00
EU-155	1.852E-01	34.5	6.382E-02	6.456E-02	3.016E-01
TL-208	4.169E-01	18.1	7.529E-02	7.801E-02	1.758E-01
PB-210	3.479E+00	23.2	8.084E-01	8.539E-01	2.336E+00
PB-212	9.740E-01	10.6	1.034E-01	1.162E-01	2.547E-01
PB-214	5.173E-01	22.0	1.137E-01	1.165E-01	3.706E-01
BI-212	2.075E+00	33.1	6.876E-01	6.950E-01	1.653E+00
BI-214	9.230E-01	18.3	1.686E-01	1.746E-01	3.981E-01
AC-228	1.783E+00	12.9	2.303E-01	2.460E-01	3.367E-01
Pa-234	3.328E-02	108.1	3.597E-02	3.601E-02	4.296E-01
TH-234	1.848E+00	47.3	8.734E-01	8.789E-01	2.378E+00
PA-234M	6.043E+00	96.0	5.799E+00	5.806E+00	1.979E+01
U-235	1.826E-01	111.9	2.044E-01	2.046E-01	8.321E-01
AM-241	3.595E-04	19180.0	6.894E-02	6.894E-02	2.357E-01
Total	3.707E+01				

Analyst: Curtis Carey

TestAmerica, Inc Spectrum name: 12_Gamma_20141994.An1

Sample description
138233_Gamma_680-102600-A-6-F

Spectrum Filename: C:\User\SPC\Det12\12_Gamma_20141994.An1

Acquisition information
Start time: 9/8/2014 12:05:12 PM
Live time: 7200
Real time: 7215
Dead time: 0.21 %
Detector ID: 12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_Liquid_D=1 25ml.Clb
Ge12_25mLd=1Cal_85520-334_090111

Energy Calibration
Created: 2/28/2012 1:26:42 PM
Zero offset: 0.049 keV
Gain: 0.250 keV/channel
Quadratic: -3.945E-08 keV/channel^2

Efficiency Calibration
Created: 9/2/2011 7:07:23 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 2.02 %
Log(Eff): -6.442716E-01 + (-8.678082E-03*Log(E)) + (-6.444773E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.33 %
Log(Eff): -1.236768E+01 + (4.728110E+00*Log(E)) + (-5.423915E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.58keV)
Stop channel: 8000 (1999.36keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/8/2014 12:04:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2014-09-06_0552.PBC 9/6/2014 5:52:55 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 21 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.2167

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.49	238.	11.38	0.99	1.097E-01	46.54	4.250	3.479E+00	PB210
56.87	36.	46.22	0.70	1.202E-01				
63.10	178.	18.91	1.25	1.239E-01	63.29	3.810	2.564E+00	TH234
74.73	140.	16.39	0.92	1.268E-01				
77.19	210.	11.50	0.92	1.270E-01				
87.19	52.	46.90	0.93	1.263E-01	86.54	30.700	PBC<MDA	EU155
92.50	7.	17.00	0.93	1.250E-01	92.59	5.584	PBC<MDA	TH234
					93.35	5.810	PBC<MDA	U235
92.78	168.	13.98	0.93	1.248E-01	92.59	5.584	PBC<MDA	TH234
93.26	88.	27.80	0.93	1.248E-01	93.35	5.561	1.752E+00	AC228
105.44	34.	50.48	0.95	1.210E-01	105.31	21.200	PBC<MDA	EU155
143.91	-2.	71.65	0.98	1.038E-01	143.79	10.960	PBC<MDA	U235
					143.79	10.960	PBC<MDA	U235
163.55	15.	96.49	1.00	9.454E-02	163.38	5.080	PBC<MDA	U235
					163.38	5.080	PBC<MDA	U235
205.42	12.	128.92	1.04	8.065E-02	205.33	5.010	PBC<MDA	U235
					205.33	5.010	3.997E-01	U235
238.56	272.	8.59	1.12	7.256E-02	238.63	43.300	9.740E-01	PB212
277.73	23.	64.27	1.11	6.507E-02	277.28	6.310	PBC<MDA	TL208
281.74	2.	546.34	1.11	6.389E-02	284.30	6.140	PBC<MDA	I131
					284.30	6.140	6.177E-02	I131
295.37	27.	31.25	1.12	6.215E-02	295.09	19.300	PBC<MDA	PB214
					295.09	19.300	PBC<MDA	PB214
299.49	29.	46.35	0.32	6.139E-02	300.03	3.280	PBC<MDA	PB212
338.09	76.	24.12	0.37	5.609E-02	338.32	12.010	1.567E+00	AC228
345.43	22.	48.72	1.17	5.535E-02	344.29	26.500	PBC<MDA	EU152
351.79	153.	13.28	1.07	5.445E-02	351.93	37.600	7.435E-01	PB214
					351.93	37.600	7.435E-01	PB214
364.23	4.	284.83	1.19	5.299E-02	364.48	81.700	PBC<MDA	I131
					364.48	81.700	1.227E-02	I131

568.85	7.	134.10	1.37	3.712E-02	569.32	15.380	PBC<MDA CS134
					569.47	8.200	3.129E-01 Pa234
					569.32	15.380	1.668E-01 CS134
					569.47	8.200	3.129E-01 Pa234

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
568.85	7.	134.19	1.37	3.712E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	3.127E-01	Pa234
583.30	124.	13.66	0.97	3.639E-02	583.02	84.500	4.224E-01	TL208
609.20	102.	12.93	1.05	3.509E-02	609.31	46.090	8.784E-01	BI214
636.90	5.	204.65	1.43	3.381E-02	636.97	7.170	PBC<MDA	I131
					636.97	7.170	2.699E-01	I131
662.05	159.	12.15	0.97	3.272E-02	661.66	85.210	7.045E-01	CS137
726.96	27.	33.14	1.51	3.021E-02	727.17	7.550	1.667E+00	BI212
785.24	12.	71.06	1.56	2.827E-02	785.42	1.280	PBC<MDA	BI212
802.75	13.	77.55	1.57	2.776E-02	801.95	8.690	PBC<MDA	CS134
					801.95	8.690	7.320E-01	CS134
860.38	9.	88.85	1.62	2.610E-02	860.56	12.420	PBC<MDA	TL208
884.50	1.	648.34	1.64	2.551E-02	883.24	9.600	PBC<MDA	Pa234
					883.24	9.600	7.193E-02	Pa234
910.99	97.	12.92	0.81	2.482E-02	911.07	29.000	1.872E+00	AC228
943.66	1.	729.40	1.69	2.400E-02	946.02	13.400	PBC<MDA	Pa234
					946.02	13.400	3.814E-02	Pa234
968.67	27.	37.54	1.71	2.349E-02	968.97	17.460	PBC<MDA	AC228
1001.27	8.	95.96	1.73	2.281E-02	1001.00	0.837	PBC<MDA	PA234M
1119.82	24.	22.50	0.33	2.060E-02	1120.29	15.100	PBC<MDA	BI214
1174.21	2.	353.46	1.87	1.975E-02	1173.24	99.900	PBC<MDA	CO60
1408.07	3.	160.23	2.05	1.666E-02	1408.00	21.005	PBC<MDA	EU152
1460.55	218.	6.44	0.71	1.609E-02	1460.83	10.670	1.766E+01	K40
1764.02	-2.	51.97	2.30	1.342E-02	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
227.09	56.87	82.	36.	2.953E+02	39.89	0.696	-	s
298.63	74.77	190.	120.	9.461E+02	20.86	1.239	-	s
308.46	77.23	197.	184.	1.448E+03	15.46	0.675	-	s
1406.00	351.79	180.	33.	6.122E+02	59.45	1.067	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV	
PB-210	185.58	46.49	264.	117.	0.016	11.38	0.993	s
TH-234	252.05	63.12	281.	63.	0.009	19.26	1.231	s
EU-155	348.25	87.19	272.	52.	0.007	46.90	0.928	s
TH-234	369.85	92.59	330.	7.	0.001	17.00	0.933	D
AC-228	372.89	93.35	252.	88.	0.012	27.80	0.934	D

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	372.89	93.35	193.	168.	0.023	13.98	0.934D
EU-155	421.21	105.44	129.	34.	0.005	50.48	0.946
EU-152	492.02	123.16	139.	-18.	-0.002	96.74	0.961s
EU-154	492.63	123.31	132.	-7.	-0.001	227.62	0.963s
Pa-234	525.56	131.55	157.	-17.	-0.002	108.08	0.970s
U-235	574.96	143.91	197.	-2.	0.000	71.65	0.982s
U-235	653.48	163.55	127.	15.	0.002	96.49	1.001s
U-235	820.86	205.42	107.	12.	0.002	128.92	1.040
PB-212	953.33	238.56	139.	220.	0.031	8.59	1.118
TL-208	1109.89	277.73	95.	23.	0.003	64.27	1.107
I-131	1125.92	281.74	44.	2.	0.000	546.34	1.114s
PB-214	1180.41	295.37	125.	27.	0.004	31.25	1.124s
PB-212	1196.89	299.49	47.	29.	0.004	46.35	0.323s
AC-228	1351.21	338.09	60.	76.	0.011	24.12	0.367s
EU-152	1380.57	345.43	48.	22.	0.003	48.72	1.169s
PB-214	1406.23	351.85	124.	76.	0.011	14.00	1.176
I-131	1455.73	364.23	57.	4.	0.001	284.83	1.187s
BE-7	1912.90	478.57	59.	-3.	0.000	383.73	1.289s
CS-134	2273.93	568.85	39.	7.	0.001	134.19	1.370s
Pa-234	2273.93	568.85	39.	7.	0.001	134.10	1.371s
TL-208	2331.74	583.30	60.	94.	0.013	13.66	0.969s
CS-134	2416.31	604.45	88.	-12.	-0.002	110.54	1.401s
BI-214	2435.31	609.20	88.	102.	0.014	12.93	1.046s
I-131	2546.10	636.90	44.	5.	0.001	204.65	1.429s
CS-137	2646.69	662.05	50.	142.	0.020	12.15	0.971s
EU-154	2891.21	723.19	56.	-10.	-0.001	115.58	1.503s
BI-212	2906.32	726.96	27.	27.	0.004	33.14	1.507
PA-234M	3059.14	765.17	33.	-1.	0.000	704.58	1.540s
BI-212	3139.42	785.24	29.	12.	0.002	71.06	1.556
CS-134	3209.48	802.75	42.	13.	0.002	77.55	1.570s
TL-208	3440.04	860.38	27.	9.	0.001	88.85	1.618s
EU-154	3493.43	873.73	43.	-4.	-0.001	212.75	1.629s
Pa-234	3536.54	884.50	33.	1.	0.000	648.34	1.637s
AC-228	3642.49	910.99	10.	97.	0.013	12.92	0.814s
Pa-234	3773.22	943.66	20.	1.	0.000	729.40	1.688s
EU-152	3854.62	964.00	49.	-1.	0.000	860.42	1.703s
AC-228	3873.31	968.67	36.	27.	0.004	37.54	1.707s
PA-234M	4003.73	1001.27	28.	8.	0.001	95.96	1.733s
EU-154	4014.72	1004.02	35.	-6.	-0.001	141.85	1.736s
EU-152	4444.43	1111.40	27.	-1.	0.000	593.52	1.821s
BI-214	4478.15	1119.82	29.	24.	0.003	22.50	0.328s
CO-60	4695.80	1174.21	30.	2.	0.000	353.46	1.869s
EU-154	5111.58	1278.09	23.	-3.	0.000	221.86	1.946s
CO-60	5335.79	1334.10	26.	-4.	-0.001	189.21	1.990s
EU-152	5631.92	1408.07	11.	3.	0.000	160.23	2.046s
K-40	5842.02	1460.55	23.	218.	0.030	6.44	0.708s
BI-214	7057.26	1764.02	26.	-2.	0.000	51.97	2.297s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Peak Code	Peak MDA Value Bq/Sample	COMMENTS
BE-7	C	-8.8051E-02				5.31E+01	
			477.60	-8.805E-02	?(	1.184E+00 3.84E+02 1.05E+01	G
K-40	N	1.7662E+01				4.66E+11	
			1460.83	1.766E+01	(P	2.014E+00 6.44E+00 1.07E+01	G
CO-60	F	-7.7491E-03				1.93E+03	
			1332.50	-3.126E-02	?(	2.093E-01 1.89E+02 1.00E+02	G
			1173.24	1.578E-02	?(	1.995E-01 3.53E+02 9.99E+01	G
I-131	I	3.4909E-02				8.02E+00	
			364.48	1.227E-02	?(	1.220E-01 2.85E+02 8.17E+01	G
			284.30	6.177E-02	&(	1.198E+00 5.46E+02 6.14E+00	G
			636.97	2.699E-01	&(	1.929E+00 2.05E+02 7.17E+00	G
CS-134	I	3.3164E-02				7.54E+02	
			604.71	-5.008E-02	?(	1.872E-01 1.11E+02 9.76E+01	G
			795.87	-1.982E-03	%	1.789E-01 2.50E+03 8.55E+01	G
			569.32	1.667E-01	?(	7.725E-01 1.34E+02 1.54E+01	G
			801.95	7.320E-01	&(	1.900E+00 7.75E+01 8.69E+00	G
			563.24	4.265E-03	%	1.466E+00 9.58E+03 8.35E+00	G
CS-137	I	7.0446E-01				1.10E+04	
			661.66	7.045E-01	@(P	1.784E-01 1.22E+01 8.52E+01	G
EU-152	F	1.7392E-01				4.94E+03	
			344.29	2.120E-01	?(	3.323E-01 4.87E+01 2.65E+01	G
			121.78	-7.576E-02	&	2.457E-01 9.67E+01 2.86E+01	G
			778.92	-6.500E-03	%	1.234E+00 5.29E+03 1.29E+01	G
			964.11	-4.656E-02	-	1.422E+00 8.60E+02 1.46E+01	G
			1112.07	-6.094E-02	-	1.311E+00 5.94E+02 1.36E+01	G
			1408.00	1.259E-01	?(	7.299E-01 1.60E+02 2.10E+01	G
EU-154	I	-1.9658E-01				3.14E+03	
			873.23	-1.966E-01	?(	1.463E+00 2.13E+02 1.23E+01	G
			123.10	-2.168E-02	+	1.685E-01 2.28E+02 4.08E+01	G
			1274.54	-6.828E-02	+	5.414E-01 2.22E+02 3.52E+01	G
			723.36	-2.157E-01	+	8.500E-01 1.16E+02 2.02E+01	G
			1004.77	-2.091E-01	+	1.029E+00 1.42E+02 1.80E+01	G
			996.33	1.264E-02	%	1.422E+00 3.05E+03 1.06E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-155	I	1.8524E-01					1.81E+03	
			105.31	1.835E-01	(	3.016E-01	5.05E+01	2.12E+01 G
			86.54	1.865E-01	&(	2.850E-01	4.69E+01	3.07E+01 G
TL-208	N	4.1693E-01					6.98E+02	
			583.02	4.224E-01	(P	1.758E-01	1.37E+01	8.45E+01 G
			277.28	7.691E-01	+	1.631E+00	6.43E+01	6.31E+00 G
			860.56	3.794E-01	?(	1.144E+00	8.88E+01	1.24E+01 G
PB-210	N	3.4794E+00					8.14E+03	
			46.54	3.479E+00	(P	2.336E+00	1.14E+01	4.25E+00 G
PB-212	N	9.7401E-01					6.98E+02	
			238.63	9.740E-01	(P	2.547E-01	8.59E+00	4.33E+01 G
			300.03	2.023E+00	+	2.383E+00	4.64E+01	3.28E+00 G
PB-214	N	5.1731E-01					5.84E+05	
			351.93	5.173E-01	(P	3.706E-01	1.40E+01	3.76E+01 G
			295.09	3.088E-01	- P	6.345E-01	3.12E+01	1.93E+01 G
			242.00	-3.106E-01	% P	2.114E+00	1.19E+03	7.43E+00 G
BI-212	N	2.0748E+00					6.98E+02	
			727.17	1.667E+00	?(	1.653E+00	3.31E+01	7.55E+00 G
			785.42	4.478E+00	(	1.059E+01	7.11E+01	1.28E+00 G
BI-214	N	9.2298E-01					5.84E+05	
			609.31	8.784E-01	(P	3.981E-01	1.29E+01	4.61E+01 G
			1120.29	1.059E+00	(P	1.247E+00	2.25E+01	1.51E+01 G
			1764.49	-1.602E-01	- P	1.764E+00	5.20E+01	1.54E+01 G
AC-228	N	1.7827E+00					2.10E+03	
			911.07	1.872E+00	@(	3.367E-01	1.29E+01	2.90E+01 G
			968.97	8.989E-01	-	1.044E+00	3.75E+01	1.75E+01 G
			338.32	1.567E+00	(	8.001E-01	2.41E+01	1.20E+01 G
								Energy duplication
			93.35	1.752E+00		1.536E+00	2.78E+01	5.56E+00 XA
Pa-234	N	3.3281E-02					1.63E+12	
			131.29	-1.183E-01	?(	4.296E-01	1.08E+02	1.80E+01 G
			569.47	3.129E-01	?(	1.449E+00	1.34E+02	8.20E+00 G
			946.02	3.814E-02	?(	1.024E+00	7.29E+02	1.34E+01 G
			883.24	7.193E-02	?(	1.676E+00	6.48E+02	9.60E+00 G
			880.53	-4.872E-02	%	2.418E+00	1.36E+03	6.00E+00 G
TH-234	N	1.8479E+00					1.63E+12	
			63.29	1.848E+00	(P	2.378E+00	1.93E+01	3.81E+00 G
			92.59	1.458E-01	- P	1.737E+00	1.70E+01	5.58E+00 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234M	N 6.0429E+00					1.63E+12	
		1001.00	6.043E+00	?(	1.979E+01	9.60E+01	8.37E-01 G
		766.41	-1.895E+00	-	4.806E+01	7.05E+02	2.94E-01 G
U-235	N 1.8261E-01					2.57E+11	
		143.79	-2.721E-02	(P	8.321E-01	7.17E+01	1.10E+01 G
		205.33	3.997E-01	?(	1.747E+00	1.29E+02	5.01E+00 G
		163.38	4.212E-01	?(P	1.596E+00	9.65E+01	5.08E+00 G
							Energy duplication
		93.35	3.227E+00	*	1.293E+00	1.40E+01	5.81E+00 X
AM-241	T 3.5947E-04					1.58E+05	
		59.54	3.595E-04	%(	2.357E-01	1.92E+04	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
EU-155	87.19	272.	52.	0.007	46.90	1.865E-01	
U-235	93.35	193.	168.	0.023	13.98	3.227E+00	
EU-155	105.44	129.	34.	0.005	50.48	1.835E-01	
EU-152	123.16	139.	-18.	-0.002	96.74	-7.576E-02	
EU-154	123.31	132.	-7.	-0.001	227.62	-2.168E-02	
Pa-234	131.55	157.	-17.	-0.002	108.08	-1.183E-01	
U-235	143.91	197.	-2.	0.000	71.65	-2.721E-02	P
U-235	163.55	127.	15.	0.002	96.49	4.212E-01	P
U-235	205.42	107.	12.	0.002	128.92	3.997E-01	
I-131	281.74	44.	2.	0.000	546.34	6.177E-02	
PB-214	295.37	125.	27.	0.004	31.25	3.088E-01	P
EU-152	345.43	48.	22.	0.003	48.72	2.120E-01	
PB-214	351.85	124.	76.	0.011	14.00	5.173E-01	P
I-131	364.23	57.	4.	0.001	284.83	1.227E-02	
BE-7	478.57	59.	-3.	0.000	383.73	-8.805E-02	
CS-134	568.85	39.	7.	0.001	134.19	1.667E-01	
Pa-234	568.85	39.	7.	0.001	134.10	3.129E-01	
CS-134	604.45	88.	-12.	-0.002	110.54	-5.008E-02	
I-131	636.90	44.	5.	0.001	204.65	2.699E-01	
EU-154	723.19	56.	-10.	-0.001	115.58	-2.157E-01	
BI-212	726.96	27.	27.	0.004	33.14	1.667E+00	
BI-212	785.24	29.	12.	0.002	71.06	4.478E+00	
CS-134	802.75	42.	13.	0.002	77.55	7.320E-01	
EU-154	873.73	43.	-4.	-0.001	212.75	-1.966E-01	
Pa-234	884.50	33.	1.	0.000	648.34	7.193E-02	
Pa-234	943.66	20.	1.	0.000	729.40	3.814E-02	
EU-152	964.00	49.	-1.	0.000	860.42	-4.656E-02	
EU-154	1004.02	35.	-6.	-0.001	141.85	-2.091E-01	
EU-152	1111.40	27.	-1.	0.000	593.52	-6.094E-02	
CO-60	1174.21	30.	2.	0.000	353.46	1.578E-02	
EU-154	1278.09	23.	-3.	0.000	221.86	-6.828E-02	
CO-60	1334.10	26.	-4.	-0.001	189.21	-3.126E-02	
EU-152	1408.07	11.	3.	0.000	160.23	1.259E-01	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

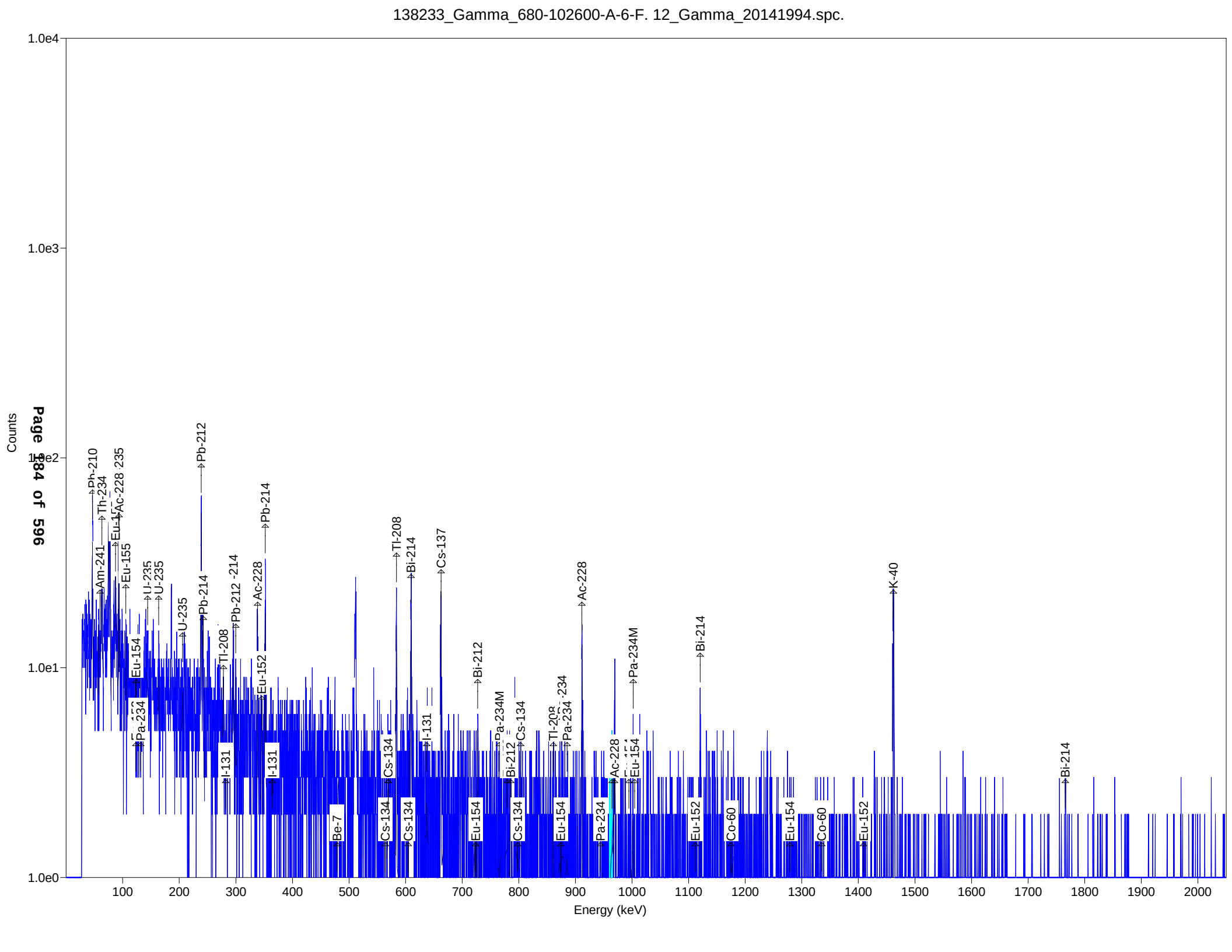
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	-8.8050E-02	-8.8051E-02	3.837E+02%	1.18E+00
K-40		1.7662E+01	1.7662E+01	7.110E+00%	2.01E+00
CO-60	#A	-7.7491E-03	-7.7491E-03	1.892E+02%	2.09E-01
I-131	#A	3.4907E-02	3.4909E-02	2.046E+02%	1.22E-01
CS-134	#A	3.3164E-02	3.3164E-02	6.345E+01%	1.87E-01
CS-137	#	7.0446E-01	7.0446E-01	1.366E+01%	1.78E-01
EU-152	#A	1.7392E-01	1.7392E-01	4.872E+01%	3.32E-01
EU-154	#A	-1.9658E-01	-1.9658E-01	2.127E+02%	1.46E+00
EU-155	#A	1.8524E-01	1.8524E-01	3.445E+01%	3.02E-01
TL-208		4.1693E-01	4.1693E-01	1.806E+01%	1.76E-01
PB-210	#	3.4794E+00	3.4794E+00	2.323E+01%	2.34E+00
PB-212		9.7400E-01	9.7401E-01	1.062E+01%	2.55E-01
PB-214	#	5.1731E-01	5.1731E-01	2.198E+01%	3.71E-01
BI-212	#	2.0748E+00	2.0748E+00	3.314E+01%	1.65E+00
BI-214		9.2298E-01	9.2298E-01	1.827E+01%	3.98E-01
AC-228		1.7827E+00	1.7827E+00	1.292E+01%	3.37E-01
Pa-234	#A	3.3281E-02	3.3281E-02	1.081E+02%	4.30E-01
TH-234	A	1.8479E+00	1.8479E+00	4.726E+01%	2.38E+00
PA-234M	#A	6.0429E+00	6.0429E+00	9.596E+01%	1.98E+01
U-235	#A	1.8261E-01	1.8261E-01	1.119E+02%	8.32E-01
AM-241	#A	3.5947E-04	3.5947E-04	1.918E+04%	2.36E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (238.5 to 1999.4 keV) 2.779E+01 Bq/Sample
Total Decayed Activity (238.5 to 1999.4 keV) 2.7790201E+01 Bq/Sample

The library has energies which are not separable.


138233_Gamma_680-102600-A-6-F. 12_Gamma_20141994.spc.
Counts
Energy (keV)
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Pb-210
Th-234
Am-241
Eu-155
U-235
Pb-212
Pb-214
Tl-208
Pb-212
Pb-214
Ac-228
Eu-152
Tl-208
Bi-214
Cs-137
Bi-212
Pa-234M
Cs-134
Tl-208
Pa-234
Ac-228
Pa-234M
Bi-214
K-40
Bi-214
Be-7
Cs-134
Cs-134
I-131
Eu-154
Bi-212
Cs-134
Eu-154
Pa-234
Ac-228
Eu-154
Eu-152
Co-60
Eu-154
Co-60
Eu-152

Test America St. Louis Spectrum ID: 7_Gamma_20142021

Sample Description: 138233_Gamma_680-102600-A-6-G DU
Detector: Ge 7 SN/154
Batch ID: 138233
Work Order Number: Gamma
Lot Number: 680-102600-A-6-G DU

Decay to Time: 9/8/2014 14:33 Live Time: 7200 sec
Acquisition Time: 9/8/2014 14:34:26 Real Time: 7315 sec
Analysis Time: 9/8/2014 16:37 Dead Time: 1.57 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 7_Liquid_D=1 25ml.Clb
Efficiency Cal Desc: 7_25mld=1_90101_032612
Efficiency Cal Date: 3/28/2012 09:22
Energy Cal Date: 2/23/2012 08:40
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 7_2014-09-06_0610.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	1.625E-01	141.9	2.306E-01	2.307E-01	8.061E-01
K-40	1.167E+01	10.8	1.266E+00	1.386E+00	2.918E+00
CO-60	-6.040E-04	196.9	1.189E-03	1.190E-03	2.192E-01
I-131	2.685E-02	106.1	2.848E-02	2.851E-02	1.062E-01
CS-134	2.052E-02	116.4	2.388E-02	2.390E-02	2.597E-01
CS-137	5.827E-01	14.0	8.181E-02	8.659E-02	1.365E-01
EU-152	8.168E-02	110.7	9.039E-02	9.047E-02	2.911E-01
EU-154	2.592E-01	143.6	3.722E-01	3.724E-01	1.299E+00
EU-155	2.115E-01	22.1	4.665E-02	4.793E-02	2.380E-01
TL-208	5.728E-01	11.0	6.307E-02	6.894E-02	8.126E-02
PB-210	3.272E+00	19.8	6.488E-01	6.819E-01	1.685E+00
PB-212	1.245E+00	8.3	1.033E-01	1.231E-01	2.013E-01
PB-214	8.887E-01	12.9	1.149E-01	1.227E-01	2.366E-01
BI-212	8.619E-01	72.6	6.254E-01	6.268E-01	1.902E+00
BI-214	6.572E-01	18.2	1.193E-01	1.235E-01	2.636E-01
AC-228	1.566E+00	12.7	1.987E-01	2.126E-01	2.520E-01
Pa-234	2.043E-01	80.9	1.654E-01	1.657E-01	2.982E-01
TH-234	3.269E-01	61.4	2.007E-01	2.013E-01	1.847E+00
PA-234M	4.316E+00	134.0	5.784E+00	5.788E+00	2.022E+01
U-235	1.878E-01	82.3	1.546E-01	1.548E-01	5.162E-01
AM-241	2.772E-02	178.0	4.934E-02	4.936E-02	1.672E-01
Total	2.714E+01				

Analyst: Curtis Carey

TestAmerica Spectrum name: 7_Gamma_20142021.An1

Sample description
138233_Gamma_680-102600-A-6-G DU

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20142021.An1

Acquisition information
Start time: 9/8/2014 2:34:26 PM
Live time: 7200
Real time: 7315
Dead time: 1.57 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Liquid_D=1 25ml.Clb
7_25mld=1_90101_032612

Energy Calibration
Created: 2/23/2012 8:40:56 AM
Zero offset: 0.117 keV
Gain: 0.250 keV/channel
Quadratic: 3.508E-09 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 9:22:15 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.82 %
Log(Eff): -7.206837E-02 + (-5.220592E-02*Log(E)) +
(-7.214522E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.58 %
Log(Eff): -1.343090E+01 + (5.323811E+00*Log(E)) +
(-6.125181E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (2000.12keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/8/2014 2:33:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2014-09-06_0610.PBC 9/6/2014 6:10:25 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 17 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1099

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.59	196.	13.45	0.88	1.328E-01	46.54	4.250	3.272E+00	PB210
59.48	11.	178.00	0.85	1.490E-01	59.54	35.900	PBC<MDA	AM241
63.38	-5.	25.78	0.85	1.516E-01	63.29	3.810	PBC<MDA	TH234
					63.29	3.810	PBC<MDA	TH234
74.79	138.	15.16	0.87	1.552E-01				
77.23	198.	11.79	0.87	1.553E-01				
87.04	115.	19.16	0.59	1.539E-01	86.54	30.700	3.378E-01	EU155
					86.54	30.700	3.378E-01	EU155
92.92	231.	12.02	1.43	1.520E-01	92.59	5.584	1.892E+00	TH234
					93.35	5.810	3.637E+00	U235
					93.35	5.561	3.800E+00	AC228
					92.59	5.584	1.892E+00	TH234
					93.35	5.810	3.637E+00	U235
105.46	22.	72.07	0.90	1.463E-01	105.31	21.200	PBC<MDA	EU155
					105.31	21.200	9.951E-02	EU155
122.94	11.	130.17	0.92	1.367E-01	121.78	28.580	PBC<MDA	EU152
					123.10	40.790	2.811E-02	EU154
123.04	17.	86.45	0.92	1.358E-01	121.78	28.580	PBC<MDA	EU152
					123.10	40.790	4.229E-02	EU154
131.51	19.	80.94	0.93	1.306E-01	131.29	18.000	PBC<MDA	Pa234
144.63	18.	82.30	0.94	1.225E-01	143.79	10.960	PBC<MDA	U235
					143.79	10.960	1.878E-01	U235
219.82	16.	44.07	0.64	8.614E-02				
238.70	315.	8.29	1.26	8.041E-02	238.63	43.300	1.256E+00	PB212
277.85	10.	105.21	1.08	7.076E-02	277.28	6.310	PBC<MDA	TL208
295.36	87.	21.60	1.23	6.704E-02	295.09	19.300	9.304E-01	PB214
300.57	17.	76.95	1.10	6.607E-02	300.03	3.280	PBC<MDA	PB212
338.38	72.	27.07	0.98	5.942E-02	338.32	12.010	1.401E+00	AC228
344.16	2.	489.46	1.15	5.849E-02	344.29	26.500	PBC<MDA	EU152
352.05	135.	14.20	1.16	5.735E-02	351.93	37.600	8.673E-01	PB214

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
473.93	5.	141.91	1.28	4.330E-02	477.60	10.520	PBC<MDA	BE7
568.05	9.	84.50	1.37	3.661E-02	569.47	8.200	PBC<MDA	Pa234
583.27	125.	11.01	0.98	3.577E-02	583.02	84.500	5.727E-01	TL208
609.44	75.	14.80	1.76	3.428E-02	609.31	46.090	6.572E-01	BI214
636.61	8.	106.09	1.43	3.282E-02	636.97	7.170	PBC<MDA	I131
661.73	113.	14.04	0.65	3.161E-02	661.66	85.210	5.827E-01	CS137
727.39	12.	72.56	1.51	2.877E-02	727.17	7.550	PBC<MDA	BI212
786.39	3.	239.49	1.57	2.662E-02	785.42	1.280	PBC<MDA	BI212
795.74	7.	116.39	1.58	2.626E-02	795.87	85.530	PBC<MDA	CS134
860.45	12.	60.46	1.63	2.425E-02	860.56	12.420	PBC<MDA	TL208
873.23	5.	143.60	1.64	2.389E-02	873.23	12.270	PBC<MDA	EU154
880.49	3.	234.94	1.65	2.368E-02	880.53	6.000	PBC<MDA	Pa234
883.81	2.	349.80	1.65	2.361E-02	883.24	9.600	PBC<MDA	Pa234
911.48	78.	12.69	0.39	2.286E-02	911.07	29.000	1.634E+00	AC228
968.99	27.	31.46	1.72	2.145E-02	968.97	17.460	1.019E+00	AC228
1001.00	5.	134.03	1.75	2.073E-02	1001.00	0.837	PBC<MDA	PA234M
1120.50	37.	19.30	1.11	1.840E-02	1120.29	15.100	1.866E+00	BI214
1176.97	2.	259.29	1.89	1.752E-02	1173.24	99.900	PBC<MDA	CO60
1408.65	5.	110.66	2.06	1.437E-02	1408.00	21.005	PBC<MDA	EU152
1460.99	124.	9.53	2.10	1.380E-02	1460.83	10.670	1.167E+01	K40
1766.45	5.	105.78	2.29	1.117E-02	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
298.52	74.74	191.	115.	7.433E+02	23.25	0.592	-	s
308.29	77.18	187.	212.	1.368E+03	13.61	1.249	-	s
347.72	87.04	215.	17.	1.085E+02	126.63	0.586	-	sc
370.28	92.92	184.	131.	8.650E+02	16.98	0.886	-	D
878.89	219.82	15.	16.	1.838E+02	44.07	0.638	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.92	46.59	199.	133.	0.018	13.45	0.879s
AM-241	237.48	59.48	175.	11.	0.001	178.00	0.850s
TH-234	253.08	63.38	253.	-5.	-0.001	25.78	0.854s
EU-155	347.77	87.05	186.	98.	0.014	22.06	0.880s
TH-234	370.36	92.70	322.	39.	0.005	15.47	0.886s
U-235	372.97	93.35	202.	140.	0.019	16.68	0.887D
AC-228	372.97	93.35	261.	52.	0.007	45.88	0.887D
EU-155	421.42	105.46	117.	22.	0.003	72.07	0.900s
EU-152	491.33	122.94	101.	11.	0.002	130.17	0.918s
EU-154	491.73	123.04	98.	17.	0.002	86.45	0.919s
Pa-234	525.64	131.51	105.	19.	0.003	80.94	0.928s
U-235	578.09	144.63	102.	18.	0.003	82.30	0.941s
U-235	823.21	205.90	105.	-11.	-0.002	135.39	1.007s
PB-212	954.41	238.70	105.	315.	0.044	8.29	1.257s
TL-208	1111.03	277.85	55.	10.	0.001	105.21	1.081s
I-131	1135.41	283.94	53.	-7.	-0.001	159.13	1.089s
PB-214	1181.07	295.36	63.	87.	0.012	21.60	1.228s
PB-212	1201.93	300.57	78.	17.	0.002	76.95	1.105
AC-228	1353.17	338.38	66.	72.	0.010	27.07	0.977
EU-152	1376.28	344.16	41.	2.	0.000	489.46	1.150s
PB-214	1407.88	352.05	53.	135.	0.019	14.20	1.164s
I-131	1459.92	365.06	47.	-4.	-0.001	251.96	1.170s
BE-7	1895.39	473.93	26.	5.	0.001	141.91	1.282s
Pa-234	2271.89	568.05	22.	9.	0.001	84.50	1.370s
TL-208	2332.78	583.27	10.	125.	0.017	11.01	0.985s
BI-214	2437.49	609.44	34.	75.	0.010	14.80	1.762s
I-131	2546.16	636.61	31.	8.	0.001	106.09	1.433s
CS-137	2646.65	661.73	26.	113.	0.016	14.04	0.651s
EU-154	2902.58	725.71	48.	-9.	-0.001	108.74	1.511s
BI-212	2909.28	727.39	34.	12.	0.002	72.56	1.515s
PA-234M	3067.28	766.89	43.	-5.	-0.001	191.42	1.550s
EU-152	3112.43	778.17	36.	-2.	0.000	410.26	1.561
BI-212	3145.31	786.39	28.	3.	0.000	239.49	1.567s
CS-134	3182.71	795.74	31.	7.	0.001	116.39	1.576s
CS-134	3201.45	800.43	30.	-3.	0.000	304.93	1.581s
TL-208	3441.54	860.45	22.	12.	0.002	60.46	1.632s
EU-154	3492.66	873.23	28.	5.	0.001	143.60	1.643s
Pa-234	3521.70	880.49	30.	3.	0.000	234.94	1.649s
Pa-234	3534.98	883.81	30.	2.	0.000	349.80	1.651s
AC-228	3645.66	911.48	4.	78.	0.011	12.69	0.394s
Pa-234	3789.53	947.45	26.	-5.	-0.001	148.19	1.704s
EU-152	3854.30	963.64	35.	-2.	0.000	480.15	1.719s
AC-228	3875.69	968.99	24.	27.	0.004	31.46	1.724s
EU-154	3974.31	993.64	22.	-4.	-0.001	162.15	1.746s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-234M	4003.73	1001.00	23.	5.	0.001	134.03	1.750s
EU-152	4447.11	1111.84	28.	-3.	0.000	289.96	1.839s
BI-214	4481.73	1120.50	10.	37.	0.005	19.30	1.112s
CO-60	4707.62	1176.97	19.	2.	0.000	259.29	1.886s
EU-154	5097.64	1274.48	27.	-3.	0.000	274.38	1.963s
CO-60	5333.04	1333.33	21.	-2.	0.000	296.47	2.005s
EU-152	5634.31	1408.65	12.	5.	0.001	110.66	2.059s
K-40	5843.65	1460.99	37.	124.	0.017	9.53	2.095
BI-214	7065.39	1766.45	18.	5.	0.001	105.78	2.290s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	1.6247E-01				5.31E+01		
			477.60	1.625E-01	&(	8.061E-01	1.42E+02	1.05E+01 G
K-40	N	1.1672E+01				4.66E+11		
			1460.83	1.167E+01	(P	2.918E+00	9.53E+00	1.07E+01 G
CO-60	F	-6.0399E-04				1.93E+03		
			1332.50	-2.044E-02	?(	2.192E-01	2.96E+02	1.00E+02 G
			1173.24	1.925E-02	?(	1.808E-01	2.59E+02	9.99E+01 G
I-131	I	2.6849E-02				8.02E+00		
			364.48	-1.203E-02	?(	1.062E-01	2.52E+02	8.17E+01 G
			284.30	-2.186E-01	+	1.201E+00	1.59E+02	6.14E+00 G
			636.97	4.699E-01	?(	1.708E+00	1.06E+02	7.17E+00 G
CS-134	I	2.0517E-02				7.54E+02		
			604.71	0.000E+00	?(	2.597E-01	1.00E+03	9.76E+01 G
			795.87	4.393E-02	(	1.763E-01	1.16E+02	8.55E+01 G
			569.32	-1.912E-02	%	7.576E-01	1.10E+03	1.54E+01 G
			801.95	-1.585E-01	+	1.725E+00	3.05E+02	8.69E+00 G
			563.24	0.000E+00	&	1.741E+00	1.00E+03	8.35E+00 G
CS-137	I	5.8272E-01				1.10E+04		
			661.66	5.827E-01	(	1.365E-01	1.40E+01	8.52E+01 G
EU-152	F	8.1678E-02				4.94E+03		
			344.29	1.673E-02	?(	2.911E-01	4.89E+02	2.65E+01 G
			121.78	3.987E-02	?(	1.761E-01	1.30E+02	2.86E+01 G
			778.92	-8.409E-02	+	1.229E+00	4.10E+02	1.29E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
		964.11	-7.815E-02	+	1.341E+00	4.80E+02	1.46E+01 G
		1112.07	-1.450E-01	+	1.503E+00	2.90E+02	1.36E+01 G
		1408.00	2.205E-01	&(	8.570E-01	1.11E+02	2.10E+01 G
EU-154	I 2.5920E-01					3.14E+03	
		873.23	2.592E-01	?(	1.299E+00	1.44E+02	1.23E+01 G
		123.10	4.229E-02	&	1.224E-01	8.65E+01	4.08E+01 G
		1274.54	-6.803E-02	-	6.669E-01	2.74E+02	3.52E+01 G
		723.36	-2.246E-01	+	8.322E-01	1.09E+02	2.02E+01 G
		1004.77	5.226E-03	%	9.384E-01	4.87E+03	1.80E+01 G
		996.33	-2.676E-01	+	1.535E+00	1.62E+02	1.06E+01 G
EU-155	I 2.1146E-01					1.81E+03	
		105.31	9.951E-02	*(	2.380E-01	7.21E+01	2.12E+01 G
		86.54	2.888E-01	*(	1.947E-01	2.21E+01	3.07E+01 G
TL-208	N 5.7282E-01					6.98E+02	
		583.02	5.727E-01	@(	8.126E-02	1.10E+01	8.45E+01 G
		277.28	3.249E-01	&	1.161E+00	1.05E+02	6.31E+00 G
		860.56	5.739E-01	?(	1.135E+00	6.05E+01	1.24E+01 G
PB-210	N 3.2719E+00					8.14E+03	
		46.54	3.272E+00	*(P	1.685E+00	1.34E+01	4.25E+00 G
PB-212	N 1.2451E+00					6.98E+02	
		238.63	1.256E+00	(	2.013E-01	8.29E+00	4.33E+01 G
		300.03	1.098E+00	?(	2.816E+00	7.69E+01	3.28E+00 G
PB-214	N 8.8871E-01					5.84E+05	
		351.93	8.673E-01	*(	2.366E-01	1.42E+01	3.76E+01 G
		295.09	9.304E-01	*(	4.272E-01	2.16E+01	1.93E+01 G
		242.00	-2.054E-03	%	1.001E+00	1.38E+04	7.43E+00 G
BI-212	N 8.6190E-01					6.98E+02	
		727.17	7.862E-01	(	1.902E+00	7.26E+01	7.55E+00 G
		785.42	1.308E+00	?(	1.114E+01	2.39E+02	1.28E+00 G
BI-214	N 6.5717E-01					5.84E+05	
		609.31	6.572E-01	(P	2.636E-01	1.48E+01	4.61E+01 G
		1120.29	1.866E+00	+ P	8.597E-01	1.93E+01	1.51E+01 G
		1764.49	3.951E-01	- P	1.801E+00	1.06E+02	1.54E+01 G
AC-228	N 1.5658E+00					2.10E+03	
		911.07	1.634E+00	(	2.520E-01	1.27E+01	2.90E+01 G
		968.97	1.019E+00	-	9.402E-01	3.15E+01	1.75E+01 G
		338.32	1.401E+00	(	7.896E-01	2.71E+01	1.20E+01 G
							Energy duplication
		93.35	8.587E-01	-	1.282E+00	4.59E+01	5.56E+00 XA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Pa-234	N	2.0432E-01					1.63E+12	
			131.29	1.104E-01	(	2.982E-01	8.09E+01	1.80E+01 G
			569.47	3.939E-01	?(	1.128E+00	8.45E+01	8.20E+00 G
			946.02	-2.416E-01	-	1.254E+00	1.48E+02	1.34E+01 G
			883.24	1.388E-01	?(	1.737E+00	3.50E+02	9.60E+00 G
			880.53	3.319E-01	&(	2.765E+00	2.35E+02	6.00E+00 G
TH-234	N	3.2688E-01					1.63E+12	
			63.29	-1.244E-01	(P	1.847E+00	2.58E+01	3.81E+00 G
			92.59	6.348E-01	*(P	1.412E+00	1.55E+01	5.58E+00 G
PA-234M	N	4.3157E+00					1.63E+12	
			1001.00	4.316E+00	?(	2.022E+01	1.34E+02	8.37E-01 G
			766.41	-8.629E+00	+	5.761E+01	1.91E+02	2.94E-01 G
U-235	N	1.8783E-01					2.57E+11	
			143.79	1.878E-01	?(	5.162E-01	8.23E+01	1.10E+01 G
			205.33	-3.347E-01	+	1.538E+00	1.35E+02	5.01E+00 G
			163.38	2.899E-02	&	1.178E+00	1.17E+03	5.08E+00 G
								Energy duplication
			93.35	2.202E+00	?	1.086E+00	1.67E+01	5.81E+00 X
AM-241	T	2.7722E-02					1.58E+05	
			59.54	2.772E-02	*(	1.672E-01	1.78E+02	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
AM-241	59.48	175.	11.	0.001	178.00	2.772E-02	
TH-234	63.38	253.	-5.	-0.001	25.78	-1.244E-01	P
EU-155	87.05	186.	98.	0.014	22.06	2.888E-01	
TH-234	92.70	322.	39.	0.005	15.47	6.348E-01	P
U-235	93.35	202.	140.	0.019	16.68	2.202E+00	
EU-155	105.46	117.	22.	0.003	72.07	9.951E-02	
EU-154	123.04	98.	17.	0.002	86.45	4.229E-02	
Pa-234	131.51	105.	19.	0.003	80.94	1.104E-01	
U-235	144.63	102.	18.	0.003	82.30	1.878E-01	
U-235	205.90	105.	-11.	-0.002	135.39	-3.347E-01	
I-131	283.94	53.	-7.	-0.001	159.13	-2.186E-01	
I-131	365.06	47.	-4.	-0.001	251.96	-1.203E-02	
BE-7	473.93	26.	5.	0.001	141.91	1.625E-01	
Pa-234	568.05	22.	9.	0.001	84.50	3.939E-01	
I-131	636.61	31.	8.	0.001	106.09	4.699E-01	
EU-154	725.71	48.	-9.	-0.001	108.74	-2.246E-01	
BI-212	727.39	34.	12.	0.002	72.56	7.862E-01	
PA-234M	766.89	43.	-5.	-0.001	191.42	-8.629E+00	
BI-212	786.39	28.	3.	0.000	239.49	1.308E+00	
CS-134	795.74	31.	7.	0.001	116.39	4.393E-02	
CS-134	800.43	30.	-3.	0.000	304.93	-1.585E-01	
EU-154	873.23	28.	5.	0.001	143.60	2.592E-01	
Pa-234	880.49	30.	3.	0.000	234.94	3.319E-01	
Pa-234	883.81	30.	2.	0.000	349.80	1.388E-01	
Pa-234	947.45	26.	-5.	-0.001	148.19	-2.416E-01	
EU-154	993.64	22.	-4.	-0.001	162.15	-2.676E-01	
PA-234M	1001.00	23.	5.	0.001	134.03	4.316E+00	
CO-60	1176.97	19.	2.	0.000	259.29	1.925E-02	
EU-154	1274.48	27.	-3.	0.000	274.38	-6.803E-02	
CO-60	1333.33	21.	-2.	0.000	296.47	-2.044E-02	
K-40	1460.99	37.	124.	0.017	9.53	1.167E+01	P

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	1.6247E-01	1.6247E-01	1.419E+02%	8.06E-01
K-40	#	1.1672E+01	1.1672E+01	1.084E+01%	2.92E+00
CO-60	#A	-6.0399E-04	-6.0399E-04	1.969E+02%	2.19E-01
I-131	#A	2.6847E-02	2.6849E-02	1.061E+02%	1.06E-01
CS-134	#A	2.0517E-02	2.0517E-02	1.164E+02%	2.60E-01
CS-137		5.8272E-01	5.8272E-01	1.404E+01%	1.37E-01
EU-152	#A	8.1678E-02	8.1678E-02	1.107E+02%	2.91E-01
EU-154	#A	2.5920E-01	2.5920E-01	1.436E+02%	1.30E+00
EU-155	#A	2.1146E-01	2.1146E-01	2.206E+01%	2.38E-01
TL-208	#	5.7282E-01	5.7282E-01	1.101E+01%	8.13E-02
PB-210	#	3.2719E+00	3.2719E+00	1.983E+01%	1.69E+00
PB-212	#	1.2451E+00	1.2451E+00	8.294E+00%	2.01E-01
PB-214	#	8.8871E-01	8.8871E-01	1.293E+01%	2.37E-01
BI-212	#A	8.6189E-01	8.6190E-01	7.256E+01%	1.90E+00
BI-214		6.5717E-01	6.5717E-01	1.815E+01%	2.64E-01
AC-228		1.5658E+00	1.5658E+00	1.269E+01%	2.52E-01
Pa-234	#A	2.0432E-01	2.0432E-01	8.094E+01%	2.98E-01
TH-234	#A	3.2688E-01	3.2688E-01	6.139E+01%	1.85E+00
PA-234M	#A	4.3157E+00	4.3157E+00	1.340E+02%	2.02E+01
U-235	#A	1.8783E-01	1.8783E-01	8.230E+01%	5.16E-01
AM-241	#A	2.7722E-02	2.7722E-02	1.780E+02%	1.67E-01

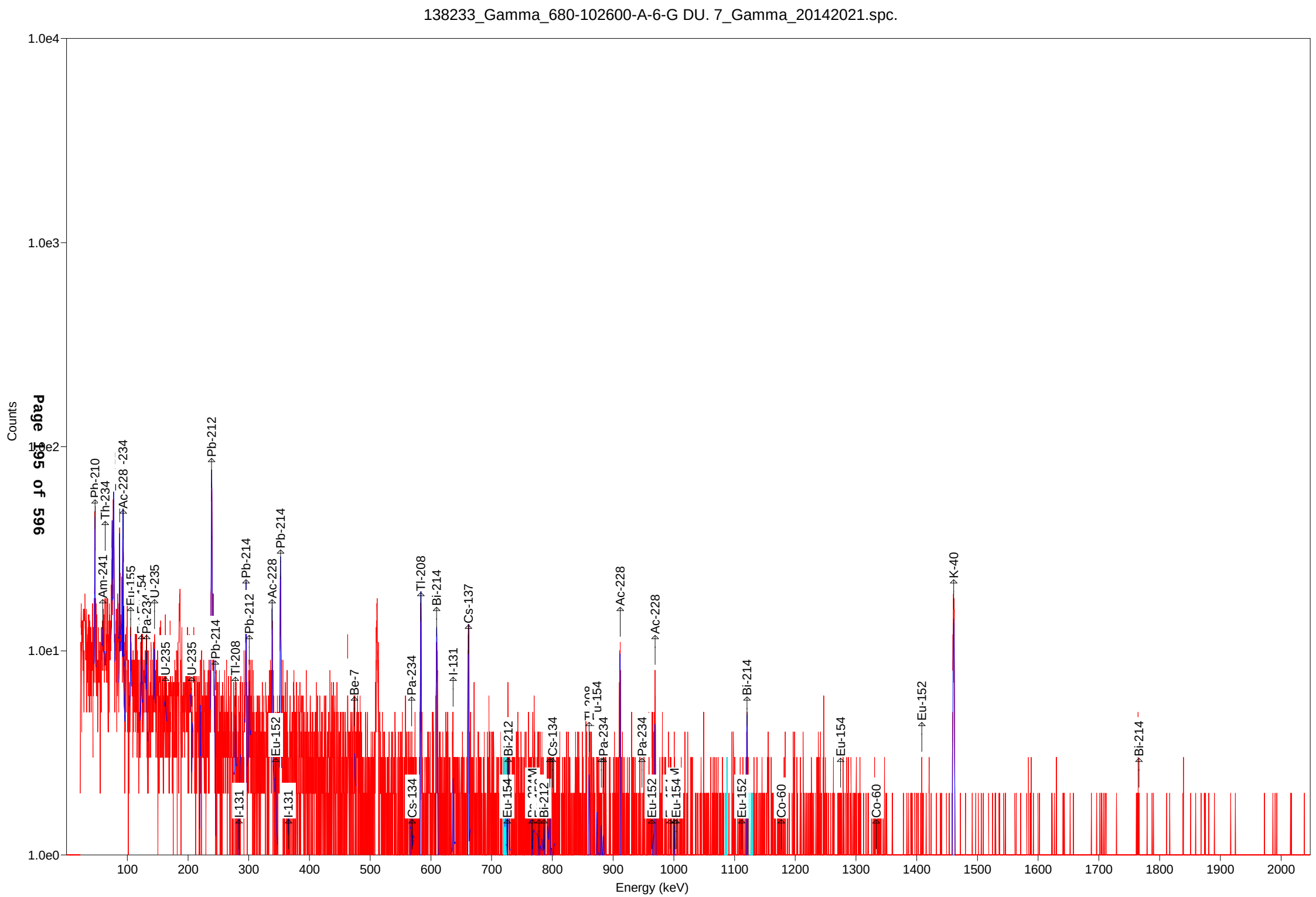
- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (121.6 to 2000.1 keV) 8.784E+00 Bq/Sample
Total Decayed Activity (121.6 to 2000.1 keV) 8.7842274E+00 Bq/Sample

The library has energies which are not separable.

138233_Gamma_680-102600-A-6-G DU. 7_Gamma_20142021.spc.



Test America St. Louis Spectrum ID: 14_Gamma_20142009

Sample Description: 138233_Gamma_680-102600-A-7-E
Detector: Ge14 SN/11080670
Batch ID: 138233
Work Order Number: Gamma
Lot Number: 680-102600-A-7-E

Decay to Time: 9/10/2014 01:56 Live Time: 7200 sec
Acquisition Time: 9/10/2014 01:56:29 Real Time: 7234 sec
Analysis Time: 9/10/2014 03:57 Dead Time: 0.47 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 14_Soil_25ml.Clb
Efficiency Cal Desc: 14_25mlSolid_90099_031312
Efficiency Cal Date: 3/14/2012 16:44
Energy Cal Date: 2/28/2012 10:48
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 14_2014-09-06_0552.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	2.161E-02	1189.0	2.570E-01	2.570E-01	9.525E-01
K-40	2.064E+01	7.7	1.583E+00	1.903E+00	2.337E+00
CO-60	3.324E-03	986.6	3.279E-02	3.279E-02	2.734E-01
I-131	2.162E-02	193.5	4.182E-02	4.184E-02	1.456E-01
CS-134	7.222E-02	74.1	5.352E-02	5.365E-02	2.854E-01
CS-137	1.029E-01	61.7	6.346E-02	6.368E-02	2.085E-01
EU-152	2.023E-01	60.7	1.227E-01	1.231E-01	4.787E-01
EU-154	1.390E-01	122.9	1.709E-01	1.711E-01	1.520E+00
EU-155	1.633E-01	76.6	1.250E-01	1.254E-01	4.156E-01
TL-208	6.194E-01	14.5	8.950E-02	9.509E-02	1.972E-01
PB-210	5.705E-01	140.4	8.011E-01	8.018E-01	2.566E+00
PB-212	1.395E+00	10.5	1.464E-01	1.720E-01	3.303E-01
PB-214	1.052E+00	17.7	1.860E-01	1.938E-01	4.336E-01
BI-212	1.598E-01	441.8	7.058E-01	7.059E-01	2.520E+00
BI-214	8.775E-01	18.5	1.627E-01	1.690E-01	4.422E-01
AC-228	1.568E+00	14.1	2.213E-01	2.354E-01	6.002E-01
Pa-234	2.208E-01	67.2	1.484E-01	1.489E-01	4.163E-01
TH-234	2.183E+00	22.7	4.952E-01	5.082E-01	2.408E+00
PA-234M	-2.800E+00	298.6	8.363E+00	8.364E+00	2.972E+01
U-235	3.124E-01	83.1	2.596E-01	2.601E-01	7.703E-01
AM-241	-1.070E-01	341.5	3.654E-01	3.655E-01	2.614E-01
Total	3.032E+01				

Analyst: Rachel Mueller

TestAmerica, Inc. Spectrum name: 14_Gamma_20142009.An1

Sample description
138233_Gamma_680-102600-A-7-E

Spectrum Filename: C:\User\SPC\Det14\14_Gamma_20142009.An1

Acquisition information
Start time: 9/10/2014 1:56:29 AM
Live time: 7200
Real time: 7234
Dead time: 0.47 %
Detector ID: 14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_Soil_25ml.Clb
14_25mlSolid_90099_031312

Energy Calibration
Created: 2/28/2012 10:48:23 AM
Zero offset: 0.130 keV
Gain: 0.250 keV/channel
Quadratic: -2.050E-08 keV/channel^2

Efficiency Calibration
Created: 3/14/2012 4:44:41 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.01 %
Log(Eff): 4.286558E-01 + (-3.868998E-01*Log(E)) + (-3.891736E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.12 %
Log(Eff): -1.120218E+01 + (4.080928E+00*Log(E)) + (-4.677621E-01*Log(E)^2)

Library Files
Main analysis library: Client_Routine Short Rev1.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.64keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/10/2014 1:56:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	14_2014-09-06_0552.PBC 9/6/2014 5:52:36 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 19 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1291

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.71	95.	22.75	0.58	8.831E-02	46.54	4.250	PBC<MDA	PB210
59.16	26.	49.03	0.51	9.647E-02				
63.28	82.	24.45	0.83	9.799E-02	63.29	3.810	PBC<MDA	TH234
74.86	173.	12.57	0.78	1.000E-01				
77.21	217.	10.78	0.78	1.001E-01				
87.19	105.	17.69	0.79	9.960E-02	86.54	30.700	4.778E-01	EU155
89.76	59.	29.07	0.79	9.927E-02				
92.86	209.	13.12	1.07	9.880E-02	92.59	5.584	3.041E+00	TH234
					93.35	5.810	5.061E+00	U235
					93.35	5.561	5.288E+00	AC228
					93.35	5.810	5.061E+00	U235
					93.35	5.561	5.288E+00	AC228
105.17	24.	76.56	0.81	9.614E-02	105.31	21.200	PBC<MDA	EU155
					105.31	21.200	1.633E-01	EU155
121.78	2.	816.29	0.83	9.146E-02	121.78	28.580	PBC<MDA	EU152
133.04	21.	67.22	0.84	8.844E-02	131.29	18.000	PBC<MDA	Pa234
142.89	18.	83.10	0.85	8.432E-02	143.79	10.960	PBC<MDA	U235
					143.79	10.960	2.775E-01	U235
164.06	16.	99.58	0.87	7.783E-02	163.38	5.080	PBC<MDA	U235
					163.38	5.080	5.754E-01	U235
204.80	3.	493.64	0.91	6.491E-02	205.33	5.010	PBC<MDA	U235
					205.33	5.010	1.219E-01	U235
238.66	288.	9.12	1.13	5.749E-02	238.63	43.300	1.395E+00	PB212
241.66	43.	42.84	0.33	5.684E-02	242.00	7.430	PBC<MDA	PB214
277.48	32.	34.97	1.70	5.084E-02	277.28	6.310	PBC<MDA	TL208
295.24	82.	20.67	0.72	4.827E-02	295.09	19.300	9.856E-01	PB214
300.24	22.	45.41	0.62	4.763E-02	300.03	3.280	PBC<MDA	PB212
338.18	56.	23.01	1.04	4.308E-02	338.32	12.010	1.505E+00	AC228
					338.32	12.010	1.505E+00	AC228
344.16	4.	298.38	1.05	4.245E-02	344.29	26.500	PBC<MDA	EU152

351.96	147.	13.79	0.94	4.167E-02	351.93	37.600	1.016E+00	PB214
365.77	5.	193.49	1.07	4.046E-02	364.48	81.700	PBC<MDA	I131
561.70	11.	74.11	1.25	2.779E-02	563.24	8.350	PBC<MDA	CS134

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
568.86	7.	107.16	1.26	2.753E-02	569.32	15.380	PBC<MDA	CS134
569.53	4.	191.03	1.26	2.752E-02	569.47	8.200	PBC<MDA	Pa234
583.21	123.	11.95	1.00	2.695E-02	583.02	84.500	6.194E-01	TL208
609.40	112.	12.50	1.16	2.592E-02	609.31	46.090	8.775E-01	BI214
662.42	15.	61.65	1.34	2.409E-02	661.66	85.210	PBC<MDA	CS137
727.53	2.	441.77	1.40	2.214E-02	727.17	7.550	PBC<MDA	BI212
872.59	3.	223.17	1.52	1.875E-02	873.23	12.270	PBC<MDA	EU154
881.04	1.	543.07	1.53	1.856E-02	883.24	9.600	PBC<MDA	Pa234
911.41	60.	16.36	1.55	1.804E-02	911.07	29.000	1.594E+00	AC228
					911.07	29.000	1.594E+00	AC228
945.16	4.	163.08	1.58	1.743E-02	946.02	13.400	PBC<MDA	Pa234
964.78	6.	140.35	1.60	1.712E-02	964.11	14.605	PBC<MDA	EU152
969.24	23.	37.47	1.60	1.705E-02	968.97	17.460	PBC<MDA	AC228
					968.97	17.460	1.090E+00	AC228
995.69	4.	155.10	1.62	1.661E-02	996.33	10.600	PBC<MDA	EU154
1175.06	1.	986.58	1.76	1.427E-02	1173.24	99.900	PBC<MDA	CO60
1275.62	2.	249.32	1.83	1.320E-02	1274.54	35.190	PBC<MDA	EU154
1407.74	10.	60.65	1.92	1.201E-02	1408.00	21.005	PBC<MDA	EU152
1460.96	184.	7.09	1.99	1.160E-02	1460.83	10.670	2.064E+01	K40
1763.86	-3.	39.01	2.14	9.672E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
236.03	59.16	63.	26.	2.695E+02	49.03	0.508	-	l
298.72	74.83	152.	170.	1.703E+03	14.08	1.007	-	s
308.13	77.19	180.	231.	2.307E+03	12.02	0.933	-	
348.40	87.26	131.	123.	1.231E+03	15.98	0.529	-	s
358.69	89.83	114.	71.	7.152E+02	28.62	0.783	-	M

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.25	46.71	204.	15.	0.002	22.75	0.576s
AM-241	241.73	60.58	180.	-27.	-0.004	204.97	0.761s
TH-234	252.52	63.28	177.	25.	0.003	24.45	0.829
EU-155	345.54	86.54	250.	-7.	-0.001	334.67	0.790s
TH-234	370.82	92.86	243.	121.	0.017	13.12	1.068s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	372.76	93.35	200.	130.	0.018	17.70	0.797D
AC-228	372.76	93.35	200.	130.	0.018	17.70	0.797D
EU-155	420.05	105.17	156.	24.	0.003	76.56	0.809s
EU-152	486.43	121.78	182.	2.	0.000	816.29	0.826
EU-154	490.80	122.87	165.	-15.	-0.002	122.03	0.827s
Pa-234	531.47	133.04	93.	21.	0.003	67.22	0.836s
U-235	570.88	142.89	109.	18.	0.003	83.10	0.849s
U-235	655.52	164.06	125.	16.	0.002	99.58	0.869s
U-235	818.44	204.80	98.	3.	0.000	493.64	0.911s
PB-212	953.86	238.66	147.	250.	0.035	9.12	1.128
PB-214	965.85	241.66	100.	43.	0.006	42.84	0.326s
TL-208	1109.10	277.48	39.	32.	0.004	34.97	1.698s
I-131	1134.20	283.75	83.	-7.	-0.001	192.74	0.990s
PB-214	1180.15	295.24	70.	66.	0.009	20.67	0.717s
PB-212	1200.14	300.24	39.	22.	0.003	45.41	0.619s
AC-228	1351.86	338.18	55.	56.	0.008	23.01	1.043s
EU-152	1375.79	344.16	60.	4.	0.001	298.38	1.049s
PB-214	1407.01	351.96	98.	115.	0.016	13.79	0.939s
I-131	1462.22	365.77	47.	5.	0.001	193.49	1.069s
CS-134	2245.89	561.70	26.	11.	0.001	74.11	1.255s
CS-134	2274.55	568.86	23.	7.	0.001	107.16	1.260s
Pa-234	2277.23	569.53	28.	4.	0.001	191.03	1.261s
TL-208	2331.93	583.21	40.	102.	0.014	11.95	1.005
BI-214	2436.71	609.40	58.	76.	0.010	12.50	1.162
I-131	2550.01	637.72	34.	-2.	0.000	363.87	1.321s
CS-137	2648.81	662.42	36.	15.	0.002	61.65	1.343s
BI-212	2909.27	727.53	35.	2.	0.000	441.77	1.400s
PA-234M	3064.62	766.36	41.	-6.	-0.001	150.66	1.434s
EU-152	3116.53	779.34	34.	-2.	0.000	440.95	1.444s
CS-134	3187.09	796.97	35.	-6.	-0.001	148.15	1.459s
CS-134	3206.76	801.89	31.	-3.	0.000	318.76	1.464s
EU-154	3489.63	872.59	23.	3.	0.000	223.17	1.523s
Pa-234	3523.42	881.04	19.	1.	0.000	543.07	1.531
AC-228	3644.92	911.41	18.	60.	0.008	16.36	1.554s
Pa-234	3779.95	945.16	21.	4.	0.001	163.08	1.582
EU-152	3858.49	964.78	35.	6.	0.001	140.35	1.597s
AC-228	3876.31	969.24	27.	23.	0.003	37.47	1.601s
EU-154	3982.17	995.69	20.	4.	0.001	155.10	1.622s
PA-234M	4005.26	1001.47	33.	-3.	0.000	298.63	1.626s
CO-60	4699.88	1175.06	21.	1.	0.000	986.58	1.757s
EU-154	5102.30	1275.62	12.	2.	0.000	249.32	1.831s
EU-152	5631.06	1407.74	14.	10.	0.001	60.65	1.923s
K-40	5844.08	1460.96	15.	184.	0.026	7.09	1.988
BI-214	7056.53	1763.86	25.	-3.	0.000	39.01	2.145s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	2.1610E-02				5.31E+01	
			477.60	2.161E-02	%(	9.525E-01 1.19E+03 1.05E+01	G
K-40	N	2.0640E+01				4.66E+11	
			1460.83	2.064E+01	(P	2.337E+00 7.09E+00 1.07E+01	G
CO-60	F	3.3236E-03				1.93E+03	
			1332.50	2.327E-04	%(	2.734E-01 3.18E+04 1.00E+02	G
			1173.24	6.417E-03	&(	2.334E-01 9.87E+02 9.99E+01	G
I-131	I	2.1615E-02				8.02E+00	
			364.48	2.161E-02	?(	1.456E-01 1.93E+02 8.17E+01	G
			284.30	-3.108E-01	+	2.058E+00 1.93E+02 6.14E+00	G
			636.97	-1.806E-01	+	2.341E+00 3.64E+02 7.17E+00	G
CS-134	I	7.2224E-02				7.54E+02	
			604.71	0.000E+00	?(	2.854E-01 1.00E+03 9.76E+01	G
			795.87	-4.707E-02	+	2.423E-01 1.48E+02 8.55E+01	G
			569.32	2.201E-01	?(	8.140E-01 1.07E+02 1.54E+01	G
			801.95	-1.974E-01	+	2.246E+00 3.19E+02 8.69E+00	G
			563.24	6.441E-01	&(	1.596E+00 7.41E+01 8.35E+00	G
CS-137	I	1.0293E-01				1.10E+04	
			661.66	1.029E-01	*(	2.085E-01 6.17E+01 8.52E+01	G
EU-152	F	2.0230E-01				4.94E+03	
			344.29	4.599E-02	&(	4.787E-01 2.98E+02 2.65E+01	G
			121.78	1.246E-02	&(	3.484E-01 8.16E+02 2.86E+01	G
			778.92	-9.740E-02	+	1.536E+00 4.41E+02 1.29E+01	G
			964.11	3.469E-01	&(	1.688E+00 1.40E+02 1.46E+01	G
			1112.07	-4.012E-02	%	1.720E+00 1.17E+03 1.36E+01	G
			1408.00	5.573E-01	?(	1.102E+00 6.06E+01 2.10E+01	G
EU-154	I	1.3904E-01				3.14E+03	
			873.23	1.907E-01	?(	1.520E+00 2.23E+02 1.23E+01	G
			123.10	-5.695E-02	+	2.340E-01 1.22E+02 4.08E+01	G
			1274.54	6.027E-02	?(	5.560E-01 2.49E+02 3.52E+01	G
			723.36	0.000E+00	-	1.420E+00 1.00E+03 2.02E+01	G
			1004.77	-1.727E-02	%	9.609E-01 1.47E+03 1.80E+01	G
			996.33	3.408E-01	&(	1.870E+00 1.55E+02 1.06E+01	G

Nuclide		Ave activity	Energy		Activity	Code	Peak	MDA	Comments
EU-155	I	1.6333E-01						1.81E+03	
			105.31	1.633E-01	(4.156E-01		7.66E+01	2.12E+01	G
			86.54	-3.051E-02	- 3.465E-01		3.35E+02	3.07E+01	G
TL-208	N	6.1936E-01						6.98E+02	
			583.02	6.194E-01	(P 1.972E-01		1.20E+01	8.45E+01	G
			277.28	1.378E+00	+ P 1.380E+00		3.50E+01	6.31E+00	G
			860.56	0.000E+00	- 9.570E-01		1.00E+03	1.24E+01	G
PB-210	N	5.7051E-01						8.14E+03	
			46.54	5.705E-01	@(P 2.566E+00		2.27E+01	4.25E+00	G
PB-212	N	1.3948E+00						6.98E+02	
			238.63	1.395E+00	(P 3.303E-01		9.12E+00	4.33E+01	G
			300.03	1.926E+00	+ P 2.839E+00		4.54E+01	3.28E+00	G
PB-214	N	1.0519E+00						5.84E+05	
			351.93	1.016E+00	(P 4.336E-01		1.38E+01	3.76E+01	G
			295.09	9.856E-01	(P 6.208E-01		2.07E+01	1.93E+01	G
			242.00	1.404E+00	(P 1.624E+00		4.28E+01	7.43E+00	G
BI-212	N	1.5977E-01						6.98E+02	
			727.17	1.598E-01	&(2.520E+00		4.42E+02	7.55E+00	G
			785.42	1.272E-01	% 1.542E+01		3.35E+03	1.28E+00	G
BI-214	N	8.7752E-01						5.84E+05	
			609.31	8.775E-01	(P 4.422E-01		1.25E+01	4.61E+01	G
			1120.29	-7.717E-01	% P 2.167E+00		1.00E+03	1.51E+01	G
			1764.49	-2.901E-01	- P 2.446E+00		3.90E+01	1.54E+01	G
AC-228	N	1.5681E+00						2.10E+03	
			911.07	1.594E+00	*(6.002E-01		1.64E+01	2.90E+01	G
			968.97	1.090E+00	- 1.249E+00		3.75E+01	1.75E+01	G
			338.32	1.505E+00	(1.002E+00		2.30E+01	1.20E+01	G
								Energy duplication	
			93.35	3.288E+00	+ 1.734E+00		1.77E+01	5.56E+00	XA
Pa-234	N	2.2080E-01						1.63E+12	
			131.29	1.872E-01	?(4.163E-01		6.72E+01	1.80E+01	G
			569.47	2.490E-01	?(1.680E+00		1.91E+02	8.20E+00	G
			946.02	2.487E-01	(1.436E+00		1.63E+02	1.34E+01	G
			883.24	8.970E-02	- 1.793E+00		5.43E+02	9.60E+00	G
			880.53	5.748E-02	% 3.323E+00		1.58E+03	6.00E+00	G
TH-234	N	2.1829E+00						1.63E+12	
			63.29	9.258E-01	(P 2.408E+00		2.45E+01	3.81E+00	G
			92.59	3.041E+00	*(P 1.897E+00		1.31E+01	5.58E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PA-234M	N -2.8003E+00					1.63E+12	
		1001.00	-2.800E+00	?(	2.972E+01	2.99E+02	8.37E-01 G
		766.41	-1.390E+01	+	7.260E+01	1.51E+02	2.94E-01 G
U-235	N 3.1237E-01					2.57E+11	
		143.79	2.775E-01	&(	7.703E-01	8.31E+01	1.10E+01 G
		205.33	1.219E-01	&(	2.084E+00	4.94E+02	5.01E+00 G
		163.38	5.754E-01	&(	1.924E+00	9.96E+01	5.08E+00 G
							Energy duplication
		93.35	3.147E+00	?	1.660E+00	1.77E+01	5.81E+00 X
AM-241	T -1.0699E-01					1.58E+05	
		59.54	-1.070E-01	?(P	2.614E-01	2.05E+02	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
AM-241	60.58	180.	-27.	-0.004	204.97	-1.070E-01	P
EU-155	86.54	250.	-7.	-0.001	334.67	-3.051E-02	
U-235	93.35	200.	130.	0.018	17.70	3.147E+00	
AC-228	93.35	200.	130.	0.018	17.70	3.288E+00	
EU-155	105.17	156.	24.	0.003	76.56	1.633E-01	
EU-152	121.78	182.	2.	0.000	816.29	1.246E-02	
EU-154	122.87	165.	-15.	-0.002	122.03	-5.695E-02	
U-235	142.89	109.	18.	0.003	83.10	2.775E-01	
U-235	164.06	125.	16.	0.002	99.58	5.754E-01	
U-235	204.80	98.	3.	0.000	493.64	1.219E-01	
I-131	283.75	83.	-7.	-0.001	192.74	-3.108E-01	
AC-228	338.18	55.	56.	0.008	23.01	1.505E+00	
EU-152	344.16	60.	4.	0.001	298.38	4.599E-02	
I-131	365.77	47.	5.	0.001	193.49	2.161E-02	
CS-134	561.70	26.	11.	0.001	74.11	6.441E-01	
CS-134	568.86	23.	7.	0.001	107.16	2.201E-01	
I-131	637.72	34.	-2.	0.000	363.87	-1.806E-01	
CS-137	662.42	36.	15.	0.002	61.65	1.029E-01	
BI-212	727.53	35.	2.	0.000	441.77	1.598E-01	
PA-234M	766.36	41.	-6.	-0.001	150.66	-1.390E+01	
EU-152	779.34	34.	-2.	0.000	440.95	-9.740E-02	
CS-134	796.97	35.	-6.	-0.001	148.15	-4.707E-02	
CS-134	801.89	31.	-3.	0.000	318.76	-1.974E-01	
EU-154	872.59	23.	3.	0.000	223.17	1.907E-01	
AC-228	911.41	18.	60.	0.008	16.36	1.594E+00	
EU-152	964.78	35.	6.	0.001	140.35	3.469E-01	
AC-228	969.24	27.	23.	0.003	37.47	1.090E+00	
EU-154	995.69	20.	4.	0.001	155.10	3.408E-01	
PA-234M	1001.47	33.	-3.	0.000	298.63	-2.800E+00	
CO-60	1175.06	21.	1.	0.000	986.58	6.417E-03	
EU-154	1275.62	12.	2.	0.000	249.32	6.027E-02	
EU-152	1407.74	14.	10.	0.001	60.65	5.573E-01	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	2.1610E-02	2.1610E-02	1.189E+03%	9.52E-01
K-40		2.0640E+01	2.0640E+01	7.671E+00%	2.34E+00
CO-60	#A	3.3236E-03	3.3236E-03	9.866E+02%	2.73E-01
I-131	#A	2.1614E-02	2.1615E-02	1.935E+02%	1.46E-01

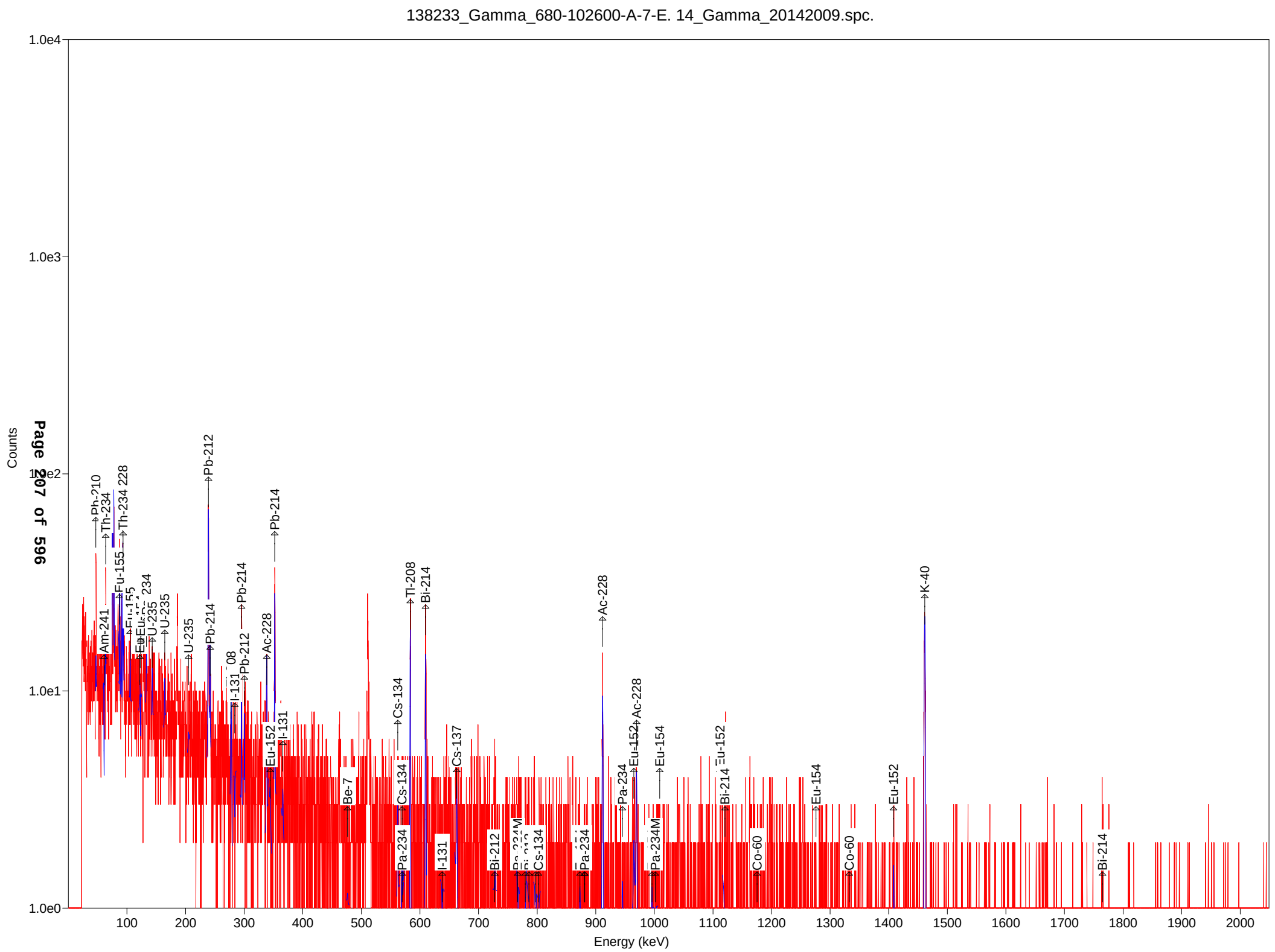
CS-134 #A	7.2224E-02	7.2224E-02	7.411E+01%	2.85E-01
CS-137 #A	1.0293E-01	1.0293E-01	6.165E+01%	2.08E-01
EU-152 #A	2.0230E-01	2.0230E-01	6.065E+01%	4.79E-01
EU-154 #A	1.3904E-01	1.3904E-01	1.229E+02%	1.52E+00
EU-155 #A	1.6333E-01	1.6333E-01	7.656E+01%	4.16E-01
TL-208	6.1936E-01	6.1936E-01	1.445E+01%	1.97E-01
PB-210 #A	5.7051E-01	5.7051E-01	1.404E+02%	2.57E+00
PB-212	1.3948E+00	1.3948E+00	1.050E+01%	3.30E-01
PB-214	1.0519E+00	1.0519E+00	1.768E+01%	4.34E-01
BI-212 #A	1.5977E-01	1.5977E-01	4.418E+02%	2.52E+00
BI-214	8.7752E-01	8.7752E-01	1.854E+01%	4.42E-01
AC-228 #	1.5681E+00	1.5681E+00	1.412E+01%	6.00E-01
Pa-234 A	2.2080E-01	2.2080E-01	6.722E+01%	4.16E-01
TH-234 A	2.1829E+00	2.1829E+00	2.269E+01%	2.41E+00
PA-234M#A	-2.8003E+00	-2.8003E+00	2.986E+02%	2.97E+01
U-235 #A	3.1237E-01	3.1237E-01	8.310E+01%	7.70E-01
AM-241 #A	-1.0699E-01	-1.0699E-01	3.415E+02%	2.61E-01

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 2.458E+01 Bq/Sample
Total Decayed Activity (37.6 to 1999.5 keV) 2.4583229E+01 Bq/Sample

The library has energies which are not separable.


138233_Gamma_680-102600-A-7-E. 14_Gamma_20142009.spc.
Counts
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Energy (keV)
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Pb-210
Th-234
Am-241
Th-234 228
Eu-155
U-235
Pb-212
Pb-214
Ac-228
Eu-152
I-131
Be-7
Cs-134
Tl-208
Bi-214
Cs-137
Bi-212
Ac-228
Pa-234
Eu-154
K-40
Co-60

Test America St. Louis Spectrum ID: 7_Gamma_20142022

Sample Description: 138233_Gamma_680-102600-A-8-E
Detector: Ge 7 SN/154
Batch ID: 138233
Work Order Number: Gamma
Lot Number: 680-102600-A-8-E

Decay to Time: 9/8/2014 17:32 Live Time: 7200 sec
Acquisition Time: 9/8/2014 17:33:21 Real Time: 7315 sec
Analysis Time: 9/8/2014 19:36 Dead Time: 1.58 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 7_Soil_25mL.Clb
Efficiency Cal Desc: Ge7_25mLSolidCal_90099_030712
Efficiency Cal Date: 3/9/2012 13:29
Energy Cal Date: 2/23/2012 08:40
Library: Client_Routine Short Rev1.lib
Bkgd Correction File: 7_2014-09-06_0610.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	2.095E-02	1541.0	3.227E-01	3.228E-01	1.154E+00
K-40	2.140E+01	7.9	1.681E+00	2.006E+00	3.178E+00
CO-60	9.273E-03	143.1	1.327E-02	1.328E-02	2.255E-01
I-131	6.471E-02	76.9	4.978E-02	4.989E-02	1.111E-01
CS-134	6.748E-05	519.6	3.506E-04	3.506E-04	3.556E-01
CS-137	0.000E+00	1000.0	3.433E-02	3.433E-02	2.486E-01
EU-152	3.282E-03	155.8	5.115E-03	5.118E-03	3.837E-01
EU-154	2.822E-02	508.4	1.434E-01	1.435E-01	1.627E+00
EU-155	-8.947E-03	956.0	8.553E-02	8.553E-02	2.955E-01
TL-208	7.460E-01	11.8	8.801E-02	9.614E-02	1.391E-01
PB-210	1.220E+00	59.4	7.251E-01	7.286E-01	2.075E+00
PB-212	1.924E+00	6.6	1.264E-01	1.774E-01	2.251E-01
PB-214	1.174E+00	12.4	1.461E-01	1.584E-01	2.703E-01
BI-212	1.397E-01	328.3	4.585E-01	4.586E-01	1.837E+00
BI-214	9.248E-01	16.6	1.534E-01	1.607E-01	3.581E-01
AC-228	1.456E+00	13.3	1.929E-01	2.067E-01	5.495E-01
Pa-234	6.948E-02	109.1	7.581E-02	7.590E-02	4.093E-01
TH-234	2.018E+00	24.6	4.972E-01	5.083E-01	2.126E+00
PA-234M	8.817E-01	747.7	6.592E+00	6.592E+00	2.397E+01
U-235	2.826E-01	58.0	1.638E-01	1.645E-01	4.919E-01
AM-241	5.808E-02	99.2	5.759E-02	5.767E-02	1.931E-01
Total	3.242E+01				

Analyst: Curtis Carey

TestAmerica Spectrum name: 7_Gamma_20142022.An1

Sample description
138233_Gamma_680-102600-A-8-E

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20142022.An1

Acquisition information
Start time:	9/8/2014 5:33:21 PM
Live time:	7200
Real time:	7315
Dead time:	1.58 %
Detector ID:	7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Soil_25mL.Clb
Ge7_25mLSolidCal_90099_030712

Energy Calibration
Created:	2/23/2012 8:40:56 AM
Zero offset:	0.117 keV
Gain:	0.250 keV/channel
Quadratic:	3.508E-09 keV/channel^2

Efficiency Calibration
Created:	3/9/2012 1:29:42 PM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 1.53 %
Log(Eff):	7.199650E-01 + (-3.527641E-01*Log(E)) + (-4.778753E-02*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 0.27 %
Log(Eff):	-1.235982E+01 + (4.659795E+00*Log(E)) + (-5.277660E-01*Log(E)^2)

Library Files
Main analysis library:	Client_Routine Short Rev1.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (2000.12keV)
Peak rejection level:	1000.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	9/8/2014 5:32:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2014-09-06_0610.PBC 9/6/2014 6:10:25 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 17 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1725

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.59	102.	22.85	0.76	1.056E-01	46.54	4.250	PBC<MDA	PB210
59.80	18.	99.17	0.85	1.187E-01	59.54	35.900	PBC<MDA	AM241
63.21	57.	16.55	1.02	1.210E-01	63.29	3.810	PBC<MDA	TH234
74.81	191.	12.68	0.87	1.250E-01				
77.28	308.	8.53	0.87	1.254E-01				
92.86	227.	13.38	0.94	1.248E-01	92.59	5.584	2.226E+00	TH234
					93.35	5.810	4.352E+00	U235
					93.35	5.561	4.547E+00	AC228
					93.35	5.561	4.547E+00	AC228
143.67	22.	57.98	0.94	1.069E-01	143.79	10.960	PBC<MDA	U235
163.09	12.	122.99	0.41	9.835E-02	163.38	5.080	PBC<MDA	U235
238.62	426.	6.57	1.20	7.109E-02	238.63	43.300	1.924E+00	PB212
241.79	46.	41.37	0.49	7.022E-02	242.00	7.430	PBC<MDA	PB214
278.24	14.	85.23	1.08	6.226E-02	277.28	6.310	PBC<MDA	TL208
284.65	2.	544.74	1.09	6.089E-02	284.30	6.140	PBC<MDA	I131
295.37	131.	15.49	1.13	5.884E-02	295.09	19.300	1.599E+00	PB214
300.52	35.	34.17	0.36	5.802E-02	300.03	3.280	2.554E+00	PB212
338.42	67.	20.82	1.14	5.206E-02	338.32	12.010	1.490E+00	AC228
					338.32	12.010	1.490E+00	AC228
351.99	159.	12.44	1.57	5.022E-02	351.93	37.600	1.167E+00	PB214
365.67	12.	76.92	1.17	4.863E-02	364.48	81.700	PBC<MDA	I131
569.33	1.	760.97	1.37	3.200E-02	569.47	8.200	PBC<MDA	Pa234
583.24	142.	11.80	1.69	3.129E-02	583.02	84.500	7.460E-01	TL208
609.46	99.	14.17	1.86	2.999E-02	609.31	46.090	9.957E-01	BI214
637.55	4.	197.52	1.43	2.873E-02	636.97	7.170	PBC<MDA	I131

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
785.33	2.	328.29	1.57	2.339E-02	785.42	1.280	PBC<MDA	BI212
795.44	2.	519.59	1.58	2.309E-02	795.87	85.530	PBC<MDA	CS134
860.97	37.	22.96	0.52	2.136E-02	860.56	12.420	1.919E+00	TL208
883.08	1.	749.06	1.65	2.088E-02	880.53	6.000	PBC<MDA	Pa234
					883.24	9.600	6.130E-02	Pa234
911.50	61.	16.39	1.68	2.018E-02	911.07	29.000	1.442E+00	AC228
					911.07	29.000	1.442E+00	AC228
945.37	6.	121.68	1.70	1.943E-02	946.02	13.400	PBC<MDA	Pa234
969.13	22.	45.87	1.72	1.896E-02	968.97	17.460	PBC<MDA	AC228
					968.97	17.460	9.369E-01	AC228
1000.83	1.	747.68	1.75	1.835E-02	1001.00	0.837	PBC<MDA	PA234M
1120.53	15.	37.80	1.85	1.636E-02	1120.29	15.100	PBC<MDA	BI214
1172.95	5.	145.43	1.89	1.560E-02	1173.24	99.900	PBC<MDA	CO60
1275.85	1.	508.35	1.96	1.433E-02	1274.54	35.190	PBC<MDA	EU154
1407.51	2.	332.76	2.06	1.292E-02	1408.00	21.005	PBC<MDA	EU152
1460.96	204.	7.25	2.10	1.243E-02	1460.83	10.670	2.140E+01	K40
1764.32	9.	41.64	2.29	1.018E-02	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
298.92	74.84	261.	152.	1.213E+03	21.09	1.089 -	sM
308.78	77.30	295.	286.	2.284E+03	13.14	0.949 -	sM

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_Routine Short Rev1.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.89	46.59	191.	39.	0.005	22.85	0.761s
AM-241	238.77	59.80	147.	18.	0.002	99.17	0.850s
TH-234	252.39	63.21	212.	57.	0.008	16.55	1.021s
EU-155	341.38	85.45	220.	-30.	-0.004	71.31	0.880
TH-234	371.03	92.86	289.	112.	0.016	13.38	0.943s
U-235	372.97	93.35	211.	153.	0.021	15.69	0.887D
AC-228	372.97	93.35	211.	153.	0.021	15.69	0.887D
EU-155	420.21	105.16	126.	-2.	0.000	955.99	0.900s
EU-154	491.74	123.04	85.	-4.	-0.001	295.14	0.919s
Pa-234	523.44	130.96	149.	-16.	-0.002	109.12	0.928s
U-235	574.28	143.67	69.	22.	0.003	57.98	0.941s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	651.95	163.09	65.	12.	0.002	122.99	0.409s
U-235	813.37	203.44	79.	-11.	-0.001	122.02	1.007
PB-212	954.12	238.62	102.	426.	0.059	6.57	1.204
PB-214	966.79	241.79	98.	46.	0.006	41.37	0.493s
TL-208	1112.61	278.24	69.	14.	0.002	85.23	1.081s
I-131	1138.23	284.65	80.	2.	0.000	544.74	1.089s
PB-214	1181.14	295.37	54.	131.	0.018	15.49	1.134s
PB-212	1201.73	300.52	27.	35.	0.005	34.17	0.355s
AC-228	1353.33	338.42	64.	67.	0.009	20.82	1.144s
EU-152	1380.21	345.14	56.	-7.	-0.001	155.83	1.150s
PB-214	1407.62	351.99	53.	159.	0.022	12.44	1.573s
I-131	1462.35	365.67	39.	12.	0.002	76.92	1.170s
Pa-234	2277.02	569.33	32.	1.	0.000	760.97	1.370
TL-208	2332.68	583.24	26.	142.	0.020	11.80	1.687s
BI-214	2437.56	609.46	50.	99.	0.014	14.17	1.864s
I-131	2549.93	637.55	34.	4.	0.001	197.52	1.433s
PA-234M	3050.76	762.76	21.	-1.	0.000	802.28	1.550s
BI-212	3141.07	785.33	22.	2.	0.000	328.29	1.567s
CS-134	3181.49	795.44	31.	2.	0.000	519.59	1.576s
TL-208	3443.61	860.97	7.	37.	0.005	22.96	0.516s
Pa-234	3532.07	883.08	21.	1.	0.000	749.06	1.649s
AC-228	3645.76	911.50	19.	61.	0.008	16.39	1.675
Pa-234	3781.22	945.37	21.	6.	0.001	121.68	1.704
AC-228	3876.27	969.13	41.	22.	0.003	45.87	1.724s
EU-154	3992.89	998.29	34.	-2.	0.000	437.23	1.746s
PA-234M	4003.07	1000.83	26.	1.	0.000	747.68	1.750s
EU-154	4014.91	1003.79	28.	-5.	-0.001	142.66	1.753s
EU-152	4450.53	1112.70	33.	-4.	-0.001	193.35	1.839s
BI-214	4481.84	1120.53	25.	15.	0.002	37.80	1.845s
CO-60	4691.54	1172.95	23.	5.	0.001	145.43	1.886s
EU-154	5103.14	1275.85	24.	1.	0.000	508.35	1.963s
CO-60	5334.96	1333.81	18.	-2.	0.000	246.47	2.005s
EU-152	5629.73	1407.51	19.	2.	0.000	332.76	2.059s
K-40	5843.51	1460.96	35.	204.	0.028	7.25	2.095
BI-214	7056.89	1764.32	5.	9.	0.001	41.64	2.290s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	Peak MDA Value Bq/Sample	COMMENTS
BE-7	C	2.0949E-02				5.31E+01	
			477.60	2.095E-02	&(	1.154E+00 1.54E+03 1.05E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
K-40	N	2.1396E+01					4.66E+11	
			1460.83	2.140E+01	(P	3.178E+00	7.25E+00	1.07E+01 G
CO-60	F	9.2732E-03					1.93E+03	
			1332.50	-2.523E-02	?(	2.255E-01	2.46E+02	1.00E+02 G
			1173.24	4.380E-02	?(	2.237E-01	1.45E+02	9.99E+01 G
I-131	I	6.4711E-02					8.02E+00	
			364.48	4.314E-02	&(	1.111E-01	7.69E+01	8.17E+01 G
			284.30	8.728E-02	&(	1.656E+00	5.45E+02	6.14E+00 G
			636.97	2.911E-01	?(	2.021E+00	1.98E+02	7.17E+00 G
CS-134	I	6.7482E-05					7.54E+02	
			604.71	-9.377E-03	%(	3.556E-01	1.11E+03	9.76E+01 G
			795.87	1.085E-02	?(	2.025E-01	5.20E+02	8.55E+01 G
			569.32	2.187E-02	%	8.230E-01	1.04E+03	1.54E+01 G
			801.95	0.000E+00	-	2.409E+00	1.00E+03	8.69E+00 G
			563.24	0.000E+00	&	1.991E+00	1.00E+03	8.35E+00 G
EU-152	F	3.2822E-03					4.94E+03	
			344.29	-7.146E-02	?(	3.837E-01	1.56E+02	2.65E+01 G
			121.78	-5.453E-03	%	2.160E-01	1.14E+03	2.86E+01 G
			778.92	-7.643E-03	%	7.991E-01	2.69E+03	1.29E+01 G
			964.11	-1.322E-02	%	1.739E+00	3.69E+03	1.46E+01 G
			1112.07	-2.690E-01	+	1.828E+00	1.93E+02	1.36E+01 G
			1408.00	9.758E-02	?(	1.183E+00	3.33E+02	2.10E+01 G
EU-154	I	2.8218E-02					3.14E+03	
			873.23	0.000E+00	?(	1.627E+00	1.00E+03	1.23E+01 G
			123.10	-1.316E-02	+	1.343E-01	2.95E+02	4.08E+01 G
			1274.54	3.806E-02	?(	7.032E-01	5.08E+02	3.52E+01 G
			723.36	1.531E-03	%	1.006E+00	1.85E+04	2.02E+01 G
			1004.77	-2.304E-01	+	1.148E+00	1.43E+02	1.80E+01 G
			996.33	-1.365E-01	+	2.132E+00	4.37E+02	1.06E+01 G
EU-155	I	-8.9469E-03					1.81E+03	
			105.31	-8.947E-03	?(	2.955E-01	9.56E+02	2.12E+01 G
			86.54	-1.096E-01	+	2.587E-01	7.13E+01	3.07E+01 G
TL-208	N	7.4596E-01					6.98E+02	
			583.02	7.460E-01	@(	1.391E-01	1.18E+01	8.45E+01 G
			277.28	5.120E-01	&	1.464E+00	8.52E+01	6.31E+00 G
			860.56	1.919E+00	+	8.024E-01	2.30E+01	1.24E+01 G
PB-210	N	1.2200E+00					8.14E+03	
			46.54	1.220E+00	@(P	2.075E+00	2.29E+01	4.25E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	1.9244E+00					6.98E+02	
			238.63	1.924E+00	(	2.251E-01	6.57E+00	4.33E+01 G
			300.03	2.554E+00	+	1.965E+00	3.42E+01	3.28E+00 G
PB-214	N	1.1744E+00					5.84E+05	
			351.93	1.167E+00	*(	2.703E-01	1.24E+01	3.76E+01 G
			295.09	1.599E+00	+	4.522E-01	1.55E+01	1.93E+01 G
			242.00	1.211E+00	(	1.297E+00	4.14E+01	7.43E+00 G
BI-212	N	1.3968E-01					6.98E+02	
			727.17	0.000E+00	?(	1.837E+00	1.00E+03	7.55E+00 G
			785.42	9.636E-01	?(	1.144E+01	3.28E+02	1.28E+00 G
BI-214	N	9.2483E-01					5.84E+05	
			609.31	9.957E-01	(P	3.581E-01	1.42E+01	4.61E+01 G
			1120.29	8.534E-01	?(P	1.451E+00	3.78E+01	1.51E+01 G
			1764.49	7.827E-01	?(P	1.119E+00	4.16E+01	1.54E+01 G
AC-228	N	1.4561E+00					2.10E+03	
			911.07	1.442E+00	?(	5.495E-01	1.64E+01	2.90E+01 G
			968.97	9.369E-01	-	1.370E+00	4.59E+01	1.75E+01 G
			338.32	1.490E+00	@(	8.879E-01	2.08E+01	1.20E+01 G
								Energy duplication
			93.35	3.064E+00	+	1.411E+00	1.57E+01	5.56E+00 XA
Pa-234	N	6.9481E-02					1.63E+12	
			131.29	-1.116E-01	&(	4.093E-01	1.09E+02	1.80E+01 G
			569.47	5.618E-02	+	1.541E+00	7.61E+02	8.20E+00 G
			946.02	3.000E-01	(	1.273E+00	1.22E+02	1.34E+01 G
			883.24	6.177E-04	%	1.871E+00	8.27E+04	9.60E+00 G
			880.53	9.778E-02	?(	2.689E+00	7.49E+02	6.00E+00 G
TH-234	N	2.0181E+00					1.63E+12	
			63.29	1.713E+00	*(P	2.126E+00	1.66E+01	3.81E+00 G
			92.59	2.226E+00	*(P	1.633E+00	1.34E+01	5.58E+00 G
PA-234M	N	8.8165E-01					1.63E+12	
			1001.00	8.816E-01	?(	2.397E+01	7.48E+02	8.37E-01 G
			766.41	-1.624E+00	+	4.786E+01	8.02E+02	2.94E-01 G
U-235	N	2.8258E-01					2.57E+11	
			143.79	2.589E-01	?(	4.919E-01	5.80E+01	1.10E+01 G
			205.33	-3.633E-01	-	1.506E+00	1.22E+02	5.01E+00 G
			163.38	3.336E-01	(	1.120E+00	1.23E+02	5.08E+00 G
								Energy duplication
			93.35	2.933E+00		1.351E+00	1.57E+01	5.81E+00 X

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AM-241	T 5.8075E-02					1.58E+05	
		59.54	5.807E-02	?(	1.931E-01	9.92E+01	3.59E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
AM-241	59.80	147.	18.	0.002	99.17	5.807E-02
EU-155	85.45	220.	-30.	-0.004	71.31	-1.096E-01
AC-228	93.35	211.	153.	0.021	15.69	3.064E+00
EU-155	105.16	126.	-2.	0.000	955.99	-8.947E-03
EU-154	123.04	85.	-4.	-0.001	295.14	-1.316E-02
I-131	284.65	80.	2.	0.000	544.74	8.728E-02
AC-228	338.42	64.	67.	0.009	20.82	1.490E+00
EU-152	345.14	56.	-7.	-0.001	155.83	-7.146E-02
I-131	365.67	39.	12.	0.002	76.92	4.314E-02
I-131	637.55	34.	4.	0.001	197.52	2.911E-01
PA-234M	762.76	21.	-1.	0.000	802.28	-1.624E+00
BI-212	785.33	22.	2.	0.000	328.29	9.636E-01

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
CS-134	795.44	31.	2.	0.000	519.59	1.085E-02		
AC-228	911.50	19.	61.	0.008	16.39	1.442E+00		
AC-228	969.13	41.	22.	0.003	45.87	9.369E-01		
EU-154	998.29	34.	-2.	0.000	437.23	-1.365E-01		
PA-234M	1000.83	26.	1.	0.000	747.68	8.816E-01		
EU-154	1003.79	28.	-5.	-0.001	142.66	-2.304E-01		
EU-152	1112.70	33.	-4.	-0.001	193.35	-2.690E-01		
CO-60	1172.95	23.	5.	0.001	145.43	4.380E-02		
EU-154	1275.85	24.	1.	0.000	508.35	3.806E-02		
CO-60	1333.81	18.	-2.	0.000	246.47	-2.523E-02		
EU-152	1407.51	19.	2.	0.000	332.76	9.758E-02		
K-40	1460.96	35.	204.	0.028	7.25	2.140E+01	P	

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	2.0949E-02	2.0949E-02	1.541E+03%	1.15E+00
K-40	#	2.1396E+01	2.1396E+01	7.856E+00%	3.18E+00
CO-60	#A	9.2732E-03	9.2732E-03	1.431E+02%	2.26E-01
I-131	#A	6.4705E-02	6.4711E-02	7.692E+01%	1.11E-01
CS-134	#A	6.7482E-05	6.7482E-05	5.196E+02%	3.56E-01
CS-137	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.49E-01
EU-152	#A	3.2822E-03	3.2822E-03	1.558E+02%	3.84E-01
EU-154	#A	2.8218E-02	2.8218E-02	5.084E+02%	1.63E+00
EU-155	#A	-8.9469E-03	-8.9469E-03	9.560E+02%	2.95E-01
TL-208		7.4596E-01	7.4596E-01	1.180E+01%	1.39E-01
PB-210	#A	1.2200E+00	1.2200E+00	5.943E+01%	2.08E+00
PB-212		1.9244E+00	1.9244E+00	6.570E+00%	2.25E-01
PB-214		1.1744E+00	1.1744E+00	1.244E+01%	2.70E-01
BI-212	#A	1.3968E-01	1.3968E-01	3.283E+02%	1.84E+00
BI-214		9.2483E-01	9.2483E-01	1.658E+01%	3.58E-01
AC-228	#	1.4561E+00	1.4561E+00	1.325E+01%	5.49E-01
Pa-234	A	6.9481E-02	6.9481E-02	1.091E+02%	4.09E-01
TH-234	#A	2.0181E+00	2.0181E+00	2.464E+01%	2.13E+00
PA-234M	#A	8.8165E-01	8.8165E-01	7.477E+02%	2.40E+01
U-235	A	2.8258E-01	2.8258E-01	5.798E+01%	4.92E-01
AM-241	#A	5.8075E-02	5.8075E-02	9.917E+01%	1.93E-01

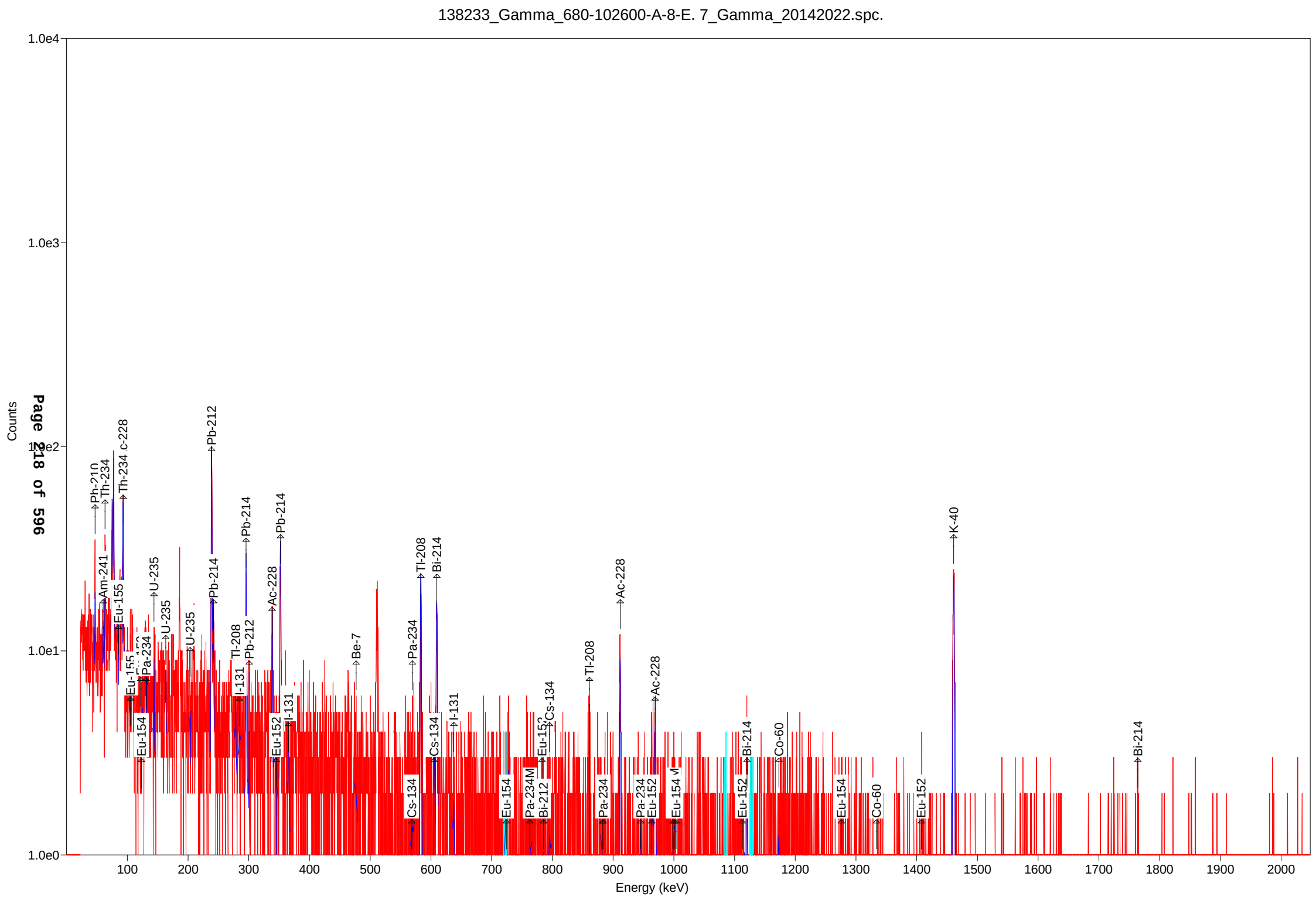
- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

--- S U M M A R Y ---

Total Activity (37.6 to 2000.1 keV) 8.290E+00 Bq/Sample
Total Decayed Activity (37.6 to 2000.1 keV) 8.2902279E+00 Bq/Sample

The library has energies which are not separable.


138233_Gamma_680-102600-A-8-E. 7_Gamma_20142022.spc.
Counts
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Energy (keV)
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Pb-210
Th-234
Th-234 c-228
Am-241
Eu-155
U-235
U-235
U-235
Pb-212
Pb-214
Tl-208
Pb-212
I-131
Pb-214
Ac-228
Eu-152
I-131
Be-7
Pa-234
Tl-208
Bi-214
Cs-134
I-131
Cs-134
Eu-154
Pa-234M
Bi-212
Eu-152
Cs-134
Tl-208
Pa-234
Ac-228
Ac-228
Pa-234
Eu-152
Eu-154 M
Eu-152
Bi-214
Co-60
Eu-154
Co-60
Eu-152
K-40
Bi-214

Prep Batch: 140177

Fill Geometry, No In-Growth

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 140177

Lab ID: MB 160-140177/1-A | Analyzed: 08/26/14 11:36 | Ts: 120 | Sigma: 2
Client ID: | Detector: GV12 | Decay Corrected: No

Analyte	MB Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	-0.4512	0.668	0.669	U	pCi/g		1.11	140267
Radium-226	0.9427	2.13	2.14	U	pCi/g	1.00	3.10	140267
Radium-228	0.1887	0.267	0.268	U	pCi/g		0.539	140267
Thorium-232	0.1887	0.267	0.268	U	pCi/g		0.539	140267
Thorium-234	-0.9281	2.43	2.43	U	pCi/g		2.36	140267
Thallium-208	-0.07418	0.218	0.218	U	pCi/g		0.205	140267
Uranium-235	0.1587	0.280	0.281	U	pCi/g		0.679	140267
Uranium-238	-0.9281	2.43	2.43	U	pCi/g		2.36	140267
Actinium 228	0.1887	0.267	0.268	U	pCi/g		0.539	140267
Bismuth-212	0.1466	1.01	1.01	U	pCi/g		1.80	140267
Bismuth-214	-0.07571	0.332	0.332	U	pCi/g		0.422	140267
Lead-210	-0.07242	1.64	1.64	U	pCi/g		2.46	140267
Lead-212	0.2592	0.185	0.187		pCi/g		0.256	140267
Lead-214	0.1092	0.195	0.195	U	pCi/g		0.318	140267
Potassium-40	-2.315	92.6	92.6	U	pCi/g		2.63	140267
Protactinium-231	1.014	2.07	2.07	U	pCi/g		3.50	140267

Lab ID: LCS 160-140177/2-A | Analyzed: 08/26/14 11:39 | Ts: 120 | Sigma: 2
Client ID: | Detector: GV7 | Decay Corrected: No

Analyte	LCS Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Americium-241	995.9	3.76	98.7		pCi/g		1.98	140271
Cesium-137	369.5	3.19	36.1		pCi/g		1.33	140271
Cobalt-60	412.8	3.01	39.6		pCi/g		0.977	140271

Lab ID: 680-102600-6 | Analyzed: 08/26/14 11:33 | Ts: 120 | Sigma: 2
Client ID: SD-278-SS | Detector: GV4 | Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.743	0.496	0.502	U	pCi/g		0.788	140269
Radium-226	5.35	3.72	3.79		pCi/g	1.00	5.19	140269
Radium-228	1.15	0.612	0.622		pCi/g		1.08	140269
Thorium-232	1.15	0.612	0.622		pCi/g		1.08	140269
Thorium-234	3.30	2.26	2.29	U	pCi/g		3.37	140269
Thallium-208	0.371	0.227	0.230		pCi/g		0.336	140269
Uranium-235	0.614	0.668	0.671	U	pCi/g		1.09	140269

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 140177

Lab ID: 680-102600-6 Analyzed: 08/26/14 11:33 Ts: 120 Sigma: 2
Client ID: SD-278-SS Detector: GV4 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Uranium-238	3.30	2.26	2.29	U	pCi/g		3.37	140269
Actinium 228	1.15	0.612	0.622		pCi/g		1.08	140269
Bismuth-212	0.000	2.96	2.96	U	pCi/g		3.30	140269
Bismuth-214	0.567	0.487	0.490	U	pCi/g		0.745	140269
Lead-210	3.22	2.16	2.20	U	pCi/g		3.33	140269
Lead-212	0.773	0.339	0.349		pCi/g		0.464	140269
Lead-214	0.626	0.363	0.368	U	pCi/g		0.638	140269
Potassium-40	14.7	4.27	4.50		pCi/g		5.23	140269
Protactinium-231	-0.126	0.357	0.357	U	pCi/g		7.46	140269

Lab ID: 680-102600-6 DU Analyzed: 08/26/14 13:40 Ts: 120 Sigma: 2
Client ID: SD-278-SS Detector: GV12 Decay Corrected: No

Analyte	DU Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.2976	0.427	0.429	U	pCi/g		0.710	140267
Radium-226	3.887	2.93	2.98		pCi/g	1.00	3.52	140267
Radium-228	1.141	0.446	0.459		pCi/g		0.595	140267
Thorium-232	1.141	0.446	0.459		pCi/g		0.595	140267
Thorium-234	0.9843	0.851	0.858	U	pCi/g		2.26	140267
Thallium-208	0.3704	0.156	0.160		pCi/g		0.192	140267
Uranium-235	0.4186	0.480	0.481	U	pCi/g		0.774	140267
Uranium-238	0.9843	0.851	0.858	U	pCi/g		2.26	140267
Actinium 228	1.141	0.446	0.459		pCi/g		0.595	140267
Bismuth-212	1.491	1.22	1.23	U	pCi/g		1.91	140267
Bismuth-214	0.9441	0.286	0.300		pCi/g		0.345	140267
Lead-210	3.103	1.91	1.97		pCi/g		2.60	140267
Lead-212	0.9958	0.208	0.234		pCi/g		0.296	140267
Lead-214	0.7779	0.287	0.297		pCi/g		0.366	140267
Potassium-40	15.59	2.70	3.09		pCi/g		2.53	140267
Protactinium-231	-0.03342	0.0765	0.0765	U	pCi/g		4.10	140267

Lab ID: 680-102600-7 Analyzed: 08/26/14 11:28 Ts: 120 Sigma: 2
Client ID: SD-278-01 Detector: GV17 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.177	0.312	0.313	U	pCi/g		2.42	140266

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 140177

Lab ID: 680-102600-7 Analyzed: 08/26/14 11:28 Ts: 120 Sigma: 2
Client ID: SD-278-01 Detector: GV17 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Radium-226	7.55	2.53	2.85		pCi/g	1.00	2.90	140266
Radium-228	1.79	0.440	0.476		pCi/g		0.573	140266
Thorium-232	1.79	0.440	0.476		pCi/g		0.573	140266
Thorium-234	1.40	1.96	1.96	U	pCi/g		3.01	140266
Thallium-208	0.475	0.147	0.155		pCi/g		0.166	140266
Uranium-235	0.150	0.515	0.515	U	pCi/g		0.944	140266
Uranium-238	1.40	1.96	1.96	U	pCi/g		3.01	140266
Actinium 228	1.79	0.440	0.476		pCi/g		0.573	140266
Bismuth-212	0.799	1.25	1.25	U	pCi/g		2.09	140266
Bismuth-214	1.05	0.293	0.313		pCi/g		0.335	140266
Lead-210	1.33	1.90	1.91	U	pCi/g		2.98	140266
Lead-212	1.39	0.225	0.288		pCi/g		0.288	140266
Lead-214	1.18	0.289	0.313		pCi/g		0.341	140266
Potassium-40	18.4	2.70	3.29		pCi/g		2.25	140266
Protactinium-231	0.690	0.624	0.628	U	pCi/g		4.85	140266

Lab ID: 680-102600-8 Analyzed: 08/26/14 11:29 Ts: 120 Sigma: 2
Client ID: SD-278-02 Detector: GV14 Decay Corrected: No

Analyte	Result	Count Unc	Total Unc	Qualifier	Unit	RL	MDC	Anly Batch
Actinium-227	0.586	0.293	0.303		pCi/g		0.405	140264
Radium-226	-0.382	2.39	2.39	U	pCi/g	1.00	3.37	140264
Radium-228	1.75	0.518	0.548		pCi/g		0.431	140264
Thorium-232	1.75	0.518	0.548		pCi/g		0.431	140264
Thorium-234	1.59	1.29	1.31	U	pCi/g		2.04	140264
Thallium-208	0.560	0.170	0.179		pCi/g		0.179	140264
Uranium-235	0.410	0.458	0.460	U	pCi/g		0.714	140264
Uranium-238	1.59	1.29	1.31	U	pCi/g		2.04	140264
Actinium 228	1.75	0.518	0.548		pCi/g		0.431	140264
Bismuth-212	3.45	1.37	1.41		pCi/g		1.30	140264
Bismuth-214	0.747	0.258	0.270		pCi/g		0.350	140264
Lead-210	0.773	1.37	1.38	U	pCi/g		2.18	140264
Lead-212	1.24	0.232	0.282		pCi/g		0.267	140264
Lead-214	0.820	0.220	0.235		pCi/g		0.326	140264
Potassium-40	16.1	2.71	3.17		pCi/g		2.64	140264
Protactinium-231	1.81	1.59	1.61	U	pCi/g		3.58	140264

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 140177

Quality Control Summary

Method Blank ID:	Analyte	Parent Result	Spike Added	MB Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
MB 160-140177/1-A	Actinium-227			-0.4512	U	pCi/g							
MB 160-140177/1-A	Radium-226			0.9427	U	pCi/g							
MB 160-140177/1-A	Radium-228			0.1887	U	pCi/g							
MB 160-140177/1-A	Thorium-232			0.1887	U	pCi/g							
MB 160-140177/1-A	Thorium-234			-0.9281	U	pCi/g							
MB 160-140177/1-A	Thallium-208			-0.07418	U	pCi/g							
MB 160-140177/1-A	Uranium-235			0.1587	U	pCi/g							
MB 160-140177/1-A	Uranium-238			-0.9281	U	pCi/g							
MB 160-140177/1-A	Actinium 228			0.1887	U	pCi/g							
MB 160-140177/1-A	Bismuth-212			0.1466	U	pCi/g							
MB 160-140177/1-A	Bismuth-214			-0.07571	U	pCi/g							
MB 160-140177/1-A	Lead-210			-0.07242	U	pCi/g							
MB 160-140177/1-A	Lead-212			0.2592		pCi/g							
MB 160-140177/1-A	Lead-214			0.1092	U	pCi/g							
MB 160-140177/1-A	Potassium-40			-2.315	U	pCi/g							
MB 160-140177/1-A	Protactinium-231			1.014	U	pCi/g							

Lab Control Sample ID:	Analyte	Parent Result	Spike Added	LCS Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
LCS 160-140177/2-A	Americium-241		981	995.9		pCi/g	101	87 - 116					
LCS 160-140177/2-A	Cesium-137		362	369.5		pCi/g	102	87 - 120					
LCS 160-140177/2-A	Cobalt-60		384	412.8		pCi/g	108	87 - 115					

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
680-102600-6	Actinium-227	0.743		0.2976	U	pCi/g			86	0.48	1.35	1	
680-102600-6	Radium-226	5.35		3.887		pCi/g			32	0.22	0.61	1	
680-102600-6	Radium-228	1.15		1.141		pCi/g			0.4	0	0.01	1	
680-102600-6	Thorium-232	1.15		1.141		pCi/g			0.4	0	0.01	1	
680-102600-6	Thorium-234	3.30		0.9843	U	pCi/g			108	0.74	1.89	1	
680-102600-6	Thallium-208	0.371		0.3704		pCi/g			0.1	0	0	1	
680-102600-6	Uranium-235	0.614		0.4186	U	pCi/g			38	0.17	0.47	1	
680-102600-6	Uranium-238	3.30		0.9843	U	pCi/g			108	0.74	1.89	1	
680-102600-6	Actinium 228	1.15		1.141		pCi/g			0.4	0	0.01	1	
680-102600-6	Bismuth-212	0.000		1.491	U	pCi/g			200	0.36	0.93	1	
680-102600-6	Bismuth-214	0.567		0.9441		pCi/g			50	0.48	1.31	1	
680-102600-6	Lead-210	3.22		3.103		pCi/g			4	0.03	0.08	1	
680-102600-6	Lead-212	0.773		0.9958		pCi/g			25	0.38	1.06	1	
680-102600-6	Lead-214	0.626		0.7779		pCi/g			22	0.23	0.64	1	
680-102600-6	Potassium-40	14.7		15.59		pCi/g			6	0.12	0.33	1	

Gamma Spectroscopy Analysis Detail Report
Prep Batch: 140177

Duplicate ID:	Analyte	Parent Result	Spike Added	DU Result	Qualifier	Unit	% Rec	% Rec Limits	RPD	RER	DER	RER Limit	Z Factor
680-102600-6	Protactinium-231	-0.126		-0.03342	U	pCi/g			116	0.21	0.51	1	

Glossary:

Ts = Count Duration, Sample

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102600-3

SDG No.: 680102600-1

Batch Number: 138233 Batch Start Date: 08/15/14 18:30 Batch Analyst: Santos, Mario J

Batch Method: Fill_Geo-21 Batch End Date:

Lab Sample ID	Client Sample ID	Method Chain	Basis	TareWeight	GrossWeight	InitialAmount	IngDecDate1	IngDecDate3	Geometry
MB 160-138233/1		Fill_Geo-21, GA-01-R				25 g	8/15/14	9/5/14	25mL d=1
LCS 160-138233/2		Fill_Geo-21, GA-01-R				25 g	8/15/14	9/5/14	25mL d=1
680-102600-A-6-D	SD-278-SS	Fill_Geo-21, GA-01-R	T	37.0 g	63.3 g	26.3 g	8/15/14	9/5/14	25mL d=1
680-102600-A-6-D DU	SD-278-SS	Fill_Geo-21, GA-01-R	T	37.0 g	63.3 g	26.3 g	8/15/14	9/5/14	25mL d=1
680-102600-A-7-C	SD-278-01	Fill_Geo-21, GA-01-R	T	36.7 g	67.4 g	30.7 g	8/15/14	9/5/14	25mL Solid
680-102600-A-8-C	SD-278-02	Fill_Geo-21, GA-01-R	T	36.8 g	69.3 g	32.5 g	8/15/14	9/5/14	25mL Solid

Lab Sample ID	Client Sample ID	Method Chain	Basis	25mLD=1 00006					
MB 160-138233/1		Fill_Geo-21, GA-01-R							
LCS 160-138233/2		Fill_Geo-21, GA-01-R		# mL					
680-102600-A-6-D	SD-278-SS	Fill_Geo-21, GA-01-R	T						
680-102600-A-6-D DU	SD-278-SS	Fill_Geo-21, GA-01-R	T						
680-102600-A-7-C	SD-278-01	Fill_Geo-21, GA-01-R	T						
680-102600-A-8-C	SD-278-02	Fill_Geo-21, GA-01-R	T						

Batch Notes	

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

GAMMA SPECTROSCOPY BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102600-3

SDG No.: 680102600-1

Batch Number: 140177 Batch Start Date: 08/26/14 09:42 Batch Analyst: Lockhart, Justin D

Batch Method: Fill_Geo-0 Batch End Date:

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	TareWeight	GrossWeight	Geometry	25mLD=1 00006	
MB 160-140177/1		Fill_Geo-0, GA-01-R		25 g			25mL d=1		
LCS 160-140177/2		Fill_Geo-0, GA-01-R		25 g			25mL d=1	# mL	
680-102600-A-6-E	SD-278-SS	Fill_Geo-0, GA-01-R	T	26.3 g	37.0 g	63.3 g	25mL d=1		
680-102600-A-6-E DU	SD-278-SS	Fill_Geo-0, GA-01-R	T	26.3 g	37.0 g	63.3 g	25mL d=1		
680-102600-A-7-D	SD-278-01	Fill_Geo-0, GA-01-R	T	30.7 g	36.7 g	67.4 g	25mL Solid		
680-102600-A-8-D	SD-278-02	Fill_Geo-0, GA-01-R	T	32.5 g	36.8 g	69.3 g	25mL Solid		

Batch Notes	

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

Test America St. Louis Spectrum ID: 12_Gamma_20141901

Sample Description: 140177_Gamma_MB 160-140177~1-A
Detector: Ge12 S/N10034336
Batch ID: 140177
Work Order Number: Gamma
Lot Number: MB 160-140177~1-A

Decay to Time: 8/26/2014 19:23 Live Time: 7200 sec
Acquisition Time: 8/26/2014 11:36:24 Real Time: 7217 sec
Analysis Time: 8/26/2014 19:23 Dead Time: 0.24 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Liquid_D=1 25ml.Clb
Efficiency Cal Desc: Ge12_25mLd=1Cal_85520-334_090111
Efficiency Cal Date: 9/2/2011 07:07
Energy Cal Date: 2/28/2012 13:26
Library: Client_ Long_no ingrowth Rev3.li
Bkgd Correction File: 12_2014-08-09_2129.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	-1.484E-01	217.0	3.219E-01	3.220E-01	1.120E+00
NA-22	2.510E-02	191.8	4.815E-02	4.817E-02	1.726E-01
K-40	-2.141E+00	2000.0	4.283E+01	4.283E+01	2.429E+00
Sc-46	-1.543E-02	273.1	4.212E-02	4.213E-02	1.503E-01
CR-51	-1.948E-02	1443.0	2.811E-01	2.811E-01	9.877E-01
MN-54	-6.044E-04	7381.0	4.461E-02	4.461E-02	1.609E-01
FE-59	-6.717E-02	137.2	9.215E-02	9.221E-02	3.209E-01
Co-56	2.441E-02	99.7	2.433E-02	2.436E-02	1.241E-01
CO-57	-3.194E-02	76.1	2.432E-02	2.437E-02	8.085E-02
CO-58	5.390E-04	6438.0	3.470E-02	3.470E-02	1.279E-01
CO-60	5.885E-02	77.1	4.539E-02	4.547E-02	1.530E-01
ZN-65	-1.561E-02	537.5	8.390E-02	8.390E-02	3.083E-01
NB-94	0.000E+00	1000.0	2.325E-02	2.325E-02	1.644E-01
ZR-95	2.363E-02	152.4	3.601E-02	3.603E-02	2.768E-01
NB-95	-1.533E-02	290.1	4.448E-02	4.449E-02	1.568E-01
RU-103	-1.493E-02	199.5	2.979E-02	2.980E-02	1.050E-01
RH-106	-1.058E-02	3539.0	3.744E-01	3.744E-01	1.342E+00
AG-108M	0.000E+00	1000.0	1.936E-02	1.936E-02	1.430E-01
AG-110M	7.539E-02	91.3	6.885E-02	6.894E-02	1.974E-01
SN-113	-1.664E-02	273.2	4.547E-02	4.548E-02	1.589E-01
SB-124	-9.578E-03	412.4	3.950E-02	3.950E-02	1.393E-01
SB-125	2.020E-02	91.6	1.850E-02	1.853E-02	3.827E-01
I-131	6.334E-02	55.0	3.481E-02	3.495E-02	9.482E-02
Gd-153	-6.445E-02	91.7	5.911E-02	5.923E-02	1.981E-01
Ga-68	-1.104E-03	1762.0	1.946E-02	1.946E-02	7.172E-02
Tc-99m	1.066E-02	86.6	9.232E-03	9.251E-03	3.094E-02
BA-133	6.376E-02	75.6	4.818E-02	4.828E-02	1.483E-01
CS-134	4.290E-02	85.2	3.656E-02	3.662E-02	1.383E-01
CS-137	3.813E-02	112.0	4.271E-02	4.275E-02	1.467E-01
CE-139	0.000E+00	1000.0	1.851E-02	1.851E-02	1.098E-01
Ba-140	6.344E-02	74.8	4.746E-02	4.756E-02	4.920E-01
La-140	3.280E-02	54.5	1.786E-02	1.793E-02	2.337E-01
CE-141	0.000E+00	1000.0	2.485E-02	2.485E-02	1.336E-01
CE-144	1.391E-01	117.8	1.639E-01	1.640E-01	5.549E-01
PM-144	1.308E-02	299.7	3.921E-02	3.921E-02	1.388E-01
EU-152	2.134E-01	59.8	1.276E-01	1.281E-01	3.691E-01
EU-154	7.815E-02	168.0	1.313E-01	1.314E-01	1.175E+00
EU-155	9.324E-02	78.6	7.333E-02	7.349E-02	2.447E-01
HF-181	1.110E-02	126.3	1.403E-02	1.404E-02	1.250E-01

Ta-182	0.000E+00	1000.0	3.859E-02	3.859E-02	5.992E-01
Hg-203	-9.401E-03	299.3	2.814E-02	2.814E-02	9.836E-02
TL-208	-6.862E-02	147.0	1.009E-01	1.009E-01	1.895E-01
pm-146	6.547E-02	143.4	9.386E-02	9.391E-02	3.586E-01
y-88	5.805E-04	7173.0	4.164E-02	4.164E-02	1.530E-01
Cd-109	-7.834E-02	593.1	4.646E-01	4.646E-01	1.602E+00
Ra-226	8.720E-01	113.1	9.858E-01	9.877E-01	2.868E+00
PB-210	-6.699E-02	1130.0	7.567E-01	7.567E-01	2.275E+00
PB-212	2.398E-01	35.6	8.543E-02	8.643E-02	2.364E-01
PB-214	1.010E-01	89.2	9.012E-02	9.025E-02	2.943E-01
BI-207	3.865E-02	91.5	3.537E-02	3.542E-02	1.198E-01
BI-212	1.357E-01	343.0	4.653E-01	4.653E-01	1.669E+00
BI-214	-7.003E-02	219.4	1.537E-01	1.537E-01	3.908E-01
BI-210M	-1.332E-03	3934.0	5.242E-02	5.242E-02	1.838E-01
RA-224	-1.460E+00	62.5	9.116E-01	9.150E-01	3.005E+00
AC-228	1.745E-01	70.8	1.235E-01	1.238E-01	4.990E-01
TH-227	-4.174E-01	74.0	3.088E-01	3.096E-01	1.024E+00
TH-229	-5.484E-02	1078.0	5.912E-01	5.912E-01	2.044E+00
TH-234	-8.585E-01	130.9	1.124E+00	1.125E+00	2.180E+00
PA-231	9.383E-01	102.1	9.581E-01	9.592E-01	3.241E+00
PA-233	-1.093E-02	712.2	7.782E-02	7.783E-02	2.725E-01
PA-234	1.328E-01	80.7	1.072E-01	1.074E-01	3.653E-01
PA-234M	-7.132E+00	2000.0	1.426E+02	1.426E+02	2.935E+01
U-235	1.468E-01	88.3	1.296E-01	1.298E-01	6.284E-01
AM-241	2.971E-02	171.1	5.083E-02	5.085E-02	1.730E-01
Ir-192	2.964E-02	88.7	2.630E-02	2.635E-02	1.052E-01
Np-237	-1.359E-01	113.7	1.545E-01	1.547E-01	5.196E-01
Total	3.996E+00				

Analyst: Siobhan Perry

TestAmerica, Inc Spectrum name: 12_Gamma_20141901.An1

Sample description
140177_Gamma_MB 160-140177~1-A

Spectrum Filename: C:\User\SPC\Det12\12_Gamma_20141901.An1

Acquisition information
Start time: 8/26/2014 11:36:24 AM
Live time: 7200
Real time: 7217
Dead time: 0.24 %
Detector ID: 12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_Liquid_D=1 25ml.Clb
Ge12_25mLd=1Cal_85520-334_090111

Energy Calibration
Created: 2/28/2012 1:26:42 PM
Zero offset: 0.049 keV
Gain: 0.250 keV/channel
Quadratic: -3.945E-08 keV/channel^2

Efficiency Calibration
Created: 9/2/2011 7:07:23 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 2.02 %
Log(Eff): -6.442716E-01 + (-8.678082E-03*Log(E)) +
(-6.444773E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.33 %
Log(Eff): -1.236768E+01 + (4.728110E+00*Log(E)) +
(-5.423915E-01*Log(E)^2)

Library Files
Main analysis library: Client_ Long_no ingrowth Rev3.li
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.58keV)
Stop channel: 8000 (1999.36keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/26/2014 7:23:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2014-08-09_2129.PBC 8/9/2014 9:29:22 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 18 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.2363

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.66	123.	19.88	0.82	1.099E-01	46.54	4.250	PBC<MDA	PB210
59.40	9.	171.07	0.90	1.220E-01	59.54	35.900	PBC<MDA	AM241
63.38	-29.	33.21	0.91	1.239E-01	63.29	3.810	PBC<MDA	TH234
					63.29	3.810	PBC<MDA	TH234
81.11	8.	195.43	0.92	1.269E-01	80.99	34.060	PBC<MDA	BA133
92.85	-31.	20.12	0.93	1.250E-01	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	PBC<MDA	AC228
					92.59	5.584	PBC<MDA	TH234
					93.35	5.561	PBC<MDA	AC228
92.88	91.	20.36	0.93	1.248E-01	92.59	5.584	PBC<MDA	TH234
					93.35	5.561	1.822E+00	AC228
103.09	4.	329.34	0.94	1.218E-01	103.20	21.800	PBC<MDA	Gd153
105.79	17.	78.64	0.95	1.210E-01	105.31	21.200	PBC<MDA	EU155
123.00	3.	476.12	0.96	1.141E-01	123.10	40.790	PBC<MDA	EU154
					121.78	28.580	1.266E-02	EU152
132.44	12.	126.33	0.97	1.089E-01	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	1.395E-01	CE144
132.54	12.	117.79	0.97	1.087E-01	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	1.391E-01	CE144
139.57	16.	86.59	0.98	1.054E-01	140.51	89.300	PBC<MDA	Tc99m
164.69	14.	74.82	1.00	9.487E-02	162.66	6.220	PBC<MDA	Ba140
					163.38	5.080	3.944E-01	U235
165.65	2.	485.69	1.00	9.454E-02	163.38	5.080	PBC<MDA	U235
					165.85	79.900	4.147E-03	CE139
185.94	18.	25.12	0.80	8.633E-02	185.99	3.280	PBC<MDA	Ra226
205.47	15.	88.27	1.04	8.065E-02	205.33	5.010	PBC<MDA	U235
					205.33	5.010	5.206E-01	U235

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
238.55	110.	17.62	0.82	7.256E-02	238.63	43.300	2.398E-01	PB212
242.24	8.	61.58	1.07	7.182E-02	242.00	7.430	PBC<MDA	PB214
284.47	6.	203.68	1.11	6.389E-02	284.30	6.140	PBC<MDA	I131
295.45	15.	88.73	1.12	6.202E-02	295.09	19.300	PBC<MDA	PB214
					295.95	30.160	1.141E-01	Ir192
295.46	-10.	80.56	1.12	6.215E-02	295.09	19.300	PBC<MDA	PB214
					295.95	30.160	PBC<MDA	Ir192
302.87	12.	102.11	1.13	6.099E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.475E-01	BA133
302.87	12.	102.22	1.13	6.096E-02	302.65	2.880	9.374E-01	PA231
					302.85	18.330	1.473E-01	BA133
327.09	18.	54.45	1.15	5.732E-02	328.76	20.300	PBC<MDA	La140
344.92	13.	87.79	1.17	5.535E-02	344.29	26.500	PBC<MDA	EU152
					344.29	26.500	1.250E-01	EU152
351.65	15.	22.51	1.01	5.443E-02	351.93	37.600	PBC<MDA	PB214
355.79	9.	111.30	1.18	5.395E-02	356.00	62.050	PBC<MDA	BA133
364.08	17.	54.97	1.19	5.299E-02	364.48	81.700	PBC<MDA	I131
463.84	6.	186.55	1.28	4.389E-02	463.37	10.470	PBC<MDA	SB125
511.05	97.	17.81	1.32	4.051E-02	511.86	20.000	1.657E+00	RH106
					511.86	20.000	1.657E+00	RH106
569.05	10.	91.52	1.37	3.710E-02	569.32	15.380	2.454E-01	CS134
					569.47	8.200	4.605E-01	PA234
					569.70	97.740	3.865E-02	BI207
					569.47	8.200	4.605E-01	PA234
569.08	10.	91.24	1.37	3.712E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	4.663E-01	PA234
					569.70	97.740	3.913E-02	BI207
569.09	10.	91.40	1.37	3.712E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	4.655E-01	PA234
					569.70	97.740	3.907E-02	BI207
583.37	-15.	42.40	1.38	3.640E-02	583.02	84.500	PBC<MDA	TL208
609.76	-8.	41.12	1.41	3.509E-02	609.31	46.090	PBC<MDA	BI214
					610.30	5.750	PBC<MDA	RU103
					609.31	46.090	PBC<MDA	BI214
609.80	28.	38.10	1.41	3.504E-02	609.31	46.090	PBC<MDA	BI214
					610.30	5.750	1.945E+00	RU103
634.82	5.	157.26	1.43	3.386E-02	635.89	11.310	PBC<MDA	SB125
662.24	8.	112.01	1.45	3.274E-02	661.66	85.210	PBC<MDA	CS137
696.25	3.	299.72	1.48	3.134E-02	696.54	99.000	PBC<MDA	PM144
724.57	5.	152.37	1.50	3.032E-02	724.20	44.150	PBC<MDA	ZR95
727.34	2.	342.98	1.51	3.021E-02	727.17	7.550	PBC<MDA	BI212
734.89	3.	255.08	1.51	2.991E-02	735.72	22.500	PBC<MDA	pm146
746.87	5.	143.36	1.52	2.951E-02	747.16	34.000	PBC<MDA	pm146
777.96	10.	73.69	1.55	2.847E-02	778.92	12.940	PBC<MDA	EU152
					778.92	12.940	3.845E-01	EU152
784.70	2.	331.29	1.56	2.827E-02	785.42	1.280	PBC<MDA	BI212
796.40	2.	318.21	1.56	2.794E-02	795.87	85.530	PBC<MDA	CS134
802.18	10.	85.23	1.57	2.776E-02	801.95	8.690	PBC<MDA	CS134
874.08	1.	930.03	1.63	2.576E-02	873.23	12.270	PBC<MDA	EU154
883.71	5.	150.37	1.64	2.547E-02	883.24	9.600	2.832E-01	PA234
					884.68	72.680	3.743E-02	AG110M
					883.24	9.600	2.832E-01	PA234
883.81	4.	178.35	1.64	2.551E-02	883.24	9.600	PBC<MDA	PA234
					884.68	72.680	3.253E-02	AG110M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
911.25	11.	70.75	1.66	2.481E-02	911.16	29.000	PBC<MDA	AC228
					911.16	29.000	2.119E-01	AC228
964.14	6.	138.12	1.70	2.360E-02	964.11	14.605	PBC<MDA	EU152
					964.11	14.605	2.220E-01	EU152
968.57	3.	243.45	1.71	2.349E-02	968.97	17.460	PBC<MDA	AC228
					968.97	17.460	1.125E-01	AC228
991.98	3.	168.03	1.73	2.291E-02	996.33	10.600	PBC<MDA	EU154
1120.00	-7.	107.50	1.83	2.060E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	PBC<MDA	Ta182
					1120.29	15.100	PBC<MDA	BI214
1237.73	6.	99.70	1.92	1.879E-02	1238.28	66.070	PBC<MDA	Co56
1273.68	3.	191.82	1.95	1.829E-02	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	7.131E-02	EU154
1273.68	3.	191.83	1.95	1.829E-02	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	7.131E-02	EU154
1331.81	7.	77.12	1.99	1.755E-02	1332.50	99.980	PBC<MDA	CO60
1386.52	6.	103.65	2.03	1.693E-02	1384.30	24.290	PBC<MDA	AG110M
1764.75	-4.	48.95	2.30	1.342E-02	1764.49	15.400	PBC<MDA	BI214

No unknown peaks passed sensitivity test.

This section based on library: Client_ Long_no ingrowth Rev3.li

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
TH-227	200.74	50.28	155.	-5.	-0.001	394.48	0.893s
AM-241	237.18	59.40	124.	9.	0.001	171.07	0.902s
TH-234	253.10	63.38	235.	-29.	-0.004	33.21	0.905s
BA-133	323.95	81.11	133.	8.	0.001	195.43	0.922s
Np-237	345.94	86.61	161.	-16.	-0.002	113.70	0.928s
EU-155	345.85	86.59	167.	-18.	-0.002	106.66	0.928s
Cd-109	351.52	88.00	126.	-3.	0.000	593.09	0.929s
TH-234	370.87	92.85	258.	-31.	-0.004	20.12	0.934s
AC-228	370.99	92.88	126.	91.	0.013	20.36	0.934s
Gd-153	389.54	97.52	116.	-17.	-0.002	91.72	0.938s
Gd-153	411.79	103.09	98.	4.	0.001	329.34	0.944s
EU-155	422.59	105.79	83.	17.	0.002	78.64	0.946s
EU-152	491.40	123.00	99.	3.	0.000	476.12	0.961s
CO-57	488.35	122.24	135.	-22.	-0.003	76.13	0.962s
PA-234	521.71	130.58	112.	-11.	-0.002	135.96	0.970s
HF-181	529.12	132.44	111.	12.	0.002	126.33	0.972s
CE-144	529.52	132.54	95.	12.	0.002	117.79	0.973s
HF-181	547.45	137.03	122.	-8.	-0.001	208.91	0.975s
CO-57	547.24	136.97	122.	-8.	-0.001	207.48	0.975s
Tc-99m	557.61	139.57	86.	16.	0.002	86.59	0.979s
Ba-140	658.03	164.69	45.	14.	0.002	74.82	1.000s
U-235	661.85	165.65	57.	2.	0.000	485.69	1.001s
Ra-226	742.96	185.94	143.	18.	0.002	25.12	0.803s
U-235	821.05	205.47	82.	15.	0.002	88.27	1.040s
TH-229	842.76	210.91	102.	-5.	-0.001	292.18	1.045s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TH-227	944.91	236.46	186.	-27.	-0.004	73.98	1.069s
PB-212	953.27	238.55	119.	54.	0.008	17.62	0.824s
RA-224	962.20	240.78	172.	-31.	-0.004	62.46	1.074
PB-214	968.03	242.24	94.	8.	0.001	61.58	1.075
EU-152	973.50	243.61	101.	-13.	-0.002	111.18	1.077s
TH-227	1020.95	255.48	67.	-9.	-0.001	135.21	1.088s
TL-208	1112.36	278.34	59.	-3.	0.000	346.03	1.107s
Hg-203	1111.95	278.24	56.	-4.	0.000	299.30	1.109s
I-131	1136.86	284.47	66.	6.	0.001	203.68	1.114s
PB-214	1180.77	295.46	116.	-10.	-0.001	80.56	1.124s
Ir-192	1180.73	295.45	86.	15.	0.002	88.73	1.125s
PA-233	1202.23	300.83	84.	-5.	-0.001	283.96	1.128s
PA-231	1210.39	302.87	67.	12.	0.002	102.11	1.131s
BA-133	1210.39	302.87	68.	12.	0.002	102.22	1.131s
Ba-140	1215.20	304.07	76.	-5.	-0.001	253.83	1.133s
BI-210M	1215.12	304.05	71.	-5.	-0.001	241.93	1.133s
Ir-192	1232.69	308.44	69.	-8.	-0.001	156.77	1.136s
PA-233	1246.45	311.89	71.	-2.	0.000	712.17	1.139s
La-140	1307.22	327.09	37.	18.	0.002	54.45	1.155s
EU-152	1378.50	344.92	61.	13.	0.002	87.79	1.169s
HF-181	1390.27	347.86	80.	-19.	-0.003	71.90	1.170
PB-214	1405.44	351.65	76.	15.	0.002	22.51	1.014
BA-133	1421.99	355.79	50.	9.	0.001	111.30	1.180s
I-131	1455.12	364.08	35.	17.	0.002	54.97	1.187s
BA-133	1537.73	384.74	73.	-8.	-0.001	149.04	1.205s
SN-113	1576.90	394.54	53.	-4.	-0.001	273.23	1.212s
SB-125	1709.41	427.68	58.	-9.	-0.001	126.35	1.245s
SB-125	1854.00	463.84	54.	6.	0.001	186.55	1.277s
Ir-192	1870.76	468.03	47.	-1.	0.000	666.55	1.281s
PM-144	1910.25	477.91	60.	-8.	-0.001	148.20	1.289s
BE-7	1909.07	477.61	53.	-5.	-0.001	216.99	1.289s
La-140	1946.28	486.92	47.	-6.	-0.001	172.75	1.298s
RU-103	1991.02	498.10	31.	-4.	-0.001	199.53	1.307s
RH-106	2042.79	511.05	100.	97.	0.013	17.81	1.320s
CS-134	2274.86	569.08	38.	10.	0.001	91.24	1.370s
PA-234	2274.89	569.09	38.	10.	0.001	91.40	1.370s
BI-207	2274.75	569.05	38.	10.	0.001	91.52	1.371s
TL-208	2332.01	583.37	71.	-15.	-0.002	42.40	1.382s
SB-124	2407.60	602.27	48.	-2.	0.000	412.37	1.400s
CS-134	2420.70	605.55	46.	-2.	0.000	398.19	1.401s
BI-214	2437.56	609.76	84.	-8.	-0.001	41.12	1.405s
RU-103	2437.70	609.80	44.	28.	0.004	38.10	1.406s
AG-108M	2454.59	614.02	64.	-7.	-0.001	175.53	1.410s
SB-125	2537.78	634.82	23.	5.	0.001	157.26	1.428s
I-131	2545.91	636.85	33.	-1.	0.000	849.63	1.429s
AG-110M	2633.54	658.76	40.	-3.	0.000	301.23	1.447s
CS-137	2647.42	662.24	33.	8.	0.001	112.01	1.451s
PM-144	2783.46	696.25	37.	3.	0.000	299.72	1.480s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-124	2888.67	722.55	37.	-5.	-0.001	189.36	1.503s
AG-108M	2888.67	722.55	37.	-5.	-0.001	189.29	1.503s
EU-154	2887.93	722.37	32.	-4.	-0.001	192.89	1.503s
ZR-95	2896.73	724.57	28.	5.	0.001	152.37	1.504s
BI-212	2907.82	727.34	28.	2.	0.000	342.98	1.507s
pm-146	2938.04	734.89	23.	3.	0.000	255.08	1.514s
pm-146	2985.94	746.87	25.	5.	0.001	143.36	1.524s
NB-95	3061.98	765.88	41.	-3.	0.000	290.12	1.539s
PA-234M	3061.83	765.84	49.	-11.	-0.002	270.29	1.540s
EU-152	3110.31	777.96	23.	10.	0.001	73.69	1.550s
BI-212	3137.27	784.70	25.	2.	0.000	331.29	1.556s
CS-134	3184.06	796.40	28.	2.	0.000	318.21	1.565s
CS-134	3207.19	802.18	29.	10.	0.001	85.23	1.570s
Co-56	3376.61	844.53	20.	-1.	0.000	665.37	1.607s
EU-154	3494.84	874.08	27.	1.	0.000	930.03	1.629s
PA-234	3533.78	883.81	28.	4.	0.001	178.35	1.637s
AG-110M	3533.35	883.71	26.	5.	0.001	150.37	1.638s
Sc-46	3567.19	892.16	28.	-3.	0.000	273.06	1.642s
AC-228	3643.55	911.25	25.	11.	0.002	70.75	1.660s
PA-234	3769.31	942.68	18.	-4.	0.000	175.64	1.689s
EU-152	3855.18	964.14	26.	6.	0.001	138.12	1.703s
AC-228	3872.88	968.57	31.	3.	0.000	243.45	1.707s
EU-154	3966.54	991.98	9.	3.	0.000	168.03	1.729s
EU-154	4012.37	1003.43	32.	-6.	-0.001	142.03	1.736s
Co-56	4151.45	1038.18	24.	-3.	0.000	271.18	1.763s
BI-207	4250.82	1063.02	27.	-6.	-0.001	133.51	1.783s
FE-59	4407.84	1102.26	28.	-6.	-0.001	137.19	1.811s
EU-152	4445.54	1111.68	20.	-4.	-0.001	169.71	1.821s
ZN-65	4461.37	1115.63	19.	-1.	0.000	537.48	1.824s
BI-214	4478.84	1120.00	30.	-7.	-0.001	107.50	1.827s
Ta-182	4755.12	1189.03	25.	-1.	0.000	485.69	1.881s
Ta-182	4887.09	1222.00	21.	-2.	0.000	338.12	1.906s
Co-56	4950.03	1237.73	16.	6.	0.001	99.70	1.919s
NA-22	5093.93	1273.68	18.	3.	0.000	191.82	1.946s
EU-154	5093.93	1273.68	18.	3.	0.000	191.83	1.946s
CO-60	5326.63	1331.81	13.	7.	0.001	77.12	1.990s
AG-110M	5545.64	1386.52	14.	6.	0.001	103.65	2.029s
BI-214	7060.17	1764.75	23.	-4.	0.000	48.95	2.297s
Co-56	7082.22	1770.25	21.	-5.	-0.001	129.76	2.302s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	-1.4835E-01				5.31E+01	
			477.60	-1.483E-01	?(	1.120E+00 2.17E+02	1.05E+01 G
NA-22	C	2.5104E-02				9.50E+02	
			1274.53	2.510E-02	&(	1.726E-01 1.92E+02	9.99E+01 G
K-40	N	-2.1414E+00				4.66E+11	
			1460.83	-2.141E+00	%(P	2.429E+00 1.00E+03	1.07E+01 G
Sc-46	F	-1.5427E-02				8.38E+01	
			889.28	-1.543E-02	?(	1.503E-01 2.73E+02	1.00E+02 G
			1120.55	0.000E+00	+	3.063E-01 1.00E+03	1.00E+02 G
CR-51	F	-1.9480E-02				2.77E+01	
			320.08	-1.948E-02	%(	9.877E-01 1.44E+03	9.94E+00 G
MN-54	C	-6.0435E-04				3.12E+02	
			834.85	-6.044E-04	&(	1.609E-01 7.38E+03	1.00E+02 G
FE-59	F	-6.7170E-02				4.45E+01	
			1099.25	-6.717E-02	?(	3.209E-01 1.37E+02	5.65E+01 G
			1291.60	1.705E-03	%	3.644E-01 5.64E+03	4.32E+01 G
Co-56	C	2.4406E-02				7.73E+01	
			846.77	-5.073E-03	?(	1.241E-01 6.65E+02	9.99E+01 G
			1238.28	6.899E-02	?(	2.376E-01 9.97E+01	6.61E+01 G
			1037.84	-1.166E-01	&	1.135E+00 2.71E+02	1.41E+01 G
			1771.35	-3.524E-01	+	1.601E+00 1.30E+02	1.55E+01 A
CO-57	C	-3.1943E-02				2.72E+02	
			122.06	-3.194E-02	?(	8.085E-02 7.61E+01	8.56E+01 G
			136.47	-9.257E-02	+	6.560E-01 2.07E+02	1.07E+01 G
CO-58	C	5.3899E-04				7.09E+01	
			810.78	5.390E-04	%(	1.279E-01 6.44E+03	9.95E+01 G
CO-60	F	5.8852E-02				1.93E+03	
			1332.50	5.885E-02	?(	1.530E-01 7.71E+01	1.00E+02 G
			1173.24	-3.115E-03	%	1.713E-01 1.49E+03	9.99E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ZN-65	F -1.5610E-02					2.44E+02	
		1115.55	-1.561E-02	?(	3.083E-01	5.37E+02	5.06E+01 G
ZR-95	I 2.3632E-02					6.40E+01	
		756.73	0.000E+00	?(	2.768E-01	1.00E+03	5.45E+01 G
		724.20	5.278E-02	?(	2.816E-01	1.52E+02	4.42E+01 G
NB-95	I -1.5331E-02					6.40E+01	
		765.79	-1.533E-02	?(	1.568E-01	2.90E+02	9.98E+01 G
RU-103	I -1.4930E-02					3.93E+01	
		497.05	-1.493E-02	?(	1.050E-01	2.00E+02	9.09E+01 G
		610.30	1.945E+00		2.310E+00	3.81E+01	5.75E+00 GA
RH-106	I -1.0579E-02					3.74E+02	
		621.92	-1.058E-02	%(	1.342E+00	3.54E+03	9.93E+00 G
		1050.36	-2.649E-01	&	1.117E+01	1.16E+03	1.56E+00 G
		511.86	1.657E+00	&	8.452E-01	1.78E+01	2.00E+01 GA
AG-110M	F 7.5393E-02					2.50E+02	
		884.68	3.743E-02	&(	1.974E-01	1.50E+02	7.27E+01 G
		657.76	-1.341E-02	-	1.427E-01	3.01E+02	9.46E+01 G
		937.49	-7.119E-03	%	3.883E-01	1.47E+03	3.44E+01 G
		1384.30	1.890E-01	?(	6.809E-01	1.04E+02	2.43E+01 G
		763.94	0.000E+00	-	1.030E+00	1.00E+03	2.23E+01 G
SN-113	F -1.6643E-02					1.15E+02	
		391.69	-1.664E-02	&(	1.589E-01	2.73E+02	6.40E+01 G
SB-124	F -9.5782E-03					6.02E+01	
		602.73	-9.578E-03	?(	1.393E-01	4.12E+02	9.83E+01 G
		1690.98	1.012E-02	%	4.194E-01	1.10E+03	4.78E+01 G
		722.79	-1.984E-01	+	1.315E+00	1.89E+02	1.08E+01 G
SB-125	I 2.0201E-02					1.01E+03	
		427.88	-8.858E-02	?(	3.827E-01	1.26E+02	2.96E+01 G
		600.50	1.919E-02	%	7.629E-01	1.12E+03	1.79E+01 G
		635.89	1.632E-01	&(	9.051E-01	1.57E+02	1.13E+01 G
		463.37	1.733E-01	(	1.120E+00	1.87E+02	1.05E+01 G
I-131	I 6.3335E-02					8.02E+00	
		364.48	5.313E-02	?(	9.482E-02	5.50E+01	8.17E+01 G
		284.30	1.992E-01	?(	1.402E+00	2.04E+02	6.14E+00 G
		636.97	-5.346E-02	-	1.637E+00	8.50E+02	7.17E+00 G

Nuclide		Ave activity	Energy		Activity	Code	Peak	MDA	Comments
Gd-153	F	-6.4446E-02						2.42E+02	
			97.50	-6.445E-02	?(	1.981E-01	9.17E+01	3.00E+01	G
			103.20	2.249E-02	+	2.556E-01	3.29E+02	2.18E+01	G
Ga-68	C	-1.1043E-03						4.71E-02	
			1077.40	-1.104E-03	%(	7.172E-02	1.76E+03	3.30E+00	G
Tc-99m	I	1.0663E-02						2.51E-01	
			140.51	1.066E-02	?(	3.094E-02	8.66E+01	8.93E+01	G
BA-133	F	6.3762E-02						3.85E+03	
			356.00	3.907E-02	(	1.483E-01	1.11E+02	6.20E+01	G
			302.85	1.473E-01	(	5.096E-01	1.02E+02	1.83E+01	G
			383.84	-2.552E-01	+	1.302E+00	1.49E+02	8.94E+00	GA
			80.99	2.722E-02	?	1.812E-01	1.95E+02	3.41E+01	GA
CS-134	I	4.2899E-02						7.54E+02	
			604.71	-9.836E-03	?(	1.383E-01	3.98E+02	9.76E+01	G
			795.87	1.393E-02	?(	1.588E-01	3.18E+02	8.55E+01	G
			569.32	2.485E-01	(	7.677E-01	9.12E+01	1.54E+01	G
			801.95	5.566E-01	&(	1.603E+00	8.52E+01	8.69E+00	G
			563.24	8.720E-03	%	1.263E+00	3.98E+03	8.35E+00	G
CS-137	I	3.8134E-02						1.10E+04	
			661.66	3.813E-02	&(	1.467E-01	1.12E+02	8.52E+01	G
Ba-140	I	6.3436E-02						1.28E+01	
			537.26	-8.073E-04	&(	4.920E-01	1.70E+04	2.44E+01	G
			162.66	3.154E-01	(	7.874E-01	7.48E+01	6.22E+00	G
			304.85	-2.596E-01	+	2.279E+00	2.54E+02	4.29E+00	G
La-140	I	3.2795E-02						1.28E+01	
			1596.21	-4.321E-03	%(	2.337E-01	1.46E+03	9.54E+01	G
			487.02	-4.124E-02	+	2.471E-01	1.73E+02	4.55E+01	G
			328.76	2.072E-01	&(	3.662E-01	5.44E+01	2.03E+01	G
			815.77	8.835E-04	%	4.981E-01	1.51E+04	2.33E+01	G
CE-144	I	1.3913E-01						2.85E+02	
			133.54	1.391E-01	(	5.549E-01	1.18E+02	1.11E+01	G
PM-144	C	1.3081E-02						3.63E+02	
			696.54	1.308E-02	?(	1.388E-01	3.00E+02	9.90E+01	G
			618.06	1.386E-03	%	1.230E-01	2.46E+03	9.91E+01	G
			476.81	-5.867E-02	+	2.987E-01	1.48E+02	4.20E+01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-152	F 2.1335E-01					4.94E+03	
		344.29	1.250E-01	?(	3.691E-01	8.78E+01	2.65E+01 G
		1112.07	-1.933E-01	+	1.166E+00	1.70E+02	1.36E+01 G
		121.78	1.266E-02	-	2.087E-01	4.76E+02	2.86E+01 G
		778.92	3.845E-01	(	9.472E-01	7.37E+01	1.29E+01 G
		964.11	2.220E-01	?(	1.070E+00	1.38E+02	1.46E+01 G
		244.69	-3.391E-01	+	1.273E+00	1.11E+02	7.58E+00 G
		1408.00	0.000E+00	-	8.374E-01	1.00E+03	2.10E+01 GA
EU-154	I 7.8150E-02					3.14E+03	
		873.23	3.470E-02	&(	1.175E+00	9.30E+02	1.23E+01 G
		123.10	4.094E-03	&	1.759E-01	1.25E+03	4.08E+01 G
		1274.54	7.131E-02	&(	4.903E-01	1.92E+02	3.52E+01 G
		723.36	-9.722E-02	+	6.596E-01	1.93E+02	2.02E+01 G
		1004.77	-2.007E-01	+	9.910E-01	1.42E+02	1.80E+01 G
		996.33	1.512E-01	?(	9.339E-01	1.68E+02	1.06E+01 G
EU-155	I 9.3237E-02					1.81E+03	
		105.31	9.324E-02	&(	2.447E-01	7.86E+01	2.12E+01 G
		86.54	-6.303E-02	-	2.256E-01	1.07E+02	3.07E+01 G
HF-181	F 1.1104E-02					4.24E+01	
		482.00	-2.007E-03	%(	1.250E-01	1.73E+03	8.05E+01 G
		133.02	3.548E-02	(	1.518E-01	1.26E+02	4.33E+01 G
		345.83	-3.082E-01	+	7.362E-01	7.19E+01	1.51E+01 G
		136.30	-1.670E-01	+	1.191E+00	2.09E+02	5.85E+00 G
Hg-203	F -9.4006E-03					4.66E+01	
		279.20	-9.401E-03	?(	9.836E-02	2.99E+02	8.15E+01 G
TL-208	N -6.8621E-02					6.98E+02	
		583.02	-6.862E-02	(P	1.895E-01	4.24E+01	8.45E+01 G
		277.28	-1.072E-01	+	1.297E+00	3.46E+02	6.31E+00 G
		860.56	1.695E-02	%	1.373E+00	2.26E+03	1.24E+01 G
pm-146	C 6.5470E-02					2.02E+03	
		747.16	7.142E-02	&(	3.586E-01	1.43E+02	3.40E+01 G
		735.72	5.648E-02	&(	5.171E-01	2.55E+02	2.25E+01 G
		453.88	-3.507E-04	%	1.506E-01	1.19E+04	6.50E+01 G
y-88	F 5.8046E-04					1.07E+02	
		898.04	5.805E-04	%(	1.530E-01	7.17E+03	9.37E+01 G
		1836.06	-2.762E-03	%	2.337E-01	2.26E+03	9.92E+01 G
Cd-109	F -7.8335E-02					4.53E+02	
		88.04	-7.834E-02	&(	1.602E+00	5.93E+02	3.79E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ra-226	N	8.7196E-01					5.84E+05	
			185.99	8.720E-01	@(P	2.868E+00	2.51E+01	3.28E+00 G
PB-210	N	-6.6989E-02					8.14E+03	
			46.54	-6.699E-02	%(P	2.275E+00	1.99E+01	4.25E+00 G
PB-212	N	2.3980E-01					6.98E+02	
			238.63	2.398E-01	*(P	2.364E-01	1.76E+01	4.33E+01 G
			300.03	0.000E+00	-	3.568E+00	1.00E+03	3.28E+00 GA
PB-214	N	1.0104E-01					5.84E+05	
			351.93	1.010E-01	(P	2.943E-01	2.25E+01	3.76E+01 G
			295.09	-1.106E-01	- P	6.118E-01	8.06E+01	1.93E+01 G
			242.00	2.083E-01	P	1.248E+00	6.16E+01	7.43E+00 GA
BI-207	C	3.8650E-02					1.18E+04	
			569.70	3.865E-02	(	1.198E-01	9.15E+01	9.77E+01 G
			1063.66	-5.015E-02	&	2.331E-01	1.34E+02	7.45E+01 G
BI-212	N	1.3565E-01					6.98E+02	
			727.17	1.357E-01	?(	1.669E+00	3.43E+02	7.55E+00 G
			785.42	8.307E-01	?	9.915E+00	3.31E+02	1.28E+00 GA
BI-214	N	-7.0029E-02					5.84E+05	
			609.31	-7.003E-02	(P	3.908E-01	4.11E+01	4.61E+01 G
			1120.29	-3.265E-01	+ P	1.269E+00	1.07E+02	1.51E+01 G
			1764.49	-2.367E-01	+ P	1.681E+00	4.89E+01	1.54E+01 G
BI-210M	T	-1.3324E-03					1.10E+09	
			265.83	-1.332E-03	&(	1.838E-01	3.93E+03	5.00E+01 G
			304.90	-4.092E-02	+	3.428E-01	2.42E+02	2.80E+01 G
RA-224	N	-1.4595E+00					6.98E+02	
			240.99	-1.460E+00	(	3.005E+00	6.25E+01	4.10E+00 G
AC-228	N	1.7453E-01					2.10E+03	
			911.16	2.119E-01	(	4.990E-01	7.07E+01	2.90E+01 G
			968.97	1.125E-01	?(	9.714E-01	2.43E+02	1.75E+01 G
			338.32	0.000E+00	-	9.830E-01	1.00E+03	1.20E+01 G
			93.35	1.822E+00	*	1.102E+00	2.04E+01	5.56E+00 XA
TH-227	N	-4.1737E-01					7.95E+03	
			235.97	-4.174E-01	?(	1.024E+00	7.40E+01	1.23E+01 G
			50.14	-6.846E-02	&	9.248E-01	3.94E+02	8.00E+00 G
			256.24	-2.551E-01	+	1.179E+00	1.35E+02	7.00E+00 G

Nuclide		Ave activity	Energy		Activity	Code	Peak	MDA	Comments
TH-229	N	-5.4839E-02						2.68E+06	
			193.51	-5.484E-02	%(	2.044E+00	1.08E+03	4.40E+00	G
			210.85	-2.903E-01	+	2.921E+00	2.92E+02	2.99E+00	G
TH-234	N	-8.5846E-01						1.63E+12	
			63.29	-8.585E-01	*(P	2.180E+00	3.32E+01	3.81E+00	G
			92.59	-6.196E-01	+ P	1.542E+00	2.01E+01	5.58E+00	G
PA-231	N	9.3833E-01						1.20E+07	
			302.65	9.383E-01	(	3.241E+00	1.02E+02	2.88E+00	G
			300.07	0.000E+00	-	4.760E+00	1.00E+03	2.46E+00	G
PA-233	C	-1.0928E-02						7.82E+08	
			312.01	-1.093E-02	?(	2.725E-01	7.12E+02	3.60E+01	G
			300.18	-1.691E-01	+	1.660E+00	2.84E+02	6.20E+00	G
PA-234	N	1.3281E-01						1.63E+12	
			131.29	-7.922E-02	?(	3.653E-01	1.36E+02	1.80E+01	G
			946.02	-1.531E-01	+	9.614E-01	1.76E+02	1.34E+01	G
			569.47	4.655E-01	(	1.441E+00	9.14E+01	8.20E+00	G
			883.24	2.462E-01	&(	1.547E+00	1.78E+02	9.60E+00	G
			880.53	-1.342E-02	%	2.327E+00	4.71E+03	6.00E+00	GA
PA-234M	N	-7.1320E+00						1.63E+12	
			1001.00	-7.132E+00	&(P	2.935E+01	1.00E+03	8.37E-01	G
			766.41	-1.858E+01	+ P	5.769E+01	2.70E+02	2.94E-01	G
U-235	N	1.4677E-01						2.57E+11	
			143.79	1.403E-02	%(	6.284E-01	1.29E+03	1.10E+01	G
			205.33	5.206E-01	&(	1.542E+00	8.83E+01	5.01E+00	G
			163.38	6.446E-02	&(	1.100E+00	4.86E+02	5.08E+00	G
AM-241	T	2.9711E-02						1.58E+05	
			59.54	2.971E-02	&(	1.730E-01	1.71E+02	3.59E+01	G
Ir-192	F	2.9644E-02						7.40E+01	
			316.49	3.708E-04	%(	1.052E-01	8.01E+03	8.70E+01	G
			468.06	-9.011E-03	+	2.130E-01	6.67E+02	5.18E+01	G
			308.44	-5.588E-02	+	3.006E-01	1.57E+02	3.18E+01	G
			295.95	1.141E-01	?(	3.397E-01	8.87E+01	3.02E+01	G
Np-237	F	-1.3590E-01						2.14E+06	
			86.49	-1.359E-01	?(	5.196E-01	1.14E+02	1.31E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.

! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.28	155.	-5.	-0.001	394.48	-6.846E-02	
AM-241	59.40	124.	9.	0.001	171.07	2.971E-02	
TH-234	63.38	235.	-29.	-0.004	33.21	-8.585E-01	P
BA-133	81.11	133.	8.	0.001	195.43	2.722E-02	
Np-237	86.61	161.	-16.	-0.002	113.70	-1.359E-01	
EU-155	86.59	167.	-18.	-0.002	106.66	-6.303E-02	
Cd-109	88.00	126.	-3.	0.000	593.09	-7.834E-02	
TH-234	92.85	258.	-31.	-0.004	20.12	-6.196E-01	P
AC-228	92.88	126.	91.	0.013	20.36	1.822E+00	
EU-155	105.79	83.	17.	0.002	78.64	9.324E-02	
EU-152	123.00	99.	3.	0.000	476.12	1.266E-02	
CO-57	122.24	135.	-22.	-0.003	76.13	-3.194E-02	
PA-234	130.58	112.	-11.	-0.002	135.96	-7.922E-02	
HF-181	132.44	111.	12.	0.002	126.33	3.548E-02	
CE-144	132.54	95.	12.	0.002	117.79	1.391E-01	
HF-181	137.03	122.	-8.	-0.001	208.91	-1.670E-01	
CO-57	136.97	122.	-8.	-0.001	207.48	-9.257E-02	
Tc-99m	139.57	86.	16.	0.002	86.59	1.066E-02	
Ba-140	164.69	45.	14.	0.002	74.82	3.154E-01	
U-235	165.65	57.	2.	0.000	485.69	6.446E-02	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
U-235	205.47	82.	15.	0.002	88.27	5.206E-01		
TH-229	210.91	102.	-5.	-0.001	292.18	-2.903E-01		
TH-227	236.46	186.	-27.	-0.004	73.98	-4.174E-01		
RA-224	240.78	172.	-31.	-0.004	62.46	-1.460E+00		
EU-152	243.61	101.	-13.	-0.002	111.18	-3.391E-01		
TH-227	255.48	67.	-9.	-0.001	135.21	-2.551E-01		
TL-208	278.34	59.	-3.	0.000	346.03	-1.072E-01		
Hg-203	278.24	56.	-4.	0.000	299.30	-9.401E-03		
I-131	284.47	66.	6.	0.001	203.68	1.992E-01		
Ir-192	295.45	86.	15.	0.002	88.73	1.141E-01		
PA-233	300.83	84.	-5.	-0.001	283.96	-1.691E-01		
PA-231	302.87	67.	12.	0.002	102.11	9.383E-01		
BA-133	302.87	68.	12.	0.002	102.22	1.473E-01		
Ba-140	304.07	76.	-5.	-0.001	253.83	-2.596E-01		
BI-210M	304.05	71.	-5.	-0.001	241.93	-4.092E-02		
Ir-192	308.44	69.	-8.	-0.001	156.77	-5.588E-02		
PA-233	311.89	71.	-2.	0.000	712.17	-1.093E-02		
La-140	327.09	37.	18.	0.002	54.45	2.072E-01		
EU-152	344.92	61.	13.	0.002	87.79	1.250E-01		
HF-181	347.86	80.	-19.	-0.003	71.90	-3.082E-01		
BA-133	355.79	50.	9.	0.001	111.30	3.907E-02		
I-131	364.08	35.	17.	0.002	54.97	5.313E-02		
BA-133	384.74	73.	-8.	-0.001	149.04	-2.552E-01		
SN-113	394.54	53.	-4.	-0.001	273.23	-1.664E-02		
SB-125	427.68	58.	-9.	-0.001	126.35	-8.858E-02		
SB-125	463.84	54.	6.	0.001	186.55	1.733E-01		
Ir-192	468.03	47.	-1.	0.000	666.55	-9.011E-03		
PM-144	477.91	60.	-8.	-0.001	148.20	-5.867E-02		
BE-7	477.61	53.	-5.	-0.001	216.99	-1.483E-01		
La-140	486.92	47.	-6.	-0.001	172.75	-4.124E-02		
RU-103	498.10	31.	-4.	-0.001	199.53	-1.493E-02		
RH-106	511.05	100.	97.	0.013	17.81	1.657E+00		
CS-134	569.08	38.	10.	0.001	91.24	2.485E-01		
PA-234	569.09	38.	10.	0.001	91.40	4.655E-01		
BI-207	569.05	38.	10.	0.001	91.52	3.865E-02		
TL-208	583.37	71.	-15.	-0.002	42.40	-6.862E-02	P	
SB-124	602.27	48.	-2.	0.000	412.37	-9.578E-03		
CS-134	605.55	46.	-2.	0.000	398.19	-9.836E-03		
BI-214	609.76	84.	-8.	-0.001	41.12	-7.003E-02	P	
RU-103	609.80	44.	28.	0.004	38.10	1.945E+00		
AG-108M	614.02	64.	-7.	-0.001	175.53	-2.939E-02		
SB-125	634.82	23.	5.	0.001	157.26	1.632E-01		
I-131	636.85	33.	-1.	0.000	849.63	-5.346E-02		
AG-110M	658.76	40.	-3.	0.000	301.23	-1.341E-02		
CS-137	662.24	33.	8.	0.001	112.01	3.813E-02		
PM-144	696.25	37.	3.	0.000	299.72	1.308E-02		
SB-124	722.55	37.	-5.	-0.001	189.36	-1.984E-01		
AG-108M	722.55	37.	-5.	-0.001	189.29	-2.371E-02		

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
EU-154	722.37	32.	-4.	-0.001	192.89	-9.722E-02		
ZR-95	724.57	28.	5.	0.001	152.37	5.278E-02		
BI-212	727.34	28.	2.	0.000	342.98	1.357E-01		
pm-146	734.89	23.	3.	0.000	255.08	5.648E-02		
pm-146	746.87	25.	5.	0.001	143.36	7.142E-02		
NB-95	765.88	41.	-3.	0.000	290.12	-1.533E-02		
PA-234M	765.84	49.	-11.	-0.002	270.29	-1.858E+01		P
EU-152	777.96	23.	10.	0.001	73.69	3.845E-01		
BI-212	784.70	25.	2.	0.000	331.29	8.307E-01		
CS-134	796.40	28.	2.	0.000	318.21	1.393E-02		
CS-134	802.18	29.	10.	0.001	85.23	5.566E-01		
Co-56	844.53	20.	-1.	0.000	665.37	-5.073E-03		
EU-154	874.08	27.	1.	0.000	930.03	3.470E-02		
PA-234	883.81	28.	4.	0.001	178.35	2.462E-01		
AG-110M	883.71	26.	5.	0.001	150.37	3.743E-02		
Sc-46	892.16	28.	-3.	0.000	273.06	-1.543E-02		
AC-228	911.25	25.	11.	0.002	70.75	2.119E-01		
PA-234	942.68	18.	-4.	0.000	175.64	-1.531E-01		
EU-152	964.14	26.	6.	0.001	138.12	2.220E-01		
AC-228	968.57	31.	3.	0.000	243.45	1.125E-01		
EU-154	991.98	9.	3.	0.000	168.03	1.512E-01		
EU-154	1003.43	32.	-6.	-0.001	142.03	-2.007E-01		
Co-56	1038.18	24.	-3.	0.000	271.18	-1.166E-01		
BI-207	1063.02	27.	-6.	-0.001	133.51	-5.015E-02		
FE-59	1102.26	28.	-6.	-0.001	137.19	-6.717E-02		
EU-152	1111.68	20.	-4.	-0.001	169.71	-1.933E-01		
ZN-65	1115.63	19.	-1.	0.000	537.48	-1.561E-02		
BI-214	1120.00	30.	-7.	-0.001	107.50	-3.265E-01		P
Ta-182	1189.03	25.	-1.	0.000	485.69	-6.423E-02		
Ta-182	1222.00	21.	-2.	0.000	338.12	-5.257E-02		
Co-56	1237.73	16.	6.	0.001	99.70	6.899E-02		
NA-22	1273.68	18.	3.	0.000	191.82	2.510E-02		
EU-154	1273.68	18.	3.	0.000	191.83	7.131E-02		
CO-60	1331.81	13.	7.	0.001	77.12	5.885E-02		
AG-110M	1386.52	14.	6.	0.001	103.65	1.890E-01		
BI-214	1764.75	23.	-4.	0.000	48.95	-2.367E-01		P
Co-56	1770.25	21.	-5.	-0.001	129.76	-3.524E-01		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	-1.4898E-01	-1.4835E-01	2.170E+02%	1.12E+00
NA-22	#A	2.5110E-02	2.5104E-02	1.918E+02%	1.73E-01
K-40	#A	-2.1414E+00	-2.1414E+00	2.000E+03%	2.43E+00
Sc-46	#A	-1.5468E-02	-1.5427E-02	2.731E+02%	1.50E-01
CR-51	#A	-1.9639E-02	-1.9480E-02	1.443E+03%	9.88E-01
MN-54	#A	-6.0479E-04	-6.0435E-04	7.381E+03%	1.61E-01
FE-59	#A	-6.7510E-02	-6.7170E-02	1.372E+02%	3.21E-01
Co-56	#A	2.4477E-02	2.4406E-02	9.970E+01%	1.24E-01
CO-57	#A	-3.1969E-02	-3.1943E-02	7.613E+01%	8.09E-02
CO-58	#A	5.4070E-04	5.3899E-04	6.438E+03%	1.28E-01
CO-60	#A	5.8859E-02	5.8852E-02	7.712E+01%	1.53E-01
ZN-65	#A	-1.5624E-02	-1.5610E-02	5.375E+02%	3.08E-01
NB-94	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.64E-01
ZR-95	#A	2.3715E-02	2.3632E-02	1.524E+02%	2.77E-01
NB-95	#A	-1.5385E-02	-1.5331E-02	2.901E+02%	1.57E-01
RU-103	#A	-1.5016E-02	-1.4930E-02	1.995E+02%	1.05E-01
RH-106	#A	-1.0586E-02	-1.0579E-02	3.539E+03%	1.34E+00
AG-108M	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.43E-01
AG-110M	#A	7.5461E-02	7.5393E-02	9.132E+01%	1.97E-01
SN-113	#A	-1.6675E-02	-1.6643E-02	2.732E+02%	1.59E-01
SB-124	#A	-9.6140E-03	-9.5782E-03	4.124E+02%	1.39E-01
SB-125	#A	2.0206E-02	2.0201E-02	9.159E+01%	3.83E-01
I-131	#A	6.5133E-02	6.3335E-02	5.497E+01%	9.48E-02
Gd-153	#A	-6.4506E-02	-6.4446E-02	9.172E+01%	1.98E-01
Ga-68	#A	-1.3025E-01	-1.1043E-03	1.762E+03%	7.17E-02
Tc-99m	#A	2.6108E-02	1.0663E-02	8.659E+01%	3.09E-02
BA-133	#A	6.3766E-02	6.3762E-02	7.556E+01%	1.48E-01
CS-134	#A	4.2911E-02	4.2899E-02	8.523E+01%	1.38E-01
CS-137	#A	3.8134E-02	3.8134E-02	1.120E+02%	1.47E-01
CE-139	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.10E-01
Ba-140	#A	6.4564E-02	6.3436E-02	7.482E+01%	4.92E-01
La-140	#A	3.3377E-02	3.2795E-02	5.445E+01%	2.34E-01
CE-141	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.34E-01
CE-144	#A	1.3924E-01	1.3913E-01	1.178E+02%	5.55E-01
PM-144	#A	1.3089E-02	1.3081E-02	2.997E+02%	1.39E-01
EU-152	#A	2.1336E-01	2.1335E-01	5.983E+01%	3.69E-01
EU-154	#A	7.8155E-02	7.8150E-02	1.680E+02%	1.17E+00
EU-155	#A	9.3248E-02	9.3237E-02	7.864E+01%	2.45E-01
HF-181	#A	1.1163E-02	1.1104E-02	1.263E+02%	1.25E-01
Ta-182	#A	0.0000E+00	0.0000E+00	1.000E+03%	5.99E-01
Hg-203	#A	-9.4460E-03	-9.4006E-03	2.993E+02%	9.84E-02
TL-208	#A	-6.8644E-02	-6.8621E-02	1.470E+02%	1.90E-01
pm-146	#A	6.5478E-02	6.5470E-02	1.434E+02%	3.59E-01

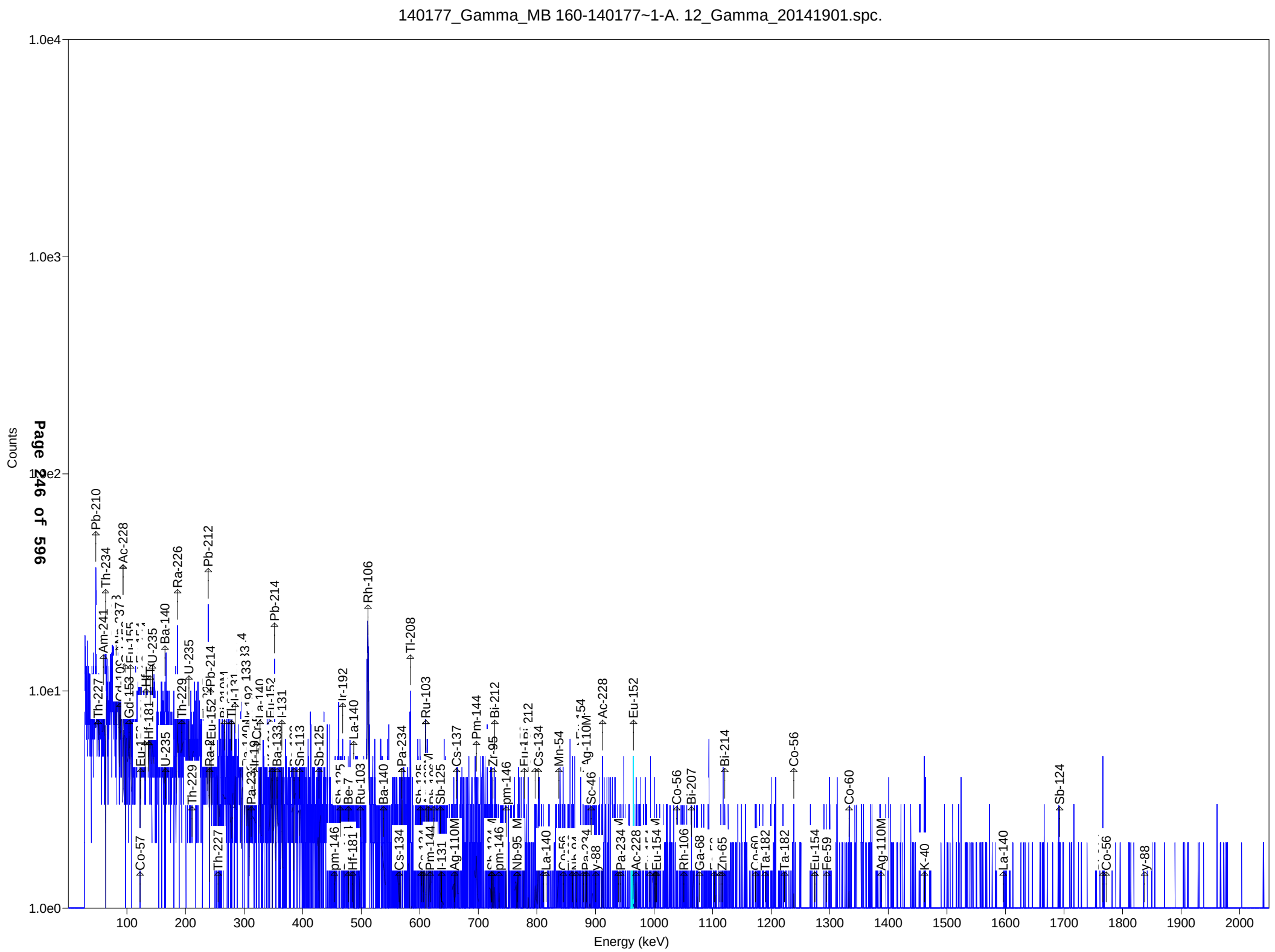
y-88	#A	5.8169E-04	5.8046E-04	7.173E+03%	1.53E-01
Cd-109	#A	-7.8374E-02	-7.8335E-02	5.931E+02%	1.60E+00
Ra-226	#A	8.7196E-01	8.7196E-01	1.131E+02%	2.87E+00
PB-210	#A	-6.6991E-02	-6.6989E-02	1.130E+03%	2.28E+00
PB-212	#	2.3988E-01	2.3980E-01	3.563E+01%	2.36E-01
PB-214	A	1.0104E-01	1.0104E-01	8.919E+01%	2.94E-01
BI-207	#A	3.8651E-02	3.8650E-02	9.152E+01%	1.20E-01
BI-212	#A	1.3570E-01	1.3565E-01	3.430E+02%	1.67E+00
BI-214	#A	-7.0029E-02	-7.0029E-02	2.194E+02%	3.91E-01
BI-210M	#A	-1.3324E-03	-1.3324E-03	3.934E+03%	1.84E-01
RA-224	#A	-1.4600E+00	-1.4595E+00	6.246E+01%	3.00E+00
AC-228	#A	1.7455E-01	1.7453E-01	7.075E+01%	4.99E-01
TH-227	#A	-4.1738E-01	-4.1737E-01	7.398E+01%	1.02E+00
TH-229	#A	-5.4839E-02	-5.4839E-02	1.078E+03%	2.04E+00
TH-234	#A	-8.5846E-01	-8.5846E-01	1.309E+02%	2.18E+00
PA-231	#A	9.3833E-01	9.3833E-01	1.021E+02%	3.24E+00
PA-233	#A	-1.0928E-02	-1.0928E-02	7.122E+02%	2.72E-01
PA-234	#A	1.3281E-01	1.3281E-01	8.072E+01%	3.65E-01
PA-234M	#A	-7.1320E+00	-7.1320E+00	2.000E+03%	2.93E+01
U-235	#A	1.4677E-01	1.4677E-01	8.827E+01%	6.28E-01
AM-241	#A	2.9711E-02	2.9711E-02	1.711E+02%	1.73E-01
Ir-192	#A	2.9734E-02	2.9644E-02	8.873E+01%	1.05E-01
Np-237	#A	-1.3590E-01	-1.3590E-01	1.137E+02%	5.20E-01

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.4 keV) 2.399E-01 Bq/Sample
Total Decayed Activity (37.6 to 1999.4 keV) 2.3980050E-01 Bq/Sample

140177_Gamma_MB 160-140177~1-A. 12_Gamma_20141901.spc.



Test America St. Louis Spectrum ID: 7_Gamma_20141924

Sample Description: 140177_Gamma_LCS 160-140177~2-A
Detector: Ge 7 SN/154
Batch ID: 140177
Work Order Number: Gamma
Lot Number: LCS 160-140177~2-A

Decay to Time: 8/26/2014 11:38 Live Time: 7200 sec
Acquisition Time: 8/26/2014 11:39:33 Real Time: 7468 sec
Analysis Time: 8/26/2014 13:44 Dead Time: 3.58 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 7_Liquid_D=1 25ml.Clb
Efficiency Cal Desc: 7_25mld=1_90101_032612
Efficiency Cal Date: 3/28/2012 09:22
Energy Cal Date: 2/23/2012 08:40
Library: Client_ Long_no ingrowth Rev3.li
Bkgd Correction File: 7_2014-08-09_2137.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	2.507E+00	122.3	3.065E+00	3.067E+00	1.014E+01
NA-22	1.542E-01	171.5	2.645E-01	2.646E-01	8.866E-01
K-40	2.612E+00	73.4	1.916E+00	1.920E+00	6.354E+00
Sc-46	-1.368E-01	401.0	5.486E-01	5.486E-01	1.821E+00
CR-51	1.049E+00	193.9	2.034E+00	2.034E+00	6.743E+00
MN-54	2.024E-01	232.7	4.710E-01	4.711E-01	1.563E+00
FE-59	2.087E-01	211.2	4.407E-01	4.408E-01	3.698E+00
Co-56	-9.392E-02	158.5	1.489E-01	1.489E-01	1.368E+00
CO-57	1.626E+01	1.2	2.023E-01	8.470E-01	3.391E-01
CO-58	-1.175E-01	369.9	4.347E-01	4.347E-01	1.445E+00
CO-60	3.818E+02	0.4	1.394E+00	1.834E+01	9.035E-01
ZN-65	1.809E+00	69.2	1.252E+00	1.255E+00	4.129E+00
NB-94	9.319E-02	100.0	9.318E-02	9.329E-02	1.132E+00
ZR-95	5.833E-01	83.3	4.859E-01	4.867E-01	1.815E+00
NB-95	-2.241E-02	1697.0	3.804E-01	3.804E-01	1.267E+00
RU-103	2.526E-01	129.6	3.273E-01	3.275E-01	1.084E+00
RH-106	4.688E-01	682.3	3.199E+00	3.199E+00	9.981E+00
AG-108M	1.564E-01	127.2	1.990E-01	1.991E-01	1.086E+00
AG-110M	2.048E-01	140.1	2.869E-01	2.871E-01	2.233E+00
SN-113	5.654E-01	71.5	4.044E-01	4.054E-01	1.334E+00
SB-124	4.025E-02	561.7	2.261E-01	2.261E-01	7.549E-01
SB-125	-1.577E-01	154.5	2.436E-01	2.438E-01	3.286E+00
I-131	2.729E-01	144.6	3.946E-01	3.948E-01	9.344E-01
Gd-153	-6.226E-02	167.6	1.043E-01	1.044E-01	9.378E-01
Ga-68	-3.710E+01	84.8	3.146E+01	3.153E+01	1.040E+02
Tc-99m	-2.947E-04	39620.0	1.168E-01	1.168E-01	3.886E-01
BA-133	-7.362E-02	487.6	3.590E-01	3.590E-01	1.192E+00
CS-134	1.980E-01	137.2	2.716E-01	2.718E-01	9.409E-01
CS-137	3.418E+02	0.4	1.474E+00	1.671E+01	1.231E+00
CE-139	1.295E+00	13.3	1.726E-01	1.946E-01	4.096E-01
Ba-140	-7.851E-02	166.1	1.304E-01	1.305E-01	3.768E+00
La-140	9.770E-02	376.3	3.676E-01	3.677E-01	7.144E-01
CE-141	5.453E-02	363.9	1.984E-01	1.985E-01	6.592E-01
CE-144	-1.793E-01	595.9	1.069E+00	1.069E+00	3.545E+00
PM-144	3.061E-02	607.1	1.858E-01	1.858E-01	1.027E+00
EU-152	1.906E+01	1.2	2.194E-01	9.498E-01	2.707E+00
EU-154	2.375E+01	1.1	2.701E-01	1.179E+00	1.024E+01
EU-155	-4.409E-01	82.4	3.631E-01	3.639E-01	1.200E+00
HF-181	1.330E+00	6.6	8.833E-02	1.092E-01	1.235E+00
Ta-182	-1.198E+00	141.7	1.697E+00	1.698E+00	5.624E+00
Hg-203	3.580E-02	389.8	1.396E-01	1.396E-01	4.654E-01
TL-208	2.585E-01	95.3	2.463E-01	2.466E-01	1.034E+00
pm-146	-5.890E-01	164.5	9.692E-01	9.696E-01	3.219E+00

y-88	8.017E-01	25.8	2.065E-01	2.101E-01	1.989E+00
Cd-109	1.993E+03	0.4	7.906E+00	1.035E+02	1.281E+01
Ra-226	5.494E+00	71.6	3.931E+00	3.949E+00	1.297E+01
PB-210	-2.379E+01	23.6	5.609E+00	5.813E+00	1.585E+01
PB-212	2.778E-01	96.3	2.674E-01	2.678E-01	8.889E-01
PB-214	4.070E-01	143.6	5.845E-01	5.849E-01	1.936E+00
BI-207	-7.880E-02	354.2	2.791E-01	2.792E-01	9.285E-01
BI-212	-5.152E+00	94.5	4.868E+00	4.874E+00	1.610E+01
BI-214	4.943E-01	120.9	5.977E-01	5.982E-01	2.177E+00
BI-210M	-7.008E-02	463.1	3.246E-01	3.246E-01	1.078E+00
RA-224	3.177E+00	96.3	3.059E+00	3.064E+00	1.012E+01
AC-228	-1.047E+00	147.2	1.541E+00	1.542E+00	5.111E+00
TH-227	1.343E+01	8.7	1.172E+00	1.380E+00	4.177E+00
TH-229	2.101E+00	130.3	2.739E+00	2.742E+00	1.003E+01
TH-234	-8.010E+00	50.6	4.056E+00	4.075E+00	8.209E+00
PA-231	-6.466E+00	104.8	6.777E+00	6.784E+00	2.241E+01
PA-233	2.614E-01	134.8	3.524E-01	3.526E-01	1.675E+00
PA-234	1.269E+00	115.9	1.470E+00	1.472E+00	1.670E+00
PA-234M	3.232E+01	111.0	3.588E+01	3.591E+01	2.249E+02
U-235	5.660E-01	152.0	8.603E-01	8.607E-01	2.855E+00
AM-241	9.212E+02	0.2	1.741E+00	4.567E+01	1.832E+00
Ir-192	4.389E-02	95.2	4.177E-02	4.184E-02	7.380E-01
Np-237	1.386E+01	11.6	1.600E+00	1.753E+00	5.193E+00
Total	3.786E+03				

Analyst: Elizabeth Newns

TestAmerica Spectrum name: 7_Gamma_20141924.An1

Sample description
140177_Gamma_LCS 160-140177~2-A

Spectrum Filename: C:\User\SPC\Det7\7_Gamma_20141924.An1

Acquisition information
Start time: 8/26/2014 11:39:33 AM
Live time: 7200
Real time: 7468
Dead time: 3.58 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Liquid_D=1 25ml.Clb
7_25mld=1_90101_032612

Energy Calibration
Created: 2/23/2012 8:40:56 AM
Zero offset: 0.117 keV
Gain: 0.250 keV/channel
Quadratic: 3.508E-09 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 9:22:15 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.82 %
Log(Eff): -7.206837E-02 + (-5.220592E-02*Log(E)) +
(-7.214522E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.58 %
Log(Eff): -1.343090E+01 + (5.323811E+00*Log(E)) +
(-6.125181E-01*Log(E)^2)

Library Files
Main analysis library: Client_ Long_no ingrowth Rev3.li
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (2000.12keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/26/2014 11:38:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2014-08-09_2137.PBC 8/9/2014 9:37:15 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 64 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0755

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.60	4107.	3.77	1.19	1.104E-01				
43.38	813.	18.36	1.08	1.267E-01				
49.56	7710.	3.99	1.60	1.377E-01	50.14	8.000	9.661E+01	TH227
					50.14	8.000	9.661E+01	TH227
59.56	354781.	0.19	1.06	1.490E-01	59.54	35.900	9.212E+02	AM241
77.49	521.	29.09	0.79	1.553E-01				
80.74	94.	125.38	0.87	1.550E-01	80.99	34.060	PBC<MDA	BA133
86.48	2014.	11.55	0.88	1.540E-01	86.49	13.100	1.386E+01	Np237
					86.54	30.700	5.916E+00	EU155
88.01	93026.	0.37	1.10	1.536E-01	86.54	30.700	2.733E+02	EU155
					88.04	3.790	2.219E+03	Cd109
92.86	-56.	194.02	0.89	1.521E-01	92.59	5.584	PBC<MDA	TH234
					92.59	5.584	PBC<MDA	TH234
102.68	240.	41.21	0.73	1.477E-01				
103.21	20.	374.01	0.90	1.474E-01	103.20	21.800	PBC<MDA	Gd153
121.99	12314.	1.14	0.92	1.365E-01	121.78	28.580	4.379E+01	EU152
					122.06	85.600	1.464E+01	CO57
					123.10	40.790	3.087E+01	EU154
					121.78	28.580	4.379E+01	EU152
125.12	78.	79.38	0.92	1.345E-01				
131.14	27.	310.46	0.93	1.306E-01	131.29	18.000	PBC<MDA	PA234
136.38	1578.	7.52	1.23	1.273E-01	136.30	5.850	2.942E+01	HF181
					136.47	10.680	1.613E+01	CO57
					136.30	5.850	2.942E+01	HF181
143.71	99.	69.24	0.46	1.225E-01	143.79	10.960	PBC<MDA	U235
145.99	23.	363.88	0.94	1.214E-01	145.44	48.200	PBC<MDA	CE141
160.39	39.	166.10	0.96	1.104E-01	162.66	6.220	PBC<MDA	Ba140
					162.66	6.220	7.881E-01	Ba140
165.74	806.	13.33	0.96	1.085E-01	165.85	79.900	1.295E+00	CE139
185.86	128.	71.56	0.99	9.876E-02	185.99	3.280	PBC<MDA	Ra226
193.46	58.	159.46	0.99	9.565E-02	193.51	4.400	PBC<MDA	TH229
211.13	46.	206.23	1.01	8.916E-02	210.85	2.990	PBC<MDA	TH229

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
238.32	70.	61.51	1.04	8.043E-02	238.63	43.300	PBC<MDA	PB212
240.76	150.	55.93	0.37	7.982E-02	240.99	4.100	6.371E+00	RA224
277.28	76.	95.26	1.08	7.076E-02	277.28	6.310	PBC<MDA	TL208
279.20	15.	389.82	1.08	7.034E-02	279.20	81.460	PBC<MDA	Hg203
298.80	60.	134.80	1.10	6.604E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	5.138E+00	PA231
					300.18	6.200	2.039E+00	PA233
298.80	60.	135.02	1.10	6.606E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	5.130E+00	PA231
					300.18	6.200	2.036E+00	PA233
298.80	60.	135.13	1.10	6.607E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	5.126E+00	PA231
					300.18	6.200	2.034E+00	PA233
317.28	98.	69.24	0.42	6.290E-02				
319.69	47.	193.93	1.13	6.241E-02	320.08	9.940	PBC<MDA	CR51
352.60	63.	143.61	1.16	5.735E-02	351.93	37.600	PBC<MDA	PB214
					351.93	37.600	4.070E-01	PB214
364.49	57.	161.94	1.17	5.557E-02	364.48	81.700	PBC<MDA	I131
391.93	136.	71.53	1.20	5.205E-02	391.69	64.000	PBC<MDA	SN113
411.87	72.	90.80	0.57	4.971E-02				
433.86	15.	668.35	1.24	4.737E-02	433.94	90.480	PBC<MDA	AG108M
468.77	72.	149.48	1.27	4.413E-02	468.06	51.750	PBC<MDA	Ir192
474.72	14.	607.08	1.28	4.337E-02	476.81	42.000	PBC<MDA	PM144
477.47	82.	122.26	1.28	4.330E-02	477.60	10.520	PBC<MDA	BE7
497.20	69.	129.55	1.30	4.170E-02	497.05	90.900	PBC<MDA	RU103
503.02	185.	48.34	0.39	4.123E-02				
510.87	79.	105.90	1.31	4.055E-02	511.86	20.000	PBC<MDA	RH106
					511.86	20.000	1.345E+00	RH106
563.19	10.	434.41	1.36	3.700E-02	563.24	8.350	PBC<MDA	CS134
565.30	168.	41.35	0.51	3.687E-02				
569.26	8.	137.19	1.37	3.662E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	3.714E-01	PA234
					569.70	97.740	3.118E-02	BI207
					569.70	97.740	3.118E-02	BI207
569.41	27.	98.19	1.37	3.661E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.268E+00	PA234
					569.70	97.740	1.065E-01	BI207
581.48	22.	307.12	1.38	3.578E-02	583.02	84.500	PBC<MDA	TL208
599.26	10.	561.72	1.40	3.464E-02	602.73	98.260	PBC<MDA	SB124
603.55	135.	42.49	0.66	3.460E-02				
608.91	62.	91.43	1.41	3.428E-02	609.31	46.090	PBC<MDA	BI214
					609.31	46.090	PBC<MDA	BI214
614.53	58.	127.17	1.41	3.401E-02	614.28	89.850	PBC<MDA	AG108M
633.36	24.	239.61	1.43	3.282E-02	636.97	7.170	PBC<MDA	I131
					635.89	11.310	8.817E-01	SB125
651.57	96.	50.37	0.45	3.209E-02				
661.73	66276.	0.43	1.56	3.160E-02	661.66	85.210	3.418E+02	CS137
683.56	103.	66.83	0.67	3.060E-02				
724.95	54.	136.73	1.51	2.889E-02	724.20	44.150	PBC<MDA	ZR95
					723.36	20.220	1.292E+00	EU154
747.95	176.	52.16	0.66	2.797E-02				
754.41	100.	52.84	0.30	2.773E-02				
756.73	62.	95.18	1.54	2.764E-02	756.73	54.460	PBC<MDA	ZR95
766.28	69.	111.01	1.55	2.729E-02	765.79	99.790	PBC<MDA	NB95
					766.41	0.294	1.187E+02	PA234M
796.01	58.	137.18	1.58	2.626E-02	795.87	85.530	PBC<MDA	CS134
816.05	21.	376.28	1.59	2.561E-02	815.77	23.280	PBC<MDA	La140
834.87	36.	232.66	1.61	2.502E-02	834.85	99.980	PBC<MDA	MN54
864.48	120.	56.04	0.48	2.414E-02				
870.61	69.	127.45	1.64	2.395E-02				
880.66	63.	100.34	1.65	2.368E-02	880.53	6.000	PBC<MDA	PA234
883.37	43.	165.50	1.65	2.361E-02	883.24	9.600	PBC<MDA	PA234
					884.68	72.680	3.491E-01	AG110M

					884.68	72.680	3.491E-01	AG110M
898.27	127.	61.15	0.34	2.320E-02				
898.59	47.	200.19	1.66	2.321E-02	898.04	93.700	PBC<MDA	y88
921.75	131.	49.70	0.59	2.259E-02				
936.99	16.	614.76	1.70	2.220E-02	937.49	34.360	PBC<MDA	AG110M
					937.49	34.360	2.985E-01	AG110M

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
944.90	39.	254.08	1.70	2.199E-02	946.02	13.400	PBC<MDA	PA234
995.91	35.	254.28	1.75	2.083E-02	996.33	10.600	PBC<MDA	EU154
					996.33	10.600	2.186E+00	EU154
1049.19	101.	63.02	0.53	1.973E-02				
1054.01	8.	928.58	1.79	1.970E-02	1050.36	1.560	PBC<MDA	RH106
					1050.36	1.560	3.453E+00	RH106
1097.86	12.	727.75	1.83	1.878E-02	1099.25	56.500	PBC<MDA	FE59
					1099.25	56.500	1.529E-01	FE59
1109.78	92.	65.72	0.48	1.859E-02				
1112.96	37.	239.05	1.84	1.855E-02	1112.07	13.644	PBC<MDA	EU152
					1112.07	13.644	2.014E+00	EU152
1115.93	122.	69.20	1.84	1.848E-02	1115.55	50.600	PBC<MDA	ZN65
1145.73	122.	42.58	0.60	1.797E-02				
1161.13	127.	51.85	0.49	1.771E-02				
1173.36	47693.	0.53	1.97	1.751E-02	1173.24	99.900	3.786E+02	CO60
1237.88	12.	284.76	1.94	1.653E-02	1238.28	66.070	PBC<MDA	Co56
1274.84	18.	171.49	1.96	1.602E-02	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	4.380E-01	EU154
					1274.54	35.190	4.380E-01	EU154
1274.84	18.	171.50	1.96	1.602E-02	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	4.380E-01	EU154
1292.14	14.	211.22	1.98	1.579E-02	1291.60	43.200	PBC<MDA	FE59
					1291.60	43.200	2.816E-01	FE59
1332.61	42310.	0.51	2.12	1.526E-02	1332.50	99.980	3.851E+02	CO60
1383.64	15.	140.08	2.04	1.464E-02	1384.30	24.290	PBC<MDA	AG110M
					1384.30	24.290	5.837E-01	AG110M
1461.06	28.	73.37	2.10	1.380E-02	1460.83	10.670	PBC<MDA	K40
1763.48	4.	342.04	2.29	1.117E-02	1764.49	15.400	PBC<MDA	BI214
					1764.49	15.400	PBC<MDA	BI214
1771.86	13.	140.23	2.29	1.113E-02	1771.35	15.480	PBC<MDA	Co56
1836.10	97.	25.76	0.66	1.068E-02	1836.06	99.200	1.276E+00	y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
145.94	36.60	5421.	4107.	3.719E+04	3.77	1.194	-	s
173.07	43.38	6777.	813.	6.413E+03	18.36	1.077	-	s
197.79	49.56	27951.	5047.	3.665E+04	4.89	1.601	-	s
309.52	77.49	6415.	521.	3.356E+03	22.18	0.793	-	s
410.32	102.68	2523.	203.	1.373E+03	35.73	0.897	-	D
500.09	125.13	1083.	98.	7.284E+02	48.55	0.449	-	sM
1268.76	317.28	1747.	155.	2.460E+03	39.04	0.416	-	s
1647.17	411.87	1658.	72.	1.438E+03	90.80	0.572	-	sc
2011.79	503.02	2139.	185.	4.495E+03	48.34	0.386	-	s
2260.70	565.30	1651.	136.	3.688E+03	43.13	1.366	-	D
2413.91	603.55	1052.	135.	3.902E+03	35.05	0.656	-	s
2606.02	651.57	847.	96.	3.002E+03	50.37	0.450	-	s
2733.95	683.56	1264.	103.	3.366E+03	66.83	0.665	-	s
2991.52	747.95	1824.	176.	6.275E+03	52.16	0.656	-	l
3017.39	754.41	1239.	71.	2.564E+03	71.02	1.539	-	lc
3457.65	864.48	1382.	120.	4.958E+03	44.88	0.479	-	sM
3686.72	921.75	1454.	131.	5.806E+03	49.70	0.587	-	sM
4196.50	1049.19	1239.	101.	5.103E+03	50.46	0.526	-	sM
4438.85	1109.78	1188.	92.	4.940E+03	54.11	0.482	-	sM
4582.67	1145.73	742.	122.	6.819E+03	42.58	0.598	-	s
4644.24	1161.13	977.	127.	7.189E+03	51.85	0.493	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_ Long_no ingrowth Rev3.li

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	189.40	47.46	18941.	-966.	-0.134	21.96	0.836s
TH-227	197.96	49.60	29661.	2856.	0.397	8.73	0.840s
AM-241	237.78	59.56	22737.	354781.	49.275	0.19	1.056s
TH-234	251.32	62.94	5279.	-333.	-0.046	40.81	0.854s
BA-133	322.51	80.74	6902.	94.	0.013	125.38	0.874s
Np-237	345.53	86.49	26021.	2014.	0.280	11.55	0.880D
EU-155	349.47	87.47	23235.	-300.	-0.042	72.21	0.880s
Cd-109	351.73	88.04	13147.	83530.	11.601	0.40	0.881D
TH-234	371.00	92.86	4148.	-56.	-0.008	194.02	0.886s
Gd-153	389.55	97.49	4184.	-55.	-0.008	167.59	0.892s
Gd-153	412.38	103.20	2659.	20.	0.003	374.01	0.898D
EU-155	416.60	104.26	3240.	-98.	-0.014	82.37	0.900s
EU-152	487.55	121.99	4244.	12623.	1.753	1.15	0.918s
CO-57	487.59	122.00	3676.	13690.	1.901	1.24	1.130s
EU-154	487.57	122.00	3743.	12398.	1.722	1.14	0.919s
PA-234	524.14	131.14	3607.	27.	0.004	310.46	0.928s
HF-181	539.33	134.94	3431.	-333.	-0.046	25.49	0.930s
CE-144	533.74	133.54	6059.	-18.	-0.003	595.87	0.930s
HF-181	545.07	136.37	3751.	1422.	0.198	6.64	0.933s
CO-57	545.10	136.38	3256.	1578.	0.219	7.52	1.226s
U-235	574.84	143.81	3437.	55.	0.008	112.34	0.941s
CE-141	583.55	145.99	3482.	23.	0.003	363.88	0.943s
Ba-140	641.17	160.39	2076.	39.	0.005	166.10	0.961s
U-235	653.50	163.48	4097.	-241.	-0.034	38.04	0.962s
CE-139	662.55	165.74	2931.	806.	0.112	13.33	0.965s
Ra-226	743.06	185.86	4140.	128.	0.018	71.56	0.986s
TH-229	773.46	193.46	4182.	58.	0.008	159.46	0.994s
U-235	815.15	203.88	3358.	-54.	-0.008	152.23	1.007s
TH-229	844.12	211.13	4484.	46.	0.006	206.23	1.012s
TH-227	941.89	235.57	4078.	-80.	-0.011	113.45	1.039s
PB-212	954.15	238.63	2232.	70.	0.010	61.51	1.041D
RA-224	963.57	240.99	2556.	75.	0.010	96.29	1.043D
PB-214	968.26	242.16	4305.	-31.	-0.004	296.68	1.045s
EU-152	979.91	245.07	4396.	-20.	-0.003	480.82	1.048s
BI-210M	1068.07	267.11	3666.	-19.	-0.003	463.14	1.069s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
TL-208	1108.77	277.28	2587.	76.	0.011	95.26	1.081D
Hg-203	1116.44	279.20	1650.	15.	0.002	389.82	1.083D
PB-212	1194.84	298.80	3254.	60.	0.008	135.13	1.105s
PA-231	1194.84	298.80	3254.	60.	0.008	135.02	1.105s
PA-233	1194.84	298.80	3254.	60.	0.008	134.80	1.105s
PA-231	1212.85	303.30	4201.	-88.	-0.012	104.81	1.107s
BA-133	1212.80	303.29	4201.	-88.	-0.012	104.91	1.108s
Ba-140	1212.98	303.33	3093.	-86.	-0.012	91.58	1.110s
BI-210M	1213.05	303.35	3272.	-85.	-0.012	95.64	1.110s
Ir-192	1229.54	307.47	3836.	-118.	-0.016	74.78	1.113s
Ir-192	1263.83	316.05	3842.	-75.	-0.010	117.89	1.121
CR-51	1278.41	319.69	4102.	47.	0.007	193.93	1.125
HF-181	1383.82	346.04	4153.	-27.	-0.004	340.35	1.151s
PB-214	1410.05	352.60	4087.	63.	0.009	143.61	1.157s
BA-133	1427.90	357.06	4134.	-19.	-0.003	487.61	1.161s
I-131	1457.64	364.49	4188.	57.	0.008	161.94	1.170s
BA-133	1534.48	383.70	4558.	-50.	-0.007	192.51	1.189s
SN-113	1567.40	391.93	4638.	136.	0.019	71.53	1.197s
SB-125	1711.93	428.06	5118.	-60.	-0.008	169.63	1.233s
AG-108M	1735.12	433.86	5090.	15.	0.002	668.35	1.239s
pm-146	1807.62	451.98	4264.	-138.	-0.019	67.64	1.259s
SB-125	1848.95	462.32	5052.	-11.	-0.002	920.23	1.268s
Ir-192	1874.76	468.77	5702.	72.	0.010	149.48	1.272
PM-144	1898.56	474.72	3867.	14.	0.002	607.08	1.281
BE-7	1909.55	477.47	5012.	82.	0.011	122.26	1.282s
HF-181	1925.91	481.55	4273.	-125.	-0.017	74.72	1.286s
La-140	1947.46	486.94	4008.	-37.	-0.005	245.72	1.291s
RU-103	1988.50	497.20	3954.	69.	0.010	129.55	1.300s
RH-106	2043.18	510.87	3419.	79.	0.011	105.90	1.315s
Ba-140	2146.38	536.67	2959.	-20.	-0.003	378.44	1.339s
CS-134	2252.66	563.24	882.	10.	0.001	434.41	1.364D
CS-134	2276.99	569.32	807.	8.	0.001	137.19	1.369D
PA-234	2277.59	569.47	798.	27.	0.004	98.19	1.370D
BI-207	2279.17	569.86	2573.	-20.	-0.003	354.23	1.370s
TL-208	2325.63	581.48	2276.	22.	0.003	307.12	1.382s
SB-125	2413.94	603.56	2008.	25.	0.003	258.34	1.399s
SB-124	2396.73	599.26	1530.	10.	0.001	561.72	1.401
BI-214	2435.35	608.91	2761.	62.	0.009	91.43	1.407
RU-103	2446.19	611.62	2690.	-63.	-0.009	116.26	1.408
AG-108M	2457.83	614.53	2712.	58.	0.008	127.17	1.412
PM-144	2471.21	617.87	2805.	-27.	-0.004	273.22	1.415s
SB-125	2543.13	635.85	2882.	-56.	-0.008	135.44	1.432s
I-131	2533.16	633.36	1587.	24.	0.003	239.61	1.433s
CS-137	2646.62	661.73	2565.	66276.	9.205	0.43	1.557
NB-94	2809.87	702.54	2542.	-46.	-0.006	154.12	1.493s
EU-154	2889.72	722.50	2616.	-17.	-0.002	417.12	1.511s
ZR-95	2899.54	724.95	2741.	54.	0.008	136.73	1.512
BI-212	2908.13	727.10	2857.	-81.	-0.011	94.47	1.515s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
pm-146	2978.91	744.79	2186.	-40.	-0.006	164.54	1.533s
ZR-95	3026.65	756.73	1733.	62.	0.009	95.18	1.541D
AG-110M	3059.46	764.93	2981.	-38.	-0.005	201.82	1.548s
PA-234M	3064.84	766.28	2861.	69.	0.010	111.01	1.550
BI-212	3136.06	784.08	2926.	-33.	-0.005	233.01	1.567
CS-134	3183.79	796.01	3130.	58.	0.008	137.18	1.576
CS-134	3209.34	802.40	3272.	-141.	-0.020	57.79	1.581s
CO-58	3241.08	810.34	3207.	-22.	-0.003	369.90	1.589s
La-140	3263.96	816.05	3226.	21.	0.003	376.28	1.593
MN-54	3339.23	834.87	3578.	36.	0.005	232.66	1.610s
Co-56	3375.28	843.88	2653.	-46.	-0.006	158.50	1.620s
NB-94	3482.17	870.61	3850.	69.	0.010	127.45	1.641
EU-154	3475.64	868.98	2099.	-13.	-0.002	489.12	1.643s
PA-234	3521.86	880.53	1984.	63.	0.009	100.34	1.649D
PA-234	3532.70	883.24	2517.	43.	0.006	165.50	1.652D
Sc-46	3557.38	889.41	4274.	-23.	-0.003	401.04	1.657s
y-88	3594.10	898.59	4387.	47.	0.007	200.19	1.664s
AC-228	3627.69	906.99	2680.	-50.	-0.007	147.17	1.675s
AG-110M	3747.70	936.99	5068.	16.	0.002	614.76	1.697s
PA-234	3779.33	944.90	4962.	39.	0.005	254.08	1.704
AC-228	3873.28	968.38	4605.	-104.	-0.015	92.40	1.724
EU-154	3983.40	995.91	3887.	35.	0.005	254.28	1.746s
Co-56	4143.88	1036.04	3056.	-14.	-0.002	559.12	1.780s
RH-106	4215.77	1054.01	2514.	8.	0.001	928.58	1.790s
BI-207	4255.80	1064.01	3504.	-22.	-0.003	387.97	1.801s
Ga-68	4320.75	1080.25	3140.	-94.	-0.013	84.81	1.812s
FE-59	4391.18	1097.86	3604.	12.	0.002	727.75	1.829s
EU-152	4451.56	1112.96	3830.	37.	0.005	239.05	1.839s
ZN-65	4463.47	1115.93	3491.	122.	0.017	69.20	1.842s
BI-214	4485.31	1121.39	3026.	-51.	-0.007	156.43	1.845s
Sc-46	4485.06	1121.33	3033.	-52.	-0.007	150.34	1.845
Ta-182	4485.14	1121.35	3044.	-55.	-0.008	141.67	1.846s
CO-60	4693.16	1173.36	1920.	47693.	6.624	0.53	1.975
Co-56	4951.25	1237.88	616.	12.	0.002	284.76	1.936s
NA-22	5099.08	1274.84	456.	18.	0.002	171.49	1.963s
EU-154	5099.08	1274.84	456.	18.	0.002	171.50	1.963s
FE-59	5168.29	1292.14	420.	14.	0.002	211.22	1.975s
CO-60	5330.15	1332.61	429.	42310.	5.876	0.51	2.117
AG-110M	5534.28	1383.64	212.	15.	0.002	140.08	2.042s
EU-152	5630.82	1407.78	233.	-13.	-0.002	169.10	2.059s
K-40	5843.94	1461.06	192.	28.	0.004	73.37	2.095s
BI-214	7053.51	1763.48	148.	4.	0.001	342.04	2.290s
Co-56	7087.02	1771.86	164.	13.	0.002	140.23	2.294s
y-88	7343.96	1836.10	100.	97.	0.014	25.76	0.658s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	2.5070E+00				5.31E+01		
			477.60	2.507E+00	?(	1.014E+01	1.22E+02	1.05E+01 G
NA-22	C	1.5422E-01				9.50E+02		
			1274.53	1.542E-01	&(	8.866E-01	1.71E+02	9.99E+01 G
K-40	N	2.6116E+00				4.66E+11		
			1460.83	2.612E+00	?(	6.354E+00	7.34E+01	1.07E+01 G
Sc-46	F	-1.3679E-01				8.38E+01		
			889.28	-1.368E-01	&(	1.821E+00	4.01E+02	1.00E+02 G
			1120.55	-3.928E-01	+	1.958E+00	1.50E+02	1.00E+02 G
CR-51	F	1.0486E+00				2.77E+01		
			320.08	1.049E+00	&(	6.743E+00	1.94E+02	9.94E+00 G
MN-54	C	2.0243E-01				3.12E+02		
			834.85	2.024E-01	?(	1.563E+00	2.33E+02	1.00E+02 G
FE-59	F	2.0866E-01				4.45E+01		
			1099.25	1.529E-01	&(	3.698E+00	7.28E+02	5.65E+01 G
			1291.60	2.816E-01	&(	1.999E+00	2.11E+02	4.32E+01 G
Co-56	C	-9.3923E-02				7.73E+01		
			846.77	-2.602E-01	?(	1.368E+00	1.59E+02	9.99E+01 G
			1238.28	1.576E-01	?(	1.506E+00	2.85E+02	6.61E+01 G
			1037.84	-6.896E-01	&	1.282E+01	5.59E+02	1.41E+01 G
			1771.35	1.062E+00	?	5.028E+00	1.40E+02	1.55E+01 A
CO-57	C	1.6259E+01				2.72E+02		
			122.06	1.628E+01	*(	3.391E-01	1.24E+00	8.56E+01 G
			136.47	1.613E+01	*(	2.746E+00	7.52E+00	1.07E+01 G
CO-58	C	-1.1751E-01				7.09E+01		
			810.78	-1.175E-01	?(	1.445E+00	3.70E+02	9.95E+01 G
CO-60	F	3.8182E+02				1.93E+03		
			1332.50	3.851E+02	(	9.035E-01	5.07E-01	1.00E+02 G
			1173.24	3.786E+02	(	1.642E+00	5.25E-01	9.99E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ZN-65	F	1.8086E+00					2.44E+02	
			1115.55	1.809E+00	&(	4.129E+00	6.92E+01	5.06E+01 G
NB-94	I	9.3190E-02					7.41E+06	
			702.63	-2.214E-01	?(	1.132E+00	1.54E+02	9.79E+01 G
			871.10	4.015E-01	(	1.694E+00	1.27E+02	9.99E+01 G
ZR-95	I	5.8330E-01					6.40E+01	
			756.73	5.758E-01	(	1.815E+00	9.52E+01	5.45E+01 G
			724.20	5.926E-01	(	2.686E+00	1.37E+02	4.42E+01 G
NB-95	I	-2.2414E-02					6.40E+01	
			765.79	-2.241E-02	%(	1.267E+00	1.70E+03	9.98E+01 G
RU-103	I	2.5260E-01					3.93E+01	
			497.05	2.526E-01	?(	1.084E+00	1.30E+02	9.09E+01 G
			610.30	-4.479E+00	&	1.725E+01	1.16E+02	5.75E+00 GA
RH-106	I	4.6884E-01					3.74E+02	
			621.92	0.000E+00	?(	9.981E+00	1.00E+03	9.93E+00 G
			1050.36	3.453E+00	?(	1.068E+02	9.29E+02	1.56E+00 G
			511.86	1.345E+00		4.712E+00	1.06E+02	2.00E+01 GA
AG-108M	C	1.5644E-01					1.53E+05	
			433.94	4.896E-02	?(	1.086E+00	6.68E+02	9.05E+01 G
			722.94	0.000E+00	}	1.325E+00	5.87E+03	9.08E+01 G
			614.28	2.647E-01	(	1.116E+00	1.27E+02	8.98E+01 G
AG-110M	F	2.0480E-01					2.50E+02	
			884.68	3.388E-02	&(	2.233E+00	1.98E+03	7.27E+01 G
			657.76	-1.712E-01	&	9.323E+00	1.65E+03	9.46E+01 G
			937.49	2.985E-01	&(	6.091E+00	6.15E+02	3.44E+01 G
			1384.30	5.837E-01	?(	2.754E+00	1.40E+02	2.43E+01 G
			763.94	-8.740E-01	+	5.855E+00	2.02E+02	2.23E+01 G
SN-113	F	5.6543E-01					1.15E+02	
			391.69	5.654E-01	*(	1.334E+00	7.15E+01	6.40E+01 G
SB-124	F	4.0250E-02					6.02E+01	
			602.73	4.025E-02	(	7.549E-01	5.62E+02	9.83E+01 G
			1690.98	1.534E-02	%	1.355E+00	2.55E+03	4.78E+01 G
			722.79	0.000E+00	}	1.113E+01	5.87E+03	1.08E+01 G
SB-125	I	-1.5767E-01					1.01E+03	
			427.88	-5.849E-01	&(	3.286E+00	1.70E+02	2.96E+01 G
			600.50	5.504E-01	?(	4.732E+00	2.58E+02	1.79E+01 G
			635.89	-2.104E+00	+	9.447E+00	1.35E+02	1.13E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			463.37	-3.254E-01	&	9.942E+00	9.20E+02	1.05E+01 G
I-131	I	2.7291E-01					8.02E+00	
			364.48	1.741E-01	*(	9.344E-01	1.62E+02	8.17E+01 G
			284.30	-2.533E-01	%	1.030E+01	1.22E+03	6.14E+00 G
			636.97	1.398E+00	&(	1.116E+01	2.40E+02	7.17E+00 G
Gd-153	F	-6.2262E-02					2.42E+02	
			97.50	-1.689E-01	?(	9.378E-01	1.68E+02	3.00E+01 G
			103.20	8.443E-02	(	1.050E+00	3.74E+02	2.18E+01 G
Ga-68	C	-3.7098E+01					4.71E-02	
			1077.40	-3.710E+01	&(	1.040E+02	8.48E+01	3.30E+00 G
Tc-99m	I	-2.9473E-04					2.51E-01	
			140.51	-2.947E-04	&(	3.886E-01	3.96E+04	8.93E+01 G
BA-133	F	-7.3620E-02					3.85E+03	
			356.00	-7.362E-02	?(	1.192E+00	4.88E+02	6.20E+01 G
			302.85	-1.016E+00	+	3.524E+00	1.05E+02	1.83E+01 G
			383.84	-1.457E+00	+	9.297E+00	1.93E+02	8.94E+00 GA
			80.99	2.473E-01	?	1.025E+00	1.25E+02	3.41E+01 GA
CS-134	I	1.9799E-01					7.54E+02	
			604.71	6.118E-03	%(	9.409E-01	4.61E+03	9.76E+01 G
			795.87	3.582E-01	(	1.629E+00	1.37E+02	8.55E+01 G
			569.32	1.980E-01	}	3.332E+00	1.37E+02	1.54E+01 G
			801.95	-8.677E+00	+	1.651E+01	5.78E+01	8.69E+00 G
			563.24	4.359E-01	(	6.345E+00	4.34E+02	8.35E+00 G
CS-137	I	3.4177E+02					1.10E+04	
			661.66	3.418E+02	(	1.231E+00	4.31E-01	8.52E+01 G
CE-139	F	1.2952E+00					1.38E+02	
			165.85	1.295E+00	@(	4.096E-01	1.33E+01	7.99E+01 G
Ba-140	I	-7.8508E-02					1.28E+01	
			537.26	-2.995E-01	?(	3.768E+00	3.78E+02	2.44E+01 G
			162.66	7.881E-01	&(	4.348E+00	1.66E+02	6.22E+00 G
			304.85	-4.298E+00	+	1.301E+01	9.16E+01	4.29E+00 G
La-140	I	9.7703E-02					1.28E+01	
			1596.21	0.000E+00	?(	7.144E-01	1.00E+03	9.54E+01 G
			487.02	-2.622E-01	&	2.138E+00	2.46E+02	4.55E+01 G
			328.76	4.055E-02	%	3.323E+00	2.46E+03	2.03E+01 G
			815.77	4.981E-01	(	6.229E+00	3.76E+02	2.33E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CE-141	I	5.4533E-02					3.25E+01	
			145.44	5.453E-02	?(	6.592E-01	3.64E+02	4.82E+01 G
CE-144	I	-1.7932E-01					2.85E+02	
			133.54	-1.793E-01	&(	3.545E+00	5.96E+02	1.11E+01 G
PM-144	C	3.0605E-02					3.63E+02	
			696.54	-3.313E-03	&(	1.027E+00	9.29E+03	9.90E+01 G
			618.06	-1.139E-01	&	1.035E+00	2.73E+02	9.91E+01 G
			476.81	1.106E-01	(	2.230E+00	6.07E+02	4.20E+01 G
EU-152	F	1.9058E+01					4.94E+03	
			344.29	-2.365E-02	%(	2.707E+00	3.44E+03	2.65E+01 G
			1112.07	2.014E+00	&(	1.598E+01	2.39E+02	1.36E+01 G
			121.78	4.489E+01	*(	1.089E+00	1.15E+00	2.86E+01 G
			778.92	-1.167E-02	&	1.041E+01	2.68E+04	1.29E+01 G
			964.11	3.406E-02	&	1.443E+01	1.28E+04	1.46E+01 G
			244.69	-4.543E-01	&	7.253E+00	4.81E+02	7.58E+00 G
			1408.00	-5.961E-01	+	3.401E+00	1.69E+02	2.10E+01 GA
EU-154	I	2.3747E+01					3.14E+03	
			873.23	-6.287E-01	?(	1.024E+01	4.89E+02	1.23E+01 G
			123.10	3.108E+01	?(	7.215E-01	1.14E+00	4.08E+01 G
			1274.54	4.380E-01	-	2.518E+00	1.71E+02	3.52E+01 G
			723.36	-4.125E-01	&	5.724E+00	4.17E+02	2.02E+01 G
			1004.77	3.233E-01	%	1.092E+01	1.02E+03	1.80E+01 G
			996.33	2.186E+00	-	1.845E+01	2.54E+02	1.06E+01 G
EU-155	I	-4.4088E-01					1.81E+03	
			105.31	-4.409E-01	?(	1.200E+00	8.24E+01	2.12E+01 G
			86.54	-8.798E-01	+	2.095E+00	7.22E+01	3.07E+01 G
HF-181	F	1.3297E+00					4.24E+01	
			482.00	-5.008E-01	&(	1.235E+00	7.47E+01	8.05E+01 G
			133.02	-8.244E-01	+	6.830E-01	2.55E+01	4.33E+01 G
			345.83	-4.243E-01	&	4.793E+00	3.40E+02	1.51E+01 G
			136.30	2.652E+01	*(	5.373E+00	6.64E+00	5.85E+00 G
Ta-182	F	-1.1977E+00					1.14E+02	
			1121.30	-1.198E+00	?(	5.624E+00	1.42E+02	3.49E+01 G
			1221.41	1.213E-01	%	4.243E+00	1.04E+03	2.70E+01 G
			1189.05	1.269E-01	%	8.574E+00	2.02E+03	1.62E+01 G
Hg-203	F	3.5804E-02					4.66E+01	
			279.20	3.580E-02	(	4.654E-01	3.90E+02	8.15E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TL-208	N	2.5854E-01					6.98E+02	
			583.02	1.012E-01	?(	1.034E+00	3.07E+02	8.45E+01 G
			277.28	2.366E+00	(	7.457E+00	9.53E+01	6.31E+00 G
			860.56	1.068E-01	%	1.346E+01	3.79E+03	1.24E+01 G
pm-146	C	-5.8904E-01					2.02E+03	
			747.16	-5.890E-01	?(	3.219E+00	1.65E+02	3.40E+01 G
			735.72	-2.700E-02	%	5.427E+00	6.03E+03	2.25E+01 G
			453.88	-6.474E-01	&	1.444E+00	6.76E+01	6.50E+01 G
y-88	F	8.0165E-01					1.07E+02	
			898.04	2.996E-01	?(	1.989E+00	2.00E+02	9.37E+01 G
			1836.06	1.276E+00	(	6.453E-01	2.58E+01	9.92E+01 G
Cd-109	F	1.9928E+03					4.53E+02	
			88.04	1.993E+03	(	1.281E+01	3.97E-01	3.79E+00 G
Ra-226	N	5.4939E+00					5.84E+05	
			185.99	5.494E+00	&(	1.297E+01	7.16E+01	3.28E+00 G
PB-210	N	-2.3790E+01					8.14E+03	
			46.54	-2.379E+01	?(P	1.585E+01	2.20E+01	4.25E+00 G
PB-212	N	2.7781E-01					6.98E+02	
			238.63	2.778E-01	(P	8.889E-01	6.15E+01	4.33E+01 G
			300.03	3.844E+00	?	1.721E+01	1.35E+02	3.28E+00 GA
PB-214	N	4.0701E-01					5.84E+05	
			351.93	4.070E-01	&(	1.936E+00	1.44E+02	3.76E+01 G
			295.09	-1.676E-02	&	3.326E+00	5.97E+03	1.93E+01 G
			242.00	-7.369E-01	+	7.254E+00	2.97E+02	7.43E+00 GA
BI-207	C	-7.8799E-02					1.18E+04	
			569.70	-7.880E-02	?(	9.285E-01	3.54E+02	9.77E+01 G
			1063.66	-2.072E-01	+	2.671E+00	3.88E+02	7.45E+01 G
BI-212	N	-5.1524E+00					6.98E+02	
			727.17	-5.152E+00	?(	1.610E+01	9.45E+01	7.55E+00 G
			785.42	-1.342E+01	+	1.039E+02	2.33E+02	1.28E+00 GA
BI-214	N	4.9433E-01					5.84E+05	
			609.31	5.424E-01	(P	2.177E+00	9.14E+01	4.61E+01 G
			1120.29	-2.526E+00	+ P	1.295E+01	1.56E+02	1.51E+01 G
			1764.49	3.505E-01	&(P	4.798E+00	3.42E+02	1.54E+01 G

Nuclide		Ave activity	Energy		Activity	Code	Peak	MDA	Comments
BI-210M	T	-7.0083E-02						1.10E+09	
			265.83	-7.008E-02	?(	1.078E+00	4.63E+02	5.00E+01	G
			304.90	-6.482E-01	+	2.050E+00	9.56E+01	2.80E+01	G
RA-224	N	3.1766E+00						6.98E+02	
			240.99	3.177E+00	(	1.012E+01	9.63E+01	4.10E+00	G
AC-228	N	-1.0470E+00						2.10E+03	
			911.16	-1.047E+00	?(	5.111E+00	1.47E+02	2.90E+01	G
			968.97	-3.874E+00	+	1.183E+01	9.24E+01	1.75E+01	G
			338.32	-1.042E-02	%	5.892E+00	1.70E+04	1.20E+01	G
			93.35	-7.328E-02	&	4.949E+00	2.03E+03	5.56E+00	XA
TH-227	N	1.3431E+01						7.95E+03	
			235.97	-1.113E+00	&(	4.177E+00	1.13E+02	1.23E+01	G
			50.14	3.579E+01	*(	1.009E+01	8.73E+00	8.00E+00	G
			256.24	-7.882E-02	&	8.037E+00	3.07E+03	7.00E+00	G
TH-229	N	2.1012E+00						2.68E+06	
			193.51	1.899E+00	?(	1.003E+01	1.59E+02	4.40E+00	G
			210.85	2.398E+00	?(	1.640E+01	2.06E+02	2.99E+00	G
TH-234	N	-8.0104E+00						1.63E+12	
			63.29	-8.010E+00	?(P	8.209E+00	4.08E+01	3.81E+00	G
			92.59	-9.139E-01	+ P	4.951E+00	1.94E+02	5.58E+00	G
PA-231	N	-6.4656E+00						1.20E+07	
			302.65	-6.466E+00	?(	2.241E+01	1.05E+02	2.88E+00	G
			300.07	5.130E+00	+	2.295E+01	1.35E+02	2.46E+00	G
PA-233	C	2.6142E-01						7.82E+08	
			312.01	-4.480E-02	&(	1.675E+00	1.12E+03	3.60E+01	G
			300.18	2.039E+00	?(	9.109E+00	1.35E+02	6.20E+00	G
PA-234	N	1.2685E+00						1.63E+12	
			131.29	1.620E-01	&(	1.670E+00	3.10E+02	1.80E+01	G
			946.02	1.852E+00	(	1.560E+01	2.54E+02	1.34E+01	G
			569.47	1.268E+00	}	6.218E+00	9.82E+01	8.20E+00	G
			883.24	2.638E+00	(	1.449E+01	1.66E+02	9.60E+00	G
			880.53	6.184E+00		2.055E+01	1.00E+02	6.00E+00	GA
PA-234M	N	3.2320E+01						1.63E+12	
			1001.00	1.988E+00	%(	2.249E+02	3.40E+03	8.37E-01	G
			766.41	1.187E+02	(	4.362E+02	1.11E+02	2.94E-01	G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

U-235    N   5.6599E-01                                      2.57E+11
                          143.79 5.660E-01 ?(P 2.855E+00 1.12E+02 1.10E+01 G
                          205.33-1.644E+00 +   8.298E+00 1.52E+02 5.01E+00 G
                          163.38-6.001E+00 +   7.482E+00 3.80E+01 5.08E+00 G

AM-241   T   9.2123E+02                                      1.58E+05
                           59.54 9.212E+02 *(  1.832E+00 1.89E-01 3.59E+01 G

Ir-192   F   4.3887E-02                                      7.40E+01
                          316.49-1.891E-01  (  7.380E-01 1.18E+02 8.70E+01 G
                          468.06 4.358E-01  (  2.156E+00 1.49E+02 5.18E+01 G
                          308.44-8.007E-01 +   1.976E+00 7.48E+01 3.18E+01 G
                          295.95-1.266E-02 %   2.021E+00 4.80E+03 3.02E+01 G

Np-237   F   1.3862E+01                                      2.14E+06
                           86.49 1.386E+01  (  5.193E+00 1.15E+01 1.31E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
PB-210	47.46	18941.	-966.	-0.134	21.96	-2.379E+01	P
TH-227	49.60	29661.	2856.	0.397	8.73	3.579E+01	
TH-234	62.94	5279.	-333.	-0.046	40.81	-8.010E+00	P
BA-133	80.74	6902.	94.	0.013	125.38	2.473E-01	
EU-155	87.47	23235.	-300.	-0.042	72.21	-8.798E-01	
TH-234	92.86	4148.	-56.	-0.008	194.02	-9.139E-01	P
EU-155	104.26	3240.	-98.	-0.014	82.37	-4.409E-01	
EU-152	121.99	4244.	12623.	1.753	1.15	4.489E+01	
EU-154	122.00	3743.	12398.	1.722	1.14	3.108E+01	
HF-181	134.94	3431.	-333.	-0.046	25.49	-8.244E-01	
CE-144	133.54	6059.	-18.	-0.003	595.87	-1.793E-01	
HF-181	136.37	3751.	1422.	0.198	6.64	2.652E+01	
CE-141	145.99	3482.	23.	0.003	363.88	5.453E-02	
Ba-140	160.39	2076.	39.	0.005	166.10	7.881E-01	
Ra-226	185.86	4140.	128.	0.018	71.56	5.494E+00	
TH-229	193.46	4182.	58.	0.008	159.46	1.899E+00	
TH-229	211.13	4484.	46.	0.006	206.23	2.398E+00	
TH-227	235.57	4078.	-80.	-0.011	113.45	-1.113E+00	
PB-214	242.16	4305.	-31.	-0.004	296.68	-7.369E-01	
EU-152	245.07	4396.	-20.	-0.003	480.82	-4.543E-01	
BI-210M	267.11	3666.	-19.	-0.003	463.14	-7.008E-02	
PA-231	298.80	3254.	60.	0.008	135.02	5.130E+00	
PA-233	298.80	3254.	60.	0.008	134.80	2.039E+00	
PA-231	303.30	4201.	-88.	-0.012	104.81	-6.466E+00	
BA-133	303.29	4201.	-88.	-0.012	104.91	-1.016E+00	
Ba-140	303.33	3093.	-86.	-0.012	91.58	-4.298E+00	
BI-210M	303.35	3272.	-85.	-0.012	95.64	-6.482E-01	
CR-51	319.69	4102.	47.	0.007	193.93	1.049E+00	
HF-181	346.04	4153.	-27.	-0.004	340.35	-4.243E-01	
PB-214	352.60	4087.	63.	0.009	143.61	4.070E-01	
BA-133	357.06	4134.	-19.	-0.003	487.61	-7.362E-02	
I-131	364.49	4188.	57.	0.008	161.94	1.741E-01	
BA-133	383.70	4558.	-50.	-0.007	192.51	-1.457E+00	
SN-113	391.93	4638.	136.	0.019	71.53	5.654E-01	
SB-125	428.06	5118.	-60.	-0.008	169.63	-5.849E-01	
pm-146	451.98	4264.	-138.	-0.019	67.64	-6.474E-01	
SB-125	462.32	5052.	-11.	-0.002	920.23	-3.254E-01	
BE-7	477.47	5012.	82.	0.011	122.26	2.507E+00	
HF-181	481.55	4273.	-125.	-0.017	74.72	-5.008E-01	
RH-106	510.87	3419.	79.	0.011	105.90	1.345E+00	
Ba-140	536.67	2959.	-20.	-0.003	378.44	-2.995E-01	
BI-207	569.86	2573.	-20.	-0.003	354.23	-7.880E-02	
SB-125	603.56	2008.	25.	0.003	258.34	5.504E-01	
BI-214	608.91	2761.	62.	0.009	91.43	5.424E-01	P

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
SB-125	635.85	2882.	-56.	-0.008	135.44	-2.104E+00		
I-131	633.36	1587.	24.	0.003	239.61	1.398E+00		
EU-154	722.50	2616.	-17.	-0.002	417.12	-4.125E-01		
BI-212	727.10	2857.	-81.	-0.011	94.47	-5.152E+00		
pm-146	744.79	2186.	-40.	-0.006	164.54	-5.890E-01		
AG-110M	764.93	2981.	-38.	-0.005	201.82	-8.740E-01		
BI-212	784.08	2926.	-33.	-0.005	233.01	-1.342E+01		
CO-58	810.34	3207.	-22.	-0.003	369.90	-1.175E-01		
MN-54	834.87	3578.	36.	0.005	232.66	2.024E-01		
Co-56	843.88	2653.	-46.	-0.006	158.50	-2.602E-01		
EU-154	868.98	2099.	-13.	-0.002	489.12	-6.287E-01		
Sc-46	889.41	4274.	-23.	-0.003	401.04	-1.368E-01		
AC-228	906.99	2680.	-50.	-0.007	147.17	-1.047E+00		
AG-110M	936.99	5068.	16.	0.002	614.76	2.985E-01		
AC-228	968.38	4605.	-104.	-0.015	92.40	-3.874E+00		
EU-154	995.91	3887.	35.	0.005	254.28	2.186E+00		
Co-56	1036.04	3056.	-14.	-0.002	559.12	-6.896E-01		
RH-106	1054.01	2514.	8.	0.001	928.58	3.453E+00		
BI-207	1064.01	3504.	-22.	-0.003	387.97	-2.072E-01		
Ga-68	1080.25	3140.	-94.	-0.013	84.81	-3.710E+01		
FE-59	1097.86	3604.	12.	0.002	727.75	1.529E-01		
EU-152	1112.96	3830.	37.	0.005	239.05	2.014E+00		
ZN-65	1115.93	3491.	122.	0.017	69.20	1.809E+00		
BI-214	1121.39	3026.	-51.	-0.007	156.43	-2.526E+00	P	
Sc-46	1121.33	3033.	-52.	-0.007	150.34	-3.928E-01		
Ta-182	1121.35	3044.	-55.	-0.008	141.67	-1.198E+00		
Co-56	1237.88	616.	12.	0.002	284.76	1.576E-01		
EU-154	1274.84	456.	18.	0.002	171.50	4.380E-01		
FE-59	1292.14	420.	14.	0.002	211.22	2.816E-01		
AG-110M	1383.64	212.	15.	0.002	140.08	5.837E-01		
EU-152	1407.78	233.	-13.	-0.002	169.10	-5.961E-01		
K-40	1461.06	192.	28.	0.004	73.37	2.612E+00		
BI-214	1763.48	148.	4.	0.001	342.04	3.505E-01	P	
Co-56	1771.86	164.	13.	0.002	140.23	1.062E+00		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	2.5070E+00	2.5070E+00	1.223E+02%	1.01E+01
NA-22	A	1.5422E-01	1.5422E-01	1.715E+02%	8.87E-01
K-40	#A	2.6116E+00	2.6116E+00	7.337E+01%	6.35E+00
Sc-46	#A	-1.3679E-01	-1.3679E-01	4.010E+02%	1.82E+00
CR-51	#A	1.0486E+00	1.0486E+00	1.939E+02%	6.74E+00
MN-54	#A	2.0243E-01	2.0243E-01	2.327E+02%	1.56E+00

FE-59	#A	2.0865E-01	2.0866E-01	2.112E+02%	3.70E+00
Co-56	#A	-9.3922E-02	-9.3923E-02	1.585E+02%	1.37E+00
CO-57	#	1.6259E+01	1.6259E+01	1.244E+00%	3.39E-01
CO-58	#A	-1.1751E-01	-1.1751E-01	3.699E+02%	1.44E+00
CO-60		3.8182E+02	3.8182E+02	3.650E-01%	9.03E-01
ZN-65	#A	1.8086E+00	1.8086E+00	6.920E+01%	4.13E+00
NB-94	A	9.3190E-02	9.3190E-02	9.999E+01%	1.13E+00
ZR-95	A	5.8329E-01	5.8330E-01	8.330E+01%	1.81E+00
NB-95	#A	-2.2413E-02	-2.2414E-02	1.697E+03%	1.27E+00
RU-103	#A	2.5260E-01	2.5260E-01	1.296E+02%	1.08E+00
RH-106	#A	4.6884E-01	4.6884E-01	6.823E+02%	9.98E+00
AG-108M	A	1.5644E-01	1.5644E-01	1.272E+02%	1.09E+00
AG-110M	#A	2.0480E-01	2.0480E-01	1.401E+02%	2.23E+00
SN-113	#A	5.6543E-01	5.6543E-01	7.153E+01%	1.33E+00
SB-124	#A	4.0250E-02	4.0250E-02	5.617E+02%	7.55E-01
SB-125	#A	-1.5767E-01	-1.5767E-01	1.545E+02%	3.29E+00
I-131	#A	2.7288E-01	2.7291E-01	1.446E+02%	9.34E-01
Gd-153	A	-6.2262E-02	-6.2262E-02	1.676E+02%	9.38E-01
Ga-68	#A	-3.6514E+01	-3.7098E+01	8.481E+01%	1.04E+02
Tc-99m	#A	-2.9386E-04	-2.9473E-04	3.962E+04%	3.89E-01
BA-133	#A	-7.3620E-02	-7.3620E-02	4.876E+02%	1.19E+00
CS-134	A	1.9799E-01	1.9799E-01	1.372E+02%	9.41E-01
CS-137		3.4177E+02	3.4177E+02	4.312E-01%	1.23E+00
CE-139	#	1.2952E+00	1.2952E+00	1.333E+01%	4.10E-01
Ba-140	#A	-7.8503E-02	-7.8508E-02	1.661E+02%	3.77E+00
La-140	A	9.7698E-02	9.7703E-02	3.763E+02%	7.14E-01
CE-141	#A	5.4532E-02	5.4533E-02	3.639E+02%	6.59E-01
CE-144	#A	-1.7932E-01	-1.7932E-01	5.959E+02%	3.54E+00
PM-144	A	3.0605E-02	3.0605E-02	6.071E+02%	1.03E+00
EU-152	#C	1.9058E+01	1.9058E+01	1.151E+00%	2.71E+00
EU-154	#C	2.3747E+01	2.3747E+01	1.137E+00%	1.02E+01
EU-155	#A	-4.4088E-01	-4.4088E-01	8.237E+01%	1.20E+00
HF-181	#C	1.3297E+00	1.3297E+00	6.643E+00%	1.24E+00
Ta-182	#A	-1.1976E+00	-1.1977E+00	1.417E+02%	5.62E+00
Hg-203	A	3.5804E-02	3.5804E-02	3.898E+02%	4.65E-01
TL-208	A	2.5854E-01	2.5854E-01	9.526E+01%	1.03E+00
pm-146	#A	-5.8904E-01	-5.8904E-01	1.645E+02%	3.22E+00
y-88	A	8.0164E-01	8.0165E-01	2.576E+01%	1.99E+00
Cd-109		1.9928E+03	1.9928E+03	3.967E-01%	1.28E+01
Ra-226	#A	5.4939E+00	5.4939E+00	7.156E+01%	1.30E+01
PB-210	#A	-2.3790E+01	-2.3790E+01	2.358E+01%	1.59E+01
PB-212	A	2.7781E-01	2.7781E-01	9.625E+01%	8.89E-01
PB-214	#A	4.0701E-01	4.0701E-01	1.436E+02%	1.94E+00
BI-207	#A	-7.8799E-02	-7.8799E-02	3.542E+02%	9.28E-01
BI-212	#A	-5.1524E+00	-5.1524E+00	9.447E+01%	1.61E+01
BI-214	#A	4.9433E-01	4.9433E-01	1.209E+02%	2.18E+00
BI-210M	#A	-7.0083E-02	-7.0083E-02	4.631E+02%	1.08E+00
RA-224	A	3.1766E+00	3.1766E+00	9.629E+01%	1.01E+01
AC-228	#A	-1.0470E+00	-1.0470E+00	1.472E+02%	5.11E+00

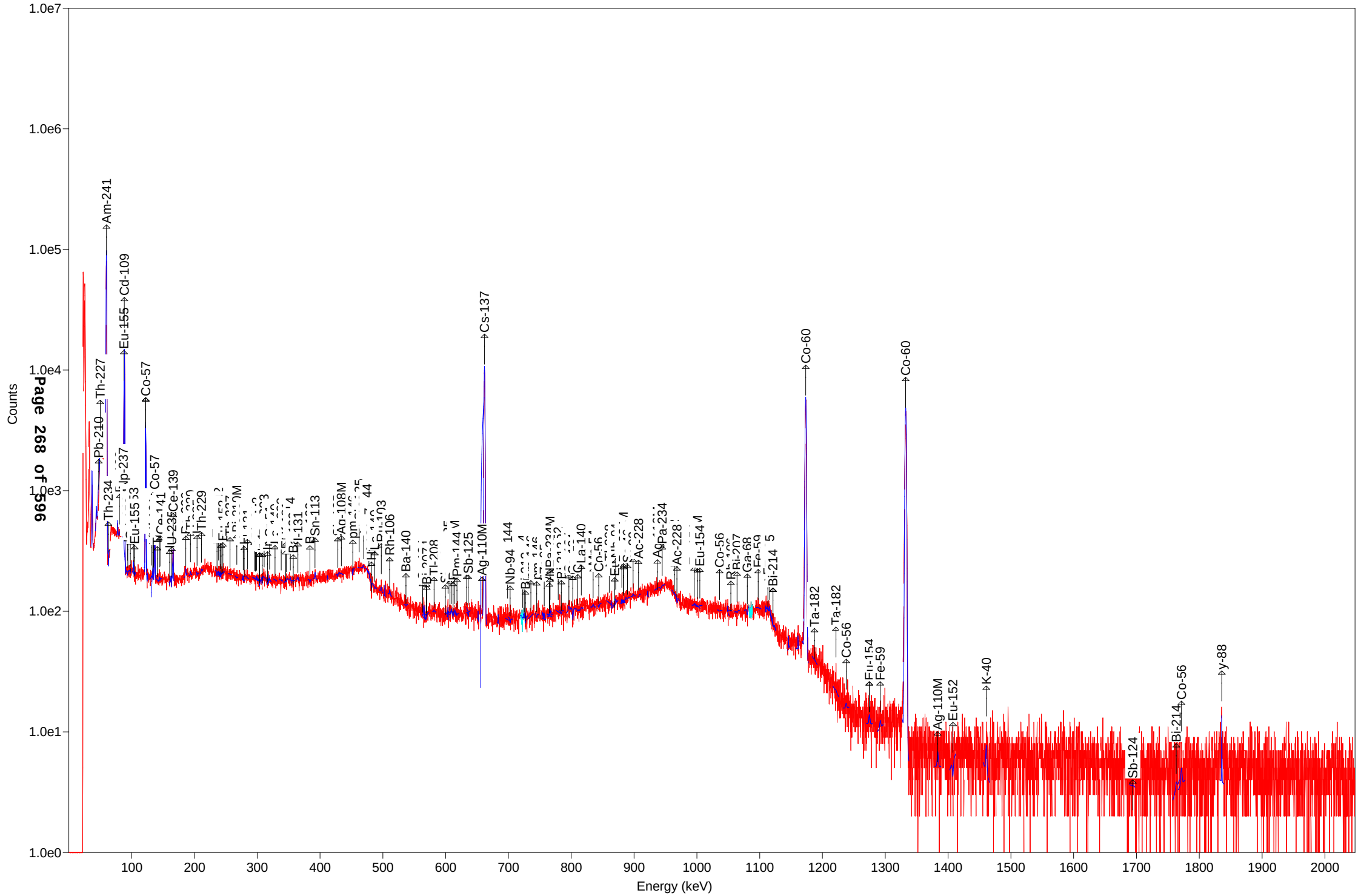
TH-227 #C	1.3431E+01	1.3431E+01	8.730E+00%	4.18E+00
TH-229 #A	2.1012E+00	2.1012E+00	1.303E+02%	1.00E+01
TH-234 #A	-8.0104E+00	-8.0104E+00	5.063E+01%	8.21E+00
PA-231 #A	-6.4656E+00	-6.4656E+00	1.048E+02%	2.24E+01
PA-233 #A	2.6142E-01	2.6142E-01	1.348E+02%	1.67E+00
PA-234 A	1.2685E+00	1.2685E+00	1.159E+02%	1.67E+00
PA-234M A	3.2320E+01	3.2320E+01	1.110E+02%	2.25E+02
U-235 #A	5.6599E-01	5.6599E-01	1.520E+02%	2.86E+00
AM-241 #	9.2123E+02	9.2123E+02	1.890E-01%	1.83E+00
Ir-192 A	4.3886E-02	4.3887E-02	9.519E+01%	7.38E-01
Np-237	1.3862E+01	1.3862E+01	1.155E+01%	5.19E+00

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (889.1 to 2000.1 keV) 3.669E+03 Bq/Sample
Total Decayed Activity (889.1 to 2000.1 keV) 3.6690029E+03 Bq/Sample

140177_Gamma_LCS 160-140177~2-A. 7_Gamma_20141924.spc.



Test America St. Louis Spectrum ID: 4_Gamma_20141651

Sample Description: 140177_Gamma_680-102600-A-6-N
Detector: Ge 4 SN/181
Batch ID: 140177
Work Order Number: Gamma
Lot Number: 680-102600-A-6-N

Decay to Time: 8/26/2014 11:33 Live Time: 7200 sec
Acquisition Time: 8/26/2014 11:33:47 Real Time: 7212 sec
Analysis Time: 8/26/2014 13:34 Dead Time: 0.16 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 4_Liquid_D=1 25ml.Clb
Efficiency Cal Desc: 4_Liquid_D=1 25ml_90101_030512
Efficiency Cal Date: 3/27/2012 20:51
Energy Cal Date: 2/28/2012 14:55
Library: Client_ Long_no ingrowth Rev3.li
Bkgd Correction File: 4_2014-08-09_2125.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	3.164E-01	161.0	5.095E-01	5.097E-01	1.804E+00
NA-22	0.000E+00	1000.0	6.904E-02	6.904E-02	8.899E-01
K-40	1.431E+01	14.5	2.077E+00	2.189E+00	5.085E+00
Sc-46	3.797E-02	220.4	8.371E-02	8.373E-02	3.034E-01
CR-51	6.205E-01	75.2	4.669E-01	4.678E-01	1.562E+00
MN-54	9.148E-02	105.6	9.657E-02	9.667E-02	3.328E-01
FE-59	3.656E-02	278.7	1.019E-01	1.019E-01	7.159E-01
Co-56	4.147E-02	136.8	5.673E-02	5.676E-02	3.177E-01
CO-57	4.927E-02	67.8	3.338E-02	3.347E-02	1.106E-01
CO-58	-5.766E-02	158.2	9.124E-02	9.128E-02	3.221E-01
CO-60	-1.151E-02	189.0	2.176E-02	2.177E-02	4.092E-01
ZN-65	-4.994E-02	496.0	2.477E-01	2.477E-01	8.986E-01
NB-94	0.000E+00	1000.0	2.321E-02	2.321E-02	4.028E-01
ZR-95	6.417E-02	194.6	1.249E-01	1.249E-01	4.526E-01
NB-95	1.070E-01	88.9	9.513E-02	9.527E-02	3.231E-01
RU-103	0.000E+00	1000.0	6.544E-02	6.544E-02	2.963E-01
RH-106	5.572E-01	146.2	8.148E-01	8.152E-01	2.662E+00
AG-108M	5.155E-03	644.1	3.321E-02	3.321E-02	3.106E-01
AG-110M	-3.730E-03	3041.0	1.134E-01	1.134E-01	4.252E-01
SN-113	-4.763E-03	1703.0	8.110E-02	8.110E-02	2.943E-01
SB-124	3.178E-04	25490.0	8.102E-02	8.102E-02	2.941E-01
SB-125	1.811E-01	129.1	2.339E-01	2.340E-01	7.062E-01
I-131	-2.206E-04	154.8	3.414E-04	3.416E-04	2.479E-01
Gd-153	-5.136E-02	202.7	1.041E-01	1.041E-01	3.580E-01
Ga-68	1.983E+00	256.2	5.079E+00	5.080E+00	1.859E+01
Tc-99m	2.361E-02	189.2	4.468E-02	4.470E-02	1.536E-01
BA-133	-2.113E-02	391.1	8.263E-02	8.264E-02	2.947E-01
CS-134	-5.251E-02	76.0	3.992E-02	4.000E-02	3.943E-01
CS-137	7.186E-01	15.8	1.135E-01	1.187E-01	1.781E-01
CE-139	6.365E-02	71.1	4.524E-02	4.545E-02	1.503E-01
Ba-140	3.220E-01	87.9	2.829E-01	2.833E-01	9.994E-01
La-140	0.000E+00	707.1	2.591E-02	2.591E-02	5.886E-01
CE-141	-8.436E-02	104.6	8.823E-02	8.832E-02	2.972E-01
CE-144	1.162E-02	2057.0	2.390E-01	2.390E-01	8.511E-01
PM-144	-4.460E-02	226.4	1.010E-01	1.010E-01	3.552E-01
EU-152	6.516E-02	82.0	5.340E-02	5.349E-02	9.333E-01
EU-154	2.284E-01	80.2	1.832E-01	1.836E-01	2.343E+00
EU-155	1.601E-01	88.9	1.423E-01	1.425E-01	4.781E-01
HF-181	2.032E-03	3533.0	7.179E-02	7.179E-02	2.631E-01
Ta-182	-2.253E-02	1217.0	2.741E-01	2.741E-01	1.033E+00
Hg-203	7.743E-02	73.3	5.672E-02	5.685E-02	1.891E-01
TL-208	3.608E-01	30.8	1.110E-01	1.118E-01	3.274E-01
pm-146	2.216E-01	81.6	1.807E-01	1.811E-01	7.619E-01

y-88	8.687E-02	90.5	7.861E-02	7.872E-02	3.376E-01
Cd-109	1.942E+00	42.9	8.338E-01	8.398E-01	2.667E+00
Ra-226	5.205E+00	34.8	1.809E+00	1.844E+00	5.046E+00
PB-210	3.137E+00	33.5	1.050E+00	1.069E+00	3.237E+00
PB-212	7.522E-01	21.9	1.650E-01	1.699E-01	4.514E-01
PB-214	6.092E-01	29.0	1.764E-01	1.789E-01	6.208E-01
BI-207	4.173E-02	94.9	3.962E-02	3.967E-02	2.331E-01
BI-212	0.000E+00	1000.0	1.441E+00	1.441E+00	3.209E+00
BI-214	5.518E-01	42.9	2.368E-01	2.383E-01	7.252E-01
BI-210M	6.577E-03	82.1	5.397E-03	5.408E-03	3.912E-01
RA-224	-3.905E+00	57.0	2.227E+00	2.237E+00	7.314E+00
AC-228	1.115E+00	26.7	2.977E-01	3.025E-01	1.048E+00
TH-227	7.226E-01	33.4	2.411E-01	2.443E-01	7.671E-01
TH-229	7.870E-01	101.6	7.993E-01	8.007E-01	3.430E+00
TH-234	3.207E+00	34.3	1.101E+00	1.112E+00	3.277E+00
PA-231	-1.224E-01	141.7	1.735E-01	1.736E-01	7.261E+00
PA-233	1.946E-01	61.0	1.187E-01	1.191E-01	4.884E-01
PA-234	1.250E-01	85.3	1.066E-01	1.068E-01	7.389E-01
PA-234M	1.226E+00	657.5	8.060E+00	8.060E+00	4.511E+01
U-235	5.980E-01	54.4	3.252E-01	3.265E-01	1.061E+00
AM-241	-2.055E-03	4425.0	9.095E-02	9.095E-02	3.168E-01
Ir-192	2.744E-02	279.1	7.660E-02	7.661E-02	2.036E-01
Np-237	8.111E-02	263.8	2.139E-01	2.140E-01	7.417E-01
Total	4.107E+01				

Analyst: Elizabeth Newns

TestAmerica Spectrum name: 4_Gamma_20141651.An1

Sample description
140177_Gamma_680-102600-A-6-N

Spectrum Filename: C:\User\SPC\Det4\4_Gamma_20141651.An1

Acquisition information
Start time: 8/26/2014 11:33:47 AM
Live time: 7200
Real time: 7212
Dead time: 0.16 %
Detector ID: 4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_Liquid_D=1 25ml.Clb
4_Liquid_D=1 25ml_90101_030512

Energy Calibration
Created: 2/28/2012 2:55:17 PM
Zero offset: 0.091 keV
Gain: 0.250 keV/channel
Quadratic: -2.917E-08 keV/channel^2

Efficiency Calibration
Created: 3/27/2012 8:51:45 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.48 %
Log(Eff): 8.809878E-01 + (-6.811249E-01*Log(E)) + (-1.909804E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -1.031199E+01 + (3.529752E+00*Log(E)) + (-4.143154E-01*Log(E)^2)

Library Files
Main analysis library: Client_ Long_no ingrowth Rev3.li
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (1999.44keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/26/2014 11:33:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	4_2014-08-09_2125.PBC 8/9/2014 9:25:56 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 21 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.3000

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.64	124.	14.74	1.20	5.691E-02	46.54	4.250	PBC<MDA	PB210
63.41	104.	17.61	0.84	6.087E-02	63.29	3.810	PBC<MDA	TH234
77.42	105.	20.93	0.68	6.097E-02				
86.49	5.	263.79	0.84	6.016E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	3.461E-02	EU155
					86.54	30.700	3.461E-02	EU155
88.04	32.	42.93	0.84	5.998E-02	88.04	3.790	PBC<MDA	Cd109
92.61	-5.	25.80	0.84	5.937E-02	92.59	5.584	PBC<MDA	TH234
93.37	31.	58.53	0.84	5.926E-02	93.35	5.561	PBC<MDA	AC228
105.68	14.	88.86	0.85	5.730E-02	105.31	21.200	PBC<MDA	EU155
					105.31	21.200	1.601E-01	EU155
121.99	16.	67.76	0.87	5.409E-02	121.78	28.580	1.474E-01	EU152
					122.06	85.600	4.927E-02	CO57
					123.10	40.790	1.038E-01	EU154
					121.78	28.580	1.474E-01	EU152
122.00	14.	81.95	0.87	5.415E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	4.256E-02	CO57
					123.10	40.790	8.966E-02	EU154
122.04	13.	80.24	0.87	5.389E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	3.946E-02	CO57
					123.10	40.790	8.312E-02	EU154
140.51	7.	189.22	0.89	5.035E-02	140.51	89.300	PBC<MDA	Tc99m
143.66	23.	54.39	0.89	4.968E-02	143.79	10.960	PBC<MDA	U235
162.19	14.	87.86	0.91	4.592E-02				
166.29	17.	71.07	0.91	4.508E-02	165.85	79.900	PBC<MDA	CE139
185.77	50.	19.72	0.98	4.077E-02	185.99	3.280	5.205E+00	Ra226

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
193.63	4.	275.04	0.94	3.937E-02	193.51	4.400	PBC<MDA	TH229
210.78	11.	101.56	0.95	3.649E-02	210.85	2.990	PBC<MDA	TH229
233.05	23.	33.37	0.97	3.302E-02	235.97	12.300	7.858E-01	TH227
238.48	103.	16.33	0.97	3.271E-02	238.63	43.300	7.522E-01	PB212
242.39	5.	238.60	0.98	3.229E-02	242.00	7.430	PBC<MDA	PB214
					242.00	7.430	PBC<MDA	PB214
256.44	9.	113.21	0.99	3.068E-02	256.24	7.000	PBC<MDA	TH227
280.61	13.	73.25	1.01	2.842E-02	279.20	81.460	PBC<MDA	Hg203
284.35	4.	268.11	1.02	2.796E-02	284.30	6.140	PBC<MDA	I131
295.10	23.	33.46	1.03	2.704E-02	295.09	19.300	PBC<MDA	PB214
					295.95	30.160	PBC<MDA	Ir192
					295.09	19.300	PBC<MDA	PB214
295.95	3.	475.18	1.03	2.697E-02	295.95	30.160	PBC<MDA	Ir192
299.19	16.	60.99	1.03	2.663E-02	300.18	6.200	PBC<MDA	PA233
301.69	3.	145.15	1.03	2.664E-02				
301.95	5.	199.54	1.03	2.663E-02				
304.00	8.	125.97	1.04	2.626E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	1.509E-01	BI210M
304.22	9.	102.89	1.04	2.626E-02	304.85	4.290	1.165E+00	Ba140
					304.90	28.000	1.786E-01	BI210M
316.54	3.	293.02	1.05	2.539E-02	316.49	87.040	PBC<MDA	Ir192
					316.49	87.040	1.969E-02	Ir192
319.36	11.	75.24	1.05	2.513E-02	320.08	9.940	PBC<MDA	CR51
338.39	47.	26.70	0.65	2.391E-02	338.32	12.010	2.258E+00	AC228
351.82	38.	20.80	1.08	2.307E-02	351.93	37.600	PBC<MDA	PB214
					351.93	37.600	PBC<MDA	PB214
428.42	5.	164.92	1.15	1.931E-02	427.88	29.600	PBC<MDA	SB125
478.26	4.	161.04	1.19	1.747E-02	477.60	10.520	PBC<MDA	BE7
511.00	68.	21.78	1.22	1.639E-02	511.86	20.000	2.896E+00	RH106
					511.86	20.000	2.896E+00	RH106
537.30	3.	254.12	1.24	1.568E-02	537.26	24.390	PBC<MDA	Ba140
568.97	7.	109.72	1.27	1.486E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	7.652E-01	PA234
569.06	6.	118.34	1.27	1.486E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	7.326E-01	PA234
583.60	32.	30.60	1.28	1.454E-02	583.02	84.500	3.608E-01	TL208
608.89	23.	28.47	1.30	1.396E-02	609.31	46.090	PBC<MDA	BI214
					610.30	5.750	4.023E+00	RU103
608.90	33.	30.03	1.30	1.393E-02	609.31	46.090	PBC<MDA	BI214
					610.30	5.750	5.699E+00	RU103
614.33	1.	812.21	1.31	1.385E-02	614.28	89.850	PBC<MDA	AG108M
634.87	4.	198.68	1.33	1.341E-02	635.89	11.310	PBC<MDA	SB125
638.06	2.	402.56	1.33	1.339E-02	636.97	7.170	PBC<MDA	I131
661.87	57.	15.79	0.41	1.293E-02	661.66	85.210	7.186E-01	CS137
735.89	5.	122.55	1.41	1.171E-02	735.72	22.500	PBC<MDA	pm146
746.08	6.	107.66	1.42	1.154E-02	747.16	34.000	PBC<MDA	pm146
756.11	3.	194.56	1.43	1.141E-02	756.73	54.460	PBC<MDA	ZR95
765.06	9.	88.91	1.44	1.128E-02	765.79	99.790	PBC<MDA	NB95
766.10	1.	657.51	1.44	1.127E-02	766.41	0.294	PBC<MDA	PA234M
836.15	7.	105.56	1.49	1.041E-02	834.85	99.980	PBC<MDA	MN54
873.10	3.	193.88	1.53	9.976E-03	873.23	12.270	PBC<MDA	EU154
888.66	3.	220.43	1.54	9.806E-03	889.28	99.984	PBC<MDA	Sc46
896.91	6.	106.41	1.55	9.716E-03	898.04	93.700	PBC<MDA	y88
911.23	17.	41.42	1.56	9.585E-03	911.16	29.000	PBC<MDA	AC228
964.75	1.	652.07	1.60	9.088E-03	964.11	14.605	PBC<MDA	EU152
					964.11	14.605	1.232E-01	EU152
968.33	9.	76.65	1.60	9.045E-03	968.97	17.460	PBC<MDA	AC228

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
998.42	1.	841.96	1.63	8.810E-03	996.33	10.600	PBC<MDA	EU154
1003.93	6.	80.53	1.63	8.740E-03	1004.77	18.010	PBC<MDA	EU154
1051.02	4.	146.22	1.67	8.381E-03	1050.36	1.560	PBC<MDA	RH106
1064.68	6.	94.93	1.68	8.281E-03	1063.66	74.500	PBC<MDA	BI207
1077.58	2.	256.18	1.69	8.181E-03	1077.40	3.300	PBC<MDA	Ga68
1120.03	7.	87.61	1.73	7.884E-03	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	1.319E-01	Sc46
1173.24	2.	311.32	1.77	7.545E-03	1173.24	99.900	PBC<MDA	CO60
1237.77	4.	136.78	1.82	7.168E-03	1238.28	66.070	PBC<MDA	Co56
1292.12	2.	278.73	1.86	6.885E-03	1291.60	43.200	PBC<MDA	FE59
1460.83	67.	12.13	1.99	6.120E-03	1460.83	10.670	1.431E+01	K40
1764.23	2.	42.52	2.21	5.102E-03	1764.49	15.400	PBC<MDA	BI214
1835.54	3.	146.40	2.26	4.909E-03	1836.06	99.200	PBC<MDA	y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
309.16	77.42	126.	105.	1.722E+03	17.99	0.678	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_ Long_no ingrowth Rev3.li

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.07	46.64	132.	55.	0.008	14.74	1.202s
TH-234	253.14	63.41	124.	54.	0.007	17.61	0.836s
BA-133	321.48	80.51	111.	-2.	0.000	674.13	0.832s
Np-237	345.40	86.49	71.	5.	0.001	263.79	0.837D
EU-155	343.93	86.12	144.	-19.	-0.003	94.32	0.837s
Cd-109	351.60	88.04	77.	32.	0.004	42.93	0.839D
TH-234	369.79	92.59	192.	-5.	-0.001	25.80	0.843D
AC-228	372.83	93.35	150.	31.	0.004	58.53	0.843D
Gd-153	387.60	97.05	84.	-7.	-0.001	202.69	0.847s
EU-155	422.13	105.68	70.	14.	0.002	88.86	0.854s
EU-152	487.36	122.00	61.	14.	0.002	81.95	0.870s
CO-57	487.31	121.99	54.	16.	0.002	67.76	0.870s
EU-154	487.54	122.04	49.	13.	0.002	80.24	0.871s
PA-234	524.28	131.23	103.	-11.	-0.002	130.64	0.878s
HF-181	543.27	135.98	95.	-4.	0.000	389.41	0.883s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CO-57	542.14	135.70	88.	-2.	0.000	742.15	0.883s
Tc-99m	561.36	140.51	80.	7.	0.001	189.22	0.887s
U-235	573.98	143.66	70.	23.	0.003	54.39	0.890s
CE-141	581.39	145.52	107.	-14.	-0.002	104.59	0.891s
Ba-140	648.03	162.19	71.	14.	0.002	87.86	0.907s
U-235	643.24	160.99	46.	-1.	0.000	837.46	0.908s
CE-139	664.42	166.29	61.	17.	0.002	71.07	0.910s
Ra-226	742.32	185.77	97.	50.	0.007	19.72	0.980s
TH-229	773.77	193.63	74.	4.	0.001	275.04	0.935s
TH-229	842.32	210.78	58.	11.	0.002	101.56	0.951s
TH-227	931.39	233.05	18.	23.	0.003	33.37	0.974s
PB-212	953.06	238.48	86.	77.	0.011	16.33	0.973
RA-224	958.62	239.87	208.	-37.	-0.005	57.03	0.979s
PB-214	968.73	242.39	99.	5.	0.001	238.60	0.979s
EU-152	974.30	243.79	82.	-12.	-0.002	108.15	0.982s
TH-227	1024.88	256.44	53.	9.	0.001	113.21	0.992s
BI-210M	1061.12	265.50	70.	-10.	-0.001	127.85	1.001s
TL-208	1106.04	276.73	57.	-4.	-0.001	248.52	1.011s
Hg-203	1121.54	280.61	38.	13.	0.002	73.25	1.013s
I-131	1136.49	284.35	53.	4.	0.001	268.11	1.018
PB-214	1179.50	295.10	55.	23.	0.003	33.46	1.027s
Ir-192	1182.88	295.95	95.	3.	0.000	475.18	1.028s
PB-212	1205.81	301.69	42.	3.	0.000	145.15	1.032
PA-231	1206.89	301.95	38.	5.	0.001	199.54	1.032s
PA-233	1195.82	299.19	40.	16.	0.002	60.99	1.032s
PA-231	1210.36	302.82	63.	-6.	-0.001	201.38	1.034s
BA-133	1210.35	302.82	63.	-6.	-0.001	201.23	1.034s
Ba-140	1215.07	304.00	47.	8.	0.001	125.97	1.036s
BI-210M	1215.93	304.22	43.	9.	0.001	102.89	1.036s
Ir-192	1265.20	316.54	41.	3.	0.000	293.02	1.047s
CR-51	1276.49	319.36	30.	11.	0.002	75.24	1.050s
AC-228	1352.57	338.39	28.	47.	0.006	26.70	0.651s
EU-152	1376.16	344.29	71.	-2.	0.000	786.63	1.071s
PB-214	1406.29	351.82	60.	38.	0.005	20.80	1.078s
BA-133	1419.91	355.23	34.	-2.	0.000	391.11	1.082s
I-131	1450.35	362.84	41.	-6.	-0.001	154.75	1.089s
BA-133	1535.29	384.08	35.	-3.	0.000	338.11	1.107
SB-125	1712.60	428.42	32.	5.	0.001	164.92	1.146s
pm-146	1805.23	451.58	21.	-5.	-0.001	133.63	1.168s
SB-125	1854.71	463.95	40.	-4.	0.000	255.74	1.177s
Ir-192	1871.23	468.08	29.	-3.	0.000	253.13	1.181s
PM-144	1905.52	476.65	24.	-2.	0.000	416.92	1.189s
BE-7	1911.94	478.26	21.	4.	0.001	161.04	1.189s
La-140	1949.69	487.70	42.	-6.	-0.001	158.85	1.198s
RH-106	2042.87	511.00	77.	68.	0.009	21.78	1.219s
Ba-140	2148.08	537.30	28.	3.	0.000	254.12	1.241s
CS-134	2252.94	563.52	30.	-3.	0.000	281.16	1.264s
CS-134	2275.09	569.06	26.	6.	0.001	118.34	1.269s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-234	2274.73	568.97	24.	7.	0.001	109.72	1.269s
BI-207	2290.84	573.00	22.	-3.	0.000	208.49	1.270s
TL-208	2333.25	583.60	32.	32.	0.004	30.60	1.281
SB-125	2386.37	596.88	20.	-1.	0.000	510.98	1.296s
CS-134	2420.55	605.43	60.	-12.	-0.002	95.46	1.300s
BI-214	2434.41	608.89	44.	23.	0.003	28.47	1.304s
RU-103	2434.46	608.90	32.	33.	0.005	30.03	1.305s
AG-108M	2456.16	614.33	28.	1.	0.000	812.21	1.308s
PM-144	2466.14	616.82	25.	-1.	0.000	948.91	1.311s
SB-125	2538.30	634.87	25.	4.	0.001	198.68	1.326s
I-131	2551.07	638.06	24.	2.	0.000	402.56	1.327
AG-110M	2635.07	659.06	47.	-10.	-0.001	99.65	1.345s
CS-137	2646.33	661.87	6.	57.	0.008	15.79	0.413s
PM-144	2792.20	698.34	37.	-4.	-0.001	226.40	1.378s
SB-124	2890.42	722.89	28.	-3.	0.000	223.27	1.400s
AG-108M	2890.47	722.91	28.	-4.	0.000	221.09	1.401s
EU-154	2892.83	723.50	31.	-4.	-0.001	188.60	1.401s
ZR-95	2895.52	724.17	33.	-5.	-0.001	165.76	1.401s
pm-146	2942.40	735.89	14.	5.	0.001	122.55	1.411s
pm-146	2983.19	746.08	16.	6.	0.001	107.66	1.421s
ZR-95	3023.29	756.11	14.	3.	0.000	194.56	1.429s
NB-95	3059.09	765.06	25.	9.	0.001	88.91	1.437s
PA-234M	3063.26	766.10	35.	1.	0.000	657.51	1.437s
EU-152	3113.70	778.71	25.	-6.	-0.001	126.52	1.448s
BI-212	3143.13	786.06	25.	-3.	0.000	283.59	1.453s
CS-134	3205.92	801.76	20.	-2.	0.000	264.56	1.467s
CO-58	3240.94	810.51	22.	-4.	-0.001	158.25	1.474s
La-140	3263.41	816.13	20.	-1.	0.000	553.17	1.478s
MN-54	3343.49	836.15	23.	7.	0.001	105.56	1.494s
Co-56	3384.75	846.46	20.	-1.	0.000	685.95	1.504s
NB-94	3483.69	871.19	22.	-3.	0.000	210.19	1.524s
EU-154	3491.33	873.10	15.	3.	0.000	193.88	1.526s
Sc-46	3553.57	888.66	16.	3.	0.000	220.43	1.539s
y-88	3586.59	896.91	17.	6.	0.001	106.41	1.547s
AC-228	3643.88	911.23	15.	17.	0.002	41.42	1.557s
AG-110M	3748.69	937.42	24.	-3.	0.000	206.81	1.579s
PA-234	3783.08	946.02	23.	-2.	0.000	292.72	1.586s
EU-152	3858.04	964.75	29.	1.	0.000	652.07	1.601s
AC-228	3872.35	968.33	20.	9.	0.001	76.65	1.605s
EU-154	3992.73	998.42	16.	1.	0.000	841.96	1.627s
EU-154	4014.81	1003.93	10.	6.	0.001	80.53	1.634s
Co-56	4158.76	1039.91	16.	-5.	-0.001	130.42	1.661s
RH-106	4203.20	1051.02	14.	4.	0.001	146.22	1.671s
BI-207	4257.88	1064.68	14.	6.	0.001	94.93	1.682s
Ga-68	4309.49	1077.58	15.	2.	0.000	256.18	1.693s
ZN-65	4462.98	1115.94	25.	-1.	0.000	496.00	1.723s
BI-214	4479.35	1120.03	18.	7.	0.001	87.61	1.727s
CO-60	4692.31	1173.24	11.	2.	0.000	311.32	1.769s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ta-182	4755.75	1189.09	20.	-2.	0.000	264.35	1.781s
Ta-182	4876.26	1219.20	16.	-1.	0.000	764.17	1.807s
Co-56	4950.54	1237.77	14.	4.	0.001	136.78	1.820s
FE-59	5168.08	1292.12	11.	2.	0.000	278.73	1.861s
CO-60	5331.51	1332.95	13.	-3.	0.000	214.46	1.893s
K-40	5843.38	1460.83	21.	67.	0.009	12.13	1.991s
BI-214	7058.08	1764.23	14.	2.	0.000	42.52	2.214s
Co-56	7087.02	1771.46	11.	-1.	0.000	324.64	2.219s
y-88	7343.62	1835.54	8.	3.	0.000	146.40	2.265s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	3.1637E-01				5.31E+01		
			477.60	3.164E-01	&(	1.804E+00	1.61E+02 1.05E+01	G
K-40	N	1.4306E+01				4.66E+11		
			1460.83	1.431E+01	(P	5.085E+00	1.21E+01 1.07E+01	G
Sc-46	F	3.7974E-02				8.38E+01		
			889.28	3.797E-02	?(	3.034E-01	2.20E+02 1.00E+02	G
			1120.55	0.000E+00	-	3.277E-01	1.00E+03 1.00E+02	G
CR-51	F	6.2047E-01				2.77E+01		
			320.08	6.205E-01	&(	1.562E+00	7.52E+01 9.94E+00	G
MN-54	C	9.1481E-02				3.12E+02		
			834.85	9.148E-02	&(	3.328E-01	1.06E+02 1.00E+02	G
FE-59	F	3.6563E-02				4.45E+01		
			1099.25	1.961E-03	%(	7.159E-01	9.80E+03 5.65E+01	G
			1291.60	8.182E-02	?(	8.499E-01	2.79E+02 4.32E+01	G
Co-56	C	4.1474E-02				7.73E+01		
			846.77	-1.258E-02	?(	3.177E-01	6.86E+02 9.99E+01	G
			1238.28	1.232E-01	?(	5.984E-01	1.37E+02 6.61E+01	G
			1037.84	-5.411E-01	+	2.488E+00	1.30E+02 1.41E+01	G
			1771.35	-2.579E-01	+	3.147E+00	3.25E+02 1.55E+01	A
CO-57	C	4.9267E-02				2.72E+02		
			122.06	4.927E-02	&(	1.106E-01	6.78E+01 8.56E+01	G
			136.47	-4.567E-02	&	1.180E+00	7.42E+02 1.07E+01	G

Nuclide		Ave activity	Energy		Activity	Code	Peak	MDA	Comments
CO-58	C	-5.7658E-02						7.09E+01	
			810.78	-5.766E-02	?(	3.221E-01	1.58E+02	9.95E+01	G
CO-60	F	-1.1513E-02						1.93E+03	
			1332.50	-5.224E-02	?(	4.092E-01	2.14E+02	1.00E+02	G
			1173.24	2.925E-02	?(	3.400E-01	3.11E+02	9.99E+01	G
ZN-65	F	-4.9943E-02						2.44E+02	
			1115.55	-4.994E-02	?(	8.986E-01	4.96E+02	5.06E+01	G
ZR-95	I	6.4173E-02						6.40E+01	
			756.73	6.417E-02	?(	4.526E-01	1.95E+02	5.45E+01	G
			724.20	-1.352E-01	+	7.833E-01	1.66E+02	4.42E+01	G
NB-95	I	1.0699E-01						6.40E+01	
			765.79	1.070E-01	?(	3.231E-01	8.89E+01	9.98E+01	G
RH-106	I	5.5721E-01						3.74E+02	
			621.92	2.950E-03	&(	2.662E+00	2.45E+04	9.93E+00	G
			1050.36	4.085E+00	&(	2.133E+01	1.46E+02	1.56E+00	G
			511.86	2.896E+00	&	1.843E+00	2.18E+01	2.00E+01	GA
AG-108M	C	5.1551E-03						1.53E+05	
			433.94	0.000E+00	?(	3.106E-01	1.00E+03	9.05E+01	G
			722.94	-4.506E-02	+	3.534E-01	2.21E+02	9.08E+01	G
			614.28	1.035E-02	&(	3.049E-01	8.12E+02	8.98E+01	G
AG-110M	F	-3.7296E-03						2.50E+02	
			884.68	-3.730E-03	&(	4.252E-01	3.04E+03	7.27E+01	G
			657.76	-1.155E-01	+	3.906E-01	9.97E+01	9.46E+01	G
			937.49	-1.510E-01	+	1.112E+00	2.07E+02	3.44E+01	G
			1384.30	-3.447E-03	%	1.874E+00	1.44E+04	2.43E+01	G
			763.94	0.000E+00	+	1.707E+00	1.00E+03	2.23E+01	G
SN-113	F	-4.7627E-03						1.15E+02	
			391.69	-4.763E-03	%(	2.943E-01	1.70E+03	6.40E+01	G
SB-124	F	3.1781E-04						6.02E+01	
			602.73	3.178E-04	%(	2.941E-01	2.55E+04	9.83E+01	G
			1690.98	0.000E+00	-	4.029E-01	1.00E+03	4.78E+01	G
			722.79	-3.735E-01	+	2.959E+00	2.23E+02	1.08E+01	G
SB-125	I	1.8114E-01						1.01E+03	
			427.88	1.224E-01	&(	7.062E-01	1.65E+02	2.96E+01	G
			600.50	-6.828E-02	+	1.281E+00	5.11E+02	1.79E+01	G
			635.89	3.349E-01	&(	2.363E+00	1.99E+02	1.13E+01	G
			463.37	-2.627E-01	+	2.366E+00	2.56E+02	1.05E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
I-131	I	-2.2061E-04					8.02E+00	
			364.48	-4.619E-02	?(	2.479E-01	1.55E+02	8.17E+01 G
			284.30	3.166E-01	(	2.967E+00	2.68E+02	6.14E+00 G
			636.97	2.522E-01	(	3.679E+00	4.03E+02	7.17E+00 G
Gd-153	F	-5.1362E-02					2.42E+02	
			97.50	-5.136E-02	?(	3.580E-01	2.03E+02	3.00E+01 G
			103.20	1.253E-03	%	4.621E-01	1.05E+04	2.18E+01 G
Ga-68	C	1.9826E+00					4.71E-02	
			1077.40	1.983E+00	?(	1.859E+01	2.56E+02	3.30E+00 G
Tc-99m	I	2.3613E-02					2.51E-01	
			140.51	2.361E-02	(	1.536E-01	1.89E+02	8.93E+01 G
BA-133	F	-2.1128E-02					3.85E+03	
			356.00	-2.113E-02	?(	2.947E-01	3.91E+02	6.20E+01 G
			302.85	-1.640E-01	+	1.142E+00	2.01E+02	1.83E+01 G
			383.84	-1.848E-01	+	2.220E+00	3.38E+02	8.94E+00 GA
			80.99	-1.494E-02	+	3.484E-01	6.74E+02	3.41E+01 GA
CS-134	I	-5.2505E-02					7.54E+02	
			604.71	-1.223E-01	?(	3.943E-01	9.55E+01	9.76E+01 G
			795.87	0.000E+00	+	2.966E-01	1.00E+03	8.55E+01 G
			569.32	3.905E-01	&(	1.600E+00	1.18E+02	1.54E+01 G
			801.95	-3.657E-01	+	3.495E+00	2.65E+02	8.69E+00 G
			563.24	-3.103E-01	+	3.109E+00	2.81E+02	8.35E+00 G
CS-137	I	7.1864E-01					1.10E+04	
			661.66	7.186E-01	@(	1.781E-01	1.58E+01	8.52E+01 G
CE-139	F	6.3651E-02					1.38E+02	
			165.85	6.365E-02	&(	1.503E-01	7.11E+01	7.99E+01 G
Ba-140	I	3.2195E-01					1.28E+01	
			537.26	1.104E-01	&(	9.994E-01	2.54E+02	2.44E+01 G
			162.66	6.940E-01	&(	2.048E+00	8.79E+01	6.22E+00 G
			304.85	9.850E-01	&(	4.258E+00	1.26E+02	4.29E+00 G
CE-141	I	-8.4356E-02					3.25E+01	
			145.44	-8.436E-02	?(	2.972E-01	1.05E+02	4.82E+01 G
CE-144	I	1.1618E-02					2.85E+02	
			133.54	1.162E-02	%(	8.511E-01	2.06E+03	1.11E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PM-144	C -4.4600E-02					3.63E+02	
		696.54	-4.460E-02	?(	3.552E-01	2.26E+02	9.90E+01 G
		618.06	-7.634E-03	+	2.645E-01	9.49E+02	9.91E+01 G
		476.81	-3.210E-02	+	4.847E-01	4.17E+02	4.20E+01 G
EU-152	F 6.5160E-02					4.94E+03	
		344.29	-3.386E-02	?(	9.333E-01	7.87E+02	2.65E+01 G
		1112.07	4.856E-02	%	3.025E+00	1.68E+03	1.36E+01 G
		121.78	1.273E-01	&(	3.496E-01	8.19E+01	2.86E+01 G
		778.92	-5.675E-01	+	2.499E+00	1.27E+02	1.29E+01 G
		964.11	1.232E-01	&(	2.903E+00	6.52E+02	1.46E+01 G
		244.69	-7.049E-01	+	2.579E+00	1.08E+02	7.58E+00 G
		1408.00	1.074E-02	%	1.718E+00	4.07E+03	2.10E+01 GA
EU-154	I 2.2835E-01					3.14E+03	
		873.23	3.340E-01	?(	2.343E+00	1.94E+02	1.23E+01 G
		123.10	8.312E-02	?(	2.235E-01	8.02E+01	4.08E+01 G
		1274.54	0.000E+00	&	2.527E+00	1.00E+03	3.52E+01 G
		723.36	-2.502E-01	+	1.660E+00	1.89E+02	2.02E+01 G
		1004.77	5.610E-01	?(	1.535E+00	8.05E+01	1.80E+01 G
		996.33	9.979E-02	&(	3.142E+00	8.42E+02	1.06E+01 G
EU-155	I 1.6010E-01					1.81E+03	
		105.31	1.601E-01	?(	4.781E-01	8.89E+01	2.12E+01 G
		86.54	-1.394E-01	-	4.403E-01	9.43E+01	3.07E+01 G
HF-181	F 2.0321E-03					4.24E+01	
		482.00	2.032E-03	%(	2.631E-01	3.53E+03	8.05E+01 G
		133.02	-1.240E-03	&	2.880E-01	6.64E+03	4.33E+01 G
		345.83	-4.245E-03	%	1.269E+00	8.32E+03	1.51E+01 G
		136.30	-1.656E-01	&	2.231E+00	3.89E+02	5.85E+00 G
Ta-182	F -2.2533E-02					1.14E+02	
		1121.30	-2.253E-02	%(	1.033E+00	1.22E+03	3.49E+01 G
		1221.41	-5.334E-02	+	1.520E+00	7.64E+02	2.70E+01 G
		1189.05	-2.832E-01	+	2.706E+00	2.64E+02	1.62E+01 G
Hg-203	F 7.7428E-02					4.66E+01	
		279.20	7.743E-02	?(	1.891E-01	7.33E+01	8.15E+01 G
TL-208	N 3.6082E-01					6.98E+02	
		583.02	3.608E-01	(	3.274E-01	3.06E+01	8.45E+01 G
		277.28	-3.359E-01	&	2.908E+00	2.49E+02	6.31E+00 G
		860.56	-1.088E-02	%	2.515E+00	6.18E+03	1.24E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
pm-146	C	2.2159E-01					2.02E+03	
			747.16	2.036E-01	&(	7.619E-01	1.08E+02	3.40E+01 G
			735.72	2.487E-01	?(	1.074E+00	1.23E+02	2.25E+01 G
			453.88	-5.984E-02	-	2.803E-01	1.34E+02	6.50E+01 G
y-88	F	8.6867E-02					1.07E+02	
			898.04	9.149E-02	?(	3.376E-01	1.06E+02	9.37E+01 G
			1836.06	8.250E-02	&(	4.418E-01	1.46E+02	9.92E+01 G
Cd-109	F	1.9423E+00					4.53E+02	
			88.04	1.942E+00	(	2.667E+00	4.29E+01	3.79E+00 G
Ra-226	N	5.2050E+00					5.84E+05	
			185.99	5.205E+00	*(P	5.046E+00	1.97E+01	3.28E+00 G
PB-210	N	3.1365E+00					8.14E+03	
			46.54	3.137E+00	*(P	3.237E+00	1.47E+01	4.25E+00 G
PB-212	N	7.5218E-01					6.98E+02	
			238.63	7.522E-01	(P	4.514E-01	1.63E+01	4.33E+01 G
			300.03	5.430E-01	P	5.253E+00	1.45E+02	3.28E+00 GA
PB-214	N	6.0918E-01					5.84E+05	
			351.93	6.133E-01	*(P	6.208E-01	2.08E+01	3.76E+01 G
			295.09	6.011E-01	(P	9.940E-01	3.35E+01	1.93E+01 G
			242.00	2.876E-01	- P	2.846E+00	2.39E+02	7.43E+00 GA
BI-207	C	4.1731E-02					1.18E+04	
			569.70	-3.128E-02	?(	2.331E-01	2.08E+02	9.77E+01 G
			1063.66	1.375E-01	&(	4.501E-01	9.49E+01	7.45E+01 G
BI-214	N	5.5183E-01					5.84E+05	
			609.31	5.012E-01	*(P	7.252E-01	2.85E+01	4.61E+01 G
			1120.29	8.731E-01	?(	2.607E+00	8.76E+01	1.51E+01 G
			1764.49	3.885E-01	?(P	3.596E+00	4.25E+01	1.54E+01 G
BI-210M	T	6.5773E-03					1.10E+09	
			265.83	-8.974E-02	?(	3.912E-01	1.28E+02	5.00E+01 G
			304.90	1.786E-01	?(	6.256E-01	1.03E+02	2.80E+01 G
RA-224	N	-3.9051E+00					6.98E+02	
			240.99	-3.905E+00	&(	7.314E+00	5.70E+01	4.10E+00 G
AC-228	N	1.1150E+00					2.10E+03	
			911.16	8.303E-01	?(	1.048E+00	4.14E+01	2.90E+01 G
			968.97	8.018E-01	?(	2.065E+00	7.67E+01	1.75E+01 G
			338.32	2.258E+00	*(	1.331E+00	2.67E+01	1.20E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			93.35	1.310E+00		2.519E+00	5.85E+01	5.56E+00 XA
TH-227	N	7.2264E-01					7.95E+03	
			235.97	7.858E-01	&(	7.671E-01	3.34E+01	1.23E+01 G
			50.14	0.000E+00	&	1.579E+00	1.00E+03	8.00E+00 G
			256.24	6.116E-01	?(	2.361E+00	1.13E+02	7.00E+00 G
TH-229	N	7.8696E-01					2.68E+06	
			193.51	3.598E-01	?(	3.430E+00	2.75E+02	4.40E+00 G
			210.85	1.416E+00	?(	4.871E+00	1.02E+02	2.99E+00 G
TH-234	N	3.2065E+00					1.63E+12	
			63.29	3.207E+00	*(P	3.277E+00	1.76E+01	3.81E+00 G
			92.59	-2.126E-01	- P	2.819E+00	2.58E+01	5.58E+00 G
PA-231	N	-1.2238E-01					1.20E+07	
			302.65	-1.043E+00	?(	7.261E+00	2.01E+02	2.88E+00 G
			300.07	9.548E-01	?(	6.675E+00	2.00E+02	2.46E+00 G
PA-233	C	1.9462E-01					7.82E+08	
			312.01	-4.495E-03	&(	4.884E-01	3.03E+03	3.60E+01 G
			300.18	1.351E+00	?(	2.705E+00	6.10E+01	6.20E+00 G
PA-234	N	1.2495E-01					1.63E+12	
			131.29	-1.667E-01	?(	7.389E-01	1.31E+02	1.80E+01 G
			946.02	-2.658E-01	+	2.803E+00	2.93E+02	1.34E+01 G
			569.47	7.652E-01	?(	2.899E+00	1.10E+02	8.20E+00 G
			883.24	0.000E+00	&	3.627E+00	1.00E+03	9.60E+00 G
			880.53	0.000E+00	-	5.753E+00	1.00E+03	6.00E+00 GA
PA-234M	N	1.2258E+00					1.63E+12	
			1001.00	-2.210E-01	%(	4.511E+01	5.50E+03	8.37E-01 G
			766.41	5.345E+00	?(	1.261E+02	6.58E+02	2.94E-01 G
U-235	N	5.9797E-01					2.57E+11	
			143.79	5.980E-01	*(	1.061E+00	5.44E+01	1.10E+01 G
			205.33	0.000E+00	-	3.404E+00	1.00E+03	5.01E+00 G
			163.38	-6.873E-02	-	2.047E+00	8.37E+02	5.08E+00 G
AM-241	T	-2.0553E-03					1.58E+05	
			59.54	-2.055E-03	&(	3.168E-01	4.43E+03	3.59E+01 G
Ir-192	F	2.7441E-02					7.40E+01	
			316.49	1.969E-02	?(	2.036E-01	2.93E+02	8.70E+01 G
			468.06	-4.683E-02	+	4.215E-01	2.53E+02	5.18E+01 G
			308.44	0.000E+00	-	6.862E-01	1.00E+03	3.18E+01 G
			295.95	4.982E-02	?(	8.203E-01	4.75E+02	3.02E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Np-237	F 8.1107E-02					2.14E+06	
		86.49	8.111E-02	(	7.417E-01	2.64E+02	1.31E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
BA-133	80.51	111.	-2.	0.000	674.13	-1.494E-02
EU-155	86.12	144.	-19.	-0.003	94.32	-1.394E-01
Gd-153	97.05	84.	-7.	-0.001	202.69	-5.136E-02
EU-155	105.68	70.	14.	0.002	88.86	1.601E-01
EU-152	122.00	61.	14.	0.002	81.95	1.273E-01
CO-57	121.99	54.	16.	0.002	67.76	4.927E-02
EU-154	122.04	49.	13.	0.002	80.24	8.312E-02
PA-234	131.23	103.	-11.	-0.002	130.64	-1.667E-01
HF-181	135.98	95.	-4.	0.000	389.41	-1.656E-01
CO-57	135.70	88.	-2.	0.000	742.15	-4.567E-02
Tc-99m	140.51	80.	7.	0.001	189.22	2.361E-02
U-235	143.66	70.	23.	0.003	54.39	5.980E-01

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CE-141	145.52	107.	-14.	-0.002	104.59	-8.436E-02	
Ba-140	162.19	71.	14.	0.002	87.86	6.940E-01	
U-235	160.99	46.	-1.	0.000	837.46	-6.873E-02	
CE-139	166.29	61.	17.	0.002	71.07	6.365E-02	
TH-227	233.05	18.	23.	0.003	33.37	7.858E-01	
RA-224	239.87	208.	-37.	-0.005	57.03	-3.905E+00	
PB-214	242.39	99.	5.	0.001	238.60	2.876E-01	P
EU-152	243.79	82.	-12.	-0.002	108.15	-7.049E-01	
TH-227	256.44	53.	9.	0.001	113.21	6.116E-01	
BI-210M	265.50	70.	-10.	-0.001	127.85	-8.974E-02	
TL-208	276.73	57.	-4.	-0.001	248.52	-3.359E-01	
Hg-203	280.61	38.	13.	0.002	73.25	7.743E-02	
PB-214	295.10	55.	23.	0.003	33.46	6.011E-01	P
Ir-192	295.95	95.	3.	0.000	475.18	4.982E-02	
PA-231	301.95	38.	5.	0.001	199.54	9.548E-01	
PA-233	299.19	40.	16.	0.002	60.99	1.351E+00	
PA-231	302.82	63.	-6.	-0.001	201.38	-1.043E+00	
BA-133	302.82	63.	-6.	-0.001	201.23	-1.640E-01	
Ba-140	304.00	47.	8.	0.001	125.97	9.850E-01	
BI-210M	304.22	43.	9.	0.001	102.89	1.786E-01	
Ir-192	316.54	41.	3.	0.000	293.02	1.969E-02	
CR-51	319.36	30.	11.	0.002	75.24	6.205E-01	
EU-152	344.29	71.	-2.	0.000	786.63	-3.386E-02	
PB-214	351.82	60.	38.	0.005	20.80	6.133E-01	P
BA-133	355.23	34.	-2.	0.000	391.11	-2.113E-02	
BA-133	384.08	35.	-3.	0.000	338.11	-1.848E-01	
SB-125	428.42	32.	5.	0.001	164.92	1.224E-01	
pm-146	451.58	21.	-5.	-0.001	133.63	-5.984E-02	
SB-125	463.95	40.	-4.	0.000	255.74	-2.627E-01	
Ir-192	468.08	29.	-3.	0.000	253.13	-4.683E-02	
PM-144	476.65	24.	-2.	0.000	416.92	-3.210E-02	
BE-7	478.26	21.	4.	0.001	161.04	3.164E-01	
La-140	487.70	42.	-6.	-0.001	158.85	-1.063E-01	
RH-106	511.00	77.	68.	0.009	21.78	2.896E+00	
Ba-140	537.30	28.	3.	0.000	254.12	1.104E-01	
CS-134	563.52	30.	-3.	0.000	281.16	-3.103E-01	
CS-134	569.06	26.	6.	0.001	118.34	3.905E-01	
PA-234	568.97	24.	7.	0.001	109.72	7.652E-01	
BI-207	573.00	22.	-3.	0.000	208.49	-3.128E-02	
TL-208	583.60	32.	32.	0.004	30.60	3.608E-01	
SB-125	596.88	20.	-1.	0.000	510.98	-6.828E-02	
CS-134	605.43	60.	-12.	-0.002	95.46	-1.223E-01	
BI-214	608.89	44.	23.	0.003	28.47	5.012E-01	P
RU-103	608.90	32.	33.	0.005	30.03	5.699E+00	
AG-108M	614.33	28.	1.	0.000	812.21	1.035E-02	
PM-144	616.82	25.	-1.	0.000	948.91	-7.634E-03	
SB-125	634.87	25.	4.	0.001	198.68	3.349E-01	
AG-110M	659.06	47.	-10.	-0.001	99.65	-1.155E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
PM-144	698.34	37.	-4.	-0.001	226.40	-4.460E-02		
SB-124	722.89	28.	-3.	0.000	223.27	-3.735E-01		
AG-108M	722.91	28.	-4.	0.000	221.09	-4.506E-02		
EU-154	723.50	31.	-4.	-0.001	188.60	-2.502E-01		
ZR-95	724.17	33.	-5.	-0.001	165.76	-1.352E-01		
pm-146	735.89	14.	5.	0.001	122.55	2.487E-01		
pm-146	746.08	16.	6.	0.001	107.66	2.036E-01		
ZR-95	756.11	14.	3.	0.000	194.56	6.417E-02		
NB-95	765.06	25.	9.	0.001	88.91	1.070E-01		
PA-234M	766.10	35.	1.	0.000	657.51	5.345E+00		
EU-152	778.71	25.	-6.	-0.001	126.52	-5.675E-01		
BI-212	786.06	25.	-3.	0.000	283.59	-2.534E+00		
CS-134	801.76	20.	-2.	0.000	264.56	-3.657E-01		
CO-58	810.51	22.	-4.	-0.001	158.25	-5.766E-02		
La-140	816.13	20.	-1.	0.000	553.17	-6.576E-02		
MN-54	836.15	23.	7.	0.001	105.56	9.148E-02		
Co-56	846.46	20.	-1.	0.000	685.95	-1.258E-02		
NB-94	871.19	22.	-3.	0.000	210.19	-4.591E-02		
EU-154	873.10	15.	3.	0.000	193.88	3.340E-01		
Sc-46	888.66	16.	3.	0.000	220.43	3.797E-02		
y-88	896.91	17.	6.	0.001	106.41	9.149E-02		
AG-110M	937.42	24.	-3.	0.000	206.81	-1.510E-01		
PA-234	946.02	23.	-2.	0.000	292.72	-2.658E-01		
EU-152	964.75	29.	1.	0.000	652.07	1.232E-01		
EU-154	998.42	16.	1.	0.000	841.96	9.979E-02		
EU-154	1003.93	10.	6.	0.001	80.53	5.610E-01		
Co-56	1039.91	16.	-5.	-0.001	130.42	-5.411E-01		
RH-106	1051.02	14.	4.	0.001	146.22	4.085E+00		
BI-207	1064.68	14.	6.	0.001	94.93	1.375E-01		
Ga-68	1077.58	15.	2.	0.000	256.18	1.983E+00		
ZN-65	1115.94	25.	-1.	0.000	496.00	-4.994E-02		
BI-214	1120.03	18.	7.	0.001	87.61	8.731E-01		
CO-60	1173.24	11.	2.	0.000	311.32	2.925E-02		
Ta-182	1189.09	20.	-2.	0.000	264.35	-2.832E-01		
Ta-182	1219.20	16.	-1.	0.000	764.17	-5.334E-02		
Co-56	1237.77	14.	4.	0.001	136.78	1.232E-01		
FE-59	1292.12	11.	2.	0.000	278.73	8.182E-02		
CO-60	1332.95	13.	-3.	0.000	214.46	-5.224E-02		
K-40	1460.83	21.	67.	0.009	12.13	1.431E+01	P	
BI-214	1764.23	14.	2.	0.000	42.52	3.885E-01	P	
Co-56	1771.46	11.	-1.	0.000	324.64	-2.579E-01		
y-88	1835.54	8.	3.	0.000	146.40	8.250E-02		

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

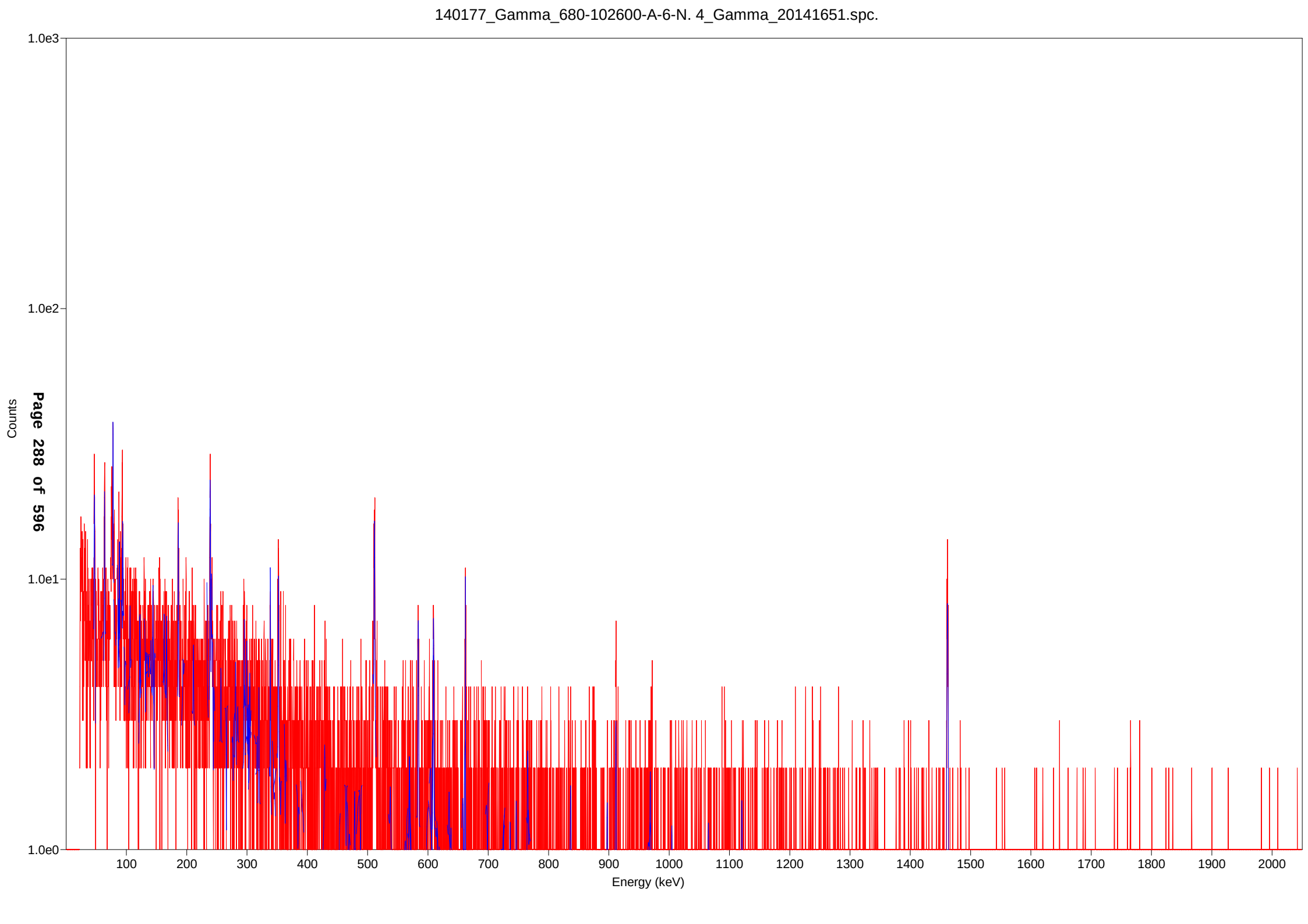
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	3.1637E-01	3.1637E-01	1.610E+02%	1.80E+00
NA-22	#A	0.0000E+00	0.0000E+00	1.000E+03%	8.90E-01
K-40	#	1.4306E+01	1.4306E+01	1.452E+01%	5.08E+00
Sc-46	#A	3.7974E-02	3.7974E-02	2.204E+02%	3.03E-01
CR-51	#A	6.2046E-01	6.2047E-01	7.524E+01%	1.56E+00
MN-54	#A	9.1481E-02	9.1481E-02	1.056E+02%	3.33E-01
FE-59	#A	3.6562E-02	3.6563E-02	2.787E+02%	7.16E-01
Co-56	#A	4.1474E-02	4.1474E-02	1.368E+02%	3.18E-01
CO-57	#A	4.9267E-02	4.9267E-02	6.776E+01%	1.11E-01
CO-58	#A	-5.7657E-02	-5.7658E-02	1.582E+02%	3.22E-01
CO-60	#A	-1.1513E-02	-1.1513E-02	1.890E+02%	4.09E-01
ZN-65	#A	-4.9943E-02	-4.9943E-02	4.960E+02%	8.99E-01
NB-94	#A	0.0000E+00	0.0000E+00	1.000E+03%	4.03E-01
ZR-95	#A	6.4173E-02	6.4173E-02	1.946E+02%	4.53E-01
NB-95	#A	1.0699E-01	1.0699E-01	8.891E+01%	3.23E-01
RU-103	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.96E-01
RH-106	#A	5.5721E-01	5.5721E-01	1.462E+02%	2.66E+00
AG-108M	#A	5.1551E-03	5.1551E-03	6.441E+02%	3.11E-01
AG-110M	#A	-3.7296E-03	-3.7296E-03	3.041E+03%	4.25E-01
SN-113	#A	-4.7626E-03	-4.7627E-03	1.703E+03%	2.94E-01
SB-124	#A	3.1781E-04	3.1781E-04	2.549E+04%	2.94E-01
SB-125	#A	1.8114E-01	1.8114E-01	1.291E+02%	7.06E-01
I-131	A	-2.2060E-04	-2.2061E-04	1.548E+02%	2.48E-01
Gd-153	#A	-5.1361E-02	-5.1362E-02	2.027E+02%	3.58E-01
Ga-68	#A	1.9668E+00	1.9826E+00	2.562E+02%	1.86E+01
Tc-99m	#A	2.3578E-02	2.3613E-02	1.892E+02%	1.54E-01
BA-133	#A	-2.1128E-02	-2.1128E-02	3.911E+02%	2.95E-01
CS-134	#A	-5.2505E-02	-5.2505E-02	7.602E+01%	3.94E-01
CS-137	#	7.1864E-01	7.1864E-01	1.579E+01%	1.78E-01
CE-139	#A	6.3651E-02	6.3651E-02	7.107E+01%	1.50E-01
Ba-140	#A	3.2194E-01	3.2195E-01	8.786E+01%	9.99E-01
La-140	#A	0.0000E+00	0.0000E+00	7.071E+02%	5.89E-01
CE-141	#A	-8.4355E-02	-8.4356E-02	1.046E+02%	2.97E-01
CE-144	#A	1.1618E-02	1.1618E-02	2.057E+03%	8.51E-01
PM-144	#A	-4.4600E-02	-4.4600E-02	2.264E+02%	3.55E-01
EU-152	#A	6.5160E-02	6.5160E-02	8.195E+01%	9.33E-01
EU-154	#A	2.2835E-01	2.2835E-01	8.024E+01%	2.34E+00
EU-155	#A	1.6010E-01	1.6010E-01	8.886E+01%	4.78E-01
HF-181	#A	2.0321E-03	2.0321E-03	3.533E+03%	2.63E-01
Ta-182	#A	-2.2533E-02	-2.2533E-02	1.217E+03%	1.03E+00
Hg-203	#A	7.7427E-02	7.7428E-02	7.325E+01%	1.89E-01
TL-208	#	3.6082E-01	3.6082E-01	3.060E+01%	3.27E-01
pm-146	#A	2.2159E-01	2.2159E-01	8.156E+01%	7.62E-01

y-88	#A	8.6866E-02	8.6867E-02	9.050E+01%	3.38E-01
Cd-109	A	1.9423E+00	1.9423E+00	4.293E+01%	2.67E+00
Ra-226	#	5.2050E+00	5.2050E+00	3.476E+01%	5.05E+00
PB-210	#A	3.1365E+00	3.1365E+00	3.348E+01%	3.24E+00
PB-212		7.5218E-01	7.5218E-01	2.194E+01%	4.51E-01
PB-214	#A	6.0918E-01	6.0918E-01	2.896E+01%	6.21E-01
BI-207	#A	4.1731E-02	4.1731E-02	9.493E+01%	2.33E-01
BI-212	#A	0.0000E+00	0.0000E+00	1.000E+03%	3.21E+00
BI-214	#A	5.5183E-01	5.5183E-01	4.292E+01%	7.25E-01
BI-210M	#A	6.5773E-03	6.5773E-03	8.206E+01%	3.91E-01
RA-224	#A	-3.9051E+00	-3.9051E+00	5.703E+01%	7.31E+00
AC-228		1.1150E+00	1.1150E+00	2.670E+01%	1.05E+00
TH-227	#A	7.2264E-01	7.2264E-01	3.337E+01%	7.67E-01
TH-229	#A	7.8696E-01	7.8696E-01	1.016E+02%	3.43E+00
TH-234	#A	3.2065E+00	3.2065E+00	3.433E+01%	3.28E+00
PA-231	#A	-1.2238E-01	-1.2238E-01	1.417E+02%	7.26E+00
PA-233	#A	1.9462E-01	1.9462E-01	6.099E+01%	4.88E-01
PA-234	#A	1.2495E-01	1.2495E-01	8.530E+01%	7.39E-01
PA-234M	#A	1.2258E+00	1.2258E+00	6.575E+02%	4.51E+01
U-235	#A	5.9797E-01	5.9797E-01	5.439E+01%	1.06E+00
AM-241	#A	-2.0553E-03	-2.0553E-03	4.425E+03%	3.17E-01
Ir-192	#A	2.7440E-02	2.7441E-02	2.791E+02%	2.04E-01
Np-237	A	8.1107E-02	8.1107E-02	2.638E+02%	7.42E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (185.9 to 1999.4 keV) 1.608E+01 Bq/Sample
Total Decayed Activity (185.9 to 1999.4 keV) 1.6076073E+01 Bq/Sample


140177_Gamma_680-102600-A-6-N. 4_Gamma_20141651.spc.
1.0e3
1.0e2
1.0e1
1.0e0
Counts
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Energy (keV)

Test America St. Louis Spectrum ID: 12_Gamma_20141902

Sample Description: 140177_Gamma_680-102600-A-6-O DU
Detector: Ge12 S/N10034336
Batch ID: 140177
Work Order Number: Gamma
Lot Number: 680-102600-A-6-O DU

Decay to Time: 8/26/2014 13:39 Live Time: 7200 sec
Acquisition Time: 8/26/2014 13:40:28 Real Time: 7218 sec
Analysis Time: 8/26/2014 15:40 Dead Time: 0.24 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 12_Liquid_D=1 25ml.Clb
Efficiency Cal Desc: Ge12_25mLd=1Cal_85520-334_090111
Efficiency Cal Date: 9/2/2011 07:07
Energy Cal Date: 2/28/2012 13:26
Library: Client_ Long_no ingrowth Rev3.li
Bkgd Correction File: 12_2014-08-09_2129.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	4.424E-02	693.4	3.068E-01	3.068E-01	1.087E+00
NA-22	1.058E-02	452.9	4.791E-02	4.792E-02	1.757E-01
K-40	1.517E+01	8.7	1.313E+00	1.503E+00	2.464E+00
Sc-46	6.499E-02	45.4	2.949E-02	2.966E-02	1.407E-01
CR-51	3.732E-01	77.1	2.878E-01	2.883E-01	9.604E-01
MN-54	-2.469E-03	1971.0	4.865E-02	4.865E-02	1.739E-01
FE-59	-2.412E-02	129.3	3.118E-02	3.120E-02	3.830E-01
Co-56	4.879E-02	113.2	5.523E-02	5.528E-02	1.572E-01
CO-57	1.757E-02	127.4	2.238E-02	2.239E-02	8.267E-02
CO-58	-2.394E-02	192.2	4.601E-02	4.603E-02	1.610E-01
CO-60	-3.415E-03	417.2	1.425E-02	1.425E-02	1.992E-01
ZN-65	3.477E-03	3837.0	1.334E-01	1.334E-01	4.750E-01
NB-94	-1.245E-02	362.7	4.515E-02	4.515E-02	1.590E-01
ZR-95	0.000E+00	1000.0	6.989E-02	6.989E-02	2.977E-01
NB-95	3.975E-03	1129.0	4.488E-02	4.488E-02	1.602E-01
RU-103	-1.007E-02	368.8	3.713E-02	3.714E-02	1.307E-01
RH-106	-2.513E-01	157.0	3.946E-01	3.948E-01	1.367E+00
AG-108M	2.511E-02	139.7	3.509E-02	3.511E-02	1.206E-01
AG-110M	2.826E-03	2420.0	6.838E-02	6.838E-02	2.451E-01
SN-113	0.000E+00	1000.0	3.464E-02	3.464E-02	1.963E-01
SB-124	2.894E-02	153.5	4.443E-02	4.445E-02	1.529E-01
SB-125	1.050E-01	88.6	9.301E-02	9.315E-02	3.380E-01
I-131	7.300E-02	69.1	5.047E-02	5.060E-02	1.244E-01
Gd-153	2.387E-02	262.7	6.270E-02	6.271E-02	2.371E-01
Ga-68	-1.630E+00	167.4	2.727E+00	2.728E+00	9.579E+00
Tc-99m	-2.312E-03	1008.0	2.331E-02	2.331E-02	8.102E-02
BA-133	-1.286E-02	400.3	5.148E-02	5.149E-02	1.792E-01
CS-134	4.380E-02	43.3	1.896E-02	1.908E-02	1.600E-01
CS-137	5.725E-01	15.4	8.808E-02	9.245E-02	1.527E-01
CE-139	-4.944E-02	69.8	3.450E-02	3.468E-02	1.142E-01
Ba-140	2.396E-01	58.1	1.392E-01	1.397E-01	4.641E-01
La-140	3.874E-02	62.3	2.412E-02	2.419E-02	1.972E-01
CE-141	-1.923E-02	280.1	5.384E-02	5.385E-02	1.833E-01
CE-144	-1.292E-01	161.6	2.088E-01	2.089E-01	7.074E-01
PM-144	2.575E-02	125.5	3.232E-02	3.235E-02	1.591E-01
EU-152	2.237E-02	403.4	9.022E-02	9.022E-02	4.989E-01
EU-154	3.215E-02	220.6	7.092E-02	7.093E-02	1.238E+00
EU-155	9.435E-02	50.1	4.730E-02	4.756E-02	3.666E-01
HF-181	2.935E-02	127.7	3.748E-02	3.750E-02	1.601E-01

Ta-182	1.150E-01	119.0	1.368E-01	1.369E-01	5.318E-01
Hg-203	-2.370E-02	147.3	3.492E-02	3.494E-02	1.192E-01
TL-208	3.605E-01	21.0	7.578E-02	7.780E-02	1.870E-01
pm-146	5.487E-02	102.8	5.643E-02	5.650E-02	3.844E-01
y-88	3.363E-02	106.4	3.578E-02	3.582E-02	1.666E-01
Cd-109	1.621E+00	34.8	5.646E-01	5.710E-01	1.796E+00
Ra-226	3.782E+00	37.7	1.424E+00	1.448E+00	3.428E+00
PB-210	3.020E+00	30.7	9.278E-01	9.580E-01	2.530E+00
PB-212	9.691E-01	10.4	1.012E-01	1.141E-01	2.883E-01
PB-214	7.570E-01	18.4	1.396E-01	1.443E-01	3.562E-01
BI-207	9.677E-02	43.4	4.200E-02	4.227E-02	1.334E-01
BI-212	1.451E+00	41.0	5.943E-01	5.985E-01	1.861E+00
BI-214	9.187E-01	15.1	1.390E-01	1.461E-01	3.359E-01
BI-210M	0.000E+00	1000.0	4.967E-02	4.967E-02	2.544E-01
RA-224	1.957E+00	50.7	9.914E-01	9.970E-01	3.237E+00
AC-228	1.111E+00	19.5	2.168E-01	2.234E-01	5.793E-01
TH-227	2.896E-01	71.8	2.079E-01	2.085E-01	6.905E-01
TH-229	-7.396E-01	87.8	6.491E-01	6.508E-01	2.169E+00
TH-234	9.578E-01	43.3	4.142E-01	4.173E-01	2.202E+00
PA-231	-3.252E-02	114.4	3.720E-02	3.723E-02	3.988E+00
PA-233	1.545E-01	59.5	9.197E-02	9.229E-02	2.571E-01
PA-234	3.239E-01	43.3	1.402E-01	1.411E-01	4.190E-01
PA-234M	3.555E-01	1441.0	5.121E+00	5.121E+00	2.036E+01
U-235	4.074E-01	57.3	2.334E-01	2.342E-01	7.534E-01
AM-241	4.262E-02	147.5	6.287E-02	6.291E-02	2.122E-01
Ir-192	8.584E-02	29.7	2.548E-02	2.592E-02	1.410E-01
Np-237	3.996E-01	46.6	1.862E-01	1.873E-01	6.057E-01
Total	3.636E+01				

Analyst: Elizabeth Newns

TestAmerica, Inc Spectrum name: 12_Gamma_20141902.An1

Sample description
140177_Gamma_680-102600-A-6-O DU

Spectrum Filename: C:\User\SPC\Det12\12_Gamma_20141902.An1

Acquisition information
Start time: 8/26/2014 1:40:28 PM
Live time: 7200
Real time: 7218
Dead time: 0.24 %
Detector ID: 12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_Liquid_D=1 25ml.Clb
Ge12_25mLd=1Cal_85520-334_090111

Energy Calibration
Created: 2/28/2012 1:26:42 PM
Zero offset: 0.049 keV
Gain: 0.250 keV/channel
Quadratic: -3.945E-08 keV/channel^2

Efficiency Calibration
Created: 9/2/2011 7:07:23 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 2.02 %
Log(Eff): -6.442716E-01 + (-8.678082E-03*Log(E)) +
(-6.444773E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.33 %
Log(Eff): -1.236768E+01 + (4.728110E+00*Log(E)) +
(-5.423915E-01*Log(E)^2)

Library Files
Main analysis library: Client_ Long_no ingrowth Rev3.li
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.58keV)
Stop channel: 8000 (1999.36keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/26/2014 1:39:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2014-08-09_2129.PBC 8/9/2014 9:29:22 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 42 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1103

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.66	227.	13.73	1.03	1.099E-01	46.54	4.250	3.020E+00	PB210
59.09	13.	147.51	0.90	1.220E-01	59.54	35.900	PBC<MDA	AM241
63.35	120.	20.10	0.90	1.240E-01	63.29	3.810	PBC<MDA	TH234
77.22	198.	17.44	0.86	1.270E-01				
86.93	56.	34.84	0.93	1.260E-01	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.997E-01	EU155
					88.04	3.790	1.621E+00	Cd109
87.01	45.	50.13	0.93	1.263E-01	86.49	13.100	3.762E-01	Np237
					86.54	30.700	1.605E-01	EU155
					88.04	3.790	1.303E+00	Cd109
87.05	48.	46.59	0.93	1.263E-01	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.705E-01	EU155
					88.04	3.790	1.384E+00	Cd109
89.83	54.	31.72	0.93	1.256E-01				
92.74	203.	11.34	0.93	1.249E-01	92.59	5.584	PBC<MDA	TH234
96.96	7.	275.25	0.94	1.236E-01	97.50	30.000	PBC<MDA	Gd153
103.26	4.	447.47	0.94	1.218E-01	103.20	21.800	PBC<MDA	Gd153
124.74	6.	260.23	0.96	1.135E-01	123.10	40.790	PBC<MDA	EU154
					123.10	40.790	1.775E-02	EU154
136.45	14.	127.68	0.98	1.074E-01	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	1.689E-01	CO57
					136.30	5.850	3.081E-01	HF181
136.49	14.	127.35	0.98	1.073E-01	136.30	5.850	PBC<MDA	HF181
					136.47	10.680	1.693E-01	CO57
144.33	30.	62.65	0.98	1.038E-01	143.79	10.960	PBC<MDA	U235

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
162.45	21.	84.50	1.00	9.487E-02	162.66	6.220	PBC<MDA	Ba140
					163.38	5.080	6.128E-01	U235
					162.66	6.220	4.988E-01	Ba140
162.46	17.	99.82	1.00	9.454E-02	162.66	6.220	PBC<MDA	Ba140
					163.38	5.080	4.913E-01	U235
185.81	139.	20.84	0.86	8.639E-02	185.99	3.280	3.782E+00	Ra226
205.27	12.	125.12	1.04	8.065E-02	205.33	5.010	PBC<MDA	U235
236.03	19.	71.79	1.07	7.313E-02	235.97	12.300	PBC<MDA	TH227
238.59	294.	9.38	1.43	7.255E-02	238.63	43.300	1.056E+00	PB212
241.05	42.	50.67	1.07	7.203E-02	240.99	4.100	PBC<MDA	RA224
242.06	44.	30.29	1.07	7.182E-02	242.00	7.430	PBC<MDA	PB214
284.25	15.	80.52	1.11	6.389E-02	284.30	6.140	PBC<MDA	I131
295.32	59.	22.91	1.49	6.215E-02	295.09	19.300	6.864E-01	PB214
					295.95	30.160	PBC<MDA	Ir192
					295.95	30.160	PBC<MDA	Ir192
295.45	54.	29.69	1.12	6.202E-02	295.09	19.300	PBC<MDA	PB214
					295.95	30.160	3.988E-01	Ir192
298.42	8.	155.19	1.13	6.139E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	7.367E-01	PA231
298.43	8.	154.44	1.13	6.138E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	7.402E-01	PA231
300.67	23.	59.51	1.13	6.137E-02	300.18	6.200	PBC<MDA	PA233
308.36	11.	119.30	1.14	6.014E-02	308.44	31.750	PBC<MDA	Ir192
					308.44	31.750	8.148E-02	Ir192
309.70	6.	191.05	1.14	5.962E-02	312.01	36.000	PBC<MDA	PA233
318.90	16.	77.12	1.15	5.849E-02	320.08	9.940	PBC<MDA	CR51
327.87	24.	62.25	1.15	5.732E-02	328.76	20.300	PBC<MDA	La140
					328.76	20.300	2.807E-01	La140
338.08	114.	20.21	1.29	5.609E-02	338.32	12.010	2.361E+00	AC228
351.75	117.	13.38	1.57	5.443E-02	351.93	37.600	7.933E-01	PB214
382.98	3.	337.50	1.20	5.091E-02	383.84	8.940	PBC<MDA	BA133
					383.84	8.940	1.013E-01	BA133
433.20	8.	139.72	1.25	4.624E-02	433.94	90.480	PBC<MDA	AG108M
451.87	9.	102.85	1.27	4.462E-02	453.88	65.000	PBC<MDA	pm146
463.33	12.	88.57	1.28	4.389E-02	463.37	10.470	PBC<MDA	SB125
475.12	1.	693.39	1.29	4.284E-02	477.60	10.520	PBC<MDA	BE7
481.84	2.	502.08	1.29	4.253E-02	482.00	80.500	PBC<MDA	HF181
					482.00	80.500	9.095E-03	HF181
486.47	2.	480.09	1.30	4.217E-02	487.02	45.500	PBC<MDA	La140
					487.02	45.500	1.527E-02	La140
511.05	123.	15.34	1.32	4.051E-02	511.86	20.000	2.107E+00	RH106
538.44	12.	79.70	1.34	3.894E-02	537.26	24.390	PBC<MDA	Ba140
					537.26	24.390	1.735E-01	Ba140
569.79	25.	43.41	1.37	3.710E-02	569.32	15.380	6.146E-01	CS134
					569.47	8.200	1.153E+00	PA234
					569.70	97.740	9.677E-02	BI207
					569.32	15.380	6.146E-01	CS134
569.79	25.	43.28	1.37	3.712E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.155E+00	PA234
					569.70	97.740	9.695E-02	BI207
569.79	25.	43.28	1.37	3.712E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.155E+00	PA234
					569.70	97.740	9.694E-02	BI207
583.09	76.	14.08	1.56	3.640E-02	583.02	84.500	3.432E-01	TL208
602.86	7.	153.54	1.40	3.541E-02	602.73	98.260	PBC<MDA	SB124
609.48	108.	13.05	1.41	3.504E-02	609.31	46.090	PBC<MDA	BI214
					610.30	5.750	7.446E+00	RU103
					610.30	5.750	7.446E+00	RU103

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
609.67	107.	11.37	1.81	3.509E-02	609.31	46.090	9.187E-01	BI214
					610.30	5.750	7.374E+00	RU103
618.47	4.	262.30	1.41	3.467E-02	618.06	99.100	PBC<MDA	PM144
635.98	4.	171.53	1.43	3.386E-02	635.89	11.310	PBC<MDA	SB125
637.07	10.	69.14	1.43	3.381E-02	636.97	7.170	PBC<MDA	I131
661.82	115.	15.38	0.66	3.274E-02	661.66	85.210	5.725E-01	CS137
696.23	8.	125.52	1.48	3.134E-02	696.54	99.000	PBC<MDA	PM144
727.29	24.	40.96	1.51	3.021E-02	727.17	7.550	PBC<MDA	BI212
733.60	2.	352.92	1.51	2.991E-02	735.72	22.500	PBC<MDA	pm146
747.66	6.	127.66	1.52	2.951E-02	747.16	34.000	PBC<MDA	pm146
763.91	-7.	997.84	1.54	2.887E-02	763.94	22.280	PBC<MDA	AG110M
					765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
795.27	6.	147.70	1.56	2.794E-02	795.87	85.530	PBC<MDA	CS134
					795.87	85.530	3.250E-02	CS134
846.12	8.	113.19	1.61	2.647E-02	846.77	99.935	PBC<MDA	Co56
860.91	11.	77.47	1.62	2.610E-02	860.56	12.420	PBC<MDA	TL208
872.49	2.	389.11	1.63	2.576E-02	873.23	12.270	PBC<MDA	EU154
					873.23	12.270	8.877E-02	EU154
879.89	16.	51.09	1.63	2.558E-02	880.53	6.000	PBC<MDA	PA234
897.77	3.	238.49	1.65	2.513E-02	898.04	93.700	PBC<MDA	y88
911.26	58.	19.53	1.66	2.481E-02	911.16	29.000	1.110E+00	AC228
960.67	2.	403.35	1.70	2.360E-02	964.11	14.605	PBC<MDA	EU152
969.42	63.	17.15	0.65	2.349E-02	968.97	17.460	2.122E+00	AC228
1000.59	0.	68.39	1.73	2.281E-02	1001.00	0.837	PBC<MDA	PA234M
1038.92	1.	580.47	1.76	2.208E-02	1037.84	14.130	PBC<MDA	Co56
1120.25	14.	25.21	1.83	2.060E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1120.55	99.987	PBC<MDA	Sc46
1120.39	19.	45.38	1.83	2.060E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	1.271E-01	Sc46
					1121.30	34.900	3.644E-01	Ta182
1121.26	7.	119.03	1.83	2.058E-02	1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	1.293E-01	Ta182
1172.89	1.	862.96	1.87	1.975E-02	1173.24	99.900	PBC<MDA	CO60
1189.35	2.	408.10	1.88	1.951E-02	1189.05	16.200	PBC<MDA	Ta182
1238.47	5.	146.86	1.92	1.879E-02	1238.28	66.070	PBC<MDA	Co56
1274.39	1.	467.70	1.95	1.829E-02	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	2.911E-02	EU154
					1274.54	35.190	2.911E-02	EU154
1274.42	1.	452.95	1.95	1.829E-02	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	3.004E-02	EU154
1292.08	3.	237.52	1.96	1.807E-02	1291.60	43.200	PBC<MDA	FE59
1407.82	3.	233.53	2.05	1.666E-02	1408.00	21.005	PBC<MDA	EU152
1460.85	188.	7.59	2.20	1.609E-02	1460.83	10.670	1.517E+01	K40
1764.37	4.	30.83	2.30	1.342E-02	1764.49	15.400	PBC<MDA	BI214
1835.60	4.	106.39	2.35	1.291E-02	1836.06	99.200	PBC<MDA	y88

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
308.42	77.22	282.	198.	1.556E+03	13.98	0.859	-
359.50	90.00	97.	67.	5.321E+02	24.18	0.605	- sM

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: Client_ Long_no ingrowth Rev3.li

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.27	46.66	312.	101.	0.014	13.73	1.031s
AM-241	235.94	59.09	190.	13.	0.002	147.51	0.902s
TH-234	252.99	63.35	240.	34.	0.005	20.10	0.896
BA-133	323.12	80.90	211.	-6.	-0.001	354.31	0.922s
Np-237	347.71	87.05	222.	48.	0.007	46.59	0.928s
EU-155	347.55	87.01	230.	45.	0.006	50.13	0.928s
Cd-109	347.24	86.93	161.	56.	0.008	34.84	0.929s
TH-234	369.85	92.59	308.	47.	0.006	13.49	0.934D
AC-228	372.89	93.35	321.	53.	0.007	49.40	0.934D
Gd-153	387.33	96.96	169.	7.	0.001	275.25	0.938s
Gd-153	412.50	103.26	174.	4.	0.001	447.47	0.944s
EU-154	498.34	124.74	116.	6.	0.001	260.23	0.963s
PA-234	522.60	130.81	149.	-8.	-0.001	224.24	0.970s
HF-181	532.14	133.19	151.	-9.	-0.001	200.71	0.972s
CE-144	532.86	133.38	158.	-11.	-0.002	161.56	0.973
HF-181	545.16	136.45	151.	14.	0.002	127.68	0.975s
CO-57	545.29	136.49	151.	14.	0.002	127.35	0.975s
U-235	576.66	144.33	160.	30.	0.004	62.65	0.982s
CE-141	584.15	146.21	182.	-7.	-0.001	280.05	0.984s
Ba-140	649.06	162.45	150.	21.	0.003	84.50	1.000s
U-235	649.10	162.46	135.	17.	0.002	99.82	1.001s
CE-139	659.62	165.09	158.	-27.	-0.004	69.79	1.003s
Ra-226	742.44	185.81	208.	77.	0.011	20.84	0.858s
TH-229	773.61	193.61	139.	-20.	-0.003	87.77	1.029s
U-235	820.23	205.27	108.	12.	0.002	125.12	1.040s
TH-229	843.93	211.20	149.	-7.	-0.001	244.29	1.045s
TH-227	942.96	235.97	81.	19.	0.003	71.79	1.069D

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PB-212	953.60	238.63	180.	219.	0.030	8.33	1.071D
RA-224	963.01	240.99	201.	42.	0.006	50.67	1.074D
PB-214	967.05	242.00	139.	44.	0.006	30.29	1.075D
EU-152	974.43	243.84	184.	-26.	-0.004	76.16	1.077s
TH-227	1023.73	256.18	135.	-17.	-0.002	99.35	1.088s
TL-208	1095.47	274.12	78.	-13.	-0.002	100.05	1.107s
Hg-203	1119.87	280.22	83.	-9.	-0.001	147.31	1.109s
I-131	1135.96	284.25	66.	15.	0.002	80.52	1.114
PB-214	1180.22	295.32	100.	59.	0.008	22.91	1.493s
Ir-192	1180.73	295.45	100.	54.	0.007	29.69	1.125s
PB-212	1192.61	298.42	73.	8.	0.001	155.19	1.128
PA-231	1192.66	298.43	73.	8.	0.001	154.44	1.128
PA-233	1201.62	300.67	79.	23.	0.003	59.51	1.128s
PA-231	1208.90	302.49	105.	-9.	-0.001	168.79	1.131s
BA-133	1208.33	302.35	105.	-8.	-0.001	179.15	1.131s
Ba-140	1227.46	307.14	64.	-2.	0.000	590.76	1.133s
Ir-192	1232.34	308.36	84.	11.	0.002	119.30	1.136s
PA-233	1237.72	309.70	63.	6.	0.001	191.05	1.139s
Ir-192	1265.08	316.55	112.	-8.	-0.001	196.27	1.143s
CR-51	1274.48	318.90	65.	16.	0.002	77.12	1.147s
La-140	1310.35	327.87	95.	24.	0.003	62.25	1.155s
AC-228	1351.17	338.08	76.	114.	0.016	20.21	1.293s
PB-214	1405.84	351.75	114.	117.	0.016	13.38	1.567s
BA-133	1423.30	356.12	75.	-3.	0.000	400.27	1.180s
I-131	1453.88	363.77	59.	-2.	0.000	613.62	1.187s
BA-133	1530.69	382.98	61.	3.	0.000	337.50	1.205
AG-108M	1731.48	433.20	52.	8.	0.001	139.72	1.250s
pm-146	1806.14	451.87	35.	9.	0.001	102.85	1.268s
SB-125	1851.97	463.33	54.	12.	0.002	88.57	1.277s
Ir-192	1866.93	467.07	43.	-3.	0.000	275.44	1.281s
BE-7	1899.11	475.12	49.	1.	0.000	693.39	1.289s
HF-181	1925.97	481.84	62.	2.	0.000	502.08	1.293s
La-140	1944.48	486.47	50.	2.	0.000	480.09	1.298s
RU-103	1987.83	497.31	49.	-3.	0.000	368.78	1.307s
RH-106	2042.79	511.05	116.	123.	0.017	15.34	1.320
Ba-140	2152.30	538.44	39.	12.	0.002	79.70	1.342s
CS-134	2277.70	569.79	47.	25.	0.004	43.28	1.370s
PA-234	2277.70	569.79	47.	25.	0.004	43.28	1.371
BI-207	2277.67	569.79	48.	25.	0.004	43.41	1.371s
TL-208	2330.89	583.09	69.	76.	0.011	14.08	1.559s
SB-124	2409.96	602.86	58.	7.	0.001	153.54	1.400
CS-134	2417.28	604.69	63.	-9.	-0.001	128.62	1.401s
BI-214	2437.16	609.67	61.	107.	0.015	11.37	1.808s
RU-103	2436.42	609.48	45.	108.	0.015	13.05	1.406s
AG-108M	2450.42	612.98	76.	-15.	-0.002	89.00	1.410s
PM-144	2472.38	618.47	43.	4.	0.000	262.30	1.413s
RH-106	2484.23	621.43	44.	-6.	-0.001	157.01	1.416s
SB-125	2542.05	635.89	18.	4.	0.001	171.53	1.428D

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
I-131	2546.39	636.97	19.	10.	0.001	69.14	1.429D
CS-137	2645.74	661.82	36.	115.	0.016	15.38	0.660s
PM-144	2783.38	696.23	50.	8.	0.001	125.52	1.480s
NB-94	2814.19	703.93	48.	-3.	0.000	362.74	1.486s
EU-154	2896.70	724.56	55.	-9.	-0.001	119.17	1.503s
ZR-95	2896.00	724.38	49.	-7.	-0.001	151.96	1.504s
BI-212	2907.62	727.29	36.	24.	0.003	40.96	1.507s
pm-146	2932.86	733.60	29.	2.	0.000	352.92	1.514s
pm-146	2989.11	747.66	29.	6.	0.001	127.66	1.523s
AG-110M	3054.50	764.01	52.	-2.	0.000	420.33	1.538s
BI-212	3133.81	783.83	30.	-4.	-0.001	187.28	1.556s
CS-134	3179.56	795.27	31.	6.	0.001	147.70	1.565s
CS-134	3200.40	800.48	34.	-1.	0.000	981.04	1.570s
CO-58	3243.57	811.27	39.	-5.	-0.001	192.19	1.577s
Co-56	3382.97	846.12	34.	8.	0.001	113.19	1.607s
TL-208	3442.14	860.91	32.	11.	0.002	77.47	1.618s
EU-154	3488.49	872.49	30.	2.	0.000	389.11	1.629s
PA-234	3518.09	879.89	26.	16.	0.002	51.09	1.635s
PA-234	3528.69	882.54	37.	-10.	-0.001	90.16	1.637
y-88	3589.61	897.77	30.	3.	0.000	238.49	1.649s
AC-228	3643.61	911.26	34.	58.	0.008	19.53	1.660
AG-110M	3768.14	942.39	15.	-1.	0.000	764.01	1.682s
EU-152	3841.29	960.67	19.	2.	0.000	403.35	1.703s
AC-228	3876.28	969.42	9.	63.	0.009	17.15	0.653s
EU-154	3984.42	996.44	36.	-4.	0.000	244.13	1.729s
Co-56	4154.37	1038.92	28.	1.	0.000	580.47	1.762s
BI-207	4256.35	1064.40	37.	-4.	-0.001	239.83	1.783s
Ga-68	4307.46	1077.17	28.	-5.	-0.001	167.36	1.794
FE-59	4397.07	1099.56	41.	-7.	-0.001	129.25	1.811s
EU-152	4444.60	1111.44	34.	-4.	-0.001	225.06	1.821s
BI-214	4480.00	1120.29	24.	14.	0.002	25.21	1.828D
Sc-46	4480.42	1120.39	27.	19.	0.003	45.38	1.828s
Ta-182	4484.06	1121.30	28.	7.	0.001	119.03	1.828D
CO-60	4690.54	1172.89	30.	1.	0.000	862.96	1.869s
Ta-182	4756.42	1189.35	30.	2.	0.000	408.10	1.881s
Co-56	4953.01	1238.47	28.	5.	0.001	146.86	1.919s
NA-22	5096.89	1274.42	19.	1.	0.000	452.95	1.946s
EU-154	5096.78	1274.39	19.	1.	0.000	467.70	1.946s
FE-59	5167.58	1292.08	27.	3.	0.000	237.52	1.959s
CO-60	5332.60	1333.30	23.	-2.	0.000	417.16	1.990s
AG-110M	5537.11	1384.39	23.	-2.	0.000	352.54	2.029s
EU-152	5630.90	1407.82	17.	3.	0.000	233.53	2.046s
K-40	5843.23	1460.85	35.	188.	0.026	7.59	2.198
BI-214	7058.65	1764.37	21.	4.	0.001	30.83	2.297s
Co-56	7080.30	1769.77	23.	-7.	-0.001	102.44	2.302s
y-88	7343.96	1835.60	8.	4.	0.001	106.39	2.345s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
BE-7	C	4.4241E-02				5.31E+01	
			477.60	4.424E-02	&(	1.087E+00 6.93E+02 1.05E+01	G
NA-22	C	1.0578E-02				9.50E+02	
			1274.53	1.058E-02	?(	1.757E-01 4.53E+02 9.99E+01	G
K-40	N	1.5170E+01				4.66E+11	
			1460.83	1.517E+01	(P	2.464E+00 7.59E+00 1.07E+01	G
Sc-46	F	6.4991E-02				8.38E+01	
			889.28	2.867E-03	%(	1.407E-01 1.34E+03 1.00E+02	G
			1120.55	1.271E-01	?(	1.821E-01 4.54E+01 1.00E+02	G
CR-51	F	3.7315E-01				2.77E+01	
			320.08	3.731E-01	?(	9.604E-01 7.71E+01 9.94E+00	G
MN-54	C	-2.4687E-03				3.12E+02	
			834.85	-2.469E-03	%(	1.739E-01 1.97E+03 1.00E+02	G
FE-59	F	-2.4122E-02				4.45E+01	
			1099.25	-8.604E-02	?(	3.830E-01 1.29E+02 5.65E+01	G
			1291.60	5.686E-02	?(	4.807E-01 2.38E+02 4.32E+01	G
Co-56	C	4.8794E-02				7.73E+01	
			846.77	4.045E-02	&(	1.572E-01 1.13E+02 9.99E+01	G
			1238.28	5.942E-02	?(	3.050E-01 1.47E+02 6.61E+01	G
			1037.84	5.813E-02	?(	1.220E+00 5.80E+02 1.41E+01	G
			1771.35	-4.805E-01	+	1.692E+00 1.02E+02 1.55E+01	A
CO-57	C	1.7569E-02				2.72E+02	
			122.06	-1.364E-03	&(	8.267E-02 1.76E+03 8.56E+01	G
			136.47	1.693E-01	&(	7.275E-01 1.27E+02 1.07E+01	G
CO-58	C	-2.3941E-02				7.09E+01	
			810.78	-2.394E-02	?(	1.610E-01 1.92E+02 9.95E+01	G
CO-60	F	-3.4154E-03				1.93E+03	
			1332.50	-1.316E-02	?(	1.992E-01 4.17E+02 1.00E+02	G
			1173.24	6.337E-03	?(	1.979E-01 8.63E+02 9.99E+01	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
ZN-65	F	3.4771E-03					2.44E+02	
			1115.55	3.477E-03	%(	4.750E-01	3.84E+03	5.06E+01 G
NB-94	I	-1.2447E-02					7.41E+06	
			702.63	-1.245E-02	?(	1.590E-01	3.63E+02	9.79E+01 G
			871.10	0.000E+00	&	1.382E-01	1.00E+03	9.99E+01 G
NB-95	I	3.9753E-03					6.40E+01	
			765.79	3.975E-03	%(	1.602E-01	1.13E+03	9.98E+01 G
RU-103	I	-1.0069E-02					3.93E+01	
			497.05	-1.007E-02	?(	1.307E-01	3.69E+02	9.09E+01 G
			610.30	7.446E+00	?	2.350E+00	1.31E+01	5.75E+00 GA
RH-106	I	-2.5132E-01					3.74E+02	
			621.92	-2.513E-01	?(	1.367E+00	1.57E+02	9.93E+00 G
			1050.36	4.831E-02	%	1.354E+01	7.81E+03	1.56E+00 G
			511.86	2.107E+00		9.080E-01	1.53E+01	2.00E+01 GA
AG-108M	C	2.5112E-02					1.53E+05	
			433.94	2.511E-02	&(	1.206E-01	1.40E+02	9.05E+01 G
			722.94	0.000E+00	-	2.979E-01	1.00E+03	9.08E+01 G
			614.28	-6.449E-02	&	1.928E-01	8.90E+01	8.98E+01 G
AG-110M	F	2.8255E-03					2.50E+02	
			884.68	2.826E-03	%(	2.451E-01	2.42E+03	7.27E+01 G
			657.76	0.000E+00	-	3.855E-01	1.00E+03	9.46E+01 G
			937.49	-1.223E-02	+	3.496E-01	7.64E+02	3.44E+01 G
			1384.30	-6.568E-02	+	8.385E-01	3.53E+02	2.43E+01 G
			763.94	-5.310E-02	+	7.853E-01	4.20E+02	2.23E+01 G
SB-124	F	2.8936E-02					6.02E+01	
			602.73	2.894E-02	?(	1.529E-01	1.54E+02	9.83E+01 G
			1690.98	0.000E+00	-	2.543E-01	1.00E+03	4.78E+01 G
			722.79	0.000E+00	-	2.476E+00	1.00E+03	1.08E+01 G
SB-125	I	1.0502E-01					1.01E+03	
			427.88	-1.583E-03	%(	3.380E-01	5.96E+03	2.96E+01 G
			600.50	-7.810E-04	%	9.127E-01	3.32E+04	1.79E+01 G
			635.89	1.342E-01	(	8.214E-01	1.72E+02	1.13E+01 G
			463.37	3.748E-01	?(	1.118E+00	8.86E+01	1.05E+01 G
I-131	I	7.2996E-02					8.02E+00	
			364.48	-5.766E-03	?(	1.244E-01	6.14E+02	8.17E+01 G
			284.30	5.334E-01	(	1.437E+00	8.05E+01	6.14E+00 G
			636.97	5.762E-01	(	1.323E+00	6.91E+01	7.17E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Gd-153	F	2.3870E-02					2.42E+02	
			97.50	2.527E-02	&(	2.371E-01	2.75E+02	3.00E+01 G
			103.20	2.195E-02	?(	3.359E-01	4.47E+02	2.18E+01 G
Ga-68	C	-1.6295E+00					4.71E-02	
			1077.40	-1.629E+00	(	9.579E+00	1.67E+02	3.30E+00 G
Tc-99m	I	-2.3121E-03					2.51E-01	
			140.51	-2.312E-03	%(	8.102E-02	1.01E+03	8.93E+01 G
BA-133	F	-1.2862E-02					3.85E+03	
			356.00	-1.286E-02	&(	1.792E-01	4.00E+02	6.20E+01 G
			302.85	-1.023E-01	+	6.260E-01	1.79E+02	1.83E+01 G
			383.84	1.013E-01	?	1.194E+00	3.37E+02	8.94E+00 GA
			80.99	-1.878E-02	&	2.265E-01	3.54E+02	3.41E+01 GA
CS-134	I	4.3800E-02					7.54E+02	
			604.71	-3.640E-02	?(	1.600E-01	1.29E+02	9.76E+01 G
			795.87	3.250E-02	?(	1.673E-01	1.48E+02	8.55E+01 G
			569.32	6.157E-01	(	8.460E-01	4.33E+01	1.54E+01 G
			801.95	-4.905E-02	+	1.732E+00	9.81E+02	8.69E+00 G
			563.24	-5.192E-03	%	1.549E+00	8.36E+03	8.35E+00 G
CS-137	I	5.7253E-01					1.10E+04	
			661.66	5.725E-01	(	1.527E-01	1.54E+01	8.52E+01 G
CE-139	F	-4.9435E-02					1.38E+02	
			165.85	-4.943E-02	?(	1.142E-01	6.98E+01	7.99E+01 G
Ba-140	I	2.3964E-01					1.28E+01	
			537.26	1.735E-01	&(	4.641E-01	7.97E+01	2.44E+01 G
			162.66	4.988E-01	(	1.406E+00	8.45E+01	6.22E+00 G
			304.85	-1.028E-01	&	2.130E+00	5.91E+02	4.29E+00 G
La-140	I	3.8737E-02					1.28E+01	
			1596.21	-1.553E-03	%(	1.972E-01	3.34E+03	9.54E+01 G
			487.02	1.527E-02	?(	2.587E-01	4.80E+02	4.55E+01 G
			328.76	2.807E-01	(	5.756E-01	6.23E+01	2.03E+01 G
			815.77	1.370E-03	%	5.470E-01	1.08E+04	2.33E+01 G
CE-141	I	-1.9225E-02					3.25E+01	
			145.44	-1.922E-02	?(	1.833E-01	2.80E+02	4.82E+01 G
CE-144	I	-1.2923E-01					2.85E+02	
			133.54	-1.292E-01	(	7.074E-01	1.62E+02	1.11E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PM-144	C 2.5752E-02					3.63E+02	
		696.54	3.697E-02	?(	1.591E-01	1.26E+02	9.90E+01 G
		618.06	1.454E-02	&(	1.341E-01	2.62E+02	9.91E+01 G
		476.81	6.573E-03	%	3.111E-01	1.34E+03	4.20E+01 G
EU-152	F 2.2367E-02					4.94E+03	
		344.29	0.000E+00	?(	4.989E-01	1.00E+03	2.65E+01 G
		1112.07	-1.835E-01	+	1.458E+00	2.25E+02	1.36E+01 G
		121.78	-2.106E-03	%	2.507E-01	3.45E+03	2.86E+01 G
		778.92	-4.973E-04	%	1.070E+00	5.91E+04	1.29E+01 G
		964.11	6.295E-02	?(	9.293E-01	4.03E+02	1.46E+01 G
		244.69	-6.696E-01	+	1.693E+00	7.62E+01	7.58E+00 G
		1408.00	1.040E-01	?	8.793E-01	2.34E+02	2.10E+01 GA
EU-154	I 3.2151E-02					3.14E+03	
		873.23	8.877E-02	?(	1.238E+00	3.89E+02	1.23E+01 G
		123.10	1.775E-02	?(	1.584E-01	2.60E+02	4.08E+01 G
		1274.54	2.911E-02	?(	4.994E-01	4.68E+02	3.52E+01 G
		723.36	-2.066E-01	+	8.408E-01	1.19E+02	2.02E+01 G
		1004.77	1.005E-03	%	9.485E-01	2.59E+04	1.80E+01 G
		996.33	-2.038E-01	+	1.756E+00	2.44E+02	1.06E+01 G
EU-155	I 9.4352E-02					1.81E+03	
		105.31	-1.509E-03	%(	3.666E-01	7.08E+03	2.12E+01 G
		86.54	1.605E-01	&(	2.629E-01	5.01E+01	3.07E+01 G
HF-181	F 2.9352E-02					4.24E+01	
		482.00	9.095E-03	?(	1.601E-01	5.02E+02	8.05E+01 G
		133.02	-2.586E-02	&	1.766E-01	2.01E+02	4.33E+01 G
		345.83	0.000E+00	-	8.270E-01	1.00E+03	1.51E+01 G
		136.30	3.081E-01	&(	1.327E+00	1.28E+02	5.85E+00 G
Ta-182	F 1.1496E-01					1.14E+02	
		1121.30	1.293E-01	(	5.318E-01	1.19E+02	3.49E+01 G
		1221.41	2.675E-03	%	4.635E-01	4.44E+03	2.70E+01 G
		1189.05	8.417E-02	?(	1.233E+00	4.08E+02	1.62E+01 G
Hg-203	F -2.3704E-02					4.66E+01	
		279.20	-2.370E-02	&(	1.192E-01	1.47E+02	8.15E+01 G
TL-208	N 3.6046E-01					6.98E+02	
		583.02	3.432E-01	*(P	1.870E-01	1.41E+01	8.45E+01 G
		277.28	-4.384E-01	-	1.480E+00	1.00E+02	6.31E+00 G
		860.56	4.781E-01	?(	1.242E+00	7.75E+01	1.24E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
pm-146	C 5.4870E-02					2.02E+03	
		747.16	8.683E-02	&(	3.844E-01	1.28E+02	3.40E+01 G
		735.72	4.547E-02	?(	5.750E-01	3.53E+02	2.25E+01 G
		453.88	4.141E-02	&(	1.454E-01	1.03E+02	6.50E+01 G
y-88	F 3.3629E-02					1.07E+02	
		898.04	1.969E-02	?(	1.666E-01	2.38E+02	9.37E+01 G
		1836.06	4.679E-02	?(	1.757E-01	1.06E+02	9.92E+01 G
Cd-109	F 1.6208E+00					4.53E+02	
		88.04	1.621E+00	&(	1.796E+00	3.48E+01	3.79E+00 G
Ra-226	N 3.7821E+00					5.84E+05	
		185.99	3.782E+00	*(P	3.428E+00	2.08E+01	3.28E+00 G
PB-210	N 3.0196E+00					8.14E+03	
		46.54	3.020E+00	*(P	2.530E+00	1.37E+01	4.25E+00 G
PB-212	N 9.6905E-01					6.98E+02	
		238.63	9.691E-01	(P	2.883E-01	8.33E+00	4.33E+01 G
		300.03	5.525E-01	-	2.938E+00	1.55E+02	3.28E+00 GA
PB-214	N 7.5701E-01					5.84E+05	
		351.93	7.933E-01	*(P	3.562E-01	1.34E+01	3.76E+01 G
		295.09	6.864E-01	*(P	5.702E-01	2.29E+01	1.93E+01 G
		242.00	1.145E+00	P	1.500E+00	3.03E+01	7.43E+00 GA
BI-207	C 9.6771E-02					1.18E+04	
		569.70	9.677E-02	(	1.334E-01	4.34E+01	9.77E+01 G
		1063.66	-3.191E-02	-	2.696E-01	2.40E+02	7.45E+01 G
BI-212	N 1.4507E+00					6.98E+02	
		727.17	1.451E+00	?(	1.861E+00	4.10E+01	7.55E+00 G
		785.42	-1.642E+00	-	1.083E+01	1.87E+02	1.28E+00 GA
BI-214	N 9.1868E-01					5.84E+05	
		609.31	9.187E-01	@(P	3.359E-01	1.14E+01	4.61E+01 G
		1120.29	6.420E-01	- P	1.132E+00	2.52E+01	1.51E+01 G
		1764.49	2.732E-01	& P	1.625E+00	3.08E+01	1.54E+01 G
RA-224	N 1.9565E+00					6.98E+02	
		240.99	1.957E+00	(	3.237E+00	5.07E+01	4.10E+00 G
AC-228	N 1.1105E+00					2.10E+03	
		911.16	1.110E+00	?(	5.793E-01	1.95E+01	2.90E+01 G
		968.97	2.122E+00	+	5.739E-01	1.72E+01	1.75E+01 G
		338.32	2.361E+00	+	8.962E-01	2.02E+01	1.20E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			93.35	1.068E+00		1.724E+00	4.94E+01	5.56E+00 XA
TH-227	N	2.8959E-01					7.95E+03	
			235.97	2.896E-01	(	6.905E-01	7.18E+01	1.23E+01 G
			50.14	-1.525E-02	%	1.100E+00	2.11E+03	8.00E+00 G
			256.24	-4.916E-01	-	1.639E+00	9.94E+01	7.00E+00 G
TH-229	N	-7.3960E-01					2.68E+06	
			193.51	-7.396E-01	?(	2.169E+00	8.78E+01	4.40E+00 G
			210.85	-4.191E-01	+	3.493E+00	2.44E+02	2.99E+00 G
TH-234	N	9.5782E-01					1.63E+12	
			63.29	1.003E+00	(P	2.202E+00	2.01E+01	3.81E+00 G
			92.59	9.268E-01	(P	1.682E+00	1.35E+01	5.58E+00 G
PA-231	N	-3.2518E-02					1.20E+07	
			302.65	-6.926E-01	?(	3.988E+00	1.69E+02	2.88E+00 G
			300.07	7.402E-01	(	3.917E+00	1.54E+02	2.46E+00 G
PA-233	C	1.5454E-01					7.82E+08	
			312.01	3.895E-02	?(	2.571E-01	1.91E+02	3.60E+01 G
			300.18	8.257E-01	&(	1.614E+00	5.95E+01	6.20E+00 G
PA-234	N	3.2388E-01					1.63E+12	
			131.29	-5.483E-02	&(	4.190E-01	2.24E+02	1.80E+01 G
			946.02	5.304E-03	%	1.091E+00	5.58E+03	1.34E+01 G
			569.47	1.155E+00	(	1.587E+00	4.33E+01	8.20E+00 G
			883.24	-5.780E-01	+	1.764E+00	9.02E+01	9.60E+00 G
			880.53	1.464E+00	?	2.398E+00	5.11E+01	6.00E+00 GA
PA-234M	N	3.5546E-01					1.63E+12	
			1001.00	3.555E-01	%(P	2.036E+01	6.84E+01	8.37E-01 G
			766.41	-1.160E+01	% P	5.498E+01	9.98E+02	2.94E-01 G
U-235	N	4.0735E-01					2.57E+11	
			143.79	3.648E-01	(	7.534E-01	6.27E+01	1.10E+01 G
			205.33	4.152E-01	(	1.759E+00	1.25E+02	5.01E+00 G
			163.38	4.913E-01	?(	1.646E+00	9.98E+01	5.08E+00 G
AM-241	T	4.2618E-02					1.58E+05	
			59.54	4.262E-02	?(	2.122E-01	1.48E+02	3.59E+01 G
Ir-192	F	8.5839E-02					7.40E+01	
			316.49	-2.102E-02	?(	1.410E-01	1.96E+02	8.70E+01 G
			468.06	-2.105E-02	+	2.040E-01	2.75E+02	5.18E+01 G
			308.44	8.148E-02	?(	3.298E-01	1.19E+02	3.18E+01 G
			295.95	3.988E-01	&(	3.666E-01	2.97E+01	3.02E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Np-237	F 3.9960E-01					2.14E+06	
		86.49	3.996E-01	&(	6.057E-01	4.66E+01	1.31E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
AM-241	59.09	190.	13.	0.002	147.51	4.262E-02
BA-133	80.90	211.	-6.	-0.001	354.31	-1.878E-02
Np-237	87.05	222.	48.	0.007	46.59	3.996E-01
EU-155	87.01	230.	45.	0.006	50.13	1.605E-01
Cd-109	86.93	161.	56.	0.008	34.84	1.621E+00
Gd-153	96.96	169.	7.	0.001	275.25	2.527E-02
Gd-153	103.26	174.	4.	0.001	447.47	2.195E-02
EU-154	124.74	116.	6.	0.001	260.23	1.775E-02
HF-181	133.19	151.	-9.	-0.001	200.71	-2.586E-02
CE-144	133.38	158.	-11.	-0.002	161.56	-1.292E-01
HF-181	136.45	151.	14.	0.002	127.68	3.081E-01
CO-57	136.49	151.	14.	0.002	127.35	1.693E-01

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
U-235	144.33	160.	30.	0.004	62.65	3.648E-01	
CE-141	146.21	182.	-7.	-0.001	280.05	-1.922E-02	
Ba-140	162.45	150.	21.	0.003	84.50	4.988E-01	
U-235	162.46	135.	17.	0.002	99.82	4.913E-01	
CE-139	165.09	158.	-27.	-0.004	69.79	-4.943E-02	
TH-229	193.61	139.	-20.	-0.003	87.77	-7.396E-01	
U-235	205.27	108.	12.	0.002	125.12	4.152E-01	
TH-229	211.20	149.	-7.	-0.001	244.29	-4.191E-01	
EU-152	243.84	184.	-26.	-0.004	76.16	-6.696E-01	
Hg-203	280.22	83.	-9.	-0.001	147.31	-2.370E-02	
Ir-192	295.45	100.	54.	0.007	29.69	3.988E-01	
PA-233	300.67	79.	23.	0.003	59.51	8.257E-01	
BA-133	302.35	105.	-8.	-0.001	179.15	-1.023E-01	
Ba-140	307.14	64.	-2.	0.000	590.76	-1.028E-01	
Ir-192	308.36	84.	11.	0.002	119.30	8.148E-02	
PA-233	309.70	63.	6.	0.001	191.05	3.895E-02	
Ir-192	316.55	112.	-8.	-0.001	196.27	-2.102E-02	
CR-51	318.90	65.	16.	0.002	77.12	3.731E-01	
La-140	327.87	95.	24.	0.003	62.25	2.807E-01	
BA-133	356.12	75.	-3.	0.000	400.27	-1.286E-02	
BA-133	382.98	61.	3.	0.000	337.50	1.013E-01	
AG-108M	433.20	52.	8.	0.001	139.72	2.511E-02	
pm-146	451.87	35.	9.	0.001	102.85	4.141E-02	
Ir-192	467.07	43.	-3.	0.000	275.44	-2.105E-02	
BE-7	475.12	49.	1.	0.000	693.39	4.424E-02	
HF-181	481.84	62.	2.	0.000	502.08	9.095E-03	
La-140	486.47	50.	2.	0.000	480.09	1.527E-02	
RU-103	497.31	49.	-3.	0.000	368.78	-1.007E-02	
Ba-140	538.44	39.	12.	0.002	79.70	1.735E-01	
CS-134	569.79	47.	25.	0.004	43.28	6.157E-01	
BI-207	569.79	48.	25.	0.004	43.41	9.677E-02	
SB-124	602.86	58.	7.	0.001	153.54	2.894E-02	
CS-134	604.69	63.	-9.	-0.001	128.62	-3.640E-02	
RU-103	609.48	45.	108.	0.015	13.05	7.446E+00	
AG-108M	612.98	76.	-15.	-0.002	89.00	-6.449E-02	
PM-144	618.47	43.	4.	0.000	262.30	1.454E-02	
PM-144	696.23	50.	8.	0.001	125.52	3.697E-02	
NB-94	703.93	48.	-3.	0.000	362.74	-1.245E-02	
EU-154	724.56	55.	-9.	-0.001	119.17	-2.066E-01	
ZR-95	724.38	49.	-7.	-0.001	151.96	-7.001E-02	
BI-212	727.29	36.	24.	0.003	40.96	1.451E+00	
pm-146	733.60	29.	2.	0.000	352.92	4.547E-02	
pm-146	747.66	29.	6.	0.001	127.66	8.683E-02	
AG-110M	764.01	52.	-2.	0.000	420.33	-5.310E-02	
BI-212	783.83	30.	-4.	-0.001	187.28	-1.642E+00	
CS-134	795.27	31.	6.	0.001	147.70	3.250E-02	
CS-134	800.48	34.	-1.	0.000	981.04	-4.905E-02	
CO-58	811.27	39.	-5.	-0.001	192.19	-2.394E-02	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Co-56	846.12		34.	8.	0.001	113.19	4.045E-02
EU-154	872.49		30.	2.	0.000	389.11	8.877E-02
y-88	897.77		30.	3.	0.000	238.49	1.969E-02
AG-110M	942.39		15.	-1.	0.000	764.01	-1.223E-02
EU-152	960.67		19.	2.	0.000	403.35	6.295E-02
EU-154	996.44		36.	-4.	0.000	244.13	-2.038E-01
Co-56	1038.92		28.	1.	0.000	580.47	5.813E-02
BI-207	1064.40		37.	-4.	-0.001	239.83	-3.191E-02
Ga-68	1077.17		28.	-5.	-0.001	167.36	-1.629E+00
FE-59	1099.56		41.	-7.	-0.001	129.25	-8.604E-02
EU-152	1111.44		34.	-4.	-0.001	225.06	-1.835E-01
Sc-46	1120.39		27.	19.	0.003	45.38	1.271E-01
CO-60	1172.89		30.	1.	0.000	862.96	6.337E-03
Co-56	1238.47		28.	5.	0.001	146.86	5.942E-02
NA-22	1274.42		19.	1.	0.000	452.95	1.058E-02
EU-154	1274.39		19.	1.	0.000	467.70	2.911E-02
FE-59	1292.08		27.	3.	0.000	237.52	5.686E-02
CO-60	1333.30		23.	-2.	0.000	417.16	-1.316E-02
AG-110M	1384.39		23.	-2.	0.000	352.54	-6.568E-02
EU-152	1407.82		17.	3.	0.000	233.53	1.040E-01
Co-56	1769.77		23.	-7.	-0.001	102.44	-4.805E-01
y-88	1835.60		8.	4.	0.001	106.39	4.679E-02

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

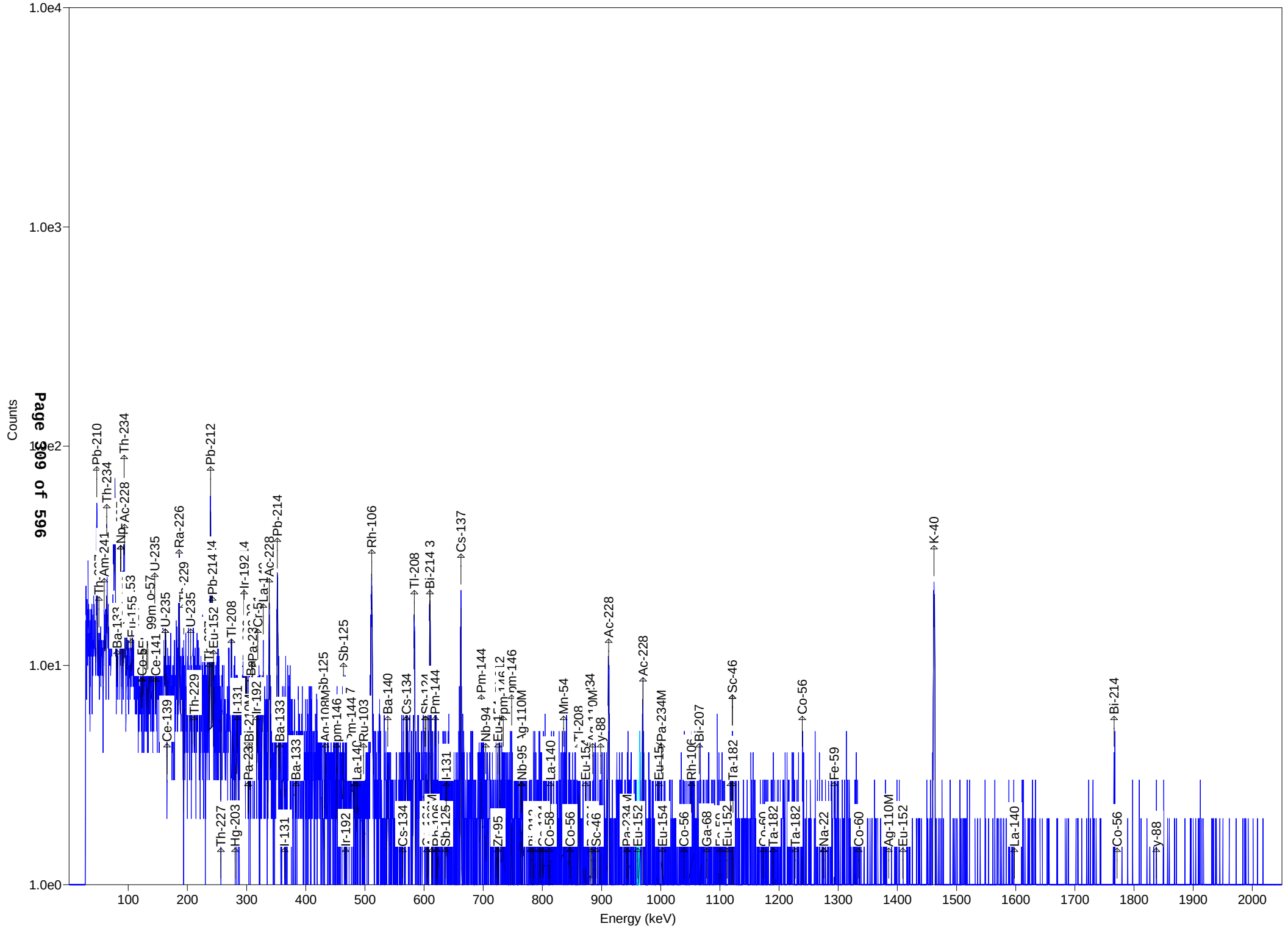
Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	4.4240E-02	4.4241E-02	6.934E+02%	1.09E+00
NA-22	#A	1.0578E-02	1.0578E-02	4.529E+02%	1.76E-01
K-40		1.5170E+01	1.5170E+01	8.656E+00%	2.46E+00
Sc-46	#A	6.4991E-02	6.4991E-02	4.538E+01%	1.41E-01
CR-51	#A	3.7314E-01	3.7315E-01	7.712E+01%	9.60E-01
MN-54	#A	-2.4687E-03	-2.4687E-03	1.971E+03%	1.74E-01
FE-59	#A	-2.4121E-02	-2.4122E-02	1.293E+02%	3.83E-01
Co-56	#A	4.8794E-02	4.8794E-02	1.132E+02%	1.57E-01
CO-57	#A	1.7569E-02	1.7569E-02	1.274E+02%	8.27E-02
CO-58	#A	-2.3941E-02	-2.3941E-02	1.922E+02%	1.61E-01
CO-60	#A	-3.4154E-03	-3.4154E-03	4.172E+02%	1.99E-01
ZN-65	#A	3.4771E-03	3.4771E-03	3.837E+03%	4.75E-01
NB-94	#A	-1.2447E-02	-1.2447E-02	3.627E+02%	1.59E-01
ZR-95	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.98E-01
NB-95	#A	3.9753E-03	3.9753E-03	1.129E+03%	1.60E-01
RU-103	#A	-1.0069E-02	-1.0069E-02	3.688E+02%	1.31E-01
RH-106	A	-2.5132E-01	-2.5132E-01	1.570E+02%	1.37E+00
AG-108M	#A	2.5112E-02	2.5112E-02	1.397E+02%	1.21E-01

AG-110M#A	2.8255E-03	2.8255E-03	2.420E+03%		2.45E-01
SN-113 #A	0.0000E+00	0.0000E+00	1.000E+03%		1.96E-01
SB-124 #A	2.8936E-02	2.8936E-02	1.535E+02%		1.53E-01
SB-125 A	1.0502E-01	1.0502E-01	8.857E+01%		3.38E-01
I-131 A	7.2990E-02	7.2996E-02	6.914E+01%		1.24E-01
Gd-153 #A	2.3870E-02	2.3870E-02	2.627E+02%		2.37E-01
Ga-68 #A	-1.6052E+00	-1.6295E+00	1.674E+02%		9.58E+00
Tc-99m #A	-2.3056E-03	-2.3121E-03	1.008E+03%		8.10E-02
BA-133 #A	-1.2862E-02	-1.2862E-02	4.003E+02%		1.79E-01
CS-134 #A	4.3800E-02	4.3800E-02	4.328E+01%		1.60E-01
CS-137	5.7253E-01	5.7253E-01	1.538E+01%		1.53E-01
CE-139 #A	-4.9435E-02	-4.9435E-02	6.979E+01%		1.14E-01
Ba-140 #A	2.3962E-01	2.3964E-01	5.808E+01%		4.64E-01
La-140 #A	3.8735E-02	3.8737E-02	6.225E+01%		1.97E-01
CE-141 #A	-1.9225E-02	-1.9225E-02	2.801E+02%		1.83E-01
CE-144 #A	-1.2923E-01	-1.2923E-01	1.616E+02%		7.07E-01
PM-144 #A	2.5751E-02	2.5752E-02	1.255E+02%		1.59E-01
EU-152 #A	2.2367E-02	2.2367E-02	4.034E+02%		4.99E-01
EU-154 #A	3.2151E-02	3.2151E-02	2.206E+02%		1.24E+00
EU-155 #A	9.4352E-02	9.4352E-02	5.013E+01%		3.67E-01
HF-181 #A	2.9351E-02	2.9352E-02	1.277E+02%		1.60E-01
Ta-182 A	1.1496E-01	1.1496E-01	1.190E+02%		5.32E-01
Hg-203 #A	-2.3703E-02	-2.3704E-02	1.473E+02%		1.19E-01
TL-208 #	3.6046E-01	3.6046E-01	2.102E+01%		1.87E-01
pm-146 #A	5.4870E-02	5.4870E-02	1.028E+02%		3.84E-01
y-88 #A	3.3629E-02	3.3629E-02	1.064E+02%		1.67E-01
Cd-109 #A	1.6208E+00	1.6208E+00	3.484E+01%		1.80E+00
Ra-226 #	3.7821E+00	3.7821E+00	3.766E+01%		3.43E+00
PB-210 #	3.0196E+00	3.0196E+00	3.073E+01%		2.53E+00
PB-212	9.6905E-01	9.6905E-01	1.044E+01%		2.88E-01
PB-214	7.5701E-01	7.5701E-01	1.843E+01%		3.56E-01
BI-207 #A	9.6771E-02	9.6771E-02	4.341E+01%		1.33E-01
BI-212 #A	1.4507E+00	1.4507E+00	4.096E+01%		1.86E+00
BI-214	9.1868E-01	9.1868E-01	1.513E+01%		3.36E-01
BI-210M#A	0.0000E+00	0.0000E+00	1.000E+03%		2.54E-01
RA-224 A	1.9565E+00	1.9565E+00	5.067E+01%		3.24E+00
AC-228	1.1105E+00	1.1105E+00	1.953E+01%		5.79E-01
TH-227 A	2.8959E-01	2.8959E-01	7.179E+01%		6.90E-01
TH-229 #A	-7.3960E-01	-7.3960E-01	8.777E+01%		2.17E+00
TH-234 A	9.5782E-01	9.5782E-01	4.325E+01%		2.20E+00
PA-231 A	-3.2518E-02	-3.2518E-02	1.144E+02%		3.99E+00
PA-233 #A	1.5454E-01	1.5454E-01	5.951E+01%		2.57E-01
PA-234 A	3.2388E-01	3.2388E-01	4.328E+01%		4.19E-01
PA-234M#A	3.5546E-01	3.5546E-01	1.441E+03%		2.04E+01
U-235 #A	4.0735E-01	4.0735E-01	5.729E+01%		7.53E-01
AM-241 #A	4.2618E-02	4.2618E-02	1.475E+02%		2.12E-01
Ir-192 #A	8.5838E-02	8.5839E-02	2.969E+01%		1.41E-01
Np-237 #A	3.9960E-01	3.9960E-01	4.659E+01%		6.06E-01

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (1189.0 to 1999.4 keV) 2.862E+01 Bq/Sample
Total Decayed Activity (1189.0 to 1999.4 keV) 2.8616201E+01 Bq/Sample


140177_Gamma_680-102600-A-6-O DU. 12_Gamma_20141902.spc.
Counts
1.0e4
1.0e3
1.0e2
1.0e1
1.0e0
Energy (keV)
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Pb-210
Th-234
Am-241
Ac-228
Th-234
Ce-141
U-235
Ra-226
Th-229
U-235
Pb-212
Pb-214
Tl-208
Ir-192
Ac-228
Pb-214
Ba-133
Sb-125
Rh-106
Ba-140
Cs-134
Tl-208
Bi-214
Cs-137
Pm-144
Nb-94
Mn-54
Ac-228
Ac-228
Pa-234M
Sc-46
Co-56
Fe-59
K-40
Bi-214
Co-56
Th-227
Hg-203
I-131
Ba-133
Ir-192
Cs-134
Sb-125
Zr-95
Co-58
Co-56
Sc-46
Eu-152
Eu-154
Co-56
Ga-68
Eu-152
Ta-182
Ta-182
Na-22
Co-60
Ag-110M
Eu-152
La-140
Co-56
y-88

Test America St. Louis Spectrum ID: 17_Gamma_20141362

Sample Description: 140177_Gamma_680-102600-A-7-H
Detector: Ge17 SN/11080671
Batch ID: 140177
Work Order Number: Gamma
Lot Number: 680-102600-A-7-H

Decay to Time: 8/26/2014 11:27 Live Time: 7200 sec
Acquisition Time: 8/26/2014 11:28:45 Real Time: 7229 sec
Analysis Time: 8/26/2014 13:29 Dead Time: 0.40 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 17_Soil_25ml.Clb
Efficiency Cal Desc: 17_25mlSoil_90099_032712
Efficiency Cal Date: 4/3/2012 07:53
Energy Cal Date: 2/29/2012 10:33
Library: Client_ Long_no ingrowth Rev3.li
Bkgd Correction File: 17_2014-08-09_2126.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	4.969E-01	81.3	4.041E-01	4.050E-01	1.356E+00
NA-22	8.497E-03	594.1	5.048E-02	5.048E-02	1.895E-01
K-40	2.095E+01	7.3	1.532E+00	1.870E+00	2.554E+00
Sc-46	6.360E-02	59.0	3.750E-02	3.765E-02	1.949E-01
CR-51	-2.935E-01	124.7	3.661E-01	3.665E-01	1.248E+00
MN-54	-9.923E-03	608.3	6.036E-02	6.037E-02	2.150E-01
FE-59	6.610E-03	274.7	1.816E-02	1.816E-02	3.532E-01
Co-56	1.409E-02	145.2	2.046E-02	2.047E-02	2.006E-01
CO-57	2.861E-02	116.6	3.337E-02	3.340E-02	1.123E-01
CO-58	0.000E+00	1000.0	1.836E-02	1.836E-02	2.891E-01
CO-60	-8.513E-03	588.7	5.012E-02	5.012E-02	1.892E-01
ZN-65	1.056E-03	14780.0	1.560E-01	1.560E-01	5.594E-01
NB-94	7.486E-03	402.0	3.010E-02	3.010E-02	2.012E-01
ZR-95	-5.237E-03	1645.0	8.614E-02	8.614E-02	3.130E-01
NB-95	9.036E-02	58.6	5.297E-02	5.317E-02	1.730E-01
RU-103	4.960E-02	91.2	4.523E-02	4.530E-02	1.531E-01
RH-106	3.056E-01	235.1	7.184E-01	7.186E-01	1.888E+00
AG-108M	0.000E+00	1000.0	1.599E-02	1.599E-02	1.863E-01
AG-110M	7.072E-02	66.4	4.692E-02	4.706E-02	2.614E-01
SN-113	2.159E-02	288.8	6.236E-02	6.237E-02	2.174E-01
SB-124	1.867E-02	346.0	6.458E-02	6.459E-02	2.243E-01
SB-125	4.372E-01	32.3	1.414E-01	1.431E-01	4.182E-01
I-131	1.606E-02	106.7	1.713E-02	1.715E-02	1.664E-01
Gd-153	-1.971E-01	57.0	1.124E-01	1.130E-01	3.691E-01
Ga-68	2.393E+00	124.7	2.985E+00	2.988E+00	1.043E+01
Tc-99m	1.616E-02	232.7	3.761E-02	3.762E-02	1.282E-01
BA-133	3.787E-02	159.7	6.050E-02	6.053E-02	2.082E-01
CS-134	8.190E-02	75.0	6.139E-02	6.154E-02	2.152E-01
CS-137	-3.353E-02	189.1	6.340E-02	6.342E-02	2.206E-01
CE-139	2.218E-02	174.1	3.862E-02	3.868E-02	1.313E-01
Ba-140	2.274E-01	87.9	1.999E-01	2.002E-01	5.927E-01
La-140	8.884E-02	46.6	4.138E-02	4.165E-02	2.649E-01
CE-141	8.796E-03	881.2	7.750E-02	7.750E-02	2.644E-01
CE-144	-1.260E-01	229.2	2.887E-01	2.888E-01	9.810E-01
PM-144	-1.623E-03	172.9	2.806E-03	2.807E-03	2.078E-01
EU-152	1.015E-01	110.5	1.121E-01	1.122E-01	5.413E-01
EU-154	4.680E-02	357.8	1.675E-01	1.675E-01	1.634E+00
EU-155	1.842E-01	78.0	1.437E-01	1.441E-01	4.776E-01
HF-181	3.205E-02	63.3	2.030E-02	2.036E-02	1.699E-01

Ta-182	3.497E-02	378.0	1.322E-01	1.322E-01	7.924E-01
Hg-203	1.754E-02	229.0	4.017E-02	4.018E-02	1.390E-01
TL-208	5.397E-01	15.4	8.324E-02	8.782E-02	1.888E-01
pm-146	1.265E-01	115.2	1.457E-01	1.458E-01	5.020E-01
y-88	-5.152E-02	135.6	6.987E-02	6.992E-02	2.413E-01
Cd-109	1.887E+00	42.2	7.969E-01	8.038E-01	2.574E+00
Ra-226	8.578E+00	16.8	1.437E+00	1.620E+00	3.289E+00
PB-210	1.513E+00	71.4	1.081E+00	1.085E+00	3.385E+00
PB-212	1.582E+00	8.1	1.277E-01	1.637E-01	3.270E-01
PB-214	1.336E+00	12.3	1.639E-01	1.780E-01	3.874E-01
BI-207	3.632E-02	122.2	4.438E-02	4.442E-02	1.379E-01
BI-212	9.078E-01	78.1	7.092E-01	7.108E-01	2.378E+00
BI-214	1.189E+00	14.0	1.665E-01	1.776E-01	3.802E-01
BI-210M	8.321E-02	80.2	6.670E-02	6.688E-02	2.472E-01
RA-224	2.965E+00	32.6	9.673E-01	9.858E-01	3.032E+00
AC-228	2.034E+00	12.3	2.497E-01	2.704E-01	6.504E-01
TH-227	2.009E-01	88.3	1.774E-01	1.779E-01	2.752E+00
TH-229	1.244E+00	65.0	8.084E-01	8.145E-01	2.669E+00
TH-234	1.585E+00	70.2	1.113E+00	1.116E+00	3.419E+00
PA-231	7.835E-01	45.2	3.541E-01	3.567E-01	5.505E+00
PA-233	2.108E-01	44.3	9.347E-02	9.416E-02	3.591E-01
PA-234	7.639E-02	195.6	1.494E-01	1.495E-01	5.641E-01
PA-234M	-5.084E+00	92.7	4.714E+00	4.721E+00	3.189E+01
U-235	1.703E-01	171.8	2.924E-01	2.926E-01	1.072E+00
AM-241	1.689E-01	53.5	9.040E-02	9.082E-02	2.959E-01
Ir-192	1.700E-01	17.7	3.009E-02	3.173E-02	1.391E-01
Np-237	3.701E-01	57.7	2.136E-01	2.146E-01	7.013E-01
Total	5.364E+01				

Analyst: Elizabeth Newns

TestAmerica, Inc. Spectrum name: 17_Gamma_20141362.An1

Sample description
140177_Gamma_680-102600-A-7-H

Spectrum Filename: C:\User\SPC\Det17\17_Gamma_20141362.An1

Acquisition information
Start time: 8/26/2014 11:28:45 AM
Live time: 7200
Real time: 7229
Dead time: 0.40 %
Detector ID: 17

Detector system
Ge17 SN/11080671

Calibration
Filename: 17_Soil_25ml.Clb
17_25mlSoil_90099_032712

Energy Calibration
Created: 2/29/2012 10:33:23 AM
Zero offset: 0.108 keV
Gain: 0.250 keV/channel
Quadratic: -2.584E-08 keV/channel^2

Efficiency Calibration
Created: 4/3/2012 7:53:15 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.37 %
Log(Eff): 1.993817E-01 + (-3.634387E-01*Log(E)) +
(-3.575305E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.22 %
Log(Eff): -1.059921E+01 + (3.730142E+00*Log(E)) +
(-4.231490E-01*Log(E)^2)

Library Files
Main analysis library: Client_ Long_no ingrowth Rev3.li
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.63keV)
Stop channel: 8000 (1999.54keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/26/2014 11:27:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	17_2014-08-09_2126.PBC 8/9/2014 9:26:48 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 39 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.2006

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.77	179.	14.95	0.88	8.106E-02	46.54	4.250	PBC<MDA	PB210
50.71	22.	88.30	0.78	8.362E-02	50.14	8.000	PBC<MDA	TH227
59.71	39.	53.52	0.79	8.872E-02	59.54	35.900	PBC<MDA	AM241
63.52	158.	17.34	0.69	9.013E-02	63.29	3.810	PBC<MDA	TH234
74.88	171.	13.48	0.80	9.235E-02				
77.22	261.	9.24	0.80	9.253E-02				
81.33	10.	228.05	0.81	9.266E-02	80.99	34.060	PBC<MDA	BA133
86.49	32.	57.70	0.81	9.256E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	1.579E-01	EU155
					86.54	30.700	1.579E-01	EU155
88.04	48.	42.22	0.81	9.248E-02	88.04	3.790	PBC<MDA	Cd109
92.72	221.	12.44	0.96	9.209E-02	92.59	5.584	PBC<MDA	TH234
93.33	44.	56.70	0.82	9.202E-02	93.35	5.561	PBC<MDA	AC228
105.44	25.	78.02	0.83	9.026E-02	105.31	21.200	PBC<MDA	EU155
					105.31	21.200	1.842E-01	EU155
121.35	15.	116.62	0.85	8.669E-02	122.06	85.600	PBC<MDA	CO57
121.77	12.	159.23	0.85	8.676E-02				
132.83	14.	126.50	0.86	8.396E-02	133.02	43.300	PBC<MDA	HF181
134.92	23.	63.33	0.86	8.311E-02				
139.60	8.	232.73	0.86	8.200E-02	140.51	89.300	PBC<MDA	Tc99m
143.70	7.	60.11	0.87	8.113E-02	143.79	10.960	PBC<MDA	U235
					143.79	10.960	PBC<MDA	U235
145.44	2.	881.16	0.87	8.068E-02	145.44	48.200	PBC<MDA	CE141
163.25	5.	375.58	0.88	7.583E-02	162.66	6.220	PBC<MDA	Ba140
					163.38	5.080	1.702E-01	U235
					162.66	6.220	1.386E-01	Ba140
					163.38	5.080	1.702E-01	U235
165.65	10.	174.11	0.89	7.486E-02	165.85	79.900	PBC<MDA	CE139
185.60	143.	16.33	1.00	6.893E-02	185.99	3.280	8.578E+00	Ra226
193.61	26.	64.97	0.91	6.684E-02	193.51	4.400	PBC<MDA	TH229

193.51 4.400 1.244E+00 TH229

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
205.18	7.	107.47	0.92	6.396E-02	205.33	5.010	PBC<MDA	U235
					205.33	5.010	PBC<MDA	U235
238.48	330.	6.76	0.95	5.718E-02	238.63	43.300	1.582E+00	PB212
240.84	50.	32.62	0.96	5.673E-02	240.99	4.100	PBC<MDA	RA224
241.57	52.	32.29	0.96	5.662E-02	242.00	7.430	PBC<MDA	PB214
256.29	5.	276.00	0.97	5.415E-02	256.24	7.000	PBC<MDA	TH227
266.30	12.	116.46	0.98	5.265E-02	265.83	50.000	PBC<MDA	BI210M
277.28	27.	38.76	0.69	5.098E-02				
279.13	5.	228.99	0.99	5.072E-02	279.20	81.460	PBC<MDA	Hg203
284.48	2.	562.99	1.00	5.002E-02	284.30	6.140	PBC<MDA	I131
295.28	104.	18.61	1.17	4.858E-02	295.09	19.300	1.177E+00	PB214
					295.95	30.160	9.892E-01	Ir192
					295.95	30.160	9.892E-01	Ir192
300.02	31.	44.33	1.01	4.797E-02	300.03	3.280	2.712E+00	PB212
					300.07	2.460	3.616E+00	PA231
					300.18	6.200	1.435E+00	PA233
300.02	30.	45.20	1.01	4.798E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	3.565E+00	PA231
					300.18	6.200	1.415E+00	PA233
300.22	44.	33.70	1.02	4.799E-02	300.03	3.280	3.912E+00	PB212
					300.07	2.460	5.217E+00	PA231
					300.18	6.200	2.070E+00	PA233
304.23	11.	110.18	1.02	4.739E-02	304.85	4.290	7.825E-01	Ba140
					304.90	28.000	1.199E-01	BI210M
					304.85	4.290	7.825E-01	Ba140
304.26	11.	122.59	1.02	4.740E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	1.140E-01	BI210M
316.52	6.	194.38	1.03	4.605E-02	316.49	87.040	PBC<MDA	Ir192
					316.49	87.040	2.071E-02	Ir192
328.28	26.	46.58	1.04	4.471E-02	328.76	20.300	PBC<MDA	La140
					328.76	20.300	4.045E-01	La140
338.44	87.	23.45	0.85	4.371E-02	338.32	12.010	2.310E+00	AC228
345.13	5.	251.36	1.05	4.313E-02	344.29	26.500	PBC<MDA	EU152
351.79	196.	10.17	1.39	4.241E-02	351.93	37.600	1.418E+00	PB214
356.29	7.	159.74	1.06	4.201E-02	356.00	62.050	PBC<MDA	BA133
391.86	4.	288.79	1.09	3.897E-02	391.69	64.000	PBC<MDA	SN113
427.93	10.	92.16	1.13	3.633E-02	427.88	29.600	PBC<MDA	SB125
					427.88	29.600	1.340E-01	SB125
463.00	36.	32.34	1.16	3.409E-02	463.37	10.470	1.398E+00	SB125
					463.37	10.470	1.398E+00	SB125
470.22	3.	221.77	1.16	3.381E-02	468.06	51.750	PBC<MDA	Ir192
					468.06	51.750	2.760E-02	Ir192
476.54	13.	81.33	1.17	3.327E-02	477.60	10.520	PBC<MDA	BE7
478.70	5.	212.15	1.17	3.331E-02				
486.65	2.	624.34	1.18	3.275E-02	487.02	45.500	PBC<MDA	La140
					487.02	45.500	1.402E-02	La140
496.58	10.	91.19	1.19	3.222E-02	497.05	90.900	PBC<MDA	RU103
					497.05	90.900	4.960E-02	RU103
510.44	110.	17.77	1.20	3.146E-02	511.86	20.000	2.430E+00	RH106
					511.86	20.000	2.430E+00	RH106
536.75	7.	126.05	1.22	3.025E-02	537.26	24.390	PBC<MDA	Ba140
					537.26	24.390	1.365E-01	Ba140
569.52	2.	358.75	1.25	2.885E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.310E-01	PA234
					569.32	15.380	6.983E-02	CS134
570.05	2.	449.71	1.25	2.885E-02	569.32	15.380	PBC<MDA	CS134
					569.47	8.200	1.026E-01	PA234
571.22	3.	265.01	1.25	2.884E-02	569.70	97.740	PBC<MDA	BI207
583.23	108.	13.24	1.00	2.829E-02	583.02	84.500	5.409E-01	TL208

602.47	4.	346.00	1.28	2.754E-02	602.73	98.260	PBC<MDA	SB124
604.75	17.	74.96	1.28	2.746E-02	604.71	97.620	PBC<MDA	CS134
					604.71	97.620	8.619E-02	CS134
609.39	133.	11.34	1.09	2.729E-02	609.31	46.090	1.189E+00	BI214
					610.30	5.750	1.179E+01	RU103
					610.30	5.750	1.179E+01	RU103

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
621.78	4.	235.11	1.30	2.684E-02	621.92	9.930	PBC<MDA	RH106
					621.92	9.930	2.302E-01	RH106
636.81	8.	106.69	1.31	2.631E-02	635.89	11.310	PBC<MDA	SB125
					636.97	7.170	6.212E-01	I131
					635.89	11.310	3.918E-01	SB125
636.96	7.	122.72	1.31	2.635E-02	635.89	11.310	PBC<MDA	SB125
					636.97	7.170	5.412E-01	I131
657.09	6.	135.12	1.33	2.562E-02	657.76	94.640	PBC<MDA	AG110M
					657.76	94.640	3.615E-02	AG110M
727.77	12.	78.13	1.39	2.357E-02	727.17	7.550	PBC<MDA	BI212
748.22	7.	115.16	1.41	2.304E-02	747.16	34.000	PBC<MDA	pm146
764.71	15.	58.62	1.42	2.257E-02	763.94	22.280	4.039E-01	AG110M
					765.79	99.790	9.036E-02	NB95
					766.41	0.294	PBC<MDA	PA234M
764.80	14.	66.35	1.42	2.262E-02	763.94	22.280	PBC<MDA	AG110M
					765.79	99.790	8.450E-02	NB95
					766.41	0.294	PBC<MDA	PA234M
					763.94	22.280	3.777E-01	AG110M
764.85	9.	65.56	1.42	2.256E-02	763.94	22.280	PBC<MDA	AG110M
					765.79	99.790	PBC<MDA	NB95
					766.41	0.294	PBC<MDA	PA234M
780.61	5.	145.90	1.43	2.225E-02	778.92	12.940	PBC<MDA	EU152
815.09	5.	186.29	1.47	2.141E-02	815.77	23.280	PBC<MDA	La140
					815.77	23.280	1.323E-01	La140
860.77	10.	78.36	1.50	2.046E-02	860.56	12.420	PBC<MDA	TL208
870.49	2.	402.03	1.51	2.025E-02	871.10	99.890	PBC<MDA	NB94
872.64	2.	412.38	1.51	2.021E-02	873.23	12.270	PBC<MDA	EU154
					873.23	12.270	1.107E-01	EU154
880.74	5.	103.44	1.52	2.007E-02	880.53	6.000	PBC<MDA	PA234
883.45	3.	195.61	1.52	2.001E-02	883.24	9.600	PBC<MDA	PA234
					884.68	72.680	2.891E-02	AG110M
884.85	2.	349.63	1.52	1.999E-02	884.68	72.680	PBC<MDA	AG110M
911.24	70.	20.64	0.43	1.949E-02	911.16	29.000	1.720E+00	AC228
968.94	55.	19.50	1.31	1.850E-02	968.97	17.460	2.365E+00	AC228
1000.79	-15.	114.24	1.62	1.799E-02	1001.00	0.837	PBC<MDA	PA234M
1053.29	2.	414.97	1.66	1.726E-02	1050.36	1.560	PBC<MDA	RH106
					1050.36	1.560	7.854E-01	RH106
1064.72	6.	122.20	1.67	1.707E-02	1063.66	74.500	PBC<MDA	BI207
1079.44	5.	124.75	1.68	1.689E-02	1077.40	3.300	PBC<MDA	Ga68
1120.15	-1.	53.69	1.72	1.633E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
					1121.30	34.900	PBC<MDA	Ta182
1120.16	15.	58.97	1.72	1.632E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	1.288E-01	Sc46
					1121.30	34.900	3.692E-01	Ta182
1186.59	2.	378.04	1.77	1.550E-02	1189.05	16.200	PBC<MDA	Ta182
1238.59	5.	154.42	1.81	1.496E-02	1238.28	66.070	PBC<MDA	Co56
					1238.28	66.070	7.029E-02	Co56
1272.83	1.	584.91	1.84	1.459E-02	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	2.451E-02	EU154
					1274.54	35.190	2.451E-02	EU154
1272.84	1.	594.05	1.84	1.459E-02	1274.53	99.940	PBC<MDA	NA22
					1274.54	35.190	2.413E-02	EU154
1291.00	2.	303.20	1.85	1.442E-02	1291.60	43.200	PBC<MDA	FE59
1386.04	2.	369.13	1.93	1.357E-02	1384.30	24.290	PBC<MDA	AG110M
					1384.30	24.290	7.306E-02	AG110M
1410.29	4.	146.98	1.94	1.337E-02	1408.00	21.005	PBC<MDA	EU152
1460.87	208.	6.57	1.55	1.294E-02	1460.83	10.670	2.095E+01	K40
1597.67	4.	158.95	2.09	1.196E-02	1596.21	95.400	PBC<MDA	La140

1596.21 95.400 4.674E-02 La140

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
1764.90	0.	42.80	2.21	1.094E-02	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
299.19	74.94	214.	155.	1.678E+03	18.21	0.819	-	
308.55	77.28	160.	257.	2.778E+03	10.56	0.753	-	s
1107.95	277.28	44.	30.	5.905E+02	36.02	0.990	-	D

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_ Long_no ingrowth Rev3.li

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV	
PB-210	186.56	46.77	303.	37.	0.005	14.95	0.876	
TH-227	202.32	50.71	170.	22.	0.003	88.30	0.778	s
AM-241	238.29	59.71	195.	39.	0.005	53.52	0.787	
TH-234	253.52	63.52	308.	39.	0.005	17.34	0.687	
BA-133	324.72	81.33	239.	10.	0.001	228.05	0.807	s
Np-237	345.35	86.49	158.	32.	0.004	57.70	0.813	D
EU-155	345.56	86.54	276.	-5.	-0.001	511.40	0.813	s
Cd-109	351.55	88.04	178.	48.	0.007	42.22	0.814	D
TH-234	369.74	92.59	352.	15.	0.002	14.07	0.818	D
AC-228	372.78	93.35	296.	44.	0.006	56.70	0.819	D
Gd-153	390.05	97.67	227.	-39.	-0.005	57.02	0.823	s
EU-155	421.11	105.44	183.	25.	0.004	78.02	0.830	s
EU-152	486.41	121.77	191.	12.	0.002	159.23	0.846	s
CO-57	484.72	121.35	151.	15.	0.002	116.62	0.846	s
EU-154	491.40	123.02	207.	-13.	-0.002	164.95	0.847	s
PA-234	519.71	130.10	160.	-3.	0.000	676.11	0.855	
HF-181	530.62	132.83	153.	14.	0.002	126.50	0.856	s
CE-144	534.40	133.77	182.	-8.	-0.001	229.20	0.857	s
HF-181	538.98	134.92	93.	23.	0.003	63.33	0.859	s
CO-57	535.10	133.95	77.	-3.	0.000	444.81	0.860	s
Tc-99m	557.70	139.60	152.	8.	0.001	232.73	0.863	s
U-235	574.10	143.70	200.	7.	0.001	60.11	0.866	s
CE-141	581.05	145.44	234.	2.	0.000	881.16	0.868	s
U-235	652.28	163.25	155.	5.	0.001	375.58	0.885	s
CE-139	661.86	165.65	134.	10.	0.001	174.11	0.887	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
Ra-226	741.64	185.60	119.	139.	0.019	16.33	0.998s
TH-229	773.66	193.61	133.	26.	0.004	64.97	0.913s
U-235	819.92	205.18	117.	7.	0.001	107.47	0.924s
TH-229	840.97	210.44	130.	-5.	-0.001	313.79	0.929s
PB-212	953.67	238.63	142.	282.	0.039	6.90	0.954D
RA-224	963.09	240.99	106.	50.	0.007	32.62	0.956D
PB-214	967.13	242.00	131.	22.	0.003	47.93	0.957D
EU-152	973.42	243.57	139.	-18.	-0.003	94.92	0.960s
TH-227	1024.28	256.29	89.	5.	0.001	276.00	0.971s
BI-210M	1064.30	266.30	90.	12.	0.002	116.46	0.979s
TL-208	1108.23	277.28	60.	-14.	-0.002	110.10	0.990D
Hg-203	1115.89	279.20	69.	5.	0.001	228.99	0.992D
I-131	1136.99	284.48	95.	2.	0.000	562.99	0.996s
PB-214	1180.19	295.28	96.	80.	0.011	18.61	1.167
Ir-192	1179.77	295.18	80.	89.	0.012	17.70	1.007s
PB-212	1199.93	300.22	54.	44.	0.006	33.70	1.018s
PA-231	1199.16	300.02	79.	30.	0.004	45.20	1.011s
PA-233	1199.15	300.02	77.	31.	0.004	44.33	1.011s
PA-231	1207.73	302.17	123.	-16.	-0.002	102.85	1.013s
BA-133	1207.73	302.17	123.	-16.	-0.002	102.84	1.013s
Ba-140	1216.11	304.26	84.	11.	0.002	122.59	1.015s
BI-210M	1215.99	304.23	74.	11.	0.002	110.18	1.015s
Ir-192	1265.13	316.52	64.	6.	0.001	194.38	1.026s
CR-51	1280.00	320.24	67.	-10.	-0.001	124.74	1.029
La-140	1312.16	328.28	63.	26.	0.004	46.58	1.037s
AC-228	1352.79	338.44	77.	87.	0.012	23.45	0.853
EU-152	1379.54	345.13	81.	5.	0.001	251.36	1.051s
HF-181	1382.17	345.79	80.	-6.	-0.001	231.23	1.053s
PB-214	1406.16	351.79	80.	163.	0.023	10.17	1.390s
BA-133	1424.17	356.29	61.	7.	0.001	159.74	1.062s
I-131	1454.12	363.78	65.	-11.	-0.001	110.69	1.070s
SN-113	1566.41	391.86	61.	4.	0.001	288.79	1.094s
SB-125	1710.68	427.93	41.	10.	0.001	92.16	1.127
pm-146	1800.45	450.38	30.	-3.	0.000	230.82	1.150s
SB-125	1850.94	463.00	49.	36.	0.005	32.34	1.159s
Ir-192	1879.81	470.22	28.	3.	0.000	221.77	1.163s
PM-144	1913.69	478.70	46.	5.	0.001	212.15	1.170
BE-7	1905.06	476.54	46.	13.	0.002	81.33	1.171s
HF-181	1921.21	480.58	41.	-5.	-0.001	195.06	1.175s
La-140	1945.51	486.65	43.	2.	0.000	624.34	1.180s
RU-103	1985.21	496.58	40.	10.	0.001	91.19	1.189s
RH-106	2040.65	510.44	136.	110.	0.015	17.77	1.202s
Ba-140	2145.88	536.75	38.	7.	0.001	126.05	1.224s
CS-134	2279.08	570.05	30.	2.	0.000	449.71	1.252s
PA-234	2276.97	569.52	31.	2.	0.000	358.75	1.253
BI-207	2283.74	571.22	29.	3.	0.000	265.01	1.253s
TL-208	2331.78	583.23	41.	93.	0.013	13.24	0.995
SB-125	2397.63	599.69	78.	-10.	-0.001	126.48	1.280s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
SB-124	2408.75	602.47	77.	4.	0.001	346.00	1.282s
CS-134	2417.87	604.75	69.	17.	0.002	74.96	1.283s
BI-214	2436.43	609.39	46.	108.	0.015	11.34	1.086s
RU-103	2436.08	609.30	37.	109.	0.015	12.42	1.288s
RH-106	2485.99	621.78	52.	4.	0.001	235.11	1.299s
SB-125	2546.69	636.96	37.	7.	0.001	122.72	1.311s
I-131	2546.10	636.81	36.	8.	0.001	106.69	1.312s
AG-110M	2627.23	657.09	33.	6.	0.001	135.12	1.330s
CS-137	2651.49	663.16	47.	-5.	-0.001	189.07	1.333s
PM-144	2786.22	696.84	52.	-4.	-0.001	273.11	1.363s
SB-124	2890.30	722.86	40.	-3.	0.000	266.26	1.386s
AG-108M	2888.35	722.37	43.	-5.	-0.001	206.91	1.386s
EU-154	2898.92	725.01	42.	-4.	-0.001	222.14	1.386s
ZR-95	2897.96	724.77	39.	-1.	0.000	964.44	1.387s
BI-212	2909.94	727.77	35.	12.	0.002	78.13	1.390s
pm-146	2940.83	735.49	40.	-4.	-0.001	245.97	1.397s
pm-146	2991.75	748.22	30.	7.	0.001	115.16	1.407s
AG-110M	3058.07	764.80	34.	14.	0.002	66.35	1.421s
NB-95	3057.71	764.71	30.	15.	0.002	58.62	1.423s
PA-234M	3058.27	764.85	34.	9.	0.001	65.56	1.423s
EU-152	3121.30	780.61	26.	5.	0.001	145.90	1.434s
BI-212	3138.61	784.93	34.	-4.	-0.001	219.06	1.439s
La-140	3259.27	815.09	37.	5.	0.001	186.29	1.465s
MN-54	3337.64	834.68	41.	-1.	0.000	608.32	1.481s
Co-56	3385.42	846.62	34.	-3.	0.000	246.05	1.491s
TL-208	3442.02	860.77	24.	10.	0.001	78.36	1.503s
NB-94	3480.90	870.49	29.	2.	0.000	402.03	1.512s
EU-154	3489.49	872.64	32.	2.	0.000	412.38	1.514s
PA-234	3521.06	880.53	12.	5.	0.001	103.44	1.520D
PA-234	3531.90	883.24	16.	3.	0.000	195.61	1.522D
AG-110M	3538.36	884.85	28.	2.	0.000	349.63	1.523s
y-88	3594.89	898.98	40.	-7.	-0.001	135.63	1.534s
AC-228	3643.94	911.24	26.	70.	0.010	20.64	0.433s
AC-228	3874.76	968.94	12.	55.	0.008	19.50	1.313s
PA-234M	4002.22	1000.79	47.	-15.	-0.002	114.24	1.620s
Co-56	4151.31	1038.05	28.	-3.	0.000	259.39	1.650s
RH-106	4212.29	1053.29	19.	2.	0.000	414.97	1.660s
BI-207	4258.00	1064.72	23.	6.	0.001	122.20	1.671s
Ga-68	4316.90	1079.44	20.	5.	0.001	124.75	1.682s
FE-59	4383.78	1096.15	21.	-1.	0.000	458.21	1.700s
EU-152	4451.32	1113.03	32.	-1.	0.000	679.83	1.711s
BI-214	4479.83	1120.15	47.	-1.	0.000	53.69	1.717s
Sc-46	4479.86	1120.16	32.	15.	0.002	58.97	1.717s
Ta-182	4745.67	1186.59	20.	2.	0.000	378.04	1.772s
Ta-182	4885.55	1221.54	27.	-2.	0.000	373.76	1.798s
Co-56	4953.76	1238.59	27.	5.	0.001	154.42	1.812s
NA-22	5090.84	1272.84	14.	1.	0.000	594.05	1.840s
EU-154	5090.82	1272.83	14.	1.	0.000	584.91	1.840s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
FE-59	5163.51	1291.00	16.	2.	0.000	303.20	1.854s
CO-60	5320.06	1330.11	12.	-1.	0.000	588.72	1.886s
AG-110M	5543.89	1386.04	20.	2.	0.000	369.13	1.926s
EU-152	5640.95	1410.29	13.	4.	0.001	146.98	1.944s
K-40	5843.42	1460.87	24.	208.	0.029	6.57	1.549
La-140	6391.00	1597.67	17.	4.	0.001	158.95	2.087s
Co-56	7085.41	1771.13	23.	-4.	-0.001	168.52	2.215s
y-88	7344.62	1835.87	18.	-3.	0.000	219.45	2.262s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	Peak MDA Value Bq/Sample		COMMENTS
BE-7	C	4.9693E-01				5.31E+01		
			477.60	4.969E-01	&(	1.356E+00	8.13E+01	1.05E+01 G
NA-22	C	8.4973E-03				9.50E+02		
			1274.53	8.497E-03	?(	1.895E-01	5.94E+02	9.99E+01 G
K-40	N	2.0951E+01				4.66E+11		
			1460.83	2.095E+01	(P	2.554E+00	6.57E+00	1.07E+01 G
Sc-46	F	6.3598E-02				8.38E+01		
			889.28	-1.603E-03	%(	1.949E-01	3.34E+03	1.00E+02 G
			1120.55	1.288E-01	?(	2.483E-01	5.90E+01	1.00E+02 G
CR-51	F	-2.9353E-01				2.77E+01		
			320.08	-2.935E-01	(	1.248E+00	1.25E+02	9.94E+00 G
MN-54	C	-9.9233E-03				3.12E+02		
			834.85	-9.923E-03	?(	2.150E-01	6.08E+02	1.00E+02 G
FE-59	F	6.6095E-03				4.45E+01		
			1099.25	-2.109E-02	?(	3.532E-01	4.58E+02	5.65E+01 G
			1291.60	4.283E-02	?(	4.761E-01	3.03E+02	4.32E+01 G
Co-56	C	1.4087E-02				7.73E+01		
			846.77	-2.307E-02	?(	2.006E-01	2.46E+02	9.99E+01 G
			1238.28	7.029E-02	?(	3.804E-01	1.54E+02	6.61E+01 G
			1037.84	-1.671E-01	+	1.545E+00	2.59E+02	1.41E+01 G
			1771.35	-3.470E-01	+	2.068E+00	1.69E+02	1.55E+01 A

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CO-57	C 2.8613E-02					2.72E+02	
		122.06	2.861E-02	*(	1.123E-01	1.17E+02	8.56E+01 G
		136.47	-4.402E-02	&	6.818E-01	4.45E+02	1.07E+01 G
CO-60	F -8.5130E-03					1.93E+03	
		1332.50	-8.513E-03	?(	1.892E-01	5.89E+02	1.00E+02 G
		1173.24	2.015E-03	%	2.285E-01	3.09E+03	9.99E+01 G
ZN-65	F 1.0555E-03					2.44E+02	
		1115.55	1.056E-03	%(	5.594E-01	1.48E+04	5.06E+01 G
NB-94	I 7.4859E-03					7.41E+06	
		702.63	1.539E-03	%(	2.012E-01	3.66E+03	9.79E+01 G
		871.10	1.331E-02	&(	1.921E-01	4.02E+02	9.99E+01 G
ZR-95	I -5.2369E-03					6.40E+01	
		756.73	-5.237E-03	%(	3.130E-01	1.64E+03	5.45E+01 G
		724.20	-1.225E-02	+	4.231E-01	9.64E+02	4.42E+01 G
NB-95	I 9.0362E-02					6.40E+01	
		765.79	9.036E-02	&(	1.730E-01	5.86E+01	9.98E+01 G
RU-103	I 4.9604E-02					3.93E+01	
		497.05	4.960E-02	?(	1.531E-01	9.12E+01	9.09E+01 G
		610.30	9.649E+00	?	2.751E+00	1.24E+01	5.75E+00 GA
RH-106	I 3.0555E-01					3.74E+02	
		621.92	2.302E-01	?(	1.888E+00	2.35E+02	9.93E+00 G
		1050.36	7.854E-01	?(	1.193E+01	4.15E+02	1.56E+00 G
		511.86	2.430E+00	?	1.261E+00	1.78E+01	2.00E+01 GA
AG-110M	F 7.0717E-02					2.50E+02	
		884.68	2.083E-02	?(	2.614E-01	3.50E+02	7.27E+01 G
		657.76	3.615E-02	?(	1.693E-01	1.35E+02	9.46E+01 G
		937.49	-2.384E-03	&	6.051E-01	6.98E+03	3.44E+01 G
		1384.30	7.306E-02	?(	9.839E-01	3.69E+02	2.43E+01 G
		763.94	3.777E-01	?(	8.290E-01	6.64E+01	2.23E+01 G
SN-113	F 2.1592E-02					1.15E+02	
		391.69	2.159E-02	?(	2.174E-01	2.89E+02	6.40E+01 G
SB-124	F 1.8665E-02					6.02E+01	
		602.73	1.867E-02	?(	2.243E-01	3.46E+02	9.83E+01 G
		1690.98	0.000E+00	-	6.023E-01	1.00E+03	4.78E+01 G
		722.79	-1.860E-01	+	1.745E+00	2.66E+02	1.08E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
SB-125	I	4.3720E-01					1.01E+03	
			427.88	1.340E-01	?(	4.182E-01	9.22E+01	2.96E+01 G
			600.50	-2.871E-01	+	1.236E+00	1.26E+02	1.79E+01 G
			635.89	3.413E-01	&(	1.442E+00	1.23E+02	1.13E+01 G
			463.37	1.398E+00	*(	1.381E+00	3.23E+01	1.05E+01 G
I-131	I	1.6059E-02					8.02E+00	
			364.48	-4.426E-02	?(	1.664E-01	1.11E+02	8.17E+01 G
			284.30	1.120E-01	?(	2.188E+00	5.63E+02	6.14E+00 G
			636.97	6.212E-01	(	2.267E+00	1.07E+02	7.17E+00 G
Gd-153	F	-1.9708E-01					2.42E+02	
			97.50	-1.971E-01	?(	3.691E-01	5.70E+01	3.00E+01 G
			103.20	-4.558E-03	%	5.031E-01	3.22E+03	2.18E+01 G
Ga-68	C	2.3925E+00					4.71E-02	
			1077.40	2.392E+00	?(	1.043E+01	1.25E+02	3.30E+00 G
Tc-99m	I	1.6160E-02					2.51E-01	
			140.51	1.616E-02	?(	1.282E-01	2.33E+02	8.93E+01 G
BA-133	F	3.7871E-02					3.85E+03	
			356.00	3.787E-02	&(	2.082E-01	1.60E+02	6.20E+01 G
			302.85	-2.503E-01	+	8.654E-01	1.03E+02	1.83E+01 G
			383.84	-3.044E-02	&	1.391E+00	1.29E+03	8.94E+00 GA
			80.99	4.265E-02	?	3.292E-01	2.28E+02	3.41E+01 GA
CS-134	I	8.1898E-02					7.54E+02	
			604.71	8.619E-02	*(	2.152E-01	7.50E+01	9.76E+01 G
			795.87	-3.715E-03	%	2.429E-01	1.83E+03	8.55E+01 G
			569.32	5.468E-02	?(	8.835E-01	4.50E+02	1.54E+01 G
			801.95	3.127E-02	&	2.294E+00	2.04E+03	8.69E+00 G
			563.24	1.180E-02	%	1.939E+00	4.59E+03	8.35E+00 G
CS-137	I	-3.3532E-02					1.10E+04	
			661.66	-3.353E-02	(	2.206E-01	1.89E+02	8.52E+01 G
CE-139	F	2.2181E-02					1.38E+02	
			165.85	2.218E-02	&(	1.313E-01	1.74E+02	7.99E+01 G
Ba-140	I	2.2735E-01					1.28E+01	
			537.26	1.365E-01	?(	5.927E-01	1.26E+02	2.44E+01 G
			162.66	5.064E-02	&	1.794E+00	1.03E+03	6.22E+00 G
			304.85	7.440E-01	&(	3.097E+00	1.23E+02	4.29E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
La-140	I	8.8843E-02					1.28E+01	
			1596.21	4.674E-02	?(	2.649E-01	1.59E+02	9.54E+01 G
			487.02	1.402E-02	?(	3.112E-01	6.24E+02	4.55E+01 G
			328.76	4.045E-01	&(	6.056E-01	4.66E+01	2.03E+01 G
			815.77	1.323E-01	(	8.628E-01	1.86E+02	2.33E+01 G
CE-141	I	8.7955E-03					3.25E+01	
			145.44	8.795E-03	&(	2.644E-01	8.81E+02	4.82E+01 G
CE-144	I	-1.2596E-01					2.85E+02	
			133.54	-1.260E-01	&(	9.810E-01	2.29E+02	1.11E+01 G
PM-144	C	-1.6228E-03					3.63E+02	
			696.54	-2.175E-02	?(	2.078E-01	2.73E+02	9.90E+01 G
			618.06	1.569E-03	%	1.809E-01	3.23E+03	9.91E+01 G
			476.81	4.582E-02	(	3.394E-01	2.12E+02	4.20E+01 G
EU-152	F	1.0146E-01					4.94E+03	
			344.29	6.234E-02	&(	5.413E-01	2.51E+02	2.65E+01 G
			1112.07	-7.302E-02	+	1.789E+00	6.80E+02	1.36E+01 G
			121.78	6.993E-02	*(	3.763E-01	1.59E+02	2.86E+01 G
			778.92	2.512E-01	?(	1.283E+00	1.46E+02	1.29E+01 G
			964.11	-2.395E-02	%	1.929E+00	2.27E+03	1.46E+01 G
			244.69	-5.924E-01	+	1.884E+00	9.49E+01	7.58E+00 G
			1408.00	1.811E-01	?	9.537E-01	1.47E+02	2.10E+01 GA
EU-154	I	4.6802E-02					3.14E+03	
			873.23	1.107E-01	?(	1.634E+00	4.12E+02	1.23E+01 G
			123.10	-4.934E-02	+	2.749E-01	1.65E+02	4.08E+01 G
			1274.54	2.451E-02	?(	5.380E-01	5.85E+02	3.52E+01 G
			723.36	-1.222E-01	+	9.511E-01	2.22E+02	2.02E+01 G
			1004.77	-1.121E-03	%	1.189E+00	2.90E+04	1.80E+01 G
			996.33	-5.447E-02	%	2.268E+00	1.16E+03	1.06E+01 G
EU-155	I	1.8419E-01					1.81E+03	
			105.31	1.842E-01	(	4.776E-01	7.80E+01	2.12E+01 G
			86.54	-2.254E-02	&	3.915E-01	5.11E+02	3.07E+01 G
HF-181	F	3.2050E-02					4.24E+01	
			482.00	-2.493E-02	?(	1.699E-01	1.95E+02	8.05E+01 G
			133.02	5.408E-02	?(	2.308E-01	1.27E+02	4.33E+01 G
			345.83	-1.195E-01	+	9.533E-01	2.31E+02	1.51E+01 G
			136.30	6.530E-01	?(	1.364E+00	6.33E+01	5.85E+00 G
Ta-182	F	3.4970E-02					1.14E+02	
			1121.30	7.236E-03	%(	7.924E-01	3.05E+03	3.49E+01 G
			1221.41	-6.751E-02	+	9.084E-01	3.74E+02	2.70E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1189.05	9.472E-02	?(	1.305E+00	3.78E+02	1.62E+01 G
Hg-203	F	1.7543E-02					4.66E+01	
			279.20	1.754E-02	(	1.390E-01	2.29E+02	8.15E+01 G
TL-208	N	5.3969E-01					6.98E+02	
			583.02	5.409E-01	(P	1.888E-01	1.32E+01	8.45E+01 G
								Energy duplication
			277.28	-6.020E-01	- P	1.681E+00	1.10E+02	6.31E+00 G
			860.56	5.318E-01	&(	1.401E+00	7.84E+01	1.24E+01 G
pm-146	C	1.2652E-01					2.02E+03	
			747.16	1.265E-01	&(	5.020E-01	1.15E+02	3.40E+01 G
			735.72	-9.824E-02	+	8.500E-01	2.46E+02	2.25E+01 G
			453.88	-2.140E-02	&	1.750E-01	2.31E+02	6.50E+01 G
y-88	F	-5.1515E-02					1.07E+02	
			898.04	-5.152E-02	?(	2.413E-01	1.36E+02	9.37E+01 G
			1836.06	-3.783E-02	+	2.994E-01	2.19E+02	9.92E+01 G
Cd-109	F	1.8874E+00					4.53E+02	
			88.04	1.887E+00	(	2.574E+00	4.22E+01	3.79E+00 G
Ra-226	N	8.5776E+00					5.84E+05	
			185.99	8.578E+00	*(P	3.289E+00	1.63E+01	3.28E+00 G
PB-210	N	1.5131E+00					8.14E+03	
			46.54	1.513E+00	(P	3.385E+00	1.49E+01	4.25E+00 G
PB-212	N	1.5824E+00					6.98E+02	
			238.63	1.582E+00	(P	3.270E-01	6.90E+00	4.33E+01 G
			300.03	3.912E+00	+	3.252E+00	3.37E+01	3.28E+00 GA
PB-214	N	1.3362E+00					5.84E+05	
			351.93	1.418E+00	*(P	3.874E-01	1.02E+01	3.76E+01 G
			295.09	1.177E+00	(P	7.144E-01	1.86E+01	1.93E+01 G
			242.00	7.400E-01	- P	1.850E+00	4.79E+01	7.43E+00 GA
BI-207	C	3.6317E-02					1.18E+04	
			569.70	1.462E-02	?(	1.379E-01	2.65E+02	9.77E+01 G
			1063.66	6.478E-02	?(	2.753E-01	1.22E+02	7.45E+01 G
BI-212	N	9.0778E-01					6.98E+02	
			727.17	9.078E-01	?(	2.378E+00	7.81E+01	7.55E+00 G
			785.42	-1.902E+00	+	1.469E+01	2.19E+02	1.28E+00 GA
BI-214	N	1.1888E+00					5.84E+05	
			609.31	1.189E+00	*(P	3.802E-01	1.13E+01	4.61E+01 G
			1120.29	-8.450E-02	- P	1.952E+00	5.37E+01	1.51E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
			1764.49	3.482E-02	% P	2.374E+00	4.28E+01	1.54E+01 G
BI-210M	T	8.3208E-02					1.10E+09	
			265.83	6.266E-02	&(	2.472E-01	1.16E+02	5.00E+01 G
			304.90	1.199E-01	?(	4.477E-01	1.10E+02	2.80E+01 G
RA-224	N	2.9652E+00					6.98E+02	
			240.99	2.965E+00	(	3.032E+00	3.26E+01	4.10E+00 G
AC-228	N	2.0339E+00					2.10E+03	
			911.16	1.720E+00	(	6.504E-01	2.06E+01	2.90E+01 G
			968.97	2.365E+00	*(	8.108E-01	1.95E+01	1.75E+01 G
			338.32	2.310E+00	(	1.151E+00	2.35E+01	1.20E+01 G
			93.35	1.207E+00	-	2.248E+00	5.67E+01	5.56E+00 XA
TH-227	N	2.0089E-01					7.95E+03	
			235.97	5.293E-02	&(	2.752E+00	1.55E+03	1.23E+01 G
			50.14	4.475E-01	?(	1.319E+00	8.83E+01	8.00E+00 G
			256.24	1.791E-01	&(	1.706E+00	2.76E+02	7.00E+00 G
TH-229	N	1.2443E+00					2.68E+06	
			193.51	1.244E+00	*(	2.669E+00	6.50E+01	4.40E+00 G
			210.85	-3.849E-01	-	4.142E+00	3.14E+02	2.99E+00 G
TH-234	N	1.5854E+00					1.63E+12	
			63.29	1.585E+00	(P	3.419E+00	1.73E+01	3.81E+00 G
			92.59	4.093E-01	- P	2.434E+00	1.41E+01	5.58E+00 G
PA-231	N	7.8352E-01					1.20E+07	
			302.65	-1.592E+00	?(	5.505E+00	1.03E+02	2.88E+00 G
			300.07	3.565E+00	*(	5.180E+00	4.52E+01	2.46E+00 G
PA-233	C	2.1083E-01					7.82E+08	
			312.01	0.000E+00	?(	3.591E-01	1.00E+03	3.60E+01 G
			300.18	1.435E+00	*(	2.041E+00	4.43E+01	6.20E+00 G
PA-234	N	7.6390E-02					1.63E+12	
			131.29	-2.431E-02	?(	5.641E-01	6.76E+02	1.80E+01 G
			946.02	0.000E+00	+	1.573E+00	1.00E+03	1.34E+01 G
			569.47	1.310E-01	(	1.681E+00	3.59E+02	8.20E+00 G
			883.24	2.185E-01	(	1.542E+00	1.96E+02	9.60E+00 G
			880.53	6.039E-01		2.178E+00	1.03E+02	6.00E+00 GA
PA-234M	N	-5.0835E+00					1.63E+12	
			1001.00	-1.367E+01	?(P	3.189E+01	1.14E+02	8.37E-01 G
			766.41	1.937E+01	?(P	6.265E+01	6.56E+01	2.94E-01 G

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 Nuclide  Ave activity   Energy    Activity  Code Peak MDA  Comments

U-235    N   1.7025E-01                                      2.57E+11
                         143.79 1.108E-01  (P 1.072E+00 6.01E+01 1.10E+01 G
                         205.33 3.005E-01 @(P 2.300E+00 1.07E+02 5.01E+00 G
                         163.38 1.702E-01 ?(  2.188E+00 3.76E+02 5.08E+00 G

AM-241   T   1.6891E-01                                      1.58E+05
                          59.54 1.689E-01 ?(  2.959E-01 5.35E+01 3.59E+01 G

Ir-192   F   1.6997E-01                                      7.40E+01
                         316.49 2.071E-02 ?(  1.391E-01 1.94E+02 8.70E+01 G
                         468.06 2.760E-02 ?(  2.172E-01 2.22E+02 5.18E+01 G
                         308.44-1.346E-02 &   5.169E-01 1.11E+03 3.18E+01 G
                         295.95 8.450E-01 ?(  4.205E-01 1.77E+01 3.02E+01 G

Np-237   F   3.7014E-01                                      2.14E+06
                          86.49 3.701E-01  (  7.013E-01 5.77E+01 1.31E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.71	170.	22.	0.003	88.30	4.475E-01	
BA-133	81.33	239.	10.	0.001	228.05	4.265E-02	
EU-155	86.54	276.	-5.	-0.001	511.40	-2.254E-02	
Gd-153	97.67	227.	-39.	-0.005	57.02	-1.971E-01	
EU-155	105.44	183.	25.	0.004	78.02	1.842E-01	
EU-152	121.77	191.	12.	0.002	159.23	6.993E-02	
CO-57	121.35	151.	15.	0.002	116.62	2.861E-02	
EU-154	123.02	207.	-13.	-0.002	164.95	-4.934E-02	
HF-181	132.83	153.	14.	0.002	126.50	5.408E-02	
CE-144	133.77	182.	-8.	-0.001	229.20	-1.260E-01	
HF-181	134.92	93.	23.	0.003	63.33	6.530E-01	
CO-57	133.95	77.	-3.	0.000	444.81	-4.402E-02	
Tc-99m	139.60	152.	8.	0.001	232.73	1.616E-02	
U-235	143.70	200.	7.	0.001	60.11	1.108E-01	P
CE-141	145.44	234.	2.	0.000	881.16	8.795E-03	
U-235	163.25	155.	5.	0.001	375.58	1.702E-01	
CE-139	165.65	134.	10.	0.001	174.11	2.218E-02	
TH-229	193.61	133.	26.	0.004	64.97	1.244E+00	
U-235	205.18	117.	7.	0.001	107.47	3.005E-01	P
TH-229	210.44	130.	-5.	-0.001	313.79	-3.849E-01	
EU-152	243.57	139.	-18.	-0.003	94.92	-5.924E-01	
TH-227	256.29	89.	5.	0.001	276.00	1.791E-01	
BI-210M	266.30	90.	12.	0.002	116.46	6.266E-02	
I-131	284.48	95.	2.	0.000	562.99	1.120E-01	
Ir-192	295.18	80.	89.	0.012	17.70	8.450E-01	
PA-231	300.02	79.	30.	0.004	45.20	3.565E+00	
PA-233	300.02	77.	31.	0.004	44.33	1.435E+00	
PA-231	302.17	123.	-16.	-0.002	102.85	-1.592E+00	
BA-133	302.17	123.	-16.	-0.002	102.84	-2.503E-01	
Ba-140	304.26	84.	11.	0.002	122.59	7.440E-01	
BI-210M	304.23	74.	11.	0.002	110.18	1.199E-01	
Ir-192	316.52	64.	6.	0.001	194.38	2.071E-02	
CR-51	320.24	67.	-10.	-0.001	124.74	-2.935E-01	
La-140	328.28	63.	26.	0.004	46.58	4.045E-01	
EU-152	345.13	81.	5.	0.001	251.36	6.234E-02	
HF-181	345.79	80.	-6.	-0.001	231.23	-1.195E-01	
BA-133	356.29	61.	7.	0.001	159.74	3.787E-02	
I-131	363.78	65.	-11.	-0.001	110.69	-4.426E-02	
SN-113	391.86	61.	4.	0.001	288.79	2.159E-02	
SB-125	427.93	41.	10.	0.001	92.16	1.340E-01	
pm-146	450.38	30.	-3.	0.000	230.82	-2.140E-02	
SB-125	463.00	49.	36.	0.005	32.34	1.398E+00	
Ir-192	470.22	28.	3.	0.000	221.77	2.760E-02	
BE-7	476.54	46.	13.	0.002	81.33	4.969E-01	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM	
HF-181	480.58	41.	-5.	-0.001	195.06	-2.493E-02		
La-140	486.65	43.	2.	0.000	624.34	1.402E-02		
RU-103	496.58	40.	10.	0.001	91.19	4.960E-02		
RH-106	510.44	136.	110.	0.015	17.77	2.430E+00		
Ba-140	536.75	38.	7.	0.001	126.05	1.365E-01		
CS-134	570.05	30.	2.	0.000	449.71	5.468E-02		
SB-125	599.69	78.	-10.	-0.001	126.48	-2.871E-01		
SB-124	602.47	77.	4.	0.001	346.00	1.867E-02		
CS-134	604.75	69.	17.	0.002	74.96	8.619E-02		
RU-103	609.30	37.	109.	0.015	12.42	9.649E+00		
RH-106	621.78	52.	4.	0.001	235.11	2.302E-01		
SB-125	636.96	37.	7.	0.001	122.72	3.413E-01		
I-131	636.81	36.	8.	0.001	106.69	6.212E-01		
AG-110M	657.09	33.	6.	0.001	135.12	3.615E-02		
CS-137	663.16	47.	-5.	-0.001	189.07	-3.353E-02		
SB-124	722.86	40.	-3.	0.000	266.26	-1.860E-01		
AG-108M	722.37	43.	-5.	-0.001	206.91	-2.953E-02		
EU-154	725.01	42.	-4.	-0.001	222.14	-1.222E-01		
ZR-95	724.77	39.	-1.	0.000	964.44	-1.225E-02		
BI-212	727.77	35.	12.	0.002	78.13	9.078E-01		
pm-146	735.49	40.	-4.	-0.001	245.97	-9.824E-02		
pm-146	748.22	30.	7.	0.001	115.16	1.265E-01		
AG-110M	764.80	34.	14.	0.002	66.35	3.777E-01		
NB-95	764.71	30.	15.	0.002	58.62	9.036E-02		
PA-234M	764.85	34.	9.	0.001	65.56	1.937E+01	P	
EU-152	780.61	26.	5.	0.001	145.90	2.512E-01		
BI-212	784.93	34.	-4.	-0.001	219.06	-1.902E+00		
La-140	815.09	37.	5.	0.001	186.29	1.323E-01		
MN-54	834.68	41.	-1.	0.000	608.32	-9.923E-03		
Co-56	846.62	34.	-3.	0.000	246.05	-2.307E-02		
NB-94	870.49	29.	2.	0.000	402.03	1.331E-02		
EU-154	872.64	32.	2.	0.000	412.38	1.107E-01		
AG-110M	884.85	28.	2.	0.000	349.63	2.083E-02		
y-88	898.98	40.	-7.	-0.001	135.63	-5.152E-02		
PA-234M	1000.79	47.	-15.	-0.002	114.24	-1.367E+01	P	
Co-56	1038.05	28.	-3.	0.000	259.39	-1.671E-01		
RH-106	1053.29	19.	2.	0.000	414.97	7.854E-01		
Ga-68	1079.44	20.	5.	0.001	124.75	2.392E+00		
FE-59	1096.15	21.	-1.	0.000	458.21	-2.109E-02		
EU-152	1113.03	32.	-1.	0.000	679.83	-7.302E-02		
Sc-46	1120.16	32.	15.	0.002	58.97	1.288E-01		
Ta-182	1186.59	20.	2.	0.000	378.04	9.472E-02		
Ta-182	1221.54	27.	-2.	0.000	373.76	-6.751E-02		
Co-56	1238.59	27.	5.	0.001	154.42	7.029E-02		
NA-22	1272.84	14.	1.	0.000	594.05	8.497E-03		
EU-154	1272.83	14.	1.	0.000	584.91	2.451E-02		
FE-59	1291.00	16.	2.	0.000	303.20	4.283E-02		
CO-60	1330.11	12.	-1.	0.000	588.72	-8.513E-03		

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
AG-110M	1386.04		20.	2.	0.000	369.13	7.306E-02
EU-152	1410.29		13.	4.	0.001	146.98	1.811E-01
La-140	1597.67		17.	4.	0.001	158.95	4.674E-02
Co-56	1771.13		23.	-4.	-0.001	168.52	-3.470E-01
y-88	1835.87		18.	-3.	0.000	219.45	-3.783E-02

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting 1 Sigma	MDA Bq/Sample
BE-7	#A	4.9692E-01	4.9693E-01	8.133E+01%	1.36E+00
NA-22	#A	8.4973E-03	8.4973E-03	5.941E+02%	1.89E-01
K-40		2.0951E+01	2.0951E+01	7.312E+00%	2.55E+00
Sc-46	#A	6.3598E-02	6.3598E-02	5.897E+01%	1.95E-01
CR-51	#A	-2.9352E-01	-2.9353E-01	1.247E+02%	1.25E+00
MN-54	#A	-9.9233E-03	-9.9233E-03	6.083E+02%	2.15E-01
FE-59	#A	6.6094E-03	6.6095E-03	2.747E+02%	3.53E-01
Co-56	#A	1.4087E-02	1.4087E-02	1.452E+02%	2.01E-01
CO-57	#A	2.8613E-02	2.8613E-02	1.166E+02%	1.12E-01
CO-58	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.89E-01
CO-60	#A	-8.5130E-03	-8.5130E-03	5.887E+02%	1.89E-01
ZN-65	#A	1.0555E-03	1.0555E-03	1.478E+04%	5.59E-01
NB-94	#A	7.4859E-03	7.4859E-03	4.020E+02%	2.01E-01
ZR-95	#A	-5.2369E-03	-5.2369E-03	1.645E+03%	3.13E-01
NB-95	#A	9.0361E-02	9.0362E-02	5.862E+01%	1.73E-01
RU-103	#A	4.9602E-02	4.9604E-02	9.119E+01%	1.53E-01
RH-106	#A	3.0555E-01	3.0555E-01	2.351E+02%	1.89E+00
AG-108M	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.86E-01
AG-110M	#A	7.0716E-02	7.0717E-02	6.635E+01%	2.61E-01
SN-113	#A	2.1592E-02	2.1592E-02	2.888E+02%	2.17E-01
SB-124	#A	1.8665E-02	1.8665E-02	3.460E+02%	2.24E-01
SB-125	#C	4.3720E-01	4.3720E-01	3.234E+01%	4.18E-01
I-131	#A	1.6058E-02	1.6059E-02	1.067E+02%	1.66E-01
Gd-153	#A	-1.9708E-01	-1.9708E-01	5.702E+01%	3.69E-01
Ga-68	#A	2.3501E+00	2.3925E+00	1.247E+02%	1.04E+01
Tc-99m	#A	1.6106E-02	1.6160E-02	2.327E+02%	1.28E-01
BA-133	#A	3.7871E-02	3.7871E-02	1.597E+02%	2.08E-01
CS-134	#A	8.1898E-02	8.1898E-02	7.496E+01%	2.15E-01
CS-137	#A	-3.3532E-02	-3.3532E-02	1.891E+02%	2.21E-01
CE-139	#A	2.2181E-02	2.2181E-02	1.741E+02%	1.31E-01
Ba-140	#A	2.2734E-01	2.2735E-01	8.791E+01%	5.93E-01
La-140	#A	8.8838E-02	8.8843E-02	4.658E+01%	2.65E-01
CE-141	#A	8.7953E-03	8.7955E-03	8.812E+02%	2.64E-01
CE-144	#A	-1.2596E-01	-1.2596E-01	2.292E+02%	9.81E-01
PM-144	A	-1.6228E-03	-1.6228E-03	1.729E+02%	2.08E-01

EU-152 #A	1.0146E-01	1.0146E-01	1.105E+02%	5.41E-01
EU-154 #A	4.6802E-02	4.6802E-02	3.578E+02%	1.63E+00
EU-155 #A	1.8419E-01	1.8419E-01	7.802E+01%	4.78E-01
HF-181 #A	3.2050E-02	3.2050E-02	6.333E+01%	1.70E-01
Ta-182 #A	3.4970E-02	3.4970E-02	3.780E+02%	7.92E-01
Hg-203 A	1.7543E-02	1.7543E-02	2.290E+02%	1.39E-01
TL-208	5.3969E-01	5.3969E-01	1.542E+01%	1.89E-01
pm-146 #A	1.2652E-01	1.2652E-01	1.152E+02%	5.02E-01
y-88 #A	-5.1515E-02	-5.1515E-02	1.356E+02%	2.41E-01
Cd-109 A	1.8874E+00	1.8874E+00	4.222E+01%	2.57E+00
Ra-226 #	8.5776E+00	8.5776E+00	1.675E+01%	3.29E+00
PB-210 A	1.5131E+00	1.5131E+00	7.144E+01%	3.39E+00
PB-212	1.5824E+00	1.5824E+00	8.072E+00%	3.27E-01
PB-214	1.3362E+00	1.3362E+00	1.227E+01%	3.87E-01
BI-207 #A	3.6317E-02	3.6317E-02	1.222E+02%	1.38E-01
BI-212 #A	9.0778E-01	9.0778E-01	7.813E+01%	2.38E+00
BI-214 #	1.1888E+00	1.1888E+00	1.401E+01%	3.80E-01
BI-210M#A	8.3208E-02	8.3208E-02	8.016E+01%	2.47E-01
RA-224 A	2.9652E+00	2.9652E+00	3.262E+01%	3.03E+00
AC-228	2.0339E+00	2.0339E+00	1.228E+01%	6.50E-01
TH-227 #A	2.0089E-01	2.0089E-01	8.830E+01%	2.75E+00
TH-229 #A	1.2443E+00	1.2443E+00	6.497E+01%	2.67E+00
TH-234 A	1.5854E+00	1.5854E+00	7.017E+01%	3.42E+00
PA-231 #A	7.8352E-01	7.8352E-01	4.520E+01%	5.51E+00
PA-233 #A	2.1083E-01	2.1083E-01	4.433E+01%	3.59E-01
PA-234 A	7.6390E-02	7.6390E-02	1.956E+02%	5.64E-01
PA-234M#A	-5.0835E+00	-5.0835E+00	9.272E+01%	3.19E+01
U-235 #A	1.7025E-01	1.7025E-01	1.718E+02%	1.07E+00
AM-241 #A	1.6891E-01	1.6891E-01	5.352E+01%	2.96E-01
Ir-192 #C	1.6997E-01	1.6997E-01	1.770E+01%	1.39E-01
Np-237 A	3.7014E-01	3.7014E-01	5.770E+01%	7.01E-01

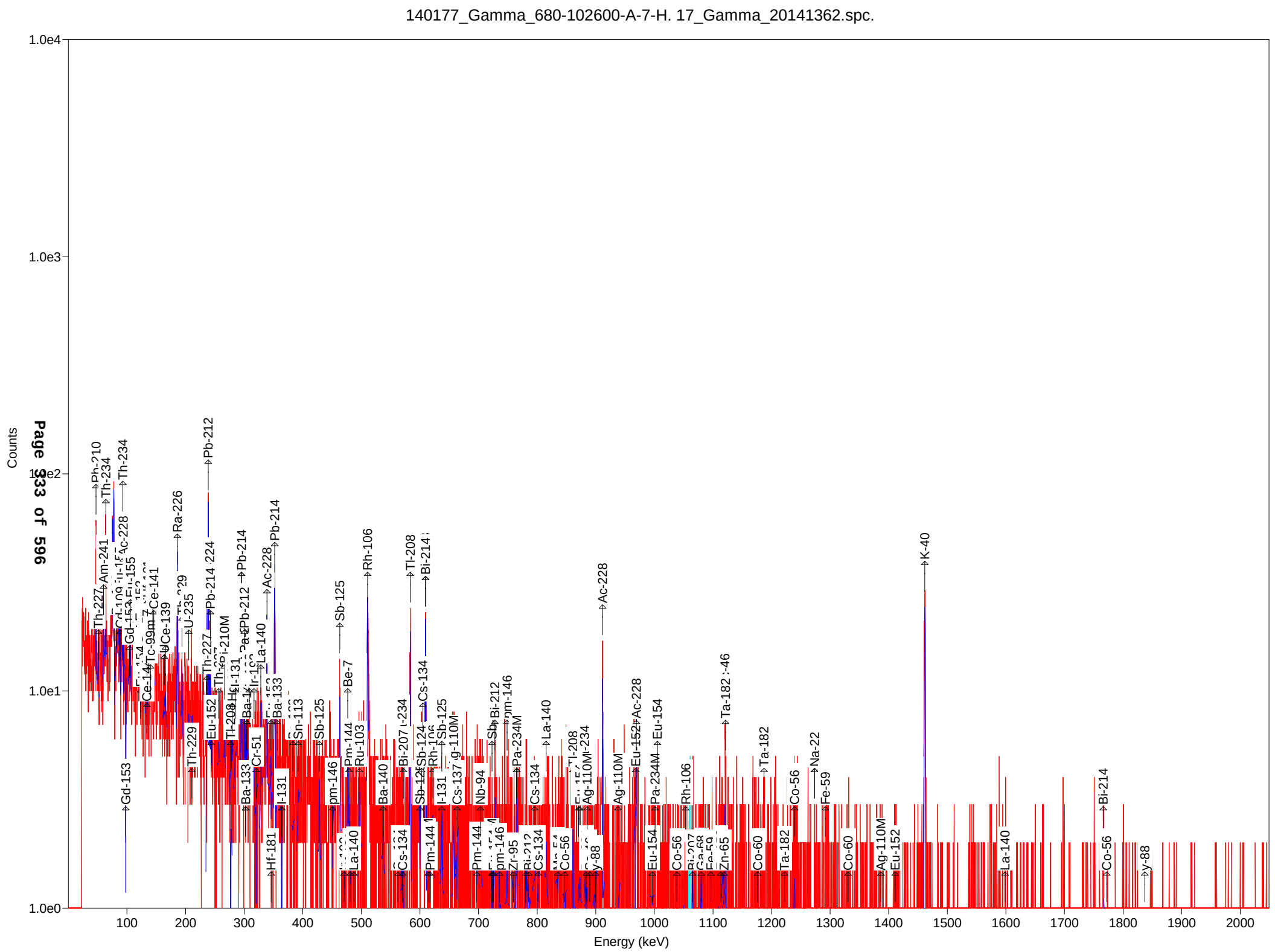
- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (911.0 to 1999.5 keV) 4.160E+01 Bq/Sample
Total Decayed Activity (911.0 to 1999.5 keV) 4.1601288E+01 Bq/Sample

The library has energies which are not separable.

140177_Gamma_680-102600-A-7-H. 17_Gamma_20141362.spc.



Test America St. Louis Spectrum ID: 14_Gamma_20141888

Sample Description: 140177_Gamma_680-102600-A-8-H
Detector: Ge14 SN/11080670
Batch ID: 140177
Work Order Number: Gamma
Lot Number: 680-102600-A-8-H

Decay to Time: 8/26/2014 11:29 Live Time: 7200 sec
Acquisition Time: 8/26/2014 11:29:54 Real Time: 7234 sec
Analysis Time: 8/26/2014 13:30 Dead Time: 0.46 %
Analysis Quantity: 1.000E+00 Sample

Efficiency Cal File: 14_Soil_25ml.Clb
Efficiency Cal Desc: 14_25mlSolid_90099_031312
Efficiency Cal Date: 3/14/2012 16:44
Energy Cal Date: 2/28/2012 10:48
Library: Client_ Long_no ingrowth Rev3.li
Bkgd Correction File: 14_2014-08-09_2127.PBC

Nuclide	Activity Bq/Sample	1-Sigma Counting Uncert %	1-Sigma Counting Uncert Bq/Sample	1-Sigma Total Uncert Bq/Sample	Minimum Detectable Activity Bq/Sample
BE-7	1.462E-02	2581.0	3.773E-01	3.773E-01	1.352E+00
NA-22	-3.270E-02	202.6	6.625E-02	6.627E-02	2.381E-01
K-40	1.941E+01	8.4	1.627E+00	1.906E+00	3.172E+00
Sc-46	7.401E-02	48.4	3.578E-02	3.598E-02	3.078E-01
CR-51	4.404E-02	734.1	3.233E-01	3.233E-01	1.142E+00
MN-54	1.305E-02	396.5	5.176E-02	5.177E-02	1.869E-01
FE-59	7.641E-02	105.3	8.045E-02	8.054E-02	4.100E-01
Co-56	4.647E-02	107.7	5.005E-02	5.010E-02	2.084E-01
CO-57	5.029E-02	71.4	3.588E-02	3.598E-02	8.832E-02
CO-58	0.000E+00	1000.0	1.392E-02	1.392E-02	2.299E-01
CO-60	1.235E-02	190.9	2.359E-02	2.359E-02	2.431E-01
ZN-65	-1.717E-01	104.4	1.793E-01	1.795E-01	6.108E-01
NB-94	-2.958E-03	1698.0	5.024E-02	5.024E-02	1.818E-01
ZR-95	5.740E-02	175.7	1.009E-01	1.009E-01	3.534E-01
NB-95	-2.201E-02	268.2	5.902E-02	5.903E-02	2.082E-01
RU-103	-2.543E-02	183.8	4.673E-02	4.675E-02	1.628E-01
RH-106	-2.492E-01	216.9	5.405E-01	5.407E-01	1.888E+00
AG-108M	3.542E-02	109.8	3.891E-02	3.895E-02	1.333E-01
AG-110M	-5.156E-05	146700.0	7.562E-02	7.562E-02	2.771E-01
SN-113	-3.835E-03	1392.0	5.338E-02	5.338E-02	1.907E-01
SB-124	7.827E-02	61.2	4.794E-02	4.811E-02	1.573E-01
SB-125	1.166E-01	93.4	1.090E-01	1.091E-01	4.768E-01
I-131	7.791E-02	76.3	5.948E-02	5.961E-02	1.726E-01
Gd-153	8.410E-03	1087.0	9.139E-02	9.139E-02	3.132E-01
Ga-68	4.141E+00	73.2	3.030E+00	3.039E+00	1.014E+01
Tc-99m	3.932E-02	86.4	3.398E-02	3.405E-02	1.135E-01
BA-133	2.031E-01	37.6	7.627E-02	7.699E-02	1.725E-01
CS-134	8.411E-02	48.3	4.064E-02	4.087E-02	2.138E-01
CS-137	-1.283E-03	3851.0	4.942E-02	4.942E-02	1.809E-01
CE-139	3.415E-02	98.7	3.371E-02	3.386E-02	1.134E-01
Ba-140	1.519E-01	124.1	1.884E-01	1.886E-01	5.730E-01
La-140	8.126E-03	364.6	2.963E-02	2.963E-02	1.663E-01
CE-141	-1.047E-03	5391.0	5.644E-02	5.644E-02	1.952E-01
CE-144	1.664E-01	142.9	2.377E-01	2.378E-01	8.052E-01
PM-144	0.000E+00	1000.0	2.112E-02	2.112E-02	1.970E-01
EU-152	4.573E-02	97.4	4.453E-02	4.460E-02	4.949E-01
EU-154	2.402E-02	1764.0	4.238E-01	4.238E-01	1.554E+00
EU-155	2.687E-01	24.5	6.593E-02	6.755E-02	4.003E-01
HF-181	3.288E-02	108.3	3.561E-02	3.565E-02	1.919E-01

Ta-182	1.852E-01	91.5	1.693E-01	1.696E-01	6.806E-01
Hg-203	2.383E-02	177.9	4.239E-02	4.241E-02	1.457E-01
TL-208	6.730E-01	15.2	1.019E-01	1.078E-01	2.156E-01
pm-146	6.123E-02	63.3	3.874E-02	3.887E-02	5.066E-01
y-88	3.905E-02	98.6	3.849E-02	3.855E-02	1.345E-01
Cd-109	3.000E-01	261.0	7.829E-01	7.830E-01	2.656E+00
Ra-226	-4.594E-01	312.9	1.437E+00	1.438E+00	4.055E+00
PB-210	9.299E-01	88.8	8.258E-01	8.276E-01	2.621E+00
PB-212	1.489E+00	9.4	1.392E-01	1.693E-01	3.206E-01
PB-214	9.859E-01	13.4	1.320E-01	1.416E-01	3.917E-01
BI-207	2.846E-02	109.6	3.119E-02	3.123E-02	1.219E-01
BI-212	4.154E+00	19.8	8.225E-01	8.504E-01	1.566E+00
BI-214	8.985E-01	17.3	1.554E-01	1.623E-01	4.209E-01
BI-210M	3.524E-02	175.7	6.190E-02	6.194E-02	2.008E-01
RA-224	-6.697E+00	28.4	1.904E+00	1.952E+00	6.081E+00
AC-228	2.102E+00	14.8	3.114E-01	3.294E-01	5.181E-01
TH-227	7.042E-01	25.0	1.763E-01	1.822E-01	4.869E-01
TH-229	-6.894E-01	114.5	7.893E-01	7.912E-01	2.659E+00
TH-234	1.910E+00	40.8	7.783E-01	7.847E-01	2.450E+00
PA-231	2.177E+00	44.0	9.585E-01	9.659E-01	4.302E+00
PA-233	2.900E-01	45.0	1.305E-01	1.315E-01	3.542E-01
PA-234	9.569E-02	88.8	8.498E-02	8.512E-02	5.614E-01
PA-234M	3.500E-01	2311.0	8.087E+00	8.087E+00	2.929E+01
U-235	4.934E-01	55.8	2.753E-01	2.765E-01	8.586E-01
AM-241	9.258E-02	71.8	6.643E-02	6.661E-02	2.204E-01
Ir-192	1.176E-01	17.4	2.050E-02	2.165E-02	1.494E-01
Np-237	7.797E-02	287.7	2.243E-01	2.243E-01	7.618E-01
Total	4.353E+01				

Analyst: Elizabeth Newns

TestAmerica, Inc. Spectrum name: 14_Gamma_20141888.An1

Sample description
140177_Gamma_680-102600-A-8-H

Spectrum Filename: C:\User\SPC\Det14\14_Gamma_20141888.An1

Acquisition information
Start time: 8/26/2014 11:29:54 AM
Live time: 7200
Real time: 7234
Dead time: 0.46 %
Detector ID: 14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_Soil_25ml.Clb
14_25mlSolid_90099_031312

Energy Calibration
Created: 2/28/2012 10:48:23 AM
Zero offset: 0.130 keV
Gain: 0.250 keV/channel
Quadratic: -2.050E-08 keV/channel^2

Efficiency Calibration
Created: 3/14/2012 4:44:41 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.01 %
Log(Eff): 4.286558E-01 + (-3.868998E-01*Log(E)) +
(-3.891736E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.12 %
Log(Eff): -1.120218E+01 + (4.080928E+00*Log(E)) +
(-4.677621E-01*Log(E)^2)

Library Files
Main analysis library: Client_ Long_no ingrowth Rev3.li
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.64keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	8/26/2014 11:29:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	14_2014-08-09_2127.PBC 8/9/2014 9:27:02 PM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 33 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.2030

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
46.73	119.	18.75	0.99	8.832E-02	46.54	4.250	PBC<MDA	PB210
50.20	9.	180.31	0.75	9.118E-02	50.14	8.000	PBC<MDA	TH227
59.13	23.	71.76	0.76	9.663E-02	59.54	35.900	PBC<MDA	AM241
63.45	113.	18.46	0.68	9.805E-02	63.29	3.810	PBC<MDA	TH234
74.91	174.	12.49	0.78	1.000E-01				
77.20	264.	8.83	0.78	1.001E-01				
86.47	7.	287.67	0.79	9.968E-02	86.49	13.100	PBC<MDA	Np237
					86.54	30.700	3.327E-02	EU155
87.13	91.	21.63	0.79	9.961E-02	86.54	30.700	4.129E-01	EU155
88.02	8.	260.99	0.79	9.950E-02	88.04	3.790	PBC<MDA	Cd109
89.96	60.	30.64	0.79	9.925E-02				
92.52	-7.	22.55	0.80	9.885E-02	92.59	5.584	PBC<MDA	TH234
93.28	72.	32.44	0.80	9.872E-02	93.35	5.561	PBC<MDA	AC228
104.80	8.	223.97	0.81	9.614E-02	105.31	21.200	PBC<MDA	EU155
					105.31	21.200	5.243E-02	EU155
121.97	18.	97.38	0.83	9.146E-02	121.78	28.580	PBC<MDA	EU152
					122.06	85.600	3.170E-02	CO57
					121.78	28.580	9.486E-02	EU152
122.31	26.	71.36	0.41	9.137E-02	122.06	85.600	PBC<MDA	CO57
133.40	3.	536.05	0.84	8.787E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	4.492E-02	CE144
133.42	12.	142.88	0.84	8.770E-02	133.02	43.300	PBC<MDA	HF181
					133.54	11.090	1.664E-01	CE144
135.47	14.	108.32	0.84	8.680E-02	136.30	5.850	PBC<MDA	HF181
136.48	5.	312.14	0.84	8.674E-02	136.47	10.680	PBC<MDA	CO57
140.71	19.	86.42	0.85	8.541E-02	140.51	89.300	PBC<MDA	Tc99m
144.14	20.	83.86	0.85	8.432E-02	143.79	10.960	PBC<MDA	U235
					143.79	10.960	3.068E-01	U235

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
164.44	6.	190.69	0.87	7.806E-02	162.66	6.220	PBC<MDA	Ba140
					163.38	5.080	2.256E-01	U235
165.72	3.	437.01	0.87	7.783E-02	163.38	5.080	PBC<MDA	U235
					165.85	79.900	6.240E-03	CE139
166.06	15.	98.71	0.87	7.688E-02	163.38	5.080	5.305E-01	U235
					165.85	79.900	3.415E-02	CE139
186.08	-8.	38.69	0.89	7.023E-02	185.99	3.280	PBC<MDA	Ra226
205.42	21.	73.62	0.91	6.491E-02	205.33	5.010	PBC<MDA	U235
					205.33	5.010	9.016E-01	U235
233.79	36.	25.03	0.94	5.802E-02	235.97	12.300	7.042E-01	TH227
238.72	312.	8.01	1.01	5.747E-02	238.63	43.300	1.489E+00	PB212
241.74	57.	32.88	0.43	5.684E-02	242.00	7.430	1.861E+00	PB214
264.55	6.	180.77	0.97	5.264E-02	265.83	50.000	PBC<MDA	BI210M
277.61	20.	67.78	0.98	5.084E-02	277.28	6.310	PBC<MDA	TL208
279.30	7.	177.87	0.99	5.055E-02	279.20	81.460	PBC<MDA	Hg203
284.06	15.	76.34	0.99	4.980E-02	284.30	6.140	PBC<MDA	I131
					284.30	6.140	6.834E-01	I131
295.34	81.	17.43	1.00	4.817E-02	295.09	19.300	9.229E-01	PB214
					295.95	30.160	7.710E-01	Ir192
					295.95	30.160	7.710E-01	Ir192
295.43	76.	16.45	1.28	4.829E-02	295.09	19.300	1.132E+00	PB214
					295.95	30.160	7.260E-01	Ir192
299.98	52.	23.22	0.53	4.763E-02	300.03	3.280	4.665E+00	PB212
					300.07	2.460	6.221E+00	PA231
					300.18	6.200	PBC<MDA	PA233
299.98	29.	45.01	1.01	4.761E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	3.401E+00	PA231
					300.18	6.200	1.350E+00	PA233
300.03	29.	44.02	1.01	4.762E-02	300.03	3.280	PBC<MDA	PB212
					300.07	2.460	3.456E+00	PA231
					300.18	6.200	1.372E+00	PA233
302.77	13.	93.84	1.01	4.726E-02	302.65	2.880	1.345E+00	PA231
					302.85	18.330	2.115E-01	BA133
302.96	11.	116.65	1.01	4.729E-02	302.65	2.880	PBC<MDA	PA231
					302.85	18.330	1.706E-01	BA133
304.91	4.	301.25	1.01	4.700E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	4.078E-02	BI210M
305.06	4.	290.18	1.01	4.700E-02	304.85	4.290	PBC<MDA	Ba140
					304.90	28.000	4.101E-02	BI210M
308.35	2.	581.35	1.01	4.655E-02	308.44	31.750	PBC<MDA	Ir192
					308.44	31.750	1.799E-02	Ir192
311.30	13.	97.68	1.02	4.610E-02	312.01	36.000	PBC<MDA	PA233
322.65	1.	734.09	1.03	4.513E-02	320.08	9.940	PBC<MDA	CR51
326.44	3.	364.60	1.03	4.413E-02	328.76	20.300	PBC<MDA	La140
					328.76	20.300	4.631E-02	La140
338.28	79.	25.31	1.21	4.308E-02	338.32	12.010	2.112E+00	AC228
345.90	6.	168.08	1.05	4.229E-02	345.83	15.070	PBC<MDA	HF181
352.07	103.	13.67	1.18	4.167E-02	351.93	37.600	9.110E-01	PB214
356.52	37.	37.55	0.47	4.127E-02	356.00	62.050	2.007E-01	BA133
363.78	8.	155.15	1.07	4.046E-02	364.48	81.700	PBC<MDA	I131
					364.48	81.700	3.240E-02	I131
383.81	5.	189.71	1.09	3.872E-02	383.84	8.940	PBC<MDA	BA133
433.08	8.	109.85	1.13	3.487E-02	433.94	90.480	PBC<MDA	AG108M
454.12	15.	63.26	1.15	3.354E-02	453.88	65.000	PBC<MDA	pm146
					453.88	65.000	9.524E-02	pm146
463.36	8.	120.80	1.16	3.295E-02	463.37	10.470	PBC<MDA	SB125
					463.37	10.470	3.061E-01	SB125

pk energy	area	uncert	fwhm	corr	nuclide	brnch.	act.	nuc
468.25	6.	142.50	1.17	3.266E-02	468.06	51.750	PBC<MDA	Ir192
					468.06	51.750	5.297E-02	Ir192
510.96	80.	20.75	1.21	3.022E-02	511.86	20.000	1.837E+00	RH106
					511.86	20.000	1.837E+00	RH106
537.21	6.	133.93	1.23	2.897E-02	537.26	24.390	PBC<MDA	Ba140
563.15	8.	87.65	1.25	2.779E-02	563.24	8.350	PBC<MDA	CS134
583.35	126.	13.03	0.98	2.694E-02	583.02	84.500	6.580E-01	TL208
601.72	14.	61.24	1.29	2.618E-02	602.73	98.260	PBC<MDA	SB124
609.52	110.	12.12	0.67	2.592E-02	609.31	46.090	8.985E-01	BI214
					610.30	5.750	1.029E+01	RU103
637.95	8.	93.83	1.32	2.496E-02	636.97	7.170	PBC<MDA	I131
					635.89	11.310	3.988E-01	SB125
727.10	50.	19.80	0.39	2.214E-02	727.17	7.550	4.154E+00	BI212
756.31	5.	175.73	1.43	2.136E-02	756.73	54.460	PBC<MDA	ZR95
795.22	17.	48.32	1.46	2.041E-02	795.87	85.530	PBC<MDA	CS134
802.39	6.	133.55	1.46	2.027E-02	801.95	8.690	PBC<MDA	CS134
835.67	2.	396.55	1.49	1.954E-02	834.85	99.980	PBC<MDA	MN54
861.14	3.	248.52	1.51	1.901E-02	860.56	12.420	PBC<MDA	TL208
902.64	5.	98.57	1.54	1.828E-02	898.04	93.700	PBC<MDA	y88
911.34	79.	15.42	0.50	1.804E-02	911.16	29.000	2.098E+00	AC228
944.96	6.	107.51	1.58	1.743E-02	946.02	13.400	PBC<MDA	PA234
968.84	25.	36.01	1.60	1.705E-02	968.97	17.460	PBC<MDA	AC228
1062.99	7.	109.59	1.67	1.564E-02	1063.66	74.500	PBC<MDA	BI207
1078.27	9.	73.16	1.69	1.545E-02	1077.40	3.300	PBC<MDA	Ga68
1098.84	2.	334.03	1.70	1.516E-02	1099.25	56.500	PBC<MDA	FE59
1120.12	16.	48.35	1.72	1.490E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	1.480E-01	Sc46
					1120.55	99.987	1.480E-01	Sc46
1120.18	10.	29.57	1.72	1.490E-02	1120.29	15.100	PBC<MDA	BI214
					1120.55	99.987	PBC<MDA	Sc46
1121.20	8.	91.45	1.72	1.489E-02	1121.30	34.900	PBC<MDA	Ta182
1174.62	3.	190.93	1.76	1.427E-02	1173.24	99.900	PBC<MDA	CO60
1222.07	4.	199.28	1.79	1.374E-02	1221.41	27.000	PBC<MDA	Ta182
1239.14	7.	107.71	1.80	1.356E-02	1238.28	66.070	PBC<MDA	Co56
1292.83	5.	105.29	1.84	1.304E-02	1291.60	43.200	PBC<MDA	FE59
1408.34	6.	90.50	1.92	1.201E-02	1408.00	21.005	PBC<MDA	EU152
					1408.00	21.005	3.131E-01	EU152
1460.76	173.	7.41	1.96	1.160E-02	1460.83	10.670	1.941E+01	K40
1764.79	6.	35.52	2.14	9.672E-03	1764.49	15.400	PBC<MDA	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
298.95	74.89	186.	168.	1.680E+03	16.04	0.746	-	
308.09	77.18	170.	261.	2.607E+03	10.64	0.759	-	
347.90	87.16	152.	87.	8.716E+02	22.78	0.790	-	D
359.21	89.99	138.	60.	6.011E+02	30.66	0.793	-	D

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: Client_ Long_no ingrowth Rev3.li

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	186.32	46.73	213.	25.	0.003	18.75	0.992s
TH-227	200.20	50.20	136.	9.	0.001	180.31	0.751s
AM-241	235.94	59.13	126.	23.	0.003	71.76	0.761s
TH-234	253.19	63.45	184.	51.	0.007	18.46	0.683s
Np-237	345.33	86.49	219.	7.	0.001	287.67	0.789D
EU-155	348.16	87.20	209.	92.	0.013	24.53	0.790s
Cd-109	351.53	88.04	222.	8.	0.001	260.99	0.791D
TH-234	369.72	92.59	295.	-7.	-0.001	22.55	0.796D
AC-228	372.76	93.35	238.	72.	0.010	32.44	0.797D
Gd-153	412.41	103.26	189.	-10.	-0.001	198.52	0.807s
EU-155	418.55	104.80	145.	8.	0.001	223.97	0.809s
EU-152	487.23	121.97	142.	18.	0.002	97.38	0.826s
CO-57	488.59	122.31	102.	26.	0.004	71.36	0.414s
PA-234	526.74	131.86	175.	-13.	-0.002	141.38	0.836s
HF-181	532.92	133.40	141.	3.	0.000	536.05	0.838s
CE-144	533.00	133.42	133.	12.	0.002	142.88	0.838s
HF-181	541.21	135.47	105.	14.	0.002	108.32	0.841s
CO-57	545.22	136.48	139.	5.	0.001	312.14	0.841
Tc-99m	562.15	140.71	129.	19.	0.003	86.42	0.845s
U-235	575.88	144.14	136.	20.	0.003	83.86	0.849s
Ba-140	657.03	164.44	72.	6.	0.001	190.69	0.868s
U-235	662.15	165.72	71.	3.	0.000	437.01	0.869s
CE-139	663.54	166.06	104.	15.	0.002	98.71	0.871
Ra-226	743.59	186.08	192.	-8.	-0.001	38.69	0.892s
TH-229	775.64	194.09	137.	-15.	-0.002	114.50	0.899s
U-235	820.92	205.42	110.	21.	0.003	73.62	0.911s
TH-229	841.54	210.57	120.	-20.	-0.003	80.30	0.917s
TH-227	934.40	233.79	23.	36.	0.005	25.03	0.942s
PB-212	954.11	238.72	138.	267.	0.037	8.01	1.009
RA-224	959.28	240.01	457.	-113.	-0.016	28.43	0.947s
PB-214	966.20	241.74	119.	57.	0.008	32.88	0.426s
EU-152	974.66	243.86	133.	-24.	-0.003	70.91	0.951s
BI-210M	1057.40	264.55	58.	6.	0.001	180.77	0.972s
TL-208	1109.63	277.61	83.	20.	0.003	67.78	0.983
Hg-203	1116.39	279.30	75.	7.	0.001	177.87	0.985s
I-131	1135.44	284.06	58.	15.	0.002	76.34	0.990s
PB-214	1180.88	295.43	63.	76.	0.011	16.45	1.282s
Ir-192	1180.54	295.34	58.	81.	0.011	17.43	1.002s
PB-212	1199.09	299.98	38.	52.	0.007	23.22	0.528s
PA-231	1199.29	300.03	68.	29.	0.004	44.02	1.006s
PA-233	1199.10	299.98	69.	29.	0.004	45.01	1.006s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-231	1211.03	302.96	72.	11.	0.001	116.65	1.008s
BA-133	1210.24	302.77	70.	13.	0.002	93.84	1.009
Ba-140	1219.41	305.06	62.	4.	0.001	290.18	1.011s
BI-210M	1218.81	304.91	66.	4.	0.001	301.25	1.011s
Ir-192	1232.56	308.35	61.	2.	0.000	581.35	1.014s
PA-233	1244.39	311.30	72.	13.	0.002	97.68	1.018s
Ir-192	1264.11	316.23	73.	-10.	-0.001	128.88	1.022s
CR-51	1289.78	322.65	54.	1.	0.000	734.09	1.025s
La-140	1304.91	326.44	58.	3.	0.000	364.60	1.034s
AC-228	1352.27	338.28	73.	79.	0.011	25.31	1.211
HF-181	1382.75	345.90	52.	6.	0.001	168.08	1.051s
PB-214	1407.45	352.07	79.	103.	0.014	13.67	1.177s
BA-133	1425.25	356.52	39.	37.	0.005	37.55	0.474s
I-131	1454.28	363.78	67.	8.	0.001	155.15	1.069s
BA-133	1534.37	383.81	51.	5.	0.001	189.71	1.087
SB-125	1711.32	428.05	51.	-4.	-0.001	234.85	1.129s
AG-108M	1731.45	433.08	35.	8.	0.001	109.85	1.135s
pm-146	1815.60	454.12	37.	15.	0.002	63.26	1.154s
SB-125	1852.56	463.36	38.	8.	0.001	120.80	1.163s
Ir-192	1872.09	468.25	39.	6.	0.001	142.50	1.167s
PM-144	1907.08	476.99	49.	-1.	0.000	891.95	1.175s
RU-103	1992.04	498.23	42.	-5.	-0.001	183.77	1.194s
RH-106	2042.94	510.96	97.	80.	0.011	20.75	1.208s
Ba-140	2147.94	537.21	32.	6.	0.001	133.93	1.231s
CS-134	2251.73	563.15	23.	8.	0.001	87.65	1.255s
CS-134	2279.87	570.19	35.	-5.	-0.001	174.58	1.260s
PA-234	2279.96	570.21	37.	-6.	-0.001	161.61	1.261s
BI-207	2268.38	567.32	20.	-2.	0.000	314.79	1.261s
TL-208	2332.50	583.35	49.	108.	0.015	13.03	0.984
SB-124	2405.98	601.72	32.	14.	0.002	61.24	1.291s
CS-134	2417.41	604.57	61.	-5.	-0.001	220.01	1.292s
BI-214	2437.21	609.52	52.	77.	0.011	12.12	0.673s
RU-103	2437.28	609.54	32.	90.	0.013	13.76	1.297s
AG-108M	2446.32	611.80	51.	-11.	-0.002	96.86	1.301s
PM-144	2473.10	618.50	56.	-6.	-0.001	185.75	1.304s
RH-106	2488.80	622.42	46.	-5.	-0.001	216.88	1.308s
SB-125	2550.94	637.95	25.	8.	0.001	93.83	1.320s
I-131	2544.93	636.45	39.	-5.	-0.001	173.44	1.321s
AG-108M	2889.52	722.59	42.	-5.	-0.001	189.31	1.397s
EU-154	2889.42	722.57	47.	-7.	-0.001	135.71	1.397s
BI-212	2907.54	727.10	12.	50.	0.007	19.80	0.390s
pm-146	2943.43	736.07	38.	-3.	0.000	305.16	1.408s
ZR-95	3024.40	756.31	33.	5.	0.001	175.73	1.426s
AG-110M	3055.12	763.99	36.	-2.	0.000	362.73	1.432s
NB-95	3063.29	766.03	38.	-3.	0.000	268.21	1.433s
EU-152	3116.38	779.30	37.	-4.	0.000	248.71	1.445s
CS-134	3180.07	795.22	25.	17.	0.002	48.32	1.459s
CS-134	3208.76	802.39	26.	6.	0.001	133.55	1.464s

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
La-140	3263.19	815.99	34.	-6.	-0.001	145.64	1.476s
MN-54	3341.91	835.67	26.	2.	0.000	396.55	1.492s
TL-208	3443.82	861.14	27.	3.	0.000	248.52	1.513s
NB-94	3485.33	871.52	26.	-1.	0.000	812.78	1.521s
y-88	3609.83	902.64	9.	5.	0.001	98.57	1.544s
AC-228	3644.65	911.34	13.	79.	0.011	15.42	0.498s
PA-234	3779.18	944.96	21.	6.	0.001	107.51	1.582s
AC-228	3874.73	968.84	29.	25.	0.004	36.01	1.601s
EU-154	3984.82	996.36	33.	-3.	0.000	297.40	1.622s
BI-207	4251.43	1062.99	24.	7.	0.001	109.59	1.675s
Ga-68	4312.58	1078.27	16.	9.	0.001	73.16	1.685s
FE-59	4394.88	1098.84	23.	2.	0.000	334.03	1.702s
ZN-65	4469.67	1117.53	43.	-9.	-0.001	104.41	1.714s
BI-214	4480.71	1120.29	22.	10.	0.001	29.57	1.718D
Sc-46	4480.04	1120.12	22.	16.	0.002	48.35	1.718s
Ta-182	4484.76	1121.30	24.	8.	0.001	91.45	1.719D
CO-60	4698.15	1174.62	18.	3.	0.000	190.93	1.757s
Ta-182	4888.03	1222.07	27.	4.	0.001	199.28	1.793s
Co-56	4956.32	1239.14	28.	7.	0.001	107.71	1.805s
NA-22	5099.23	1274.85	18.	-3.	0.000	202.59	1.831s
EU-154	5099.21	1274.84	18.	-3.	0.000	202.39	1.831s
FE-59	5171.17	1292.83	13.	5.	0.001	105.29	1.843s
CO-60	5316.54	1329.15	17.	-1.	0.000	939.41	1.871
AG-110M	5525.99	1381.48	18.	-4.	-0.001	147.39	1.907s
EU-152	5633.46	1408.34	10.	6.	0.001	90.50	1.923s
K-40	5843.30	1460.76	30.	173.	0.024	7.41	1.958
BI-214	7060.28	1764.79	23.	6.	0.001	35.52	2.145s
Co-56	7085.78	1771.16	20.	-3.	0.000	213.67	2.149s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
BE-7	C	1.4618E-02				5.31E+01		
			477.60	1.462E-02	%(	1.352E+00	2.58E+03 1.05E+01	G
NA-22	C	-3.2700E-02				9.50E+02		
			1274.53	-3.270E-02	?(	2.381E-01	2.03E+02 9.99E+01	G
K-40	N	1.9409E+01				4.66E+11		
			1460.83	1.941E+01	?(P	3.172E+00	7.41E+00 1.07E+01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Sc-46	F 7.4008E-02					8.38E+01	
		889.28	0.000E+00	&(	3.078E-01	1.00E+03	1.00E+02 G
		1120.55	1.480E-01	?(	2.268E-01	4.84E+01	1.00E+02 G
CR-51	F 4.4041E-02					2.77E+01	
		320.08	4.404E-02	?(	1.142E+00	7.34E+02	9.94E+00 G
MN-54	C 1.3054E-02					3.12E+02	
		834.85	1.305E-02	?(	1.869E-01	3.97E+02	1.00E+02 G
FE-59	F 7.6411E-02					4.45E+01	
		1099.25	3.399E-02	?(	4.100E-01	3.34E+02	5.65E+01 G
		1291.60	1.319E-01	?(	4.840E-01	1.05E+02	4.32E+01 G
Co-56	C 4.6466E-02					7.73E+01	
		846.77	1.620E-03	%(	2.084E-01	3.54E+03	9.99E+01 G
		1238.28	1.143E-01	?(	4.232E-01	1.08E+02	6.61E+01 G
		1037.84	0.000E+00	-	2.450E+00	1.00E+03	1.41E+01 G
		1771.35	-2.885E-01	+	2.211E+00	2.14E+02	1.55E+01 A
CO-57	C 5.0286E-02					2.72E+02	
		122.06	4.647E-02	@(	8.832E-02	7.14E+01	8.56E+01 G
		136.47	8.090E-02	(	8.648E-01	3.12E+02	1.07E+01 G
CO-60	F 1.2354E-02					1.93E+03	
		1332.50	-6.953E-03	?(	2.431E-01	9.39E+02	1.00E+02 G
		1173.24	3.168E-02	?(	2.171E-01	1.91E+02	9.99E+01 G
ZN-65	F -1.7172E-01					2.44E+02	
		1115.55	-1.717E-01	?(	6.108E-01	1.04E+02	5.06E+01 G
NB-94	I -2.9579E-03					7.41E+06	
		702.63	-2.958E-03	%(	1.818E-01	1.70E+03	9.79E+01 G
		871.10	-6.582E-03	+	1.948E-01	8.13E+02	9.99E+01 G
ZR-95	I 5.7400E-02					6.40E+01	
		756.73	5.740E-02	&(	3.534E-01	1.76E+02	5.45E+01 G
		724.20	-2.808E-03	%	4.430E-01	4.38E+03	4.42E+01 G
NB-95	I -2.2007E-02					6.40E+01	
		765.79	-2.201E-02	?(	2.082E-01	2.68E+02	9.98E+01 G
RU-103	I -2.5428E-02					3.93E+01	
		497.05	-2.543E-02	?(	1.628E-01	1.84E+02	9.09E+01 G
		610.30	8.439E+00	?	2.723E+00	1.38E+01	5.75E+00 GA

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
RH-106	I	-2.4924E-01				3.74E+02		
			621.92	-2.492E-01	?(	1.888E+00	2.17E+02	9.93E+00 G
			1050.36	2.112E-01	%	1.433E+01	1.85E+03	1.56E+00 G
			511.86	1.837E+00	*	1.120E+00	2.07E+01	2.00E+01 GA
AG-108M	C	3.5417E-02				1.53E+05		
			433.94	3.542E-02	&(	1.333E-01	1.10E+02	9.05E+01 G
			722.94	-3.428E-02	+	2.264E-01	1.89E+02	9.08E+01 G
			614.28	-6.601E-02	&	2.165E-01	9.69E+01	8.98E+01 G
AG-110M	F	-5.1563E-05				2.50E+02		
			884.68	-5.156E-05	&(	2.771E-01	1.47E+05	7.27E+01 G
			657.76	9.139E-04	%	1.779E-01	5.37E+03	9.46E+01 G
			937.49	-5.087E-03	%	6.525E-01	3.53E+03	3.44E+01 G
			1384.30	-2.019E-01	+	1.054E+00	1.47E+02	2.43E+01 G
			763.94	-6.979E-02	+	9.005E-01	3.63E+02	2.23E+01 G
SN-113	F	-3.8351E-03				1.15E+02		
			391.69	-3.835E-03	%(	1.907E-01	1.39E+03	6.40E+01 G
SB-124	F	7.8273E-02				6.02E+01		
			602.73	7.827E-02	@(	1.573E-01	6.12E+01	9.83E+01 G
			1690.98	3.630E-03	%	4.753E-01	3.33E+03	4.78E+01 G
			722.79	0.000E+00	-	3.331E+00	1.00E+03	1.08E+01 G
SB-125	I	1.1664E-01				1.01E+03		
			427.88	-5.818E-02	&(	4.768E-01	2.35E+02	2.96E+01 G
			600.50	0.000E+00	+	1.112E+00	1.00E+03	1.79E+01 G
			635.89	3.988E-01	?(	1.277E+00	9.38E+01	1.13E+01 G
			463.37	3.061E-01	&(	1.271E+00	1.21E+02	1.05E+01 G
I-131	I	7.7910E-02				8.02E+00		
			364.48	3.240E-02	&(	1.726E-01	1.55E+02	8.17E+01 G
			284.30	6.834E-01	(	1.741E+00	7.63E+01	6.14E+00 G
			636.97	-4.084E-01	+	2.470E+00	1.73E+02	7.17E+00 G
Gd-153	F	8.4098E-03				2.42E+02		
			97.50	8.410E-03	%(	3.132E-01	1.09E+03	3.00E+01 G
			103.20	-6.532E-02	+	4.397E-01	1.99E+02	2.18E+01 G
Ga-68	C	4.1413E+00				4.71E-02		
			1077.40	4.141E+00	&(	1.014E+01	7.32E+01	3.30E+00 G
Tc-99m	I	3.9321E-02				2.51E-01		
			140.51	3.932E-02	?(	1.135E-01	8.64E+01	8.93E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
BA-133	F 2.0313E-01					3.85E+03	
		356.00	2.007E-01	(	1.725E-01	3.75E+01	6.20E+01 G
		302.85	2.115E-01	(	6.685E-01	9.38E+01	1.83E+01 G
		383.84	2.202E-01		1.450E+00	1.90E+02	8.94E+00 GA
		80.99	-6.274E-03	%	2.507E-01	1.16E+03	3.41E+01 GA
CS-134	I 8.4107E-02					7.54E+02	
		604.71	-2.802E-02	?(	2.138E-01	2.20E+02	9.76E+01 G
		795.87	1.336E-01	?(	2.051E-01	4.83E+01	8.55E+01 G
		569.32	-1.635E-01	+	9.982E-01	1.75E+02	1.54E+01 G
		801.95	4.509E-01	&(	2.098E+00	1.34E+02	8.69E+00 G
		563.24	5.064E-01	&(	1.507E+00	8.76E+01	8.35E+00 G
CS-137	I -1.2832E-03					1.10E+04	
		661.66	-1.283E-03	&(	1.809E-01	3.85E+03	8.52E+01 G
CE-139	F 3.4145E-02					1.38E+02	
		165.85	3.415E-02	?(	1.134E-01	9.87E+01	7.99E+01 G
Ba-140	I 1.5186E-01					1.28E+01	
		537.26	1.234E-01	?(	5.730E-01	1.34E+02	2.44E+01 G
		162.66	1.837E-01	?(	1.207E+00	1.91E+02	6.22E+00 G
		304.85	2.677E-01	&(	2.706E+00	2.90E+02	4.29E+00 G
La-140	I 8.1260E-03					1.28E+01	
		1596.21	0.000E+00	?(	1.663E-01	1.00E+03	9.54E+01 G
		487.02	-2.212E-03	%	2.961E-01	3.71E+03	4.55E+01 G
		328.76	4.631E-02	?(	5.914E-01	3.65E+02	2.03E+01 G
		815.77	-1.766E-01	+	8.941E-01	1.46E+02	2.33E+01 G
CE-141	I -1.0470E-03					3.25E+01	
		145.44	-1.047E-03	%(	1.952E-01	5.39E+03	4.82E+01 G
CE-144	I 1.6635E-01					2.85E+02	
		133.54	1.664E-01	&(	8.052E-01	1.43E+02	1.11E+01 G
EU-152	F 4.5733E-02					4.94E+03	
		344.29	-7.246E-03	%(	4.949E-01	1.94E+03	2.65E+01 G
		1112.07	0.000E+00	+	1.297E+00	1.00E+03	1.36E+01 G
		121.78	9.486E-02	(	3.096E-01	9.74E+01	2.86E+01 G
		778.92	-1.816E-01	+	1.593E+00	2.49E+02	1.29E+01 G
		964.11	3.963E-02	&	1.564E+00	1.09E+03	1.46E+01 G
		244.69	-7.812E-01	+	1.836E+00	7.09E+01	7.58E+00 G
		1408.00	3.131E-01	?	9.766E-01	9.05E+01	2.10E+01 GA

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
EU-154	I 2.4021E-02					3.14E+03	
		873.23	2.402E-02	%(	1.554E+00	1.76E+03	1.23E+01 G
		123.10	6.335E-03	%	2.243E-01	1.03E+03	4.08E+01 G
		1274.54	-9.297E-02	+	6.762E-01	2.02E+02	3.52E+01 G
		723.36	-2.300E-01	+	1.074E+00	1.36E+02	2.02E+01 G
		1004.77	1.083E-02	%	1.202E+00	3.02E+03	1.80E+01 G
		996.33	-2.208E-01	+	2.334E+00	2.97E+02	1.06E+01 G
EU-155	I 2.6874E-01					1.81E+03	
		105.31	5.243E-02	?(	4.003E-01	2.24E+02	2.12E+01 G
		86.54	4.181E-01	&(	3.183E-01	2.45E+01	3.07E+01 G
HF-181	F 3.2877E-02					4.24E+01	
		482.00	0.000E+00	&(	1.919E-01	1.00E+03	8.05E+01 G
		133.02	1.148E-02	?(	2.116E-01	5.36E+02	4.33E+01 G
		345.83	1.359E-01	&(	7.900E-01	1.68E+02	1.51E+01 G
		136.30	3.783E-01	@(	1.382E+00	1.08E+02	5.85E+00 G
Ta-182	F 1.8515E-01					1.14E+02	
		1121.30	2.184E-01	(	6.806E-01	9.14E+01	3.49E+01 G
		1221.41	1.421E-01	?(	1.003E+00	1.99E+02	2.70E+01 G
		1189.05	3.973E-02	&	1.598E+00	1.10E+03	1.62E+01 G
Hg-203	F 2.3831E-02					4.66E+01	
		279.20	2.383E-02	?(	1.457E-01	1.78E+02	8.15E+01 G
TL-208	N 6.7298E-01					6.98E+02	
		583.02	6.580E-01	(P	2.156E-01	1.30E+01	8.45E+01 G
		277.28	8.738E-01	(	1.961E+00	6.78E+01	6.31E+00 G
		860.56	1.791E-01	-	1.586E+00	2.49E+02	1.24E+01 G
pm-146	C 6.1230E-02					2.02E+03	
		747.16	-3.787E-03	%(	5.066E-01	3.66E+03	3.40E+01 G
		735.72	-8.152E-02	+	8.807E-01	3.05E+02	2.25E+01 G
		453.88	9.524E-02	(	1.984E-01	6.33E+01	6.50E+01 G
y-88	F 3.9052E-02					1.07E+02	
		898.04	3.905E-02	&(	1.345E-01	9.86E+01	9.37E+01 G
		1836.06	-3.085E-03	%	2.886E-01	2.45E+03	9.92E+01 G
Cd-109	F 2.9996E-01					4.53E+02	
		88.04	3.000E-01	(	2.656E+00	2.61E+02	3.79E+00 G
Ra-226	N -4.5935E-01					5.84E+05	
		185.99	-4.594E-01	@(P	4.055E+00	3.87E+01	3.28E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-210	N	9.2990E-01					8.14E+03	
			46.54	9.299E-01	*(P	2.621E+00	1.87E+01	4.25E+00 G
PB-212	N	1.4892E+00					6.98E+02	
			238.63	1.489E+00	(P	3.206E-01	8.01E+00	4.33E+01 G
			300.03	4.665E+00	+ P	2.779E+00	2.32E+01	3.28E+00 GA
PB-214	N	9.8587E-01					5.84E+05	
			351.93	9.110E-01	(P	3.917E-01	1.37E+01	3.76E+01 G
			295.09	1.132E+00	(P	5.918E-01	1.64E+01	1.93E+01 G
			242.00	1.861E+00	+ P	1.764E+00	3.29E+01	7.43E+00 GA
BI-207	C	2.8463E-02					1.18E+04	
			569.70	-1.067E-02	?(	1.219E-01	3.15E+02	9.77E+01 G
			1063.66	7.980E-02	?(	3.019E-01	1.10E+02	7.45E+01 G
BI-212	N	4.1544E+00					6.98E+02	
			727.17	4.154E+00	(	1.566E+00	1.98E+01	7.55E+00 G
			785.42	7.859E-02	%	1.474E+01	5.15E+03	1.28E+00 GA
BI-214	N	8.9851E-01					5.84E+05	
			609.31	8.985E-01	(P	4.209E-01	1.21E+01	4.61E+01 G
			1120.29	5.926E-01	- P	1.529E+00	2.96E+01	1.51E+01 G
			1764.49	5.625E-01	- P	2.338E+00	3.55E+01	1.54E+01 G
BI-210M	T	3.5240E-02					1.10E+09	
			265.83	3.214E-02	&(	2.008E-01	1.81E+02	5.00E+01 G
			304.90	4.078E-02	&(	4.276E-01	3.01E+02	2.80E+01 G
RA-224	N	-6.6967E+00					6.98E+02	
			240.99	-6.697E+00	?(	6.081E+00	2.84E+01	4.10E+00 G
AC-228	N	2.1017E+00					2.10E+03	
			911.16	2.098E+00	(	5.181E-01	1.54E+01	2.90E+01 G
			968.97	1.182E+00	-	1.296E+00	3.60E+01	1.75E+01 G
			338.32	2.112E+00	(	1.144E+00	2.53E+01	1.20E+01 G
			93.35	1.825E+00		1.887E+00	3.24E+01	5.56E+00 XA
TH-227	N	7.0420E-01					7.95E+03	
			235.97	7.042E-01	?(	4.869E-01	2.50E+01	1.23E+01 G
			50.14	1.774E-01	&	1.088E+00	1.80E+02	8.00E+00 G
			256.24	2.387E-02	&	1.626E+00	1.95E+03	7.00E+00 G
TH-229	N	-6.8935E-01					2.68E+06	
			193.51	-6.894E-01	&(	2.659E+00	1.15E+02	4.40E+00 G
			210.85	-1.470E+00	+	3.934E+00	8.03E+01	2.99E+00 G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
TH-234	N	1.9095E+00					1.63E+12	
			63.29	1.910E+00	@(P	2.450E+00	1.85E+01	3.81E+00 G
			92.59	-1.669E-01	- P	2.081E+00	2.26E+01	5.58E+00 G
PA-231	N	2.1774E+00					1.20E+07	
			302.65	1.085E+00	(	4.302E+00	1.17E+02	2.88E+00 G
			300.07	3.456E+00	(	4.869E+00	4.40E+01	2.46E+00 G
PA-233	C	2.8999E-01					7.82E+08	
			312.01	1.075E-01	&(	3.542E-01	9.77E+01	3.60E+01 G
			300.18	1.350E+00	(	1.949E+00	4.50E+01	6.20E+00 G
PA-234	N	9.5687E-02					1.63E+12	
			131.29	-1.176E-01	?(	5.614E-01	1.41E+02	1.80E+01 G
			946.02	3.822E-01	?(	1.421E+00	1.08E+02	1.34E+01 G
			569.47	-3.402E-01	+	1.915E+00	1.62E+02	8.20E+00 G
			883.24	4.697E-02	&	2.073E+00	1.21E+03	9.60E+00 G
			880.53	7.326E-02	%	3.036E+00	1.13E+03	6.00E+00 GA
PA-234M	N	3.4999E-01					1.63E+12	
			1001.00	3.500E-01	&(	2.929E+01	2.31E+03	8.37E-01 G
			766.41	-8.212E-01	%	6.333E+01	2.12E+03	2.94E-01 G
U-235	N	4.9343E-01					2.57E+11	
			143.79	3.068E-01	(	8.586E-01	8.39E+01	1.10E+01 G
			205.33	9.016E-01	?(	2.205E+00	7.36E+01	5.01E+00 G
			163.38	9.695E-02	&	1.478E+00	4.37E+02	5.08E+00 G
AM-241	T	9.2576E-02					1.58E+05	
			59.54	9.258E-02	?(	2.204E-01	7.18E+01	3.59E+01 G
Ir-192	F	1.1761E-01					7.40E+01	
			316.49	-3.402E-02	?(	1.494E-01	1.29E+02	8.70E+01 G
			468.06	5.297E-02	?(	2.613E-01	1.42E+02	5.18E+01 G
			308.44	1.799E-02	?(	3.675E-01	5.81E+02	3.18E+01 G
			295.95	7.710E-01	(	3.665E-01	1.74E+01	3.02E+01 G
Np-237	F	7.7966E-02					2.14E+06	
			86.49	7.797E-02	(	7.618E-01	2.88E+02	1.31E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.

% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity	
TH-227	50.20	136.	9.	0.001	180.31	1.774E-01	
AM-241	59.13	126.	23.	0.003	71.76	9.258E-02	
EU-155	87.20	209.	92.	0.013	24.53	4.181E-01	
Gd-153	103.26	189.	-10.	-0.001	198.52	-6.532E-02	
EU-155	104.80	145.	8.	0.001	223.97	5.243E-02	
EU-152	121.97	142.	18.	0.002	97.38	9.486E-02	
PA-234	131.86	175.	-13.	-0.002	141.38	-1.176E-01	
HF-181	133.40	141.	3.	0.000	536.05	1.148E-02	
CE-144	133.42	133.	12.	0.002	142.88	1.664E-01	
HF-181	135.47	105.	14.	0.002	108.32	3.783E-01	
Tc-99m	140.71	129.	19.	0.003	86.42	3.932E-02	
U-235	144.14	136.	20.	0.003	83.86	3.068E-01	
Ba-140	164.44	72.	6.	0.001	190.69	1.837E-01	
U-235	165.72	71.	3.	0.000	437.01	9.695E-02	
CE-139	166.06	104.	15.	0.002	98.71	3.415E-02	
Ra-226	186.08	192.	-8.	-0.001	38.69	-4.594E-01	P
TH-229	194.09	137.	-15.	-0.002	114.50	-6.894E-01	
U-235	205.42	110.	21.	0.003	73.62	9.016E-01	
TH-229	210.57	120.	-20.	-0.003	80.30	-1.470E+00	
TH-227	233.79	23.	36.	0.005	25.03	7.042E-01	
RA-224	240.01	457.	-113.	-0.016	28.43	-6.697E+00	
EU-152	243.86	133.	-24.	-0.003	70.91	-7.812E-01	
BI-210M	264.55	58.	6.	0.001	180.77	3.214E-02	
Hg-203	279.30	75.	7.	0.001	177.87	2.383E-02	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
I-131	284.06	58.	15.	0.002	76.34	6.834E-01	
Ir-192	295.34	58.	81.	0.011	17.43	7.710E-01	
PA-231	300.03	68.	29.	0.004	44.02	3.456E+00	
PA-233	299.98	69.	29.	0.004	45.01	1.350E+00	
PA-231	302.96	72.	11.	0.001	116.65	1.085E+00	
Ba-140	305.06	62.	4.	0.001	290.18	2.677E-01	
BI-210M	304.91	66.	4.	0.001	301.25	4.078E-02	
Ir-192	308.35	61.	2.	0.000	581.35	1.799E-02	
PA-233	311.30	72.	13.	0.002	97.68	1.075E-01	
Ir-192	316.23	73.	-10.	-0.001	128.88	-3.402E-02	
CR-51	322.65	54.	1.	0.000	734.09	4.404E-02	
La-140	326.44	58.	3.	0.000	364.60	4.631E-02	
HF-181	345.90	52.	6.	0.001	168.08	1.359E-01	
I-131	363.78	67.	8.	0.001	155.15	3.240E-02	
SB-125	428.05	51.	-4.	-0.001	234.85	-5.818E-02	
AG-108M	433.08	35.	8.	0.001	109.85	3.542E-02	
pm-146	454.12	37.	15.	0.002	63.26	9.524E-02	
SB-125	463.36	38.	8.	0.001	120.80	3.061E-01	
Ir-192	468.25	39.	6.	0.001	142.50	5.297E-02	
PM-144	476.99	49.	-1.	0.000	891.95	-1.143E-02	
RU-103	498.23	42.	-5.	-0.001	183.77	-2.543E-02	
RH-106	510.96	97.	80.	0.011	20.75	1.837E+00	
Ba-140	537.21	32.	6.	0.001	133.93	1.234E-01	
CS-134	563.15	23.	8.	0.001	87.65	5.064E-01	
CS-134	570.19	35.	-5.	-0.001	174.58	-1.635E-01	
PA-234	570.21	37.	-6.	-0.001	161.61	-3.402E-01	
BI-207	567.32	20.	-2.	0.000	314.79	-1.067E-02	
SB-124	601.72	32.	14.	0.002	61.24	7.827E-02	
CS-134	604.57	61.	-5.	-0.001	220.01	-2.802E-02	
RU-103	609.54	32.	90.	0.013	13.76	8.439E+00	
AG-108M	611.80	51.	-11.	-0.002	96.86	-6.601E-02	
PM-144	618.50	56.	-6.	-0.001	185.75	-3.199E-02	
RH-106	622.42	46.	-5.	-0.001	216.88	-2.492E-01	
SB-125	637.95	25.	8.	0.001	93.83	3.988E-01	
I-131	636.45	39.	-5.	-0.001	173.44	-4.084E-01	
AG-108M	722.59	42.	-5.	-0.001	189.31	-3.428E-02	
EU-154	722.57	47.	-7.	-0.001	135.71	-2.300E-01	
pm-146	736.07	38.	-3.	0.000	305.16	-8.152E-02	
ZR-95	756.31	33.	5.	0.001	175.73	5.740E-02	
AG-110M	763.99	36.	-2.	0.000	362.73	-6.979E-02	
NB-95	766.03	38.	-3.	0.000	268.21	-2.201E-02	
EU-152	779.30	37.	-4.	0.000	248.71	-1.816E-01	
CS-134	795.22	25.	17.	0.002	48.32	1.336E-01	
CS-134	802.39	26.	6.	0.001	133.55	4.509E-01	
La-140	815.99	34.	-6.	-0.001	145.64	-1.766E-01	
MN-54	835.67	26.	2.	0.000	396.55	1.305E-02	
NB-94	871.52	26.	-1.	0.000	812.78	-6.582E-03	
y-88	902.64	9.	5.	0.001	98.57	3.905E-02	

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
PA-234	944.96		21.	6.	0.001	107.51	3.822E-01
EU-154	996.36		33.	-3.	0.000	297.40	-2.208E-01
BI-207	1062.99		24.	7.	0.001	109.59	7.980E-02
Ga-68	1078.27		16.	9.	0.001	73.16	4.141E+00
FE-59	1098.84		23.	2.	0.000	334.03	3.399E-02
ZN-65	1117.53		43.	-9.	-0.001	104.41	-1.717E-01
Sc-46	1120.12		22.	16.	0.002	48.35	1.480E-01
CO-60	1174.62		18.	3.	0.000	190.93	3.168E-02
Co-56	1239.14		28.	7.	0.001	107.71	1.143E-01
NA-22	1274.85		18.	-3.	0.000	202.59	-3.270E-02
EU-154	1274.84		18.	-3.	0.000	202.39	-9.297E-02
FE-59	1292.83		13.	5.	0.001	105.29	1.319E-01
CO-60	1329.15		17.	-1.	0.000	939.41	-6.953E-03
AG-110M	1381.48		18.	-4.	-0.001	147.39	-2.019E-01
EU-152	1408.34		10.	6.	0.001	90.50	3.131E-01
Co-56	1771.16		20.	-3.	0.000	213.67	-2.885E-01

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
BE-7	#A	1.4618E-02	1.4618E-02	2.581E+03%	1.35E+00
NA-22	#A	-3.2700E-02	-3.2700E-02	2.026E+02%	2.38E-01
K-40	#	1.9409E+01	1.9409E+01	8.384E+00%	3.17E+00
Sc-46	#A	7.4007E-02	7.4008E-02	4.835E+01%	3.08E-01
CR-51	#A	4.4041E-02	4.4041E-02	7.341E+02%	1.14E+00
MN-54	#A	1.3054E-02	1.3054E-02	3.965E+02%	1.87E-01
FE-59	#A	7.6410E-02	7.6411E-02	1.053E+02%	4.10E-01
Co-56	#A	4.6466E-02	4.6466E-02	1.077E+02%	2.08E-01
CO-57	A	5.0286E-02	5.0286E-02	7.136E+01%	8.83E-02
CO-58	#A	0.0000E+00	0.0000E+00	1.000E+03%	2.30E-01
CO-60	#A	1.2354E-02	1.2354E-02	1.909E+02%	2.43E-01
ZN-65	#A	-1.7172E-01	-1.7172E-01	1.044E+02%	6.11E-01
NB-94	#A	-2.9579E-03	-2.9579E-03	1.698E+03%	1.82E-01
ZR-95	#A	5.7400E-02	5.7400E-02	1.757E+02%	3.53E-01
NB-95	#A	-2.2007E-02	-2.2007E-02	2.682E+02%	2.08E-01
RU-103	#A	-2.5428E-02	-2.5428E-02	1.838E+02%	1.63E-01
RH-106	#A	-2.4924E-01	-2.4924E-01	2.169E+02%	1.89E+00
AG-108M	#A	3.5417E-02	3.5417E-02	1.098E+02%	1.33E-01
AG-110M	#A	-5.1563E-05	-5.1563E-05	1.467E+05%	2.77E-01
SN-113	#A	-3.8351E-03	-3.8351E-03	1.392E+03%	1.91E-01
SB-124	#A	7.8272E-02	7.8273E-02	6.124E+01%	1.57E-01
SB-125	#A	1.1664E-01	1.1664E-01	9.342E+01%	4.77E-01
I-131	#A	7.7905E-02	7.7910E-02	7.634E+01%	1.73E-01
Gd-153	#A	8.4098E-03	8.4098E-03	1.087E+03%	3.13E-01

Ga-68	#A	4.1033E+00	4.1413E+00	7.316E+01%	1.01E+01
Tc-99m	#A	3.9253E-02	3.9321E-02	8.642E+01%	1.14E-01
BA-133		2.0313E-01	2.0313E-01	3.755E+01%	1.73E-01
CS-134	#A	8.4107E-02	8.4107E-02	4.832E+01%	2.14E-01
CS-137	#A	-1.2832E-03	-1.2832E-03	3.851E+03%	1.81E-01
CE-139	#A	3.4145E-02	3.4145E-02	9.871E+01%	1.13E-01
Ba-140	#A	1.5186E-01	1.5186E-01	1.241E+02%	5.73E-01
La-140	#A	8.1257E-03	8.1260E-03	3.646E+02%	1.66E-01
CE-141	#A	-1.0469E-03	-1.0470E-03	5.391E+03%	1.95E-01
CE-144	#A	1.6635E-01	1.6635E-01	1.429E+02%	8.05E-01
PM-144	#A	0.0000E+00	0.0000E+00	1.000E+03%	1.97E-01
EU-152	#A	4.5733E-02	4.5733E-02	9.738E+01%	4.95E-01
EU-154	#A	2.4021E-02	2.4021E-02	1.764E+03%	1.55E+00
EU-155	#A	2.6874E-01	2.6874E-01	2.453E+01%	4.00E-01
HF-181	#A	3.2877E-02	3.2877E-02	1.083E+02%	1.92E-01
Ta-182	A	1.8515E-01	1.8515E-01	9.145E+01%	6.81E-01
Hg-203	#A	2.3830E-02	2.3831E-02	1.779E+02%	1.46E-01
TL-208		6.7297E-01	6.7298E-01	1.515E+01%	2.16E-01
pm-146	#A	6.1230E-02	6.1230E-02	6.326E+01%	5.07E-01
y-88	#A	3.9052E-02	3.9052E-02	9.857E+01%	1.34E-01
Cd-109	A	2.9996E-01	2.9996E-01	2.610E+02%	2.66E+00
Ra-226	#A	-4.5935E-01	-4.5935E-01	3.129E+02%	4.05E+00
PB-210	#A	9.2990E-01	9.2990E-01	8.881E+01%	2.62E+00
PB-212		1.4892E+00	1.4892E+00	9.350E+00%	3.21E-01
PB-214	#	9.8587E-01	9.8587E-01	1.339E+01%	3.92E-01
BI-207	#A	2.8463E-02	2.8463E-02	1.096E+02%	1.22E-01
BI-212		4.1544E+00	4.1544E+00	1.980E+01%	1.57E+00
BI-214		8.9851E-01	8.9851E-01	1.730E+01%	4.21E-01
BI-210M	#A	3.5240E-02	3.5240E-02	1.757E+02%	2.01E-01
RA-224	#A	-6.6967E+00	-6.6967E+00	2.843E+01%	6.08E+00
AC-228		2.1017E+00	2.1017E+00	1.482E+01%	5.18E-01
TH-227	#	7.0420E-01	7.0420E-01	2.503E+01%	4.87E-01
TH-229	#A	-6.8935E-01	-6.8935E-01	1.145E+02%	2.66E+00
TH-234	#A	1.9095E+00	1.9095E+00	4.076E+01%	2.45E+00
PA-231	#A	2.1774E+00	2.1774E+00	4.402E+01%	4.30E+00
PA-233	#A	2.8999E-01	2.8999E-01	4.501E+01%	3.54E-01
PA-234	#A	9.5687E-02	9.5687E-02	8.881E+01%	5.61E-01
PA-234M	#A	3.4999E-01	3.4999E-01	2.311E+03%	2.93E+01
U-235	#A	4.9343E-01	4.9343E-01	5.579E+01%	8.59E-01
AM-241	#A	9.2576E-02	9.2576E-02	7.176E+01%	2.20E-01
Ir-192	#A	1.1761E-01	1.1761E-01	1.743E+01%	1.49E-01
Np-237	A	7.7966E-02	7.7966E-02	2.877E+02%	7.62E-01

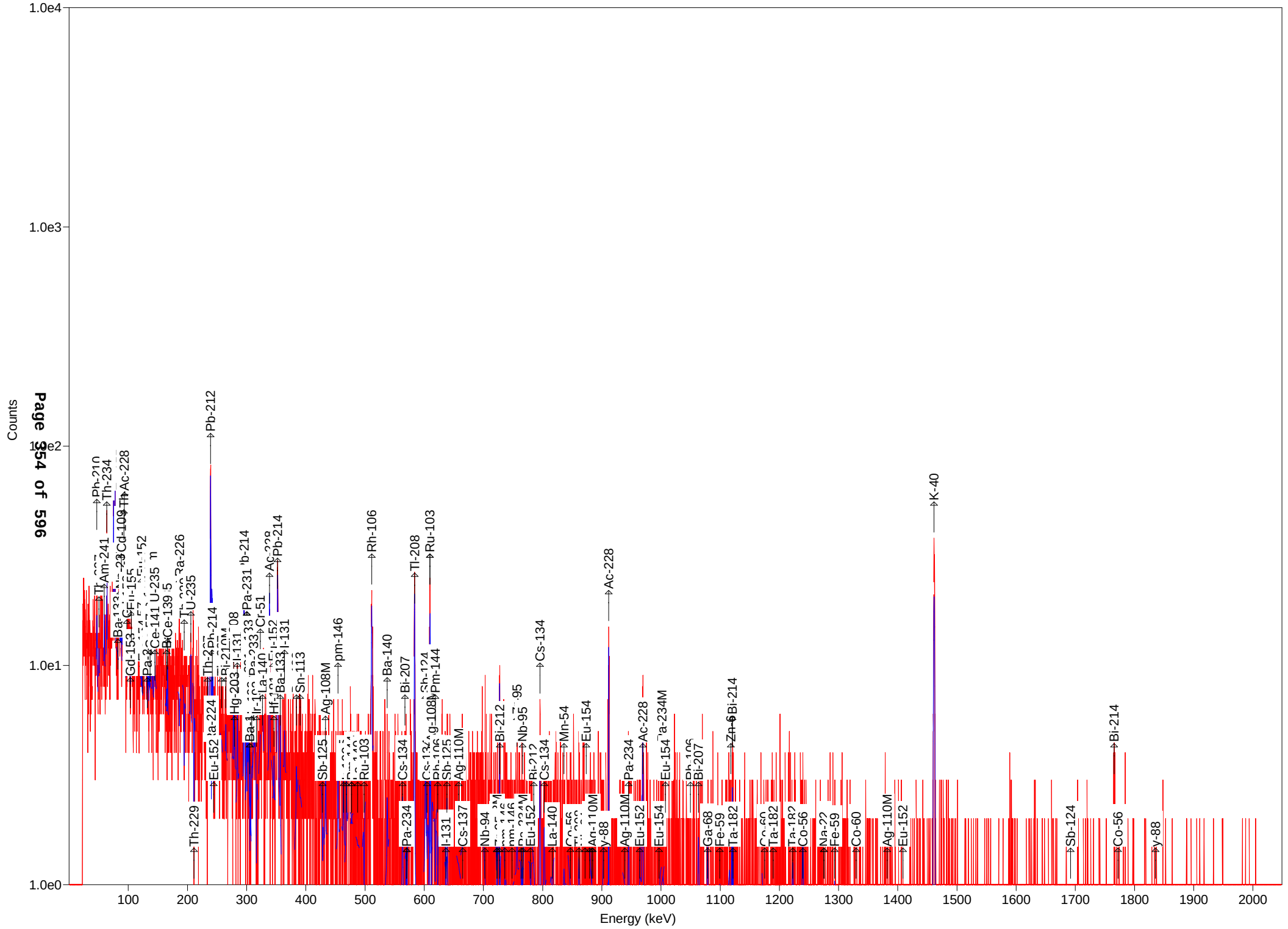
- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (1188.8 to 1999.5 keV)	3.187E+01	Bq/Sample
Total Decayed Activity (1188.8 to 1999.5 keV)	3.1874889E+01	Bq/Sample

140177_Gamma_680-102600-A-8-H. 14_Gamma_20141888.spc.



Daily Checks

Test America
St. Louis
Background Check

Spectrum: 4_20140826001_BG
Acquired: 8/26/2014 12:01:17 AM
Detector: Ge 4 SN/181
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.32	1.20	1.24	1.29	1.39	1.43	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

TestAmerica Spectrum name: 4_20140826001_BG.An1

Sample description
Background Contamination Check

Spectrum Filename: C:\User\SPC\Det4\4_20140826001_BG.An1

Acquisition information
Start time:	8/26/2014 12:01:17 AM
Live time:	1800
Real time:	1802
Dead time:	0.12 %
Detector ID:	4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_QC.Clb
4_QA-D_Rad11-0018_032612

Energy Calibration
Created:	2/28/2012 2:55:17 PM
Zero offset:	0.091 keV
Gain:	0.250 keV/channel
Quadratic:	-2.917E-08 keV/channel^2

Efficiency Calibration
Created:	3/27/2012 7:34:55 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (1999.44keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

TestAmerica Spectrum name: 4_20140826001_BG.An1

Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 0 cutoff: 5.00E+01%

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc

No unknown peaks passed sensitivity test.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS	COMMENTS

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.

- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- - - -

SB-124	<	2.0391E-01
SB-125	<	3.7799E-01
I-131	<	2.9183E-01
BA-133	<	3.9189E-01
CS-134	<	2.0710E-01
CS-137	<	3.2058E-01
CE-139	<	8.5752E-02
Ba-140	<	6.3383E-01
La-140	<	5.4812E-01
CE-141	<	2.4369E-01
CE-144	<	8.5095E-01
PM-144	<	2.8937E-01
EU-152	<	3.5036E-01
EU-154	<	3.0996E+00
EU-155	<	5.3914E-01
HF-181	<	1.6099E-01
Ta-182	<	1.2935E+00
Hg-203	<	1.0091E-01
TL-208	<	2.7473E-01
pm-146	<	1.3263E+00
y-88	<	4.2545E-01
PB-210	<	9.9603E+00
PB-212	<	4.1940E-01
PB-214	<	5.9356E-01
BI-207	<	1.7836E-01
BI-212	<	7.0619E+00
BI-214	<	8.5870E-01
BI-210M	<	4.7778E-01
RA-224	<	4.4465E+00
AC-228	<	2.4660E+00
TH-227	<	7.8362E-01
TH-229	<	2.0482E+00
TH-234	<	9.3844E+00
PA-231	<	6.0751E+00
PA-233	<	3.0581E-01
PA-234	<	3.5694E-01
PA-234M	<	7.3644E+01
Ra-226	<	4.1254E+00
U-235	<	1.2238E+00
AM-241	<	4.6236E-01
Np-237	<	5.0573E-01

  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

TestAmerica Spectrum name: 4_20140826001_BG.An1

--- S U M M A R Y ---

Total Activity (37.6 to 1999.4 keV)	0.000E+00	DPS

Test America
St. Louis
Quality Control Check

Spectrum: 4_20140826002_QCAsLeft
Acquired: 8/26/2014 1:27:22 AM
Detector: Ge 4 SN/181
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.00	239.00	240.00	PASS
Energy	59.54	59.22	59.29	59.64	59.79	59.86	PASS
FWHM	0.77	0.00	0.00	1.19	1.87	1.97	PASS
ActivityDiff	650.60	-5.00	-4.00	-1.62	4.00	5.00	PASS
QA-662							
FWHM	1.34	0.00	0.00	1.62	3.04	3.14	PASS
ActivityDiff	609.90	-5.00	-4.00	-3.65	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.40	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.69	1333.01	1333.26	PASS
FWHM	1.84	0.00	0.00	1.99	4.04	4.14	PASS
ActivityDiff	1189.70	-5.00	-4.00	-3.07	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

TestAmerica Spectrum name: 4_20140826002_QCAsLeft.An1

Sample description
Quality control Check (QC Source 'D') Post Stabilization

Spectrum Filename: C:\User\SPC\Det4\4_20140826002_QCAsLeft.An1

Acquisition information
Start time:	8/26/2014 1:27:22 AM
Live time:	1000
Real time:	1015
Dead time:	1.45 %
Detector ID:	4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_QC.Clb
4_QA-D_Rad11-0018_032612

Energy Calibration
Created:	2/28/2012 2:55:17 PM
Zero offset:	0.091 keV
Gain:	0.250 keV/channel
Quadratic:	-2.917E-08 keV/channel^2

Efficiency Calibration
Created:	3/27/2012 7:34:55 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_QC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (1999.44keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	1.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

TestAmerica Spectrum name: 4_20140826002_QCAsLeft.An1

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	4/1/2009 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 5 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1060

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. GPS	Nuc
59.64	28806.	0.66	1.19	4.402E-02	59.54	100.000	6.612E+02	QA60
88.17	3101.	2.30	1.25	6.283E-02	88.03	100.000	9.484E+02	QA88
661.64	8366.	1.20	1.62	1.499E-02	661.66	100.000	6.321E+02	QA662
1173.43	5300.	1.49	1.94	8.790E-03	1173.23	100.000	1.227E+03	QA1173
1332.69	4723.	1.49	1.99	7.837E-03	1332.51	100.000	1.226E+03	QA1332

No unknown peaks passed sensitivity test.

This section based on library: DET_QC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
QA-60	238.07	59.64	1743.	28806.	28.806	0.66	1.187s
QA-88	352.11	88.17	478.	3101.	3.101	2.30	1.248s
QA-662	2645.40	661.64	280.	8366.	8.366	1.20	1.615s
QA-1173	4693.08	1173.43	134.	5300.	5.300	1.49	1.939
QA-1332	5330.48	1332.69	29.	4723.	4.723	1.49	1.992

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity GPS	Peak Energy keV	Peak Activity GPS		Peak Code	MDA Value GPS		COMMENTS
QA-60		6.6115E+02					1.58E+05		
			59.54	6.612E+02	*(	4.528E+00	6.57E-01	1.00E+02	G
QA-88		9.4836E+02					4.63E+02		
			88.03	9.484E+02	*(	3.199E+01	2.30E+00	1.00E+02	G
QA-662		6.3215E+02					1.10E+04		
			661.66	6.321E+02	(	6.097E+00	1.20E+00	1.00E+02	G
QA-1173		1.2267E+03					1.92E+03		
			1173.23	1.227E+03	(	1.312E+01	1.49E+00	1.00E+02	G
QA-1332		1.2262E+03					1.92E+03		
			1332.51	1.226E+03	(	7.237E+00	1.49E+00	1.00E+02	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average

R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity GPS	Time Corrected Activity GPS	Uncertainty 1 Sigma Counting	MDA
QA-60	#	6.5545E+02	6.6115E+02	6.566E-01%	4.53E+00
QA-88	#	4.9358E+01	9.4836E+02	2.302E+00%	3.20E+01
QA-122	<	1.7470E+00	2.6734E+02		
QA-166			>12 Halflives		
QA-279			>12 Halflives		
QA-392			>12 Halflives		
QA-514			>12 Halflives		
QA-662	#	5.5815E+02	6.3215E+02	1.198E+00%	6.10E+00
QA-898			>12 Halflives		
QA-1173		6.0288E+02	1.2267E+03	1.488E+00%	1.31E+01
QA-1332		6.0263E+02	1.2262E+03	1.486E+00%	7.24E+00
QA-1836			>12 Halflives		

\# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.4 keV) 2.468E+03 GPS
Total Decayed Activity (37.6 to 1999.4 keV) 4.6944932E+03 GPS

Test America
St. Louis
Quality Control Check

Spectrum: 4_20140908001_QCAsLeft
Acquired: 9/8/2014 7:10:57 AM
Detector: Ge 4 SN/181
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.54	59.22	59.29	59.61	59.79	59.86	PASS
FWHM	0.77	0.00	0.00	1.33	1.87	1.97	PASS
ActivityDiff	650.60	-5.00	-4.00	-1.52	4.00	5.00	PASS
QA-662							
FWHM	1.34	0.00	0.00	1.73	3.04	3.14	PASS
ActivityDiff	609.90	-5.00	-4.00	-0.94	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.90	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.55	1333.01	1333.26	PASS
FWHM	1.84	0.00	0.00	2.08	4.04	4.14	PASS
ActivityDiff	1189.70	-5.00	-4.00	-1.48	4.00	5.00	PASS

Analyst: Jody Watson Reviewer: Jody Watson

Test America
St. Louis
Background Check

Spectrum: 4_20140908002_BG
Acquired: 9/8/2014 7:32:37 AM
Detector: Ge 4 SN/181
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.32	1.20	1.24	1.28	1.39	1.43	PASS

Analyst: Jody Watson Reviewer: Jody Watson

Test America
St. Louis
Quality Control Check

Spectrum: 7_20140826001_QCAsLeft
Acquired: 8/26/2014 12:23:12 AM
Detector: Ge 7 SN/154
  Quality Control Evaluation Criteria:
  1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
  2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.80	239.00	240.00	PASS
Energy	59.58	59.04	59.29	59.57	59.79	60.04	PASS
FWHM	0.84	0.00	0.00	1.22	1.94	2.04	PASS
ActivityDiff	647.00	-5.00	-4.00	2.55	4.00	5.00	PASS
QA-662							
FWHM	1.45	0.00	0.00	1.70	3.15	3.25	PASS
ActivityDiff	606.50	-5.00	-4.00	0.40	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.40	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.67	1333.01	1333.26	PASS
FWHM	1.98	0.00	0.00	2.16	4.18	4.28	PASS
ActivityDiff	1183.00	-5.00	-4.00	0.23	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

TestAmerica Spectrum name: 7_20140826001_QCAsLeft.An1

Sample description
Quality control Check (QC Source 'C') Post Stabilization

Spectrum Filename: C:\User\SPC\Det7\7_20140826001_QCAsLeft.An1

Acquisition information
Start time:	8/26/2014 12:23:12 AM
Live time:	1000
Real time:	1032
Dead time:	3.06 %
Detector ID:	7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_QC.Clb
Ge7_QC

Energy Calibration
Created:	2/23/2012 8:40:56 AM
Zero offset:	0.117 keV
Gain:	0.250 keV/channel
Quadratic:	3.508E-09 keV/channel^2

Efficiency Calibration
Created:	1/6/2011 8:06:10 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_QC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (2000.12keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	1.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

TestAmerica Spectrum name: 7_20140826001_QCAsLeft.An1

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	4/1/2009 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 6 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0825

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. GPS	Nuc
59.57	70956.	0.41	1.22	1.136E-01	59.54	100.000	6.305E+02	QA60
88.03	8560.	1.39	1.21	1.845E-01	88.03	100.000	8.913E+02	QA88
122.01	558.	7.99	0.92	1.962E-01	122.06	100.000	4.353E+02	QA122
661.76	24969.	0.70	1.70	4.681E-02	661.66	100.000	6.041E+02	QA662
1173.41	13817.	0.99	1.98	2.392E-02	1173.23	100.000	1.175E+03	QA1173
1332.67	12330.	0.95	2.16	2.125E-02	1332.51	100.000	1.180E+03	QA1332

No unknown peaks passed sensitivity test.

This section based on library: DET_QC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
QA-60	237.84	59.57	3781.	70956.	70.956	0.41	1.219s
QA-88	351.68	88.03	1355.	8560.	8.560	1.39	1.208s
QA-122	487.77	122.05	821.	676.	0.676	8.99	1.403s
QA-662	2646.78	661.76	833.	24969.	24.969	0.70	1.704
QA-1173	4693.37	1173.41	585.	13817.	13.817	0.99	1.982
QA-1332	5330.41	1332.67	173.	12330.	12.330	0.95	2.161

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity GPS	Peak Energy keV	Peak Activity GPS		Code	MDA Value GPS		COMMENTS
QA-60		6.3053E+02					1.58E+05		
			59.54	6.305E+02	*(	2.570E+00	4.15E-01	1.00E+02	G
QA-88		8.9135E+02					4.63E+02		
			88.03	8.913E+02	*(	1.815E+01	1.39E+00	1.00E+02	G
QA-122		5.2683E+02					2.72E+02		
			122.06	5.268E+02	*(	1.062E+02	8.99E+00	1.00E+02	G
QA-662		6.0407E+02					1.10E+04		
			661.66	6.041E+02	(	3.319E+00	7.00E-01	1.00E+02	G
QA-1173		1.1752E+03					1.92E+03		
			1173.23	1.175E+03	(	9.817E+00	9.92E-01	1.00E+02	G
QA-1332		1.1803E+03					1.92E+03		
			1332.51	1.180E+03	(	6.133E+00	9.48E-01	1.00E+02	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape

C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity GPS	Time Corrected Activity GPS	Uncertainty 1 Sigma Counting	MDA
QA-60 #	6.2509E+02	6.3053E+02	4.150E-01%	2.57E+00
QA-88 #	4.6394E+01	8.9135E+02	1.392E+00%	1.81E+01
QA-122 #	3.4430E+00	5.2683E+02	8.987E+00%	1.06E+02
QA-166		>12 Halflives		
QA-279		>12 Halflives		
QA-392		>12 Halflives		
QA-514		>12 Halflives		
QA-662	5.3336E+02	6.0407E+02	6.997E-01%	3.32E+00
QA-898		>12 Halflives		
QA-1173	5.7758E+02	1.1752E+03	9.921E-01%	9.82E+00
QA-1332	5.8012E+02	1.1803E+03	9.479E-01%	6.13E+00
QA-1836		>12 Halflives		

\# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.1 keV) 2.366E+03 GPS
Total Decayed Activity (37.6 to 2000.1 keV) 5.0082666E+03 GPS

Test America
St. Louis
Background Check

Spectrum: 7_20140826002_BG
Acquired: 8/26/2014 1:06:00 AM
Detector: Ge 7 SN/154
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.29	1.40	1.45	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

TestAmerica Spectrum name: 7_20140826002_BG.An1

Sample description
Background Contamination Check

Spectrum Filename: C:\User\SPC\Det7\7_20140826002_BG.An1

Acquisition information
Start time:	8/26/2014 1:06:00 AM
Live time:	1800
Real time:	1833
Dead time:	1.83 %
Detector ID:	7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_QC.Clb
Ge7_QC

Energy Calibration
Created:	2/23/2012 8:40:56 AM
Zero offset:	0.117 keV
Gain:	0.250 keV/channel
Quadratic:	3.508E-09 keV/channel^2

Efficiency Calibration
Created:	1/6/2011 8:06:10 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (2000.12keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 0 cutoff: 5.00E+01%

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc

No unknown peaks passed sensitivity test.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS	COMMENTS

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.

- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

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SB-124	<	7.7339E-02
SB-125	<	1.8482E-01
I-131	<	5.5504E-02
BA-133	<	1.1488E-01
CS-134	<	1.4985E-01
CS-137	<	1.0264E-01
CE-139	<	6.7696E-02
Ba-140	<	2.7196E-01
La-140	<	2.3065E-01
CE-141	<	1.0009E-01
CE-144	<	3.1762E-01
PM-144	<	1.1715E-01
EU-152	<	1.5679E-01
EU-154	<	1.0091E+00
EU-155	<	1.2796E-01
HF-181	<	1.4261E-01
Ta-182	<	4.6290E-01
Hg-203	<	5.0691E-02
TL-208	<	1.7581E-01
pm-146	<	2.9187E-01
y-88	<	1.3891E-01
PB-210	<	4.3386E+00
PB-212	<	1.5112E-01
PB-214	<	1.4401E-01
BI-207	<	9.1397E-02
BI-212	<	1.6080E+00
BI-214	<	3.2069E-01
BI-210M	<	1.2796E-01
RA-224	<	1.3599E+00
AC-228	<	4.5399E-01
TH-227	<	2.3314E-01
TH-229	<	9.4858E-01
TH-234	<	3.2484E+00
PA-231	<	3.2574E+00
PA-233	<	1.2846E-01
PA-234	<	2.2823E-01
PA-234M	<	1.7081E+01
Ra-226	<	1.1189E+00
U-235	<	3.6185E-01
AM-241	<	2.2755E-01
Np-237	<	2.1831E-01

  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

TestAmerica Spectrum name: 7_20140826002_BG.An1

--- S U M M A R Y ---

Total Activity (37.6 to 2000.1 keV) 0.000E+00 DPS

Test America
St. Louis
Background Check

Spectrum: 7_20140908001_BG
Acquired: 9/8/2014 6:49:10 AM
Detector: Ge 7 SN/154
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.25	1.40	1.45	PASS

Analyst: Jody Watson Reviewer: Jody Watson

Test America
St. Louis
Quality Control Check

Spectrum: 7_20140908002_QCAsLeft
Acquired: 9/8/2014 7:55:41 AM
Detector: Ge 7 SN/154
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.90	239.00	240.00	PASS
Energy	59.58	59.04	59.29	59.60	59.79	60.04	PASS
FWHM	0.84	0.00	0.00	1.30	1.94	2.04	PASS
ActivityDiff	647.00	-5.00	-4.00	0.25	4.00	5.00	PASS
QA-662							
FWHM	1.45	0.00	0.00	1.73	3.15	3.25	PASS
ActivityDiff	606.50	-5.00	-4.00	-1.11	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.50	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.71	1333.01	1333.26	PASS
FWHM	1.98	0.00	0.00	2.22	4.18	4.28	PASS
ActivityDiff	1183.00	-5.00	-4.00	-0.46	4.00	5.00	PASS

Analyst: Jody Watson Reviewer: Jody Watson

Test America
St. Louis
Background Check

Spectrum: 12_20140826001_BG
Acquired: 8/26/2014 12:03:50 AM
Detector: Ge12 S/N10034336
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.16	1.95	2.02	2.13	2.29	2.36	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

TestAmerica, Inc Spectrum name: 12_20140826001_BG.An1

Sample description
Background Contamination Check

Spectrum Filename: C:\User\SPC\Det12\12_20140826001_BG.An1

Acquisition information
Start time: 8/26/2014 12:03:50 AM
Live time: 1800
Real time: 1805
Dead time: 0.26 %
Detector ID: 12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_QC.Clb
12_QC-H_83725-334_060211

Energy Calibration
Created: 2/28/2012 1:26:42 PM
Zero offset: 0.049 keV
Gain: 0.250 keV/channel
Quadratic: -3.945E-08 keV/channel^2

Efficiency Calibration
Created: 6/3/2011 6:41:14 AM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.58keV)
Stop channel: 8000 (1999.36keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

```
       Half lives decay limit:    12.000
       Activity range factor:      2.000
       Min. step backg. energy     0.000
       Multiplet shift channel     2.000

 Corrections                          Status          Comments
       Decay correct to date:          NO
       Decay during acquisition:       NO
       Decay during collection:        NO
       True coincidence correction:    NO
       Peaked background correction:   NO
       Absorption (Internal):          NO
       Geometry correction:            NO
       Random summing:                 NO


 total peaks alloc.    0 cutoff: 5.00E+01%

 *****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
  Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
  Energy                             Factor    Energy   Ratio    DPS
 ____________________________________________________________________________
 No unknown peaks passed sensitivity test.

------------------------------------------------------------
 This section based on library: DET_Long Background PBC.lib


 ************** I D E N T I F I E D   P E A K    S U M M A R Y **************
 Nuclide  Peak    Centroid  Background  Net Area   Intensity   Uncert  FWHM
          Channel Energy    Counts      Counts     Cts/Sec  1 Sigma %  keV
 ____________________________________________________________________________

 *****   S U M M A R Y   O F   L I B R A R Y   P E A K   U S A G E   *****
- Nuclide -  Average     ------------- Peak --------------
Name   Code  Activity     Energy   Activity Code MDA Value
             DPS           keV     DPS           DPS            COMMENTS
 ____________________________________________________________________________
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
```

- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the
library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- - - -

SB-124	<	1.0036E-01
SB-125	<	2.5500E-01
I-131	<	1.9463E-01
BA-133	<	1.2709E-01
CS-134	<	1.4829E-01
CS-137	<	2.6335E-01
CE-139	<	9.9039E-02
Ba-140	<	3.6269E-01
La-140	<	2.5886E-01
CE-141	<	1.1825E-01
CE-144	<	4.9981E-01
PM-144	<	2.5075E-01
EU-152	<	8.1185E-01
EU-154	<	1.2313E+00
EU-155	<	4.7273E-01
HF-181	<	1.0110E-01
Ta-182	<	5.3741E-01
Hg-203	<	7.5405E-02
TL-208	<	1.1280E-01
pm-146	<	3.6340E-01
y-88	<	1.6863E-01
PB-210	<	7.7362E+00
PB-212	<	3.4226E-01
PB-214	<	5.4581E-01
BI-207	<	2.1597E-01
BI-212	<	1.5905E+00
BI-214	<	5.1237E-01
BI-210M	<	2.6404E-01
RA-224	<	3.0984E+00
AC-228	<	9.7974E-01
TH-227	<	5.7448E-01
TH-229	<	1.5809E+00
TH-234	<	6.5012E+00
PA-231	<	2.6514E+00
PA-233	<	3.0469E-01
PA-234	<	4.0465E-01
PA-234M	<	2.0357E+01
Ra-226	<	5.1675E+00
U-235	<	1.0141E+00
AM-241	<	2.3100E-01
Np-237	<	4.3557E-01

  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (	37.6 to	1999.4 keV)	0.000E+00 DPS

Test America
St. Louis
Quality Control Check

Spectrum: 12_20140826002_QCAsLeft
Acquired: 8/26/2014 1:28:57 AM
Detector: Ge12 S/N10034336
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.10	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.63	59.79	60.04	PASS
FWHM	0.90	0.00	0.00	1.17	2.00	2.10	PASS
ActivityDiff	691.00	-5.00	-4.00	-0.90	4.00	5.00	PASS
QA-662							
FWHM	1.48	0.00	0.00	1.68	3.18	3.28	PASS
ActivityDiff	659.00	-5.00	-4.00	1.93	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.60	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.57	1333.01	1333.26	PASS
FWHM	2.00	0.00	0.00	2.07	4.20	4.30	PASS
ActivityDiff	1274.00	-5.00	-4.00	-2.79	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

TestAmerica, Inc Spectrum name: 12_20140826002_QCAsLeft.An1

Sample description
Quality control Check (QC Source 'H') Post Stabilization

Spectrum Filename: C:\User\SPC\Det12\12_20140826002_QCAsLeft.An1

Acquisition information
Start time:	8/26/2014 1:28:57 AM
Live time:	1000
Real time:	1015
Dead time:	1.49 %
Detector ID:	12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_QC.Clb
12_QC-H_83725-334_060211

Energy Calibration
Created:	2/28/2012 1:26:42 PM
Zero offset:	0.049 keV
Gain:	0.250 keV/channel
Quadratic:	-3.945E-08 keV/channel^2

Efficiency Calibration
Created:	6/3/2011 6:41:14 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_QC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.58keV)
Stop channel:	8000 (1999.36keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	1.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2011 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 6 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0486

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. GPS	Nuc
59.63	55867.	0.47	1.17	8.071E-02	59.54	100.000	6.972E+02	QA60
88.17	16514.	0.93	1.21	1.192E-01	88.03	100.000	1.020E+03	QA88
122.24	2168.	3.66	1.17	1.237E-01	122.06	100.000	5.241E+02	QA122
661.76	22122.	0.75	1.68	3.723E-02	661.66	100.000	6.463E+02	QA662
1173.32	16264.	0.90	1.95	2.088E-02	1173.23	100.000	1.259E+03	QA1173
1332.57	15166.	0.84	2.07	1.871E-02	1332.51	100.000	1.309E+03	QA1332

No unknown peaks passed sensitivity test.

This section based on library: DET_QC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
QA-60	238.10	59.63	3290.	55867.	55.867	0.47	1.170s
QA-88	352.17	88.17	1572.	16514.	16.514	0.93	1.210s
QA-122	488.37	122.24	957.	2168.	2.168	3.66	1.175s
QA-662	2645.51	661.76	920.	22122.	22.122	0.75	1.676
QA-1173	4692.23	1173.32	647.	16264.	16.264	0.90	1.951
QA-1332	5329.68	1332.57	153.	15166.	15.166	0.84	2.068

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Nuclide Code	Average Activity GPS	Peak Energy keV	Peak Activity GPS		Peak Code	MDA Value GPS		COMMENTS
QA-60		6.9723E+02					1.58E+05		
			59.54	6.972E+02	*(	3.370E+00	4.72E-01	1.00E+02	G
QA-88		1.0202E+03					4.63E+02		
			88.03	1.020E+03	*(	1.158E+01	9.30E-01	1.00E+02	G
QA-122		5.2415E+02					2.72E+02		
			122.06	5.241E+02	*(	3.550E+01	3.66E+00	1.00E+02	G
QA-662		6.4629E+02					1.10E+04		
			661.66	6.463E+02	(	4.208E+00	7.54E-01	1.00E+02	G
QA-1173		1.2586E+03					1.92E+03		
			1173.23	1.259E+03	(	9.380E+00	8.96E-01	1.00E+02	G
QA-1332		1.3095E+03					1.92E+03		
			1332.51	1.309E+03	(	5.216E+00	8.43E-01	1.00E+02	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went
    negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide
    failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the
    library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity
    to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape

C - Charged Particle Reaction K - Key Line
M - No MDA Calculation A - Not in Average
R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity GPS	Time Corrected Activity GPS	Uncertainty 1 Sigma Counting	MDA
QA-60	#	6.9316E+02	6.9723E+02	4.721E-01%	3.37E+00
QA-88	#	1.3853E+02	1.0202E+03	9.300E-01%	1.16E+01
QA-122	#	1.7518E+01	5.2415E+02	3.665E+00%	3.55E+01
QA-166	<	1.2767E+00	1.0506E+03		
QA-279			>12 Halflives		
QA-392	<	2.6138E+00	7.9897E+03		
QA-514			>12 Halflives		
QA-662		5.9416E+02	6.4629E+02	7.536E-01%	4.21E+00
QA-898			>12 Halflives		
QA-1173		7.7892E+02	1.2586E+03	8.957E-01%	9.38E+00
QA-1332		8.1037E+02	1.3095E+03	8.429E-01%	5.22E+00
QA-1836			>12 Halflives		

\# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.4 keV) 3.033E+03 GPS
Total Decayed Activity (37.6 to 1999.4 keV) 5.4560034E+03 GPS

Test America
St. Louis
Background Check

Spectrum: 12_20140908001_BG
Acquired: 9/8/2014 7:37:57 AM
Detector: Ge12 S/N10034336
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.16	1.95	2.02	2.19	2.29	2.36	PASS

Analyst: Jody Watson Reviewer: Jody Watson

Test America
St. Louis
Quality Control Check

Spectrum: 12_20140908002_QCAsLeft
Acquired: 9/8/2014 8:36:05 AM
Detector: Ge12 S/N10034336
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	237.80	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.57	59.79	60.04	PASS
FWHM	0.90	0.00	0.00	1.08	2.00	2.10	PASS
ActivityDiff	691.00	-5.00	-4.00	0.33	4.00	5.00	PASS
QA-662							
FWHM	1.48	0.00	0.00	1.57	3.18	3.28	PASS
ActivityDiff	659.00	-5.00	-4.00	0.71	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5329.20	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.47	1333.01	1333.26	PASS
FWHM	2.00	0.00	0.00	2.08	4.20	4.30	PASS
ActivityDiff	1274.00	-5.00	-4.00	0.83	4.00	5.00	PASS

Analyst: Jody Watson Reviewer: Jody Watson

Test America
St. Louis
Quality Control Check

Spectrum: 14_20140826001_QCAsLeft
Acquired: 8/26/2014 12:23:48 AM
Detector: Ge14 SN/11080670
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.00	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.66	59.79	60.04	PASS
FWHM	0.76	0.00	0.00	0.82	1.86	1.96	PASS
ActivityDiff	671.90	-5.00	-4.00	-0.39	4.00	5.00	PASS
QA-662							
FWHM	1.35	0.00	0.00	1.41	3.05	3.15	PASS
ActivityDiff	628.85	-5.00	-4.00	-0.91	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.00	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.52	1333.01	1333.26	PASS
FWHM	1.91	0.00	0.00	1.98	4.11	4.21	PASS
ActivityDiff	1224.59	-5.00	-4.00	-4.52	4.00	5.00	Low OOT

Analyst: Siobhan Perry Reviewer: Rachel Mueller

TestAmerica, Inc. Spectrum name: 14_20140826001_QCAsLeft.An1

Sample description
Quality control Check (QC Source 'E') Post Stabilization

Spectrum Filename: C:\User\SPC\Det14\14_20140826001_QCAsLeft.An1

Acquisition information
Start time:	8/26/2014 12:23:48 AM
Live time:	1000
Real time:	1014
Dead time:	1.40 %
Detector ID:	14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_QC.Clb
14_QC_79670-334_SOURCE E_042211

Energy Calibration
Created:	2/28/2012 10:48:23 AM
Zero offset:	0.130 keV
Gain:	0.250 keV/channel
Quadratic:	-2.050E-08 keV/channel^2

Efficiency Calibration
Created:	5/1/2011 8:43:09 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_QC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.64keV)
Stop channel:	8000 (1999.52keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	1.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

TestAmerica, Inc. Spectrum name: 14_20140826001_QCAsLeft.An1

Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	4/1/2009 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 6 cutoff: 5.00E+01%

Energy Calibration

Normalized diff: 0.0613

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. GPS	Nuc
59.66	53468.	0.47	0.82	8.013E-02	59.54	100.000	6.745E+02	QA60
88.06	6012.	1.53	0.88	1.211E-01	88.03	100.000	9.541E+02	QA88
122.10	490.	9.34	0.77	1.241E-01	122.06	100.000	6.040E+02	QA122
661.77	18297.	0.80	1.41	3.265E-02	661.66	100.000	6.346E+02	QA662
1173.28	11235.	1.01	1.80	1.868E-02	1173.23	100.000	1.224E+03	QA1173
1332.52	10410.	1.00	1.98	1.655E-02	1332.51	100.000	1.280E+03	QA1332

No unknown peaks passed sensitivity test.

This section based on library: DET_QC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
QA-60	238.04	59.66	2462.	53468.	53.467	0.47	0.817
QA-88	351.61	88.06	708.	6012.	6.011	1.53	0.878
QA-122	487.72	122.10	507.	490.	0.490	9.34	0.768s
QA-662	2646.20	661.77	535.	18297.	18.297	0.80	1.408
QA-1173	4692.75	1173.28	261.	11235.	11.235	1.01	1.800
QA-1332	5330.03	1332.52	67.	10410.	10.410	1.00	1.983

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Nuclide Code	Average Activity GPS	Peak Energy keV	Peak Activity GPS	Peak Code	MDA Value GPS		COMMENTS
QA-60		6.7449E+02				1.58E+05		
			59.54	6.745E+02	(	2.951E+00	4.66E-01	1.00E+02 G
QA-88		9.5412E+02				4.63E+02		
			88.03	9.541E+02	(	2.010E+01	1.53E+00	1.00E+02 G
QA-122		6.0396E+02				2.72E+02		
			122.06	6.040E+02	*(	1.327E+02	9.34E+00	1.00E+02 G
QA-662		6.3460E+02				1.10E+04		
			661.66	6.346E+02	(	3.832E+00	8.02E-01	1.00E+02 G
QA-1173		1.2236E+03				1.92E+03		
			1173.23	1.224E+03	(	8.494E+00	1.01E+00	1.00E+02 G
QA-1332		1.2800E+03				1.92E+03		
			1332.51	1.280E+03	(	5.011E+00	1.00E+00	1.00E+02 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape

C - Charged Particle Reaction K - Key Line
M - No MDA Calculation A - Not in Average
R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity GPS	Time Corrected Activity GPS	Uncertainty 1 Sigma Counting	MDA
QA-60	6.6867E+02	6.7449E+02	4.660E-01%	2.95E+00
QA-88	4.9661E+01	9.5412E+02	1.533E+00%	2.01E+01
QA-122 #	3.9472E+00	6.0396E+02	9.342E+00%	1.33E+02
QA-166		>12 Halflives		
QA-279		>12 Halflives		
QA-392		>12 Halflives		
QA-514		>12 Halflives		
QA-662	5.6032E+02	6.3460E+02	8.015E-01%	3.83E+00
QA-898		>12 Halflives		
QA-1173	6.0137E+02	1.2236E+03	1.005E+00%	8.49E+00
QA-1332	6.2909E+02	1.2800E+03	1.004E+00%	5.01E+00
QA-1836		>12 Halflives		

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 2.513E+03 GPS
Total Decayed Activity (37.6 to 1999.5 keV) 5.3707412E+03 GPS

Test America
St. Louis
Background Check

Spectrum: 14_20140826002_BG
Acquired: 8/26/2014 1:07:47 AM
Detector: Ge14 SN/11080670
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.91	1.75	1.80	1.93	2.01	2.06	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

TestAmerica, Inc. Spectrum name: 14_20140826002_BG.An1

Sample description
Background Contamination Check

Spectrum Filename: C:\User\SPC\Det14\14_20140826002_BG.An1

Acquisition information
Start time:	8/26/2014 1:07:47 AM
Live time:	1800
Real time:	1808
Dead time:	0.43 %
Detector ID:	14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_QC.Clb
14_QC_79670-334_SOURCE E_042211

Energy Calibration
Created:	2/28/2012 10:48:23 AM
Zero offset:	0.130 keV
Gain:	0.250 keV/channel
Quadratic:	-2.050E-08 keV/channel^2

Efficiency Calibration
Created:	5/1/2011 8:43:09 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.64keV)
Stop channel:	8000 (1999.52keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

```
       Half lives decay limit:    12.000
       Activity range factor:      2.000
       Min. step backg. energy     0.000
       Multiplet shift channel     2.000

 Corrections                          Status          Comments
       Decay correct to date:          NO
       Decay during acquisition:       NO
       Decay during collection:        NO
       True coincidence correction:    NO
       Peaked background correction:   NO
       Absorption (Internal):          NO
       Geometry correction:            NO
       Random summing:                 NO


 total peaks alloc.    3 cutoff: 5.00E+01%

 *****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
  Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
  Energy                             Factor    Energy   Ratio    DPS
 ____________________________________________________________________________
 No unknown peaks passed sensitivity test.

------------------------------------------------------------
 This section based on library: DET_Long Background PBC.lib


 ************** I D E N T I F I E D   P E A K    S U M M A R Y **************
 Nuclide  Peak    Centroid  Background  Net Area   Intensity   Uncert  FWHM
          Channel Energy    Counts      Counts     Cts/Sec  1 Sigma %  keV
 ____________________________________________________________________________

 *****   S U M M A R Y   O F   L I B R A R Y   P E A K   U S A G E   *****
- Nuclide -  Average     ------------- Peak --------------
Name   Code  Activity     Energy   Activity Code MDA Value
             DPS           keV     DPS           DPS            COMMENTS
 ____________________________________________________________________________
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
```

- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- - - -

SB-124	<	1.6195E-01
SB-125	<	2.6384E-01
I-131	<	2.1292E-01
BA-133	<	1.2921E-01
CS-134	<	1.1193E-01
CS-137	<	1.4715E-01
CE-139	<	1.4600E-01
Ba-140	<	3.8881E-01
La-140	<	2.9504E-01
CE-141	<	2.2538E-01
CE-144	<	4.4637E-01
PM-144	<	1.3093E-01
EU-152	<	2.8935E-01
EU-154	<	1.6084E+00
EU-155	<	2.5710E-01
HF-181	<	1.0629E-01
Ta-182	<	5.8794E-01
Hg-203	<	7.5767E-02
TL-208	<	1.2328E-01
pm-146	<	7.1423E-01
y-88	<	1.7189E-01
PB-210	<	7.4013E+00
PB-212	<	3.0720E-01
PB-214	<	4.4039E-01
BI-207	<	1.9856E-01
BI-212	<	1.7694E+00
BI-214	<	6.5486E-01
BI-210M	<	1.6756E-01
RA-224	<	2.8337E+00
AC-228	<	5.6248E-01
TH-227	<	5.7462E-01
TH-229	<	2.4176E+00
TH-234	<	4.7494E+00
PA-231	<	1.8267E+00
PA-233	<	1.5068E-01
PA-234	<	6.3597E-01
PA-234M	<	2.6956E+01
Ra-226	<	4.2580E+00
U-235	<	8.0853E-01
AM-241	<	5.2110E-01
Np-237	<	7.1899E-01

  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

TestAmerica, Inc. Spectrum name: 14_20140826002_BG.An1

--- S U M M A R Y ---

Total Activity (	37.6 to	1999.5 keV)	0.000E+00 DPS

Test America
St. Louis
Quality Control Check

Spectrum: 14_20140910001_QCAsLeft
Acquired: 9/10/2014 12:24:12 AM
Detector: Ge14 SN/11080670
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.00	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.66	59.79	60.04	PASS
FWHM	0.76	0.00	0.00	0.79	1.86	1.96	PASS
ActivityDiff	671.90	-5.00	-4.00	-0.79	4.00	5.00	PASS
QA-662							
FWHM	1.35	0.00	0.00	1.39	3.05	3.15	PASS
ActivityDiff	628.85	-5.00	-4.00	-0.58	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.50	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.64	1333.01	1333.26	PASS
FWHM	1.91	0.00	0.00	1.84	4.11	4.21	PASS
ActivityDiff	1224.59	-5.00	-4.00	0.98	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

Test America
St. Louis
Quality Control Check

Spectrum: 14_20140910001_QCAsLeft
Acquired: 9/10/2014 12:24:12 AM
Detector: Ge14 SN/11080670
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.00	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.66	59.79	60.04	PASS
FWHM	0.76	0.00	0.00	0.79	1.86	1.96	PASS
ActivityDiff	671.90	-5.00	-4.00	-0.79	4.00	5.00	PASS
QA-662							
FWHM	1.35	0.00	0.00	1.39	3.05	3.15	PASS
ActivityDiff	628.85	-5.00	-4.00	-0.58	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.50	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.64	1333.01	1333.26	PASS
FWHM	1.91	0.00	0.00	1.84	4.11	4.21	PASS
ActivityDiff	1224.59	-5.00	-4.00	0.98	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

TestAmerica, Inc. Spectrum name: 14_20140910001_QCAsLeft.An1

Sample description
Quality control Check (QC Source 'E') Post Stabilization

Spectrum Filename: C:\User\SPC\Det14\14_20140910001_QCAsLeft.An1

Acquisition information
Start time: 9/10/2014 12:24:12 AM
Live time: 1000
Real time: 1015
Dead time: 1.45 %
Detector ID: 14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_QC.Clb
14_QC_79670-334_SOURCE E_042211

Energy Calibration
Created: 2/28/2012 10:48:23 AM
Zero offset: 0.130 keV
Gain: 0.250 keV/channel
Quadratic: -2.050E-08 keV/channel^2

Efficiency Calibration
Created: 5/1/2011 8:43:09 AM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_QC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.64keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

TestAmerica, Inc. Spectrum name: 14_20140910001_QCAsLeft.An1

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	4/1/2009 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 6 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0843

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. GPS	Nuc
59.66	53678.	0.47	0.79	8.013E-02	59.54	100.000	6.772E+02	QA60
88.04	5900.	1.56	0.85	1.211E-01	88.03	100.000	9.578E+02	QA88
122.04	499.	9.38	0.83	1.241E-01	122.06	100.000	6.386E+02	QA122
661.79	18218.	0.81	1.39	3.265E-02	661.66	100.000	6.325E+02	QA662
1173.37	11147.	1.03	1.80	1.868E-02	1173.23	100.000	1.221E+03	QA1173
1332.64	9810.	1.03	1.84	1.655E-02	1332.51	100.000	1.213E+03	QA1332

No unknown peaks passed sensitivity test.

This section based on library: DET_QC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
QA-60	238.03	59.66	2680.	53678.	53.678	0.47	0.793
QA-88	351.54	88.04	738.	5900.	5.900	1.56	0.855
QA-122	487.48	122.04	506.	499.	0.499	9.38	0.829s
QA-662	2646.31	661.79	588.	18218.	18.219	0.81	1.388
QA-1173	4693.12	1173.37	304.	11147.	11.147	1.03	1.805
QA-1332	5330.52	1332.64	50.	9810.	9.809	1.03	1.839

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Nuclide Code	Average Activity GPS	Peak Energy keV	Peak Activity GPS	Peak Code	MDA Value GPS			COMMENTS
QA-60		6.7719E+02				1.58E+05			
			59.54	6.772E+02	(	3.078E+00	4.69E-01	1.00E+02	G
QA-88		9.5779E+02				4.63E+02			
			88.03	9.578E+02	(	2.098E+01	1.56E+00	1.00E+02	G
QA-122		6.3862E+02				2.72E+02			
			122.06	6.386E+02	@(	1.378E+02	9.38E+00	1.00E+02	G
QA-662		6.3248E+02				1.10E+04			
			661.66	6.325E+02	(	4.019E+00	8.15E-01	1.00E+02	G
QA-1173		1.2206E+03				1.92E+03			
			1173.23	1.221E+03	(	9.193E+00	1.03E+00	1.00E+02	G
QA-1332		1.2126E+03				1.92E+03			
			1332.51	1.213E+03	(	4.388E+00	1.03E+00	1.00E+02	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went
    negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide
    failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the
    library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity
    to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape

C - Charged Particle Reaction K - Key Line
M - No MDA Calculation A - Not in Average
R - Coincidence Corrected C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity GPS	Time Corrected Activity GPS	Uncertainty 1 Sigma Counting	MDA
QA-60	6.7130E+02	6.7719E+02	4.695E-01%	3.08E+00
QA-88	4.8744E+01	9.5779E+02	1.561E+00%	2.10E+01
QA-122 #	4.0170E+00	6.3862E+02	9.377E+00%	1.38E+02
QA-166		>12 Halflives		
QA-279		>12 Halflives		
QA-392		>12 Halflives		
QA-514		>12 Halflives		
QA-662	5.5792E+02	6.3248E+02	8.149E-01%	4.02E+00
QA-898		>12 Halflives		
QA-1173	5.9666E+02	1.2206E+03	1.026E+00%	9.19E+00
QA-1332	5.9279E+02	1.2126E+03	1.026E+00%	4.39E+00
QA-1836		>12 Halflives		

\# - All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 2.471E+03 GPS
Total Decayed Activity (37.6 to 1999.5 keV) 5.3392881E+03 GPS

Test America
St. Louis
Background Check

Spectrum: 14_20140910002_BG
Acquired: 9/10/2014 12:45:25 AM
Detector: Ge14 SN/11080670
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.91	1.75	1.80	1.83	2.01	2.06	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

Test America
St. Louis
Background Check

Spectrum: 14_20140910002_BG
Acquired: 9/10/2014 12:45:25 AM
Detector: Ge14 SN/11080670
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.91	1.75	1.80	1.83	2.01	2.06	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

TestAmerica, Inc. Spectrum name: 14_20140910002_BG.An1

Sample description
Background Contamination Check

Spectrum Filename: C:\User\SPC\Det14\14_20140910002_BG.An1

Acquisition information
Start time:	9/10/2014 12:45:25 AM
Live time:	1800
Real time:	1808
Dead time:	0.47 %
Detector ID:	14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_QC.Clb
14_QC_79670-334_SOURCE E_042211

Energy Calibration
Created:	2/28/2012 10:48:23 AM
Zero offset:	0.130 keV
Gain:	0.250 keV/channel
Quadratic:	-2.050E-08 keV/channel^2

Efficiency Calibration
Created:	5/1/2011 8:43:09 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.64keV)
Stop channel:	8000 (1999.52keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 4 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0624

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
63.12	19.	29.93	0.37	8.537E-02	63.29	3.810	3.245E+00	TH234
92.64	34.	24.61	0.99	1.215E-01	92.59	5.584	2.785E+00	TH234
					93.35	5.561	2.795E+00	AC228

No unknown peaks passed sensitivity test.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
TH-234	251.87	63.12	5.	19.	0.011	29.93	0.374s
TH-234	369.92	92.64	12.	34.	0.019	24.61	0.992s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS	COMMENTS
TH-234	N	2.9717E+00				1.63E+12	
			63.29	3.245E+00	@(	2.243E+00	2.99E+01 3.81E+00 G
			92.59	2.785E+00	(	1.544E+00	2.46E+01 5.58E+00 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went
negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide
failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the
library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Activity DPS	Time of Count Uncertainty Counting 1 Sigma	MDA
BE-7	<	8.0709E-01		
NA-22	<	2.3647E-01		
K-40	<	2.4639E+00		
Sc-46	<	2.0115E-01		
CR-51	<	7.0764E-01		
MN-54	<	1.4971E-01		
FE-59	<	3.5360E-01		
Co-56	<	1.5180E-01		
CO-57	<	6.8645E-02		
CO-58	<	1.4654E-01		

CO-60	<	2.4748E-01		
ZN-65	<	4.0267E-01		
NB-94	<	1.3319E-01		
ZR-95	<	2.5275E-01		
NB-95	<	1.3924E-01		
RU-103	<	9.6707E-02		
RH-106	<	1.6748E+00		
AG-108M	<	8.7165E-02		
AG-110M	<	2.7521E-01		
SN-113	<	1.4549E-01		
SB-124	<	1.1071E-01		
SB-125	<	3.8596E-01		
I-131	<	1.0149E-01		
BA-133	<	1.9624E-01		
CS-134	<	1.6374E-01		
CS-137	<	1.4715E-01		
CE-139	<	8.1402E-02		
Ba-140	<	3.8881E-01		
La-140	<	2.9504E-01		
CE-141	<	1.6338E-01		
CE-144	<	5.4361E-01		
PM-144	<	3.0994E-01		
EU-152	<	4.6790E-01		
EU-154	<	1.2746E+00		
EU-155	<	4.6854E-01		
HF-181	<	1.0629E-01		
Ta-182	<	9.5970E-01		
Hg-203	<	6.0042E-02		
TL-208	<	1.5556E-01		
pm-146	<	4.0090E-01		
y-88	<	1.7189E-01		
PB-210	<	5.9379E+00		
PB-212	<	3.4899E-01		
PB-214	<	5.8705E-01		
BI-207	<	1.3074E-01		
BI-212	<	2.2328E+00		
BI-214	<	6.5486E-01		
BI-210M	<	2.4059E-01		
RA-224	<	2.6382E+00		
AC-228	<	5.6248E-01		
TH-227	<	9.3199E-01		
TH-229	<	1.1161E+00		
TH-234		2.9717E+00	1.9373E+01%	2.243E+00
PA-231	<	2.9816E+00		
PA-233	<	3.8544E-01		
PA-234	<	2.7362E-01		
PA-234M	<	2.1361E+01		
Ra-226	<	2.6395E+00		
U-235	<	9.8736E-01		

AM-241 < 4.5580E-01
Np-237 < 4.2934E-01
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 2.972E+00 DPS

Test America
St. Louis
Quality Control Check

Spectrum: 17_20140826002_QCAsLeft
Acquired: 8/26/2014 12:44:06 AM
Detector: Ge17 SN/11080671
Quality Control Evaluation Criteria:
1) Notify Supervisor if 'AS FOUND' parameters exceed Tolerance or Control Limits.
2) Place out of service if 'AS LEFT' parameters exceed Tolerance or Control Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
QA-60							
Channel	238.00	236.00	237.00	238.10	239.00	240.00	PASS
Energy	59.54	59.04	59.29	59.67	59.79	60.04	PASS
FWHM	0.77	0.00	0.00	0.78	1.87	1.97	PASS
ActivityDiff	691.00	-5.00	-4.00	-0.94	4.00	5.00	PASS
QA-662							
FWHM	1.37	0.00	0.00	1.33	3.07	3.17	PASS
ActivityDiff	659.00	-5.00	-4.00	1.45	4.00	5.00	PASS
QA-1332							
Channel	5330.00	5327.00	5328.00	5330.00	5332.00	5333.00	PASS
Energy	1332.51	1331.76	1332.01	1332.61	1333.01	1333.26	PASS
FWHM	1.88	0.00	0.00	1.86	4.08	4.18	PASS
ActivityDiff	1274.00	-5.00	-4.00	-0.86	4.00	5.00	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

TestAmerica, Inc. Spectrum name: 17_20140826002_QCAsLeft.An1

Sample description
Quality control Check (QC Source 'H') Post Stabilization

Spectrum Filename: C:\User\SPC\Det17\17_20140826002_QCAsLeft.An1

Acquisition information
Start time: 8/26/2014 12:44:06 AM
Live time: 1000
Real time: 1015
Dead time: 1.52 %
Detector ID: 17

Detector system
Ge17 SN/11080671

Calibration
Filename: 17_QC.Clb
17_QC_83725-334_SOURCE H_042211

Energy Calibration
Created: 2/29/2012 10:33:23 AM
Zero offset: 0.108 keV
Gain: 0.250 keV/channel
Quadratic: -2.584E-08 keV/channel^2

Efficiency Calibration
Created: 5/1/2011 11:17:56 AM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_QC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.63keV)
Stop channel: 8000 (1999.54keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 1.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2011 12:00:00 PM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 6 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0852

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. GPS	Nuc
59.67	52475.	0.48	0.78	7.583E-02	59.54	100.000	6.975E+02	QA60
88.13	15330.	0.90	0.80	1.113E-01	88.03	100.000	1.014E+03	QA88
122.02	2054.	3.23	0.91	1.155E-01	122.06	100.000	5.321E+02	QA122
661.74	20043.	0.76	1.33	3.357E-02	661.66	100.000	6.494E+02	QA662
1173.35	14880.	0.90	1.77	1.896E-02	1173.23	100.000	1.268E+03	QA1173
1332.61	13556.	0.88	1.86	1.705E-02	1332.51	100.000	1.285E+03	QA1332

No unknown peaks passed sensitivity test.

This section based on library: DET_QC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
QA-60	238.12	59.67	2873.	52475.	52.475	0.48	0.778
QA-88	351.91	88.13	1037.	15330.	15.330	0.90	0.796
QA-122	487.42	122.02	668.	2054.	2.055	3.23	0.911
QA-662	2645.82	661.74	615.	20043.	20.043	0.76	1.327
QA-1173	4692.68	1173.35	408.	14880.	14.880	0.90	1.765
QA-1332	5330.06	1332.61	78.	13556.	13.556	0.88	1.861

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Nuclide Code	Average Activity GPS	Peak Energy keV	Peak Activity GPS	Peak Code	MDA Value GPS	COMMENTS
QA-60		6.9750E+02				1.58E+05	
			59.54	6.975E+02 (	3.356E+00	4.80E-01 1.00E+02	G
QA-88		1.0140E+03				4.63E+02	
			88.03	1.014E+03 (	1.011E+01	9.02E-01 1.00E+02	G
QA-122		5.3213E+02				2.72E+02	
			122.06	5.321E+02 (	3.189E+01	3.23E+00 1.00E+02	G
QA-662		6.4944E+02				1.10E+04	
			661.66	6.494E+02 (	3.833E+00	7.62E-01 1.00E+02	G
QA-1173		1.2678E+03				1.92E+03	
			1173.23	1.268E+03 (	8.251E+00	8.95E-01 1.00E+02	G
QA-1332		1.2849E+03				1.92E+03	
			1332.51	1.285E+03 (	4.158E+00	8.76E-01 1.00E+02	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape

C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity GPS	Time Corrected Activity GPS	Uncertainty 1 Sigma Counting	MDA
QA-60		6.9343E+02	6.9750E+02	4.802E-01%	3.36E+00
QA-88		1.3770E+02	1.0140E+03	9.023E-01%	1.01E+01
QA-122		1.7788E+01	5.3213E+02	3.225E+00%	3.19E+01
QA-166	<	1.2043E+00	9.9072E+02		
QA-279			>12 Halflives		
QA-392	<	1.4025E+00	4.2853E+03		
QA-514			>12 Halflives		
QA-662		5.9706E+02	6.4944E+02	7.620E-01%	3.83E+00
QA-898			>12 Halflives		
QA-1173		7.8462E+02	1.2678E+03	8.950E-01%	8.25E+00
QA-1332		7.9520E+02	1.2849E+03	8.760E-01%	4.16E+00
QA-1836			>12 Halflives		

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 3.026E+03 GPS
Total Decayed Activity (37.6 to 1999.5 keV) 5.4458545E+03 GPS

Test America
St. Louis
Background Check

Spectrum: 17_20140826003_BG
Acquired: 8/26/2014 1:08:40 AM
Detector: Ge17 SN/11080671
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.36	2.23	2.27	2.40	2.45	2.50	PASS

Analyst: Siobhan Perry Reviewer: Rachel Mueller

TestAmerica, Inc. Spectrum name: 17_20140826003_BG.An1

Sample description
Background Contamination Check

Spectrum Filename: C:\User\SPC\Det17\17_20140826003_BG.An1

Acquisition information
Start time:	8/26/2014 1:08:40 AM
Live time:	1800
Real time:	1807
Dead time:	0.37 %
Detector ID:	17

Detector system
Ge17 SN/11080671

Calibration
Filename: 17_QC.Clb
17_QC_83725-334_SOURCE H_042211

Energy Calibration
Created:	2/29/2012 10:33:23 AM
Zero offset:	0.108 keV
Gain:	0.250 keV/channel
Quadratic:	-2.584E-08 keV/channel^2

Efficiency Calibration
Created:	5/1/2011 11:17:56 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.63keV)
Stop channel:	8000 (1999.54keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 5 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.2862

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
63.06	35.	24.94	0.92	8.036E-02	63.29	3.810	6.350E+00	TH234
92.67	53.	18.96	0.80	1.119E-01	92.59	5.584	4.713E+00	TH234
					93.35	5.561	4.728E+00	AC228
185.75	26.	27.20	1.08	9.850E-02	185.72	54.000	PBC<MDA	U235
					185.99	3.280	4.471E+00	Ra226

No unknown peaks passed sensitivity test.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
TH-234	251.69	63.06	13.	35.	0.019	24.94	0.917
TH-234	370.06	92.67	16.	53.	0.029	18.96	0.797s
Ra-226	742.22	185.75	8.	26.	0.014	27.20	1.079s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS		COMMENTS
TH-234	N	5.3770E+00				1.63E+12		
			63.29	6.350E+00	(	3.540E+00	2.49E+01 3.81E+00	G
			92.59	4.713E+00	(	1.898E+00	1.90E+01 5.58E+00	G
Ra-226		4.4708E+00				5.84E+05		
			185.99	4.471E+00	(	2.732E+00	2.72E+01 3.28E+00	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	< 1.0682E+00		
NA-22	< 2.3087E-01		
K-40	< 4.2502E+00		
Sc-46	< 1.6963E-01		
CR-51	< 6.0542E-01		
MN-54	< 1.9578E-01		
FE-59	< 3.5771E-01		
Co-56	< 1.5818E-01		
CO-57	< 6.7599E-02		
CO-58	< 1.5028E-01		
CO-60	< 3.0315E-01		
ZN-65	< 4.0512E-01		
NB-94	< 1.3122E-01		
ZR-95	< 4.8627E-01		
NB-95	< 1.4025E-01		
RU-103	< 1.0084E-01		
RH-106	< 1.8567E+00		
AG-108M	< 1.5098E-01		
AG-110M	< 2.3153E-01		
SN-113	< 1.5594E-01		
SB-124	< 1.1099E-01		
SB-125	< 2.8040E-01		
I-131	< 8.6478E-02		
BA-133	< 1.6121E-01		
CS-134	< 3.0648E-01		
CS-137	< 1.4314E-01		
CE-139	< 7.2728E-02		
Ba-140	< 6.5310E-01		
La-140	< 2.8480E-01		
CE-141	< 2.2604E-01		
CE-144	< 5.8601E-01		
PM-144	< 1.2874E-01		
EU-152	< 3.1176E-01		
EU-154	< 1.3452E+00		
EU-155	< 5.4400E-01		
HF-181	< 1.1134E-01		

Ta-182	<	7.4496E-01			
Hg-203	<	1.8308E-01			
TL-208	<	3.3002E-01			
pm-146	<	4.0105E-01			
y-88	<	1.8377E-01			
PB-210	<	8.4727E+00			
PB-212	<	3.4132E-01			
PB-214	<	4.7414E-01			
BI-207	<	1.0534E-01			
BI-212	<	1.7576E+00			
BI-214	<	7.4802E-01			
BI-210M	<	1.2859E-01			
RA-224	<	1.4652E+00			
AC-228	<	5.9955E-01			
TH-227	<	5.5879E-01			
TH-229	<	1.5693E+00			
TH-234		5.3770E+00	1.5663E+01%		3.540E+00
PA-231	<	1.9746E+00			
PA-233	<	1.6278E-01			
PA-234	<	3.8621E-01			
PA-234M	<	2.2258E+01			
Ra-226	#	4.4708E+00	2.7196E+01%		2.732E+00
U-235	<	7.3670E-01			
AM-241	<	5.0242E-01			
Np-237	<	1.1738E+00			

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 9.848E+00 DPS

Initial Calibrations

Gamma Verification per Geometry

Detector: Ge 04
Geometry: 25 mL D=1
Reference date 1/1/2012
Calibration Standard: 90101
Standard volume g / vial 5.31144
Standard volume transferred in g / geometry 0.5067
lab ID# of cal standard 6706

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	abundance	activity Bq/sample	Count Results	%recovery
Am-241	3253	310	0.359	**864.4**	870.13	100.7
Cd-109	4733	452	0.0361	**12507.4**	12351	98.7
Co-57	2482	237	0.856	**276.6**	282	101.9
Ce-139	3514	335	0.799	**419.6**	409.08	97.5
Hg-203	7639	729	0.8155	**893.6**	934.77	104.6
Sn-113	4952	472	0.64	**738.1**	740.3	100.3
Cs-137	3184	304	0.851	**356.9**	350.56	98.2
Y-88	11930	1138	0.937	**1214.6**	1183.9	97.5
Co-60	5881	561	0.99974	**561.2**	558.63	99.5
Co-60	5882	561	0.99986	**561.2**	561.14	100.0
Y-88	12630	1205	0.992	**1214.6**	1239.2	102.0

Reviewed By: Jody watson

Date: 3/5/2012

Calibration Data from file: 4_Liquid_D=1 25ml.Clb
Energy Calibration Date: 3/27/2012 Time: 8:51:16 PM
Efficiency Calibration Date: 3/27/2012 Time: 8:51:45 PM

Calibration Description:
4_Liquid_D=1 25ml_90101_030512

Energy Calibration Fit
Energy = 0.0651 +0.250131*Channel -2.88088e-008*Channel**2
FWHM (ch) = 2.9461 +0.001043*Channel -2.99169e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
238.09	59.54	59.62	-0.13%	0.79	0.80	-1.22%
352.11	88.03	88.13	-0.12%	0.82	0.83	-1.13%
487.94	122.06	122.11	-0.04%	0.86	0.86	-0.41%
662.73	165.85	165.82	0.02%	0.91	0.91	-0.13%
1115.56	279.17	279.06	0.04%	1.04	1.02	2.48%
1565.31	391.69	391.53	0.04%	1.15	1.13	2.01%
2645.35	661.66	661.55	0.02%	1.35	1.37	-1.92%
3591.75	898.02	898.10	-0.01%	1.57	1.58	-0.25%
4693.13	1173.24	1173.33	-0.01%	1.79	1.79	-0.28%
5330.61	1332.50	1332.60	-0.01%	1.92	1.91	0.50%
7345.84	1836.01	1835.93	0.00%	2.25	2.25	-0.01%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.4766 %
Ln(Eff) = 0.8810 -0.681125*Ln(Eng) -0.019098*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 1.2753 %
Ln(Eff) = -10.3120 +3.529752*Ln(Eng) -0.414315*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
59.54	6.0541E-002	6.0417E-002	0.20%
88.03	5.8352E-002	5.9979E-002	-2.79%
122.06	5.5100E-002	5.4094E-002	1.83%
165.85	========== Knee ==========		
165.85	4.3994E-002	4.5085E-002	-2.48%
279.17	2.9708E-002	2.8418E-002	4.34%
391.69	2.1015E-002	2.0933E-002	0.39%
661.66	1.2703E-002	1.2928E-002	-1.77%
898.02	9.4729E-003	9.7164E-003	-2.57%
1173.24	7.5060E-003	7.5454E-003	-0.52%
1332.50	6.6834E-003	6.6830E-003	0.01%
1836.01	5.0093E-003	4.9096E-003	1.99%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Am-241	59.54	35.70	1.58E+005	868.35	310.00	1.80%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	12521.00	452.00	3.50%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	276.87	237.00	2.70%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	419.27	335.00	2.30%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	894.48	729.00	2.30%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	737.50	472.00	2.30%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	356.77	304.00	2.80%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1214.50	1138.00	2.40%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	561.56	561.00	2.50%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	561.10	561.00	2.60%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1214.70	1205.00	2.60%	1/1/2012 11:00:00 AM

ORTEC g v - i (1087) Env32 G53W4.25 3/27/2012 8:52:55 PM Page 1
TestAmerica Spectrum name: 4_D=125mL_20120084.An1

Sample description
4_D=125mL_90101_030512

Spectrum Filename: W:\SPC\Det4\4_D=125mL_20120084.An1

Acquisition information
Start time: 3/5/2012 9:42:23 PM
Live time: 3600
Real time: 3764
Dead time: 4.37 %
Detector ID: 4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_Liquid_D=1 25ml.Clb
4_Liquid_D=1 25ml_90101_030512

Energy Calibration
Created: 3/27/2012 8:51:16 PM
Zero offset: 0.065 keV
Gain: 0.250 keV/channel
Quadratic: -2.881E-08 keV/channel^2

Efficiency Calibration
Created: 3/27/2012 8:51:45 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.48 %
Log(Eff): 8.809878E-01 + (-6.811249E-01*Log(E)) +
(-1.909804E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -1.031199E+01 + (3.529752E+00*Log(E)) +
(-4.143154E-01*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.58keV)
Stop channel: 8000 (1999.27keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (1087) Env32 G53W4.25 3/27/2012 8:52:55 PM Page 2
TestAmerica Spectrum name: 4_D=125mL_20120084.An1
Page 1

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0741

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
38.00	8025.	2.56	0.80	5.211E-02				
59.62	67544.	0.53	0.79	6.043E-02	59.54	35.700	8.701E+02	AM241
70.89	2777.	4.84	0.81	6.117E-02				
72.97	4782.	2.95	0.81	6.115E-02				
82.53	1308.	9.44	0.82	6.058E-02				
88.13	87415.	0.43	0.82	5.997E-02	88.03	3.610	1.235E+04	CD109
122.11	39884.	0.68	0.86	5.408E-02	122.06	85.600	2.820E+02	CO57
136.47	4743.	3.33	0.90	5.117E-02				
165.82	38348.	0.66	0.91	4.531E-02	165.85	79.900	4.091E+02	Ce139
199.01	1361.	7.90	1.16	3.840E-02				
254.98	1129.	9.91	0.90	3.082E-02				
279.06	29723.	0.73	1.04	2.843E-02	279.17	81.500	9.291E+02	Hg203
391.53	24219.	0.83	1.15	2.094E-02	391.69	64.000	7.403E+02	SN113
661.55	13846.	1.23	1.35	1.293E-02	661.66	85.210	3.506E+02	CS137
898.10	25520.	0.77	1.57	9.716E-03	898.02	93.700	1.184E+03	Y898
1173.33	14811.	0.99	1.79	7.545E-03	1173.24	99.900	5.586E+02	Co1173
1332.59	13188.	1.10	1.92	6.683E-03	1332.50	99.982	5.611E+02	Co1332
1835.93	14289.	0.87	2.25	4.910E-03	1836.01	99.200	1.239E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
151.65	38.00	8922.	8025.	1.540E+05	2.56	0.800 -	s
283.17	70.89	8050.	2248.	3.675E+04	7.04	0.842 -	D
291.48	72.97	7402.	4470.	7.310E+04	3.11	0.812 -	D
329.58	82.50	7298.	1596.	2.635E+04	9.60	1.124 -	s
545.35	136.47	5256.	4743.	9.269E+04	3.33	0.903 -	

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
795.45	199.01	3061.	1361.	3.543E+04	7.90	1.156	- s
1019.26	254.98	2847.	1129.	3.663E+04	9.91	0.899	-

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	238.09	59.62	14266.	67544.	18.762	0.53	0.789
CD-109	352.11	88.13	12363.	87415.	24.282	0.43	0.819
CO-57	487.94	122.11	7672.	39884.	11.079	0.68	0.859
Ce-139	662.73	165.82	5915.	38348.	10.652	0.66	0.905
Hg-203	1115.57	279.07	3524.	29903.	8.306	0.73	1.045
SN-113	1565.31	391.53	2943.	24219.	6.727	0.83	1.150
CS-137	2645.35	661.55	2660.	13846.	3.846	1.23	1.348
Y-898	3591.74	898.10	1949.	25520.	7.089	0.77	1.573
Co-1173	4693.14	1173.33	975.	14811.	4.114	0.99	1.790
Co-1332	5330.61	1332.59	939.	13188.	3.663	1.10	1.922
Y-1836	7345.85	1835.93	131.	14289.	3.969	0.87	2.249

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq	COMMENTS
AM-241		8.7013E+02				1.58E+05	
			59.54	8.701E+02	(	7.205E+00 5.28E-01 3.57E+01	G
CD-109		1.2351E+04				4.63E+02	
			88.03	1.235E+04	(	7.359E+01 4.26E-01 3.61E+00	G
CO-57		2.8200E+02				2.72E+02	
			122.06	2.820E+02	(	2.905E+00 6.84E-01 8.56E+01	G
Ce-139		4.0908E+02				1.38E+02	
			165.85	4.091E+02	(	3.852E+00 6.65E-01 7.99E+01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
Hg-203	9.3477E+02				4.66E+01	
		279.17	9.348E+02	(	8.732E+00 7.29E-01 8.15E+01	G
SN-113	7.4030E+02				1.15E+02	

		391.69	7.403E+02	(	7.810E+00	8.30E-01	6.40E+01	G
CS-137	3.5056E+02						1.10E+04	
		661.66	3.506E+02	(	6.154E+00	1.23E+00	8.52E+01	G
Y-898	1.1839E+03						1.07E+02	
		898.02	1.184E+03	(	9.671E+00	7.69E-01	9.37E+01	G
Co-1173	5.5863E+02						1.93E+03	
		1173.24	5.586E+02	(	5.589E+00	9.86E-01	9.99E+01	G
Co-1332	5.6114E+02						1.93E+03	
		1332.50	5.611E+02	(	6.191E+00	1.10E+00	1.00E+02	G
Y-1836	1.2392E+03						1.07E+02	
		1836.01	1.239E+03	(	4.855E+00	8.71E-01	9.92E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average

R - Coincidence Corrected
C - Coincidence Peak
H - Halflife limit exceeded

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity	Time Corrected Activity	Uncertainty 1 Sigma Counting	MDA

	Bq	Bq		
AM-241	8.6988E+02	8.7013E+02	5.276E-01%	7.21E+00
CD-109	1.1214E+04	1.2351E+04	4.264E-01%	7.36E+01
CO-57	2.3926E+02	2.8200E+02	6.839E-01%	2.91E+00
Ce-139	2.9571E+02	4.0908E+02	6.647E-01%	3.85E+00
Hg-203	3.5864E+02	9.3477E+02	7.290E-01%	8.73E+00
SN-113	5.0216E+02	7.4030E+02	8.300E-01%	7.81E+00
CS-137	3.4913E+02	3.5056E+02	1.228E+00%	6.15E+00
Y-898	7.7862E+02	1.1839E+03	7.690E-01%	9.67E+00
Co-1173	5.4582E+02	5.5863E+02	9.856E-01%	5.59E+00
Co-1332	5.4827E+02	5.6114E+02	1.095E+00%	6.19E+00
Y-1836	8.1500E+02	1.2392E+03	8.709E-01%	4.85E+00

  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

S U M M A R Y

Total Activity (82.4 to 1999.3 keV) 1.652E+04 Bq
Total Decayed Activity (82.4 to 1999.3 keV) 1.9481035E+04 Bq

Gamma Verification per Geometry

Detector: Ge7

Geometry: 25mL solid

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 56

lab ID# of cal standard Rad12-0010

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	112	0.0425	2630	2647.2	100.6
Am-241	2037	74	0.359	205	205.94	100.5
Cd-109	2881	104	0.0361	2883	2885.4	100.1
Co-57	1511	55	0.856	64	64.298	100.8
Ce-139	2139	77	0.799	97	93.788	97.0
Hg-203	4651	168	0.8146	206	213.53	103.5
Sn-113	3015	109	0.64	170	172.61	101.4
Cs-137	1938	70	0.851	82	84.005	102.1
Y-88	7264	262	0.937	280	264.1	94.3
Co-60	3580	129	0.99974	129	126.18	97.5
Co-60	3581	129	0.999856	129	129.57	100.1
Y-88	7690	278	0.992	280	288.85	103.1

Reviewed By: Jody Watson

Date: 3/7/2012

Calibration Data from file: 7_Soil_25ml.Clb
Energy Calibration Date: 3/28/2012 Time: 8:56:59 AM
Efficiency Calibration Date: 3/28/2012 Time: 8:57:12 AM

Calibration Description:
7_25mLSoil_90099_030712

Energy Calibration Fit
Energy = 0.0996 +0.249961*Channel +4.92759e-009*Channel**2
FWHM (ch) = 3.0351 +0.001152*Channel -4.05318e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.98	46.54	46.59	-0.10%	0.83	0.81	2.22%
237.92	59.54	59.57	-0.05%	0.84	0.83	1.72%
351.75	88.03	88.02	0.01%	0.87	0.86	0.84%
487.64	122.06	121.99	0.06%	0.91	0.90	1.29%
662.74	165.85	165.76	0.05%	0.93	0.95	-1.76%
1116.68	279.17	279.23	-0.02%	1.03	1.07	-3.69%
1566.71	391.69	391.73	-0.01%	1.16	1.19	-2.22%
2646.42	661.66	661.64	0.00%	1.48	1.45	2.29%
3592.07	898.02	898.04	-0.00%	1.63	1.66	-2.26%
4692.81	1173.24	1173.23	0.00%	1.91	1.89	1.10%
5329.80	1332.50	1332.48	0.00%	2.03	2.01	1.27%
7343.75	1836.01	1836.02	-0.00%	2.31	2.33	-0.68%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.5270 %
Ln(Eff) = 0.7200 -0.352764*Ln(Eng) -0.0477875*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 0.2695 %
Ln(Eff) = -12.3598 +4.659795*Ln(Eng) -0.527766*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	1.0606E-001	1.0558E-001	0.45%
59.54	1.1795E-001	1.1873E-001	-0.65%
88.03	1.2622E-001	1.2540E-001	0.65%
122.06	1.1607E-001	1.1598E-001	0.08%
165.85	========== Knee ==========		
165.85	9.4576E-002	9.7159E-002	-2.73%
279.17	6.4148E-002	6.1888E-002	3.52%
391.69	4.6144E-002	4.5518E-002	1.36%
661.66	2.8309E-002	2.7684E-002	2.21%
898.02	1.9341E-002	2.0472E-002	-5.85%
1173.24	1.5248E-002	1.5605E-002	-2.34%
1332.50	1.3738E-002	1.3680E-002	0.42%
1836.01	1.0055E-002	9.7524E-003	3.01%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	2635.30	112.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	207.28	74.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	2880.90	104.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	64.25	55.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	96.37	77.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	206.13	168.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	170.31	109.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	82.15	70.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	279.62	262.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	129.13	129.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	129.03	129.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	280.24	278.00	4.00%	1/1/2012 11:00:00 AM

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 8:58:08 AM
TestAmerica Spectrum name: 7_25mLSoil_20120399.An1

Sample description
7_Soil_25mL_90099

Spectrum Filename: C:\User\SPC\Det7\7_25mLSoil_20120399.An1

Acquisition information
Start time: 3/7/2012 11:02:17 AM
Live time: 7200
Real time: 7370
Dead time: 2.30 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Soil_25ml.Clb
7_25mLSoil_90099_030712

Energy Calibration
Created: 3/28/2012 8:56:59 AM
Zero offset: 0.100 keV
Gain: 0.250 keV/channel
Quadratic: 4.928E-09 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 8:57:12 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.53 %
Log(Eff): 7.199650E-01 + (-3.527641E-01*Log(E)) +
(-4.778753E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.27 %
Log(Eff): -1.235982E+01 + (4.659795E+00*Log(E)) +
(-5.277660E-01*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix & Pb.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.59keV)
Stop channel: 8000 (2000.11keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0351

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
37.87	3155.	4.76	0.80	9.113E-02				
46.59	85050.	0.44	0.83	1.056E-01	46.54	4.250	2.647E+03	Pb210
59.58	62828.	0.52	0.84	1.188E-01	59.54	35.700	2.059E+02	AM241
70.82	2496.	5.45	0.84	1.241E-01				
72.94	4222.	3.28	0.84	1.246E-01				
82.42	1862.	6.76	0.85	1.257E-01				
84.86	1513.	8.51	0.86	1.256E-01				
88.03	85472.	0.37	0.86	1.254E-01	88.03	3.610	2.895E+03	CD109
121.99	38839.	0.66	0.92	1.160E-01	122.06	85.600	6.430E+01	CO57
136.38	4758.	3.00	0.94	1.101E-01				
165.76	37598.	0.64	0.96	9.732E-02	165.85	79.900	9.379E+01	Ce139
198.99	1749.	7.06	1.10	8.322E-02				
255.04	1266.	9.14	1.17	6.705E-02				
279.23	29071.	0.68	1.09	6.188E-02	279.17	81.500	2.135E+02	Hg203
391.73	24329.	0.82	1.22	4.551E-02	391.69	64.000	1.726E+02	SN113
661.64	14208.	1.16	1.48	2.768E-02	661.66	85.210	8.401E+01	CS137
898.04	23747.	0.76	1.63	2.047E-02	898.02	93.700	2.641E+02	Y898
1173.23	13830.	1.02	1.91	1.560E-02	1173.24	99.900	1.262E+02	Co1173
1332.48	12460.	1.10	2.03	1.368E-02	1332.50	99.982	1.296E+02	Co1332
1835.99	13099.	0.94	2.32	9.752E-03	1836.01	99.200	2.888E+02	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
151.10	37.88	9720.	3155.	3.463E+04	4.76	0.802	-	D
282.97	70.83	7572.	2203.	1.776E+04	6.79	0.855	-	D
291.42	72.94	7075.	3828.	3.071E+04	3.94	0.876	-	D
339.09	84.85	7530.	1513.	4.518E+03	8.51	0.855	-	lD

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 8:58:08 AM
TestAmerica Spectrum name: 7_25mLSoil_20120399.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
545.19	136.38	4478.	4758.	4.323E+04	3.00	0.936	-
795.68	198.99	3525.	1749.	2.102E+04	7.06	1.101	-
1019.90	255.04	2907.	1266.	1.888E+04	9.14	1.169	-

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.98	46.59	15688.	85050.	11.812	0.44	0.831
AM-241	237.94	59.58	11866.	62828.	8.726	0.52	0.840
CD-109	351.75	88.02	10767.	85190.	11.832	0.43	0.877
CO-57	487.64	121.99	6229.	38839.	5.394	0.66	0.923
Ce-139	662.74	165.76	4533.	37598.	5.222	0.64	0.955
Hg-203	1116.68	279.23	2521.	29071.	4.038	0.68	1.088
SN-113	1566.70	391.73	2644.	24329.	3.379	0.82	1.222
CS-137	2646.42	661.64	2287.	14208.	1.973	1.16	1.484
Y-898	3592.07	898.04	1556.	23747.	3.298	0.76	1.626
Co-1173	4692.81	1173.23	895.	13830.	1.921	1.02	1.909
Co-1332	5329.80	1332.48	770.	12460.	1.731	1.10	2.032
Y-1836	7343.64	1835.99	221.	13099.	1.819	0.94	2.318

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq	COMMENTS
Pb-210	N	2.6472E+03				8.15E+03	
			46.54	2.647E+03	(	1.825E+01 4.44E-01 4.25E+00	G
AM-241		2.0594E+02				1.58E+05	
			59.54	2.059E+02	(	1.673E+00 5.24E-01 3.57E+01	G
CD-109		2.8854E+03				4.63E+02	
			88.03	2.885E+03	(	1.647E+01 4.26E-01 3.61E+00	G

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 8:58:08 AM
TestAmerica Spectrum name: 7_25mLSoil_20120399.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
CO-57	6.4298E+01				2.72E+02	
		122.06	6.430E+01	(	6.133E-01 6.55E-01 8.56E+01	G
Ce-139	9.3788E+01				1.38E+02	
		165.85	9.379E+01	(	7.894E-01 6.36E-01 7.99E+01	G
Hg-203	2.1353E+02				4.66E+01	
		279.17	2.135E+02	(	1.738E+00 6.84E-01 8.15E+01	G
SN-113	1.7261E+02				1.15E+02	
		391.69	1.726E+02	(	1.719E+00 8.20E-01 6.40E+01	G
CS-137	8.4005E+01				1.10E+04	
		661.66	8.401E+01	(	1.334E+00 1.16E+00 8.52E+01	G
Y-898	2.6410E+02				1.07E+02	
		898.02	2.641E+02	(	2.075E+00 7.63E-01 9.37E+01	G
Co-1173	1.2618E+02				1.93E+03	
		1173.24	1.262E+02	(	1.297E+00 1.02E+00 9.99E+01	G
Co-1332	1.2957E+02				1.93E+03	
		1332.50	1.296E+02	(	1.373E+00 1.10E+00 1.00E+02	G
Y-1836	2.8885E+02				1.07E+02	
		1836.01	2.888E+02	(	1.587E+00 9.41E-01 9.92E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation

Peak Codes:
G - Gamma Ray

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 8:58:08 AM
TestAmerica Spectrum name: 7_25mLSoil_20120399.An1

F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
Pb-210	2.6324E+03	2.6472E+03	4.440E-01%	1.83E+01
AM-241	2.0588E+02	2.0594E+02	5.238E-01%	1.67E+00
CD-109	2.6137E+03	2.8854E+03	4.262E-01%	1.65E+01
CO-57	5.4337E+01	6.4298E+01	6.554E-01%	6.13E-01
Ce-139	6.7266E+01	9.3788E+01	6.364E-01%	7.89E-01
Hg-203	8.0052E+01	2.1353E+02	6.843E-01%	1.74E+00
SN-113	1.1599E+02	1.7261E+02	8.195E-01%	1.72E+00
CS-137	8.3656E+01	8.4005E+01	1.160E+00%	1.33E+00
Y-898	1.7194E+02	2.6410E+02	7.630E-01%	2.07E+00
Co-1173	1.2321E+02	1.2618E+02	1.017E+00%	1.30E+00
Co-1332	1.2653E+02	1.2957E+02	1.095E+00%	1.37E+00
Y-1836	1.8805E+02	2.8885E+02	9.412E-01%	1.59E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (40.8 to 2000.1 keV) 6.463E+03 Bq
Total Decayed Activity (40.8 to 2000.1 keV) 7.1755029E+03 Bq

Analyzed by: _____
Admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica

Gamma Verification per Geometry

Detector: Ge 07

Geometry: 25 mL D=1

Reference date 1/1/2012

Calibration Standard: 90101

Standard volume g / vial 5.31144

Standard volume transferred in g / geometry 0.5067

lab ID# of cal standard 6706

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	abundance	activity Bq/sample	Count Results	%recovery
Am-241	3253	310	0.359	**864.4**	869.15	100.5
Cd-109	4733	452	0.0361	**12507.4**	12148	97.1
Co-57	2482	237	0.856	**276.6**	279.17	100.9
Ce-139	3514	335	0.799	**419.6**	404.29	96.4
Hg-203	7639	729	0.8155	**893.6**	945.2	105.8
Sn-113	4952	472	0.64	**738.1**	747.38	101.3
Cs-137	3184	304	0.851	**356.9**	362.35	101.5
Y-88	11930	1138	0.937	**1214.6**	1152.4	94.9
Co-60	5881	561	0.99974	**561.2**	549.99	98.0
Co-60	5882	561	0.99986	**561.2**	546.72	97.4
Y-88	12630	1205	0.992	**1214.6**	1282.9	105.6

Reviewed By: Megan McAfee

Date: 4/9/2012

Calibration Data from file: 7_Liquid_D=1 25ml.Clb
Energy Calibration Date: 3/28/2012 Time: 9:22:02 AM
Efficiency Calibration Date: 3/28/2012 Time: 9:22:15 AM

Calibration Description:
7_25mld=1_90101_032612

Energy Calibration Fit
Energy = 0.1293 +0.249936*Channel +5.39796e-009*Channel**2
FWHM (ch) = 3.3547 +0.000987*Channel -1.43509e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
237.88	59.54	59.58	-0.08%	0.87	0.90	-2.98%
351.72	88.03	88.04	-0.01%	0.92	0.92	-0.97%
487.62	122.06	122.00	0.05%	0.97	0.96	1.05%
662.71	165.85	165.77	0.05%	1.00	1.00	0.16%
1116.69	279.17	279.24	-0.02%	1.13	1.11	1.86%
1566.76	391.69	391.73	-0.01%	1.23	1.22	1.16%
2646.58	661.66	661.64	0.00%	1.45	1.47	-0.95%
3592.29	898.02	898.04	-0.00%	1.70	1.68	1.52%
4693.09	1173.24	1173.22	0.00%	1.92	1.92	0.09%
5330.14	1332.50	1332.48	0.00%	2.01	2.05	-2.08%
7344.29	1836.01	1836.02	-0.00%	2.47	2.46	0.64%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.8221 %
Ln(Eff) = -0.0721 -0.052206*Ln(Eng) -0.0721452*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 0.5792 %
Ln(Eff) = -13.4309 +5.323811*Ln(Eng) -0.612518*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
59.54	1.4913E-001	1.4900E-001	0.09%
88.03	1.5172E-001	1.5361E-001	-1.25%
122.06	1.3762E-001	1.3648E-001	0.83%
165.85	========== Knee ==========		
165.85	1.0437E-001	1.0822E-001	-3.69%
279.17	7.4359E-002	7.0345E-002	5.40%
391.69	5.2758E-002	5.2053E-002	1.34%
661.66	3.2103E-002	3.1608E-002	1.54%
898.02	2.2024E-002	2.3208E-002	-5.37%
1173.24	1.7155E-002	1.7515E-002	-2.10%
1332.50	1.4872E-002	1.5263E-002	-2.63%
1836.01	1.1283E-002	1.0682E-002	5.33%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Am-241	59.54	35.70	1.58E+005	868.35	310.00	1.80%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	12521.00	452.00	3.50%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	276.87	237.00	2.70%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	419.27	335.00	2.30%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	894.48	729.00	2.30%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	737.50	472.00	2.30%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	356.77	304.00	2.80%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1214.50	1138.00	2.40%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	561.56	561.00	2.50%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	561.10	561.00	2.60%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1214.70	1205.00	2.60%	1/1/2012 11:00:00 AM

7_25mLd=1_20120466

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 9:23:02 AM Page 1
TestAmerica Spectrum name: 7_25mLd=1_20120466.An1

Sample description
7_25mLd=1_90101_032612

Spectrum Filename: C:\User\SPC\Det7\7_25mLd=1_20120466.An1

Acquisition information
Start time: 3/26/2012 11:32:07 AM
Live time: 3600
Real time: 3867
Dead time: 6.91 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Liquid_D=1 25ml.Clb
7_25mld=1_90101_032612

Energy Calibration
Created: 3/28/2012 9:22:02 AM
Zero offset: 0.129 keV
Gain: 0.250 keV/channel
Quadratic: 5.398E-09 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 9:22:15 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.82 %
Log(Eff): -7.206837E-02 + (-5.220592E-02*Log(E)) + (-7.214522E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.58 %
Log(Eff): -1.343090E+01 + (5.323811E+00*Log(E)) + (-6.125181E-01*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.62keV)
Stop channel: 8000 (1999.96keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (1087) Env32 G53W4.25 3/28/2012 9:23:02 AM Page 2
TestAmerica Spectrum name: 7_25mLd=1_20120466.An1
Page 1

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0313

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
37.89	18099.	1.63	0.97	1.139E-01				
49.55	3924.	6.74	1.61	1.377E-01				
59.58	166371.	0.31	0.87	1.490E-01	59.54	35.700	8.692E+02	AM241
70.85	5190.	3.61	0.91	1.546E-01				
72.93	8628.	2.25	0.91	1.550E-01				
82.44	3595.	4.73	0.92	1.548E-01				
85.00	3017.	5.54	0.92	1.544E-01				
88.04	217134.	0.22	0.92	1.536E-01	88.03	3.610	1.235E+04	CD109
122.00	94526.	0.40	0.97	1.365E-01	122.06	85.600	2.792E+02	CO57
136.37	11722.	1.94	1.00	1.273E-01				
165.77	82020.	0.42	1.00	1.085E-01	165.85	79.900	4.043E+02	Ce139
199.05	6340.	3.15	1.15	9.348E-02				
203.83	1685.	9.26	1.37	9.168E-02				
255.17	2643.	5.31	1.22	7.599E-02				
279.24	55124.	0.51	1.13	7.033E-02	279.17	81.500	9.452E+02	Hg203
391.73	53714.	0.53	1.23	5.205E-02	391.69	64.000	7.474E+02	SN113
661.64	34945.	0.77	1.45	3.161E-02	661.66	85.210	3.623E+02	CS137
898.04	51902.	0.54	1.71	2.321E-02	898.02	93.700	1.152E+03	Y898
1173.22	33601.	0.66	1.92	1.752E-02	1173.24	99.900	5.500E+02	Co1173
1332.48	29130.	0.74	2.01	1.526E-02	1332.50	99.982	5.467E+02	Co1332
1836.00	28155.	0.66	2.48	1.068E-02	1836.01	99.200	1.283E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV		Suspected Nuclide
151.07	37.89	15344.	18099.	1.589E+05	1.63	0.970	-	s
197.75	49.55	18878.	3924.	2.850E+04	6.74	1.609	-	s
282.95	70.83	14930.	5190.	3.358E+04	3.61	0.908	-	D
291.26	72.91	14501.	8628.	5.568E+04	2.25	0.910	-	D
329.28	82.43	15722.	2688.	1.736E+04	8.73	1.074	-	D

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
339.57	84.99	12459.	3017.	4.589E+03	5.54	0.922	- D
545.11	136.37	9624.	11722.	9.209E+04	1.94	0.996	-
795.87	199.05	8021.	6340.	6.782E+04	3.15	1.154	-
815.01	203.83	6179.	1685.	1.838E+04	9.26	1.370	- s
1020.41	255.17	4656.	2643.	3.478E+04	5.31	1.225	-

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.88	59.58	22227.	166371.	46.214	0.31	0.871
CD-109	351.72	88.04	14627.	213505.	59.307	0.24	0.916
CO-57	487.62	122.00	10857.	94526.	26.257	0.40	0.968
Ce-139	662.71	165.77	8746.	82020.	22.783	0.42	1.002
Hg-203	1116.69	279.24	5408.	55124.	15.312	0.51	1.131
SN-113	1566.76	391.73	5105.	53714.	14.921	0.53	1.231
CS-137	2646.57	661.64	5888.	34945.	9.707	0.77	1.453
Y-898	3592.28	898.04	3972.	51902.	14.417	0.54	1.705
Co-1173	4693.09	1173.22	2232.	33601.	9.334	0.66	1.920
Co-1332	5330.14	1332.48	2107.	29130.	8.092	0.74	2.010
Y-1836	7344.19	1836.00	619.	28155.	7.821	0.66	2.479

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq		COMMENTS
AM-241		8.6915E+02				1.58E+05		
			59.54	8.692E+02	(	3.644E+00	3.06E-01 3.57E+01 G	
CD-109		1.2148E+04				4.63E+02		
			88.03	1.215E+04	(	3.222E+01	2.42E-01 3.61E+00 G	
CO-57		2.7917E+02				2.72E+02		
			122.06	2.792E+02	(	1.442E+00	3.98E-01 8.56E+01 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
Ce-139	4.0429E+02				1.38E+02	

```
                                7_25mLd=1_20120466
                          165.85 4.043E+02  (  2.162E+00 4.25E-01 7.99E+01 G

Hg-203       9.4520E+02                                        4.66E+01
                          279.17 9.452E+02  (  5.922E+00 5.11E-01 8.15E+01 G

SN-113       7.4738E+02                                        1.15E+02
                          391.69 7.474E+02  (  4.670E+00 5.30E-01 6.40E+01 G

CS-137       3.6235E+02                                        1.10E+04
                          661.66 3.623E+02  (  3.736E+00 7.69E-01 8.52E+01 G

Y-898        1.1524E+03                                        1.07E+02
                          898.02 1.152E+03  (  6.582E+00 5.42E-01 9.37E+01 G

Co-1173      5.4999E+02                                        1.93E+03
                         1173.24 5.500E+02  (  3.648E+00 6.63E-01 9.99E+01 G

Co-1332      5.4672E+02                                        1.93E+03
                         1332.50 5.467E+02  (  4.065E+00 7.36E-01 1.00E+02 G

Y-1836       1.2829E+03                                        1.07E+02
                         1836.01 1.283E+03  (  5.405E+00 6.62E-01 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
```

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      ORTEC g v - i (1087) Env32  G53W4.25  3/28/2012 9:23:02 AM    Page  5
 TestAmerica                      Spectrum name: 7_25mLd=1_20120466.An1

   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


 *************** D I S C A R D E D  I S O T O P E  P E A K S ***************
 Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
            Energy   Counts     Counts     Cts/Sec  1 Sigma %
                                    Page 4
```

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
AM-241	8.6883E+02	8.6915E+02	3.059E-01%	3.64E+00
CD-109	1.0695E+04	1.2148E+04	2.421E-01%	3.22E+01
CO-57	2.2475E+02	2.7917E+02	3.980E-01%	1.44E+00
Ce-139	2.6348E+02	4.0429E+02	4.248E-01%	2.16E+00
Hg-203	2.6708E+02	9.4520E+02	5.114E-01%	5.92E+00
SN-113	4.4788E+02	7.4738E+02	5.297E-01%	4.67E+00
CS-137	3.6041E+02	3.6235E+02	7.691E-01%	3.74E+00
Y-898	6.6300E+02	1.1524E+03	5.417E-01%	6.58E+00
Co-1173	5.3341E+02	5.4999E+02	6.628E-01%	3.65E+00
Co-1332	5.3023E+02	5.4672E+02	7.362E-01%	4.07E+00
Y-1836	7.3808E+02	1.2829E+03	6.621E-01%	5.40E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

S U M M A R Y

Total Activity (82.4 to 2000.0 keV) 1.559E+04 Bq
Total Decayed Activity (82.4 to 2000.0 keV) 1.9287574E+04 Bq

Gamma Verification per Geometry

Detector: Ge 12

Geometry: 25 mL D=1

Reference date 7/1/2011

Calibration Standard: 85520-334

Standard volume g / vial 5.32298

Standard volume transferred in g / geometry 0.5177

lab ID# of cal standard Rad11-0100

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	abundance	activity Bq/sample	Count Results	%recovery
Am-241	3368	328	0.359	**912.4**	920.15	100.8
Cd-109	4780	465	0.0361	**12877.9**	12656	98.3
Co-57	2554	248	0.856	**290.2**	291.13	100.3
Ce-139	3552	345	0.799	**432.4**	418.17	96.7
Hg-203	7851	764	0.8155	**936.3**	987.93	105.5
Sn-113	4932	480	0.64	**749.5**	754.46	100.7
Cs-137	3188	310	0.851	**364.3**	370.02	101.6
Y-88	11970	1164	0.937	**1242.4**	1170.6	94.2
Co-60	5897	574	0.99974	**573.7**	565.76	98.6
Co-60	5897	574	0.99986	**573.6**	571.12	99.6
Y-88	12680	1233	0.992	**1243.2**	1279.6	102.9

Reviewed By: Jody Watson

Date: 9/2/2011

Calibration Data from file: 12_Liquid_D=1 25ml.Clb
Energy Calibration Date: 9/2/2011 Time: 6:53:12 AM
Efficiency Calibration Date: 9/2/2011 Time: 7:07:23 AM

Calibration Description:
Ge12_25mLd=1Cal_85520-334_090111

Energy Calibration Fit
Energy = 0.0253 +0.250193*Channel -3.73323e-008*Channel**2
FWHM (ch) = 3.4026 +0.000931*Channel -1.46035e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
238.02	59.54	59.57	-0.06%	0.89	0.91	-2.15%
351.85	88.03	88.05	-0.02%	0.92	0.93	-1.08%
487.91	122.06	122.09	-0.02%	0.96	0.96	-0.20%
663.09	165.85	165.91	-0.04%	1.01	1.00	1.04%
1115.48	279.17	279.06	0.04%	1.13	1.11	2.39%
1565.43	391.69	391.59	0.02%	1.21	1.21	0.20%
2645.59	661.66	661.67	-0.00%	1.44	1.44	0.18%
3591.20	898.02	898.03	-0.00%	1.64	1.64	-0.19%
4692.60	1173.24	1173.26	-0.00%	1.86	1.86	-0.23%
5330.26	1332.50	1332.56	-0.00%	1.97	1.99	-0.63%
7346.20	1836.01	1835.97	0.00%	2.37	2.36	0.33%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 2.0247 %
Ln(Eff) = -0.6443 -0.008678*Ln(Eng) -0.0644477*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 0.3253 %
Ln(Eff) = -12.3677 +4.728110*Ln(Eng) -0.542392*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
59.54	1.2217E-001	1.2198E-001	0.15%
88.03	1.2499E-001	1.2600E-001	-0.81%
122.06	1.1455E-001	1.1399E-001	0.49%
165.85	========== Knee ==========		
165.85	9.0351E-002	9.3275E-002	-3.24%
279.17	6.8283E-002	6.4748E-002	5.18%
391.69	5.0419E-002	5.0116E-002	0.60%
661.66	3.3299E-002	3.2740E-002	1.68%
898.02	2.3688E-002	2.5134E-002	-6.10%
1173.24	1.9444E-002	1.9747E-002	-1.56%
1332.50	1.7456E-002	1.7547E-002	-0.52%
1836.01	1.3296E-002	1.2913E-002	2.88%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Am-241	59.54	35.90	1.58E+005	913.65	328.00	3.10%	7/1/2011 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	12881.00	465.00	3.80%	7/1/2011 11:00:00 AM
Co-57	122.06	85.59	2.72E+002	289.75	248.00	2.80%	7/1/2011 11:00:00 AM
Ce-139	165.85	80.00	1.38E+002	431.25	345.00	2.40%	7/1/2011 11:00:00 AM
Hg-203	279.17	81.55	4.66E+001	936.85	764.00	2.40%	7/1/2011 11:00:00 AM
Sn-113	391.69	64.17	1.15E+002	748.01	480.00	2.50%	7/1/2011 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	363.81	310.00	3.06%	7/1/2011 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	1242.30	1164.00	2.60%	7/1/2011 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	574.57	574.00	2.70%	7/1/2011 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	574.10	574.00	2.80%	7/1/2011 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	1242.90	1233.00	2.40%	7/1/2011 11:00:00 AM

```
     ORTEC g v - i (3263) Env32  G53W4.25  9/7/2011 11:36:58 AM
TestAmerica, Inc                Spectrum name: 12_Liquid25mLD=1_20111905.An1

Sample description
     12_25mLD=1_85520-334_090111


Spectrum Filename: C:\User\SPC\Det12\12_Liquid25mLD=1_20111905.An1

Acquisition information
       Start time:                 9/1/2011 7:20:35 PM
       Live time:               3600
       Real time:               3910
       Dead time:                  7.93 %
       Detector ID:                   12

Detector system
     Ge12 SN/10034336


Calibration
       Filename:                   12_Liquid_D=1  25ml.Clb
     Ge12_25mLd=1Cal_85520-334_090111


       Energy Calibration
            Created:               9/2/2011 6:53:12 AM
            Zero offset:           0.025 keV
            Gain:                  0.250 keV/channel
            Quadratic:            -3.733E-08 keV/channel^2

       Efficiency Calibration
            Created:               9/2/2011 7:07:23 AM
            Knee Energy:         165.85 keV
            Above the Knee:        Quadratic        Uncertainty =   2.02 %
            Log(Eff):             -6.442716E-01 + (-8.678082E-03*Log(E) ) +
                                   ( -6.444773E-02*Log(E)^2 )
            Below the Knee:        Quadratic        Uncertainty =   0.33 %
            Log(Eff):             -1.236768E+01 + ( 4.728110E+00*Log(E) ) +
                                   ( -5.423915E-01*Log(E)^2 )

Library Files
       Main analysis library:      DET_EnergyStandardMix.Lib
       Library Match Width:        0.500
       Peak stripping:             Library based

Analysis parameters
       Analysis engine:            Env32   G53W4.25
       Start channel:            150 (    37.55keV )
       Stop channel:            8000 (  1999.18keV )
       Peak rejection level:    1000.000%
       Peak search sensitivity:    3
       Sample Size:                1.0000E+00
       Activity scaling factor:    1.0000E+00/(  1.0000E+00*  1.0000E+00) =
                                   1.0000E+00
       Detection limit method:     Reg. Guide 4.16 Method
```

Random error: 1.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.
Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	7/1/2011 11:00:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2011-08-29_0027.PBC 8/29/2011 12:27:29 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0354

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
37.95	18040.	1.92	0.95	9.568E-02				
43.81	2028.	10.97	1.36	1.059E-01				
49.75	3200.	8.37	1.11	1.137E-01				
59.57	144216.	0.33	0.89	1.220E-01	59.54	35.700	9.202E+02	AM241
66.47	1541.	13.90	1.31	1.252E-01				
70.79	6146.	3.16	0.92	1.263E-01				
72.92	10060.	2.03	0.92	1.266E-01				
74.98	273.	59.35	0.92	1.269E-01				
78.22	335.	48.82	0.92	1.270E-01				
82.39	3883.	4.51	0.93	1.268E-01				
85.03	3028.	5.65	0.93	1.265E-01				
88.06	190362.	0.24	0.93	1.260E-01	88.03	3.610	1.276E+04	CD109
108.45	219.	76.25	0.58	1.198E-01				
122.09	87233.	0.43	0.96	1.140E-01	122.06	85.600	2.911E+02	CO57
136.49	11055.	2.31	1.00	1.073E-01				
165.91	81961.	0.44	1.01	9.325E-02	165.85	79.900	4.182E+02	Ce139
199.10	5807.	3.69	1.18	8.239E-02				
203.74	1635.	9.95	1.46	8.108E-02				
255.05	2590.	6.27	1.08	6.915E-02				
279.06	74286.	0.43	1.13	6.477E-02	279.17	81.500	9.879E+02	Hg203
306.64	83.	67.91	0.64	6.040E-02				
380.14	197.	40.64	0.53	5.129E-02				
391.59	59843.	0.50	1.21	5.013E-02	391.69	64.000	7.545E+02	SN113
439.97	295.	41.21	0.34	4.574E-02				
471.77	327.	34.30	0.90	4.326E-02				
556.09	40.	92.49	0.27	3.785E-02				
661.67	37016.	0.76	1.44	3.274E-02	661.66	85.210	3.700E+02	CS137
694.65	102.	80.83	0.33	3.142E-02				
795.40	166.	43.52	0.75	2.796E-02				
813.89	1034.	10.43	1.66	2.740E-02				
878.46	95.	57.57	0.38	2.563E-02				
885.57	103.	55.74	1.63	2.545E-02				
890.63	46.	126.79	1.63	2.532E-02				
898.03	66170.	0.46	1.64	2.513E-02	898.02	93.700	1.171E+03	Y898
912.48	1536.	10.38	1.68	2.478E-02				

942.97	206.	37.00	0.68	2.407E-02				
991.92	163.	45.99	0.66	2.300E-02				
1074.29	227.	42.42	0.49	2.140E-02				
1093.58	145.	34.01	1.27	2.106E-02				
1173.25	39287.	0.64	1.86	1.975E-02	1173.24	99.900	5.658E+02	Co1173
1223.27	101.	41.56	1.90	1.900E-02				
1229.31	146.	31.53	1.91	1.891E-02				
1332.55	35270.	0.67	1.97	1.755E-02	1332.50	99.982	5.711E+02	Co1332
1354.39	35.	63.31	0.50	1.728E-02				
1380.13	141.	55.53	0.35	1.698E-02				
1416.98	51.	44.76	0.49	1.656E-02				
1528.36	153.	49.74	0.62	1.541E-02				
1571.00	129.	40.23	2.17	1.502E-02				
1577.83	125.	48.97	2.17	1.495E-02				
1583.43	146.	36.47	2.18	1.490E-02				
1641.97	184.	43.10	0.30	1.439E-02				
1835.95	39341.	0.58	2.38	1.291E-02	1836.01	99.200	1.280E+03	Y1836
1913.70	62.	29.12	0.47	1.240E-02				

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
151.58	37.95	24558.	18040.	1.886E+05	1.92	0.946	-	s
175.00	43.81	14233.	2028.	1.915E+04	10.97	1.360	-	s
198.76	49.75	19592.	3200.	2.815E+04	8.37	1.106	-	s
265.59	66.47	14003.	1541.	1.231E+04	13.90	1.310	-	s

ORTEC g v - i (3263) Env32 G53W4.25 9/7/2011 11:36:58 AM
TestAmerica, Inc Spectrum name: 12_Liquid25mLD=1_20111905.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
282.88	70.80	15719.	6224.	4.927E+04	3.12	0.917	- D
291.39	72.93	15681.	10231.	8.078E+04	1.99	0.919	- D
299.58	74.98	13037.	273.	2.156E+03	59.35	0.921	- D
312.58	78.23	14109.	453.	3.565E+03	46.93	0.620	- s
329.19	82.38	16336.	3255.	2.568E+04	7.38	1.059	- s
339.76	85.03	12888.	686.	5.421E+03	27.31	0.736	- M
433.40	108.45	8736.	219.	1.828E+03	76.25	0.576	- s
545.48	136.49	12026.	11055.	1.031E+05	2.31	1.002	-
795.80	199.10	8918.	5807.	7.048E+04	3.69	1.181	- s
814.33	203.74	6471.	1635.	2.016E+04	9.95	1.462	- s
1019.47	255.05	5710.	2590.	3.746E+04	6.27	1.084	-
1225.73	306.64	1434.	83.	1.377E+03	67.91	0.643	- c
1519.64	380.14	2185.	197.	3.834E+03	40.64	0.535	- s
1758.88	439.97	3477.	295.	6.449E+03	41.21	0.344	- s
1886.06	471.77	3193.	327.	7.554E+03	34.30	0.905	- s
2223.30	556.09	731.	40.	1.061E+03	92.49	0.266	- sc
2777.51	694.65	2232.	102.	3.247E+03	80.83	0.329	- sc
3180.57	795.40	1452.	166.	5.955E+03	43.52	0.754	- s
3254.52	813.89	2196.	1034.	3.775E+04	10.43	1.664	- s
3512.87	878.46	1078.	95.	3.694E+03	57.57	0.379	- s
3540.94	885.47	891.	79.	3.117E+03	58.55	0.654	- s
3561.19	890.54	744.	63.	2.488E+03	62.51	0.497	- sc
3649.00	912.48	3875.	1536.	6.198E+04	10.38	1.676	- s
3770.98	942.97	1675.	206.	8.545E+03	37.00	0.679	- s
3966.89	991.92	1488.	163.	7.086E+03	45.99	0.664	- s
4296.49	1074.29	1932.	227.	1.059E+04	42.42	0.486	- s
4373.70	1093.58	853.	145.	6.870E+03	34.01	1.270	- s
4893.18	1223.37	757.	141.	7.439E+03	41.38	0.772	- s
4917.35	1229.41	1065.	297.	1.570E+04	27.53	0.842	- s
5417.66	1354.39	228.	35.	2.025E+03	63.31	0.501	- sc
5520.71	1380.13	1089.	141.	8.305E+03	55.53	0.349	- s
5668.26	1416.98	235.	51.	3.079E+03	44.76	0.495	- s
6114.22	1528.36	1214.	153.	9.947E+03	49.74	0.624	- s
6284.70	1570.94	1354.	174.	1.162E+04	45.38	0.328	- s
6312.06	1577.77	1119.	102.	6.810E+03	65.08	0.670	- s
6334.48	1583.37	585.	99.	6.643E+03	39.91	0.447	- s
6569.15	1641.97	1073.	184.	1.276E+04	43.10	0.303	- s
7657.55	1913.70	66.	62.	5.000E+03	29.12	0.466	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix.Lib

ORTEC g v - i (3263) Env32 G53W4.25 9/7/2011 11:36:58 AM
TestAmerica, Inc Spectrum name: 12_Liquid25mLD=1_20111905.An1

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	238.02	59.57	21801.	144216.	40.060	0.33	0.887
CD-109	351.85	88.05	17748.	188754.	52.432	0.27	0.923
CO-57	487.91	122.09	12190.	87233.	24.231	0.43	0.962
Ce-139	663.09	165.91	10469.	81961.	22.767	0.44	1.014
Hg-203	1115.48	279.06	6263.	74286.	20.635	0.43	1.133
SN-113	1565.43	391.59	5690.	59843.	16.623	0.50	1.209
CS-137	2645.59	661.67	6528.	37016.	10.282	0.76	1.444
Y-898	3591.19	898.03	4552.	66170.	18.381	0.46	1.636
Co-1173	4692.55	1173.25	3024.	39287.	10.913	0.64	1.860
Co-1332	5330.25	1332.55	2607.	35270.	9.797	0.67	1.974
Y-1836	7346.10	1835.95	1309.	39341.	10.928	0.58	2.377

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample		COMMENTS
AM-241		9.2015E+02				1.58E+05		
			59.54	9.202E+02	(	4.407E+00	3.34E-01 3.57E+01	G
CD-109		1.2656E+04				4.63E+02		
			88.03	1.266E+04	(	4.181E+01	2.70E-01 3.61E+00	G
CO-57		2.9113E+02				2.72E+02		
			122.06	2.911E+02	(	1.726E+00	4.29E-01 8.56E+01	G
Ce-139		4.1817E+02				1.38E+02		
			165.85	4.182E+02	(	2.446E+00	4.44E-01 7.99E+01	G
Hg-203		9.8793E+02				4.66E+01		
			279.17	9.879E+02	(	4.940E+00	4.33E-01 8.15E+01	G
SN-113		7.5446E+02				1.15E+02		
			391.69	7.545E+02	(	4.466E+00	5.02E-01 6.40E+01	G
CS-137		3.7002E+02				1.10E+04		
			661.66	3.700E+02	(	3.791E+00	7.56E-01 8.52E+01	G

ORTEC g v - i (3263) Env32 G53W4.25 9/7/2011 11:36:58 AM
TestAmerica, Inc Spectrum name: 12_Liquid25mLD=1_20111905.An1

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Y-898	1.1706E+03					1.07E+02	
		898.02	1.171E+03	(	5.610E+00	4.64E-01	9.37E+01 G
Co-1173	5.6576E+02					1.93E+03	
		1173.24	5.658E+02	(	3.729E+00	6.41E-01	9.99E+01 G
Co-1332	5.7112E+02					1.93E+03	
		1332.50	5.711E+02	(	3.896E+00	6.66E-01	1.00E+02 G
Y-1836	1.2796E+03					1.07E+02	
		1836.01	1.280E+03	(	5.571E+00	5.80E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

ORTEC g v - i (3263) Env32 G53W4.25 9/7/2011 11:36:58 AM
TestAmerica, Inc Spectrum name: 12_Liquid25mLD=1_20111905.An1

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
AM-241	9.1990E+02	9.2015E+02	3.336E-01%	4.41E+00
CD-109	1.1527E+04	1.2656E+04	2.700E-01%	4.18E+01
CO-57	2.4833E+02	2.9113E+02	4.290E-01%	1.73E+00
Ce-139	3.0549E+02	4.1817E+02	4.442E-01%	2.45E+00
Hg-203	3.9104E+02	9.8793E+02	4.331E-01%	4.94E+00
SN-113	5.1827E+02	7.5446E+02	5.018E-01%	4.47E+00
CS-137	3.6857E+02	3.7002E+02	7.562E-01%	3.79E+00
Y-898	7.8046E+02	1.1706E+03	4.639E-01%	5.61E+00
Co-1173	5.5320E+02	5.6576E+02	6.413E-01%	3.73E+00
Co-1332	5.5844E+02	5.7112E+02	6.665E-01%	3.90E+00
Y-1836	8.5312E+02	1.2796E+03	5.796E-01%	5.57E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (78.1 to 1999.2 keV) 1.702E+04 Bq/Sample
Total Decayed Activity (78.1 to 1999.2 keV) 1.9984479E+04 Bq/Sample

Analyzed by: _____
admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica, Inc

Gamma Verification per Geometry

Detector: Ge14

Geometry: 25mL solid

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 56

lab ID# of cal standard 6701

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	112	0.0425	2630	2640.5	100.4
Am-241	2037	74	0.359	205	206.84	100.9
Cd-109	2881	104	0.0361	2883	2875.8	99.7
Co-57	1511	55	0.856	64	64.519	101.2
Ce-139	2139	77	0.799	97	94.344	97.5
Hg-203	4651	168	0.8146	206	212.13	102.8
Sn-113	3015	109	0.64	170	171.77	100.9
Cs-137	1938	70	0.851	82	83.192	101.1
Y-88	7264	262	0.937	280	269.81	96.3
Co-60	3580	129	0.99974	129	127.55	98.6
Co-60	3581	129	0.999856	129	127.85	98.8
Y-88	7690	278	0.992	280	287.7	102.7

Reviewed By: Rachael Schneider

Date: 3/15/2012

Calibration Data from file: 14_Soil_25ml.Clb
Energy Calibration Date: 3/14/2012 Time: 4:42:38 PM
Efficiency Calibration Date: 3/14/2012 Time: 4:44:41 PM

Calibration Description:
14_25mlSolid_90099_031312

Energy Calibration Fit
Energy = 0.1074 +0.250090*Channel -1.95777e-008*Channel**2
FWHM (ch) = 2.8508 +0.000977*Channel -1.16879e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
186.18	46.54	46.67	-0.28%	0.74	0.76	-1.92%
238.01	59.54	59.63	-0.15%	0.75	0.77	-3.34%
351.43	88.03	87.99	0.04%	0.82	0.80	2.29%
487.23	122.06	121.95	0.09%	0.82	0.83	-0.96%
662.45	165.85	165.77	0.05%	0.91	0.87	4.34%
1115.90	279.17	279.16	0.00%	0.99	0.98	1.05%
1565.77	391.69	391.64	0.01%	1.07	1.09	-1.44%
2645.87	661.66	661.68	-0.00%	1.32	1.34	-1.07%
3591.60	898.02	898.08	-0.01%	1.56	1.55	0.19%
4692.55	1173.24	1173.24	0.00%	1.81	1.79	0.78%
5329.88	1332.50	1332.50	-0.00%	1.92	1.93	-0.50%
7345.14	1836.01	1836.00	0.00%	2.35	2.35	0.03%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.0125 %
Ln(Eff) = 0.4287 -0.386900*Ln(Eng) -0.0389174*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 0.1180 %
Ln(Eff) = -11.2022 +4.080928*Ln(Eng) -0.467762*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	8.8325E-002	8.8152E-002	0.20%
59.54	9.6431E-002	9.6635E-002	-0.21%
88.03	9.9336E-002	9.9506E-002	-0.17%
122.06	9.1761E-002	9.1372E-002	0.42%
165.85	==========	Knee ==========	
165.85	7.5283E-002	7.6883E-002	-2.13%
279.17	5.2061E-002	5.0557E-002	2.89%
391.69	3.8396E-002	3.8060E-002	0.87%
661.66	2.4400E-002	2.4095E-002	1.25%
898.02	1.7643E-002	1.8279E-002	-3.61%
1173.24	1.4094E-002	1.4269E-002	-1.24%
1332.50	1.2542E-002	1.2656E-002	-0.92%
1836.01	9.5561E-003	9.3059E-003	2.62%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	2635.30	112.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	207.28	74.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	2880.90	104.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	64.25	55.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	96.37	77.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	206.13	168.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	170.31	109.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	82.15	70.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	279.62	262.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	129.13	129.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	129.03	129.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	280.24	278.00	4.00%	1/1/2012 11:00:00 AM

ORTEC g v - i (1087) Env32 G53W4.25 3/14/2012 4:46:53 PM Page 1
TestAmerica, Inc. Spectrum name: 14_Solid25mL_20120243.An1

Sample description
14_Solid25mL_90099_031312

Spectrum Filename: C:\User\SPC\Det14\14_Solid25mL_20120243.An1

Acquisition information
Start time: 3/13/2012 11:03:55 AM
Live time: 7200
Real time: 7292
Dead time: 1.26 %
Detector ID: 14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_Soil_25ml.Clb
14_25mlSolid_90099_031312

Energy Calibration
Created: 3/14/2012 4:42:38 PM
Zero offset: 0.107 keV
Gain: 0.250 keV/channel
Quadratic: -1.958E-08 keV/channel^2

Efficiency Calibration
Created: 3/14/2012 4:44:41 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.01 %
Log(Eff): 4.286558E-01 + (-3.868998E-01*Log(E)) +
(-3.891736E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.12 %
Log(Eff): -1.120218E+01 + (4.080928E+00*Log(E)) +
(-4.677621E-01*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix & Pb.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.62keV)
Stop channel: 8000 (1999.58keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0551

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
37.94	3126.	4.53	0.75	7.819E-02				
46.67	70790.	0.48	0.74	8.827E-02	46.54	4.250	2.640E+03	Pb210
59.63	51362.	0.55	0.75	9.667E-02	59.54	35.700	2.068E+02	AM241
70.81	1957.	6.09	0.78	9.964E-02				
72.91	3108.	3.95	0.78	9.988E-02				
82.41	1190.	9.26	0.79	1.000E-01				
88.00	68357.	0.40	0.80	9.951E-02	88.03	3.610	2.944E+03	CD109
121.95	30238.	0.73	0.82	9.140E-02	122.06	85.600	6.452E+01	CO57
136.38	3633.	4.08	0.86	8.677E-02				
165.77	29037.	0.71	0.91	7.705E-02	165.85	79.900	9.434E+01	Ce139
198.99	1176.	8.66	1.19	6.656E-02				
255.02	999.	9.56	0.92	5.446E-02				
279.16	21580.	0.79	0.99	5.056E-02	279.17	81.500	2.121E+02	Hg203
391.64	19526.	0.86	1.07	3.806E-02	391.69	64.000	1.718E+02	SN113
661.68	12242.	1.29	1.32	2.409E-02	661.66	85.210	8.319E+01	CS137
898.08	20833.	0.82	1.56	1.828E-02	898.02	93.700	2.698E+02	Y898
1173.24	12756.	1.03	1.81	1.427E-02	1173.24	99.900	1.275E+02	Co1173
1332.50	11350.	1.03	1.92	1.266E-02	1332.50	99.982	1.278E+02	Co1332
1835.99	11973.	0.94	2.35	9.306E-03	1836.01	99.200	2.877E+02	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
151.30	37.91	8378.	3223.	4.122E+04	4.39	0.750	-	D
282.71	70.81	6862.	1839.	1.845E+04	7.93	0.727	-	
291.09	72.90	6115.	2882.	2.885E+04	4.81	0.765	-	D
544.92	136.38	4590.	3633.	4.187E+04	4.08	0.862	-	

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
795.28	198.99	2632.	1176.	1.768E+04	8.66	1.187	- s
1019.36	255.02	2119.	999.	1.834E+04	9.56	0.921	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	186.18	46.67	13300.	70790.	9.832	0.48	0.744
AM-241	238.01	59.63	8309.	51362.	7.134	0.55	0.746
CD-109	351.43	87.99	6302.	66772.	9.274	0.44	0.817
CO-57	487.23	121.95	4666.	30238.	4.200	0.73	0.823
Ce-139	662.45	165.77	3303.	29037.	4.033	0.71	0.913
Hg-203	1115.90	279.16	1944.	21580.	2.997	0.79	0.992
SN-113	1565.77	391.64	1736.	19526.	2.712	0.86	1.073
CS-137	2645.87	661.68	2135.	12242.	1.700	1.29	1.325
Y-898	3591.59	898.08	1359.	20833.	2.893	0.82	1.555
Co-1173	4692.55	1173.24	676.	12756.	1.772	1.03	1.808
Co-1332	5329.88	1332.50	387.	11350.	1.576	1.03	1.922
Y-1836	7345.11	1835.99	90.	11973.	1.663	0.94	2.351

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq		COMMENTS
Pb-210	N	2.6405E+03				8.15E+03		
			46.54	2.640E+03	(	2.015E+01	4.84E-01 4.25E+00	G
AM-241		2.0684E+02				1.58E+05		
			59.54	2.068E+02	(	1.722E+00	5.47E-01 3.57E+01	G
CD-109		2.8758E+03				4.63E+02		
			88.03	2.876E+03	(	1.605E+01	4.44E-01 3.61E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
CO-57	6.4519E+01				2.72E+02	
		122.06	6.452E+01	(	6.850E-01 7.25E-01 8.56E+01	G
Ce-139	9.4344E+01				1.38E+02	
		165.85	9.434E+01	(	8.790E-01 7.08E-01 7.99E+01	G

Hg-203	2.1213E+02					4.66E+01	
		279.17	2.121E+02	(	2.046E+00	7.94E-01	8.15E+01 G
SN-113	1.7177E+02					1.15E+02	
		391.69	1.718E+02	(	1.732E+00	8.56E-01	6.40E+01 G
CS-137	8.3192E+01					1.10E+04	
		661.66	8.319E+01	(	1.482E+00	1.29E+00	8.52E+01 G
Y-898	2.6981E+02					1.07E+02	
		898.02	2.698E+02	(	2.260E+00	8.20E-01	9.37E+01 G
Co-1173	1.2755E+02					1.93E+03	
		1173.24	1.275E+02	(	1.239E+00	1.03E+00	9.99E+01 G
Co-1332	1.2785E+02					1.93E+03	
		1332.50	1.278E+02	(	1.063E+00	1.03E+00	1.00E+02 G
Y-1836	2.8770E+02					1.07E+02	
		1836.01	2.877E+02	(	1.126E+00	9.45E-01	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went
negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide
failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the
library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation

Peak Codes:
G - Gamma Ray

F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded

X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq	Time Corrected Activity Bq	Uncertainty 1 Sigma Counting	MDA
Pb-210	2.6243E+03	2.6405E+03	4.839E-01%	2.01E+01
AM-241	2.0678E+02	2.0684E+02	5.474E-01%	1.72E+00
CD-109	2.5817E+03	2.8758E+03	4.437E-01%	1.60E+01
CO-57	5.3696E+01	6.4519E+01	7.255E-01%	6.85E-01
Ce-139	6.5651E+01	9.4344E+01	7.079E-01%	8.79E-01
Hg-203	7.2741E+01	2.1213E+02	7.940E-01%	2.05E+00
SN-113	1.1133E+02	1.7177E+02	8.557E-01%	1.73E+00
CS-137	8.2815E+01	8.3192E+01	1.293E+00%	1.48E+00
Y-898	1.6894E+02	2.6981E+02	8.204E-01%	2.26E+00
Co-1173	1.2428E+02	1.2755E+02	1.027E+00%	1.24E+00
Co-1332	1.2458E+02	1.2785E+02	1.028E+00%	1.06E+00
Y-1836	1.8014E+02	2.8770E+02	9.448E-01%	1.13E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (40.6 to 1999.6 keV) 6.397E+03 Bq
Total Decayed Activity (40.6 to 1999.6 keV) 7.1619751E+03 Bq

Gamma Verification per Geometry

Detector: Ge17

Geometry: 25mL solid

Reference date 1/1/2012

Calibration Standard: 90099

Standard volume g / vial 1550

Standard volume transferred in g / geometry 56

lab ID# of cal standard 6701

Isotope	Certified Activity gammas/sec	Geometry Activity gammas/sec	γ abundance	Bq/sample	Count Results	%recovery
Pb-210	3094	112	0.0425	2630	2656.9	101.0
Am-241	2037	74	0.359	205	205.05	100.0
Cd-109	2881	104	0.0361	2883	2896.9	100.5
Co-57	1511	55	0.856	64	64.687	101.4
Ce-139	2139	77	0.799	97	94.403	97.6
Hg-203	4651	168	0.8146	206	213.24	103.4
Sn-113	3015	109	0.64	170	169.12	99.4
Cs-137	1938	70	0.851	82	84.917	103.2
Y-88	7264	262	0.937	280	266.71	95.2
Co-60	3580	129	0.99974	129	126.25	97.6
Co-60	3581	129	0.999856	129	129.91	100.4
Y-88	7690	278	0.992	280	286.49	102.3

Reviewed By: Megan McAfee

Date: 4/9/2012

Calibration Data from file: 17_Soil_25ml.Clb
Energy Calibration Date: 4/3/2012 Time: 7:52:59 AM
Efficiency Calibration Date: 4/3/2012 Time: 7:53:15 AM

Calibration Description:
17_25mlSoil_90099_032712

Energy Calibration Fit
Energy = 0.2064 +0.250095*Channel -2.42378e-008*Channel**2
FWHM (ch) = 2.9543 +0.001005*Channel -3.26871e-008*Channel**2

Energy/FWHM Table

Channel	Energy(keV)	Fit(keV)	Delta	FWHM(keV)	Fit(keV)	Delta
185.64	46.54	46.63	-0.20%	0.77	0.79	-2.18%
237.57	59.54	59.62	-0.14%	0.78	0.80	-1.80%
351.39	88.03	88.09	-0.06%	0.85	0.83	2.52%
487.02	122.06	122.00	0.05%	0.85	0.86	-0.93%
661.89	165.85	165.73	0.07%	0.89	0.90	-1.65%
1115.18	279.17	279.08	0.03%	1.03	1.01	2.51%
1565.42	391.69	391.65	0.01%	1.13	1.11	1.81%
2645.55	661.66	661.68	-0.00%	1.35	1.35	0.13%
3591.36	898.02	898.08	-0.01%	1.54	1.53	0.37%
4692.57	1173.24	1173.26	-0.00%	1.69	1.74	-2.99%
5329.92	1332.50	1332.51	-0.00%	1.87	1.84	1.24%
7345.55	1836.01	1835.99	0.00%	2.15	2.14	0.25%

Efficiency Calibration Fit
Knee Energy = 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.3673 %
Ln(Eff) = 0.1994 -0.363439*Ln(Eng) -0.035753*(Ln(Eng))**2
Below the Knee: Quadratic Uncertainty = 0.2201 %
Ln(Eff) = -10.5992 +3.730142*Ln(Eng) -0.423149*(Ln(Eng))**2

Efficiency Table

Energy	Efficiency	Fit	Delta
46.54	8.1536E-002	8.0871E-002	0.82%
59.54	8.7762E-002	8.8717E-002	-1.09%
88.03	9.2996E-002	9.2477E-002	0.56%
122.06	8.7289E-002	8.6693E-002	0.68%
165.85	========== Knee ==========		
165.85	7.3345E-002	7.4858E-002	-2.06%
279.17	5.2502E-002	5.0720E-002	3.39%
391.69	3.8706E-002	3.8969E-002	-0.68%
661.66	2.6356E-002	2.5497E-002	3.26%
898.02	1.8829E-002	1.9735E-002	-4.81%
1173.24	1.5335E-002	1.5684E-002	-2.28%
1332.50	1.4130E-002	1.4034E-002	0.68%
1836.01	1.0791E-002	1.0553E-002	2.21%

Calibration Certificate Table

Isotope	Energy	Pct	Halflife	Activity	GPS	Error	Date & Time
Pb-210	46.54	4.25	8.15E+003	2635.30	112.00	4.10%	1/1/2012 11:00:00 AM
Am-241	59.54	35.70	1.58E+005	207.28	74.00	3.50%	1/1/2012 11:00:00 AM
Cd-109	88.03	3.61	4.63E+002	2880.90	104.00	4.70%	1/1/2012 11:00:00 AM
Co-57	122.06	85.60	2.72E+002	64.25	55.00	4.10%	1/1/2012 11:00:00 AM
Ce-139	165.85	79.90	1.38E+002	96.37	77.00	3.90%	1/1/2012 11:00:00 AM
Hg-203	279.17	81.50	4.66E+001	206.13	168.00	3.80%	1/1/2012 11:00:00 AM
Sn-113	391.69	64.00	1.15E+002	170.31	109.00	3.90%	1/1/2012 11:00:00 AM
Cs-137	661.66	85.21	1.10E+004	82.15	70.00	4.00%	1/1/2012 11:00:00 AM
Y-88	898.02	93.70	1.07E+002	279.62	262.00	3.90%	1/1/2012 11:00:00 AM
Co-60	1173.24	99.90	1.93E+003	129.13	129.00	4.00%	1/1/2012 11:00:00 AM
Co-60	1332.50	99.98	1.93E+003	129.03	129.00	4.00%	1/1/2012 11:00:00 AM
Y-88	1836.01	99.20	1.07E+002	280.24	278.00	4.00%	1/1/2012 11:00:00 AM

ORTEC g v - i (1087) Env32 G53W4.25 4/3/2012 7:54:12 AM Page 1
TestAmerica, Inc. Spectrum name: 17_Soil25mL_20120269.An1

Sample description
17_Soil25mL_90099_032712

Spectrum Filename: C:\User\SPC\Det17\17_Soil25mL_20120269.An1

Acquisition information
Start time: 3/27/2012 3:45:02 PM
Live time: 7200
Real time: 7292
Dead time: 1.26 %
Detector ID: 17

Detector system
Ge17 SN/11080671

Calibration
Filename: 17_Soil_25ml.Clb
17_25mlSoil_90099_032712

Energy Calibration
Created: 4/3/2012 7:52:59 AM
Zero offset: 0.206 keV
Gain: 0.250 keV/channel
Quadratic: -2.424E-08 keV/channel^2

Efficiency Calibration
Created: 4/3/2012 7:53:15 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.37 %
Log(Eff): 1.993817E-01 + (-3.634387E-01*Log(E)) + (-3.575305E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.22 %
Log(Eff): -1.059921E+01 + (3.730142E+00*Log(E)) + (-4.231490E-01*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix & Pb.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.72keV)
Stop channel: 8000 (1999.42keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (1087) Env32 G53W4.25 4/3/2012 7:54:12 AM Page 2
TestAmerica, Inc. Spectrum name: 17_Soil25mL_20120269.An1
Page 1

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2012 11:00:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0577

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq	Nuc
37.91	2828.	4.80	0.78	7.202E-02				
46.63	65270.	0.52	0.77	8.095E-02	46.54	4.250	2.657E+03	Pb210
59.62	46742.	0.60	0.78	8.875E-02	59.54	35.700	2.051E+02	AM241
70.81	1350.	8.66	0.81	9.181E-02				
72.96	2280.	5.31	0.81	9.212E-02				
88.09	61194.	0.49	0.85	9.247E-02	88.03	3.610	2.897E+03	CD109
122.00	27742.	0.77	0.85	8.671E-02	122.06	85.600	6.469E+01	CO57
136.43	3533.	3.51	0.89	8.308E-02				
165.73	26338.	0.77	0.89	7.519E-02	165.85	79.900	9.440E+01	Ce139
198.90	1087.	8.90	1.16	6.549E-02				
279.08	17623.	0.89	1.03	5.073E-02	279.17	81.500	2.132E+02	Hg203
391.65	18070.	0.96	1.13	3.897E-02	391.69	64.000	1.691E+02	SN113
661.68	13211.	1.06	1.35	2.550E-02	661.66	85.210	8.492E+01	CS137
898.08	20273.	0.84	1.54	1.973E-02	898.02	93.700	2.667E+02	Y898
1173.26	13808.	1.02	1.69	1.568E-02	1173.24	99.900	1.263E+02	Co1173
1332.50	12723.	1.02	1.87	1.403E-02	1332.50	99.982	1.299E+02	Co1332
1835.96	12328.	0.94	2.15	1.055E-02	1836.01	99.200	2.865E+02	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
150.77	37.93	7784.	2828.	3.928E+04	4.80	0.777	-	D
290.82	72.94	5703.	2043.	2.217E+04	6.43	0.812	-	D
544.70	136.43	3395.	3533.	4.253E+04	3.51	0.887	-	
794.53	198.90	2365.	1087.	1.660E+04	8.90	1.158	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.64	46.63	13200.	65270.	9.065	0.52	0.768
AM-241	237.57	59.62	8928.	46742.	6.492	0.60	0.784
CD-109	351.39	88.09	7401.	61194.	8.499	0.49	0.847
CO-57	487.02	122.00	4554.	27742.	3.853	0.77	0.851
Ce-139	661.89	165.73	3493.	26338.	3.658	0.77	0.887
Hg-203	1115.18	279.08	1833.	17623.	2.448	0.89	1.035
SN-113	1565.42	391.65	2146.	18070.	2.510	0.96	1.132
CS-137	2645.55	661.68	1357.	13211.	1.835	1.06	1.348
Y-898	3591.36	898.08	1364.	20273.	2.816	0.84	1.541
Co-1173	4692.54	1173.26	845.	13808.	1.918	1.02	1.688
Co-1332	5329.90	1332.50	551.	12723.	1.767	1.02	1.868
Y-1836	7345.43	1835.96	150.	12328.	1.712	0.94	2.151

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq	Peak Energy keV	Peak Activity Bq	Code	MDA Value Bq	COMMENTS
Pb-210	N	2.6569E+03				8.15E+03	
			46.54	2.657E+03	(	2.190E+01 5.17E-01 4.25E+00	G
AM-241		2.0505E+02				1.58E+05	
			59.54	2.051E+02	(	1.944E+00 6.03E-01 3.57E+01	G
CD-109		2.8969E+03				4.63E+02	
			88.03	2.897E+03	(	1.911E+01 4.89E-01 3.61E+00	G
CO-57		6.4687E+01				2.72E+02	
			122.06	6.469E+01	(	7.396E-01 7.73E-01 8.56E+01	G

Nuclide	Ave activity	Energy	Activity	Code	Peak MDA	Comments
Ce-139	9.4403E+01				1.38E+02	
		165.85	9.440E+01	(	9.969E-01 7.73E-01 7.99E+01	G
Hg-203	2.1324E+02				4.66E+01	
		279.17	2.132E+02	(	2.447E+00 8.91E-01 8.15E+01	G
SN-113	1.6912E+02				1.15E+02	
		391.69	1.691E+02	(	2.046E+00 9.57E-01 6.40E+01	G

```
CS-137       8.4917E+01                                          1.10E+04
                          661.66 8.492E+01  (  1.121E+00 1.06E+00 8.52E+01 G

Y-898        2.6671E+02                                          1.07E+02
                          898.02 2.667E+02  (  2.300E+00 8.35E-01 9.37E+01 G

Co-1173      1.2625E+02                                          1.93E+03
                         1173.24 1.263E+02  (  1.263E+00 1.02E+00 9.99E+01 G

Co-1332      1.2991E+02                                          1.93E+03
                         1332.50 1.299E+02  (  1.145E+00 1.02E+00 1.00E+02 G

Y-1836       2.8649E+02                                          1.07E+02
                         1836.01 2.865E+02  (  1.387E+00 9.41E-01 9.92E+01 G
   ( - This peak used in the nuclide activity average.

   * - Peak is too wide, but only one peak in library.
   ! - Peak is part of a multiplet and this area went
       negative during deconvolution.
   ? - Peak is too narrow.
   @ - Peak is too wide at FW25M, but ok at FWHM.
   % - Peak fails sensitivity test.
   $ - Peak identified, but first peak of this nuclide
       failed one or more qualification tests.
   + - Peak activity higher than counting uncertainty range.
   - - Peak activity lower than counting uncertainty range.
   = - Peak outside analysis energy range.
   & - Calculated peak centroid is not close enough to the
       library energy centroid for positive identification.
   P - Peakbackground subtraction
   } - Peak is too close to another for the activity
       to be found directly.

   Nuclide Codes:                      Peak Codes:
   T - Thermal Neutron Activation      G - Gamma Ray
   F - Fast Neutron Activation         X - X-Ray
   I - Fission Product                 P - Positron Decay
   N - Naturally Occurring Isotope     S - Single-Escape
```



```
   P - Photon Reaction                 D - Double-Escape
   C - Charged Particle Reaction       K - Key Line
   M - No MDA Calculation              A - Not in Average
   R - Coincidence Corrected           C - Coincidence Peak
   H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


 *************** D I S C A R D E D  I S O T O P E  P E A K S ***************
 Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
           Energy   Counts     Counts     Cts/Sec  1 Sigma %
 ____________________________________________________________________________
   P - Peakbackground subtraction

 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
         Time of Count  Time Corrected  Uncertainty  1 Sigma
 Nuclide     Activity       Activity       Counting                   MDA
                Bq             Bq
```

Pb-210	2.6375E+03	2.6569E+03	5.165E-01%	2.19E+01
AM-241	2.0498E+02	2.0505E+02	6.031E-01%	1.94E+00
CD-109	2.5459E+03	2.8969E+03	4.891E-01%	1.91E+01
CO-57	5.1922E+01	6.4687E+01	7.728E-01%	7.40E-01
Ce-139	6.1159E+01	9.4403E+01	7.732E-01%	9.97E-01
Hg-203	5.9211E+01	2.1324E+02	8.909E-01%	2.45E+00
SN-113	1.0063E+02	1.6912E+02	9.565E-01%	2.05E+00
CS-137	8.4456E+01	8.4917E+01	1.058E+00%	1.12E+00
Y-898	1.5227E+02	2.6671E+02	8.354E-01%	2.30E+00
Co-1173	1.2240E+02	1.2625E+02	1.021E+00%	1.26E+00
Co-1332	1.2594E+02	1.2991E+02	1.018E+00%	1.14E+00
Y-1836	1.6356E+02	2.8649E+02	9.407E-01%	1.39E+00

  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (46.5 to 1999.4 keV) 6.310E+03 Bq
Total Decayed Activity (46.5 to 1999.4 keV) 7.1946113E+03 Bq

Initial Calibration Verifications

2nd Source Verification

Detector: Ge 4

Geometry: 25 mL D=1

Reference date 1/1/2011

Source: 85520-334

Standard volume g / vial 5.32298

Standard volume transferred in g / geometry 0.5177

lab ID# of cal standard 6673

Isotope	Certified Activity gammas/sec	Geometry Activity	Abundance	Activity Bq/sample	Count Results	%recovery
Am-241	3368	328	0.359	**912.4**	960.81	105.3
Cs-137	3188	310	0.851	**364.3**	371.48	102.0
Co-60	5897	574	0.99974	**573.7**	614.66	107.1
Co-60	5897	574	0.99986	**573.6**	619.49	108.0

Reviewed By: Jody Watson

Date: 3/8/2012

ORTEC g v - i (3135) Env32 G53W4.25 3/27/2012 8:58:04 PM Page 1
TestAmerica Spectrum name: 4_D=125mL2nd_20120098.An1

Sample description
4_D=125mL_85520-334_2ndsource_030812

Spectrum Filename: W:\SPC\Det4\4_D=125mL2nd_20120098.An1

Acquisition information
Start time: 3/8/2012 3:13:50 AM
Live time: 3600
Real time: 3733
Dead time: 3.56 %
Detector ID: 4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_Liquid_D=1 25ml.Clb
4_Liquid_D=1 25ml_90101_030512

Energy Calibration
Created: 3/27/2012 8:51:16 PM
Zero offset: 0.065 keV
Gain: 0.250 keV/channel
Quadratic: -2.881E-08 keV/channel^2

Efficiency Calibration
Created: 3/27/2012 8:51:45 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.48 %
Log(Eff): 8.809878E-01 + (-6.811249E-01*Log(E)) + (-1.909804E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -1.031199E+01 + (3.529752E+00*Log(E)) + (-4.143154E-01*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.58keV)
Stop channel: 8000 (1999.27keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (3135) Env32 G53W4.25 3/27/2012 8:58:04 PM Page 2
TestAmerica Spectrum name: 4_D=125mL2nd_20120098.An1
Page 1

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2011 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0708

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
37.80	4081.	3.50	0.87	5.196E-02				
44.00	335.	28.24	0.86	5.570E-02				
49.32	965.	13.36	0.98	5.795E-02				
59.57	74149.	0.45	0.79	6.042E-02	59.54	35.700	9.568E+02	AM241
73.01	375.	29.92	1.02	6.115E-02				
88.10	73864.	0.42	0.81	5.997E-02	88.03	3.610	1.809E+04	CD109
122.06	27233.	0.71	0.86	5.409E-02	122.06	85.600	4.912E+02	CO57
136.46	3315.	3.07	0.89	5.117E-02				
165.77	16324.	1.00	0.95	4.532E-02	165.85	79.900	1.107E+03	Ce139
195.59	73.	58.82	0.94	3.899E-02				
199.02	600.	9.28	0.94	3.839E-02				
203.61	382.	20.59	0.76	3.764E-02				
229.52	38.	88.77	0.52	3.385E-02				
254.98	500.	12.21	1.05	3.082E-02				
278.99	2010.	4.05	1.08	2.843E-02	279.17	81.500	1.475E+04	Hg203
391.47	8465.	1.54	1.16	2.094E-02	391.69	64.000	2.363E+03	SN113
425.89	32.	75.99	0.32	1.940E-02				
489.73	133.	42.27	0.78	1.707E-02				
661.54	14400.	1.04	1.39	1.293E-02	661.66	85.210	3.731E+02	CS137
686.80	111.	39.50	0.75	1.249E-02				
717.92	107.	45.74	0.69	1.198E-02				
813.41	333.	17.28	1.91	1.066E-02				
898.05	7995.	1.72	1.51	9.716E-03	898.02	93.700	4.039E+03	Y898
981.05	72.	60.97	0.32	8.939E-03				
1173.29	14575.	0.97	1.75	7.545E-03	1173.24	99.900	6.274E+02	Co1173
1332.58	12862.	0.97	1.91	6.683E-03	1332.50	99.982	6.246E+02	Co1332
1835.95	4416.	1.57	2.03	4.910E-03	1836.01	99.200	4.170E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide

150.86	37.80	4264.	4081.	7.853E+04	3.50	0.869	-	s
175.65	44.00	2872.	335.	6.014E+03	28.24	0.861	-	s
196.92	49.32	5524.	965.	1.666E+04	13.36	0.984	-	s
291.63	73.01	4314.	375.	6.135E+03	29.92	1.016	-	s
545.31	136.46	1923.	3315.	6.478E+04	3.07	0.894	-	

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
782.01	195.65	606.	32.	8.208E+02	110.22	0.457	-	c
795.72	199.08	1400.	546.	1.423E+04	12.92	1.065	-	s
813.82	203.61	1516.	382.	1.015E+04	20.59	0.765	-	s
917.44	229.52	550.	38.	1.123E+03	88.77	0.518	-	sc
1019.25	254.98	1020.	500.	1.624E+04	12.21	1.049	-	
1702.73	425.89	312.	32.	1.667E+03	75.99	0.316	-	c
1958.09	489.73	821.	133.	7.772E+03	42.27	0.784	-	s
2746.37	686.80	572.	111.	8.889E+03	39.50	0.747	-	s
2870.88	717.92	601.	107.	8.957E+03	45.74	0.687	-	s
3252.91	813.41	638.	333.	3.123E+04	17.28	1.905	-	s
3923.65	981.05	538.	72.	8.110E+03	60.97	0.323	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.92	59.57	8382.	74149.	20.597	0.45	0.787
CD-109	351.96	88.10	5292.	73864.	20.518	0.42	0.805
CO-57	487.75	122.06	2536.	27233.	7.565	0.71	0.858
Ce-139	662.51	165.77	2240.	16324.	4.534	1.00	0.946
Hg-203	1115.28	278.99	1261.	2010.	0.558	4.05	1.080
SN-113	1565.10	391.47	1654.	8465.	2.351	1.54	1.160
CS-137	2645.32	661.54	1387.	14400.	4.000	1.04	1.386
Y-898	3591.55	898.05	1566.	7995.	2.221	1.72	1.507
Co-1173	4692.98	1173.29	715.	14575.	4.049	0.97	1.748
Co-1332	5330.55	1332.58	357.	12862.	3.573	0.97	1.906
Y-1836	7345.94	1835.95	53.	4416.	1.227	1.57	2.026

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
AM-241		9.5675E+02				1.58E+05	
			59.54	9.568E+02	(	5.540E+00	4.45E-01 3.57E+01 G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
CD-109	1.8094E+04					4.63E+02	
		88.03	1.809E+04	(	8.370E+01	4.17E-01	3.61E+00 G
CO-57	4.9122E+02					2.72E+02	
		122.06	4.912E+02	(	4.282E+00	7.06E-01	8.56E+01 G
Ce-139	1.1068E+03					1.38E+02	
		165.85	1.107E+03	(	1.514E+01	9.95E-01	7.99E+01 G
Hg-203	1.4752E+04					4.66E+01	
		279.17	1.475E+04	(	1.235E+03	4.05E+00	8.15E+01 G
SN-113	2.3626E+03					1.15E+02	
		391.69	2.363E+03	(	5.366E+01	1.54E+00	6.40E+01 G
CS-137	3.7313E+02					1.10E+04	
		661.66	3.731E+02	(	4.567E+00	1.04E+00	8.52E+01 G
Y-898	4.0391E+03					1.07E+02	
		898.02	4.039E+03	(	9.453E+01	1.72E+00	9.37E+01 G
Co-1173	6.2742E+02					1.93E+03	
		1173.24	6.274E+02	(	5.481E+00	9.69E-01	9.99E+01 G
Co-1332	6.2462E+02					1.93E+03	
		1332.50	6.246E+02	(	4.407E+00	9.75E-01	1.00E+02 G
Y-1836	4.1702E+03					1.07E+02	
		1836.01	4.170E+03	(	3.470E+01	1.57E+00	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction

} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape

P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
AM-241	9.5494E+02	9.5675E+02	4.454E-01%	5.54E+00
CD-109	9.4759E+03	1.8094E+04	4.174E-01%	8.37E+01
CO-57	1.6337E+02	4.9122E+02	7.059E-01%	4.28E+00
Ce-139	1.2588E+02	1.1068E+03	9.954E-01%	1.51E+01
Hg-203	2.4103E+01	1.4752E+04	4.053E+00%	1.23E+03
SN-113	1.7551E+02	2.3626E+03	1.541E+00%	5.37E+01
CS-137	3.6310E+02	3.7313E+02	1.041E+00%	4.57E+00
Y-898	2.4393E+02	4.0391E+03	1.722E+00%	9.45E+01
Co-1173	5.3711E+02	6.2742E+02	9.688E-01%	5.48E+00
Co-1332	5.3471E+02	6.2462E+02	9.747E-01%	4.41E+00
Y-1836	2.5185E+02	4.1702E+03	1.573E+00%	3.47E+01

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

S U M M A R Y

Total Activity (37.6 to 1999.3 keV) 1.285E+04 Bq/Sample
Total Decayed Activity (37.6 to 1999.3 keV) 4.7597492E+04 Bq/Sample

2nd Source Verification

Detector:	Ge7
Geometry:	25mL solid
Reference date	1/1/2011
Source:	83814-334
Standard volume g / vial	1550
Standard volume transferred in g / geometry	56.25
lab ID# of cal standard	6669

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2090	76	0.359	211	217.55	103.0
Cs-137	1877	68	0.851	80	80.272	100.3
Co-60	3626	132	0.99974	132	130.26	99.0
Co-60	3627	132	0.999856	132	130.19	98.9

Reviewed By: Jody Watson

Date: 3/7/2012

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:59:23 AM Page 1
TestAmerica Spectrum name: 7_Solid25mL2nd_20120401.An1

Sample description
7_Solid25mL_83814-334_2ndsource_030712

Spectrum Filename: C:\User\SPC\Det7\7_Solid25mL2nd_20120401.An1

Acquisition information
Start time: 3/7/2012 8:19:38 PM
Live time: 7200
Real time: 7338
Dead time: 1.89 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Soil_25ml.Clb
7_25mLSoil_90099_030712

Energy Calibration
Created: 3/28/2012 8:56:59 AM
Zero offset: 0.100 keV
Gain: 0.250 keV/channel
Quadratic: 4.928E-09 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 8:57:12 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.53 %
Log(Eff): 7.199650E-01 + (-3.527641E-01*Log(E)) + (-4.778753E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.27 %
Log(Eff): -1.235982E+01 + (4.659795E+00*Log(E)) + (-5.277660E-01*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix & Pb.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.59keV)
Stop channel: 8000 (2000.11keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:59:23 AM Page 2
TestAmerica Spectrum name: 7_Solid25mL2nd_20120401.An1
Page 1

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2011 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2012-02-26_0327.PBC 2/26/2012 3:27:47 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0366

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.86	1472.	9.87	0.90	8.906E-02				
46.62	77395.	0.40	0.81	1.056E-01	46.54	4.250	2.483E+03	Pb210
49.63	56.	224.18	0.82	1.095E-01				
59.58	66264.	0.47	0.83	1.188E-01	59.54	35.700	2.175E+02	AM241
81.63	134.	69.10	0.44	1.257E-01				
88.03	49549.	0.55	0.87	1.254E-01	88.03	3.610	2.901E+03	CD109
121.98	14879.	1.03	0.92	1.160E-01	122.06	85.600	6.254E+01	CO57
136.36	1855.	4.45	0.98	1.101E-01				
148.63	70.	63.26	0.34	1.048E-01				
165.76	5818.	1.85	1.00	9.732E-02	165.85	79.900	9.139E+01	Ce139
199.22	284.	18.44	1.15	8.314E-02				
214.06	40.	73.65	0.54	7.814E-02				
238.69	259.	22.70	0.97	7.107E-02				
255.27	222.	26.87	0.88	6.700E-02				
279.13	206.	25.81	0.89	6.189E-02	279.17	81.500	3.463E+02	Hg203
323.46	73.	71.15	0.27	5.422E-02				
391.74	2759.	3.51	1.15	4.551E-02	391.69	64.000	1.768E+02	SN113
661.67	13267.	1.05	1.42	2.768E-02	661.66	85.210	8.027E+01	CS137
736.66	30.	70.44	0.36	2.492E-02				
869.35	26.	85.64	0.35	2.115E-02				
898.07	2280.	3.37	1.74	2.047E-02	898.02	93.700	2.729E+02	Y898
911.09	71.	59.34	0.55	2.018E-02				
925.78	65.	56.00	0.48	1.986E-02				
1095.33	158.	34.19	0.73	1.674E-02				
1107.15	136.	34.11	0.42	1.656E-02				
1153.08	63.	36.05	0.67	1.588E-02				
1173.26	12517.	0.98	1.95	1.560E-02	1173.24	99.900	1.303E+02	Co1173
1332.51	10976.	1.03	1.96	1.368E-02	1332.50	99.982	1.302E+02	Co1332
1836.06	1269.	3.35	2.57	9.752E-03	1836.01	99.200	3.011E+02	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide
147.04	36.86	6199.	1472.	1.653E+04	9.87	0.895	- s
197.99	49.59	7562.	1019.	9.309E+03	15.50	1.241	- sM
326.16	81.63	3165.	134.	1.066E+03	69.10	0.439	- s

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
545.10	136.36	1355.	1855.	1.685E+04	4.45	0.975	-
594.19	148.63	746.	70.	6.633E+02	63.26	0.344	- s
796.58	199.22	865.	284.	3.412E+03	18.44	1.150	-
855.97	214.06	414.	40.	5.119E+02	73.65	0.544	- c
954.50	238.69	959.	259.	3.644E+03	22.70	0.975	-
1020.83	255.27	958.	222.	3.321E+03	26.87	0.878	- s
1293.59	323.46	750.	73.	1.346E+03	71.15	0.272	- s
2946.52	736.66	183.	30.	1.217E+03	70.44	0.362	- sc
3477.29	869.35	207.	26.	1.245E+03	85.64	0.345	- sc
3644.24	911.09	506.	71.	3.502E+03	59.34	0.552	- s
3703.01	925.78	420.	65.	3.274E+03	56.00	0.481	- s
4381.24	1095.33	552.	158.	9.437E+03	34.19	0.730	- s
4428.49	1107.15	452.	136.	8.242E+03	34.11	0.418	- s
4612.23	1153.08	143.	63.	3.966E+03	36.05	0.669	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.98	46.59	12611.	80307.	11.154	0.44	0.834
AM-241	237.94	59.58	7974.	66264.	9.203	0.47	0.831
CD-109	351.78	88.03	5488.	49549.	6.882	0.55	0.868
CO-57	487.61	121.98	2148.	14879.	2.067	1.03	0.920
Ce-139	662.74	165.76	1446.	5818.	0.808	1.85	0.997
Hg-203	1116.28	279.13	789.	206.	0.029	25.81	0.886
SN-113	1566.74	391.74	1244.	2759.	0.383	3.51	1.154
CS-137	2646.57	661.67	971.	13267.	1.843	1.05	1.419
Y-898	3592.18	898.07	748.	2280.	0.317	3.37	1.737
Co-1173	4692.94	1173.26	416.	12517.	1.738	0.98	1.948
Co-1332	5329.92	1332.51	210.	10976.	1.524	1.03	1.964
Y-1836	7343.93	1836.06	54.	1269.	0.176	3.35	2.570

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
Pb-210	N	2.5785E+03				8.15E+03	
			46.54	2.579E+03	(P	1.689E+01 4.42E-01 4.25E+00	G
AM-241		2.1755E+02				1.58E+05	
			59.54	2.175E+02	(	1.375E+00 4.73E-01 3.57E+01	G
CD-109		2.9015E+03				4.63E+02	
			88.03	2.901E+03	(	2.037E+01 5.50E-01 3.61E+00	G
CO-57		6.2544E+01				2.72E+02	
			122.06	6.254E+01	(	9.192E-01 1.03E+00 8.56E+01	G
Ce-139		9.1389E+01				1.38E+02	
			165.85	9.139E+01	(	2.826E+00 1.85E+00 7.99E+01	G
Hg-203		3.4626E+02				4.66E+01	
			279.17	3.463E+02	(	2.242E+02 2.58E+01 8.15E+01	G
SN-113		1.7679E+02				1.15E+02	
			391.69	1.768E+02	(	1.070E+01 3.51E+00 6.40E+01	G
CS-137		8.0272E+01				1.10E+04	
			661.66	8.027E+01	(	8.948E-01 1.05E+00 8.52E+01	G
Y-898		2.7291E+02				1.07E+02	
			898.02	2.729E+02	(	1.557E+01 3.37E+00 9.37E+01	G
Co-1173		1.3026E+02				1.93E+03	
			1173.24	1.303E+02	(	1.017E+00 9.83E-01 9.99E+01	G
Co-1332		1.3019E+02				1.93E+03	
			1332.50	1.302E+02	(	8.331E-01 1.03E+00 1.00E+02	G
Y-1836		3.0110E+02				1.07E+02	
			1836.01	3.011E+02	(	8.768E+00 3.35E+00 9.92E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.

P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty Counting	1 Sigma MDA Bq/Sample
Pb-210	2.4856E+03	2.5785E+03	4.426E-01%	1.69E+01
AM-241	2.1714E+02	2.1755E+02	4.728E-01%	1.38E+00
CD-109	1.5202E+03	2.9015E+03	5.499E-01%	2.04E+01
CO-57	2.0816E+01	6.2544E+01	1.030E+00%	9.19E-01
Ce-139	1.0409E+01	9.1389E+01	1.851E+00%	2.83E+00
Hg-203	5.6817E-01	3.4626E+02	2.581E+01%	2.24E+02
SN-113	1.3156E+01	1.7679E+02	3.512E+00%	1.07E+01
CS-137	7.8116E+01	8.0272E+01	1.050E+00%	8.95E-01
Y-898	1.6512E+01	2.7291E+02	3.366E+00%	1.56E+01
Co-1173	1.1152E+02	1.3026E+02	9.834E-01%	1.02E+00
Co-1332	1.1146E+02	1.3019E+02	1.029E+00%	8.33E-01
Y-1836	1.8218E+01	3.0110E+02	3.352E+00%	8.77E+00

ORTEC g v - i (3263) Env32 G53W4.25 3/28/2012 8:59:23 AM Page 6
TestAmerica Spectrum name: 7_Solid25mL2nd_20120401.An1

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.1 keV) 4.604E+03 Bq/Sample
Total Decayed Activity (37.6 to 2000.1 keV) 7.2892856E+03 Bq/Sample

2nd Source Verification

Detector: Ge 7

Geometry: 25 mL D=1

Reference date 1/1/2011

Source: 83925-334

Standard volume g / vial 5.29152

Standard volume transferred in g / geometry 0.5067

lab ID# of cal standard 6673

Isotope	Certified Activity gammas/sec	Geometry Activity	Abundance	Activity Bq/sample	Count Results	%recovery
Am-241	3254	312	0.359	**867.9**	929.11	107.0
Cs-137	3106	297	0.851	**349.5**	373.86	107.0
Co-60	6000	575	0.99974	**574.7**	607.64	105.7
Co-60	6003	575	0.99986	**574.9**	612.65	106.6

Reviewed By: Jody Watson

Date: 4/12/2012

7_25mLD=12nd_20120604

ORTEC g v - i (3263) Env32 G53W4.25 4/23/2012 2:07:40 PM Page 1
TestAmerica Spectrum name: 7_25mLD=12nd_20120604.An1

Sample description
7_25mLD=12nd_85520-334_041212

Spectrum Filename: C:\User\SPC\Det7\7_25mLD=12nd_20120604.An1

Acquisition information
Start time: 4/12/2012 7:52:15 PM
Live time: 3600
Real time: 3803
Dead time: 5.33 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Liquid_D=1 25ml.Clb
7_25mld=1_90101_032612

Energy Calibration
Created: 3/28/2012 9:22:02 AM
Zero offset: 0.129 keV
Gain: 0.250 keV/channel
Quadratic: 5.398E-09 keV/channel^2

Efficiency Calibration
Created: 3/28/2012 9:22:15 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.82 %
Log(Eff): -7.206837E-02 + (-5.220592E-02*Log(E)) + (-7.214522E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.58 %
Log(Eff): -1.343090E+01 + (5.323811E+00*Log(E)) + (-6.125181E-01*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.62keV)
Stop channel: 8000 (1999.96keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (3263) Env32 G53W4.25 4/23/2012 2:07:40 PM Page 2
TestAmerica Spectrum name: 7_25mLD=12nd_20120604.An1
Page 1

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2011 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	7_2012-04-01_0533.PBC 4/1/2012 5:33:35 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 11 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0588

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.43	1825.	6.75	0.87	1.098E-01				
37.89	5397.	2.56	0.88	1.138E-01				
43.56	579.	22.56	0.83	1.271E-01				
49.44	3458.	6.01	1.42	1.375E-01				
59.57	177550.	0.28	0.86	1.490E-01	59.54	35.700	9.291E+02	AM241
66.59	892.	19.13	0.37	1.532E-01				
73.20	116.	97.62	0.91	1.550E-01				
74.91	77.	163.63	0.91	1.552E-01				
77.89	392.	32.50	0.91	1.552E-01				
88.02	167199.	0.28	0.91	1.536E-01	88.03	3.610	1.687E+04	CD109
121.98	60039.	0.49	0.96	1.365E-01	122.06	85.600	4.701E+02	CO57
136.38	7130.	2.12	0.93	1.273E-01				
165.75	31388.	0.70	1.00	1.085E-01	165.85	79.900	1.061E+03	Ce139
171.73	111.	60.36	0.33	1.053E-01				
199.04	2428.	5.86	1.23	9.348E-02				
203.59	614.	18.07	1.25	9.177E-02				
223.07	107.	45.30	0.41	8.510E-02				
228.40	200.	41.38	0.44	8.344E-02				
255.06	796.	12.01	1.30	7.601E-02				
279.13	2902.	4.58	1.08	7.035E-02	279.17	81.500	1.463E+04	Hg203
310.45	155.	43.52	0.64	6.412E-02				
364.80	27.	195.79	0.00	5.553E-02				
382.44	121.	40.24	0.99	5.320E-02				
391.70	16380.	1.13	1.22	5.205E-02	391.69	64.000	2.280E+03	SN113
516.34	54.	64.42	0.42	4.022E-02				
532.72	133.	44.32	0.84	3.904E-02				
639.13	47.	71.55	0.30	3.271E-02				
656.28	102.	46.64	1.46	3.187E-02				
661.61	34790.	0.57	1.47	3.161E-02	661.66	85.210	3.696E+02	CS137
677.55	78.	54.05	0.55	3.087E-02				
740.13	188.	37.66	0.52	2.826E-02				

807.52	233.	41.90	0.56	2.588E-02				
843.71	91.	43.48	0.56	2.475E-02				
897.94	14497.	1.26	1.69	2.321E-02	898.02	93.700	3.867E+03	Y898
908.26	205.	47.83	0.54	2.294E-02				
1030.51	100.	44.14	0.28	2.010E-02				
1058.41	202.	40.11	0.75	1.955E-02				
1173.09	32348.	0.63	1.86	1.752E-02	1173.24	99.900	6.076E+02	Co1173
1300.50	65.	41.07	0.37	1.567E-02				
1332.33	28445.	0.65	2.00	1.527E-02	1332.50	99.982	6.126E+02	Co1332
1636.57	70.	40.15	0.48	1.216E-02				
1835.79	7962.	1.24	2.36	1.068E-02	1836.01	99.200	4.359E+03	Y1836
1880.34	22.	48.10	0.72	1.040E-02				

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
145.22	36.38	6680.	1825.	1.662E+04	6.75	0.874	-	D
151.09	37.85	6856.	5397.	4.742E+04	2.56	0.876	-	D
173.76	43.56	5202.	579.	4.555E+03	22.56	0.834	-	s
197.28	49.44	12523.	3458.	2.514E+04	6.01	1.421	-	s

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
265.91	66.59	8458.	892.	5.820E+03	19.13	0.373	-	s
291.50	73.04	6174.	225.	1.452E+03	49.82	0.910	-	D
299.20	74.96	7848.	77.	4.946E+02	163.63	0.912	-	c
310.48	77.73	8244.	629.	4.050E+03	26.00	0.806	-	s
545.12	136.38	3778.	7130.	5.602E+04	2.12	0.935	-	
686.57	171.73	1652.	111.	1.058E+03	60.36	0.332	-	s
795.85	199.04	4110.	2428.	2.597E+04	5.86	1.226	-	
814.04	203.59	3195.	614.	6.694E+03	18.07	1.250	-	s
891.97	223.07	1121.	107.	1.257E+03	45.30	0.409	-	s
913.31	228.40	2216.	200.	2.397E+03	41.38	0.436	-	s
1019.98	255.06	2382.	796.	1.047E+04	12.01	1.299	-	
1241.57	310.45	1551.	155.	2.417E+03	43.52	0.643	-	s
1459.00	364.80	1107.	27.	4.862E+02	195.79	0.000	-	sc
1529.59	382.44	964.	121.	2.274E+03	40.24	0.988	-	s
2065.27	516.34	578.	54.	1.343E+03	64.42	0.418	-	sc
2130.80	532.72	1114.	133.	3.407E+03	44.32	0.839	-	s
2556.52	639.13	542.	47.	1.437E+03	71.55	0.300	-	sc
2625.00	656.25	642.	59.	1.862E+03	64.17	0.436	-	sM
2710.21	677.55	735.	78.	2.537E+03	54.05	0.555	-	s
2960.57	740.13	1261.	188.	6.657E+03	37.66	0.518	-	s
3230.17	807.52	1800.	233.	9.003E+03	41.90	0.560	-	s
3374.95	843.71	632.	91.	3.677E+03	43.48	0.563	-	s
3633.16	908.26	2009.	205.	8.923E+03	47.83	0.541	-	s
4122.21	1030.51	688.	100.	4.958E+03	44.14	0.276	-	s
4233.81	1058.41	1414.	202.	1.034E+04	40.11	0.747	-	s
5202.24	1300.50	185.	65.	4.147E+03	41.07	0.366	-	s
6546.50	1636.57	180.	70.	5.756E+03	40.15	0.479	-	s
7521.56	1880.34	30.	22.	2.116E+03	48.10	0.721	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_EnergyStandardMix.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.84	59.57	15206.	177550.	49.319	0.28	0.856
CD-109	351.64	88.02	10997.	167199.	46.444	0.28	0.909
CO-57	487.52	121.98	5647.	60039.	16.678	0.49	0.964
Ce-139	662.64	165.75	3801.	31388.	8.719	0.70	1.001
Hg-203	1116.25	279.13	3172.	2902.	0.806	4.58	1.075
SN-113	1566.62	391.70	3337.	16380.	4.550	1.13	1.218

Nuclide	Channel	Energy	Background	Net area	Cnts/sec	Uncert	FWHM
CS-137	2646.31	661.57	2470.	35196.	9.777	0.63	1.481
Y-898	3591.88	897.94	3048.	14497.	4.027	1.26	1.691
Co-1173	4692.57	1173.09	1348.	32348.	8.986	0.63	1.856
Co-1332	5329.54	1332.33	750.	28445.	7.901	0.65	2.003
Y-1836	7343.31	1835.78	216.	7984.	2.218	1.25	2.356

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Peak Code	Peak MDA Value Bq/Sample	Peak COMMENTS
AM-241		9.2911E+02				1.58E+05	
			59.54	9.291E+02	(	3.021E+00 2.76E-01	3.57E+01 G
CD-109		1.6871E+04				4.63E+02	
			88.03	1.687E+04	(	4.958E+01 2.78E-01	3.61E+00 G
CO-57		4.7012E+02				2.72E+02	
			122.06	4.701E+02	(	2.763E+00 4.90E-01	8.56E+01 G
Ce-139		1.0611E+03				1.38E+02	
			165.85	1.061E+03	(	9.804E+00 7.02E-01	7.99E+01 G
Hg-203		1.4630E+04				4.66E+01	
			279.17	1.463E+04	(	1.337E+03 4.58E+00	8.15E+01 G
SN-113		2.2795E+03				1.15E+02	
			391.69	2.280E+03	(	3.784E+01 1.13E+00	6.40E+01 G
CS-137		3.7386E+02				1.10E+04	
			661.66	3.739E+02	(	2.489E+00 6.28E-01	8.52E+01 G
Y-898		3.8673E+03				1.07E+02	
			898.02	3.867E+03	(	6.936E+01 1.26E+00	9.37E+01 G
Co-1173		6.0764E+02				1.93E+03	
			1173.24	6.076E+02	(	3.264E+00 6.30E-01	9.99E+01 G

Co-1332 6.1265E+02 1.93E+03
1332.50 6.126E+02 (2.807E+00 6.45E-01 1.00E+02 G

Y-1836 4.3709E+03 1.07E+02
1836.01 4.371E+03 (3.898E+01 1.25E+00 9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
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@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
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= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

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T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction
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M - No MDA Calculation
R - Coincidence Corrected
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Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
AM-241	9.2720E+02	9.2911E+02	2.764E-01%	3.02E+00
CD-109	8.3754E+03	1.6871E+04	2.784E-01%	4.96E+01
CO-57	1.4275E+02	4.7012E+02	4.895E-01%	2.76E+00
Ce-139	1.0083E+02	1.0611E+03	7.016E-01%	9.80E+00
Hg-203	1.4062E+01	1.4630E+04	4.584E+00%	1.34E+03
SN-113	1.3658E+02	2.2795E+03	1.129E+00%	3.78E+01
CS-137	3.6299E+02	3.7386E+02	6.275E-01%	2.49E+00

Y-898	1.8518E+02	3.8673E+03	1.259E+00%	6.94E+01
Co-1173	5.1353E+02	6.0764E+02	6.302E-01%	3.26E+00
Co-1332	5.1776E+02	6.1265E+02	6.453E-01%	2.81E+00

Y-1836	2.0930E+02	4.3709E+03	1.248E+00%	3.90E+01

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

S U M M A R Y

Total Activity (77.6 to 2000.0 keV) 1.149E+04 Bq/Sample
Total Decayed Activity (77.6 to 2000.0 keV) 4.6073586E+04 Bq/Sample

2nd Source Verification

Detector:	Ge 12
Geometry:	25mL D=1
Reference date	1/1/2010
Source:	81593-334
Standard volume g / vial	5.31128
Standard volume transferred in g / geometry	0.5096
lab ID# of cal standard	Rad10-0042

Isotope	Certified Activity gammas/sec	Geometry Activity	Abundance	Activity Bq/sample	Count Results	%recovery
Am-241	3474	333	0.359	**928.5**	968.4	104.3
Cs-137	3289	316	0.851	**370.8**	384.55	103.7
Co-60	6166	592	0.99974	**591.8**	588.21	99.4
Co-60	6169	592	0.99986	**592.0**	601.63	101.6

Reviewed By: Jody Watson

Date: 9/6/2011

ORTEC g v - i (3263) Env32 G53W4.25 9/7/2011 8:23:34 AM
TestAmerica, Inc Spectrum name: 12_25mLD=12nd_20111928.An1

Sample description
12_25mLD=12nd_81593-334_090611

Spectrum Filename: C:\User\SPC\Det12\12_25mLD=12nd_20111928.An1

Acquisition information
Start time: 9/6/2011 7:27:31 AM
Live time: 3600
Real time: 3766
Dead time: 4.40 %
Detector ID: 12

Detector system
Ge12 SN/10034336

Calibration
Filename: 12_Liquid_D=1 25ml.Clb
Ge12_25mLd=1Cal_85520-334_090111

Energy Calibration
Created: 9/2/2011 6:53:12 AM
Zero offset: 0.025 keV
Gain: 0.250 keV/channel
Quadratic: -3.733E-08 keV/channel^2

Efficiency Calibration
Created: 9/2/2011 7:07:23 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 2.02 %
Log(Eff): -6.442716E-01 + (-8.678082E-03*Log(E)) +
(-6.444773E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.33 %
Log(Eff): -1.236768E+01 + (4.728110E+00*Log(E)) +
(-5.423915E-01*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.55keV)
Stop channel: 8000 (1999.18keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error:	1.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.
Half lives decay limit:	12.000
Activity range factor:	2.000
Min. step backg. energy	0.000
Multiplet shift channel	2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2010 11:00:00 AM
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	12_2011-08-29_0027.PBC 8/29/2011 12:27:29 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 10 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0611

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.41	1530.	6.47	0.89	9.242E-02				
37.86	1162.	9.24	0.89	9.539E-02				
43.68	944.	14.89	1.56	1.057E-01				
49.55	3158.	6.97	1.42	1.135E-01				
59.56	151412.	0.30	0.87	1.220E-01	59.54	35.700	9.684E+02	AM241
66.32	103.	75.06	0.13	1.251E-01				
81.70	91.	92.39	0.93	1.268E-01				
83.46	9.	972.50	0.93	1.267E-01				
88.03	84896.	0.38	0.90	1.260E-01	88.03	3.610	1.299E+04	CD109
122.05	21792.	0.81	0.95	1.140E-01	122.06	85.600	2.961E+02	CO57
136.47	2742.	3.23	0.94	1.073E-01				
165.85	5468.	2.15	1.02	9.327E-02	165.85	79.900	4.463E+02	Ce139
199.11	340.	23.99	0.87	8.239E-02				
278.80	78.	87.41	1.11	6.475E-02	279.17	81.500	HL>Cutoff	Hg203
334.14	68.	60.97	0.71	5.662E-02				
391.50	2536.	4.17	1.14	5.014E-02	391.69	64.000	8.804E+02	SN113
496.05	101.	47.58	0.52	4.155E-02				
529.79	41.	74.42	0.42	3.939E-02				
544.94	64.	45.67	0.74	3.849E-02				
661.57	37156.	0.58	1.46	3.274E-02	661.66	85.210	3.846E+02	CS137
897.89	1912.	5.71	1.49	2.514E-02	898.02	93.700	1.213E+03	Y898
946.97	47.	95.26	0.41	2.398E-02				
1173.08	33502.	0.65	1.89	1.975E-02	1173.24	99.900	5.882E+02	Co1173
1332.35	30474.	0.62	1.95	1.755E-02	1332.50	99.982	6.016E+02	Co1332
1459.80	102.	24.65	0.39	1.610E-02				
1520.49	41.	33.41	0.42	1.549E-02				
1647.33	24.	36.44	0.53	1.435E-02				
1835.76	1181.	3.88	2.56	1.291E-02	1836.01	99.200	1.377E+03	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
145.44	36.35	4132.	15369	1.656E-04	6.47	0.885	-	D

151.24	37.81	5191.	1162.	1.219E+04	9.24	0.886	-	D
174.51	43.68	5382.	944.	8.936E+03	14.89	1.565	-	s
197.95	49.55	12942.	3158.	2.784E+04	6.97	1.420	-	s

ORTEC g v - i (3263) Env32 G53W4.25 9/7/2011 8:23:34 AM
TestAmerica, Inc Spectrum name: 12_25mLD=12nd_20111928.An1

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected
264.97	66.32	2501.	103.	8.205E+02	75.06	0.129	- sc
326.48	81.66	3475.	91.	7.160E+02	92.39	0.927	- sc
333.48	83.41	3603.	9.	6.895E+01	972.50	0.928	- sc
545.39	136.47	1538.	2742.	2.556E+04	3.23	0.944	-
795.81	199.11	1798.	340.	4.121E+03	23.99	0.866	-
1335.70	334.14	715.	68.	1.207E+03	60.97	0.713	- s
1983.15	496.05	785.	101.	2.439E+03	47.58	0.518	- s
2118.08	529.79	418.	41.	1.049E+03	74.42	0.422	- sc
2178.68	544.94	369.	64.	1.672E+03	45.67	0.745	- s
3786.99	946.97	783.	47.	1.960E+03	95.26	0.414	- sc
5839.70	1459.80	74.	102.	6.335E+03	24.65	0.393	- s
6082.71	1520.49	40.	41.	2.647E+03	33.41	0.425	- s
6590.62	1647.33	21.	24.	1.673E+03	36.44	0.525	- s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.97	59.56	12410.	151412.	42.059	0.30	0.874
CD-109	351.75	88.03	5469.	84896.	23.582	0.38	0.905
CO-57	487.76	122.05	2302.	21792.	6.053	0.81	0.950
Ce-139	662.87	165.85	1992.	5468.	1.519	2.15	1.023
Hg-203	1114.43	278.80	2278.	78.	0.022	87.41	1.106s
SN-113	1565.04	391.50	2000.	2536.	0.704	4.17	1.143
CS-137	2645.18	661.57	1764.	37156.	10.321	0.58	1.458
Y-898	3590.61	897.89	1881.	1912.	0.531	5.71	1.489
Co-1173	4691.90	1173.08	1670.	33502.	9.306	0.65	1.889
Co-1332	5329.44	1332.35	704.	30474.	8.465	0.62	1.954
Y-1836	7345.34	1835.76	110.	1181.	0.328	3.88	2.556

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
AM-241		9.6840E+02				1.58E+05	
			59.54	9.684E+02	(	3.338E+00 2.98E-01 3.57E+01	G
CD-109		1.2987E+04				4.63E+02	
			88.03	1.299E+04	(	5.313E+01 3.85E-01 3.61E+00	G
CO-57		2.9607E+02				2.72E+02	
			122.06	2.961E+02	(	3.075E+00 8.13E-01 8.56E+01	G
Ce-139		4.4626E+02				1.38E+02	
			165.85	4.463E+02	(	1.719E+01 2.15E+00 7.99E+01	G
Hg-203		4.0990E-01				4.66E+01	
			279.17	4.099E-01	(	1.185E+00 8.74E+01 8.15E+01	G
SN-113		8.8038E+02				1.15E+02	
			391.69	8.804E+02	(	7.329E+01 4.17E+00 6.40E+01	G
CS-137		3.8455E+02				1.10E+04	
			661.66	3.846E+02	(	2.054E+00 5.84E-01 8.52E+01	G
Y-898		1.2131E+03				1.07E+02	
			898.02	1.213E+03	(	1.299E+02 5.71E+00 9.37E+01	G
Co-1173		5.8821E+02				1.93E+03	
			1173.24	5.882E+02	(	3.391E+00 6.48E-01 9.99E+01	G
Co-1332		6.0163E+02				1.93E+03	
			1332.50	6.016E+02	(	2.494E+00 6.23E-01 1.00E+02	G
Y-1836		1.3774E+03				1.07E+02	
			1836.01	1.377E+03	(	6.016E+01 3.88E+00 9.92E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide

failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- - - -

ORTEC g v - i (3263) Env32 G53W4.25 9/7/2011 8:23:34 AM
TestAmerica, Inc Spectrum name: 12_25mLD=12nd_20111928.An1

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (87.8 to 1999.2 keV) 7.627E+03 Bq/Sample
Total Decayed Activity (87.8 to 1999.2 keV) 1.9742869E+04 Bq/Sample

Analyzed by: _____
admin

Reviewed by: _____
Supervisor

Laboratory: TestAmerica, Inc

2nd Source Verification

Detector: Ge14

Geometry: 25mL solid

Reference date 1/1/2011

Source: 83814-334

Standard volume g / vial 1550

Standard volume transferred in g / geometry 56.25

lab ID# of cal standard 6669

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2090	76	0.359	211	216.99	102.7
Cs-137	1877	68	0.851	80	81.969	102.4
Co-60	3626	132	0.99974	132	131.68	100.0
Co-60	3627	132	0.999856	132	132.29	100.5

Reviewed By: Megan McAfee

Date: 4/5/2012

ORTEC g v - i (3263) Env32 G53W4.25 4/2/2012 5:53:49 PM Page 1
TestAmerica, Inc. Spectrum name: 14_Soilid25mL2nd_20120252.An1

Sample description
14_Soilid25mL2nd_83814-334_031612

Spectrum Filename: C:\User\SPC\Det14\14_Soilid25mL2nd_20120252.An1

Acquisition information
Start time: 3/16/2012 10:15:40 AM
Live time: 7200
Real time: 7266
Dead time: 0.91 %
Detector ID: 14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_Soil_25ml.Clb
14_25mlSolid_90099_031312

Energy Calibration
Created: 3/14/2012 4:42:38 PM
Zero offset: 0.107 keV
Gain: 0.250 keV/channel
Quadratic: -1.958E-08 keV/channel^2

Efficiency Calibration
Created: 3/14/2012 4:44:41 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.01 %
Log(Eff): 4.286558E-01 + (-3.868998E-01*Log(E)) + (-3.891736E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.12 %
Log(Eff): -1.120218E+01 + (4.080928E+00*Log(E)) + (-4.677621E-01*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix & Pb.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.62keV)
Stop channel: 8000 (1999.58keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (3263) Env32 G53W4.25 4/2/2012 5:53:49 PM Page 2
TestAmerica, Inc. Spectrum name: 14_Soilid25mL2nd_20120252.An1
Page 1

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2011 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	14_2012-02-26_0428.PBC 2/26/2012 4:28:40 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1056

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.71	1129.	8.70	0.75	7.640E-02				
38.03	309.	33.14	0.75	7.831E-02				
46.66	67706.	0.48	0.73	8.826E-02	46.54	4.250	2.602E+03	Pb210
49.79	944.	15.86	1.18	9.091E-02				
59.62	53796.	0.51	0.75	9.667E-02	59.54	35.700	2.170E+02	AM241
63.55	98.	65.23	0.46	9.808E-02				
77.03	393.	26.27	0.85	1.001E-01				
87.99	39876.	0.58	0.81	9.951E-02	88.03	3.610	2.981E+03	CD109
121.96	11730.	1.14	0.84	9.140E-02	122.06	85.600	6.397E+01	CO57
136.37	1456.	5.51	0.84	8.677E-02				
165.79	4593.	1.69	0.87	7.704E-02	165.85	79.900	9.520E+01	Ce139
168.39	44.	76.96	0.88	7.597E-02				
198.97	216.	27.86	0.45	6.656E-02				
203.45	96.	40.27	0.69	6.539E-02				
238.63	218.	19.77	0.89	5.749E-02				
279.60	128.	46.76	0.51	5.049E-02	279.17	81.500	2.987E+02	Hg203
391.66	2150.	3.65	1.04	3.806E-02	391.69	64.000	1.735E+02	SN113
528.94	27.	58.05	0.24	2.937E-02				
661.73	11785.	1.03	1.34	2.409E-02	661.66	85.210	8.197E+01	CS137
877.88	48.	69.22	0.27	1.866E-02				
898.13	2023.	4.09	1.56	1.828E-02	898.02	93.700	2.867E+02	Y898
1062.54	41.	45.62	0.37	1.565E-02				
1173.35	11534.	1.04	1.81	1.427E-02	1173.24	99.900	1.317E+02	Co1173
1332.62	10287.	1.02	1.90	1.266E-02	1332.50	99.982	1.323E+02	Co1332
1836.13	1132.	3.17	2.08	9.305E-03	1836.01	99.200	2.976E+02	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide

146.34	36.66	4258.	1129.	1.478E+04	8.70	0.749	-	D
151.65	37.99	5107.	309.	3.952E+03	33.14	0.750	-	D
198.66	49.79	6775.	944.	1.038E+04	15.86	1.178	-	s

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
253.69	63.55	1697.	98.	9.958E+02	65.23	0.461	-	s
307.58	77.03	3422.	393.	3.926E+03	26.27	0.850	-	s
544.90	136.37	1360.	1456.	1.678E+04	5.51	0.838	-	
672.93	168.39	288.	38.	4.958E+02	63.18	0.272	-	C
795.21	198.97	978.	216.	3.253E+03	27.86	0.447	-	s
813.14	203.45	554.	96.	1.461E+03	40.27	0.686	-	
953.82	238.63	615.	218.	3.792E+03	19.77	0.890	-	
2114.91	528.94	121.	27.	9.251E+02	58.05	0.236	-	s
3510.80	877.88	336.	48.	2.581E+03	69.22	0.267	-	s
4249.60	1062.54	135.	41.	2.641E+03	45.62	0.366	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	186.16	46.66	11241.	67617.	9.391	0.48	0.730
AM-241	237.99	59.62	6082.	53796.	7.472	0.51	0.750
CD-109	351.41	87.99	3766.	39876.	5.538	0.58	0.807
CO-57	487.27	121.96	1572.	11730.	1.629	1.14	0.839
Ce-139	662.54	165.79	1197.	4641.	0.645	2.11	0.915
Hg-203	1117.69	279.60	901.	128.	0.018	46.76	0.514s
SN-113	1565.85	391.66	889.	2150.	0.299	3.65	1.039
CS-137	2646.10	661.73	596.	11785.	1.637	1.03	1.343
Y-898	3591.81	898.13	780.	2023.	0.281	4.09	1.563
Co-1173	4692.99	1173.35	374.	11534.	1.602	1.04	1.808
Co-1332	5330.33	1332.62	105.	10287.	1.429	1.02	1.901
Y-1836	7345.68	1836.13	20.	1132.	0.157	3.17	2.082

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS
Pb-210	N	2.6023E+03				8.15E+03	
			46.54	2.602E+03	(P	1.912E+01 4.83E-01 4.25E+00 G	

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
AM-241	2.1699E+02					1.58E+05	
		59.54	2.170E+02	(	1.477E+00	5.09E-01	3.57E+01 G
CD-109	2.9808E+03					4.63E+02	
		88.03	2.981E+03	(	2.158E+01	5.84E-01	3.61E+00 G
CO-57	6.3971E+01					2.72E+02	
		122.06	6.397E+01	(	1.023E+00	1.14E+00	8.56E+01 G
Ce-139	9.6194E+01					1.38E+02	
		165.85	9.619E+01	(	3.398E+00	2.11E+00	7.99E+01 G
Hg-203	2.9871E+02					4.66E+01	
		279.17	2.987E+02	(	3.328E+02	4.68E+01	8.15E+01 G
SN-113	1.7348E+02					1.15E+02	
		391.69	1.735E+02	(	1.143E+01	3.65E+00	6.40E+01 G
CS-137	8.1969E+01					1.10E+04	
		661.66	8.197E+01	(	8.100E-01	1.03E+00	8.52E+01 G
Y-898	2.8666E+02					1.07E+02	
		898.02	2.867E+02	(	1.883E+01	4.09E+00	9.37E+01 G
Co-1173	1.3168E+02					1.93E+03	
		1173.24	1.317E+02	(	1.059E+00	1.04E+00	9.99E+01 G
Co-1332	1.3229E+02					1.93E+03	
		1332.50	1.323E+02	(	6.484E-01	1.02E+00	1.00E+02 G
Y-1836	2.9763E+02					1.07E+02	
		1836.01	2.976E+02	(	6.192E+00	3.17E+00	9.92E+01 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went
negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide
failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the

library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity
P - Peakbackground subtraction						

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity Bq/Sample	Time Corrected Activity Bq/Sample	Uncertainty 1 Sigma Counting	MDA Bq/Sample
Pb-210		2.5067E+03	2.6023E+03	4.832E-01%	1.91E+01
AM-241		2.1658E+02	2.1699E+02	5.094E-01%	1.48E+00
CD-109		1.5418E+03	2.9808E+03	5.844E-01%	2.16E+01
CO-57		2.0830E+01	6.3971E+01	1.136E+00%	1.02E+00
Ce-139		1.0493E+01	9.6194E+01	2.114E+00%	3.40E+00
Hg-203	A	4.3146E-01	2.9871E+02	4.676E+01%	3.33E+02
SN-113		1.2259E+01	1.7348E+02	3.648E+00%	1.14E+01
CS-137		7.9725E+01	8.1969E+01	1.034E+00%	8.10E-01
Y-898		1.6403E+01	2.8666E+02	4.087E+00%	1.88E+01
Co-1173		1.1239E+02	1.3168E+02	1.036E+00%	1.06E+00
Co-1332		1.1291E+02	1.3229E+02	1.021E+00%	6.48E-01
Y-1836		1.7031E+01	2.9763E+02	3.167E+00%	6.19E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

S U M M A R Y

Total Activity (46.4 to 1999.6 keV) 4.648E+03 Bq/Sample
Total Decayed Activity (46.4 to 1999.6 keV) 7.3627104E+03 Bq/Sample

2nd Source Verification

Detector: Ge17

Geometry: 25mL solid

Reference date 1/1/2011

Source: 83814-334

Standard volume g / vial 1550

Standard volume transferred in g / geometry 56.25

lab ID# of cal standard 6669

Isotope	Certified Activity gammas/sec	Geometry Activity	γ abundance	Bq/sample	Count Results	%recovery
Am-241	2090	76	0.359	211	219.29	103.8
Cs-137	1877	68	0.851	80	81.57	101.9
Co-60	3626	132	0.99974	132	130.2	98.9
Co-60	3627	132	0.999856	132	132.43	100.6

Reviewed By: Megan McAfee

Date: 4/17/2012

ORTEC g v - i (3263) Env32 G53W4.25 4/17/2012 9:59:56 AM Page 1
TestAmerica, Inc. Spectrum name: 17_25mLSolid2nd_20120320.An1

Sample description
17_25mLSolid2nd_83814-334_041212

Spectrum Filename: C:\User\SPC\Det17\17_25mLSolid2nd_20120320.An1

Acquisition information
Start time: 4/12/2012 7:55:45 PM
Live time: 7200
Real time: 7254
Dead time: 0.74 %
Detector ID: 17

Detector system
Ge17 SN/11080671

Calibration
Filename: 17_Soil_25ml.Clb
17_25mlSoil_90099_032712

Energy Calibration
Created: 4/3/2012 7:52:59 AM
Zero offset: 0.206 keV
Gain: 0.250 keV/channel
Quadratic: -2.424E-08 keV/channel^2

Efficiency Calibration
Created: 4/3/2012 7:53:15 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.37 %
Log(Eff): 1.993817E-01 + (-3.634387E-01*Log(E)) + (-3.575305E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.22 %
Log(Eff): -1.059921E+01 + (3.730142E+00*Log(E)) + (-4.231490E-01*Log(E)^2)

Library Files
Main analysis library: DET_EnergyStandardMix & Pb.Lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.72keV)
Stop channel: 8000 (1999.42keV)
Peak rejection level: 1000.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

ORTEC g v - i (3263) Env32 G53W4.25 4/17/2012 9:59:56 AM Page 2
TestAmerica, Inc. Spectrum name: 17_25mLSolid2nd_20120320.An1
Page 1

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	1/1/2011 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	YES	17_2012-04-01_0328.PBC 4/1/2012 3:28:52 AM
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 12 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0669

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. Bq/Sampl	Nuc
36.94	1378.	9.67	0.78	7.077E-02				
40.49	156.	71.14	0.57	7.502E-02				
46.67	61982.	0.50	0.76	8.098E-02	46.54	4.250	2.600E+03	Pb210
49.88	962.	15.23	1.14	8.344E-02				
59.65	49903.	0.56	0.75	8.876E-02	59.54	35.700	2.193E+02	AM241
77.14	180.	51.38	0.73	9.252E-02				
88.12	35017.	0.64	0.82	9.247E-02	88.03	3.610	2.935E+03	CD109
122.04	10374.	1.25	0.84	8.670E-02	122.06	85.600	6.394E+01	CO57
136.43	1284.	5.01	0.93	8.308E-02				
144.00	38.	84.51	0.52	8.107E-02				
165.78	3824.	2.43	0.94	7.518E-02	165.85	79.900	9.345E+01	Ce139
183.79	30.	111.53	0.92	6.942E-02				
185.66	125.	32.43	0.92	6.891E-02				
238.42	292.	20.08	0.92	5.719E-02				
278.99	72.	61.22	1.01	5.072E-02	279.17	81.500	PBC<MDA	Hg203
366.09	26.	103.43	0.40	4.110E-02				
391.69	1907.	3.99	1.10	3.897E-02	391.69	64.000	1.772E+02	SN113
459.39	39.	66.32	0.67	3.432E-02				
468.72	56.	46.06	0.71	3.378E-02				
661.71	12389.	1.02	1.33	2.550E-02	661.66	85.210	8.157E+01	CS137
786.50	52.	41.32	0.73	2.207E-02				
898.16	1906.	4.41	1.54	1.973E-02	898.02	93.700	2.990E+02	Y898
1173.30	12414.	0.97	1.72	1.568E-02	1173.24	99.900	1.302E+02	Co1173
1332.56	11307.	0.98	1.84	1.403E-02	1332.50	99.982	1.324E+02	Co1332
1643.96	16.	36.80	0.70	1.165E-02				
1836.05	1038.	3.39	2.03	1.055E-02	1836.01	99.200	2.876E+02	Y1836

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide

146.88	36.94	5172.	1378.	1.948E+04	9.67	0.783	-	s
161.07	40.49	5235.	156.	2.084E+03	71.14	0.575	-	sc
198.64	49.88	6476.	962.	1.153E+04	15.23	1.142	-	s

Channel	Energy	Background	Net area	Eff*Area	Uncert	FWHM	Suspected	
307.62	77.14	2961.	180.	1.947E+03	51.38	0.735	-	s
544.70	136.43	952.	1284.	1.546E+04	5.01	0.928	-	
574.99	144.00	467.	38.	4.729E+02	84.51	0.523	-	c
734.12	183.83	551.	30.	4.344E+02	111.53	0.919	-	c
741.57	185.69	757.	125.	1.811E+03	32.43	0.921	-	D
952.59	238.42	902.	292.	5.115E+03	20.08	0.921	-	
1463.19	366.09	307.	26.	6.407E+02	103.43	0.404	-	c
1836.35	459.39	288.	39.	1.131E+03	66.32	0.674	-	c
1873.67	468.72	285.	56.	1.668E+03	46.06	0.708	-	s
3144.93	786.50	160.	52.	2.333E+03	41.32	0.732	-	s
6576.69	1643.96	8.	16.	1.373E+03	36.80	0.699	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EnergyStandardMix & Pb.Lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
Pb-210	185.78	46.67	10351.	61831.	8.588	0.50	0.758
AM-241	237.68	59.65	6888.	49903.	6.931	0.56	0.754
CD-109	351.52	88.12	3819.	35017.	4.863	0.64	0.816
CO-57	487.17	122.04	1644.	10374.	1.441	1.25	0.841
Ce-139	662.07	165.78	1197.	3824.	0.531	2.43	0.939
Hg-203	1114.82	278.99	922.	72.	0.010	61.22	1.009
SN-113	1565.56	391.69	861.	1907.	0.265	3.99	1.095
CS-137	2645.68	661.71	639.	12389.	1.721	1.02	1.327
Y-898	3591.71	898.16	816.	1906.	0.265	4.41	1.538
Co-1173	4692.74	1173.30	348.	12414.	1.724	0.97	1.722
Co-1332	5330.15	1332.56	120.	11307.	1.570	0.98	1.842
Y-1836	7345.82	1836.05	23.	1038.	0.144	3.39	2.028

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity Bq/Sample	Peak Energy keV	Peak Activity Bq/Sample	Code	MDA Value Bq/Sample	COMMENTS

Pb-210	N	2.5999E+03					8.15E+03		
			46.54	2.600E+03	(P	2.005E+01	5.04E-01	4.25E+00	G
AM-241		2.1929E+02					1.58E+05		
			59.54	2.193E+02	(	1.711E+00	5.58E-01	3.57E+01	G
CD-109		2.9346E+03					4.63E+02		
			88.03	2.935E+03	(	2.436E+01	6.44E-01	3.61E+00	G
CO-57		6.3943E+01					2.72E+02		
			122.06	6.394E+01	(	1.181E+00	1.25E+00	8.56E+01	G
Ce-139		9.3451E+01					1.38E+02		
			165.85	9.345E+01	(	4.006E+00	2.43E+00	7.99E+01	G
Hg-203		2.5000E+02					4.66E+01		
			279.17	2.500E+02	?(	5.043E+02	6.12E+01	8.15E+01	G
SN-113		1.7725E+02					1.15E+02		
			391.69	1.772E+02	(	1.296E+01	3.99E+00	6.40E+01	G
CS-137		8.1570E+01					1.10E+04		
			661.66	8.157E+01	(	7.934E-01	1.02E+00	8.52E+01	G
Y-898		2.9898E+02					1.07E+02		
			898.02	2.990E+02	(	2.131E+01	4.41E+00	9.37E+01	G
Co-1173		1.3020E+02					1.93E+03		
			1173.24	1.302E+02	(	9.402E-01	9.68E-01	9.99E+01	G
Co-1332		1.3243E+02					1.93E+03		
			1332.50	1.324E+02	(	6.296E-01	9.78E-01	1.00E+02	G
Y-1836		2.8760E+02					1.07E+02		
			1836.01	2.876E+02	(	6.943E+00	3.39E+00	9.92E+01	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went
negative during deconvolution.
? - Peak is too narrow.

@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide
failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the
library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation

Peak Codes:
G - Gamma Ray
X - X-Ray

```
  I - Fission Product                  P - Positron Decay
  N - Naturally Occurring Isotope      S - Single-Escape
  P - Photon Reaction                  D - Double-Escape
  C - Charged Particle Reaction        K - Key Line
  M - No MDA Calculation               A - Not in Average
  R - Coincidence Corrected            C - Coincidence Peak
  H - Halflife limit exceeded

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


*************** D I S C A R D E D  I S O T O P E  P E A K S ***************
Nuclide Centroid  Background  Net Area   Intensity   Uncert   Activity
           Energy   Counts     Counts     Cts/Sec  1 Sigma %
_____________________________________________________________________________
  P - Peakbackground subtraction

*****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
         Time of Count  Time Corrected  Uncertainty  1 Sigma
Nuclide     Activity       Activity       Counting                    MDA
               Bq/Sample     Bq/Sample                                  Bq/Sample

_____________________________________________________________________________
Pb-210       2.4986E+03    2.5999E+03    5.055E-01%                 2.00E+01
AM-241       2.1884E+02    2.1929E+02    5.577E-01%                 1.71E+00
CD-109       1.4568E+03    2.9346E+03    6.445E-01%                 2.44E+01
CO-57        1.9416E+01    6.3943E+01    1.255E+00%                 1.18E+00
Ce-139       8.8798E+00    9.3451E+01    2.427E+00%                 4.01E+00
Hg-203 #A    2.4028E-01    2.5000E+02    6.122E+01%                 5.04E+02
SN-113       1.0620E+01    1.7725E+02    3.987E+00%                 1.30E+01
CS-137       7.9199E+01    8.1570E+01    1.018E+00%                 7.93E-01
Y-898        1.4316E+01    2.9898E+02    4.413E+00%                 2.13E+01
Co-1173      1.1004E+02    1.3020E+02    9.681E-01%                 9.40E-01
Co-1332      1.1192E+02    1.3243E+02    9.779E-01%                 6.30E-01
Y-1836       1.3771E+01    2.8760E+02    3.389E+00%                 6.94E+00
```

ORTEC g v - i (3263) Env32 G53W4.25 4/17/2012 9:59:56 AM Page 6
TestAmerica, Inc. Spectrum name: 17_25mLSolid2nd_20120320.An1

```
  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded
----------------------------   S U M M A R Y   ----------------------------
Total Activity (  238.3 to  1999.4 keV)     4.543E+03  Bq/Sample
Total Decayed Activity (  238.3 to  1999.4 keV) 7.2692256E+03  Bq/Sample
```

Annual Calibration Verifications

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector # 4**
SpectrumID: 4_20130227011_EffVerif
Analysis Description: ACVTop-91774;Tuna Can 2006
Calibration: 4_Soil_TunaCan_90099_033012
Detector: Ge 4 SN/181

Verification Date: 2013-02-27 16:17
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) (Assay-Actual)/Assay
Am-241	59.54	449	4.48E+02	0.3%
Cs-137	661.66	400	3.83E+02	4.3%
Co-1332	1332.5	777	7.45E+02	4.1%

Comments:

Perform ____KM 2/27/13_____ Reviev ___RM 2/27/13_____

C:\User\CRpt\4_20130227011_EffVerif.xls

Sample Description: ACVTop-91774;Tuna Can 2006
Detector: Ge 4 SN/181
Source Date: 10/1/2006 11:00
Acquired: 2/27/2013 16:17:24
Analyzed: 3/4/2013 09:45

Analyst: Jody Watson

Efficiency: 4_Soil_TunaCan_90099_033012
Library: DET_EfficiencyVerification.lib

Nuclide	Activity uCi/Source	Uncertainty %
AM-241	4.478E+02	0.56
CS-137	3.829E+02	0.86
Co-1332	7.452E+02	1.09
Total	1.576E+03	

TestAmerica Spectrum name: 4_20130227011_EffVerif.An1

Sample description
ACVTop-91774;Tuna Can 2006

Spectrum Filename: C:\User\SPC\Det4\4_20130227011_EffVerif.An1

Acquisition information
Start time: 2/27/2013 4:17:24 PM
Live time: 7200
Real time: 7253
Dead time: 0.72 %
Detector ID: 4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_Soil_TunaCan.Clb
4_Soil_TunaCan_90099_033012

Energy Calibration
Created: 2/28/2012 2:55:17 PM
Zero offset: 0.091 keV
Gain: 0.250 keV/channel
Quadratic: -2.917E-08 keV/channel^2

Efficiency Calibration
Created: 4/2/2012 1:19:41 PM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.78 %
Log(Eff): -3.983609E-01 + (-5.746278E-01*Log(E)) + (-2.046438E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 0.80 %
Log(Eff): -2.546791E+01 + (9.285295E+00*Log(E)) + (-9.904428E-01*Log(E)^2)

Library Files
Main analysis library: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (1999.44keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.

       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                          Status          Comments
       Decay correct to date:         YES       10/1/2006 11:00:00 AM
       Decay during acquisition:      YES
       Decay during collection:       NO
       True coincidence correction:   NO
       Peaked background correction:  NO
       Absorption (Internal):         NO
       Geometry correction:           NO
       Random summing:                NO


total peaks alloc.    3 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.1108

*****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
 Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
 Energy                             Factor    Energy   Ratio    uCi/Sour
_____________________________________________________________________________
   46.55    47124.   0.63   0.76  1.208E-02
   59.59    54866.   0.56   0.76  1.721E-02    59.54 100.000  4.478E+02 AM241
   88.12     3315.   2.53   0.84  2.354E-02
  661.43    16127.   0.86   1.34  6.783E-03   661.66 100.000  3.829E+02 CS137
 1173.07     9616.   1.14   1.61  4.163E-03
 1332.31     8608.   1.09   1.83  3.728E-03  1332.50 100.000  7.452E+02 Co1332


************ U N I D E N T I F I E D    P E A K    S U M M A R Y ************
  Peak Centroid  Background Net Area  Efficiency  Uncert   FWHM  Suspected
Channel   Energy   Counts     Counts   * Area    1 Sigma %  keV   Nuclide
_____________________________________________________________________________
  185.74    46.55     11672.     47124. 3.900E+06    0.63   0.759  -
  351.92    88.08      1814.      3335. 1.417E+05    2.50   0.839  -       D
 4691.64  1173.07       330.      9616. 2.310E+06    1.14   1.611  -

  s - Peak fails shape tests.
  D - Peak area deconvoluted.
  L - Peak written from unknown list.
  C - Area < Critical level.

------------------------------------------------------------
This section based on library: DET_EfficiencyVerification.lib
```

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.85	59.59	10017.	54866.	7.620	0.56	0.763
CS-137	2644.55	661.43	602.	16127.	2.240	0.86	1.344
Co-1332	5328.94	1332.31	36.	8608.	1.196	1.09	1.834

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity uCi/Source	Peak Energy keV	Peak Activity uCi/Source	Code	MDA Value uCi/Source	COMMENTS
AM-241		4.4779E+02				1.58E+05	
			59.54	4.478E+02	(	3.829E+00 5.62E-01	1.00E+02 G
CS-137		3.8291E+02				1.10E+04	
			661.66	3.829E+02	(	2.780E+00 8.62E-01	1.00E+02 G
Co-1332		7.4516E+02				1.93E+03	
			1332.50	7.452E+02	(	2.655E+00 1.09E+00	1.00E+02 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity uCi/Source	Time Corrected Activity uCi/Source	Uncertainty 1 Sigma Counting	MDA
AM-241	4.4322E+02	4.4779E+02	5.616E-01%	3.83E+00
CS-137	3.3031E+02	3.8291E+02	8.623E-01%	2.78E+00
Co-1332	3.2075E+02	7.4516E+02	1.093E+00%	2.65E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (92.9 to 1999.4 keV) 1.094E+03 uCi/Source
Total Decayed Activity (92.9 to 1999.4 keV) 1.5758633E+03 uCi/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector # 7**
SpectrumID: 7_20140128004_EffVerif
Analysis Description: ACVTOP-259586;TunaCan2006
Calibration: 7_TunaCan_90099_032712
Detector: Ge 7 SN/154

Verification Date: 2014-01-28 18:43
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.25E+02	5.2%
Cs-137	661.66	400	3.78E+02	5.6%
Co-1332	1332.5	777	7.28E+02	6.2%

Comments:

Perform Jody Watson Reviev 1/28/2014

C:\User\CRpt\7_20140128004_EffVerif.xls

Sample Description: ACVTOP-259586;TunaCan2006
Detector: Ge 7 SN/154
Source Date: 10/1/2006 11:00
Acquired: 1/28/2014 18:43:13
Analyzed: 1/28/2014 20:45

Analyst: Jody Watson

Efficiency: 7_TunaCan_90099_032712
Library: DET_EfficiencyVerification.lib

Nuclide	Activity GPS/Source	Uncertainty %
AM-241	4.255E+02	0.39
CS-137	3.777E+02	0.59
Co-1332	7.285E+02	0.82
Total	1.532E+03	

TestAmerica Spectrum name: 7_20140128004_EffVerif.An1

Sample description
ACVTOP-259586;TunaCan2006

Spectrum Filename: C:\User\SPC\Det7\7_20140128004_EffVerif.An1

Acquisition information
Start time: 1/28/2014 6:43:13 PM
Live time: 7200
Real time: 7330
Dead time: 1.77 %
Detector ID: 7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_Soil_TunaCan.Clb
7_TunaCan_90099_032712

Energy Calibration
Created: 2/23/2012 8:40:56 AM
Zero offset: 0.117 keV
Gain: 0.250 keV/channel
Quadratic: 3.508E-09 keV/channel^2

Efficiency Calibration
Created: 3/16/2012 11:45:14 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.87 %
Log(Eff): 6.716580E-01 + (-6.166540E-01*Log(E)) +
(-2.065917E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.48 %
Log(Eff): -2.689695E+01 + (1.019544E+01*Log(E)) +
(-1.081671E+00*Log(E)^2)

Library Files
Main analysis library: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (2000.12keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

```
       Random error:                4.0000000E+00
       Systematic error:            4.0000000E+00
       Fraction Limit:              0.000%
       Background width:            average of three points.

       Half lives decay limit:     12.000
       Activity range factor:       2.000
       Min. step backg. energy      0.000
       Multiplet shift channel      2.000

Corrections                          Status          Comments
       Decay correct to date:         YES       10/1/2006 11:00:00 AM
       Decay during acquisition:      YES
       Decay during collection:       NO
       True coincidence correction:   NO
       Peaked background correction:  NO
       Absorption (Internal):         NO
       Geometry correction:           NO
       Random summing:                NO


total peaks alloc.    3 cutoff: 5.00E+01%
       Energy Calibration
            Normalized diff:       0.0148

*****   S U M M A R Y   O F   P E A K S   I N   R A N G E   *****
 Peak       Area   Uncert  FWHM    Corrctn   Nuclide  Brnch.     Act.   Nuc
 Energy                             Factor    Energy   Ratio    GPS/Sour
_____________________________________________________________________________
   36.68     1330.   9.67   1.05  1.489E-02
   46.60    80032.   0.43   0.84  2.484E-02
   59.54   112070.   0.39   0.88  3.701E-02    59.54 100.000  4.255E+02 AM241
   88.01     3908.   2.64   0.88  5.327E-02
  661.64    34273.   0.59   1.49  1.492E-02   661.66 100.000  3.777E+02 CS137
 1173.20    17374.   0.85   1.92  8.929E-03
 1332.45    15910.   0.82   2.01  7.951E-03  1332.50 100.000  7.285E+02 Co1332


************ U N I D E N T I F I E D    P E A K    S U M M A R Y ************
  Peak Centroid  Background Net Area  Efficiency  Uncert   FWHM  Suspected
Channel   Energy   Counts     Counts   * Area    1 Sigma %  keV   Nuclide
_____________________________________________________________________________
  146.25    36.68      5068.      1330. 8.929E+04    9.67   1.047  -      s
  185.76    46.55     21357.     85177. 3.429E+06    0.47   0.876  -
  351.61    87.98      3362.      3908. 7.336E+04    2.64   0.881  -       D
 4692.54  1173.20       614.     17374. 1.946E+06    0.85   1.923  -

  s - Peak fails shape tests.
  D - Peak area deconvoluted.
  L - Peak written from unknown list.
  C - Area < Critical level.

------------------------------------------------------------
This section based on library: DET_EfficiencyVerification.lib
```

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.70	59.54	19241.	112070.	15.565	0.39	0.882
CS-137	2646.28	661.64	1145.	34273.	4.760	0.59	1.489
Co-1332	5329.51	1332.45	128.	15910.	2.210	0.82	2.010

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity GPS/Source	Peak Energy keV	Peak Activity GPS/Source	Code	MDA Value GPS/Source	COMMENTS
AM-241		4.2547E+02				1.58E+05	
			59.54	4.255E+02	(	2.464E+00 3.91E-01 1.00E+02 G	
CS-137		3.7766E+02				1.10E+04	
			661.66	3.777E+02	(	1.767E+00 5.92E-01 1.00E+02 G	
Co-1332		7.2849E+02				1.93E+03	
			1332.50	7.285E+02	(	2.533E+00 8.19E-01 1.00E+02 G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
\+ - Peak activity higher than counting uncertainty range.
\- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity GPS/Source	Time Corrected Activity GPS/Source	Uncertainty 1 Sigma Counting	MDA
AM-241	4.2051E+02	4.2547E+02	3.912E-01%	2.46E+00
CS-137	3.1896E+02	3.7766E+02	5.918E-01%	1.77E+00
Co-1332	2.7793E+02	7.2849E+02	8.193E-01%	2.53E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (98.9 to 2000.1 keV) 1.017E+03 GPS/Source
Total Decayed Activity (98.9 to 2000.1 keV) 1.5316135E+03 GPS/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector #12**
SpectrumID: 12_20140128004_EffVerif
Analysis Description: ACVTop-259586;TunaCan2006
Calibration: 12_TunaCanCal_90099_100212
Detector: Ge12 S/N10034336

Verification Date: 2014-01-28 14:18
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.47E+02	0.4%
Cs-137	661.66	400	3.94E+02	1.6%
Co-1332	1332.5	777	7.55E+02	2.8%

Comments:

Perform Jody Watson Revie 1/28/2014

C:\User\CRpt\12_20140128004_EffVerif.xls

Sample Description: ACVTop-259586;TunaCan2006
Detector: Ge12 S/N10034336
Source Date: 10/1/2006 11:00
Acquired: 1/28/2014 14:18:05
Analyzed: 1/28/2014 16:18

Analyst: Jody Watson

Efficiency: 12_TunaCanCal_90099_100212
Library: DET_EfficiencyVerification.lib

Nuclide	Activity GPS/Source	Uncertainty %
AM-241	4.471E+02	0.42
CS-137	3.935E+02	0.58
Co-1332	7.554E+02	0.77
Total	1.596E+03	

TestAmerica, Inc Spectrum name: 12_20140128004_EffVerif.An1

Sample description
ACVTop-259586;TunaCan2006

Spectrum Filename: C:\User\SPC\Det12\12_20140128004_EffVerif.An1

Acquisition information
Start time:	1/28/2014 2:18:05 PM
Live time:	7200
Real time:	7246
Dead time:	0.63 %
Detector ID:	12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_Soil_TunaCan.Clb
12_TunaCanCal_90099_100212

Energy Calibration
Created:	2/28/2012 1:26:42 PM
Zero offset:	0.049 keV
Gain:	0.250 keV/channel
Quadratic:	-3.945E-08 keV/channel^2

Efficiency Calibration
Created:	10/4/2012 9:05:44 AM
Knee Energy:	165.85 keV
Above the Knee:	Quadratic Uncertainty = 0.70 %
Log(Eff):	-7.827468E-01 + (-3.001271E-01*Log(E)) + (-3.369562E-02*Log(E)^2)
Below the Knee:	Quadratic Uncertainty = 0.96 %
Log(Eff):	-2.288409E+01 + (8.352717E+00*Log(E)) + (-8.812368E-01*Log(E)^2)

Library Files
Main analysis library:	DET_EfficiencyVerification.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.58keV)
Stop channel:	8000 (1999.36keV)
Peak rejection level:	10.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 3 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0087

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. GPS/Sour	Nuc
36.55	1480.	9.57	0.89	1.444E-02				
46.52	77370.	0.54	1.12	2.228E-02				
59.52	99318.	0.42	1.11	3.121E-02	59.54	100.000	4.471E+02	AM241
87.99	3561.	4.10	1.18	4.277E-02				
661.67	37598.	0.58	1.62	1.571E-02	661.66	100.000	3.935E+02	CS137
1173.21	20770.	0.79	1.92	1.018E-02				
1332.49	19132.	0.77	2.06	9.220E-03	1332.50	100.000	7.554E+02	Co1332

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
145.89	36.55	5572.	1480.	1.025E+05	9.57	0.886	-	s
185.74	46.52	24066.	77370.	3.473E+06	0.54	1.118	-	s
351.46	87.99	4624.	3561.	8.326E+04	4.10	1.175	-	s
4691.80	1173.21	827.	20770.	2.040E+06	0.79	1.915	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EfficiencyVerification.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.67	59.52	17591.	99318.	13.794	0.42	1.110s
CS-137	2645.17	661.67	1535.	37598.	5.222	0.58	1.616
Co-1332	5329.33	1332.49	294.	19132.	2.657	0.77	2.055

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity GPS/Source	Peak Energy keV	Peak Activity GPS/Source	Peak Code	Peak MDA Value GPS/Source	COMMENTS
AM-241		4.4707E+02				1.58E+05	
			59.54	4.471E+02	*(	2.794E+00 4.18E-01 1.00E+02	G
CS-137		3.9351E+02				1.10E+04	
			661.66	3.935E+02	(	1.939E+00 5.75E-01 1.00E+02	G
Co-1332		7.5535E+02				1.93E+03	
			1332.50	7.554E+02	(	3.261E+00 7.65E-01 1.00E+02	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity GPS/Source	Time Corrected Activity GPS/Source	Uncertainty 1 Sigma Counting	MDA
AM-241 #	4.4186E+02	4.4707E+02	4.183E-01%	2.79E+00
CS-137	3.3236E+02	3.9351E+02	5.754E-01%	1.94E+00
Co-1332	2.8820E+02	7.5535E+02	7.652E-01%	3.26E+00

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.4 keV) 1.062E+03 GPS/Source
Total Decayed Activity (37.6 to 1999.4 keV) 1.5959352E+03 GPS/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector #14**
SpectrumID: 14_20140124005_EffVerif
Analysis Description: ACVTop-259586;TunaCan2006
Calibration: 14_TunaCan_90099_042312
Detector: Ge14 SN/11080670

Verification Date: 2014-01-24 08:37
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.50E+02	-0.3%
Cs-137	661.66	400	3.96E+02	1.0%
Co-1332	1332.5	777	7.52E+02	3.3%

Comments:

Perform Jody Watson Revie 1/24/2014

C:\User\CRpt\14_20140124005_EffVerif.xls

Sample Description: ACVTop-259586;TunaCan2006
Detector: Ge14 SN/11080670
Source Date: 10/1/2006 11:00
Acquired: 1/24/2014 08:37:03
Analyzed: 1/24/2014 10:38

Analyst: Jody Watson

Efficiency: 14_TunaCan_90099_042312
Library: DET_EfficiencyVerification.lib

Nuclide	Activity GPS/Source	Uncertainty %
AM-241	4.504E+02	0.41
CS-137	3.959E+02	0.61
Co-1332	7.517E+02	0.83
Total	1.598E+03	

TestAmerica, Inc. Spectrum name: 14_20140124005_EffVerif.An1

Sample description
ACVTop-259586;TunaCan2006

Spectrum Filename: C:\User\SPC\Det14\14_20140124005_EffVerif.An1

Acquisition information
Start time: 1/24/2014 8:37:03 AM
Live time: 7200
Real time: 7252
Dead time: 0.72 %
Detector ID: 14

Detector system
Ge14 SN/11080670

Calibration
Filename: 14_Soil_TunaCan.Clb
14_TunaCan_90099_042312

Energy Calibration
Created: 2/28/2012 10:48:23 AM
Zero offset: 0.130 keV
Gain: 0.250 keV/channel
Quadratic: -2.050E-08 keV/channel^2

Efficiency Calibration
Created: 4/23/2012 11:29:47 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 1.02 %
Log(Eff): 2.101260E-01 + (-5.951973E-01*Log(E)) +
(-1.605331E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.28 %
Log(Eff): -2.391492E+01 + (8.828985E+00*Log(E)) +
(-9.371496E-01*Log(E)^2)

Library Files
Main analysis library: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.64keV)
Stop channel: 8000 (1999.52keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 3 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0538

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. GPS/Sour	Nuc
36.71	1330.	9.37	0.74	1.399E-02				
46.66	77034.	0.50	0.77	2.180E-02				
59.60	98253.	0.41	0.78	3.069E-02	59.54	100.000	4.504E+02	AM241
87.91	3613.	3.51	0.89	4.194E-02				
661.71	31623.	0.61	1.37	1.313E-02	661.66	100.000	3.959E+02	CS137
1173.29	17093.	0.83	1.70	8.243E-03				
1332.57	15352.	0.83	1.88	7.422E-03	1332.50	100.000	7.517E+02	Co1332

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
146.27	36.71	4728.	1330.	9.509E+04	9.37	0.737	-	s
186.05	46.66	19645.	77034.	3.534E+06	0.50	0.771	-	
351.01	87.91	3738.	3613.	8.616E+04	3.51	0.888	-	s
4692.81	1173.29	462.	17093.	2.074E+06	0.83	1.704	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EfficiencyVerification.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.82	59.60	15728.	98253.	13.646	0.41	0.779
CS-137	2645.98	661.71	958.	31623.	4.392	0.61	1.366
Co-1332	5330.24	1332.57	122.	15352.	2.132	0.83	1.879

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity GPS/Source	Peak Energy keV	Peak Activity GPS/Source	Code	MDA Value GPS/Source	COMMENTS
AM-241		4.5043E+02				1.58E+05	
			59.54	4.504E+02	(	2.692E+00 4.05E-01	1.00E+02 G
CS-137		3.9589E+02				1.10E+04	
			661.66	3.959E+02	(	1.839E+00 6.06E-01	1.00E+02 G
Co-1332		7.5170E+02				1.93E+03	
			1332.50	7.517E+02	(	2.658E+00 8.29E-01	1.00E+02 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity GPS/Source	Time Corrected Activity GPS/Source	Uncertainty 1 Sigma Counting	MDA
AM-241	4.4518E+02	4.5043E+02	4.053E-01%	2.69E+00
CS-137	3.3446E+02	3.9589E+02	6.060E-01%	1.84E+00
Co-1332	2.8725E+02	7.5170E+02	8.288E-01%	2.66E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 1.067E+03 GPS/Source
Total Decayed Activity (37.6 to 1999.5 keV) 1.5980186E+03 GPS/Source

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANNUAL CALIBRATION VERIFICATION

Detector ID: **Detector #17**
SpectrumID: 17_20140123005_EffVerif
Analysis Description: ACVTop-259586;TunaCan2006
Calibration: 17_TunaCan_90099_032612
Detector: Ge17 SN/11080671

Verification Date: 2014-01-23 11:17
Source Assay Date/Time: 2006-10-01 11:00

Isotope	Gamma Energy (kev)	Source Emission Rate (GPS) (Assay)	Observed Activity (GPS) (Actual)	Percent Difference (%) Assay-Actual / Assay
Am-241	59.54	449	4.37E+02	2.6%
Cs-137	661.66	400	3.87E+02	3.3%
Co-1332	1332.5	777	7.33E+02	5.6%

Comments:

Perform Jody Watson Revie 1/23/2014

C:\User\CRpt\17_20140123005_EffVerif.xls

Sample Description: ACVTop-259586;TunaCan2006
Detector: Ge17 SN/11080671
Source Date: 10/1/2006 11:00
Acquired: 1/23/2014 11:17:37
Analyzed: 1/23/2014 13:18

Analyst: JustinL

Efficiency: 17_TunaCan_90099_032612
Library: DET_EfficiencyVerification.lib

Nuclide	Activity GPS/Source	Uncertainty %
AM-241	4.371E+02	0.43
CS-137	3.868E+02	0.60
Co-1332	7.334E+02	0.79
Total	1.557E+03	

TestAmerica, Inc. Spectrum name: 17_20140123005_EffVerif.An1

Sample description
ACVTop-259586;TunaCan2006

Spectrum Filename: C:\User\SPC\Det17\17_20140123005_EffVerif.An1

Acquisition information
Start time: 1/23/2014 11:17:37 AM
Live time: 7200
Real time: 7248
Dead time: 0.66 %
Detector ID: 17

Detector system
Ge17 SN/11080671

Calibration
Filename: 17_Soil_TunaCan.Clb
17_TunaCan_90099_032612

Energy Calibration
Created: 2/29/2012 10:33:23 AM
Zero offset: 0.108 keV
Gain: 0.250 keV/channel
Quadratic: -2.584E-08 keV/channel^2

Efficiency Calibration
Created: 4/12/2012 9:28:42 AM
Knee Energy: 165.85 keV
Above the Knee: Quadratic Uncertainty = 0.91 %
Log(Eff): -5.264190E-01 + (-4.024164E-01*Log(E)) + (-2.604461E-02*Log(E)^2)
Below the Knee: Quadratic Uncertainty = 1.00 %
Log(Eff): -2.343889E+01 + (8.582715E+00*Log(E)) + (-9.075430E-01*Log(E)^2)

Library Files
Main analysis library: DET_EfficiencyVerification.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.63keV)
Stop channel: 8000 (1999.54keV)
Peak rejection level: 10.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method: Reg. Guide 4.16 Method

Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	YES	10/1/2006 11:00:00 AM
Decay during acquisition:	YES	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 3 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0187

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. GPS/Sour	Nuc
46.59	73432.	0.50	0.76	2.104E-02				
59.58	91985.	0.43	0.76	2.959E-02	59.54	100.000	4.371E+02	AM241
88.06	3451.	4.45	0.83	4.060E-02				
661.65	33946.	0.60	1.33	1.443E-02	661.66	100.000	3.868E+02	CS137
1173.26	19157.	0.83	1.72	9.359E-03				
1332.50	17118.	0.79	1.86	8.481E-03	1332.50	100.000	7.334E+02	Co1332

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
185.85	46.59	17888.	73432.	3.489E+06	0.50	0.760	-	
351.64	88.06	4826.	3451.	8.500E+04	4.45	0.825	-	s
4692.35	1173.26	773.	19157.	2.047E+06	0.83	1.724	-	

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_EfficiencyVerification.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
AM-241	237.75	59.58	15258.	91985.	12.776	0.43	0.764
CS-137	2645.46	661.65	1213.	33946.	4.715	0.60	1.331
Co-1332	5329.63	1332.50	157.	17118.	2.377	0.79	1.865

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity GPS/Source	Peak Energy keV	Peak Activity GPS/Source	Code	MDA Value GPS/Source	COMMENTS
AM-241		4.3712E+02				1.58E+05	
			59.54	4.371E+02	(	2.748E+00 4.25E-01 1.00E+02 G	
CS-137		3.8679E+02				1.10E+04	
			661.66	3.868E+02	(	1.880E+00 5.95E-01 1.00E+02 G	
Co-1332		7.3337E+02				1.93E+03	
			1332.50	7.334E+02	(	2.619E+00 7.91E-01 1.00E+02 G	

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity GPS/Source	Time Corrected Activity GPS/Source	Uncertainty 1 Sigma Counting	MDA
AM-241	4.3203E+02	4.3712E+02	4.253E-01%	2.75E+00
CS-137	3.2679E+02	3.8679E+02	5.952E-01%	1.88E+00
Co-1332	2.8033E+02	7.3337E+02	7.913E-01%	2.62E+00

< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 1999.5 keV) 1.039E+03 GPS/Source
Total Decayed Activity (37.6 to 1999.5 keV) 1.5572817E+03 GPS/Source

Monthly Backgrounds

Test America
St. Louis
Background Check

Spectrum: 4_20140809001_BGLong
Acquired: 8/9/2014 9:24:49 AM
Detector: Ge 4 SN/181
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.32	1.20	1.24	1.29	1.39	1.43	PASS

Analyst: Jody Watson Reviewer:

TestAmerica Spectrum name: 4_20140809001_BGLong.An1

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det4\4_20140809001_BGLong.An1

Acquisition information
Start time: 8/9/2014 9:24:49 AM
Live time: 43200
Real time: 43239
Dead time: 0.09 %
Detector ID: 4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_QC.Clb
4_QA-D_Rad11-0018_032612

Energy Calibration
Created: 2/28/2012 2:55:17 PM
Zero offset: 0.091 keV
Gain: 0.250 keV/channel
Quadratic: -2.917E-08 keV/channel^2

Efficiency Calibration
Created: 3/27/2012 7:34:55 AM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.61keV)
Stop channel: 8000 (1999.44keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 15 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1088

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.58	416.	10.77	0.70	3.536E-02	46.54	4.250	6.420E+00	PB210
63.33	305.	10.13	0.73	4.646E-02	63.29	3.810	3.989E+00	TH234
75.02	90.	27.29	0.83	5.418E-02				
77.09	102.	25.34	0.83	5.555E-02				
92.63	437.	10.08	0.97	6.309E-02	92.59	5.584	2.874E+00	TH234
					93.35	5.561	2.884E+00	AC228
185.56	229.	14.67	0.78	5.803E-02	185.72	54.000	1.695E-01	U235
					185.99	3.280	2.791E+00	Ra226
238.36	158.	21.35	0.84	5.340E-02	238.63	43.300	1.583E-01	PB212
351.35	111.	25.40	1.13	4.343E-02	351.93	37.600	1.574E-01	PB214
510.56	710.	6.41	1.50	2.895E-02				
609.23	71.	26.63	1.32	1.983E-02	609.31	46.090	1.790E-01	BI214
					610.30	5.750	1.441E+00	RU103
1461.06	80.	22.84	1.01	7.834E-03	1460.83	10.670	2.202E+00	K40
1764.25	53.	13.74	0.34	7.826E-03	1764.49	15.400	1.018E+00	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
307.67	77.05	248.	105.	1.884E+03	26.46	0.941	-	M
2041.11	510.56	256.	710.	2.453E+04	6.41	1.503	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.
M - Peak is close to a library peak.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.86	46.58	416.	416.	0.010	10.77	0.703
TH-234	252.81	63.33	229.	305.	0.007	10.13	0.731
TH-234	369.93	92.63	411.	437.	0.010	10.08	0.970
Ra-226	741.50	185.56	271.	229.	0.005	14.67	0.781s
PB-212	952.60	238.36	280.	158.	0.004	21.35	0.842
PB-214	1404.41	351.35	171.	111.	0.003	25.40	1.134s
BI-214	2435.76	609.23	77.	71.	0.002	26.63	1.322s
K-40	5844.31	1461.06	38.	80.	0.002	22.84	1.006s
BI-214	7058.14	1764.25	0.	53.	0.001	13.74	0.337s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Peak Code	Peak MDA Value DPS	COMMENTS
K-40	N	2.2017E+00				4.66E+11	
			1460.83	2.202E+00	(	8.758E-01 2.28E+01 1.07E+01	G
PB-210	N	6.4200E+00				8.14E+03	
			46.54	6.420E+00	(	1.508E+00 1.08E+01 4.25E+00	G
PB-212	N	1.5826E-01				6.98E+02	
			238.63	1.583E-01	(	8.082E-02 2.14E+01 4.33E+01	G
			300.03	0.000E+00	%	8.163E-01 1.07E+02 3.28E+00	GA
PB-214	N	1.5735E-01				5.84E+05	
			351.93	1.574E-01	&(	9.023E-02 2.54E+01 3.76E+01	G
			295.09	0.000E+00	%	1.700E-01 4.48E+01 1.93E+01	G
			242.00	0.000E+00	%	3.229E-01 2.78E+02 7.43E+00	GA
BI-214	N	1.7901E-01				5.84E+05	
			609.31	1.790E-01	(	1.107E-01 2.66E+01 4.61E+01	G
			1120.29	0.000E+00		1.245E-01 0.00E+00 1.51E+01	G
			1764.49	1.018E+00	+	1.416E-01 1.37E+01 1.54E+01	G
TH-234	N	3.9888E+00				1.63E+12	
			63.29	3.989E+00	(	9.585E-01 1.01E+01 3.81E+00	G
			92.59	2.874E+00	-	6.383E-01 1.01E+01 5.58E+00	G

Nuclide	Ave activity	Energy	Activity	Code	Peak	MDA	Comments
Ra-226	2.7909E+00					5.84E+05	
		185.99	2.791E+00	@(	9.660E-01	1.47E+01	3.28E+00 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Activity DPS	Time of Count Uncertainty Counting	1 Sigma MDA
BE-7	<	3.6818E-01		
NA-22	<	7.9904E-02		
K-40		2.2017E+00	2.2842E+01%	8.758E-01
Sc-46	<	9.2423E-02		

CR-51	<	2.8745E-01			
MN-54	<	3.6471E-02			
FE-59	<	1.6757E-01			
Co-56	<	8.1418E-02			
CO-57	<	2.9116E-02			
CO-58	<	7.2815E-02			
CO-60	<	1.1285E-01			
ZN-65	<	1.6722E-01			
NB-94	<	3.1456E-02			
ZR-95	<	1.3172E-01			
NB-95	<	8.8599E-02			
RU-103	<	1.7503E-02			
RH-106	<	5.5123E-01			
AG-108M	<	2.9605E-02			
AG-110M	<	4.8030E-02			
SN-113	<	5.6826E-02			
SB-124	<	5.6577E-02			
SB-125	<	9.6516E-02			
I-131	<	4.0774E-02			
BA-133	<	4.8367E-02			
CS-134	<	7.1103E-02			
CS-137	<	1.1274E-01			
CE-139	<	2.3100E-02			
Ba-140	<	1.0990E-01			
La-140	<	9.1352E-02			
CE-141	<	5.4068E-02			
CE-144	<	2.4384E-01			
PM-144	<	8.5831E-02			
EU-152	<	1.3327E-01			
EU-154	<	4.8725E-01			
EU-155	<	8.1523E-02			
HF-181	<	4.8148E-02			
Ta-182	<	1.0329E-01			
Hg-203	<	1.7717E-02			
TL-208	<	8.1560E-02			
pm-146	<	2.2754E-01			
y-88	<	3.8222E-02			
PB-210		6.4200E+00	1.0772E+01%		1.508E+00
PB-212		1.5826E-01	2.1351E+01%		8.082E-02
PB-214	#	1.5735E-01	2.5402E+01%		9.023E-02
BI-207	<	4.8047E-02			
BI-212	<	1.3734E+00			
BI-214	#	1.7901E-01	2.6633E+01%		1.107E-01
BI-210M	<	6.4937E-02			
RA-224	<	8.8018E-01			
AC-228	<	3.6523E-01			
TH-227	<	1.7635E-01			
TH-229	<	6.3861E-01			
TH-234		3.9888E+00	1.0133E+01%		9.585E-01

PA-231	<	9.2603E-01			
PA-233	<	9.7329E-02			
PA-234	<	1.6028E-01			
PA-234M	<	1.0959E+01			
Ra-226	#	2.7909E+00	1.4668E+01%		9.660E-01
U-235	<	2.4442E-01			
AM-241	<	9.3124E-02			
Np-237	<	1.2236E-01			

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

--- S U M M A R Y ---

Total Activity (37.6 to 1999.4 keV) 1.590E+01 DPS

Test America
St. Louis
Background Check

Spectrum: 4_20140905007_BGLong
Acquired: 9/5/2014 5:56:46 PM
Detector: Ge 4 SN/181
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.32	1.20	1.24	1.26	1.39	1.43	PASS

Analyst: Curtis Carey Reviewer:

TestAmerica Spectrum name: 4_20140905007_BGLong.An1

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det4\4_20140905007_BGLong.An1

Acquisition information
Start time:	9/5/2014 5:56:46 PM
Live time:	43200
Real time:	43239
Dead time:	0.09 %
Detector ID:	4

Detector system
Ge 4 SN/181

Calibration
Filename: 4_QC.Clb
4_QA-D_Rad11-0018_032612

Energy Calibration
Created:	2/28/2012 2:55:17 PM
Zero offset:	0.091 keV
Gain:	0.250 keV/channel
Quadratic:	-2.917E-08 keV/channel^2

Efficiency Calibration
Created:	3/27/2012 7:34:55 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (1999.44keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 9 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 1.0000

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.48	365.	10.52	1.25	3.530E-02	46.54	4.250	5.631E+00	PB210
63.29	303.	13.79	1.34	4.643E-02	63.29	3.810	3.969E+00	TH234
92.61	403.	9.96	1.52	6.309E-02	92.59	5.584	2.648E+00	TH234
					93.35	5.561	2.657E+00	AC228
185.62	240.	16.02	1.42	5.802E-02	185.72	54.000	1.773E-01	U235
					185.99	3.280	2.921E+00	Ra226
238.48	211.	15.55	1.26	5.339E-02	238.63	43.300	2.117E-01	PB212
510.73	741.	6.15	2.27	2.894E-02	511.86	20.000	2.975E+00	RH106
582.71	110.	21.41	0.93	2.226E-02	583.02	84.500	1.354E-01	TL208

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
2041.80	510.73	243.	741.	2.561E+04	6.15	2.268	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.47	46.48	334.	365.	0.008	10.52	1.254s
TH-234	252.66	63.29	395.	303.	0.007	13.79	1.336s
TH-234	369.87	92.61	345.	403.	0.009	9.96	1.518s
Ra-226	741.72	185.62	323.	240.	0.006	16.02	1.425s
PB-212	953.06	238.48	227.	211.	0.005	15.55	1.263s
TL-208	2329.68	582.71	92.	110.	0.003	21.41	0.934s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	Peak MDA Value DPS	COMMENTS
TL-208	N	1.3539E-01				6.98E+02	
			583.02	1.354E-01	(	5.835E-02 2.14E+01 8.45E+01	G
			277.28	0.000E+00	&	4.124E-01 9.96E+01 6.31E+00	G
			860.56	0.000E+00		1.247E-01 0.00E+00 1.24E+01	G
PB-210	N	5.6313E+00				8.14E+03	
			46.54	5.631E+00	*(	1.354E+00 1.05E+01 4.25E+00	G
PB-212	N	2.1168E-01				6.98E+02	
			238.63	2.117E-01	*(	7.299E-02 1.56E+01 4.33E+01	G
			300.03	0.000E+00	%	5.435E-01 1.00E+03 3.28E+00	GA
TH-234	N	3.9692E+00				1.63E+12	
			63.29	3.969E+00	(	1.247E+00 1.38E+01 3.81E+00	G
			92.59	2.648E+00	-	5.866E-01 9.96E+00 5.58E+00	G
Ra-226		2.9207E+00				5.84E+05	
			185.99	2.921E+00	*(	1.052E+00 1.60E+01 3.28E+00	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide

failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- - - -

AG-110M	<	5.2733E-02			
SN-113	<	4.6311E-02			
SB-124	<	3.9560E-02			
SB-125	<	1.0686E-01			
I-131	<	1.8612E-02			
BA-133	<	4.7473E-02			
CS-134	<	4.6823E-02			
CS-137	<	3.8695E-02			
CE-139	<	2.8798E-02			
Ba-140	<	1.7918E-01			
La-140	<	6.0463E-02			
CE-141	<	5.0712E-02			
CE-144	<	1.2462E-01			
PM-144	<	8.7945E-02			
EU-152	<	1.2029E-01			
EU-154	<	2.7846E-01			
EU-155	<	1.1011E-01			
HF-181	<	4.5721E-02			
Ta-182	<	2.8378E-01			
Hg-203	<	4.0436E-02			
TL-208	#	1.3539E-01	2.1410E+01%		5.835E-02
pm-146	<	8.1453E-02			
y-88	<	9.7579E-02			
PB-210	#	5.6313E+00	1.0522E+01%		1.354E+00
PB-212	#	2.1168E-01	1.5552E+01%		7.299E-02
PB-214	<	1.0115E-01			
BI-207	<	4.7557E-02			
BI-212	<	1.2560E+00			
BI-214	<	1.5335E-01			
BI-210M	<	2.8200E-02			
RA-224	<	7.6611E-01			
AC-228	<	3.8221E-01			
TH-227	<	2.3383E-01			
TH-229	<	7.9100E-01			
TH-234	#	3.9692E+00	1.3793E+01%		1.247E+00
PA-231	<	1.3103E+00			
PA-233	<	1.1485E-01			
PA-234	<	1.5999E-01			
PA-234M	<	1.2560E+01			
Ra-226	#	2.9207E+00	1.6020E+01%		1.052E+00
U-235	<	2.2293E-01			
AM-241	<	9.2862E-02			
Np-237	<	2.3149E-01			

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.

  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

--- S U M M A R Y ---

Total Activity (37.6 to 1999.4 keV)	1.287E+01	DPS

Test America
St. Louis
Background Check

Spectrum: 7_20140809001_BGLong
Acquired: 8/9/2014 9:24:34 AM
Detector: Ge 7 SN/154
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.29	1.40	1.45	PASS

Analyst: Jody Watson Reviewer:

TestAmerica Spectrum name: 7_20140809001_BGLong.An1

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det7\7_20140809001_BGLong.An1

Acquisition information
Start time:	8/9/2014 9:24:34 AM
Live time:	43200
Real time:	43899
Dead time:	1.59 %
Detector ID:	7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_QC.Clb
Ge7_QC

Energy Calibration
Created:	2/23/2012 8:40:56 AM
Zero offset:	0.117 keV
Gain:	0.250 keV/channel
Quadratic:	3.508E-09 keV/channel^2

Efficiency Calibration
Created:	1/6/2011 8:06:10 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (2000.12keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 19 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.2745

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.59	428.	8.84	0.99	8.125E-02	46.54	4.250	2.871E+00	PB210
63.30	481.	9.20	0.81	1.229E-01	63.29	3.810	2.379E+00	TH234
74.69	94.	27.76	0.87	1.513E-01				
77.19	143.	18.50	0.87	1.575E-01				
92.61	614.	7.39	1.10	1.861E-01	92.59	5.584	1.369E+00	TH234
					93.35	5.561	1.372E+00	AC228
143.32	116.	24.13	0.59	1.842E-01	143.79	10.960	1.330E-01	U235
185.60	304.	12.55	0.93	1.634E-01	185.72	54.000	7.980E-02	U235
					185.99	3.280	1.315E+00	Ra226
238.73	236.	17.86	1.10	1.417E-01	238.63	43.300	8.904E-02	PB212
511.03	822.	6.34	2.39	6.487E-02	511.86	20.000	1.469E+00	RH106
608.79	119.	22.99	0.57	5.309E-02	609.31	46.090	1.129E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
298.32	74.69	298.	115.	7.603E+02	27.62	0.998	-	s
308.31	77.19	260.	164.	1.039E+03	18.34	1.226	-	s
2043.81	511.03	315.	822.	1.267E+04	6.34	2.388	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.92	46.59	316.	428.	0.010	8.84	0.987s
TH-234	252.77	63.30	369.	481.	0.011	9.20	0.811s
TH-234	370.00	92.61	395.	614.	0.014	7.39	1.100s
U-235	572.88	143.32	210.	116.	0.003	24.13	0.591s
U-235	742.49	185.72	288.	287.	0.007	9.14	0.934D
PB-212	954.54	238.73	330.	236.	0.005	17.86	1.099
BI-214	2434.86	608.79	136.	119.	0.003	22.99	0.567s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

- Nuclide - Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	Peak MDA Value DPS	COMMENTS
PB-210	N	2.8715E+00				8.14E+03	
			46.54	2.871E+00	*(	5.747E-01 8.84E+00 4.25E+00	G
PB-212	N	8.9039E-02				6.98E+02	
			238.63	8.904E-02	(	3.296E-02 1.79E+01 4.33E+01	G
			300.03	0.000E+00		4.460E-02 0.00E+00 3.28E+00	GA
BI-214	N	1.1289E-01				5.84E+05	
			609.31	1.129E-01	(	5.391E-02 2.30E+01 4.61E+01	G
			1120.29	0.000E+00	%	1.302E-01 1.70E+02 1.51E+01	G
			1764.49	0.000E+00	%	1.826E-01 1.56E+02 1.54E+01	G
TH-234	N	2.3788E+00				1.63E+12	
			63.29	2.379E+00	@(	4.561E-01 9.20E+00 3.81E+00	G
			92.59	1.369E+00	-	2.123E-01 7.39E+00 5.58E+00	G
U-235	N	1.3301E-01				2.57E+11	
			185.72	7.521E-02	}	2.147E-02 9.14E+00 5.40E+01	GA
			143.79	1.330E-01	(	8.069E-02 2.41E+01 1.10E+01	G
			205.33	0.000E+00		2.193E-02 0.00E+00 5.01E+00	G
			163.38	0.000E+00		1.943E-02 0.00E+00 5.08E+00	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.

? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide
failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the
library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity DPS	Uncertainty Counting 1 Sigma	MDA
BE-7	<	1.1071E-01	
NA-22	<	2.3428E-02	
K-40	<	5.1511E-01	
Sc-46	<	2.1311E-02	
CR-51	<	1.7656E-01	
MN-54	<	2.8213E-02	
FE-59	<	4.6546E-02	
Co-56	<	3.1076E-02	
CO-57	<	1.0668E-02	
CO-58	<	1.2629E-02	
CO-60	<	1.9788E-02	
ZN-65	<	6.5142E-02	
NB-94	<	2.3772E-02	
ZR-95	<	1.4773E-02	

NB-95	<	2.1768E-02			
RU-103	<	9.7729E-03			
RH-106	<	2.5053E-01			
AG-108M	<	2.5278E-02			
AG-110M	<	3.2069E-02			
SN-113	<	1.9549E-02			
SB-124	<	1.0066E-02			
SB-125	<	3.4388E-02			
I-131	<	9.1223E-03			
BA-133	<	1.3237E-02			
CS-134	<	2.1064E-02			
CS-137	<	2.9150E-02			
CE-139	<	8.9403E-03			
Ba-140	<	8.4592E-02			
La-140	<	3.3302E-02			
CE-141	<	1.3183E-02			
CE-144	<	4.7081E-02			
PM-144	<	2.2320E-02			
EU-152	<	4.7084E-02			
EU-154	<	1.5613E-01			
EU-155	<	4.4960E-02			
HF-181	<	1.8892E-02			
Ta-182	<	1.1617E-01			
Hg-203	<	6.8764E-03			
TL-208	<	3.0031E-02			
pm-146	<	9.5455E-02			
y-88	<	3.3609E-02			
PB-210	#	2.8715E+00	8.8404E+00%		5.747E-01
PB-212		8.9039E-02	1.7857E+01%		3.296E-02
PB-214	<	4.0719E-02			
BI-207	<	2.0191E-02			
BI-212	<	2.4886E-01			
BI-214	#	1.1289E-01	2.2987E+01%		5.391E-02
BI-210M	<	2.6125E-02			
RA-224	<	2.9988E-01			
AC-228	<	1.4644E-01			
TH-227	<	4.2900E-02			
TH-229	<	1.1498E-01			
TH-234	#	2.3788E+00	9.1971E+00%		4.561E-01
PA-231	<	4.3015E-01			
PA-233	<	3.5590E-02			
PA-234	<	5.2899E-02			
PA-234M	<	4.3615E+00			
Ra-226	<	4.6367E-01			
U-235		1.3301E-01	2.4132E+01%		8.069E-02
AM-241	<	5.0352E-02			
Np-237	<	7.3847E-02			

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

S U M M A R Y

Total Activity (205.1 to 2000.1 keV) 5.585E+00 DPS

Test America
St. Louis
Background Check

Spectrum: 7_20140905005_BGLong
Acquired: 9/5/2014 5:58:08 PM
Detector: Ge 7 SN/154
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.30	1.16	1.21	1.27	1.40	1.45	PASS

Analyst: Curtis Carey Reviewer:

TestAmerica Spectrum name: 7_20140905005_BGLong.An1

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det7\7_20140905005_BGLong.An1

Acquisition information
Start time:	9/5/2014 5:58:08 PM
Live time:	43200
Real time:	43910
Dead time:	1.62 %
Detector ID:	7

Detector system
Ge 7 SN/154

Calibration
Filename: 7_QC.Clb
Ge7_QC

Energy Calibration
Created:	2/23/2012 8:40:56 AM
Zero offset:	0.117 keV
Gain:	0.250 keV/channel
Quadratic:	3.508E-09 keV/channel^2

Efficiency Calibration
Created:	1/6/2011 8:06:10 AM		
Knee Energy:	0.00 keV		
Above the Knee:	Interpolative	Uncertainty =	0.00 %
Below the Knee:	Interpolative	Uncertainty =	0.00 %

Library Files
Main analysis library:	DET_Long Background PBC.lib
Library Match Width:	0.500
Peak stripping:	Library based

Analysis parameters
Analysis engine:	Env32 G53W4.25
Start channel:	150 (37.61keV)
Stop channel:	8000 (2000.12keV)
Peak rejection level:	30.000%
Peak search sensitivity:	3
Sample Size:	1.0000E+00
Activity scaling factor:	1.0000E+00/(1.0000E+00* 1.0000E+00) = 1.0000E+00
Detection limit method:	Reg. Guide 4.16 Method
Random error:	4.0000000E+00
Systematic error:	4.0000000E+00
Fraction Limit:	0.000%
Background width:	average of three points.

TestAmerica Spectrum name: 7_20140905005_BGLong.An1

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 17 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.0637

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.59	378.	10.78	1.09	8.125E-02	46.54	4.250	2.541E+00	PB210
63.32	506.	8.53	1.44	1.229E-01	63.29	3.810	2.502E+00	TH234
92.70	692.	7.05	1.45	1.861E-01	92.59	5.584	1.541E+00	TH234
					93.35	5.561	1.545E+00	AC228
185.87	317.	13.51	1.40	1.632E-01	185.72	54.000	8.321E-02	U235
					185.99	3.280	1.371E+00	Ra226
609.22	102.	24.56	0.56	5.309E-02	609.31	46.090	9.602E-02	BI214
1460.63	102.	16.33	1.10	1.997E-02	1460.83	10.670	1.112E+00	K40

No unknown peaks passed sensitivity test.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.91	46.59	368.	378.	0.009	10.78	1.089s
TH-234	252.84	63.32	354.	506.	0.012	8.53	1.438s
TH-234	370.37	92.70	405.	692.	0.016	7.05	1.446s
Ra-226	742.81	185.80	364.	290.	0.007	14.67	1.363s
BI-214	2436.60	609.22	116.	102.	0.002	24.56	0.556s
K-40	5842.21	1460.63	25.	102.	0.002	16.33	1.100s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS		COMMENTS
K-40	N	1.1119E+00				4.66E+11		
			1460.83	1.112E+00	?(	2.809E-01	1.63E+01 1.07E+01	G
PB-210	N	2.5414E+00				8.14E+03		
			46.54	2.541E+00	*(	6.180E-01	1.08E+01 4.25E+00	G
BI-214	N	9.6020E-02				5.84E+05		
			609.31	9.602E-02	(	4.994E-02	2.46E+01 4.61E+01	G
			1120.29	0.000E+00	%	2.073E-01	5.13E+01 1.51E+01	G
			1764.49	0.000E+00	%	2.084E-01	1.47E+02 1.54E+01	G
TH-234	N	2.5016E+00				1.63E+12		
			63.29	2.502E+00	*(	4.471E-01	8.53E+00 3.81E+00	G
			92.59	1.541E+00	-	2.151E-01	7.05E+00 5.58E+00	G
Ra-226		1.2534E+00				5.84E+05		
			185.99	1.253E+00	*(	3.963E-01	1.47E+01 3.28E+00	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product
N - Naturally Occurring Isotope
P - Photon Reaction

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay
S - Single-Escape
D - Double-Escape

C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	<	1.7375E-01		
NA-22	<	4.3456E-02		
K-40	#	1.1119E+00	1.6326E+01%	2.809E-01
Sc-46	<	3.0938E-02		
CR-51	<	1.4159E-01		
MN-54	<	1.4150E-02		
FE-59	<	3.5495E-02		
Co-56	<	1.7005E-02		
CO-57	<	5.4704E-03		
CO-58	<	1.4432E-02		
CO-60	<	1.3105E-02		
ZN-65	<	5.5710E-02		
NB-94	<	1.0096E-02		
ZR-95	<	1.7457E-02		
NB-95	<	3.1504E-02		
RU-103	<	1.7185E-02		
RH-106	<	2.6933E-01		
AG-108M	<	1.6941E-02		
AG-110M	<	3.7637E-02		
SN-113	<	3.3239E-02		
SB-124	<	1.6568E-02		
SB-125	<	5.5501E-02		
I-131	<	1.2909E-02		
BA-133	<	2.4163E-02		
CS-134	<	2.2901E-02		
CS-137	<	3.3454E-02		
CE-139	<	9.3333E-03		
Ba-140	<	9.9489E-02		
La-140	<	3.5108E-02		
CE-141	<	1.2756E-02		
CE-144	<	8.4200E-02		
PM-144	<	2.7879E-02		
EU-152	<	4.8954E-02		

EU-154	<	2.5025E-01			
EU-155	<	3.9240E-02			
HF-181	<	9.9073E-03			
Ta-182	<	7.6079E-02			
Hg-203	<	1.4085E-02			
TL-208	<	3.4134E-02			
pm-146	<	5.8844E-02			
y-88	<	1.4266E-02			
PB-210	#	2.5414E+00	1.0780E+01%		6.180E-01
PB-212	<	3.4932E-02			
PB-214	<	5.4941E-02			
BI-207	<	2.8761E-02			
BI-212	<	2.7519E-01			
BI-214		9.6020E-02	2.4557E+01%		4.994E-02
BI-210M	<	2.1727E-02			
RA-224	<	2.6515E-01			
AC-228	<	1.2834E-01			
TH-227	<	8.1748E-02			
TH-229	<	1.9390E-01			
TH-234	#	2.5016E+00	8.5340E+00%		4.471E-01
PA-231	<	4.3015E-01			
PA-233	<	1.7873E-02			
PA-234	<	3.0920E-02			
PA-234M	<	3.9452E+00			
Ra-226	#	1.2534E+00	1.4667E+01%		3.963E-01
U-235	<	9.1147E-02			
AM-241	<	4.7696E-02			
Np-237	<	6.9131E-02			

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (37.6 to 2000.1 keV) 7.504E+00 DPS

Test America
St. Louis
Background Check

Spectrum: 12_20140809001_BGLong
Acquired: 8/9/2014 9:27:41 AM
Detector: Ge12 S/N10034336
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.16	1.95	2.02	2.12	2.29	2.36	PASS

Analyst: Jody Watson Reviewer:

TestAmerica, Inc Spectrum name: 12_20140809001_BGLong.An1

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det12\12_20140809001_BGLong.An1

Acquisition information
Start time: 8/9/2014 9:27:41 AM
Live time: 43200
Real time: 43296
Dead time: 0.22 %
Detector ID: 12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_QC.Clb
12_QC-H_83725-334_060211

Energy Calibration
Created: 2/28/2012 1:26:42 PM
Zero offset: 0.049 keV
Gain: 0.250 keV/channel
Quadratic: -3.945E-08 keV/channel^2

Efficiency Calibration
Created: 6/3/2011 6:41:14 AM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.58keV)
Stop channel: 8000 (1999.36keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 22 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1578

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.52	754.	7.88	1.02	6.295E-02	46.54	4.250	6.517E+00	PB210
63.22	515.	11.54	1.14	8.559E-02	63.29	3.810	3.654E+00	TH234
74.89	219.	17.91	0.92	1.013E-01				
77.17	183.	20.47	0.92	1.044E-01				
92.64	752.	7.19	1.10	1.198E-01	92.59	5.584	2.602E+00	TH234
					93.35	5.561	2.610E+00	AC228
185.93	373.	13.22	1.07	1.067E-01	185.72	54.000	1.499E-01	U235
					185.99	3.280	2.470E+00	Ra226
238.48	332.	14.28	1.02	9.398E-02	238.63	43.300	1.892E-01	PB212
295.08	161.	23.22	1.74	8.027E-02	295.09	19.300	2.411E-01	PB214
351.88	265.	13.53	1.52	6.652E-02	351.93	37.600	2.450E-01	PB214
582.87	225.	16.23	1.55	4.296E-02	583.02	84.500	1.435E-01	TL208
609.55	212.	19.92	1.20	4.104E-02	609.31	46.090	2.596E-01	BI214
					610.30	5.750	2.085E+00	RU103
1000.59	59.	26.52	0.43	2.403E-02	1001.00	0.837	6.771E+00	PA234M
1120.16	79.	29.64	0.64	2.185E-02	1120.29	15.100	5.566E-01	BI214
					1120.55	99.987	8.408E-02	Sc46
1238.02	51.	28.15	1.92	2.000E-02	1238.28	66.070	8.915E-02	Co56
1460.70	159.	13.62	1.30	1.768E-02	1460.83	10.670	1.949E+00	K40
1764.26	86.	18.57	0.57	1.522E-02	1764.49	15.400	8.494E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
299.09	74.85	661.	219.	2.163E+03	17.91	0.917	-	D
308.21	77.13	609.	183.	1.751E+03	20.47	0.919	-	D
4951.19	1238.02	35.	97.	4.867E+03	17.26	0.614	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.73	46.52	722.	754.	0.017	7.88	1.017s
TH-234	252.48	63.22	788.	515.	0.012	11.54	1.137s
TH-234	370.05	92.64	620.	752.	0.017	7.19	1.104s
Ra-226	742.93	185.93	563.	373.	0.009	13.22	1.068s
PB-212	952.98	238.48	502.	332.	0.008	14.28	1.018s
PB-214	1179.27	295.08	339.	161.	0.004	23.22	1.741s
PB-214	1406.33	351.88	277.	265.	0.006	13.53	1.520s
TL-208	2329.99	582.87	208.	225.	0.005	16.23	1.551s
BI-214	2436.72	609.55	326.	212.	0.005	19.92	1.204
PA-234M	4001.01	1000.59	48.	59.	0.001	26.52	0.431s
BI-214	4479.48	1120.16	92.	79.	0.002	29.64	0.643s
K-40	5842.61	1460.70	43.	159.	0.004	13.62	1.299s
BI-214	7058.23	1764.26	29.	86.	0.002	18.57	0.572s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS		COMMENTS
K-40	N	1.9495E+00				4.66E+11		
			1460.83	1.949E+00	(	4.090E-01	1.36E+01 1.07E+01	G
TL-208	N	1.4349E-01				6.98E+02		
			583.02	1.435E-01	*(	4.459E-02	1.62E+01 8.45E+01	G
			277.28	0.000E+00	%	1.734E-01	1.00E+03 6.31E+00	G
			860.56	0.000E+00		4.958E-02	0.00E+00 1.24E+01	G
PB-210	N	6.5170E+00				8.14E+03		
			46.54	6.517E+00	(	1.107E+00	7.88E+00 4.25E+00	G

Nuclide		Ave activity	Energy	Activity	Code	Peak	MDA	Comments
PB-212	N	1.8922E-01				6.98E+02		
			238.63	1.892E-01	@(	6.093E-02	1.43E+01	4.33E+01 G
			300.03	0.000E+00		6.578E-02	0.00E+00	3.28E+00 GA
PB-214	N	2.4367E-01				5.84E+05		
			351.93	2.450E-01	*(	7.435E-02	1.35E+01	3.76E+01 G
			295.09	2.411E-01	(	1.322E-01	2.32E+01	1.93E+01 G
			242.00	0.000E+00	%	3.103E-01	4.36E+01	7.43E+00 GA
BI-214	N	2.5963E-01				5.84E+05		
			609.31	2.596E-01	(	1.062E-01	1.99E+01	4.61E+01 G
			1120.29	5.566E-01	+	3.321E-01	2.96E+01	1.51E+01 G
			1764.49	8.494E-01	+	2.746E-01	1.86E+01	1.54E+01 G
TH-234	N	3.6544E+00				1.63E+12		
			63.29	3.654E+00	*(	9.466E-01	1.15E+01	3.81E+00 G
			92.59	2.602E+00	-	4.108E-01	7.19E+00	5.58E+00 G
PA-234M	N	6.7710E+00				1.63E+12		
			1001.00	6.771E+00	(	4.034E+00	2.65E+01	8.37E-01 G
			766.41	0.000E+00	&	1.081E+01	3.71E+01	2.94E-01 G
Ra-226		2.4697E+00				5.84E+05		
			185.99	2.470E+00	@(	7.492E-01	1.32E+01	3.28E+00 G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went
    negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide
    failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the
    library energy centroid for positive identification.
P - Peakbackground subtraction
} - Peak is too close to another for the activity
    to be found directly.

Nuclide Codes:
T - Thermal Neutron Activation
F - Fast Neutron Activation
I - Fission Product

Peak Codes:
G - Gamma Ray
X - X-Ray
P - Positron Decay

N - Naturally Occurring Isotope
P - Photon Reaction
C - Charged Particle Reaction
M - No MDA Calculation
R - Coincidence Corrected
H - Halflife limit exceeded
S - Single-Escape
D - Double-Escape
K - Key Line
A - Not in Average
C - Coincidence Peak

- -

********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	<	2.2323E-01		
NA-22	<	1.4287E-02		
K-40		1.9495E+00	1.3623E+01%	4.090E-01
Sc-46	<	5.0513E-02		
CR-51	<	2.5187E-01		
MN-54	<	3.9264E-02		
FE-59	<	3.2148E-02		
Co-56	<	4.2839E-02		
CO-57	<	2.4598E-02		
CO-58	<	4.1742E-02		
CO-60	<	3.8421E-02		
ZN-65	<	1.0758E-01		
NB-94	<	1.9762E-02		
ZR-95	<	4.2804E-02		
NB-95	<	3.5304E-02		
RU-103	<	2.7486E-02		
RH-106	<	3.2084E-01		
AG-108M	<	3.1345E-02		
AG-110M	<	4.1161E-02		
SN-113	<	5.5716E-02		
SB-124	<	4.1722E-02		
SB-125	<	8.0504E-02		
I-131	<	3.1500E-02		
BA-133	<	3.0969E-02		
CS-134	<	4.3354E-02		
CS-137	<	4.8843E-02		
CE-139	<	2.8006E-02		
Ba-140	<	1.1699E-01		
La-140	<	3.4465E-02		
CE-141	<	3.9378E-02		
CE-144	<	1.3576E-01		

PM-144	<	4.2888E-02		
EU-152	<	8.8098E-02		
EU-154	<	4.4430E-01		
EU-155	<	7.1610E-02		
HF-181	<	4.9494E-02		
Ta-182	<	1.0934E-01		
Hg-203	<	3.5406E-02		
TL-208	#	1.4349E-01	1.6235E+01%	4.459E-02
pm-146	<	1.3994E-01		
y-88	<	4.9600E-02		
PB-210	#	6.5170E+00	7.8773E+00%	1.107E+00
PB-212	#	1.8922E-01	1.4281E+01%	6.093E-02
PB-214	#	2.4367E-01	1.3435E+01%	7.435E-02
BI-207	<	4.9857E-02		
BI-212	<	5.7233E-01		
BI-214		2.5963E-01	1.9925E+01%	1.062E-01
BI-210M	<	5.2531E-02		
RA-224	<	6.0612E-01		
AC-228	<	2.0918E-01		
TH-227	<	9.1877E-02		
TH-229	<	5.3845E-01		
TH-234	#	3.6544E+00	1.1537E+01%	9.466E-01
PA-231	<	9.3252E-01		
PA-233	<	6.7165E-02		
PA-234	<	6.7154E-02		
PA-234M		6.7710E+00	2.6522E+01%	4.034E+00
Ra-226	#	2.4697E+00	1.3222E+01%	7.492E-01
U-235	<	1.8363E-01		
AM-241	<	9.3948E-02		
Np-237	<	1.0125E-01		

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

S U M M A R Y

Total Activity (92.4 to 1999.4 keV) 2.220E+01 DPS

Test America
St. Louis
Background Check

Spectrum: 12_20140905007_BGLong
Acquired: 9/5/2014 5:50:49 PM
Detector: Ge12 S/N10034336
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.16	1.95	2.02	2.09	2.29	2.36	PASS

Analyst: Curtis Carey Reviewer:

TestAmerica, Inc Spectrum name: 12_20140905007_BGLong.An1

Sample description
Background Long PBC Count

Spectrum Filename: C:\User\SPC\Det12\12_20140905007_BGLong.An1

Acquisition information
Start time: 9/5/2014 5:50:49 PM
Live time: 43200
Real time: 43312
Dead time: 0.26 %
Detector ID: 12

Detector system
Ge12 S/N10034336

Calibration
Filename: 12_QC.Clb
12_QC-H_83725-334_060211

Energy Calibration
Created: 2/28/2012 1:26:42 PM
Zero offset: 0.049 keV
Gain: 0.250 keV/channel
Quadratic: -3.945E-08 keV/channel^2

Efficiency Calibration
Created: 6/3/2011 6:41:14 AM
Knee Energy: 0.00 keV
Above the Knee: Interpolative Uncertainty = 0.00 %
Below the Knee: Interpolative Uncertainty = 0.00 %

Library Files
Main analysis library: DET_Long Background PBC.lib
Library Match Width: 0.500
Peak stripping: Library based

Analysis parameters
Analysis engine: Env32 G53W4.25
Start channel: 150 (37.58keV)
Stop channel: 8000 (1999.36keV)
Peak rejection level: 30.000%
Peak search sensitivity: 3
Sample Size: 1.0000E+00
Activity scaling factor: 1.0000E+00/(1.0000E+00* 1.0000E+00) =
1.0000E+00
Detection limit method: Reg. Guide 4.16 Method
Random error: 4.0000000E+00
Systematic error: 4.0000000E+00
Fraction Limit: 0.000%
Background width: average of three points.

Half lives decay limit: 12.000
Activity range factor: 2.000
Min. step backg. energy 0.000
Multiplet shift channel 2.000

Corrections	Status	Comments
Decay correct to date:	NO	
Decay during acquisition:	NO	
Decay during collection:	NO	
True coincidence correction:	NO	
Peaked background correction:	NO	
Absorption (Internal):	NO	
Geometry correction:	NO	
Random summing:	NO	

total peaks alloc. 29 cutoff: 5.00E+01%
Energy Calibration
Normalized diff: 0.1746

***** S U M M A R Y O F P E A K S I N R A N G E *****

Peak Energy	Area	Uncert	FWHM	Corrctn Factor	Nuclide Energy	Brnch. Ratio	Act. DPS	Nuc
46.53	730.	8.82	0.95	6.296E-02	46.54	4.250	6.312E+00	PB210
63.25	548.	10.21	1.18	8.562E-02	63.29	3.810	3.886E+00	TH234
74.89	194.	20.21	0.92	1.014E-01				
77.52	180.	20.11	0.92	1.049E-01				
92.64	774.	7.47	1.41	1.198E-01	92.59	5.584	2.679E+00	TH234
					93.35	5.561	2.688E+00	AC228
143.97	173.	28.63	0.83	1.177E-01	143.79	10.960	3.104E-01	U235
185.65	488.	10.40	1.38	1.068E-01	185.72	54.000	1.960E-01	U235
					185.99	3.280	3.228E+00	Ra226
238.60	312.	13.98	1.02	9.395E-02	238.63	43.300	1.777E-01	PB212
294.99	145.	29.46	0.91	8.029E-02	295.09	19.300	2.167E-01	PB214
351.88	261.	15.50	1.13	6.652E-02	351.93	37.600	2.413E-01	PB214
510.84	1206.	5.07	2.16	4.821E-02	511.86	20.000	2.900E+00	RH106
568.83	88.	27.26	0.33	4.393E-02	569.70	97.740	4.718E-02	BI207
					569.47	8.200	5.621E-01	PA234
583.60	181.	18.72	1.16	4.291E-02	583.02	84.500	1.152E-01	TL208
609.77	267.	15.98	0.97	4.101E-02	609.31	46.090	3.263E-01	BI214
					610.30	5.750	2.620E+00	RU103
661.89	105.	22.80	0.61	3.723E-02	661.66	85.210	7.661E-02	CS137
1120.15	120.	19.96	2.34	2.185E-02	1120.29	15.100	8.396E-01	BI214
					1120.55	99.987	1.268E-01	Sc46
					1121.30	34.900	3.636E-01	Ta182
1460.47	136.	15.30	0.39	1.768E-02	1460.83	10.670	1.669E+00	K40
1763.97	82.	20.15	1.07	1.522E-02	1764.49	15.400	8.149E-01	BI214

********** U N I D E N T I F I E D P E A K S U M M A R Y **********

Peak Centroid Channel	Energy	Background Counts	Net Area Counts	Efficiency * Area	Uncert 1 Sigma %	FWHM keV	Suspected Nuclide	
299.02	74.87	640.	214.	2.111E+03	21.59	1.141	-	s
309.53	77.50	574.	189.	1.799E+03	23.72	0.926	-	s
2041.95	510.84	448.	1206.	2.502E+04	5.07	2.157	-	s

s - Peak fails shape tests.
D - Peak area deconvoluted.
L - Peak written from unknown list.
C - Area < Critical level.

This section based on library: DET_Long Background PBC.lib

********** I D E N T I F I E D P E A K S U M M A R Y **********

Nuclide	Peak Channel	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	FWHM keV
PB-210	185.75	46.53	820.	730.	0.017	8.82	0.949s
TH-234	252.57	63.25	704.	548.	0.013	10.21	1.183s
TH-234	370.06	92.64	672.	774.	0.018	7.47	1.409s
U-235	575.21	143.97	595.	173.	0.004	28.63	0.833s
U-235	742.09	185.72	619.	376.	0.009	9.94	1.022D
PB-212	953.46	238.60	435.	312.	0.007	13.98	1.020s
PB-214	1178.90	294.99	420.	145.	0.003	29.46	0.907s
PB-214	1406.36	351.88	329.	261.	0.006	15.50	1.125s
BI-207	2273.84	568.83	138.	88.	0.002	27.26	0.333s
TL-208	2332.94	583.60	199.	181.	0.004	18.72	1.160s
BI-214	2437.22	609.68	292.	253.	0.006	16.56	0.969s
CS-137	2646.02	661.89	117.	105.	0.002	22.80	0.606s
BI-214	4479.43	1120.15	77.	120.	0.003	19.96	2.344s
K-40	5841.69	1460.47	54.	136.	0.003	15.30	0.388s
BI-214	7057.05	1763.97	38.	82.	0.002	20.15	1.072s

s - Peak fails shape tests.
D - Peak area deconvoluted.
A Derived peak area.

***** S U M M A R Y O F L I B R A R Y P E A K U S A G E *****

Nuclide Name	Code	Average Activity DPS	Peak Energy keV	Peak Activity DPS	Code	MDA Value DPS	COMMENTS
K-40	N	1.6692E+00				4.66E+11	
			1460.83	1.669E+00	(	4.536E-01 1.53E+01	1.07E+01 G
CS-137	I	7.6610E-02				1.10E+04	
			661.66	7.661E-02	*(	3.875E-02 2.28E+01	8.52E+01 G
TL-208	N	1.1522E-01				6.98E+02	
			583.02	1.152E-01	*(	4.369E-02 1.87E+01	8.45E+01 G
			277.28	0.000E+00		3.197E-02 0.00E+00	6.31E+00 G
			860.56	0.000E+00		4.958E-02 0.00E+00	1.24E+01 G

Nuclide		Ave activity	Energy	Activity	Code	Peak MDA	Comments
PB-210	N	6.3123E+00				8.14E+03	
			46.54	6.312E+00	(	1.178E+00 8.82E+00 4.25E+00	G
PB-212	N	1.7775E-01				6.98E+02	
			238.63	1.777E-01	(	5.683E-02 1.40E+01 4.33E+01	G
			300.03	0.000E+00		6.578E-02 0.00E+00 3.28E+00	GA
PB-214	N	2.3294E-01				5.84E+05	
			351.93	2.413E-01	*(	8.079E-02 1.55E+01 3.76E+01	G
			295.09	2.167E-01	*(	1.467E-01 2.95E+01 1.93E+01	G
			242.00	0.000E+00	%	2.613E-01 3.35E+01 7.43E+00	GA
BI-207	C	4.7178E-02				1.18E+04	
			569.70	4.718E-02	&(	3.092E-02 2.73E+01 9.77E+01	G
			1063.66	0.000E+00	%	3.947E-02 3.35E+01 7.45E+01	G
BI-214	N	3.1000E-01				5.84E+05	
			609.31	3.100E-01	*(	1.007E-01 1.66E+01 4.61E+01	G
			1120.29	8.396E-01	+	3.065E-01 2.00E+01 1.51E+01	G
			1764.49	8.149E-01	+	3.086E-01 2.01E+01 1.54E+01	G
TH-234	N	3.8860E+00				1.63E+12	
			63.29	3.886E+00	*(	8.960E-01 1.02E+01 3.81E+00	G
			92.59	2.679E+00	-	4.271E-01 7.47E+00 5.58E+00	G
U-235	N	3.1039E-01				2.57E+11	
			185.72	1.511E-01	}	4.764E-02 9.94E+00 5.40E+01	GA
			143.79	3.104E-01	*(	2.088E-01 2.86E+01 1.10E+01	G
			205.33	0.000E+00		3.338E-02 0.00E+00 5.01E+00	G
			163.38	0.000E+00	%	3.515E-01 2.05E+02 5.08E+00	G

(- This peak used in the nuclide activity average.

* - Peak is too wide, but only one peak in library.
! - Peak is part of a multiplet and this area went
    negative during deconvolution.
? - Peak is too narrow.
@ - Peak is too wide at FW25M, but ok at FWHM.
% - Peak fails sensitivity test.
$ - Peak identified, but first peak of this nuclide
    failed one or more qualification tests.
+ - Peak activity higher than counting uncertainty range.
- - Peak activity lower than counting uncertainty range.
= - Peak outside analysis energy range.
& - Calculated peak centroid is not close enough to the
    library energy centroid for positive identification.
P - Peakbackground subtraction

} - Peak is too close to another for the activity
to be found directly.

Nuclide Codes:	Peak Codes:
T - Thermal Neutron Activation	G - Gamma Ray
F - Fast Neutron Activation	X - X-Ray
I - Fission Product	P - Positron Decay
N - Naturally Occurring Isotope	S - Single-Escape
P - Photon Reaction	D - Double-Escape
C - Charged Particle Reaction	K - Key Line
M - No MDA Calculation	A - Not in Average
R - Coincidence Corrected	C - Coincidence Peak
H - Halflife limit exceeded	

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********** D I S C A R D E D I S O T O P E P E A K S **********

Nuclide	Centroid Energy	Background Counts	Net Area Counts	Intensity Cts/Sec	Uncert 1 Sigma %	Activity

P - Peakbackground subtraction

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity DPS	Uncertainty 1 Sigma Counting	MDA
BE-7	<	3.3710E-01		
NA-22	<	3.3021E-02		
K-40		1.6692E+00	1.5300E+01%	4.536E-01
Sc-46	<	5.1889E-02		
CR-51	<	1.6935E-01		
MN-54	<	1.5610E-02		
FE-59	<	4.9613E-02		
Co-56	<	3.5817E-02		
CO-57	<	2.0698E-02		
CO-58	<	1.5581E-02		
CO-60	<	6.2708E-02		
ZN-65	<	3.6384E-02		
NB-94	<	1.8347E-02		
ZR-95	<	9.0092E-02		
NB-95	<	3.2490E-02		
RU-103	<	2.9832E-02		
RH-106	<	2.2369E-01		
AG-108M	<	2.8517E-02		
AG-110M	<	4.5079E-02		
SN-113	<	4.9596E-02		
SB-124	<	4.2497E-02		
SB-125	<	9.9152E-02		
I-131	<	2.1909E-02		
BA-133	<	3.4039E-02		
CS-134	<	4.0345E-02		

CS-137 #	7.6610E-02	2.2798E+01%		3.875E-02
CE-139 <	2.0845E-02			
Ba-140 <	1.5015E-01			
La-140 <	5.0219E-02			
CE-141 <	4.4297E-02			
CE-144 <	1.0082E-01			
PM-144 <	4.1612E-02			
EU-152 <	4.4288E-02			
EU-154 <	1.5649E-01			
EU-155 <	9.9905E-02			
HF-181 <	4.4746E-02			
Ta-182 <	1.9229E-01			
Hg-203 <	1.8516E-02			
TL-208 #	1.1522E-01	1.8722E+01%		4.369E-02
pm-146 <	1.1001E-01			
y-88 <	5.1654E-02			
PB-210 #	6.3123E+00	8.8238E+00%		1.178E+00
PB-212 #	1.7775E-01	1.3978E+01%		5.683E-02
PB-214 #	2.3294E-01	1.5502E+01%		8.079E-02
BI-207 #	4.7178E-02	2.7255E+01%		3.092E-02
BI-212 <	5.6588E-01			
BI-214 #	3.1000E-01	1.6561E+01%		1.007E-01
BI-210M <	5.7756E-02			
RA-224 <	6.5000E-01			
AC-228 <	2.4383E-01			
TH-227 <	1.1704E-01			
TH-229 <	4.9895E-01			
TH-234 #	3.8860E+00	1.0208E+01%		8.960E-01
PA-231 <	5.7639E-01			
PA-233 <	7.6301E-02			
PA-234 <	1.1266E-01			
PA-234M <	5.3429E+00			
Ra-226 <	8.4327E-01			
U-235	3.1039E-01	2.8634E+01%		2.088E-01
AM-241 <	9.1181E-02			
Np-237 <	1.6609E-01			

  # - All peaks for activity calculation had bad shape.
  * - Activity omitted from total
  & - Activity omitted from total and all peaks had bad shape.
  < - MDA value printed.
  A - Activity printed, but activity < MDA.
  B - Activity < MDA and failed test.
  C - Area < Critical level.
  F - Failed fraction or key line test.
  H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (205.2 to 1999.4 keV) 1.314E+01 DPS

Test America
St. Louis
Background Check

Spectrum: 14_20140809001_BGLong
Acquired: 8/9/2014 9:22:30 AM
Detector: Ge14 SN/11080670
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.91	1.75	1.80	1.82	2.01	2.06	PASS

Analyst: Jody Watson Reviewer:

Test America
St. Louis
Background Check

Spectrum: 14_20140905006_BGLong
Acquired: 9/5/2014 5:49:12 PM
Detector: Ge14 SN/11080670
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	1.91	1.75	1.80	1.80	2.01	2.06	Low OOT

Analyst: Curtis Carey Reviewer:

Test America
St. Louis
Background Check

Spectrum: 17_20140809001_BGLong
Acquired: 8/9/2014 9:24:01 AM
Detector: Ge17 SN/11080671
Background Evaluation Criteria:
1) Place instrument out of service if Countrate exceeds Control Limits.
2) Investigate high countrate and take corrective action as necessary if Countrate exceeds Tolerance Limits.

	Target	L_Ctrl	L_Tol	Measured	H_Tol	H_Ctrl	Results
Bkgd Countrate	2.47	2.30	2.35	2.35	2.58	2.63	PASS

Analyst: Jody Watson Reviewer:

Run Logs

Gamma Spectroscopy Run Log

Detector: GV4

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/05/12 21:42		IC 160-12292/1		12292			JLW
03/08/12 03:13		ICV 160-12292/2		12292			JLW
02/27/13 16:17		ACVTOP 160-38300/1		38300			JLW
08/09/14 09:24		ICB 160-136893/1		136893			RTM
08/26/14 00:01		CCB 160-140269/1		140269			SMP
08/26/14 01:05		CCV 160-140269/2		140269			
08/26/14 01:27		CCV 160-140269/3		140269			SMP
08/26/14 09:39	30	ZZZZZ		140269			
08/26/14 10:24	30	ZZZZZ		140269			
08/26/14 11:33	120	680-102600-6	SD-278-SS	140269	140177	GA-01-R	SMP
08/26/14 14:21	30	ZZZZZ		140269			
08/26/14 15:09	30	ZZZZZ		140269			
08/26/14 16:13	30	ZZZZZ		140269			
08/26/14 17:00	30	ZZZZZ		140269			
08/26/14 19:06	30	ZZZZZ		140269			
08/26/14 19:48	30	ZZZZZ		140269			
08/26/14 20:32	30	ZZZZZ		140269			
08/26/14 21:10	30	ZZZZZ		140269			
09/05/14 17:56		ICB 160-142444/1		142444			JLW
09/08/14 06:50		CCV 160-142442/1		142442			
09/08/14 07:10		CCV 160-142442/2		142442			SMP
09/08/14 07:32		CCB 160-142442/3		142442			SMP
09/08/14 10:44	120	MB 160-138233/1-A		142442	138233	GA-01-R	SMP
09/08/14 13:04	30	ZZZZZ		142442			
09/08/14 13:40	30	ZZZZZ		142442			
09/08/14 14:22	30	ZZZZZ		142442			
09/08/14 15:01		ZZZZZ		142442			
09/08/14 17:41	30	ZZZZZ		142442			
09/08/14 18:15	30	ZZZZZ		142442			
09/08/14 19:11	30	ZZZZZ		142442			

Detector: GV7

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/07/12 11:02		IC 160-12300/1		12300			JLW
03/07/12 20:19		ICV 160-12300/2		12300			JLW
03/26/12 11:32		IC 160-12301/1		12301			JLW
04/12/12 19:52		ICV 160-12301/2		12301			JLW
01/28/14 18:43		ACVTOP 160-101797/1		101797			JLW
08/09/14 09:24		ICB 160-136895/1		136895			RTM
08/26/14 00:01		CCV 160-140271/1		140271			
08/26/14 00:23		CCV 160-140271/2		140271			SMP
08/26/14 01:06		CCB 160-140271/3		140271			SMP
08/26/14 09:34	60	ZZZZZ		140271			
08/26/14 10:49	30	ZZZZZ		140271			
08/26/14 11:39	120	LCS 160-140177/2-A		140271	140177	GA-01-R	SMP
08/26/14 14:15	30	ZZZZZ		140271			
08/26/14 15:01	30	ZZZZZ		140271			
08/26/14 15:54	30	ZZZZZ		140271			
08/26/14 19:06	30	ZZZZZ		140271			
08/26/14 19:49	90	ZZZZZ		140271			
08/26/14 21:52	30	ZZZZZ		140271			
09/05/14 17:58		ICB 160-142451/1		142451			JLW

Gamma Spectroscopy Run Log

Detector: GV7 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
09/08/14 06:49		CCB 160-142447/1		142447			EMN
09/08/14 07:33		CCV 160-142447/2		142447			
09/08/14 07:55		CCV 160-142447/3		142447			EMN
09/08/14 10:51	60	ZZZZZ		142447			
09/08/14 12:28	120	LCS 160-138233/2-A		142447	138233	GA-01-R	EMN
09/08/14 14:34	120	680-102600-6 DU	SD-278-SS DU	142447	138233	GA-01-R	EMN
09/08/14 17:33	120	680-102600-8	SD-278-02	142447	138233	GA-01-R	EMN

Detector: GV12

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
09/01/11 19:20		IC 160-45527/1		45527			JLW
09/06/11 07:27		ICV 160-45527/2		45527			JLW
01/28/14 14:18		ACVTOP 160-101795/1		101795			JLW
08/09/14 09:27		ICB 160-136897/1		136897			RTM
08/26/14 00:03		CCB 160-140267/1		140267			SMP
08/26/14 01:08		CCV 160-140267/2		140267			
08/26/14 01:28		CCV 160-140267/3		140267			SMP
08/26/14 09:30	60	ZZZZZ		140267			
08/26/14 10:41	30	ZZZZZ		140267			
08/26/14 11:36	120	MB 160-140177/1-A		140267	140177	GA-01-R	SMP
08/26/14 13:40	120	680-102600-6 DU	SD-278-SS DU	140267	140177	GA-01-R	SMP
08/26/14 15:52	30	ZZZZZ		140267			
08/26/14 19:04	30	ZZZZZ		140267			
08/26/14 19:46	30	ZZZZZ		140267			
08/26/14 20:30	30	ZZZZZ		140267			
08/26/14 21:09	30	ZZZZZ		140267			
08/26/14 21:51	120	ZZZZZ		140267			
09/05/14 17:50		ICB 160-142440/1		142440			JLW
09/08/14 07:37		CCB 160-142436/1		142436			EMN
09/08/14 08:15		CCV 160-142436/2		142436			
09/08/14 08:36		CCV 160-142436/3		142436			EMN
09/08/14 10:42	60	ZZZZZ		142436			
09/08/14 12:05	120	680-102600-6	SD-278-SS	142436	138233	GA-01-R	EMN
09/08/14 14:16	30	ZZZZZ		142436			
09/08/14 14:48	30	ZZZZZ		142436			
09/08/14 15:29		ZZZZZ		142436			
09/08/14 16:07		ZZZZZ		142436			
09/08/14 17:17	30	ZZZZZ		142436			
09/08/14 18:04	120	ZZZZZ		142436			

Detector: GV14

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/13/12 11:03		IC 160-12356/1		12356			JLW
03/16/12 10:15		ICV 160-12356/2		12356			JLW
01/24/14 08:37		ACVTOP 160-101066/1		101066			JLW
08/09/14 09:22		ICB 160-136899/1		136899			RTM
08/26/14 00:02		CCV 160-140264/1		140264			
08/26/14 00:23		CCV 160-140264/2		140264			SMP
08/26/14 01:07		CCB 160-140264/3		140264			SMP
08/26/14 09:30	60	ZZZZZ		140264			
08/26/14 10:43	30	ZZZZZ		140264			

Gamma Spectroscopy Run Log

Detector: GV14 (Continued)

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
08/26/14 11:29	120	680-102600-8	SD-278-02	140264	140177	GA-01-R	SMP
08/26/14 14:09	30	ZZZZZ		140264			
08/26/14 14:59	30	ZZZZZ		140264			
08/26/14 15:51	30	ZZZZZ		140264			
08/26/14 19:03	30	ZZZZZ		140264			
08/26/14 19:45	30	ZZZZZ		140264			
08/26/14 20:29	30	ZZZZZ		140264			
08/26/14 21:07	30	ZZZZZ		140264			
08/26/14 21:50	30	ZZZZZ		140264			
08/26/14 23:00	30	ZZZZZ		140264			
09/05/14 17:49		ICB 160-142433/1		142433			JLW
09/10/14 00:03		CCV 160-143250/1		143250			
09/10/14 00:24		CCV 160-143250/2		143250			SMP
09/10/14 00:45		CCB 160-143250/3		143250			SMP
09/10/14 01:56	120	680-102600-7	SD-278-01	143250	138233	GA-01-R	SMP
09/10/14 07:02	30	ZZZZZ		143250			
09/10/14 08:33	120	ZZZZZ		143250			
09/10/14 10:53	60	ZZZZZ		143250			
09/10/14 12:19	60	ZZZZZ		143250			
09/10/14 14:04	30	ZZZZZ		143250			
09/10/14 16:25	45	ZZZZZ		143250			
09/10/14 19:00	30	ZZZZZ		143250			
09/10/14 19:38		ZZZZZ		143250			
09/10/14 21:46	30	ZZZZZ		143250			
09/10/14 22:19	60	ZZZZZ		143250			

Detector: GV17

Analysis Date	Count Minutes	Lab Sample ID	Client Sample ID	Analysis Batch	Prep Batch	Method	Analyst Initials
03/27/12 15:45		IC 160-12388/1		12388			JLW
04/12/12 19:55		ICV 160-12388/2		12388			JLW
01/23/14 11:17		ACVTOP 160-100896/1		100896			JLW
08/09/14 09:24		ICB 160-136901/1		136901			RTM
08/26/14 00:03		CCV 160-140266/1		140266			
08/26/14 00:23		CCV 160-140266/2		140266			
08/26/14 00:44		CCV 160-140266/3		140266			SMP
08/26/14 01:08		CCB 160-140266/4		140266			SMP
08/26/14 09:32	60	ZZZZZ		140266			
08/26/14 10:42	30	ZZZZZ		140266			
08/26/14 11:28	120	680-102600-7	SD-278-01	140266	140177	GA-01-R	SMP
08/26/14 14:06	30	ZZZZZ		140266			
08/26/14 15:00	30	ZZZZZ		140266			
08/26/14 15:49	30	ZZZZZ		140266			
08/26/14 16:28	30	ZZZZZ		140266			
08/26/14 19:04	30	ZZZZZ		140266			
08/26/14 19:47	30	ZZZZZ		140266			
08/26/14 20:31	30	ZZZZZ		140266			
08/26/14 21:09	30	ZZZZZ		140266			
08/26/14 21:52	30	ZZZZZ		140266			

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.43
Client Contact: Mike Martin	Phone: (703) 342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page [redacted] 1 of 1
Company: Tetra Tech, Inc.		Analysis Requested		Job #:
Address: 20251 Century Blvd Suite 200	Due Date Requested:			Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
City: Germantown	TAT Requested (days): Standard			
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			Other:
Email: MIchael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-278-SS	6/20/14	1000	C	Solid				X				
SD-278-01	↓	1005	C	Solid				X				
SD-278-02		1010	C	Solid				X				
SD-278-03		1015	C	Solid				X				
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements: 680 - 102600

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
[signature]	6/20/14 - 1100	TT	[signature]	6/23/14 09:00	TA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:
		24.2 C

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 680-102600-4

SDG Number: 680102600-1

Job Description: Sediments

For:
Tetra Tech, Inc.
20251 Century Blvd
Suite 200
Germantown, MD 20874

Attention: Mike Martin



Approved for release.
Jerry A Lanier
Project Manager I
9/12/2014 4:53 PM

Jerry A Lanier, Project Manager I
5102 LaRoche Avenue, Savannah, GA, 31404
(912)354-7858 e.3410
jerry.lanier@testamericainc.com

09/12/2014
Revision: 1

cc: Samantha Brenner
Keir Craigie
Dan Drzik
Mr. Fred Kolberg
Ms. Amy Thomson

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

Savannah Certifications and ID #s: A2LA: 0399.01; AL: 41450; ARDEQ: 88-0692; ARDOH; AZ: AZ0741; CA: 03217CA; CO; CT: PH0161; DE; FL: E87052; GA: 803; Guam; HI; IL: 200022; IN: C-GA-02; IA: 353; KS: E-10322; KY EPPC: 90084; KY UST; LA DEQ: 30690; LA DHH: LA080008; ME: 2008022; MD: 250; MA: M-GA006; MI: 9925; MS; NFESC: 249; NV: GA00006; NJ: GA769; NM; NY: 10842; NC DWQ: 269; NC DHHS: 13701; PA: 68-00474; PR: GA00006; RI: LAO00244; SC: 98001001; TN: TN0296; TX: T104704185; USEPA: GA00006; VT: VT-87052; VA: 00302; WA; WV DEP: 094; WV DHHR: 9950 C; WI DNR: 999819810; WY/EPAR8: 8TMS-Q

Table of Contents

Cover Title Page 1

Data Summaries 4

Definitions 4

Case Narrative 5

Client Sample Results 6

Default Detection Limits 9

QC Sample Results 10

QC Association 12

Chronicle 13

Certification Summary 15

Method Summary 17

Sample Summary 18

Reagent Traceability 19

COAs 27

Inorganic Sample Data 51

Metals Data 51

Met Cover Page 52

Met Sample Data 53

Met QC Data 57

Met ICV/CCV 57

Met CRQL 60

Met Blanks 61

Met ICSA/ICSAB 63

Met MS/MSD/PDS 64

Met LCS/LCSD 66

Met Serial Dilution 67

Table of Contents

Met MDL 68

Met Linear Ranges 71

Met Preparation Log 72

Met Analysis Run Log 73

Met ICP/MS Int Stds 78

Met Raw Data 79

Met Prep Data 217

Subcontracted Data 218

Shipping and Receiving Documents 219

Client Chain of Custody 220

Sample Receipt Checklist 221

Qualifiers

Metals

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Sediments

Report Number: 680-102600-4

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT
The samples were received on 06/23/2014. The temperature of the coolers at receipt was 24.2 C.

A revised report was necessary to correct the final volume that was used to calculate the Uranium data.

TOTAL URANIUM
Samples SD-278-SS (680-102600-6), SD-278-01 (680-102600-7), SD-278-02 (680-102600-8) and SD-278-03 (680-102600-9) were analyzed for Total Uranium in accordance with EPA SW-846 6020A. The samples were analyzed on 08/22/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM
Samples SD-278-SS (680-102600-6), SD-278-01 (680-102600-7), SD-278-02 (680-102600-8) and SD-278-03 (680-102600-9) were analyzed for Isotopic Uranium in accordance with EPA SW-846 6020A. The samples were prepared on 08/19/2014 and analyzed on 08/21/2014.

The instrument blank contained uranium 233 greater than the reporting limit (RL), and were not reanalyzed because the samples were all non detect for the analyte. The data have been qualified and reported. (ICB 160-139525/10)

The presence of the '4' qualifier indicates analytes where the concentration in the unspiked sample exceeded four times the spiking amount.

Refer to the QC report for details.

Samples SD-278-SS (680-102600-6)[5X], SD-278-01 (680-102600-7)[5X], SD-278-02 (680-102600-8)[5X] and SD-278-03 (680-102600-9)[5X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM PERCENTAGE
Samples SD-278-SS (680-102600-6), SD-278-01 (680-102600-7), SD-278-02 (680-102600-8) and SD-278-03 (680-102600-9) were analyzed for Isotopic Uranium Percentage in accordance with EPA SW-846 6020A. The samples were analyzed on 08/22/2014.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ISOTOPIC URANIUM ACTIVITY
Samples SD-278-SS (680-102600-6), SD-278-01 (680-102600-7), SD-278-02 (680-102600-8) and SD-278-03 (680-102600-9) were analyzed for Isotopic Uranium Activity in accordance with EPA SW-846 6020A. The samples were prepared on 08/19/2014 and analyzed on 08/21/2014.

Samples SD-278-SS (680-102600-6)[5X], SD-278-01 (680-102600-7)[5X], SD-278-02 (680-102600-8)[5X] and SD-278-03 (680-102600-9)[5X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Client Sample ID: SD-278-SS

Lab Sample ID: 680-102600-6

Date Collected: 06/20/14 10:00

Matrix: Solid

Date Received: 06/23/14 09:00

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	0.0036	U	0.012	0.0036	mg/Kg		08/19/14 10:40	08/21/14 17:38	5
U-234	0.00073	U	0.012	0.00073	mg/Kg		08/19/14 10:40	08/21/14 17:38	5
U-235	**0.019**		0.012	0.0049	mg/Kg		08/19/14 10:40	08/21/14 17:38	5
U-236	0.00097	U	0.012	0.00097	mg/Kg		08/19/14 10:40	08/21/14 17:38	5
U-238	**2.5**		0.012	0.00073	mg/Kg		08/19/14 10:40	08/21/14 17:38	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**2.5**		0.0050	0.00030	mg/Kg			08/22/14 14:31	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-29.3	U	0.294	2.71	117	35.1	pCi/g	08/19/14 10:40	08/21/14 17:38	5
U-234	1.33	U	0.629	0.641	75.5	4.53	pCi/g	08/19/14 10:40	08/21/14 17:38	5
U-235	**0.0411**		0.00158	0.00410	0.0262	0.0107	pCi/g	08/19/14 10:40	08/21/14 17:38	5
U-236	0.000659	U	0.00211	0.00211	0.785	0.0629	pCi/g	08/19/14 10:40	08/21/14 17:38	5
U-238	**0.857**		0.00821	0.0792	0.00408	0.000245	pCi/g	08/19/14 10:40	08/21/14 17:38	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.754**						%		08/22/14 14:30	1

Client Sample ID: SD-278-01

Lab Sample ID: 680-102600-7

Date Collected: 06/20/14 10:05

Matrix: Solid

Date Received: 06/23/14 09:00

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	0.0034	U	0.011	0.0034	mg/Kg		08/19/14 10:40	08/21/14 17:57	5
U-234	0.00069	U	0.011	0.00069	mg/Kg		08/19/14 10:40	08/21/14 17:57	5
U-235	**0.015**		0.011	0.0046	mg/Kg		08/19/14 10:40	08/21/14 17:57	5
U-236	0.00091	U	0.011	0.00091	mg/Kg		08/19/14 10:40	08/21/14 17:57	5
U-238	**2.1**		0.011	0.00069	mg/Kg		08/19/14 10:40	08/21/14 17:57	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	**2.1**		0.0050	0.00030	mg/Kg			08/22/14 14:31	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-27.9	U	0.482	2.61	110	33.0	pCi/g	08/19/14 10:40	08/21/14 17:57	5
U-234	1.03	U	0.483	0.493	71.0	4.26	pCi/g	08/19/14 10:40	08/21/14 17:57	5
U-235	**0.0331**		0.00414	0.00514	0.0247	0.0100	pCi/g	08/19/14 10:40	08/21/14 17:57	5
U-236	-0.0000295	U	0.00111	0.00111	0.738	0.0591	pCi/g	08/19/14 10:40	08/21/14 17:57	5
U-238	**0.716**		0.0892	0.111	0.00384	0.000231	pCi/g	08/19/14 10:40	08/21/14 17:57	5

Client Sample ID: SD-278-01

Lab Sample ID: 680-102600-7

Date Collected: 06/20/14 10:05

Matrix: Solid

Date Received: 06/23/14 09:00

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.709						%		08/22/14 14:30	1

Client Sample ID: SD-278-02

Lab Sample ID: 680-102600-8

Date Collected: 06/20/14 10:10

Matrix: Solid

Date Received: 06/23/14 09:00

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	0.0034	U	0.011	0.0034	mg/Kg		08/19/14 10:40	08/21/14 18:02	5
U-234	0.00069	U	0.011	0.00069	mg/Kg		08/19/14 10:40	08/21/14 18:02	5
U-235	0.019		0.011	0.0046	mg/Kg		08/19/14 10:40	08/21/14 18:02	5
U-236	0.00091	U	0.011	0.00091	mg/Kg		08/19/14 10:40	08/21/14 18:02	5
U-238	2.6		0.011	0.00069	mg/Kg		08/19/14 10:40	08/21/14 18:02	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	2.6		0.0050	0.00030	mg/Kg			08/22/14 14:31	1

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-28.0	U	0.859	2.72	110	33.0	pCi/g	08/19/14 10:40	08/21/14 18:02	5
U-234	1.08	U	0.414	0.426	71.1	4.27	pCi/g	08/19/14 10:40	08/21/14 18:02	5
U-235	0.0416		0.00323	0.00501	0.0247	0.0101	pCi/g	08/19/14 10:40	08/21/14 18:02	5
U-236	-0.000177	U	0.00140	0.00140	0.739	0.0592	pCi/g	08/19/14 10:40	08/21/14 18:02	5
U-238	0.860		0.0517	0.0945	0.00384	0.000231	pCi/g	08/19/14 10:40	08/21/14 18:02	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	0.725						%		08/22/14 14:30	1

Client Sample ID: SD-278-03

Lab Sample ID: 680-102600-9

Date Collected: 06/20/14 10:15

Matrix: Solid

Date Received: 06/23/14 09:00

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	0.0032	U	0.011	0.0032	mg/Kg		08/19/14 10:40	08/21/14 18:07	5
U-234	0.00064	U	0.011	0.00064	mg/Kg		08/19/14 10:40	08/21/14 18:07	5
U-235	0.023		0.011	0.0043	mg/Kg		08/19/14 10:40	08/21/14 18:07	5
U-236	0.00085	U	0.011	0.00085	mg/Kg		08/19/14 10:40	08/21/14 18:07	5
U-238	3.0		0.011	0.00064	mg/Kg		08/19/14 10:40	08/21/14 18:07	5

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Uranium	3.0		0.0050	0.00030	mg/Kg			08/22/14 14:31	1

Client Sample ID: SD-278-03
Date Collected: 06/20/14 10:15
Date Received: 06/23/14 09:00

Lab Sample ID: 680-102600-9
Matrix: Solid

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-26.2	U	0.0424	2.41	103	30.8	pCi/g	08/19/14 10:40	08/21/14 18:07	5
U-234	1.32	U	0.549	0.562	66.2	3.97	pCi/g	08/19/14 10:40	08/21/14 18:07	5
U-235	**0.0490**		0.000949	0.00461	0.0230	0.00937	pCi/g	08/19/14 10:40	08/21/14 18:07	5
U-236	0.000523	U	0.00103	0.00103	0.688	0.0551	pCi/g	08/19/14 10:40	08/21/14 18:07	5
U-238	**1.02**		0.0305	0.0987	0.00358	0.000215	pCi/g	08/19/14 10:40	08/21/14 18:07	5

Method: 6020A - Metals (ICP/MS), Isotopic Uranium Percentage

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	NONE	NONE	Unit	Prepared	Analyzed	Dil Fac
Percent U-235	**0.761**						%		08/22/14 14:30	1

Default Detection Limits

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102600-4
SDG: 680102600-1

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Analyte	RL	MDL	Units	Method
U-233	0.0050	0.0015	mg/Kg	6020A
U-234	0.0050	0.00030	mg/Kg	6020A
U-235	0.0050	0.0020	mg/Kg	6020A
U-236	0.0050	0.00040	mg/Kg	6020A
U-238	0.0050	0.00030	mg/Kg	6020A

Method: 6020A - Metals (ICP/MS), Total Uranium

Analyte	RL	MDL	Units	Method
Total Uranium	0.0050	0.00030	mg/Kg	6020A

Method: 6020A - Metals (ICP/MS), Isotopic Uranium

Lab Sample ID: MB 160-138784/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139525 — **Prep Batch: 138784**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
U-233	0.0015	U	0.0049	0.0015	mg/Kg		08/19/14 10:40	08/21/14 17:29	2
U-234	0.00029	U	0.0049	0.00029	mg/Kg		08/19/14 10:40	08/21/14 17:29	2
U-235	0.0020	U	0.0049	0.0020	mg/Kg		08/19/14 10:40	08/21/14 17:29	2
U-236	0.00039	U	0.0049	0.00039	mg/Kg		08/19/14 10:40	08/21/14 17:29	2
U-238	0.00029	U	0.0049	0.00029	mg/Kg		08/19/14 10:40	08/21/14 17:29	2

Lab Sample ID: LCS 160-138784/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139525 — **Prep Batch: 138784**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
U-234	0.00741	0.00723		mg/Kg		98	80 - 120
U-235	0.434	0.439		mg/Kg		101	80 - 120
U-238	0.450	0.452		mg/Kg		100	80 - 120

Lab Sample ID: 680-102600-6 MS — **Client Sample ID: SD-278-SS**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139525 — **Prep Batch: 138784**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
U-234	0.00073	U	0.00815	0.00740	J	mg/Kg		91	75 - 125
U-235	0.019		0.478	0.456		mg/Kg		91	75 - 125
U-238	2.5		0.496	3.03	4	mg/Kg		97	75 - 125

Lab Sample ID: 680-102600-6 MSD — **Client Sample ID: SD-278-SS**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139525 — **Prep Batch: 138784**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
U-234	0.00073	U	0.00794	0.00746	J	mg/Kg		94	75 - 125	1	20
U-235	0.019		0.465	0.459		mg/Kg		95	75 - 125	1	20
U-238	2.5		0.483	3.13	4	mg/Kg		120	75 - 125	3	20

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity)

Lab Sample ID: MB 160-138784/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 139526 — **Prep Batch: 138784**

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
U-233	-11.83	U	0.127	1.10	47.2	14.2	pCi/g	08/19/14 10:40	08/21/14 17:29	2
U-234	0.01706	U	0.152	0.152	30.5	1.83	pCi/g	08/19/14 10:40	08/21/14 17:29	2
U-235	-0.00006940	U	0.00000514	0.00000820	0.0106	0.00431	pCi/g	08/19/14 10:40	08/21/14 17:29	2
U-236	-0.0002153	U	0.000181	0.000183	0.317	0.0254	pCi/g	08/19/14 10:40	08/21/14 17:29	2
U-238	-0.00005304	U	0.0000360	0.0000363	0.00165	0.000098 9	pCi/g	08/19/14 10:40	08/21/14 17:29	2

Method: 6020A Activity - Metals (ICP/MS), Isotopic Uranium (Activity) (Continued)

Lab Sample ID: LCS 160-138784/2-A
Matrix: Solid
Analysis Batch: 139526

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 138784

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-235			0.938	0.9484		0.0958	0.00968	0.00394	pCi/g	101	80 - 120		
U-238			0.151	0.1520		0.0152	0.00151	0.0000905	pCi/g	100	80 - 120		

Lab Sample ID: 680-102600-6 MS
Matrix: Solid
Analysis Batch: 139526

Client Sample ID: SD-278-SS
Prep Type: Total/NA
Prep Batch: 138784

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
U-235	0.0411		1.03	0.9855		0.0908	0.0266	0.0108	pCi/g	91	75 - 125		
U-238	0.857		0.167	1.019		0.0946	0.00414	0.000249	pCi/g	97	75 - 125		

Lab Sample ID: 680-102600-6 MSD
Matrix: Solid
Analysis Batch: 139526

Client Sample ID: SD-278-SS
Prep Type: Total/NA
Prep Batch: 138784

Analyte	Sample Result	Sample Qual	Spike Added	MSD Result	MSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
U-235	0.0411		1.01	0.9927		0.0921	0.0259	0.0106	pCi/g	95	75 - 125	0.04	1
U-238	0.857		0.162	1.051		0.0978	0.00403	0.000242	pCi/g	120	75 - 125	0.16	1

Metals

Prep Batch: 138784

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102600-6	SD-278-SS	Total/NA	Solid	3050B	
680-102600-6 MS	SD-278-SS	Total/NA	Solid	3050B	
680-102600-6 MSD	SD-278-SS	Total/NA	Solid	3050B	
680-102600-6 SD	SD-278-SS	Total/NA	Solid	3050B	
680-102600-7	SD-278-01	Total/NA	Solid	3050B	
680-102600-8	SD-278-02	Total/NA	Solid	3050B	
680-102600-9	SD-278-03	Total/NA	Solid	3050B	
LCS 160-138784/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 160-138784/1-A	Method Blank	Total/NA	Solid	3050B	

Analysis Batch: 139525

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102600-6	SD-278-SS	Total/NA	Solid	6020A	138784
680-102600-6 MS	SD-278-SS	Total/NA	Solid	6020A	138784
680-102600-6 MSD	SD-278-SS	Total/NA	Solid	6020A	138784
680-102600-6 SD	SD-278-SS	Total/NA	Solid	6020A	138784
680-102600-7	SD-278-01	Total/NA	Solid	6020A	138784
680-102600-8	SD-278-02	Total/NA	Solid	6020A	138784
680-102600-9	SD-278-03	Total/NA	Solid	6020A	138784
CRI 160-139525/11	DL		Solid	6020A	
CRI 160-139525/12	DL		Solid	6020A	
ICSA 160-139525/13	ICS		Solid	6020A	
ICSAB 160-139525/14	ICS		Solid	6020A	
LCS 160-138784/2-A	Lab Control Sample	Total/NA	Solid	6020A	138784
MB 160-138784/1-A	Method Blank	Total/NA	Solid	6020A	138784

Analysis Batch: 139596

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102600-6	SD-278-SS	Total/NA	Solid	6020A	
680-102600-7	SD-278-01	Total/NA	Solid	6020A	
680-102600-8	SD-278-02	Total/NA	Solid	6020A	
680-102600-9	SD-278-03	Total/NA	Solid	6020A	

Rad

Prep Batch: 138784

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-102600-6	SD-278-SS	Total/NA	Solid	3050B	
680-102600-6 MS	SD-278-SS	Total/NA	Solid	3050B	
680-102600-6 MSD	SD-278-SS	Total/NA	Solid	3050B	
680-102600-6 SD	SD-278-SS	Total/NA	Solid	3050B	
680-102600-7	SD-278-01	Total/NA	Solid	3050B	
680-102600-8	SD-278-02	Total/NA	Solid	3050B	
680-102600-9	SD-278-03	Total/NA	Solid	3050B	
LCS 160-138784/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 160-138784/1-A	Method Blank	Total/NA	Solid	3050B	

Client Sample ID: SD-278-SS

Lab Sample ID: 680-102600-6

Date Collected: 06/20/14 10:00

Matrix: Solid

Date Received: 06/23/14 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			138784	08/19/14 10:40	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/21/14 17:38	KLE	TAL SL
Total/NA	Analysis	6020A		1	139596	08/22/14 14:31	KLE	TAL SL
Total/NA	Analysis	6020A		1	139595	08/22/14 14:30	KLE	TAL SL
Total/NA	Prep	3050B			138784	08/19/14 10:40	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139526	08/21/14 17:38	KLE	TAL SL

Client Sample ID: SD-278-01

Lab Sample ID: 680-102600-7

Date Collected: 06/20/14 10:05

Matrix: Solid

Date Received: 06/23/14 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			138784	08/19/14 10:40	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/21/14 17:57	KLE	TAL SL
Total/NA	Analysis	6020A		1	139596	08/22/14 14:31	KLE	TAL SL
Total/NA	Analysis	6020A		1	139595	08/22/14 14:30	KLE	TAL SL
Total/NA	Prep	3050B			138784	08/19/14 10:40	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139526	08/21/14 17:57	KLE	TAL SL

Client Sample ID: SD-278-02

Lab Sample ID: 680-102600-8

Date Collected: 06/20/14 10:10

Matrix: Solid

Date Received: 06/23/14 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			138784	08/19/14 10:40	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/21/14 18:02	KLE	TAL SL
Total/NA	Analysis	6020A		1	139596	08/22/14 14:31	KLE	TAL SL
Total/NA	Analysis	6020A		1	139595	08/22/14 14:30	KLE	TAL SL
Total/NA	Prep	3050B			138784	08/19/14 10:40	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139526	08/21/14 18:02	KLE	TAL SL

Client Sample ID: SD-278-03

Lab Sample ID: 680-102600-9

Date Collected: 06/20/14 10:15

Matrix: Solid

Date Received: 06/23/14 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			138784	08/19/14 10:40	SMD	TAL SL
Total/NA	Analysis	6020A		5	139525	08/21/14 18:07	KLE	TAL SL
Total/NA	Analysis	6020A		1	139596	08/22/14 14:31	KLE	TAL SL
Total/NA	Analysis	6020A		1	139595	08/22/14 14:30	KLE	TAL SL
Total/NA	Prep	3050B			138784	08/19/14 10:40	SMD	TAL SL
Total/NA	Analysis	6020A Activity		5	139526	08/21/14 18:07	KLE	TAL SL

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Certification Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102600-4
SDG: 680102600-1

Laboratory: TestAmerica Savannah

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
	AFCEE		SAVLAB	
A2LA	DoD ELAP		399.01	02-28-15
A2LA	ISO/IEC 17025		399.01	02-28-15
Alabama	State Program	4	41450	06-30-15
Arkansas DEQ	State Program	6	88-0692	01-31-15
California	NELAP	9	3217CA	07-31-14 *
Colorado	State Program	8	N/A	12-31-14
Connecticut	State Program	1	PH-0161	03-31-15
Florida	NELAP	4	E87052	06-30-15
GA Dept. of Agriculture	State Program	4	N/A	06-12-17
Georgia	State Program	4	N/A	06-30-15
Georgia	State Program	4	803	06-30-15
Guam	State Program	9	09-005r	04-16-15
Hawaii	State Program	9	N/A	06-30-15
Illinois	NELAP	5	200022	11-30-14
Indiana	State Program	5	N/A	06-30-15
Iowa	State Program	7	353	07-01-15
Kentucky (DW)	State Program	4	90084	12-31-14
Kentucky (UST)	State Program	4	18	06-30-15
Louisiana	NELAP	6	30690	06-30-14 *
Louisiana (DW)	NELAP	6	LA140023	12-31-14
Maine	State Program	1	GA00006	08-16-14 *
Maryland	State Program	3	250	12-31-14
Massachusetts	State Program	1	M-GA006	06-30-15
Michigan	State Program	5	9925	06-30-15
Mississippi	State Program	4	N/A	06-30-15
Montana	State Program	8	CERT0081	01-01-15
Nebraska	State Program	7	TestAmerica-Savannah	06-30-15
New Jersey	NELAP	2	GA769	06-30-15
New Mexico	State Program	6	N/A	06-30-15
New York	NELAP	2	10842	03-31-15
North Carolina (DW)	State Program	4	13701	07-31-15
North Carolina (WW/SW)	State Program	4	269	12-31-14
Oklahoma	State Program	6	9984	08-31-14 *
Pennsylvania	NELAP	3	68-00474	06-30-15
Puerto Rico	State Program	2	GA00006	12-31-14
South Carolina	State Program	4	98001	06-30-14 *
Tennessee	State Program	4	TN02961	06-30-15
Texas	NELAP	6	T104704185-08-TX	11-30-14
USDA	Federal		SAV 3-04	06-11-17
Virginia	NELAP	3	460161	06-14-15
Washington	State Program	10	C805	06-10-15
West Virginia (DW)	State Program	3	9950C	12-31-14
West Virginia DEP	State Program	3	94	06-30-15
Wisconsin	State Program	5	999819810	08-31-15
Wyoming	State Program	8	8TMS-L	06-30-15

Laboratory: TestAmerica St. Louis

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

* Certification renewal pending - certification considered valid.

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102600-4
SDG: 680102600-1

Laboratory: TestAmerica St. Louis (Continued)

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska	State Program	10	MO00054	06-30-15
California	NELAP	9	2886	03-31-15
Connecticut	State Program	1	PH-0241	03-31-15
Florida	NELAP	4	E87689	06-30-15
Illinois	NELAP	5	200023	11-30-14
Iowa	State Program	7	373	12-01-14
Kansas	NELAP	7	E-10236	10-31-14 *
Kentucky (DW)	State Program	4	90125	12-31-14
L-A-B	DoD ELAP		L2305	01-10-16
Louisiana	NELAP	6	04080	06-30-15
Maryland	State Program	3	310	09-30-15
Missouri	State Program	7	780	06-30-14 *
Nevada	State Program	9	MO000542013-1	07-31-14 *
New Jersey	NELAP	2	MO002	06-30-15
New Mexico	State Program	6		06-30-10 *
New York	NELAP	2	11616	03-31-15
North Dakota	State Program	8	R207	06-30-14 *
NRC	NRC		24-24817-01	12-31-22
Oklahoma	State Program	6	9997	08-31-15
Pennsylvania	NELAP	3	68-00540	02-28-15
South Carolina	State Program	4	85002001	06-30-14 *
Texas	NELAP	6	T104704193-13-6	07-31-15
USDA	Federal		P330-07-00122	01-09-17
USEPA Reg V SDWA	Federal	1	WG-15J	08-30-14
Utah	NELAP	8	MO000542013-5	07-31-15
Virginia	NELAP	3	460230	06-14-15
Washington	State Program	10	C592	08-30-15
West Virginia DEP	State Program	3	381	12-31-14 *

* Certification renewal pending - certification considered valid.

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102600-4
SDG: 680102600-1

Method	Method Description	Protocol	Laboratory
6020A	Metals (ICP/MS), Isotopic Uranium	SW846	TAL SL
6020A	Metals (ICP/MS), Total Uranium	SW846	TAL SL
6020A	Metals (ICP/MS), Isotopic Uranium Percentage	SW846	TAL SL
6020A Activity	Metals (ICP/MS), Isotopic Uranium (Activity)	SW846	TAL SL

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Sediments

TestAmerica Job ID: 680-102600-4
SDG: 680102600-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-102600-6	SD-278-SS	Solid	06/20/14 10:00	06/23/14 09:00
680-102600-7	SD-278-01	Solid	06/20/14 10:05	06/23/14 09:00
680-102600-8	SD-278-02	Solid	06/20/14 10:10	06/23/14 09:00
680-102600-9	SD-278-03	Solid	06/20/14 10:15	06/23/14 09:00

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG No.: 680102600-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
ISOU Cal 1_00019	08/25/14	08/18/14	2%HCL 2%HNO3, Lot 376565	50 mL	ISOU Cal Low_00006	0.25 mL	U-233	0.000515225 ug/L
							U-236	0.000889887 ug/L
							U-234	0.000826729 ug/L
							U-235	0.0484747 ug/L
							U-238	0.0502596 ug/L
							Total Uranium	0.05 ug/L
.ISOU Cal Low_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU Cal Int_00006	1 mL	U-233	0.103045 ug/L
							U-236	0.177977 ug/L
							U-234	0.165346 ug/L
							U-235	9.69494 ug/L
							U-238	10.0519 ug/L
							Total Uranium	10 ug/L
..ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
...ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
....ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
...ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
....ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
...ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
....ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
...STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
ISOU Cal 2_00020	08/25/14	08/18/14	2% Nitric Acid, Lot 376565	50 mL	ISOU Cal Int_00006	0.15 mL	U-233	0.0309135 ug/L
							U-236	0.0533932 ug/L

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG No.: 680102600-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							U-234	0.0496037 ug/L
							U-235	2.90848 ug/L
							U-238	3.01557 ug/L
							Total Uranium	3 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
ISOU Cal 3_00019	08/25/14	08/18/14	2% Nitric Acid, Lot 376565	100 mL	ISOU Cal Int_00006	0.5 mL	U-233	0.0515225 ug/L
							U-236	0.0889887 ug/L
							U-234	0.0826729 ug/L
							U-235	4.84747 ug/L
							U-238	5.02596 ug/L
							Total Uranium	5 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG No.: 680102600-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
ISOU Cal 4_00019	08/25/14	08/18/14	2% Nitric Acid, Lot 376565	50 mL	ISOU Cal Int_00006	0.5 mL	U-233	0.103045 ug/L
							U-236	0.177977 ug/L
							U-234	0.165346 ug/L
							U-235	9.69494 ug/L
							U-238	10.0519 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG No.: 680102600-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		U-238	1000 ug/mL
ISOU Cal 5_00019	08/25/14	08/18/14	2% Nitric Acid, Lot 376565	50 mL	ISOU Cal Int_00006	1.5 mL	U-233	0.309135 ug/L
							U-236	0.533932 ug/L
							U-234	0.496037 ug/L
							U-235	29.0848 ug/L
							U-238	30.1557 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		U-238	1000 ug/mL
ISOU ICSAB_00020	08/25/14	08/18/14	2% Nitric Acid, Lot 376565	50 mL	ISOU Cal Int_00006	0.25 mL	U-233	0.0515225 ug/L
							U-236	0.0889887 ug/L
							U-234	0.0826729 ug/L
							U-235	4.84747 ug/L
							U-238	5.02596 ug/L
							Total Uranium	5 ug/L
					MS ICSA_00014	2.5 mL	Al	50000 ug/L
							Ca	50000 ug/L
							Chlorine	500000 ug/L
							Fe	50000 ug/L
							K	50000 ug/L
							Mg	50000 ug/L
							Mo	1000 ug/L

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG No.: 680102600-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							Na	50000 ug/L
							P	50000 ug/L
							Sulfur	50000 ug/L
							Ti	1000 ug/L
.ISOU Cal Int_00006	12/01/14	07/10/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU-I 233CAL_00003	10 mL	U-233	10.3045 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
..ISOU-I 233CAL_00003	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00007	5.1938 g	U-233	103.045 ug/L
...ISOU-C 233CAL_00007	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1.984 ug/g
..ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
...ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
..ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
...ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
..STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL
.MS ICSA_00014	07/01/15	Inorganic Ventures, Lot G2-MEB476152MCA			(Purchased Reagent)		Al	1000 ug/mL
							Ca	1000 ug/mL
							Chlorine	10000 ug/mL
							Fe	1000 ug/mL
							K	1000 ug/mL
							Mg	1000 ug/mL
							Mo	20 ug/mL
							Na	1000 ug/mL
							P	1000 ug/mL
							Sulfur	1000 ug/mL
							Ti	20 ug/mL
ISOU ICV(3)_00018	08/14/14	08/18/14	2% Nitric Acid, Lot 365730	50 mL	ISOU QC Low_00004	0.25 mL	U-234	0.000417422 ug/L
							U-235	0.000528391 ug/L
							U-238	0.0488908 ug/L

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG No.: 680102600-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							U-233	0.223475 ug/L
							U-236	0.0000372865 ug/L
.ISOU QC Low_00004	11/01/14	08/18/14	2%HCL 2%HNO3, Lot 376565	100 mL	ISOU QC Int_00005	1 mL	U-234	0.0834844 ug/L
							U-235	0.105678 ug/L
							U-238	9.77816 ug/L
							U-233	44.695 ug/L
							U-236	0.00745731 ug/L
..ISOU QC Int_00005	11/01/14	05/14/14	2%HCL 2%HNO3, Lot 355914	100 mL	ISOU UNAT_00002	1 mL	U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-238	977.816 ug/L
					ISOU-I 233 QC_00005	10 mL	U-233	4469.5 ug/L
							U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-236	0.745731 ug/L
							U-238	977.816 ug/L
...ISOU UNAT_00002	11/13/14	11/11/13	1M HNO3, Lot n/a	200 mL	ISOU U parent_00001	20 mL	U-234	5.10149 ug/L
							U-235	701.888 ug/L
							U-238	96754.7 ug/L
....ISOU U parent_00001	08/01/47	05/03/13	1M HNO3, Lot n/a	200 mL	ISOU ampule_00001	19.2509 g	U-234	51.0149 ug/L
							U-235	7018.88 ug/L
							U-238	967547 ug/L
.....ISOU ampule_00001	03/30/58	New Brunswick Lab, Lot CRM 145			(Purchased Reagent)		U-234	0.53 ug/g
							U-235	72.92 ug/g
							U-238	10052 ug/g
...ISOU-I 233 QC_00005	12/20/14	12/20/13	2%HCL 2% HNO3, Lot 250193	100 mL	ISOU-C 233 QC_00005	9.3263 g	U-233	44695 ug/L
							U-234	82.9742 ug/L
							U-235	35.4894 ug/L
							U-236	7.45731 ug/L
							U-238	102.695 ug/L
....ISOU-C 233 QC_00005	12/20/18	New Brunswick Laboratory, Lot CRM 111-A			(Purchased Reagent)		U-233	479.236 ug/g
							U-234	0.88968 ug/g
							U-235	0.38053 ug/g
							U-236	0.07996 ug/g
							U-238	1.10114 ug/g
ISOU ICV(4,8)_00018	08/25/14	08/18/14	2% Nitric Acid, Lot 376565	50 mL	ISOU QC Int_00005	0.5 mL	U-234	0.0834844 ug/L
							U-235	0.105678 ug/L
							U-238	9.77816 ug/L
							U-233	44.695 ug/L
							U-236	0.00745731 ug/L
.ISOU QC Int_00005	11/01/14	05/14/14	2%HCL 2%HNO3, Lot 355914	100 mL	ISOU UNAT_00002	1 mL	U-234	8.34844 ug/L

REAGENT TRACEABILITY SUMMARY

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG No.: 680102600-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
							U-235	10.5678 ug/L
							U-238	977.816 ug/L
					ISOU-I 233 QC_00005	10 mL	U-233	4469.5 ug/L
							U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-236	0.745731 ug/L
							U-238	977.816 ug/L
..ISOU UNAT_00002	11/13/14	11/11/13	1M HNO3, Lot n/a	200 mL	ISOU U parent_00001	20 mL	U-234	5.10149 ug/L
							U-235	701.888 ug/L
							U-238	96754.7 ug/L
...ISOU U parent_00001	08/01/47	05/03/13	1M HNO3, Lot n/a	200 mL	ISOU ampule_00001	19.2509 g	U-234	51.0149 ug/L
							U-235	7018.88 ug/L
							U-238	967547 ug/L
....ISOU ampule_00001	03/30/58	New Brunswick Lab, Lot CRM 145			(Purchased Reagent)		U-234	0.53 ug/g
							U-235	72.92 ug/g
							U-238	10052 ug/g
..ISOU-I 233 QC_00005	12/20/14	12/20/13	2%HCL 2% HNO3, Lot 250193	100 mL	ISOU-C 233 QC_00005	9.3263 g	U-233	44695 ug/L
							U-234	82.9742 ug/L
							U-235	35.4894 ug/L
							U-236	7.45731 ug/L
							U-238	102.695 ug/L
...ISOU-C 233 QC_00005	12/20/18	New Brunswick Laboratory, Lot CRM 111-A			(Purchased Reagent)		U-233	479.236 ug/g
							U-234	0.88968 ug/g
							U-235	0.38053 ug/g
							U-236	0.07996 ug/g
							U-238	1.10114 ug/g
ISOU ICV(5,6)_00020	08/25/14	08/18/14	2% Nitric Acid, Lot 376565	50 mL	ISOU QC Int_00005	5 mL	U-234	0.834844 ug/L
							U-235	1.05678 ug/L
							U-238	97.7816 ug/L
							U-233	446.95 ug/L
							U-236	0.0745731 ug/L
.ISOU QC Int_00005	11/01/14	05/14/14	2%HCL 2%HNO3, Lot 355914	100 mL	ISOU UNAT_00002	1 mL	U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-238	977.816 ug/L
					ISOU-I 233 QC_00005	10 mL	U-233	4469.5 ug/L
							U-234	8.34844 ug/L
							U-235	10.5678 ug/L
							U-236	0.745731 ug/L
							U-238	977.816 ug/L
..ISOU UNAT_00002	11/13/14	11/11/13	1M HNO3, Lot n/a	200 mL	ISOU U parent_00001	20 mL	U-234	5.10149 ug/L
							U-235	701.888 ug/L
							U-238	96754.7 ug/L

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG No.: 680102600-1

Reagent ID	Exp Date	Prep Date	Dilutant Used	Reagent Final Volume	Parent Reagent		Analyte	Concentration
					Reagent ID	Volume Added		
...ISOU U parent_00001	08/01/47	05/03/13	1M HNO3, Lot n/a	200 mL	ISOU ampule_00001	19.2509 g	U-234	51.0149 ug/L
							U-235	7018.88 ug/L
							U-238	967547 ug/L
....ISOU ampule_00001	03/30/58	New Brunswick Lab, Lot CRM 145			(Purchased Reagent)		U-234	0.53 ug/g
							U-235	72.92 ug/g
							U-238	10052 ug/g
..ISOU-I 233 QC_00005	12/20/14	12/20/13	2%HCL 2% HNO3, Lot 250193	100 mL	ISOU-C 233 QC_00005	9.3263 g	U-233	44695 ug/L
							U-234	82.9742 ug/L
							U-235	35.4894 ug/L
							U-236	7.45731 ug/L
							U-238	102.695 ug/L
...ISOU-C 233 QC_00005	12/20/18	New Brunswick Laboratory, Lot CRM 111-A			(Purchased Reagent)		U-233	479.236 ug/g
							U-234	0.88968 ug/g
							U-235	0.38053 ug/g
							U-236	0.07996 ug/g
							U-238	1.10114 ug/g
ISOU Prep Spk_00002	12/01/14	07/09/14	2%HCL 2%HNO3, Lot 397367	100 mL	ISOU-I 233CAL_00002	1 mL	U-233	947.058 ug/L
					ISOU-I 236_00004	1.5 mL	U-236	17.7977 ug/L
					ISOU-I Enrich_00001	1 mL	U-234	16.5346 ug/L
							U-235	969.494 ug/L
							U-236	17.7977 ug/L
							U-238	1005.19 ug/L
					STD U_00005	0.1 mL	Total Uranium	1000 ug/L
							U-238	1005.19 ug/L
.ISOU-I 233CAL_00002	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 233CAL_00006	5.1938 g	U-233	94705.8 ug/L
..ISOU-C 233CAL_00006	12/19/18	Eckert & Ziegler Analytics, Lot 95301			(Purchased Reagent)		U-233	1823.44 ug/g
.ISOU-I 236_00004	12/23/14	12/23/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C 236_00002	3.472 g	U-236	1087.78 ug/L
..ISOU-C 236_00002	10/05/15	Eckert & Ziegler Isotope Products, Lot 1480-21			(Purchased Reagent)		U-236	31.33 ug/g
.ISOU-I Enrich_00001	12/20/14	12/20/13	2%HCL 2% HN03, Lot 250193	100 mL	ISOU-C Enrich_00001	5.0549 g	U-234	1653.46 ug/L
							U-235	96949.4 ug/L
							U-236	148.109 ug/L
							U-238	519.138 ug/L
..ISOU-C Enrich_00001	10/16/18	Eckert & Ziegler Analytics, Lot 95302			(Purchased Reagent)		U-234	32.71 ug/g
							U-235	1917.93 ug/g
							U-236	2.93 ug/g
							U-238	10.27 ug/g
.STD U_00005	12/01/14	INORGANIC VENTURES, Lot f2-u01098			(Purchased Reagent)		Total Uranium	1000 ug/mL
							U-238	1000 ug/mL

Reagent

ISOU ampule_00001

New Brunswick Laboratory
U.S. Department of Energy

Certificate of Analysis

CRM 145

228405
ID ISOU ampule_00001
Exp:03/30/58 Prpd:KLE Opn:05/03/13
UNAT Ampoule

Uranyl (Normal) Nitrate Assay and Isotopic Solution

Uranium Mass Fraction: **0.0101356 g U/g solution ± 0.0000011 g U/g solution**
[10.1356 mg U/g solution ± 0.0011 mg U/g solution]

	$^{234}U/^{238}U$	$^{235}U/^{238}U$
Atom Ratio:	0.000052841	0.0072543
Atom Ratio Uncertainty:	0.000000082	0.0000040

	^{234}U	^{235}U	^{238}U
Atom Percent:	0.0052458	0.72017	99.27458
Atom Percent Uncertainty:	0.0000081	0.00039	0.00039
Weight Percent:	0.0051579	0.71114	99.28370
Weight Percent Uncertainty:	0.0000080	0.00038	0.00038

Relative Atomic Weight: 238.028918
Relative Atomic Weight Uncertainty: 0.000012

Note: ^{233}U and ^{236}U were not detected. The detection limit of uranium ratios for the technique used is 5×10^{-9}.

This Certified Reference Material (CRM) is a uranium concentration and isotopic solution standard intended for use in calibration of and/or quality control for uranium analysis methods. Each unit of CRM 145 consists of approximately 20-mL of uranyl nitrate solution in 1M nitric acid, contained in a sealed glass ampoule.

NOTE: The vial should be handled under proper radiologically-controlled conditions at all times.

The certified uranium content value is based on the mass of high-purity metal dissolved and diluted to a known solution mass. The stated uranium concentration was calculated as the prepared value and verified experimentally by the NBL-modified Davies and Gray titration. The certified uranium isotopic composition and atomic weight is based upon measurements performed on multiple samples by two different measurement techniques on a Thermal Ionization Mass Spectrometer (TIMS), calibrated using CRM U030-A as primary comparator and CRM 129-A as a quality control sample. The isotopic values are shared with CRM 112-A, uranium (normal) metal standard which was the source of uranium used to produce the solutions.

RAD13-0018
UNAT Spike
marrss
None
Prep/Opened: 5/3/2013
Exp(1): 5/10/2014
Exp(2): 5/10/2014

All uncertainties for the certified values are expressed as expanded uncertainties (U) where $U = k*u_c$, where u_c is the

September 30, 2010
Argonne, Illinois

www.nbl.doe.gov

Jon Neuhoff, Director
New Brunswick Laboratory

(Revision of Certificate dated March 30, 2008)

127971
ID: UNAT_00008
Exp: 05/10/14 Prpd: SB Crt: 05/03/13
UNAT spike

combined standard uncertainty and the coverage factor k = 2. Uncertainties were determined according to the JCGM 100:2008 *Guide to the Expression of Uncertainty in Measurement*. The coverage factor of 2 was chosen to provide an approximate 95% level of confidence. The input quantities associated with the uranium content included uncertainties due to weighing, CRM 112-A purity, and buoyancy factors. The input quantities associated with the uranium isotopic composition included uncertainties from the certified value for CRM U030-A, measurement precision, and background corrections associated with the analytical techniques.

The CRM was produced by dissolving uranium metal in a single batch and container, with extensive mixing of the resultant solution followed by dispensation into individual bottles. Subsequent measurements of a random sampling of the total lot produced did not indicate any inhomogeneity in uranium concentration or isotopic composition. The minimum sample sizes taken from packaged units and measured were 30 mg U by titration and 1 µg U by TIMS. The NBL makes no recommendation as to the minimum sample size to be used to ensure concentration or isotopic homogeneity.

Users are cautioned that once the vial is opened, the uranium concentration and/or isotopic composition of the material may be affected by evaporative losses or environmental contamination. User's should take appropriate precautions to safeguard the material before, during and after use to ensure valid certificate values.

Recommended Procedure for Ampoule Handling and Dispensing of Solution

1. The ampoule contains a strongly acidic solution of uranium. Appropriate precautions should be taken.

2. Before opening the ampoule, ensure that any dried uranium or condensed liquid in the neck or body of the ampoule is re-dissolved into solution. This can be accomplished by inverting the ampoule repeatedly.

3. The glass ampoules are scored at the neck for ease of opening. However, glass burrs and fragments pose a cut hazard to anyone opening the ampoules. Appropriate precautions should be taken.

4. Lightly moisten the scored line on the neck with distilled water to help ensure a clean break at the score.

5. Because of the narrow neck of the ampoule it may be difficult or impossible to pour the solution out. Here is one possible method:

    a. Obtain approximately 12-cm length of plastic capillary tubing (e.g. i.d. 0f 0.1", o.d. of 0.16").
    b. Insert one end of the capillary tubing fully into the ampoule
    c. Fold the remaining length of tubing along the outside of the ampoule, ensuring that the tube is not crimped and will allow the free flow of air through the tube and into the ampoule.
    d. Holding the ampoule and tubing in one hand, and a beaker or dispensing bottle in another, invert the ampoule over the container allowing the solution to drain into it.
    e. The capillary tubing allows air to flow into the ampoule, eliminating the "airlock" created by the narrow neck of the open ampoule.

6. The user should be wary of evaporative losses once the ampoule is opened, and prevent uranium contamination of the sample. It is recommended that the entire solution be accurately weighed and aliquanted as soon as possible after opening the sample. Precautions should be taken (clean glass/plastic ware, air filtration, etc) to prevent uranium contamination of the CRM with subsequent perturbation of the isotopic composition.

Reagent

ISOU-C 233 QC_00005

New Brunswick Laboratory
U.S. Department of Energy

Certificate of Analysis
CRM 111-A
Uranium-233 in Nitrate Form
Uranium Spike Assay and Isotopic Solution Standard

280627
ID ISOU-C 233 QC_00005
Exp 12/20/18 Prpd:KLE Opn:12/20/13
233 QC

Uranium Concentration : 2.06684 ± 0.00052 μmoles U/gram solution

	U-233	U-234	U-235	U-236	U-238
Atom Percent:	99.4911	0.1847	0.0790	0.0166	0.2286
Uncertainty:	0.0006	0.0002	0.0002	0.0002	0.0004

Relative Atomic Weight : 233.055

This Certified Reference Material (CRM) is intended for use as a spike in the analysis of uranium materials by isotope dilution mass spectrometry (IDMS). Each unit of CRM 111-A consists of approximately 5 milligrams of uranium dissolved in 10 grams of 0.8 N HNO_3. This solution is contained in a sealed glass ampoule.

NOTE: *The ampoule should be handled under proper radiologically-controlled conditions at all times.*

The indicated uncertainties for the certified values are 95% confidence intervals for the means. The uncertainty assigned to the uranium assay includes components due to analytical variation. The uncertainties assigned to the isotopic abundance values include random measurement variations and a component based on the uncertainties associated with the determination of the mass discrimination correction factors.

The uranium elemental concentration was determined by the NBL-modified Davies-Gray titrimetric method [Reference: A. R. Eberle, M. W. Lerner, C. G. Goldbeck, and C. J. Rodden, NBL-252 (1970), pp. 1-25] using NBL CRM 112-A (uranium (normal) metal assay standard) as a control to verify the measurement system. The uranium isotopic composition was determined by thermal ionization mass spectrometry using NBL CRM 111 (U-233 spike) to demonstrate compatibility. The uranium assay value obtained by chemical analysis was verified by IDMS using NBL CRM 115 (uranium (depleted) metal assay standard) and NBL CRM 135 (U-235 spike) as spikes. For both the isotopic abundance and the IDMS assay measurements, mass discrimination correction factors were established using NBL CRM U500 and were applied to the calculations. The total impurity content was less than 1600 μg/g U as determined by inductively-coupled plasma atomic emission spectrometry on a subsample of the master

March 30, 2008
Argonne, Illinois

www.nbl.doe.gov

Jon Neuhoff, Director
New Brunswick Laboratory

(Editorial revision of Certificate dated January 18, 1990)

solution. Iron is the dominant impurity at 1330 μg/g U. Calcium, zinc, sodium, and magnesium were also found at 90, 50,50, and 10 μg/g U respectively. These impurity values are provided for information only; the impurity values are not certified.

The starting material from which this CRM was prepared was supplied by Argonne National Laboratory (ANL). Preparation and packaging of CRM 111-A were carried out by V. E. Connolly, M. I. Spaletto, F. P. Orlowicz, and F. E. Jones, NBL. Titrimetric assay measurements were performed by M. I. Spaletto, NBL; IDMS assay measurements were performed by V. E. Connolly, NBL; isotopic abundance measurements were performed by M. A. Legel and F. E. Jones, NBL; impurity measurements were performed by E. A. Huff and associates, ANL; statistical assessment of the data for certification was performed by M. D. Soriano, NBL. Project technical direction was provided by V. E. Connolly, NBL; overall technical direction and coordination of the preparation, certification, and issuance of this CRM was provided by N. M. Trahey, NBL.

RECOMMENDED PROCEDURE FOR USING CRM 111-A

The package is designed to prepare a solution having a known concentration of uranium on a weight basis. Once prepared, it is suggested that all the solution be immediately distributed as subportions for later use as individual spikes. After the spike has been added to a sample and isotopic equilibrium has been assured, a chemical separation should be performed to remove isobaric isotopes before mass spectrometric analysis.

Shake the ampoule vigorously before opening to homogenize contents. Secure in an upright position and allow solution trapped in the ampoule tip to drain back into the reservoir. Wrap the ampoule in a small cloth or towel, and break off the tip at the pre-scored line. Discard the tip, transfer the solution to a tared container, and proceed to distribute it as weighed portions into suitable containers for use as spikes.

If a more dilute solution is desired, transfer the solution to a larger tared container, weigh, dilute and weigh again, mix vigorously, and distribute all the solution as weighed portions.

Reagent

ISOU-C 233CAL_00006

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404-352-8677
Fax 404-352-2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

95301
U-233 5 mL Liquid in Flame Sealed Vial

280632
ID ISOU-C 233CAL_00006
Exp 12/19/18 Prpd KLE Opn 12/19/13
233 CAL

Customer: TestAmerica - St. Louis
P.O. No.: 2548635, Item 1 Product Code: 8055

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide calibration and purity were checked by germanium gamma-ray spectrometry, liquid scintillation counting, and/or alpha spectrometry, as applicable. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty* , % Type u_A	u_B	U	Reference Date (12:00 PM EST)
U-233	5.815E+07	3.705E+03	0.1	0.6	1.2	12/12/2013

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: U-232 4.811 Bq; U-234 4.450 Bq; α-impurities<0.001%; γ-impurities<0.1%.
5.23229 g 1M HNO3 solution. Carrier free.
Original material calibrated by New Brunswick Laboratory as CRM 111-A.

Source Prepared by: K. Eardley, Radiochemist

QC Approved: J.D. McCorvey, Counting Room Manager Date: 12 Dec 13

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

ISOU-C 233CAL_00007

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

95301
U-233 5 mL Liquid in Flame Sealed Vial

288644
ID ISOU-C 233CAL_00007
Exp 12/19/18 Prpd KLE Opn 12/19/13
233 CAL

Customer: TestAmerica - St. Louis
P.O. No.: 2548635, Item 1 Product Code: 8055

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide calibration and purity were checked by germanium gamma-ray spectrometry, liquid scintillation counting, and/or alpha spectrometry, as applicable. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty* , % Type u_A	u_B	U	Reference Date (12:00 PM EST)
U-233	5.815E+07	3.705E+03	0.1	0.6	1.2	12/12/2013

***Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: U-232 4.811 Bq; U-234 4.450 Bq; α-impurities<0.001%; γ-impurities<0.1%.
5.23229 g 1M HNO3 solution. Carrier free.
Original material calibrated by New Brunswick Laboratory as CRM 111-A.

Source Prepared by: K. Eardley, Radiochemist

QC Approved: J.D. McCorvey, Counting Room Manager Date: 12 Dec 13

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1958

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355
Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

ISOU-C 236_00002

Eckert & Ziegler
Isotope Products

24937 Avenue Tibbitts
Valencia, California 91355

Tel 661•309•1010
Fax 661•257•8303

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

Radionuclide:	U-236	**Customer:**	TEST AMERICA
Half-life:	(2.342 ± 0.003)E+07 years	**P.O. No.:**	2380469
Catalog No.:	7336	**Reference Date:**	15-Oct-10 12:00 PST
Source No.:	1480-21	**Contained Radioactivity: (Total alpha)**	0.01017 µCi 376.3 Bq

Physical Description:

A.	Mass of solution:	5.01498 g in 5 mL V-Vial
B.	Chemical form:	$UO_2(NO_3)_2$ in 0.1M HNO_3
C.	Carrier content:	None
D.	Density:	1.0016 g/mL @ 20°C

MT02535-10
ISOU U-236 QC CONC
elyk
.1M HN03
Prep/Opened: 10/5/2010
Exp(1): 10/5/2020
Exp(2): 10/5/2020

281584
ID ISOU-C 236_00002
Exp 10/05/15 Prpd KLE Opn 10/05/10
236 CAL

Radioimpurities:

See Technical Data Sheet

Radionuclide Concentration: 0.002028 µCi/g, 75.04 Bq/g

Method of Calibration:

This source was prepared from a weighed aliquot of solution whose activity in µCi/g was determined using a liquid scintillation counter.

Uncertainty of Measurement:

A.	Type A (random) uncertainty:	± 0.9 %
B.	Type B (systematic) uncertainty:	± 3.0 %
C.	Uncertainty in aliquot weighing:	± 0.4 %
D.	Total uncertainty at the 99% confidence level:	± 3.2 %

Notes:

- See reverse side for leak test(s) performed on this source.
- EZIP participates in a NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (as in NRC Regulatory Guide 4.15).
- Nuclear data was taken from "Table of Radioactive Isotopes", edited by Virginia Shirley, 1986.
- This solution has a working life of 5 years.

Daniel James Van Dalsem
Quality Control

21-Sep-10
Date

EZIP Ref. No.: 1480-21

Reagent

ISOU-C Enrich_00001

Eckert & Ziegler
Analytics

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318
Tel 404·352·8677
Fax 404·352·2837
www.analyticsinc.com

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

95302

279791
ID: ISOU-C Enrich_00001
Exp:10/16/18 Prpd KLE Opn 12/19/13
U enriched (234 and 235)

U-Enriched (97%) 5 mL Liquid in Flame Sealed Vial

Customer: Test America - St. Louis
P.O. No.: 2547082, Item 1 Product Code: 8235

This standard radionuclide source was prepared using an aliquot measured gravimetrically from a master radionuclide solution. The master radionuclide solution was prepared by dissolution of Uranium Oxide in 2.5M nitric acid. Total activity was calibrated by liquid scintillation counting. Atomic mass and weight percentages were certified by New Brunswick Laboratory. Radionuclide purity and calibration were checked by liquid scintillation counting and gamma-ray spectrometry. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July, 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Reference Date 12-December-2013 12:00 PM EST

Isotope	Activity (Bq)	Half-Life, Days	Uncertainty Type*, (%) u_A	u_B	U
U-234	3.924 E+04	8.967 E+07	1.9	0.9	4.2
U-235	7.991 E+02	2.571 E+11	1.9	0.9	4.2
U-236	3.653 E+01	8.554 E+09	1.9	0.9	4.2
U-238	6.653 E-01	1.632 E+12	1.9	0.9	4.2

***Uncertainty:** U – Relative expanded uncertainty, k=2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

Comments:
Impurities: α-impurities (other than decay products)< 0.1%; β-impurities(other than decay products)<0.1%; γ-impurities (other than decay products)<0.1%.
5.20568 grams of 1M HNO_3 solution with Uranium 1.97 mg/g.
Original material certified by New Brunswick Laboratory as CRM U970.

Source Prepared By: _____
R. Ormsby, Radiochemist

QA Approved: _____ 12 DEC 13
J.D. McCorvey, Counting Room Manager

ACCREDITED SOURCE CALIBRATION LABORATORY HEALTH PHYSICS SOCIETY FOUNDED 1956

End of Certificate

Corporate Office
24937 Avenue Tibbitts Valencia, California 91355

Laboratory
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Reagent

MS ICSA_00014

INORGANIC VENTURES
300 Technology Drive
Christiansburg, VA 24073 USA
inorganicventures.com

CERTIFICATE OF ANALYSIS

1.0 **INORGANIC VENTURES** is an ISO Guide 34 "General Requirements for the Competence of Reference Material Producers" and ISO 9001 registered manufacturer. Our manufacturing laboratory is accredited to ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories."

ACCREDITED Testing Laboratory Certificate 883.01

ACCREDITED Reference Material Producer Certificate 883.02

2.0 **DESCRIPTION OF CRM**

Stock Solution

Catalog No.: 6020ICS-0A

Lot Number: **G2-MEB476152MCA**

Matrix: 1.4% HNO3(v/v)

397615
ID: MS ICSA_00014
Exp:07/01/15 Prpd:CCB Opn:07/03/14
ICSA

10,000 µg/mL ea:
Chloride,

2,000 µg/mL ea:
C,

1,000 µg/mL ea:
Al, Ca, Fe, K, Mg, Na, P, S,

20 µg/mL ea:
Mo, Ti

3.0 **CERTIFIED VALUES AND UNCERTAINTIES**

ELEMENT	CERTIFIED VALUE	ELEMENT	CERTIFIED VALUE	ELEMENT	CERTIFIED VALUE
Aluminum, Al	1,002 ± 6 µg/mL	Calcium, Ca	1,002 ± 6 µg/mL	Carbon, C	2,004 ± 13 µg/mL
Chloride, Chloride	10,020.0 ± 50.0 µg/mL	Iron, Fe	1,002 ± 7 µg/mL	Magnesium, Mg	1,002 ± 4 µg/mL
Molybdenum, Mo	20.04 ± 0.14 µg/mL	Phosphorus, P	1,002 ± 7 µg/mL	Potassium, K	1,002 ± 4 µg/mL
Sodium, Na	1,002 ± 7 µg/mL	Sulfur, S	1,002 ± 5 µg/mL	Titanium, Ti	20.04 ± 0.13 µg/mL

Certified Density: 1.034 g/mL (measured at 20 ± 1° C)

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

$$\text{Certified Value } (\bar{x}) = \frac{\Sigma x_i}{n}$$

$$\text{Uncertainty } (\pm) = 2\,[\,\Sigma(s_i)^2\,]^{1/2}$$

$(\bar{x})$ = mean

x_i = individual results

n = number of measurements

2 = the coverage factor.

$[\,\Sigma(s_i)^2\,]^{1/2}$ = The square root of the sum of the squares of the most common errors (where 's' stands for the standard deviation) from instrumental measurement, density, NIST SRM uncertainty, weighing, dilution to volume, homogeneity, long term stability and short term stability.

4.0 TRACEBILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

· "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)
· This product is Traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRMs are available, the term 'in-house std.' is specified.
- The Calculated Value is a value calculated from the weight of a starting material that has been certified directly vs. a NIST SRM/RM. See section 4.2 for balance traceability.

4.1 ASSAY INFORMATION

ELEMENT	METHOD	NIST SRM#	SRM LOT#
Al	ICP Assay	3101a	060502
Al	EDTA	928	928
C	Gravimetric		See Sec. 4.2
Ca	ICP Assay	3109a	050825
Ca	EDTA	928	928
Chloride	Acidimetric	84L	84L
Fe	ICP Assay	3126a	051031
Fe	EDTA	928	928
K	Gravimetric		See Sec. 4.2
K	ICP Assay	3141a	051220
Mg	ICP Assay	3131a	050302
Mg	EDTA	928	928
Mo	Calculated		See Sec. 4.2
Mo	ICP Assay	3134	891307
Na	Gravimetric		See Sec. 4.2
Na	ICP Assay	3152a	010728
P	ICP Assay	3139a	060717
P	Acidimetric	84L	84L
S	Acidimetric	84k	84k
Ti	ICP Assay	3162a	060808

4.2 BALANCE CALIBRATION - All analytical balances are calibrated yearly by an accredited calibration laboratory and are traceable to a class E 2 analytical weight set with NIST Traceability. All balances are checked daily using an in-house procedure. The weights used for testing are annually compared to master weights and are traceable to the National Institute of Standards and Technology (NIST).

4.3 THERMOMETER CALIBRATION - All thermometers are NIST traceable through thermometers that are calibrated by an A2LA accredited calibration laboratory.

4.4 GLASSWARE CALIBRATION - An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM's.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP-MS AND ICP-OES IN µg/mL

Custom-Grade solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

s	Al		M	Dy	< 0.000100	O	Li	0.002000	M	Pr	< 0.000100	M	Te	< 0.012007
M	Sb	< 0.000600	M	Er	< 0.000100	M	Lu	< 0.000100	M	Re	< 0.000100	M	Tb	< 0.000100
O	As	< 0.020000	M	Eu	< 0.000100	s	Mg		M	Rh	< 0.000100	M	Tl	< 0.000100
O	Ba	< 0.000200	M	Gd	< 0.000100	O	Mn	0.003000	M	Rb	< 0.020012	M	Th	< 0.000100
O	Be	< 0.000090	M	Ga	< 0.001001	O	Hg	< 0.005000	M	Ru	< 0.000100	M	Tm	< 0.000100
M	Bi	< 0.005003	O	Ge	< 0.015000	s	Mo		M	Sm	< 0.000100	M	Sn	< 0.003002
O	B	< 0.005000	M	Au	< 0.001001	M	Nd	< 0.000100	O	Sc	< 0.000700	s	Ti	
O	Cd	0.003400	M	Hf	< 0.002001	O	Ni	< 0.002000	M	Se	< 0.050029	O	W	< 0.007000
s	Ca		M	Ho	< 0.000100	M	Nb	< 0.002001	n	Si		M	U	< 0.000100
M	Ce	< 0.000500	M	In	< 0.001001	n	Os		M	Ag	< 0.001001	O	V	< 0.004000
M	Cs	< 0.001001	M	Ir	< 0.000100	M	Pd	< 0.003002	s	Na		M	Yb	< 0.000100
O	Cr	< 0.010000	s	Fe		s	P		O	Sr	0.005000	M	Y	< 0.000100
M	Co	< 0.001001	M	La	< 0.000200	M	Pt	< 0.000100	s	S		M	Zn	0.016610
O	Cu	< 0.020000	M	Pb	0.002001	s	K		M	Ta	< 0.001001	M	Zr	< 0.004002

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
HPLC, IC, TLC, ISE, IR, NMR, UV/VIS, MS, Capillary Electrophoresis, Potentiometry, Wet Chemistry and Voltammetry
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact Technical Staff

This CRM was manufactured using 18 megohm doubly deionized water that has been filtered through a 0.2 micron filter.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep **Tightly** sealed when not in use. Store and use at 20 ± 4°C. **Do Not** pipette from the container. **Do Not** return portions removed from pipetting to container.

Element Specific Information - For specific information regarding any element: Contact technical staff.

Uranium Note: If uranium is present in this standard, it is natural abundance unless specified in Section 3.0.

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Safety Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous.

Inorganic Ventures homogeneity data indicate that the end user should take a minimum sample size of 0.2mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration
- SAI Global File Number 010105

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration"
- Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 "General Requirements for the Competence of Reference Material Producers"
- Reference Materials Production - Accredited A2LA Certificate Number 883.02

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission
- Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission
- Reporting Defects and Non-Compliance

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability. Transpiration studies of chemically-stable solutions performed at the manufacturer's facility show a CRM shelf-life of twenty one months for solutions packaged in 125-mL low density polyethylene bottles. When stored under special conditions that minimize transpiration and instability, the shelf life can be extended past this limit.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life. Manufacturer concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

11.3 Chemical Stability - Studies have been conducted on this or similar CRMs and it has been demonstrated that this CRM is chemically stable for a period of not less than two years provided the "Storage & Handling" conditions are followed that are described in section 7.0.

Certification Date: July 12, 2013

Expiration Date: EXPIRES 1[illegible]2015

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By: Zach Saunders
Product Documentation Technician

Zachary Saunders

Certificate Approved By: Allyson Guilliams
Quality Control Supervisor

Allyson Guilliams

Certifying Officer: Paul Gaines
PhD., Senior Technical Director

Paul R Gaines

Reagent

STD U_00005

INORGANIC VENTURES™
CUSTOMER SUPPLY DRIVE
CHARLOTTESVILLE, VA 24073-3455
WWW.INORGANICVENTURES.COM

CERTIFICATE OF ANALYSIS

260559
ID STD U_00005
Exp 12/01/14 Prpd:REV Opn:12/02/13
U 1000PPM

1.0 **INORGANIC VENTURES** is an ISO Guide 34 "General Requirements for the Competence of Reference Material Producers" and ISO 9001 registered manufacturer. Our manufacturing laboratory is accredited to ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories."

ACCREDITED Testing Laboratory Certificate 883.01

ACCREDITED Reference Material Producer Certificate 883.02

2.0 DESCRIPTION OF CRM **1000 µg/mL Uranium in 2% (v/v) HNO3**

Catalog Number:	CGU1-1, CGU1-2, and CGU1-5
Lot Number:	**F2-U01098**
Starting Material:	UO2(NO3)2.6H2O
Starting Material Purity (%):	99.9979
Starting Material Lot No:	1627
Matrix:	2% (v/v) HNO3

3.0 CERTIFIED VALUES AND UNCERTAINTIES

Certified Concentration: 1,003 ± 6 µg/mL - weighted mean

Certified Density: 1.010 g/mL (measured at 20 ± 1°C)

The following equations are used in the calculation of the certified value and the uncertainty. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k = 2.

Certified Value $(\bar{x}) = \frac{\Sigma x_i}{n}$ ($\bar{x}$) = mean

x_i = individual results

n = number of measurements

Uncertainty (±) = $2\ [\ \Sigma(s_i)^2\ ]^{½}$ 2 = the coverage factor.

$[\ \Sigma(s_i)^2\ ]^{½}$ = The square root of the sum of the squares of the most common errors (where 's' stands for the standard deviation) from instrumental measurement, density, NIST SRM uncertainty, weighing, dilution to volume, homogeneity, long term stability and short term stability.

Certified Abundance: The 235U in this standard is depleted. The Certified abundances in Atom % are as follows:

IV's Certified Abundance

Isotope	Atom%
Uranium 238U	99.6 ± 0.1
235U	0.42 ± 0.05

4.0 TRACEABILITY TO NIST AND VALUES OBTAINED BY INDEPENDENT METHODS

· "Property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties." (ISO VIM, 2nd ed., 1993, definition 6.10)

· This product is Traceable to NIST via an unbroken chain of comparisons. The uncertainties for each certified value are reported, taking into account the SRM uncertainty error and the measurement, weighing and volume dilution errors. In rare cases where no NIST SRMs are available, the term 'in-house std.' is specified.

- The Calculated Value is a value calculated from the weight of a starting material that has been certified directly vs. a NIST SRM/RM. See section 4.2 for balance traceability.

4.1 **Assay Method #1** **1,003 ± 4 µg/mL**
ICP Assay NIST SRM 3164 Lot Number: 080521

Assay Method #2 **1,002 ± 3 µg/mL**
Calculated NIST SRM Lot Number: See Sec. 4.2

4.2 **BALANCE CALIBRATION -** All analytical balances are calibrated yearly by an accredited calibration laboratory and are traceable to a class E 2 analytical weight set with NIST Traceability. All balances are checked daily using an in-house procedure. The weights used for testing are annually compared to master weights and are traceable to the National Institute of Standards and Technology (NIST).

4.3 **THERMOMETER CALIBRATION -** All thermometers are NIST traceable through thermometers that are calibrated by an A2LA accredited calibration laboratory.

4.4 **GLASSWARE CALIBRATION -** An in-house procedure is used to calibrate all Class A glassware used in the manufacturing and quality control of CRM's.

5.0 TRACE METALLIC IMPURITIES (TMI) DETERMINED BY ICP/MS AND ICP-OES IN µg/mL

CRM's solutions are tested for trace metallic impurities by Axial ICP-OES and ICP-MS. The result from the most sensitive method for each element, is reported below. Solutions tested by ICP-MS were analyzed in an ULPA-Filtered Clean Room. An ULPA-Filter is 99.9985% efficient for the removal of particles down to 0.3 µm.

O Al < 0.050000	M Dy < 0.015093	M Li < 0.025154	M Pr < 0.000755	M Te < 0.075463
M Sb < 0.001258	M Er < 0.012577	M Lu < 0.001006	M Re < 0.002515	M Tb < 0.000755
M As < 0.025154	M Eu < 0.007546	M Mg < 0.075463	M Rh < 0.002515	M Tl < 0.002515
M Ba < 0.025154	M Gd < 0.002515	M Mn < 0.010062	M Rb < 0.002515	M Th < 0.002515
M Be < 0.001258	M Ga < 0.002515	i Hg	M Ru < 0.005031	M Tm < 0.001006
M Bi < 0.001006	M Ge < 0.015093	M Mo < 0.005031	M Sm < 0.002515	O Sn < 0.100000
M B < 0.176080	M Au < 0.007546	M Nd < 0.005031	M Sc < 0.025154	M Ti < 0.125772
M Cd < 0.007546	M Hf < 0.005031	M Ni < 0.020123	M Se < 0.020123	M W < 0.025154
O Ca 0.003976	M Ho < 0.001258	M Nb < 0.001258	i Si	s U
M Ce < 0.012577	M In < 0.025154	n Os	M Ag < 0.005031	M V < 0.005031
M Cs < 0.000755	M Ir < 0.012577	M Pd < 0.012577	O Na 0.039757	M Yb < 0.002515
M Cr < 0.012577	M Fe < 0.503087	i P	M Sr < 0.001258	M Y < 0.100617
M Co < 0.007546	M La < 0.001258	M Pt < 0.005031	i S	M Zn < 0.025154
M Cu < 0.015093	M Pb < 0.007546	i K	M Ta < 0.017608	M Zr < 0.012577

M - Checked by ICP-MS O - Checked by ICP-OES i - Spectral Interference n - Not Checked For s - Solution Standard Element

6.0 INTENDED USE

For the calibration of analytical instruments including but not limited to the following:
HPLC, IC, TLC, ISE, IR, NMR, UV/VIS, MS, Capillary Eletrophoresis, Potentiometry, Wet Chemistry and Voltammetry
For the validation of analytical methods
For the preparation of "working reference samples"
For interference studies and the determination of correction coefficients
For detection limit and linearity studies
For additional intended uses, contact Technical Staff

This CRM was manufactured using 18 megohm-double deionized water that has been filtered through a 0.2 micron filter.

7.0 INSTRUCTIONS FOR THE CORRECT USE OF THIS REFERENCE MATERIAL

Storage & Handling - Keep tightly sealed when not in use. Store and use at 20 ± 4°C. Do not pipet from container. Do not return portions removed for pipetting to container.

Atomic Weight; Valence; Coordination Number; Chemical Form in Solution - 238.0289; +6 ; 8; UO_2^{2+}(uranyl)

Chemical Compatibility - Soluble in HCl and HNO_3. Avoid H_3PO_4. H_2SO_4 and HF matrices should not be a problem depending upon [U]. Although the UO_2^{2+} ion is distinctly basic, any U^{+4} will precipitate in basic media. UO_2^{2+}salts are generally soluble in water and UO_2^{2+} is stable with most metals and inorganic anions. The uranyl phosphate is insoluble in water. UF_4 and UF_6 are water soluble.

Stability - 2-100 ppb levels stable for months in 1% HNO_3 / LDPE container. 1-10,000 ppm solutions chemically stable for years in 2-5% HNO_3 / LDPE container.

U Containing Samples (Preparation and Solution) - Metal (Dissolves rapidly in HCl and HNO_3); Oxide (Soluble in HNO_3); Ores (Digest for 1-2 hours with 1 gram of ore to 30 mL 1:1 HNO_3. Silica insolubles are removed by filtration after bringing the sample to fumes with conc. H_2SO_4.)

Atomic Spectroscopic Information (ICP-OES D.L.s are given as radial/axial view):

Technique/Line	Estimated D.L.	Order	Type	Interferences (underlined indicates severe)
ICP-OES 385.958 nm	0.3 / 0.01 µg/mL	1	ion	Th, Fe
ICP-OES 367.007 nm	0.3 / 0.02 µg/mL	1	ion	Th, Ce
ICP-OES 263.553 nm	0.3 / 0.01 µg/mL	1	ion	Ce, Ir, Th, Rh, W, Zr, Ta, Ti, V, Hf, Fe, Re, Ru
ICP-MS 238 amu	2 ppt	n/a	M+	206Pb16O2

Uranium Note: If uranium is present in this standard, it is natural abundance unless specified in Section 3.0.

8.0 HAZARDOUS INFORMATION - Please refer to the enclosed Material Safety Data sheet for information regarding this CRM.

9.0 HOMOGENEITY - This solution was mixed according to an in house procedure and is guaranteed to be homogeneous. Inorganic Ventures homogeneity data indicate that the end user should take a minimum sample size of 0.2mL to assure homogeneity.

10.0 QUALITY STANDARD DOCUMENTATION

10.1 ISO 9001 Quality Management System Registration
- SAI Global File Number 010105

10.2 ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration"
- Chemical Testing - Accredited A2LA Certificate Number 883.01

10.3 ISO/IEC Guide 34 "General Requirements for the Competence of Reference Material Producers"
- Reference Materials Production - Accredited A2LA Certificate Number 883.02

10.4 10CFR50 Appendix B - Nuclear Regulatory Commission
- Domestic Licensing of Production and Utilization Facilities

10.5 10CFR21 - Nuclear Regulatory Commission
- Reporting Defects and Non-Compliance

11.0 DATE OF CERTIFICATION AND PERIOD OF VALIDITY

11.1 Shelf Life - The period of time during which the concentration of the analyte(s) in a properly packaged, unopened, and unused standard stored under environmentally controlled and monitored conditions will remain within the specified uncertainty range. Shelf life is limited primarily by transpiration (loss of water from the solution) and infrequently, by chemical instability.

11.2 Expiration Date - The date after which a CRM should not be used. Routine laboratory use of a CRM increases transpiration losses and the chance of contamination which affect the integrity of the CRM and limit its useful life. Manufacturer concurs with state and federal regulatory agencies' recommendations that solution standards be assigned a one-year expiration date.

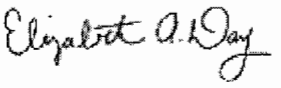
11.3 Chemical Stability - Studies have been conducted on this or similar CRMs and it has been demonstrated that this CRM is chemically stable for a period of not less than two years provided the "Storage & Handling" conditions are followed that are described in section 7.0.

Certification Date: September 07, 2012

Expiration Date:

01 Dec 2014

12.0 NAMES AND SIGNATURES OF CERTIFYING OFFICERS

Certificate Prepared By:	Stephan Blaakman Manufacturing Tech	
Certificate Approved By:	Elizabeth Day Quality Assurance Specialist	
Certifying Officer:	Paul Gaines PhD., Senior Technical Director	

METALS

COVER PAGE
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102600-4

SDG No.: 680102600-1

Project: Sediments

Client Sample ID	Lab Sample ID
SD-278-SS	680-102600-6
SD-278-01	680-102600-7
SD-278-02	680-102600-8
SD-278-03	680-102600-9

Comments:

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-278-SS
Lab Sample ID: 680-102600-6
Lab Name: TestAmerica St. Louis
Job No.: 680-102600-4
SDG ID.: 680102600-1
Matrix: Solid
Date Sampled: 06/20/2014 10:00
Reporting Basis: WET
Date Received: 06/23/2014 09:00

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	0.0036	0.012	0.0036	mg/Kg	U		5	6020A
13966-29-5	U-234	0.00073	0.012	0.00073	mg/Kg	U		5	6020A
15117-96-1	U-235	0.019	0.012	0.0049	mg/Kg			5	6020A
13982-70-2	U-236	0.00097	0.012	0.00097	mg/Kg	U		5	6020A
7440-61-1	U-238	2.5	0.012	0.00073	mg/Kg			5	6020A
7440-61-1	Total Uranium	2.5	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-278-01 Lab Sample ID: 680-102600-7

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG ID.: 680102600-1

Matrix: Solid Date Sampled: 06/20/2014 10:05

Reporting Basis: WET Date Received: 06/23/2014 09:00

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	0.0034	0.011	0.0034	mg/Kg	U		5	6020A
13966-29-5	U-234	0.00069	0.011	0.00069	mg/Kg	U		5	6020A
15117-96-1	U-235	0.015	0.011	0.0046	mg/Kg			5	6020A
13982-70-2	U-236	0.00091	0.011	0.00091	mg/Kg	U		5	6020A
7440-61-1	U-238	2.1	0.011	0.00069	mg/Kg			5	6020A
7440-61-1	Total Uranium	2.1	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-278-02 Lab Sample ID: 680-102600-8

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG ID.: 680102600-1

Matrix: Solid Date Sampled: 06/20/2014 10:10

Reporting Basis: WET Date Received: 06/23/2014 09:00

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	0.0034	0.011	0.0034	mg/Kg	U		5	6020A
13966-29-5	U-234	0.00069	0.011	0.00069	mg/Kg	U		5	6020A
15117-96-1	U-235	0.019	0.011	0.0046	mg/Kg			5	6020A
13982-70-2	U-236	0.00091	0.011	0.00091	mg/Kg	U		5	6020A
7440-61-1	U-238	2.6	0.011	0.00069	mg/Kg			5	6020A
7440-61-1	Total Uranium	2.6	0.0050	0.00030	mg/Kg			1	6020A

1A-IN
INORGANIC ANALYSIS DATA SHEET
METALS

Client Sample ID: SD-278-03 Lab Sample ID: 680-102600-9

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG ID.: 680102600-1

Matrix: Solid Date Sampled: 06/20/2014 10:15

Reporting Basis: WET Date Received: 06/23/2014 09:00

CAS No.	Analyte	Result	RL	MDL	Units	C	Q	DIL	Method
13968-55-3	U-233	0.0032	0.011	0.0032	mg/Kg	U		5	6020A
13966-29-5	U-234	0.00064	0.011	0.00064	mg/Kg	U		5	6020A
15117-96-1	U-235	0.023	0.011	0.0043	mg/Kg			5	6020A
13982-70-2	U-236	0.00085	0.011	0.00085	mg/Kg	U		5	6020A
7440-61-1	U-238	3.0	0.011	0.00064	mg/Kg			5	6020A
7440-61-1	Total Uranium	3.0	0.0050	0.00030	mg/Kg			1	6020A

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG No.: 680102600-1

ICV Source: ISOU ICV(3)_00018 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	ICV 160-139525/7 08/21/2014 16:42				CCV 160-139525/15 08/21/2014 17:20				CCV 160-139525/27 08/21/2014 18:16			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-233	0.232		0.223	104	0.0481	J	0.0515	93	0.0492	J	0.0515	95

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG No.: 680102600-1

ICV Source: ISOU ICV(4,8)_00018 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	ICV 160-139525/8 08/21/2014 16:47				CCV 160-139525/15 08/21/2014 17:20				CCV 160-139525/27 08/21/2014 18:16			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-234	0.0900		0.0835	108	0.0852		0.0827	103	0.0873		0.0827	106
U-238	10.1		9.78	104	5.30		5.03	105	5.41		5.03	108

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2A-IN
CALIBRATION VERIFICATIONS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG No.: 680102600-1

ICV Source: ISOU ICV(5,6)_00020 Concentration Units: ug/L

CCV Source: ISOU Cal 3_00019

Analyte	ICV 160-139525/9 08/21/2014 16:52				CCV 160-139525/15 08/21/2014 17:20				CCV 160-139525/27 08/21/2014 18:16			
	Found	C	True	%R	Found	C	True	%R	Found	C	True	%R
U-235	1.16		1.06	109	5.11		4.85	105	5.19		4.85	107
U-236	0.0704		0.0746	94	0.0909		0.0890	102	0.0933		0.0890	105

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.
Italicized analytes were not requested for this sequence.

2B-IN
CRQL CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG No.: 680102600-1

Method: 6020A Instrument ID: ICPMS6100

Lab Sample ID: CRI 160-139525/11 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 1_00019

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-235	0.0485	0.0508		105	70-130
U-238	0.0503	0.0541		108	70-130

Lab Sample ID: CRI 160-139525/12 Concentration Units: ug/L

CRQL Check Standard Source: ISOU Cal 2_00020

Analyte	CRQL Check Standard				
	True	Found	Qualifiers	%R(1)	Limits
U-233	0.0309	0.0310	J	100	70-130
U-234	0.0496	0.0520		105	70-130
U-236	0.0534	0.0553		104	70-130

Note! Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IIB-IN

3-IN
INSTRUMENT BLANKS
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG No.: 680102600-1

Concentration Units: ug/L

Analyte	RL	ICB 160-139525/10 08/21/2014 16:56		CCB 160-139525/16 08/21/2014 17:25		CCB 160-139525/28 08/21/2014 18:21			
		Found	C	Found	C	Found	C	Found	C
U-233	0.050	0.0829		0.00703	J	0.00988	J		
U-234	0.050	0.0021	U	0.0021	U	0.0021	U		
U-235	0.050	0.0034	U	0.0034	U	0.0034	U		
U-236	0.050	0.0015	U	0.0015	U	0.0015	U		
U-238	0.050	0.0166	J	0.0082	U	0.0082	U		

Italicized analytes were not requested for this sequence.

3-IN
METHOD BLANK
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG No.: 680102600-1

Concentration Units: mg/Kg Lab Sample ID: MB 160-138784/1-A

Instrument Code: ICPMS6100 Batch No.: 139525

CAS No.	Analyte	Concentration	C	Q	Method
13968-55-3	U-233	0.0015	U		6020A_U
13966-29-5	U-234	0.00029	U		6020A_U
15117-96-1	U-235	0.0020	U		6020A_U
13982-70-2	U-236	0.00039	U		6020A_U
7440-61-1	U-238	0.00029	U		6020A_U

4A-IN
INTERFERENCE CHECK STANDARD
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG No.: 680102600-1

Lab Sample ID: ICSAB 160-139525/14 Instrument ID: ICPMS6100

Lab File ID: 082114m2.rep ICS Source: ISOU ICSAB_00020

Concentration Units: ug/L

Analyte	True Solution AB	Found Solution AB	Percent Recovery
U-233	**0.0515**	**0.0516**	**100**
U-234	**0.0827**	**0.0890**	**108**
U-235	**4.85**	**5.32**	**110**
U-236	**0.0890**	**0.0952**	**107**
U-238	**5.03**	**5.51**	**110**

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM IVA-IN

5A-IN
MATRIX SPIKE SAMPLE RECOVERY
METALS

Client ID: SD-278-SS MS
Lab ID: 680-102600-6 MS
Lab Name: TestAmerica St. Louis
Job No.: 680-102600-4
SDG No.: 680102600-1
Matrix: Solid
Concentration Units: mg/Kg
% Solids:

Analyte	SSR	C	Sample Result (SR)	C	Spike Added (SA)	%R	Control Limit %R	Q	Method
U-234	0.00740	J	0.00073	U	0.00815	91	75-125		6020A
U-235	0.456		0.019		0.478	91	75-125		6020A
U-238	3.03		2.5		0.496	97	75-125	4	6020A

SSR = Spiked Sample Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VA - IN

5A-IN
MATRIX SPIKE DUPLICATE SAMPLE RECOVERY
METALS

Client ID: SD-278-SS MSD
Lab ID: 680-102600-6 MSD
Lab Name: TestAmerica St. Louis
Job No.: 680-102600-4
SDG No.: 680102600-1
Matrix: Solid
Concentration Units: mg/Kg
% Solids:

Analyte	(SDR)	C	Spike Added (SA)	%R	Control Limit %R	RPD	RPD Limit	Q	Method
U-234	0.00746	J	0.00794	94	75-125	1	20		6020A
U-235	0.459		0.465	95	75-125	1	20		6020A
U-238	3.13		0.483	120	75-125	3	20	4	6020A

SDR = Sample Duplicate Result

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VD - IN

7A-IN
LAB CONTROL SAMPLE
METALS

Lab ID: LCS 160-138784/2-A

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

Sample Matrix: Solid LCS Source: ISOU Prep Spk_00002

Analyte	Solid(mg/Kg)							
	True	Found	C	%R	Limits		Q	Method
U-234	0.00741	0.00723		98	80	120		6020A
U-235	0.434	0.439		101	80	120		6020A
U-238	0.450	0.452		100	80	120		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIIA - IN

8-IN
ICP-AES AND ICP-MS SERIAL DILUTIONS
METALS

Lab ID: 680-102600-6

SDG No: 680102600-1

Lab Name: TestAmerica St. Louis Job No: 680-102600-4

Matrix: Solid Concentration Units: mg/Kg

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Method
U-233	0.0036	U	0.018	U	NC		6020A
U-234	0.00073	U	0.0036	U	NC		6020A
U-235	0.019		0.025	U	NC		6020A
U-236	0.00097	U	0.0049	U	NC		6020A
U-238	2.5		2.40		5.9		6020A

Calculations are performed before rounding to avoid round-off errors in calculated results.

FORM VIII-IN

9-IN
DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102600-4

SDG Number: 680102600-1

Matrix: Solid Instrument ID: ICPMS6100

Method: 6020A MDL Date: 08/05/2013 10:01

Prep Method: 3050B

Analyte	Wavelength/ Mass	RL (mg/Kg)	MDL (mg/Kg)
U-233	233	0.005	0.0015
U-234	234	0.005	0.0003
U-235	235	0.005	0.00203
U-236	236	0.005	0.0004
U-238	238	0.005	0.0003

9-IN
CALIBRATION BLANK DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102600-4

SDG Number: 680102600-1

Matrix: Solid Instrument ID: ICPMS6100

Method: 6020A XMDL Date: 07/18/2014 15:08

Analyte	Wavelength/ Mass	XRL (ug/L)	XMDL (ug/L)
U-233	233	0.05	0.0066
U-234	234	0.05	0.0021
U-235	235	0.05	0.0034
U-236	236	0.05	0.0015
U-238	238	0.05	0.0082

9-IN
DETECTION LIMITS
METALS

Lab Name: TestAmerica St. Louis Job Number: 680-102600-4

SDG Number: 680102600-1

Matrix: Solid Instrument ID: NOEQUIP

Method: 6020A MDL Date: 06/12/2013 14:02

Analyte	Wavelength/ Mass	RL (mg/Kg)	MDL (mg/Kg)
Total Uranium		0.005	0.0003

11-IN
LINEAR RANGES
METALS

Lab Name: TestAmerica St. Louis Job No: 680-102600-4

SDG No.: 680102600-1

Instrument ID: ICPMS6100 Date: 02/14/2012 11:04

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	Method
U-233		2000	6020A
U-234		2000	6020A
U-235		2000	6020A
U-236		2000	6020A
U-238		2000	6020A

12-IN
PREPARATION LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG No.: 680102600-1

Prep Method: 3050B

Lab Sample ID	Preparation Date	Prep Batch	Initial Weight (g)	Initial Volume	Final Volume (mL)
MB 160-138784/1-A	08/19/2014 10:40	138784	0.5107		50
LCS 160-138784/2-A	08/19/2014 10:40	138784	0.5581		50
680-102600-6	08/19/2014 10:40	138784	0.5150		50
680-102600-6 MS	08/19/2014 10:40	138784	0.5071		50
680-102600-6 MSD	08/19/2014 10:40	138784	0.5208		50
680-102600-7	08/19/2014 10:40	138784	0.5474		50
680-102600-8	08/19/2014 10:40	138784	0.5470		50
680-102600-9	08/19/2014 10:40	138784	0.5872		50

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG No.: 680102600-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/21/2014 16:12 End Date: 08/22/2014 02:28

Lab Sample Id	D/F	Type	Time	Analytes																										
				U-233	U-234	U-235	U-236	U-238																						
ICIS 160-139525/1			16:12	X	X	X	X	X																						
IC 160-139525/2	1		16:19	X	X	X	X	X																						
IC 160-139525/3	1		16:24	X	X	X	X	X																						
IC 160-139525/4	1		16:28	X	X	X	X	X																						
IC 160-139525/5	1		16:33	X	X	X	X	X																						
IC 160-139525/6	1		16:38	X	X	X	X	X																						
ICV 160-139525/7	1		16:42	X																										
ICV 160-139525/8	1		16:47		X			X																						
ICV 160-139525/9	1		16:52			X	X																							
ICB 160-139525/10	1		16:56	X	X	X	X	X																						
CRI 160-139525/11	1		17:01			X		X																						
CRI 160-139525/12	1		17:06	X	X		X																							
ICSA 160-139525/13	1		17:10	X	X	X	X	X																						
ICSAB 160-139525/14	1		17:15	X	X	X	X	X																						
CCV 160-139525/15	1		17:20	X	X	X	X	X																						
CCB 160-139525/16	1		17:25	X	X	X	X	X																						
MB 160-138784/1-A	2	T	17:29	X	X	X	X	X																						
LCS 160-138784/2-A	2	T	17:34		X	X		X																						
680-102600-6	5	T	17:38	X	X	X	X	X																						
680-102600-6 SD	25	T	17:43	X	X	X	X	X																						
680-102600-6 MS	5	T	17:48		X	X		X																						
680-102600-6 MSD	5	T	17:52		X	X		X																						
680-102600-7	5	T	17:57	X	X	X	X	X																						
680-102600-8	5	T	18:02	X	X	X	X	X																						
680-102600-9	5	T	18:07	X	X	X	X	X																						
ZZZZZZ			18:11																											
CCV 160-139525/27	1		18:16	X	X	X	X	X																						
CCB 160-139525/28	1		18:21	X	X	X	X	X																						
ZZZZZZ			18:25																											
ZZZZZZ			18:30																											
ZZZZZZ			18:35																											
ZZZZZZ			18:39																											
ZZZZZZ			18:44																											
ZZZZZZ			18:49																											
ZZZZZZ			18:53																											
ZZZZZZ			18:58																											
ZZZZZZ			19:03																											
ZZZZZZ			19:07																											
CCV 160-139525/39			19:12																											

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG No.: 680102600-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/21/2014 16:12 End Date: 08/22/2014 02:28

Lab Sample Id	D/F	Type	Time	Analytes																										
				U-233	U-234	U-235	U-236	U-238																						
CCB 160-139525/40			19:17																											
ZZZZZZ			19:21																											
ZZZZZZ			19:26																											
ZZZZZZ			19:31																											
ZZZZZZ			19:35																											
ZZZZZZ			19:40																											
ZZZZZZ			19:45																											
ZZZZZZ			19:49																											
ZZZZZZ			19:54																											
ZZZZZZ			19:59																											
ZZZZZZ			20:03																											
CCV 160-139525/51			20:08																											
CCB 160-139525/52			20:13																											
ZZZZZZ			20:17																											
ZZZZZZ			20:22																											
ZZZZZZ			20:27																											
ZZZZZZ			20:31																											
ZZZZZZ			20:36																											
CCV 160-139525/58			20:41																											
CCB 160-139525/59			20:45																											
ICIS 160-139525/60			20:50	X	X	X	X	X																						
IC 160-139525/61			20:57	X	X	X	X	X																						
IC 160-139525/62			21:01	X	X	X	X	X																						
IC 160-139525/63			21:06	X	X	X	X	X																						
IC 160-139525/64			21:11	X	X	X	X	X																						
IC 160-139525/65			21:15	X	X	X	X	X																						
ICV 160-139525/66			21:20																											
ICV 160-139525/67			21:25																											
ICV 160-139525/68			21:29																											
ICB 160-139525/69			21:34																											
CRI 160-139525/70			21:39																											
CRI 160-139525/71			21:43																											
ICSA 160-139525/72			21:48																											
ICSAB 160-139525/73			21:53																											
CCV 160-139525/74			21:58																											
CCB 160-139525/75			22:02																											
ZZZZZZ			22:07																											
ZZZZZZ			22:12																											
ZZZZZZ			22:16																											

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG No.: 680102600-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/21/2014 16:12 End Date: 08/22/2014 02:28

Lab Sample Id	D/F	Type	Time	Analytes																										
				U-233	U-234	U-235	U-236	U-238																						
CCV 160-139525/79			22:21																											
CCB 160-139525/80			22:26																											
ZZZZZZ			22:30																											
ZZZZZZ			22:35																											
ZZZZZZ			22:40																											
ZZZZZZ			22:44																											
ZZZZZZ			22:49																											
ZZZZZZ			22:54																											
ZZZZZZ			22:58																											
ZZZZZZ			23:03																											
ZZZZZZ			23:08																											
ZZZZZZ			23:12																											
CCV 160-139525/91			23:17																											
CCB 160-139525/92			23:22																											
ZZZZZZ			23:26																											
ZZZZZZ			23:31																											
ZZZZZZ			23:36																											
ZZZZZZ			23:40																											
ZZZZZZ			23:45																											
ZZZZZZ			23:50																											
ZZZZZZ			23:54																											
ZZZZZZ			23:59																											
ZZZZZZ			00:04																											
ZZZZZZ			00:08																											
CCV 160-139525/103			00:13																											
CCB 160-139525/104			00:18																											
ZZZZZZ			00:22																											
ZZZZZZ			00:27																											
ZZZZZZ			00:32																											
ZZZZZZ			00:36																											
ZZZZZZ			00:41																											
ZZZZZZ			00:46																											
ZZZZZZ			00:50																											
ZZZZZZ			00:55																											
ZZZZZZ			01:00																											
ZZZZZZ			01:04																											
CCV 160-139525/115			01:09																											
CCB 160-139525/116			01:14																											
ZZZZZZ			01:18																											

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG No.: 680102600-1

Instrument ID: ICPMS6100 Analysis Method: 6020A

Start Date: 08/21/2014 16:12 End Date: 08/22/2014 02:28

Lab Sample Id	D/F	Type	Time	Analytes																									
				U-233	U-234	U-235	U-236	U-238																					
ZZZZZZ			01:23																										
ZZZZZZ			01:28																										
ZZZZZZ			01:32																										
ZZZZZZ			01:37																										
ZZZZZZ			01:42																										
ZZZZZZ			01:46																										
ZZZZZZ			01:51																										
ZZZZZZ			01:56																										
ZZZZZZ			02:00																										
CCV 160-139525/127			02:05																										
CCB 160-139525/128			02:10																										
ZZZZZZ			02:14																										
ZZZZZZ			02:19																										
CCV 160-139525/131			02:24																										
CCB 160-139525/132			02:28																										

Prep Types:
T = Total/NA

FORM XIII-IN

13-IN
ANALYSIS RUN LOG
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG No.: 680102600-1

Instrument ID: NOEQUIP Analysis Method: 6020A

Start Date: 08/22/2014 14:31 End Date: 08/22/2014 14:31

Lab Sample Id	D/F	Type	Time	Analytes																								
				U																								
680-102600-6	1	T	14:31	X																								
680-102600-7	1	T	14:31	X																								
680-102600-8	1	T	14:31	X																								
680-102600-9	1	T	14:31	X																								

Prep Types:
T = Total/NA

FORM XIII-IN

15-IN
ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY
METALS

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG No.: 680102600-1

ICP-MS Instrument ID: ICPMS6100 Start Date: 08/21/2014 End Date: 08/21/2014

Lab Sample ID	Time	Internal Standards %RI For:									
		Element Ho	Q	Element	Q	Element	Q	Element	Q	Element	Q
IC 160-139525/2	16:19										
IC 160-139525/3	16:24										
IC 160-139525/4	16:28										
IC 160-139525/5	16:33										
IC 160-139525/6	16:38										
ICV 160-139525/7	16:42	96									
ICV 160-139525/8	16:47	96									
ICV 160-139525/9	16:52	94									
ICB 160-139525/10	16:56	96									
CRI 160-139525/11	17:01	96									
CRI 160-139525/12	17:06	96									
ICSA 160-139525/13	17:10	87									
ICSAB 160-139525/14	17:15	87									
CCV 160-139525/15	17:20	96									
CCB 160-139525/16	17:25	95									
MB 160-138784/1-A	17:29	97									
LCS 160-138784/2-A	17:34	101									
680-102600-6	17:38	92									
680-102600-6 SD	17:43	98									
680-102600-6 MS	17:48	93									
680-102600-6 MSD	17:52	92									
680-102600-7	17:57	92									
680-102600-8	18:02	92									
680-102600-9	18:07	91									
CCV 160-139525/27	18:16	92									
CCB 160-139525/28	18:21	91									

KE 8/22/14

082114M2

A Batch 139525 139526

Sample/Batch Report

TA ST. LOUIS - PERKIN ELMER ELAN 6100 - METHOD 6020 / 200.8 QUANTITATIVE ANALYSIS REPORT

User Name: stlmetals
Computer Name: SLICP03
Sample File: D:\Elandata\Sample\SW846 TEMP1.sam
Report Date/Time: Thursday, August 21, 2014 16:11:36
Method File: d:\Elandata\Method\DAILY EPA.mth
Tuning File: d:\Elandata\Tuning\EPA TUNING.tun
Optimization File: d:\Elandata\Optimize\EPA2008.dac
Calibration File:
Calibration Type: External Calibration
Number of Replicates: 6
Number of Readings: 1
Number of Sweeps: 60
Dual Detector Mode: Pulse

ICB 233P

A/S Loc.	Batch ID	Sample ID	Description	Aliquot Vol.	Diluted Vol.
11	138784	429764	2		
12		429765	2		
13		680-102600-A-6-K	5		
14		680-102600-A-6-K SD	25		
15		680-102600-A-6-L MS	5		
16		680-102600-A-6-M MS	5		
17		680-102600-A-7-G	5		
18		680-102600-A-8-G	5		
19		680-102600-A-9-G	5		
20	137845	426404	2		
21	CCV	426405	2		
22	CCB	160-7878-C-1-C	10		
23		160-7878-C-1-C SD	50		
24		160-7878-C-1-D MS	10		
25		160-7878-C-1-E MSD	10		
26		160-7878-D-2-C	10		
27		160-7878-B-3-A	10		
28		160-7878-C-4-C	10		
29		160-7878-A-5-A	10		
30	CCV (233b)	160-7878-B-6-A	5000		
31	CCB	680-102370-A-1-D	5		
32		680-102370-A-2-C	5		
33		680-102370-A-3-C	5		
34		680-102370-A-4-C	5		
35		680-102370-A-6-D	5		
36	138746	429618	2		
37		429626	2		
38		160-7944-C-4-B	50		
39		160-7944-C-4-B SD	250		
40	CCV	160-7944-C-4-C MS	50		
41	CCB	160-7944-C-4-D MSD	50		
42		160-7944-C-5-B	100		
43		160-7944-C-6-B	50		
44		160-7944-C-7-B	200		
45		160-7944-A-8-C	200		
10		CCV (233b)	200		
1		CCB	200		
46	139022	430546	2		
47		430547	2		
48	CCV	680-102327-A-1-H	5		
49	CCB	680-102327-A-1-H SD	25		

All

All except 233

Recal (ICB 233P)(CCV-233b)

All except 233, 238

50		680-102327-A-1-I MS	5	
51		680-102327-A-1-J MSD	5	
52		680-102327-A-2-E	5	
53		680-102327-A-3-E	5	
54		680-102327-A-5-D	5	
55		680-102327-A-6-D	5	
56		680-102327-A-7-D	5	
57		680-102327-A-9-D	5	
58	CCV (8?)	680-102327-A-10-D	5	
59	CCB	680-102327-A-11-D	5	
60		680-102327-A-13-D	5	
61		680-102327-A-14-D	5	
62		680-102327-A-15-F	5	
63		680-102327-A-16-D	5	
64		680-102327-A-17-D	5	
65		680-102327-A-18-D	5	
66		680-102327-A-19-D	5	
67		680-102327-A-21-D	5	
68	CCV	680-102327-A-22-D	5	
69	CCB	680-102327-A-23-D	5	
70	137774	425544	2	
71		425545	2	
72		680-102327-A-25-D	5	
73		680-102327-A-25-D SD	25	
74		680-102327-A-25-E MS	5	
75		680-102327-A-25-F MS	5	
76		680-102327-A-26-C	5	
77		680-102327-A-27-C	5	
78	CCV	680-102327-A-28-C	5	
79	CCB	680-102327-A-29-C	5	
80		680-102327-A-30-C	5	
81		680-102327-A-34-C	5	
82		680-102327-A-36-C	5	
83	139028	430572	2	
84		430573	2	
85		680-102327-A-31-D	5	
86		680-102327-A-31-D SD	25	
87		680-102327-A-31-E MS	5	
88	CCV	680-102327-A-31-F MS	5	
89	CCB	680-102327-A-32-D	5	
90		680-102327-A-35-D	5	
	CCV CCB			

All except 233, 238

All except 233

Quantitative Analysis Calibration Report

File Name: 082114M2.cal
File Path: D:\Elandata\System
Calibration Type: External Calibration

Analyte	Mass	Curve Type	Slope	Intercept	Corr. Coeff.
Ho (IS)	164.930	Linear Thru Zero	0.000000	0.00	0.000000
U	233.000	Linear Thru Zero	0.048686	0.00	0.999740
U	234.041	Linear Thru Zero	0.037599	0.00	0.999998
U	235.044	Linear Thru Zero	0.034951	0.00	0.999977
U	236.000	Linear Thru Zero	0.053958	0.00	0.999998
U	238.050	Linear Thru Zero	0.031168	0.00	0.999988

Quantitative Analysis Calibration Report

File Name: 082114M2-2.cal
File Path: D:\Elandata\System
Calibration Type: External Calibration

Analyte	Mass	Curve Type	Slope	Intercept	Corr. Coeff.
Ho (IS)	164.930	Linear Thru Zero	0.000000	0.00	0.000000
U	233.000	Linear Thru Zero	0.045664	0.00	0.998338
U	234.041	Linear Thru Zero	0.036687	0.00	0.999999
U	235.044	Linear Thru Zero	0.034480	0.00	0.999996
U	236.000	Linear Thru Zero	0.053136	0.00	0.999986
U	238.050	Linear Thru Zero	0.030830	0.00	0.999994

Instrument Tuning Report

File Name: EPA TUNING.tun
File Path: d:\Elandata\Tuning
Sample ID: Sample
Sample Date/Time: Thursday, August 21, 2014 15:07:19

Analyte	Exact Mass	Meas. Mass	Mass DAC	Res. DAC	Meas. Pk. Width	Custom Res.
Li	7.016	7.025	1570	2065	0.653	
Mg	23.985	23.979	5688	2080	0.678	
Rh	102.905	102.879	24919	2080	0.687	
Ce	139.905	139.929	33931	2120	0.665	
Pb	207.977	207.977	50415	2310	0.643	

Replicates: 6

Daily Performance Report

Sample ID: Sample
Sample Date/Time: Thursday, August 21, 2014 15:29:59
Sample Description:
Method File: d:\Elandata\Method\DAILY EPA.mth
Dataset File: d:\Elandata\Dataset\daily3\Sample.139
Tuning File: d:\Elandata\Tuning\EPA TUNING.tun
Optimization File: d:\Elandata\Optimize\EPA2008.dac
Dual Detector Mode: Pulse

Acq. Dead Time(ns): 35
Current Dead Time (ns): 35

Summary

	Analyte	Mass	Meas. Intens. Mean	Net Intens. Mean	Net Intens. SD	Net Intens. RSD
	Li	7.0	2851.7	2851.674	78.557	2.8
	Mg	24.0	14862.6	14862.562	173.709	1.2
	Rh	102.9	231924.9	231924.862	2077.601	0.9
	Pb	208.0	221302.9	221302.936	1850.540	0.8
⌈>	Ba	137.9	279582.9	279582.929	1975.147	0.7
⌊	Ba++	69.0	1959.4	0.007	0.000	1.7
⌈>	Ce	139.9	341912.6	341912.622	1696.191	0.5
⌊	CeO	155.9	9041.0	0.026	0.000	1.5
	Bkgd	220.0	4.8	4.833	1.696	35.1

Current Optimization File Data

Current Value	Description
0.97	Nebulizer Gas Flow
5.75	Lens Voltage
1400.00	ICP RF Power
-2156.25	Analog Stage Voltage
1200.00	Pulse Stage Voltage
70.00	Discriminator Threshold
-6.00	AC Rod Offset
60.00	Service DAC 1
0.00	Quadrupole Rod Offset

Current Autolens Data

Analyte	Mass	Num of Pts	DAC Value	Maximum Intensity
Be	9	33	7.0	2666.6
Mg	24	33	5.3	25568.9
Co	59	33	5.8	81517.2
Rh	103	33	6.3	296833.8
In	115	33	6.3	399106.5
Ba	138	33	6.8	389084.3
Ce	140	33	6.5	482116.6
Pb	208	33	8.3	345811.4

QUANTITATIVE ANALYSIS REPORT

Sample ID: Blank

Sample Date/Time: Thursday, August 21, 2014 16:12:48
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082114M2\Blank.001

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			805590.911	ug/L	
	233	**U**			264.336	ug/L	
	234	**U**			4.533	ug/L	
	235	**U**			19.067	ug/L	
	236	**U**			5.400	ug/L	
	238	**U**			285.403	ug/L	

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 1

Sample Date/Time: Thursday, August 21, 2014 16:19:28
Autosampler Position: 191
Dataset File: D:\Elandata\Dataset\082114M2\Standard 1.002

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			799719.741	ug/L	805590.911
	233	**U**			24.733	ug/L	264.336
	234	**U**			29.733	ug/L	4.533
	235	**U**	**0.048500**	1.307	1406.869	ug/L	19.067
	236	**U**			43.267	ug/L	5.400
	238	**U**	**0.050300**	1.544	1484.144	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 2
Sample Date/Time: Thursday, August 21, 2014 16:24:09
Autosampler Position: 192
Dataset File: D:\Elandata\Dataset\082114M2\Standard 2.003

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			786994.153	ug/L	805590.911
	233	**U**			1219.519	ug/L	264.336
	234	**U**	**0.049600**	1.104	1459.075	ug/L	4.533
	235	**U**	**2.900552**	1.883	81695.922	ug/L	19.067
	236	**U**	**0.053400**	1.516	2262.246	ug/L	5.400
	238	**U**	**3.161473**	1.510	74558.990	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 3
Sample Date/Time: Thursday, August 21, 2014 16:28:50
Autosampler Position: 193
Dataset File: D:\Elandata\Dataset\082114M2\Standard 3.004

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			796715.705	ug/L	805590.911
	233	**U**	**0.051500**	2.299	2010.742	ug/L	264.336
	234	**U**	**0.082697**	1.333	2459.479	ug/L	4.533
	235	**U**	**4.760723**	2.050	135705.918	ug/L	19.067
	236	**U**	**0.088197**	2.520	3776.433	ug/L	5.400
	238	**U**	**5.253911**	1.300	125245.676	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 4
Sample Date/Time: Thursday, August 21, 2014 16:33:31
Autosampler Position: 194
Dataset File: D:\Elandata\Dataset\082114M2\Standard 4.005

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			780165.805	ug/L	805590.911
	233	**U**	**0.104971**	2.425	4036.637	ug/L	264.336
	234	**U**	**0.165487**	2.565	4873.298	ug/L	4.533
	235	**U**	**9.694899**	2.440	269549.931	ug/L	19.067
	236	**U**	**0.178150**	3.395	7532.186	ug/L	5.400
	238	**U**	**10.051814**	2.241	248129.544	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 5
Sample Date/Time: Thursday, August 21, 2014 16:38:12
Autosampler Position: 195
Dataset File: D:\Elandata\Dataset\082114M2\Standard 5.006

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			781968.211	ug/L	805590.911
	233	**U**	**0.311283**	1.209	12101.731	ug/L	264.336
	234	**U**	**0.495759**	2.148	14568.165	ug/L	4.533
	235	**U**	**29.018366**	2.153	792469.921	ug/L	19.067
	236	**U**	**0.533576**	2.040	22501.393	ug/L	5.400
	238	**U**	**30.105377**	1.783	733505.061	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 1

Sample Date/Time: Thursday, August 21, 2014 16:42:53
Autosampler Position: 196
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 1.007

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			769114.681	ug/L	805590.911
	233	**U**	**0.232364**	2.410	8945.269	ug/L	264.336
	234	**U**	**0.000707**	14.537	24.667	ug/L	4.533
	235	**U**	**0.011756**	3.921	333.737	ug/L	19.067
	236	**U**	**0.000235**	13.271	14.867	ug/L	5.400
	238	**U**	**0.052965**	3.661	1540.350	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.472**	
	U	233		**103.966**
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 2

Sample Date/Time: Thursday, August 21, 2014 16:47:34
Autosampler Position: 197
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 2.008

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			774039.605	ug/L	805590.911
	233	**U**	**44.902625**	2.407	1690693.595	ug/L	264.336
	234	**U**	**0.089960**	2.545	2619.774	ug/L	4.533
	235	**U**	**0.116916**	0.993	3180.021	ug/L	19.067
	236	**U**	**0.007027**	2.436	298.403	ug/L	5.400
	238	**U**	**10.126660**	1.695	244436.413	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.083**	
	U	233		
	U	234		**107.737**
	U	235		
	U	236		
	U	238		**103.564**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 3

Sample Date/Time: Thursday, August 21, 2014 16:52:15
Autosampler Position: 198
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 3.009

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			760022.105	ug/L	805590.911
	233	**U**	**458.645191**	1.523	16961842.802	ug/L	264.336
	234	**U**	**0.907707**	2.029	25924.319	ug/L	4.533
	235	**U**	**1.156582**	1.032	30729.658	ug/L	19.067
	236	**U**	**0.070448**	2.026	2892.093	ug/L	5.400
	238	**U**	**98.736065**	1.609	2337825.658	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.343**	
	U	233		
	U	234		
	U	235		**109.442**
	U	236		**94.435**
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 4

Sample Date/Time: Thursday, August 21, 2014 16:56:55
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 4.010

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			772536.969	ug/L	805590.911
	233	**U**	**0.082909**	7.508	3363.129	ug/L	264.336
	234	**U**	**0.000227**	48.563	10.800	ug/L	4.533
	235	**U**	**0.000699**	17.066	37.067	ug/L	19.067
	236	**U**	**0.000006**	447.217	5.400	ug/L	5.400
	238	**U**	**0.016630**	6.655	673.016	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.897**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 5

Sample Date/Time: Thursday, August 21, 2014 17:01:35
Autosampler Position: 191
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 5.011

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			772575.194	ug/L	805590.911
	233	**U**	**0.011233**	20.221	673.149	ug/L	264.336
	234	**U**	**0.000893**	9.860	30.200	ug/L	4.533
	235	**U**	**0.050843**	0.571	1390.868	ug/L	19.067
	236	**U**	**0.000838**	5.042	40.133	ug/L	5.400
	238	**U**	**0.054126**	5.337	1574.287	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.902**	
	U	233		
	U	234		
	U	235		**104.831**
	U	236		
	U	238		**107.606**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Thursday, August 21, 2014 17:06:16
Autosampler Position: 192
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 6.012

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			770262.057	ug/L	805590.911
	233	**U**	**0.031038**	4.607	1414.403	ug/L	264.336
	234	**U**	**0.052007**	2.838	1508.880	ug/L	4.533
	235	**U**	**3.096640**	2.861	83283.597	ug/L	19.067
	236	**U**	**0.055279**	2.975	2299.985	ug/L	5.400
	238	**U**	**3.193397**	2.219	76866.750	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.615**	
	U	233		**100.445**
	U	234		**104.853**
	U	235		
	U	236		**103.518**
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7
Sample Date/Time: Thursday, August 21, 2014 17:10:57
Autosampler Position: 199
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 7.013

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			699830.426	ug/L	805590.911
	233	**U**	**-0.003008**	20.403	126.334	ug/L	264.336
	234	**U**	**0.000108**	33.469	6.800	ug/L	4.533
	235	**U**	**0.001107**	22.485	43.400	ug/L	19.067
	236	**U**	**0.000030**	99.392	5.800	ug/L	5.400
	238	**U**	**-0.007927**	8.278	74.534	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**86.872**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 8

Sample Date/Time: Thursday, August 21, 2014 17:15:38
Autosampler Position: 200
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 8.014

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			702709.923	ug/L	805590.911
	233	**U**	**0.051601**	0.986	1995.540	ug/L	264.336
	234	**U**	**0.089005**	2.215	2353.861	ug/L	4.533
	235	**U**	**5.322425**	1.608	130657.630	ug/L	19.067
	236	**U**	**0.095208**	1.949	3613.258	ug/L	5.400
	238	**U**	**5.509541**	0.967	120875.842	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**87.229**	
	U	233		**100.196**
	U	234		**107.624**
	U	235		**109.797**
	U	236		**106.975**
	U	238		**109.623**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9

Sample Date/Time: Thursday, August 21, 2014 17:20:19

Autosampler Position: 10

Dataset File: D:\Elandata\Dataset\082114M2\QC Std 9.015

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			776975.064	ug/L	805590.911
	233	**U**	**0.048116**	1.657	2074.084	ug/L	264.336
	234	**U**	**0.085194**	1.582	2492.218	ug/L	4.533
	235	**U**	**5.110572**	1.216	138746.993	ug/L	19.067
	236	**U**	**0.090925**	2.047	3814.643	ug/L	5.400
	238	**U**	**5.302016**	1.181	128623.982	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.448**	
	U	233		**93.429**
	U	234		**103.016**
	U	235		**105.427**
	U	236		**102.163**
	U	238		**105.494**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 21, 2014 17:25:00
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 10.016

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			764401.390	ug/L	805590.911
	233	**U**	**0.007025**	5.879	511.876	ug/L	264.336
	234	**U**	**0.000124**	54.792	7.867	ug/L	4.533
	235	**U**	**0.002996**	17.581	97.600	ug/L	19.067
	236	**U**	**0.000080**	30.707	8.400	ug/L	5.400
	238	**U**	**0.003058**	16.587	343.204	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.887**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 429764

Sample Date/Time: Thursday, August 21, 2014 17:29:39
Autosampler Position: 11
Dataset File: D:\Elandata\Dataset\082114M2\429764.017

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			784888.735	ug/L	805590.911
	233	**U**	**-0.006271**	0.537	17.933	ug/L	264.336
	234	**U**	**0.000014**	445.062	4.800	ug/L	4.533
	235	**U**	**-0.000164**	3.704	14.067	ug/L	19.067
	236	**U**	**-0.000017**	42.154	4.533	ug/L	5.400
	238	**U**	**-0.000806**	33.915	258.136	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.430**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 429765

Sample Date/Time: Thursday, August 21, 2014 17:34:19
Autosampler Position: 12
Dataset File: D:\Elandata\Dataset\082114M2\429765.018

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			809688.942	ug/L	805590.911
	233	**U**	**-0.003862**	5.950	113.134	ug/L	264.336
	234	**U**	**0.040334**	3.149	1231.186	ug/L	4.533
	235	**U**	**2.449435**	2.079	69288.352	ug/L	19.067
	236	**U**	**0.043503**	3.438	1904.194	ug/L	5.400
	238	**U**	**2.523656**	1.985	63931.108	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.509**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102600-A-6-K
Sample Date/Time: Thursday, August 21, 2014 17:38:59
Autosampler Position: 13
Dataset File: D:\Elandata\Dataset\082114M2\680-102600-A-6-K.019

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			739714.512	ug/L	805590.911
	233	**U**	**-0.006264**	0.502	17.133	ug/L	264.336
	234	**U**	**0.000441**	23.625	16.400	ug/L	4.533
	235	**U**	**0.039197**	1.916	1031.171	ug/L	19.067
	236	**U**	**0.000021**	159.670	5.800	ug/L	5.400
	238	**U**	**5.251044**	0.479	121323.117	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.823**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102600-A-6-K SD

Sample Date/Time: Thursday, August 21, 2014 17:43:39

Autosampler Position: 14

Dataset File: D:\Elandata\Dataset\082114M2\680-102600-A-6-K SD.020

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			789103.811	ug/L	805590.911
	233	**U**	**-0.006489**	0.574	9.667	ug/L	264.336
	234	**U**	**0.000080**	102.809	6.800	ug/L	4.533
	235	**U**	**0.007125**	2.406	215.002	ug/L	19.067
	236	**U**	**-0.000008**	51.405	4.933	ug/L	5.400
	238	**U**	**0.987923**	0.447	24573.421	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.953**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102600-A-6-L MS

Sample Date/Time: Thursday, August 21, 2014 17:48:19

Autosampler Position: 15

Dataset File: D:\Elandata\Dataset\082114M2\680-102600-A-6-L MS.021

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			749397.458	ug/L	805590.911
	233	**U**	**-0.005360**	2.410	50.267	ug/L	264.336
	234	**U**	**0.015009**	1.122	427.206	ug/L	4.533
	235	**U**	**0.925071**	0.235	24248.441	ug/L	19.067
	236	**U**	**0.015604**	2.018	636.148	ug/L	5.400
	238	**U**	**6.149397**	0.612	143895.851	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.025**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102600-A-6-M MSD

Sample Date/Time: Thursday, August 21, 2014 17:52:59

Autosampler Position: 16

Dataset File: D:\Elandata\Dataset\082114M2\680-102600-A-6-M MSD.022

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			741764.807	ug/L	805590.911
	233	**U**	**-0.005377**	0.885	49.200	ug/L	264.336
	234	**U**	**0.015541**	3.728	437.873	ug/L	4.533
	235	**U**	**0.956983**	0.609	24825.357	ug/L	19.067
	236	**U**	**0.016318**	0.561	658.149	ug/L	5.400
	238	**U**	**6.511849**	0.705	150800.723	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.077**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102600-A-7-G

Sample Date/Time: Thursday, August 21, 2014 17:57:39

Autosampler Position: 17

Dataset File: D:\Elandata\Dataset\082114M2\680-102600-A-7-G.023

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			743228.973	ug/L	805590.911
	233	**U**	**-0.006348**	0.862	14.200	ug/L	264.336
	234	**U**	**0.000364**	23.359	14.400	ug/L	4.533
	235	**U**	**0.033564**	6.244	888.161	ug/L	19.067
	236	**U**	**-0.000001**	1881.622	4.933	ug/L	5.400
	238	**U**	**4.666489**	6.223	108207.292	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.259**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102600-A-8-G

Sample Date/Time: Thursday, August 21, 2014 18:02:19

Autosampler Position: 18

Dataset File: D:\Elandata\Dataset\082114M2\680-102600-A-8-G.024

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			740467.709	ug/L	805590.911
	233	**U**	**-0.006368**	1.532	13.400	ug/L	264.336
	234	**U**	**0.000381**	19.121	14.733	ug/L	4.533
	235	**U**	**0.042143**	3.883	1107.176	ug/L	19.067
	236	**U**	**-0.000006**	393.809	4.733	ug/L	5.400
	238	**U**	**5.595425**	3.007	129304.718	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.916**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102600-A-9-G

Sample Date/Time: Thursday, August 21, 2014 18:07:00

Autosampler Position: 19

Dataset File: D:\Elandata\Dataset\082114M2\680-102600-A-9-G.025

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			730690.237	ug/L	805590.911
	233	**U**	**-0.006378**	0.081	12.867	ug/L	264.336
	234	**U**	**0.000497**	20.837	17.733	ug/L	4.533
	235	**U**	**0.053282**	0.968	1377.933	ug/L	19.067
	236	**U**	**0.000019**	98.748	5.667	ug/L	5.400
	238	**U**	**7.132346**	1.496	162653.066	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.702**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 426404

Sample Date/Time: Thursday, August 21, 2014 18:11:40

Autosampler Position: 20

Dataset File: D:\Elandata\Dataset\082114M2\426404.026

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			771909.141	ug/L	805590.911
	233	**U**	**-0.006554**	0.581	6.933	ug/L	264.336
	234	**U**	**0.000022**	170.962	4.933	ug/L	4.533
	235	**U**	**-0.000187**	14.252	13.200	ug/L	19.067
	236	**U**	**-0.000018**	166.677	4.467	ug/L	5.400
	238	**U**	**0.015809**	3.655	653.682	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.819**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9

Sample Date/Time: Thursday, August 21, 2014 18:16:21
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 9.027

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			743341.786	ug/L	805590.911
	233	**U**	**0.049173**	3.208	2021.343	ug/L	264.336
	234	**U**	**0.087269**	3.196	2440.275	ug/L	4.533
	235	**U**	**5.192420**	3.064	134760.499	ug/L	19.067
	236	**U**	**0.093303**	1.615	3744.958	ug/L	5.400
	238	**U**	**5.406657**	2.750	125394.686	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.273**	
	U	233		**95.482**
	U	234		**105.525**
	U	235		**107.115**
	U	236		**104.835**
	U	238		**107.576**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 21, 2014 18:21:02

Autosampler Position: 1

Dataset File: D:\Elandata\Dataset\082114M2\QC Std 10.028

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			735689.202	ug/L	805590.911
	233	**U**	**0.009881**	4.173	594.946	ug/L	264.336
	234	**U**	**0.000099**	79.258	6.800	ug/L	4.533
	235	**U**	**0.002658**	42.400	84.600	ug/L	19.067
	236	**U**	**0.000070**	96.373	7.600	ug/L	5.400
	238	**U**	**0.004074**	40.669	352.538	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.323**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 426405

Sample Date/Time: Thursday, August 21, 2014 18:25:42
Autosampler Position: 21
Dataset File: D:\Elandata\Dataset\082114M2\426405.029

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			760242.607	ug/L	805590.911
	233	**U**	**-0.003800**	3.898	108.600	ug/L	264.336
	234	**U**	**0.043685**	2.581	1251.722	ug/L	4.533
	235	**U**	**2.614801**	2.116	69438.454	ug/L	19.067
	236	**U**	**0.047046**	1.230	1934.598	ug/L	5.400
	238	**U**	**2.676231**	2.057	63633.026	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.371**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7878-C-1-C
Sample Date/Time: Thursday, August 21, 2014 18:30:23
Autosampler Position: 22
Dataset File: D:\Elandata\Dataset\082114M2\160-7878-C-1-C.030

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			740903.731	ug/L	805590.911
	233	**U**	**-0.006526**	0.326	7.733	ug/L	264.336
	234	**U**	**0.002388**	5.425	70.600	ug/L	4.533
	235	**U**	**0.334031**	2.777	8658.025	ug/L	19.067
	236	**U**	**0.000576**	7.655	27.933	ug/L	5.400
	238	**U**	**41.457689**	2.361	956727.634	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.970**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7878-C-1-C SD

Sample Date/Time: Thursday, August 21, 2014 18:35:03

Autosampler Position: 23

Dataset File: D:\Elandata\Dataset\082114M2\160-7878-C-1-C SD.031

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			734603.329	ug/L	805590.911
	233	**U**	**-0.006549**	0.420	6.800	ug/L	264.336
	234	**U**	**0.000540**	18.797	19.067	ug/L	4.533
	235	**U**	**0.064037**	1.775	1660.563	ug/L	19.067
	236	**U**	**0.000133**	9.401	10.200	ug/L	5.400
	238	**U**	**8.208632**	2.112	188069.461	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.188**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7878-C-1-D MS

Sample Date/Time: Thursday, August 21, 2014 18:39:43

Autosampler Position: 24

Dataset File: D:\Elandata\Dataset\082114M2\160-7878-C-1-D MS.032

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			732402.154	ug/L	805590.911
	233	**U**	**-0.005991**	1.111	26.667	ug/L	264.336
	234	**U**	**0.010606**	3.515	296.203	ug/L	4.533
	235	**U**	**0.870539**	1.079	22297.617	ug/L	19.067
	236	**U**	**0.009308**	5.074	372.138	ug/L	5.400
	238	**U**	**50.482171**	0.825	1152472.014	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.915**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7878-C-1-E MSD

Sample Date/Time: Thursday, August 21, 2014 18:44:22

Autosampler Position: 25

Dataset File: D:\Elandata\Dataset\082114M2\160-7878-C-1-E MSD.033

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			742688.190	ug/L	805590.911
	233	**U**	**-0.006070**	1.663	24.333	ug/L	264.336
	234	**U**	**0.009944**	4.184	281.536	ug/L	4.533
	235	**U**	**0.741999**	0.790	19274.139	ug/L	19.067
	236	**U**	**0.009000**	1.606	365.471	ug/L	5.400
	238	**U**	**35.063109**	1.371	811606.916	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.192**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7878-D-2-C

Sample Date/Time: Thursday, August 21, 2014 18:49:02

Autosampler Position: 26

Dataset File: D:\Elandata\Dataset\082114M2\160-7878-D-2-C.034

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			742180.009	ug/L	805590.911
	233	**U**	**-0.006526**	0.558	7.733	ug/L	264.336
	234	**U**	**0.001969**	2.565	59.067	ug/L	4.533
	235	**U**	**0.289501**	3.231	7519.246	ug/L	19.067
	236	**U**	**0.000569**	10.673	27.667	ug/L	5.400
	238	**U**	**36.268200**	3.192	838299.631	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.129**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7878-B-3-A
Sample Date/Time: Thursday, August 21, 2014 18:53:42
Autosampler Position: 27
Dataset File: D:\Elandata\Dataset\082114M2\160-7878-B-3-A.035

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			748637.747	ug/L	805590.911
	233	**U**	**-0.006525**	0.597	7.800	ug/L	264.336
	234	**U**	**0.002066**	8.645	62.200	ug/L	4.533
	235	**U**	**0.305198**	2.985	7995.971	ug/L	19.067
	236	**U**	**0.000512**	17.204	25.733	ug/L	5.400
	238	**U**	**37.565818**	2.065	876245.505	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.930**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7878-C-4-C

Sample Date/Time: Thursday, August 21, 2014 18:58:22

Autosampler Position: 28

Dataset File: D:\Elandata\Dataset\082114M2\160-7878-C-4-C.036

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			752902.951	ug/L	805590.911
	233	**U**	**-0.006465**	0.833	10.133	ug/L	264.336
	234	**U**	**0.001205**	9.898	38.267	ug/L	4.533
	235	**U**	**0.163738**	5.633	4319.253	ug/L	19.067
	236	**U**	**0.000296**	8.075	17.067	ug/L	5.400
	238	**U**	**22.072370**	4.725	517481.908	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.460**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7878-A-5-A

Sample Date/Time: Thursday, August 21, 2014 19:03:02

Autosampler Position: 29

Dataset File: D:\Elandata\Dataset\082114M2\160-7878-A-5-A.037

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			746958.281	ug/L	805590.911
	233	**U**	**-0.006584**	0.367	5.667	ug/L	264.336
	234	**U**	**0.000100**	9.102	7.000	ug/L	4.533
	235	**U**	**0.015642**	4.470	425.473	ug/L	19.067
	236	**U**	**0.000033**	41.335	6.333	ug/L	5.400
	238	**U**	**2.674987**	3.312	62469.927	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.722**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7878-B-6-A

Sample Date/Time: Thursday, August 21, 2014 19:07:42

Autosampler Position: 30

Dataset File: D:\Elandata\Dataset\082114M2\160-7878-B-6-A.038

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			752236.724	ug/L	805590.911
	233	**U**	**-0.006531**	0.412	7.600	ug/L	264.336
	234	**U**	**0.000083**	47.747	6.533	ug/L	4.533
	235	**U**	**0.009632**	3.430	270.736	ug/L	19.067
	236	**U**	**0.000015**	161.881	5.600	ug/L	5.400
	238	**U**	**1.542627**	1.970	36406.783	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.377**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Thursday, August 21, 2014 19:12:23
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 9.039

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			737096.242	ug/L	805590.911
	233	**U**	**0.044301**	2.109	1830.384	ug/L	264.336
	234	**U**	**0.079178**	3.148	2195.702	ug/L	4.533
	235	**U**	**4.745510**	2.205	122162.984	ug/L	19.067
	236	**U**	**0.085503**	2.583	3402.539	ug/L	5.400
	238	**U**	**4.956761**	2.300	114030.480	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.498**	
	U	233		**86.022**
	U	234		**95.741**
	U	235		**97.896**
	U	236		**96.071**
	U	238		**98.624**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 21, 2014 19:17:04
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 10.040

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			733211.852	ug/L	805590.911
	233	**U**	**0.009169**	5.154	567.278	ug/L	264.336
	234	**U**	**0.000115**	35.515	7.267	ug/L	4.533
	235	**U**	**0.002610**	31.148	83.467	ug/L	19.067
	236	**U**	**0.000071**	78.742	7.733	ug/L	5.400
	238	**U**	**0.003725**	37.275	343.737	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.015**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-1-D

Sample Date/Time: Thursday, August 21, 2014 19:21:44

Autosampler Position: 31

Dataset File: D:\Elandata\Dataset\082114M2\680-102370-A-1-D.041

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			740918.084	ug/L	805590.911
	233	**U**	**-0.006484**	0.229	9.200	ug/L	264.336
	234	**U**	**0.000154**	21.063	8.467	ug/L	4.533
	235	**U**	**0.007640**	3.090	215.202	ug/L	19.067
	236	**U**	**0.000015**	207.504	5.533	ug/L	5.400
	238	**U**	**1.097833**	4.249	25585.760	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.972**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-2-C

Sample Date/Time: Thursday, August 21, 2014 19:26:24

Autosampler Position: 32

Dataset File: D:\Elandata\Dataset\082114M2\680-102370-A-2-C.042

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			691987.165	ug/L	805590.911
	233	**U**	**-0.006475**	0.491	8.933	ug/L	264.336
	234	**U**	**0.000562**	5.925	18.533	ug/L	4.533
	235	**U**	**0.059528**	1.892	1455.874	ug/L	19.067
	236	**U**	**0.000027**	104.636	5.667	ug/L	5.400
	238	**U**	**7.315554**	1.614	158006.902	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**85.898**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-3-C
Sample Date/Time: Thursday, August 21, 2014 19:31:05
Autosampler Position: 33
Dataset File: D:\Elandata\Dataset\082114M2\680-102370-A-3-C.043

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			694145.522	ug/L	805590.911
	233	**U**	**-0.006376**	1.292	12.267	ug/L	264.336
	234	**U**	**0.000392**	11.068	14.133	ug/L	4.533
	235	**U**	**0.046534**	0.975	1145.313	ug/L	19.067
	236	**U**	**0.000027**	145.646	5.667	ug/L	5.400
	238	**U**	**5.412007**	0.433	117328.804	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**86.166**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-4-C
Sample Date/Time: Thursday, August 21, 2014 19:35:46
Autosampler Position: 34
Dataset File: D:\Elandata\Dataset\082114M2\680-102370-A-4-C.044

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			699174.046	ug/L	805590.911
	233	**U**	**-0.006412**	0.727	11.133	ug/L	264.336
	234	**U**	**0.001981**	4.653	56.000	ug/L	4.533
	235	**U**	**0.187818**	2.461	4604.342	ug/L	19.067
	236	**U**	**0.000325**	31.499	16.933	ug/L	5.400
	238	**U**	**6.409741**	3.259	139849.937	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**86.790**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102370-A-6-D

Sample Date/Time: Thursday, August 21, 2014 19:40:26

Autosampler Position: 35

Dataset File: D:\Elandata\Dataset\082114M2\680-102370-A-6-D.045

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			735474.118	ug/L	805590.911
	233	**U**	**-0.006492**	0.106	8.867	ug/L	264.336
	234	**U**	**0.000178**	42.127	9.000	ug/L	4.533
	235	**U**	**0.014614**	7.226	392.139	ug/L	19.067
	236	**U**	**-0.000008**	400.828	4.600	ug/L	5.400
	238	**U**	**1.947637**	4.375	44840.268	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.296**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 429618

Sample Date/Time: Thursday, August 21, 2014 19:45:05
Autosampler Position: 36
Dataset File: D:\Elandata\Dataset\082114M2\429618.046

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			742272.994	ug/L	805590.911
	233	**U**	**-0.006576**	0.416	5.867	ug/L	264.336
	234	**U**	**0.000027**	164.817	4.933	ug/L	4.533
	235	**U**	**-0.000445**	9.400	6.000	ug/L	19.067
	236	**U**	**0.000015**	186.508	5.533	ug/L	5.400
	238	**U**	**-0.006270**	3.255	117.867	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**92.140**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 429626

Sample Date/Time: Thursday, August 21, 2014 19:49:45
Autosampler Position: 37
Dataset File: D:\Elandata\Dataset\082114M2\429626.047

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			738955.603	ug/L	805590.911
	233	**U**	**-0.003873**	4.321	103.067	ug/L	264.336
	234	**U**	**0.042935**	0.544	1196.850	ug/L	4.533
	235	**U**	**2.575145**	1.036	66502.720	ug/L	19.067
	236	**U**	**0.046217**	1.148	1847.386	ug/L	5.400
	238	**U**	**2.648367**	1.626	61222.044	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**91.728**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7944-C-4-B

Sample Date/Time: Thursday, August 21, 2014 19:54:25

Autosampler Position: 38

Dataset File: D:\Elandata\Dataset\082114M2\160-7944-C-4-B.048

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			701258.981	ug/L	805590.911
	233	**U**	**-0.006549**	0.791	6.467	ug/L	264.336
	234	**U**	**0.003181**	8.942	87.734	ug/L	4.533
	235	**U**	**0.419483**	2.056	10290.641	ug/L	19.067
	236	**U**	**0.002346**	1.921	93.400	ug/L	5.400
	238	**U**	**55.301838**	2.306	1208003.967	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**87.049**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7944-C-4-B SD

Sample Date/Time: Thursday, August 21, 2014 19:59:05

Autosampler Position: 39

Dataset File: D:\Elandata\Dataset\082114M2\160-7944-C-4-B SD.049

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			701343.592	ug/L	805590.911
	233	**U**	**-0.006571**	0.631	5.800	ug/L	264.336
	234	**U**	**0.000663**	15.773	21.333	ug/L	4.533
	235	**U**	**0.081084**	2.840	2002.007	ug/L	19.067
	236	**U**	**0.000448**	15.638	21.600	ug/L	5.400
	238	**U**	**11.132370**	1.880	243405.082	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**87.060**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7944-C-4-C MS

Sample Date/Time: Thursday, August 21, 2014 20:03:44

Autosampler Position: 40

Dataset File: D:\Elandata\Dataset\082114M2\160-7944-C-4-C MS.050

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			699609.150	ug/L	805590.911
	233	**U**	**-0.006465**	0.600	9.333	ug/L	264.336
	234	**U**	**0.004910**	4.270	132.934	ug/L	4.533
	235	**U**	**0.565035**	1.901	13823.226	ug/L	19.067
	236	**U**	**0.004180**	4.637	162.668	ug/L	5.400
	238	**U**	**64.049567**	1.914	1395843.113	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**86.844**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9

Sample Date/Time: Thursday, August 21, 2014 20:08:25
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 9.051

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			702594.418	ug/L	805590.911
	233	**U**	**0.047482**	3.329	1852.854	ug/L	264.336
	234	**U**	**0.083949**	2.880	2219.372	ug/L	4.533
	235	**U**	**5.045220**	1.551	123844.971	ug/L	19.067
	236	**U**	**0.090569**	1.351	3436.747	ug/L	5.400
	238	**U**	**5.228564**	1.683	114680.828	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**87.215**	
	U	233		**92.197**
	U	234		**101.510**
	U	235		**104.079**
	U	236		**101.763**
	U	238		**104.032**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 21, 2014 20:13:05

Autosampler Position: 1

Dataset File: D:\Elandata\Dataset\082114M2\QC Std 10.052

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			714434.820	ug/L	805590.911
	233	**U**	**0.009450**	2.572	562.811	ug/L	264.336
	234	**U**	**0.000171**	41.309	8.600	ug/L	4.533
	235	**U**	**0.002146**	27.042	69.934	ug/L	19.067
	236	**U**	**0.000050**	57.106	6.667	ug/L	5.400
	238	**U**	**0.007641**	19.743	422.073	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**88.685**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7944-C-4-D MSD

Sample Date/Time: Thursday, August 21, 2014 20:17:45

Autosampler Position: 41

Dataset File: D:\Elandata\Dataset\082114M2\160-7944-C-4-D MSD.053

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			700825.693	ug/L	805590.911
	233	**U**	**-0.006456**	0.737	9.667	ug/L	264.336
	234	**U**	**0.004899**	4.645	132.801	ug/L	4.533
	235	**U**	**0.549555**	2.057	13466.884	ug/L	19.067
	236	**U**	**0.004145**	0.765	161.401	ug/L	5.400
	238	**U**	**60.639698**	2.351	1323603.086	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**86.995**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7944-C-5-B

Sample Date/Time: Thursday, August 21, 2014 20:22:26

Autosampler Position: 42

Dataset File: D:\Elandata\Dataset\082114M2\160-7944-C-5-B.054

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			701980.585	ug/L	805590.911
	233	**U**	**-0.006536**	0.274	6.933	ug/L	264.336
	234	**U**	**0.002694**	5.873	75.067	ug/L	4.533
	235	**U**	**0.352982**	2.558	8668.032	ug/L	19.067
	236	**U**	**0.001892**	10.275	76.067	ug/L	5.400
	238	**U**	**47.456228**	2.471	1037474.007	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**87.139**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7944-C-6-B
Sample Date/Time: Thursday, August 21, 2014 20:27:06
Autosampler Position: 43
Dataset File: D:\Elandata\Dataset\082114M2\160-7944-C-6-B.055

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			706432.628	ug/L	805590.911
	233	**U**	**-0.006586**	0.127	5.267	ug/L	264.336
	234	**U**	**0.003092**	8.919	85.867	ug/L	4.533
	235	**U**	**0.390435**	1.918	9649.328	ug/L	19.067
	236	**U**	**0.002207**	1.630	88.934	ug/L	5.400
	238	**U**	**51.937040**	1.868	1142975.269	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**87.691**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7944-C-7-B

Sample Date/Time: Thursday, August 21, 2014 20:31:46
Autosampler Position: 44
Dataset File: D:\Elandata\Dataset\082114M2\160-7944-C-7-B.056

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			707500.883	ug/L	805590.911
	233	**U**	**-0.006577**	0.186	5.600	ug/L	264.336
	234	**U**	**0.002427**	4.869	68.533	ug/L	4.533
	235	**U**	**0.316212**	2.605	7827.680	ug/L	19.067
	236	**U**	**0.001695**	2.197	69.467	ug/L	5.400
	238	**U**	**40.583609**	2.537	894221.863	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**87.824**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 160-7944-A-8-C

Sample Date/Time: Thursday, August 21, 2014 20:36:27

Autosampler Position: 45

Dataset File: D:\Elandata\Dataset\082114M2\160-7944-A-8-C.057

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			696091.770	ug/L	805590.911
	233	**U**	**-0.006579**	0.281	5.467	ug/L	264.336
	234	**U**	**0.002433**	6.738	67.667	ug/L	4.533
	235	**U**	**0.322164**	2.247	7847.157	ug/L	19.067
	236	**U**	**0.001896**	5.209	75.734	ug/L	5.400
	238	**U**	**40.981462**	2.439	888511.411	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**86.408**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: CCV

Sample Date/Time: Thursday, August 21, 2014 20:41:08
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082114M2\CCV.058

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			692559.477	ug/L	805590.911
	233	**U**	**0.046087**	4.037	1778.311	ug/L	264.336
	234	**U**	**0.082427**	2.517	2147.828	ug/L	4.533
	235	**U**	**4.956349**	2.643	119843.956	ug/L	19.067
	236	**U**	**0.088736**	2.640	3316.652	ug/L	5.400
	238	**U**	**5.178400**	2.640	111895.031	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**85.969**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: CCB

Sample Date/Time: Thursday, August 21, 2014 20:45:48
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082114M2\CCB.059

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			698621.330	ug/L	805590.911
	233	**U**	**0.009302**	1.107	545.477	ug/L	264.336
	234	**U**	**0.000163**	20.144	8.200	ug/L	4.533
	235	**U**	**0.002834**	22.033	85.134	ug/L	19.067
	236	**U**	**0.000077**	27.912	7.600	ug/L	5.400
	238	**U**	**0.007921**	21.008	418.539	ug/L	285.403

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**86.722**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Blank

Sample Date/Time: Thursday, August 21, 2014 20:50:28
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082114M2\Blank.060

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			707940.340	ug/L	
	233	**U**			556.744	ug/L	
	234	**U**			6.933	ug/L	
	235	**U**			49.467	ug/L	
	236	**U**			6.267	ug/L	
	238	**U**			342.737	ug/L	

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 1

Sample Date/Time: Thursday, August 21, 2014 20:57:08
Autosampler Position: 191
Dataset File: D:\Elandata\Dataset\082114M2\Standard 1.061

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			713409.693	ug/L	707940.340
	233	**U**			266.336	ug/L	556.744
	234	**U**			29.800	ug/L	6.933
	235	**U**	**0.048500**	1.984	1226.186	ug/L	49.467
	236	**U**			37.333	ug/L	6.267
	238	**U**	**0.050300**	5.808	1368.399	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 2
Sample Date/Time: Thursday, August 21, 2014 21:01:49
Autosampler Position: 192
Dataset File: D:\Elandata\Dataset\082114M2\Standard 2.062

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			700158.935	ug/L	707940.340
	233	**U**			1160.914	ug/L	556.744
	234	**U**	**0.049600**	2.384	1291.458	ug/L	6.933
	235	**U**	**3.035034**	1.729	72298.334	ug/L	49.467
	236	**U**	**0.053400**	1.998	2010.608	ug/L	6.267
	238	**U**	**3.348089**	1.788	67273.899	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 3
Sample Date/Time: Thursday, August 21, 2014 21:06:30
Autosampler Position: 193
Dataset File: D:\Elandata\Dataset\082114M2\Standard 3.063

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			706458.527	ug/L	707940.340
	233	**U**	**0.051500**	0.632	1782.511	ug/L	556.744
	234	**U**	**0.082749**	1.335	2170.498	ug/L	6.933
	235	**U**	**4.950057**	1.618	118977.435	ug/L	49.467
	236	**U**	**0.087001**	1.371	3302.049	ug/L	6.267
	238	**U**	**5.447177**	1.499	110255.606	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 4
Sample Date/Time: Thursday, August 21, 2014 21:11:11
Autosampler Position: 194
Dataset File: D:\Elandata\Dataset\082114M2\Standard 4.064

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			716258.771	ug/L	707940.340
	233	**U**	**0.106504**	1.782	3539.373	ug/L	556.744
	234	**U**	**0.165114**	1.981	4328.257	ug/L	6.933
	235	**U**	**9.694901**	1.853	237214.528	ug/L	49.467
	236	**U**	**0.177625**	2.134	6669.559	ug/L	6.267
	238	**U**	**10.051816**	1.817	219899.486	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: Standard 5

Sample Date/Time: Thursday, August 21, 2014 21:15:52
Autosampler Position: 195
Dataset File: D:\Elandata\Dataset\082114M2\Standard 5.065

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			702315.726	ug/L	707940.340
	233	**U**	**0.315322**	2.060	10657.112	ug/L	556.744
	234	**U**	**0.496192**	2.693	12778.384	ug/L	6.933
	235	**U**	**29.112851**	1.519	704617.520	ug/L	49.467
	236	**U**	**0.534769**	1.586	19950.206	ug/L	6.267
	238	**U**	**30.189414**	2.468	653369.606	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165		
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 1

Sample Date/Time: Thursday, August 21, 2014 21:20:33
Autosampler Position: 196
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 1.066

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			700083.091	ug/L	707940.340
	233	**U**	**0.232165**	3.148	7964.021	ug/L	556.744
	234	**U**	**0.000619**	11.722	22.800	ug/L	6.933
	235	**U**	**0.014302**	6.523	393.339	ug/L	49.467
	236	**U**	**0.000311**	10.656	17.733	ug/L	6.267
	238	**U**	**0.052060**	2.085	1461.875	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.890**	
	U	233		**103.877**
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 2

Sample Date/Time: Thursday, August 21, 2014 21:25:14
Autosampler Position: 197
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 2.067

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			702351.498	ug/L	707940.340
	233	**U**	**47.154602**	2.241	1511483.685	ug/L	556.744
	234	**U**	**0.090572**	2.180	2338.458	ug/L	6.933
	235	**U**	**0.115046**	2.735	2832.415	ug/L	49.467
	236	**U**	**0.007015**	3.456	267.669	ug/L	6.267
	238	**U**	**10.113441**	2.706	219078.431	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.211**	
	U	233		
	U	234		**108.470**
	U	235		
	U	236		
	U	238		**103.428**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 3

Sample Date/Time: Thursday, August 21, 2014 21:29:55
Autosampler Position: 198
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 3.068

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			702215.440	ug/L	707940.340
	233	**U**	**470.632565**	1.752	15081637.667	ug/L	556.744
	234	**U**	**0.899765**	1.234	23176.212	ug/L	6.933
	235	**U**	**1.134320**	1.316	27503.694	ug/L	49.467
	236	**U**	**0.069100**	3.290	2581.300	ug/L	6.267
	238	**U**	**94.962648**	0.409	2055912.436	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.191**	
	U	233		
	U	234		
	U	235		**107.335**
	U	236		**92.628**
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 4
Sample Date/Time: Thursday, August 21, 2014 21:34:36
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 4.069

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			708867.009	ug/L	707940.340
	233	**U**	**0.110430**	37.411	4079.142	ug/L	556.744
	234	**U**	**0.000178**	24.513	11.533	ug/L	6.933
	235	**U**	**0.000096**	185.633	51.733	ug/L	49.467
	236	**U**	**0.000001**	4196.675	6.333	ug/L	6.267
	238	**U**	**0.020715**	38.035	789.089	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.131**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 5

Sample Date/Time: Thursday, August 21, 2014 21:39:16
Autosampler Position: 191
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 5.070

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			700724.137	ug/L	707940.340
	233	**U**	**0.015699**	59.978	1041.239	ug/L	556.744
	234	**U**	**0.000942**	3.870	31.067	ug/L	6.933
	235	**U**	**0.048770**	1.456	1226.919	ug/L	49.467
	236	**U**	**0.000877**	4.864	38.800	ug/L	6.267
	238	**U**	**0.051936**	6.312	1458.408	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.981**	
	U	233		
	U	234		
	U	235		**100.557**
	U	236		
	U	238		**103.252**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 6

Sample Date/Time: Thursday, August 21, 2014 21:43:57
Autosampler Position: 192
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 6.071

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			695836.660	ug/L	707940.340
	233	**U**	**0.031646**	13.591	1547.684	ug/L	556.744
	234	**U**	**0.050606**	2.309	1297.526	ug/L	6.933
	235	**U**	**2.998226**	2.332	71917.646	ug/L	49.467
	236	**U**	**0.053968**	4.210	1998.140	ug/L	6.267
	238	**U**	**3.115317**	2.392	67103.331	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.290**	
	U	233		**102.413**
	U	234		**102.027**
	U	235		
	U	236		**101.063**
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 7
Sample Date/Time: Thursday, August 21, 2014 21:48:38
Autosampler Position: 199
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 7.072

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			685732.753	ug/L	707940.340
	233	**U**	**-0.011059**	12.310	191.401	ug/L	556.744
	234	**U**	**-0.000032**	240.563	5.867	ug/L	6.933
	235	**U**	**-0.000658**	53.658	32.067	ug/L	49.467
	236	**U**	**-0.000006**	717.873	5.800	ug/L	6.267
	238	**U**	**-0.012321**	1.129	71.400	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.863**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 8

Sample Date/Time: Thursday, August 21, 2014 21:53:19
Autosampler Position: 200
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 8.073

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			689130.697	ug/L	707940.340
	233	**U**	**0.044670**	5.068	1944.932	ug/L	556.744
	234	**U**	**0.087145**	1.341	2209.505	ug/L	6.933
	235	**U**	**5.148747**	1.327	122328.516	ug/L	49.467
	236	**U**	**0.093374**	2.571	3421.877	ug/L	6.267
	238	**U**	**5.322061**	1.483	113347.181	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.343**	
	U	233		**86.737**
	U	234		**105.375**
	U	235		**106.214**
	U	236		**104.915**
	U	238		**105.893**

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Thursday, August 21, 2014 21:58:00
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 9.074

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			737572.048	ug/L	707940.340
	233	**U**	**0.038147**	2.177	1864.122	ug/L	556.744
	234	**U**	**0.082914**	0.995	2250.044	ug/L	6.933
	235	**U**	**4.895794**	1.997	124469.390	ug/L	49.467
	236	**U**	**0.087500**	2.660	3432.613	ug/L	6.267
	238	**U**	**5.066100**	1.744	115484.806	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**104.186**	
	U	233		**74.072**
	U	234		**100.259**
	U	235		**100.996**
	U	236		**98.314**
	U	238		**100.800**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 21, 2014 22:02:40
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 10.075

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			716029.337	ug/L	707940.340
	233	**U**	**0.009475**	8.137	873.960	ug/L	556.744
	234	**U**	**0.000043**	40.286	8.133	ug/L	6.933
	235	**U**	**0.000686**	41.794	66.667	ug/L	49.467
	236	**U**	**0.000032**	86.421	7.533	ug/L	6.267
	238	**U**	**0.001301**	60.788	374.672	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.143**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 430546

Sample Date/Time: Thursday, August 21, 2014 22:07:20
Autosampler Position: 46
Dataset File: D:\Elandata\Dataset\082114M2\430546.076

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			760820.949	ug/L	707940.340
	233	**U**	**-0.016809**	0.187	14.400	ug/L	556.744
	234	**U**	**-0.000071**	3.928	5.467	ug/L	6.933
	235	**U**	**-0.001629**	5.219	10.467	ug/L	49.467
	236	**U**	**-0.000028**	185.654	5.533	ug/L	6.267
	238	**U**	**-0.008924**	3.120	158.801	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**107.470**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 430547
Sample Date/Time: Thursday, August 21, 2014 22:12:00
Autosampler Position: 47
Dataset File: D:\Elandata\Dataset\082114M2\430547.077

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			755132.342	ug/L	707940.340
	233	**U**	**-0.013835**	0.920	116.667	ug/L	556.744
	234	**U**	**0.041684**	0.656	1161.914	ug/L	6.933
	235	**U**	**2.495041**	1.796	64971.103	ug/L	49.467
	236	**U**	**0.045716**	1.834	1839.985	ug/L	6.267
	238	**U**	**2.546329**	1.356	59615.434	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**106.666**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-1-H

Sample Date/Time: Thursday, August 21, 2014 22:16:40

Autosampler Position: 48

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-1-H.078

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			686225.943	ug/L	707940.340
	233	**U**	**-0.016665**	0.411	17.467	ug/L	556.744
	234	**U**	**0.000490**	10.335	19.067	ug/L	6.933
	235	**U**	**0.049100**	2.376	1209.918	ug/L	49.467
	236	**U**	**0.000016**	26.036	6.667	ug/L	6.267
	238	**U**	**6.647149**	1.280	140967.388	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.933**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Thursday, August 21, 2014 22:21:20
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 9.079

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			706181.322	ug/L	707940.340
	233	**U**	**0.040580**	1.688	1863.255	ug/L	556.744
	234	**U**	**0.086736**	1.554	2252.911	ug/L	6.933
	235	**U**	**5.081658**	2.064	123691.699	ug/L	49.467
	236	**U**	**0.091325**	1.354	3431.479	ug/L	6.267
	238	**U**	**5.272888**	2.227	115047.890	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.752**	
	U	233		**78.796**
	U	234		**104.880**
	U	235		**104.830**
	U	236		**102.612**
	U	238		**104.914**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 21, 2014 22:26:01
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 10.080

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			706480.370	ug/L	707940.340
	233	**U**	**0.010538**	6.447	894.628	ug/L	556.744
	234	**U**	**-0.000017**	125.041	6.467	ug/L	6.933
	235	**U**	**0.001342**	36.162	81.600	ug/L	49.467
	236	**U**	**0.000018**	143.536	6.933	ug/L	6.267
	238	**U**	**0.002158**	15.054	388.805	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.794**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-1-H SD

Sample Date/Time: Thursday, August 21, 2014 22:30:40

Autosampler Position: 49

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-1-H SD.081

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			714237.117	ug/L	707940.340
	233	**U**	**-0.016934**	0.063	9.400	ug/L	556.744
	234	**U**	**0.000056**	118.734	8.400	ug/L	6.933
	235	**U**	**0.008434**	2.688	257.469	ug/L	49.467
	236	**U**	**-0.000010**	306.758	5.933	ug/L	6.267
	238	**U**	**1.249743**	2.196	27842.997	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.889**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-1-I MS

Sample Date/Time: Thursday, August 21, 2014 22:35:20

Autosampler Position: 50

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-1-I MS.082

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			675204.134	ug/L	707940.340
	233	**U**	**-0.015842**	0.250	42.533	ug/L	556.744
	234	**U**	**0.016163**	1.342	407.072	ug/L	6.933
	235	**U**	**0.988904**	1.381	23070.355	ug/L	49.467
	236	**U**	**0.016910**	2.887	612.413	ug/L	6.267
	238	**U**	**7.366823**	1.313	153674.081	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.376**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-1-J MSD

Sample Date/Time: Thursday, August 21, 2014 22:40:00

Autosampler Position: 51

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-1-J MSD.083

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			678790.441	ug/L	707940.340
	233	**U**	**-0.015633**	0.587	49.267	ug/L	556.744
	234	**U**	**0.017652**	2.316	446.140	ug/L	6.933
	235	**U**	**1.079056**	0.544	25300.126	ug/L	49.467
	236	**U**	**0.018758**	2.561	682.283	ug/L	6.267
	238	**U**	**7.522022**	0.776	157748.564	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.882**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-2-E

Sample Date/Time: Thursday, August 21, 2014 22:44:40

Autosampler Position: 52

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-2-E.084

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			668837.783	ug/L	707940.340
	233	**U**	**-0.016820**	0.200	12.267	ug/L	556.744
	234	**U**	**0.000333**	10.764	14.733	ug/L	6.933
	235	**U**	**0.047174**	4.622	1134.245	ug/L	49.467
	236	**U**	**0.000019**	65.531	6.600	ug/L	6.267
	238	**U**	**6.354383**	1.869	131336.592	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.477**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-3-E

Sample Date/Time: Thursday, August 21, 2014 22:49:20
Autosampler Position: 53
Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-3-E.085

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			705657.280	ug/L	707940.340
	233	**U**	**-0.016816**	0.189	13.067	ug/L	556.744
	234	**U**	**0.000340**	30.289	15.733	ug/L	6.933
	235	**U**	**0.034704**	6.204	892.695	ug/L	49.467
	236	**U**	**-0.000054**	49.417	4.200	ug/L	6.267
	238	**U**	**4.839174**	4.223	105536.180	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.678**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-5-D

Sample Date/Time: Thursday, August 21, 2014 22:54:01

Autosampler Position: 54

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-5-D.086

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			687586.757	ug/L	707940.340
	233	**U**	**-0.016835**	0.556	12.133	ug/L	556.744
	234	**U**	**0.000331**	16.347	15.067	ug/L	6.933
	235	**U**	**0.041621**	3.365	1034.437	ug/L	49.467
	236	**U**	**0.000001**	810.568	6.133	ug/L	6.267
	238	**U**	**5.820750**	1.670	123688.721	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.125**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-6-D

Sample Date/Time: Thursday, August 21, 2014 22:58:41

Autosampler Position: 55

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-6-D.087

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			681289.181	ug/L	707940.340
	233	**U**	**-0.016856**	0.414	11.400	ug/L	556.744
	234	**U**	**0.000421**	7.074	17.200	ug/L	6.933
	235	**U**	**0.049807**	2.344	1217.185	ug/L	49.467
	236	**U**	**-0.000024**	101.125	5.133	ug/L	6.267
	238	**U**	**6.671979**	1.054	140445.618	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.235**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-7-D

Sample Date/Time: Thursday, August 21, 2014 23:03:22

Autosampler Position: 56

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-7-D.088

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			710459.916	ug/L	707940.340
	233	**U**	**-0.016789**	0.572	14.000	ug/L	556.744
	234	**U**	**0.000175**	52.267	11.467	ug/L	6.933
	235	**U**	**0.027462**	3.005	721.885	ug/L	49.467
	236	**U**	**0.000011**	263.963	6.733	ug/L	6.267
	238	**U**	**4.000502**	4.017	87871.488	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.356**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-9-D

Sample Date/Time: Thursday, August 21, 2014 23:08:02

Autosampler Position: 57

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-9-D.089

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			661296.151	ug/L	707940.340
	233	**U**	**-0.016863**	0.279	10.867	ug/L	556.744
	234	**U**	**0.000345**	28.564	14.867	ug/L	6.933
	235	**U**	**0.050067**	3.787	1187.183	ug/L	49.467
	236	**U**	**-0.000019**	123.294	5.200	ug/L	6.267
	238	**U**	**6.887238**	2.758	140679.910	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**93.411**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-10-D

Sample Date/Time: Thursday, August 21, 2014 23:12:43

Autosampler Position: 58

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-10-D.090

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			697292.398	ug/L	707940.340
	233	**U**	**-0.016790**	0.423	13.733	ug/L	556.744
	234	**U**	**0.000557**	19.897	21.067	ug/L	6.933
	235	**U**	**0.063885**	4.766	1583.288	ug/L	49.467
	236	**U**	**0.000021**	67.903	6.933	ug/L	6.267
	238	**U**	**7.609034**	4.626	163769.538	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.496**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9

Sample Date/Time: Thursday, August 21, 2014 23:17:24

Autosampler Position: 10

Dataset File: D:\Elandata\Dataset\082114M2\QC Std 9.091

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			688136.303	ug/L	707940.340
	233	**U**	**0.043010**	2.699	1891.459	ug/L	556.744
	234	**U**	**0.091029**	2.659	2302.652	ug/L	6.933
	235	**U**	**5.327077**	2.329	126334.700	ug/L	49.467
	236	**U**	**0.096088**	1.650	3517.367	ug/L	6.267
	238	**U**	**5.556848**	1.657	118151.975	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.203**	
	U	233		**83.514**
	U	234		**110.071**
	U	235		**109.893**
	U	236		**107.964**
	U	238		**110.564**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q
U	234	Q
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Thursday, August 21, 2014 23:22:05
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 10.092

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			678138.604	ug/L	707940.340
	233	**U**	**0.013036**	3.273	936.431	ug/L	556.744
	234	**U**	**0.000086**	69.262	8.733	ug/L	6.933
	235	**U**	**0.001283**	36.402	76.934	ug/L	49.467
	236	**U**	**0.000071**	30.565	8.533	ug/L	6.267
	238	**U**	**0.004222**	16.103	416.073	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.790**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-11-D

Sample Date/Time: Thursday, August 21, 2014 23:26:44

Autosampler Position: 59

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-11-D.093

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			678367.670	ug/L	707940.340
	233	**U**	**-0.016861**	0.437	11.133	ug/L	556.744
	234	**U**	**0.000427**	4.430	17.267	ug/L	6.933
	235	**U**	**0.049344**	5.959	1199.917	ug/L	49.467
	236	**U**	**-0.000035**	29.142	4.733	ug/L	6.267
	238	**U**	**6.895049**	5.318	144338.307	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.823**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-13-D

Sample Date/Time: Thursday, August 21, 2014 23:31:24

Autosampler Position: 60

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-13-D.094

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			669014.025	ug/L	707940.340
	233	**U**	**-0.016901**	0.139	9.800	ug/L	556.744
	234	**U**	**0.000328**	28.766	14.667	ug/L	6.933
	235	**U**	**0.042466**	4.599	1025.103	ug/L	49.467
	236	**U**	**-0.000054**	46.763	4.000	ug/L	6.267
	238	**U**	**5.845249**	4.457	120738.233	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.501**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-14-D
Sample Date/Time: Thursday, August 21, 2014 23:36:03
Autosampler Position: 61
Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-14-D.095

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			671759.629	ug/L	707940.340
	233	**U**	**-0.016870**	0.243	10.800	ug/L	556.744
	234	**U**	**0.000346**	15.686	15.133	ug/L	6.933
	235	**U**	**0.038424**	2.569	936.297	ug/L	49.467
	236	**U**	**-0.000048**	75.343	4.200	ug/L	6.267
	238	**U**	**5.300552**	1.987	110033.086	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.889**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-15-F
Sample Date/Time: Thursday, August 21, 2014 23:40:43
Autosampler Position: 62
Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-15-F.096

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			636718.423	ug/L	707940.340
	233	**U**	**-0.016993**	0.007	6.667	ug/L	556.744
	234	**U**	**0.000162**	15.268	10.000	ug/L	6.933
	235	**U**	**0.021241**	0.105	510.809	ug/L	49.467
	236	**U**	**-0.000037**	10.086	4.400	ug/L	6.267
	238	**U**	**2.960285**	2.816	58381.790	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**89.940**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-16-D
Sample Date/Time: Thursday, August 21, 2014 23:45:23
Autosampler Position: 63
Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-16-D.097

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			709624.835	ug/L	707940.340
	233	**U**	**-0.016917**	0.113	9.867	ug/L	556.744
	234	**U**	**0.000084**	32.017	9.133	ug/L	6.933
	235	**U**	**0.012860**	1.429	364.138	ug/L	49.467
	236	**U**	**0.000008**	370.552	6.600	ug/L	6.267
	238	**U**	**1.938617**	3.241	42720.587	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.238**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-17-D

Sample Date/Time: Thursday, August 21, 2014 23:50:02

Autosampler Position: 64

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-17-D.098

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			705019.460	ug/L	707940.340
	233	**U**	**-0.016900**	0.271	10.400	ug/L	556.744
	234	**U**	**0.000057**	45.936	8.400	ug/L	6.933
	235	**U**	**0.008445**	5.017	254.469	ug/L	49.467
	236	**U**	**-0.000045**	59.846	4.600	ug/L	6.267
	238	**U**	**1.366137**	1.871	30017.856	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.587**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-18-D

Sample Date/Time: Thursday, August 21, 2014 23:54:42

Autosampler Position: 65

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-18-D.099

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			742322.409	ug/L	707940.340
	233	**U**	**-0.016949**	0.125	9.267	ug/L	556.744
	234	**U**	**-0.000009**	152.652	7.000	ug/L	6.933
	235	**U**	**0.005648**	4.110	196.468	ug/L	49.467
	236	**U**	**-0.000039**	67.052	5.000	ug/L	6.267
	238	**U**	**0.989201**	2.516	22977.542	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**104.857**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-19-D
Sample Date/Time: Thursday, August 21, 2014 23:59:23
Autosampler Position: 66
Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-19-D.100

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			705202.819	ug/L	707940.340
	233	**U**	**-0.016964**	0.584	8.200	ug/L	556.744
	234	**U**	**0.000009**	412.282	7.133	ug/L	6.933
	235	**U**	**0.005289**	2.600	177.868	ug/L	49.467
	236	**U**	**-0.000018**	72.597	5.600	ug/L	6.267
	238	**U**	**0.925886**	2.063	20459.046	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.613**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-21-D

Sample Date/Time: Friday, August 22, 2014 00:04:02
Autosampler Position: 67
Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-21-D.101

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			678757.199	ug/L	707940.340
	233	**U**	**-0.017007**	0.074	6.667	ug/L	556.744
	234	**U**	**0.000042**	80.262	7.667	ug/L	6.933
	235	**U**	**0.012851**	4.645	347.804	ug/L	49.467
	236	**U**	**-0.000021**	189.868	5.200	ug/L	6.267
	238	**U**	**1.860448**	3.171	39226.923	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.878**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-22-D
Sample Date/Time: Friday, August 22, 2014 00:08:42
Autosampler Position: 68
Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-22-D.102

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			716936.927	ug/L	707940.340
	233	**U**	**-0.016905**	0.234	10.400	ug/L	556.744
	234	**U**	**0.000081**	85.058	9.200	ug/L	6.933
	235	**U**	**0.019155**	1.845	523.410	ug/L	49.467
	236	**U**	**-0.000023**	92.134	5.467	ug/L	6.267
	238	**U**	**2.782001**	0.643	61828.656	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.271**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Friday, August 22, 2014 00:13:23
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 9.103

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			686569.846	ug/L	707940.340
	233	**U**	**0.041331**	2.125	1834.585	ug/L	556.744
	234	**U**	**0.088408**	3.051	2230.708	ug/L	6.933
	235	**U**	**5.244255**	2.152	124082.518	ug/L	49.467
	236	**U**	**0.094321**	2.196	3444.416	ug/L	6.267
	238	**U**	**5.425269**	2.530	115049.774	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.981**	
	U	233		**80.255**
	U	234		**106.902**
	U	235		**108.185**
	U	236		**105.979**
	U	238		**107.946**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Friday, August 22, 2014 00:18:04
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 10.104

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			666246.257	ug/L	707940.340
	233	**U**	**0.014664**	7.148	968.833	ug/L	556.744
	234	**U**	**0.000106**	11.222	9.133	ug/L	6.933
	235	**U**	**0.004751**	36.603	156.868	ug/L	49.467
	236	**U**	**0.000074**	51.956	8.533	ug/L	6.267
	238	**U**	**0.007498**	21.425	477.075	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**94.111**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-23-D

Sample Date/Time: Friday, August 22, 2014 00:22:44

Autosampler Position: 69

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-23-D.105

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			680838.482	ug/L	707940.340
	233	**U**	**-0.016869**	0.262	10.933	ug/L	556.744
	234	**U**	**0.000074**	63.274	8.533	ug/L	6.933
	235	**U**	**0.008858**	1.444	255.602	ug/L	49.467
	236	**U**	**0.000012**	205.208	6.467	ug/L	6.267
	238	**U**	**1.373630**	2.211	29141.575	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.172**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 425544

Sample Date/Time: Friday, August 22, 2014 00:27:24
Autosampler Position: 70
Dataset File: D:\Elandata\Dataset\082114M2\425544.106

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			695743.270	ug/L	707940.340
	233	**U**	**-0.017005**	0.393	6.800	ug/L	556.744
	234	**U**	**-0.000030**	174.186	6.000	ug/L	6.933
	235	**U**	**-0.001619**	9.016	9.600	ug/L	49.467
	236	**U**	**-0.000006**	427.209	5.933	ug/L	6.267
	238	**U**	**-0.010768**	9.721	104.800	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.277**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 425545

Sample Date/Time: Friday, August 22, 2014 00:32:05
Autosampler Position: 71
Dataset File: D:\Elandata\Dataset\082114M2\425545.107

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			702729.918	ug/L	707940.340
	233	**U**	**-0.014122**	0.947	99.334	ug/L	556.744
	234	**U**	**0.043974**	1.958	1139.779	ug/L	6.933
	235	**U**	**2.603654**	1.844	63091.889	ug/L	49.467
	236	**U**	**0.047010**	1.404	1760.842	ug/L	6.267
	238	**U**	**2.694182**	1.400	58679.220	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.264**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-25-D

Sample Date/Time: Friday, August 22, 2014 00:36:45

Autosampler Position: 72

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-25-D.108

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			746209.654	ug/L	707940.340
	233	**U**	**-0.016919**	0.304	10.267	ug/L	556.744
	234	**U**	**0.000111**	92.201	10.267	ug/L	6.933
	235	**U**	**0.012859**	12.078	382.072	ug/L	49.467
	236	**U**	**0.000077**	20.416	9.667	ug/L	6.267
	238	**U**	**1.068924**	1.286	24941.514	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**105.406**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-25-D SD

Sample Date/Time: Friday, August 22, 2014 00:41:24

Autosampler Position: 73

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-25-D SD.109

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			704605.998	ug/L	707940.340
	233	**U**	**-0.017014**	0.258	6.667	ug/L	556.744
	234	**U**	**-0.000057**	44.990	5.400	ug/L	6.933
	235	**U**	**0.000768**	22.260	67.733	ug/L	49.467
	236	**U**	**-0.000003**	2250.071	6.133	ug/L	6.267
	238	**U**	**0.216999**	1.164	5052.961	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.529**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-25-E MS

Sample Date/Time: Friday, August 22, 2014 00:46:04
Autosampler Position: 74
Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-25-E MS.110

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			750580.893	ug/L	707940.340
	233	**U**	**-0.015859**	0.677	46.667	ug/L	556.744
	234	**U**	**0.015879**	0.632	444.540	ug/L	6.933
	235	**U**	**0.962833**	1.040	24968.768	ug/L	49.467
	236	**U**	**0.017282**	2.910	696.484	ug/L	6.267
	238	**U**	**2.080874**	0.663	48512.019	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**106.023**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-25-F MSD

Sample Date/Time: Friday, August 22, 2014 00:50:44

Autosampler Position: 75

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-25-F MSD.111

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			754895.660	ug/L	707940.340
	233	**U**	**-0.015910**	0.140	45.267	ug/L	556.744
	234	**U**	**0.016634**	4.250	467.408	ug/L	6.933
	235	**U**	**0.994051**	2.167	25907.486	ug/L	49.467
	236	**U**	**0.017864**	5.040	722.685	ug/L	6.267
	238	**U**	**1.942351**	2.704	45528.802	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**106.633**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-26-C
Sample Date/Time: Friday, August 22, 2014 00:55:24
Autosampler Position: 76
Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-26-C.112

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			741926.999	ug/L	707940.340
	233	**U**	**-0.016934**	0.197	9.733	ug/L	556.744
	234	**U**	**-0.000016**	365.074	6.800	ug/L	6.933
	235	**U**	**0.008077**	1.882	258.536	ug/L	49.467
	236	**U**	**-0.000034**	100.530	5.200	ug/L	6.267
	238	**U**	**1.258545**	4.748	29107.232	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**104.801**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-27-C
Sample Date/Time: Friday, August 22, 2014 01:00:04
Autosampler Position: 77
Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-27-C.113

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			643505.811	ug/L	707940.340
	233	**U**	**-0.016961**	0.107	7.667	ug/L	556.744
	234	**U**	**0.000278**	1.354	12.867	ug/L	6.933
	235	**U**	**0.035921**	2.603	841.758	ug/L	49.467
	236	**U**	**0.000007**	206.278	5.933	ug/L	6.267
	238	**U**	**4.175884**	1.267	83153.881	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**90.898**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-28-C
Sample Date/Time: Friday, August 22, 2014 01:04:45
Autosampler Position: 78
Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-28-C.114

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			708262.217	ug/L	707940.340
	233	**U**	**-0.016978**	0.297	7.933	ug/L	556.744
	234	**U**	**0.000023**	72.652	7.533	ug/L	6.933
	235	**U**	**0.007814**	3.729	240.135	ug/L	49.467
	236	**U**	**-0.000039**	32.973	4.800	ug/L	6.267
	238	**U**	**1.272168**	3.626	28082.854	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**100.045**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Friday, August 22, 2014 01:09:25
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 9.115

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			691307.973	ug/L	707940.340
	233	**U**	**0.040606**	4.862	1822.916	ug/L	556.744
	234	**U**	**0.086601**	2.621	2200.836	ug/L	6.933
	235	**U**	**5.170876**	2.526	123174.237	ug/L	49.467
	236	**U**	**0.093879**	2.732	3450.750	ug/L	6.267
	238	**U**	**5.369702**	2.257	114673.586	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.651**	
	U	233		**78.846**
	U	234		**104.717**
	U	235		**106.671**
	U	236		**105.482**
	U	238		**106.841**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Friday, August 22, 2014 01:14:06
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 10.116

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			698669.103	ug/L	707940.340
	233	**U**	**0.013819**	1.807	989.968	ug/L	556.744
	234	**U**	**0.000252**	79.928	13.067	ug/L	6.933
	235	**U**	**0.013987**	59.444	376.339	ug/L	49.467
	236	**U**	**0.000267**	45.914	15.867	ug/L	6.267
	238	**U**	**0.016441**	62.491	682.017	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.690**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-29-C

Sample Date/Time: Friday, August 22, 2014 01:18:46
Autosampler Position: 79
Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-29-C.117

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			717958.154	ug/L	707940.340
	233	**U**	**-0.016985**	0.245	7.733	ug/L	556.744
	234	**U**	**0.000040**	78.603	8.067	ug/L	6.933
	235	**U**	**0.008719**	3.872	266.136	ug/L	49.467
	236	**U**	**-0.000016**	182.132	5.733	ug/L	6.267
	238	**U**	**1.340324**	1.881	29998.279	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**101.415**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-30-C
Sample Date/Time: Friday, August 22, 2014 01:23:27
Autosampler Position: 80
Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-30-C.118

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			695665.587	ug/L	707940.340
	233	**U**	**-0.016946**	0.491	8.733	ug/L	556.744
	234	**U**	**0.000331**	39.056	15.200	ug/L	6.933
	235	**U**	**0.051615**	1.418	1286.991	ug/L	49.467
	236	**U**	**-0.000020**	144.140	5.400	ug/L	6.267
	238	**U**	**6.543627**	0.723	140660.880	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.266**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-34-C
Sample Date/Time: Friday, August 22, 2014 01:28:07
Autosampler Position: 81
Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-34-C.119

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			692128.117	ug/L	707940.340
	233	**U**	**-0.016991**	0.374	7.267	ug/L	556.744
	234	**U**	**0.000095**	24.795	9.200	ug/L	6.933
	235	**U**	**0.022226**	2.244	578.478	ug/L	49.467
	236	**U**	**-0.000033**	11.154	4.933	ug/L	6.267
	238	**U**	**2.934912**	1.361	62945.799	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.766**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-36-C

Sample Date/Time: Friday, August 22, 2014 01:32:48
Autosampler Position: 82
Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-36-C.120

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			705658.281	ug/L	707940.340
	233	**U**	**-0.016881**	0.389	10.933	ug/L	556.744
	234	**U**	**0.000149**	21.173	10.800	ug/L	6.933
	235	**U**	**0.021640**	1.405	575.678	ug/L	49.467
	236	**U**	**-0.000029**	185.681	5.133	ug/L	6.267
	238	**U**	**3.079154**	0.496	67335.368	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**99.678**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 430572
Sample Date/Time: Friday, August 22, 2014 01:37:28
Autosampler Position: 83
Dataset File: D:\Elandata\Dataset\082114M2\430572.121

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			745750.904	ug/L	707940.340
	233	**U**	**-0.017048**	0.210	5.933	ug/L	556.744
	234	**U**	**-0.000043**	75.766	6.133	ug/L	6.933
	235	**U**	**-0.001646**	13.176	9.600	ug/L	49.467
	236	**U**	**-0.000034**	117.008	5.200	ug/L	6.267
	238	**U**	**-0.011506**	12.378	95.267	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**105.341**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 430573
Sample Date/Time: Friday, August 22, 2014 01:42:08
Autosampler Position: 84
Dataset File: D:\Elandata\Dataset\082114M2\430573.122

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			740670.700	ug/L	707940.340
	233	**U**	**-0.014337**	1.069	97.400	ug/L	556.744
	234	**U**	**0.042113**	2.732	1150.380	ug/L	6.933
	235	**U**	**2.476627**	2.388	63244.394	ug/L	49.467
	236	**U**	**0.044175**	2.215	1743.773	ug/L	6.267
	238	**U**	**2.526845**	1.099	58035.672	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**104.623**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-31-D

Sample Date/Time: Friday, August 22, 2014 01:46:48

Autosampler Position: 85

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-31-D.123

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			682077.986	ug/L	707940.340
	233	**U**	**-0.016894**	0.265	10.200	ug/L	556.744
	234	**U**	**0.001285**	6.582	38.867	ug/L	6.933
	235	**U**	**0.123627**	0.872	2955.239	ug/L	49.467
	236	**U**	**0.000272**	28.701	15.867	ug/L	6.267
	238	**U**	**5.708249**	2.110	120391.459	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**96.347**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-31-D SD

Sample Date/Time: Friday, August 22, 2014 01:51:28

Autosampler Position: 86

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-31-D SD.124

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			697215.953	ug/L	707940.340
	233	**U**	**-0.017006**	0.060	6.867	ug/L	556.744
	234	**U**	**0.000222**	38.950	12.600	ug/L	6.933
	235	**U**	**0.023656**	3.413	616.813	ug/L	49.467
	236	**U**	**0.000017**	97.237	6.800	ug/L	6.267
	238	**U**	**1.156936**	2.140	25185.670	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.485**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-31-E MS

Sample Date/Time: Friday, August 22, 2014 01:56:08
Autosampler Position: 87
Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-31-E MS.125

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			687806.923	ug/L	707940.340
	233	**U**	**-0.015756**	1.104	46.133	ug/L	556.744
	234	**U**	**0.018108**	2.075	463.608	ug/L	6.933
	235	**U**	**1.121086**	0.424	26635.285	ug/L	49.467
	236	**U**	**0.018601**	1.991	685.683	ug/L	6.267
	238	**U**	**6.635647**	0.093	141041.309	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.156**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-31-F MSD

Sample Date/Time: Friday, August 22, 2014 02:00:48

Autosampler Position: 88

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-31-F MSD.126

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			687109.451	ug/L	707940.340
	233	**U**	**-0.015773**	0.903	45.400	ug/L	556.744
	234	**U**	**0.017895**	1.939	457.674	ug/L	6.933
	235	**U**	**1.104087**	0.343	26205.758	ug/L	49.467
	236	**U**	**0.018621**	1.713	685.816	ug/L	6.267
	238	**U**	**6.434770**	1.048	136620.275	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.058**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Friday, August 22, 2014 02:05:29
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 9.127

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			699511.731	ug/L	707940.340
	233	**U**	**0.040717**	4.013	1848.520	ug/L	556.744
	234	**U**	**0.086972**	2.549	2236.642	ug/L	6.933
	235	**U**	**5.123825**	3.237	123461.569	ug/L	49.467
	236	**U**	**0.092730**	2.045	3449.950	ug/L	6.267
	238	**U**	**5.323742**	2.691	115019.075	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**98.809**	
	U	233		**79.061**
	U	234		**105.166**
	U	235		**105.700**
	U	236		**104.191**
	U	238		**105.926**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Friday, August 22, 2014 02:10:09
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 10.128

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			687288.004	ug/L	707940.340
	233	**U**	**0.014559**	6.910	996.101	ug/L	556.744
	234	**U**	**0.000141**	28.040	10.267	ug/L	6.933
	235	**U**	**0.007813**	22.201	231.535	ug/L	49.467
	236	**U**	**0.000138**	23.424	11.133	ug/L	6.267
	238	**U**	**0.011536**	29.423	574.145	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.083**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	238	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-32-D

Sample Date/Time: Friday, August 22, 2014 02:14:48

Autosampler Position: 89

Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-32-D.129

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			675770.383	ug/L	707940.340
	233	**U**	**-0.016936**	0.097	8.800	ug/L	556.744
	234	**U**	**0.000294**	15.989	13.933	ug/L	6.933
	235	**U**	**0.033912**	0.689	837.358	ug/L	49.467
	236	**U**	**-0.000036**	22.197	4.667	ug/L	6.267
	238	**U**	**4.535803**	1.311	94800.111	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.456**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: 680-102327-A-35-D

Sample Date/Time: Friday, August 22, 2014 02:19:29
Autosampler Position: 90
Dataset File: D:\Elandata\Dataset\082114M2\680-102327-A-35-D.130

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			676090.402	ug/L	707940.340
	233	**U**	**-0.016889**	0.198	10.267	ug/L	556.744
	234	**U**	**0.000952**	10.843	30.200	ug/L	6.933
	235	**U**	**0.089959**	4.341	2142.494	ug/L	49.467
	236	**U**	**0.000075**	93.180	8.733	ug/L	6.267
	238	**U**	**6.113858**	4.213	127654.681	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**95.501**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 9
Sample Date/Time: Friday, August 22, 2014 02:24:10
Autosampler Position: 10
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 9.131

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			687032.039	ug/L	707940.340
	233	**U**	**0.042539**	5.294	1872.056	ug/L	556.744
	234	**U**	**0.089590**	2.510	2262.646	ug/L	6.933
	235	**U**	**5.317942**	2.042	125923.053	ug/L	49.467
	236	**U**	**0.096082**	3.060	3509.765	ug/L	6.267
	238	**U**	**5.461885**	2.140	115924.241	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.047**	
	U	233		**82.600**
	U	234		**108.331**
	U	235		**109.705**
	U	236		**107.957**
	U	238		**108.675**

QC Out Of Limits

Analyte	Mass	Out of Limits Message
U	233	Q

QUANTITATIVE ANALYSIS REPORT

Sample ID: QC Std 10

Sample Date/Time: Friday, August 22, 2014 02:28:50
Autosampler Position: 1
Dataset File: D:\Elandata\Dataset\082114M2\QC Std 10.132

Sample Result Summary

	Mass	Analyte	Conc. Mean	Conc. RSD	Meas. Intens. Mean	Sample Unit	Blank Intensity
>	165	**Ho (IS)**			687964.518	ug/L	707940.340
	233	**U**	**0.015476**	5.708	1027.570	ug/L	556.744
	234	**U**	**0.000144**	69.605	10.267	ug/L	6.933
	235	**U**	**0.005680**	17.990	182.001	ug/L	49.467
	236	**U**	**0.000141**	30.030	11.200	ug/L	6.267
	238	**U**	**0.008213**	16.675	505.942	ug/L	342.737

Internal Standard And QC Recoveries

	Analyte	Mass	Int Std % Recovery	QC Std % Recovery
>	**Ho (IS)**	165	**97.178**	
	U	233		
	U	234		
	U	235		
	U	236		
	U	238		

QC Out Of Limits

Analyte Mass Out of Limits Message

METALS BATCH WORKSHEET

Lab Name: TestAmerica St. Louis Job No.: 680-102600-4

SDG No.: 680102600-1

Batch Number: 138784 Batch Start Date: 08/19/14 10:39 Batch Analyst: Davis, Shanika M

Batch Method: 3050B Batch End Date: 08/19/14 15:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	FinalAmount	ISOU Prep Spk 00002			
MB 160-138784/1		3050B, 6020A		0.5107 g	50 mL				
LCS 160-138784/2		3050B, 6020A		0.5581 g	50 mL	0.25 mL			
680-102600-A-6	SD-278-SS	3050B, 6020A	T	0.5150 g	50 mL				
680-102600-A-6 MS	SD-278-SS	3050B, 6020A	T	0.5071 g	50 mL	0.25 mL			
680-102600-A-6 MSD	SD-278-SS	3050B, 6020A	T	0.5208 g	50 mL	0.25 mL			
680-102600-A-7	SD-278-01	3050B, 6020A	T	0.5474 g	50 mL				
680-102600-A-8	SD-278-02	3050B, 6020A	T	0.5470 g	50 mL				
680-102600-A-9	SD-278-03	3050B, 6020A	T	0.5872 g	50 mL				

Batch Notes	
Balance ID	27150548
Hydrogen peroxide lot number	408031
Lot # of hydrochloric acid	422962
Lot # of Nitric Acid	422893
Hot Block ID number	HOTBLOCK1
Oven, Bath or Block Temperature 1	95.0 Degrees C
Pipette ID	M-PREP-2
ID number of the thermometer	111815886
Digestion Tube/Cup Lot #	191064

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

Subcontract Data

Shipping and Receiving Documents

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Stu Cameron	Lab PM: Lanier, Jerry A	Carrier Tracking No(s):	COC No: 680-56831-24906.43
Client Contact: Mike Martin	Phone: (703) 342-8389	E-Mail: jerry.lanier@testamericainc.com		Page: Page [redacted] 1 of 1
Company: Tetra Tech, Inc.				Job #:
Address: 20251 Century Blvd Suite 200	Due Date Requested:			
City: Germantown	TAT Requested (days): Standard			
State, Zip: MD, 20874				
Phone:	PO #: Purchase Order not required			
Email: MIchael.Martin@tetratech.com	WO #:			
Project Name: Sediments	Project #: 68012942			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	680 - Local Method	A01R_Th - Standard Target List	6020, 7470A	GA_01_R_Ra - (MOD) Radium-226/228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
SD-278-SS	6/20/14	1000	C	Solid				X				
SD-278-01	↓	1005	C	Solid				X				
SD-278-02		1010	C	Solid				X				
SD-278-03		1015	C	Solid				X				
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								
				Solid								

Possible Hazard Identification

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements: 680 - 102600

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	[signature]	6/20/14 - 1100	TT	[signature]	6/23/14 09:00	TA
2						
3						

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 2.4, 2.2 C

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-102600-4
SDG Number: 680102600-1

Login Number: 102600
List Number: 1
Creator: Kicklighter, Marilyn D

List Source: TestAmerica Savannah

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	False	melted
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-102600-4
SDG Number: 680102600-1

Login Number: 102600
List Number: 2
Creator: Clarke, Jill C

List Source: TestAmerica St. Louis
List Creation: 06/24/14 02:13 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	4.8
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

APPENDIX D—REGULATORY AGENCY CORRESPONDANCE

MARYLAND DEPARTMENT OF THE ENVIRONMENT
1800 Washington Boulevard • Baltimore MD 21230
410-537-3000 • 1-800-633-6101 • www.mde.maryland.gov

Martin O'Malley
Governor

Anthony G. Brown
Lieutenant Governor

Robert M. Summers, Ph.D.
Secretary

December 10, 2014

Thomas D. Blackman
Project Lead, Environmental Remediation
Lockheed Martin Corporation
6801 Rockledge Drive, MP: CCT 246
Bethesda, Maryland 20817

Re: PCB contaminated sediment, Dark Head Cove removal project

Dear Mr. Blackman:

A review of the radiological data submitted to the Maryland Department of the Environment's Air and Radiation Management Administration by Lockheed Martin for the PCB contaminated sediment being dredged at its Middle River facility indicates that the radioactive material present is in concentrations that are very low or not detectable and is consistent with background concentrations of radioisotopes in the environment. The material is therefore not subject to Maryland's Radiation Regulations. Accordingly, the material should be handled as a toxic Substance Control Act (TSCA) regulated waste subject to disposal at a permitted Treatment Storage and Disposal Facility and transported by and manifested according to applicable regulations.

Should you have any additional questions concerning this matter, please contact Mr. James Carroll, Program Administrator, Land Management Administration, Land Restoration Program at (410) 537-3459.

Sincerely,

Angelo Bianco, Deputy Director
Air and Radiation Management Administration

AOC:
cc: Mr. Horacio Tablada
Mr. James Carroll
Mr. Mark Mank
Mr. Art O'Connell

McGee, Steve

From: Papura, Thomas R (DEC) <thomas.papura@dec.ny.gov>
Sent: Wednesday, December 03, 2014 1:30 PM
To: Bailey, Lawson
Cc: Argona, Andrew (aargona@wm.com); McGee, Steve
Subject: RE: Middle River Radiological Data

Lawson,

I have reviewed the site and composite data, focusing on the isotopic (Presuming Alpha Spectrometry) results for U-235 and U-238. Since there are no associated uncertainties with the results, I can only base my observations on the stand alone results.

That being said, on average, what I see is a ratio of ~20:1 for U-238 to U-235 on an activity/mass basis. This is normally indicative of natural Uranium. And especially considering the results. Which are in line with what I would expect from sediments and soils.

Hope this helps. If you need anything else, do not hesitate to contact me.

Tom

Thomas Papura
Environmental Radiation Specialist II
Contaminated Sites Group Leader
Remedial Bureau A
518-402-8783
thomas.papura@dec.ny.gov

From: Bailey, Lawson [mailto:Lawson.Bailey@tetratech.com]
Sent: Wednesday, December 03, 2014 11:09 AM
To: Papura, Thomas R (DEC)
Cc: Argona, Andrew (aargona@wm.com); McGee, Steve
Subject: Middle River Radiological Data

Tom,

We are beginning dredging operations at the Middle River facility next week and would like for you to take a final look at our laboratory data. The attached file contains the data I forwarded earlier in a little different format, but also includes some additional statistical modeling (ProUCL) and the inclusion of our site specific PRGs. While the sample area data is consistent with our background data, our reviews indicated that we had several U-235 percentages that were above our background levels. We would appreciate your taking another look at the data. We are available at your convenience to discuss the data.

Thanks for your help,

A wise man once said nothing

Lawson Bailey | Senior Health Physicist
Direct: 803.641.6326 | Main: 803.649.7963 | Cell: 706.830.7530 | Fax: 803.642.8454
Lawson.Bailey@tetratech.com

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